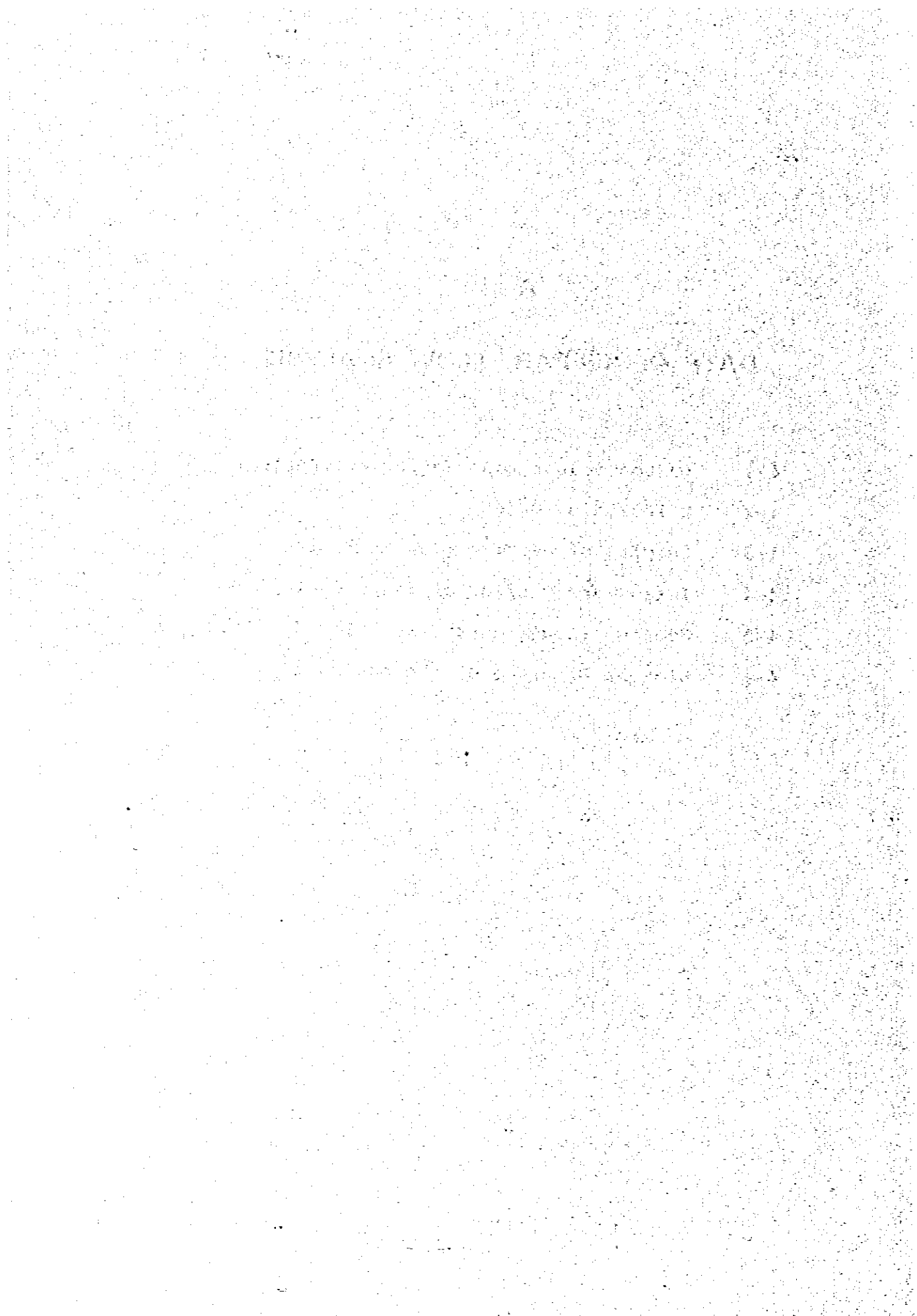


DATA OF SEEPAGE FLOW ANALYSIS

- 4-1 Lugeon Values Adopted for the Analysis**
- 4-2 Calculation Cases**
- 4-3 Results of Seepage Flow Analysis**
- 4-4 Inflow and Outflow of Seepage Flow**
- 4-5 Seepage Flow Diagrams and Flow Net Diagrams**
- 4-6 Element Diagrams of the Analyses**



4-1 Lugeon Values Adopted for the Analysis

Unit: Lugeon

Item	Measured Average Value	Adopted Values			
		K1	K2	K3	
Surface (Depth 40 m)	Köprüçay Conglomerate	35.2	40	200	400
	Shale and Sandstone	13.3	20	100	200
Facies	Köprüçay Conglomerate	5.9	10	50	100
	Shale and Sandstone	1.6	2	10	20
Sheared zone (Width 40 m P-1 Fault)	Köprüçay Conglomerate	41	40	200	400
	Shale and Sandstone	-	40	200	400
Sheared zone (Width 30 m Fault except P-1)	Köprüçay Conglomerate	9.9	20	100	200
	Shale and Sandstone	-	20	100	200
Grout zone	Curtain	-	5	5	5
	Consolidation	-	1	1	1

4-2 Calculation Cases

GROUT CONDITION	WITHOUT GROUT			GROUT EL.-60 m (A)			GROUT EL.-120 m (B)		
	K1	K2	K3	K1	K2	K3	K1	K2	K3
Permeability Coe.									
Right Bank	H-R-1	-	-	*H-R-2A	-	-	-	-	*H-R-2B **H-R-2C
Left Bank	H-L-1	-	-	*H-L-2A	-	-	-	-	*H-L-2B **H-L-2C
Dam Foundation	D-1-01	D-1-02	-	D-1-A1	-	D-1-A3	D-1-B1	-	D-1-B3
Right Bank (R-1)	R-1-01	R-1-02	R-1-03	R-1-A1	R-1-A2	R-1-A3	R-1-B1	R-1-B2	R-1-B3
Right Bank (R-2)	R-2-01	-	-	-	-	-	-	-	-
Right Bank (R-3)	R-3-01	-	-	-	-	-	-	-	-
Left Bank (L-1)	L-1-01	-	-	L-1-A1	-	-	-	-	-
Left Bank (L-2)	L-2-01	-	-	-	-	-	-	-	-
Right Bank (R-1)	-	-	-	R-1-A1-C1	-	-	-	-	-
Right Bank (R-2)	R-1-01-C2	-	-	R-1-A1-C2	-	-	R-1-B1-C2	-	-

Remarks: * Considered horizontal grout line.

** Considered horizontal grout line in half length.

4-3-1 Result of Seepage Flow Analysis
(Case of Permeability Coefficient K_1)

Calculated Section	Distance (m)	Non Grouted		Grout A (EL - 60 m)		Grout B (EL - 120 m)	
		Unit seepage flow (l/min/m)	Seepage flow (l/min)	Unit seepage flow (l/min/m)	Seepage flow (l/min)	Unit seepage flow (l/min/m)	Seepage flow (l/min)
Dam foundation	100	16.80	1,680	8.52	852	8.42	842
Right Bank	R-1	7.78	778	7.75	775	7.73	773
	R-2	4.54	908	(4.52)	(904)	(4.51)	(902)
	R-3	1.65	1,320	(1.64)	(1,312)	(1.64)	(1,312)
	Sub-total		3,006		(2,991)		(2,987)
Left Bank	L-1	8.15	815	8.14	814	(8.10)	(810)
	L-2	2.52	1,008	(2.51)	(1,004)	(2.50)	(1,000)
	Sub-total		1,823		(1,818)		(1,812)
Grand Total			6,509		(5,661)		(5,639)
Solution Crack	0-2 cm	(12.61)		7.78		(3.48)	
	2.0 cm	148.04		91.31		40.83	

Remark: () shows estimated values

4-3-2 Result of Seepage Flow Analysis
(Case of Permeability Coefficient K2)

Calculated Section	Distance (m)	Non Grouted		Grout A (EL. - 60 m)		Grout B (EL. - 120 m)	
		Unit seepage flow (l/min/m)	Seepage flow (l/min)	Unit seepage flow (l/min/m)	Seepage flow (l/min)	Unit seepage flow (l/min/m)	Seepage flow (l/min)
Dam foundation	100	76.83	7,683	(27.15)	(2,715)	(18.83)	(1,883)
Right Bank	R-1	28.28	2,828	23.47	2,347	21.61	2,161
	R-2	(16.50)	(3,300)	(13.69)	(2,738)	(12.61)	(2,522)
	R-3	(6.00)	(4,800)	(4.98)	(3,984)	(4.58)	(3,664)
	Sub-total		(10,928)		(9,069)		(8,347)
Left Bank	L-1	(29.63)	(2,963)	(24.59)	(2,459)	(22.64)	(2,264)
	L-2	(9.16)	(3,664)	(7.60)	(3,040)	(7.00)	(2,800)
	Sub-total		(6,627)		(5,499)		(5,064)
Grand Total			(25,238)		(17,283)		(15,294)
Solution Crack	R-1						
	2.0 cm						
	0.2 cm						

Remark: () shows estimated values

4-3-3 Result of Seepage Flow Analysis
(Case of Permeability Coefficient K_3)

Calculated Section	Distance (m)	Non Grouted		Grout A (EL = 60 m)		Grout B (EL = 120 m)	
		Unit seepage flow (l/min/m)	Seepage flow (l/min)	Unit seepage flow (l/min/m)	Seepage flow (l/min)	Unit seepage flow (l/min/m)	Seepage flow (l/min)
Dam foundation	100	(142.09)	(14,209)	46.02	4,602	28.66	2,866
Right Bank	R-1	52.30	5,230	39.78	3,978	32.90	3,290
	R-2	(30.52)	(6,104)	(23.21)	(4,642)	(19.20)	(3,840)
	R-3	(11.09)	(8,872)	(8.44)	(6,752)	(6.98)	(5,584)
	Sub-total		(20,206)		(15,372)		(12,714)
Left Bank	L-1	(54.79)	(5,479)	(41.67)	(4,167)	(34.47)	(3,447)
	L-2	(16.94)	(6,776)	(12.88)	(5,152)	(10.66)	(4,264)
	Sub-total		(12,255)		(9,139)		(7,711)
Grand Total			(46,670)		(29,293)		(23,291)
Solution Crack	0.2 cm						
	R-1 2.0 cm						

Remark; () shows estimated values

4-4-1(a) Inflow & Outflow of Seepage Flow (H-R-1)

Inflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage (%)	
		at Joint	Accumulated
219	5.948	24.0	24.0
218	1.877	7.6	31.6
217	5.478	22.1	53.7
216	1.894	7.6	61.3
215	0.991	4.0	65.3
214	0.748	3.0	68.3
213	0.382	1.5	69.8
212	0.364	1.5	71.3
211	0.668	2.7	74.0
210	0.975	3.9	77.9
209	0.537	2.2	80.1
208	0.603	2.4	82.5
207	0.490	2.0	84.5
206	2.120	8.5	93.0
181	0.337	1.4	94.4
182	0.116	0.5	94.9
183	0	0	94.9
154	0.100	0.4	95.3
142	0.425	1.7	97.0
156	0.038	0.2	97.2
155	0.003	0	97.2
184	0.006	0	97.2
187	0.001	0	97.2
188	0	0	97.2
186	0.001	0	97.2
160	0.002	0	97.2
143	0.001	0	97.2
124	0.062	0.2	97.4
89	0.269	1.1	98.5
90	0	0	98.5
73	0.119	0.5	99.0
74	0.023	0.1	99.1
62	0.150	0.6	99.7
76	0.005	0	99.7
91	0	0	99.7
95	0	0	99.7
94	0.001	0	99.7
93	0.001	0	99.7
79	0.003	0	99.7
65	0.024	0.1	99.8
66	0.007	0	99.8
69	0.045	0.2	100.0
Total	24.82 l/min/m		100.0%

Outflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage (%)	
		at Joint	Accumulated
314	10.496	42.3	42.3
312	3.381	13.6	55.9
330	1.718	6.9	62.8
332	1.030	4.2	67.0
342	0.383	1.5	68.5
348	0.639	2.6	71.1
372	0.645	2.6	73.7
379	0.631	2.5	76.2
402	0.421	1.7	77.9
413	0.122	0.5	78.4
414	0.235	0.9	79.3
421	0.122	0.5	79.8
447	0.020	0.1	79.9
446	0.094	0.4	80.3
445	0.402	1.6	81.9
482	0.014	0	81.9
488	0.016	0	81.9
489	0.009	0	81.9
491	0.001	0	81.9
486	0.013	0	81.9
480	0.217	0.9	82.8
479	0.322	1.3	84.1
485	0.024	0.1	84.2
484	0.089	0.4	84.6
483	0.022	0.1	84.7
475	0.091	0.4	85.1
474	0.096	0.4	85.5
469	0.431	1.7	87.2
467	0.306	1.2	88.4
466	0.377	1.5	89.9
526	0.149	0.6	90.5
527	0.069	0.3	90.8
528	0.017	0.1	90.9
529	0.002	0	90.9
531	0.002	0	90.9
532	0.001	0	90.9
533	0.001	0	90.9
522	0.096	0.4	91.3
520	0.215	0.9	92.2
516	0.166	0.7	92.9
507	0.102	0.4	93.3
506	0.256	1.0	94.3
501	0.111	0.4	94.7
494	0.237	1.0	95.7
Total	24.82 l/min/m		100.0%

Condition

Section: Right Bank (EL. 80m)
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Grout Curtain: None
 Permeability Coef.: K₂

4-4-1(D) Inflow & Outflow of Seepage Flow (H-1-1)

Inflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Percentage for Total Seepage Accumulated (%)
191	12.281	54.8	54.8
200	2.309	10.7	65.5
201	1.505	6.7	72.2
202	1.252	5.6	77.8
203	0.778	3.5	81.3
204	1.234	6.0	87.3
205	0.633	2.8	90.1
210	0.073	0.3	90.4
211	0.330	1.5	91.9
229	0	0	91.9
228	0	0	91.9
227	0	0	91.9
226	0	0	91.9
225	0.091	0.4	92.3
224	0.524	2.3	94.6
223	0.088	0.4	95.0
221	0.169	0.7	95.7
165	0.310	1.4	97.1
166	0.661	2.9	100.0
167	-0.008	0	100.0
168	-0.019	-0.1	99.9
230	0.002	0	99.9
235	0.017	0.1	100.0
Total	22.61 l/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Percentage for Total Seepage Accumulated (%)
180	14.063	62.8	62.8
177	1.590	7.1	69.9
174	1.264	5.6	75.5
172	1.213	5.4	80.9
153	0.925	4.1	85.0
137	0.674	3.0	88.0
135	0.058	0.3	88.3
133	0.002	0	88.3
114	0.002	0	88.3
110	0.027	0.1	88.4
111	0.543	2.4	90.8
112	0.142	0.6	91.4
113	0.807	3.6	95.0
94	0.717	3.2	98.2
93	0.025	0.1	98.3
92	0.001	0	98.3
87	0.006	0	98.3
84	0.008	0	98.3
83	0.016	0.1	98.4
82	0.002	0	98.4
81	0	0	98.4
78	0	0	98.4
79	0.012	0.1	98.5
65	0.150	0.7	99.2
44	0.167	0.7	99.9
25	0.021	0.1	100.0
10	0.021	0.1	100.1
9	0	0	100.1
1	-0.026	-0.1	100.0
Total	22.41 l/min/m		100.0 %

Condition

Section: Left Bank (El. 80 m)
 Reservoir W.L.: El. 150.00 m
 Downstream W.L.: El. 40.00 m
 Grout Curtain: None
 Permeability Coef.: K_1

4-4-2(a) Inflow & Outflow of Seepage Flow (H-R-2A)

Inflow

Joint Number	Joint Seepage (L/min/m)	Percentage for Total Seepage at Joint	Accumulated
219	3.090	15.6	15.6
218	1.355	6.9	22.5
217	4.182	21.2	43.7
216	1.722	8.7	52.4
215	0.940	4.8	57.2
214	0.725	3.7	60.9
213	0.575	2.9	63.8
212	0.363	1.8	65.6
211	0.665	3.4	69.0
210	0.960	4.9	73.9
209	0.533	2.7	76.6
208	0.389	2.0	78.6
207	0.472	2.4	81.0
206	1.947	9.9	90.9
181	0.356	1.8	92.7
182	0.121	0.6	93.3
183	0	0	93.3
154	0.105	0.5	93.8
142	0.449	2.3	96.1
156	0.040	0.2	96.3
155	0.004	0	96.3
184	0.006	0	96.3
187	0.001	0	96.3
188	0	0	96.3
186	0.001	0	96.3
160	0.002	0	96.3
143	0.001	0	96.3
124	0.065	0.3	96.6
89	0.281	1.4	98.0
90	0	0	98.0
73	0.124	0.6	98.6
74	0.023	0.1	98.7
62	0.156	0.8	99.5
76	0.005	0	99.5
91	0	0	99.5
95	0	0	99.5
94	0.001	0	99.5
93	0.001	0	99.5
79	0.004	0	99.5
65	0.024	0.1	99.6
66	0.007	0	99.6
68	0.047	0.2	99.8
70	0	0	99.8
69	0.007	0.2	100.0
Total	19.75 L/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (L/min/m)	Percentage for Total Seepage at Joint	Accumulated
314	5.959	30.2	30.2
312	3.240	16.4	46.6
330	1.599	8.1	54.7
332	0.977	4.9	59.6
342	0.367	1.9	61.5
348	0.423	2.1	63.6
372	0.623	3.2	66.8
379	0.612	3.1	69.9
402	0.409	2.1	72.0
413	0.119	0.6	72.6
414	0.483	2.4	75.0
421	0.229	1.2	76.2
422	0.119	0.6	76.8
447	0.020	0.1	76.9
446	0.091	0.5	77.4
445	0.392	2.0	79.4
482	0.015	0.1	79.5
488	0.015	0.1	79.6
489	0.008	0	79.6
491	0.001	0	79.6
486	0.012	0.1	79.7
480	0.212	1.1	80.8
479	0.314	1.6	82.4
485	0.023	0.1	82.5
484	0.087	0.4	82.9
483	0.021	0.1	83.0
475	0.088	0.4	83.4
474	0.093	0.5	83.9
469	0.420	2.1	86.0
467	0.299	1.5	87.5
466	0.369	1.9	89.4
526	0.146	0.7	90.1
527	0.067	0.3	90.4
528	0.016	0	90.5
529	0.002	0	90.5
520	0.210	1.1	92.1
516	0.162	0.8	93.3
509	0.086	0.4	94.6
506	0.231	1.3	96.4
548	0.009	0	98.5
547	0	0	98.5
543	0.012	0.1	98.6
539	0.046	0.2	98.8
494	0.233	1.2	100.0
Total	19.75 L/min/m		100.0 %

Condition

Section: Right Bank (El. 80m)
 Reservoir W.L.: El. 150.00m
 Downstream W.L.: El. 40.00m
 Grout Curtain: X = 1100m
 Permeability Coef.: K₁

4-4-2(b) Inflow & Outflow of Seepage Flow (E-L-2A)

Condition
 Section: Left Bank (El. 80a)
 Reservoir W.L.: El. 150.00m
 Downstream W.L.: El. 40.00m
 Grout Curtain: L = 450m
 Permeability Coef.: K_f

Inflow		Outflow	
Joint Number	Joint Seepage (L/min/m)	Joint Number	Joint Seepage (L/min/m)
180	6.724	180	6.724
177	1.250	177	1.250
174	1.001	174	1.001
172	1.029	172	1.029
153	0.849	153	0.849
137	0.642	137	0.642
135	0.056	135	0.056
133	0.002	133	0.002
114	0.002	114	0.002
110	0.026	110	0.026
111	0.528	111	0.528
112	0.139	112	0.139
113	0.792	113	0.792
94	0.709	94	0.709
93	0.025	93	0.025
92	0.001	92	0.001
87	0.005	87	0.005
84	0.098	84	0.098
83	0.016	83	0.016
82	0.002	82	0.002
81	0	81	0
79	0	79	0
78	0.012	78	0.012
65	0.150	65	0.150
44	0.146	44	0.146
25	0.021	25	0.021
10	0.021	10	0.021
9	0	9	0
1	0.026	1	0.026
Total	14.11 L/min/m	Total	14.11 L/min/m

Inflow		Outflow	
Joint Number	Joint Seepage (L/min/m)	Joint Number	Joint Seepage (L/min/m)
191	5.245	180	6.724
200	1.428	177	1.250
201	1.258	174	1.001
202	1.160	172	1.029
203	0.759	153	0.849
204	1.305	137	0.642
205	0.646	135	0.056
210	0.077	133	0.002
211	0.353	114	0.002
228	0	110	0.026
227	0	111	0.528
226	0	112	0.139
225	0.098	113	0.792
224	0.530	94	0.709
223	0.090	93	0.025
221	0.173	92	0.001
165	0.311	87	0.005
166	0.662	84	0.098
167	-0.008	83	0.016
168	-0.019	82	0.002
230	0.002	81	0
235	0.027	79	0
Total	14.11 L/min/m	Total	14.11 L/min/m

4-4-3(a) Inflow & Outflow of Seepage Flow (H-R-2B)

Inflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Accumulated
219	5.014	5.0	5.0
216	3.048	3.0	8.0
217	11.447	11.4	19.4
216	7.583	7.6	27.0
215	5.185	5.2	32.2
214	4.651	4.7	36.9
213	4.164	4.2	41.1
212	2.802	2.8	43.9
211	5.052	5.1	49.0
210	6.838	6.8	55.8
209	3.916	3.9	59.7
208	2.741	2.7	62.4
207	3.167	3.2	65.6
206	12.191	12.2	77.8
181	3.894	3.9	81.7
182	1.379	1.4	83.1
183	0	0	83.1
154	1.268	1.3	84.4
142	5.738	5.7	90.1
156	0.510	0.5	90.6
155	0.045	0	90.6
184	0.076	0.1	90.7
187	0.011	0	90.7
188	0	0	90.7
186	0.010	0	90.7
160	0.024	0	90.7
143	0.011	0	90.7
124	0.824	0.8	91.5
89	3.514	3.5	95.0
90	0	0	95.0
73	1.526	1.5	96.5
74	0.288	0.3	96.8
62	1.906	1.9	98.7
76	0.060	0.1	98.8
91	0.004	0	98.8
95	0.002	0	98.8
94	0.007	0	98.8
93	0.015	0	98.8
79	0.043	0	98.8
65	0.299	0.3	99.1
66	0.691	0.7	99.2
68	0.572	0.6	99.8
70	0	0	99.8
69	0.085	0.1	100.0
Total	100.00 l/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Accumulated
314	12.131	12.1	12.1
312	12.843	12.8	24.9
330	8.284	8.3	33.2
332	5.692	5.7	38.9
342	2.296	2.3	41.2
348	2.750	2.8	44.0
372	4.153	4.2	48.2
379	4.207	4.2	52.4
402	2.922	2.9	55.3
413	0.861	0.9	56.2
410	3.535	3.5	59.7
414	1.090	1.1	61.4
421	0.889	0.9	62.3
447	0.148	0.1	62.4
446	0.685	0.7	63.1
445	2.981	3.0	66.1
482	0.101	0.1	66.2
488	0.118	0.1	66.3
489	0.064	0.1	66.4
491	0.010	0	66.4
486	0.095	0.1	66.5
480	1.634	1.6	68.1
479	2.647	2.6	70.7
485	0.182	0.2	70.7
484	0.681	0.7	71.4
483	0.166	0.2	71.6
475	0.701	0.7	72.3
474	0.741	0.7	73.0
469	3.381	3.4	76.4
467	2.436	2.4	78.8
466	3.049	3.0	81.8
526	1.218	1.2	83.0
527	0.564	0.6	83.6
528	0.138	0.1	83.7
523	0.790	0.8	84.5
534	0.545	0.5	86.8
516	1.384	1.4	88.4
510	0.343	0.3	89.8
506	2.163	2.2	93.6
501	0.947	0.9	95.6
542	0.168	0.2	97.1
548	0.077	0.1	97.4
539	0.397	0.4	97.9
494	2.029	2.0	99.9
538	0.064	0.1	100.0
Total	100.00 l/min/m		100.0 %

Condition

Section: Right Bank (El. 80m)
 Reservoir W.L.: El. 150.00m
 Downstream W.L.: El. 40.00m
 Grout Curtain: $\lambda = 1100$ m
 Permeability Coef.: K_3

4-4-3(b) Inflow & Outflow of Seepage Flow (H-L-2B)

Inflow

Joint Number	Joint Seepage (ℓ /min/m)	Percentage for Total Seepage at Joint	Accumulated
191	9.013	14.5	14.5
200	3.322	5.3	19.8
201	4.724	7.6	27.4
202	5.326	8.6	36.0
203	5.977	9.4	42.4
204	7.806	12.5	54.9
205	4.710	7.6	62.5
210	0.604	1.0	63.5
211	3.103	5.0	68.5
229	0	0	68.5
228	0	0	68.5
227	0	0	68.5
226	0	0	68.5
225	0.937	1.5	70.0
224	5.878	9.4	79.4
223	0.998	1.6	81.0
221	1.906	3.1	84.1
165	3.238	5.2	89.3
166	6.793	10.9	100.2
167	-0.080	-0.1	100.1
168	-0.195	-0.3	99.8
230	0.023	0	99.8
235	0.171	0.2	100.0
Total	62.25 ℓ /min/m		100.0 %

Outflow

Joint Number	Joint Seepage (ℓ /min/m)	Percentage for Total Seepage at Joint	Accumulated
180	17.189	27.5	27.5
177	4.839	7.8	35.3
174	4.138	6.7	42.0
172	5.125	8.2	50.2
153	5.022	8.1	58.3
137	4.158	6.7	65.0
135	0.373	0.6	65.6
133	0.012	-	-
114	0.015	-	-
110	0.187	0.3	65.9
111	3.866	6.2	72.1
112	1.071	1.7	73.8
113	6.615	10.5	84.1
94	6.211	10.0	94.1
93	0.221	0.4	94.5
92	0.007	-	-
87	0.049	0.1	94.6
84	0.070	0.1	94.7
83	0.169	0.2	94.9
82	0.016	0	94.9
81	0	0	94.9
78	0	0	94.9
79	0.111	0.2	95.1
65	1.458	2.3	97.4
44	1.430	2.3	99.7
25	0.209	0.3	100.0
10	0.208	0.3	100.3
9	0	0	100.3
1	-0.257	-0.3	100.0
Total	62.25 ℓ /min/m		100.0 %

Condition

Section: Left Bank (El. 80m)
 Reservoir W.L.: El. 150.00m
 Downstream W.L.: El. 40.00m
 Grout Curtain $\lambda = 450m$
 Permeability Coef.: K_3

4-4-4(a) Inflow & Outflow of Seepage Flow (H-R-2C)

Inflow

Joint Number	Joint Seepage ($l^2/min/m$)	Percentage for Total Seepage at Joint	Accumulated
219	5.010	4.3	4.3
218	3.041	2.6	6.9
217	11.910	9.8	16.7
216	7.300	6.3	23.0
215	4.830	4.2	27.2
214	4.158	3.6	30.8
213	3.619	3.1	33.9
212	2.573	2.2	36.1
211	6.408	5.5	41.6
210	12.268	10.6	52.2
209	6.178	5.3	57.5
208	4.567	3.8	61.3
207	5.196	4.5	65.8
206	21.776	18.8	84.6
181	3.413	3.0	87.6
182	1.173	1.0	88.6
154	1.011	0.9	89.5
142	4.298	3.7	93.2
156	0.383	0.3	93.5
155	0.034	0.1	93.6
184	0.056	0.1	93.7
187	0.008	0	93.7
186	0.007	0	93.7
160	0.018	0	93.7
143	0.009	0	93.7
124	0.623	0.5	94.2
89	2.711	2.3	96.5
90	0	0	96.5
75	1.202	1.0	97.5
74	0.227	0.2	97.7
62	1.510	1.3	99.0
76	0.048	0.1	99.1
91	0.003	0	99.1
95	0.002	0	99.1
94	0.006	0	99.1
93	0.012	0	99.1
79	0.034	0.1	99.2
65	0.236	0.2	99.4
66	0.073	0.1	99.5
68	0.455	0.4	99.9
70	0	0	99.9
69	0.067	0.1	100.0
Total	115.66 $l^2/min/m$	100.0%	100.0%

Outflow

Joint Number	Joint Seepage ($l^2/min/m$)	Percentage for Total Seepage at Joint	Accumulated
314	12.272	10.6	10.6
312	13.426	11.6	22.2
330	8.989	7.8	30.0
332	6.388	5.5	35.5
342	2.634	2.3	37.8
348	3.257	2.8	40.6
372	4.998	4.3	44.9
379	3.168	2.8	49.4
402	3.674	3.2	52.6
413	1.091	0.9	53.5
410	4.490	3.9	57.4
414	2.152	1.9	59.3
421	1.136	1.0	60.3
447	0.189	0.2	60.5
446	0.875	0.8	61.3
445	3.801	3.3	64.6
482	0.129	0.1	64.7
488	0.150	0.1	64.8
489	0.081	0.1	64.9
491	0.013	0.0	65.0
486	0.121	0.1	65.1
480	2.077	1.8	66.9
479	3.099	2.7	69.6
485	0.230	0.2	69.8
484	0.859	0.7	70.5
483	0.209	0.2	70.7
475	0.881	0.8	71.5
474	0.930	0.8	72.3
469	4.211	3.6	75.9
467	3.003	2.6	78.5
526	1.473	1.3	81.7
506	2.541	2.2	83.0
503	0.904	0.8	83.8
502	0.380	0.3	84.2
501	1.102	1.0	85.2
498	1.502	1.3	86.5
542	0.196	0.2	86.7
546	0.026	0.0	86.7
549	0.053	0.1	86.8
548	0.090	0.1	86.9
543	0.126	0.1	87.0
539	0.462	0.4	87.4
494	2.357	2.0	89.4
538	0.075	0.1	89.5
Total	115.66 $l^2/min/m$	100.0%	100.0%

