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T Epsom

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THE S I S O N T O W N  
P L A N N I N G  
S C H E M E .

BY:

M I G U E L K A W A S .

B . S . C E

1944-1945.

A . U . B .

## I N T R O D U C T I O N

At the beginning of this century people started thinking seriously of the importance of proper city planning. This awakening was caused because in the past roads and buildings were built without proper thinking so that disorder and irregularities were caused.

Roads were narrow and buildings were crowded so that in many places hygienic conditions were very poor. The beginning of this century made people realize that civilized communities must live in towns which have laws governing their present and future growth.

Engineers started studying different towns and reports were concluded. Ideas of proper city planning were detected. Municipalities enforced laws governing width of roads, height of houses, special areas for buildings, and other important factors that made a town better from all respects.

The aesthetic and hygienic conditions of many towns were thus improved.

But, Alas! my own country which is Palestine still has much to improve. It is true that there are laws governing the present and future growth of towns in Palestine, but there are still old buildings, such as <sup>the</sup> Bethlehem, Nazareth, the Old City of Jerusalem and other towns that cause disorder.

If our municipalities were rich enough they would have rebuilt these old buildings according to proper planning, but unfortunately they are not.

Unless we the present Palestinian engineers study city planning and help, it would take a long time before our cities would be improved. This was the main factor which made me take city planning as my thesis, with the advice of Professor Manassah.

Another factor was the present war. Many towns in Europe have been completely destroyed, (the) which will have to be re-planned and rebuilt. Engineers with knowledge of city planning will be better qualified for the job.

In conclusion I must say that the guidance of Professor Manassah was a great help in my work.

A plot of land of 483 meters x 473 meters which is found somewhere in Palestine is to be divided into lots suitable for development into a first class Residential Suburb Villa type.

As the time is limited it is not required to enter into minute details.

Profiles of the roads and the plan of the drains for the roads are to be shown.

The contours of the plan given are at 1/2 meter intervals and the scale is 1:1000. On the west of this quarter is the town in which the inhabitants work and it is only a short distance away.

#### A I M O F P L O T

The plot is meant only for Villas and so the people that live here are going to be of high class who want peace and quietness. For this reason it is my aim not to encourage any vehicles or those who have no business in the district to pass through it. So a green belt 15 meters wide will be planted all along the district. This will have four effects:

- 1). It will beautify the place.
- 2). It will indicate the boundaries of the plot.
- 3). It will discourage those passing by to get into the

district.

4). It will act as a forest or recreational place where inhabitants can have picnics.

### PROCEDURE OF WORK

In brief, the way the plot was dealt with is as follows. First the roads were drawn on the plan keeping in mind the following:

- 1). not to exceed the slope limit,
- 2). to leave space for two tiers of lots between one road and the other,
- 3). to leave a place at the middle for a community centre,
- 4). keeping in mind the valley which has water during winter and is dry during summer, and
- 5). the rules of alignment and curvature were taken into account.

The profiles of the roads were drawn to see if the slope exceeded the limit and whether the cut or fill were too great so as to change the direction of the roads if advisable. A place for the community centre was then chosen. Then the blocks and lots were divided. Lastly the direction of the drains were thought of. Changes were done until the correct solution was found.



## DISCUSSION OF THE PLAN

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### LOTS.

The size of the lots are between 600 to 800 Sq. Meters. (Width is between 15 meters to 25 meters, while the length is between 30 meters to 40 meters). The houses that are going to be built in these lots should not be more than 2 1/2 storeys inhabited by a single family. The space used by the building should comply with the town planning regulations of the district.

### BLOCKS.

The blocks should be so arranged that people could go around from one place to the other without much trouble. Also there should not be any difficulty for students to get from any block to the community centre.

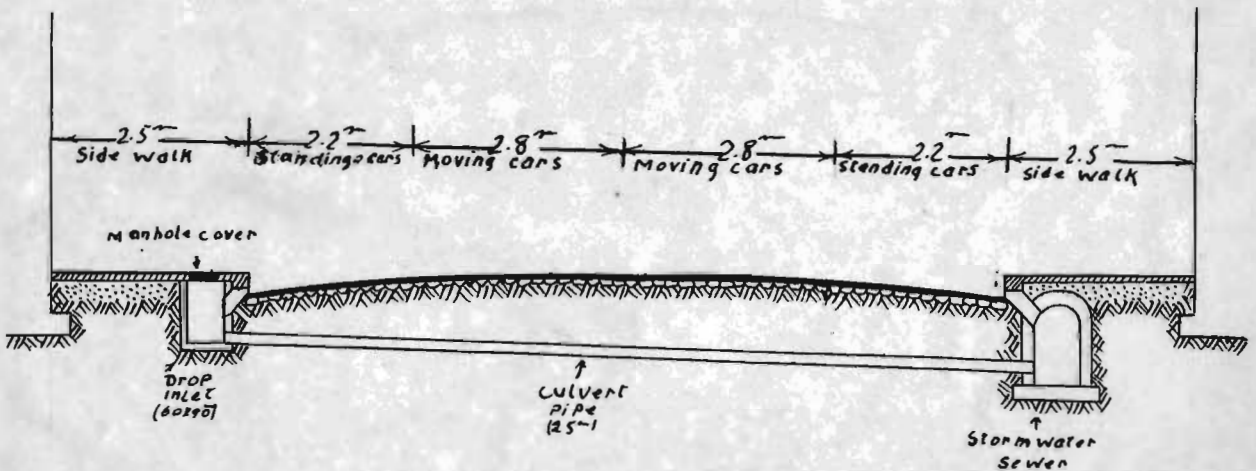
### ROADS.

