

# TABLES



**TABLE 1 — CONVERSION FACTORS**

TO CONVERT	TO	MULTIPLY BY
Acres	Sq. Miles	0.0015625
Acres	Sq. Yards	4840
Centimeters	Inches	0.393700
Centimeters	Meters	10 <sup>-2</sup>
Centimeters	Yards	0.01093611
Chains (Gunter's)	Yards	22
Chains (Gunter's)	Feet	66
Decameter	Meters	10
Decimeter	Meter	10 <sup>-1</sup>
Degrees (Sexagesimal)	Minutes (Sexagesimal)	60
Degrees (Sexagesimal)	Radians	0.0174533
Fathoms	Feet	6
Feet	Inches	12
Feet	Meters	0.3048006096
Furlongs	Miles	0.125
Inches	Centimeters	2.540005
Inches	Feet	1/12
Kilometers	Meters	1000
Kilometers	Miles (Nautical)	0.539593
Kilometers	Miles (Statute)	0.6213699495
Leagues (Statute)	Miles (Statute)	3
Links (Gunter's)	Inches	7.92
Meters	Feet	3.280833333
Meters	Inches	39.3700
Meters	Yards	1.093611
Miles (Nautical)	Feet	6080.20
Miles (Nautical)	Miles (Statute)	1.1516
Miles (Statute)	Feet	5280
Miles (Statute)	Kilometers	1.609347219
Minutes (Sexagesimal)	Radians	2.90888 x 10 <sup>-4</sup>
Minutes (Sexagesimal)	Seconds (Sexagesimal)	60
Radians	Degrees (Sexagesimal)	57.29578
Rods	Yards	5.5
Rods	Feet	16.5
Seconds (Sexagesimal)	Minutes (Sexagesimal)	1/60
Square Feet	Acres	0.000022956
Square Feet	Sq. Inches	144
Square Feet	Sq. Meters	0.09290341
Square Meters	Sq. Yards	1.195985
Square Miles	Acres	640
Square Yards	Sq. Feet	9
Square Yards	Sq. Meters	0.83613
Yards	Feet	3
Yards	Meters	0.91440183

## TABLE 2 TABLES OF MEASUREMENTS

### LINEAR MEASURE

1 foot	=	12 inches	1 furlong	=	1/8 mile
1 yard	=	36 inches	1 furlong	=	220 yards
1 yard	=	3 feet	1 mile	=	320 rods
1 rod	=	5.5 yards	1 mile	=	80 chains
1 rod	=	16.5 feet	1 mile	=	8 furlongs
1 Link*	=	7.92 inches	1 mile	=	1760 yards
1 Chain*	=	66 feet	1 mile	=	5280 feet

### SQUARE MEASURE

1 sq. foot	=	144 sq. inches	1 acre	=	160 sq. rods
1 sq. yard	=	9 sq. feet	1 acre	=	43,560 sq. feet
1 sq. rod	=	30.25 sq. yards	1 sq. mile	=	640 acres

### SURVEYOR'S SQUARE MEASURE

1 sq. rod	=	625 sq. links*	1 sq. mile	=	640. acres
1 sq. chain*	=	16. sq. rods	1 section	=	640 acres
1 acre	=	10 sq. chains*	1 township	=	36 sections

### ANGULAR MEASURE

1 minute	=	60 seconds	1 quadrant	=	90 degrees
1 degree	=	60 minutes	1 semi-circle	=	180 degrees
1 octant	=	45 degrees	1 circle	=	360 degrees
1 sextant	=	60 degrees	1 radian	=	57.30 degrees

### MISCELLANEOUS MEASURE.

One length	=	7.5 feet
one pace	=	3 feet
one pace (military)	=	36 inches
one perch (linear)	=	5.5 yards = 16.5 feet
one perch (land)	=	1 square rod
one pole	=	5.5 yards = 16.5 feet
one rod	=	16.5 feet = 5.5 yards
one chain*	=	66 feet
one chain (engineer's)	=	100 feet
one link*	=	7.92 inches
one link (engineer's)	=	12 inches
one furlong	=	660 feet = 1/8 mile
one vara	=	33.33 inches
one rood	=	0.25 acre

\*Gunter's chain (66 feet). The words "chain" and "link" should always be interpreted as meaning "Gunter's chain or link." The "engineer's chain" length should never be used unless the deed or survey specifically calls for "engineer's chain." See explanation of both chain measures, under "chain" in the glossary.

### TABLE 3 — METRIC TABLES

#### ABBREVIATIONS

m	—	meter	c	—	centi-	G	—	giga-
a	—	are	d	—	deci-	T	—	tera-
s	—	stere	da	—	deka-	n	—	nano-
g	—	gram	h	—	hecto-	p	—	pico-
liter	—	liter	k	—	kilo-	f	—	femto
u	—	micro-	my	—	myria-	a	—	atto
m	—	milli-	M	—	mega-			

#### NUMERICAL VALUES

deci-	1/10	deka-	10	giga-	1,000,000,000
centi-	1/100	hecto-	100	tera-	1,000,000,000,000
milli-	1/1,000	kilo-	1000	nano	1/1,000,000,000
micro-	1/1,000,000	Myria-	10000	Pico-	1/1,000,000,000,000
		mega-	100,000	femto-	one quadrillionth
				atto-	one quintillionth

#### LENGTH

1 micron	=	1/1000 millimeters	=	0.03937 mil
1 millimicron	=	1/1000 micron	=	0.0000394 mil
1 micromillimeter	=	1,000,000 millimeter		
1 micromicron	=	1,000,000 micron		
1 millimeter	=	1/1000 meter	=	0.03937 in.
1 centimeter	=	10 millimeters	=	0.3937 in.
1 decimeter	=	10 centimeters	=	3.937 in.
1 meter	=	10 decimeters	=	39.37 in.
1 dekameter	=	10 meters	=	393.7 in.
1 hectometer	=	10 dekameters	=	328-083 ft.
1 kilometer	=	10 hectometers	=	3280-83 ft.
1 myriameter	=	10 kilometers	=	6.2137 mi.

#### AREA

1sq. centimeter (cm <sup>2</sup> )	=	1 / 10,000 m <sup>2</sup>	=	0.1550 sq. in.
1 sq. meter (m <sup>2</sup> )	=		=	1.196 sq. yds.
1 sq. dekameter (dam <sup>2</sup> )	=	100 m <sup>2</sup>	=	119.6 sq. yds.
1 are (a)*	=	100 m <sup>2</sup>	=	119.6 sq. yds.
1 sq. hectometer (hm <sup>2</sup> )	=	10,000 m <sup>2</sup>	=	2.471 acres
1 hectare (ha)*	=	10,000 m <sup>2</sup>	=	2.471 acres
1 sq. kilometer (km <sup>2</sup> )	=	1,000,000 m <sup>2</sup>	=	0.386 sq. mi.

\*"are" and "hectare" should be used for land area.

Note: Weight, capacity, and volume not shown because the values are not needed in cadastral cartography.

## TABLE 4 — METRIC CONVERSION TABLES

### LINEAR MEASURE

#### Survey Measure to Metric Measure

1 inch	=	2.54 centimeters	1 link*	=	0.2012 meter
1 foot	=	0.3048 meter	1 chain*	=	20.1168 meters
1 foot	=	30.48 centimeters	1 link (eng.)	=	0.3048 meter
1 yard	=	0.9144 meter	1 chain (eng.)	=	30.480 meters
1 mile	=	1.609 kilometers	1 mile (naut.)	=	1.852 kilometers
1 rod	=	5.0292 meters	1 fathom	=	1.8288 meters
1 pole	=	5.0292 meters	1 league	=	5.5597 kilometers
1 furlong	=	201.168 meters			

### AREA

#### Survey Square Measure to Metric Square Measure

1 sq. inch	=	6.4516 cm <sup>2</sup>	1 acre	=	40.468 are
1 sq. foot	=	0.0929 m <sup>2</sup>	1 acre	=	0.4047 hectare
1 sq. yard	=	0.8361 m <sup>2</sup>	1 sq. mile	=	258.99 hectares
1 sq. rod	=	25.29 m <sup>2</sup>	1 sq. mile	=	2.59 km <sup>2</sup> ,
1 sq. link*	=	0.0405 m <sup>2</sup>	1 section	=	2.59 k <sub>2</sub> km <sup>2</sup>
1 sq. chain*	=	404.68 m <sup>2</sup>	1 township	=	9,324 hectares
1 sq. pole	=	25.29 m <sup>2</sup>	1 township	=	93.24 km <sup>2</sup>

### LINEAR MEASURE

#### Metric Measure to English Measure

1 millimeter	=	0.03937 inch	1 dekameter	=	32.8083 feet
1 centimeter	=	0.3937 inch	1 hectometer	=	328.083 feet
1 decimeter	=	3.937 inches	1 kilometer	=	0.62137 mile
1 meter	=	39.37 inches	1 kilometer	=	3280.83 feet
1 meter	=	3.208 feet	1 myriameter	=	6.2137 miles
1 dekameter	=	393.7 inches			

### SQUARE MEASURE

#### Metric Square Measure to English Square Measure

1 sq. centimeter	=	0.15499 sq. inch	1 sq. meter	=	10.294 sq. feet
1 sq. decimeter	=	15.499 sq. inches	1 sq. decameter	=	119.6 sq. yards
1 sq. meter	=	1,549.9 sq. inches	1 sq. hectometer	=	2.471 acres
1 sq. meter	=	1.196 sq. yards	1 sq. kilometer	=	0.386 sq. mile

### LAND AREA

#### Metric Square Measure to English Square Measure

1 sq. meter	=	1,549.9 sq. inches	1 hectare	=	2.471 acres
1 centiare	=	1,549.9 sq. inches	1 sq. kilometer	=	0.386 sq. mile
1 are	=	119.6 sq. yards			

\*Gunter's chain

## TABLE 4 (continued)

### CENTIMETERS TO INCHES

Centimeters	=	Inches	=	Centimeters	=	Inches
2.54	=	1	=	1	=	0.39370
5.08	=	2	=	2	=	0.78740
7.62	=	3	=	3	=	1.18110
10.16	=	4	=	4	=	1.57480
12.70	=	5	=	5	=	1.96850
15.24	=	6	=	6	=	2.36220
17.78	=	7	=	7	=	2.75590
20.32	=	8	=	8	=	3.14960
22.86	=	9	=	9	=	5.54330

### METERS — FEET

Meters	=	Feet	=	Meters	=	Feet
0.3048	=	1	=	1	=	3.28084
0.6096	=	2	=	2	=	6.56168
0.9144	=	3	=	3	=	9.84252
1.2192	=	4	=	4	=	13.12336
1.5240	=	5	=	5	=	16.40420
1.8288	=	6	=	6	=	19.68504
2.1336	=	7	=	7	=	22.96588
2.4384	=	8	=	8	=	26.24672
2.7432	=	9	=	9	=	29.52756

### METRIC CONVERSION FACTORS

To Convert	To	Multiply by
Square miles	Hectares	258.99881
Square miles	Square meters	2589988.1
Square miles	Square kilometers	2.5899881
Square chains	Square meters	404.68564
Square feet	Square centimeters	929.0304
Square feet	Square meters	0.09290304
Square centimeters	Square feet	0.0010763867
Square centimeters	Square meters	0.0001
Square dekameters	Square meters	100
Square dekameters	Acres	1
Square dekameters	Acres	0.024710538
Square hectares	Square meters	10000
Square kilometers	Square miles	0.38610216
Square kilometers	Square feet	1.0763910 × 10 <sup>7</sup>
Square kilometers	Acres	247.10538
Hectares	Acres	2.4710538
Hectares	Square feet	107639.10
Hectares	Square miles	0.0038610*216
Hectares	Acres	100
Hectares	Square centimeters	1 × 10 <sup>8</sup>
Hectares	Square meters	10000
Chains	Meters	20.1168

## TABLE 5 — METRIC ANGULAR MEASURE

### CENTESIMAL SYSTEM

The metric system of angular measure is known as the “centesimal system.”

In the centesimal system, each quadrant of a circle is divided into 100 parts known as “grads” (or grades). Each grad is further divided into decimal parts.

Angles of the centesimal system are written, for example, as: 376g 7289, or as 376g 72' 89"

Which is read as “three hundred seventy-six point seven two eight nine grads”; or, as “three hundred seventy-six grads, seventy-two centesimal minutes, and eighty-nine centesimal seconds.” The first method is recommended.

### CENTESIMAL CONVERSION FACTORS

TO CONVERT	TO	MULTIPLY BY
Grads	Circumferences	0.0025
Grads	Degrees	0.9
Grads	Minutes	54
Grads	Seconds	3240
Grads	Radians	0.015707963

### CONVERSION — GRADS TO DEGREES

GRADS	=	DEGREES	GRADS	=	DEGREES	GRADS	=	DEGREES
1	=	0.9	35	=	31.5	69	=	62.1
2	=	1.8	36	=	32.4	70	=	63.0
3	=	2.7	37	=	33.3	71	=	63.9
4	=	3.6	38	=	34.2	72	=	64.8
5	=	4.5	39	=	35.1	73	=	65.7
6	=	5.4	40	=	36.0	74	=	66.6
7	=	6.3	41	=	36.9	75	=	67.5
8	=	7.2	42	=	37.3	76	=	68.4
9	=	8.1	43	=	38.7	77	=	69.3
10	=	9.0	44	=	39.6	78	=	70.2
11	=	9.9	45	=	40.5	79	=	71.1
12	=	10.8	46	=	41.4	80	=	72.0
13	=	11.7	47	=	42.3	81	=	72.9
14	=	12.6	48	=	43.2	82	=	73.8
15	=	13.5	49	=	44.1	83	=	74.7
16	=	14.4	50	=	45.0	84	=	75.6
17	=	15.3	51	=	45.9	85	=	76.5
18	=	16.2	52	=	46.8	86	=	77.4
19	=	17.1	53	=	47.7	87	=	78.3
20	=	18.0	54	=	48.6	88	=	79.2
21	=	18.9	55	=	49.5	89	=	80.1
22	=	19.8	56	=	50.4	90	=	81.0
23	=	20.7	57	=	51.3	91	=	81.9
24	=	21.6	58	=	52.2	92	=	82.8
25	=	22.5	59	=	53.1	93	=	83.7
26	=	23.4	60	=	54.0	94	=	84.6
27	=	24.3	61	=	54.9	95	=	85.5
28	=	25.2	62	=	55.8	96	=	86.4
29	=	26.1	63	=	56.7	97	=	87.3
30	=	27.0	64	=	57.6	98	=	88.2
31	=	27.9	65	=	58.5	99	=	89.1
32	=	28.8	66	=	59.4	100	=	90.0
33	=	29.7	67	=	60.3			
34	=	30.6	68	=	61.2			

**TABLE 6 — RODS TO FEET**

RODS	FEET	RODS	FEET	RODS	FEET	RODS	FEET
.50	8.25	25.50	420.75	50.50	833.25	75.50	1245.75
1.00	16.50	26.00	429.00	51.00	841.50	76.00	1254.00
1.50	24.75	26.50	437.25	51.50	849.75	76.50	1262.25
2.00	33.00	27.00	445.50	52.00	858.00	77.00	1270.50
2.50	41.25	27.50	453.75	52.50	866.25	77.50	1278.75
3.00	49.50	28.00	462.00	53.00	874.50	78.00	1287.00
3.50	57.75	28.50	470.25	53.50	882.75	78.50	1295.25
4.00	66.00	29.00	478.50	54.00	891.00	79.00	1303.50
4.50	74.25	29.50	486.75	54.50	899.25	79.50	1311.75
5.00	82.50	30.00	495.00	55.00	907.50	80.00	1320.00
5.50	90.75	30.50	503.25	55.50	915.75	80.50	1328.25
6.00	99.00	31.00	511.50	56.00	924.00	81.00	1336.50
6.50	107-25	31.50	519.75	56.50	932.25	81.50	1344.75
7.00	115.50	32.00	528.00	57.00	940.50	82.00	1353.00
7.50	123.75	32.50	536.25	57.50	948.75	82.50	1361.25
8.00	132.00	33.00	544.50	58.00	957.00	83.00	1369.50
8.50	140.25	33.50	552.75	58.50	965.25	83.50	1377.75
9.00	148.50	34.00	561.00	59.00	973.50	84.00	1386.00
9.50	156.75	34.50	569-25	59.50	981.75	84.50	1394.25
10.00	165.00	35.00	577.50	60.00	990.00	85.00	1402.50
10.50	173.25	35.50	585.75	60.50	998.25	85.50	1410.75
11.00	181.50	36.00	594.00	61.00	1006.50	86.00	1419-00
11.50	189.75	36.50	602.25	61.50	1014.75	86.50	1427.25
12.00	198.00	37.00	610.50	62.00	1023.00	87.00	1435.50
12.50	206.25	37.50	618.75	62.50	1031.25	87.50	1443.75
13.00	214.50	38.00	627.00	63.00	1039.50	88.00	1452.00
13.50	222.75	38.50	635.25	63.50	1047.75	88.50	1460.25
14.00	231.00	39.00	643.50	64.00	1056.00	89.00	1468.50
14.50	239.25	39.50	651.75	64.50	1064.25	89.50	1476.75
15.00	247.50	40.00	660.00	65.00	1072.50	90.00	1485.00
15.50	255.75	40.50	668.25	65.50	1080.75	90.50	1493.25
16.00	264.00	41.00	676.50	66.00	1089.00	91.00	1501.50
16.50	272.25	41.50	684.75	66.50	1097.25	91.50	1509.75
17.00	280.50	42.00	693.00	67.00	1105.50	92.00	1518.00
17.50	288.75	42.50	701.25	67.50	1113.75	92.50	1526.25
18.00	297.00	43.00	709.50	68.00	1122.00	93.00	1534.50
18.50	305.25	43.50	717.75	68.50	1130.25	93.50	1542.75
19.00	313.50	44.00	726.00	69.00	1138.50	94.00	1551.00
19.50	321.75	44.50	734.25	69.50	1146.75	94.50	1559.25
20.00	330.00	45.00	742.50	70.00	1155.00	95.00	1567.50
20.50	338.25	45.50	750.75	70.50	1163.25	95.50	1575.75
21.00	346.50	46.00	759.00	71.00	1171.50	96.00	1584.00
21.50	354.75	46.50	767.25	71.50	1179.75	96.50	1592.25
22.00	363.00	47.00	775.50	72.00	1188.00	97.00	1600.50
22.50	371.25	47.50	783.75	72.50	1196.25	97.50	1608.75
23.00	379.50	48.00	792.00	73.00	1204.50	98.00	1617.00
23.50	387.75	48.50	800.25	73.50	1212.75	98.50	1625.25
24.00	396.00	49.00	808.50	74.00	1221.00	99.00	1633.50
24.50	404.25	49.50	816.75	74.50	1229-25	99.50	1641.75
25.00	412.50	50.00	825-00	75.00	1237.50	100.00	1650.00

**TABLE 7 — CHAINS TO FEET**

CHAINS	FEET
.25	16.50
.50	33.00
.75	49.50
1.00	66.00
1.50	99.00
2.00	132.00
2.50	165.00
3.00	198.00
3.50	231.00
4.00	264.00
4.50	297.00
5.00	330.00
5.50	363.00
6.00	396.00
6.50	429.00
7.00	462.00
7.50	495.00
8.00	528.00
8.50	561.00
9.00	594.00
9.50	627.00
10.00	660.00
10.50	693.00
11.00	726.00
11.50	759.00
12.00	792.00
12.50	825.00
13.00	858.00
13.50	891.00
14.00	924.00
14.50	957.00
15.00	990.00
15.50	1023.00
16.00	1056.00
16.50	1089.00
17.00	1122.00
17.50	1155.00
18.00	1188.00
18.50	1221.00
19.00	1254.00
19.50	1287.00
20.00	1320.00
20.50	1353.00
21.00	1386.00
21.50	1419.00
22.00	1452.00
22.50	1485.00
23.00	1518.00
23.50	1551.00
24.00	1584.00

CHAINS	FEET
24.50	1617.00
25.00	1650.00
25.50	1683.00
26.00	1716.00
26.50	1749.00
27.00	1782.00
27.50	1815.00
28.00	1848.00
28.50	1881.00
29.00	1914.00
29.50	1947.00
30.00	1980.00
30.50	2013.00
31.00	2046.00
31.50	2079.00
32.00	2112.00
32.50	2145.00
33.00	2178.00
33.50	2211.00
34.00	2244.00
34.50	2277.00
35.00	2310.00
35.50	2343.00
36.00	2376.00
36.50	2409.00
37.00	2442.00
37.50	2475.00
38.00	2508.00
38.50	2541.00
39.00	2574.00
39.50	2607.00
40.00	2640.00
40.50	2673.00
41.00	2706.00
41.50	2739.00
42.00	2772.00
42.50	2805.00
43.00	2838.00
43.50	2871.00
44.00	2904.00
44.50	2937.00
45.00	2970.00
45.50	3003.00
46.00	3036.00
46.50	3069.00
47.00	3102.00
47.50	3135.00
48.00	3168.00
48.50	3201.00
49.00	3234.00

CHAINS	FEET
49.50	3267.00
50.00	3300.00
50.50	3333.00
51.00	3366.00
51.50	3399.00
52.00	3432.00
52.50	3465.00
53.00	3498.00
53.50	3531.00
54.00	3564.00
54.50	3597.00
55.00	3630.00
55.50	3663.00
56.00	3696.00
56.50	3729.00
57.00	3762.00
57.50	3795.00
58.00	3828.00
58.50	3861.00
59.00	3894.00
59.50	3927.00
60.00	3960.00
60.50	3993.00
61.00	4026.00
61.50	4059.00
62.00	4092.00
62.50	4125.00
63.00	4158.00
63.50	4191.00
64.00	4224.00
64.50	4257.00
65.00	4290.00
65.50	4323.00
66.00	4356.00
66.50	4389.00
67.00	4422.00
67.50	4455.00
68.00	4488.00
68.50	4521.00
69.00	4554.00
69.50	4587.00
70.00	4620.00
70.50	4653.00
71.00	4686.00
71.50	4719.00
72.00	4752.00
72.50	4785.00
73.00	4818.00
73.50	4851.00
74.00	4884.00
74.50	4917.00

CHAINS	I FEET
75.00	4950.00
75.50	4983.00
76.00	5016.00
76.50	5049.00
77.00	5082.00
77.50	5115.00
78.00	5148.00
78.50	5181.00
79.00	5214.00
79.50	5247.00
80.00	5280.00
80.50	5313.00
81.00	5346.00
81.50	5379.00
82.00	5412.00
82.50	5445.00
83.00	5478.00
83.50	5511.00
84.00	5544.00
84.50	5577.00
85.00	5610.00
85.50	5643.00
86.00	5676.00
86.50	5709.00
87.00	5742.00
87.50	5775.00
88.00	5808.00
88.50	5841.00
89.00	5874.00
89.50	5907.00
90.00	5940.00
90.50	5973.00
91.00	6006.00
91.50	6039.00
92.00	6072.00
92.50	6105.00
93.00	6138.00
93.50	6171.00
94.00	6204.00
94.50	6237.00
95.00	6270.00
95.50	6303.00
96.00	6336.00
96.50	6369.00
97.00	6402.00
97.50	6435.00
98.00	6468.00
98.50	6501.00
99.00	6534.00
99.50	6567.00
100.00	6600.00

**TABLE 8 — DECIMAL EQUIVALENTS OF FRACTIONS**

FRACTION				DECIMAL	FRACTION				DECIMAL
1/8	1/16	1/32	1/64	0.015625	5/8	9/16	17/32	33/64	0.515625
			2/64	0.03125				34/64	0.53125
		3/64	0.046875	35/64			0.546875		
		4/64	0.0625	36/64			0.5625		
	2/16	2/32	5/64	0.078125		10/16	18/32	37/64	0.578125
			6/64	0.09375				38/64	0.59375
		7/64	0.109375	39/64			0.609375		
		8/64	0.125	40/64			0.625		
1/4	3/16	4/32	9/64	0.140625	3/4	11/16	20/32	41/64	0.640625
			10/64	0.15625				42/64	0.65625
		11/64	0.171875	43/64			0.671875		
		12/64	0.1875	44/64			0.6875		
	4/16	6/32	13/64	0.203125		12/16	22/32	45/64	0.703125
			14/64	0.21875				46/64	0.71875
		15/64	0.234375	47/64			0.734375		
		16/64	0.25	48/64			0.75		
3/8	5/16	8/32	17/64	0.265625	3/4	13/16	24/32	49/64	0.765625
			18/64	0.28125				50/64	0.78125
		19/64	0.296875	51/64			0.796875		
		20/64	0.3125	52/64			0.8125		
	6/16	10/32	21/64	0.328125		14/16	26/32	53/64	0.828125
			22/64	0.34375				54/64	0.84375
		23/64	0.359375	55/64			0.859375		
		24/64	0.375	56/64			0.875		
7/16	12/32	25/64	0.390625	15/16	28/32	57/64	0.890625		
		26/64	0.40625			58/64	0.90625		
	27/64	0.421875	59/64		0.921875				
	28/64	0.4375	60/64		0.9375				
1/2	7/16	29/64	0.453125	1	15/16	30/32	61/64	0.953125	
		30/64	0.46875			31/32	62/64	0.96875	
	31/64	0.484375	63/64		0.984375				
	32/64	0.50	64/64		1.0				

To change a fraction to a decimal divide the numerator by the denominator and write the quotient in decimal form.

Example:  $3/5 = 3 \div 5 = .60$

Example:  $1/7 = 1 \div 7 = .142857$

**TABLE 9 — MAP SCALE CONVERSIONS**

MAP SCALE Inches to Feet	STATUTE MILES Per Inch	KILOMETERS Per Inch	RATIO
*1" = 50'	.0095	.0153	1:600
*1" = 100'	.0189	.0305	1:1200
1" = 167'	.0316	.0508	1:2000
*1" = 200'	.0379	.0610	1:2400
1" = 300'	.0568	.0914	1:3600
*1" = 400'	.0758	.1219	1:4800
1" = 417'	.0789	.1270	1:5000
1" = 500'	.0947	.1524	1:6000
1" = 600'	.1136	.1829	1:7900
1" = 660'	.1250	.2012	1:7920
*1" = 800'	.1315	.2438	1:9600
1" = 833'	.1578	.2540	1:10000
1" = 880'	.1667	.2680	1:10560
1" = 1000'	.1894	.3050	1:12000
1" = 1320'	.2500	.4020	1:15840
1" = 1666'	.3156	.5080	1:20000
1" = 1760'	.3333	.5360	1:21120
*1" = 2000'	.3788	.6100	1 :24000**
1" = 2083'	.3945	.6350	1:25000
1" = 2640'	.5000	.8040	1:31680
1" = 4000'	.7575	1.2190	1:48000**
1" = 5208'	.9864	1.5870	1:62500**
1" = 5280'	1.0000	1.6090	1:63360
1" = 6250'	1.1837	1.9050	1:75000
1" = 6666'	1.2626	2.0320	1:80000
1" = 8333'	1.5780	2.5400	1:100000
1" = 20856'	3.9500	6.3570	1:250000**
1" = 26400'	5.0000	8.0500	1:316000
1" = 41666'	7.8910	12.7000	1:500000
1" = 83333'	15.7830	25.4000	1:1000000

\* Denotes state standard map scales.

\*\* Denotes U.S.G.S. map scales.

NOTE: The designation of quadrangle maps by "minutes" (such as 30 minute quad.) does not denote scale, rather, it denotes the geographical area covered in minutes of longitude.

**TABLE 10 — RADIANS TO DEGREES, MINUTES & SECONDS  
& RADIANS TO DEGREES IN DECIMALS**

RAD.	° ' "	RAD.	° ' "	RAD.	° ' "	RAD.	° ' "	RAD.	° ' "
1	57° 17' 44"	.1	5° 43' 46"	.01	0° 34' 22"	.001	0° 03' 26"	.0001	0° 00' 20"
2	114° 35' 29"	.2	11° 27' 33"	.02	1° 08' 45"	.002	0° 06' 52"	.0002	0° 00' 41"
3	171° 53' 14"	.3	17° 11' 19"	.03	1° 43' 07"	.003	0° 10' 18"	.0003	0° 01' 01"
4	229° 10' 59"	.4	22° 55' 05"	.04	2° 17' 30"	.004	0° 13' 45"	.0004	0° 01' 22"
5	286° 28' 44"	.5	28° 38' 52"	.05	2° 51' 53"	.005	0° 17' 11"	.0005	0° 01' 41"
6	343° 46' 28"	.6	34° 22' 38"	.06	3° 26' 15"	.006	0° 20' 37"	.0006	0° 02' 03"
7	401° 04' 13"	.7	40° 06' 25"	.07	4° 00' 38"	.007	0° 24' 03"	.0007	0° 02' 24"
8	458° 21' 58"	.8	45° 50' 11"	.08	4° 35' 01"	.008	0° 27' 30"	.0008	0° 02' 45"
9	515° 39' 43"	.9	51° 33' 58"	.09	5° 09' 23"	.009	0° 30' 56"	.0009	0° 03' 05"

**RADIANS TO DEGREES IN DECIMALS**

RAD.	DEGREE
1	57.2958
2	114.5916
3	171.8873
4	229.1832
5	286.4789
6	343.7747
7	401.0705
8	458.3662
9	515.6620

**TABLE 11 — DEGREES, MINUTES SECONDS TO RADIANS**

DEGREE	RADIAN	MIN.	RADIAN	SEC.	RADIAN
1	0.01745 33	1	0.00029 09	1	0.00000 48
2	0.03490 66	2	0.00058 18	2	0.00000 97
3	0.05235 99	3	0.00087 27	3	0.00001 45
4	0.06981 32	4	0.00116 36	4	0.00001 94
5	0.08726 65	5	0.00145 44	5	0.00002 42
6	0.10471 98	6	0.00174 53	6	0.00002 91
7	0.12217 30	7	0.00203 62	7	0.00003 39
8	0.13962 63	8	0.00232 71	8	0.00003 88
9	0.15707 96	9	0.00261 80	9	0.00004 36
10	0.17453 30	10	0.00290 89	10	0.00004 85
20	0.34906 59	20	0.00581 78	20	0.00009 70
30	0.52359 88	30	0.00872 66	30	0.00014 54
40	0.69813 17	40	0.01163 55	40	0.00019 39
50	0.87266 46	50	0.01454 44	50	0.00024 24
60	1.04719 76	60	0.01745 33	60	0.00029 09
70	1.22173 05				
80	1.39626 34				
90	1.57079 63				

$1^\circ = 0.01745\ 32925\ 19943$  radians

$1^\circ = 60'$ ;  $1^\circ = 3600''$

1 radian =  $57^\circ\ 17'\ 44''$  .80625

$\pi$  radians =  $180^\circ$ ;  $\pi - 180^\circ =$  radians in  $1^\circ$ ;  $180^\circ - \pi =$  deg. in 1 rad.

