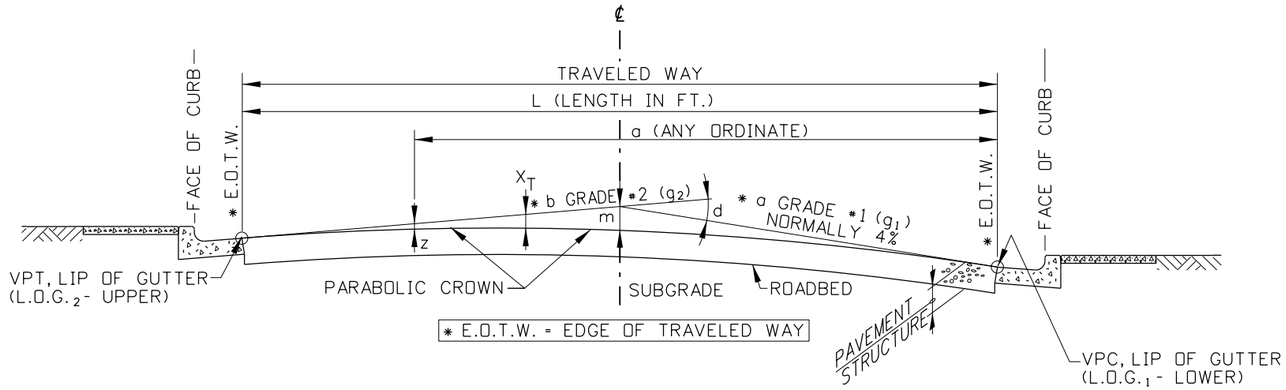
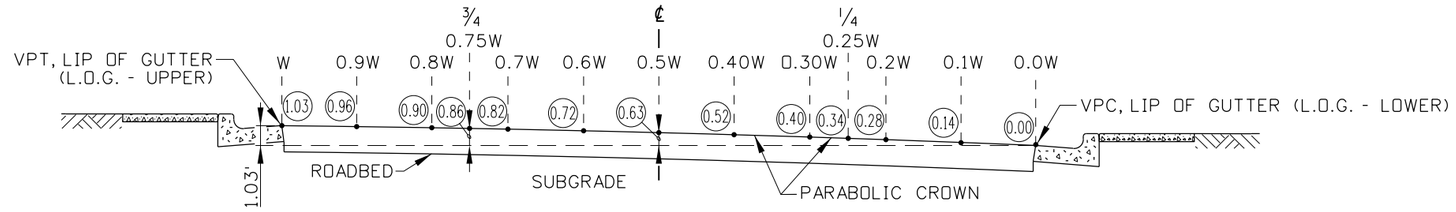


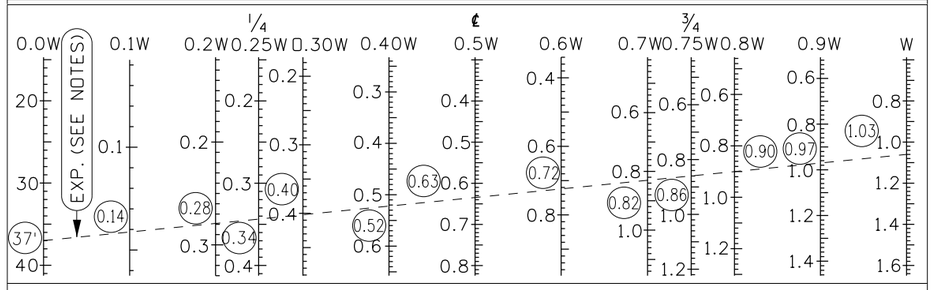
PARABOLIC CROWN FORMULAS LAYOUT

(SEE FORMULA TABLE)



EXAMPLE ELEVATIONS

NOMOGRAPH EXAMPLE



EXAMPLE: AT A GIVEN CROSS-SECTION, ROADWAY WIDTH BETWEEN CURBS IS 40 FT., GUTTER WIDTHS ARE 18 IN., AND THE LIP OF THE LEFT GUTTER IS 1.03 FT HIGHER. WITH STRAIGHT-EDGE (SEE DASHED LINE) AT 37 FT. ON LEFT SCALE AND 1.03 FT. ON RIGHT SCALE, READ AS FOLLOWS:

THE FINISHED ROADWAY SURFACE IS HIGHER THAN THE LIP OF THE RIGHT (LOWER) GUTTER BY 0.14 FT AT 3.7 FT. (OR 0.1 OF WIDTH) FROM LIP OF RIGHT GUTTER, 0.28 FT. AT 7.4 FT., 0.34 FT. AT 9.25 FT. (QUARTER POINT), 0.40 AT 11.1 FT., 0.52 FT. AT 14.8 FT., 0.63 FT. AT 18.5 FT. (*) 0.72 FT. AT 22.2 FT., 0.82 FT. AT 25.9 FT., 0.86 FT. AT 27.75 FT., (THREE QUARTERS POINT), 0.90 FT. AT 29.6 FT., 0.97 FT. AT 33.3 FT., AND 1.03 FT. AT 37 FT. (LIP OF LEFT GUTTER). DISTANCES OUT FROM LOWER GUTTER MAY BE ROUNDED TO THE NEAREST FOOT WITHOUT APPRECIABLE ERROR.

