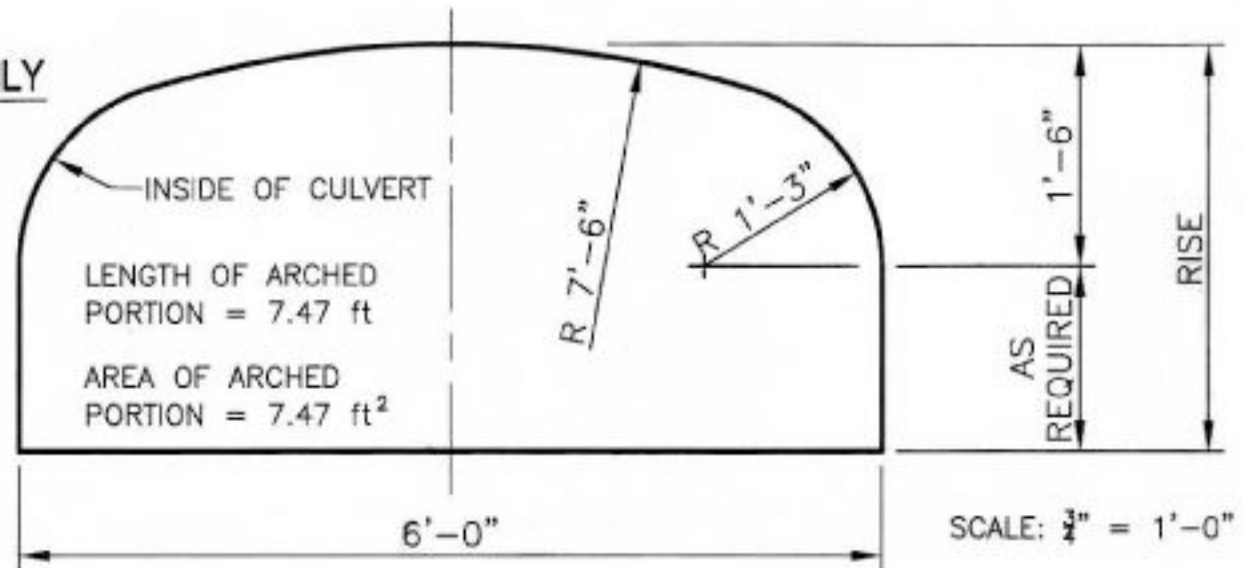




CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

FOR OFFICIAL USE ONLY



6' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft ²)	Wetted Perim. (ft)	Hyd. Radius (ft)	AR ^{2/3}	Wall(1) Shotcrete (CY/ft)	Arch+Wall Concrete(1) (CY/ft)	Floor Concrete(2) (CY/ft)	Total Yds (CY/ft)	Total Reinf(3) (lb/ft)
3'-0"	16.5	16.5	1.0	16.5	0.06	0.21	0.13	0.34	27
3'-6"	19.5	17.5	1.1	20.9	0.07	0.22	0.13	0.35	29
4'-0"	22.5	18.5	1.2	25.6	0.09	0.24	0.13	0.37	30
4'-6"	25.5	19.5	1.3	30.5	0.11	0.26	0.13	0.39	32
5'-0"	28.5	20.5	1.4	35.5	0.13	0.28	0.13	0.41	33
5'-6"	31.5	21.5	1.5	40.6	0.15	0.30	0.13	0.43	35
6'-0"	34.5	22.5	1.5	45.8	0.17	0.32	0.13	0.45	36

1) Arch & wall shotcrete thickness = 6"

2) Floor avg thickness = 6"

3) Reinf. avg. wt/ft³ = 3.0 lb/ft³ (assumed)

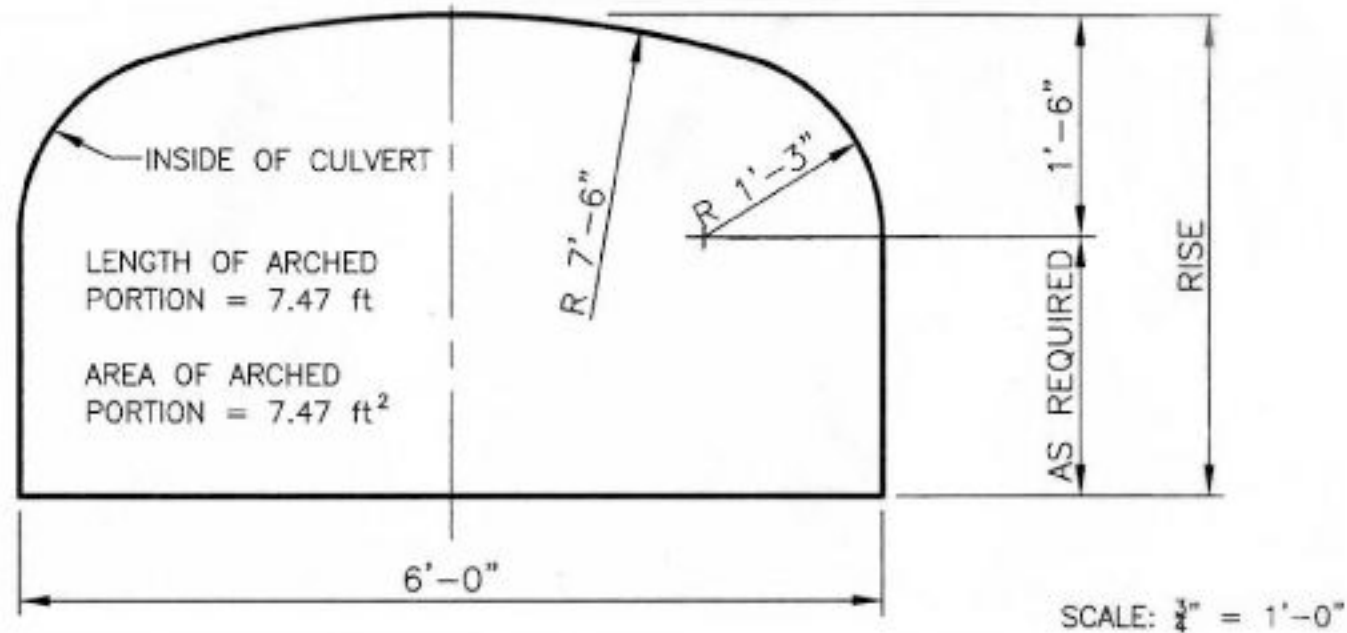
BY: ATS apr 2000

CHECK BY: TAG apr 2000

F:\AUTOCAD\FORMS\FORMSTD

CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading



6' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	AR ^{2/3}	COMMENTS
2'-6"	13.5	15.5	0.9	12.3	
3'-0"	16.5	16.5	1.0	16.5	
3'-6"	19.5	17.5	1.1	20.9	
4'-0"	22.5	18.5	1.2	25.6	
4'-6"	25.5	19.5	1.3	30.5	
5'-0"	28.5	20.5	1.4	35.5	
5'-6"	31.5	21.5	1.5	40.6	
6'-0"	34.5	22.5	1.5	45.8	

BY: ATS apr 2000

CHKD BY: TAS apr 2000

F:\AUTOCAD\FORMS\FORMSTD

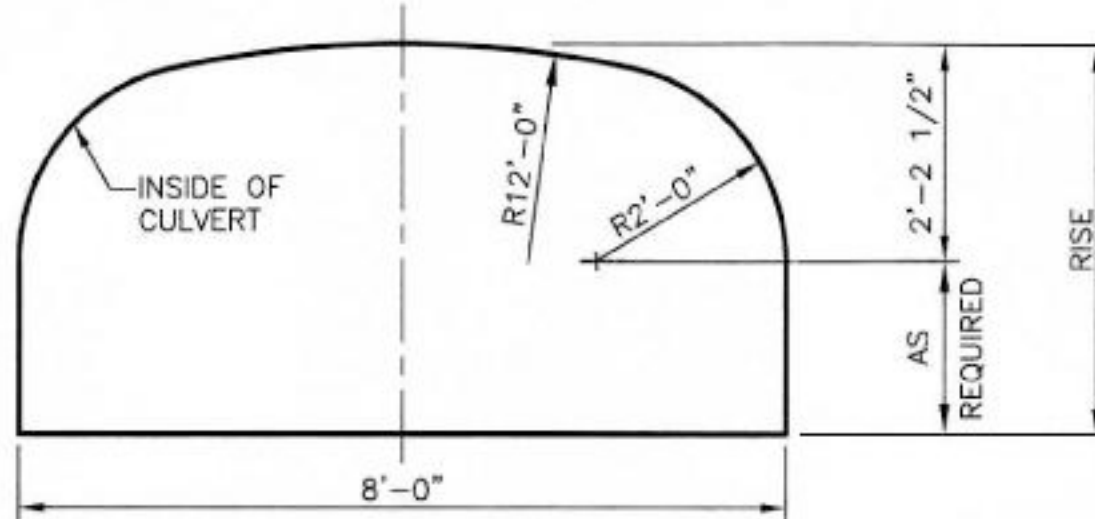
CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

