

People's Republic of Bangladesh
Ministry of Irrigation, Water Development
and Flood Control

Flood Plan Coordination Organisation

JAMALPUR PRIORITY PROJECT STUDY

Caisse Francaise de Developpement
and
Commission of the European Communities

FAP 3.1

FINAL FEASIBILITY REPORT

Annex 4 Modelling

January 1993



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Consortium

SOGREAH/ HALCROW/ LAHMEYER

in association with
Engineering & Planning Consultants Ltd.
AQUA Consultants and Associates Ltd.
and Service Civil International.

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PEOPLE'S REPUBLIC OF BANGLADESH
MINISTRY OF IRRIGATION, WATER DEVELOPMENT AND FLOOD CONTROL
FLOOD PLAN COORDINATION ORGANISATION

JAMALPUR PRIORITY PROJECT STUDY

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ANNEX 4

MODELLING

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SUMMARY AND CONCLUSIONS

General Comments

The mathematical model of the Jamalpur Priority Project Study area has been operational since January 1992 and is based on the MIKE-11 software of the SWMC. It uses information from their General Model of the major rivers of Bangladesh, together with the data from the similar Coarse Pilot Model constructed by the North Central Regional Study (FAP-3).

The initial model, constructed using the only data then available, was not accurate enough and further topographical and hydrological data were therefore required to improve its precision. These were collected during the extension period of the study i.e.

- topographical cross-sections and longitudinal profiles of the principal rivers and embankments within the area,
- hydrological surveys (seven gauge measuring points and four discharge measuring points) during the 1992 monsoon period,
- the Finmap topographical survey was not available in time and so the old map dating from 1960 (scale 4 inches to a mile) was used to obtain the elevation-area curves for the various cells.

The new reference model was entirely reconstructed by introducing the new data and validated by means of hydrological measurements during the 1992 monsoon.

Aim and Limitations of the Model

The ultimate aim of modelling, according to the terms of reference, is to model the effect of different development options, in terms of water elevation and discharges in the hydrographic network, flow rates through structures to be studied at preliminary design level and water management procedures. During the course of the study, the aim was to see how these would change the flooding conditions in the floodplain, in terms of water levels, duration and period, in order to convert these results into land types based on depths of flooding for the "with" and "without" Projects scenarios.

This latter exercise proved disappointing due to the basic philosophy of the model and, in this respect, it is worth recalling the following points:

- The mathematical model based on the MIKE-11 software is of the looped type, with topography being represented schematically. The pronounced micro-relief in the area and local development works carried out by farmers, which strongly affect the real classification of land types, cannot be taken into account with a sufficient level of detail by this model,

- The data available for validating the model vary from one year to another, in particular with respect to the breaches in existing embankments along the Jamuna,
- It is not possible to make a direct comparison between the distribution of actual agricultural land types and those calculated by the model from elevation-area curves. Indeed, the former are net cultivated areas, while the latter are gross areas.

Because of these different factors, it is essential to interpret the simulation results with caution, as far as calculating modifications in land type distribution is concerned. A special methodology was used, which considers the model results as only relative (and not absolute) values.

Validation of Reference Model

The reference model was validated mainly by using hydrological data from 1992. Unfortunately, the 1992 monsoon was particularly dry and the maximum water levels reached were about one metre lower than usual. The few data available for 1991 were also used. The maximum discrepancies between calculated and observed water levels were of the order of 20 cm, which is satisfactory in view of the accuracy of the topographical data and method of exploiting the model in relative terms.

Construction of Option B Models

The basic model for Option B was constructed by taking the reference model and introducing the Project embankments and the following gated structures:

- Islampur inlet
- Chatal inlet
- Jhenai inlet
- Jhenai/Chatal outlet, which operates as a flap gate, preventing water from downstream in the Jamuna from entering the embanked area

The minor structures were also introduced in localised groups.

Two other derived models were also constructed to carry out the following simulations:

- Option B without the Jhenai/Chatal outlet structure,
- Option B including only the length of the Jamuna embankment between its northern end and Maderganj (to represent an intermediate stage in the construction phase of the Project)

Methodology Adopted for Calculating Land Types

In view of the above considerations concerning the accuracy of the model and its limitations, a special methodology was applied to exploit the model results in relative terms and not as absolute values, in order to calculate the land type distribution.

The reference year was chosen from simulations of 8 years run on the reference model. 1977 was the year that gave the closest distribution to that actually assessed by the agronomists. In order to validate the selected reference year, tests were also performed to check that the results obtained concerning the new land type distributions with Option B remained similar with other years, confirming that 1977 is a good choice.

A results processing programme was written specifically to compute land type distribution using the model results (hydrographs) and area-elevation curves of the different cells.

Results Obtained

i) New Land Type Distribution for Option B

The new land type distribution for Option B (net cultivated areas) is as follows:

•	F0	55%
•	F1	38%
•	F2	7%
•	F3	0%

ii) Usefulness of Jhenai/Chatal Outlet Structure

The simulations run with and without the structure show that this outlet provides little improvement in the reference year. In contrast, it would have considerably limited flooding in 1988 and other high return period floods, and is recommended for inclusion in the scheme.

iii) Sizing of Structures

The size of the inlet structures was fixed with regard to the present river bed discharge capacities downstream the structures, so that present normal flooding conditions can be reproduced in the [W] situation. Details are given in Annex 7 on Engineering.

The size of the Chatal/Jhenai outlet structure was fixed according to magnitude of flows under the [WO] situation. The sizing was subsequently checked with model in order to assess the structure operation with regards to maximum acceptable need loss at the structure and the impact of reduced ventage. As a result a 25 vent

structure is proposed, it has a nominal capacity of 400 m³/s under 0.20 m head.

iv) Management of Structures

Once the project area is protected against high water levels in the Jamuna, the opening times in June do not affect the maximum water levels reached in August and September which will actually result from rainfall within the project embankments. Hydraulic management of these structures can therefore be based on local upstream and downstream water level criteria during the month of June.

Scheduling of Works

The simulations carried out on the model including a partial embankment along the Jamuna showed that the relative improvement in terms of flooded area is of the order of 30-35% of the improvement obtained between the reference situation and Option B.

1 GENERAL

1.1 Hydrodynamic Mathematical Model

The mathematical model of the Jamalpur Priority Project Study area has been operational since January 1992 and is based on the MIKE-11 software of the Surface Water Modelling Centre (SWMC) and uses information from their General Model of the major rivers of Bangladesh together with the data from the similar model, the coarse Pilot Model, constructed by the North Central Regional Study (FAP 3).

Initially, the general intention was to use the coarse Pilot Model established by FAP 3, and to refine it progressively. However, due to scarcity of field information it became clear that the results obtained would not be sufficiently accurate. It was therefore decided to extend the services for the JPPS, and to refine the model during this extension. Three factors have improved the model during the extension period:

- Topographic Survey of the irrigation area by Finnmap and site surveys.
- Hydrometric data including water levels and flow data from newly installed internal gauges operated during the extension period.
- Revised and more compartments in keeping with the Engineering option B5.

In the absence of Finnmap contour mapping, attempts have been made to overcome the lack of mapping by using the old 1960's Water Development 4 inch to the mile topographic maps with one foot contours, based on 1957 aerial photography, and by more extensive surveys. However, both these have severe limitations: the old mapping is clearly inaccurate in the Jamuna active flood plain, and out of data with regard to roads and homestead areas; site surveys are necessarily of limited extent, and can only depict a narrow strip, which may miss important features. This is more relevant to the modelling, since much of model output is based on area elevation curves which are at present derived primarily from the Old Water Development maps. To minimize errors, the Project Area is divided into nine cells and the area-elevation-capacity curve for individual cells have been prepared.

1.2 Purpose and Limits of Modelling

The ultimate aim of modelling, according to the terms of reference, is to model the effect of different development options, in terms of water elevations and discharges in the hydrographic network, flow rates through structures to be studied at preliminary design level and water management procedures.

To this end, the hydrodynamic model study had to take into account the boundary conditions based on 25 year model simulation by FAP 25 and also the boundary conditions on the south limit of Jamalpur area from the FAP 3 model.

The study has investigated changes in the flooding conditions on the flood plain, in terms of water level, duration and period in order to convert these results in terms of land types based on depth of flooding for the with and without project scenarios. Hence the financial benefits and disbenefits have been assessed to arrive at an overall development strategy for the area.

The determination of land type changes due to the project has proved difficult because of the inherent limitations of the model. The following points explain the difficulties involved:

- Regarding the model philosophy , MIKE 11 is looped model which represents the land topography, and more specifically, flooded lands, in a schematic way. As far as Jamalpur area is concerned, the micro topography is significative and it is represented globally and statistically. The simplification of the actual land topography is necessary in order to meet MIKE 11 constraints, and despite the simplification, the computer memory is used at more than 90% of its capacity.
- Regarding the available data for the model validation, it is necessary to underline that due to the variability of the topography, and more specifically the variability of the breaches in the existing embankments along the Jamuna, the model is theoretically valid only for the specific year of surveys used to provide the validation data.
- The comparison of reported agricultural data of land categories and those derived from the model results is complicated, because the actual categories are determined not only by the natural topography used for the construction of the model, but also by artificial obstacles which are not represented in the model. These obstacles include drains, bunds and embankments built by the farmers for the control of the water in their paddy fields and roads built for the access to the paddy fields.
- There are some difficulties regarding the accuracy of the data used for boundary conditions, as issued from FAP 25 calculations, compared to the accuracy required for the differentiation of land types . For example at Bahadurabad, the standard deviation of peak water elevations is 27 cm between observed and calculated data, which is the magnitude of the maximum flood depth for land category F0.



All these considerations mean that it is essential to exercise caution when interpreting the results of the simulations with regard to land types. However, it is reasonable to assume that the results remain valid provided that they are used to make an overall comparison of the reference situation with the chosen option, without treating the results as absolute.

In order to minimise the effect of distortions in comparisons between land type distributions in the original agricultural reference situation and land type distribution calculated by the model, a methodology has been developed to correct in relative terms the observed differences.

1.3 Flood Pattern Within The Area

The Jamalpur Priority Project Study area is dominated by the Jamuna river to the west and by the Old Brahmaputra river to the north-east. Two main distributaries drain the area: the Chatal, originating in the Jamuna, and the Jhenai, originating in the Old Brahmaputra. They join near the southern limit of the project area and then divide into two branches. One, carrying a rather limited discharge, flows southward to join other internal rivers of the NC region. The other flows back towards the Jamuna river. Excess water over the area is due to rainfall and to the other two outer major rivers flowing over bank. Flooding from the Old Brahmaputra does not occur frequently. Flooding from the Jamuna occurs more frequently. An embankment constructed along the left bank of the Chatal river apparently effectively protects the eastern part of the project area from some of the minor Jamuna floods. An embankment was constructed a few years ago closer to the Jamuna river. It had some effect over the area, but changes in the Jamuna deep channel morphology and other hydraulic conditions lead to consistent breaching of the embankment nearly every year. The without project scenario assumes that these two embankments are ineffective in preventing major floods.

1.4 MIKE 11 Software Package

The hydraulic simulation models for the area were constructed using the MIKE 11 software.

MIKE 11 is a software package developed at the Danish Hydraulic Institute (DHI) for the simulation of flows, sediment transport and water quality in estuaries, rivers, irrigation systems and similar bodies of water.

It is provided free of charge to consultants carrying out studies in Bangladesh. SWMC installed it on the FAP 3.1 computer in September 1991.

In addition to the hydrodynamic flow simulation model, MIKE 11 includes a module which simulates rainfall-runoff to calculate inflows to the model.

In the project area there are three rain gauges station, namely Jamalpur, Dewanganj and Sarishabari as indicated Appendix A on hydrology. Raw data of rainfall have been received from FAP 25 for hydrological analysis and for modelling purposes. Rainfall runoff result files NCRM.NRF, NAM file from 1986 to 1989) was used. For other years, rainfall-runoff files of FAP 3 were used.

2 METHODOLOGY

2.1 Methodology for Fixing the Flood Event

The general methodology adopted for the hydraulic model analysis are as follows:

- calibration of the model with 1992 and 1991 hydrometric data.
- Simulation of 8 years for the future "without project" situation (1977, 1980, 1987, 1988, 1989, 1990, 1991, 1992)
- Selection of a representative reference year from the analysis of the 8 year model results
- Appraisal of various development options, for selected years only
- Reference year run for the finally selected "with project" situations.

2.2 Selection of Representative Events

Data is available for a period of 25 years. Due to constraint of time and situation it was not feasible to go for full simulation of all the available years. Therefore the selection of particular years of record is justified. For the purpose of assessment of the present flooding problem, the main issue is the assessment of the depth and duration of major monsoon flooding, characterised by annual maximum peak river level and seasonal rainfall.

Considering years 1977, 1980, 1987, 1988, 1989, 1990, 1991 & 1992 it is found that significant amount of overlap exists among the years. A reasonable selection for analysis is assessed to be 1977, 1980, 1987, 1988, 1989, 1991 and the events include two of the worst on record and form a suitable basis for analysis and evaluation of flood events.

2.3 Study of the Options

2.3.1 Option A

Actually, Option A was not simulated. It is indeed impossible to carry out realistic simulations using a reference model that gives overall water storage values within the cells.

The accelerated drainage under option A involves the local improvement of drainage conditions, which cannot be represented at the level of accuracy of the model.

Realistic modelling of option A would require much more accurate knowledge of the topography than that adopted in the reference model, and in particular, knowledge of the topography of each depression and its outlet, which is impossible to achieve without computation facilities that are quite out of keeping with the scope of the present study.

2.3.2 Option B and Others

The mathematical model study involved establishing a reference model which was calibrated with 1992 monsoon data within the project area. The following scenarios were then modelled on the basis of the reference model.

Option B

Option B aims at assessing the feasibility of flood control within the project area. More specifically, the simulation principle is to admit floods into the project area during a fixed period and to secure a continuous receding flood level within the project area after the closure of the flood intakes. At Bausi bridge a maximum discharge of 50 m³/sec has been assumed towards the area south of the project area as per FAP 3 boundary condition.

Option B (Modified)

This option aims at assessing the effect of back flow from Jamuna in absence of Chatal/Jhenai drainage outlet structure.

Option B (First phase of embankment construction)

With this option, it is possible to assess the effect of a first phase of works in constructing the embankment along the Jamuna between its northern extremity and Maderganj.

2.4 Data Used to Improve the Accuracy of Model

Most of the data used to improve the accuracy of the model were provided by SWMC, FAP 3 and FAP 25.

Complementary data used were:

- (a) Topographical Surveys :
 - new cross-sections of internal rivers and main khals (92 Nos)
 - longitudinal profiles of existing road and railway embankment (83 Km)

- longitudinal profiles of existing embankments at the project boundaries.
- size and elevation of existing structures.

(b) Hydrological Data

In the 1992 monsoon, water level data and flow data were received from ten number gauging station that were installed in the project area during the extension period. Three were installed by BWDB and seven by FAP 3.1.

2.5 Construction of Reference Model

The reference model has been constructed on the basis of the following topographical survey data:

- for Chatal, Jhenai, Dadbhanga & Patherkata khals
- for other internal link channels hydraulic sections were calculated by dividing the area-elevation of the link catchment by the average length of channel
- for the existing embankment
- for the existing road embankments within the project area.
- the lateral storage areas derived from the 4" to a mile map were introduced into the model at calculation points.

The project area has been divided into cells which are physically divided by existing dykes, roads & railway embankments. This natural division was used as a basis for the construction of the model.

Rainfall run-off values were introduced at calculation points on the basis of the catchment area relevant to each point.

2.6 Boundaries

(a) Data

The model boundaries are provided with $Y(t)$ i.e. stage-time series observed relationships, with Y as absolute water level.

Three $Y(t)$ time series were used:

- Bahadurabad gauge observations were extrapolated for the $Y(t)$ fixings at the upstream end of the Jamuna branch of the model.

- Jagannathganj gauge observations are used for $Y(t)$ fixing at the downstream end of the Jamuna branch of the model
- Jamalpur gauge observations are used for $Y(t)$ fixing at the downstream end of the Old Brahmaputra

(b) Jamuna Boundary

The Jamuna has been introduced in the model to provide $Y(t)$ relationships for exchange paths between the Jamuna and the project area. This is necessary to avoid pre-processing of $Y(t)$ relationships in Bahadurabad and Jagannathganj and to avoid providing the model with multiple boundary files. Model output from run 6 and Option-3 of FAP-25 for $Y(t)$ has been used for the scenarios.

(c) Bausi Bridge Boundary

Two possible boundary conditions could be introduced at the Baushi bridge outlet:

- A condition of the $Y(t)$ type, identical to the three other model boundary conditions. This solution, which is technically the best, could not be used because the available data do not cover all the years to be simulated. Furthermore, option B involves limiting the flow rate at this point to $50 \text{ m}^3/\text{s}$. The same type of condition could therefore not be used in the reference model and option B, which could result in distortion when comparing the results
- A condition of the $Q(h)$ type in the reference mode. This is mathematically sound, provided that the flow rate is not influenced by downstream conditions. Analysis of the observations for 1992 (water levels and flow rates at this point) and satellite imagery of past floods showed little downstream influence, which is confirmed by satellite images showing that the downstream area remains unflooded, even during major floods.

It is this latter solution that has been adopted. It also has the advantage of being of the same type as that introduced into the model of option B.

(d) External Influences

For the simulations, the stage-time $Y(t)$ provide by FAP 25 takes into account the influences on water levels and discharges in the major rivers caused by the Jamuna left embankment and Jamuna bridge.



2.7 Model Validation

The model has been constructed so that the results of the simulation of the 1992 floods agree with the 1992 observed values of the water level on the internal gauge station. The comparison of the results of the model and observed values is given in appendix C1.

The discharge measurements performed in 1992 on the Chatal (Maderganj & Belamari), Dadbhanga and Jhenai are also compared to the simulation results. It can be concluded that the performance and the accuracy of the model is adequate for its use in this project.

Unfortunately, the levels reached by the 1992 flood are very much lower than those of a normal year, and the model's behaviour for higher levels could not be tested thoroughly and with the same degree of precision. The few data available for 1991 were nevertheless used. The results obtained are also given in appendix C1.

After the model validation, it can be assumed that the results are reliable for comparison between different calculations, especially when comparing the different scenarios with the without project scenario.

Curves showing a comparison between calculated and measured levels at points within the area are given below. They show maximum differences of ± 20 cm. Greater accuracy is impossible to obtain given the level of precision of the topographical data, and in particular the area-elevation curves for the cells. The important point with this type of model, which is used to make a relative comparison of results with and without the option, is its general behaviour in relation to the real situation. From this point of view, the setting is satisfactory.

2.8 Construction of Option Model

Construction of the option B model involved reusing and modifying the reference model as follows:

- replacement of the inlet weirs at the following points by gated structures:
 - Chatal inlet
 - Islampur inlet
 - Jhenai inlet
- replacement of all other weirs in connections between the Jamuna and Old Brahmaputra and within the area by culverts, in order to simulate the effect of minor flushing structures

- installation of a culvert at the Jhenai/Chatal outlet, operating as a flap gate and preventing water from being introduced from downstream
- modification of the Q(h) curve at Bausi bridge in order to limit the flow rate to 50 m³/s

Construction of the derived models involved modifying the option B or reference model:

- For option B with no structure at Jhenai/Chatal outlet, reusing the option B model and eliminating the structure
- For the model enabling simulation of flooding after implementation of the first phase of works:
 - Reusing the option B model along the Jamuna river between the northern end of the scheme and Maderganj
 - Reusing the reference model for the rest of the area

2.9 Methodology Adopted for Calculating Land Types

2.9.1 Definition of Land Types

Crop statistics and cropping distribution have been based on the flood phases, as such, the present situation regarding flood and drainage in the project area can be assessed from land classification related to the flood depth. Flood phases are categorised as follows:

- | | | | |
|---|----|----------------|-----------------------------------|
| • | F0 | Flood depth of | <0.3 m |
| • | F1 | Flood depth of | 0.3 m - 0.9 m |
| • | F2 | Flood depth of | 0.9 m - 1.8 m |
| • | F3 | Flood depth of | > 1.8 m for less than nine months |
| • | F4 | Flood depth of | >1.8 m for more than nine months |

2.9.2 Land Types Identified in the Field

The land type areas identified by field investigations and measured on the 1:50,000 maps produced by SRDI are representative of the crops traditionally grown in the regions considered.

In addition to the official definition based on water levels, this distribution takes into account the following factors:

- the pronounced micro-relief throughout the study area

- the ability of farmers to erect bunds, taking advantage of the micro-relief to carry out localised protection works and thus be in a position to cultivate F0 crops on F1 land, for example.

The figures represent net areas of cultivated land. They do not include inhabited or wooded areas, tracks, embankments, areas of deep water, etc.

2.9.3 Land Types Calculated by the Model

Interpretation of the results of the model is based on analysis of the area-elevation curves for each model cell, following the methodology explained in section 2.9.6. These curves are derived from a topographical map dating from 1960, to the scale of 4" to the mile. In contrast to the land types identified in the field, they cannot provide details on the micro-relief and localised works carried out by farmers.

In addition, the area-elevation curve cannot correctly represent beel areas situated at relatively high levels. Indeed, the beels are classified as F2, F3 or F4 according to their depth, but if they are at a relatively high altitude, they will be represented by the area-elevation curve as F0 or F1.

In order to test the sensitivity of the land type distribution to variations in water levels, the tables showing "Land type distribution according to assumed water level within the model cells" (see Appendix B) were calculated using the definition of the different land types. For each model cell, on the basis solely of the area-elevation curve, they give the theoretical distribution of the various land types for each water depth.

It can be seen from Table 4.2.1 that, in the range of normal flooding for each cell, a 10 cm variation in water level causes significant variations in land classification.

The distribution of land types is consequently highly sensitive to variations in water levels and this shows that the results of the hydraulic model, irrespective of its accuracy, must be taken as relative values, so as partly to eliminate systematic distortions.

2.9.4 Comparison of Land distribution Identified in the Field and Calculated by the Model

The foregoing considerations show that care must be exercised when comparing the different land types. The land types identified in the field apply to a net cultivated area, and are representative of the real reference situation.

In order to make a comparison, they must be referred to the same gross area. This transformation is not identical for all land types. The

difference between net cultivated area and total gross area must be distributed primarily:

- over the F0, in which are located all the inhabited areas and tracks (mainly in areas not subject to flooding)
- over the F2, F3 and F4, which include uncultivated areas of unconfined water (beels).

In order to carry out this transformation, the following coefficients were adopted:

- 50% of the difference between gross and net areas is added to the net areas classified as F0
- the remaining 50% is shared equally between F2 and F3/F4.

Table 4.2.2 gives the corrected percentages of gross areas according to this transformation criterion, for each thana.

These percentages will be used as a basis for selecting the reference year for comparing the various options.

However, it should be stressed that it is unrealistic to try to find a year which gives a distribution similar to that actually observed in the field, as various uncertainties are involved:

- The relative precision of the model results. It should be recalled that the results were validated primarily on the basis of 1992 hydrological measurements. In 1992, maximum water level were much lower than usual
- The relative precision of the area-elevation curves derived from the old 1960 topographical map (in the absence of the Finnmap survey)
- The presence of micro-relief, beels and development works carried out by the farmers, which are taken into account in the percentages obtained in the field surveys, but not in those derived from the model.

The methodology therefore involves performing various simulations to choose different and contrasting years, for which the necessary data are available, and then selecting the year which appears to coincide most nearly with the distribution actually observed in the field.

The results obtained by simulating the various options will be compared in relative terms to the simulated reference situation. A reverse transformation to that used in obtaining gross areas from net areas will

be performed to transform the gross areas calculated by the model into net cultivated by the model into net cultivated areas that can be used in the agricultural calculations.

2.9.5 Choice of Reference Year

The methodology adopted for selecting a reference year to be used in calculating the modifications in land type between the without-project situation and with-project situation involves simulating a number of years chosen from among those in which boundary conditions are available for the without-project and with-project situations. FAP 25 provides these conditions for with and without the FAP embankments-Jamuna bridge combined projects. It should be noted that the with Project simulations were made for the situation with both the embankments and the new bridge on the Jamuna. Data for the situation with embankments but without the new bridge are not yet available from FAP 25.

Table 4.2.3 shows the years which were simulated by the without option model, following validation. They were chosen according to the peak flood return periods established by FAP 25 in terms of maximum levels reached:

The distribution of land types throughout the area within the embankments was calculated for each simulation and for inundation times of 3 and 10 days. The results were then compared with the corrected agricultural data (gross areas - see para 2.9.4 above). The selection criterion adopted for the reference year is the standard deviation between the cultivated area values transformed into gross areas and the values calculated by the model. Table 4.2.4 (Land type distribution from model findings) summarises the results.

Analysis of the Table 4.2.4 shows the following:

- Irrespective of the year simulated, there is a severe distortion with regard to areas of F1. These remain relatively constant (22%) whatever the depth of water. This phenomenon can be seen from the shape of the area-elevation curves or from the tables of "Land type distribution according to assumed water level within the model cells". Because of the shape of the area-elevation curves of the cells, and in particular of the gradient of the central straight section, the agricultural values (35%) will never be reached, whatever the model results. This phenomenon may be explained when the Finnmap information is available.
- The year which has the smallest standard deviation with 10 days submersion is 1977. This year has been selected as reference year.

From the above, it is confirmed that model simulation results have a relative value and not an absolute value.

2.9.6. Processing of simulation results

A computer programme for processing the results of the various simulations has been especially written in order to assess the distribution of inundated areas for each computation cell and for each Thana, in each option.

On the basis of the area-elevation curves for the cells of the area concerned (and area-elevation curves of the sub-cells defined by the intersection of the hydraulic cells and thana) and corresponding hydrographs calculated by simulation, this programme can perform two types of computation:

- generate a table, giving the inundated areas in each hydraulic cell, each thana or for the entire area within embankments, according to the depth of water and submersion time
- generate tables giving the distribution of land types for each cell, each thana or for the entire area

Corresponding to each cell area-elevation curve is a hydrograph calculated by simulation at the representative point of the cell. Each area-elevation curve is stored in a separate file. There are nine model cell curves and area-elevation curves for the sub-cells at the intersection between cells and thana (totalling 22 sub-cells).

The hydrographs of the representative points are stored for each simulation in a single .TXT file generated by MIKE 11.

The algorithm for computing the inundated area as a function of depth and time of submersion is the following:

- introduction of the table of correspondence between area-elevation curve file names and corresponding hydrographs (from MIKE 11 computation); this table is stored in a special file for correction or reuse
- area-elevation
- hydrograph (from MIKE 11 computation)
- reading of files
- determination of flood start and end dates from the hydrograph file

- 29
- calculation of maximum level reached on the hydrograph, and of levels corresponding to submersion periods of 3, 5, 10, 20, 40, 60 and 90 days, by means of an iterative computation
 - iterative computation of flooded areas for various depths, by interpolating these into the area-elevation curves of the corresponding cells
 - consolidation of the various sub-tables in order to obtain a representative table for the entire area or for each thana.

An example of the results is given in Table 4.2.5. The full set of tables calculated for the requirements of the study is given in Appendix C3.

The land type calculation algorithm is based on the same principle:

For each computation block, based on the area-elevation curve and flood hydrograph at the representative point in the block, obtained by simulation, this programme calculated the respective areas of the various categories of land:

- F0 unflooded land or land inundated to a depth of less than 0.30 m
- F1 land inundated to a depth of 0.30 m to 0.90 m
- F2 land inundated to a depth of 0.90 m to 1.80 m
- F3 land inundated to a depth exceeding 1.80 m

together with the flood dates and durations.

The duration of submersion in days (d) for which the flood level is taken into account may be parameterised. The programme uses the following algorithm:

- introduction of the table of correspondence between area-elevation curve file names and corresponding hydrographs:
 - area-elevation
 - hydrograph (from MIKE 11 computation)

This table is stored in a special file for correction or reuse. It is the same as the one used for calculating flooded areas as a function of submersion time and depths.

- reading of files
- determination of flood start and end dates from the hydrograph file

- calculation of maximum water level and correction of this level by eliminating flood peaks lasting less than (d) days, by iterative calculation
- calculation of the areas of different categories of land by interpolation of the corresponding elevations on the area-elevation curve specified to the computation block considered
- calculation of land inundation start and end dates for the various water levels corresponding to the different categories of land.

Figure 4.2.1 shows the correlation between hydrographs and area-elevation curves.

An example of the results is given in Table 4.2.6. The various tables calculated for the requirements of the study are given in Appendix C3.

2.10 Methodology Adopted to Test The Utility of The Jhenai/Chatal Outlet Structure

The function of the structure located downstream of the project area is to control the discharge of water into Jamuna while at same time preventing backflows from the river.

Several simulations were run:

- with the structure for the reference year
- without the structure for the reference year
- with the structure for an exceptional year (1988)
- without the structure for the same exceptional year (1988)

The various solutions are compared on the basis of water levels immediately upstream of the structure and on the basis of the areas flooded (see Section 3.2).

2.11 Methodology Adopted to Test The Sizing and Hydraulic Management of the Structure

Bearing in mind that the selected option is a controlled flooding option, the preliminary size of inlet structures was fixed on the basis of the flows entering the area in the without project situation, so that rivers downstream these structures can flow at full bank level. Discussion and justification of this is included in Annex 7 on Engineering.

It was then confirmed with the model that the flows introduced were sufficient to ensure adequate water levels in the cells, particularly during the month of June.

The sizes of the outlet structures i.e. Jhenai/Chatal outlet and Bausi Bridge outlet, were fixed on the following basis:

- Jhenai/Chatal outlet: results of the model regarding the flow leaving the area in the without project situation.
- Bausi Bridge outlet: restriction of the flow to 50 m³/s as per assessment made by FAP 3.

Subsequently simulations were run to test the size of the structures with respect to the resulting maximum head loss through the Jhenai/Chatal outlet during monsoon and the incremental head loss for reduced/increased discharge capacities at this outlet structure.

Two sets of simulations were carried out:

- One set concerning the reduction of ventages at Jhenai/Chatal outlet with a restricted discharge at Bausi Bridge (50 m³/s)
- One set concerning the reduction of ventage at Jhenai/Chatal outlet without flow restriction at Bausi bridge.

From the management point of view, several simulations were run with progressively longer opening times during the month of June. Opening times of two weeks and one month were adopted in order to analyze the difference in behaviour of the system.

2.12 Methodology Adopted to Evaluate The Effect of Partial Construction of The Embankment Along The Jamuna

A specific model was built to simulate this case (cf. section 2.8). The simulations for the reference year and exceptional year (1988) enable comparisons to be made between these different situations.

3 RESULTS AND INTERPRETATION OF VARIOUS SIMULATIONS

3.1 Calculation of new Land Type Distribution for Option B

The various curves and results tables are given in Appendix C3 to this Annex.

Table 4.3.1 summarises the new distribution for the entire area inside the embankments and gives the standard deviation for choosing the reference year. 1977, with a maximum submersion time of 10 days, is the year with the smallest standard deviation. It has therefore been chosen as the reference year. It corresponds to a flood peak return period of about 1 in 5.

The new distribution of land types corrected with respect to the net agricultural area is given in Table 4.3.2.

To confirm the distribution obtained, the years 1980 (10 days), 1987 (2 days) and 1988 (10 days), with standard deviations again close to the minimum, were also simulated. The values obtained for the net cultivated areas are shown in Table 4.3.3.

Table 4.3.3 shows that the differences from one year to another, in the case of the closest years to the agricultural distribution actually observed, are not very far from one another, confirming that 1977 is a good choice of reference year.

Land type distribution calculations for all of the Thana are set out in Appendix C3.

3.2 Usefulness of the Jhenai/Chatal Outlet

Analysis of the simulation results in terms of water levels immediately upstream of the structure site, with and without the structure, shows that the difference is relatively slight (of the order of 10%) for the reference year.

This phenomenon can be explained by the fact that inflow into the area as a result of rainfall is sufficient to fill the low-lying part of the area at a speed almost equivalent to that of the rise in the Jamuna.

In contrast, in an exceptional year such as 1988, the difference reaches one metre and this would have been enough to prevent the catastrophic flooding within the embanked area.

In terms of flooded area, the difference between the with and without structure situations for the reference year is 600 ha, with a maximum submersion time of 3 days.

3.3 Sizing and Managements of Hydraulic Structures

3.3.1 Sizing of Structures (see appendix D 6)

(i) General

The model was used to check that the nominal discharge through the structures were indeed complied with, taking into account actual operation of the structures and in particular hydraulic effects from downstream.

The real discharge through the structures fluctuates considerably with upstream level variations in the Jamuna or the Old Brahmaputra, causing significant changes in head loss in the structures.

In option B simulations, the minor flushing structures remained open throughout. This hypothesis is justified by the fact that these structures are widespread and can only be managed in a simple way based on local water level criteria (upstream or downstream), which will not necessarily respond to requirements further away. This hypothesis is slightly unfavourable, as it introduces an additional flow to that produced by rainfall (between 50 to 100 m³/s depending on water level conditions in main rivers). In reality, even if the operating instructions are not followed, these structures will definitely be closed in the event of a flood or heavy rains. This hypothesis was considered for the sake of caution.

(ii) Reduction of vantage at Jhenai/Chatal outlet - Base case

In the base case, the outlet at Bausi Bridge is designed for a fixed discharge of 50m³/s. This limitation has been assessed by FAP 3 as the maximum discharge acceptable for the requirements of PU 2 of the North Central Region. The following simulations were carried out with the 1977 hydrological data:

- RUN 1- No vantage reduction at Jhenai/Chatal outlet.
See fig. 4.3.1

It appears that for 25 vents (or 400 m³/s nominal discharge under 20cm head) the head loss through the Jhenai/Chatal outlet can reach a peak value of 48 cm, when the discharge through the structure is 600 m³/s.

This simulation shows that under the proposed Jhenai/Chatal outlet, due to the construction of the embankment and structures, the free flow conditions from the Jhenai/Chatal river system toward the Jamuna are altered. With respect to free flow

conditions, the 48 cm head loss through the structure represents an additional water depth on the mainland side of the embankment. The fig 4.3.1 shows that the additional water depth for a minimum duration of 10 days is of the order of 30cm. The average head loss from June to October is 10cm.

- RUN 2 - 25% Ventage reduction at Jhenai/Chatal outlet.
See fig. 4.3.2

In RUN 2, the Jhenai/Chatal outlet size is reduced by 25% (19 vents structure). As a result of this restriction of the structure capacity, the maximum head loss is 78 cm, i.e. 30cm more than for RUN 1. With respect to free flow conditions, the additional water depth for a minimum duration of 10 days is 55 cm. The average head loss from June to October is 20 cm i.e. 10 cm more than for RUN 1.

- RUN 3 - 50% Ventage reduction at Jhenai/Chatal outlet.
See fig. 4.3.3

In RUN 3, the Jhenai/Chatal outlet size is reduced by 50% (13 vents structure). As a result of this restriction of the structure capacity, the maximum head loss is 128 cm i.e.80 cm more than for RUN 1. With respect to free flow conditions, the additional water depth for a minimum duration of 10 days is 100 cm. The average head loss from June to October is 33 cm i.e. 23 cm more than for RUN 1.

Recapitulation of simulation results.			
	Peak Head loss (cm)	10 days Head loss (cm)	Average Head loss (cm)
RUN 1	48	30	10
RUN 2	78	55	20
RUN 3	128	100	33

- Impact on the agricultural production

From the area/elevation curves of the concerned model cells (C1, C2, C3) it appears that for an absolute water level at 15 m, an increment of 10 cm of the water depth will affect the following area:

C1	330 ha
C2	205 ha
C3	<u>465 ha</u>
Total	1000 ha out of a total of 30,000 ha, gross area.

On this basis, a 25% reduction of the structure capacity would affect an incremental 2500 ha gross area as a result of an increased water depth of about 25 cm, considering a minimum duration of 10 days. For a 50% reduction, the affected area is 7000 ha.

In order to justify the proposed sizing, it is necessary to compare the saving on the Jhenai/Chatal outlet cost for a 25% ventage reduction to the loss of agricultural gross margin on the area affected by an increased water depth.

Cost of Jhenai/Chatal outlet: Tk 164.3 million

Saving for 25% size reduction: Tk 41.0 million

- Affected gross area 2500 ha
- Affected net area (74%) 1850 ha

For a rough estimate and considering the shape of the area/elevation curves it will be assumed that the transfer of land categories due to increased water depth will be a reduction of 1850 ha on F0 area, no change in F1 area (linear section of the area/elevation curves) an increase of 925 ha on F2 and an increase of 925 ha on F3.

Based on the data of the economic analysis, the resulting loss of financial gross margin per ha can be calculated as follows:

- Yearly gross margin F0 25,560 Tk/ha
- Yearly gross margin F2 15,232 Tk/ha
- Yearly gross margin F3 9,700 Tk/ha

$$\text{Yearly loss} = 25,560 - \frac{(15,232 + 9,700)}{2} = 13,094 \text{ Tk/ha}$$

$$\text{i.e. } 13,094 \times 1,850 = \text{Tk } 24.2 \text{ million}$$

Even without capitalising the value, this yearly loss on the financial gross margin represents more than 50% of the saving on the outlet structure. This result is self explanatory, it shows that the 25% reduction of ventage is not acceptable on a financial basis. On a social basis, any structure which would entail excessive head loss and increased water depth in the fields would not be accepted by the population, as assessed on other projects where public cuts to embankments have been experienced. As discussed with FPCO, the proposed sizing, which implies a limited 30 cm at 10 days, would be acceptable.

- (iii) Reduction of ventage at Jhenai/Chatal outlet - no restriction at Bausi Bridge

- RUN 4, 5 and 6

For 1977 hydrological year, 3 simulations were carried out in order to assess the impact of the proposed discharge limitation at Bausi Bridge on the flooding conditions within the embanked area. Three runs were carried out, with the following ventages at Jhenai/Chatal outlet : 25 vents (design size, RUN 4) 19 vents (25% reduction, RUN 5), 13 vents (50% reduction, RUN 6). At Bausi Bridge, the flows have been simulated without restriction and without downstream influence on the discharge (water level downstream the structure not affected by the topography or flooding conditions). This last arbitrary assumption has to be taken into account for the analysis of the simulation results and for the formulation of the conclusions.

The comparison of the results of the 3 Runs with the proposed base case RUN 1 is as follows : (See figures 4.3.4, 4.3.5 and 4.3.6)

Recapitulation of simulation results				
	Peak Head loss (cm)	10 days Head loss (cm)	Average Head loss (cm)	Differential between Max/Min head (cm)
RUN 1	48	30	10	70
RUN 4	27	12	3	120
RUN 5	42	20	5	135
RUN 6	68	40	10	160

The above table shows the significant consequences of the flow restriction at Bausi Bridge.

First consequence: To drain the project area and to maintain similar peak flood level within the embankment to the same extent as in, RUN 1, it would be possible to reduce the size of the Chatal outlet structure by about 35% ,if the Bausi Bridge remains as it is now (without a 50 m³/s limitation imposed).

Second consequence: The restriction of the discharge of Bausi Bridge would aggravate the general flooding situation within the

JPPS project area. The differential between the maximum and minimum head recorded during the simulation period is 120 cm when the Bausi Bridge outlet flows freely (RUN 4) and 70 cm with the 50 m³/s restriction (RUN 1). This is on the assumption already stated that there is no downstream influence on the discharge at Bausi Bridge outlet and therefore that the drainage of the project area is more favourable in the Jhenai river downstream Bausi bridge than in the Jamuna river.

(iv) Conclusions

The above analysis is based on 1977 hydrological year which has a 1 to 5 year return period. For hydrological years having an higher return period, the magnitude of the simulation results would be amplified and the following conclusions would likely be strengthened.

From a financial and social point of view, the proposed size of Jhenai/Chatal outlet, 25 vents for a nominal discharge of 400 m³/s under 25 cm head, is acceptable.

As regards to Bausi Bridge, it will be necessary at detailed design stage to re-assess the impact of the development of PU 2 on the JPPS. The JPPS model should be extended in order to integrate the topography of the Jhenai river downstream of Bausi Bridge and subsequent feasibility studies of FAP 3 for PU 2 should aim at limiting any discharge restriction at Bausi Bridge (accurate assessment of Jhenai full bank capacity, construction of embankment to contain higher discharges, etc).

3.3.2 Management of Structures

The with-project simulations show that, once the Jamuna in flows are controlled, the maximum water levels within the project area are reached in August and September due to the influence of rainfall. The type of management applied to all the larger structures, which are open only during June, will not therefore interfere with the maximum flooding levels which define the land type distribution. Under these circumstances, management of all the structures can remain fairly flexible, depending on local requirements, as long as the project area is protected against the high water levels in the Jamuna.

As far as the three large inflow structures and minor flushing structures are concerned, there are two criteria to follow:

- A sufficient flow must be introduced in June to meet the requirements of agriculture, fisheries etc and a sufficient level of water must be maintained in the internal rivers.

- Inflows must be restricted when external levels in the Jamuna and Old Brahmaputra are high. In the event of sudden floods, these structures must be closed.

These management criteria, and in particular the upstream and downstream set levels, will have to be finalised for each of the structures in the detailed design study phase, according to the actual location and final setting of the structures. They must be set out in the scheme's management manual.

The upstream and downstream levels, along with the relevant discharges, are contained in Appendix C6.

3.4 Work Schedule

Simulation with the partial embankment along the Jamuna between the extreme northern end of the project area and Maderganj shows that the relative improvement in terms of flooded area is of the order of 30% to 35% of the improvement obtained between the reference situation and option B.

The flooded areas for the reference year under the three situations are as follows:

- | | | |
|----------------------|---|-----------|
| ● Without option | : | 50,640 ha |
| ● Option B | : | 33,840 ha |
| ● Partial embankment | : | 44,800 ha |

TABLES



Table 4.2.1 Percentage Variation of Land Classification Areas resulting from a 10 cm change in Flood Depth

Model Cell	Land Classes			
	F0	F1	F2	F3 + F4
C1	5	1	2	2
C2	3	2	3	2
C3	4	1	1	2
C4	6	1	5	1
C5	4	1	2	1
C6	4	0.5	2	1
C7	1	1	1	2
C8	4	0.5	2	1
C9	3	0.5	2	1
Note This table shows absolute values (%) which may represent plus or minus variations in land classification.				

Table 4.2.2 Land Classification (% Gross Area) by Thana

Thana	Land Classes			
	F0	F1	F2	F3 + F4
Jamalpur	40	15	34	11
Sarishabari	44	32	20	4
Melandaha	34	38	18	10
Islampur	25	39	29	7
Dewanganj	42	19	34	6
Madarganj	32	41	19	9
TOTAL AREA	34	23	23	9

Table 4.2.3 Water Level Return Periods

Year	Return Period at Bahadurabad (years)
1977	4.1
1980	6.4
1987	1.5
1988	59.5
1989	1.2
1990	1.02
1991	5.0
1992	1.0

Table 4.2.4 Land Distribution from Model Findings

AREA WITHIN EMBANKMENTS WITHOUT OPTION										

* LAND TYPE *										

* F0	* F1	* F2	* F3	* TOTAL						
* area (Ha)	* area (Ha)	* area (Ha)	* area (Ha)	* area (Ha)	* area (Ha)	* area (Ha)	* area (Ha)	* area (Ha)	* area (Ha)	* area (Ha)
* %	* %	* %	* %	* %	* %	* %	* %	* %	* %	* %

*Reported area										
* Net cult.area	14219	28%	22874	46%	11132	22%	1928	4%	50153	100%
										* Gr-Net
* Gross/net coef.	50%		0%		25%		25%			
* Gross area	22045	34%	22874	35%	15045	23%	5841	9%	65805	100%
										15652

*Model calculation										
*(gross area)										
										*Stand.
										*deviat.

*1977										
*3 days mx fld dur	21710	33%	14458	22%	18096	27%	11541	18%	65805	100%
*10 days mx fld dur	24193	37%	14513	22%	17251	26%	9848	15%	65805	100%
										5309
										4885

*1980										
*3 days mx fld dur	18062	27%	14474	22%	19230	29%	14039	21%	65805	100%
*10 days mx fld dur	26379	40%	14577	22%	16266	25%	8584	13%	65806	100%
										6541
										4915

*1987										
*3 days mx fld dur	21471	33%	14727	22%	18389	28%	11218	17%	65805	100%
*10 days mx fld dur	29757	45%	14837	23%	14824	23%	6387	10%	65805	100%
										5167
										5577

*1988										
*3 days mx fld dur	9561	15%	11013	17%	21901	33%	23331	35%	65806	100%
*10 days mx fld dur	21826	33%	14692	22%	18673	28%	10614	16%	65805	100%
										12742
										5073

*1989										
*3 days mx fld dur	38549	59%	13098	20%	10606	16%	3553	5%	65806	100%
*10 days mx fld dur	43158	66%	11476	17%	8564	13%	2608	4%	65806	100%
										9911
										12531

*1990										
*3 days mx fld dur	39819	61%	12370	19%	10026	15%	3590	5%	65805	100%
*10 days mx fld dur	42257	64%	11672	18%	8886	14%	2990	5%	65805	100%
										10683
										12042

*1991										
*3 days mx fld dur	23121	35%	14442	22%	17550	27%	10692	16%	65805	100%
*10 days mx fld dur	32495	49%	14458	22%	13338	20%	5514	8%	65805	100%
										5051
										6765

*1992										
*3 days mx fld dur	50764	77%	8450	13%	4829	7%	1762	3%	65805	100%
*10 days mx fld dur	55290	84%	6107	9%	3181	5%	1228	2%	65806	100%
										16984
										19675

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Table 4.2.5 Main Findings from MIKE 11 Outputs - Flood Depth/Area Characteristics - Without Project

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *								*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*

* 0.00	* 506.37	* 498.26	* 484.65	* 414.15	* 325.08	* 230.22	* 137.68	*
* 0.15	* 475.18	* 466.18	* 450.97	* 379.72	* 289.28	* 197.37	* 114.33	*
* 0.30	* 440.95	* 431.37	* 416.12	* 344.86	* 252.42	* 166.14	* 93.63	*
* 0.45	* 405.78	* 396.25	* 380.44	* 309.27	* 217.24	* 137.19	* 75.25	*
* 0.60	* 369.93	* 360.40	* 344.26	* 271.98	* 185.59	* 112.19	* 60.02	*
* 0.75	* 333.25	* 323.43	* 306.93	* 235.10	* 156.35	* 90.59	* 47.98	*
* 0.90	* 296.37	* 286.96	* 270.99	* 201.79	* 129.30	* 72.61	* 38.27	*
* 1.05	* 261.12	* 251.44	* 234.89	* 171.57	* 105.80	* 57.07	* 25.16	*
* 1.20	* 225.56	* 216.36	* 201.88	* 144.35	* 84.66	* 41.73	* 20.93	*
* 1.35	* 194.06	* 185.42	* 172.03	* 119.41	* 63.65	* 32.63	* 16.94	*
* 1.50	* 164.77	* 157.00	* 145.03	* 93.25	* 51.11	* 25.76	* 14.10	*
* 1.65	* 135.03	* 128.03	* 117.27	* 75.63	* 40.54	* 19.32	* 11.59	*
* 1.80	* 113.01	* 106.38	* 96.41	* 60.92	* 31.69	* 16.33	* 8.26	*
* 1.95	* 92.63	* 86.85	* 78.33	* 48.96	* 25.07	* 12.23	* 7.30	*
* 2.10	* 75.03	* 69.85	* 62.42	* 38.52	* 18.86	* 10.38	* 0.00	*
* 2.25	* 59.97	* 56.06	* 50.27	* 30.01	* 15.90	* 8.51	* 0.00	*
* 2.40	* 48.02	* 44.43	* 39.26	* 22.96	* 13.10	* 0.00	* 0.00	*
* 2.55	* 37.68	* 35.06	* 31.13	* 17.54	* 9.80	* 0.00	* 0.00	*
* 2.70	* 29.62	* 27.11	* 21.90	* 14.47	* 8.30	* 0.00	* 0.00	*
* 2.85	* 21.05	* 19.59	* 17.91	* 10.66	* 0.18	* 0.00	* 0.00	*
* 3.00	* 17.23	* 16.09	* 14.47	* 8.80	* 0.00	* 0.00	* 0.00	*
* 3.15	* 12.46	* 11.63	* 10.68	* 0.31	* 0.00	* 0.00	* 0.00	*
* 3.30	* 10.23	* 9.59	* 8.84	* 0.00	* 0.00	* 0.00	* 0.00	*
* 3.45	* 8.67	* 8.39	* 0.49	* 0.00	* 0.00	* 0.00	* 0.00	*
* 3.60	* 0.46	* 0.35	* 0.05	* 0.00	* 0.00	* 0.00	* 0.00	*
* 3.75	* 0.03	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*
* 3.90	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*
* 4.05	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*
* 4.20	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*
* 4.35	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*
* 4.50	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*
* 4.65	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*

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Table 4.2.6 Main Findings from MIKE 11 Outputs - Land Type Distribution - Without Project

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 3 days

* Cell	* Max fld	* Flooded	* F0	* F1	* F2	* F3+F4	* Total
* name	* elev.	* grd level	* (ha)	* (ha)	* (ha)	* (ha)	* (ha)

* C1	* 16.28	* 16.26	* 2469	* 2158	* 1960	* 860	* 7447
			* (33%)	* (29%)	* (26%)	* (12%)	* (100%)
* C2	* 16.13	* 16.11	* 1444	* 1226	* 1936	* 840	* 5446
			* (27%)	* (23%)	* (36%)	* (15%)	* (100%)
* C3	* 16.36	* 16.35	* 7394	* 2961	* 3346	* 3392	* 17093
			* (43%)	* (17%)	* (20%)	* (20%)	* (100%)
* C4	* 17.49	* 17.49	* 1210	* 2413	* 2001	* 240	* 5865
			* (21%)	* (41%)	* (34%)	* (4%)	* (100%)
* C5	* 17.62	* 17.62	* 609	* 766	* 1378	* 1415	* 4169
			* (15%)	* (18%)	* (33%)	* (34%)	* (100%)
* C6	* 17.54	* 17.54	* 1331	* 772	* 105	* 477	* 3685
			* (37%)	* (21%)	* (29%)	* (13%)	* (100%)
* C7	* 19.18	* 19.14	* 0	* 176	* 1395	* 1968	* 3539
			* (0%)	* (5%)	* (39%)	* (56%)	* (100%)
* C8	* 17.70	* 17.69	* 3866	* 2484	* 3224	* 1659	* 11233
			* (34%)	* (22%)	* (29%)	* (15%)	* (100%)
* C9	* 18.79	* 18.77	* 3387	* 1501	* 1805	* 690	* 7383
			* (46%)	* (20%)	* (24%)	* (9%)	* (100%)

		* TOTAL	* 21710	* 14458	* 18096	* 11541	* 65805
			* (33%)	* (22%)	* (27%)	* (18%)	* (100%)

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Table 4.3.1 Main Findings from MIKE 11 Outputs - Land Type Distribution - With Project

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

* Cell *	* Max fld *	* Flooded *	* F0 *	* F1 *	* F2 *	* F3+F4 *	* Total *	
* name *	* elev. *	*grd level*	(ha) *	(ha) *	(ha) *	(ha) *	(ha) *	

* C1 *	* 15.96 *	* 15.81 *	* 4124 *	* 1686 *	* 1251 *	* 386 *	* 7447 *	
* C2 *	* 15.94 *	* 15.79 *	* 2033 *	* 1483 *	* 1456 *	* 474 *	* 5446 *	
* C3 *	* 15.95 *	* 15.80 *	* 10126 *	* 2459 *	* 2462 *	* 2047 *	* 17093 *	
* C4 *	* 17.47 *	* 17.41 *	* 1495 *	* 2395 *	* 1789 *	* 186 *	* 5865 *	
* C5 *	* 16.17 *	* 16.09 *	* 2806 *	* 946 *	* 413 *	* 4 *	* 4169 *	
* C6 *	* 16.25 *	* 16.19 *	* 3014 *	* 420 *	* 188 *	* 9 *	* 3631 *	
* C7 *	* 18.16 *	* 18.11 *	* 614 *	* 1246 *	* 1414 *	* 265 *	* 3539 *	
* C8 *	* 16.24 *	* 16.17 *	* 9623 *	* 1016 *	* 556 *	* 38 *	* 11233 *	
* C9 *	* 17.36 *	* 17.34 *	* 6607 *	* 515 *	* 177 *	* 83 *	* 7382 *	

* TOTAL *			* 40442 *	* 12166 *	* 9705 *	* 3492 *	* 65805 *	
			* (61%) *	* (18%) *	* (15%) *	* (5%) *	* (100%) *	

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Table 4.3.2 Adjusted Land Categories Distribution - Option B

Model reference year : 1977

*Sl *No	Name of Thana	(a) F0	(b) F1	(c) F2	(d) F3	* *	(e) TOTAL	* *
1	JAMALPUR	2365	1316	679	0	*	4360	*
2	SARISHABARI	1327	889	310	0	*	2526	*
3	MELANDAHA	10781	6424	774	0	*	17979	*
4	ISLAMPUR	5743	3669	396	0	*	9808	*
5	DEWANGONJ	2248	567	52	0	*	2867	*
6	MADERGONJ	4986	6015	1519	90	*	12610	*
TOTAL CULTIVATED		27450	18880	3730	90	*	50150	*
NET AREA		55%	38%	7%	0%	*	100%	*

Table 4.3.3 Model Results - Land Classification

Year	Flood duration (days)	F0 (%)	F1 (%)	F2 (%)	F3 (%)
1977	10	55	38	7	0
1980	10	58	31	10	1
1987	3	52	36	12	1
1988	10	63	30	8	0

FIGURES

CORRELATION BETWEEN HYDROGRAPH AND AREA/ELEVATION CURVE

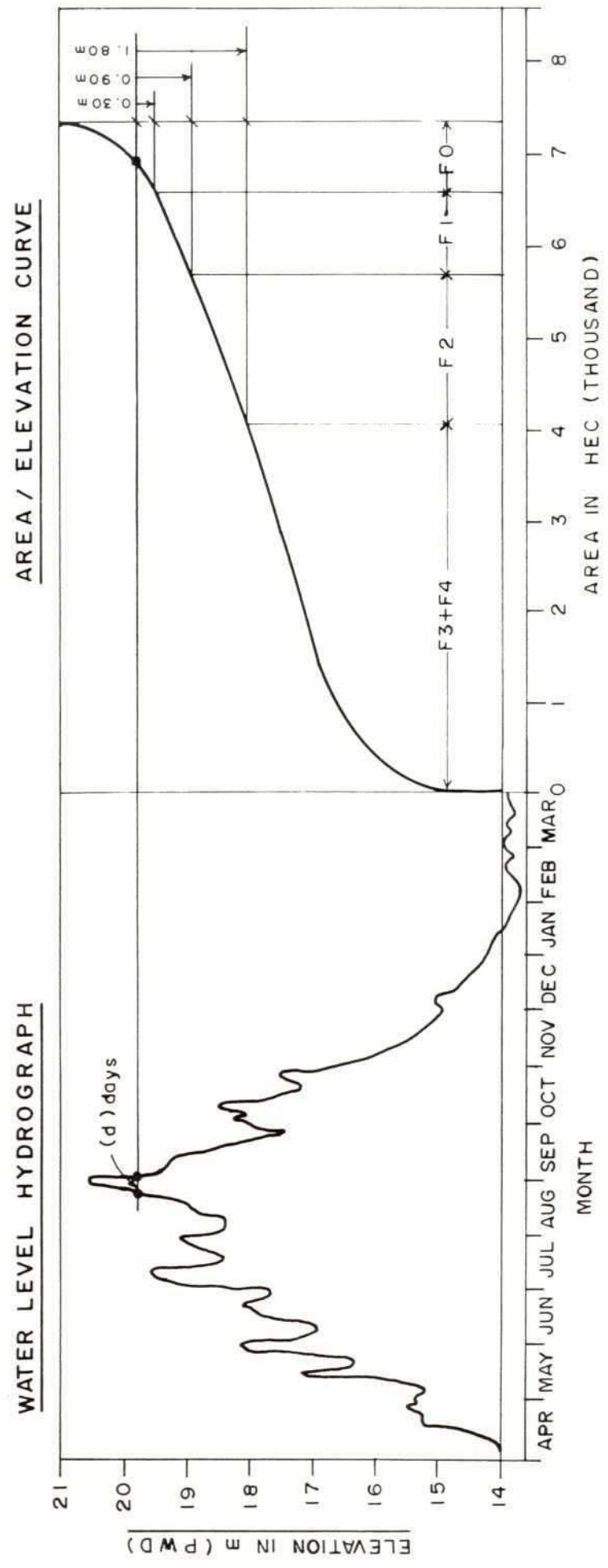


FIGURE 4.3.1

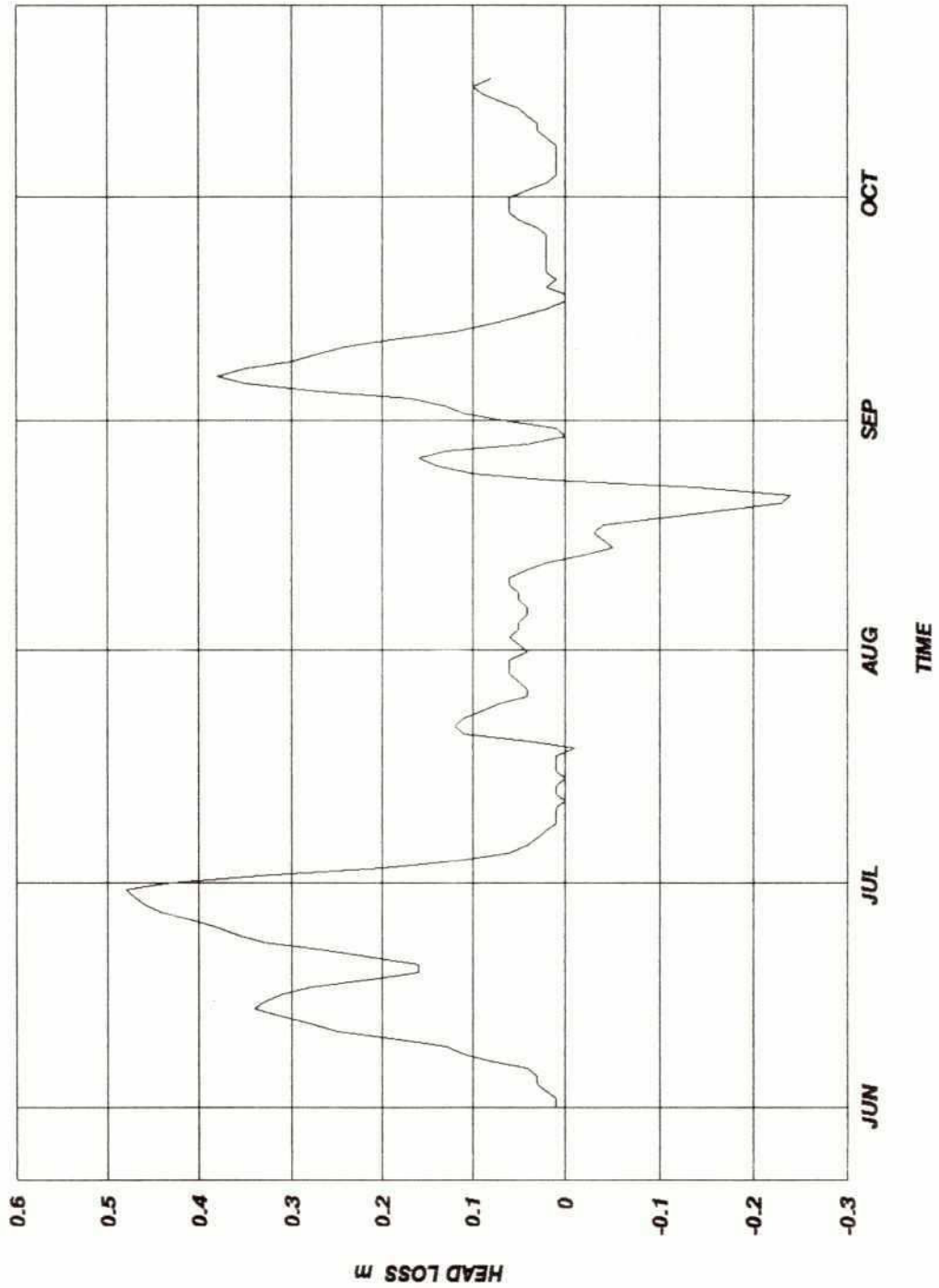
JAMALPUR PRIORITY PROJECT STUDY**NO VENTAGE REDUCTION RESTRICTION AT BAUSHI**

FIGURE 4.3.2

JAMALPUR PRIORITY PROJECT STUDY
25% VEGETATION REDUCTION RESTRICTION AT BAUSHI

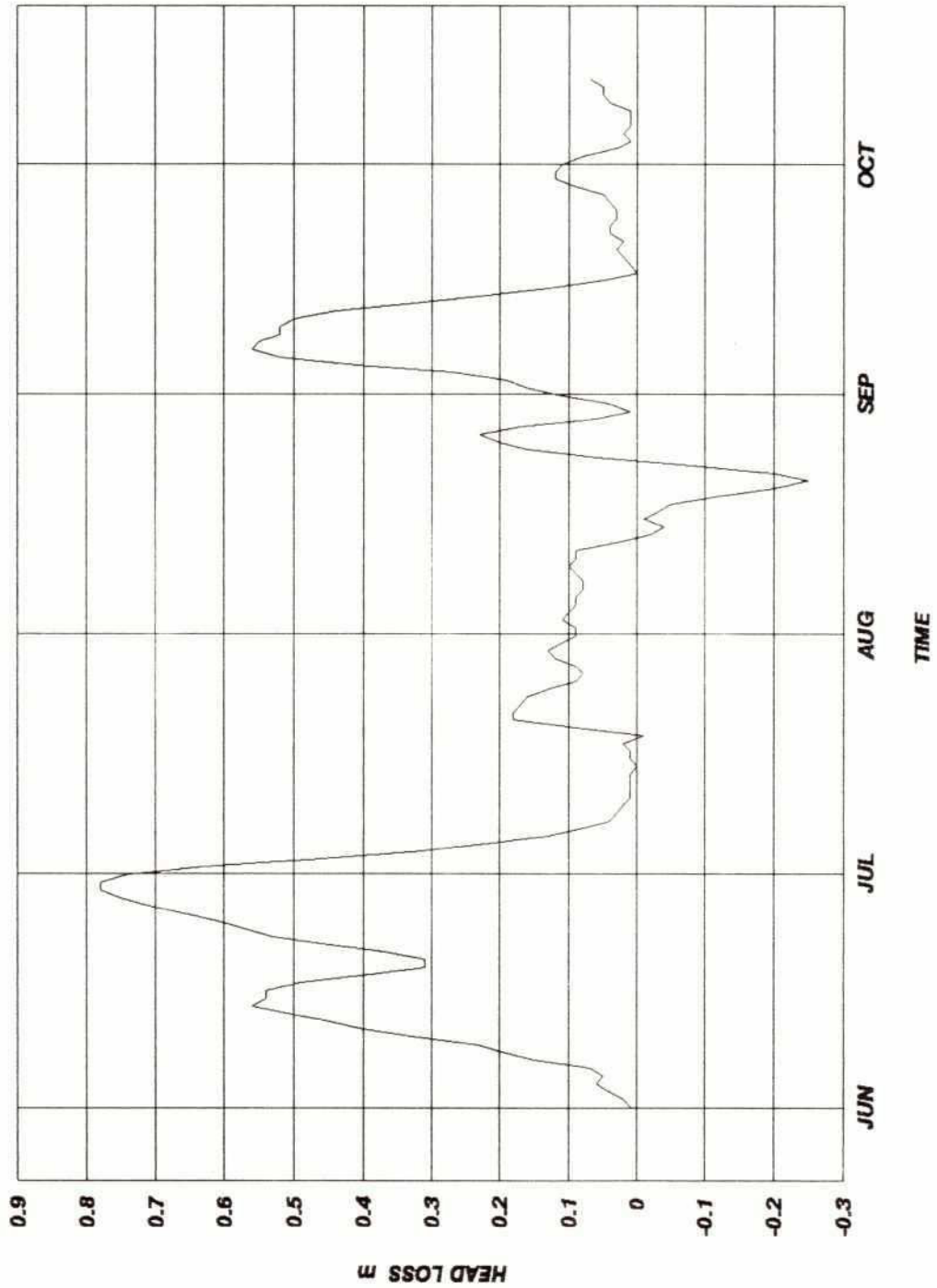


FIGURE 4.3.3

JAMALPUR PRIORITY PROJECT STUDY
50% VENTAGE REDUCTION RESTRICTION AT BAUSHI

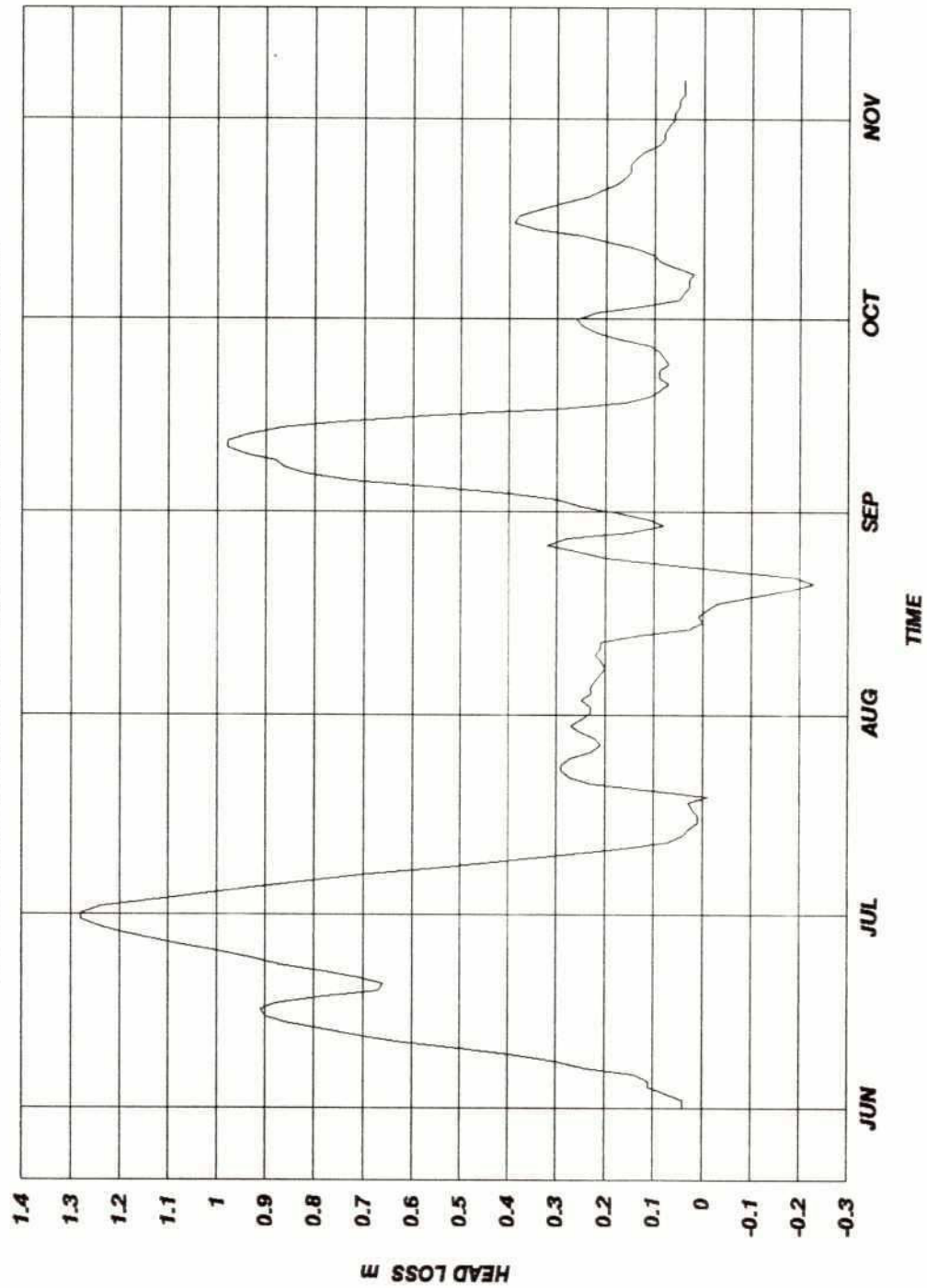


FIGURE 4.3.4

JAMALPUR PRIORITY PROJECT STUDY
NO VENTAGE REDUCTION NO RESTRICTION AT BAUSHI

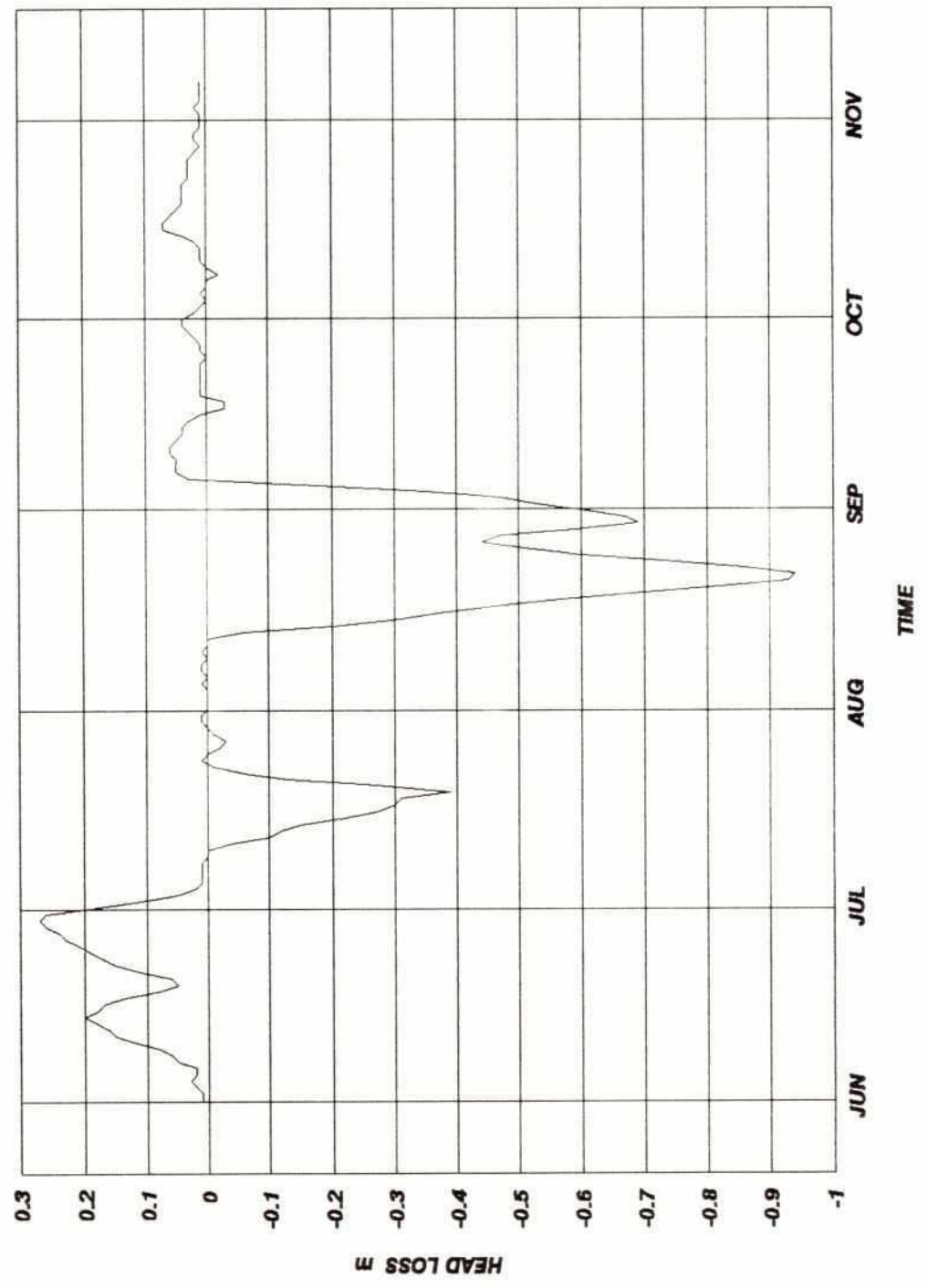


FIGURE 4.3.5

JAMALPUR PRIORITY PROJECT STUDY

25% VENTAGE REDUCTION NO RESTRICION AT BAUSHI

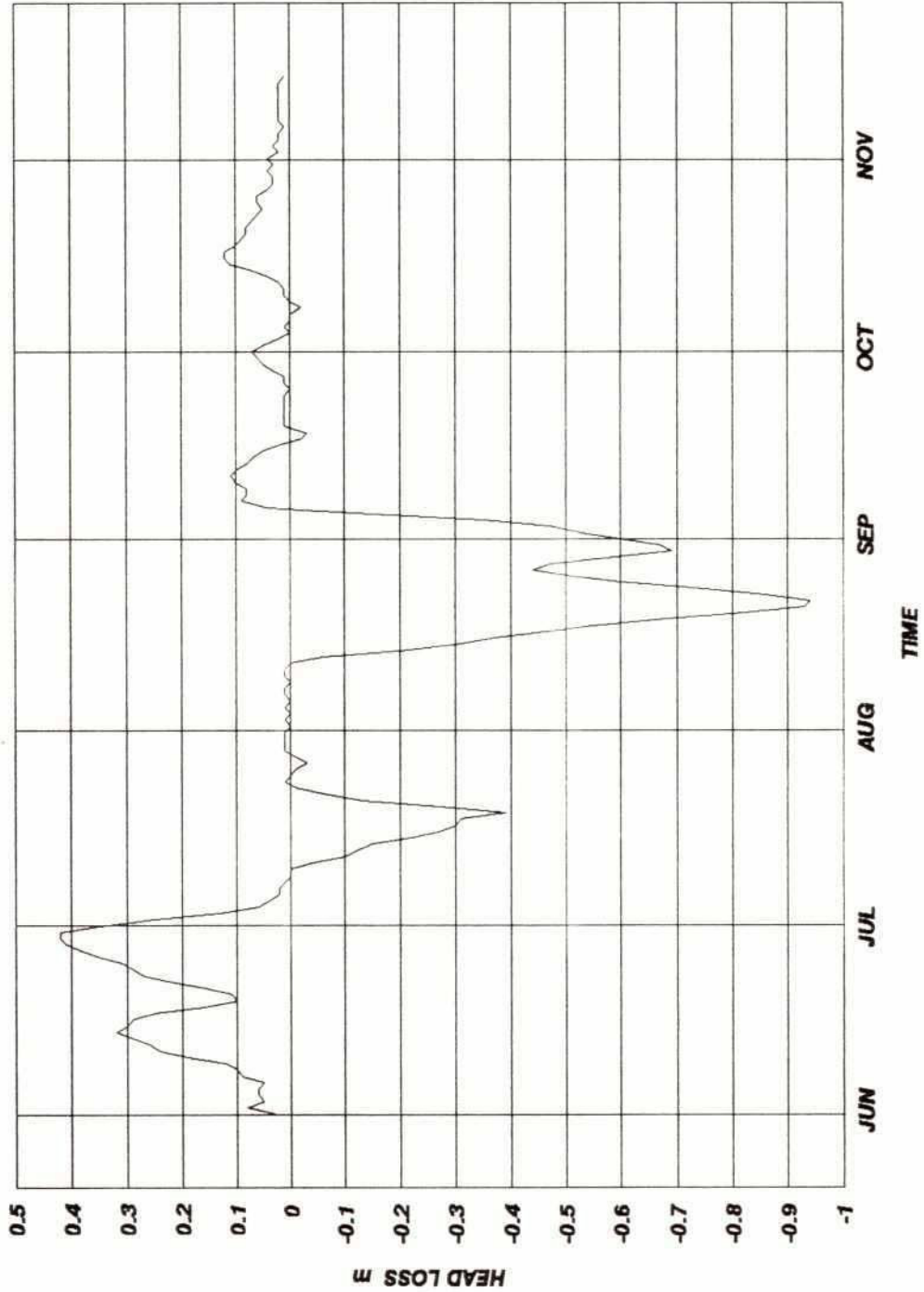
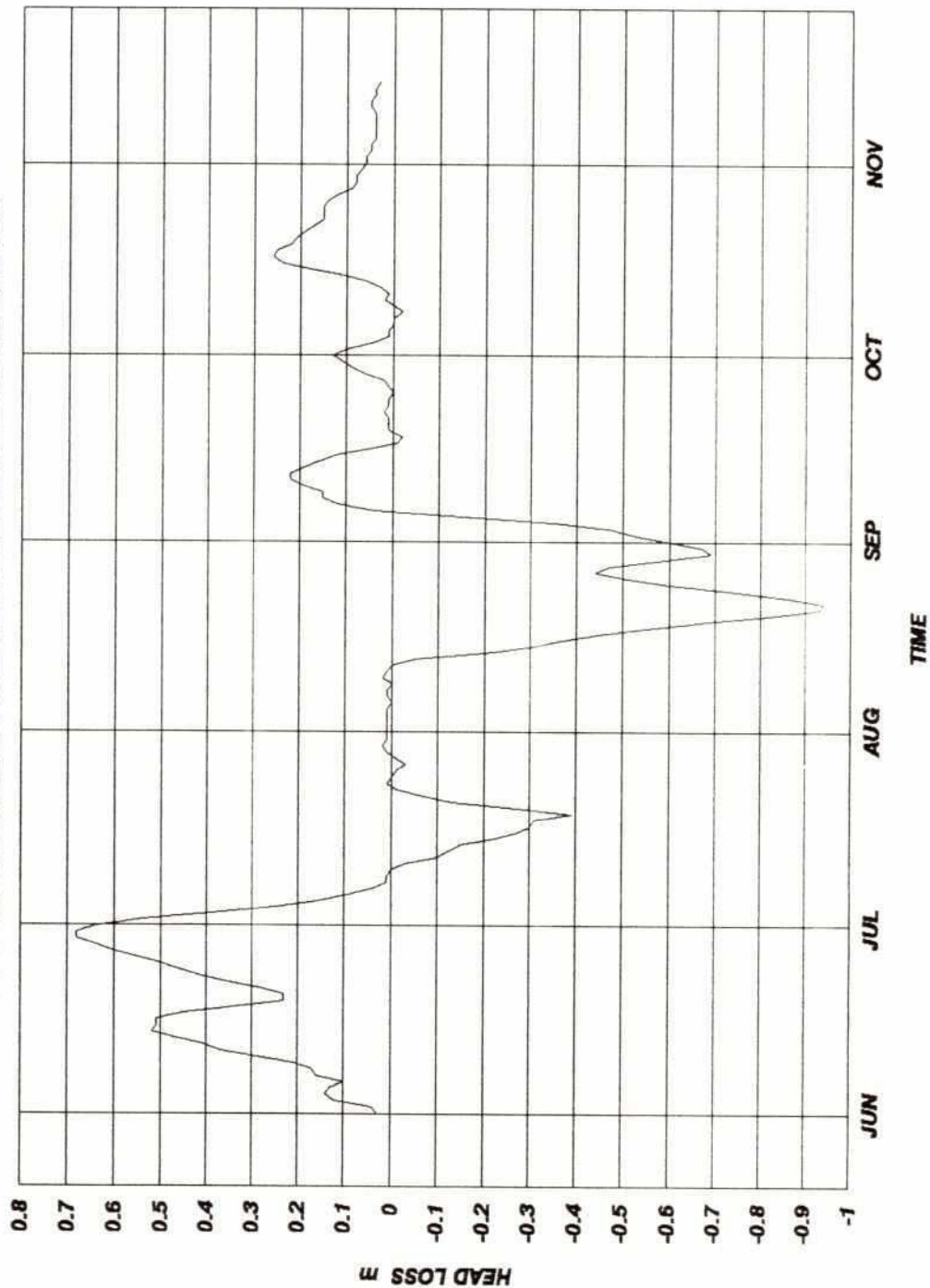


FIGURE 4.3.6

JAMALPUR PRIORITY PROJECT STUDY
50% VENTAGE REDUCTION NO RESTRICTION AT BAUSHI



APPENDICES

APPENDIX - A

HYDROLOGICAL DATA REVIEW

APPENDIX A

HYDROLOGICAL DATA REVIEW

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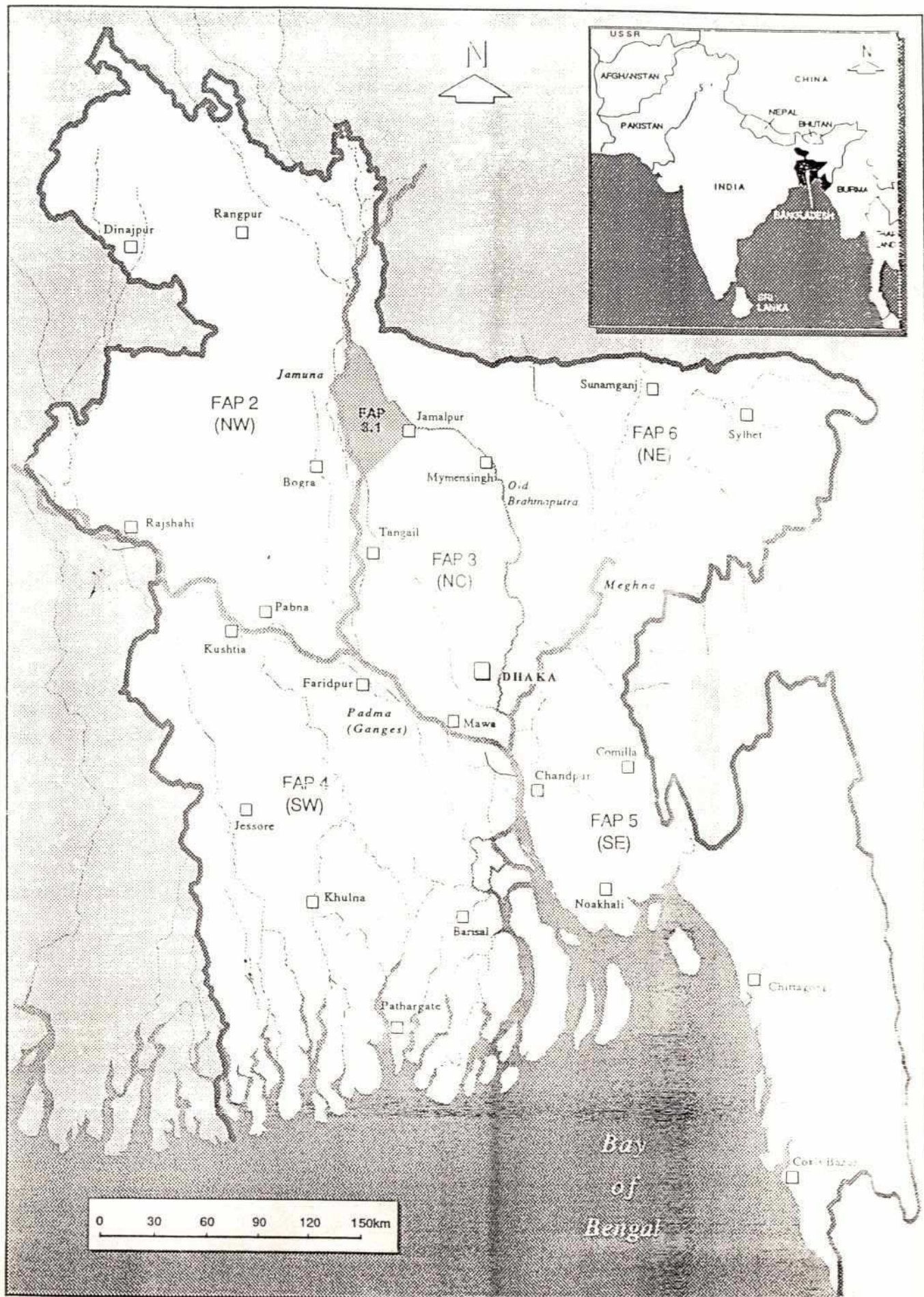
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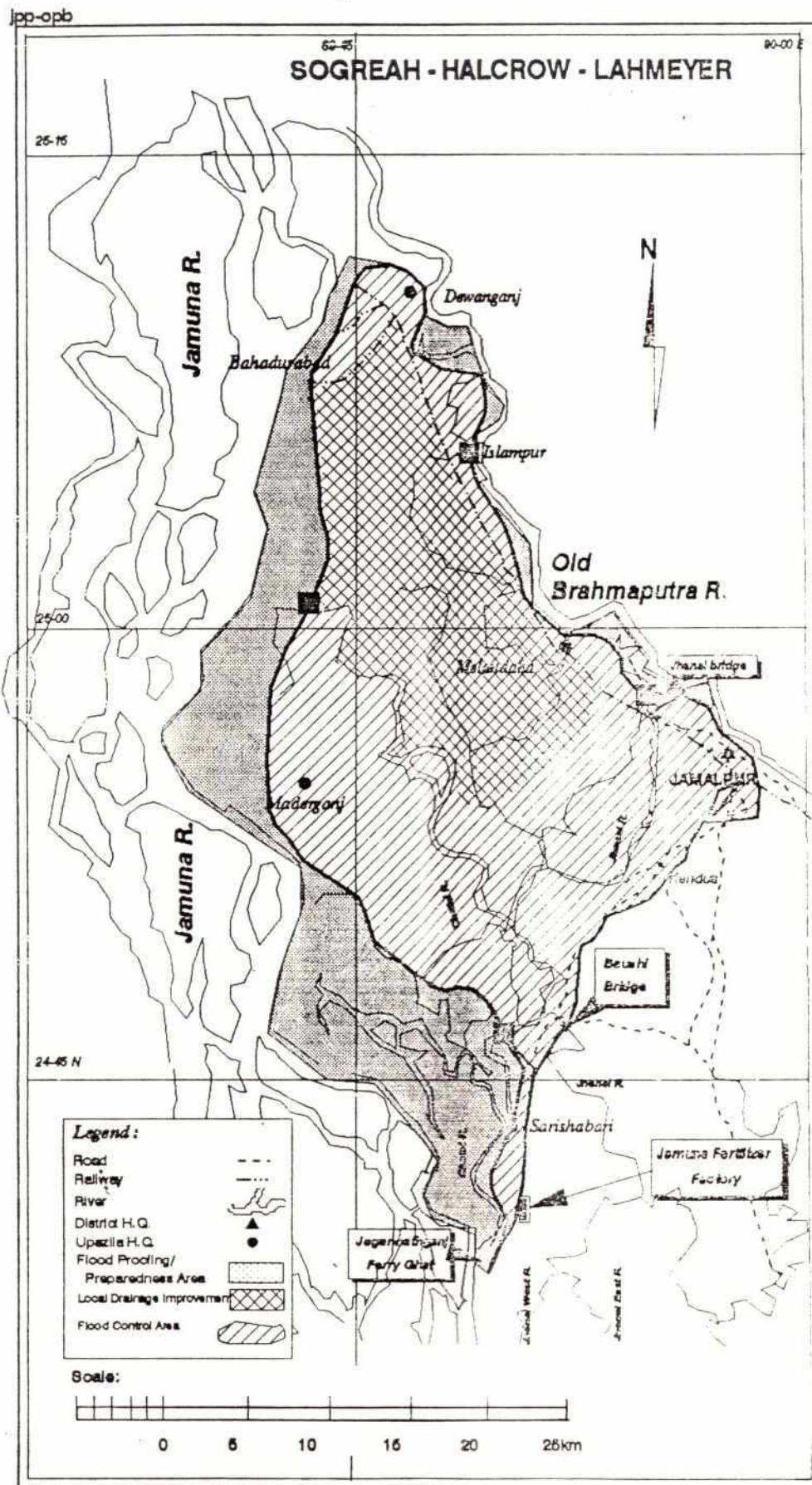
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A.1 HYDROLOGICAL ANALYSIS AND DESIGN

A.1.1 Introduction

On priority basis the Jamalpur area has been taken as the first project in the Flood Action Plan for feasibility study. The studies will undertake wide range of disciplines to achieve an integrated development of the area. This is a Flood Control and Drainage project, where river flooding will be prevented by peripheral embankments, and internal run-off generated during the monsoon will be drained out through sluices by gravity drainage. Such FCD scheme will be required flood protection and drainage improvement works in which hydrological data information and processing play a vital role for the optimal selection of design criteria.

A.1.2 Objective

The primary objectives of this working paper in the context of feasibility study of Jamalpur project area are to provide required hydrological parameters for the hydrodynamic modelling, geo-morphological studies in relation to bank the movement of the Jamuna river and the engineering studies. Also to provide rainfall, water level and flow analysis data required for the design of embankments, drainage channels, hydraulic structures & river bank protection works and other related specialist study.

A.1.3 River & Channel System

(i) Background

The Jamalpur Priority Project area is bordered by two rivers, the Jamuna in the west and Old Brahmaputra in the north east. The Old Brahmaputra which branches from the Jamuna near Dewanganj, has only a little run-off during the dry season because the off-take is silted up and the inflow ceases every year on January. The Zinziram river, a northern tributary of the Jamuna, gives the only surface water inflow during the dry season, but this inflow is minor. However, during the rainy season the Old Brahmaputra is feed directly from the Jamuna.

The Project area itself is crossed by two water courses flowing southward: in the west, the Chatal a tributary of the Jamuna, partially closed recently by an embankment. The Chatal drains into the Jamuna. In the east, the Jhena a

distributary of the Old Brahmaputra. A small part of the Jhenai flow joins the upper Bangsi and the other part flows to the south through the Baushi Railway bridge. Both water course are seasonal and become almost dry during the winter season.

(ii) Prediction of Flood Flow

Prediction of river flow is based upon the records of the past. The accuracy of such prediction depends upon the sophistication and accuracy of observations and measurements.

It is very difficult to predict the probable maximum flood flow of Jamuna as the hydrometeorological data of the Indian portion of the basin are not available. Snow melt accounts for major portion of the flow of the Brahmaputra, but rainfall in Indian province of Assam and northern part of Bangladesh contributes substantially. Prediction by analysis of physical features and storm patterns are not possible. Physical features and hydrometeorological data for the Bangladesh portion of Jamuna basin are available for a period of 25 years. In the Jamuna river, during severe flood, overtopping and breaching of the existing flood embankment are common and there is no arrangement to measure the overland flow. Without determining the overland flow prediction of probable flood flow is not possible.

Bahadurabad Transit is the only station where Jamuna flow is currently being measured and data are available for a long period since 1960. Therefore the available discharge data at Bahadurabad Transit is considered the most suitable for flow analysis.

A.1.4 Climatology

The climate in the project area shown in Table 4.A.1 is tropical. The monsoon rain occur during the month of June, July, August & September, rain does not happen continuously rather it falls intermittently spreading for a period of several days. The daily evaporation during the year varies from 2.5 mm to 6.50 mm. The table summarises the climatological data of Mymensingh station except rainfall and evaporation. The monthly average temperature varies from 18.4°C in January to 28.5°C in August-September. Wind

velocity of 1.90 Km/Hr. is the lowest in December and 6.00 Km/Hr. in the month of July is highest. The sunshine hours is 5 hours in the month of June and 9 hours in Nov-Dec month.

A.1.5 Hydrological Data

In the project area the BWDB is maintaining a number of hydrological station which are the main source of hydrological data for the study. In addition SWMC arranged discharged measurements of Chatal and Jhenai for the year 1991. There are five water level gauge stations, three rainfall stations and two evaporation stations which are located almost at the project periphery. BWDB maintaining discharge records of Jamuna at Bahadurabad and Old Bramhaputra at Mymensingh. The locations of the existing & proposed Hydrological stations along with the project area including adjoining river and internal channel network is shown in fig-1. The status of Hydrological data received from BWDB & FAP is shown in Table 4.A.2 & Table 4.A.3.

In addition, we have received the water level information for both present and embankment condition for the reach of river Jamuna between Bahadurabad and Jagannathgonj Ghat from FAP-25 shown in table 4.A.24 and also received mode discharge of Jamuna at Kholabarichar and Old Brahmaputra at Jamalpur for the year 1975 - 1980.

Regional evaporation data for the year 1986 to 1990 were obtained from FAP-25.

A.1.6 Area Elevation Curve

The land elevation varies from 12 m to 20 m (PWD) and slopes generally from north to south. The area below elevation 13.00 and 12.00 m (PWD) are occupied by beels, depression and water bodies.

The area-elevation-capacity curve has been prepared from 1/4" ft. contour Water Development Maps. To minimize error the project area is divided into 9 cells shown in fig-2. The area elevation curve for the individual cells have been prepared accordingly. Based on them an area elevation curve for the entire project area has been prepared and shown Table 4.A.4.

(i) Flood and Flooded Area

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The project area is dominated by the Jamuna river to the west and by the Old Brahmaputra river to the north east. Flooding from the Jamuna occurs more frequently. Flooding from Old-Brahmaputra is very rare. Flood is a natural phenomena of this area and people are accustomed to live with the flood but with the increased demand of basic need due to population increase and the severe erosion effect of Jamuna, low laying areas and flood plain have been encroached upon by the people for cultivation and homestead.

In the present condition about 20% of the area is above normal flood level, located mostly along the north east boarder of the Project Area. In the central part of the area about 35% of land is subjected to shallow flooding. Whereas 40% of the area fall under category moderately to deeply flooded and lies in the western part of the project. The remaining 5% area is in the very deeply flooded zone. In general about 80% of the project area is seasonally flooded.

(ii) Inundation In The Project Area

There are few numbers of natural channels in the project area, which will drain-off the rainfall run-off generated within the catchment.

Embankment will stop inundation from back flow of the main river but intense rain will inundate low lying basin in the project area for a short duration due to high stage in peripheral river.

The rainfall run-off of a basin depends upon number of factor such as rainfall intensity and duration, area and contours, initial stage of wetness losses from evaporation, percolation and transpiration by vegetation etc.

The inundation caused due to accumulation of the rainfall run-off in embanked condition and for different development option will be determined by using MIKE-11 software.

A.1.7 Rainfall Analysis

(i) Introduction

The project area is under direct influence of Jamalpur and Dewanganj rain gauge station. Sarishabari is located at the extreme south of the project area.

The monsoon last from June to September. The mean annual rainfall is about 2240 mm. The monthly rainfall for the stations Dewanganj & Jamalpur are shown in Table 4.A.5 and 4.A.6. Individual months during the monsoon season sometimes have more than 800 mm. rainfall which, coinciding with heavier rainfall in the upper basin and lower basin cause catastrophic flooding in the area.

(ii) Rainfall-Depth-Duration-Frequency Analysis

The pre-monsoon May-June maximum rainfall upto 10-day duration is required to compute drainage modules and for drainage and irrigation studies. The maximum May-June rainfall for duration upto 10-days and for different return periods were derived by a frequency analysis using the Gumbel Extreme Value Type-1 distributions Table 4.A.7 shows the Rainfall depth duration frequency.

(iii) Drainage Module Analysis

The "Drainage Modulus" is the most fundamental parameter which governs the design of drainage channel system and its economy. An effective drainage system can prevent prolonged inundation thereby save in crop loss.

Studies of rainfall data shows that more or less continuous rain can occur for a period upto 10-days. A design 10-day rainfall, 1 in 10 year return period occurring during the pre-monsoon months of May and June has been used to derive the drainage modules.

The following criteria have been taken into consideration in evaluating the drainage modules:

- An initial pre-storage level of 50 mm
- A deep percolation loss of 2 mm/day
- An evapo transpiration loss of half the average potential rate for May and June
- Little or no submergence will be allowed above 200 mm from ground level during the storm period
- Other losses ($ET \times 0.5t + \text{Percolation}$)

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Analysis was done in respect of drainage module for the two stations: Jamalpur & Dewanganj. A drainage module of 33 mm/day was recommended for the project. Table 4.A.8 and 4.A.9 shows the drainage module analysis.

In computing the drainage module sixteen years of rainfall data were used at the preliminary stage. The drainage modulus 33mm/day thus obtained more or less conforms with the value adopted by MPO but it does not fulfil the condition of limiting flooding which should be within approximately 200mm. To overcome the above drawback the rainfall data was further analyzed in order to find out the rationality of the data. The result of the frequency analysis (Gumbel Distribution) of 1-day, 5-day and 10-day maximum rainfall have been plotted together with the observed data on the probability paper. In the process number of events were deleted to find out the suited values. Finally thirteen and fourteen events were considered for Jamalpur and Dewanganj station respectively. Accordingly the frequency analysis have been done and plotted on the probability paper which shows that the observed data and computed values fit very "good".

The rainfall data of these thirteen and fourteen years were used to recheck the drainage module. The re-computation shows that the drainage module 33mm/day satisfy the limiting residual flooding 200mm.

(iv) 10-day Rainfall Analysis:

Decadewise 10-day rainfall are required for the pre-monsoon and post monsoon flood routing. While the 80% dependable (1 in 5 dry year) rainfall estimates are required for the design of flushing sluice and for crop water requirement. 10-day rainfall for the period April to November for different return periods were derived by a frequency analysis using normal distribution. The results are given in Table 4.A.10, 4.A.11 and 4.A.12. A 1 in 5 year return period is generally accepted as the standard to determine cropping pattern and to investigate the economic viability of a drainage scheme and were shown in fig-3.

A.1.8 Water Level Analysis

The river water level analysis are required for fixing the crest level of flood embankment with peak water level. Decadewise water level for the period April to November is

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required for drainage studies and post-monsoon flood routing. Whereas minimum water level is required for irrigation and fisheries.

Maximum water levels under the existing conditions with different frequencies for the river Jamuna and Old Brahmaputra at Bahadurabad, Jagannathgonj and Jamalpur were derived by a frequency analysis of the annual maximum river level data. Table 4.A.13 shows station with corresponding yearly highest stage each for frequency analysis. The Gamble Extreme value Type-1 distribution was used for analysis. Also computed the water level frequency analysis for Jhenai offtake of Jhenai river. The results are given in Table 4.A.14.

The general water level characteristics of Jamuna/Brahmaputra at Bahadurabad shown in fig 4. The figure shows that the water level during the months of July, August and September are generally at high level. The lowest water level normally occurs in February. The maximum range of variation during the rising stage of the water level hydrograph occurs during the month of June whereas the lowest range of variation during the falling stage of the hydrograph is observed during the month of February.

Computation of 10-day water level decadewise at different frequencies for the period April to November was carried out by fitting a normal distribution to the Ten-day average water level in each month. The results are given in Table 4.A.15 to 4.A.20.

Fig-5 shows the typical hydrograph of river Jamuna at Bahadurabad and Jagannathgonj and Old-Brahmaputra river at Jhenai offtake for the year 1988.

A 10-day water level analysis for lean period from December to March was carried out for Jamuna at offtake of Chatal and Old-Brahmaputra at offtake of Jhenai to ascertain the lean period availability of water for supplementary irrigation. The results are given in Table 4.A.21 & 4.A.22.

The maximum water level observed during the 1988 and the corresponding values are :

River Name	Gauge Station Location	1988 Values	1 in 20 year JPPS Values
Jamuna	Bhadurabad	20.61	20.49
Jamuna	Jagannathganj	16.14	16.12
Jhenai	Off-Jhenai	18.73	18.71
Old-Brahmaputra	Jamalpur	17.81	17.97
Jhenai	Baushi Rly.Brdg.	17.25	17.30

The above values shows that the observed 1988 Jamuna flood level exceeded the computed 1 in 20 year event.

A.1.9 Discharge Analysis

Maximum annual discharge of Jamuna at Bahadurabad during 1988-1989 has been recorded to the tune of 98,600 cumec. The value observed during 1988 exceeded the corresponding value of the last 20 year event. Maximum discharge for Jamuna and Old-Brahmaputra are required for confinement studies, river training and bank protection works & geomorphological studies. Discharge data are available for Jamuna at Bahadurabad and Padma at Baruria and Old Brahmaputra at Mymensingh. BWDB is not taking discharge measurement of Jamuna at Jagannathganj and Old Brahmaputra at Jamalpur.

Discharge records of Jhenai offtake and Baushi railway bridge are available for the period 1965-1979. Since 1980 BWDB has suspended discharge measurement at Jhenai offtake and Baushi railway bridge. Discharge measurement have been taken during 1991 flood period at Chatal bridge site and at Jhenai channel 1 & 2 by SWMC and were made available to JPPS.

Computation of annual maximum discharge with different frequencies at different station was done directly by a

frequency analysis of the annual maximum discharges. The results are given in Table 4.A.23.

The general discharge characteristic of the Jamuna/ Brahmaputra at Bahadurabad shown in fig-6. It shows that the discharge starts increasing in April and the first peak flood generally occurs in July and is characterised by an extremely rapid increase in discharge. After this the major peak occurs in August. The discharge begin to subside in October. A 25 year mean rating curve of Jamuna river at Bahadurabad is shown in fig-7.

The maximum yearly discharge computed by general model for Old Brahmaputra river at Jamalpur for the year 1975 to 1979 were shown in Table 4.A.24.

A.1.10 On Site Hydrological Survey

Field trips helped in observing the main feature of land morphology and the drainage network system within the flood plain. Objective is to precise the data that are necessary for an appropriate model activity. In addition to levelling of flood plain and description of the existing structures in the area, the water level records and discharge measurement in high flood condition at strategic points are of paramount importance.

Considering the necessity and purpose of Modelling, a list of all the elements, making no distinction what already exist but for improvement and precision of the model the correct location of hydrological installation such as water level gauge and discharge measurement points play a vital rule. During field visit specialist travelled in the interior of the project area and obtained information through the testimony of local people on the depth of inundations and flood propagation. It is expected that the following strategic location for gauge installation & discharge measurement may serve the study purpose. The location of the stations are as follows and shown in fig-1

- Water Level and Discharge measurement of Chatal river at upstream 75m away from the bridge on Jamalpur Madargonj road
- Water level gauge station on Patherghata khal at upstream 150m away from railway bridge at Islampur

- Water level gauge station at Gamaria on Delyer khal 80m upstream of RCC bridge on Islampur - Belgachha road
- Water level gauge station on Madardhaw khal at upstream 100m away from Pailar bridge on Melandah - Mohammedpur road
- Water Level and Discharge measurement of Dadbhanga khal at Char - Adirpara on Jamalpur - Madargonj road
- Water Level and Discharge measurement of Jhenai channel 1 and 2
- Water Level and Discharge measurement of Belamari khal, a secondary channel of Chatal river in between Bara - Bhangbari and Chhota Bhangbari
- Water Level gauge station at the upstream confluence of Chatal & Jhenai at Haripur
- Water Level gauge station at extreme downstream confluence of Chatal & Jhenai near Sarishabari
- Water Level and Discharge measurement of Jhena offtake at Jhenai railway bridge.

Table 4.A.1

Climatological Data

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp in °C	Mean Max.	25.2	27.6	32.0	33.8	32.4	31.2	31.3	31.3	31.5	30.7	28.7	26.4
	Mean Min.	11.6	13.8	18.2	22.0	23.5	24.9	25.7	25.6	25.4	23.8	18.2	12.6
	Avg	18.4	20.7	25.1	27.9	28.0	28.1	28.5	28.5	28.5	27.3	23.5	20.0
Hum. %	9 a.m.	62	77	73	76	82	87	87	88	85	85	81	84
	6 p.m.	62	54	49	56	74	82	81	81	82	79	73	67
Sun shine	Hr/ Day	8.8	8.8	8.6	8.4	8.7	5.0	5.4	5.6	5.9	7.3	9.2	9.1
Wind vecty	Km/ Hr	2.3	2.8	3.9	5.2	5.0	5.0	6.0	4.6	3.70	3.0	2.30	1.9
Evap, ETO	mm/ mth	99	124	198	221	208	140	142	140	132	130	109	97

Source: Mymensingh Meteorological Station.

Table 4.A.2 Status of Hydrological Data Received

DATA: Rainfall

STATION		AVAILABLE YEARS	TOTAL YEARS RECEIVED	SOURCE OF COLLECTION
No.	Name			
RO 67	Jamalpur	1974 - 1989	19	FAP-25
		1990 - 1991, 1992		SWMC
RO 62	Dewangonj	1974 - 1989	19	"
		1990 - 1991, 1992		
RO 32	Sarishabari	1974 - 1989	19	"
		1990 - 1991, 1992		

DATA: Water Level

STATION		RIVER		AVAILABLE YEARS	TOTAL YEARS RECEIVED	SOURCE OF COLLECTION
No.	Name	No.	Name			
46.9L	Bahadurabad	22	Jamuna	1964 - 1970	28	FAP-25
				1972 - 1991, 1992		SWMC
48	Jagannathgonj	22	Jamuna	1964 - 1981 1984 - 1991, 1992	26	FAP-1 SWMC
225	Jamalpur	86	O-Brahpta	1964 - 1989	29	FAP-25
134B	O-Jhenai	52	Jhenai	1990 - 1992 1974 - 1979 1981 - 1991, 1992	18	SWMC BWD B SWMC
134A	Baushi Rly. Bridge	52	Jhenai	1975 - 1991, 1992	18	BWD B SWMC
NCQ1	Madargonj	-	Chatal	1991, 1992	-	SWMC

Table 4.A.3

DATA: Discharge

STATION		RIVER		AVAILABLE YEARS	TOTAL YEARS RECEIVED	SOURCE OF COLLECTION
No.	Name	No.	Name			
46.9	Bahadurabad	22	Jamuna	1965 - 1970 1972 - 1981 1991	25	FAP-25
91.9L	Baruria	39	Ganges	1965 - 1970 1972 - 1978 1980 - 1989	22	FAP-25
13.4B	O-Jhenai	52	Jhenai	1966 - 1970 1972 - 1978 1991, 1992	14	BWDB FAP-25
13.4A	Baushi Rly Bridge	52	Jhenai	1965 - 1970 1972 - 1980 1991, 1992	17	BWDB SWMC
228.5	Mymensingh	86	O-Bramha	1970 1974 - 1987	15	BWDB
NCQ1	Madargonj	-	Chatal	1991, 1992	2	SWMC

AREA-ELEVATION-STORAGE

JPPS: COMBINED

=====

Elevation (ft) (PWD)	(m) (PWD)	Areas acre	hec	Cum-area hec	Storage hec-m	Cum-Stora hec-m
=====						
36.50	11.13	0	0	0	0	0
37.50	11.43	184	74	74	11	11
38.50	11.73	312	126	201	42	53
39.50	12.04	839	340	541	113	166
40.50	12.34	198	80	621	177	343
41.50	12.65	312	126	747	208	552
42.50	12.95	372	151	898	251	802
43.50	13.26	1084	439	1337	341	1143
44.50	13.56	1156	468	1805	479	1622
45.50	13.87	1743	706	2510	658	2280
46.50	14.17	2613	1058	3568	926	3206
47.50	14.48	4331	1753	5322	1355	4561
48.50	14.78	5246	2124	7445	1946	6506
49.50	15.09	7983	3232	10677	2762	9268
50.50	15.39	9150	3704	14382	3819	13087
51.50	15.70	11123	4503	18885	5070	18157
52.50	16.00	12887	5218	24103	6551	24709
53.50	16.31	14408	5833	29936	8235	32944
54.50	16.61	15183	6147	36083	10061	43005
55.50	16.92	14962	6058	42140	11921	54926
56.50	17.22	13107	5307	47447	13653	68580
57.50	17.53	11624	4706	52153	15179	83759
58.50	17.83	8962	3628	55781	16449	100208
59.50	18.14	6970	2822	58603	17432	117640
60.50	18.44	5128	2076	60679	18179	135819
61.50	18.75	4246	1719	62398	18757	154576
62.50	19.05	2415	978	63376	19168	173743
63.50	19.35	2114	856	64232	19447	193191
64.50	19.66	1724	698	64930	19684	212875
65.50	19.96	1162	470	65400	19862	232737
66.50	20.27	495	200	65600	19964	252702
67.50	20.57	341	138	65739	20016	272718
68.50	20.88	162	65	65804	20047	292765
		162536	65804		292765	

Table 4.A.5

Monthly Total Rainfall (mm)
Station: R067 Jamalpur.

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1974	138.5	367.0	407.8	744.4	265.5	256.5	162.5	1.3
1975	94.0	265.4	158.7	814.5	283.2	186.5	284.7	5.1
1976	121.9	375.3	574.2	518.2	511.8	843.4	27.9	15.2
1977	147.2	494.0	751.8	368.5	360.6	273.1	133.2	0.0
1978	138.5	373.4	670.5	363.3	125.7	186.7	22.8	5.1
1979	44.4	160.0	279.2	714.7	266.5	297.4	58.5	15.2
1980	78.6	521.9	204.3	352.8	424.0	238.7	210.9	0.0
1981	201.8	383.5	124.4	444.4	312.4	242.7	19.0	0.0
1982	109.1	224.9	1014.6	423.0	566.4	177.7	47.0	16.5
1983	74.9	238.8	219.7	452.2	556.1	314.8	358.2	0.0
1984	104.1	348.0	767.2	306.1	187.9	415.4	207.0	0.0
1985	134.7	202.0	397.6	486.3	265.4	421.6	139.6	0.0
1986	273.1	158.8	420.6	640.1	316.3	495.7	437.0	40.6
1987	167.7	210.8	374.9	865.0	696.1	611.0	120.7	21.6
1988	132.1	425.6	958.9	449.7	742.6	300.4	240.8	97.9
1989	8.4	501.5	514.2	1026.1	82.0	304.3	137.3	0.0
Max	273.1	521.9	1014.6	1026.1	742.6	843.4	437.0	97.9
Min	8.4	158.8	124.4	306.1	82.0	177.7	19.0	0.0

Table 4.A.6

Monthly Total Rainfall (mm)
Station: R062 Dewanganj.

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1974	132.8	354.7	331.2	680.6	190.0	284.9	320.7	0.0
1975	140.2	310.1	120.5	523.6	161.0	287.5	136.2	0.0
1976	177.6	124.6	618.0	409.8	590.4	183.6	51.5	12.7
1977	186.9	448.3	593.5	325.9	302.8	277.6	229.4	15.3
1978	144.7	316.1	478.4	189.4	162.8	225.8	28.7	17.8
1979	28.7	79.8	197.0	591.3	606.8	192.0	58.4	12.4
1980	147.6	593.4	268.1	296.2	439.2	291.8	299.2	0.0
1981	333.9	415.4	101.9	698.2	190.5	143.0	0.0	0.0
1982	138.5	156.0	746.2	516.0	446.7	381.2	39.5	5.9
1983	0.0	305.5	146.7	442.8	494.0	551.1	199.0	0.0
1984	91.9	557.8	709.7	344.4	186.2	395.9	454.3	0.0
1985	123.0	221.5	563.5	890.8	196.5	508.4	92.7	0.0
1986	267.1	248.4	340.2	551.5	351.3	482.8	613.0	40.7
1987	321.4	420.7	467.1	1064.0	434.3	424.9	52.3	5.3
1988	115.6	469.4	948.2	546.8	402.7	293.2	71.5	85.9
1989	44.7	548.7	425.1	692.9	232.4	343.5	45.2	0.0
Max	333.9	593.4	948.2	1064.0	606.8	551.1	613.0	85.9
Min	0.0	79.8	101.9	189.4	161.0	143.0	0.0	0.0

Table 4.A.7

Rainfall Depth-Duration
Frequency (May-June)

Station Name	Return Period (Year)	1Day mm	2Day mm	3Day mm	4Day mm	5Day mm	6Day mm	7Day mm	8Day mm	9Day mm	10Day mm
DEWANGANJ (R062)	2	143	204	224	240	254	264	275	283	291	300
	5	238	317	337	354	365	374	384	393	402	411
	10	310	404	424	441	449	458	467	475	487	495
	20	380	486	507	524	530	538	547	555	568	576
	25	402	512	533	551	555	563	572	581	594	602
JAMALPUR (R067)	2	120	168	195	216	227	241	250	257	260	262
	5	207	275	310	334	340	357	368	376	386	397
	10	274	357	398	424	427	445	459	467	481	490
	20	338	436	483	510	511	530	546	555	571	582
	25	358	460	509	537	537	557	573	583	602	610
SARISHABARI (R032)	2	141	190	225	259	275	291	305	316	333	348
	5	230	308	388	444	476	491	508	523	540	556
	10	298	397	511	585	629	643	662	678	698	715
	20	363	483	630	720	776	790	810	827	849	868
	25	383	510	667	762	822	836	856	873	897	916

JAMALPUR PRIORITY PROJECT STUDY

DRAINAGE MODULE ANALYSIS

RAINFALL STATION : JAMALPUR R067

Evapotranspiration: May - 6
(mm/day) June - 5

Percolation (mm/d): 2

Losses = (Et*0.5 + Perc.) : 5
(mm/day)

Design Standards :

1. Rainfall : 1 in 10-year 10 day rainfall
2. Pre-storage : 50 mm
3. Long-term flood depth : 200 mm

Assume drainage module : 32 mm/day
(l/s/ha) : 3.7

```
*****
* Day ! Cum.rain ! Inc.rain ! Cum.loss ! Net rain ! Drainage ! Residual *
*      ! (mm)    ! (mm)    ! (mm)    ! (mm)    ! (mm)    ! Flood (mm) *
*****!*****!*****!*****!*****!*****!*****!*****
* 1 ! 160 ! 160 ! 5 ! 155 ! 32.0 ! 173 *
* 2 ! 190 ! 30 ! 10 ! 180 ! 64.0 ! 166 *
* 3 ! 220 ! 30 ! 15 ! 205 ! 96.0 ! 159 *
* 4 ! 250 ! 30 ! 20 ! 230 ! 128.0 ! 152 *
* 5 ! 285 ! 35 ! 25 ! 260 ! 160.0 ! 150 *
* 6 ! 315 ! 30 ! 30 ! 285 ! 192.0 ! 143 *
* 7 ! 345 ! 30 ! 35 ! 310 ! 224.0 ! 136 *
* 8 ! 390 ! 45 ! 40 ! 350 ! 256.0 ! 144 *
* 9 ! 400 ! 10 ! 45 ! 355 ! 288.0 ! 117 *
* 10 ! 431 ! 31 ! 50 ! 381 ! 320.0 ! 111 *
*      !      !      !      !      !      !      *
```

MAXIMUM RESIDUAL FLOOD : 200 mm

DRAINAGE MODULE : 32 mm/day

JAMALPUR PRIORITY PROJECT STUDY

DRAINAGE MODULE ANALYSIS

RAINFALL STATION : DEWANGONJ R062

Evapotranspiration: May - 6
(mm/day) June - 5

Percolation (mm/d): 2

Losses = (Et*0.5 + Perc.) : 5
(mm/day)

Design Standards :

1. Rainfall : 1 in 10-year 10 day rainfall
2. Pre-storage : 50 mm
3. Long-term flood depth : 200 mm

Assume drainage module : 34 mm/day
(l/s/ha) : 3.9

```
*****
* Day ! Cum.rain ! Inc.rain ! Cum.loss ! Net rain ! Drainage ! Residual *
*      ! (mm)    ! (mm)    ! (mm)    ! (mm)    ! (mm)    ! (mm)    ! Flood (mm)*
*****!*****!*****!*****!*****!*****!*****!*****
* 1 ! 165 ! 165 ! 5 ! 160 ! 34.0 ! 176 *
* 2 ! 210 ! 45 ! 10 ! 200 ! 68.0 ! 182 *
* 3 ! 250 ! 40 ! 15 ! 235 ! 102.0 ! 183 *
* 4 ! 280 ! 30 ! 20 ! 260 ! 136.0 ! 174 *
* 5 ! 325 ! 45 ! 25 ! 300 ! 170.0 ! 180 *
* 6 ! 355 ! 30 ! 30 ! 325 ! 204.0 ! 171 *
* 7 ! 385 ! 30 ! 35 ! 350 ! 238.0 ! 162 *
* 8 ! 410 ! 25 ! 40 ! 370 ! 272.0 ! 148 *
* 9 ! 430 ! 20 ! 45 ! 385 ! 306.0 ! 129 *
* 10 ! 450 ! 20 ! 50 ! 400 ! 340.0 ! 110 *
*      !      !      !      !      !      !      *
*****!*****!*****!*****!*****!*****!*****
```

MAXIMUM RESIDUAL FLOOD : 200 mm

DRAINAGE MODULE : 34 mm/day

JAMALPUR PRIORITY PROJECT STUDY

10-DAY MAXIMUM RAINFALL

STATION : R067 JAMALPUR

PERIOD : 1974 - 1989

* MONTH	* DECADE	RAINFALL (mm)					
*	*	* 1:2	* 1:5	* 1:10	* 1:20	* 1:25	* 80%

Apr	I	13.4	16.1	18.1	20.1	20.7	10.7
	II	41.4	49.7	56.0	62.1	64.0	33.1
	III	68.2	81.9	92.3	102.3	105.4	54.6
May	I	10.9	13.0	14.7	16.3	16.8	8.7
	II	100.4	120.5	135.8	150.5	155.1	80.3
	III	133.5	160.2	180.6	200.1	206.3	106.8
Jun	I	187.6	225.1	253.7	281.2	289.9	150.1
	II	155.0	186.0	209.7	232.4	239.5	124.3
	III	147.3	176.7	199.2	220.8	227.6	117.8
Jul	I	172.4	206.9	233.2	258.5	266.4	137.3
	II	186.5	223.8	252.3	279.6	288.2	149.2
	III	201.6	242.0	272.7	302.2	311.6	161.3
Aug	I	121.1	145.3	163.8	181.6	187.2	96.3
	II	106.9	128.3	144.6	160.2	165.2	85.3
	III	144.6	173.6	195.6	216.8	223.5	115.7
Sep	I	97.2	116.6	131.4	145.6	150.1	77.7
	II	111.6	134.0	151.0	167.3	172.5	89.3
	III	139.1	166.9	188.1	208.5	214.9	111.3
Oct	I	88.6	106.3	119.9	132.8	136.9	70.9
	II	41.0	49.2	55.4	61.4	63.3	32.8
	III	21.8	26.2	29.5	32.7	33.7	17.3
Nov	I	4.2	5.0	5.7	6.3	6.5	3.4
	II	1.4	1.6	1.8	2.0	2.1	1.1
	III	8.1	9.7	11.0	12.1	12.5	5.5



JAMALPUR PRIORITY PROJECT STUDY

10-DAY MAXIMUM RAINFALL
STATION : R062 DEWANGANJ
PERIOD : 1974 - 1989

* MONTH	* DECADE	RAINFALL (mm)										*	
		* 1:2	!	1:5	!	1:10	!	1:20	!	1:25	!	80%	*

* Apr	* I	* 15.5	!	18.4	!	20.6	!	22.7	!	23.4	!	12.6	*
	* II	* 43.7	!	51.8	!	58.0	!	64.0	!	65.9	!	35.5	*
	* III	* 93.5	!	111.0	!	124.2	!	137.0	!	141.0	!	76.1	*
* May	* I	* 103.6	!	123.0	!	137.7	!	151.8	!	156.2	!	84.3	*
	* II	* 98.8	!	117.2	!	131.2	!	144.7	!	148.9	!	80.4	*
	* III	* 150.9	!	179.1	!	200.5	!	221.1	!	227.5	!	122.8	*
* Jun	* I	* 177.1	!	210.1	!	235.3	!	259.5	!	267.0	!	144.1	*
	* II	* 138.7	!	164.5	!	184.2	!	203.2	!	209.1	!	112.8	*
	* III	* 128.7	!	152.7	!	171.0	!	188.6	!	194.1	!	104.7	*
* Jul	* I	* 171.2	!	203.1	!	227.5	!	250.9	!	258.2	!	139.3	*
	* II	* 142.4	!	169.0	!	189.2	!	208.6	!	214.7	!	115.9	*
	* III	* 243.6	!	289.0	!	323.6	!	356.8	!	367.2	!	198.2	*
* Aug	* I	* 101.8	!	120.8	!	135.3	!	149.2	!	153.5	!	82.9	*
	* II	* 95.2	!	112.9	!	126.4	!	139.4	!	143.5	!	77.4	*
	* III	* 151.6	!	179.9	!	201.4	!	222.1	!	228.6	!	123.4	*
* Sep	* I	* 99.1	!	117.6	!	131.6	!	145.2	!	149.4	!	80.6	*
	* II	* 115.8	!	137.4	!	153.8	!	169.6	!	174.5	!	94.2	*
	* III	* 114.7	!	136.1	!	152.4	!	168.0	!	172.9	!	93.3	*
* Oct	* I	* 101.1	!	119.9	!	134.3	!	148.1	!	152.4	!	82.3	*
	* II	* 38.5	!	45.7	!	51.2	!	56.5	!	58.1	!	31.4	*
	* III	* 29.1	!	34.5	!	38.7	!	42.6	!	43.9	!	23.7	*
* Nov	* I	* 5.0	!	6.0	!	6.7	!	7.4	!	7.6	!	4.1	*
	* II	* 0.7	!	0.8	!	0.9	!	1.0	!	1.0	!	0.6	*
	* III	* 7.4	!	8.8	!	9.8	!	10.8	!	11.2	!	6.0	*

10-DAY MAXIMUM RAINFALL
STATION : R032 SARISHABARI
PERIOD : 1974 - 1989

* MONTH	* DECADE	RAINFALL (mm)						*
		* 1:2	* 1:5	* 1:10	* 1:20	* 1:25	* 80%	*

* Apr	* I	* 26.2	* 36.4	* 44.1	* 51.6	* 53.9	* 16.0	*
	* II	* 37.6	* 52.3	* 63.4	* 74.1	* 77.4	* 23.0	*
	* III	* 50.0	* 69.4	* 84.2	* 98.4	* 102.9	* 30.6	*
* May	* I	* 95.3	* 132.4	* 160.6	* 187.7	* 196.2	* 58.3	*
	* II	* 130.6	* 181.4	* 220.0	* 257.1	* 268.8	* 79.8	*
	* III	* 135.1	* 187.6	* 227.5	* 265.9	* 278.0	* 82.6	*
* Jun	* I	* 199.5	* 277.1	* 336.1	* 392.9	* 410.7	* 122.0	*
	* II	* 160.1	* 222.3	* 269.7	* 315.2	* 329.5	* 97.9	*
	* III	* 136.3	* 189.3	* 229.7	* 268.4	* 280.6	* 83.3	*
* Jul	* I	* 177.7	* 246.8	* 299.4	* 349.9	* 365.8	* 108.6	*
	* II	* 154.6	* 214.7	* 260.4	* 304.3	* 318.1	* 94.5	*
	* III	* 218.2	* 303.0	* 367.5	* 429.6	* 449.0	* 133.4	*
* Aug	* I	* 52.6	* 73.0	* 88.6	* 103.5	* 108.2	* 32.1	*
	* II	* 84.4	* 117.3	* 142.3	* 166.3	* 173.8	* 51.6	*
	* III	* 124.1	* 172.3	* 209.1	* 244.3	* 255.4	* 75.8	*
* Sep	* I	* 113.5	* 157.6	* 191.2	* 223.4	* 233.6	* 69.4	*
	* II	* 124.6	* 173.0	* 209.9	* 245.3	* 256.4	* 76.1	*
	* III	* 79.6	* 110.6	* 134.2	* 156.8	* 163.9	* 48.7	*
* Oct	* I	* 74.7	* 103.8	* 125.9	* 147.1	* 153.8	* 45.7	*
	* II	* 29.9	* 41.5	* 50.3	* 58.8	* 61.5	* 18.2	*
	* III	* 19.4	* 26.9	* 32.7	* 38.2	* 39.9	* 11.9	*
* Nov	* I	* 3.8	* 5.3	* 6.4	* 7.5	* 7.8	* 2.3	*
	* II	* 1.5	* 2.1	* 2.5	* 3.0	* 3.1	* 0.9	*
	* III	* 18.3	* 25.5	* 30.9	* 36.1	* 37.8	* 11.2	*

Table 4.A.13

Highest Stage of
Jamuna, Old Bramaputra & Jhenai

Sl. No.	YEAR	OBSERVED HIGHEST STAGE IN METER (PWD)				
		Jamuna at Bahadurabad	Jamuna at Jagannath	O-Bramptn at Jamalpur	Jhenai at Offtake	Jhenai at Bushi. Bridge
1	1964	19.84	15.10	17.03	-	
2	1965	19.69	-	17.07	-	
3	1966	19.62	14.97	17.04	-	
4	1967	19.5	14.96	16.83	-	
5	1968	19.80	15.14	16.98	-	
6	1969	19.84	14.90	17.09	-	
7	1970	20.20	15.58	17.38	-	
8	1971	-	14.92	16.22	-	
9	1972	19.98	15.23	17.28	-	
10	1973	19.88	15.56	17.28	-	
11	1974	20.26	15.72	17.56	17.97	
12	1975	19.60	14.75	16.90	17.40	15.60
13	1976	19.87	14.67	17.22	17.51	15.52
14	1977	19.99	15.36	17.28	17.67	16.25
15	1978	19.63	14.79	16.81	17.23	15.26
16	1979	19.78	14.75	16.74	17.24	15.29
17	1980	20.10	15.35	17.40	-	16.38
18	1981	19.48	15.10	16.68	17.19	15.30
19	1982	19.42	-	16.62	17.03	15.38
20	1983	19.92	-	16.52	17.14	16.05
21	1984	20.10	15.29	17.30	18.14	16.66
22	1985	19.61	15.39	17.50	17.64	16.06
23	1986	19.15	14.53	15.96	16.80	15.29
24	1987	19.68	15.88	17.20	17.78	16.48
25	1988	20.61	16.14	17.81	18.73	17.25
26	1989	19.57	14.46	16.28	17.50	15.50

Table 4.A.14 Water Level Frequency Analysis

STATION	RIVER	RIVER STAGE IN METER (PWD)					
		RETURN INTERVAL YEARS					
		2	5	10	20	50	100
Bahadurabad	Jamuna	19.80	20.08	20.29	20.49	20.76	20.95
Jagannathgonj	Jamuna	15.15	15.54	15.83	16.12	16.49	16.75
Jamalpur	O-Bramph	17.00	17.38	17.68	17.97	18.34	18.61
Baushi Rly. Bridge	Jhenai	15.88	16.48	16.93	17.30	17.84	18.25
Jhenai offtake	Jhenai	17.53	18.00	18.35	18.71	19.15	19.45

JAMALPUR PRIORITY PROJECT STUDY

10 DAY WATER LEVEL ANALYSIS

STATION : 46.9L BAHADURABAD (T)

LEVEL : m PWD

PERIOD : 1964 to 1989

RIVER : JAMUNA

* * *		WATER LEVEL (m PWD)							*
* MONTH	* DECADE	*****							
*	*	* 1:2	* 1:5	* 1:10	* 1:20	* 1:50	* 1:100	* 80%DRY	*

* APR	* I	* 14.23	* 14.61	* 14.90	* 15.18	* 15.54	* 15.81	* 13.85	*
*	* II	* 14.79	* 15.29	* 15.67	* 16.04	* 16.52	* 16.88	* 14.29	*
*	* III	* 15.30	* 15.79	* 16.16	* 16.52	* 16.98	* 17.32	* 14.82	*
* MAY	* I	* 15.83	* 16.45	* 16.93	* 17.39	* 17.98	* 18.43	* 15.21	*
*	* II	* 16.26	* 16.94	* 17.46	* 17.96	* 18.61	* 19.09	* 15.59	*
*	* III	* 16.73	* 17.43	* 17.96	* 18.48	* 19.14	* 19.65	* 16.04	*
* JUN	* I	* 17.36	* 18.13	* 18.73	* 19.30	* 20.05	* 20.60	* 16.59	*
*	* II	* 18.19	* 18.92	* 19.49	* 20.03	* 20.74	* 21.27	* 17.45	*
*	* III	* 18.78	* 19.33	* 19.75	* 20.16	* 20.68	* 21.07	* 18.24	*
* JUL	* I	* 19.15	* 19.49	* 19.74	* 19.99	* 20.31	* 20.55	* 18.82	*
*	* II	* 19.18	* 19.59	* 19.90	* 20.20	* 20.59	* 20.88	* 18.78	*
*	* III	* 19.43	* 19.80	* 20.08	* 20.35	* 20.71	* 20.97	* 19.07	*
* AUG	* I	* 19.32	* 19.74	* 20.08	* 20.40	* 20.81	* 21.12	* 18.89	*
*	* II	* 18.97	* 19.53	* 19.96	* 20.37	* 20.91	* 21.31	* 18.41	*
*	* III	* 18.92	* 19.51	* 19.96	* 20.40	* 20.97	* 21.39	* 18.33	*
* SEP	* I	* 18.82	* 19.45	* 19.94	* 20.42	* 21.03	* 21.49	* 18.18	*
*	* II	* 18.92	* 19.42	* 19.80	* 20.17	* 20.65	* 21.01	* 18.42	*
*	* III	* 18.77	* 19.23	* 19.58	* 19.92	* 20.36	* 20.69	* 18.31	*
* OCT	* I	* 18.28	* 18.87	* 19.32	* 19.75	* 20.31	* 20.73	* 17.70	*
*	* II	* 17.65	* 18.38	* 18.94	* 19.49	* 20.19	* 20.71	* 16.92	*
*	* III	* 16.81	* 17.38	* 17.82	* 18.24	* 18.79	* 19.20	* 16.24	*
* NOV	* I	* 15.98	* 16.33	* 16.61	* 16.87	* 17.20	* 17.46	* 15.63	*
*	* II	* 15.34	* 15.60	* 15.80	* 15.99	* 16.24	* 16.43	* 15.08	*
*	* III	* 14.38	* 15.06	* 15.20	* 15.34	* 15.52	* 15.65	* 14.69	*

JAMALPUR PRIORITY PROJECT STUDY

10 DAY WATER LEVEL ANALYSIS
 RIVER : BRAHMAPUTRA-JAMUNA
 STATION: 48 JAGANATHGANJ
 PERIOD : 1964 to 1989

* *		WATER LEVEL (m PWD)							
* MONTH	* DECADE	*****							
* *	* *	1:2	1:5	1:10	1:20	1:50	1:100	80%DRY	*

* *	* *	!	!	!	!	!	!	!	*
* APR	* I	9.32	9.67	9.93	10.19	10.52	10.77	8.98	*
* *	* II	9.80	10.35	10.78	11.19	11.72	12.12	9.25	*
* *	* III	10.25	10.70	11.06	11.40	11.84	12.17	9.79	*
* *	* *	!	!	!	!	!	!	!	*
* MAY	* I	10.78	11.43	11.93	12.41	13.03	13.50	10.14	*
* *	* II	11.16	11.81	12.31	12.79	13.41	13.87	10.52	*
* *	* III	11.60	12.23	12.72	13.19	13.79	14.25	10.97	*
* *	* *	!	!	!	!	!	!	!	*
* JUN	* I	12.26	12.95	13.48	14.00	14.66	15.16	11.57	*
* *	* II	13.18	13.79	14.26	14.71	15.30	15.74	12.57	*
* *	* III	13.99	14.63	15.12	15.59	16.21	16.67	13.35	*
* *	* *	!	!	!	!	!	!	!	*
* JUL	* I	14.29	14.68	14.98	15.27	15.64	15.92	13.90	*
* *	* II	14.47	14.86	15.16	15.45	15.82	16.10	14.09	*
* *	* III	14.68	15.11	15.44	15.75	16.16	16.46	14.26	*
* *	* *	!	!	!	!	!	!	!	*
* AUG	* I	14.67	15.19	15.59	15.98	16.48	16.85	14.15	*
* *	* II	14.37	14.98	15.45	15.90	16.48	16.92	13.76	*
* *	* III	14.38	14.97	15.43	15.88	16.45	16.88	13.78	*
* *	* *	!	!	!	!	!	!	!	*
* SEP	* I	14.29	14.88	15.33	15.76	16.32	16.74	13.71	*
* *	* II	14.24	14.73	15.10	15.46	15.92	16.27	13.76	*
* *	* III	14.05	14.51	14.87	15.21	15.66	15.99	13.58	*
* *	* *	!	!	!	!	!	!	!	*
* OCT	* I	13.61	14.06	14.42	14.75	15.19	15.52	13.15	*
* *	* II	12.99	13.55	13.99	14.41	14.95	15.35	12.42	*
* *	* III	12.22	12.74	13.14	13.53	14.03	14.40	11.70	*
* *	* *	!	!	!	!	!	!	!	*
* NOV	* I	11.36	11.77	12.09	12.39	12.79	13.08	10.95	*
* *	* II	10.76	11.08	11.33	11.56	11.87	12.10	10.44	*
* *	* III	10.27	10.53	10.73	10.92	11.16	11.35	10.02	*
* *	* *	!	!	!	!	!	!	!	*

