# CONTENIDO

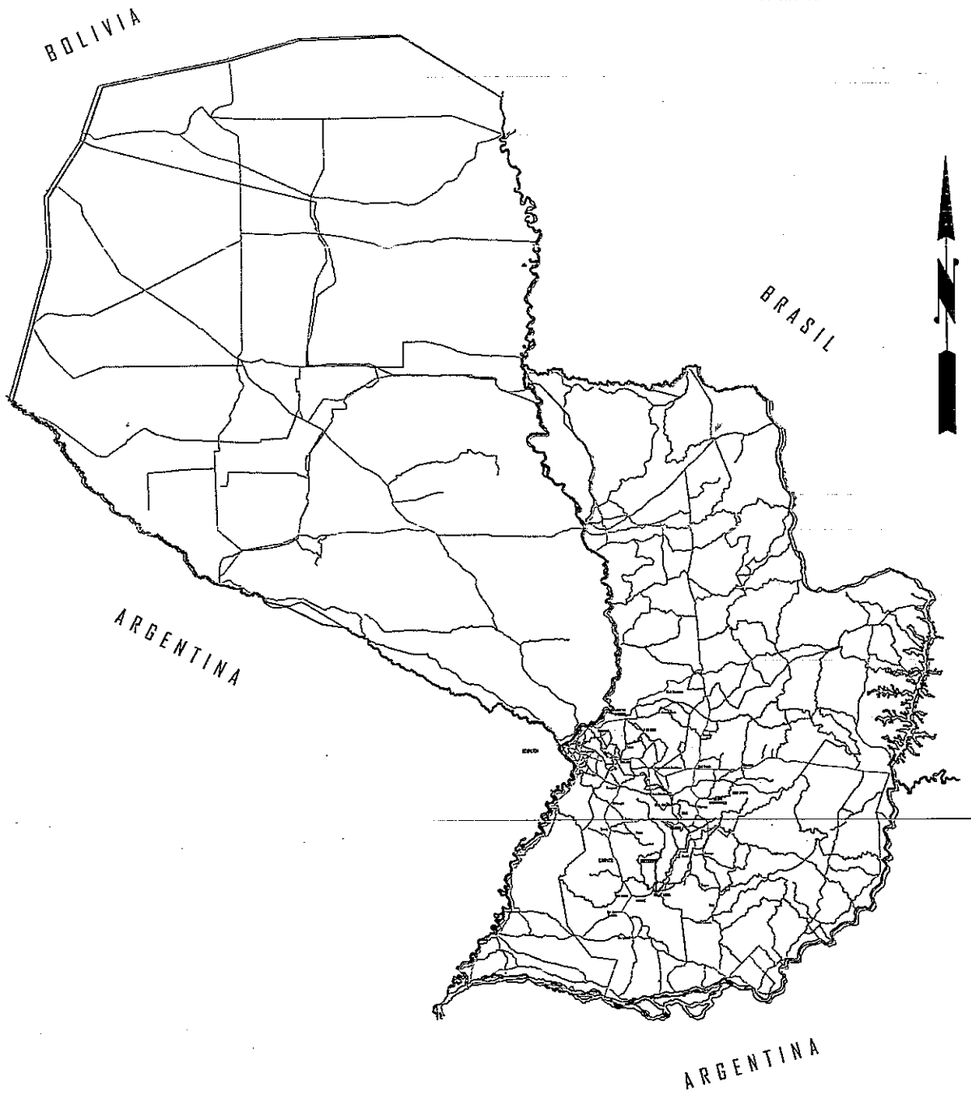
PAG. 02 PLANO GENERAL DE UBICACIÓN

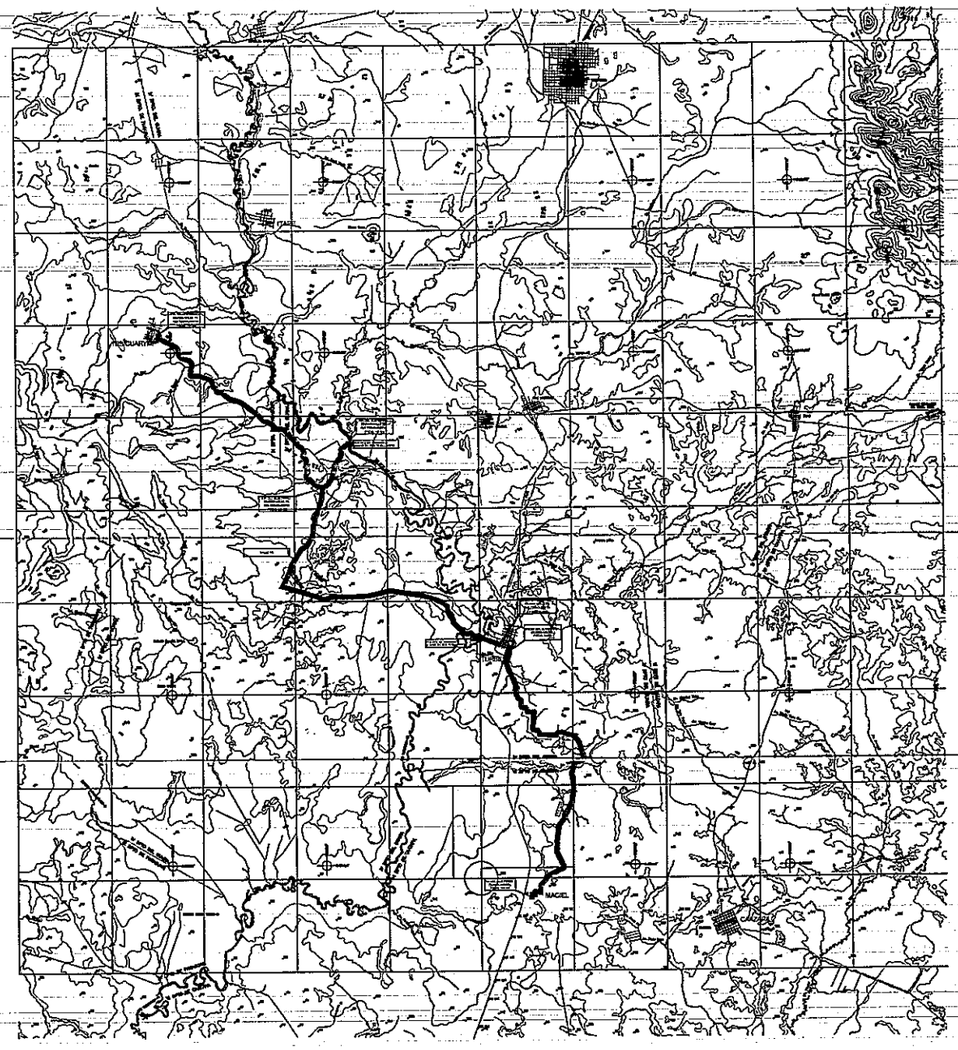
PAG. 04 PUENTE DE LONGITUD = 24M.

PAG. 11 PUENTES DE LONGITUD =12M.

PAG. 20 ALCANTARILLAS CELULARES

# PLANO DE UBICACION



CIALPA S.A. Consorcio Cialpa - Electropar

REPUBLICA DEL PARAGUAY
VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION DE VIALIDAD
CONTRATO S.G.V.M.O.P. Nº 36 / 2010
LLAMADO MOPC Nº 204 / 2009

DISEÑO FINAL DE INGENIEÍA PARA LA PAVIMENTACIÓN TIPO
EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE
SOBRE EL RIO TEBICUARYMI Y RAMAL A TEBICUARYMI