One road running in the North-South direction and cutting the green belt at the North and two roads running East-West leading to the down town district are constructed. We are not constructing more roads so as to discourage those who have no business to get inside.

There are two kinds of streets, (1) Major streets and (2) Minor streets. The width of the streets are such that it is

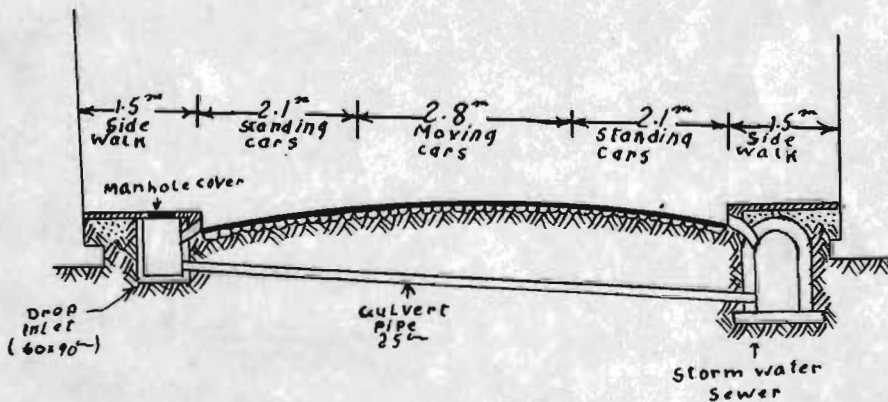
considered that no trucks or very large vehicles will pass through them except at rare occasions. The cars will be mostly private ones which carry the men from their homes to their work and visa versa.

1). Major Streets have a width of 15 meters containing two lanes of 2.8 meters width each at the centre for moving cars, two lanes for standing cars of 2.2 meters each at the sides, and two side walks of 2.5 meters each; ( $2.8 \times 2$  plus  $2.2 \times 2$  plus  $2.5 \times 2 = 15$ ). The diagram below shows a cross-section of a Major Street with dimensions.





2). Minor Streets have a width of 10 meters containing one lane of moving cars of 2.8 meters at the centre and two lanes of standing cars of 2.1 meters each at the ends, and two side walks of 1.5 meters each; ( $2.8 \times 2$  plus  $2.1 \times 2$  plus  $1.5 \times 2 = 10$  meters). These widths are slightly increased when there is a curve. The diagram below shows a cross-section of a Minor Street with the dimensions.



Scale: 1:100

Note that road (18)-(19)-(20)-(21)-(22), etc. on the plan does not lead to the central square as there are five roads meeting there and I do not want to make the place too congested. This however will not delay cars much as the increase in distance will not be much. I have made a side-walk of 2 meters wide from this road between points (20) and (21) leading to road (1), (2), (3), and (4), for people and specially students who are going on foot.

#### G R A D I E N T

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It is recommended to keep as far as possible the gradient for Major Streets below 6% and for Minor Streets below 9%. It is however permissible to exceed these slopes in order to avoid great excavation or cut, but only for short distances. The exceptions to the limited slopes are:

- a). Between (7) and (9) for 116.5 meters at 6.6%.
- b). Between (15) and (16) for 95 meters at 7.3%.
- c). Between (10) and (11) for 41.5 meters at 6.7%.
- d). Between (6) and (23) for 45.2 meters at 9.6%.
- e). Between (21) and (22) for 51.2 meters at 7%.

This shows that the maximum slope for a major street is 7.3% and for a minor street 9.6%.



VERTICAL CURVES.

Changes in street grades are connected by vertical curves of a minimum length 5 times the algebraic difference in rates of grades in major streets and 3 times in minor streets, e.g. the length of the vertical curve between (15) and (16) is  $(7.3 - 1.7) \times 5 = 28$  meters. Therefore 28 Meters is the minimum length of that vertical curve.

CLEAR VISIBILITY.

The clear visibility measured along the centre line of the road is at least 60 meters in major streets and 30 meters in minor streets. This applies for curves and not for corners.

RADIUS OF CURVATURE.

The minimum radius of curvature at the centre line of roads is of 60 meters for major streets and 30 meters for minor streets.

REVERSED TANGENTS.

Tangents between reversed curves are 30 meters and more when practicable.

CORNERS.

Corners of property lines are rounded off by an arc at the intersections of the streets. According to some authors on town planning, the minimum radius of such arcs should be

3 meters for minor streets and 5 meters for major streets. In this suburb I find it suitable to use arcs of 9 meters radius for minor streets and major streets in order to increase the visibility at the corners.

### PROFILES.

Profiles of all roads are drawn. The horizontal scale is 1:1000 and the vertical scale is 1:200.

### S H O P P I N G   C E N T R E

At the centre of the district we have a shopping place marked X. Here there is place for a grocer, a butcher, and a barber. Near the forests in the North-East and South-East, places for a grocer and a butcher marked X are left.

It is calculated that one grocer and one butcher is enough for about 65 families as it is assumed that many things are got from the down town district when the man of the house comes from his business.

Only one barber is found in this district for emergency cases. Most of the shaving, hair cutting and hair dressing will be done in the down town district.

No more shops are allowed as the object of this suburb is for residential purposes.



### S T R E A M

Along the valley there is a stream of water which dries up during summer. The water of the stream comes from the mountains and goes in the direction of the down town district.