RIVER : OLD BRAHMAPUTRA

AN4-Apx.A-27

Table 4.A.18

JAMALPUR PRIORITY PROJECT STUDY

10 DAY WATER LEVEL ANALYSIS

STATION :134B OFFTAKE OF JHENAI

LEVEL : m PWD

PERIOD : 1975 to 1989

RIVER : OLD BRAHMAPUTRA

* * *		WATER LEVEL (m PWD)							*
* MONTH	* DECADE	*****							
*	*	* 1:2	* 1:5	* 1:10	* 1:20	* 1:50	* 1:100	* 80%DRY	*

* APR	* I	* 12.02	* 12.38	* 12.65	* 12.87	* 13.19	* 13.43	* 11.67	*
*	* II	* 12.39	* 12.95	* 13.38	* 13.73	* 14.24	* 14.63	* 11.82	*
*	* III	* 12.57	* 13.08	* 13.47	* 13.78	* 14.24	* 14.58	* 12.06	*
*	*	*	*	*	*	*	*	*	*
* MAY	* I	* 13.12	* 13.96	* 14.61	* 15.13	* 15.90	* 16.47	* 12.27	*
*	* II	* 13.44	* 14.21	* 14.79	* 15.26	* 15.96	* 16.48	* 12.68	*
*	* III	* 14.14	* 15.09	* 15.81	* 16.40	* 17.26	* 17.91	* 13.19	*
*	*	*	*	*	*	*	*	*	*
* JUN	* I	* 14.63	* 15.65	* 16.43	* 17.06	* 17.98	* 18.68	* 13.61	*
*	* II	* 15.27	* 16.31	* 17.10	* 17.75	* 18.70	* 19.41	* 14.22	*
*	* III	* 16.13	* 17.04	* 17.74	* 18.30	* 19.13	* 19.75	* 15.22	*
*	*	*	*	*	*	*	*	*	*
* JUL	* I	* 16.74	* 17.25	* 17.63	* 17.94	* 18.40	* 18.75	* 16.23	*
*	* II	* 16.82	* 17.43	* 17.90	* 18.28	* 18.84	* 19.26	* 16.20	*
*	* III	* 17.08	* 17.55	* 17.91	* 18.20	* 18.62	* 18.94	* 16.60	*
*	*	*	*	*	*	*	*	*	*
* AUG	* I	* 16.99	* 17.56	* 18.00	* 18.36	* 18.88	* 19.27	* 16.42	*
*	* II	* 16.47	* 17.22	* 17.79	* 18.25	* 18.93	* 19.44	* 15.72	*
*	* III	* 16.49	* 17.39	* 18.08	* 18.63	* 19.45	* 20.06	* 15.60	*
*	*	*	*	*	*	*	*	*	*
* SEP	* I	* 16.57	* 17.43	* 18.09	* 18.62	* 19.41	* 19.99	* 15.71	*
*	* II	* 16.66	* 17.26	* 17.72	* 18.09	* 18.63	* 19.04	* 16.06	*
*	* III	* 16.28	* 17.01	* 17.56	* 18.02	* 18.68	* 19.18	* 15.55	*
*	*	*	*	*	*	*	*	*	*
* OCT	* I	* 15.79	* 16.39	* 16.85	* 17.22	* 17.77	* 18.18	* 15.19	*
*	* II	* 15.32	* 16.24	* 16.94	* 17.50	* 18.34	* 18.96	* 14.40	*
*	* III	* 14.52	* 15.21	* 15.74	* 16.17	* 16.79	* 17.26	* 13.83	*
*	*	*	*	*	*	*	*	*	*
* NOV	* I	* 13.53	* 13.98	* 14.33	* 14.62	* 15.03	* 15.34	* 13.07	*
*	* II	* 12.96	* 13.38	* 13.70	* 13.96	* 14.34	* 14.63	* 12.54	*
*	* III	* 12.62	* 13.01	* 13.31	* 13.55	* 13.90	* 14.17	* 12.22	*
*	*	*	*	*	*	*	*	*	*

JAMALPUR PRIORITY PROJECT STUDY

10 DAY WATER LEVEL ANALYSIS

LOCATION: CHATAL OFFTAKE

LEVEL: m PWD

PERIOD: 1964 to 1989

RIVER: JAMUNA

* MONTH * DECADE		* WATER LEVEL (m PWD) *							
* * *		1:2	1:5	1:10	1:20	1:50	1:100	80% DRY	*

* APR *	I	13.02	13.40	13.69	13.97	14.33	14.60	12.64	*
	II	13.58	14.08	14.39	14.83	15.31	15.67	13.08	*
	III	14.09	14.58	14.95	15.31	15.77	16.11	13.61	*
* MAY *	I	14.62	15.24	15.72	16.18	16.77	17.22	14.00	*
	II	15.05	15.73	16.25	16.75	17.40	17.88	14.38	*
	III	15.52	16.22	16.75	17.27	17.93	18.44	14.80	*
* JUN *	I	16.15	16.92	17.52	18.09	18.84	19.39	15.38	*
	II	16.98	17.71	18.28	18.82	19.50	20.06	15.94	*
	III	17.57	18.09	18.54	18.95	19.47	19.86	17.03	*
* JUL *	I	17.94	17.98	18.53	18.78	19.10	19.34	17.61	*
	II	17.97	18.38	18.67	18.99	19.38	19.67	17.56	*
	III	18.22	18.59	18.87	19.14	19.50	19.76	17.86	*
* AUG *	I	18.11	18.53	18.87	19.19	19.60	19.91	17.66	*
	II	17.76	18.32	18.74	19.16	19.70	20.10	16.90	*
	III	17.71	18.30	18.75	19.19	19.76	20.18	17.12	*
* SEP *	I	17.61	18.24	18.73	19.21	19.82	20.28	16.97	*
	II	17.71	18.21	18.59	18.96	19.44	19.80	17.21	*
	III	17.56	18.02	18.37	18.71	19.15	19.48	17.10	*
* OCT *	I	17.07	17.66	18.11	18.54	19.10	19.52	16.49	*
	II	16.44	17.17	17.70	18.28	18.98	19.50	15.71	*
	III	15.60	16.17	16.61	17.03	17.58	17.99	15.03	*
* NOV *	I	14.77	15.12	15.40	15.66	15.99	16.25	14.42	*
	II	14.13	14.39	14.59	14.78	15.03	15.22	13.87	*
	III	13.67	13.85	13.99	14.43	14.31	14.44	13.48	*

JAMALPUR PRIORITY PROJECT STUDY

10 DAY WATER LEVEL ANALYSIS

LOCATION : ISLAMPUR

LEVEL : m PWD

PERIOD : 1975 to 1989

RIVER : OLD BRAHMAPUTRA

* * *		WATER LEVEL (m PWD)							*
* MONTH	* DECADE	*****							
* *	* *	* 1:2	* 1:5	* 1:10	* 1:20	* 1:50	* 1:100	* 80%DRY	*

* APR	* I	* 13.16	* 13.40	* 13.59	* 13.77	* 14.01	* 14.19	* 12.92	*
* *	* II	* 13.41	* 13.78	* 14.07	* 14.34	* 14.70	* 14.97	* 13.04	*
* *	* III	* 13.75	* 14.15	* 14.46	* 14.76	* 15.15	* 15.43	* 13.35	*
* *	* *	* *	* *	* *	* *	* *	* *	* *	*
* MAY	* I	* 14.21	* 14.84	* 15.33	* 15.80	* 16.41	* 16.86	* 13.58	*
* *	* II	* 14.60	* 15.26	* 15.78	* 16.27	* 16.91	* 17.38	* 13.94	*
* *	* III	* 15.06	* 15.67	* 16.14	* 15.39	* 17.19	* 17.63	* 14.44	*
* *	* *	* *	* *	* *	* *	* *	* *	* *	*
* JUN	* I	* 15.56	* 16.35	* 16.98	* 17.56	* 18.32	* 18.90	* 14.77	*
* *	* II	* 16.38	* 17.18	* 17.80	* 18.39	* 19.15	* 19.73	* 15.59	*
* *	* III	* 17.12	* 17.81	* 18.34	* 18.85	* 19.52	* 20.02	* 16.43	*
* *	* *	* *	* *	* *	* *	* *	* *	* *	*
* JUL	* I	* 17.56	* 18.01	* 18.35	* 18.69	* 19.12	* 19.44	* 17.12	*
* *	* II	* 17.65	* 18.16	* 18.61	* 19.01	* 19.53	* 19.92	* 17.12	*
* *	* III	* 17.93	* 18.42	* 17.43	* 19.14	* 19.60	* 19.94	* 17.45	*
* *	* *	* *	* *	* *	* *	* *	* *	* *	*
* AUG	* I	* 17.80	* 18.40	* 18.86	* 19.30	* 19.87	* 20.30	* 17.21	*
* *	* II	* 17.44	* 18.18	* 18.75	* 19.29	* 20.00	* 20.53	* 17.01	*
* *	* III	* 17.36	* 18.10	* 18.68	* 19.23	* 19.95	* 20.49	* 16.61	*
* *	* *	* *	* *	* *	* *	* *	* *	* *	*
* SEP	* I	* 17.23	* 17.99	* 18.57	* 19.13	* 19.85	* 20.40	* 16.47	*
* *	* II	* 17.28	* 17.83	* 18.26	* 18.67	* 19.20	* 19.60	* 16.73	*
* *	* III	* 17.16	* 17.68	* 18.09	* 18.48	* 18.99	* 19.37	* 16.63	*
* *	* *	* *	* *	* *	* *	* *	* *	* *	*
* OCT	* I	* 16.67	* 17.20	* 17.61	* 18.00	* 18.51	* 18.89	* 16.15	*
* *	* II	* 16.17	* 16.85	* 17.38	* 17.90	* 18.56	* 19.05	* 15.48	*
* *	* III	* 15.31	* 15.79	* 16.16	* 16.51	* 16.98	* 17.32	* 14.83	*
* *	* *	* *	* *	* *	* *	* *	* *	* *	*
* NOV	* I	* 14.56	* 14.93	* 15.22	* 15.50	* 15.86	* 16.13	* 14.18	*
* *	* II	* 14.07	* 14.38	* 14.61	* 14.84	* 15.14	* 15.36	* 13.46	*
* *	* III	* 13.78	* 14.02	* 14.20	* 14.38	* 14.61	* 14.78	* 13.54	*
* *	* *	* *	* *	* *	* *	* *	* *	* *	*



Table 4.A.21 10 Day Water Level Analysis
Offtake Of Chatal (Lean Period)

MONTH	DECD	1:2	1:5	1:10	1:20	1:50	1:100	80% DRY
DECEMBER	I	13.26	13.47	13.62	13.77	13.97	14.11	13.05
	II	12.98	13.15	13.28	13.41	13.58	13.70	12.81
	III	12.75	12.91	13.04	13.16	13.31	13.43	12.58
JANUARY	I	12.54	12.71	12.85	12.97	13.14	13.26	12.37
	II	12.38	12.54	12.67	12.79	12.95	13.07	12.22
	III	12.22	12.42	12.54	12.66	12.81	12.92	12.10
FEBRUARY	I	12.14	12.32	12.45	12.58	12.75	12.87	11.97
	II	12.14	12.36	12.53	12.69	12.91	13.06	11.92
	III	12.20	12.40	12.56	12.71	12.91	13.04	12.00
MARCH	I	12.31	12.58	12.79	12.99	13.24	13.43	12.05
	II	12.51	12.85	13.12	13.37	13.70	13.94	4.17
	III	12.62	12.97	13.25	13.52	13.86	14.12	12.26

Table 4.A.22 10 Day Water Level Analysis
Offtake Of Jhenai (Lean Period)

MONTH	DECD	1:2	1:5	1:10	1:20	1:50	1:100	80% DRY
DECEMBER	I	12.75	12.93	13.07	13.21	13.39	13.52	13.56
	II	12.66	12.89	13.07	13.24	13.44	13.63	12.42
	III	12.50	12.64	12.75	12.86	12.99	13.09	12.36
JANUARY	I	12.45	12.57	12.65	12.74	12.85	12.94	12.33
	II	12.40	12.51	12.60	12.69	12.80	12.89	12.28
	III	12.39	12.47	12.55	12.64	12.72	12.82	12.24
FEBRUARY	I	12.32	12.43	12.55	12.60	12.71	12.79	12.20
	II	12.29	12.40	12.49	12.57	12.68	12.77	12.17
	III	12.25	12.37	12.46	12.55	12.66	12.75	12.13
MARCH	I	12.24	12.37	12.48	12.57	12.70	12.79	12.11
	II	12.23	12.36	12.46	12.57	12.70	12.79	12.09
	III	12.23	12.38	12.49	12.60	12.74	12.85	12.08

Table 4.A.23 Frequency Analysis of
Annual Maximum Discharge

STATION	RIVER	RIVER DISCHARGE IN CUMEC					
		RETURN INTERVAL YEARS					
		2	5	10	20	50	100
Bahadurabad	Jamuna	66396	76790	84824	92532	102507	109995
Baruria	Padma	90564	105064	116223	126934	140811	151202
Jhenai offtake	Jhenai	864	1139	1347	1548	1807	2001
Wymensingh	O-Bramph	3078	3734	4233	4713	5331	5795

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**COMPUTER RUN JAMUNA WATER LEVEL FOR 1985-1988
BOTH PRESENT AND EMBANKED CONDITION**

CHAINAGE Km	1985		1986		1987		1988	
	CONFINED	UN-CONF.	CONFINED	UN-CONF.	CONFINED	UN-CONF.	CONFINED	UN-CONF.
BAHA.BAD								
76.60	19.78	19.74	18.81	18.76	20.12	20.06	21.15	21.07
83.80	19.18	19.12	18.26	18.19	19.51	19.42	20.48	20.36
91.00	18.45	18.34	17.56	17.45	18.78	18.62	19.78	19.55
98.20	17.82	17.67	16.91	16.80	18.16	17.94	19.20	18.95
105.40	17.27	17.09	16.39	16.28	17.59	17.39	18.59	18.31
113.80	16.82	16.62	16.00	15.89	17.12	16.90	18.09	17.77
119.80	16.52	16.29	15.68	15.56	16.83	16.57	17.83	17.45
125.20	16.33	16.07	15.47	15.33	16.65	16.36	17.68	17.27
130.60	16.16	15.88	15.29	15.14	16.48	16.17	17.52	17.07
JAG.GONJ								
137.60	15.85	15.55	14.97	14.80	16.18	15.85	17.24	16.77

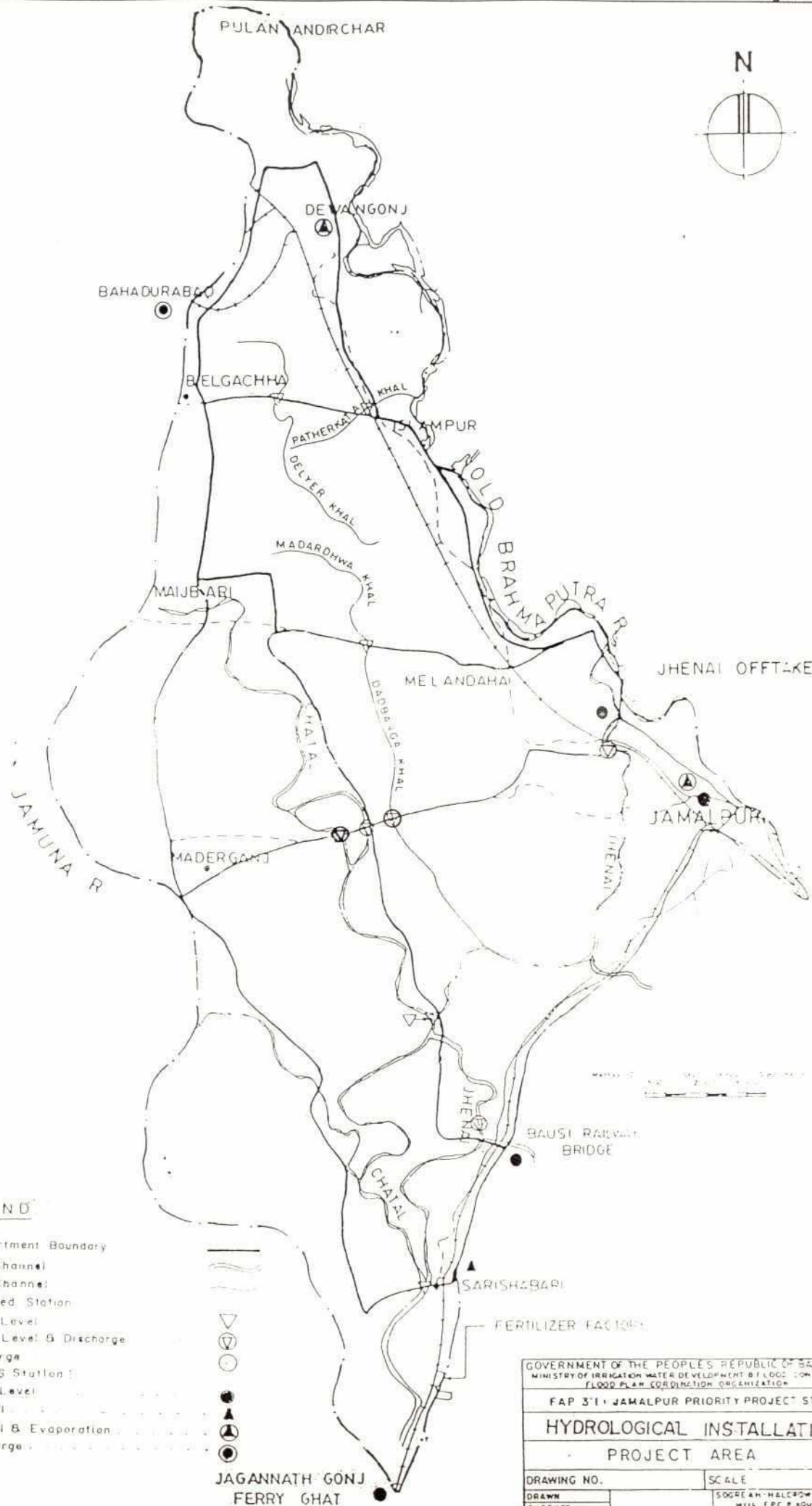
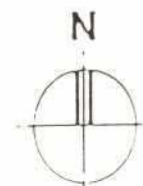
WATER LEVEL : m PWD

SOURCE : FAP-25

YEARLY MAXIMUM MODEL DISCHARGE OF OLD-BRAHMAPUTRA AT JAMALPUR

YEAR	MONTH	DAY	DISCHARGE in Cumec
1975	JULY	28	2419
1976	JULY	05	3005
1977	AUGUST	22	2944
1978	JUNE	29	2211
1979	JULY	28	2569

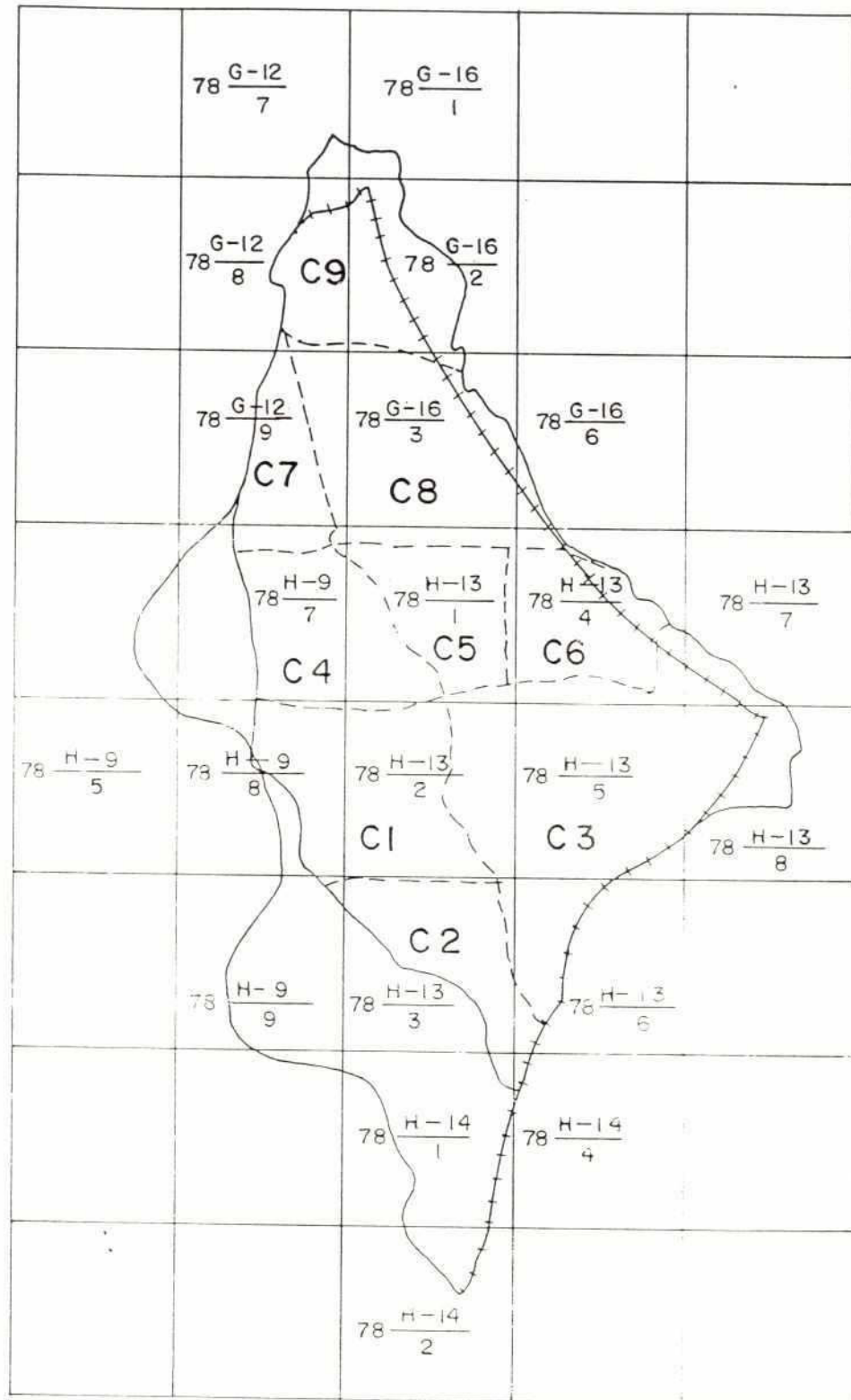
SOURCE : FAP-25



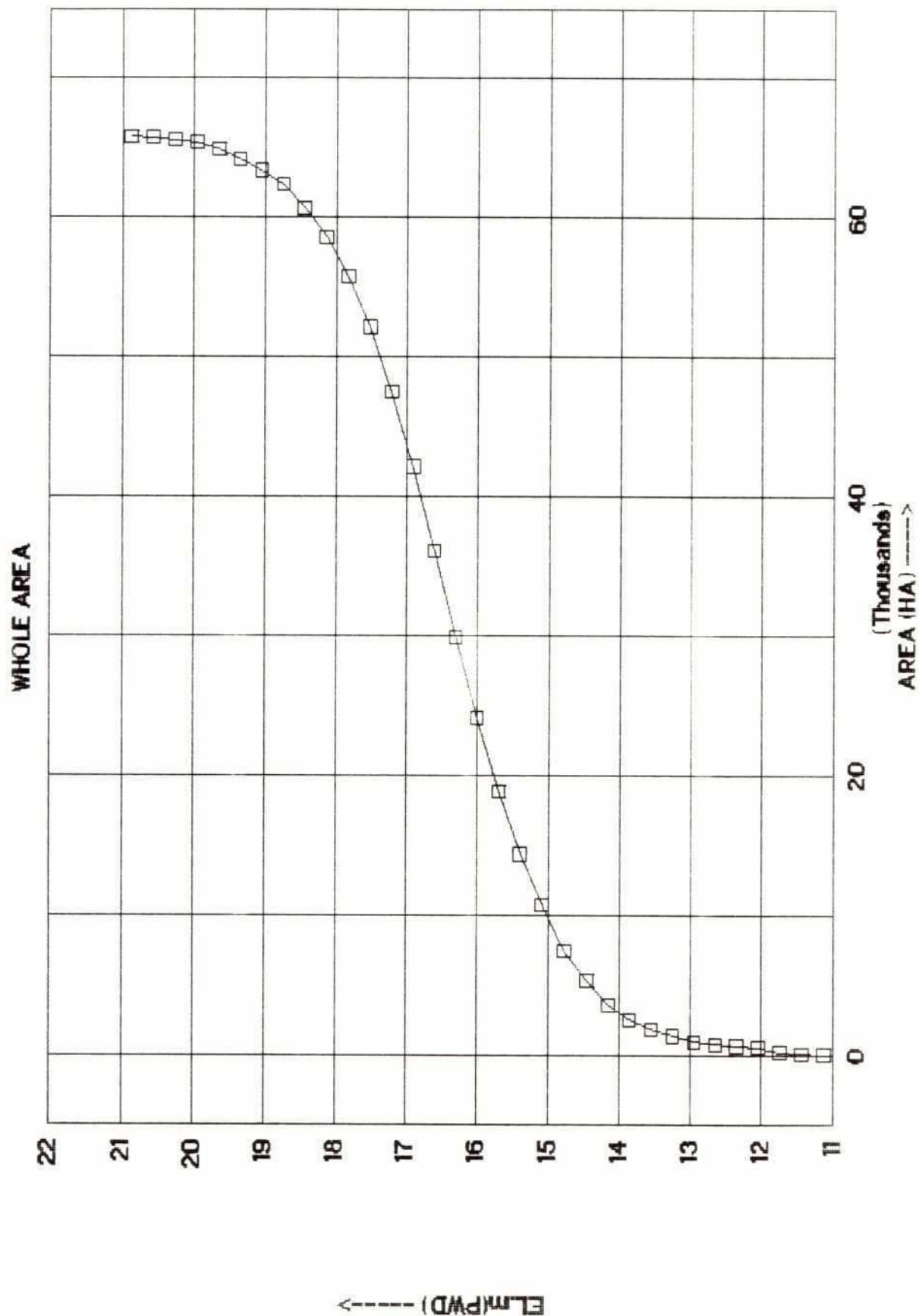
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH	
MINISTRY OF IRRIGATION, WATER DEVELOPMENT & FLOOD CONTROL	
FLOOD PLAN COORDINATION ORGANIZATION	
FAP 311 JAMALPUR PRIORITY PROJECT STUDY	
HYDROLOGICAL INSTALLATION	
PROJECT AREA	
DRAWING NO.	SCALE
DRAWN	SOGREAH-HALCROW-LAMMEYER
CHECKED	WILL EPC & HOWE
APPROVED	Project Office
DATE	HEAVY TO SOGREAH-HALCROW-LAMMEYER

JAMALPUR PRIORITY PROJECT STUDY

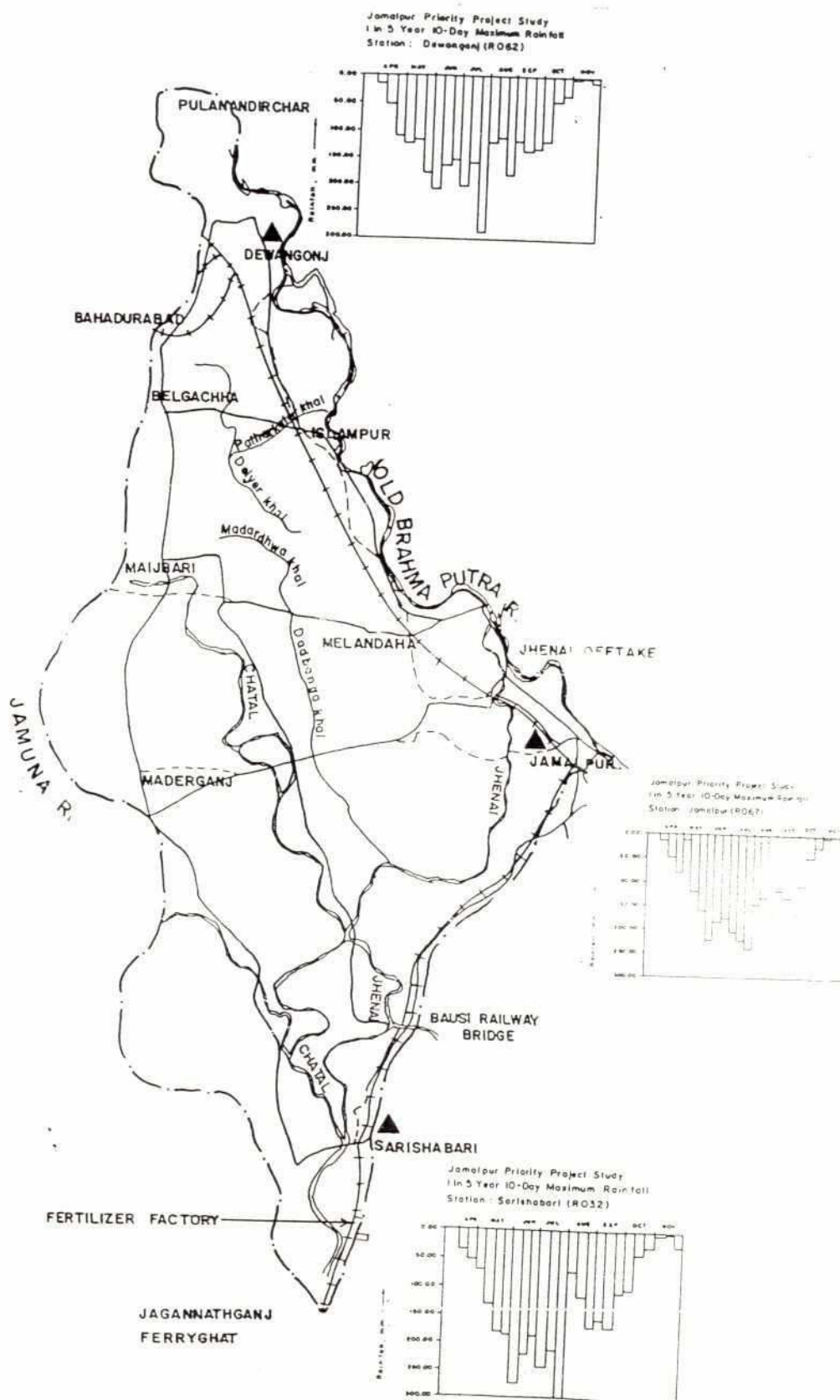
Location of cells



AREA-ELEVATION CURVE

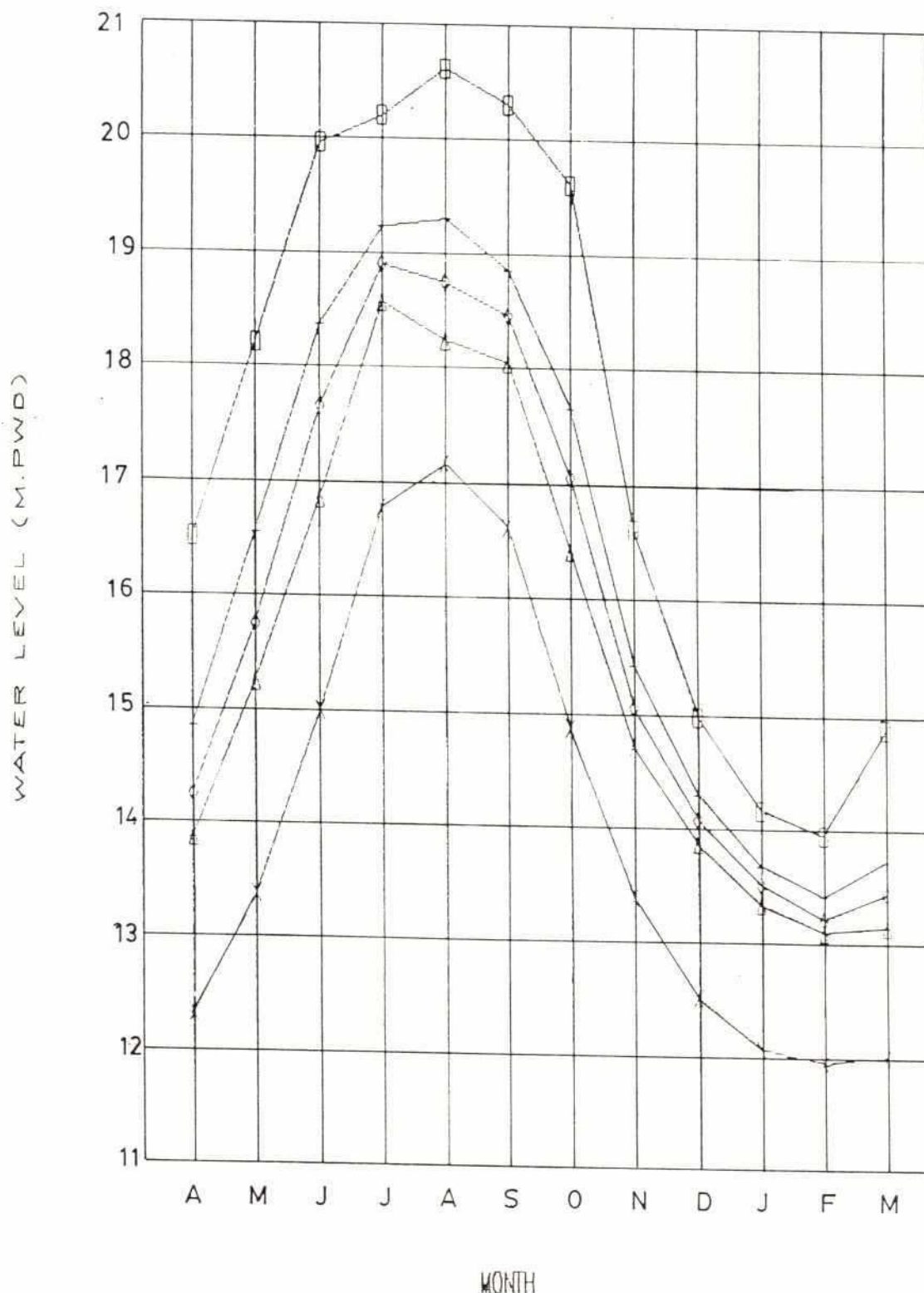


1 in 5 year 10-day Rainfall



Key :

- Maximum
- + 75% Probability of exceedence
- ◇ 50% Probability of exceedence
- △ 25% Probability of exceedence
- X Minimum

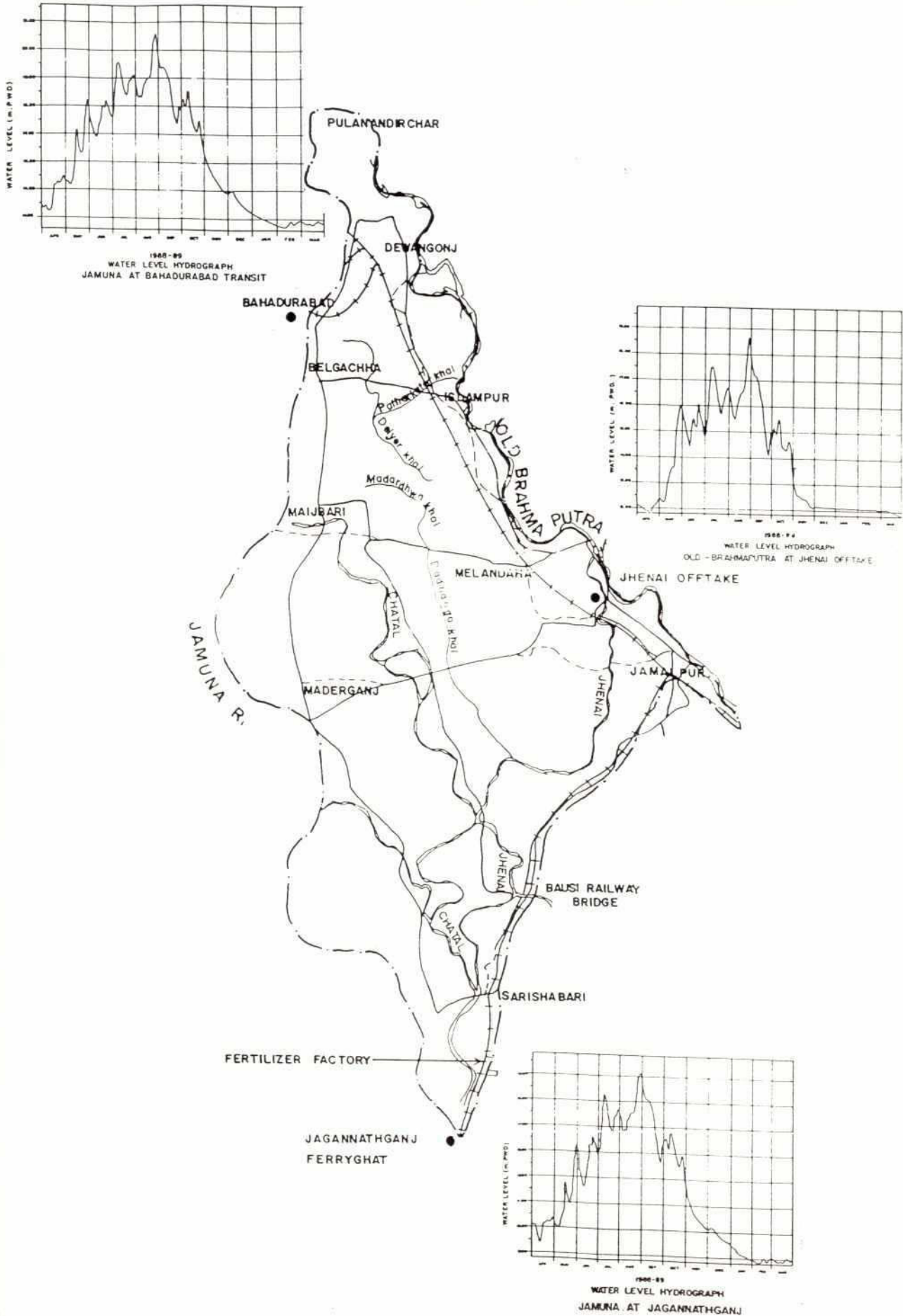


GENERAL WATER LEVEL CHARACTERISTIC OF THE
BRAHMAPUTRA AT BAHADURABAD TRANSIT

SOURCE : B R T S

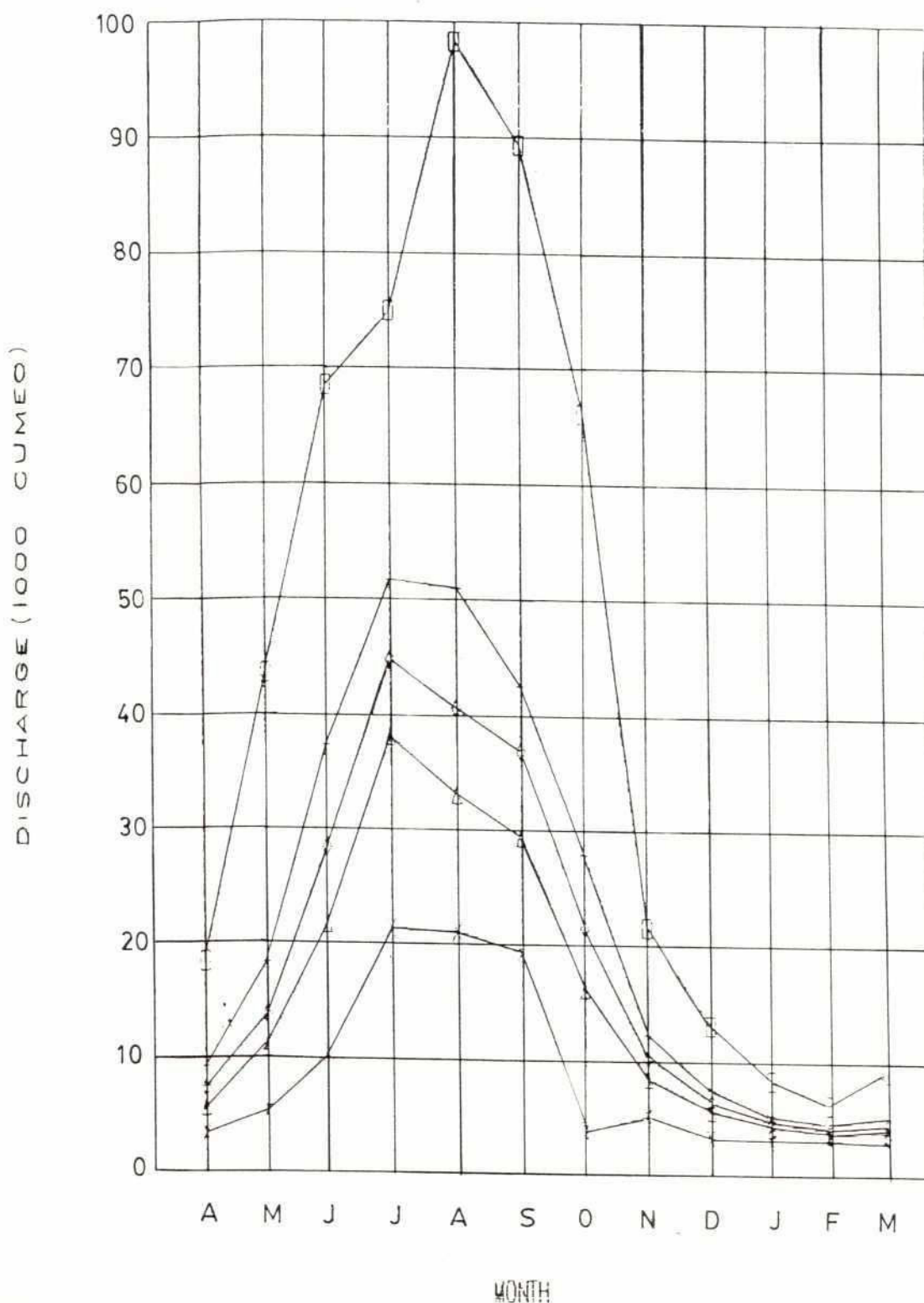
101

Water Level Hydrograph—1988



Key :

- Maximum
- + 75% Probability of exceedence
- ◇ 50% Probability of exceedence
- △ 25% Probability of exceedence
- × Minimum

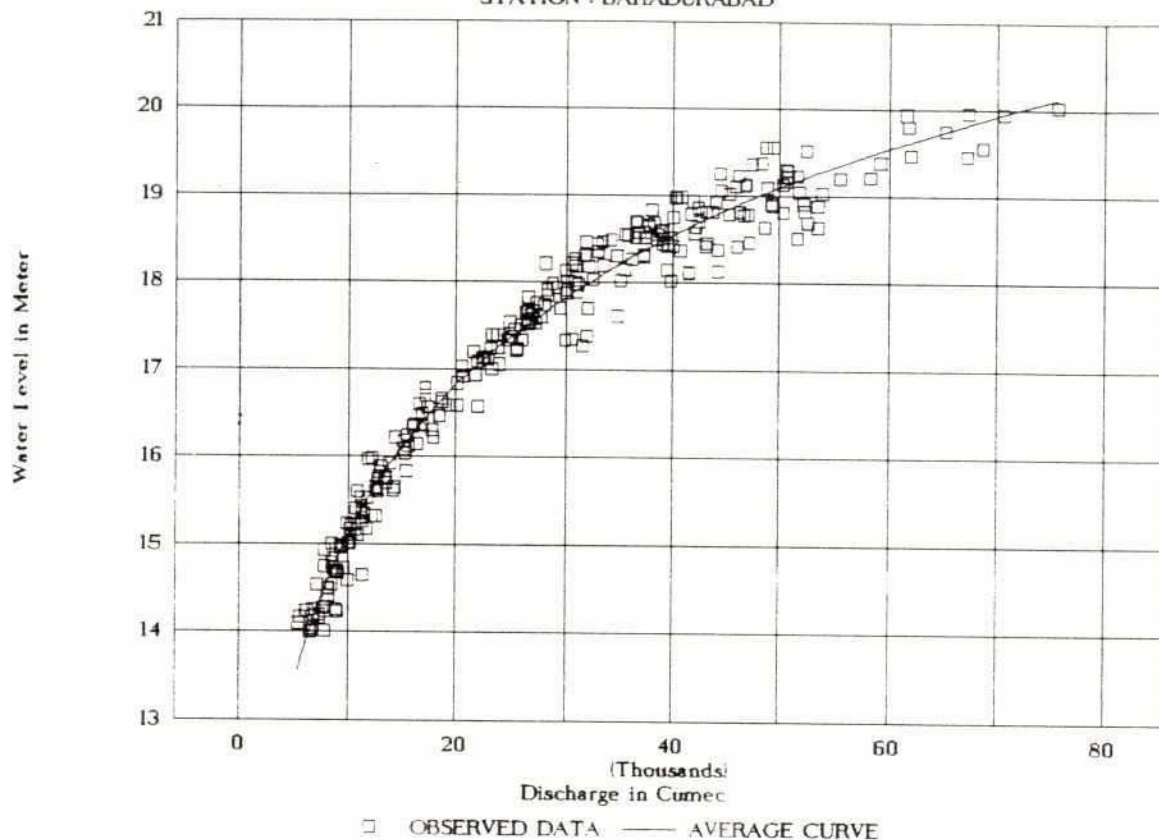


GENERAL DISCHARGE CHARACTERISTIC OF THE
BRAHMAPUTRA AT BAHADURABAD TRANSIT

SOURCE : BRTS

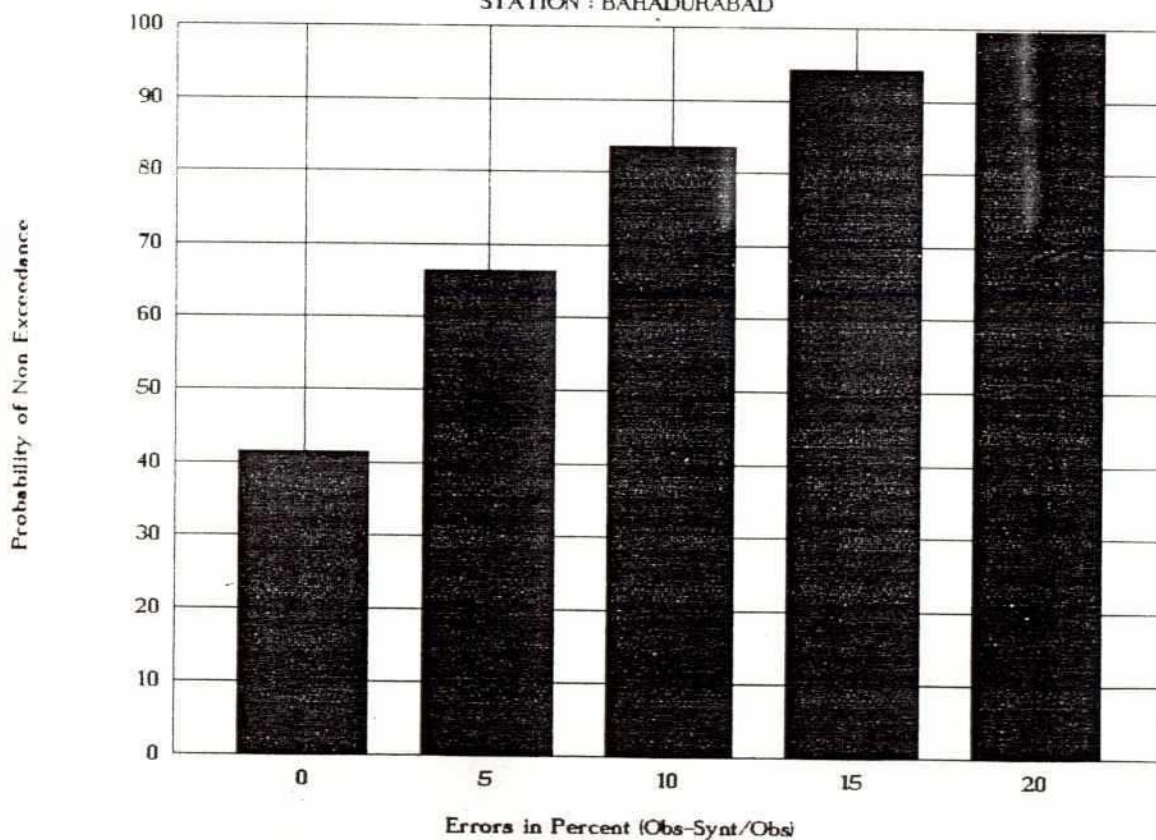
25 YEARS MEAN RATING CURVE

STATION : BAHADURABAD



ERRORS IN MEAN RATING CURVE

STATION : BAHADURABAD



Source : FAP. 25

APPENDIX - B

REPORT ON
HYDROLOGICAL ACTIVITIES
DURING THE EXTENTION PERIOD

APPENDIX B

REPORT ON HYDROLOGICAL ACTIVITIES
DURING THE EXTENTION PERIOD

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4.B.1 Introduction

On priority basis the Jamalpur area has been selected as the first project in the Flood Action Plan (FAP) to be advanced to the stage of feasibility study. The actual study started at the end of September 1991 by then the peak of the river level had passed and the main rainfall was over. The whole study period was thus limited to entirely in the dry season allowing no scope to observe the affects of monsoon flooding on the area. Observation of flooding pattern in the project area is of particular importance for the design of drainage works and for the hydrodynamic model.

4.B.2 Background

The Hydrodynamic mathematical model of the JPPS area has been operational since January 1992 which was developed using existing data. This is based on MIKE 11 software of the SWMC and used information from their General Model of the major rivers of Bangladesh together with data from the similar model, the Coarse Pilot Model constructed by the "North Central Regional Study" FAP-3.

The main objectives of the model application is to provide designers with a model system exhibiting the same hydrodynamic and statistical characteristic as the real system in which topographic mapping and internal gauge water level and flow data play a vital role.

The different non-measurable parameters mainly due to the schematization introduced by modelling and the consistence of such must be adjusted to make the simulation reproduce the reality. It is obvious that, even if a certain degree of schematization is unavoidable but certain character must be described in a quantitative form. As such the data used by calibration which are gauge measurements of water level during a flood event inside the model is of particular importance. The degree of reliability of the model depends on the calibration simulations. Apart from these data we have only qualitative elements for the validation of the model. Most of them have been obtained through the testimony of local people on the depth of last inundation and of their perception of the flood propagation. As agricultural flood damage not only depends on the depth of flooding but also on the duration and period of occurrence.

Scarcity of field information like water level and flow data within the area hampered the model study to a great extent. There were no flow gauging stations for flows into or out of the project area except one at Chatal. Therefore, it is obvious that the Model is of limited reliability because of uncertainties of back up data and because of limited calibration.

4.B.3 Objectives

The main object of the extended studies is to include direct observation of monsoon conditions on site. Collection and analysis of hydrological data and the updating and calibration of the hydrodynamic model with this data and with amendments resulting from the field observations of the drainage pattern, the effects of the different development options proposal can be modelled on the hydrodynamic model to see the consequences interms of water level, discharge, duration period and depth of flooding & drainage efficiency in the area. These can then be interpreted in terms of benefits and disbenefit to arrive at an overall development strategy for the area. With the inclusion of monsoon field data and new contour mapping the study will achieve necessary standard for appraisal.

4.B.4 Programme

A discussion meeting was held on 23rd February 1992 in the SWMC office between the Team Leader JPPS and computational Hydraulic Engineer Mr. Finn Hansen in presence of Executive Engineer BWDB in connection with the setting up of hydrological installation in Jamalpur Priority Project Study Area. The purpose of the meeting was to avoid duplication in gauging activity that may occur as the Jamalpur Priority Project Area is within the boundary of North Central Region Study.

After discussion it was decided and agreed that SWMC will take care of three station namely Chatal at Madargonj, Jhenai offtake and Baushi railway bridge which fall within the JPPS Area.

JPPS will take care of the following stations :

1. Water level gauge station of Patherkata khal at upstream 150m away from railway bridge at Islampur. (Longitude- $89^{\circ}49'$, Latitude- $25^{\circ}05'$).

2. Water level gauge station at Gamaria on Delyer khal 80m upstream of R.C.C. bridge on Islampur - Belgachha road (Longitude- $89^{\circ}44'$, Latitude- $25^{\circ}05'$).
3. Water level gauge station on Madardhaw khal at upstream 100m away from Poilar bridge on Melandah - Mohammedpur road. (Longitude- $89^{\circ}47'$, Latitude- $24^{\circ}59'$).
4. Discharge and water level measurement of Dadbhanga khal at Charadirpara on Jamalpur - Madargonj road. (Longitude- $89^{\circ}48'$, Latitude- $24^{\circ}55'$).
5. Discharge and water level measurement of spill channel of chatal in between Bara Bhangbari and Chhota Bhangbari at Bhelamati on Jamalpur Madargonj Road. (Longitude- $89^{\circ}46'$, Latitude- $24^{\circ}54.5'$).
6. Water level gauge station at about 300m downstream of Chatal - Jhenai upstream confluence near Haripur. (Longitude- $89^{\circ}49'$, Latitude- $24^{\circ}50'$).
7. Water level gauge station after the extreme downstream confluence of Chatal & Jhenai near Sarishabari, at about 500m downstream of the confluence close to Boyera bazar (Longitude- $89^{\circ}49'$, Latitude- $24^{\circ}43'$).

4.B.5 Stream Gauging Installation

A contract to this effect was drawn up between the FAP-3.1 & the Executive Engineer, North Eastern Measurement Division Surface Water Hydrology-1, BWDB on 4th March 1992. As per agreed decision of the meeting on 15th April 1992 in JPPS office between the Hydrologists and the Sub-Divisional Engineer in-charge of Jamalpur area of Mymensingh Hydrological Sub-Division of BWDB the installation of the gauging station started from 19th April 1992 and completed on 15th May 1992. This also includes the bench mark connection to zero level value of the gauges with the general levelling system.

List of gauging stations are as follows:

1. Patherkata khal at upstream of Islampur railway bridge;
2. Delyer khal across Islampur - Belgachha road;

3. Madardhwa khal across Melandaha - Mohammadpur road;
4. Dadbanga khal across Jamalpur - Madarganj road;
5. Belamari khal across Jamalpur - Madarganj road;
6. Upstream confluence of Chatal and Jhenai at Haripur;
7. Down stream confluence of Chatal and Jhenai at Boyera.

It should be recalled that three stations managed by SWMC are currently in operation in the study area, bringing the total to 10. In addition BWDB is maintaining two water level and one discharge station in Jamuna river and water level gauging station at Jamalpur.

4.B.6 Network Supervision

The reliability and the accuracy of data depends on the acceptance, performance and alertness of the gauge reader and gauge connection to general levelling system. Time to time field level checking of water level and discharge measurement activity conducted by BWDB were made. This was required to have quality data and to maintain the accuracy of the same. To ensure that the data are fully reliable and to correct any reading errors, frequent inspections were carried out.

The key personnel of BWDB responsible for data collection and processing are based at Dewangonj and Mymensingh respectively. Those officials were contacted time to time.

4.B.7 Flood and Flood Plain Drainage

The project area is dominated by the Jamuna river to the west and by the Old Brahmaputra river to the north east. Flooding from the Jamuna occurs more frequently. Flooding from Old-Brahmaputra is very rare. Flood is a natural phenomena of this area and people are accustomed to live with the flood but with the increased demand of basic needs due to population increase and the severe erosion effect of Jamuna, low lying areas and flood plain have been encroached upon by the people for cultivation and homestead.

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Flooding or inundation is a recurring phenomenon in the project area, which under certain unfavourable circumstances adversely affect the agricultural production. The flood problem in the area is caused by the following factors:

- Inflow from Jamuna river through side spill channels, khals and creeks;
- Over bank flow from Jamuna, which begins to contribute significantly to the flooding of the project area;
- Rainfall in the project area, which has often responsible for the quick rise of water level in the low lying area at the beginning of monsoon season.

The net flooding effect of the spills from Jamuna and rainfall excess depends to a large extent on the drainage capacity and hence on the water level of lower Jamuna and Jhenai at Baushi railway bridge.

Only three major drainage paths pass out of the area. One, the lower Chatal passes out to Jamuna near Sarishabari, the other two the Jhenai and upper Bangsi flow under the railway bridge at Baushi and Kendua respectively into the area to the southern part of NC region.

Rainfall in the project area during the period July to September 1992 shows a very poor record with a monthly maximum of 489 mm at Jamalpur in the month of July. On rush of flood water from hilly areas of India coupled with rain inundated vast areas in the Brahmaputra basin as well as our project area during the early part of July. Drainage in the area in general slow but pattern and flow path remains the same as considered in the model.

4.B.8 Observation on Bench Mark Connection

Gauge zero level connection to general levelling system was conducted by BWDB. They carried the B.M. value from hydrology permanent B.M. established at Bahadurabad Ghat, Jhenai railway bridge, Baushi railway bridge and Jagannathganj Ghat. The hydrology B.M. values are as follows:

Description of BWDB Bench Mark

- Bahadurabad Ghat

B.M. fixed on R.C.C. pillar, located near the Bahadurabad Ghat about 6m south side from railway line.
Top value = 21.785m (PWD)

- Jhenai Railway Bridge

B.M. fixed on southern abutment (west) wall at Jhenai railway bridge. Top value = 20.282m (PWD)

- Baushi Railway Bridge

B.M. fixed on the north-west corner of Baushi railway bridge.
Top value = 18.280m (PWD)

- Jagannathgonj Ghat

B.M. fixed on the north-west corner of passenger shed at Jagannathgonj Ghat.
Top value = 16.170m (PWD).

M/S. Survey Corporation was instructed to connect the zero values of staff gauges installed in the JPPS area by BWDB with respect to the B.M. values used in the topographical survey work and also from nearest Finnmap B.M. The zero level value of gauges shows a minor difference in between Finnmap and Survey Corporation. While comparing to BWDB it is found that the variation ranges from 0.40m to 1.17m but such wide variation is not acceptable.

Accordingly the BWDB was asked to recheck the gauge zero level value. The revised level supplied by Executive Engineer, North Eastern Measurement Division also shows variation ranges from 0.25m to 1.1m with respect to the previous value. A comparative statement of gauge zero value of Finnmap, BWDB and JPPS are shown in the Table 4.B.1 & 4.B.2.

4.B.9 Data Collection and Processing

We have received 3 hourly water level and weekly discharge measurement for the period from May to September 1992 of the proposed hydrological station. The raw data thus obtained were corrected with respect to JPPS gauge zero level value. Attempts have been made to locate the possible sources of error through interviews and inspection in the field and subsequent amendments were made before using it to improve

the model. Water level and discharge hydrograph were drawn to verify the trend and the plots are attached in the report for reference.

4.B.10 Conclusion

The main purpose of the Feasibility Study is to increase the agricultural production by reducing flood damage and to save lands and properties from recurrent flood devastations. To achieve this, flood protection and drainage improvement works are necessary in which hydrological data information and processing play a vital role for the optimal selection of design criteria. Therefore the collection and analysis of field hydrological data has been given top most priority in the extended study period. The discrepancy observed in B.M. connection values were attended properly to avoid any inordinate levelling during the final run of the hydrodynamic model of the study area.

Table 4.B.1

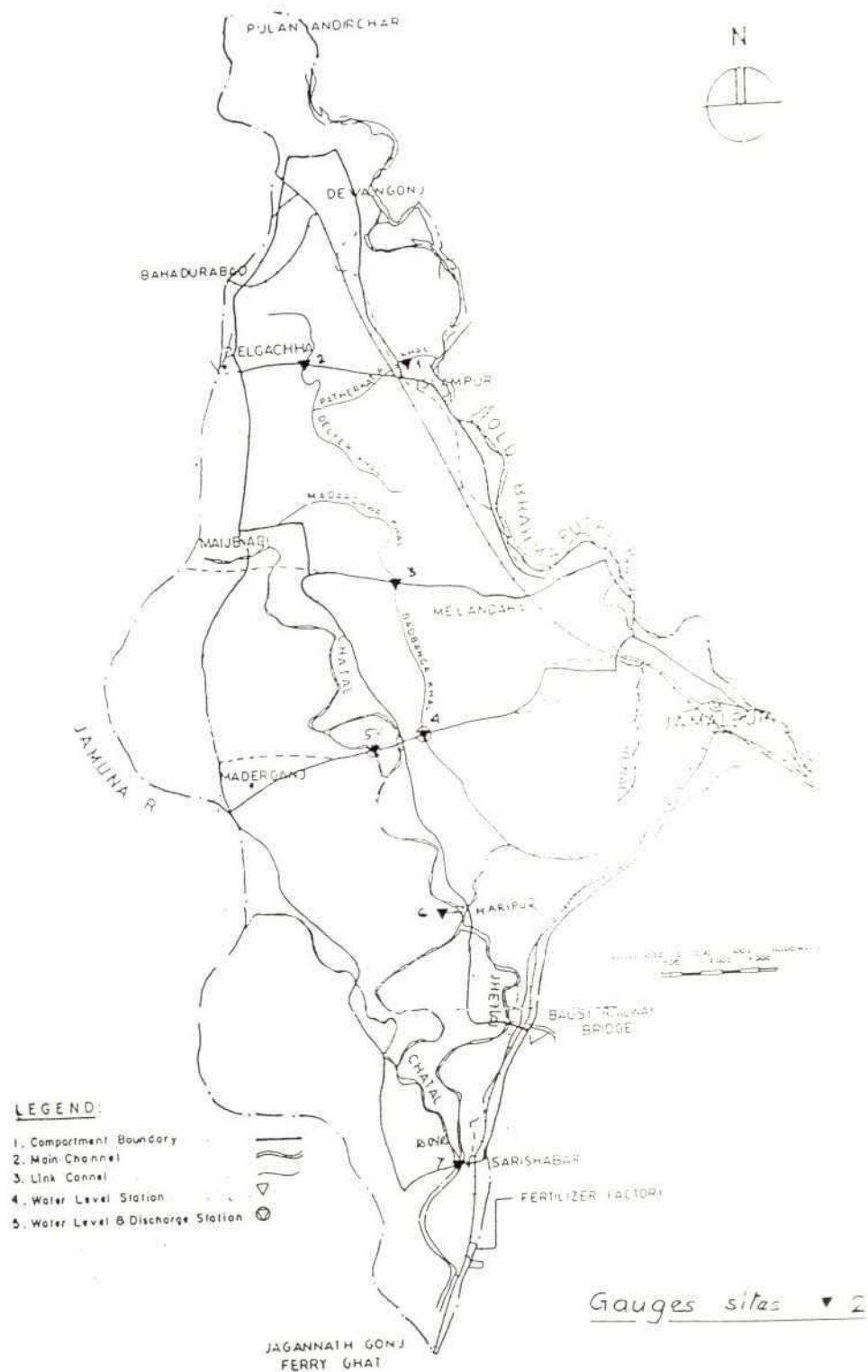
Comparative Statement of
Gauge Connection By BWDB.

Gauge Stn. No.	Name of Khal	Lower Gauge 0 Value in m (PWD)		Diff. between 1st & 2nd Check	Upper Gauge 0 Value in m (PWD)		Diff. between 1st & 2nd Check
		1st Check	2nd Check		1st Check	2nd Check	
1.	Patherkata Khal	15.30	14.19	1.10	17.90	16.79	1.10
2.	Deiyer Khal	14.18	13.68	0.50	17.04	16.54	0.50
3.	Madardhawa Khal	13.89	13.53	0.36	16.58	16.23	0.36
4.	Dadbanga Khal	12.31	12.31	0.00	14.94	14.94	0.00
5.	Belamari Khal	12.81	12.81	0.00	15.23	15.23	0.00
6.	Upstream Confluence of Chatal-Jhenai Haripur	11.54	11.54	0.00	14.17	14.17	0.00
7.	Downstream Confluence of Chatal-Jhenai Boyera	11.89	11.64	0.25	14.68	14.43	0.25

Table 4.B.2 Comparative Statement of Gauge "0" Level
Value: FINNMAP, BWDB and JPPS.

Gauge Stn. No.	Name of Khal	Lower Gauge 0 Value in m (PWD)		Diff. between BWDB & JPPS	Upper Gauge 0 Value in m (PWD)		Diff. between BWDB & JPPS
		FINN MAP	BWDB/JPPS		FINN MAP	BWDB/JPPS	
1.	Patherkata Khal	-	14.19/14.47	0.28	16.95	15.79/17.05	0.17
2.	Deiyer Khal	-	13.68/13.83	0.20	16.65	16.54/16.69	0.15
3.	Madardhawa Khal	-	13.53/12.37	1.16	15.00	16.23/15.06	1.17
4.	Dadbanga Khal	-	12.31/12.32	0.01	14.87	14.94/14.85	0.01
5.	Belamari Khal	12.72	12.81/12.79	0.02	15.14	15.23/15.21	0.02
6.	Upstream Confluence of Chatal-Jhenai Haripur	-	11.54/11.35	0.19	-	14.17/14.00	0.17
7.	Downstream Confluence of Chatal-Jhenai Boyera	-	11.64/11.49	0.15	14.16	14.43/14.29	0.14

LOCATION OF GAUGING STATIONS



STATION: 1

NAME: Patherkata Khal

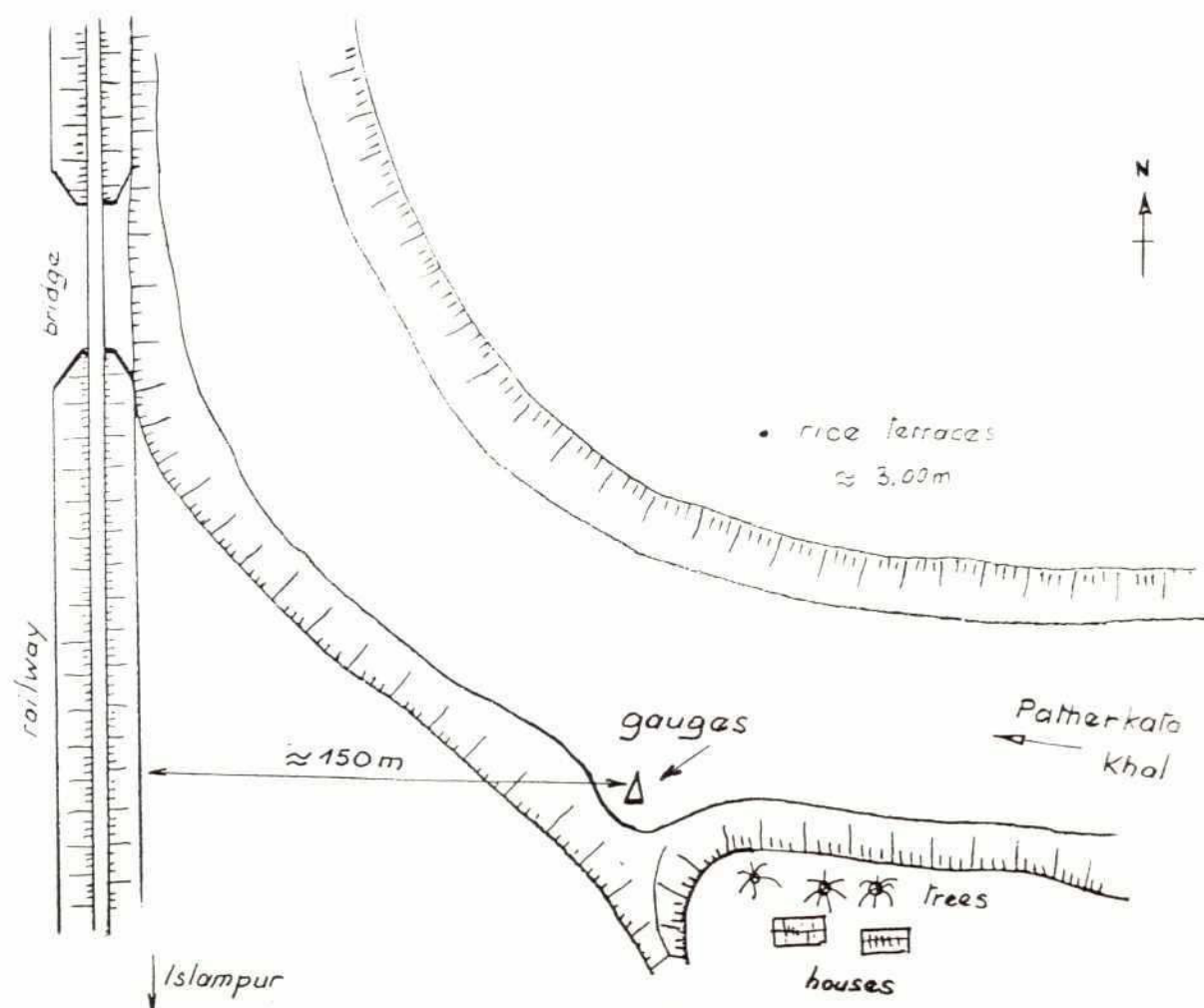
LOCATION: Near the village of Islampur on the Patherkata Khal river, a spill channel of the Old Brahmaputra. 150 m upstream of the railway bridge on the left bank, near small houses. Long = $89^{\circ}49'$. Lat = $25^{\circ}05'$.

OBSERVER: Mr Iqbal Hossain

REMARKS: Located in a sheltered part of the river and protected against floods by upstream vegetation, and by boats with a bamboo network. Good station in a regular part of the river bed

APPROX LAYOUT

The rice crop terraces on the right bank are exactly at the Δ in point of the gauges



STATION: 2

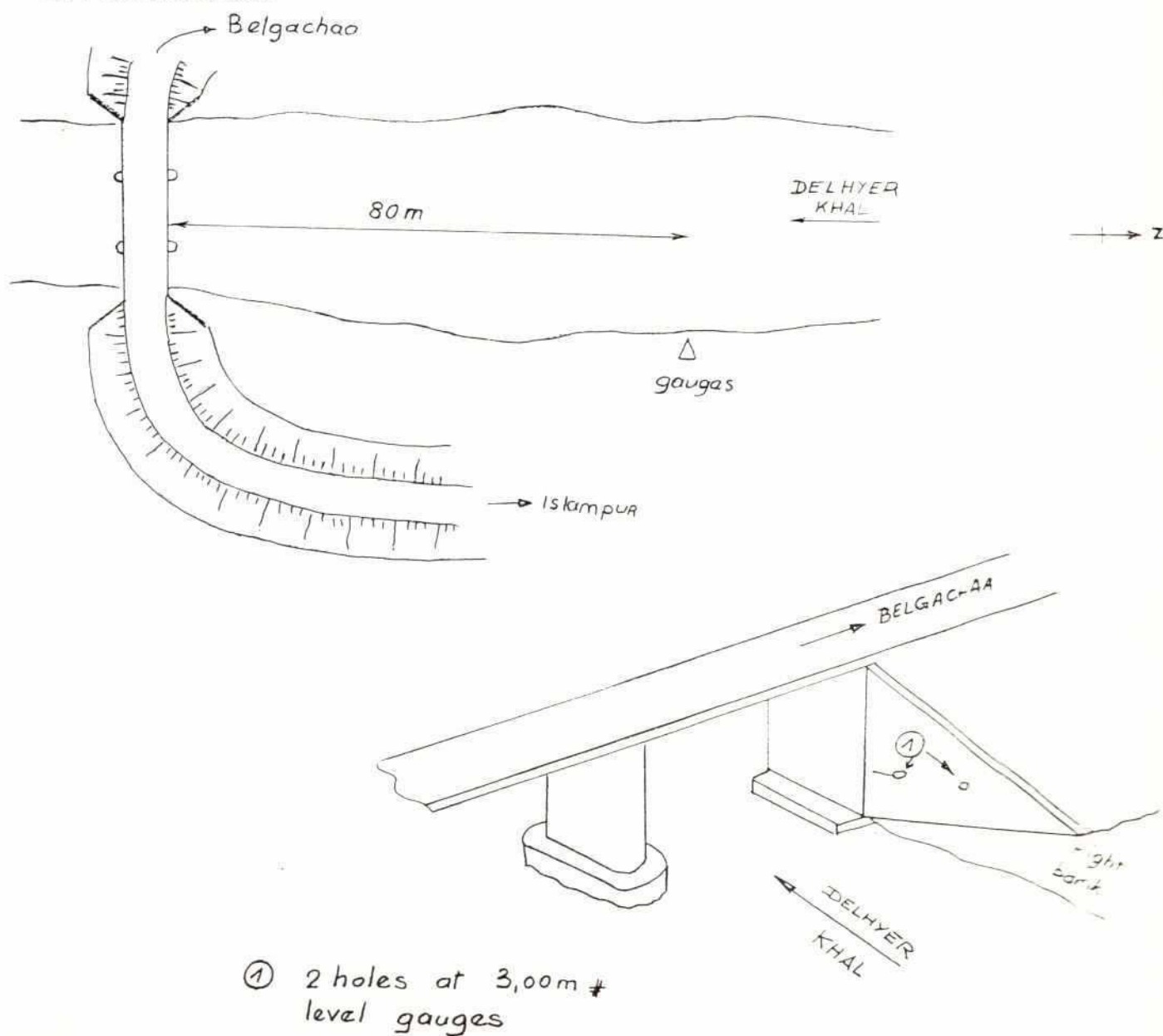
NAME: Delyer Khal

LOCATION: Near the bridge on the Islampur-Belgachaa road, 80 m upstream of the bridge on the left bank. Long = $89^{\circ}44'$. Lat = $25^{\circ}05'$.

OBSERVER: Mr Abdul Latif

REMARKS: Good station. Located in a regular part of the river bed.

APPROX. LAYOUT



STATION: 3

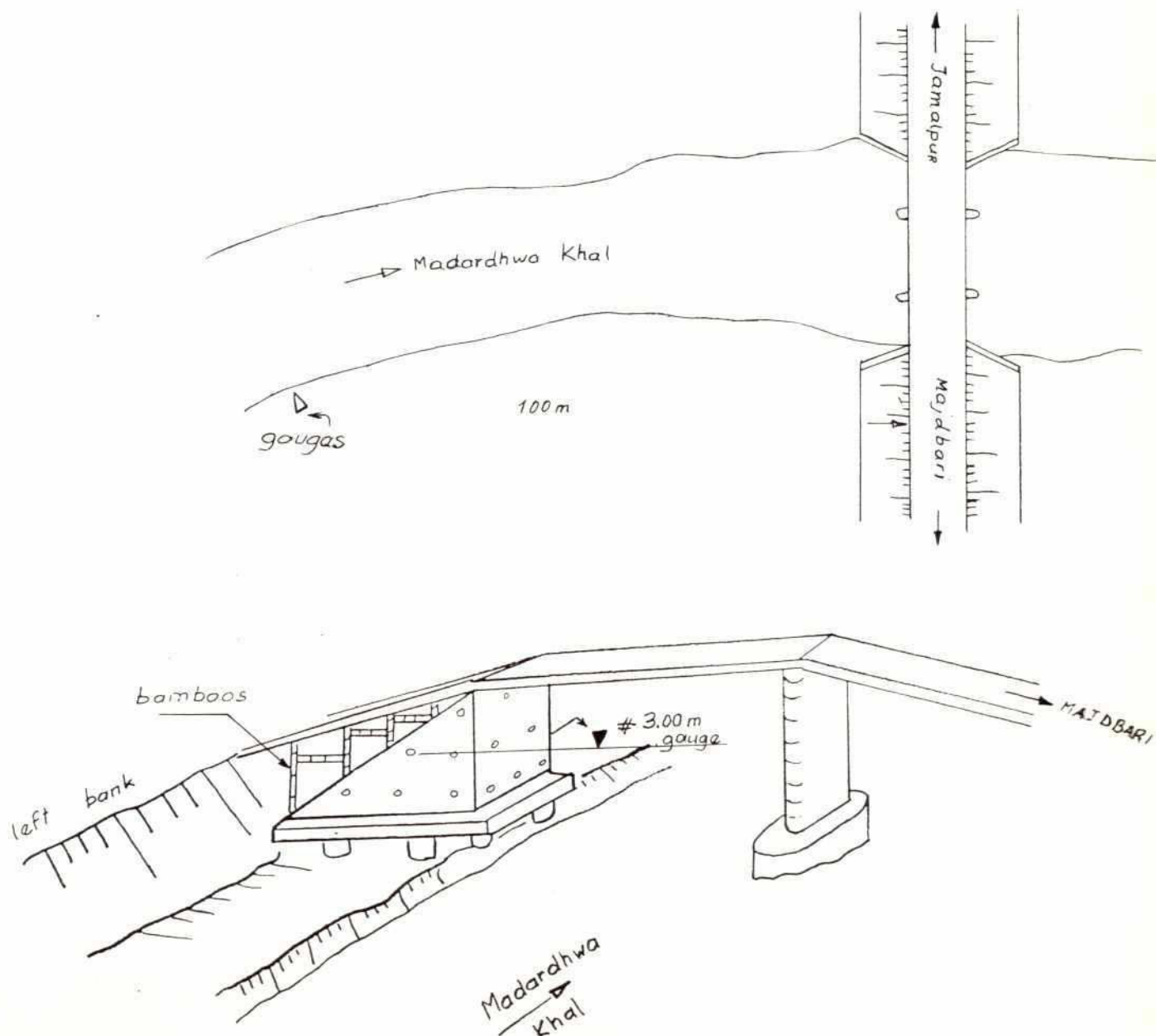
NAME: Madardhwa Khal

LOCATION: On the right bank, 100 m upstream of the destroyed bridge.
Long = $89^{\circ}47'$. Lat = $24^{\circ}59'$.

OBSERVER: Mr Mohamed Hasem

REMARKS: Good station. Located in a regular part of the river bed, in a wide curve.

APPROX. LAYOUT



STATION: 4

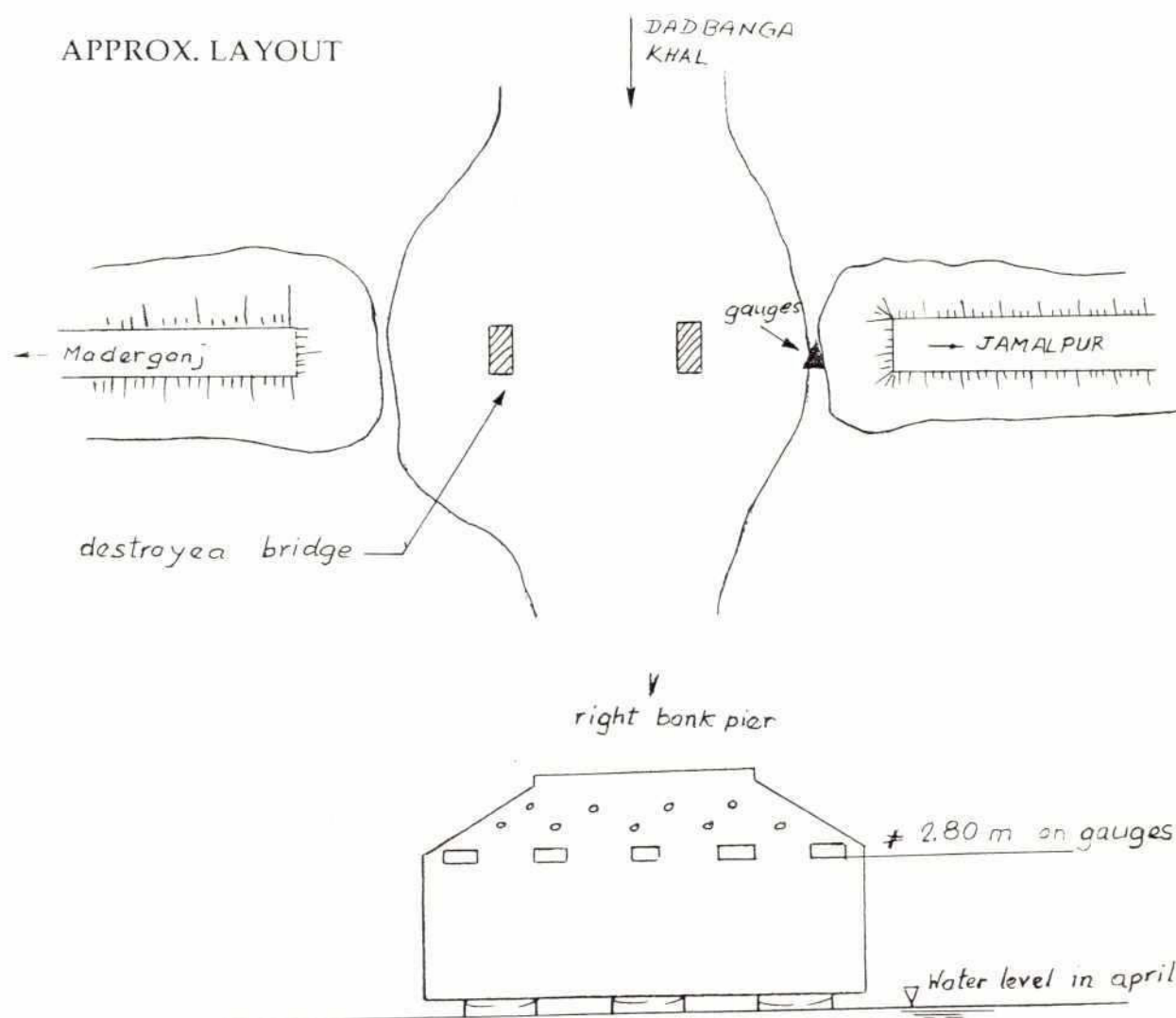
NAME: Dadbanga Khal

LOCATION: On Dadbanga Khal channel. On the destroyed bridge to Maderganj, on the left bank. Long = $89^{\circ}48'$. Lat = $24^{\circ}55'$.

OBSERVER: Mr Mohamed Kirul Alam

REMARKS: Good station. The gauges are in a part of the river where the current is gentle.

APPROX. LAYOUT



STATION: 5

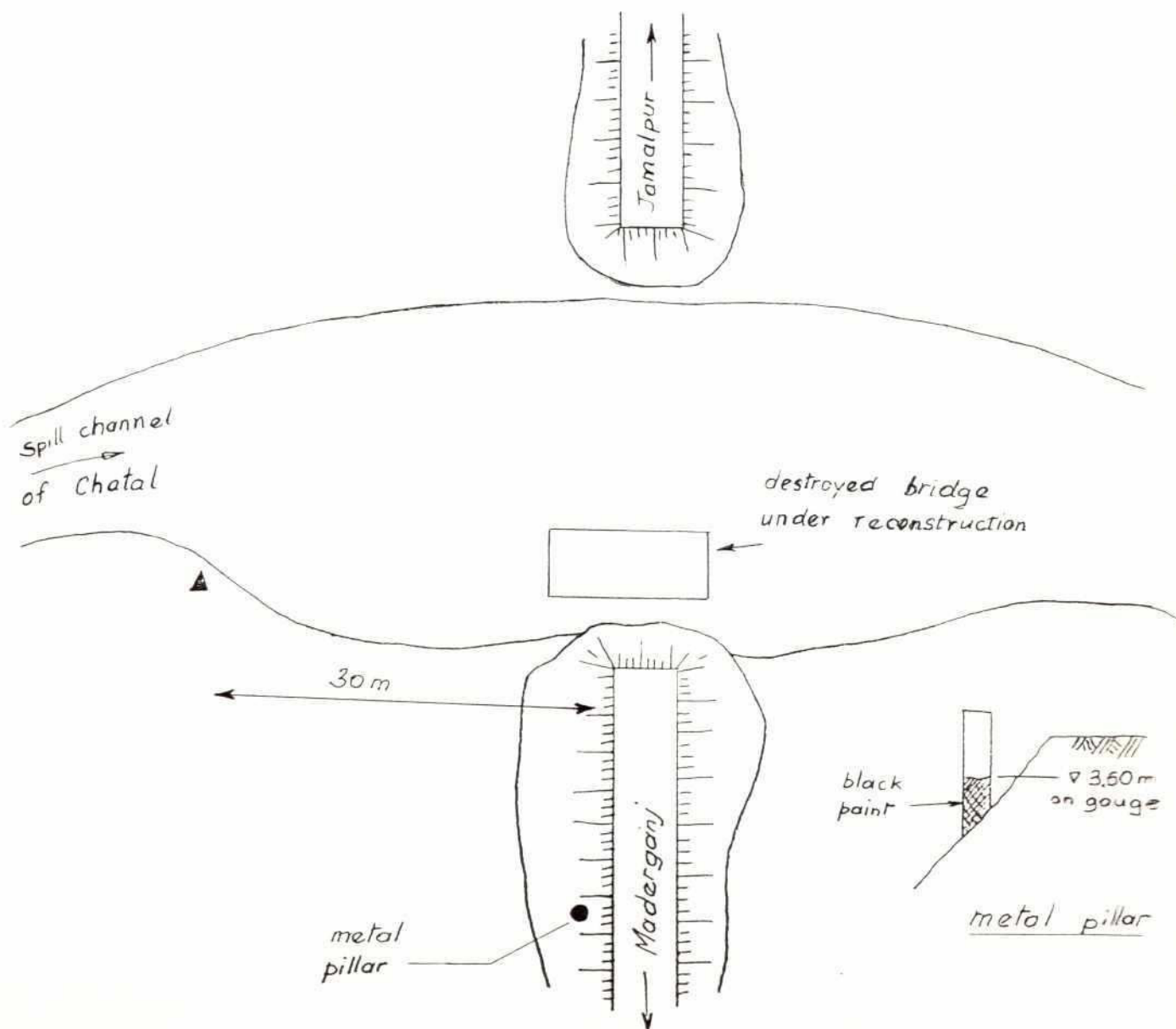
NAME: Chatal

LOCATION: On Chatal spill channel. Upstream of the bridge under construction, on the left bank. Long = $89^{\circ}46'$. Lat = $24^{\circ}54'$.

OBSERVER: Mr Rabiul Alam

REMARKS: This station is located in an irregular part of the channel. It is important to take readings carefully.

APPROX. LAYOUT



STATION: 6

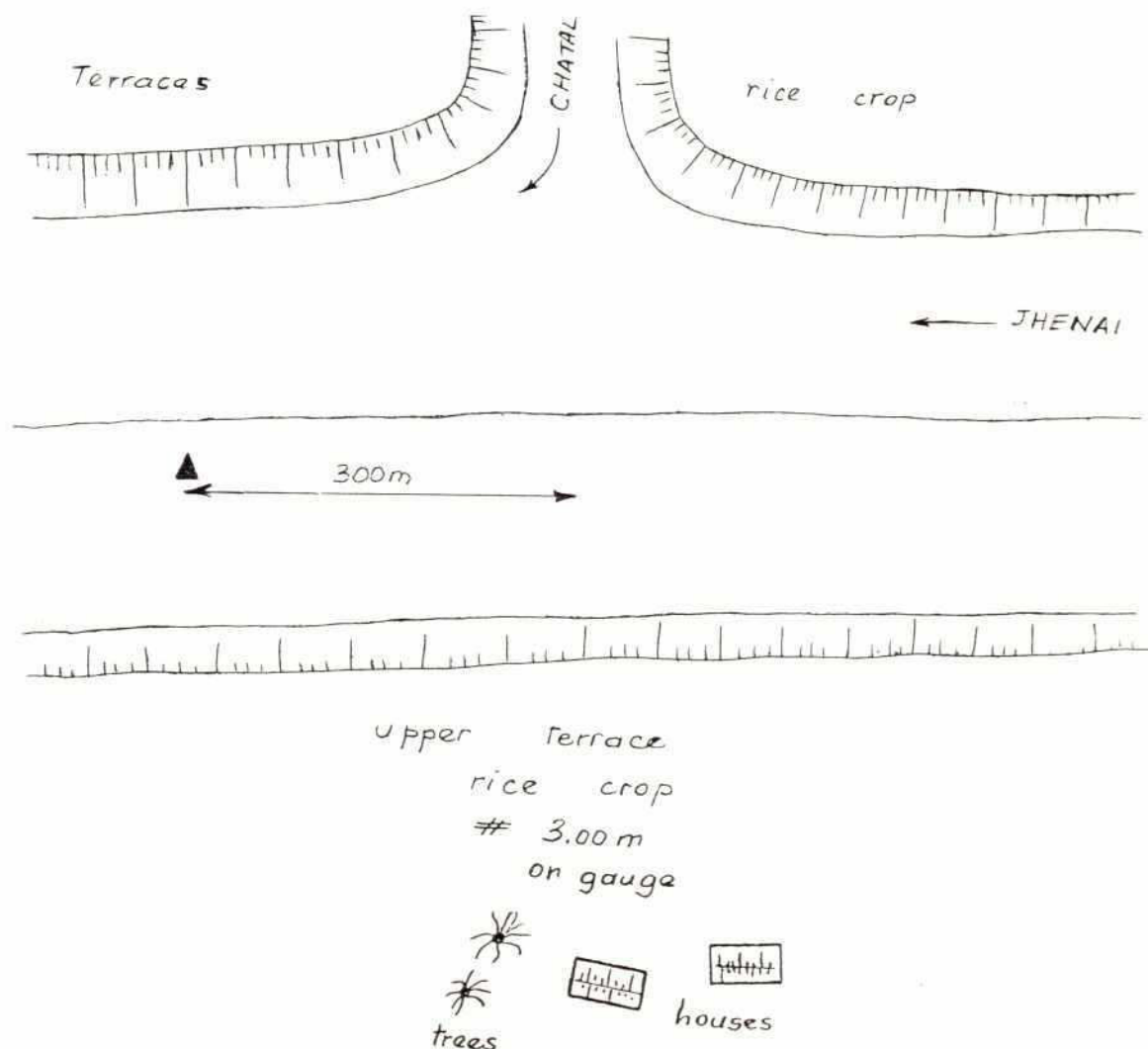
NAME: Upstream Chatal-Jhenai confluence

LOCATION: About 300 m downstream of the Chatal-Jhenai confluence, on the left bank near small houses. Long = $89^{\circ}49'$. Lat = $24^{\circ}50'$.

OBSERVER: Mr Abdul Hoque

REMARKS: Good station. Located in a straight part of the river. Upper and lower sections are regular, without any particular hydraulic features. It takes 45 minutes to reach the site on foot.

APPROX. LAYOUT



STATION: 7

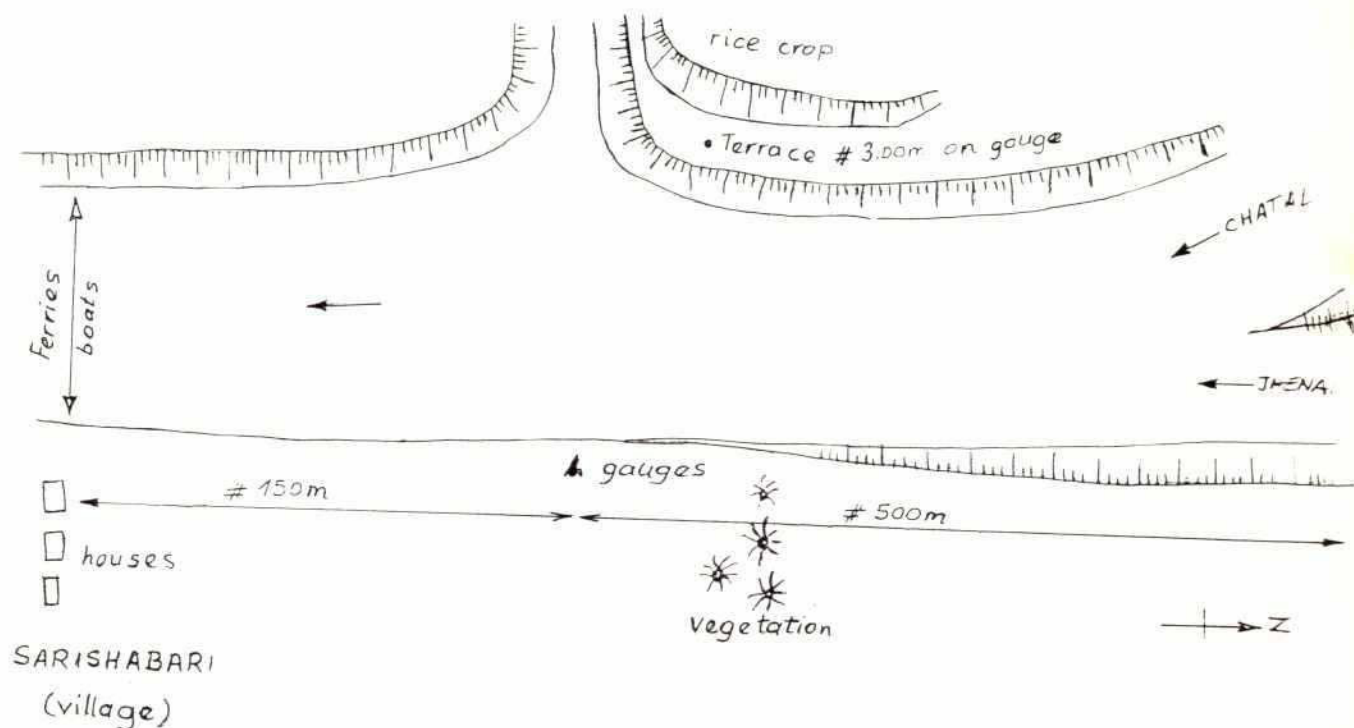
NAME: Downstream Chatal-Jhenai confluence

LOCATION: Near Sarishabari, 500 m downstream of the Chatal-Jhenai confluence, on the left bank. Long = $89^{\circ}49'$. Lat = $24^{\circ}43'$.

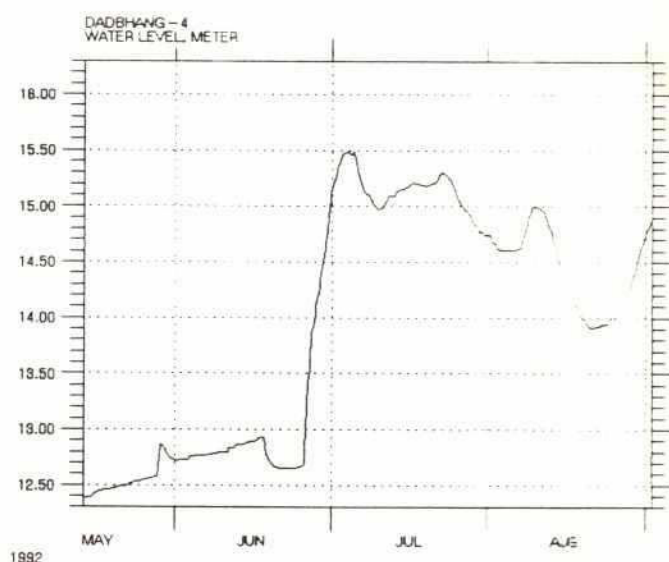
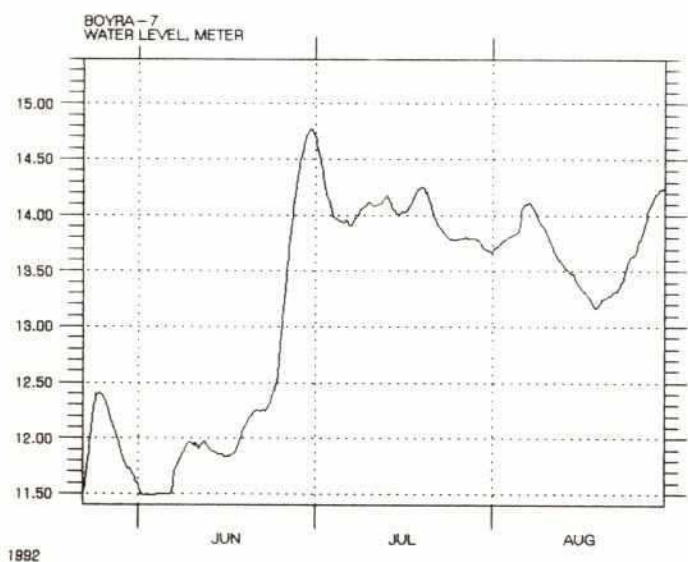
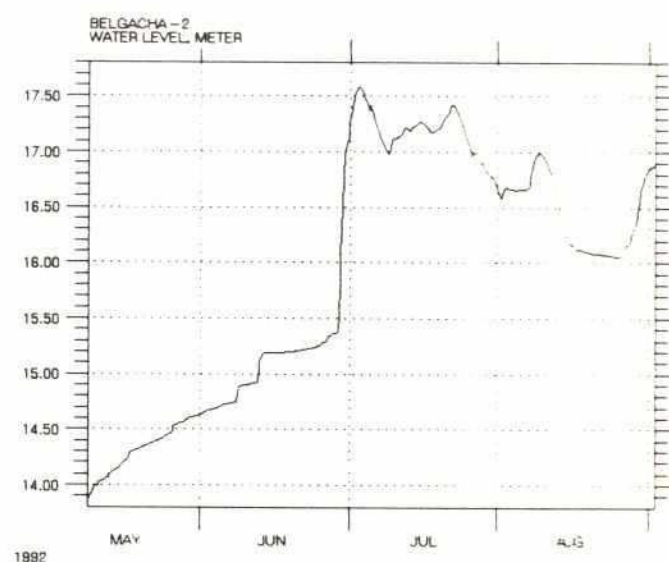
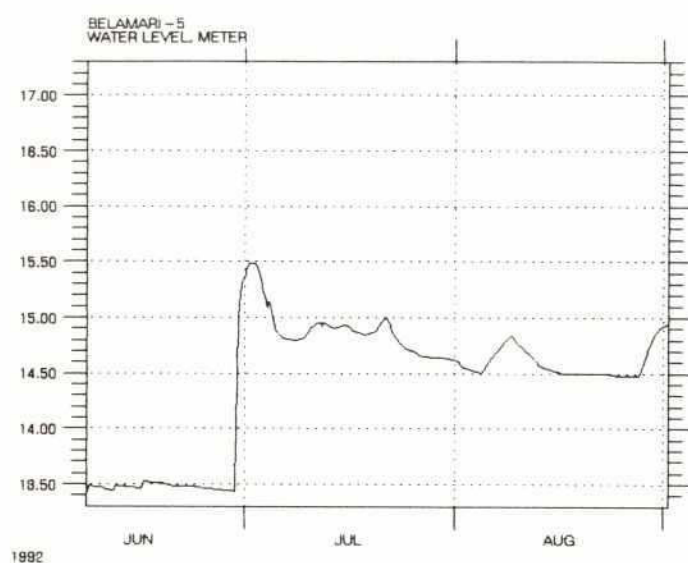
OBSERVER: Mr Saifur Rahman

REMARKS: Good station. Located in a wide, regular curve and protected upstream by trees and bushes. Upper and lower sections are regular, without any particular hydraulic features. This station is influenced downstream by the Jamuna river in the event of floods.

APPROX. LAYOUT

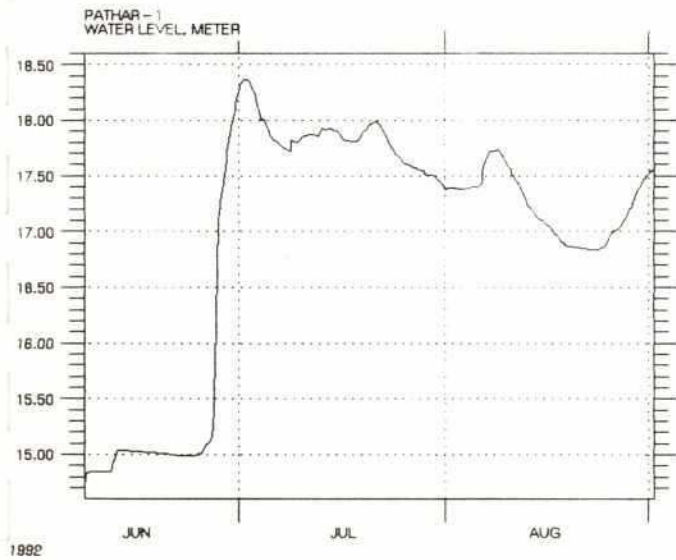
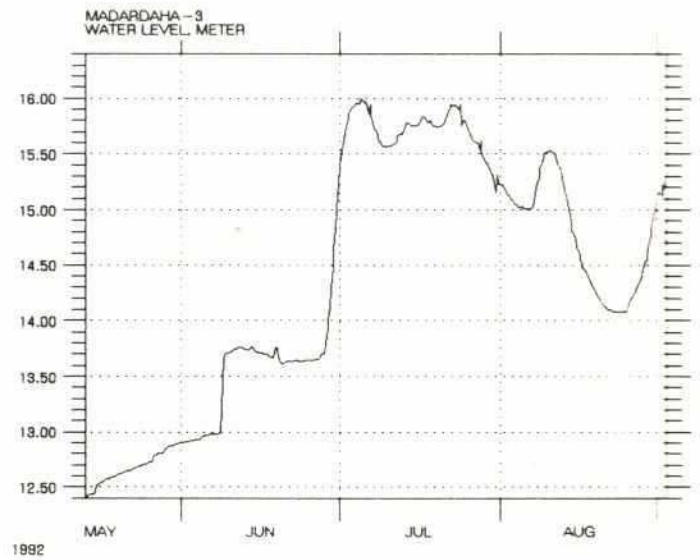
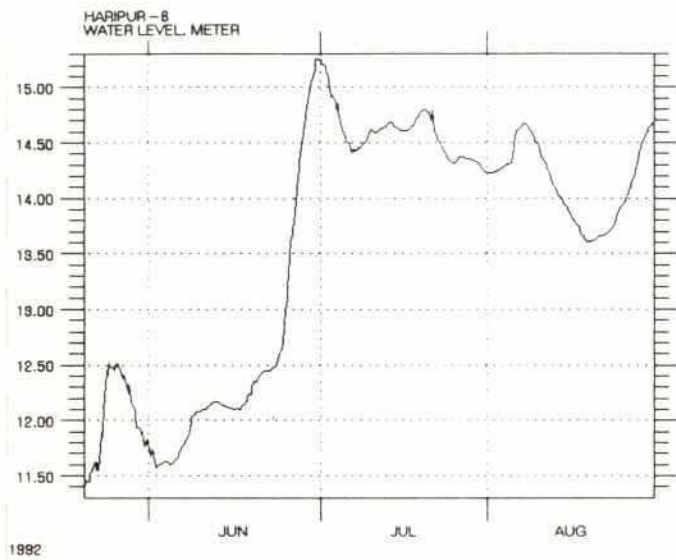


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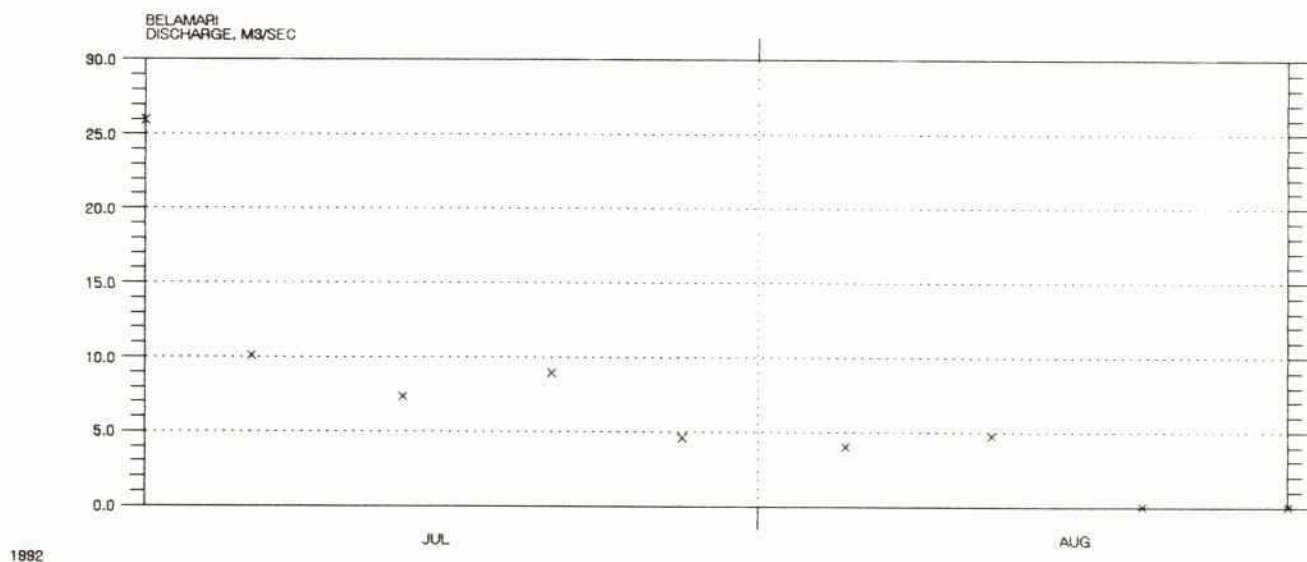
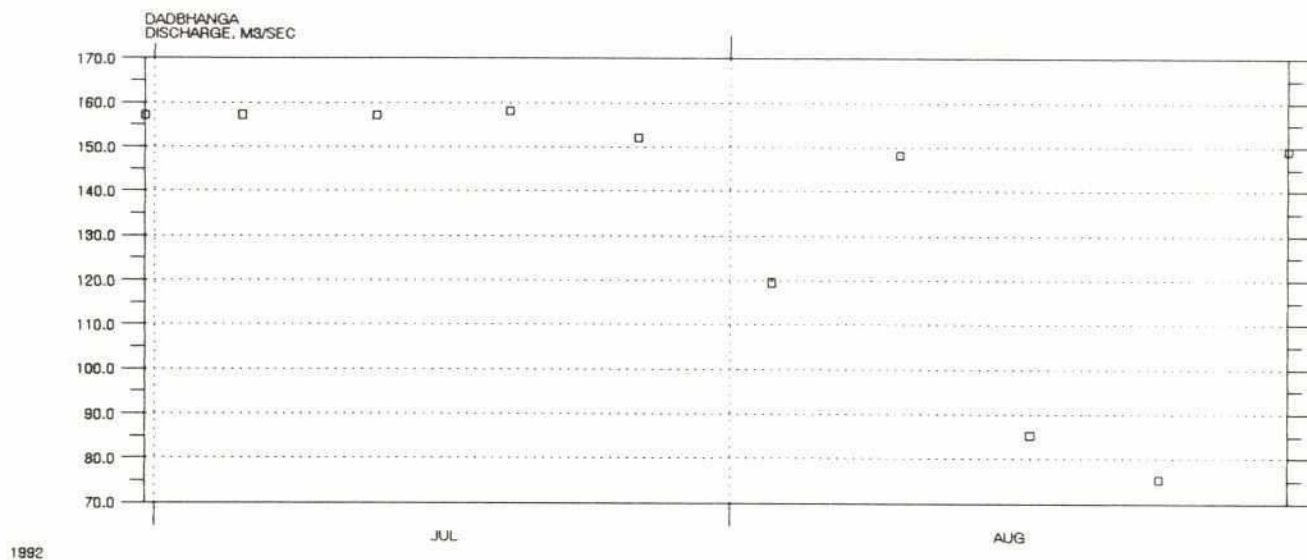
**SWMC**OBSERVED WATER LEVEL HYDROGRAPH
JPPS GAUGE STATION
1992**MIKE 11**

TIME SERIES DATA BASE : WL92

Dwg no.:



S W M C	OBSERVED WATER LEVEL HYDROGRAPH JPPS GAUGE STATION 1992
TIME SERIES DATA BASE : WL92	MIKE 11
	Dwg no.:



S W M C	OBSERVED DISCHARGE HYDROGRAPH JPPS GAUGE STATION 1992	MIKE 11
		Dwg no.:

TIME SERIES DATA BASE : Q92

APPENDIX - C

MODEL CONSTRUCTION

APPENDIX C

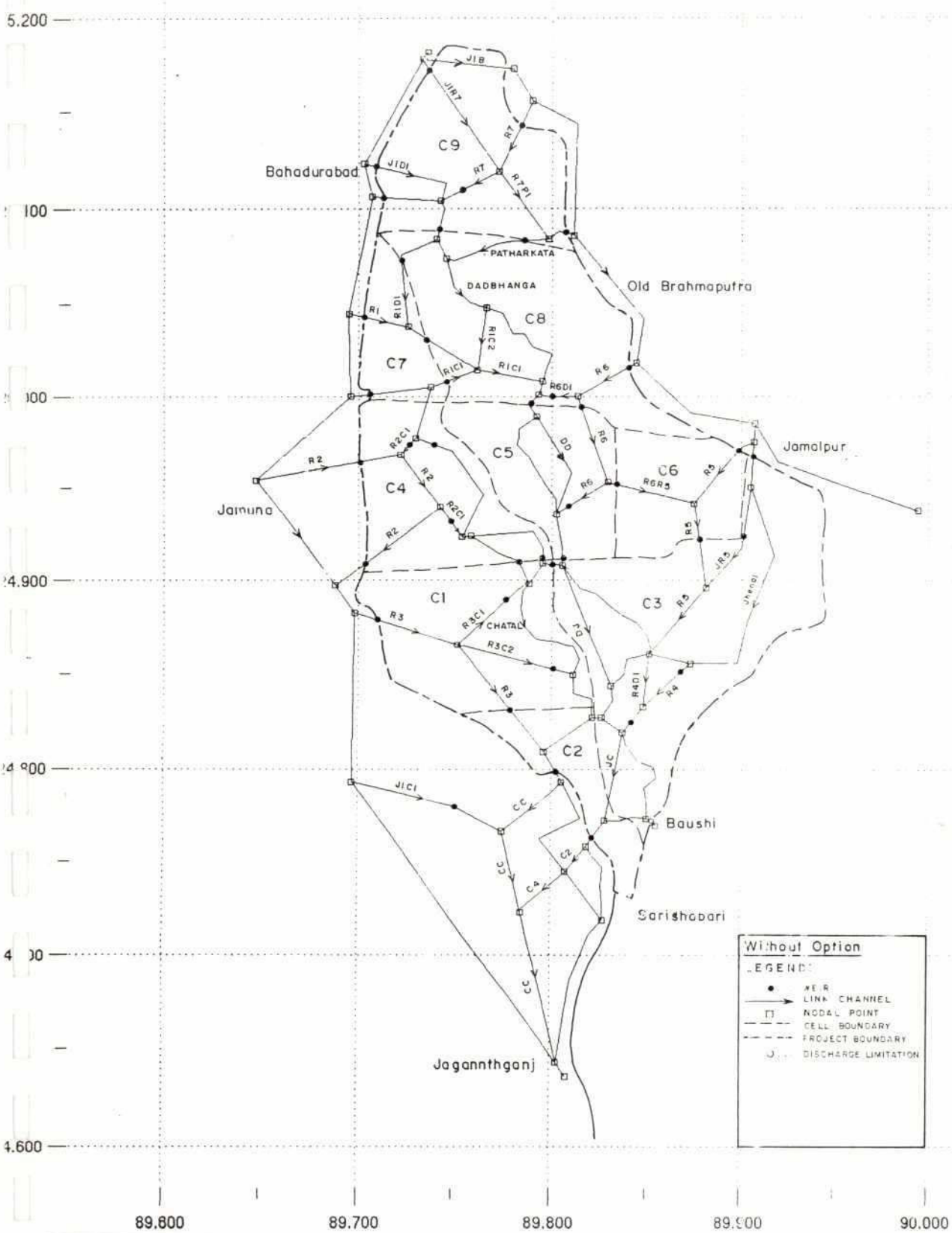
MODEL CONSTRUCTION

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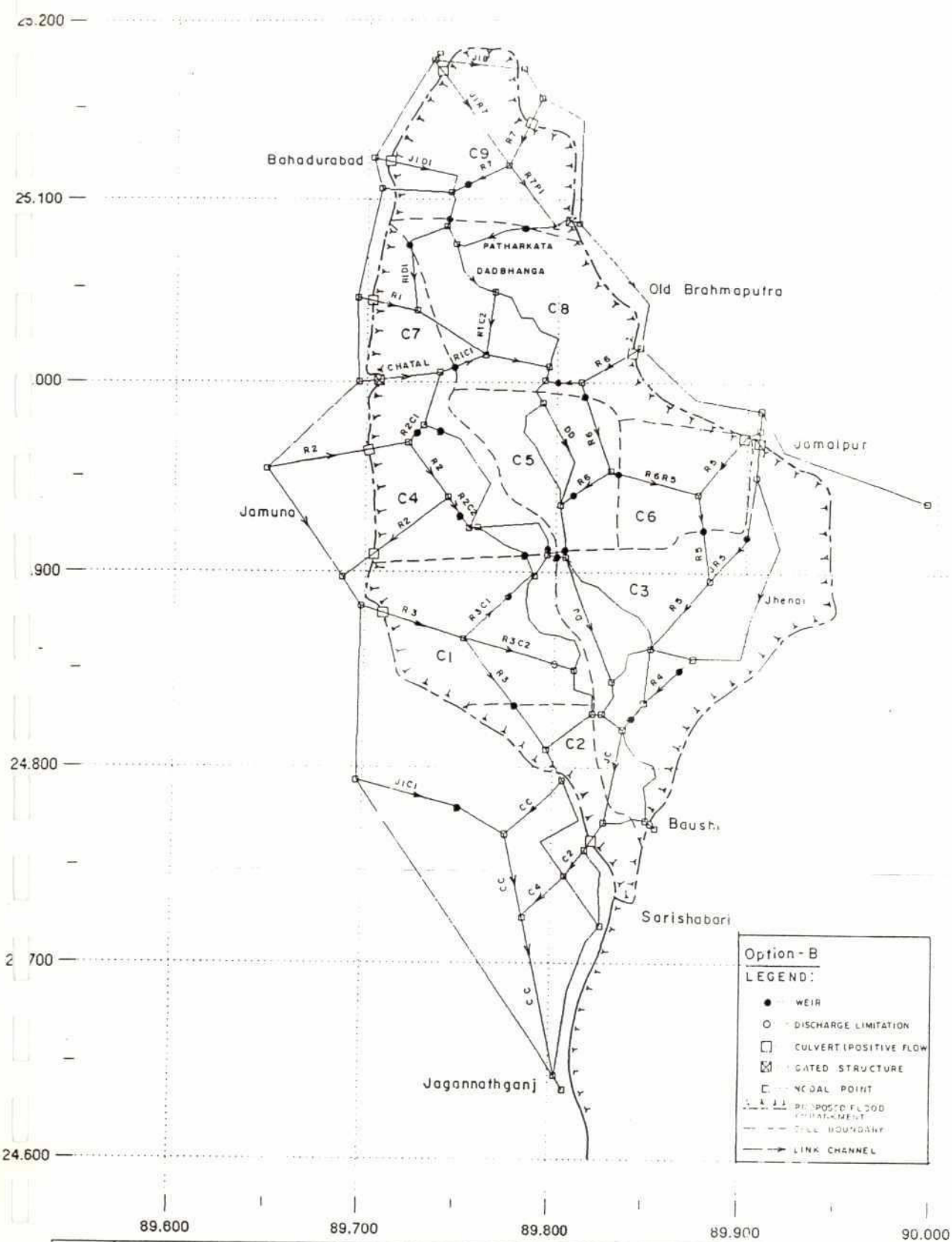
River Model Setup Schematic Plan

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S W M C	RIVER SETUP MODEL SCHEMATIC PLAN JAMALPUR PRIORITY PROJECT STUDY (FAP 3.1) BANANI, DHAKA	MIKE 11
		Dwg no.:

131



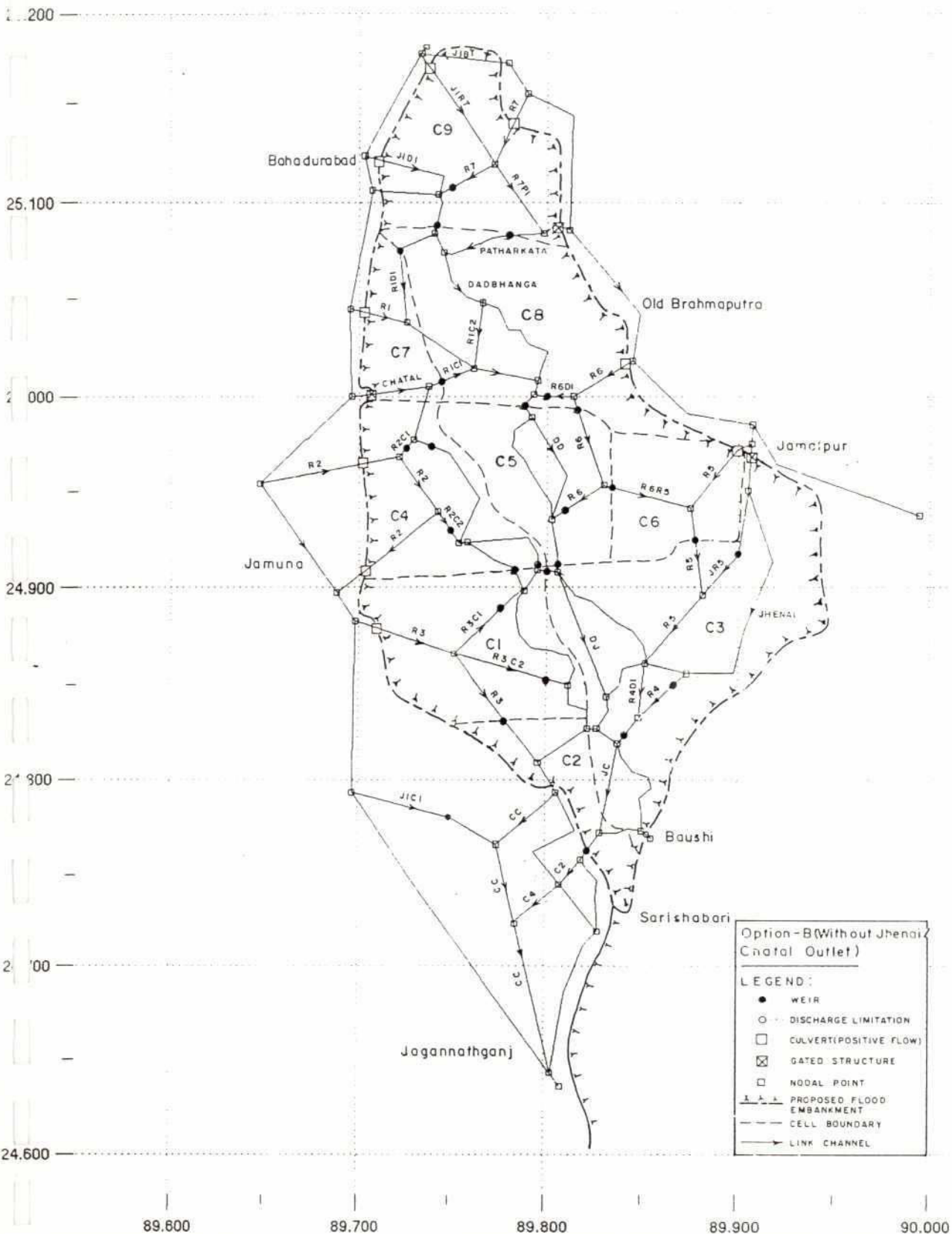
S W M C

RIVER SETUP MODEL SCHEMATIC PLAN
 JAMALPUR PRIORITY PROJECT STUDY (FAP 3.1)
 BANANI, DHAKA

MIKE 11

Dwg no.:

U32

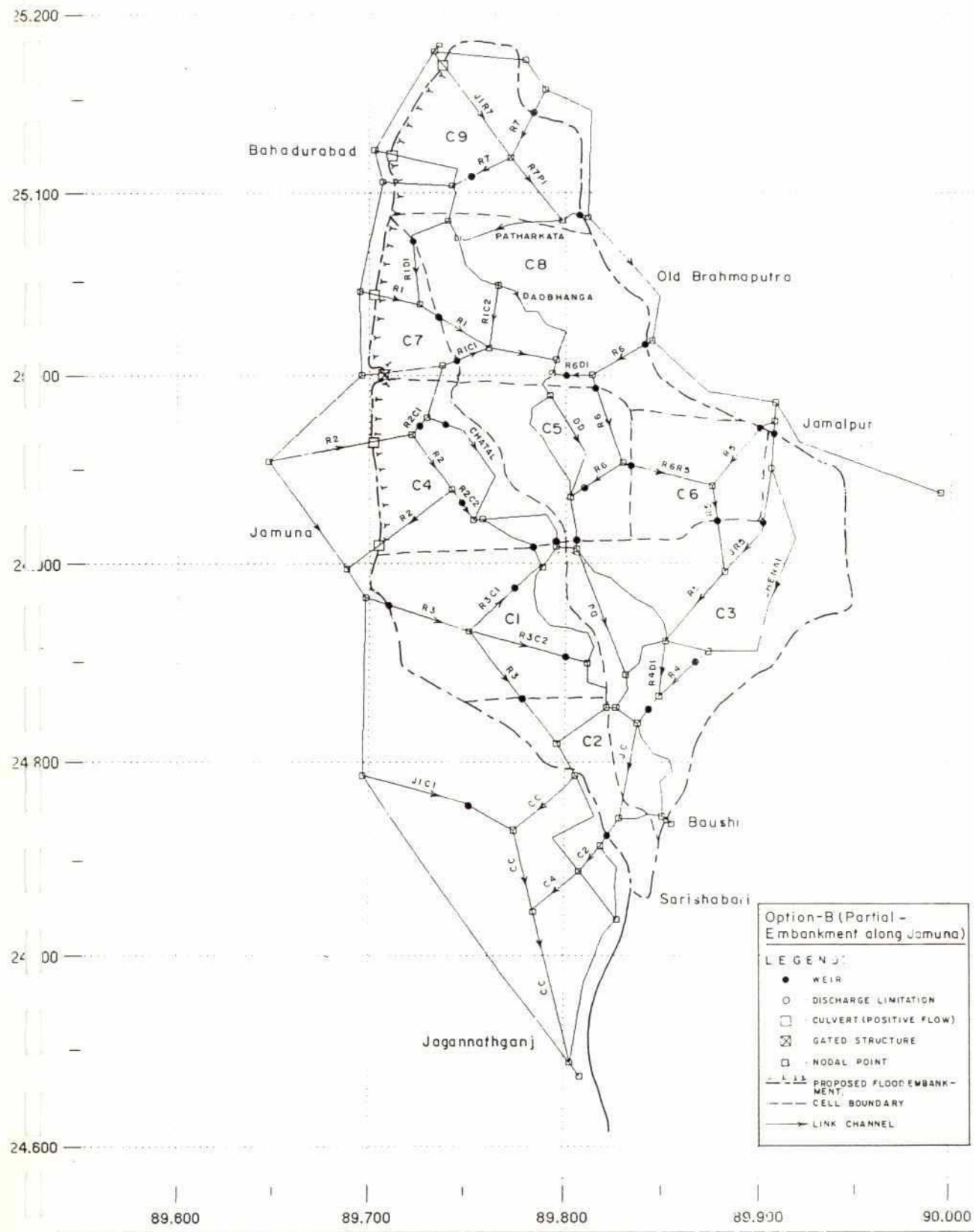


S W M C

RIVER SETUP MODEL SCHEMATIC PLAN
JAMALPUR PRIORITY PROJECT STUDY (FAP 3.1)
BANANI, DHAKA

MIKE 11

Dwg no.:



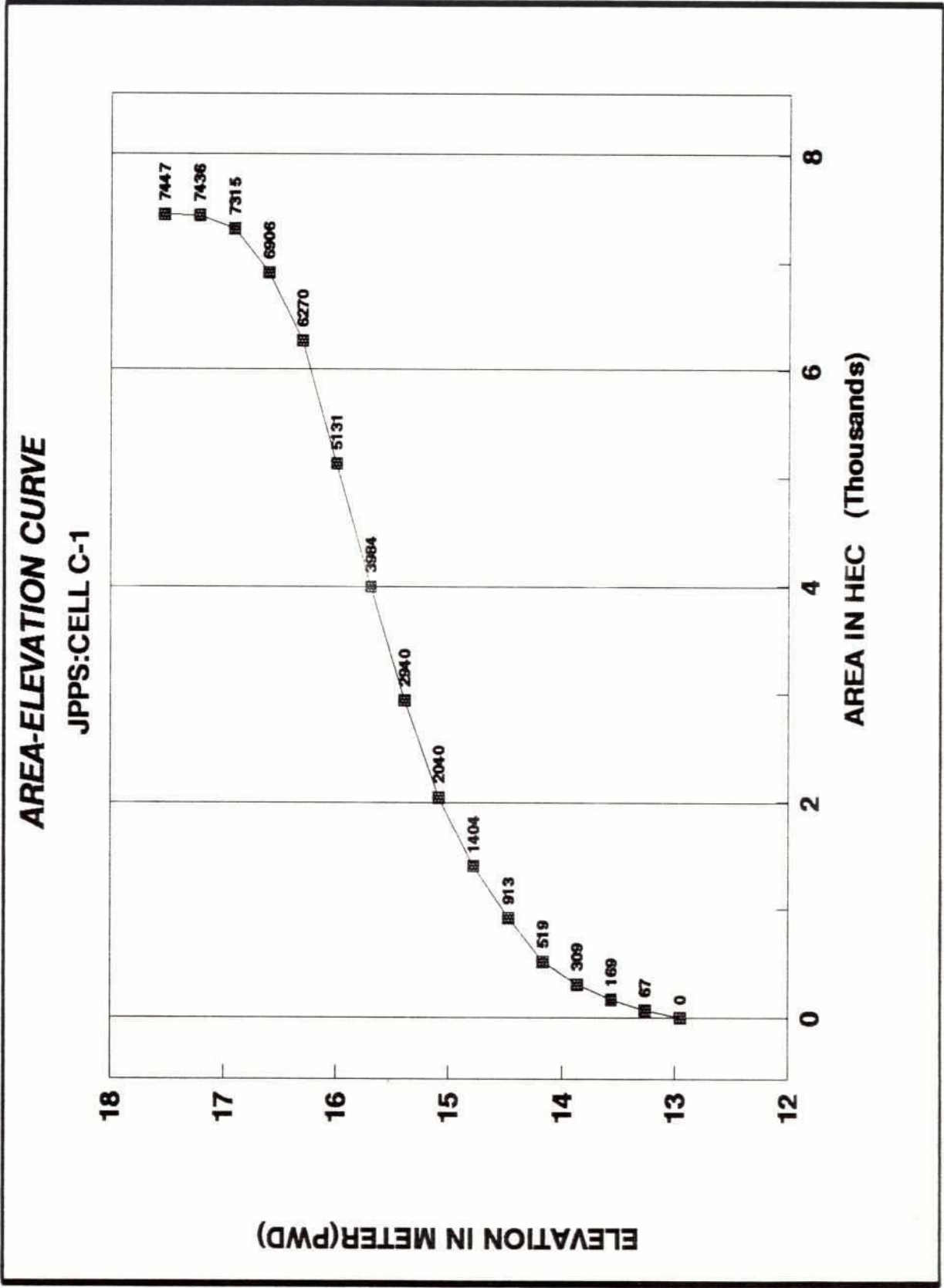
S W M C

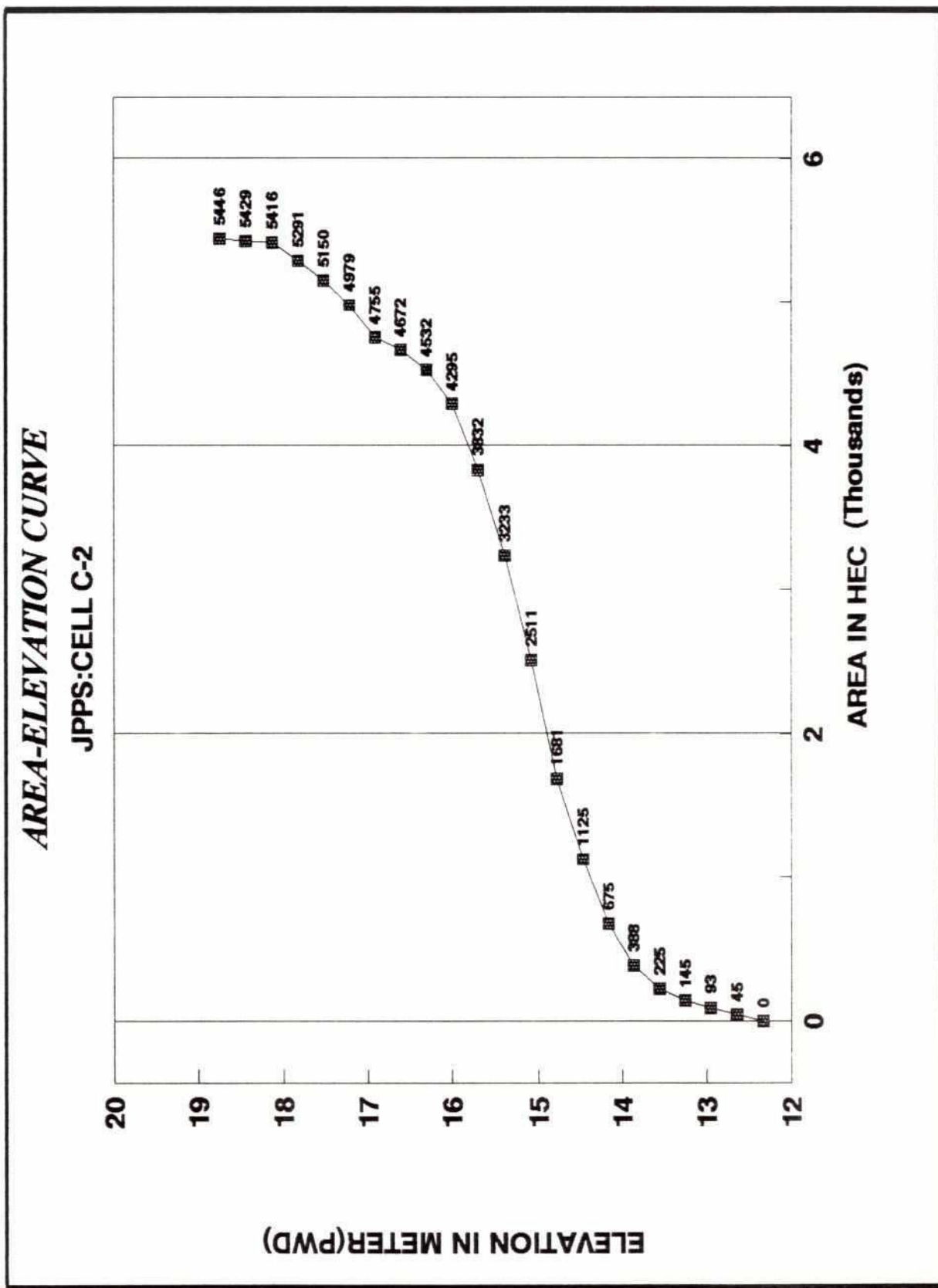
RIVER SETUP MODEL SCHEMATIC PLAN
JAMALPUR PRIORITY PROJECT STUDY (FAP 3.1)
BANANI, DHAKA

MIKE 11

Dwg no.:

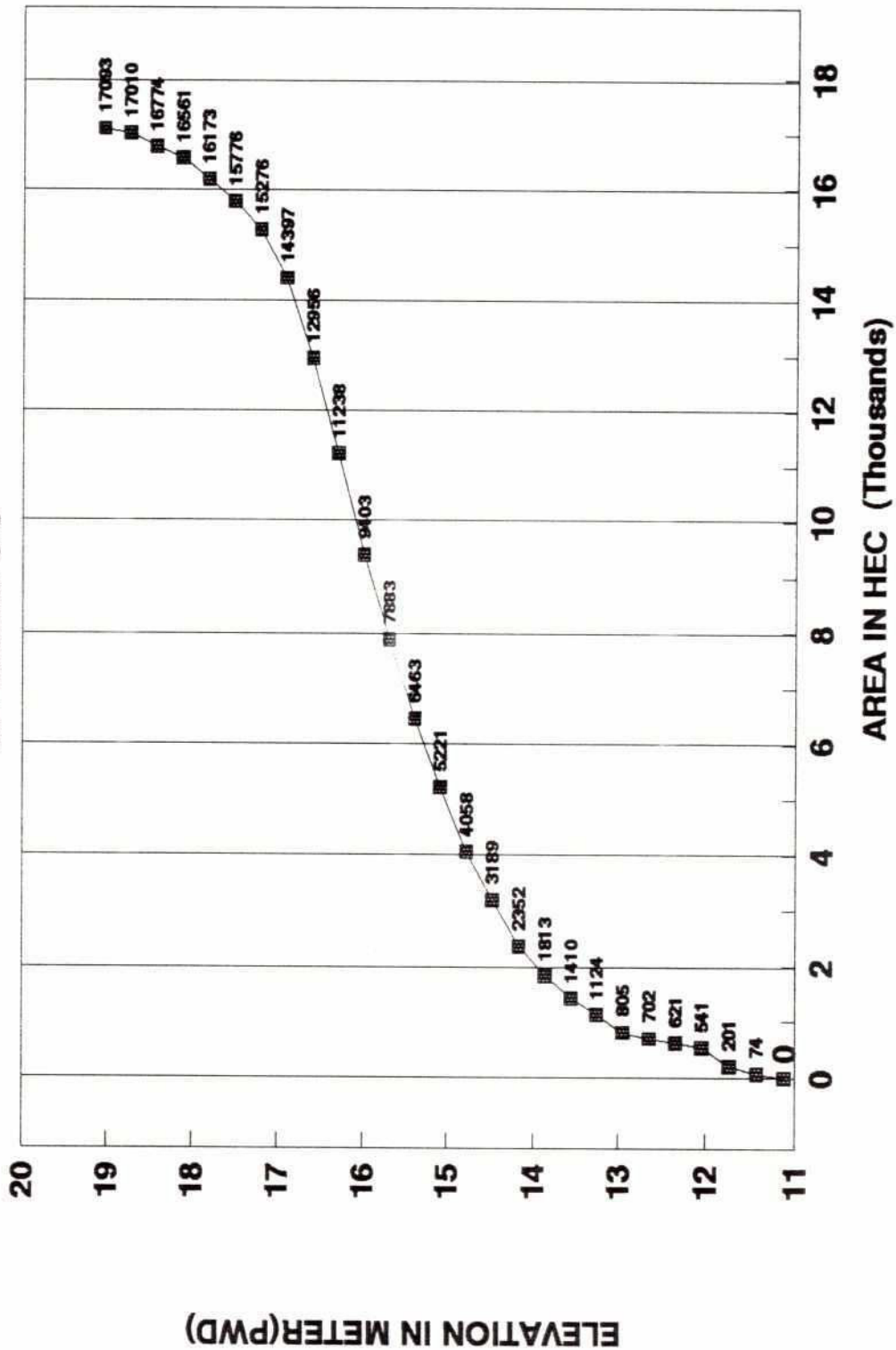
Area/Elevation Curves For Each Cell





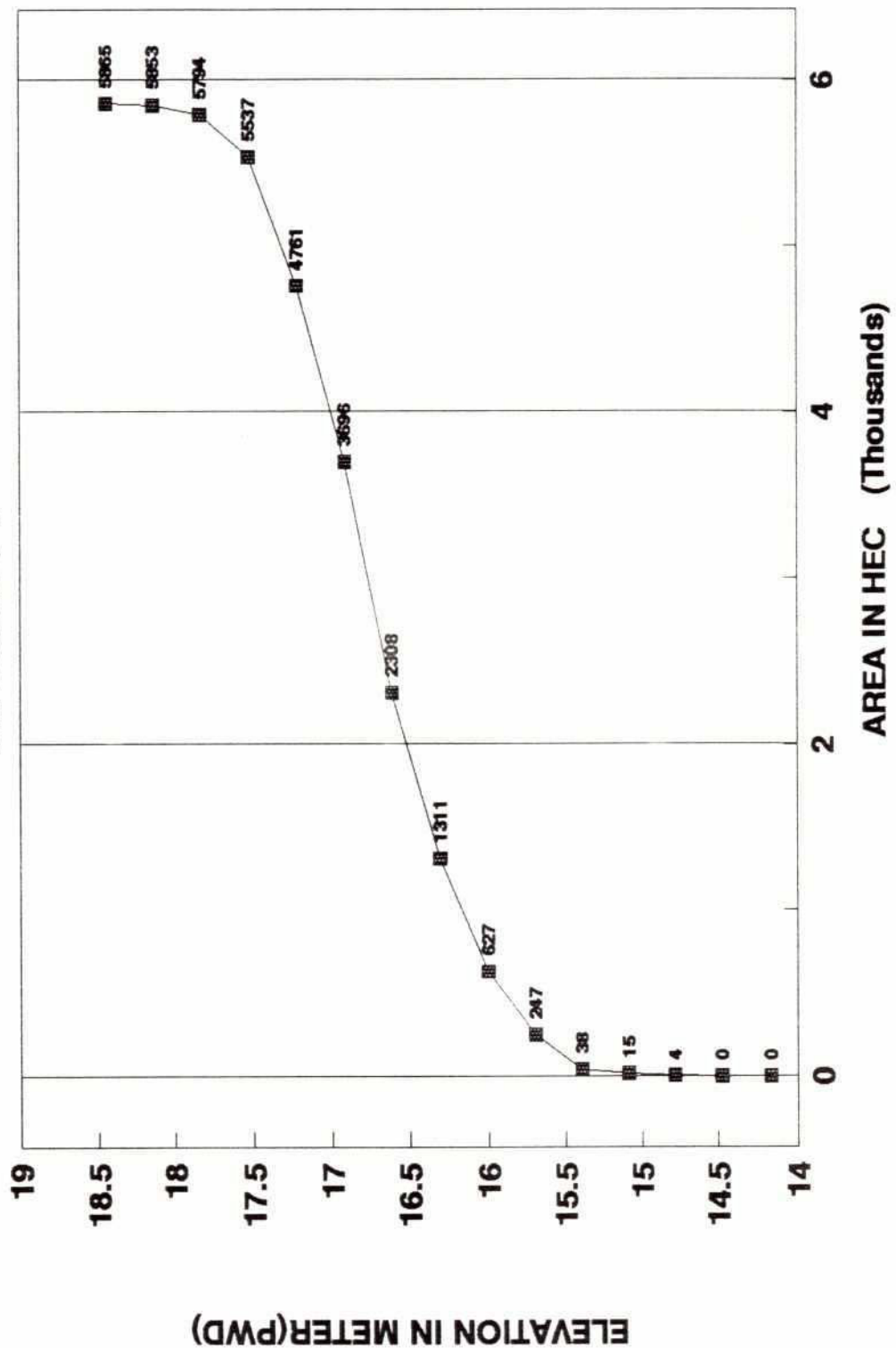
AREA-ELEVATION CURVE

JPPS:CELL C-3



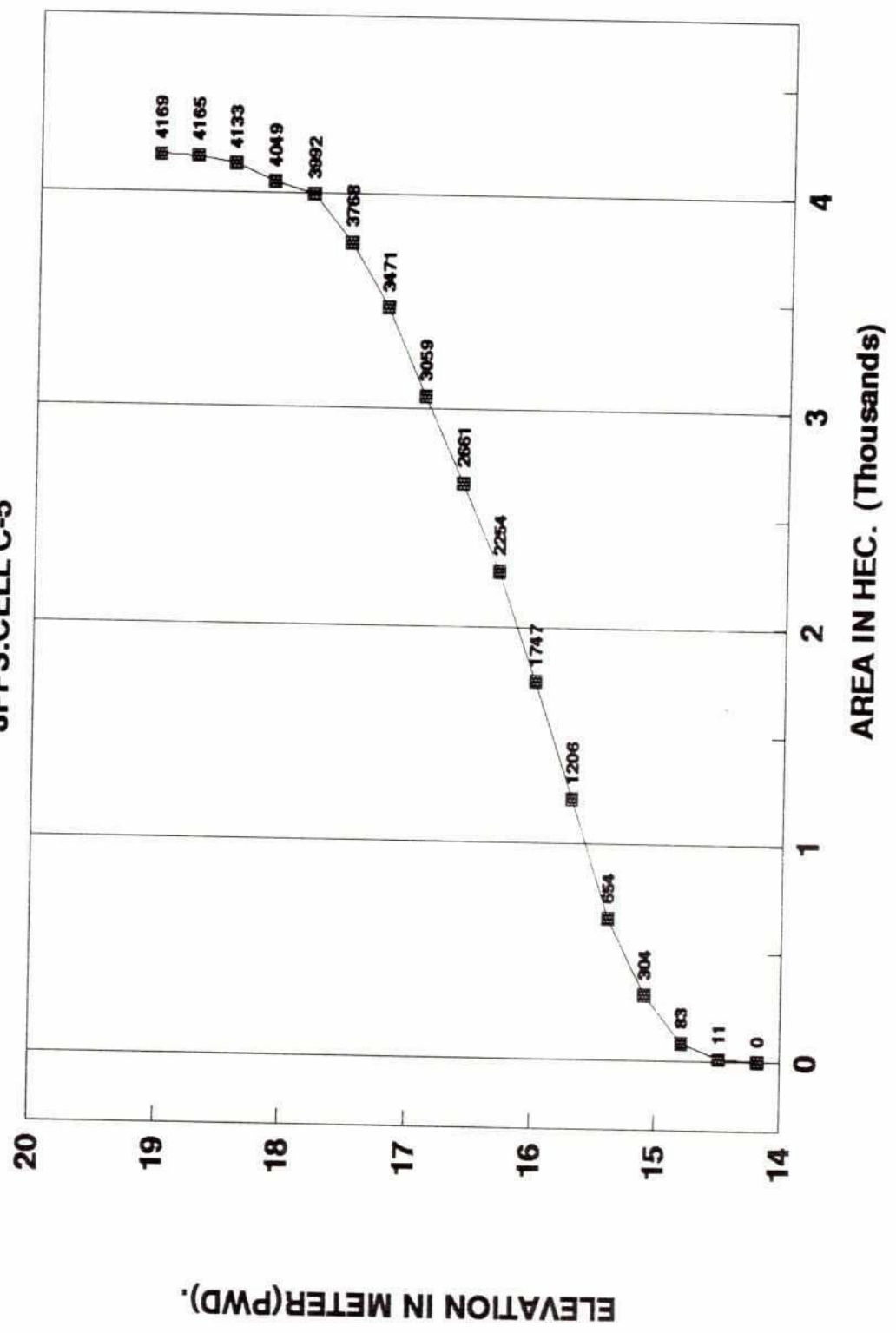
AREA-ELEVATION-CURVE

JPPS:CELL C-4



AREA-ELEVATION CURVE.

