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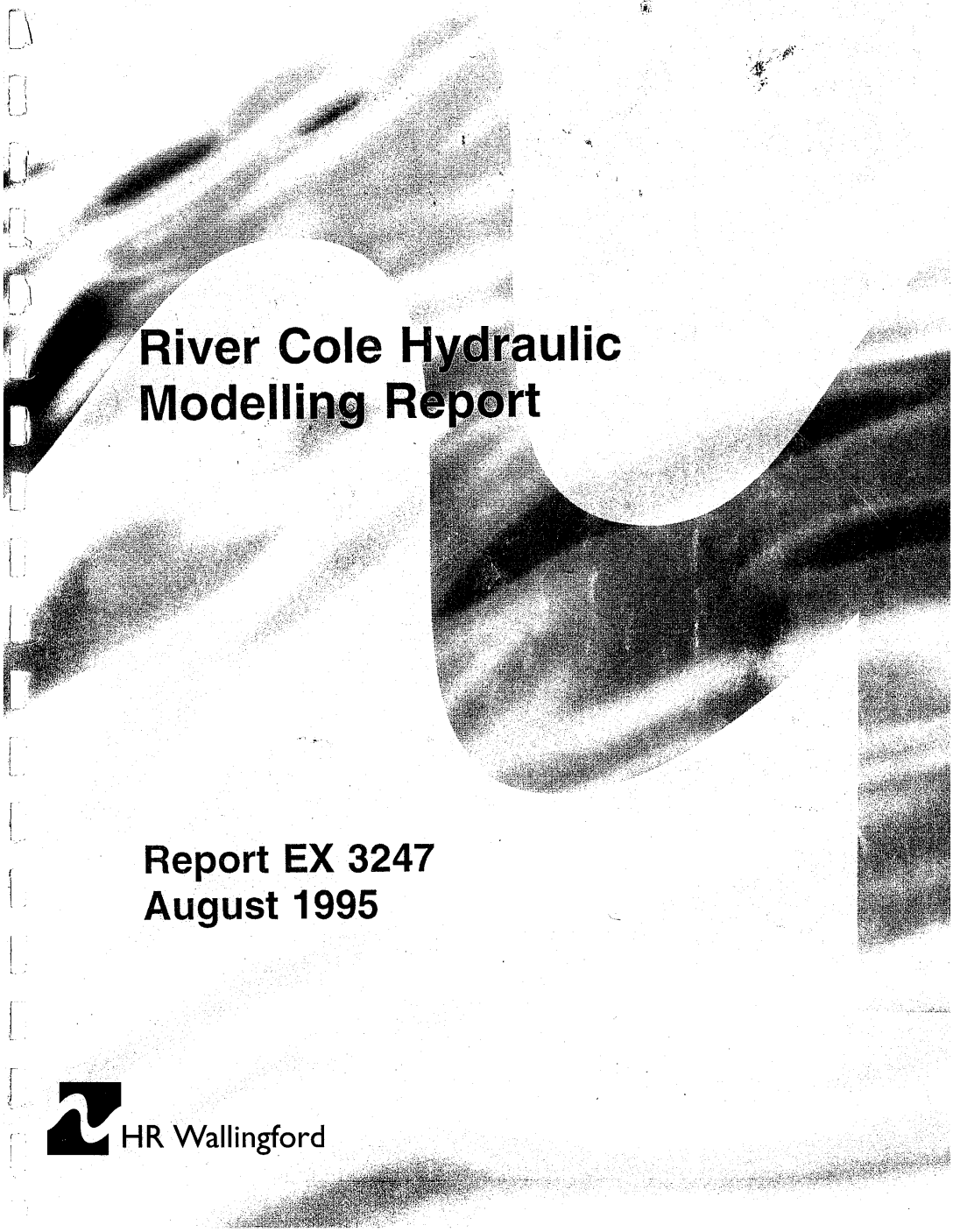

River Cole Hydraulic Modelling Report

Report EX 3247
August 1995

HR Wallingford

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Contract

This report describes work commissioned by the River Restoration Project (RRP) Ltd, whose representative was Mr R Vivash. Mr Colin Platt of the National Rivers Authority was the project manager. The calibration work and testing of options 1, 2 and 3 was funded by the Ministry of Agriculture, Fisheries and Food. The HR job number was RRS 0013/32. The testing of the tender and vision plans were funded by RRP. The job number was RPR 1865. The study was carried out by Mrs K R Fisher, R Cheetham and E Haag in Dr R Bettess's section of the Rivers group at HR Wallingford.

Prepared by ....
(name) (Job title)

Approved by ....

Date .....

Summary

River Cole Hydraulic Modelling Report

EX 3247
July 1995

This report gives details of a computational, hydraulic model study of the River Cole in Wiltshire. The River Cole has been chosen as a demonstration site for river restoration by the River Restoration Project (RRP) Ltd. RRP was formed by a group of people interested in actively promoting the restoration of rivers which have over the years been straightened, widened and deepened. Proposed changes to the River Cole included re-routing the river along its original course, introduction of meanders and raising bed levels to raise water levels and have the river in more contact with the surrounding flooplain.

HR Wallingford were asked to investigate the hydraulic impact of the proposed changes by building a computational, hydraulic model of the river. The model has investigated a number of options and provides information for the detailed design of the river.

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1 Introduction

The River Cole has been chosen for a site of a demonstration site for river restoration by the River Restoration Project (RRP). HR Wallingford were asked to investigate the hydraulic impact of the proposed changes by building a computational hydraulic model of the river. The hydraulic modelling has investigated a number of options and provides information for the detailed design of the river. The results from the options have been discussed with the RRP working group for the River Cole and from these discussions a final design option will be chosen and future additional modifications decided. The detailed design of the changes to the River Cole will be undertaken by Sir William Halcrow and Partners.

2 Background to the project

2.1 River Restoration Project

The River Restoration Project (RRP) was formed by a group of people, from a variety of disciplines, interested in promoting and being actively involved in restoring rivers which have over the years been straightened, widened and deepened. The natural habitats and ecological balance of many river channels in the UK have been damaged in this way. Using LIFE funding from the EC and matching funds from organisations within the UK, RRP are planning to restore two river channels, one urban and one rural, as demonstration projects. The urban site is on the River Skerne in Darlington and the rural site will be on the River Cole at Coleshill near Swindon.

HR Wallingford has been involved on the Technical Committee of RRP and has been involved in detailed proposals for pre and post project monitoring of the hydraulics of both the rural and urban sites. The water level regimes within the newly designed river channels are of fundamental importance to the wetland , floodplain, riverine and catchment management of the project and the varied habitats to be created there. RRP have felt that it is important to model both the urban and rural river sites to ensure that the hydraulic design is verified before construction.

2.2 Objectives of the project

The overall objectives of the project is to restore a 2km stretch of the River Cole. The reach to be restored falls within the National Trust boundaries, Figure 1. The upstream and downstream boundaries of the reach to be modelled are given in Figure 1a. This restoration will involve:

- bringing the river back into contact with the surrounding floodplain;
- altering the course of the main channel upstream of Coleshill bridge to be similar to the original course of the river;
- retaining the mill channel to ensure that some water still flows over the mill weir to provide water if the mill was restored to working order;
- raise the dredged river bed downstream of Coleshill bridge and incorporate meanders into this reach.

A more detailed description of the options considered to achieve these objectives is given in section 4.

The objectives of the hydraulic modelling part of the project undertaken by HR Wallingford are to:

- calibrate the model using existing conditions;
- determine the hydraulic impact of the options, tender and vision plan considered for a 1 in 2 year up to a 1 in 100 year flood event.
- determine the hydraulic impact of the use of sluice gates and the water flow in the channel for a low flow of 0.4m^3/s

After construction, monitoring of the restored reach will be undertaken. The post-project monitoring will record water levels at a number of locations along the reach and discharges will be measured at the existing Inglesham gauging station.

The pre and post project data will be compared to establish the hydraulic impact of the river restoration in the restored reach. The design data generated from the models and the research experience in environmental channels will also be compared with the post-project data. These comparisons will give invaluable data on the hydraulic performance of the restored reach against pre-scheme and design situation.

Ministry of Agriculture, Fisheries and Food are funding the hydraulic modelling part of the calibration and options 1,2 and 3. The River Restoration Project Ltd have funded the hydraulic modelling for the tender and vision plan.

2.3 Model Features

The hydraulic model was constructed using the HR package SALMON-F, which is a general purpose river simulation model suitable for branched and looped river systems. It can include flood plains where the water level is the same on the flood plain as the adjacent river section, or flood plains which are separated from the river by embankments and have different water levels to the river.

The model was constructed by dividing the area to be modelled into river and floodplain cells which are bounded by river cross-sections, embankments and flood plain cross-sections. The outer limits of the flood plain are represented by no-flow boundaries. River structures, including bridges, weirs and sluices are contained within short river cells. Culverts and breaches may also be included in embankments.

It is assumed in SALMON-F that the water level is constant across a river or flood plain and the direction of flow in perpendicular to the section. It is therefore important to select sections which are as far as possible perpendicular to the flow line. Storage in flood plain cells is calculated from tables of area against water level for each cell and this forms part of the input data. SALMON-F requires inflows for all rivers entering the modelled area, together with lateral inflows, representing rainfall-runoff for example, where appropriate. Tributary discharges into the main channel can also be specified. A stage hydrograph or rating curve is also required at the downstream boundary.

3 River Cole site

3.1 Existing conditions

The River Cole is located in Wiltshire to the north of Swindon. The catchment is 135km^2 and drains the northern edge of the Berkshire Downs before flowing north via the suburbs of Swindon. Before flowing into the River Thames at Inglesham, the River Cole flows through National Trust owned farmland at Coleshill. The stretch of river flowing through Coleshill has been straightened and deepened for the operation of an old mill at Coleshill Bridge. The old Ordnance survey map shows the county boundary following the old course of the river when the river had meanders. The more recent maps, Figure 1, show the straightened course of the river upstream and downstream of Coleshill Bridge.

3.2 Previous studies

A previous study had been undertaken on the River Cole catchment by HR Wallingford and Howard Humphreys and Partners in 1988. This study had been commissioned by Thames Water to assess the response of the catchment to rainfall events. The aim of the study was to develop a planning tool for future use by Thames Water to enable the effects of proposed developments on the flow regime to be assessed.

A flood routing model RIBAMAN was developed of the River Cole catchment to Inglesham weir as part of the project in order to assess discharge hydrographs for the 1 in 2 year to 1 in 100 year return period events for several durations. The hydrographs were based on existing rainfall data and were derived at several locations down the river Cole including at Coleshill Bridge. The discharge and stage hydrograph data from the RIBAMAN model was used in the calibration of the hydraulic model in this study as described below.

3.3 Model Data

The purpose of the River Restoration Project at this site is to restore a 2km stretch of the River Cole as described above. The boundaries are chosen to be remote from the area of interest to ensure that the reach of interest is not affected by any instabilities in the model due to the boundaries. There is a fixed stage-discharge relationship at downstream boundary at Inglesham weir.

A survey of cross-sections and floodplains from Westmill Bridge, the upstream boundary of the model, to Inglesham weir, the downstream boundary of the model was undertaken in 1986 by Thames Water was used for the parts of the river outside the reach of interest. A new survey of the cross-sections and floodplains was commissioned by RRP for the 2km reach of river to be restored.

The characteristics of Coleshill bridge and a small bridge at Fresden were included in the new survey and incorporated into the model.

Details of each of the existing structures were included in the model. The structures within the reach of interest were:

- mill overflow weir;
- mill weir;
- seven steps weir;

- syphon from Waterloo Drain.

The syphon structure was not modelled as a structure but the discharge coming from the Waterloo Drain was entered in the model as a tributary at a suitable position, cross-section OC3006, Figure 1.

The input hydrographs for a 1 in 2 year and a 1 in 100 year event at the upstream boundary of the model, Westmill Bridge, were used in the model. These hydrographs were taken from the RIBAMAN model described above.

4 Description of Options

4.1 Option 1

Significant alterations have been made to the preliminary model representing the existing conditions of the River Cole. The object of the project is to return a stretch of the River Cole to its natural beauty and this involves diverting the river from its present course down a new channel back into the original river channel. The new channel was modelled using a series of designed cross sections positioned at the lowest points on the left floodplain of the present river course. The cross sections used were a mixture of trapezoidal and triangular sections. The triangular sections were used to represent the shallow and deep areas of a meander and had a bank to bank width of 3.25 metres and a depth of 1 metre. The trapezoidal sections had a bed width of 2.5 metres and a depth of 0.75 metres. The channel had side slopes of gradient 1 in 1 and 1 in 3.

The bed level slope of the new channel and the old channel was put at a gradient of 1 in 1300 from an initial bed level of 77.9 mAOD at the upstream bifurcation, at section MC3012, and the channel ended when it reached the original river course at section OC3007A2 (see Figures 1 and 2) A weir of height 359 mm was inserted at the transition point to allow for the difference between the elevated bed levels of the new channel and the existing levels of the old channel. The bed level just upstream of Coleshill Bridge, at section MC3002, was set at 76.819 mAOD, the existing level in the mill pond.

In order to divert the majority of the river flow down the new channel and hence return the river to its original river path the mill weir at section RC3005B (see figure 1) was raised by 381mm (15 inches) to a level of 78.841 mAOD. The crest of the bifurcation was set half a metre below the crest of the mill weir, 78.3m AOD. The bifurcation weir was modelled as a two stage weir with the lower stage being 4m wide and the upper stage being 50m wide and set at a level of 78.5m AOD. The mill overflow weir was also raised so that there was no flow into the pond and hence the majority of the flow would pass down the new channel.

The seven steps side weir from the main channel, upstream of the bridge was set at a higher level of 79.8m AOD to prevent water being drawn out of the main channel.
The bed levels downstream of Coleshill Bridge were also raised to lie on a gradient of 1 in 744 from a level of 76.819 mAOD, at section MC3002, to the crest level of the first existing fish weir at section MC2057, set at 75.488 mAOD. The fish weir acts in conjunction with a transition zone downstream of the weir taking the raised bed levels back down to the present excavated bed levels. The cross-section shapes were trapezoidal with side slopes of 1

in 1 for the straight parts of the channel and side slopes of 1 in 1 and 1 in 3 for cross-sections on the meander bends proposed downstream of Coleshill bridge.

4.2 Option 2

The second option but the a bed levels of the new channel were raised by 200 mm to try and bring the new channel closer to the flood plain. The cross sections of the old channel were returned to their existing shape. The weir at the confluence of the new and old channels was replaced with a steep bed profile. The bed levels downstream of Coleshill bridge were returned to their existing levels but the shapes of the cross-sections were retained as described in option 1.

4.3 Option 3

This option was as option 2 but the shape of the downstream channel sections were returned to the existing bed levels and shapes

4.4 The tender plan

The tender drawings follow the same main lines as option 1, 2 and 3, with modifications of the channel shape and bed level on the new channel and downstream of the bridge as given on the tender drawings.

The cross sections of the new channel are trapezoidal on the straight reaches and triangular on the bends. The trapezoidal sections have a bed width of 2.6m, a top width of 11m, a 700mm wide ledge on each side of the channel at 800mm above bed level and side slopes of gradient 2:1 between the bed and the ledge and approximately 1:3 on banks. The triangular sections have a top width of 11m a 2.4m wide ledge at 1m above bed level.

The bed slope of the new channel was put at approximately 1 in 1300 from an initial bed level of 78.46 mAOD at the bifurcation, at section AC3012j. A weir has been included in the model at the bifurcation between sections AC3012j and section AC3012w. It has been modelled as a two stage weir, the first stage is 3 m wide and its crest has been set to 78.46 mAOD, the second stage is 10 m wide with a crest level of 78.9 mAOD.

The original channel between cross-sections OC3006Aj and OC3003A has been returned to the existing bed levels and shapes. The junction between the new and original channel is between sections AC3007A and OC3006. A weir of height 830mm was inserted at this transition point.

The channel bed level and shape in the existing main channel, mill channel and mill overflow channel are kept identical to the existing conditions. The mill weir at section RC3005B is set to the same level than in option 1, i.e. 78.841 mAOD. The mill overflow weir is raised, as in option 1, to the level of 79.33 mAOD. Finally, the Seven Steps weir was raised to the level of 79.4 mAOD.

Two meanders are included in the channel between Coleshill bridge and the first fish weir, to allow more water to flow over the banks onto the flood plain on this reach, Figure 2. The bed level on the first, upstream meander is raised, at the upstream end between cross sections MC2065 and MC2065w, by 1 m to the level of 76.8 mAOD. This meander is 120m long, and has an approximate bed slope of 1 in 460. The bed level on the second downstream meander, at the upstream end between sections MC2062 and MC2062w, is raised by 900mm to the level of 76.2mAOD. It has a length of 345m and a bed

slope of approximately 1 in 908. The cross sections on the two meanders are of the same shape and dimension as the ones on the new channel as given on the tender drawings

A 12m wide berm at level 78.00mAOD, was included on the left bank, in the new channel between cross section MC2065w and MC2064. This is achieved by filling the old channel up only partially, to the level of 78.00mAOD, when creating the first, upstream meander. The berm is required to increase the conveyance through the meander and ensure that the water level at coleshill Bridge is no higher than levels in the existing condition.

Finally a ford and a culvert have been added to the model between cross section MC3002 and MC3001 and cross sections MC3010c and MC3009c respectively. The ford has been modelled as a weir which crest level has been set to 76.8 mAOD. The culvert between cross-sections MC3010c and MC3009c has been modelled as a 3m wide and 2.1m high sluice gate permanently opened. The invert level of this sluice gate has been set to 77.4mAOD.

4.5 The Vision Plan

The downstream reach, from Coleshill bridge to the first fish weir, the mill channel, from the last stone weir, between sections RC3003B1 and RC3003B, to Coleshill bridge and the original channel have been modified in the vision plan compared to the tender plan, Figure 3.

To allow even more water to flow over the banks downstream of Coleshill Bridge and hence to bring the river back into contact with the surrounding floodplain and return this stretch of the river to a more naturel and aesthetically appealing course, new meanders have been included between meander 1 and 2 of the tender plan. The cross sections on these new meanders are of the same shape and dimensions as in the tender plan. The bed level on the new meanders is drawn on a straight line from the downstream end of meander 1 to the upstream end of meander 2 of the tender plan.

A new berm is added on the right bank of the new meanders, between sections MC2064 and MC2063b. This berm has the same characteristics as the one described previously for the tender plan.

The bed level between the last stone weir in the mill channel and the 1st meander downstream of Coleshill bridge is drawn on a straight line between the level at section RC3003B1, i.e. 76.85mAOD and the level at section MC2065w, i.e. 76.75mAOD. The bed level between cross section MC3001 and MC2065 is lowered by 300mm to reduce the constriction created at Coleshill bridge by raising the bed level between the stone weir and the 1st meander. This local bed reduction lowers the water levels upstream of Coleshill bridge to an acceptable level.

The shape of the cross sections on the original channel have been modified to the shape and dimension of the cross sections in the new channel as described in the tender option. The bed level slope of the original channel was made the same gradient as the bed gradient in the new channel, i.e. 1 in 1300, starting at the downstream end at a bed level of 76.84 mAOD, at cross section MC3002. A weir of height 140mm was thus introduced at the junction between the original and new channel between sections AC3007A and OC3006.

4.6 Use of Sluice Gates

For both the tender and the vision plan, three sluice gates have been introduced into the model, at the mill weir, at the same level as the cascade weir. The sluice gates will be used to evacuate more water down the main existing channel into the mill overflow channel during a summer flood and hence reduce the flooding on the flood plain surrounding the new channel in such an event. In the event of a flood which may affect harvesting on hay crops, boards will be placed on top of the bifurcation weir to try and push the water down the main channel.

The sluice gates are modelled as one 2.92m wide gate, with an invert level of 78mAOD and the maximum opening of the gate set to 700mm. The sluice gate opening time is set when flooding just begins to occur from the new channel in a 1:2 year storm event, the closing time is set to the ending time of such a flood. The gate opens and closes gradually, over one hour, to the maximum opening capacity.

Two boards of 245mm are placed on top of the bigurcation weir to bring the crest to 79.02m AOD.

5 Model Calibration

The model was calibrated using a 1 in 100 year flow event given in RIBAMAN. The RIBAMAN model was verified using rainfall data from significant storms by comparing predicted and observed hydrographs at as many locations as possible in the river system.

Figures 4 to 4c show the 1 in 2 year to 1 in 100 year flow event hydrographs comparing the hydrographs for the RIBAMAN model and the SALMON-F model at Coleshill Bridge. It can be seen that the peak of the hydrographs as predicted by the SALMON-F model is lower than that predicted by RIBAMAN and the peak flow occurs approximately 3 hours earlier. The shapes of the hydrographs are very similar and it was felt that the hydrographs were sufficiently close for the purposes of the calibration where there is very little calibration data.

There was a flood in 1968 which was statistically a 1 in 100 year flood event. There were a few water levels collected during this flood event. At a point 190m upstream of Coleshill Bridge the observed water level was 80.00m AOD. Figure 5 shows the predicted water surface profile from the upstream National Trust boundary to Coleshill Bridge for a 1 in 100 year flood event from the SALMON-F model. At the position 190m upstream of Coleshill bridge the water level predicted in the model was 80.00m AOD.

The roughness coefficients in the model to achieve the matching of the observed and model water level are given below. In the channel a Manning's n roughness coefficient of 0.05 was used and a value of 0.08 was used on the left bank flood plain and on the right bank flood plain from Coleshill bridge to Inglesham weir. For the area around the mill a flood plain roughness on the right bank of 0.15 was used to account for the trees, fences and buildings in this area. From Coleshill bridge to the forest area on the right bank, at the National Trust boundary, a roughness coefficient of 0.08 was used. For the forest area a roughness coefficient of 0.1 was used for the calibration.

There is very little data with which to calibrate the model. The calibration was undertaken using the available data. Further, more accurate, calibration of the model can be undertaken with data collected during the pre-project monitoring phase of the project if a significant flood event occurs.

6 Discussion of the results

6.1 Option 1, 2 and 3

The water levels for the 1in 2, 1in 10, 1 in 50 and 1 in 100 year storm events in the existing situation are given in Appendix A, Tables A.1 to A.4.

The water levels along the River Cole for each of the three schemes are given in appendix B, tables B.1 to B.4. Long profiles of the river are given in Figures 6 to 17. The long profiles show the water levels in the River Cole for the option under consideration and what the present water levels in the river are following the described storm event.

Figures 6 and 7 show the long profiles for option one in the mill channel with the application of a 1 in 2 and a 1 in 100 year storm event. It can be seen from figures 6 and 7 that the river level at the Waterloo ditch confluence in the mill channel has been reduced by 60 mm for a 1 in 2 year event following the alterations described in section 4. It can be seen however that at the mill weir the predicted water levels for the 1 in 2 year storm event are higher by 229 mm than the present levels for the storm. This is due to the fact that the mill weir has been raised by 381 mm producing a forced increase in water levels over the weir. The reduction in water level is most obvious in the profile of the 1 in 100 year storm event where there is a reduction of 0.5m in stage at the Waterloo ditch, figure 7. This reduction in stage is explained by the fact that the river has been diverted from its present course down the new channel and there is no longer the same discharge passing down the mill reach.

Similar patterns can be observed for the stages in options two and three for the same reach of the river, Figures 8 and 9. Upstream of the weir the water levels are entirely in bank on the left hand side of the channel, but out of bank on the right up to the waterloo ditch. The increase in water level over the weir is also obvious from these long profiles.

Figures 10, 11, 12 and 13 show the long profiles for each option for the added channel and the old channel which have now been designed to hold the main flow of the River Cole. There are no present water levels for the added channel reach on the long profiles because at present the channel does not exist. It can be seen that there is a marked increase in water levels in option one of 0.5m in the old channel around the football pitch, for the 1 in 2 year storm, Figure 10. Figure 11 shows the water levels for the 1 in 100 year flood in the new and old parts of the channel. The water levels at the football pitch have been reduced from existing levels by 0.3m. There is more water stored on the floodplain for this large event which reduces the peak water level as the hydrograph is longer but flatter.

Options two and three show a much smaller increase in stage, of 0.241m and 0.10m respectively, Figures 12 and 13. This latter fact can be explained by the fact that downstream of Coleshill Bridge the main channel has been returned to its present excavated bed level and therefore the conveyance of

the downstream channel has been increased providing a more efficient draining course for the flood water.

It can be seen that the river is entirely out of bank along the new channel in all of the four studies of flooding, Figures 10 to 13. The water levels in option 1 at the football pitch reach a height of 79.358m AOD during the 1 in 100 year storm, Figure 11 and 78.931m during the 1 in 2 year storm, Figure 10, see section label OC3005A in tables 1 and 2 in appendix A. This corresponds to water levels of 1.35m and 0.96m above the left bank for the 100 year and the 2 year storm respectively.

Figures 14 to 17 show the long profiles for the reach of the river downstream of Coleshill Bridge. Figure 14 shows that there is a significant increase in water levels in option one with a 1 in 2 year storm event. At the fritillary meadow the water level increase is predicted to be 0.21m. This increase in water levels becomes less great as the downstream channel is reverted to its present conditions through the application of options two and three, figures 16 and 17. There is then a decrease in the water levels over existing conditions at the fritillary meadow in option three.

The results for the 1 in 100 year storm event show that at Coleshill Bridge there is a reduction in stage. This manifests itself both upstream and downstream of the bridge. The stage at Coleshill Bridge reduces from 79.492m AOD to 79.252m AOD. This reduction in water level can be explained by the increased flood water storage area created upstream of the bridge which reduces the peak level at the bridge. Flooding of the old channel already occurs in the existing situation in a 1 in 100 year storm event. In option 1 the same storm event floods the floodplains adjacent to the added channel as well as the old channel and hence the peak level of the stage hydrograph is reduced.

6.2 Tender plan

The tender plan and vision plan have been tested for the 1:2, 1:10, 1:50 and 1:100 year flood event as well as for a low flow of 0.4m^3/s. A separate run has been done using the sluice gates, for both the tender and the vision plan.

The water levels along the River Cole for each of the runs, for the tender and the vision plan are given in appendix C, tables C.1 to C.6 and appendix D, tables D.1 to D.6 respectively. Long profile of the river for the tender plan and vision plan are given in figures 18 to 53. The long profiles show the water levels for each of the runs and both the vision and tender plan compare to the existing water levels following the same storm event.

Figure 18 to 21 show the water levels in the main existing channel and the mill channel for the 1:2, 1:10, 1:50 and 1:100 storm event for the tender plan. These figures show that for each one of these events, the water level is reduced compare to the existing conditions, in the main existing channel and also in the mill channel for the 1:50 and 1:100 storm event. However, it can be seen that the predicted water levels for the 1:2 and 1:10 storm event, are reduced in the main channel but increased in the mill channel. This increase is of 118mm, and 80mm, for the 1 in 2 and 1 in 10 respectively, at the mill weir, for the same reason as in option1, as explained in section 6.1. The larger the return period, in the main channel, the larger the reduction in water level in the main channel, compared to the existing conditions. This reduction is

660mm for the 1:100 storm event and only 60mm for the 1:2 at the Waterloo ditch.

Figures 22 to 25 show the long profiles for each of the storm event in the new and old channel for the tender plan. The water level at the football ground increases for the 1:2 storm event by 0.4m, compare to the existing water level. For the three other storm events, however, this water level decreases. This decrease is larger, as the return period increases, and there is a 0.2m increase in water levels at the football ground for the 1:100 storm event compared with existing conditions. For the four events the water is entirely out of bank for both the new and the original channel. The water level at the football ground is thus 0.65, 0.94, 1.25 and 1.41m above the left bank for the 1:2, 1:10, 1:50 and 1:100 storm events respectively.

Figures 26 to 29 show the long profiles for the reach of the river downstream of Coleshill bridge for the tender plan. Figure 26 shows that there is a significant increase in water level downstream of the bridge and down to MC2060 at fritillary meadow for the 1:2 storm event. This increase reduces for the higher return periods, as more water flows over the banks upstream of the bridge. Downstream of the fritillary meadow, the water level is lower than under the existing conditions.

The water level at Coleshill bridge is increased for the 1:2 storm event, by 0.31m, for the tender plan compare to the existing conditions. However this water level is decreased by 0.13m for the 1:100 event. This reduction is explained by the increase in water storage both upstream and downstream of the bridge. Indeed, the floodplain is flooded in a 1:100 storm event for both the new and old channel in the tender plan compared to only flooding from the old channel for the existing conditions. The peak level of the stage hydrograph is thus reduced at the bridge. Furthermore, the presence of the berm on the first meander increases theconveyance of the channel for the downstream reach and hence decreases the water level downstream of and at the bridge.

Figures 42 to 44 show the long profiles for a low flow of 0.4m3/s for the tender plan, for the mill channel, the new and original channel and for the reach downstream of Coleshill bridge.

Figures 48 to 50 show the long profiles for the 1:2 flood event for the tender plan, for the mill channel the new and original channel and for the reach downstream of Coleshill bridge, when the sluice gates are used. Figure 49 shows that both the left and the right floodplains adjacent to the new and the original channel are still flooded, in the event of a summer flood. However the water level in the new channel is reduced from 10 to 130mm, from the upstream end at section AC3012w to the downstream end at section AC3007A. The water level in the existing channel are lowered by 1 to 15cm from sections MC3012A and MC3005. The water level at the mill weir is reduced by 14cm, this is due to the fact that part of the water running down the existing channel is diverted through the gates into the mill overflow channel.

6.3 Vision plan

Figures 30 to 33 show the long profiles for each of the storm events for the existing and mill channel for the vision plan. The vision plan shows the same pattern as the tender plan for this reach, as the water levels in the main existing channel and the mill channel vary by only 1 or 2cm between the tender and the vision plan. Indeed this reach of the river has not been modified between the 2 plans.

Figures 34 to 37 show the long profiles for each of the storm events for the new and old channel, for the vision plan. The water level in the new channel increases by 10mm at the upstream end to 130mm at the downstream end for the vision plan compare to the tender plan for the 1:2 storm event. This is due to the fact that the bed level in the original channel, just downstream of this new channel, is raised in the vision plan.

Another consequence of the raised be is the increase in water level in the original channel by an average of 100mm (110mm at the football pitch) for the 1:2 storm event. This increase in water level is even bigger for the 1:10, 1:50 and 1:100 storm event. As a consequence, the water level at the football ground is now only decreased by 60mm for the 1:100 year event in the vision plan compare to the existing conditions. The water level at the football ground is now 0.76, 1.05, 1.38 and 1.55m above the left bank for the 1:2, 1:10, 1:50 and 1:100 storm events respectively.

Figures 38 to 41 show the long profiles for the reach of the river downstream of Coleshill bridge for the vision plan. The results are very similar to the ones observed for the tender plan. The water level is higher for the vision plan than for the tender plan between sections MC3002 and MC2059w, due to the raised bed level upstream of the bridge up to the stone weir and in the original channel and due to the added meanders and raised bed level in them. The water level at Coleshill bridge is now 79.49m AOD for the 1:100 storm event, exactly the same than the one obtained for the same event under existing conditions.

Figures 45 to 47 show the long profiles for a low flow of 0.4m3/s for the vision plan, for the mill channel, the new and original channel and for the reach downstream of Coleshill bridge.

Figures 51 to 53 show the long profiles for the 1:2 flood event for the vision plan, for the mill channel the new and original channel and for the reach downstream of Coleshill bridge, when the sluice gates are used. The vision plan shows the same pattern than the tender plan in this case.

Tables 1a to 1e shows the results for the 1 in 2 year to 1 in 100 year flood at key positions along the river. Appendix E describes the impact of an embankment/wall downstream of the fritillery field protecting the land of the downstream farmer from more frequent flooding.

7 Flooded frequency

Figure 54 and 55 shows the flooded outlines for the reach of interest for the 1 in 2 year and 1 in 100 year events, for both the existing and the tender plan. The difference between the flooded outlines between the vision plan and the tender plan would not be shown at this scale on the map. The map giving the flooded outlines for the vision plan is thus identical to the one given in Figure 55. It can be seen, on Figure 55, compared to Figure 55 that there is an increase in depth of flooding in the 1 in 2 year event especially around the football pitch. For the 1 in 100 year event there is a slight decrease in the depth of flooding due to more storage on the flood plain, but the change is not sufficient to be able to distinguish on the scale of maps shown in Figure 54 and 55.

The frequency of flooding will change with the proposed options. The flow exceedence table developed from the last 18 years of records is given in Table 2.

We can use this table to determine the increase in frequency of flooding on the various parts of the reach.

Upstream of the bifurcation a bankful discharge is 18m3/s, which is approximately a 1 in 2 year flood event and the water stays within the river. On the main channel at section MC3008, downstream of the bifurcation a 1 in 2 year flood typically lasts for approximately 36 hours. With the proposed changes the length of flooding at this place will be approximately the same.

Table 3 shows the bankful discharges and frequency of out of bank flow for the existing situation and the tender and vision plan.

At the football pitch the existing bankful capacity of the old channel is 4m3/s which at present is 30 % of the overall flow and this flow will be exceeded 1 day in a year. The bankful capacity of the old channel will be approximately 3m3/s for the options but this flow will occur now when the total flow is approximately 8m3/s that is 5 days in a year. The length of flooding will be approximately 12 hours, similar to the existing length of flooding.

Downstream of Coleshill bridge the length of flooding will be increased by approximately 10% in a 1 in 2 year flood. The length of flooding will be doubled in a 1 in 100 year event.

Table 3 shows that the frequency of flooding at the fritillary field will increase from approximately 2 hours in a year to 1 day per year. The bed levels have been raised and conveyance of the channel decreased in order to achieve this.

Downstream of the bifurcation on the main channel the embankments on the left bank will be removed for the tender and vision plan. This will increase the frequency of flooding per year from less than 1 day to 6 days.

8 Conclusions

8.1 Option 1, 2 and 3

1. For a 1 in 2 year event the levels in the mill channel are reduced by 130mm for options 1, 2 and 3 although at the mill weir the level is increased by 400mm due to the increased crest level.

2. For a 1 in 100 year event the levels in the mill channel are reduced by up to 0.5m.

3. Option 1 increases levels at the football pitch for a 1 in 2 year event by 0.5m. This is due to a combination of more water flowing down the old channel by the football pitch and the backing up effect from the raised bed levels downstream of Coleshill bridge.

4. Options 2 and 3 show increase in level of 0.25 m and 0.1m respectively at the football pitch for a 1 in 2 year event.

5. The river will be entirely out of bank along the new channel for all options considered in a 1 in 2 year flood.

6. The statistics indicate that the bankful capacity of the old channel will be exceeded at least 7 days in a year.

7. The statistics indicate that the bankful capacity of the old channel at the football club will be exceeded 5 days in a year in comparison to less than one day a year under existing conditions.

8. Downstream of Coleshill bridge for Option 1 there would be an increase in water level of 0.2m for a 1 in 2 year flood event.

8.2 The tender and the vision plan

1. For a 1 in 2 year event the levels in the mill channel are reduced by 60mm for both the tender and the vision plan, but increased by 120mm at the mill weir.

2. For a 1 in 10, 1 in 50, 1 in 100 event the levels in the mill channel are reduced by 100, 230 and 190mm respectively. The water level is also reduced at the mill weir for these events.

3. For both the tender and the vision plan, the water level at the football ground increases for the 1:2 year flood event . The increase is 0.4m in the tender plan and 0.3m in the vision plan.

4. For the 1 in 10, 1 in 50 and 1 in 100 this water level decreases by 0, 130, and 200mm for the tender plan and increases by 110mm, 0mm and decreases by 60mm respectively for the vision plan.

5. For the four events and both plans, the river is entirely out of bank along the new and original channel as shown in Figures 54 and 55.

6. The statistics indicate that the bankful capacity of the old channel will be exceeded at least 5 days in a year for both the tender and the vision plan.

7. The statistics indicate that the bankful capacity of the old channel at the football club will be exceeded 1 day in a year in comparison to less than one day a year under existing conditions.

8. The statistics indicate that the bankful capacity at the fritillary field will be exceeded from 2 hours to 1 days in a year for both the tender and the vision plan.

9. Downstream of Coleshill bridge, for a 1 in 2 year flood event, the water level is increased by 0.3m for the tender plan and 0.1m for the vision plan. The water level at Coleshill bridge is reduced for the tender and identical for the vision plan, compared to the existing conditions.

10. The river is still flooding when using the sluice gates and boards on the bifurcation weir to alleviate flooding in the new channel in a summer 1 in 2 flood event. The water level is reduced however by 10 to 130mm for the tender plan and 10 to 260mm for the vision plan.

11. Downstream of Coleshill bridge water levels are raised by up to 110mm over existing water levels for the tender and vision plans. This rise in water levels is due to raised bed levels and meanders through the downstream reach.

Tables

Table 1a Levels for 1 in 2 year flood event at key positions

Location	Cross-Section	Existing Level (m)AOD	Tender Plan Levels (m)AOD	Vision Plan Levels (m)AOD
Mill House (u/s)	RC3005B	79.42	79.54	79.55
Mill House (d/s)	RC3004B2	78.52	78.75	78.78
Little Lodge	MC3009	79.72	79.54	79.56
Waterloo Lodge	MC3010	79.76	79.66	79.66
Coleshill bridge	MC3001	78.43	78.70	78.74
Raglan Stream	MC2060	77.89	77.92	77.91
Ford	MC3002	78.44	78.71	78.75
Football Pitch	OC3005A	78.48	78.82	78.93

Table 1b Levels for 1 in 10 year flood event at key positions

Location	Cross-Section	Existing Level (m)AOD	Tender Plan Levels (m)AOD	Vision Plan Levels (m)AOD
Mill House (u/s)	RC3005B	79.61	79.69	79.70
Mill House (d/s)	RC3004B2	79.12	79.01	79.07
Little Lodge	MC3009	79.99	79.71	79.73
Waterloo Lodge	MC3010	79.85	79.85	79.86
Coleshill bridge	MC3001	79.01	78.94	79.02
Raglan Stream	MC2060	78.21	78.22	78.20
Ford	MC3002	79.04	78.95	79.04
Football Pitch	OC3005A	79.12	79.11	79.22

Table 1c Levels for 1 in 50 year flood event at key positions

Location	Cross-Section	Existing Level (m)AOD	Tender Plan Levels (m)AOD	Vision Plan Levels (m)AOD
Mill House (u/s)	RC3005B	79.54	79.81	79.83
Mill House (d/s)	RC3004B2	79.54	79.30	79.40
Little Lodge	MC3009	80.20	79.84	79.88
Waterloo Lodge	MC3010	80.24	80.01	79.89
Coleshill bridge	MC3001	79.40	79.20	79.33
Raglan Stream	MC2060	78.26	78.36	78.33
Ford	MC3002	79.46	79.22	79.35
Football Pitch	OC3005A	79.55	79.42	79.55

Table 1d Levels for 1 in 100 year flood event at key positions

Location	Cross-section	Existing Level (m) AOD	Tender Plan Levels (m) AOD	Vision Plan Levels (m) AOD
Mill House (u/s)	RC3005B	79.92	79.87	79.91
Mill House (d/s)	RC3004B2	79.66	79.46	79.57
Little Lodge	MC3009	80.40	79.92	79.97
Waterloo Lodge	MC3010	80.45	80.11	80.13
Coleshill bridge	MC3001	79.49	79.36	79.49
Raglan Stream	MC2060	78.31	78.40	78.42
Ford	MC3002	79.57	79.38	79.51
Football Pitch	OC3005A	79.78	79.58	79.72

Table 1e Levels for low flow (0.4m^{3}s) event at key positions

Location	Cross-Section	Existing Level (m)AOD	Tender Plan Levels (m)AOD	Vision Plan Levels (m)AOD
Mill House (u/s)	RC3005B	78.67	78.71	78.69
Mill House (d/s)	RC3004B2	77.50	77.47	77.38
Little Lodge	MC3009	78.69	78.71	78.69
Waterloo Lodge	MC3010	78.69	78.71	78.69
Coleshill bridge	MC3001	76.46	77.46	77.19
Raglan Stream	MC2060	75.93	76.25	76.71
Ford	MC3002	76.55	77.47	77.19
Football Pitch	OC3005A	76.63	77.47	77.46

Table 2 Flow exceedence for the River Cole

Discharge (m^3/s)	No of days in a year when flow is exceeded
21.60	0.06
17.60	0.11
15.70	0.22
14.25	0.33
13.10	0.55
12.27	0.88
11.40	1.83
10.45	2.50
9.37	3.89
8.31	4.60
7.49	6.10
6.44	8.20
5.47	12.00
4.44	17.90
3.43	30.00
2.43	56.00
1.72	80.00
1.25	126.00
0.75	207.00
0.30	365.00

Table 3 Bankful flow and flooded frequency

Location	U/s of bifurcation	D/s of bifurcation on main channel	New channel just d/s of bifurcation	New channel	Football pitch	D/s of Coleshill Bridge	Fritillery field
Q_{BF} existing (m^3/s)	22	15			4	34	23
Duration of out of bank flow in 1 year	4 hours	8 hours			1 day	~1 hr	2 hrs
Q_{BF} tender (m^3/s)	22	5	4	1.5	2.7	15.6	12
Duration of out of bank flow in 1 year	4 hours	6 days	1 day	17 days	5 days	5 hours	1 day
Q_{BF} vision (m^3/s)	22	5	4	1.5	2.7	15.6	12
Duration of out of bank flow in 1 year	4 hours	6 days	1 day	17 days	5 days	5 hours	1 day

Figures

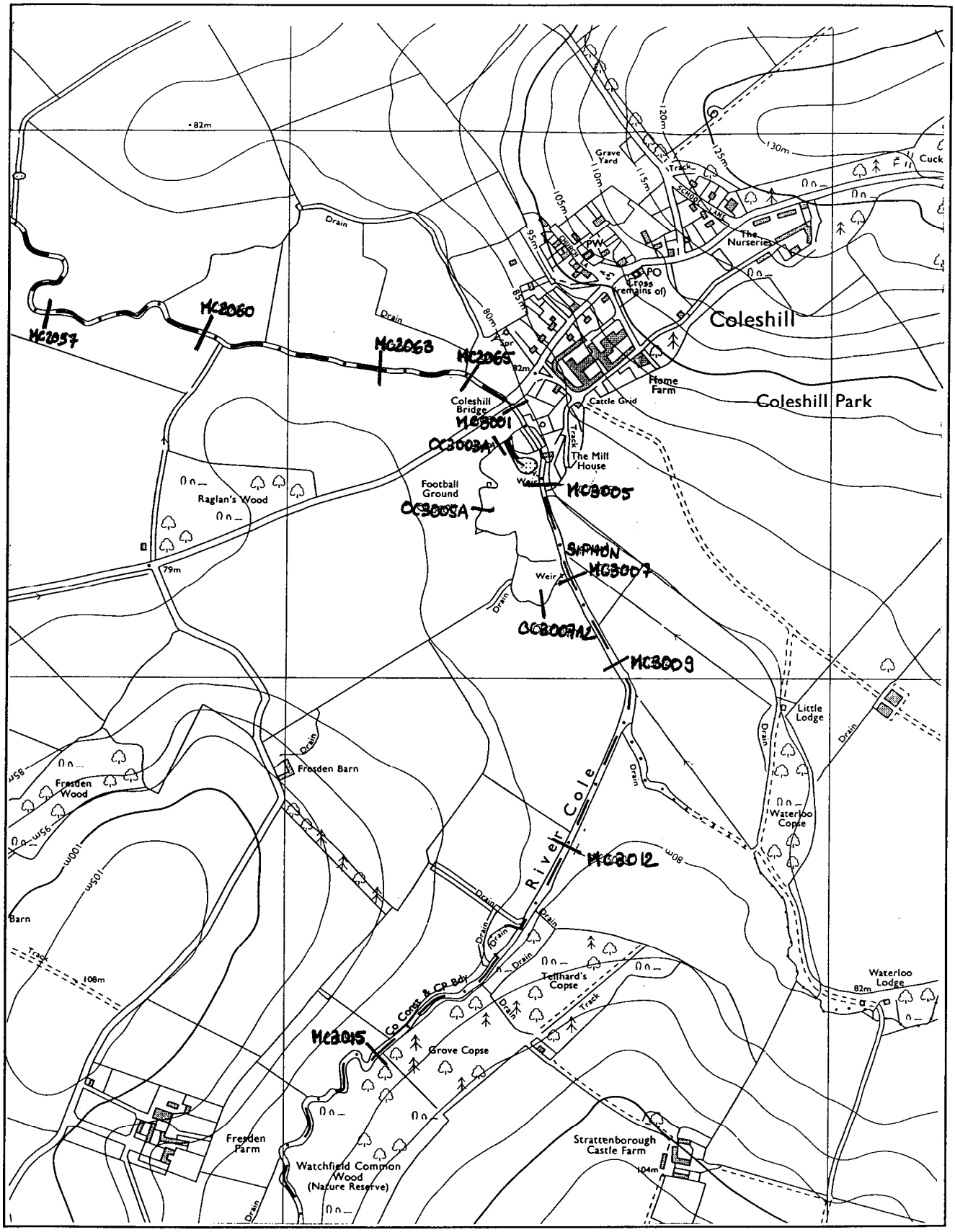
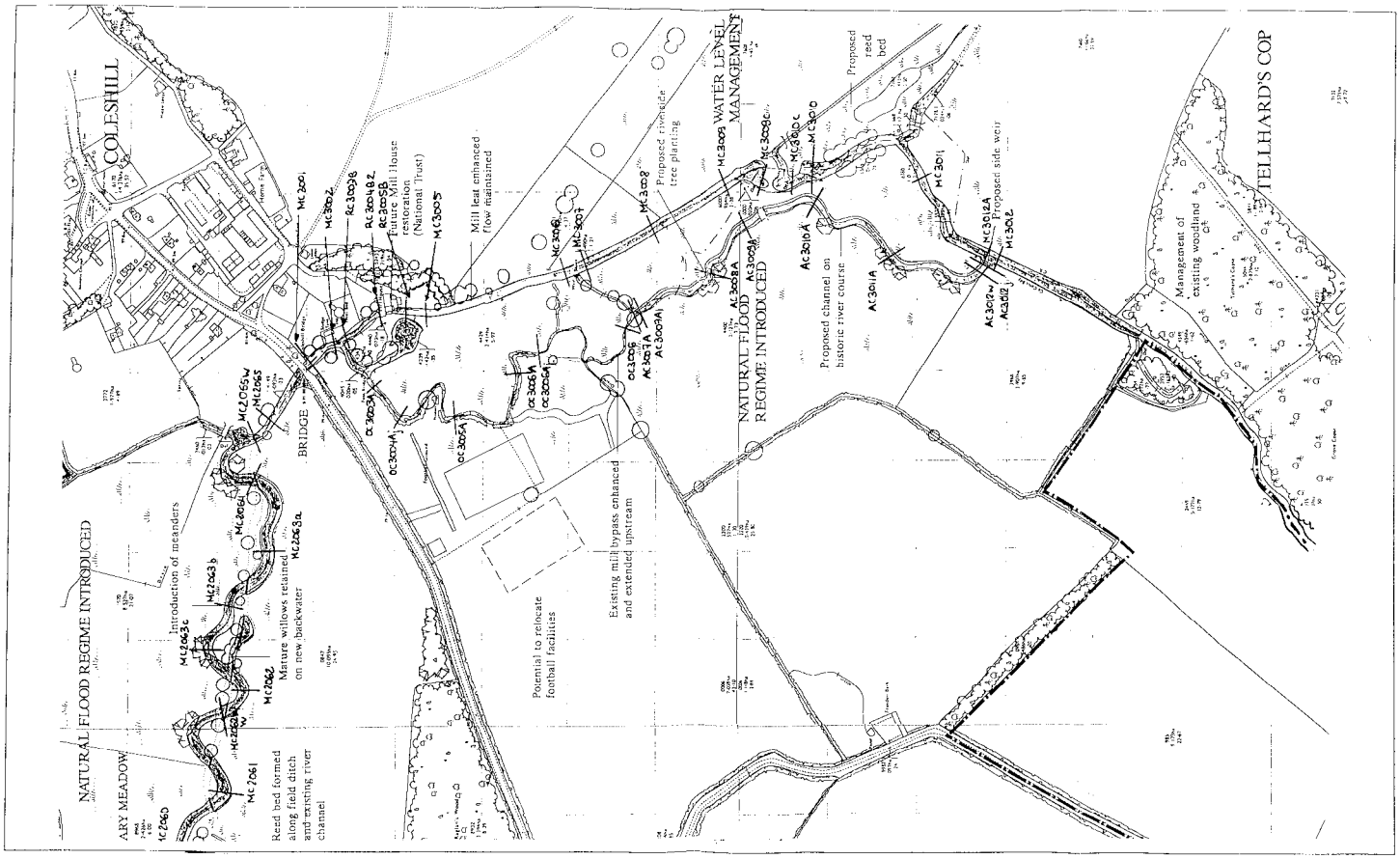


Figure 1 General layout of existing site



General layout showing vision plan

Figure 3.