$1/\sqrt{\pi} = 0.56418958$ ;  $\sqrt[3]{\pi} = 1.46459189$ ;  $\sqrt[3]{\pi} r = 2.14502940$

**TABLE 12 — COMPASS CONVERSIONS: CARDINAL TO ANGULAR**

CARDINAL POINTS	INTERCARDINAL POINTS	ANGULAR Degrees	MEASURE Minutes
North		0°	0'
	N. by E.	11°	15'
	N.N.E.	22°	30'
	N.E. by N.	33°	45'
	N.E.	45°	0'
	N.E. by E.	56°	15'
	E.N.E.	67°	30'
	E. by N.	78°	45'
East		90°	0'
	E. by S.	101°	15'
	E.S.E.	112°	30'
	S.E. by E.	123°	45'
	S.E.	135°	0'
	S.E. by S.	146°	15'
	S.S.E.	157°	30'
	S. by E.	168°	45'
South		180°	0'
	S. by W.	191°	15'
	S.S.W.	202°	30'
	S.W. by S.	213°	45'
	S.W.	225°	0'
	S.W. by W.	236°	15'
	W.S.W.	247°	30'
	W. by S.	258°	45'
West		270°	0'
	W. by N.	281°	15'
	W.N.W.	292°	30'
	N.W. by W.	303°	45'
	N.W.	315°	0'
	N.W. by N.	326°	15'
	N.N.W.	337°	30'
	N. by W.	348°	45'
North		360°	0'

See table 13 for compass conversions to bearings.

**TABLE 13 — COMPASS CONVERSIONS: CARDINAL TO BEARINGS**

CARDINAL POINTS	INTERCARDINAL POINTS	BEARINGS
North		0°
		N.11° 15'E.
		N.22° 30'E.
		N.33° 45'E.
		N.45° 00'E.
		N.56° 15'E.
		N.67° 30'E.
		N.78° 45'E.
		90°
		S. 78° 45'E.
		S. 67° 30'E.
		S. 56° 15'E.
		S. 45° 00'E.
		S. 33° 45'E.
		S. 22° 30'E.
		S. 11° 15'E.
South		0°
		S. 11° 15'W.
		S. 22° 30'W.
		S. 33° 45'W.
		S. 45° 00'W.
		S. 56° 15'W.
		S. 67° 30'W.
		S. 78° 45'W.
		90°
	West	
		N. 67° 30'W.
		N. 56° 15'W.
		N. 45° 00'W.
		N. 33° 45'W.
		N. 22° 30'W.
		N. 11° 15'W.

See table 12 for compass conversions to angular measure.

**TABLE 14 — DEGREE OF CURVE TO RADII**

0° to 2.25°

2.30° to 6.50°

CURVE DEFINED IN DECIMALS OF DEGREES	CURVE DEFINED IN		RADII (in feet)
	DEGREES	MINUTES	
0.05	0	03	114,591.599
0.10	0	06	57,295.780
0.15	0	09	38,197.186
0.20	0	12	28,647.890
0.25	0	15	22,918.312
0.30	0	18	19,098.593
0.35	0	21	16,370.223
0.40	0	24	14,323.945
0.45	0	27	12,732.395
0.50	0	30	11,459.156
0.55	0	33	10,417.414
0.60	0	36	9,549.297
0.65	0	39	8,814.735
0.70	0	42	8,185.111
0.75	0	45	7,639.437
0.80	0	48	7,161.972
0.85	0	51	6,740.680
0.90	0	54	6,366.198
0.95	0	57	6,031.135
1.00	1	00	5,729.578
1.05	1	03	5,456.741
1.10	1	06	5,208.707
1.15	1	09	4,982.242
1.20	1	12	4,774.648
1.25	1	15	4,583.662
1.30	1	18	4,407.368
1.35	1	21	4,244.132
1.40	1	24	4,092.556
1.45	1	27	3,951.433
1.50	1	30	3,819.719
1.55	1	33	3,696.502
1.60	1	36	3,580.936
1.65	1	39	3,472.471
1.70	1	42	3,370.340
1.75	1	45	3,274.045
1.80	1	48	3,183.099
1.85	1	51	3,097.069
1.90	1	54	3,015.567
1.95	1	57	2,938.245
2.00	2	00	2,864.789
2.05	2	03	2,794.916
2.10	2	06	2,728.370
2.15	2	09	2,664.920
2.20	2	12	2,604.354
2.25	2	15	2,546.479

CURVE DEFINED IN DECIMALS OF DEGREES	CURVE DEFINED IN		RADII (in feet)
	DEGREES	MINUTES	
2.30	2	18	2,491.121
2.35	2	21	2,438.118
2.40	2	24	2,387.324
2.45	2	27	2,338.603
2.50	2	30	2,291.831
2.55	2	33	2,246.893
2.60	2	36	2,203.684
2.65	2	39	2,162.105
2.70	2	42	2,122.066
2.75	2	45	2,083.483
2.80	2	48	2,046.278
2.85	2	51	2,010.378
2.90	2	54	1,975.717
2.95	2	57	1,942.230
3.00	3	00	1,909.859
3.05	3	03	1,878.550
3.10	3	06	1,848.1-51
3.15	3	09	1,818.914
3.20	3	12	1,790.493
3.25	3	15	1,762.947
3.30	3	18	1,736.236
3.35	3	21	1,710.322
3.40	3	24	1,685.170
3.45	3	27	1,660.747
3.50	3	30	1,637.022
3.55	3	33	1,613.966
3.60	3	36	1,591.549
3.65	3	39	1,569.747
3.70	3	42	1,548.535
3.75	3	45	1,527.887
3.80	3	48	1,507.784
3.85	3	51	1,488.202
3.90	3	54	1,469-123
3.95	3	57	1,450.526
4.00	4	00	1,43-2.394
4.25	4	15	1,348.136
4.50	4	30	1,273.240
4.75	4	45	1,206.227
5.00	5	00	1,145.916
5.25	5	15	1,091.348
5.50	5	30	1,041.741
5.75	5	45	996.448
6.00	6	00	954.930
6.25	6	15	916.732
6.50	6	30	881.474

**TABLE 14 — DEGREE OF CURVE TO RADII (Continued)**

6.75° to 17.75°

18° to 29°

CURVE DEFINED IN DECIMALS OF DEGREES	CURVE DEFINED IN		RADII (in feet)
	DEGREES	MINUTES	
6.75	6	45	848.826
7.00	7	00	818.511
7.25	7	15	790.287
7.50	7	30	763.944
7.75	7	45	739.300
8.00	8	00	716.197
8.25	8	15	694.494
8.50	8	30	674.068
8.75	8	45	654.809
9.00	9	00	636.620
9.25	9	15	619.414
9.50	9	30	603.113
9.75	9	45	587.649
10.00	10	00	572.958
10.25	10	15	558.983
10.50	10	30	545.674
10.75	10	45	532.984
11.00	11	00	520.871
11.25	11	15	509.296
11.50	11	30	498.224
11.75	11	45	487.624
12.00	12	00	477.465
12.25	12	15	467.721
12.50	12	30	458.366
12.75	12	45	449.379
13.00	13	00	440.737
13.25	13	15	432.421
13.50	13	30	424.413
13.75	13	45	416.697
14.00	14	00	409.256
14.25	14	15	402.076
14.50	14	30	395.143
14.75	14	45	388.446
15.00	15	00	381.972
15.25	15	15	375.710
15.50	15	30	369.650
15.75	15	45	363.783
16.00	16	00	358.099
16.25	16	15	352.589
16.50	16	30	347.247
16.75	16	45	342.064
17.00	17	00	337.034
17.25	17	15	332.149
17.50	17	30	327.404
17.75	17	45	322.793

CURVE DEFINED IN DECIMALS OF DEGREES	CURVE DEFINED IN		RADII (in feet)
	DEGREES	MINUTES	
18.00	18	00	318.310
18.25	18	15	313.949
18.50	18	30	309.707
18.75	18	45	305.577
19.00	19	00	301.557
19.25	19	15	297.640
19.50	19	30	293.825
19.75	19	45	290.105
20.00	20	00	286.479
20.25	20	15	282.942
20.50	20	30	279.492
20.75	20	45	276.124
21.00	21	00	272.837
21.25	21	15	269.627
21.50	21	30	266.492
21.75	21	45	263.429
22.00	22	00	260.435
22.25	22	15	257.509
22.50	22	30	254.648
22.75	22	45	251.850
23.00	23	00	249.112
23.25	23	15	246.433
23.50	23	30	243.812
23.75	23	45	241.245
24.00	24	00	238.732
24.25	24	15	236.271
24.50	24	30	233.860
24.75	24	45	231.498
25.00	25	00	229.183
25.25	25	15	226.914
25.50	25	30	224.689
25.75	25	45	222.508
26.00	26	00	220.368
26.25	26	15	218.270
26.50	26	30	216.210
26.75	26	45	214.190
27.00	27	00	212.207
27.25	27	15	210.260
27.50	27	30	208.348
27.75	27	45	206.471
28.00	28	00	204.628
28.25	28	15	202.817
28.50	28	30	201.038
28.75	28	45	199.290
29.00	29	00	197.572

**TABLE 14 — DEGREE OF CURVE TO RADII (Continued)**

29.25° to 40.25°

CURVE DEFINED IN DECIMALS OF DEGREES	CURVE DEFINED IN		RADII (in feet)
	DEGREES	MINUTES	
29.25	29	15	195.883
29.50	29	30	194.223
29.75	29	45	192.591
30.00	30	00	190.986
30.25	30	15	189.408
30.50	30	30	187.855
30.75	30	45	186.328
31.00	31	00	184.825
31.25	31	15	183.346
31.50	31	30	181.891
31.75	31	45	180.459
32.00	32	00	179.049
32.25	32	15	177.661
32.50	32	30	176.295
32.75	32	45	174.949
33.00	33	00	173.624
33.25	33	15	172.318
33.50	33	30	171.032
33.75	33	45	169.765
34.00	34	00	168.517
34.25	34	15	167.287
34.50	34	30	166.075
34.75	34	45	164.880
35.00	35	00	163.702
35.25	35	15	162.541
35.50	35	30	161.397
35.75	35	45	160.268
36.00	36	00	159.155
36.25	36	15	158.057
36.50	36	30	156.975
36.75	36	45	155.907
37.00	37	00	154.853
37.25	37	15	153.814
37.50	37	30	152.789
37.75	37	45	151.777
38.00	38	00	150.778
38.25	38	15	149.793
38.50	38	30	148.820
38.75	38	45	147.860
39.00	39	00	146.912
39.25	39	15	145.977
39.50	39	30	145.053
39.75	39	45	144.140
40.00	40	00	143.239
40.25	40	15	142.350

40.50° to 51.50°

CURVE DEFINED IN DECIMALS OF DEGREES	CURVE DEFINED IN		RADII (in feet)
	DEGREES	MINUTES	
40.50	40	30	141.471
40.75	40	45	140.603
41.00	41	00	139.746
41.25	41	15	138.899
41.50	41	30	138.062
41.75	41	45	137.235
42.00	42	00	136.419
42.25	42	15	135.611
42.50	42	30	134.814
42.75	42	45	134.025
43.00	43	00	133.246
43.25	43	15	132.476
43.50	43	30	131.714
43.75	43	45	130.962
44.00	44	00	130.218
44.25	44	15	129.482
44.50	44	30	128.755
44.75	44	45	128.035
45.00	45	00	127.324
45.25	45	15	126.621
45.50	45	30	125.925
45.75	45	45	125.237
46.00	46	00	124.556
46.25	46	15	123.883
46.50	46	30	123.217
46.75	46	45	122.558
47.00	47	00	121.906
47.25	47	15	121.261
47.50	47	30	120.623
47.75	47	45	119.991
48.00	48	00	119.366
48.25	48	15	118.748
48.50	48	30	118.136
48.75	48	45	117.530
49.00	49	00	116.930
49.25	49	15	116.337
49.50	49	30	115.749
49.75	49	45	115.167
50.00	50	00	114.592
50.25	50	15	114.021
50.50	50	30	113.457
50.75	50	45	112.898
51.00	51	00	112.345
51.25	51	15	111.797
51.50	51	30	111.254

**TABLE 14 — DEGREE OF CURVE TO RADII (Continued)**

51.75° to 62.75°

63° to 74°

CURVE DEFINED IN DECIMALS OF DEGREES	CURVE DEFINED IN		RADII (in feet)
	DEGREES	MINUTES	
51.75	51	45	110.716
52.00	52	00	110.184
52.25	52	15	109.657
52.50	52	30	109.135
52.75	52	45	108.618
53.00	53	00	108.105
53.25	53	15	107.598
53.50	53	30	107.095
53.75	53	45	106.597
54.00	54	00	106.103
54.25	54	15	105.614
54.50	54	30	105.130
54.75	54	45	104.650
55.00	55	00	104.175
55.25	55	15	103.703
55.50	55	30	103.236
55.75	55	45	102.773
56.00	56	00	102.314
56.25	56	15	101.859
56.50	56	30	101.408
56.75	56	45	100.962
57.00	57	00	100.519
57.25	57	15	100.080
57.50	57	30	99.645
57.75	57	45	99.213
58.00	58	00	98.786
58.25	58	15	98.362
58.50	58	30	97.942
58.75	58	45	97.525
59.00	59	00	97.111
59.25	59	15	96.702
59.50	59	30	96.295
59.75	59	45	95.893
60.00	60	00	95.493
60.25	60	15	95.097
60.50	60	30	94.704
60.75	60	45	94.314
61.00	61	00	93.928
61.25	61	15	93.544
61.50	61	30	93.164
61.75	61	45	92.787
62.00	62	00	92.413
62.25	62	15	92.041
62.50	62	30	91.673
62.75	62	45	91.308

CURVE DEFINED IN DECIMALS OF DEGREES	CURVE DEFINED IN		RADII (in feet)
	DEGREES	MINUTES	
63.00	63	00	90.946
63.25	63	15	90.586
63.50	63	30	90.230
63.75	63	45	89.876
64.00	64	00	89.525
64.25	64	15	89.176
64.50	64	30	88.831
64.75	64	45	88.488
65.00	65	00	88.147
65.25	65	15	87.810
65.50	65	30	87.474
65.75	65	45	87.142
66.00	66	00	86.812
66.25	66	15	86.484
66.50	66	30	86.159
66.75	66	45	85.836
67.00	67	00	85.516
67.25	67	15	85.198
67.50	67	30	84.883
67.75	67	45	84.569
68.00	68	00	84.258
68.25	68	45	83.950
68.50	68	30	83.643
68.75	68	15	83.339
69.00	69	00	83.037
69.25	69	15	82.738
69.50	69	30	82.440
69.75	69	45	82.144
70.00	70	00	81.851
70.25	70	15	81.560
70.50	70	30	81.271
70.75	70	45	80.983
71.00	71	00	80.698
71.25	71	15	80.415
71.50	71	30	80.134
71.75	71	45	79.855
72.00	72	00	79.577
72.25	72	15	79.302
72.50	72	30	79.029
72.75	72	45	78.757
73.00	73	00	78.487
73.25	73	15	78.219
73.50	73	30	77.953
73.75	73	45	77.689
74.00	74	00	77.427

**TABLE 14 — DEGREE OF CURVE TO RADII (Continued)**

74.25° to 85.25°

CURVE DEFINED IN DECIMALS OF DEGREES	CURVE DEFINED IN		RADII (in feet)
	DEGREES	MINUTES	
74.25	74	15	77.166
74.50	74	30	76.907
74.75	74	45	76.650
75.00	75	00	76.394
75.25	75	15	76.141
75.50	75	30	75.888
75.75	75	45	75.638
76.00	76	00	75.389
76.25	76	15	75.142
76.50	76	30	74.896
76.75	76	45	74.652
77.00	77	00	74.410
77.25	77	15	74.169
77.50	77	30	73.930
77.75	77	45	73.692
78.00	78	00	73.456
78.25	78	15	73.221
78.50	78	30	72.988
78.75	78	45	72.757
79.00	79	00	72.526
79.25	79	15	72.298
79.50	79	30	72.070
79.75	79	45	71.844
80.00	80	00	71.620
80.25	80	15	71.397
80.50	80	30	71.175
80.75	80	45	70.955
81.00	81	00	70.736
81.25	81	15	70.518
81.50	81	30	70.302
81.75	81	45	70.087
82.00	82	00	69.873
82.25	82	15	69.661
82.50	82	30	69.449
82.75	82	45	69.240
83.00	83	00	69.031
83.25	83	15	68.824
83.50	83	30	68.618
83.75	83	45	68.413
84.00	84	00	68.209
84.25	84	15	68.007
84.50	84	30	67.806
84.75	84	45	67.606
85.00	85	00	67.407
85.25	85	15	67.209

85.50° to 96.50°

CURVE DEFINED IN DECIMALS OF DEGREES	CURVE DEFINED IN		RADII (in feet)
	DEGREES	MINUTES	
85.50	85	.30	67.013
85.75	85	45	66.817
86.00	86	00	66.623
86.25	86	15	66.430
86.50	86	30	66.238
86.75	86	45	66.047
87.00	87	00	65.857
87-25	87	15	65.669
87.50	87	30	65.481
87.75	87	45	65.294
88.00	88	00	65.109
88.25	88	15	64.924
88.50	88	30	64.741
88.75	88	45	64.559
89.00	89	00	64.377
89.25	89	15	64.197
89.50	89	30	64.018
89.75	89	45	63.839
90.00	90	00	63.662
90-25	90	15	63.486
90.50	90	30	63.310
90.75	90	45	63.136
91.00	91	00	62.962
91.25	91	15	62.790
91.50	91	30	62.618
91.75	91	45	62.448
92.00	92	00	62.278
92.25	92	15	62.109
92.50	92	30	61.941
92.75	92	45	61.774
93.00	93	00	61.608
93.25	92	15	61.443
93.50	93	30	61.279
93.75	93	45	61.115
94.00	94	00	60.953
94.25	94	15	60.791
94.50	94	30	60.630
94.75	94	45	60.470
95.00	95	00	60.311
95.25	95	15	60.153
95.50	95	30	59.996
95.75	95	45	59.839
96.00	96	00	59.683
96.25	96	15	59.928
96.50	96	30	59.374

**TABLE 14 — DEGREE OF CURVE TO RADII (Continued)**

96.75° to 98.25°

CURVE DEFINED IN DECIMALS OF DEGREES	CURVE DEFINED IN		RADII (in feet)
	DEGREES	MINUTES	
98.50	98	30	58.168
98.75	98	45	58.021
99.00	99	00	57.875
99.25	99	15	57.729
99.50	99	30	57.583
99.75	99	45	57.439
100.00	100	00	57.296

98.50° to 100°

CURVE DEFINED IN DECIMALS OF DEGREES	CURVE DEFINED IN		RADII (in feet)
	DEGREES	MINUTES	
96.75	96	45	59.220
97.00	97	00	59.068
97.25	97	15	58.916
97.50	97	30	58.765
97.75	97	45	58.615
98.00	98	00	58.465
98.25	98	15	58.316

**RADII FORMULA**

The radius of a one degree curve is 5,729.57795+ feet. To find radii for other degree curves, divide the foregoing radius by the desired degree of curve.

**TABLE 15 — LAMBERT CONFORMAL PROJECTION  
OREGON NORTH ZONE**

LATITUDE	R (feet)	Y' Y VALUE ON CENTRAL MERIDIAN (feet)	TABULAR DIFFERENCE FOR 1 SECOND OF LATITUDE (feet)	1 MINUTE OF $\theta$ IN FEET (Approx.)	SCALE EXPRESSED AS A RATIO
43° 40'	21,383,852.48	0	101.27783	6219	1.0002340
41'	21,377,775.81	6,076.67	101.27733		1.0002265
42'	21,371,699.17	12,153.31	101.27683		1.0002191
43'	21,365,622.56	18,229.92	101.27650		1.0002118
44'	21,359,545.97	24,306.51	101.27600		1.0002046
43° 45'	21,353,469.41	30,383.07	101.27550	6219	1.0001975
46'	21,347,392.88	36,459.60	101.27517		1.0001904
47'	21,341,316.37	42,536.11	101.27483		1.0001834
48'	21,335,239.88	48,612.60	101.27433		1.0001766
49'	21,329,163.42	34,689.06	101.27400		1.0001698
43° 50'	21,323,086.98	60,765.50	101.27367	6202	1.0001631
51'	21,317,010.56	66,841.92	101.27333		1.0001565
52'	21,310,934.16	72,518.32	101.27283		1.0001499
53'	21,304,857.79	78,994.69	101.27267		1.0001434
54'	21,298,781.43	85,071.05	101.27217		1.0001370
43° 55'	21,292,705.10	91,147.38	101.27183	6202	1.0001307
56'	21,286,628.78	97,223.69	101.27167		1.0001245
57'	21,280,552.49	103,299.99	101.27117		1.0001184
58'	21,274,476.22	109,376.26	101.27100		1.0001123
59'	21,268,399.96	115,452.52	101.27050		1.0001064
44° 00'	21,262,323.73	121,528.75	101.27033	6184	1.0001005
01'	21,256,247.51	127,604.97	101.27017		1.0000947
02'	21,250,171.30	133,681.18	101.26983		1.0000889
03'	21,244,095.11	139,757.37	101.26950		1.0000833
04'	21,238,018.94	145,833.54	101.26917		1.0000777
44° 05'	21,231,942.79	151,909.69	101.26900	6184	1.0000722
06'	21,225,866.65	157,985.83	101.26883		1.0000668
07'	21,219,790.52	164,061.96	101.26850		1.0000615
08'	21,213,714.41	170,138.07	101.26817		1.0000563
09'	21,207,638.32	176,214.16	101.26817		1.0000511
44° 10'	21,201,562.23	182,290.25	101.26783	6167	1.0000461
11'	21,195,486.16	188,366.32	101.26767		1.0000411
12'	21,189,410.10	194,442.38	101.26750		1.0000362
13'	21,183,334.05	200,518.43	101.26733		1.0000314
14'	21,177,258.01	206,594.47	101.26717		1.0000267
44° 15'	21,171,181.98	212,670.50	101.26683	6167	1.0000220
16'	21,165,105.97	218,746.51	101.26683		1.0000174
17'	21,159,029.96	224,822.52	101.26667		1.0000130
18'	21,152,953.96	230,898.52	101.26650		1.0000086
19'	21,146,877.97	236,974.51	101.26633		1.0000042
44° 20'	21,140,801.99	243,050.49	101.26633	6149	1.0000000
21'	21,134,726.01	249,126.47	101.26617		0.9999959
22'	21,128,650.04	255,202.44	101.26600		0.9999918
23'	21,122,574.08	261,278.40	101.26583		0.9999878
24'	21,116,498.13	267,354.35	101.26583		0.9999839

**TABLE 15 — LAMBERT CONFORMAL PROJECTION  
OREGON NORTH ZONE (Continued)**

LATITUDE	R (feet)	Y' Y VALUE ON CENTRAL MERIDIAN (feet)	TABULAR DIFFERENCE FOR 1 SECOND OF LATITUDE (feet)	1 MINUTE OF $\theta$ IN FEET (Approx.)	SCALE EXPRESSED AS A RATIO
44° 25'	21,110,422.18	273,430.30	101.26583		0.9999801
26'	21,104,346.23	279,506.25	101.26567		0.9999763
27'	21,098,270.29	285,582.19	101.26550		0.9999726
28'	21,092,194.36	291,658.12	101.26550		0.9999691
29'	21,086,118.43	297,734.05	101.26550		0.9999656
44° 30'	21,080,042.50	303,809.98	101.26550	6132	0.9999622
31'	21,073,966.57	309,885.91	101.26550		0.9999589
32'	21,067,890.64	315,961.84	101.26533		0.9999556
33'	21,061,814.72	322,037.76	101.26550		0.9999525
34'	21,055,738.79	328,113.69	101.26533		0.9999494
44° 35'	21,049,662.87	334,189.61	101.26533		0.9999464
36'	21,043,586.95	340,265.53	101.26550		0.9999435
37'	21,037,511.02	346,341.46	101.26533		0.9999407
38'	21,031,435.10	352,417.38	101.26550		0.9999379
39'	21,025,359.17	358,493.31	101.26550		0.9999353
44° 40'	21,019,283.24	364,569.24	101.26550	6115	0.9999327
41'	21,013,207.31	370,645.17	101.26550		0.9999302
42'	21,007,131.38	376,721.10	101.26567		0.9999278
43'	21,001,055.44	382,797.04	101.26567		0.9999253
44'	20,994,979.50	388,872.98	101.26583		0.9999233
44° 45'	20,988,903.55	394,948.93	101.26583		0.9999211
46'	20,982,827.60	401,024.88	101.26600		0.9999191
47'	20,976,751.64	407,100.84	101.26600		0.9999171
48'	20,970,675.68	413,176.80	101.26617		0.9999152
49'	20,964,599.71	419,252.77	101.26633		0.9999134
44° 50'	20,958,523.73	425,328.75	101.26650	6097	0.9999116
51'	20,952,447.74	431,404.74	101.26650		0.9999100
52'	20,946,371.75	437,480.73	101.26667		0.9999084
53'	20,940,295.75	443,556.73	101.26683		0.9999069
54'	20,934,219.74	449,632.74	101.26700		0.9999055
44° 55'	20,928,143.72	455,708.76	101.26733		0.9999042
56'	20,922,067.68	461,784.80	101.26733		0.9999030
57'	20,915,991.64	467,860.84	101.26750		0.9999018
58'	20,909,915.59	473,936.89	101.26783		0.9999008
59'	20,903,839.52	480,012.93	101.26800		0.9998998
45° 00'	20,897,763.44	486,089.04	101.26817	6080	0.9998989
01'	20,891,687.35	492,165.13	101.26833		0.9998981
02'	20,885,611.25	498,241.23	101.26867		0.9998974
03'	20,879,535.13	504,317.35	101.26883		0.9998967
04'	20,873,459.00	510,393.48	101.26917		0.9998962
45° 05'	20,867,382.85	516,469.63	101.26933		0.9998957
06'	20,861,306.69	522,545.79	101.26967		0.9998953
07'	20,855,230.51	528,621.97	101.26983		0.9998950
08'	20,849,154.32	534,698.16	101.27033		0.9998948
09'	20,843,078.10	540,774.38	101.27050		0.9998946

**TABLE 15 — LAMBERT CONFORMAL PROJECTION  
OREGON NORTH ZONE (Continued)**

LATITUDE	R (feet)	Y' Y VALUE ON CENTRAL MERIDIAN (feet)	TABULAR DIFFERENCE FOR 1 SECOND OF LATITUDE (feet)	1 MINUTE OF $\theta$ IN FEET (Approx.)	SCALE EXPRESSED AS A RATIO
45° 10'	20,837,001.87	546,850.61	101.27067	6062	0.9998946
11'	20,830,925.63	552,926.85	101.27117		0.9998946
12'	20,824,849.36	559,003.12	101.27133		0.9998947
13'	20,818,773.08	565,079.40	101.27183		0.9998949
14'	20,812,696.77	571,155.71	101.27200		0.9998952
45° 15'	20,806,620.45	577,232.03	101.27250	6044	0.9998956
16'	20,800,544.10	583,308.38	101.27267		0.9998960
17'	20,794,467.74	589,384.74	101.27317		0.9998966
18'	20,788,391.35	595,461.13	101.27350		0.9998972
19'	20,782,314.94	601,537.54	101.27383		0.9998979
45° 20'	20,776,238.51	607,613.97	101.27417	6044	0.9998987
21'	20,770,162.06	613,690.42	101.27467		0.9998996
22'	20,764,085.58	619,766.90	101.27517		0.9999005
23'	20,758,009.07	625,843.41	101.27533		0.9999016
24'	20,751,932.55	631,919.93	101.27600		0.9999027
45° 25'	20,745,855.99	637,996.49	101.27617	6026	0.9999039
26'	20,739,779.42	644,073.06	101.27683		0.9999052
27'	20,733,702.81	650,149.67	101.27717		0.9999066
28'	20,727,626.18	656,226.30	101.27767		0.9999081
29'	20,721,549.52	662,302.96	101.27800		0.9999096
45° 30'	20,715,472.84	668,379.64	101.27867	6026	0.9999113
31'	20,709,396.12	674,456.36	101.27900		0.9999130
32'	20,703,319.38	680,533.10	101.27950		0.9999148
33'	20,697,242.61	686,609.87	101.28000		0.9999167
34'	20,691,165.81	692,686.67	101.28050		0.9999187
45° 35'	20,685,088.98	698,763.50	101.28117	6008	0.9999207
36'	20,679,012.11	704,840.37	101.28150		0.9999229
37'	20,672,935.22	710,917.26	101.28217		0.9999251
38'	20,666,858.29	716,994.19	101.28267		0.9999274
39'	20,660,781.33	723,071.15	101.28317		0.9999298
45° 40'	20,654,704.34	729,148.14	101.28367	6008	0.9999323
41'	20,648,627.32	735,225.16	101.28433		0.9999349
42'	20,642,550.26	741,302.22	101.28483		0.9999376
43'	20,636,473.17	747,379.31	101.28550		0.9999403
44'	20,630,396.04	753,456.44	101.28600		0.9999431
45° 45'	20,624,318.88	759,533.60	101.28667	5991	0.9999461
46'	20,618,241.68	765,610.80	101.28733		0.9999490
47'	20,612,164.44	771,688.04	101.28783		0.9999521
48'	20,606,087.17	777,765.31	101.28850		0.9999553
49'	20,600,009.86	783,842.62	101.28917		0.9999586
45° 50'	20,593,932.51	789,919.97	101.28983	5991	0.9999619
51'	20,587,855.12	795,997.36	101.29033		0.9999653
52'	20,581,777.70	802,074.78	101.29117		0.9999688
53'	20,575,700.23	808,152.25	101.29167		0.9999724
54'	20,569,622.73	814,229.75	101.29250		0.9999761

**TABLE 15 — LAMBERT CONFORMAL PROJECTION  
OREGON NORTH ZONE (Continued)**

LATITUDE	R (feet)	Y' Y VALUE ON CENTRAL MERIDIAN (feet)	TABULAR DIFFERENCE FOR 1 SECOND OF LATITUDE (feet)	1 MINUTE OF $\theta$ IN FEET (Approx.)	SCALE EXPRESSED AS A RATIO
45° 55'	20,563,545.18	820,307.30	101.29317		0.9999799
56'	20,557,467.59	826,384.89	101.29383		0.9999837
57'	20,551,389.96	832,462.52	101.29450		0.9999877
58'	20,545,312.29	838,540.19	101.29517		0.9999917
59'	20,539,234.58	844,617.90	101.29600		0.9999958
46° 00'	20,533,156.82	850,695.66	101.29667	5973	1.0000000
01'	20,527,079.02	856,773.46	101.29733		1.0000043
02'	20,521,001.18	862,851.30	101.29817		1.0000086
03'	20,514,923.29	868,929.19	101.29900		1.0000131
04'	20,508,845.35	875,007.13	101.29967		1.0000176
46° 05'	20,502,767.37	881,085.11	101.30050		1.0000223
06'	20,496,689.34	887,163.14	101.30117		1.0000270
07'	20,490,611.27	893,241.21	101.30217		1.0000318
08'	20,484,533.14	899,319.34	101.30267		1.0000366
09'	20,478,454.98	905,397.50	101.30367		1.0000416
46° 10'	20,472,376.76	911,475.72	101.30450	5955	1.0000467
11'	20,466,298.49	917,553.99	101.30533		1.0000518
12'	20,460,220.17	923,632.31	101.30600		1.0000570
13'	20,454,141.81	929,710.67	101.30700		1.0000623
14'	20,448,063.39	935,789.09	101.30783		1.0000677
46° 15'	20,441,984.92	941,867.56	101.30867		1.0000732
16'	20,435,906.40	947,946.08	101.30950		1.0000788
17'	20,429,827.83	954,024.65	101.31050		1.0000844
18'	20,423,749.20	960,103.28	101.31117		1.0000902
19'	20,417,670.53	966,181.95	101.31217		1.0000960
46° 20'	20,411,591.80	972,260.68	101.31317	5937	1.0001019
21'	20,405,513.01	978,339.47	101.31400		1.0001079
22'	20,399,434.17	984,418.31	101.31483		1.0001140
23'	20,393,355.28	990,497.20	101.31600		1.0001201
24'	20,387,276.32	996,576.16	101.31667		1.0001264
46°25'	20,381,197.32	1,002,655.16	101.31783		1.0001328
26'	20,375,118.25	1,008,734.23	101.31867		1.0001392
27'	20,369,039.13	1,014,813.35	101.31967		1.0001457
28'	20,362,959.95	1,020,892.53	101.32067		1.0001523
29'	20,356,880.71	1,026,971.77	101.32150		1.0001590
30'	20,350,801.42	1,033,051.06		5919	1.0001658

R = The radius for the latitude of the station.