FOR OFFICIAL USE ONLY

LENGTH OF ARCH
PORTION = 10.3 ft

AREA OF ARCH
PORTION = 14.9 ft²



8' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	^{2/3} AR	Wall(1) Shotcrete (CY/ft)	Arch+Wall Concrete(1) (CY/ft)	Floor Concrete(2) (CY/ft)	Total Yds (CY/ft)	Total Reinf(3) (lb/ft)
3'-0"	21.3	19.9	1.1	22.3	0.03	0.24	0.17	0.41	33
3'-6"	25.3	20.9	1.2	28.7	0.05	0.26	0.17	0.43	35
4'-0"	29.3	21.9	1.3	35.6	0.07	0.28	0.17	0.45	36
4'-6"	33.3	22.9	1.5	42.7	0.09	0.30	0.17	0.47	38
5'-0"	37.3	23.9	1.6	50.2	0.10	0.31	0.17	0.48	39
5'-6"	41.3	24.9	1.7	57.9	0.12	0.33	0.17	0.50	41
6'-0"	45.3	25.9	1.7	65.7	0.14	0.35	0.17	0.52	42
6'-6"	49.3	26.9	1.8	73.8	0.16	0.37	0.17	0.54	44
7'-0"	53.3	27.9	1.9	82.0	0.18	0.39	0.17	0.56	45
7'-6"	57.3	28.9	2.0	90.4	0.20	0.41	0.17	0.58	47
8'-0"	61.3	29.9	2.1	98.9	0.21	0.42	0.17	0.59	48

1) Arch & wall shotcrete thickness = 6"

2) Floor avg thickness = 6"

3) Reinf. avg. wt/ft³ = 3.0 lb/ft³ (assumed)

BY: JTS apr 2000

CHKD BY: TAS apr 2000

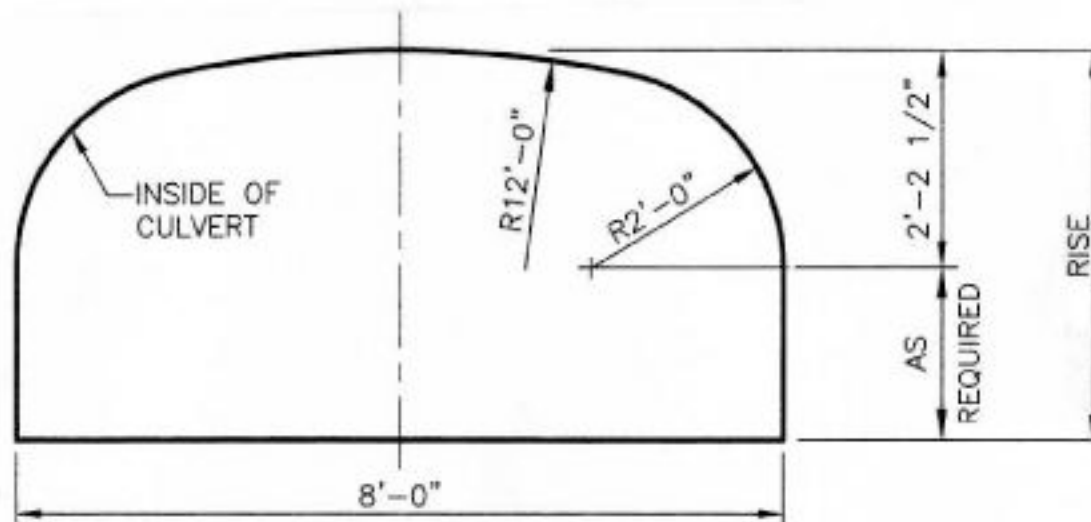
F:\AUTOCAD\FORMS\FORMSTD

CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

LENGTH OF ARCH
PORTION = 10.3 ft

AREA OF ARCH
PORTION = 14.9 ft²



SCALE: $\frac{1}{2}" = 1'-0"$

8' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	AR ^{2/3}	COMMENTS
3'-0"	21.3	19.9	1.1	22.3	
3'-6"	25.3	20.9	1.2	28.7	
4'-0"	29.3	21.9	1.3	35.6	
4'-6"	33.3	22.9	1.5	42.7	
5'-0"	37.3	23.9	1.6	50.2	
5'-6"	41.3	24.9	1.7	57.9	
6'-0"	45.3	25.9	1.7	65.7	
6'-6"	49.3	26.9	1.8	73.8	
7'-0"	53.3	27.9	1.9	82.0	
7'-6"	57.3	28.9	2.0	90.4	
8'-0"	61.3	29.9	2.1	98.9	

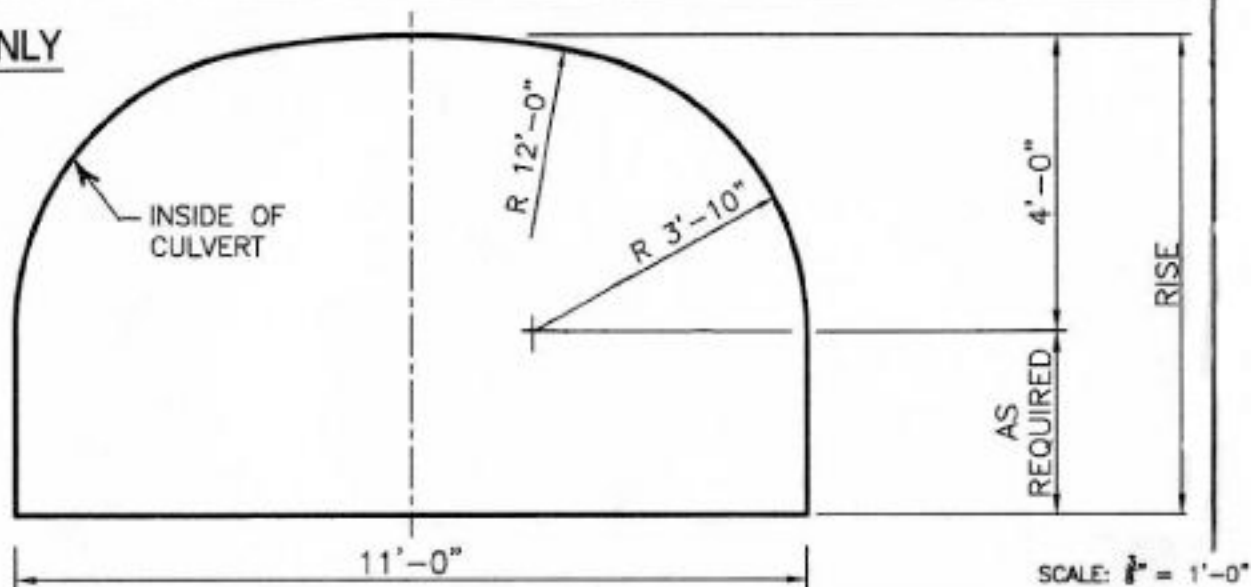
CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

FOR OFFICIAL USE ONLY

LENGTH OF ARCH
PORTION = 15.4 ft

AREA OF ARCH
PORTION = 36.3 ft²



11' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft) Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	^{2/3} AR	Wall(1) Shotcrete (CY/ft)	Arch+Wall Concrete(1) (CY/ft)	Floor Concrete(2) (CY/ft)	Total Yds (CY/ft)	Total Reinf(3) (lb/ft)
4'-0"	36.3	26.4	1.4	44.9	0.00	0.30	0.22	0.52	42
4'-6"	41.8	27.4	1.5	55.4	0.02	0.32	0.22	0.54	44
5'-0"	47.3	28.4	1.7	66.5	0.04	0.34	0.22	0.56	45
5'-6"	52.8	29.4	1.8	78.0	0.06	0.36	0.22	0.58	47
6'-0"	58.3	30.4	1.9	90.0	0.07	0.37	0.22	0.59	48
6'-6"	63.8	31.4	2.0	102.3	0.09	0.39	0.22	0.61	50
7'-0"	69.3	32.4	2.1	115.0	0.11	0.41	0.22	0.63	51
7'-6"	74.8	33.4	2.2	128.0	0.13	0.43	0.22	0.65	53
8'-0"	80.3	34.4	2.3	141.3	0.15	0.45	0.22	0.67	54
8'-6"	85.8	35.4	2.4	154.8	0.17	0.47	0.22	0.69	56
9'-0"	91.3	36.4	2.5	168.5	0.19	0.49	0.22	0.71	57
9'-6"	96.8	37.4	2.6	182.4	0.20	0.50	0.22	0.72	59
10'-0"	102.3	38.4	2.7	196.5	0.22	0.52	0.22	0.74	60