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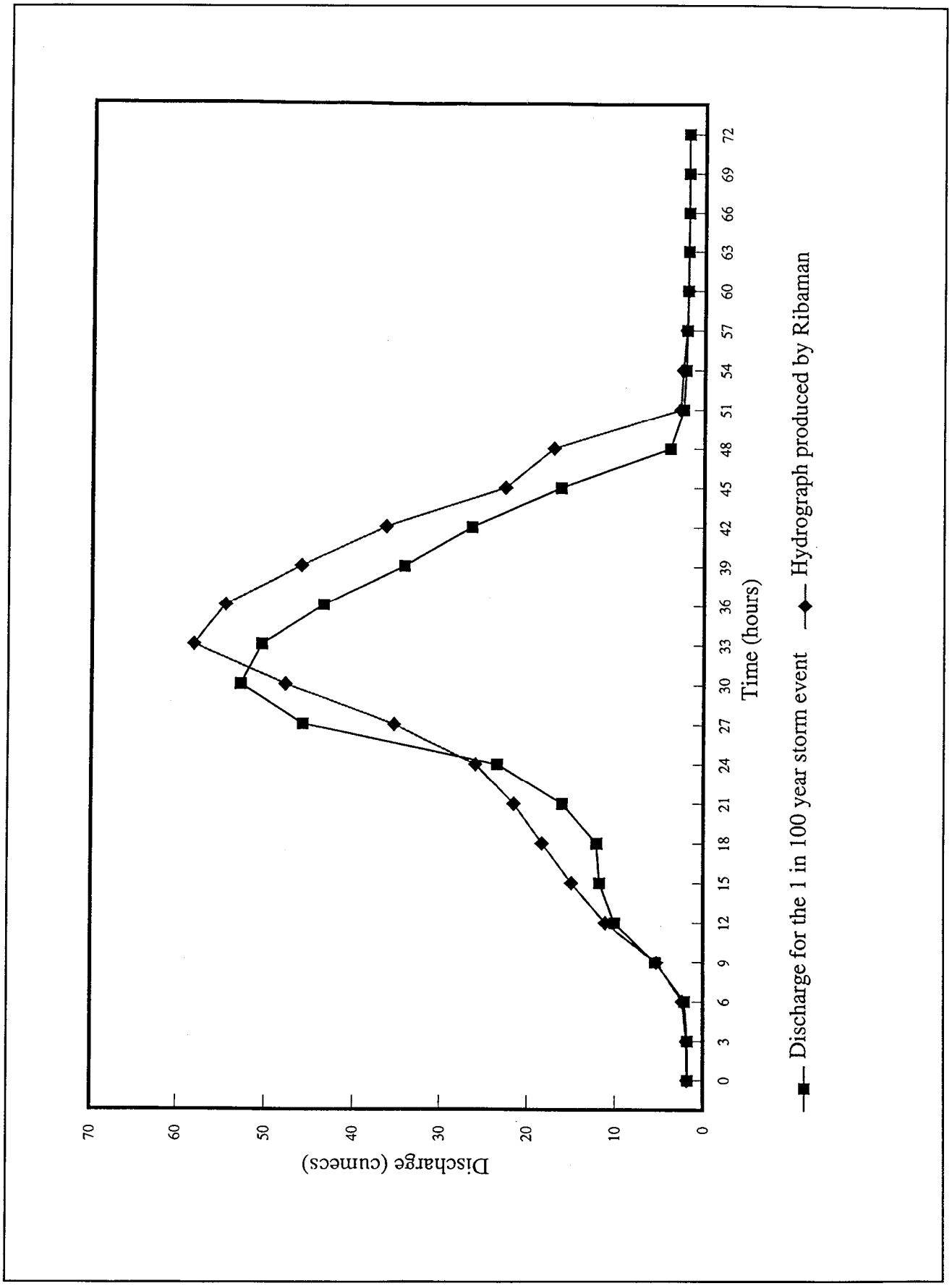

Figure 4. Calibration - discharge hydrograph

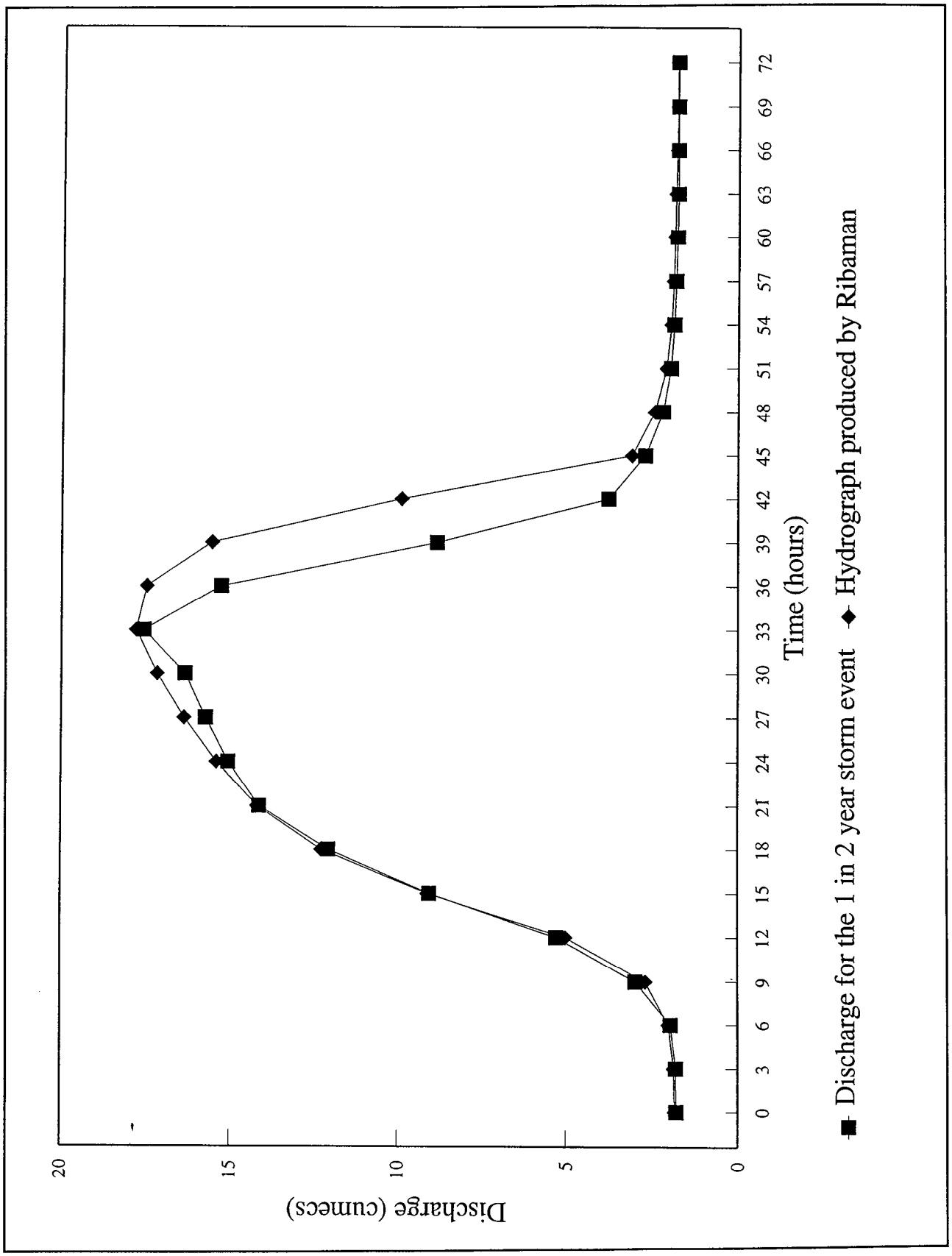

Figure 4a. Calibration - discharge hydrograph for 1 in 2 year flood

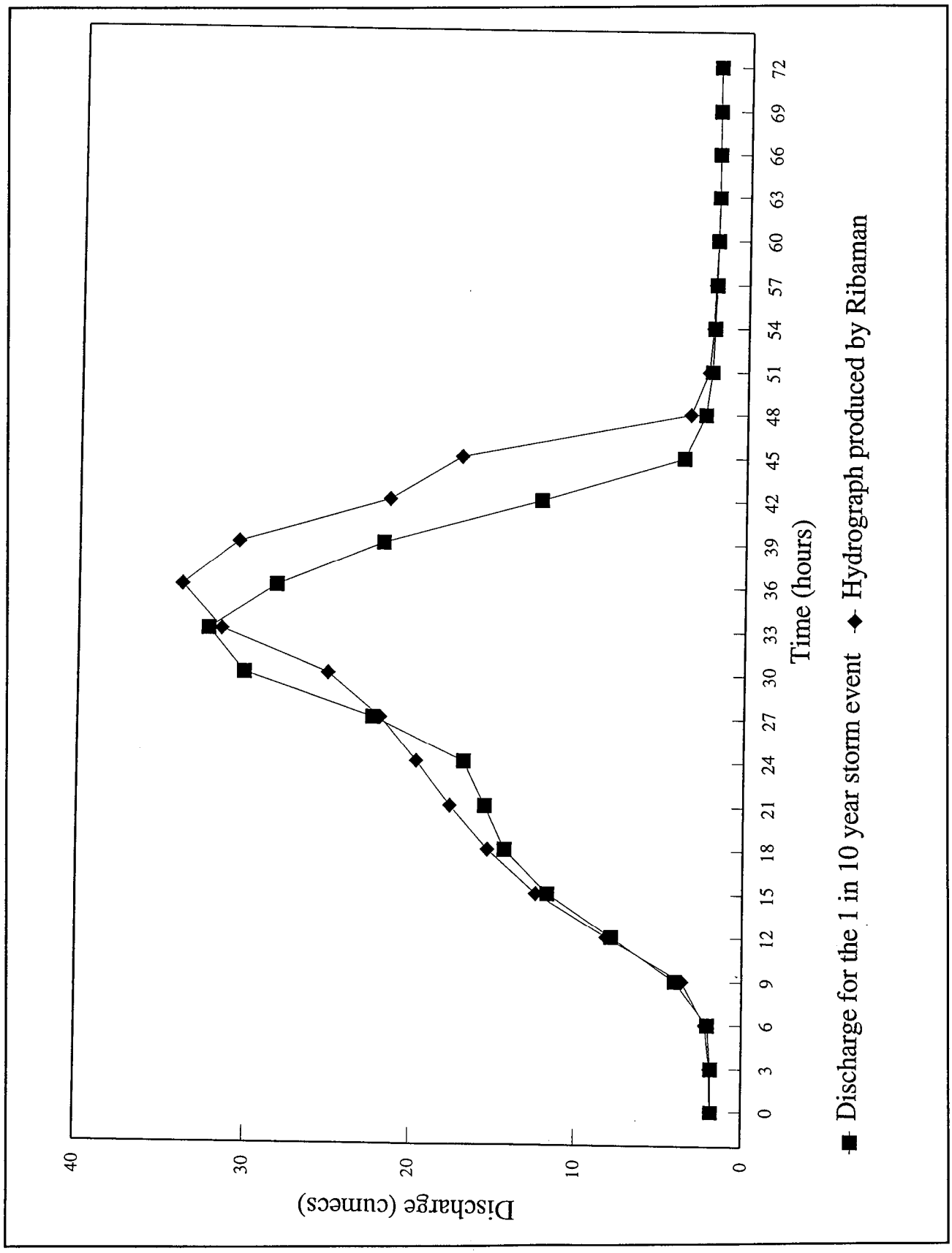

Figure 4b. Calibration - discharge hydrograph for 1 in 10 year flood

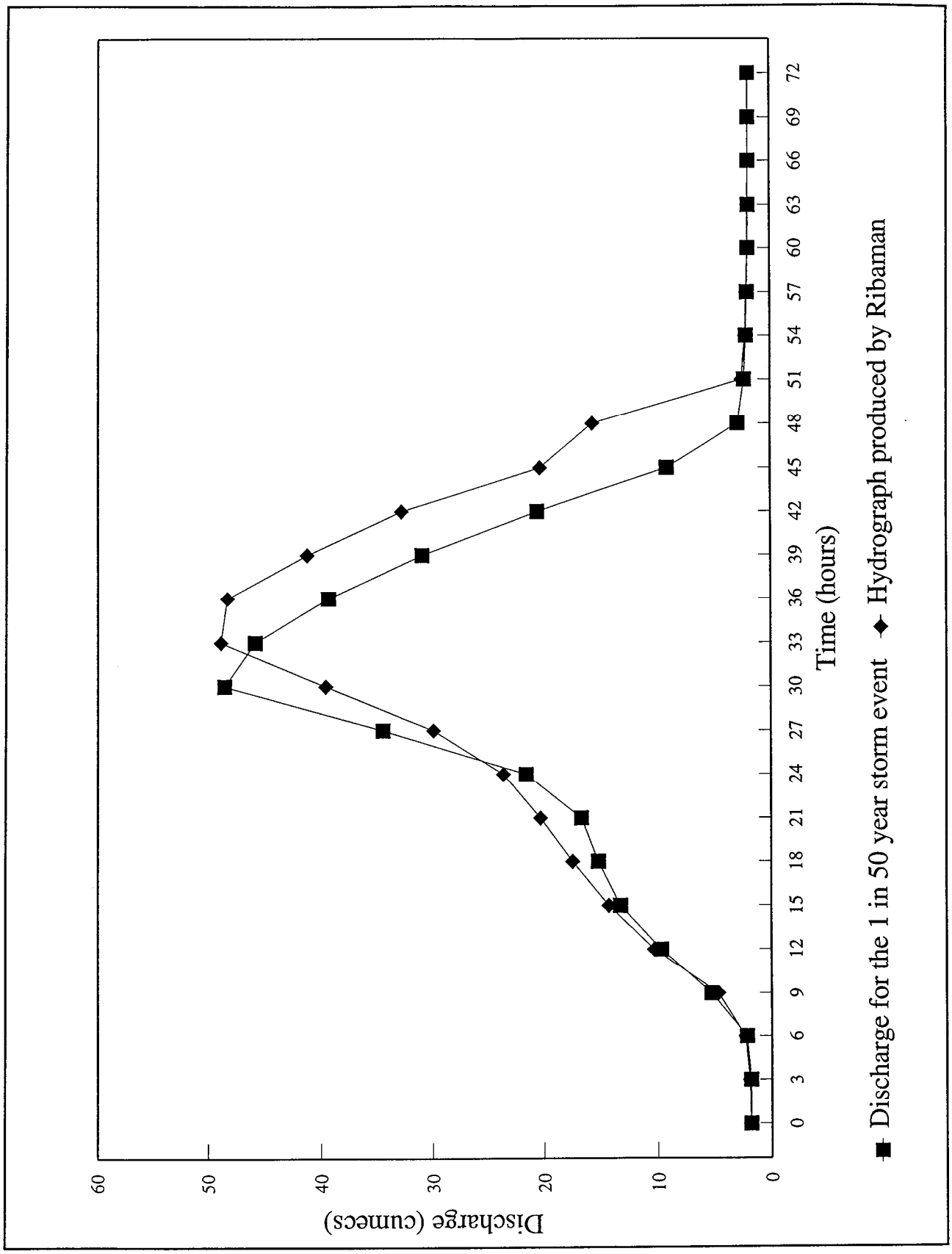

Figure 4c. Calibration - discharge hydrograph foe 1 in 50 year flood

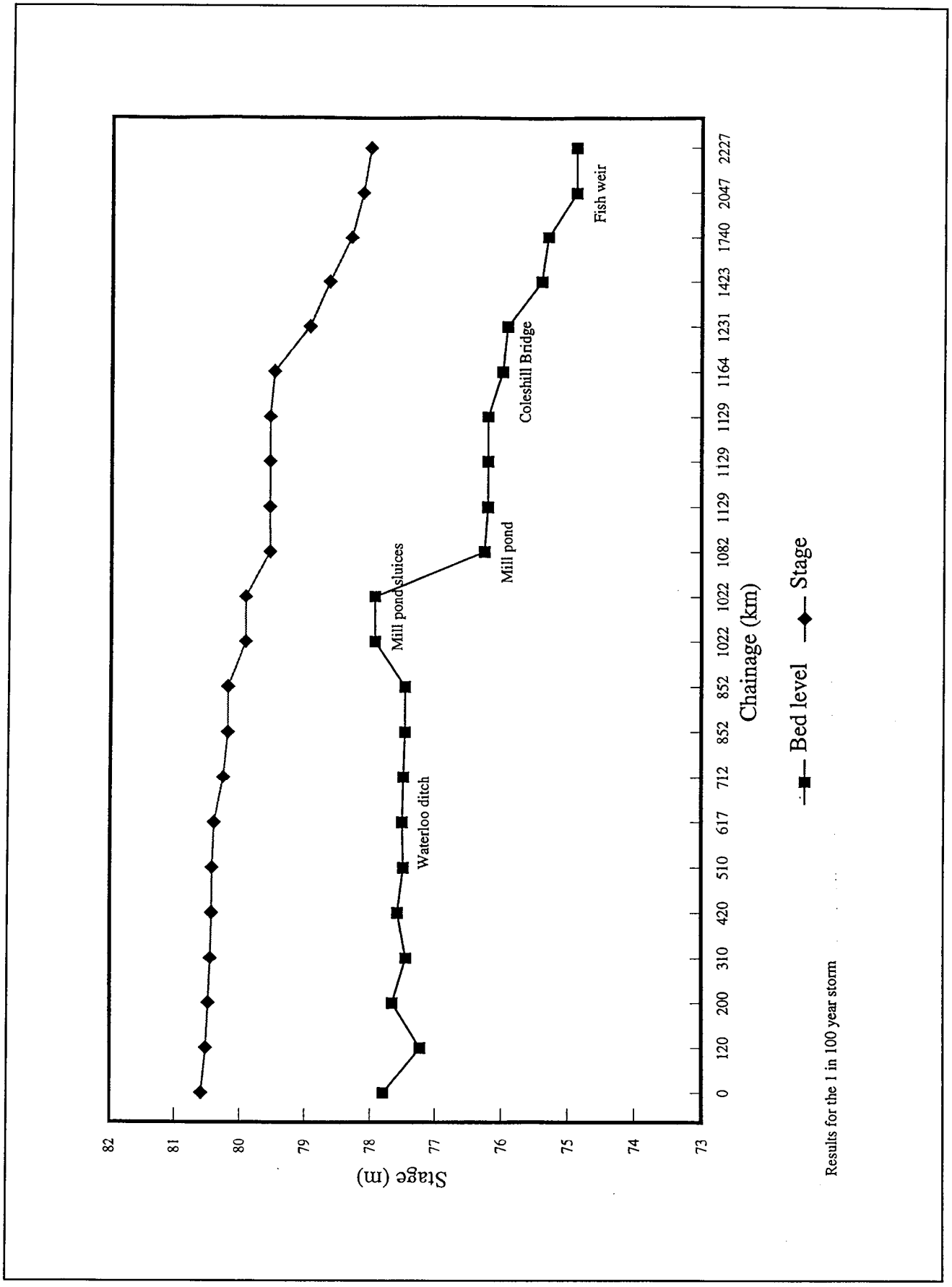

Figure 5. Calibration - longitudinal profile

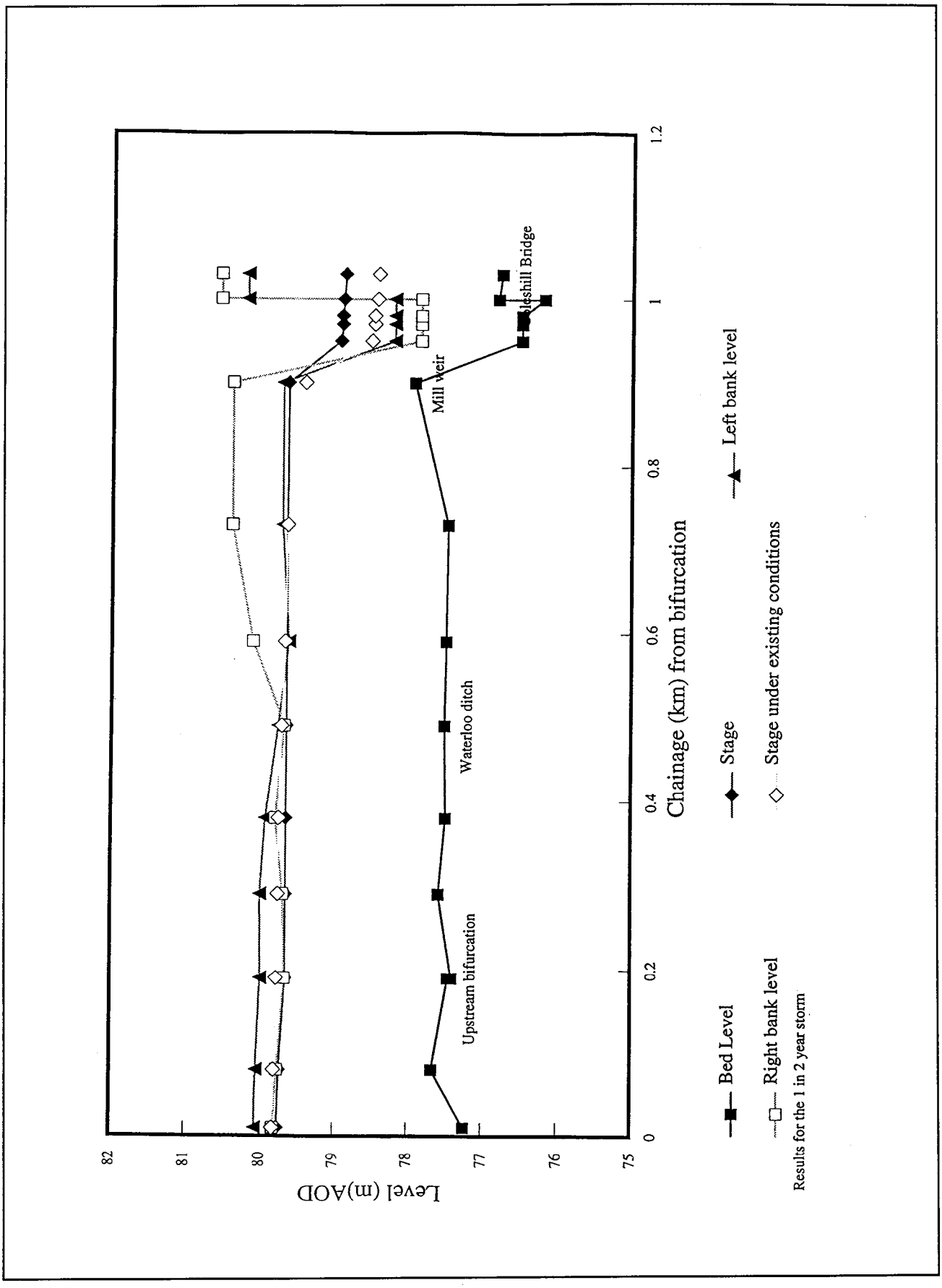

Figure 6. Longitudinal profile - option 1, mill channel reach, 1 in 2 year event

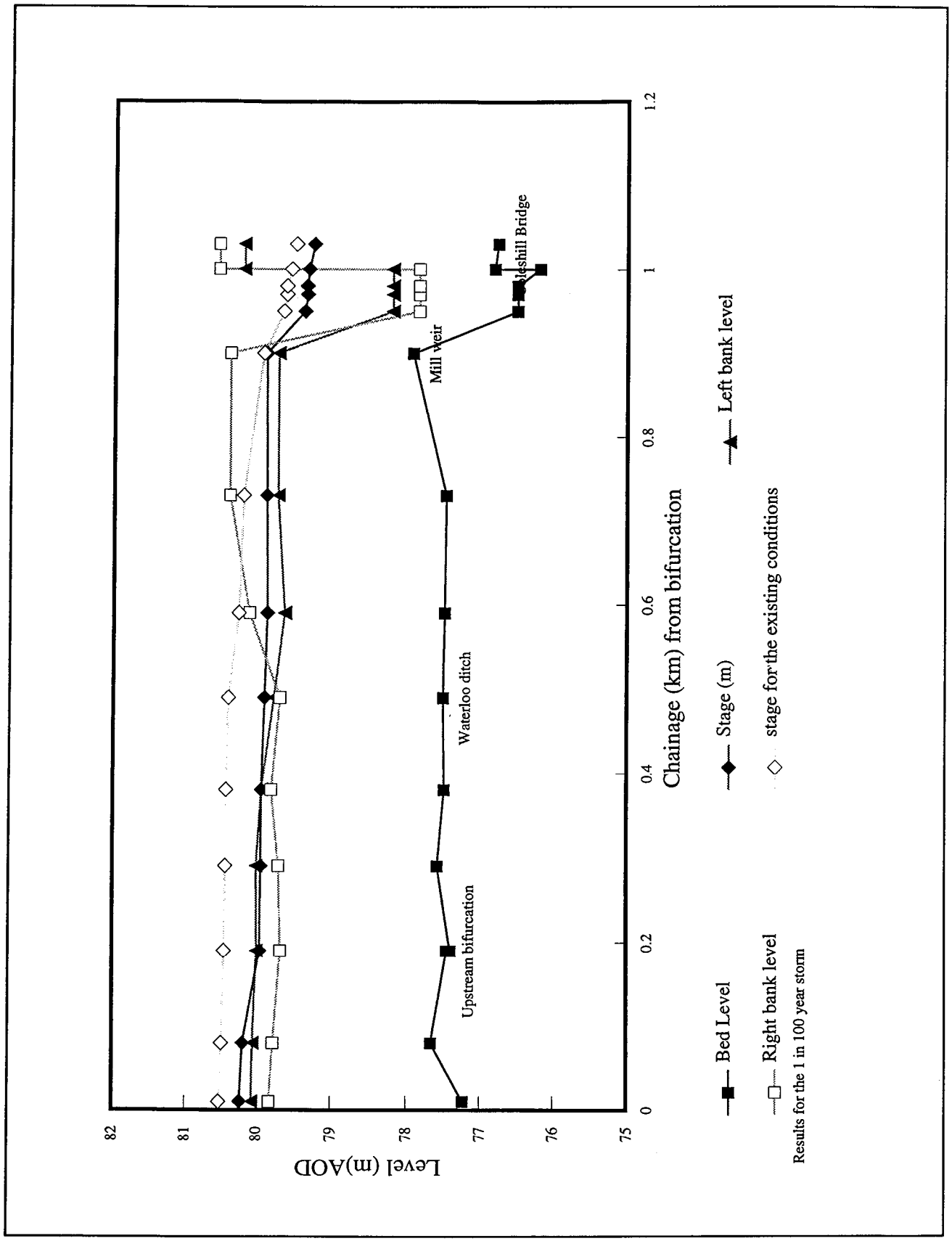

Figure 7. Longitudinal profile - option 1, mill channel reach, 1 in 100 year event

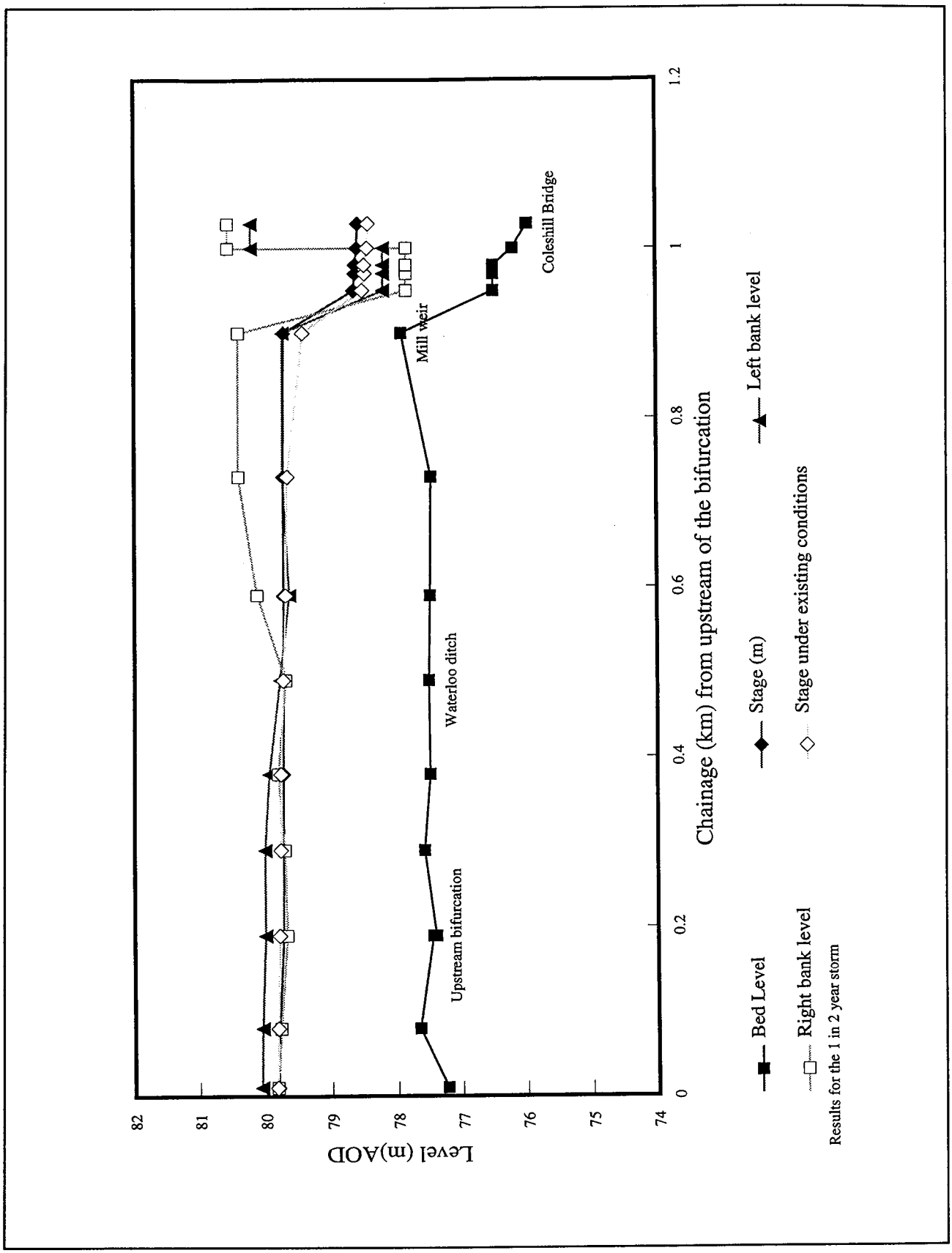

Figure 8. Longitudinal profile - option 2, mill channel reach, 1 in 2 year event

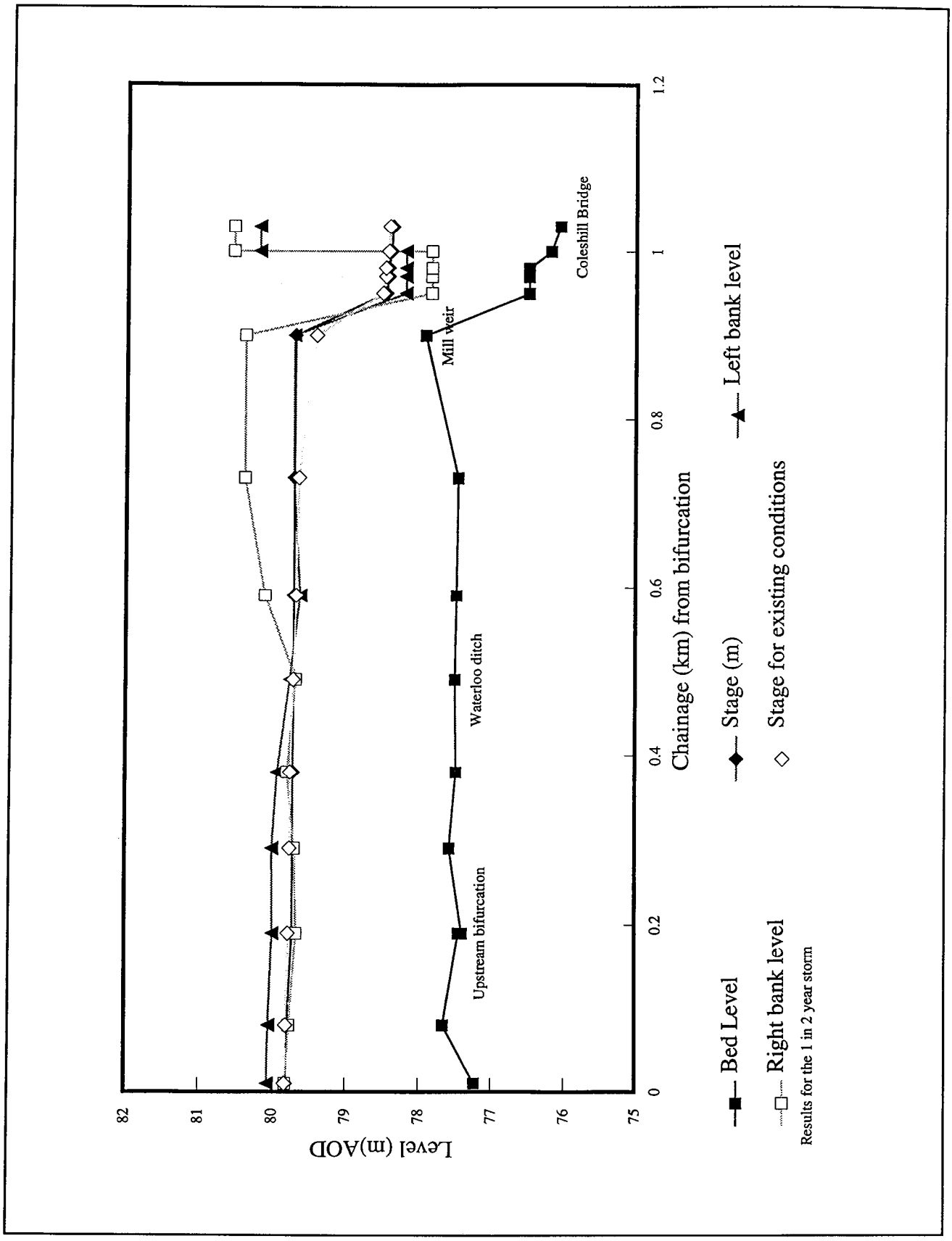

Figure 9. **Longitudinal profile - option 3, mill channel reach, 1 in 2 year event**

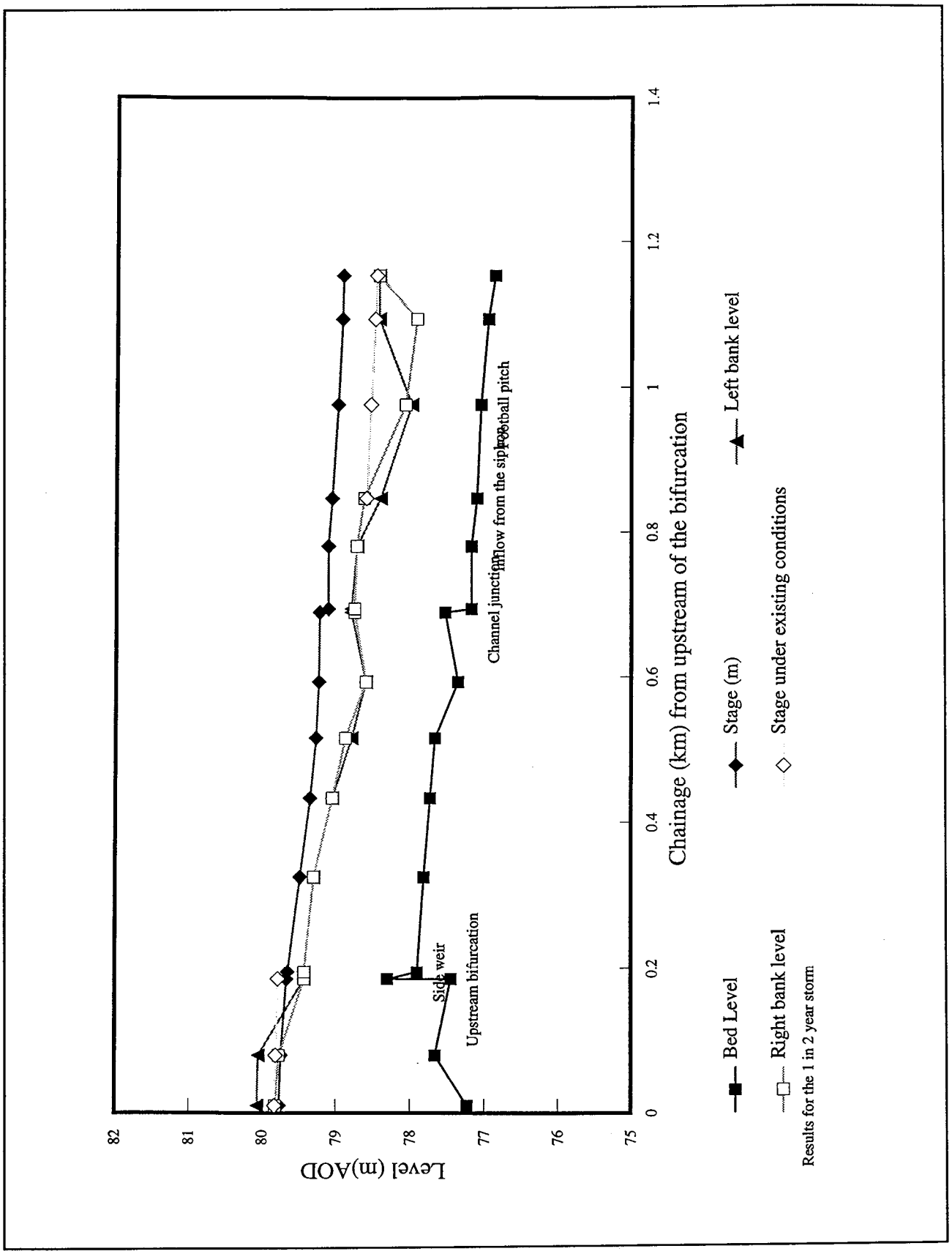

Figure 10. Longitudinal profile - option 1, added and old channel reach, 1 in 2 year event