PLANIMETRIA GENERAL

Escalas
SIN ESCALA

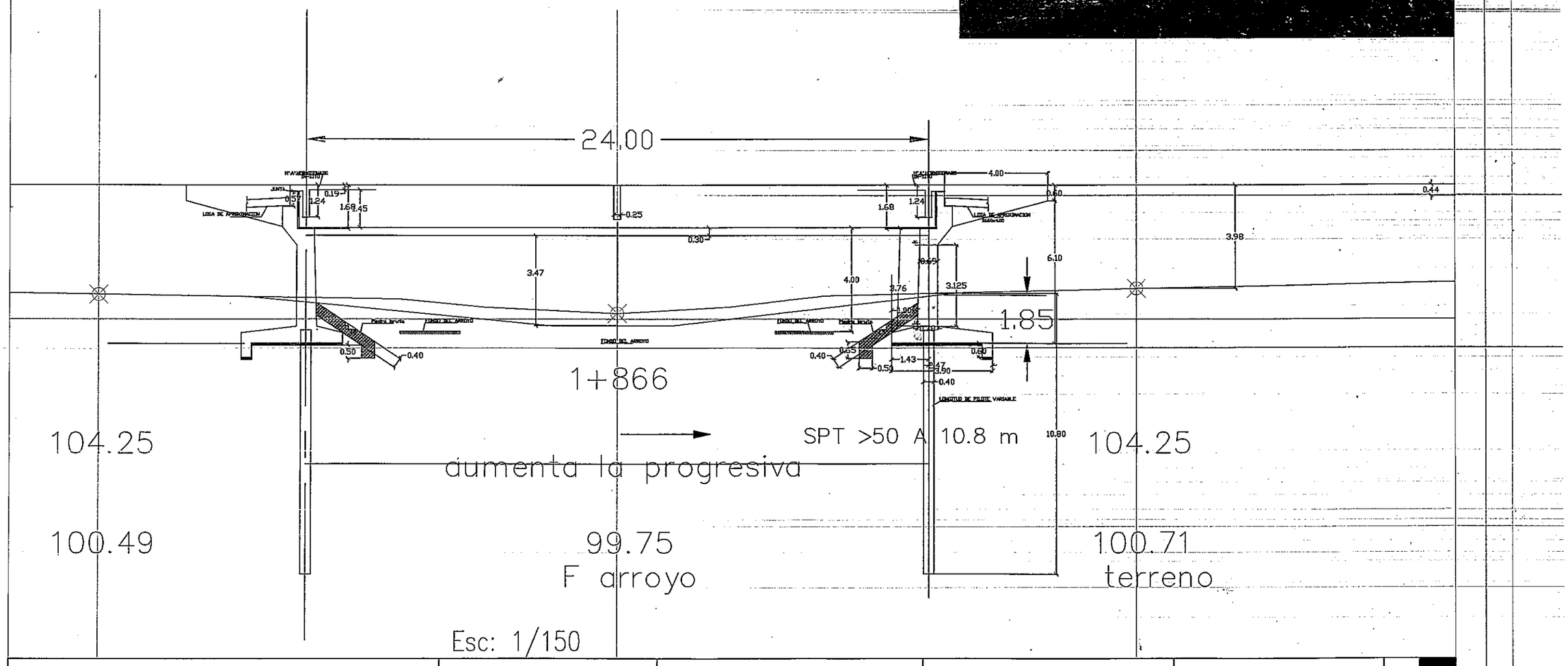
M.O.P.C.
MAPA DEL PARAGUAY
AREA PROYECTO
BOLIVIA
BRASIL
ARGENTINA

3
(tres)

PUENTE DE LONGITUD = 24M.