- 1) Arch & wall shotcrete thickness = 6"
- 2) Floor avg thickness = 6"
- 3) Reinf. avg. wt/ft³ = 3.0 lb/ft³ (assumed)

BY :ATS apr 2000

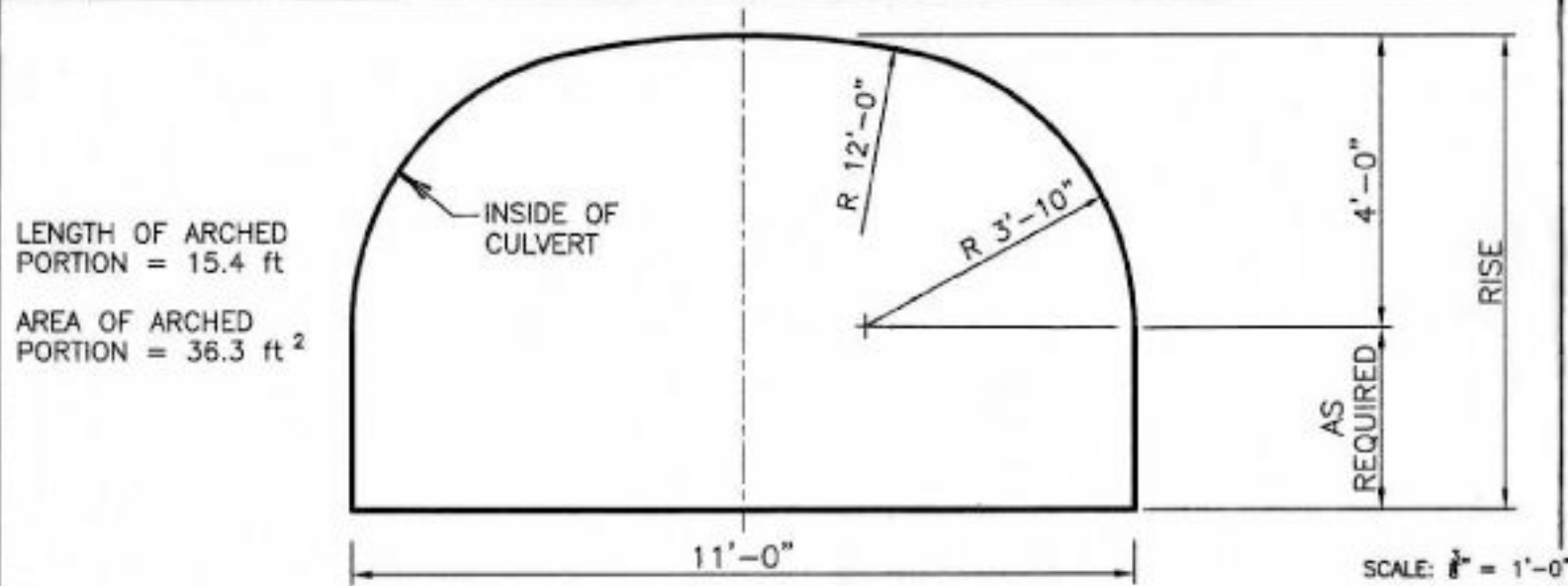
4/14/0011elful

CHKD BY: TAB apr 2000

F:\AUTOCAD\MOLANOUS\LOTUS_RE\STANDARD

CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading



11' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft)	Wetted Perim. (ft)	Hyd. Radius (ft)	AR ^{2/3}	COMMENTS
4'-0"	36.3	26.4	1.4	44.9	
4'-6"	41.8	27.4	1.5	55.4	
5'-0"	47.3	28.4	1.7	66.5	
5'-6"	52.8	29.4	1.8	78.0	
6'-0"	58.3	30.4	1.9	90.0	
6'-6"	63.8	31.4	2.0	102.3	
7'-0"	69.3	32.4	2.1	115.0	
7'-6"	74.8	33.4	2.2	128.0	
8'-0"	80.3	34.4	2.3	141.3	
8'-6"	85.8	35.4	2.4	154.8	
9'-0"	91.3	36.4	2.5	168.5	
9'-6"	96.8	37.4	2.6	182.4	
10'-0"	102.3	38.4	2.7	196.5	

BY: ATS apr 2000

CHKD BY: TAS apr 2000

CON-ARCH STANDARD FORMS

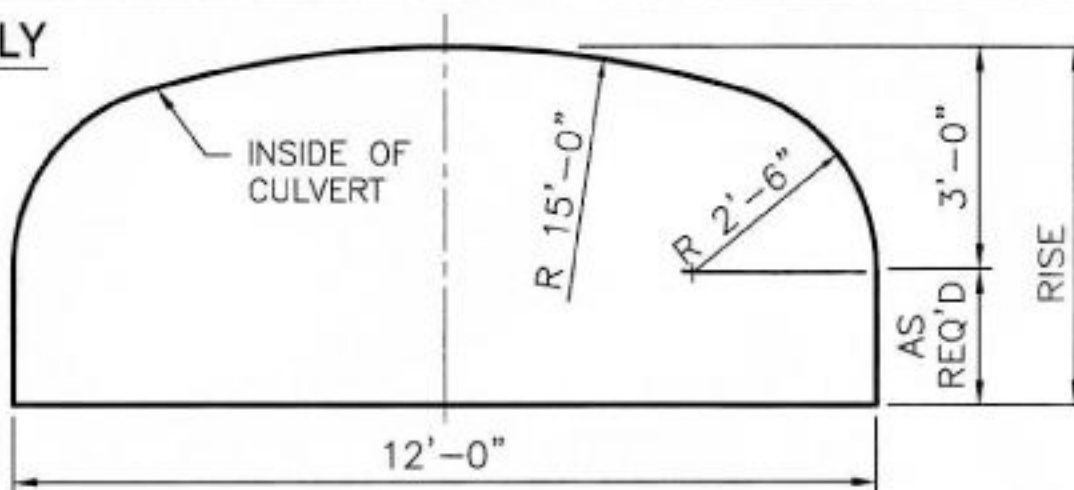
Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

FOR OFFICIAL USE ONLY

LENGTH OF ARCHED PORTION = 14.9 ft

AREA OF ARCHED PORTION = 29.9 ft²

SCALE: $\frac{8^{1/2}''}{1' - 0''} = 1' - 0''$



12' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	^{2/3} AR	Wall(1) Shotcrete (CY/ft)	Arch+Wall Concrete(1) (CY/ft)	Floor Concrete(2) (CY/ft)	Total Yds (CY/ft)	Total Reinf(3) (lb/ft)
3'-0"	29.9	26.9	1.1	32.1	0.00	0.29	0.24	0.53	43
3'-6"	35.9	27.9	1.3	42.5	0.02	0.31	0.24	0.55	44
4'-0"	41.9	28.9	1.4	53.7	0.04	0.33	0.24	0.57	46
4'-6"	47.9	29.9	1.6	65.6	0.06	0.35	0.24	0.59	47
5'-0"	53.9	30.9	1.7	78.1	0.07	0.36	0.24	0.60	49
5'-6"	59.9	31.9	1.9	91.1	0.09	0.38	0.24	0.62	50
6'-0"	65.9	32.9	2.0	104.7	0.11	0.40	0.24	0.64	52
6'-6"	71.9	33.9	2.1	118.6	0.13	0.42	0.24	0.66	53
7'-0"	77.9	34.9	2.2	133.0	0.15	0.44	0.24	0.68	55
7'-6"	83.9	35.9	2.3	147.7	0.17	0.46	0.24	0.70	56
8'-0"	89.9	36.9	2.4	162.7	0.19	0.48	0.24	0.72	58
8'-6"	95.9	37.9	2.5	178.0	0.20	0.49	0.24	0.73	59
9'-0"	101.9	38.9	2.6	193.5	0.22	0.51	0.24	0.75	61

1) Arch & wall shotcrete thickness = 6"

2) Floor avg thickness = 6"

3) Reinf. avg. wt/ft³ = 3.0 lb/ft³ (assumed)

