200.00 *SQR(0.00 / 0.00)

CALCULATION OF INITIAL PRESSURE

Km 2+150 HE=5.0 m 13.2 m from Toe of Slope

SOIL No.	SOIL	THICKNESS OF SOIL	WET UNIT WEIGHT	CALCULATION OF INITIAL PRESSURE	INITIAL PRESSURE
1	Ac1	7.500	1.660	0.000+0.5(0.000 * 0.000 + 7.500 * 1.660)	6.225
2	Ac2	2.000	0.660	6.225+0.5(7.500 * 1.660 + 2.000 * 0.660)	13.110
3	As1	2.000	0.700	13.110+0.5(2.000 * 0.660 + 2.000 * 0.700)	14.470

INTENSITY OF DISTRIBUTED LOAD q=H*rt= 5.00* 1.800 9.00

SOIL No.	SOIL	DEPTH FROM CENTRAL SOIL STRUTA	a1/Z a1= 7.500	a1+a2+b/Z a2=13.200	a2/Z b= 4.400	I1	I2	DP	Po	Po+DP
1	Ac1	3.750	2.000	7.867	3.520	0.002	0.000	0.019	6.225	6.244
2	Ac2	8.500	0.882	3.471	1.553	0.018	0.000	0.166	13.110	13.276
3	As1	10.500	0.714	2.810	1.257	0.030	0.000	0.269	14.470	14.739

SUBSIDED VALUE FOR CONSOLIDATION AND COEFFICIENT OF CONSOLIDATTION

SOIL No.	SOIL	THICKNESS OF SOIL	Po	DP	Po+DP	e0	e1	Sc	DP/2	Po+DP/2	Cv
1	Ac1	7.5000	6.2250	0.0186	6.2436	1.3450	1.3440	0.0032	0.0093	6.2343	400
2	Ac2	2.0000	13.1100	0.1660	13.2760	1.2620	1.2600	0.0018	0.0830	13.1930	360
3	As1	2.0000	14.4700	0.2688	14.7388	0.5460	0.5460	0.0000	0.1344	14.6044	0

0.0050

TYPICAL COEFFICIENT OF CONSOLIDATION AND DISTANCE OF DRAINAGE

SOIL No	SOIL	THICKNESS OF SOIL	Cv	Cv'	H'	CONDITION OF DRAINAGE	DISTANCE OF DRAINAGE
1	Ac1	750.00	400.00	400.00	960.82	2Side	480.41
2	Ac2	200.00	360.00				
3	As1	200.00	0.00	0.00	0.00	2Side	0.00

SUBSIDED TIME FOR CONSOLIDATION BY MOMENTARY EMBANKMENT

U (%)	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	95.00	100.00
Tv	0.008	0.031	0.071	0.126	0.196	0.287	0.403	0.567	0.848	1.130	infinite

EXPRESSION t=Tv.d^2/C'v=Tv. 480.41^2/ 400.00= 576.98

t (days)	4.62	17.89	40.97	72.70	113.09	165.59	232.52	327.15	489.28	651.99	
Sc.U (cm)	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.47	0.50