Condition

Section: Right Bank (El. 80m)
 Reservoir W.L.: El. 150.00m
 Downstream W.L.: El. 40.00m
 Grout Curtain: $g = 550m$
 Permeability Coef.: K_3

4-4-4(b) Inflow & Outflow of Seepage Flow (H-1-2C)

Inflow

Joint Number	Joint Seepage (ℓ /min/m)	Percentage for Total Seepage at Joint	Percentage for Total Seepage Accumulated
191	8.836	11.7	11.7
200	3.207	4.3	16.0
201	4.503	6.0	22.0
202	5.597	7.4	29.4
203	6.047	8.0	37.4
204	15.780	20.9	58.3
205	7.674	10.2	68.5
210	0.858	1.1	69.6
211	3.799	5.0	74.6
229	0	0	74.6
228	0	0	74.6
227	0	0	74.6
226	0	0	74.6
225	1.017	1.3	75.9
224	5.690	7.5	83.4
223	0.927	1.2	84.6
221	1.780	2.4	87.0
165	3.140	4.2	91.2
166	6.658	8.8	100.0
167	-0.076	-0.1	99.9
168	-0.291	-0.4	99.8
230	0.023	0.1	100.0
235	0.168	0.2	100.0
Total	75.44 ℓ /min/m		100.0 %

Outflow

Joint Number	Joint Seepage (ℓ /min/m)	Percentage for Total Seepage at Joint	Percentage for Total Seepage Accumulated
180	19.507	25.9	25.9
177	5.977	7.9	33.8
174	5.258	7.0	40.8
172	6.815	9.0	49.8
153	6.946	9.2	59.0
137	5.667	7.5	66.5
135	0.500	0.7	67.2
133	0.016	0	67.2
114	0.020	0	67.2
110	0.241	0.3	67.5
111	4.912	6.5	74.0
112	1.310	1.7	75.7
113	7.581	10.0	85.7
94	6.905	9.2	94.9
93	0.242	0.3	95.2
92	0.008	0.1	95.3
87	0.054	0.1	95.4
84	0.076	0.1	95.6
83	0.158	0.2	95.6
82	0.017	0	95.6
81	0	0	95.6
79	0	0	95.6
78	0	0	95.6
79	0.116	0.2	95.8
65	1.491	2.0	97.8
44	1.457	1.9	99.7
25	0.213	0.3	100.0
10	0.212	0.3	100.3
9	0	0	100.3
1	-0.261	-0.3	100.0
Total	75.44 ℓ /min/m		100.0 %

Condition:

Section: Left Bank (El. 90a)
 Reservoir W.L.: El. 150.00m
 Downstream W.L.: El. 40.00m
 Grout Curtain: ℓ = 225m
 Permeability Coef.: K_3

4-4-5 Inflow & Outflow of Seepage Flow (D-1-01)

Inflow

Joint Number	Joint Seepage ($\frac{g}{min/m}$)	Percentage for Total Seepage (%) at Joint	Accumulated
225	9.891	58.9	58.9
224	0.762	4.5	63.4
257	0.239	1.4	64.8
236	0.943	5.6	70.4
255	0.683	4.1	74.5
254	0.467	2.8	77.3
253	0.483	2.9	80.2
252	0.654	3.9	84.1
251	0.537	3.2	87.3
250	0.398	2.4	89.7
249	0.277	1.6	91.3
248	0.244	1.5	92.8
247	0.273	1.6	94.4
246	0.309	1.8	96.2
245	0.267	1.6	97.8
244	0.252	1.5	99.3
243	0.121	0.7	100.0
Total	16.80 $\frac{g}{min/m}$		100.0 %

Outflow

Joint Number	Joint Seepage ($\frac{g}{min/m}$)	Percentage for Total Seepage (%) at Joint	Accumulated
227	9.463	56.3	56.3
228	1.837	10.9	67.2
229	0.870	5.2	72.4
230	0.611	3.6	76.0
231	0.436	2.6	78.6
232	0.343	2.0	80.6
233	0.372	2.2	82.8
234	0.378	2.3	85.1
235	0.446	2.7	87.8
236	0.460	2.7	90.5
237	0.338	2.0	92.5
238	0.347	2.1	94.6
239	0.317	1.9	96.5
240	0.240	1.4	97.9
241	0.230	1.4	99.3
242	0.110	0.7	100.0
Total	16.80 $\frac{g}{min/m}$		100.0 %

Condition

Section: Dam Foundation
Reservoir W.L.: El. 150.00m
Downstream W.L.: El. 40.00m
Grout Curtain: None
Permeability Coef.: K_1

4-4-6 Inflow & Outflow of Seepage Flow (D-1-02)

Inflow

Joint Number	Joint Seepage (g/min/m)	Percentage for Total Seepage at Joint	Accumulated
225	49.280	64.0	64.0
226	3.744	4.9	68.9
227	1.143	1.5	70.4
228	4.500	5.9	76.3
229	3.183	4.2	80.4
230	2.073	2.7	83.1
231	1.936	2.5	85.6
232	2.501	3.3	88.9
233	2.994	3.9	91.5
234	1.422	1.8	93.3
235	0.961	1.2	94.5
236	0.824	1.1	95.6
237	0.853	1.1	96.7
238	0.885	1.2	97.9
239	0.660	0.9	98.8
240	0.594	0.8	99.6
241	0.274	0.4	100.0
Total	76.83 g/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (g/min/m)	Percentage for Total Seepage at Joint	Accumulated
227	47.293	61.6	61.6
228	9.079	11.8	73.4
229	4.178	5.4	78.8
230	2.838	3.7	82.5
231	1.923	2.5	85.0
232	1.452	1.9	86.9
233	1.498	1.9	88.8
234	1.430	1.8	90.6
235	1.596	2.1	92.7
236	1.584	2.1	94.8
237	1.104	1.4	96.2
238	0.987	1.3	97.5
239	0.769	1.0	98.5
240	0.477	0.6	99.1
241	0.430	0.6	99.7
242	0.196	0.3	100.0
Total	76.83 g/min/m		100.0 %

Condition

Section: Dam Foundation
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Grout Curtain: None
 Permeability Coef.: K2

4-4-7 Inflow & Outflow of Seepage Flow (D-1-A1)

Inflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Percentage for Total Seepage Accumulated
225	1.998	23.5	23.5
224	0.597	7.0	30.5
227	0.214	2.5	33.0
226	0.844	9.9	42.9
225	0.637	7.5	50.4
224	0.447	5.3	55.7
223	0.473	5.6	61.3
222	0.643	7.6	68.9
221	0.511	6.2	75.1
220	0.395	4.6	79.7
219	0.275	3.2	82.9
218	0.243	2.8	85.7
217	0.273	3.2	88.9
216	0.309	3.6	92.5
215	0.267	3.1	95.6
214	0.252	3.0	98.6
213	0.121	1.4	100.0
Total	8.52 l/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Percentage for Total Seepage Accumulated
227	1.841	21.6	21.6
228	1.443	16.9	38.5
229	0.761	8.9	47.4
230	0.561	6.6	54.0
231	0.422	4.8	58.8
232	0.329	3.9	62.7
233	0.360	4.2	66.9
234	0.369	4.3	71.2
235	0.437	5.1	76.3
236	0.451	5.3	81.6
237	0.332	3.9	85.5
238	0.341	4.0	89.5
239	0.313	3.7	93.2
240	0.237	2.8	96.0
241	0.227	2.7	98.7
242	0.109	1.3	100.0
Total	8.52 l/min/m		100.0 %

Condition

Section: Dam Foundation
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Grout Curtain: EL. -60m
 Permeability Coef.: K₁

4-4-8 Inflow & Outflow of Seepage Flow (D-1-A3)

Condition

Section: Dam Foundation
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Grout Curtain: EL. -60m
 Permeability Coef.: K3

Inflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Accumulated
225	7.702	16.7	16.7
224	2.977	6.5	23.2
237	1.364	3.0	26.2
256	5.371	11.7	37.9
255	4.351	9.5	47.4
254	3.078	6.7	54.1
253	3.110	6.8	60.9
252	4.133	9.0	69.9
251	3.329	7.2	77.1
250	2.389	5.2	82.3
249	1.617	3.5	85.8
248	1.381	3.0	88.8
247	2.416	5.1	91.9
246	1.441	3.1	95.0
245	1.033	2.2	97.2
244	0.916	2.0	99.2
243	0.415	0.8	100.0
Total	46.02 l/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Accumulated
227	8.167	17.7	17.7
228	7.996	17.4	35.1
229	5.002	10.9	40.0
230	3.882	8.4	54.4
231	2.894	6.3	60.7
232	2.262	4.9	65.6
233	2.395	5.2	70.8
234	2.317	5.0	75.8
235	2.587	5.6	81.4
236	2.556	5.6	87.0
237	1.768	3.8	90.8
238	1.535	3.3	94.1
239	1.148	2.5	96.6
240	0.668	1.5	98.1
241	0.589	1.3	99.4
242	0.263	0.6	100.0
Total	46.02 l/min/m		100.0 %

4-4-9 Inflow & Outflow of Seepage Flow (D-1-B1)

Inflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Accumulated
225	1.989	23.6	23.6
226	0.592	7.0	30.6
227	0.211	2.5	33.1
228	0.831	9.9	43.0
229	0.626	7.4	50.4
230	0.438	5.2	55.6
231	0.464	5.5	61.1
232	0.634	7.5	68.6
233	0.523	6.2	74.8
234	0.389	4.6	79.4
235	0.271	3.2	82.6
236	0.239	2.8	85.4
237	0.269	3.2	88.6
238	0.205	2.4	91.0
239	0.264	3.1	94.1
240	0.250	3.0	97.1
241	0.120	1.5	98.6
242			100.0
Total	8.62 l/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Accumulated
227	1.829	21.7	21.7
228	1.428	17.0	38.9
229	0.749	8.9	47.6
230	0.551	6.5	54.1
231	0.405	4.8	58.9
232	0.323	3.8	62.7
233	0.354	4.2	66.9
234	0.363	4.3	71.2
235	0.431	5.1	76.3
236	0.445	5.3	81.6
237	0.327	3.9	85.5
238	0.337	4.0	89.5
239	0.309	3.7	93.2
240	0.235	2.8	96.0
241	0.225	2.7	98.7
242	0.108	1.3	100.0
Total	8.62 l/min/m		100.0 %

Condition

Section: Dam Foundation
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Grout Curtain: EL. -120m
 Permeability Coef.: K_1

4-4-10 Inflow & Outflow of Seepage Flow (D-1-B3)

Inflow

Joint Number	Joint Seepage ($l/min/m$)	Percentage for Total Seepage (%) at Joint	Accumulated
225	5.361	19.4	19.4
224	1.994	7.0	26.4
257	0.828	2.9	29.3
256	3.260	11.4	40.7
255	2.500	8.9	49.6
254	1.791	6.2	55.8
253	1.814	6.3	62.1
252	2.421	8.4	70.5
251	1.958	6.8	77.3
250	1.416	4.9	82.2
249	0.964	3.4	85.6
248	0.829	2.9	88.5
247	0.864	3.0	91.5
246	0.891	3.1	94.6
245	0.657	2.3	96.9
244	0.589	2.1	99.0
243	0.269	1.0	100.0
Total	28.67 $l/min/m$		100.0 %

Outflow

Joint Number	Joint Seepage ($l/min/m$)	Percentage for Total Seepage (%) at Joint	Accumulated
227	5.640	19.7	19.7
228	5.148	18.0	37.7
229	2.984	10.4	48.1
230	2.266	7.9	56.0
231	1.678	5.9	61.9
232	1.318	4.6	66.5
233	1.407	4.9	71.4
234	1.377	4.8	76.2
235	1.553	5.4	81.6
236	1.543	5.4	87.0
237	1.074	3.7	90.7
238	0.950	3.3	94.0
239	0.727	2.5	96.5
240	0.435	1.5	98.0
241	0.387	1.4	99.4
242	0.175	0.6	100.0
Total	28.67 $l/min/m$		100.0

Condition

Section: Dam Foundation
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Grout Curtain: EL. -120m
 Permeability Coef.: K3

4-4-11 Inflow & Outflow of Seepage Flow (R-1-01)

Inflow

Joint Number	Joint Seepage (L/min/m)	Percentage for Total Seepage at Joint	Percentage for Total Seepage Accumulated
217	0.396	5.1	5.1
207	0.678	8.7	13.8
195	0.603	7.7	21.5
192	0.425	5.5	27.0
178	0.510	6.6	33.6
165	0.621	8.0	41.6
152	0.385	4.9	46.5
151	0.892	11.5	58.0
150	0.915	11.8	69.8
149	1.509	19.4	89.2
148	0.433	5.6	94.8
147	0.009	0.1	94.9
146	0.019	0.2	95.1
145	0.035	0.4	95.5
144	0.005	0.1	95.6
123	0.092	1.2	96.8
122	0.050	0.6	97.4
Total	7.78 L/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (L/min/m)	Percentage for Total Seepage at Joint	Percentage for Total Seepage Accumulated
143	-0.893	-11.5	-11.5
141	2.842	36.5	25.0
118	2.508	32.2	57.2
119	1.827	23.5	80.7
120	1.049	13.5	94.2
121	0.443	5.8	100.0
Total	7.78 L/min/m		100.0 %

Condition

Section: Right Bank - 1
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Grout Curtain: None
 Permeability Coef.: K1

4-4-12 Inflow & Outflow of Seepage Flow (R-2-02)

Condition

Section: Right Bank - 1
 Reservoir W.L.: El. 150.00m
 Downstream W.L.: El. 40.00m
 Grout Curtain: None
 Permeability Coef.: X2

Inflow

Joint Number	Joint Seepage ($\mu\text{m}^3/\text{m}^2/\text{s}$)	Percentage for Total Seepage (%) at Joint	Accumulated
217	0.918	3.2	3.2
207	1.265	4.4	7.6
195	0.928	3.2	10.8
192	0.634	2.2	13.0
178	0.738	2.7	15.7
165	1.079	3.7	19.4
152	3.769	13.0	32.4
151	4.891	16.9	49.3
150	4.679	16.1	65.4
149	7.268	25.1	90.5
148	2.042	7.0	97.5
147	0.037	0.1	97.6
146	0.078	0.3	97.9
145	0.138	0.5	98.4
144	0.019	0.1	98.5
123	0.319	1.1	99.6
122	0.167	0.4	100.0
Total	29.01 $\mu\text{m}^3/\text{m}^2/\text{s}$		100.0 %

Outflow

Joint Number	Joint Seepage ($\mu\text{m}^3/\text{m}^2/\text{s}$)	Percentage for Total Seepage (%) at Joint	Accumulated
141	6.047	21.4	21.4
118	9.397	33.2	54.6
119	7.105	25.1	79.7
120	4.034	14.3	94.0
121	1.692	6.0	100.0
Total	28.28 $\mu\text{m}^3/\text{m}^2/\text{s}$		100.0 %

4-4-13 Inflow & Outflow of Seepage Flow (R-1-03)

Inflow

Joint Number	Joint Seepage ($l/min/m$)	Percentage for Total Seepage at Joint	Percentage for Total Seepage Accumulated
217	0.948	1.8	1.8
207	1.311	2.4	4.2
295	0.972	1.8	6.0
192	0.672	1.3	7.3
178	0.844	1.6	8.9
165	1.200	2.2	11.1
152	8.014	15.0	26.1
151	10.058	18.8	44.9
150	9.488	17.7	62.6
149	14.555	27.2	89.8
148	4.074	7.6	97.4
147	0.071	0.1	97.5
146	0.152	0.3	97.8
145	0.264	0.5	98.3
144	0.037	0.1	98.4
123	0.595	1.1	99.5
122	0.307	0.5	100.0
Total	53.56 $l/min/m$		100.0 %

Outflow

Joint Number	Joint Seepage ($l/min/m$)	Percentage for Total Seepage at Joint	Percentage for Total Seepage Accumulated
141	10.348	20.2	20.2
118	17.553	33.6	53.8
119	13.411	25.6	79.4
120	7.603	14.5	93.9
121	3.285	6.1	100.0
Total	52.20 $l/min/m$		100.0 %

Condition

Section: Right bank - 1
Reservoir W.L.: El. 150.00m
Downstream W.L.: El. 40.00m
Crout Curtain: None
Permeability Coef.: K_3

4-4-14 Inflow & Outflow of Seepage Flow (R-1-A1)

Inflow

Joint Number	Joint Seepage ($\ell/\text{min}/\text{m}$)	Percentage for Total Seepage (%) at Joint	Accumulated
217	0.457	5.5	5.5
207	0.739	8.9	14.4
195	0.748	9.0	23.4
192	0.501	6.0	29.4
178	0.575	6.9	36.3
165	0.662	8.0	44.3
152	0.604	7.3	51.6
151	0.908	10.9	62.5
150	0.930	11.2	73.7
149	1.535	18.5	92.1
148	0.440	5.3	97.4
147	0.009	0.1	97.5
146	0.020	0.2	97.7
145	0.036	0.4	98.1
144	0.005	0.1	98.2
123	0.096	1.1	99.3
122	0.051	0.7	100.0
Total	8.31 $\ell/\text{min}/\text{m}$		100.0 %

Outflow

Joint Number	Joint Seepage ($\ell/\text{min}/\text{m}$)	Percentage for Total Seepage (%) at Joint	Accumulated
141	2.110	27.2	27.2
118	2.438	31.5	58.7
119	1.764	22.8	81.5
120	1.014	13.1	94.6
121	0.429	5.4	100.0
Total	7.75 $\ell/\text{min}/\text{m}$		100.0 %

Condition

Section: Right Bank - 1
 Reservoir W.L.: XL-150.00m
 Downstream W.L.: XL-40.00m
 Grout Curtain: XL-60m
 Permeability Coef.: K_1

4-4-15 Inflow & Outflow of Seepage Flow (R-1-A2)

Condition
 Section: Right Bank - 1
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Grout Curtain: EL. -60m
 Permeability Coef.: K2

Inflow

Joint Number	Joint Seepage (ℓ /min/m)	Percentage for Total Seepage (%)	
		at Joint	Accumulated
217	0.274	1.2	1.2
207	0.389	2.5	3.7
195	0.787	3.3	7.0
192	0.564	2.4	9.4
178	0.675	2.9	12.3
165	0.841	3.6	15.9
152	2.725	11.6	27.5
151	4.027	17.2	44.7
150	4.002	17.1	61.8
149	6.439	27.4	89.2
148	1.828	7.8	97.0
147	0.034	0.1	97.1
146	0.075	0.3	97.4
145	0.152	0.6	98.0
144	0.018	0.1	98.1
123	0.311	1.3	99.4
122	0.163	0.6	100.0
Total	23.46 ℓ/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (ℓ /min/m)	Percentage for Total Seepage (%)	
		at Joint	Accumulated
141	4.075	17.4	17.4
118	8.072	34.4	51.8
119	6.247	26.6	78.4
120	3.370	15.2	93.6
121	1.500	6.4	100.0
Total	23.46 ℓ/min/m		100.0 %

4-4-16 Inflow & Outflow of Seepage Flow (R-1-A3)

Condition

Section: Right Bank - 1
 Reservoir W.L.: El. 150.00m
 Downstream W.L.: El. 40.00m
 Crout Curtain: El. -60m
 Permeability Coef.: K3

Inflow

Joint Number	Joint Seepage (ℓ /min/m)	Percentage for Total Seepage (%)	
		at Joint	Accumulated
217	0.271	0.7	0.7
207	0.561	1.5	2.2
195	0.768	1.9	4.1
192	0.569	1.4	5.5
178	0.666	1.7	7.2
165	0.794	2.0	9.2
152	4.671	11.7	20.9
151	7.341	18.5	39.4
150	7.377	18.5	57.9
149	11.985	30.1	88.0
148	5.411	8.6	96.6
147	0.064	0.2	96.8
146	0.139	0.3	97.1
145	0.247	0.6	97.7
144	0.034	0.1	97.8
123	0.568	1.4	99.2
122	0.295	0.8	100.0
Total	39.78 ℓ /min/m		100.0 %

Outflow

Joint Number	Joint Seepage (ℓ /min/m)	Percentage for Total Seepage (%)	
		at Joint	Accumulated
141	6.519	16.4	16.4
118	13.684	34.4	50.8
119	10.789	27.1	77.9
120	6.186	15.6	93.5
121	2.602	6.5	100.0
Total	39.78 ℓ /min/m		100.0 %

4-4-17 Inflow & Outflow of Seepage Flow (R-1-BI)

Inflow

Joint Number	Joint Seepage (μ /min/m)	Percentage for Total Seepage (%) at Joint	Accumulated
217	0.458	5.5	5.5
207	0.743	9.0	14.5
195	0.753	9.1	23.6
192	0.500	6.0	29.6
178	0.571	6.9	36.5
165	0.664	8.0	44.5
152	0.604	7.3	51.8
151	0.902	10.9	62.7
150	0.924	11.1	73.8
149	1.523	18.4	92.2
148	0.437	5.3	97.5
147	0.069	0.1	97.6
146	0.020	0.2	97.8
145	0.036	0.4	98.2
144	0.005	0.1	98.3
123	0.093	1.1	99.4
122	0.051	0.6	100.0
Total	8.29 μ /min/m		100.0 %

Outflow

Joint Number	Joint Seepage (μ /min/m)	Percentage for Total Seepage (%) at Joint	Accumulated
141	2.108	27.3	27.3
118	2.431	31.4	58.7
129	1.758	22.7	81.4
120	1.010	13.1	94.5
121	0.427	5.5	100.0
Total	7.73 μ /min/m		100.0 %

Comments

Section: Right Bank - 1
 Reference N.L.: El. 150.00m
 Downstream N.L.: El. 140.00m
 Grout Curtain: El. 120m
 Permeability Coef.: K_2

4-4-18 Inflow & Outflow of Seepage Flow (R-1-B2)

Inflow

Joint Number	Joint Seepage ($\frac{L}{min/m}$)	Percentage for Total Seepage (%) at Joint	Percentage for Total Seepage (%) Accumulated
217	0.269	1.2	1.2
207	0.575	2.7	3.9
195	0.752	3.5	7.4
192	0.556	2.6	10.0
178	0.670	3.1	13.1
165	0.833	3.9	17.0
152	2.697	12.5	29.5
151	3.699	17.1	46.6
150	3.635	16.7	63.3
149	3.704	16.4	79.7
148	1.613	7.5	87.2
147	0.030	0.1	87.3
146	0.064	0.3	87.6
145	0.114	0.5	88.1
144	0.016	0.1	88.2
123	0.268	1.2	89.4
122	0.140	0.6	100.0
Total	21.61 $\frac{L}{min/m}$		100.0 %

Outflow

Joint Number	Joint Seepage ($\frac{L}{min/m}$)	Percentage for Total Seepage (%) at Joint	Percentage for Total Seepage (%) Accumulated
141	3.775	17.5	17.5
118	7.449	34.5	52.0
119	5.738	26.6	78.6
120	3.270	15.1	93.7
121	1.373	6.3	100.0
Total	21.61 $\frac{L}{min/m}$		100.0 %

Condition

Section: Right Bank - 1
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Grouse Curcain: EL. -120m
 Permeability Coef.: K2

4-4-19 Inflow & Outflow of Seepage Flow (R-1-B3)

Inflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage (%) at Joint	Accumulated
217	0.281	0.9	0.9
207	0.605	1.8	2.7
195	0.800	2.4	5.1
192	0.591	1.8	6.9
178	0.681	2.1	9.0
165	0.780	2.4	11.4
152	4.486	13.6	25.0
151	6.048	18.4	43.4
150	5.849	17.8	61.2
149	9.200	28.0	89.2
148	2.596	7.9	97.1
147	0.047	0.1	97.2
146	0.102	0.3	97.5
145	0.179	0.5	98.0
144	0.025	0.1	98.1
123	0.411	1.2	99.3
122	0.213	0.6	99.9
Total	32.89 l/min/m		99.9 %

Outflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage (%) at Joint	Accumulated
141	5.347	16.9	16.9
118	11.375	34.6	51.5
119	8.834	26.9	78.4
120	5.030	15.3	93.7
121	2.110	6.4	100.1
Total	32.89 l/min/m		100.1 %

Condition

Section: Right Bank - 1
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Crest Curcain: EL. -120m
 Permeability Coeff.: K₃

4-4-20 Inflow & Outflow of Seepage Flow (R-2-01)

Inflow

Joint Number	Joint Seepage (μ /min/m)	Percentage for Total Seepage at Joint	Accumulated
267	1.161	23.9	23.9
252	0.690	10.1	34.0
251	0.232	4.8	38.8
233	0.400	8.2	47.0
226	0.232	4.8	51.8
201	0.286	5.9	57.7
173	0.582	12.0	69.7
172	1.068	22.0	91.7
171	0.183	3.8	95.5
169	0.052	1.1	96.6
222	0.028	0.6	97.2
223	0.017	0.4	97.6
225	0.012	0.2	97.8
224	0.002	0	97.8
219	0.013	0.3	98.1
197	0.015	0.3	98.4
163	0.012	0.2	98.6
146	0.011	0.2	98.8
145	0.003	0.1	98.9
114	0.024	0.5	99.4
113	0.028	0.6	100.0
Total	4.85 μ /min/m		100.0 %

Outflow

Joint Number	Joint Seepage (μ /min/m)	Percentage for Total Seepage at Joint	Accumulated
160	1.147	25.3	25.3
140	1.155	25.4	50.7
141	0.889	19.6	70.3
142	0.663	14.6	84.9
143	0.475	10.5	95.4
144	0.210	4.6	100.0
Total	4.54 μ /min/m		100.0 %

Condition

No. of Joints: Right Bank - 2
 Maximum Water El.: 150.00m
 Minimum Water El.: 40.00m
 Seepage Curtains: None
 Permeability Coef.: K1

4-4-21 Inflow & Outflow of Seepage Flow (R-3-01)

Condition
 Section: Right Bank - 3
 Reservoir H.L.: EL. 150.00m
 Downstream H.L.: EL. 40.00m
 GROUT CURTAIN: None
 Permeability Coef.: K1

Inflow

Joint Number	Joint Seepage (L/min/m)	Percentage for Total Seepage (%) at Joint	Accumulated
250	0.009	0.5	0.5
252	0.020	1.1	1.6
254	0.012	0.7	2.3
256	0.004	0.2	2.5
258	0.006	0.3	2.8
260	0.015	0.9	3.7
261	0.016	0.9	4.6
262	0.017	1.0	5.6
265	0.012	0.7	6.3
267	0.008	0.4	6.7
270	0.008	0.4	7.1
272	0.006	0.4	7.5
274	0.015	0.8	8.3
275	0.028	1.5	9.8
276	0.126	7.0	16.8
277	0.323	18.0	34.8
278	0.213	11.9	46.7
280	0.280	15.6	62.3
283	0.260	14.5	76.8
454	0.416	23.2	100.0
Total	1.79 L/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (L/min/m)	Percentage for Total Seepage (%) at Joint	Accumulated
462	0.717	43.5	43.5
463	0.531	32.2	75.8
464	0.286	17.4	93.1
468	0.113	6.9	100.0
Total	1.65 L/min/m		100.0 %

4-4-22 Inflow & Outflow of Seepage Flow (L-1-01)

Inflow

Joint Number	Joint Seepage (L/min/m)	Percentage for Total Seepage (%) at Joint	Accumulated
196	1.228	15.1	15.1
191	0.902	11.1	26.2
182	0.401	4.9	31.1
171	0.556	6.8	37.9
158	0.587	7.2	45.1
145	0.640	7.9	53.0
143	0.710	8.7	61.7
127	0.464	5.7	67.4
126	0.682	8.4	75.8
121	0.794	9.7	85.5
124	0.198	2.4	87.9
107	0.773	9.5	97.4
106	0.150	1.8	99.2
105	0.065	0.8	100.0
Total	8.15 L/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (L/min/m)	Percentage for Total Seepage (%) at Joint	Accumulated
121	2.192	26.9	26.9
101	2.320	30.9	57.8
102	1.822	22.4	80.2
103	1.156	14.2	94.4
104	0.461	5.6	100.0
Total	8.15 L/min/m		100.0 %

Condition

Section: Left Bank - 1
 Riverfront W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Grout Curtain: None
 Permeability Coef.: K₁

4-4-23 Inflow & Outflow of Seepage Flow (L-I-AI)

Inflow

Joint Number	Joint Seepage (L/min/m)	Percentage for Total Seepage (%) at Joint	Percentage for Total Seepage (%) Accumulated
196	1.053	12.3	12.3
191	1.091	12.7	25.0
182	0.485	5.7	30.7
171	0.645	7.5	38.2
158	0.648	7.6	45.8
145	0.678	7.9	53.7
143	0.741	8.7	62.4
127	0.481	5.6	68.0
126	0.703	8.2	76.2
125	0.817	9.5	85.7
124	0.203	2.4	88.1
107	0.795	9.3	97.4
106	0.154	1.8	99.2
105	0.066	0.8	100.0
Total	8.56 L/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (L/min/m)	Percentage for Total Seepage (%) at Joint	Percentage for Total Seepage (%) Accumulated
121	2.513	30.9	30.9
101	2.374	29.2	60.1
102	1.719	21.1	81.2
103	1.096	13.5	94.7
104	0.438	5.3	100.0
Total	8.14 L/min/m		100.0 %

Condition

Section: Left Bank - 1
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 GROUT CURTAIN: EL. -60m
 Permeability Coef.: K1

4-4-24 Inflow & Outflow of Seepage Flow (L-2-01)

