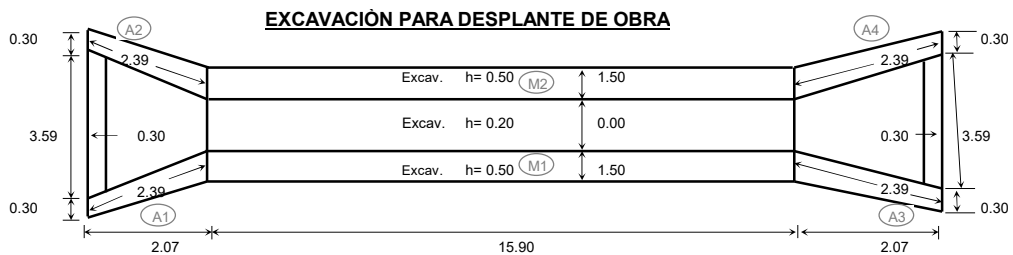


CAMINO: MONTERREY - COLOMBIA
 TRAMO: LA GLORIA - COLOMBIA
 ALCANTARILLA DE LOSA : DE 1.20 X 1.20 X 15.90
 ESTACION DE OBRA : 216+483.30 ESVIAJE NORMAL EN TANGENTE



EN MUROS = 23.86 M3

VM 1	=	15.90	X	1.50	X	0.50	=	11.93	M3
VM2	=	15.90	X	1.50	X	0.50	=	11.93	M3

EN ALEROS = 3.72 M3

VA1	=	((1.50	+	0.30)	/	2.00)	X	2.07)	X	0.50	=	0.93	M3
VA2	=	((1.50	+	0.30)	/	2.00)	X	2.07)	X	0.50	=	0.93	M3
VA3	=	((1.50	+	0.30)	/	2.00)	X	2.07)	X	0.50	=	0.93	M3
VA4	=	((1.50	+	0.30)	/	2.00)	X	2.07)	X	0.50	=	0.93	M3

EN PLANTILLA = 1.48 M3

VM	=	15.90	X	0.00	X	0.20	=	0.00	M3				
VI	=	((3.59	+	0.00	/	2.00)	X	2.07)	X	0.20	=	0.74	M3
VD	=	((3.59	+	0.00	/	2.00)	X	2.07)	X	0.20	=	0.74	M3

EN DENTELLONES = 0.64 M3

VI	=	3.59	X	0.30	X	0.30	=	0.32	M3
VD	=	3.59	X	0.30	X	0.30	=	0.32	M3

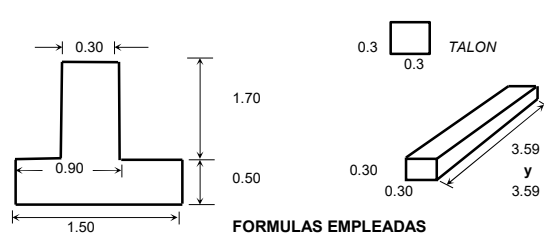
VOLUMEN TOTAL = 23.86 + 3.72 + 1.48 + 0.64

VOLUMEN TOTAL = 30 M3

CAMINO: MONTERREY - COLOMBIA
 TRAMO: LA GLORIA - COLOMBIA
 ALCANTARILLA DE LOSA : DE 1.20 X 1.20 X 15.90
 ESTACION DE OBRA : 216+483.30 ES VIAJE NORMAL EN TANGENTE

