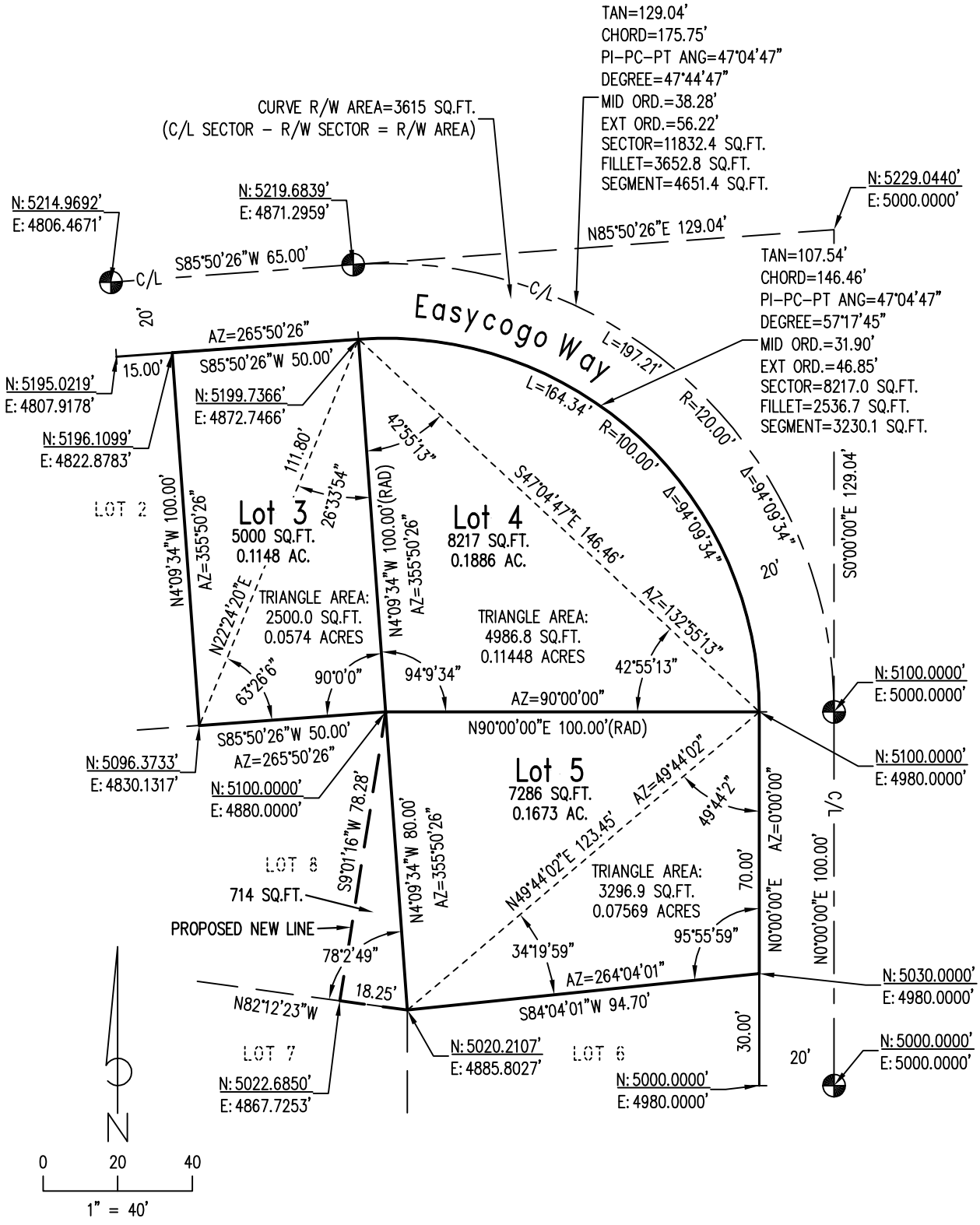