F:\AUTOCAD\FORMS\FORMSTD

CHKD BY: TAB apr 2000

BY: ATS apr 2000

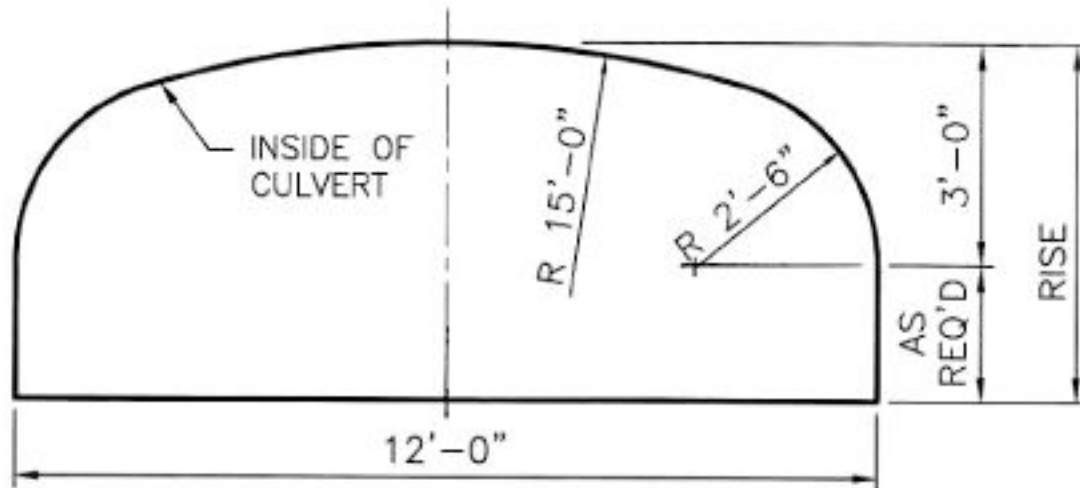
CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

LENGTH OF ARCHED
PORTION = 14.9 ft

AREA OF ARCHED
PORTION = 29.9 ft²

SCALE: $\frac{3}{8}" = 1'-0"$



12' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

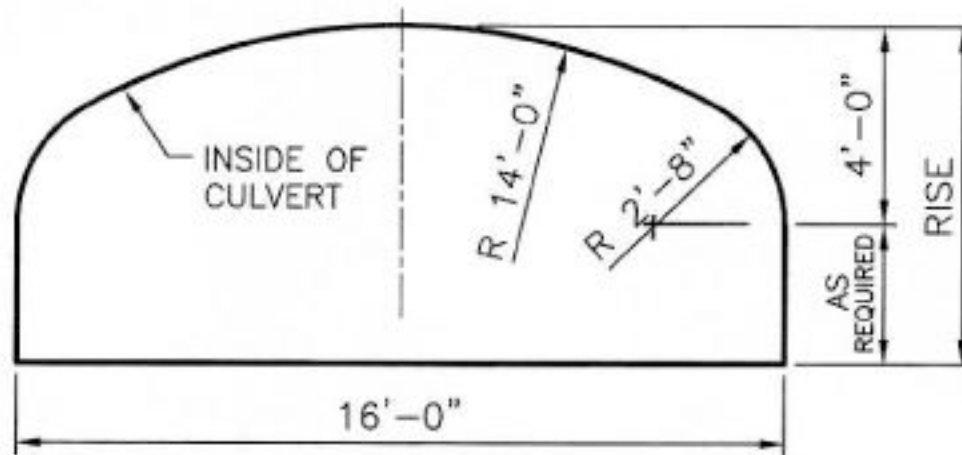
Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	AR ^{2/3}	COMMENTS
3'-0"	29.9	26.9	1.1	32.1	
3'-6"	35.9	27.9	1.3	42.5	
4'-0"	41.9	28.9	1.4	53.7	
4'-6"	47.9	29.9	1.6	65.6	
5'-0"	53.9	30.9	1.7	78.1	
5'-6"	59.9	31.9	1.9	91.1	
6'-0"	65.9	32.9	2.0	104.7	
6'-6"	71.9	33.9	2.1	118.6	
7'-0"	77.9	34.9	2.2	133.0	
7'-6"	83.9	35.9	2.3	147.7	
8'-0"	89.9	36.9	2.4	162.7	
8'-6"	95.9	37.9	2.5	178.0	
9'-0"	101.9	38.9	2.6	193.5	

CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

LENGTH OF ARCHED PORTION = 19.5 ft

AREA OF ARCHED PORTION = 50.4 ft²



16' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	AR ^{2/3}	COMMENTS
4'-0"	50.4	35.5	1.4	63.7	
4'-6"	58.4	36.5	1.6	79.9	
5'-0"	66.4	37.5	1.8	97.2	
5'-6"	74.4	38.5	1.9	115.4	
6'-0"	82.4	39.5	2.1	134.5	
6'-6"	90.4	40.5	2.2	154.4	
7'-0"	98.4	41.5	2.4	174.9	
7'-6"	106.4	42.5	2.5	196.1	
8'-0"	114.4	43.5	2.6	217.9	
8'-6"	122.4	44.5	2.8	240.2	
9'-0"	130.4	45.5	2.9	263.0	
9'-6"	138.4	46.5	3.0	286.2	
10'-0"	146.4	47.5	3.1	309.9	
10'-6"	154.4	48.5	3.2	334.0	
11'-0"	162.4	49.5	3.3	358.4	

BY :ATS apr 2000

F:\AUTOCAD\FORMS\FORMSTD

CHKD BY: TAS apr 2000

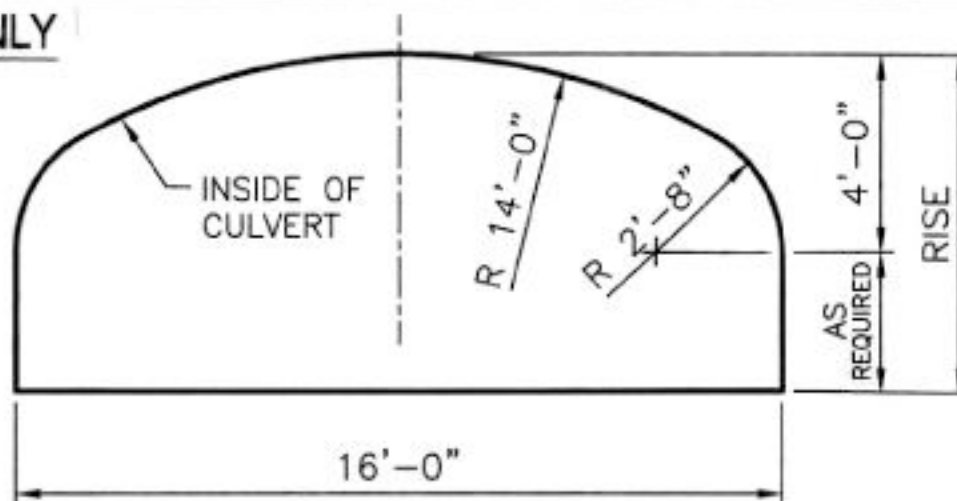
CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

FOR OFFICIAL USE ONLY

LENGTH OF ARCHED PORTION = 19.5 ft

AREA OF ARCHED PORTION = 50.4 ft²



SCALE: 1/4" = 1'-0"

16' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	^{2/3} AR	Wall(1) Shotcrete (CY/ft)	Arch+Wall Concrete(1) (CY/ft)	Floor Concrete(2) (CY/ft)	Total Yds (CY/ft)	Total Reinf(3) (lb/ft)
4'-0"	50.4	35.5	1.4	63.7	0.00	0.44	0.37	0.81	66
4'-6"	58.4	36.5	1.6	79.9	0.02	0.46	0.37	0.83	67
5'-0"	66.4	37.5	1.8	97.2	0.04	0.48	0.37	0.85	69
5'-6"	74.4	38.5	1.9	115.4	0.06	0.50	0.37	0.87	71
6'-0"	82.4	39.5	2.1	134.5	0.09	0.53	0.37	0.90	73
6'-6"	90.4	40.5	2.2	154.4	0.11	0.55	0.37	0.92	74
7'-0"	98.4	41.5	2.4	174.9	0.13	0.57	0.37	0.94	76
7'-6"	106.4	42.5	2.5	196.1	0.15	0.59	0.37	0.96	78
8'-0"	114.4	43.5	2.6	217.9	0.17	0.61	0.37	0.98	80
8'-6"	122.4	44.5	2.8	240.2	0.19	0.63	0.37	1.00	81
9'-0"	130.4	45.5	2.9	263.0	0.22	0.66	0.37	1.03	83
9'-6"	138.4	46.5	3.0	286.2	0.24	0.68	0.37	1.05	85
10'-0"	146.4	47.5	3.1	309.9	0.26	0.70	0.37	1.07	87
10'-6"	154.4	48.5	3.2	334.0	0.28	0.72	0.37	1.09	88
11'-0"	162.4	49.5	3.3	358.4	0.30	0.74	0.37	1.11	90