CONCRETO SIMPLE DE F'c = 200 KG/CM2

EN MUROS, ALEROS Y DENTELLONES

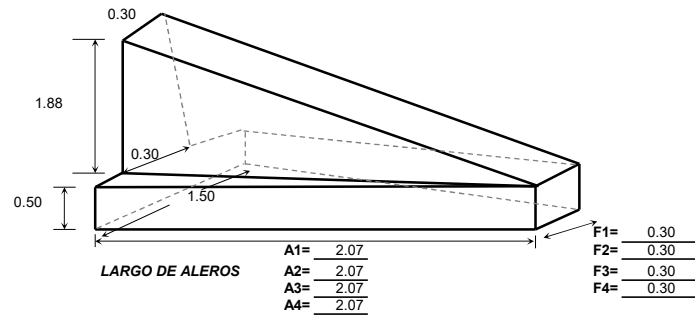


FORMULAS EMPLEADAS

CUBO: $V = L \times L \times L$

RECTANGULO: $V = (b \times h) \times H$

TRIANGULO: $V = (b \times h) / 2 \times H$



EN MUROS = 42.93 M3

$$\begin{aligned} VM &= ((1.50 \times 0.50) + ((1.70 \times 0.30) \times 15.90)) \times 2.00 = 40.07 \text{ M3} \\ VTAL &= 0.30 \times 0.30 \times 2.00 = 2.86 \text{ M3} \end{aligned}$$

EN ALEROS = 6.08 M3

$$\begin{aligned} VA1 &= (((1.50 + 0.30) / 2.00) \times 2.07) \times 0.50 + ((2.07 \times 1.88) / 2.00) \times ((0.30 + 0.30 + 0.30) / 3.00) = 1.52 \text{ M3} \\ VA2 &= (((1.50 + 0.30) / 2.00) \times 2.07) \times 0.50 + ((2.07 \times 1.88) / 2.00) \times ((0.30 + 0.30 + 0.30) / 3.00) = 1.52 \text{ M3} \\ VA3 &= (((1.50 + 0.30) / 2.00) \times 2.07) \times 0.50 + ((2.07 \times 1.88) / 2.00) \times ((0.30 + 0.30 + 0.30) / 3.00) = 1.52 \text{ M3} \\ VA4 &= (((1.50 + 0.30) / 2.00) \times 2.07) \times 0.50 + ((2.07 \times 1.88) / 2.00) \times ((0.30 + 0.30 + 0.30) / 3.00) = 1.52 \text{ M3} \end{aligned}$$

EN DENTELLONES = 0.64 M3

$$\begin{aligned} VI &= 0.30 \times 0.30 \times 3.59 = 0.32 \text{ M3} \\ VD &= 0.30 \times 0.30 \times 3.59 = 0.32 \text{ M3} \end{aligned}$$

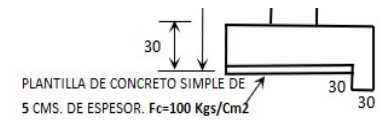
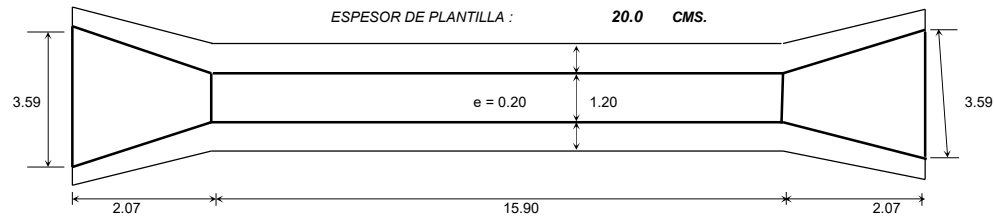
$$VOLUMEN \text{ TOTAL} = 42.93 + 6.08 + 0.64$$

$$VOLUMEN \text{ TOTAL} = 49.46 \text{ M3}$$

CON DESCUENTO DE ACERO

CAMINO: MONTERREY - COLOMBIA
 TRAMO: LA GLORIA - COLOMBIA
 ALCANTARILLA DE LOSA : DE 1.20 X 1.20 X 15.90
 ESTACION DE OBRA : 216+483.30 ESVIAJE NORMAL EN TANGENTE