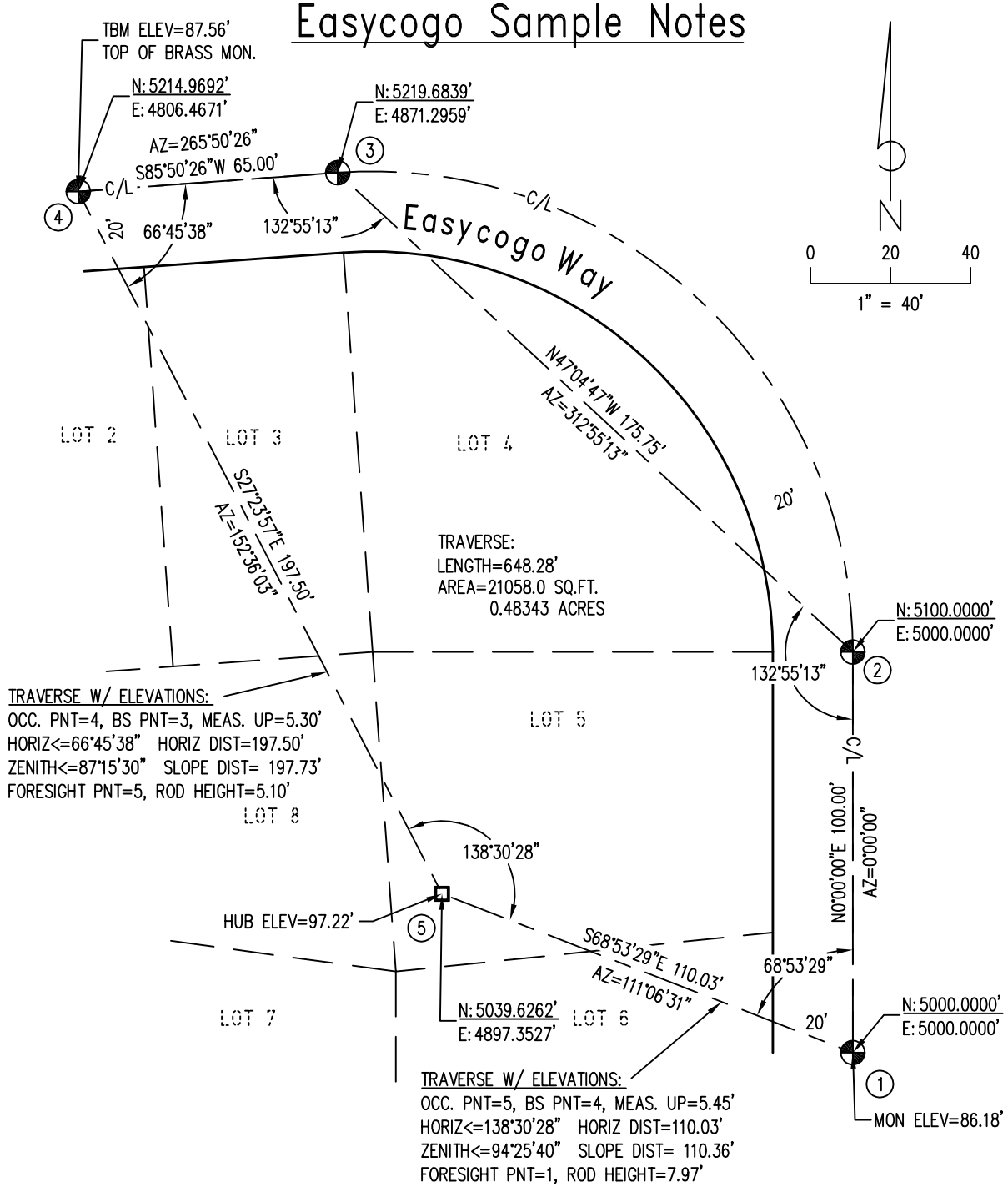
Easycogo Sample Maps and Problems