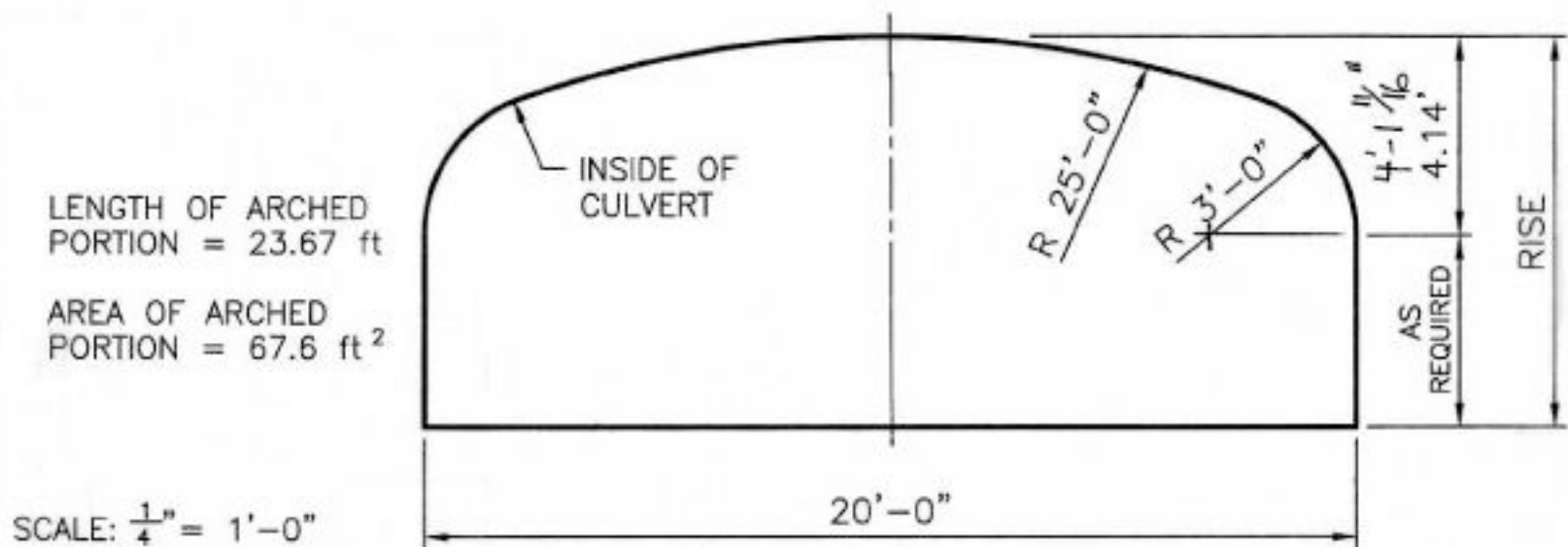
1) Arch & wall shotcrete thickness = 7"

2) Floor avg thickness = 7"

3) Reinf avg wt/ft = 3.0 lb/ft (assumed)

CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading



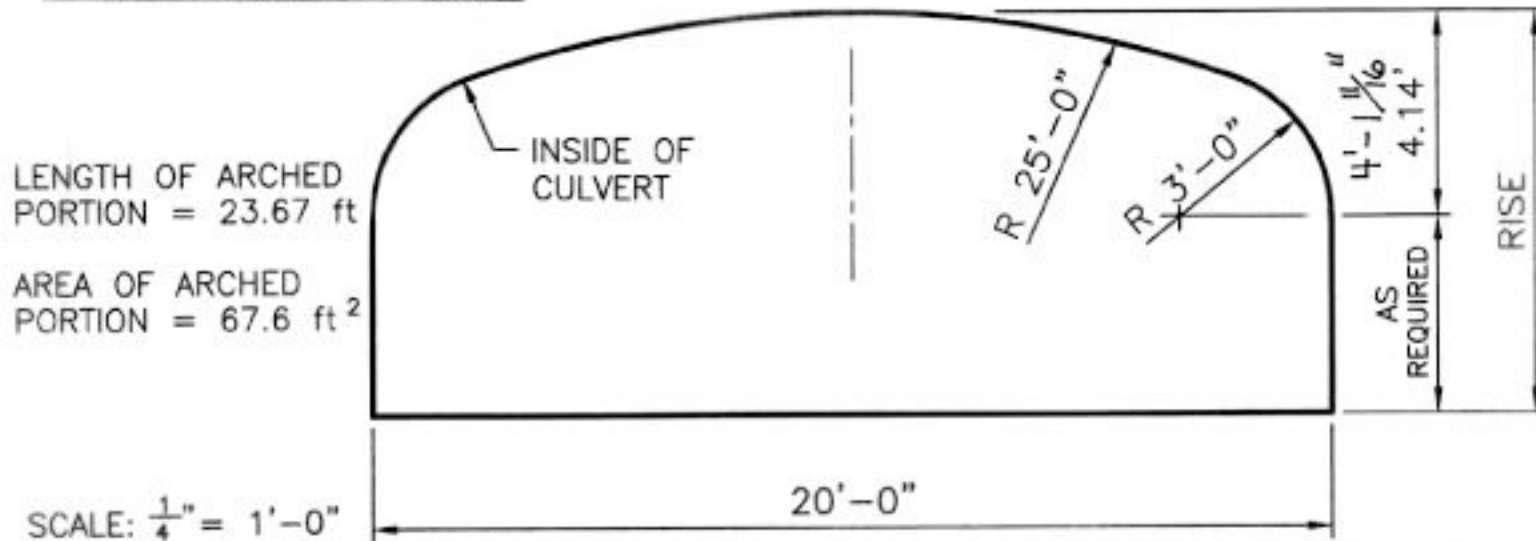
20' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	AR ^{2/3}	COMMENTS
4'-2"	67.6	43.7	1.5	90.4	
4'-6"	74.8	44.4	1.7	105.9	
5'-0"	84.8	45.4	1.9	128.6	
5'-6"	94.8	46.4	2.0	152.6	
6'-0"	104.8	47.4	2.2	177.8	
6'-6"	114.8	48.4	2.4	204.1	
7'-0"	124.8	49.4	2.5	231.4	
7'-6"	134.8	50.4	2.7	259.6	
8'-0"	144.8	51.4	2.8	288.7	
8'-6"	154.8	52.4	3.0	318.5	

CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

FOR OFFICIAL USE ONLY



20' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	2/3 AR	Wall(1) Shotcrete (CY/ft)	Arch+Wall Concrete(2) (CY/ft)	Floor Concrete(3) (CY/ft)	Total Yds (CY/ft)	Total Reinf(4) (lb/ft)
4'-2"	67.6	43.7	1.5	90.4	0.00	0.61	0.53	1.14	92
4'-6"	74.8	44.4	1.7	105.9	0.02	0.63	0.53	1.16	94
5'-0"	84.8	45.4	1.9	128.6	0.04	0.65	0.53	1.18	96
5'-6"	94.8	46.4	2.0	152.6	0.07	0.68	0.53	1.21	98
6'-0"	104.8	47.4	2.2	177.8	0.09	0.70	0.53	1.23	100
6'-6"	114.8	48.4	2.4	204.1	0.12	0.73	0.53	1.26	102
7'-0"	124.8	49.4	2.5	231.4	0.14	0.75	0.53	1.28	104
7'-6"	134.8	50.4	2.7	259.6	0.17	0.78	0.53	1.31	106
8'-0"	144.8	51.4	2.8	288.7	0.19	0.80	0.53	1.33	108
8'-6"	154.8	52.4	3.0	318.5	0.22	0.83	0.53	1.36	110
9'-0"	164.8	53.4	3.1	349.1	0.24	0.85	0.53	1.38	112

- 1) Arch avg thickness = 8"
- 2) Floor avg thickness = 8"
- 3) Reinf. avg. wt/ft³ = 3.0 lb/ft³ (assumed)