The water is used for gardens and washing but not for drinking. Along the sides of the stream, trees are planted to make the place more beautiful.

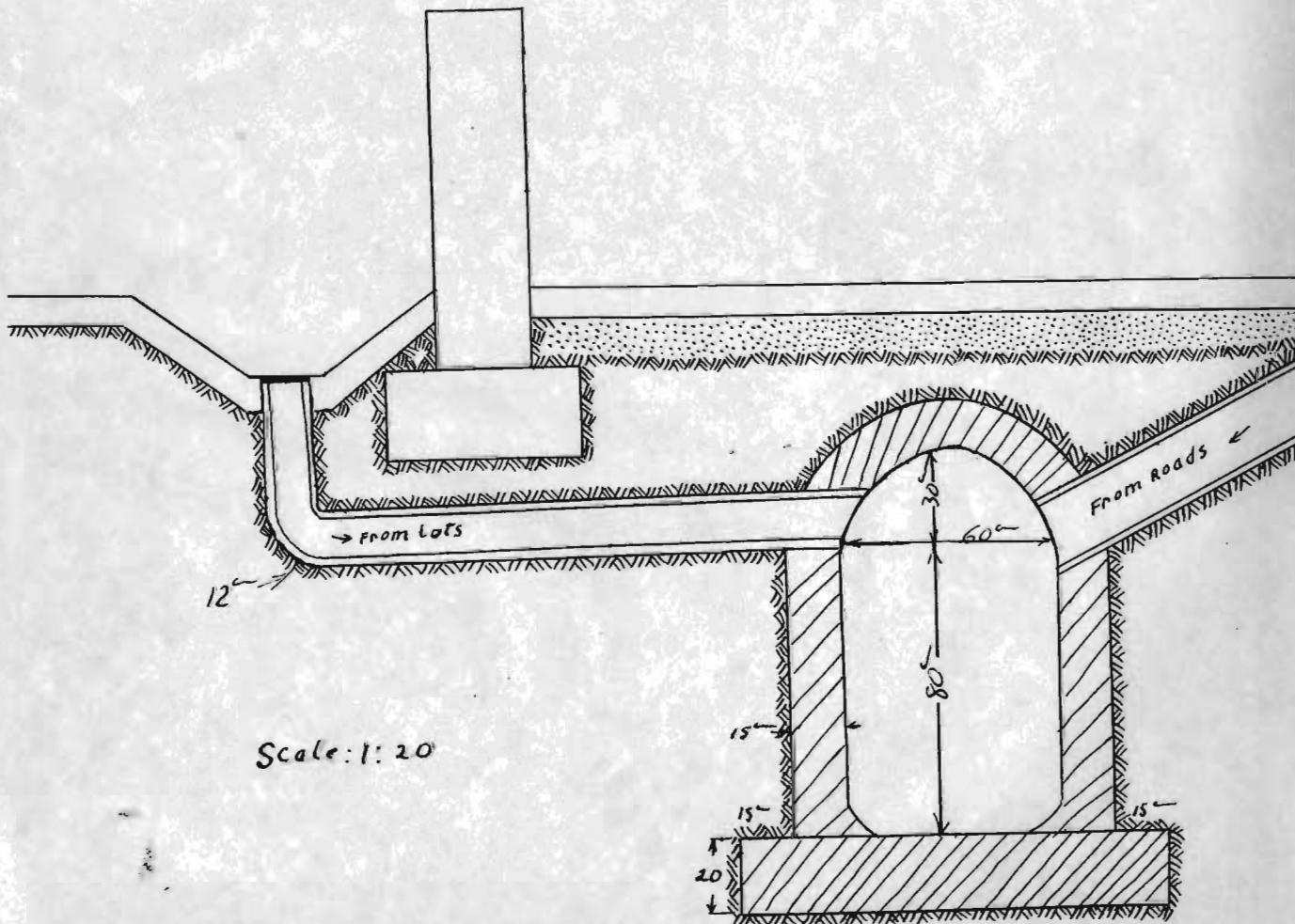
### S T O R M W A T E R S E W E R S

The storm water sewers are shown on the plan by dotted lines. It is found that it is more economical to have sewers on one side of the road. Catch basins at intervals of 30 meters and at street corners are made on the other side of the road. By means of concrete pipes of 30 centi-meters in diameter the water from these catch basins are carried to the sewers on the other side of the road.

Note that between points (11) and (30), on the plan, there is a dip, so storm water is collected there and is carried through a lot to the community centre and then joined to the main sewer between points (12) and (14).

The storm water of the community centre is collected and carried through this sewer. The cross-section of the sewer is shown below with dimensions.

Note that easements at least 2m. wide (1m. on each side) of rear or side lot lines shall be provided for utilities where necessary.





## COMMUNITY CENTRE

The most important factor of the plan is the Community Centre. There are several functions for this centre, and they are as follows:

1). To have a primary school for children. (Students of the secondary classes can go to the down town school on the west of the suburb).

2). To have a library for the students and for the inhabitants.

3). To have an Assembly Hall for the following reasons:

a). lectures, b). acting, c). cinema performances.

4). To have a gym hall, tennis courts, basket-ball fields and children's play ground and garden for families. Great attention is taken to sports because rich people are apt to become lazy. Unless greatly encouraged they will do little or no sports. For this reason I have allotted a great space for athletics.

### PLANNING THE COMMUNITY CENTRE.

The Community Centre is roughly planned so as to justify the space allotted for it. The real or final planning is left

for the architect as I am only dealing with town planning.

The general plan of the ground and building is shown on the main plan.

