

1994

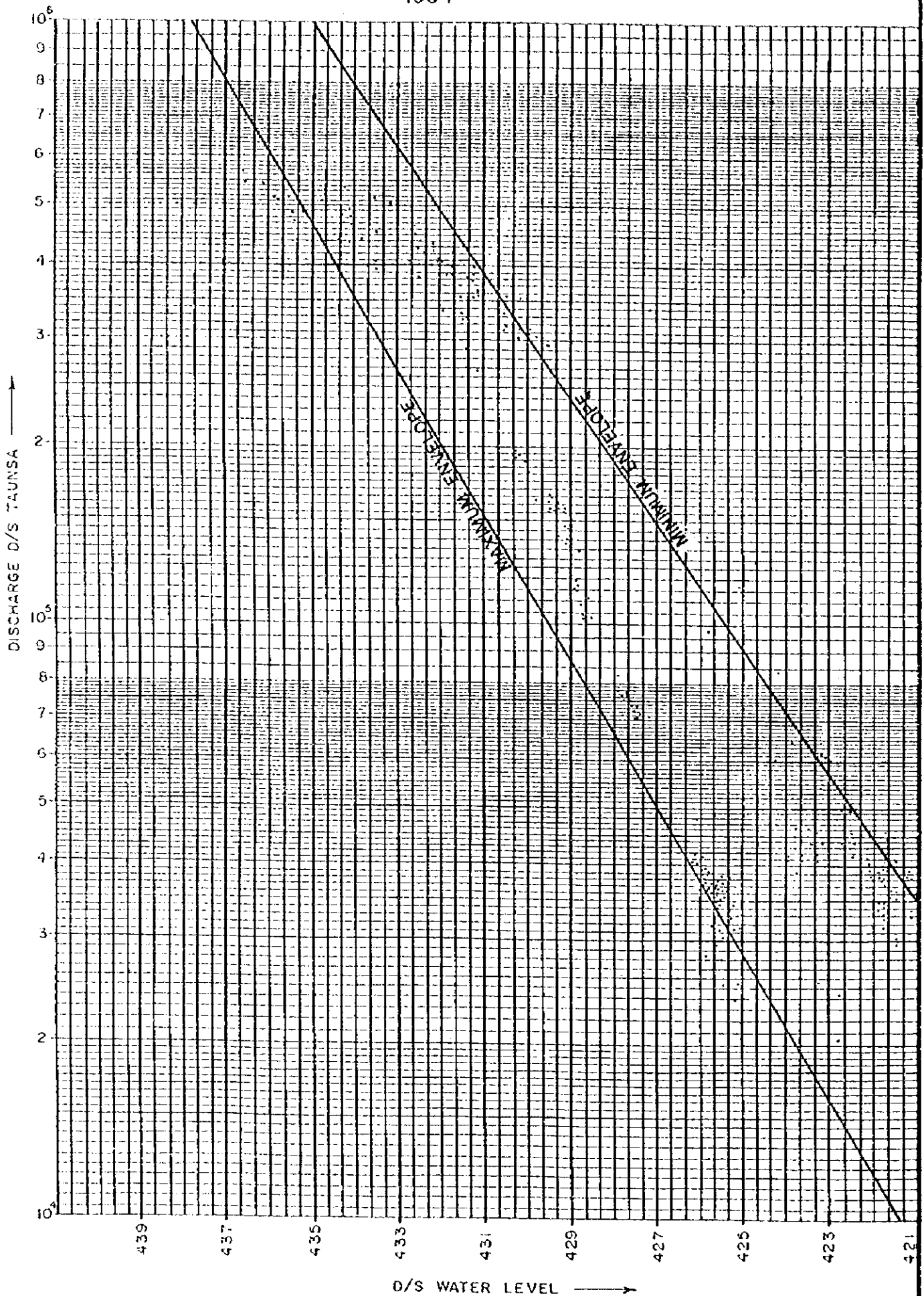


Fig.B2.2.2 Envelope / Lines for the Discharges Observed on D/S in 1994

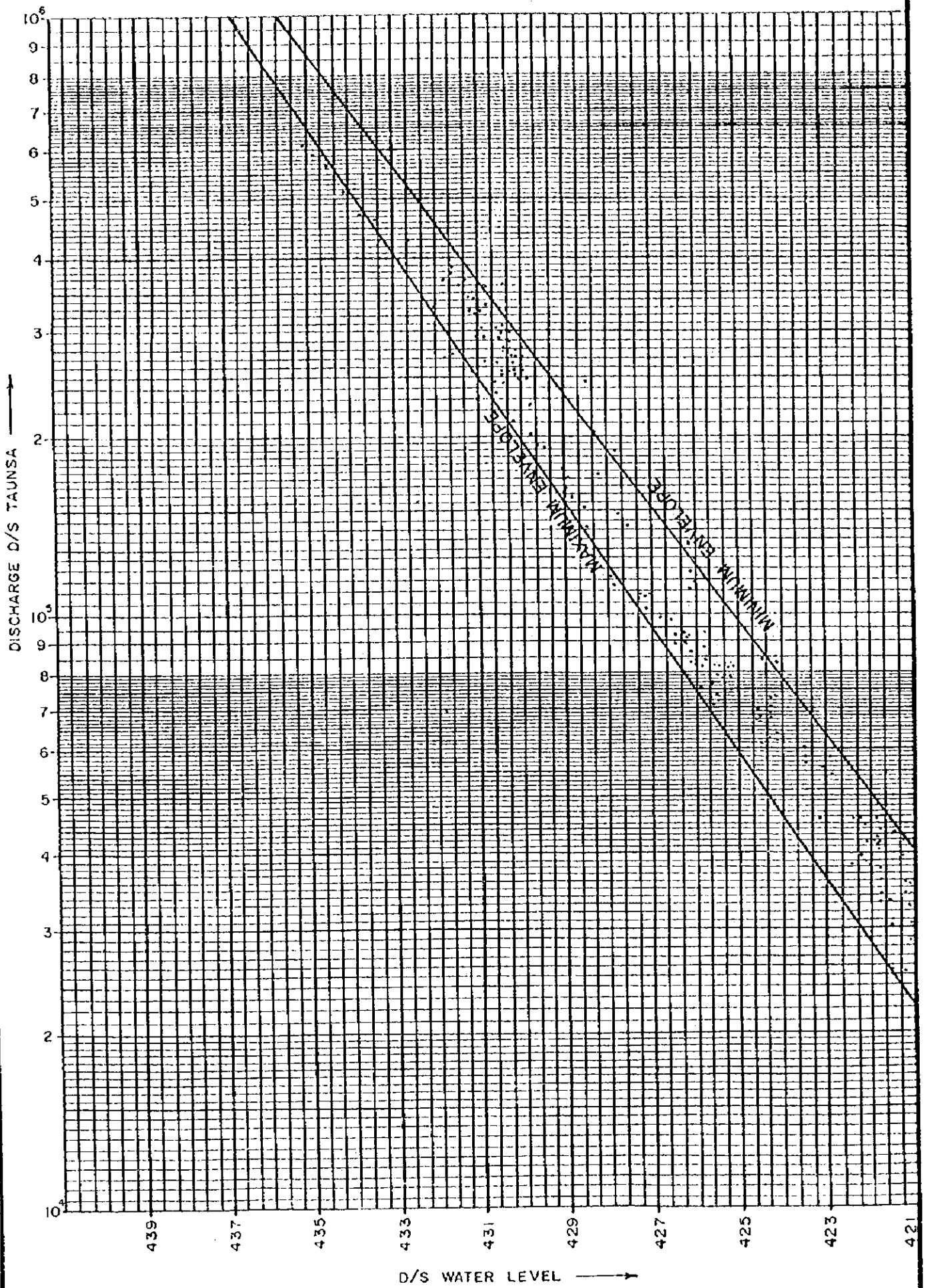


Fig.B2.2.3 Envelope / Lines for the Discharges Observed on D/S in 1995

1996

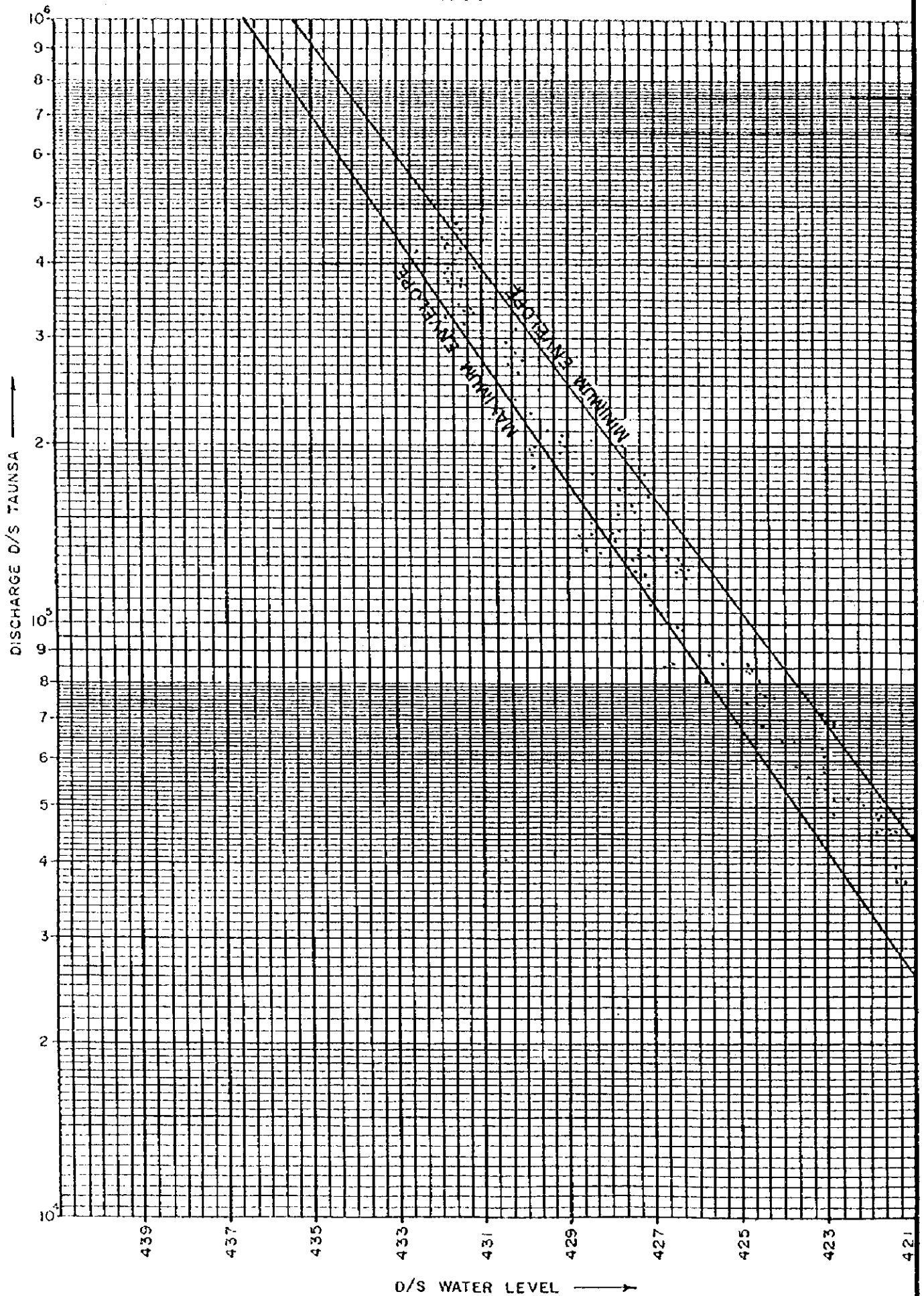


Fig.B2.2.4 Envelope / Lines for the Discharges Observed on D/S in 1996

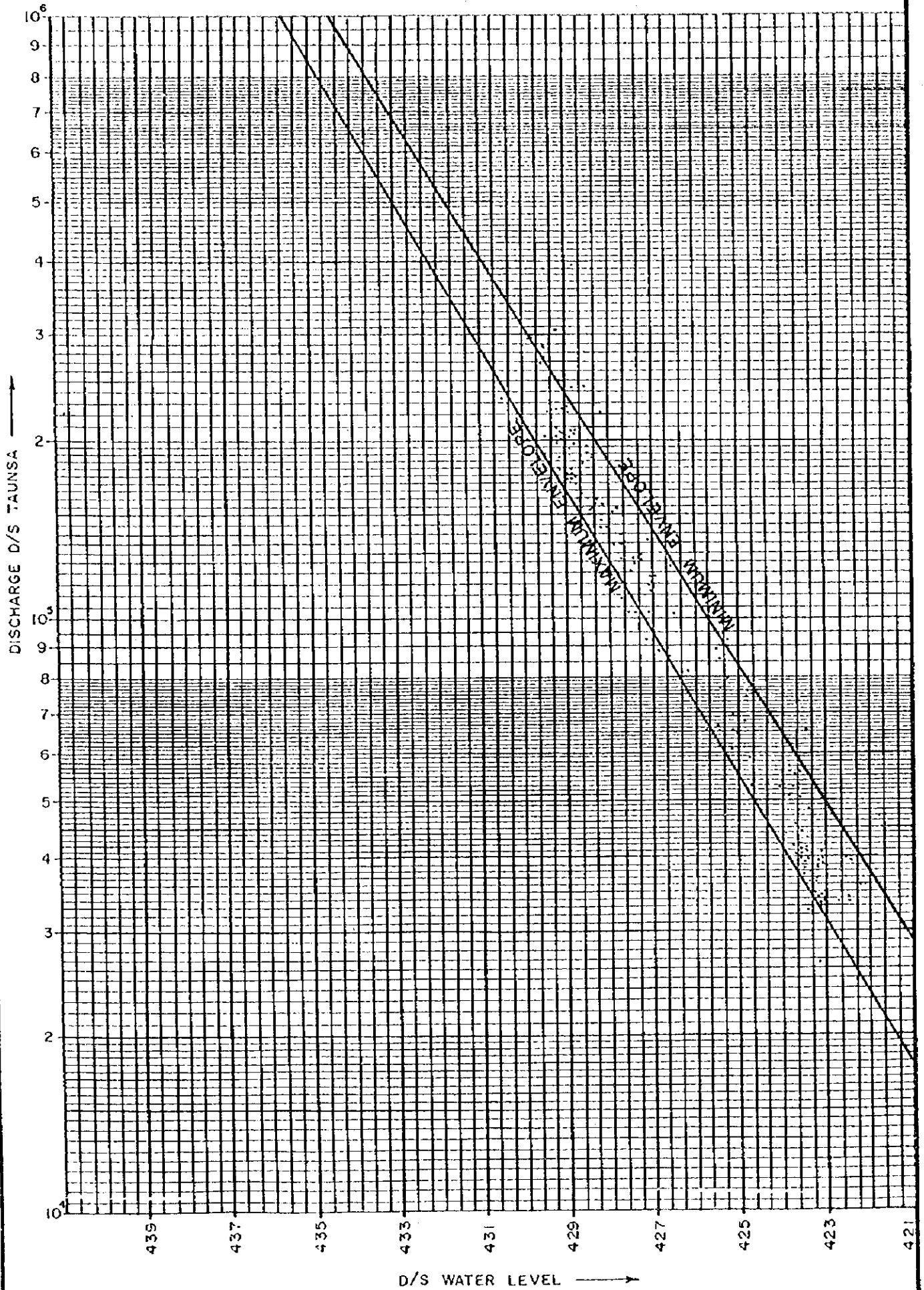


Fig.B2.2.5 Envelope / Lines for the Discharges Observed on D/S in 1997

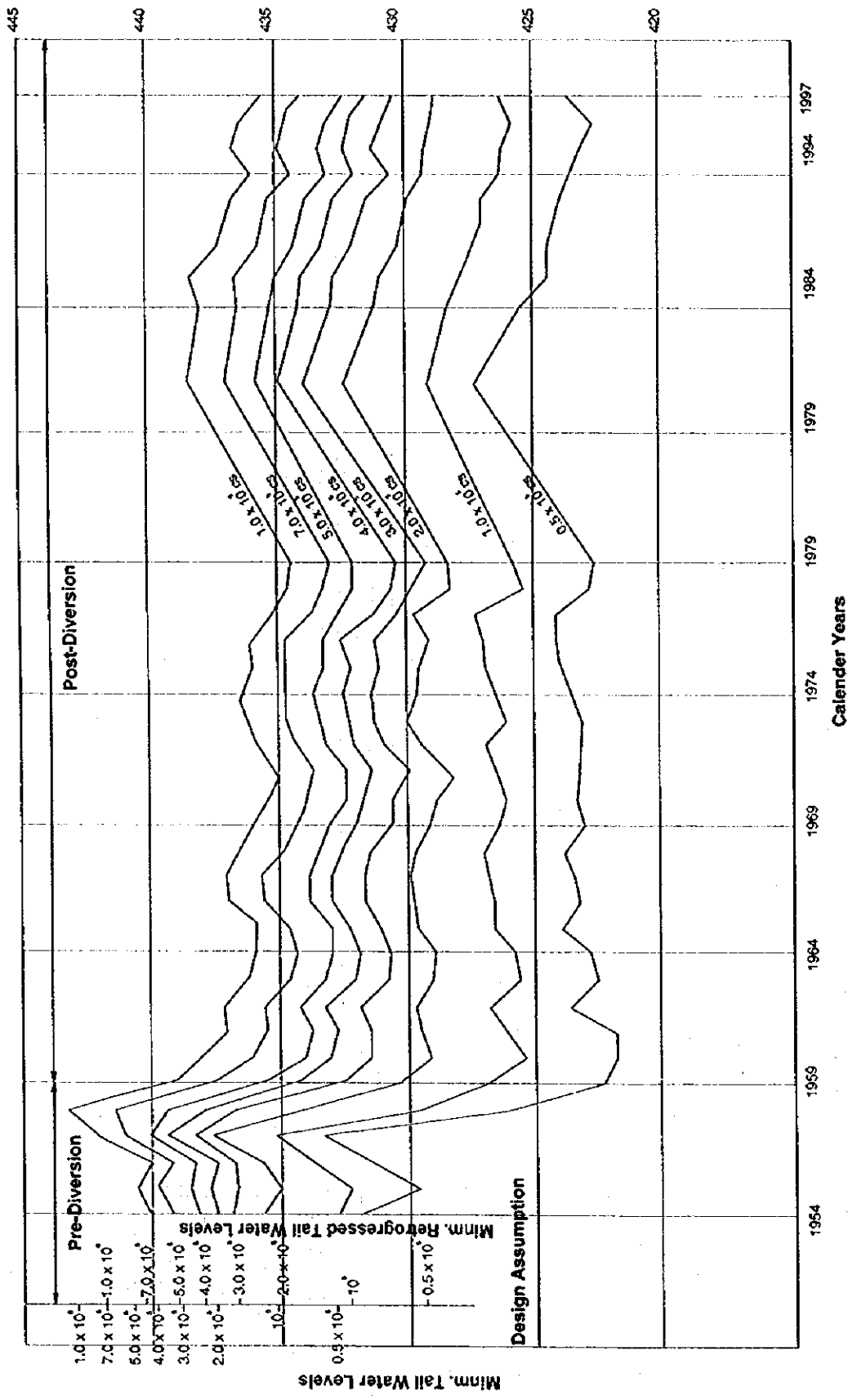


Fig. B2.2.6 Taunsa Barrage Retrogression Curves 1954 - 1997

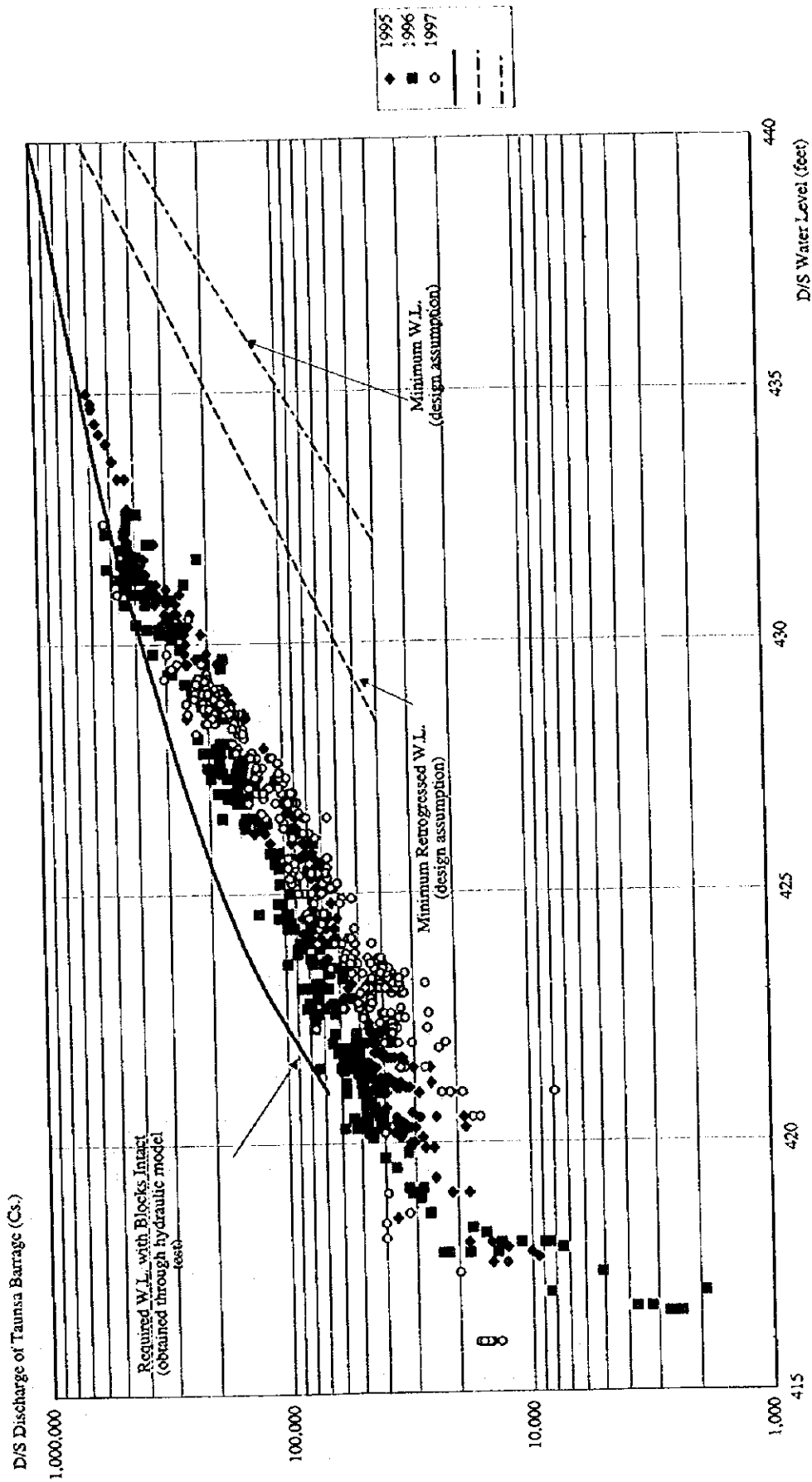


Fig. B2.2.7 Retrogression Study of Taunsa Barrage

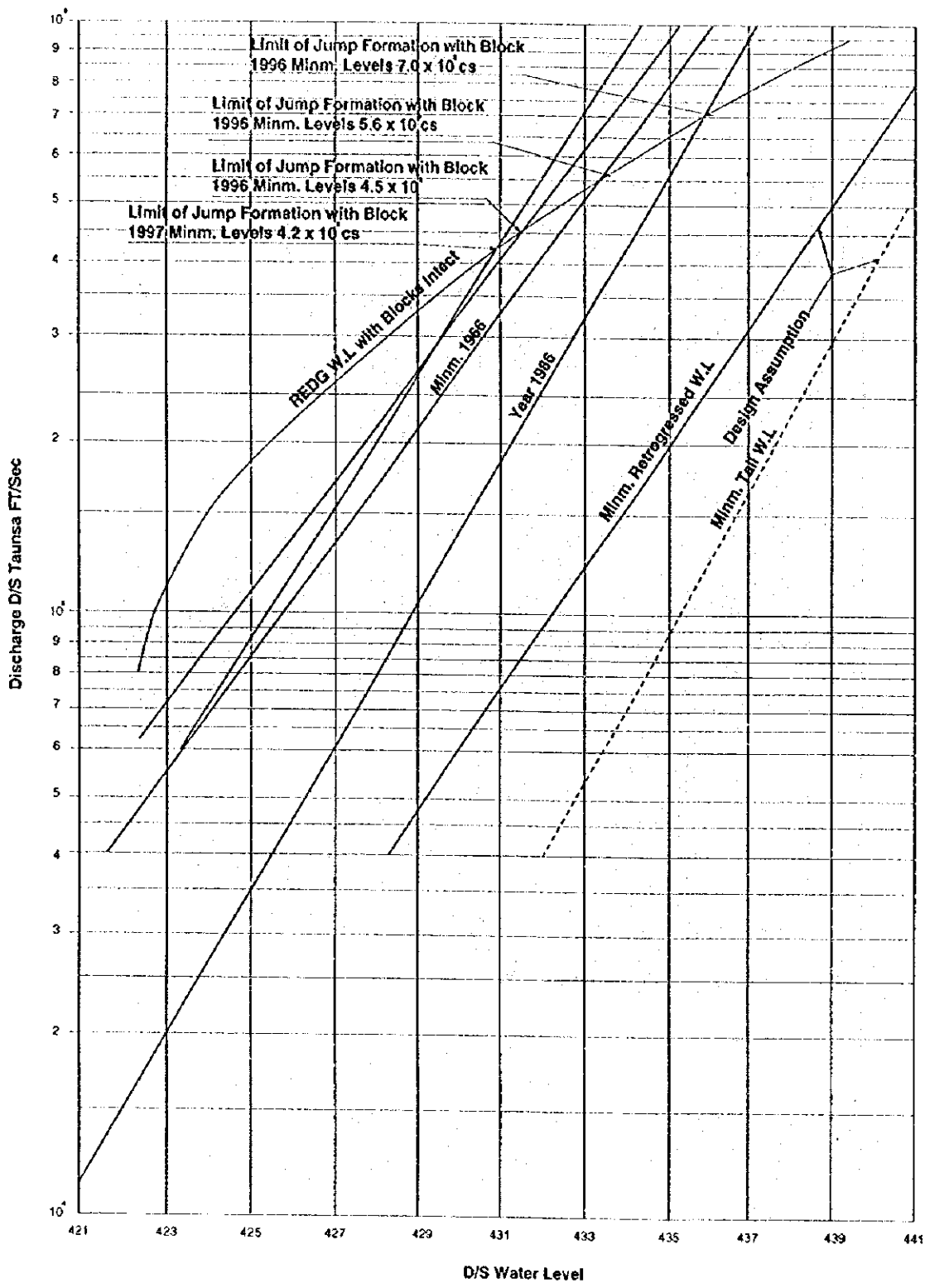


Fig. B2.2.8 Taunsa Barrage Stilling Basin Limiting Tail water Rating Curve and Minimum D/S Gauges for Under Sluice Section

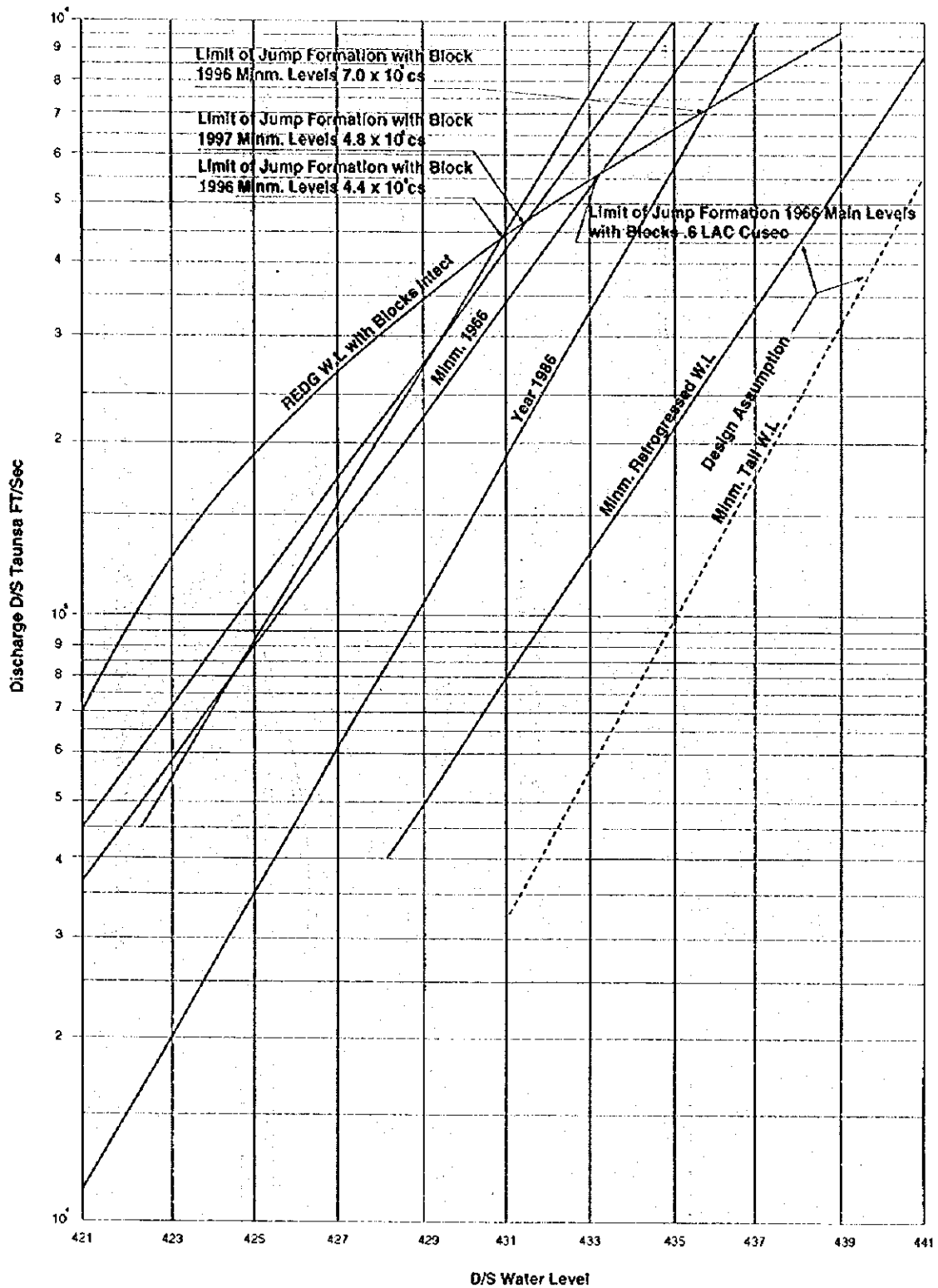


Fig. B2.2.9 Taunsa Barrage Stilling Basin Limiting Tail water Rating Curve and Minimum D/S Gauges for Under Sluice Section

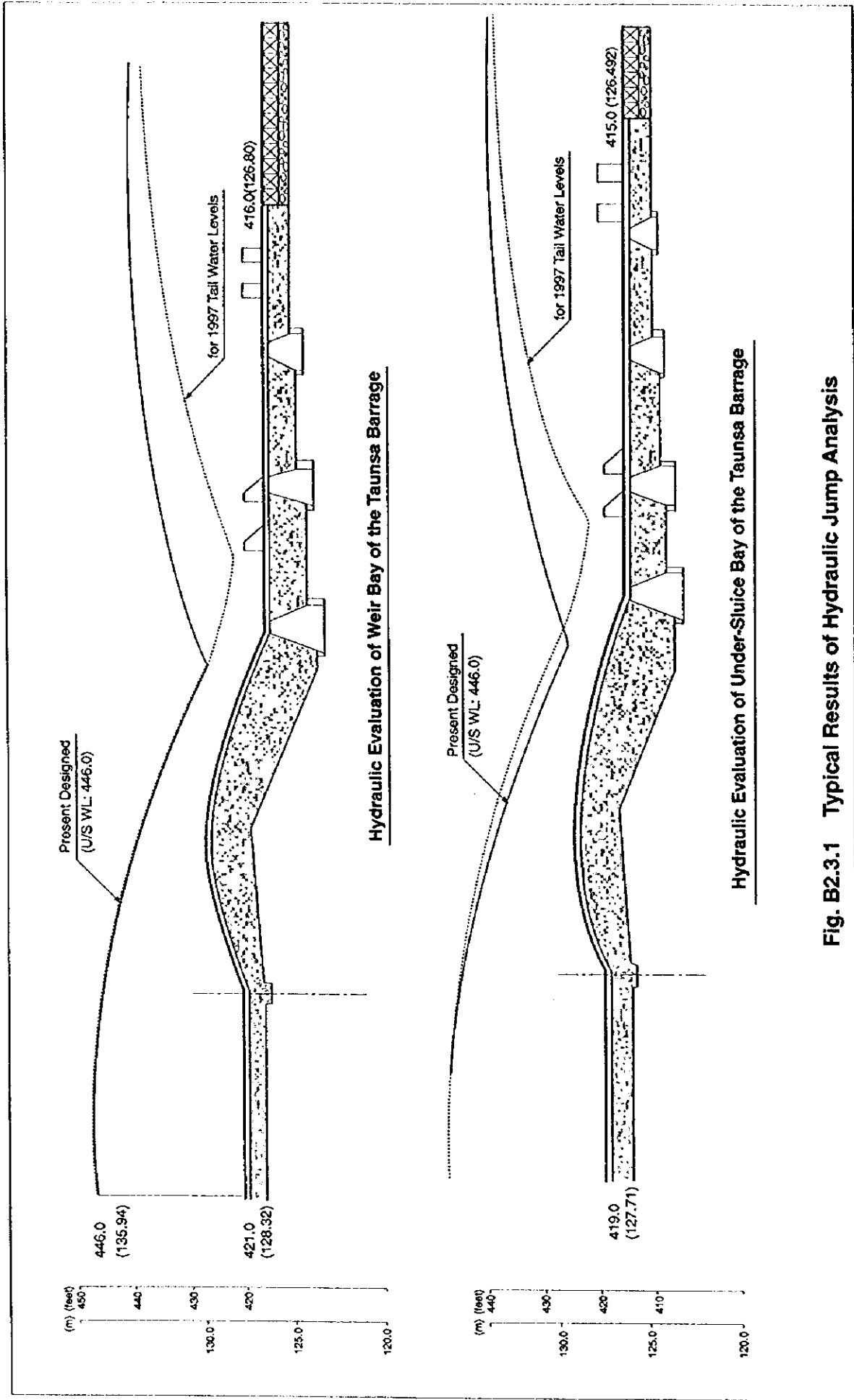
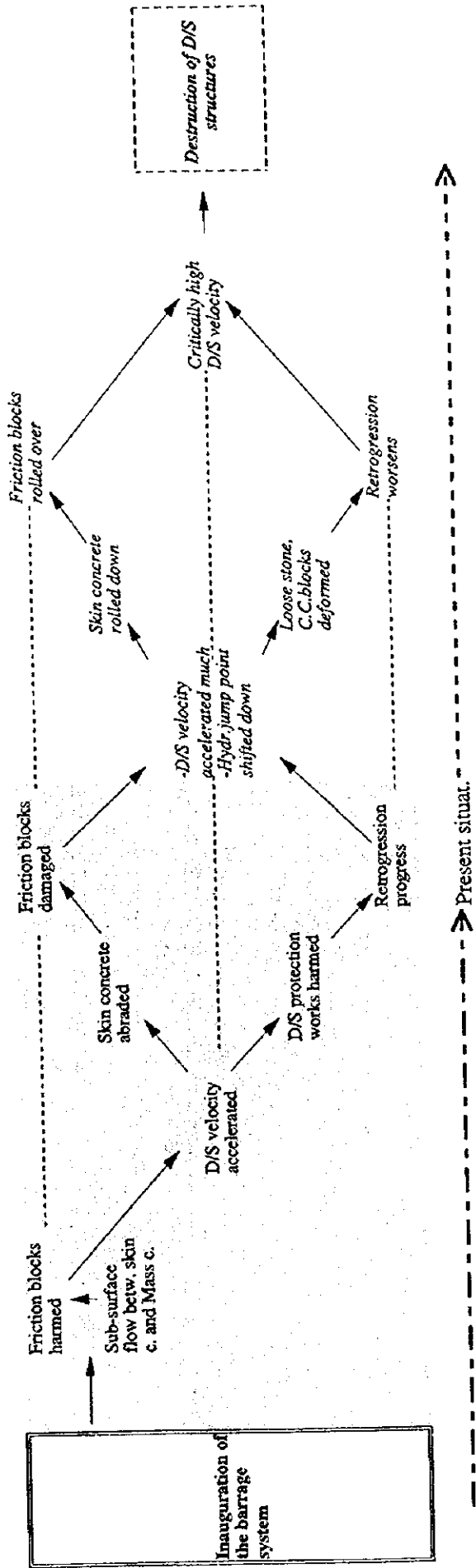


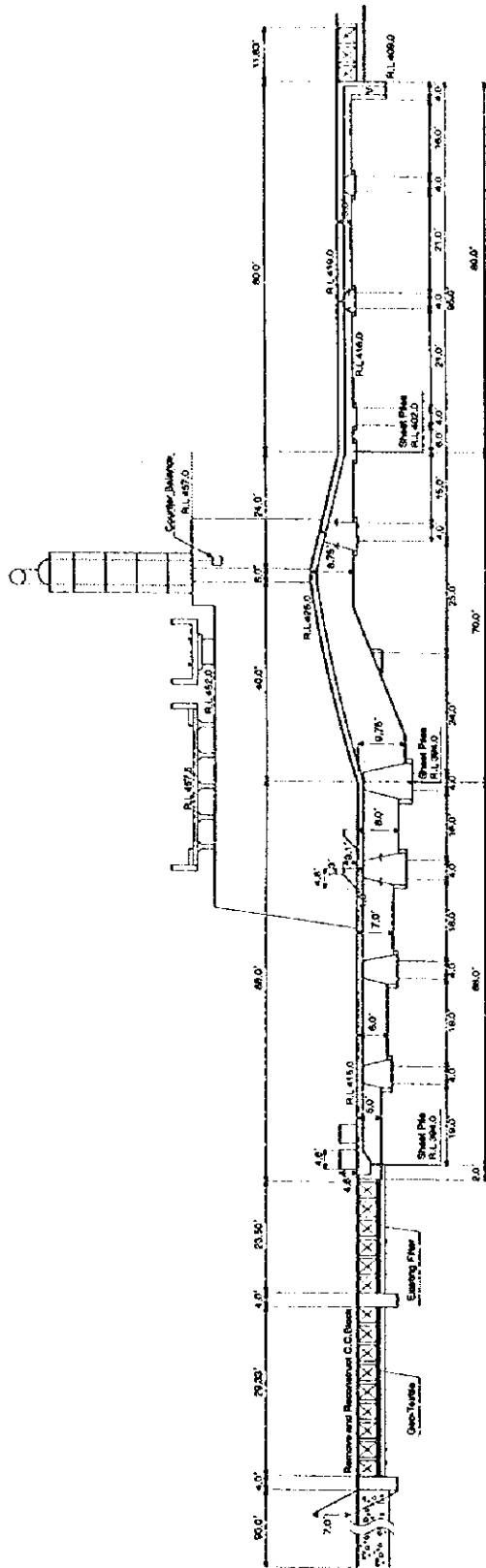
Fig. B2.3.1 Typical Results of Hydraulic Jump Analysis



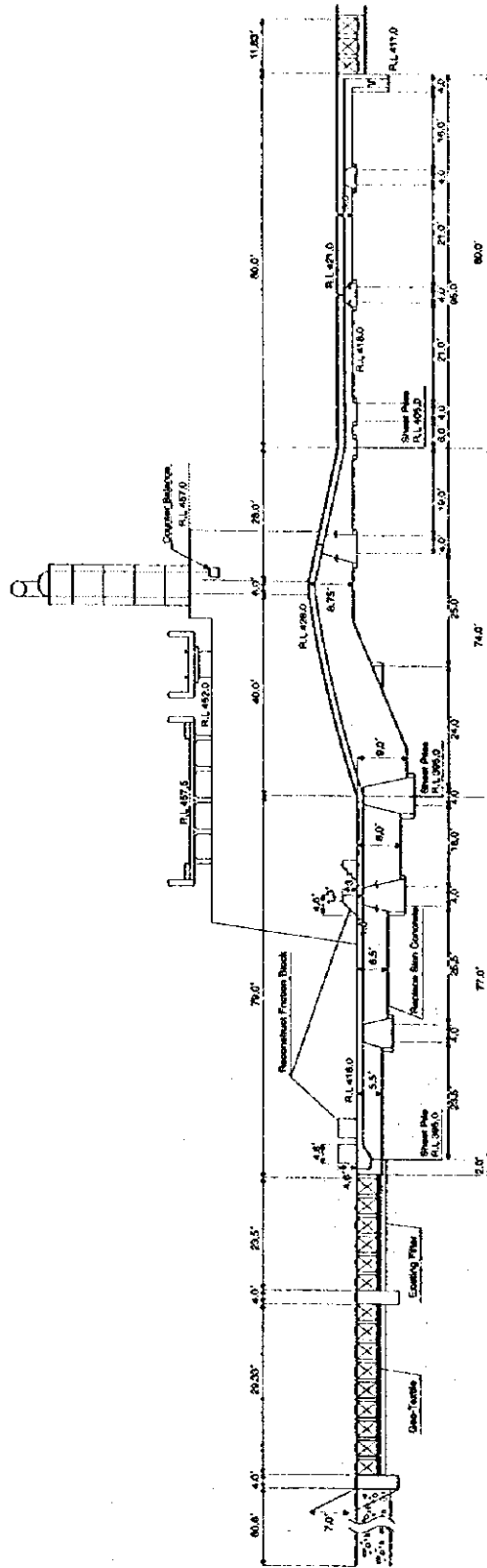