Inflow

Joint Number	Joint Seepage ($l/min/m$)	Percentage for Total Seepage (2) at Joint	Accumulated
331	0.727	27.9	27.9
330	0.361	13.9	41.8
329	0.257	9.9	51.7
328	0.276	10.6	62.3
327	0.407	15.6	77.9
326	0.285	10.9	88.8
325	0.123	4.7	93.5
324	0.045	1.7	95.2
323	0.027	1.0	96.2
322	0.019	0.7	96.9
321	0.014	0.5	97.4
320	0.011	0.4	97.8
319	0.008	0.3	98.1
318	0.004	0.2	98.3
317	0.004	0.2	98.5
316	0.006	0.2	98.7
315	0.008	0.3	99.0
314	0.008	0.3	99.3
313	0.005	0.2	99.5
312	0.001	0	99.5
311	0.001	0	99.5
310	0	0	99.5
309	0.002	0.1	99.6
308	0.002	0.1	99.7
307	0	0	99.7
306	0.003	0.2	99.9
305	0.001	0.1	100.0
Total	2.61 $l/min/m$		100.0 %

Outflow

Joint Number	Joint Seepage ($l/min/m$)	Percentage for Total Seepage (2) at Joint	Accumulated
349	0.054	2.1	2.1
350	-0.052	-2.1	0
351	-0.033	-1.3	-1.3
352	-0.385	-15.3	-16.6
353	1.290	51.2	34.6
354	0.313	12.4	47.0
355	-0.535	-21.2	25.8
356	-	-	-
357	-	-	-
358	-	-	-
359	0.098	19.8	45.6
360	0.463	18.4	64.0
361	0.417	16.5	80.5
207	0.244	9.7	90.2
265	0.171	6.8	97.0
266	0.076	3.0	100.0
Total	2.52 $l/min/m$		100.0 %

Condition

Section: Left Bank - Z
Reservoir W.L.: EL- 150.00m
Downstream W.L.: EL- 40.00m
Crout Curtain: None
Permeability Coef.: K1

4-4-25 Inflow & Outflow of Seepage Flow (R-1-01-C2)

Inflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage (%) at Joint	ACCUMULATED
217	0.482	0.3	0.3
207	0.850	0.6	0.9
195	0.863	0.6	1.5
192	0.646	0.4	1.9
178	0.878	0.6	2.5
165	1.466	1.0	3.5
152	43.756	29.6	33.1
151	9.134	6.2	39.3
150	12.478	8.4	47.7
149	32.032	21.7	69.4
148	7.014	4.7	74.1
147	16.437	11.1	85.2
146	-0.373	-0.3	84.9
145	18.550	12.5	97.4
144	1.505	1.0	98.4
123	2.158	1.5	99.9
122	0.111	0.1	100.0
Total	167.89 l/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage (%) at Joint	ACCUMULATED
164	-2.289	-1.6	-1.6
162	23.423	15.8	14.2
143	0.736	0.5	14.7
141	3.076	2.1	16.8
118	59.390	40.1	56.9
119	34.582	23.4	80.3
120	24.400	16.5	96.8
121	4.678	3.2	100.0
Total	148.00 l/min/m		100.0 %

Condition

Section: Right Bank - 1
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Grout Curtain: None
 Permeability Coef.: K₁
 Crack: Width 2 cm

4-4-26 Inflow & Outflow of Seepage Flow (R-1-A1-C2)

Inflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Accumulated
217	0.281	0.3	0.3
207	0.610	0.7	1.0
195	0.822	0.9	1.9
192	0.630	0.7	2.6
178	0.775	0.8	3.4
165	0.934	1.0	4.4
132	20.063	22.0	26.4
151	4.681	5.1	31.5
150	6.434	7.0	38.5
149	18.869	20.7	59.2
148	4.702	5.1	64.3
147	13.505	14.8	79.1
146	-0.332	-0.4	78.7
145	16.045	17.6	96.3
144	1.301	1.4	97.7
123	1.870	2.0	99.7
122	0.099	0.3	100.0
Total	91.31 l/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Accumulated
162	0.159	0.2	0.2
143	0.460	0.5	0.7
141	2.798	3.1	3.8
118	41.425	45.4	49.2
119	24.980	27.4	76.6
120	18.038	19.8	96.4
121	3.471	3.0	100.0
Total	91.31 l/min/m		100.0 %

Condition

Section: Right Bank - 1
 Reservoir W.L.: El. 150.00m
 Downstream W.L.: El. 40.00m
 Grout Curtain: El. -60m
 Permeability Coef.: K1
 Cracks: Width 2 cm

4-4-27 Inflow & Outflow of Seepage Flow (R-1-B1-C2)

Inflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Accumulated
217	0.274	0.7	0.7
207	0.567	1.4	2.1
195	0.782	1.9	4.0
192	0.592	1.5	5.5
178	0.696	1.7	7.2
165	0.695	1.7	8.9
152	10.272	25.0	33.9
151	2.157	5.3	39.2
150	2.946	7.2	46.4
149	8.092	19.7	66.1
148	1.896	4.6	70.7
147	4.962	12.1	82.8
146	0.119	0.3	83.1
145	5.796	14.1	97.2
144	0.470	1.1	98.3
123	0.675	1.6	99.9
122	0.035	0.1	100.0
Total	41.07 l/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (l/min/m)	Percentage for Total Seepage at Joint	Accumulated
141	0.604	1.5	1.5
118	19.322	47.3	48.8
119	11.333	27.8	76.6
120	8.029	19.7	96.3
121	1.541	3.7	100.0
Total	40.83 l/min/m		100.0 %

Condition

Section: Right Bank - 1
 Reservoir H.L.: El. 150.00m
 Downstream H.L.: El. 40.00m
 Grout Curtain: El. -120m
 Permeability Coef.: K_1
 Crack: Width 2 cm

4-4-28 Inflow & Outflow of Seepage Flow (R-1-A1-C1)

Inflow

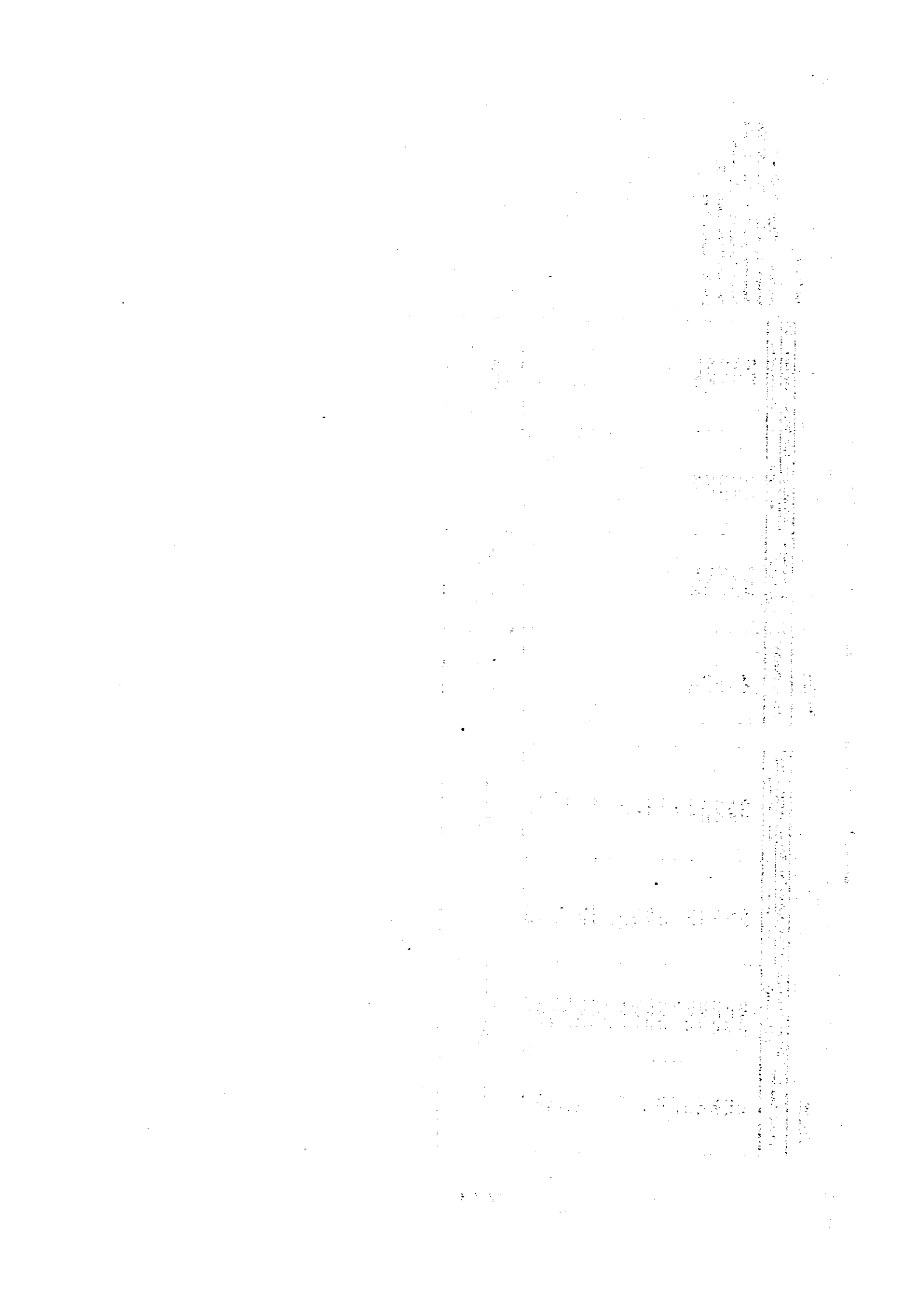
Joint Number	Joint Seepage (L/min/m)	Percentage for Total Seepage at Joint	Percentage for Total Seepage Accumulated
227	0.658	5.5	5.5
207	0.743	8.9	14.4
195	0.753	9.0	23.4
192	0.500	6.0	29.4
178	0.572	6.9	36.3
165	0.665	8.0	44.3
152	0.607	7.3	51.6
151	0.910	10.9	62.5
150	0.933	11.2	73.7
149	1.539	18.5	92.2
148	0.462	5.5	97.5
147	0.009	0.1	97.6
146	0.020	0.2	97.8
145	0.037	0.4	98.2
144	0.005	0.1	98.3
123	0.095	1.1	99.4
122	0.052	0.6	100.0
Total	8.34 L/min/m		100.0 %

Outflow

Joint Number	Joint Seepage (L/min/m)	Percentage for Total Seepage at Joint	Percentage for Total Seepage Accumulated
141	2.113	27.2	27.2
118	2.447	31.5	58.7
119	1.770	22.8	81.5
120	1.017	13.1	94.6
121	0.430	5.4	100.0
Total	7.78 L/min/m		100.0 %

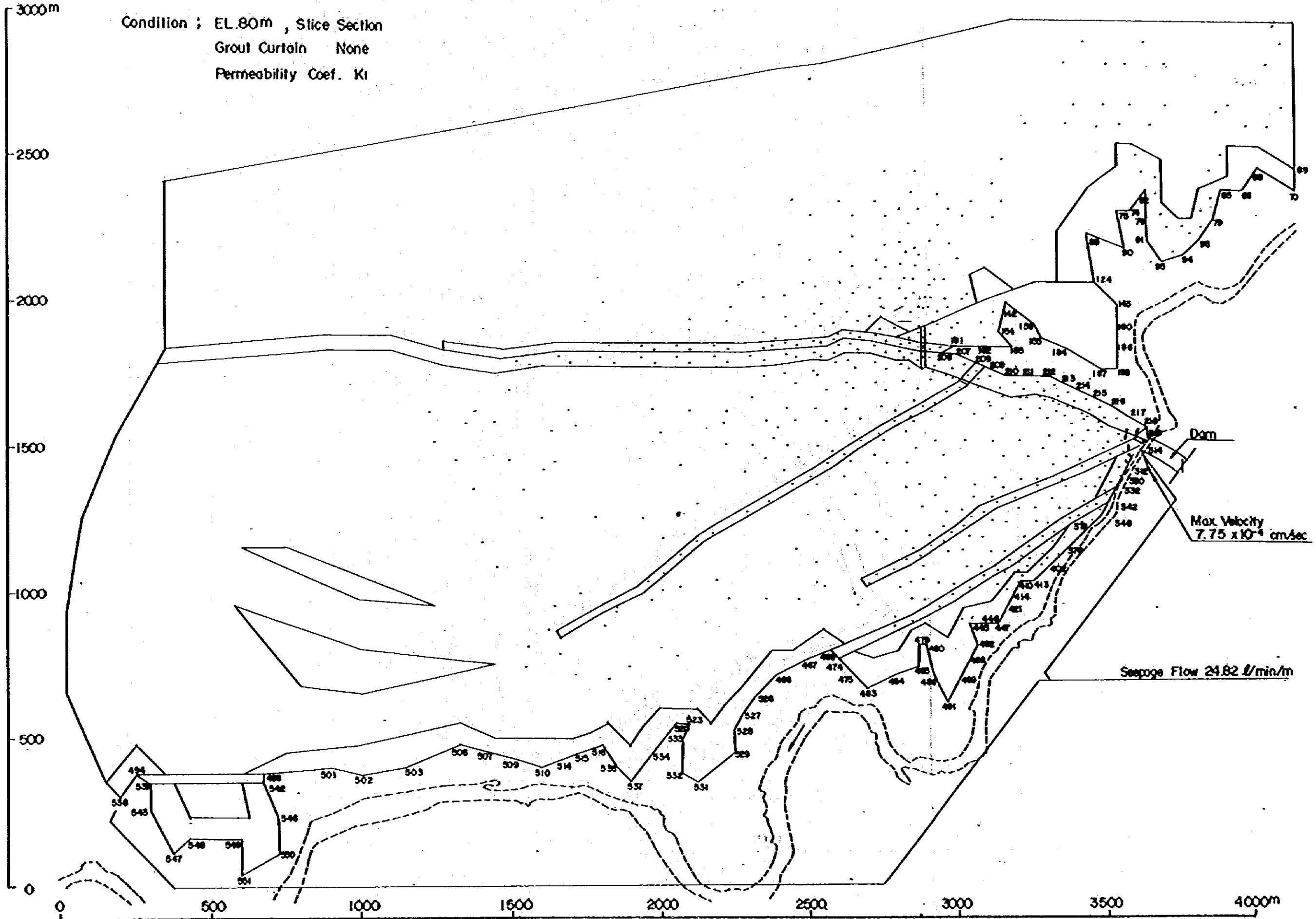
Condition

Section: Right Bank - 1
 Reservoir W.L.: EL. 150.00m
 Downstream W.L.: EL. 40.00m
 Grout Curtain: EL. -60m
 Permeability Coef.: K1
 Crack: Width 2 mm



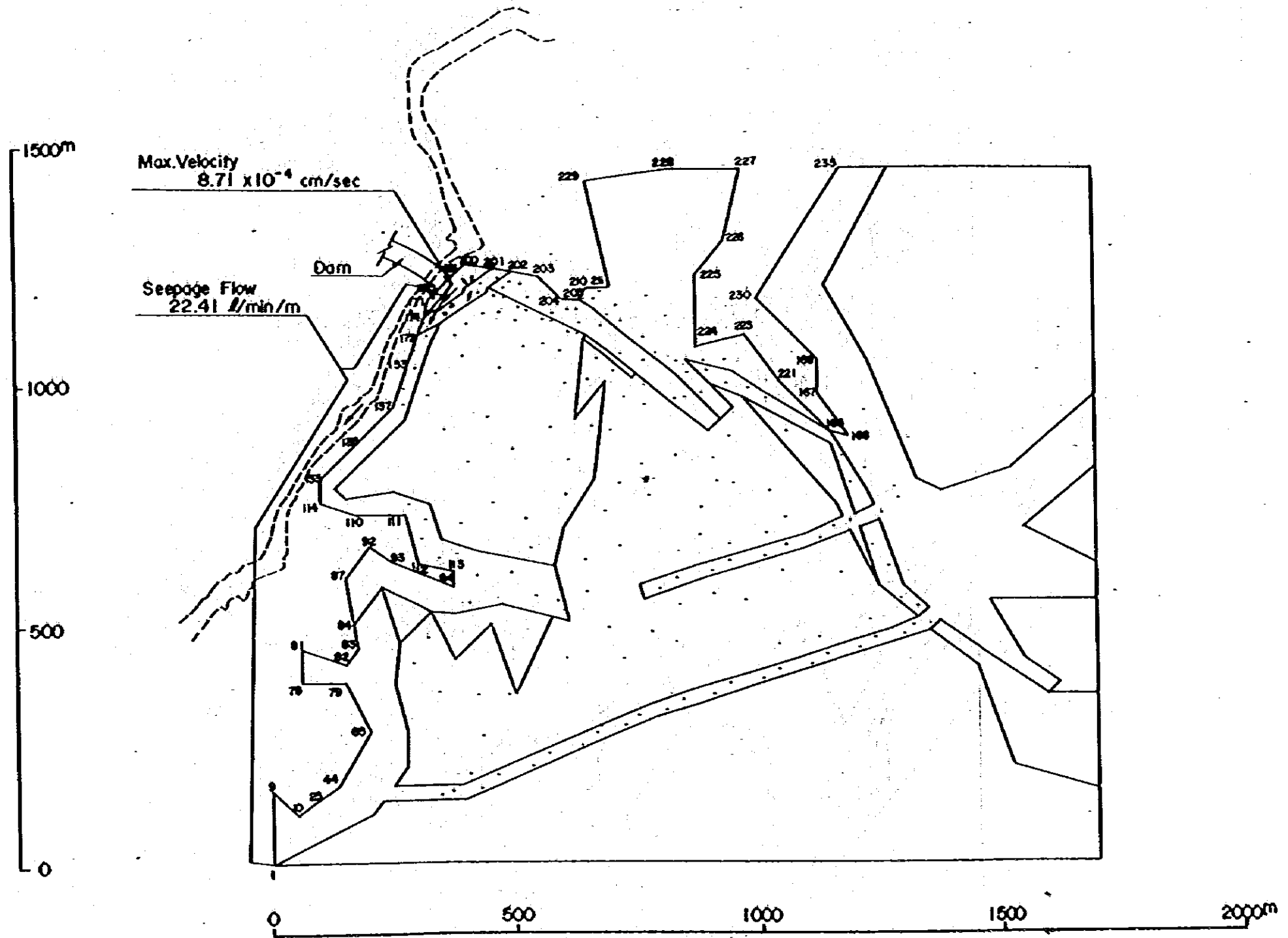
4-5-1 Seepage Flow Diagram (H-R-1)

Condition : EL.80m , Slice Section
Grout Curtain None
Permeability Coef. K_1



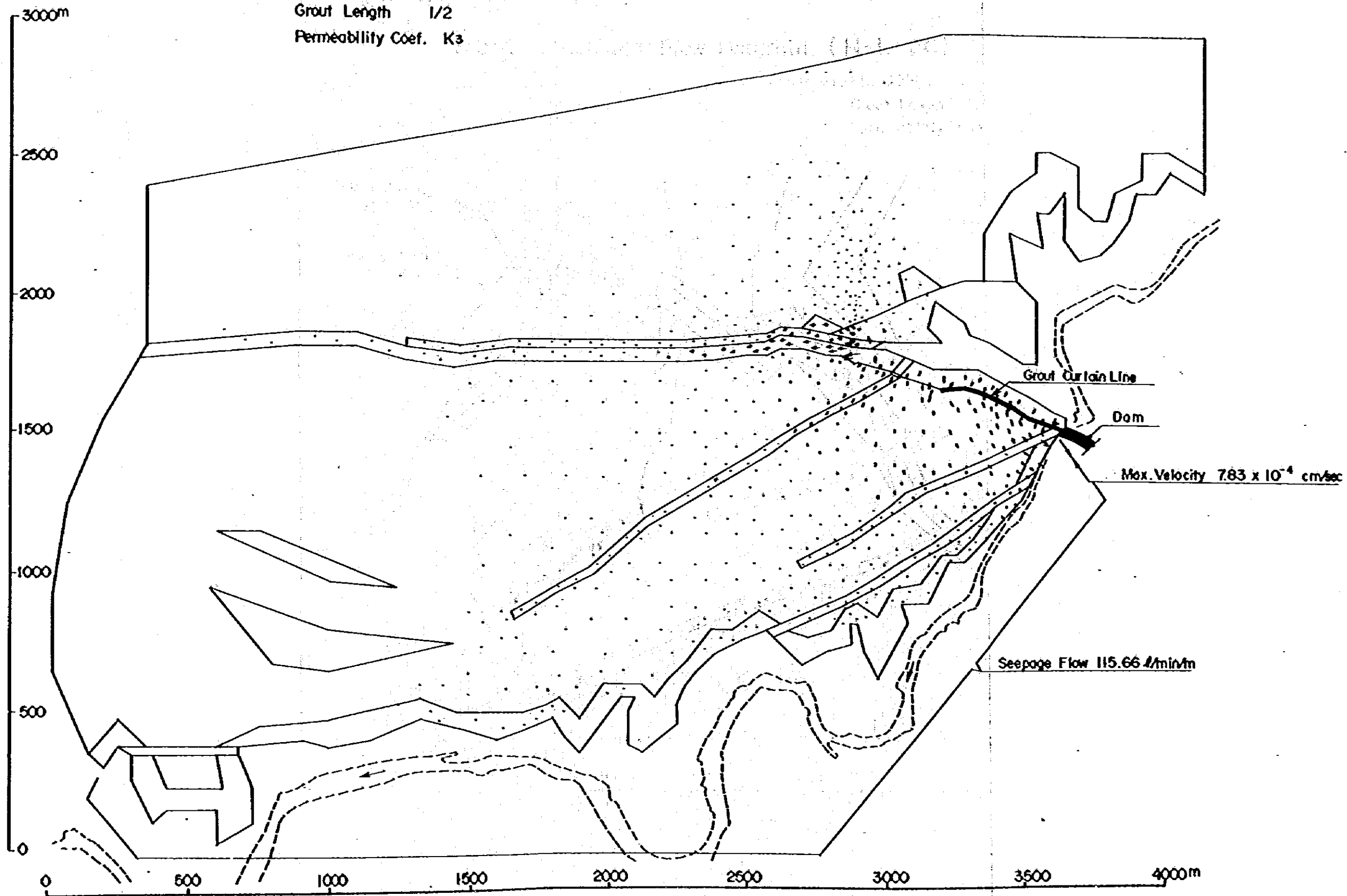
4-5-2 Seepage Flow Diagram (H-L-1)

Condition ; EL. 80m, Slice Section
Ground Curtain None
Permeability Coef. K1



4-5-3 Seepage Flow Diagram (H-R-2C)

Condition ; EL. 80.00 m , Slice Section
Grout Length 1/2
Permeability Coef. K_3

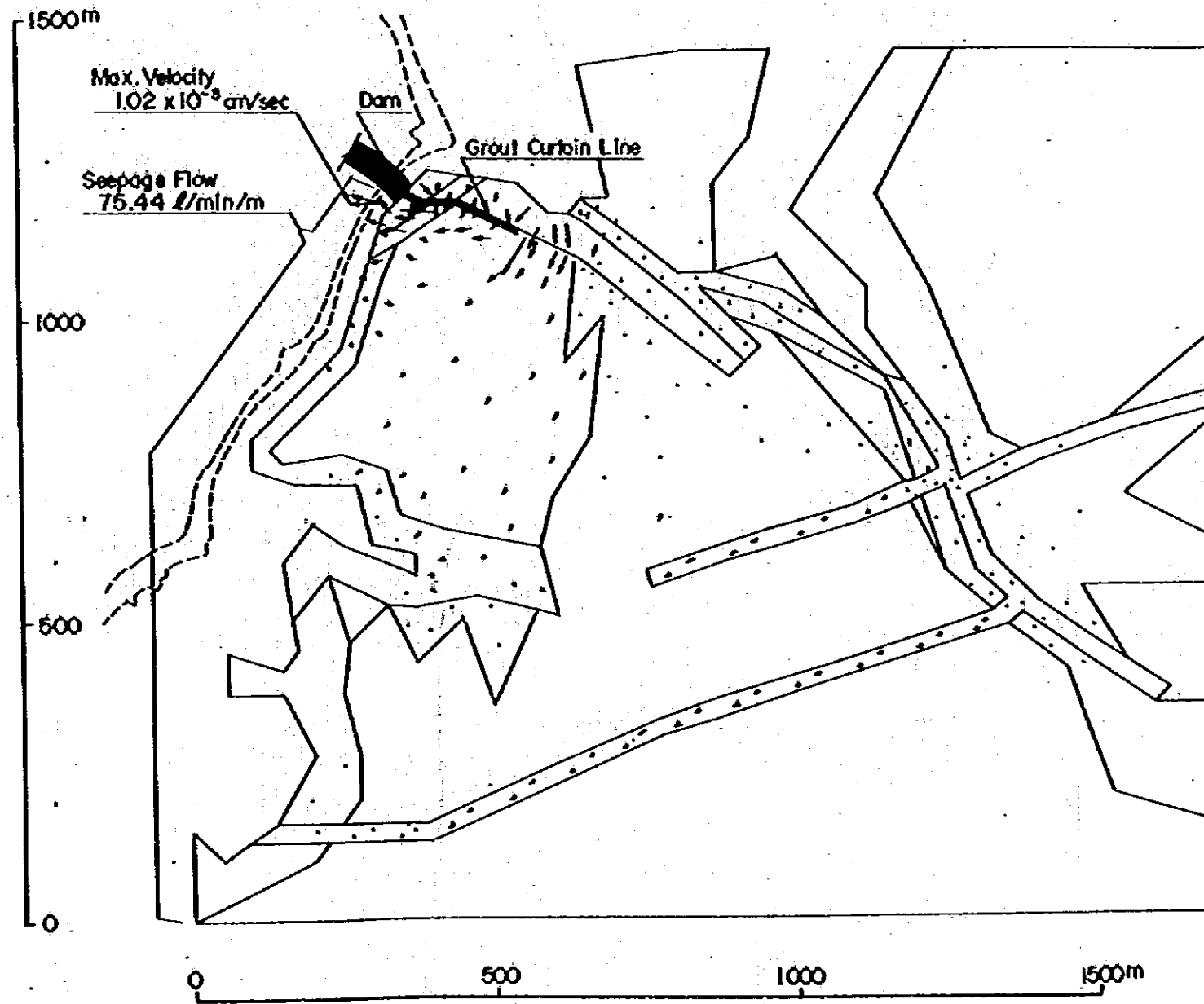


4-5-4 Seepage Flow Diagram (H-L-2C)

Condition; EL. 80m , Slice Section

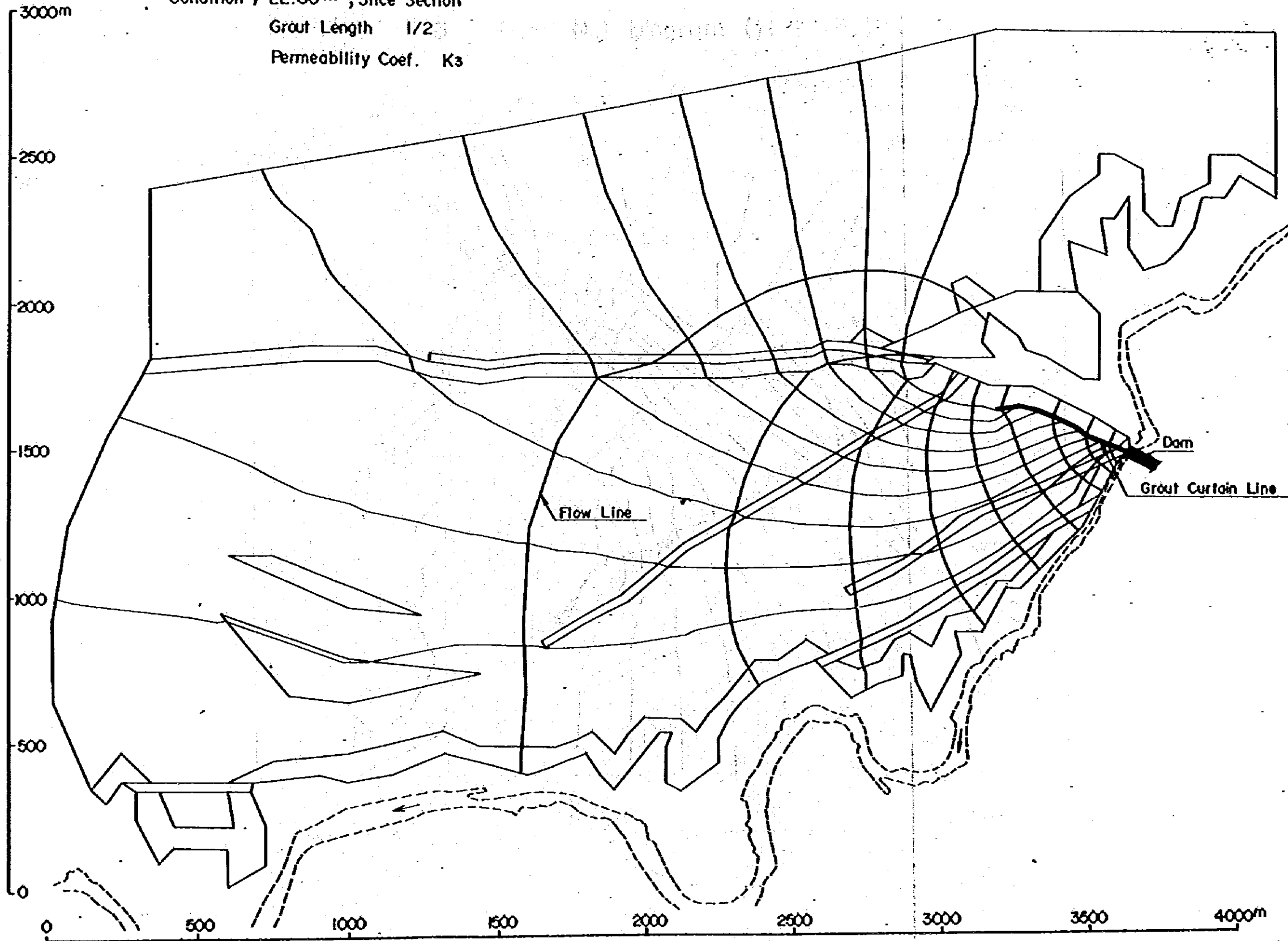
Grout Length 1/2

Permeability Coef. K_3



4-5-5 Flow Net Diagram (H-R-2C)