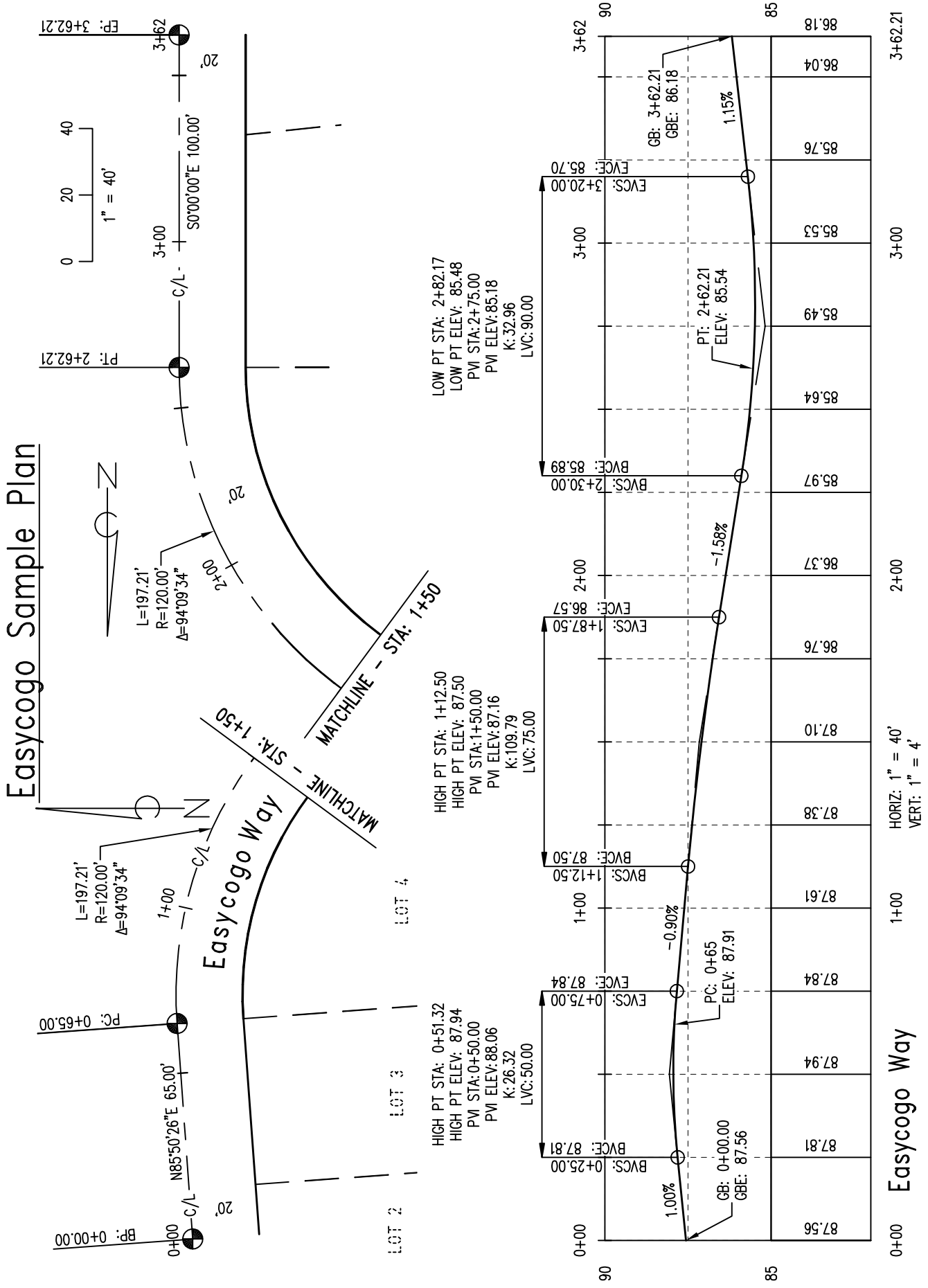
Easycogo Sample Map



Easycogo Sample Notes



		Differential Levels			
sta	+	HI	-	rod	elev
BM no. 25	3.75	98.95			95.20
TP	4.37	92.82	10.50		88.45
TBM=4	6.32	93.88	5.26		87.56
TP	10.01	98.02	5.87		88.01
BM no. 25			2.82		95.20
	24.45		24.45		95.20
	24.45			ERROR=	0.00
ERROR=	0.00			TBM =	87.56