CONCRETO SIMPLE DE $F_c = 100 \text{ KGS/CM}^2$

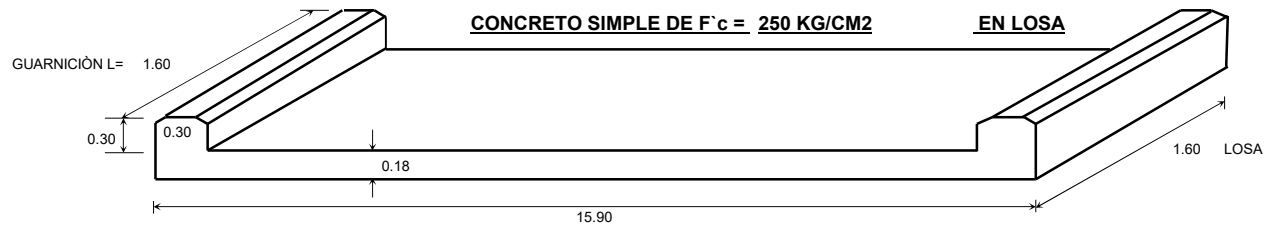


EN PLANTILLA = 8.80 M3											
VAM	=	15.90	X	1.20	X	0.20	=	3.82	M3		
VPLA	=	20.04	X	1.50	X	0.05	X	2.00	=	3.01	M3
VA1	=	((3.59	+	1.20)	/	2.00)	X	2.07)	X	0.20	= 0.99 M3
VA2	=	((3.59	+	1.20)	/	2.00)	X	2.07)	X	0.20	= 0.99 M3
VOLUMEN TOTAL = 3.82 + 3.01 + 0.99 + 0.99											
VOLUMEN TOTAL = 8.80 M3											

CAMINO: MONTERREY - COLOMBIA
 TRAMO: LA GLORIA - COLOMBIA

ALCANTARILLA DE LOSA :
 ESTACION DE OBRA : 216+483.30

DE 1.20 X 1.20 X 15.90
 ESVAJE NORMAL EN TANGENTE
 CONCRETO SIMPLE DE F'c = 250 KG/CM2 EN LOSA



EN LOSA = 4.58 M3
 V = 15.90 X 1.60 X 0.18 = 4.58 M3

EN GUARNICIONES = 0.29 M3
 V = 0.30 X 0.30 X 1.60 X 2.00 = 0.29 M3

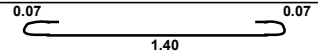
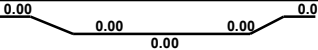
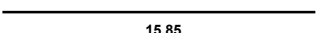
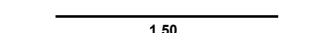
VOLUMEN TOTAL = 4.58 + 0.29

VOLUMEN TOTAL = 4.87 M3 - 0.05 = 4.82 M3

CON DESCUENTO DE ACERO

CAMINO: MONTERREY - COLOMBIA
TRAMO: LA GLORIA - COLOMBIA
ALCANTARILLA DE LOSA : DE 1.20 X 1.20 X 15.90
ESTACION DE OBRA : 216+483.30 ESVAJE NORMAL EN TANGENTE

ACERO DE REFUERZO PARA LOSA

LISTA DE VARILLAS Y PESOS						
DESIGNACION	NUMERO	DIAMETRO	CROQUIS	LONGITUD	ESPACIO	PESO (KG)
VARILLAS " A "	159	4		1.54	0.100 Y 0.200	245
VARILLAS " B "	0	0		0.00	0.000	0
VARILLAS " C "	10	4		15.85	0.200	159
VARILLAS " D "	0	0		0.00	0.000	0
VARILLAS " E "	0	0		0.00	0.000	0
VARILLAS " F "	4	4		1.50	0.100	6

VARILLAS	"A"	159	X	1.54	X	1.000	=	245	KGS.
VARILLAS	"B"	0	X	0.00	X	0.000	=	0	KGS.
VARILLAS	"C"	10	X	15.85	X	1.000	=	159	KGS.
VARILLAS	"D"	0	X	0.00	X	0.000	=	0	KGS.
VARILLAS	"E"	0	X	0.00	X	0.000	=	0	KGS.
VARILLAS	"F"	4	X	1.50	X	1.000	=	6	KGS.