Condition ; EL. 80 m , Slice Section
Grout Length 1/2
Permeability Coef. K_3

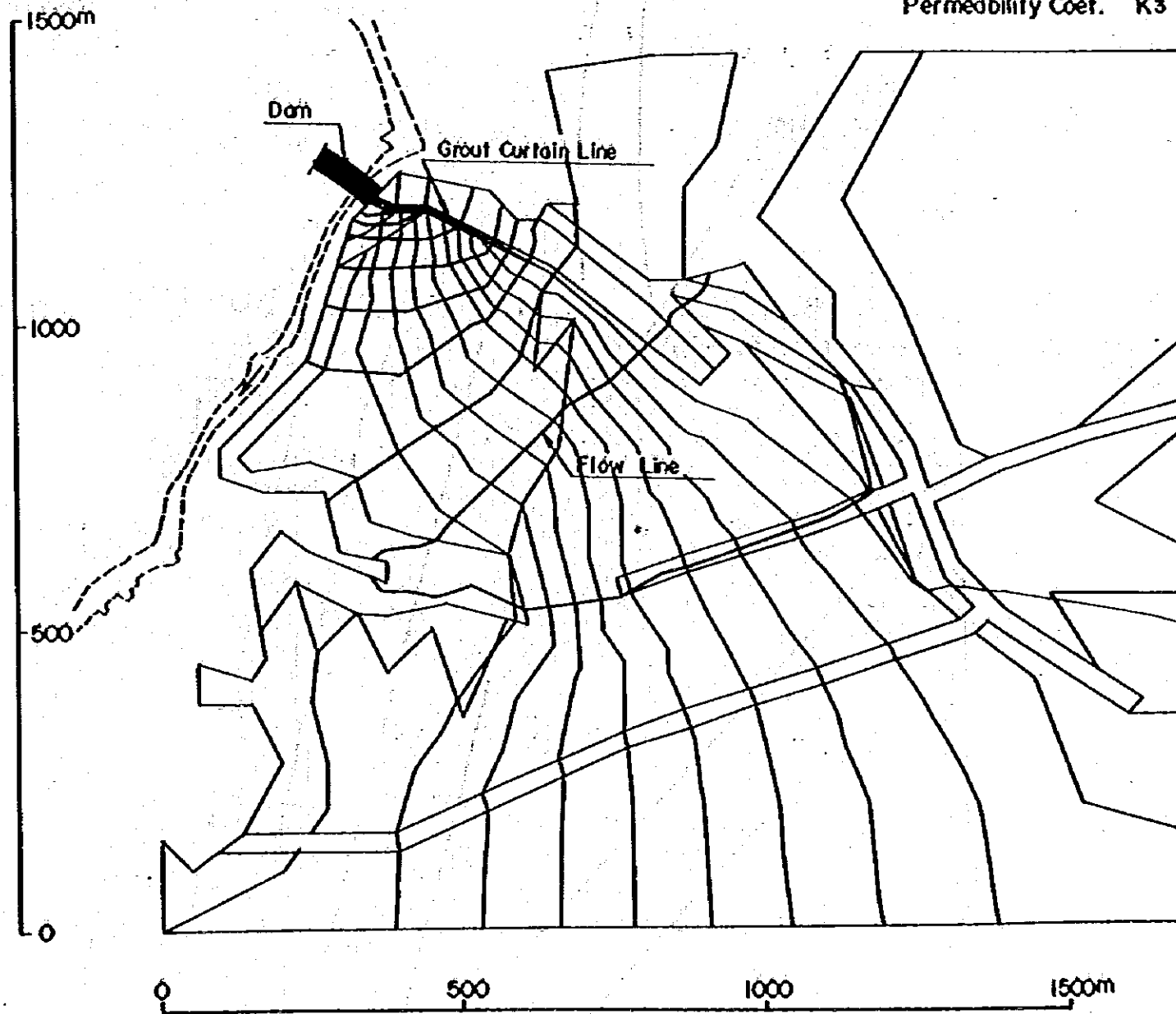


4-5-6 Flow Net Diagram (H-L-2C)

Condition ; EL. 80.00m , Slice Section

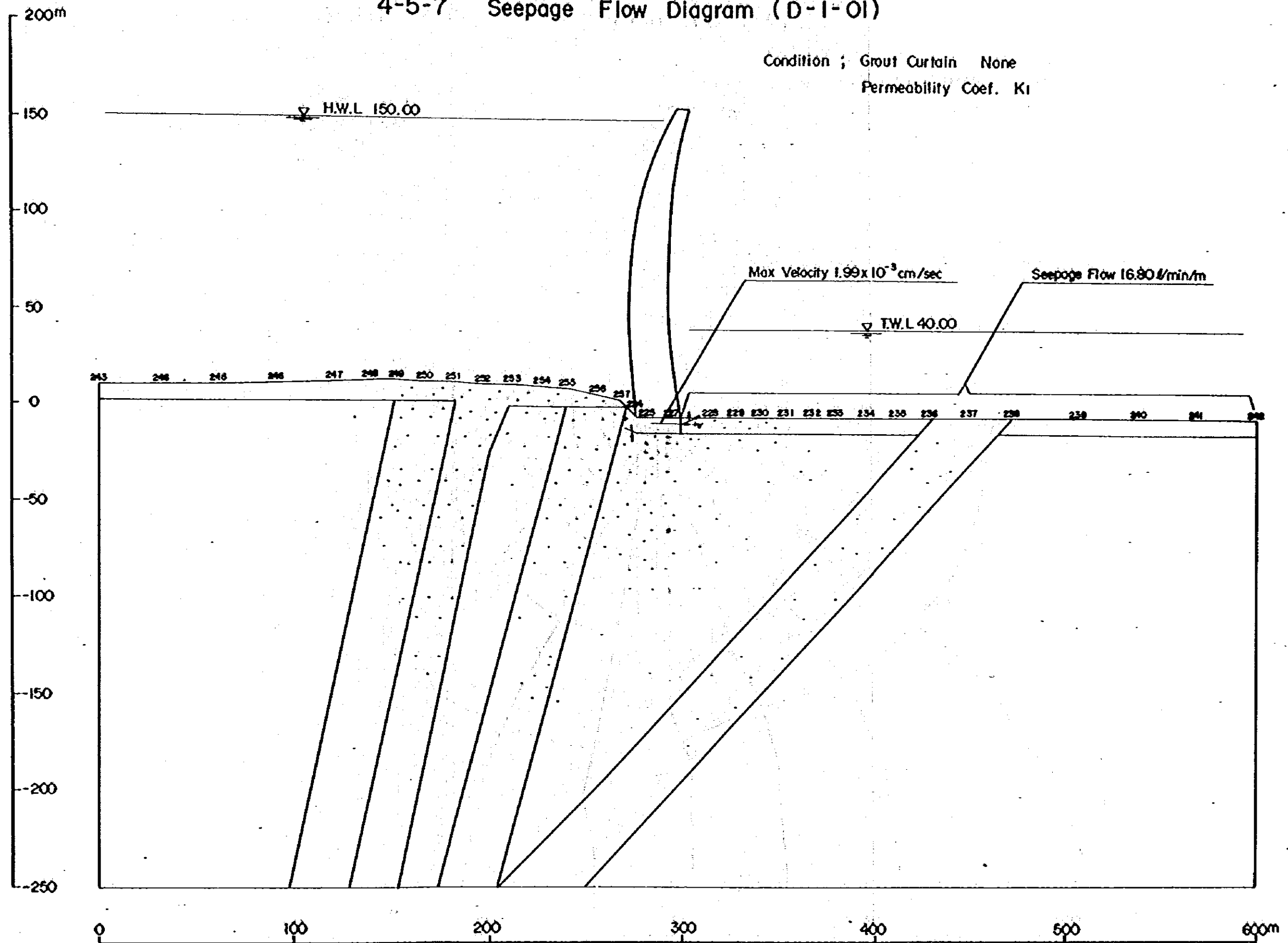
Grout Length 1/2

Permeability Coef. K_3

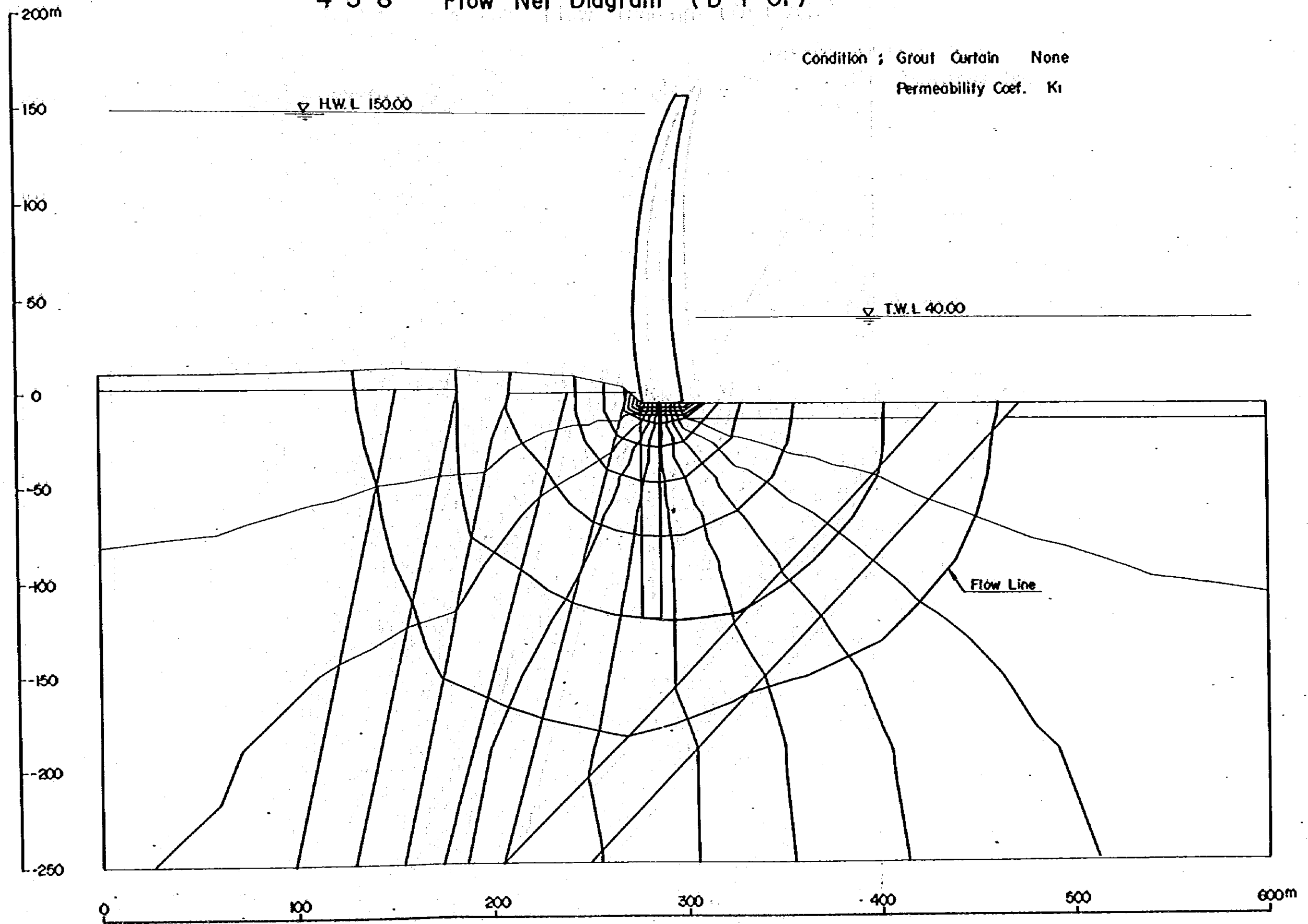


4-5-7 Seepage Flow Diagram (D-I-OI)

Condition ; Grout Curtain None
Permeability Coef. K1

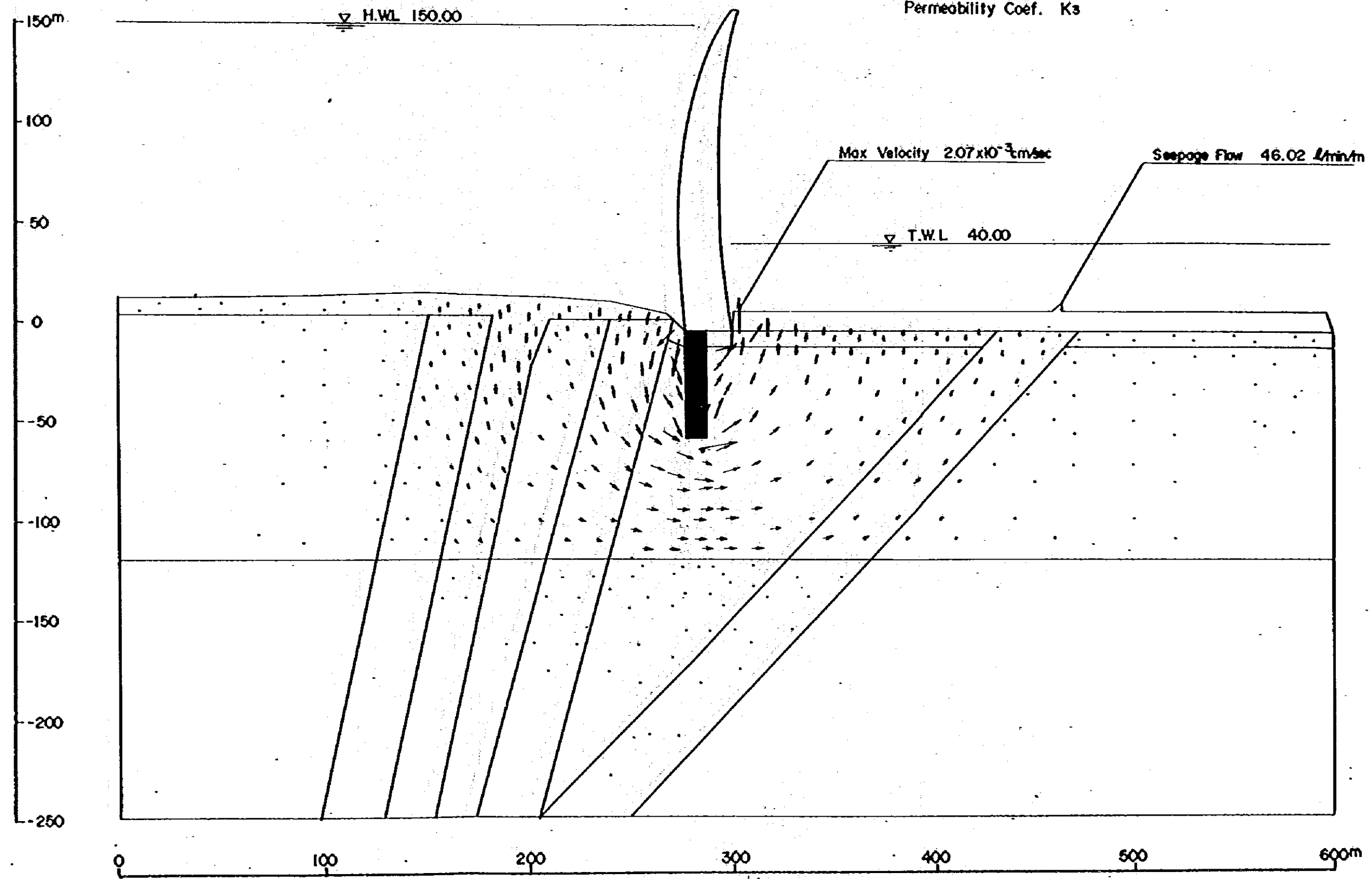


4-5-8 Flow Net Diagram (D-1-01)

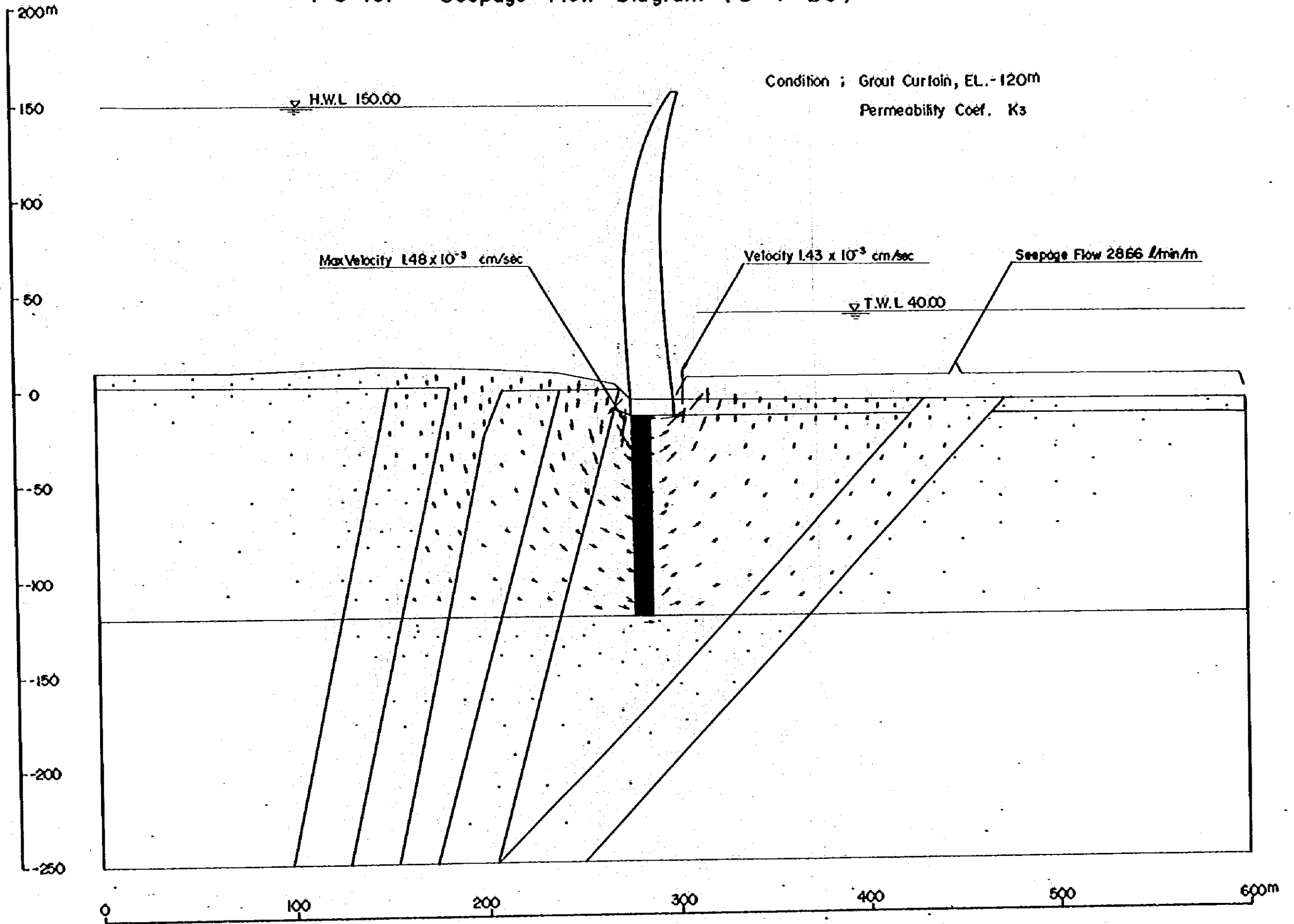


4-5-9 Seepage Flow Diagram (D-1-A3)

Condition ; Grout , EL.-60m
Permeability Coef. K_3



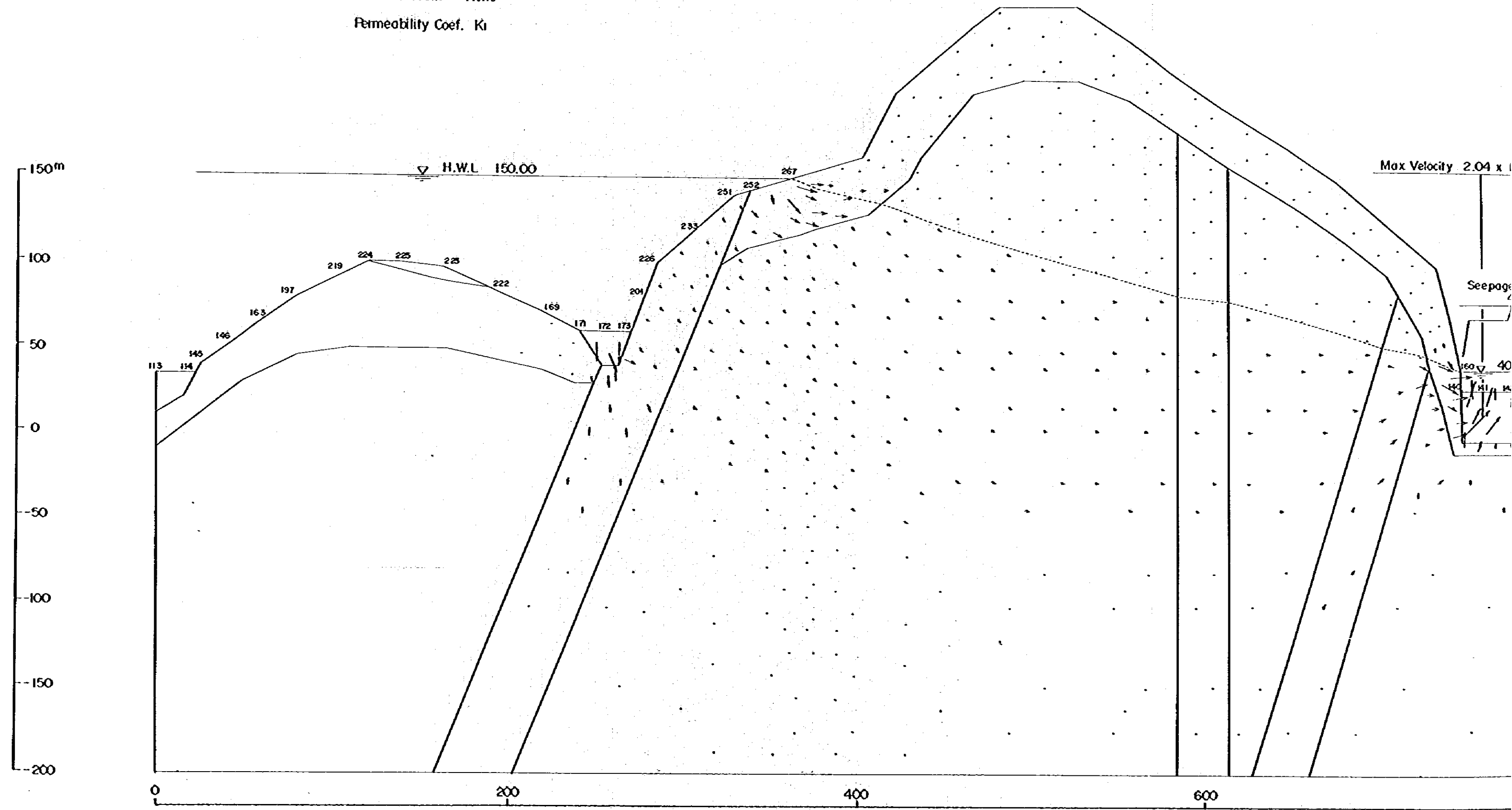
4-5-10. Seepage Flow Diagram (D-1-B3)



4-5-11 Seepage Flow Diagram (R-2-01)

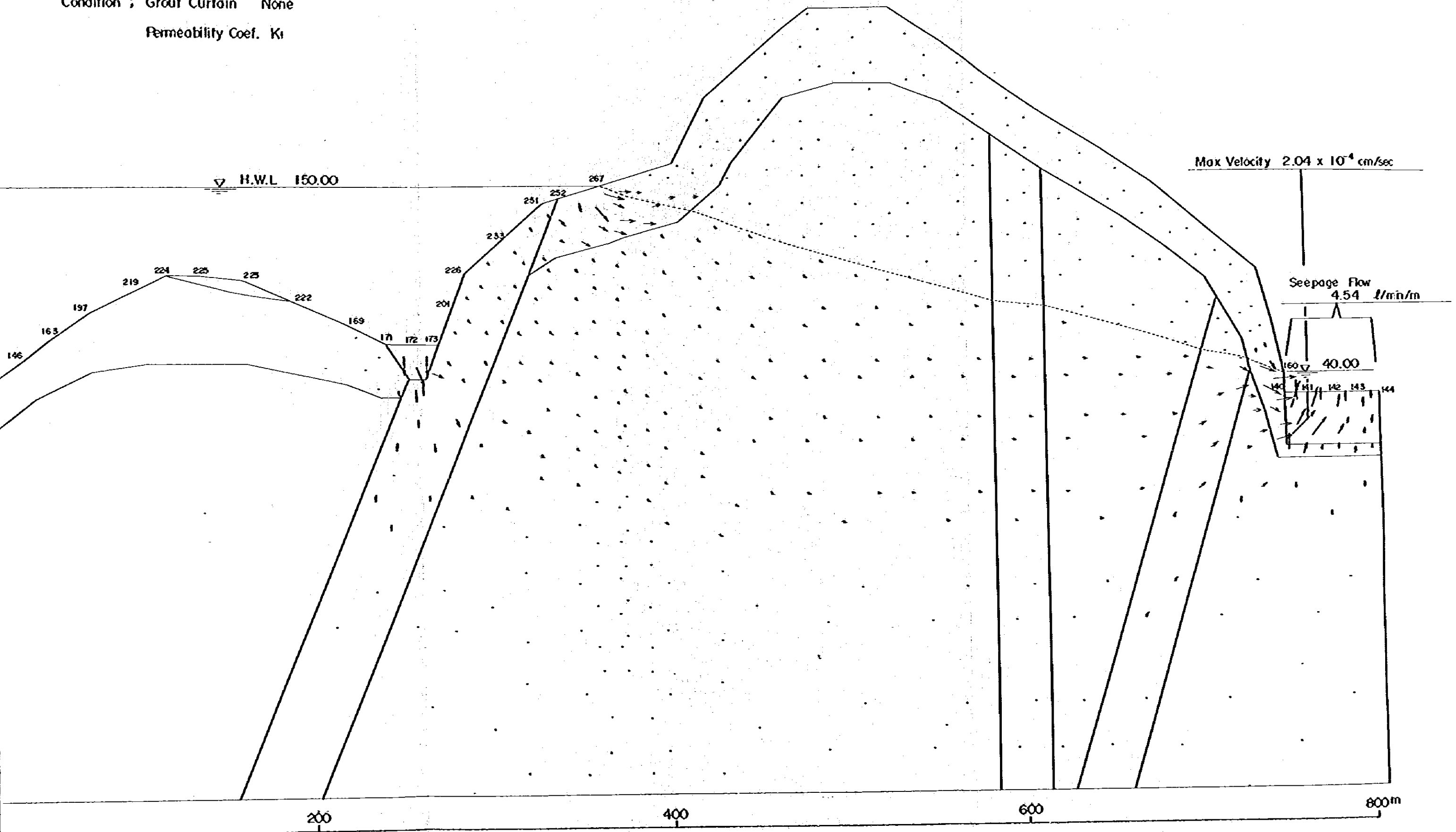
Condition ; Grout Curtain None

Permeability Coef. K_i



4-5-11 Seepage Flow Diagram (R-2-01)

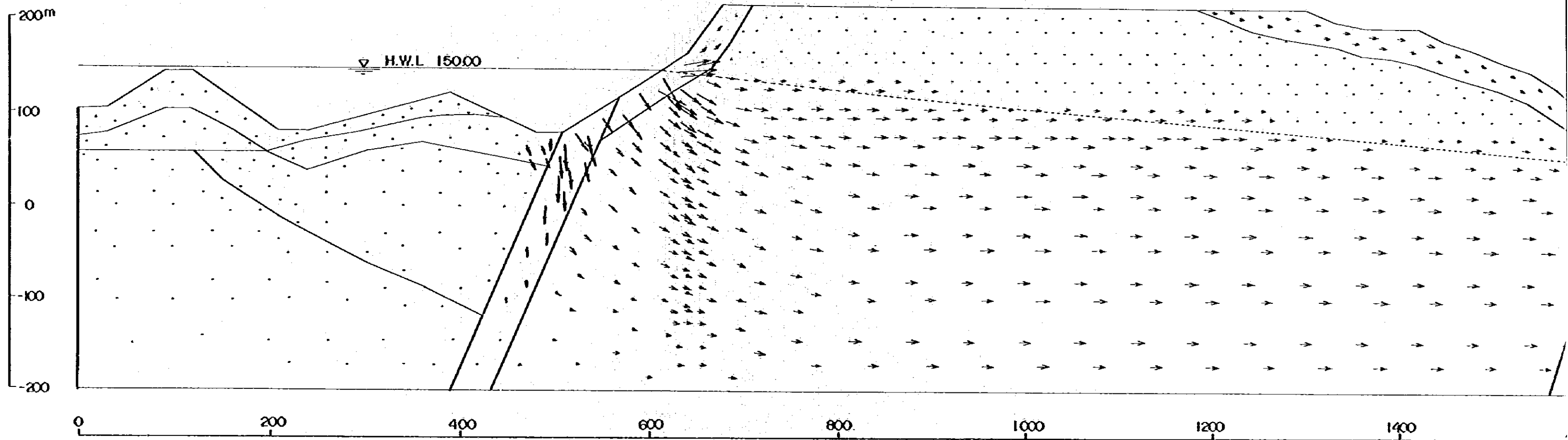
Condition ; Grout Curtain None
Permeability Coef. K_1



4-5-12 Seepage Flow Diagram (R-3-01)