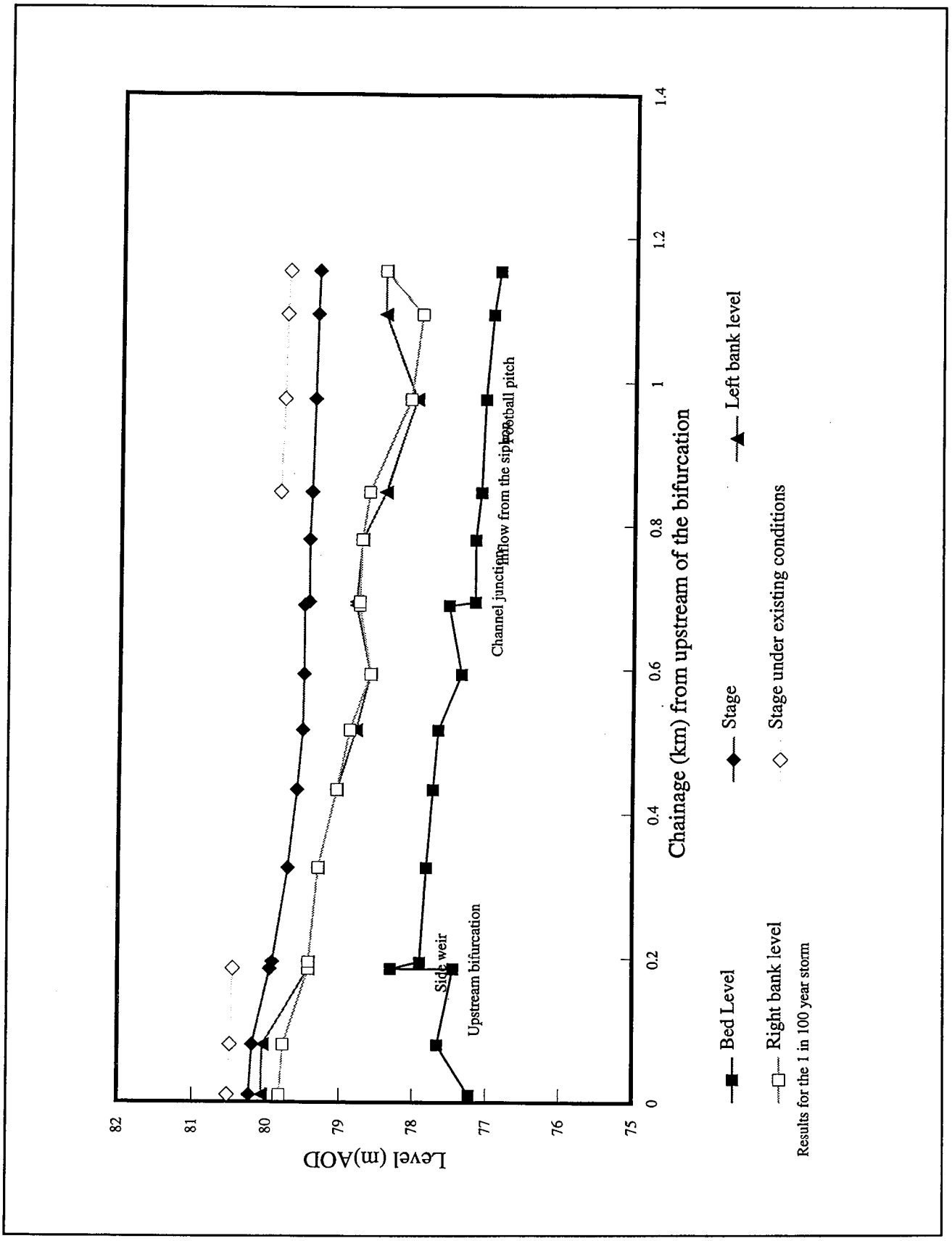

Figure 11. Longitudinal profile - option 1, added and old channel reach, 1 in 100 year event

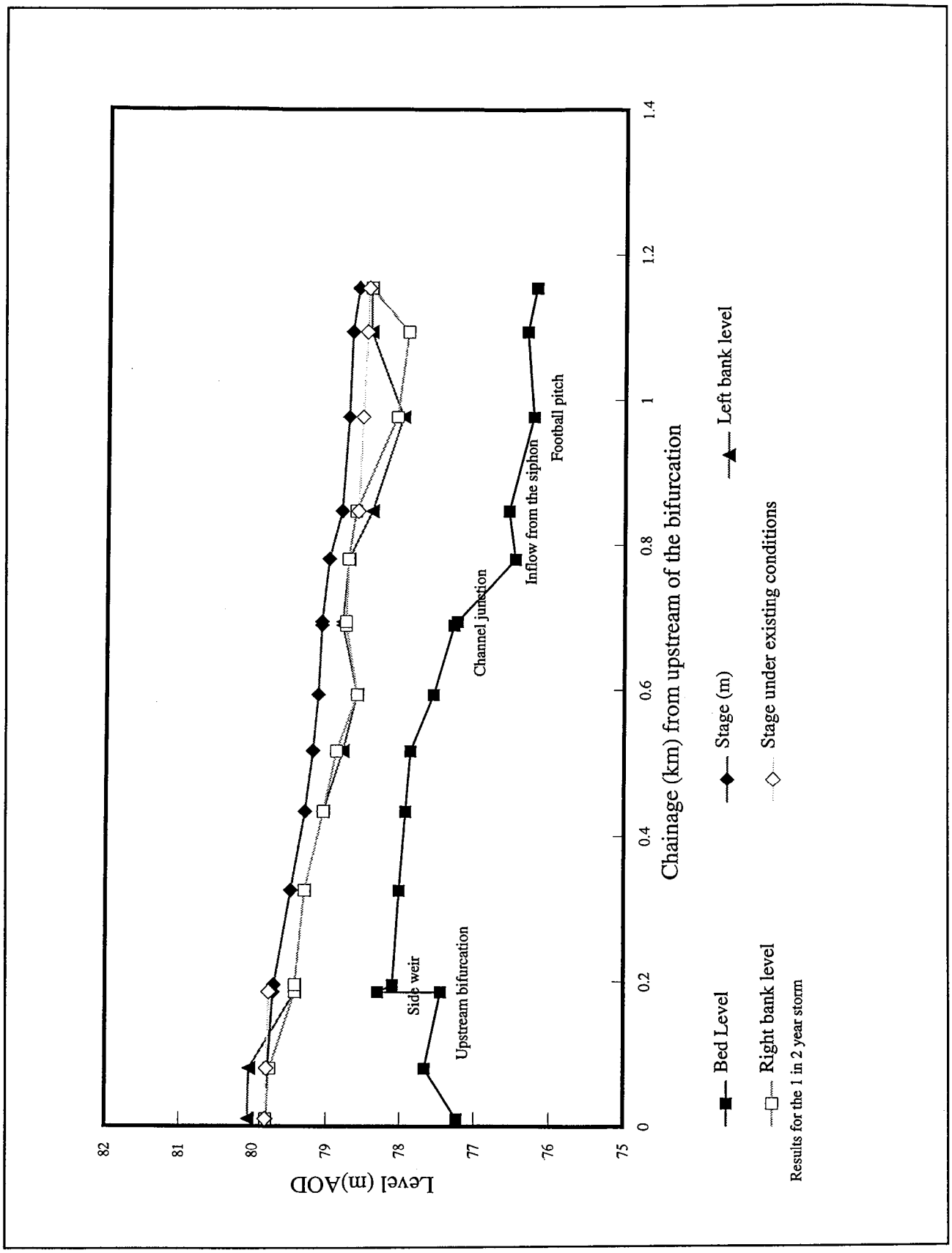

Figure 12. Longitudinal profile - option 2, added and old channel reach, 1 in 2 year event

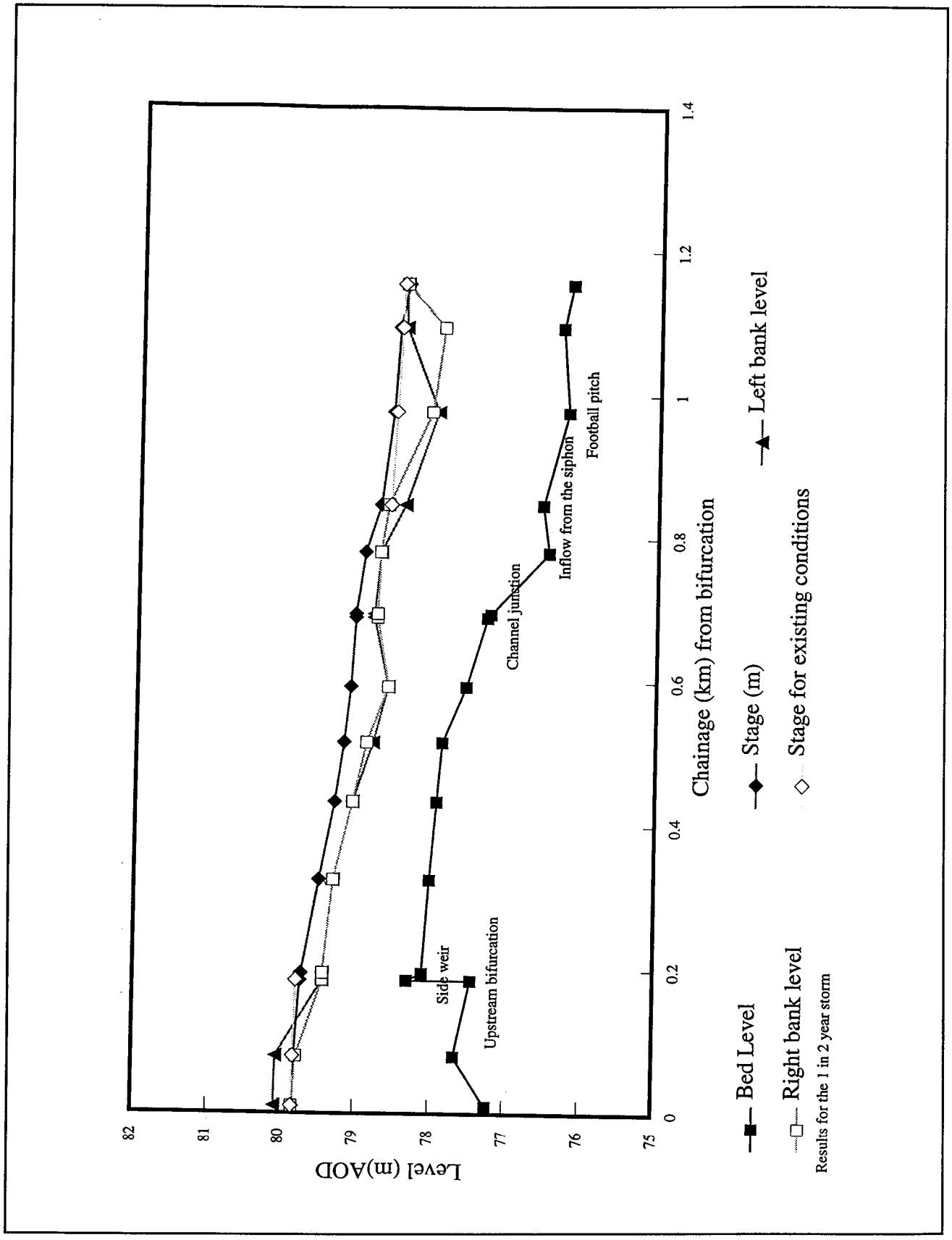

Figure 13. Longitudinal profile - option 3, added and old channel reach, 1 in 2

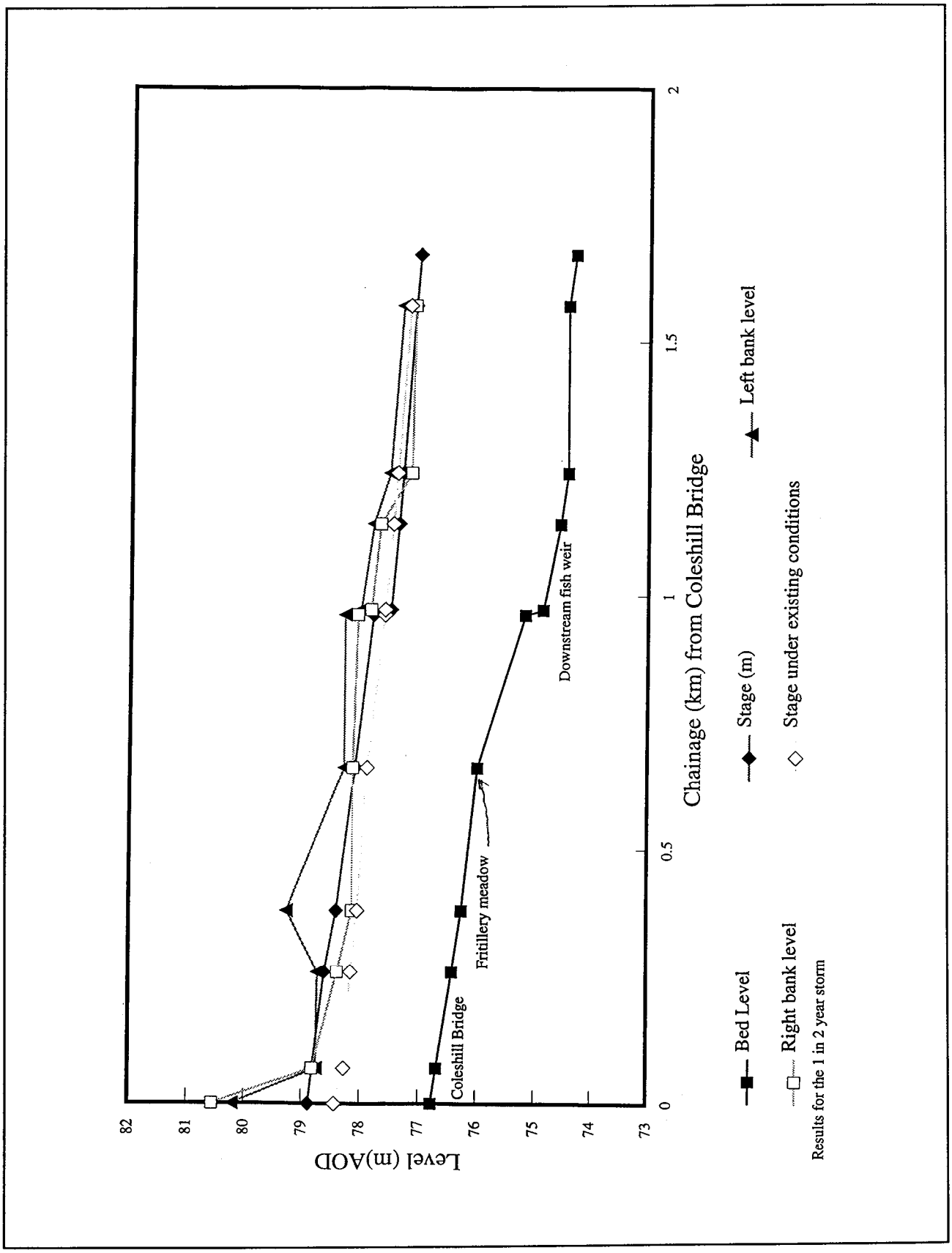

Figure 14. Longitudinal profile - option 1, downstream reach, 1 in 2 year event

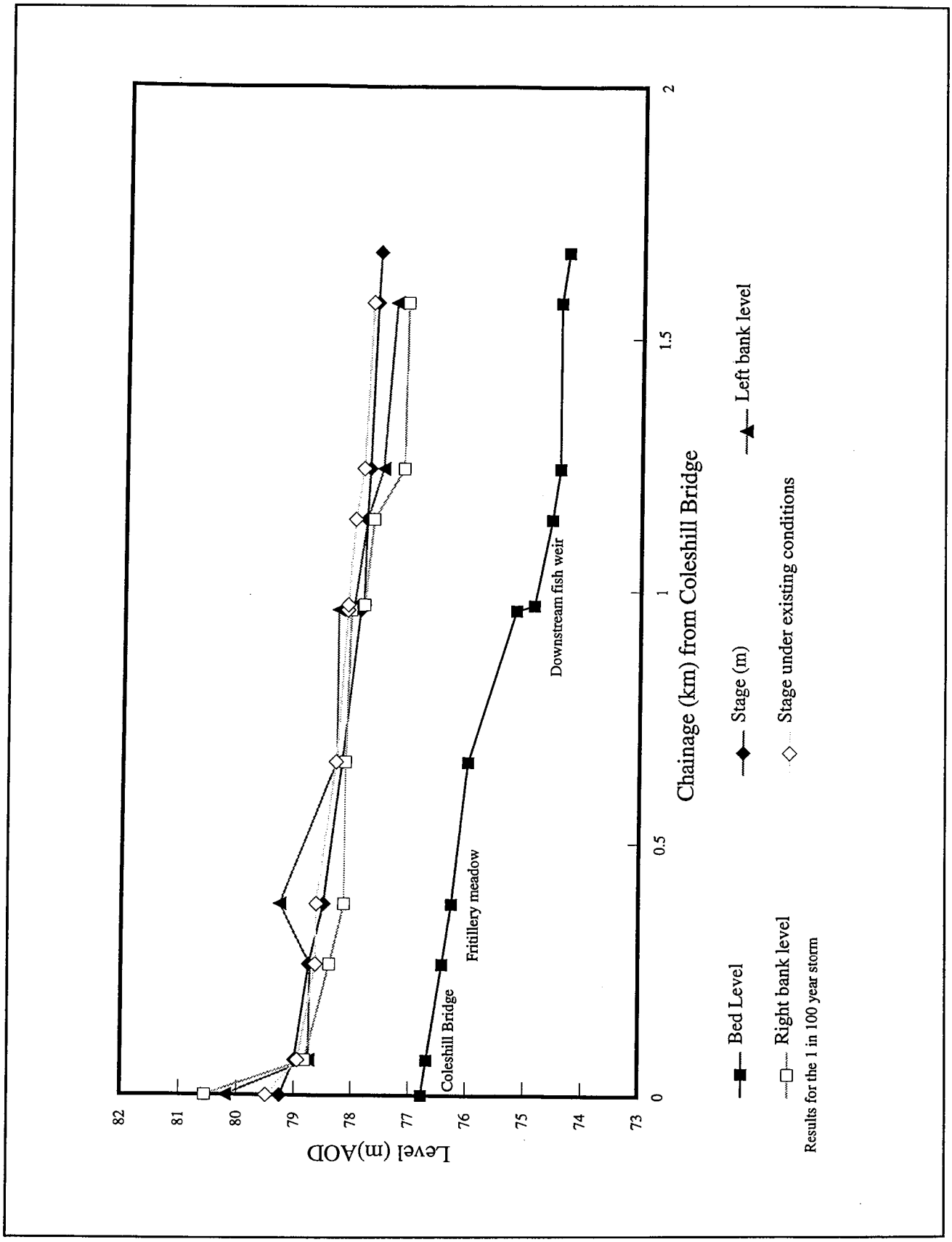

Figure 15. Longitudinal profile - option 1, downstream reach, 1 in 100 year event

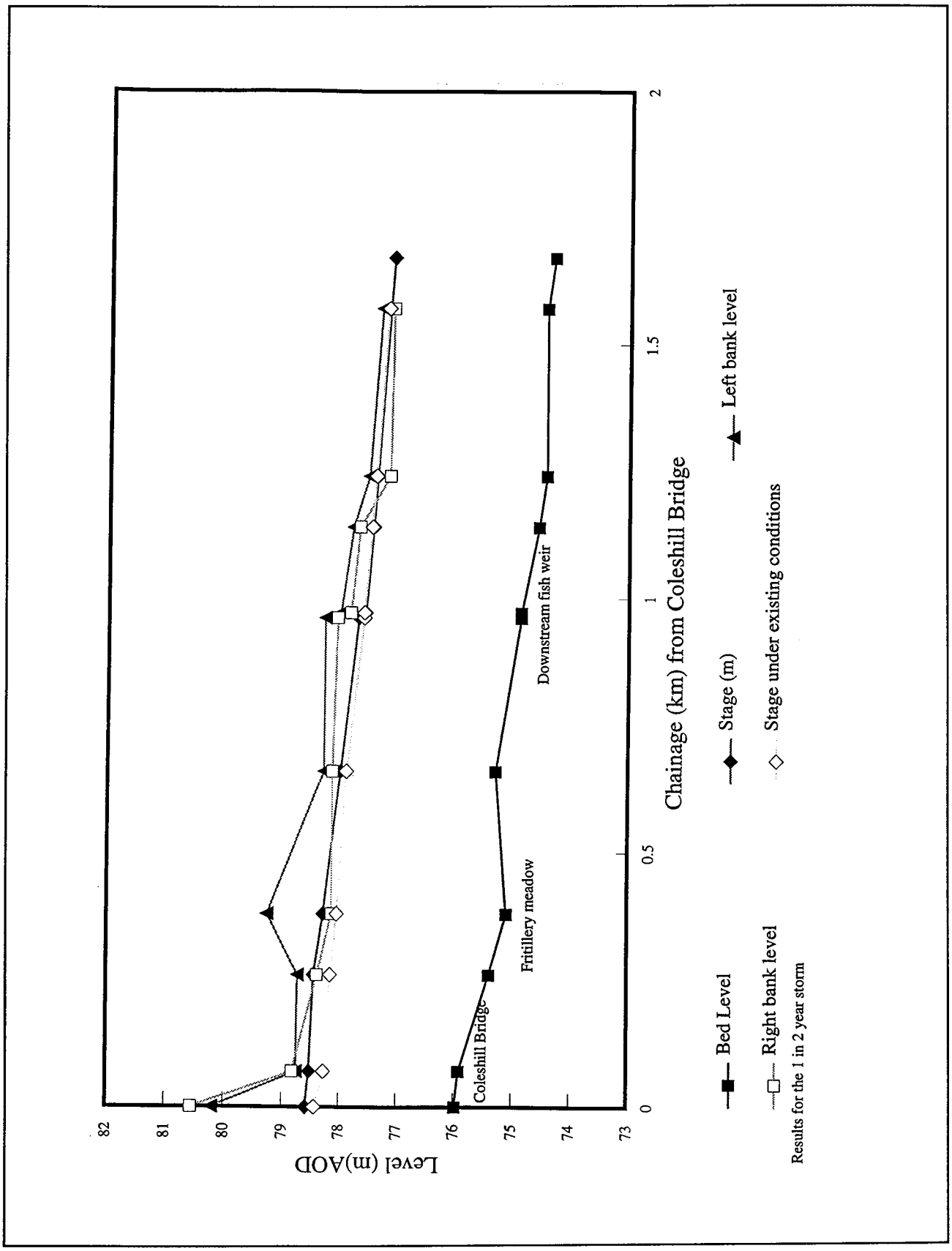

Figure 16. Longitudinal profile - option 2, downstream reach, 1 in 2 year event

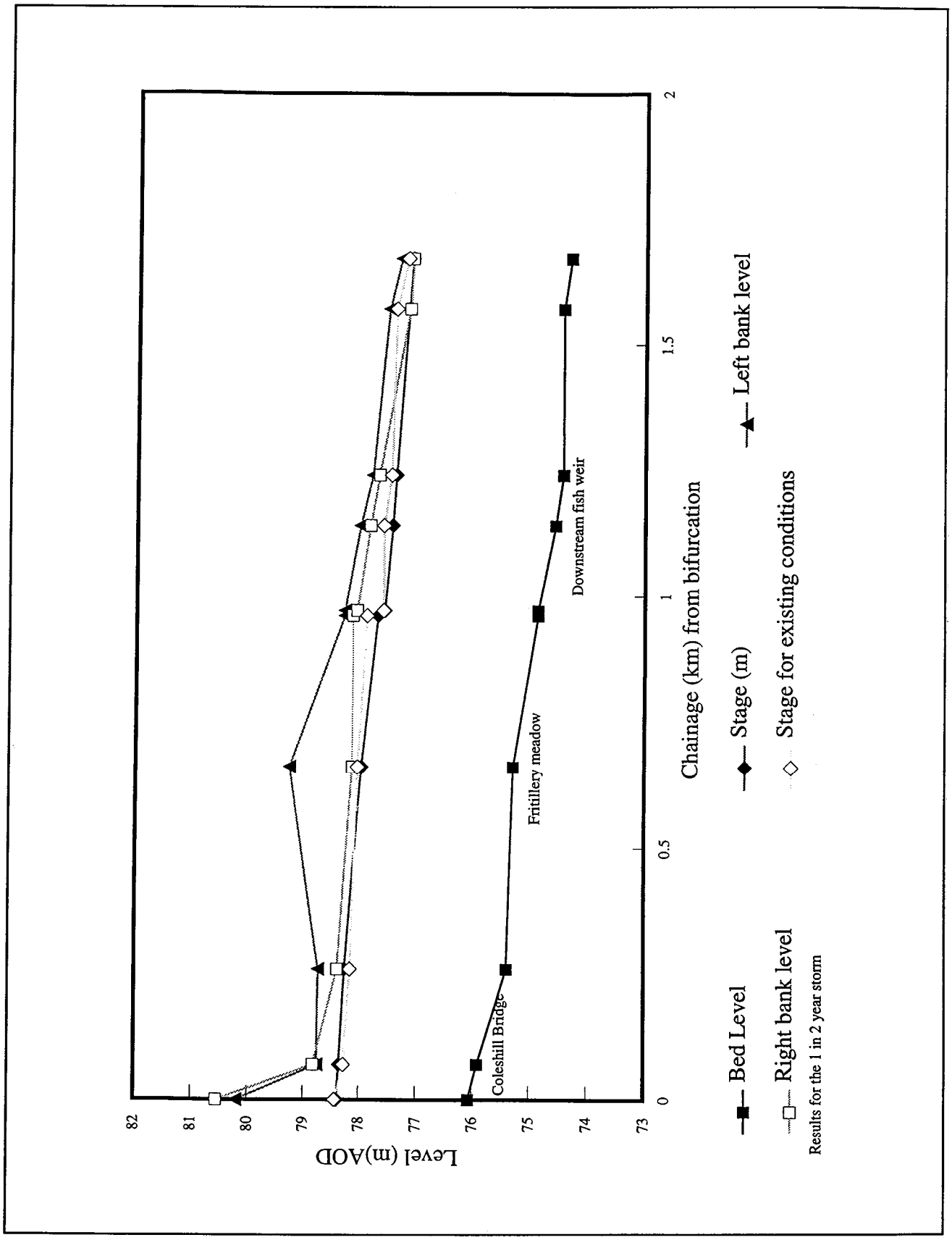

Figure 17. Longitudinal profile - option 3, downstream reach, 1 in 2 year event

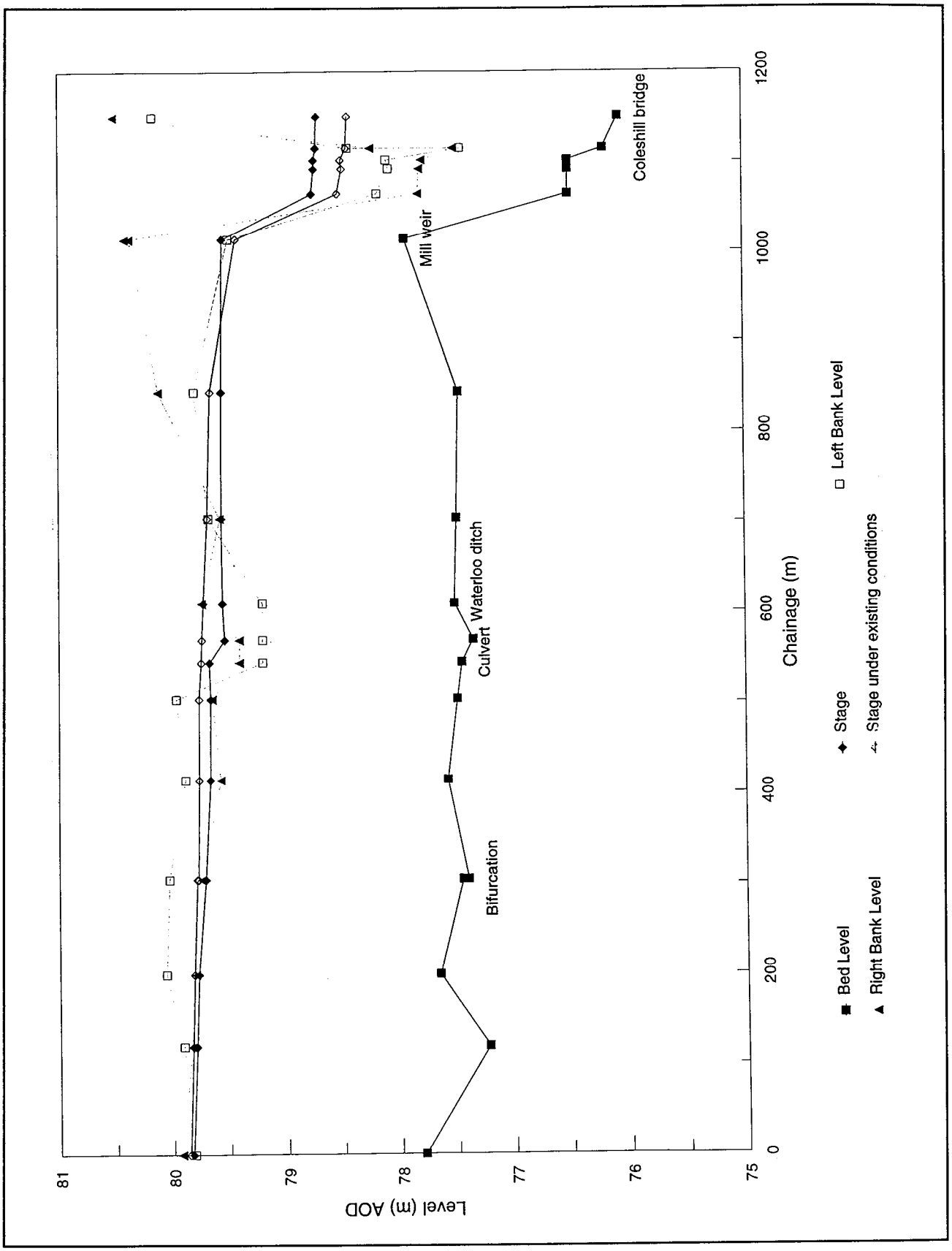

Figure 18. Longitudinal profile - tender plan, mill channel reach, 1 in 2 year event

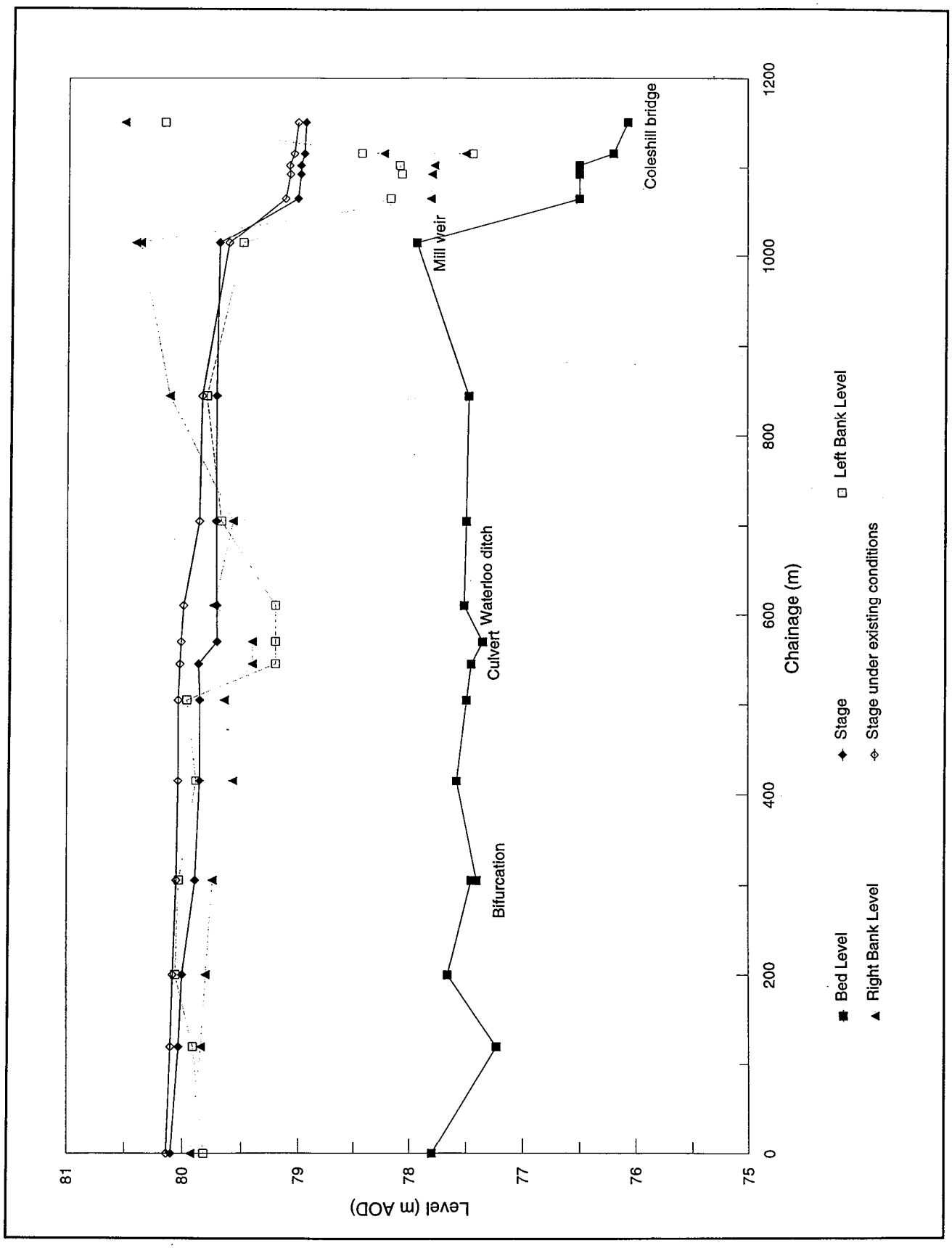

Figure 19. Longitudinal profile - tender plan, mill channel reach, 1 in 10 year event

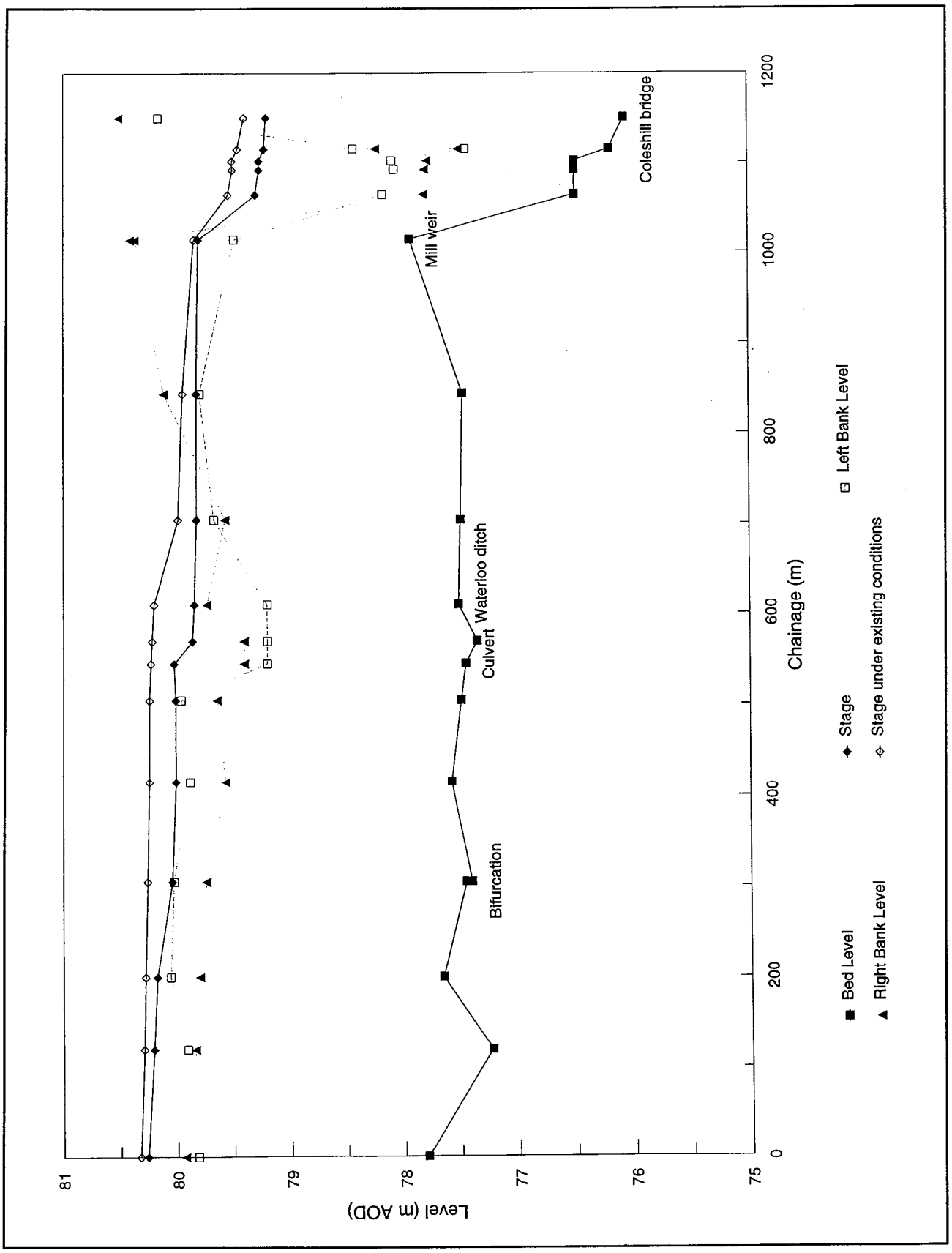

Figure 20. Longitudinal profile - tender plan, mill channel reach, 1 in 50 year event

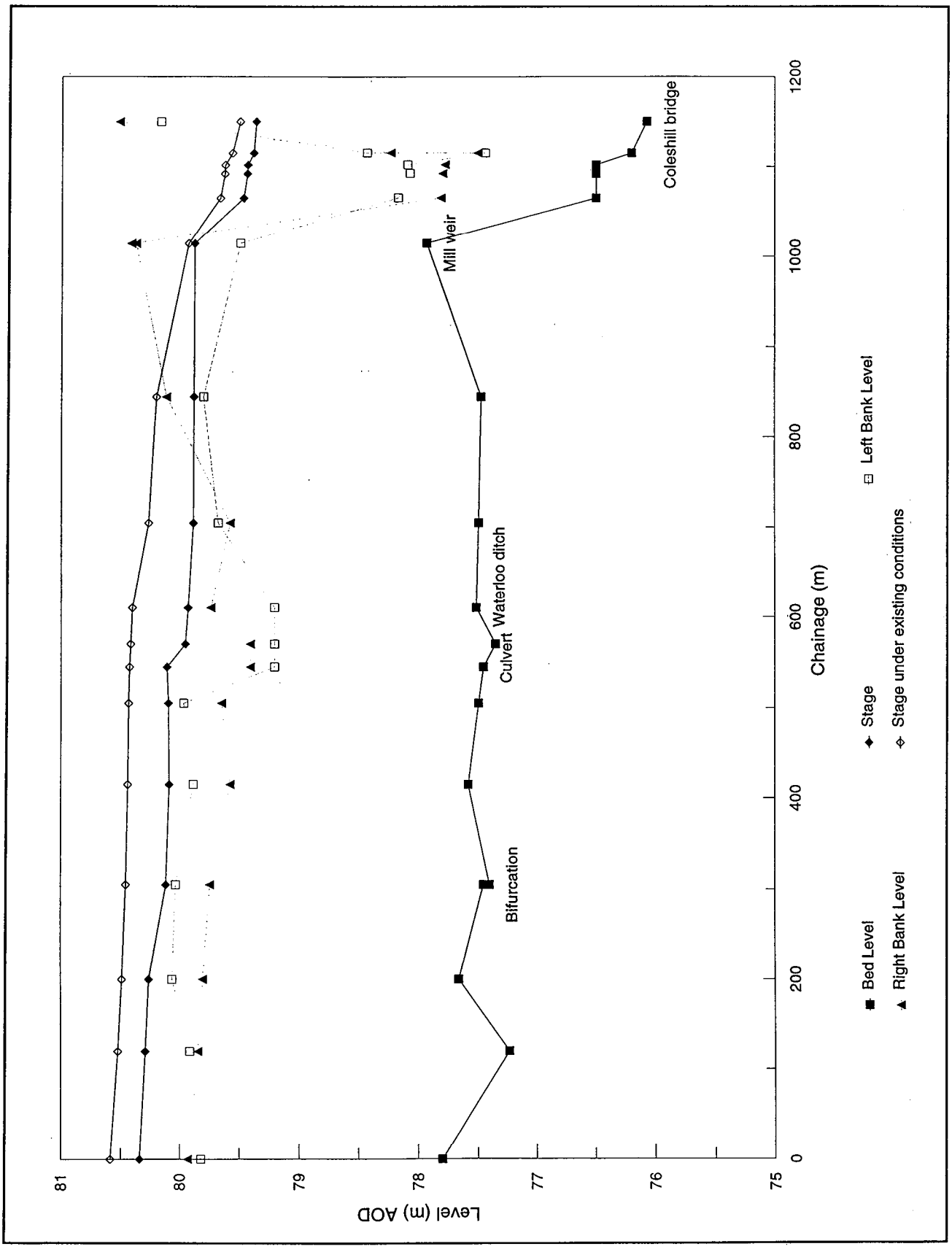

Figure 21. Longitudinal profile - tender plan, mill channel reach, 1 in 100 year event