PARABOLIC CROWN FORMULAS

GRADE #1	$g_1 = .04$ (4% NORMALLY)
GRADE #2	$g_2 = \left[\left(L.O.G._2 - L.O.G._1\right) - \left(\frac{L}{2}\right) g_1 \Big/ \frac{L}{2}\right]$
GRADE DIFFERENCE	$d = (g_2 - g_1)$
MIDDLE ORDINATE	$m = \frac{dL}{8}$
COEFFICIENT	$k = \frac{L}{d}$
ANY ORDINATE	$z = \frac{ma^2}{(1/2)^2}$ OR $z = \frac{da^2}{2L}$
HIGH POINT	$X_T = g_1 k$
ELEVATION AT PT.	$E = [a\,(g_1) - z] + L.O.G._1$

DEFINITION OF TERMS

g_1	RATE OF GRADE #1 (HUNDREDTH'S/FT.)
g_2	RATE OF GRADE #2 (HUNDREDTH'S/FT.)
L.O.G.$_1$	LIP OF GUTTER ELEV. (LOW SIDE)
L.O.G.$_2$	LIP OF GUTTER ELEV. (HIGH SIDE)
E	ELEVATION AT ANY POINT ON THE PARABOLIC CROWN
k	COEFFICIENT
X_T	HIGH POINT
m	MIDORDINATE (FT.)
z	ANY ORDINATE (FT.)
d	TOTAL CHANGE, ALGEBRAIC DIFFERENCE (ALWAYS "+") OF GRADES (PERCENT)
L	LENGTH OF PARABOLIC CURVE (FT.)
a	DISTANCE (FT.) FROM VPC TO ANY ORDINATE "z"
VPC	VERTICAL POINT OF CURVE (LOWER L.O.G.$_1$)
VPT	VERTICAL POINT OF TANGENT (UPPER L.O.G.$_2$)

NOTES

1. GENERAL INFORMATION: THE GRADE (g_1) TANGENT FROM THE LOWER LIP OF GUTTER (VPC) IS NORMALLY +4%. THE GRADE (g_2) FROM THE HIGHER LIP OF GUTTER (VPT) TO THE (VPI) IS CALCULATED (NOTE: THE GRADES MEET AT CENTERLINE).

2. OTHER METHODS: THE EXAMPLES SHOWN TO INSTALL A PARABOLIC CROWN (BY USING THE NOMOGRAPH OR CALCULATED USING THE FORMULAS) ARE THE IDAHO TRANSPORTATION's TRADITIONAL INSTALLATION METHODS, OTHER METHODS ARE PERMITTED PROVIDED A SOUND ENGINEERING PRACTICE IS EMPLOYED. ORDINARY CROWN OR SHED SECTIONS BETWEEN LIPS OF GUTTERS ARE NOT RECOMMENCED AND SHOULD ONLY BE USED WITH AN ENGINEER'S APPROVAL.

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

ORIGINAL SIGNED BY: TED E. MASON DATE ORIGINAL SIGNED: OCTOBER 26, 2010

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-05	MSM						
2	09-10	PLR						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: a10_1010.dgn