Hydraulic structure of the Taunsa Barrage has deteriorated considerably. Such deterioration is not found in limited portion only, but is seen in every sections in different ways. Defects appear in some portions will bring about defects in other sections. Deterioration of the facilities advances in vicious circle. Defect such as frictional wear and destruction of friction blocks etc., were observed. These defects are not the only problems in the sites, but also leads defects in other sections. As shown in the above figure, for instance, a damages of friction blocks will bring about deterioration of skin-concrete, then advance and worsen situation of facilities. The vicious-circle of such damages causes complete destruction of the overall facility.

According to the investigation result during phase 2, Taunsa barrage is identified in the stage of "retrosession progressed" in the above diagram. Comprehensive rehabilitation plan is required essentially.

Fig.B.2.3.2 Consideration for the relation of defections in every phases of the Barrage Facilities



Under Sluice



Weir

Fig. B3.1 Typical Cross Sections of the Barrage

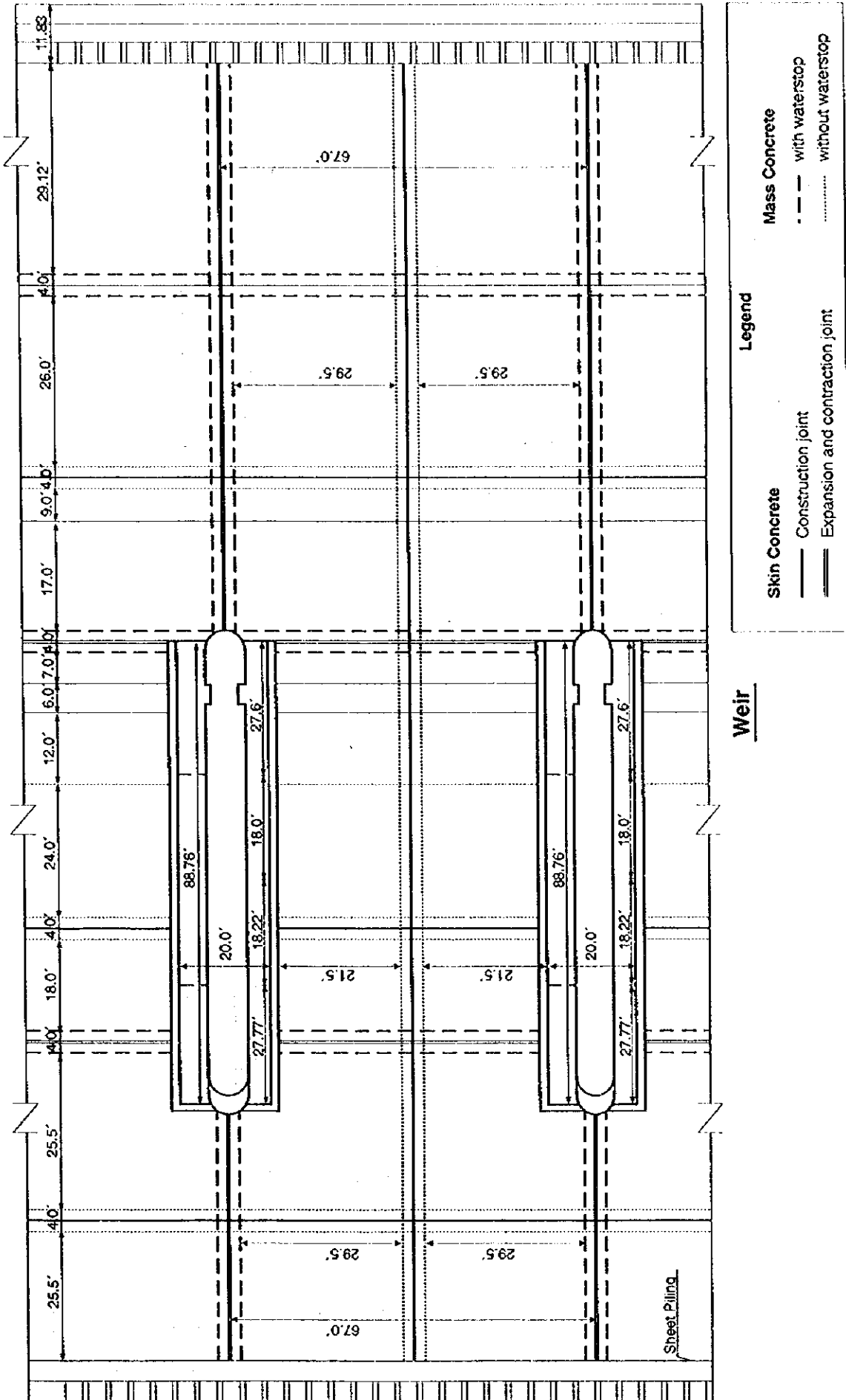
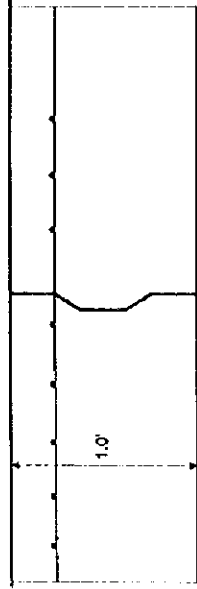
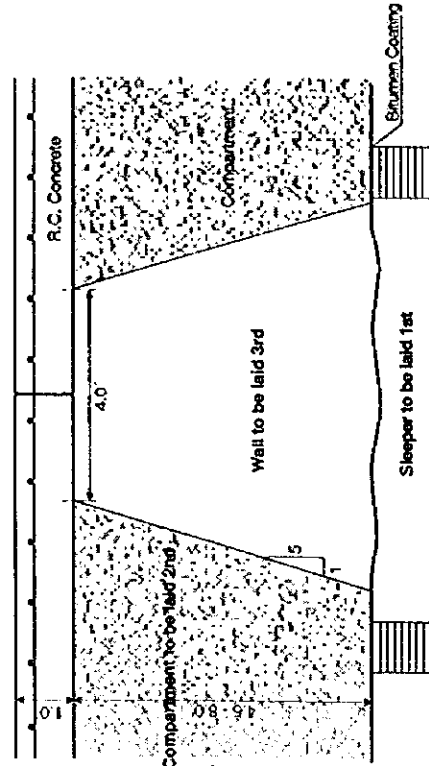
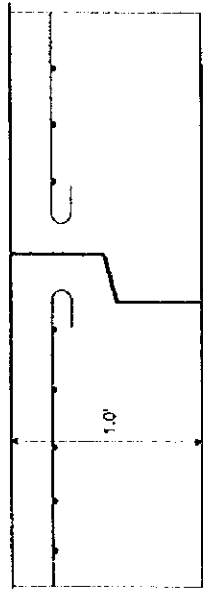