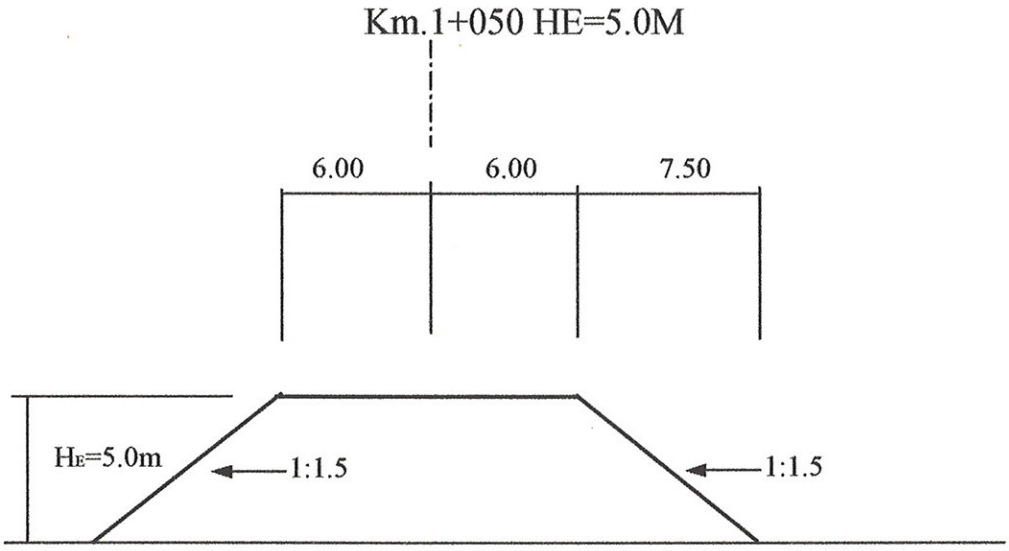
EXPRESSION t=Tv.d^2/C'v=Tv. 0.00^2/ 0.00= 0.00

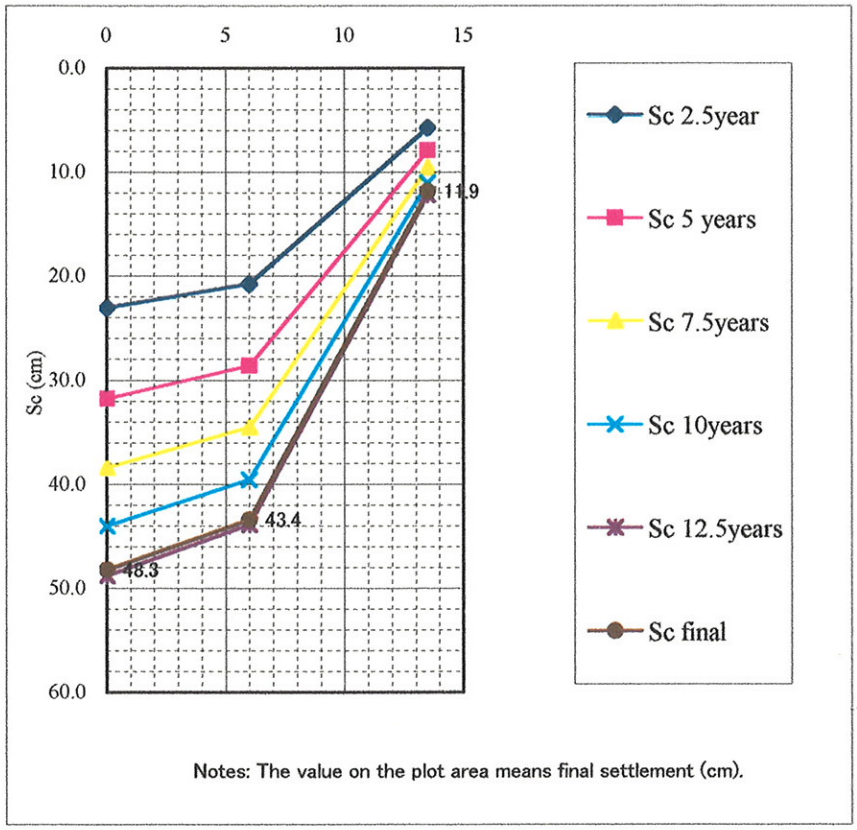
t (days)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sc.U (cm)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

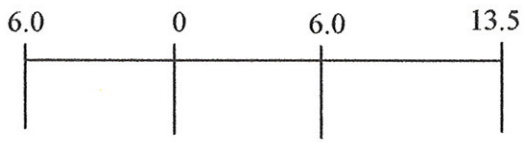
*APPENDIX

CALCULATION OF CONVERTIBLE SOIL THICKNESS

750.00 *SQR(400.00 / 400.00) + 200.00 *SQR(400.00 / 360.00)