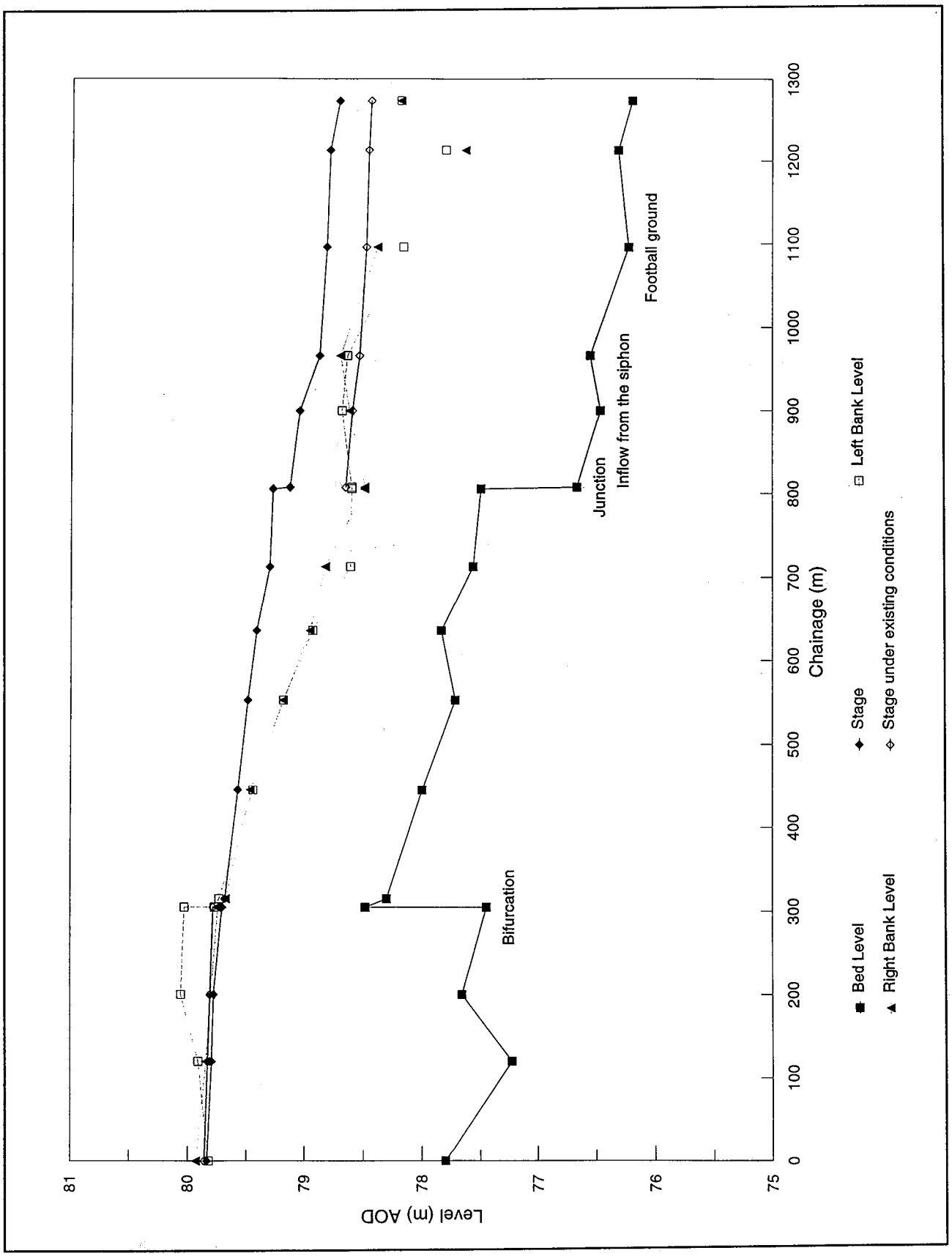

Figure 22. Longitudinal profile - tender plan, new and old channel reach, 1 in 2 year event

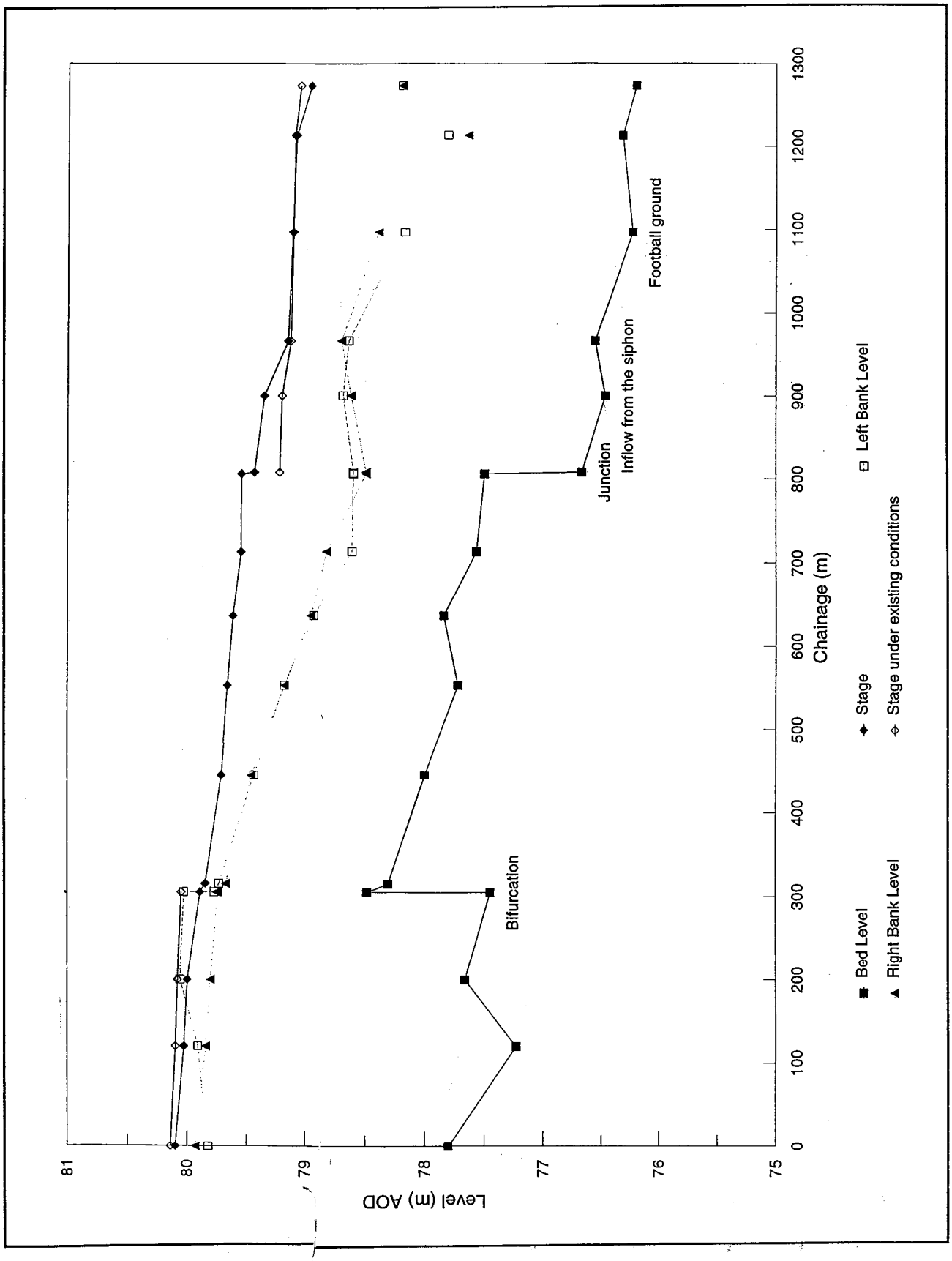

Figure 23. Longitudinal profile - tender plan, new and old channel reach, 1 in 10 year event

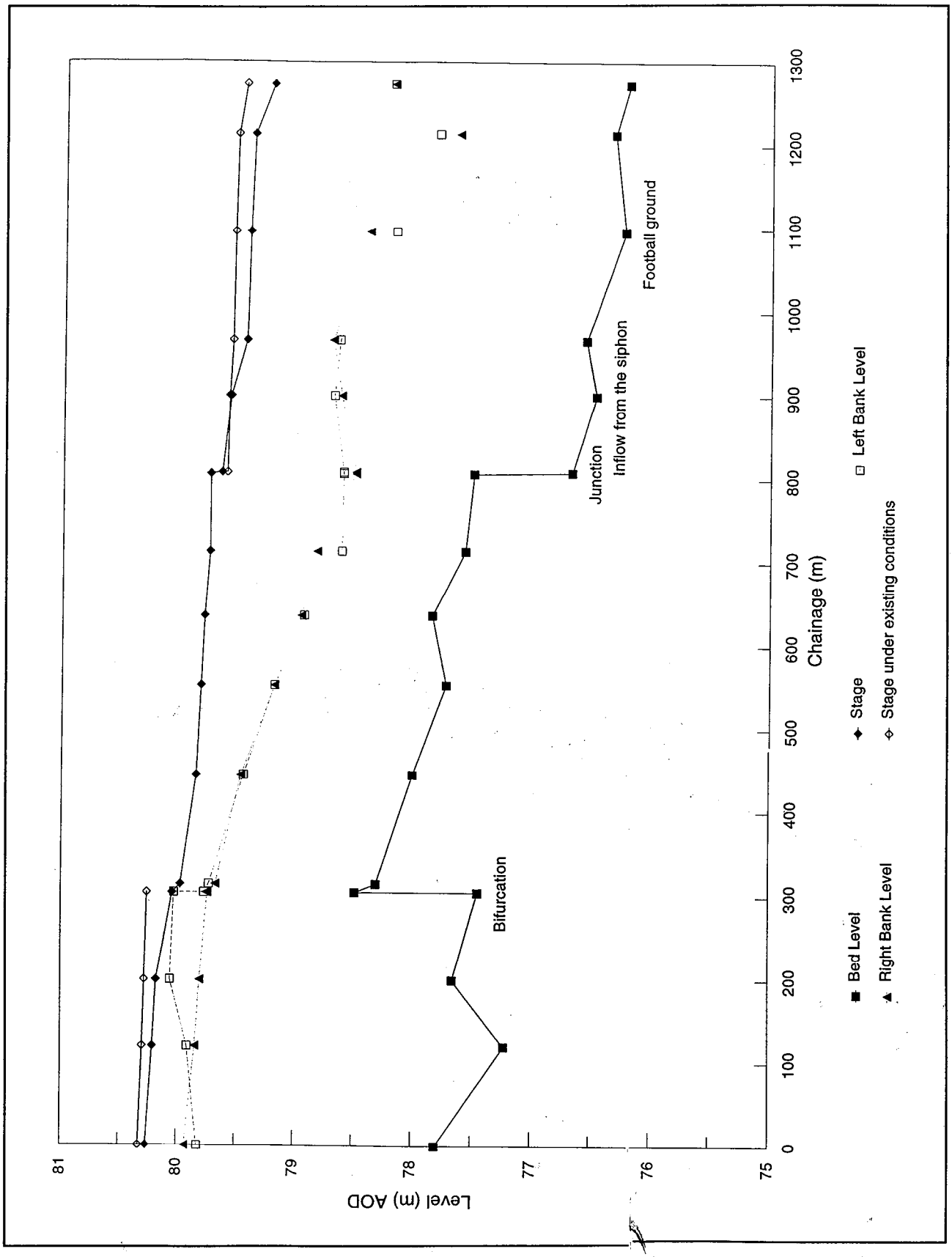

Figure 24. Longitudinal profile - tender plan, new and old channel reach, 1 in 50 year event

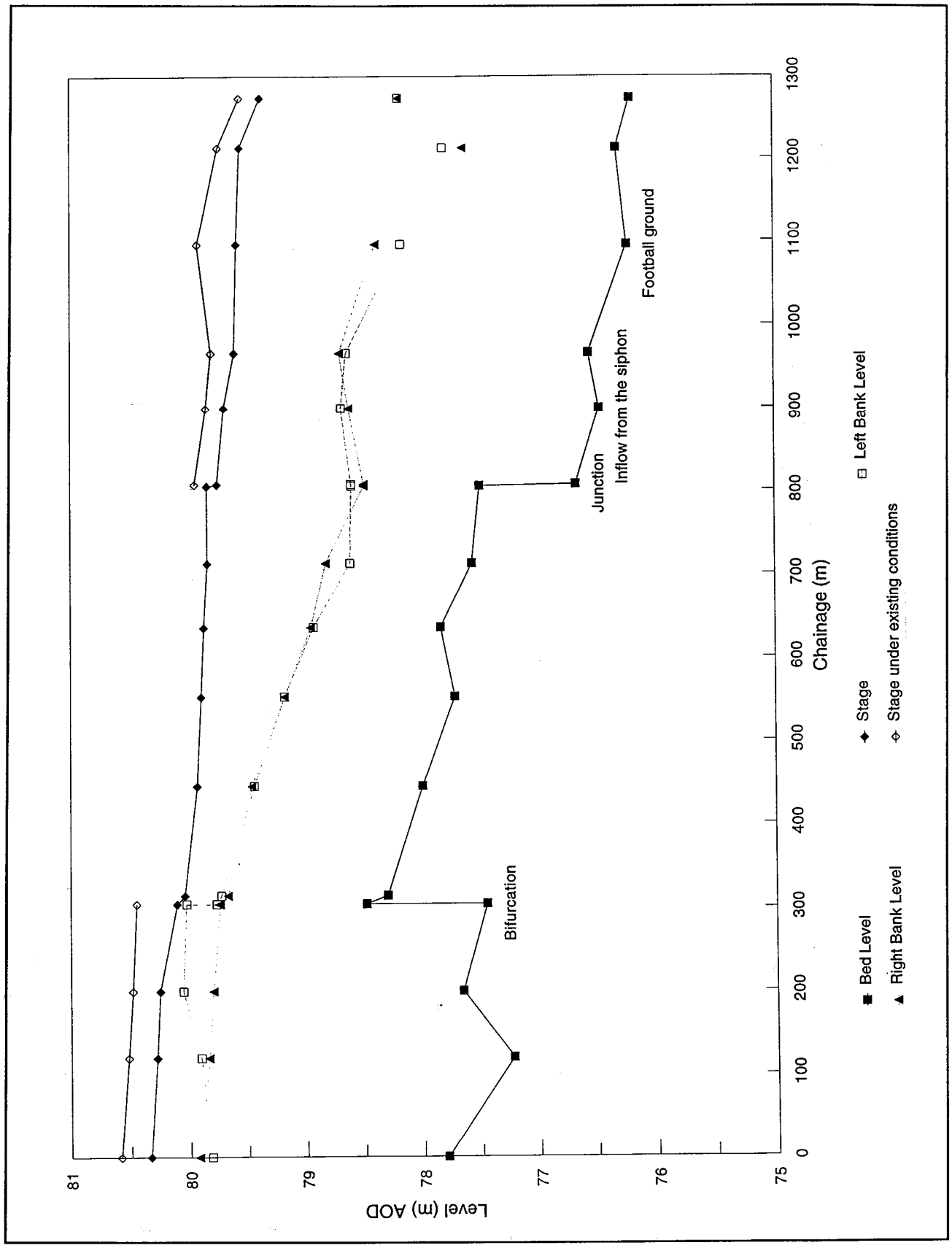

Figure 25. Longitudinal profile - tender plan, new and old channel reach, 1 in 100 year event

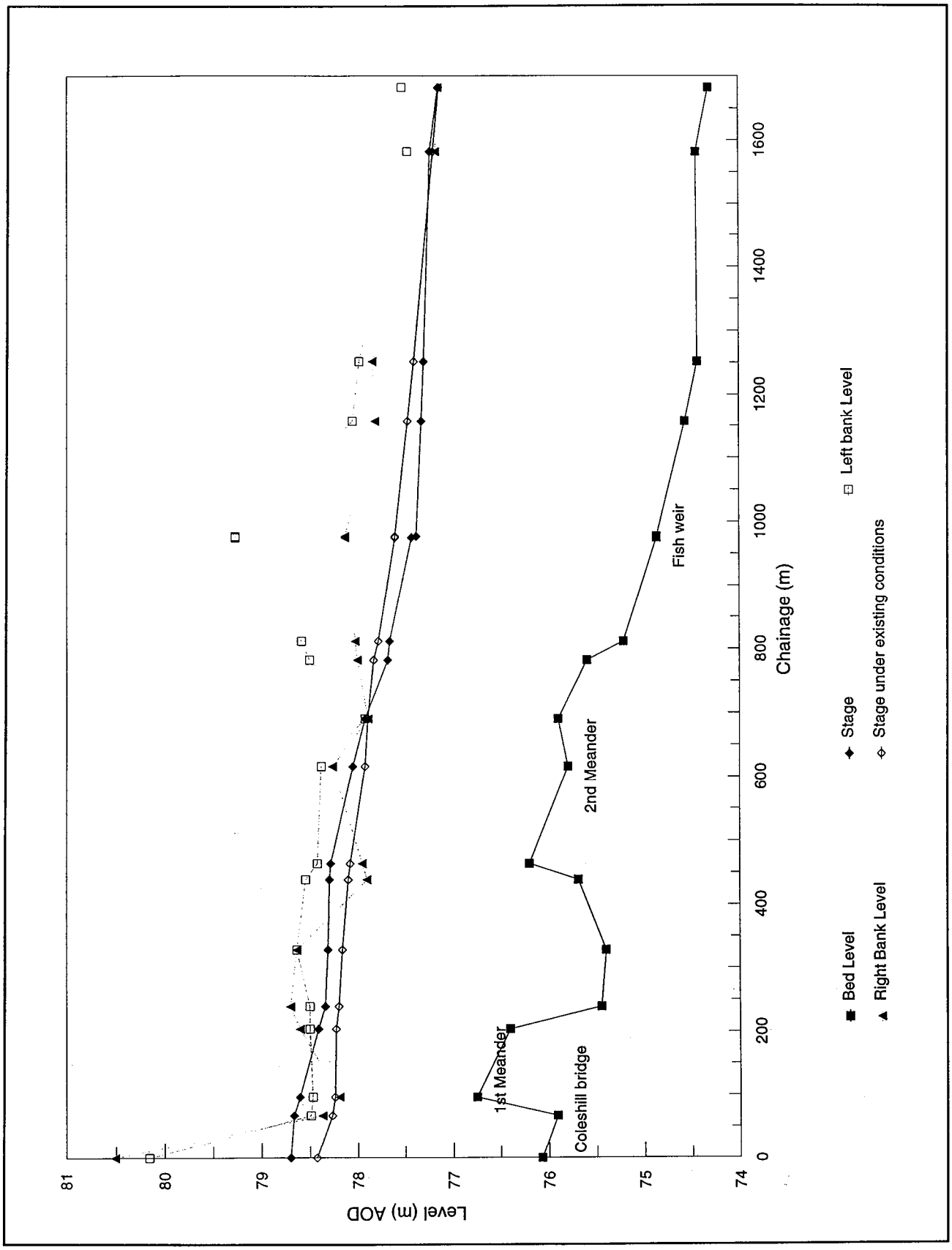

Figure 26. Longitudinal profile - tender plan, downstream reach, 1 in 2 year event

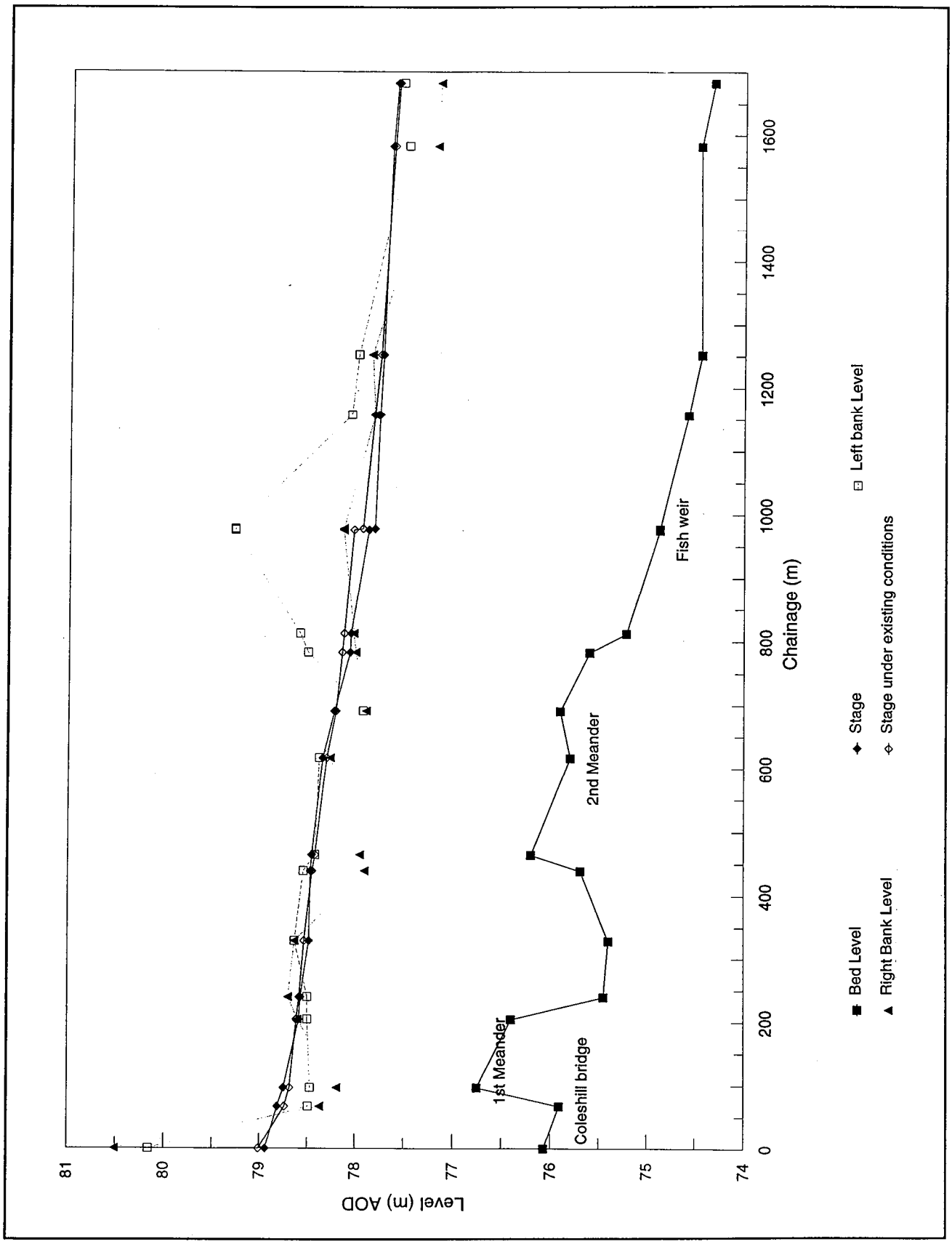

Figure 27. Longitudinal profile - tender plan, downstream reach, 1 in 10 year event

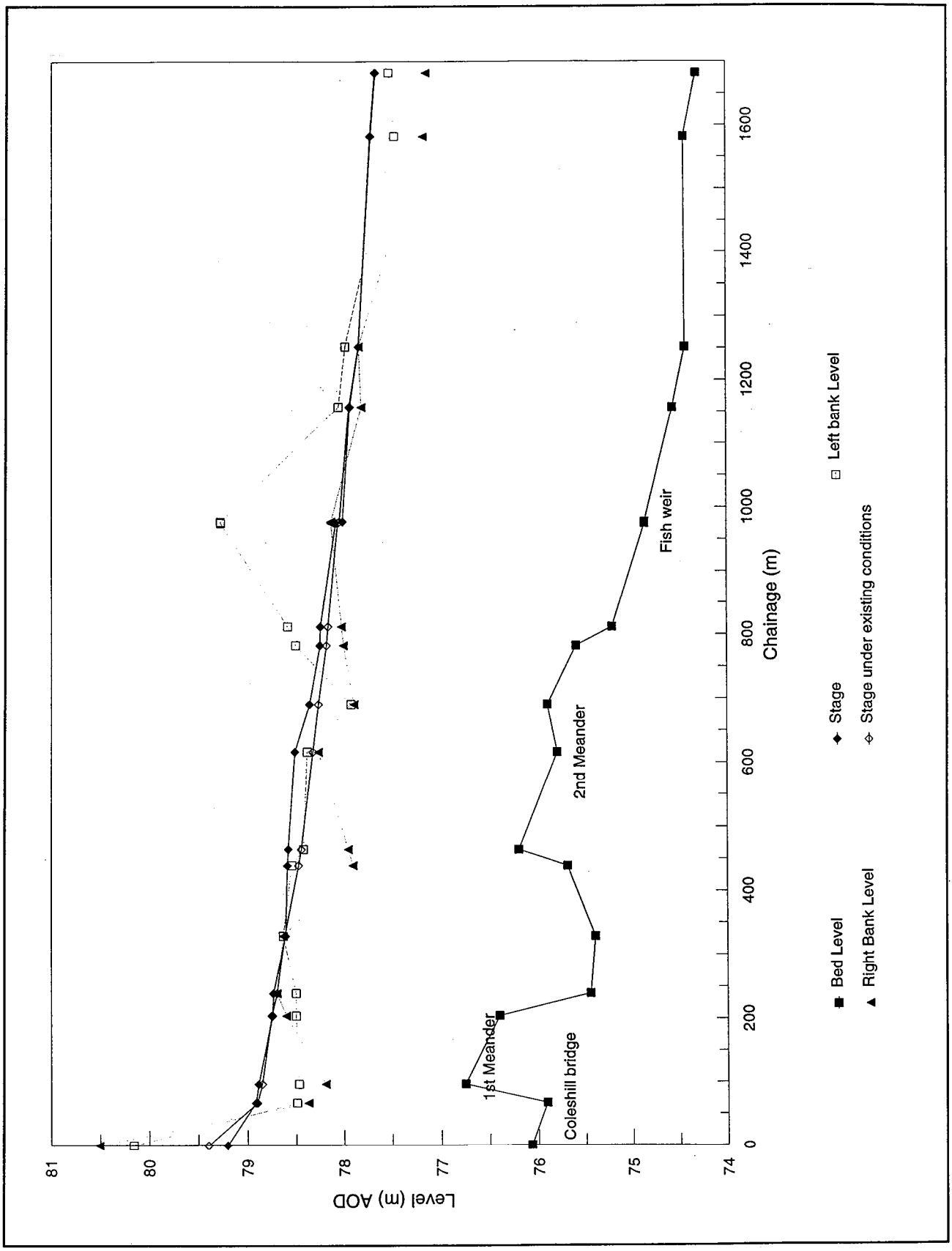

Figure 28. Longitudinal profile - tender plan, downstream reach, 1 in 50 year event

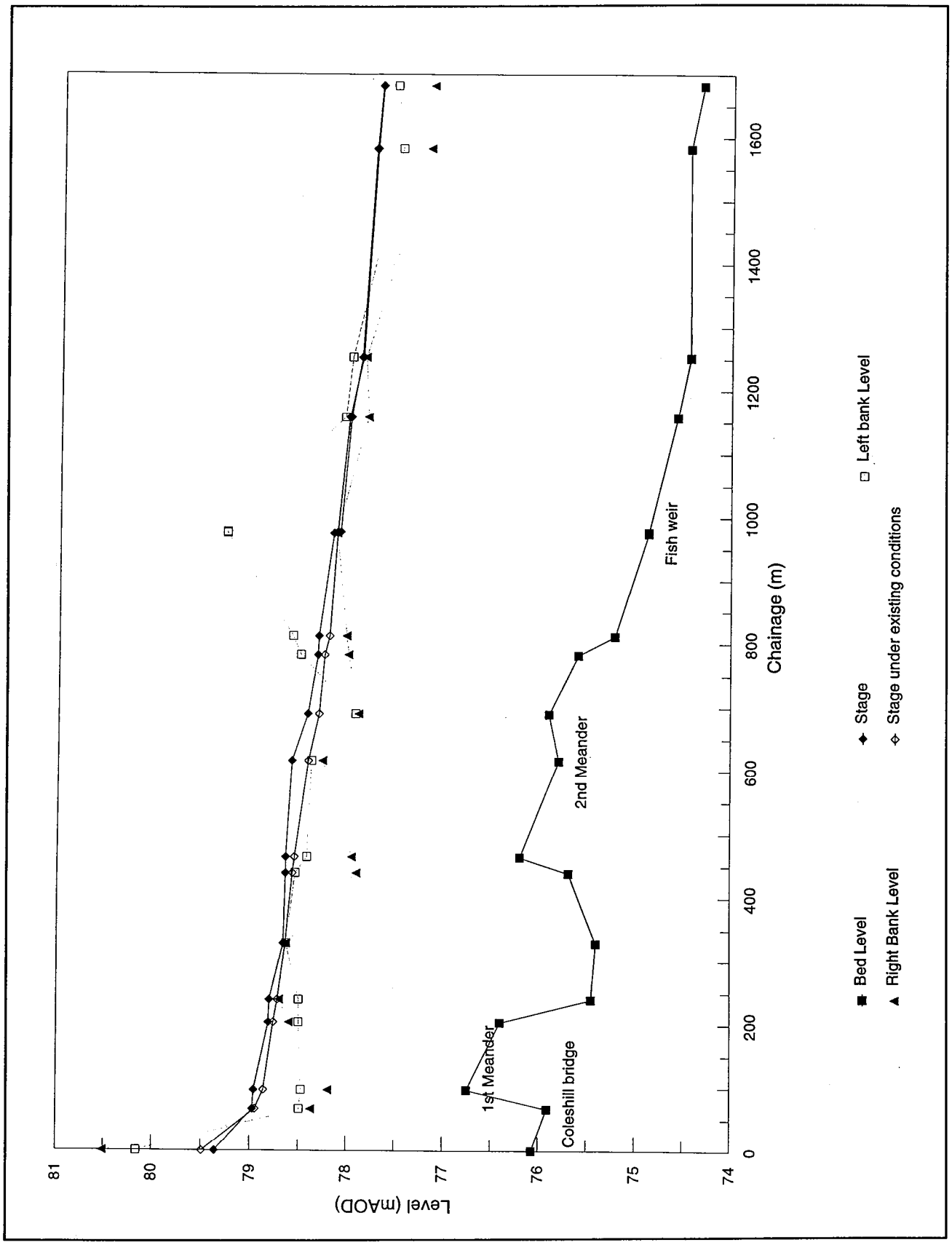

Figure 29. Longitudinal profile - tender plan, downstream reach, 1 in 100 year event

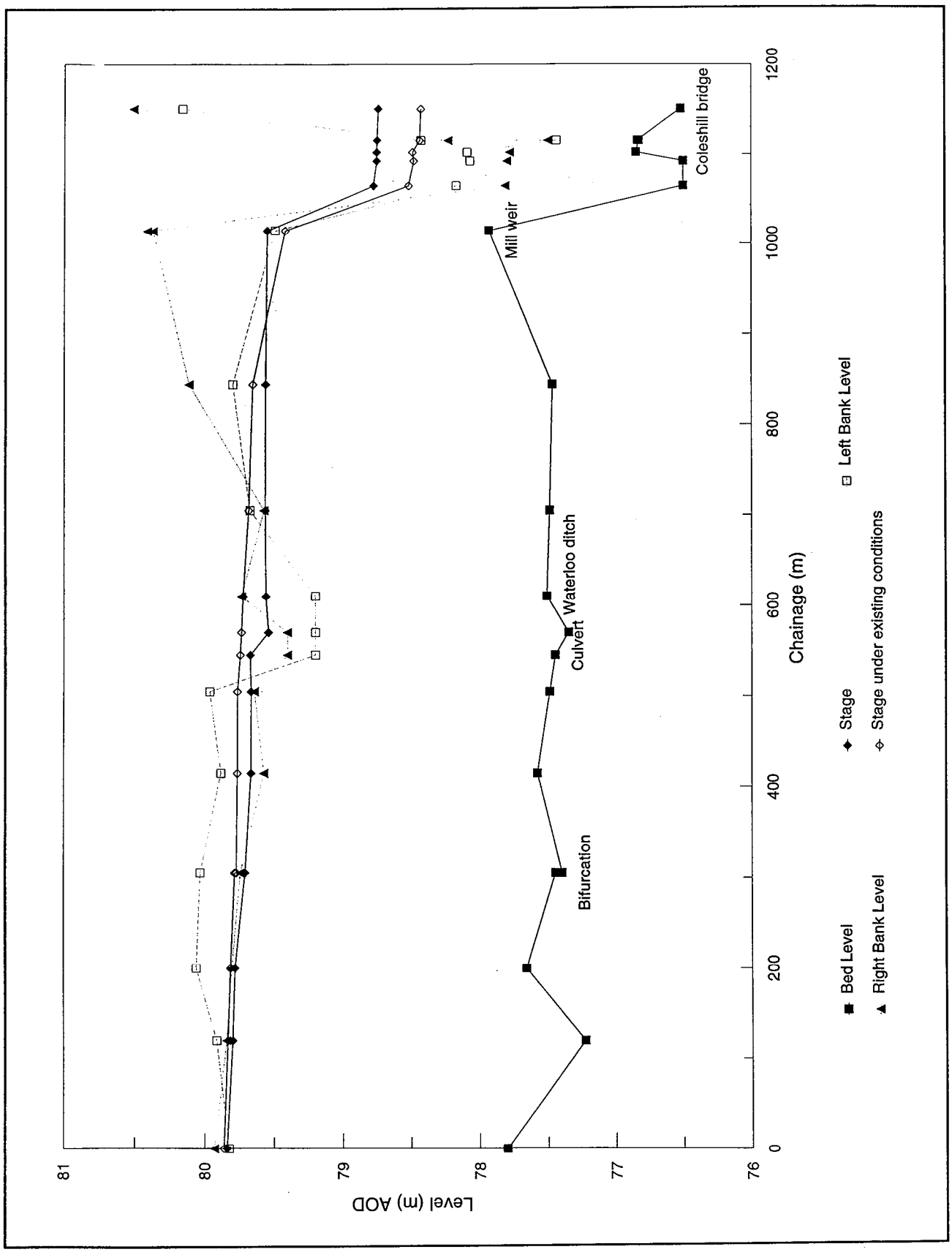

Figure 30. Longitudinal profile - vision plan, mill channel reach, 1 in 2 year event

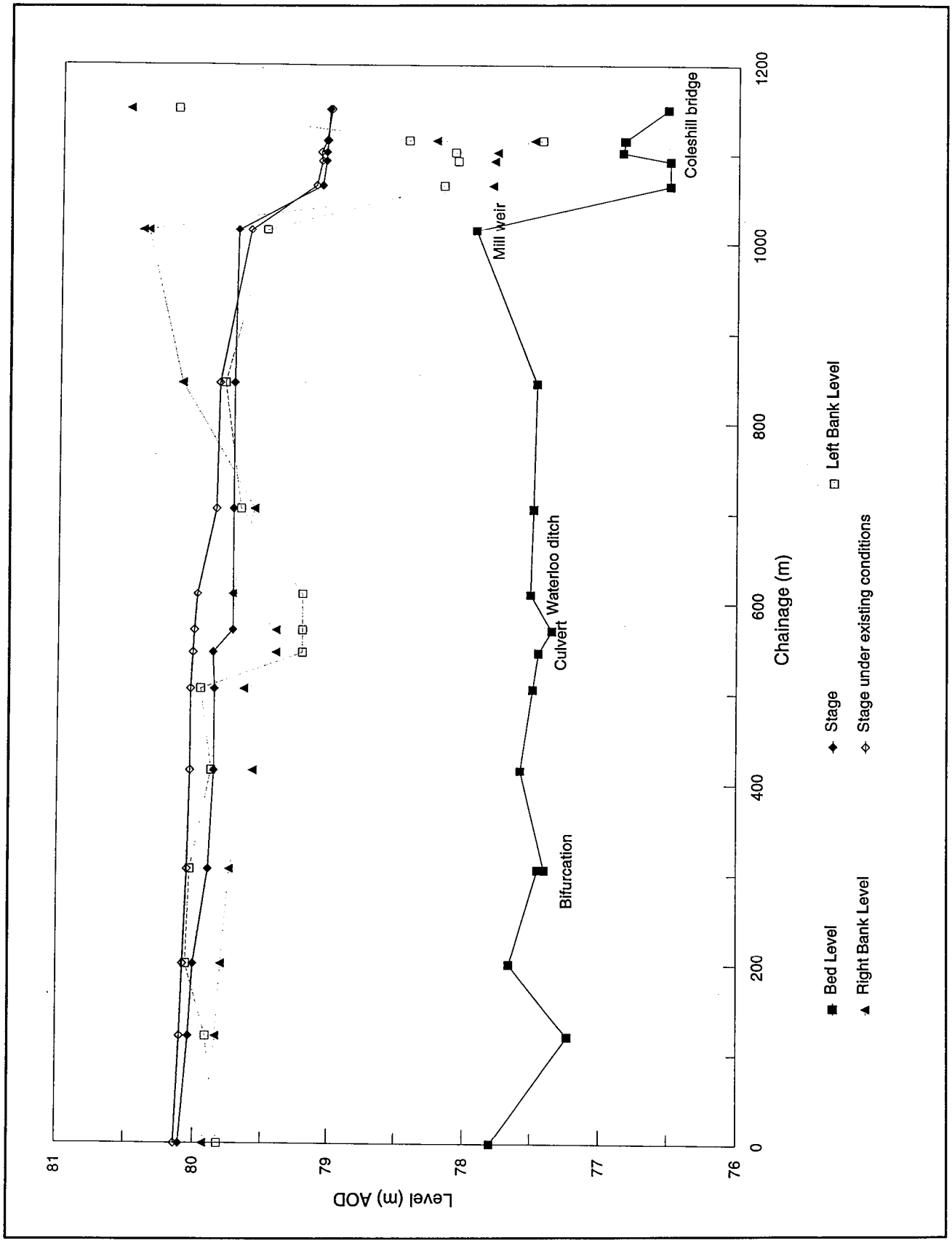

Figure 31. Longitudinal profile - vision plan, mill channel reach, 1 in 10 year event

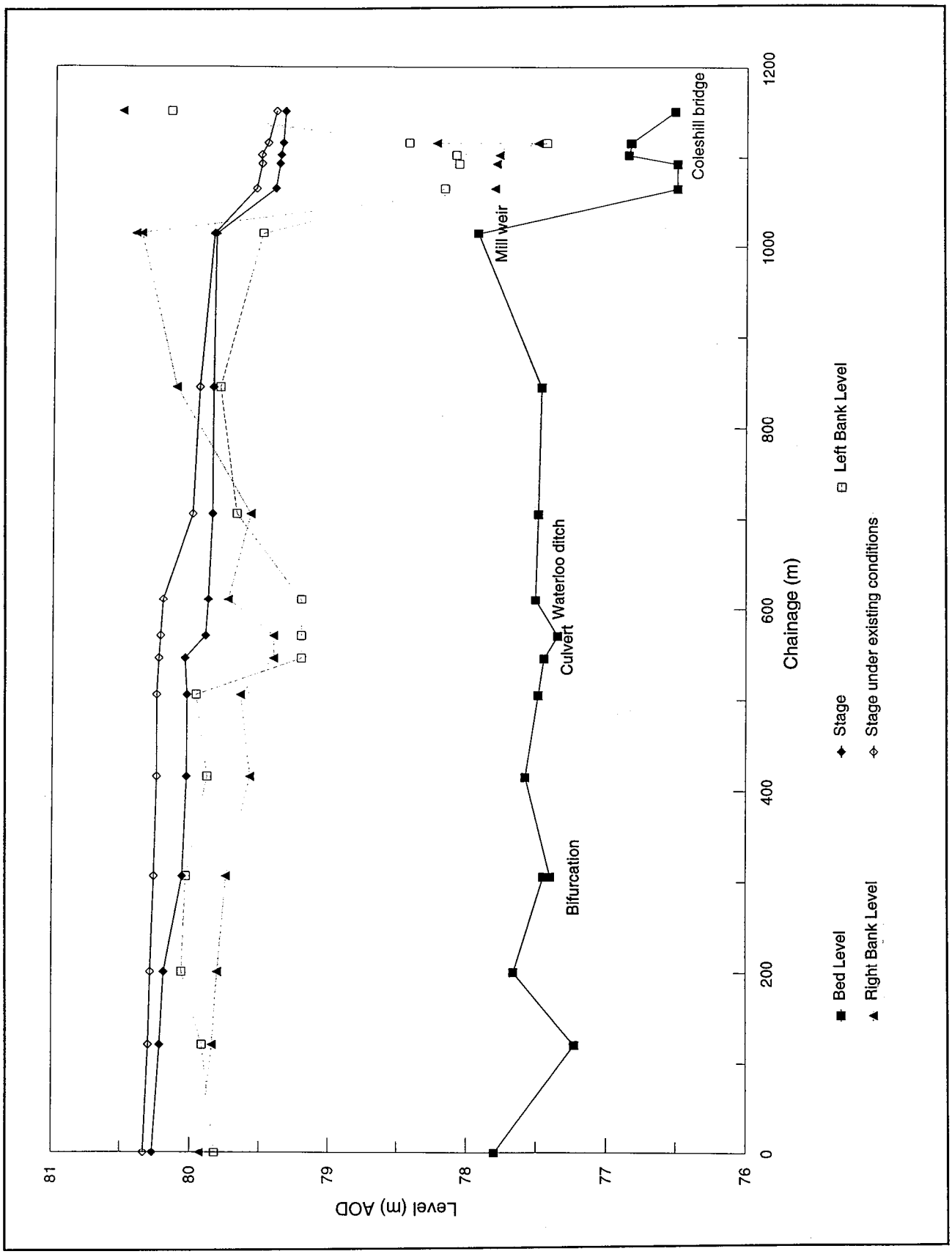

Figure 32. Longitudinal profile - vision plan, mill channel reach, 1 in 50 year event