Fig. B3.2 Plan of Joints on Floor Concrete

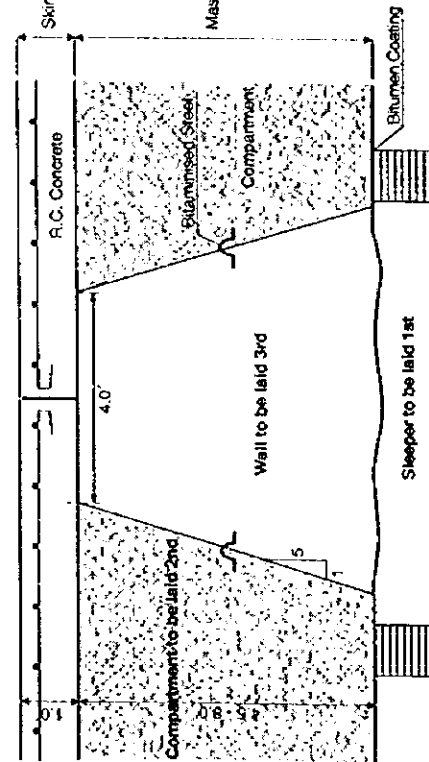
Detail of Construction Joint



Expansion and Contraction Joint



Joint without Waterstop



Joint with Waterstop

Fig. B3.3 Detail of Joints

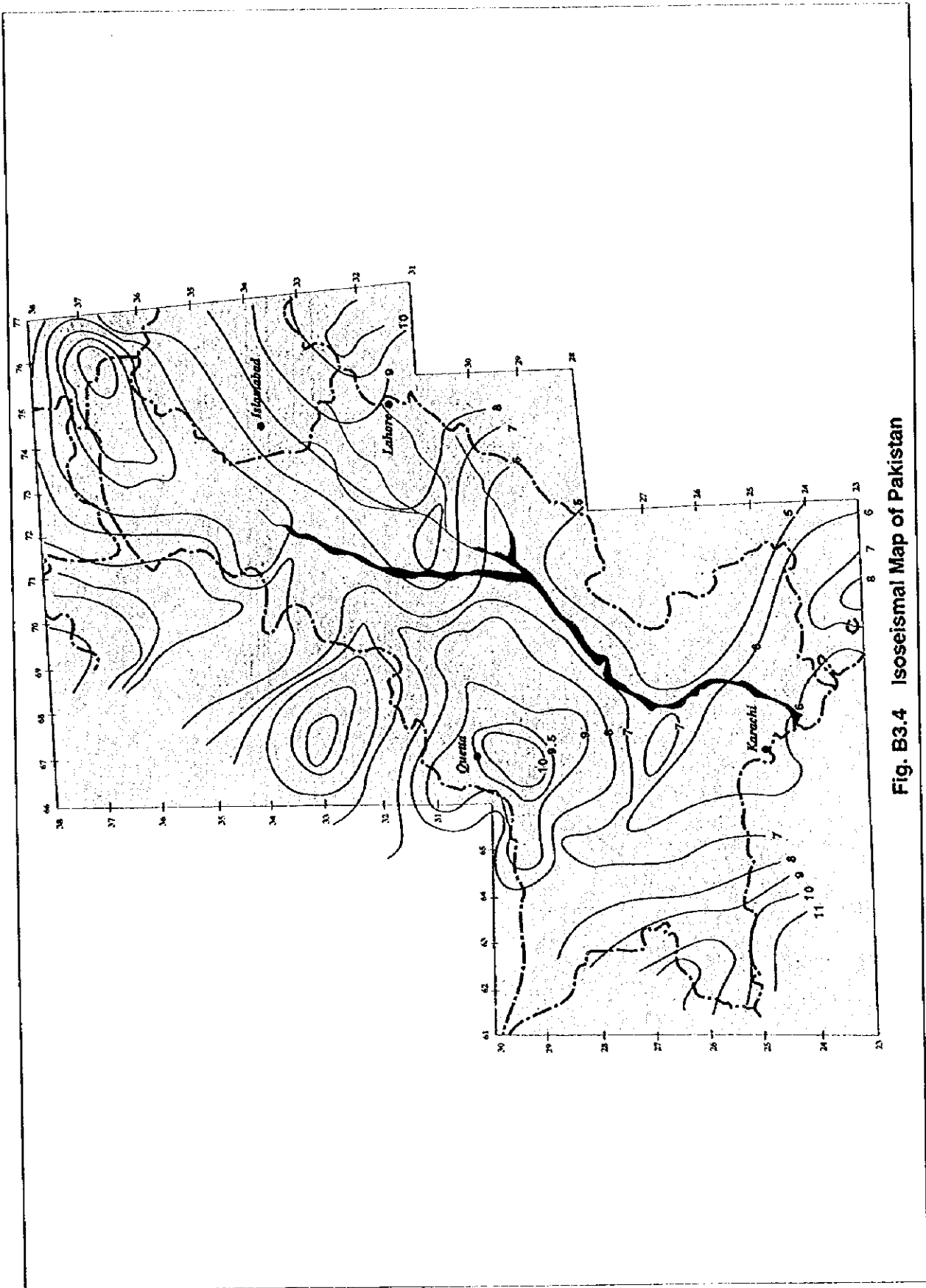


Fig. B3.4 Isoseismal Map of Pakistan

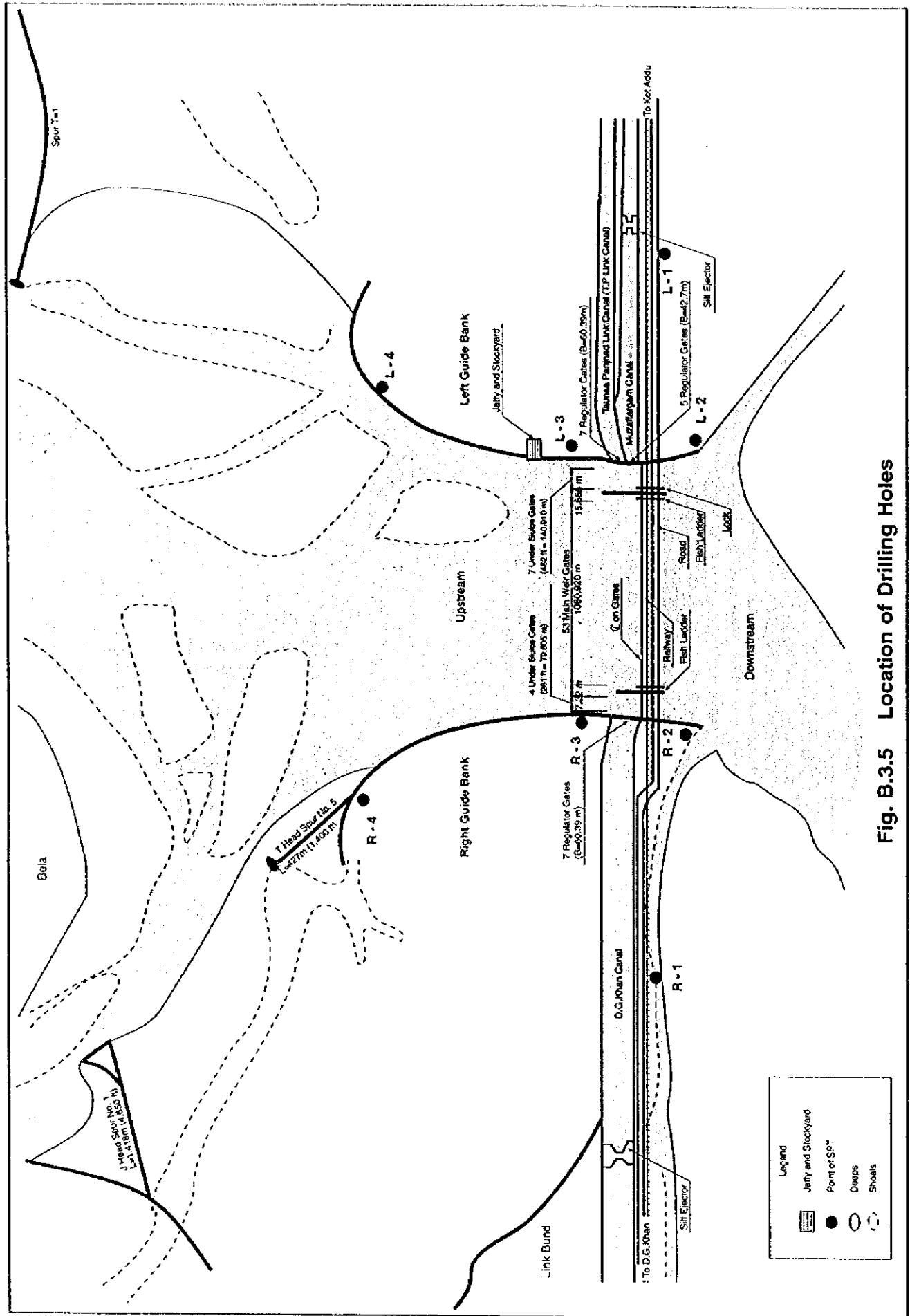


Fig. B.3.5 Location of Drilling Holes

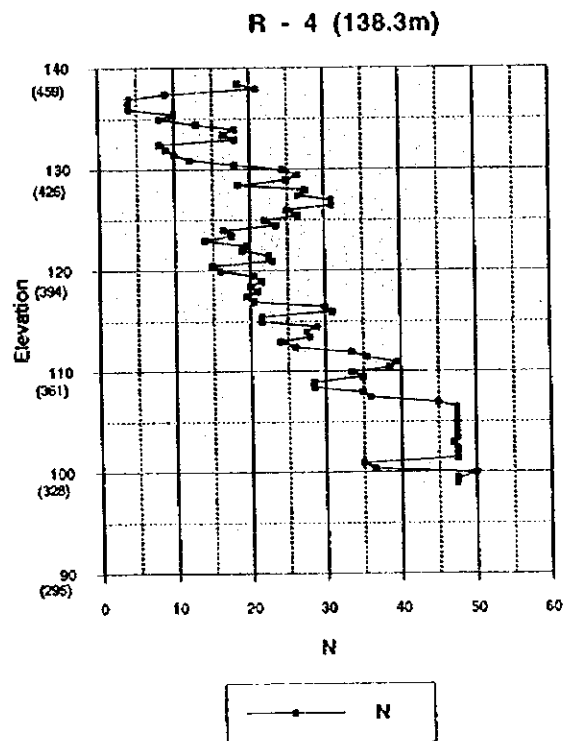
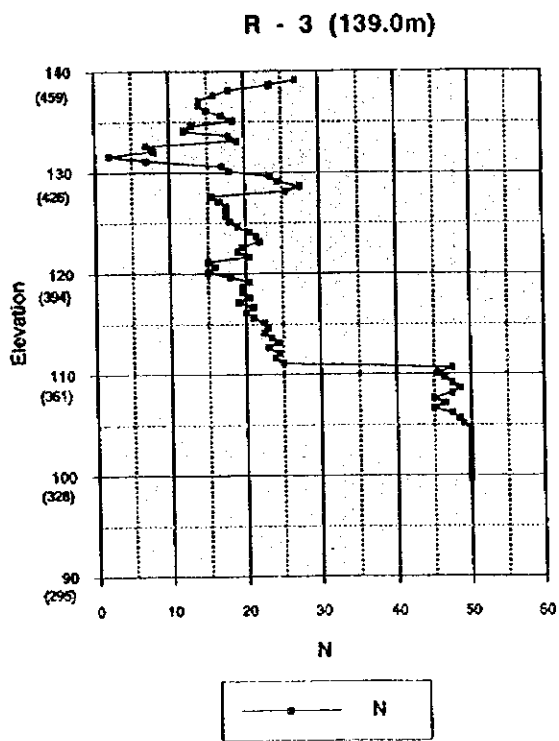
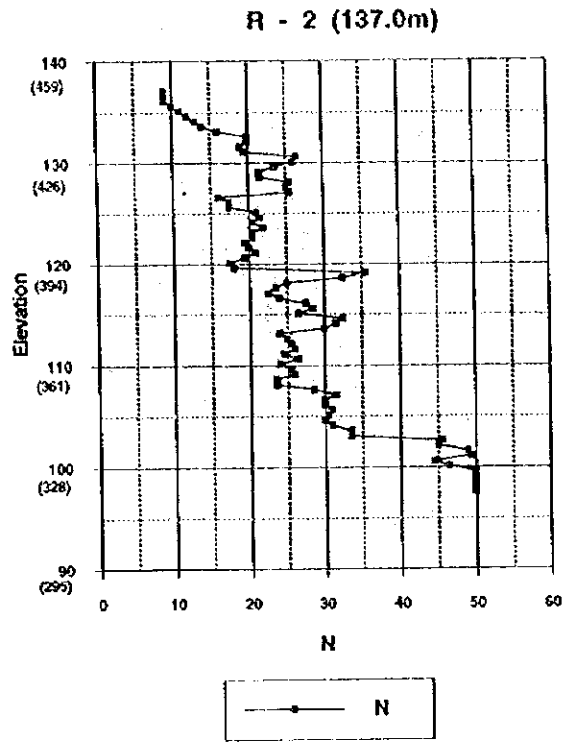
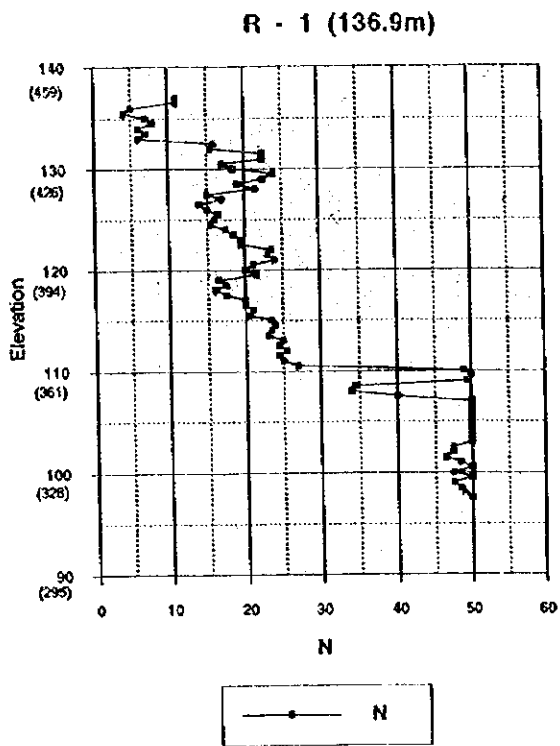


Fig. B3.6 (1) SPT Test Result

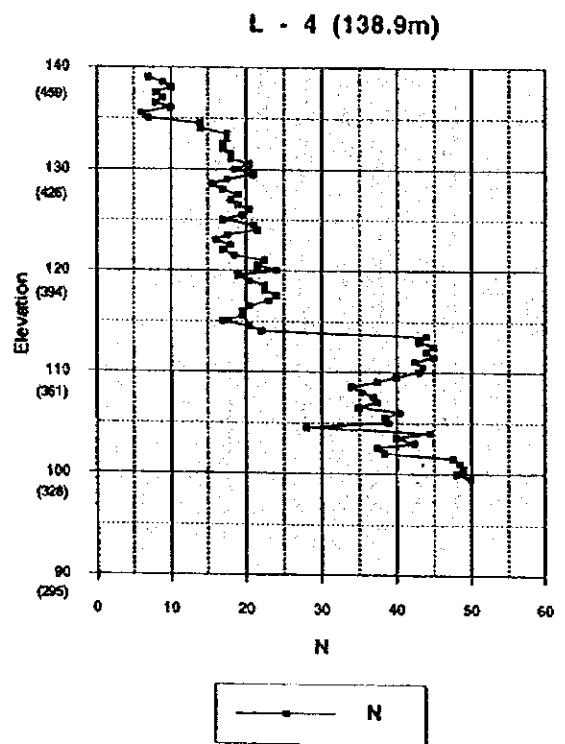
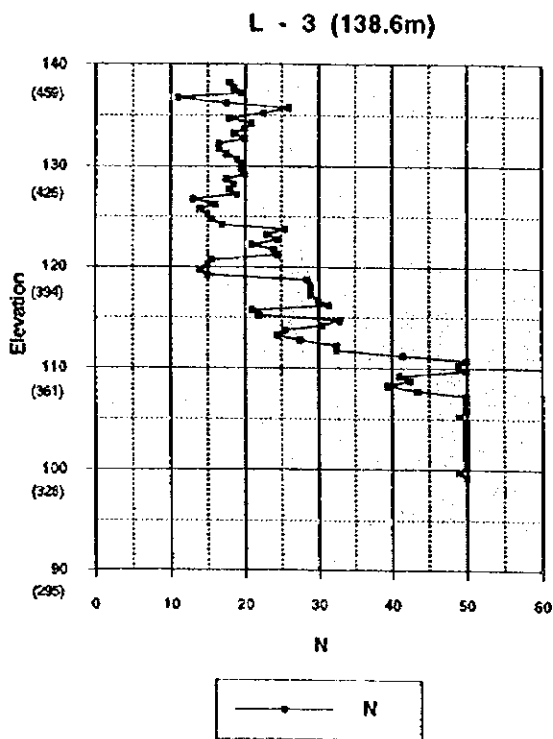
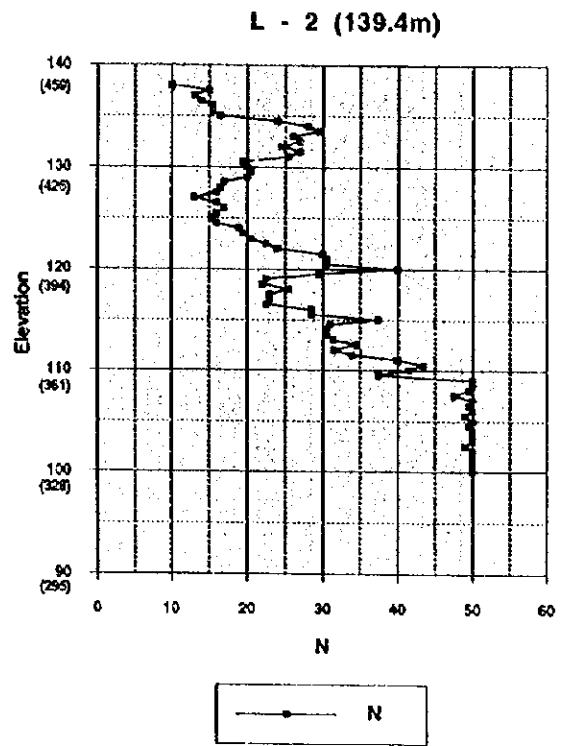
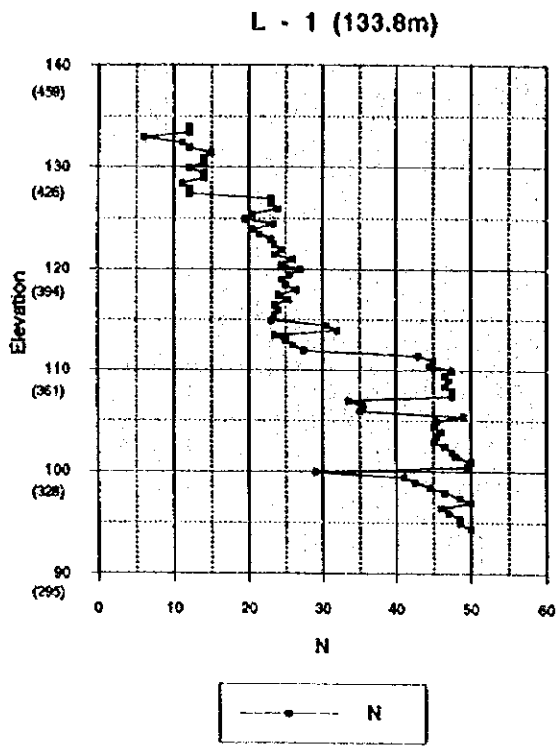