**TABLE 16 — LAMBERT CONFORMAL PROJECTION - OREGON NORTH ZONE**

For 1" of LONGITUDE = 0."70918602 of  $\theta$

Long.	$\theta$	Long.	$\theta$	Long.	$\theta$
116° 00'	+3° 11' 2".8135	116° 46'	+2° 38' 51".4601	117° 31'	+2° 06' 56".6579
01'	+3° 10' 46".2624	47'	+2° 38' 08".9089	32'	+2° 06' 14".1067
02'	+3° 10' 03".7112	48'	+2° 37' 26".3578	33'	+2° 05' 31".5555
03'	+3° 09' 21".1600	49'	+2° 36' 43".8066	34'	+2° 04' 49".0044
04'	+3° 08' 38".6089	50'	+2° 36' 01".2555	35'	+2° 04' 06".4532
05'	+3° 07' 56".0577				
		116° 51'	+2° 35' 18".7043	117° 36'	+2° 03' 23".9020
116° 06'	+3° 07' 13".5066	52'	+2° 34' 36".1531	37'	+2° 02' 41".3509
07'	+3° 06' 30".9544	53'	+2° 33' 53".6020	38'	+2° 01' 58".7997
08'	+3° 05' 48".4042	54'	+2° 33' 11".0508	39'	+2° 01' 16".2486
09'	+3° 05' 05".8531	55'	+2° 32' 28".4997	40'	+2° 00' 33".6974
10'	+3° 04' 23".3019				
		116° 56'	+2° 31' 45".9485	117° 41'	+1° 59' 51".1462
116° 11'	+3° 03' 40".7508	57'	+2° 31' 03".3973	42'	+1° 59' 08".5951
12'	+3° 02' 58".1996	58'	+2° 30' 20".8462	43'	+1° 58' 26".0439
13'	+3° 02' 15".6484	59'	+2° 29' 38".2950	44'	+1° 57' 43".4928
14'	+3° 01' 33".0973			45'	+1° 57' 00".9416
15'	+3° 00' 50".5461	117° 00'	+2° 28' 55".7439		
		01'	+2° 28' 13".1927	117° 46'	+1° 56' 18".3904
116° 16'	+3° 00' 07".9949	02'	+2° 27' 30".6415	47'	+1° 55' 35".8393
17'	+2° 59' 25".4438	03'	+2° 26' 48".0904	48'	+1° 54' 53".2881
18'	+2° 58' 42".8926	04'	+2° 26' 05".5392	49'	+1° 54' 10".7370
19'	+2° 58' 00".3415	05,	+2° 25' 22".9880	50'	+1° 53' 28".1858
20'	+2° 57' 17".7903				
		117° 06'	+2° 24' 40".4369	117° 51'	+1° 52' 45".6346
116° 21'	+2° 56' 35".2391	07'	+2° 23' 57".8857	52'	+1° 52' 03".0835
19'	+2° 55' 52".6880	08'	+2° 23' 15".3346	53'	+1° 51' 20".5323
23'	+2° 55' 10".1368	09'	+2° 22' 32".7834	54'	+1° 50' 37".9811
24'	+2° 54' 27".5857	10'	+2° 21' 50".2322	55,	+1° 49' 55".4300
25'	+2° 53' 45".0345				
		117° 11'	+2° 21' 07".6811	117° 56'	+1° 49' 12".8788
116° 26'	+2° 53' 02".4833	12'	+2° 20' 25".1299	57'	+1° 48' 30".3277
27'	+2° 52' 19".9322	13'	+2° 19' 42".5788	58'	+1° 47' 47".7765
28'	+2° 51' 37".3810	14'	+2° 19' 00".0276	59'	+1° 47' 05".2253
29'	+2° 50' 54".8298	15'	+2° 18' 17".4764		
30'	+2° 50' 12".2787			118° 00'	+1° 46' 22".6742
		117° 16'	+2° 17' 34".9253	01'	+1° 45' 40".1230
116° 31'	+2° 49' 29".7275	17'	+2° 16' 52".3741	02'	+1° 44' 57".5719
32'	+2° 48' 47".1764	18'	+2° 16' 09".8230	03'	+1° 44' 15".0207
33'	+2° 48' 04".6252	19'	+2° 15' 27".2718	04'	+1° 43' 32".4695
34'	+2° 47' 22".0740	20'	+2° 14' 44".7206	05'	+1° 42' 49".9184
35'	+2° 46' 39".5229				
		117° 21'	+2° 14' 02".1695	118° 06'	+1° 42' 07".3672
116° 36'	+2° 45' 56".9717	22'	+2° 13' 19".6183	07'	+1° 41' 24".8161
37'	+2° 45' 14".4206	23'	+2° 12' 31".0671	08'	+1° 40' 42".2649
38'	+2° 44' 31".8694	24'	+2° 11' 54".5160	09'	+1° 39' 59".7137
39'	+2° 43' 49".3182	25'	+2° 11' 11".9648	10'	+1° 39' 17".1626
40'	+2° 43' 06".7671				
		117° 26'	+2° 10' 29".4137	118° 11'	+1° 38' 34".6114
116° 41'	+2° 42' 24".2159	27'	+2° 09' 46".8625	12'	+1° 37' 52".0602
42'	+2° 41' 41".6648	28'	+2° 09' 04".3113	13'	+1° 37' 09".5091
43'	+2° 40' 59".1136	29'	+2° 08' 21".7602	14'	+1° 36' 26".9579
44'	+2° 40' 16".5624	30'	+2° 07' 39".2090	15'	+1° 35' 44".4068
45'	+2° 39' 34".0113				

**TABLE 16 — LAMBERT CONFORMAL PROJECTION - OREGON NORTH ZONE**

For 1" of LONGITUDE = 0."70918602 of  $\theta$  (Continued)

Long.	$\theta$	Long.	$\theta$	Long.	$\theta$
118° 16'	+1° 35' 01".8556	119° 00'	+1° 03' 49".6045	119° 46'	+0° 31' 12".2511
17'	+1° 34' 19".3044	01'	+1° 03' 07".0533	47'	+0° 30' 29".6999
18'	+1° 33' 36".7533	02'	+1° 02' 24".5022	48'	+0° 29' 47".1488
19'	+1° 32' 54".2021	03'	+1° 01' 41".9510	49'	+0° 29' 04".5976
20'	+1° 32' 11".6510	04'	+1° 00' 59".3999	50'	+0° 28' 22".0464
		05'	+1° 00' 16".8487		
118° 21'	+1° 31' 29".0998	119° 51'	+0° 27' 39".4953		
22'	+1° 30' 46".5486	119° 06'	+0° 59' 34".2975	52'	+0° 26' 56".9441
23'	+1° 30' 03".9975	07'	+0° 58' 51".7464	53'	+0° 26' 14".3930
24'	+1° 29' 21".4463	08'	+0° 58' 09".1952	54'	+0° 25' 31".8418
25'	+1° 28' 38".8952	09'	+0° 57' 26".6441	55'	+0° 24' 49".2906
		10'	+0° 56' 44".0209		
118° 26'	+1° 27' 56".3440	119° 56'	+0° 24' 06".7395		
27'	+1° 27' 13".7928	119° 11'	+0° 56' 01".5417	57'	+0° 23' 24".1883
28'	+1° 26' 31".2417	12'	+0° 55' 18".9906	58'	+0° 22' 41".6372
29'	+1° 25' 48".6905	13'	+0° 54' 36".4394	59'	+0° 21' 59".0860
30'	+1° 25' 06".1393	14'	+0° 53' 53".8883		
		15'	+0° 53' 11".3371	120° 00'	+0° 21' 16".5348
118° 31'	+1° 24' 25".5882			01'	+0° 20' 33".9837
32'	+1° 23' 41".0370	119° 16'	+0° 52' 28".7859	02'	+0° 19' 51".4325
33'	+1° 22' 58".4859	17'	+0° 51' 46".2348	03'	+0° 19' 08".8814
34'	+1° 22' 15".9347	18'	+0° 51' 03".6836	04'	+0° 18' 26".3302
35'	+1° 21' 33".3835	19'	+0° 50' 21".1324	05'	+0° 17' 43".7790
		20'	+0° 49' 38".5813		
118° 36'	+1° 20' 50".8324			120° 06'	+0° 17' 01".2279
37'	+1° 20' 08".2812	119° 21'	+0° 48' 56".0301	07'	+0° 16' 18".6767
38'	+1° 19' 25".7301	22'	+0° 48' 13".4790	08'	+0° 15' 36".1255
39'	+1° 18' 43".1789	23'	+0° 47' 30".9278	09'	+0° 14' 53".5744
40'	+1° 18' 00".6277	24'	+0° 46' 48".3766	10'	+0° 14' 11".0232
		25'	+0° 46' 05".8255		
118° 41'	+1° 17' 18".0766			120° 11'	+0° 13' 28".4721
42'	+1° 16' 35".5254	119° 26'	+0° 45' 23".2743	12'	+0° 12' 45".9209
43'	+1° 15' 52".9742	27'	+0° 44' 40".7232	13'	+0° 12' 03".3697
44'	+1° 15' 10".4231	28'	+0° 43' 58".1720	14'	+0° 11' 20".8186
45'	+1° 14' 27".8719	29'	+0° 43' 15".6208	15'	+0° 10' 38".2674
		30'	+0° 42' 33".0697		
118° 46'	+1° 13' 45".3208			120° 16'	+0° 09' 55".7163
47'	+1° 13' 02".7696	119° 31'	+0° 41' 50".5185	17'	+0° 09' 13".1651
48'	+1° 12' 20".2184	32'	+0° 41' 07".9673	18'	+0° 08' 30".6139
49'	+1° 11' 37".6673	33'	+0° 40' 25".4162	19'	+0° 07' 48".0628
50'	+1° 10' 55".1161	34'	+0° 39' 42".8650	20'	+0° 07' 05".5116
		35'	+0° 39' 00".3139		
118° 51'	+1° 10' 12".5650			120° 21'	+0° 06' 22".9605
52'	+1° 09' 30".0138	119° 36'	+0° 38' 17".7627	22'	+0° 05' 40".4093
53'	+1° 08' 47".4626	37'	+0° 37' 35".2115	23'	+0° 04' 57".8581
54'	+1° 08' 04".9115	38'	+0° 36' 52".6604	24'	+0° 04' 15".3070
55'	+1° 07' 22".3603	39'	+0° 36' 10".1092	25'	+0° 03' 32".7558
		40'	+0° 35' 27".5581		
118° 56'	+1° 06' 39".8092			120° 26'	+0° 02' 50".2046
57'	+1° 05' 57".2580	119° 41'	+0° 34' 45".0069	27'	+0° 02' 07".6535
58'	+1° 05' 14".7068	42'	+0° 34' 02".4557	28'	+0° 01' 25".1023
59'	+1° 04' 32".1557	43'	+0° 33' 19".9046	29'	+0° 00' 42".5512
		44'	+0° 32' 37".3534	C.M. 30'	+0° 00' 00".0000
		45'	+0° 31' 54".8023		

**TABLE 16 — LAMBERT CONFORMAL PROJECTION - OREGON NORTH ZONE**

For 1" of LONGITUDE = 0."70918602 of  $\theta$  (Continued)

Long.	$\theta$	Long.	$\theta$	Long.	$\theta$
120° 31'	-0° 00' 42".5512	121° 16'	-0° 32' 37".3534	122° 00'	-1° 03' 49".6045
32'	-0° 01' 25".1023	17'	-0° 33' 19".9046	01'	-1° 04' 32".1557
33'	-0° 02' 07".6535	18'	-0° 34' 02".4557	02'	-1° 05' 14".7068
34'	-0° 02' 50".2046	19'	-0° 34' 45".0069	03'	-1° 05' 57".2580
35'	-0° 03' 32".7558	20'	-0° 35' 27".5581	04'	-1° 06' 39".8092
				05'	-1° 07' 22".3603
120° 36'	-0° 04' 15".3070	121° 21'	-0° 36' 10".1092		
37'	-0° 04' 57".8581	22'	-0° 36' 52".6604	122° 06'	-1° 08' 04".9115
38'	-0° 05' 40".4093	23'	-0° 37' 35".2115	07'	-1° 08' 47".4626
39'	-0° 06' 22".9605	24'	-0° 38' 17".7627	08'	-1° 09' 30".0138
40'	-0° 07' 05".5116	25'	-0° 39' 00".3139	09'	-1° 10' 12".5650
				10'	-1° 10' 55".1161
120° 41'	-0° 07' 48".0628	121° 26'	-0° 39' 42".8650		
42'	-0° 08' 30".6139	27'	-0° 40' 25".4162	122° 11'	-1° 11' 37".6673
43'	-0° 09' 13".1651	28'	-0° 41' 07".9673	12'	-1° 12' 20".2184
44'	-0° 09' 55".7163	29'	-0° 41' 50".5185	13'	-1° 13' 01".7696
45'	-0° 10' 38".2674	30'	-0° 42' 33".0697	14'	-1° 13' 45".3208
				15'	-1° 14' 27".8719
120° 46'	-0° 11' 20".8186	121° 31'	-0° 43' 15".6208		
47'	-0° 12' 03".3697	32'	-0° 43' 59".1720	122° 16'	-1° 15' 10".4231
48'	-0° 12' 45".9209	33'	-0° 44' 40".7232	17'	-1° 15' 52".9742
49'	-0° 13' 28".4721	34'	-0° 45' 23".2743	18'	-1° 16' 35".5254
50'	-0° 14' 11".0232	35'	-0° 46' 05".8255	19'	-1° 17' 18".0766
				20'	-1° 18' 00".6277
120° 51'	-0° 14' 53".5744	121° 36'	-0° 46' 48".3766		
52'	-0° 15' 36".1255	37'	-0° 47' 30".9278	122° 21'	-1° 18' 43".1789
53'	-0° 16' 18".6767	38'	-0° 48' 13".4790	22'	-1° 19' 25".7301
54'	-0° 17' 01".2279	39'	-0° 48' 56".0301	23'	-1° 20' 09".2812
55'	-0° 17' 43".7790	40'	-0° 49' 38".5813	24'	-1° 20' 50".8324
				25'	-1° 21' 33".3835
120° 56'	-0° 18' 26".3302	121° 41'	-0° 50' 21".1324		
57'	-0° 19' 08".8814	42'	-0° 51' 03".6836	122° 26'	-1° 22' 15".9347
58'	-0° 19' 51".4325	43'	-0° 51' 46".2348	27'	-1° 22' 58".4859
59'	-0° 20' 33".9837	44'	-0° 52' 28".7859	28'	-1° 23' 41".0370
		45'	-0° 53' 11".3371	29'	-1° 24' 23".5882
121° 00'	-0° 21' 16".5348			30'	-1° 25' 06".1393
01'	-0° 21' 59".0860	121° 46'	-0° 53' 53".8883		
02'	-0° 22' 41".6372	47'	-0° 54' 36".4394	122° 31'	-1° 25' 48".6905
03'	-0° 23' 24".1883	48'	-0° 55' 18".9906	32'	-1° 26' 31".2417
04'	-0° 24' 06".7395	49'	-0° 56' 01".5417	33'	-1° 27' 13".7928
05'	-0° 24' 49".2906	50'	-0° 56' 44".0929	34'	-1° 27' 56".3440
				35'	-1° 28' 38".8952
121° 06'	-0° 25' 31".8418	121° 51'	-0° 57' 26".6441		
07'	-0° 26' 14".3930	52'	-0° 58' 09".1952	122° 36'	-1° 29' 21".4463
08'	-0° 26' 56".9441	53'	-0° 58' 51".7464	37'	-1° 30' 03".9975
09'	-0° 27' 39".4953	54'	-0° 59' 34".2975	38'	-1° 30' 46".5486
10'	-0° 28' 22".0464	55'	-1° 00' 16".8487	39'	-1° 31' 29".0998
				40'	-1° 32' 11".6510
121° 11'	-0° 29' 04".5976	121° 56'	-1° 00' 59".3999		
12'	-0° 29' 47".1488	57'	-1° 01' 41".9510	122° 41'	-1° 32' 54".2021
13'	-0° 30' 29".6999	58'	-1° 02' 24".5022	42'	-1° 33' 36".7533
14'	-0° 31' 12".2511	59'	-1° 03' 07".0533	43'	-1° 34' 19".3044
15'	-0° 31' 54".8023			44'	-1° 35' 01".8556
				45'	-1° 35' 44".4068

**TABLE 16 — LAMBERT CONFORMAL PROJECTION - OREGON NORTH ZONE**

For 1" of LONGITUDE = 0."70918602 of  $\theta$  (Continued)

Long.	$\theta$	Long.	$\theta$	Long.	$\theta$
122° 46'	-1° 36' 26".9579	123° 31'	-2° 08' 21".7602	124° 16'	-2° 40' 16".5624
47'	-1° 37' 09".5091	32'	-2° 09' 04".3113	17'	-2° 40' 59".1136
48'	-1° 37' 52".0602	33'	-2° 09' 46".8625	18'	-2° 41' 41".6648
49'	-1° 38' 34".6114	34'	-2° 10' 29".4137	19'	-2° 42' 24".2159
50'	-1° 39' 17".1626	35'	-2° 11' 11".9648	20'	-2° 43' 06".7671
122° 51'	-1° 39' 59".7137	123° 36'	-2° 11' 54".5160	124° 21'	-2° 43' 49".3182
52'	-1° 40' 42".2649	37'	-2° 12' 37".0671	22'	-2° 44' 31".8694
53'	-1° 41' 24".8161	38'	-2° 13' 19".6183	23'	-2° 45' 14".4206
54'	-1° 42' 07".3672	39'	-2° 14' 02".1695	24'	-2° 45' 56".9717
55'	-1° 42' 49".9184	40'	-2° 14' 44".7206	25'	-2° 46' 39".5229
122° 56'	-1° 43' 32".4695	123° 41'	-2° 15' 27".2718	124° 26'	-2° 47' 22".0740
57'	-1° 44' 15".0207	42'	-2° 16' 09".8230	27'	-2° 48' 04".6252
58'	-1° 44' 57".5719	43'	-2° 16' 52".3741	28'	-2° 48' 47".1764
59'	-1° 45' 40".1230	44'	-2° 17' 34".9253	29'	-2° 49' 29".7275
		45'	-2° 18' 17".4764	30'	-2° 50' 12".2787
123° 00'	-1° 46' 22".6742	123° 46'	-2° 19' 00".0276	124° 31'	-2° 50' 54".8298
01'	-1° 47' 05".2253	47'	-2° 19' 42".5788	32'	-2° 51' 37".3810
02'	-1° 47' 47".7765	48'	-2° 20' 25".1299	33'	-2° 52' 19".9322
03'	-1° 48' 30".3277	49'	-2° 21' 07".6811	34'	-2° 53' 02".4833
04'	-1° 49' 12".8788	50'	-2° 21' 50".2322	35'	-2° 53' 45".0345
05'	-1° 49' 55".4300				
123° 06'	-1° 50' 37".9811	123° 51'	-2° 22' 32".7834	124° 36'	-2° 54' 27".5857
07'	-1° 51' 20".5323	52'	-2° 23' 15".3346	37'	-2° 55' 10".1368
08'	-1° 52' 03".0835	53'	-2° 23' 57".8857	38'	-2° 55' 52".6880
09'	-1° 52' 45".6346	54'	-2° 24' 40".4369	39'	-2° 56' 35".2391
10'	-1° 53' 28".1858	55'	-2° 25' 22".9880	40'	-2° 57' 17".7903
123° 11'	-1° 54' 10".7370	123° 56'	-2° 26' 05".5392	124° 41'	-2° 58' 00".3415
12'	-1° 54' 53".2881	57'	-2° 26' 48".0904	42'	-2° 58' 42".8926
13'	-1° 55' 35".8393	58'	-2° 27' 30".6415	43'	-2° 59' 25".4438
14'	-1° 56' 18".3904	59'	-2° 28' 13".1927	44'	-3° 00' 07".9949
15'	-1° 57' 00".9416			45'	-3° 00' 50".5461
		124° 00'	-2° 28' 55".7439		
123° 16'	-1° 57' 43".4928	01'	-2° 29' 38".2950	124° 46'	-3° 01' 33".0973
17'	-1° 58' 26".0439	02'	-2° 30' 20".8462	47'	-3° 02' 15".6484
18'	-1° 59' 08".5951	03'	-2° 31' 03".3973	48'	-3° 02' 58".1996
19'	-1° 59' 51".1462	04'	-2° 31' 45".9485	49'	-3° 03' 40".7508
20'	-2° 00' 33".6974	05'	-2° 32' 28".4997	50'	-3° 04' 23".3019
123° 21'	-2° 01' 16".2486	124° 06'	-2° 33' 11".0508	124° 51'	-3° 05' 05".8351
22'	-2° 01' 58".7997	07'	-2° 33' 53".6020	52'	-3° 05' 48".4042
23'	-2° 02' 41".3509	08'	-2° 34' 36".1531	53'	-3° 06' 30".9554
24'	-2° 03' 23".9020	09'	-2° 35' 18".7043	54'	-3° 07' 13".5066
25'	-2° 04' 06".4532	10'	-2° 36' 01".2555	55'	-3° 07' 56".0577
123° 26'	-2° 04' 49".0044	124° 11'	-2° 36' 43".8066	124° 56'	-3° 08' 38".6089
27'	-2° 05' 31".5555	12'	-2° 37' 26".3578	57'	-3° 09' 21".1600
28'	-2° 06' 14".1067	13'	-2° 38' 08".9089	58'	-3° 10' 03".7112
29'	-2° 06' 56".6579	14'	-2° 38' 51".4601	59'	-3° 10' 46".2624
30'	-2° 07' 39".2090	15'	-2° 39' 34".0113		
				125° 00'	-3° 11' 28".8135

$\theta$  is the mapping angle (theta) for the longitude of the station.

**TABLE 17 — LAMBERT CONFORMAL PROJECTION  
OREGON SOUTH ZONE**

LATITUDE	R (feet)	Y' Y VALUE ON CENTRAL MERIDIAN (feet)	TABULAR DIFFERENCE FOR 1 SECOND OF LATITUDE (feet)	1 MINUTE OF $\theta$ IN FEET (Approx.)	SCALE EXPRESSED AS A RATIO
41°40'	22,888,667.15	0	101.24167	6656	1.0002341
41'	22,882,592.64	6,074.51	101.24167		1.0002266
42'	22,876,518.15	12,149.00	101.24100		1.0002192
43'	22,870,443.69	18,223.46	101.24067		1.0002119
44'	22,864,369.25	24,297.90	101.24017		1.0002047
45'	22,858,294.84	30,372.31	101.23967	1.0001976	
41°46'	22,852,220.46	36,446.69	101.23933	6639	1.0001905
47'	22,846,146.10	42,521.05	101.23833		1.0001836
48'	22,840,071.77	48,595.38	101.23850		1.0001767
49'	22,833,997.46	54,669.69	101.23817		1.0001699
50'	22,827,923.17	60,743.98	101.23783		1.0001631
41°51'	22,821,848.90	66,818.25	101.23733		1.0001565
52'	22,815,774.66	72,892.49	101.23700		1.0001500
53'	22,809,700.44	78,966.71	101.23667		1.0001435
54'	22,803,626.24	85,040.91	101.23633		1.0001371
55'	22,797,552.06	91,115.09	101.23600		1.0001308
41°56'	22,791,477.90	97,189.25	101.23567		1.0001246
57'	22,785,403.76	103,263.39	101.23533		1.0001184
58'	22,779,329.64	109,337.51	101.23500		1.0001124
59'	22,773,255.54	115,411.61	101.23483		1.0001064
42°00'	22,767,181.45	121,485.70	101.23433	6622	1.0001005
01'	22,761,107.39	127,559.76	101.23417		1.0000947
02'	22,755,033.34	133,633.81	101.23383		1.0000889
03'	22,748,959.31	139,707.84	101.23367		1.0000833
04'	22,742,885.29	145,781.86	101.23333		1.0000777
42°05'	22,736,811.29	151,855.86	101.23317		1.0000723
06'	22,730,737.30	157,929.85	101.23283		1.0000669
07'	22,724,663.33	164,003.82	101.23267		1.0000615
08'	22,718,589.37	170,077.78	101.23233		1.0000563
09'	22,712,515.43	176,151.72	101.23217		1.0000512
42°10'	22,706,441.50	182,225.65	101.23183	6605	1.0000461
11'	22,700,367.59	188,299.56	101.23183		1.0000411
12'	22,694,293.68	194,373.47	101.23150		1.0000362
13'	22,688,219.79	200,447.36	101.23150		1.0000314
14'	22,682,145.90	206,521.25	101.23117		1.0000267
42°15'	22,676,072.03	212,595.12	101.23100	6587	1.0000220
16'	22,669,998.17	218,668.98	101.23083		1.0000175
17'	22,663,924.32	224,742.83	101.23067		1.0000130
18'	22,657,850.48	230,816.67	101.23067		1.0000086
19'	22,651,776.64	236,890.51	101.23033		1.0000042
20'	22,645,702.82	242,964.33	101.23033		1.0000000
42°21'	22,639,629.00	249,038.15	101.23033		0.9999959
22'	22,633,555.18	255,111.97	101.23000		0.9999918
23'	22,627,481.38	261,185.77	101.23000		0.9999878
24'	22,621,407.58	267,259.57	101.22983		0.9999839
25'	22,615,333.79	273,333.36	101.22983		0.9999801

**TABLE 17 — LAMBERT CONFORMAL PROJECTION  
OREGON SOUTH ZONE (Continued)**

LATITUDE	R (feet)	Y' Y VALUE ON CENTRAL MERIDIAN (feet)	TABULAR DIFFERENCE FOR 1 SECOND OF LATITUDE (feet)	1 MINUTE OF $\theta$ IN FEET (Approx.)	SCALE EXPRESSED AS A RATIO
42°26'	22,609,260.00	279,407.15	101.22983	6570	0.9999763
27'	22,603,186.21	285,480.94	101.22967		0.9990727
28'	22,597,112.43	291,554.72	101.22967		0.9999691
29'	22,591,038.65	297,628.50	101.22950		0.9999656
30'	22,584,964.88	303,702.27	101.22950		0.9999622
42°31'	22,578,891.11	309,776.04	101.22950	6552	0.9999589
32'	22,572,817.34	315,849.81	101.22933		0.9999556
33'	22,566,743.58	321,923.57	101.22950		0.9999525
34'	22,560,669.81	327,997.34	101.22950		0.9999494
35'	22,554,596.04	334,071.11	101.22933		0.9999464
42°36'	22,548,522.28	340,144.87	101.22950	6535	0.9999435
37'	22,542,448.51	346,218.64	101.22950		0.9999407
38'	22,536,374.74	352,292.41	101.22950		0.9999379
39'	22,530,300.97	358,366.18	101.22950		0.9999353
40'	22,524,227.20	364,439.95	101.22950		0.9999327
42°41'	22,518,153.43	370,513.72	101.22967	6518	0.9999302
42'	22,512,079.65	376,587.50	101.22967		0.9999278
43'	22,506,005.87	382,661.28	101.22967		0.9999255
44'	22,499,932.09	388,735.06	101.22983		0.9999233
45'	22,493,858.30	394,808.85	101.23000		0.9999211
42°46'	22,487,784.50	400,882.65	101.23000	6535	0.9999191
47'	22,481,710.70	406,956.45	101.23017		0.9999171
48'	22,475,636.89	413,030.26	101.23017		0.9999152
49'	22,469,563.08	419,104.07	101.23033		0.9999133
50'	22,463,489.26	425,177.89	101.23050		0.9999116
42°51'	22,457,415.43	431,251.72	101.23050	6518	0.9999100
52'	22,451,341.60	437,325.55	101.23083		0.9999084
53'	22,445,267.75	443,399.40	101.23083		0.9999069
54'	22,439,193.90	449,473.25	101.23100		0.9999055
55'	22,433,120.04	455,547.11	101.23133		0.9999042
42°56'	22,427,046.16	461,620.99	101.23133	6518	0.9999030
57'	22,420,972.28	467,694.87	101.23167		0.9999018
58'	22,414,898.38	473,768.77	101.23183		0.9999008
59'	22,408,824.47	479,842.68	101.23200		0.9998998
43°00'	22,402,750.55	485,916.60	101.23217		6518
01'	22,396,676.62	491,990.53	101.23233	0.9998981	
02'	22,390,602.68	498,064.47	101.23267	0.9998974	
03'	22,384,528.72	504,138.43	101.23300	0.9998967	
04'	22,378,454.74	510,212.41	101.23317	0.9998962	
05'	22,372,380.75	516,286.40	101.23333	0.9998957	
43°06'	22,366,306.75	522,360.40	101.23367	6500	0.9998953
07'	22,360,232.73	528,434.42	101.23400		0.9998950
08'	22,354,158.69	534,508.46	101.23417		0.9998948
09'	22,348,084.64	540,582.51	101.23450		0.9998947
10'	22,342,010.57	546,656.58	101.23483		0.9998946