Final settlement (cm)

Distance (m)	0	6.0	13.5
Settlement (cm)	48.3	43.4	11.9

Fig. Settlement and Distance Km.1+050 HE=5.0m

Table SOIL SECTION AND DESIGN SOIL VALUE

EXAMINED LOCATION:

Km 1+ 050

Location Manggarai-Jatinegara

Depth	Division of soil	Thickness of soil	Depth of central stratum	N Value	Wet unit weight	Cohesion of initial condition	Modulus of deformation	The rate of increase in strength	Yield stress	Remark
(m)		H (m)	(m)		γ (t/m^3)	Co (t/m^2)	E_{50}(t/m^2)		Py (t/m^2)	
5.00	Ac1	5.00	2.50	3	1.660	2.50	-	0.25	10.00	5.00 ▽
13.00	Ac2	8.00	9.00	4	0.660	2.50	-	0.25	10.00	
16.50	Ac3	3.50	14.75	14	0.700	8.00	-	-	-	
20.00	Dc1	3.50	18.25	50	0.800	30.00	-	-	-	

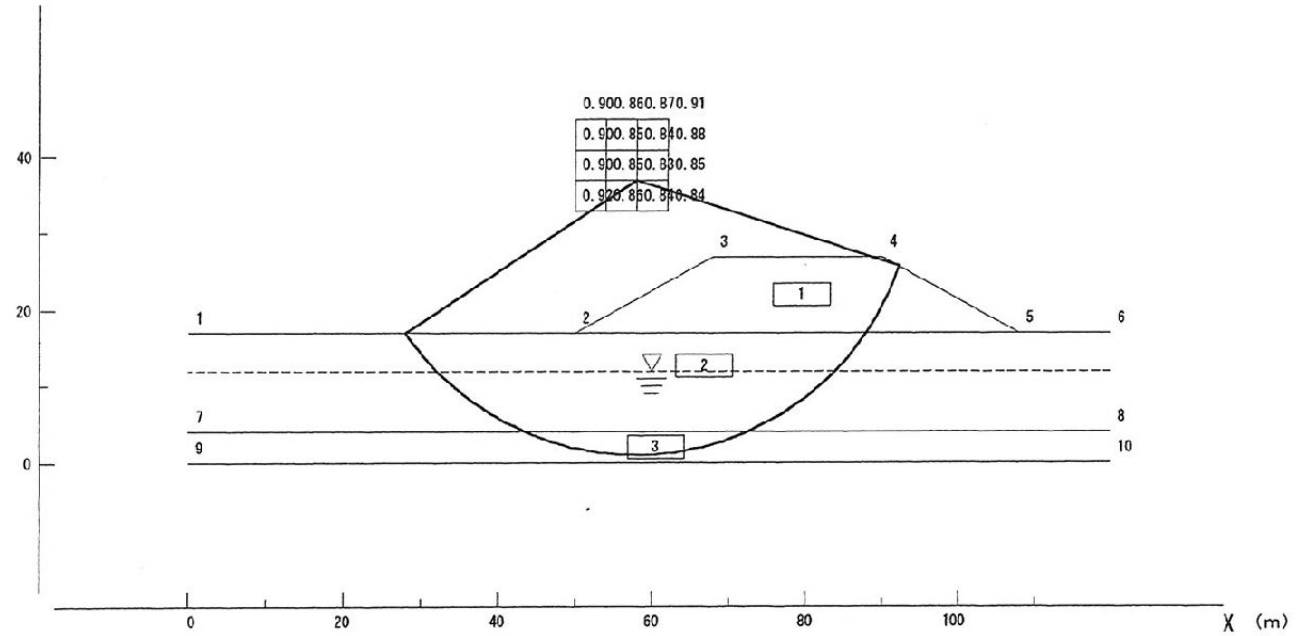
JKT Railway Km 1+050 HE=10m Normal Banking