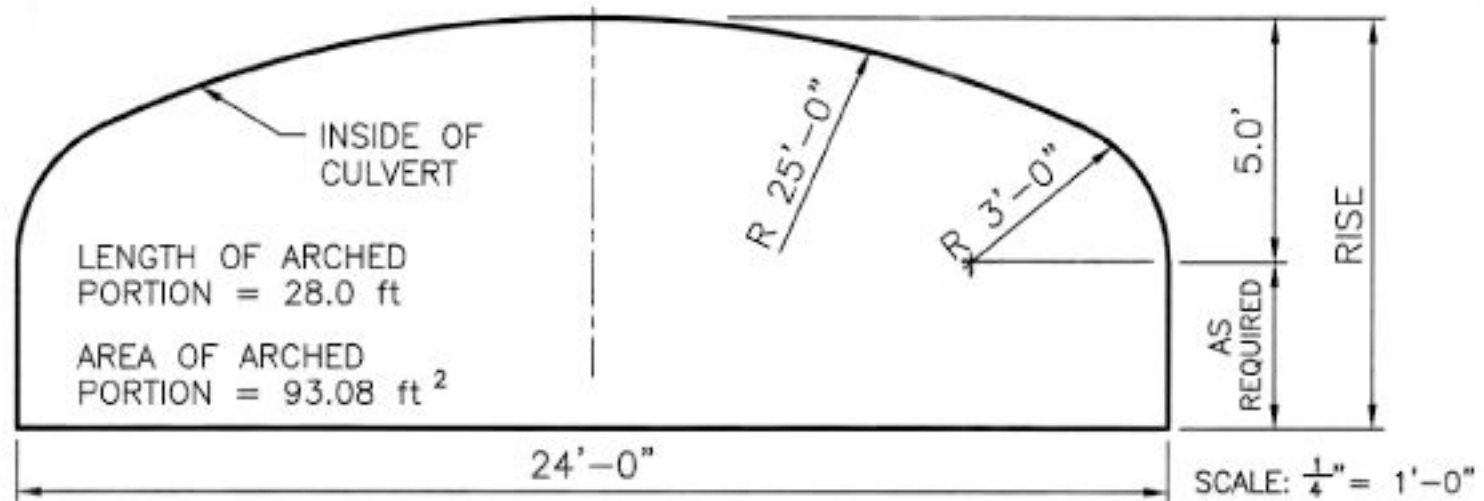
BY: A15 apr 2000

CHD BY: T45 apr 2000

F:\AUTOCAD\FORMS\FORMSTD

CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading



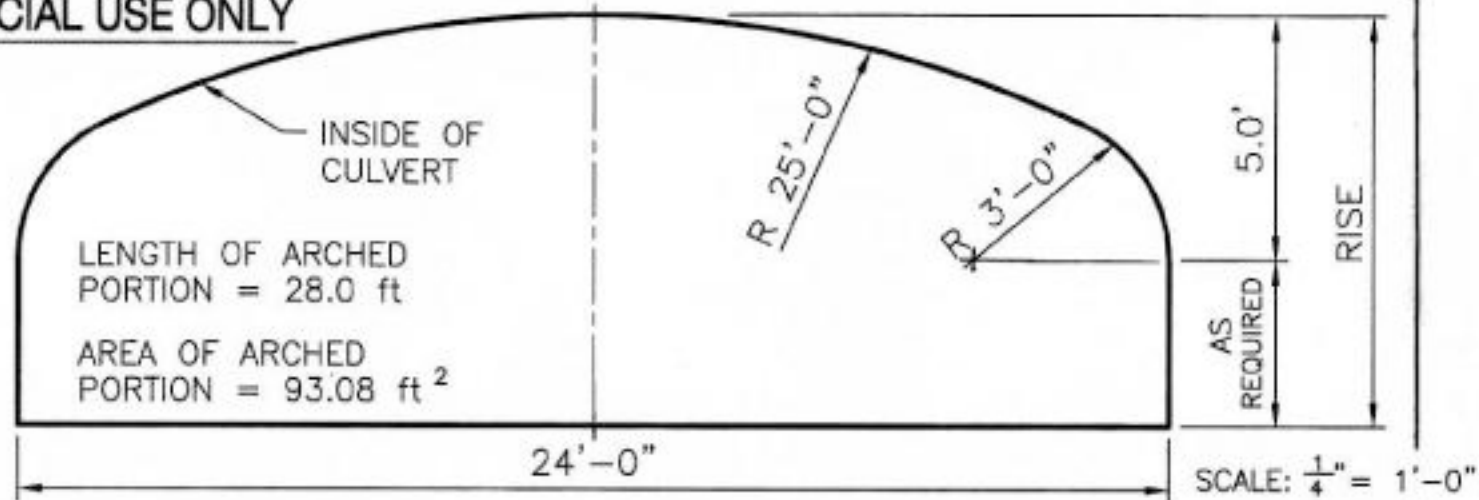
24' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	^{2/3} AR	COMMENTS
5'-0"	93.1	52.0	1.8	137.2	
5'-6"	105.1	53.0	2.0	165.8	
6'-0"	117.1	54.0	2.2	196.0	
6'-6"	129.1	55.0	2.3	227.8	
7'-0"	141.1	56.0	2.5	261.0	
7'-6"	153.1	57.0	2.7	295.6	
8'-0"	165.1	58.0	2.8	331.7	
8'-6"	177.1	59.0	3.0	368.7	
9'-0"	189.1	60.0	3.2	406.7	
9'-6"	201.1	61.0	3.3	445.6	
10'-0"	213.1	62.0	3.4	485.5	
10'-6"	225.1	63.0	3.6	526.0	
11'-0"	237.1	64.0	3.7	568.0	

CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

FOR OFFICIAL USE ONLY



24' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	^{2/3} AR	Wall(1) Shotcrete (CY/ft)	Arch+Wall Concrete(1) (CY/ft)	Floor Concrete(2) (CY/ft)	Total Yds (CY/ft)	Total Reinf(3) (lb/ft)
5'-0"	93.1	52.0	1.8	137.2	0.00	0.72	0.63	1.35	109
5'-6"	105.1	53.0	2.0	165.8	0.02	0.74	0.63	1.37	111
6'-0"	117.1	54.0	2.2	196.0	0.05	0.77	0.63	1.40	113
6'-6"	129.1	55.0	2.3	227.8	0.07	0.79	0.63	1.42	115
7'-0"	141.1	56.0	2.5	261.0	0.10	0.81	0.63	1.44	117
7'-6"	153.1	57.0	2.7	295.6	0.12	0.84	0.63	1.47	119
8'-0"	165.1	58.0	2.8	331.7	0.15	0.86	0.63	1.49	121
8'-6"	177.1	59.0	3.0	368.7	0.17	0.89	0.63	1.52	123
9'-0"	189.1	60.0	3.2	406.7	0.20	0.91	0.63	1.54	125
9'-6"	201.1	61.0	3.3	445.6	0.22	0.94	0.63	1.57	127
10'-0"	213.1	62.0	3.4	485.5	0.25	0.96	0.63	1.59	129
10'-6"	225.1	63.0	3.6	526.0	0.27	0.99	0.63	1.62	131
11'-0"	237.1	64.0	3.7	568.0	0.30	1.01	0.63	1.64	133

1) Arch & wall shotcrete thickness = 8"

2) Floor avg thickness = 8"

3) Reinf. avg. wt/ft³ = 3.0 lb/ft³ (assumed)

BY: ATS apr 2000

CHKD BY: TAG apr 2000

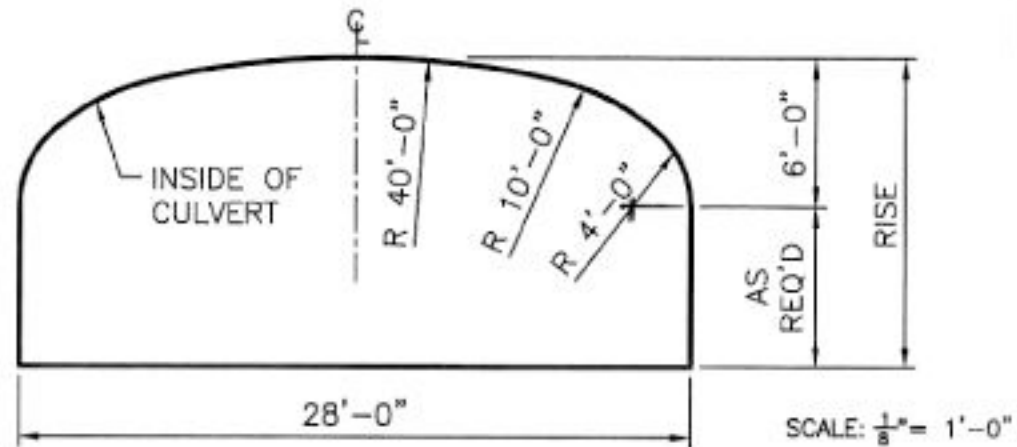
F:\AUTOCAD\FORMS\FORMSTD

CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

LENGTH OF ARCHED
PORTION = 33.3 ft

AREA OF ARCHED
PORTION = 138 ft²



28' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	^{2/3} AR	COMMENTS
5'-0"	110.0	59.3	1.9	166.0	
5'-6"	124.0	60.3	2.1	200.4	
6'-0"	138.0	61.3	2.3	236.9	
6'-6"	152.0	62.3	2.4	275.3	
7'-0"	166.0	63.3	2.6	315.5	
7'-6"	180.0	64.3	2.8	357.3	
8'-0"	194.0	65.3	3.0	400.6	
8'-6"	208.0	66.3	3.1	445.4	
9'-0"	222.0	67.3	3.3	491.5	
9'-6"	236.0	68.3	3.5	538.9	
10'-0"	250.0	69.3	3.6	587.5	
10'-6"	264.0	70.3	3.8	637.3	
11'-0"	278.0	71.3	3.9	688.1	

- 1) Arch & wall shotcrete thickness = 9"
- 2) Floor avg thickness = 9"
- 3) Reinf. avg. wt/ft³ = 3.0 lb/ft³ (assumed)