Easycogo Sample Volumes

VOLUME CALCULATIONS (BY AVERAGE END AREA)

DITCH BEGINNING STATION = 0
(ENTER STA 0+00 INFO)

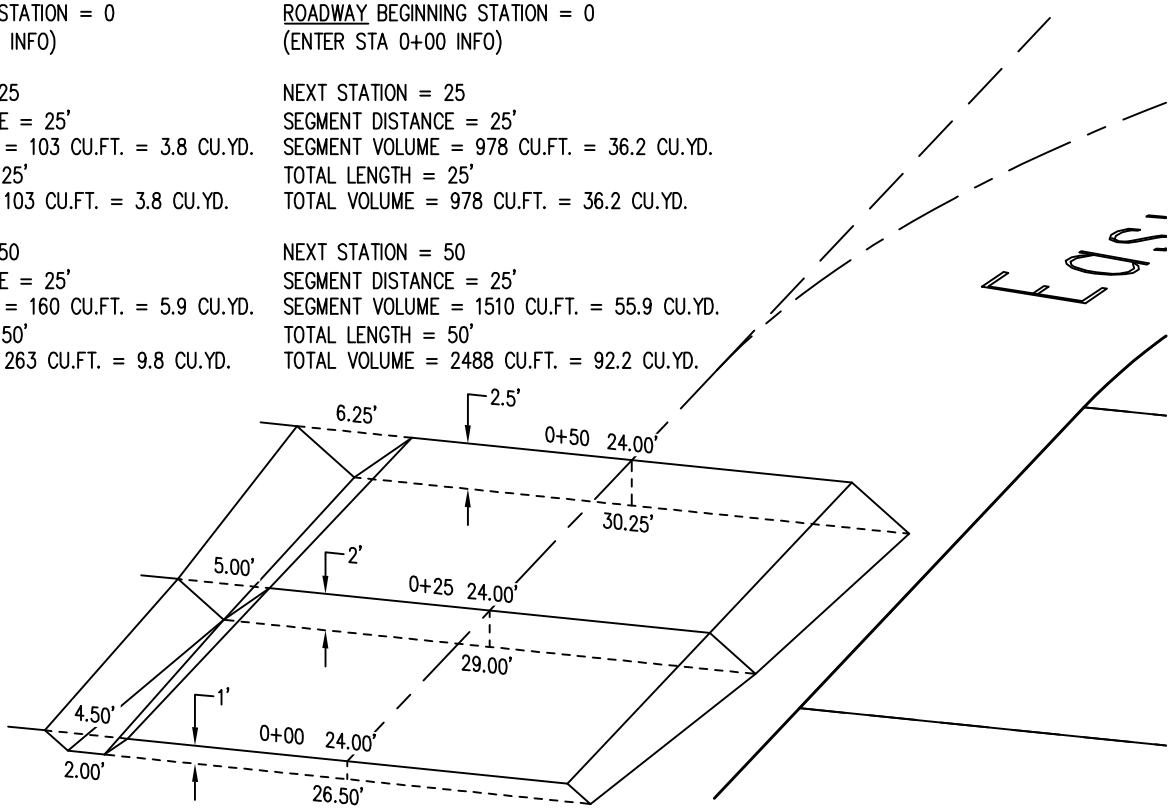
NEXT STATION = 25
SEGMENT DISTANCE = 25'
SEGMENT VOLUME = 103 CU.FT. = 3.8 CU.YD.
TOTAL LENGTH = 25'
TOTAL VOLUME = 103 CU.FT. = 3.8 CU.YD.

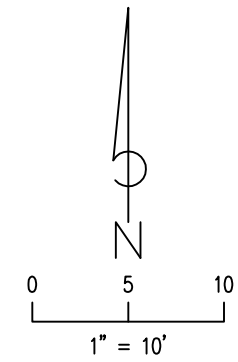
NEXT STATION = 50
SEGMENT DISTANCE = 25'
SEGMENT VOLUME = 160 CU.FT. = 5.9 CU.YD.
TOTAL LENGTH = 50'
TOTAL VOLUME = 263 CU.FT. = 9.8 CU.YD.