Scale : 1 / 986

Safety Factor	Fs MIN	= 0.835
	X	= 58.00 (m)
	Y	= 37.00 (m)
Radius	R	= 36.00 (m)
Resistive Moment	Mr	= 7265.67 (tf - m)
Slipping Moment	Mo	= 8703.47 (tf - m)

Layer	Unit Weight (t/m^3)	Saturated gravity(t/m^3)	Internal friction angle	Cohesion (t/m^2)	1st Coeff. of Cohesion	Horizontal Seismic Coeff	Vertical seismic Coeff
1	1.800	1.700	10.00	2.20	0.00	0.000	0.000
2	1.760	1.660	0.00	2.50	0.00	0.000	0.000
3	1.760	1.660	0.00	2.50	0.00	0.000	0.000

Unit weight of water = 1.000 tf / m^3



Slope Stability Analysis

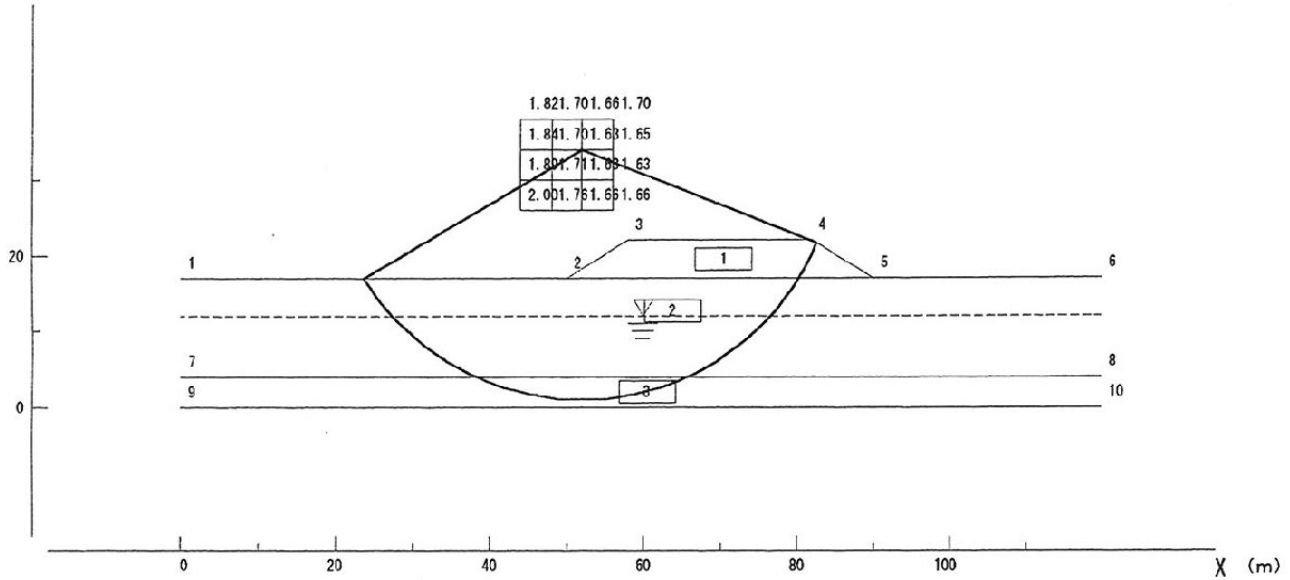
JKT Railway Km 1+050 HE=5.0m Normal Banking

Scale : 1 / 986

Safety Factor	Fs MIN	= 1.634
	X	= 52.00 (m)
	Y	= 34.00 (m)
Radius	R	= 33.00 (m)
Resistive Moment	Mr	= 6011.72 (tf - m)
Slipping Moment	Mo	= 3678.79 (tf - m)