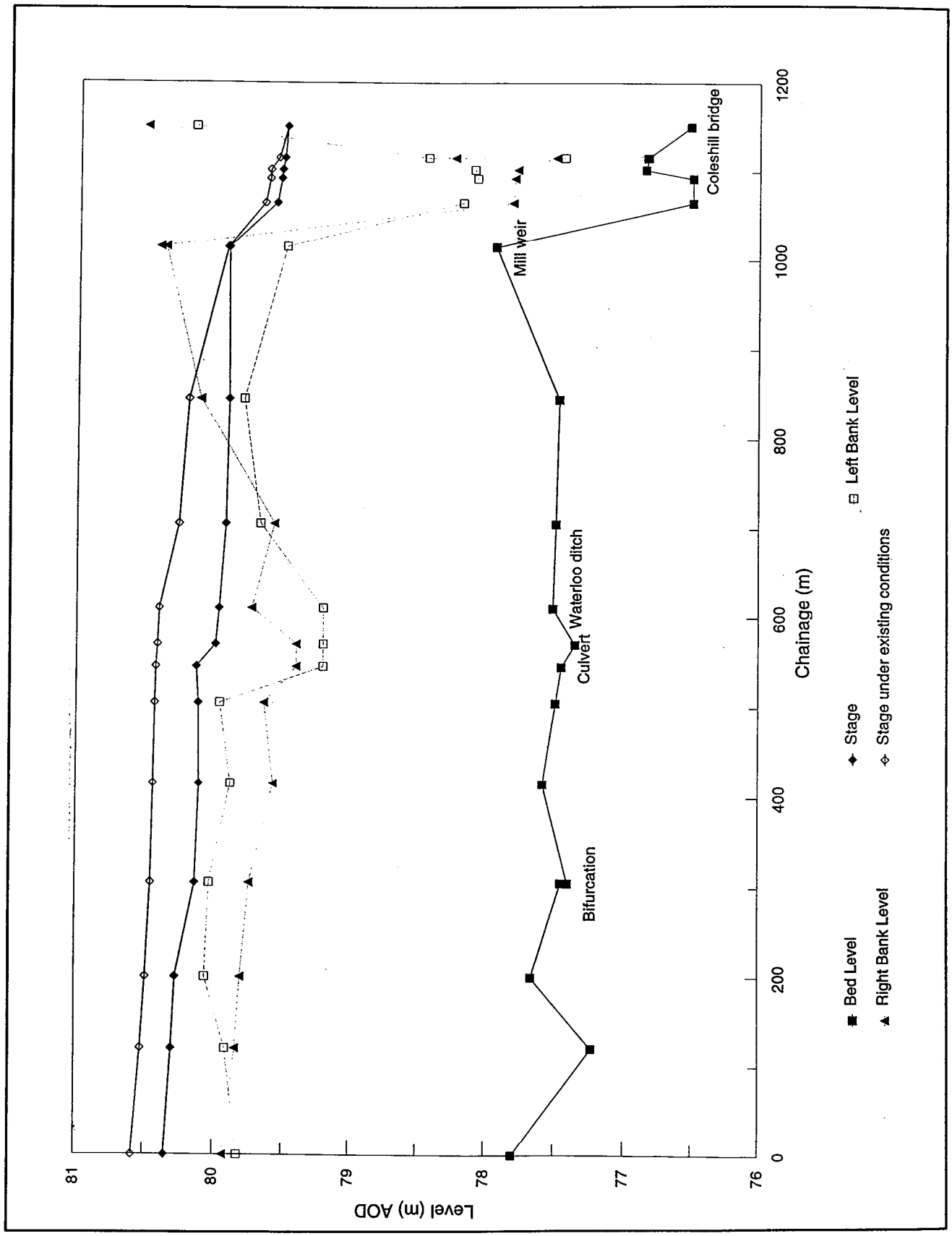

Figure 33. Longitudinal profile - vision plan, mill channel reach, 1 in 100 year event

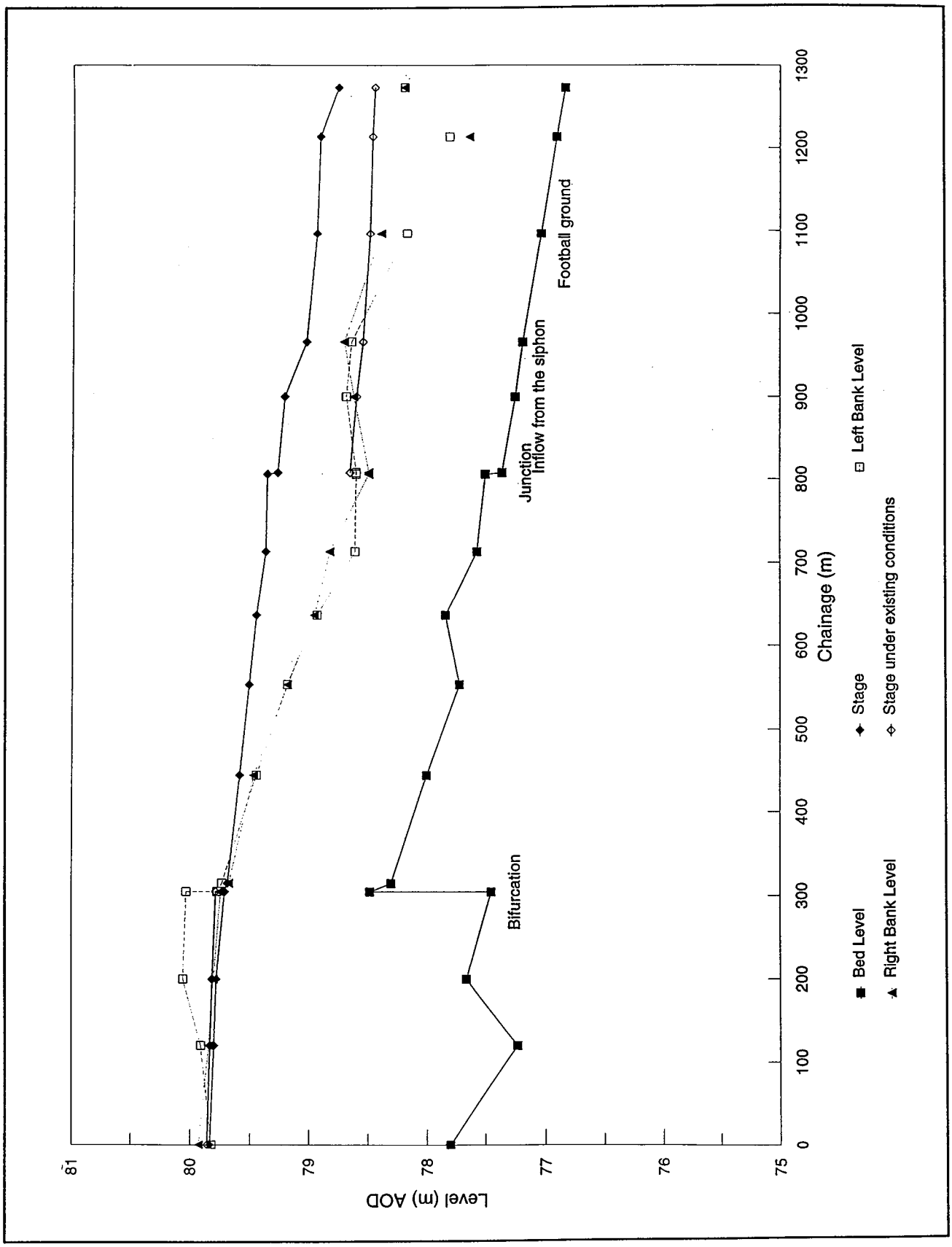

Figure 34. Longitudinal profile - vision plan, new and old channel reach, 1 in 2 year event

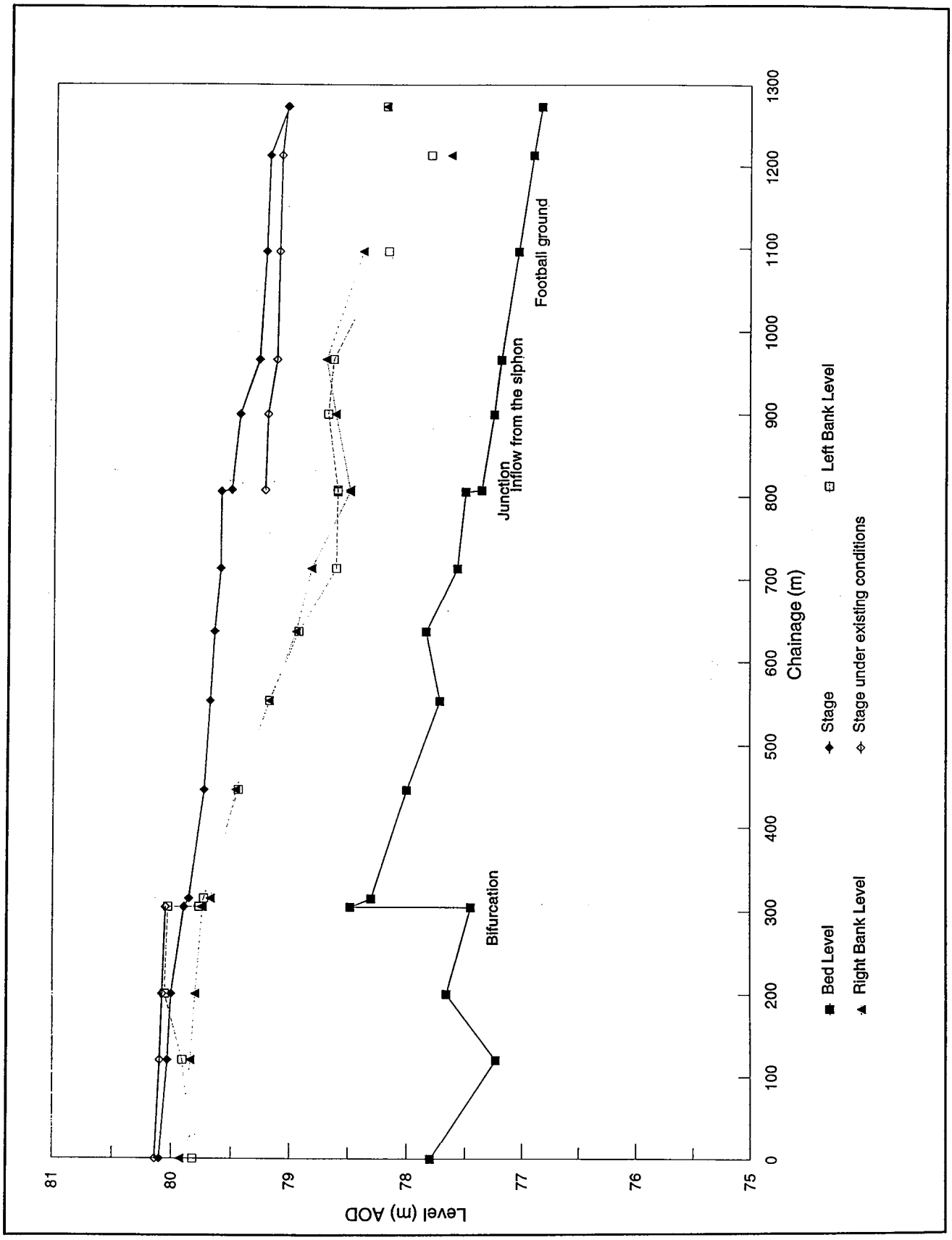

Figure 35. Longitudinal profile - vision plan, new and old channel reach, 1 in 10 year event

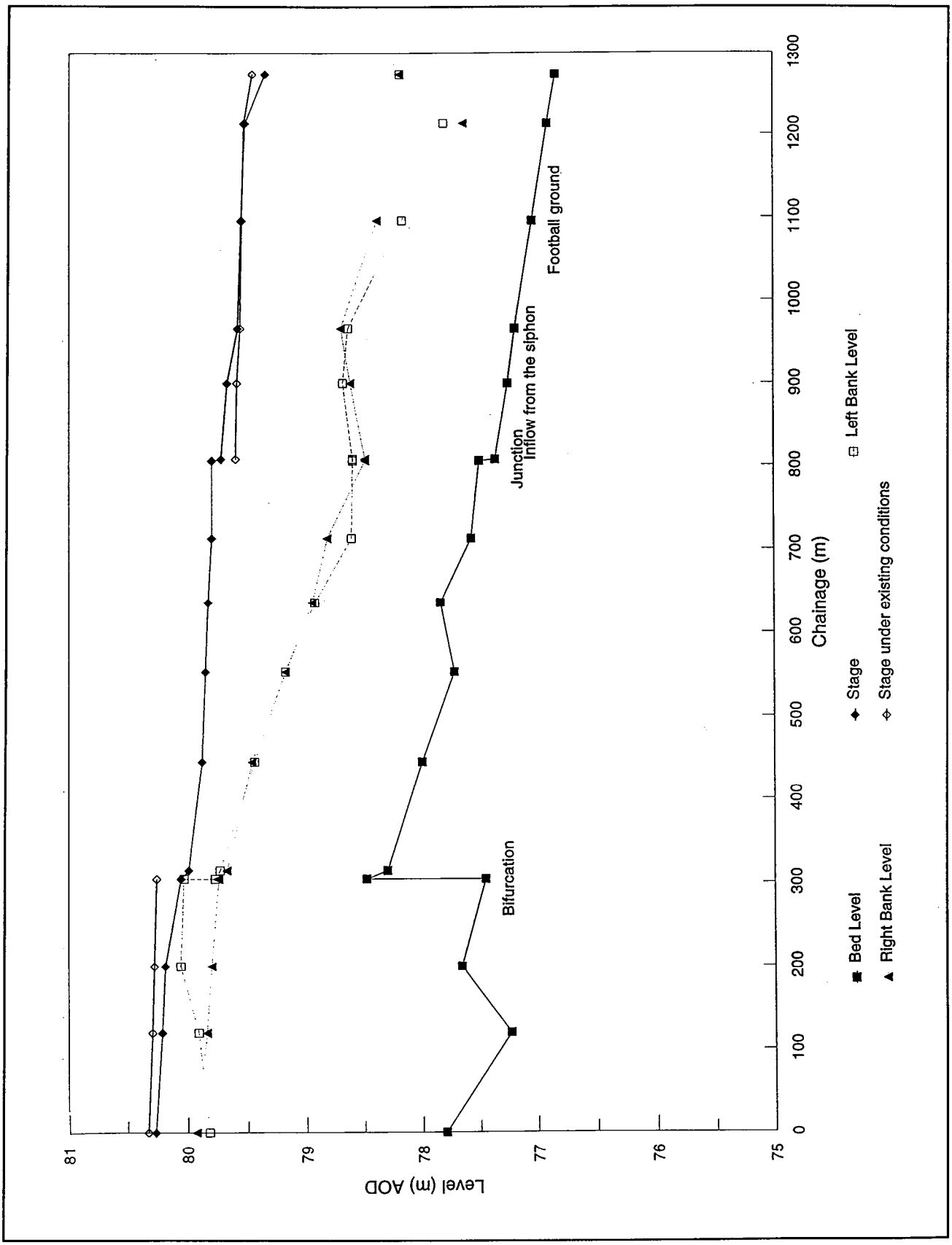

Figure 36. Longitudinal profile - vision plan, new and old channel reach, 1 in 50 year event

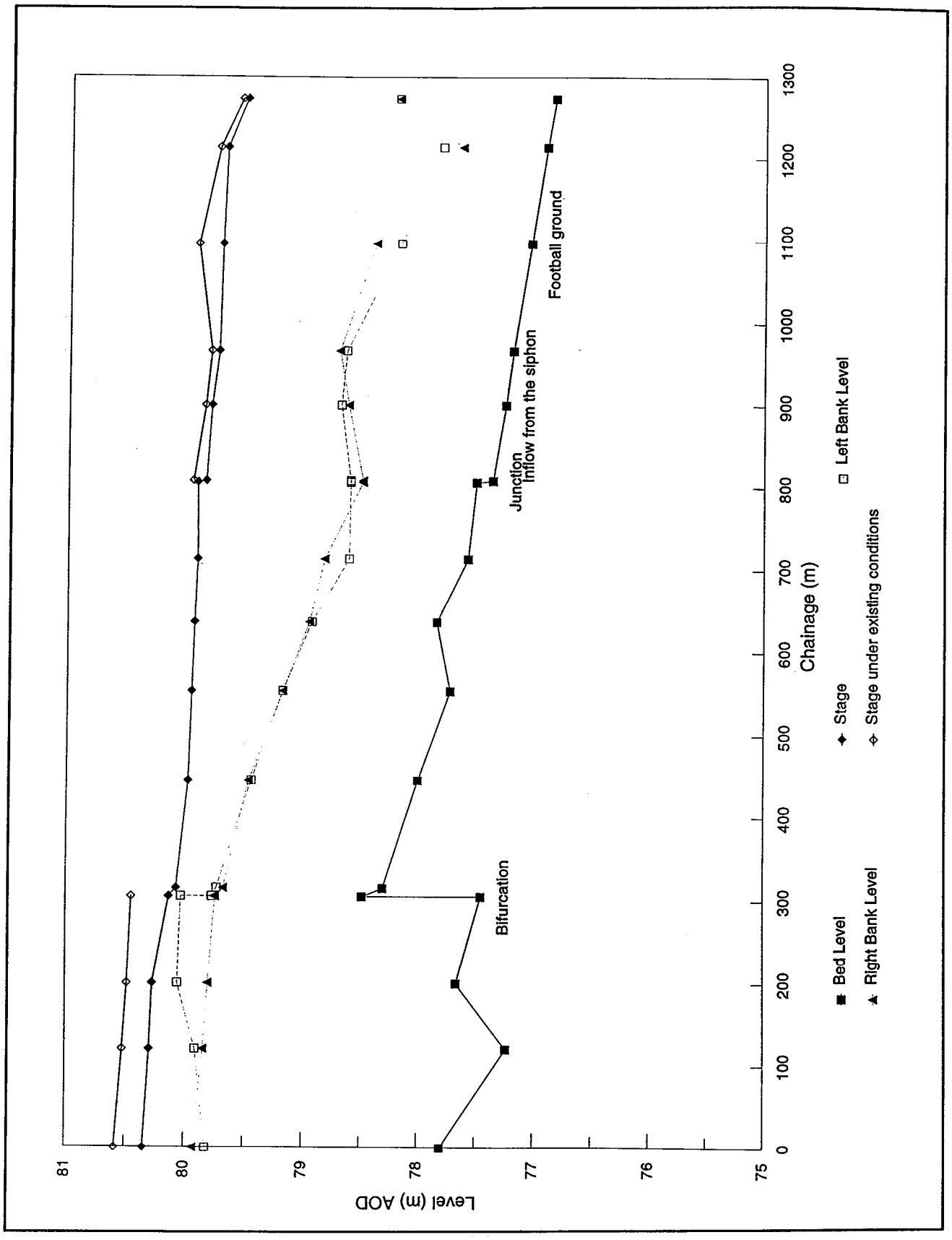

Figure 37. Longitudinal profile - vision plan, new and old channel reach, 1 in 100 year event

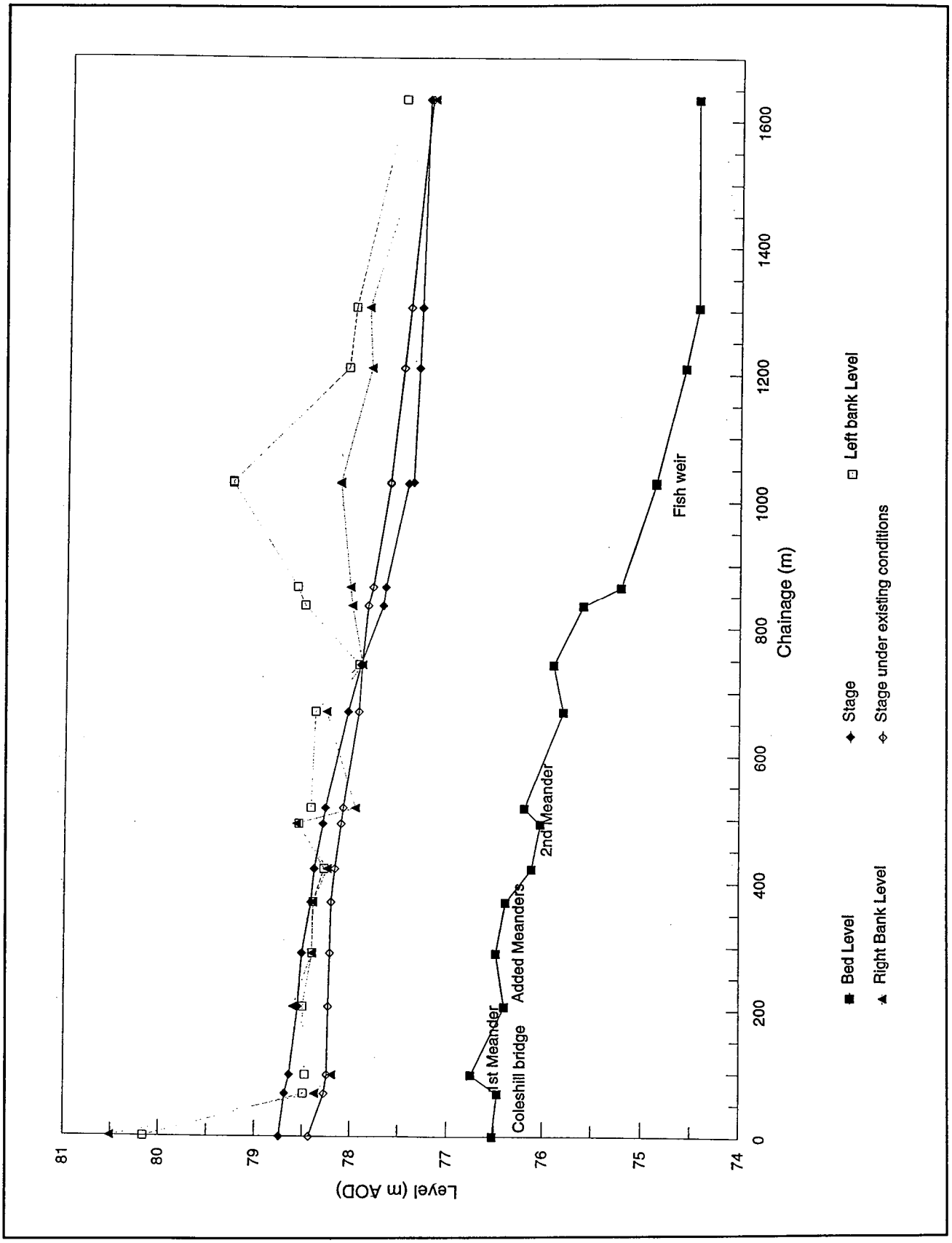

Figure 38. Longitudinal profile - vision plan, downstream reach, 1 in 2 year event

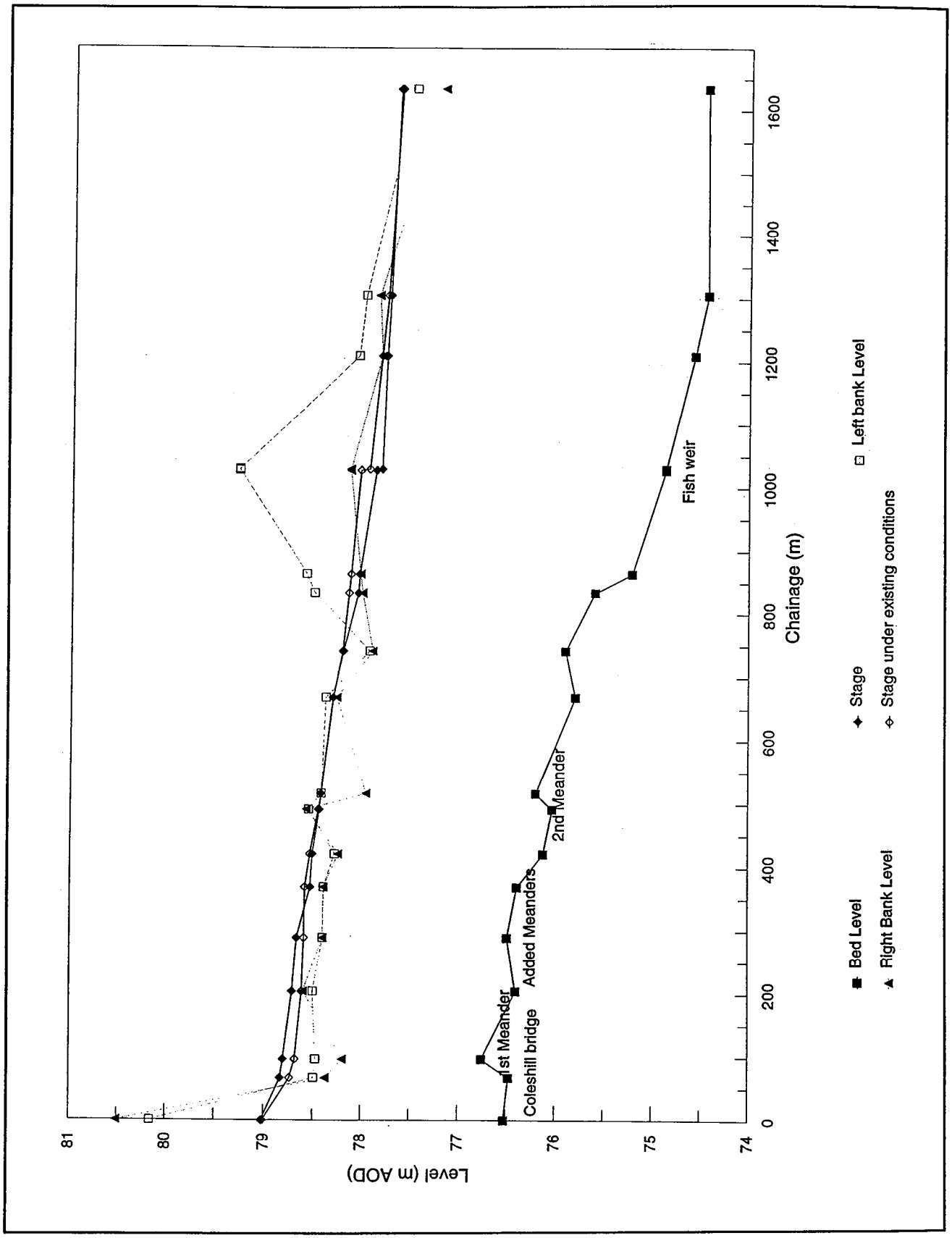

Figure 39. Longitudinal profile - vision plan, downstream reach, 1 in 10 year event

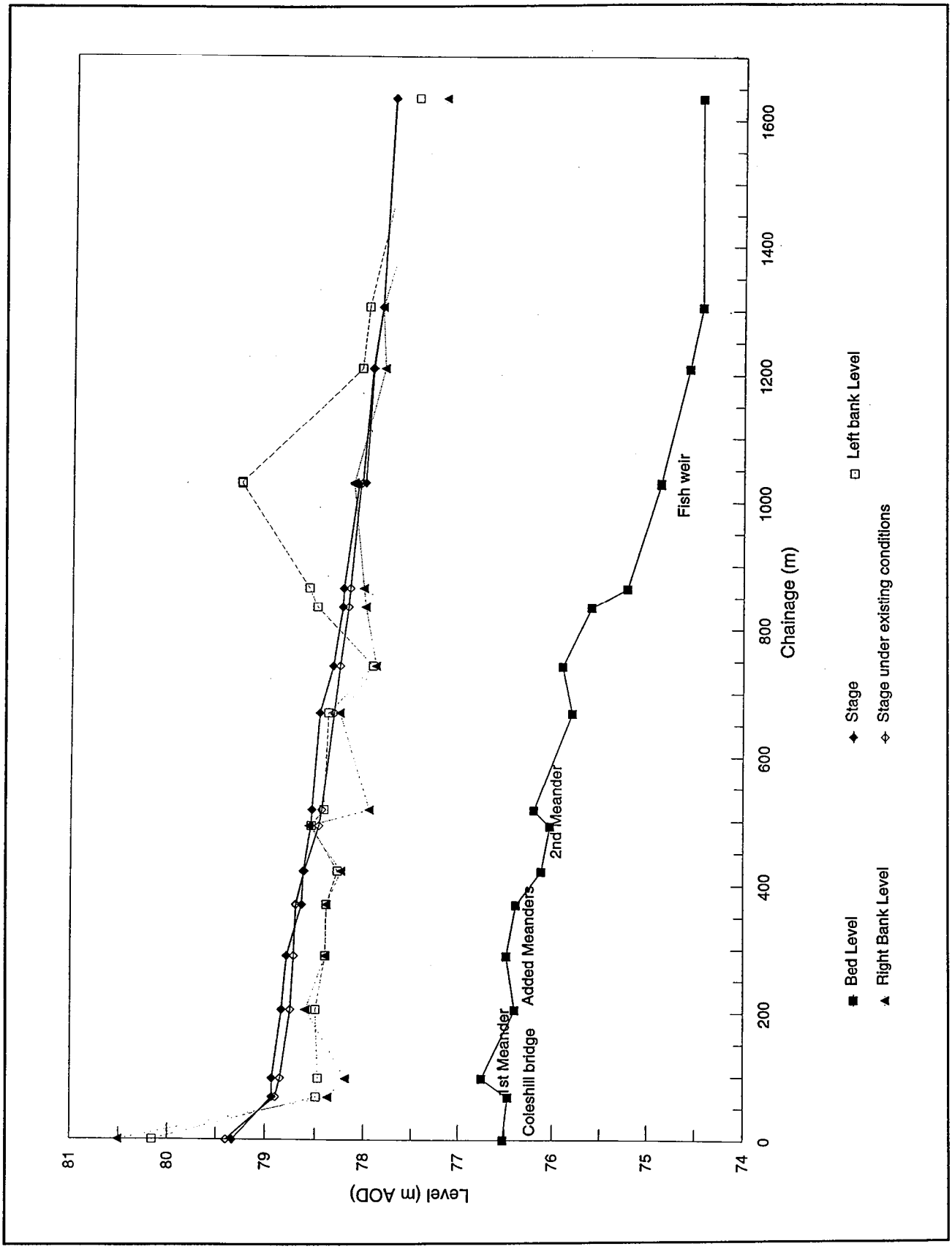

Figure 40. Longitudinal profile - vision plan, downstream reach, 1 in 50 year event

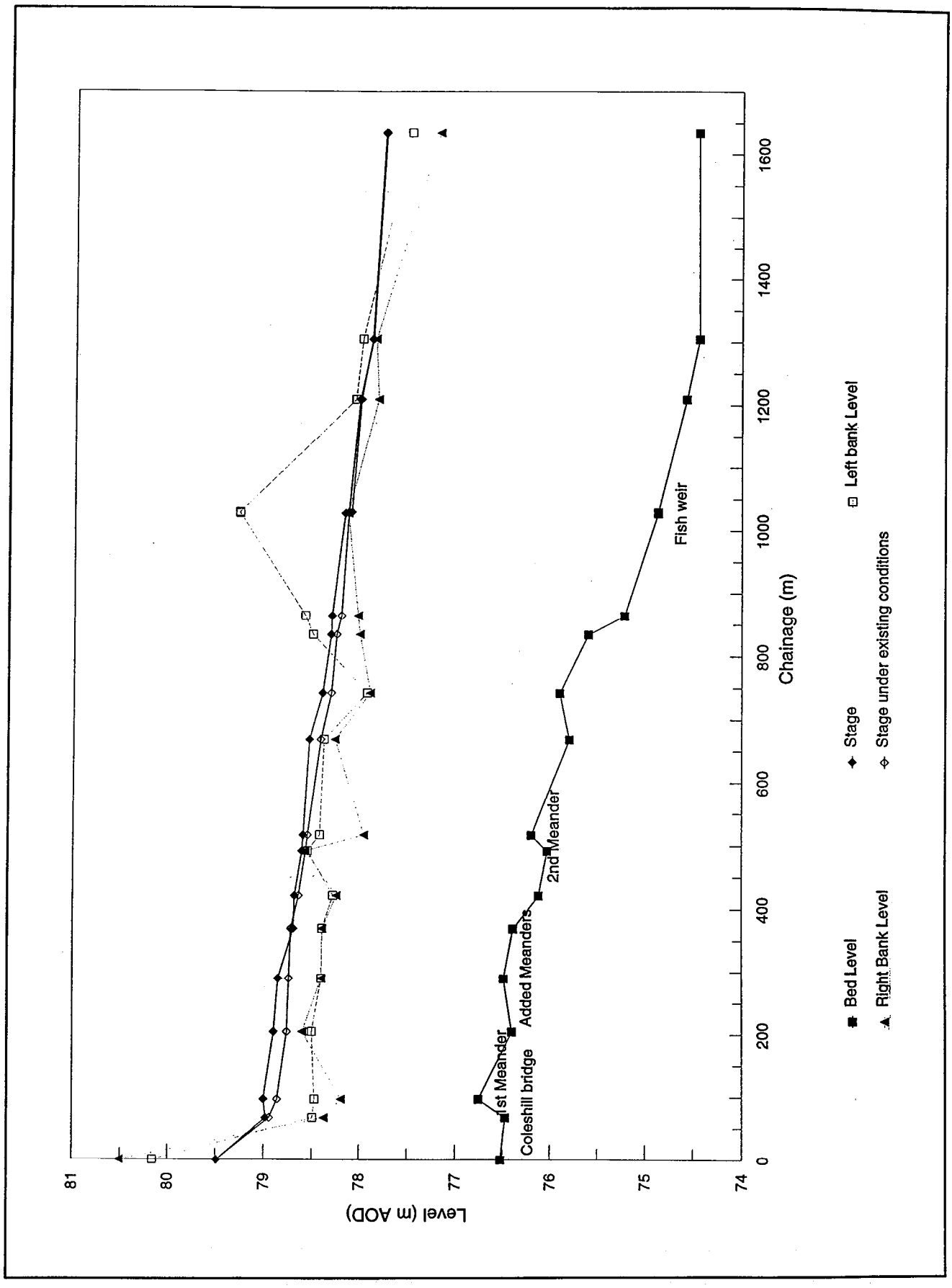

Figure 41. Longitudinal profile - vision plan, downstream reach, 1 in 100 year event

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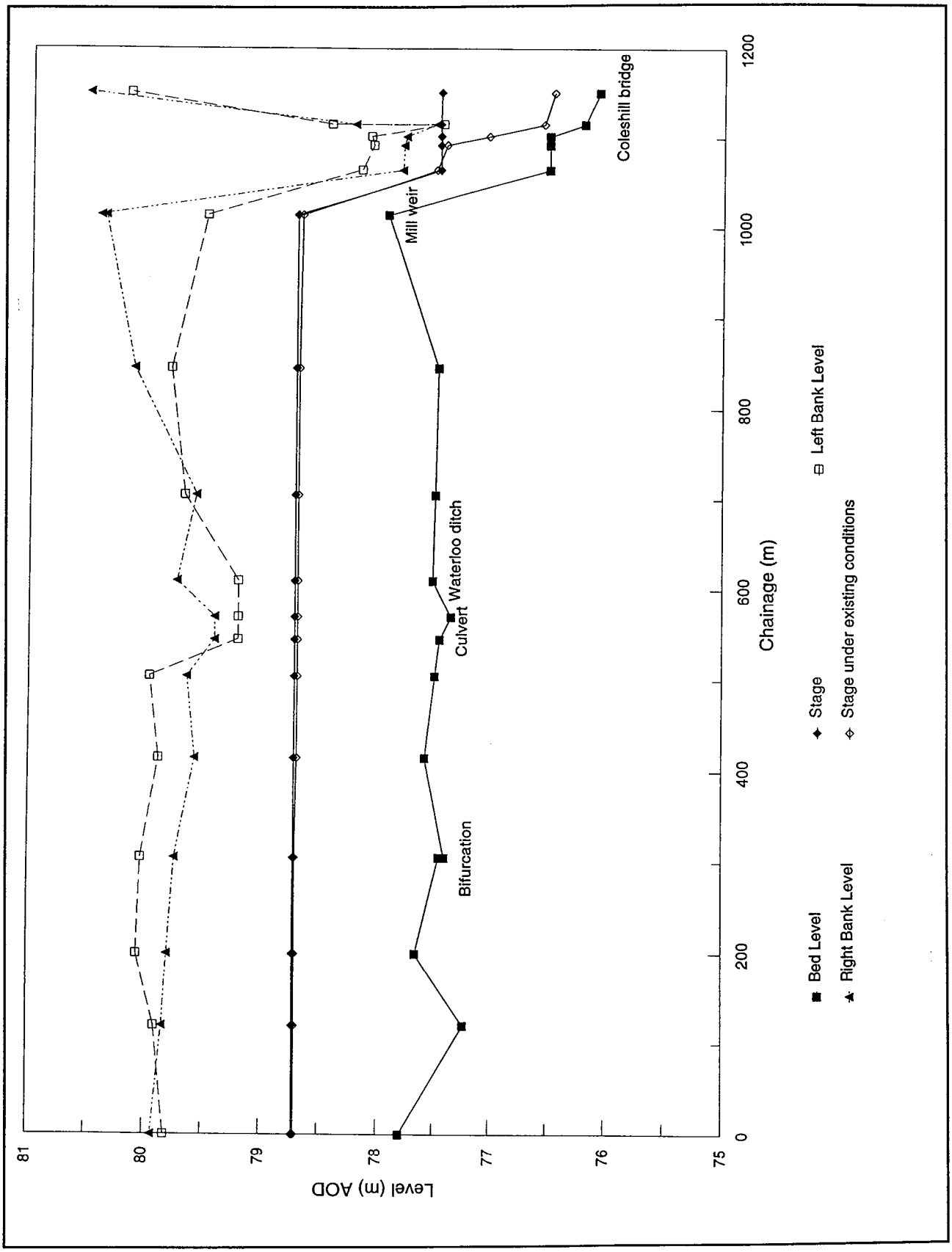


Figure 42. Longitudinal profile - tender plan, mill channel reach, low flow event

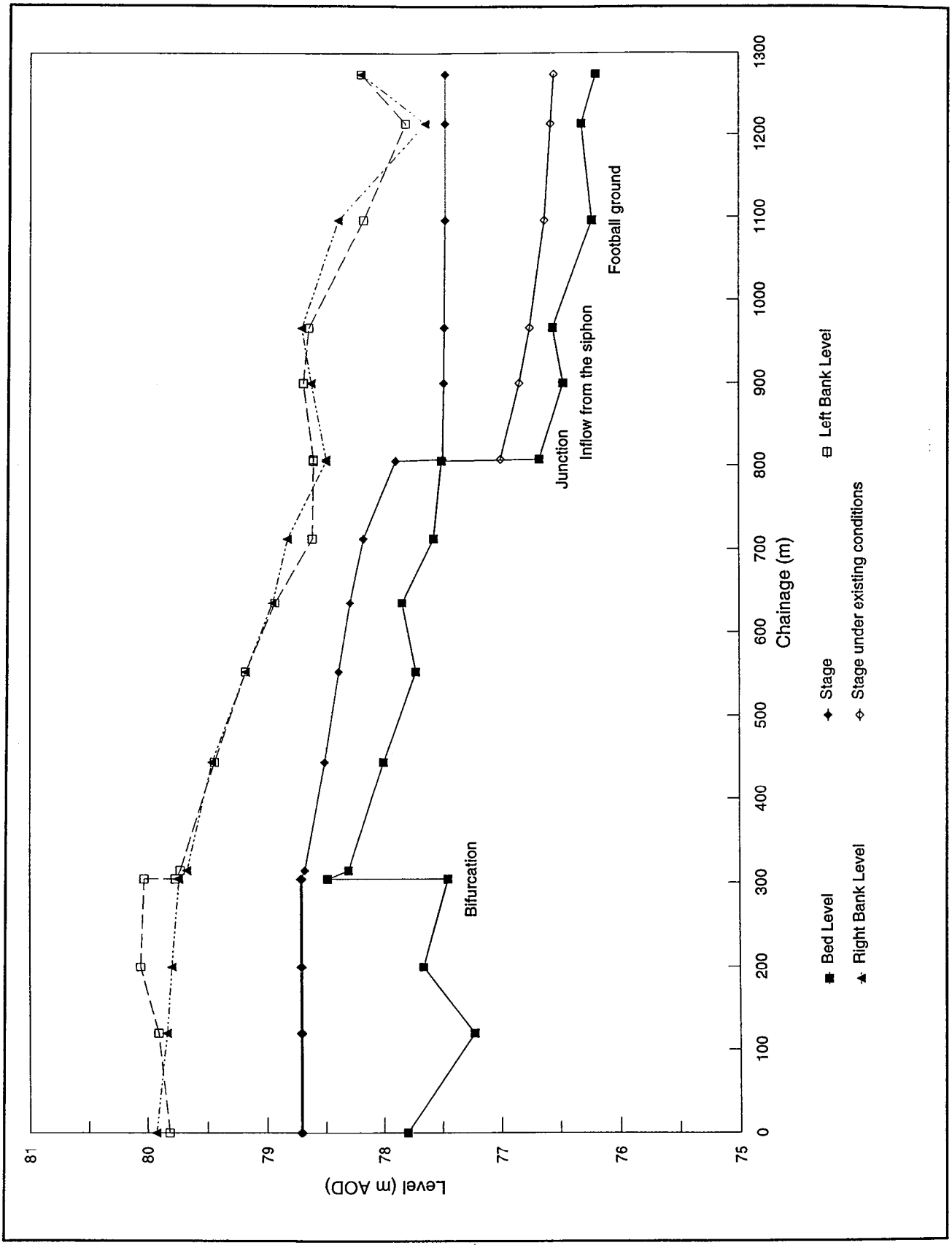


Figure 43. Longitudinal profile - tender plan, new and old channel reach, low flow event