### SCHOOL PROPER.

The school proper of two floors is in the form of a double U. The Assembly Hall forms one wing and the Gym Hall forms the other. The dimensions of the Assembly and Gym Halls are 15 meters x 30 meters. Basket-ball could be played in the Gym Hall. Dimensions of basket-ball field are 94ft. x 50ft. maximum and 60ft x 35ft. minimum. The minimum of these is taken for the basket-ball court in the Gym Hall. Besides the athletic director's office, showers, lavatories, and apparatus rooms are found in the Gym Hall.

The dimension of the Assembly Hall is 15 Meters x 30 Meters. The stage and actors' rooms and lavatories are included.

There are seven class rooms 8 meters x 6 meters each. It is considered that each family will send one child to school and there are about 187 houses. In each class there will be place for 30 students. Therefore the school can accommodate (7 x 30) 210 students. The reason why I give space of 48 Sq; meters for each class is due to the fact that I am allowing

1.6 Sq. meters (48 + 30 = 1.6 sq. m.) for each student.

A library of 6 meters x 10 meters is found on the second floor.

### TENNIS COURTS.

Two tennis courts of 36ft. x 78ft. are to be constructed in the South-East corner. A trapezoidal space of parallel sides 41 x 35 meters and height 31 meters is left for the tennis courts. The least dimension is 35 meters and this is in the North-South direction. The length of the courts will be in this direction so that the sun will not obstruct in the afternoon. There will be about 3.5 meters left at each end of the courts after making them of dimensions 36ft. x 78ft. Spectators can watch from the garden and the children's playground.

### GARDEN.

Two places of about 30 meters x 60 meters each are left at the North-West and South-West corners of the Community Centre for gardens. This might be called "The Community's Park." Here the families during their spare time will come and sit down and enjoy themselves. There will be a lovely fish pool at the center. The rest of the place will be planted with





# TOWN PLANNING SCHEME BY M. KAWAS



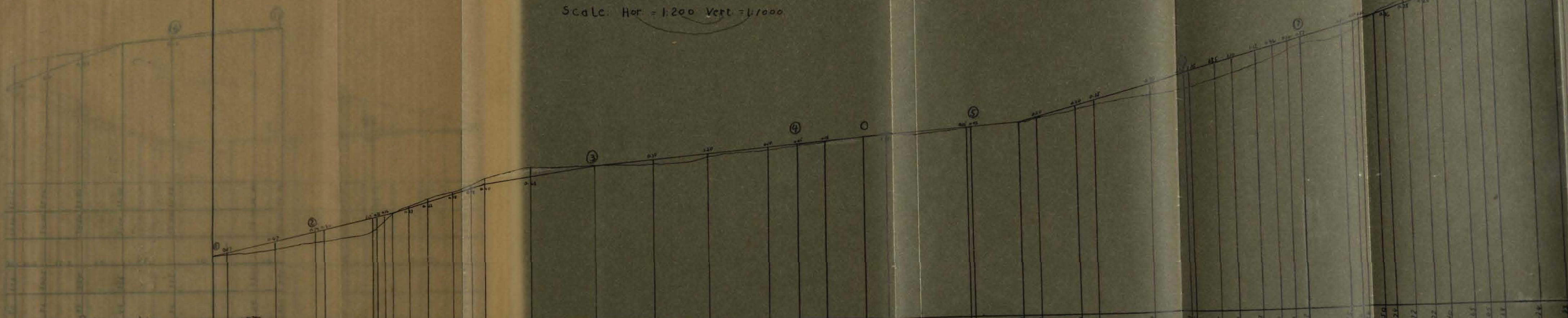
Scale 1:1000

Storm water Sowers  
C.L. of Streets  
etc. Points on Street Profiles



# STREET PROFILES

Scale: Hor = 1:200 Vert = 1:1000



Peg No.	Partial Distance	Accumulated Dist	Ground Elevation	Grade Elevation
165	5	5	19.9	20.17
166	18	13	20.00	20.17
167	23	18	20.50	20.97
168	37	31	20.90	21.60
169	40.5	40.5	21.00	21.80
170	58.5	58.5	21.50	22.65
171	60	60	22.00	23.22
172	63	63	22.50	23.86
173	72	72	23.00	24.00
174	78.5	78.5	23.50	24.00
175	88	88	24.00	24.42
176	95	95	24.50	24.42
177	100	100	25.00	25.10
178	117	117	26.00	26.65
179	140.5	140.5	26.50	26.80
180	162	162	26.50	26.80
181	182.5	182.5	27.00	27.20
182	205	205	27.50	27.60
183	216	216	28.00	27.85
184	226	226	28.00	28.02
185	240.5	240.5	28.30	28.30
186	249.5	249.5	28.50	28.50
187	271	271	29.00	29.05
188	300	300	29.50	29.50
189	317	317	29.50	29.70
190	327	327	30.00	30.50
191	338	338	30.50	30.85
192	348.5	348.5	31.00	31.22
193	357	357	31.50	31.75
194	367	367	32.00	32.35
195	377	377	32.50	32.60
196	391	391	33.00	33.00
197	407	407	33.50	33.50
198	407.5	407.5	34.00	34.00
199	408	408	34.50	34.50
200	424.5	424.5	35.00	35.00
201	442	442	35.50	35.50
202	444	444	36.00	36.00
203	461	461	36.50	36.50
204	467	467	37.00	37.00
205	487	487	37.50	37.50
206	507	507	38.00	38.00
207	517	517	38.50	38.50
208	527	527	39.00	39.00
209	547	547	39.50	39.50
210	571	571	40.00	40.00
211	594.5	594.5	40.50	40.50
212	611	611	41.00	41.00
213	627	627	41.50	41.50
214	647	647	42.00	42.00
215	667	667	42.50	42.50
216	687	687	43.00	43.00
217	707	707	43.50	43.50
218	727	727	44.00	44.00
219	747	747	44.50	44.50
220	767	767	45.00	45.00
221	787	787	45.50	45.50
222	807	807	46.00	46.00
223	827	827	46.50	46.50
224	847	847	47.00	47.00
225	867	867	47.50	47.50
226	887	887	48.00	48.00
227	907	907	48.50	48.50
228	927	927	49.00	49.00
229	947	947	49.50	49.50
230	1000	1000	49.50	49.50