**TABLE 17 — LAMBERT CONFORMAL PROJECTION  
OREGON SOUTH ZONE (Continued)**

LATITUDE	R (feet)	Y' Y VALUE ON CENTRAL MERIDIAN (feet)	TABULAR DIFFERENCE FOR 1 SECOND OF LATITUDE (feet)	1 MINUTE OF $\theta$ IN FEET (Approx.)	SCALE EXPRESSED AS A RATIO
43°11'	22,335,936.48	552,730.67	101.23517		0.9998946
12'	22,329,862.37	558,804.78	101.23533		0.9998947
13'	22,323,788.25	564,878.90	101.23583		0.9998950
14'	22,317,714.10	570,953.05	101.23600		0.9998952
15'	22,311,639.94	577,027.21	101.23650		0.9998956
43°16'	22,305,565.75	583,101.40	101.23683		0.9998961
17'	22,299,491.54	589,175.61	101.23700		0.9998966
18'	22,293,417.32	595,249.83	101.23750		0.9998972
19'	22,287,343.07	601,324.08	101.23800		0.9998979
20'	22,281,268.79	607,398.36	101.23817	6482	0.9998987
43°21'	22,275,194.50	613,472.65	101.23867		0.9998996
22'	22,269,120.18	619,546.97	101.23917		0.9999006
23'	22,263,045.83	625,621.32	101.23933		0.9999016
24'	22,256,971.47	631,695.68	101.24000		0.9999040
25'	22,250,897.07	637,770.08	101.24033		0.9999000
43°26'	22,244,822.65	643,844.50	101.24067		0.9999052
27'	22,238,748.21	649,918.94	101.24133		0.9999066
28'	22,232,673.73	655,993.42	101.24167		0.9999081
29'	22,226,599.23	662,067.92	101.24200		0.9999097
30'	22,220,524.71	668,142.44	101.24250	6464	0.9999113
43°31'	22,214,450.16	674,216.99	101.24300		0.9999130
32'	22,208,375.58	680,291.57	101.24367		0.9999149
33'	22,202,300.96	686,366.19	101.24400		0.9999167
34'	22,196,226.32	692,440.83	101.24450		0.9999187
35'	22,190,151.65	698,515.50	101.24500		0.9999208
43°36'	22,184,076.95	704,590.20	101.24567		0.9999229
37'	22,178,002.21	710,664.94	101.24600		0.9999251
38'	22,171,927.45	716,739.70	101.24667		0.9999275
39'	22,165,852.65	722,814.50	101.24717		0.9999299
40'	22,159,777.82	728,889.33	101.24783	6446	0.9999324
43°41'	22,153,702.95	734,964.20	101.24833		0.9999349
42'	22,147,628.05	741,039.10	101.24883		0.9999376
43'	22,141,553.12	747,114.03	101.24950		0.9999403
44'	22,135,478.15	753,189.00	101.25000		0.9999432
45'	22,129,403.15	759,264.00	101.25067		0.9999461
43°46'	22,123,328.11	765,339.04	101.25133		0.9999491
47'	22,117,253.03	771,414.12	101.25183		0.9999522
48'	22,111,177.92	777,489.23	101.25250		0.9999553
49'	22,105,102.77	783,564.38	101.25317		0.9999586
50'	22,099,027.58	789,639.57	101.25383	6428	0.9999619
43°51'	22,092,952.35	795,714.80	101.25433		0.9999653
52'	22,086,877.09	801,790.06	101.25500		0.9999688
53'	22,080,801.79	807,865.36	101.25583		0.9999724
54'	22,074,726.44	813,940.71	101.25633		0.9999761
55'	22,068,651.06	820,016.09	101.25717		0.9999799

**TABLE 17 — LAMBERT CONFORMAL PROJECTION  
OREGON SOUTH ZONE (Continued)**

LATITUDE	R (feet)	Y' Y VALUE ON CENTRAL MERIDIAN (feet)	TABULAR DIFFERENCE FOR 1 SECOND OF LATITUDE (feet)	1 MINUTE OF $\theta$ IN FEET (Approx.)	SCALE EXPRESSED AS A RATIO
43°56'	22,062,575.63	826,091.52	101.25783		0.9999837
57'	22,056,500.16	832,166.99	101.25850		0.9999877
58'	22,050,424.65	838,242.50	101.25933		0.9999917
59'	22,044,349.09	844,318.06	101.25983		0.9999958
43°00'	22,038,273.50	850,393.65	101.26067	6410	1.0000000
01'	22,032,197.86	856,469.29	101.26150		1.0000043
02'	22,026,122.17	862,544.98	101.26217		1.0000086
03'	22,020,046.44	868,620.71	101.26283		1.0000131
04'	22,013,970.67	874,696.48	101.26367		1.0000176
05'	22,007,894.85	880,772.30	101.26450		1.0000222
44°06'	22,001,818.98	886,848.17	101.26517		1.0000269
07'	21,995,743.07	892,924.08	101.26617		1.0000317
08'	21,989,667.10	899,000.05	101.26667		1.0000366
09'	21,983,591.10	905,076.05	101.26767		1.0000416
10'	21,977,515.04	911,152.11	101.26850	6393	1.0000466
44°11'	21,971,438.93	917,228.22	101.26917		1.0000518
12'	21,965,362.78	923,304.37	101.27017		1.0000570
13'	21,959,286.57	929,380.58	101.27083		1.0000623
14'	21,953,210.32	935,456.83	101.27183		1.0000677
15'	21,947,134.01	941,533.14	101.27267		1.0000732
44°16'	21,941,057.65	947,609.50	101.27350		1.0000787
17'	21,934,981.24	953,685.91	101.27450		1.0000844
18'	21,928,904.77	959,762.38	101.27517		1.0000901
19'	21,922,828.26	965,838.89	101.27617		1.0000959
20'	21,916,751.69	971,915.46	101.27717	6375	1.0001018
44°21'	21,910,675.06	977,992.09	101.27800		1.0001078
22'	21,904,598.38	984,068.77	101.27883		1.0001139
23'	21,898,521.65	990,145.50	101.27983		1.0001201
24'	21,892,444.86	996,222.29	101.28067		1.0001263
25'	21,886,368.02	1,002,299.13	101.28183		1.0001327
44°26'	21,880,291.11	1,008,376.04	101.28267		1.0001391
27'	21,874,214.15	1,014,453.00	101.28367		1.0001456
28'	21,868,137.13	1,020,530.02	101.28450		1.0001522
29'	21,862,060.06	1,026,607.09	101.28567		1.0001589
30'	21,855,982.92	1,032,684.23	101.28650	6356	1.0001656
44°31'	21,849,905.73	1,038,761.42	101.28767		1.0001725
32'	21,843,828.47	1,044,838.68	101.28850		1.0001794
33'	21,837,751.16	1,050,915.99	101.28967		1.0001865
34'	21,831,673.78	1,056,993.37	101.29050		1.0001936
35'	21,825,596.35	1,063,070.80	101.29167		1.0002008
44°36'	21,819,518.85	1,069,148.30	101.29283		1.0002081
37'	21,813,441.28	1,075,225.87	101.29367		1.0002154
38'	21,807,363.66	1,081,303.49	101.29483		1.0002229
39'	21,801,285.97	1,087,381.18	101.29583		1.0002304
40'	21,795,208.22	1,093,458.93	101.29700	6338	1.0002381

**TABLE 17 — LAMBERT CONFORMAL PROJECTION  
OREGON SOUTH ZONE (Continued)**

LATITUDE	R (feet)	Y' Y VALUE ON CENTRAL MERIDIAN (feet)	TABULAR DIFFERENCE FOR 1 SECOND OF LATITUDE (feet)	1 MINUTE OF $\theta$ IN FEET (Approx.)	SCALE EXPRESSED AS A RATIO
44°41'	21,789,130.40	1,099,536.75	101.29800		1.0002458
42'	21,783,052.52	1,105,614.63	101.29917		1.0002536
43'	21,776,974.57	1,111,692.58	101.30017		1.0002615
44'	21,770,896.56	1,117,770.59	101.30133		1.0002694
45'	21,764,818.48	1,123,848.67	101.30250		1.0002775
44°46'	21,758,740.33	1,129,926.82	101.30367		1.0002857
47'	21,752,662.11	1,136,005.04	101.30467		1.0002939
48'	21,746,583.83	1,142,083.32	101.30600		1.0003022
49'	21,740,505.47	1,148,161.68	101.30700		1.0003106
50'	21,734,427.05	1,154,240.10	101.30817	6320	1.0003191
44°51'	21,728,348.56	1,160,318.59	101.30950		1.0003277
52'	21,722,269.99	1,166,397.16	101.31050		1.0003364
53'	21,716,191.36	1,172,475.79	101.31167		1.0003451
54'	21,710,112.66	1,178,554.49	101.31300		1.0003540
55'	21,704,033.88	1,184,633.27	101.31417		1.0003629
44°56'	21,697,955.03	1,190,712.12	101.31550		1.0003719
57'	21,691,876.10	1,196,791.05	101.31650		1.0003810
58'	21,685,797.11	1,202,870.04	101.31783		1.0003902
59'	21,679,718.04	1,208,949.11	101.31917		1.0003995
45°00'	21,673,638.89	1,215,028.26		6302	1.0004088

R = The radius for the latitude of the station

**TABLE 18 — LAMBERT CONFORMAL PROJECTION - OREGON SOUTH ZONE**

For 1" of LONGITUDE = 0."68414738 of  $\theta$

Long.	$\theta$	Long.	$\theta$	Long.	$\theta$
116° 00'	+3° 04' 43".1876	116° 46'	+2° 33' 14".9408	117° 31'	+2° 02' 27".7429
01'	+3° 04' 02".1388	47'	+2° 32' 33".8920	32'	+2° 01' 46".6941
02'	+3° 03' 21".0899	48'	+2° 31' 52".8431	33'	+2° 02' 05".6452
03'	+3° 02' 40".0411	49'	+2° 31' 11".7943	34'	+2° 00' 24".5964
04'	+3° 01' 58".9921	50'	+2° 30' 30".7455	35'	+1° 59' 43".5475
05'	+3° 01' 17".9434				
		116° 51'	+2° 29' 49".6966	117° 36'	+1° 59' 02".4987
116° 06'	+3° 00' 36".8946	52'	+2° 29' 08".6478	37'	+1° 58' 21".4498
07'	+2° 59' 55".8457	53'	+2° 28' 27".5989	38'	+1° 57' 40".4010
08'	+2° 59' 14".7969	54'	+2° 27' 46".5501	39'	+1° 56' 59".3522
09'	+2° 58' 33".7480	55'	+2° 27' 05".5012	40'	+1° 56' 18".3033
10'	+2° 57' 52".6992				
		116° 56'	+2° 26' 24".4524	117° 41'	+1° 55' 37".2545
116° 11'	+2° 57' 11".6503	57'	+2° 25' 43".4036	42'	+1° 54' 56".2056
12'	+2° 56' 30".6015	58'	+2° 25' 02".3547	43'	+1° 54' 15".1568
13'	+2° 55' 49".5527	59'	+2° 24' 21".3059	44'	+1° 53' 34".1079
14'	+2° 55' 08".5038			45'	+1° 52' 53".0591
15'	+2° 54' 27".4550	117° 00'	+2° 23' 40".2570		
		01'	+2° 22' 59".2082	117° 46'	+1° 52' 52".0103
116° 16'	+2° 53' 46".4061	02'	+2° 22' 18".1593	47'	+1° 51' 30".9614
17'	+2° 53' 05".3573	03'	+2° 21' 37".1105	48'	+1° 50' 49".9126
18'	+2° 52' 24".3084	04'	+2° 20' 56".0617	49'	+1° 50' 08".863
19'	+2° 51' 43".2596	05'	+2° 20' 15".0128	50'	+1° 49' 27".8149
20'	+2° 51' 02".2108				
		117° 06'	+2° 19' 33".9640	117° 51'	+1° 48' 46".7660
116° 21'	+2° 50' 21".1619	07'	+2° 18' 52".9151	52'	+1° 48' 05".7172
22'	+2° 49' 40".1131	08'	+2° 18' 11".8663	53'	+1° 47' 24".6684
23'	+2° 48' 50".0642	09'	+2° 17' 30".8174	54'	+1° 46' 43".6195
24'	+2° 48' 18".0154	10'	+2° 16' 49".7686	55'	+1° 46' 02".5707
25'	+2° 47' 36".9665				
		117° 11'	+2° 16' 08".7198	117° 56'	+1° 45' 21".218
116° 26'	+2° 46' 55".9177	12'	+2° 15' 27".6709	57'	+1° 44' 40".4730
27'	+2° 46' 14.8688	13'	+2° 14' 46".6221	58'	+1° 43' 59".4241
28'	+2° 45' 33".8200	14'	+2° 14' 05".5732	59'	+1° 43' 18".3753
29'	+2° 44' 52".7712	15'	+2° 13' 24".5244		
30'	+2° 44' 11".7223			118° 00'	+1° 42' 37".3264
		117° 16'	+2° 12' 43".4755	01'	+1° 41' 56".2776
116° 31'	+2° 43' 30".6735	17'	+2° 12' 02".4267	02'	+1° 41' 16".2288
32'	+2° 42' 49".6246	18'	+2° 11' 21".3779	03'	+1° 40' 34".1799
33'	+2° 42' 08".5758	19'	+2° 10' 40".3290	04'	+1° 39' 53".1311
34'	+2° 41' 27".5269	20'	+2° 09' 59".2802	05'	+1° 39' 12".0822
35'	+2° 40' 46".4781				
		117° 21'	+2° 09' 18".2313	118° 06'	+1° 38' 31".0334
116° 36'	+2° 40' 05".4293	22'	+2° 08' 37".1825	07'	+1° 37' 49".9845
37'	+2° 39' 24".3804	23'	+2° 07' 56".1336	08'	+1° 37' 08".9357
38'	+2° 38' 43".3316	24'	+2° 07' 15".0848	09'	+1° 36' 27".8869
39'	+2° 38' 02".2827	25'	+2° 06' 34".0360	10'	+1° 35' 46".8380
40'	+2° 37' 21".2339				
		117° 26'	+2° 05' 52".9871	118° 11'	+1° 35' 05".7892
116° 41'	+2° 36' 46".1850	27'	+2° 05' 11".9383	12'	+1° 34' 24".7403
42'	+2° 35' 59".1362	28'	+2° 04' 30".8894	13'	+1° 33' 43".6915
43'	+2° 35' 18".0874	29'	+2° 03' 49".8406	14'	+1° 33' 02".6426
44'	+2° 34' 37".0385	30'	+2° 03' 08".7917	15'	+1° 32' 21".5938
45'	+2° 33' 55".9897				

**TABLE 18 — LAMBERT CONFORMAL PROJECTION - OREGON SOUTH ZONE**

For 1" of LONGITUDE = 0."68414738 of  $\theta$  (Continued)

Long.	$\theta$	Long.	$\theta$	Long.	$\theta$
118° 16'	+1° 31' 40".5450	119° 00'	+1° 01' 34".3959	119° 46'	+0° 30' 06".1491
17'	+1° 30' 59".4961	01'	+1° 00' 53".3470	47'	+0° 29' 25".1002
18'	+1° 30' 18".4473	02'	+1° 00' 12".2982	48'	+0° 28' 44".0514
19'	+1° 29' 37".3984	03'	+0° 59' 31".2493	49'	+0° 28' 03".0026
20'	+1° 28' 56".3496	04'	+0° 58' 50".2005	50'	+0° 27' 21".9537
		05'	+0° 58' 09".1517		
118° 21'	+1° 28' 15".3007			119° 51'	+0° 26' 40".9049
22'	+1° 27' 34".2519	119° 06'	+0° 57' 28".1028	52'	+0° 25' 59".8560
23'	+1° 26' 53".2031	07'	+0° 56' 47".0540	53'	+0° 25' 18".8072
24'	+1° 26' 12".1542	08'	+0° 56' 06".0051	54'	+0° 24' 37".7583
25'	+1° 25' 31".1054	09'	+0° 55' 24".9563	55'	+0° 23' 56".7095
		10'	+0° 54' 43".9074		
118° 26'	+1° 24' 50".0565			119° 56'	+0° 23' 15".6607
27'	+1° 24' 09".0077	119° 11'	+0° 54' 02".8586	57'	+0° 22' 34".6118
28'	+1° 23' 27".9588	12'	+0° 53' 21".8098	58'	+0° 21' 53".5630
29'	+1° 22' 41".9100	13'	+0° 52' 40".7609	59'	+0° 21' 12".5141
30'	+1° 22' 05".8612	14'	+0° 51' 59".7121		
		15'	+0° 51' 18".6632	120° 00'	+0° 20' 31".4653
118° 31'	+1° 21' 24".8123			01'	+0° 19' 50".4164
32'	+1° 20' 43".7635	119° 16'	+0° 50' 37".6144	02'	+0° 19' 09".3676
33'	+1° 20' 02".7146	17'	+0° 49' 56".5655	03'	+0° 18' 28".3188
34'	+1° 19' 21".6658	18'	+0° 49' 15".5167	04'	+0° 17' 47".2699
35'	+1° 18' 40".6169	19'	+0° 48' 34".4679	05'	+0° 17' 06".2211
		20'	+0° 47' 53".4190		
118° 36'	+1° 17' 59".5681			120° 06'	+0° 16' 25".1722
37'	+1° 17' 18".5193	119° 21'	+0° 47' 12".3702	07'	+0° 15' 44".1234
38'	+1° 16' 37".4704	22'	+0° 46' 31".3213	08'	+0° 15' 03".0745
39'	+1° 15' 56".4216	23'	+0° 45' 50".2725	09'	+0° 14' 22".0257
40'	+1° 15' 15".3727	24'	+0° 45' 09".2236	10'	+0° 13' 40".9769
		25'	+0° 44' 28".1748		
118° 41'	+1° 14' 34".3239			120° 11'	+0° 12' 59".9280
42'	+1° 13' 53".2750	119° 26'	+0° 43' 47".1260	12'	+0° 12' 18".8792
43'	+1° 13' 12".2262	27'	+0° 43' 06".0771	13'	+0° 11' 37".8303
44'	+1° 12' 31".1774	28'	+0° 42' 25".0283	14'	+0° 10' 56".7815
45'	+1° 11' 50".1285	29'	+0° 41' 43".9794	15'	+0° 10' 15".7326
		30'	+0° 41' 02".9306		
118° 46'	+1° 11' 09".0797			120° 16'	+0° 09' 34".6838
47'	+1° 10' 28".0308	119° 31'	+0° 40' 21".8817	17'	+0° 08' 53".6350
48'	+1° 09' 46".9820	32'	+0° 39' 40".8329	18'	+0° 08' 12".5861
49'	+1° 09' 05".9331	33'	+0° 38' 59".7841	19'	+0° 07' 31".5373
50'	+1° 08' 24".8843	34'	+0° 38' 18".7352	20'	+0° 06' 50".4884
118° 51'	+1° 07' 43".8355	119° 36'	+0° 36' 56".6375	120° 21'	+0° 06' 09".4396
52'	+1° 07' 02".7866	37'	+0° 36' 15".5887	22'	+0° 05' 28".3907
53'	+1° 06' 21".7378	38'	+0° 35' 34".5398	23'	+0° 04' 47".3419
54'	+1° 05' 40".6889	39'	+0° 34' 53".4910	24'	+0° 04' 06".2931
55'	+1° 04' 59".6401	40'	+0° 34' 12".4422	25'	+0° 03' 25".2442
118° 56'	+1° 04' 18".5912	119° 41'	+0° 33' 31".3933	120° 26'	+0° 02' 44".1954
57'	+1° 03' 37".5424	42'	+0° 32' 50".3445	27'	+0° 02' 03".1465
58'	+1° 02' 56".4936	43'	+0° 32' 09".2956	28'	+0° 01' 22".0977
59'	+1° 02' 15".4447	44'	+0° 31' 28".2468	29'	+0° 00' 41".0488
		45'	+0° 30' 47".1979	30'	0° 00' 00".0000

**TABLE 18 — LAMBERT CONFORMAL PROJECTION - OREGON SOUTH ZONE**

For 1" of LONGITUDE = 0."68414738 of  $\theta$  (Continued)

Long.	$\theta$	Long.	$\theta$	Long.	$\theta$
120° 31'	-0° 00' 41".0488	121° 16'	-0° 31' 28".2468	122° 00'	-1° 01' 34".3959
32'	-0° 01' 22".0977	17'	-0° 32' 09".2956	01'	-1° 01' 15".4447
33'	-0° 02' 03".1465	18'	-0° 32' 50".3445	02'	-1° 02' 56".4936
34'	-0° 02' 44".1954	19'	-0° 33' 31".3933	03'	-1° 03' 37".5424
35'	-0° 03' 25".2442	20'	-0° 34' 12".4422	04'	-1° 04' 18".5912
				05'	-1° 04' 59".6401
120° 36'	-0° 04' 06".2931	121° 21'	-0° 34' 53".4910		
37'	-0° 04' 47".3419	22'	-0° 35' 34".5398	122° 06'	-1° 05' 40".6889
38'	-0° 05' 28".3907	23'	-0° 36' 15".5887	07'	-1° 06' 21".7378
39'	-0° 06' 09".4396	24'	-0° 36' 56".6375	08'	-1° 07' 02".7866
40'	-0° 06' 50".4884	25'	-0° 37' 37".6864	09'	-1° 07' 43".8355
				10'	-1° 08' 24".8843
120° 41'	-0° 07' 31".5373	121° 26'	-0° 38' 18".7352		
42'	-0° 08' 12".5861	27'	-0° 38' 59".7841	122° 11'	-1° 09' 05".9331
43'	-0° 08' 53".6350	28'	-0° 39' 40".8329	12'	-1° 09' 46".9820
44'	-0° 09' 34".6838	29'	-0° 40' 21".8817	13'	-1° 10' 28".0308
45'	-0° 10' 15".7326	30'	-0° 41' 02".9306	14'	-1° 11' 09".0797
				15'	-1° 11' 50".1285
120° 46'	-0° 10' 56".7815	121° 31'	-0° 41' 43".9794		
47'	-0° 11' 37".8303	32'	-0° 42' 25".0283	122° 16'	-1° 12' 31".1774
48'	-0° 12' 18".8792	33'	-0° 43' 06".0771	17'	-1° 13' 12".2262
49'	-0° 12' 59".9280	34'	-0° 43' 47".1260	18'	-1° 13' 53.2750
50'	-0° 13' 40".9769	35'	-0° 44' 28".1748	19'	-1° 14' 34".3239
				20'	-1° 15' 15".3727
120° 51'	-0° 14' 22".0257	121° 36'	-0° 45' 09".2236		
52'	-0° 15' 03".0745	37'	-0° 45' 50".2725	122° 21'	-1° 15' 56".4216
53'	-0° 15' 44".1234	38'	-0° 46' 31".3213	22'	-1° 16' 37".4704
54'	-0° 16' 25".1722	39'	-0° 47' 12".3702	23'	-1° 17' 18".5193
55'	-0° 17' 06".2211	40'	-0° 47' 53".4190	24'	-1° 17' 59".5681
				25'	-1° 18' 40".6169
120° 56'	-0° 17' 47".2699	121° 41'	-0° 48' 34".4679		
57'	-0° 18' 28".3188	42'	-0° 49' 15".5167	122° 26'	-1° 19' 21".6658
58'	-0° 19' 09".3676	43'	-0° 49' 56".5655	27'	-1° 20' 02".7146
59'	-0° 19' 50".4164	44'	-0° 50' 37".6144	28'	-1° 20' 43".7635
		45'	-0° 51' 18".6632	29'	-1° 21' 24".8123
121° 00'	-0° 20' 31".4653			30'	-1° 22' 05".8612
01'	-0° 21' 12".5141	121° 46'	-0° 51' 59".7121		
02'	-0° 21' 53".5630	47'	-0° 52' 40".7609	122° 31'	-1° 22' 46".9100
03'	-0° 22' 34".6118	48'	-0° 53' 21".8098	32'	-1° 23' 27".9588
04'	-0° 23' 15".6607	49'	-0° 54' 02".8586	33'	-1° 24' 09".0077
05'	-0° 23' 56".7095	50'	-0° 54' 43".9074	34'	-1° 24' 50".0565
		51'	-1° 25' 31".1054	35'	-1° 25' 31".1054
121° 06'	-0° 24' 37".7583	121° 51'	-0° 55' 24".9563		
07'	-0° 25' 18".8072	52'	-0° 56' 06".0051	122° 36'	-1° 26' 12".1542
08'	-0° 25' 59".8560	53'	-0° 56' 47".0540	37'	-1° 26' 53".2031
09'	-0° 26' 40".9049	54'	-0° 57' 29".1028	38'	-1° 27' 34".2519
10'	-0° 27' 21".9537	55'	-0° 58' 09".1517	39'	-1° 28' 15".3007
				40'	-1° 28' 56".3496
121° 11'	-0° 28' 03".0026	121° 56'	-0° 58' 50".2005		
12'	-0° 28' 44".0514	57'	-0° 59' 31".2493	122° 41'	-1° 29' 37".3984
13'	-0° 29' 25".1002	58'	-1° 00' 12".2982	42'	-1° 30' 18".4473
14'	-0° 30' 06".1491	59'	-1° 00' 53".3470	43'	-1° 30' 59".4961
15'	-0° 30' 47".1979			44'	-1° 31' 40".5450
				45'	-1° 32' 21".5938

**TABLE 18 — LAMBERT CONFORMAL PROJECTION - OREGON SOUTH ZONE**

For 1" of LONGITUDE = 0."68414738 of  $\theta$  (Continued)

Long.	$\theta$	Long.	$\theta$	Long.	$\theta$
122°46'	-1° 33' 02".6426	123°31'	-2° 03' 49".8406	124° 16'	-2° 34' 37".0385
47'	-1° 33' 43".6915	32'	-2° 04' 30".8894	17'	-2° 35' 18".0874
48'	-1° 34' 24".7403	33'	-2° 05' 11".9383	18'	-2° 35' 59".1362
49'	-1° 35' 05".7892	34'	-2° 05' 52".9871	19'	-2° 36' 46".1850
50'	-1° 35' 46".8380	35'	-2° 06' 34".0360	20'	-2° 37' 21".2339
122° 51'	-1° 36' 27".8869	123° 36'	-2° 07' 15".0848	124° 21'	-2° 38' 02".2827
52'	-1° 37' 08".9357	37'	-2° 07' 56".1336	22'	-2° 38' 43".3316
53'	-1° 37' 49".9845	38'	-2° 08' 37".1825	23'	-2° 39' 24".3804
54'	-1° 38' 31".0334	39'	-2° 09' 18".2313	24'	-2° 40' 05".4293
55'	-1° 39' 12".0822	40'	-2° 09' 59".2802	25'	-2° 40' 46".4781
122° 56'	-1° 39' 53".1311	123° 41'	-2° 10' 40".3290	124° 26'	-2° 41' 27".5269
57'	-1° 40' 34".1799	42'	-2° 11' 21".3779	27'	-2° 42' 09".5758
58'	-1° 41' 15".2288	43'	-2° 12' 02".4267	28'	-2° 42' 49".6246
59'	-1° 41' 56".2776	44'	-2° 12' 43".4755	29'	-2° 43' 30".6735
123° 00'	-1° 42' 37".3264	45'	-2° 13' 24".5244	30'	-2° 44' 11".7223
01'	-1° 43' 18".3753	123° 46'	-2° 14' 05".5732	124° 31'	-2° 44' 52".7712
02'	-1° 43' 59".4241	47'	-2° 14' 46".6221	32'	-2° 45' 33".8200
03'	-1° 44' 40".4730	48'	-2° 15' 27".6709	33'	-2° 46' 14".8688
04'	-1° 45' 21".5218	49'	-2° 16' 08".7198	34'	-2° 46' 55".9177
05'	-1° 46' 02".5707	50'	-2° 16' 49".7686	35'	-2° 47' 36".9665
123° 06'	-1° 46' 43".6195	123° 51'	-2° 17' 30".8174	124° 36'	-2° 48' 18".0154
07'	-1° 47' 24".6684	52'	-2° 18' 11".8663	37'	-2° 48' 59".0642
08'	-1° 48' 05".7172	53'	-2° 18' 52".9151	38'	-2° 49' 40".1131
09'	-1° 48' 46".7660	54'	-2° 19' 33".9640	39'	-2° 50' 21".1619
10'	-1° 49' 27".8149	55'	-2° 20' 15".0128	40'	-2° 51' 02".2108
123° 11'	-1° 50' 08".8637	123° 56'	-2° 20' 56".0617	124° 41'	-2° 51' 43".2596
12'	-1° 50' 49".9126	57'	-2° 21' 37".1105	42'	-2° 52' 24".3084
13'	-1° 51' 30".9614	58'	-2° 22' 18".1593	43'	-2° 53' 05".3573
14'	-1° 52' 12".0103	59'	-2° 22' 59".2082	44'	-2° 53' 46".4061
15'	-1° 52' 53".0591	124° 00'	-2° 23' 40".2570	45'	-2° 54' 27".4550
123° 16'	-1° 53' 34".1079	01'	-2° 24' 21".3059	124° 46'	-2° 55' 08".3038
17'	-1° 54' 15".1568	02'	-2° 25' 02".3547	47'	-2° 55' 49".5527
18'	-1° 54' 56".2056	03'	-2° 25' 43".4036	48'	-2° 56' 30".6015
19'	-1° 55' 37".2545	04'	-2° 26' 24".4524	49'	-2° 57' 11".6503
20'	-1° 56' 18".3033	05'	-2° 27' 05".5012	50'	-2° 57' 52".6992
123° 21'	-1° 56' 59".3522	124° 06'	-2° 27' 46".5501	124° 51'	-2° 58' 33".7480
22'	-1° 57' 40".4010	07'	-2° 28' 27".5989	52'	-2° 59' 14".7969
23'	-1° 58' 21".4498	08'	-2° 29' 08".6478	53'	-2° 59' 55".8457
24'	-1° 59' 02".4987	09'	-2° 29' 49".6966	54'	-3° 00' 36".8946
25'	-1° 59' 43".5475	10'	-2° 30' 30".7455	55'	-3° 01' 17".9434
123° 26'	-2° 00' 24".5964	124° 11'	-2° 31' 11".7943	124° 56'	-3° 01' 58".9922
27'	-2° 01' 05".6452	12'	-2° 31' 52".8431	57'	-3° 02' 40".0411
28'	-2° 01' 46".6941	13'	-2° 32' 33".8920	58'	-3° 03' 21".0899
29'	-2° 02' 27".7429	14'	-2° 33' 14".9408	59'	-3° 04' 02".1388
30'	-2° 03' 08".7917	15'	-2° 33' 55".9897	125° 00'	-3° 04' 43".1876

$\theta$  is the mapping angle (theta) for the longitude of the station

**TABLE 19 — MERIDIAN CONVERGENCY  
(SIX MILES LONG — SIX MILES APART)**

LAT.	CONVERGENCY		LONGITUDE DIFFERENCE Per Range		LATITUDE DIFFERENCE	
	On Parallel	Angle	In Arc.	In Time	1 Mile	1 Tshp.
41°	63.1 Lks.	4' 31"	6' 53.15"	27.54 sec.	0.869	5.217
42°	65.4 Lks.	4' 41"	6' 59.56"	27.97 sec.	0.869	5.217
43°	67.7 Lks.	4' 51"	7' 06.29"	28.42 sec.	0.869	5.217
44°	70.1 Lks.	5' 1"	7' 13.39"	28.89 sec.	0.869	5.217
45°	72.6 Lks.	5' 12"	7' 20.86"	29.39 sec.	0.869	5.211
46°	75.2 Lks.	5' 23"	7' 28.74"	29.92 sec.	0.869	5.211
47°	77.8 Lks.	5' 34"	7' 37.04"	30.47 sec.	0.869	5.211

**TABLE 20 — CONSTANTS FOR OREGON  
OREGON COORDINATE SYSTEM**

CONSTANT		NORTH ZONE	SOUTH ZONE
C	=	2,000,000.00 feet	2,000,000.00 feet
Central Meridian	=	120°30' 00".00	120° 30' 00".00
Rb	=	21,383,852.48 feet	22,888,667.15 feet
$y^\circ$	=	547,601.54 feet	547,357.72 feet
$\ell$	=	0.709 18602	0.684 14738
$\frac{1}{2}$ $2p \sin 1''$	=	$2.355 \times 10^{-10}$	$2356 \times 10^{-10}$
$\log \frac{1}{2}$ $2p \sin 1''$	=	0.372 0173-10	0372 2232-10
$\log \ell$	=	9.85076 01672-10	9.83514 96702-10
$\log k$	=	7.59008 31907	7.59638 31366

C = The value of "X" assigned to the central meridian for each zone.