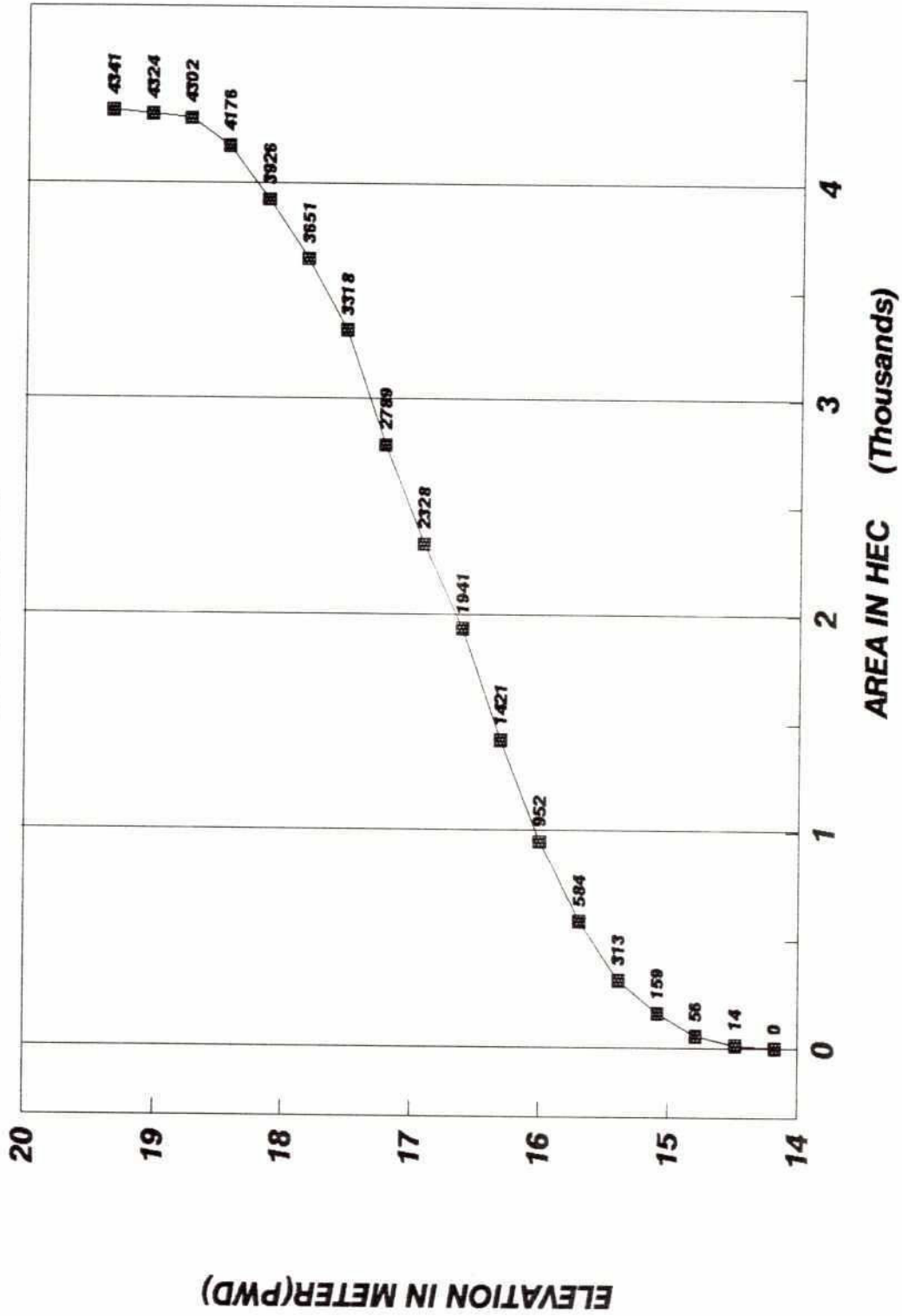
JPPS:CELL C-5

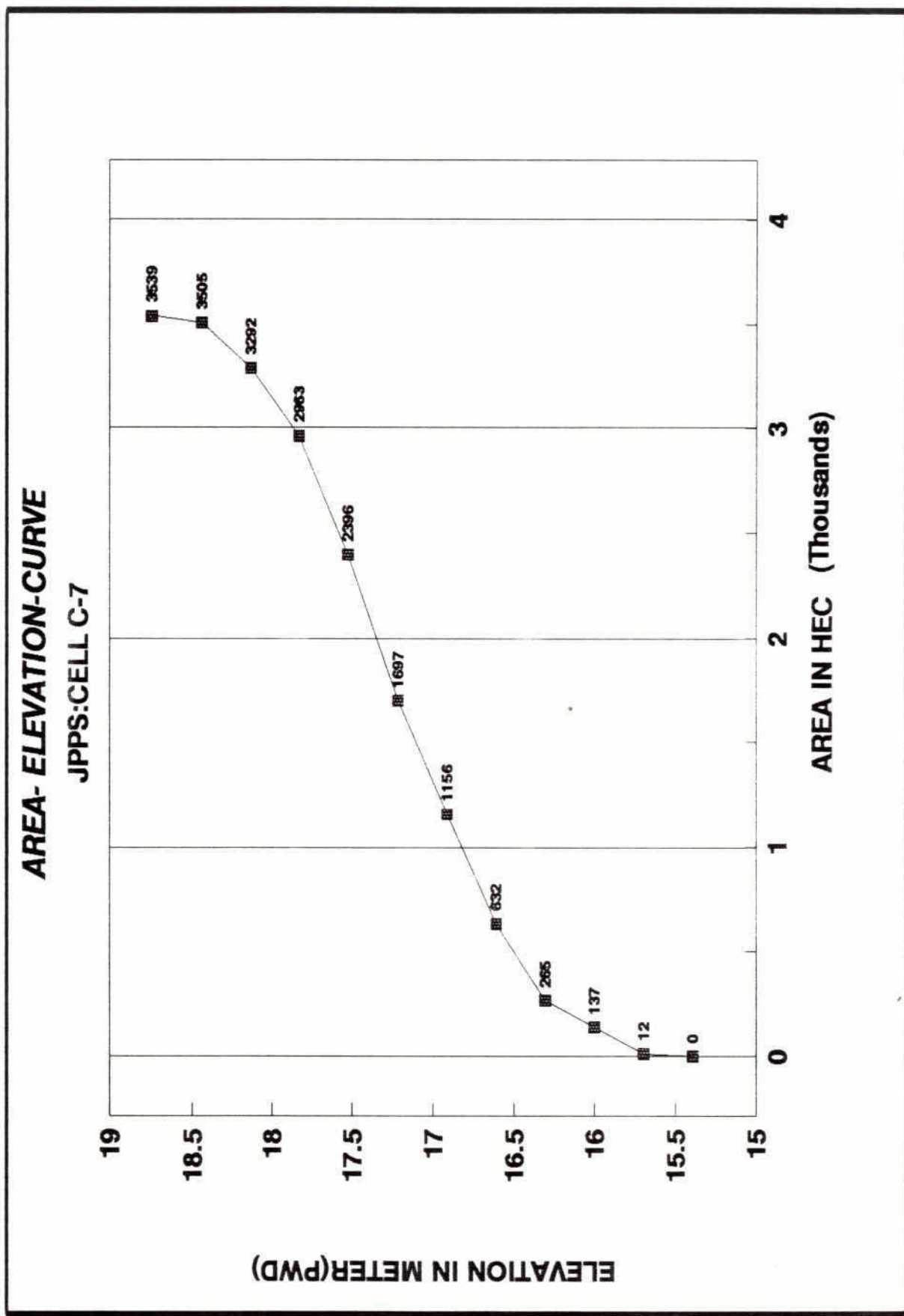


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AREA-ELEVATION-CURVE

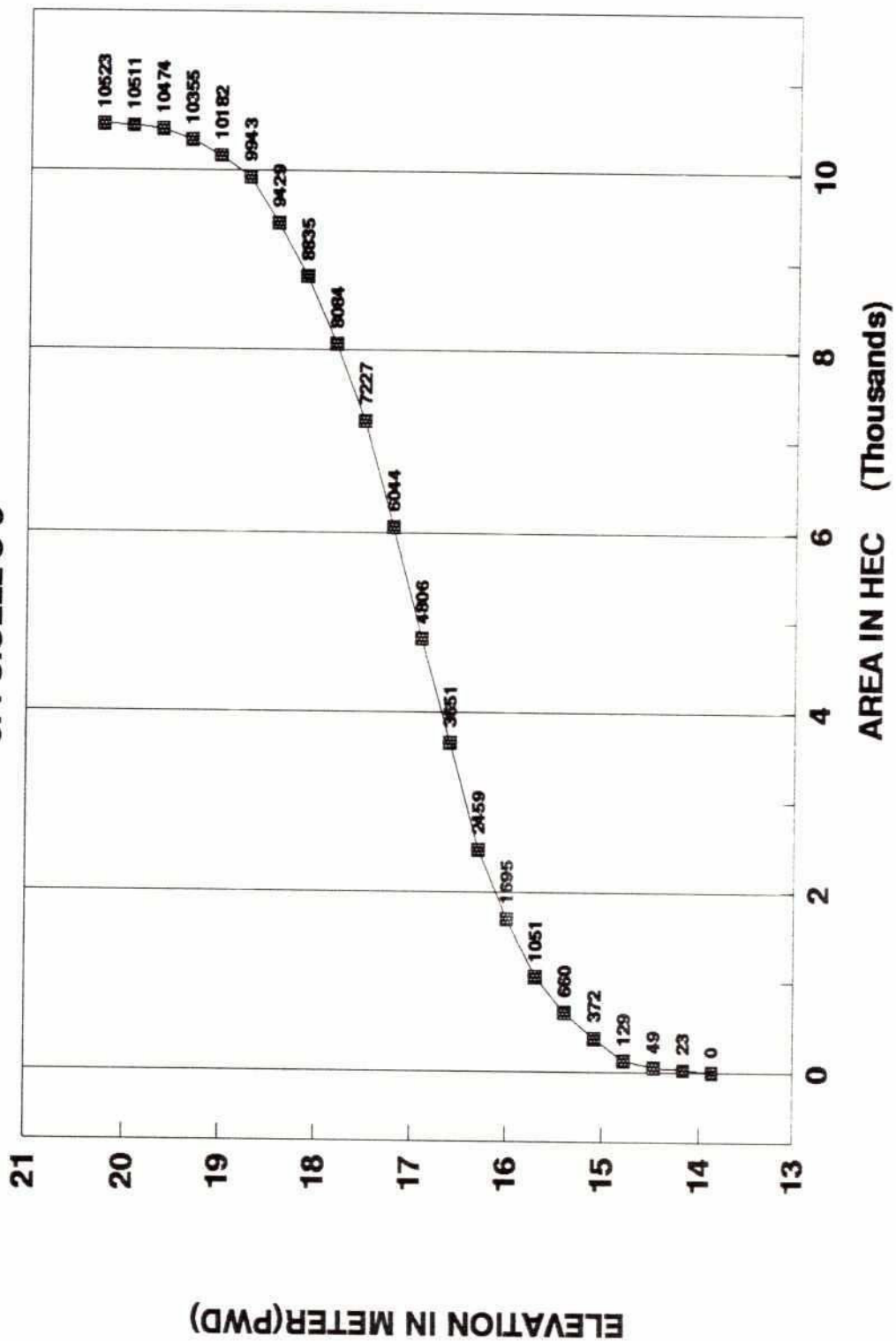
JPPS:CELL C-6





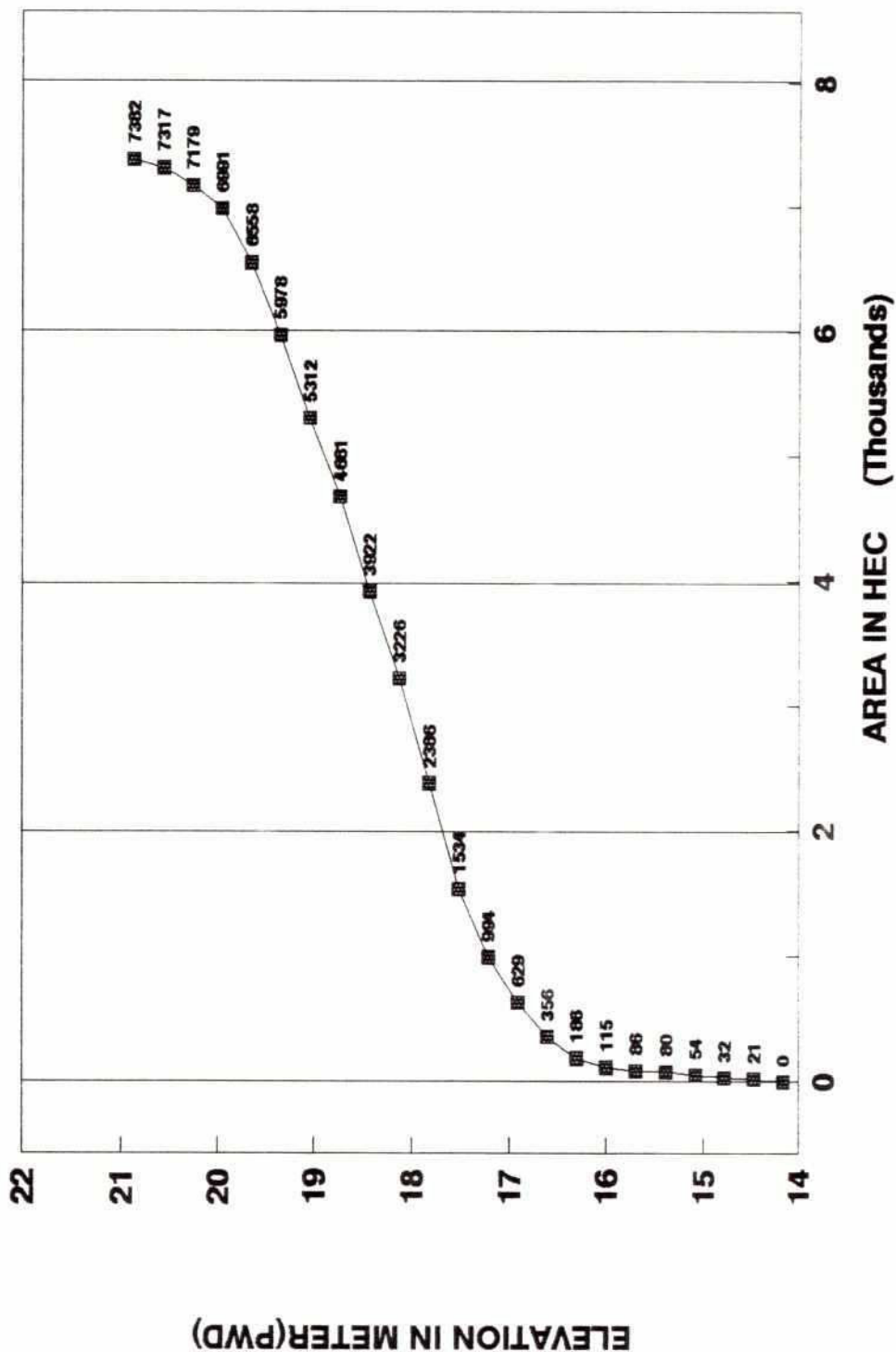
AREA-ELEVATION CURVE

JPPS:CELL C-8



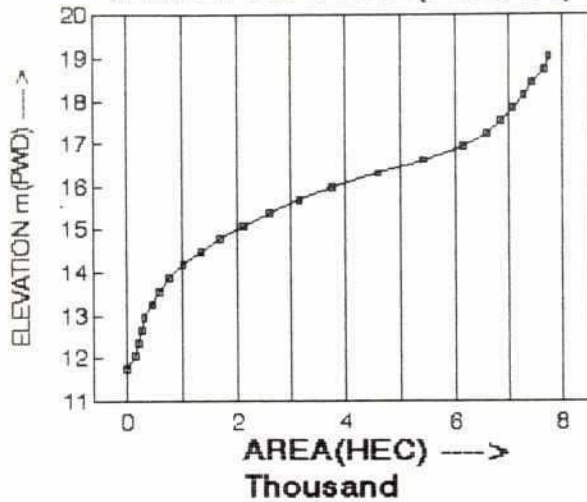
AREA ELEVATION CURVE

JPPS:CELL C-9

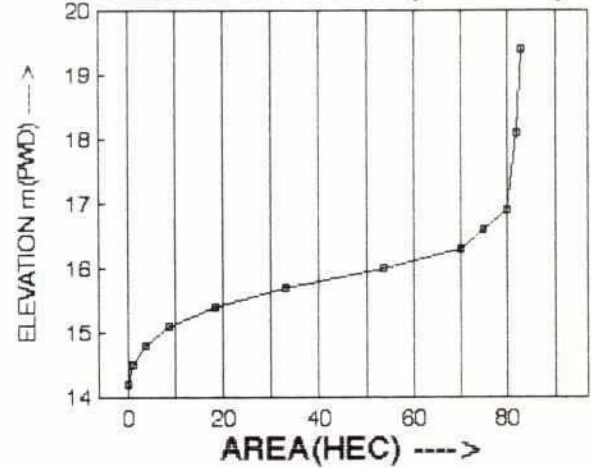


Area/Elevation Curves For Each Sub-Cell

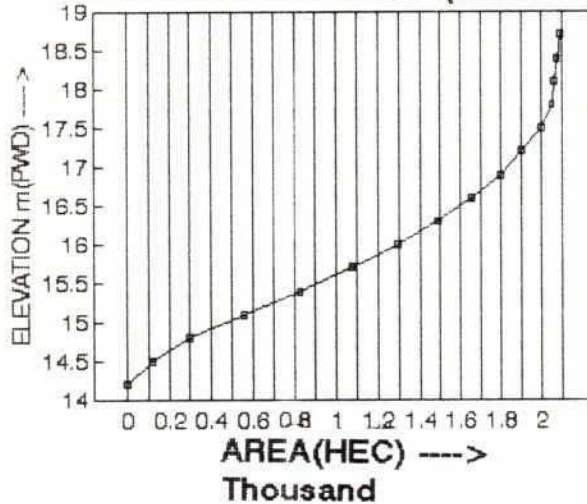
**AREA-ELEVATION CURVE
JAMALPUR THANA(PART C3)**



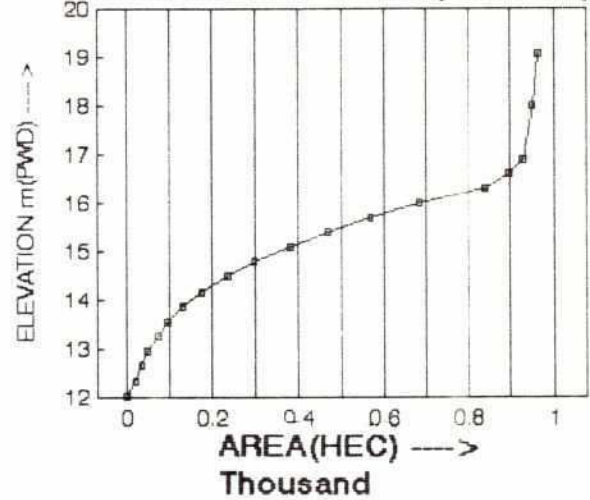
**AREA-ELEVATION CURVE
JAMALPUR THANA(PART C6)**



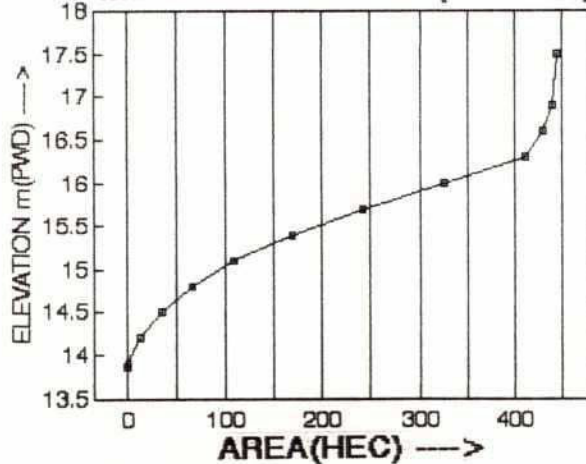
**AREA-ELEVATION CURVE
SARISHABARI THANA(PART C2)**



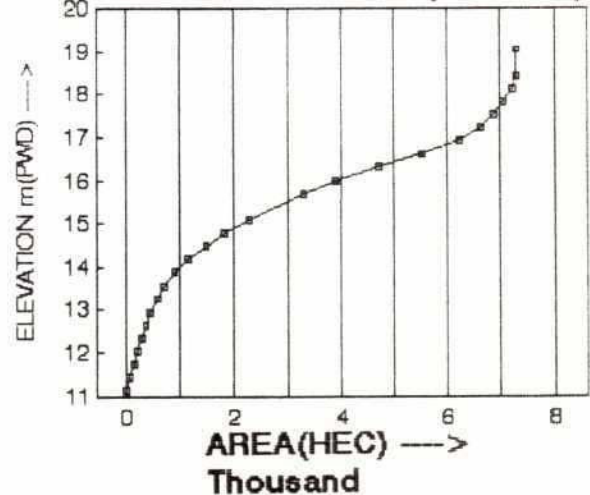
**AREA-ELEVATION CURVE
SARISHABARI THANA(PART C3)**



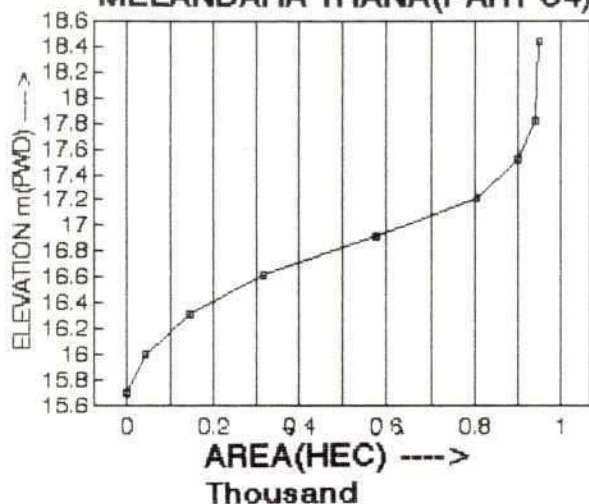
**AREA-ELEVATION CURVE
MELANDAHA THANA(PART C1)**



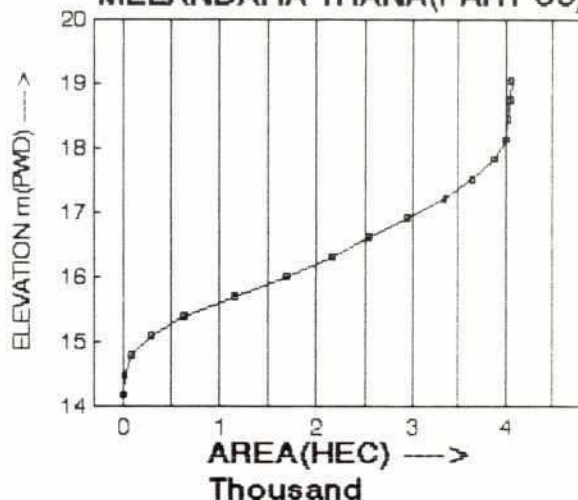
**AREA-ELEVATION CURVE
MELANDAHA THANA(PART C3)**



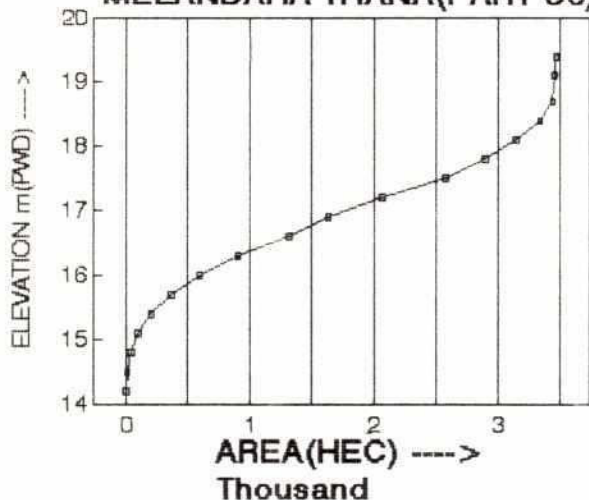
**AREA-ELEVATION CURVE
MELANDAHA THANA(PART C4)**



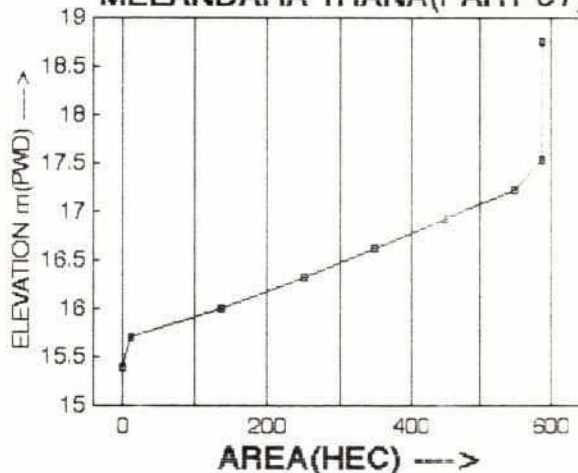
**AREA-ELEVATION CURVE
MELANDAHA THANA(PART C5)**



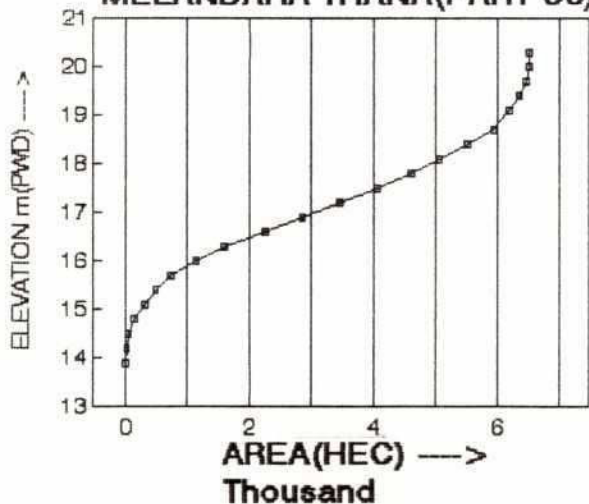
**AREA-ELEVATION CURVE
MELANDAHA THANA(PART C6)**



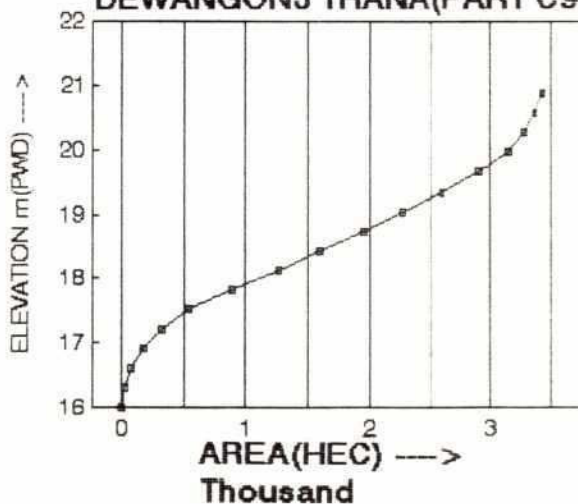
**AREA-ELEVATION CURVE
MELANDAHA THANA(PART C7)**



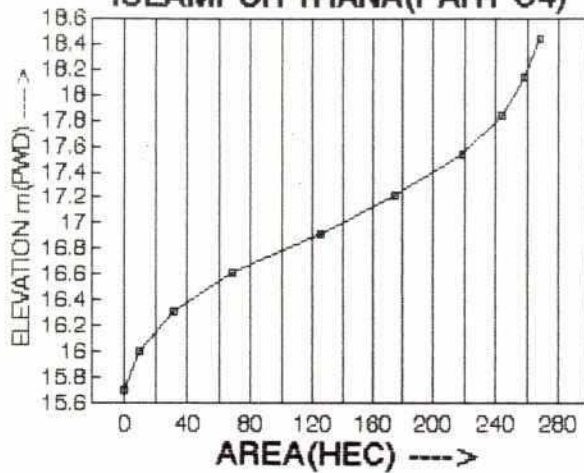
**AREA-ELEVATION CURVE
MELANDAHA THANA(PART C8)**



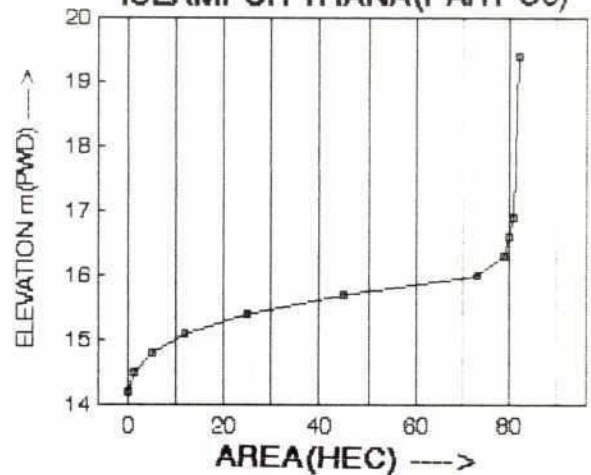
**AREA-ELEVATION CURVE
DEWANGONJ THANA(PART C9)**



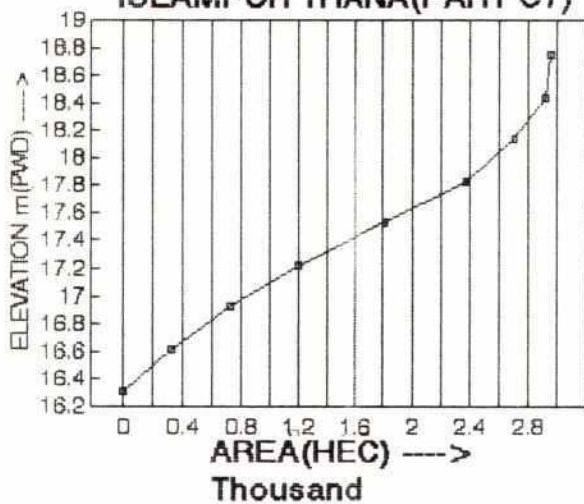
AREA-ELEVATION CURVE
ISLAMPUR THANA(PART C4)



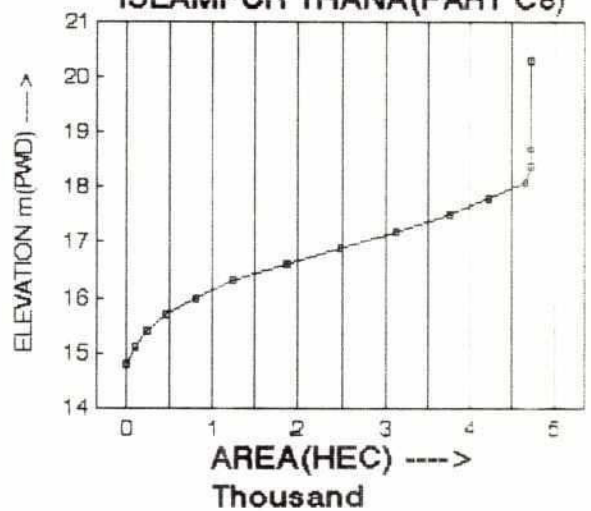
AREA-ELEVATION CURVE
ISLAMPUR THANA(PART C6)



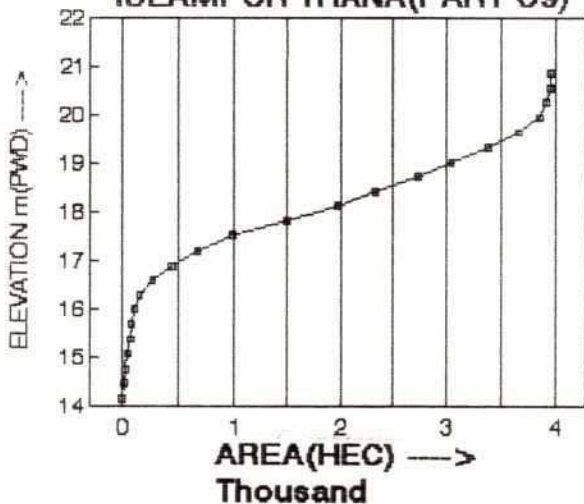
AREA-ELEVATION CURVE
ISLAMPUR THANA(PART C7)



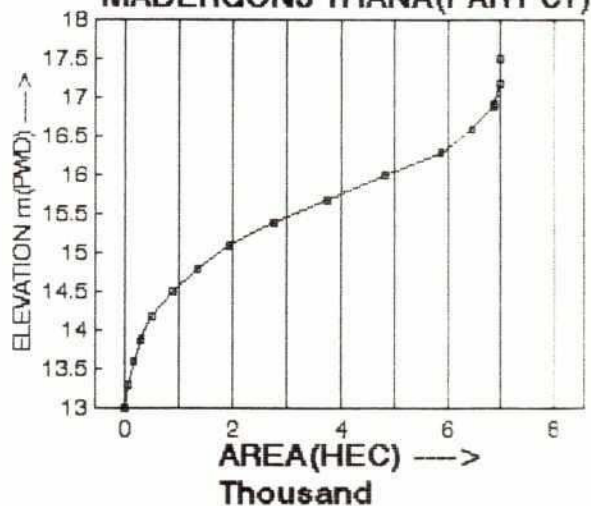
AREA-ELEVATION CURVE
ISLAMPUR THANA(PART C8)



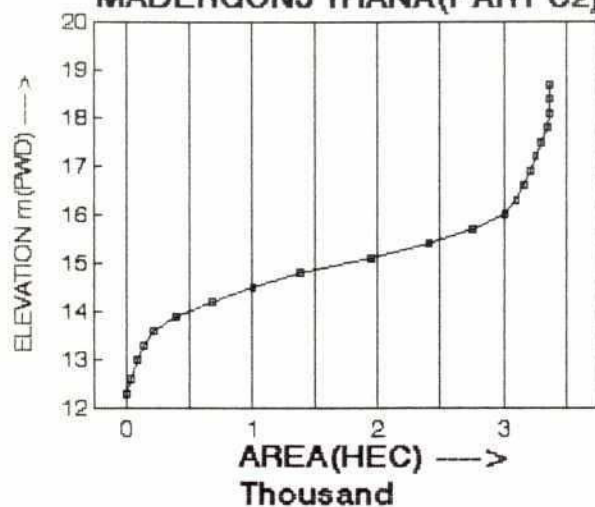
AREA-ELEVATION CURVE
ISLAMPUR THANA(PART C9)



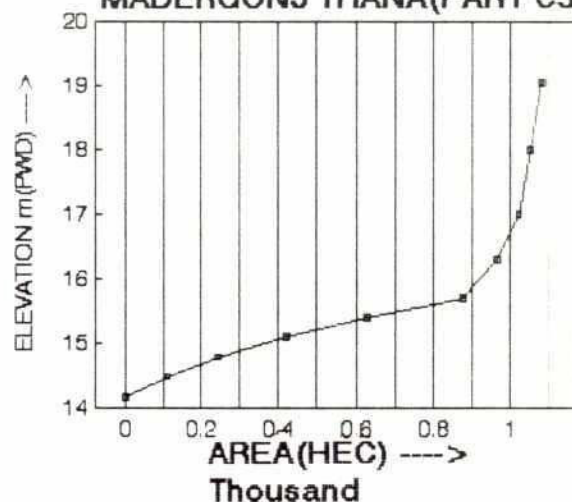
AREA-ELEVATION CURVE
MADERGONJ THANA(PART C1)



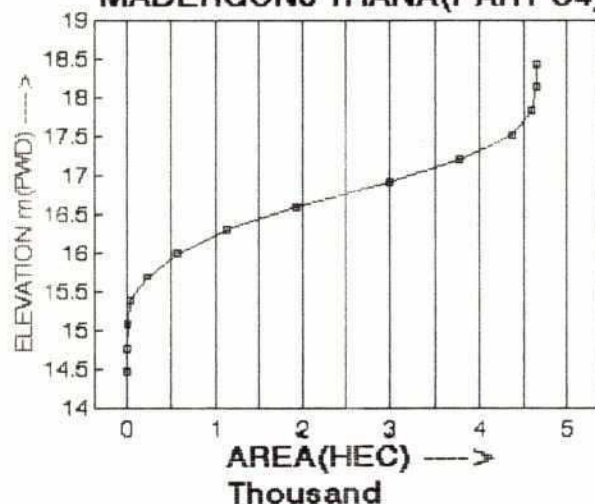
AREA-ELEVATION CURVE
MADERGONJ THANA(PART C2)



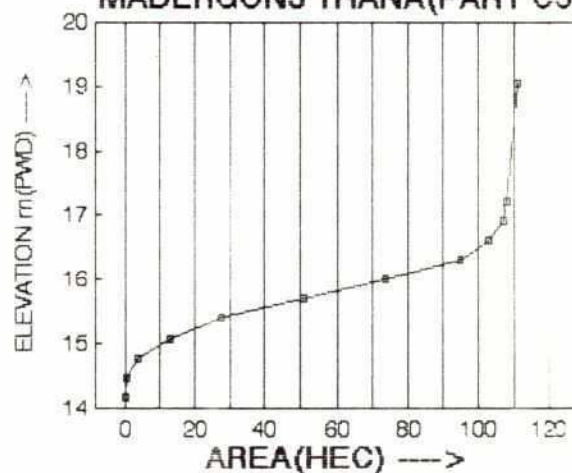
AREA-ELEVATION CURVE
MADERGONJ THANA(PART C3)



AREA-ELEVATION CURVE
MADERGONJ THANA(PART C4)



AREA-ELEVATION CURVE
MADERGONJ THANA(PART C5)



Tables of Land Type Distribution
Within the Model Cell



LAND TYPE DISTRIBUTION ACCORDING TO ASSUMED WATER LEVEL
WITHIN THE MODEL CELLS

150

Cell name : C1

*	*	*	*	*	*	*
Elev.	F0	F1	F2	F3+F4	TOTAL	*

13.00	100	0	0	0	100	*
13.10	100	0	0	0	100	*
13.20	100	0	0	0	100	*
13.30	100	0	0	0	100	*
13.40	100	0	0	0	100	*
13.50	99	1	0	0	100	*
13.60	99	1	0	0	100	*
13.70	99	1	0	0	100	*
13.80	98	2	0	0	100	*
13.90	98	2	0	0	100	*
14.00	97	3	0	0	100	*
14.10	96	3	1	0	100	*
14.20	96	3	1	0	100	*
14.30	95	4	1	0	100	*
14.40	94	4	2	0	100	*
14.50	93	5	2	0	100	*
14.60	91	6	3	0	100	*
14.70	90	7	4	0	100	*
14.80	88	8	4	0	100	*
14.90	86	9	5	0	100	*
15.00	83	11	5	1	100	*
15.10	81	12	6	1	100	*
15.20	78	13	7	1	100	*
15.30	75	14	9	2	100	*
15.40	73	15	10	2	100	*
15.50	69	17	12	3	100	*
15.60	65	19	13	4	100	*
15.70	61	21	15	4	100	*
15.80	56	22	17	5	100	*
15.90	51	24	19	6	100	*
16.00	47	26	20	7	100	*
16.10	41	27	23	9	100	*
16.20	36	28	25	10	100	*
16.30	31	29	27	12	100	*
16.40	26	30	30	14	100	*
16.50	21	30	32	17	100	*
16.60	16	31	35	19	100	*
16.70	13	28	37	22	100	*
16.80	10	26	39	25	100	*
16.90	7	24	42	27	100	*
17.00	5	21	43	31	100	*
17.10	4	17	44	35	100	*
17.20	2	14	45	39	100	*
17.30	1	12	43	44	100	*
17.40	1	9	41	49	100	*

LAND TYPE DISTRIBUTION ACCORDING TO ASSUMED WATER LEVEL
WITHIN THE MODEL CELLS

157

Cell name : C2

*	*	*	*	*	*	*
Elev.	F0	F1	F2	F3+F4	TOTAL	*

*	*	*	*	*	*	*
12.30	100	0	0	0	100	*
12.50	100	0	0	0	100	*
12.70	100	0	0	0	100	*
12.90	99	1	0	0	100	*
13.10	99	1	0	0	100	*
13.30	98	1	0	0	100	*
13.50	98	2	1	0	100	*
13.70	97	2	1	0	100	*
13.90	96	2	2	0	100	*
14.10	94	4	2	0	100	*
14.30	91	6	3	1	100	*
14.50	88	8	3	1	100	*
14.70	82	12	5	1	100	*
14.90	76	15	7	2	100	*
15.10	69	18	10	3	100	*
15.30	59	23	14	4	100	*
15.50	49	26	19	5	100	*
15.70	41	28	24	7	100	*
15.90	33	26	30	11	100	*
16.10	27	23	35	15	100	*
16.30	21	20	39	21	100	*
16.50	18	15	39	27	100	*
16.70	16	11	37	36	100	*
16.90	14	7	33	46	100	*
17.10	13	5	27	55	100	*
17.30	11	5	21	63	100	*
17.50	9	6	15	70	100	*
17.70	6	7	11	76	100	*
17.90	5	7	8	80	100	*
18.10	3	6	8	83	100	*
18.30	1	5	9	85	100	*
18.50	0	4	9	86	100	*

LAND TYPE DISTRIBUTION ACCORDING TO ASSUMED WATER LEVEL
WITHIN THE MODEL CELLS

152

Cell name : C3

* Elev. *	* F0	* F1	* F2	* F3+F4	* TOTAL	*

* 11.13 *	100	0	0	0	100	*
* 11.33 *	100	0	0	0	100	*
* 11.53 *	100	0	0	0	100	*
* 11.73 *	100	0	0	0	100	*
* 11.93 *	99	1	0	0	100	*
* 12.13 *	98	2	0	0	100	*
* 12.33 *	97	3	0	0	100	*
* 12.53 *	97	3	1	0	100	*
* 12.73 *	96	2	2	0	100	*
* 12.93 *	96	1	3	0	100	*
* 13.13 *	96	1	3	0	100	*
* 13.33 *	95	1	3	1	100	*
* 13.53 *	94	2	3	1	100	*
* 13.73 *	92	3	2	2	100	*
* 13.93 *	91	4	2	3	100	*
* 14.13 *	90	4	3	4	100	*
* 14.33 *	88	5	4	4	100	*
* 14.53 *	85	6	5	4	100	*
* 14.73 *	82	8	6	5	100	*
* 14.93 *	79	9	6	6	100	*
* 15.13 *	75	10	8	7	100	*
* 15.33 *	71	11	10	8	100	*
* 15.53 *	66	13	12	10	100	*
* 15.73 *	61	14	14	11	100	*
* 15.93 *	56	15	16	13	100	*
* 16.13 *	50	16	18	16	100	*
* 16.33 *	44	17	19	20	100	*
* 16.53 *	37	19	21	23	100	*
* 16.73 *	30	20	23	27	100	*
* 16.93 *	24	20	25	32	100	*
* 17.13 *	18	19	27	36	100	*
* 17.33 *	14	16	28	42	100	*
* 17.53 *	11	13	29	47	100	*
* 17.73 *	9	10	29	53	100	*
* 17.93 *	7	7	27	60	100	*
* 18.13 *	5	5	23	66	100	*
* 18.33 *	4	5	18	73	100	*
* 18.53 *	3	4	14	79	100	*
* 18.73 *	2	3	10	84	100	*
* 18.93 *	1	3	8	88	100	*

LAND TYPE DISTRIBUTION ACCORDING TO ASSUMED WATER LEVEL
WITHIN THE MODEL CELLS

153

Cell name : C4

* Elev.	* F0	* F1	* F2	* F3+F4	* TOTAL	*

* 14.48	* 100	* 0	* 0	* 0	* 100	*
* 14.58	* 100	* 0	* 0	* 0	* 100	*
* 14.68	* 100	* 0	* 0	* 0	* 100	*
* 14.78	* 100	* 0	* 0	* 0	* 100	*
* 14.88	* 100	* 0	* 0	* 0	* 100	*
* 14.98	* 100	* 0	* 0	* 0	* 100	*
* 15.08	* 100	* 0	* 0	* 0	* 100	*
* 15.18	* 100	* 0	* 0	* 0	* 100	*
* 15.28	* 100	* 0	* 0	* 0	* 100	*
* 15.38	* 100	* 0	* 0	* 0	* 100	*
* 15.48	* 100	* 0	* 0	* 0	* 100	*
* 15.58	* 99	* 0	* 0	* 0	* 100	*
* 15.68	* 99	* 1	* 0	* 0	* 100	*
* 15.78	* 98	* 2	* 0	* 0	* 100	*
* 15.88	* 97	* 3	* 0	* 0	* 100	*
* 15.98	* 96	* 4	* 0	* 0	* 100	*
* 16.08	* 94	* 6	* 0	* 0	* 100	*
* 16.18	* 92	* 8	* 1	* 0	* 100	*
* 16.28	* 90	* 10	* 1	* 0	* 100	*
* 16.38	* 86	* 12	* 2	* 0	* 100	*
* 16.48	* 83	* 15	* 3	* 0	* 100	*
* 16.58	* 79	* 17	* 4	* 0	* 100	*
* 16.68	* 74	* 20	* 6	* 0	* 100	*
* 16.78	* 68	* 24	* 8	* 0	* 100	*
* 16.88	* 62	* 27	* 10	* 0	* 100	*
* 16.98	* 55	* 31	* 13	* 0	* 100	*
* 17.08	* 48	* 35	* 17	* 1	* 100	*
* 17.18	* 40	* 39	* 21	* 1	* 100	*
* 17.28	* 33	* 40	* 25	* 2	* 100	*
* 17.38	* 27	* 41	* 29	* 3	* 100	*
* 17.48	* 21	* 41	* 34	* 4	* 100	*
* 17.58	* 16	* 39	* 39	* 6	* 100	*
* 17.68	* 12	* 36	* 44	* 8	* 100	*
* 17.78	* 8	* 32	* 50	* 10	* 100	*
* 17.88	* 5	* 28	* 53	* 14	* 100	*
* 17.98	* 3	* 24	* 55	* 17	* 100	*
* 18.08	* 2	* 19	* 58	* 21	* 100	*
* 18.18	* 1	* 15	* 57	* 26	* 100	*
* 18.28	* 1	* 11	* 56	* 32	* 100	*
* 18.38	* 0	* 7	* 55	* 38	* 100	*

LAND TYPE DISTRIBUTION ACCORDING TO ASSUMED WATER LEVEL
WITHIN THE MODEL CELLS

154

Cell name : C5

*	*	!	!	!	!	*
Elev.	F0	F1	F2	F3+F4	TOTAL	

*	*	!	!	!	!	*
14.18	100	0	0	0	100	*
14.28	100	0	0	0	100	*
14.38	100	0	0	0	100	*
14.48	100	0	0	0	100	*
14.58	100	0	0	0	100	*
14.68	100	0	0	0	100	*
14.78	100	0	0	0	100	*
14.88	99	1	0	0	100	*
14.98	99	1	0	0	100	*
15.08	98	2	0	0	100	*
15.18	96	3	0	0	100	*
15.28	95	5	0	0	100	*
15.38	93	7	0	0	100	*
15.48	90	9	1	0	100	*
15.58	88	11	1	0	100	*
15.68	85	13	2	0	100	*
15.78	81	16	4	0	100	*
15.88	76	18	5	0	100	*
15.98	72	21	7	0	100	*
16.08	68	23	10	0	100	*
16.18	64	24	12	0	100	*
16.28	59	26	15	0	100	*
16.38	55	26	18	1	100	*
16.48	51	25	22	1	100	*
16.58	47	25	26	2	100	*
16.68	44	24	29	4	100	*
16.78	41	23	31	5	100	*
16.88	37	22	34	7	100	*
16.98	34	21	35	10	100	*
17.08	31	20	36	12	100	*
17.18	28	19	38	15	100	*
17.28	25	19	37	19	100	*
17.38	22	19	36	24	100	*
17.48	18	19	35	28	100	*
17.58	16	19	33	32	100	*
17.68	13	18	32	36	100	*
17.78	11	17	31	41	100	*
17.88	9	16	31	45	100	*
17.98	7	15	30	49	100	*
18.08	5	13	29	53	100	*
18.18	4	11	28	56	100	*
18.28	4	10	27	59	100	*
18.38	3	8	27	63	100	*
18.48	3	6	26	66	100	*
18.58	2	5	24	69	100	*
18.68	1	4	23	72	100	*
18.78	1	3	21	75	100	*
18.88	1	3	18	78	100	*
18.98	0	3	15	82	100	*

LAND TYPE DISTRIBUTION ACCORDING TO ASSUMED WATER LEVEL
WITHIN THE MODEL CELLS

155

Cell name : C6

*	*	*	*	*	*	*
Elev.	F0	F1	F2	F3+F4	TOTAL	*

*	*	*	*	*	*	*
*	14.20	100	0	0	100	*
*	14.30	100	0	0	100	*
*	14.40	100	0	0	100	*
*	14.50	100	0	0	100	*
*	14.60	100	0	0	100	*
*	14.70	100	0	0	100	*
*	14.80	100	0	0	100	*
*	14.90	99	1	0	100	*
*	15.00	99	1	0	100	*
*	15.10	99	1	0	100	*
*	15.20	98	2	0	100	*
*	15.30	97	2	0	100	*
*	15.40	97	3	0	100	*
*	15.50	96	4	1	100	*
*	15.60	94	5	1	100	*
*	15.70	93	5	1	100	*
*	15.80	91	7	2	100	*
*	15.90	90	8	3	100	*
*	16.00	88	9	3	100	*
*	16.10	85	10	4	100	*
*	16.20	83	12	5	100	*
*	16.30	80	13	6	100	*
*	16.40	77	14	8	100	*
*	16.50	74	16	9	100	*
*	16.60	71	17	11	100	*
*	16.70	67	18	13	100	*
*	16.80	63	20	15	100	*
*	16.90	59	21	17	100	*
*	17.00	56	21	19	100	*
*	17.10	53	21	21	100	*
*	17.20	50	20	23	100	*
*	17.30	46	20	25	100	*
*	17.40	42	20	27	100	*
*	17.50	39	21	29	100	*
*	17.60	34	22	29	100	*
*	17.70	29	24	29	100	*
*	17.80	25	26	30	100	*
*	17.90	22	25	31	100	*
*	18.00	19	24	31	100	*
*	18.10	16	23	32	100	*
*	18.20	14	20	33	100	*
*	18.30	11	18	34	100	*
*	18.40	9	16	34	100	*
*	18.50	7	15	34	100	*
*	18.60	5	13	35	100	*
*	18.70	3	12	35	100	*
*	18.80	3	11	33	100	*
*	18.90	2	10	31	100	*
*	19.00	1	8	30	100	*
*	19.10	1	7	27	100	*
*	19.20	0	5	24	100	*
*	19.30	0	3	21	100	*

LAND TYPE DISTRIBUTION ACCORDING TO ASSUMED WATER LEVEL
WITHIN THE MODEL CELLS

156

Cell name : C7

*	*	!	!	!	!	*
Elev.	F0	F1	F2	F3+F4	TOTAL	*

*	*	!	!	!	!	*
15.39	100	0	0	0	100	*
15.49	100	0	0	0	100	*
15.59	100	0	0	0	100	*
15.69	100	0	0	0	100	*
15.79	100	0	0	0	100	*
15.89	100	0	0	0	100	*
15.99	100	0	0	0	100	*
16.09	99	1	0	0	100	*
16.19	97	3	0	0	100	*
16.29	96	4	0	0	100	*
16.39	95	5	0	0	100	*
16.49	94	6	0	0	100	*
16.59	93	7	0	0	100	*
16.69	90	9	1	0	100	*
16.79	86	11	3	0	100	*
16.89	83	13	4	0	100	*
16.99	78	17	5	0	100	*
17.09	74	20	6	0	100	*
17.19	69	24	7	0	100	*
17.29	64	26	10	0	100	*
17.39	59	28	13	0	100	*
17.49	54	29	17	0	100	*
17.59	48	31	20	1	100	*
17.69	41	32	24	3	100	*
17.79	35	34	27	4	100	*
17.89	29	35	31	5	100	*
17.99	24	35	35	6	100	*
18.09	18	35	39	7	100	*
18.19	14	33	42	10	100	*
18.29	11	30	45	14	100	*
18.39	8	26	48	17	100	*
18.49	6	23	49	22	100	*
18.59	4	20	50	26	100	*
18.69	2	16	50	31	100	*

LAND TYPE DISTRIBUTION ACCORDING TO ASSUMED WATER LEVEL
WITHIN THE MODEL CELLS

157

Cell name : C8.DAT

*	*	!	!	!	!	*
Elev.	F0	F1	F2	F3+F4	TOTAL	*

*	*	!	!	!	!	*
13.90	100	0	0	0	100	*
14.10	100	0	0	0	100	*
14.30	100	0	0	0	100	*
14.50	100	0	0	0	100	*
14.70	100	0	0	0	100	*
14.90	99	1	0	0	100	*
15.10	99	1	0	0	100	*
15.30	97	3	0	0	100	*
15.50	95	4	1	0	100	*
15.70	94	5	1	0	100	*
15.90	91	6	3	0	100	*
16.10	87	8	4	0	100	*
16.30	83	11	6	0	100	*
16.50	78	13	8	1	100	*
16.70	71	16	11	2	100	*
16.90	63	19	13	4	100	*
17.10	56	21	17	6	100	*
17.30	49	22	21	8	100	*
17.50	41	22	26	11	100	*
17.70	34	22	29	15	100	*
17.90	28	21	31	20	100	*
18.10	23	18	34	25	100	*
18.30	18	16	33	33	100	*
18.50	14	14	32	40	100	*
18.70	10	13	30	47	100	*
18.90	7	11	27	55	100	*
19.10	5	9	24	62	100	*
19.30	4	6	20	70	100	*
19.50	3	4	18	75	100	*
19.70	2	3	16	80	100	*
19.90	1	3	12	84	100	*
20.10	0	2	9	88	100	*

LAND TYPE DISTRIBUTION ACCORDING TO ASSUMED WATER LEVEL
WITHIN THE MODEL CELLS

158

Cell name : C9

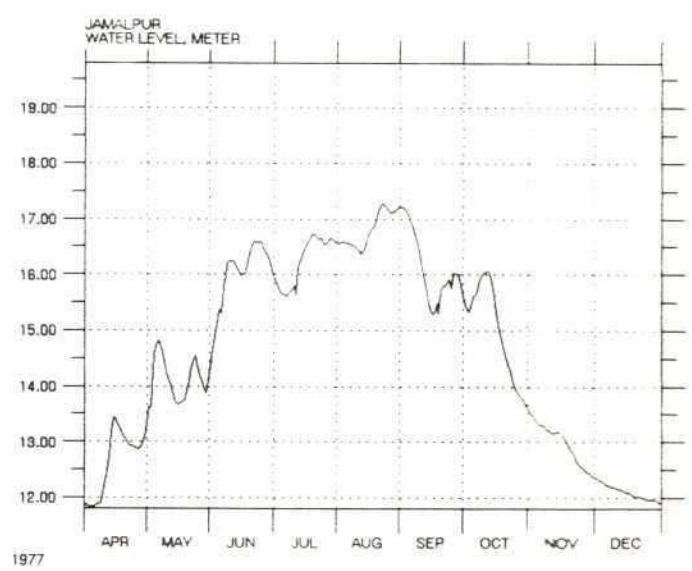
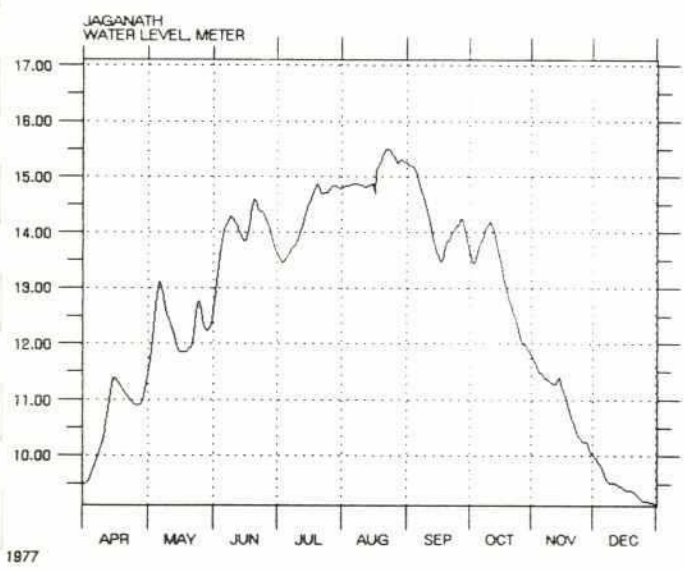
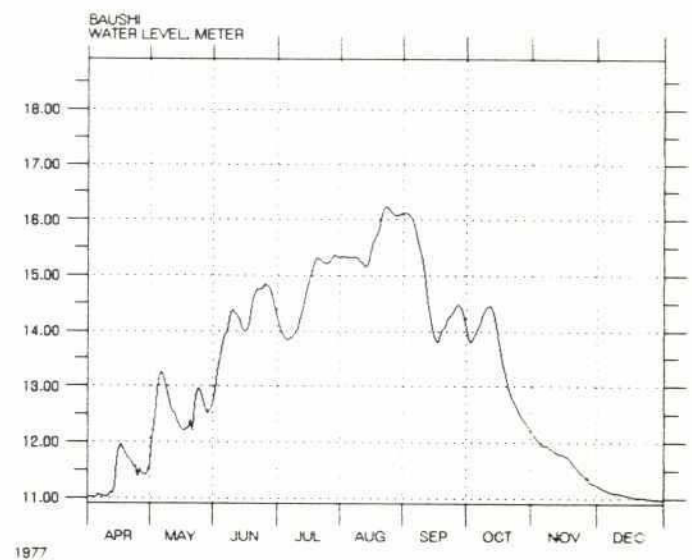
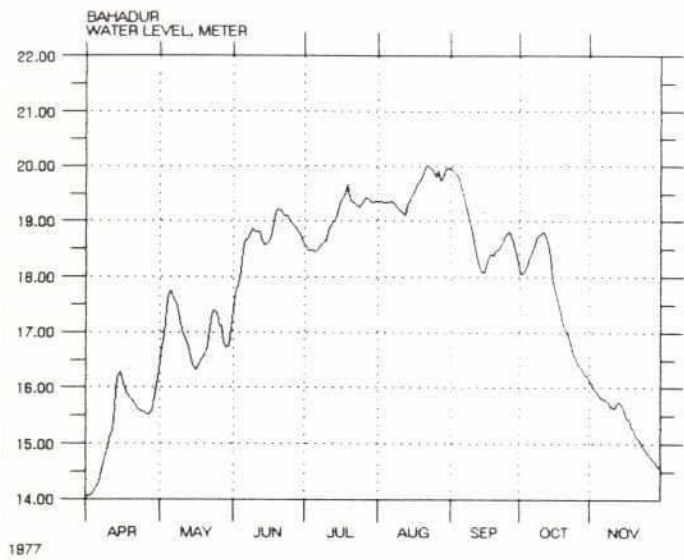
*	*	*	*	*	*	*
Elev.	F0	F1	F2	F3+F4	TOTAL	

*	*	*	*	*	*	*
14.17	100	0	0	0	100	*
14.37	100	0	0	0	100	*
14.57	100	0	0	0	100	*
14.77	100	0	0	0	100	*
14.97	100	0	0	0	100	*
15.17	99	0	0	0	100	*
15.37	99	0	0	0	100	*
15.57	99	1	0	0	100	*
15.77	99	1	1	0	100	*
15.97	99	0	1	0	100	*
16.17	99	0	1	0	100	*
16.37	98	1	1	0	100	*
16.57	98	1	1	0	100	*
16.77	96	2	1	1	100	*
16.97	94	4	1	1	100	*
17.17	92	6	1	1	100	*
17.37	89	7	3	1	100	*
17.57	85	9	4	1	100	*
17.77	81	11	6	2	100	*
17.97	74	15	9	2	100	*
18.17	66	19	12	3	100	*
18.37	59	22	15	5	100	*
18.57	52	22	19	7	100	*
18.77	46	20	24	9	100	*
18.97	39	20	28	13	100	*
19.17	33	19	31	17	100	*
19.37	27	18	32	22	100	*
19.57	21	18	31	30	100	*
19.77	16	17	29	37	100	*
19.97	11	16	28	45	100	*
20.17	7	14	28	51	100	*
20.37	4	12	27	57	100	*
20.57	3	8	25	64	100	*
20.77	2	6	23	70	100	*

Water Level Hydrograph
(for Boundaries)

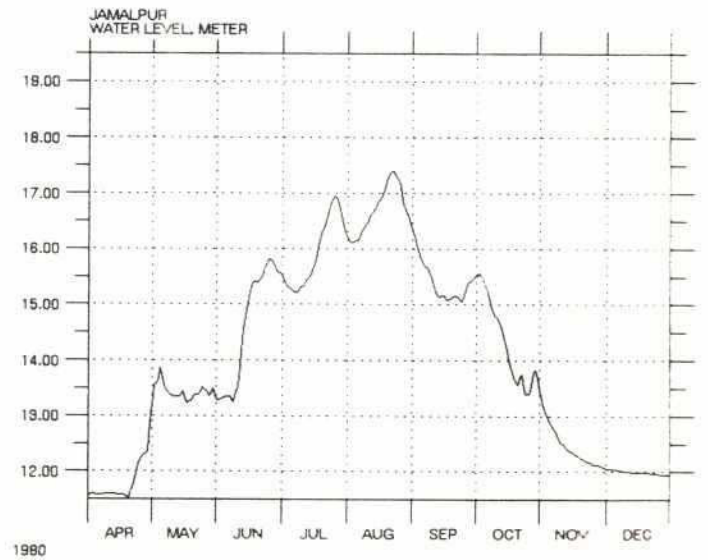
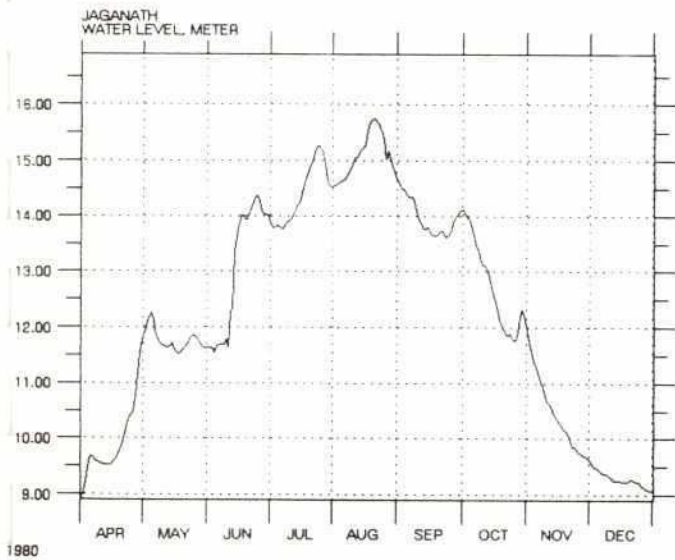
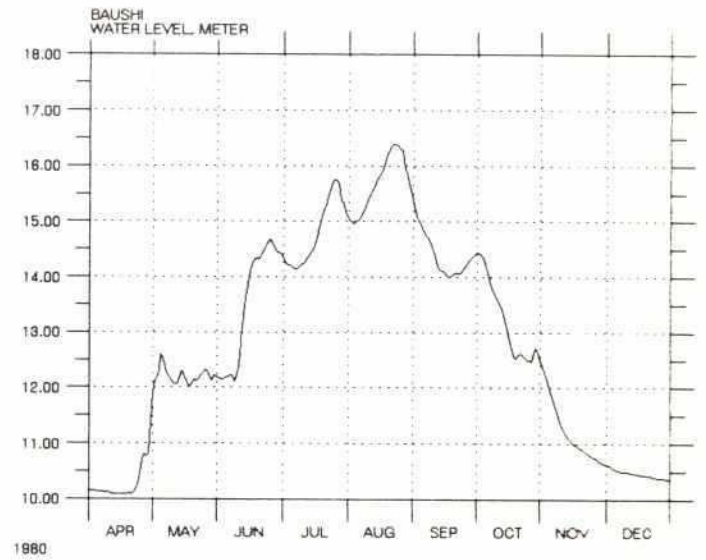
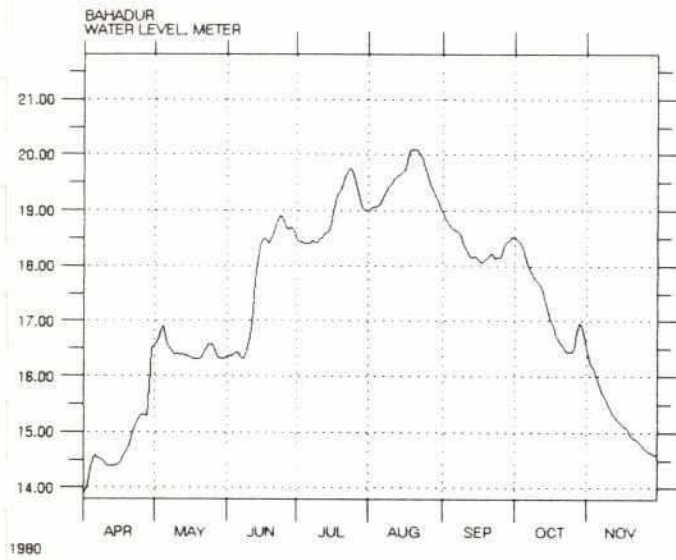


160



S W M C	OBSERVED WATER LEVEL HYDROGRAPH EXTERNAL BOUNDARY 1977	MIKE 11	
		TIME SERIES DATA BASE : WL77	Dwg no.:

661



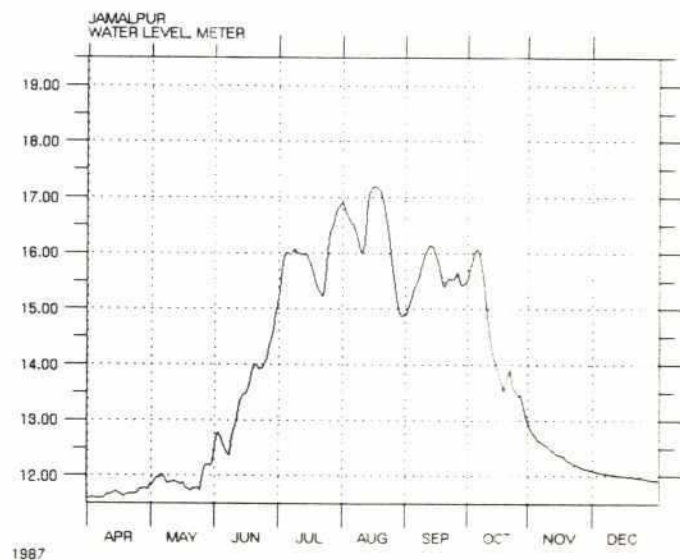
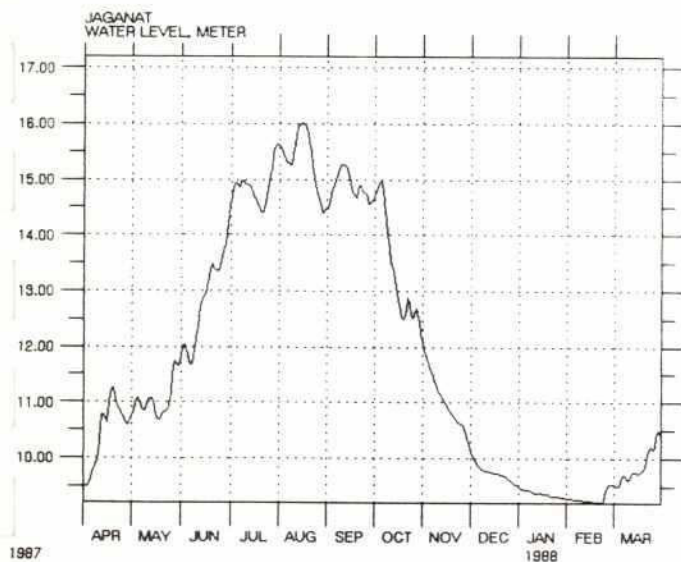
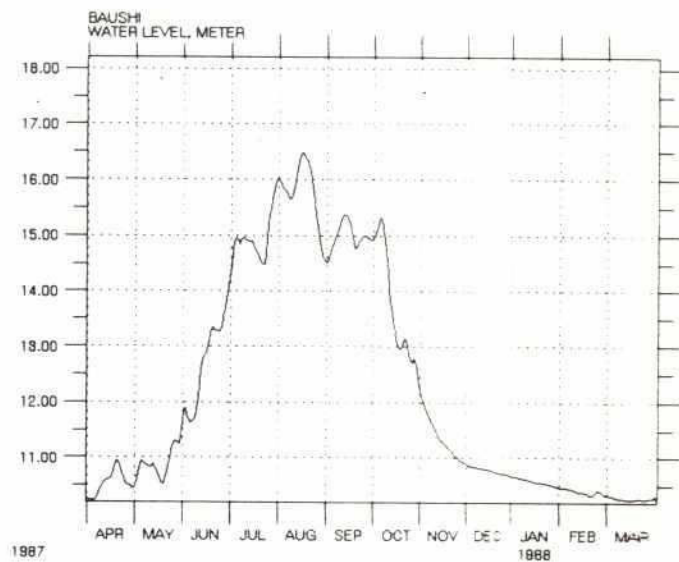
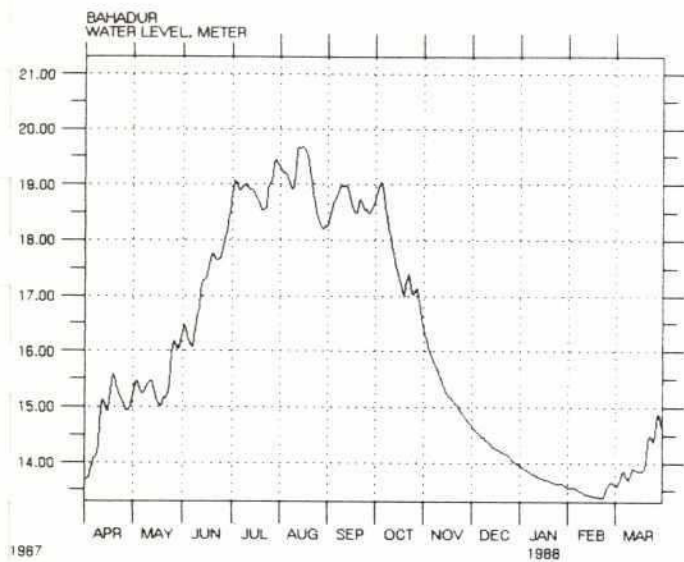
S W M C

OBSERVED WATER LEVEL HYDROGRAPH
EXTERNAL BOUNDARY
1980

TIME SERIES DATA BASE : WL80

MIKE 11

Dwg no.:



S W M C

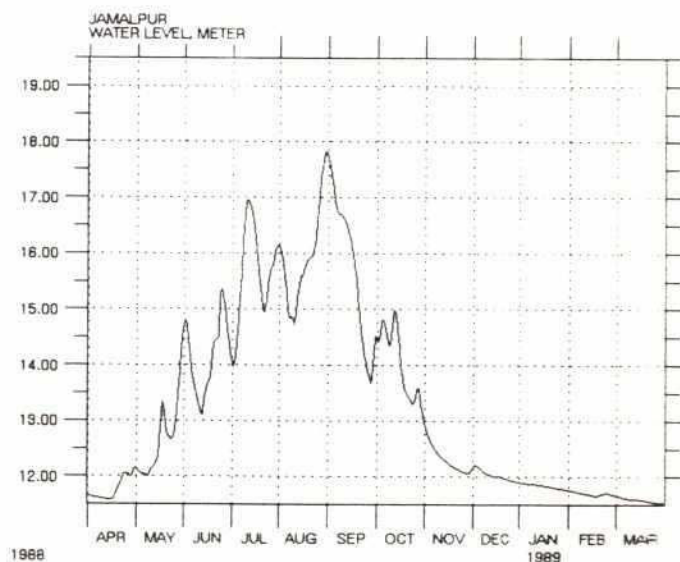
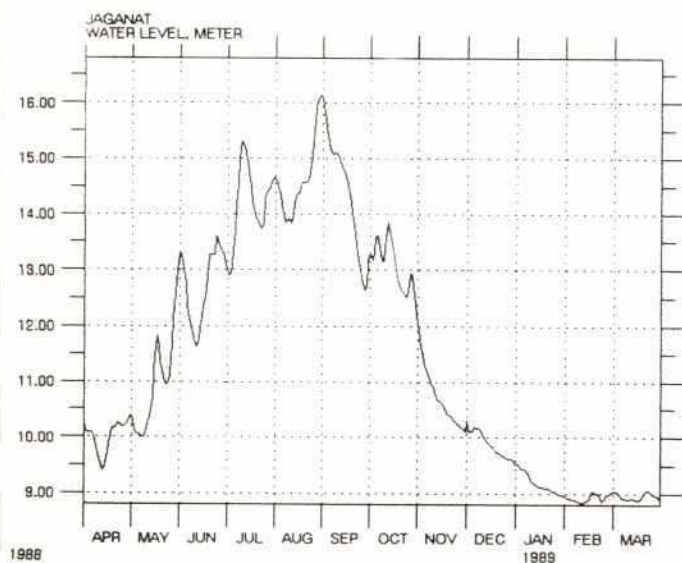
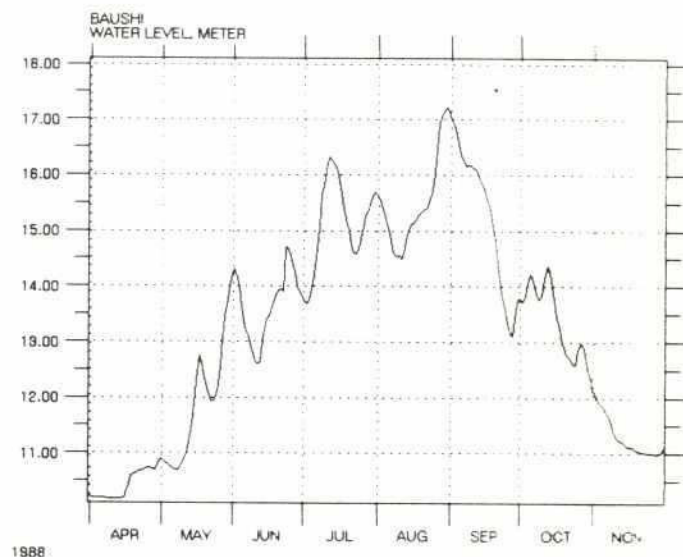
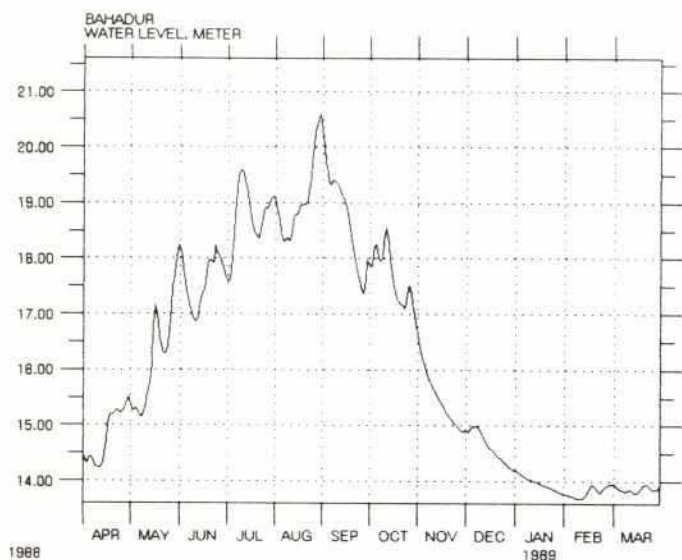
OBSERVED WATER LEVEL HYDROGRAPH
EXTERNAL BOUNDARY
1987

TIME SERIES DATA BASE : WL87

MIKE 11

Dwg no.:

663



S W M C

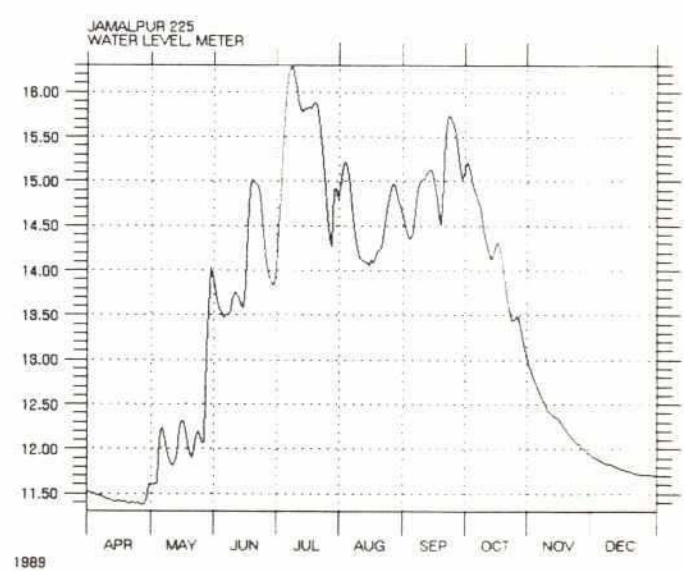
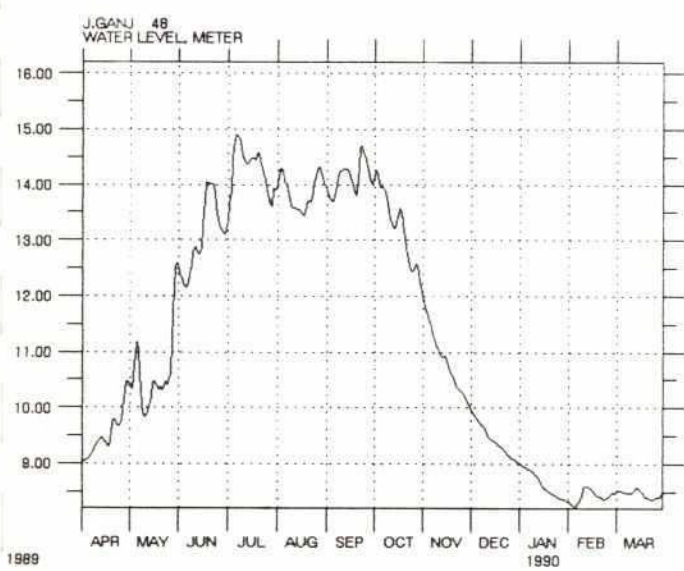
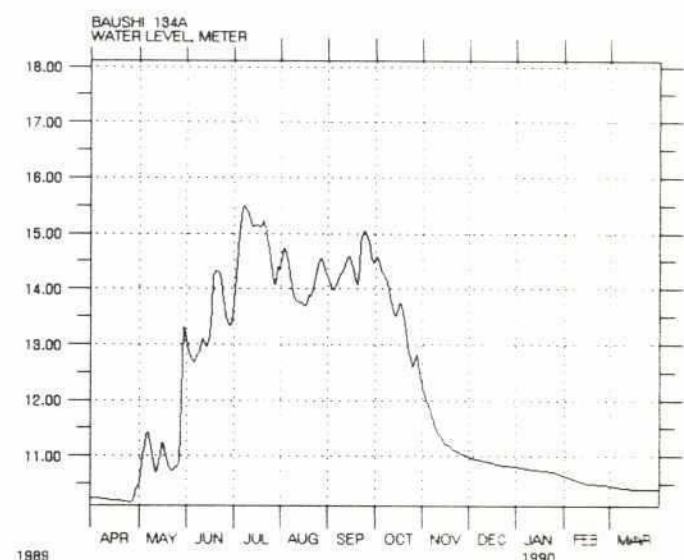
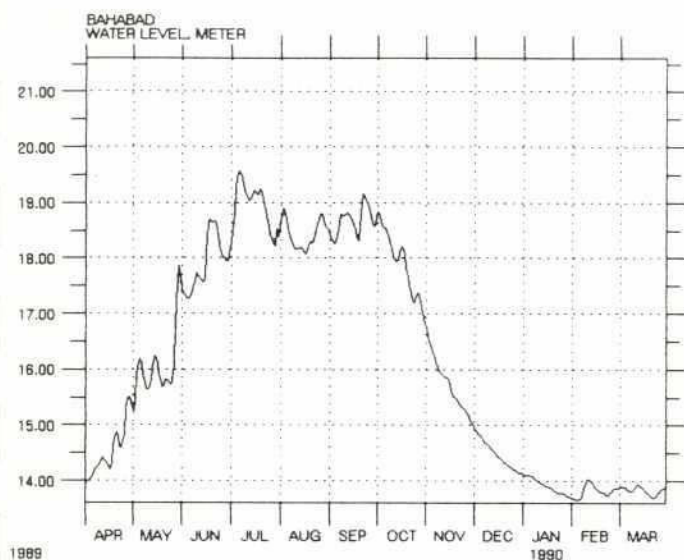
OBSERVED WATER LEVEL HYDROGRAPH
EXTERNAL BOUNDARY
1988

TIME SERIES DATA BASE : WL88

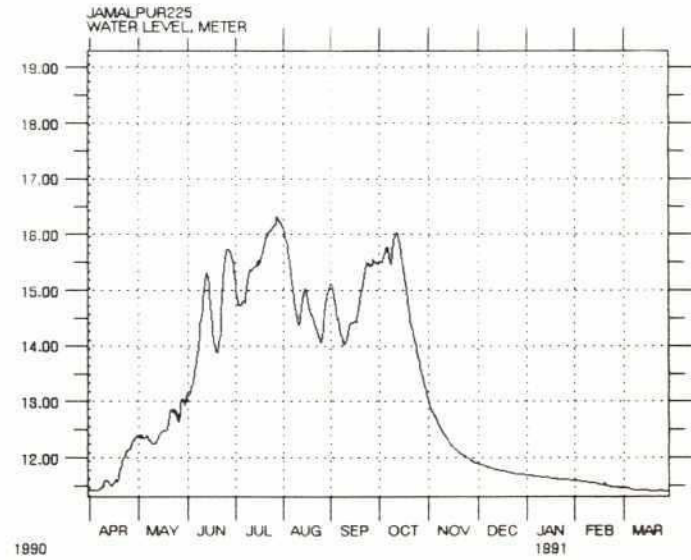
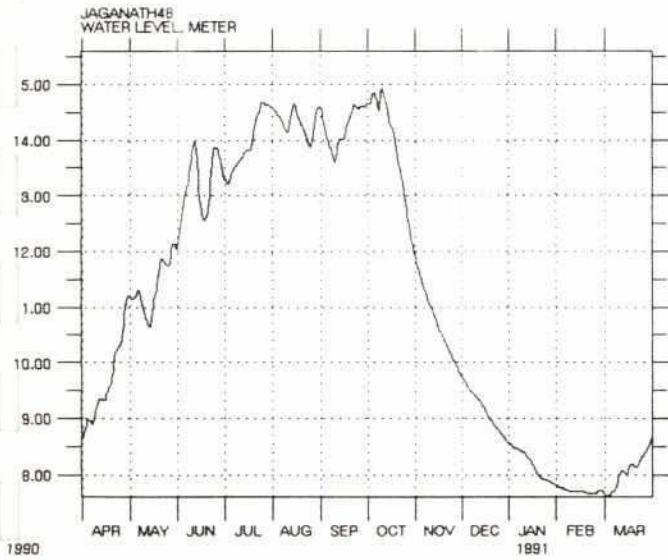
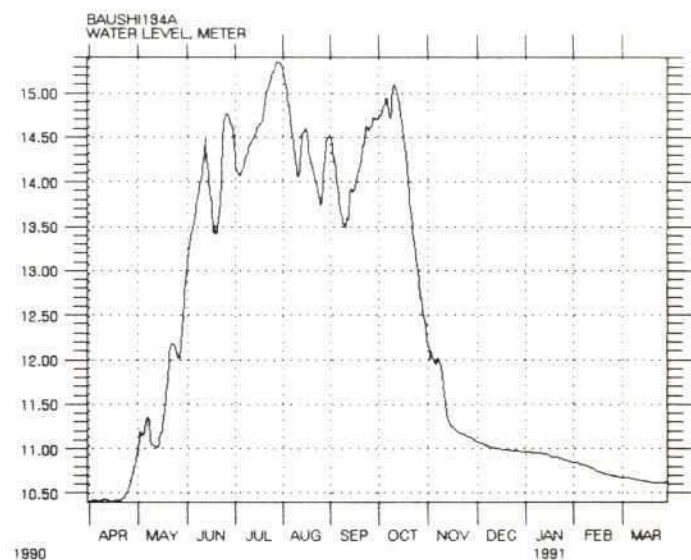
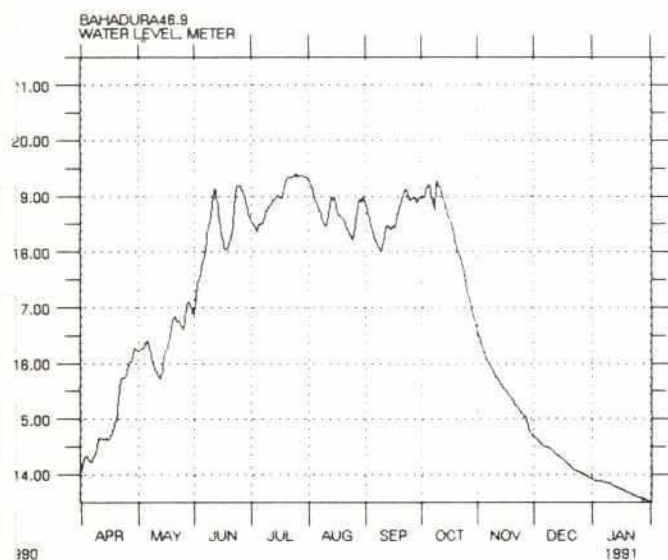
MIKE 11

Dwg no.:

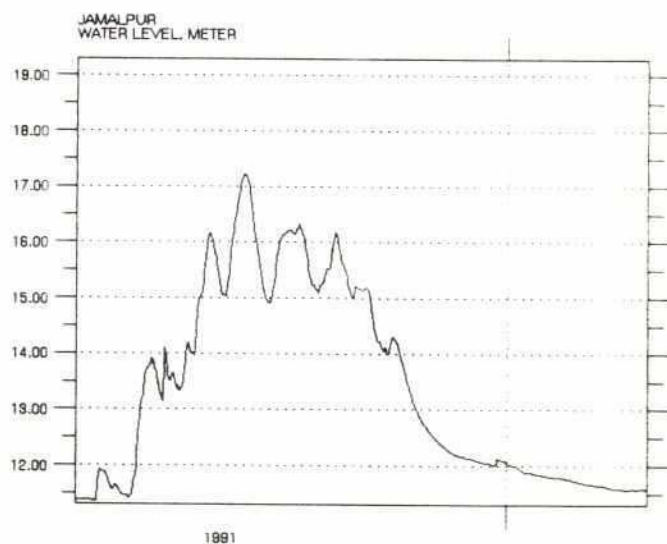
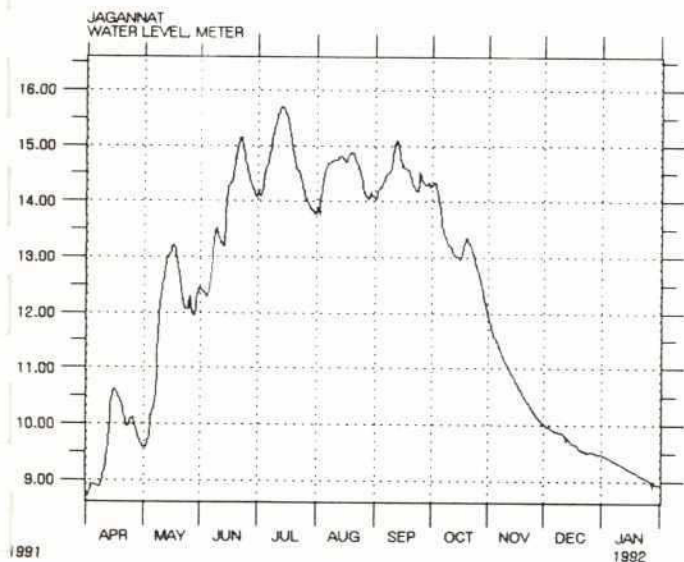
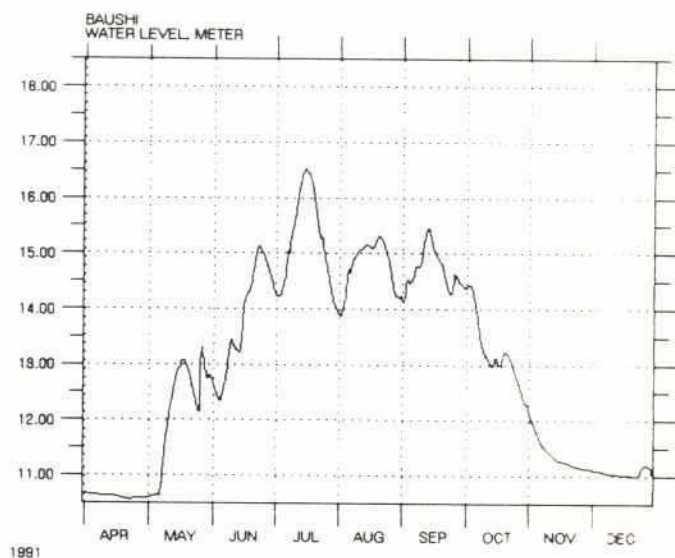
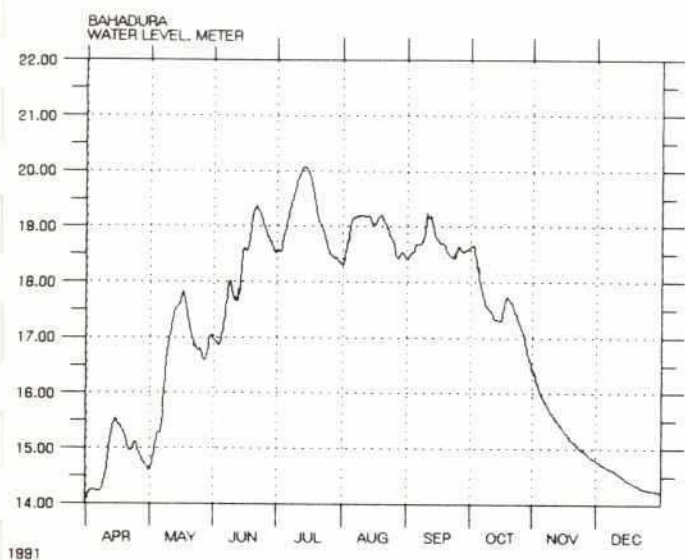
164



S W M C	OBSERVED WATER LEVEL HYDROGRAPH EXTERNAL BOUNDARY 1989
TIME SERIES DATA BASE : WL89	MIKE 11 Dwg no.:



S W M C	OBSERVED WATER LEVEL HYDROGRAPH EXTERNAL BOUNDARY 1990
TIME SERIES DATA BASE : WL90	MIKE 11 Dwg no.:



S W M C

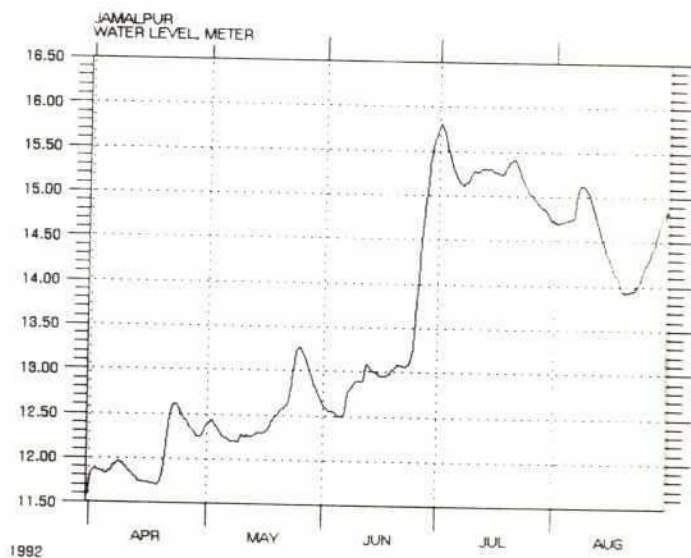
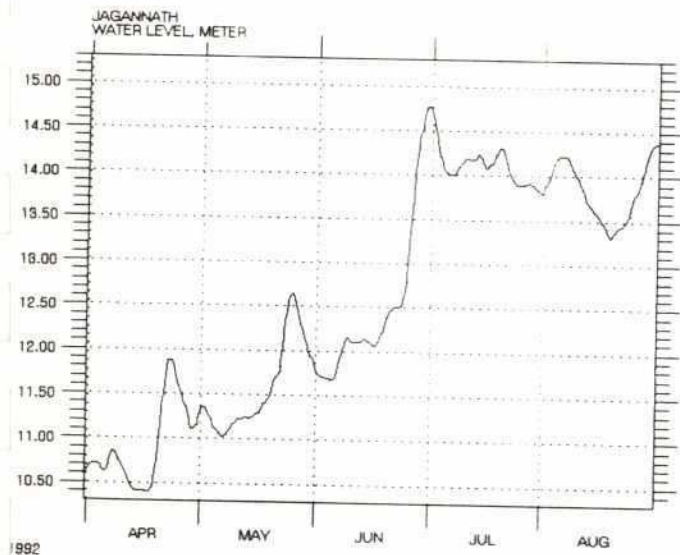
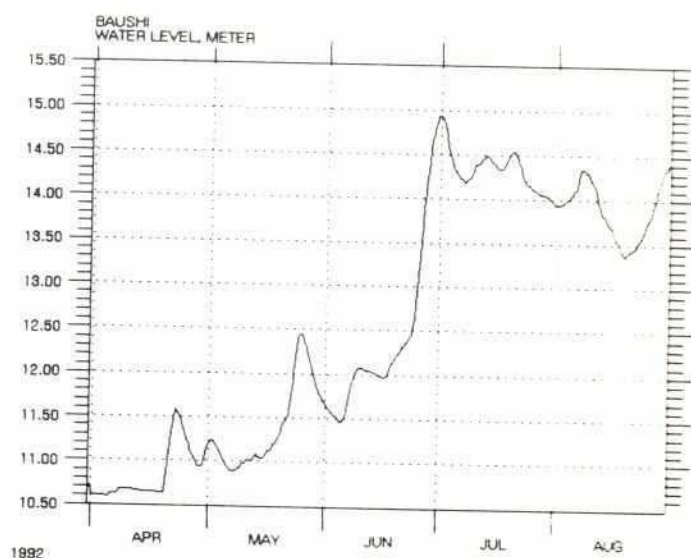
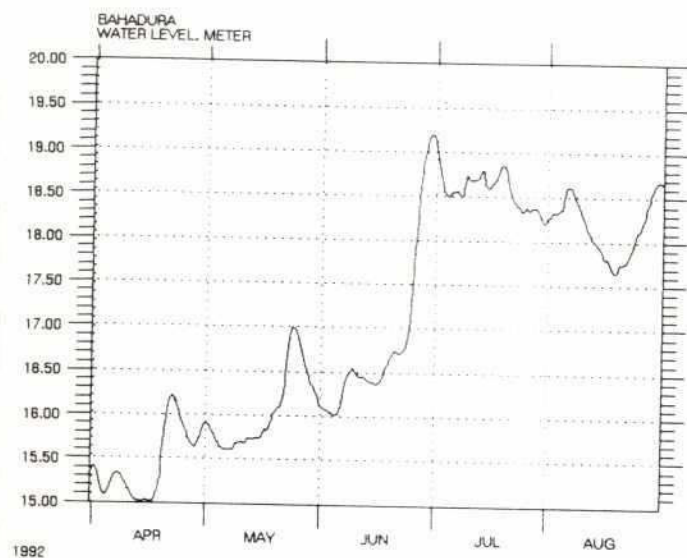
OBSERVED WATER LEVEL HYDROGRAPH
EXTERNAL BOUNDARY
1991

TIME SERIES DATA BASE : WL91

MIKE 11

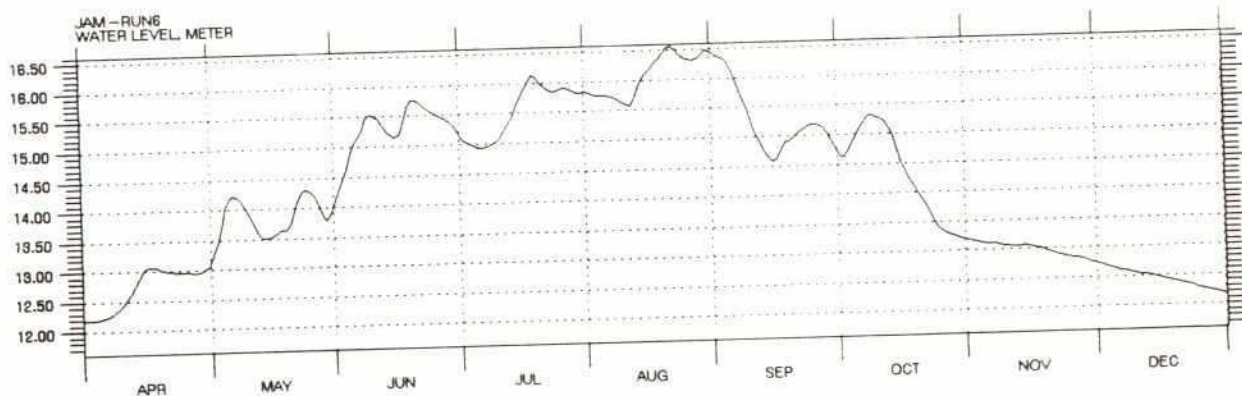
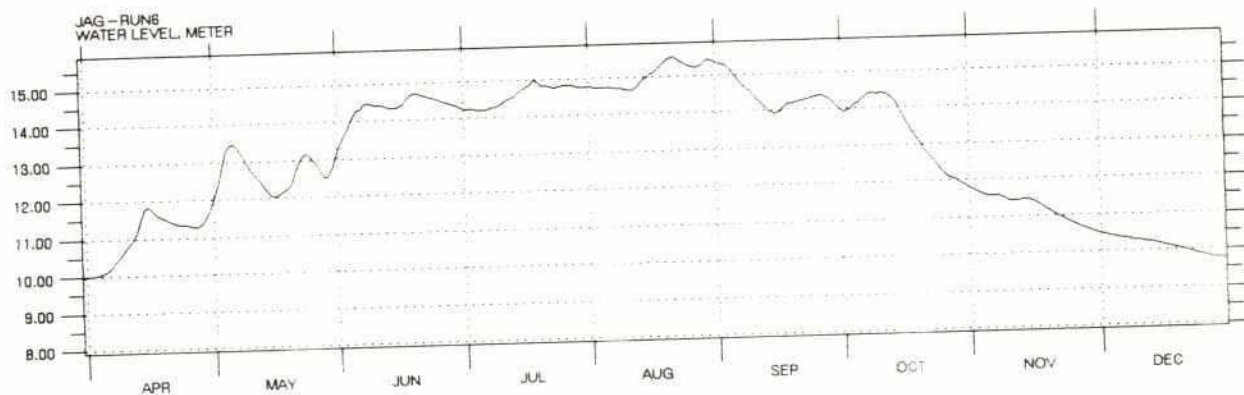
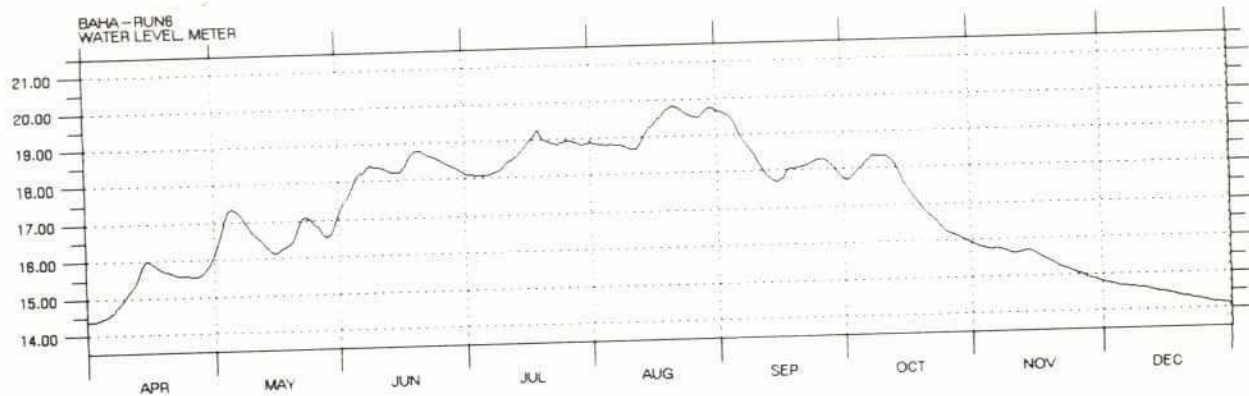
Dwg no.:

167



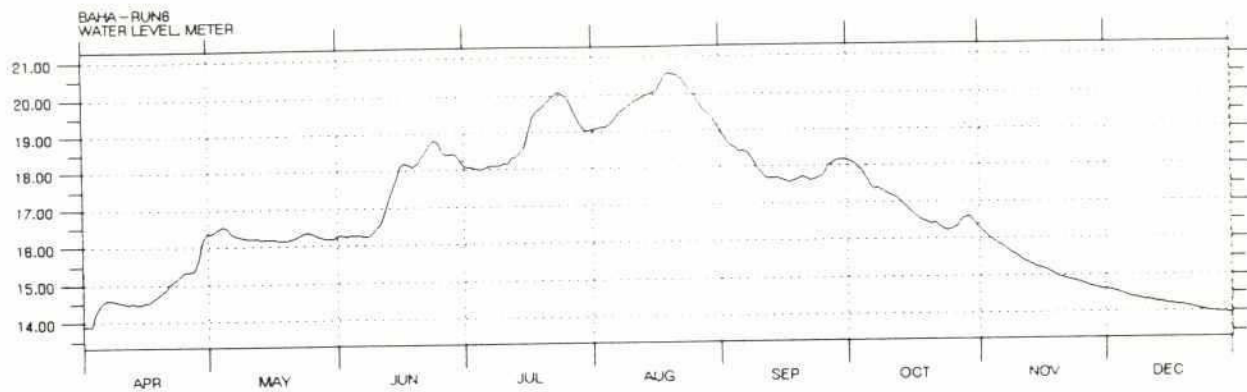
SWMC	OBSERVED WATER LEVEL HYDROGRAPH EXTERNAL BOUNDARY 1992
TIME SERIES DATA BASE : WL92	MIKE 11
	Dwg no.:

168

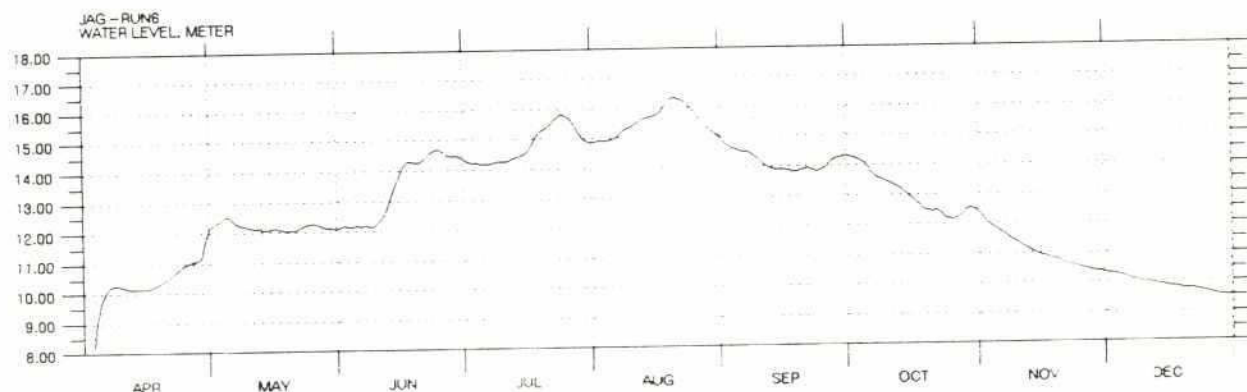


S W M C	FAP25 RUN - 6 (WITHOUT OPTION) EXTERNAL BOUNDARY 1977	MIKE 11
	TIME SERIES DATA BASE : WL77	Dwg no.:

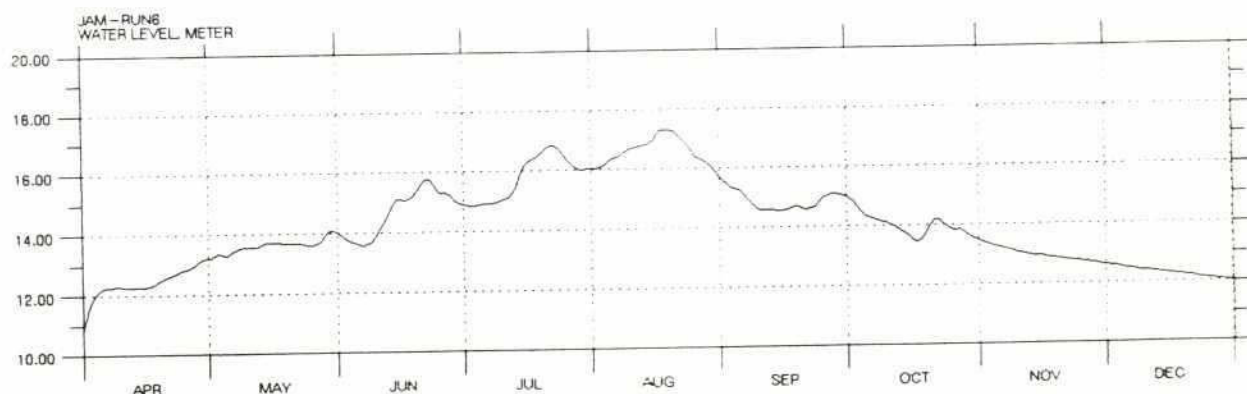
669



1980



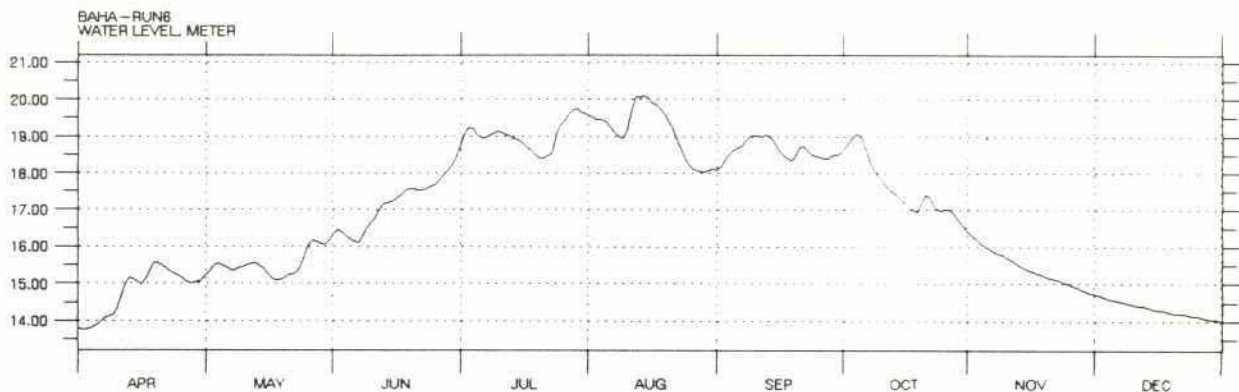
1980



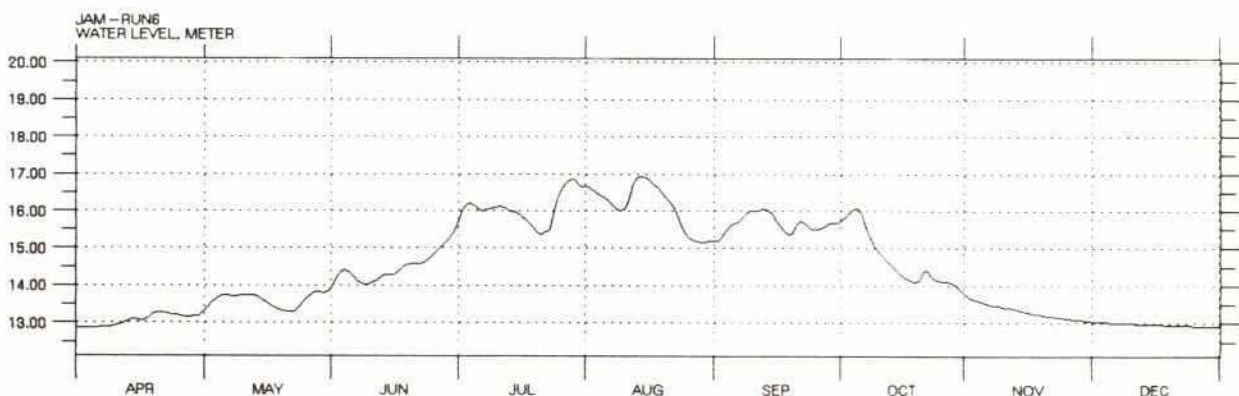
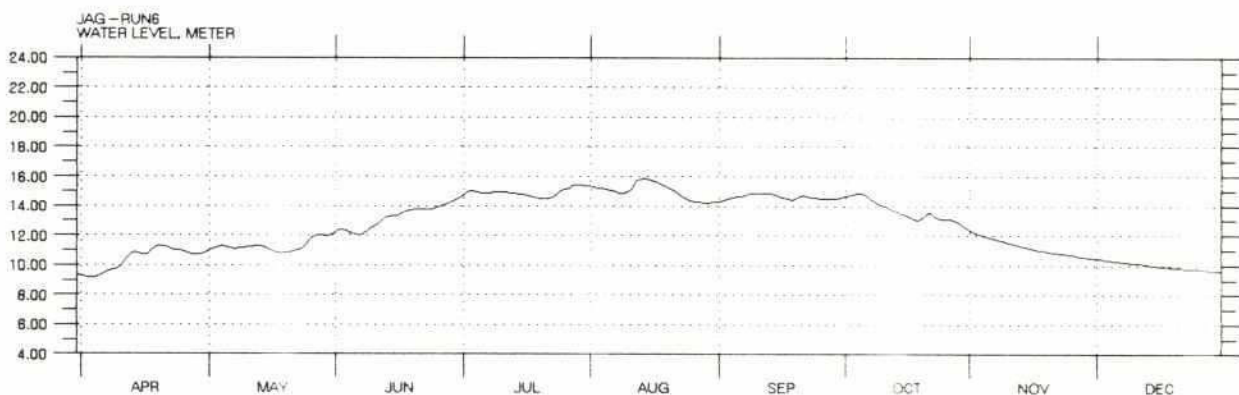
1980

S W M C	FAP25 RUN-6 (WITHOUT OPTION) EXTERNAL BOUNDARY 1980	MIKE 11
TIME SERIES DATA BASE : WL80		Dwg no.:

170



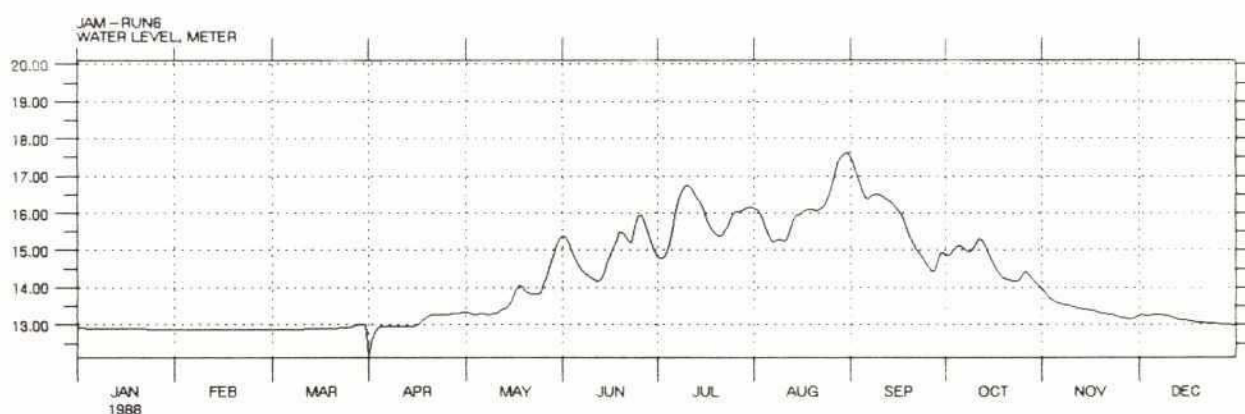
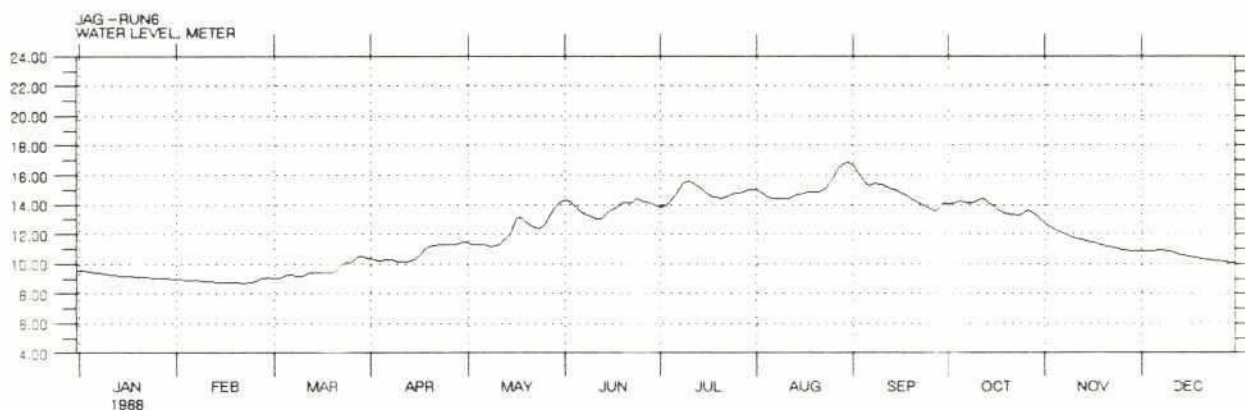
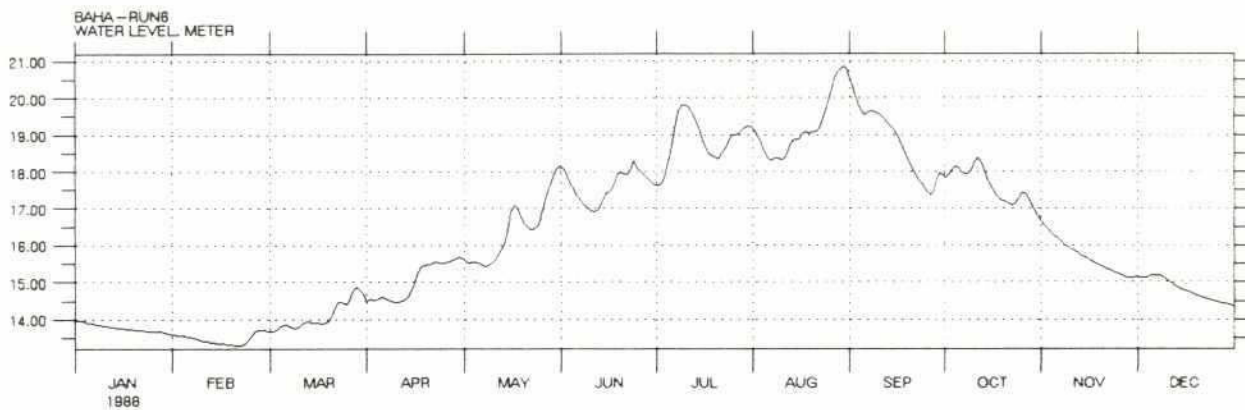
1987



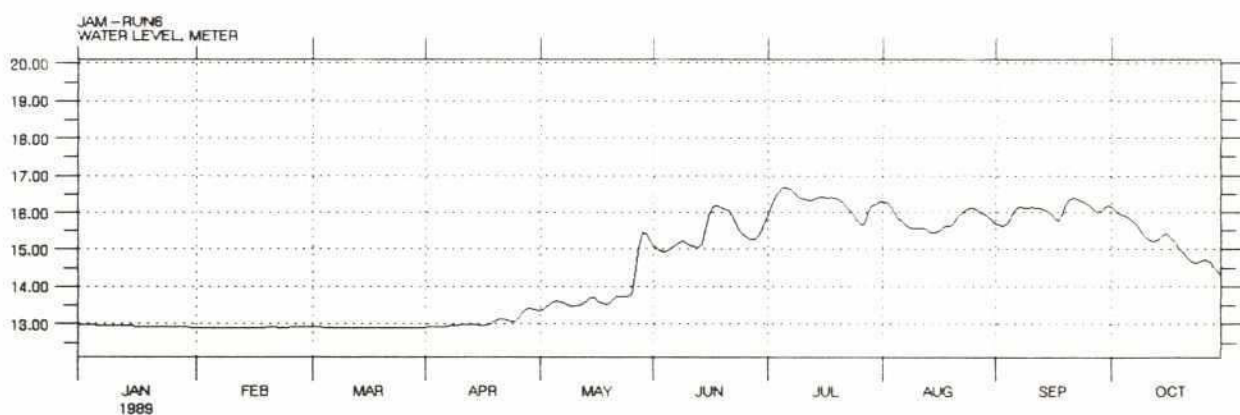
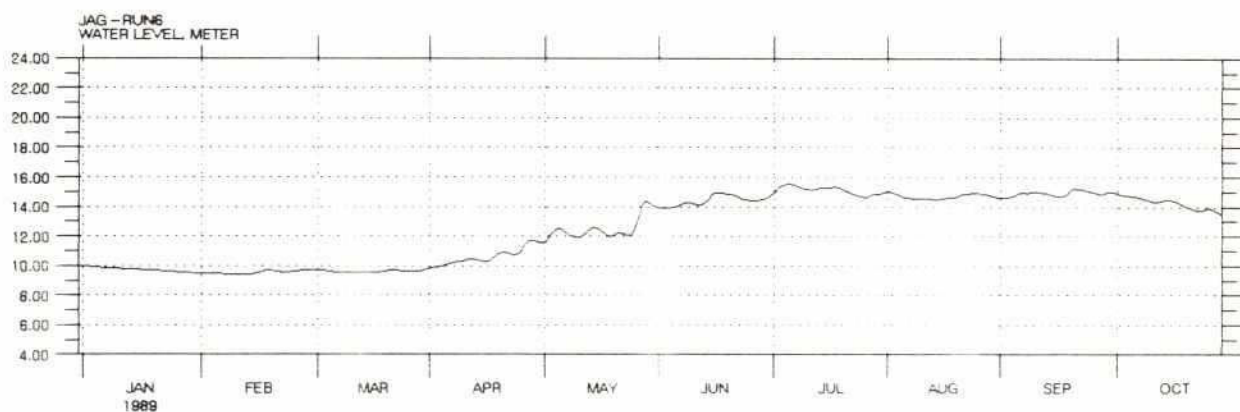
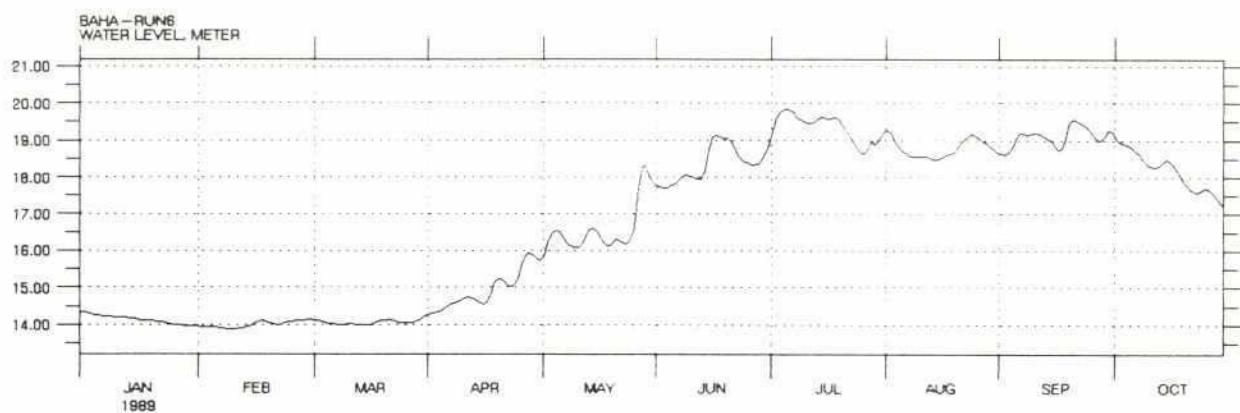
1987