+4.7  
100

+3.25  
40.5

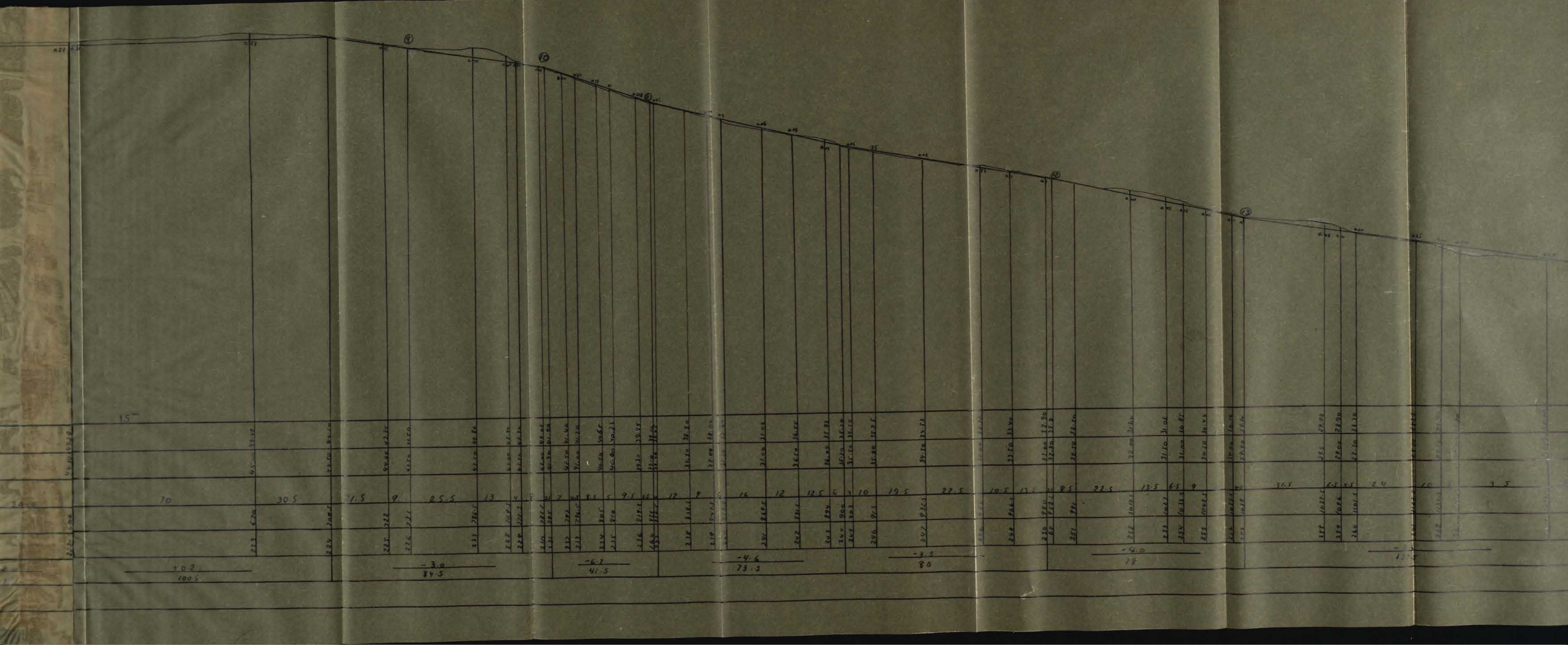
+1.9  
100

+2.85  
59.5

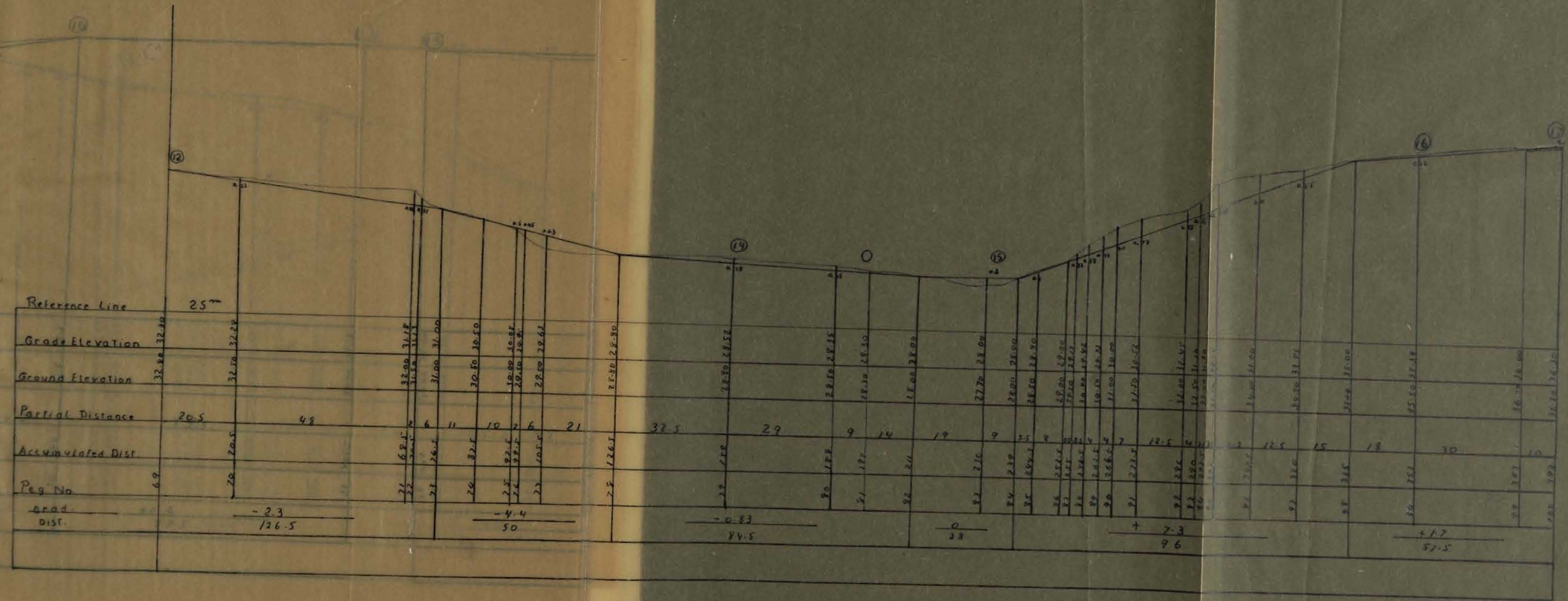
+3.70  
138

+6.6  
116









Grade	Dist.	Elevation	Partial Distance	Accumulated Dist.	Peg No.
		32.80			69
	20.5	32.28		20.5	70
	48	32.00	6	26.5	71
		31.50	11	37.5	72
		31.00	16	53.5	73
		30.50	21	74.5	74
		30.00	26	100.5	75
		29.50	31	126.5	76
		29.00	36	162.5	77
		28.50	41	203.5	78
		28.00	46	249.5	79
		28.50	51	300.5	80
		28.00	56	356.5	81
		28.50	61	417.5	82
		28.00	66	483.5	83
		28.50	71	554.5	84
		28.00	76	630.5	85
		28.50	81	711.5	86
		28.00	86	797.5	87
		28.50	91	898.5	88
		28.00	96	1014.5	89
		28.50	101	1135.5	90
		28.00	106	1261.5	91
		28.50	111	1392.5	92
		28.00	116	1528.5	93
		28.50	121	1669.5	94
		28.00	126	1815.5	95
		28.50	131	1966.5	96
		28.00	136	2122.5	97
		28.50	141	2283.5	98
		28.00	146	2449.5	99
		28.50	151	2620.5	100
		28.00	156	2796.5	101
		28.50	161	2977.5	102
		28.00	166	3163.5	103
		28.50	171	3354.5	104
		28.00	176	3550.5	105
		28.50	181	3751.5	106
		28.00	186	3957.5	107
		28.50	191	4168.5	108
		28.00	196	4384.5	109