R = Radius for the latitude of the station.

Rb = A constant for a zone.

$\ell$  = A constant for a zone.

**TABLE 21 — CORRECTIONS TO NATURAL SCALE RATIOS**  
(in units of the 7th decimal place)

**LAMBERT PROJECTION**

Note: Scale ratio interpolated for mean latitude or mean  $X'$  of the ends of a line and corrected by the following table is a true mean value accurate to within one in the seventh decimal place.

$\Delta\theta^1$  = the difference in latitude in minutes of the ends of the line.

$\Delta\theta^1$	Correction (Plus)	$\Delta\theta^1$	Correction (Plus)
1	0	31	34
1	0	32	36
3	0	33	38
4	1	34	40
5	1	35	43
6	1	36	45
7	2	37	48
8	2	38	51
9	3	39	53
10	4	40	56
11	4	41	59
12	5	42	62
13	6	43	65
14	7	44	68
15	8	45	71
16	9	46	74
17	10	47	77
18	11	48	81
19	13	49	84
20	14	50	88
21	15	51	91
22	17	52	95
23	19	53	98
24	20	54	102
25	22	55	106
26	24	56	110
27	26	57	114
28	27	58	118
29	29	59	122
30	32	60	126

**TABLE 22 — CORRECTIONS TO NATURAL SCALE RATIOS**  
(in units of the 7th decimal place)

**LAMBERT OR TRANSVERSE MERCATOR PROJECTION**

Note: Scale ratio interpolated for mean latitude or mean  $x^1$  of the ends of a line and corrected by the following, table is a true mean value accurate to within one in the seventh decimal place.

$\Delta y$ or $\Delta x$	Correction (plus)
10,000	0
20,000	0
30,000	1
40,000	2
50,000	2
60,000	3
70,000	5
80,000	6
90,000	8
100,000	10
110,000	11
120,000	14
130,000	16
140,000	19
150,000	21
160,000	24
170,000	27
180,000	31
190,000	34
200,000	38
210,000	42
220,000	46
230,000	50
240,000	55
250,000	59
260,000	64
270,000	69
280,000	74
290,000	80
300,000	86
310,000	91
320,000	97
330,000	103
340,000	110
350,000	116

**TABLE 23 — PROBABLE ERROR FACTORS**

n	:0.6745 n-1	:0.6745 n(n-1)
2	0.6745	0.4769
3	0.4769	0.2754
4	0.3894	0.1947
5	0.3372	0.1508
6	0.3016	0.1231
7	0.2754	0.1041
8	0.2549	0.0901
9	0.2385	0.0795
10	0.2248	0.0711
11	0.2133	0.0643
12	0.2034	0.0587
13.	0.1947	0.0540
14	0.1871	0.0500
15	0.1803	0.0465
16	0.1742	0.0435
17	0.1686	0.0409
18	0.1636	0.0386

n	:0.6745 n-1	:0.6745 n(n-1)
19	0.1590	0.0365
20	0.1547	0.0346
21	0.1508	0.0329
22	0.1472	0.0314
23	0.1438	0.0300
24	0.1406	0.0287
25	0.1377	0.0275
26	0.1349	0.0265
27	0.1323	0.0255
28	0.1298	0.0245
29	0.1275	0.0237
30	0.1252	0.0219
31	0.1231	0.0221
32	0.1211	0.0214
33	0.1192	0.0208
34	0.1174	0.0201
35	0.1157	0.0196

**TABLE 24 — CONVERSION - ACRES TO SQUARE FEET  
AND SQUARE FEET TO ACRES**

0 to 19.9 ACRES				0 to 866,844 SQUARE FEET			
ACRES	SQ. FT.	ACRES	SQ. FT.	ACRES	SQ. FT.	ACRES	SQ. FT.
0.0	0	5.0	217,800	10.0	435,600	15.0	653,400
0.1	4,356	5.1	222,156	10.1	439,956	15.1	657,756
0.2	8,712	5.2	226,512	10.2	444,312	15.2	662,112
0.3	13,068	5.3	230,868	10.3	448,668	15.3	666,468
0.4	17,424	5.4	235,224	10.4	453,024	15.4	670,824
0.5	21,780	5.5	239,580	10.5	457,380	15.5	675,180
0.6	26,136	5.6	243,936	10.6	461,736	15.6	679,536
0.7	30,492	5.7	248,292	10.7	466,092	15.7	683,892
0.8	34,848	5.8	252,648	10.8	470,448	15.8	688,248
0.9	39,204	5.9	257,004	10.9	474,804	15.9	692,604
1.0	43,560	6.0	261,360	11.0	479,160	16.0	696,960
1.1	47,916	6.1	265,716	11.1	483,516	16.1	701,316
1.2	52,272	6.2	270,072	11.2	487,872	16.2	705,672
1.3	56,628	6.3	274,428	11.3	492,228	16.3	710,028
1.4	60,984	6.4	278,784	11.4	496,584	16.4	714,384
1.5	65,340	6.5	283,140	11.5	500,940	16.5	718,740
1.6	69,696	6.6	287,496	11.6	505,296	16.6	723,096
1.7	74,052	6.7	291,852	11.7	509,652	16.7	727,452
1.8	78,408	6.8	296,208	11.8	514,008	16.8	731,808
1.9	82,764	6.9	300,564	11.9	518,364	16.9	736,164
2.0	87,120	7.0	304,920	12.0	522,720	17.0	740,520
2.1	91,476	7.1	309,276	12.1	527,076	17.1	744,876
2.2	95,832	7.2	313,632	12.2	531,432	17.2	749,232
2.3	100,188	7.3	317,988	12.3	535,788	17.3	753,588
2.4	104,544	7.4	322,344	12.4	540,144	17.4	757,944
2.5	108,900	7.5	326,700	12.5	544,500	17.5	762,300
2.6	113,256	7.6	331,056	12.6	548,856	17.6	766,656
2.7	117,612	7.7	335,412	12.7	553,212	17.7	771,012
2.8	121,968	7.8	339,768	12.8	557,568	17.8	775,368
2.9	126,324	7.9	344,124	12.9	561,924	17.9	779,724
3.0	130,680	8.0	348,480	13.0	566,280	18.0	784,080
3.1	135,036	8.1	352,836	13.1	570,636	18.1	788,436
3.2	139,392	8.2	357,192	13.2	574,992	18.2	792,792
3.3	143,748	8.3	361,548	13.3	579,348	18.3	797,148
3.4	148,104	8.4	365,904	13.4	583,704	18.4	801,504
3.5	152,460	8.5	370,260	13.5	588,060	18.5	805,860
3.6	156,816	8.6	374,616	13.6	592,416	18.6	810,216
3.7	161,172	8.7	378,972	13.7	596,772	18.7	814,572
3.8	165,528	8.8	383,328	13.8	601,128	18.8	818,928
3.9	169,884	8.9	387,684	13.9	605,484	18.9	823,284
4.0	174,240	9.0	392,040	14.0	609,840	19.0	827,640
4.1	178,596	9.1	396,396	14.1	614,196	19.1	831,996
4.2	182,952	9.2	400,752	14.2	618,552	19.2	836,352
4.3	187,308	9.3	405,108	14.3	622,908	19.3	840,708
4.4	191,664	9.4	409,464	14.4	627,264	19.4	845,064
4.5	196,020	9.5	413,820	14.5	631,620	19.5	849,420
4.6	200,376	9.6	418,176	14.6	635,976	19.6	853,776
4.7	204,732	9.7	422,532	14.7	640,332	19.7	858,132
4.8	209,088	9.8	426,888	14.8	644,688	19.8	862,488
4.9	213,444	9.9	431,244	14.9	649,044	19.9	866,844

**TABLE 24 — CONVERSION - ACRES TO SQUARE FEET  
AND SQUARE FEET TO ACRES (Continued)**

20 to 39.9 ACRES				871,200 to 1,738,044 SQUARE FEET			
ACRES	SQ. FT.	ACRES	SQ. FT.	ACRES	SQ. FT.	ACRES	SQ. FT.
20.0	871,200	25.0	1,089,000	30.0	1,306,800	35.0	1,524,600
20.1	875,556	25.1	1,093,356	30.1	1,311,156	35.1	1,528,956
20.2	879,912	25.2	1,097,712	30.2	1,315,512	35.2	1,533,312
20.3	884,268	25.3	1,102,068	30.3	1,319,868	35.3	1,537,668
20.4	888,624	25.4	1,106,424	30.4	1,324,224	35.4	1,542,024
20.5	892,980	25.5	1,110,780	30.5	1,328,580	35.5	1,546,380
20.6	897,336	25.6	1,115,136	30.6	1,332,936	35.6	1,550,736
20.7	901,692	25.7	1,119,492	30.7	1,337,292	35.7	1,555,092
20.8	906,048	25.8	1,123,848	30.8	1,341,648	35.8	1,559,448
20.9	910,404	25.9	1,128,204	30.9	1,346,004	35.9	1,563,804
21.0	914,760	26.0	1,132,560	31.0	1,350,360	36.0	1,568,160
21.1	919,116	26.1	1,136,916	31.1	1,354,716	36.1	1,572,516
21.2	923,472	26.2	1,141,272	31.2	1,359,072	36.2	1,576,872
21.3	927,828	26.3	1,145,628	31.3	1,363,428	36.3	1,581,228
21.4	932,184	26.4	1,149,984	31.4	1,367,784	36.4	1,585,584
21.5	936,540	26.5	1,154,340	31.5	1,372,140	36.5	1,589,940
21.6	940,896	26.6	1,158,696	31.6	1,376,496	36.6	1,594,296
21.7	945,252	26.7	1,163,052	31.7	1,380,852	36.7	1,598,652
21.8	949,608	26.8	1,167,408	31.8	1,385,208	36.8	1,603,008
21.9	953,964	26.9	1,171,764	31.9	1,389,564	36.9	1,607,364
22.0	958,320	27.0	1,176,120	32.0	1,393,920	37.0	1,611,720
22.1	962,676	27.1	1,180,476	32.1	1,398,276	37.1	1,616,076
22.2	967,032	27.2	1,184,832	32.2	1,402,632	37.2	1,620,432
22.3	971,388	27.3	1,189,188	32.3	1,406,988	37.3	1,624,788
22.4	975,744	27.4	1,193,544	32.4	1,411,344	37.4	1,629,144
22.5	980,100	27.5	1,197,900	32.5	1,415,700	37.5	1,633,500
22.6	984,456	27.6	1,202,256	32.6	1,420,056	37.6	1,637,856
22.7	988,812	27.7	1,206,612	32.7	1,424,412	37.7	1,642,212
22.8	993,168	27.8	1,210,968	32.8	1,428,768	37.8	1,646,568
22.9	997,524	27.9	1,215,324	32.9	1,433,124	37.9	1,650,924
23.0	1,001,880	28.0	1,219,680	33.0	1,437,480	38.0	1,655,280
23.1	1,006,236	28.1	1,224,036	33.1	1,441,836	38.1	1,659,636
23.2	1,010,592	28.2	1,228,392	33.2	1,446,192	38.2	1,663,992
23.3	1,014,948	28.3	1,232,748	33.3	1,450,548	38.3	1,668,348
23.4	1,019,304	28.4	1,237,104	33.4	1,454,904	38.4	1,672,704
23.5	1,023,660	28.5	1,241,460	33.5	1,459,260	38.5	1,677,060
23.6	1,028,016	28.6	1,245,816	33.6	1,463,616	38.6	1,681,416
23.7	1,032,372	28.7	1,250,172	33.7	1,467,972	38.7	1,685,772
23.8	1,036,728	28.8	1,254,528	33.8	1,472,328	38.8	1,690,128
23.9	1,041,084	28.9	1,258,884	33.9	1,476,684	38.9	1,694,484
24.0	1,045,440	29.0	1,263,240	34.0	1,481,040	39.0	1,698,840
24.1	1,049,796	29.1	1,267,596	34.1	1,485,396	39.1	1,703,196
24.2	1,054,152	29.2	1,271,952	34.2	1,489,752	39.2	1,707,552
24.3	1,058,508	29.3	1,276,308	34.3	1,494,108	39.3	1,711,908
24.4	1,062,864	29.4	1,280,664	34.4	1,498,464	39.4	1,716,264
24.5	1,067,220	29.5	1,285,020	34.5	1,502,820	39.5	1,720,620
24.6	1,071,576	29.6	1,289,376	34.6	1,507,176	39.6	1,724,976
24.7	1,075,932	29.7	1,293,732	34.7	1,511,532	39.7	1,729,332
24.8	1,080,288	29.8	1,298,088	34.8	1,515,888	39.8	1,733,688
24.9	1,084,644	29.9	1,302,444	34.9	1,520,244	39.9	1,738,044

**TABLE 24 — CONVERSION - ACRES TO SQUARE FEET  
AND SQUARE FEET TO ACRES (Continued)**

40 to 59.9 ACRES				1,742,400 to 2,609,244 SQUARE FEET			
ACRES	SQ. FT.	ACRES	SQ. FT.	ACRES	SQ. FT.	ACRES	SQ. FT.
40.0	1,742,400	45.0	1,960,200	50.0	2,178,000	55.0	2,395,800
40.1	1,746,756	45.1	1,964,556	50.1	2,182,356	55.1	2,400,156
40.2	1,751,112	45.2	1,968,912	50.2	2,186,712	55.2	2,404,512
40.3	1,755,468	45.3	1,973,268	50.3	2,191,068	55.3	2,408,868
40.4	1,759,824	45.4	1,977,624	50.4	2,195,424	55.4	2,413,224
40.5	1,764,180	45.5	1,981,980	50.5	2,199,780	55.5	2,417,580
40.6	1,768,536	45.6	1,986,336	50.6	2,204,136	55.6	2,421,936
40.7	1,772,892	45.7	1,990,692	50.7	2,208,492	55.7	2,426,292
40.8	1,777,248	45.8	1,995,048	50.8	2,212,848	55.8	2,430,648
40.9	1,781,604	45.9	1,999,404	50.9	2,217,204	55.9	2,435,004
41.0	1,785,960	46.0	2,003,760	51.0	2,221,506	56.0	2,439,360
41.1	1,790,316	46.1	2,008,116	51.1	2,225,916	56.1	2,443,716
41.2	1,794,672	46.2	2,012,472	51.2	2,230,272	56.2	2,448,072
41.3	1,799,028	46.3	2,016,828	51.3	1,234,628	56.3	2,452,428
41.4	1,803,384	46.4	2,021,184	51.4	2,238,984	56.4	2,456,784
41.5	1,807,740	46.5	2,025,540	51.5	2,243,340	56.5	2,461,140
41.6	1,812,096	46.6	2,029,896	51.6	2,247,696	56.6	2,465,496
41.7	1,816,452	46.7	2,034,252	51.7	2,252,052	56.7	2,469,852
41.8	1,820,808	46.8	2,038,608	51.8	2,256,408	56.8	2,474,208
41.9	1,825,164	46.9	2,042,964	51.9	2,260,764	56.9	2,478,564
42.0	1,829,520	47.0	2,047,320	52.0	2,265,120	57.0	2,482,920
42.1	1,833,876	47.1	2,051,676	52.1	2,269,476	57.1	2,487,276
42.2	1,838,232	47.2	2,056,032	52.2	2,273,832	57.2	2,491,632
42.3	1,842,588	47.3	2,060,388	52.3	2,278,188	57.3	2,495,988
42.4	1,846,944	47.4	2,064,744	52.4	2,282,544	57.4	2,500,344
42.5	1,851,300	47.5	2,069,100	52.5	2,286,900	57.5	2,504,700
42.6	1,855,656	47.6	2,073,456	52.6	2,291,256	57.6	2,509,056
42.7	1,860,012	47.7	2,077,812	52.7	2,295,612	57.7	2,513,412
42.8	1,864,368	47.8	2,082,168	52.8	2,299,968	57.8	2,517,768
42.9	1,868,724	47.9	2,086,524	52.9	2,304,324	57.9	2,522,124
43.0	1,873,080	48.0	2,090,880	53.0	2,308,680	58.0	2,526,480
43.1	1,877,436	48.1	2,095,236	53.1	2,313,036	58.1	2,530,836
43.2	1,881,792	48.2	2,099,592	53.2	2,317,392	58.2	2,535,192
43.3	1,886,148	48.3	2,103,948	53.3	2,321,748	58.3	2,539,548
43.4	1,890,504	48.4	2,108,304	53.4	2,326,104	58.4	2,543,904
43.5	1,894,860	48.5	2,112,660	53.5	2,330,460	58.5	2,548,260
43.6	1,899,216	48.6	2,117,016	53.6	2,334,816	58.6	2,552,616
43.7	1,903,572	48.7	2,121,372	53.7	2,339,172	58.7	2,556,972
43.8	1,907,928	48.8	2,125,728	53.8	2,343,528	58.8	2,561,328
43.9	1,912,284	48.9	2,130,084	53.9	2,347,884	58.9	2,565,684
44.0	1,916,640	49.0	2,134,440	54.0	2,352,240	59.0	2,570,040
44.1	1,920,996	49.1	2,138,796	54.1	2,356,596	59.1	2,574,396
44.2	1,925,352	49.2	2,143,152	54.2	2,360,952	59.2	2,578,752
44.3	1,929,708	49.3	2,147,508	54.3	2,365,308	59.3	2,583,108
44.4	1,934,064	49.4	2,151,864	54.4	2,369,664	59.4	2,587,464
44.5	1,938,420	49.5	2,156,220	54.5	2,374,020	59.5	2,591,820
44.6	1,942,776	49.6	2,160,576	54.6	2,378,376	59.6	2,596,176
44.7	1,947,132	49.7	2,164,932	54.7	2,382,732	59.7	2,600,532
44.8	1,951,488	49.8	2,169,288	54.8	2,387,088	59.8	2,604,888
44.9	1,955,844	49.9	2,173,644	54.9	2,391,444	59.9	2,609,244

**TABLE 24 — CONVERSION - ACRES TO SQUARE FEET  
AND SQUARE FEET TO ACRES (Continued)**

60 to 79.9 ACRES				2,613,600 to 3,480,444 SQUARE FEET			
ACRES	SQ. FT.	ACRES	SQ. FT.	ACRES	SQ. FT.	ACRES	SQ. FT.
60.0	2,613,600	65.0	2,831,400	70.0	3,049,200	75.0	3,267,000
60.1	2,617,956	65.1	2,835,756	70.1	3,053,556	75.1	3,271,356
60.2	2,622,312	65.2	2,840,112	70.2	3,057,912	75.2	3,275,712
60.3	2,626,668	65.3	2,844,468	70.3	3,062,268	75.3	3,280,068
60.4	2,631,024	65.4	2,848,824	70.4	3,066,624	75.4	3,284,424
60.5	2,635,380	65.5	2,853,180	70.5	3,070,980	75.5	3,288,780
60.6	2,639,736	65.6	2,857,536	70.6	3,075,336	75.6	3,293,136
60.7	2,644,092	65.7	2,861,892	70.7	3,079,692	75.7	3,297,492
60.8	2,648,448	65.8	2,866,248	70.8	3,084,048	75.8	3,301,848
60.9	2,652,804	65.9	2,870,604	70.9	3,088,404	75.9	3,306,204
61.0	2,657,160	66.0	2,874,960	71.0	3,092,760	76.0	3,310,560
61.1	2,661,516	66.1	2,879,316	71.1	3,097,116	76.1	3,314,916
61.2	2,665,872	66.2	2,883,672	71.2	3,101,472	76.2	3,319,272
61.3	2,670,228	66.3	2,888,028	71.3	3,105,828	76.3	3,323,628
61.4	2,674,584	66.4	2,892,384	71.4	3,110,184	76.4	3,327,984
61.5	2,678,940	66.5	2,896,740	71.5	3,114,540	76.5	3,332,340
61.6	2,683,296	66.6	2,901,096	71.6	3,118,896	76.6	3,336,696
61.7	2,687,652	66.7	2,905,452	71.7	3,123,252	76.7	3,341,052
61.8	2,692,008	66.8	2,909,808	71.8	3,127,608	76.8	3,345,408
61.9	2,696,364	66.9	2,914,164	71.9	3,131,964	76.9	3,349,764
62.0	2,700,720	67.0	2,918,520	72.0	3,136,320	77.0	3,354,120
62.1	2,705,076	67.1	2,922,876	72.1	3,140,676	77.1	3,358,476
62.2	2,709,432	67.2	2,927,232	72.2	3,145,032	77.2	3,362,832
62.3	2,713,788	67.3	2,931,588	72.3	3,149,388	77.3	3,367,188
62.4	2,718,144	67.4	2,935,944	72.4	3,153,744	77.4	3,371,544
62.5	2,722,500	67.5	2,940,300	72.5	3,158,100	77.5	3,375,900
62.6	2,726,856	67.6	2,944,656	72.6	3,162,456	77.6	3,380,256
62.7	2,731,212	67.7	2,949,012	72.7	3,166,812	77.7	3,384,612
62.8	2,735,568	67.8	2,953,368	72.8	3,171,168	77.8	3,388,968
62.9	2,739,924	67.9	2,957,724	72.9	3,175,524	77.9	3,393,324
63.0	2,744,280	68.0	2,962,080	73.0	3,179,880	78.0	3,397,680
63.1	2,748,636	68.1	2,966,436	73.1	3,184,236	78.1	3,402,036
63.2	2,752,992	68.2	2,970,792	73.2	3,188,592	78.2	3,406,392
63.3	2,757,348	68.3	2,975,148	73.3	3,192,948	78.3	3,410,748
63.4	2,761,704	68.4	2,979,504	73.4	3,197,304	78.4	3,415,104
63.5	2,766,060	68.5	2,983,860	73.5	3,201,660	78.5	3,419,460
63.6	2,770,416	68.6	2,988,216	73.6	3,206,016	78.6	3,423,816
63.7	2,774,772	68.7	2,992,572	73.7	3,210,372	78.7	3,428,172
63.8	2,779,128	68.8	2,996,928	73.8	3,214,728	78.8	3,432,528
63.9	2,783,484	68.9	3,001,284	73.9	3,219,084	78.9	3,436,884
64.0	2,787,840	69.0	3,005,640	74.0	3,223,440	79.0	3,441,240
64.1	2,792,196	69.1	3,009,996	74.1	3,227,796	79.1	3,445,596
64.2	2,796,552	69.2	3,014,352	74.2	3,232,152	79.2	3,449,952
64.3	2,800,908	69.3	3,018,708	74.3	3,236,508	79.3	3,454,308
64.4	2,805,264	69.4	3,023,064	74.4	3,240,864	79.4	3,458,664
64.5	2,809,620	69.5	3,027,420	74.5	3,245,220	79.5	3,463,020
64.6	2,813,976	69.6	3,031,776	74.6	3,249,576	79.6	3,467,376
64.7	2,818,332	69.7	3,036,132	74.7	3,253,932	79.7	3,471,732
64.8	2,822,688	69.8	3,040,488	74.8	3,258,288	79.8	3,476,088
64.9	2,827,044	69.9	3,044,844	74.9	3,262,644	79.9	3,480,444

**TABLE 24 — CONVERSION - ACRES TO SQUARE FEET  
AND SQUARE FEET TO ACRES (Continued)**

80 to 99.9 ACRES				3,484,800 to 4,351,644 SQUARE FEET			
ACRES	SQ. FT.	ACRES	SQ. FT.	ACRES	SQ. FT.	ACRES	SQ. FT.
80.0	3,484,800	85.0	3,702,600	90.0	3,920,400	95.0	4,138,200
80.1	3,489,156	85.1	3,706,956	90.1	3,924,756	95.1	4,142,556
80.2	3,493,512	85.2	3,711,312	90.2	3,929,112	95.2	4,146,912
80.3	3,497,868	85.3	3,715,668	90.3	3,933,468	95.3	4,151,268
80.4	3,502,224	85.4	3,720,024	90.4	3,937,824	95.4	4,155,624
80.5	3,506,580	85.5	3,724,380	90.5	3,942,180	95.5	4,159,980
80.6	3,510,936	85.6	3,728,736	90.6	3,946,536	95.6	4,164,336
80.7	3,515,292	85.7	3,733,092	90.7	3,950,892	95.7	4,168,692
80.8	3,519,648	85.8	3,737,448	90.8	3,955,248	95.8	4,173,048
80.9	3,524,004	85.9	3,741,804	90.9	3,959,604	95.9	4,177,404
81.0	3,528,360	86.0	3,746,160	91.0	3,963,960	96.0	4,181,760
81.1	3,532,716	86.1	3,750,516	91.1	3,968,316	96.1	4,186,116
81.2	3,537,072	86.2	3,754,872	91.2	3,972,672	96.2	4,190,472
81.3	3,541,428	86.3	3,759,228	91.3	3,977,028	96.3	4,194,828
81.4	3,545,784	86.4	3,763,584	91.4	3,981,384	96.4	4,199,184
81.5	3,550,140	86.5	3,767,940	91.5	3,985,740	96.5	4,203,540
81.6	3,554,496	86.6	3,772,296	91.6	3,990,096	96.6	4,207,896
81.7	3,558,852	86.7	3,776,652	91.7	3,994,452	96.7	4,212,252
81.8	3,563,208	86.8	3,781,008	91.8	3,998,808	96.8	4,216,608
81.9	3,567,564	86.9	3,785,364	91.9	4,003,164	96.9	4,220,964
82.0	3,571,920	87.0	3,789,720	92.0	4,007,520	97.0	4,225,320
82.1	3,576,276	87.1	3,794,076	92.1	4,011,876	97.1	4,229,676
82.2	3,580,632	87.2	3,798,432	92.2	4,016,232	97.2	4,234,032
82.3	3,584,988	87.3	3,802,788	92.3	4,020,588	97.3	4,238,388
82.4	3,589,344	87.4	3,807,144	92.4	4,024,944	97.4	4,242,744
82.5	3,593,700	87.5	3,811,500	92.5	4,029,300	97.5	4,247,100
82.6	3,598,056	87.6	3,815,856	92.6	4,033,656	97.6	4,251,456
82.7	3,602,412	87.7	3,820,212	92.7	4,038,012	97.7	4,255,812
82.8	3,606,768	87.8	3,824,568	92.8	4,042,368	97.8	4,260,168
82.9	3,611,124	87.9	3,828,924	92.9	4,046,724	97.9	4,264,524
83.0	3,615,480	88.0	3,833,280	93.0	4,051,080	98.0	4,268,880
83.1	3,619,836	88.1	3,837,636	93.1	4,055,436	98.1	4,273,236
83.2	3,624,192	88.2	3,841,992	93.2	4,059,792	98.2	4,277,592
83.3	3,628,548	88.3	3,846,348	93.3	4,064,148	98.3	4,281,948
83.4	3,632,904	88.4	3,850,704	93.4	4,068,504	98.4	4,286,304
83.5	3,637,260	88.5	3,855,060	93.5	4,072,860	98.5	4,290,660
83.6	3,641,616	88.6	3,859,416	93.6	4,077,216	98.6	4,295,016
83.7	3,645,972	88.7	3,863,772	93.7	4,081,572	98.7	4,299,372
83.8	3,650,328	88.8	3,868,128	93.8	4,085,928	98.8	4,303,728
83.9	3,654,684	88.9	3,872,484	93.9	4,090,284	98.9	4,308,084
84.0	3,659,040	89.0	3,876,840	94.0	4,094,640	99.0	4,312,440
84.1	3,663,396	89.1	3,881,196	94.1	4,098,996	99.1	4,316,796
84.2	3,667,752	89.2	3,835,552	94.2	4,103,352	99.2	4,321,152
84.3	3,672,108	89.3	3,889,908	94.3	4,107,708	99.3	4,325,508
84.4	3,676,464	89.4	3,894,264	94.4	4,112,064	99.4	4,329,864
84.5	3,680,820	89.5	3,898,620	94.5	4,116,420	99.5	4,334,220
84.6	3,685,176	89.6	3,902,976	94.6	4,120,776	99.6	4,338,576
84.7	3,689,532	89.7	3,907,332	94.7	4,125,132	99.7	4,342,932
84.8	3,693,888	89.8	3,911,688	94.8	4,129,488	99.8	4,347,288
84.9	3,698,244	89.9	3,916,044	94.9	4,133,844	99.9	4,351,644