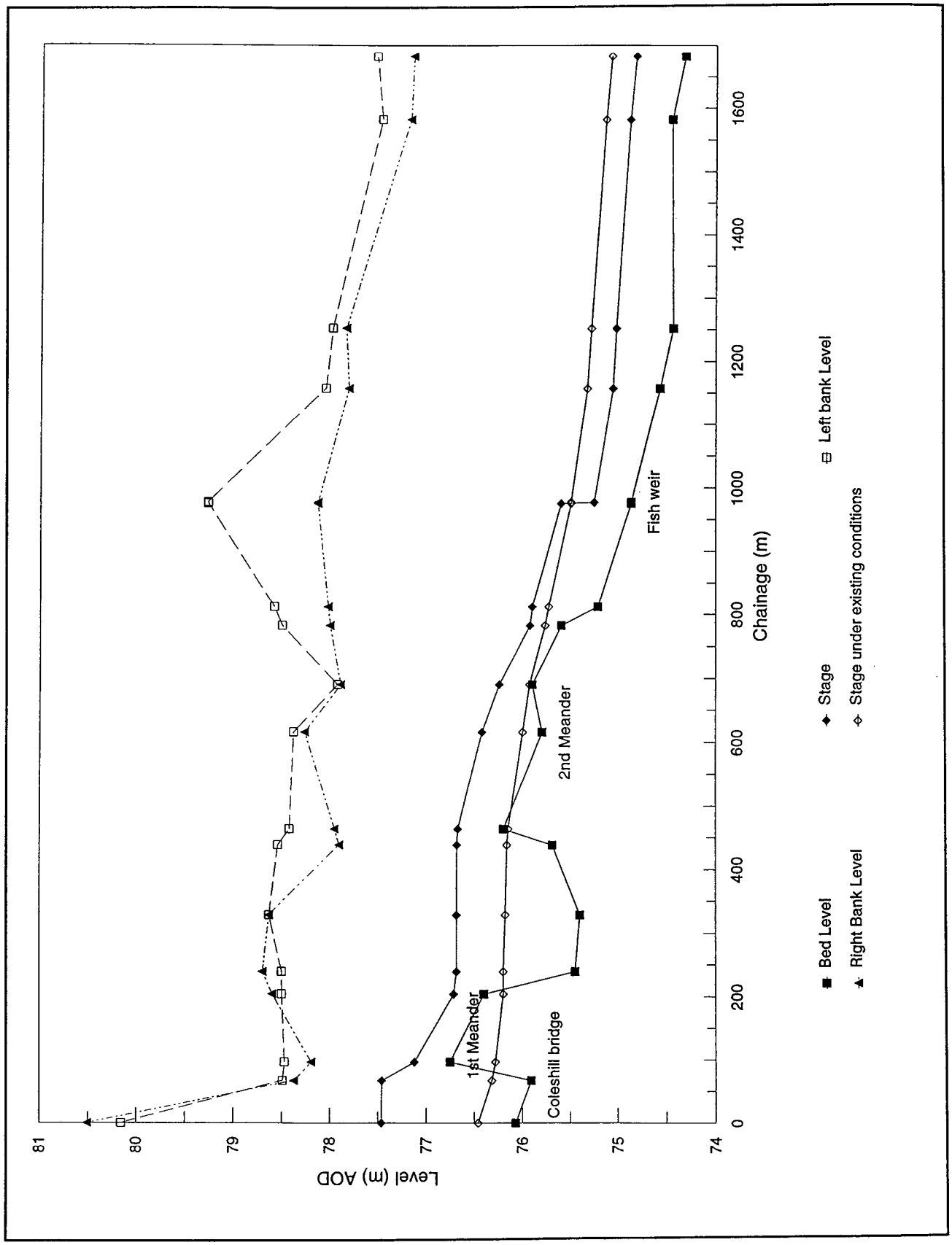


Figure 44. Longitudinal profile - tender plan, downstream reach, low flow event

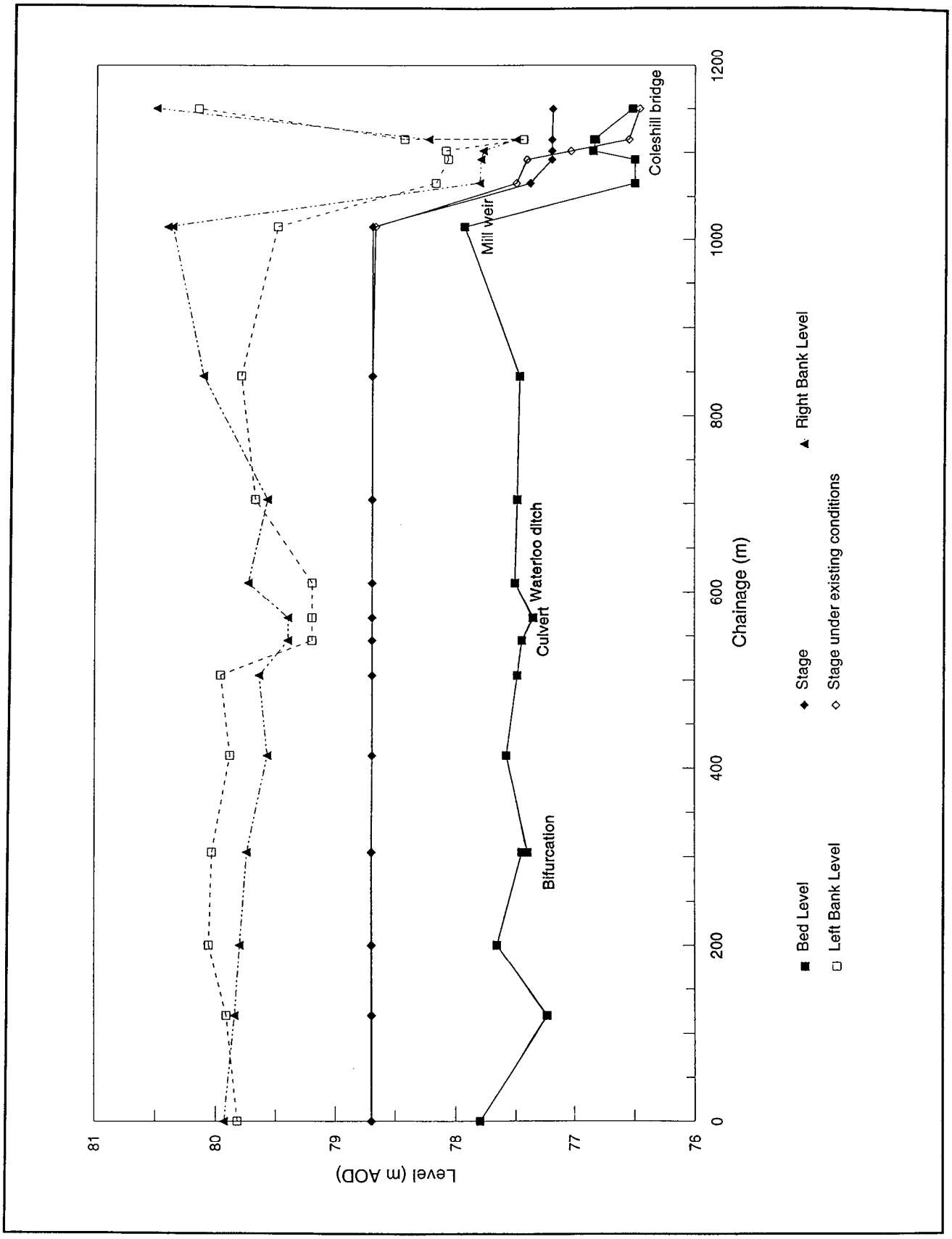


Figure 45. Longitudinal profile - vision plan, mill channel reach, low flow event

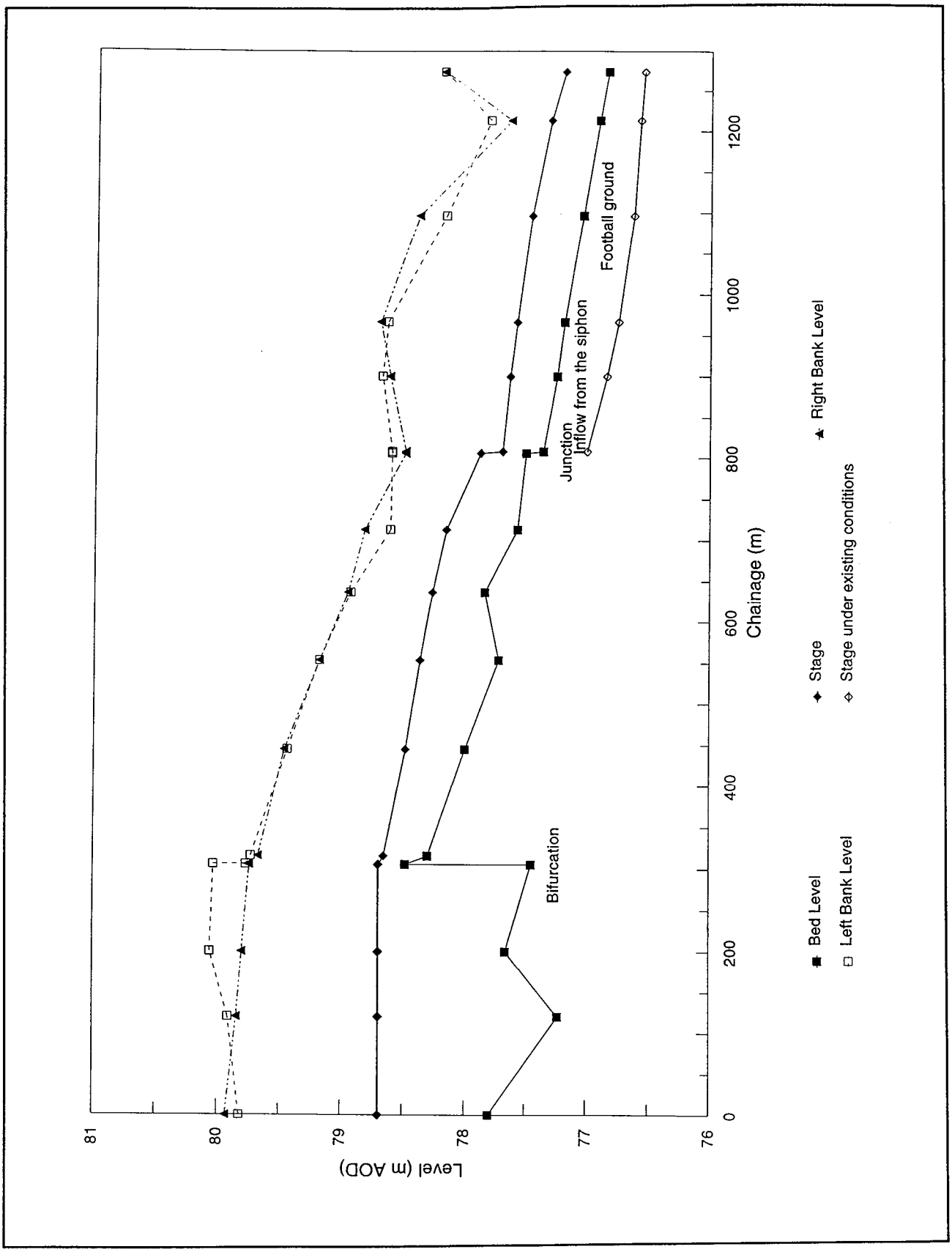


Figure 46. Longitudinal profile - vision plan, new and old channel reach, low flow event

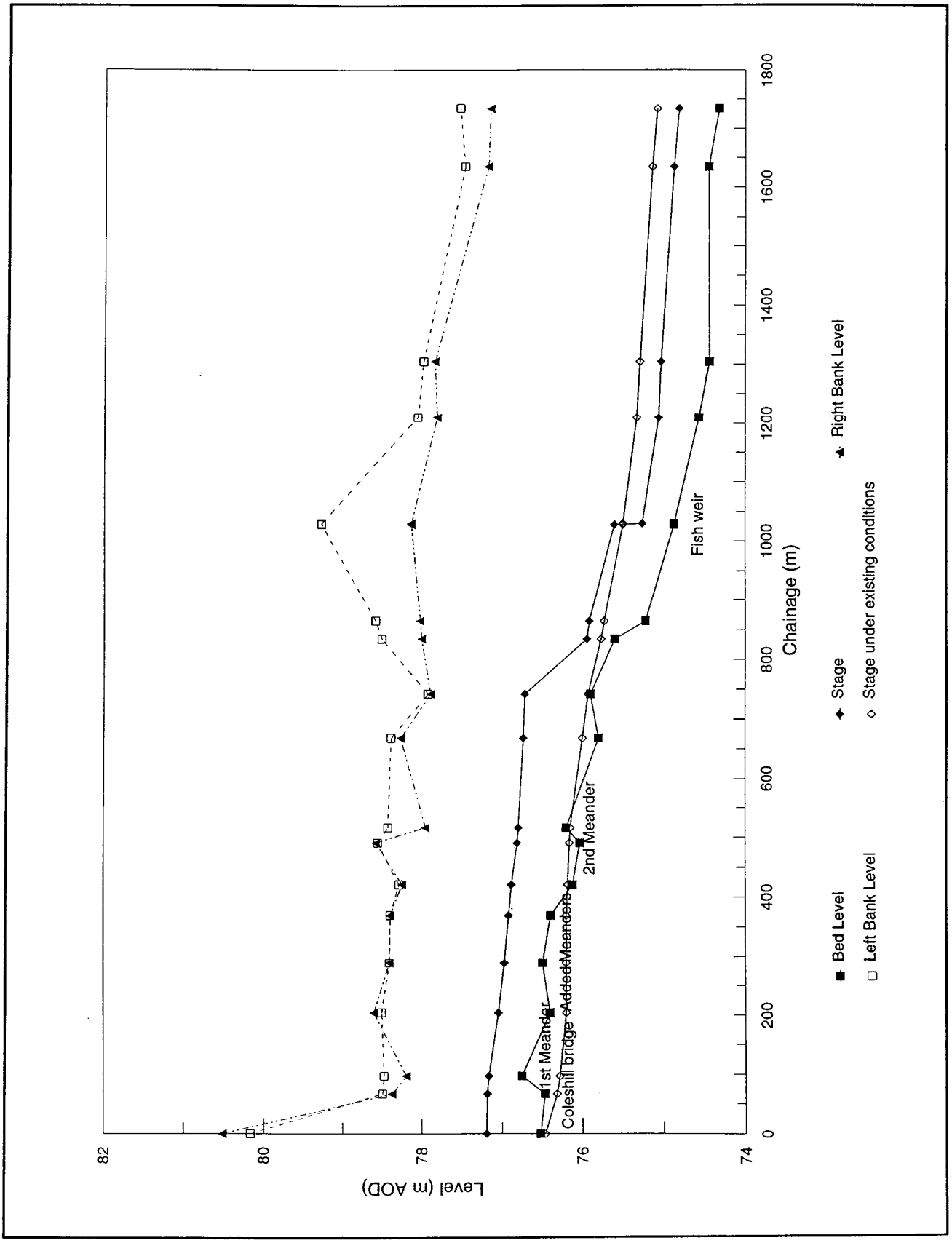


Figure 47. Longitudinal profile - vision plan, downstream reach, low flow event

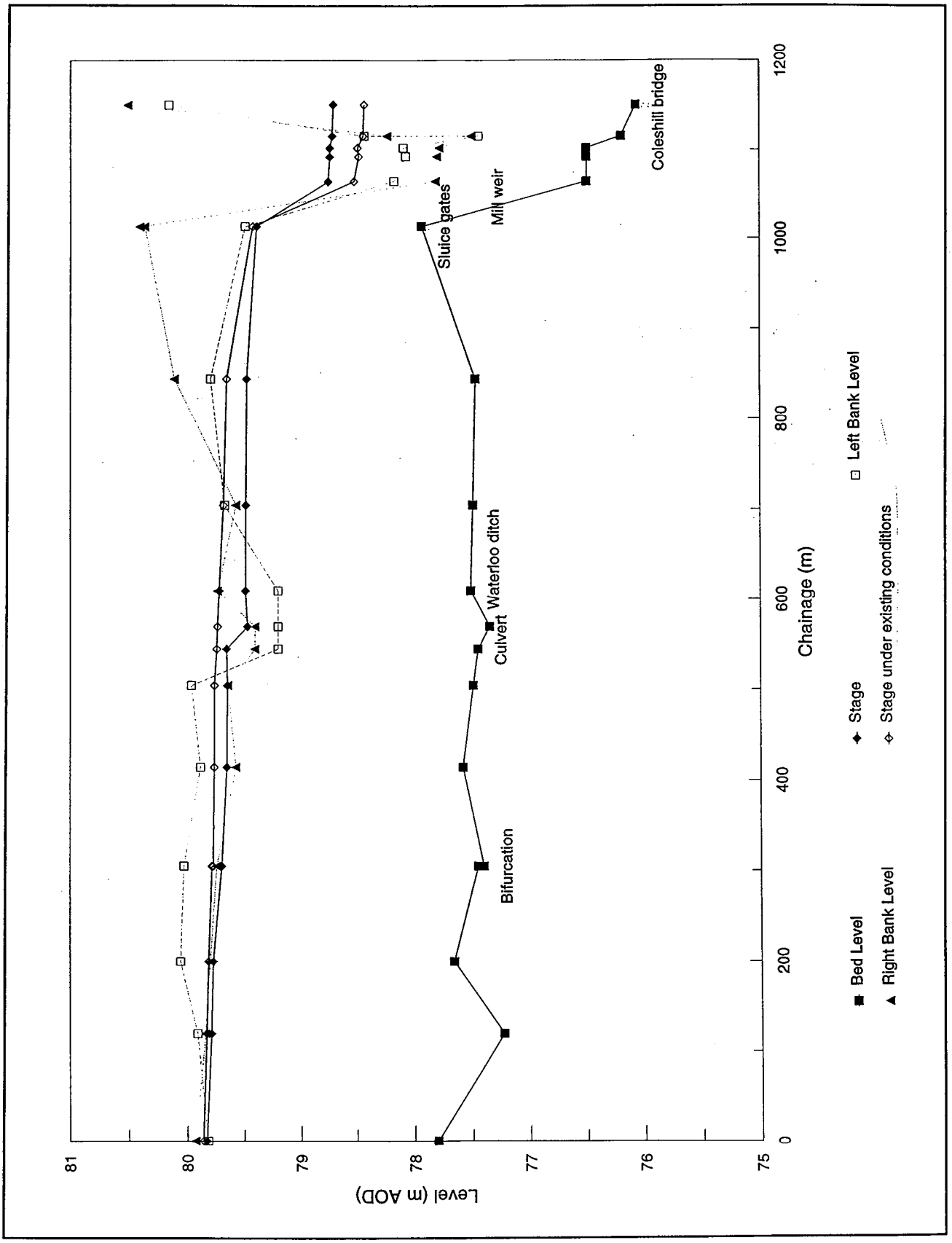


Figure 48. Longitudinal profile - tender plan, mill channel reach, use of sluice gates

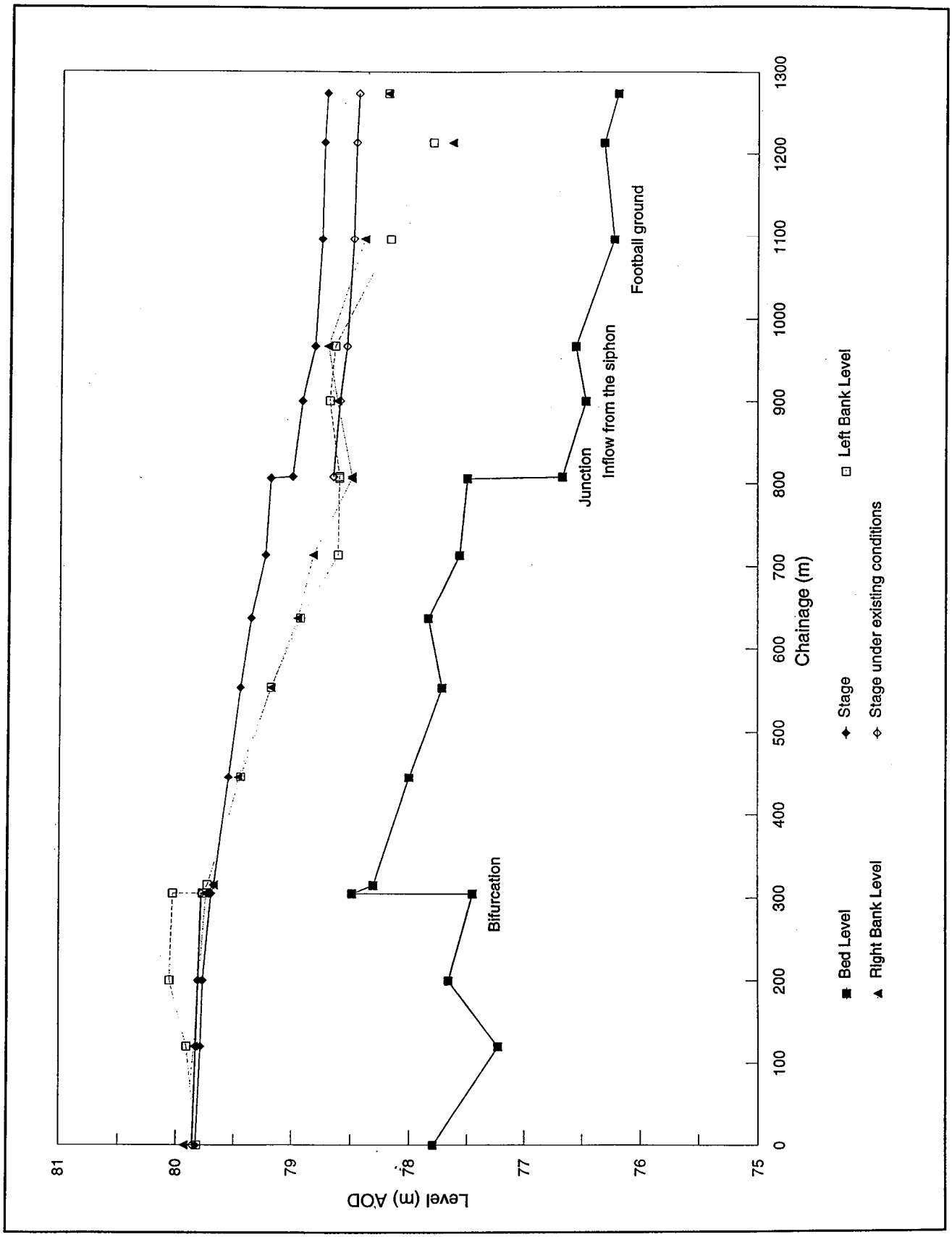


Figure 49. Longitudinal profile - tender plan, new and old channel reach, use of sluice gates

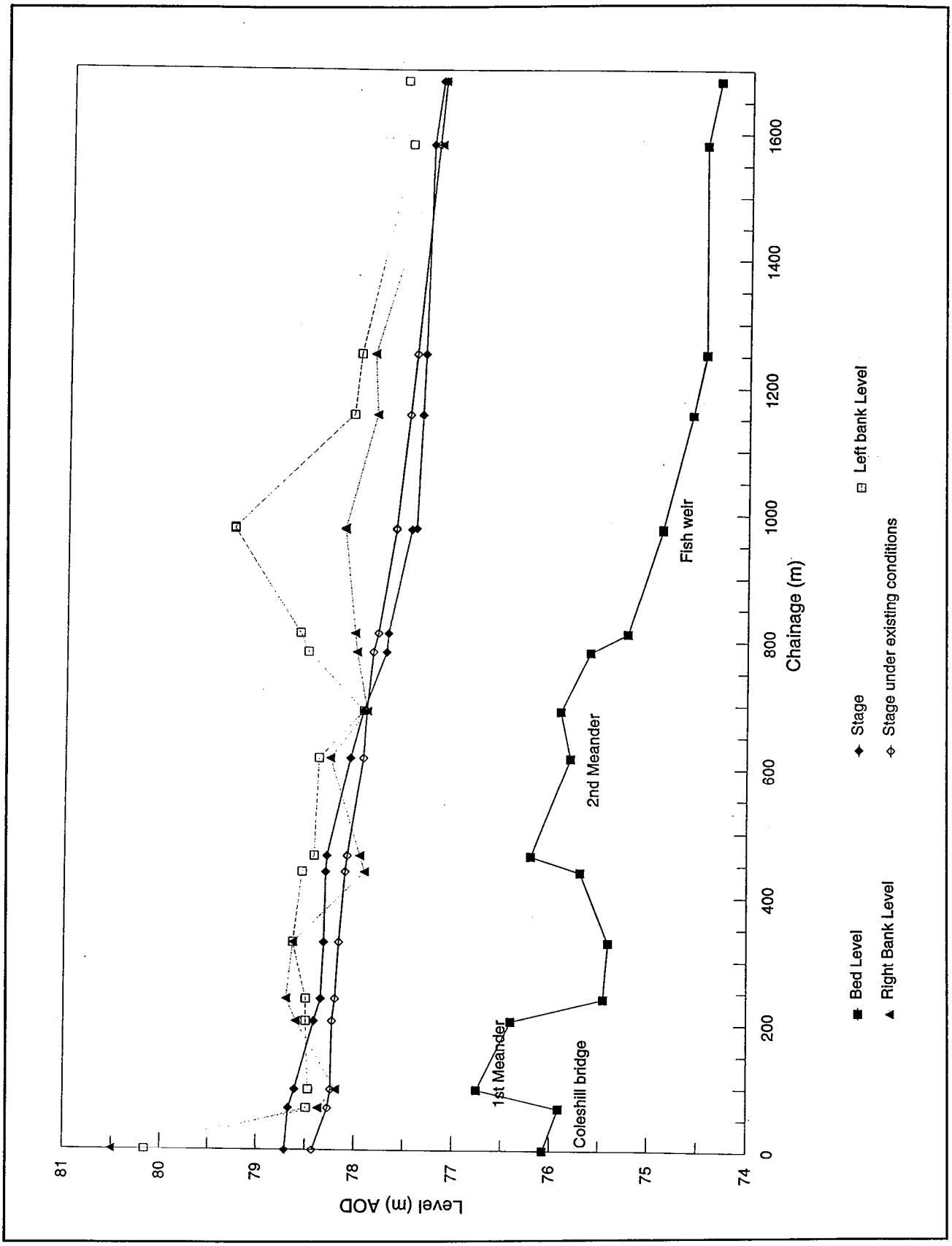


Figure 50. Longitudinal profile - tender plan, downstream reach, use of sluice gates

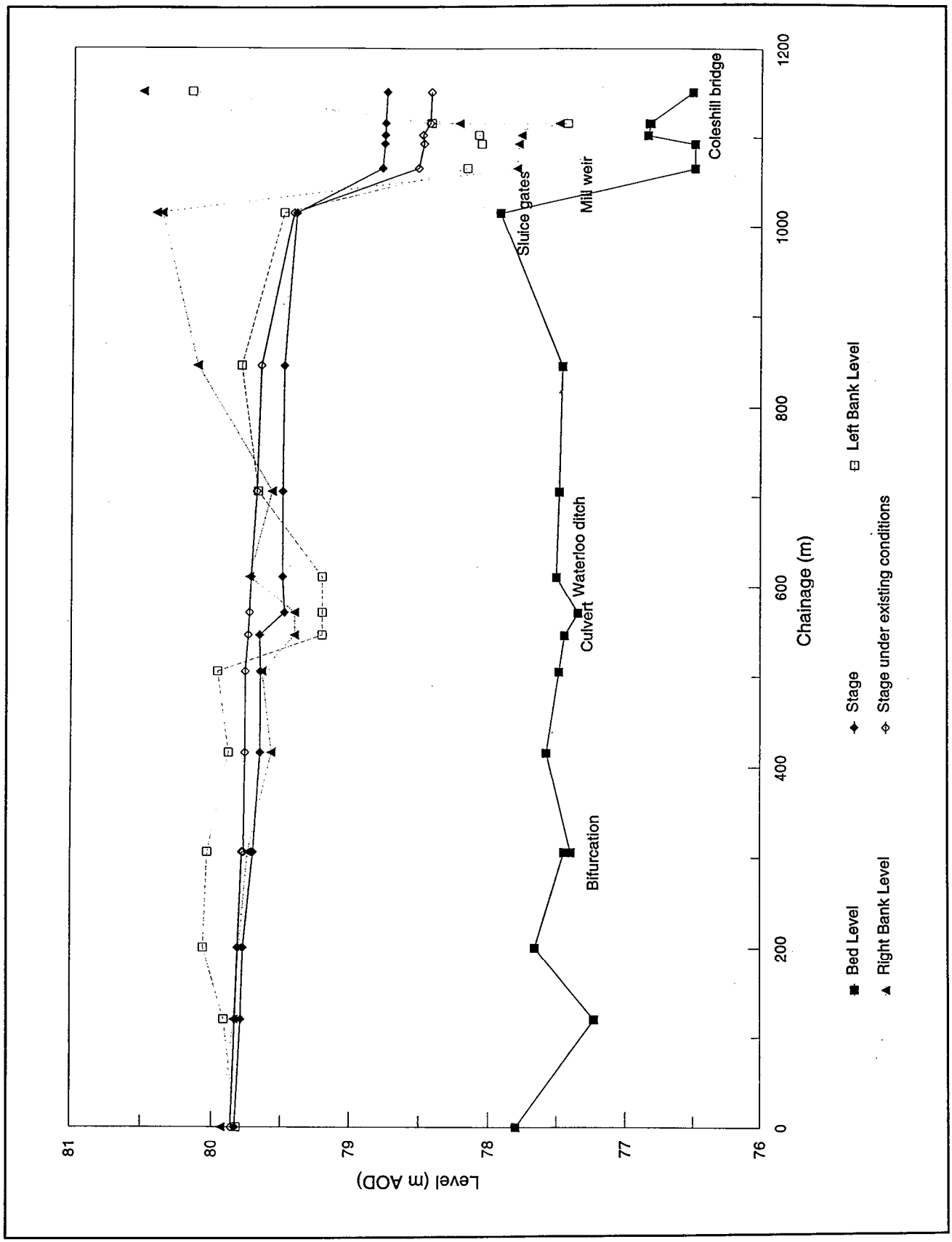


Figure 51. Longitudinal profile - vision plan, mill channel reach, use of sluice gates

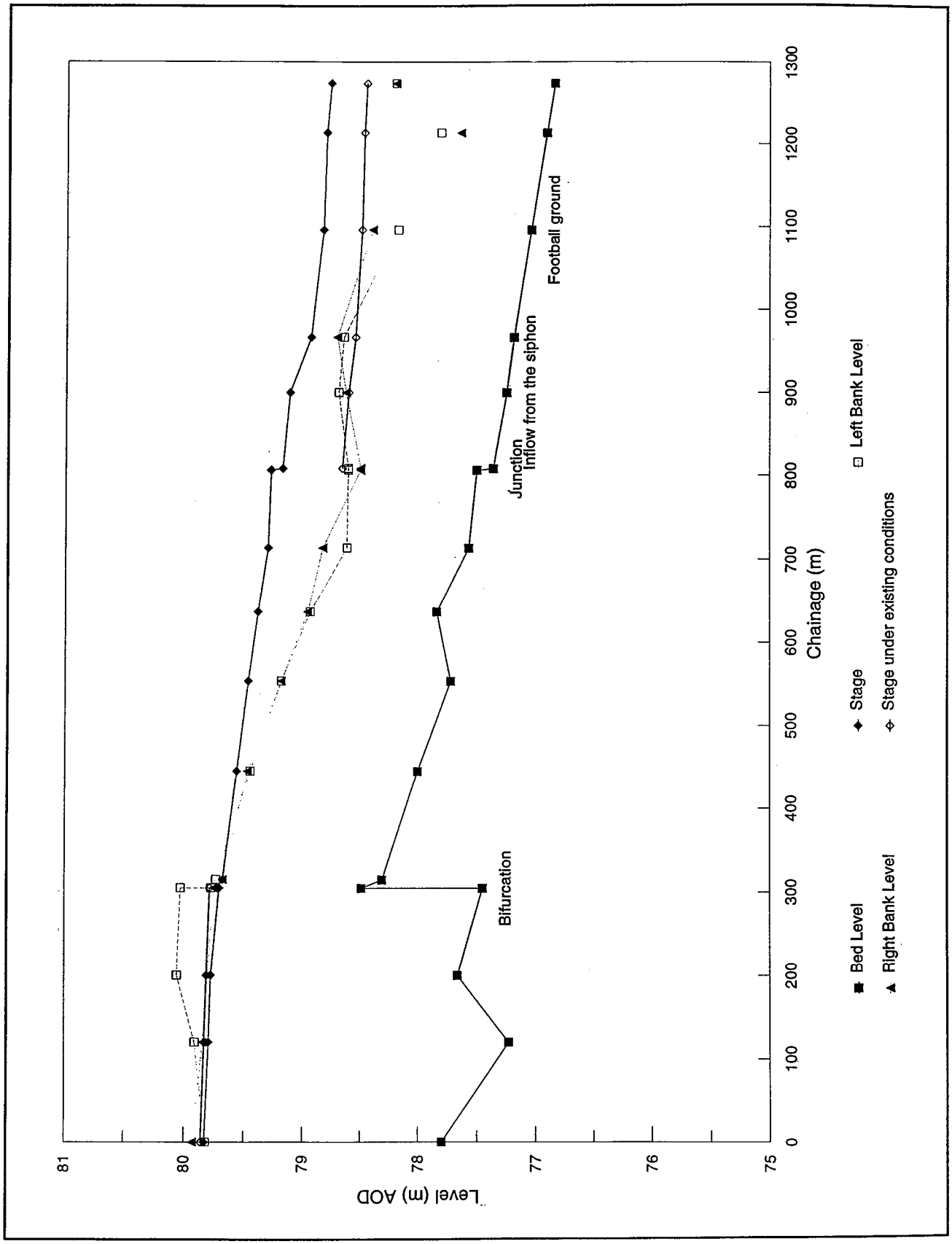


Figure 52. Longitudinal profile - vision plan, new and old channel reach, use of sluice gates

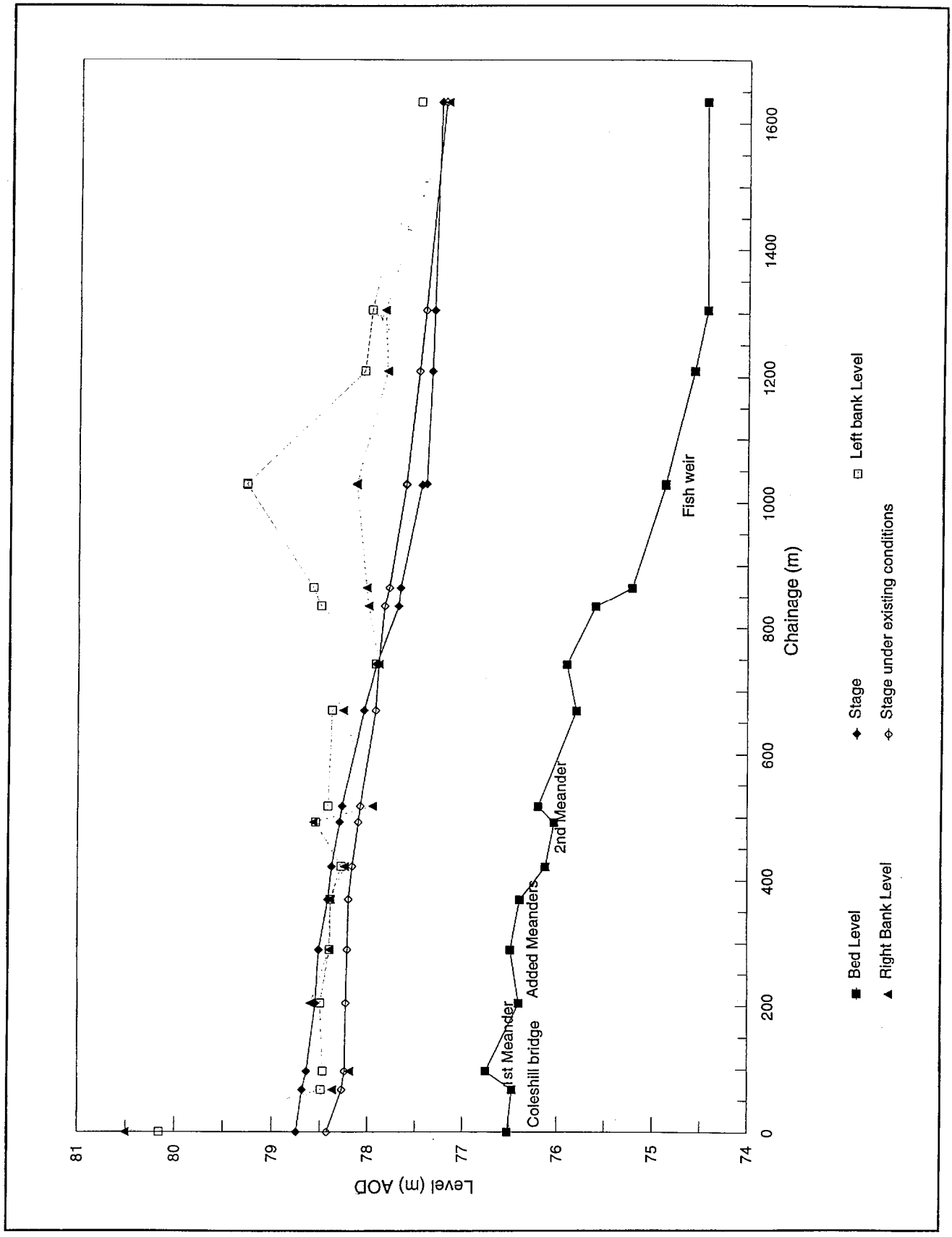


Figure 53. Longitudinal profile - vision plan, downstream reach, use of sluice gates

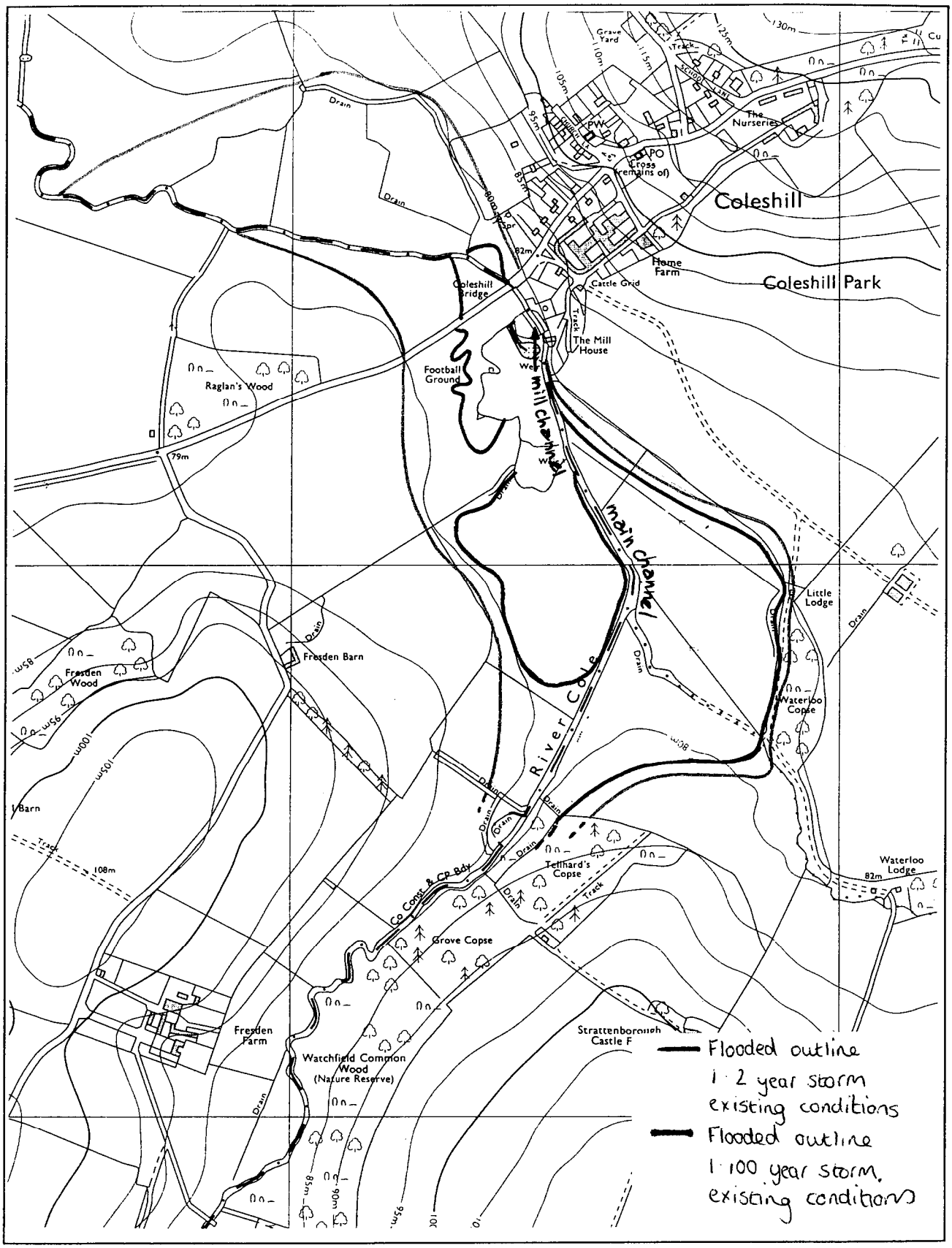


Figure 54. Flooded outline for 1 in 2 year and 1 in 100 year floods, under existing conditions.

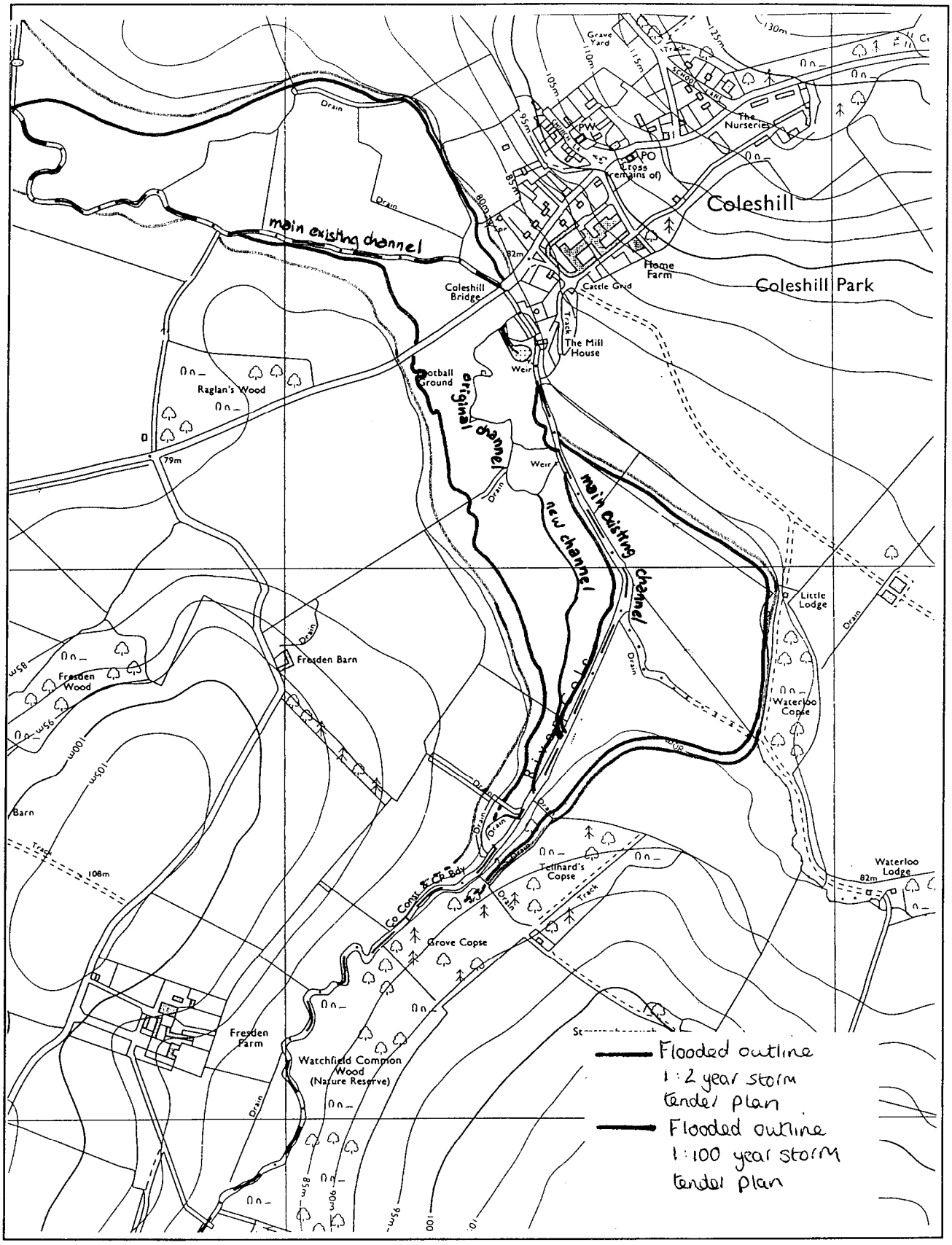


Figure 55. Flooded outline for 1 in 2 year and 1 in 100 year floods, for the tender plan.