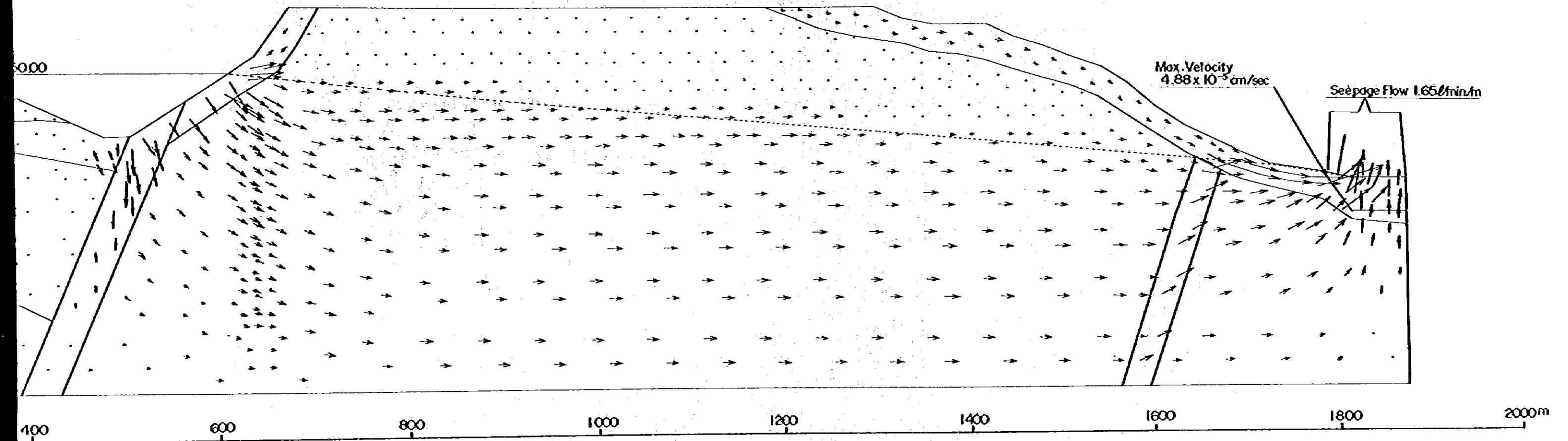
Condition ; Grout Curtain None

Permeability Coef. K_1



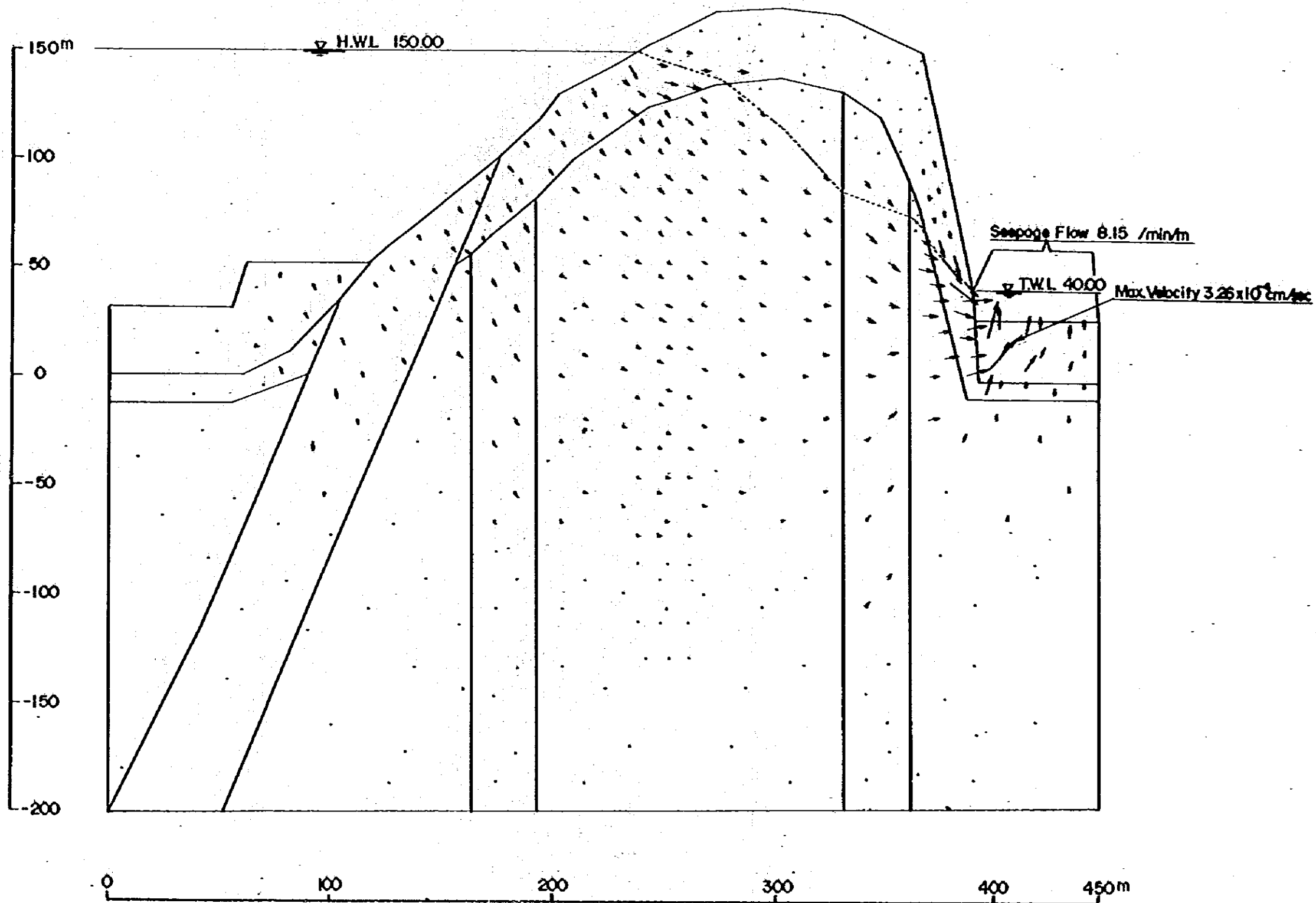
4-5-12 Seepage Flow Diagram (R-3-01)

Condition ; Grout Curtain None
Permeability Coef. K_1



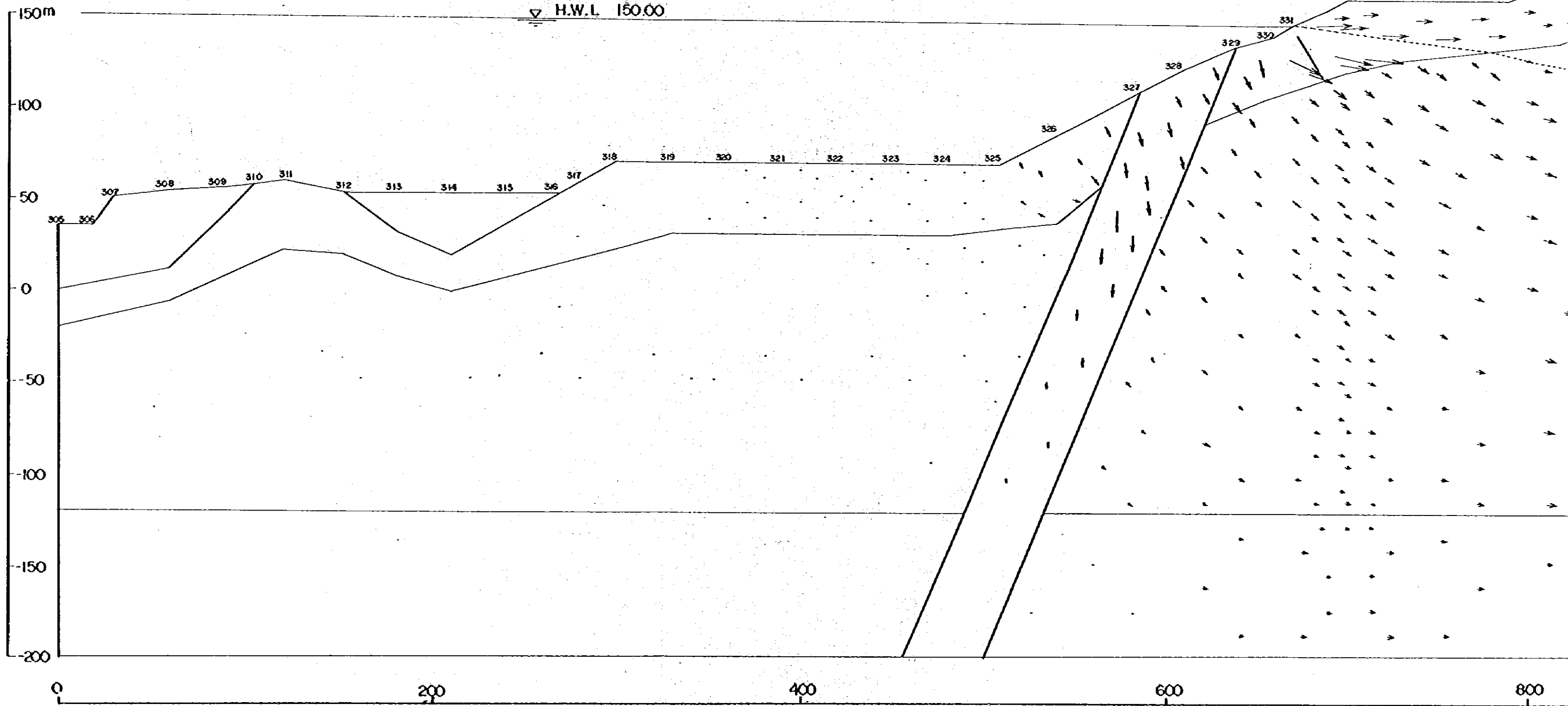
4-5-13 Seepage Flow Diagram (L-1-01)

Condition ; Grout Curtain None
Permeability Coef. K_1



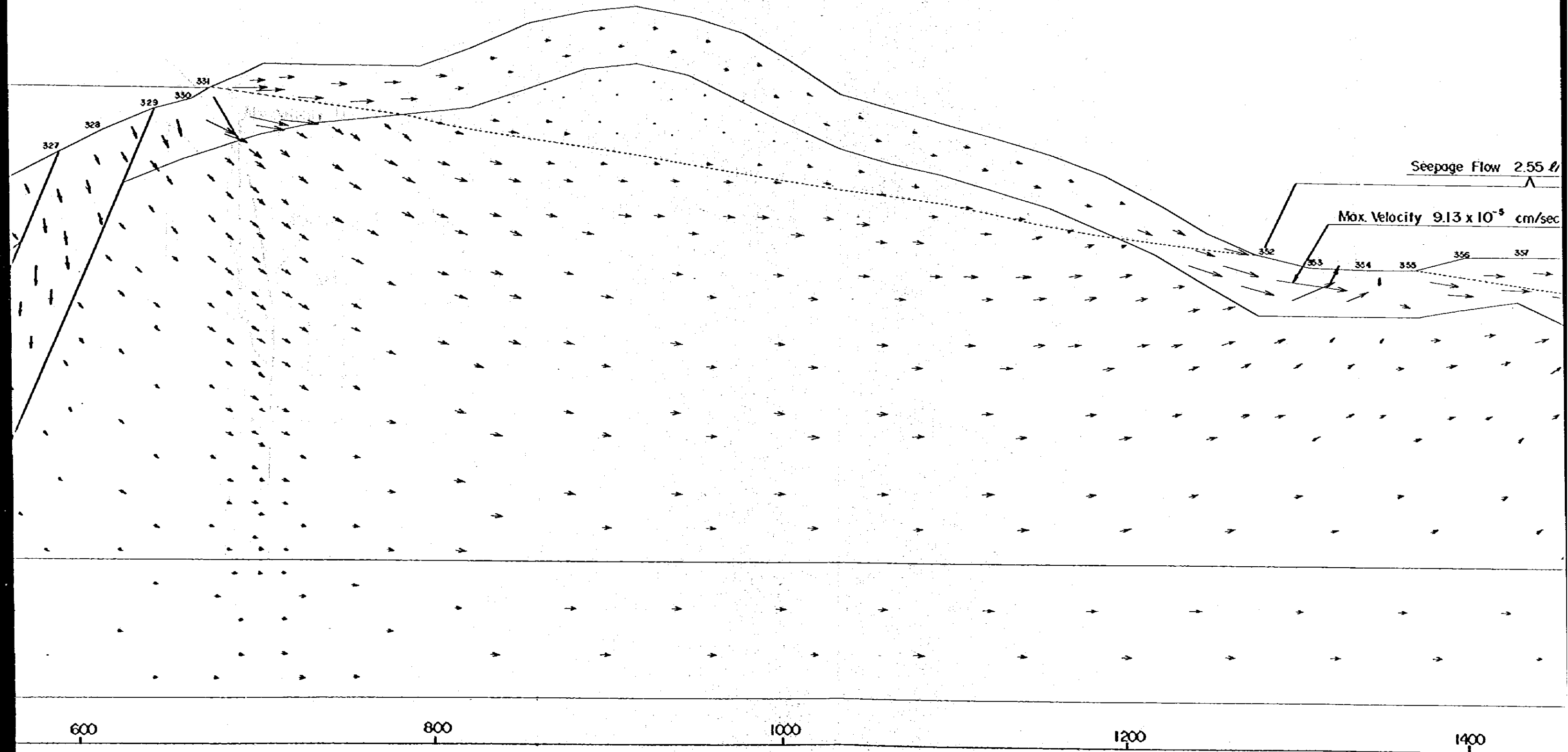
4-5-14 Seepage Flow Diagram (L-2-01)

Condition ; Grout Curtain None
Permeability Coef. K_i



Seepage Flow Diagram (L-2-01)

Condition ; Grout Curtain None
Permeability Coef. K_1

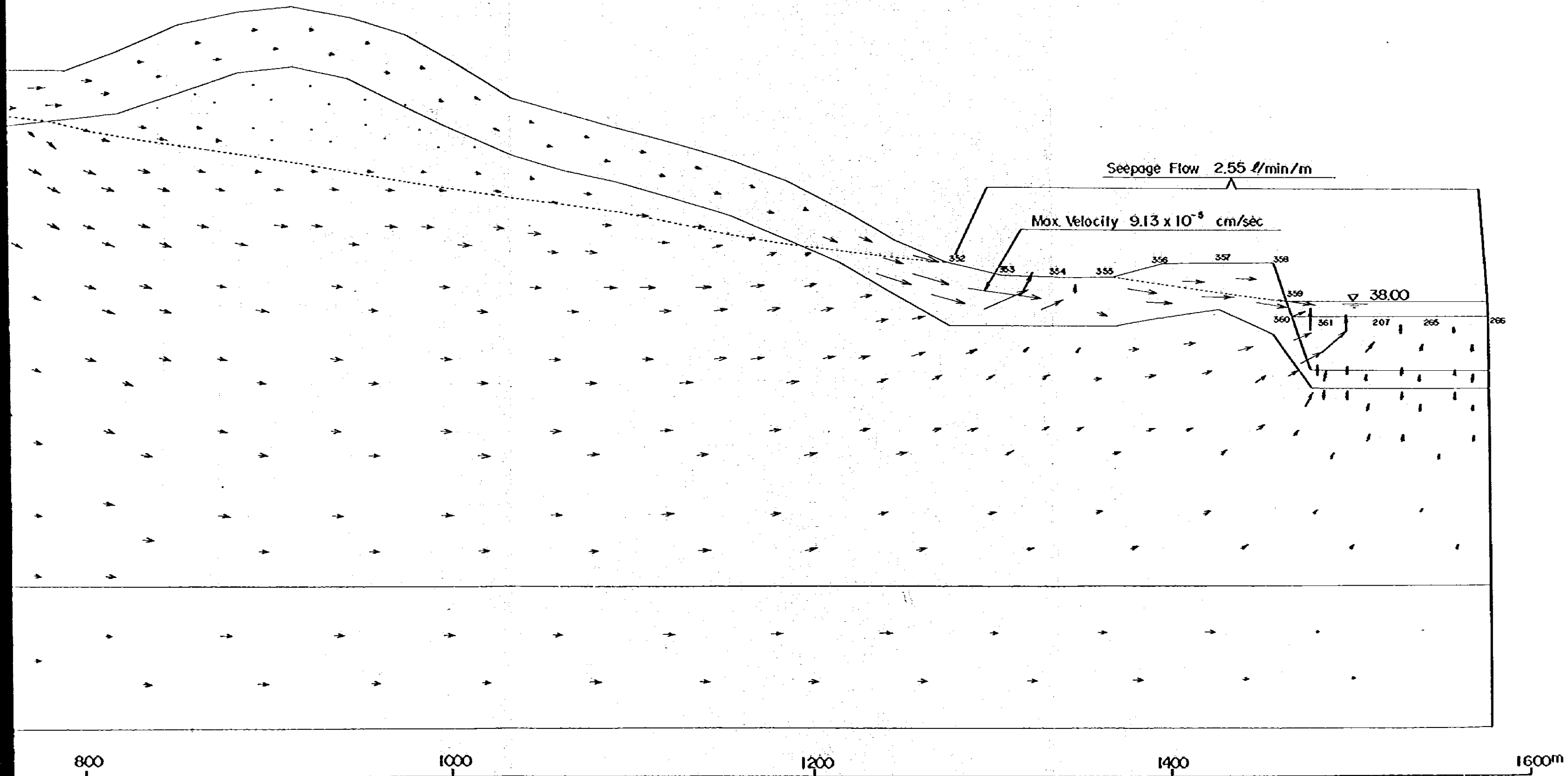


Seepage Flow 2.55 l/s

Max. Velocity 9.13×10^{-5} cm/sec

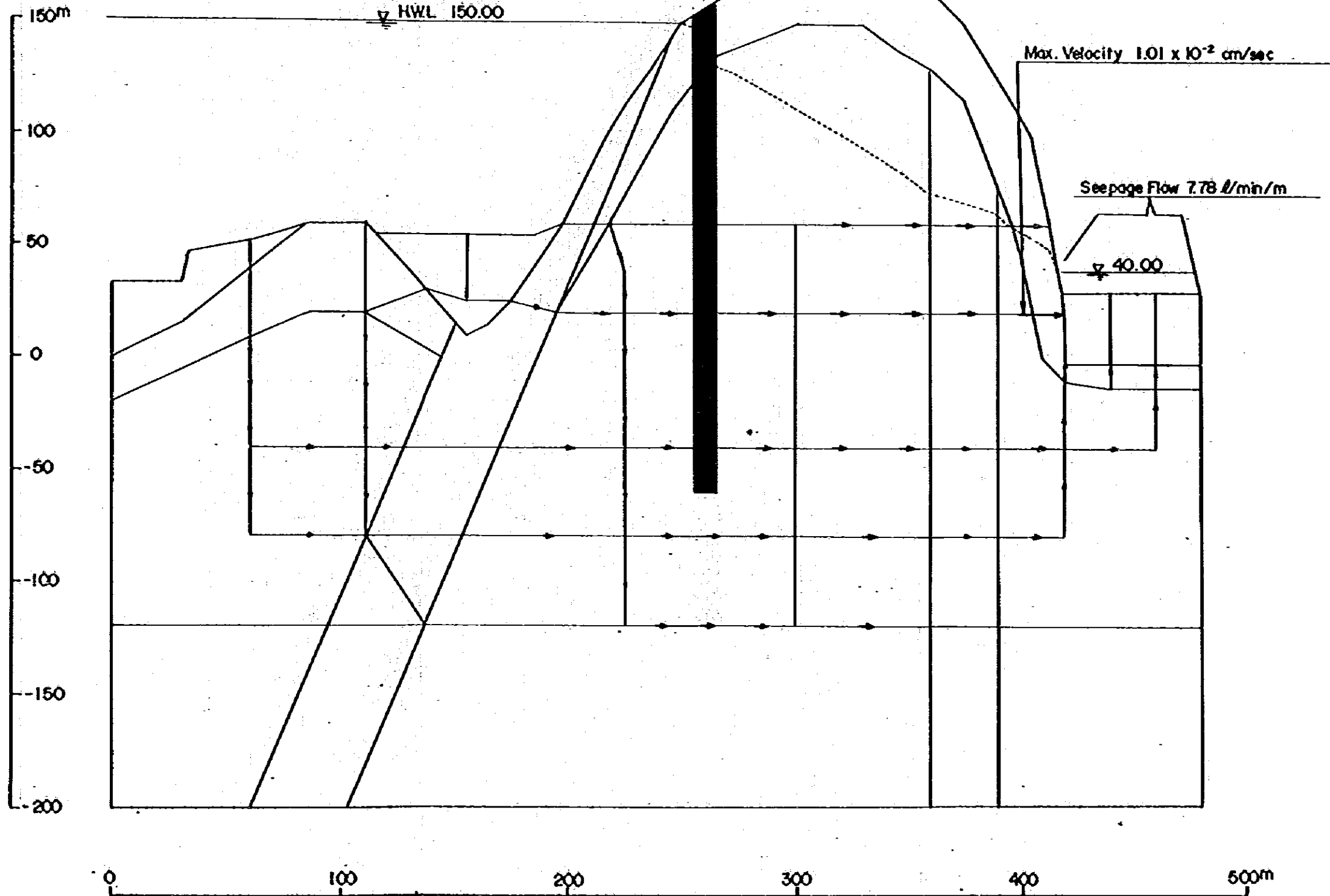
600 800 1000 1200 1400

)



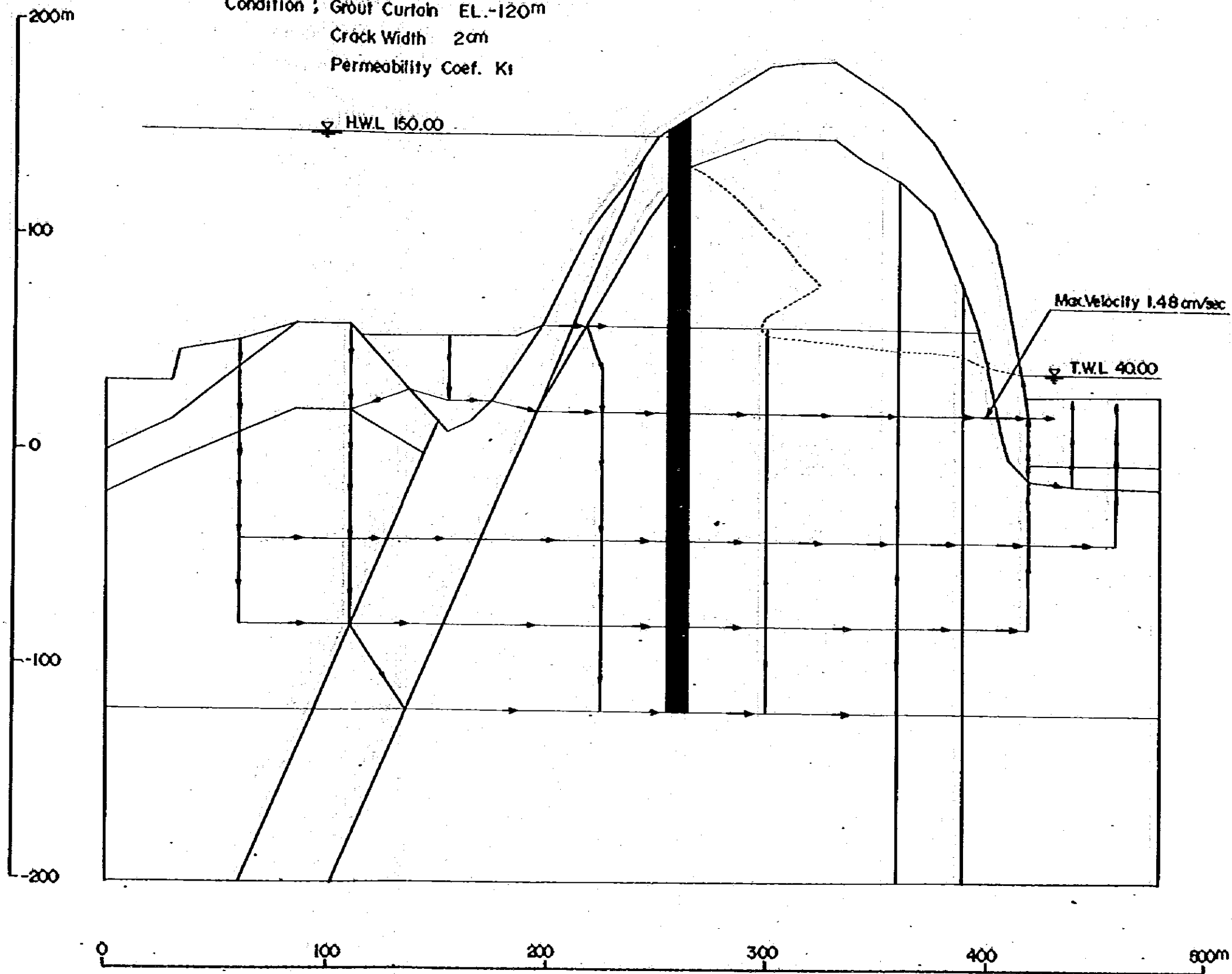
4-5-15 Seepage Flow Diagram along Solution Crack (R-I-AI-CI)

Condition ; Grout EL. -60m
Crack Width 2mm
Permeability Coef. K_1



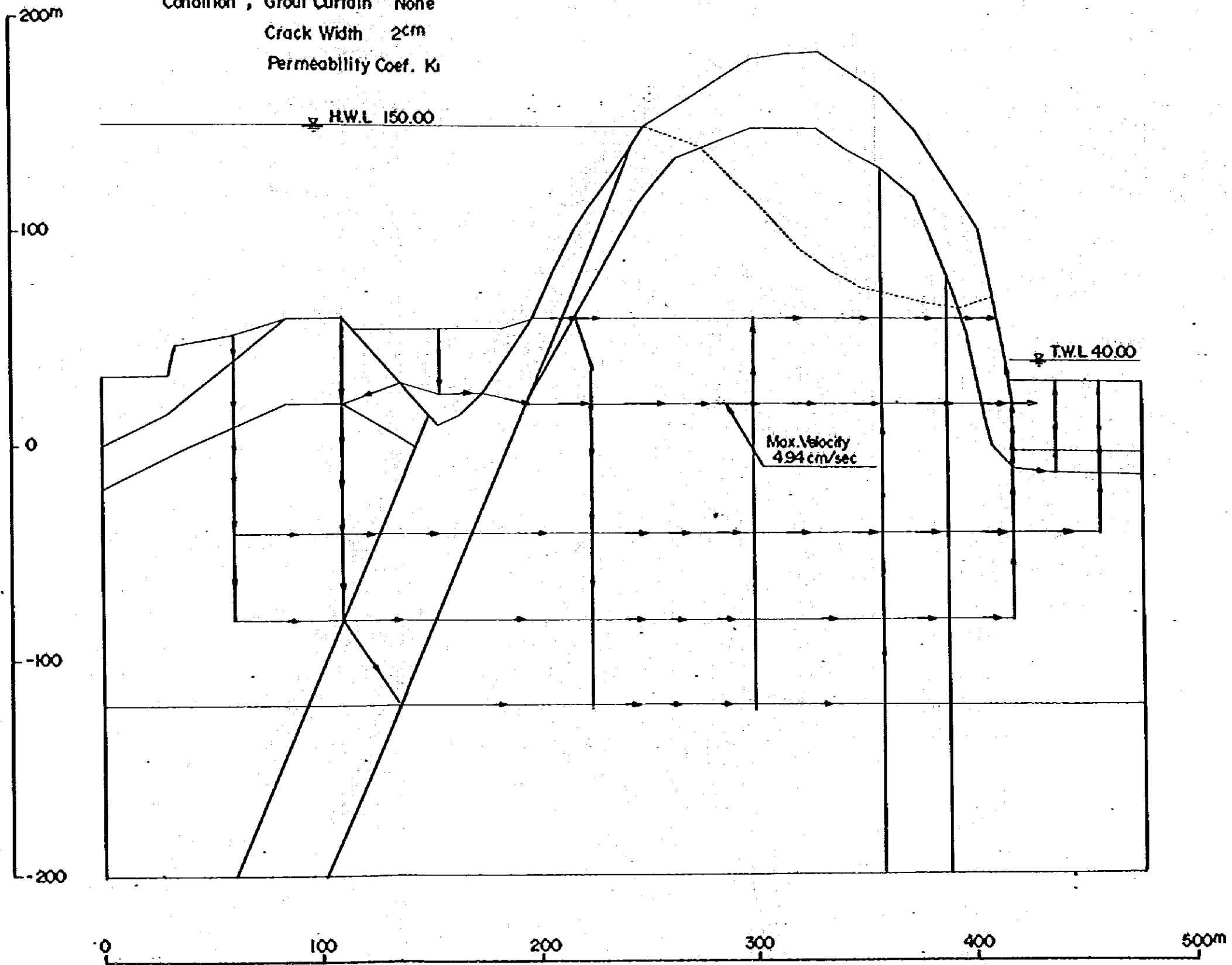
4-5-16 Seepage Flow Diagram along Solution Crack (R-1-B1-C2)