## TABLE 25 — RIGHT-OF-WAY ACREAGES

### ACRES PER VARIOUS WIDTHS AND LENGTHS OF RIGHT-OF-WAY

R/W WIDTH	PER 100 FT.	PER 1/4 MI. 1320'	PER 1/2 MI. 2640'	PER 1 MI. 5280'
5	0.012	0.152	0.303	0.606
10	0.023	0.303	0.606	1.212
15	0.034	0.454	0.909	1.818
20	0.046	0.606	1.212	2.424
25	0.057	0.758	1.515	3.030
30	0.069	0.909	1.818	3.636
35	0.080	1.061	2.121	4.242
40	0.092	1.212	2.424	4.848
45	0.103	1.364	2.727	5.454
50	0.114	1.515	3.030	6.060
55	0.126	1.667	3.333	6.667
60	0.138	1.818	3.636	7.273
65	0.149	1.970	3.939	7.879
70	0.161	2.121	4.242	8.485
75	0.172	2.273	4.545	9.091
80	0.184	2.424	4.848	9.697
85	0.195	2.576	5.152	10.303
90	0.207	2.727	5.454	10.909
95	0.218	2.879	5.758	11.515
100	0.230	3.030	6.061	12.121
105	0.241	3.182	6.364	12.727
110	0.252	3.333	6.667	13.333
115	0.264	3.485	6.970	13.939
120	0.275	3.636	7.273	14.545
125	0.287	3.788	7.576	15.152
130	0.298	3.939	7.879	15.758
135	0.310	4.091	8.182	16.364
140	0.321	4.242	8.485	16.970
145	0.333	4.394	8.788	17.576
150	0.344	4.545	9.091	18.182

### MISCELLANEOUS R/W ACREAGES

R/W WIDTH	RIGHT-OF-WAY LENGTH									
	40'	50'	60'	70'	80'	90'	100'	200'	300'	400'
6'	.01	.01	.01	.01	.01	.01	.01	.03	.04	.06
11'	.01	.01	.02	.02	.02	.02	.02	.05	.08	.10
12'	.01	.01	.02	.02	.02	.02	.03	.06	.08	.11
16'	.02	.02	.02	.03	.03	.03	.04	.07	.11	.15
18'	.02	.02	.02	.03	.03	.04	.04	.08	.12	.16
24'	.02	.03	.03	.04	.04	.05	.06	.11	.16	.22

## TABLE 26 — RIGHT-OF-WAY ACREAGES

### ACRES PER TENTH OF HUNDRED FOOT STATIONS

		WIDTHS									
		10'	20'	30'	40'	50'	60'	70'	80'	90'	100'
Lengths in Tenths	0.1	.002	.005	.01	.01	.01	.01	.02	.02	.02	.02
	0.2	.005	.01	.02	.02	.02	.03	.04	.04	.04	.02
	0.3	.01	.01	.02	.03	.04	.04	.05	.06	.06	.05
	0.4	.01	.02	.03	.04	.05	.06	.06	.07	.08	.09
	0.5	.01	.02	.03	.05	.06	.07	.08	.09	.10	.12
	0.6	.01	.03	.04	.06	.07	.08	.10	.11	.12	.14
	0.7	.02	.03	.05	.07	.08	.10	.11	.13	.15	.16
	0.8	.02	.04	.06	.07	.09	.11	.13	.15	.17	.18
	0.9	.02	.04	.06	.08	.10	.12	.15	.17	.19	.21
	1.0	.02	.05	.07	.09	.12	.14	.16	.18	.21	.23

### ACRES PER HUNDRED FOOT STATIONS

		WIDTHS									
		10'	20'	30'	40'	50'	60'	70'	80'	90'	100'
Lengths in Hundred Feet	1.0	.02	.05	.07	.09	.12	.14	.16	.18	.21	.23
	2.0	.05	.09	.14	.18	.23	.28	.32	.39	.41	.46
	3.0	.07	.14	.21	.28	.35	.41	.48	.55	.62	.69
	4.0	.09	.18	.28	.36	.46	.55	.64	.74	.83	.92
	5.0	.12	.23	.35	.46	.58	.69	.81	.92	1.04	1.15
	6.0	.14	.28	.41	.55	.69	.83	.97	1.10	.24	1.38
	7.0	.16	.32	.48	.65	.81	.97	1.13	1.29	1.45	1.61
	8.0	.18	.39	.56	.74	.92	1.10	1.29	1.47	1.66	1.84
	9.0	.21	.41	.62	.83	1.04	1.24	1.45	1.66	1.86	2.07
	10.0	.23	.46	.70	.92	1.15	1.38	1.61	1.84	2.07	2.30

See Table 25 for acreages of various widths and lengths of right-of-way.

**TABLE 27 — STANDARD HIGHWAY SPIRAL**

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a = 0.1

SPIRAL LENGTH	D	S	q in feet	p in feet	Y in feet	X in feet	C in feet	U in feet	V in feet
10	0°00.6'	0°00.03'	5.00	0.00	10.00'	0.00'	10.00'	6.67'	3.13'
20	0°01.2'	0°00.12'	10.00	0.00	20.00	0.00	20.00	13.33	6.67
30	0°01.8'	0°00.27'	15.00	0.00	30.00	0.00	30.00	20.00	10.00
40	0°02.4'	0°00.48'	20.00	0.00	40.00	0.00	40.00	26.67	13.33
50	0°03.0'	0°00.75'	25.00	0.00	50.00	0.00	50.00	33.33	16.67
60	0°03.6'	0°01.08'	30.00	0.00	60.00	0.01	60.00	40.00	20.00
70	0°04.2'	0°01.47'	35.00	0.00	70.00	0.01	70.00	46.67	23.33
80	0°04.8'	0°01.92'	40.00	0.00	80.00	0.01	80.00	53.33	26.67
90	0°05.4'	0°02.43'	45.00	0.00	90.00	0.02	90.00	60.00	30.00
100	0°06.0'	0°03.00'	50.00	0.01	100.00	0.03	100.00	66.67	33.33
110	0°06.6'	0°03.63'	55.00	0.01	110.00	0.04	110.00	73.33	36.67
120	0°07.2'	0°04.32'	60.00	0.01	120.00	0.05	120.00	80.00	40.00
130	0°07.8'	0°05.07'	65.00	0.02	130.00	0.06	130.00	86.67	43.33
140	0°08.4'	0°05.88'	70.00	0.02	140.00	0.08	140.00	93.33	46.67
150	0°09.0'	0°06.75'	75.00	0.02	150.00	0.10	150.00	100.00	50.00
160	0°09.6'	0°07.68'	80.00	0.03	160.00	0.12	160.00	106.67	53.33
170	0°10.2'	0°08.67'	85.00	0.04	170.00	0.14	170.00	113.33	56.61
180	0°10.8'	0°09.72'	90.00	0.04	180.00	0.17	180.00	120.00	60.00
190	0°11.4'	0°10.83'	95.00	0.05	190.00	0.20	190.00	126.67	63.33
200	0°12.0'	0°12.00'	100.00	0.06	200.00	0.23	200.00	133.33	66.67
210	0°12.6'	0°13.23'	105.00	0.07	210.00	0.27	210.00	140.00	70.00
220	0°13.2'	0°14.52'	110.00	0.08	220.00	0.31	220.00	146.67	73.33
230	0°13.8'	0°15.87'	115.00	0.09	230.00	0.35	230.00	153.33	76.67
240	0°14.4'	0°17.28'	120.00	0.10	240.00	0.40	240.00	160.00	80.00
250	0°15.0'	0°18.75'	125.00	0.11	250.00	0.45	250.00	166.67	83.33
260	0°15.6'	0°20.28'	130.00	0.13	260.00	0.51	260.00	173.33	86.67
270	0°16.2'	0°21.87'	135.00	0.14	270.00	0.57	270.00	180.00	90.00
280	0°16.8'	0°23.52'	140.00	0.16	280.00	0.64	280.00	186.67	93.33
290	0°17.4'	0°25.23'	145.00	0.18	290.00	0.71	290.00	193.33	96.67
300	0°18.0'	0°27.00'	150.00	0.20	300.00	0.79	300.00	200.00	100.00
310	0°18.6'	0°28.83'	155.00	0.22	310.00	0.87	310.00	206.67	103.33
320	0°19.2'	0°30.72'	160.00	0.24	320.00	0.95	320.00	213.33	106.67
330	0°19.8'	0°32.67'	165.00	0.26	330.00	1.05	330.00	220.00	110.00
340	0°20.4'	0°34.68'	170.00	0.29	340.00	1.14	340.00	226.67	113.33
350	0°21.0'	0°36.75'	175.00	0.31	350.00	1.25	350.00	233.33	116.67
360	0°21.6'	0°38.88'	180.00	0.34	360.00	1.36	360.00	240.00	120.00
370	0°22.2'	0°41.07'	185.00	0.37	369.99	1.47	370.00	246.67	123.34
380	0°22.8'	0°43.32'	190.00	0.40	379.99	1.60	380.00	253.34	126.67
390	0°23.4'	0°45.63'	195.00	0.43	389.99	1.73	390.00	260.00	130.00
400	0°24.0'	0°48.00	200.00	0.47	399.99	1.86	400.00	266.67	133.34
410	0°24.6'	0°50.43'	205.00	0.50	409.99	2.00	410.00	273.34	136.67
420	0°25.2'	0°52.92'	210.00	0.54	419.99	2.16	420.00	280.00	140.00
430	0°25.8'	0°55.47'	215.00	0.58	429.99	2.31	430.00	286.67	143.34
440	0°26.4'	0°58.08'	220.00	0.62	439.99	2.48	439.99	293.34	146.67
450	0°27.0'	1°00.75'	225.10	0.66	449.99	2.65	449.99	300.00	150.00
460	0°27.6'	1°03.48'	230.00	0.71	459.98	2.83	459.99	306.67	153.34
470	0°28.2'	1°06.27'	235.00	0.75	469.98	3.02	469.99	313.34	156.67
480	0°28.8'	1°09.12'	240.00	0.80	479.98	3.22	479.99	320.01	160.01
490	0°29.4'	1°12.03'	245.00	0.86	489.98	3.42	489.99	326.67	163.34
500	0°30.0'	1°15.00'	250.00	0.91	499.98	3.64	499.99	333.34	166.67

See Appendix for spiral curve nomenclature

**TABLE 27 — STANDARD HIGHWAY SPIRAL (Continued)**

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a = 0.1

SPIRAL LENGTH	D	S	q in feet	p in feet	Y in feet	X in feet	C in feet	U in feet	V in feet
510	0°30.6'	1°18.03'	255.00'	0.96'	509.97'	3.86'	509.99'	340.01'	170.01'
520	0°31.2'	1°21.12'	260.00	1.02	519.97	4.09	519.99	346.68	173.34
530	0°31.8'	1°24.27'	264.99	1.08	529.97	4.33	529.99	353.34	176.68
540	0°32.4'	1°27.48'	269.99	1.15	539.97	4.58	539.98	360.01	180.01
550	0°33.0'	1°30.75'	274.99	1.21	549.96	4.84	549.98	366.68	183.35
560	0°33.6'	1°34.08'	279.99	1.28	559.96	5.11	559.98	373.35	186.68
570	0°34.2'	1°37.47'	284.99	1.35	569.95	5.39	569.98	380.02	190.01
580	0°34.8'	1°40.92'	289.99	1.42	579.95	5.68	579.98	386.68	193.35
590	0°35.4'	1°44.43'	294.99	1.49	589.95	5.97	589.98	393.35	196.68
600	0°36.0'	1°48.00'	299.99	1.57	599.94	6.28	599.97	400.02	200.02
610	0°36.6'	1°51.63'	304.99	1.65	609.94	6.60	609.97	406.69	203.35
620	0°37.2'	1°55.32'	309.99	1.73	619.93	6.93	619.97	413.36	206.69
630	0°37.8'	1°59.07'	314.99	1.82	629.92	7.27	629.97	420.03	210.02
640	0°38.4'	2°02.88'	319.99	1.91	639.92	7.62	639.96	426.70	213.36
650	0°39.0'	2°06.75'	324.99	2.00	649.91	7.99	649.96	433.36	216.69
660	0°39.6'	2°10.68'	329.98	2.09	659.90	8.36	659.96	440.03	220.03
670	0°40.2'	2°14.67'	334.98	2.19	669.90	8.75	669.95	446.70	223.37
680	0°40.8'	2°18.72'	339.98	2.29	679.89	9.15	679.95	453.37	226.70
690	0°41.4'	2°22.83'	344.98	2.39	689.88	9.55	689.95	460.04	230.04
700	0°42.0'	2°27.00'	349.98	2.49	699.87	9.98	699.94	466.71	233.37
710	0°42.6'	2°31.23'	354.98	2.60	709.86	10.41	709.94	473.38	236.71
720	0°43.2'	2°35.52'	359.98	2.71	719.85	10.86	719.93	480.05	240.05
730	0°43.8'	2°39.87'	364.97	2.83	729.84	11.31	729.93	486.72	243.38
740	0°44.4'	2°44.28'	369.97	2.95	739.83	11.79	739.92	493.39	246.72
750	0°45.0'	2°48.75'	374.97	3.07	749.82	12.27	749.92	500.06	250.06
760	0°45.6'	2°53.26'	379.97	3.19	759.81	12.77	759.91	506.73	253.39
770	0°46.2'	2°57.87'	384.97	3.32	769.79	13.28	769.91	513.41	256.73
780	0°46.8'	3°02.52'	389.96	3.45	779.78	13.80	779.90	520.08	260.07
790	0°47.4'	3°07.23'	394.96	3.59	789.77	14.34	789.90	526.75	263.41
800	0°48.0'	3°12.00'	399.96	3.72	799.75	14.89	799.89	533.42	266.75
810	0°48.6'	3°16.85'	404.96	3.86	809.73	15.46	809.88	540.09	270.08
820	0°49.2'	3°21.72'	409.95	4.01	819.72	16.03	819.87	546.77	273.42
830	0°49.8'	3°26.67'	414.95	4.16	829.70	16.63	829.87	553.44	276.76
840	0°50.4'	3°31.68'	419.95	4.31	839.68	17.24	839.86	560.11	280.10
850	0°51.0'	3°36.75'	424.94	4.47	849.66	17.86	849.85	566.78	283.44
860	0°51.6'	3°41.88'	429.94	4.62	859.64	18.50	859.84	573.46	286.78
870	0°52.2'	3°47.07	434.94	4.79	869.62	19.15	869.83	580.13	290.12
880	0°52.8'	3°52.32'	439.93	4.95	879.60	19.82	879.82	586.81	293.46
890	0°53.4'	3°57.63'	444.93	5.13	889.57	20.50	889.81	593.48	296.80
900	0°54.0'	4°03.00'	449.93	5.30	899.55	21.20	899.80	600.16	300.14
910	0°54.6'	4°08.43'	454.92	5.48	909.52	21.91	909.79	606.83	303.48
920	0°55.2'	4°13.92'	459.92	5.66	919.50	22.64	919.78	613.51	306.83
930	0°55.8'	4°19.47'	464.91	5.85	929.47	23.39	929.76	620.19	310.17
940	0°56.4'	4°25.08'	469.91	6.04	939.44	24.15	939.75	626.86	313.51
950	0°57.0'	4°30.75'	474.90	6.23	949.41	24.93	949.74	633.54	316.85
960	0°57.6'	4°36.48'	479.90	6.43	959.38	25.72	959.72	640.22	320.20
970	0°58.2'	4°42.27'	484.89	6.64	969.35	26.54	969.71	646.90	323.54
980	0°58.8'	4°48.12'	489.89	6.84	979.31	27.36	979.69	653.57	326.89
990	0°59.4'	4°54.03'	494.88	7.05	989.28	28.21	989.68	660.25	330.23
1000	1°00.0'	5°00.00'	499.87	7.27	999.24	29.07	999.66	666.93	333.58

See Appendix for graphic illustration of spiral curve elements

**TABLE 27 — STANDARD HIGHWAY SPIRAL (Continued)**

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a = 0.2

SPIRAL LENGTH	D	S	q in feet	p in feet	Y in feet	X in feet	C in feet	U in feet	V in feet
10	0°01.2'	0°00.06'	5.00	0.00	10.00	0.00	10.00	6.67	3.33
20	0°02.4'	0°00.24'	10.00	0.00	20.00	0.00	20.00	13.33	6.67
30	0°03.6'	0°00.54'	15.00	0.00	30.00	0.00	30.00	20.00	10.00
40	0°04.8'	0°00.96'	20.00	0.00	40.00	0.00	40.00	26.67	13.33
so	0°06.0'	0°01.50'	25.00	0.00	50.00	0.01	50.00	33.33	16.67
60	0°07.2'	0°02.16'	30.00	0.00	60.00	0.01	60.00	40.00	20.00
70	0°08.4'	0°02.94'	35.00	0.00	70.00	0.02	70.00	46.67	23.33
80	0°09.6'	0°03.84'	40.00	0.01	80.00	0.03	80.00	53.33	26.67
90	0°10.8'	0°04.86'	45.00	0.01	90.00	0.04	90.00	60.00	30.00
100	0°12.0'	0°06.00'	50.00	0.01	100.00	0.06	100.00	66.67	33.33
110	0°13.2'	0°07.26'	55.00	0.02	110.00	0.08	110.00	73.33	36.67
120	0°14.4'	0°08.64'	60.00	0.03	120.00	0.10	120.00	80.00	40.00
130	0°15.6'	0°10.14'	65.00	0.03	130.00	0.13	130.00	86.67	43.33
140	0°16.8'	0°11.76'	70.00	0.04	140.00	0.16	140.00	93.33	46.67
156	0°18.0'	0°13.50'	75.00	0.05	150.00	0.20	150.00	100.00	50.00
160	0° 19.2'	0°15.3 6'	80.00	0.06	160.00	0.24	160.00	106.67	53.33
170	0°20.4'	0°17.34'	85.00	0.07	170.00	0.29	170.00	113.33	56.67
180	0°21.6'	0°19.44'	90.00	0.08	180.00	0.34	180.00	120.00	60.00
190	0°22.8'	0° 21.66'	95.00	0.10	190.00	0.40	190.00	126.67	63.33
200	0°24.0'	0° 24.00'	100.00	0.12	200.00	0.47	200.00	133.33	66.67
210	0°25.2'	0°26.46'	105.00	0.13	210.00	0.54	210.00	140.00	70.00
220	0°26.4'	0°29.04'	110.00	0.15	220.00	0.62	220.00	146.67	73.33
230	0°27.6'	0°31.74'	115.00	0.18	230.00	0.71	230.00	153.33	76.67
240	0°28.8'	0°34.56'	120.00	0.20	240.00	0.80	240.00	160.00	80.00
250	0°30.0'	0°37.50'	125.00	0.23	250.00	0.91	250.00	166.67	83.33
260	0°31.2'	0°40.56'	130.00	0.26	260.00	1.02	260.00	173.33	86.67
270,	0°32.4'	0°43.74'	135.00	0.29	270.00	1.15	270.00	180.00	90.00
280	0°33.6'	0°47.04'	140.00	0.32	279.99	1.28	280.00	186.67	93.34
290	0°34.8'	0°50.46'	145.00	0.35	289.99	1.42	290.00	193.34	96.67
300	0°36.0'	0°54.00'	150.00	0.39	299.99	1.57	300.00	200.00	100.00
310	0°37.2'	0°57.66'	155.00	0.43	309.99	1.73	310.00	206.67	103.34
320	0°38.4'	1°01.44'	160.00	0.48	319.99	1.91	320.00	213.34	106.67
330	0°39.6'	1°05.34'	165.00	0.52	329.99	2.09	329.99	220.00	110.00
340	0°40.8'	1°09.36'	170.00	0.57	339.99	2.29	339.99	226.67	113.34
350	0°42.0'	1°13.50'	175.00	0.62	349.98	2.49	349.99	233.34	116.67
360	0°43.2'	1°17.76'	180.00	0.68	359.98	2.71	359.99	240.01	120.01
370	0°44.4'	1°22.14'	185.00	0.74	369.98	2.95	369.99	246.67	123.34
380	0°45.6'	1°26.64'	190.00	0.80	379.98	3.19	379.99	253.34	126.67
390	0°46.8'	1°31.26'	195.00	0.86	389.97	3.45	389.99	260.01	130.01
400	0°48.0'	1°36.00'	199.99	0.93	399.97	3.72	399.99	266.68	133.34
410	0°49.2'	1°40.86'	204.99	1.00	409.96	4.01	409.98	273.35	136.68
420	0°50.4'	1°45.84'	209.99	1.08	419.96	4.31	419.98	280.01	140.01
430	0°51.6'	1°50.94'	214.99	1.16	429.96	4.63	429.98	286.68	143.35
440	0°52.8'	1°56.16'	219.99	1.24	439.95	4.96	439.98	293.35	146.68
450	0°54.0'	2°01.50'	224.99	1.33	449.94	5.30	449.98	300.02	150.02
460	0°55.2'	2°06.96'	229.99	1.42	439.94	5.66	459.97	306.69	153.35
470	0°56.4'	2°12.54'	234.99	1.51	469.93	6.04	469.97	313.36	156.69
480	0°57.6'	2°18.24'	239.99	1.61	479.92	6.43	479.97	320.03	160.02
490	0°58.8'	2°24.06'	244.99	1.71	489.91	6.84	489.96	226.70	163.36
500	1°00.0'	2°30.00'	249.98	1.82	499.90	7.27	499.96	333.37	166.70

See Appendix for spiral curve nomenclature

**TABLE 27 — STANDARD HIGHWAY SPIRAL (Continued)**

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a = 0.2

SPIRAL LENGTH	D	S	q in feet	p in feet	Y in feet	X in feet	C in feet	U in feet	V in feet
510	1°01.2'	2°36.06'	254.98	1.93	509.89	7.72	509.95	340.04	170.03
520	1°02.4'	2°42.24'	259.98	2.04	519.88	8.18	519.95	346.71	173.37
530	1°03.6'	2°48.54'	264.98	2.17	529.87	8.66	529.94	353.38	176.71
540	1°04.8'	2°54.96'	269.98	2.29	539.86	9.16	539.94	360.05	180.04
550	1°06.0'	3°01.50'	274.97	2.42	549.85	9.68	549.93	366.72	183.38
560	1°07.2'	3°08.16'	279.97	2.55	559.83	10.21	559.93	373.39	186.72
570	1°08.4'	3°14.94'	284.97	2.69	569.82	10.77	569.92	380.06	190.06
580	1°09.6'	3°21.84'	289.97	2.84	579.80	11.35	579.91	386.74	193.40
590	1°10.8'	3°28.86'	294.96	2.99	589.78	11.95	589.90	393.41	196.74
600	1°12.0'	3°36.00'	299.96	3.14	599.76	12.56	599.89	400.08	200.08
610	1°13.2'	3°43.26'	304.96	3.30	609.74	13.20	609.89	406.76	203.42
620	1°14.4'	3°50.64'	309.95	3.47	610.72	13.86	619.88	413.43	206.76
630	1°15.6'	3°58.14'	314.95	3.64	629.70	14.54	629.87	420.11	210.10
640	1°16.8'	4°05.76'	319.95	3.81	639.67	15.25	639.85	426.78	213.44
650	1°18.0'	4°13.50'	324.94	3.99	649.65	15.97	649.84	433.46	216.78
660	1°19.2'	4°21.36'	329.94	4.18	659.62	16.72	659.83	440.13	220.12
670	1°20.4'	4°29.34'	334.93	4.37	669.59	17.49	669.82	446.81	223.46
680	1°21.6'	4°37.44'	339.93	4.57	679.56	18.28	679.80	453.49	226.81
690	1°22.8'	4°45.66'	344.92	4.78	689.52	19.10	689.79	460.17	230.15
700	1°24.0'	4°54.00'	349.91	4.99	699.49	19.94	699.77	466.85	233.50
710	1°25.2'	5°02.46'	354.91	5.20	709.45	20.81	709.76	473.53	236.84
720	1°26.4'	5°11.04'	359.90	5.43	719.41	21.70	719.74	480.21	240.19
730	1°27.6'	5°19.74'	364.89	5.66	729.37	22.62	729.72	486.89	243.53
740	1°28.8'	5°28.56'	369.89	5.89	739.32	23.56	739.70	493.57	246.88
750	1°30.0'	5°37.50'	374.88	6.13	749.28	24.53	749.68	500.25	250.23
760	1°31.2'	5°46.56'	379.87	6.38	759.23	25.52	759.66	506.94	253.58
770	1°32.4'	5°55.74'	384.86	6.64	769.18	26.54	769.63	513.62	256.93
780	1°33.6'	6°05.04'	389.85	6.90	779.12	27.59	779.61	520.31	260.28
790	1°34.8'	6°14.46'	394.84	7.17	789.06	28.66	789.58	526.99	263.63
800	1°36.0'	6°24.00'	399.83	7.44	799.00	29.76	799.56	533.68	266.98
810	1°37.2'	6°33.66'	404.82	7.73	808.94	30.89	809.53	540.37	270.34
920	1°38.4'	6°43.44'	409.81	8.02	818.87	32.05	819.50	547.06	273.69
830	1°39.6'	6°53.34'	414.80	8.31	828.80	33.23	829.47	553.75	277.05
840	1°40.8'	7°03.36'	419.79	8.62	838.73	34.44	839.43	560.45	280.41
850	1°42.0'	7°13.50'	424.77	8.93	848.65	35.69	849.40	567.14	283.76
860	1°43.2'	7°23.76'	429.76	9.25	858.57	36.96	859.36	573.83	287.12
870	1°44.4'	7°34.14'	434.75	9.57	868.48	38.26	869.33	580.53	290.48
880	1°45.6'	7°44.64'	439.73	9.91	878.39	39.59	879.29	587.23	293.84
890	1°46.8'	7°55.26'	444.72	10.25	888.30	40.96	889.24	593.93	297.21
900	1°48.0'	8°06.00'	449.70	10.60	898.20	42.35	899.20	600.63	300.57
910	1°49.2'	8°16.86'	454.68	10.95	908.10	43.78	909.16	607.33	303.94
920	1°50.4'	8°27.84'	459.67	11.32	917.99	45.23	919.11	614.04	307.31
930	1°51.6'	8°38.94'	464.65	11.69	927.88	46.72	929.06	620.74	310.67
940	1°52.8'	8°50.16'	469.63	12.07	937.77	48.24	939.01	627.45	314.04
950	1°54.0'	9°01.50'	474.61	12.46	947.65	49.79	948.95	634.16	317.42
960	1°55.2'	9°12.96'	479.59	12.86	957.52	51.38	958.90	640.87	320.79
970	1°56.4'	9°24.54'	484.56	13.26	967.39	52.99	968.84	647.58	324.17
980	1°57.6'	9°36.24'	489.54	13.68	977.25	54.65	978.78	654.30	327.54
990	1°58.8'	9°48.06'	494.52	14.10	987.11	56.33	988.71	661.01	330.92
1000	2°00.0'	10°00.00'	499.49	14.53	996.96	58.05	998.65	667.73	334.30