ROADWAY BEGINNING STATION = 0
(ENTER STA 0+00 INFO)

NEXT STATION = 25
SEGMENT DISTANCE = 25'
SEGMENT VOLUME = 978 CU.FT. = 36.2 CU.YD.
TOTAL LENGTH = 25'
TOTAL VOLUME = 978 CU.FT. = 36.2 CU.YD.

NEXT STATION = 50
SEGMENT DISTANCE = 25'
SEGMENT VOLUME = 1510 CU.FT. = 55.9 CU.YD.
TOTAL LENGTH = 50'
TOTAL VOLUME = 2488 CU.FT. = 92.2 CU.YD.

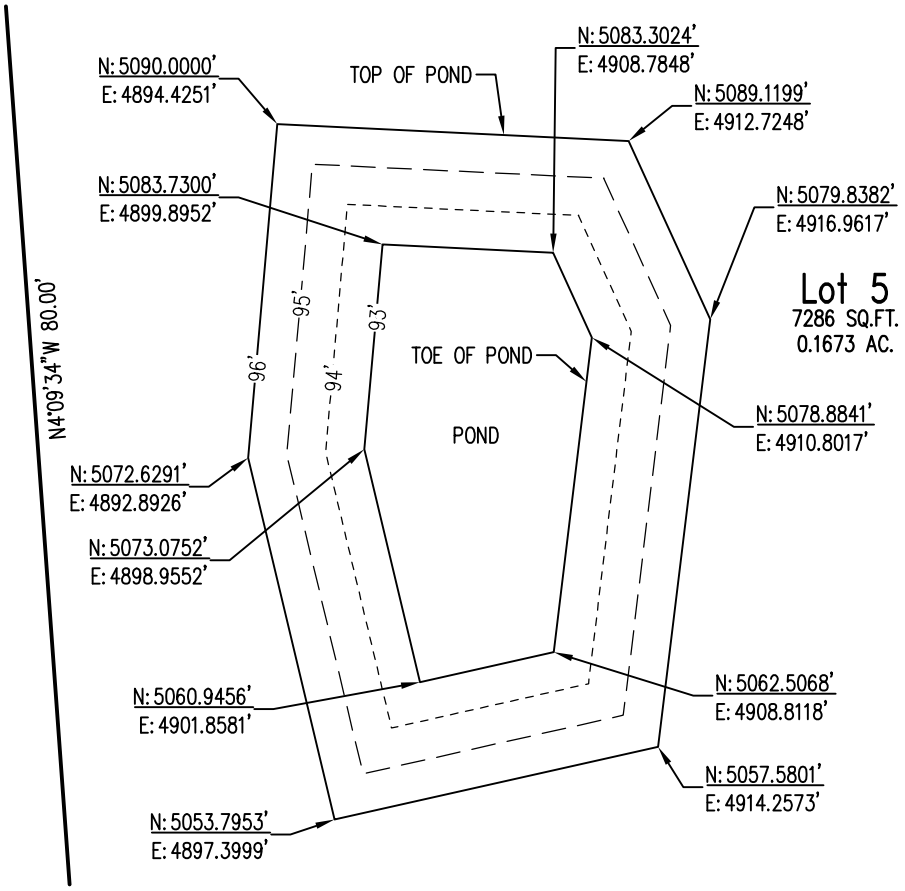




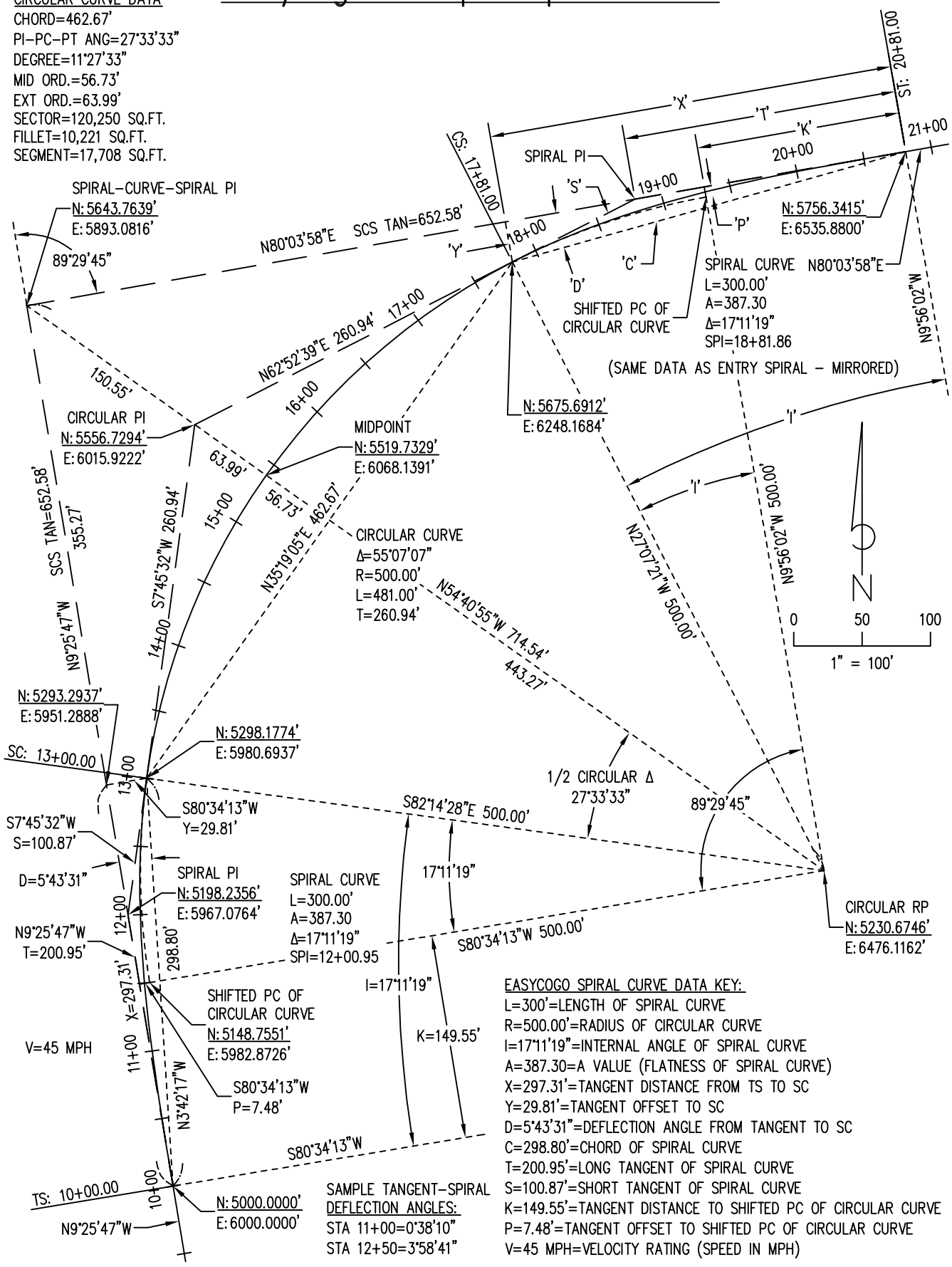
POND TOP:
PERIMETER = 105.0'
AREA = 712 SQ.FT. = 0.0163 AC.

POND BOTTOM:
PERIMETER = 60.6'
AREA = 215 SQ.FT. = 0.0049 AC.

POND VOLUME = 1391 CU.FT.



Easycogo Sample Spiral Curve



Easycogo Sample Problems for Equations

Astronomy-Altitude Method-East (AM)

A morning solar observation produced the following information:
Latitude: 46°15'27"N
Longitude: 122°27'42"W
Zenith angle: 74°30'15"
Declination: -11°10'14"
What was the astronomic azimuth to the sun?