Condition ; Grout Curtain EL.-120m
Crack Width 2cm
Permeability Coef. K_1



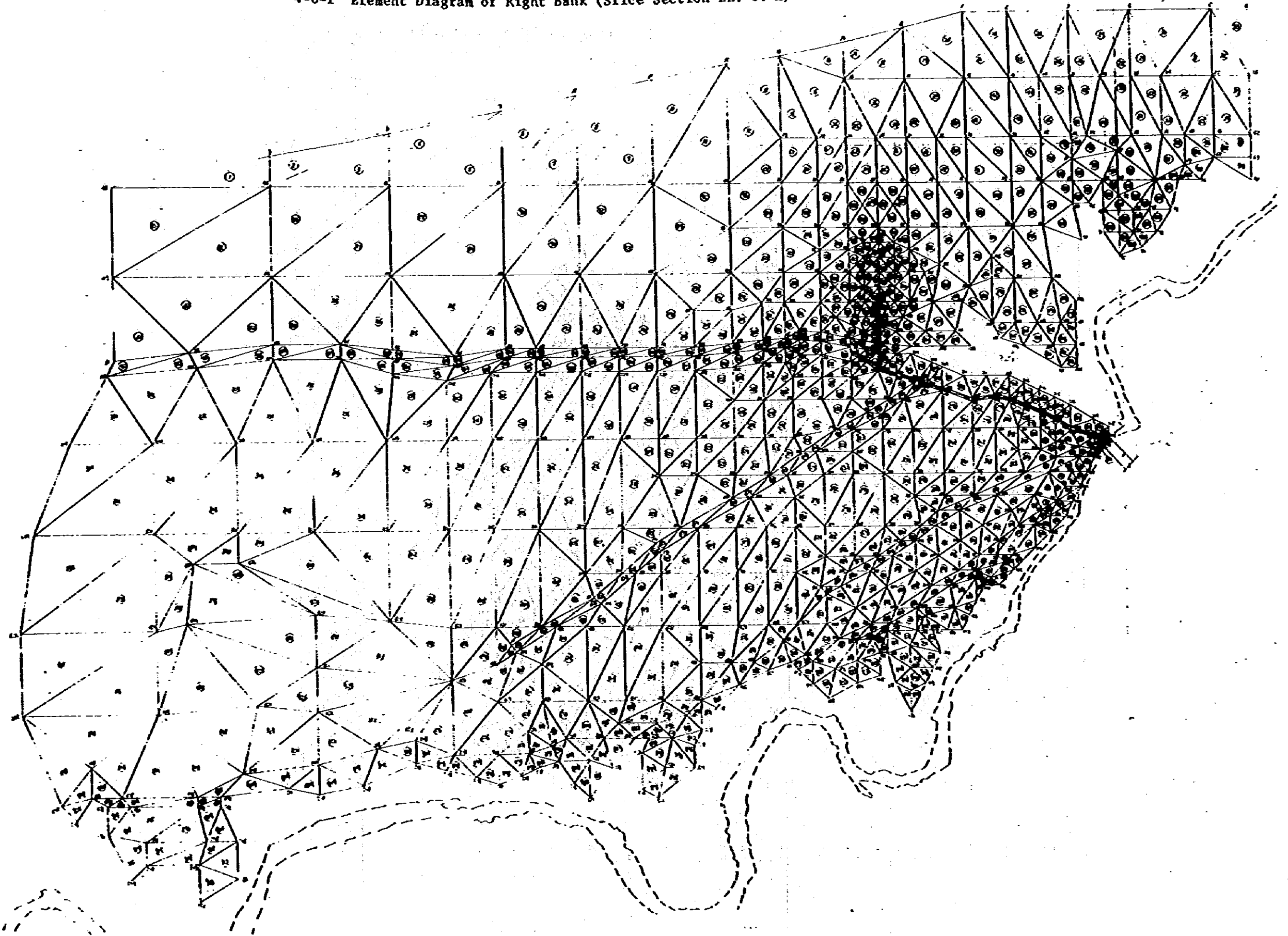
4-5-17 Seepage Flow Diagram along Solution Crack (R-1-01-C2)

Condition ; Grout Curtain None
Crack Width 2cm
Permeability Coef. K_i

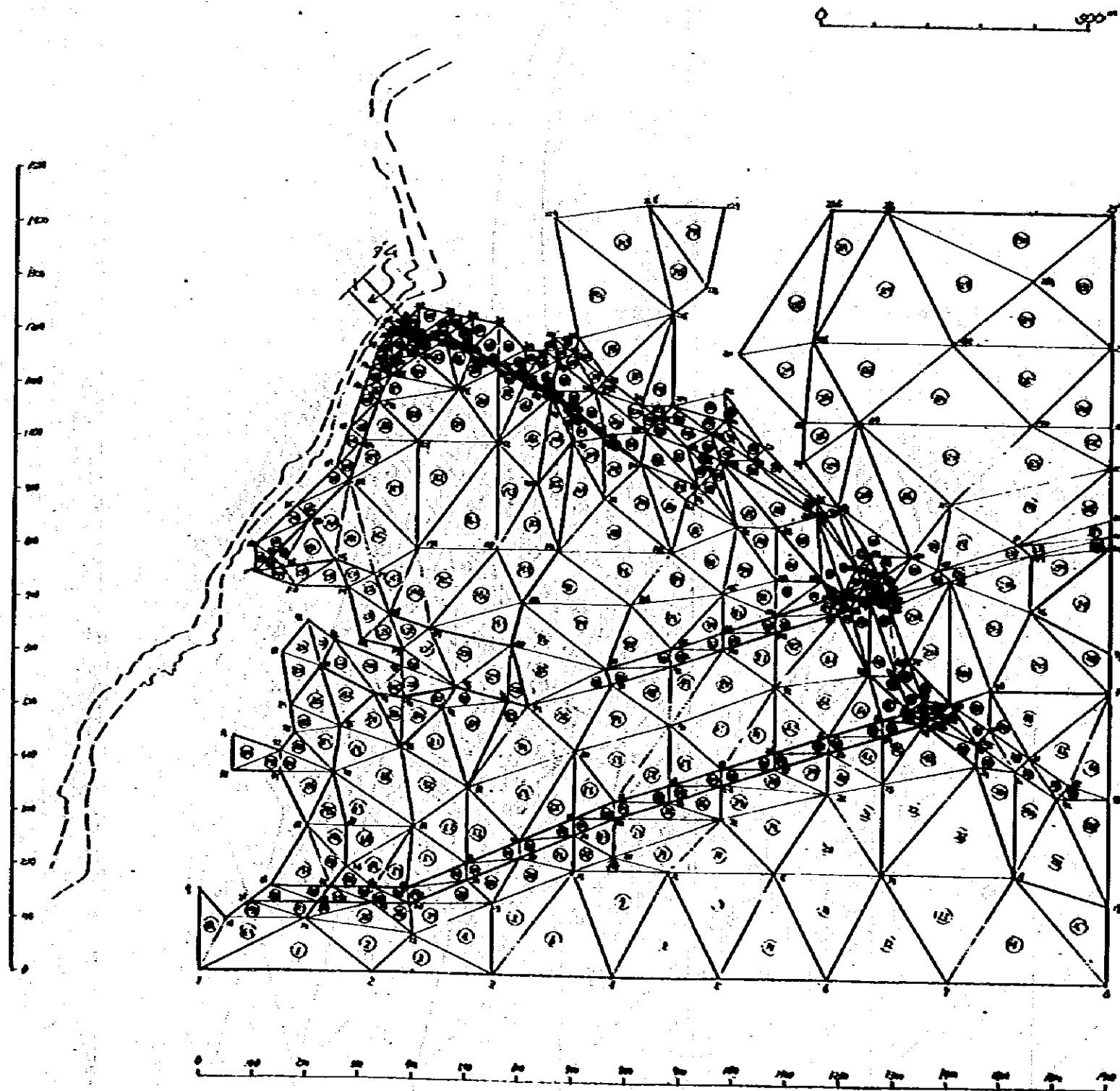


4-6-1 Element Diagram of Right Bank (Slice Section EL. 80 m)

0 500 m

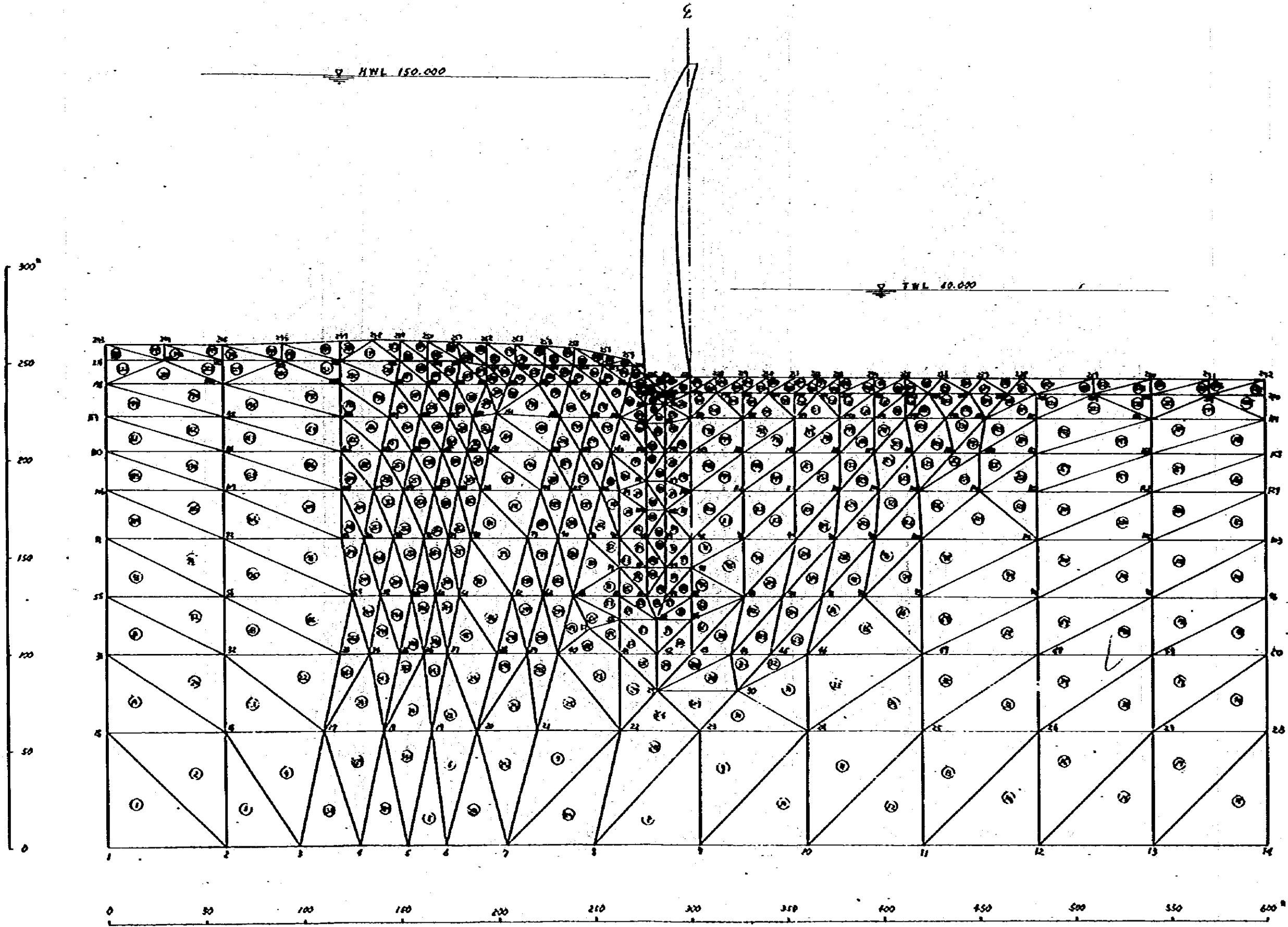


4-6-2 Element Diagram of Left Bank (Slice Section EL. 80 m)

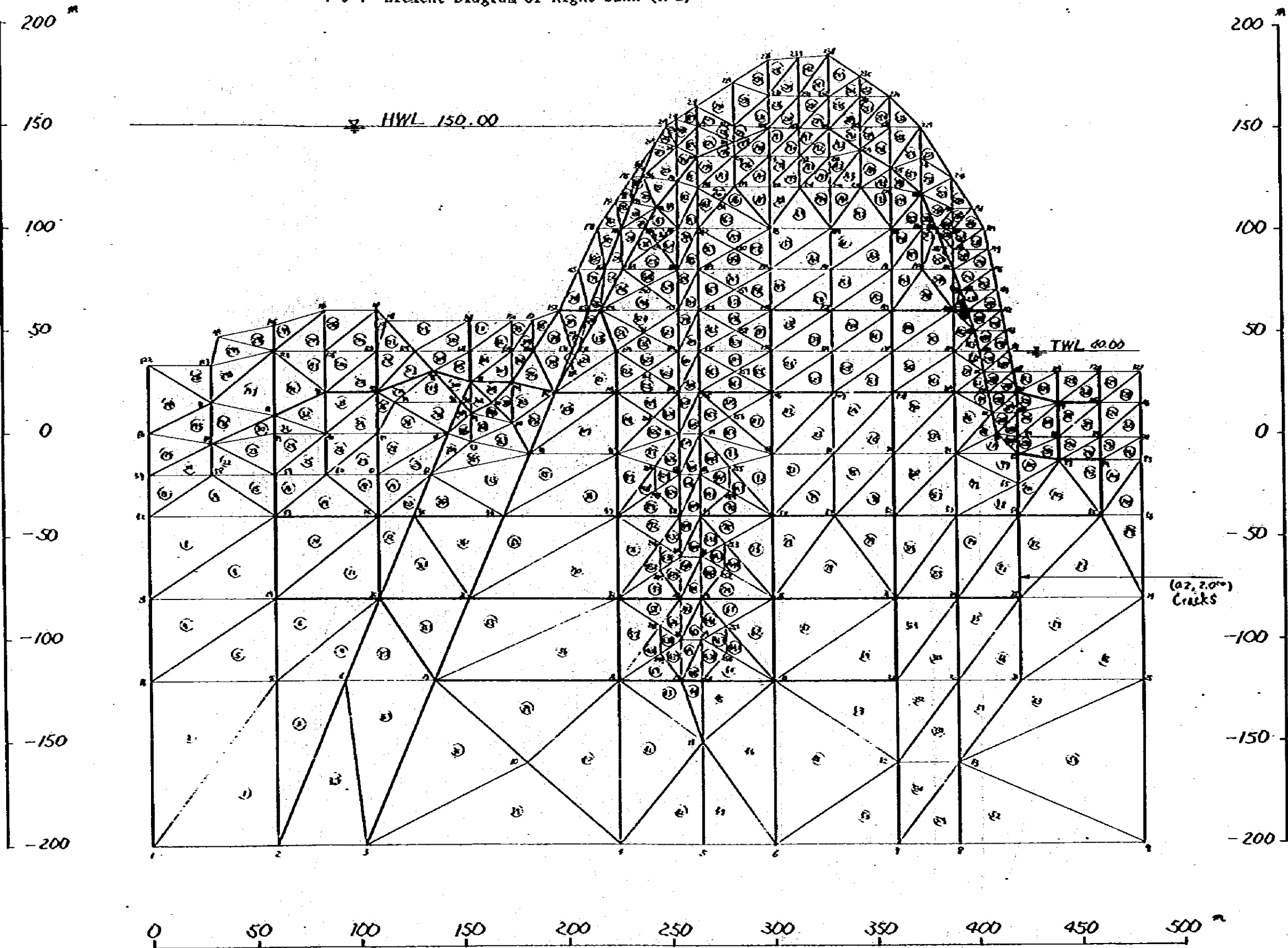


4-6-3 Element Diagram of Dam Foundation (D-1)

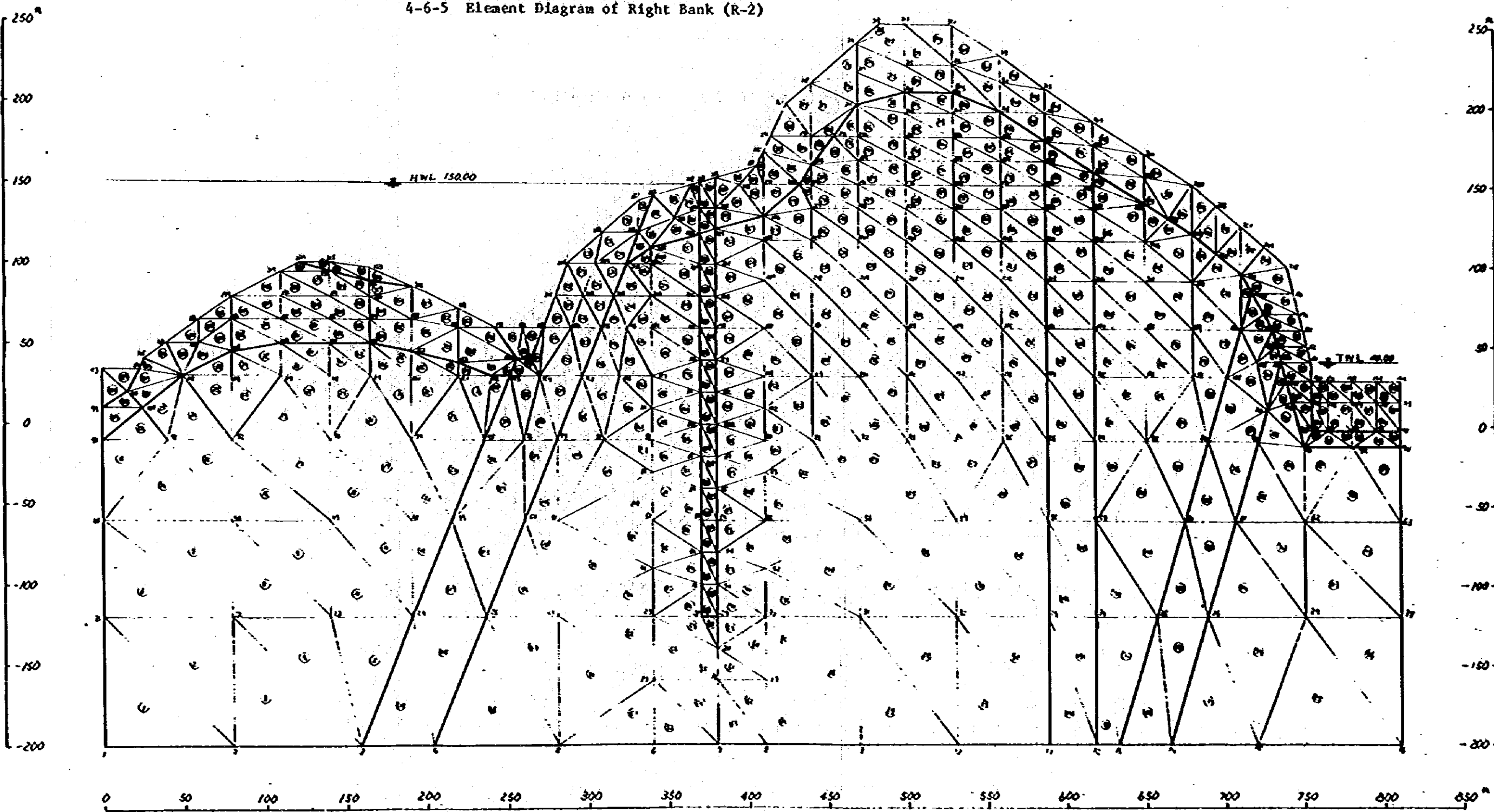
0 1000^m



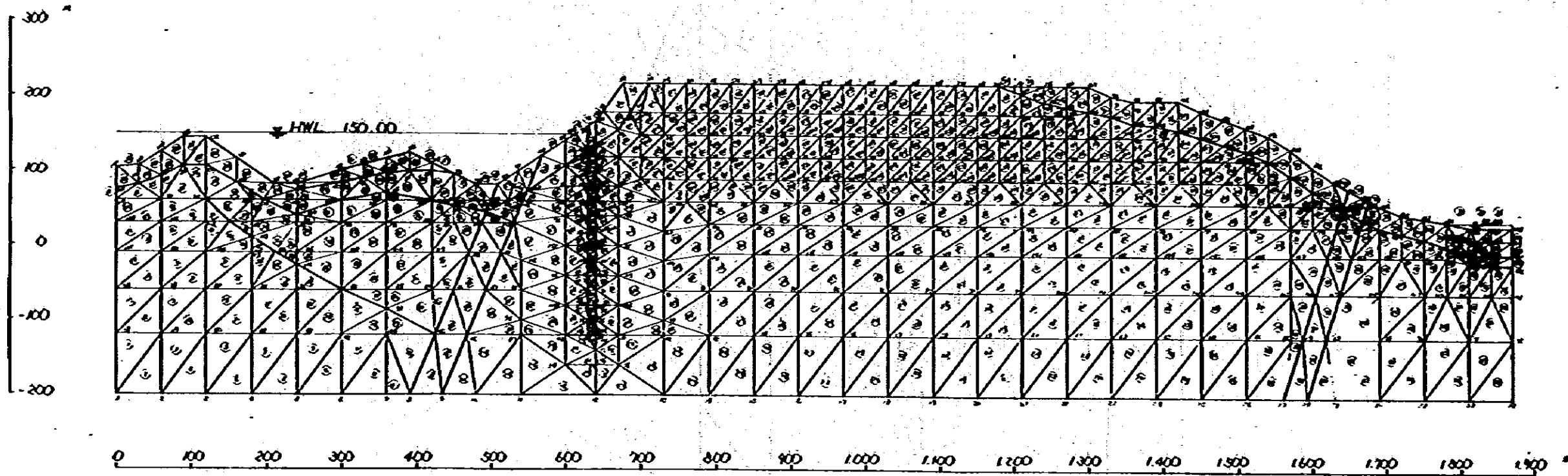
4-6-4 Element Diagram of Right Bank (R-1)



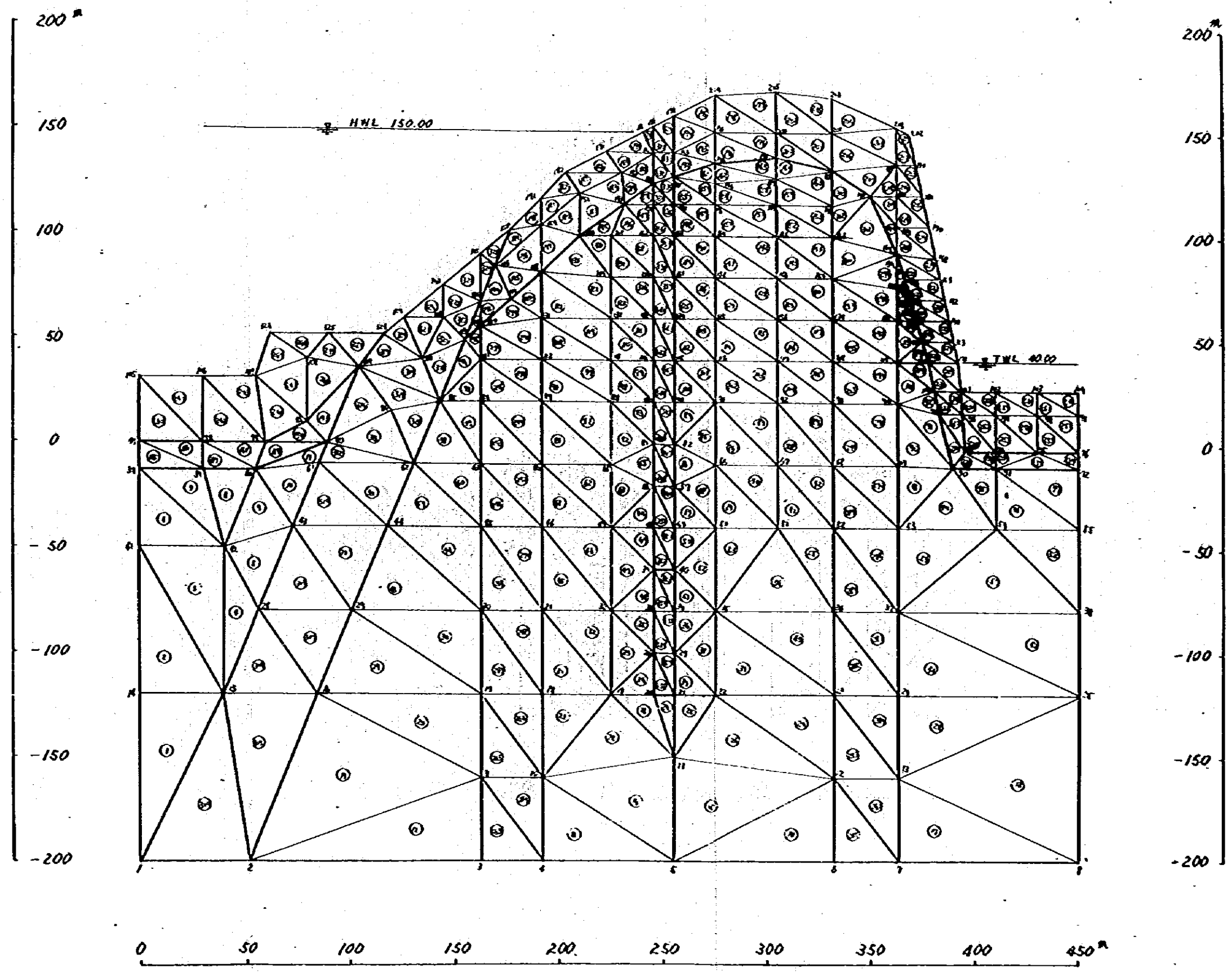
4-6-5 Element Diagram of Right Bank (R-2)



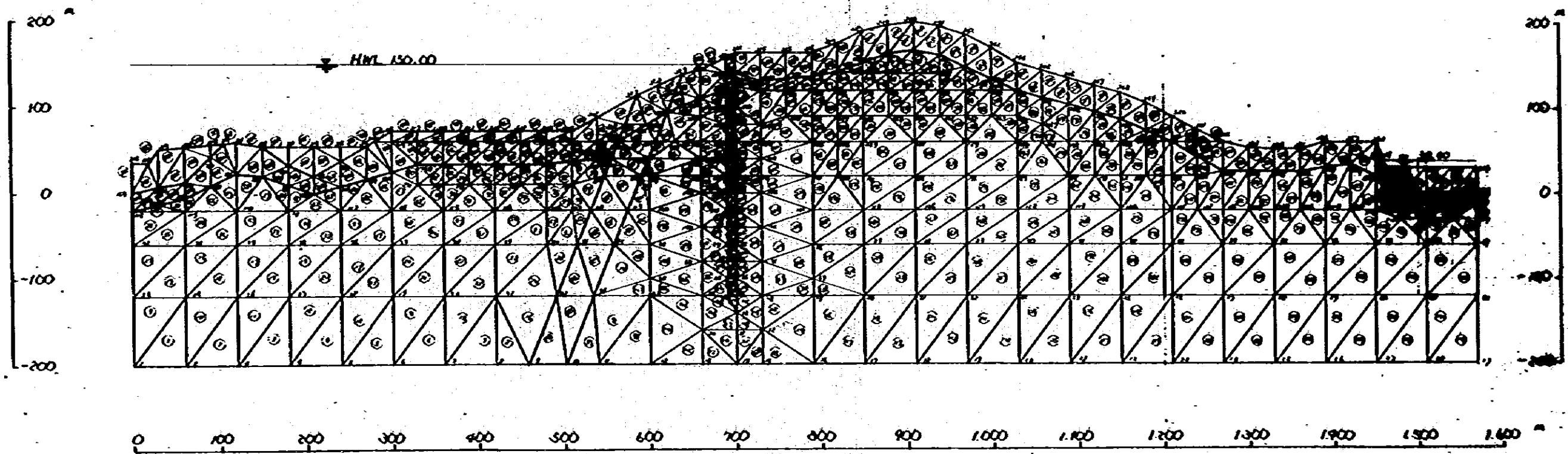
4-6-6 Element Diagram of Right Bank (R-3)



4-6-7 Element Diagram of Left Bank (L-1)



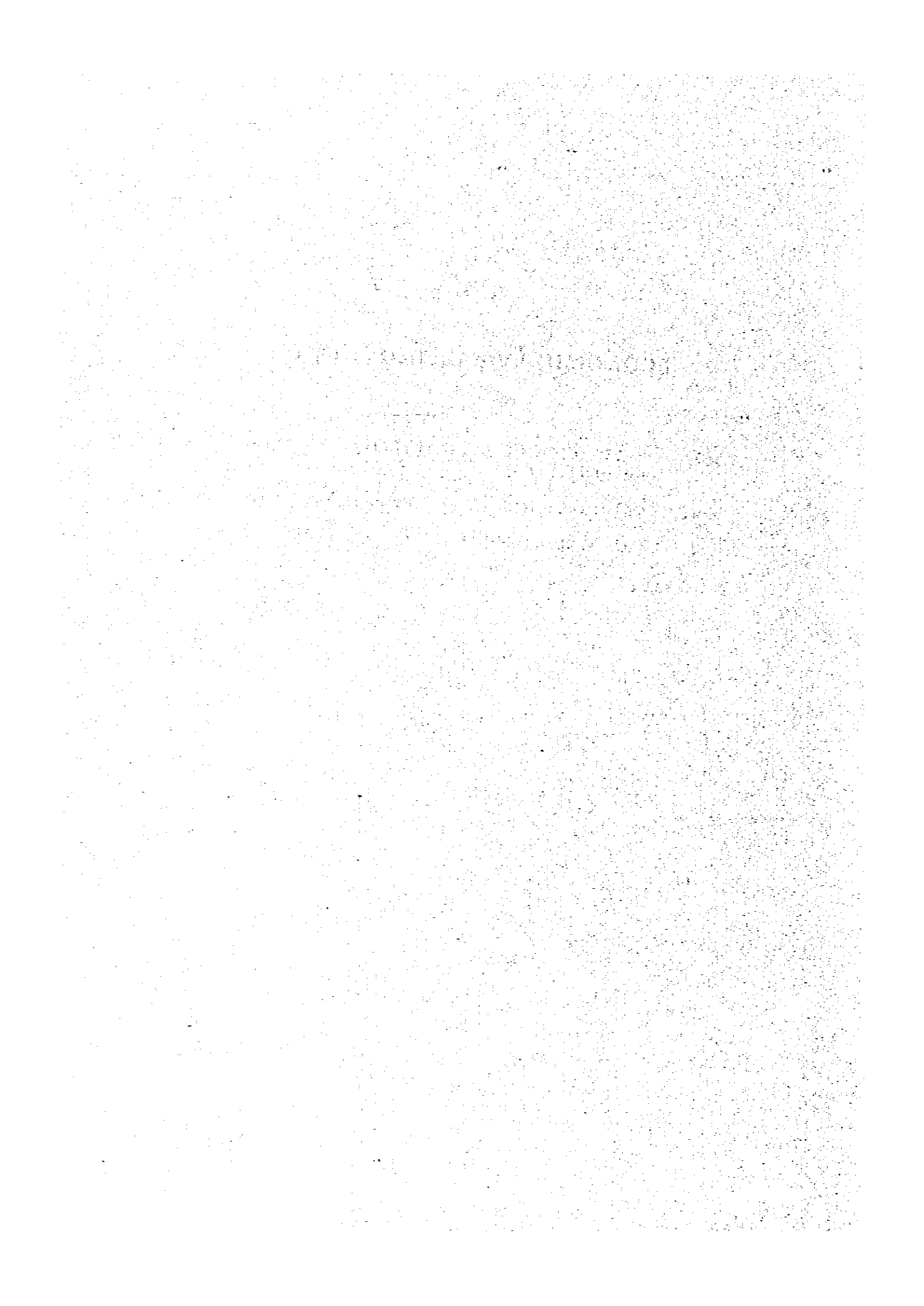
4-6-8 Element Diagram of Left Bank (L-2)