S W M C	FAP25 RUN - 6 (WITHOUT OPTION) EXTERNAL BOUNDARY 1987	
	TIME SERIES DATA BASE : WL87	MIKE 11 Dwg no.:

171

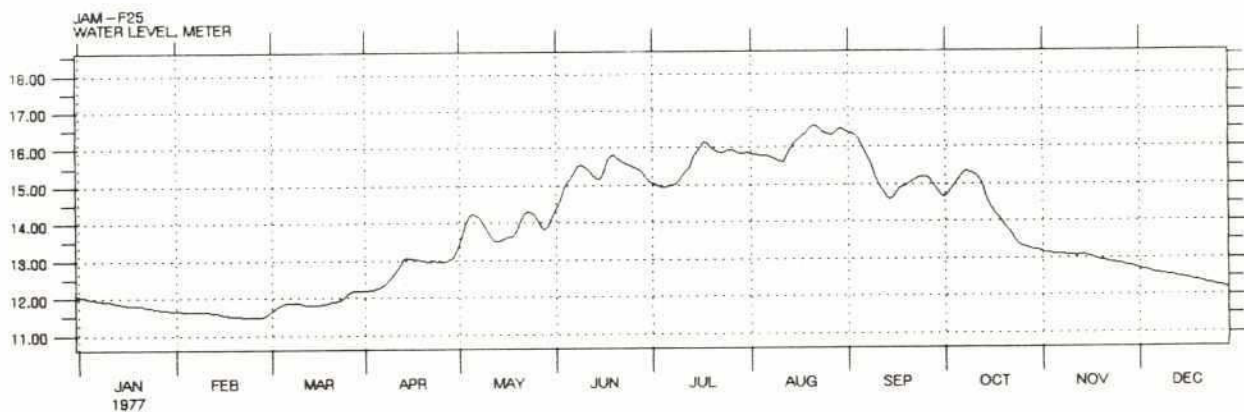
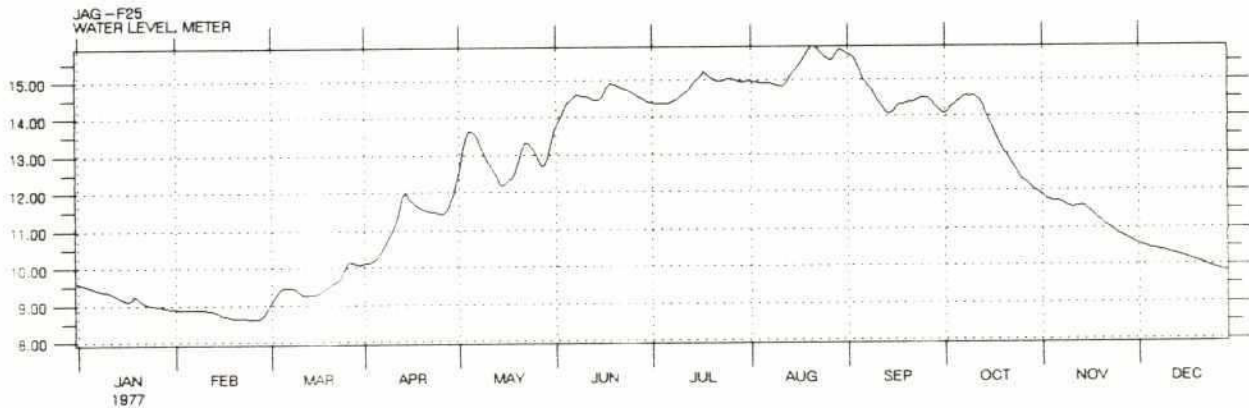
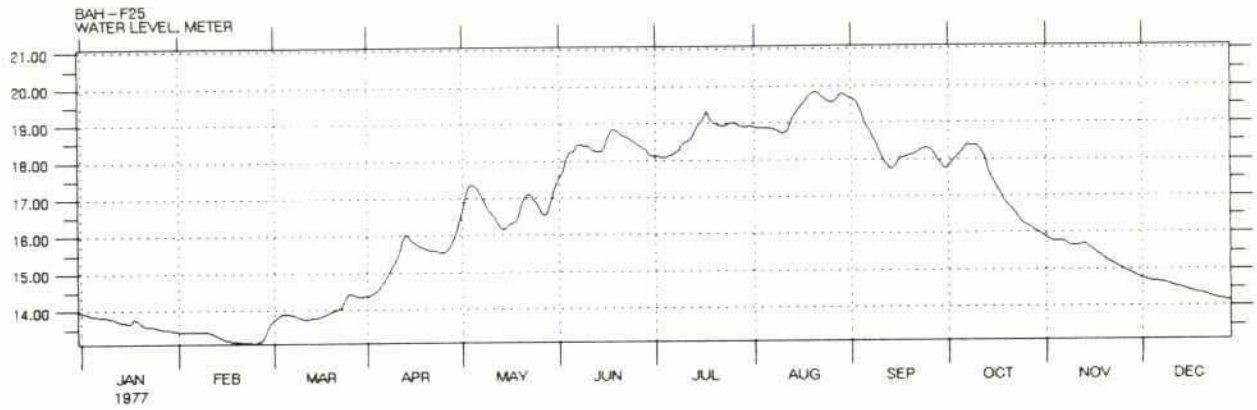


S W M C	FAP25 RUN-6 (WITHOUT OPTION) EXTERNAL BOUNDARY 1988
TIME SERIES DATA BASE : WL87	MIKE 11 Dwg no.:



S W M C	FAP25 RUN - 6 (WITHOUT OPTION) EXTERNAL BOUNDARY 1989
TIME SERIES DATA BASE : WL87	MIKE 11
	Dwg no.:

173



S W M C

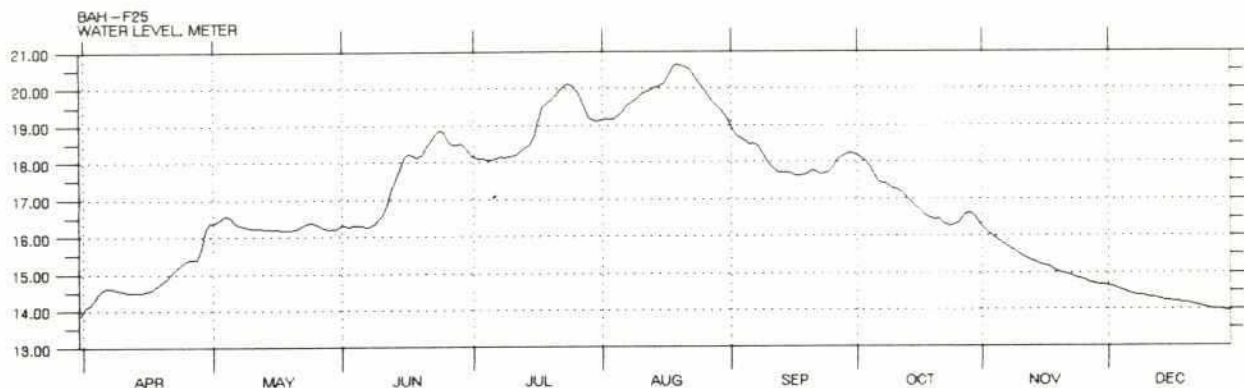
FAP25 OPTION - 3
EXTERNAL BOUNDARY
1977

MIKE 11

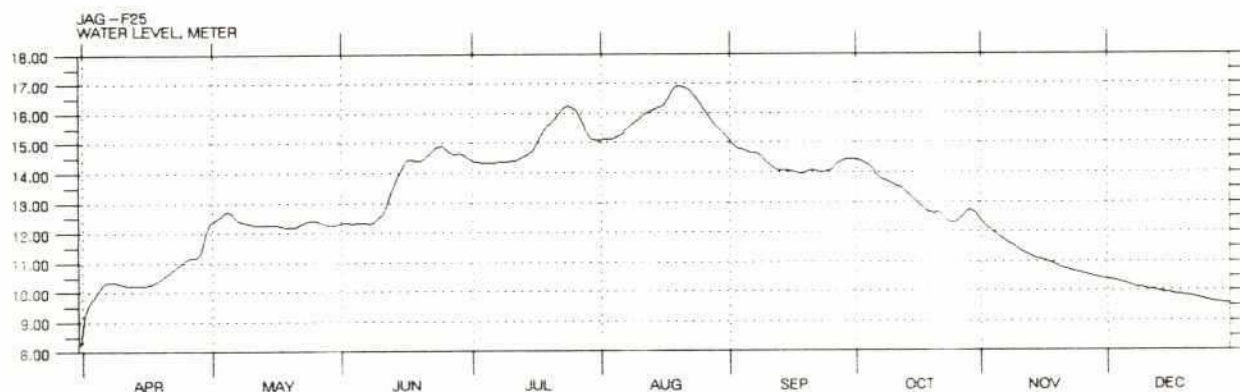
TIME SERIES DATA BASE : WL77

Dwg no.:

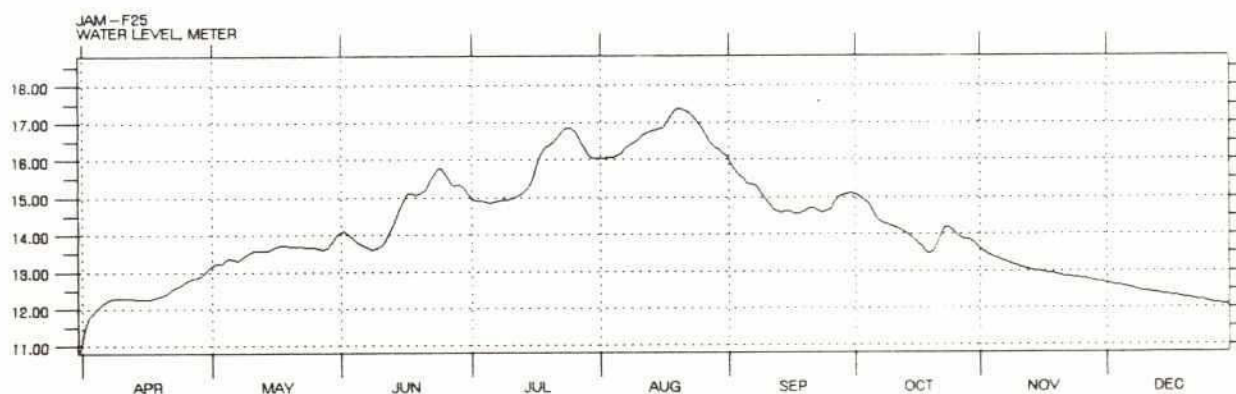
174



1980



1980



1980

S W M C

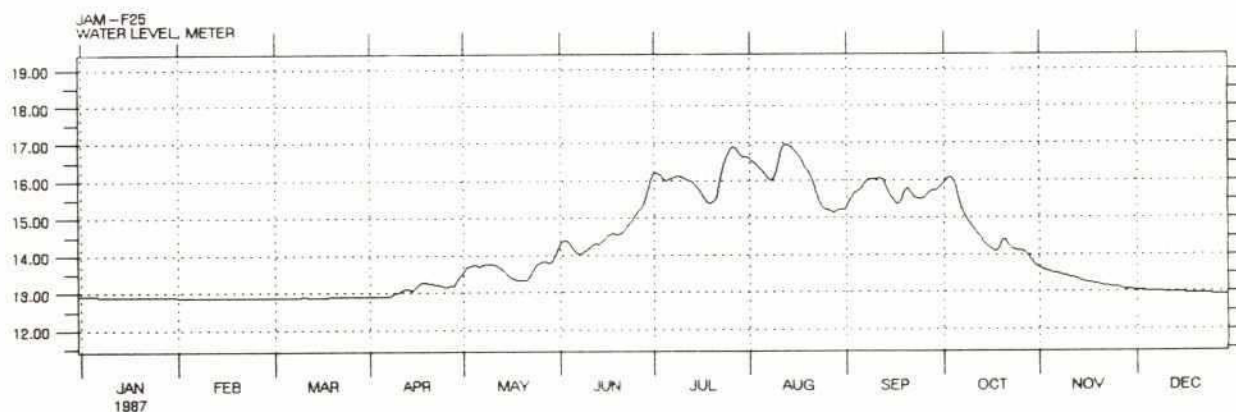
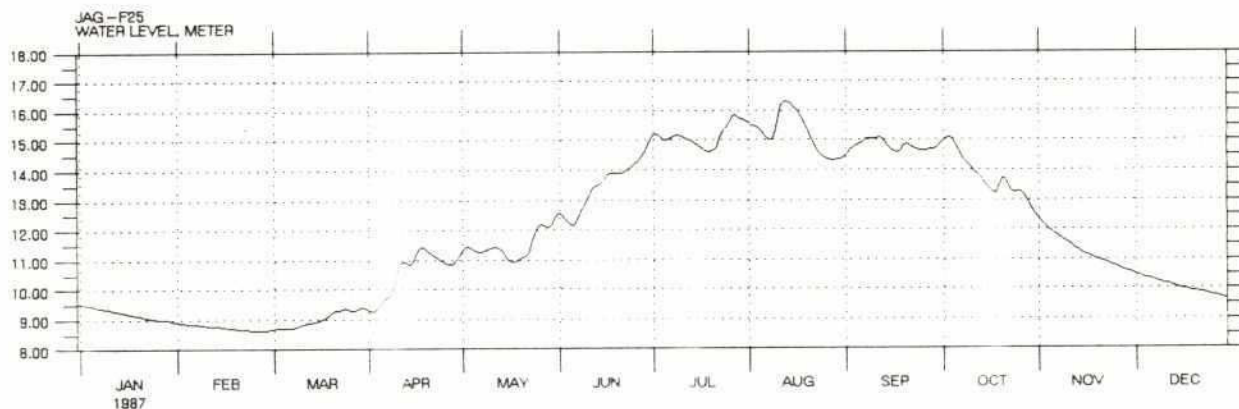
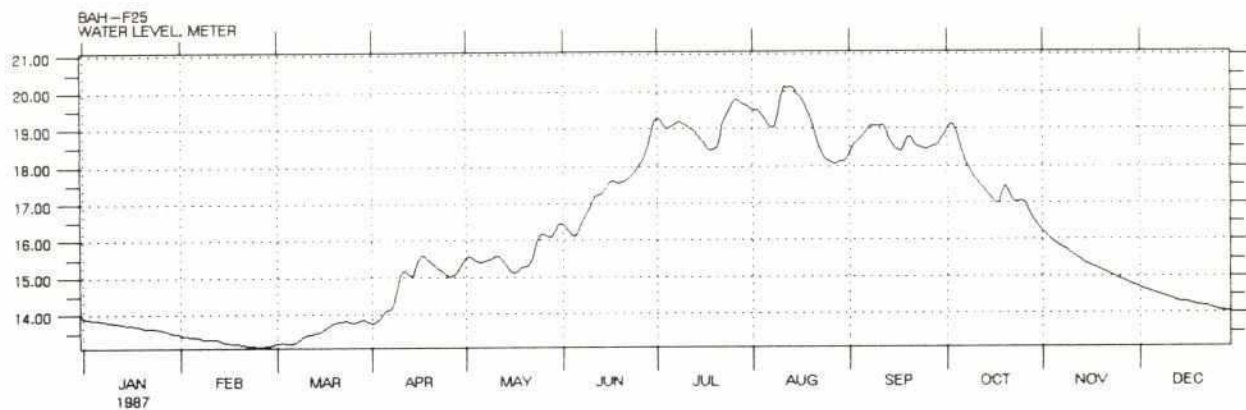
FAP25 OPTION-3
EXTERNAL BOUNDARY
1980

TIME SERIES DATA BASE : WL80

MIKE 11

Dwg no.:

175



SWMC

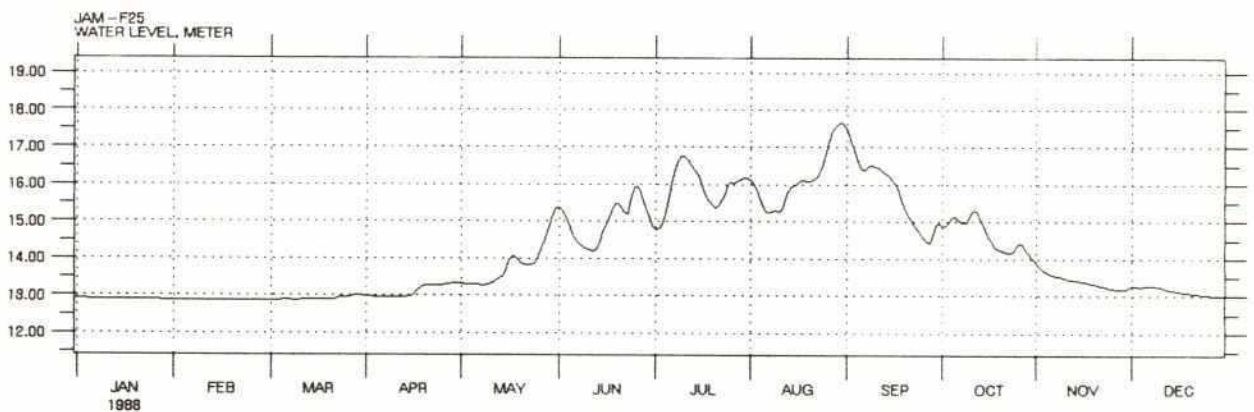
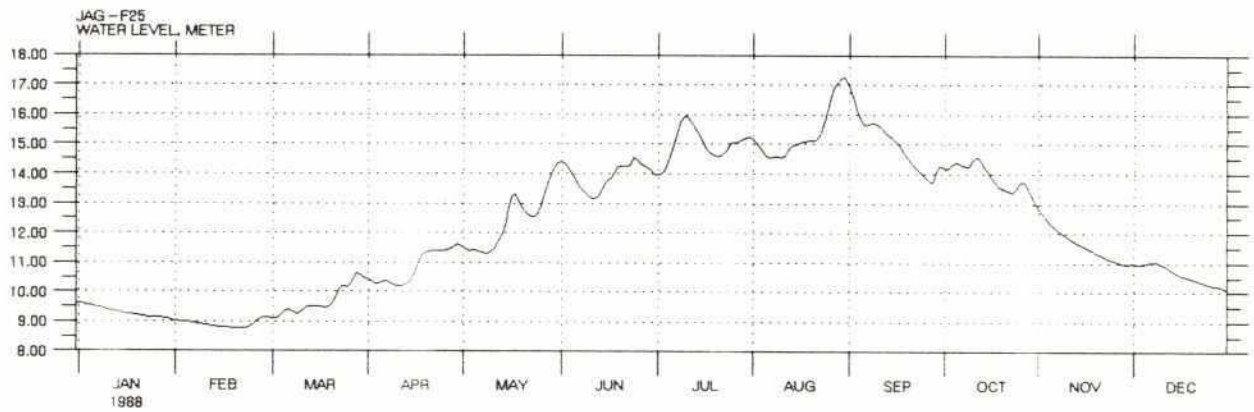
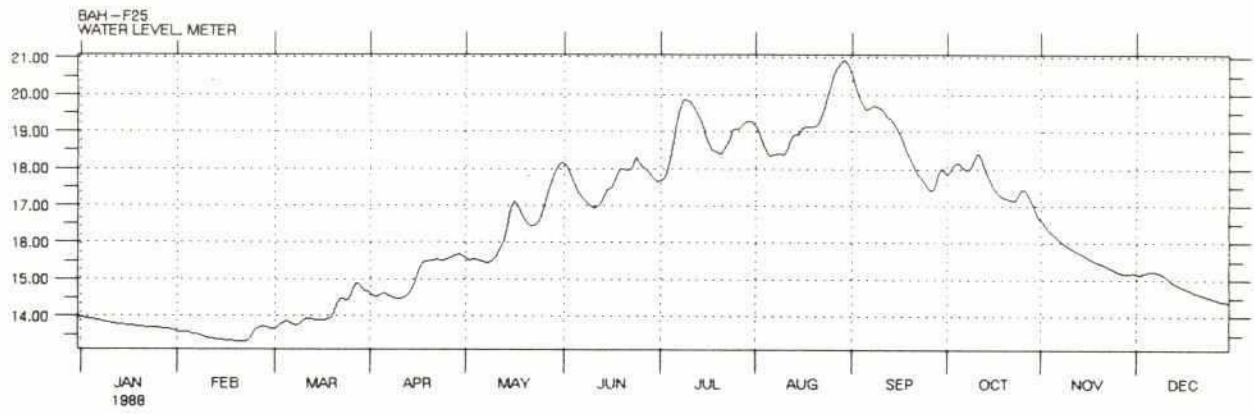
FAP25 OPTION-3
EXTERNAL BOUNDARY
1987

MIKE 11

TIME SERIES DATA BASE : WL87

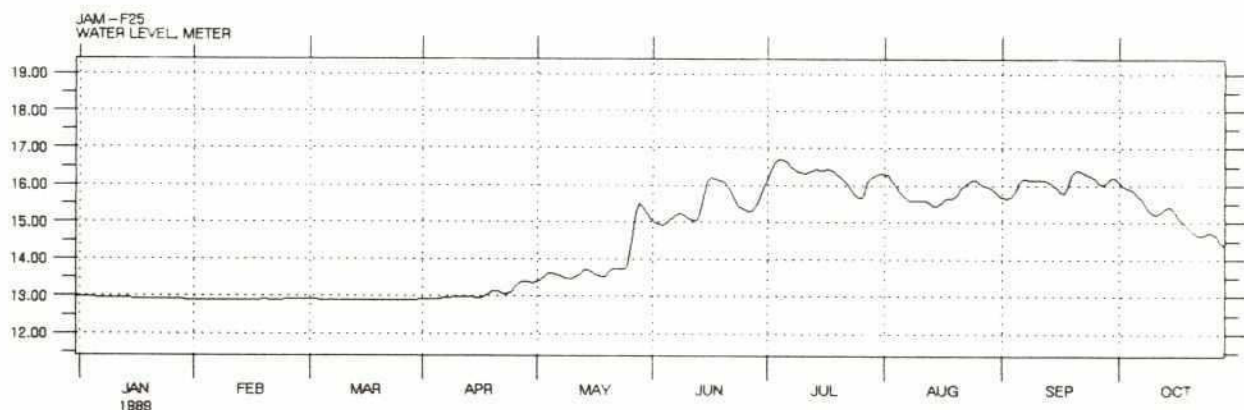
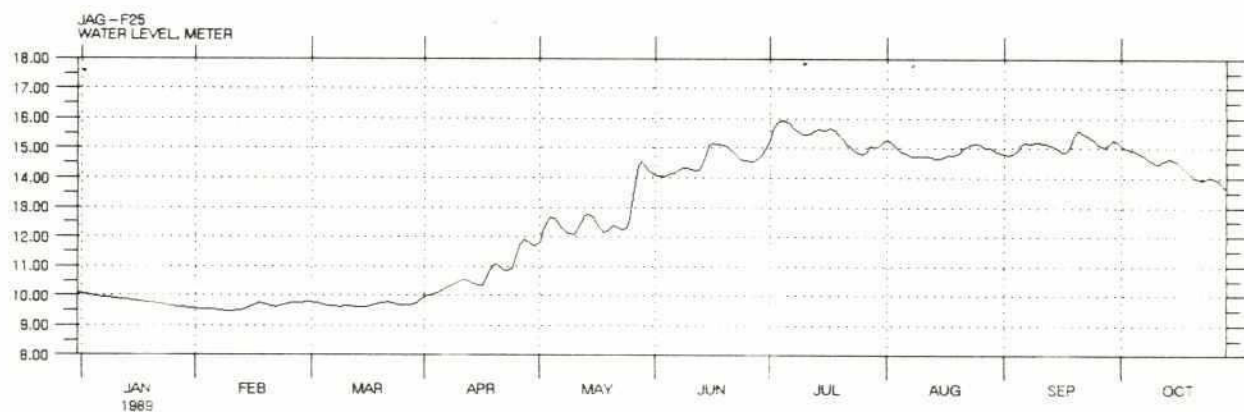
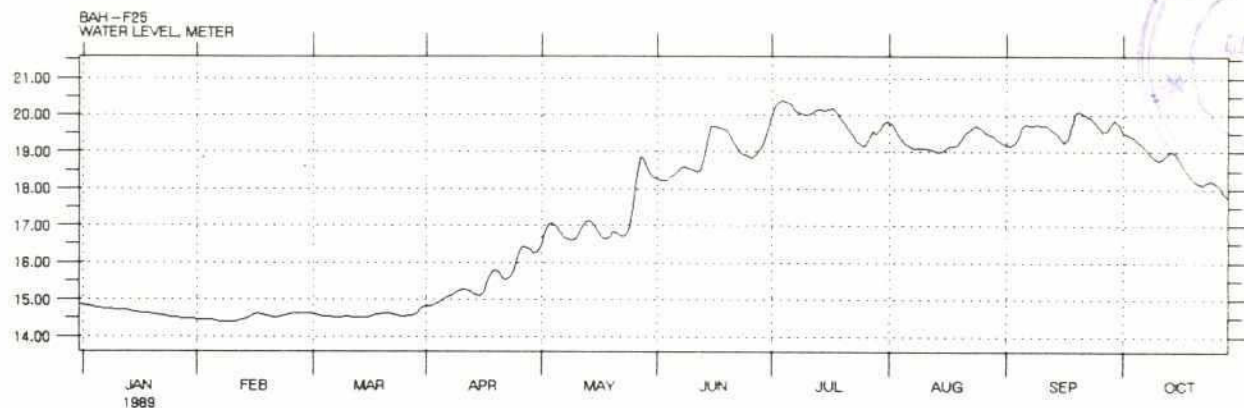
Dwg no.:

176



S W M C	FAP25 OPTION – 3 EXTERNAL BOUNDARY 1988	MIKE 11	
		TIME SERIES DATA BASE : WL88	Dwg no.:

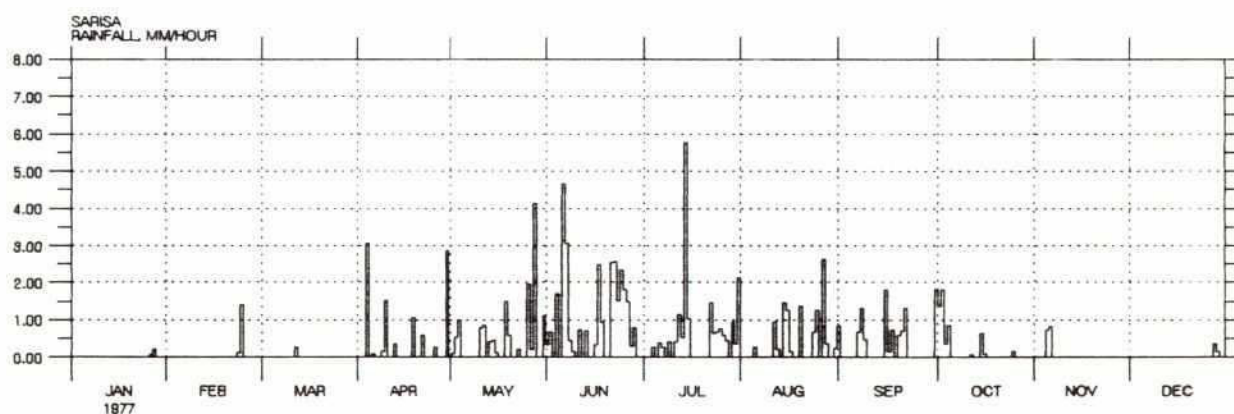
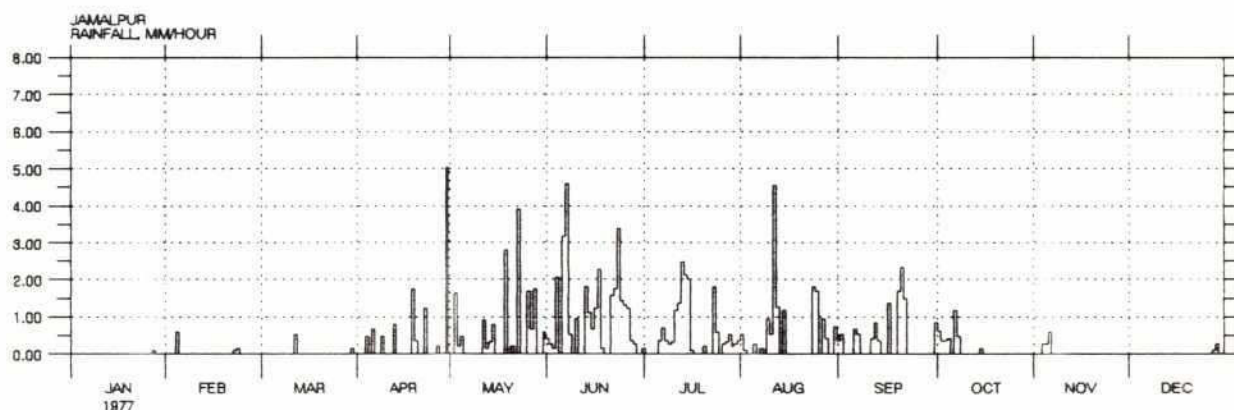
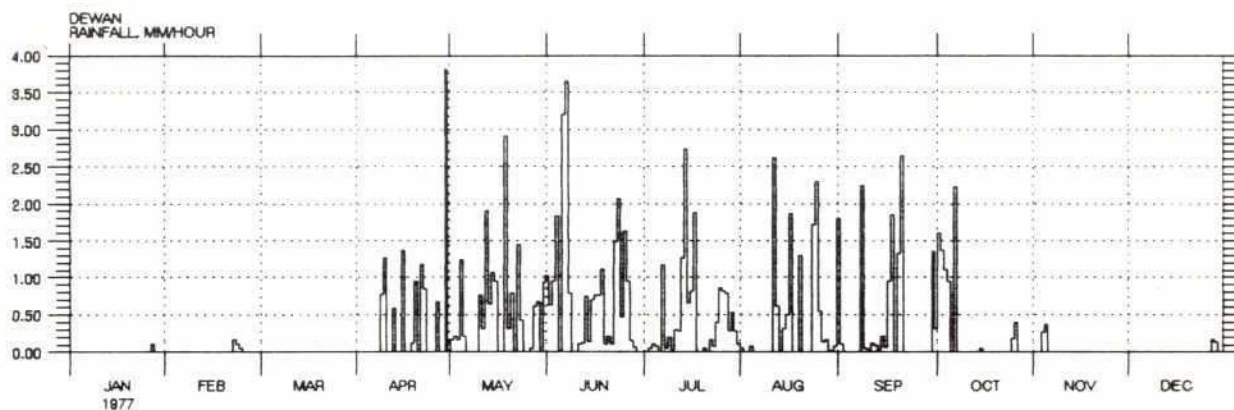
177



S W M C	FAP25 OPTION-3 EXTERNAL BOUNDARY 1989
TIME SERIES DATA BASE : WL89	MIKE 11
	Dwg no.:

Rainfall Within The Project Area

(79)



S W M C

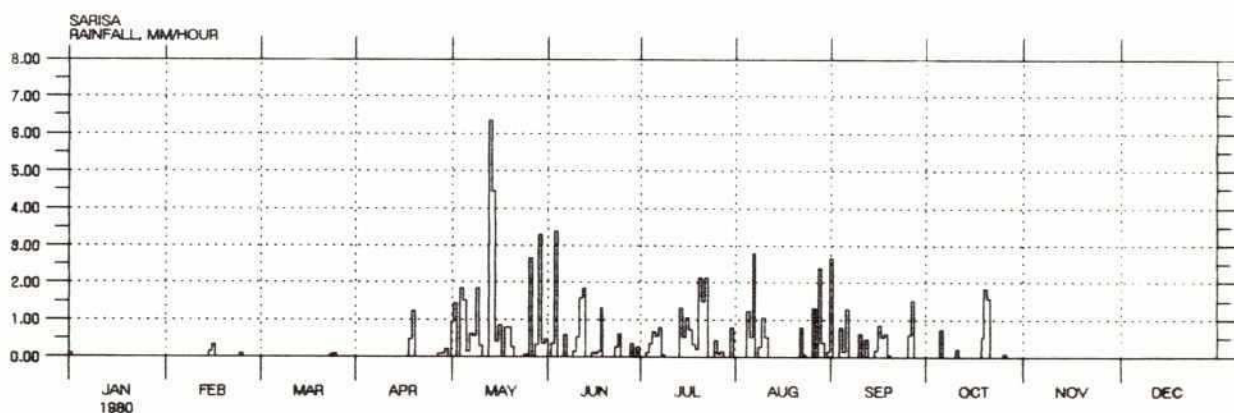
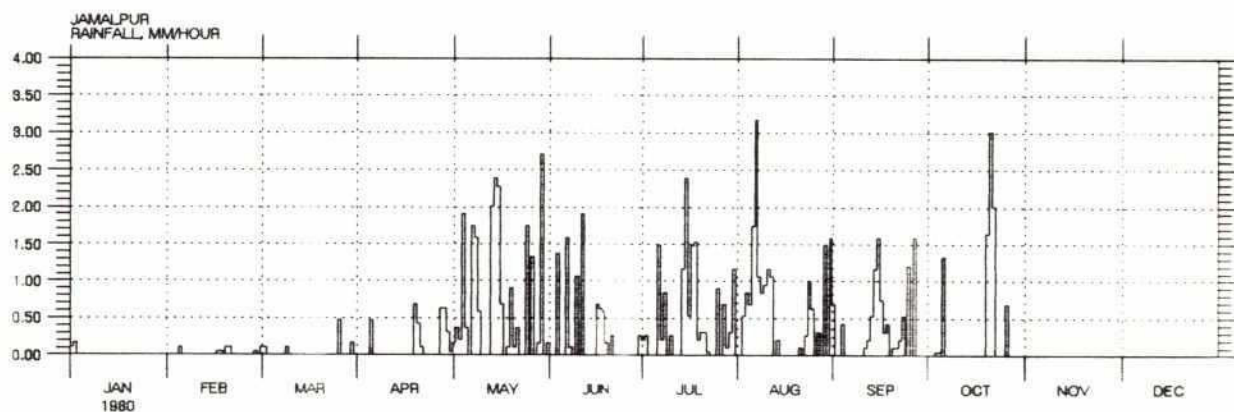
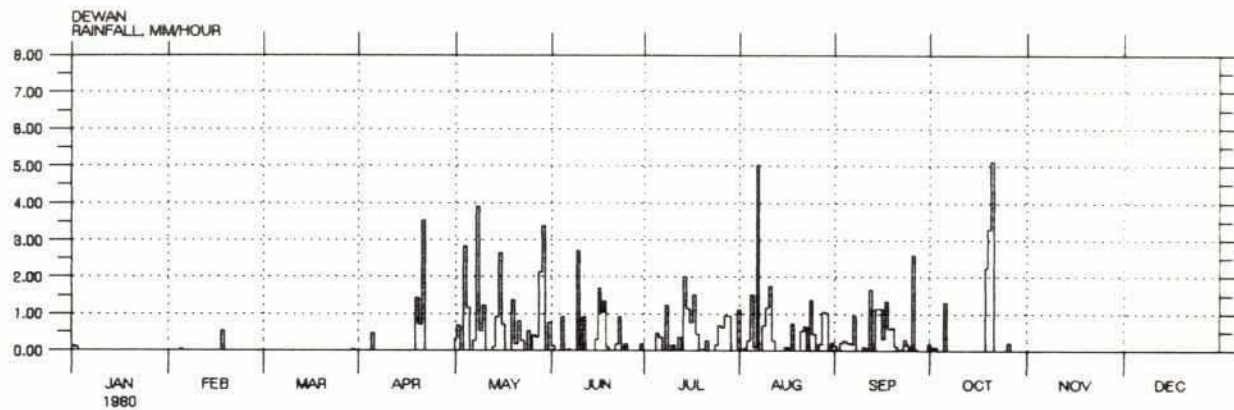
OBSERVED RAINFALL WITHIN THE JPPS AREA
DEWANGONJ , JAMALPUR & SARISHABARI
1977

TIME SERIES DATA BASE : NAM - 77

MIKE 11

Dwg no.:

180



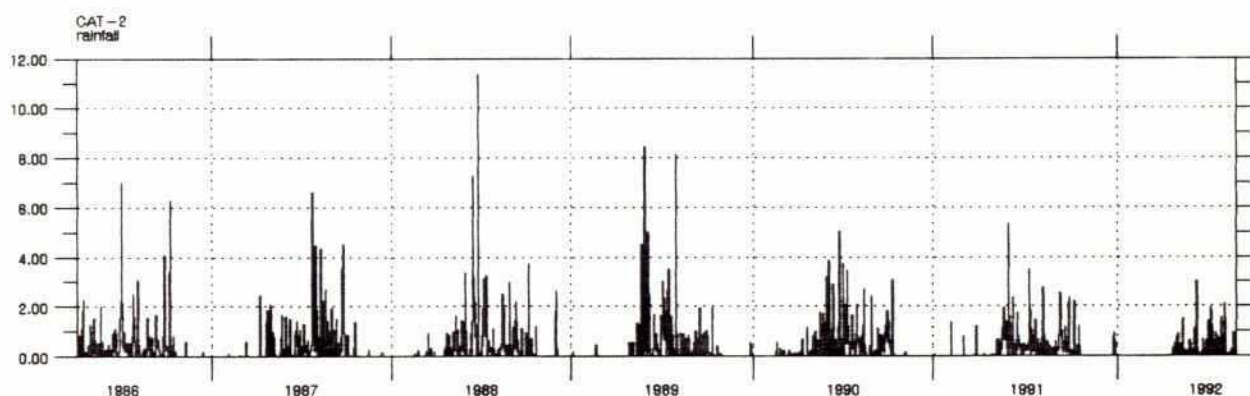
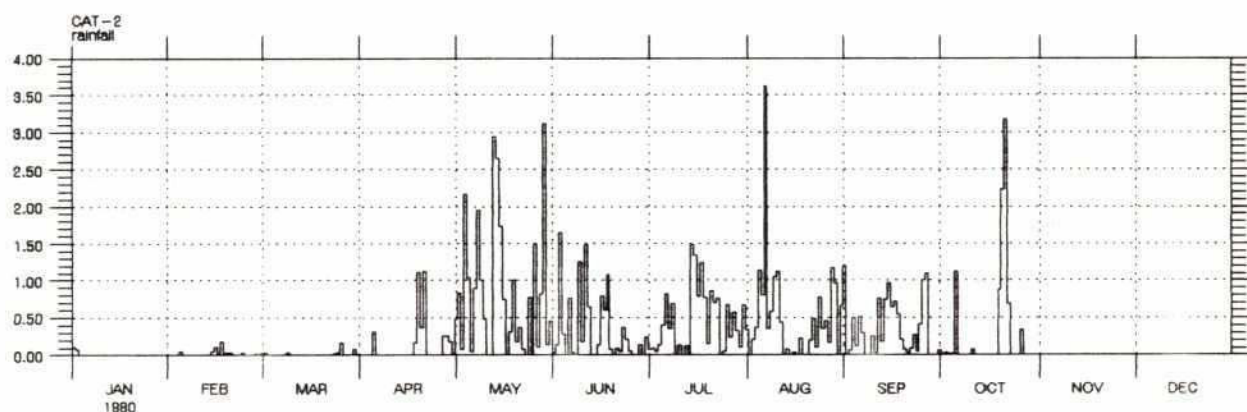
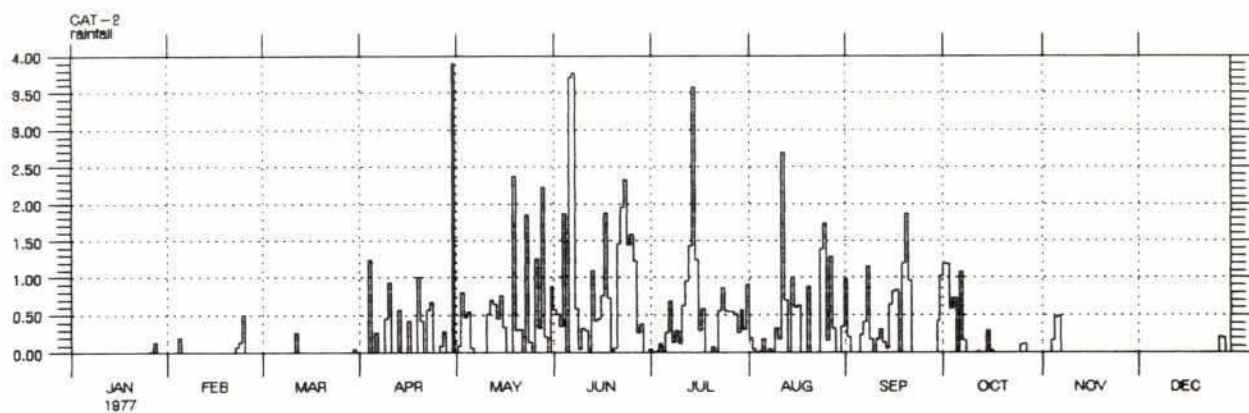
S W M C

OBSERVED RAINFALL WITHIN THE JPPS AREA
DEWANGONJ, JAMALPUR & SARISHABARI
1980

TIME SERIES DATA BASE : NAM - 80

MIKE 11

Dwg no.:



S W M C

MEAN AREAL RAINFALL FOR THE FOLLOWING STATIONS :-
SARISHABARI, DEWANGONJ & JAMALPUR
1977, 1980 & 1986 - 1992 Aug.

TIME SERIES DATA BASE : MAR - 77

MIKE 11

Dwg no.:

APPENDIX - D

RESULT OF MODEL SIMULATIONS

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APPENDIX D

RESULT OF MODEL SIMULATIONS

CONTENTS

D 1	VALIDATION OF THE REFERENCE MODEL (WITHOUT OPTION)	AN4-Apx.D-1
D 2	CHOICE OF REFERENCE YEAR	AN4-Apx.D-10
D 3	CALCULATION OF LAND TYPE	AN4-Apx.D-56
D 4	UTILITY OF JHENAI/CHATAL	AN4-Apx.D-139
D 5	OPTION B WITH PARTIAL EMBANKMENT	AN4-Apx.D-166
D 6	STRUCTURE DESIGN AND MANAGEMENT	AN4-Apx.D-188

ANNEX 4

APPENDIX

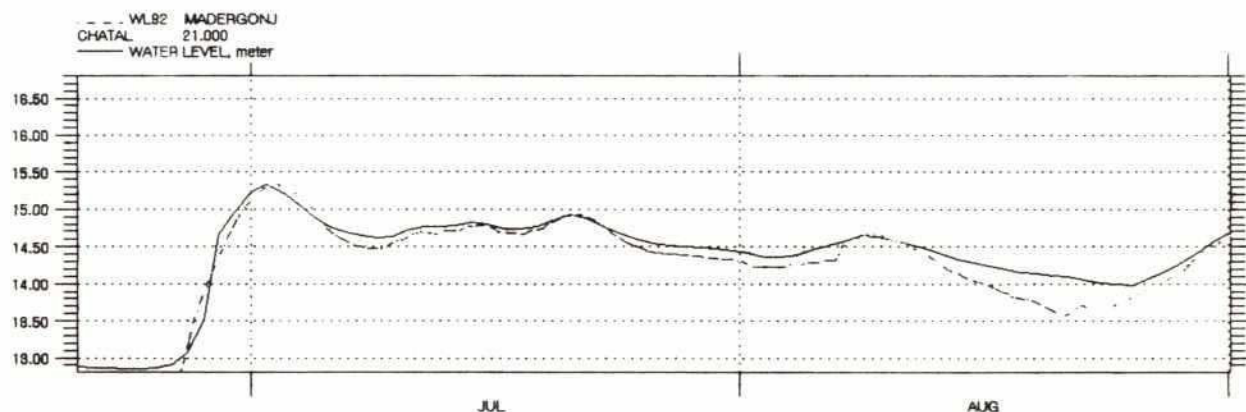
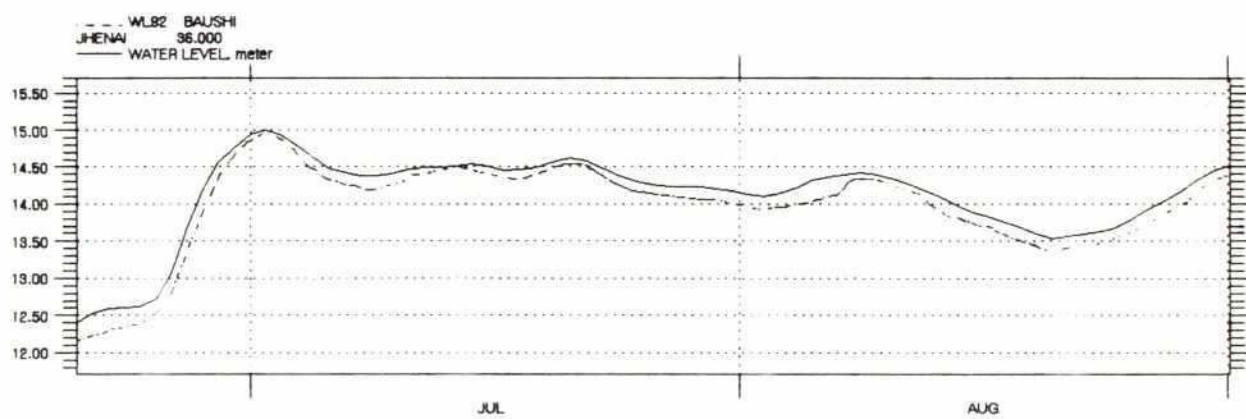
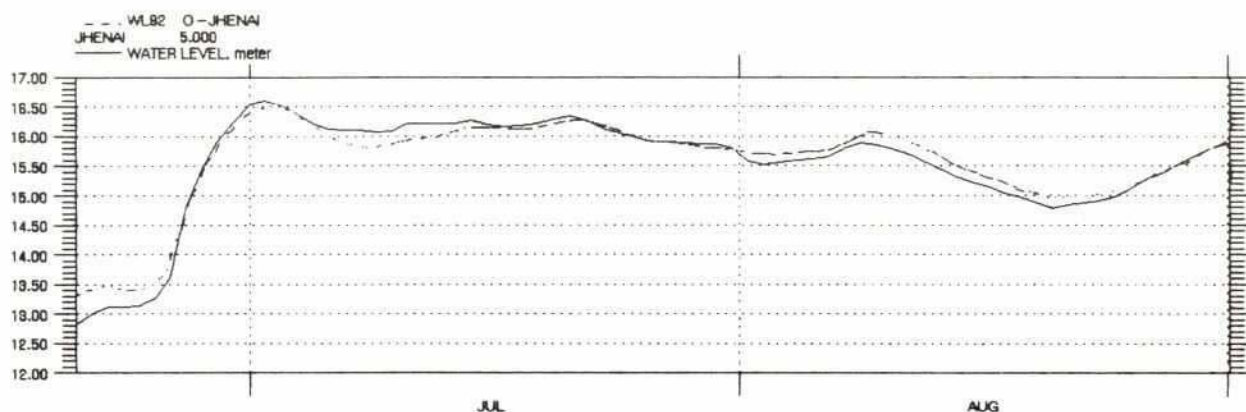
D1 VALIDATION OF THE REFERENCE MODEL (WITHOUT OPTION)

Comparison Between Observed & Computed Water Level
(1992 & 1991)

Comparison Between Observed & Computed Discharge (1992)

Comparison Between Observed & Computed Water Level
(1992 & 1991)

187



SWMC

VALIDATION OF MODEL
WITHOUT OPTION
1992

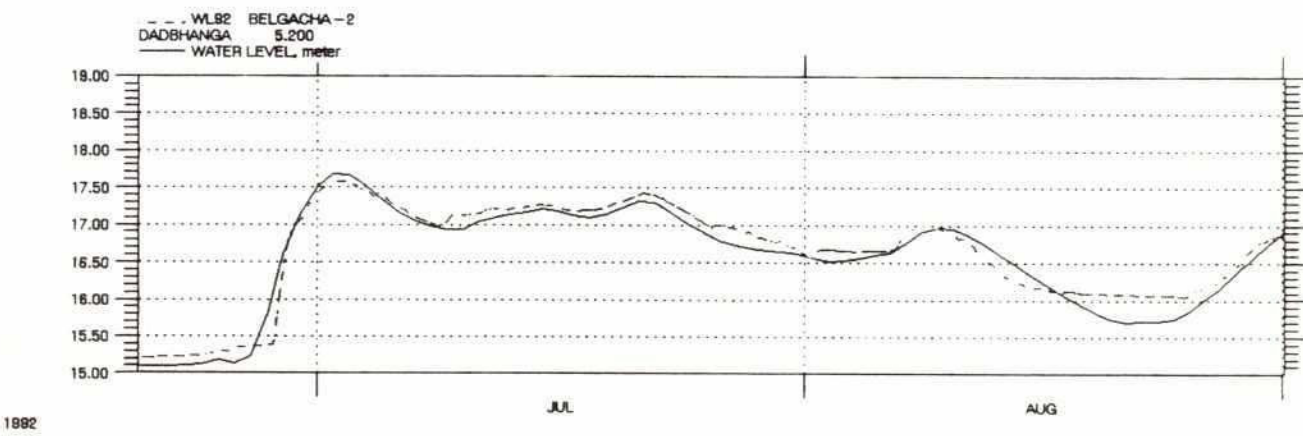
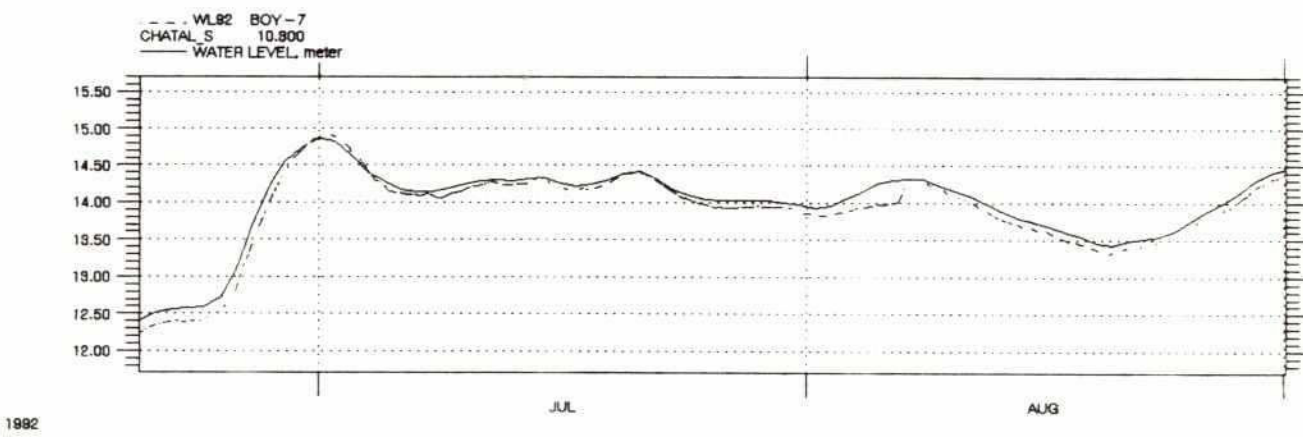
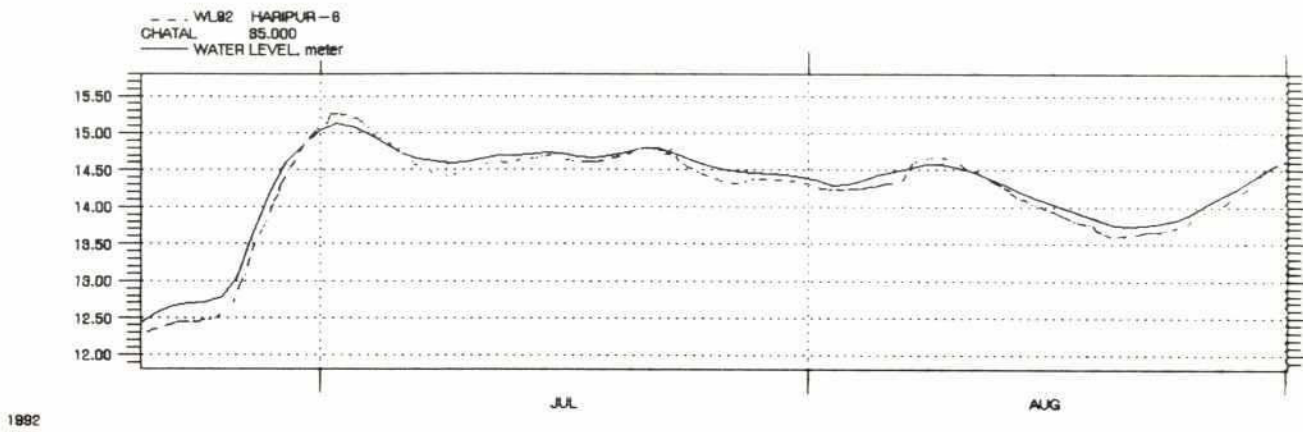
DATA FILE : JPPWO.RDF
RESULT FILE : 92JPWO.RRF

BOUNDARY FILE : JPWO92.BSF
CALCULATED : 8 - OCT - 1992, 17:59

MIKE 11

Dwg no.:

188



SWMC

VALIDATION OF MODEL
WITHOUT OPTION
1992

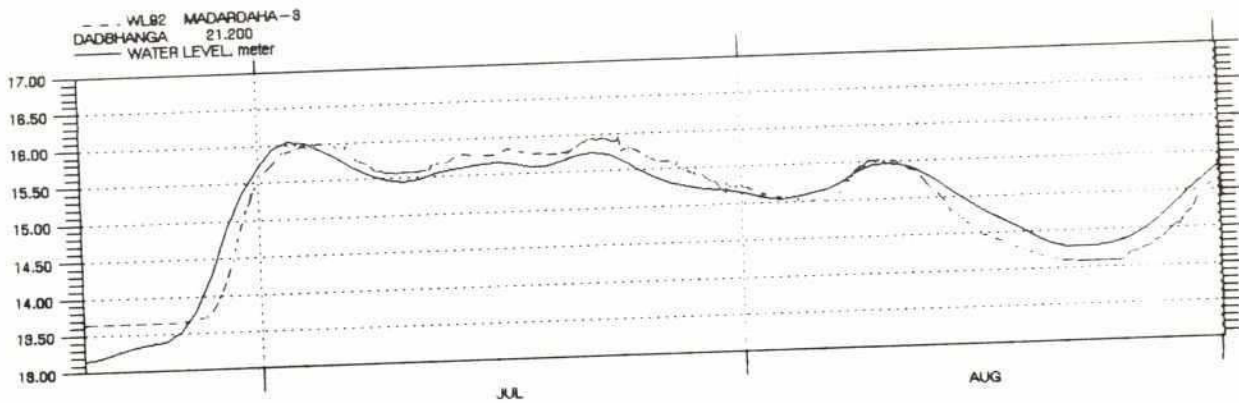
DATA FILE : JPPWO.RDF
RESULT FILE : 92JPWO.RRF

BOUNDARY FILE : JPWO92.BSF
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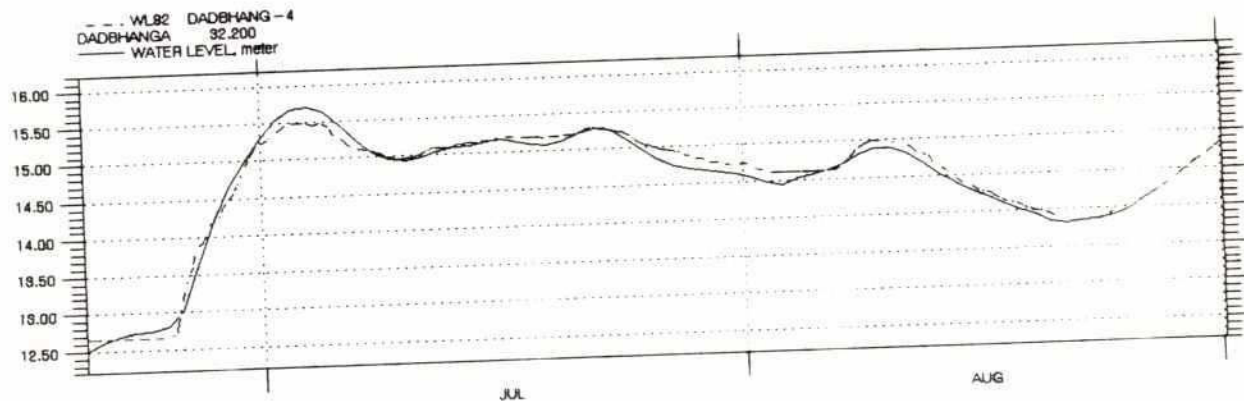
MIKE 11

Dwg no.:

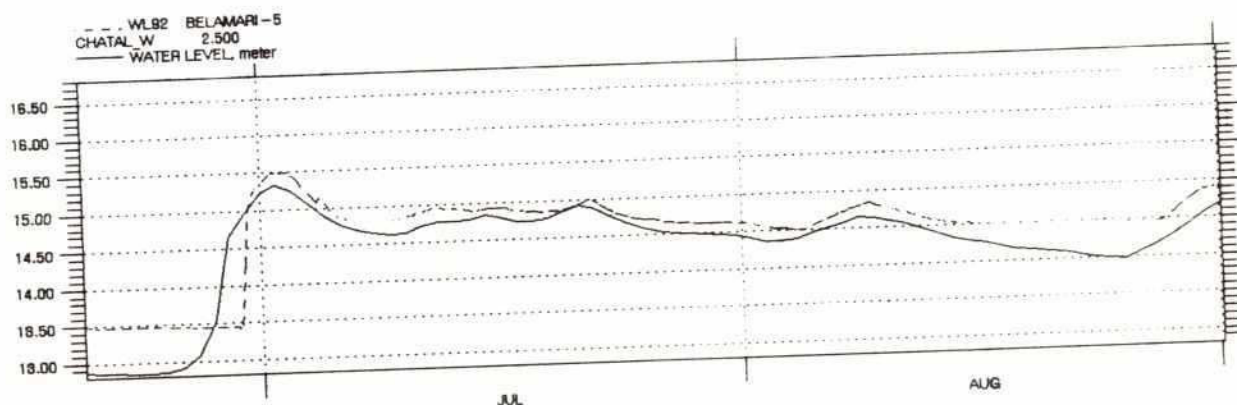
189



1992

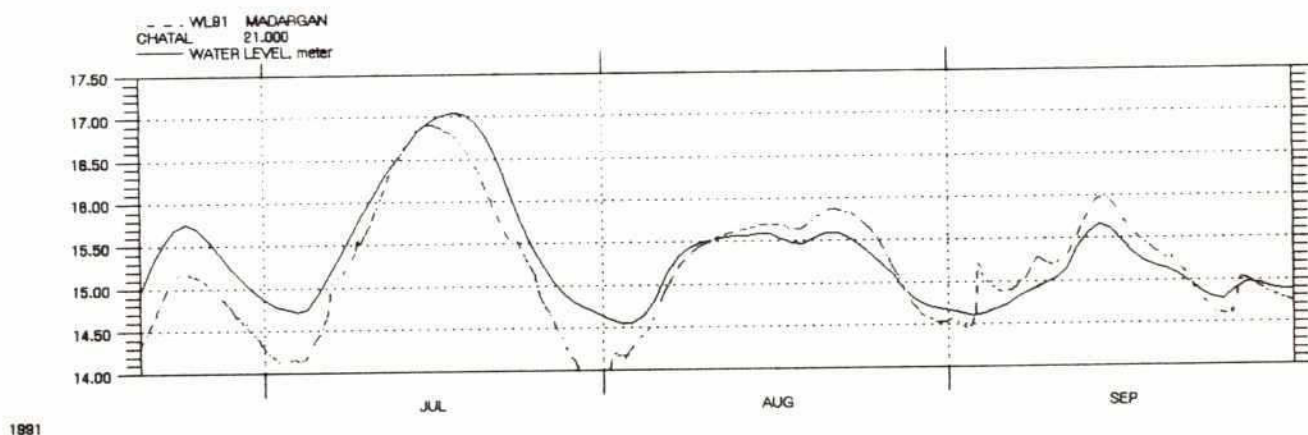
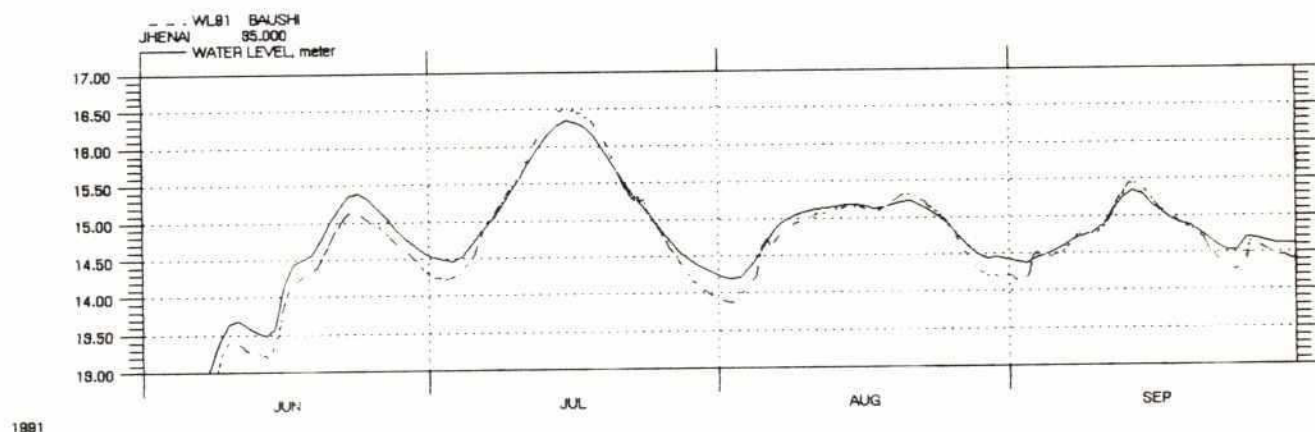
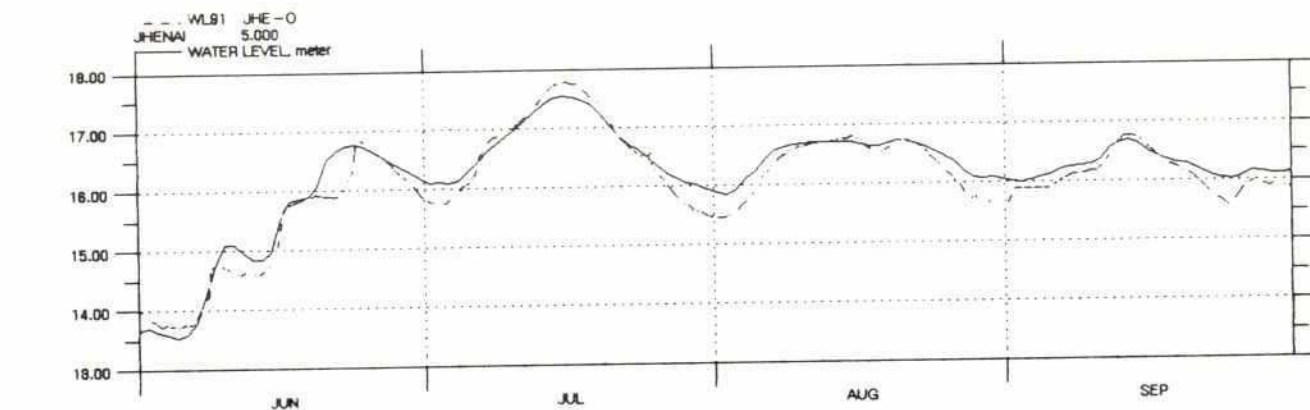


1992



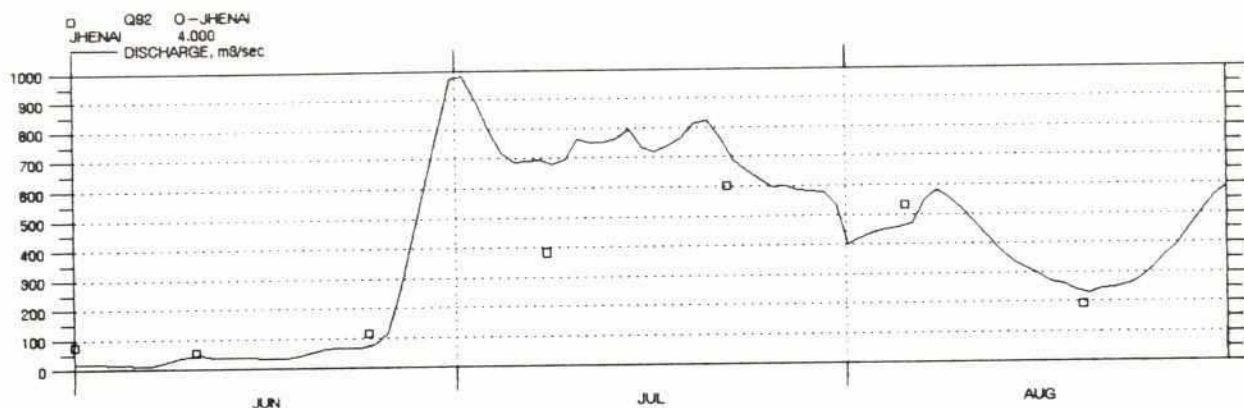
1992

S W M C	VALIDATION OF MODEL WITHOUT OPTION 1992	MIKE 11
		Dwg no.:
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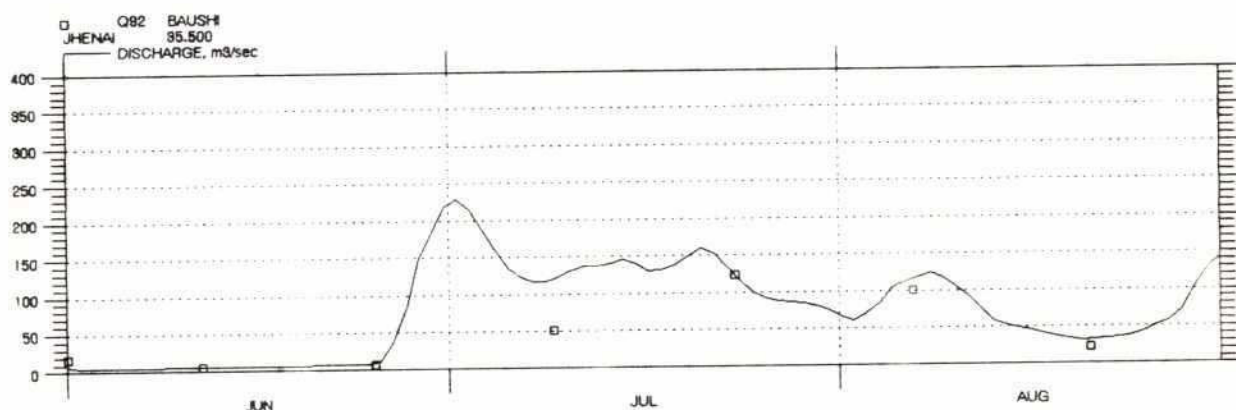


S W M C	VALIDATION OF MODEL WITHOUT OPTION 1991	MIKE 11	
		Dwg no.:	
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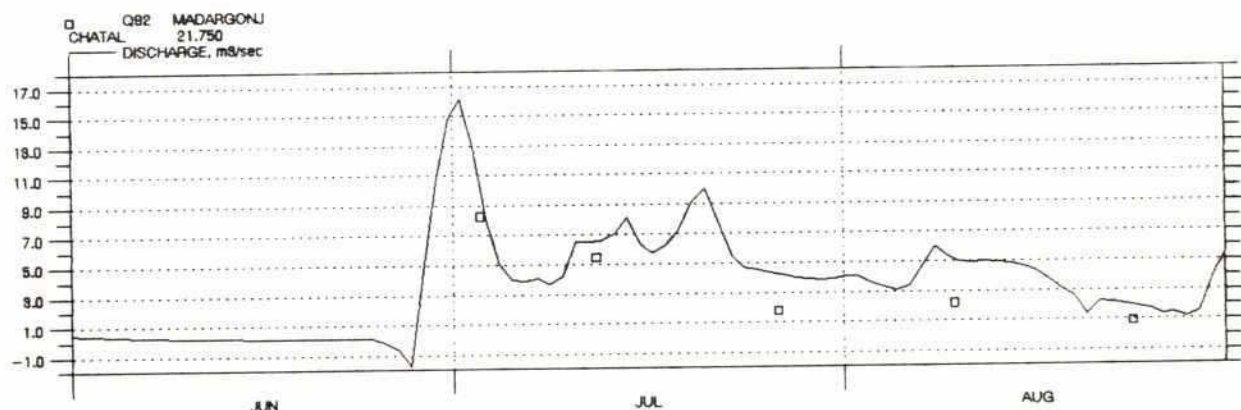
Comparison Between Observed & Computed Discharge
(1992)



1992

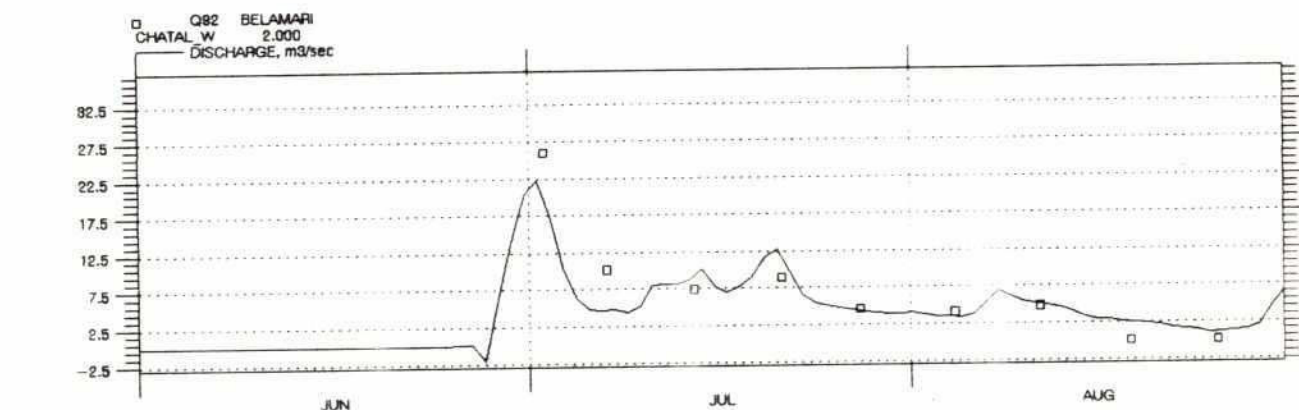
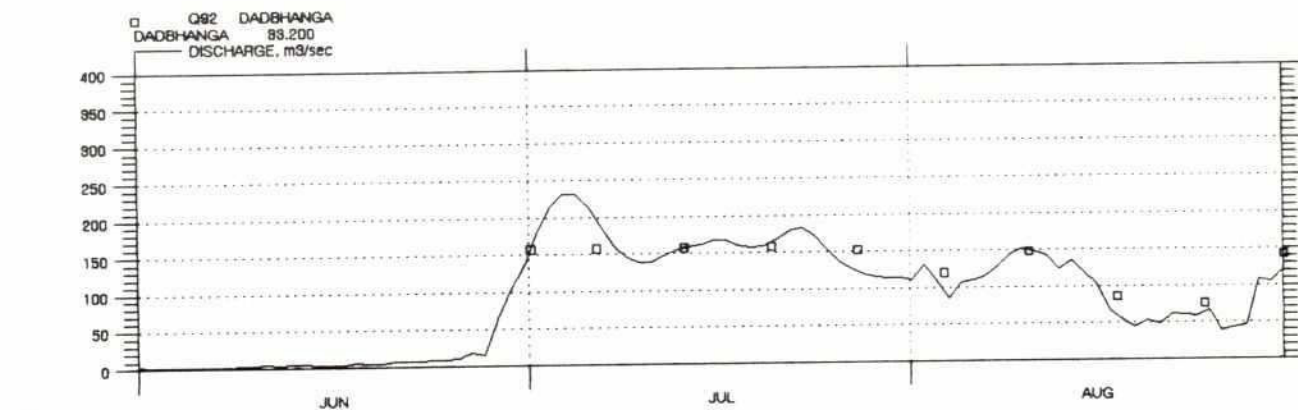


1992



1992

SWMC	VALIDATION OF MODEL WITHOUT OPTION 1992	
DATA FILE : JPPWO.RDF RESULT FILE : 92JPWO.RRF	BOUNDARY FILE : JPWO92.BSF CALCULATED : 8-OCT-1992, 17:59	MIKE 11
		Dwg no.:



S W M C	VALIDATION OF MODEL WITHOUT OPTION 1992	MIKE 11
		Dwg no.:
DATA FILE : JPPWO.RDF RESULT FILE : 92JPWO.RRF		BOUNDARY FILE : JPWO92.BSF CALCULATED : 8 - OCT - 1992, 17:59

ANNEX 4

APPENDIX

D2 CHOICE OF REFERENCE YEAR

Land Type Distribution Within Embankment (Without Option)

Land Type Distribution Within Embankment for Each Cells
(Without Option)

Maximum Water Level of Representative Cell Points (Without Option)

Land Type Distribution Within Embankment
(With Option)

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LAND TYPE DISTRIBUTION FROM MODEL FINDINGS
AREA WITHIN EMBANKMENTS
WITHOUT OPTION

* LAND TYPE *										

	F0		F1		F2		F3		TOTAL	
	*area (Ha)	%	*area (Ha)	%	*area (Ha)	%	*area (Ha)	%	*area (Ha)	%

*Reported area										
* Net cult.area	14219	28%	22874	46%	11132	22%	1928	4%	50153	100%
										* Gr-Net *
* Gross/net coef.*	50%		0%		25%		25%			
* Gross area	22045	34%	22874	35%	15045	23%	5841	9%	65805	100%

*Model calculation *										*Stand. *
*(gross area)										*deviat. *

*1977										
*3 days mx fld dur *	21710	33%	14458	22%	18096	27%	11541	18%	65805	100%
10 days mx fld dur	24193	37%	14513	22%	17251	26%	9848	15%	65805	100%

*1980										
*3 days mx fld dur *	18062	27%	14474	22%	19230	29%	14039	21%	65805	100%
10 days mx fld dur	26379	40%	14577	22%	16266	25%	8584	13%	65806	100%

*1987										
*3 days mx fld dur *	21471	33%	14727	22%	18389	28%	11218	17%	65805	100%
10 days mx fld dur	29757	45%	14837	23%	14824	23%	6387	10%	65805	100%

*1988										
*3 days mx fld dur *	9561	15%	11013	17%	21901	33%	23331	35%	65806	100%
10 days mx fld dur	21826	33%	14692	22%	18673	28%	10614	16%	65805	100%

*1989										
*3 days mx fld dur *	38549	59%	13098	20%	10606	16%	3553	5%	65806	100%
10 days mx fld dur	43158	66%	11476	17%	8564	13%	2608	4%	65806	100%

*1990										
*3 days mx fld dur *	39819	61%	12370	19%	10026	15%	3590	5%	65805	100%
10 days mx fld dur	42257	64%	11672	18%	8886	14%	2990	5%	65805	100%

*1991										
*3 days mx fld dur *	23121	35%	14442	22%	17550	27%	10692	16%	65805	100%
10 days mx fld dur	32495	49%	14458	22%	13338	20%	5514	8%	65805	100%

*1992										
*3 days mx fld dur *	50764	77%	8450	13%	4829	7%	1762	3%	65805	100%
10 days mx fld dur	55290	84%	6107	9%	3181	5%	1228	2%	65806	100%

Land Type Distribution Within Embankment
for Each Cells (Without Option)

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 3 days

* Cell	* Max fld	* Flooded	* F0	* F1	* F2	* F3+F4	* Total	*	
* name	* elev.	*grd level*	(ha)	(ha)	(ha)	(ha)	(ha)	*	

* C1	* 16.28	* 16.26	* 2469	* 2158	* 1960	* 860	* 7447	*	
			(33%)	(29%)	(26%)	(12%)	(100%)	*	
* C2	* 16.13	* 16.11	* 1444	* 1226	* 1936	* 840	* 5446	*	
			(27%)	(23%)	(36%)	(15%)	(100%)	*	
* C3	* 16.36	* 16.35	* 7394	* 2961	* 3346	* 3392	* 17093	*	
			(43%)	(17%)	(20%)	(20%)	(100%)	*	
* C4	* 17.49	* 17.49	* 1210	* 2413	* 2001	* 240	* 5865	*	
			(21%)	(41%)	(34%)	(4%)	(100%)	*	
* C5	* 17.62	* 17.62	* 609	* 766	* 1378	* 1415	* 4169	*	
			(15%)	(18%)	(33%)	(34%)	(100%)	*	
* C6	* 17.54	* 17.54	* 1331	* 772	* 1051	* 477	* 3631	*	
			(37%)	(21%)	(29%)	(13%)	(100%)	*	
* C7	* 19.18	* 19.14	* 0	* 176	* 1395	* 1968	* 3539	*	
			(0%)	(5%)	(39%)	(56%)	(100%)	*	
* C8	* 17.70	* 17.69	* 3866	* 2484	* 3224	* 1659	* 11233	*	
			(34%)	(22%)	(29%)	(15%)	(100%)	*	
* C9	* 18.79	* 18.77	* 3387	* 1501	* 1805	* 690	* 7382	*	
			(46%)	(20%)	(24%)	(9%)	(100%)	*	

		* TOTAL	* 21710	* 14458	* 18096	* 11541	* 65805	*	
			(33%)	(22%)	(27%)	(18%)	(100%)	*	

```
- OPTION      : WITHOUT OPTION
- COMMENT     : 1977 - AREA WITHIN EMBANKMENTS
```

* Cell	* Max fld	* Flooded	* F0	* F1	* F2	* F3+F4	* Total
* name	* elev.	* grd level	* (ha)	* (ha)	* (ha)	* (ha)	* (ha)
* C1	* 16.28	* 16.15	* 2890	* 2067	* 1774	* 716	* 7447
			* (39%)	* (28%)	* (24%)	* (10%)	* (100%)
* C2	* 16.13	* 15.97	* 1674	* 1344	* 1782	* 646	* 5446
			* (31%)	* (25%)	* (33%)	* (12%)	* (100%)
* C3	* 16.36	* 16.24	* 7994	* 2843	* 3175	* 3081	* 17093
			* (47%)	* (17%)	* (19%)	* (18%)	* (100%)
* C4	* 17.49	* 17.44	* 1388	* 2402	* 1869	* 207	* 5865
			* (24%)	* (41%)	* (32%)	* (4%)	* (100%)
* C5	* 17.62	* 17.49	* 751	* 796	* 1434	* 1188	* 4169
			* (18%)	* (19%)	* (34%)	* (28%)	* (100%)
* C6	* 17.54	* 17.46	* 1456	* 746	* 1016	* 414	* 3631
			* (40%)	* (21%)	* (28%)	* (11%)	* (100%)
* C7	* 19.18	* 19.01	* 4	* 274	* 1581	* 1679	* 3539
			* (0%)	* (8%)	* (45%)	* (47%)	* (100%)
* C8	* 17.70	* 17.56	* 4391	* 2492	* 3009	* 1341	* 11233
			* (39%)	* (22%)	* (27%)	* (12%)	* (100%)
* C9	* 18.79	* 18.66	* 3646	* 1549	* 1611	* 576	* 7382
			* (49%)	* (21%)	* (22%)	* (8%)	* (100%)
* TOTAL			* 24193	* 14513	* 17251	* 9848	* 65805
			* (37%)	* (22%)	* (26%)	* (15%)	* (100%)

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1980 - AREA WITHIN EMBANKMENTS

Simulation from 15-06-1980 to 18-10-1980 / Max. fld durat. : 3 days

```

*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
*   C1 * 16.60 * 16.56 * 1329 ! 2273 ! 2506 ! 1339 ! 7447 *
*      *      *      *      * (18%) ! (31%) ! (34%) ! (18%) ! (100%) *
*   C2 * 16.47 * 16.44 * 1040 ! 893 ! 2128 ! 1384 ! 5446 *
*      *      *      *      * (19%) ! (16%) ! (39%) ! (25%) ! (100%) *
*   C3 * 16.64 * 16.62 * 5798 ! 3311 ! 3776 ! 4208 ! 17093 *
*      *      *      *      * (34%) ! (19%) ! (22%) ! (25%) ! (100%) *
*   C4 * 17.47 * 17.47 * 1281 ! 2408 ! 1948 ! 227 ! 5865 *
*      *      *      *      * (22%) ! (41%) ! (33%) ! (4%) ! (100%) *
*   C5 * 17.68 * 17.66 * 569 ! 753 ! 1362 ! 1485 ! 4169 *
*      *      *      *      * (14%) ! (18%) ! (33%) ! (36%) ! (100%) *
*   C6 * 17.61 * 17.60 * 1231 ! 809 ! 1058 ! 533 ! 3631 *
*      *      *      *      * (34%) ! (22%) ! (29%) ! (15%) ! (100%) *
*   C7 * 19.30 * 19.28 * 0 ! 77 ! 1179 ! 2283 ! 3539 *
*      *      *      *      * (0%) ! (2%) ! (33%) ! (65%) ! (100%) *
*   C8 * 17.76 * 17.72 * 3745 ! 2483 ! 3274 ! 1732 ! 11233 *
*      *      *      *      * (33%) ! (22%) ! (29%) ! (15%) ! (100%) *
*   C9 * 18.90 * 18.90 * 3068 ! 1467 ! 1999 ! 848 ! 7382 *
*      *      *      *      * (42%) ! (20%) ! (27%) ! (11%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 18062 ! 14474 ! 19230 ! 14039 ! 65805 *
*      *      *      *      * (27%) ! (22%) ! (29%) ! (21%) ! (100%) *
*****

```


MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1987 - AREA WITHIN EMBANKMENTS

Simulation from 15-06-1987 to 12-11-1987 / Max. fld durat. : 3 days

```

*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
*   C1 * 16.56 * 16.54 * 1405 ! 2267 ! 2469 ! 1306 ! 7447 *
*      *      *      *      * (19%) ! (30%) ! (33%) ! (18%) ! (100%) *
*   C2 * 16.47 * 16.46 * 1025 ! 869 ! 2131 ! 1422 ! 5446 *
*      *      *      *      * (19%) ! (16%) ! (39%) ! (26%) ! (100%) *
*   C3 * 16.59 * 16.57 * 6092 ! 3256 ! 3717 ! 4029 ! 17093 *
*      *      *      *      * (36%) ! (19%) ! (22%) ! (24%) ! (100%) *
*   C4 * 17.54 * 17.54 * 1054 ! 2369 ! 2145 ! 298 ! 5865 *
*      *      *      *      * (18%) ! (40%) ! (37%) ! (5%) ! (100%) *
*   C5 * 17.32 * 17.30 * 1004 ! 793 ! 1534 ! 838 ! 4169 *
*      *      *      *      * (24%) ! (19%) ! (37%) ! (20%) ! (100%) *
*   C6 * 17.32 * 17.28 * 1715 ! 740 ! 880 ! 296 ! 3631 *
*      *      *      *      * (47%) ! (20%) ! (24%) ! (8%) ! (100%) *
*   C7 * 18.97 * 18.96 * 10 ! 322 ! 1618 ! 1589 ! 3539 *
*      *      *      *      * (0%) ! (9%) ! (46%) ! (45%) ! (100%) *
*   C8 * 17.37 * 17.35 * 5266 ! 2505 ! 2499 ! 962 ! 11233 *
*      *      *      *      * (47%) ! (22%) ! (22%) ! (9%) ! (100%) *
*   C9 * 18.55 * 18.55 * 3901 ! 1606 ! 1396 ! 479 ! 7382 *
*      *      *      *      * (53%) ! (22%) ! (19%) ! (6%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      * TOTAL * 21471 ! 14727 ! 18389 ! 11218 ! 65805 *
*      *      *      *      * (33%) ! (22%) ! (28%) ! (17%) ! (100%) *
*****

```


MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1987 - AREA WITHIN EMBANKMENTS

Simulation from 15-06-1987 to 12-11-1987 / Max. fld durat. : 10 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
* C1 * 16.56 * 16.17 * 2813 ! 2084 ! 1808 ! 742 ! 7447 *
*      *      *      * (38%) ! (28%) ! (24%) ! (10%) ! (100%) *
* C2 * 16.47 * 15.93 * 1754 ! 1375 ! 1709 ! 608 ! 5446 *
*      *      *      * (32%) ! (25%) ! (31%) ! (11%) ! (100%) *
* C3 * 16.59 * 16.18 * 8298 ! 2787 ! 3089 ! 2919 ! 17093 *
*      *      *      * (49%) ! (16%) ! (18%) ! (17%) ! (100%) *
* C4 * 17.54 * 17.45 * 1352 ! 2404 ! 1895 ! 213 ! 5865 *
*      *      *      * (23%) ! (41%) ! (32%) ! (4%) ! (100%) *
* C5 * 17.32 * 16.93 * 1495 ! 893 ! 1432 ! 349 ! 4169 *
*      *      *      * (36%) ! (21%) ! (34%) ! (8%) ! (100%) *
* C6 * 17.32 * 16.94 * 2103 ! 762 ! 633 ! 133 ! 3631 *
*      *      *      * (58%) ! (21%) ! (17%) ! (4%) ! (100%) *
* C7 * 18.97 * 18.45 * 240 ! 865 ! 1734 ! 700 ! 3539 *
*      *      *      * (7%) ! (24%) ! (49%) ! (20%) ! (100%) *
* C8 * 17.37 * 17.01 * 6678 ! 2302 ! 1723 ! 531 ! 11233 *
*      *      *      * (59%) ! (20%) ! (15%) ! (5%) ! (100%) *
* C9 * 18.55 * 18.12 * 5024 ! 1364 ! 802 ! 192 ! 7382 *
*      *      *      * (68%) ! (18%) ! (11%) ! (3%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 29757 ! 14837 ! 14824 ! 6387 ! 65805 *
*      *      *      * (45%) ! (23%) ! (23%) ! (10%) ! (100%) *
*****
```

204

- Simulation from 15-06-1988 to 12-11-1988 / Max. fld durat. : 3 days

AN4-Apx.D-20

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1988 - AREA WITHIN EMBANKMENTS

Simulation from 15-06-1988 to 12-11-1988 / Max. fld durat. : 10 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. * grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *
* C1 * 17.25 * 16.41 * 1898 ! 2226 ! 2230 ! 1093 ! 7447 *
*      *      *      *      * (25%) ! (30%) ! (30%) ! (15%) ! (100%) *
* C2 * 17.13 * 16.21 * 1290 ! 1140 ! 2026 ! 990 ! 5446 *
*      *      *      *      * (24%) ! (21%) ! (37%) ! (18%) ! (100%) *
* C3 * 17.26 * 16.32 * 7572 ! 2921 ! 3296 ! 3305 ! 17093 *
*      *      *      *      * (44%) ! (17%) ! (19%) ! (19%) ! (100%) *
* C4 * 17.89 * 17.59 * 929 ! 2270 ! 2305 ! 361 ! 5865 *
*      *      *      *      * (16%) ! (39%) ! (39%) ! (6%) ! (100%) *
* C5 * 18.20 * 17.55 * 678 ! 790 ! 1408 ! 1293 ! 4169 *
*      *      *      *      * (16%) ! (19%) ! (34%) ! (31%) ! (100%) *
* C6 * 18.07 * 17.48 * 1427 ! 746 ! 1031 ! 427 ! 3631 *
*      *      *      *      * (39%) ! (21%) ! (28%) ! (12%) ! (100%) *
* C7 * 19.59 * 18.73 * 41 ! 535 ! 1789 ! 1174 ! 3539 *
*      *      *      *      * (1%) ! (15%) ! (51%) ! (33%) ! (100%) *
* C8 * 18.27 * 17.60 * 4229 ! 2489 ! 3075 ! 1439 ! 11233 *
*      *      *      *      * (38%) ! (22%) ! (27%) ! (13%) ! (100%) *
* C9 * 19.31 * 18.61 * 3762 ! 1575 ! 1513 ! 532 ! 7382 *
*      *      *      *      * (51%) ! (21%) ! (20%) ! (7%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 21826 ! 14692 ! 18673 ! 10614 ! 65805 *
*      *      *      * (33%) ! (22%) ! (28%) ! (16%) ! (100%) *
*****
```



```
- OPTION      : WITHOUT OPTION
- COMMENT     : 1989 - AREA WITHIN EMBANKMENT
```

Cell name	Max fld elev.	Flooded grd level	F0 (ha)	F1 (ha)	F2 (ha)	F3+F4 (ha)	Total (ha)
C1	15.51	15.48	5167 (69%)	1236 (17%)	838 (11%)	206 (3%)	7447 (100%)
C2	15.31	15.27	3295 (60%)	1221 (22%)	740 (14%)	190 (3%)	5446 (100%)
C3	15.66	15.63	10878 (64%)	2301 (13%)	2152 (13%)	1761 (10%)	17093 (100%)
C4	17.25	17.25	2062 (35%)	2359 (40%)	1365 (23%)	78 (1%)	5865 (100%)
C5	16.64	16.63	1889 (45%)	1022 (25%)	1146 (27%)	112 (3%)	4169 (100%)
C6	16.67	16.66	2483 (68%)	652 (18%)	434 (12%)	62 (2%)	3631 (100%)
C7	18.42	18.39	300 (8%)	933 (26%)	1698 (48%)	608 (17%)	3539 (100%)
C8	16.98	16.73	7858 (70%)	1863 (17%)	1254 (11%)	258 (2%)	11233 (100%)
C9	18.33	18.27	4617 (63%)	1510 (20%)	979 (13%)	277 (4%)	7383 (100%)
TOTAL			38549 (59%)	13098 (20%)	10606 (16%)	3553 (5%)	65805 (100%)

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1989 - AREA WITHIN EMBANKMENT

Simulation from 01-06-1989 to 29-10-1989 / Max. fld durat. : 10 days

```

*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
* C1 * 15.51 * 15.19 * 5852 ! 958 ! 540 ! 98 ! 7447 *
*      *      *      * (79%) ! (13%) ! (7%) ! (1%) ! (100%) *
* C2 * 15.31 * 14.95 * 4043 ! 871 ! 412 ! 119 ! 5446 *
*      *      *      * (74%) ! (16%) ! (8%) ! (2%) ! (100%) *
* C3 * 15.66 * 15.38 * 11910 ! 1994 ! 1753 ! 1436 ! 17093 *
*      *      *      * (70%) ! (12%) ! (10%) ! (8%) ! (100%) *
* C4 * 17.25 * 17.16 * 2438 ! 2227 ! 1165 ! 36 ! 5865 *
*      *      *      * (42%) ! (38%) ! (20%) ! (1%) ! (100%) *
* C5 * 16.64 * 16.52 * 2067 ! 1043 ! 992 ! 67 ! 4169 *
*      *      *      * (50%) ! (25%) ! (24%) ! (2%) ! (100%) *
* C6 * 16.67 * 16.57 * 2601 ! 609 ! 375 ! 45 ! 3631 *
*      *      *      * (72%) ! (17%) ! (10%) ! (1%) ! (100%) *
* C7 * 18.42 * 18.30 * 396 ! 1041 ! 1605 ! 497 ! 3539 *
*      *      *      * (11%) ! (29%) ! (45%) ! (14%) ! (100%) *
* C8 * 16.98 * 16.63 * 8287 ! 1678 ! 1103 ! 165 ! 11233 *
*      *      *      * (74%) ! (15%) ! (10%) ! (1%) ! (100%) *
* C9 * 18.33 * 17.93 * 5564 ! 1055 ! 618 ! 145 ! 7382 *
*      *      *      * (75%) ! (14%) ! (8%) ! (2%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 43158 ! 11476 ! 8564 ! 2608 ! 65905 *
*      *      *      * (66%) ! (17%) ! (13%) ! (4%) ! (100%) *
*****

```

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1990 - AREA WITHIN EMBANKMENTS

Simulation from 01-06-1990 to 29-10-1990 / Max. fld durat. : 3 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
*   C1 * 15.37 * 15.37 * 5471 ! 1103 ! 715 ! 159 ! 7447 *
*      *      *      *      * (73%) ! (15%) ! (10%) ! (2%) ! (100%) *
*   C2 * 15.21 * 15.18 * 3544 ! 1107 ! 629 ! 166 ! 5446 *
*      *      *      *      * (65%) ! (20%) ! (12%) ! (3%) ! (100%) *
*   C3 * 15.57 * 15.57 * 11127 ! 2227 ! 2056 ! 1683 ! 17093 *
*      *      *      *      * (65%) ! (13%) ! (12%) ! (10%) ! (100%) *
*   C4 * 17.20 * 17.20 * 2259 ! 2318 ! 1244 ! 45 ! 5865 *
*      *      *      *      * (39%) ! (40%) ! (21%) ! (1%) ! (100%) *
*   C5 * 16.59 * 16.59 * 1949 ! 1033 ! 1105 ! 83 ! 4169 *
*      *      *      *      * (47%) ! (25%) ! (26%) ! (2%) ! (100%) *
*   C6 * 16.66 * 16.66 * 2483 ! 652 ! 434 ! 62 ! 3631 *
*      *      *      *      * (68%) ! (18%) ! (12%) ! (2%) ! (100%) *
*   C7 * 18.59 * 18.59 * 140 ! 700 ! 1762 ! 936 ! 3539 *
*      *      *      *      * (4%) ! (20%) ! (50%) ! (26%) ! (100%) *
*   C8 * 16.70 * 16.70 * 7987 ! 1807 ! 1209 ! 230 ! 11233 *
*      *      *      *      * (71%) ! (16%) ! (11%) ! (2%) ! (100%) *
*   C9 * 18.18 * 18.18 * 4861 ! 1423 ! 873 ! 226 ! 7382 *
*      *      *      *      * (66%) ! (19%) ! (12%) ! (3%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 39819 ! 12370 ! 10026 ! 3590 ! 65805 *
*      *      *      *      * (61%) ! (19%) ! (15%) ! (5%) ! (100%) *
*****
```

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1990 - AREA WITHIN EMBANKMENTS

Simulation from 01-06-1990 to 29-10-1990 / Max. fld durat. : 10 days

```

*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
* C1 * 15.37 * 15.28 * 5661 ! 1030 ! 627 ! 128 ! 7447 *
*      *      *      * (76%) ! (14%) ! (8%) ! (2%) ! (100%) *
* C2 * 15.21 * 15.06 * 3839 ! 970 ! 499 ! 138 ! 5446 *
*      *      *      * (70%) ! (18%) ! (9%) ! (3%) ! (100%) *
* C3 * 15.57 * 15.47 * 11541 ! 2102 ! 1897 ! 1553 ! 17093 *
*      *      *      * (68%) ! (12%) ! (11%) ! (9%) ! (100%) *
* C4 * 17.20 * 17.14 * 2527 ! 2181 ! 1122 ! 34 ! 5865 *
*      *      *      * (43%) ! (37%) ! (19%) ! (1%) ! (100%) *
* C5 * 16.59 * 16.44 * 2202 ! 1055 ! 863 ! 48 ! 4169 *
*      *      *      * (53%) ! (25%) ! (21%) ! (1%) ! (100%) *
* C6 * 16.66 * 16.51 * 2670 ! 580 ! 343 ! 38 ! 3631 *
*      *      *      * (74%) ! (16%) ! (9%) ! (1%) ! (100%) *
* C7 * 18.59 * 18.47 * 226 ! 842 ! 1738 ! 733 ! 3539 *
*      *      *      * (6%) ! (24%) ! (49%) ! (21%) ! (100%) *
* C8 * 16.70 * 16.54 * 8594 ! 1537 ! 982 ! 119 ! 11233 *
*      *      *      * (77%) ! (14%) ! (9%) ! (1%) ! (100%) *
* C9 * 18.18 * 18.13 * 4996 ! 1375 ! 814 ! 197 ! 7382 *
*      *      *      * (68%) ! (19%) ! (11%) ! (3%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 42257 ! 11672 ! 8886 ! 2990 ! 65805 *
*      *      *      * (64%) ! (18%) ! (14%) ! (5%) ! (100%) *
*****

```

```
- OPTION      : WITHOUT OPTION
- COMMENT    : 1991 - AREA WITHIN EMBANKMENTS
```

Cell name	Max fld elev.	Flooded *grd level*	F0 (ha)	F1 (ha)	F2 (ha)	F3+F4 (ha)	Total ha
C1	16.47	16.44	1784 (24%)	2235 (30%)	2285 (31%)	1142 (15%)	7447 (100%)
C2	16.34	16.29	1166 (21%)	1071 (20%)	2099 (39%)	1110 (20%)	5446 (100%)
C3	16.51	16.48	6625 (39%)	3135 (18%)	3565 (21%)	3768 (22%)	17093 (100%)
C4	17.33	17.32	1814 (31%)	2374 (40%)	1551 (26%)	126 (2%)	5865 (100%)
C5	17.51	17.47	778 (19%)	796 (19%)	1445 (35%)	1151 (28%)	4169 (100%)
C6	17.47	17.44	1484 (41%)	745 (21%)	1001 (28%)	401 (11%)	3631 (100%)
C7	19.22	19.12	0 (0%)	190 (5%)	1426 (40%)	1922 (54%)	3539 (100%)
C8	17.58	17.55	4431 (39%)	2492 (22%)	2993 (27%)	1317 (12%)	11233 (100%)
C9	18.86	18.85	3191 (43%)	1480 (20%)	1924 (26%)	787 (11%)	7382 (100%)
TOTAL			21273 (32%)	14519 (22%)	18288 (28%)	11724 (18%)	65305 (100%)

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1991 - AREA WITHIN EMBANKMENTS

Simulation from 10-05-1991 to 23-10-1991 / Max. fld durat. : 10 days

* Cell	* Max fld	* Flooded	* F0	* F1	* F2	* F3+F4	* Total
* name	* elev.	*grd level*	(ha)	(ha)	(ha)	(ha)	(ha)
* C1	* 16.47	* 15.86	* 3950	* 1754	* 1322	* 421	* 7447
			(53%)	(24%)	(18%)	(6%)	(100%)
* C2	* 16.34	* 15.73	* 2153	* 1529	* 1347	* 417	* 5446
			(40%)	(28%)	(25%)	(8%)	(100%)
* C3	* 16.51	* 15.97	* 9347	* 2600	* 2794	* 2352	* 17093
			(55%)	(15%)	(16%)	(14%)	(100%)
* C4	* 17.33	* 17.22	* 2169	* 2352	* 1286	* 58	* 5865
			(37%)	(40%)	(22%)	(1%)	(100%)
* C5	* 17.51	* 17.01	* 1389	* 864	* 1477	* 439	* 4169
			(33%)	(21%)	(35%)	(11%)	(100%)
* C6	* 17.47	* 17.00	* 2040	* 756	* 676	* 159	* 3631
			(56%)	(21%)	(19%)	(4%)	(100%)
* C7	* 19.22	* 18.58	* 148	* 712	* 1760	* 919	* 3539
			(4%)	(20%)	(50%)	(26%)	(100%)
* C8	* 17.58	* 17.06	* 6473	* 2358	* 1819	* 583	* 11233
			(58%)	(21%)	(16%)	(5%)	(100%)
* C9	* 18.86	* 18.40	* 4264	* 1636	* 1131	* 350	* 7382
			(58%)	(22%)	(15%)	(5%)	(100%)
* TOTAL			* 31934	* 14561	* 13612	* 5699	* 65805
			(49%)	(22%)	(21%)	(9%)	(100%)

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1992 - AREA WITHIN EMBANKMENTS

Simulation from 01-06-1992 to 31-08-1992 / Max. fld durat. : 3 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *
* C1 * 15.14 * 15.05 * 6125 ! 838 ! 428 ! 56 ! 7447 *
*      *      *      *      * (82%) ! (11%) ! (6%) ! (1%) ! (100%) *
* C2 * 15.02 * 14.95 * 4043 ! 871 ! 412 ! 119 ! 5446 *
*      *      *      *      * (74%) ! (16%) ! (8%) ! (2%) ! (100%) *
* C3 * 15.31 * 15.22 * 12510 ! 1826 ! 1480 ! 1277 ! 17093 *
*      *      *      *      * (73%) ! (11%) ! (9%) ! (7%) ! (100%) *
* C4 * 16.74 * 16.73 * 4155 ! 1298 ! 402 ! 9 ! 5865 *
*      *      *      *      * (71%) ! (22%) ! (7%) ! (0%) ! (100%) *
* C5 * 15.74 * 15.67 * 3549 ! 542 ! 78 ! 0 ! 4169 *
*      *      *      *      * (85%) ! (13%) ! (2%) ! (0%) ! (100%) *
* C6 * 16.05 * 16.02 * 3172 ! 334 ! 124 ! 1 ! 3631 *
*      *      *      *      * (87%) ! (9%) ! (3%) ! (0%) ! (100%) *
* C7 * 17.94 * 17.92 * 973 ! 1230 ! 1150 ! 187 ! 3539 *
*      *      *      *      * (27%) ! (35%) ! (32%) ! (5%) ! (100%) *
* C8 * 16.05 * 15.97 * 10085 ! 760 ! 367 ! 21 ! 11233 *
*      *      *      *      * (90%) ! (7%) ! (3%) ! (0%) ! (100%) *
* C9 * 17.82 * 17.71 * 6057 ! 793 ! 426 ! 106 ! 7382 *
*      *      *      *      * (82%) ! (11%) ! (6%) ! (1%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 50669 ! 8493 ! 4868 ! 1775 ! 65805 *
*      *      *      *      * (77%) ! (13%) ! (7%) ! (3%) ! (100%) *
*****
```

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1992 - AREA WITHIN EMBANKMENTS