Solution:
Altitude angle = 90° - zenith angle = 15°29'45"
Azimuth to sun = 125°28'57"

Astronomy-Altitude Method-West (PM)

If the previous observation was in the afternoon, what would have been the astronomic azimuth to the sun?

Solution:
Azimuth to sun = 234°31'03"

Astronomy-Hour Angle Method-HA>180-East

If the Local Hour Angle (LHA) for the previous morning solar observation was 306°53'05", what was the astronomic bearing to the sun?

Solution:
Bearing = S 54°31'03" E

Astronomy-Hour Angle Method-HA<180-West

Using the same location as the previous solar observations, if the Local Hour Angle (LHA) for an evening Polaris observation was 82°50'10" and the Declination was 89°18'50", what was the astronomic bearing to the star?

Solution:
Bearing = N 0°59'10" W

Conversion-Survey Feet ↔ Int'l Feet

You were provided international foot control point coordinates of N: 600,000 and E: 1,200,000, but your project requires US survey feet. What would be the correct values for your project?

Solution:
N: 599,998.8 US SF
E: 1,199,997.6 US SF

Curve Degree-Arc Definition

(Use highway arc on 'Easycogo Sample Map')

Curve Degree-Chord Definition

A railroad arc has a radius of 1000', what is the degree of curvature?

Solution:
Degree of curvature = 5°43'55"

Curve Length

(Use any curve on 'Easycogo Sample Map')

Depreciation

If you purchase a total station for $12,450 and expect it to depreciate by $1,500 per year, what would be the expected value of the total station after 4 years?

Solution:
Expected value = $6,450

Ellipse Area

Using the values shown in the 'Ellipse Flattening' sample that follows, calculate the cross-section area of the same ellipsoid in square miles.

Solution:
Area = $3.4275916 \times 10^{14} ft^2 \div 5280 = 64{,}916{,}508{,}000 mi^2$

Ellipse Flattening

If the semi-major axis of the ellipsoid of the earth is published as 20,925,646 ft and the flattening value is 1/f=298.257223563, what is the length of the semi-minor axis?

Solution:
Flattening = 1÷298.257223563 = 0.0033528106648
Semi-minor axis = 20,855,486 ft

Grade-Percent

A new detached garage needs to be placed on a flat lot that has an elevation of 107 ft, but the access road is at an elevation of 100 ft. How long must the driveway be to meet the maximum grade of 15%?

Solution:
47 ft

Loan Payments

You want to get a $12,450 loan with a 6.25% APR to purchase a total station and pay it off in 4 years. What would your monthly payment need to be to accomplish this? What would be the total amount paid at the end of the loan?

Solution:
Number of payments = 4x12 = 48
Future value (of loan) = $0
Monthly payment = $293.82
Total amount paid = $293.82 x 48 = $14,103.36

Photogrammetry-Angular Field of View

What is the angular field of view for a 9”x9” format camera with a 6” fixed focal length?

Solution:
Angular field of view = 93°

Photogrammetry-Relief Displacement

A vertical photograph taken at an elevation of 3500 ft above sea level shows a building with a base elevation of 450 ft. The building is 3.65” from the principal point of the photograph and has a relief displacement of 0.62”. What is the height of the building?

Solution:
Building height = 518 ft

Plane-Azimuth Conversion (Grid ↔ Ground)

If the basis of bearings of the “Easycogo Sample Map” is true north and the convergence angle for the site is known to be -1°15’42”, what is the grid azimuth of the west line of lot 4?

Solution:
True azimuth = 355°50’26”
Grid (plane) azimuth = 357°06’08”

Plane-Coordinate Conversion (Grid ↔ Ground)

You were provided a map with a US survey foot control point coordinate of N: 900,000 and E: 1,700,000. A note on the map states that the coordinates are shown at ground level, based on a combined grid factor of 0.99999876, followed by an offset value of 500,000. What would be the actual plane coordinates for the same point?