A-5

ECONOMIC EVALUATION DATA

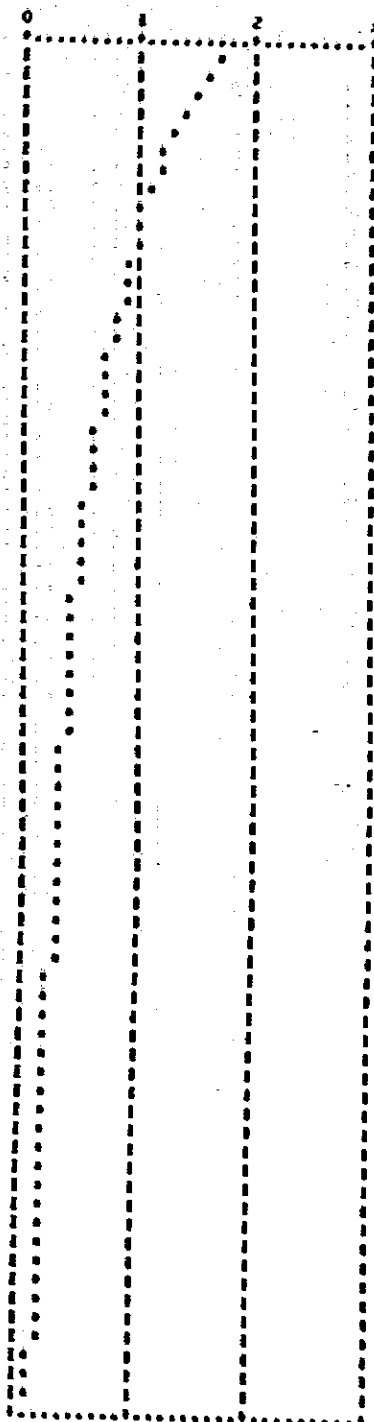
- 5-1 Estimation of Financial Internal Rate of Return (FIRR)
- 5-2 Calculation Sheet of Economic Cost Flow
- 5-3 Calculation Sheet of Economic Benefit Flow



5-1 Estimation of Financial Internal Rate of Return (FIRR)

DISCOUNT RATE (%)	HYDRO TOTAL INVEST (MIL. TL)	ALT TOTAL INVEST (MIL. TL)	BENEFIT - COST ANALYSIS			B/C RATIO
			COST (MIL. TL)	BENEFIT (MIL. TL)	B-C (MIL. TL)	
5.0	36415.58	0.0	30774.78	31610.03	20439.25	1.6778
5.5	36415.58	0.0	29598.44	46528.11	16929.27	1.5720
6.0	36415.58	0.0	28329.02	42102.17	13573.16	1.4758
6.5	36415.58	0.0	27554.02	38235.94	10681.92	1.3817
7.0	36415.58	0.0	26661.11	34844.16	8183.05	1.3069
7.5	36415.58	0.0	25839.33	31854.95	6015.62	1.2328
8.0	36415.58	0.0	25079.86	29210.70	4130.84	1.1647
8.5	36415.58	0.0	24374.66	26861.02	2486.36	1.1020
9.0	36415.58	0.0	23717.37	24765.59	1048.21	1.0442
9.5	36415.58	0.0	23222.39	23249.23	26.85	1.0012
10.0	36415.58	0.0	23102.54	22890.20	-212.34	0.9908
10.5	36415.58	0.0	22525.36	21205.93	-1319.42	0.9616
11.0	36415.58	0.0	21981.86	19888.43	-2293.43	0.8957
11.5	36415.58	0.0	21468.38	18316.50	-3151.88	0.8532
12.0	36415.58	0.0	20981.96	17072.61	-3909.36	0.8137
12.5	36415.58	0.0	20520.66	15941.71	-4578.95	0.7769
13.0	36415.58	0.0	20080.36	14910.77	-5169.59	0.7426
13.5	36415.58	0.0	19660.93	13969.66	-5692.27	0.7105
14.0	36415.58	0.0	19259.88	13105.41	-6154.47	0.6805
14.5	36415.58	0.0	18875.79	12312.71	-6563.07	0.6523
15.0	36415.58	0.0	18507.31	11583.30	-6924.01	0.6259
15.5	36415.58	0.0	18153.21	10910.63	-7242.58	0.6010
16.0	36415.58	0.0	17812.48	10289.20	-7523.28	0.5776
16.5	36415.58	0.0	17484.22	9714.15	-7770.07	0.5556
17.0	36415.58	0.0	17167.46	9180.84	-7986.61	0.5348
17.5	36415.58	0.0	16861.49	8685.53	-8175.96	0.5151
18.0	36415.58	0.0	16565.68	8224.83	-8340.85	0.4965
18.5	36415.58	0.0	16279.39	7795.44	-8483.74	0.4789
19.0	36415.58	0.0	16002.11	7395.39	-8606.72	0.4622
19.5	36415.58	0.0	15733.25	7021.39	-8711.85	0.4463
20.0	36415.58	0.0	15472.37	6671.58	-8800.79	0.4312
20.5	36415.58	0.0	15219.10	6344.00	-8875.10	0.4168
21.0	36415.58	0.0	14973.03	6036.49	-8936.14	0.4032
21.5	36415.58	0.0	14733.86	5748.70	-8985.17	0.3902
22.0	36415.58	0.0	14501.15	5477.02	-9023.33	0.3778
22.5	36415.58	0.0	14274.70	5223.08	-9051.61	0.3659
23.0	36415.58	0.0	14054.17	4983.26	-9070.91	0.3546
23.5	36415.58	0.0	13839.37	4757.24	-9082.13	0.3437
24.0	36415.58	0.0	13630.02	4544.07	-9085.95	0.3334
24.5	36415.58	0.0	13425.91	4342.90	-9083.01	0.3235
25.0	36415.58	0.0	13226.82	4152.79	-9074.04	0.3140
25.5	36415.58	0.0	13032.56	3973.10	-9059.46	0.3049
26.0	36415.58	0.0	12842.93	3803.01	-9039.93	0.2961
26.5	36415.58	0.0	12657.79	3641.95	-9015.84	0.2877
27.0	36415.58	0.0	12477.01	3489.35	-8987.66	0.2797
27.5	36415.58	0.0	12300.34	3344.63	-8955.71	0.2719
28.0	36415.58	0.0	12127.71	3207.31	-8920.41	0.2645
28.5	36415.58	0.0	11959.96	3076.92	-8882.04	0.2573
29.0	36415.58	0.0	11793.44	2953.05	-8840.89	0.2504
29.5	36415.58	0.0	11632.61	2835.31	-8797.30	0.2437
30.0	36415.58	0.0	11476.75	2723.33	-8751.45	0.2373
30.5	36415.58	0.0	11320.28	2616.71	-8703.57	0.2312
31.0	36415.58	0.0	11169.13	2515.20	-8653.93	0.2252
31.5	36415.58	0.0	11021.16	2418.50	-8602.66	0.2194
32.0	36415.58	0.0	10876.30	2326.32	-8549.98	0.2139
32.5	36415.58	0.0	10734.46	2238.43	-8495.03	0.2085
33.0	36415.58	0.0	10595.53	2154.56	-8438.97	0.2033
33.5	36415.58	0.0	10459.43	2074.50	-8381.96	0.1983
34.0	36415.58	0.0	10326.10	1998.06	-8324.04	0.1935
34.5	36415.58	0.0	10195.43	1924.93	-8270.44	0.1888
35.0	36415.58	0.0	10067.39	1855.18	-8212.21	0.1843
35.5	36415.58	0.0	9941.85	1788.41	-8153.44	0.1799
36.0	36415.58	0.0	9818.78	1724.56	-8094.24	0.1756
36.5	36415.58	0.0	9698.10	1663.41	-8034.68	0.1715
37.0	36415.58	0.0	9579.76	1604.93	-7974.66	0.1675
37.5	36415.58	0.0	9463.72	1548.85	-7914.23	0.1637
38.0	36415.58	0.0	9349.82	1495.17	-7854.65	0.1599
38.5	36415.58	0.0	9238.13	1443.71	-7794.42	0.1563
39.0	36415.58	0.0	9128.58	1394.37	-7734.16	0.1527
39.5	36415.58	0.0	9020.96	1347.05	-7673.89	0.1493
40.0	36415.58	0.0	8915.36	1301.65	-7613.31	0.1460
40.5	36415.58	0.0	8811.75	1258.09	-7553.68	0.1428

B/C - DISCOUNT RATE
B/C (%)



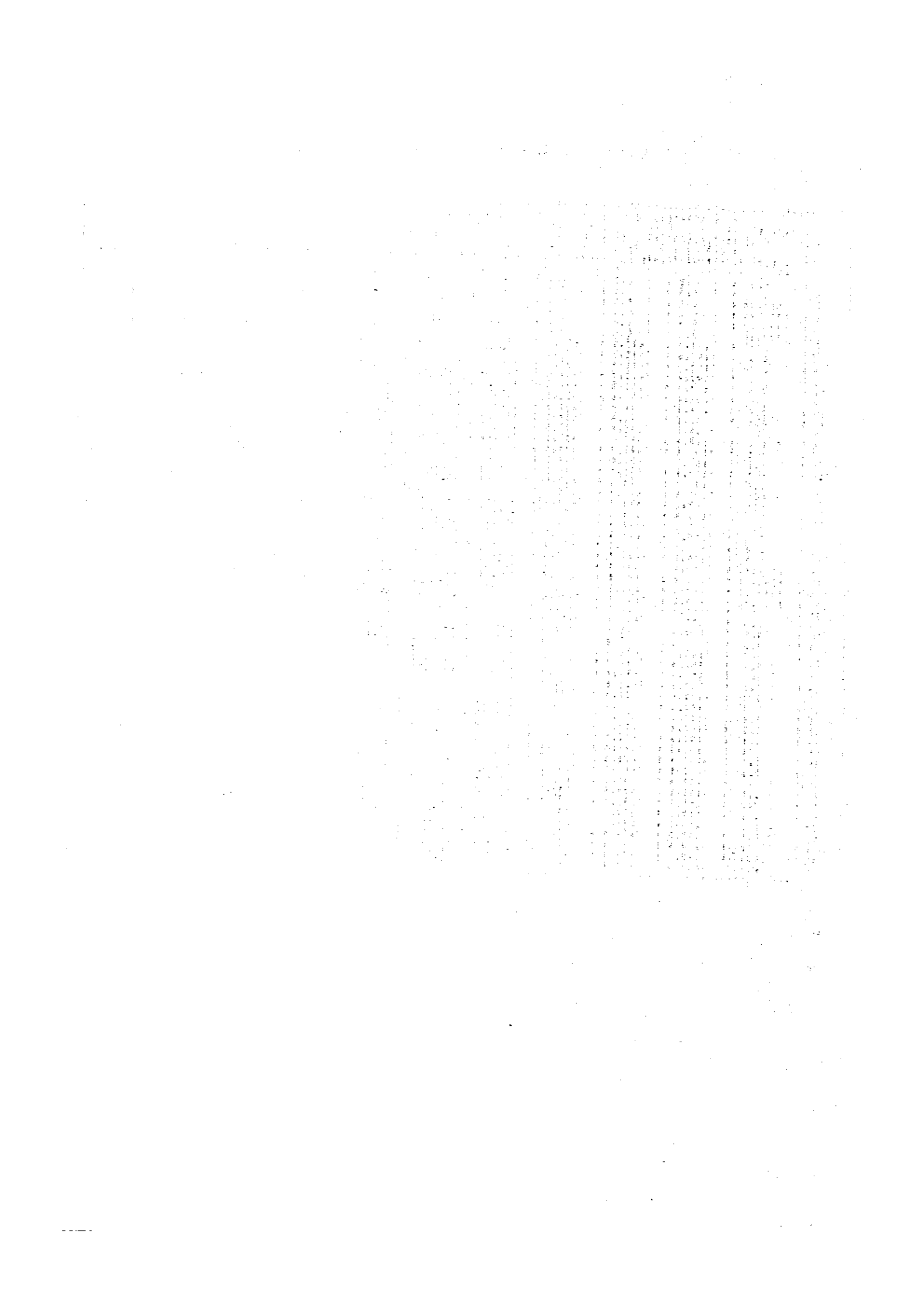
--- I.C.R. (HYDROPOWER)

5-2 Calculation Sheet of Economic Cost Flow

YEAR	INVESTMENT ENR. TL	GENERATING END			GENERATING OCM COST			TRANS- MISSION OCM COST	SUB- STATION OCM COST	ANNUAL COST	COST FLOW
		INSTALLATION CAPACITY	PRODUCTION	SALABLE ENERGY	FIXED COST	VARIABLE COST	TOTAL COST				
		(MW)	ENR. KW	ENR. KW	ENR. TL	ENR. TL	ENR. TL				
1	1384.90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1384.90	
2	1787.70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1787.70	
3	3249.20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3249.20	
4	5788.70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5788.70	
5	5787.80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5787.80	
6	2692.10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2692.10	
7	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
8	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
9	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
10	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
11	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
12	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
13	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
14	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
15	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
16	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
17	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
18	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
19	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
20	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
21	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
22	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
23	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
24	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
25	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
26	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
27	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
28	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
29	819.50	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
30	3019.40	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
31	2856.50	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
32	469.70	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
33	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
34	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
35	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
36	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
37	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
38	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
39	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
40	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
41	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
42	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
43	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
44	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
45	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
46	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
47	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
48	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
49	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
50	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
51	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
52	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
53	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
54	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
55	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
56	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
57	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
58	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
59	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	
60	0.0	200.0	659.9	631.5	238.50	0.0	298.50	3.90	0.0	302.40	

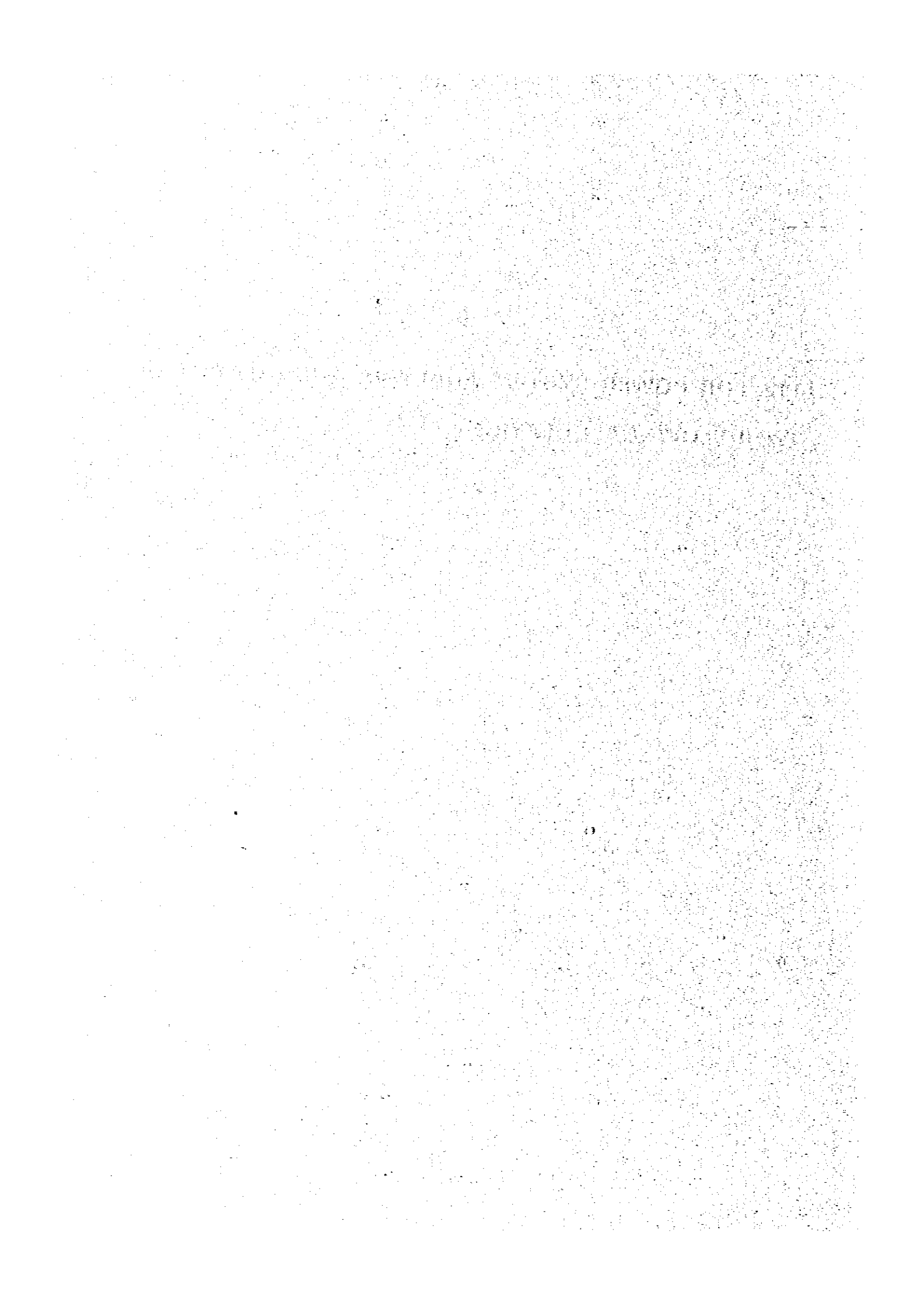
5-3 Calculation Sheet of Economic Benefit Flow

YEAR	INVEST- MENT (MIL. FL)	GENERATING END		SALABLE ENERGY (MIL. KWH)	GENERATING O&M COST			TRANS- MISSION O&M COST (MIL. FL)	SUB- STATION O&M COST (MIL. FL)	ANNUAL COST (MIL. FL)	COST FLOW
		INSTALLED CAPACITY (MW)	PRODUC- TION (MIL. KWH)		FIXED COST (MIL. FL)	VARIABLE COST (MIL. FL)	TOTAL COST (MIL. FL)				
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	1588.30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	6353.20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1588.30
5	6353.20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6353.20
6	1588.30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6353.20
7	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	0.0	1588.30
8	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
9	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
10	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
11	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
12	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
13	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
14	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
15	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
16	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
17	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
18	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
19	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
20	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
21	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
22	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
23	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
24	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
25	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
26	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
27	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
28	1588.30	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
29	6353.20	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	6353.20
30	6353.20	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	6353.20
31	1588.30	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	1588.30
32	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
33	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
34	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
35	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
36	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
37	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
38	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
39	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
40	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
41	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
42	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
43	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
44	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
45	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
46	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
47	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
48	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
49	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
50	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
51	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
52	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
53	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
54	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
55	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51
56	0.0	190.6	671.8	631.5	397.10	4971.52	5395.51	0.0	0.0	5395.51	5395.51



A-6

**DATA FOR POWER SYSTEM ANALYSIS AND OUT-PUT OF
POWER FLOW CALCULATION**



* BRANCH DATA (POSITIVE-SEQUENCE) *

CODE	FROM	TO	R	X	Y/Z	C C T OLD	NON CAPACITY	ID.	T. A. P REAL	IMAG. F/T
1	1	2	J-2100	2.7200	31.7100	0	0.0	0.0	0.0	0.0
2	2	3	J-3300	6.6300	10.6300	0	0.0	0.0	0.0	0.0
3	3	4	J-1200	1.5600	107.5200	0	0.0	0.0	0.0	0.0
4	4	5	J-1300	1.3400	15.6000	0	0.0	0.0	0.0	0.0
5	5	6	J-1400	1.3300	131.2400	0	0.0	0.0	0.0	0.0
6	6	7	J-3300	6.4000	6.9000	0	0.0	0.0	0.0	0.0
7	7	8	J-3300	6.3700	6.2500	0	0.0	0.0	0.0	0.0
8	8	9	J-3300	6.4600	7.8200	0	0.0	0.0	0.0	0.0
9	9	10	J-3300	6.4600	21.1000	0	0.0	0.0	0.0	0.0
10	10	11	J-3300	6.8600	42.1700	0	0.0	0.0	0.0	0.0
11	11	12	J-1500	1.5600	18.2000	0	0.0	0.0	0.0	0.0
12	12	13	J-1500	1.5600	106.9900	0	0.0	0.0	0.0	0.0
13	13	14	J-2100	2.2100	37.5000	0	0.0	0.0	0.0	0.0
14	14	15	J-2100	2.8500	74.2600	0	0.0	0.0	0.0	0.0
15	15	16	J-1800	1.8700	22.4000	0	0.0	0.0	0.0	0.0
16	16	17	J-3200	3.2200	10.5400	0	0.0	0.0	0.0	0.0
17	17	18	J-4000	4.0000	46.8000	0	0.0	0.0	0.0	0.0
18	18	19	J-2100	2.1300	25.5700	0	0.0	0.0	0.0	0.0
19	19	20	J-2500	3.2500	38.0000	0	0.0	0.0	0.0	0.0
20	20	21	J-2500	6.2400	72.8000	0	0.0	0.0	0.0	0.0
21	21	22	J-2500	3.2500	31.1900	0	0.0	0.0	0.0	0.0
22	22	23	J-2700	2.6800	37.7000	0	0.0	0.0	0.0	0.0
23	23	24	J-2700	2.6800	31.2000	0	0.0	0.0	0.0	0.0
24	24	25	J-1200	1.1700	17.7000	0	0.0	0.0	0.0	0.0
25	25	26	J-3300	3.6800	42.9000	0	0.0	0.0	0.0	0.0
26	26	27	J-1300	1.5600	22.8700	0	0.0	0.0	0.0	0.0
27	27	28	J-0900	0.9400	10.9200	0	0.0	0.0	0.0	0.0
28	28	29	J-1200	1.1700	17.7000	0	0.0	0.0	0.0	0.0
29	29	30	J-1300	1.3400	15.6000	0	0.0	0.0	0.0	0.0
30	30	31	J-1100	1.8300	21.3100	0	0.0	0.0	0.0	0.0
31	31	32	J-1100	1.1100	12.9500	0	0.0	0.0	0.0	0.0
32	32	33	J-6400	6.2200	75.4000	0	0.0	0.0	0.0	0.0
33	33	34	J-6000	6.5000	78.0000	0	0.0	0.0	0.0	0.0
34	34	35	J-6000	4.7200	56.6700	0	0.0	0.0	0.0	0.0
35	35	36	J-3200	3.2600	37.9000	0	0.0	0.0	0.0	0.0
36	36	37	J-0900	4.4200	5.0000	0	0.0	0.0	0.0	0.0
37	37	38	J-5300	6.6200	79.2000	0	0.0	0.0	0.0	0.0
38	38	39	J-2200	2.2300	25.9900	0	0.0	0.0	0.0	0.0
39	39	40	J-1300	1.3400	15.6000	0	0.0	0.0	0.0	0.0
40	40	41	J-3100	2.6200	137.5000	0	0.0	0.0	0.0	0.0
41	41	42	J-0500	6.7500	68.7500	0	0.0	0.0	0.0	0.0
42	42	43	J-4400	6.4400	20.8000	0	0.0	0.0	0.0	0.0
43	43	44	J-0500	6.8200	15.5900	0	0.0	0.0	0.0	0.0
44	44	45	J-0900	4.8900	10.3900	0	0.0	0.0	0.0	0.0
45	45	46	J-0500	6.5800	6.4900	0	0.0	0.0	0.0	0.0
46	46	47	J-3100	3.1200	36.4000	0	0.0	0.0	0.0	0.0
47	47	48	J-1700	1.7600	20.8000	0	0.0	0.0	0.0	0.0
48	48	49	J-2700	3.6600	63.6000	0	0.0	0.0	0.0	0.0
49	49	50	J-1900	4.0100	23.4200	0	0.0	0.0	0.0	0.0
50	50	51	J-2100	6.2100	9.8800	0	0.0	0.0	0.0	0.0

* BRANCH DATA (POSITIVE-SEQUENCE) *

CODE	FROM	TO	R	X	Y/2	OLD CAPACITY	IO.	REAL	IMAG.	F/Y
56	6	55	J-145J	1.8400	125.0200	0	0	0.0	0.0	
57	56	53	J-270J	2.7900	32.4900	0	0	0.0	0.0	
58	12	75	J-343J	5.1500	87.5000	0	0	0.0	0.0	
59	57	56	J-773J	7.3600	85.8000	0	0	0.0	0.0	
60	60	61	J-684J	4.9100	57.2000	0	0	0.0	0.0	
61	61	58	J-262J	2.4500	28.6000	0	0	0.0	0.0	
62	58	59	J-293J	2.0100	23.3900	0	0	0.0	0.0	
63	13	62	J-293J	2.9150	152.2000	0	0	0.0	0.0	
64	63	58	J-393J	3.0000	157.4000	0	0	0.0	0.0	
65	63	68	J-393J	3.0800	35.8700	0	0	0.0	0.0	
66	68	58	J-373J	3.7700	43.9000	0	0	0.0	0.0	
67	58	72	J-335J	6.8900	41.5800	0	0	0.0	0.0	
68	13	68	J-503J	7.3600	125.0000	0	0	0.0	0.0	
69	12	64	J-333J	4.2300	71.8000	0	0	0.0	0.0	
70	65	68	J-333J	4.2300	71.8900	0	0	0.0	0.0	
71	16	60	J-423J	5.5200	93.7500	0	0	0.0	0.0	
72	67	68	J-423J	5.5200	97.7500	0	0	0.0	0.0	
73	68	72	J-293J	3.8600	65.6300	0	0	0.0	0.0	
74	28	69	J-893J	9.0800	103.7800	0	0	0.0	0.0	
75	70	71	J-243J	2.9800	50.6400	0	0	0.0	0.0	
76	71	72	J-213J	2.6800	45.6300	0	0	0.0	0.0	
77	72	73	J-113J	1.1200	26.0000	0	0	0.0	0.0	
78	73	74	J-133J	1.6700	78.0000	0	0	0.0	0.0	
79	27	28	J-0	-2.0600	0.0	0	0	0.0	0.0	
C-28	55	56	J-0	-1.1800	0.0	0	0	0.0	0.0	
C-55	75	56	J-0	-2.4200	0.0	0	0	0.0	0.0	
C-54	75	56	J-0	-2.4300	0.0	0	0	0.0	0.0	
C-57	56	57	J-0	-2.4300	0.0	0	0	0.0	0.0	
C-60	56	60	J-0	-1.2100	0.0	0	0	0.0	0.0	
C-62	62	63	J-0	-4.3700	0.0	0	0	0.0	0.0	
C-63	64	65	J-0	-5.3300	0.0	0	0	0.0	0.0	
C-66	66	67	J-0	-2.9800	0.0	0	0	0.0	0.0	
C-70	69	70	J-0	3.7700	43.9300	0	0	0.0	0.0	
79	70	68	J-373J	3.7700	43.9300	0	0	0.0	0.0	
R4	4	EARTH	J-0	-50.0000	0.0	0	0	0.0	0.0	
R5	5	EARTH	J-0	-50.0000	0.0	0	0	0.0	0.0	
RT	7	EARTH	J-0	-25.0000	0.0	0	0	0.0	0.0	
R9	9	EARTH	J-0	-25.0000	0.0	0	0	0.0	0.0	
R10	10	EARTH	J-0	-25.0000	0.0	0	0	0.0	0.0	
R13	13	EARTH	J-0	-40.0000	0.0	0	0	0.0	0.0	
R18	18	EARTH	J-0	-200.0000	0.0	0	0	0.0	0.0	
R20	20	EARTH	J-0	-50.0000	0.0	0	0	0.0	0.0	
A	A	1	J-0	2.3900	0.0	0	0	0.0	0.0	Y
B	B	20	J-0	2.1600	0.0	0	0	1.0500	0.0	Y
C	C	21	J-0	9.3200	0.0	0	0	1.0500	0.0	Y
D	D	23	J-0	2.2900	0.0	0	0	1.0500	0.0	Y
E	E	24	J-0	2.2900	0.0	0	0	1.0500	0.0	Y
F	F	17	J-0	2.3900	0.0	0	0	1.0500	0.0	Y
G	G	19	J-0	5.1600	0.0	0	0	1.0500	0.0	Y
H	H	11	J-0	2.3900	0.0	0	0	1.0500	0.0	Y
I	I	26	J-0	2.6700	0.0	0	0	1.0500	0.0	Y

← BRANCH DATA (POSITIVE-SEQUENCE) *

BRANCH CODE	FROM	TO	R	X	Y/2	C	G	T	OLD	NEW	CAPACITY	ID.	Y	A	P	REAL	IMAG	F/T
J	J	29	0.0	0.0000	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
K	K	30	0.0	3.4000	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
L	L	15	0.0	3.5500	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
M	M	33	0.0	5.2200	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
N	N	2	0.0	2.3000	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
O	O	51	0.0	2.8100	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
P	P	52	0.0	2.0500	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
Q	Q	54	0.0	2.7600	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
R	R	61	0.0	4.4400	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
S	S	58	0.0	0.9400	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
T	T	72	0.0	0.8000	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
U	U	68	0.0	0.2600	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
V	V	71	0.0	4.7100	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y
W	W	74	0.0	1.1900	0.0	0	0	0	0	0	0.0		0.0	1.0500	0.0	0.0	0.0	Y