Fig. B3.6 (2) SPT Test Result

Particle Size Distribution

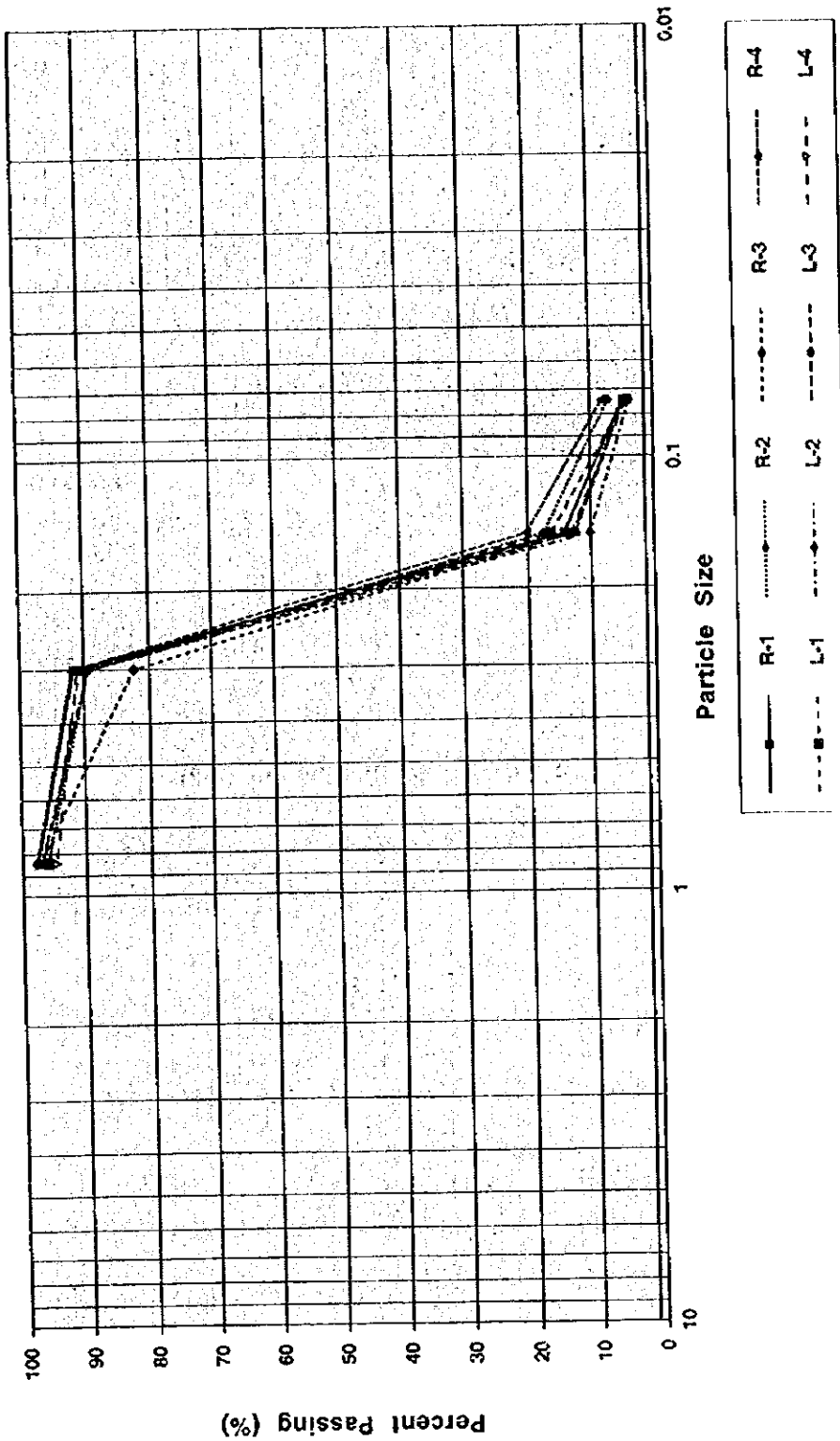
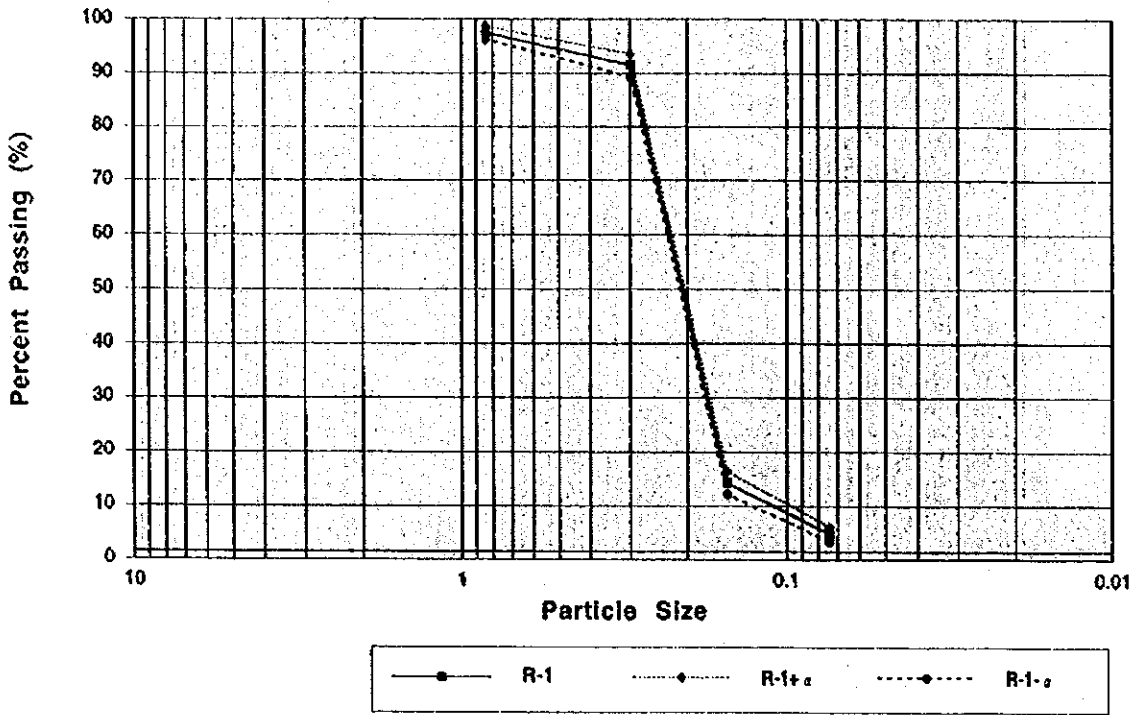


Fig. B3.7 (1) Particle Size Distributions

Particle Size Distribution (R-1)



Particle Size Distribution (R-2)

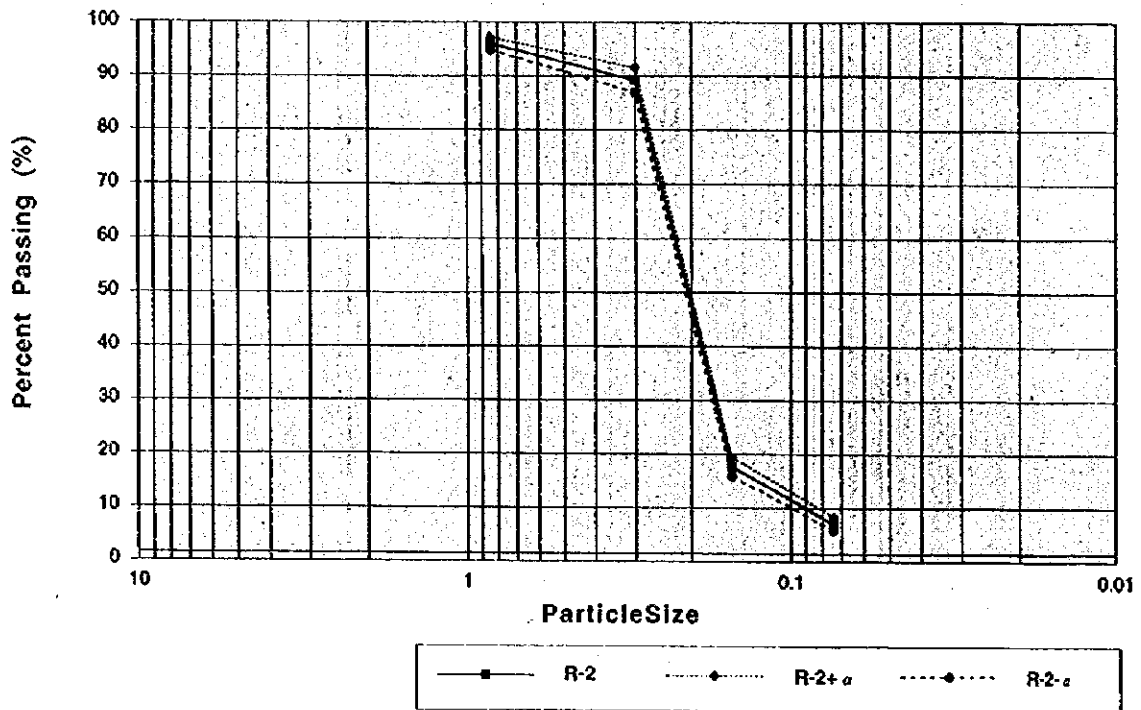
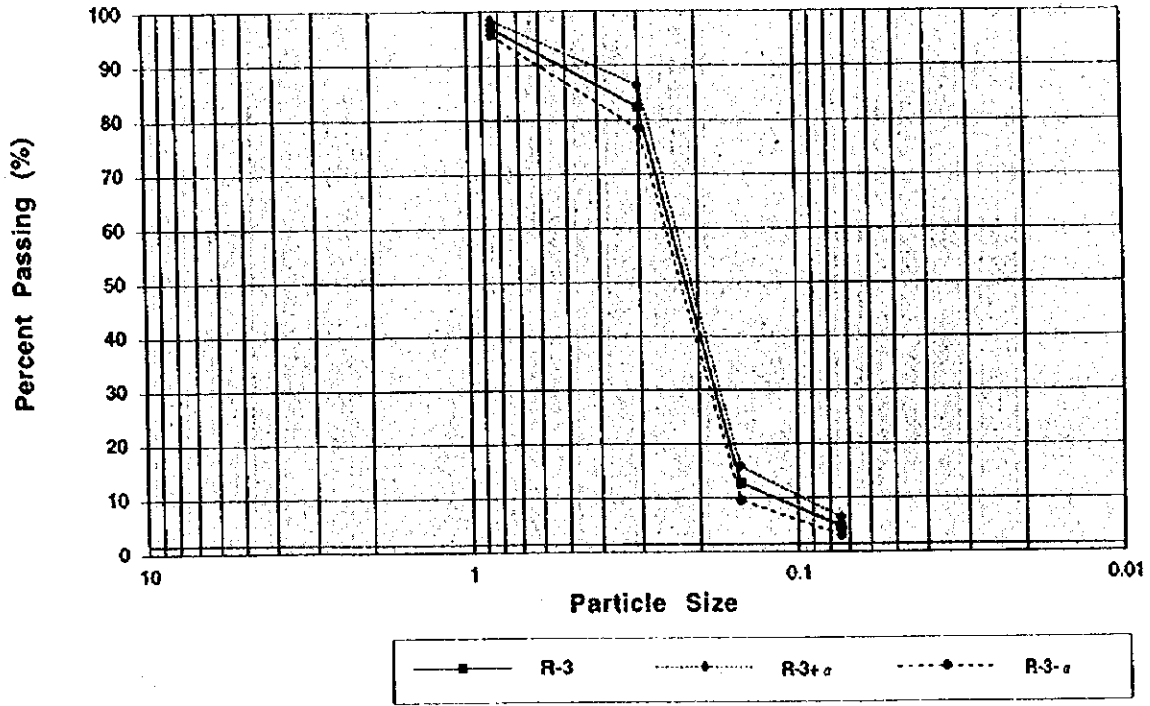


Fig. B3.7 (2) Particle Size Distributions

Particle Size Distribution (R-3)



Particle Size Distribution (R-4)

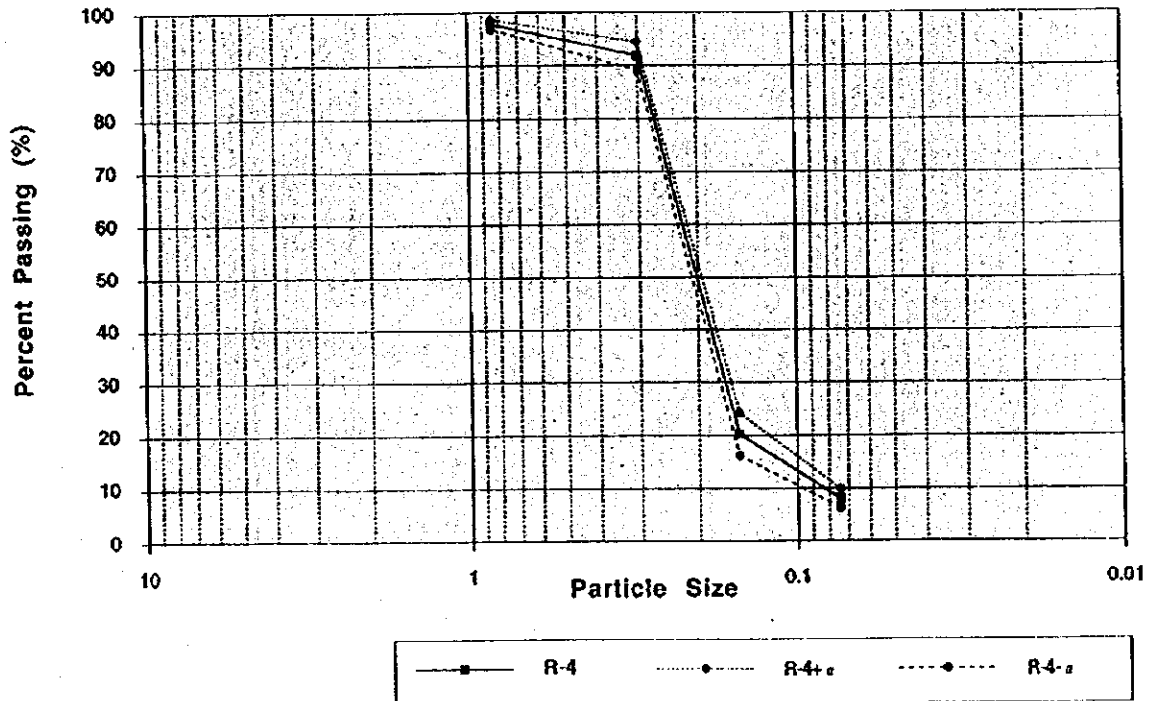


Fig. B3.7 (3) Particle Size Distributions

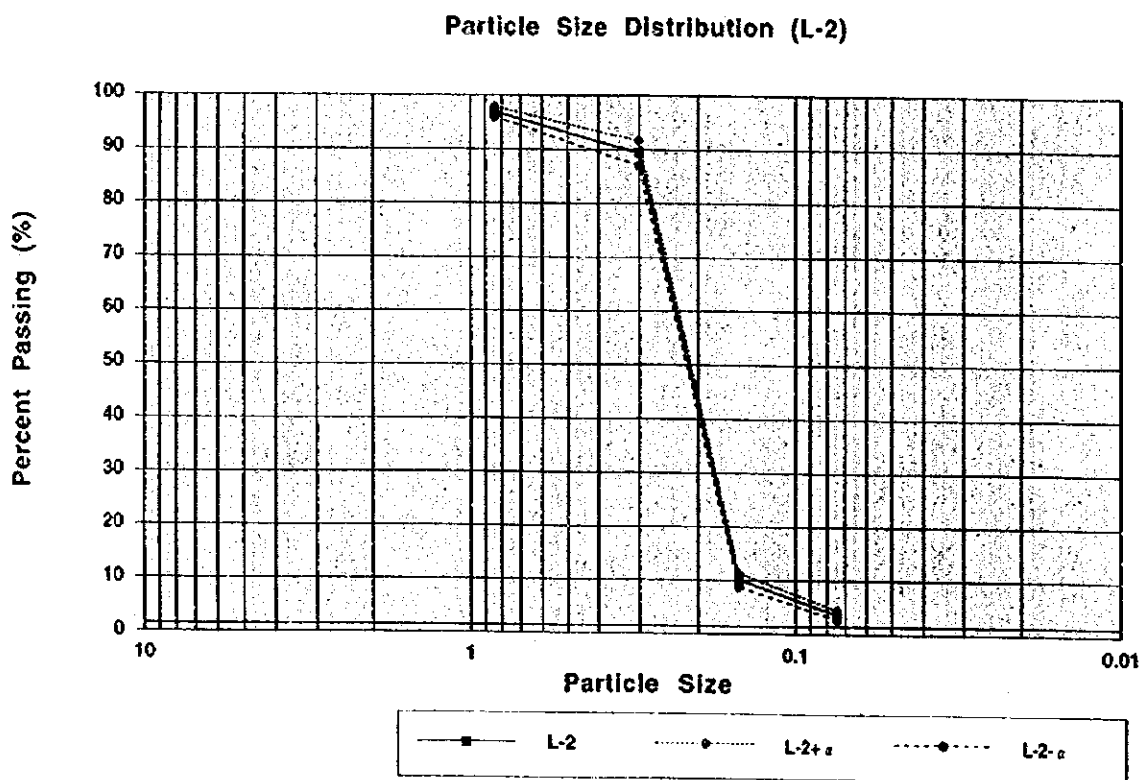
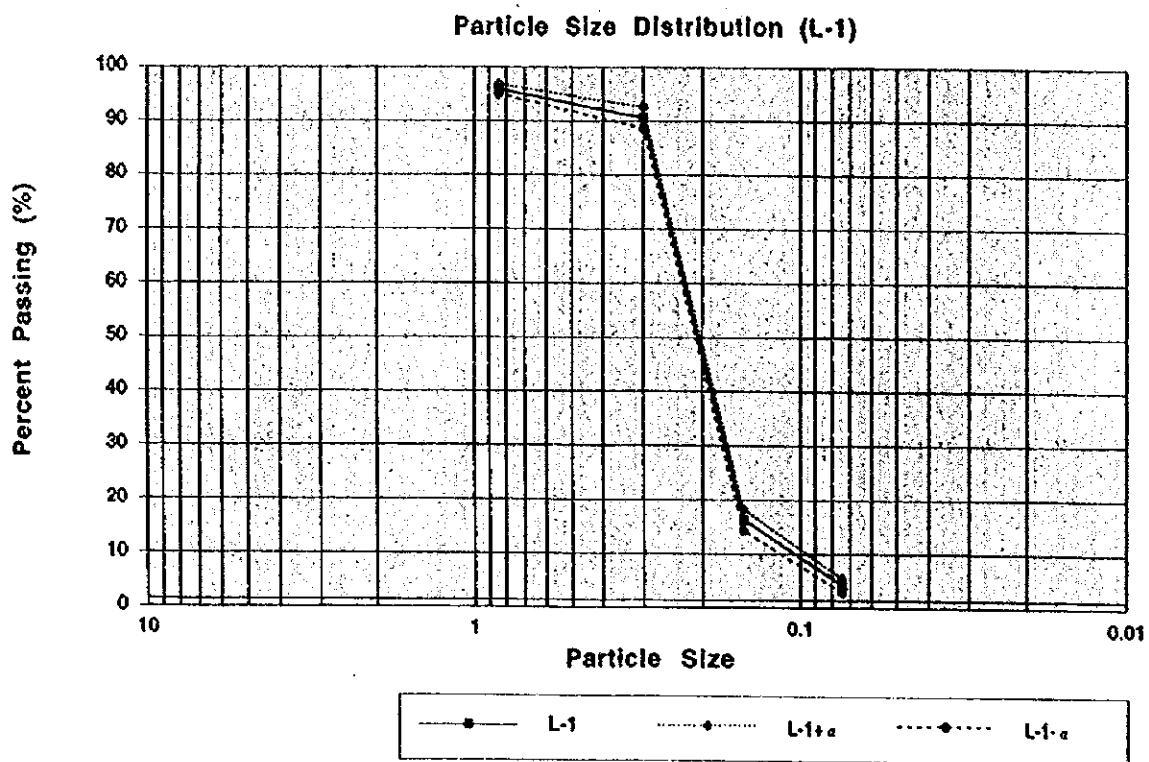
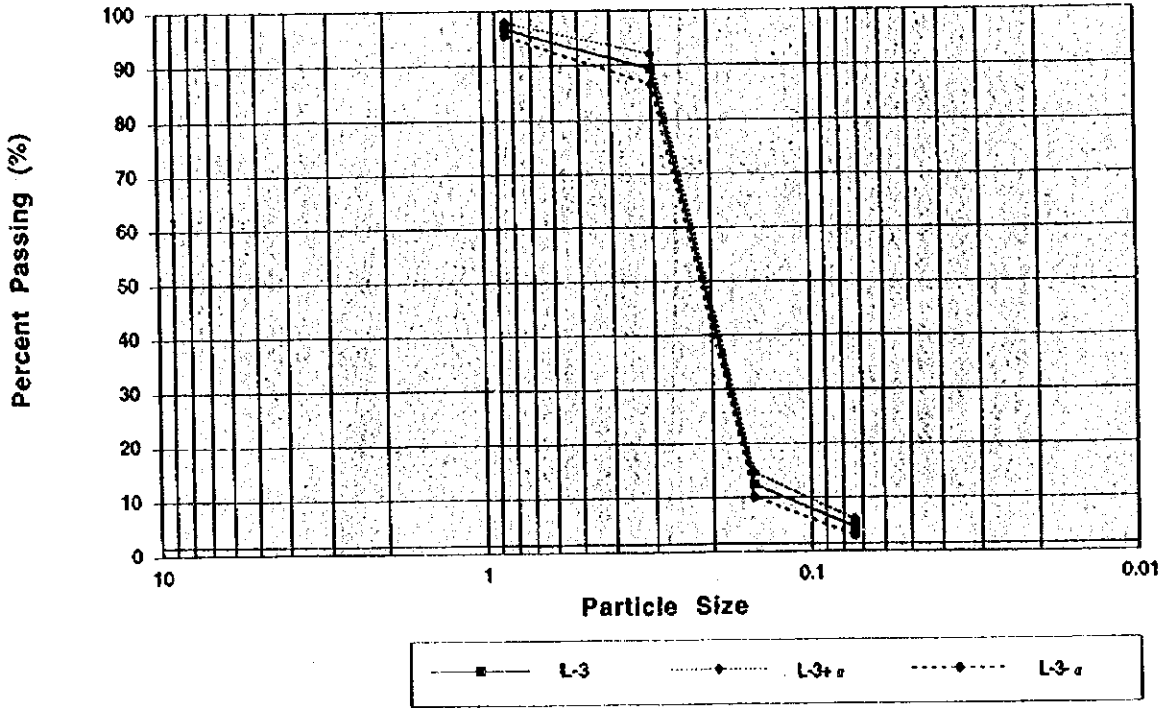


Fig. B3.7 (4) Particle Size Distributions

Particle Size Distribution (L-3)



Particle Size Distribution (L-4)