Layer	Unit Weight (t/m^3)	Saturated gravity(t/m^3)	Internal friction angle	Cohesion (t/m^2)	1st Coeff. of Cohesion	Horizontal Seismic Coeff	Vertical seismic Coeff
1	1.800	1.700	10.00	2.20	0.00	0.000	0.000
2	1.760	1.660	0.00	2.50	0.00	0.000	0.000
3	1.760	1.660	0.00	2.50	0.00	0.000	0.000

Unit weight of water = 1.000 tf / m^3



Slope Stability Analysis

Km 1+050 HE=10.0m Center of Embankment

CALCULATION OF INITIAL PRESSURE

SOIL No.	SOIL	THICKNESS OF SOIL	WET UNIT WEIGHT	CALCULATION OF INITIAL PRESSURE	INITIAL PRESSURE
1	Ac1	5.000	1.660	0.000+0.5(0.000 * 0.000 + 5.000 * 1.660)	4.150
2	Ac2	8.000	0.660	4.150+0.5(5.000 * 1.660 + 8.000 * 0.660)	10.940

INTENSITY OF DISTRIBUTED LOAD q=H*rt= 10.00* 1.800 18.00

SOIL No.	SOIL	DEPTH FROM CENTRAL SOIL STRUTA	a/Z a=16.000	b/Z b= 6.000	I	DP	Po	Po+DP
1	Ac1	2.500	6.400	2.400	0.498	17.914	4.150	22.064
2	Ac2	9.000	1.778	0.667	0.447	16.105	10.940	27.045

SUBSIDED VALUE FOR CONSOLIDATION AND COEFFICIENT OF CONSOLIDATTION

SOIL No.	SOIL	THICKNESS OF SOIL	Po	DP	Po+DP	e0	e1	Sc	DP/2	Po+DP/2	Cv
1	Ac1	5.0000	4.1500	17.9136	22.0636	1.3770	1.1800	0.4144	8.9568	13.1068	360
2	Ac2	8.0000	10.9400	16.1048	27.0448	1.2850	1.1450	0.4902	8.0524	18.9924	350

TYPICAL COEFFICIENT OF CONSOLIDATION AND DISTANCE OF DRAINAGE

SOIL No	SOIL	THICKNESS OF SOIL	Cv	Cv'	H'	CONDITION OF DRAINAGE	DISTANCE OF DRAINAGE
1	Ac1	500.00	360.00	350.00	1293.01	1Side	1293.01
2	Ac2	800.00	350.00				

SUBSIDED TIME FOR CONSOLIDATION BY MOMENTARY EMBANKMENT

U (%)	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	95.00	100.00
Tv	0.008	0.031	0.071	0.126	0.196	0.287	0.403	0.567	0.848	1.130	infinite

EXPRESSION t=Tv.d^2/C'v=Tv.1293.01²/ 350.00=4776.76

t (days)	38.21	148.08	339.15	601.87	936.25	1370.93	1925.03	2708.42	4050.69	5397.74	
Sc.U (cm)	9.05	18.09	27.14	36.18	45.23	54.27	63.32	72.36	81.41	85.93	90.45

*APPENDIX

CALCULATION OF CONVERTIBLE SOIL THICKNESS

500.00 *SQR(350.00 / 360.00) + 800.00 *SQR(350.00 / 350.00)

CALCULATION OF INITIAL PRESSURE

Km 1+050 HE=5.0m Center of Embankment

SOIL No.	SOIL	THICKNESS OF SOIL	WET UNIT WEIGHT	CALCULATION OF INITIAL PRESSURE	INITIAL PRESSURE
1	Ac1	5.000	1.660	0.000+0.5(0.000 * 0.000 + 5.000 * 1.660)	4.150
2	Ac2	8.000	0.660	4.150+0.5(5.000 * 1.660 + 8.000 * 0.660)	10.940