• NODE DATA •
 CODE 6-KV

CODE	6-KV	FKS	PG	QC	PL	QL	C/R	IO
1	0	0.0	J-J	U-U	558.0000	183.4060	0.0	0.0
2	0	0.0	J-J	U-U	808.0000	263.3759	0.0	0.0
3	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
4	0	0.0	J-J	U-U	259.0000	85.1291	0.0	0.0
5	0	0.0	J-J	U-U	170.0000	55.8763	0.0	0.0
6	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
7	0	0.0	J-J	U-U	939.0000	308.6340	0.0	0.0
8	0	97.5000	J-J	U-U	1109.0000	364.3100	0.0	0.0
9	0	0.0	J-J	U-U	1058.0000	351.0339	0.0	0.0
10	0	0.0	J-J	U-U	1058.0000	348.4050	0.0	0.0
11	0	96.0000	J-J	U-U	874.0000	287.2700	0.0	0.0
12	0	0.0	J-J	U-U	1109.0000	364.3100	0.0	0.0
13	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
14	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
15	0	0.0	J-J	U-U	248.0000	88.0873	0.0	0.0
16	0	0.0	J-J	U-U	153.0000	50.2886	0.0	0.0
17	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
18	0	0.0	J-J	U-U	292.0000	95.9757	0.0	0.0
19	0	0.0	J-J	U-U	737.0000	242.2400	0.0	0.0
20	0	0.0	J-J	U-U	1709.0000	561.7209	0.0	0.0
21	0	97.5000	J-J	U-U	1264.0000	415.4561	0.0	0.0
22	0	97.5000	J-J	U-U	461.0000	151.5230	0.0	0.0
23	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
24	0	0.0	J-J	U-U	324.0000	106.4940	0.0	0.0
25	0	0.0	J-J	U-U	500.0000	164.3420	0.0	0.0
26	0	0.0	J-J	U-U	284.0000	93.7462	0.0	0.0
27	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
28	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
29	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
30	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
31	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
32	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
33	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
34	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
35	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
36	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
37	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
38	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
39	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
40	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
41	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
42	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
43	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
44	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
45	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
46	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
47	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
48	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
49	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
50	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
51	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
52	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
53	0	0.0	J-J	U-U	315.0000	103.5350	0.0	0.0
54	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
55	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
56	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
57	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
58	0	0.0	J-J	U-U	110.0000	36.1552	0.0	0.0
59	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
60	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
61	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
62	0	0.0	J-J	U-U	182.0000	59.8703	0.0	0.0
63	0	0.0	J-J	U-U	394.0000	129.5010	0.0	0.0
64	0	0.0	J-J	U-U	213.0000	70.0097	0.0	0.0
65	0	0.0	J-J	U-U	630.0000	207.0710	0.0	0.0
66	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
67	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
68	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
69	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
70	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
71	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
72	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
73	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
74	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
75	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
76	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
77	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
78	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
79	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
80	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
81	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
82	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
83	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
84	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
85	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0
86	0	0.0	J-J	U-U	0.0	0.0	0.0	0.0

#	MODE DATA	0-KV	EKS	PG	CG	PL	OL	C/R	TO
67		0	0-0	3-3	0-0	0-0	0-0	0-0	
68		0	0-0	3-3	0-0	0-0	0-0	0-0	
69		0	0-0	3-3	0-0	0-0	0-0	0-0	
70		0	0-0	3-3	0-0	710-0000	233-3660	0-0	
71		0	0-0	3-3	0-0	0-0	0-0	0-0	
72		0	0-0	3-3	0-0	0-0	0-0	0-0	
73		0	0-0	3-3	0-0	0-0	0-0	0-0	
74		0	0-0	3-3	0-0	0-0	0-0	0-0	
EARTH		0	0-0	3-3	0-0	0-0	0-0	0-0	
A		0	0-0	3-3	260-0000	0-0	0-0	0-0	KARAFSKI
B		0	0-0	3-3	300-0000	0-0	0-0	0-0	SOMA
C		0	0-0	3-3	116-0000	0-0	0-0	0-0	ALIAGA
D		0	0-0	3-3	260-0000	0-0	0-0	0-0	SEKIK
E		0	0-0	3-3	280-0000	0-0	0-0	0-0	YATAGAN
F		0	0-0	3-3	270-0000	0-0	0-0	0-0	SEYITOMR
G		0	0-0	3-3	136-0000	0-0	0-0	0-0	GOKCEKAY
H		0	0-0	3-3	270-0000	0-0	0-0	0-0	BEYPAZAR
I		0	0-0	3-3	260-0000	0-0	0-0	0-0	DYNAPINR
J		0	102-5000	3-3	0-0	0-0	0-0	0-0	AKDUYU
K		0	102-0000	3-3	0-0	0-0	0-0	0-0	KAYRAKTP
L		0	0-0	3-3	180-0000	0-0	0-0	0-0	KURSA
M		0	0-0	3-3	90-0000	0-0	0-0	0-0	BEKONAK
N		0	0-0	3-3	270-0000	0-0	0-0	0-0	ANARLI
O		0	102-0000	3-3	0-0	0-0	0-0	0-0	ROYAGAT
P		0	102-0000	3-3	0-0	0-0	0-0	0-0	ROYAGAT
Q		0	102-0000	3-3	0-0	0-0	0-0	0-0	ALTINKAY
R		0	102-0000	3-3	0-0	0-0	0-0	0-0	HUGURLU
S		0	102-0000	3-3	0-0	0-0	0-0	0-0	KANGAL
T		0	101-5000	3-3	0-0	0-0	0-0	0-0	KEBAN
U		0	102-0000	3-3	0-0	230-0000	75-5073	0-0	KARAKAYA
V		0	102-0000	3-3	0-0	0-0	0-0	0-0	ELBISTAN
W		0	100-5000	3-3	0-0	0-0	0-0	0-0	ATATURK
X		0	100-5000	3-3	0-0	0-0	0-0	0-0	ILISU

POWER FLOW

MODE	CODE	NO	E (KV)	E (KV)	VOLTAGE ANGLE	GENERATOR P (MW)	GENERATOR Q (MVAR)	LOAD P (MW)	LOAD Q (MVAR)
1		1	99.241	99.641	-62.806	0.0	0.0	538.003	183.404
2		2	96.836	96.836	-62.860	0.0	0.0	808.005	265.962
3		3	96.851	96.851	-61.412	0.0	0.0	0.014	-0.001
4		4	96.218	96.218	-46.648	0.0	0.0	259.000	85.127
5		5	95.727	95.727	-68.044	0.0	0.0	169.999	55.876
6		6	100.122	100.122	-29.424	0.0	0.0	-0.004	-0.003
7		7	96.836	96.836	-63.219	0.0	0.0	939.004	308.627
8		8	97.500	97.500	-62.303	0.0	0.0	1108.970	-479.266
9		9	96.395	96.395	-60.056	0.0	0.0	1068.001	351.029
10		10	95.825	95.825	-53.079	0.0	0.0	1059.997	348.398
11		11	96.300	96.300	-35.316	0.0	0.0	873.989	261.787
12		12	97.187	97.187	-38.509	0.0	0.0	0.001	0.001
13		13	95.787	95.787	-34.694	0.0	0.0	1108.966	364.670
14		14	95.377	95.377	-43.951	0.0	0.0	0.002	-0.002
15		15	98.389	98.389	-61.686	0.0	0.0	0.001	-0.001
16		16	97.190	97.190	-49.689	0.0	0.0	267.997	88.085
17		17	96.371	96.371	-42.191	0.0	0.0	152.998	50.290
18		18	96.390	96.880	-43.398	0.0	0.0	0.002	0.002
19		19	96.352	96.662	-43.319	0.0	0.0	291.999	95.971
20		20	96.340	96.846	-67.219	0.0	0.0	737.001	242.238
21		21	97.300	97.300	-73.365	0.0	0.0	1709.993	-27.802
22		22	97.500	97.500	-71.339	0.0	0.0	1244.000	-315.937
23		23	100.392	100.892	-16.961	0.0	0.0	461.000	151.521
24		24	98.656	98.656	-54.745	0.0	0.0	-0.003	-0.004
25		25	98.313	98.613	-54.614	0.0	0.0	324.008	106.488
26		26	96.301	96.601	-26.010	0.0	0.0	509.002	164.343
27		27	100.238	100.238	-19.306	0.0	0.0	293.997	93.339
28		28	105.340	105.340	-4.133	0.0	0.0	0.000	-0.023
29		29	105.568	105.648	-3.177	0.0	0.0	-0.001	0.011
30		30	99.213	99.213	-20.723	0.0	0.0	-0.001	0.002
31		31	99.716	99.716	-20.099	0.0	0.0	0.001	-0.001
32		32	104.706	104.706	-21.210	0.0	0.0	-0.002	0.002
33		33	105.211	105.212	-21.294	0.0	0.0	-0.001	-0.001
34		34	104.691	104.691	-22.475	0.0	0.0	315.001	103.535
35		35	104.895	104.895	-21.995	0.0	0.0	-0.001	0.001
36		36	102.660	102.660	-18.184	0.0	0.0	0.0	0.0
37		37	103.994	103.994	-25.239	0.0	0.0	0.001	-0.001
38		38	105.411	105.411	-17.170	0.0	0.0	-0.000	-0.001
39		39	105.583	105.583	-34.158	0.0	0.0	-0.001	-0.001
40		40	105.156	105.156	-5.646	0.0	0.0	110.001	36.165
41		41	106.623	106.623	-35.994	0.0	0.0	0.001	0.001
42		42	104.707	104.707	-13.399	0.0	0.0	-0.000	0.002
43		43	104.084	104.084	-7.525	0.0	0.0	182.000	58.821
44		44	101.480	101.481	-11.290	0.0	0.0	0.001	-0.003
45		45	100.666	100.666	-20.530	0.0	0.0	394.000	129.502

POWER FLOW

NODE	CODE	NO	ES(KV)	ANGLE	LOAD	GENERATOR	LOAD
			(K)	(DEG)	(MW)	(MW)	(MW)
68		46	134.977	-6.108	0.0	0.0	213.006
72		47	135.246	-0.134	0.0	0.0	630.001
64		48	134.727	-4.246	0.0	0.0	0.000
65		49	135.954	-36.246	0.0	0.0	0.0
66		50	134.625	-6.228	0.0	0.0	-0.000
67		51	134.762	-30.922	0.0	0.0	0.0
28		52	98.871	-18.805	0.0	0.0	-0.002
69		53	130.377	-10.634	0.0	0.0	0.000
70		54	132.380	-12.450	0.0	0.0	710.001
71		55	135.213	-5.721	0.0	0.0	0.000
73		56	135.424	5.591	0.0	0.0	-0.002
74		57	135.842	14.198	0.0	0.0	-0.001
EARTH		58	2.428	-54.759	0.0	0.0	-43.183
BABESKI	A	59	95.667	-54.915	540.000	260.000	0.003
SOMA	B	60	99.578	-59.013	620.000	300.000	0.002
ALIAGA	C	61	98.384	-65.827	240.000	116.000	-0.001
SEKIK	D	62	99.505	-46.442	540.000	260.000	0.001
YATAGAN	E	63	98.827	-45.993	590.000	280.000	0.002
SEYITOMR	F	64	97.606	-34.598	570.000	270.000	0.001
COGCEKAY	G	65	97.481	-34.726	278.000	130.000	0.000
REYPAZAR	H	66	98.735	-29.998	570.000	270.000	0.000
GYMAPINR	I	67	121.253	-9.727	540.000	260.000	0.0
AKKUYU	J	68	122.500	2.926	1420.000	338.177	0.0
KAYRAKTP	K	69	132.300	4.821	420.000	70.859	-0.000
BURSA	L	70	97.959	-41.115	380.000	180.000	-0.000
BESKONAK	M	71	99.120	-13.731	200.000	90.000	0.002
AMBARLI	N	72	97.749	-54.205	570.000	270.000	-0.001
BOYABAY	O	73	132.300	-13.270	500.000	117.455	0.000
ALTINKAY	P	74	132.300	-15.238	500.000	114.625	0.0
MUCURLU	Q	75	132.300	-15.774	400.000	99.339	-0.001
KANGAL	R	76	132.300	-6.370	280.000	69.332	0.000
KEBAN	S	77	132.300	1.756	1400.000	291.437	0.000
KARAKAYA	T	78	131.500	6.186	1400.000	237.898	0.000
FLRISTAN	U	79	132.300	0.0	4403.355	1091.289	75.597
ATATURK	V	80	132.300	4.226	300.000	50.760	0.0
ILISU	W	81	130.500	20.947	1000.000	35.456	-0.001
							0.0

*** LINE FLOW ***

BRANCH	FROM	TO	> amp>	Q amp>	I amp>	LOSS-P	LOSS-Q	Case P	Case Q	Case I
1	1	2	11.203	46.663	0.4985	0.176	-59.066	-11.024	-107.149	1.1123
20	1	14	-22.202	-57.911	0.6548	0.064	-141.227	29.267	-83.316	0.8975
4	1	3	-540.031	-173.675	5.7770	0.001	86.421	540.000	259.998	6.0134
2	2	1	-373.633	-22.177	3.8653	0.751	-10.497	374.390	-32.673	3.8603
6	2	7	143.650	-9.657	1.5177	0.070	-12.625	-146.590	-2.368	1.5144
N	3	N	-573.031	-174.912	6.1452	0.001	99.047	570.000	270.000	6.4524
3	3	4	-1677.324	243.579	15.4596	30.664	167.001	1507.998	-56.578	15.6673
4	3	6	337.081	-164.935	3.5991	0.445	-4.929	-306.638	156.007	3.5286
4	4	5	473.324	13.545	1.7763	0.418	-24.463	-169.946	-38.008	1.8192
5	4	6	-483.435	24.337	15.2477	34.506	198.694	1502.941	175.356	15.1129
12	4	12	-1134.320	127.429	11.6200	18.654	29.047	1149.980	-98.382	12.0227
R4	4	EARTH	-3.653	-160.913	1.8793	0.000	-176.400	0.660	4.513	1.8783
R5	5	EARTH	-3.054	-17.866	0.1866	0.000	-17.416	0.054	0.450	0.1866
51	6	51	-486.409	-100.787	4.9619	7.446	-1.454	493.912	99.333	4.8116
53	6	52	-391.545	-143.922	4.1567	4.600	-77.152	396.195	63.770	3.8142
56	7	55	-1244.598	-70.810	10.8358	17.060	-40.618	1101.658	30.192	10.7351
7	7	3	-793.815	59.307	8.2229	0.032	19.315	793.847	-45.991	8.2310
R7	7	EARTH	1.384	-345.552	3.7762	0.000	-350.487	-1.364	9.065	3.7762
6	8	9	-832.347	323.280	8.8721	3.606	-6.420	805.952	-327.706	9.0257
10	9	10	-1267.533	228.604	13.1373	15.769	76.274	1263.299	-152.330	13.2769
17	9	19	-627.295	116.448	6.6076	17.960	93.084	643.235	-17.364	6.6076
R9	9	EARTH	3.865	-962.356	3.7591	0.000	-953.268	-0.865	9.048	3.7591
11	10	4	-625.963	53.257	6.9679	7.110	40.337	663.070	-12.920	6.8853
14	10	11	-815.677	69.236	8.3668	20.742	146.847	837.219	61.611	8.5760
18	10	19	-573.289	73.671	7.1198	10.739	61.672	689.028	-11.799	7.1504
R10	10	EARTH	-3.272	-357.990	3.7359	0.000	-344.921	0.272	9.069	3.7359
13	12	6	-445.669	-156.003	5.0170	4.034	-18.824	450.723	137.181	4.7917
16	12	13	-443.143	125.740	4.7682	0.434	-14.342	440.598	-140.082	4.8267
58	12	75	-614.314	-111.819	6.5043	16.011	33.567	630.331	145.386	6.1368
69	12	64	-1238.113	179.903	12.7094	34.276	550.617	1262.390	379.713	12.5676
15	11	12	-257.223	110.866	2.9555	1.670	-24.734	268.890	-135.620	3.1370
H	11	H	-573.303	-172.475	6.0638	0.000	97.527	570.001	270.002	6.3660
63	13	62	-1322.468	79.456	13.6228	56.087	237.831	1358.555	178.375	13.5022
68	13	68	-645.431	-18.553	6.7514	26.069	90.176	672.500	108.729	6.4893
R13	13	EARTH	-1.993	-223.913	2.3377	0.000	-218.000	1.993	5.315	2.3377
19	19	12	-617.093	48.477	4.3775	6.297	-6.204	425.387	-56.681	4.4703
75	19	13	-394.987	46.895	4.1272	6.338	-14.417	401.325	-61.312	4.2384
C	19	C	-278.923	-78.857	2.9683	0.000	51.163	278.000	130.000	3.1482
21	14	15	-722.622	163.554	7.5328	15.043	93.495	737.468	-70.063	7.6299
29	14	20	699.133	-62.257	7.9444	6.513	36.747	-646.642	119.024	7.0500
22	15	10	173.333	-9.610	1.7881	1.042	-59.629	-172.290	-50.019	1.8723
23	15	18	-445.039	69.775	4.6409	5.759	0.970	451.795	-68.805	4.7421
26	15	16	-352.763	34.621	3.6327	2.574	-16.450	353.345	-82.871	3.7083
L	15	L	-380.003	-114.594	4.0680	0.001	65.406	380.000	160.000	4.2924
74	18	19	242.074	-56.048	2.5520	6.770	-25.383	-242.204	12.663	2.5165

LINE FLOW

BRANCH	FROM	TO	P	Q	I	LOSS-P	LOSS-Q	Qsum P	Qsum Q	Qsum I
71	16	66	-1031.654	156.491	10.5199	48.056	441.897	1049.714	295.406	10.3973
R18	16	EARTH	-3.253	-45.295	0.4700	0.000	-44.182	0.253	1.113	0.4700
27	16	17	-335.346	52.873	3.7083	1.248	-7.403	356.594	-60.278	3.7414
28	17	18	-153.821	24.835	1.6119	0.327	-29.799	154.148	-54.634	1.6970
33	17	27	-653.663	64.256	6.7875	30.690	159.419	681.350	75.161	6.7942
F	17	F	-567.999	-170.205	6.1541	0.000	99.794	569.999	269.999	6.4616
30	20	21	568.635	26.350	5.7585	5.997	19.889	-562.608	-6.460	5.7707
820	20	EARTH	1.035	-190.732	1.9296	0.000	-186.162	-1.036	4.570	1.9296
B	20	B	-620.002	-196.865	6.5809	0.001	103.133	620.002	299.998	6.9099
31	21	22	-269.602	16.777	2.7759	0.854	-16.008	270.656	-34.783	2.7988
34	21	23	-635.583	50.992	6.5954	20.624	102.633	657.208	11.641	6.6627
C	21	C	-260.003	-75.440	2.5804	0.000	40.521	240.000	116.001	2.7094
32	22	17	-690.847	169.326	7.3473	35.000	214.761	725.898	25.435	7.5142
35	22	24	-863.767	161.419	8.8109	25.278	185.078	869.044	23.659	8.8699
40	27	29	-1168.412	-144.082	11.6685	20.117	-21.628	1189.529	122.494	11.3425
C-28	27	28	-154.382	-100.509	1.8259	0.000	-6.934	154.382	93.574	1.8259
36	23	24	-117.202	157.677	1.9914	0.167	-7.950	117.369	-165.628	2.0711
D	23	D	-340.002	-169.504	5.7363	0.000	90.696	340.002	260.000	6.0231
37	24	25	-723.424	215.504	7.6721	36.793	242.466	757.219	26.961	7.8436
E	24	E	-595.332	-179.999	6.2935	0.001	100.001	590.001	280.000	6.6082
38	25	26	-588.073	-64.618	6.1504	8.238	35.147	596.312	117.765	6.0638
45	25	34	-669.149	-106.882	7.0144	6.454	35.313	675.599	142.195	6.9588
39	26	27	-183.013	-45.632	1.8512	0.431	-27.117	180.441	17.915	1.7972
41	26	29	-638.233	-67.134	6.4020	12.567	18.808	650.770	85.961	6.2314
I	26	I	-543.309	-166.455	5.6375	0.0	93.546	540.000	260.001	5.9192
42	29	30	-619.301	-50.772	4.0095	0.700	-39.199	420.001	11.574	3.9770
J	29	J	-423.303	-157.662	13.5629	0.000	180.501	1420.000	336.163	14.2411
K	30	K	-423.303	-11.572	3.9770	0.000	59.268	420.000	70.859	4.1756
44	34	26	-675.841	-67.396	4.8440	2.054	0.118	477.895	67.514	4.8149
47	34	33	-193.743	-74.784	2.1498	0.248	-10.342	199.997	64.442	2.1072
M	33	M	-232.303	-64.443	2.1073	0.000	25.355	200.000	89.998	2.2126
52	51	52	5.089	-53.127	0.5107	0.015	-45.673	-6.074	7.454	0.0914
O	51	O	-533.303	-66.208	4.7956	0.000	71.248	500.000	117.456	5.0354
54	52	53	189.882	-84.429	1.0475	0.222	-49.302	194.361	-40.873	1.1179
P	52	P	-500.301	-62.777	4.7896	9.0	51.848	500.001	114.623	5.0291
55	53	54	-399.713	-72.863	3.8809	0.302	-18.560	400.011	54.303	3.8484
Q	54	Q	-432.001	-54.277	3.8483	0.000	45.062	400.000	99.339	4.0407
C-55	55	56	-101.658	-36.194	10.7351	0.000	-135.987	1101.657	-105.793	10.7351
57	55	53	-193.373	-70.164	1.9955	0.982	-59.992	194.361	10.193	1.8501
C-57	56	57	-634.504	51.641	6.7551	0.0	-110.885	644.508	-162.326	6.7551
60	56	60	-846.106	70.261	8.2161	0.0	-164.035	844.106	-234.216	8.2161
C-56	56	56	-630.331	-145.387	6.1368	0.0	-91.137	630.331	54.250	6.1368
59	57	58	-898.533	162.526	6.7551	35.944	171.865	730.451	9.539	6.9469
62	58	59	182.633	1.7426	1.7426	0.634	-44.937	-182.000	-59.819	1.8406
67	58	72	-4473.193	113.518	11.2656	10.664	21.926	1190.074	-91.392	11.3610

TURKEY 1993 LOAD FLOW NAME=TURK03-A

GENERATOR TYPE DATA

NO.	CTYPE	XL(X)	K3*(X)	YA	T00**	T00**
1	TH1	18.000	J=J	0.400	0.050	0.070
2	MU1	22.000	J=J	0.300	0.041	0.060
3	XXX	14.000	J=J	0.200	0.041	0.100

TURKEY 1993 LJA0 HJJA

GENERATOR CONSTANT DATA

GEN	GMVA(MVA)	X(R)	K ₁ (%)	K ₂ (%)	K ₃ (%)	X(%)	P ₂₄ (MW)	P ₀₀ (MW)
A	670.00	0.0	25.00	15.00	15.00	155.00	5360.00	0.0
B	740.00	0.0	25.00	15.00	15.00	155.00	4970.00	0.0
C	200.00	0.0	25.00	15.00	15.00	155.00	2320.00	0.0
D	640.00	0.0	25.00	15.00	15.00	155.00	5120.00	0.0
E	700.00	0.0	25.00	15.00	15.00	155.00	5600.00	0.0
F	670.00	0.0	25.00	15.00	15.00	155.00	5360.00	0.0
G	670.00	0.0	25.00	15.00	15.00	155.00	5360.00	0.0
H	450.00	0.0	25.00	15.00	15.00	155.00	3600.00	0.0
I	360.00	0.0	25.00	15.00	15.00	155.00	2800.00	0.0
J	670.00	0.0	25.00	15.00	15.00	155.00	4960.00	0.0
K	670.00	0.0	25.00	15.00	15.00	155.00	5360.00	0.0
L	310.00	0.0	30.00	20.00	20.00	100.00	2100.00	0.0
M	600.00	0.0	30.00	20.00	20.00	100.00	4050.00	0.0
N	470.00	0.0	30.00	20.00	20.00	100.00	3190.00	0.0
O	230.00	0.0	30.00	20.00	20.00	100.00	1560.00	0.0
P	570.00	0.0	30.00	20.00	20.00	100.00	3470.00	0.0
Q	780.00	0.0	30.00	20.00	20.00	100.00	5300.00	0.0
R	580.00	0.0	30.00	20.00	20.00	100.00	3640.00	0.0
S	1700.00	0.0	35.00	25.00	25.00	100.00	11560.00	0.0
T	2000.00	0.0	35.00	25.00	25.00	100.00	13600.00	0.0
V	340.00	0.0	35.00	25.00	25.00	100.00	2812.00	0.0
Y	1340.00	0.0	35.00	25.00	25.00	100.00	9112.00	0.0
Z	1400.00	0.0	35.00	25.00	25.00	170.00	13300.00	0.0

GENERATOR CONSTANT DATA(2)

GEN	X0*(H)	X0*(H)	X0*(H)	XL(L)	TJ*(S)	TJ*(S)	Y00*(S)	TA(S)	GM(S)	GD(S)	CPF(P-U)	AVR	PSS	GCV
A	20.00	20.00	20.00	18.00	3.05	0.07	0.07	0.40	R=00	0.0	0.0	(0)	(0)	(0)
B	20.00	20.00	20.00	18.00	3.05	0.07	0.07	0.40	R=00	0.0	0.0	(0)	(0)	(0)
C	20.00	20.00	20.00	18.00	3.05	0.07	0.07	0.40	R=00	0.0	0.0	(0)	(0)	(0)
D	20.00	20.00	20.00	18.00	3.05	0.07	0.07	0.40	R=00	0.0	0.0	(0)	(0)	(0)
E	20.00	20.00	20.00	18.00	3.05	0.07	0.07	0.40	R=00	0.0	0.0	(0)	(0)	(0)
F	20.00	20.00	20.00	18.00	3.05	0.07	0.07	0.40	R=00	0.0	0.0	(0)	(0)	(0)
H	20.00	20.00	20.00	18.00	3.05	0.07	0.07	0.40	R=00	0.0	0.0	(0)	(0)	(0)
L	20.00	20.00	20.00	18.00	3.05	0.07	0.07	0.40	R=00	0.0	0.0	(0)	(0)	(0)
R	20.00	20.00	20.00	18.00	3.05	0.07	0.07	0.40	R=00	0.0	0.0	(0)	(0)	(0)
U	20.00	20.00	20.00	18.00	3.05	0.07	0.07	0.40	R=00	0.0	0.0	(0)	(0)	(0)
N	20.00	20.00	20.00	18.00	3.05	0.07	0.07	0.40	R=00	0.0	0.0	(0)	(0)	(0)
G	22.00	22.00	22.00	14.00	3.04	0.10	0.10	0.20	6=80	0.0	0.0	(0)	(0)	(0)
I	22.00	22.00	22.00	14.00	3.04	0.10	0.10	0.20	6=80	0.0	0.0	(0)	(0)	(0)
K	22.00	22.00	22.00	14.00	3.04	0.10	0.10	0.20	6=80	0.0	0.0	(0)	(0)	(0)
M	22.00	22.00	22.00	14.00	3.04	0.10	0.10	0.20	6=80	0.0	0.0	(0)	(0)	(0)
O	22.00	22.00	22.00	14.00	3.04	0.10	0.10	0.20	6=80	0.0	0.0	(0)	(0)	(0)
P	22.00	22.00	22.00	14.00	3.04	0.10	0.10	0.20	6=80	0.0	0.0	(0)	(0)	(0)
S	22.00	22.00	22.00	14.00	3.04	0.10	0.10	0.20	6=80	0.0	0.0	(0)	(0)	(0)
T	22.00	22.00	22.00	14.00	3.04	0.10	0.10	0.20	6=80	0.0	0.0	(0)	(0)	(0)
V	22.00	22.00	22.00	14.00	3.04	0.10	0.10	0.20	6=80	0.0	0.0	(0)	(0)	(0)
W	22.00	22.00	22.00	14.00	3.04	0.10	0.10	0.20	6=80	0.0	0.0	(0)	(0)	(0)
J	25.00	25.00	25.00	22.00	3.04	0.06	0.06	0.30	R=50	0.0	0.0	(0)	(0)	(0)

GENERATOR = 23 FREQUENCY = 50.0 DELT = 0.010 DK = 1.00 NK0 = 0.0 TCASE = 3

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes the need for transparency and accountability in financial reporting.

2. The second part of the document outlines the various methods and techniques used to collect and analyze data. It includes a detailed description of the sampling process and the statistical tools employed.

3. The third part of the document presents the results of the study, including a comparison of the different methods and a discussion of the findings. It highlights the strengths and weaknesses of each approach and provides recommendations for future research.

4. The fourth part of the document discusses the implications of the study for practice and policy. It provides a clear and concise summary of the key findings and their potential impact on the field.

5. The fifth part of the document concludes the study and provides a final summary of the findings. It reiterates the importance of the research and offers suggestions for further exploration.

6. The sixth part of the document discusses the limitations of the study and the potential for bias. It acknowledges the challenges faced during the research process and offers ways to minimize their impact.

7. The seventh part of the document provides a detailed description of the data collection process, including the selection of participants and the use of various instruments.

8. The eighth part of the document discusses the ethical considerations of the study and the steps taken to ensure the protection of participants. It highlights the importance of informed consent and confidentiality.

9. The ninth part of the document provides a detailed description of the data analysis process, including the use of statistical software and the interpretation of the results.

10. The tenth part of the document discusses the overall findings of the study and their implications for the field. It provides a clear and concise summary of the key results and offers suggestions for future research.

11. The eleventh part of the document provides a detailed description of the data collection process, including the selection of participants and the use of various instruments.

12. The twelfth part of the document discusses the ethical considerations of the study and the steps taken to ensure the protection of participants. It highlights the importance of informed consent and confidentiality.

13. The thirteenth part of the document provides a detailed description of the data analysis process, including the use of statistical software and the interpretation of the results.

14. The fourteenth part of the document discusses the overall findings of the study and their implications for the field. It provides a clear and concise summary of the key results and offers suggestions for future research.