DRAWING DATE: JULY, 2003

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

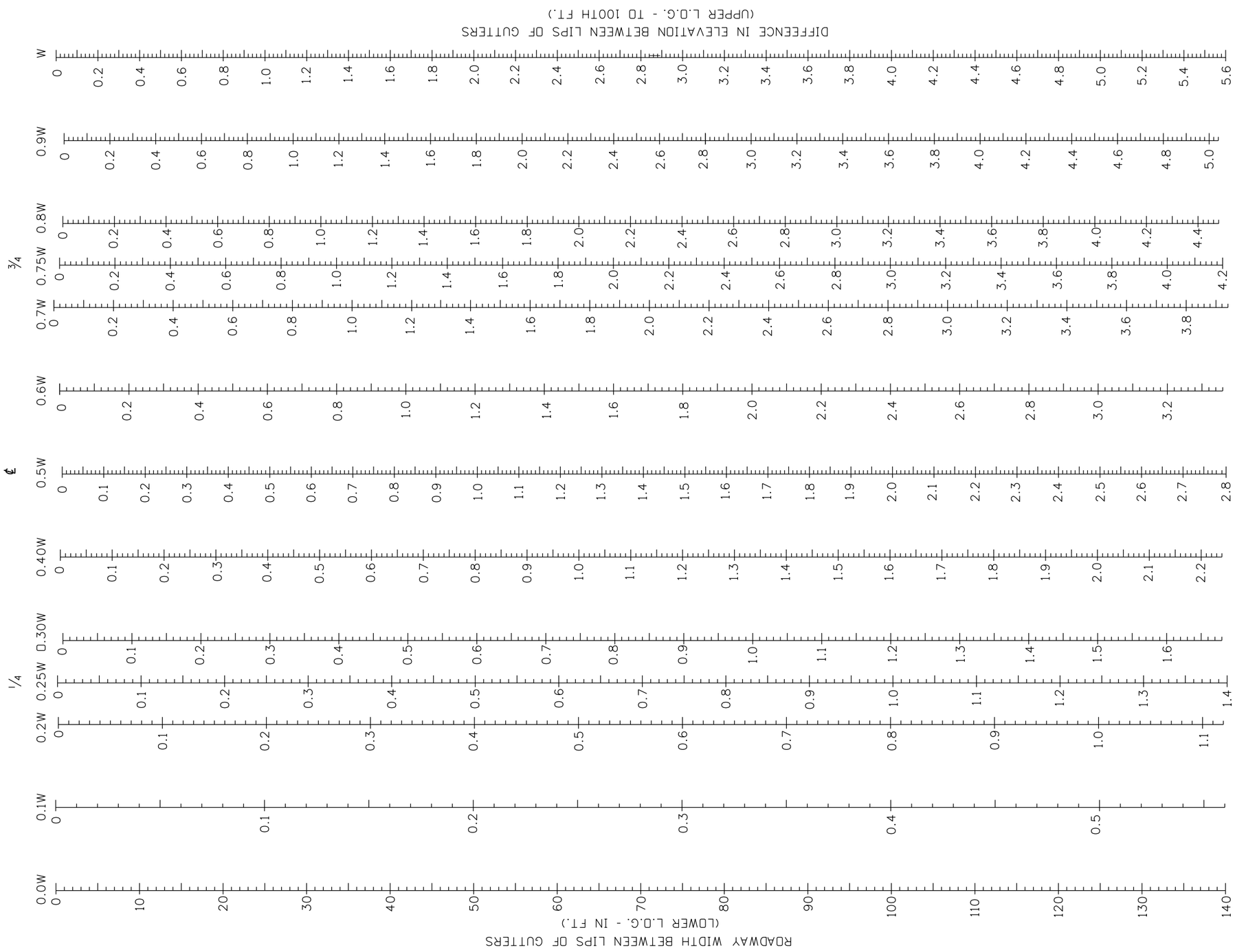
PARABOLIC CROWN

REQUIRES SHEETS 2 OF 2

English

STANDARD DRAWING NO. A-10

SHEET 1 OF 2



NOMOGRAPH

INSTRUCTIONS:

1. PLACE A STRAIGHT-EDGE ON THE LEFT-HAND SCALE, "ROADWAY WIDTH BETWEEN LIPS OF GUTTERS".
2. PLACE THE OPPOSITE END OF THE STRAIGHT-EDGE ON THE RIGHT-HAND SCALE, "DIFFERENCE IN ELEVATION BETWEEN LIPS OF GUTTERS".
3. READ THE INTERMEDIATE SCALES ACROSS THE STRAIGHT-EDGE WHICH ARE THE HEIGHTS OF ROADWAY SURFACE ABOVE THE LOWER LIP OF GUTTER. INTERPRET ION OF THE INTERMEDIATE SCALES ARE AT TENTHS AND QUARTERS OF THE ROADWAY WIDTH "W" (SEE "NOMOGRAPH EXAMPLE" ON SHEET 2 OF 2).

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

ORIGINAL SIGNED BY: TED E. MASON
DATE ORIGINAL SIGNED: OCTOBER 26, 2010

REVISIONS

NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	03-05	MSM						
2	09-10	PLR						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: a10_1010.dgn

DRAWING DATE: JULY, 2003

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
ASSISTANT CHIEF ENGINEER (DEVELOPMENT)
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

PARABOLIC CROWN

REQUIRES SHEETS 1 OF 2

English

STANDARD DRAWING NO.

A-10

SHEET 2 OF 2