Simulation from 01-06-1992 to 31-08-1992 / Max. fld durat. : 10 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
* C1 * 15.14 * 14.68 * 6692 ! 502 ! 253 ! 0 ! 7447 *
*      *      *      *      * (90%) ! (7%) ! (3%) ! (0%) ! (100%) *
* C2 * 15.02 * 14.45 * 4819 ! 415 ! 161 ! 51 ! 5446 *
*      *      *      *      * (88%) ! (8%) ! (3%) ! (1%) ! (100%) *
* C3 * 15.31 * 14.87 * 13643 ! 1457 ! 1064 ! 928 ! 17093 *
*      *      *      *      * (80%) ! (9%) ! (6%) ! (5%) ! (100%) *
* C4 * 16.74 * 16.69 * 4288 ! 1216 ! 353 ! 8 ! 5865 *
*      *      *      *      * (73%) ! (21%) ! (6%) ! (0%) ! (100%) *
* C5 * 15.74 * 15.14 * 4049 ! 118 ! 2 ! 0 ! 4169 *
*      *      *      *      * (97%) ! (3%) ! (0%) ! (0%) ! (100%) *
* C6 * 16.05 * 15.81 * 3315 ! 242 ! 74 ! 0 ! 3631 *
*      *      *      *      * (91%) ! (7%) ! (2%) ! (0%) ! (100%) *
* C7 * 17.94 * 17.86 * 1086 ! 1225 ! 1066 ! 162 ! 3539 *
*      *      *      *      * (31%) ! (35%) ! (30%) ! (5%) ! (100%) *
* C8 * 16.05 * 15.60 * 10608 ! 517 ! 108 ! 0 ! 11233 *
*      *      *      *      * (94%) ! (5%) ! (1%) ! (0%) ! (100%) *
* C9 * 17.82 * 17.18 * 6788 ! 415 ! 100 ! 79 ! 7382 *
*      *      *      *      * (92%) ! (6%) ! (1%) ! (1%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 55289 ! 6107 ! 3181 ! 1228 ! 65805 *
*      *      *      * (84%) ! (9%) ! (5%) ! (2%) ! (100%) *
*****
```

Maximum Water Level of Representative
Cell Points (Without Option)

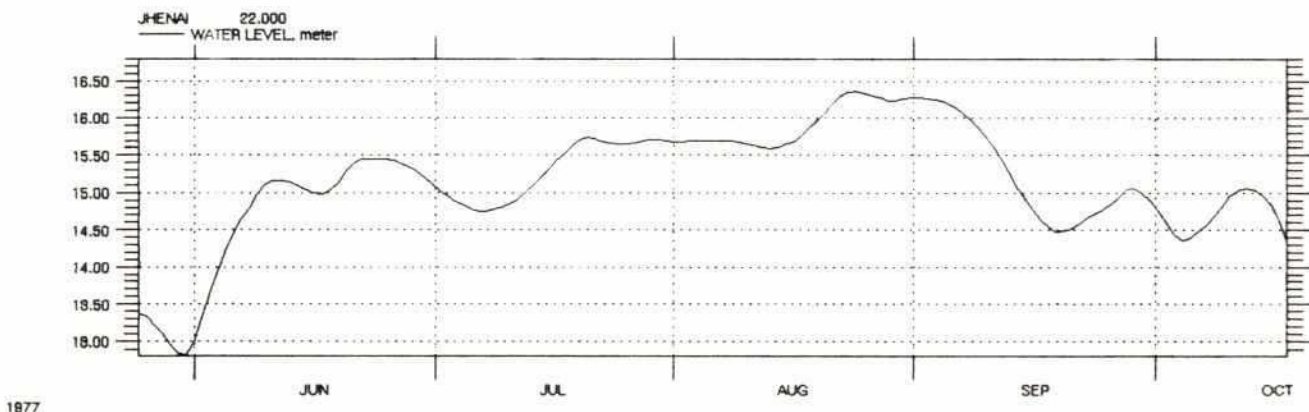
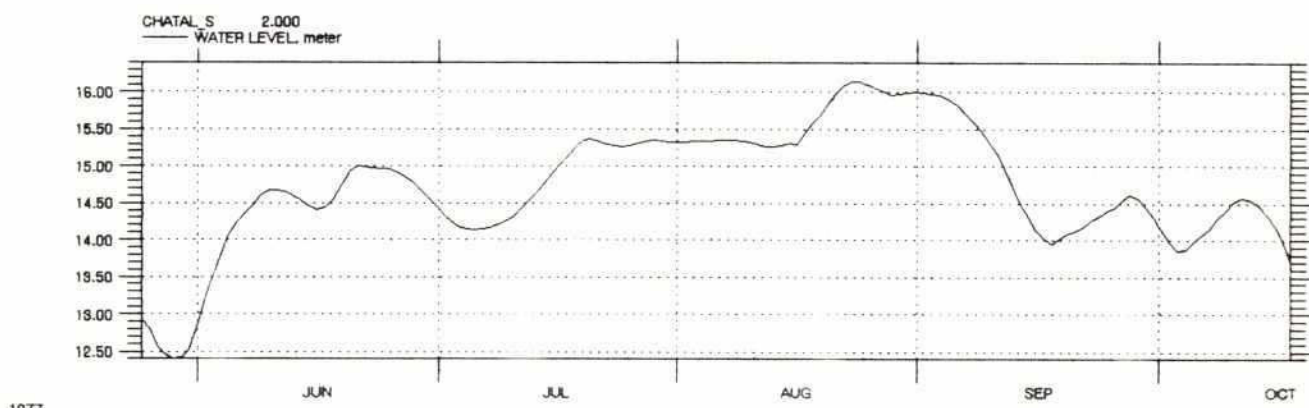
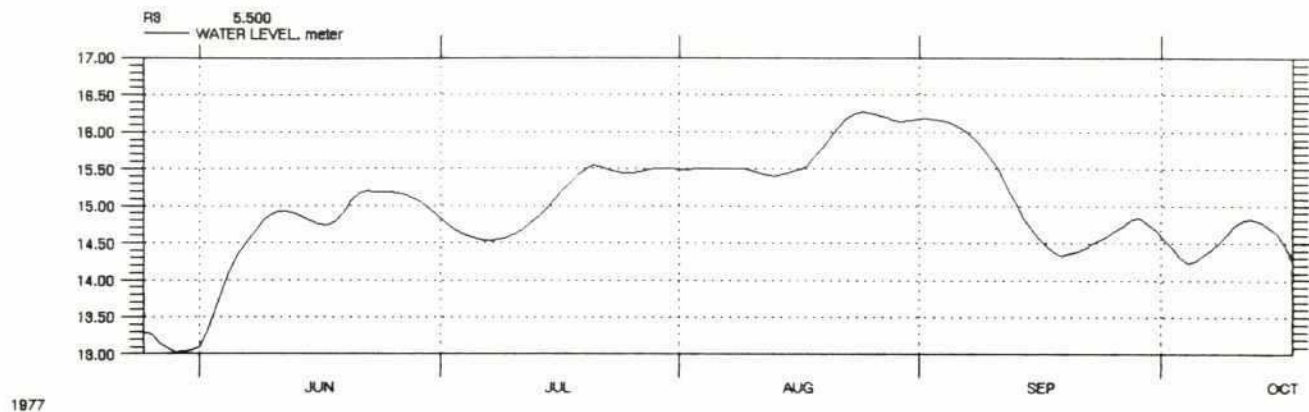
MAX. WATER LEVEL OF REPRESENTATIVE CELL CALCULATION POINTS
(WITHOUT OPTION)

* Name of *	* Calculation Point *		MAXIMUM CELL WATER LEVEL m(PWD)									* Average *
* Cell	* River name*	Km	* 1977	* 1980	* 1987	* 1988	* 1989	* 1990	* 1991	* 1992*	* Maximum	
											WL m(PWD)	

* C-1	* R3	* 5.500	* 16.28	* 16.60	* 16.60	* 17.25	* 15.50	* 15.40	* 16.48	* 15.15	* 16.16	
* C-2	* CHATAL_S	* 2.000	* 16.13	* 16.50	* 16.50	* 17.15	* 15.35	* 15.20	* 16.32	* 15.00	* 16.02	
* C-3	* JHENAI	* 22.000	* 16.36	* 16.65	* 16.60	* 17.25	* 15.68	* 15.55	* 16.50	* 15.30	* 16.24	
* C-4	* R2	* 11.000	* 17.49	* 17.48	* 17.55	* 17.90	* 17.25	* 17.20	* 17.35	* 16.75	* 17.37	
* C-5	* DADBHANGA	* 32.200	* 17.62	* 17.70	* 17.30	* 18.20	* 16.65	* 16.62	* 17.50	* 15.72	* 17.16	
* C-6	* R5	* 4.000	* 17.54	* 17.60	* 17.32	* 18.10	* 16.68	* 16.65	* 17.48	* 16.05	* 17.18	
* C-7	* R1	* 2.500	* 19.18	* 19.30	* 18.98	* 19.60	* 18.40	* 18.60	* 19.23	* 17.95	* 18.91	
* C-8	* DADBHANGA	* 20.200	* 17.70	* 17.75	* 17.40	* 18.30	* 16.75	* 16.70	* 17.60	* 16.08	* 17.29	
* C-9	* DADBHANGA	* 2.200	* 18.79	* 18.90	* 18.52	* 19.30	* 18.35	* 18.20	* 18.90	* 17.81	* 18.60	

Note : * Calculation upto August

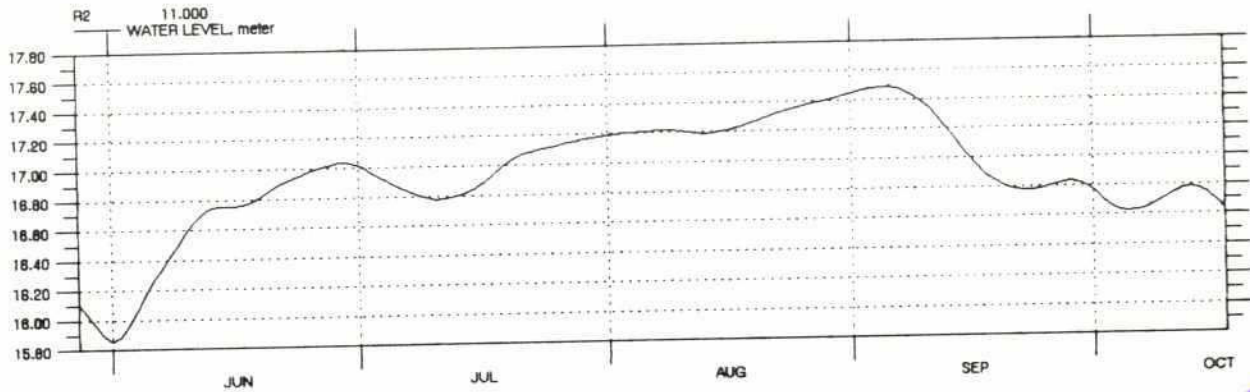
266



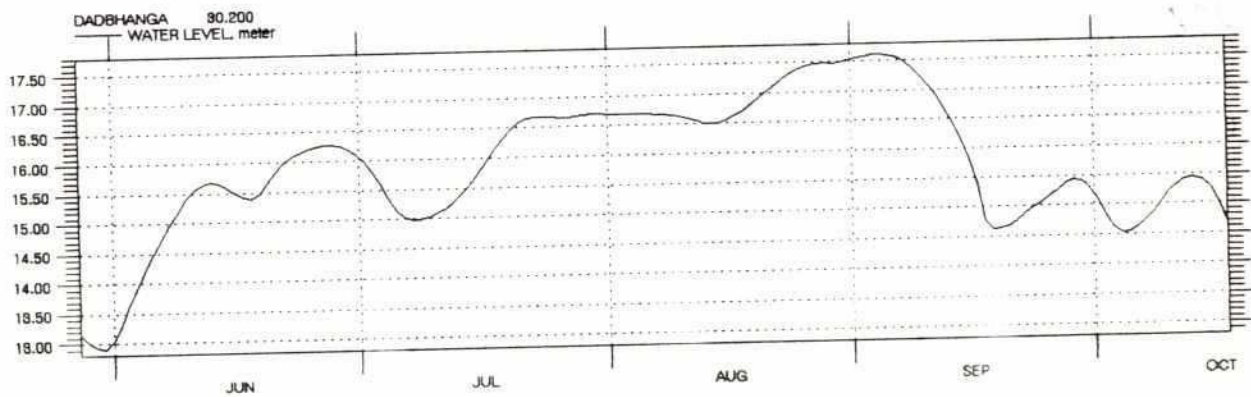
SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1977	
DATA FILE : JPPWO.RDF RESULT FILE : 77JPWO.RRF	BOUNDARY FILE : JPWO77.BSF CALCULATED : 7 - OCT - 1992, 19:05	MIKE 11
		Dwg no.:

217

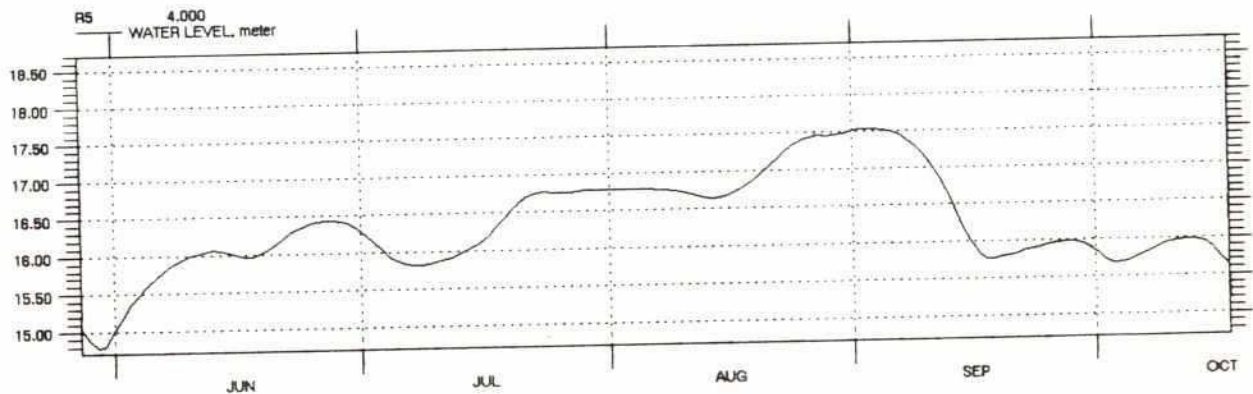
1977



1977

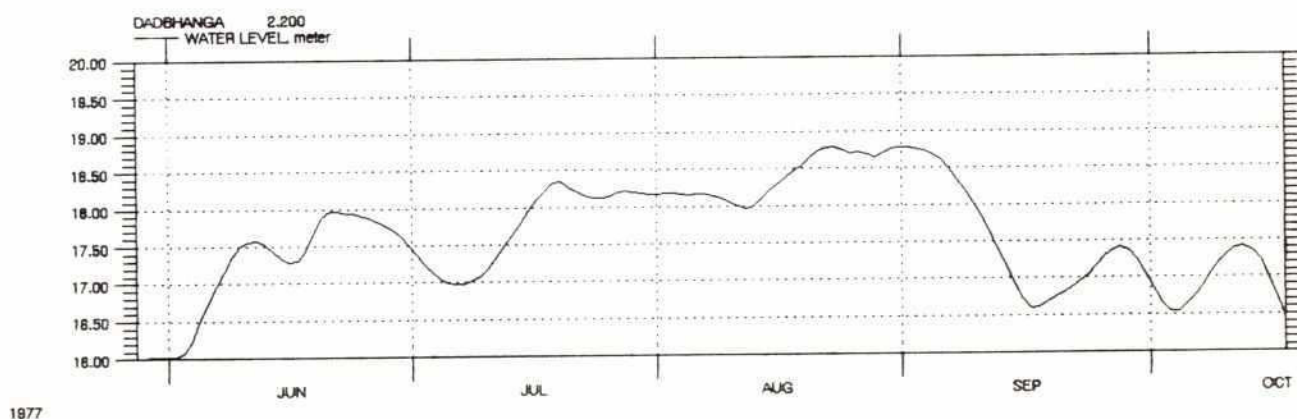
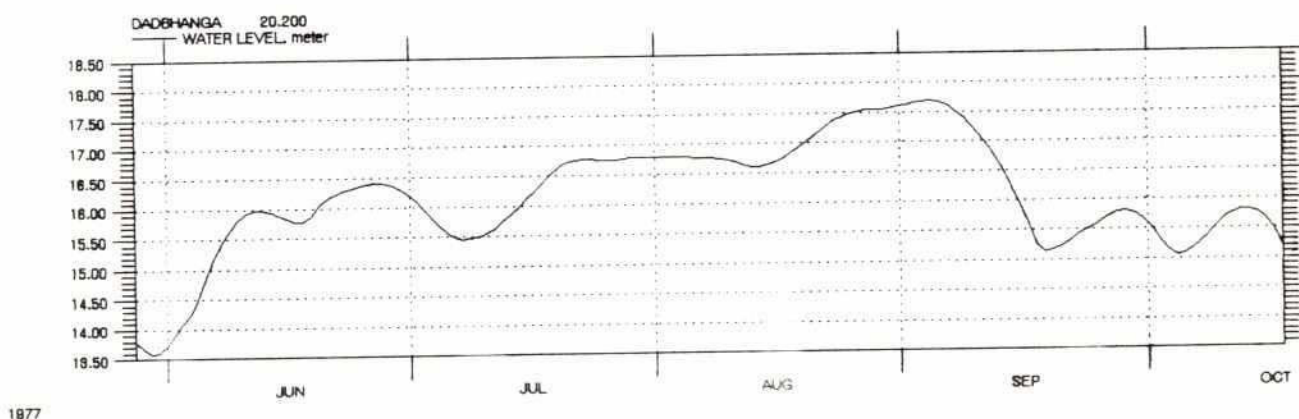
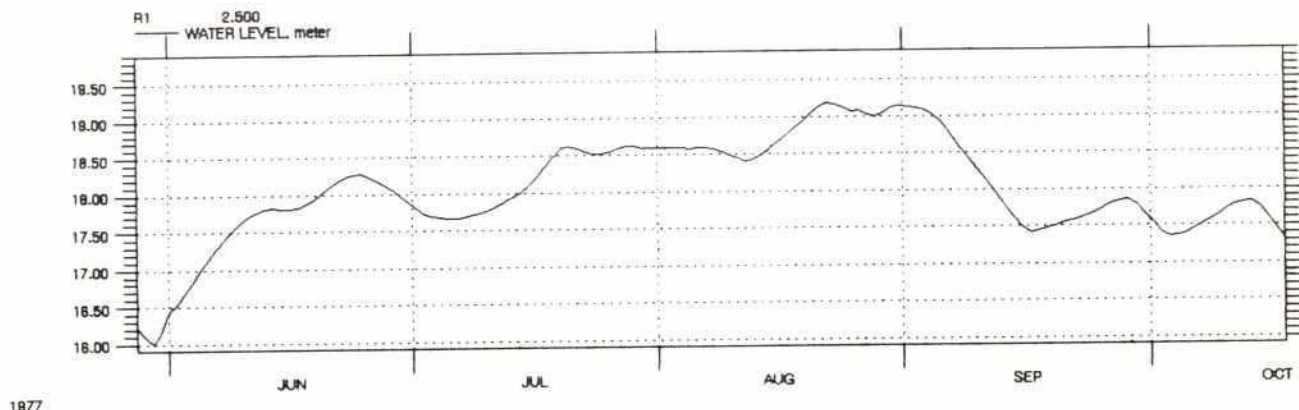


1977



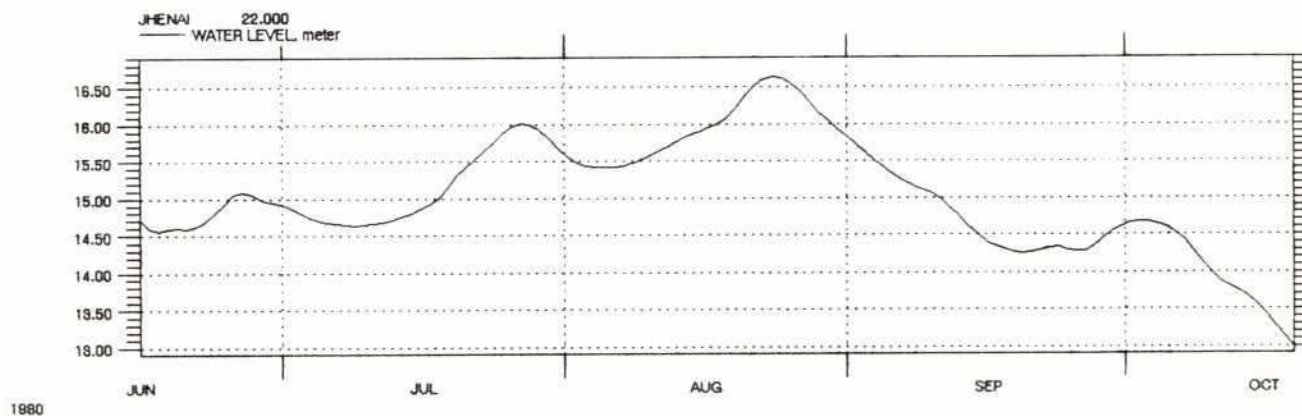
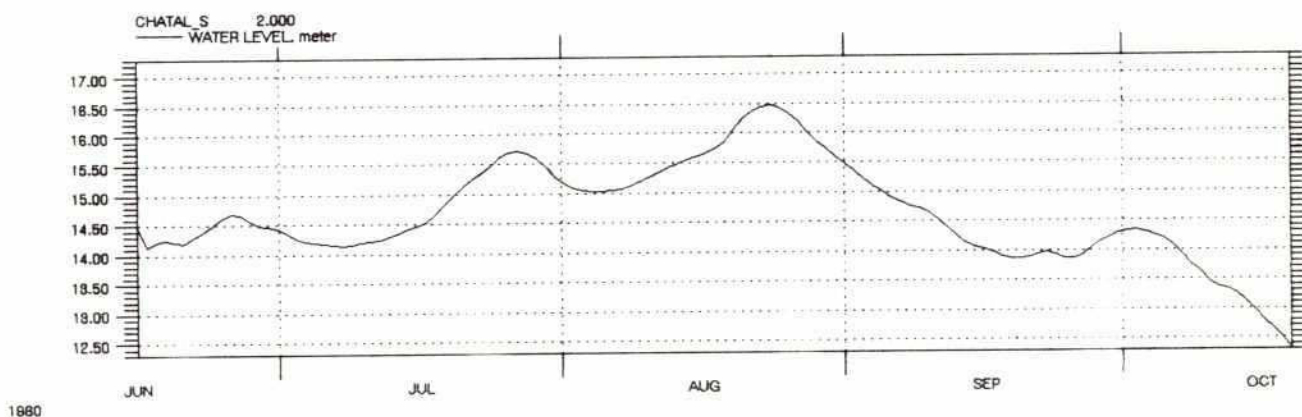
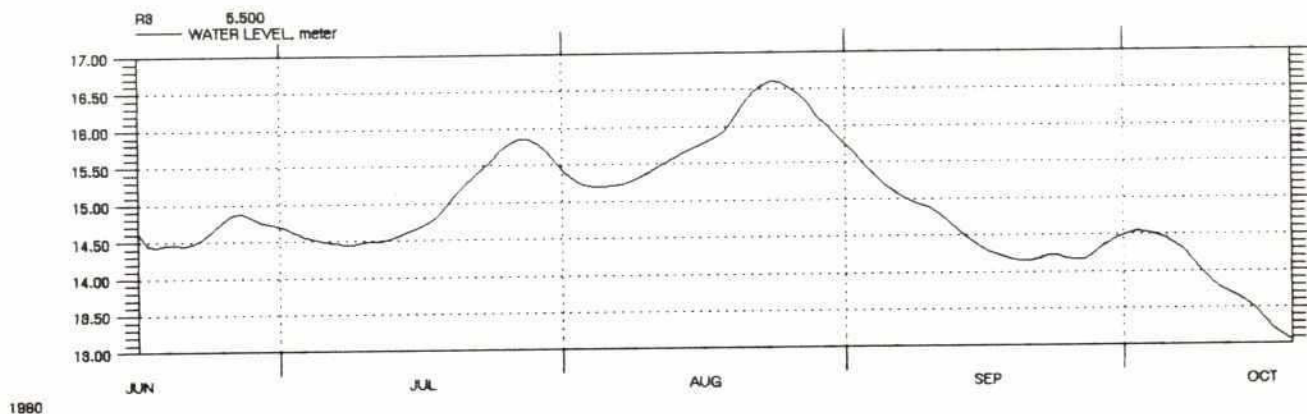
SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1977	
	DATA FILE : JPPWO.RDF RESULT FILE : 77JPWO.RRF	BOUNDARY FILE : JPWO77.BSF CALCULATED : 7 - OCT - 1992, 19:05
		MIKE 11 Dwg no.:

268

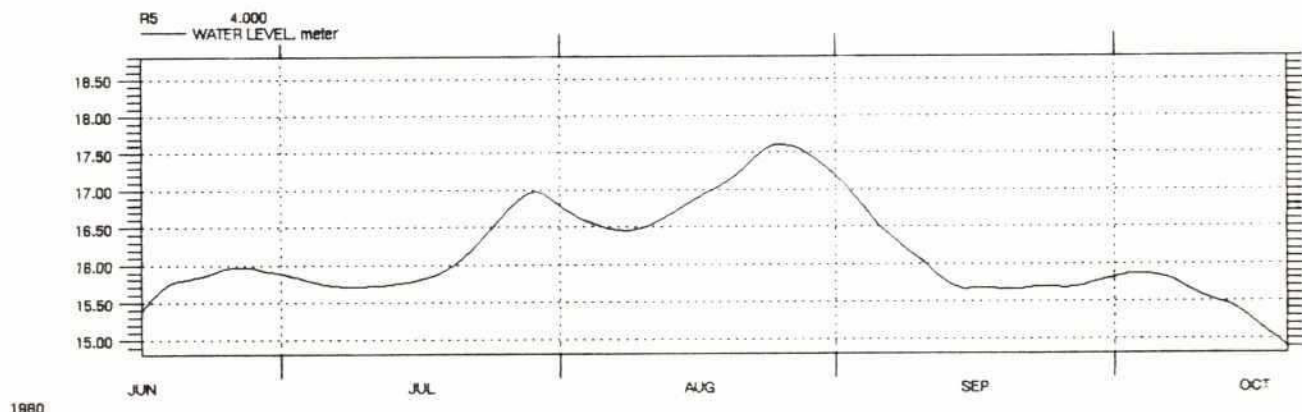
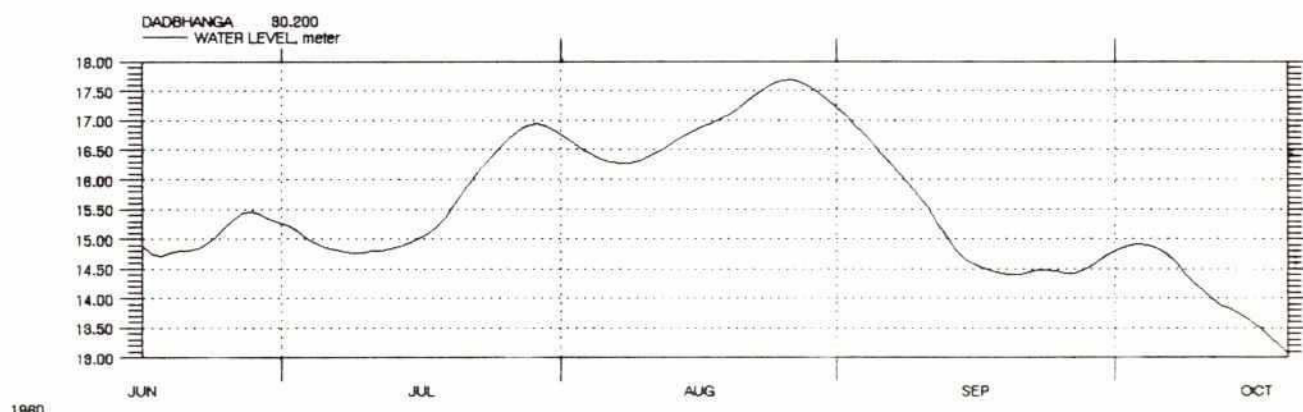
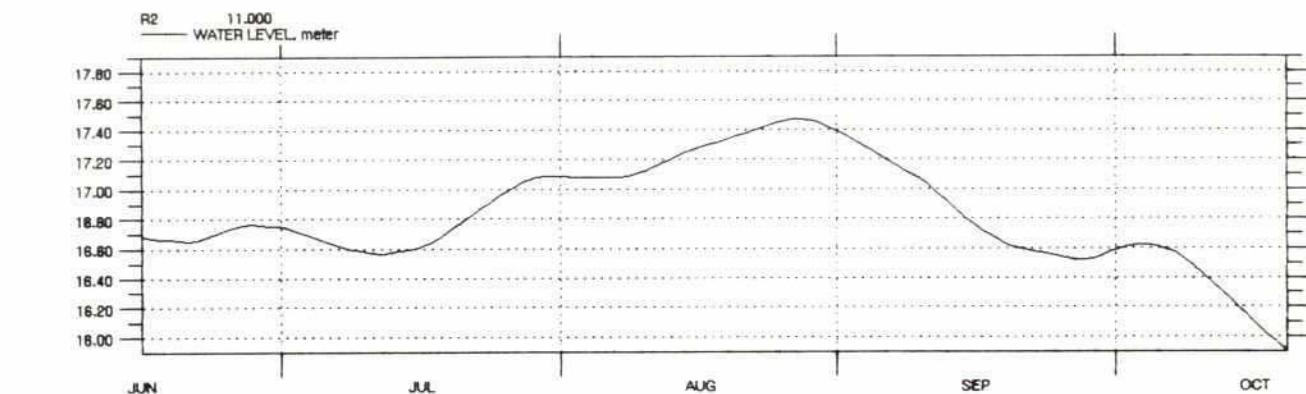


SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1977	
	DATA FILE : JPPWO.RDF RESULT FILE : 77JPWO.RRF	BOUNDARY FILE : JPWO77.BSF CALCULATED : 7 - OCT - 1992, 19:05
		MIKE 11 Dwg no.:

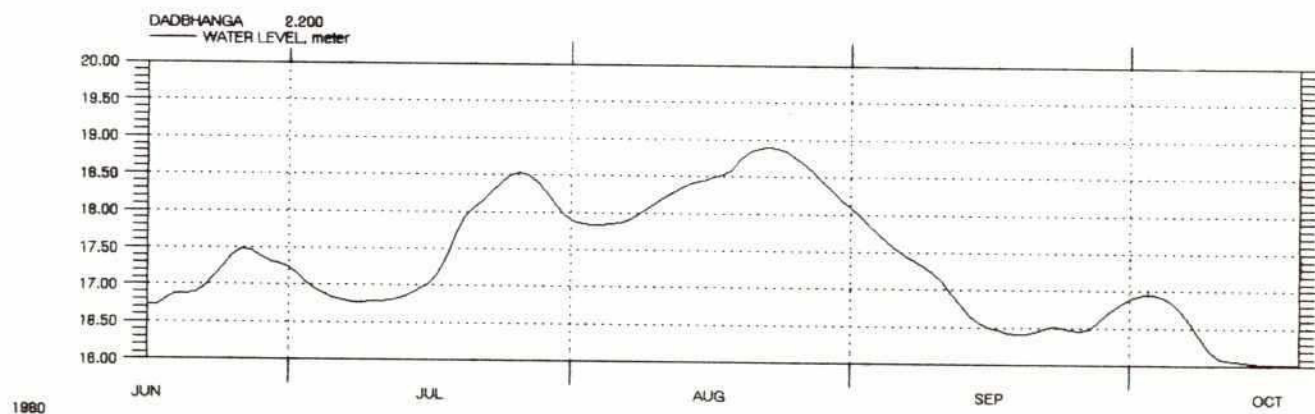
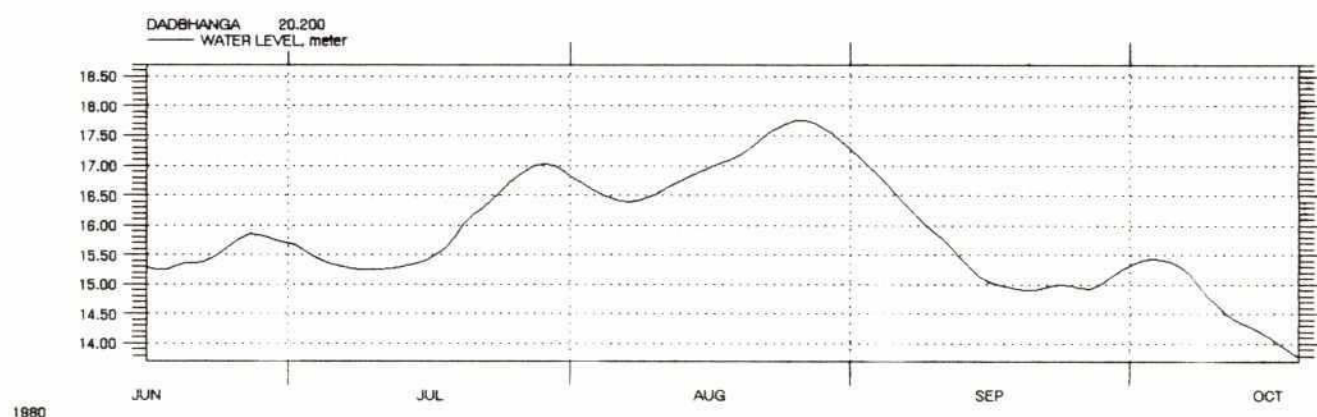
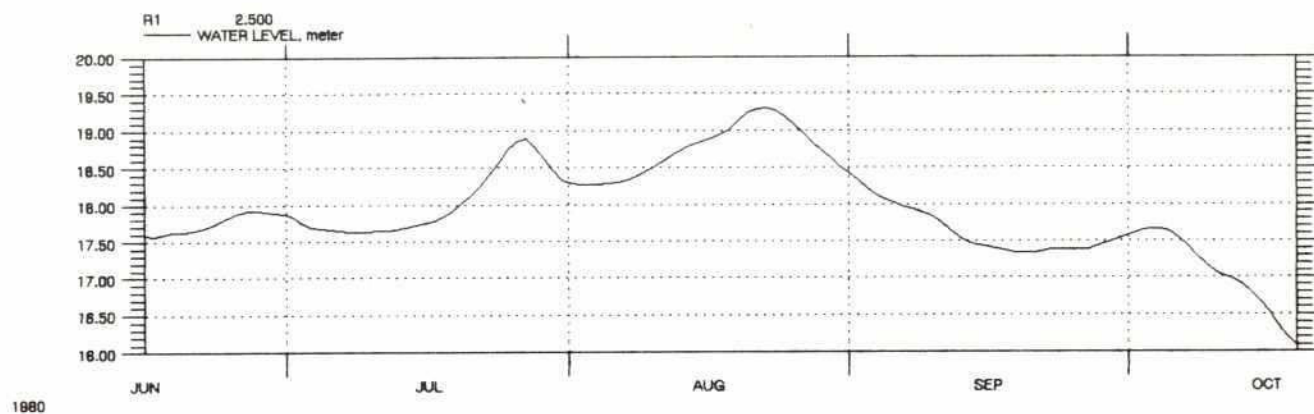
219



SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1980	
DATA FILE : JPPWO.RDF RESULT FILE : S80JPWO.RRF	BOUNDARY FILE : JPWO80.BSF CALCULATED : 9 - OCT - 1992, 12:50	MIKE 11
		Dwg no.:



SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1980
DATA FILE : JPPWO.RDF RESULT FILE : S80JPWO.RRF	BOUNDARY FILE : JPWO80.BSF CALCULATED : 9 - OCT - 1992, 12:50 MIKE 11 Dwg no.:


SWMC

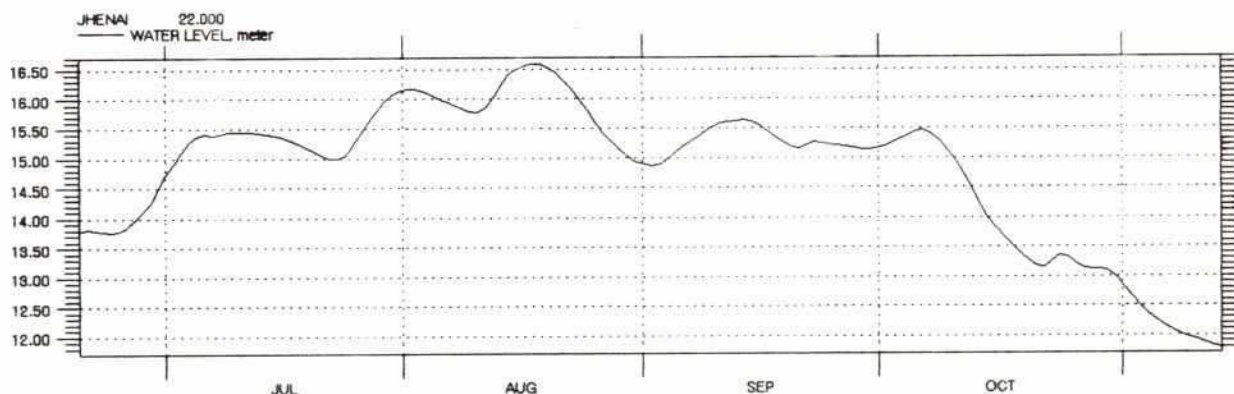
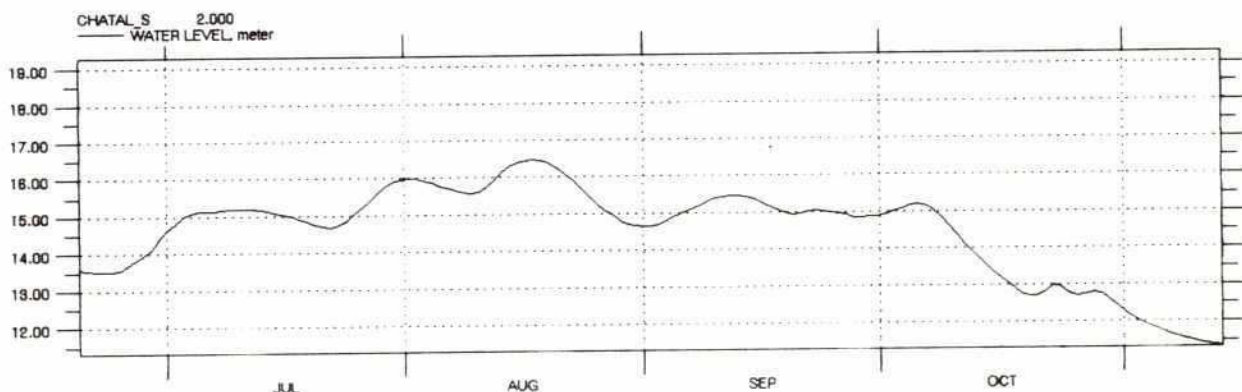
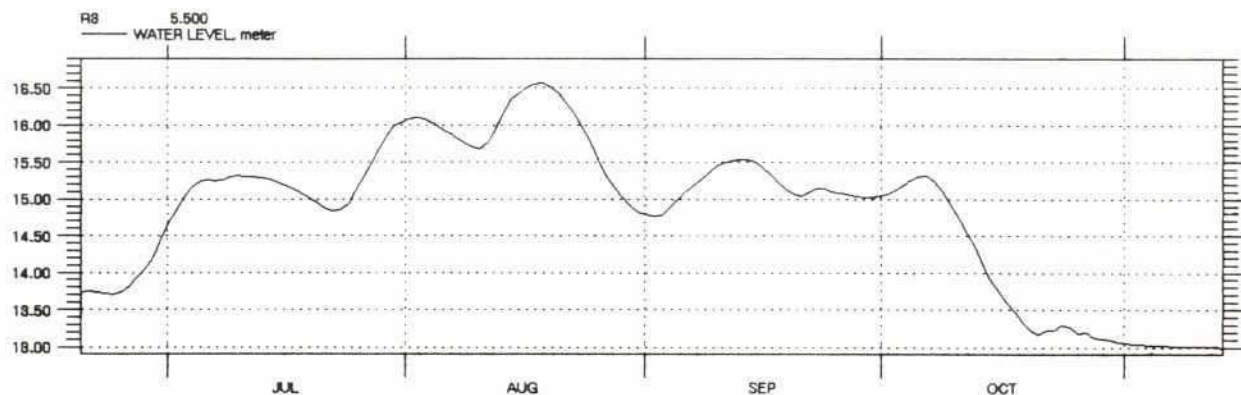
WATER LEVEL AT REPRESENTATIVE CELL POINT
WITHOUT OPTION
1980

DATA FILE : JPPWO.RDF
RESULT FILE : S80JPWO.RRF

BOUNDARY FILE : JPWO80.BSF
CALCULATED : 9 - OCT - 1992, 12:50

MIKE 11

Dwg no.:



SWMC

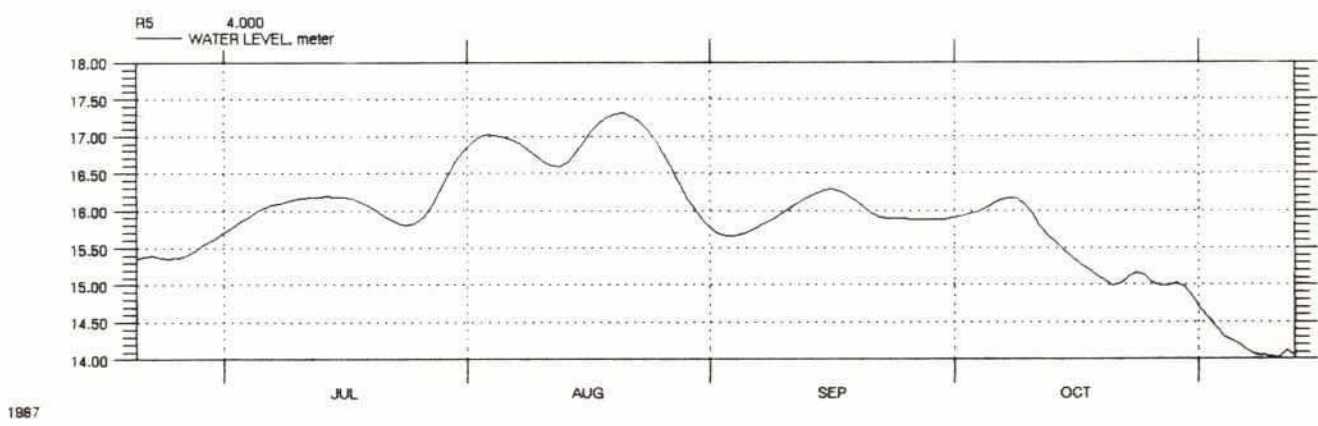
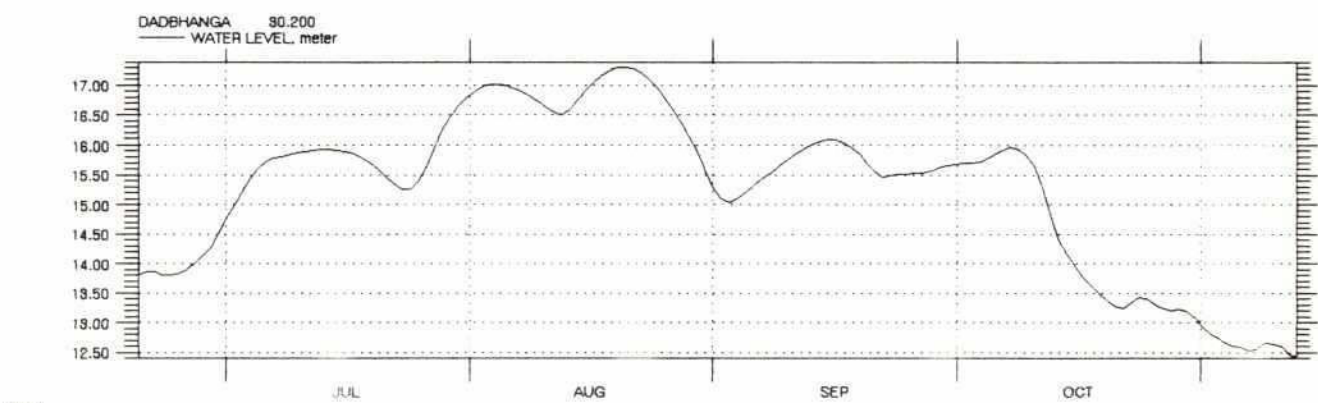
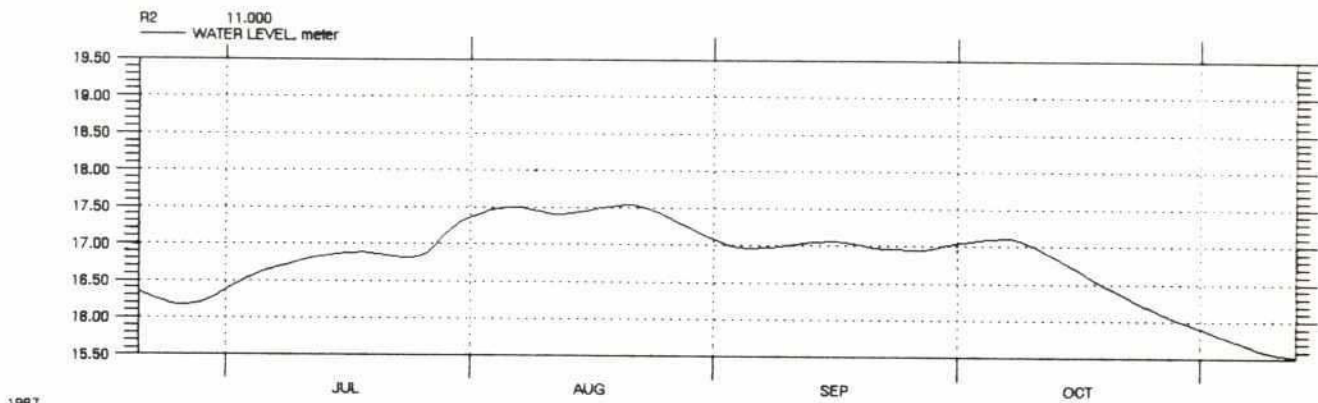
WATER LEVEL AT REPRESENTATIVE CELL POINT
WITHOUT OPTION
1987

DATA FILE : JPPWO.RDF
RESULT FILE : 87JPWO.RRF

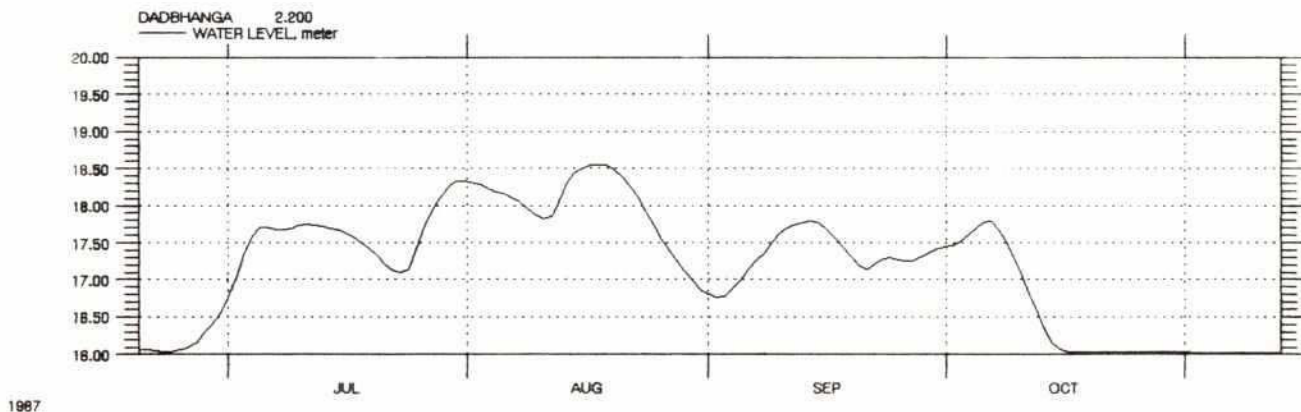
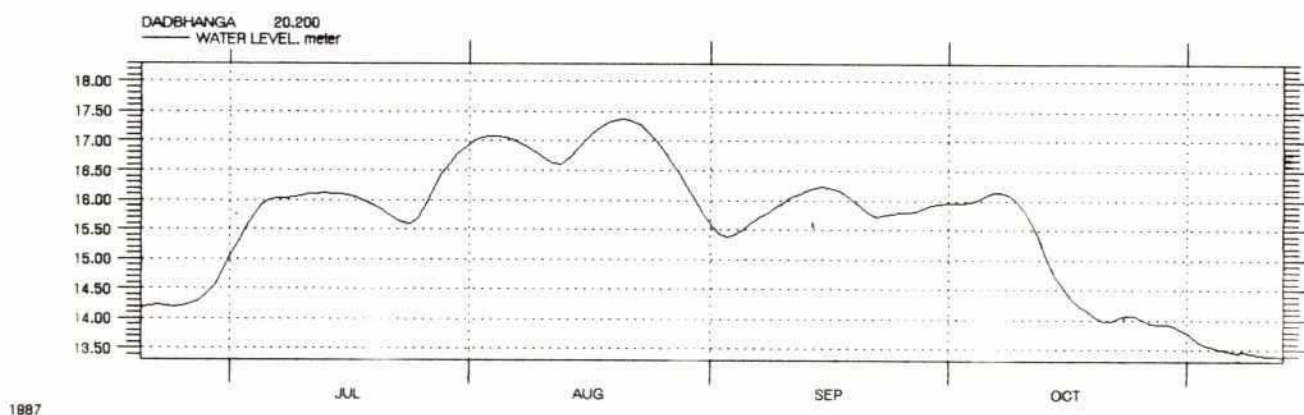
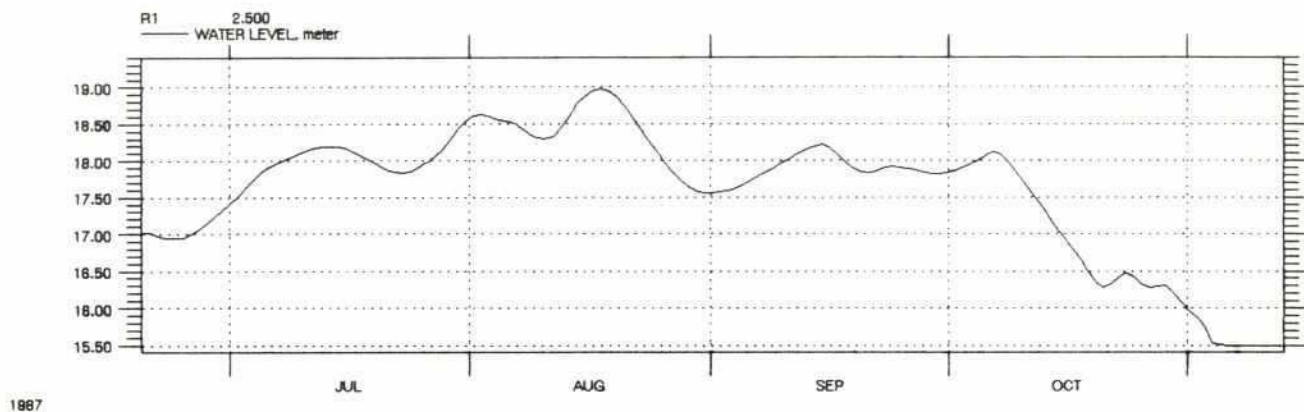
BOUNDARY FILE : JPWO87.BSF
CALCULATED : 9 - OCT - 1992, 17:19

MIKE 11

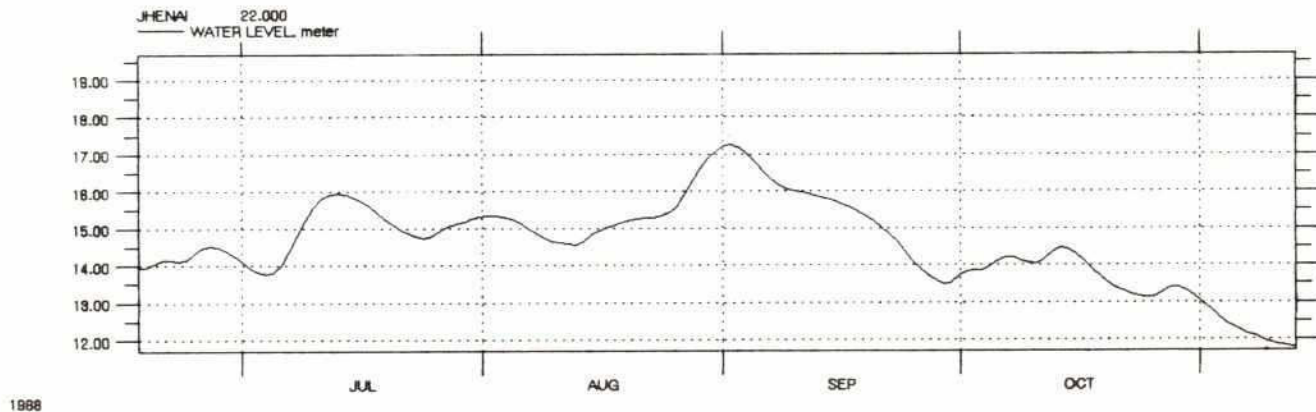
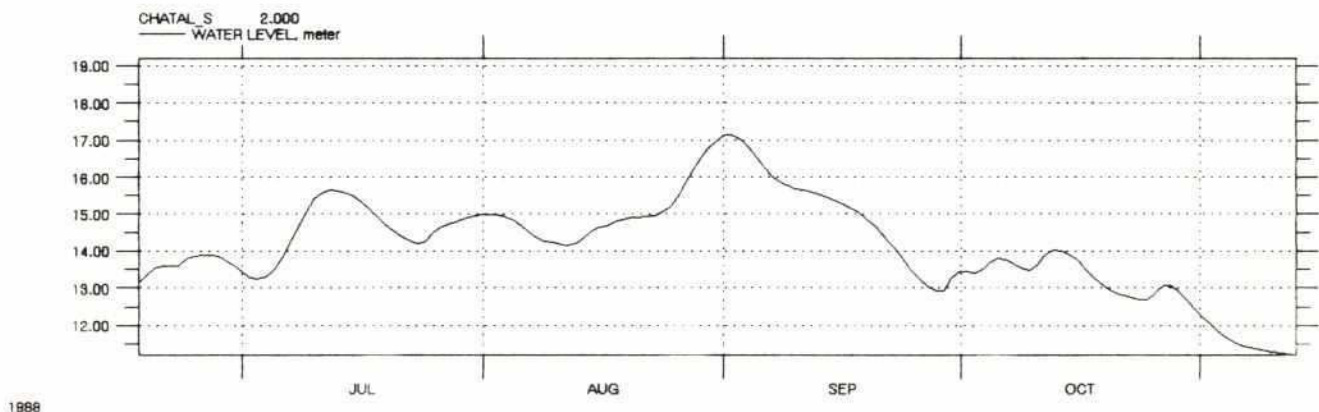
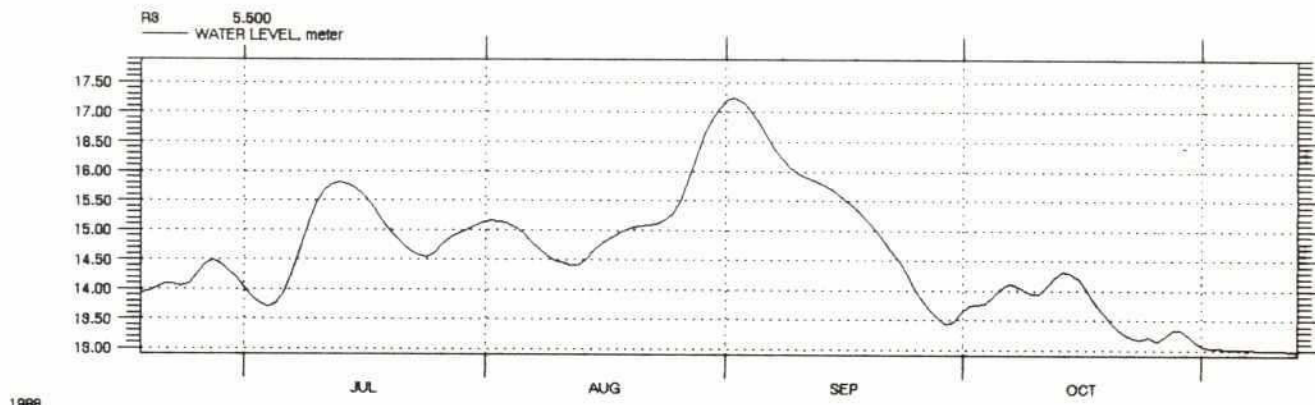
Dwg no.:



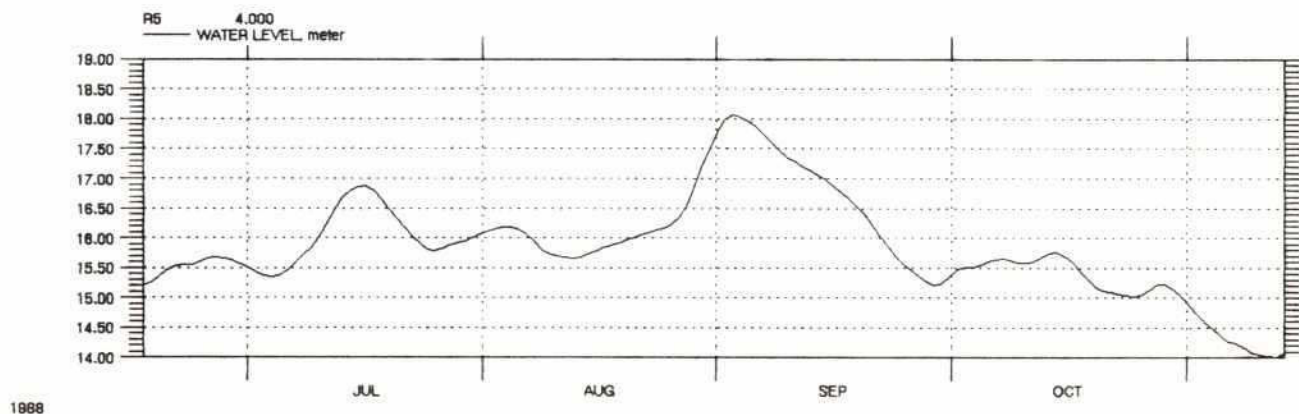
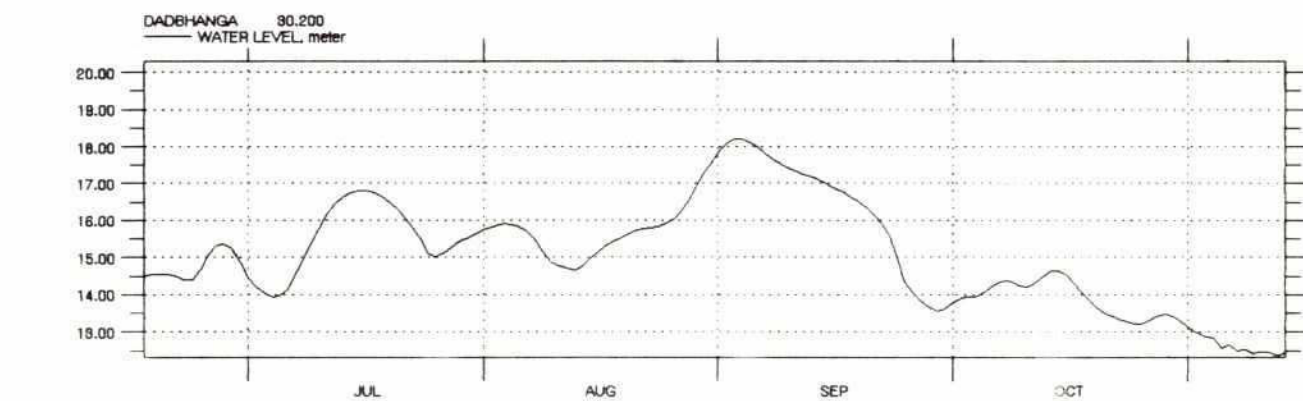
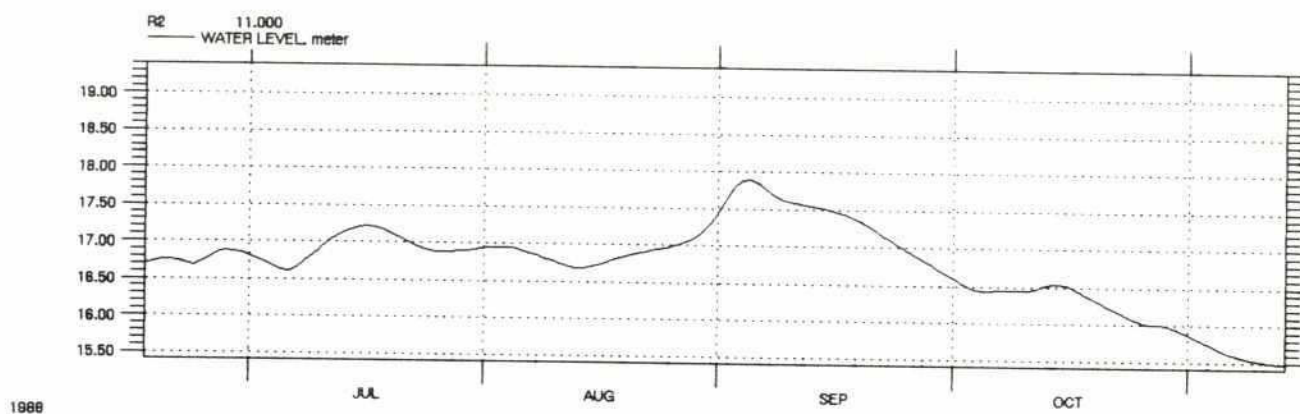
SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1987	
DATA FILE : JPPWO.RDF RESULT FILE : 87JPWO.RRF	BOUNDARY FILE : JPWO87.BSF CALCULATED : 9 - OCT - 1992, 17:19	MIKE 11 Dwg no.:



S W M C	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1987	
DATA FILE : JPPWO.RDF RESULT FILE : 87JPWO.RRF		MIKE 11 Dwg no.:
BOUNDARY FILE : JPWO87.BSF CALCULATED : 9 - OCT - 1992, 17:19		



SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1988	
DATA FILE : JPPWO.RDF RESULT FILE : S88JPWO.RRF	BOUNDARY FILE : JPWO88.BSF CALCULATED : 9 - OCT - 1992, 14:48	MIKE 11 Dwg no.:


SWMC

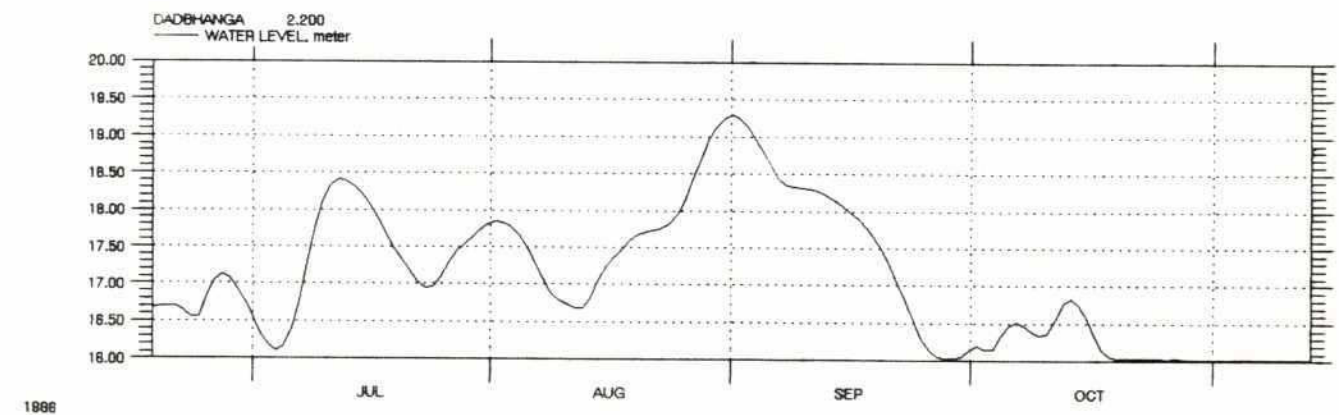
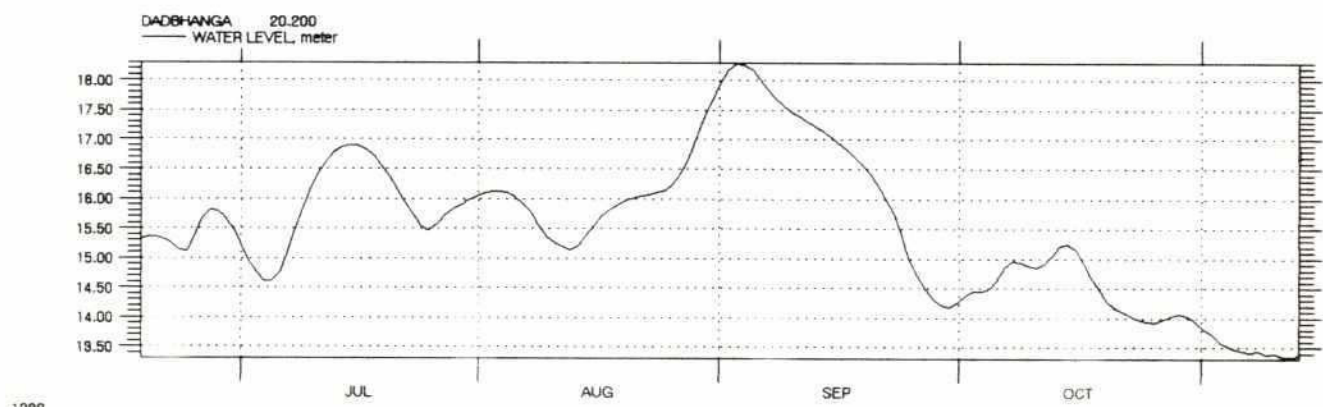
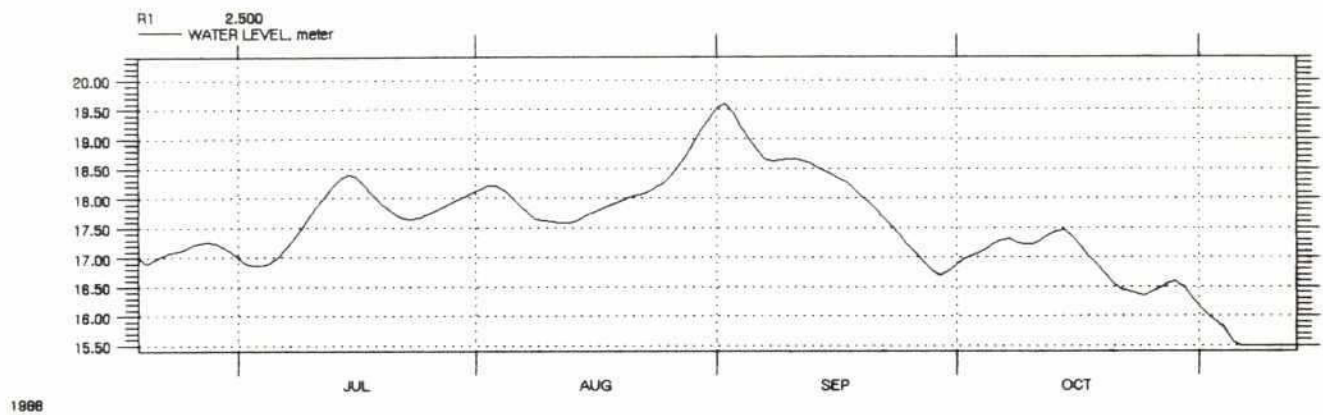
 WATER LEVEL AT REPRESENTATIVE CELL POINT
 WITHOUT OPTION
 1988

 DATA FILE : JPPWO.RDF
 RESULT FILE : S88JPWO.RRF

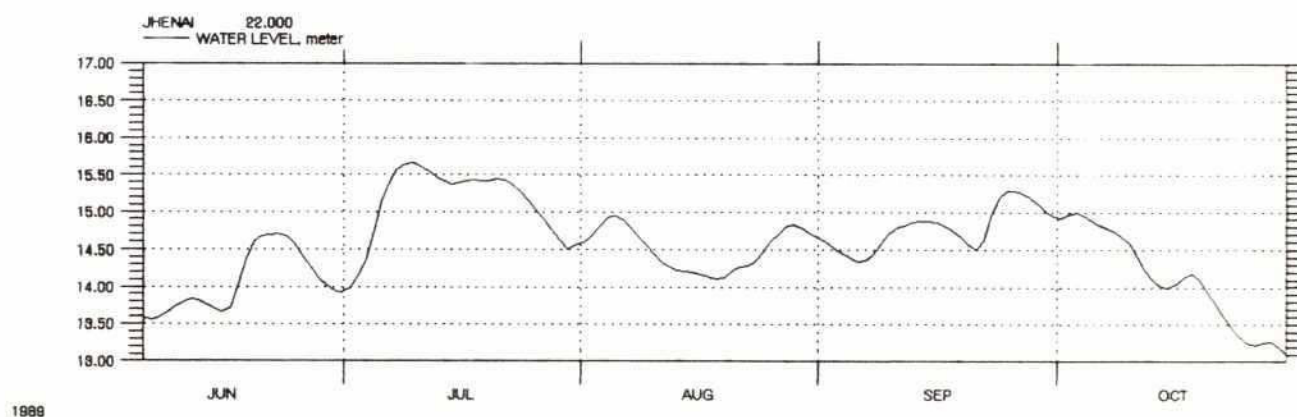
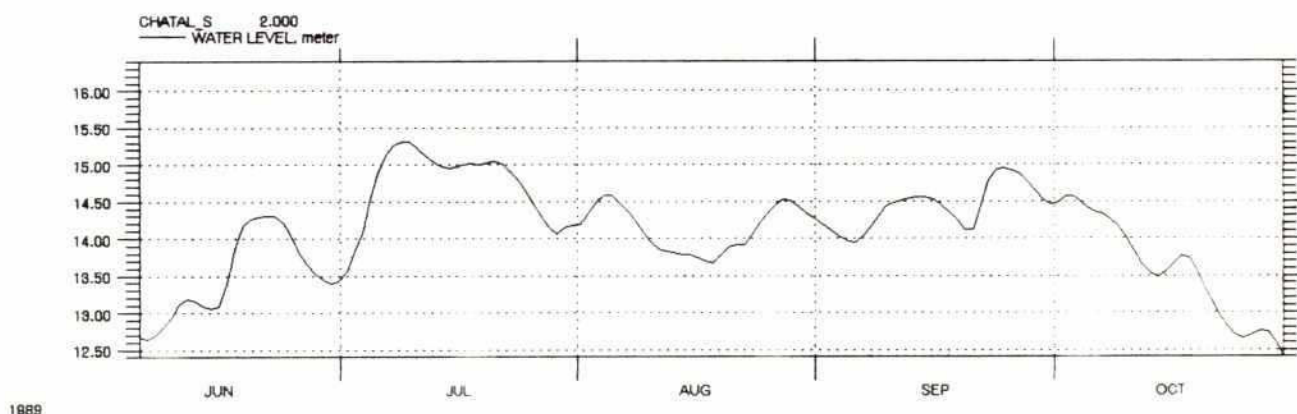
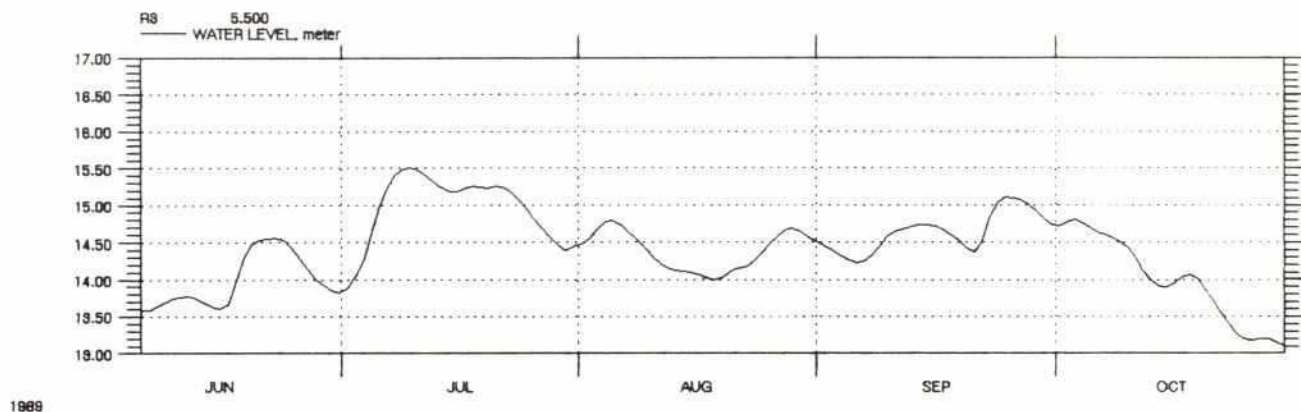
 BOUNDARY FILE : JPWO88.BSF
 CALCULATED : 9 - OCT - 1992, 14:48

MIKE 11

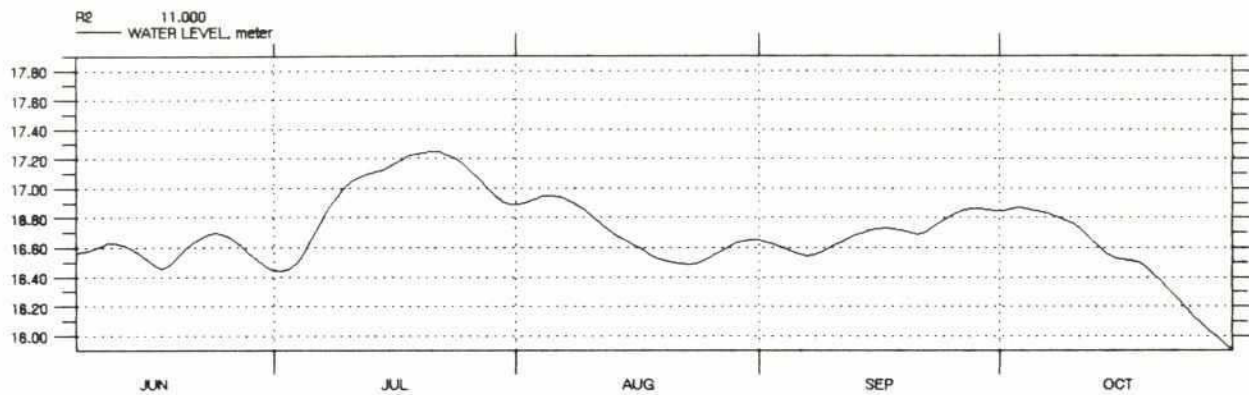
Dwg no.:



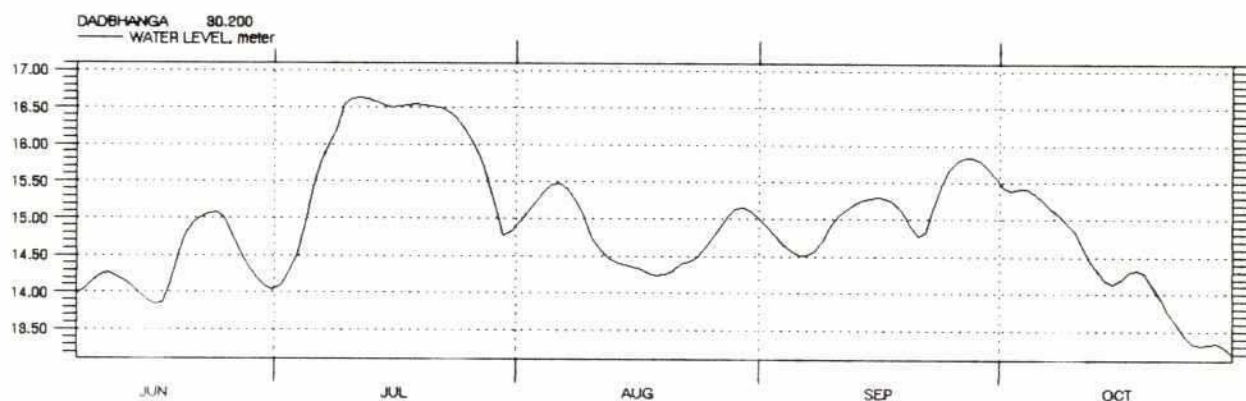
SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1988	MIKE 11 Dwg no.:
DATA FILE : JPPWO.RDF RESULT FILE : S88JPWO.RRF	BOUNDARY FILE : JPWO88.BSF CALCULATED : 9 - OCT - 1992, 14:48	



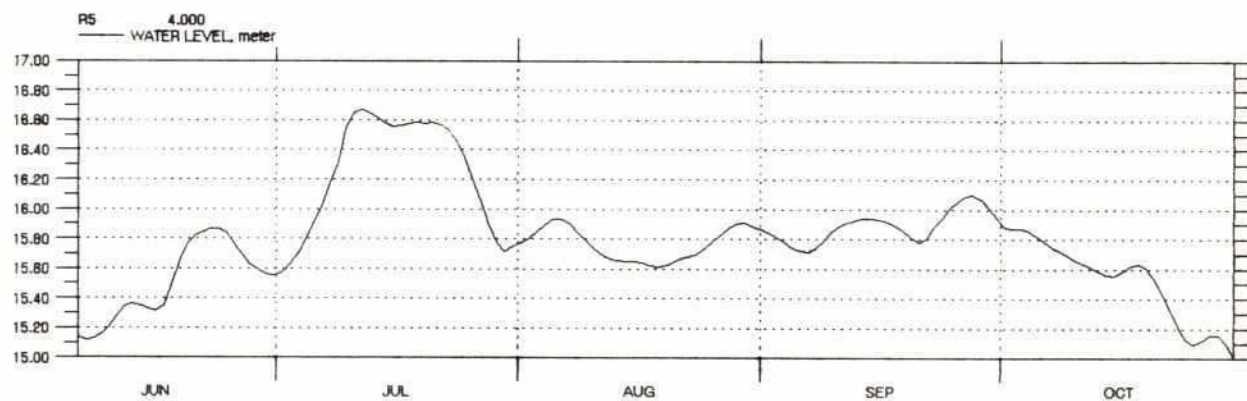
SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1989	
DATA FILE : JPPWO.RDF RESULT FILE : 89JPWO.RRF	BOUNDARY FILE : JPWO89.BSF CALCULATED : 11 - OCT - 1992, 09:05	MIKE 11 Dwg no.:



1989

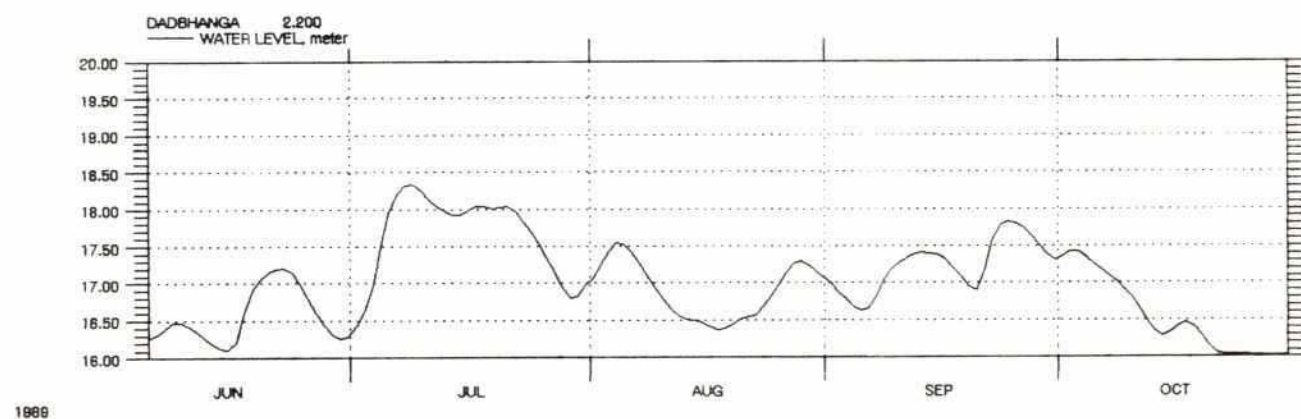
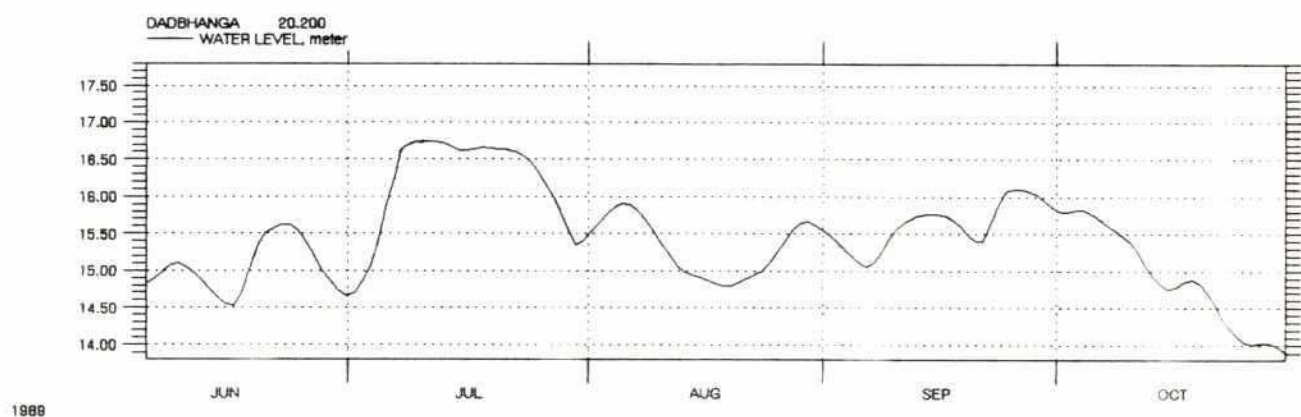
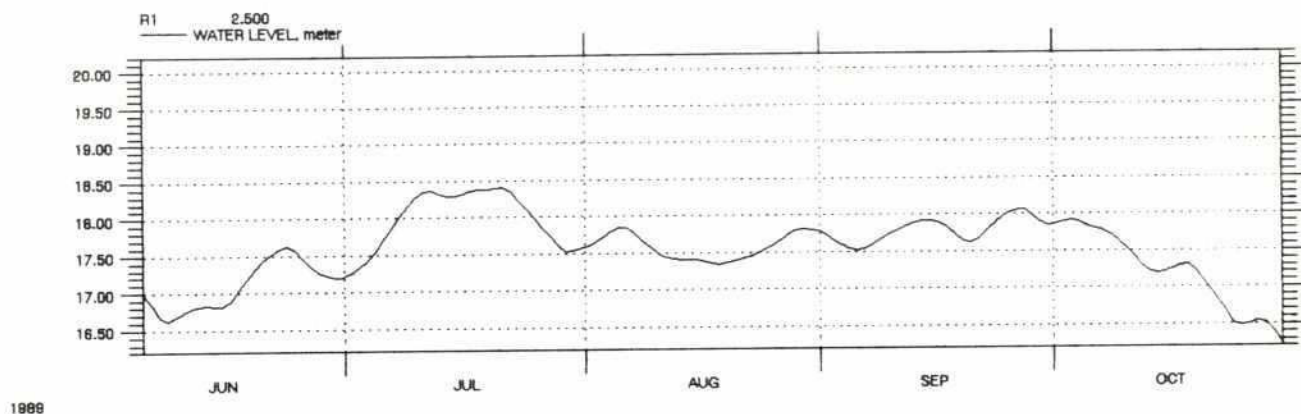


1989

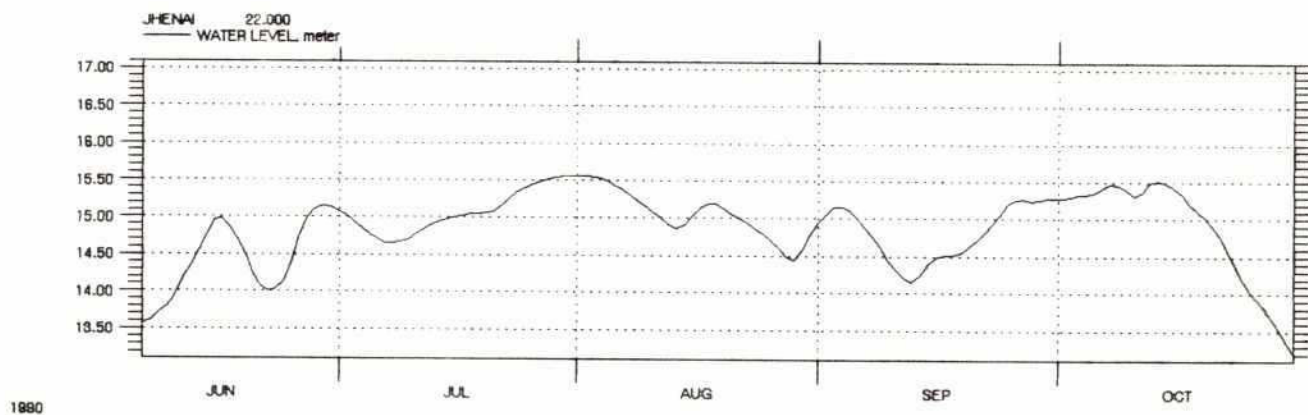
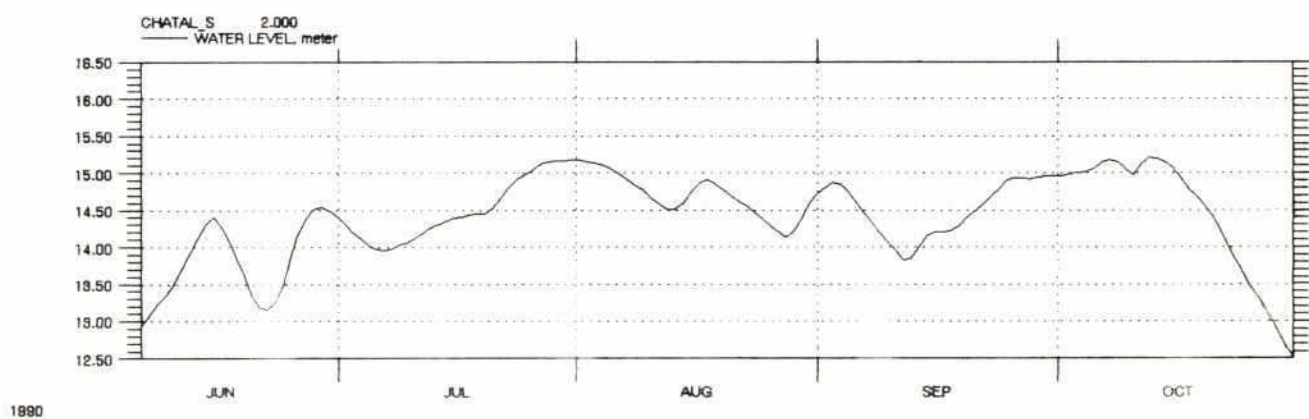
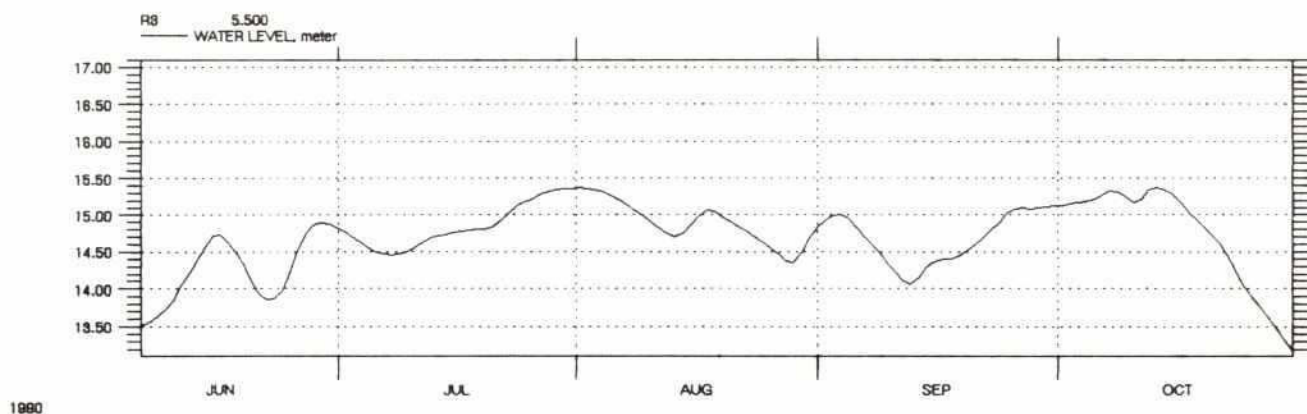


1989

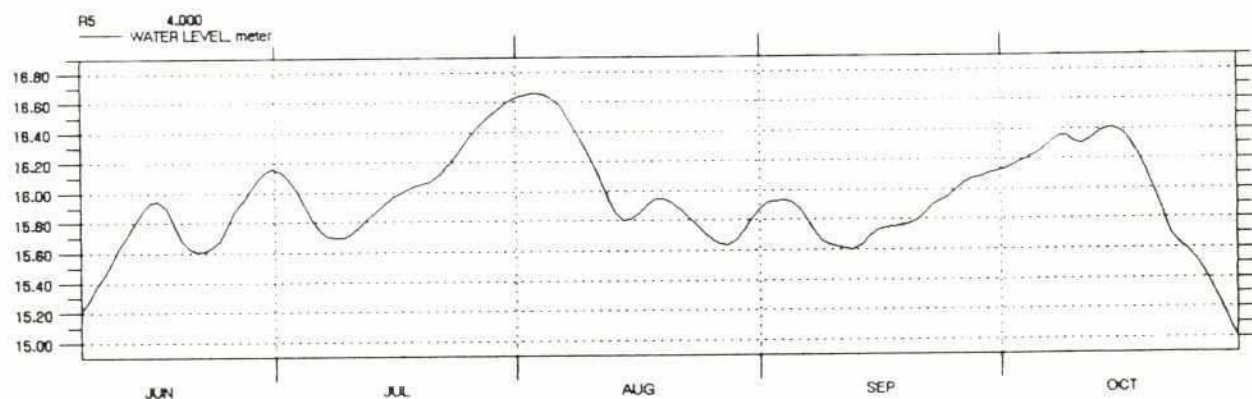
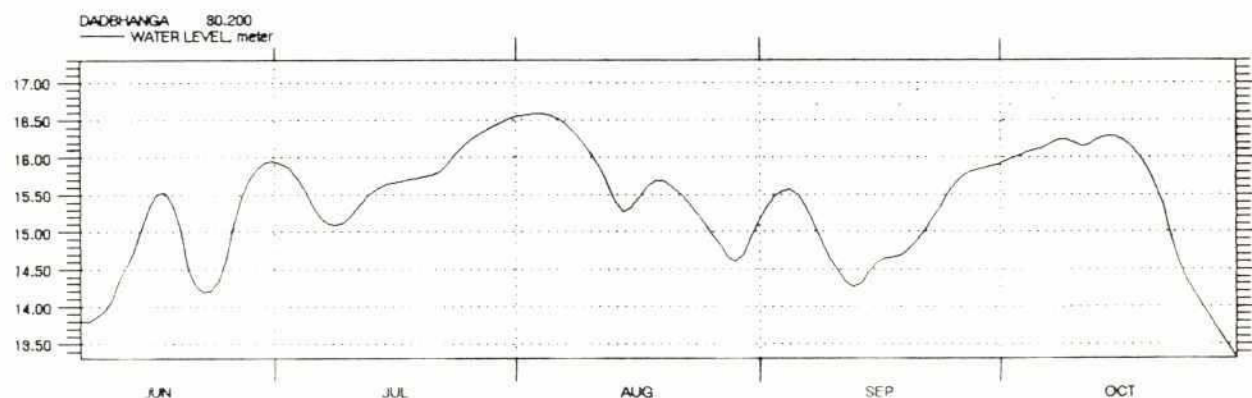
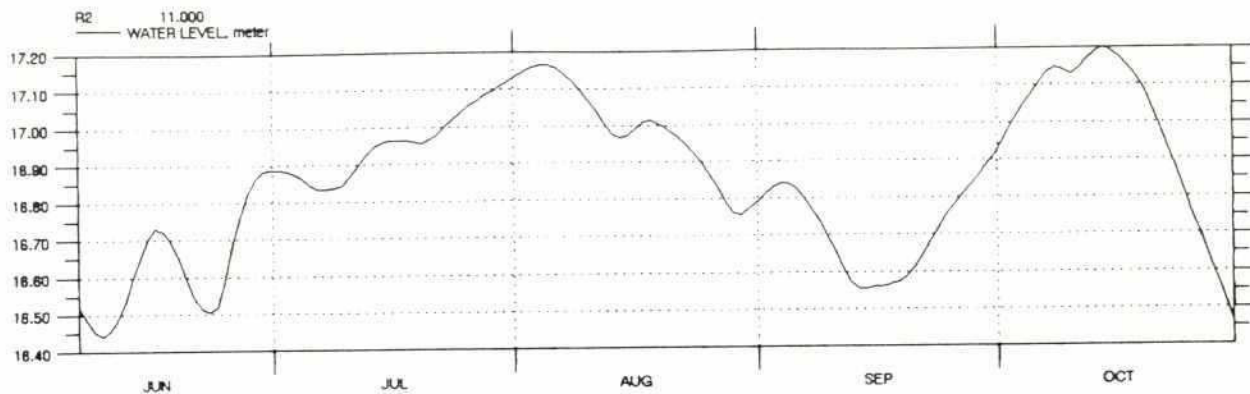
SWMC		WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1989	
DATA FILE : JPPWO.RDF RESULT FILE : 89JPWO.RRF		BOUNDARY FILE : JPWO89.BSF CALCULATED : 11 - OCT - 1992, 09:06	
		MIKE 11 Dwg no.:	



SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1989	
	DATA FILE : JPPWO.RDF RESULT FILE : 89JPWO.RRF	BOUNDARY FILE : JPWO89.BSF CALCULATED : 11 - OCT - 1992, 09:05
		MIKE 11 Dwg no.:



SWMC		WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1990	
DATA FILE : JPPWO.RDF RESULT FILE : 90JPWO.RRF		BOUNDARY FILE : JPWO90.BSF CALCULATED : 11 - OCT - 1992, 11:35	
		MIKE 11	
		Dwg no.:	

**SWMC**

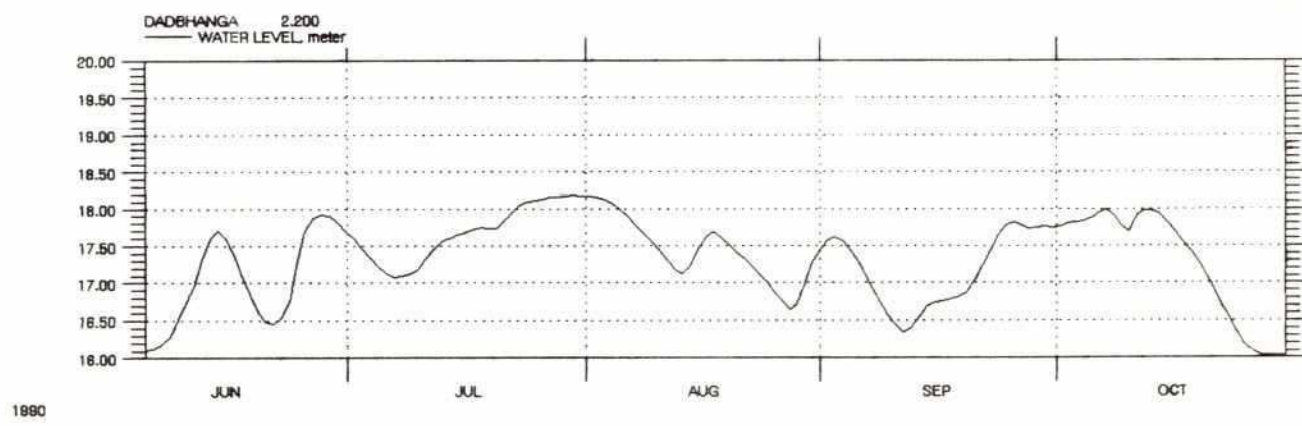
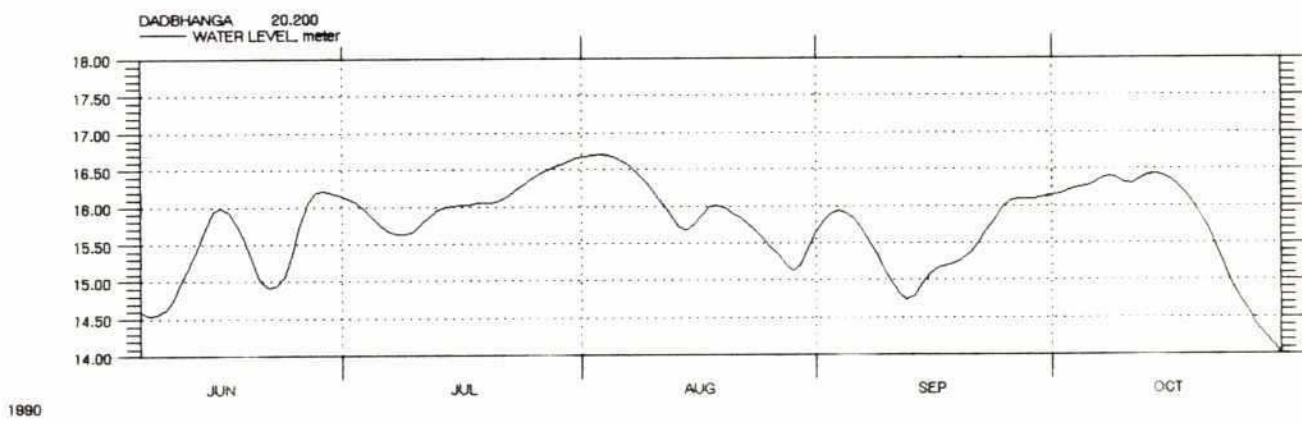
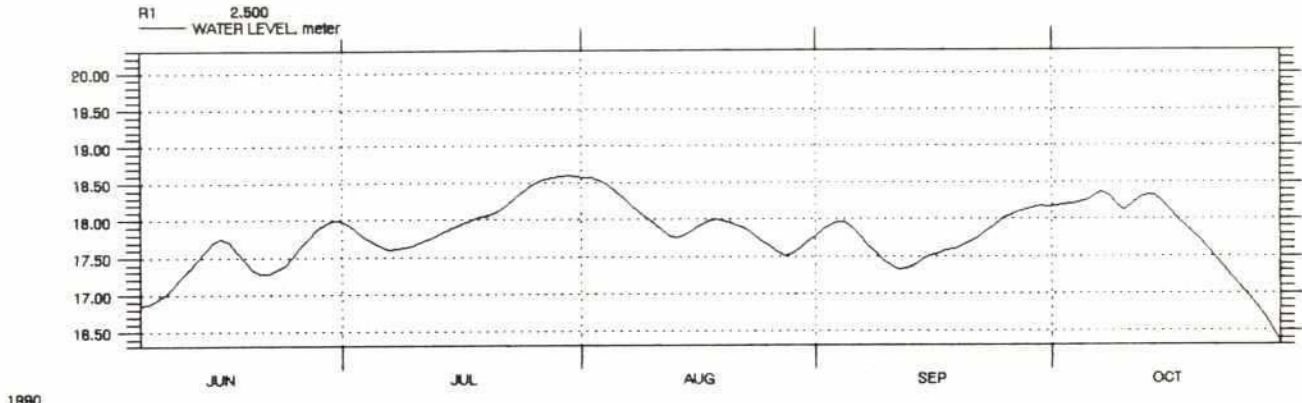
WATER LEVEL AT REPRESENTATIVE CELL POINT
WITHOUT OPTION
1990

DATA FILE : JPPWO.RDF
RESULT FILE : 90JPWO.RRF

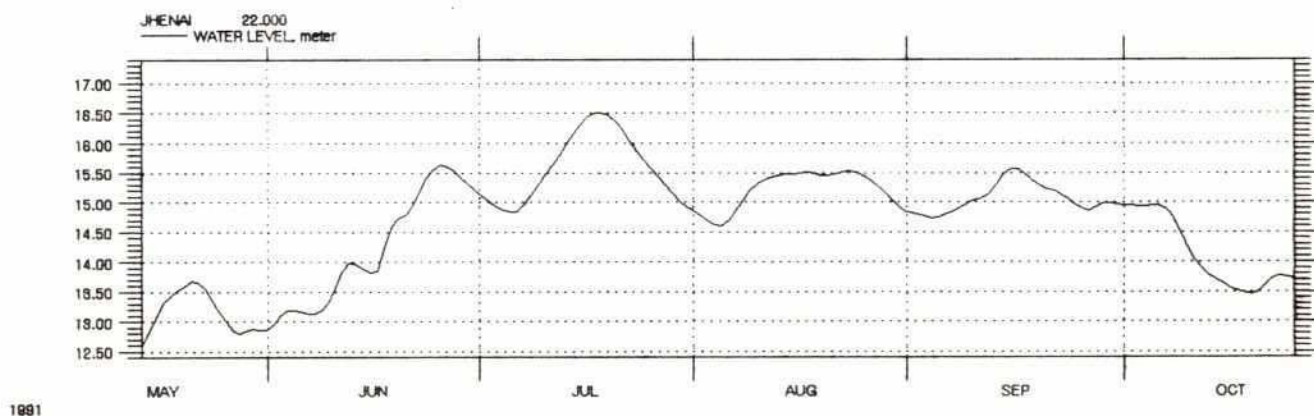
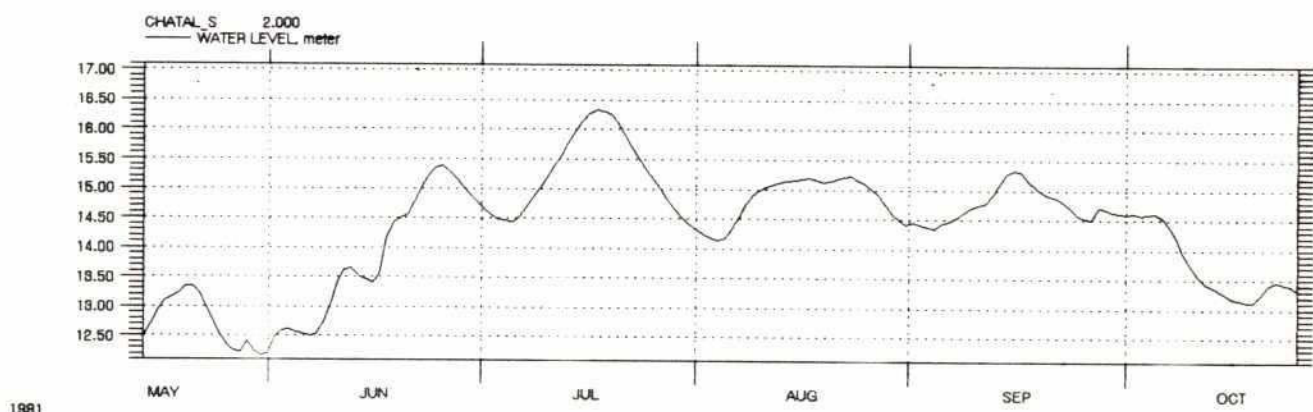
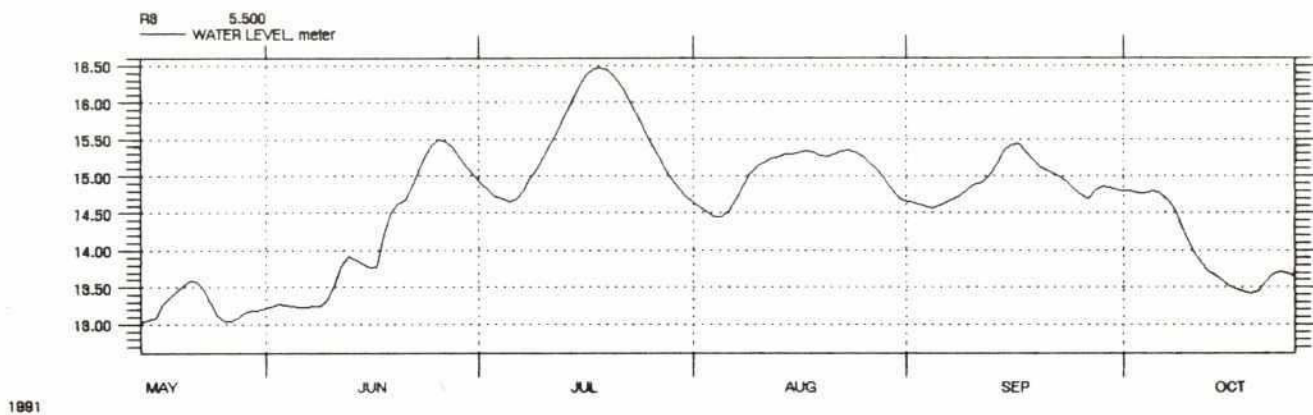
BOUNDARY FILE : JPWO90.BSF
CALCULATED : 11 - OCT - 1992, 11:35

MIKE 11

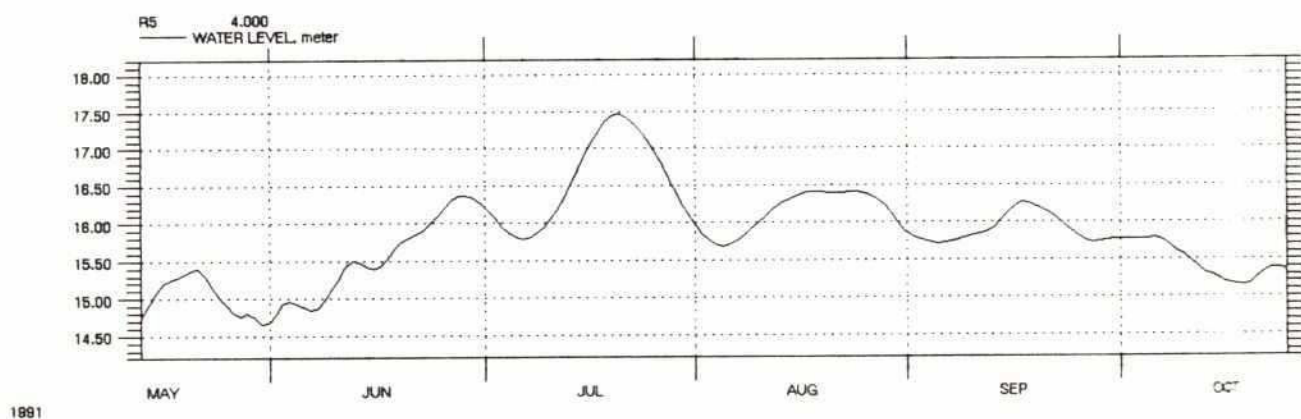
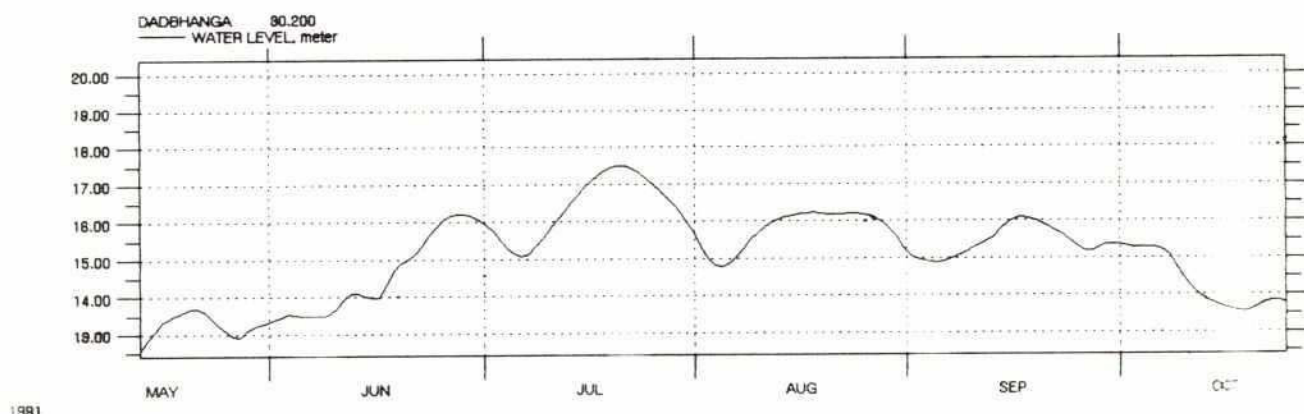
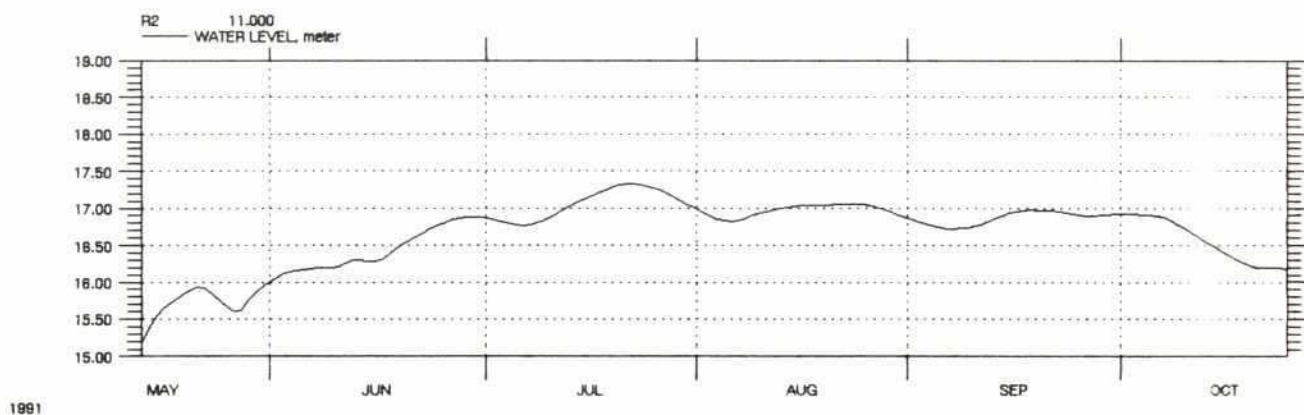
Dwg no.:



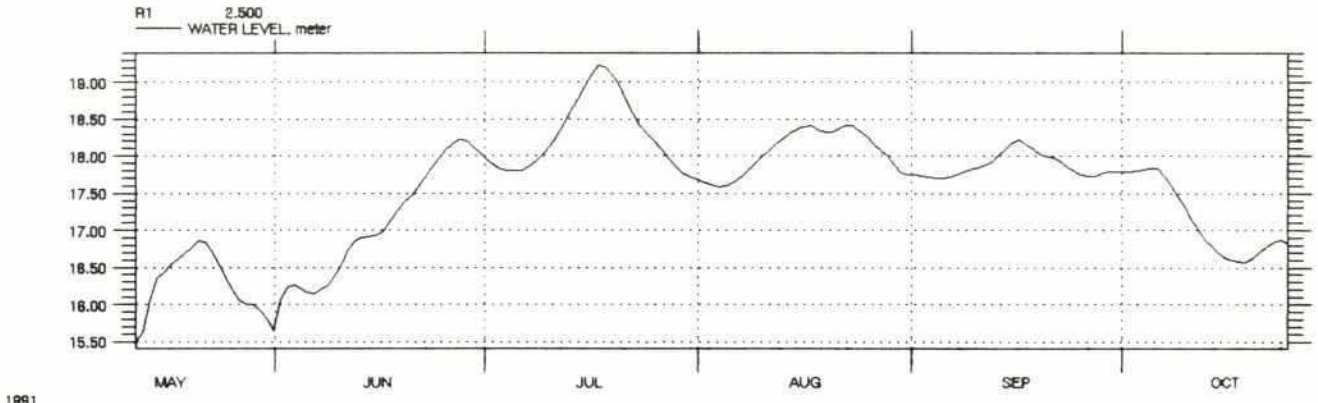
SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1990	
DATA FILE : JPPWO.RDF RESULT FILE : 90JPWO.RRF		MIKE 11 Dwg no.:
BOUNDARY FILE : JPWO90.BSF CALCULATED : 11 - OCT - 1992, 11:35		



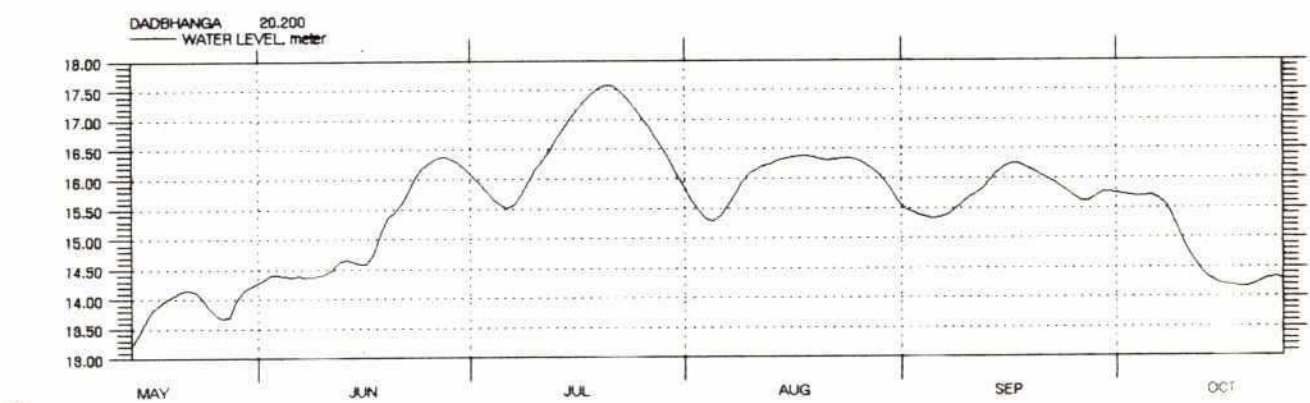
SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1991	
DATA FILE : JPPWO.RDF RESULT FILE : 91JPWO.RRF	BOUNDARY FILE : JPWO91.BSF CALCULATED : 8 - OCT - 1992, 22:13	MIKE 11 Dwg no.:



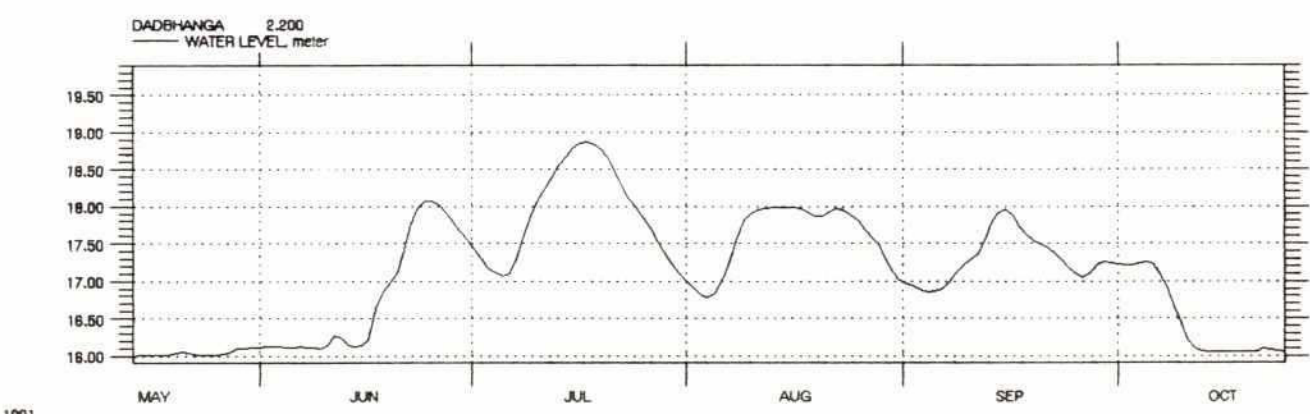
SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1991	MIKE 11
		Dwg no.:
DATA FILE : JPPWO.RDF RESULT FILE : 91JPWO.RRF	BOUNDARY FILE : JPWO91.BSF CALCULATED : 8 - OCT - 1992, 22:13	



1991

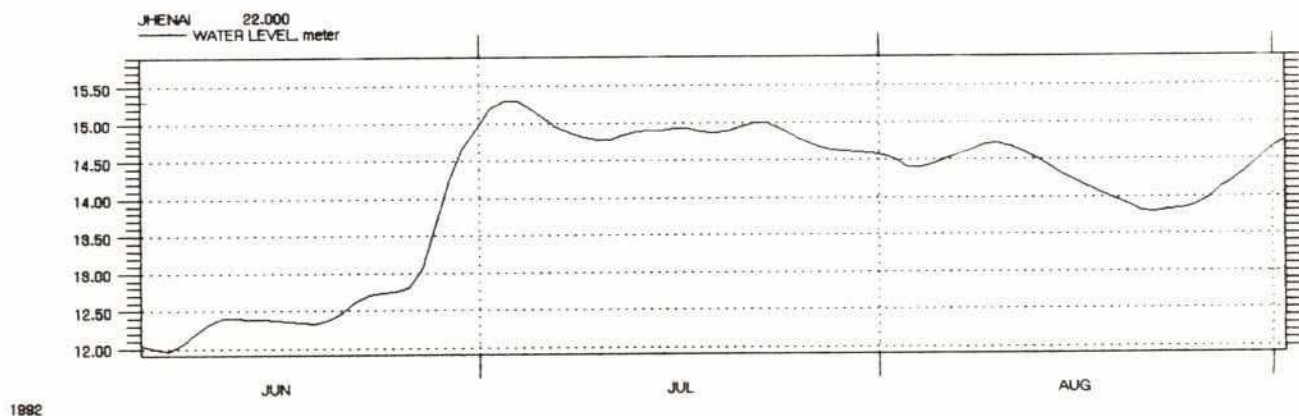
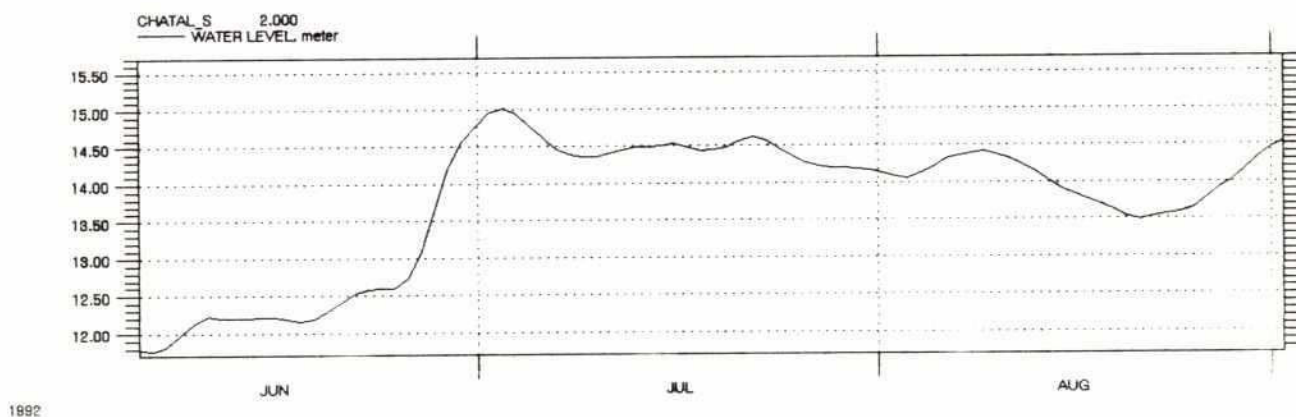
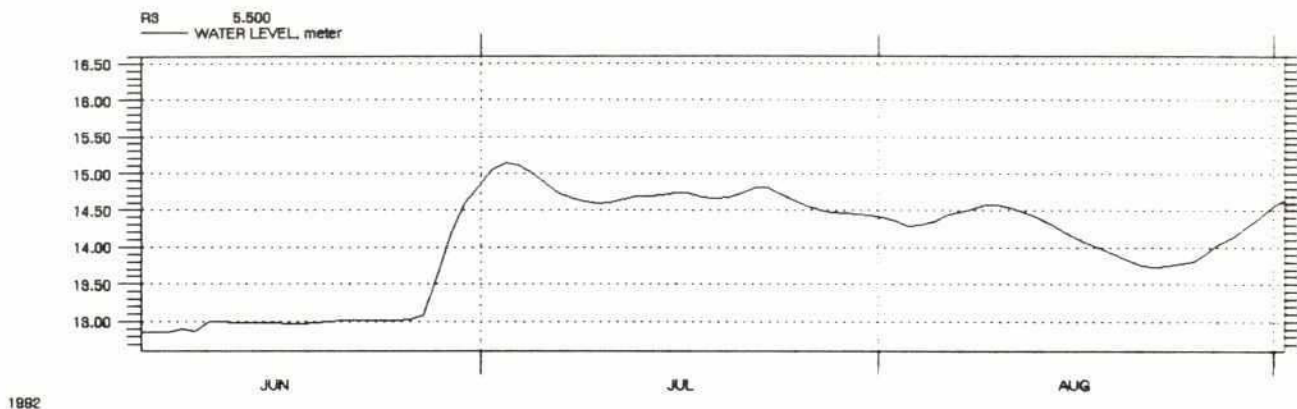


1991



1991

SWMC	WATER LEVEL AT REPRESENTATIVE CELL POINT WITHOUT OPTION 1991	MIKE 11
DATA FILE : JPPWO.RDF RESULT FILE : 91JPWO.RRF	BOUNDARY FILE : JPWO91.BSF CALCULATED : 8 - OCT - 1992, 22:13	Dwg no.:


SWMC

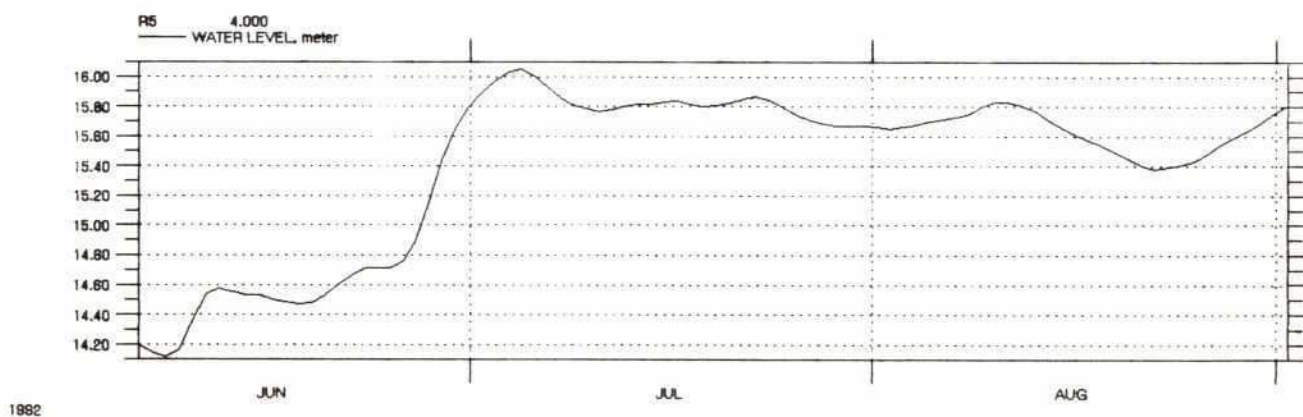
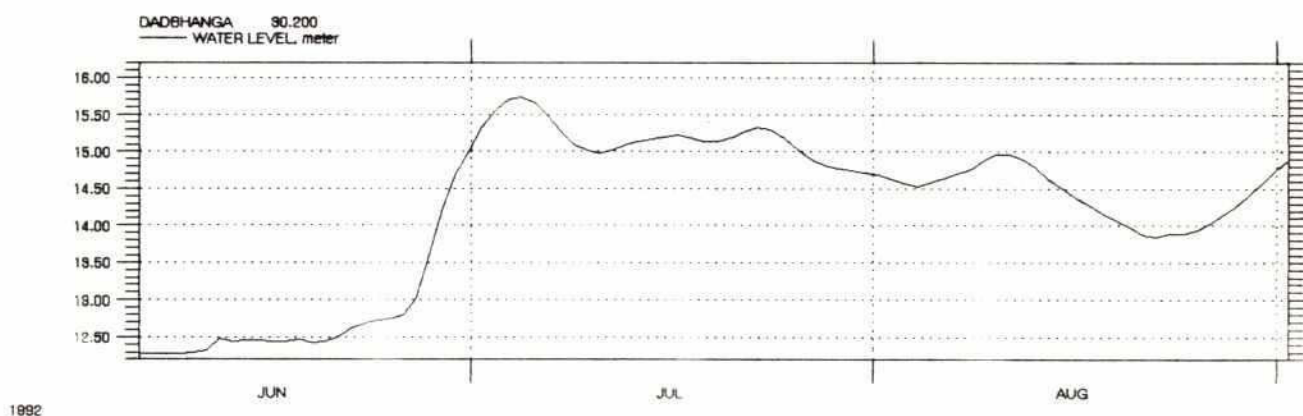
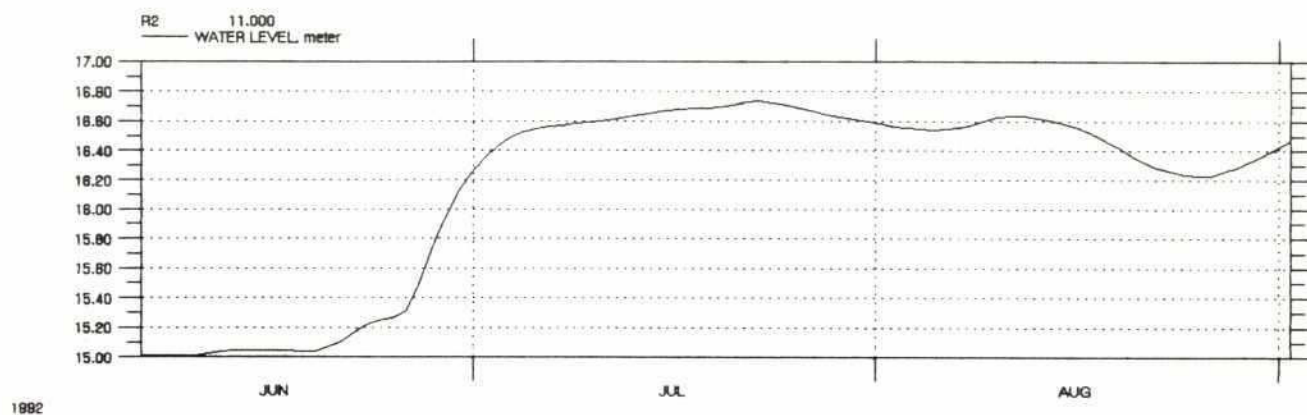
 WATER LEVEL AT REPRESENTATIVE CELL POINT
WITHOUT OPTION
1992

 DATA FILE : JPPWO.RDF
RESULT FILE : 92JPWO.RRF

 BOUNDARY FILE : JPWO92.BSF
CALCULATED : 8 - OCT - 1992, 17:59

MIKE 11

Dwg no.:


SWMC

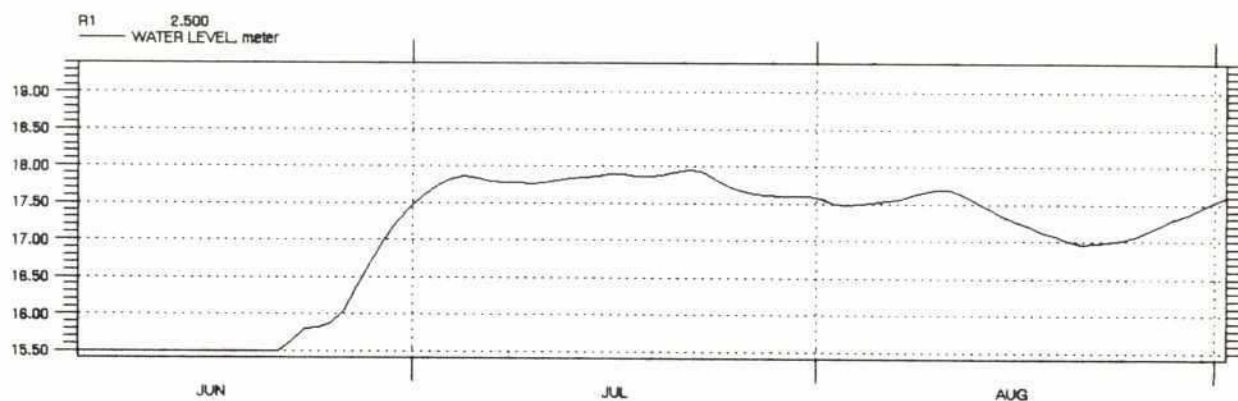
 WATER LEVEL AT REPRESENTATIVE CELL POINT
 WITHOUT OPTION
 1992

 DATA FILE : JPPWO.RDF
 RESULT FILE : 92JPWO.RRF

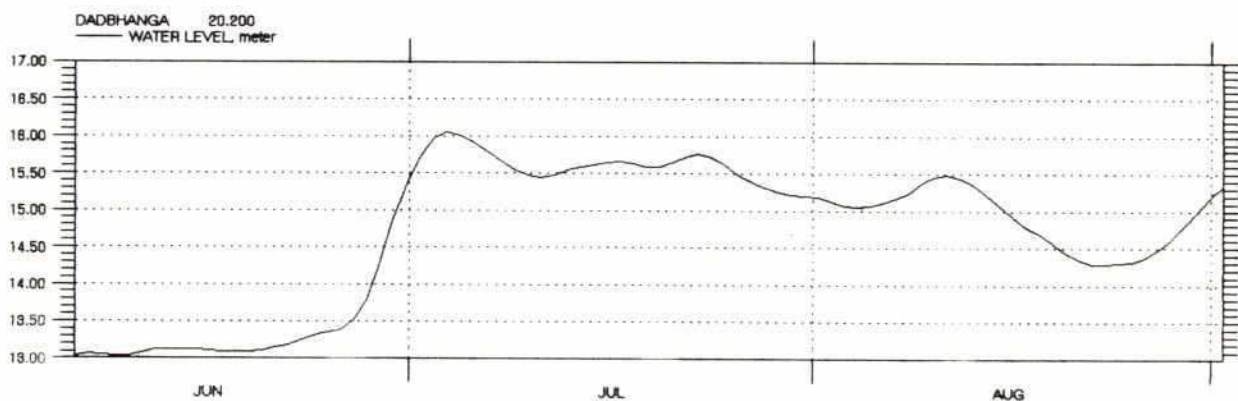
 BOUNDARY FILE : JPWO92.BSF
 CALCULATED : 8 - OCT - 1992, 17:59

MIKE 11

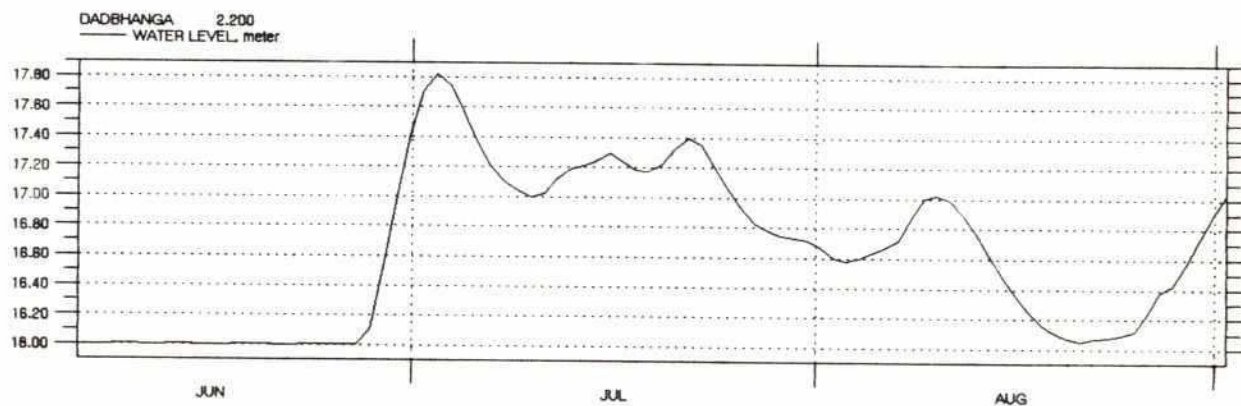
Dwg no.:



1992



1992



1992

SWMC

WATER LEVEL AT REPRESENTATIVE CELL POINT
WITHOUT OPTION
1992

DATA FILE : JPPWO.RDF
RESULT FILE : 92JPWO.RRF

BOUNDARY FILE : JPWO92.BSF
CALCULATED : 8 - OCT - 1992, 17:59

MIKE 11

Dwg no.:

ANNEX 4

APPENDIX

D3 LAND TYPE CALCULATION WITH OUT AND WITH OPTION B

ADJUSTED LAND TYPE CALCULATION FOR REFERENCE YEAR

Total Area Within The Project Embankment
Thana Wise Within The Project Embankment

ADJUSTED LAND TYPE CALCULATION FOR TOTAL AREA

1980, 1987, 1988

LAND TYPE CALCULATION FOR REFERENCE YEAR (1977)

Without Option (Total Area and Thana Wise)
With Option B (Total Area and Thana Wise)

TABLE OF FLOOD-DEPTH-AREA CHARACTERISTIC (1977)

Without Option (Total Area, Thana and Cell Wise)
With Option B (Total Area, Thana and Cell Wise)

HYDROGRAPH OF CELL REPRESENTATIVE CALCULATION POINT

With Option B (1977,1980,1987,1988,1989)

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ADJUSTED LAND TYPE CALCULATION FOR REFERENCE YEAR

Total Area Within The Project Embankment
Thana Wise Within The Project Embankment



ADJUSTED LAND CATEGORIES DISTRIBUTION FOR (W) SITUATIONS
CULTIVATED NET AREA WITHIN EMBANKMENTS (Ha)

Model reference year : 1977

*Sl	!		!	(a)	!	(b)	!	(c)	!	(d)	*	(e)	*
*No	!	Name of Thana	!	F0	!	F1	!	F2	!	F3	*	TOTAL	*

*	!		!		!		!		!		*		*
* 1	!	JAMALPUR	!	2365	!	1316	!	679	!	0	*	4360	*
*	!		!		!		!		!		*		*
* 2	!	SARISHABARI	!	1327	!	889	!	310	!	0	*	2526	*
*	!		!		!		!		!		*		*
* 3	!	MELANDAHA	!	10781	!	6424	!	774	!	0	*	17979	*
*	!		!		!		!		!		*		*
* 4	!	ISLAMPUR	!	5743	!	3669	!	396	!	0	*	9808	*
*	!		!		!		!		!		*		*
* 5	!	DEWANGONJ	!	2248	!	567	!	52	!	0	*	2867	*
*	!		!		!		!		!		*		*
* 6	!	MADERGONJ	!	4986	!	6015	!	1519	!	90	*	12610	*
*	!		!		!		!		!		*		*

*	!		!		!		!		!		*		*
*	!	TOTAL CULTIVATED	!	27450	!	18880	!	3730	!	90	*	50150	*
*	!	NET AREA	!	55%	!	38%	!	7%	!	0%	*	100%	*

ADJUSTED LAND CATEGORIES DISTRIBUTION FOR (WO) AND (W) SITUATIONS
AREA WITHIN EMBANKMENTS (Ha)

JAMALPUR

Model reference year : 1977

*	!		!	(a)	!	(b)	!	(c)	!	(d)	*	(e)	*		
*	!		!	F0	!	F1	!	F2	!	F3	*	TOTAL	*		
			-----				-----				-----				
*	!		!		!		!		!		*		*		
*	W	!	1) Gross/net coef.	!	50%	!	0%	!	25%	!	25%	*	100%	*	
*	I	!		!		!		!		!		*		*	
*	T	!		!		!		!		!		*		*	
*	H	!	2) Reported net cultiv.	!	1374	!	1184	!	1800	!	0	*	4358	*	
*	O	!	area	!	32%	!	27%	!	41%	!	0%	*	100%	*	
*	U	!		!		!		!		!		*		*	
*	T	!	3) Adjusted gross area	!	3114	!	1184	!	2670	!	870	*	7837	*	
*	!		!	40%	!	15%	!	34%	!	11%	*	100%	*		
			-----				-----				-----				
*	P	!	4) (Gross - Net) area	!	1740	!	0	!	870	!	870	*	3479	*	
			-----				-----				-----				
*	I	!		!		!		!		!		*		*	
*	O	!	5) Model calc. gross	!	4123	!	1103	!	1272	!	1338	*	7836	*	
*	N	!	area	!	53%	!	14%	!	16%	!	17%	*	100%	*	
			-----				-----				-----				
*	!		!		!		!		!			*		*	
*	!		!	6) Model calc. net	!	2384	!	1103	!	402	!	468	*	4357	*
*	!		!	area	!	55%	!	25%	!	9%	!	11%	*	100%	*

*	!		!		!		!		!			*		*	
*	!		!	7) Model calc. gross	!	4992	!	972	!	990	!	884	*	7838	*
*	O	!	area	!	64%	!	12%	!	13%	!	11%	*	100%	*	
			-----				-----				-----				
*	P	!		!		!		!		!		*		*	
*	T	!	8) Model calc. net	!	3253	!	972	!	120	!	14	*	4359	*	
*	I	!	area	!	75%	!	22%	!	3%	!	0%	*	100%	*	
*	O	!		!		!		!		!		*		*	
			-----				-----				-----				
*	N	!		!		!		!		!		*		*	
			-----				-----				-----				
*	!		!		!		!		!			*		*	
*	B	!	9) Correct. cultivated	!	2365	!	1316	!	679	!	0	*	4359	*	
*	!		net area	!	54%	!	30%	!	16%	!	0%	*	100%	*	
			-----				-----				-----				
*	!		!		!		!		!			*		*	

- 1) This coefficient is applicated on the difference between total gross and net area (e4)
- 2) Reported data from agriculture
- 3) (3) = (2) + (4)
- 4) (4) = (e4) x (1)
- 5) Reference model calculation
- 6) (6) = (5) - (4)
- 7) Option model calculation
- 8) (8) = (7) - (4)
- 9) Correction of the areas to be homogenous with the reported net agricul. area
(9) = (8) / (6) x (2), then proportionnal ajustement on the total net area

See text for comments on applied methodology.

ADJUSTED LAND CATEGORIES DISTRIBUTION FOR (WO) AND (W) SITUATIONS
AREA WITHIN EMBANKMENTS (Ha)
SHARISABARI

Model reference year : 1977

		(a)	(b)	(c)	(d)	e)	
		F0	F1	F2	F3	TOTAL	
W	1) Gross/net coef.	50%	0%	25%	25%	100%	
I							
T							
H	2) Reported net cultiv.	1081	963	482	0	2526	
O	area	43%	38%	19%	0%	100%	
U							
T	3) Adjusted gross area	1345	963	614	132	3054	
O		44%	32%	20%	4%	100%	
P	4) (Gross - Net) area	264	0	132	132	528	
T							
I							
O	5) Model calc. gross	1341	728	757	227	3053	
N	area	44%	24%	25%	7%	100%	
	6) Model calc. net	1077	728	625	95	2525	
	area	43%	29%	25%	4%	100%	
	7) Model calc. gross	1648	703	553	150	3054	
O	area	54%	23%	18%	5%	100%	
P							
T	8) Model calc. net	1384	703	421	18	2526	
I	area	55%	28%	17%	1%	100%	
O							
N							
B	9) Correct. cultivated	1327	689	310	0	2526	
	net area	53%	35%	12%	0%	100%	

- 1) This coefficient is applicated on the difference between total gross and net area (e4)
- 2) Reported data from agriculture
- 3) (3) = (2) + (4)
- 4) (4) = (e4) x (1)
- 5) Reference model calculation
- 6) (6) = (5) - (4)
- 7) Option model calculation
- 8) (8) = (7) - (4)
- 9) Correction of the areas to be homogenous with the reported net agricul. area
(9) = (8) / (6) x (2), then proportionnal ajustement on the total net area

See text for comments on applied methodology.

ADJUSTED LAND CATEGORIES DISTRIBUTION FOR (WO) AND (W) SITUATIONS
AREA WITHIN EMBANKMENTS (Ha)
MELANDAHA

Model reference year : 1977

		(a)	(b)	(c)	(d)	(e)
		F0	F1	F2	F3	TOTAL
W	1) Gross/net coef.	50%	0%	25%	25%	100%
I						
T						
H	2) Reported net cultiv. area	5264	8810	2796	1109	17979
O		29%	49%	16%	6%	100%
U						
T	3) Adjusted gross area	7935	8810	4131	2444	23320
O		34%	38%	18%	10%	100%
P	4) (Gross - Net) area	2671	0	1335	1335	5341
T						
I						
O	5) Model calc. gross area	9030	4465	5515	4309	23319
N		39%	19%	24%	18%	100%
	6) Model calc. net area	6360	4465	4180	2974	17979
		35%	25%	23%	17%	100%
	7) Model calc. gross area	16100	3357	2530	1333	23320
O		69%	14%	11%	6%	100%
P						
T	8) Model calc. net area	13430	3357	1193	0	17979
I		75%	19%	7%	0%	100%
O						
N						
B	9) Correct. cultivated net area	10781	6424	774	0	17979
		60%	36%	4%	0%	100%

- 1) This coefficient is applicated on the difference between total gross and net area (e4)
- 2) Reported data from agriculture
- 3) (3) = (2) + (4)
- 4) (4) = (e4) x (1)
- 5) Reference model calculation
- 6) (6) = (5) - (4)
- 7) Option model calculation
- 8) (8) = (7) - (4)
- 9) Correction of the areas to be homogenous with the reported net agricul. area
(9) = (8) / (6) x (2), then proportionnal ajustement on the total net area

See text for comments on applied methodology.

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ADJUSTED LAND CATEGORIES DISTRIBUTION FOR (WO) AND (WI) SITUATIONS
AREA WITHIN EMBANKMENTS (Ha)
ISLAMPUR

Model reference year : 1977

*	!	(a)	(b)	(c)	(d)	*	(e)
*	!	F0	F1	F2	F3	*	TOTAL

*	!					*	
*	!					*	
W	!	1) Gross/net coef.	50%	0%	25%	25%	100%
I	!						
T	!						
H	!	2) Reported net cultiv.	1353	4687	2931	237	9808
O	!	area	20%	48%	30%	2%	100%
U	!						
T	!	3) Adjusted gross area	3038	4687	3473	779	11977
	!		25%	39%	29%	7%	100%

P	!	4) (Gross - Net) area	1085	0	542	542	2169

I	!						
O	!	5) Model calc. gross	3500	2505	4048	2122	11975
N	!	area	29%	21%	34%	18%	100%
	!						
	!	6) Model calc. net	2216	3505	3506	1580	9808
	!	area	23%	26%	36%	16%	100%

	!						
	!	7) Model calc. gross	3224	2149	1520	84	11977
O	!	area	69%	18%	13%	1%	100%
P	!						
T	!	8) Model calc. net	7140	2149	520	0	9808
I	!	area	73%	22%	5%	0%	100%
O	!						

	!						
B	!	9) Correct. cultivated	5743	3669	396	0	9808
	!	net area	59%	37%	4%	0%	100%

- 1) This coefficient is applicated on the difference between total gross and net area (e4)
- 2) Reported data from agriculture
- 3) (3) = (2) + (4)
- 4) (4) = (e4) x (1)
- 5) Reference model calculation
- 6) (6) = (5) - (4)
- 7) Option model calculation
- 8) (8) = (7) - (4)
- 9) Correction of the areas to be homogenous with the reported net agricul. area
(9) = (8) / (6) x (2), then proportionnal ajustement on the total net area

See text for comments on applied methodology.

ADJUSTED LAND CATEGORIES DISTRIBUTION FOR (WO) AND (W) SITUATIONS
AREA WITHIN EMBANKMENTS (Ha)
DEWANGANJ

Model reference year : 1977

*	!		(a)	!	(b)	!	(c)	!	(d)	*	e)	*
*	!		F0	!	F1	!	F2	!	F3	*	TOTAL	*
			-----		-----		-----				-----	
*	!			!		!		!		*		*
*	W	!1) Gross/net coef.	50%	!	0%	!	25%	!	25%	*	100%	*
*	I	!		!		!		!		*		*
*	T	!		!		!		!		*		*
*	H	!2) Reported net cultiv.	1149	!	655	!	1008	!	55	*	2867	*
*	O	!area	40%	!	23%	!	35%	!	2%	*	100%	*
*	U	!		!		!		!		*		*
*	T	!3) Adjusted gross area	1428	!	655	!	1148	!	195	*	3425	*
*		!	42%	!	19%	!	34%	!	6%	*	100%	*
			-----		-----		-----				-----	
*	P	!4) (Gross - Net) area	279	!	0	!	140	!	140	*	558	*
			-----		-----		-----				-----	
*	I	!		!		!		!		*		*
*	O	!5) Model calc. gross	1521	!	679	!	909	!	316	*	3425	*
*	N	!area	44%	!	20%	!	27%	!	9%	*	100%	*
*		!		!		!		!		*		*
*		!6) Model calc. net	1242	!	679	!	770	!	177	*	2867	*
*		!area	43%	!	24%	!	27%	!	6%	*	100%	*

			-----		-----		-----				-----	
*		!		!		!		!		*		*
*		!7) Model calc. gross	2558	!	551	!	289	!	27	*	3425	*
*	O	!area	75%	!	16%	!	8%	!	1%	*	100%	*
*	P	!		!		!		!		*		*
*	T	!8) Model calc. net	2279	!	551	!	37	!	0	*	2867	*
*	I	!area	79%	!	19%	!	1%	!	0%	*	100%	*
*	O	!		!		!		!		*		*
			-----		-----		-----				-----	
*		!		!		!		!		*		*
*	B	!9) Correct. cultivated	2248	!	567	!	52	!	0	*	2867	*
*		!net area	78%	!	20%	!	2%	!	0%	*	100%	*
			-----		-----		-----				-----	
*		!		!		!		!		*		*

- 1) This coefficient is applicated on the difference between total gross and net area (e4)
- 2) Reported data from agriculture
- 3) (3) = (2) + (4)
- 4) (4) = (e4) x (1)
- 5) Reference model calculation
- 6) (6) = (5) - (4)
- 7) Option model calculation
- 8) (8) = (7) - (4)
- 9) Correction of the areas to be homogenous with the reported net agricul. area
(9) = (8) / (6) x (2), then proportionnal ajustement on the total net area

See text for comments on applied methodology.

ADJUSTED LAND CATEGORIES DISTRIBUTION FOR (W) AND (N) SITUATIONS
AREA WITHIN EMBANKMENTS (Ha)
MADERGANJ

Model reference year : 1977

*	!	(a)	(b)	(c)	(d)	(e)
*	!	F0	F1	F2	F3	TOTAL

*	!					
*	W !1) Gross/net coef.	50%	0%	25%	25%	100%
*	I !					
*	T !					
*	H !2) Reported net cultiv.	3396	6573	2114	527	12610
*	O ! area	27%	52%	17%	4%	100%
*	U !					
*	T !3) Adjusted gross area	5187	6573	3010	1423	16192
*	!	32%	41%	19%	9%	100%

*	O !					
*	P !4) (Gross - Net) area	1791	0	896	896	3582
*	T !					

*	I !					
*	O !5) Model calc. gross	4636	4876	4989	1691	16192
*	N ! area	29%	30%	31%	10%	100%
*	!					
*	!6) Model calc. net	2845	4876	4094	796	12610
*	!	23%	39%	32%	6%	100%

*	!					
*	!7) Model calc. gross	6287	4802	4062	1041	16192
*	O ! area	39%	30%	25%	6%	100%
*	P !					
*	T !8) Model calc. net	4496	4802	3167	146	12610
*	I ! area	36%	38%	25%	1%	100%
*	O !					

*	N !					
*	!					
*	B !9) Correct. cultivated	4986	6016	1519	90	12610
*	!	40%	48%	12%	1%	100%
*	!					

- 1) This coefficient is applicated on the difference between total gross and net area (e4)
- 2) Reported data from agriculture
- 3) (3) = (2) + (4)
- 4) (4) = (e4) x (1)
- 5) Reference model calculation
- 6) (6) = (5) - (4)
- 7) Option model calculation
- 8) (8) = (7) - (4)
- 9) Correction of the areas to be homogenous with the reported net agricul. area
(9) = (8) / (6) x (2), then proportionnal adjustement on the total net area

See text for comments on applied methodology.

ADJUSTED LAND TYPE CALCULATION FOR TOTAL AREA

1980, 1987, 1988

AJUSTED LAND CATEGORIES DISTRIBUTION FOR (WO) AND (W) SITUATIONS
AREA WITHIN EMBANKMENTS (Ha)

Max. fld. durat.: 10 days Year : 1980

	(a)	(b)	(c)	(d)	(e)
	F0	F1	F2	F3	TOTAL
* W !1) Gross/net coef.	50%	0%	25%	25%	100%
* I !					
* T !					
* H !2) Reported net cultiv.	14219	22874	11132	1928	50153
* O ! area	28%	46%	22%	4%	100%
* U !					
* T !3) Adjusted gross area	22045	22874	15045	5841	65805
* !	34%	35%	23%	9%	100%
* O !					
* P !4) (Gross - Net) area	7826	0	3913	3913	15652
* T !-----					
* I !					
* O !5) Model calc. gross	15709	13729	20533	15834	65805
* N ! area	24%	21%	31%	24%	100%
* !					
* !6) Model calc. net	7883	13729	15620	11921	50153
* ! area	16%	27%	33%	24%	100%

* !					
* !7) Model calc. gross	30511	13341	14651	7301	65804
* O ! area	46%	20%	22%	11%	100%
* P !					
* T !8) Model calc. net	22685	13341	10738	3388	50152
* I ! area	45%	27%	21%	7%	100%
* O !					
* N !-----					
* !					
* B !9) Correct. cultivated	28950	15726	5089	388	50152
* ! net area	58%	31%	10%	1%	100%
* !					

- 1) This coefficient is applicated on the difference between total gross and net area (e4)
- 2) Reported data from agriculture
- 3) $(3) = (2) + (4)$
- 4) $(4) = (e4) \times (1)$
- 5) Reference model calculation
- 6) $(6) = (5) - (4)$
- 7) Option model calculation
- 8) $(8) = (7) - (4)$
- 9) Correction of the areas to be homogenous with the reported net agricul. area
 $(9) = (8) / (6) \times (2)$, then proportionnal ajustement on the total net area

See text for comments on applied methodology.

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MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1980 - AREA WITHIN EMBANKMENTS (FAP-25)

Simulation from 15-05-1980 to 12-10-1980 / Max. fld durat. : 10 days

```

*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      !      !      !      !      !      *
* C1 * 17.38 * 16.73 * 901 ! 2065 ! 2801 ! 1680 ! 7447 *
*      *      *      * (12%) ! (28%) ! (38%) ! (23%) ! (100%) *
* C2 * 17.28 * 16.54 * 961 ! 772 ! 2142 ! 1570 ! 5446 *
*      *      *      * (18%) ! (14%) ! (39%) ! (29%) ! (100%) *
* C3 * 17.37 * 16.67 * 5511 ! 3344 ! 3842 ! 4396 ! 17093 *
*      *      *      * (32%) ! (20%) ! (22%) ! (26%) ! (100%) *
* C4 * 18.17 * 17.70 * 653 ! 2053 ! 2658 ! 500 ! 5865 *
*      *      *      * (11%) ! (35%) ! (45%) ! (9%) ! (100%) *
* C5 * 18.33 * 17.83 * 401 ! 696 ! 1291 ! 1781 ! 4169 *
*      *      *      * (10%) ! (17%) ! (31%) ! (43%) ! (100%) *
* C6 * 18.09 * 17.72 * 1030 ! 884 ! 1072 ! 645 ! 3631 *
*      *      *      * (28%) ! (24%) ! (30%) ! (18%) ! (100%) *
* C7 * 19.70 * 19.25 * 0 ! 98 ! 1226 ! 2216 ! 3539 *
*      *      *      * (0%) ! (3%) ! (35%) ! (63%) ! (100%) *
* C8 * 18.40 * 17.90 * 3133 ! 2345 ! 3532 ! 2224 ! 11233 *
*      *      *      * (28%) ! (21%) ! (31%) ! (20%) ! (100%) *
* C9 * 19.29 * 18.88 * 3117 ! 1472 ! 1969 ! 824 ! 7382 *
*      *      *      * (42%) ! (20%) ! (27%) ! (11%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 15709 ! 13729 ! 20533 ! 15834 ! 65805 *
*      *      *      * (24%) ! (21%) ! (31%) ! (24%) ! (100%) *
*****

```

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : OPTION B
- COMMENT : 1980 - AREA WITHIN EMBANKMENTS
Structures opened from 01-06-1980 to 30-06-1980

Simulation from 15-05-1980 to 12-10-1980 / Max. fld durat. : 10 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
*   C1 * 16.66 * 16.41 * 1898 ! 2226 ! 2230 ! 1093 ! 7447 *
*      *      *      *      * (25%) ! (30%) ! (30%) ! (15%) ! (100%) *
*   C2 * 16.65 * 16.41 * 1064 ! 929 ! 2124 ! 1329 ! 5446 *
*      *      *      *      * (20%) ! (17%) ! (39%) ! (24%) ! (100%) *
*   C3 * 16.66 * 16.41 * 7039 ! 3041 ! 3447 ! 3566 ! 17093 *
*      *      *      *      * (41%) ! (18%) ! (20%) ! (21%) ! (100%) *
*   C4 * 17.64 * 17.61 * 879 ! 2231 ! 2369 ! 386 ! 5865 *
*      *      *      *      * (15%) ! (38%) ! (40%) ! (7%) ! (100%) *
*   C5 * 16.77 * 16.58 * 1966 ! 1034 ! 1089 ! 81 ! 4169 *
*      *      *      *      * (47%) ! (25%) ! (26%) ! (2%) ! (100%) *
*   C6 * 16.80 * 16.65 * 2497 ! 648 ! 426 ! 60 ! 3631 *
*      *      *      *      * (69%) ! (18%) ! (12%) ! (2%) ! (100%) *
*   C7 * 18.39 * 18.34 * 353 ! 993 ! 1647 ! 546 ! 3539 *
*      *      *      *      * (10%) ! (28%) ! (47%) ! (15%) ! (100%) *
*   C8 * 16.80 * 16.62 * 8330 ! 1659 ! 1088 ! 156 ! 11233 *
*      *      *      *      * (74%) ! (15%) ! (10%) ! (1%) ! (100%) *
*   C9 * 17.47 * 17.44 * 6485 ! 580 ! 231 ! 85 ! 7382 *
*      *      *      *      * (88%) ! (8%) ! (3%) ! (1%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 30511 ! 13341 ! 14651 ! 7301 ! 65805 *
*      *      *      *      * (46%) ! (20%) ! (22%) ! (11%) ! (100%) *
*****
```

ADJUSTED LAND CATEGORIES DISTRIBUTION FOR (WO) AND (W) SITUATIONS
AREA WITHIN EMBANKMENTS (Ha)

Max. fld. durat.: 3 days Year : 1987

		(a)	(b)	(c)	(d)	(e)
		F0	F1	F2	F3	TOTAL
W	!1) Gross/net coef.	50%	0%	25%	25%	100%
I						
T						
H	!2) Reported net cultiv.	14219	22874	11132	1928	50153
O	area	28%	46%	22%	4%	100%
U						
T	!3) Adjusted gross area	22045	22874	15045	5841	65805
		34%	35%	23%	9%	100%
P	!4) (Gross - Net) area	7826	0	3913	3913	15652
I						
O	!5) Model calc. gross	19807	14434	19173	12391	65805
N	area	30%	22%	29%	19%	100%
	!6) Model calc. net	11981	14434	15260	8478	50153
	area	24%	29%	30%	17%	100%
	!7) Model calc. gross	33765	13354	13347	5339	65805
O	area	51%	20%	20%	8%	100%
P						
T	!8) Model calc. net	25939	13354	9434	1426	50153
I	area	52%	27%	19%	3%	100%
O						
N						
B	!9) Correct. cultivated	26100	17943	5835	275	50153
	net area	52%	36%	12%	1%	100%

- 1) This coefficient is applicated on the difference between total gross and net area (e4)
- 2) Reported data from agriculture
- 3) $(3) = (2) + (4)$
- 4) $(4) = (e4) \times (1)$
- 5) Reference model calculation
- 6) $(6) = (5) - (4)$
- 7) Option model calculation
- 8) $(8) = (7) - (4)$
- 9) Correction of the areas to be homogenous with the reported net agricul. area
 $(9) = (8) / (6) \times (2)$, then proportionnal ajustement on the total net area

See text for comments on applied methodology.