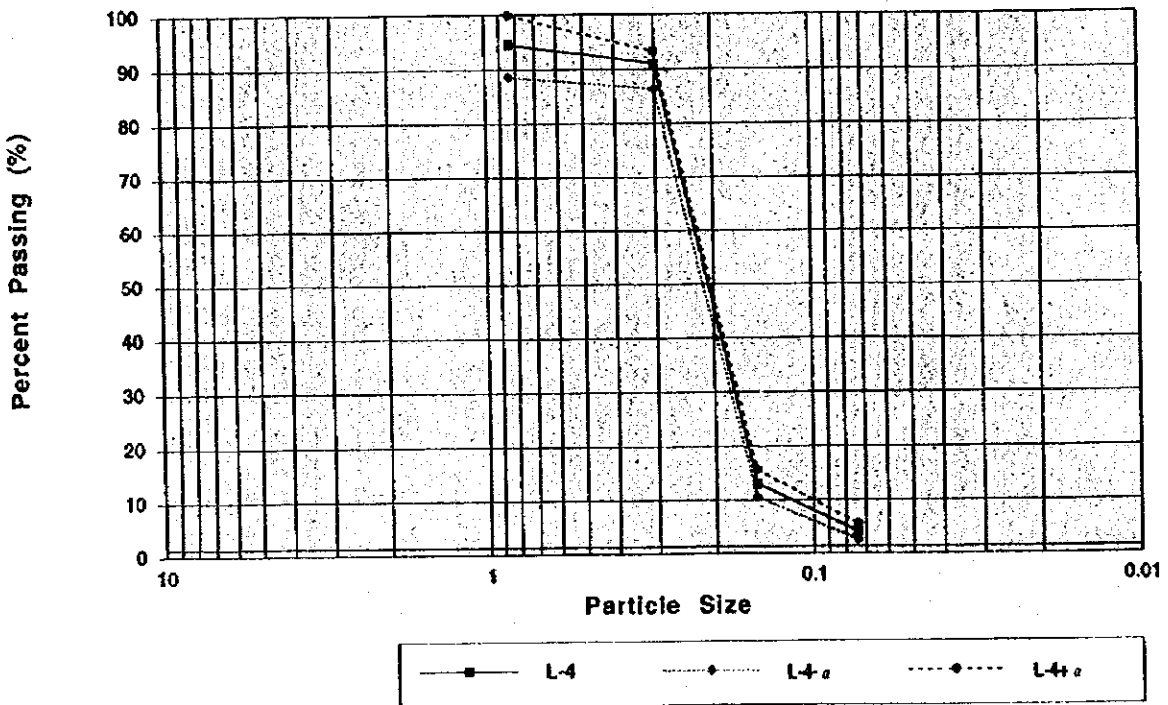


Fig. B3.7 (5) Particle Size Distributions

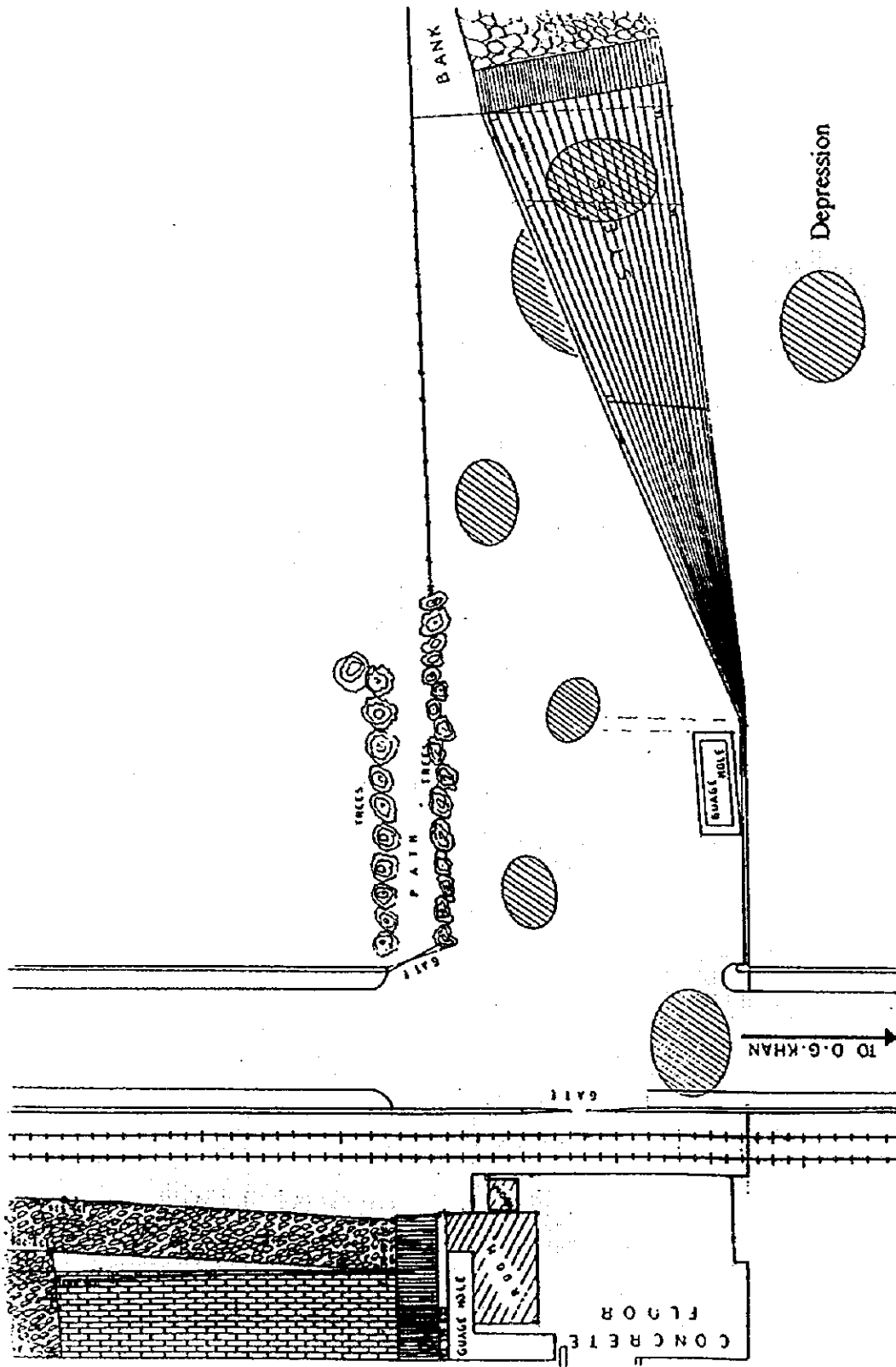


Fig. B3.8 Depressions in Left Bank

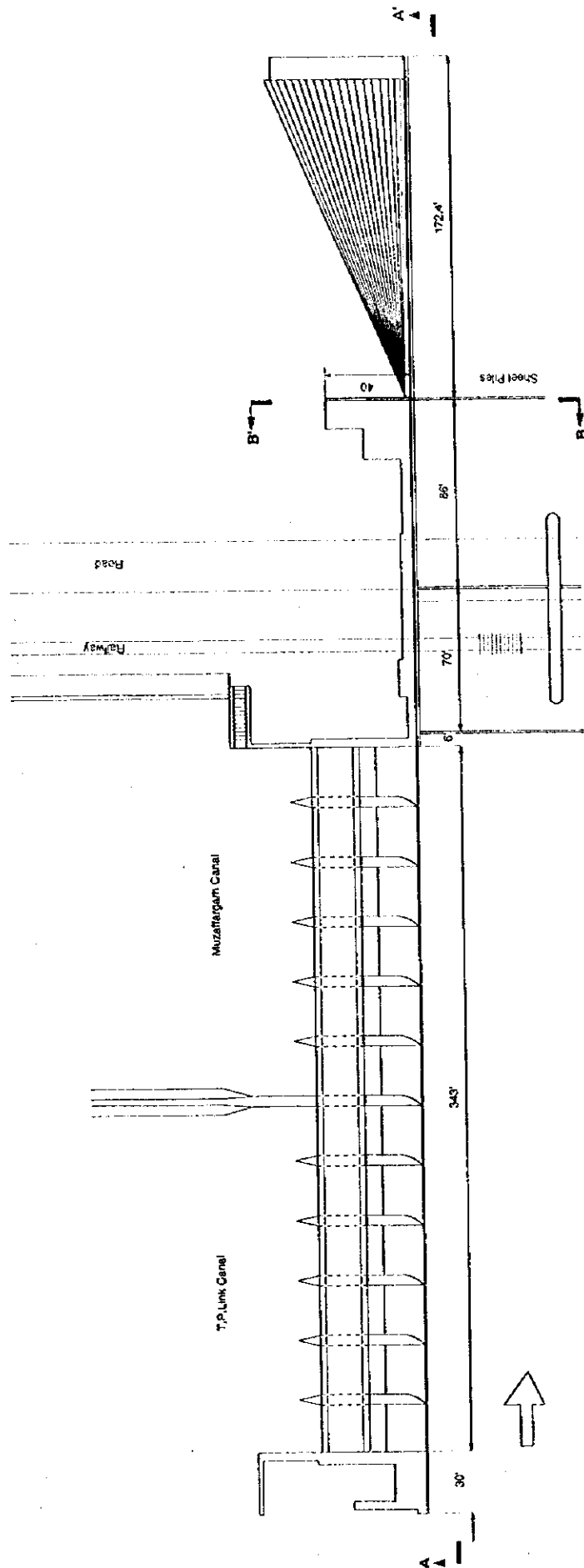
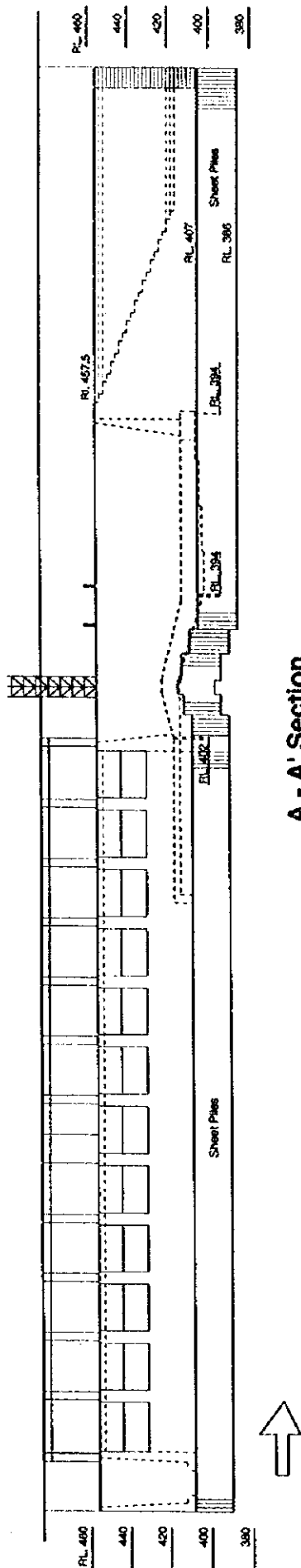
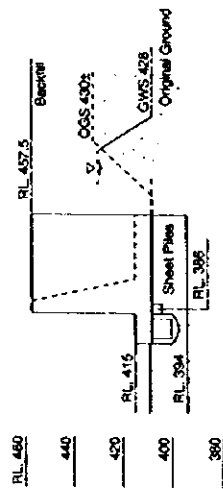


Fig. B3.9 (1) Plan of Left Bank



A - A' Section



B - B' Section

Fig. B3.9 (2) Plan of Left Bank

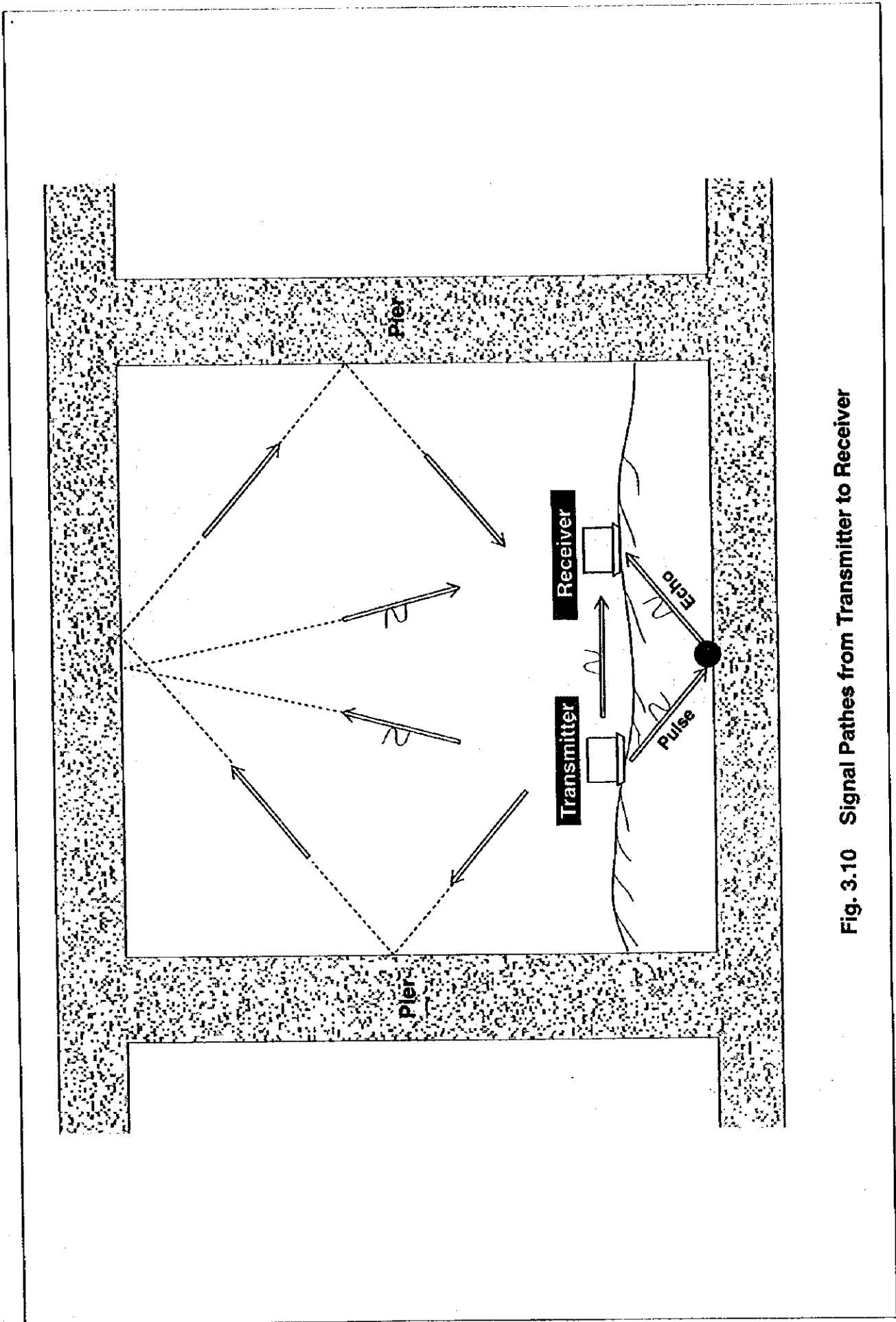


Fig. 3.10 Signal Pathes from Transmitter to Receiver

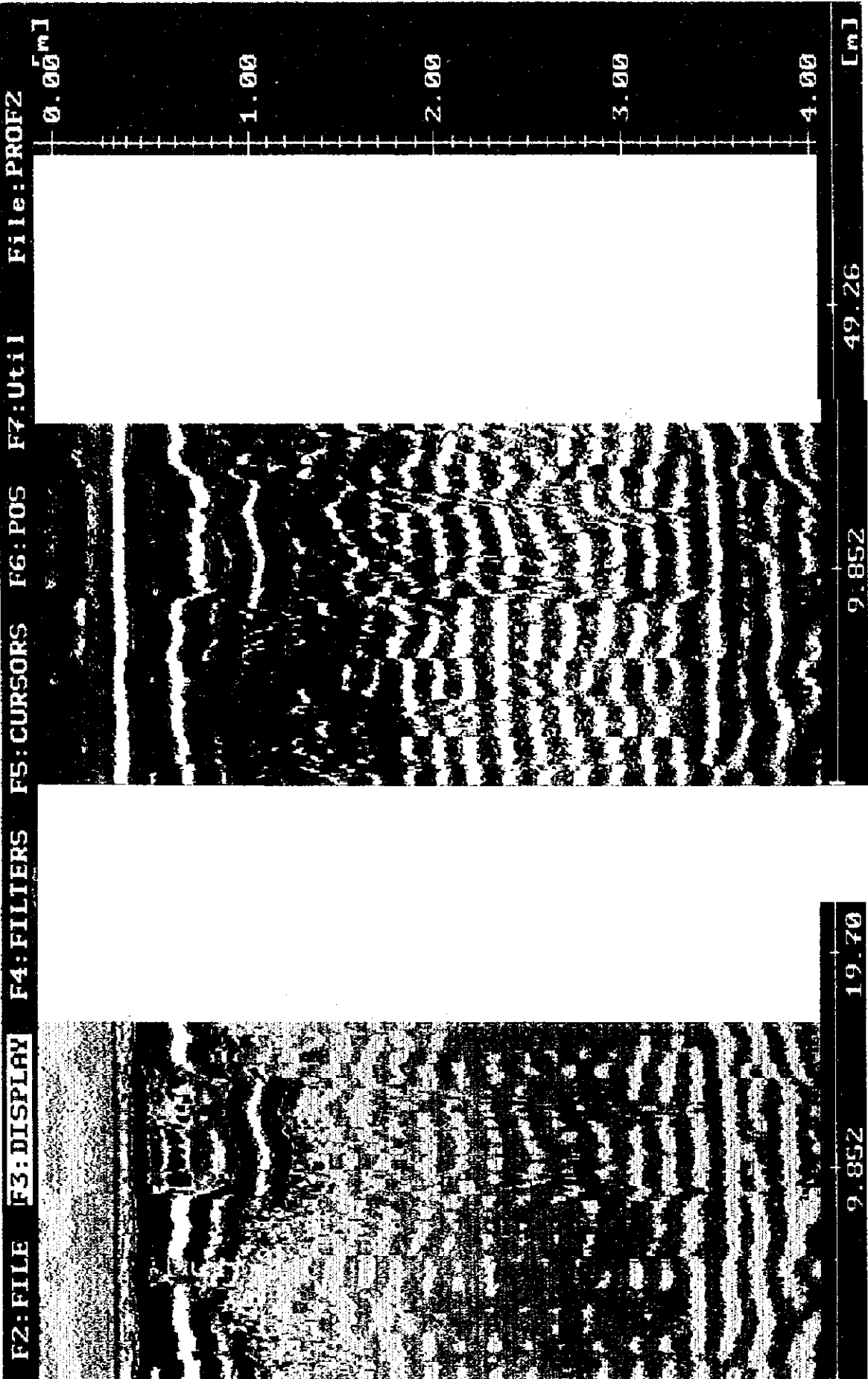


Fig. B3.11 GPR images along Prof-2

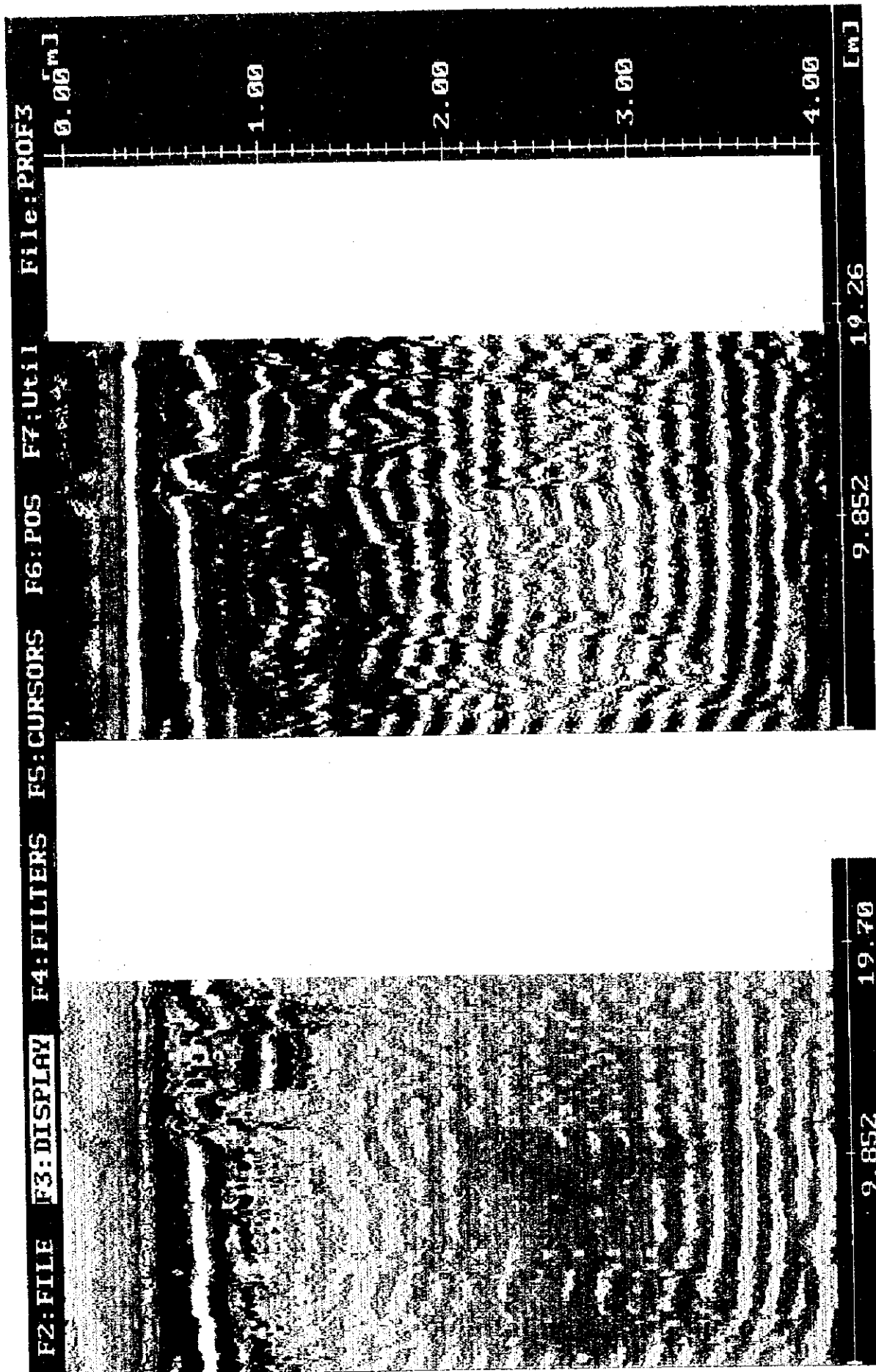


Fig. B3.12 GPR images along Prof-3

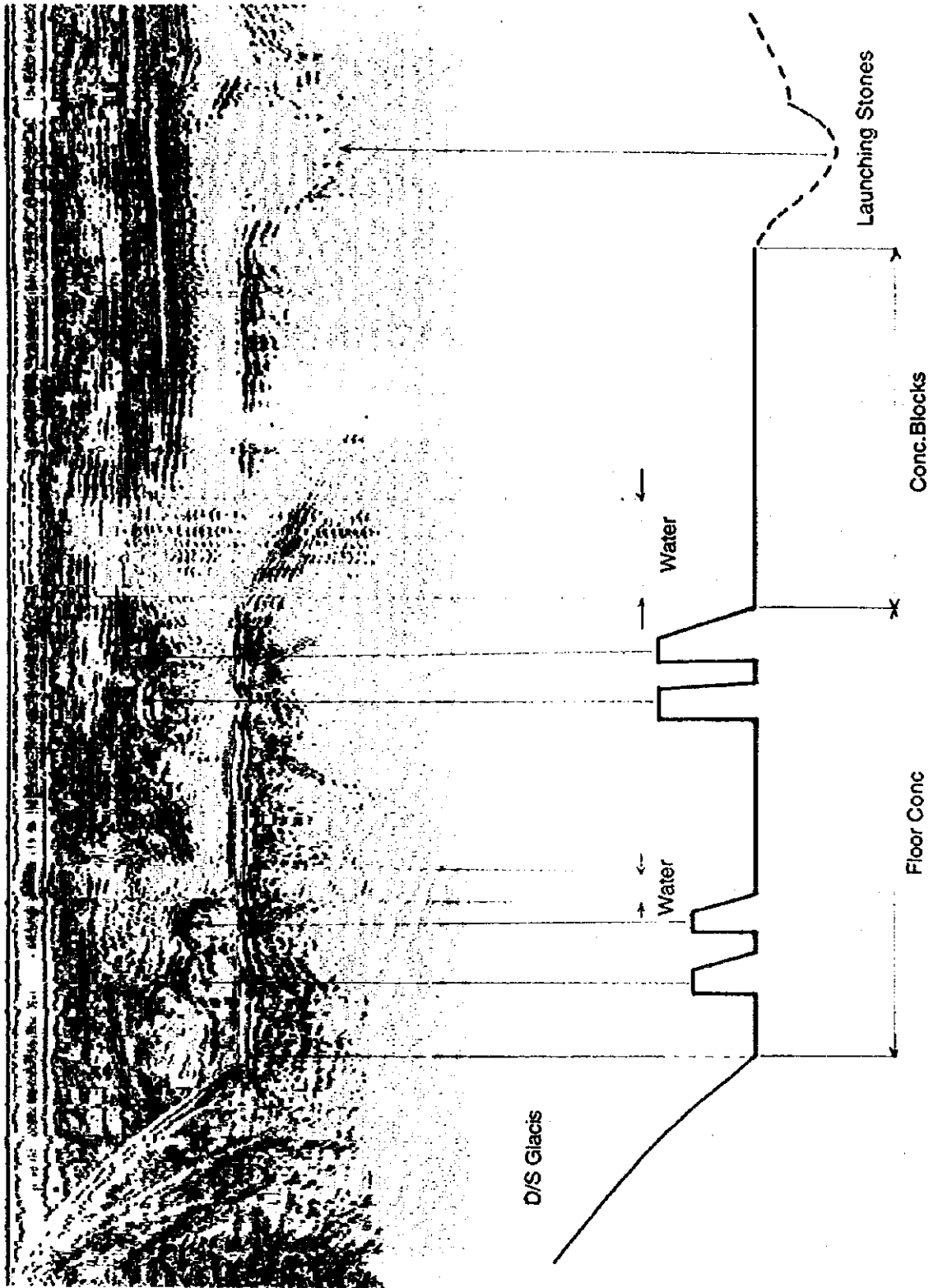
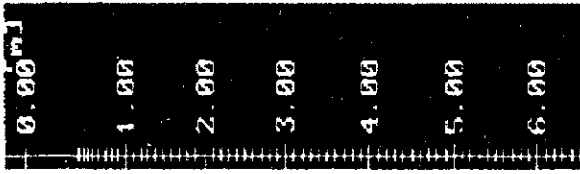