		28.50	201	4605.5	110
		28.00	206	4831.5	111
		28.50	211	5062.5	112
		28.00	216	5308.5	113
		28.50	221	5559.5	114
		28.00	226	5815.5	115
		28.50	231	6076.5	116
		28.00	236	6342.5	117
		28.50	241	6613.5	118
		28.00	246	6889.5	119
		28.50	251	7170.5	120
		28.00	256	7456.5	121
		28.50	261	7747.5	122
		28.00	266	8043.5	123
		28.50	271	8344.5	124
		28.00	276	8650.5	125
		28.50	281	8961.5	126
		28.00	286	9277.5	127
		28.50	291	9598.5	128
		28.00	296	9924.5	129
		28.50	301	10255.5	130
		28.00	306	10591.5	131
		28.50	311	10932.5	132
		28.00	316	11278.5	133
		28.50	321	11629.5	134
		28.00	326	11985.5	135
		28.50	331	12346.5	136
		28.00	336	12712.5	137
		28.50	341	13083.5	138
		28.00	346	13459.5	139
		28.50	351	13840.5	140
		28.00	356	14226.5	141
		28.50	361	14617.5	142
		28.00	366	15013.5	143
		28.50	371	15414.5	144
		28.00	376	15820.5	145
		28.50	381	16231.5	146
		28.00	386	16647.5	147
		28.50	391	17068.5	148
		28.00	396	17494.5	149
		28.50	401	17925.5	150

grad dist:  $\frac{-2.3}{126.5}$   
 $\frac{-4.4}{50}$   
 $\frac{-0.83}{84.5}$   
 $\frac{0}{38}$   
 $\frac{+7.3}{96}$   
 $\frac{+1.7}{57.5}$