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MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1987 - AREA WITHIN EMBANKMENTS (FAP. 25)

Simulation from 15-06-1987 to 12-11-1987 / Max. fld durat. : 3 days

```

*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
* C1 * 16.56 * 16.52 * 1481 ! 2261 ! 2433 ! 1273 ! 7447 *
*      *      *      *      * (20%) ! (30%) ! (33%) ! (17%) ! (100%) *
* C2 * 16.43 * 16.37 * 1096 ! 978 ! 2118 ! 1255 ! 5446 *
*      *      *      *      * (20%) ! (18%) ! (39%) ! (23%) ! (100%) *
* C3 * 16.57 * 16.54 * 6269 ! 3215 ! 3666 ! 3942 ! 17093 *
*      *      *      *      * (37%) ! (19%) ! (21%) ! (23%) ! (100%) *
* C4 * 17.59 * 17.58 * 954 ! 2290 ! 2273 ! 348 ! 5865 *
*      *      *      *      * (16%) ! (39%) ! (39%) ! (6%) ! (100%) *
* C5 * 17.50 * 17.48 * 764 ! 796 ! 1439 ! 1169 ! 4169 *
*      *      *      *      * (18%) ! (19%) ! (35%) ! (28%) ! (100%) *
* C6 * 17.40 * 17.39 * 1556 ! 743 ! 963 ! 368 ! 3631 *
*      *      *      *      * (43%) ! (20%) ! (27%) ! (10%) ! (100%) *
* C7 * 19.19 * 19.14 * 0 ! 176 ! 1395 ! 1968 ! 3539 *
*      *      *      *      * (0%) ! (5%) ! (39%) ! (56%) ! (100%) *
* C8 * 17.57 * 17.54 * 4472 ! 2493 ! 2976 ! 1293 ! 11233 *
*      *      *      *      * (40%) ! (22%) ! (26%) ! (12%) ! (100%) *
* C9 * 18.86 * 18.84 * 3215 ! 1483 ! 1909 ! 775 ! 7382 *
*      *      *      *      * (44%) ! (20%) ! (26%) ! (10%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 19807 ! 14434 ! 19173 ! 12391 ! 65805 *
*      *      *      *      * (30%) ! (22%) ! (29%) ! (19%) ! (100%) *
*****

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MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : OPTION B
- COMMENT : 1987 - AREA WITHIN EMBANKMENTS (FAP-2S)
Structures opened from 01-06-1987 to 30-06-1987

Simulation from 15-05-1987 to 12-10-1987 / Max. fld durat. : 3 days

```

*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
*   C1 * 16.18 * 16.13 * 2966 ! 2051 ! 1740 ! 690 ! 7447 *
*      *      *      *      * (40%) ! (28%) ! (23%) ! (9%) ! (100%) *
*   C2 * 16.16 * 16.09 * 1475 ! 1243 ! 1918 ! 810 ! 5446 *
*      *      *      *      * (27%) ! (23%) ! (35%) ! (15%) ! (100%) *
*   C3 * 16.17 * 16.10 * 8703 ! 2713 ! 2973 ! 2703 ! 17093 *
*      *      *      *      * (51%) ! (16%) ! (17%) ! (16%) ! (100%) *
*   C4 * 17.65 * 17.64 * 804 ! 2171 ! 2466 ! 424 ! 5865 *
*      *      *      *      * (14%) ! (37%) ! (42%) ! (7%) ! (100%) *
*   C5 * 16.50 * 16.49 * 2118 ! 1048 ! 944 ! 60 ! 4169 *
*      *      *      *      * (51%) ! (25%) ! (23%) ! (1%) ! (100%) *
*   C6 * 16.53 * 16.53 * 2647 ! 589 ! 353 ! 41 ! 3631 *
*      *      *      *      * (73%) ! (16%) ! (10%) ! (1%) ! (100%) *
*   C7 * 18.20 * 18.20 * 502 ! 1160 ! 1502 ! 375 ! 3539 *
*      *      *      *      * (14%) ! (33%) ! (42%) ! (11%) ! (100%) *
*   C8 * 16.58 * 16.58 * 8475 ! 1594 ! 1033 ! 131 ! 11233 *
*      *      *      *      * (75%) ! (14%) ! (9%) ! (1%) ! (100%) *
*   C9 * 17.75 * 17.70 * 6074 ! 784 ! 418 ! 105 ! 7382 *
*      *      *      *      * (82%) ! (11%) ! (6%) ! (1%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 33765 ! 13354 ! 13347 ! 5339 ! 65805 *
*      *      *      *      * (51%) ! (20%) ! (20%) ! (8%) ! (100%) *
*****

```

ADJUSTED LAND CATEGORIES DISTRIBUTION FOR (W) AND (N) SITUATIONS
AREA WITHIN EMBANKMENTS (Ha)

Max. Fld. durat.: 10 days Year : 1988

*	!	!	(a)	!	(b)	!	(c)	!	(d)	*	(e)	*
*	!	!	F0	!	F1	!	F2	!	F3	*	TOTAL	*
*****			-----						*****			
*	!	!	!	!	!	!	!	!	!	*	!	*
* W	!	!	1) Gross/net coef.	!	50%	!	0%	!	25%	!	25%	100%
* I	!	!	!	!	!	!	!	!	!	!	!	!
* T	!	!	!	!	!	!	!	!	!	!	!	!
* H	!	!	2) Reported net cultiv.	!	14219	!	22874	!	11132	!	1928	50153
* O	!	!	area	!	28%	!	46%	!	22%	!	4%	100%
* U	!	!	!	!	!	!	!	!	!	!	!	!
* T	!	!	3) Adjusted gross area	!	22045	!	22874	!	15045	!	5841	65805
*	!	!	!	!	34%	!	35%	!	23%	!	9%	100%
*****			-----						*****			
* P	!	!	4) (Gross - Net) area	!	7826	!	0	!	3913	!	3913	15652
*****			-----						*****			
* I	!	!	!	!	!	!	!	!	!	!	!	!
* O	!	!	5) Model calc. gross	!	16723	!	14009	!	20717	!	14356	65805
* N	!	!	area	!	25%	!	21%	!	31%	!	22%	100%
*	!	!	!	!	!	!	!	!	!	!	!	!
*	!	!	6) Model calc. net	!	8897	!	14009	!	16804	!	10443	50153
*	!	!	area	!	18%	!	28%	!	34%	!	21%	100%

*	!	!	!	!	!	!	!	!	!	!	!	!
* !	!	!	7) Model calc. gross	!	35212	!	12879	!	12599	!	5115	65805
* O	!	!	area	!	54%	!	20%	!	19%	!	8%	100%
* P	!	!	!	!	!	!	!	!	!	!	!	!
* T	!	!	8) Model calc. net	!	27386	!	12879	!	8686	!	1202	50153
* I	!	!	area	!	55%	!	26%	!	17%	!	2%	100%
* O	!	!	!	!	!	!	!	!	!	!	!	!
*****			-----						*****			
*	!	!	!	!	!	!	!	!	!	!	!	!
* B	!	!	9) Correct. cultivated	!	31016	!	14902	!	4078	!	157	50153
*	!	!	net area	!	62%	!	30%	!	8%	!	0%	100%
*	!	!	!	!	!	!	!	!	!	!	!	!

- 1) This coefficient is applicated on the difference between total gross and net area (e4)
- 2) Reported data from agriculture
- 3) (3) = (2) + (4)
- 4) (4) = (e4) x (1)
- 5) Reference model calculation
- 6) (6) = (5) - (4)
- 7) Option model calculation
- 8) (8) = (7) - (4)
- 9) Correction of the areas to be homogenous with the reported net agricul. area
(9) = (8) / (6) x (2), then proportionnal ajustement on the total net area

See text for comments on applied methodology.

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MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1988 - AREA WITHIN EMBANKMENTS (FAP-25)

Simulation from 01-06-1988 to 29-10-1988 / Max. fld durat. : 10 days

```

*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
*   C1 * 17.64 * 16.66 * 1050 ! 2184 ! 2682 ! 1531 ! 7447 *
*      *      *      *      * (14%) ! (29%) ! (36%) ! (21%) ! (100%) *
*   C2 * 17.56 * 16.51 * 985 ! 809 ! 2138 ! 1514 ! 5446 *
*      *      *      *      * (18%) ! (15%) ! (39%) ! (28%) ! (100%) *
*   C3 * 17.64 * 16.59 * 5974 ! 3282 ! 3742 ! 4095 ! 17093 *
*      *      *      *      * (35%) ! (19%) ! (22%) ! (24%) ! (100%) *
*   C4 * 18.34 * 17.74 * 553 ! 1974 ! 2787 ! 551 ! 5865 *
*      *      *      *      * (9%) ! (34%) ! (48%) ! (9%) ! (100%) *
*   C5 * 18.51 * 17.77 * 460 ! 716 ! 1315 ! 1677 ! 4169 *
*      *      *      *      * (11%) ! (17%) ! (32%) ! (40%) ! (100%) *
*   C6 * 18.30 * 17.63 * 1180 ! 828 ! 1061 ! 561 ! 3631 *
*      *      *      *      * (33%) ! (23%) ! (29%) ! (15%) ! (100%) *
*   C7 * 19.88 * 18.94 * 12 ! 341 ! 1633 ! 1553 ! 3539 *
*      *      *      *      * (0%) ! (10%) ! (46%) ! (44%) ! (100%) *
*   C8 * 18.57 * 17.87 * 3220 ! 2385 ! 3494 ! 2135 ! 11233 *
*      *      *      *      * (29%) ! (21%) ! (31%) ! (19%) ! (100%) *
*   C9 * 19.51 * 18.81 * 3289 ! 1491 ! 1864 ! 738 ! 7382 *
*      *      *      *      * (45%) ! (20%) ! (25%) ! (10%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 16723 ! 14009 ! 20717 ! 14356 ! 65805 *
*      *      *      *      * (25%) ! (21%) ! (31%) ! (22%) ! (100%) *
*****

```


MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : OPTION B
- COMMENT : 1988 - AREA WITHIN EMBANKMENTS
Structures opened from 01-06-1988 to 30-06-1988

Simulation from 15-05-1988 to 12-10-1988 / Max. fld durat. : 10 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
* C1 * 16.37 * 16.09 * 3119 ! 2018 ! 1673 ! 637 ! 7447 *
*      *      *      *      * (42%) ! (27%) ! (22%) ! (9%) ! (100%) *
* C2 * 16.36 * 16.06 * 1521 ! 1269 ! 1890 ! 765 ! 5446 *
*      *      *      *      * (28%) ! (23%) ! (35%) ! (14%) ! (100%) *
* C3 * 16.37 * 16.07 * 8855 ! 2685 ! 2930 ! 2622 ! 17093 *
*      *      *      *      * (52%) ! (16%) ! (17%) ! (15%) ! (100%) *
* C4 * 17.61 * 17.60 * 904 ! 2250 ! 2337 ! 374 ! 5865 *
*      *      *      *      * (15%) ! (38%) ! (40%) ! (6%) ! (100%) *
* C5 * 16.54 * 16.39 * 2287 ! 1063 ! 783 ! 37 ! 4169 *
*      *      *      *      * (55%) ! (25%) ! (19%) ! (1%) ! (100%) *
* C6 * 16.58 * 16.44 * 2750 ! 545 ! 305 ! 30 ! 3631 *
*      *      *      *      * (76%) ! (15%) ! (8%) ! (1%) ! (100%) *
* C7 * 18.29 * 18.28 * 417 ! 1064 ! 1585 ! 473 ! 3539 *
*      *      *      *      * (12%) ! (30%) ! (45%) ! (13%) ! (100%) *
* C8 * 16.59 * 16.45 * 8861 ! 1410 ! 869 ! 93 ! 11233 *
*      *      *      *      * (79%) ! (13%) ! (8%) ! (1%) ! (100%) *
* C9 * 17.60 * 17.43 * 6498 ! 574 ! 226 ! 85 ! 7382 *
*      *      *      *      * (88%) ! (8%) ! (3%) ! (1%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 35212 ! 12879 ! 12599 ! 5115 ! 65805 *
*      *      *      *      * (54%) ! (20%) ! (19%) ! (8%) ! (100%) *
*****
```


LAND TYPE CALCULATION FOR REFERENCE YEAR (1977)

Without Option (Total Area and Thana Wise)
With Option B (Total Area and Thana Wise)

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

```

*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. * grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
* C1 * 16.28 * 16.15 * 2890 ! 2067 ! 1774 ! 716 ! 7447 *
*      *      *      *      * (39%) ! (28%) ! (24%) ! (10%) ! (100%) *
* C2 * 16.13 * 15.97 * 1674 ! 1344 ! 1782 ! 646 ! 5446 *
*      *      *      *      * (31%) ! (25%) ! (33%) ! (12%) ! (100%) *
* C3 * 16.36 * 16.24 * 7994 ! 2843 ! 3175 ! 3081 ! 17093 *
*      *      *      *      * (47%) ! (17%) ! (19%) ! (18%) ! (100%) *
* C4 * 17.49 * 17.44 * 1388 ! 2402 ! 1869 ! 207 ! 5865 *
*      *      *      *      * (24%) ! (41%) ! (32%) ! (4%) ! (100%) *
* C5 * 17.62 * 17.49 * 751 ! 796 ! 1434 ! 1188 ! 4169 *
*      *      *      *      * (18%) ! (19%) ! (34%) ! (28%) ! (100%) *
* C6 * 17.54 * 17.46 * 1456 ! 746 ! 1016 ! 414 ! 3631 *
*      *      *      *      * (40%) ! (21%) ! (28%) ! (11%) ! (100%) *
* C7 * 19.18 * 19.01 * 4 ! 274 ! 1581 ! 1679 ! 3539 *
*      *      *      *      * (0%) ! (8%) ! (45%) ! (47%) ! (100%) *
* C8 * 17.70 * 17.56 * 4391 ! 2492 ! 3009 ! 1341 ! 11233 *
*      *      *      *      * (39%) ! (22%) ! (27%) ! (12%) ! (100%) *
* C9 * 18.79 * 18.66 * 3646 ! 1549 ! 1611 ! 576 ! 7382 *
*      *      *      *      * (49%) ! (21%) ! (22%) ! (8%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 24193 ! 14513 ! 17251 ! 9848 ! 65805 *
*      *      *      * (37%) ! (22%) ! (26%) ! (15%) ! (100%) *
*****

```



MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1977 - SHARISABARI (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *
* Sar/C2 * 16.13 * 15.97 * 1039 ! 522 ! 531 ! 0 ! 2091 *
*      *      *      *      * (50%) ! (25%) ! (25%) ! (0%) ! (100%) *
* Sar/C3 * 16.36 * 16.24 * 302 ! 207 ! 227 ! 227 ! 963 *
*      *      *      *      * (31%) ! (21%) ! (24%) ! (24%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 1341 ! 728 ! 757 ! 227 ! 3054 *
*      *      *      * (44%) ! (24%) ! (25%) ! (7%) ! (100%) *
*****
```

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1977 - MELANDAHA (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. * grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
* * * * *
* Mel/C1 * 16.28 * 16.15 * 161 ! 145 ! 114 ! 24 ! 445 *
* * * * * (36%) ! (33%) ! (26%) ! (5%) ! (100%) *
* Mel/C3 * 16.36 * 16.24 * 3529 ! 1090 ! 1229 ! 1450 ! 7298 *
* * * * * (48%) ! (15%) ! (17%) ! (20%) ! (100%) *
* Mel/C4 * 17.49 * 17.44 * 205 ! 469 ! 276 ! 0 ! 950 *
* * * * * (22%) ! (49%) ! (29%) ! (0%) ! (100%) *
* Mel/C5 * 17.62 * 17.49 * 751 ! 795 ! 1375 ! 1138 ! 4058 *
* * * * * (19%) ! (20%) ! (34%) ! (28%) ! (100%) *
* Mel/C6 * 17.54 * 17.46 * 1456 ! 746 ! 924 ! 341 ! 3466 *
* * * * * (42%) ! (22%) ! (27%) ! (10%) ! (100%) *
* Mel/C7 * 19.18 * 19.01 * 0 ! 0 ! 42 ! 544 ! 586 *
* * * * * (0%) ! (0%) ! (7%) ! (93%) ! (100%) *
* Mel/C8 * 17.70 * 17.56 * 2929 ! 1221 ! 1555 ! 812 ! 6517 *
* * * * * (45%) ! (19%) ! (24%) ! (12%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
* * * TOTAL * 9030 ! 4465 ! 5515 ! 4309 ! 23320 *
* * * * (39%) ! (19%) ! (24%) ! (18%) ! (100%) *
*****
```


MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1977 - ISLAMPUR (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      !      !      !      !      !      *
* Isl/C4 * 17.49 * 17.44 * 107 ! 102 ! 60 ! 0 ! 268 *
*      *      *      * (40%) ! (38%) ! (22%) ! (0%) ! (100%) *
* Isl/C6 * 17.54 * 17.46 * 6 ! 2 ! 33 ! 42 ! 82 *
*      *      *      * (7%) ! (2%) ! (40%) ! (51%) ! (100%) *
* Isl/C7 * 19.18 * 19.01 * 4 ! 274 ! 1539 ! 1135 ! 2953 *
*      *      *      * (0%) ! (9%) ! (52%) ! (38%) ! (100%) *
* Isl/C8 * 17.70 * 17.56 * 1462 ! 1271 ! 1454 ! 529 ! 4716 *
*      *      *      * (31%) ! (27%) ! (31%) ! (11%) ! (100%) *
* Isl/C9 * 18.79 * 18.66 * 1721 ! 857 ! 963 ! 416 ! 3957 *
*      *      *      * (43%) ! (22%) ! (24%) ! (11%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 3300 ! 2505 ! 4048 ! 2122 ! 11976 *
*      *      *      * (28%) ! (21%) ! (34%) ! (18%) ! (100%) *
*****
```

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1977 - DEWANGANJ (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *
* Dew/C9 * 19.18 * 19.01 * 1521 ! 679 ! 909 ! 316 ! 3425 *
*      *      *      * (44%) ! (20%) ! (27%) ! (9%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 1521 ! 679 ! 909 ! 316 ! 3425 *
*      *      *      * (44%) ! (20%) ! (27%) ! (9%) ! (100%) *
*****
```

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : WITHOUT OPTION
- COMMENT : 1977 - MADARGANJ (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *
* Mad/C1 * 16.28 * 16.15 * 2727 ! 1922 ! 1660 ! 692 ! 7001 *
*      *      *      *      * (39%) ! (27%) ! (24%) ! (10%) ! (100%) *
* Mad/C2 * 16.13 * 15.97 * 635 ! 823 ! 1251 ! 646 ! 3355 *
*      *      *      *      * (19%) ! (25%) ! (37%) ! (19%) ! (100%) *
* Mad/C3 * 16.36 * 16.24 * 187 ! 297 ! 499 ! 96 ! 1078 *
*      *      *      *      * (17%) ! (28%) ! (46%) ! (9%) ! (100%) *
* Mad/C4 * 17.49 * 17.44 * 1077 ! 1831 ! 1533 ! 207 ! 4647 *
*      *      *      *      * (23%) ! (39%) ! (33%) ! (4%) ! (100%) *
* Mad/C5 * 17.62 * 17.49 * 11 ! 4 ! 47 ! 50 ! 111 *
*      *      *      *      * (10%) ! (3%) ! (42%) ! (45%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 4636 ! 4876 ! 4989 ! 1691 ! 16192 *
*      *      *      * (29%) ! (30%) ! (31%) ! (10%) ! (100%) *
*****
```

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : OPTION B
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *      *
* C1 * 15.96 * 15.81 * 4124 ! 1686 ! 1251 ! 386 ! 7447 *
*      *      *      *      * (55%) ! (23%) ! (17%) ! (5%) ! (100%) *
* C2 * 15.94 * 15.79 * 2033 ! 1483 ! 1456 ! 474 ! 5446 *
*      *      *      *      * (37%) ! (27%) ! (27%) ! (9%) ! (100%) *
* C3 * 15.95 * 15.80 * 10126 ! 2459 ! 2462 ! 2047 ! 17093 *
*      *      *      *      * (59%) ! (14%) ! (14%) ! (12%) ! (100%) *
* C4 * 17.47 * 17.41 * 1495 ! 2395 ! 1789 ! 186 ! 5865 *
*      *      *      *      * (25%) ! (41%) ! (31%) ! (3%) ! (100%) *
* C5 * 16.17 * 16.09 * 2806 ! 946 ! 413 ! 4 ! 4169 *
*      *      *      *      * (67%) ! (23%) ! (10%) ! (0%) ! (100%) *
* C6 * 16.25 * 16.19 * 3014 ! 420 ! 188 ! 9 ! 3631 *
*      *      *      *      * (83%) ! (12%) ! (5%) ! (0%) ! (100%) *
* C7 * 18.16 * 18.11 * 614 ! 1246 ! 1414 ! 265 ! 3539 *
*      *      *      *      * (17%) ! (35%) ! (40%) ! (7%) ! (100%) *
* C8 * 16.24 * 16.17 * 9623 ! 1016 ! 556 ! 38 ! 11233 *
*      *      *      *      * (86%) ! (9%) ! (5%) ! (0%) ! (100%) *
* C9 * 17.36 * 17.34 * 6607 ! 515 ! 177 ! 83 ! 7382 *
*      *      *      *      * (90%) ! (7%) ! (2%) ! (1%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 40442 ! 12166 ! 9705 ! 3492 ! 65805 *
*      *      *      *      * (61%) ! (18%) ! (15%) ! (5%) ! (100%) *
*****
```


MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : OPTION B
- COMMENT : 1977 - JAMALPUR (AREA WITHIN EMBANKMENTS)
Structures opened from 1-06-1977 to 30-06-1977

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

```

*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      !      !      !      !      !      *
* Jam/C3 * 15.95 * 15.80 * 4955 ! 940 ! 975 ! 883 ! 7754 *
*      *      *      *      ! (64%) ! (12%) ! (13%) ! (11%) ! (100%) *
* Jam/C6 * 16.25 * 16.19 * 37 ! 31 ! 14 ! 1 ! 83 *
*      *      *      *      ! (44%) ! (38%) ! (17%) ! (1%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 4992 ! 972 ! 990 ! 884 ! 7837 *
*      *      *      *      ! (64%) ! (12%) ! (13%) ! (11%) ! (100%) *
*****

```

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : OPTION B
- COMMENT : 1977 - SHARISABARI (AREA WITHIN EMBANKMENTS)
Structures opened from 1-06-1977 to 30-06-1977

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

```
*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      !      !      !      !      !      *
* Sar/C2 * 15.94 * 15.79 * 1190 ! 528 ! 373 ! 0 ! 2091 *
*      *      *      * (57%) ! (25%) ! (18%) ! (0%) ! (100%) *
* Sar/C3 * 15.95 * 15.80 * 458 ! 175 ! 180 ! 150 ! 963 *
*      *      *      * (48%) ! (18%) ! (19%) ! (16%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 1648 ! 703 ! 553 ! 150 ! 3054 *
*      *      *      * (54%) ! (23%) ! (18%) ! (5%) ! (100%) *
*****
```

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : OPTION B
- COMMENT : 1977 - MELANDAHA (AREA WITHIN EMBANKMENTS)
Structures opened from 1-06-1977 to 30-06-1977

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

* Cell	* Max fld	* Flooded	* F0	* F1	* F2	* F3+F4	* Total
* name	* elev.	* grd level	* (ha)	* (ha)	* (ha)	* (ha)	* (ha)
* Mel/C1	* 15.96	* 15.81	* 250	* 114	* 76	* 5	* 445
			* (56%)	* (26%)	* (17%)	* (1%)	* (100%)
* Mel/C3	* 15.95	* 15.80	* 4351	* 940	* 994	* 1014	* 7298
			* (60%)	* (13%)	* (14%)	* (14%)	* (100%)
* Mel/C4	* 17.47	* 17.41	* 228	* 463	* 259	* 0	* 950
			* (24%)	* (49%)	* (27%)	* (0%)	* (100%)
* Mel/C5	* 16.17	* 16.09	* 2752	* 906	* 395	* 4	* 4058
			* (68%)	* (22%)	* (10%)	* (0%)	* (100%)
* Mel/C6	* 16.25	* 16.19	* 2958	* 346	* 155	* 7	* 3466
			* (85%)	* (10%)	* (4%)	* (0%)	* (100%)
* Mel/C7	* 18.16	* 18.11	* 0	* 42	* 279	* 265	* 586
			* (0%)	* (7%)	* (48%)	* (45%)	* (100%)
* Mel/C8	* 16.24	* 16.17	* 5562	* 546	* 372	* 38	* 6517
			* (85%)	* (8%)	* (6%)	* (1%)	* (100%)
* TOTAL			* 16100	* 3357	* 2530	* 1333	* 23320
			* (69%)	* (14%)	* (11%)	* (6%)	* (100%)

MAIN FINDINGS FROM MIKE11 OUTPUTS LAND TYPE DISTRIBUTION

- OPTION : OPTION B
- COMMENT : 1977 - ISLAMPUR (AREA WITHIN EMBANKMENTS)
Structures opened from 1-06-1977 to 30-06-1977

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. 10 day							

* Cell	* Max fld	* Flooded	* F0	* F1	* F2	* F3+F4	* Total
* name	* elev.	*grd level*	(ha)	(ha)	(ha)	(ha)	(ha)

* Is1/C4	* 17.47	* 17.41	* 112	* 100	* 56	* 0	* 268
			* (42%)	* (37%)	* (21%)	* (0%)	* (100%)
* Is1/C6	* 16.25	* 16.19	* 19	* 43	* 19	* 1	* 82
			* (23%)	* (52%)	* (23%)	* (1%)	* (100%)
* Is1/C7	* 18.16	* 18.11	* 614	* 1204	* 1135	* 0	* 2953
			* (21%)	* (41%)	* (38%)	* (0%)	* (100%)
* Is1/C8	* 16.24	* 16.17	* 4062	* 471	* 184	* 0	* 4716
			* (86%)	* (10%)	* (4%)	* (0%)	* (100%)
* Is1/C9	* 17.36	* 17.34	* 3418	* 331	* 126	* 83	* 3957
			* (86%)	* (8%)	* (3%)	* (2%)	* (100%)

		* TOTAL	* 8224	* 2149	* 1520	* 84	* 11976
			* (69%)	* (18%)	* (13%)	* (1%)	* (100%)

JPPS

MAIN FINDINGS FROM MIKE11 OUTPUTS LAND TYPE DISTRIBUTION

- OPTION : OPTION B
 - COMMENT : 1977 - DEWANGANJ (AREA WITHIN EMBANKMENTS)
 Structures opened from 1-06-1977 to 30-06-1977

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

* Cell *	* Max fld *	* Flooded *	* F0 *	* F1 *	* F2 *	* F3+F4 *	* Total *
* name *	* elev. *	* grd level *	(ha)	(ha)	(ha)	(ha)	(ha)
* Dew/C9 *	18.16 *	18.11 *	2558 *	551 *	289 *	27 *	3425 *
			(75%)	(16%)	(8%)	(1%)	(100%)
* TOTAL *			2558 *	551 *	289 *	27 *	3425 *
			(75%)	(16%)	(8%)	(1%)	(100%)

MAIN FINDINGS FROM MIKE11 OUTPUTS LAND TYPE DISTRIBUTION

- OPTION : OPTION B
- COMMENT : 1977 - MADERGANJ (AREA WITHIN EMBANKMENTS)
Structures opened from 1-06-1977 to 30-06-1977

Simulation from 20-05-1977 to 17-10-1977 / Max. fld durat. : 10 days

* Cell	* Max fld	* Flooded	* F0	* F1	* F2	* F3+F4	* Total
* name	* elev.	* grd level	(ha)	(ha)	(ha)	(ha)	(ha)
* Mad/C1	* 15.96	* 15.81	* 3874 (55%)	* 1572 (22%)	* 1175 (17%)	* 381 (5%)	* 7001 (100%)
* Mad/C2	* 15.94	* 15.79	* 844 (25%)	* 955 (28%)	* 1082 (32%)	* 474 (14%)	* 3355 (100%)
* Mad/C3	* 15.95	* 15.80	* 361 (34%)	* 404 (37%)	* 313 (29%)	* 0 (0%)	* 1078 (100%)
* Mad/C4	* 17.47	* 17.41	* 1155 (25%)	* 1832 (39%)	* 1474 (32%)	* 186 (4%)	* 4647 (100%)
* Mad/C5	* 16.17	* 16.09	* 54 (48%)	* 40 (36%)	* 17 (16%)	* 0 (0%)	* 111 (100%)
* TOTAL			* 6287 (39%)	* 4802 (30%)	* 4062 (25%)	* 1041 (6%)	* 16192 (100%)

TABLE OF FLOOD-DEPTH-AREA CHARACTERISTIC (1977)

Without Option (Total Area, Thana and Cell Wise)
With Option B (Total Area, Thana and Cell Wise)

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days *	* 5 days *	* 10 days *	* 20 days *	* 40 days *	* 60 days *	* 90 days *	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*
* 0.00 *	* 506.37 *	* 498.26 *	* 484.65 *	* 414.15 *	* 325.08 *	* 230.22 *	* 137.68 *	*
* 0.15 *	* 475.18 *	* 466.18 *	* 450.97 *	* 379.72 *	* 289.28 *	* 197.37 *	* 114.33 *	*
* 0.30 *	* 440.95 *	* 431.37 *	* 416.12 *	* 344.86 *	* 252.42 *	* 166.14 *	* 93.63 *	*
* 0.45 *	* 405.78 *	* 396.25 *	* 380.44 *	* 309.27 *	* 217.24 *	* 137.19 *	* 75.25 *	*
* 0.60 *	* 369.93 *	* 360.40 *	* 344.26 *	* 271.98 *	* 185.59 *	* 112.19 *	* 60.02 *	*
* 0.75 *	* 333.25 *	* 323.43 *	* 306.93 *	* 235.10 *	* 156.35 *	* 90.59 *	* 47.98 *	*
* 0.90 *	* 296.37 *	* 286.96 *	* 270.99 *	* 201.79 *	* 129.30 *	* 72.61 *	* 38.27 *	*
* 1.05 *	* 261.12 *	* 251.44 *	* 234.89 *	* 171.67 *	* 105.80 *	* 57.07 *	* 26.16 *	*
* 1.20 *	* 225.56 *	* 216.36 *	* 201.88 *	* 144.35 *	* 84.66 *	* 41.73 *	* 20.93 *	*
* 1.35 *	* 194.06 *	* 185.42 *	* 172.03 *	* 119.41 *	* 63.65 *	* 32.63 *	* 16.94 *	*
* 1.50 *	* 164.77 *	* 157.00 *	* 145.03 *	* 93.25 *	* 51.11 *	* 25.76 *	* 14.10 *	*
* 1.65 *	* 135.03 *	* 128.03 *	* 117.27 *	* 75.63 *	* 40.54 *	* 19.32 *	* 11.59 *	*
* 1.80 *	* 113.01 *	* 106.38 *	* 96.41 *	* 60.92 *	* 31.69 *	* 16.33 *	* 8.26 *	*
* 1.95 *	* 92.69 *	* 86.85 *	* 78.33 *	* 48.96 *	* 25.07 *	* 12.23 *	* 7.60 *	*
* 2.10 *	* 75.03 *	* 69.85 *	* 62.42 *	* 38.52 *	* 18.86 *	* 10.38 *	* 0.00 *	*
* 2.25 *	* 59.97 *	* 56.06 *	* 50.27 *	* 30.01 *	* 15.90 *	* 8.51 *	* 0.00 *	*
* 2.40 *	* 48.02 *	* 44.43 *	* 39.26 *	* 22.96 *	* 13.10 *	* 0.00 *	* 0.00 *	*
* 2.55 *	* 37.68 *	* 35.06 *	* 31.13 *	* 17.54 *	* 9.80 *	* 0.00 *	* 0.00 *	*
* 2.70 *	* 29.62 *	* 27.11 *	* 21.90 *	* 14.47 *	* 8.30 *	* 0.00 *	* 0.00 *	*
* 2.85 *	* 21.05 *	* 19.59 *	* 17.91 *	* 10.66 *	* 0.18 *	* 0.00 *	* 0.00 *	*
* 3.00 *	* 17.23 *	* 16.09 *	* 14.47 *	* 8.80 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.15 *	* 12.46 *	* 11.63 *	* 10.68 *	* 0.31 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.30 *	* 10.23 *	* 9.59 *	* 8.84 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.45 *	* 8.67 *	* 8.39 *	* 0.49 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.60 *	* 0.46 *	* 0.35 *	* 0.05 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.75 *	* 0.03 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.90 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.05 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.20 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.35 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.50 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.65 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION

- COMMENT : 1977 - JAMALPUR (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)								*
* depth *	-----								*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*	
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*	
* * *	* * *	* * *	* * *	* * *	* * *	* * *	* * *	* * *	
* 0.00	* 47.86	* 46.51	* 44.88	* 37.54	* 30.54	* 23.96	* 17.16	* * *	
* 0.15	* 43.79	* 42.43	* 40.80	* 34.51	* 27.94	* 21.49	* 15.39	* * *	
* 0.30	* 39.71	* 38.35	* 37.14	* 31.59	* 25.47	* 19.20	* 13.64	* * *	
* 0.45	* 36.33	* 35.32	* 34.10	* 28.98	* 23.01	* 16.99	* 11.98	* * *	
* 0.60	* 33.29	* 32.28	* 31.24	* 26.42	* 20.62	* 15.23	* 10.34	* * *	
* 0.75	* 30.54	* 29.68	* 28.63	* 24.05	* 18.33	* 13.49	* 9.08	* * *	
* 0.90	* 27.94	* 27.07	* 26.11	* 21.60	* 16.32	* 11.85	* 7.84	* * *	
* 1.05	* 25.47	* 24.68	* 23.73	* 19.29	* 14.56	* 10.23	* 6.93	* * *	
* 1.20	* 23.10	* 22.31	* 21.39	* 17.07	* 12.86	* 8.98	* 6.01	* * *	
* 1.35	* 20.75	* 20.01	* 19.08	* 15.29	* 11.21	* 7.76	* 5.34	* * *	
* 1.50	* 18.44	* 17.70	* 16.91	* 13.55	* 9.75	* 6.83	* 4.69	* * *	
* 1.65	* 16.42	* 15.85	* 15.13	* 11.89	* 8.50	* 5.95	* 4.00	* * *	
* 1.80	* 14.64	* 14.06	* 13.38	* 10.27	* 7.41	* 5.30	* 3.31	* * *	
* 1.95	* 12.93	* 12.39	* 11.72	* 9.01	* 6.48	* 4.64	* 2.98	* * *	
* 2.10	* 11.26	* 10.72	* 10.14	* 7.78	* 5.69	* 3.95	* 0.00	* * *	
* 2.25	* 9.79	* 9.38	* 8.87	* 6.87	* 5.03	* 3.26	* 0.00	* * *	
* 2.40	* 8.53	* 8.11	* 7.68	* 5.95	* 4.37	* 0.00	* 0.00	* * *	
* 2.55	* 7.43	* 7.14	* 6.77	* 5.30	* 3.68	* 0.00	* 0.00	* * *	
* 2.70	* 6.52	* 6.23	* 5.86	* 4.64	* 3.13	* 0.00	* 0.00	* * *	
* 2.85	* 5.69	* 5.47	* 5.21	* 3.95	* 0.00	* 0.00	* 0.00	* * *	
* 3.00	* 5.03	* 4.82	* 4.55	* 3.26	* 0.00	* 0.00	* 0.00	* * *	
* 3.15	* 4.37	* 4.14	* 3.86	* 0.00	* 0.00	* 0.00	* 0.00	* * *	
* 3.30	* 3.68	* 3.45	* 3.20	* 0.00	* 0.00	* 0.00	* 0.00	* * *	
* 3.45	* 3.13	* 3.03	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* * *	

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MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION

- COMMENT : 1977 - SHARISABARI (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)								*
* depth *	-----								*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*	*

* 0.00	* 21.91	* 21.59	* 20.78	* 16.70	* 12.46	* 6.76	* 2.95	*	*
* 0.15	* 20.51	* 19.89	* 18.93	* 14.88	* 10.63	* 5.46	* 2.64	*	*
* 0.30	* 18.66	* 18.04	* 17.13	* 13.02	* 8.85	* 4.29	* 2.33	*	*
* 0.45	* 16.89	* 16.28	* 15.30	* 11.18	* 7.10	* 3.29	* 2.04	*	*
* 0.60	* 15.07	* 14.46	* 13.49	* 9.38	* 5.76	* 2.62	* 1.75	*	*
* 0.75	* 13.27	* 12.66	* 11.66	* 7.63	* 4.49	* 2.31	* 1.53	*	*
* 0.90	* 11.44	* 10.83	* 9.85	* 6.15	* 3.49	* 2.02	* 1.31	*	*
* 1.05	* 9.64	* 9.06	* 8.09	* 4.88	* 2.58	* 1.74	* 1.14	*	*
* 1.20	* 7.89	* 7.31	* 6.44	* 3.78	* 2.20	* 1.51	* 0.98	*	*
* 1.35	* 6.28	* 5.86	* 5.17	* 2.86	* 1.91	* 1.30	* 0.86	*	*
* 1.50	* 5.01	* 4.59	* 3.98	* 2.31	* 1.65	* 1.13	* 0.73	*	*
* 1.65	* 3.86	* 3.55	* 3.06	* 2.02	* 1.42	* 0.97	* 0.61	*	*
* 1.80	* 2.94	* 2.64	* 2.27	* 1.74	* 1.23	* 0.85	* 0.49	*	*
* 1.95	* 2.20	* 2.10	* 1.98	* 1.51	* 1.07	* 0.73	* 0.42	*	*
* 2.10	* 1.91	* 1.81	* 1.71	* 1.30	* 0.92	* 0.60	* 0.00	*	*
* 2.25	* 1.65	* 1.57	* 1.48	* 1.13	* 0.80	* 0.48	* 0.00	*	*
* 2.40	* 1.42	* 1.35	* 1.27	* 0.97	* 0.68	* 0.00	* 0.00	*	*
* 2.55	* 1.23	* 1.18	* 1.11	* 0.85	* 0.55	* 0.00	* 0.00	*	*
* 2.70	* 1.07	* 1.01	* 0.95	* 0.73	* 0.45	* 0.00	* 0.00	*	*
* 2.85	* 0.92	* 0.88	* 0.83	* 0.60	* 0.00	* 0.00	* 0.00	*	*
* 3.00	* 0.80	* 0.76	* 0.71	* 0.48	* 0.00	* 0.00	* 0.00	*	*
* 3.15	* 0.68	* 0.64	* 0.59	* 0.00	* 0.00	* 0.00	* 0.00	*	*
* 3.30	* 0.55	* 0.51	* 0.47	* 0.00	* 0.00	* 0.00	* 0.00	*	*
* 3.45	* 0.45	* 0.43	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*	*
* 3.60	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION

- COMMENT : 1977 - MELANDAHA (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days *	* 5 days *	* 10 days *	* 20 days *	* 40 days *	* 60 days *	* 90 days *	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*
* 0.00 *	* 172.90 *	* 170.19 *	* 165.73 *	* 138.72 *	* 107.38 *	* 75.86 *	* 41.45 *	*
* 0.15 *	* 162.78 *	* 159.73 *	* 154.56 *	* 127.65 *	* 96.25 *	* 65.75 *	* 35.16 *	*
* 0.30 *	* 151.30 *	* 147.95 *	* 142.90 *	* 116.54 *	* 84.67 *	* 56.13 *	* 30.01 *	*
* 0.45 *	* 139.56 *	* 136.41 *	* 131.17 *	* 105.83 *	* 74.24 *	* 47.07 *	* 25.26 *	*
* 0.60 *	* 127.80 *	* 124.61 *	* 119.68 *	* 94.65 *	* 64.22 *	* 39.47 *	* 20.85 *	*
* 0.75 *	* 116.65 *	* 113.68 *	* 108.85 *	* 83.54 *	* 55.24 *	* 33.14 *	* 17.31 *	*
* 0.90 *	* 105.89 *	* 102.99 *	* 98.24 *	* 73.27 *	* 46.62 *	* 27.25 *	* 14.44 *	*
* 1.05 *	* 95.32 *	* 92.43 *	* 87.52 *	* 63.85 *	* 39.23 *	* 22.23 *	* 12.14 *	*
* 1.20 *	* 84.64 *	* 81.73 *	* 77.10 *	* 55.22 *	* 32.69 *	* 18.07 *	* 10.44 *	*
* 1.35 *	* 74.65 *	* 71.76 *	* 67.54 *	* 47.20 *	* 26.82 *	* 14.77 *	* 9.42 *	*
* 1.50 *	* 65.25 *	* 62.68 *	* 58.74 *	* 39.67 *	* 22.02 *	* 12.23 *	* 8.08 *	*
* 1.65 *	* 56.70 *	* 54.29 *	* 50.62 *	* 32.82 *	* 17.86 *	* 10.58 *	* 6.68 *	*
* 1.80 *	* 48.98 *	* 46.68 *	* 43.09 *	* 27.08 *	* 14.33 *	* 8.95 *	* 4.46 *	*
* 1.95 *	* 41.56 *	* 39.19 *	* 35.78 *	* 22.19 *	* 11.88 *	* 6.18 *	* 4.21 *	*
* 2.10 *	* 34.35 *	* 32.18 *	* 29.01 *	* 17.99 *	* 10.21 *	* 5.32 *	* 0.00 *	*
* 2.25 *	* 27.95 *	* 26.32 *	* 23.95 *	* 14.46 *	* 8.74 *	* 4.48 *	* 0.00 *	*
* 2.40 *	* 22.95 *	* 21.44 *	* 19.24 *	* 11.68 *	* 7.28 *	* 0.00 *	* 0.00 *	*
* 2.55 *	* 18.58 *	* 17.53 *	* 15.89 *	* 9.82 *	* 4.98 *	* 0.00 *	* 0.00 *	*
* 2.70 *	* 15.23 *	* 14.16 *	* 12.23 *	* 8.08 *	* 4.32 *	* 0.00 *	* 0.00 *	*
* 2.85 *	* 11.81 *	* 11.02 *	* 10.04 *	* 5.47 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.00 *	* 9.68 *	* 8.99 *	* 7.98 *	* 4.59 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.15 *	* 6.29 *	* 5.90 *	* 5.51 *	* 0.07 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.30 *	* 5.29 *	* 4.99 *	* 4.63 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.45 *	* 4.57 *	* 4.46 *	* 0.16 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.60 *	* 0.15 *	* 0.11 *	* 0.05 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.75 *	* 0.03 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.90 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.05 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.20 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.35 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.50 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.65 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION

- COMMENT : 1977 - ISLAMPUR (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*
* 0.00 *	* 100.52 !	* 99.38 !	* 97.05 !	* 85.90 !	* 67.59 !	* 50.35 !	* 30.43 !	* 30.43 *
* 0.15 *	* 96.08 !	* 94.84 !	* 92.08 !	* 80.43 !	* 60.86 !	* 43.83 !	* 25.34 !	* 25.34 *
* 0.30 *	* 91.00 !	* 89.54 !	* 86.76 !	* 74.98 !	* 53.83 !	* 37.10 !	* 20.28 !	* 20.28 *
* 0.45 *	* 85.66 !	* 84.16 !	* 81.28 !	* 68.62 !	* 47.24 !	* 30.66 !	* 15.50 !	* 15.50 *
* 0.60 *	* 80.17 !	* 78.64 !	* 75.35 !	* 61.89 !	* 41.59 !	* 24.59 !	* 12.04 !	* 12.04 *
* 0.75 *	* 73.99 !	* 72.09 !	* 68.59 !	* 54.61 !	* 35.15 !	* 19.16 !	* 9.10 !	* 9.10 *
* 0.90 *	* 67.25 !	* 65.40 !	* 61.71 !	* 47.58 !	* 29.14 !	* 15.08 !	* 6.83 !	* 6.83 *
* 1.05 *	* 60.29 !	* 58.21 !	* 54.30 !	* 41.03 !	* 23.45 !	* 11.32 !	* 3.53 !	* 3.53 *
* 1.20 *	* 52.89 !	* 50.81 !	* 47.20 !	* 34.44 !	* 18.12 !	* 8.05 !	* 1.82 !	* 1.82 *
* 1.35 *	* 45.92 !	* 43.67 !	* 40.15 !	* 28.15 !	* 14.21 !	* 5.06 !	* 0.21 !	* 0.21 *
* 1.50 *	* 39.01 !	* 37.03 !	* 33.62 !	* 22.18 !	* 10.71 !	* 2.85 !	* 0.00 !	* 0.00 *
* 1.65 *	* 32.46 !	* 30.47 !	* 27.20 !	* 17.51 !	* 7.62 !	* 0.00 !	* 0.00 !	* 0.00 *
* 1.80 *	* 26.18 !	* 24.30 !	* 21.22 !	* 13.54 !	* 4.90 !	* 0.00 !	* 0.00 !	* 0.00 *
* 1.95 *	* 20.44 !	* 19.02 !	* 16.82 !	* 10.06 !	* 2.89 !	* 0.00 !	* 0.00 !	* 0.00 *
* 2.10 *	* 16.12 !	* 14.88 !	* 12.79 !	* 6.86 !	* 0.11 !	* 0.00 !	* 0.00 !	* 0.00 *
* 2.25 *	* 12.20 !	* 11.09 !	* 9.33 !	* 4.21 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 2.40 *	* 8.79 !	* 7.78 !	* 6.16 !	* 2.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 2.55 *	* 5.77 !	* 4.97 !	* 3.72 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 2.70 *	* 3.37 !	* 2.62 !	* 0.23 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 2.85 *	* 0.17 !	* 0.02 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 3.00 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 3.15 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 3.30 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 3.45 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 3.60 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 3.75 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 3.90 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 4.05 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION

- COMMENT : 1977 - DEWANGANJ (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							
* depth *	-----							
* (m) *	* 3 days *	* 5 days *	* 10 days *	* 20 days *	* 40 days *	* 60 days *	* 90 days *	* *

* 0.00 *	* 23.66 *	* 23.10 *	* 22.24 *	* 19.82 *	* 15.66 *	* 10.34 *	* 7.15 *	* *
* 0.15 *	* 22.03 *	* 21.50 *	* 20.66 *	* 18.10 *	* 14.02 *	* 8.55 *	* 5.39 *	* *
* 0.30 *	* 20.45 *	* 19.93 *	* 19.04 *	* 16.34 *	* 12.37 *	* 6.80 *	* 4.33 *	* *
* 0.45 *	* 18.81 *	* 18.22 *	* 17.28 *	* 14.68 *	* 10.58 *	* 5.18 *	* 3.28 *	* *
* 0.60 *	* 17.05 *	* 16.46 *	* 15.55 *	* 13.04 *	* 8.78 *	* 4.12 *	* 2.55 *	* *
* 0.75 *	* 15.33 *	* 14.79 *	* 13.91 *	* 11.29 *	* 7.03 *	* 3.11 *	* 1.84 *	* *
* 0.90 *	* 13.70 *	* 13.15 *	* 12.25 *	* 9.50 *	* 5.32 *	* 2.40 *	* 1.35 *	* *
* 1.05 *	* 12.01 *	* 11.41 *	* 10.46 *	* 7.73 *	* 4.26 *	* 1.73 *	* 0.88 *	* *
* 1.20 *	* 10.22 *	* 9.62 *	* 8.67 *	* 5.98 *	* 3.21 *	* 1.26 *	* 0.58 *	* *
* 1.35 *	* 8.43 *	* 7.85 *	* 6.91 *	* 4.69 *	* 2.50 *	* 0.80 *	* 0.31 *	* *
* 1.50 *	* 6.68 *	* 6.09 *	* 5.25 *	* 3.63 *	* 1.79 *	* 0.53 *	* 0.16 *	* *
* 1.65 *	* 5.11 *	* 4.76 *	* 4.19 *	* 2.78 *	* 1.32 *	* 0.26 *	* 0.03 *	* *
* 1.80 *	* 4.05 *	* 3.70 *	* 3.16 *	* 2.07 *	* 0.85 *	* 0.13 *	* 0.00 *	* *
* 1.95 *	* 3.06 *	* 2.83 *	* 2.45 *	* 1.51 *	* 0.56 *	* 0.00 *	* 0.00 *	* *
* 2.10 *	* 2.36 *	* 2.12 *	* 1.76 *	* 1.04 *	* 0.29 *	* 0.00 *	* 0.00 *	* *
* 2.25 *	* 1.70 *	* 1.54 *	* 1.29 *	* 0.67 *	* 0.15 *	* 0.00 *	* 0.00 *	* *
* 2.40 *	* 1.23 *	* 1.07 *	* 0.82 *	* 0.40 *	* 0.02 *	* 0.00 *	* 0.00 *	* *
* 2.55 *	* 0.78 *	* 0.69 *	* 0.54 *	* 0.20 *	* 0.00 *	* 0.00 *	* 0.00 *	* *
* 2.70 *	* 0.51 *	* 0.42 *	* 0.27 *	* 0.07 *	* 0.00 *	* 0.00 *	* 0.00 *	* *
* 2.85 *	* 0.26 *	* 0.21 *	* 0.14 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* *
* 3.00 *	* 0.12 *	* 0.08 *	* 0.01 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* *

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION

- COMMENT : 1977 - MADERGANG (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							
* depth *	-----							
* (m) *	* 3 days *	* 5 days *	* 10 days *	* 20 days *	* 40 days *	* 60 days *	* 90 days *	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*
* 0.00 *	* 140.64 *	* 138.51 *	* 135.17 *	* 116.92 *	* 96.35 *	* 66.57 *	* 43.61 *	*
* 0.15 *	* 131.76 *	* 129.37 *	* 125.73 *	* 106.82 *	* 84.71 *	* 55.73 *	* 34.29 *	*
* 0.30 *	* 122.09 *	* 119.61 *	* 115.56 *	* 95.59 *	* 72.49 *	* 45.37 *	* 26.33 *	*
* 0.45 *	* 111.38 *	* 108.74 *	* 104.48 *	* 83.27 *	* 60.27 *	* 36.11 *	* 19.80 *	*
* 0.60 *	* 100.18 *	* 97.60 *	* 92.64 *	* 70.10 *	* 49.12 *	* 27.92 *	* 14.64 *	*
* 0.75 *	* 87.42 *	* 84.30 *	* 79.13 *	* 57.58 *	* 39.94 *	* 20.78 *	* 10.76 *	*
* 0.90 *	* 74.25 *	* 71.43 *	* 66.79 *	* 47.28 *	* 31.22 *	* 15.18 *	* 7.78 *	*
* 1.05 *	* 62.58 *	* 59.62 *	* 54.77 *	* 38.00 *	* 24.19 *	* 10.77 *	* 2.42 *	*
* 1.20 *	* 51.05 *	* 48.58 *	* 44.78 *	* 30.29 *	* 17.48 *	* 4.60 *	* 1.68 *	*
* 1.35 *	* 41.81 *	* 39.67 *	* 36.21 *	* 23.17 *	* 8.65 *	* 3.49 *	* 1.11 *	*
* 1.50 *	* 33.49 *	* 31.66 *	* 28.85 *	* 13.51 *	* 6.42 *	* 2.60 *	* 0.60 *	*
* 1.65 *	* 22.85 *	* 21.28 *	* 19.05 *	* 9.91 *	* 4.85 *	* 1.83 *	* 0.30 *	*
* 1.80 *	* 18.25 *	* 16.82 *	* 14.84 *	* 7.28 *	* 3.67 *	* 1.24 *	* 0.00 *	*
* 1.95 *	* 14.09 *	* 12.78 *	* 10.90 *	* 5.53 *	* 2.73 *	* 0.68 *	* 0.00 *	*
* 2.10 *	* 10.38 *	* 9.35 *	* 8.06 *	* 4.21 *	* 1.93 *	* 0.50 *	* 0.00 *	*
* 2.25 *	* 7.73 *	* 7.10 *	* 6.18 *	* 3.14 *	* 1.32 *	* 0.28 *	* 0.00 *	*
* 2.40 *	* 5.94 *	* 5.41 *	* 4.69 *	* 2.29 *	* 0.77 *	* 0.00 *	* 0.00 *	*
* 2.55 *	* 4.47 *	* 4.09 *	* 3.54 *	* 1.58 *	* 0.59 *	* 0.00 *	* 0.00 *	*
* 2.70 *	* 3.37 *	* 3.05 *	* 2.61 *	* 1.03 *	* 0.40 *	* 0.00 *	* 0.00 *	*
* 2.85 *	* 2.46 *	* 2.20 *	* 1.83 *	* 0.64 *	* 0.18 *	* 0.00 *	* 0.00 *	*
* 3.00 *	* 1.72 *	* 1.52 *	* 1.23 *	* 0.46 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.15 *	* 1.13 *	* 0.96 *	* 0.72 *	* 0.24 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.30 *	* 0.70 *	* 0.64 *	* 0.53 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.45 *	* 0.52 *	* 0.46 *	* 0.33 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.60 *	* 0.32 *	* 0.24 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.75 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.90 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.05 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.20 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.35 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.50 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 4.65 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION
- CELL : C1
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*
* 0.00	* 61.18	* 59.28	* 57.00	* 43.28	* 29.75	* 17.64	* 9.78	*
* 0.15	* 55.49	* 53.59	* 51.31	* 37.75	* 25.20	* 14.46	* 7.68	*
* 0.30	* 49.78	* 47.87	* 45.57	* 32.53	* 20.70	* 11.91	* 5.71	*
* 0.45	* 44.05	* 42.13	* 39.84	* 27.60	* 17.43	* 9.46	* 4.42	*
* 0.60	* 38.45	* 36.71	* 34.62	* 23.10	* 14.25	* 7.42	* 3.37	*
* 0.75	* 33.23	* 31.49	* 29.40	* 19.13	* 11.75	* 5.45	* 2.58	*
* 0.90	* 28.20	* 26.70	* 24.90	* 15.95	* 9.29	* 4.28	* 1.88	*
* 1.05	* 23.70	* 22.20	* 20.40	* 13.06	* 7.29	* 3.23	* 1.32	*
* 1.20	* 19.55	* 18.49	* 17.22	* 10.60	* 5.32	* 2.48	* 0.81	*
* 1.35	* 16.37	* 15.31	* 14.04	* 8.34	* 4.21	* 1.78	* 0.42	*
* 1.50	* 13.39	* 12.57	* 11.59	* 6.37	* 3.16	* 1.25	* 0.09	*
* 1.65	* 10.93	* 10.11	* 9.13	* 4.77	* 2.44	* 0.74	* 0.00	*
* 1.80	* 8.60	* 7.95	* 7.16	* 3.72	* 1.74	* 0.38	* 0.00	*
* 1.95	* 6.63	* 5.98	* 5.19	* 2.81	* 1.21	* 0.00	* 0.00	*
* 2.10	* 4.91	* 4.56	* 4.14	* 2.11	* 0.70	* 0.00	* 0.00	*
* 2.25	* 3.86	* 3.51	* 3.09	* 1.49	* 0.36	* 0.00	* 0.00	*
* 2.40	* 2.90	* 2.67	* 2.39	* 0.98	* 0.00	* 0.00	* 0.00	*
* 2.55	* 2.20	* 1.97	* 1.69	* 0.54	* 0.00	* 0.00	* 0.00	*
* 2.70	* 1.55	* 1.38	* 1.18	* 0.20	* 0.00	* 0.00	* 0.00	*
* 2.85	* 1.04	* 0.87	* 0.67	* 0.00	* 0.00	* 0.00	* 0.00	*
* 3.00	* 0.58	* 0.47	* 0.34	* 0.00	* 0.00	* 0.00	* 0.00	*
* 3.15	* 0.25	* 0.13	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION
- CELL : C2
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)								*
* depth *	-----								*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*	*

* 0.00	* 43.82	* 43.42	* 42.49	* 36.52	* 29.20	* 15.70	* 6.27	*	*
* 0.15	* 42.33	* 41.56	* 40.17	* 33.53	* 25.59	* 12.92	* 4.84	*	*
* 0.30	* 40.02	* 39.25	* 37.72	* 30.16	* 21.51	* 10.35	* 3.61	*	*
* 0.45	* 37.52	* 36.52	* 34.73	* 26.55	* 17.36	* 8.10	* 2.79	*	*
* 0.60	* 34.53	* 33.53	* 31.61	* 22.62	* 14.40	* 6.18	* 2.12	*	*
* 0.75	* 31.37	* 30.16	* 28.00	* 18.47	* 11.62	* 4.74	* 1.72	*	*
* 0.90	* 27.76	* 26.55	* 24.28	* 15.14	* 9.30	* 3.55	* 1.36	*	*
* 1.05	* 24.00	* 22.62	* 20.13	* 12.36	* 7.05	* 2.74	* 1.10	*	*
* 1.20	* 19.85	* 18.47	* 16.25	* 9.90	* 5.51	* 2.09	* 0.87	*	*
* 1.35	* 16.07	* 15.14	* 13.47	* 7.65	* 4.07	* 1.69	* 0.69	*	*
* 1.50	* 13.29	* 12.36	* 10.80	* 5.89	* 3.17	* 1.35	* 0.51	*	*
* 1.65	* 10.65	* 9.90	* 8.55	* 4.45	* 2.36	* 1.09	* 0.30	*	*
* 1.80	* 8.40	* 7.65	* 6.46	* 3.39	* 1.90	* 0.86	* 0.00	*	*
* 1.95	* 6.37	* 5.89	* 5.03	* 2.58	* 1.50	* 0.68	* 0.00	*	*
* 2.10	* 4.93	* 4.45	* 3.72	* 2.01	* 1.22	* 0.50	* 0.00	*	*
* 2.25	* 3.66	* 3.39	* 2.90	* 1.61	* 0.96	* 0.28	* 0.00	*	*
* 2.40	* 2.85	* 2.58	* 2.17	* 1.29	* 0.77	* 0.00	* 0.00	*	*
* 2.55	* 2.14	* 2.01	* 1.77	* 1.03	* 0.59	* 0.00	* 0.00	*	*
* 2.70	* 1.74	* 1.61	* 1.40	* 0.82	* 0.40	* 0.00	* 0.00	*	*
* 2.85	* 1.38	* 1.29	* 1.14	* 0.64	* 0.18	* 0.00	* 0.00	*	*
* 3.00	* 1.12	* 1.03	* 0.89	* 0.46	* 0.00	* 0.00	* 0.00	*	*
* 3.15	* 0.88	* 0.82	* 0.71	* 0.24	* 0.00	* 0.00	* 0.00	*	*
* 3.30	* 0.70	* 0.64	* 0.53	* 0.00	* 0.00	* 0.00	* 0.00	*	*
* 3.45	* 0.52	* 0.46	* 0.33	* 0.00	* 0.00	* 0.00	* 0.00	*	*
* 3.60	* 0.32	* 0.24	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION
- CELL : C3
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							
* depth *	-----							
* (m) *	* 3 days *	* 5 days *	* 10 days *	* 20 days *	* 40 days *	* 60 days *	* 90 days *	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*
* 0.00 *	* 114.67 *	* 111.79 *	* 108.24 *	* 92.00 *	* 74.25 *	* 57.18 *	* 40.29 *	*
* 0.15 *	* 105.87 *	* 102.91 *	* 99.36 *	* 84.40 *	* 67.38 *	* 51.08 *	* 35.94 *	*
* 0.30 *	* 96.99 *	* 94.03 *	* 90.99 *	* 77.00 *	* 60.90 *	* 45.46 *	* 31.62 *	*
* 0.45 *	* 88.96 *	* 86.43 *	* 83.39 *	* 70.13 *	* 54.69 *	* 40.00 *	* 27.57 *	*
* 0.60 *	* 81.36 *	* 78.83 *	* 76.08 *	* 63.39 *	* 48.83 *	* 35.65 *	* 23.52 *	*
* 0.75 *	* 74.25 *	* 71.96 *	* 69.21 *	* 57.18 *	* 43.21 *	* 31.35 *	* 20.82 *	*
* 0.90 *	* 67.38 *	* 65.09 *	* 62.56 *	* 51.08 *	* 38.26 *	* 27.30 *	* 18.13 *	*
* 1.05 *	* 60.90 *	* 58.83 *	* 56.35 *	* 45.46 *	* 33.92 *	* 23.34 *	* 16.18 *	*
* 1.20 *	* 54.69 *	* 52.62 *	* 50.33 *	* 40.00 *	* 29.73 *	* 20.64 *	* 14.23 *	*
* 1.35 *	* 48.83 *	* 46.96 *	* 44.71 *	* 35.66 *	* 25.68 *	* 18.00 *	* 12.77 *	*
* 1.50 *	* 43.21 *	* 41.33 *	* 39.42 *	* 31.35 *	* 22.26 *	* 16.05 *	* 11.34 *	*
* 1.65 *	* 38.26 *	* 36.81 *	* 35.08 *	* 27.30 *	* 19.57 *	* 14.10 *	* 9.80 *	*
* 1.80 *	* 33.92 *	* 32.47 *	* 30.81 *	* 23.34 *	* 17.22 *	* 12.67 *	* 8.26 *	*
* 1.95 *	* 29.73 *	* 28.38 *	* 26.76 *	* 20.65 *	* 15.27 *	* 11.24 *	* 7.60 *	*
* 2.10 *	* 25.68 *	* 24.33 *	* 22.98 *	* 18.00 *	* 13.53 *	* 9.70 *	* 0.00 *	*
* 2.25 *	* 22.26 *	* 21.36 *	* 20.29 *	* 16.05 *	* 12.10 *	* 8.15 *	* 0.00 *	*
* 2.40 *	* 19.57 *	* 18.67 *	* 17.74 *	* 14.10 *	* 10.62 *	* 0.00 *	* 0.00 *	*
* 2.55 *	* 17.22 *	* 16.57 *	* 15.79 *	* 12.67 *	* 9.08 *	* 0.00 *	* 0.00 *	*
* 2.70 *	* 15.27 *	* 14.62 *	* 13.91 *	* 11.24 *	* 7.88 *	* 0.00 *	* 0.00 *	*
* 2.85 *	* 13.53 *	* 13.05 *	* 12.48 *	* 9.70 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.00 *	* 12.10 *	* 11.62 *	* 11.03 *	* 8.15 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.15 *	* 10.62 *	* 10.11 *	* 9.49 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.30 *	* 9.08 *	* 8.56 *	* 8.02 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 3.45 *	* 7.88 *	* 7.71 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION
- CELL : C4
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

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*****
* Flood *                               Area Flooded (Km2)                               *
* depth *-----*-----*-----*-----*-----*-----*-----*-----*-----*
* (m) * 3 days ! 5 days ! 10 days ! 20 days ! 40 days ! 60 days ! 90 days *
*-----*-----*-----*-----*-----*-----*-----*-----*-----*
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* 0.00 * 54.37 ! 54.12 ! 53.12 ! 50.36 ! 46.90 ! 38.38 ! 31.14 *
* 0.15 * 50.61 ! 50.36 ! 49.36 ! 46.19 ! 41.57 ! 32.03 ! 24.42 *
* 0.30 * 46.55 ! 46.19 ! 44.77 ! 40.86 ! 36.06 ! 25.32 ! 19.09 *
* 0.45 * 41.22 ! 40.87 ! 39.44 ! 35.17 ! 29.35 ! 19.76 ! 14.11 *
* 0.60 * 35.62 ! 35.17 ! 33.38 ! 28.45 ! 22.75 ! 14.77 ! 10.46 *
* 0.75 * 28.90 ! 28.45 ! 26.66 ! 22.08 ! 17.76 ! 10.90 ! 7.15 *
* 0.90 * 22.42 ! 22.08 ! 20.75 ! 17.10 ! 12.89 ! 7.59 ! 4.88 *
* 1.05 * 17.43 ! 17.10 ! 15.77 ! 12.45 ! 9.58 ! 5.13 ! 0.00 *
* 1.20 * 12.67 ! 12.45 ! 11.57 ! 9.14 ! 6.27 ! 0.00 ! 0.00 *
* 1.35 * 9.36 ! 9.14 ! 8.26 ! 6.02 ! 0.00 ! 0.00 ! 0.00 *
* 1.50 * 6.14 ! 6.02 ! 5.51 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
*****
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MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION
- CELL : C5

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)								*
* depth *	-----								*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*
* 0.00 *	38.33	37.97	37.28	32.72	25.17	16.07	2.30	*	*
* 0.15 *	37.09	36.59	35.80	30.72	23.20	13.46	1.20	*	*
* 0.30 *	35.60	35.11	34.18	28.73	20.85	10.77	0.60	*	*
* 0.45 *	33.91	33.25	32.18	26.74	18.31	8.01	0.25	*	*
* 0.60 *	31.92	31.25	30.19	24.77	15.72	5.75	0.08	*	*
* 0.75 *	29.93	29.26	28.20	22.80	13.11	4.06	0.02	*	*
* 0.90 *	27.94	27.27	26.22	20.34	10.40	2.60	0.00	*	*
* 1.05 *	25.95	25.30	24.25	17.81	7.64	1.49	0.00	*	*
* 1.20 *	23.98	23.33	22.20	15.20	5.52	0.69	0.00	*	*
* 1.35 *	21.86	21.02	19.67	12.58	3.83	0.34	0.00	*	*
* 1.50 *	19.33	18.48	17.12	9.85	2.45	0.09	0.00	*	*
* 1.65 *	16.77	15.90	14.50	7.09	1.35	0.04	0.00	*	*
* 1.80 *	14.15	13.28	11.88	5.19	0.64	0.00	0.00	*	*
* 1.95 *	11.51	10.59	9.12	3.49	0.30	0.00	0.00	*	*
* 2.10 *	8.75	7.83	6.43	2.23	0.08	0.00	0.00	*	*
* 2.25 *	6.20	5.64	4.73	1.12	0.03	0.00	0.00	*	*
* 2.40 *	4.51	3.94	3.04	0.57	0.00	0.00	0.00	*	*
* 2.55 *	2.89	2.52	1.94	0.23	0.00	0.00	0.00	*	*
* 2.70 *	1.79	1.42	0.83	0.07	0.00	0.00	0.00	*	*
* 2.85 *	0.78	0.67	0.48	0.02	0.00	0.00	0.00	*	*
* 3.00 *	0.44	0.32	0.13	0.00	0.00	0.00	0.00	*	*
* 3.15 *	0.11	0.09	0.06	0.00	0.00	0.00	0.00	*	*
* 3.30 *	0.05	0.03	0.00	0.00	0.00	0.00	0.00	*	*
* 3.45 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	*
* 3.60 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	*
* 3.75 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	*
* 3.90 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	*
* 4.05 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	*
* 4.20 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	*
* 4.35 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	*
* 4.50 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	*
* 4.65 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION
- CELL : C6
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							
* depth *	-----							
* (m) *	* 3 days *	* 5 days *	* 10 days *	* 20 days *	* 40 days *	* 60 days *	* 90 days *	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*
* 0.00 *	* 27.78 *	* 27.56 *	* 26.68 *	* 20.46 *	* 15.38 *	* 9.49 *	* 5.71 *	*
* 0.15 *	* 25.51 *	* 25.17 *	* 24.17 *	* 18.30 *	* 13.45 *	* 7.77 *	* 4.33 *	*
* 0.30 *	* 23.00 *	* 22.66 *	* 21.75 *	* 16.64 *	* 11.34 *	* 6.27 *	* 3.35 *	*
* 0.45 *	* 20.75 *	* 20.46 *	* 19.59 *	* 15.07 *	* 9.49 *	* 4.87 *	* 2.40 *	*
* 0.60 *	* 18.59 *	* 18.30 *	* 17.59 *	* 13.03 *	* 7.77 *	* 3.75 *	* 1.76 *	*
* 0.75 *	* 16.86 *	* 16.65 *	* 16.02 *	* 10.92 *	* 6.27 *	* 2.77 *	* 1.14 *	*
* 0.90 *	* 15.28 *	* 15.07 *	* 14.30 *	* 9.15 *	* 4.87 *	* 2.01 *	* 0.80 *	*
* 1.05 *	* 13.31 *	* 13.03 *	* 12.19 *	* 7.43 *	* 3.75 *	* 1.37 *	* 0.48 *	*
* 1.20 *	* 11.20 *	* 10.92 *	* 10.18 *	* 5.99 *	* 2.77 *	* 0.94 *	* 0.00 *	*
* 1.35 *	* 9.38 *	* 9.15 *	* 8.46 *	* 4.59 *	* 2.01 *	* 0.60 *	* 0.00 *	*
* 1.50 *	* 7.66 *	* 7.43 *	* 6.83 *	* 3.55 *	* 1.37 *	* 0.00 *	* 0.00 *	*
* 1.65 *	* 6.17 *	* 5.99 *	* 5.43 *	* 2.57 *	* 0.94 *	* 0.00 *	* 0.00 *	*
* 1.80 *	* 4.77 *	* 4.59 *	* 4.14 *	* 1.89 *	* 0.60 *	* 0.00 *	* 0.00 *	*
* 1.95 *	* 3.68 *	* 3.55 *	* 3.16 *	* 1.25 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 2.10 *	* 2.70 *	* 2.57 *	* 2.27 *	* 0.87 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 2.25 *	* 1.97 *	* 1.89 *	* 1.63 *	* 0.53 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 2.40 *	* 1.33 *	* 1.25 *	* 1.07 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 2.55 *	* 0.91 *	* 0.87 *	* 0.74 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 2.70 *	* 0.58 *	* 0.53 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION
- CELL : C7
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)								*					
* depth *	-----								*					
* (m) *	* 3 days	!	5 days	!	10 days	!	20 days	!	40 days	!	60 days	!	90 days	*
-----	*-----*	!	*-----*	!	*-----*	!	*-----*	!	*-----*	!	*-----*	!	*-----*	*
* *	* *	!	* *	!	* *	!	* *	!	* *	!	* *	!	* *	*
* 0.00	* 35.39	!	35.39	!	35.39	!	35.39	!	34.91	!	30.90	!	26.79	*
* 0.15	* 35.39	!	35.39	!	35.39	!	35.26	!	33.84	!	29.06	!	23.96	*
* 0.30	* 35.39	!	35.39	!	35.35	!	35.09	!	32.71	!	26.23	!	20.58	*
* 0.45	* 35.32	!	35.27	!	35.18	!	34.27	!	31.12	!	23.28	!	17.19	*
* 0.60	* 35.16	!	35.10	!	34.84	!	33.20	!	29.44	!	19.90	!	14.44	*
* 0.75	* 34.70	!	34.34	!	33.77	!	31.75	!	26.61	!	16.61	!	11.74	*
* 0.90	* 33.63	!	33.28	!	32.60	!	30.16	!	23.73	!	13.90	!	9.19	*
* 1.05	* 32.39	!	31.86	!	31.01	!	27.74	!	20.35	!	11.22	!	6.66	*
* 1.20	* 30.80	!	30.27	!	29.25	!	24.90	!	16.97	!	8.69	!	4.73	*
* 1.35	* 28.87	!	27.93	!	26.42	!	21.71	!	14.26	!	6.20	!	2.89	*
* 1.50	* 26.04	!	25.09	!	23.51	!	18.32	!	11.56	!	4.36	!	2.11	*
* 1.65	* 23.06	!	21.93	!	20.13	!	15.35	!	9.02	!	2.61	!	1.49	*
* 1.80	* 19.68	!	18.55	!	16.79	!	12.64	!	6.49	!	1.99	!	0.00	*
* 1.95	* 16.43	!	15.53	!	14.08	!	10.04	!	4.61	!	0.00	!	0.00	*
* 2.10	* 13.72	!	12.82	!	11.39	!	7.50	!	2.77	!	0.00	!	0.00	*
* 2.25	* 11.05	!	10.21	!	8.86	!	5.34	!	2.07	!	0.00	!	0.00	*
* 2.40	* 8.52	!	7.67	!	6.32	!	3.51	!	1.45	!	0.00	!	0.00	*
* 2.55	* 6.08	!	5.46	!	4.49	!	2.32	!	0.00	!	0.00	!	0.00	*
* 2.70	* 4.24	!	3.63	!	2.65	!	1.70	!	0.00	!	0.00	!	0.00	*
* 2.85	* 2.57	!	2.36	!	2.03	!	0.00	!	0.00	!	0.00	!	0.00	*
* 3.00	* 1.95	!	1.74	!	1.41	!	0.00	!	0.00	!	0.00	!	0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION
- CELL : C8

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							
* depth *	-----							
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	*

* 0.00 *	83.60 !	82.16 !	79.84 !	63.47 !	41.87 !	26.39 !	8.38 !	*
* 0.15 *	79.27 !	77.71 !	74.48 !	57.13 !	35.47 !	21.94 !	6.45 !	*
* 0.30 *	73.67 !	71.65 !	68.42 !	50.87 !	29.03 !	17.81 !	4.89 !	*
* 0.45 *	67.61 !	65.58 !	62.20 !	44.73 !	24.31 !	14.15 !	3.42 !	*
* 0.60 *	61.35 !	59.24 !	55.86 !	38.47 !	19.86 !	11.02 !	2.02 !	*
* 0.75 *	55.02 !	52.92 !	49.65 !	32.03 !	16.10 !	8.69 !	1.14 !	*
* 0.90 *	48.83 !	46.78 !	43.51 !	26.39 !	12.44 !	6.66 !	0.70 !	*
* 1.05 *	42.69 !	40.62 !	37.19 !	21.94 !	9.93 !	5.10 !	0.42 !	*
* 1.20 *	36.33 !	34.18 !	30.75 !	17.81 !	7.60 !	3.60 !	0.29 !	*
* 1.35 *	29.89 !	27.87 !	25.50 !	14.15 !	5.93 !	2.21 !	0.17 !	*
* 1.50 *	24.91 !	23.42 !	21.05 !	11.02 !	4.37 !	1.19 !	0.05 !	*
* 1.65 *	20.46 !	19.03 !	17.07 !	8.69 !	2.95 !	0.75 !	0.00 !	*
* 1.80 *	16.59 !	15.37 !	13.41 !	6.66 !	1.56 !	0.44 !	0.00 !	*
* 1.95 *	12.93 !	11.79 !	10.55 !	5.10 !	0.99 !	0.31 !	0.00 !	*
* 2.10 *	10.24 !	9.46 !	8.22 !	3.60 !	0.55 !	0.18 !	0.00 !	*
* 2.25 *	7.91 !	7.19 !	6.35 !	2.21 !	0.38 !	0.07 !	0.00 !	*
* 2.40 *	6.14 !	5.62 !	4.79 !	1.19 !	0.25 !	0.00 !	0.00 !	*
* 2.55 *	4.58 !	4.07 !	3.32 !	0.75 !	0.13 !	0.00 !	0.00 !	*
* 2.70 *	3.14 !	2.67 !	1.93 !	0.44 !	0.02 !	0.00 !	0.00 !	*
* 2.85 *	1.74 !	1.34 !	1.11 !	0.31 !	0.00 !	0.00 !	0.00 !	*
* 3.00 *	1.05 !	0.90 !	0.67 !	0.18 !	0.00 !	0.00 !	0.00 !	*
* 3.15 *	0.61 !	0.48 !	0.41 !	0.07 !	0.00 !	0.00 !	0.00 !	*
* 3.30 *	0.39 !	0.35 !	0.28 !	0.00 !	0.00 !	0.00 !	0.00 !	*
* 3.45 *	0.26 !	0.22 !	0.16 !	0.00 !	0.00 !	0.00 !	0.00 !	*
* 3.60 *	0.15 !	0.11 !	0.05 !	0.00 !	0.00 !	0.00 !	0.00 !	*
* 3.75 *	0.03 !	0.00 !	0.00 !	0.00 !	0.00 !	0.00 !	0.00 !	*
* 3.90 *	0.00 !	0.00 !	0.00 !	0.00 !	0.00 !	0.00 !	0.00 !	*
* 4.05 *	0.00 !	0.00 !	0.00 !	0.00 !	0.00 !	0.00 !	0.00 !	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : WITHOUT OPTION
- CELL : C9
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)								*
* depth *	-----								*
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	*	
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*	
* 0.00 *	* 47.23 !	* 46.57 !	* 44.61 !	* 39.95 !	* 27.65 !	* 18.46 !	* 7.02 !	*	
* 0.15 *	* 43.63 !	* 42.89 !	* 40.93 !	* 36.44 !	* 23.58 !	* 14.64 !	* 5.50 !	*	
* 0.30 *	* 39.95 !	* 39.22 !	* 37.36 !	* 32.96 !	* 19.32 !	* 12.03 !	* 4.18 !	*	
* 0.45 *	* 36.44 !	* 35.74 !	* 33.88 !	* 29.01 !	* 15.17 !	* 9.57 !	* 3.11 !	*	
* 0.60 *	* 32.96 !	* 32.26 !	* 30.09 !	* 24.94 !	* 12.55 !	* 7.75 !	* 2.26 !	*	
* 0.75 *	* 29.01 !	* 28.20 !	* 26.03 !	* 20.74 !	* 9.94 !	* 6.03 !	* 1.68 !	*	
* 0.90 *	* 24.94 !	* 24.13 !	* 21.87 !	* 16.48 !	* 8.11 !	* 4.70 !	* 1.33 !	*	
* 1.05 *	* 20.74 !	* 19.88 !	* 17.61 !	* 13.42 !	* 6.29 !	* 3.45 !	* 0.00 !	*	
* 1.20 *	* 16.48 !	* 15.62 !	* 14.12 !	* 10.81 !	* 4.97 !	* 2.60 !	* 0.00 !	*	
* 1.35 *	* 13.42 !	* 12.90 !	* 11.51 !	* 8.72 !	* 3.65 !	* 1.81 !	* 0.00 !	*	
* 1.50 *	* 10.81 !	* 10.29 !	* 9.21 !	* 6.90 !	* 2.77 !	* 1.47 !	* 0.00 !	*	
* 1.65 *	* 8.72 !	* 8.36 !	* 7.39 !	* 5.41 !	* 1.92 !	* 0.00 !	* 0.00 !	*	
* 1.80 *	* 6.90 !	* 6.53 !	* 5.76 !	* 4.09 !	* 1.54 !	* 0.00 !	* 0.00 !	*	
* 1.95 *	* 5.41 !	* 5.15 !	* 4.44 !	* 3.05 !	* 1.20 !	* 0.00 !	* 0.00 !	*	
* 2.10 *	* 4.09 !	* 3.82 !	* 3.28 !	* 2.20 !	* 0.00 !	* 0.00 !	* 0.00 !	*	
* 2.25 *	* 3.05 !	* 2.88 !	* 2.43 !	* 1.65 !	* 0.00 !	* 0.00 !	* 0.00 !	*	
* 2.40 *	* 2.20 !	* 2.03 !	* 1.75 !	* 1.31 !	* 0.00 !	* 0.00 !	* 0.00 !	*	
* 2.55 *	* 1.65 !	* 1.59 !	* 1.40 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*	
* 2.70 *	* 1.31 !	* 1.24 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*	

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							
* depth *	-----							
* (m) *	* 3 days *	* 5 days *	* 10 days *	* 20 days *	* 40 days *	* 60 days *	* 90 days *	*

* 0.00	* 338.35	* 330.52	* 317.16	* 271.00	* 184.51	* 150.54	* 108.70	*
* 0.15	* 306.16	* 298.32	* 285.08	* 239.81	* 156.56	* 126.10	* 88.29	*
* 0.30	* 274.65	* 267.14	* 253.63	* 208.27	* 132.08	* 102.74	* 69.15	*
* 0.45	* 242.18	* 234.66	* 221.05	* 177.64	* 107.77	* 82.95	* 55.52	*
* 0.60	* 210.23	* 203.23	* 189.80	* 148.53	* 87.74	* 64.99	* 34.46	*
* 0.75	* 178.54	* 171.68	* 158.77	* 121.92	* 68.85	* 50.76	* 26.65	*
* 0.90	* 149.42	* 143.32	* 131.97	* 100.34	* 54.11	* 31.42	* 20.97	*
* 1.05	* 123.84	* 117.79	* 107.84	* 79.30	* 33.71	* 25.66	* 17.19	*
* 1.20	* 99.66	* 95.18	* 86.94	* 54.30	* 27.58	* 20.26	* 13.21	*
* 1.35	* 81.35	* 76.93	* 60.48	* 42.62	* 21.86	* 16.88	* 11.18	*
* 1.50	* 57.70	* 54.17	* 48.61	* 34.56	* 18.07	* 13.08	* 1.04	*
* 1.65	* 46.57	* 42.80	* 38.12	* 27.84	* 13.91	* 11.17	* 0.10	*
* 1.80	* 36.77	* 34.63	* 31.35	* 22.90	* 11.80	* 1.02	* 0.00	*
* 1.95	* 30.40	* 28.26	* 25.43	* 18.86	* 9.88	* 0.79	* 0.00	*
* 2.10	* 24.52	* 23.12	* 21.18	* 16.25	* 0.86	* 0.00	* 0.00	*
* 2.25	* 20.94	* 19.54	* 17.85	* 13.15	* 0.00	* 0.00	* 0.00	*
* 2.40	* 17.66	* 16.73	* 15.43	* 11.32	* 0.00	* 0.00	* 0.00	*
* 2.55	* 15.27	* 13.50	* 12.48	* 9.46	* 0.00	* 0.00	* 0.00	*
* 2.70	* 12.38	* 11.64	* 10.68	* 0.71	* 0.00	* 0.00	* 0.00	*
* 2.85	* 10.58	* 9.84	* 0.86	* 0.00	* 0.00	* 0.00	* 0.00	*
* 3.00	* 0.86	* 0.77	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B

- COMMENT : 1977 - JAMALPUR (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)								*
* depth *	-----								*
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	*	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*
* 0.00 *	* 37.09 !	* 35.85 !	* 34.20 !	* 29.38 !	* 19.87 !	* 16.97 !	* 13.58 !	*	*
* 0.15 *	* 33.91 !	* 32.68 !	* 31.17 !	* 26.67 !	* 17.63 !	* 15.23 !	* 11.94 !	*	*
* 0.30 *	* 30.92 !	* 29.87 !	* 28.45 !	* 24.18 !	* 15.77 !	* 13.51 !	* 10.30 !	*	*
* 0.45 *	* 28.21 !	* 27.16 !	* 25.80 !	* 21.74 !	* 14.04 !	* 11.88 !	* 9.06 !	*	*
* 0.60 *	* 25.59 !	* 24.63 !	* 23.35 !	* 19.49 !	* 12.40 !	* 10.26 !	* 7.82 !	*	*
* 0.75 *	* 23.15 !	* 22.19 !	* 20.96 !	* 17.27 !	* 10.78 !	* 9.03 !	* 6.92 !	*	*
* 0.90 *	* 20.78 !	* 19.90 !	* 18.73 !	* 15.48 !	* 9.43 !	* 7.80 !	* 6.01 !	*	*
* 1.05 *	* 18.56 !	* 17.69 !	* 16.61 !	* 13.78 !	* 8.18 !	* 6.89 !	* 5.34 !	*	*
* 1.20 *	* 16.48 !	* 15.81 !	* 14.91 !	* 12.15 !	* 7.19 !	* 6.01 !	* 4.69 !	*	*
* 1.35 *	* 14.78 !	* 14.11 !	* 13.22 !	* 10.55 !	* 6.30 !	* 5.34 !	* 4.00 !	*	*
* 1.50 *	* 13.11 !	* 12.47 !	* 11.62 !	* 9.24 !	* 5.56 !	* 4.69 !	* 0.00 !	*	*
* 1.65 *	* 11.50 !	* 10.85 !	* 10.05 !	* 8.02 !	* 4.90 !	* 4.00 !	* 0.00 !	*	*
* 1.80 *	* 9.97 !	* 9.48 !	* 8.83 !	* 7.07 !	* 4.23 !	* 0.00 !	* 0.00 !	*	*
* 1.95 *	* 8.75 !	* 8.26 !	* 7.66 !	* 6.19 !	* 3.54 !	* 0.00 !	* 0.00 !	*	*
* 2.10 *	* 7.60 !	* 7.25 !	* 6.78 !	* 5.47 !	* 0.00 !	* 0.00 !	* 0.00 !	*	*
* 2.25 *	* 6.72 !	* 6.36 !	* 5.91 !	* 4.82 !	* 0.00 !	* 0.00 !	* 0.00 !	*	*
* 2.40 *	* 5.86 !	* 5.60 !	* 5.25 !	* 4.14 !	* 0.00 !	* 0.00 !	* 0.00 !	*	*
* 2.55 *	* 5.21 !	* 4.95 !	* 4.60 !	* 3.45 !	* 0.00 !	* 0.00 !	* 0.00 !	*	*
* 2.70 *	* 4.55 !	* 4.27 !	* 3.91 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*	*
* 2.85 *	* 3.86 !	* 3.59 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B

- COMMENT : 1977 - SHARISABARI (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977

* Flood *								
* depth *-----Area Flooded (Km2)-----*								
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	* *
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*
* 0.00 *	* 19.11 !	* 18.38 !	* 17.50 !	* 14.47 !	* 7.74 !	* 5.67 !	* 3.34 !	* *
* 0.15 *	* 17.46 !	* 16.73 !	* 15.80 !	* 12.71 !	* 6.03 !	* 4.49 !	* 2.45 !	* *
* 0.30 *	* 15.77 !	* 14.99 !	* 14.06 !	* 10.92 !	* 4.83 !	* 3.38 !	* 1.75 !	* *
* 0.45 *	* 14.03 !	* 13.24 !	* 12.29 !	* 9.14 !	* 3.65 !	* 2.49 !	* 1.53 !	* *
* 0.60 *	* 12.26 !	* 11.46 !	* 10.50 !	* 7.42 !	* 2.74 !	* 1.75 !	* 1.31 !	* *
* 0.75 *	* 10.47 !	* 9.67 !	* 8.74 !	* 5.80 !	* 1.85 !	* 1.53 !	* 1.14 !	* *
* 0.90 *	* 8.71 !	* 7.94 !	* 7.03 !	* 4.61 !	* 1.60 !	* 1.31 !	* 0.98 !	* *
* 1.05 *	* 7.00 !	* 6.23 !	* 5.51 !	* 3.49 !	* 1.38 !	* 1.14 !	* 0.86 !	* *
* 1.20 *	* 5.49 !	* 4.96 !	* 4.33 !	* 2.58 !	* 1.20 !	* 0.98 !	* 0.73 !	* *
* 1.35 *	* 4.31 !	* 3.78 !	* 3.26 !	* 1.81 !	* 1.04 !	* 0.86 !	* 0.61 !	* *
* 1.50 *	* 3.24 !	* 2.85 !	* 2.37 !	* 1.57 !	* 0.90 !	* 0.73 !	* 0.00 !	* *
* 1.65 *	* 2.35 !	* 1.95 !	* 1.72 !	* 1.35 !	* 0.78 !	* 0.61 !	* 0.00 !	* *
* 1.80 *	* 1.71 !	* 1.62 !	* 1.50 !	* 1.18 !	* 0.65 !	* 0.00 !	* 0.00 !	* *
* 1.95 *	* 1.48 !	* 1.39 !	* 1.28 !	* 1.01 !	* 0.53 !	* 0.00 !	* 0.00 !	* *
* 2.10 *	* 1.27 !	* 1.21 !	* 1.12 !	* 0.88 !	* 0.00 !	* 0.00 !	* 0.00 !	* *
* 2.25 *	* 1.11 !	* 1.05 !	* 0.96 !	* 0.76 !	* 0.00 !	* 0.00 !	* 0.00 !	* *
* 2.40 *	* 0.95 !	* 0.91 !	* 0.84 !	* 0.64 !	* 0.00 !	* 0.00 !	* 0.00 !	* *
* 2.55 *	* 0.83 !	* 0.78 !	* 0.72 !	* 0.51 !	* 0.00 !	* 0.00 !	* 0.00 !	* *
* 2.70 *	* 0.71 !	* 0.66 !	* 0.59 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* *
* 2.85 *	* 0.59 !	* 0.54 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* *
* 3.00 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* *

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B

- COMMENT : 1977 - MELANDAHA (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*
* 0.00 *	* 97.76 !	* 95.12 !	* 91.53 !	* 75.90 !	* 48.63 !	* 39.93 !	* 30.45 !	* 30.45 *
* 0.15 *	* 87.91 !	* 85.25 !	* 81.79 !	* 66.54 !	* 41.40 !	* 34.13 !	* 25.88 !	* 25.88 *
* 0.30 *	* 78.11 !	* 75.75 !	* 72.20 !	* 57.33 !	* 35.56 !	* 28.77 !	* 21.08 !	* 21.08 *
* 0.45 *	* 68.40 !	* 66.02 !	* 62.51 !	* 49.01 !	* 29.83 !	* 24.17 !	* 17.57 !	* 17.57 *
* 0.60 *	* 59.03 !	* 56.92 !	* 53.69 !	* 41.70 !	* 25.26 !	* 19.71 !	* 10.79 !	* 10.79 *
* 0.75 *	* 50.25 !	* 48.28 !	* 45.36 !	* 35.18 !	* 20.57 !	* 16.61 !	* 9.11 !	* 9.11 *
* 0.90 *	* 42.77 !	* 41.15 !	* 38.63 !	* 29.43 !	* 17.32 !	* 10.13 !	* 7.59 !	* 7.59 *
* 1.05 *	* 36.04 !	* 34.46 !	* 32.10 !	* 24.25 !	* 10.52 !	* 8.67 !	* 6.57 !	* 6.57 *
* 1.20 *	* 29.97 !	* 28.74 !	* 26.76 !	* 16.41 !	* 9.07 !	* 7.24 !	* 5.91 !	* 5.91 *
* 1.35 *	* 24.81 !	* 23.63 !	* 18.18 !	* 13.42 !	* 7.58 !	* 6.57 !	* 5.19 !	* 5.19 *
* 1.50 *	* 17.29 !	* 16.40 !	* 15.13 !	* 11.22 !	* 6.79 !	* 5.91 !	* 0.00 !	* 0.00 *
* 1.65 *	* 14.41 !	* 13.33 !	* 12.23 !	* 9.61 !	* 6.13 !	* 5.19 !	* 0.00 !	* 0.00 *
* 1.80 *	* 11.92 !	* 11.36 !	* 10.61 !	* 8.32 !	* 5.43 !	* 0.00 !	* 0.00 !	* 0.00 *
* 1.95 *	* 10.42 !	* 9.86 !	* 9.17 !	* 7.42 !	* 4.70 !	* 0.00 !	* 0.00 !	* 0.00 *
* 2.10 *	* 8.87 !	* 8.50 !	* 8.02 !	* 6.70 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 2.25 *	* 7.96 !	* 7.60 !	* 7.14 !	* 6.05 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 2.40 *	* 7.09 !	* 6.83 !	* 6.48 !	* 5.34 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 2.55 *	* 6.44 !	* 6.18 !	* 5.82 !	* 4.60 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 2.70 *	* 5.77 !	* 5.48 !	* 5.09 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *
* 2.85 *	* 5.04 !	* 4.75 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B

- COMMENT : 1977 - ISLAMPUR (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*
* 0.00 *	* 49.69 !	* 49.26 !	* 47.94 !	* 42.18 !	* 34.05 !	* 28.70 !	* 21.07 !	*
* 0.15 *	* 44.28 !	* 43.85 !	* 42.51 !	* 37.30 !	* 28.67 !	* 23.67 !	* 16.25 !	*
* 0.30 *	* 39.32 !	* 38.96 !	* 37.52 !	* 31.55 !	* 23.83 !	* 18.61 !	* 12.59 !	*
* 0.45 *	* 33.54 !	* 33.18 !	* 31.52 !	* 26.37 !	* 18.73 !	* 14.31 !	* 9.33 !	*
* 0.60 *	* 28.01 !	* 27.78 !	* 26.25 !	* 21.05 !	* 14.42 !	* 10.94 !	* 1.70 !	*
* 0.75 *	* 22.59 !	* 22.36 !	* 20.79 !	* 16.19 !	* 11.01 !	* 6.82 !	* 0.08 !	*
* 0.90 *	* 17.54 !	* 17.39 !	* 16.04 !	* 12.56 !	* 7.12 !	* 0.11 !	* 0.00 !	*
* 1.05 *	* 13.59 !	* 13.44 !	* 12.42 !	* 8.03 !	* 0.12 !	* 0.04 !	* 0.00 !	*
* 1.20 *	* 9.04 !	* 8.93 !	* 8.05 !	* 0.20 !	* 0.06 !	* 0.00 !	* 0.00 !	*
* 1.35 *	* 6.41 !	* 6.30 !	* 0.30 !	* 0.10 !	* 0.01 !	* 0.00 !	* 0.00 !	*
* 1.50 *	* 0.13 !	* 0.13 !	* 0.10 !	* 0.03 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 1.65 *	* 0.06 !	* 0.04 !	* 0.02 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 1.80 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 1.95 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 2.10 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 2.25 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 2.40 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 2.55 *	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B

- COMMENT : 1977 - DEWANGANJ (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)								*
* depth *	-----								*
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	*	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*
* 0.00 *	* 12.83 !	* 12.83 !	* 12.25 !	* 10.69 !	* 8.43 !	* 6.44 !	* 4.12 !	* 4.12 *	* 4.12 *
* 0.15 *	* 11.05 !	* 11.05 !	* 10.46 !	* 8.90 !	* 6.68 !	* 4.97 !	* 3.11 !	* 3.11 *	* 3.11 *
* 0.30 *	* 9.26 !	* 9.26 !	* 8.67 !	* 7.15 !	* 5.11 !	* 3.91 !	* 2.40 !	* 2.40 *	* 2.40 *
* 0.45 *	* 7.50 !	* 7.50 !	* 6.91 !	* 5.39 !	* 4.05 !	* 2.97 !	* 1.73 !	* 1.73 *	* 1.73 *
* 0.60 *	* 5.74 !	* 5.74 !	* 5.25 !	* 4.33 !	* 3.06 !	* 2.26 !	* 0.00 !	* 0.00 *	* 0.00 *
* 0.75 *	* 4.55 !	* 4.55 !	* 4.19 !	* 3.28 !	* 2.36 !	* 1.63 !	* 0.00 !	* 0.00 *	* 0.00 *
* 0.90 *	* 3.49 !	* 3.49 !	* 3.16 !	* 2.55 !	* 1.70 !	* 0.00 !	* 0.00 !	* 0.00 *	* 0.00 *
* 1.05 *	* 2.69 !	* 2.69 !	* 2.45 !	* 1.84 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *	* 0.00 *
* 1.20 *	* 1.98 !	* 1.98 !	* 1.76 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *	* 0.00 *
* 1.35 *	* 1.45 !	* 1.45 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 *	* 0.00 *

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B

- COMMENT : 1977 - MADERGANJ (AREA WITHIN EMBANKMENTS)

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*
* 0.00	* 128.11	* 125.70	* 120.63	* 105.45	* 71.72	* 57.15	* 38.59	*
* 0.15	* 118.51	* 116.10	* 110.59	* 93.94	* 61.05	* 47.04	* 30.59	*
* 0.30	* 108.07	* 105.13	* 99.05	* 82.36	* 50.78	* 37.40	* 22.67	*
* 0.45	* 96.24	* 93.30	* 87.23	* 69.96	* 40.67	* 29.41	* 17.54	*
* 0.60	* 84.05	* 81.16	* 74.77	* 57.94	* 32.35	* 21.91	* 12.61	*
* 0.75	* 71.26	* 68.37	* 62.14	* 46.86	* 24.35	* 16.78	* 9.40	*
* 0.90	* 59.07	* 56.39	* 51.03	* 37.91	* 18.64	* 12.07	* 6.39	*
* 1.05	* 48.38	* 45.70	* 40.94	* 29.76	* 13.51	* 8.92	* 4.42	*
* 1.20	* 38.68	* 36.74	* 32.89	* 22.95	* 10.07	* 6.03	* 1.88	*
* 1.35	* 31.04	* 29.10	* 25.51	* 16.73	* 6.92	* 4.11	* 1.38	*
* 1.50	* 23.93	* 22.33	* 19.39	* 12.51	* 4.83	* 1.75	* 1.04	*
* 1.65	* 18.25	* 16.64	* 14.10	* 8.86	* 2.10	* 1.37	* 0.10	*
* 1.80	* 13.17	* 12.17	* 10.41	* 6.33	* 1.49	* 1.02	* 0.00	*
* 1.95	* 9.74	* 8.74	* 7.31	* 4.24	* 1.11	* 0.79	* 0.00	*
* 2.10	* 6.78	* 6.16	* 5.26	* 3.20	* 0.86	* 0.00	* 0.00	*
* 2.25	* 5.15	* 4.53	* 3.85	* 1.53	* 0.00	* 0.00	* 0.00	*
* 2.40	* 3.75	* 3.40	* 2.86	* 1.21	* 0.00	* 0.00	* 0.00	*
* 2.55	* 2.79	* 1.59	* 1.35	* 0.89	* 0.00	* 0.00	* 0.00	*
* 2.70	* 1.35	* 1.22	* 1.09	* 0.71	* 0.00	* 0.00	* 0.00	*
* 2.85	* 1.09	* 0.96	* 0.86	* 0.00	* 0.00	* 0.00	* 0.00	*
* 3.00	* 0.86	* 0.77	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C1

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	*

* 0.00 *	49.40 !	47.49 !	44.05 !	34.97 !	18.07 !	13.71 !	9.13 !	*
* 0.15 *	43.66 !	41.75 !	38.45 !	29.75 !	14.89 !	11.26 !	7.16 !	*
* 0.30 *	38.10 !	36.36 !	33.23 !	25.20 !	12.24 !	8.87 !	5.19 !	*
* 0.45 *	32.88 !	31.14 !	28.20 !	20.70 !	9.78 !	6.90 !	4.14 !	*
* 0.60 *	27.90 !	26.40 !	23.70 !	17.43 !	7.69 !	5.05 !	3.09 !	*
* 0.75 *	23.40 !	21.90 !	19.55 !	14.25 !	5.72 !	4.00 !	2.39 !	*
* 0.90 *	19.34 !	18.28 !	16.37 !	11.75 !	4.42 !	3.00 !	1.69 !	*
* 1.05 *	16.16 !	15.10 !	13.39 !	9.29 !	3.37 !	2.30 !	1.18 !	*
* 1.20 *	13.22 !	12.40 !	10.93 !	7.29 !	2.58 !	1.62 !	0.00 !	*
* 1.35 *	10.77 !	9.95 !	8.60 !	5.32 !	1.88 !	1.11 !	0.00 !	*
* 1.50 *	8.47 !	7.82 !	6.63 !	4.21 !	1.32 !	0.00 !	0.00 !	*
* 1.65 *	6.50 !	5.85 !	4.91 !	3.16 !	0.00 !	0.00 !	0.00 !	*
* 1.80 *	4.84 !	4.49 !	3.86 !	2.44 !	0.00 !	0.00 !	0.00 !	*
* 1.95 *	3.79 !	3.44 !	2.90 !	1.74 !	0.00 !	0.00 !	0.00 !	*
* 2.10 *	2.86 !	2.62 !	2.20 !	1.21 !	0.00 !	0.00 !	0.00 !	*
* 2.25 *	2.16 !	1.92 !	1.55 !	0.00 !	0.00 !	0.00 !	0.00 !	*
* 2.40 *	1.52 !	1.35 !	1.04 !	0.00 !	0.00 !	0.00 !	0.00 !	*
* 2.55 *	1.01 !	0.00 !	0.00 !	0.00 !	0.00 !	0.00 !	0.00 !	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C2
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

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*****
* Flood *                               Area Flooded (Km2) *
* depth *-----*
* (m) * 3 days ! 5 days !10 days !20 days !40 days !60 days !90 days *
*-----*-----*-----*-----*-----*-----*-----*
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* 0.00 * 42.02 ! 40.94 ! 39.71 ! 34.73 ! 20.96 ! 16.07 ! 10.50 *
* 0.15 * 39.71 ! 38.63 ! 37.12 ! 31.61 ! 16.81 ! 13.29 ! 8.25 *
* 0.30 * 37.12 ! 35.72 ! 34.13 ! 28.00 ! 14.03 ! 10.65 ! 6.27 *
* 0.45 * 34.13 ! 32.73 ! 30.89 ! 24.28 ! 11.25 ! 8.40 ! 4.84 *
* 0.60 * 30.89 ! 29.20 ! 27.28 ! 20.13 ! 9.00 ! 6.37 ! 3.61 *
* 0.75 * 27.28 ! 25.59 ! 23.45 ! 16.25 ! 6.75 ! 4.93 ! 2.79 *
* 0.90 * 23.45 ! 21.51 ! 19.30 ! 13.47 ! 5.31 ! 3.66 ! 2.12 *
* 1.05 * 19.30 ! 17.36 ! 15.70 ! 10.80 ! 3.88 ! 2.85 ! 1.72 *
* 1.20 * 15.70 ! 14.40 ! 12.92 ! 8.55 ! 3.06 ! 2.14 ! 1.36 *
* 1.35 * 12.92 ! 11.62 ! 10.35 ! 6.46 ! 2.25 ! 1.74 ! 1.10 *
* 1.50 * 10.35 ! 9.30 ! 8.10 ! 5.03 ! 1.85 ! 1.38 ! 0.87 *
* 1.65 * 8.10 ! 7.05 ! 6.18 ! 3.72 ! 1.45 ! 1.12 ! 0.00 *
* 1.80 * 6.18 ! 5.51 ! 4.74 ! 2.90 ! 1.19 ! 0.88 ! 0.00 *
* 1.95 * 4.74 ! 4.07 ! 3.55 ! 2.17 ! 0.93 ! 0.70 ! 0.00 *
* 2.10 * 3.55 ! 3.17 ! 2.74 ! 1.77 ! 0.75 ! 0.00 ! 0.00 *
* 2.25 * 2.74 ! 2.36 ! 2.09 ! 1.40 ! 0.00 ! 0.00 ! 0.00 *
* 2.40 * 2.09 ! 1.90 ! 1.69 ! 1.14 ! 0.00 ! 0.00 ! 0.00 *
* 2.55 * 1.69 ! 1.50 ! 1.35 ! 0.89 ! 0.00 ! 0.00 ! 0.00 *
* 2.70 * 1.35 ! 1.22 ! 1.09 ! 0.71 ! 0.00 ! 0.00 ! 0.00 *
* 2.85 * 1.09 ! 0.96 ! 0.86 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
* 3.00 * 0.86 ! 0.77 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
*****
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MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C3

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)								*
* depth *	-----								*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*	*

* 0.00	* 90.99	* 87.95	* 83.90	* 71.96	* 47.71	* 40.29	* 31.62	*	*
* 0.15	* 83.39	* 80.35	* 76.54	* 65.09	* 42.08	* 35.94	* 27.57	*	*
* 0.30	* 76.08	* 73.33	* 69.67	* 58.83	* 37.39	* 31.62	* 23.52	*	*
* 0.45	* 69.21	* 66.46	* 62.97	* 52.62	* 33.05	* 27.57	* 20.82	*	*
* 0.60	* 62.56	* 60.08	* 56.76	* 46.96	* 28.92	* 23.52	* 18.13	*	*
* 0.75	* 56.35	* 53.87	* 50.71	* 41.33	* 24.87	* 20.82	* 16.18	*	*
* 0.90	* 50.33	* 48.08	* 45.08	* 36.81	* 21.72	* 18.13	* 14.23	*	*
* 1.05	* 44.71	* 42.46	* 39.71	* 32.47	* 19.03	* 16.18	* 12.77	*	*
* 1.20	* 39.42	* 37.68	* 35.37	* 28.38	* 16.83	* 14.23	* 11.34	*	*
* 1.35	* 35.08	* 33.34	* 31.08	* 24.33	* 14.88	* 12.77	* 9.80	*	*
* 1.50	* 30.81	* 29.19	* 27.03	* 21.36	* 13.24	* 11.34	* 0.00	*	*
* 1.65	* 26.76	* 25.14	* 23.16	* 18.67	* 11.81	* 9.80	* 0.00	*	*
* 1.80	* 22.98	* 21.90	* 20.47	* 16.57	* 10.31	* 0.00	* 0.00	*	*
* 1.95	* 20.29	* 19.21	* 17.87	* 14.62	* 8.77	* 0.00	* 0.00	*	*
* 2.10	* 17.74	* 16.96	* 15.92	* 13.05	* 0.00	* 0.00	* 0.00	*	*
* 2.25	* 15.79	* 15.01	* 14.00	* 11.62	* 0.00	* 0.00	* 0.00	*	*
* 2.40	* 13.91	* 13.34	* 12.57	* 10.11	* 0.00	* 0.00	* 0.00	*	*
* 2.55	* 12.48	* 11.91	* 11.14	* 8.56	* 0.00	* 0.00	* 0.00	*	*
* 2.70	* 11.03	* 10.42	* 9.59	* 0.00	* 0.00	* 0.00	* 0.00	*	*
* 2.85	* 9.49	* 8.87	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C4
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

* Flood *	Area Flooded (Km2)							
* depth *	-----							
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	* *

* 0.00 *	53.87 !	53.87 !	52.37 !	49.11 !	42.64 !	34.72 !	23.08 !	*
* 0.15 *	50.11 !	50.11 !	48.61 !	44.41 !	37.31 !	28.00 !	18.09 !	*
* 0.30 *	45.84 !	45.84 !	43.70 !	39.09 !	30.69 !	21.75 !	13.11 !	*
* 0.45 *	40.51 !	40.51 !	38.38 !	32.93 !	23.98 !	16.77 !	9.80 !	*
* 0.60 *	34.72 !	34.72 !	32.03 !	26.21 !	18.76 !	12.23 !	6.49 !	*
* 0.75 *	28.01 !	28.01 !	25.32 !	20.42 !	13.77 !	8.92 !	4.50 !	*
* 0.90 *	21.75 !	21.75 !	19.76 !	15.44 !	10.24 !	5.89 !	2.60 !	*
* 1.05 *	16.77 !	16.77 !	14.77 !	11.34 !	6.93 !	3.99 !	1.53 !	*
* 1.20 *	12.23 !	12.23 !	10.90 !	8.04 !	4.75 !	2.27 !	0.51 !	*
* 1.35 *	8.92 !	8.92 !	7.59 !	5.38 !	2.85 !	1.26 !	0.28 !	*
* 1.50 *	5.89 !	5.89 !	5.13 !	3.48 !	1.66 !	0.36 !	0.17 !	*
* 1.65 *	3.99 !	3.99 !	3.23 !	2.00 !	0.65 !	0.25 !	0.10 !	*
* 1.80 *	2.27 !	2.27 !	1.86 !	0.99 !	0.30 !	0.14 !	0.00 !	*
* 1.95 *	1.26 !	1.26 !	0.85 !	0.33 !	0.18 !	0.09 !	0.00 !	*
* 2.10 *	0.36 !	0.36 !	0.32 !	0.22 !	0.11 !	0.00 !	0.00 !	*
* 2.25 *	0.25 !	0.25 !	0.20 !	0.13 !	0.00 !	0.00 !	0.00 !	*
* 2.40 *	0.14 !	0.14 !	0.12 !	0.08 !	0.00 !	0.00 !	0.00 !	*
* 2.55 *	0.09 !	0.09 !	0.00 !	0.00 !	0.00 !	0.00 !	0.00 !	*



MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C5

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

```
*****
* Flood *                               Area Flooded (Km2)                               *
* depth *-----*-----*-----*-----*-----*-----*-----*-----*-----*
* (m) * 3 days ! 5 days ! 10 days ! 20 days ! 40 days ! 60 days ! 90 days *
*-----*-----*-----*-----*-----*-----*-----*-----*-----*
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* 0.00 * 20.17 ! 19.50 ! 18.82 ! 13.98 ! 4.85 ! 2.67 ! 0.62 *
* 0.15 * 17.64 ! 16.95 ! 16.25 ! 11.32 ! 3.15 ! 1.57 ! 0.27 *
* 0.30 * 15.03 ! 14.33 ! 13.63 ! 8.56 ! 2.01 ! 0.71 ! 0.08 *
* 0.45 * 12.41 ! 11.69 ! 10.96 ! 6.09 ! 0.90 ! 0.37 ! 0.03 *
* 0.60 * 9.67 ! 8.93 ! 8.20 ! 4.39 ! 0.50 ! 0.10 ! 0.00 *
* 0.75 * 6.91 ! 6.31 ! 5.86 ! 2.82 ! 0.16 ! 0.04 ! 0.00 *
* 0.90 * 5.07 ! 4.62 ! 4.17 ! 1.71 ! 0.06 ! 0.00 ! 0.00 *
* 1.05 * 3.38 ! 2.97 ! 2.67 ! 0.76 ! 0.01 ! 0.00 ! 0.00 *
* 1.20 * 2.16 ! 1.86 ! 1.57 ! 0.41 ! 0.00 ! 0.00 ! 0.00 *
* 1.35 * 1.05 ! 0.81 ! 0.71 ! 0.10 ! 0.00 ! 0.00 ! 0.00 *
* 1.50 * 0.55 ! 0.46 ! 0.37 ! 0.05 ! 0.00 ! 0.00 ! 0.00 *
* 1.65 * 0.20 ! 0.11 ! 0.10 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
* 1.80 * 0.07 ! 0.06 ! 0.04 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
* 1.95 * 0.01 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
* 2.10 * 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
* 2.25 * 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
* 2.40 * 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
* 2.55 * 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
* 2.70 * 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
* 2.85 * 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
*****
```


MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C6

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

```
*****
* Flood *                               Area Flooded (Km2) *
* depth *-----*
* (m) * 3 days ! 5 days ! 10 days ! 20 days ! 40 days ! 60 days ! 90 days *
*-----*-----*-----*-----*-----*-----*-----*
* * * * *
* 0.00 * 10.07 ! 9.84 ! 9.38 ! 7.01 ! 3.68 ! 3.09 ! 2.51 *
* 0.15 * 8.35 ! 8.12 ! 7.66 ! 5.61 ! 2.70 ! 2.23 ! 1.84 *
* 0.30 * 6.73 ! 6.55 ! 6.17 ! 4.27 ! 1.97 ! 1.59 ! 1.20 *
* 0.45 * 5.33 ! 5.15 ! 4.77 ! 3.29 ! 1.33 ! 1.05 ! 0.85 *
* 0.60 * 4.07 ! 3.94 ! 3.68 ! 2.35 ! 0.91 ! 0.71 ! 0.51 *
* 0.75 * 3.09 ! 2.96 ! 2.70 ! 1.71 ! 0.58 ! 0.43 ! 0.33 *
* 0.90 * 2.23 ! 2.14 ! 1.97 ! 1.12 ! 0.36 ! 0.26 ! 0.00 *
* 1.05 * 1.59 ! 1.50 ! 1.33 ! 0.78 ! 0.00 ! 0.00 ! 0.00 *
* 1.20 * 1.05 ! 1.00 ! 0.91 ! 0.47 ! 0.00 ! 0.00 ! 0.00 *
* 1.35 * 0.71 ! 0.67 ! 0.58 ! 0.29 ! 0.00 ! 0.00 ! 0.00 *
* 1.50 * 0.43 ! 0.41 ! 0.36 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
* 1.65 * 0.26 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
*****
```


MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C7

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

```
*****
* Flood *                               Area Flooded (Km2)                               *
* depth *-----*
* (m) * 3 days ! 5 days !10 days !20 days !40 days !60 days !90 days *
*-----*-----*-----*-----*-----*-----*-----*
* * * * *
* 0.00 * 33.06 ! 33.06 ! 32.60 ! 31.22 ! 28.87 ! 25.66 ! 19.90 *
* 0.15 * 31.54 ! 31.54 ! 31.01 ! 29.63 ! 26.04 ! 22.61 ! 16.61 *
* 0.30 * 29.95 ! 29.95 ! 29.25 ! 26.79 ! 23.06 ! 19.22 ! 13.90 *
* 0.45 * 27.36 ! 27.36 ! 26.42 ! 23.96 ! 19.68 ! 16.07 ! 11.22 *
* 0.60 * 24.53 ! 24.53 ! 23.51 ! 20.58 ! 16.43 ! 13.36 ! 0.00 *
* 0.75 * 21.25 ! 21.25 ! 20.13 ! 17.20 ! 13.72 ! 10.71 ! 0.00 *
* 0.90 * 17.87 ! 17.87 ! 16.79 ! 14.45 ! 11.05 ! 0.00 ! 0.00 *
* 1.05 * 14.99 ! 14.99 ! 14.08 ! 11.74 ! 0.00 ! 0.00 ! 0.00 *
* 1.20 * 12.28 ! 12.28 ! 11.39 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
* 1.35 * 9.70 ! 9.70 ! 0.00 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
*****
```

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MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C8
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

```
*****
* Flood *                               Area Flooded (Km2) *
* depth *-----*
* (m) * 3 days ! 5 days ! 10 days ! 20 days ! 40 days ! 60 days ! 90 days *
*-----*-----*-----*-----*-----*-----*-----*
* * * * *
* 0.00 * 26.39 ! 25.50 ! 24.31 ! 17.56 ! 9.62 ! 7.19 ! 5.41 *
* 0.15 * 21.94 ! 21.05 ! 19.86 ! 13.90 ! 7.29 ! 5.62 ! 3.88 *
* 0.30 * 17.81 ! 17.07 ! 16.10 ! 10.86 ! 5.72 ! 4.07 ! 2.49 *
* 0.45 * 14.15 ! 13.41 ! 12.44 ! 8.53 ! 4.16 ! 2.67 ! 1.28 *
* 0.60 * 11.02 ! 10.55 ! 9.93 ! 6.56 ! 2.76 ! 1.34 ! 0.84 *
* 0.75 * 8.69 ! 8.22 ! 7.60 ! 4.99 ! 1.37 ! 0.90 ! 0.46 *
* 0.90 * 6.66 ! 6.35 ! 5.93 ! 3.51 ! 0.93 ! 0.48 ! 0.33 *
* 1.05 * 5.10 ! 4.79 ! 4.37 ! 2.11 ! 0.49 ! 0.35 ! 0.00 *
* 1.20 * 3.60 ! 3.32 ! 2.95 ! 1.16 ! 0.36 ! 0.00 ! 0.00 *
* 1.35 * 2.21 ! 1.93 ! 1.56 ! 0.72 ! 0.00 ! 0.00 ! 0.00 *
* 1.50 * 1.19 ! 1.11 ! 0.99 ! 0.43 ! 0.00 ! 0.00 ! 0.00 *
* 1.65 * 0.75 ! 0.67 ! 0.55 ! 0.30 ! 0.00 ! 0.00 ! 0.00 *
* 1.80 * 0.44 ! 0.41 ! 0.38 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
* 1.95 * 0.31 ! 0.28 ! 0.25 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
*****
```

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C9
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 20-05-1977 to 17-10-1977

```

*****
* Flood *                               Area Flooded (Km2)                               *
* depth *-----*-----*-----*-----*-----*-----*-----*-----*-----*
* (m) * 3 days ! 5 days ! 10 days ! 20 days ! 40 days ! 60 days ! 90 days *
*-----*-----*-----*-----*-----*-----*-----*-----*-----*
* * ! ! ! ! ! ! ! ! ! !
* 0.00 * 12.38 ! 12.38 ! 12.03 ! 10.46 ! 8.11 ! 7.14 ! 5.94 *
* 0.15 * 9.82 ! 9.82 ! 9.58 ! 8.48 ! 6.29 ! 5.59 ! 4.62 *
* 0.30 * 7.99 ! 7.99 ! 7.75 ! 6.65 ! 4.97 ! 4.26 ! 3.39 *
* 0.45 * 6.20 ! 6.20 ! 6.03 ! 5.23 ! 3.65 ! 3.16 ! 2.54 *
* 0.60 * 4.88 ! 4.88 ! 4.70 ! 3.91 ! 2.77 ! 2.31 ! 1.79 *
* 0.75 * 3.56 ! 3.56 ! 3.45 ! 2.94 ! 1.92 ! 0.00 ! 0.00 *
* 0.90 * 2.71 ! 2.71 ! 2.60 ! 2.09 ! 0.00 ! 0.00 ! 0.00 *
* 1.05 * 1.86 ! 1.86 ! 1.81 ! 0.00 ! 0.00 ! 0.00 ! 0.00 *
*****

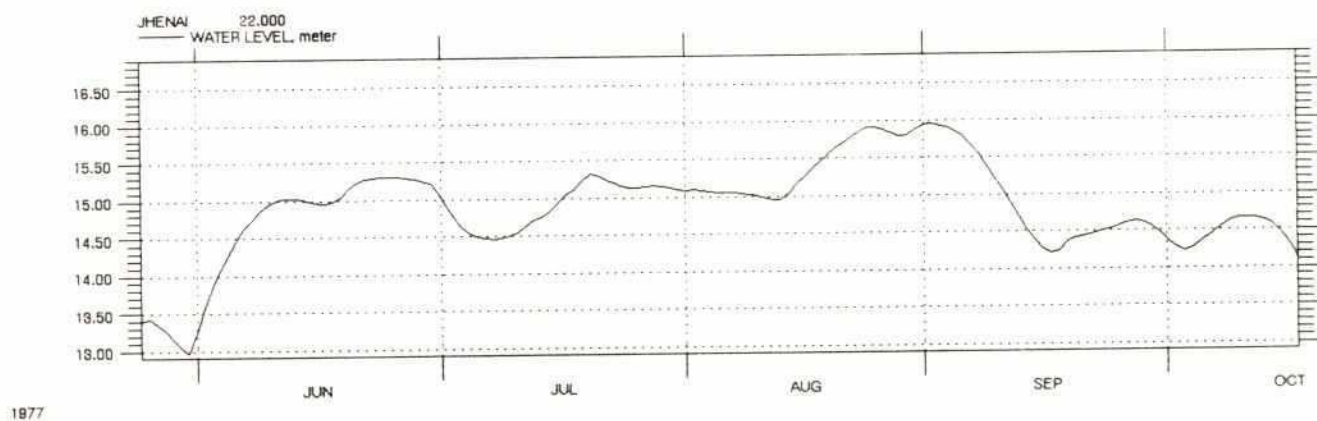
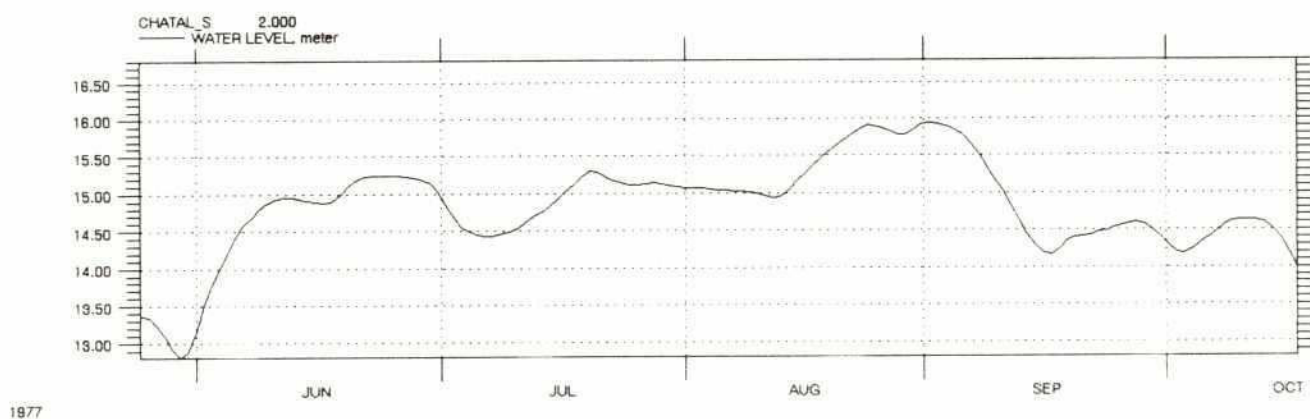
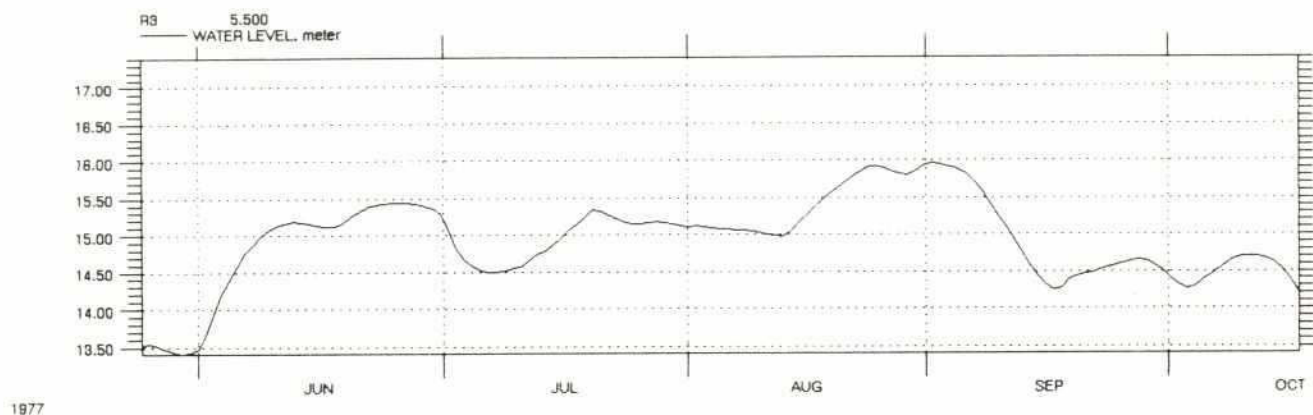
```

HYDROGRAPH OF CELL REPRESENTATIVE CALCULATION POINT

With Option B (1977,1980,1987,1988,1989)

MAX. WATER LEVEL OF REPRESENTATIVE CELL CALCULATION POINTS
(WITH OPTION B)

* Name of *	* Calculation Point *			MAXIMUM CELL WATER LEVEL m(Average *										
* Cell	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	* Maximum *				
* *River name*	Km	* 1977	!	1980	!	1987	!	1988	!	1989	! WL m(PWD)*			
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*			
* C-1	* R3	* 5.500	* 15.96	!	16.60	!	16.18	!	16.37	!	15.82	!	16.19	*
* C-2	* CHATAL_S	* 2.000	* 15.94	!	16.65	!	16.16	!	16.36	!	15.81	!	16.18	*
* C-3	* JHENAI	* 22.000	* 15.95	!	16.66	!	16.17	!	16.37	!	18.50	!	16.73	*
* C-4	* R2	* 11.000	* 17.47	!	17.64	!	17.65	!	17.61	!	17.64	!	17.60	*
* C-5	* DADBHANGA	* 32.200	* 16.17	!	16.77	!	16.50	!	16.54	!	16.29	!	16.45	*
* C-6	* R5	* 4.000	* 16.25	!	16.80	!	16.53	!	16.58	!	16.39	!	16.51	*
* C-7	* R1	* 2.500	* 18.16	!	18.39	!	18.20	!	18.29	!	18.12	!	18.23	*
* C-8	* DADBHANGA	* 20.200	* 16.24	!	16.80	!	16.58	!	16.59	!	16.40	!	16.52	*
* C-9	* DADBHANGA	* 2.200	* 17.36	!	17.47	!	17.75	!	17.60	!	17.58	!	17.55	*


SWMC
OPTION B

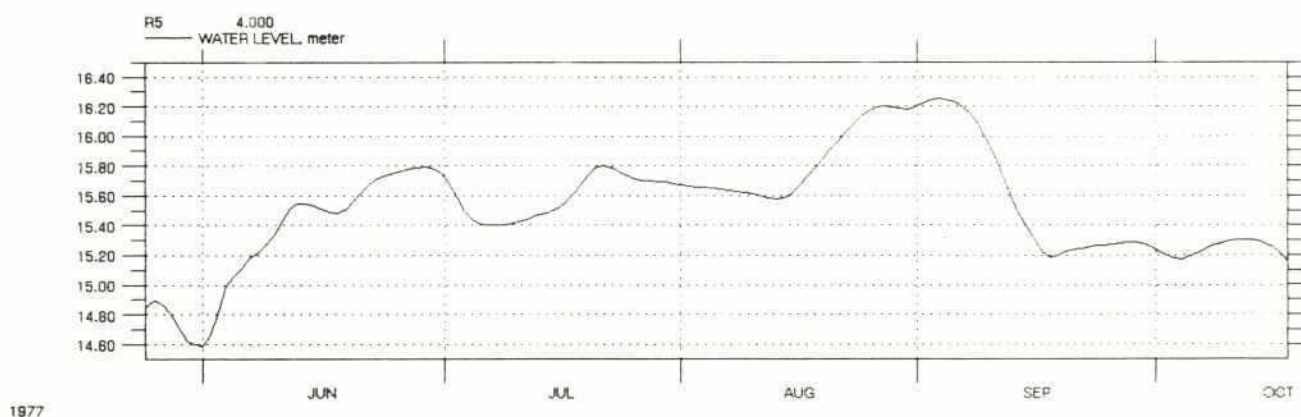
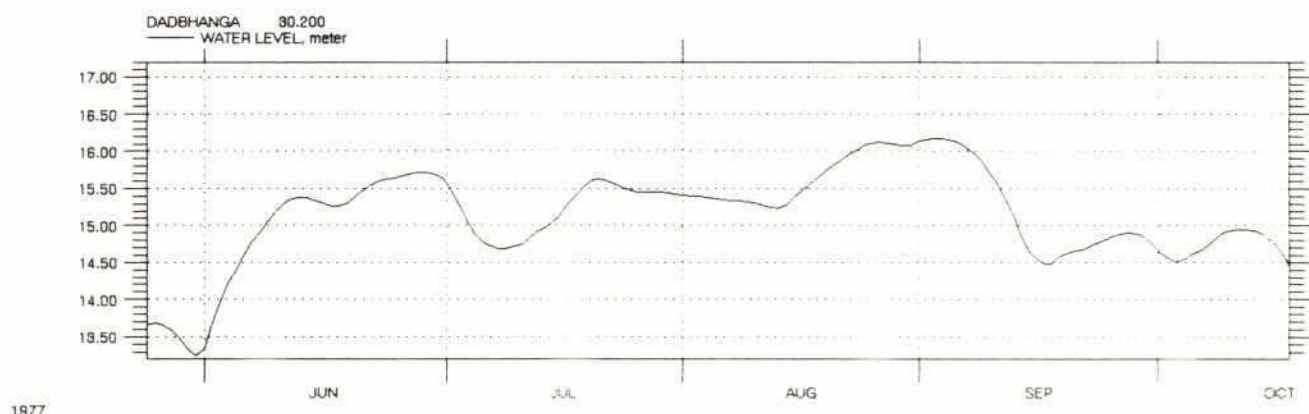
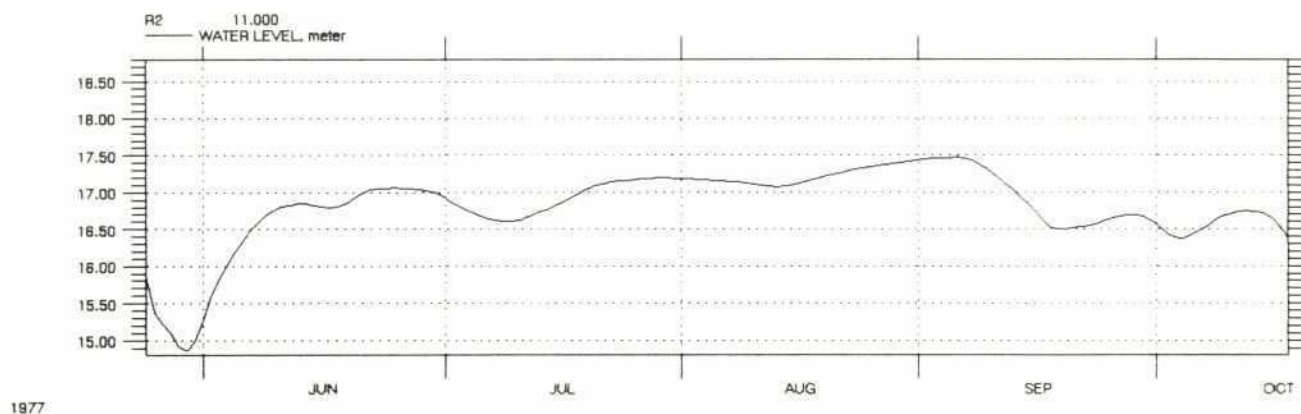
Structures opened from 1st June to 30th June
1977

DATA FILE : JPOB1.RDF
RESULT FILE : 77JPOB1F.RRF

BOUNDARY FILE : JPOB1F77.BSF
CALCULATED : 9 - OCT - 1992, 10:17

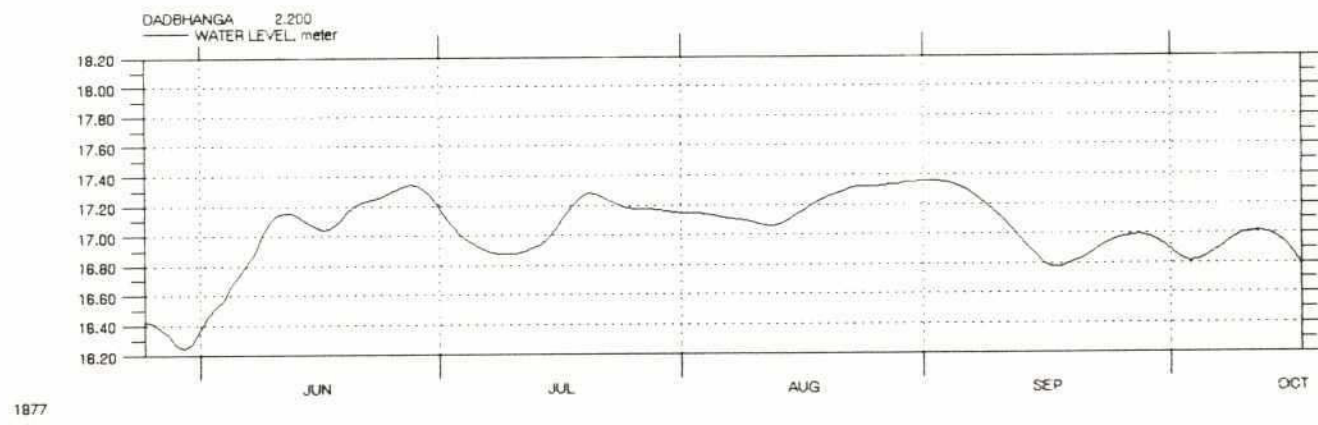
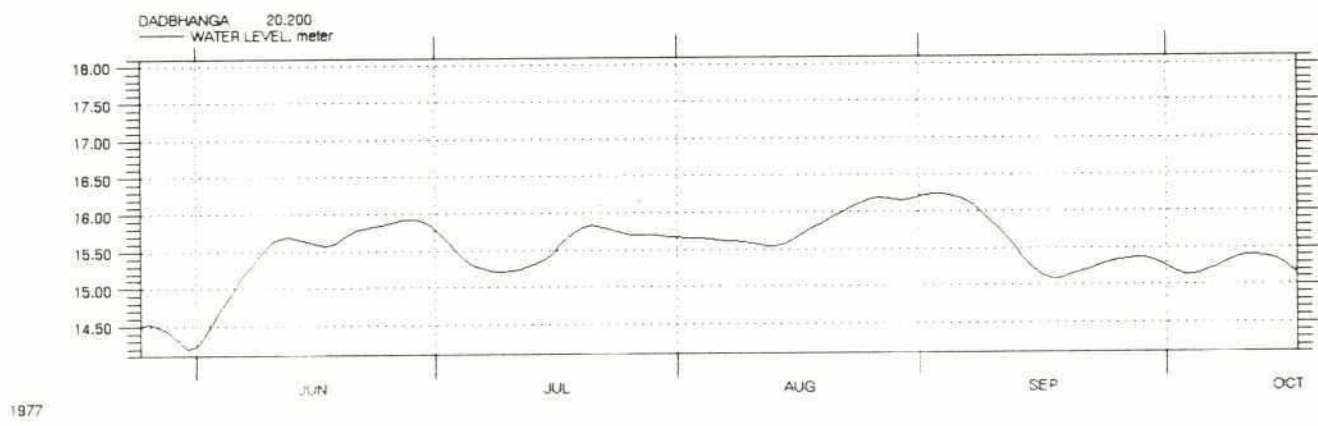
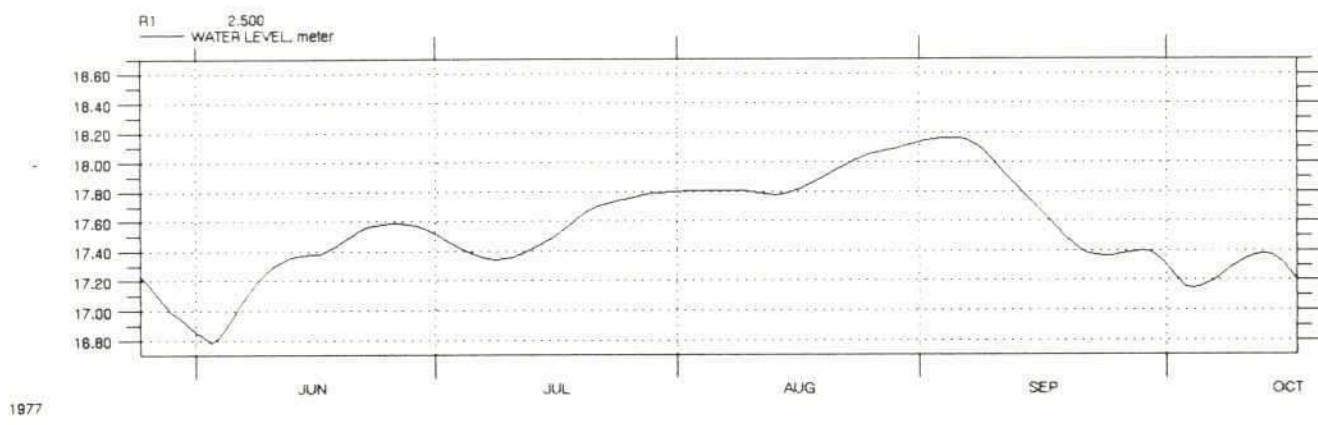
MIKE 11