Fig. B3.13 GPR images along Prof-23

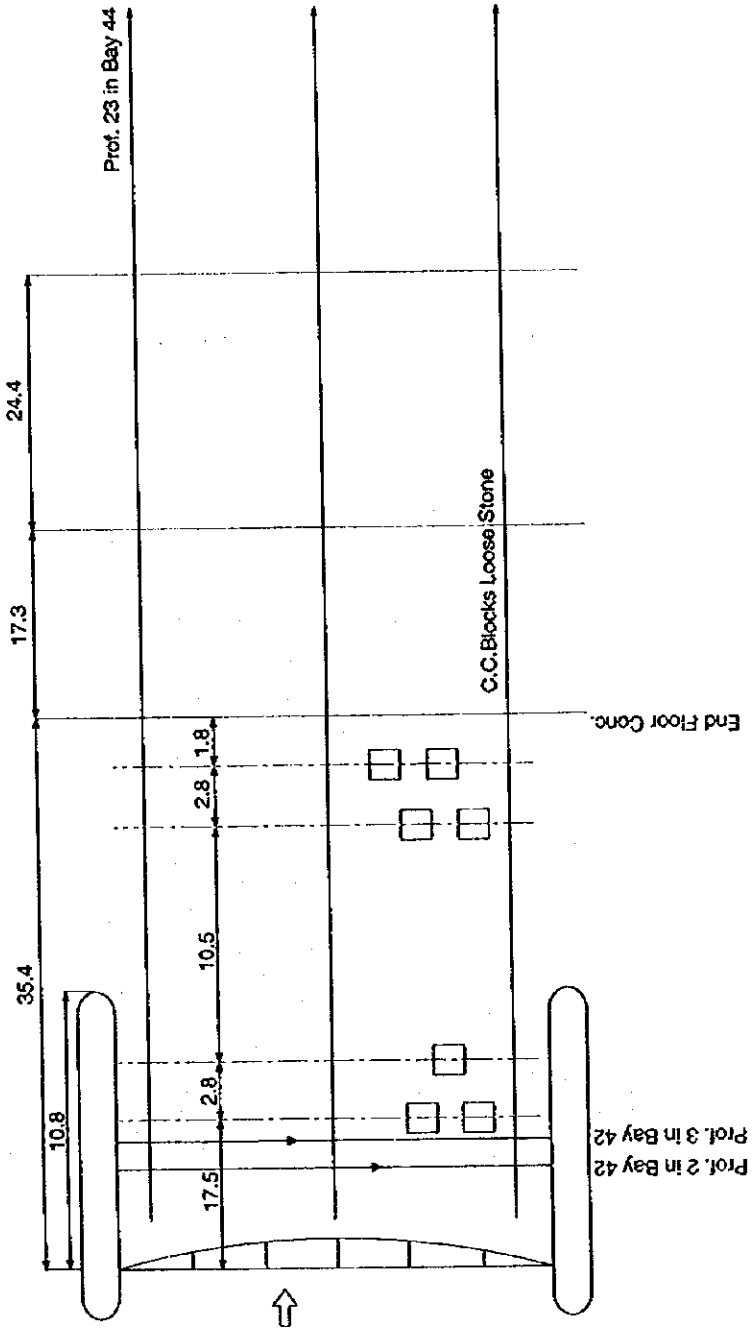


Fig. B3.14 Survey Lines for GRP



Fig. B3.15 Black and White Image of Prof-23

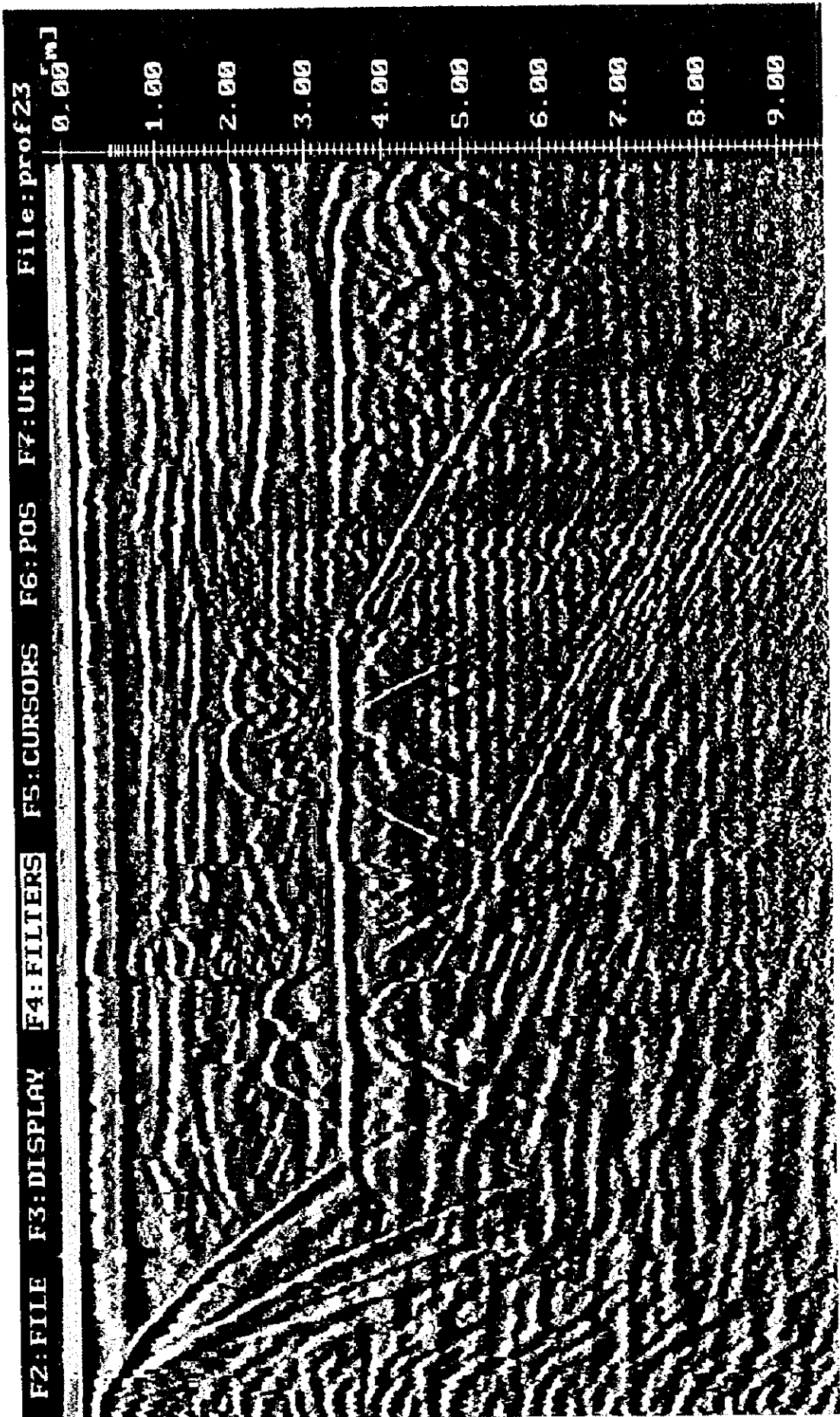


Fig. B3.16 Stressed Image by AGS filter of Prof-23

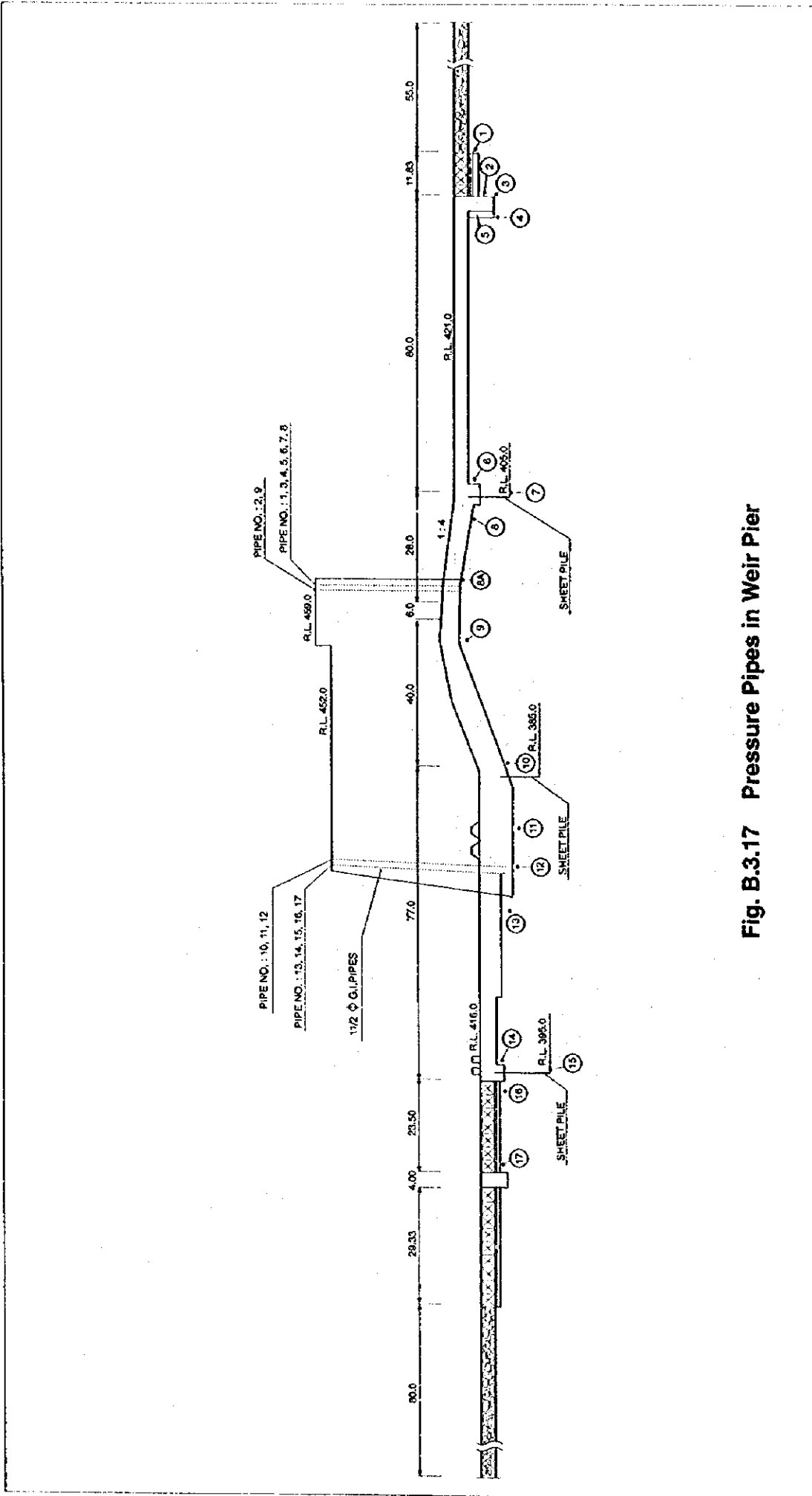


Fig. B.3.17 Pressure Pipes in Weir Pier

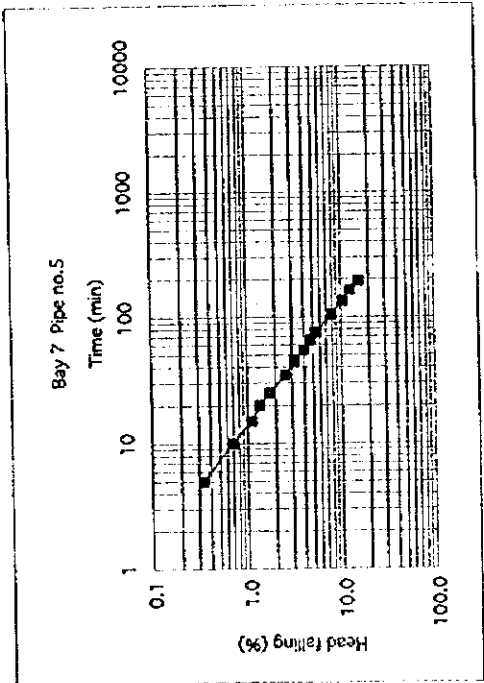
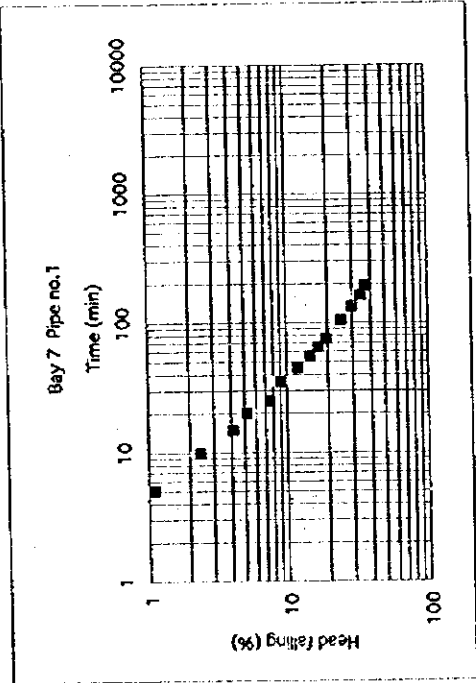
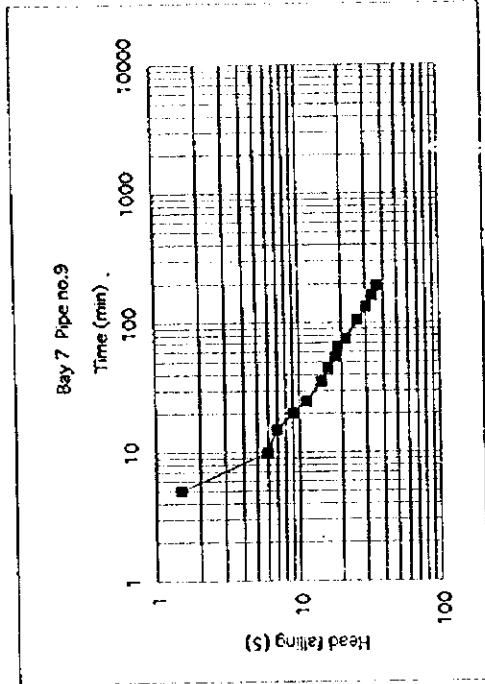
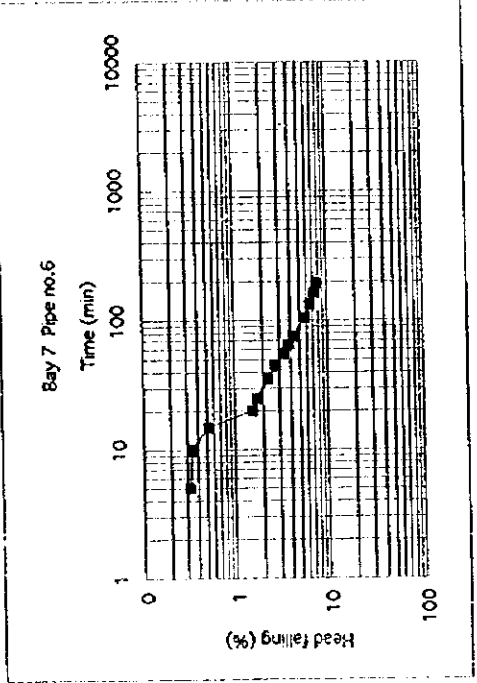


Fig. B3.18 (1) Results of the Falling Head Test

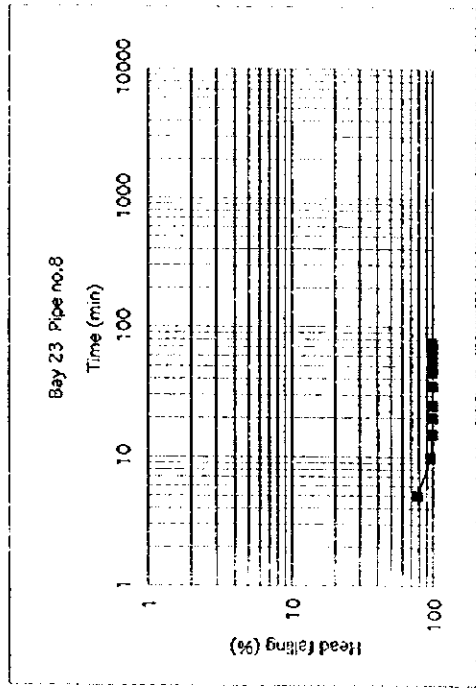
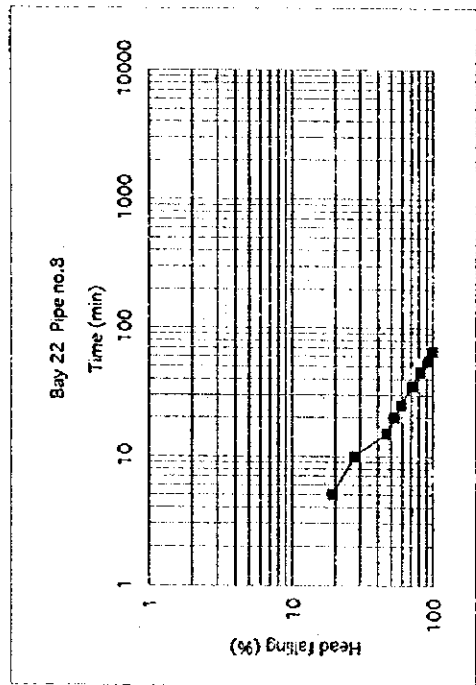
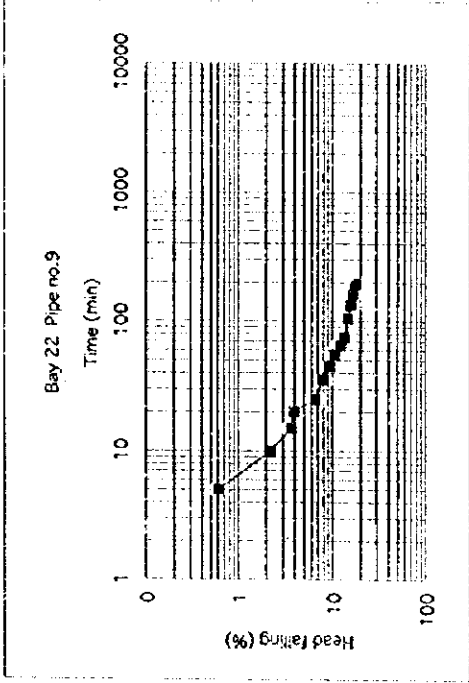
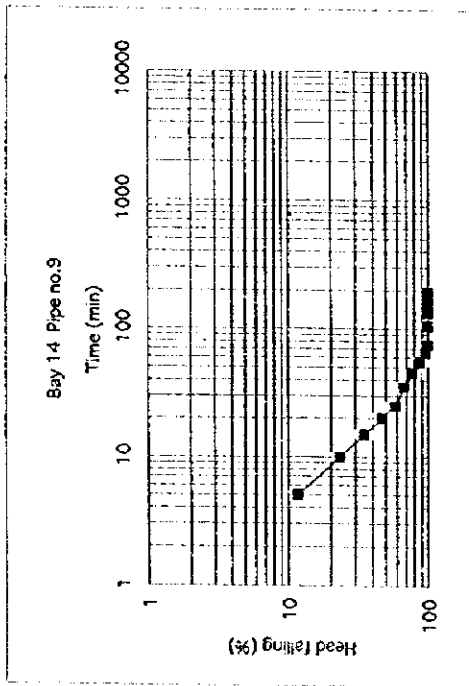