Appendices

Appendix A

Existing Conditions

Table A.1 Existing water levels for a 1 in 2 year flood event

Section label	Bed level (m)	Left embankment Level (m)	Stage (m)	Right embankment level (m)
Upstream of Coleshill Bridge				
MC3014	77.23	79.91	79.82	79.84
MC3013	77.66	80.06	79.81	79.80
MC3012	77.45	80.03	79.73	79.74
MC3011	77.58	79.88	79.76	79.57
MC3010	77.49	79.96	79.76	79.73
MC3009	77.51	79.87	79.72	79.73
MC3008	77.49	79.67	79.68	79.57
MC3007	77.47	79.59	79.65	79.46
MC3006	77.47	80	79.65	80.11
MC3005	77.93	79.49	79.42	80.31
RC3005B	77.93	79.33	79.42	80.41
RC3004B2	76.50	78.17	78.52	77.81
RC3004B1	76.50	78.07	78.48	77.80
RC3003B1	76.50	78.09	78.47	77.78
RC3003B	76.20	77.44	78.44	77.50
MC3002	76.20	78.43	78.44	78.23
MC3001	75.98	80.16	78.43	80.51
Downstream of Coleshill Bridge				
MC2065	75.91	78.49	78.27	78.37
MC2063	75.4	78.63	78.16	78.63
MC2060	75.30	78.38	77.89	78.31
MC2057	74.87	79.27	77.60	78.13
MC2055	74.57	78.05	77.47	77.81
MC2054	74.44	77.98	77.40	77.84
MC2051	74.45	77.47	77.20	77.05

Table A.1 Continued				
MC2050	74.32	77.53	77.14	77.15
Old channel reach				
OC3006Aj	76.47	78.77	78.60	78.62
OC3006A	76.56	78.64	78.54	78.7
OC3005A	76.23	78.17	78.48	78.39
OC3003A	76.2	78.19	78.44	78.19
Mill pond reach				
LC3004j	77.93	79.53	79.42	79.23
LC3004	76.25	78.60	78.47	78.56
LC3003	76.2	78.26	78.44	78.54
Downstream of the seven steps				
OC3006j	77.47	79.38	79.65	79.3
OC3007A1	76.91	78.83	78.75	78.71
OC3007A2	76.67	78.26	78.68	78.81

Table A.2 Existing water levels for a 1 in 10 year flood event

Section label	Bed level (m)	Left embankment Level (m)	Stage (m)	Right embankment level (m)
Upstream of Coleshill Bridge				
MC3014	77.23	79.91	80.10	79.84
MC3013	77.66	80.06	80.08	79.80
MC3012	77.45	80.03	80.05	79.74
MC3011	77.58	79.88	80.05	79.57
MC3010	77.49	79.96	80.32	79.73
MC3009	77.51	79.87	79.99	79.73
MC3008	77.49	79.67	79.85	79.57
MC3007	77.47	79.59	79.83	79.46
MC3006	77.47	80	79.83	80.11
MC3005	77.93	79.49	79.61	80.31
RC3005B	77.93	79.33	79.61	80.41
RC3004B2	76.50	78.17	79.12	77.81
RC3004B1	76.50	78.07	79.08	77.80
RC3003B1	76.50	78.09	79.09	77.78
RC3003B	76.20	77.44	79.04	77.50
MC3002	76.20	78.43	79.04	78.23
MC3001	75.98	80.16	79.01	80.51
Downstream of Coleshill Bridge				
MC2065	75.91	78.49	78.73	78.37
MC2063	75.4	78.63	78.53	78.63
MC2060	75.30	78.38	78.21	78.31
MC2057	74.87	79.27	77.93	78.13
MC2055	74.57	78.05	77.81	77.81
MC2054	74.44	77.98	77.75	77.84

Table A.2 Continued				
MC2051	74.45	77.47	77.62	77.05
MC2050	74.32	77.53	77.57	77.15
Old channel reach				
OC3006Aj	76.47	78.77	79.22	78.62
OC3006A	76.56	78.64	79.20	78.7
OC3005A	76.23	78.17	79.12	78.39
OC3003A	76.2	78.19	78.04	78.19
Mill pond reach				
LC3004j	77.93	79.53		79.23
LC3004	76.25	78.60		78.56
LC3003	76.2	78.26		78.54
Downstream of the seven steps				
OC3006j	77.47	79.38	79.12	79.3
OC3007A1	76.91	78.83		78.71
OC3007A2	76.67	78.26		78.81

Table A.3 Existing water levels for a 1 in 50 year flood event

Section label	Bed level (m)	Left embankment Level (m)	Stage (m)	Right embankment level (m)
Upstream of Coleshill Bridge				
MC3014	77.23	79.91	80.30	79.84
MC3013	77.66	80.06	80.28	79.80
MC3012	77.45	80.03	80.26	79.74
MC3011	77.58	79.88	80.24	79.57
MC3010	77.49	79.96	80.24	79.73
MC3009	77.51	79.87	80.20	79.73
MC3008	77.49	79.67	79.99	79.57
MC3007	77.47	79.59	79.94	79.46
MC3006	77.47	80	79.94	80.11
MC3005	77.93	79.49	79.84	80.31
RC3005B	77.93	79.33	79.54	80.41
RC3004B2	76.50	78.17	79.54	77.81
RC3004B1	76.50	78.07	79.50	77.80
RC3003B1	76.50	78.09	79.51	77.78
RC3003B	76.20	77.44	79.46	77.50
MC3002	76.20	78.43	79.46	78.23
MC3001	75.98	80.16	79.40	80.51
Downstream of Coleshill Bridge				
MC2065	75.91	78.49	78.90	78.37
MC2063	75.4	78.63	78.62	78.63
MC2060	75.30	78.38	78.26	78.31
MC2057	74.87	79.27	78.04	78.13
MC2055	74.57	78.05	77.94	77.81
MC2054	74.44	77.98	77.84	77.84

Table A.3 Continued				
MC2051	74.45	77.47	77.72	77.05
MC2050	74.32	77.53	77.67	77.15
Old channel reach				
OC3006Aj	76.47	78.77	79.60	78.62
OC3006A	76.56	78.64	79.56	78.7
OC3005A	76.23	78.17	79.55	78.39
OC3003A	76.2	78.19	78.46	78.19
Mill pond reach				
LC3004j	77.93	79.53		79.23
LC3004	76.25	78.60		78.56
LC3003	76.2	78.26		78.54
Downstream of the seven steps				
OC3006j	77.47	79.38		79.3
OC3007A1	76.91	78.83		78.71
OC3007A2	76.67	78.26		78.81

Table A.4 Existing water levels for a 1 in 100 year flood event

Section label	Bed level (m)	Left embankment Level (m)	Stage (m)	Right embankment level (m)
Upstream of Coleshill Bridge				
MC3014	77.23	79.91	80.52	79.84
MC3013	77.66	80.06	80.48	79.80
MC3012	77.45	80.03	80.45	79.74
MC3011	77.58	79.88	80.43	79.57
MC3010	77.49	79.96	80.43	79.73
MC3009	77.51	79.87	80.40	79.73
MC3008	77.49	79.67	80.36	79.57
MC3007	77.47	79.59	80.19	79.46
MC3006	77.47	80	80.19	80.11
MC3005	77.93	79.49	79.92	80.31
RC3005B	77.93	79.33	79.92	80.41
RC3004B2	76.50	78.17	79.66	77.81
RC3004B1	76.50	78.07	79.62	77.80
RC3003B1	76.50	78.09	79.62	77.78
RC3003B	76.20	77.44	79.56	77.50
MC3002	76.20	78.43	79.56	78.23
MC3001	75.98	80.16	79.49	80.51
Downstream of Coleshill Bridge				
MC2065	75.91	78.49	78.94	78.37
MC2063	75.4	78.63	78.64	78.63
MC2060	75.30	78.38	78.31	78.31
MC2057	74.87	79.27	78.13	78.13
MC2055	74.57	78.05	78.01	77.81
MC2054	74.44	77.98	77.87	77.84

Table A.4 Continued				
MC2051	74.45	77.47	77.74	77.05
MC2050	74.32	77.53	77.68	77.15
Old channel reach				
OC3006Aj	76.47	78.77	79.85	78.62
OC3006A	76.56	78.64	79.80	78.7
OC3005A	76.23	78.17	79.78	78.39
OC3003A	76.2	78.19	78.56	78.19
Mill pond reach				
LC3004j	77.93	79.53	79.92	79.23
LC3004	76.25	78.60	79.55	78.56
LC3003	76.2	78.26	79.56	78.54
Downstream of the seven steps				
OC3006j	77.47	79.38	80.19	79.3
OC3007A1	76.91	78.83	79.98	78.71
OC3007A2	76.67	78.26	79.93	78.81

Table A.5 Existing water levels for a low flow (0.4m^{3}s) event

Section label	Bed level (m)	Left embankment Level (m)	Stage (m)	Right embankment level (m)
Upstream of Coleshill Bridge				
MC3014	77.23	79.91	78.70	79.84
MC3013	77.66	80.06	78.70	79.80
MC3012	77.45	80.03	78.70	79.74
MC3011	77.58	79.88	78.69	79.57
MC3010	77.49	79.96	78.69	79.73
MC3009	77.51	79.87	78.69	79.73
MC3008	77.49	79.67	78.69	79.57
MC3007	77.47	79.59	78.69	79.46
MC3006	77.47	80.00	78.69	80.11
MC3005	77.93	79.49	78.67	80.31
RC3005B	77.93	79.33	78.67	80.41
RC3004B2	76.50	78.17	77.50	77.81
RC3004B1	76.50	78.07	77.41	77.80
RC3003B1	76.50	78.09	77.03	77.78
RC3003B	76.20	77.44	76.55	77.50
MC3002	76.20	78.43	76.55	78.23
MC3001	75.98	80.16	76.46	80.51
Downstream of Coleshill Bridge				
MC2065	75.91	78.49	76.32	78.37
MC2063	75.40	78.63	76.18	78.63
MC2060	75.30	78.38	75.93	78.31
MC2057	74.87	79.27	75.50	78.13
MC2055	74.57	78.05	75.33	77.81
MC2054	74.44	77.98	75.29	77.84
MC2051	74.45	77.47	75.14	77.05
MC2050	74.32	77.53	75.08	77.15

Table A.5 Continued				
Old channel reach				
OC3006Aj	76.47	78.77	76.84	78.62
OC3006A	76.56	78.64	76.75	78.70
OC3005A	76.23	78.17	76.63	78.39
OC3003A	76.20	78.19	76.55	78.19
Mill pont reach				
LC3004j	77.93	79.53	78.67	79.23
LC3004	76.20	78.60	76.95	78.56
LC3003	76.20	78.26	76.55	78.54
Downstream of the seven steps				
OC3006j	77.47	79.38	78.69	79.3
OC3007A1	76.91	78.83	77.12	78.71
OC3007A2	76.67	78.26	76.95	78.81

Appendix B

Options 1, 2 & 3

Table B.1 Option one - Results for the 1 in 2 year storm event

Section label	Bed level (m)	Left embankment Level (m)	Stage (m)	Right embankment level (m)
Upstream of Coleshill Bridge				
MC3014	77.230	80.060	79.763	79.820
MC3013	77.660	80.045	79.741	79.770
MC3012	77.450		79.663	
MC3012A	77.400	79.995	79.663	79.670
MC3011	77.580	80.000	79.662	79.700
MC3010	77.490	79.935	79.661	79.800
MC3009	77.510	79.770	79.659	79.685
MC3008	77.490	79.630	79.658	80.110
MC3007	77.470		79.657	
MC3006	77.470	79.725	79.657	80.390
MC3005	77.930		79.651	
RC3005B	77.930		79.651	
RC3004B2	76.500		78.943	
RC3004B1	76.500	78.205	78.925	77.849
RC3003B1	76.500		78.922	
RC3003B	76.200		78.903	
MC3002	76.819	80.200	78.903	80.550
MC3001	76.772		78.882	
Downstream of Coleshill Bridge				
MC2065	76.682	78.751	78.814	78.823
MC2063	76.424	78.630	78.612	78.630
MC2063A	76.263	78.733	78.414	78.391
MC2060	75.900	79.270	78.1	78.141
MC2057w	75.600		77.8	
MC2057	75.300	78.289	77.5	78.071

Table B.1 Continued				
MC2055	74.970	78.015	77.373	77.840
MC2054	74.440	77.802	77.306	77.685
MC2051	74.450	77.530	77.107	77.165
MC2050	74.320	74.320	77.041	77.119
Added channel and old channel reach				
MC3014	77.230	80.060	79.763	79.820
MC3013	77.660	80.045	79.741	79.770
MC3012	77.450		79.663	
AC3012j	78.300		79.663	
AC3012w	77.900	79.425	79.647	79.425
AC3011A	77.815	79.300	79.483	79.300
AC3010A	77.732	79.050	79.345	79.050
AC3009A	77.668	78.790	79.269	78.875
AC3008A	77.359	78.600	79.234	78.60
AC3007Aw	77.536		79.225	
AC3007A	77.177		79.11	
OC3006	77.177	78.800	79.11	78.755
OC3006Aj	77.106	78.720	79.061	78.725
OC3006A	77.055	78.405	78.984	78.625
OC3005A	76.955	77.990	78.931	78.070
OC3004A	76.865	78.430	78.916	77.922
OC3003A	76.569		78.903	
Mill pond reach				
LC3004j	77.930		79.651	
LC3004	76.250	78.830	78.904	78.375
LC3003	76.200		78.903	
Downstream of the seven steps				
OC3006j	77.470		79.657	
OC3007A1	77.601	78.810	79.113	78.810
OC3007A2	77.522		79.110	

Table B.2 Option one - Results for the 1 in 100 year storm event

Section label	Bed level (m)	Left bankLevel (m)	Stage (m)	Right bank level (m)
Upstream of Coleshill Bridge				
MC3014	77.230	80.060	80.226	79.820
MC3013	77.660	80.045	80.184	79.770
MC3012	77.450		79.951	
MC3012A	77.40	79.995	79.951	79.670
MC3011	77.580	80.000	79.938	79.700
MC3010	77.490	79.935	79.933	79.800
MC3009	77.510	79.770	79.895	79.685
MC3008	77.490	79.630	79.863	80.110
MC3007	77.470		79.874	
MC3006	77.470	79.725	79.874	80.390
MC3005	77.930		79.885	
RC3005B	77.930		79.885	
RC3004B2	76.500		79.374	
RC3004B1	76.500	78.205	79.342	77.849
RC3003B1	76.500		79.347	
RC3003B	76.200		79.32	
MC3002	76.819	80.200	79.32	80.550
MC3001	76.772		79.252	
Downstream of Coleshill Bridge				
MC2065	76.682	78.751	78.995	78.823
MC2063	76.424	78.630	78.756	78.630
MC2063A	76.263	78.733	78.502	78.391
MC2060	75.998	79.270	78.147	78.141
MC2057w	74.870		77.77.941	
MC2057	75.620	78.289	77.868	78.071

Table B.2 Continued				
MC2055	74.570	78.015	77.806	77.840
MC2054	74.440	77.802	77.758	77.685
MC2051	74.450	77.530	77.657	77.165
MC2050	74.320	74.320	77.612	77.119
Added channel and old channel reach				
MC3014	77.230	80.060	80.226	79.820
MC3013	77.660	80.045	80.184	79.770
MC3012	77.450		79.951	
AC3012j	78.300		79.951	
AC3012w	77.900	79.425	79.917	79.425
AC3011A	77.815	79.300	79.712	79.300
AC3010A	77.732	79.050	79.59	79.050
AC3009A	77.668	78.790	79.521	78.875
AC3008A	77.359	78.600	79.512	78.600
AC3007Aw	77.536		79.511	
AC3007A	77.177		79.448	
OC3006	77.177	78.800	79.448	78.755
OC3006Aj	77.106	78.720	79.418	78.725
OC3006A	77.055	78.405	79.383	78.625
OC3005A	76.955	77.990	79.358	78.070
OC3004A	76.865	78.430	79.34	77.922
OC3003A	76.569		79.32	
Mill pond reach				
LC3004j	77.930		79.885	
LC3004	76.250		79.327	
LC3003	76.20	78.83	79.32	78.375
Downstream of the seven steps				
OC3006j	77.470		79.874	
OC3007A1	77.601	78.810	79.451	78.810
OC3007A2	77.522		79.448	

Table B.3 Option Two, 1 in 2 year storm event

Section label	Bed level (m)	Left bank Level (m)	Stage (m)	Right bank level (m)
Upstream of Coleshill Bridge				
MC3014	77.23	80.060	79.809	79.820
MC3013	77.66	80.045	79.791	79.770
MC3012	77.45		79.724	
MC3012A	77.4	79.995	79.724	79.670
MC3011	77.58	80.000	79.72	79.700
MC3010	77.49	79.935	79.721	79.800
MC3009	77.51	79.770	79.715	79.685
MC3008	77.49	79.630	79.714	80.11
MC3007	77.47		79.714	
MC3006	77.47	79.725	79.714	80.390
MC3005	77.93		79.708	
RC3005B	77.93		79.708	
RC3004B2	76.5		78.652	
RC3004B1	76.5	78.205	78.628	77.849
RC3003B1	76.5		78.626	
RC3003B	76.2		78.601	
MC3002	76.2	80.200	78.601	80.550
MC3001	75.98		78.585	
Downstream of Coleshill Bridge				
MC2065	75.91	78.751	78.521	78.823
MC2063	75.4	78.630	78.412	78.630
MC2063A	75.1	78.733	78.288	78.391
MC2060	75.3	79.270	77.997	78.141
MC2057w	74.87		77.696	
MC2057	74.87	78.289	77.580	78.071

Table B.3 Continued				
MC2055	74.57	78.015	77.449	77.84
MC2054	74.44	77.802	77.385	77.685
MC2051	74.45	77.530	77.184	77.165
MC2050	74.32	74.320	77.118	77.119
Added channel and old channel reach				
MC3014	77.23	80.060	79.809	79.820
MC3013	77.66	80.045	79.791	79.770
MC3012	77.45		79.724	
AC3012j	78.3		79.724	
AC3012w	78.1	79.425	79.712	79.425
AC3011A	78.015	79.300	79.487	79.300
AC3010A	77.932	79.050	79.295	79.050
AC3009A	77.868	78.790	79.193	78.875
AC3008A	77.559	78.600	79.127	78.600
AC3007A	77.286		79.083	
OC3006	77.244	78.800	79.083	78.755
OC3006Aj	76.47	78.720	78.988	78.725
OC3006A	76.56	78.405	78.814	78.625
OC3005A	76.23	77.990	78.725	78.070
OC3004A	76.32	78.430	78.686	77.922
OC3003A	76.2		78.601	
Mill pond reach				
LC3004j	77.93		79.708	
LC3004	76.25	78.830	78.601	78.375
LC3003	76.2		78.601	
Downstream of the seven steps				
OC3006j	77.58		79.714	
OC3007A1	77.59	78.810	79.084	78.810
OC3007A2	77.601		79.083	

Table B. 4 Option three, Results for the 1 in 2 year storm event

Section label	Bed level (m)	Left embankment Level (m)	Stage (m)	Right embankment level (m)
Upstream of Coleshill Bridge				
MC3014	77.230	80.060	79.809	79.820
MC3013	77.660	80.045	79.791	79.770
MC3012	77.450		79.724	
MC3012A	77.400	79.995	79.724	79.670
MC3011	77.580	80.000	79.720	79.700
MC3010	77.490	79.935	79.721	79.800
MC3009	77.510	79.770	79.715	79.685
MC3008	77.490	79.630	79.714	80.11
MC3007	77.470		79.714	
MC3006	77.470	79.725	79.714	80.390
MC3005	77.930		79.708	
RC3005B	77.930		79.708	
RC3004B2	76.500		78.476	
RC3004B1	76.500	78.205	78.444	77.849
RC3003B1	76.500		78.446	
MC3003B	76.200		78.407	
MC3002	76.200	80.200	78.407	80.550
MC3001	76.070		78.390	
Downstream of Coleshill Bridge				
MC2065	75.910	78.751	78.349	78.823
MC2063	75.400	78.733	78.256	78.391
MC2060	75.300	79.270	77.980	78.141
MC2057w	74.870		77.697	
MC2057	74.870	78.289	77.580	78.071
MC2055	74.570	78.015	77.450	77.840

Table B.4 Continued				
MC2054	74.440	77.802	77.385	77.685
MC2051	74.450	77.530	77.184	77.165
MC2050	74.320	74.320	77.119	77.119
Added channel and old channel reach				
MC3014	77.230	80.060	79.809	79.820
MC3013	77.660	80.045	79.791	79.770
MC3012	77.450		79.724	
AC3012j	78.300		79.724	
AC3012w	78.100	79.425	79.712	79.425
AC3011A	78.015	79.300	79.486	79.300
AC3010A	77.932	79.050	79.289	79.050
AC3009A	77.868	78.790	79.178	78.875
AC3008A	77.559	78.600	79.099	78.600
AC3007A	77.286		79.043	
OC3006	77.244	78.800	79.043	78.755
AC3006Aj	76.470	78.720	78.928	78.725
OC3006A	76.560	78.405	78.729	78.625
AC3005A	76.230	77.990	78.581	78.070
AC3004A	76.320	78.430	78.514	77.922
AC3003A	76.200		78.407	
Mill pond reach				
LC3004j	77.930		79.708	
LC3004	76.250	78.830	78.408	78.375
LC3003	76.200		78.407	
Downstream of the seven steps				
OC3006j	77.580		79.714	
OC3007A1	77.590	78.810	79.045	78.810
OC3007A2	77.601		79.043	

Appendix C

Tender Plan

Table C.1 Tender Plan - 1 in 2 year flood event

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	79.83	79.93
MC3014	77.23	79.91	79.79	79.84
MC3013	77.66	80.06	79.78	79.80
MC3012	77.45	80.03	79.70	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	79.70	79.74
MC3011	77.58	79.88	79.66	79.57
MC3010	77.49	79.96	79.66	79.64
MC3010c	77.45	79.2	79.66	79.4
MC3009c	77.35	79.2	79.53	79.4
MC3009	77.51	79.2	79.54	79.73
MC3008	77.49	79.67	79.55	79.57
MC3007	77.47	79.80	79.55	80.11
MC3006	77.47	79.80	79.55	80.11
MC3005	77.93	79.49	79.54	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.20	78.43	78.71	78.23
MC3001	76.07	80.16	78.70	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	75.91	78.49	78.66	78.37
MC2065w	76.75	78.47	78.60	78.19
MC2064	76.40	78.50	78.41	78.60
MC2064w	75.45	78.50	78.34	78.70
MC2063	75.40	78.63	78.31	78.63

Table C.1 Continued				
MC2062	75.69	78.54	78.30	77.90
MC2062w	76.20	78.42	78.28	77.95
MC2061	75.80	78.38	78.05	78.26
MC2060	75.90	77.92	77.92	77.89
MC2059	75.60	78.50	77.68	78.00
MC2059w	75.22	78.58	77.66	78.02
MC2057w	74.87	79.27	77.43	78.13
MC2057	74.87	79.27	77.38	78.13
MC2055	74.57	78.05	77.33	77.81
MC2054	74.44	77.98	77.30	77.84
MC2051	74.45	77.47	77.24	77.18
MC2050	74.32	77.53	77.15	77.15
Mill Channel				
RC3005B	77.93	79.49	79.54	80.41
RC3004B2	76.50	78.17	78.75	77.81
RC3004B1	76.50	78.07	78.73	77.80
RC3003B1	76.50	78.09	78.73	77.78
RC3003B	76.20	77.44	78.71	77.5
Added New channel				
AC3012j	78.48	79.77	79.70	79.75
AC3012w	78.30	79.73	79.68	79.67
AC3011A	78.00	79.44	79.57	79.46
AC3010A	77.72	79.18	79.49	79.18
AC3009A	77.84	78.93	79.41	78.95
AC3008A	77.57	78.61	79.30	78.82
AC3007A1	77.50	78.60	79.27	78.49
AC3007A	76.67	78.60	79.13	78.49
Old original channel				
OC3006	76.67	78.60	79.13	78.49
OC3006Aj	76.47	78.69	79.04	78.62

Table C.1 Continued				
OC3006A	76.56	78.64	78.88	78.70
OC3005A	76.23	78.17	78.82	78.39
OC3004Aj	76.32	77.81	78.79	77.64
OC3003A	76.20	78.19	78.71	78.19

Table C.2 Tender plan - 1 in 10 year flood event

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	80.10	79.93
MC3014	77.23	79.91	80.03	79.84
MC3013	77.66	80.06	80.00	79.80
MC3012	77.45	80.03	79.89	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	79.89	79.74
MC3011	77.58	79.88	79.85	79.57
MC3010	77.49	79.96	79.85	79.64
MC3010c	77.45	79.2	79.86	79.4
MC3009c	77.35	79.2	79.71	79.4
MC3009	77.51	79.2	79.71	79.73
MC3008	77.49	79.67	79.71	79.57
MC3007	77.47	79.80	79.71	80.11
MC3006	77.47	79.80	79.71	80.11
MC3005	77.93	79.49	79.69	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.20	78.43	78.95	78.23
MC3001	76.07	80.16	78.94	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	75.91	78.49	78.81	78.37
MC2065w	76.75	78.47	78.75	78.19

Table C.2 Continued				
MC2064	76.40	78.50	78.58	78.60
MC2064w	75.45	78.50	78.57	78.70
MC2063	75.40	78.63	78.48	78.63
MC2062	75.69	78.54	78.46	77.90
MC2062w	76.20	78.42	78.45	77.95
MC2061	75.80	78.38	78.34	78.26
MC2060	75.90	77.92	78.22	77.89
MC2059	75.60	78.50	78.06	78.00
MC2059w	75.22	78.58	78.05	78.02
MC2057w	74.87	79.27	77.87	78.13
MC2057	74.87	79.27	77.81	78.13
MC2055	74.57	78.05	77.76	77.81
MC2054	74.44	77.98	77.72	77.84
MC2051	74.45	77.47	77.64	77.18
MC2050	74.32	77.53	77.59	77.15
Mill Channel				
RC3005B	77.93	79.49	79.69	80.41
RC3004B2	76.50	78.17	79.01	77.81
RC3004B1	76.50	78.07	78.98	77.80
RC3003B1	76.50	78.09	78.98	77.78
RC3003B	76.20	77.44	78.95	77.5
Added New channel				
AC3012j	78.48	79.77	79.89	79.75
AC3012w	78.30	79.73	79.85	79.67
AC3011A	78.00	79.44	79.71	79.46
AC3010A	77.72	79.18	79.66	79.18
AC3009A	77.84	78.93	79.61	78.95

Table C.2 Continued				
AC3008A	77.57	78.61	79.54	78.82
AC3007A1	77.50	78.60	79.54	78.49
AC3007A	76.67	78.60	79.43	78.49
Old original channel				
OC3006	76.67	78.60	79.43	78.49
OC3006Aj	76.47	78.69	79.35	78.62
OC3006A	76.56	78.64	79.15	78.70
OC3005A	76.23	78.17	79.11	78.39
OC3004Aj	76.32	77.81	79.08	77.64
OC3003A	76.20	78.19	78.95	78.19

Table C.3 Tender plan - 1 in 50 year flood event

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	80.26	79.93
MC3014	77.23	79.91	80.21	79.84
MC3013	77.66	80.06	80.19	79.80
MC3012	77.45	80.03	80.04	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	80.04	79.74
MC3011	77.58	79.88	80.01	79.57
MC3010	77.49	79.96	80.01	79.64
MC3010c	77.45	79.2	80.02	79.4
MC3009c	77.35	79.2	79.86	79.4
MC3009	77.51	79.2	79.84	79.73
MC3008	77.49	79.67	79.82	79.57
MC3007	77.47	79.80	79.82	80.11
MC3006	77.47	79.80	79.82	80.11
MC3005	77.93	79.49	79.81	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.20	78.43	79.22	78.23
MC3001	76.07	80.16	79.20	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	75.91	78.49	78.92	78.37
MC2065w	76.75	78.47	78.89	78.19
MC2064	76.40	78.50	78.75	78.60
MC2064w	75.45	78.50	78.73	78.70

Table C.3 Continued				
MC2063	75.40	78.63	78.61	78.63
MC2062	75.69	78.54	78.59	77.90
MC2062w	76.20	78.42	78.58	77.95
MC2061	75.80	78.38	78.51	78.26
MC2060	75.90	77.92	78.36	77.89
MC2059	75.60	78.50	78.25	78.00
MC2059w	75.22	78.58	78.24	78.02
MC2057w	74.87	79.27	78.08	78.13
MC2057	74.87	79.27	78.01	78.13
MC2055	74.57	78.05	77.93	77.81
MC2054	74.44	77.98	77.84	77.84
MC2051	74.45	77.47	77.72	77.18
MC2050	74.32	77.53	77.67	77.15
Mill Channel				
RC3005B	77.93	79.49	79.81	80.41
RC3004B2	76.50	78.17	79.30	77.81
RC3004B1	76.50	78.07	79.27	77.80
RC3003B1	76.50	78.09	79.27	77.78
RC3003B	76.20	77.44	78.22	77.5
Added New channel				
AC3012j	78.48	79.77	80.04	79.75
AC3012w	78.30	79.73	79.97	79.67
AC3011A	78.00	79.44	79.84	79.46
AC3010A	77.72	79.18	79.81	79.18
AC3009A	77.84	78.93	79.78	78.95
AC3008A	77.57	78.61	79.74	78.82
AC3007A1	77.50	78.60	79.74	78.49
AC3007A	76.67	78.60	79.64	78.49
Old original channel				

Table C.3 Continued				
OC3006	76.67	78.60	79.64	78.49
OC3006Aj	76.47	78.69	79.57	78.62
OC3006A	76.56	78.64	79.44	78.70
OC3005A	76.23	78.17	79.42	78.39
OC3004Aj	76.32	77.81	79.38	77.64
OC3003A	76.20	78.19	79.22	78.19

Table C.4 Tender plan - 1 in 100 year flood event

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	80.34	79.93
MC3014	77.23	79.91	80.28	79.84
MC3013	77.66	80.06	80.26	79.80
MC3012	77.45	80.03	80.11	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	80.11	79.74
MC3011	77.58	79.88	80.08	79.57
MC3010	77.49	79.96	80.09	79.64
MC3010c	77.45	79.2	80.10	79.4
MC3009c	77.35	79.2	79.95	79.4
MC3009	77.51	79.2	79.92	79.73
MC3008	77.49	79.67	79.88	79.57
MC3007	77.47	79.80	79.88	80.11
MC3006	77.47	79.80	79.88	80.11
MC3005	77.93	79.49	79.87	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.20	78.43	79.38	78.23
MC3001	76.07	80.16	79.36	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	75.91	78.49	78.97	78.37
MC2065w	76.75	78.47	78.96	78.19
MC2064	76.40	78.50	78.81	78.60
MC2064w	75.45	78.50	78.80	78.70
MC2063	75.40	78.63	78.66	78.63

Table C.4 Continued				
MC2062	75.69	78.54	78.64	77.90
MC2062w	76.20	78.42	78.64	77.95
MC2061	75.80	78.38	78.58	78.26
MC2060	75.90	77.92	78.42	77.89
MC2059	75.60	78.50	78.32	78.00
MC2059w	75.22	78.58	78.31	78.02
MC2057w	74.87	79.27	78.16	78.13
MC2057	74.87	79.27	78.09	78.13
MC2055	74.57	78.05	77.99	77.81
MC2054	74.44	77.98	77.88	77.84
MC2051	74.45	77.47	77.75	77.18
MC2050	74.32	77.53	77.69	77.15
Mill Channel				
RC3005B	77.93	79.49	79.87	80.41
RC3004B2	76.50	78.17	79.46	77.81
RC3004B1	76.50	78.07	79.43	77.80
RC3003B1	76.50	78.09	79.43	77.78
RC3003B	76.20	77.44	79.38	77.5
Added New channel				
AC3012j	78.48	79.77	80.11	79.75
AC3012w	78.30	79.73	80.04	79.67
AC3011A	78.00	79.44	79.93	79.46
AC3010A	77.72	79.18	79.90	79.18
AC3009A	77.84	78.93	79.87	78.95
AC3008A	77.57	78.61	79.84	78.82
AC3007A1	77.50	78.60	79.84	78.49
AC3007A	76.67	78.60	79.76	78.49
Old original channel				
OC3006	76.67	78.60	79.76	78.49
OC3006Aj	76.47	78.69	79.70	78.62

Table C.4 Continued				
OC3006A	76.56	78.64	79.61	78.70
OC3005A	76.23	78.17	79.58	78.39
OC3004Aj	76.32	77.81	79.55	77.64
OC3003A	76.20	78.19	79.38	78.19

Table C.5 Tender plan - low flow 0.4m^3/s

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	78.71	79.93
MC3014	77.23	79.91	78.71	79.84
MC3013	77.66	80.06	78.71	79.80
MC3012	77.45	80.03	78.71	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	78.71	79.74
MC3011	77.58	79.88	78.71	79.57
MC3010	77.49	79.96	78.71	79.64
MC3010c	77.45	79.2	78.71	79.4
MC3009c	77.35	79.2	78.71	79.4
MC3009	77.51	79.2	78.71	79.73
MC3008	77.49	79.67	78.71	79.57
MC3007	77.47	79.80	78.71	80.11
MC3006	77.47	79.80	78.71	80.11
MC3005	77.93	79.49	78.71	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.20	78.43	77.47	78.23
MC3001	76.07	80.16	77.46	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	75.91	78.49	77.46	78.37
MC2065w	76.75	78.47	77.12	78.19
MC2064	76.40	78.50	76.71	78.60
MC2064w	75.45	78.50	76.69	78.70
MC2063	75.40	78.63	76.68	78.63

Table C.5 Continued				
MC2062	75.69	78.54	76.68	77.90
MC2062w	76.20	78.42	76.67	77.95
MC2061	75.80	78.38	76.42	78.26
MC2060	75.90	77.92	76.25	77.89
MC2059	75.60	78.50	75.93	78.00
MC2059w	75.22	78.58	75.90	78.02
MC2057w	74.87	79.27	75.60	78.13
MC2057	74.87	79.27	75.25	78.13
MC2055	74.57	78.05	75.06	77.81
MC2054	74.44	77.98	75.03	77.84
MC2051	74.45	77.47	74.88	77.18
MC2050	74.32	77.53	74.83	77.15
Mill Channel				
RC3005B	77.93	79.49	78.71	80.41
RC3004B2	76.50	78.17	77.47	77.81
RC3004B1	76.50	78.07	77.47	77.80
RC3003B1	76.50	78.09	77.47	77.78
RC3003B	76.20	77.44	77.47	77.5
Added New channel				
AC3012j	78.48	79.77	78.71	79.75
AC3012w	78.30	79.73	78.67	79.67
AC3011A	78.00	79.44	78.50	79.46
AC3010A	77.72	79.18	78.39	79.18
AC3009A	77.84	78.93	78.29	78.95
AC3008A	77.57	78.61	78.17	78.82
AC3007A1	77.50	78.60	77.90	78.49
AC3007A	76.67	78.60	77.49	78.49
Old original channel				
OC3006	76.67	78.60	77.49	78.49
OC3006Aj	76.47	78.69	77.48	78.62

Table C.5 Continued				
OC3006A	76.56	78.64	77.48	78.70
OC3005A	76.23	78.17	77.47	78.39
OC3004Aj	76.32	77.81	77.47	77.64
OC3003A	76.20	78.19	77.47	78.19

Table C.6 Tender plan - 1 in 2 year flood event with sluices open

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	79.83	79.93
MC3014	77.23	79.91	79.79	79.84
MC3013	77.66	80.06	79.77	79.80
MC3012	77.45	80.03	79.70	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	79.70	79.74
MC3011	77.58	79.88	79.65	79.57
MC3010	77.49	79.96	79.65	79.64
MC3010c	77.45	79.2	79.65	79.4
MC3009c	77.35	79.2	79.47	79.4
MC3009	77.51	79.2	79.49	79.73
MC3008	77.49	79.67	79.48	79.57
MC3007	77.47	79.80	79.48	80.11
MC3006	77.47	79.80	79.48	80.11
MC3005	77.93	79.49	79.39	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.20	78.43	78.72	78.23
MC3001	76.07	80.16	78.71	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	75.91	78.49	78.67	78.37
MC2065w	76.75	78.47	78.60	78.19
MC2064	76.40	78.50	78.41	78.60
MC2064w	75.45	78.50	78.34	78.70
MC2063	75.40	78.63	78.31	78.63

Table C.6 Continued				
MC2062	75.69	78.54	78.30	77.90
MC2062w	76.20	78.42	78.29	77.95
MC2061	75.80	78.38	78.06	78.26
MC2060	75.90	77.92	77.93	77.89
MC2059	75.60	78.50	77.70	78.00
MC2059w	75.22	78.58	77.68	78.02
MC2057w	74.87	79.27	77.45	78.13
MC2057	74.87	79.27	77.40	78.13
MC2055	74.57	78.05	77.34	77.81
MC2054	74.44	77.98	77.32	77.84
MC2051	74.45	77.47	77.26	77.18
MC2050	74.32	77.53	77.17	77.15
Mill Channel				
RC3005B	77.93	79.49	79.40	80.41
RC3004B2	76.50	78.17	78.75	77.81
RC3004B1	76.50	78.07	78.74	77.80
RC3003B1	76.50	78.09	78.74	77.78
RC3003B	76.20	77.44	78.72	77.5
Added New channel				
AC3012j	78.48	79.77	79.70	79.75
AC3012w	78.30	79.73	79.67	79.67
AC3011A	78.00	79.44	79.55	79.46
AC3010A	77.72	79.18	79.44	79.18
AC3009A	77.84	78.93	79.35	78.95
AC3008A	77.57	78.61	79.23	78.82
AC3007A1	77.50	78.60	79.19	78.49
AC3007A	76.67	78.60	79.00	78.49
Old original channel				
OC3006	76.67	78.60	79.00	78.49
OC3006Aj	76.47	78.69	78.92	78.62

Table C.6 Continued				
OC3006A	76.56	78.64	78.81	78.70
OC3005A	76.23	78.17	78.76	78.39
OC3004Aj	76.32	77.81	78.74	77.64
OC3003A	76.20	78.19	78.72	78.19

Appendix D

Vision Plan

Table D.1 Vision Plan - 1 in 2 year flood event

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	79.84	79.93
MC3014	77.23	79.91	79.80	79.84
MC3013	77.66	80.06	79.78	79.80
MC3012	77.45	80.03	79.71	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	79.71	79.74
MC3011	77.58	79.88	79.66	79.57
MC3010	77.49	79.96	79.66	79.64
MC3010c	77.45	79.2	79.67	79.4
MC3009c	77.35	79.2	79.54	79.4
MC3009	77.51	79.2	79.56	79.73
MC3008	77.49	79.67	79.56	79.57
MC3007	77.47	79.80	79.56	80.11
MC3006	77.47	79.80	79.56	80.11
MC3005	77.93	79.49	79.55	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.84	78.43	78.75	78.23
MC3001	76.52	80.16	78.74	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	76.47	78.49	78.68	78.37
MC2065w	76.75	78.47	78.64	78.19
MC2064	76.40	78.50	78.55	78.60
MC2063a	76.49	78.40	78.50	78.40
MC2063b	76.39	78.39	78.41	78.39

Table D.1 Continued				
MC2063c	76.12	78.28	78.38	78.24
MC2062	76.03	78.55	78.29	78.57
MC2062w	76.20	78.42	78.27	77.95
MC2061	75.80	78.38	78.04	78.26
MC2060	75.90	77.92	77.91	77.89
MC2059	75.60	78.50	77.67	78.00
MC2059w	75.22	78.58	77.65	78.02
MC2057w	74.87	79.27	77.42	78.13
MC2057	74.87	79.27	77.37	78.13
MC2055	74.57	78.05	77.31	77.81
MC2054	74.44	77.98	77.29	77.84
MC2051	74.45	77.47	77.23	77.18
MC2050	74.32	77.53	77.14	77.15
Mill Channel				
RC3005B	77.93	79.49	79.55	80.41
RC3004B2	76.50	78.17	78.78	77.81
RC3004B1	76.50	78.07	78.75	77.80
RC3003B1	76.85	78.09	78.75	77.78
RC3003B	76.83	77.44	78.75	77.5
Added New channel				
AC3012j	78.48	79.77	79.71	79.75
AC3012w	78.30	79.73	79.68	79.67
AC3011A	78.00	79.44	79.58	79.46
AC3010A	77.72	79.18	79.50	79.18
AC3009A	77.84	78.93	79.44	78.95
AC3008A	77.57	78.61	79.36	78.82
AC3007A1	77.50	78.60	79.35	78.49
AC3007A	77.36	78.60	79.26	78.49
Old original channel				
OC3006	77.36	78.60	79.26	78.49

Table D.1 Continued				
OC3006Aj	77.25	78.69	79.20	78.62
OC3006A	77.19	78.64	79.02	78.70
OC3005A	77.04	78.17	78.93	78.39
OC3004Aj	76.91	77.81	78.90	77.64
OC3003A	76.84	78.19	78.75	78.19

Table D.3 Continued				
MC2063c	76.12	78.28	78.62	78.24
MC2062	76.03	78.55	78.55	78.57
MC2062w	76.20	78.42	78.54	77.95
MC2061	75.80	78.38	78.47	78.26
MC2060	75.90	77.92	78.33	77.89
MC2059	75.60	78.50	78.24	78.00
MC2059w	75.22	78.58	78.23	78.02
MC2057w	74.87	79.27	78.08	78.13
MC2057	74.87	79.27	78.01	78.13
MC2055	74.57	78.05	77.93	77.81
MC2054	74.44	77.98	77.84	77.84
MC2051	74.45	77.47	77.72	77.18
MC2050	74.32	77.53	77.67	77.15
Mill Channel				
RC3005B	77.93	79.49	79.83	80.41
RC3004B2	76.50	78.17	79.40	77.81
RC3004B1	76.50	78.07	79.37	77.80
RC3003B1	76.85	78.09	79.36	77.78
RC3003B	76.83	77.44	79.35	77.5
Added New channel				
AC3012j	78.48	79.77	80.06	79.75
AC3012w	78.30	79.73	79.99	79.67
AC3011A	78.00	79.44	79.88	79.46
AC3010A	77.72	79.18	79.85	79.18
AC3009A	77.84	78.93	79.83	78.95
AC3008A	77.57	78.61	79.80	78.82
AC3007A1	77.50	78.60	79.80	78.49
AC3007A	77.36	78.60	79.72	78.49
Old original channel				
OC3006	77.36	78.60	79.72	78.49

Table D.3 Continued				
OC3006Aj	77.25	78.69	79.67	78.62
OC3006A	77.19	78.64	79.58	78.70
OC3005A	77.04	78.17	79.55	78.39
OC3004Aj	76.91	77.81	79.52	77.64
OC3003A	76.84	78.19	79.35	78.19

Table D.4 Vision plan - 1 in 100 year flood event

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	80.34	79.93
MC3014	77.23	79.91	80.29	79.84
MC3013	77.66	80.06	80.27	79.80
MC3012	77.45	80.03	80.13	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	80.13	79.74
MC3011	77.58	79.88	80.11	79.57
MC3010	77.49	79.96	80.11	79.64
MC3010c	77.45	79.2	80.13	79.4
MC3009c	77.35	79.2	79.99	79.4
MC3009	77.51	79.2	79.97	79.73
MC3008	77.49	79.67	79.92	79.57
MC3007	77.47	79.80	79.91	80.11
MC3006	77.47	79.80	79.91	80.11
MC3005	77.93	79.49	79.91	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.84	78.43	79.51	78.23
MC3001	76.52	80.16	79.49	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	76.47	78.49	78.98	78.37
MC2065w	76.75	78.47	79.00	78.19
MC2064	76.40	78.50	78.90	78.60
MC2063a	76.49	78.40	78.85	78.40
MC2063b	76.39	78.39	78.70	78.39