INTENSITY OF DISTRIBUTED LOAD q=H*rt= 5.00* 1.800 9.00

SOIL No.	SOIL	DEPTH FROM CENTRAL SOIL STRUTA	a/Z a= 7.500	b/Z b= 6.000	I	DP	Po	Po+DP
1	Ac1	2.500	3.000	2.400	0.496	8.921	4.150	13.071
2	Ac2	9.000	0.833	0.667	0.413	7.441	10.940	18.381

SUBSIDED VALUE FOR CONSOLIDATION AND COEFFICIENT OF CONSOLIDATTION

SOIL No.	SOIL	THICKNESS OF SOIL	Po	DP	Po+DP	e0	e1	Sc	DP/2	Po+DP/2	Cv
1	Ac1	5.0000	4.1500	8.9211	13.0711	1.3770	1.2640	0.2377	4.4606	8.6106	380
2	Ac2	8.0000	10.9400	7.4405	18.3806	1.2850	1.2150	0.2451	3.7203	14.6603	360

TYPICAL COEFFICIENT OF CONSOLIDATION AND DISTANCE OF DRAINAGE

SOIL No	SOIL	THICKNESS OF SOIL	Cv	Cv'	H'	CONDITION OF DRAINAGE	DISTANCE OF DRAINAGE
1	Ac1	500.00	380.00	380.00	1321.92	1Side	1321.92
2	Ac2	800.00	360.00				

SUBSIDED TIME FOR CONSOLIDATION BY MOMENTARY EMBANKMENT

U (%)	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	95.00	100.00
Tv	0.008	0.031	0.071	0.126	0.196	0.287	0.403	0.567	0.848	1.130	infinite

EXPRESSION t=Tv.d^2/C'v=Tv.1321.92^2/ 380.00=4598.63

t (days)	36.79	142.56	326.50	579.43	901.33	1319.81	1853.25	2607.42	3899.63	5196.45	
Sc.U (cm)	4.83	9.66	14.48	19.31	24.14	28.97	33.79	38.62	43.45	45.86	48.28

*APPENDIX

CALCULATION OF CONVERTIBLE SOIL THICKNESS

500.00 *SQR(380.00 / 380.00) + 800.00 *SQR(380.00 / 360.00)

CALCULATION OF INITIAL PRESSURE

Km 1+050 HE=5.0 m Top of Slope of Embankment

SOIL No.	SOIL	THICKNESS OF SOIL	WET UNIT WEIGHT	CALCULATION OF INITIAL PRESSURE	INITIAL PRESSURE
1	Ac1	5.000	1.660	0.000+0.5(0.000 * 0.000 + 5.000 * 1.660)	4.150
2	Ac2	8.000	0.660	4.150+0.5(5.000 * 1.660 + 8.000 * 0.660)	10.940

INTENSITY OF DISTRIBUTED LOAD q=H*rt= 5.00* 1.800 9.00

SOIL No.	SOIL	DEPTH FROM CENTRAL SOIL STRUTA	a/Z a= 7.500	b1/Z b1= 0.000	b2/Z b2=12.000	I1	I2	DP	Po	Po+DP
1	Ac1	2.500	3.000	0.000	4.800	0.398	0.499	8.070	4.150	12.220
2	Ac2	9.000	0.833	0.000	1.333	0.221	0.470	6.219	10.940	17.159

SUBSIDED VALUE FOR CONSOLIDATION AND COEFFICIENT OF CONSOLIDATTION

SOIL No.	SOIL	THICKNESS OF SOIL	Po	DP	Po+DP	e0	e1	Sc	DP/2	Po+DP/2	Cv
1	Ac1	5.0000	4.1500	8.0700	12.2200	1.3770	1.2720	0.2209	4.0350	8.1850	380
2	Ac2	8.0000	10.9400	6.2191	17.1591	1.2850	1.2240	0.2136	3.1096	14.0496	360

TYPICAL COEFFICIENT OF CONSOLIDATION AND DISTANCE OF DRAINAGE

SOIL No	SOIL	THICKNESS OF SOIL	Cv	Cv'	H'	CONDITION OF DRAINAGE	DISTANCE OF DRAINAGE
1	Ac1	500.00	380.00	380.00	1321.92	1Side	1321.92
2	Ac2	800.00	360.00				