Fig. B3.18 (2) Results of the Falling Head Test

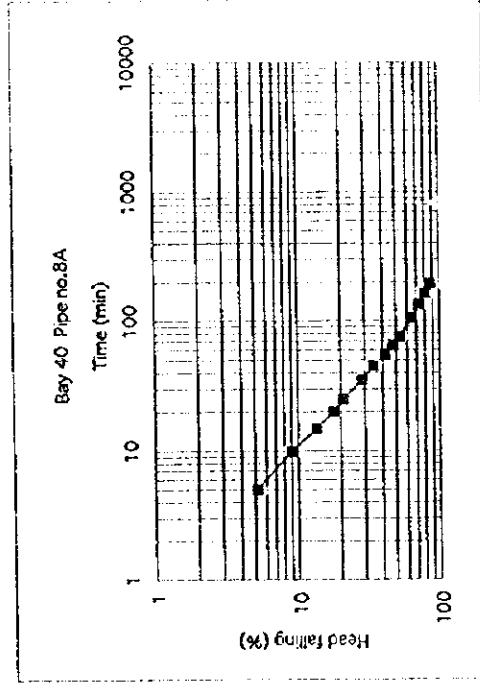
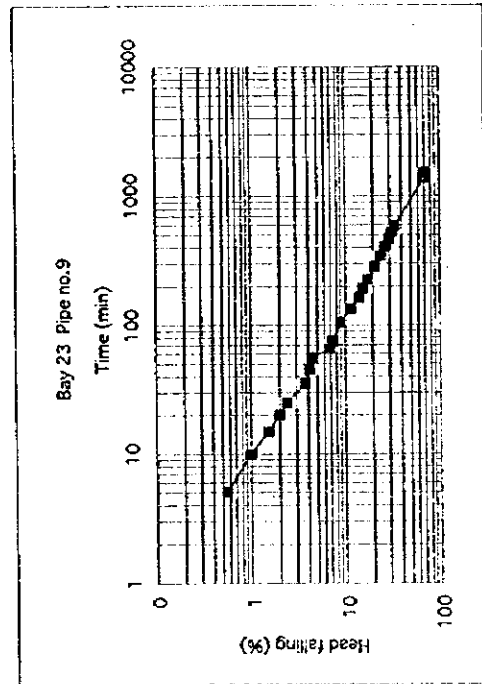
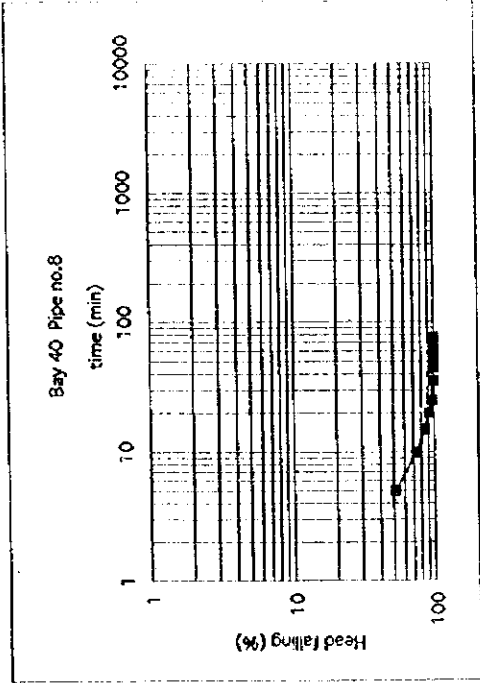
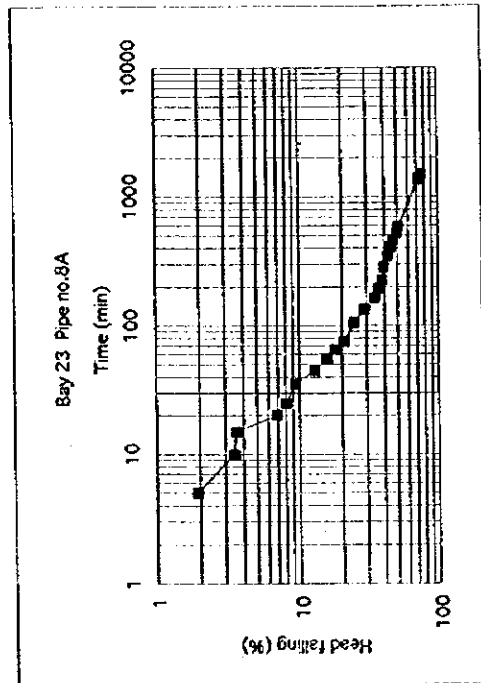


Fig. B3.18 (3) Results of the Falling Head Test

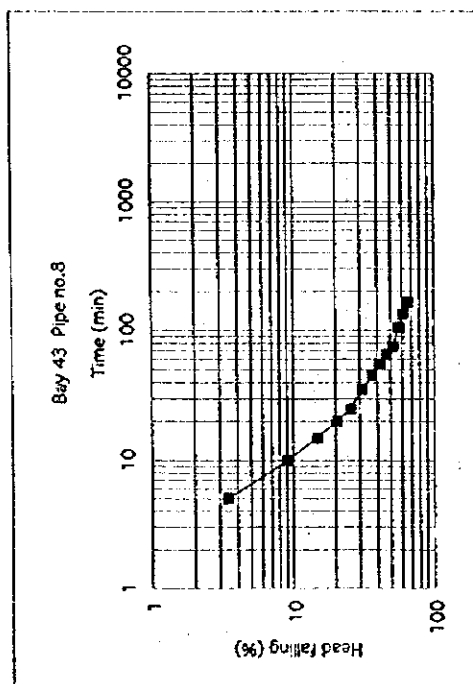
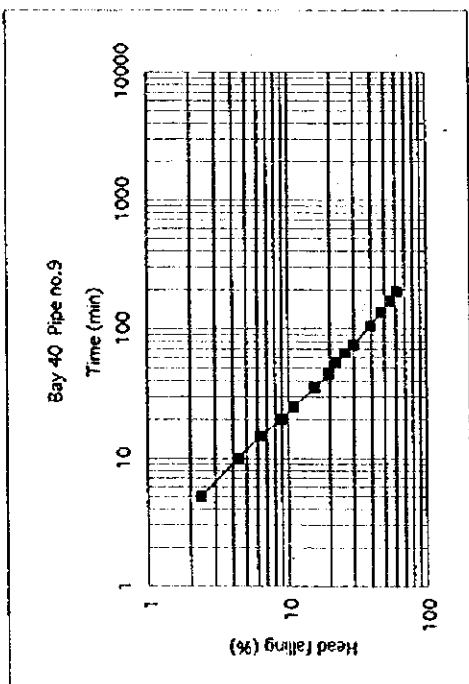
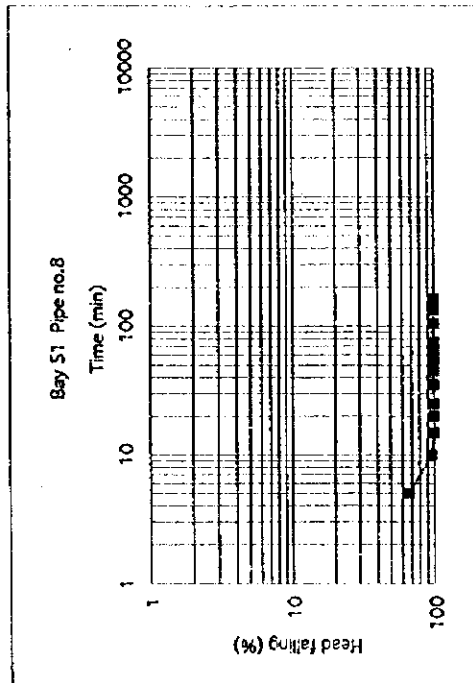
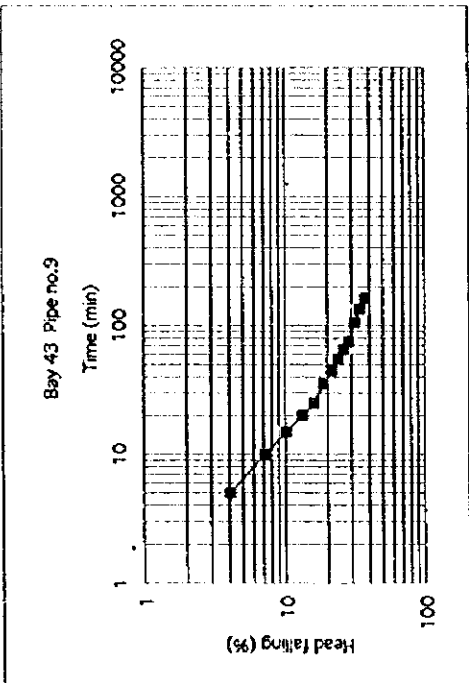


Fig. B3.18 (4) Results of the Falling Head Test

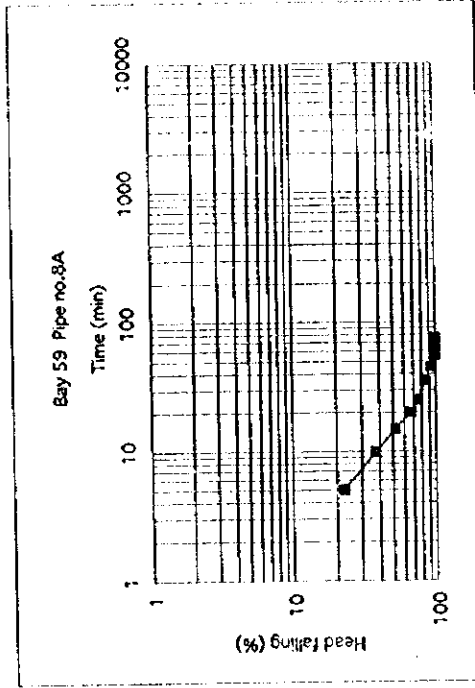
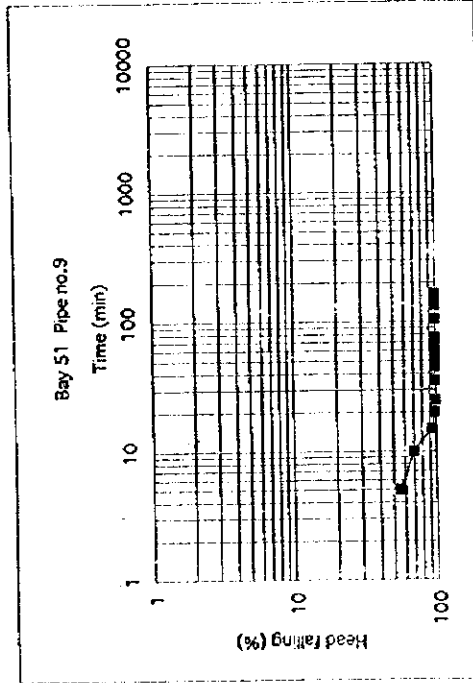
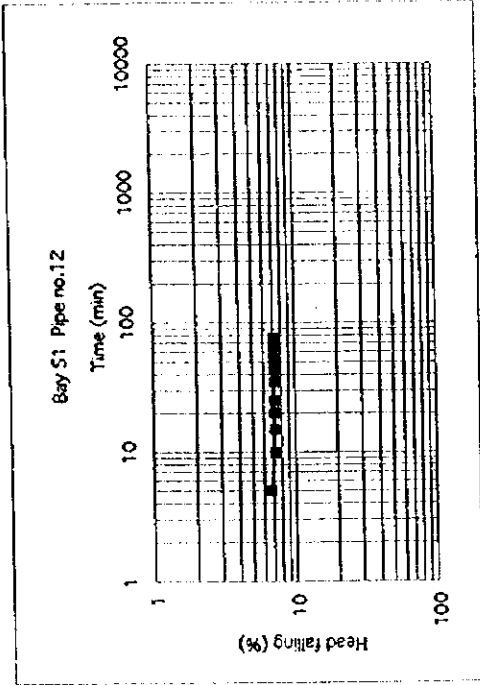
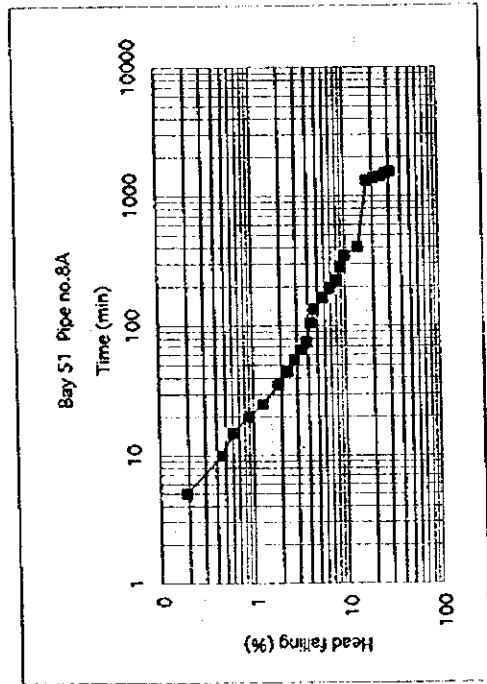


Fig. B3.18 (5) Results of the Falling Head Test

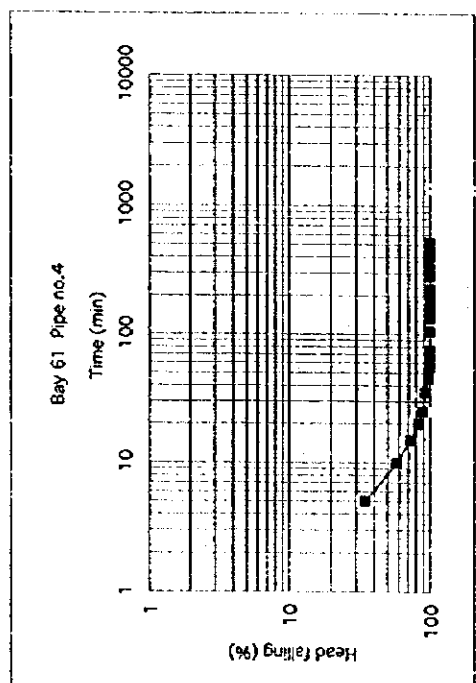
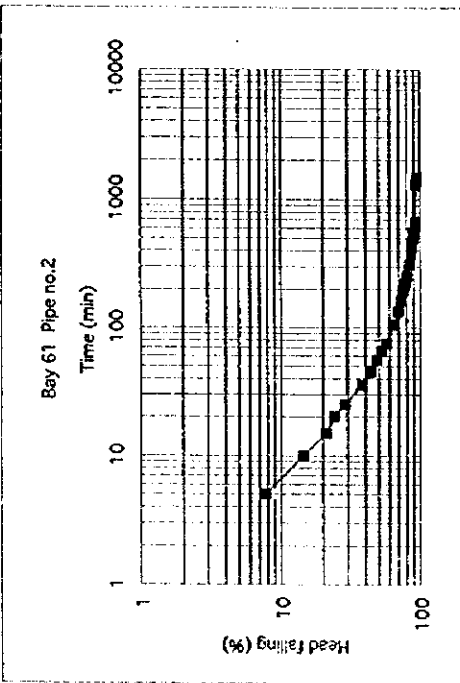
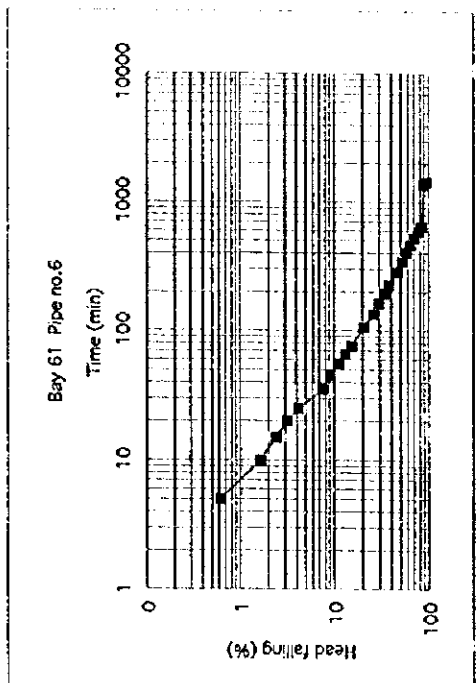
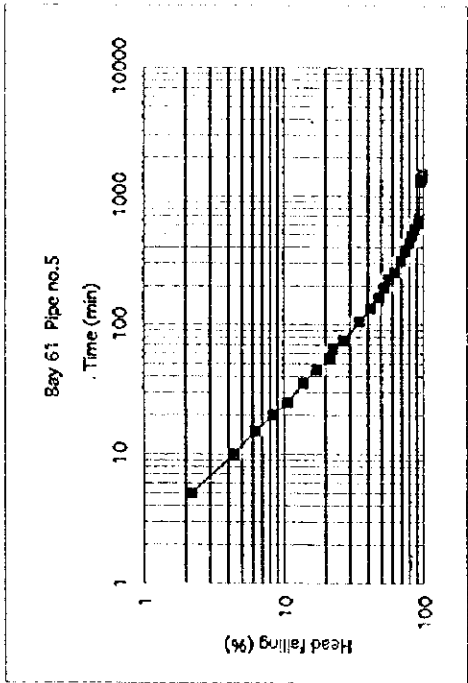


Fig. B3.18 (6) Results of the Falling Head Test

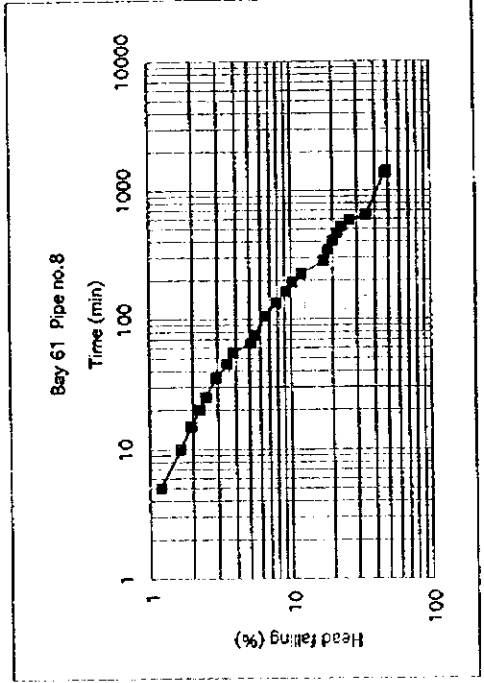
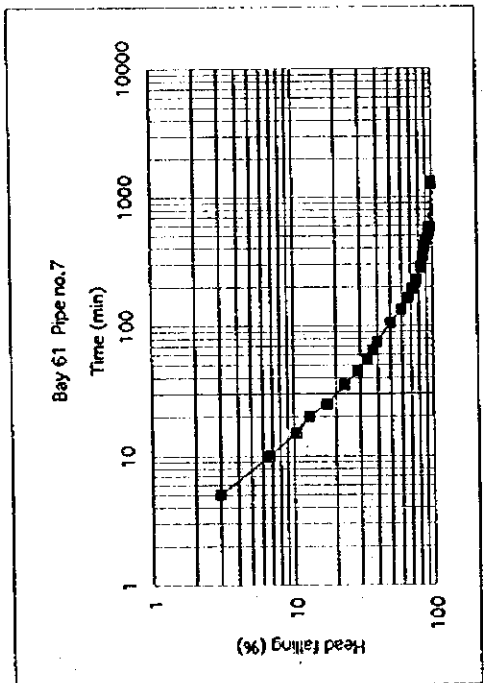
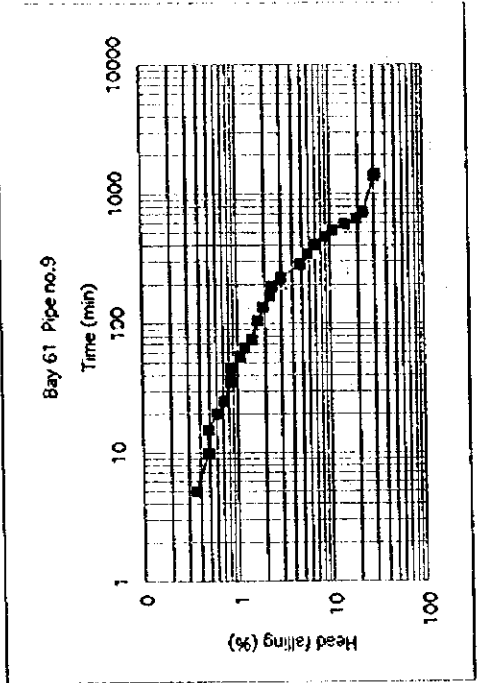


Fig. B3.18 (7) Results of the Falling Head Test

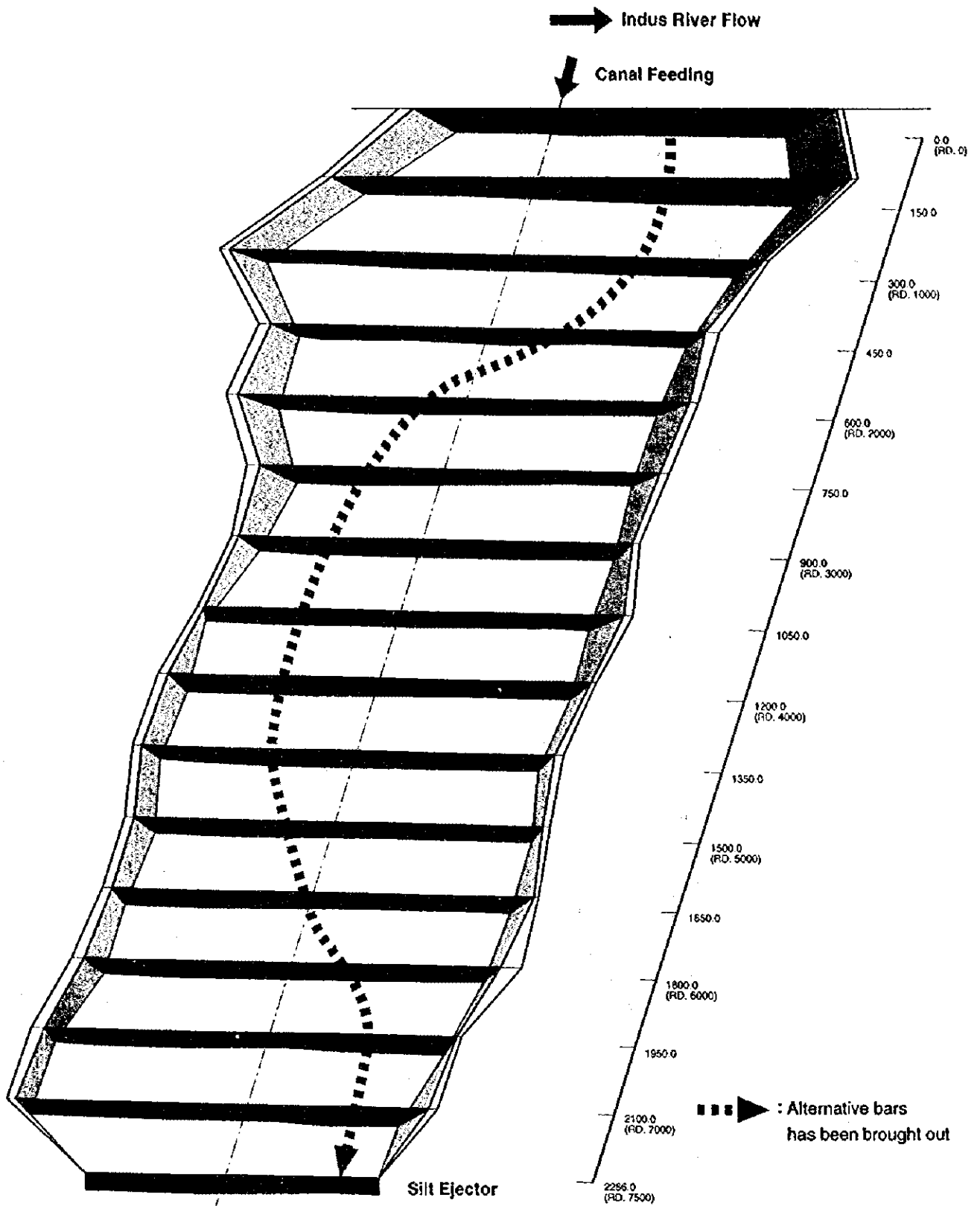


Fig. B4.1 3-D View of D.G. Khan Canal (from RD. 0 to RD. 7500)