Table D.4 Continued				
MC2063c	76.12	78.28	78.68	78.24
MC2062	76.03	78.55	78.61	78.57
MC2062w	76.20	78.42	78.59	77.95
MC2061	75.80	78.38	78.53	78.26
MC2060	75.90	77.92	78.40	77.89
MC2059	75.60	78.50	78.31	78.00
MC2059w	75.22	78.58	78.30	78.02
MC2057w	74.87	79.27	78.16	78.13
MC2057	74.87	79.27	78.09	78.13
MC2055	74.57	78.05	77.99	77.81
MC2054	74.44	77.98	77.88	77.84
MC2051	74.45	77.47	77.75	77.18
MC2050	74.32	77.53	77.69	77.15
Mill Channel				
RC3005B	77.93	79.49	79.91	80.41
RC3004B2	76.50	78.17	79.57	77.81
RC3004B1	76.50	78.07	79.54	77.80
RC3003B1	76.85	78.09	79.53	77.78
RC3003B	76.83	77.44	79.51	77.5
Added New channel				
AC3012j	78.48	79.77	80.13	79.75
AC3012w	78.30	79.73	80.07	79.67
AC3011A	78.00	79.44	79.98	79.46
AC3010A	77.72	79.18	79.95	79.18
AC3009A	77.84	78.93	79.93	78.95
AC3008A	77.57	78.61	79.91	78.82
AC3007A1	77.50	78.60	79.91	78.49
AC3007A	77.36	78.60	79.84	78.49
Old original channel				
OC3006	77.36	78.60	79.84	78.49

Table D.4 Continued				
OC3006Aj	77.25	78.69	79.80	78.62
OC3006A	77.19	78.64	79.74	78.70
OC3005A	77.04	78.17	79.72	78.39
OC3004Aj	76.91	77.81	79.68	77.64
OC3003A	76.84	78.19	79.51	78.19

Table D.5 Vision Plan - low flow 0.4m^3/s

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	78.69	79.93
MC3014	77.23	79.91	78.69	79.84
MC3013	77.66	80.06	78.69	79.80
MC3012	77.45	80.03	78.69	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	78.69	79.74
MC3011	77.58	79.88	78.69	79.57
MC3010	77.49	79.96	78.69	79.64
MC3010c	77.45	79.2	78.69	79.4
MC3009c	77.35	79.2	78.69	79.4
MC3009	77.51	79.2	78.69	79.73
MC3008	77.49	79.67	78.69	79.57
MC3007	77.47	79.80	78.69	80.11
MC3006	77.47	79.80	78.69	80.11
MC3005	77.93	79.49	78.69	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.84	78.43	77.19	78.23
MC3001	76.52	80.16	77.19	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	76.47	78.49	77.18	78.37
MC2065w	76.75	78.47	77.16	78.19
MC2064	76.40	78.50	77.04	78.60
MC2063a	76.49	78.40	76.97	78.40
MC2063b	76.39	78.39	76.91	78.39

Table D.5 Continued				
MC2063c	76.12	78.28	76.88	78.24
MC2062	76.03	78.55	76.81	78.57
MC2062w	76.20	78.42	76.79	77.95
MC2061	75.80	78.38	76.73	78.26
MC2060	75.90	77.92	76.71	77.89
MC2059	75.60	78.50	75.94	78.00
MC2059w	75.22	78.58	78.92	78.02
MC2057w	74.87	79.27	75.61	78.13
MC2057	74.87	79.27	75.26	78.13
MC2055	74.57	78.05	75.06	77.81
MC2054	74.44	77.98	75.03	77.84
MC2051	74.45	77.47	74.87	77.18
MC2050	74.32	77.53	74.81	77.15
Mill Channel				
RC3005B	77.93	79.49	78.69	80.41
RC3004B2	76.50	78.17	77.38	77.81
RC3004B1	76.50	78.07	77.19	77.80
RC3003B1	76.85	78.09	77.19	77.78
RC3003B	76.83	77.44	77.19	77.5
Added New channel				
AC3012j	78.48	79.77	78.69	79.75
AC3012w	78.30	79.73	78.65	79.67
AC3011A	78.00	79.44	78.48	79.46
AC3010A	77.72	79.18	78.37	79.18
AC3009A	77.84	78.93	78.27	78.95
AC3008A	77.57	78.61	78.15	78.82
AC3007A1	77.50	78.60	77.88	78.49
AC3007A	77.36	78.60	77.70	78.49
Old original channel				
OC3006	77.36	78.60	77.70	78.49

Table D.5 Continued				
OC3006Aj	77.25	78.69	77.63	78.62
OC3006A	77.19	78.64	77.58	78.70
OC3005A	77.04	78.17	77.46	78.39
OC3004Aj	76.91	77.81	77.31	77.64
OC3003A	76.84	78.19	77.19	78.19

Table D.6 Vision plan - 1 in 2 year flood event with sluices open

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	79.83	79.93
MC3014	77.23	79.91	79.79	79.84
MC3013	77.66	80.06	79.77	79.80
MC3012	77.45	80.03	79.70	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	79.70	79.74
MC3011	77.58	79.88	79.65	79.57
MC3010	77.49	79.96	79.65	79.64
MC3010c	77.45	79.2	79.66	79.4
MC3009c	77.35	79.2	79.48	79.4
MC3009	77.51	79.2	79.49	79.73
MC3008	77.49	79.67	79.49	79.57
MC3007	77.47	79.80	79.48	80.11
MC3006	77.47	79.80	79.48	80.11
MC3005	77.93	79.49	79.40	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.84	78.43	78.76	78.23
MC3001	76.52	80.16	78.75	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	76.47	78.49	78.69	78.37
MC2065w	76.75	78.47	78.64	78.19
MC2064	76.40	78.50	78.55	78.60
MC2063a	76.49	78.40	78.51	78.40
MC2063b	76.39	78.39	78.42	78.39

Table D.6 Continued				
MC2063c	76.12	78.28	78.38	78.24
MC2062	76.03	78.55	78.29	78.57
MC2062w	76.20	78.42	78.27	77.95
MC2061	75.80	78.38	78.04	78.26
MC2060	75.90	77.92	77.91	77.89
MC2059	75.60	78.50	77.68	78.00
MC2059w	75.22	78.58	77.66	78.02
MC2057w	74.87	79.27	77.44	78.13
MC2057	74.87	79.27	77.39	78.13
MC2055	74.57	78.05	77.34	77.81
MC2054	74.44	77.98	77.31	77.84
MC2051	74.45	77.47	77.25	77.18
MC2050	74.32	77.53	77.16	77.15
Mill Channel				
RC3005B	77.93	79.49	79.40	80.41
RC3004B2	76.50	78.17	78.78	77.81
RC3004B1	76.50	78.07	78.76	77.80
RC3003B1	76.85	78.09	78.76	77.78
RC3003B	76.83	77.44	78.76	77.5
Added New channel				
AC3012j	78.48	79.77	79.70	79.75
AC3012w	78.30	79.73	79.67	79.67
AC3011A	78.00	79.44	79.55	79.46
AC3010A	77.72	79.18	79.46	79.18
AC3009A	77.84	78.93	79.38	78.95
AC3008A	77.57	78.61	79.29	78.82
AC3007A1	77.50	78.60	79.27	78.49
AC3007A	77.36	78.60	79.17	78.49
Old original channel				
OC3006	77.36	78.60	79.17	78.49

Table D.6 Continued				
OC3006Aj	77.25	78.69	79.11	78.62
OC3006A	77.19	78.64	78.92	78.70
OC3005A	77.04	78.17	78.82	78.39
OC3004Aj	76.91	77.81	78.79	77.64
OC3003A	76.84	78.19	78.76	78.19

Appendix E

Appendix E

The field downstream of the fritillery field on the right bank close to cross-section MC2060, does not belong to the National Trust. At the request of the farmer an embankment may be placed along the field boundary, downstream of the fritillery meadow and associated drainage ditch, to ensure that the field is flooded no more frequently than in the present situation.

HR Wallingford used the model to design an embankment or wall which would restrict flooding on the field to the present frequency and depth as far as possible. The level of the embankment/wall was set at 78.6m AOD, initially to prevent more frequent flooding on the field downstream of the fritillery meadow. The embankment/wall causes a backwater effect and the flood water in the fritillery field and upstream is deeper. This causes a rise in water levels of 40 mm upstream of Coleshill Bridge above the existing water levels for a 1 in 100 year flood event, Table E1. The problem of raised water levels was partially solved by including berms along the left and right banks of the meandering downstream channel from MC2065 to MC2060. The berms are 12m wide and are set at a level of between 78m AOD at MC2065 and 77.8m AOD at MC2060. The berms incorporate the infilled existing channel. The impact of the embankment/wall and the channel with berms is a water levl of 79.52m AOD at Coleshill Bridge, 30mm above existing levels for a 1 in 100 year flood, Table E2.

By lowering the raised banks along the left bank of the downstream reach to the levels of existing ground levels behind the water level at Coleshill Bridge is 78.51m AOD, 20mm above existing water levels for a 1 in 100 year flood, Table E3.

The water levels at the Mill House, RC3005B, are at or below existing levels for a 1 in 100 year flood level for the situation with the embankment/wall and berms and the embankment/wall, berms and lowered bank levels.

Tables E4 and E5 show the vision plan including embankment/wall for the 1 in 2 year and 1 in 10 year flood events.

The 1 in 2 year flood will cause flooding to the field downstream of the fritillery field and it was considered that the bank/wall should be designed to prevent the 1 in 2 year flood from passing onto the field.

Table E6 shows the vision plan including embankment/wall, berms and lowered left bank, for the 1 in 2 year. The results show that the level of the bank/wall should be set at 78.21m AOD.

Table E.1 Vision plan - 1 in 100 year flood event - including wall

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	80.35	79.93
MC3014	77.23	79.91	80.30	79.84
MC3013	77.66	80.06	80.27	79.80
MC3012	77.45	80.03	80.14	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	80.14	79.74
MC3011	77.58	79.88	80.11	79.57
MC3010	77.49	79.96	80.12	79.64
MC3010c	77.45	79.2	80.13	79.4
MC3009c	77.35	79.2	80.00	79.4
MC3009	77.51	79.2	79.98	79.73
MC3008	77.49	79.67	79.93	79.57
MC3007	77.47	79.80	79.91	80.11
MC3006	77.47	79.80	79.91	80.11
MC3005	77.93	79.49	79.93	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.84	78.43	79.55	78.23
MC3001	76.52	80.16	79.53	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	76.47	78.49	79.07	78.37
MC2065w	76.75	78.47	79.10	78.19
MC2064	76.40	78.50	79.04	78.60
MC2063a	76.49	78.40	79.01	78.40
MC2063b	76.39	78.39	78.93	78.39

Table E.1 Continued				
MC2063c	76.12	78.28	78.92	78.24
MC2062	76.03	78.55	78.88	78.57
MC2062w	76.20	78.42	78.87	77.95
MC2061	75.80	78.38	78.82	78.26
MC2060	75.90	77.92	78.56	77.89
MC2059	75.60	78.50	78.35	78.00
MC2059w	75.22	78.58	78.34	78.02
MC2057w	74.87	79.27	78.14	78.13
MC2057	74.87	79.27	78.08	78.13
MC2055	74.57	78.05	77.99	77.81
MC2054	74.44	77.98	77.88	77.84
MC2051	74.45	77.47	77.75	77.18
MC2050	74.32	77.53	77.69	77.15
Mill Channel				
RC3005B	77.93	79.49	79.93	80.41
RC3004B2	76.50	78.17	79.60	77.81
RC3004B1	76.50	78.07	79.57	77.80
RC3003B1	76.85	78.09	79.56	77.78
RC3003B	76.83	77.44	79.55	77.5
Added New channel				
AC3012j	78.48	79.77	80.14	79.75
AC3012w	78.30	79.73	80.08	79.67
AC3011A	78.00	79.44	79.99	79.46
AC3010A	77.72	79.18	79.96	79.18
AC3009A	77.84	78.93	79.94	78.95
AC3008A	77.57	78.61	79.92	78.82
AC3007A1	77.50	78.60	79.92	78.49
AC3007A	77.36	78.60	79.86	78.49

Table E.1 Continued				
Old original channel				
OC3006	77.36	78.60	79.86	78.49
OC3006Aj	77.25	78.69	79.81	78.62
OC3006A	77.19	78.64	79.76	78.70
OC3005A	77.04	78.17	79.73	78.39
OC3004Aj	76.91	77.81	79.70	77.64
OC3003A	76.84	78.19	79.55	78.19

Table E.2 Vision plan - 1 in 100 year flood event - including wall and berms

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	80.35	79.93
MC3014	77.23	79.91	80.30	79.84
MC3013	77.66	80.06	80.27	79.80
MC3012	77.45	80.03	80.14	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	80.14	79.74
MC3011	77.58	79.88	80.11	79.57
MC3010	77.49	79.96	80.12	79.64
MC3010c	77.45	79.2	80.13	79.4
MC3009c	77.35	79.2	80.00	79.4
MC3009	77.51	79.2	79.98	79.73
MC3008	77.49	79.67	79.93	79.57
MC3007	77.47	79.80	79.91	80.11
MC3006	77.47	79.80	79.91	80.11
MC3005	77.93	79.49	79.92	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.84	78.43	79.54	78.23
MC3001	76.52	80.16	79.52	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	76.47	78.49	79.04	78.37
MC2065w	76.75	78.47	79.07	78.19
MC2064	76.40	78.50	78.99	78.60
MC2063a	76.49	78.40	78.96	78.40
MC2063b	76.39	78.39	78.89	78.39

Table E.2 Continued				
MC2063c	76.12	78.28	78.88	78.24
MC2062	76.03	78.55	78.83	78.57
MC2062w	76.20	78.42	78.82	77.95
MC2061	75.80	78.38	78.74	78.26
MC2060	75.90	77.92	78.56	77.89
MC2059	75.60	78.50	78.41	78.00
MC2059w	75.22	78.58	78.40	78.02
MC2057w	74.87	79.27	78.12	78.13
MC2057	74.87	79.27	78.06	78.13
MC2055	74.57	78.05	77.98	77.81
MC2054	74.44	77.98	77.88	77.84
MC2051	74.45	77.47	77.75	77.18
MC2050	74.32	77.53	77.69	77.15
Mill Channel				
RC3005B	77.93	79.49	79.92	80.41
RC3004B2	76.50	78.17	79.59	77.81
RC3004B1	76.50	78.07	79.56	77.80
RC3003B1	76.85	78.09	79.55	77.78
RC3003B	76.83	77.44	79.54	77.5
Added New channel				
AC3012j	78.48	79.77	80.14	79.75
AC3012w	78.30	79.73	80.08	79.67
AC3011A	78.00	79.44	79.99	79.46
AC3010A	77.72	79.18	79.96	79.18
AC3009A	77.84	78.93	79.94	78.95
AC3008A	77.57	78.61	79.92	78.82
AC3007A1	77.50	78.60	79.92	78.49
AC3007A	77.36	78.60	79.85	78.49

Table E.2 Continued				
Old original channel				
OC3006	77.36	78.60	79.85	78.49
OC3006Aj	77.25	78.69	79.81	78.62
OC3006A	77.19	78.64	79.75	78.70
OC3005A	77.04	78.17	79.73	78.39
OC3004Aj	76.91	77.81	79.70	77.64
OC3003A	76.84	78.19	79.54	78.19

Table E.3 Vision plan - 1 in 100 year flood event - including wall, berms and lowering the left embankments

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	80.35	79.93
MC3014	77.23	79.91	80.30	79.84
MC3013	77.66	80.06	80.27	79.80
MC3012	77.45	80.03	80.13	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	80.13	79.74
MC3011	77.58	79.88	80.11	79.57
MC3010	77.49	79.96	80.12	79.64
MC3010c	77.45	79.2	80.13	79.4
MC3009c	77.35	79.2	80.00	79.4
MC3009	77.51	79.2	79.97	79.73
MC3008	77.49	79.67	79.93	79.57
MC3007	77.47	79.80	79.91	80.11
MC3006	77.47	79.80	79.91	80.11
MC3005	77.93	79.49	79.92	80.37
Main existing channel - from the downstream end of the mill channel to Coleshill bridge				
MC3002	76.84	78.43	79.53	78.23
MC3001	76.52	80.16	79.51	80.51
Main existing channel - downstream of Coleshill bridge				
MC2065	76.47	78.40	79.02	78.37
MC2065w	76.75	78.40	79.04	78.19
MC2064	76.40	78.40	78.97	78.60
MC2063a	76.49	78.38	78.94	78.40
MC2063b	76.39	78.39	78.87	78.39

Table E.3 Continued				
MC2063c	76.12	78.25	78.86	78.24
MC2062	76.03	78.52	78.82	78.57
MC2062w	76.20	78.42	78.80	77.95
MC2061	75.80	78.38	78.74	78.26
MC2060	75.90	77.92	78.57	77.89
MC2059	75.60	78.20	78.42	78.00
MC2059w	75.22	78.20	78.40	78.02
MC2057w	74.87	79.27	78.12	78.13
MC2057	74.87	79.27	78.07	78.13
MC2055	74.57	78.05	77.98	77.81
MC2054	74.44	77.98	77.86	77.84
MC2051	74.45	77.47	77.75	77.18
MC2050	74.32	77.53	77.69	77.15
Mill Channel				
RC3005B	77.93	79.49	79.92	80.41
RC3004B2	76.50	78.17	79.58	77.81
RC3004B1	76.50	78.07	79.55	77.80
RC3003B1	76.85	78.09	79.54	77.78
RC3003B	76.83	77.44	79.53	77.5
Added New channel				
AC3012j	78.48	79.77	80.13	79.75
AC3012w	78.30	79.73	80.07	79.67
AC3011A	78.00	79.44	79.98	79.46
AC3010A	77.72	79.18	79.96	79.18
AC3009A	77.84	78.93	79.94	78.95
AC3008A	77.57	78.61	79.91	78.82
AC3007A1	77.50	78.60	79.92	78.49
AC3007A	77.36	78.60	79.85	78.49

Table E.3 Continued				
Old original channel				
OC3006	77.36	78.60	79.85	78.49
OC3006Aj	77.25	78.69	79.80	78.62
OC3006A	77.19	78.64	79.75	78.70
OC3005A	77.04	78.17	79.72	78.39
OC3004Aj	76.91	77.81	79.69	77.64
OC3003A	76.84	78.19	79.53	78.19

Table E.4 Vision plan - 1 in 10 year flood event - including wall

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	80.10	79.93
MC3014	77.23	79.91	80.04	79.84
MC3013	77.66	80.06	80.01	79.80
MC3012	77.45	80.03	79.90	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	79.90	79.74
MC3011	77.58	79.88	79.86	79.57
MC3010	77.49	79.96	79.86	79.64
MC3010c	77.45	79.2	79.87	79.4
MC3009c	77.35	79.2	79.73	79.4
MC3009	77.51	79.2	79.73	79.73
MC3008	77.49	79.67	79.73	79.57
MC3007	77.47	79.80	79.73	80.11
MC3006	77.47	79.80	79.73	80.11
MC3005	77.93	79.49	79.71	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.84	78.43	79.09	78.23
MC3001	76.52	80.16	79.08	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	76.47	78.49	78.90	78.37
MC2065w	76.75	78.47	78.89	78.19
MC2064	76.40	78.50	78.84	78.60
MC2063a	76.49	78.40	78.82	78.40
MC2063b	76.39	78.39	78.76	78.39

Table E.4 Continued				
MC2063c	76.12	78.28	78.76	78.24
MC2062	76.03	78.55	78.72	78.57
MC2062w	76.20	78.42	78.72	77.95
MC2061	75.80	78.38	78.65	78.26
MC2060	75.90	77.92	78.42	77.89
MC2059	75.60	78.50	78.17	78.00
MC2059w	75.22	78.58	78.16	78.02
MC2057w	74.87	79.27	77.90	78.13
MC2057	74.87	79.27	77.83	78.13
MC2055	74.57	78.05	77.77	77.81
MC2054	74.44	77.98	77.73	77.84
MC2051	74.45	77.47	77.63	77.18
MC2050	74.32	77.53	77.60	77.15
Mill Channel				
RC3005B	77.93	79.49	79.71	80.41
RC3004B2	76.50	78.17	79.13	77.81
RC3004B1	76.50	78.07	79.10	77.80
RC3003B1	76.85	78.09	79.10	77.78
RC3003B	76.83	77.44	79.09	77.5
Added New channel				
AC3012j	78.48	79.77	79.90	79.75
AC3012w	78.30	79.73	79.86	79.67
AC3011A	78.00	79.44	79.73	79.46
AC3010A	77.72	79.18	79.70	79.18
AC3009A	77.84	78.93	79.66	78.95
AC3008A	77.57	78.61	79.61	78.82
AC3007A1	77.50	78.60	79.61	78.49
AC3007A	77.36	78.60	79.53	78.49

Table E.4 Continued				
Old original channel				
OC3006	77.36	78.60	79.53	78.49
OC3006Aj	77.25	78.69	79.46	78.62
OC3006A	77.19	78.64	79.31	78.70
OC3005A	77.04	78.17	79.25	78.39
OC3004Aj	76.91	77.81	79.23	77.64
OC3003A	76.84	78.19	79.09	78.19

Table E.5 Vision plan - 1 in 2 year flood event - including wall

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	79.84	79.93
MC3014	77.23	79.91	79.80	79.84
MC3013	77.66	80.06	79.78	79.80
MC3012	77.45	80.03	79.71	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	79.71	79.74
MC3011	77.58	79.88	79.66	79.57
MC3010	77.49	79.96	79.66	79.64
MC3010c	77.45	79.2	79.67	79.4
MC3009c	77.35	79.2	79.54	79.4
MC3009	77.51	79.2	79.57	79.73
MC3008	77.49	79.67	79.56	79.57
MC3007	77.47	79.80	79.56	80.11
MC3006	77.47	79.80	79.56	80.11
MC3005	77.93	79.49	79.55	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.84	78.43	78.79	78.23
MC3001	76.52	80.16	78.78	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	76.47	78.49	78.73	78.37
MC2065w	76.75	78.47	78.70	78.19
MC2064	76.40	78.50	78.65	78.60
MC2063a	76.49	78.40	78.63	78.40
MC2063b	76.39	78.39	78.58	78.39

Table E.5 Continued				
MC2063c	76.12	78.28	78.57	78.24
MC2062	76.03	78.55	78.55	78.57
MC2062w	76.20	78.42	78.54	77.95
MC2061	75.80	78.38	78.46	78.26
MC2060	75.90	77.92	78.27	77.89
MC2059	75.60	78.50	77.97	78.00
MC2059w	75.22	78.58	77.96	78.02
MC2057w	74.87	79.27	77.62	78.13
MC2057	74.87	79.27	77.52	78.13
MC2055	74.57	78.05	77.41	77.81
MC2054	74.44	77.98	77.36	77.84
MC2051	74.45	77.47	77.20	77.18
MC2050	74.32	77.53	77.13	77.15
Mill Channel				
RC3005B	77.93	79.49	79.55	80.41
RC3004B2	76.50	78.17	78.82	77.81
RC3004B1	76.50	78.07	78.79	77.80
RC3003B1	76.85	78.09	78.79	77.78
RC3003B	76.83	77.44	78.79	77.5
Added New channel				
AC3012j	78.48	79.77	79.71	79.75
AC3012w	78.30	79.73	79.68	79.67
AC3011A	78.00	79.44	79.58	79.46
AC3010A	77.72	79.18	79.50	79.18
AC3009A	77.84	78.93	79.45	78.95
AC3008A	77.57	78.61	79.37	78.82
AC3007A1	77.50	78.60	79.36	78.49
AC3007A	77.36	78.60	79.28	78.49

Table E.5 Continued				
MC2063c	76.12	78.25	78.44	78.24
MC2062	76.03	78.52	78.40	78.57
MC2062w	76.20	78.42	78.39	77.95
MC2061	75.80	78.38	78.31	78.26
MC2060	75.90	77.92	78.21	77.89
MC2059	75.60	78.20	78.04	78.00
MC2059w	75.22	78.20	78.03	78.02
MC2057w	74.87	79.27	77.67	78.13
MC2057	74.87	79.27	77.56	78.13
MC2055	74.57	78.05	77.43	77.81
MC2054	74.44	77.98	77.37	77.84
MC2051	74.45	77.47	77.17	77.18
MC2050	74.32	77.53	77.10	77.15
Mill Channel				
RC3005B	77.93	79.49	79.55	80.41
RC3004B2	76.50	78.17	78.76	77.81
RC3004B1	76.50	78.07	78.73	77.80
RC3003B1	76.85	78.09	78.73	77.78
RC3003B	76.83	77.44	78.73	77.5
Added New channel				
AC3012j	78.48	79.77	79.71	79.75
AC3012w	78.30	79.73	79.68	79.67
AC3011A	78.00	79.44	79.58	79.46
AC3010A	77.72	79.18	79.50	79.18
AC3009A	77.84	78.93	79.44	78.95
AC3008A	77.57	78.61	79.36	78.82
AC3007A1	77.50	78.60	79.35	78.49
AC3007A	77.36	78.60	79.26	78.49

Table E.5 Continued				
Old original channel				
OC3006	77.36	78.60	79.28	78.49
OC3006Aj	77.25	78.69	79.26	78.62
OC3006A	77.19	78.64	79.01	78.70
OC3005A	77.04	78.17	78.93	78.39
OC3004Aj	76.91	77.81	78.90	77.64
OC3003A	76.84	78.19	78.73	78.19

Table E.5 Continued				
Old original channel				
OC3006	77.36	78.60	79.28	78.49
OC3006Aj	77.25	78.69	79.22	78.62
OC3006A	77.19	78.64	79.04	78.70
OC3005A	77.04	78.17	78.95	78.39
OC3004Aj	76.91	77.81	78.92	77.64
OC3003A	76.84	78.19	78.79	78.19

Table E.6 Vision plan - 1 in 2 year flood event - including wall, berms and lowering the left embankments

Section Label	Bed Level (m)	Left Embankment Level (m)	Stage (m)	Right Embankment Level (m)
Main existing channel - Upstream of the bifurcation				
MC3015	77.80	79.82	79.84	79.93
MC3014	77.23	79.91	79.80	79.84
MC3013	77.66	80.06	79.78	79.80
MC3012	77.45	80.03	79.71	79.74
Main existing channel - from the bifurcation to the mill channel				
MC3012A	77.45	80.03	79.71	79.74
MC3011	77.58	79.88	79.66	79.57
MC3010	77.49	79.96	79.66	79.64
MC3010c	77.45	79.2	79.67	79.4
MC3009c	77.35	79.2	79.54	79.4
MC3009	77.51	79.2	79.55	79.73
MC3008	77.49	79.67	79.56	79.57
MC3007	77.47	79.80	79.56	80.11
MC3006	77.47	79.80	79.56	80.11
MC3005	77.93	79.49	79.55	80.37
Main existing channel - from the donwstream end of the mill channel to Coleshill bridge				
MC3002	76.84	78.43	78.73	78.23
MC3001	76.52	80.16	78.72	80.51
Main existing channel - donwstream of Coleshill bridge				
MC2065	76.47	78.40	78.66	78.37
MC2065w	76.75	78.40	78.61	78.19
MC2064	76.40	78.40	78.54	78.60
MC2063a	76.49	78.38	78.52	78.40
MC2063b	76.39	78.39	78.46	78.39

Appendix F

Appendix F

The following tests were undertaken as additional work. The purpose of the model runs was to:

- determine the height of the dam boards in the bifurcation structure to maintain summer water levels in the mill leat;
- to investigate how summer flooding, from an event overspilling the low spot on the right bank upstream of the culvert, could be avoided; and
- whether the overspill weir on the bifurcation structure is required and the implications of removing it.

1. The vision plan was modelled with the sluice gates at the mill house closed and 1 of 3 of the main sluice gates 'cracked' open 25mm to give a sweetening flow.
   The level of the dam boards at the bifurcation structure which generate a water level of 380mm above the existing sill at the mill during steady state Summer flow of 0.6m^3/s is 78.75m AOD. This is a height of dam board of 0.29m above the weir crest level of 78.46m AOD.

2. The vision plan was modelled with the sluice at the mill house closed and all the main sluices fully open, the overspill adjacent to the bifurcation weir deleted, the low spot on the right bank upstream of the new culvert at 79.3m AOD, the dam boards in the bifurcation weir at 78.75m AOD as in 1 above.

a) The total discharge in the system which raises water levels to the 79.3m AOD threshold on the right bank is 8.42m^3/s.

b) The component flows and water levels at various positions are given in Table F1 for the time when the water level on the right bank is at 79.3m AOD. Figure F1 shows the water levels and discharges.

Cross-section	Discharge (m^3/s)	Level (mAOD)
Upstream of bifurcation structure	8.42	79.33
MC3010c	5	79.3
Overspill from RB at MC3010c	0.85	
AC3012j	1.87	79.33
AC3011A	1.83	79.08
AC3010A	1.79	79
AC3009A	2.57	78.88
AC3008A	2.42	78.78
AC3007A1	2.01	78.69
OC3005A	1.86	78.45
RC3005B	0.41	79.2

Table F1 Water levels and discharges without overspill weir

iii) The overspill discharge from the 79.2m low spot on the left bank of the main channel is 0.85m^3/s. This discharge flows into the new channel and causes the banks of the new channel to be overtopped at sections AC3009, AC3008A and AC3007A1. This will cause flooding on the floodplain along a 10m corridor along the left bank of the new channel, downstream of the ford, as shown in Figure F4.

iv) The average football pitch level is 78.5mAOD with the lowest level being 78.37m AOD. The water level of 78.48m AOD at the football pitch will cause some flooding on the pitch, Figure F5.

5. The vision plan was modelled with the modifications as described in 2 above but with the main sluices closed for the 1 in 2 and 1 in 100 year flood events. The results at key points are given in Tables F5 and F6.

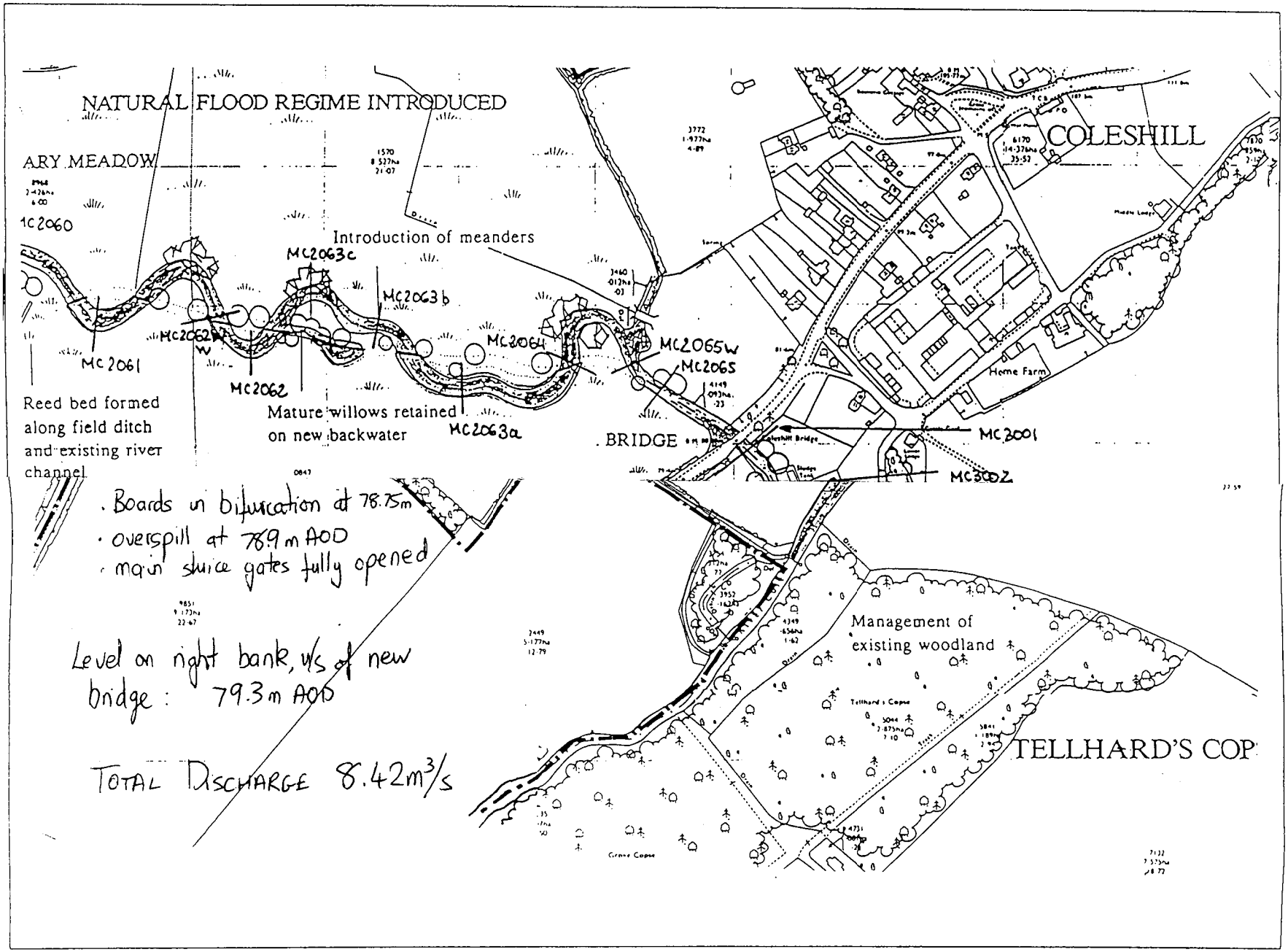
Location	Cross-section	Existing level m AOD	Vision Plan m AOD	Vision Plan with modifications m AOD
Waterloo Lodge	MC3010	79.76	79.66	79.62
Little Lodge	MC3009	79.72	79.56	79.49
Mill House u/s	RC3005B	79.42	79.55	79.4
Mill House d/s	RC3004B2	78.52	78.78	78.79
Coleshill Bridge	MC3001	78.43	78.74	78.76
Football pitch	OC3005A	78.48	78.93	78.83

Table F5 1 in 2 year flood

Location	Cross-section	Existing level m AOD	Vision Plan m AOD	Vision Plan with modifications m AOD
Waterloo Lodge	MC3010	80.45	80.13	80.12
Little Lodge	MC3009	80.4	79.97	79.94
Mill House u/s	RC3005B	79.92	79.91	79.85
Mill House d/s	RC3004B2	78.66	79.57	79.58
Coleshill Bridge	MC3001	79.49	79.49	79.51
Football pitch	OC3005A	79.78	79.58	79.65

Table F6 1 in 100 year flood

6. If the overspill weir was placed at a level of 78.9m AOD the discharge upstream of the bifurcation weir at which the water would lap at the overspill weir is 3.0m^3/s. If the overspill weir was placed at a level of 79.0m AOD the discharge upstream of the bifurcation weir at which the water would lap at the overspill weir is 4.3m^3/s.



Water levels and discharges with ov

Figure F2

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Water levels and discharges withou

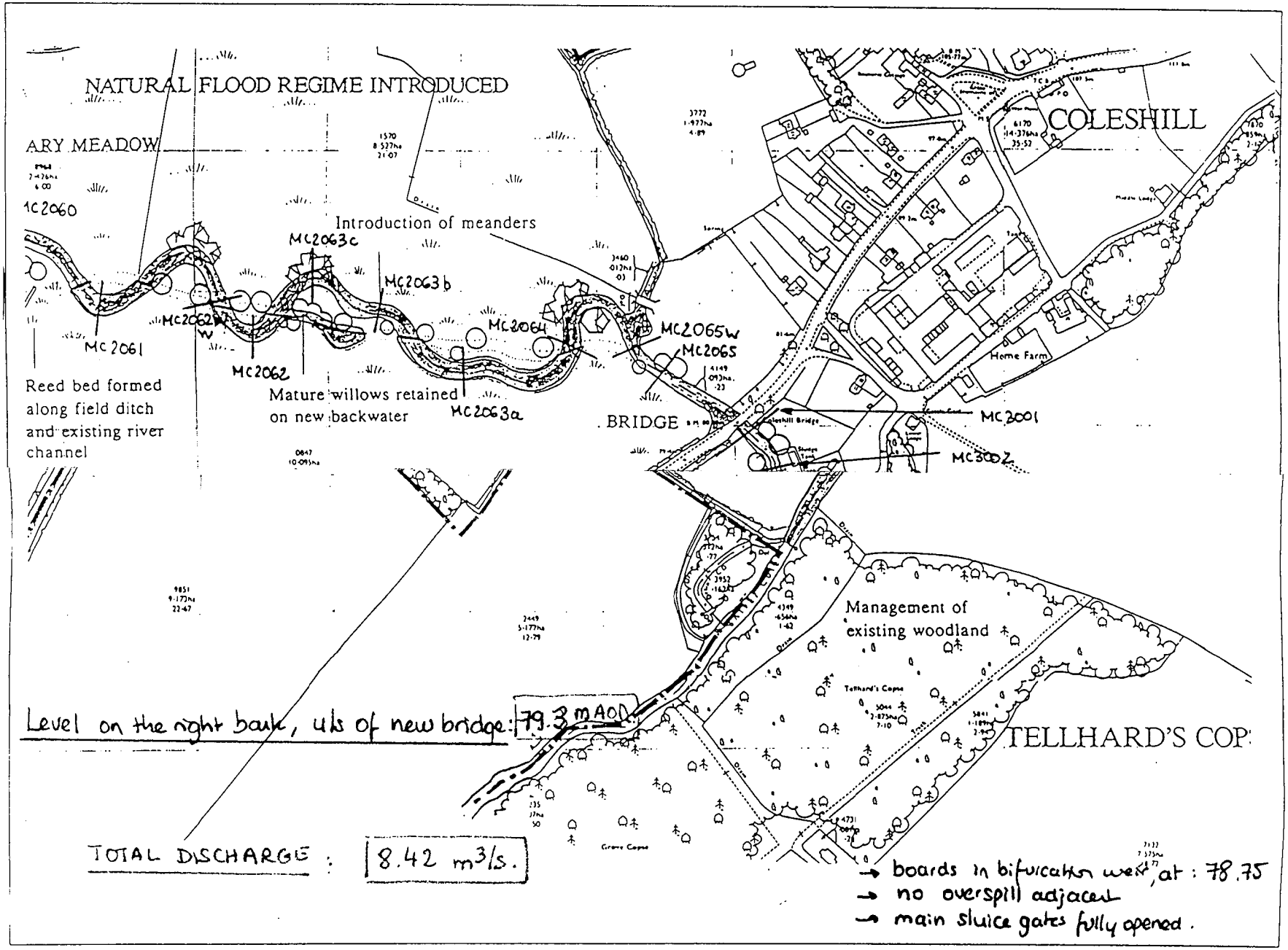

Figure F1

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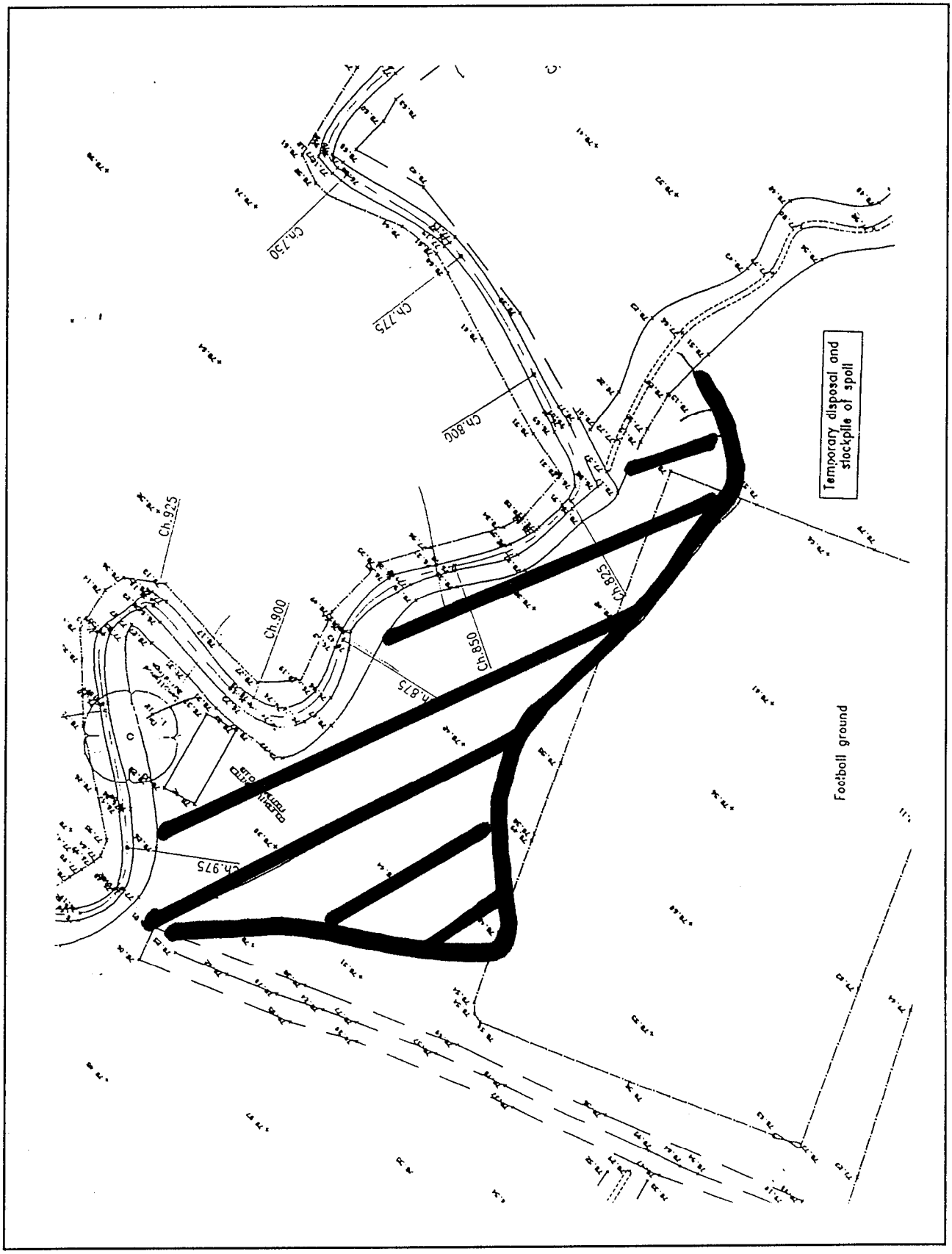

Figure F3 Local Flooding on football pitch without overspill weir