VARILLAS	"A"	245	KGS.
VARILLAS	"B"	0	KGS.
VARILLAS	"C"	159	KGS.
VARILLAS	"D"	0	KGS.
VARILLAS	"E"	0	KGS.
VARILLAS	"F"	6	KGS.

PESO TOTAL	410	KGS.
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CAMINO: MONTERREY - COLOMBIA
TRAMO: LA GLORIA - COLOMBIA
ALCANTARILLA DE LOSA : DE 1.20 X 1.20 X 15.90
ESTACION DE OBRA : 216+483.30 ESVIAJE NORMAL EN TANGENTE

DESCUENTO DE ACERO DE REFUERZO A CONCRETO SIMPLE EN LOSA DE 250 KG/CM2

VARILLAS	"A"	159	X	1.54	X	1.000	=	245	KGS.
VARILLAS	"B"	0	X	0.00	X	0.000	=	0	KGS.
VARILLAS	"C"	10	X	15.85	X	1.000	=	159	KGS.
VARILLAS	"D"	0	X	0.00	X	0.000	=	0	KGS.
VARILLAS	"E"	0	X	0.00	X	0.000	=	0	KGS.
VARILLAS	"F"	4	X	1.50	X	1.000	=	6	KGS.

VARILLAS	"A"	245	KGS.
VARILLAS	"B"	0	KGS.
VARILLAS	"C"	159	KGS.
VARILLAS	"D"	0	KGS.
VARILLAS	"E"	0	KGS.
VARILLAS	"F"	6	KGS.

PESO TOTAL 410 KGS.

Tipo de varillas	Diametro	Area de Acero en (m2)	Numero de Varillas	Longitud (m)	Volumen (m3)
A	4	0.000127	159	1.54	0.03
B	0	0	0	0.00	0.00
C	4	0.000127	10	15.85	0.02
D	0	0.000000	0	0.00	0.00
E	0	0.000000	0	0.00	0.00
F	4	0.000127	4	1.50	0.00

0.05 POR LOSA

VOLUMEN DE ACERO EN MUROS 0.24 EN MUROS

VOLUMEN TOTAL DE DESCUENTO EN LOSA Y MUROS = 0.29 M3

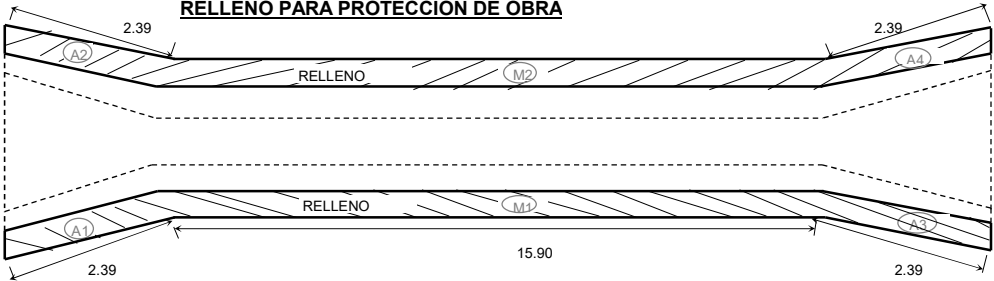
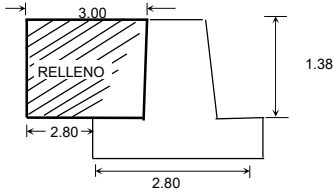
VAR. No.	DIAM.	PLGS.	AREA (CM2)	PESO (KG)
2.5	0.79	5/16"	0.49	0.384
3	0.95	3/8"	0.71	0.560
4	1.27	1/2"	1.27	1.000
5	1.59	5/8"	1.99	1.570
6	1.91	3/4"	2.87	2.260
7	2.22	7/8"	3.87	3.070
8	2.54	1"	5.07	4.000
9	2.86	1 1/8"	6.42	5.100
10	3.18	1 1/4"	7.94	6.300
11	3.49	1 3/8"	9.56	7.600
12	3.81	1 1/2"	11.40	9.000