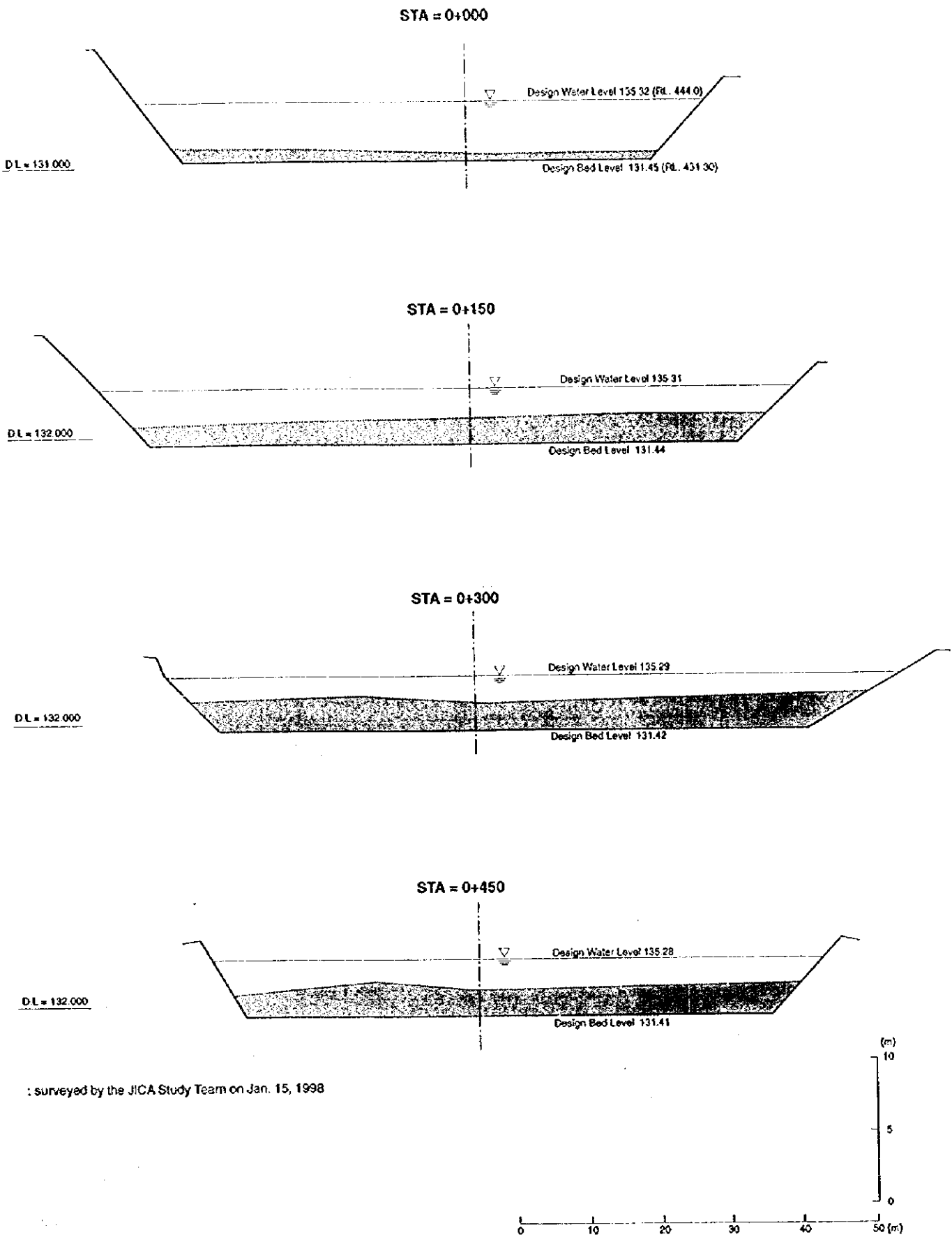


Fig. B4.2 Cross Section of D.G. Khan Canal at Taunsa Barrage (1/4)

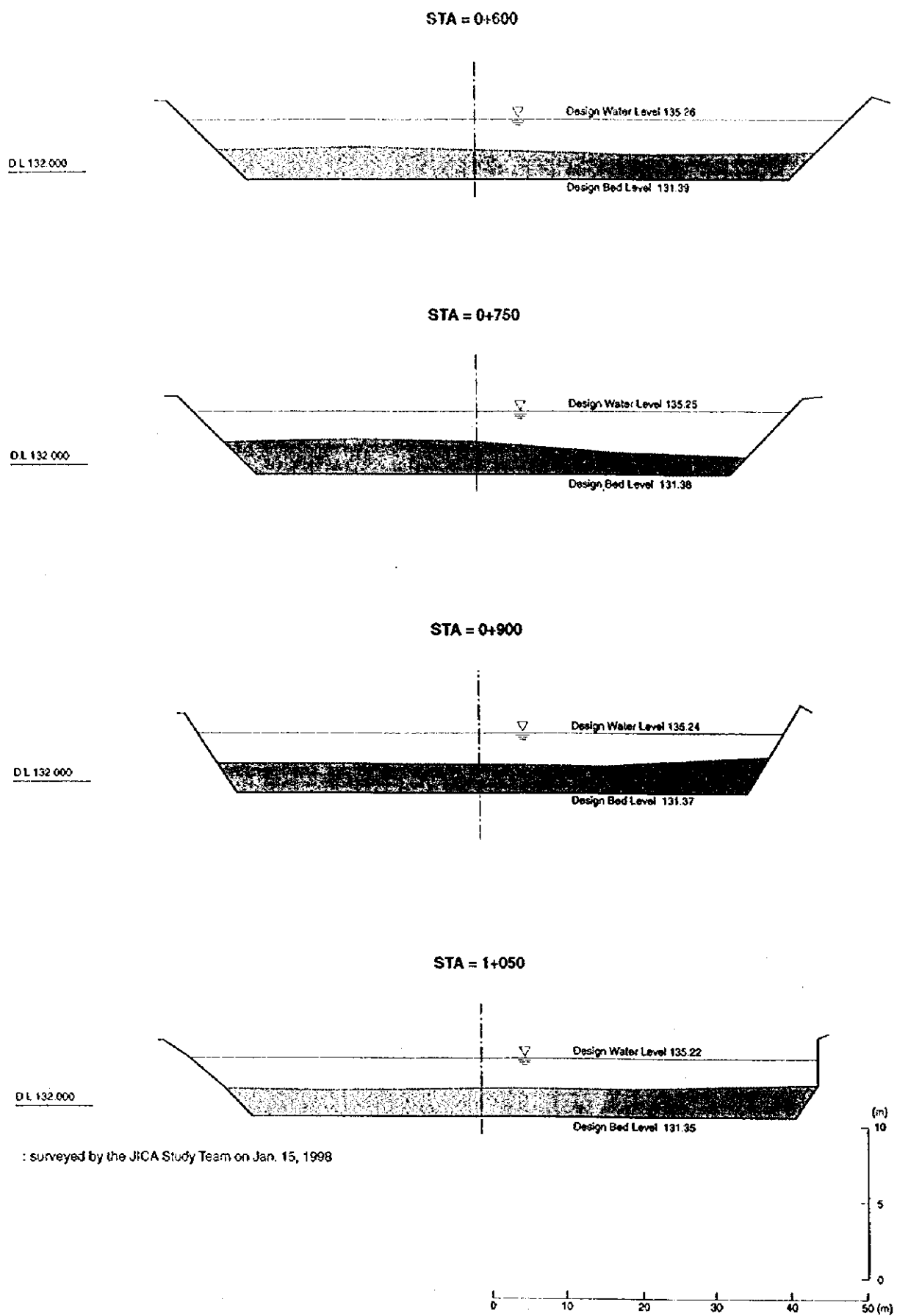


Fig.B4.2 Cross Section of D.G. Khan Canal at Taunsa Barrage (2/4)

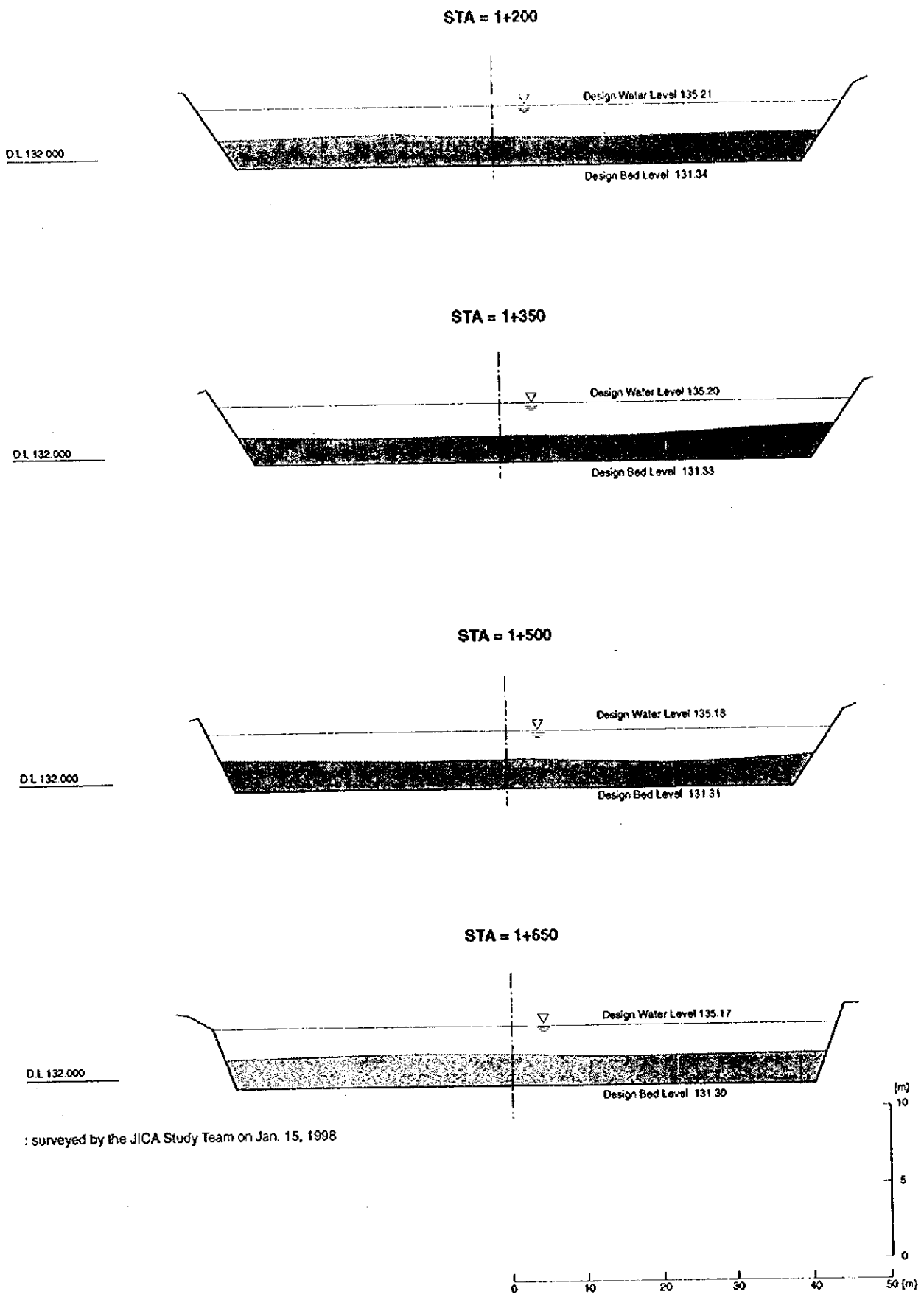


Fig.B4.2 Cross Section of D.G. Khan Canal at Taunsa Barrage (3/4)

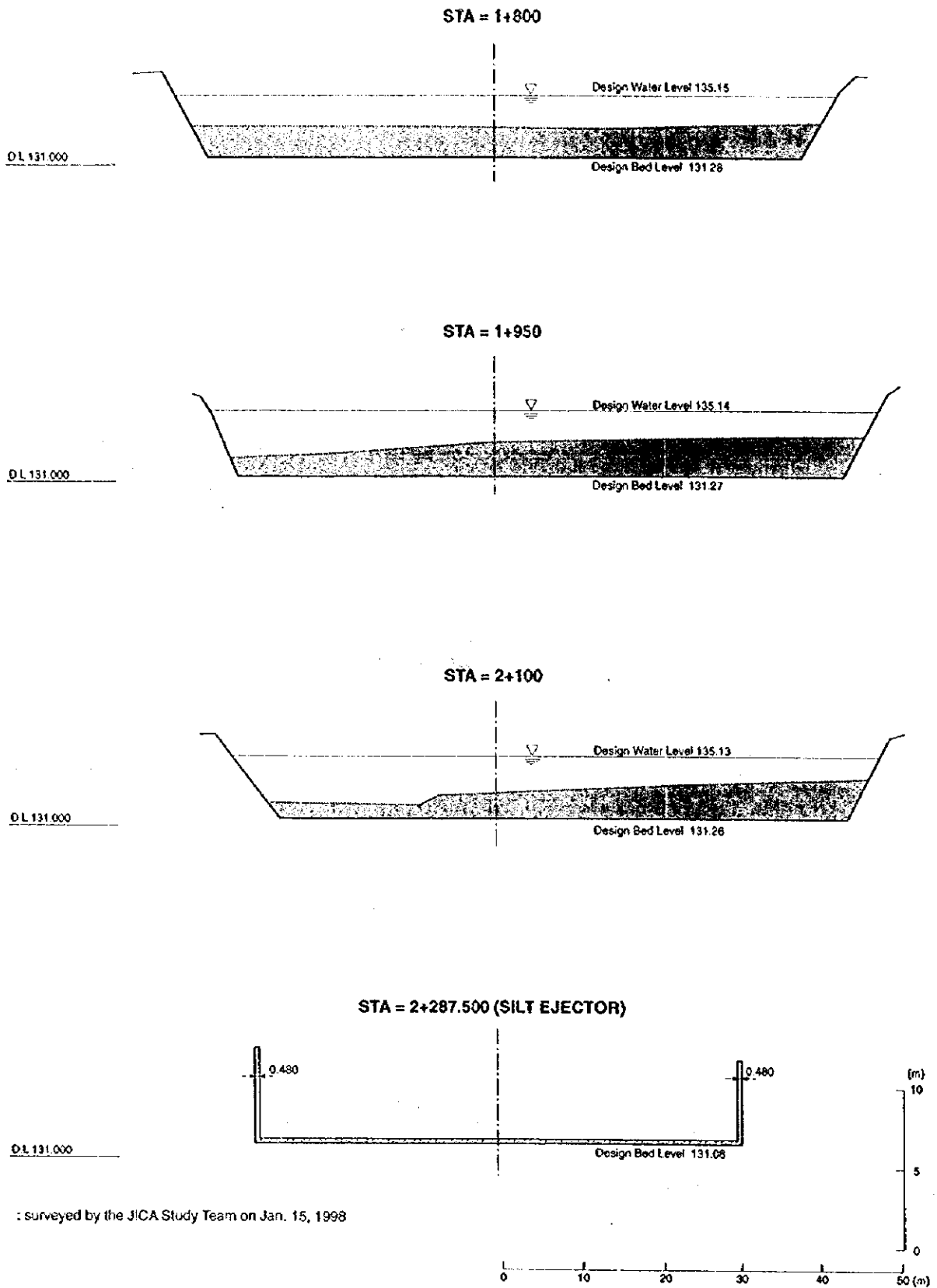
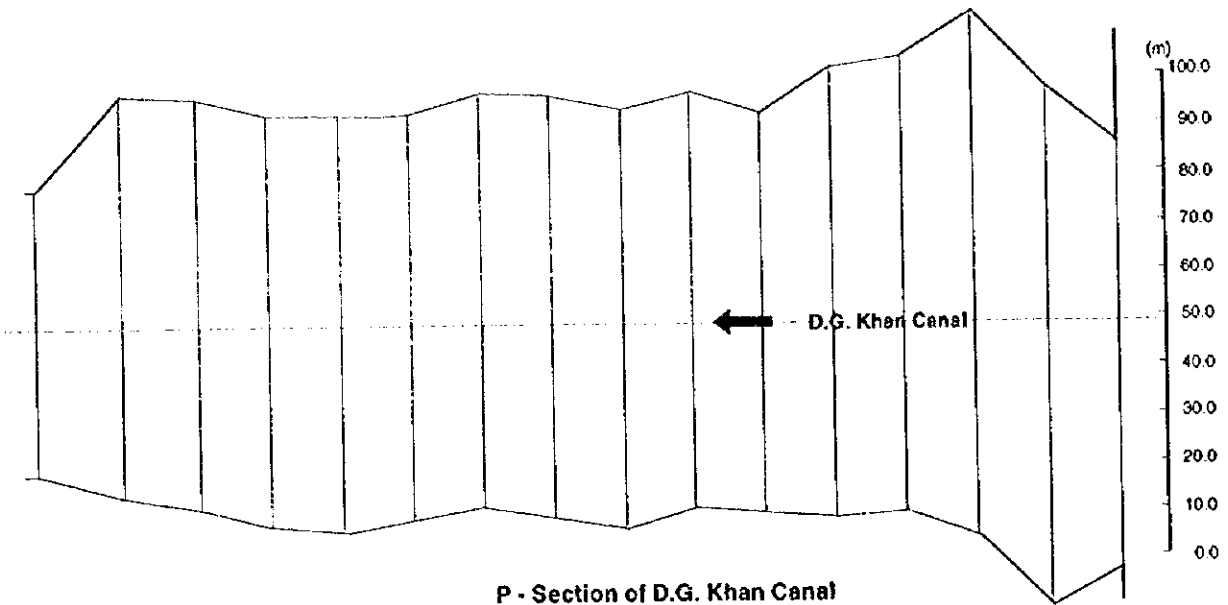
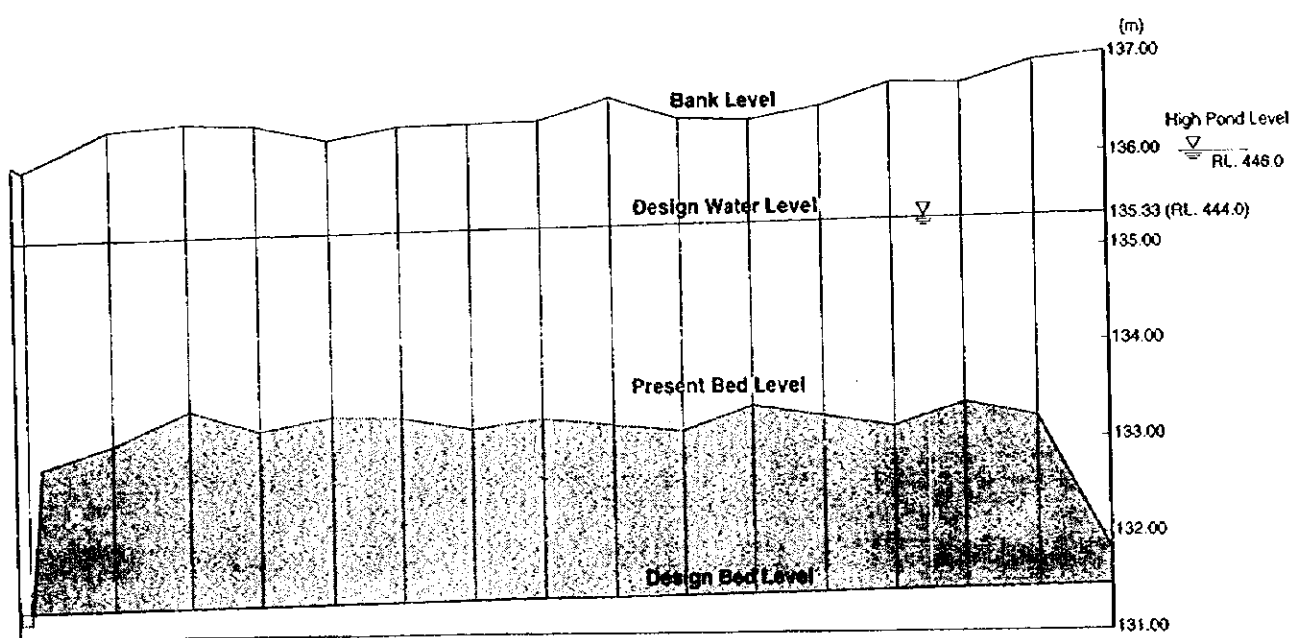


Fig.B4.2 Cross Section of D.G. Khan Canal at Taunsa Barrage (4/4)



P - Section of D.G. Khan Canal



| | | | | | |
|-------|--------|--------|--------|--------|--------------------|
| 7,500 | 2296.0 | 131.08 | 131.08 | 135.85 | Bank Level |
| | | 131.24 | 131.24 | 135.11 | Design Water Level |
| 7,000 | 2060.0 | 131.26 | 133.02 | 135.13 | Present Bed Level |
| | | 131.27 | 133.04 | 135.14 | Design Bed Level |
| 6,500 | 1960.0 | 131.27 | 133.04 | 135.14 | Bank Level |
| 6,000 | 1800.0 | 131.28 | 133.14 | 135.15 | Design Water Level |
| | | 131.30 | 133.20 | 135.17 | Present Bed Level |
| 5,500 | 1650.0 | 131.30 | 133.20 | 135.17 | Design Bed Level |
| 5,000 | 1500.0 | 131.31 | 133.24 | 135.18 | Bank Level |
| | | 131.33 | 133.14 | 135.20 | Design Water Level |
| 4,500 | 1350.0 | 131.33 | 133.14 | 135.20 | Present Bed Level |
| | | 131.34 | 133.22 | 135.21 | Design Bed Level |
| 4,000 | 1200.0 | 131.34 | 133.22 | 135.21 | Bank Level |
| | | 131.35 | 133.18 | 135.22 | Design Water Level |
| 3,500 | 1050.0 | 131.35 | 133.18 | 135.22 | Present Bed Level |
| | | 131.37 | 133.10 | 135.24 | Design Bed Level |
| 3,000 | 900.0 | 131.37 | 133.10 | 135.24 | Bank Level |
| | | 131.38 | 133.36 | 135.25 | Design Water Level |
| 2,500 | 750.0 | 131.38 | 133.36 | 135.25 | Present Bed Level |
| | | 131.39 | 133.24 | 135.26 | Design Bed Level |
| 2,000 | 600.0 | 131.39 | 133.24 | 135.26 | Bank Level |
| | | 131.41 | 133.15 | 135.28 | Design Water Level |
| 1,500 | 450.0 | 131.41 | 133.15 | 135.28 | Present Bed Level |
| | | 131.42 | 133.78 | 135.29 | Design Bed Level |
| 1,000 | 300.0 | 131.42 | 133.78 | 135.29 | Bank Level |
| | | 131.44 | 133.24 | 135.31 | Design Water Level |
| 500 | 150.0 | 131.44 | 133.24 | 135.31 | Present Bed Level |
| | | 131.45 | 131.88 | 135.32 | Design Bed Level |
| 0.0 | 0.0 | 131.45 | 131.88 | 135.32 | Bank Level |
| | | 131.00 | 137.00 | 137.00 | R.D. |

L - Section of D.G. Khan Canal

Fig. B4.3 P and L-Section of D.G. Khan Canal (RD.0 - RD.7500)