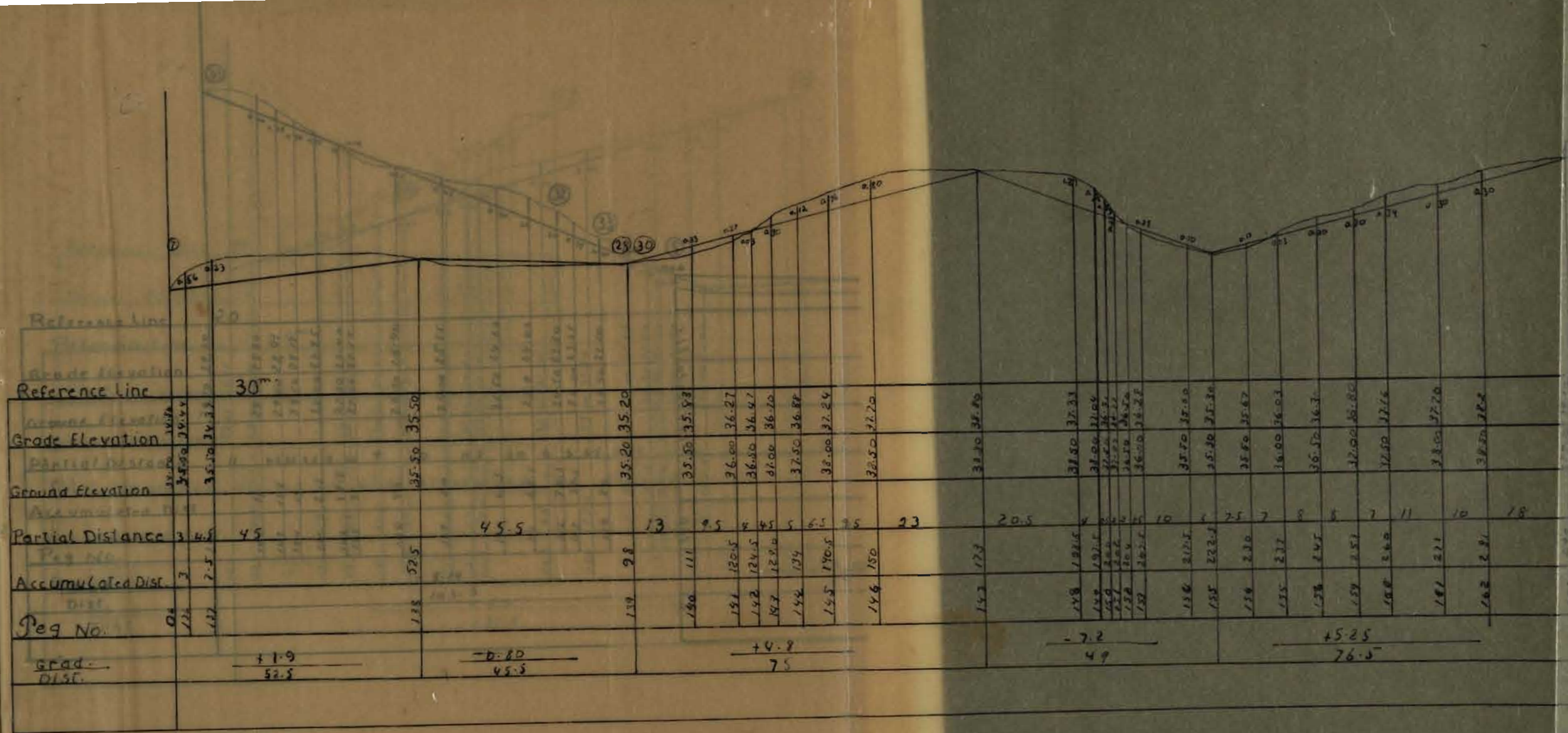


Reference  
 Grade Elev  
 Partial Dist  
 Accumulated  
 Peg No  
 Grad.  
 Dist.

Reference Line	20																																																	
Grade Elevation	24.30	23.80	24.00	24.10	24.20	24.30	24.40	24.50	24.60	24.70	24.80	24.90	25.00	25.10	25.20	25.30	25.40	25.50	25.60																															
Ground Elevation	24.30	23.80	24.00	24.10	24.20	24.30	24.40	24.50	24.60	24.70	24.80	24.90	25.00	25.10	25.20	25.30	25.40	25.50	25.60																															
Partial Distance		44		60.5		25.5		33		7		6		17.5		4		8		6		7		6		4		2		5		31																		
Accumulated Dist.			44																																															
Peg No.	35		36					37		38		39		40		41		42		43		44		45		46		47		48		49		50		51		52		53		54		55		56		57		58
Grad. Dist.			+0.75								+7.5												+0.3																											
			163								110.5												31																											