BY: JTS apr 2003

CHKD BY: TAS apr 20

F:\AUTOCAD\FORMS\FORMSTD

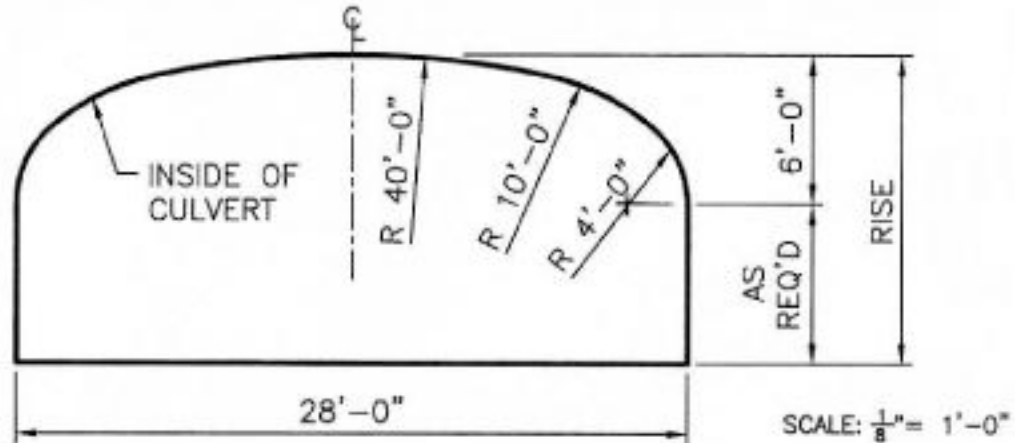
CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

FOR OFFICIAL USE ONLY

LENGTH OF ARCH
PORTION = 33.3 ft

AREA OF ARCHED
PORTION = 138 ft²



28' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	AR ^{2/3}	Wall(1) Shotcrete (CY/ft)	Arch+Wall Concrete(1) (CY/ft)	Floor Concrete(2) (CY/ft)	Total Yds (CY/ft)	Total Reinf(3) (lb/ft)
5'-0"	110.0	59.3	1.9	166.0	0.00	0.87	0.82	1.69	137
5'-6"	124.0	60.3	2.1	200.4	0.03	0.90	0.82	1.72	139
6'-0"	138.0	61.3	2.3	236.9	0.06	0.93	0.82	1.75	141
6'-6"	152.0	62.3	2.4	275.3	0.08	0.95	0.82	1.77	144
7'-0"	166.0	63.3	2.6	315.5	0.11	0.98	0.82	1.80	146
7'-6"	180.0	64.3	2.8	357.3	0.14	1.01	0.82	1.83	148
8'-0"	194.0	65.3	3.0	400.6	0.17	1.04	0.82	1.86	150
8'-6"	208.0	66.3	3.1	445.4	0.19	1.06	0.82	1.88	153
9'-0"	222.0	67.3	3.3	491.5	0.22	1.09	0.82	1.91	155
9'-6"	236.0	68.3	3.5	538.9	0.25	1.12	0.82	1.94	157
10'-0"	250.0	69.3	3.6	587.5	0.28	1.15	0.82	1.97	159
10'-6"	264.0	70.3	3.8	637.3	0.31	1.18	0.82	2.00	162
11'-0"	278.0	71.3	3.9	688.1	0.33	1.20	0.82	2.02	164

1) Arch & wall shotcrete thickness = 9"

2) Floor avg thickness = 9"

3) Reinf. avg. wt/ft³ = 3.0 lb/ft³ (assumed)

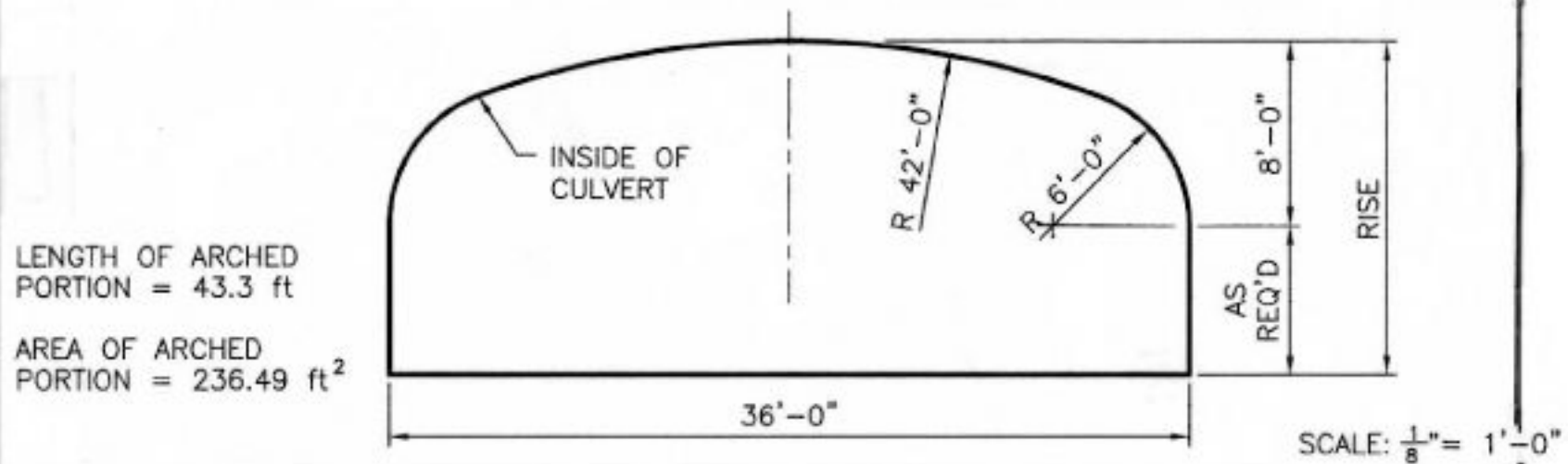
BY: ATS apr 2000

CHKD BY: TAG apr 2001

F:\AUTOCAD\FORMS\FORMSTD

CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading



36' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

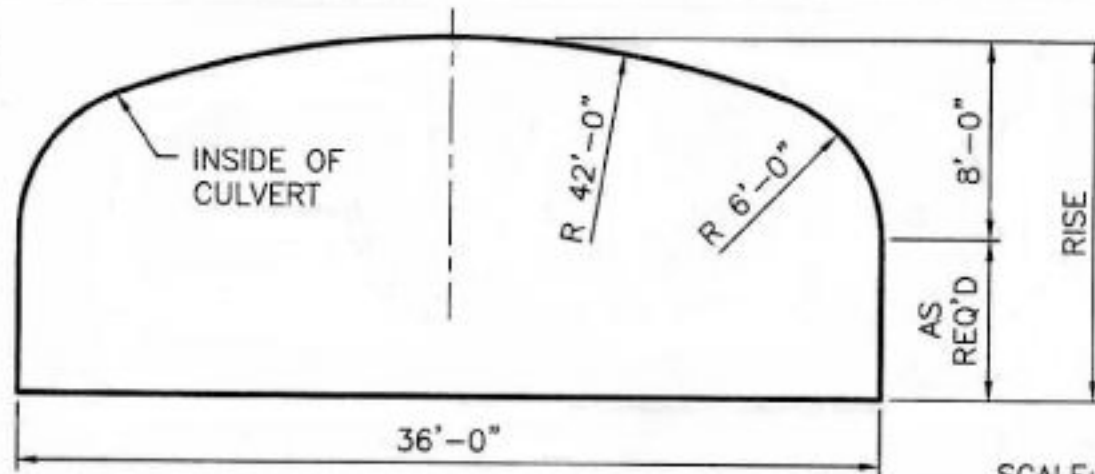
Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	AR ^{2/3}	COMMENTS
8'-0"	236.5	79.3	3.0	489.6	
8'-6"	254.5	80.3	3.2	548.7	
9'-0"	272.5	81.3	3.4	609.8	
9'-6"	290.5	82.3	3.5	672.9	
10'-0"	308.5	83.3	3.7	737.8	
10'-6"	326.5	84.3	3.9	804.5	
11'-0"	344.5	85.3	4.0	872.8	
11'-6"	362.5	86.3	4.2	942.8	
12'-0"	380.5	87.3	4.4	1014.2	
12'-6"	398.5	88.3	4.5	1087.1	
13'-0"	416.5	89.3	4.7	1161.4	
13'-6"	434.5	90.3	4.8	1237.0	
14'-0"	452.5	91.3	5.0	1313.9	

CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

FOR OFFICE USE ONLY

LENGTH OF ARCHED PORTION = 43.3 ft
 AREA OF ARCHED PORTION = 236.49 ft²



SCALE: $\frac{1}{8}'' = 1'-0''$

36' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	^{2/3} AR	Wall(1) Shotcrete (CY/ft)	Arch+Wall Concrete(1) (CY/ft)	Floor Concrete(2) (CY/ft)	Total Yds (CY/ft)	Total Reinf(3) (lb/ft)
8'-0"	236.5	79.3	3.0	489.6	0.00	1.38	1.16	2.54	206
8'-6"	254.5	80.3	3.2	548.7	0.03	1.41	1.16	2.57	208
9'-0"	272.5	81.3	3.4	609.8	0.06	1.44	1.16	2.60	211
9'-6"	290.5	82.3	3.5	672.9	0.09	1.47	1.16	2.63	213
10'-0"	308.5	83.3	3.7	737.8	0.12	1.50	1.16	2.66	216
10'-6"	326.5	84.3	3.9	804.5	0.15	1.53	1.16	2.69	218
11'-0"	344.5	85.3	4.0	872.8	0.19	1.57	1.16	2.73	221
11'-6"	362.5	86.3	4.2	942.8	0.22	1.60	1.16	2.76	223
12'-0"	380.5	87.3	4.4	1014.2	0.25	1.63	1.16	2.79	226
12'-6"	398.5	88.3	4.5	1087.1	0.28	1.66	1.16	2.82	228
13'-0"	416.5	89.3	4.7	1161.4	0.31	1.69	1.16	2.85	231
13'-6"	434.5	90.3	4.8	1237.0	0.34	1.72	1.16	2.88	233
14'-0"	452.5	91.3	5.0	1313.9	0.37	1.75	1.16	2.91	236

1) Arch & Wall Shotcrete Thickness = 10"

2) Floor Avg Thickness = 10"

3) Reinf. Avg. Wt/ft³ = 3.0 lb/ft³ (assumed)

BY MJC DEC 98

CHKD BY: TAG DEC 98

CON-ARCH STANDARD FORMS

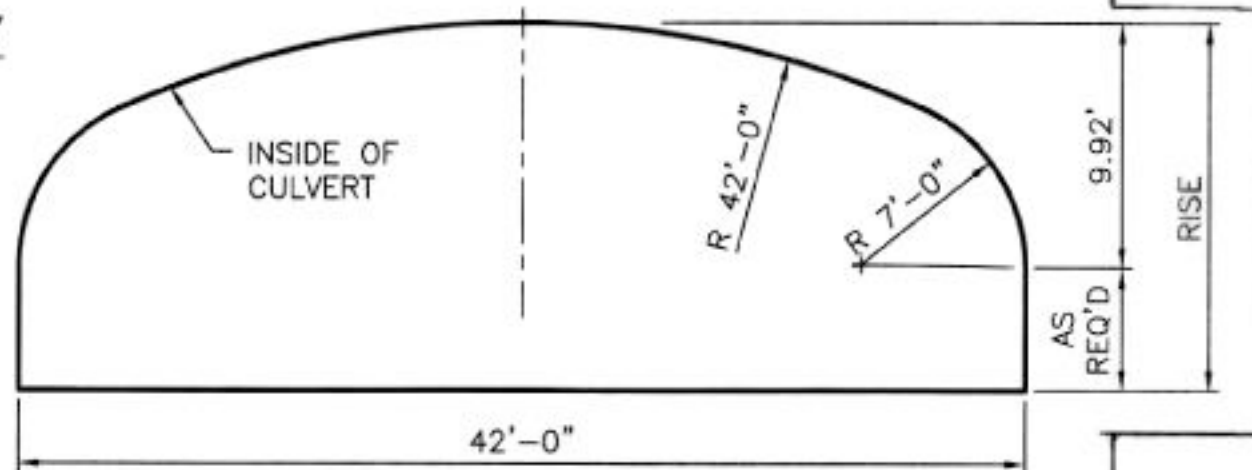
Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

FOR OFFICE USE ONLY

LENGTH OF ARCH
PORTION = 50.8 ft

AREA OF ARCH
PORTION = 333.63 ft²

SCALE: $\frac{1}{8}'' = 1'-0''$



42' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	^{2/3} AR	Wall(1) Shotcrete (CY/ft)	Arch+Wall Concrete(1) (CY/ft)	Floor Concrete(2) (CY/ft)	Total Yds (CY/ft)	Total Reinf(3) (lb/ft)
9'-11"	334	92.8	3.60	782.3	0.00	1.940	1.63	3.57	289
10'-0"	337	93.0	3.63	794.5	0.01	1.946	1.63	3.57	290
10'-6"	358	94.0	3.81	872.5	0.04	1.983	1.63	3.61	293
11'-0"	379	95.0	3.99	952.7	0.08	2.020	1.63	3.65	296
11'-6"	400	96.0	4.17	1035.0	0.12	2.057	1.63	3.69	299
12'-0"	421	97.0	4.34	1119.3	0.15	2.094	1.63	3.72	302
12'-6"	442	98.0	4.51	1205.6	0.19	2.131	1.63	3.76	305
13'-0"	463	99.0	4.68	1293.8	0.23	2.168	1.63	3.80	308
13'-6"	484	100.0	4.84	1383.7	0.27	2.205	1.63	3.83	311
14'-0"	505	101.0	5.00	1475.4	0.30	2.242	1.63	3.87	314
14'-6"	526	102.0	5.16	1568.7	0.34	2.279	1.63	3.91	317
15'-0"	547	103.0	5.31	1663.5	0.38	2.316	1.63	3.94	320
15'-6"	568	104.0	5.46	1759.9	0.41	2.353	1.63	3.98	323
16'-0"	589	105.0	5.61	1857.8	0.45	2.390	1.63	4.02	326
16'-6"	610	106.0	5.76	1957.0	0.49	2.427	1.63	4.06	329

1) Arch & wall shotcrete thickness = 12"

2) Floor avg thickness = 12"

BY: ATS apr 2000

CHKD BY: TAG apr 200

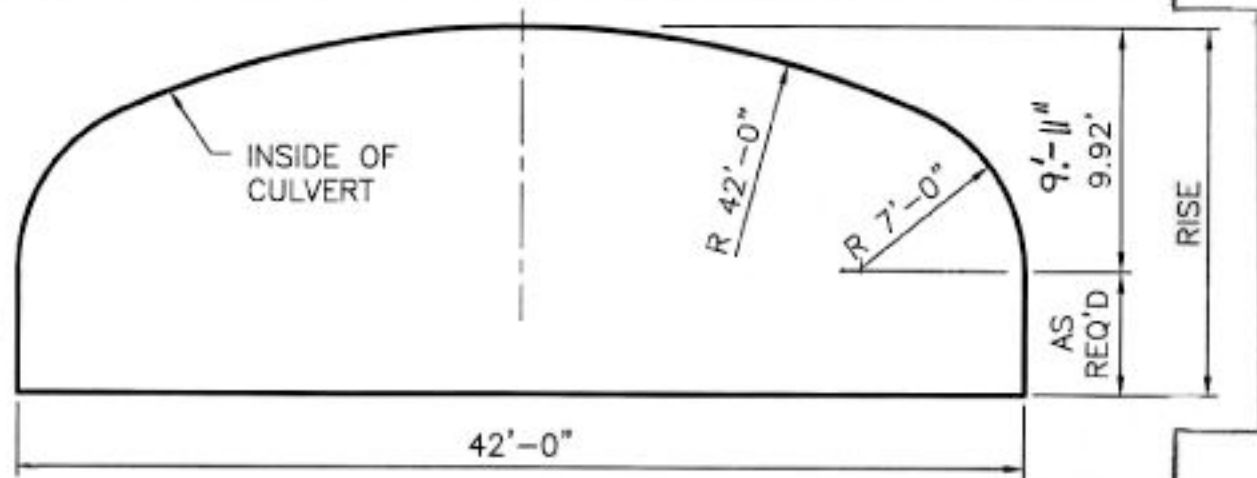
CON-ARCH STANDARD FORMS

Note: Arch Barrel & Side Wall Thickness varies with Rise and Loading

LENGTH OF ARCHED PORTION = 50.8 ft

AREA OF ARCHED PORTION = 333.63 ft²

SCALE: $\frac{1}{8}" = 1'-0"$



42' SPAN ELLIPTICAL ARCH with CONCRETE FLOOR

Rise (ft)	Waterway Area (ft) ²	Wetted Perim. (ft)	Hyd. Radius (ft)	^{2/3} AR	COMMENTS
9'-11"	334	92.8	3.60	783	
10'-0"	337	93.0	3.63	795	
10'-6"	358	94.0	3.81	873	
11'-0"	379	95.0	3.99	953	
11'-6"	400	96.0	4.17	1036	
12'-0"	421	97.0	4.34	1120	
12'-6"	442	98.0	4.51	1206	
13'-0"	463	99.0	4.68	1294	
13'-6"	484	100.0	4.84	1384	
14'-0"	505	101.0	5.00	1476	
14'-6"	526	102.0	5.16	1569	
15'-0"	547	103.0	5.31	1664	
15'-6"	568	104.0	5.46	1761	
16'-0"	589	105.0	5.61	1859	
16'-6"	610	106.0	5.76	1958	