SUBSIDED TIME FOR CONSOLIDATION BY MOMENTARY EMBANKMENT

U (%)	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	95.00	100.00
Tv	0.003	0.031	0.071	0.126	0.196	0.287	0.403	0.567	0.848	1.130	infinite

EXPRESSION t=Tv.d^2/C'v=Tv.1321.92²/ 380.00=4598.63

t (days)	36.79	142.56	326.50	579.43	901.33	1319.81	1853.25	2607.42	3899.63	5196.45	
Sc.U (cm)	4.34	8.69	13.03	17.38	21.72	26.07	30.41	34.75	39.10	41.27	43.44

*APPENDIX

CALCULATION OF CONVERTIBLE SOIL THICKNESS

500.00 *SQR(380.00 / 380.00) + 800.00 *SQR(380.00 / 360.00)

CALCULATION OF INITIAL PRESSURE

Km 1+050 HE=5.0 m Toe of Slope of Embankment

SOIL No.	SOIL	THICKNESS OF SOIL	WET UNIT WEIGHT	CALCULATION OF INITIAL PRESSURE	INITIAL PRESSURE
1	Ac1	5.000	1.660	0.000+0.5(0.000 * 0.000 + 5.000 * 1.660)	4.150
2	Ac2	8.000	0.660	4.150+0.5(5.000 * 1.660 + 8.000 * 0.660)	10.940

INTENSITY OF DISTRIBUTED LOAD

SOIL No.	SOIL	DEPTH FROM CENTRAL SOIL STRUTA	a1+a2/Z a1=7.500	a1+b/Z a2=0.000	a1/Z	a2/Z	b/Z b=12.000	I1	I2	I3	DP	Po	Po+DP
1	Ac1	2.500	3.000	7.800	3.000	0.000	0.000	0.500	0.400	0.000	0.900	4.150	5.050
2	Ac2	9.000	0.833	2.167	0.833	0.000	0.000	0.497	0.220	0.000	2.493	10.940	13.433

SUBSIDED VALUE FOR CONSOLIDATION AND COEFFICIENT OF CONSOLIDATTION

SOIL No.	SOIL	THICKNESS OF SOIL	Po	DP	Po+DP	e0	e1	Sc	DP/2	Po+DP/2	Cv
1	Ac1	5.0000	4.1500	0.9000	5.0500	1.3770	1.3620	0.0316	0.4500	4.6000	400
2	Ac2	8.0000	10.9400	2.4930	13.4330	1.2850	1.2600	0.0875	1.2465	12.1865	365

TYPICAL COEFFICIENT OF CONSOLIDATION AND DISTANCE OF DRAINAGE

SOIL No	SOIL	THICKNESS OF SOIL	Cv	Cv'	H'	CONDITION OF DRAINAGE	DISTANCE OF DRAINAGE
1	Ac1	500.00	400.00	400.00	1337.48	1Side	1337.48
2	Ac2	800.00	365.00				

SUBSIDED TIME FOR CONSOLIDATION BY MOMENTARY EMBANKMENT

U (%)	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	95.00	100.00
Tv	0.008	0.031	0.071	0.126	0.196	0.287	0.403	0.567	0.848	1.130	infinite

EXPRESSION t=Tv.d^2/C'v=Tv.1337.48²/ 400.00=4472.12

t (days)	35.78	138.64	317.52	563.49	876.54	1283.50	1802.26	2535.69	3792.36	5053.50
Sc.U (cm)	1.19	2.38	3.57	4.76	5.95	7.14	8.34	9.53	10.72	11.31	11.91

*APPENDIX

CALCULATION OF CONVERTIBLE SOIL THICKNESS

500.00 *SQR(400.00 / 400.00) + 800.00 *SQR(400.00 / 365.00)