Dwg no.:



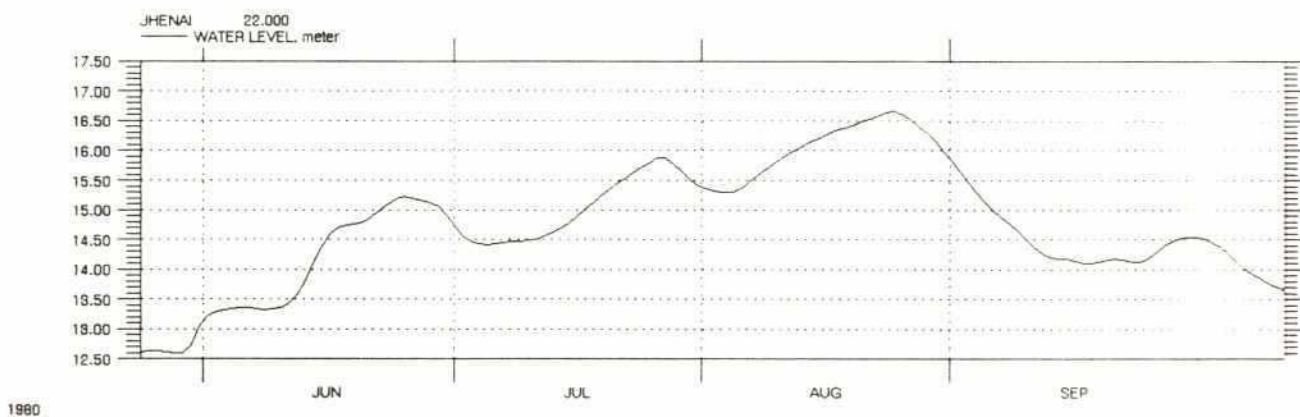
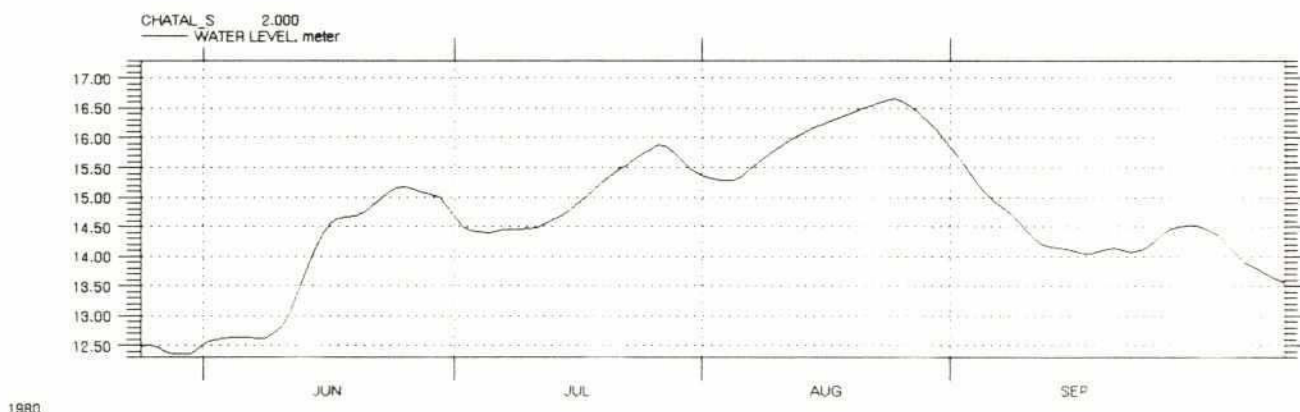
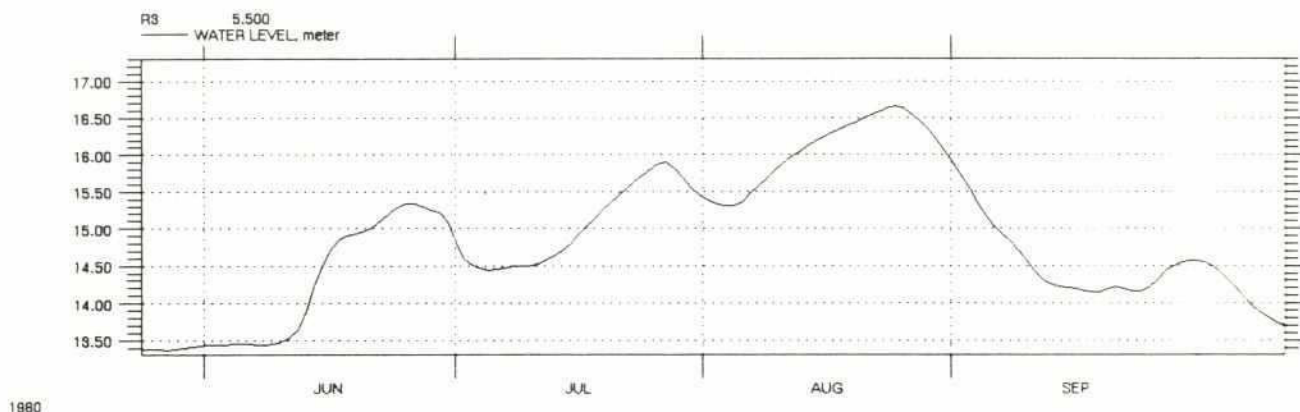
S W M C	OPTION B Structures opened from 1st June to 30th June 1977	MIKE 11 Dwg no.:
DATA FILE : JPOB1.RDF RESULT FILE : 77JPOB1F.RRF	BOUNDARY FILE : JPOB1F77.BSF CALCULATED : 9 - OCT - 1992, 10:17	

360



S W M C		OPTION B Structures opened from 1st June to 30th June 1977	
DATA FILE : JPPOB1.RDF RESULT FILE : 77JPOB1F.RRF		BOUNDARY FILE : JPOB1F77.BSF CALCULATED : 9 - OCT - 1992, 10:17	
		MIKE 11 Dwg no.:	

311



SWMC

OPTION B
Structures opened from 1st June to 30th June
1980

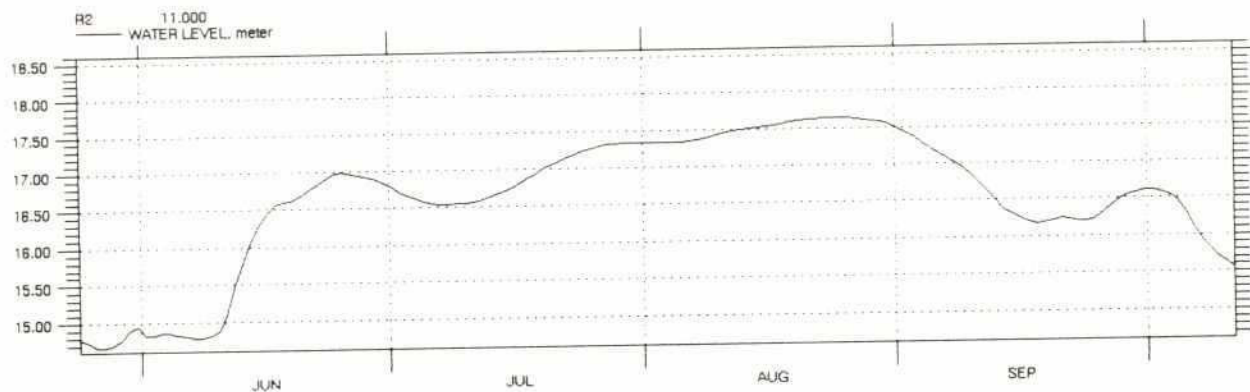
DATA FILE : JPOB1.RDF
RESULT FILE : 80JPOB1F.RRF

BOUNDARY FILE : JPOB1F80.BSF
CALCULATED : 10 - OCT - 1992, 15:18

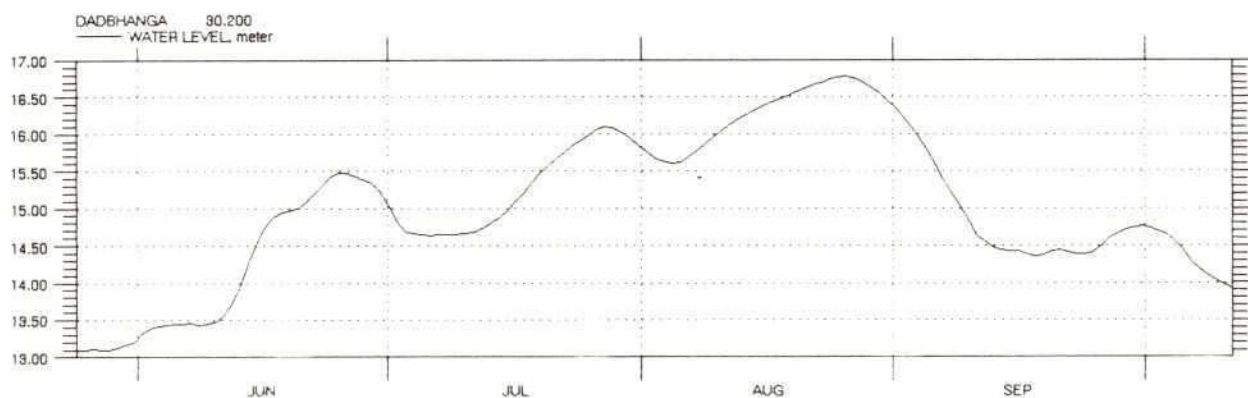
MIKE 11

Dwg no.:

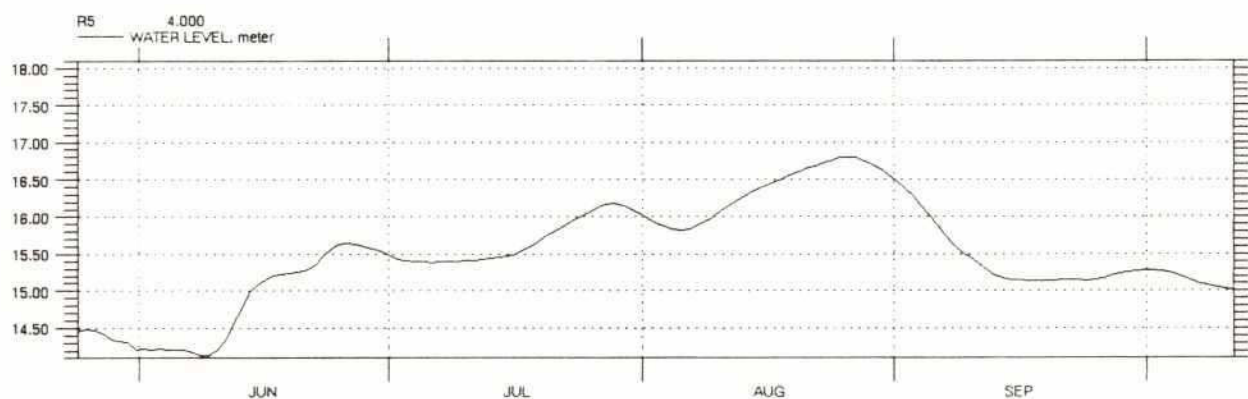
1980



1980



1980

**SWMC**

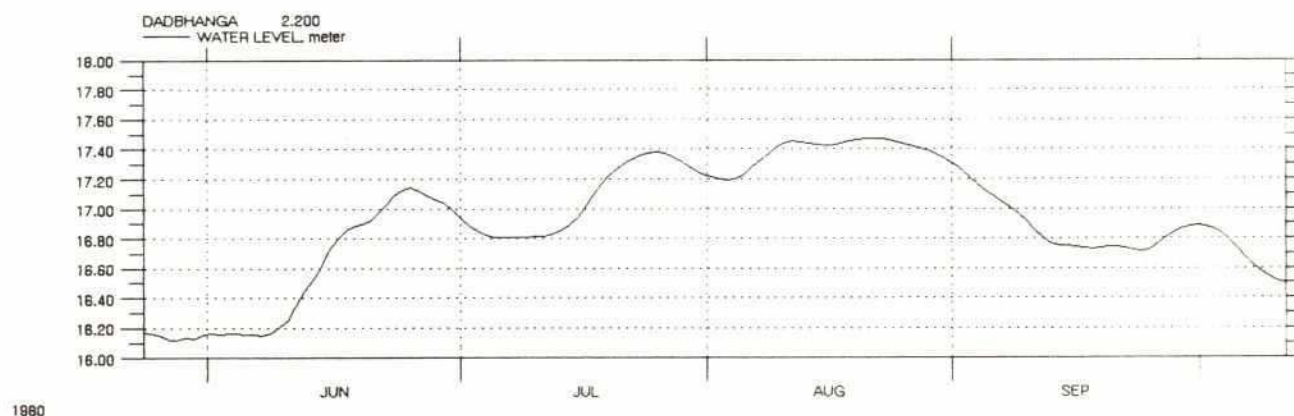
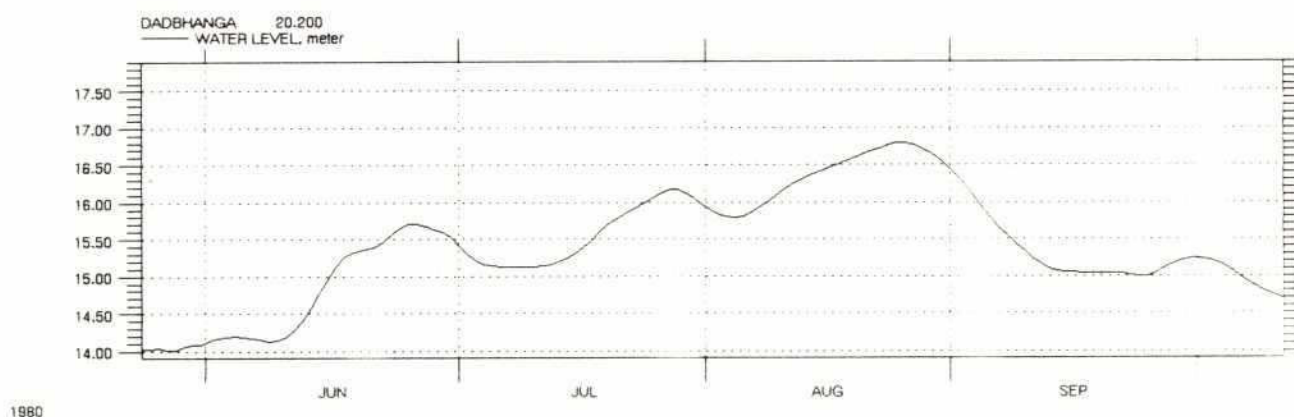
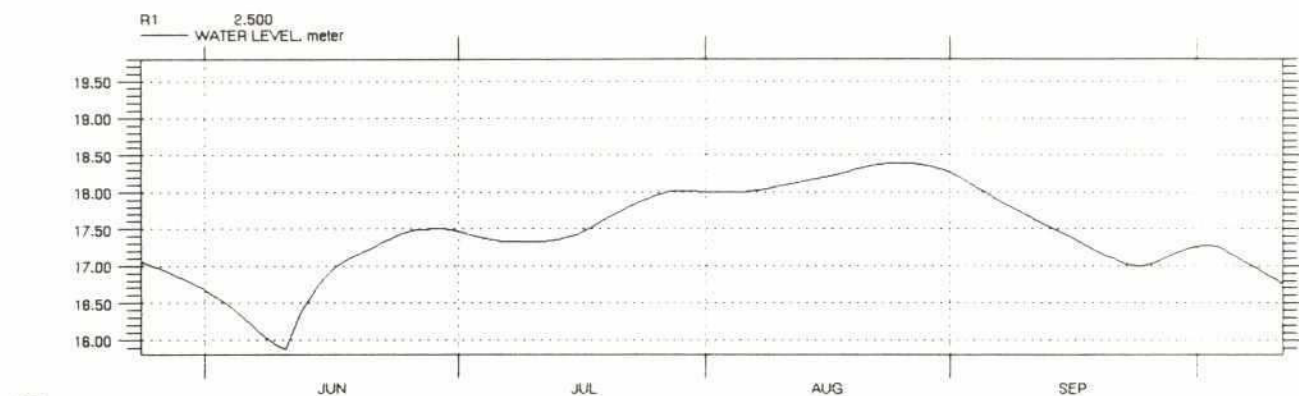
OPTION B
Structures opened from 1st June to 30th June
1980

DATA FILE : JPOB1.RDF
RESULT FILE : 80JPOB1F.RRF

BOUNDARY FILE : JPOB1F80.BSF
CALCULATED : 10 - OCT - 1992, 15:18

MIKE 11

Dwg no.:


SWMC

OPTION B
Structures opened from 1st June to 30th June
1980

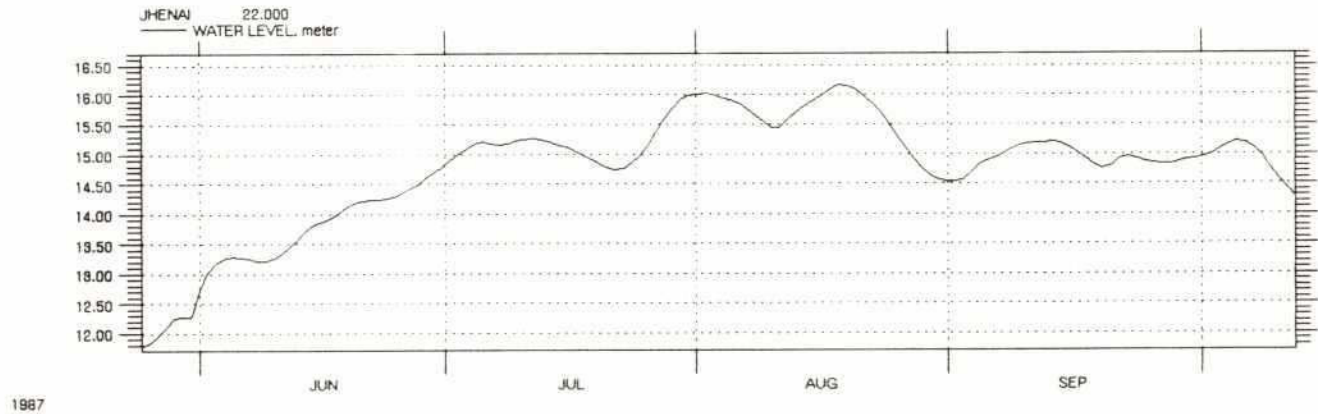
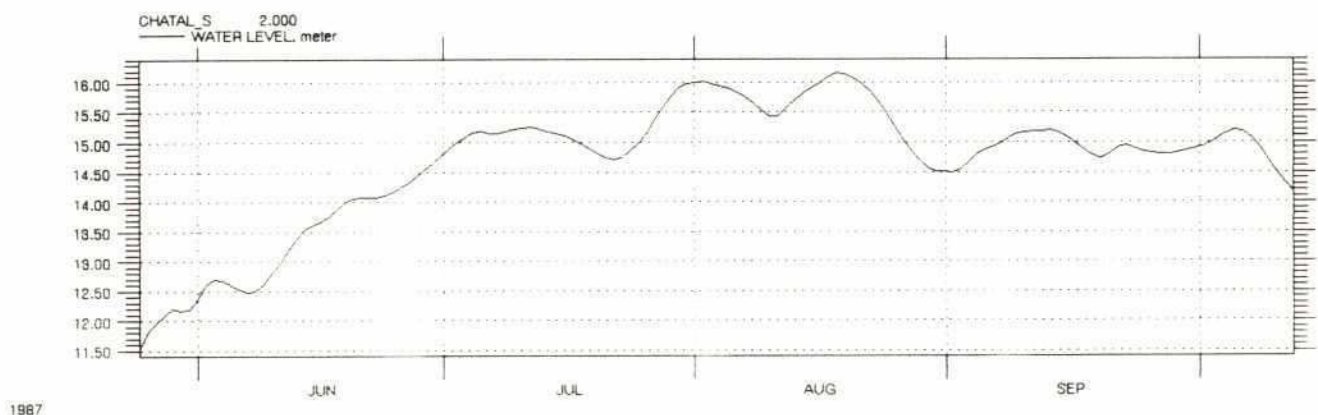
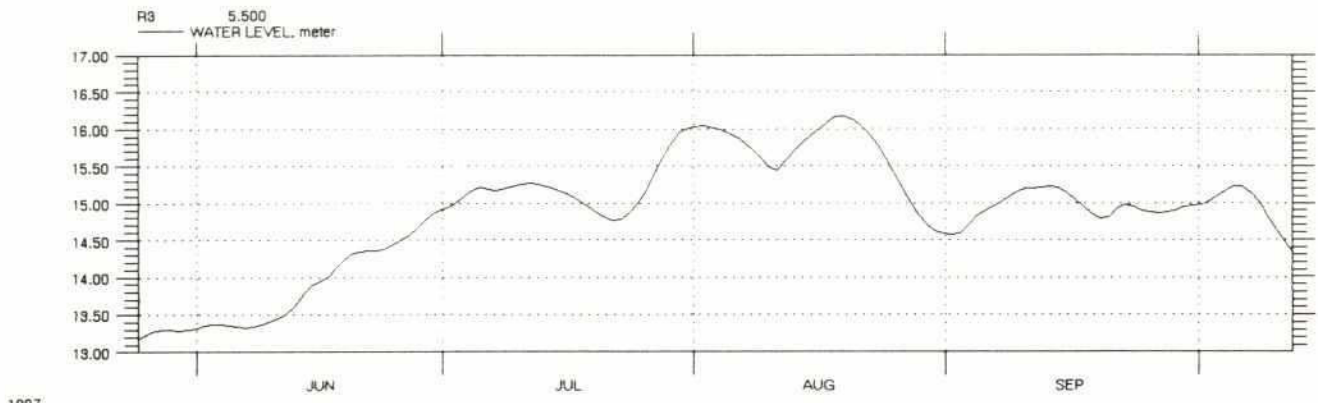
DATA FILE : JPOB1.RDF
RESULT FILE : 80JPOB1F.RRF

BOUNDARY FILE : JPOB1F80.BSF
CALCULATED : 10 - OCT - 1992, 15:18

MIKE 11

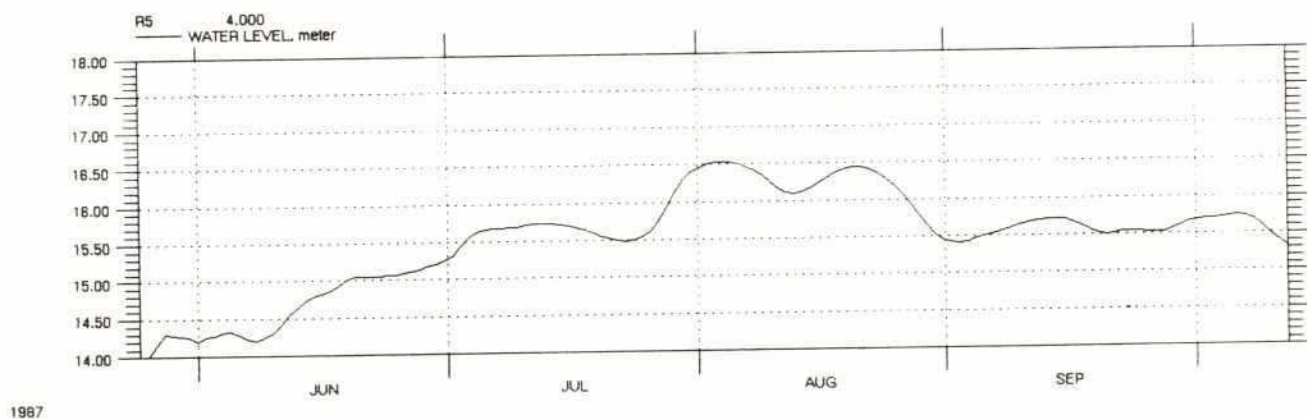
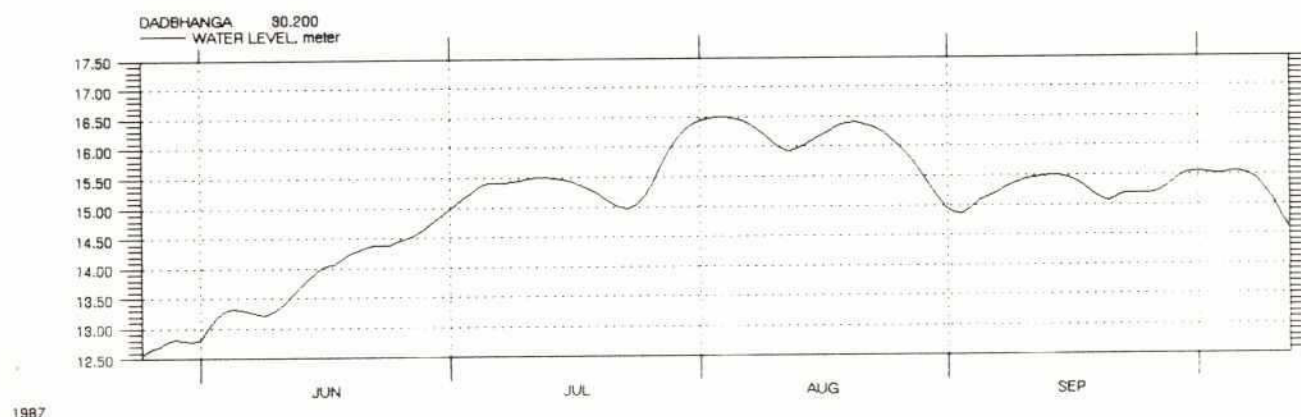
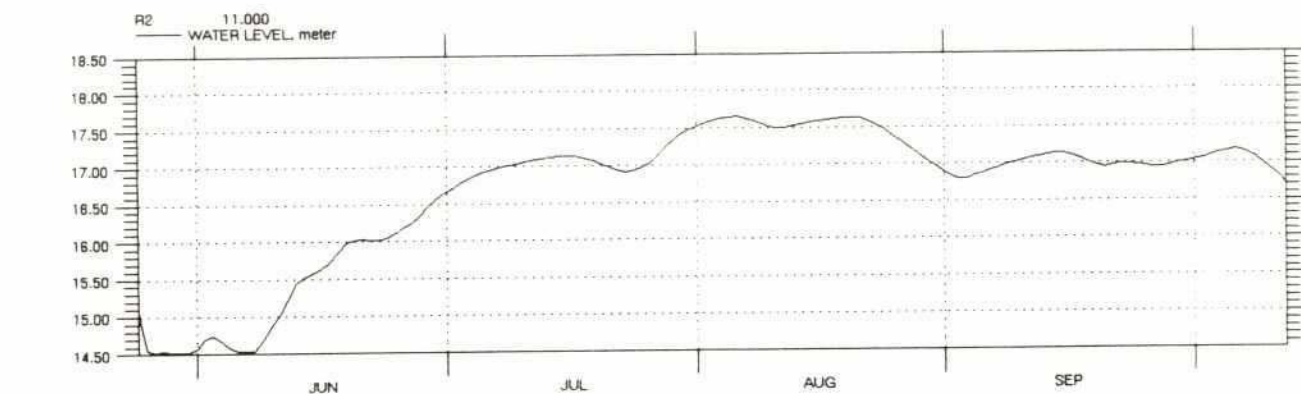
Dwg no.:

314



SWMC	OPTION B Structures opened from 1st June to 30th June 1987	MIKE 11
DATA FILE : JPROB1.RDF RESULT FILE : 87JPROB1F.RRF	BOUNDARY FILE : JPROB1F87.BSF CALCULATED : 12 - OCT - 1992, 17:23	Dwg no.:

315



SWMC

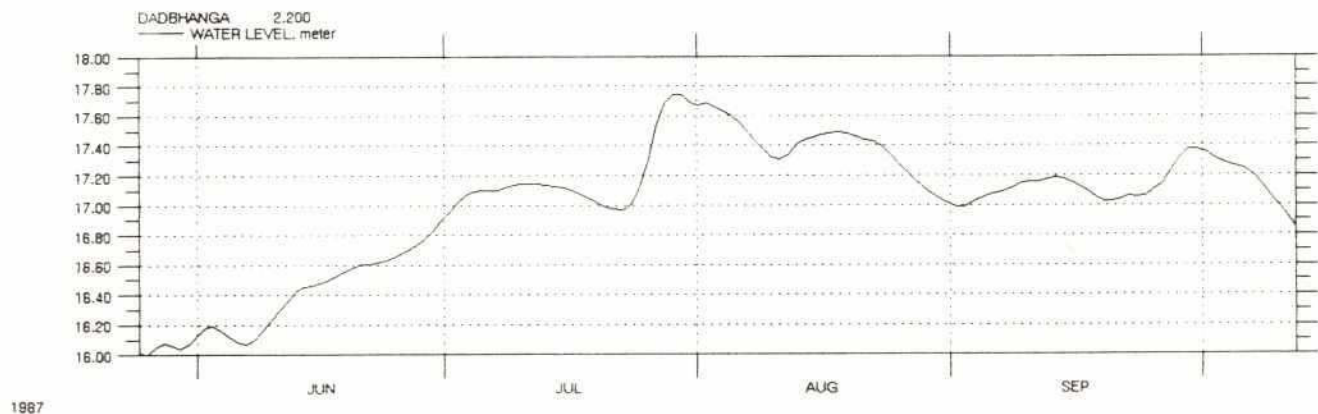
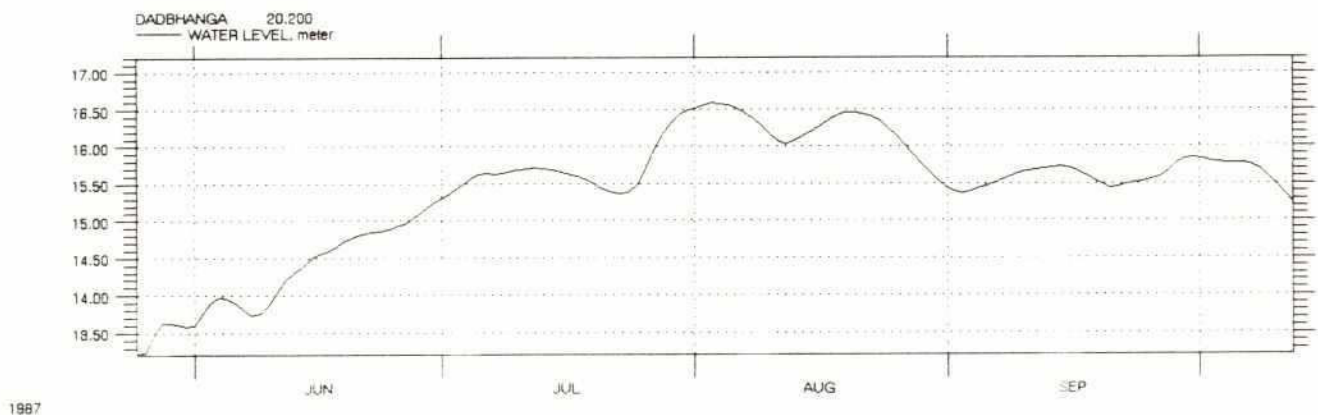
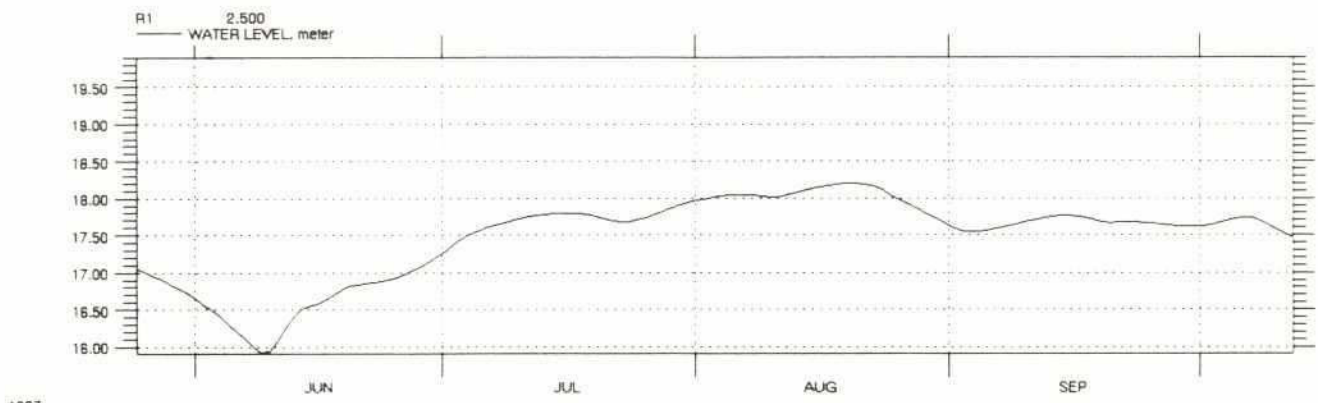
OPTION B
Structures opened from 1st June to 30th June
1987

DATA FILE : JPOB1.RDF
RESULT FILE : 87JPOB1F.RRF

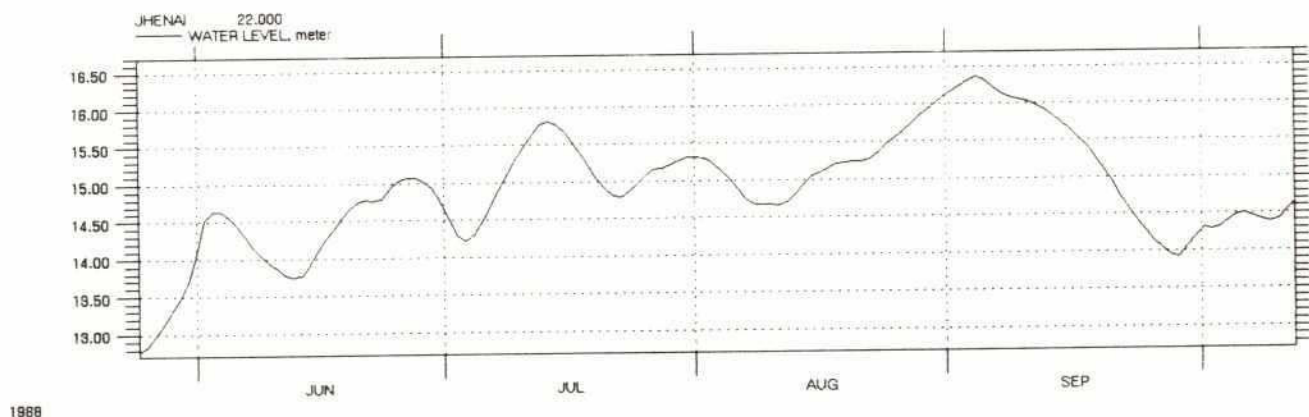
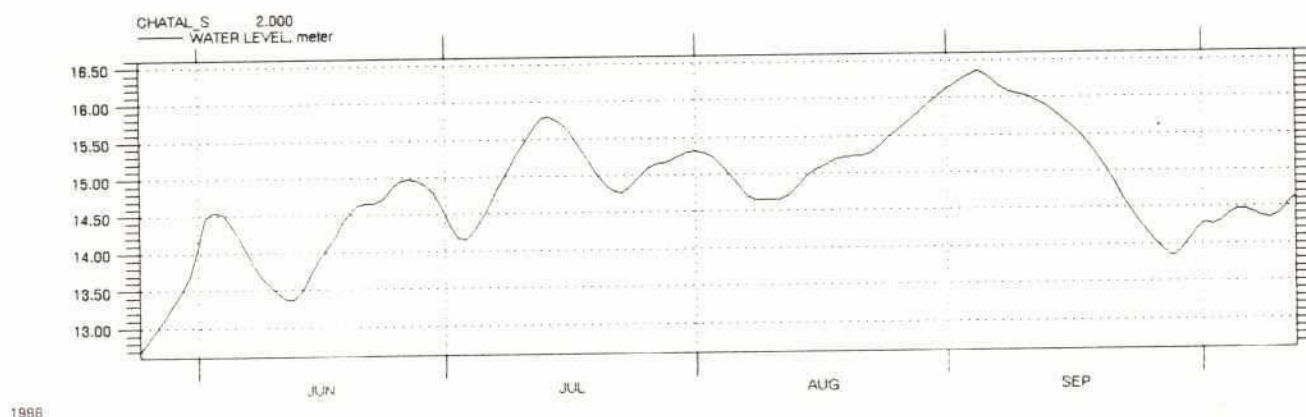
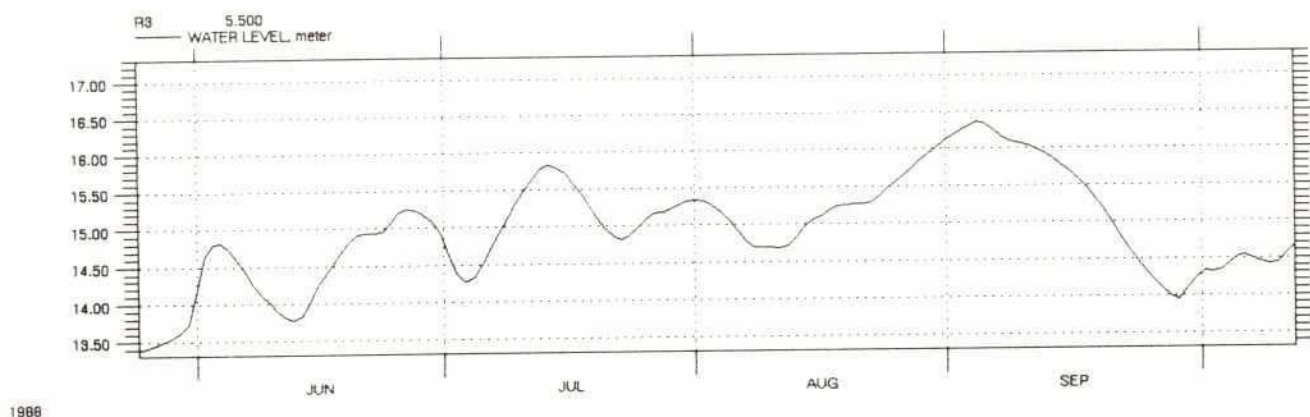
BOUNDARY FILE : JPOB1F87.BSF
CALCULATED : 12 - OCT - 1992, 17:23

MIKE 11

Dwg no.:

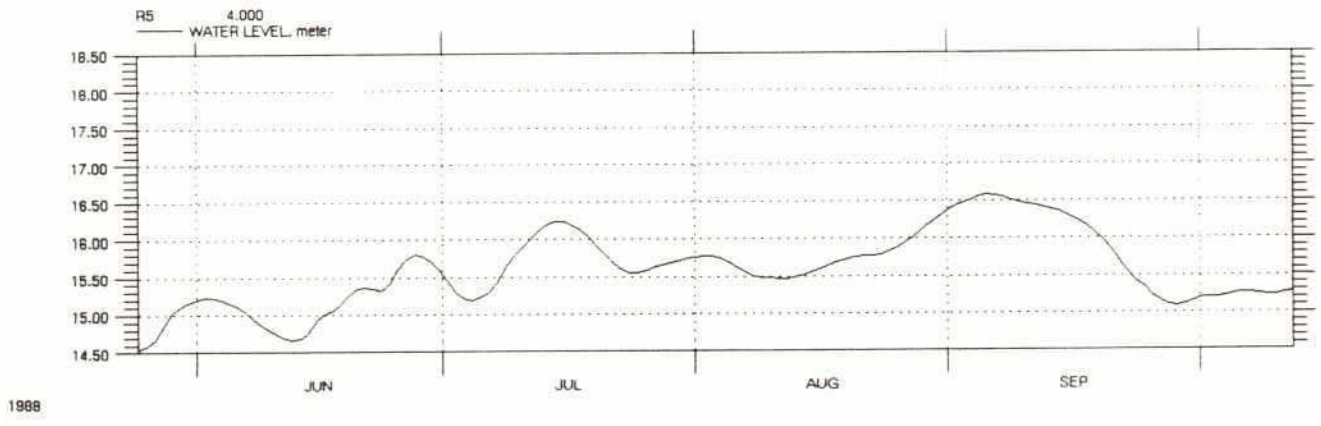
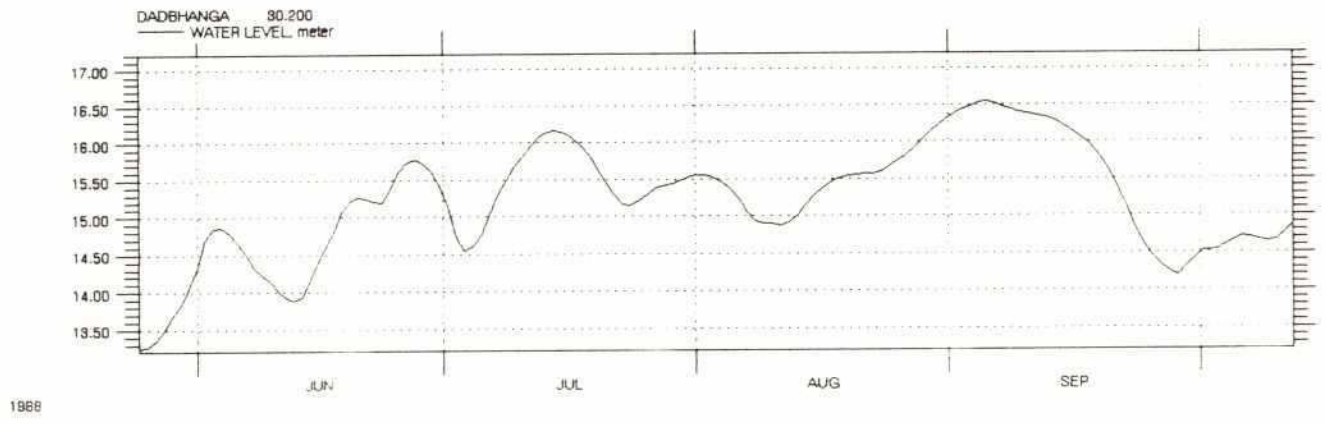
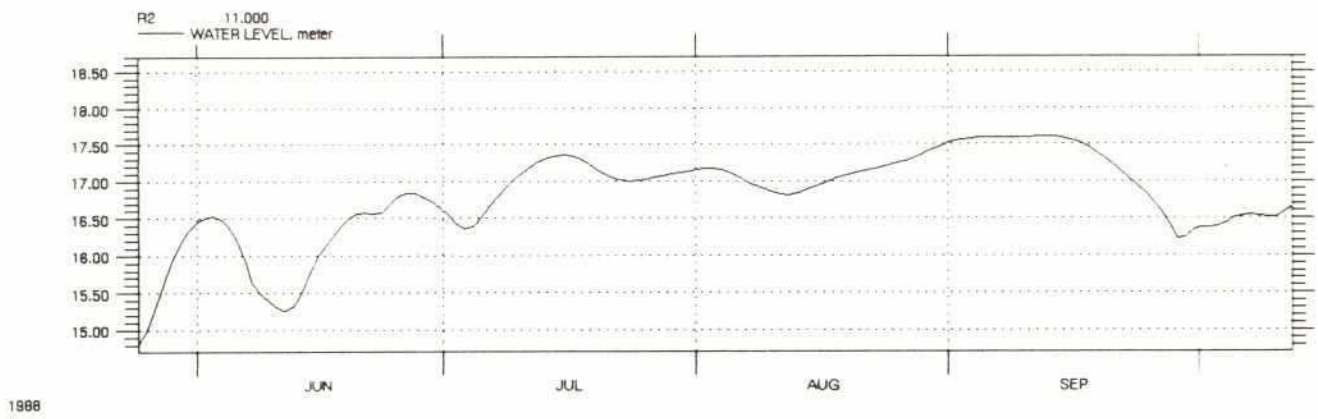


SWMC	OPTION B Structures opened from 1st June to 30th June 1987
DATA FILE : JPOB1.RDF RESULT FILE : 87JPOB1F.RRF	BOUNDARY FILE : JPOB1F87.BSF CALCULATED : 12 - OCT - 1992, 17:23
	MIKE 11 Dwg no.:

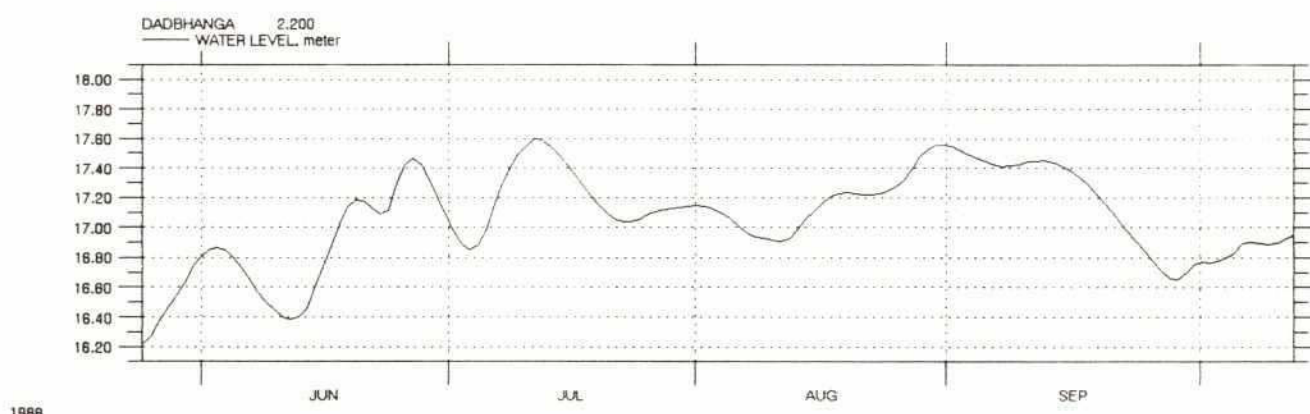
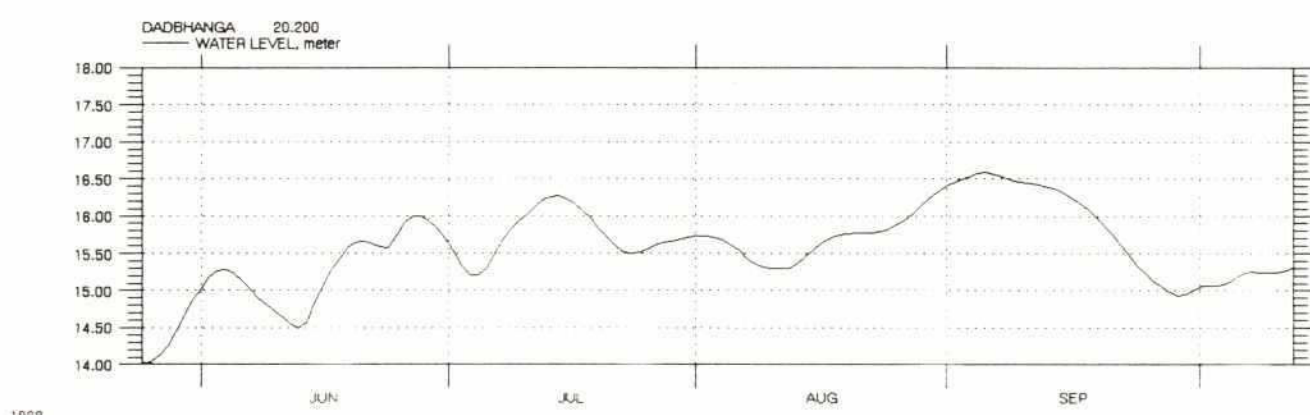
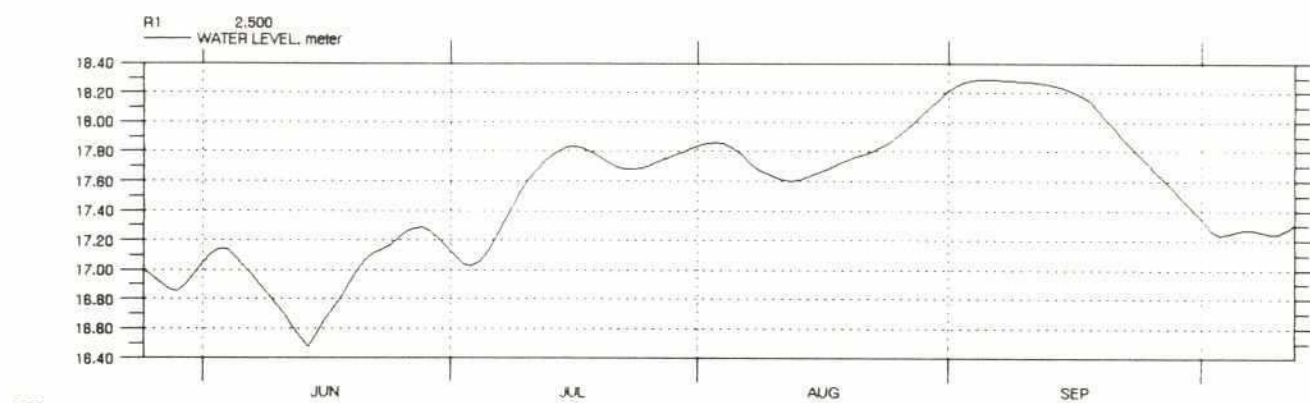


SWMC	OPTION B Structures opened from 1st June to 30th June 1988	MIKE 11 Dwg no.:
DATA FILE : JPOB1.RDF RESULT FILE : 88JPOB1F.RRF	BOUNDARY FILE : JPOB1F88.BSF CALCULATED : 13 - OCT - 1992, 19:44	

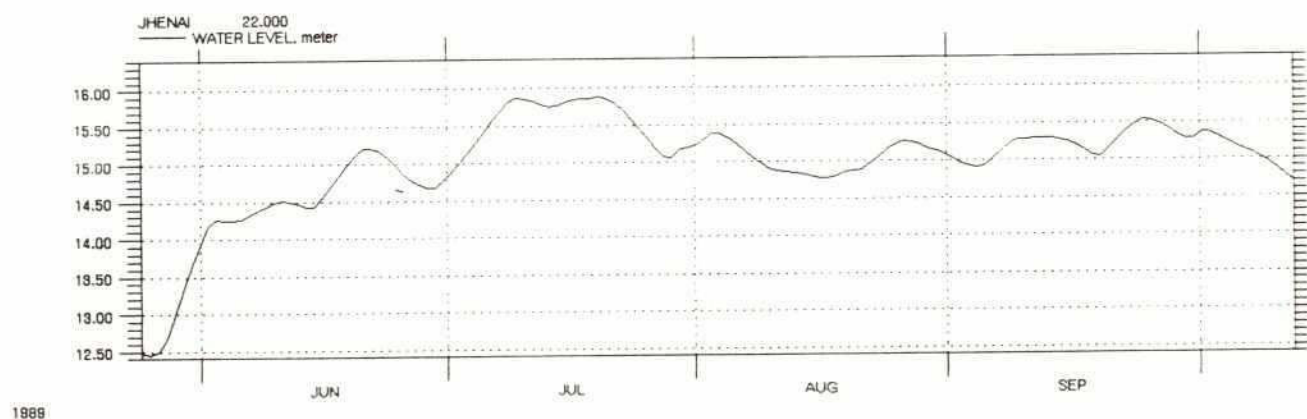
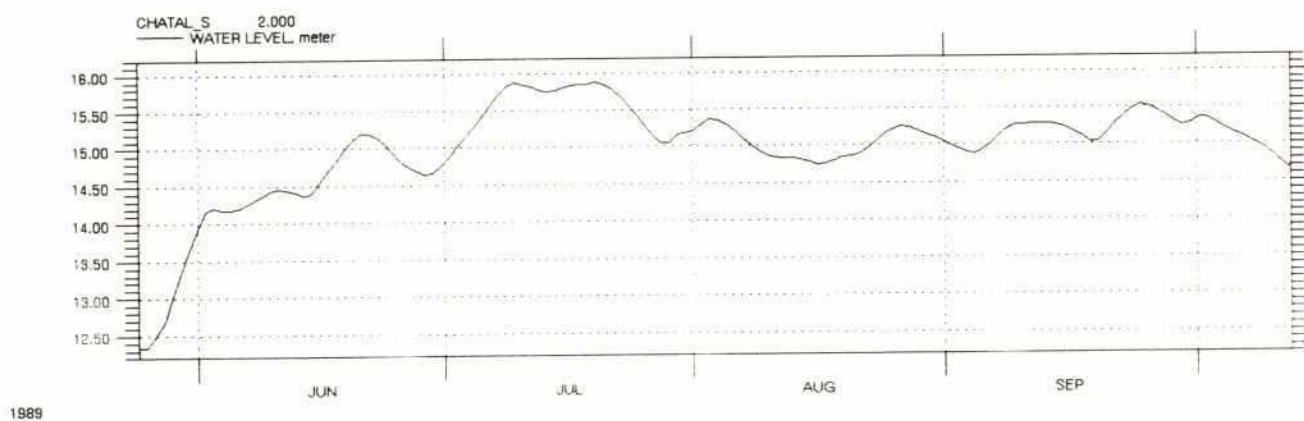
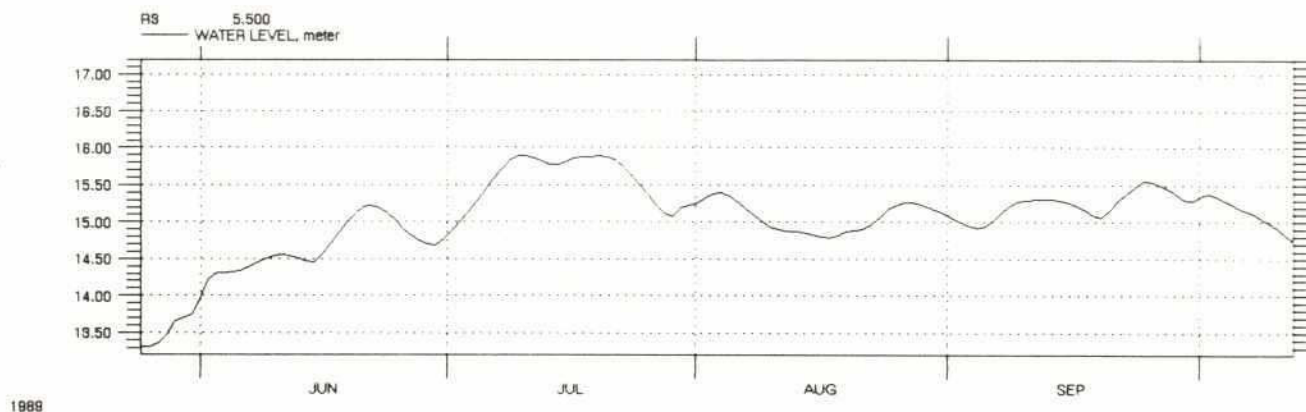
318



S W M C	OPTION B Structures opened from 1st June to 30th June 1988	MIKE 11
DATA FILE : JPROB1.RDF RESULT FILE : 88JPROB1F.RRF	BOUNDARY FILE : JPROB1F88.BSF CALCULATED : 13 - OCT - 1992, 19:44	Dwg no.:



S W M C		OPTION B Structures opened from 1st June to 30th June 1988	
DATA FILE : JPOB1.RDF RESULT FILE : 88JPOB1F.RRF		BOUNDARY FILE : JPOB1F88.BSF CALCULATED : 13 - OCT - 1992, 19:44	
		MIKE 11 Dwg no.:	


SWMC
OPTION B

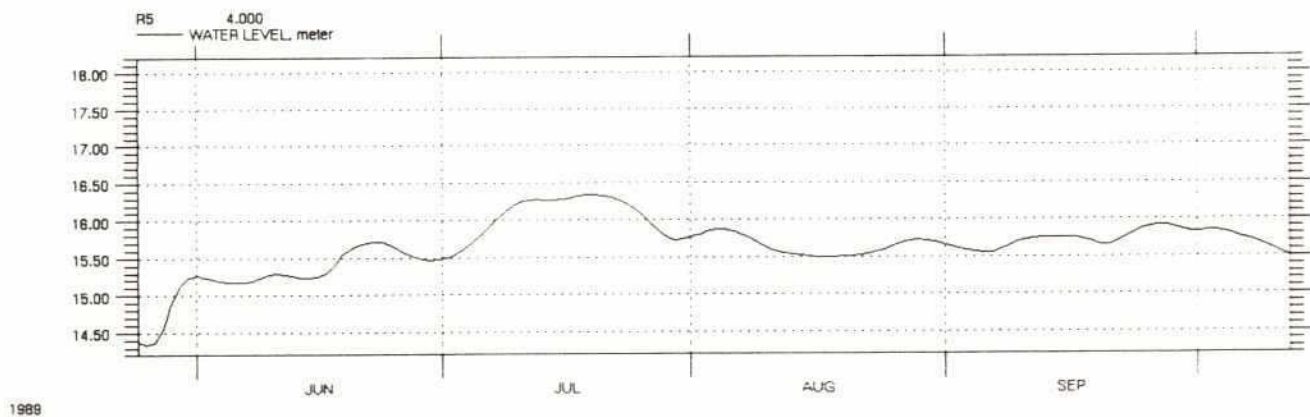
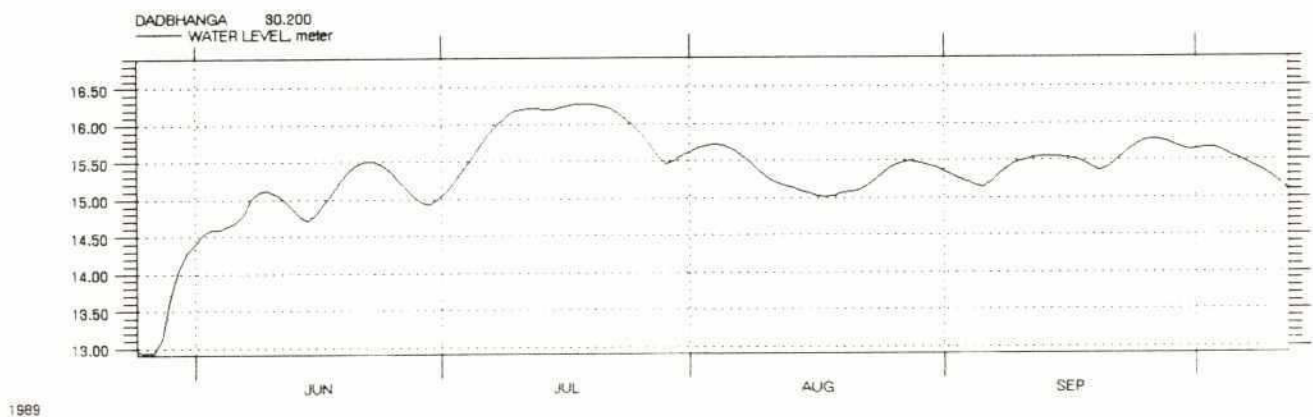
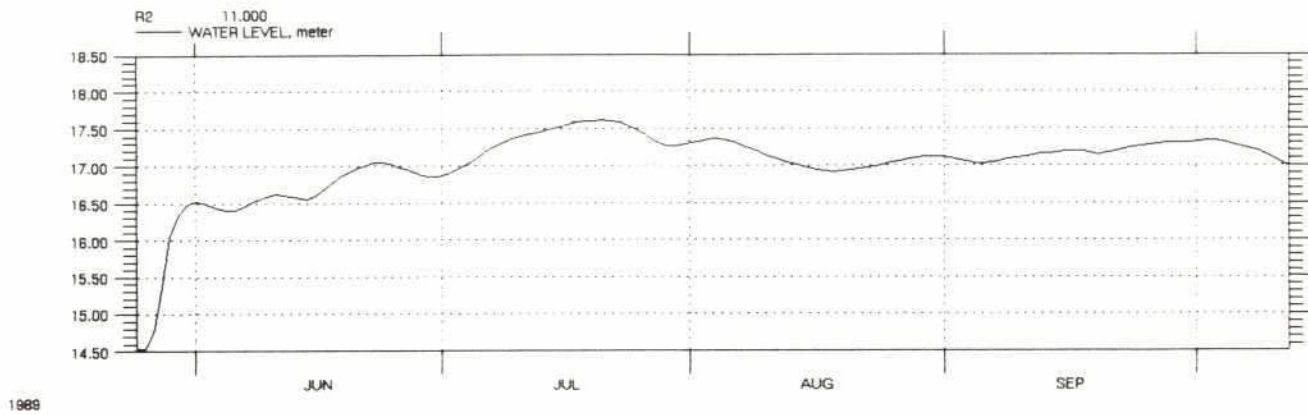
Structures opened from 1st June to 30th June 1989

 DATA FILE : JPROB1.RDF
 RESULT FILE : 89JPROB1F.RRF

 BOUNDARY FILE : JPROB1F89.BSF
 CALCULATED : 12 - OCT - 1992, 21:12

MIKE 11

Dwg no.:


SWMC
OPTION B

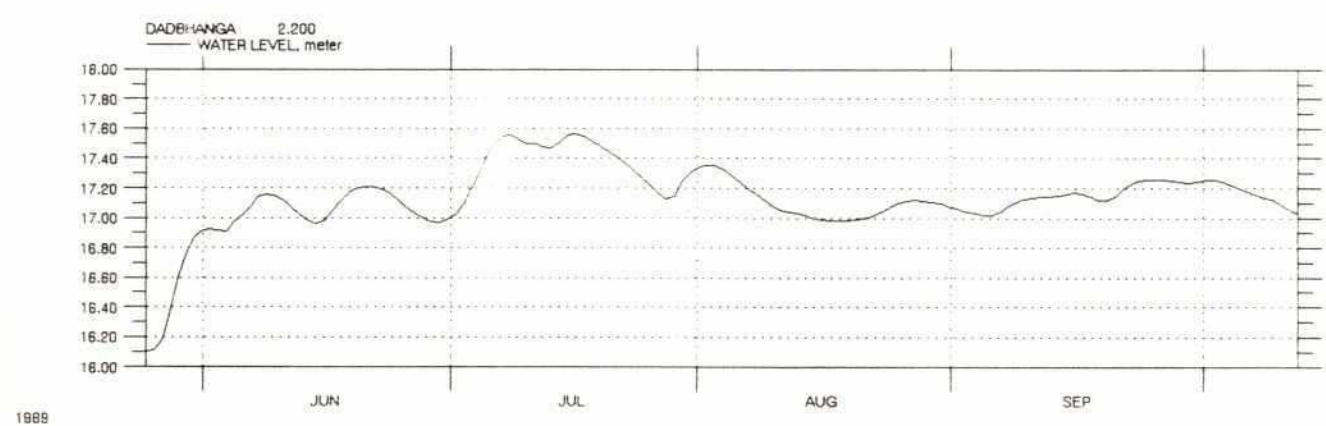
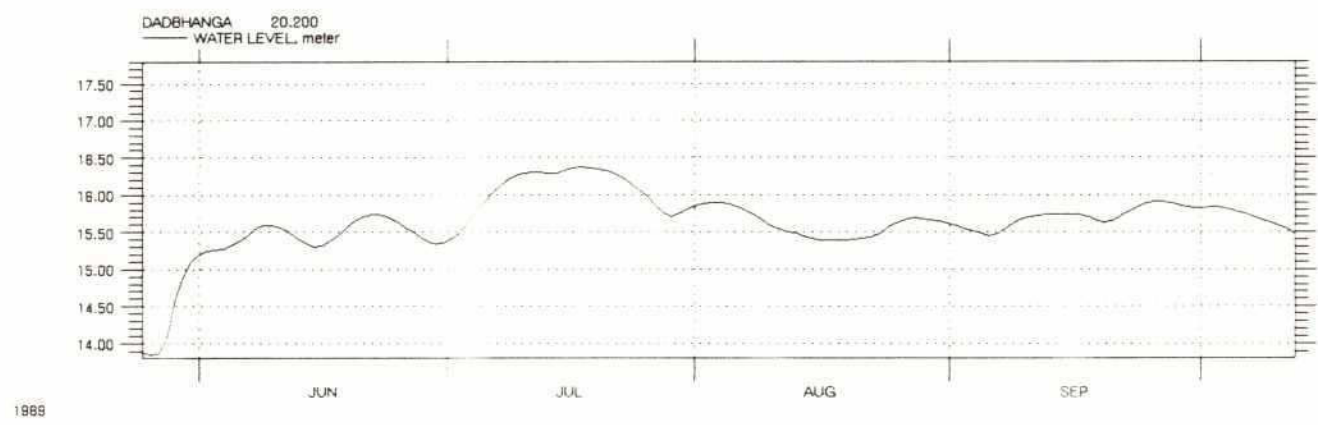
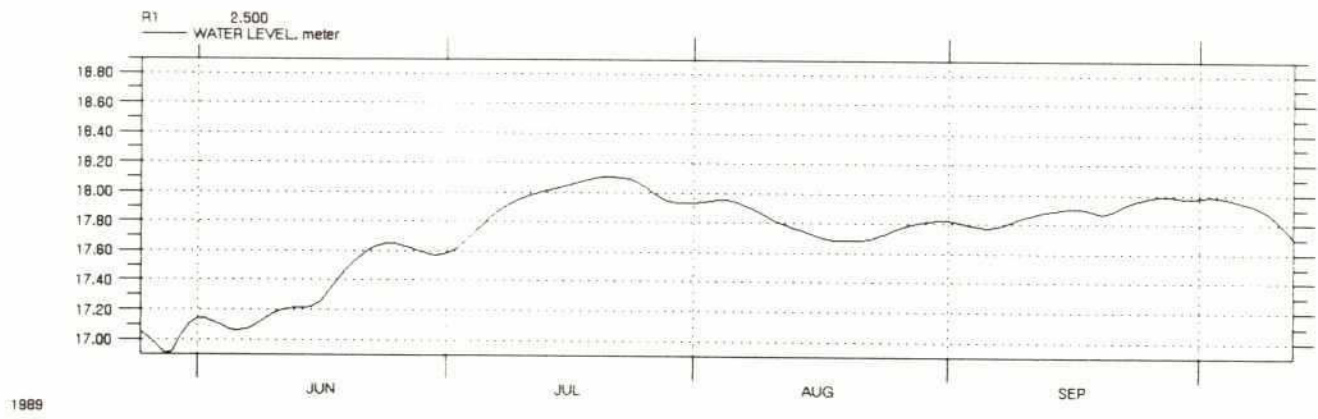
 Structures opened from 1st June to 30th June
1989

 DATA FILE : JPOB1.RDF
 RESULT FILE : 89JPOB1F.RRF

 BOUNDARY FILE : JPOB1F89.BSF
 CALCULATED : 12 - OCT - 1992, 21:12

MIKE 11

Dwg no.:



SWMC	OPTION B Structures opened from 1st June to 30th June 1989	MIKE 11 Dwg no.:
DATA FILE : JPOB1.RDF RESULT FILE : 89JPOB1F.RRF	BOUNDARY FILE : JPOB1F89.BSF CALCULATED : 12 - OCT - 1992, 21:12	

ANNEX 4

APPENDIX

D4 UTILITY OF JHENAI/CHATAL

OPTION B (WITHOUT JHENAI/CHATAL OUTLET)

U/S & D/S Water Level With Discharge at Structure for 1977
(Structures opened from 1st - 30th June)

U/S & D/S Water Level With Discharge at Structure for 1988
(Structures opened from 1st - 30th June)

OPTION B (WITH JHENAI/CHATAL OUTLET)

U/S & D/S Water Level With Discharge at Structure for 1977
(Structures opened from 1st - 30th June)

U/S & D/S Water Level With Discharge at Structure for 1988
(Structures opened from 1st - 30th June)

OPTION B (WITH JHENAI/CHATAL OUTLET)

U/S & D/S Water Level With Discharge at Structure for 1977
(Structures Closed Rainfall Only)

U/S & D/S Water Level With Discharge at Structure for 1988
(Structures Closed Rainfall Only)

OPTION B (WITHOUT JHENAI/CHATAL OUTLET)

Hydrograph of Cells Representative Points for 1977 & 1988
(Structures opened from 1st - 30th June)

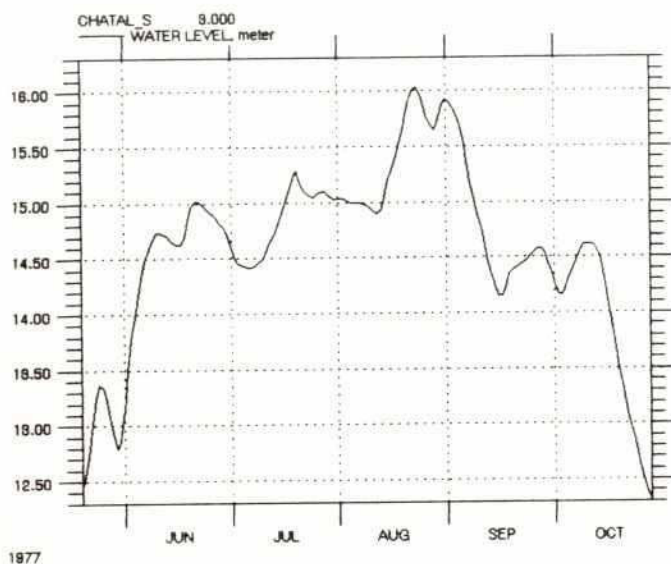
TABLE OF FLOOD-DEPTH-AREA CHARACTERISTIC (WITHOUT JHENAI/CHATAL OUTLET)

Water Level and Discharge Hydrograph Option B
(With and Without Jhenai/Chatal Outlet)
(1977 & 1988)

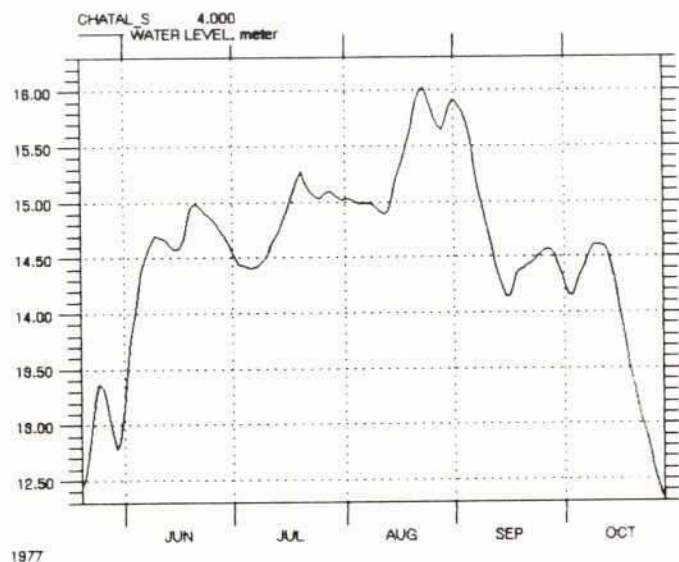


WATER LEVEL AND DISCHARGE OF JHENAI/CHATAL OUTLET STRUCTURE
WITH OPTION : B for 1977 AND 1988

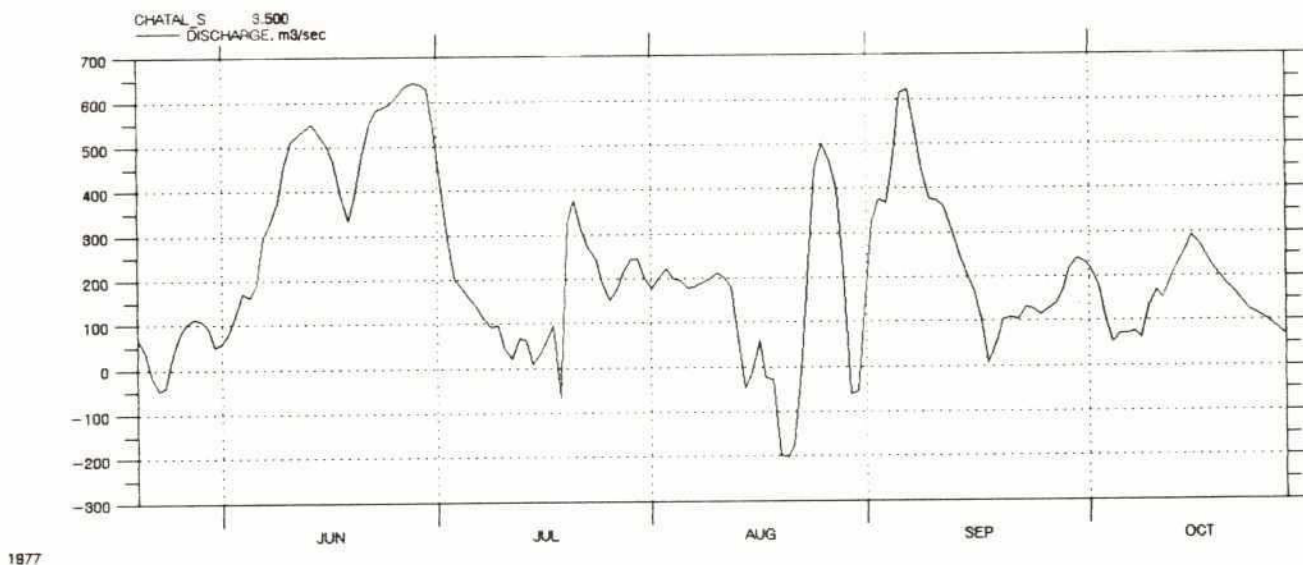
*		1977			!	1988			*				
*		*-----*			!	*-----*			*				
* OPTION B		* WATER LEVEL m(PWD)!DISCHARGE!			!	* WATER LEVEL m(PWD)!DISCHARGE*			*				
*		*-----*			!	*-----*			*				
*		* U/S	!	D/S	!	* U/S	!	D/S	!	m^3/sec	*		
-----		*-----*			!	*-----*			!	*-----*			
*		*	!	!	!	*	!	!	!	*	*		
* Without		*	!	!	!	*	!	!	!	*	*		
* JHENAI/CHATAL		* 16.03	!	16.03	!	643	!	17.53	!	17.53	!	1692	*
* outlet		*	!	!	!	*	!	!	!	*	!	*	
*		*	!	!	!	*	!	!	!	*	!	*	
----- <td colspan="3">*-----*<td>!</td><td colspan="3">*-----*<td>!</td><td colspan="2">*-----*</td></td></td>		*-----* <td>!</td> <td colspan="3">*-----*<td>!</td><td colspan="2">*-----*</td></td>			!	*-----* <td>!</td> <td colspan="2">*-----*</td>			!	*-----*			
*		*	!	!	!	*	!	!	!	*	!	*	
* With		*	!	!	!	*	!	!	!	*	!	*	
* JHENAI/CHATAL		* 15.94	!	16.02	!	627	!	16.36	!	17.54	!	669	*
* outlet		*	!	!	!	*	!	!	!	*	!	*	
*		*	!	!	!	*	!	!	!	*	!	*	
----- <td colspan="3">*-----*<td>!</td><td colspan="3">*-----*<td>!</td><td colspan="2">*-----*</td></td></td>		*-----* <td>!</td> <td colspan="3">*-----*<td>!</td><td colspan="2">*-----*</td></td>			!	*-----* <td>!</td> <td colspan="2">*-----*</td>			!	*-----*			
*		*	!	!	!	*	!	!	!	*	!	*	
* With		*	!	!	!	*	!	!	!	*	!	*	
* JHENAI/CHATAL		* 15.20	!	16.03	!	375	!	15.30	!	17.58	!	346	*
* outlet		*	!	!	!	*	!	!	!	*	!	*	
(RAINFALL only)		*	!	!	!	*	!	!	!	*	!	*	



U/S. Water level

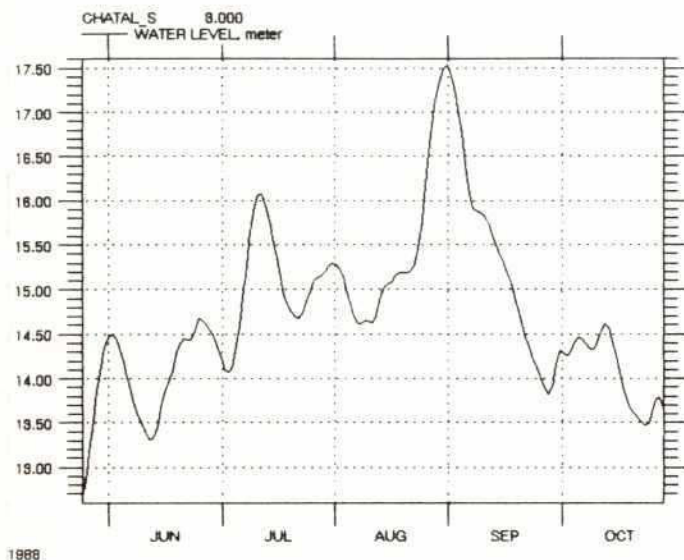


D/S. Water level

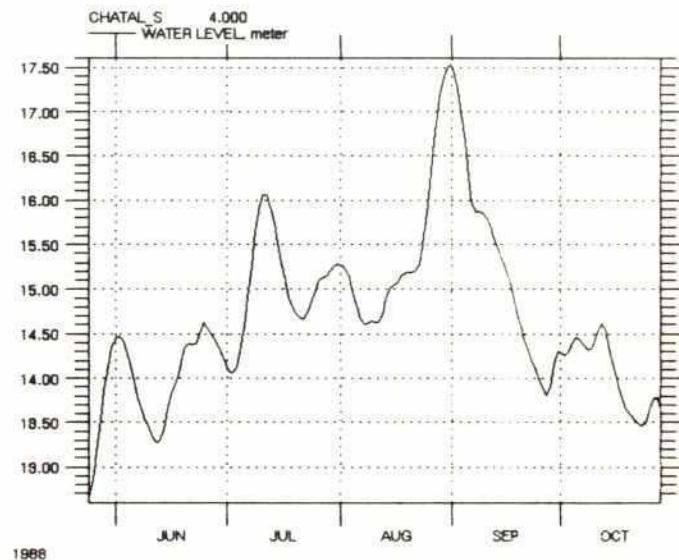


Discharge

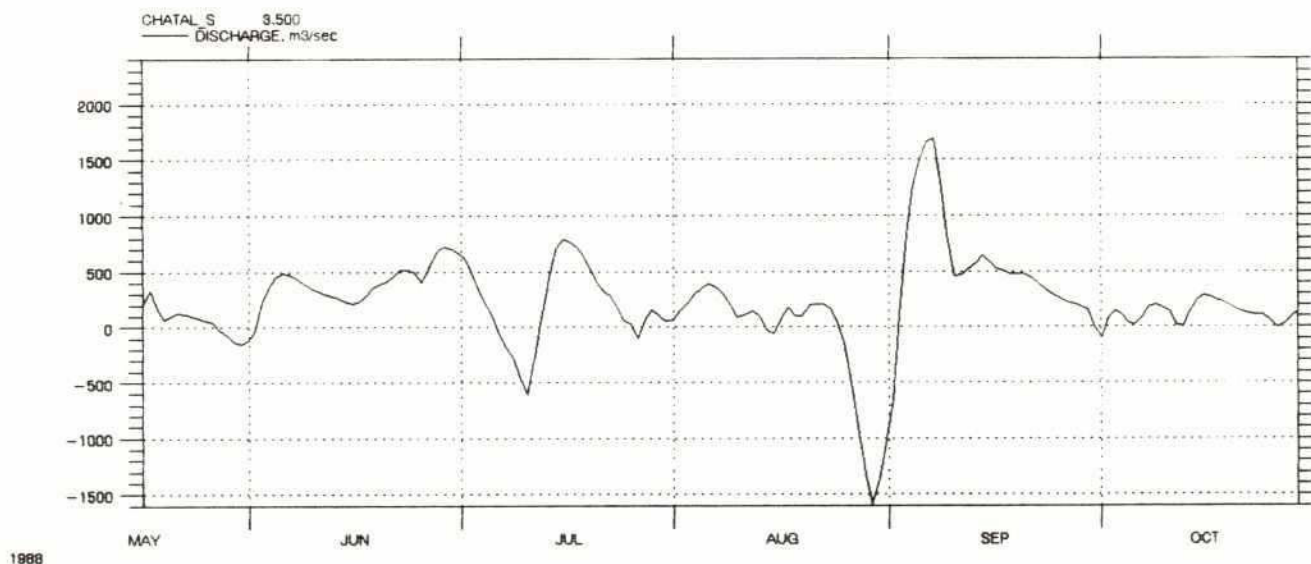
SWMC	OPTION B (without JHENAI/CHATAL outlet structure) Structure opened from 1st June to 30th June 1977	
DATA FILE : JPOB2.RDF RESULT FILE : 77JPOB2F.RRF	BOUNDARY FILE : JPOB1F77.BSF CALCULATED : 10 - OCT - 1992, 21:38	MIKE 11 Dwg no.:



U/S. Water level



D/S. Water level



Discharge

SWMC

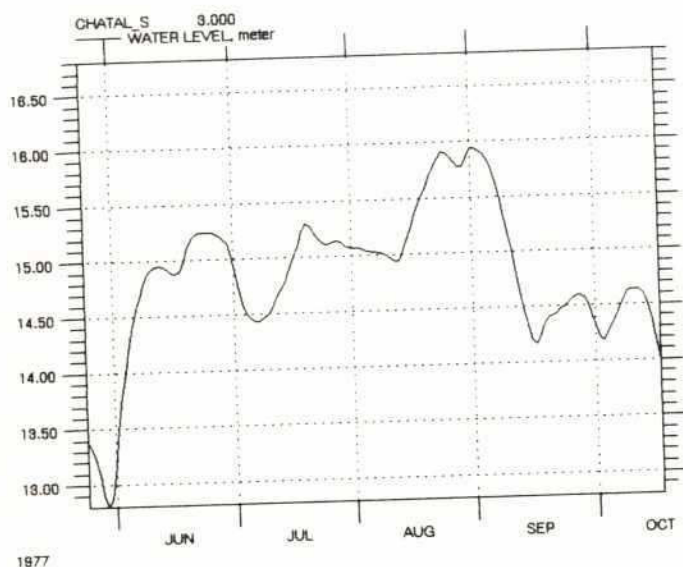
OPTION B (without JHENA/CHATAL outlet structure)
Structure opened from 1st June to 30th June
1988

DATA FILE : JPOB2.RDF
RESULT FILE : 88JPOB2F.RRF

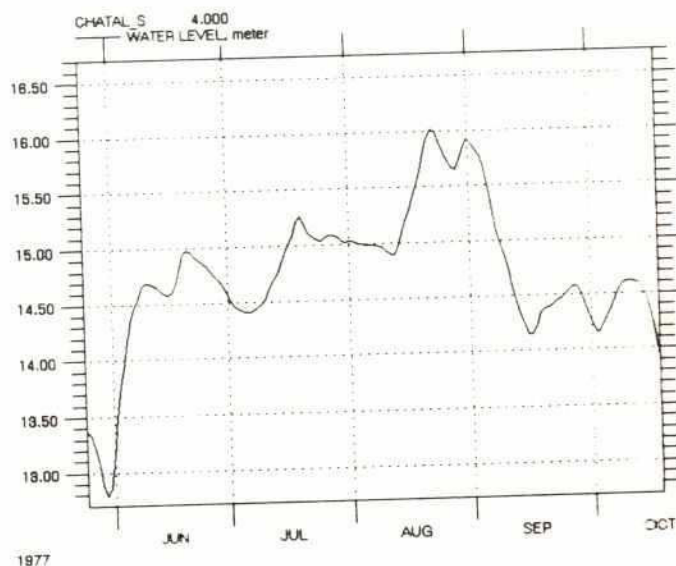
BOUNDARY FILE : JPOB1F88.BSF
CALCULATED : 10 - OCT - 1992, 17:42

MIKE 11

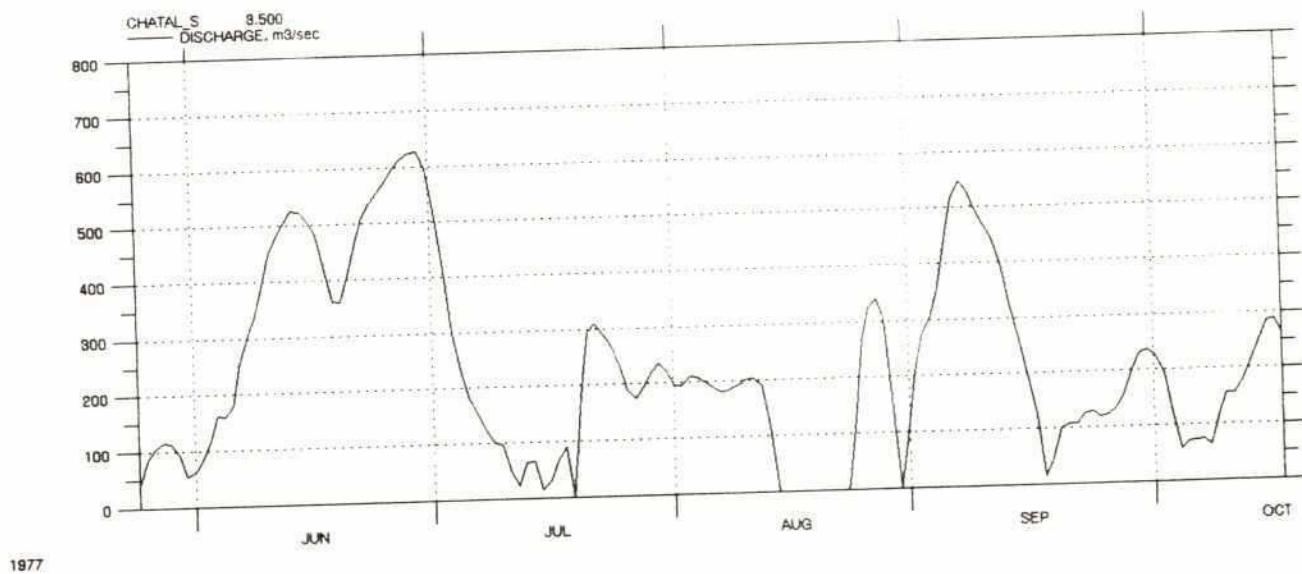
Dwg no.:



U/S. Water level

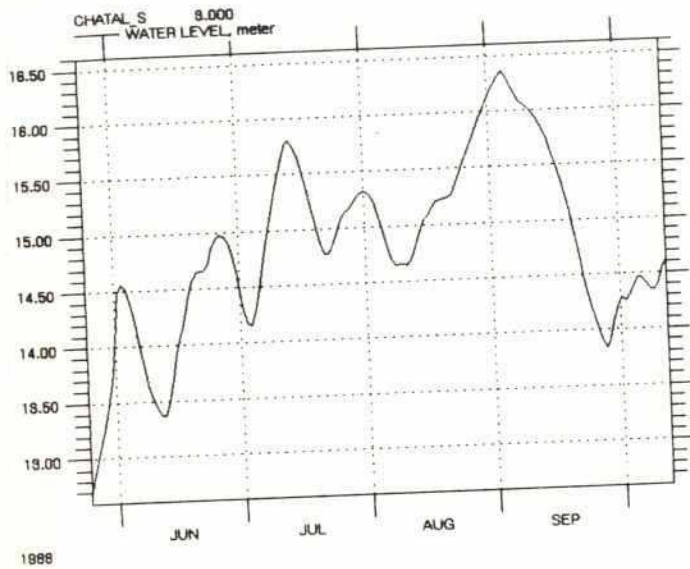


D/S. Water level

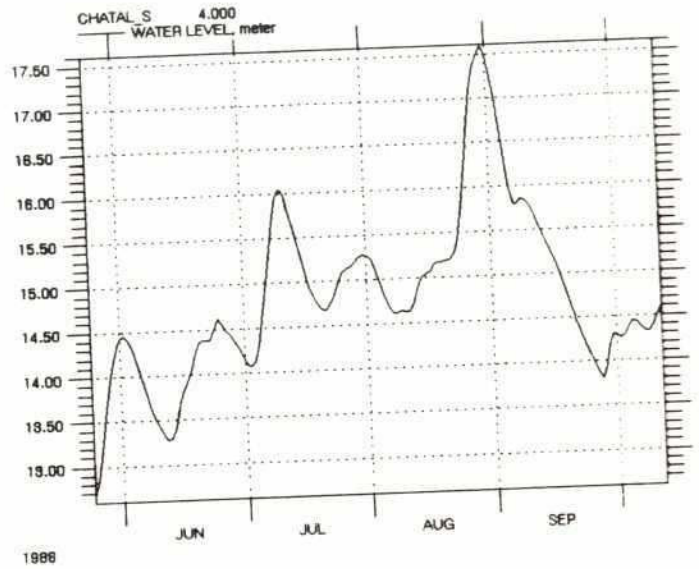


Discharge

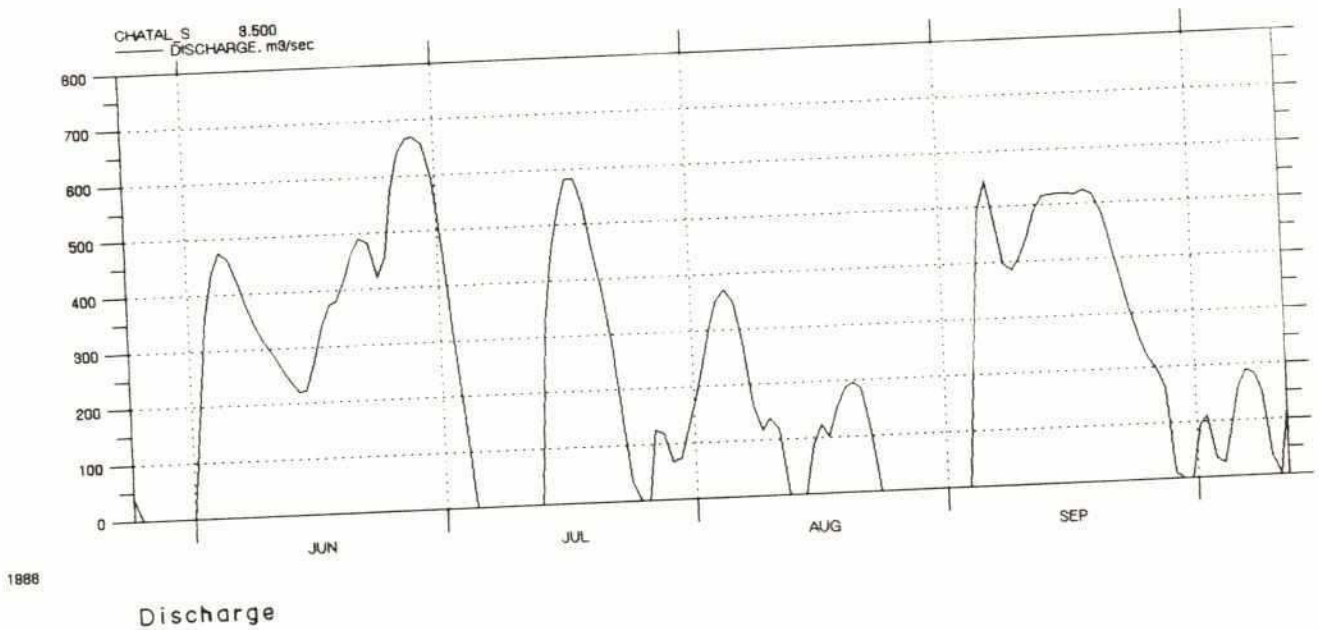
SWMC	OPTION B (with JHENA/CHATAL outlet structure) Structure opened from 1st June to 30th June 1977	MIKE 11
DATA FILE : JPP0B1.RDF RESULT FILE : 77JPOB1F.RRF	BOUNDARY FILE : JPOB1F77.BSF CALCULATED : 9 - OCT - 1992, 10:17	Dwg no.:



U/S. Water level

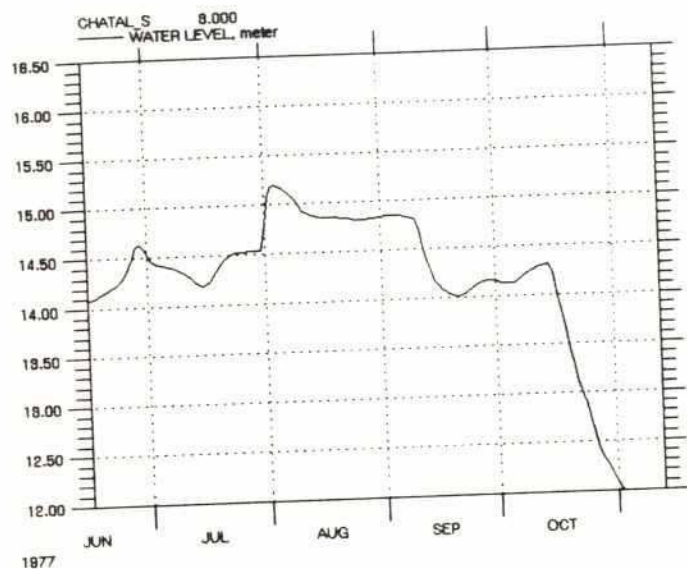


D/S. Water level

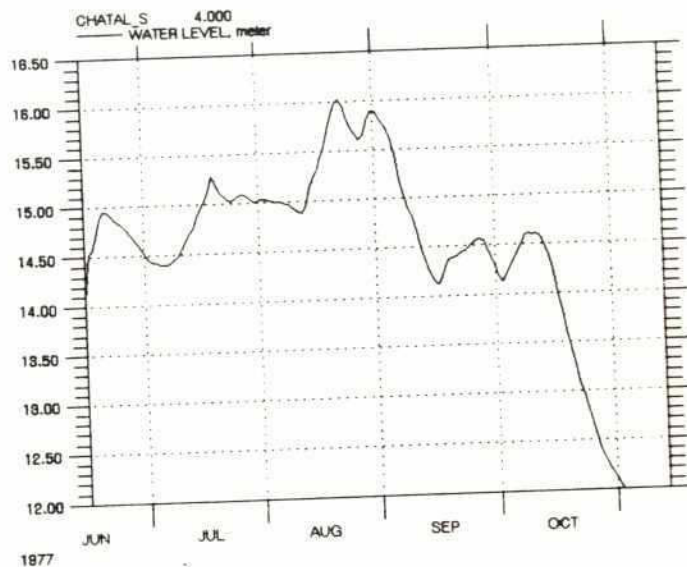


Discharge

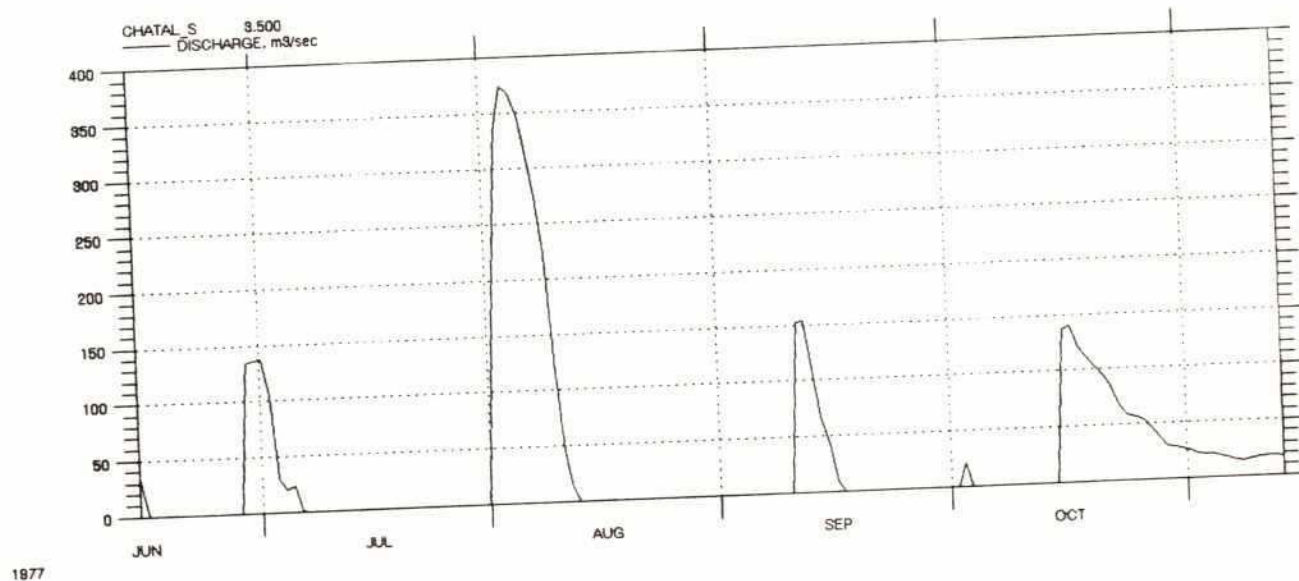
SWMC	OPTION B (with JHENA/CHATAL outlet structure) Structure opened from 1st June to 30th June 1988	MIKE 11
		Dwg no.:
DATA FILE : JPPOB1.RDF RESULT FILE : 88JPOB1F.RRF	BOUNDARY FILE : JPOB1F88.BSF CALCULATED : 13 - OCT - 1992, 19:44	



U/S. Water level



D/S. Water level



Discharge

SWMC

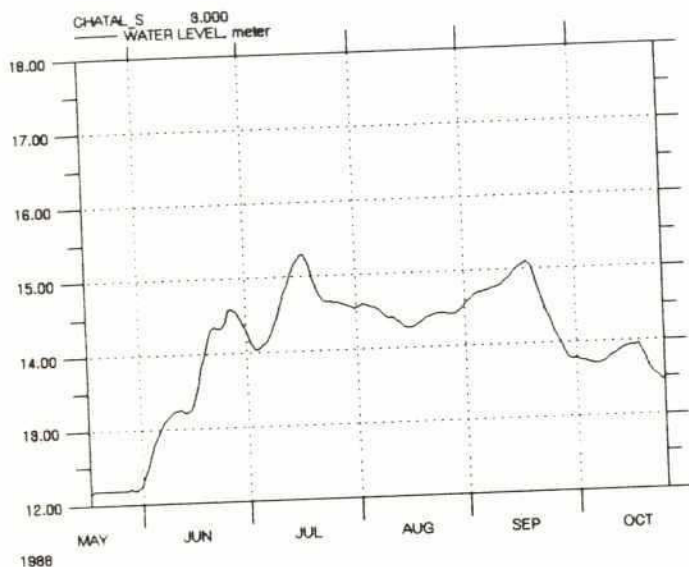
OPTION B (with JHENAI/CHATAL outlet structure)
Structures closed (Rainfall only)
1977

DATA FILE : JPOB.RDF
RESULT FILE : 77JPOBC.RRF

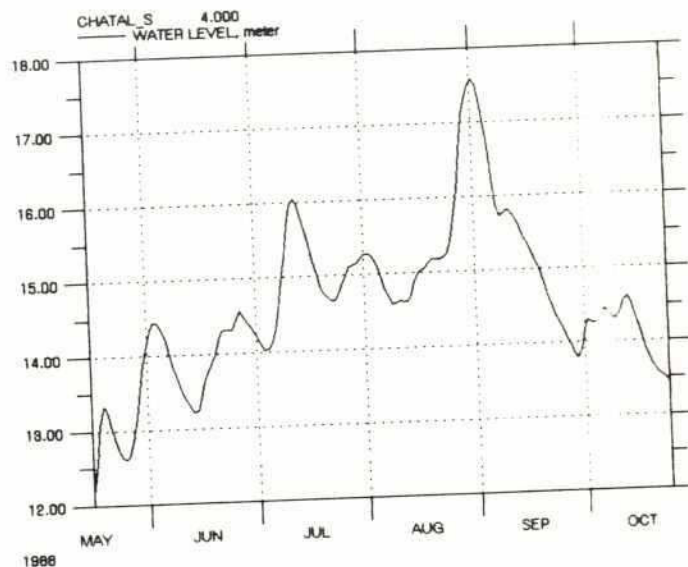
BOUNDARY FILE : JPOB077.BSF
CALCULATED : 11 - OCT - 1992, 16:52

MIKE 11

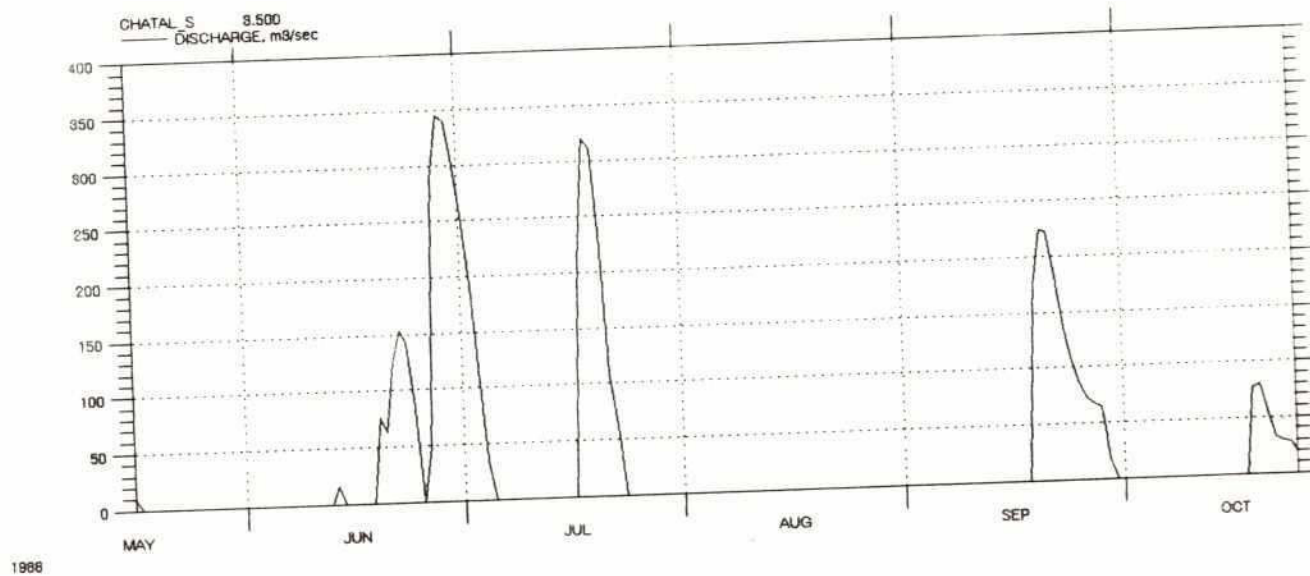
Dwg no.:



U/S. Water level



D/S. Water level



Discharge

SWMC

OPTION B (with JHENA/CHATAL outlet structure)
Structures closed (Rainfall only)
1988

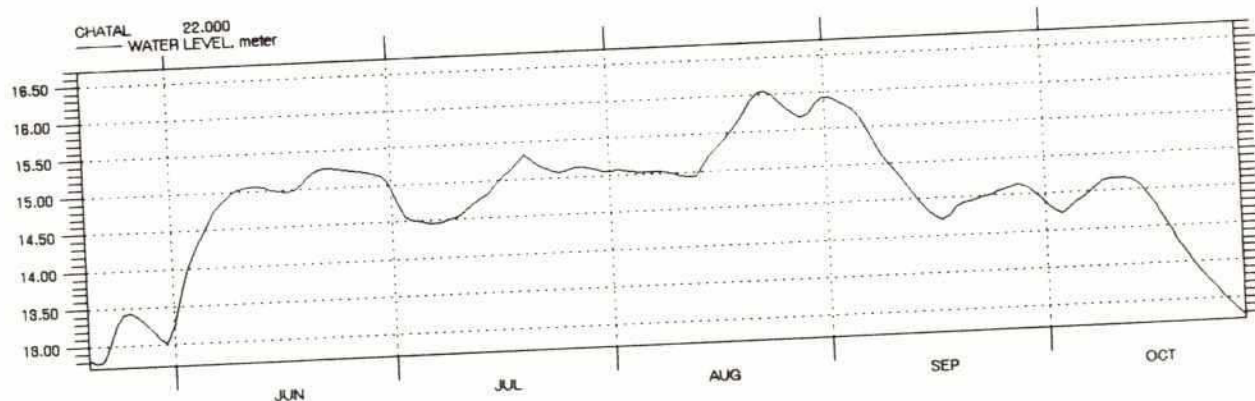
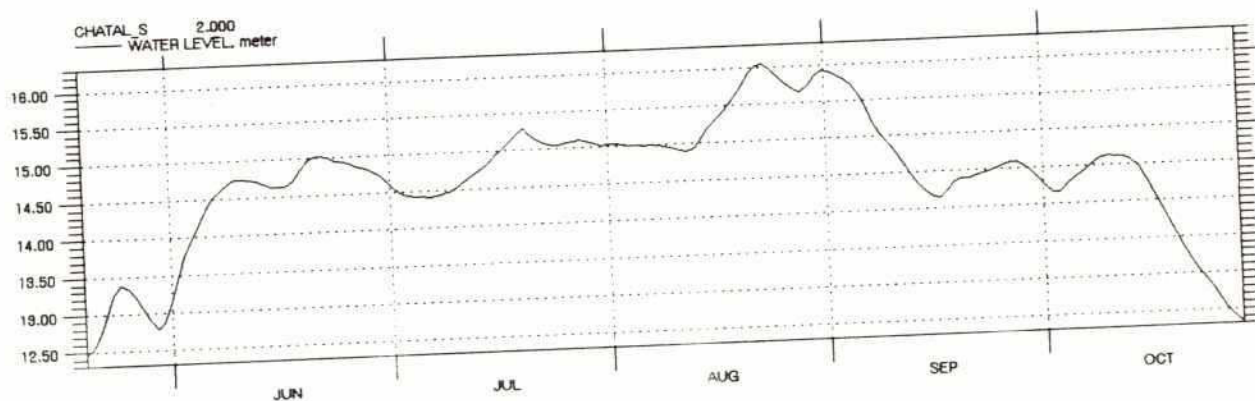
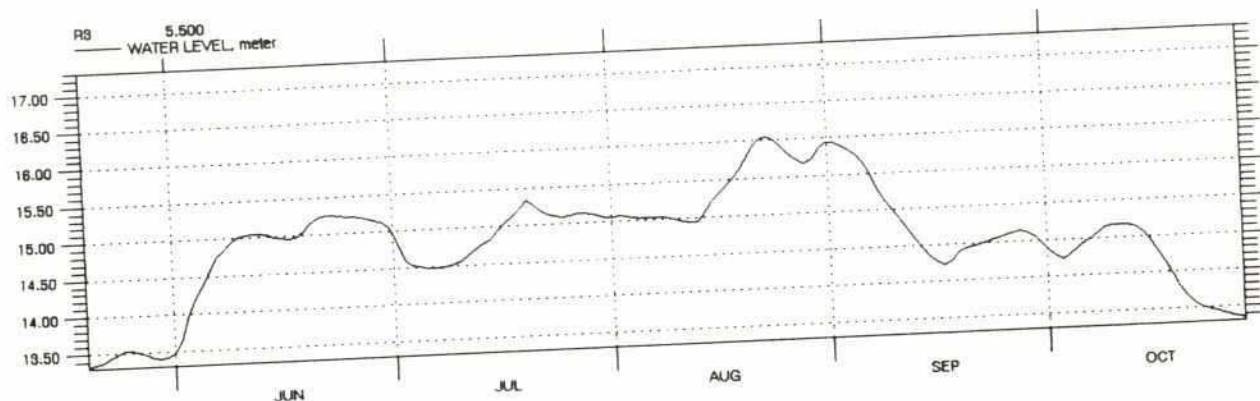
DATA FILE : JPPOB.RDF
RESULT FILE : 88JPOBC.RRF

BOUNDARY FILE : JPOBC88.BSF
CALCULATED : 9 - OCT - 1992, 21:21

MIKE 11

Dwg no.:

Hydrograph of Cells Representative Calculation Point
Option B (Without Jhenai/Chatal Outlet)
(1977 & 1988)



SWMC

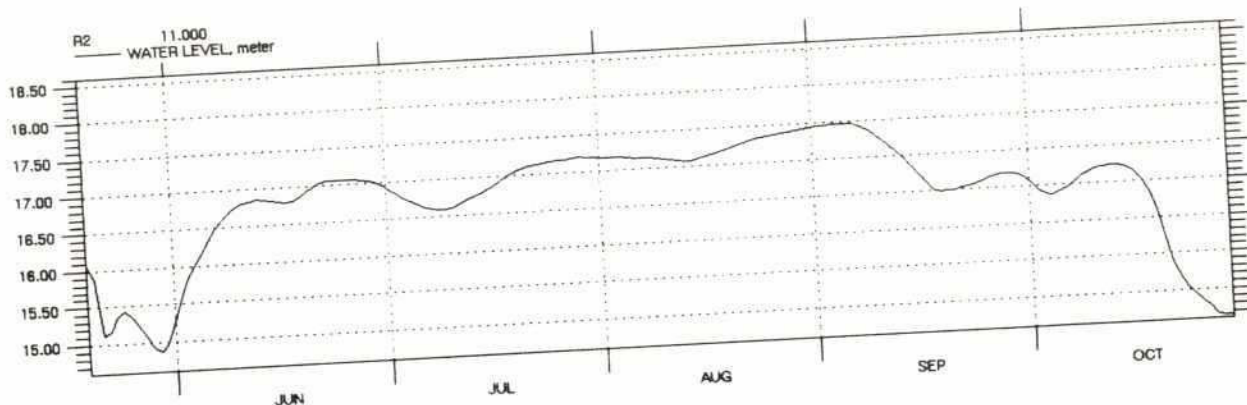
OPTION B (without JHENA/CHATAL outlet structure)
Structures opened from 1st June to 30th June
1977

DATA FILE : JPOB2.RDF
RESULT FILE : 77JPOB2F.RRF

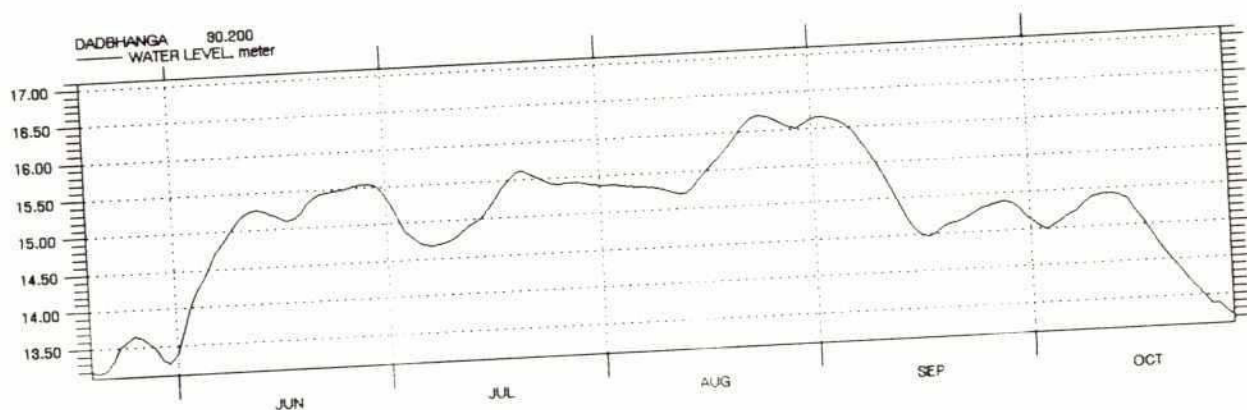
BOUNDARY FILE : JPOB1F77.BSF
CALCULATED : 10 - OCT - 1992, 21:38

MIKE 11

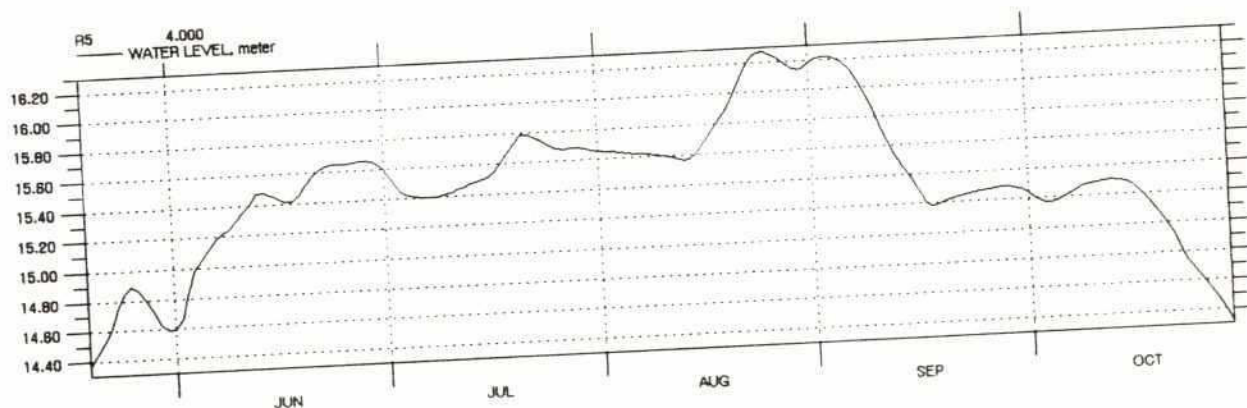
Dwg no.:



1977

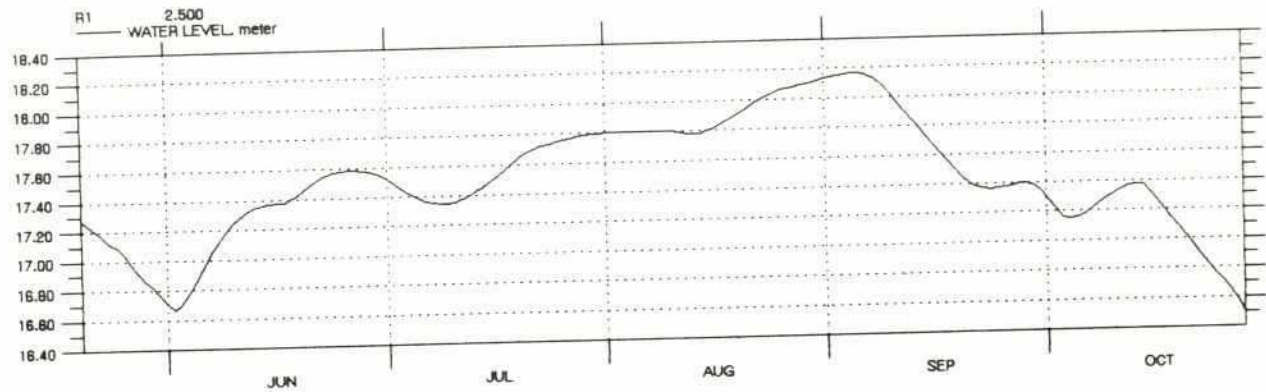


1977

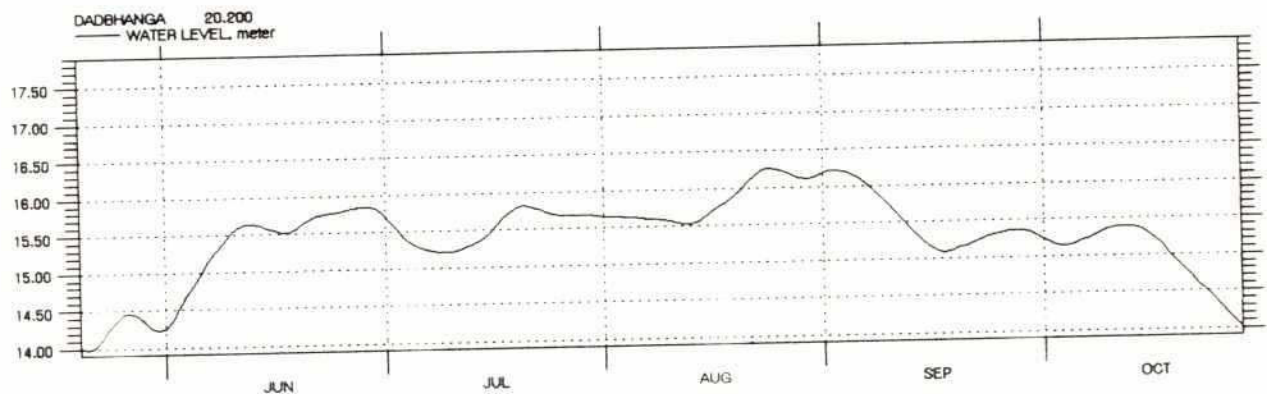


1977

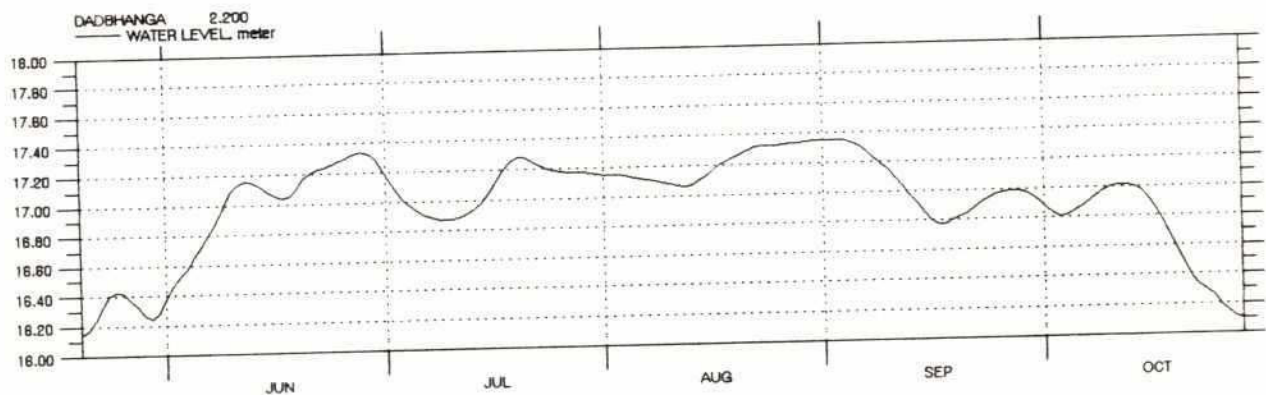
S W M C	OPTION B (without JHENA/CHATAL outlet structure) Structures opened from 1st June to 30th June 1977		MIKE 11
	DATA FILE : JPOB2.RDF RESULT FILE : 77JPOB2F.RRF	BOUNDARY FILE : JPOB1F77.BSF CALCULATED : 10 - OCT - 1992, 21:38	



1977



1977



1977

SWMC

OPTION B (without JHENA/CHATAL outlet structure)
Structures opened from 1st June to 30th June
1977

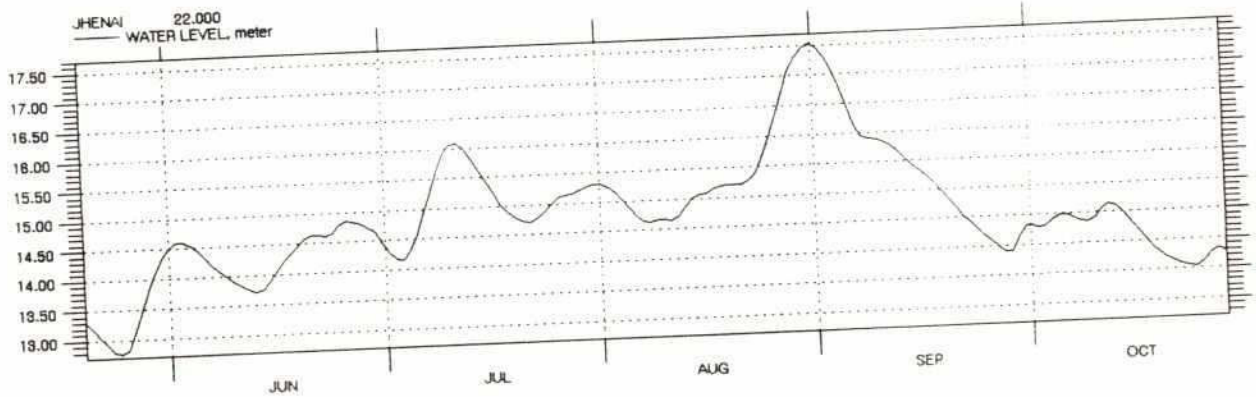
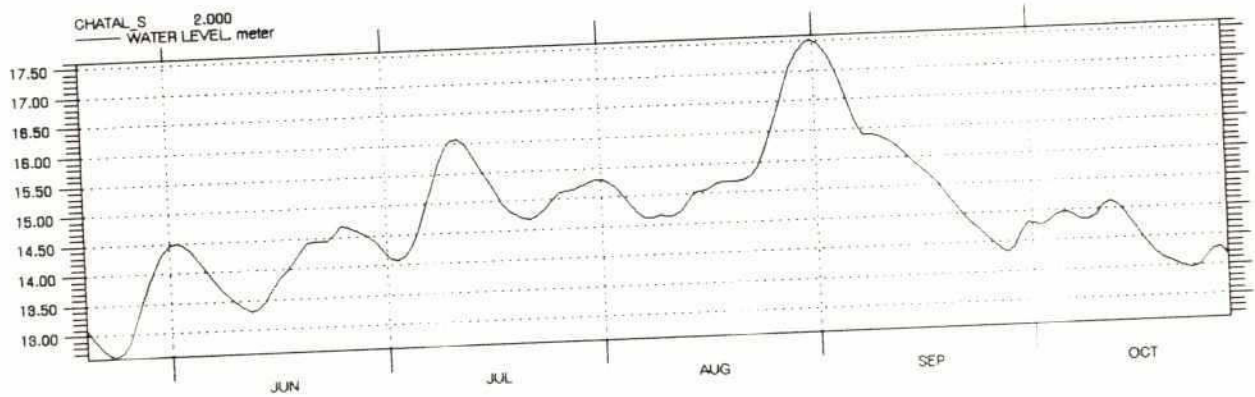
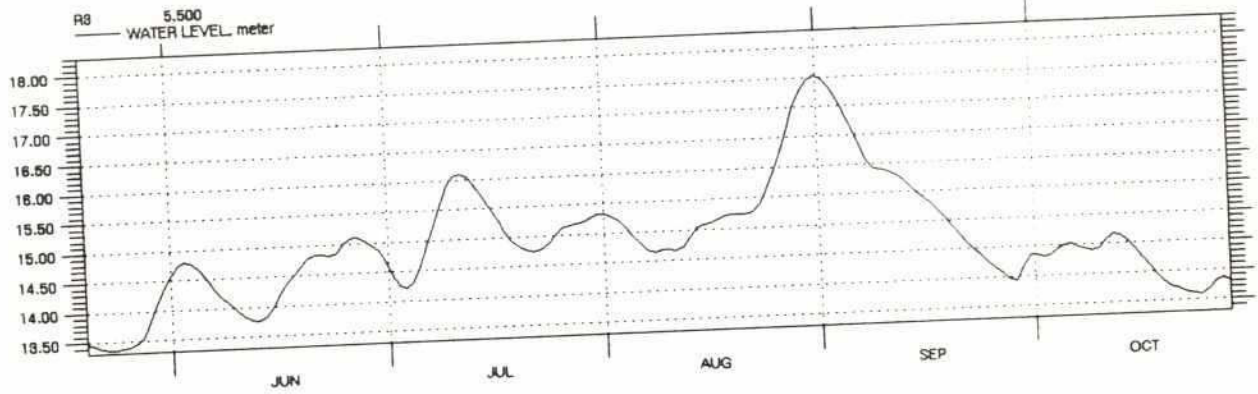
DATA FILE : JPOB2.RDF
RESULT FILE : 77JPOB2F.RRF

BOUNDARY FILE : JPOB1F77.BSF
CALCULATED : 10 - OCT - 1992, 21:38

MIKE 11

Dwg no.:

336



SWMC

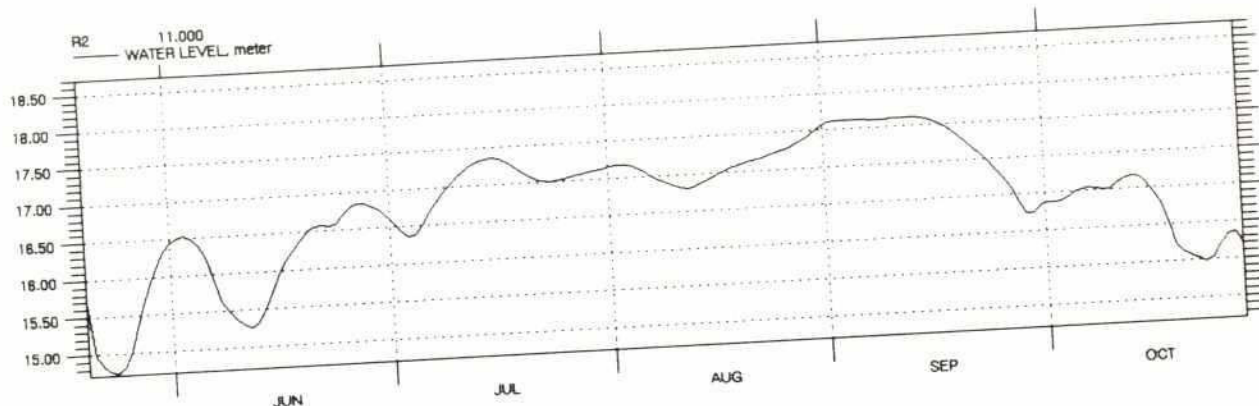
OPTION B (without JHENAI/CHATAL outlet structure)
Structures opened from 1st June to 30th June
1988

DATA FILE : JPOB2.RDF
RESULT FILE : 88JPOB2F.RRF

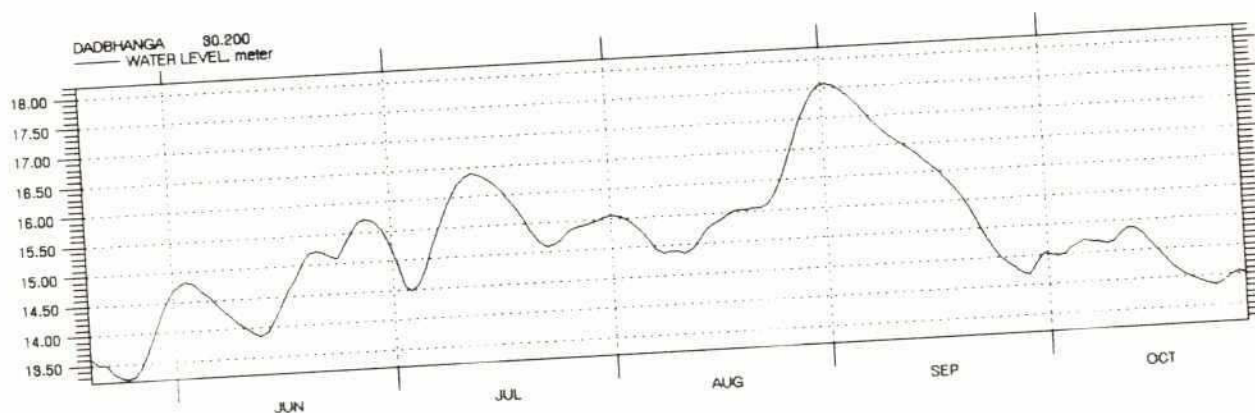
BOUNDARY FILE : JPOB1F88.BSF
CALCULATED : 10 - OCT - 1992, 17:42

MIKE 11

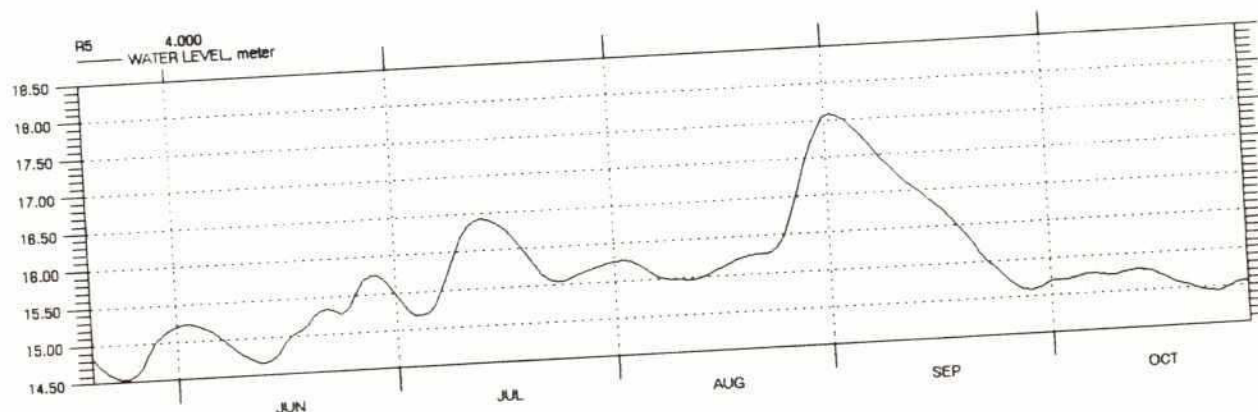
Dwg no.:



1988

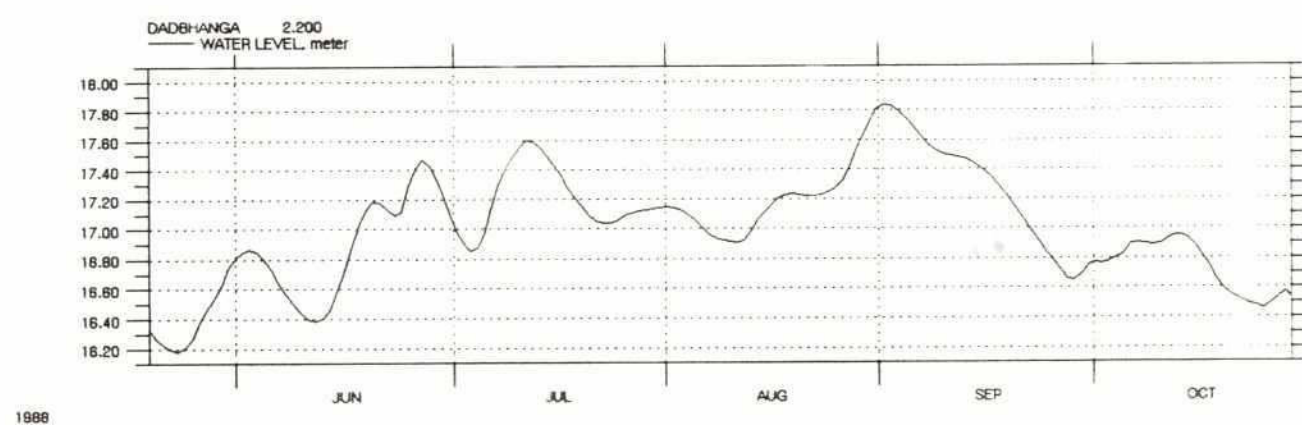
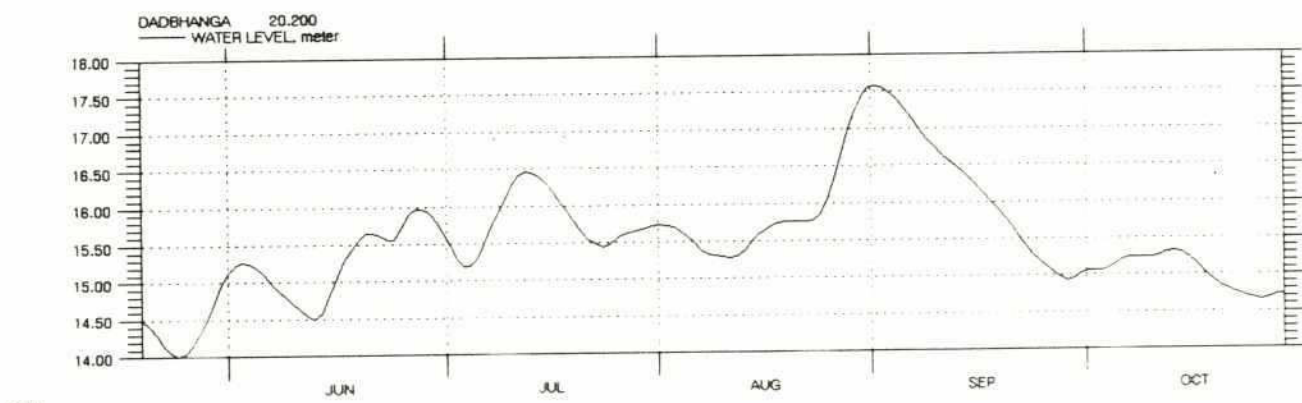
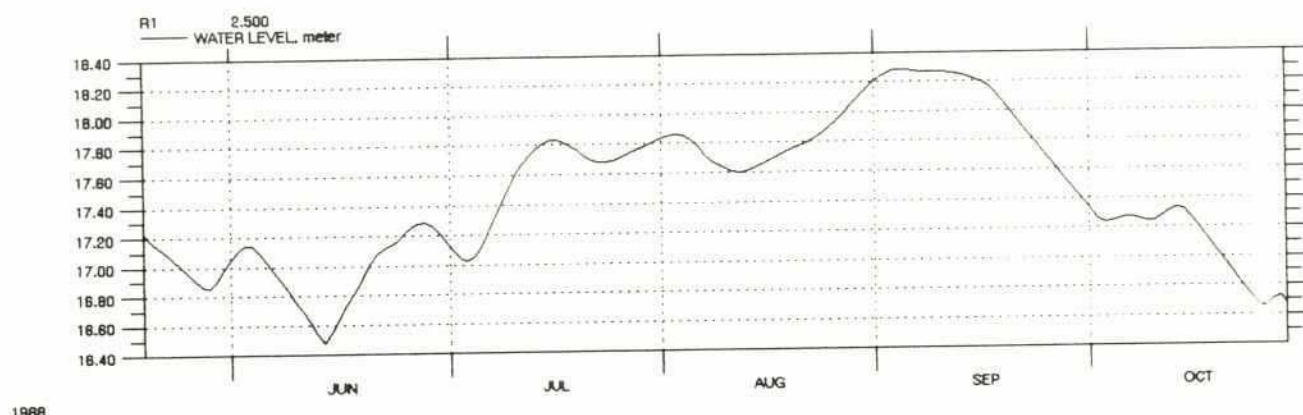


1988



1988

SWMC	OPTION B (without JHENA/CHATAL outlet structure) Structures opened from 1st June to 30th June 1988	
	DATA FILE : JPOB2.RDF RESULT FILE : 88JPOB2F.RRF	BOUNDARY FILE : JPOB1F88.BSF CALCULATED : 10 - OCT - 1992, 17:42
		MIKE 11 Dwg no.:



S W M C	OPTION B (without JHENA/CHATAL outlet structure) Structures opened from 1st June to 30th June 1988	MIKE 11
DATA FILE : JPOB2.RDF RESULT FILE : 88JPOB2F.RRF	BOUNDARY FILE : JPOB1F88.BSF CALCULATED : 10 - OCT - 1992, 17:42	Dwg no.:

Table of Flood-Depth-Area Characteristic
Option B (Without Jhenai/Chatal Outlet)



MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B (Without JH/CHt structure)

- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 15-05-1977 to 28-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*
* 0.00	* 344.21	* 330.52	* 300.51	* 258.77	* 180.49	* 146.34	* 107.69	*
* 0.15	* 312.08	* 298.37	* 268.99	* 227.87	* 153.04	* 121.90	* 87.28	*
* 0.30	* 280.22	* 267.23	* 237.76	* 196.75	* 129.16	* 99.42	* 68.53	*
* 0.45	* 247.76	* 234.78	* 206.02	* 166.89	* 105.11	* 79.62	* 54.89	*
* 0.60	* 215.38	* 203.43	* 175.17	* 138.11	* 85.35	* 63.00	* 42.73	*
* 0.75	* 183.66	* 171.91	* 145.86	* 113.94	* 66.77	* 50.47	* 33.88	*
* 0.90	* 153.80	* 143.48	* 119.81	* 92.66	* 54.21	* 38.29	* 20.81	*
* 1.05	* 128.17	* 117.98	* 98.36	* 74.22	* 41.17	* 30.31	* 17.19	*
* 1.20	* 104.53	* 96.82	* 79.26	* 57.08	* 32.81	* 19.57	* 13.07	*
* 1.35	* 84.60	* 77.07	* 61.64	* 44.85	* 21.27	* 16.11	* 10.94	*
* 1.50	* 67.59	* 61.54	* 47.75	* 30.67	* 17.55	* 12.37	* 9.06	*
* 1.65	* 54.34	* 48.34	* 33.66	* 24.98	* 13.46	* 10.45	* 8.30	*
* 1.80	* 38.76	* 34.86	* 27.07	* 20.38	* 11.32	* 8.87	* 7.56	*
* 1.95	* 32.07	* 28.38	* 22.38	* 16.91	* 9.42	* 8.12	* 0.29	*
* 2.10	* 25.92	* 23.36	* 18.41	* 14.46	* 8.45	* 0.49	* 0.04	*
* 2.25	* 22.11	* 19.64	* 15.82	* 11.63	* 7.70	* 0.22	* 0.00	*
* 2.40	* 18.54	* 16.80	* 12.84	* 9.78	* 0.34	* 0.00	* 0.00	*
* 2.55	* 16.03	* 14.41	* 10.99	* 8.56	* 0.09	* 0.00	* 0.00	*
* 2.70	* 12.96	* 11.68	* 9.17	* 7.83	* 0.00	* 0.00	* 0.00	*
* 2.85	* 11.14	* 9.84	* 8.31	* 0.37	* 0.00	* 0.00	* 0.00	*
* 3.00	* 9.36	* 8.58	* 7.61	* 0.15	* 0.00	* 0.00	* 0.00	*
* 3.15	* 8.39	* 7.89	* 0.31	* 0.00	* 0.00	* 0.00	* 0.00	*
* 3.30	* 7.69	* 0.41	* 0.09	* 0.00	* 0.00	* 0.00	* 0.00	*
* 3.45	* 0.33	* 0.18	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*
* 3.60	* 0.11	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*



MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B (Without JH/CHt structure)
- CELL : C1
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 15-05-1977 to 28-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days *	* 5 days *	* 10 days *	* 20 days *	* 40 days *	* 60 days *	* 90 days *	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*
* 0.00 *	* 51.69 *	* 48.25 *	* 39.14 *	* 32.53 *	* 17.22 *	* 13.06 *	* 9.00 *	*
* 0.15 *	* 45.96 *	* 42.52 *	* 33.92 *	* 27.60 *	* 14.04 *	* 10.60 *	* 7.03 *	*
* 0.30 *	* 40.22 *	* 37.06 *	* 28.80 *	* 23.10 *	* 11.58 *	* 8.34 *	* 5.12 *	*
* 0.45 *	* 34.97 *	* 31.84 *	* 24.30 *	* 19.13 *	* 9.13 *	* 6.37 *	* 4.07 *	*
* 0.60 *	* 29.75 *	* 27.00 *	* 19.98 *	* 15.95 *	* 7.16 *	* 4.77 *	* 3.04 *	*
* 0.75 *	* 25.20 *	* 22.50 *	* 16.80 *	* 13.06 *	* 5.19 *	* 3.72 *	* 2.34 *	*
* 0.90 *	* 20.70 *	* 18.70 *	* 13.71 *	* 10.60 *	* 4.14 *	* 2.81 *	* 1.66 *	*
* 1.05 *	* 17.43 *	* 15.52 *	* 11.26 *	* 8.34 *	* 3.09 *	* 2.11 *	* 1.15 *	*
* 1.20 *	* 14.25 *	* 12.73 *	* 8.87 *	* 6.37 *	* 2.39 *	* 1.49 *	* 0.00 *	*
* 1.35 *	* 11.75 *	* 10.28 *	* 6.90 *	* 4.77 *	* 1.69 *	* 0.98 *	* 0.00 *	*
* 1.50 *	* 9.29 *	* 8.08 *	* 5.05 *	* 3.72 *	* 1.18 *	* 0.00 *	* 0.00 *	*
* 1.65 *	* 7.29 *	* 6.11 *	* 4.00 *	* 2.81 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 1.80 *	* 5.32 *	* 4.63 *	* 3.00 *	* 2.11 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 1.95 *	* 4.21 *	* 3.58 *	* 2.30 *	* 1.49 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 2.10 *	* 3.16 *	* 2.72 *	* 1.62 *	* 0.98 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 2.25 *	* 2.44 *	* 2.02 *	* 1.11 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 2.40 *	* 1.74 *	* 1.42 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 2.55 *	* 1.21 *	* 0.91 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B (Without JH/CHt structure)
- CELL : C2
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 15-05-1977 to 28-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*
* 0.00 *	42.49	40.94	37.52	32.33	19.85	14.96	10.20	*
* 0.15 *	40.17	38.63	34.53	28.72	16.07	12.18	7.95	*
* 0.30 *	37.72	35.72	31.37	25.11	13.29	9.75	6.08	*
* 0.45 *	34.73	32.73	27.76	20.96	10.65	7.50	4.65	*
* 0.60 *	31.61	29.20	24.00	16.81	8.40	5.79	3.50	*
* 0.75 *	28.00	25.59	19.85	14.03	6.37	4.36	2.68	*
* 0.90 *	24.28	21.51	16.07	11.25	4.93	3.34	2.06	*
* 1.05 *	20.13	17.36	13.29	9.00	3.66	2.52	1.66	*
* 1.20 *	16.25	14.40	10.65	6.75	2.85	1.98	1.33	*
* 1.35 *	13.47	11.62	8.40	5.31	2.14	1.58	1.07	*
* 1.50 *	10.80	9.30	6.37	3.88	1.74	1.28	0.85	*
* 1.65 *	8.55	7.05	4.93	3.06	1.38	1.02	0.67	*
* 1.80 *	6.46	5.51	3.66	2.25	1.12	0.81	0.49	*
* 1.95 *	5.03	4.07	2.85	1.85	0.88	0.63	0.27	*
* 2.10 *	3.72	3.17	2.14	1.45	0.70	0.45	0.04	*
* 2.25 *	2.90	2.36	1.74	1.19	0.52	0.22	0.00	*
* 2.40 *	2.17	1.90	1.38	0.93	0.31	0.00	0.00	*
* 2.55 *	1.77	1.50	1.12	0.75	0.09	0.00	0.00	*
* 2.70 *	1.40	1.22	0.88	0.57	0.00	0.00	0.00	*
* 2.85 *	1.14	0.96	0.70	0.37	0.00	0.00	0.00	*
* 3.00 *	0.89	0.77	0.52	0.15	0.00	0.00	0.00	*
* 3.15 *	0.71	0.59	0.31	0.00	0.00	0.00	0.00	*
* 3.30 *	0.53	0.41	0.09	0.00	0.00	0.00	0.00	*
* 3.45 *	0.33	0.18	0.00	0.00	0.00	0.00	0.00	*
* 3.60 *	0.11	0.00	0.00	0.00	0.00	0.00	0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B (Without JH/CHt structure)
- CELL : C3
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 15-05-1977 to 28-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*
-----	*-----	*-----	*-----	*-----	*-----	*-----	*-----	*
* 0.00 *	93.52	87.95	77.46	66.00	46.21	38.55	31.08	*
* 0.15 *	85.92	80.35	70.58	59.66	40.58	34.21	27.03	*
* 0.30 *	78.37	73.33	63.80	53.45	36.23	30.00	23.16	*
* 0.45 *	71.50	66.46	57.59	47.71	31.89	25.95	20.47	*
* 0.60 *	64.63	60.08	51.46	42.08	27.84	22.44	17.87	*
* 0.75 *	58.42	53.87	45.83	37.39	23.79	19.75	15.92	*
* 0.90 *	52.21	48.08	40.29	33.05	21.00	17.35	14.00	*
* 1.05 *	46.58	42.46	35.95	28.92	18.31	15.40	12.57	*
* 1.20 *	40.96	37.68	31.62	24.87	16.31	13.62	11.14	*
* 1.35 *	36.52	33.34	27.57	21.72	14.36	12.19	9.59	*
* 1.50 *	32.18	29.19	23.52	19.03	12.86	10.73	8.05	*
* 1.65 *	28.11	25.14	20.82	16.83	11.43	9.18	7.53	*
* 1.80 *	24.06	21.90	18.13	14.88	9.90	7.91	7.02	*
* 1.95 *	21.18	19.21	16.18	13.24	8.36	7.40	0.00	*
* 2.10 *	18.49	16.96	14.23	11.81	7.64	0.00	0.00	*
* 2.25 *	16.44	15.01	12.77	10.31	7.12	0.00	0.00	*
* 2.40 *	14.49	13.34	11.34	8.77	0.00	0.00	0.00	*
* 2.55 *	12.96	11.91	9.80	7.78	0.00	0.00	0.00	*
* 2.70 *	11.53	10.42	8.26	7.26	0.00	0.00	0.00	*
* 2.85 *	10.01	8.87	7.60	0.00	0.00	0.00	0.00	*
* 3.00 *	8.46	7.81	7.09	0.00	0.00	0.00	0.00	*
* 3.15 *	7.67	7.29	0.00	0.00	0.00	0.00	0.00	*
* 3.30 *	7.16	0.00	0.00	0.00	0.00	0.00	0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B (Without JH/CHt structure)
- CELL : C4
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 15-05-1977 to 28-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	*****							
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*
* 0.00 *	* 53.87	* 53.87	* 52.37	* 49.11	* 42.64	* 34.72	* 23.08	*-----*
* 0.15 *	* 50.11	* 50.11	* 48.61	* 44.41	* 37.31	* 28.00	* 18.09	*-----*
* 0.30 *	* 45.84	* 45.84	* 43.70	* 39.09	* 30.69	* 21.75	* 13.11	*-----*
* 0.45 *	* 40.51	* 40.51	* 38.38	* 32.93	* 23.98	* 16.77	* 9.80	*-----*
* 0.60 *	* 34.72	* 34.72	* 32.03	* 26.21	* 18.76	* 12.23	* 6.49	*-----*
* 0.75 *	* 28.01	* 28.01	* 25.32	* 20.42	* 13.77	* 8.92	* 4.50	*-----*
* 0.90 *	* 21.75	* 21.75	* 19.76	* 15.44	* 10.24	* 5.89	* 2.60	*-----*
* 1.05 *	* 16.77	* 16.77	* 14.77	* 11.34	* 6.93	* 3.99	* 1.53	*-----*
* 1.20 *	* 12.23	* 12.23	* 10.90	* 8.04	* 4.75	* 2.27	* 0.51	*-----*
* 1.35 *	* 8.92	* 8.92	* 7.59	* 5.38	* 2.85	* 1.26	* 0.28	*-----*
* 1.50 *	* 5.89	* 5.89	* 5.13	* 3.48	* 1.66	* 0.36	* 0.11	*-----*
* 1.65 *	* 3.99	* 3.99	* 3.23	* 2.00	* 0.65	* 0.25	* 0.10	*-----*
* 1.80 *	* 2.27	* 2.27	* 1.86	* 0.99	* 0.30	* 0.14	* 0.05	*-----*
* 1.95 *	* 1.26	* 1.26	* 0.85	* 0.33	* 0.18	* 0.09	* 0.02	*-----*
* 2.10 *	* 0.36	* 0.36	* 0.32	* 0.22	* 0.11	* 0.04	* 0.00	*-----*
* 2.25 *	* 0.25	* 0.25	* 0.20	* 0.13	* 0.06	* 0.00	* 0.00	*-----*
* 2.40 *	* 0.14	* 0.14	* 0.12	* 0.08	* 0.03	* 0.00	* 0.00	*-----*
* 2.55 *	* 0.09	* 0.09	* 0.07	* 0.03	* 0.00	* 0.00	* 0.00	*-----*
* 2.70 *	* 0.04	* 0.04	* 0.03	* 0.00	* 0.00	* 0.00	* 0.00	*-----*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B (without JH/CHt structure)
- CELL : C5
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 15-05-1977 to 28-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							
* (m) *	* 3 days *	* 5 days *	* 10 days *	* 20 days *	* 40 days *	* 60 days *	* 90 days *	*

* 0.00 *	20.51	19.50	17.64	13.46	4.51	2.08	0.57	*
* 0.15 *	17.98	16.95	15.03	10.77	2.89	0.98	0.23	*
* 0.30 *	15.38	14.33	12.41	8.01	1.79	0.53	0.07	*
* 0.45 *	12.76	11.69	9.67	5.75	0.78	0.18	0.02	*
* 0.60 *	10.04	8.93	6.91	4.06	0.44	0.07	0.00	*
* 0.75 *	7.28	6.31	5.07	2.60	0.11	0.01	0.00	*
* 0.90 *	5.30	4.62	3.38	1.49	0.05	0.00	0.00	*
* 1.05 *	3.60	2.97	2.16	0.69	0.00	0.00	0.00	*
* 1.20 *	2.30	1.86	1.05	0.34	0.00	0.00	0.00	*
* 1.35 *	1.20	0.81	0.55	0.09	0.00	0.00	0.00	*
* 1.50 *	0.60	0.46	0.20	0.04	0.00	0.00	0.00	*
* 1.65 *	0.25	0.11	0.07	0.00	0.00	0.00	0.00	*
* 1.80 *	0.08	0.06	0.01	0.00	0.00	0.00	0.00	*
* 1.95 *	0.02	0.00	0.00	0.00	0.00	0.00	0.00	*
* 2.10 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 2.25 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 2.40 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 2.55 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 2.70 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 2.85 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 3.00 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B (Without JH/CHt structure)
- CELL : C6
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 15-05-1977 to 28-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							
* (m) *	* 3 days *	* 5 days *	* 10 days *	* 20 days *	* 40 days *	* 60 days *	* 90 days *	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*
* 0.00 *	* 10.18 *	* 9.84 *	* 8.92 *	* 6.83 *	* 3.62 *	* 3.09 *	* 2.51 *	*
* 0.15 *	* 8.46 *	* 8.12 *	* 7.20 *	* 5.43 *	* 2.64 *	* 2.23 *	* 1.84 *	*
* 0.30 *	* 6.83 *	* 6.55 *	* 5.80 *	* 4.14 *	* 1.93 *	* 1.59 *	* 1.20 *	*
* 0.45 *	* 5.43 *	* 5.15 *	* 4.40 *	* 3.16 *	* 1.29 *	* 1.05 *	* 0.85 *	*
* 0.60 *	* 4.14 *	* 3.94 *	* 3.42 *	* 2.27 *	* 0.89 *	* 0.71 *	* 0.51 *	*
* 0.75 *	* 3.16 *	* 2.96 *	* 2.44 *	* 1.63 *	* 0.56 *	* 0.43 *	* 0.33 *	*
* 0.90 *	* 2.27 *	* 2.14 *	* 1.80 *	* 1.07 *	* 0.35 *	* 0.26 *	* 0.15 *	*
* 1.05 *	* 1.63 *	* 1.50 *	* 1.16 *	* 0.74 *	* 0.17 *	* 0.12 *	* 0.07 *	*
* 1.20 *	* 1.07 *	* 1.00 *	* 0.83 *	* 0.44 *	* 0.08 *	* 0.00 *	* 0.00 *	*
* 1.35 *	* 0.74 *	* 0.67 *	* 0.49 *	* 0.27 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 1.50 *	* 0.44 *	* 0.41 *	* 0.32 *	* 0.12 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 1.65 *	* 0.27 *	* 0.23 *	* 0.14 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 1.80 *	* 0.12 *	* 0.11 *	* 0.07 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*
* 1.95 *	* 0.05 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	* 0.00 *	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B (Without JH/CHt structure)
- CELL : C7
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 15-05-1977 to 28-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*
* 0.00 *	33.06	33.06	32.60	31.22	28.87	25.66	19.90	*
* 0.15 *	31.54	31.54	31.01	29.63	26.04	22.61	16.61	*
* 0.30 *	29.95	29.95	29.25	26.79	23.06	19.22	13.90	*
* 0.45 *	27.36	27.36	26.42	23.96	19.68	16.07	11.22	*
* 0.60 *	24.53	24.53	23.51	20.58	16.43	13.36	8.69	*
* 0.75 *	21.25	21.25	20.13	17.20	13.72	10.71	6.20	*
* 0.90 *	17.87	17.87	16.79	14.45	11.05	8.18	0.00	*
* 1.05 *	14.99	14.99	14.08	11.74	8.52	5.83	0.00	*
* 1.20 *	12.28	12.28	11.39	9.19	6.08	0.00	0.00	*
* 1.35 *	9.70	9.70	8.86	6.66	0.00	0.00	0.00	*
* 1.50 *	7.17	7.17	6.32	0.00	0.00	0.00	0.00	*
* 1.65 *	5.10	5.10	0.00	0.00	0.00	0.00	0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B (Without JH/CHt structure)
- CELL : C8
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 15-05-1977 to 28-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*
-----	-----	-----	-----	-----	-----	-----	-----	*
* 0.00 *	26.69	24.91	22.83	16.83	9.46	7.08	5.41	*
* 0.15 *	22.24	20.46	18.54	13.17	7.19	5.52	3.88	*
* 0.30 *	18.05	16.59	14.88	10.40	5.62	3.97	2.49	*
* 0.45 *	14.39	12.93	11.48	8.07	4.07	2.58	1.28	*
* 0.60 *	11.17	10.24	9.15	6.25	2.67	1.31	0.84	*
* 0.75 *	8.84	7.91	6.98	4.68	1.34	0.87	0.46	*
* 0.90 *	6.77	6.14	5.41	3.23	0.90	0.47	0.33	*
* 1.05 *	5.20	4.58	3.88	1.83	0.48	0.34	0.21	*
* 1.20 *	3.70	3.14	2.49	1.08	0.35	0.21	0.09	*
* 1.35 *	2.30	1.74	1.28	0.64	0.22	0.10	0.00	*
* 1.50 *	1.22	1.05	0.84	0.40	0.11	0.00	0.00	*
* 1.65 *	0.78	0.61	0.46	0.27	0.00	0.00	0.00	*
* 1.80 *	0.45	0.39	0.33	0.15	0.00	0.00	0.00	*
* 1.95 *	0.32	0.26	0.21	0.00	0.00	0.00	0.00	*
* 2.10 *	0.19	0.15	0.09	0.00	0.00	0.00	0.00	*
* 2.25 *	0.08	0.00	0.00	0.00	0.00	0.00	0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B (Without JH/CHt structure)
- CELL : C9
- COMMENT : 1977 - AREA WITHIN EMBANKMENTS

Simulation from 15-05-1977 to 28-10-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*
* 0.00 *	* 12.20 !	* 12.20 !	* 12.03 !	* 10.46 !	* 8.11 !	* 7.14 !	* 5.94 !	*
* 0.15 *	* 9.70 !	* 9.70 !	* 9.58 !	* 8.48 !	* 6.29 !	* 5.59 !	* 4.62 !	*
* 0.30 *	* 7.87 !	* 7.87 !	* 7.75 !	* 6.65 !	* 4.97 !	* 4.26 !	* 3.39 !	*
* 0.45 *	* 6.11 !	* 6.11 !	* 6.03 !	* 5.23 !	* 3.65 !	* 3.16 !	* 2.54 !	*
* 0.60 *	* 4.79 !	* 4.79 !	* 4.70 !	* 3.91 !	* 2.77 !	* 2.31 !	* 1.79 !	*
* 0.75 *	* 3.50 !	* 3.50 !	* 3.45 !	* 2.94 !	* 1.92 !	* 1.70 !	* 1.45 !	*
* 0.90 *	* 2.65 !	* 2.65 !	* 2.60 !	* 2.09 !	* 1.54 !	* 0.00 !	* 0.00 !	*
* 1.05 *	* 1.84 !	* 1.84 !	* 1.81 !	* 1.61 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 1.20 *	* 1.49 !	* 1.49 !	* 1.47 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*

ANNEX 4

APPENDIX

D5 OPTION B WITH PARTIAL EMBANKMENT

Adjusted Land Type Calculation With and Without Option
(Option B and Option B With Partial Embankment)
Land Type Distribution Option B (With Partial Embankment)
Table of Flood-Depth-Area Characteristics
(Total Area and Cell Wise)
Hydrograph of All Cell Representative Points (1977)

Adjusted Land Type Calculation
(With and Without Option)

ADJUSTED LAND CATEGORIES DISTRIBUTION FOR (W) AND (N) SITUATIONS
AREA WITHIN EMBANKMENTS (Ha)

Model reference year : 1977 / Fld Dur. : 10 days

*	!		(a)	!	(b)	!	(c)	!	(d)	*	(e)	*
*	!		F0	!	F1	!	F2	!	F3	*	TOTAL	*
			-----			-----			-----			
*	!			!		!		!		*		*
* W	!	1) Gross/net coef.	50%	!	0%	!	25%	!	25%	*	100%	*
* I	!			!		!		!		*		*
* T	!			!		!		!		*		*
* H	!	2) Reported net cultiv.	14219	!	22874	!	11132	!	1928	*	50153	*
* O	!	area	28%	!	46%	!	22%	!	4%	*	100%	*
* U	!			!		!		!		*		*
* T	!	3) Adjusted gross area	22045	!	22874	!	15045	!	5841	*	65805	*
*	!		34%	!	35%	!	23%	!	9%	*	100%	*
			-----			-----			-----			
* P	!	4) (Gross - Net) area	7826	!	0	!	3913	!	3913	*	15652	*
* T	!			!		!		!		*		*
* I	!			!		!		!		*		*
* O	!	5) Model calc. gross	24193	!	14513	!	17251	!	9848	*	65805	*
* N	!	area	37%	!	22%	!	26%	!	15%	*	100%	*
*	!			!		!		!		*		*
*	!	6) Model calc. net	16367	!	14513	!	13338	!	5935	*	50153	*
*	!	area	33%	!	29%	!	27%	!	12%	*	100%	*

*	!			!		!		!		*		*
*	!	7) Model calc. gross	40442	!	12166	!	9705	!	3492	*	65805	*
* O	!	area	61%	!	18%	!	15%	!	5%	*	100%	*
* P	!			!		!		!		*		*
* T	!	8) Model calc. net	32616	!	12166	!	5371	!	0	*	50153	*
* I	!	area	65%	!	24%	!	11%	!	0%	*	100%	*
* O	!			!		!		!		*		*
* N	!			!		!		!		*		*
			-----			-----			-----			
*	!			!		!		!		*		*
* B	!	9) Correct. cultivated	27333	!	18496	!	4324	!	0	*	50153	*
*	!	net area	54%	!	37%	!	9%	!	0%	*	100%	*
*	!			!		!		!		*		*

- *****
- 1) This coefficient is applicated on the difference between total gross and net area (e4)
 - 2) Reported data from agriculture
 - 3) (3) = (2) + (4)
 - 4) (4) = (e4) x (1)
 - 5) Reference model calculation
 - 6) (6) = (5) - (4)
 - 7) Option model calculation
 - 8) (8) = (7) - (4)
 - 9) Correction of the areas to be homogenous with the reported net agricul. area
(9) = (8) / (6) x (2), then proportionnal adjustement on the total net area

See text for comments on applied methodology.

ADJUSTED LAND CATEGORIES DISTRIBUTION FOR (WO) AND (W) SITUATIONS

AREA WITHIN EMBANKMENTS (Ha)

(Partial embankment along Jamuna)

Model reference year : 1977 / Fld Dur. : 10 days

*	!	!	(a)	!	(b)	!
*	!	!	F0	!	F1	!
*	!	!		!	(c)	!
*	!	!		!	F2	!
*	!	!		!	(d)	!
*	!	!		!	F3	!
*	!	!		!	(e)	!
*	!	!		!	TOTAL	!

*	!	!		!		!
*	!	!		!		!
*	W	!	1) Gross/net coef.	!	50%	!
*	I	!		!	0%	!
*	T	!		!	25%	!
*	H	!	2) Reported net cultiv.	!	25%	!
*	O	!	area	!		!
*	U	!		!	11132	!
*	T	!	3) Adjusted gross area	!	1928	!
*	O	!		!		!
*	P	!	4) (Gross - Net) area	!	50153	!
*	T	!		!		!
*	I	!		!		!
*	O	!	5) Model calc. gross	!		!
*	N	!	area	!		!
*		!		!		!
*		!	6) Model calc. net	!		!
*		!	area	!		!

*	!	!		!		!
*		!	7) Model calc. gross	!		!
*	O	!	area	!		!
*	P	!		!		!
*	T	!	8) Model calc. net	!		!
*	I	!	area	!		!
*	O	!		!		!
*	N	!		!		!
*		!		!		!
*	B	!	9) Correct. cultivated	!		!
*		!	net area	!		!
*		!		!		!

*	!	!		!		!
*		!		!		!
*		!		!		!
*		!		!		!
*		!		!		!
*		!		!		!
*		!		!		!

- 1) This coefficient is applicated on the difference between total gross and net area (e4)
- 2) Reported data from agriculture
- 3) (3) = (2) + (4)
- 4) (4) = (e4) x (1)
- 5) Reference model calculation
- 6) (6) = (5) - (4)
- 7) Option model calculation
- 8) (8) = (7) - (4)
- 9) Correction of the areas to be homogenous with the reported net agricul. area
(9) = (8) / (6) x (2), then proportionnal ajustement on the total net area

See text for comments on applied methodology.

Land Type Distribution Option B
(With Partial Embankment)

MAIN FINDINGS FROM MIKE11 OUTPUTS
LAND TYPE DISTRIBUTION

- OPTION : OPTION B
- COMMENT : Partial embankment along Jamuna
Structures opened from 01-06-1977 to 30-06-1977

Simulation from 15-06-1977 to 12-11-1977 / Max. fld durat. : 10 days

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*****
* Cell * Max fld * Flooded * F0 ! F1 ! F2 ! F3+F4 ! Total *
* name * elev. *grd level* (ha) ! (ha) ! (ha) ! (ha) ! (ha) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      *      *      *      *      *      *      *
* C1 * 16.44 * 16.12 * 3004 ! 2043 ! 1723 ! 677 ! 7447 *
*      *      *      *      * (40%) ! (27%) ! (23%) ! (9%) ! (100%) *
* C2 * 16.39 * 16.06 * 1521 ! 1269 ! 1890 ! 765 ! 5446 *
*      *      *      *      * (28%) ! (23%) ! (35%) ! (14%) ! (100%) *
* C3 * 16.49 * 16.20 * 8197 ! 2806 ! 3117 ! 2973 ! 17093 *
*      *      *      *      * (48%) ! (16%) ! (18%) ! (17%) ! (100%) *
* C4 * 17.47 * 17.42 * 1459 ! 2397 ! 1816 ! 193 ! 5865 *
*      *      *      *      * (25%) ! (41%) ! (31%) ! (3%) ! (100%) *
* C5 * 16.85 * 16.79 * 1679 ! 953 ! 1307 ! 230 ! 4169 *
*      *      *      *      * (40%) ! (23%) ! (31%) ! (6%) ! (100%) *
* C6 * 16.94 * 16.89 * 2159 ! 761 ! 597 ! 114 ! 3631 *
*      *      *      *      * (59%) ! (21%) ! (16%) ! (3%) ! (100%) *
* C7 * 18.19 * 18.14 * 565 ! 1232 ! 1440 ! 302 ! 3539 *
*      *      *      *      * (16%) ! (35%) ! (41%) ! (9%) ! (100%) *
* C8 * 16.91 * 16.85 * 7343 ! 2085 ! 1435 ! 369 ! 11233 *
*      *      *      *      * (65%) ! (19%) ! (13%) ! (3%) ! (100%) *
* C9 * 17.98 * 17.91 * 5621 ! 1023 ! 598 ! 140 ! 7382 *
*      *      *      *      * (76%) ! (14%) ! (8%) ! (2%) ! (100%) *
*-----*-----*-----*-----*-----*-----*-----*
*      *      * TOTAL * 31548 ! 14569 ! 13925 ! 5763 ! 65805 *
*      *      *      *      * (48%) ! (22%) ! (21%) ! (9%) ! (100%) *
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Table of Flood-Depth-Area Characteristics
(Total Area and Cell Wise)

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B

- COMMENT : Partial embankment along Jamuna
Structures opened from 01-06-1977 to 30-06-1977

Simulation from 15-06-1977 to 12-11-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*
-----	-----	-----	-----	-----	-----	-----	-----	*
* 0.00	* 447.99	* 433.61	* 414.78	* 338.60	* 215.73	* 168.58	* 115.00	*
* 0.15	* 415.26	* 398.79	* 379.12	* 301.64	* 184.80	* 140.55	* 93.77	*
* 0.30	* 379.68	* 362.66	* 342.57	* 266.70	* 155.59	* 115.90	* 74.60	*
* 0.45	* 340.85	* 324.63	* 304.53	* 231.43	* 128.54	* 94.13	* 59.32	*
* 0.60	* 303.13	* 287.07	* 267.22	* 197.18	* 105.46	* 75.30	* 46.96	*
* 0.75	* 265.90	* 250.66	* 230.84	* 164.60	* 84.89	* 59.41	* 35.97	*
* 0.90	* 230.51	* 215.57	* 196.89	* 136.17	* 67.49	* 46.89	* 28.39	*
* 1.05	* 197.66	* 183.63	* 165.42	* 111.31	* 52.98	* 36.04	* 22.23	*
* 1.20	* 166.93	* 153.46	* 136.92	* 90.63	* 41.83	* 28.41	* 17.96	*
* 1.35	* 139.26	* 127.02	* 111.82	* 72.14	* 32.06	* 22.55	* 14.89	*
* 1.50	* 114.04	* 102.99	* 90.69	* 56.53	* 25.39	* 18.29	* 12.03	*
* 1.65	* 93.29	* 84.16	* 73.07	* 43.55	* 20.66	* 15.25	* 9.44	*
* 1.80	* 75.74	* 67.43	* 57.63	* 33.85	* 17.03	* 12.44	* 8.32	*
* 1.95	* 61.14	* 52.49	* 43.92	* 27.30	* 14.19	* 9.94	* 7.51	*
* 2.10	* 47.45	* 40.93	* 34.81	* 22.63	* 11.48	* 8.53	* 6.84	*
* 2.25	* 39.28	* 33.49	* 28.37	* 18.68	* 9.55	* 7.73	* 6.34	*
* 2.40	* 31.11	* 27.07	* 23.12	* 15.77	* 8.29	* 7.04	* 5.94	*
* 2.55	* 25.72	* 22.63	* 19.42	* 13.44	* 7.53	* 6.47	* 5.54	*
* 2.70	* 21.67	* 18.97	* 16.44	* 11.30	* 6.86	* 6.08	* 4.31	*
* 2.85	* 18.39	* 16.24	* 14.07	* 9.45	* 6.42	* 5.68	* 0.00	*
* 3.00	* 15.74	* 13.87	* 11.92	* 8.35	* 6.02	* 4.86	* 0.00	*
* 3.15	* 13.55	* 11.79	* 9.90	* 7.65	* 5.62	* 0.00	* 0.00	*
* 3.30	* 11.45	* 9.74	* 8.52	* 6.98	* 4.64	* 0.00	* 0.00	*
* 3.45	* 9.48	* 8.50	* 7.83	* 6.39	* 0.00	* 0.00	* 0.00	*
* 3.60	* 8.37	* 7.80	* 7.13	* 6.00	* 0.00	* 0.00	* 0.00	*
* 3.75	* 7.68	* 7.14	* 6.51	* 5.60	* 0.00	* 0.00	* 0.00	*
* 3.90	* 7.01	* 6.52	* 6.10	* 4.53	* 0.00	* 0.00	* 0.00	*
* 4.05	* 6.39	* 6.05	* 5.70	* 0.00	* 0.00	* 0.00	* 0.00	*
* 4.20	* 6.00	* 5.65	* 4.97	* 0.00	* 0.00	* 0.00	* 0.00	*
* 4.35	* 5.60	* 4.75	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*
* 4.50	* 4.53	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*
* 4.65	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C1

- COMMENT : Partial embankment along Jamuna
Structures opened from 01-06-1977 to 30-06-1977

Simulation from 15-06-1977 to 12-11-1977

* Flood *	Area Flooded (km2)							*
* depth *	-----							*
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	*

* 0.00 *	* 64.82 !	* 61.56 !	* 55.87 !	* 41.75 !	* 21.60 !	* 15.95 !	* 10.44 !	*
* 0.15 *	* 60.80 !	* 55.87 !	* 50.16 !	* 36.36 !	* 18.07 !	* 13.06 !	* 8.21 !	*
* 0.30 *	* 55.11 !	* 50.16 !	* 44.43 !	* 31.14 !	* 14.89 !	* 10.60 !	* 6.24 !	*
* 0.45 *	* 49.40 !	* 44.43 !	* 38.80 !	* 26.40 !	* 12.24 !	* 8.34 !	* 4.70 !	*
* 0.60 *	* 43.66 !	* 38.80 !	* 33.58 !	* 21.90 !	* 9.78 !	* 6.37 !	* 3.65 !	*
* 0.75 *	* 38.10 !	* 33.58 !	* 28.50 !	* 18.28 !	* 7.68 !	* 4.77 !	* 2.73 !	*
* 0.90 *	* 32.88 !	* 28.50 !	* 24.00 !	* 15.10 !	* 5.71 !	* 3.72 !	* 2.06 !	*
* 1.05 *	* 27.90 !	* 24.00 !	* 19.76 !	* 12.40 !	* 4.42 !	* 2.81 !	* 1.45 !	*
* 1.20 *	* 23.40 !	* 19.76 !	* 16.58 !	* 9.95 !	* 3.37 !	* 2.11 !	* 0.94 !	*
* 1.35 *	* 19.34 !	* 16.58 !	* 13.55 !	* 7.82 !	* 2.58 !	* 1.49 !	* 0.51 !	*
* 1.50 *	* 16.16 !	* 13.55 !	* 11.09 !	* 5.85 !	* 1.88 !	* 0.98 !	* 0.19 !	*
* 1.65 *	* 13.22 !	* 11.09 !	* 8.74 !	* 4.49 !	* 1.32 !	* 0.54 !	* 0.00 !	*
* 1.80 *	* 10.77 !	* 8.74 !	* 6.77 !	* 3.44 !	* 0.81 !	* 0.20 !	* 0.00 !	*
* 1.95 *	* 8.47 !	* 6.77 !	* 4.98 !	* 2.62 !	* 0.42 !	* 0.00 !	* 0.00 !	*
* 2.10 *	* 6.50 !	* 4.98 !	* 3.93 !	* 1.92 !	* 0.09 !	* 0.00 !	* 0.00 !	*
* 2.25 *	* 4.84 !	* 3.93 !	* 2.95 !	* 1.35 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 2.40 *	* 3.79 !	* 2.95 !	* 2.25 !	* 0.84 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 2.55 *	* 2.86 !	* 2.25 !	* 1.59 !	* 0.45 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 2.70 *	* 2.16 !	* 1.59 !	* 1.08 !	* 0.11 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 2.85 *	* 1.52 !	* 1.08 !	* 0.60 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 3.00 *	* 1.01 !	* 0.60 !	* 0.27 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 3.15 *	* 0.56 !	* 0.27 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*
* 3.30 *	* 0.22 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C2

- COMMENT : Partial embankment along Jamuna
Structures opened from 01-06-1977 to 30-06-1977

Simulation from 15-06-1977 to 12-11-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*

* 0.00 *	45.55	44.92	43.42	38.78	23.17	17.36	10.80	*
* 0.15 *	44.53	43.74	41.56	35.92	19.02	14.40	8.55	*
* 0.30 *	43.34	42.18	39.25	32.93	15.51	11.62	6.46	*
* 0.45 *	41.41	39.86	36.52	29.44	12.73	9.30	5.03	*
* 0.60 *	39.09	37.32	33.53	25.83	10.20	7.05	3.72	*
* 0.75 *	36.32	34.33	30.16	21.79	7.95	5.51	2.90	*
* 0.90 *	33.33	31.13	26.55	17.64	6.08	4.07	2.17	*
* 1.05 *	29.92	27.52	22.62	14.59	4.65	3.17	1.77	*
* 1.20 *	26.31	23.73	18.47	11.81	3.50	2.36	1.40	*
* 1.35 *	22.34	19.58	15.14	9.45	2.68	1.90	1.14	*
* 1.50 *	18.19	15.88	12.36	7.20	2.06	1.50	0.89	*
* 1.65 *	14.96	13.10	9.90	5.60	1.66	1.22	0.71	*
* 1.80 *	12.18	10.50	7.65	4.17	1.33	0.96	0.53	*
* 1.95 *	9.75	8.25	5.89	3.23	1.07	0.77	0.33	*
* 2.10 *	7.50	6.27	4.45	2.41	0.85	0.59	0.10	*
* 2.25 *	5.79	4.84	3.39	1.93	0.67	0.40	0.00	*
* 2.40 *	4.36	3.61	2.58	1.53	0.49	0.18	0.00	*
* 2.55 *	3.34	2.79	2.01	1.24	0.27	0.00	0.00	*
* 2.70 *	2.52	2.12	1.61	0.98	0.04	0.00	0.00	*
* 2.85 *	1.98	1.72	1.29	0.79	0.00	0.00	0.00	*
* 3.00 *	1.58	1.36	1.03	0.61	0.00	0.00	0.00	*
* 3.15 *	1.28	1.10	0.82	0.42	0.00	0.00	0.00	*
* 3.30 *	1.02	0.87	0.64	0.19	0.00	0.00	0.00	*
* 3.45 *	0.81	0.69	0.46	0.00	0.00	0.00	0.00	*
* 3.60 *	0.63	0.51	0.24	0.00	0.00	0.00	0.00	*
* 3.75 *	0.45	0.30	0.02	0.00	0.00	0.00	0.00	*
* 3.90 *	0.23	0.08	0.00	0.00	0.00	0.00	0.00	*
* 4.05 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 4.20 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 4.35 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 4.50 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 4.65 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C3

- COMMENT : Partial embankment along Jamuna
Structures opened from 01-06-1977 to 30-06-1977

Simulation from 15-06-1977 to 12-11-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days !	* 5 days !	* 10 days !	* 20 days !	* 40 days !	* 60 days !	* 90 days !	*
-----	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*	*-----*
* 0.00 *	* 120.97 !	* 113.53 !	* 105.87 !	* 86.94 !	* 59.66 !	* 48.46 !	* 36.52 !	*-----*
* 0.15 *	* 112.38 !	* 104.68 !	* 96.99 !	* 79.34 !	* 53.45 !	* 42.83 !	* 32.13 !	*-----*
* 0.30 *	* 103.50 !	* 95.81 !	* 88.96 !	* 72.42 !	* 47.71 !	* 37.97 !	* 28.11 !	*-----*
* 0.45 *	* 94.62 !	* 87.95 !	* 81.36 !	* 65.55 !	* 42.08 !	* 33.63 !	* 24.06 !	*-----*
* 0.60 *	* 86.94 !	* 80.35 !	* 74.25 !	* 59.25 !	* 37.39 !	* 29.46 !	* 21.13 !	*-----*
* 0.75 *	* 79.34 !	* 73.33 !	* 67.38 !	* 53.04 !	* 33.05 !	* 25.41 !	* 18.49 !	*-----*
* 0.90 *	* 72.42 !	* 66.46 !	* 60.90 !	* 47.33 !	* 28.92 !	* 22.08 !	* 16.41 !	*-----*
* 1.05 *	* 65.55 !	* 60.08 !	* 54.69 !	* 41.71 !	* 24.87 !	* 19.39 !	* 14.49 !	*-----*
* 1.20 *	* 59.25 !	* 53.87 !	* 48.83 !	* 37.10 !	* 21.72 !	* 17.09 !	* 12.96 !	*-----*
* 1.35 *	* 53.04 !	* 48.08 !	* 43.21 !	* 32.76 !	* 19.03 !	* 15.14 !	* 11.53 !	*-----*
* 1.50 *	* 47.33 !	* 42.46 !	* 38.26 !	* 28.65 !	* 16.83 !	* 13.43 !	* 10.01 !	*-----*
* 1.65 *	* 41.71 !	* 37.68 !	* 33.92 !	* 24.60 !	* 14.88 !	* 12.00 !	* 8.46 !	*-----*
* 1.80 *	* 37.10 !	* 33.34 !	* 29.73 !	* 21.54 !	* 13.24 !	* 10.52 !	* 7.61 !	*-----*
* 1.95 *	* 32.76 !	* 29.19 !	* 25.63 !	* 18.85 !	* 11.81 !	* 8.98 !	* 7.16 !	*-----*
* 2.10 *	* 28.65 !	* 25.14 !	* 22.25 !	* 16.70 !	* 10.31 !	* 7.84 !	* 6.71 !	*-----*
* 2.25 *	* 24.60 !	* 21.90 !	* 19.57 !	* 14.75 !	* 8.77 !	* 7.33 !	* 6.34 !	*-----*
* 2.40 *	* 21.54 !	* 19.21 !	* 17.22 !	* 13.15 !	* 7.78 !	* 6.86 !	* 5.94 !	*-----*
* 2.55 *	* 18.85 !	* 16.96 !	* 15.27 !	* 11.72 !	* 7.26 !	* 6.47 !	* 5.54 !	*-----*
* 2.70 *	* 16.70 !	* 15.01 !	* 13.53 !	* 10.21 !	* 6.81 !	* 6.08 !	* 4.91 !	*-----*
* 2.85 *	* 14.75 !	* 13.34 !	* 12.10 !	* 8.67 !	* 6.42 !	* 5.68 !	* 0.00 !	*-----*
* 3.00 *	* 13.15 !	* 11.91 !	* 10.62 !	* 7.74 !	* 6.02 !	* 4.86 !	* 0.00 !	*-----*
* 3.15 *	* 11.72 !	* 10.42 !	* 9.08 !	* 7.23 !	* 5.62 !	* 0.00 !	* 0.00 !	*-----*
* 3.30 *	* 10.21 !	* 8.87 !	* 7.88 !	* 6.78 !	* 4.64 !	* 0.00 !	* 0.00 !	*-----*
* 3.45 *	* 8.67 !	* 7.81 !	* 7.36 !	* 6.39 !	* 0.00 !	* 0.00 !	* 0.00 !	*-----*
* 3.60 *	* 7.74 !	* 7.29 !	* 6.89 !	* 6.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*-----*
* 3.75 *	* 7.23 !	* 6.84 !	* 6.50 !	* 5.60 !	* 0.00 !	* 0.00 !	* 0.00 !	*-----*
* 3.90 *	* 6.78 !	* 6.45 !	* 6.10 !	* 4.53 !	* 0.00 !	* 0.00 !	* 0.00 !	*-----*
* 4.05 *	* 6.39 !	* 6.05 !	* 5.70 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*-----*
* 4.20 *	* 6.00 !	* 5.65 !	* 4.97 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*-----*
* 4.35 *	* 5.60 !	* 4.75 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*-----*
* 4.50 *	* 4.53 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	* 0.00 !	*-----*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C4

- COMMENT : Partial embankment along Jamuna
Structures opened from 01-06-1977 to 30-06-1977

Simulation from 15-06-1977 to 12-11-1977

* Flood *		Area Flooded (Km2)						

* depth *								
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*

* 0.00	* 53.87	* 53.62	* 52.62	* 49.36	* 42.64	* 34.27	* 23.08	*
* 0.15	* 50.11	* 49.86	* 48.86	* 44.77	* 37.31	* 27.56	* 18.09	*
* 0.30	* 45.84	* 45.48	* 44.06	* 39.44	* 30.69	* 21.42	* 13.11	*
* 0.45	* 40.51	* 40.16	* 38.73	* 33.38	* 23.98	* 16.43	* 9.80	*
* 0.60	* 34.72	* 34.27	* 32.48	* 26.66	* 18.76	* 12.01	* 6.49	*
* 0.75	* 28.01	* 27.56	* 25.77	* 20.75	* 13.77	* 8.70	* 4.50	*
* 0.90	* 21.75	* 21.42	* 20.09	* 15.77	* 10.24	* 5.76	* 2.60	*
* 1.05	* 16.77	* 16.43	* 15.10	* 11.57	* 6.93	* 3.86	* 1.53	*
* 1.20	* 12.23	* 12.01	* 11.12	* 8.26	* 4.75	* 2.20	* 0.51	*
* 1.35	* 8.92	* 8.70	* 7.81	* 5.51	* 2.85	* 1.19	* 0.28	*
* 1.50	* 5.89	* 5.76	* 5.26	* 3.61	* 1.66	* 0.36	* 0.17	*
* 1.65	* 3.99	* 3.86	* 3.36	* 2.07	* 0.65	* 0.24	* 0.10	*
* 1.80	* 2.27	* 2.20	* 1.93	* 1.05	* 0.30	* 0.14	* 0.05	*
* 1.95	* 1.26	* 1.19	* 0.92	* 0.34	* 0.18	* 0.09	* 0.02	*
* 2.10	* 0.36	* 0.36	* 0.33	* 0.23	* 0.11	* 0.04	* 0.00	*
* 2.25	* 0.25	* 0.24	* 0.21	* 0.13	* 0.06	* 0.00	* 0.00	*
* 2.40	* 0.14	* 0.14	* 0.13	* 0.08	* 0.03	* 0.00	* 0.00	*
* 2.55	* 0.09	* 0.09	* 0.07	* 0.03	* 0.00	* 0.00	* 0.00	*
* 2.70	* 0.04	* 0.04	* 0.03	* 0.00	* 0.00	* 0.00	* 0.00	*
* 2.85	* 0.02	* 0.02	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C5

- COMMENT : Partial embankment along Jamuna
Structures opened from 01-06-1977 to 30-06-1977

Simulation from 15-06-1977 to 12-11-1977

* Flood *	Area Flooded (Km2)							*
* depth *	-----							*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*

* 0.00 *	29.66	29.26	28.87	23.07	9.30	4.85	0.83	*
* 0.15 *	27.67	27.27	26.88	20.68	6.54	3.15	0.43	*
* 0.30 *	25.69	25.30	24.90	18.15	4.85	2.01	0.13	*
* 0.45 *	23.72	23.33	22.93	15.55	3.15	0.90	0.06	*
* 0.60 *	21.53	21.02	20.51	12.93	2.01	0.50	0.00	*
* 0.75 *	18.99	18.48	17.98	10.22	0.90	0.16	0.00	*
* 0.90 *	16.42	15.90	15.38	7.46	0.50	0.06	0.00	*
* 1.05 *	13.81	13.28	12.76	5.41	0.16	0.01	0.00	*
* 1.20 *	11.14	10.59	10.04	3.72	0.06	0.00	0.00	*
* 1.35 *	8.38	7.83	7.28	2.38	0.01	0.00	0.00	*
* 1.50 *	5.98	5.64	5.30	1.27	0.00	0.00	0.00	*
* 1.65 *	4.28	3.94	3.60	0.62	0.00	0.00	0.00	*
* 1.80 *	2.75	2.52	2.30	0.27	0.00	0.00	0.00	*
* 1.95 *	1.64	1.42	1.20	0.08	0.00	0.00	0.00	*
* 2.10 *	0.74	0.67	0.60	0.03	0.00	0.00	0.00	*
* 2.25 *	0.39	0.32	0.25	0.00	0.00	0.00	0.00	*
* 2.40 *	0.10	0.09	0.08	0.00	0.00	0.00	0.00	*
* 2.55 *	0.04	0.03	0.02	0.00	0.00	0.00	0.00	*
* 2.70 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 2.85 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 3.00 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 3.15 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 3.30 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 3.45 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 3.60 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 3.75 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 3.90 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 4.05 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 4.20 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*
* 4.35 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*



MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C6

- COMMENT : Partial embankment along Jamuna
Structures opened from 01-06-1977 to 30-06-1977

Simulation from 15-06-1977 to 12-11-1977

* Flood *		Area Flooded (Km2)						
* depth *		-----						
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*
-----		-----		-----	-----	-----	-----	*
* 0.00	* 18.59	* 18.30	* 17.90	* 13.17	* 6.92	* 5.89	* 2.73	*
* 0.15	* 16.86	* 16.65	* 16.33	* 11.06	* 5.52	* 4.49	* 2.73	*
* 0.30	* 15.28	* 15.07	* 14.72	* 9.26	* 4.20	* 3.49	* 2.07	*
* 0.45	* 13.31	* 13.03	* 12.61	* 7.54	* 3.22	* 2.51	* 1.37	*
* 0.60	* 11.20	* 10.92	* 10.53	* 6.08	* 2.31	* 1.64	* 0.84	*
* 0.75	* 9.38	* 9.15	* 8.81	* 4.68	* 1.67	* 1.20	* 0.61	*
* 0.90	* 7.66	* 7.43	* 7.11	* 3.62	* 1.09	* 0.65	* 0.31	*
* 1.05	* 6.17	* 5.99	* 5.71	* 2.64	* 0.76	* 0.51	* 0.23	*
* 1.20	* 4.77	* 4.59	* 4.33	* 1.93	* 0.45	* 0.33	* 0.15	*
* 1.35	* 3.68	* 3.55	* 3.35	* 1.29	* 0.28	* 0.15	* 0.08	*
* 1.50	* 2.70	* 2.57	* 2.40	* 0.89	* 0.13	* 0.07	* 0.04	*
* 1.65	* 1.97	* 1.89	* 1.76	* 0.56	* 0.06	* 0.03	* 0.02	*
* 1.80	* 1.33	* 1.25	* 1.14	* 0.35	* 0.00	* 0.00	* 0.00	*
* 1.95	* 0.91	* 0.87	* 0.80	* 0.17	* 0.00	* 0.00	* 0.00	*
* 2.10	* 0.58	* 0.53	* 0.48	* 0.08	* 0.00	* 0.00	* 0.00	*
* 2.25	* 0.36	* 0.34	* 0.30	* 0.01	* 0.00	* 0.00	* 0.00	*
* 2.40	* 0.19	* 0.16	* 0.14	* 0.00	* 0.00	* 0.00	* 0.00	*
* 2.55	* 0.09	* 0.08	* 0.07	* 0.00	* 0.00	* 0.00	* 0.00	*
* 2.70	* 0.02	* 0.01	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*
* 2.85	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	* 0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C7

- COMMENT : Partial embankment along Jamuna
Structures opened from 01-06-1977 to 30-06-1977

Simulation from 15-06-1977 to 12-11-1977

* Flood * Area Flooded (Km2) *								
* depth *	-----							
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*
-----	-----	-----	-----	-----	-----	-----	-----	*
* 0.00 *	33.28	33.20	32.92	31.33	28.87	25.66	20.13	*
* 0.15 *	31.86	31.75	31.33	29.74	26.04	22.61	16.79	*
* 0.30 *	30.27	30.16	29.74	26.98	23.06	19.22	14.08	*
* 0.45 *	27.93	27.74	26.98	24.15	19.68	16.07	11.39	*
* 0.60 *	25.09	24.91	24.15	20.80	16.43	13.36	8.86	*
* 0.75 *	21.93	21.71	20.80	17.42	13.72	10.71	6.32	*
* 0.90 *	18.55	18.32	17.42	14.63	11.05	8.18	4.49	*
* 1.05 *	15.53	15.35	14.63	11.92	8.52	5.83	2.69	*
* 1.20 *	12.82	12.64	11.92	9.36	6.08	4.00	2.03	*
* 1.35 *	10.21	10.04	9.36	6.83	4.24	2.48	1.41	*
* 1.50 *	7.67	7.50	6.83	4.85	2.57	1.87	0.79	*
* 1.65 *	5.46	5.34	4.85	3.02	1.95	1.24	0.16	*
* 1.80 *	3.63	3.51	3.02	2.15	1.33	0.62	0.07	*
* 1.95 *	2.36	2.32	2.15	1.54	0.70	0.11	0.00	*
* 2.10 *	1.74	1.70	1.54	0.91	0.12	0.05	0.00	*
* 2.25 *	1.12	1.08	0.91	0.29	0.06	0.00	0.00	*
* 2.40 *	0.50	0.45	0.29	0.08	0.00	0.00	0.00	*
* 2.55 *	0.10	0.09	0.08	0.00	0.00	0.00	0.00	*

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C8

- COMMENT : Partial embankment along Jamuna
Structures opened from 01-06-1977 to 30-06-1977

Simulation from 15-06-1977 to 12-11-1977

* Flood *		Area Flooded (Km2)							*
* depth *	-----								*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*	
* -----	* -----	* -----	* -----	* -----	* -----	* -----	* -----	*	
* *								*	
* 0.00 *	53.33	52.10	51.28	33.75	12.93	9.00	4.58	*	
* 0.15 *	47.19	45.96	45.14	27.58	10.24	6.87	3.14	*	
* 0.30 *	41.05	39.76	38.90	23.13	7.91	5.31	1.74	*	
* 0.45 *	34.61	33.32	32.46	18.78	6.14	3.79	1.05	*	
* 0.60 *	28.17	27.28	26.69	15.12	4.58	2.39	0.61	*	
* 0.75 *	23.72	22.83	22.24	11.64	3.14	1.25	0.39	*	
* 0.90 *	19.27	18.54	18.05	9.31	1.74	0.81	0.26	*	
* 1.05 *	15.61	14.88	14.39	7.08	1.05	0.46	0.15	*	
* 1.20 *	11.95	11.48	11.17	5.52	0.61	0.33	0.03	*	
* 1.35 *	9.62	9.15	8.84	3.97	0.39	0.20	0.00	*	
* 1.50 *	7.29	6.98	6.77	2.58	0.26	0.08	0.00	*	
* 1.65 *	5.73	5.41	5.20	1.31	0.15	0.00	0.00	*	
* 1.80 *	4.16	3.88	3.70	0.87	0.03	0.00	0.00	*	
* 1.95 *	2.77	2.49	2.30	0.47	0.00	0.00	0.00	*	
* 2.10 *	1.37	1.28	1.22	0.34	0.00	0.00	0.00	*	
* 2.25 *	0.93	0.84	0.78	0.21	0.00	0.00	0.00	*	
* 2.40 *	0.49	0.46	0.45	0.10	0.00	0.00	0.00	*	
* 2.55 *	0.36	0.33	0.32	0.00	0.00	0.00	0.00	*	
* 2.70 *	0.23	0.21	0.19	0.00	0.00	0.00	0.00	*	
* 2.85 *	0.12	0.09	0.08	0.00	0.00	0.00	0.00	*	
* 3.00 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	
* 3.15 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	
* 3.30 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	
* 3.45 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	
* 3.60 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	
* 3.75 *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	*	

MAIN FINDINGS FROM MIKE11 OUTPUTS
FLOOD DEPTH/AREA CHARACTERISTICS

- OPTION : OPTION B
- CELL : C9

- COMMENT : Partial embankment along Jamuna
Structures opened from 01-06-1977 to 30-06-1977

Simulation from 15-06-1977 to 12-11-1977

* Flood *		Area Flooded (km2)							*
* depth *	-----								*
* (m) *	* 3 days	* 5 days	* 10 days	* 20 days	* 40 days	* 60 days	* 90 days	*	
-----	-----								*
-----	-----								*
* 0.00 *	27.92	27.11	26.03	20.45	10.64	7.14	4.38	*	
* 0.15 *	23.86	23.01	21.87	16.19	8.60	5.59	3.56	*	
* 0.30 *	19.60	18.75	17.61	13.25	6.78	4.26	2.71	*	
* 0.45 *	15.34	14.82	14.12	10.64	5.32	3.16	1.86	*	
* 0.60 *	12.73	12.20	11.51	8.60	4.00	2.31	1.52	*	
* 0.75 *	10.11	9.70	9.21	6.78	2.99	1.70	0.90	*	
* 0.90 *	8.24	7.87	7.39	5.32	2.14	1.36	0.60	*	
* 1.05 *	6.41	6.11	5.76	4.00	1.63	0.90	0.30	*	
* 1.20 *	5.06	4.79	4.44	2.99	1.29	0.60	0.10	*	
* 1.35 *	3.74	3.50	3.28	2.14	0.90	0.30	0.00	*	
* 1.50 *	2.82	2.65	2.43	1.63	0.60	0.10	0.00	*	
* 1.65 *	1.97	1.84	1.75	1.29	0.30	0.00	0.00	*	
* 1.80 *	1.56	1.49	1.40	0.90	0.00	0.00	0.00	*	
* 1.95 *	1.22	0.90	0.00	0.00	0.00	0.00	0.00	*	

Hydrograph of All Cell Representative Points
(1977)

CELL AND REPRESENTATIVE CALCULATION POINTS

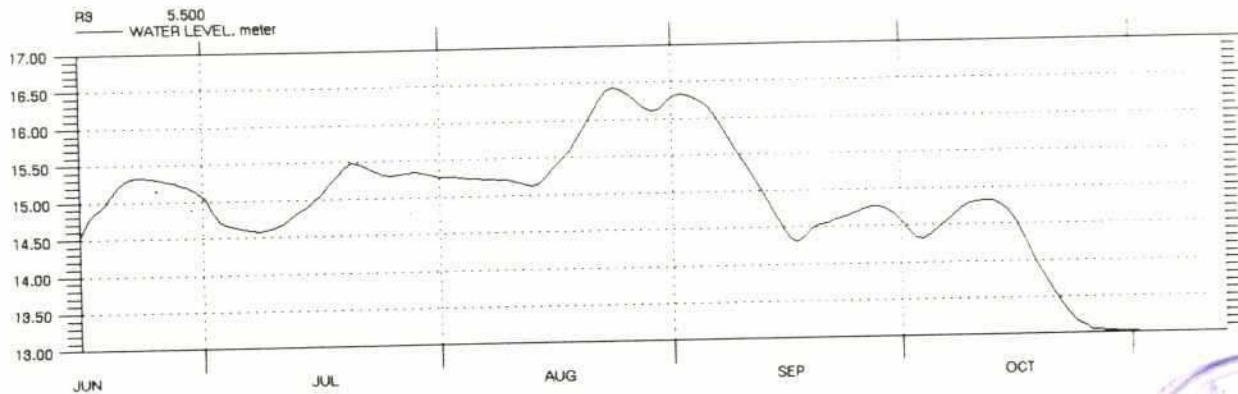
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*****
* Name of * Calculation Point *Water level*
* Cell    *-----*-----*-----*
*         *River name*   Km   *   1977   *
*-----*-----*-----*
*   C-1   *   R3       *   5.500 *   16.44 *
*         *           *       *       *
*   C-2   * CHATAL_S  *   2.000 *   16.39 *
*         *           *       *       *
*   C-3   *   JHENAI   *  22.000 *   16.49 *
*         *           *       *       *
*   C-4   *   R2       *  11.000 *   17.47 *
*         *           *       *       *
*   C-5   * DADBHANGA *  32.200 *   16.85 *
*         *           *       *       *
*   C-6   *   R5       *   4.000 *   16.94 *
*         *           *       *       *
*   C-7   *   R1       *   2.500 *   18.19 *
*         *           *       *       *
*   C-8   * DADBHANGA *  20.200 *   16.91 *
*         *           *       *       *
*   C-9   * DADBHANGA *   2.200 *   17.98 *
*         *           *       *       *
*****

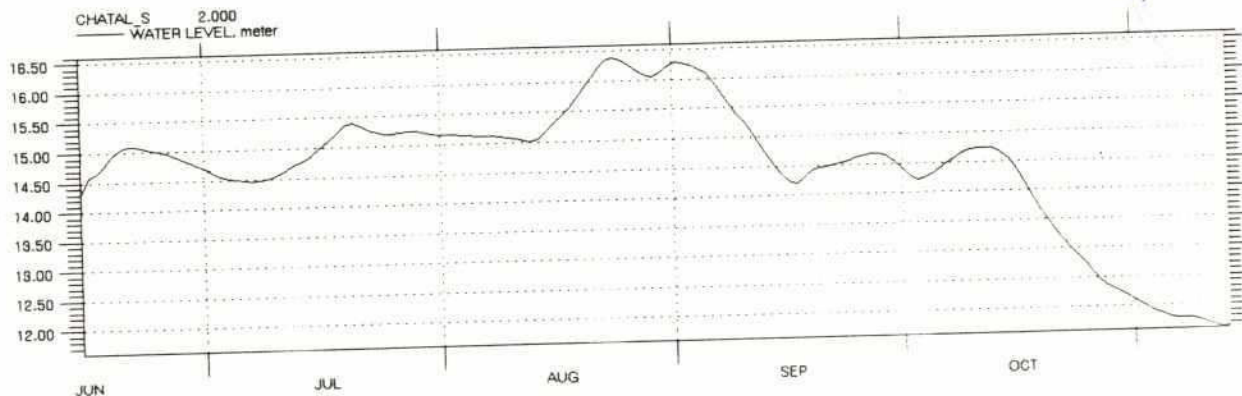
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369

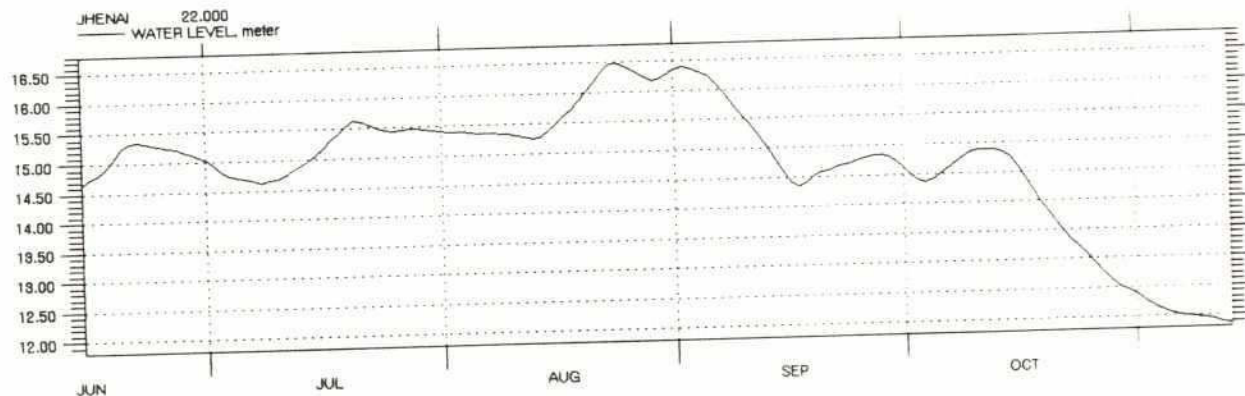
1977



1977

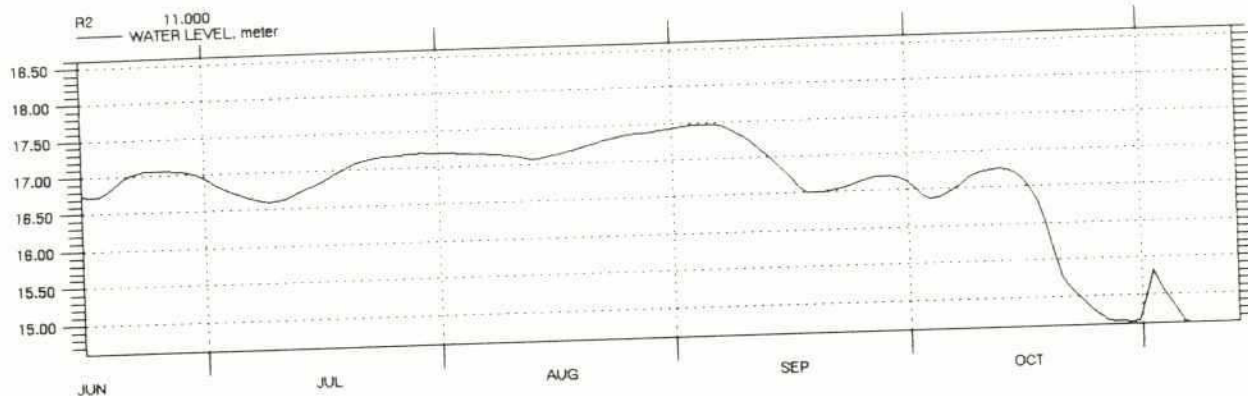


1977

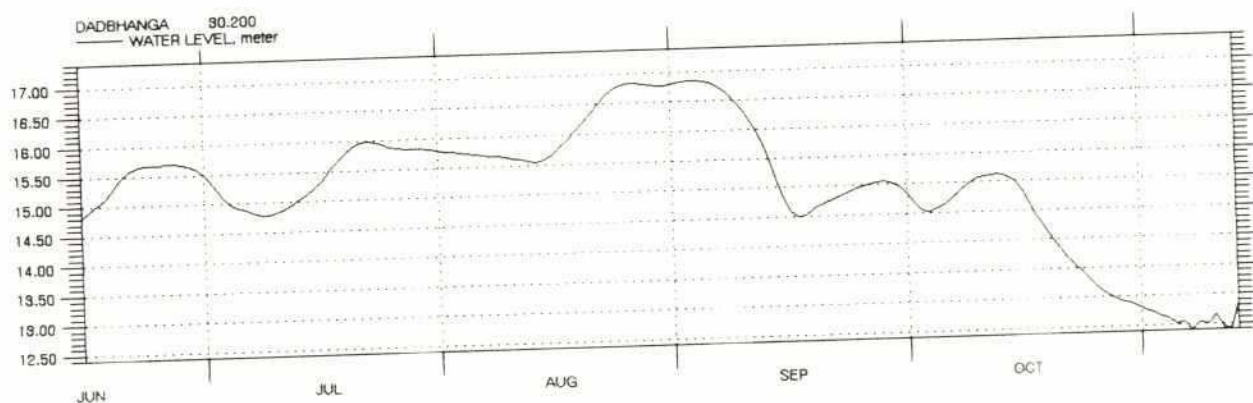


S W M C	OPTION B (with PARTIAL EMBANKMENT along JAMUNA) Structures opened from 1st June to 30th June REFERENCE YEAR 1977	MIKE 11
		Dwg no.:
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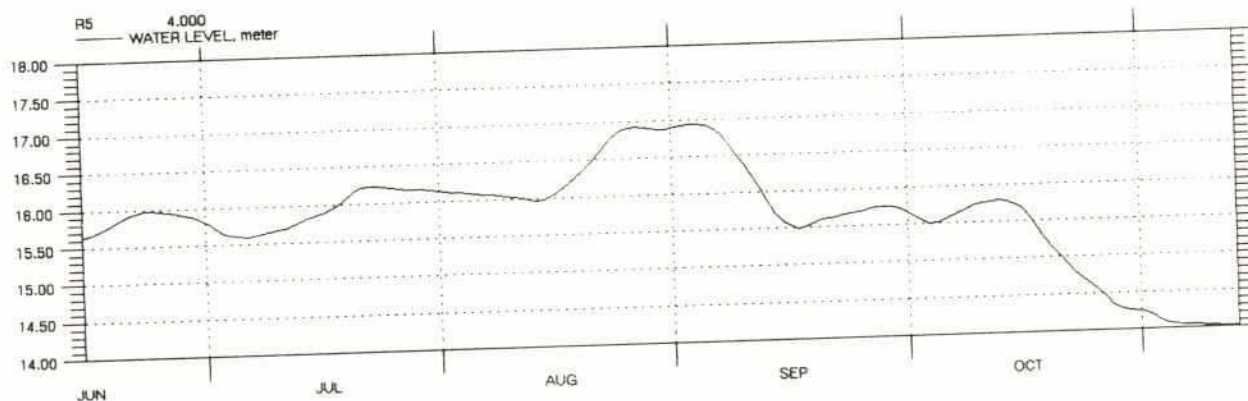
370



1977



1977



1977

SWMC

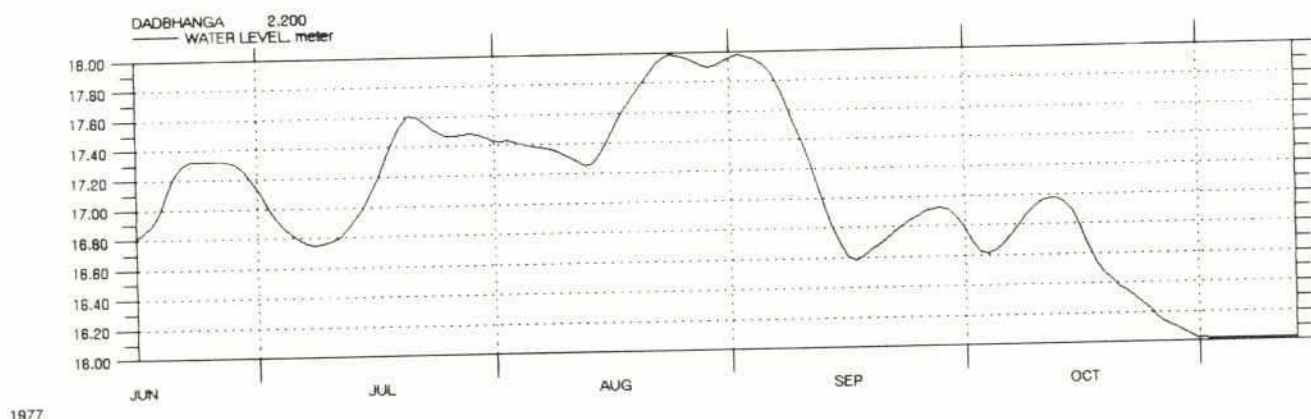
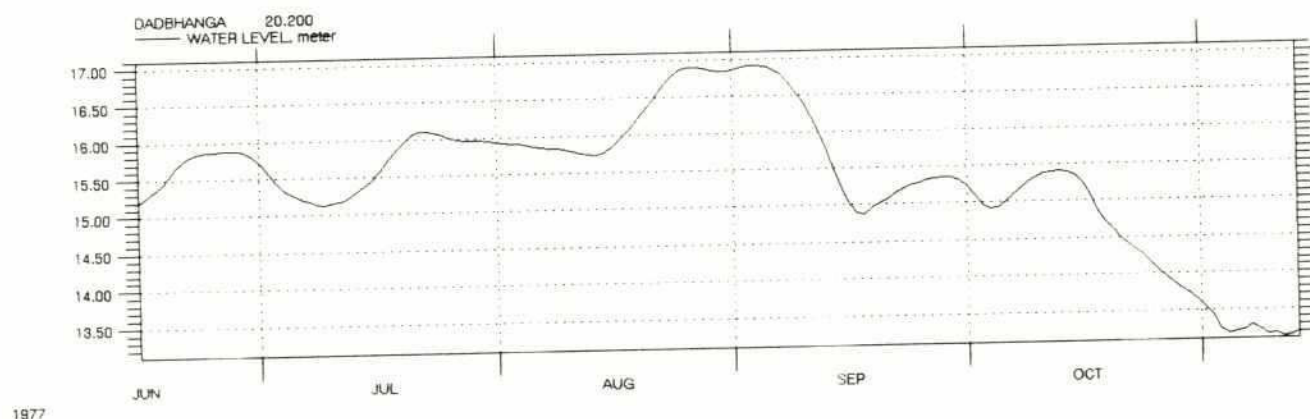
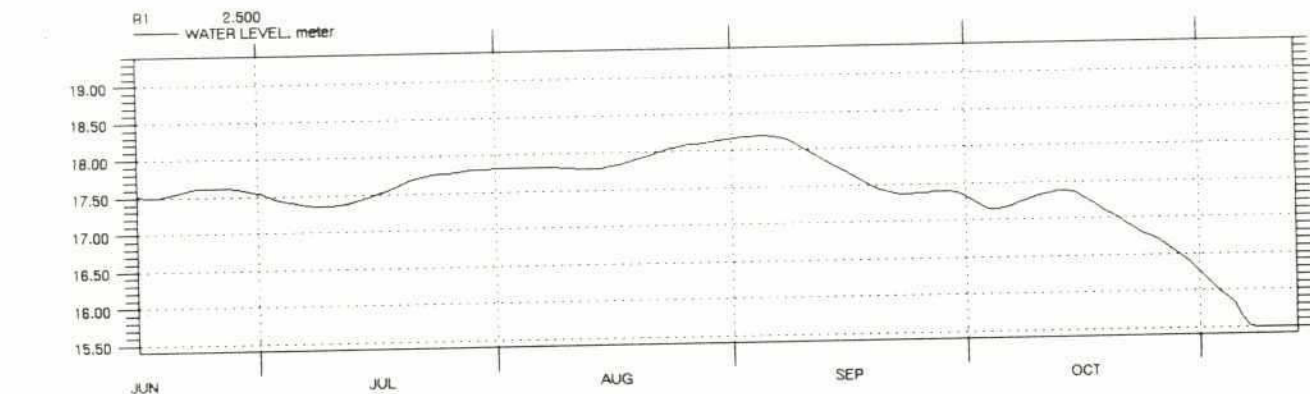
OPTION B (with PARTIAL EMBANKMENT along JAMUNA)
Structures opened from 1st June to 30th June
REFERENCE YEAR 1977

DATA FILE : JPOB3.RDF
RESULT FILE : 77JPOB3F.RRF

BOUNDARY FILE : JPOB3F77.BSF
CALCULATED : 11 - OCT - 1992, 14:12

MIKE 11

Dwg no.:



SWMC

OPTION B (with PARTIAL EMBANKMENT along JAMUNA)
Structures opened from 1st June to 30th June
REFERENCE YEAR 1977

DATA FILE : JPOB3.RDF
RESULT FILE : 77JPOB3F.RRF

BOUNDARY FILE : JPOB3F77.BSF
CALCULATED : 11 - OCT - 1992, 14:12

MIKE 11

Dwg no.:

ANNEX 4

APPENDIX

D6 STRUCTURE DESIGN AND MANAGEMENT

UPSTREAM AND DOWNSTREAM WATER LEVEL WITH DISCHARGE
OPTION B WITH JHENAI/CHATAL OUTLET STR. (REF.YEAR 1977)

Chatal Inlet
Jhenai Inlet
Islampur Inlet

REDUCTION OF VENTAGE AT JHENAI/CHATAL OUTLET

DETAILS OF INLET STRUCTURES

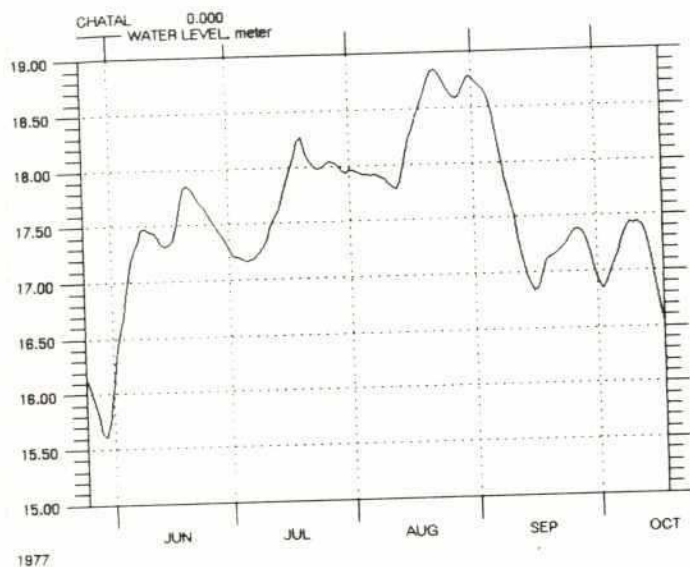
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*****
*Name of Inlet* Chainage ! No.of ! Size !Invert !Water level m (PWD)! Discharge *
* Structure * Km !Vent(s)! m x m !level !-----*-----! *
* * * * * ! * * * * * !m(PWD) ! U/S ! D/S ! m^3/sec *
*-----*-----*-----*-----*-----*-----*-----*
* * * * * ! * * * * * ! * * * * * ! * * * * * ! * * * * * !
* CHATAL * 2.000 ! 8 !3.35X2.44! 15.00 ! 18.85 ! 17.30 ! 150.00 *
* * * * * ! * * * * * ! * * * * * ! * * * * * ! * * * * * !
* JHENAI * 4.000 ! 7 !3.35X2.44! 10.00 ! 17.91 ! 15.95 ! 210.00 *
* * * * * ! * * * * * ! * * * * * ! * * * * * ! * * * * * !
* ISLAMPUR * 0.500 ! 1 !3.35X2.44! 15.00 ! 18.94 ! 17.73 ! 12.00 *
* * * * * ! * * * * * ! * * * * * ! * * * * * ! * * * * * !
*****

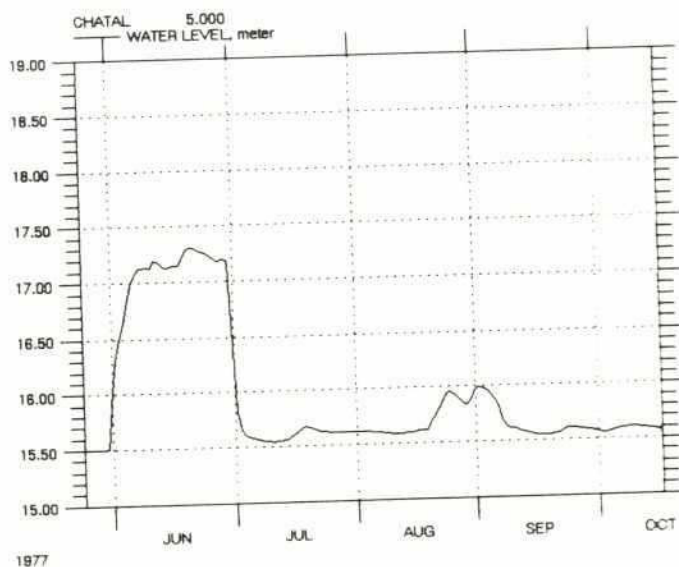
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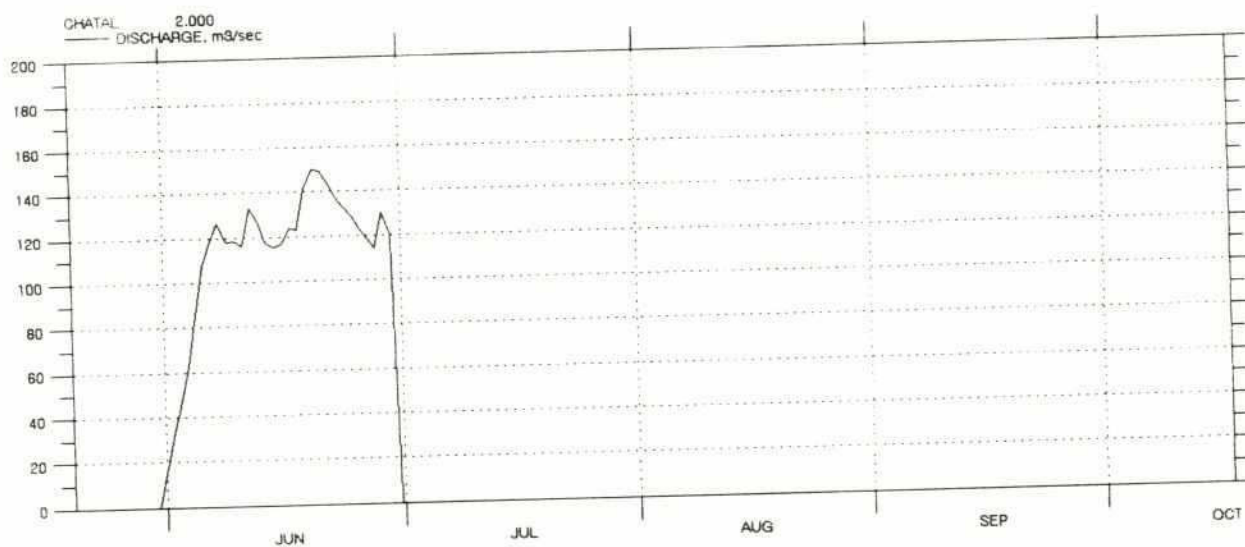
374



U/S. Water level



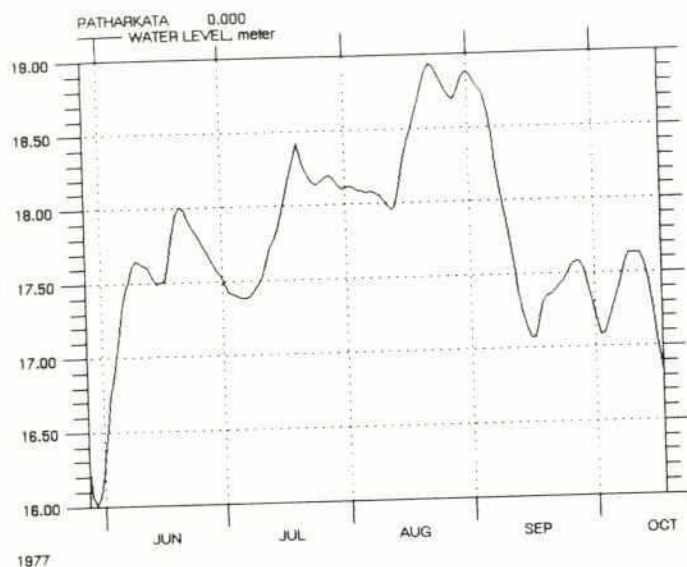
D/S. Water level



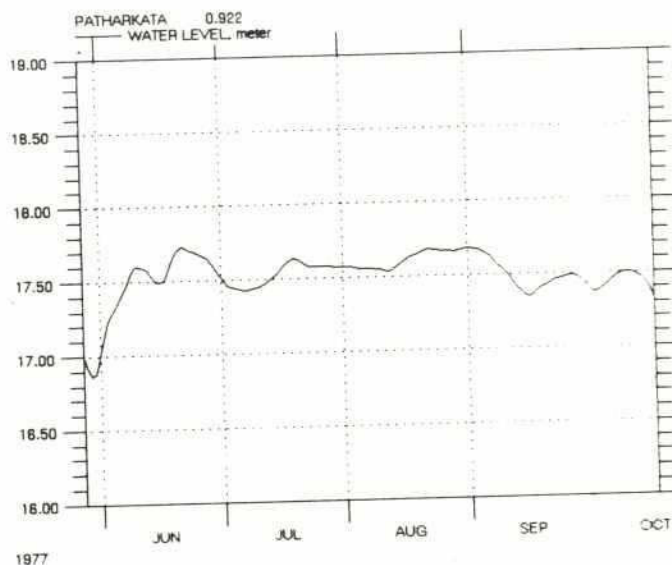
Discharge

S W M C	OPTION B (with JHENAI/CHATAL outlet structure) Structures opened from 1st June to 30th June U/S & D/S WATER LEVEL with DISCHARGE AT CHATAL INLET 1977	MIKE 11 Dwg no.:
DATA FILE : JPOB1.RDF RESULT FILE : 77JPOB1F.RRF	BOUNDARY FILE : JPOB1F77.BSF CALCULATED : 9 - OCT - 1992, 10:17	

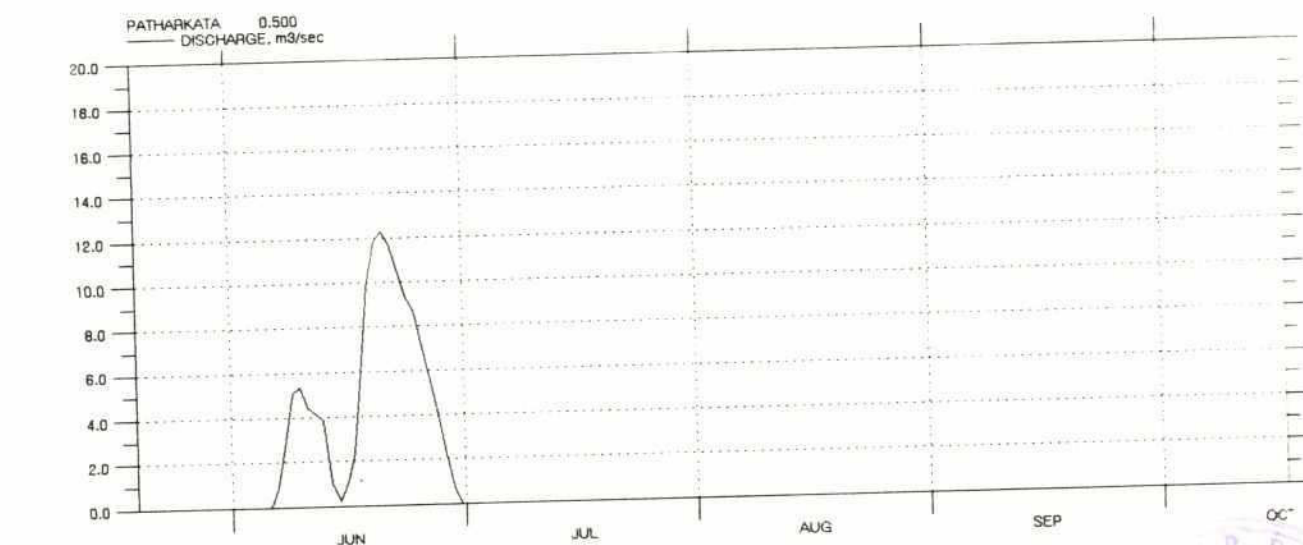
375



U/S. Water level



D/S. Water level

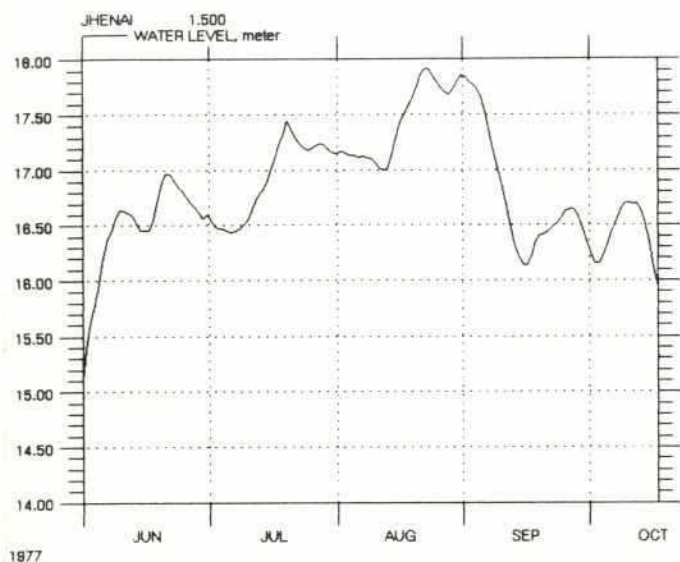


Discharge

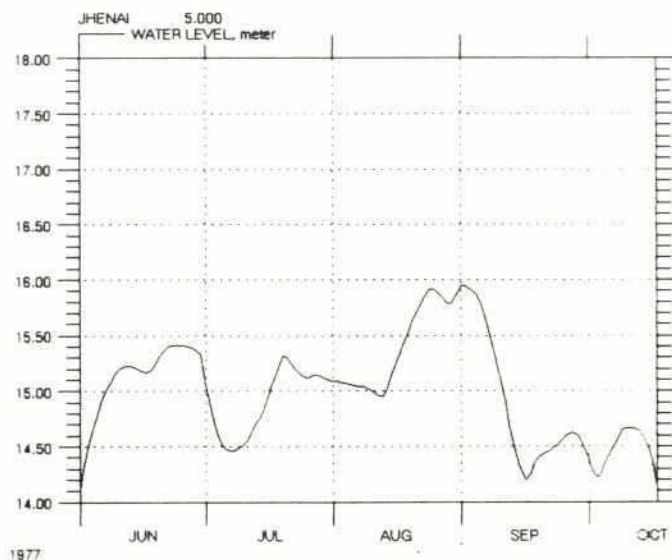


SWMC	OPTION B (with JHENAI/CHATAL outlet structure) Structures opened from 1st June to 30th June U/S & D/S WATER LEVEL with DISCHARGE AT ISLAMPUR INLET 1977	MIKE 11 Dwg no.:
DATA FILE : JPROB1.RDF RESULT FILE : 77JPROB1F.RRF	BOUNDARY FILE : JPROB1F77.BSF CALCULATED : 9 - OCT - 1992, 10:17	

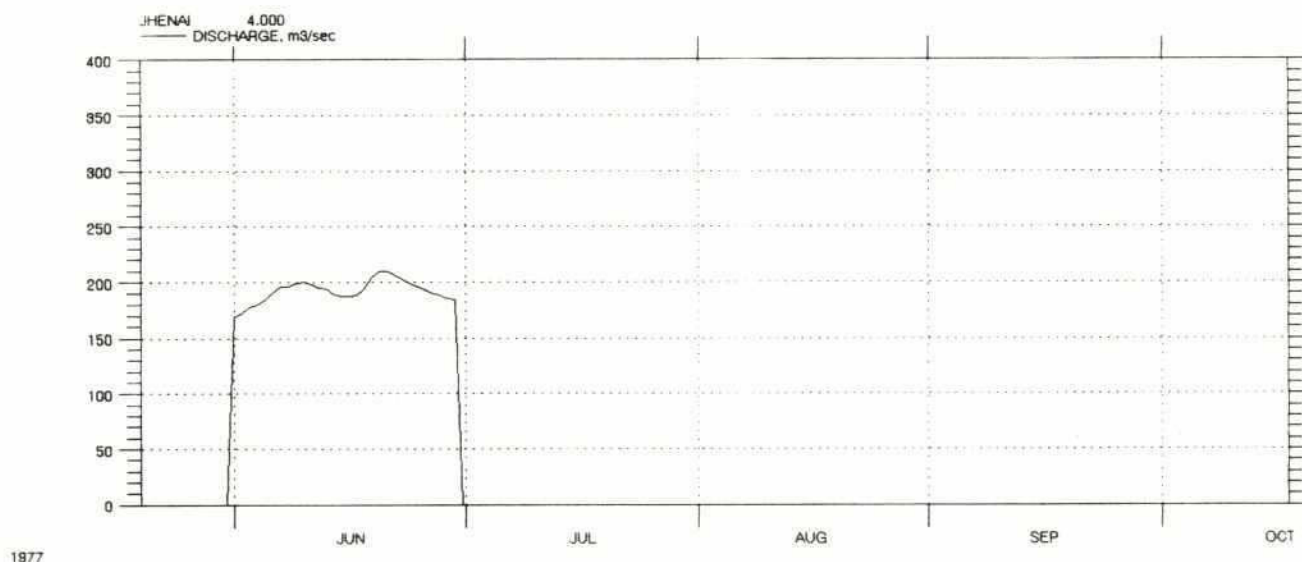
376



U/S. Water level



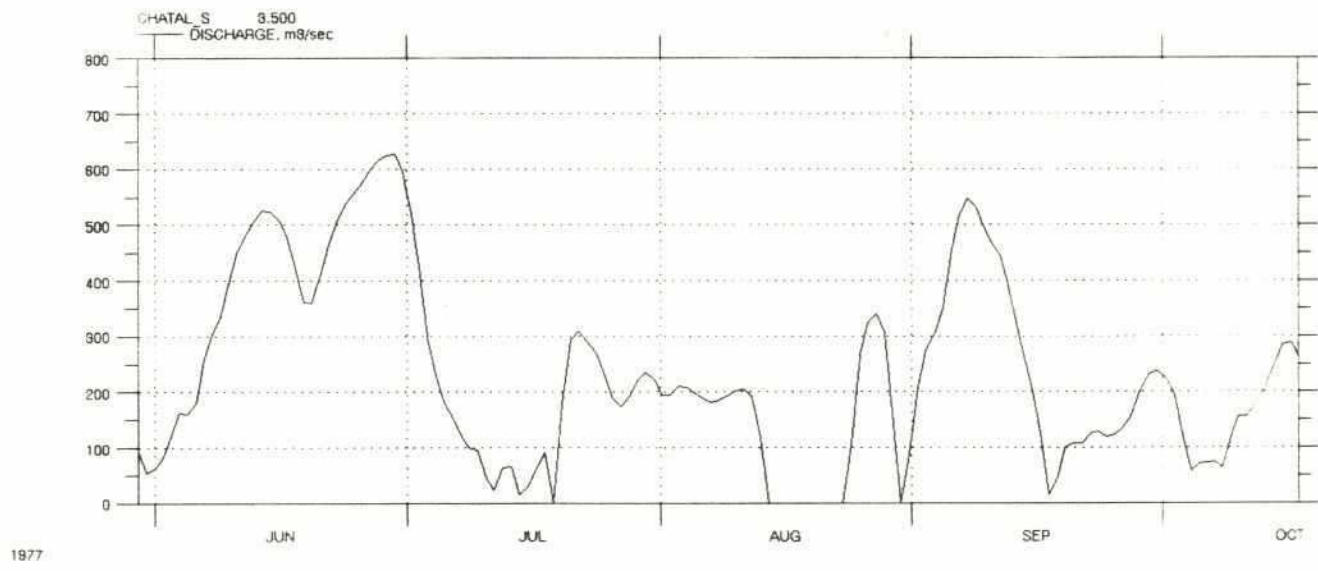
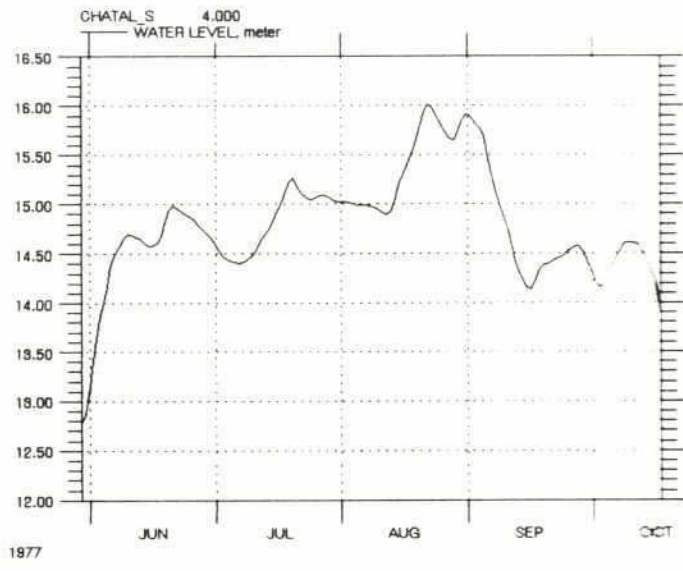
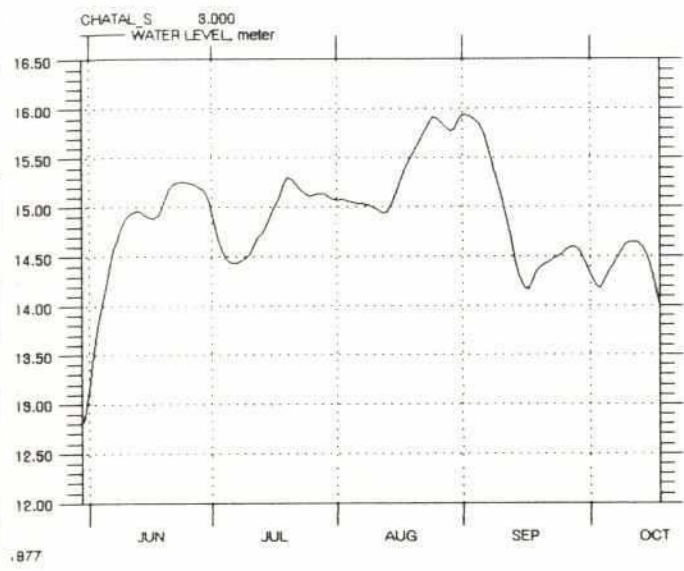
D/S. Water level



Discharge

SWMC	OPTION B (with JHENAI/CHATAL outlet structure) Structures opened from 1st June to 30th June U/S & D/S WATER LEVEL with DISCHARGE AT JHENAI INLET 1977	
DATA FILE : JPOB1.RDF RESULT FILE : 77JPOB1F.RRF	BOUNDARY FILE : JPOB1F77.BSF CALCULATED : 9 - OCT - 1992, 10:17	MIKE 11
		Dwg no.:

377



SWMC

OPTION B (Structure opened 1st June to 30th June)
No reduction of ventage restriction at Baushi bridge
Year 1977

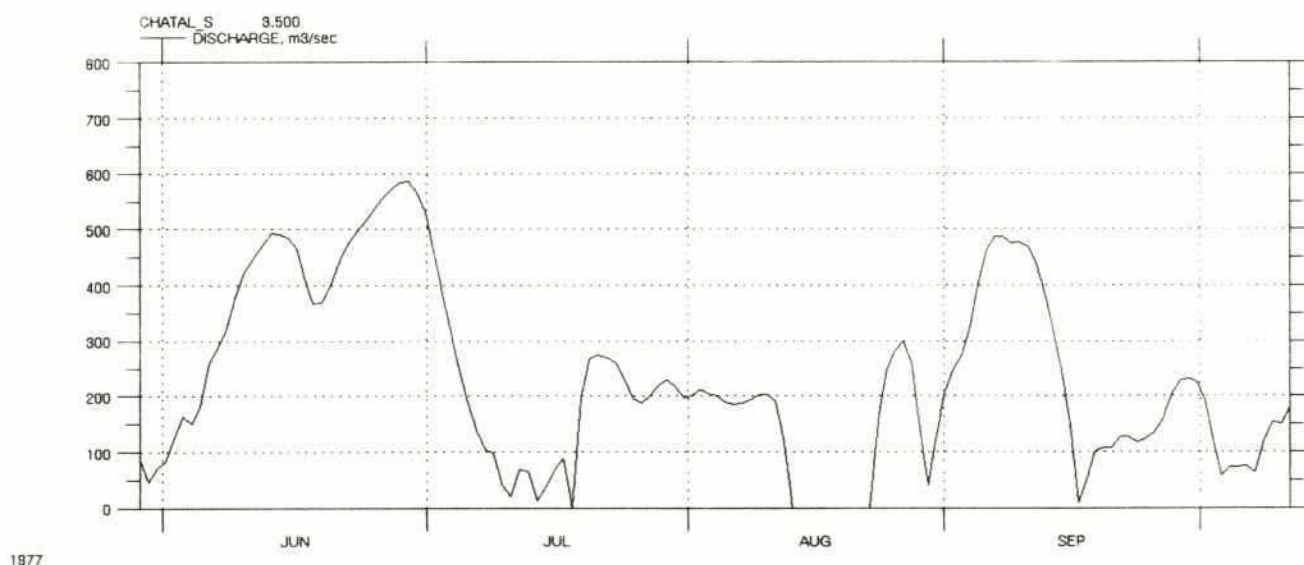
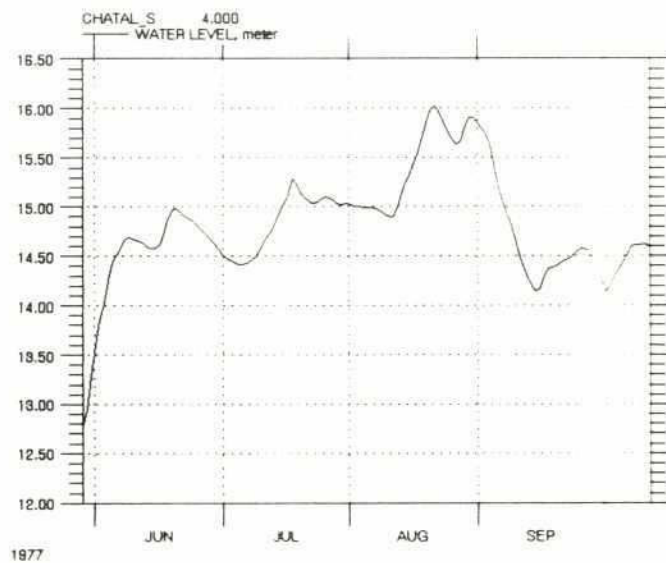
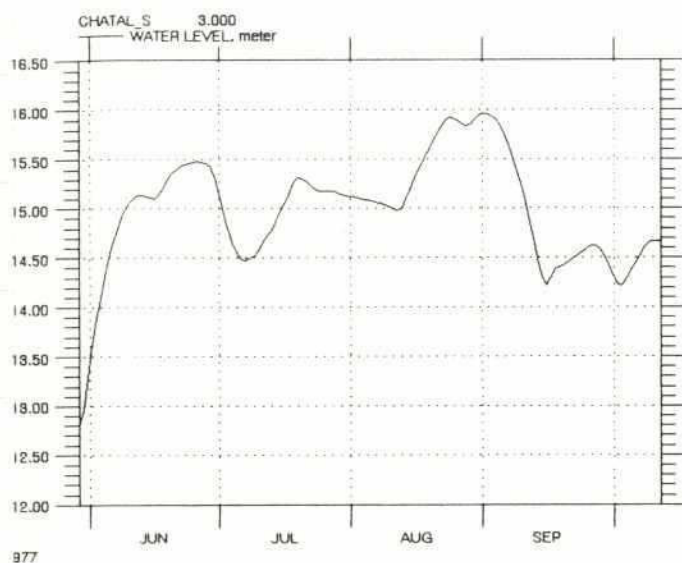
DATA FILE : JPROB1.RDF
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BOUNDARY FILE : JPROB1F77.BSF
CALCULATED : 9 - OCT - 1992, 10:17

MIKE 11

Dwg no.:

378



S W M C

OPTION B (Structure opened 1st June to 30th June)
25% reduction of ventage restriction at Baushi bridge
Year 1977

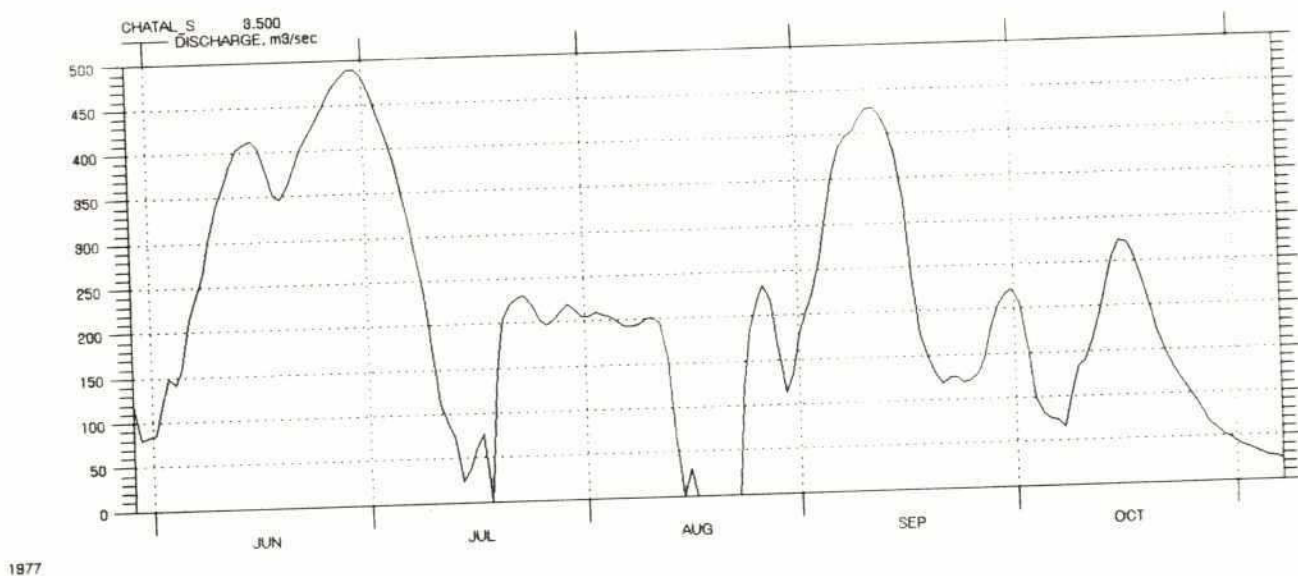
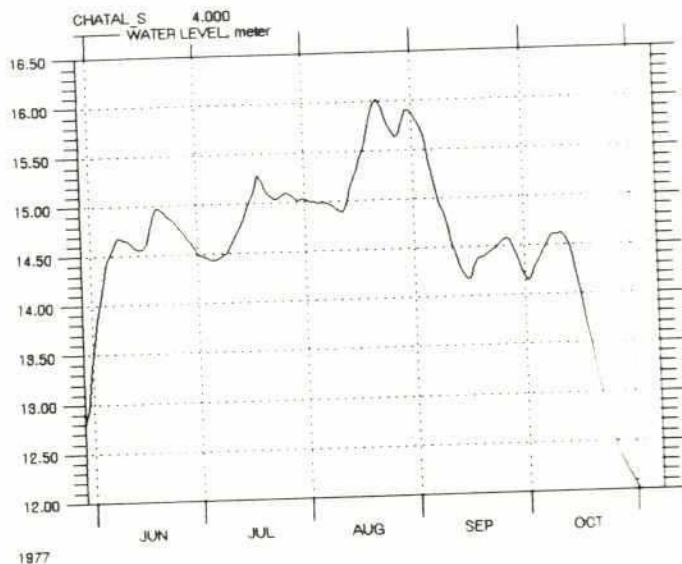
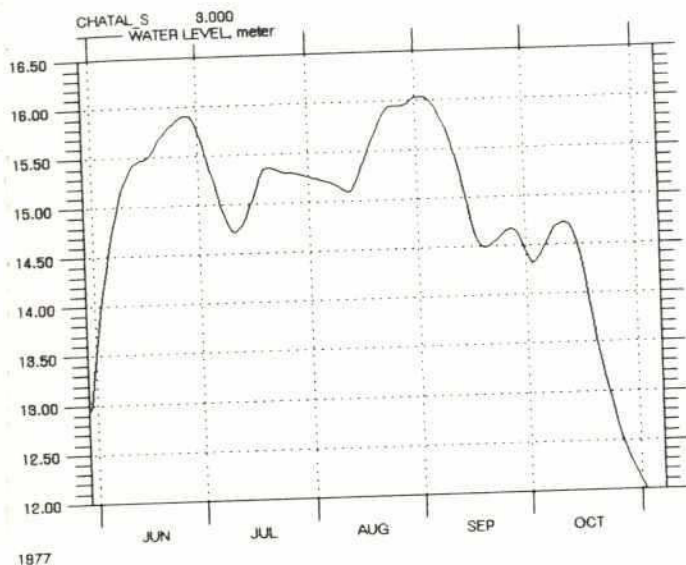
DATA FILE : JPOB1-25.RDF
RESULT FILE : 77OB125.RRF

BOUNDARY FILE : JPOB1F77.BSF
CALCULATED : 9-JAN-1983, 10:42

MIKE 11

Dwg no.:

379



SWMC

OPTION B (Structure opened 1st June to 30th June)
50% ventage reduction restriction at Baushi bridge
Year 1977

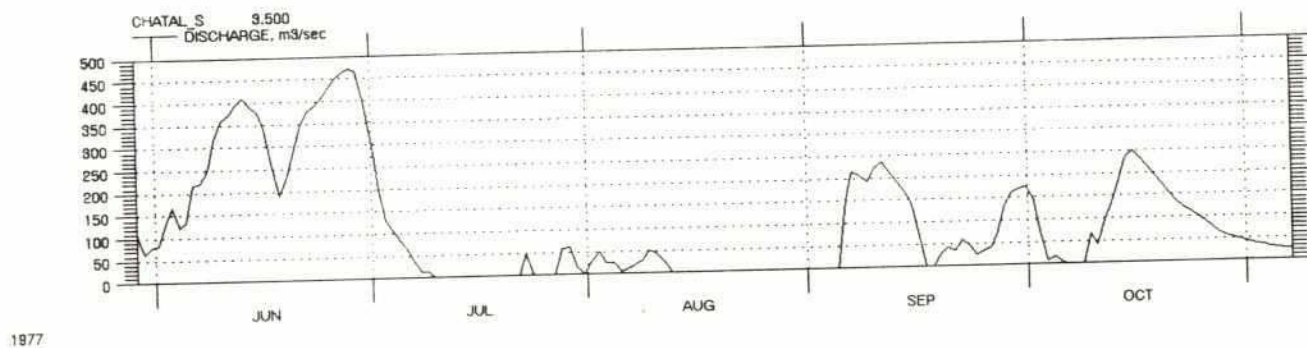
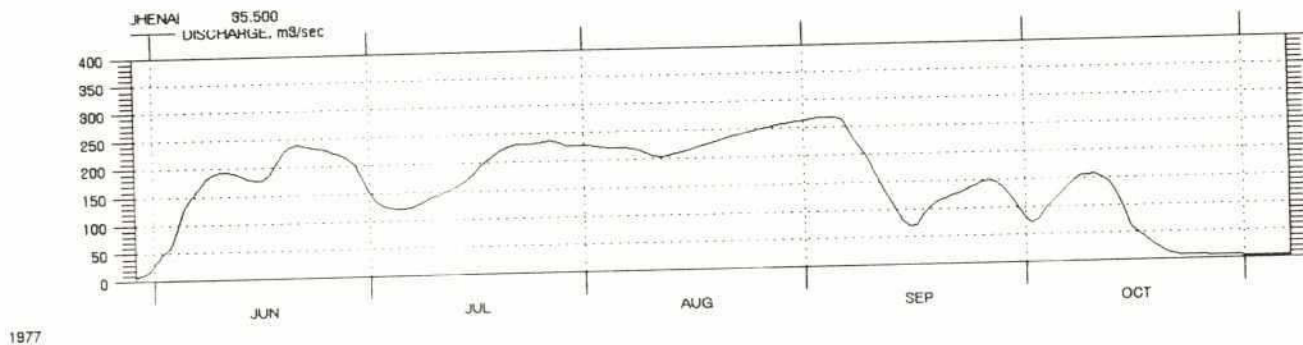
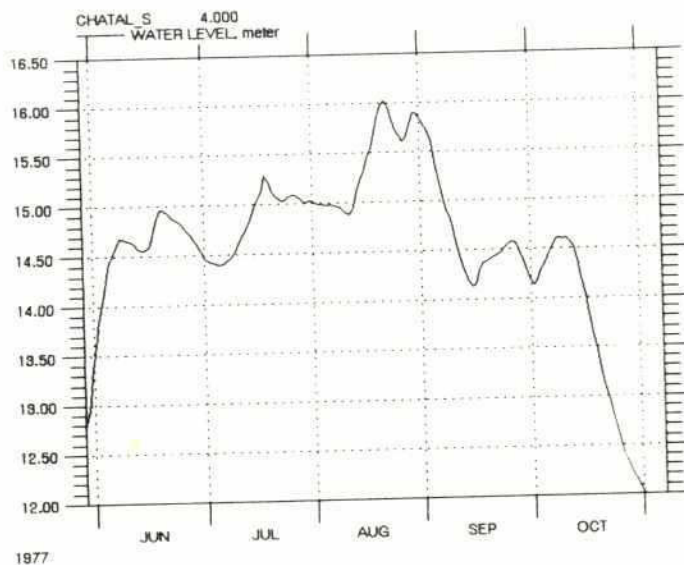
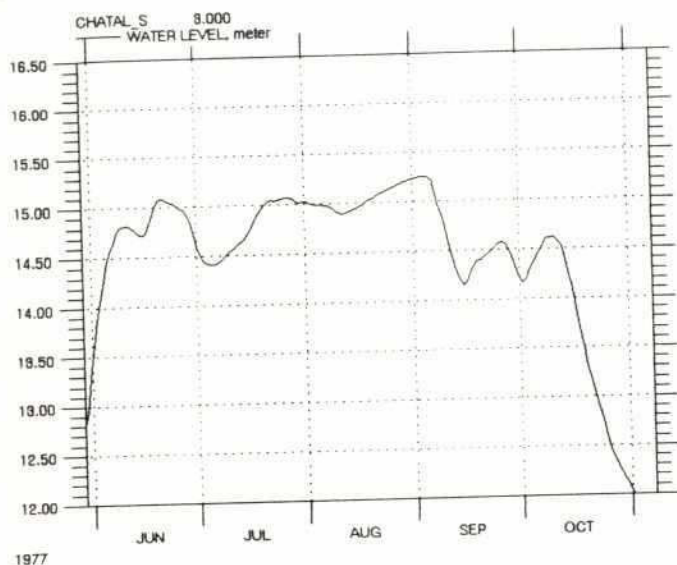
DATA FILE : JPOB1 - 60.RDF
RESULT FILE : 77OB150.RRF

BOUNDARY FILE : JPOB1F77.BSF
CALCULATED : 10 - JAN - 1993, 10:11

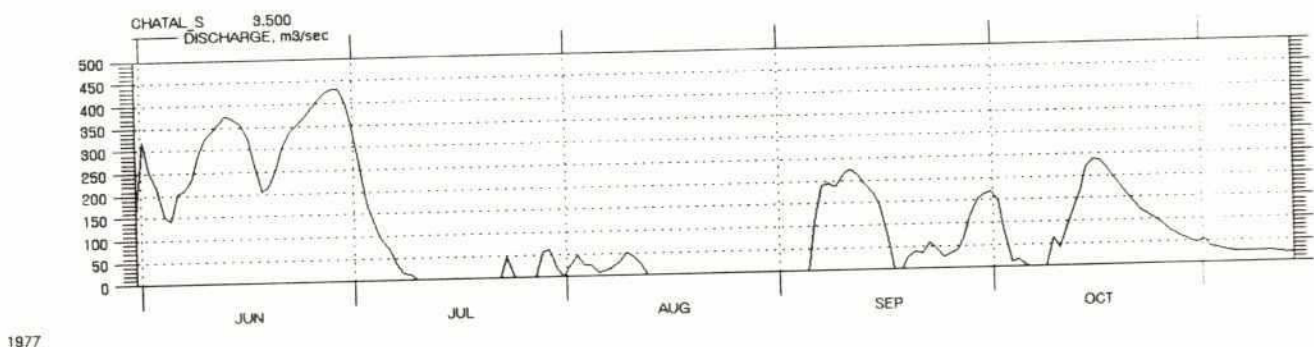
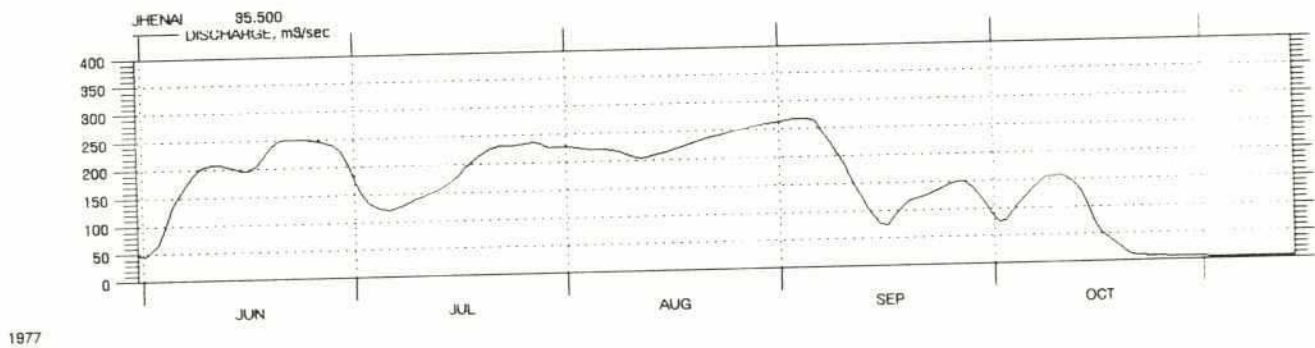
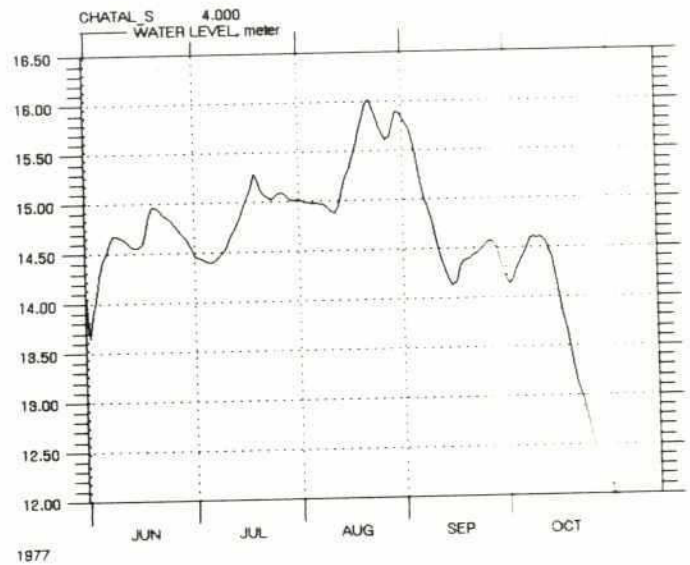
MIKE 11

Dwg no.:

380



SWMC	OPTION B (Structure opened 1st June to 30th June) No ventage reduction No restriction at Baushi bridge Year 1977	
DATA FILE : OB1BO.RDF RESULT FILE : 77OB1BO.RRF	MIKE 11	
	Dwg no.:	
BOUNDARY FILE : JPOB1F77.BSF CALCULATED : 11 - JAN - 1993, 09:34		

**SWMC**

OPTION B (Structure opened 1st June to 30th June)
25% ventage reduction No restriction at Baushi bridge
Year 1977

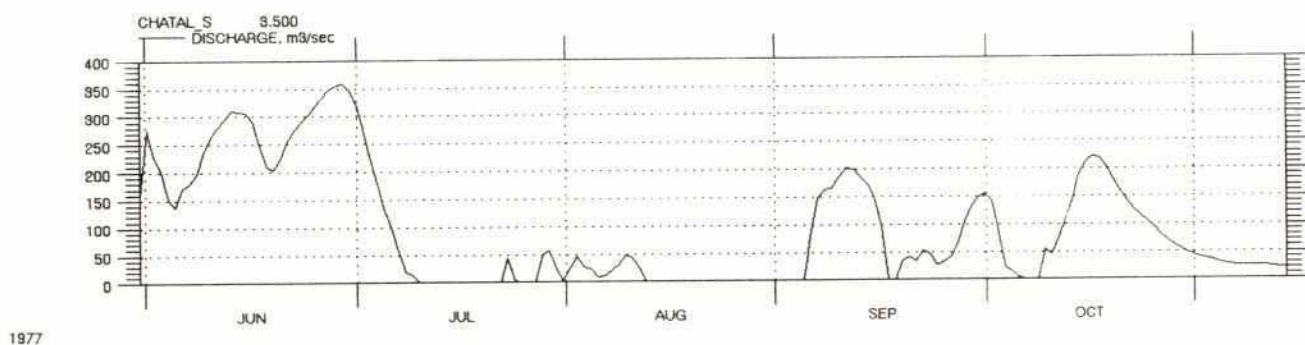
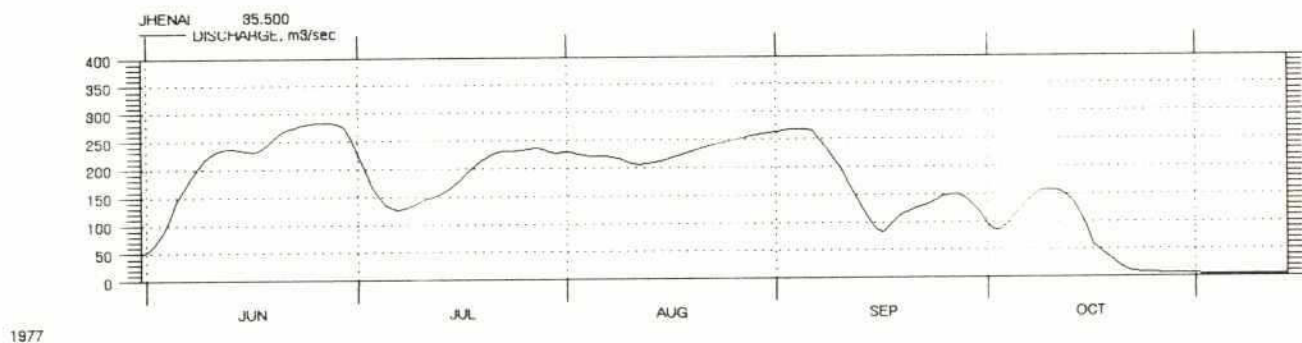
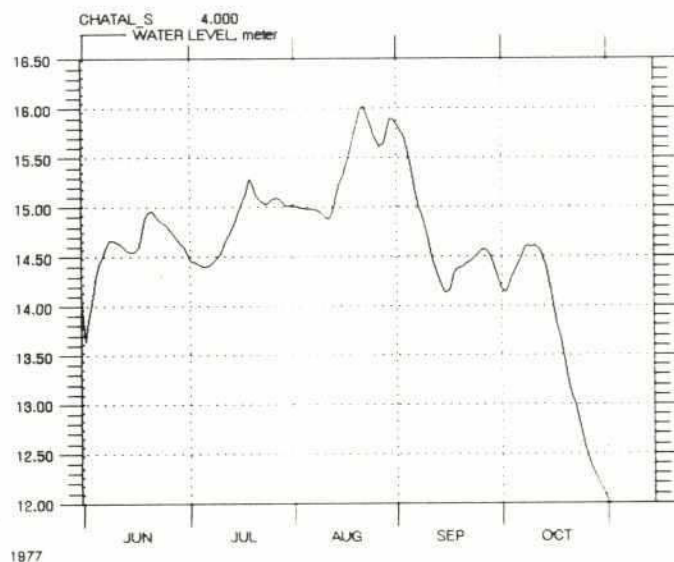
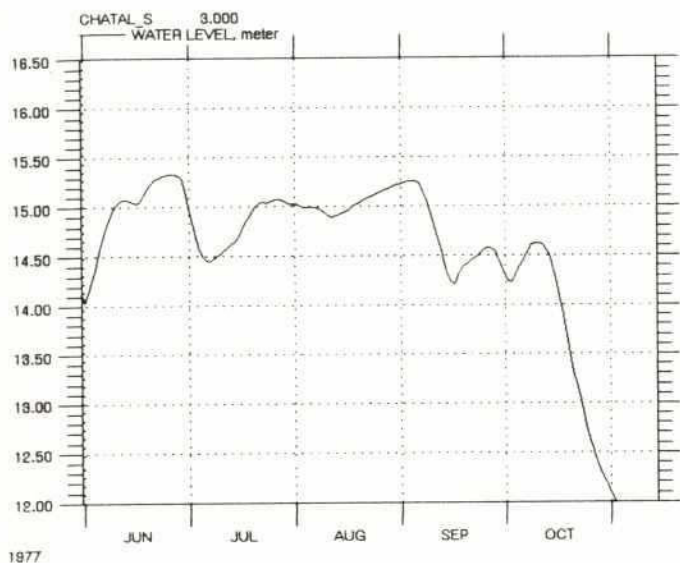
DATA FILE : OB1BO25.RDF
RESULT FILE : 77OB1B25.RRF

BOUNDARY FILE : JPOB1F77.BSF
CALCULATED : 11 - JAN - 1993, 13:51

MIKE 11

Dwg no.:

382



SWMC

OPTION B (Structure opened 1st June to 30th June)
50% ventage reduction No restriction at Baushi bridge
Year 1977

DATA FILE : OB1B050.RDF
RESULT FILE : 77OB1B50.RRF

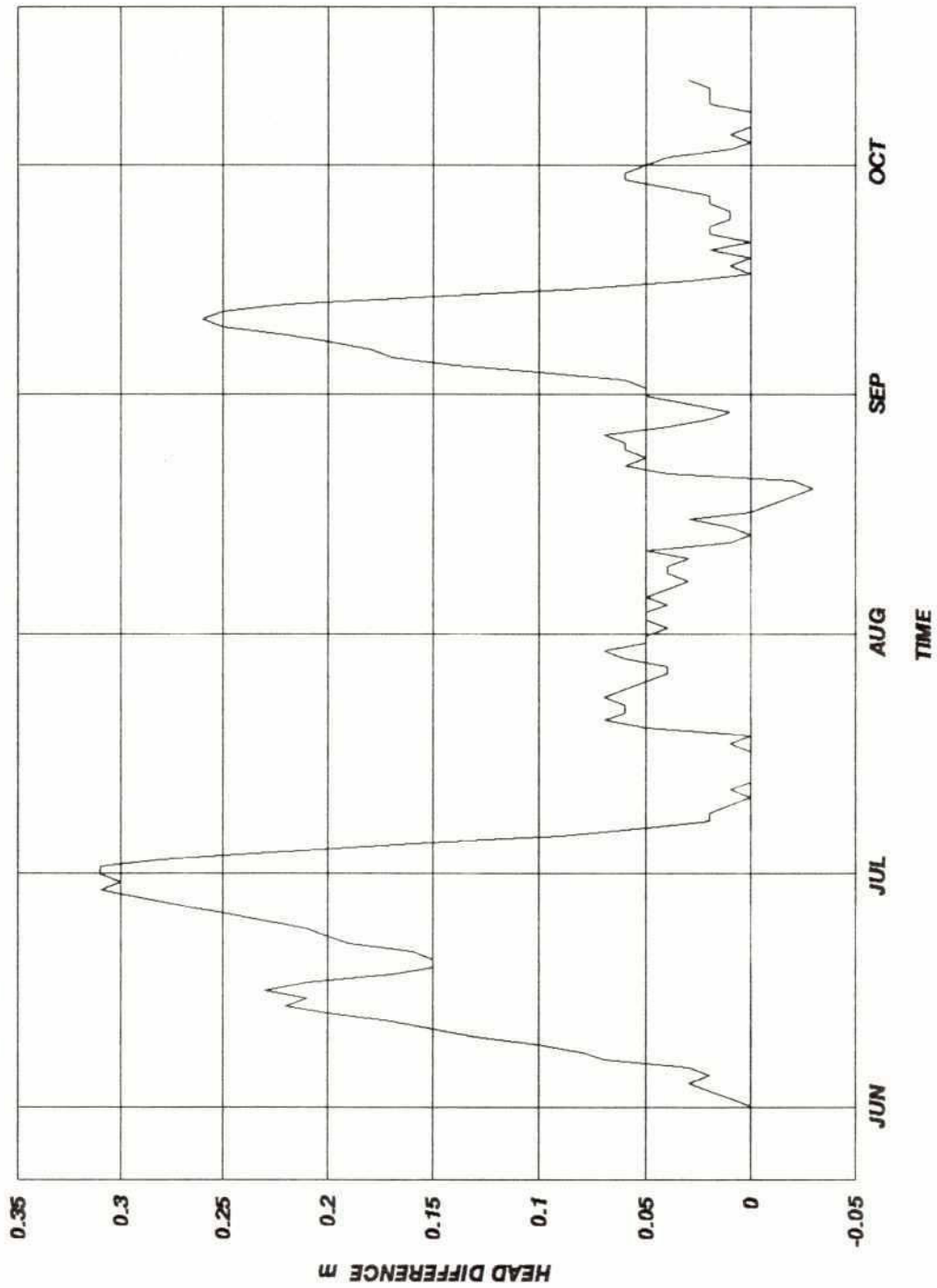
BOUNDARY FILE : JPOB1F77.BSF
CALCULATED : 12 - JAN - 1993, 11:52

MIKE 11

Dwg no.:

JAMALPUR PRIORITY PROJECT STUDY

DIFFERENTIAL HEAD: 25% REDUCTION OF VENTAGE COMPARED TO NO REDUCTION OF VENTAGE



JAMALPUR PRIORITY PROJECT STUDY

DIFFERENTIAL HEAD: 50% REDUCTION OF VENTAGE COMPARED TO NO REDUCTION OF VENTAGE