DENSIDAD DEL ACERO
7,860 KGS/M3

CAMINO: MONTERREY - COLOMBIA
TRAMO: LA GLORIA - COLOMBIA
ALCANTARILLA DE LOSA :
ESTACION DE OBRA :

DE 1.20 X 1.20 X 15.90
ESVIAJE NORMAL EN TANGENTE

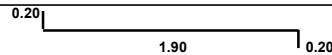
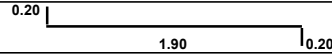
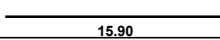
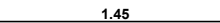
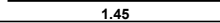
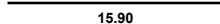
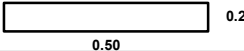
RELLENO PARA PROTECCIÓN DE OBRA



EN MUROS =		127.26	M3
VM 1y2	=	((2.80 + 3.00) / 2.00) X 1.38 X (15.90) X (2.00)	= 127.26 M3
EN ALEROS =		18.91	M3
VA1	=	((2.39 X 1.38) / 2.00) X (3.00 + 2.80 + 2.80) / 3.00	= 4.73 M3
VA2	=	((2.39 X 1.38) / 2.00) X (3.00 + 2.80 + 2.80) / 3.00	= 4.73 M3
VA3	=	((2.39 X 1.38) / 2.00) X (3.00 + 2.80 + 2.80) / 3.00	= 4.73 M3
VA4	=	((2.39 X 1.38) / 2.00) X (3.00 + 2.80 + 2.80) / 3.00	= 4.73 M3
VOLUMEN TOTAL =		127.26 + 18.91	
VOLUMEN TOTAL		= 146	M3

CAMINO: MONTERREY - COLOMBIA
TRAMO: LA GLORIA - COLOMBIA
ALCANTARILLA DE LOSA : DE 1.20 X 1.20 X 15.90
ESTACION DE OBRA : 216+483.30 ESVAJE NORMAL EN TANGENTE

ACERO DE REFUERZO EN MURO

LISTA DE VARILLAS Y PESOS						
DESIGNACION	NUMERO	DIAMETRO	CROQUIS	LONGITUD	ESPACIO	PESO (KG)
VARILLAS " A "	81	5		2.30	0.200	292.00
VARILLAS " B "	65	3		2.30	0.250	84.00
VARILLAS " C "	17	3		15.90	0.250	151.00
VARILLAS " D "	65	4		1.45	0.250	94.00
VARILLAS " E "	81	4		1.45	0.200	117
VARILLAS " F "	16	3		15.90	0.250	142
VARILLAS " G "	81	3		1.40	0.200	64

VARILLAS	"A"	81	X	2.30	X	1.57	=	292	KGS.
VARILLAS	"B"	65	X	2.30	X	0.56	=	84	KGS.
VARILLAS	"C"	17	X	15.90	X	0.56	=	151	KGS.
VARILLAS	"D"	65	X	1.45	X	1.00	=	94	KGS.
VARILLAS	"E"	81	X	1.45	X	1.00	=	117	KGS.
VARILLAS	"F"	16	X	15.90	X	0.56	=	142	KGS.
VARILLAS	"G"	81	X	1.40	X	0.56	=	64	KGS.

VARILLAS	"A"	292	KGS.
VARILLAS	"B"	84	KGS.
VARILLAS	"C"	151	KGS.
VARILLAS	"D"	94	KGS.
VARILLAS	"E"	117	KGS.
VARILLAS	"F"	142	KGS.
VARILLAS	"F"	64	KGS.

PESO TOTAL	944	X	2	=	1,888	KGS.
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