Solution:
N: 399,999.50 US SF
E: 1,199,998.51 US SF

Right Triangle-Angle

(Use right triangle on ‘Easycogo Sample Map’)

Right Triangle-Side

(Use right triangle on ‘Easycogo Sample Map’)

Spiral-Deflection Angle to Point On Spiral

(Use spiral curve on ‘Easycogo Sample Spiral Curve’)

Spiral-Internal Angle (Delta)

(Use spiral curve on ‘Easycogo Sample Spiral Curve’)

Spiral-Velocity (Speed) in MPH

(Use spiral curve on ‘Easycogo Sample Spiral Curve’)

Stadia-Distance (Horiz) to Foresight

Using a transit with a stadia interval factor of 100, a stadia side shot is recorded with a stadia interval of 3.47 and a vertical angle of 2°44’. What is the horizontal distance to the foresight point?

Solution:
Horizontal distance = 346 ft

Stadia-Elevation at Foresight

If the transit in the previous problem was set up over a point with an elevation of 143.25 ft, having a measure-up (height of instrument) of 5.5 ft, and the rod height was recorded as 6 ft for the same side shot, what would be the elevation of the foresight point?

Solution:
Elevation = 159.3 ft

Tape Calibration Correction

What tape calibration correction should be applied to a measured distance of 1127.58 ft if the 300 ft tape used for the measurement is known to be actually 300.11 ft?

Solution:
Tape calibration correction = 0.41 ft

Tape Sag Correction

The crew used an unsupported 2 lb, 100 ft tape under 10 lb of tension to measure between two points and noted the distance between the points as 100 ft, but no correction was applied. Assuming only a correction for sag is necessary, what is the actual distance between the two points?

Solution:
Tape sag correction = -0.17 ft
Corrected distance = 100 ft + (-0.17 ft) = 99.83 ft

Tape Temperature Correction

If a steel tape is standardized for 68° F and you measure a line to 478.34 ft at 42° F, assuming no other corrections are necessary, what is the actual length of the measured line?

Solution:
Correction for temperature = -0.08 ft
Actual line length = 478.34 ft + (-0.08 ft) = 478.26 ft

Tape Tension Correction

Assuming a 0.35" wide x 0.02" thick steel tape is 100 ft long when only supported at its ends and pulled with a tension of 20 lbs, and assuming no other corrections are necessary, what would be the actual length of a line measured as 478.34 ft with the same steel tape, having an applied pull of 35 lbs, and assuming the modulus of elasticity of steel to be 29,000,000 psi?

Solution:
Cross-sectional Area = 0.35 in x 0.02 in = 0.007 in^2
Correction for tension = 0.04 ft
Corrected length = 478.34 ft + 0.04 ft = 478.38 ft

Triangle-Law of Cosines

(Use triangles on 'Easycogo Sample Map')

Triangle-Law of Sines

(Use triangles on 'Easycogo Sample Map')

Triangle-Size (also Swing on Line)

(Use triangles on 'Easycogo Sample Map')

*Swing on Line

(Use 'proposed new line' on 'Easycogo Sample Map')
The owner of lot 5 wants to subdivide his property into 2 lots, but local zoning codes require a minimum parcel size of 4,000 sq.ft. The owner of lot 8 has agreed to adjust their common line, but wants to run the new line from his existing NE property corner to a point on his south line. What would be the distance from the existing SE corner of lot 8 to the new property corner?

Solution:
Additional area needed = 714 sq.ft.
Distance along south line of lot 8 = 18.25 ft

Vertical Curve-Point On Curve

(Use vertical curves on 'Easycogo Sample Plan')

Volume of Cone

What is the volume of a 3 ft tall cone that is 1.5 ft wide at its base?

Solution:
Volume = 1.8 ft^3

Volume of Cylinder

If a tank must be able to hold 30,000 ft^3 of water, what would be the necessary width of the tank if its height restriction is 35 ft?

Solution:
Width (diameter) = 33 ft

Volume of Pond or Pile

(Use pond on 'Easycogo Sample Volumes')