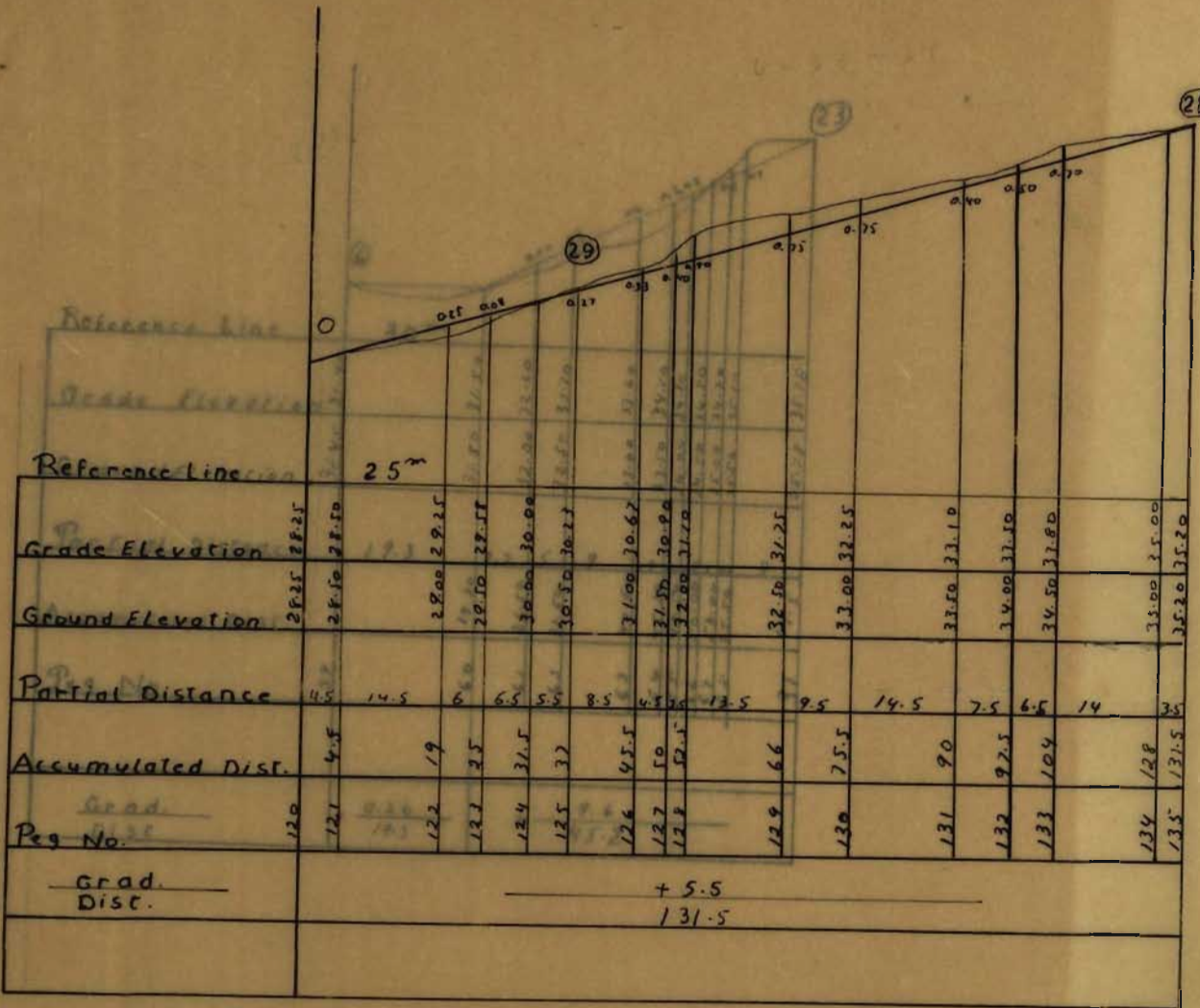


Reference Line	Grade Elevation	Ground Elevation	Partial Distance	Accumulated Dist.	Peg No.	Grad. DIST.
30m	35.50	35.50	45	52.5	126	+1.9 52.5
	35.20	35.20	45.5	98	127	-0.30 45.5
	35.50	35.50	13	111	128	
	36.00	36.00	9.5	120.5	129	+0.9 75
	36.50	36.47	8	128.5	130	
	37.00	36.70	4.5	133	131	
	37.50	36.88	5	138	132	
	38.00	37.24	6.5	144.5	133	
	32.50	32.20	23	150	134	
	38.50	38.80	20.5	173	135	
	37.50	37.31	4	177.5	136	-0.2 49
	37.00	37.09	8	185.5	137	
	36.50	36.31	4	190	138	
	36.00	35.70	10	200	139	
	35.50	35.34	2.5	202.5	140	
	35.00	35.67	7	210	141	
	36.00	36.01	8	218	142	
	36.50	36.7	8	226	143	+5.25 76.5
	32.00	32.80	7	233	144	
	32.50	32.76	11	244	145	
	33.00	32.70	10	254	146	
	33.50	32.8	18	272	147	





Reference Line	20																								
Grade Elevation	29.70	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50	23.00	22.50	22.00	21.50	21.00						
Ground Elevation	29.70	29.50	29.00	28.50	28.00	27.50	27.00	26.50	26.00	25.50	25.00	24.50	24.00	23.50	23.00	22.50	22.00	21.50	21.00						
Partial Distance	11	4.5	5.5	4.5	5	4.5	9	10	11.5	7.0	6	3	6.5	5.5	4	1.5	3.5	3.5							
Accumulated Dist		11	15.5	19	23.5	27.5	31	40	50	61.5	68.5	75.5	77.5	84	89.5	93.5	96.5	100	105.5						
Peg No.	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120					
Grad. Disc.		- 8.14															+ 0.68								
Disc.		105.5															73								



+ 5.5

131.5



23

2

Reference Line

30m

Grade Elevation

Ground Elevation

Partial Distance

Accumulated Dist.

Peg No.

Grad.  
Dist

+  $\frac{0.26}{19.3}$

+  $\frac{9.6}{45.2}$

31.45

31.50

19.3

59

31.50

31.50

19.30

60

32.00

32.00

26.50

61

32.70

32.50

31.50

62

33.00

32.00

40.50

63

34.00

33.50

45.20

64

34.50

34.00

52.50

65

34.50

34.50

50.00

66

34.80

35.00

52.00

67

35.00

35.00

55.50

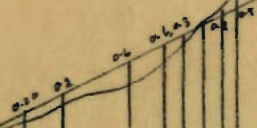
68

35.70

35.70

64.5

71



0.26%

0.26%

0.26%

0.26%

0.26%