See Appendix for graphic illustration of spiral curve elements

**TABLE 27 — STANDARD HIGHWAY SPIRAL (Continued)**

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a = 0.25

SPIRAL LENGTH	D	S	q in feet	p in feet	Y in feet	X in feet	C in feet	U in feet	V in feet
10	0°01.5'	0°00.08'	5.00	0.00	10.00	0.00	10.00	6.67	3.33
20	0°03.0'	0°00.30'	10.00	0.00	20.00	0.00	20.00	13.33	6.67
30	0°04.5'	0°00.68'	15.00	0.00	30.00	0.00	30.00	20.00	10.00
40	0°06.0'	0°01.20'	20.00	0.00	40.00	0.00	40.00	26.67	13.33
50	0°07.5'	0°01.88'	25.00	0.00	50.00	0.01	50.00	33.33	16.67
60	0°09.0'	0°02.70'	30.00	0.00	60.00	0.02	60.00	40.00	20.00
70	0°10.5'	0°03.68'	35.00	0.01	70.00	0.02	70.00	46.67	23.33
80	0°12.0'	0°04.80'	40.00	0.01	80.00	0.04	80.00	53.33	26.67
90	0°13.5'	0°06.08'	45.00	0.01	90.00	0.05	90.00	60.00	30.00
100	0°15.0'	0°07.50'	50.00	0.02	100.00	0.07	100.00	66.67	33.33
110	0°16.5'	0°09.08'	55.00	0.02	110.00	0.10	110.00	73.33	36.67
120	0°18.0'	0°10.80'	60.00	0.03	120.00	0.13	120.00	80.00	40.00
130	0°19.5'	0°12.68'	65.00	0.04	130.00	0.16	130.00	86.67	43.33
140	0°21.0'	0°14.70'	70.00	0.05	140.00	0.20	140.00	93.33	46.67
150	0°22.5'	0°16.88'	75.00	0.06	150.00	0.25	150.00	100.00	50.00
160	0°24.0'	0°19.20'	80.00	0.07	160.00	0.30	160.00	106.67	53.33
170	0°25.5'	0°21.68'	85.00	0.09	170.00	0.36	170.00	113.33	56.67
180	0°27.0'	0°24.30'	90.00	0.11	180.00	0.42	180.00	120.00	60.00
190	0°28.5'	0°27.08'	95.00	0.12	190.00	0.50	190.00	126.67	63.33
200	0°30.0'	0°30.00'	100.00	0.15	200.00	0.58	200.00	133.33	66.67
210	0°31.5'	0°33.08'	105.00	0.17	210.00	0.67	210.00	140.00	70.00
220	0°33.0'	0°36.30'	110.00	0.19	220.00	0.77	220.00	146.67	73.33
230	0°34.5'	0°39.68'	115.00	0.22	230.00	0.88	230.00	153.33	76.67
240	0°36.0'	0°43.20'	120.00	0.25	240.00	1.01	240.00	160.00	80.00
250	0°37.5'	0°46.88'	125.00	0.28	250.00	1.14	250.00	166.67	83.33
260	0°39.0'	0°50.70'	130.00	0.32	259.99	1.28	260.00	173.34	86.67
270	0°40.5'	0°54.68'	135.00	0.36	269.99	1.43	270.00	180.00	90.00
280	0°42.0'	0°58.80'	140.00	0.40	279.99	1.60	280.00	186.67	93.34
290	0°43.5'	1°03.08'	145.00	0.44	289.99	1.77	290.00	193.34	96.67
300	0°45.0'	1°07.50'	150.00	0.49	299.99	1.96	299.99	200.00	100.00
310	0°46.5'	1°12.08'	155.00	0.54	309.99	2.17	309.99	206.67	103.34
320	0°48.0'	1°16.80'	160.00	0.60	319.98	2.38	319.99	213.34	106.67
330	0°49.5'	1°21.68'	165.00	0.65	329.98	2.61	329.99	220.01	110.01
340	0°51.0'	1°26.70'	170.00	0.71	339.98	2.86	339.99	226.67	113.34
350	0°52.5'	1°31.88'	175.00	0.78	349.97	3.12	349.99	233.34	116.67
360	0°54.0'	1°37.20'	180.00	0.85	359.97	3.39	359.99	240.01	120.01
370	0°55.5'	1°42.68'	184.99	0.92	369.97	3.68	369.99	246.68	123.34
380	0°57.0'	1°48.30'	189.99	1.00	379.96	3.99	379.98	253.35	126.68
390	0°58.5'	1°54.08'	194.99	1.08	389.96	4.31	389.98	260.01	130.01
400	1°00.0'	2°00.00'	199.99	1.16	399.95	4.65	399.98	266.68	133.35
410	1°01.5'	2°06.08'	204.99	1.25	409.94	5.01	409.98	273.35	136.68
420	1°03.0'	2°12.30'	209.99	1.35	419.94	5.39	419.97	280.02	140.02
430	1°04.5'	2°18.68'	214.99	1.45	429.93	5.78	429.97	286.69	143.36
440	1°06.0'	2°25.20'	219.99	1.55	439.92	6.19	439.97	293.36	146.69
450	1°07.5'	2°31.88'	224.99	1.66	449.91	6.63	449.96	300.03	150.03
460	1°09.0'	2°38.70'	229.98	1.77	459.90	7.08	459.96	306.70	153.36
470	1°10.5'	2°45.68'	234.98	1.89	469.89	7.55	469.95	313.37	156.70
480	1°12.0'	2°52.80'	239.98	2.01	479.88	8.04	479.95	320.04	160.04
490	1°13.5'	3°00.08'	244.98	2.14	489.87	8.55	489.94	326.71	163.38
500	1°15.0'	3°07.50'	249.98	2.27	499.85	9.09	499.93	333.39	166.71

See Appendix for spiral curve nomenclature

**TABLE 27 — STANDARD HIGHWAY SPIRAL (Continued)**

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a = 0.25

SPIRAL LENGTH	D	S	q in feet	p in feet	Y in feet	X in feet	C in feet	U in feet	V in feet
510	1°16.5'	3°15.08'	254.97	2.41	509.84	9.64	509.93	340.06	170.05
520	1°18.0'	3°22.80'	259.97	2.56	519.82	10.22	519.92	346.73	173.39
530	1°19.5'	3°30.68'	264.97	2.71	529.80	10.82	529.91	353.40	176.73
540	1°21.0'	3°38.70'	269.96	2.86	539.78	11.45	539.90	360.08	180.07
550	1°22.5'	3°46.88'	274.96	3.02	549.76	12.10	549.89	366.75	183.41
560	1°24.0'	3°55.20'	279.96	3.19	559.74	12.77	559.88	373.42	186.75
570	1°25.5'	4°03.68'	284.95	3.37	569.71	13.46	569.87	380.10	190.09
580	1°27.0'	4°12.30'	289.95	3.55	579.69	14.18	579.86	386.78	193.43
590	1°28.5'	4°21.08'	294.94	3.73	589.66	14.93	589.85	393.45	196.77
600	1°30.0'	4°30.00'	299.94	3.93	599.63	15.70	599.84	400.13	200.12
610	1°31.5'	4°39.08'	304.93	4.13	609.60	16.50	609.82	406.81	203.46
620	1°33.0'	4°48.30'	309.93	4.33	619.56	17.32	619.81	413.49	206.81
630	1°34.5'	4°57.68'	314.92	4.54	629.53	18.17	629.79	420.17	210.15
640	1°36.0'	5°07.20'	319.91	4.76	639.49	19.05	639.77	426.85	213.50
650	1°37.5'	5°16.88'	324.91	4.99	649.45	19.96	649.75	433.53	216.84
660	1°39.0'	5°26.70'	329.90	5.23	659.40	20.89	659.74	440.21	220.19
670	1°40.5'	5°36.68'	334.89	5.47	669.36	21.86	669.71	446.89	223.54
680	1°42.0'	5°46.80'	339.88	5.71	679.31	22.85	679.69	453.58	226.89
690	1°43.5'	5°57.08'	344.88	5.97	689.26	23.87	689.67	460.26	230.24
700	1°45.0'	6°07.50'	349.87	6.23	699.20	24.92	699.64	466.95	233.59
710	1°46.5'	6°18.08'	354.86	6.50	709.14	26.01	709.62	473.63	236.94
720	1°48.0'	6°28.80'	359.85	6.78	719.08	27.12	719.59	480.32	240.29
730	1°49.5'	6°39.68'	364.84	7.07	729.01	28.26	729.56	487.01	243.65
740	1°51.0'	6° 50.70'	369.82	7.36	738.94	29.44	739.53	493.70	247.00
750	1°52.5'	7°01.88'	374.81	7.67	748.87	30.65	749.50	500.39	250.36
760	1°54.0'	7°13.20'	379.80	7.98	758.79	31.89	759.46	507.09	253.72
770	1°56.5'	7°24.68'	384.79	8.30	768.71	33.16	769.43	513.78	257.08
780	1°57.0'	7°36.30'	389.77	8.62	778.63	34.47	779.39	520.48	260.44
790	1°58.5'	7°48.08'	394.76	8.96	788.54	35.81	789.35	527.18	263.80
800	2°00.0'	8°00.00'	399.74	9.30	798.44	37.18	799.31	533.88	267.16
810	2°01.5'	8°12.08'	404.72	9.65	808.34	38.59	809.26	540.58	270.53
820	2°03.0'	8°24.30'	409.71	10.02	818.24	40.04	819.22	547.28	273.89
830	2°04.5'	8°36.68'	414.69	10.39	828.13	41.51	829.17	553.90	277.26
840	2°06.0'	8°49.20'	419.67	10.77	838.01	43.03	839.12	560.70	280.63
850	2°07.5'	9°01.88'	424.65	11.16	847.89	44.58	849.06	567.41	284.01
860	2°09.0'	9°14.70'	429.63	11.55	857.76	46.17	859.01	574.12	287.38
870	2°10.5'	9°27.68'	434.60	11.96	867.63	47.79	868.95	580.83	290.76
880	2°12.0'	9°40.80'	439.58	12.38	877.49	49.46	878.88	587.55	294.13
890	2°13.5'	9°54.08'	444.56	12.80	887.35	51.16	888.82	594.26	297.51
900	2°15.0'	10°07.50'	449.53	13.24	897.19	52.90	898.75	600.98	300.90
910	2°16.5'	10°21.08'	454.51	13.68	907.03	54.67	908.68	607.71	304.28
920	2°18.0'	10°34.80'	459.48	14.14	916.87	56.49	918.61	614.43	307.67
930	2°19.5'	10°48.68'	464.45	14.61	926.69	58.35	928.53	621.16	311.06
940	2°21.0'	11°02.70'	469.42	15.08	936.51	60.24	938.45	627.89	314.45
950	2°22.5'	11°16.88'	474.39	15.57	946.32	62.18	948.36	634.62	317.84
960	2°24.0'	11°31.20'	479.35	16.06	956.13	64.15	958.28	641.36	321.24
970	2°25.5'	11°45.68'	484.32	16.57	965.92	66.17	968.18	648.10	324.64
980	2°27.0'	12°00.30'	489.28	17.08	975.71	68.23	978.09	654.84	328.04
990	2°28.5'	12°15.08'	494.25	17.61	985.48	70.33	987.99	661.59	331.44
1000	2°30.0'	12°30.00'	499.21	18.15	995.25	72.48	997.89	668.34	334.85

See Appendix for graphic illustration of spiral curve elements

**TABLE 27 — STANDARD HIGHWAY SPIRAL (Continued)**

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a = 0.3

SPIRAL LENGTH	D	S	q in feet	p in feet	Y in feet	X in feet	C in feet	U in feet	V in feet
10	0°01.8'	0°00.09'	5.00	0.00	10.00	0.00	10.00	6.67	3.33
20	0°03.6'	0°00.36'	10.00	0.00	20.00	0.00	20.00	13.33	6.67
10	0°05.4'	0°00.81'	15.00	0.00	30.00	0.00	30.00	20.00	10.00
40	0°07.2'	0°01.44'	20.00	0.00	40.00	0.01	40.00	26.67	13.33
50	0°09.0'	0°02.25'	25.00	0.00	50.00	0.01	50.00	33.33	16.67
60	0°10.8'	0°03.24'	30.00	0.00	60.00	0.02	60.00	40.00	20.00
70	0°12.6'	0°04.41'	35.00	0.01	70.00	0.03	70.00	46.67	23.33
80	0°14.4'	0°05.76'	40.00	0.01	80.00	0.04	80.00	53.33	26.67
90	0°16.2'	0°07.29'	45.00	0.02	90.00	0.06	90.00	60.00	30.00
100	0°18.0'	0°09.00'	50.00	0.02	100.00	0.09	100.00	66.67	33.33
110	0°19.8'	0°10.89'	55.00	0.03	110.00	0.12	110.00	73.33	36.67
120	0°21.6'	0°12.96'	60.00	0.04	120.00	0.15	120.00	80.00	40.00
130	0°23.4'	0°15.21'	65.00	0.05	130.00	0.19	130.00	86.67	43.33
140	0°25.2'	0°17.64'	70.00	0.06	140.00	0.24	140.00	93.33	46.67
150	0°27.0'	0°20.25'	75.00	0.07	150.00	0.29	150.00	100.00	50.00
160	0°28.8'	0°23.04'	80.00	0.09	160.00	0.36	160.00	106.67	53.33
170	0°30.6'	0°26.01'	85.00	0.11	170.00	0.43	170.00	113.33	56.67
180	0°32.4'	0°29.16'	90.00	0.13	180.00	0.51	180.00	120.00	60.00
190	0°34.2'	0°32.49'	95.00	0.15	190.00	0.60	190.00	126.67	63.33
200	0°36.0'	0°36.00'	100.00	0.17	200.00	0.70	200.00	133.33	66.67
210	0°37.8'	0°39.69'	105.00	0.20	210.00	0.81	210.00	140.00	70.00
220	0°39.6'	0°43.56'	110.00	0.23	220.00	0.93	220.00	146.67	73.33
230	0°41.4'	0°47.61'	115.00	0.27	230.00	1.06	230.00	153.33	76.67
240	0°43.2'	0°51.84'	120.00	0.30	239.99	1.21	240.00	160.00	80.00
250	0°45.0'	0°56.25'	125.00	0.34	249.99	1.36	250.00	166.67	83.34
260	0°46.8'	1°00.84'	130.00	0.38	259.99	1.53	260.00	173.34	86.67
270	0°48.6'	1°05.61'	135.00	0.43	269.99	1.72	270.00	180.00	90.00
280	0°50.4'	1°10.56'	140.00	0.48	279.99	1.92	279.99	186.67	93.34
290	0°52.2'	1°15.69'	145.00	0.53	289.99	2.13	289.99	193.34	96.67
300	0°54.0'	1°21.00'	150.00	0.59	299.98	2.36	299.99	200.01	100.01
310	0°55.8'	1°26.49'	155.00	0.65	309.98	2.60	309.99	206.67	103.34
320	0°57.6'	1°32.16'	160.00	0.71	319.98	2.86	319.99	213.34	106.67
330	0°59.4'	1°38.01'	165.00	0.78	329.97	3.14	329.99	220.01	110.01
340	1°01.2'	1°44.04'	169.99	0.86	339.97	3.43	339.99	226.68	113.34
350	1°03.0'	1°50.25'	174.99	0.94	349.96	3.74	349.98	233.35	116.68
360	1°04.8'	1°56.64'	179.99	1.02	359.96	4.07	359.98	240.01	120.01
370	1°06.6'	2°03.21'	184.99	1.11	369.95	4.42	369.98	246.68	123.35
380	1°08.4'	2°09.96'	189.99	1.20	379.95	4.79	379.98	253.35	126.68
390	1°10.2'	2°16.89'	194.99	1.29	389.94	5.18	389.97	260.02	130.02
400	1°12.0'	2°24.00'	199.99	1.40	399.93	5.58	399.97	266.69	133.36
410	1°13.8'	2°31.29'	204.99	1.50	409.92	6.01	409.96	273.36	136.69
420	1°15.6'	2°38.76'	209.99	1.62	419.91	6.46	419.96	280.03	140.03
430	1°17.4'	2°46.41'	214.98	1.73	429.90	6.94	429.96	286.70	143.37
440	1°19.2'	2°54.24'	219.98	1.86	439.89	7.43	439.95	293.37	146.70
450	1°21.0'	3°02.25'	224.98	1.99	449.87	7.95	449.94	300.04	150.04
460	1°22.8'	3°10.44'	229.98	2.12	459.86	8.49	459.94	306.72	153.38
470	1°24.6'	3°18.81'	234.97	2.26	469.84	9.06	469.93	313.39	156.72
480	1°26.4'	3°27.36'	239.97	2.41	479.83	9.65	479.92	320.06	160.06
490	1°28.2'	3°36.09'	244.97	2.57	489.81	10.26	489.91	326.73	163.39
500	1°30.0'	3°45.00'	249.96	2.73	499.79	10.90	499.90	333.41	166.73

See Appendix for spiral curve nomenclature

**TABLE 27 — STANDARD HIGHWAY SPIRAL (Continued)**

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a = 0.3

SPIRAL LENGTH	D	S	q in feet	p in feet	Y in feet	X in feet	C in feet	U in feet	V in feet
510	1°31.8'	3°54.09'	254.96	2.89	509.76	11.57	509.89	340.08	170.08
520	1°33.6'	4°03.36'	259.96	3.07	519.74	12.27	519.88	346.76	173.42
530	1°35.4'	4°12.81'	264.95	3.25	529.71	12.99	529.87	353.43	176.76
540	1°37.2'	4°22.44'	269.95	3.43	539.69	13.74	539.86	360.11	180.10
550	1°39.0'	4°32.25'	274.94	3.63	549.66	14.51	549.85	366.79	183.44
560	1°40.8'	4°42.24'	279.94	3.83	559.62	15.32	559.83	373.47	186.79
570	1°42.6'	4°52.41'	284.93	4.04	569.59	16.15	569.82	380.14	190.13
580	1°44.4'	5°02.76'	289.93	4.26	579.55	17.02	579.80	386.82	193.48
590	1°46.2'	5°13.29'	294.92	4.48	589.51	17.91	589.78	393.50	196.82
600	1°48.0'	5°24.00'	299.91	4.71	599.47	18.84	599.76	400.19	200.17
610	1°49.8'	5°34.89'	304.90	4.95	609.42	19.79	609.74	406.87	203.52
620	1°51.6'	5°45.96'	309.90	5.20	619.37	20.78	619.72	413.55	206.87
630	1°53.4'	5°57.21'	314.89	5.45	629.32	21.80	629.70	420.24	210.22
640	1°55.2'	6°08.64'	319.88	5.72	639.26	22.86	639.67	426.92	213.57
650	1°57.0'	6°20.25'	324.87	5.99	649.21	23.94	649.65	433.61	216.92
660	1°58.8'	6°32.04'	329.86	6.27	659.14	25.07	659.62	440.30	220.27
670	2°00.6'	6°44.01'	334.85	6.56	669.08	26.22	669.59	446.99	223.63
680	2°02.4'	6°56.16'	339.83	6.86	679.00	27.41	679.56	453.68	226.98
690	2°04.2'	7°08.49'	344.82	7.16	688.93	28.64	689.52	460.37	230.34
700	2°06.0'	7°21.00'	349.81	7.48	698.85	29.90	699.49	467.07	233.70
710	2°07.8'	7°33.69'	354.79	7.80	708.76	31.19	709.45	473.77	237.06
720	2°09.6'	7°46.56'	359.78	8.14	718.67	32.53	719.41	480.46	240.42
730	2°11.4'	7°59.61'	364.76	8.48	728.58	33.90	729.37	487.16	243.79
740	2°13.2'	8°12.84'	369.75	8.83	738.48	35.31	739.32	493.87	247.15
750	2°15.0'	8°26.25'	374.73	9.20	748.38	36.76	749.28	500.57	250.52
760	2°16.8'	8°39.84'	379.71	9.57	758.26	38.25	759.23	507.27	253.89
770	2°18.6'	8°53.61'	384.69	9.95	768.15	39.77	769.18	513.98	257.26
780	2°20.4'	9°07.56'	389.67	10.34	778.02	41.34	779.12	520.69	260.63
790	2°22.2'	9°21.69'	394.65	10.75	787.89	42.94	789.06	527.41	264.00
800	2°24.0'	9°36.00'	399.63	11.16	797.76	44.59	799.00	534.12	267.38
810	2°25.8'	9°50.49'	404.60	11.58	807.61	46.28	808.94	540.84	270.76
820	2°27.6'	10°05.16'	409.58	12.02	817.46	48.01	818.87	547.56	274.14
830	2°29.4'	10°20.01'	414.55	12.46	827.30	49.78	828.80	554.28	277.53
840	2°31.2'	10°35.04'	419.52	12.92	837.14	51.60	838.73	561.00	280.91
850	2°33.0'	10°50.25'	424.49	13.38	846.96	53.46	848.65	567.73	284.30
860	2°34.8'	11°05.64'	429.46	13.86	856.78	55.36	858.57	574.46	287.69
870	2°36.6'	11°21.21'	434.43	14.35	866.59	57.30	868.48	581.20	291.09
880	2°38.4'	11°36.96'	439.40	14.85	876.39	59.30	878.39	587.93	294.49
890	2°40.2'	11°52.89'	444.36	15.36	886.18	61.33	888.30	594.68	297.89
900	2°42.0'	12°09.00'	449.33	15.88	895.96	63.41	899.20	601.42	301.29
910	2°43.8'	12°25.29'	454.29	16.41	905.73	65.54	908.10	608.17	304.70
920	2°45.6'	12°41.76'	459.25	16.96	915.49	67.72	917.99	614.92	308.11
930	2°47.4'	12°58.41'	464.21	17.52	925.24	69.94	927.88	621.67	311.52
940	2°49.2'	13°15.24'	469.16	18.09	934.98	72.21	937.77	628.43	314.94
950	2°51.0'	13°32.25'	474.12	18.67	944.71	74.52	947.64	635.20	318.36
960	2°52.8'	13°49.44'	479.07	19.26	954.43	76.89	957.52	641.96	321.78
970	2°54.6'	14°06.81'	484.02	19.87	964.13	79.30	967.39	648.73	325.21
980	2°56.4'	14°24.36'	488.97	20.49	973.82	81.76	977.25	655.51	328.65
990	2°58.2'	14°42.09'	493.92	21.12	983.50	84.28	987.11	662.29	332.08
1000	3°00.0'	15°00.00'	498.86	21.76	993.17	86.84	996.96	669.08	335.52

See Appendix for graphic illustration of spiral curve elements

**TABLE 27 — STANDARD HIGHWAY SPIRAL (Continued)**

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a = 0.4

SPIRAL LENGTH	D	S	q in feet	p in feet	Y in feet	X in feet	C in feet	U in feet	V in feet
10	0°02.4'	0°00.12'	5.00	0.00	10.00	0.00	10.00	6.67	3.33
20	0°04.8'	0°00.48'	10.00	0.00	20.00	0.00	20.00	13.33	6.67
30	0°07.2'	0°01.06'	15.00	0.00	30.00	0.00	30.00	20.00	10.00
40	0°09.6'	0°01.92'	20.00	0.00	40.00	0.01	40.00	26.67	13.33
50	0°12.0'	0°03.00'	25.00	0.00	50.00	0.01	50.00	33.33	16.67
60	0°14.4'	0°04.32'	30.00	0.01	60.00	0.03	60.00	40.00	20.00
70	0°16.8'	0°05.88'	35.00	0.01	70.00	0.04	70.00	46.67	23.33
80	0°19.2'	0°07.68'	40.00	0.01	80.00	0.06	80.00	53.33	26.67
90	0°21.6'	0°09.72'	45.00	0.02	90.00	0.08	90.00	60.00	30.00
100	0°24.0'	0°12.00'	50.00	0.03	100.00	0.12	100.00	66.67	33.33
110	0°26.4'	0°14.52'	55.00	0.04	110.00	0.15	110.00	73.33	36.67
120	0°28.8'	0°17.28'	60.00	0.05	120.00	0.20	120.00	80.00	40.00
130	0°31.2'	0°20.28'	65.00	0.06	130.00	0.26	130.00	86.67	43.33
140	0°33.6'	0°23.52'	70.00	0.08	140.00	0.32	140.00	93.33	46.67
150	0°36.0'	0°27.00'	75.00	0.10	150.00	0.39	150.00	100.00	50.00
160	0°38.4'	0°30.72'	80.00	0.12	160.00	0.48	160.00	106.67	53.33
170	0°40.8'	0°34.68'	85.00	0.14	170.00	0.57	170.00	113.33	56.67
180	0°43.2'	0°38.88'	90.00	0.17	180.00	0.68	180.00	120.00	60.00
190	0°45.6'	0°43.32'	95.00	0.20	190.00	0.80	190.00	126.67	63.33
200	0°48.0'	0°48.00'	100.00	0.23	200.00	0.93	200.00	133.33	66.67
210	0°50.4'	0°52.92'	105.00	0.27	210.00	1.08	210.00	140.00	70.00
220	0°52.8'	0°58.08'	110.00	0.31	219.99	1.24	220.00	146.67	73.34
230	0°55.2'	1°03.48'	115.00	0.35	229.99	1.42	230.00	153.34	76.67
240	0°57.6'	1°09.12'	120.00	0.40	239.99	1.61	240.00	160.00	80.00
250	1°00.0'	1°15.00'	125.00	0.45	249.99	1.82	249.99	166.67	83.34
260	1°02.4'	1°21.12'	130.00	0.51	259.99	2.04	259.99	173.34	86.67
270	1°04.8'	1°27.48'	135.00	0.57	269.98	2.29	269.99	180.01	90.01
280	1°07.2'	1°34.08'	140.00	0.64	279.98	2.55	279.99	186.67	93.34
290	1°09.6'	1°40.92'	145.00	0.71	289.98	2.84	289.99	193.34	96.67
300	1°12.0'	1°48.00'	150.00	0.79	299.97	3.14	299.99	200.01	100.01
310	1°14.4'	1°55.32'	154.99	0.87	309.97	3.47	309.98	206.68	103.34
320	1°16.8'	2°02.88'	159.99	0.95	319.96	3.81	319.98	213.35	106.68
330	1°19.2'	2°10.68'	164.99	1.05	329.95	4.18	329.98	220.02	110.02
340	1°21.6'	2°18.72'	169.99	1.14	339.94	4.57	339.98	226.69	113.35
350	1°24.0'	2°27.00'	174.99	1.25	349.94	4.99	349.97	233.36	116.69
360	1°26.4'	2°35.52'	179.99	1.36	359.93	5.43	359.97	240.03	120.02
370	1°28.8'	2°44.28'	184.99	1.47	369.92	5.89	369.96	246.70	123.36
380	1°31.2'	2°53.28'	189.98	1.60	379.90	6.38	379.96	253.37	126.70
390	1°33.6'	3°02.52'	194.98	1.73	389.89	6.90	389.95	260.04	130.03
400	1°36.0'	3°12.00'	199.98	1.86	399.88	7.45	399.94	266.71	133.37
410	1°38.4'	3°21.72'	204.98	2.00	409.86	8.02	409.94	273.38	136.71
420	1°40.8'	3°31.68'	209.97	2.15	419.84	8.62	419.93	280.06	140.05
430	1°43.2'	3°41.88'	214.97	2.31	429.82	9.25	429.92	286.73	143.39
440	1°45.6'	3°52.32'	219.97	2.48	439.80	9.91	439.91	293.40	146.73
450	1°48.0'	4°03.00'	224.96	2.65	449.78	10.60	449.90	300.08	150.07
460	1°50.4'	4°13.92'	229.96	2.83	459.75	11.32	459.89	306.75	153.41
470	1°52.8'	4°25.08'	234.95	3.02	469.72	12.08	469.88	313.43	156.76
480	1°55.2'	4°36.48'	239.95	3.22	479.69	12.86	479.86	320.11	160.10
490	1°57.6'	4°48.12'	244.94	3.42	489.66	13.68	489.85	326.79	163.44
500	2°00.0'	5°00.00'	249.94	3.64	499.62	14.54	499.83	333.47	166.79

See Appendix for spiral curve nomenclature

**TABLE 27 — STANDARD HIGHWAY SPIRAL (Continued)**

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a = 0.4

SPIRAL LENGTH	D	S	q in feet	p in feet	Y in feet	X in feet	C in feet	U in feet	V in feet
510	2°02.4'	5°12.12'	254.93	3.86	509.58	15.43	509.81	340.15	170.13
520	2°04.8'	5°24.48'	259.92	4.09	519.54	16.35	519.79	346.83	173.48
530	2°07.2'	5°37.08'	264.92	4.33	529.49	17.31	529.77	353.51	176.83
540	2°09.6'	5°49.92'	269.91	4.58	539.44	18.31	539.75	360.20	180.18
550	2°12.0'	6°03.00'	274.90	4.84	549.39	19.34	549.73	366.88	183.53
560	2°14.4'	6°16.32'	279.89	5.11	559.33	20.42	559.70	373.57	186.88
570	2°16.8'	6°29.88'	284.88	5.38	569.27	21.53	569.67	380.26	190.23
580	2°19.2"	6°43.68'	289.87	5.67	579.20	22.68	579.64	386.95	193.59
590	2°21.6'	6°57.72'	294.85	5.97	589.13	23.87	589.61	393.64	196.94
600	2°24.0'	7°12.00'	299.84	6.28	599.05	25.10	599.58	400.33	200.30
610	2°26.4'	7°26.52'	304.83	6.60	608.97	26.38	609.54	407.03	203.66
620	2°28.8'	7°41.28'	309.81	6.93	618.88	27.70	619.50	413.72	207.02
630	2°31.2'	7°56.28'	314.80	7.27	628.79	29.05	629.46	420.42	210.38
640	2°33.6'	8°11.52'	319.78	7.62	638.69	30.46	639.42	427.12	213.75
650	2°36.0'	8°27.00'	324.76	7.98	648.59	31.90	649.37	433.83	217.12
660	2°38.4'	8°42.72'	329.75	8.36	658.48	33.40	659.32	440.53	220.49
670	2°40.8'	8°58.68'	334.73	8.74	668.36	34.93	669.27	447.24	223.86
680	2°43.2'	9°14.88'	339.70	9.14	678.23	36.52	679.21	453.95	227.23
690	2°45.6'	9°31.32'	344.68	9.55	688.10	38.15	689.15	460.67	230.61
700	2°48.0'	9°48.00'	349.66	9.97	697.95	39.83	699.09	467.38	233.99
710	2°50.4'	10°04.92'	354.63	10.40	707.80	41.55	709.02	474.10	237.37
720	2°52.8'	10°22.08'	359.61	10.84	717.65	43.33	718.95	480.83	240.75
730	2°55.2'	10°39.48'	364.58	11.30	727.48	45.15	728.88	487.55	244.14
740	2°57.6'	10°57.12'	369.55	11.77	737.30	47.03	738.80	494.28	247.53
750	3°00.0'	11°15.00'	374.52	12.25	747.11	48.95	748.72	501.01	250.92
760	3°02.4'	11°33.12'	379.49	12.75	756.92	50.93	758.63	507.75	254.32
770	3°04.8'	11°51.48'	384.45	13.26	766.71	52.96	768.54	514.49	257.72
780	3°07.2'	12°10.08'	389.41	13.78	776.49	55.04	778.44	521.23	261.12
790	3°09.6'	12°28.92'	394.38	14.32	786.26	57.17	788.33	527.98	264.53
800	3°12.0'	12°48.00'	399.34	14.87	796.02	59.36	798.23	534.73	267.94
810	3°14.4'	13°07.32'	404.29	15.43	805.76	61.60	808.11	541.49	271.36
820	3°16.8'	13°26.88'	409.25	16.01	815.49	63.90	817.99	548.25	274.78
830	3°19.2'	13°46.68'	414.20	16.60	825.21	66.26	827.87	555.02	278.20
840	3°21.6'	14°06.72'	419.15	17.20	834.92	68.67	837.74	561.79	281.63
850	3°24.0'	14°27.00'	424.10	17.82	844.61	71.13	847.60	568.57	285.06
860	3°26.4'	14°47.52'	429.05	18.46	854.29	73.66	857.46	575.35	288.50
870	3°28.8'	15°08.28'	433.99	19.11	863.95	76.24	867.30	582.14	291.94
880	3°31.2'	15°29.28'	438.93	19.77	873.59	78.88	877.15	588.93	295.39
890	3°33.6'	15°50.52'	443.87	20.45	883.22	81.58	886.98	595.73	298.84
900	3°36.0'	16°12.00'	448.80	21.15	892.83	84.34	896.81	602.53	302.30
910	3°38.4'	16°33.72'	453.74	21.86	902.43	87.16	906.63	609.34	305.77
920	3°40.8'	16°55.68'	458.66	22.58	912.00	90.04	916.44	616.16	309.24
930	3°43.2'	17°17.88'	463.59	23.32	921.56	92.98	926.24	622.99	312.72
940	3°45.6'	17°40.32'	468.51	24.08	931.10	95.99	936.03	629.82	316.20
950	3°48.0'	18°03.00'	473.43	24.85	940.61	99.06	945.82	636.66	319.69
960	3°50.4'	18°25.92'	478.35	25.64	950.11	102.19	955.59	643.50	323.19
970	3°52.8'	18°49.08'	483.26	26.45	959.59	105.38	965.36	650.36	326.69
980	3°55.2'	19°12.48'	488.17	27.27	969.04	108.64	975.11	657.22	330.20
990	3°57.6'	19°36.12'	493.08	28.11	978.48	111.96	984.86	664.09	333.72
1000	4°00.0'	20°00.00'	497.98	28.96	987.88	115.35	994.60	670.97	337.25

See Appendix for graphic illustration of spiral curve elements

**TABLE 27 — STANDARD HIGHWAY SPIRAL (Continued)**

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a = 0.5

SPIRAL LENGTH	D	S	q in feet	p in feet	Y in feet	X in feet	C in feet	U in feet	V in feet
10	0°03.0'	0°00.15'	5.00	0.00	10.00	0.00	10.00	6.67	3.33
20	0°06.0'	0°00.60'	10.00	0.00	20.00	0.00	20.00	13.33	6.67
30	0°09.0'	0°01.35'	15.00	0.00	30.00	0.00	30.00	20.00	10.00
40	0°12.0'	0°02.40'	20.00	0.00	40.00	0.01	40.00	26.67	13.33
50	0°15.0'	0°03.75'	25.00	0.00	50.00	0.02	50.00	33.33	16.67
60	0°18.0'	0°05.40'	30.00	0.01	60.00	0.03	60.00	40.00	20.00
70	0°21.0'	0°07.35'	35.00	0.01	70.00	0.05	70.00	46.67	23.00
80	0°24.0'	0°09.60'	40.00	0.02	80.00	0.07	80.00	53.33	26.67
90	0°27.0'	0°12.15'	45.00	0.03	90.00	0.11	90.00	60.00	30.00
100	0°30.0'	0°15.00'	50.00	0.04	100.00	0.15	100.00	66.67	33.00
110	0°33.0'	0°18.15'	55.00	0.05	110.00	0.19	110.00	73.33	36.67
120	0°36.0'	0°21.60'	60.00	0.06	120.00	0.25	120.00	80.00	40.00
130	0°39.0'	0°25.35'	65.00	0.08	130.00	0.32	130.00	86.67	43.33
140	0°42.0'	0°29.40'	70.00	0.10	140.00	0.40	140.00	93.33	46.67
150	0°45.0'	0°33.75'	75.00	0.12	150.00	0.49	150.00	100.00	50.00
160	0°48.0'	0°38.40'	80.00	0.15	160.00	0.60	160.00	106.67	53.33
170	0°51.0'	0°43.35'	85.00	0.18	170.00	0.71	170.00	113.33	56.67
180	0°54.0'	0°48.60'	90.00	0.21	180.00	0.85	180.00	120.00	60.00
190	0°57.0'	0°54.15'	95.00	0.25	190.00	1.00	190.00	126.67	63.33
200	1°00.0'	1°00.00'	100.00	0.29	199.99	1.16	200.00	133.34	66.67
210	1°03.0'	1°06.15'	105.00	0.34	209.99	1.35	210.00	140.00	70.00
220	1°06.0'	1°12.60'	110.00	0.39	219.99	1.55	220.00	146.67	73.34
230	1°09.0'	1°19.35'	115.00	0.44	229.99	1.77	229.99	153.34	76.67
240	1°12.0'	1°26.40'	120.00	0.50	239.98	2.01	239.99	160.01	80.00
250	1°15.0'	1°33.75'	125.00	0.57	249.98	2.27	249.99	166.67	83.34
260	1°18.0'	1°41.40'	130.00	0.64	259.98	2.56	259.99	173.34	86.67
270	1°21.0'	1°49.35'	135.00	0.72	269.97	2.86	269.99	180.01	90.01
280	1°24.0'	1°57.60'	139.99	0.80	279.97	3.19	279.99	186.68	93.34
290	1°27.0'	2°06.15'	144.99	0.89	289.96	3.55	289.98	193.35	96.68
300	1°30.0'	2°15.00'	149.99	0.98	299.95	3.93	299.98	200.02	100.01
310	1°33.0'	2°24.15'	154.99	1.08	309.95	4.33	309.98	206.69	103.35
320	1°36.0'	2°33.60'	159.99	1.19	319.94	4.77	319.97	213.36	106.69
330	1°39.0'	2°43.35'	164.99	1.31	329.93	5.23	329.97	220.03	110.02
340	1°42.0'	2°53.40'	169.99	1.43	339.91	5.72	339.96	226.70	113.36
350	1°45.0'	3°03.75'	174.98	1.56	349.90	6.23	349.96	233.37	116.70
360	1°48.0'	3°14.40'	179.98	1.70	359.88	6.78	359.95	240.04	120.04
370	1°51.0'	3°25.35'	184.98	1.84	369.87	7.37	369.94	246.71	123.38
380	1°54.0'	3°36.60'	189.97	1.99	379.85	7.98	379.93	253.39	126.71
390	1°57.0'	3°48.15'	194.97	2.16	389.83	8.62	389.92	260.06	130.05
400	2°00.0'	4°00.00'	199.97	2.33	399.81	9.31	399.91	266.73	133.40
410	2°03.0'	4°12.15'	204.96	2.51	409.78	10.02	409.90	273.41	136.74
420	2°06.0'	4°24.60'	209.96	2.69	419.75	10.77	419.89	280.09	140.08
430	2°09.0'	4°37.35'	214.95	2.89	429.72	11.56	429.88	286.76	143.42
440	2°12.0'	4°50.40'	219.95	3.10	439.69	12.38	439.86	293.44	146.77
450	2°15.0'	5°03.75'	224.94	3.31	449.65	13.25	449.84	300.12	150.11
460	2°18.0'	5°17.40'	229.93	3.54	459.61	14.15	459.83	306.80	153.46
470	2°21.0'	5°31.35'	234.93	3.77	469.56	15.09	469.81	313.49	156.81
480	2°24.0'	5°45.60'	239.92	4.02	479.52	16.07	479.78	320.17	160.15
490	2°27.0'	6°00.15'	244.91	4.28	489.46	17.10	489.76	326.85	163.50
500	2°30.0'	6°15.00'	249.90	4.54	499.41	18.17	499.74	333.54	166.86

See Appendix for spiral curve nomenclature

**TABLE 27 — STANDARD HIGHWAY SPIRAL (Continued)**

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a = 0.5

SPIRAL LENGTH	D	S	q in feet	p in feet	Y in feet	X in feet	C in feet	U in feet	V in feet
510	2°33.0'	6°30.15'	254.89	4.82	509.34	19.28	500.71	340.23	170.21
520	2°36.0'	6°45.60'	259.88	5.11	519.28	20.43	519.68	346.92	173.56
530	2°39.0'	7°01.35'	264.87	5.41	529.20	21.63	529.65	353.61	176.92
540	2°42.0'	7°17.40'	269.85	5.72	539.13	22.88	539.61	360.31	180.28
550	2°45.0'	7°33.75'	274.84	6.05	549.04	24.17	549.57	367.00	183.64
560	2°48.0'	7°50.40'	279.83	6.38	558.95	25.51	559.53	373.70	187.00
570	2°51.0'	8°07.35'	284.81	6.73	568.86	26.90	569.49	380.40	190.36
580	2°54.0'	8°24.60'	289.79	7.09	578.75	28.33	579.44	387.10	193.73
590	2°57.0'	8°42.15'	294.77	7.46	588.64	29.82	589.40	393.81	197.10
600	3°00.0'	9°00.00'	299.75	7.85	598.52	31.36	599.34	400.52	200.47
610	3°03.0'	9°18.15'	304.73	8.25	608.39	32.95	609.29	407.23	203.85
620	3°06.0'	9°36.60'	309.71	8.66	618.26	34.59	619.23	413.94	207.22
630	3°09.0'	9°55.35'	314.69	9.08	628.11	36.29	629.16	420.66	210.60
640	3°12.0'	10°14.40'	319.66	9.52	637.96	38.04	639.09	427.38	213.98
650	3°15.0'	10°33.75'	324.63	9.97	647.79	39.85	649.02	434.11	217.37
660	3°18.0'	10°53.40'	329.60	10.44	657.62	41.71	658.94	440.84	220.76
670	3°21.0'	11°13.35'	334.57	10.92	667.43	43.62	668.86	447.57	224.15
680	3°24.0'	11°33.60'	339.54	11.42	677.24	45.60	678.77	454.30	227.55
690	3°27.0'	11°54.15'	344.50	11.93	687.03	47.63	688.68	461.04	230.95
700	3°30.0'	12°15.00'	349.47	12.45	696.81	49.72	698.58	467.79	234.35
710	3°33.0'	12°36.15'	354.43	12.99	706.57	51.88	708.47	474.54	237.76
720	3°36.0'	12°57.60'	359.39	13.55	716.32	54.09	718.36	481.29	241.18
730	3°39.0'	13°19.35'	364.34	14.12	726.06	56.36	728.25	488.05	244.59
740	3°42.0'	13°41.40'	369.30	14.70	735.79	58.70	738.12	494.82	248.02
750	3°45.0'	14°03.75'	374.25	15.31	745.49	61.10	747.99	501.59	251.44
760	3°48.0'	14°26.40'	379.20	15.93	755.19	63.56	757.86	508.36	254.88
770	3°51.0'	14°49.35'	384.14	16.56	764.86	66.08	767.71	515.14	258.31
780	3°54.0'	15°12.60'	389.09	17.21	774.52	68.67	777.56	521.93	261.76
790	3°57.0'	15°36.15'	394.03	17.88	784.16	71.33	787.40	528.73	265.21
800	4°00.0'	16°00.00'	398.96	18.57	793.78	74.05	797.23	535.53	268.66
810	4°03.0'	16°24.15'	403.90	19.27	803.39	76.84	807.05	542.34	272.13
820	4°06.0'	16°48.60'	408.83	19.99	812.97	79.70	816.87	549.15	275.59
830	4°09.0'	17°13.35'	413.75	20.72	822.53	82.63	826.67	555.93	279.07
840	4°12.0'	17°38.40'	418.68	21.48	832.07	85.62	836.47	562.81	282.55
850	4°15.0'	18°03.75'	423.60	22.25	841.59	88.69	846.25	569.64	286.04
860	4°18.0'	18°29.40'	428.51	23.04	851.09	91.82	856.03	576.49	289.54
870	4°21.0'	18°55.35'	433.52	23.85	860.56	95.03	865.79	583.35	293.05
880	4°24.0'	19°21.60'	438.33	24.68	870.01	98.31	875.54	590.21	296.56
890	4°27.0'	19°48.15'	443.23	25.52	879.43	101.66	885.28	597.09	300.08
900	4°30.0'	20°15.00'	448.13	26.39	888.82	105.09	895.01	603.97	303.62
910	4°33.0'	20°42.15'	453.03	27.27	898.19	108.58	904.73	610.87	307.16
920	4°36.0'	21°09.60'	457.92	28.18	907.53	112.16	914.44	617.77	310.71
930	4°39.0'	21°37.35'	462.80	29.10	916.84	115.80	924.13	624.69	314.27
940	4°42.0'	22°05.40'	467.68	30.04	926.12	119.53	933.80	631.62	317.84
950	4°45.0'	22°33.75'	472.56	31.00	935.37	123.33	943.47	638.56	321.42
960	4°48.0'	23°02.40'	477.42	31.98	944.59	127.20	953.12	645.51	325.01
970	4°51.0'	23°31.35'	482.29	32.99	953.78	131.15	962.75	652.47	328.62
980	4°54.0'	24°00.60'	487.15	34.01	962.93	135.18	972.37	659.45	332.23
990	4°57.0'	24°30.15'	492.00	35.05	972.05	139.29	981.98	666.44	335.86
1000	5°00.0'	25°00.00'	496.84	36.11	981.13	143.48	991.56	673.44	339.50

See Appendix for graphic illustration of spiral curve elements

**TABLE 28 — RAILROAD TAPER TABLES**

T=1/2

Changing 15' for each 30 feet

See Chapter 8 for Explanation

L feet	D° Central curve	S°	HAX	u feet	v feet	C feet	t feet	d feet	(R+d) feet	x feet	y feet
30	30'	00°04'30"	00°02'15"	15.00	15.00	30.00	11.00	.004	11,549.18	30.00	.02
60	45'	00°13'30"	00°05'37"	35.00	25.00	60.00	30.00	.030	7,639.45	60	.10
90	1°	00°27'00"	00°10'30"	55.00	35.00	90.00	45.00	.098	5,729.69	90	.27
120	1°15'	00°45'00"	00°16'52"	75.00	45.00	120	60	.198	4,583.88	120	.59
150	1°30'	1°07'30"	00°24'45"	95.00	55.00	150	75	.344	3,820.09	150	1.08
180	1°45'	1°34'30"	00°36'07"	115.00	65.00	180	90	.550	3,274.68	179.98	1.79
210	2°	2°06'00"	00°45'00"	135.01	75.01	210	105	.825	2,865.65	209.97	2.75
240	2°15'	2°42'00"	00°57'27"	155.02	85.02	239.90	119.99	1.08	2,547.60	239.94	4.00
270	2°30'	3°22'30"	1°11'15"	175.04	95.04	269.96	134.98	1.67	2,293.55	269.90	5.59
300	2°45'	4°07'30"	1°26'37"	195.06	105.05	299.93	149.96	2.16	2,085.70	299.84	7.96
330	3°	4°57'00"	1°43'30"	215.00	115.08	329.89	164.94	2.81	1,912.72	329.74	9.93
360	3°15'	5°51'00"	2°01'52"	235.14	125.12	359.84	179.92	3.57	1,766.58	359.61	12.75
390	3°30'	6°49'30"	2°21'44"	255.20	135.10	389.76	194.88	4.64	1,641.56	389.43	16.06
420	3°45'	7°52'30"	2°43'06"	275.29	145.77	419.65	209.83	5.49	1,533.45	419.18	19.90
450	4°	9°	3°03'58"	295.40	155.37	449.51	224.77	6.67	1,439.14	448.85	24.30
480	4°15'	10°12'00"	3°30'19"	315.55	165.50	479.33	239.69	8	1,356.21	478.44	29.31
510	4°30'	11°28,30"	3°56'11"	335.14	175.67	509.10	254.58	4.50	1,282.82	507.90	34.95
540	4°45'	12°49'30"	4°23'31"	355.98	185.81	538.81	269.46	11.17	1,217.48	537.23	41.26
570	5°	14°15'00"	4°52'22"	376.27	196.16	568.45	284.30	13.07	1,159.03	566.40	48.28

T=2/3

Changing 20' for each 30 feet

L feet	D° Central curve	S°	HAX	u feet	v feet	C feet	t feet	d feet	(R+d) feet	x feet	y feet
30	00°40'	00°06'00"	00°03'00"	15.00	15.00	30.00	15.00	.013	8,594.39	30.00	.03
60	1°	00°18'00"	00°07'30"	35.00	25.00	60.00	30.00	.052	5,729.65	60.00	.13
90	1°20'	00°36'00"	00°14'00"	55.00	35.00	90.00	45.00	.131	4,287.34	90.00	.37
120	1°40'	1°	00°22'30"	75.00	45.00	120	60.00	.262	3,438.04	119.99	.78
150	2°	1°30'00"	00°33'00"	95.00	55.00	150	75.00	.458	2,865.32	149.99	1.44
180	2°20'	2°06'00"	00°45'30"	115.01	65.01	180	89.99	.733	2,456.31	179.97	2.38
210	2°40'	2°48'00"	1°	135.02	75.02	209.98	104.99	1.099	2,149.74	209.95	3.66
240	3°	3°36'00"	1°16'30"	155.04	85.03	239.96	119.98	1.570	1,911.48	239.90	5.34
270	3°20'	4°30'00"	1°35'00"	175.06	95.06	269.93	134.96	2.159	1,721.03	249.82	7.44
300	3°40'	5°30'00"	1°55'30"	195.10	105.09	299.88	149.94	2.878	1,565.56	299.71	10.07
330	4°	6°36'00"	2°17'59"	215.16	115.15	329.81	164.90	3.741	1,436.21	329.54	13.23
360	4°20'	7°48'00"	2°42'29"	235.24	125.22	359.71	179.85	4.761	1,327.03	358.31	16.99
390	4°40'	9°06'	3°08'58"	255.35	135.33	389.57	194.79	5.949	1,233.80	388.98	21.40
420	5°	10°30'	3°37'27"	275.51	145.47	419.38	209.70	7.319	1,153.33	418.54	26.51
450	5°20'	12°00'	4°07'55"	295.72	155.65	449.14	224.59	8.888	1,083.28	447.97	32.36
480	5°40'	13°36'	4°40'23"	315.98	165.89	478.81	239.44	10.66	1,021.86	477.22	39.01
510	6°	15°18,	5°14'50"	336.32	176.20	500.40	254.26	12.65	967.68	506.27	46.49
540	6°20'	17°06'	5°51'16"	356.74	186.59	537.59	269.04	14.87	919.65	535.08	54.86
570	6°40'	19°00"	6°29'40"	377.27	197.07	567.24	283.76	17.33	876.88	563.60	64.16

**TABLE 28 — RAILROAD TAPER TABLES (Continued)**

T=1

Changing 30' for each 30 feet

L feet	D° Central curve	S°	HAX	u feet	v feet	C feet	t feet	d feet	(R+d) feet	x feet	y feet
30	1°	00°09'	00°04'30"	15.00	15.00	30.00	15.00	.020	5,729.62	30.00	.04
60	1°30'	00°27'	00°11'15"	35.00	25.00	60.00	30.00	.078	3,819.82	60.00	.20
90	2°	00°54'	00°21'00"	55.00	35.00	90.00	45	.196	2,865.02	90.00	.55
120	2°30'	1°30'	00°33'45"	75.00	45.00	120.00	60	.393	2,292.27	119.99	1.18
150	3°	2°15'	00°49'30"	95.01	55.01	149.99	74.99	.687	1,910.60	149.97	2.16
180	3°30'	3°09'	1°08'15"	115.02	65.02	179.98	89.98	1.099	1,638.19	179.94	3.57
210	4°	4°12'	1°30'00"	135.04	75.04	209.95	104.97	1.649	1,434.12	209.88	5.50
240	4°30'	1°24'	1°54'45"	155.08	85.07	239.91	119.94	2.355	1,275.68	239.77	8.01
270	5°	6°45'	2°22'29"	175.14	95.13	269.84	134.91	3.237	1,149.24	269.61	11.18
300	5°30'	8°15'	2°53'14"	195.23	105.21	299.73	149.85	4.315	1,046.16	299.35	15.10
330	6°	9°54'	3°26'57"	215.36	115.33	329.57	164.78	5.607	960.65	328.07	19.83
360	6°30'	11°42'	4°03'41"	235.55	125.50	359.34	179.68	7.133	888.73	358.44	25.45
390	7°	13°39'	4°43'23"	255.81	135.74	389.03	194.52	8.911	827.55	387.71	32.03
420	7°30'	15°45'	5°26'04"	276.16	146.06	418.61	209.33	10.96	775.04	416.73	39.64
450	8°	18°	6°11'43"	296.62	156.48	448.06	224.08	13.29	729.64	445.44	48.35
480	8°30'	20°24'	7°00'21"	317.22	167.02	477.33	238.75	15.93	690.16	473.77	58.22
510	9°	22°57'	7°51'55"	337.99	177.73	506.41	253.35	18.90	655.68	501.65	69.30
540	9°30'	25°39'	8°46'26"	358.96	188.61	535.25	267.84	22.20	625.48	528.99	81.64
570	10°	28°30'	9°43'53"	380.18	199.72	563.82	282.22	25.85	598.98	555.70	95.30

T=1 1/2

Changing 00°45' for each 30 feet

L feet	D° Central curve	S°	HAX	u feet	v feet	C feet	t feet	d feet	(R+d) feet	x feet	y feet
30	1°30'	00°13'30"	00°04'30"	20.00	10.00	30.00	15.00	.029	3,819.75	30.00	0.059
60	2°15"	00°40'30"	00°13'30"	40.00	20.00	60.00	30.00	.118	2,546.64	59.999	0.295
90	3°	1°21'	00°27'30"	60.00	20.00	90.00	45.00	.294	1,910.21	89.994	0.825
120	3°45"	2°15'	00°45'00"	80.01	40.00	119.99	59.99	.589	1,528.54	119.98	1.767
150	4°30"	3°22'30"	01°07'30"	100.02	50.02	149.98	74.98	1.03	1,274.35	149.943	3.239
180	5°15"	4°43'30"	01°34'30"	120.04	60.04	179.95	89.96	1.65	1,093.09	179.869	5.358
210	6°	6°18'	02°05'59"	140.09	70.08	209.89	104.93	2.47	957.51	209.730	8.240
240	6°45"	8°06'	02°41'58"	160.17	80.15	239.79	119.88	3.53	852.48	239.493	12.000
270	7°30"	10°07'0"	03°22'27"	180.30	90.27	269.63	134.79	4.85	768.93	269.115	16.751
300	8°15"	12°22'30"	04°07'24"	200.49	100.45	299.20	149.67	6.46	701.11	298.538	22.604
330	9°	14°51'	04°56'50"	220.78	110.71	329.02	164.50	8.40	645.18	327.695	29.664

**TABLE 28 — RAILROAD TAPER TABLES (Continued)**

T=1 1/3

Changing 00°40' for each 30 feet

L feet	D° Central curve	S°	HAX	u feet	v feet	C feet	t feet	d feet	(R+d) feet	x feet	y feet
30	1°20'	00°12'	0°04'00"	20.00	10.00	30.00	15.00	.026	4,297.26	30	.05
60	2°	00°36'	0°12'00"	40.00	20.00	60.00	30.00	.105	2,864.94	60	.21
90	2°40'	1°12'	0°24'00"	60.00	30.00	90.00	45.00	.262	2,148.90	90	.63
120	3°20'	2°00'	0°40'00"	80.00	40.00	119.99	59.99	.524	1,719.46	119.98	1.40
150	4°	3°00'	1°00'00"	100.00	50.01	149.98	74.89	.916	1,433.38	149.96	2.62
180	4°40'	4°12'	1°24'00"	120.03	60.03	179.96	89.97	1.466	1,229.32	179.90	4.39
210	5°20'	5°36'	1°51'59"	140.07	70.06	209.91	104.94	2.197	1,076.59	209.80	6.83
240	6°	7°12'	2°23'59"	160.13	80.12	239.83	119.90	3.139	958.18	239.62	10.04
270	6°40'	9°00'	2°59'58"	182.33	90.21	269.70	134.84	4.314	863.69	269.33	14.11
300	7°20'	10°59'	3°39'36"	200.39	100.35	299.51	149.74	5.749	787.19	298.89	19.12
330	8°	13°12'	4°23'53"	220.61	110.56	329.22	164.60	7.469	723.81	328.25	25.25
360	8°40'	15°36'	5°11'48"	240.94	120.85	358.82	179.41	9.496	670.76	357.34	32.50
390	9°20'	18°12'	6°03'41"	261.39	131.26	388.25	194.15	11.86	625.91	386.08	41.00

T=2

Changing 1° for each 30 feet

L feet	D° Central curve	S°	HAX	u feet	v feet	C feet	t feet	d feet	(R+d) feet	x feet	y feet
30	2°	00°18'	00°09'00"	15.00	15.00	30.00	15.00	.039	2,864.86	30.00	.08
60	3°	00°54'	00°22'30"	35.00	25.00	60.00	30.00	.157	1,910.07	60.00	.39
90	4°	01°48'	00°42'00"	55.00	35.00	90.00	45.00	.393	1,432.86	89.99	1.10
120	5°	03°	01°07'30"	75.01	45.01	120.00	59.99	.785	1,146.79	119.96	2.35
150	6°	04°30'	01°39'00"	95.03	55.03	149.96	74.97	1.37	956.41	149.90	4.32
180	7°	06°10'	02°16'30"	115.08	65.08	179.91	89.93	2.20	820.83	179.77	7.14
210	8°	08°24'	02°59'59"	135.17	75.16	209.81	104.87	3.29	719.64	209.52	10.98
240	9°	10°48'	03°49'27"	155.32	85.29	239.63	119.78	4.70	641.49	239.10	15.98
270	10°	13°30'	04°44'54"	175.56	95.51	269.35	134.63	6.46	579.60	268.43	22.30

T=2 1/2

Changing 1°30' for each 30 feet

L feet	D° Central curve	S°	HAX	u feet	v feet	C feet	t feet	d feet	(R+d) feet	x feet	y feet
30	3°00'	00°27'	00°13'35"	15.00	15.00	30.00	15.00	.051	1,909.97	30.00	.12
60	4°30'	01°21'	00°33'45"	35.00	25.00	60.00	30.00	.236	1,273.56	60.00	.59
90	6°00'	02°42'	01°03'00"	55.00	35.01	89.99	45.00	.589	955.63	90.00	1.65
120	7°30'	04°30'	01°41'15"	75.03	45.03	119.97	59.96	1.18	765.26	119.92	3.53
150	9°00'	06°45'	02°28'29"	95.08	55.08	149.91	74.93	2.06	638.84	149.77	6.47
180	10°30'	09°27'	03°24'43"	115.19	65.17	179.79	89.85	3.29	549.16	179.47	10.70
210	12°00'	12°36'	04°29'55"	135.38	75.35	209.57	104.72	4.93	482.62	208.92	16.44

**TABLE 28 — RAILROAD TAPER TABLES (Continued)**

T=2 1/4

Changing 1°15' for each 30 feet

L feet	D° Central curve	S°	HAX	u feet	v feet	C feet	t feet	d feet	(R+d) feet	x feet	y feet
30	2°30'	00°22'30"	00°07'30"	20.00	10.00	30.00	15.00	.049	2,291.92	30.00	0.09
60	3°45'	00°45'00"	00°15'00"	40.00	20.00	60.00	30.00	.197	1,528.15	60.00	0.49
90	5°	1°07'30"	00°22'30"	60.00	30.00	90.00	44.99	.491	1,146.50	89.98	1.37
120	6°15'	1°30'00"	00°30'00"	80.00	40.00	120.00	59.98	.981	917.83	119.94	2.94
150	7°30'	1°52'30"	00°37'30"	100.01	50.01	149.99	74.95	1.717	765.80	149.84	5.40
180	8°45'	2°15'00"	00°45'00"	120.01	60.01	179.99	89.90	2.745	657.71	179.64	8.92
210	10°	2°37'30"	00°52'20"	140.02	70.01	209.98	104.80	4.115	577.25	209.25	13.71

T=2 3/4

Changing 2° for each 30 feet

L feet	D° Central curve	S°	HAX	u feet	v feet	C feet	t feet	d feet	(R+d) feet	x feet	y feet
30	4°	00°36'	00°18'00"	15.00	15.00	30.00	14.999	.078	1,432.55	30.00	.1571
60	6°	01°48'	00°45'00"	35.00	25.00	60.00	29.995	.314	953.35	59.99	.7854
90	8°	03°36'	01°24'00"	55.02	35.01	89.99	44.981	.785	717.13	89.96	2.198
120	10°	06°00'	02°15'00"	75.05	45.05	119.95	59.945	1.57	574.71	119.85	4.709
150	12°	09°00'	03°17'58"	95.14	55.03	149.85	74.872	2.74	480.43	149.60	8.625
180	14°	12°36'	04°32'55"	115.33	65.31	179.63	89.785	4.38	413.89	179.07	14.25
210	16°	16°48'	05°39'48"	135.68	75.63	209.23	104.50	6.56	364.95	208.08	21.84

T=3

Changing 2°30' for each 30 feet

L feet	D° Central curve	S°	HAX	u feet	v feet	C feet	t feet	d feet	(R+d) feet	x feet	y feet
30	5°00'	00°45'	00°22'30"	15.00	15.00	30.00	15.00	.098	1,146.10	30.00	.1963
60	7°30'	02°15'	00°56'15"	35.00	25.00	60.00	29.99	.393	764.47	59.99	.9816
90	10°	04°30'	01°45'00"	55.02	35.02	89.98	44.97	.981	574.12	89.94	2.748
120	12°30'	07°30'	02°48'44"	75.08	45.08	119.92	59.91	1.96	460.35	119.77	5.884
150	15°	11°45'	04°07'27"	95.22	55.21	149.76	74.80	3.43	385.67	149.37	10.770
180	17°30'	15°45'	05°41'08"	115.52	65.48	179.43	89.59	5.47	333.19	178.54	17.774
210	20°	21°	07°29'38"	136.08	75.99	208.80	104.22	8.18	295.02	207.01	27.231

**TABLE 28 — RAILROAD TAPER TABLES (Continued)**

T=3 1/2

Changing 2° for each 15 feet

L feet	D° Central curve	S°	HAX	u feet	v feet	C feet	t feet	d feet	(R+d) feet	x feet	y feet
15	4°	00°18,	00°09'00"	7.50	7.50	15.00	7.50	.020	1,432.49	14.9999	.0393
30	6°	00°54'	00°22'00"	17.50	12.50	30.00	15.00	.078	955.12	29.999	.1963
45	8°	01°48'	00°42'00"	27.50	17.50	45.00	22.49	.197	716.54	44.995	.5497
60	10°	03°00'	01°07'30"	37.51	22.51	59.99	30.00	.392	575.53	59.98	1.1779
75	12°	04°30'	01°30'00"	47.52	27.52	74.98	37.47	.686	478.37	74.95	2.1589
90	14°	06°18'	02°16'30"	57.54	32.54	89.95	44.95	1.10	410.61	89.88	3.5706
105	16°	08°24'	02°59'59"	67.58	37.58	104.90	52.41	1.65	360.03	104.76	5.4895

T=4

Changing 2°30' for each 15 feet

L feet	D° Central curve	S°	HAX	u feet	v feet	C feet	t feet	d feet	(R+d) feet	x feet	y feet
15	5°	22'30"	00°11'15"	7.50	7.50	15.00	7.50	.024	1,146.03	14.9999	.0491
30	7°30'	1°07'30"	00°28'07"	17.50	12.50	30.00	15.00	.098	764.18	29.999	.2454
45	10°	2°15'00"	00°52'30"	27.50	17.50	44.99	22.49	.245	573.38	44.99	.6872
60	12°30'	3°45'00"	01°24'22"	37.51	22.51	59.99	29.98	.490	459.08	59.97	1.4722
75	15°15'	5°37'30"	02°03'45"	47.53	27.53	74.97	37.46	.857	383.10	74.92	2.6980
90	17°30'	7°52'30"	02°50'36"	57.56	32.56	89.93	44.91	1.370	329.09	89.82	4.4611
105	20°	10°50'00"	03°44'57"	67.63	37.62	104.85	52.35	2.053	288.90	104.62	6.8561