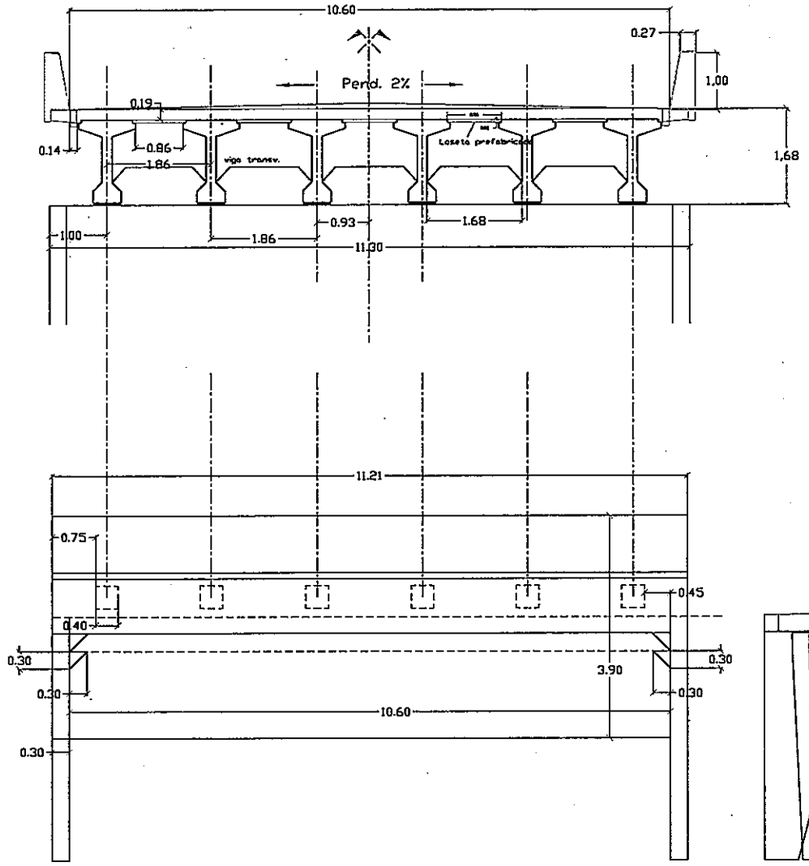
VALLEPE-CIUDAD DE TEBICUARYMI

# PUENTE DE 24 m. PROG 1+866

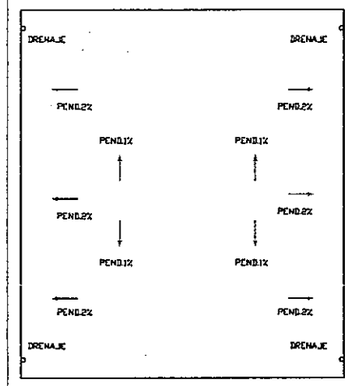


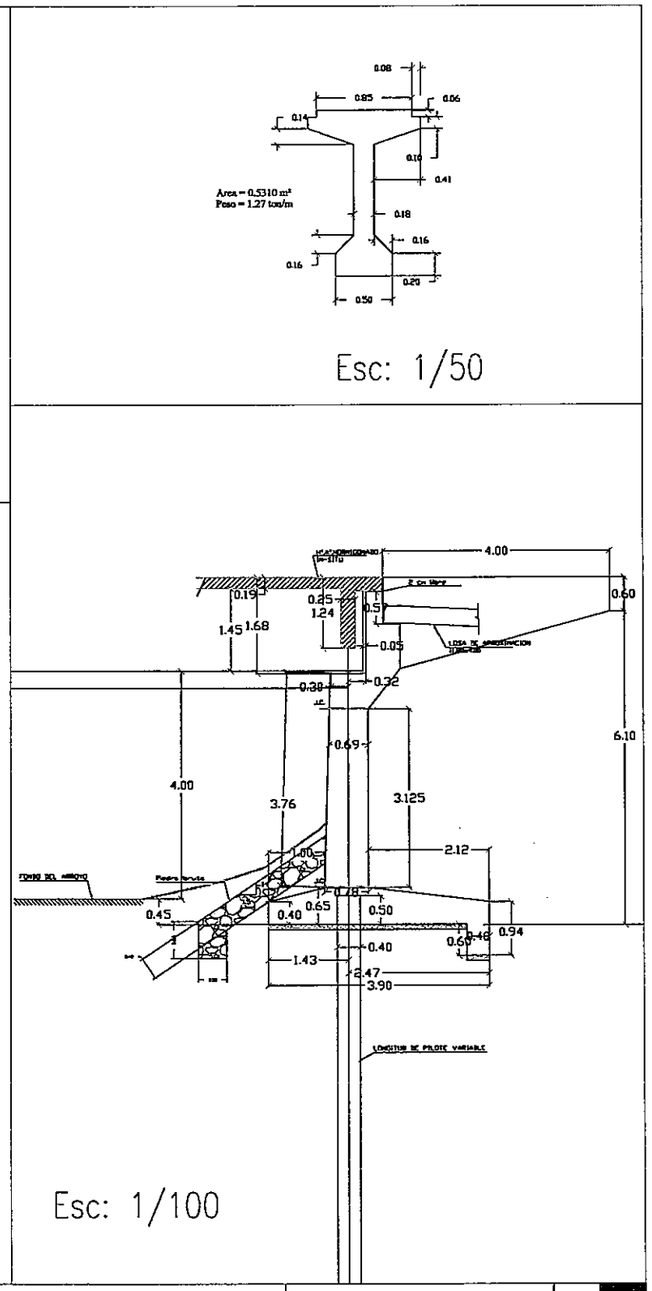

| | | | | | |
|---|---|---|---|---|---|
| | CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | PUENTE 24 METROS PROG. 1+880<br>CORTE LONGITUDINAL<br>Escalas: VER LAMINA<br>Lamina Nº 1 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

5
(cinco)




Esc: 1/100




| | | | | |
|---|---|---|---|---|
| CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | PUENTE 24 METROS<br>CORTES TRANSVERSALES<br>Escalas: VER LAMINA<br>Lamina Nº 14 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

6
(seis)

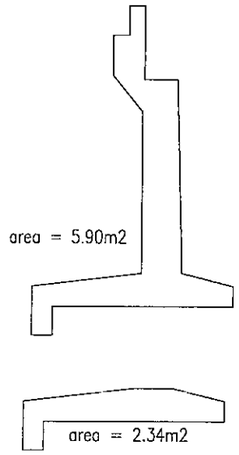
| Armaduras en estribos de apoyo puente pretensado | | | | |
|---|---|---|---|---|
| PLANILLA DE ARMADURA para 2 ZAPATAS | | | | |
| Pos | Φ | CANT | LONG UNIT | LONG TOTAL |
| 1 | 16 | 132 | 4.37 | 575.81 |
| 2 | 16 | 160 | 4.3 | 688.00 |
| 2a | 16 | 24 | 2.3 | 55.20 |
| 2b | 16 | 24 | 1.2 | 28.80 |
| 3 | 16 | 36 | 11.17 | 402.12 |
| 3a | 16 | 30 | 1.4 | 42 |
| 3b | 16 | 12 | 0.6 | 7.2 |
| 4 | 16 | 32 | 11.17 | 357.44 |
| 5 | 16 | 30 | 11.17 | 335.1 |
| 6 | 10 | 132 | 2.65 | 349.1764706 |
| 9 | 16 | 96 | 1 | 96 |

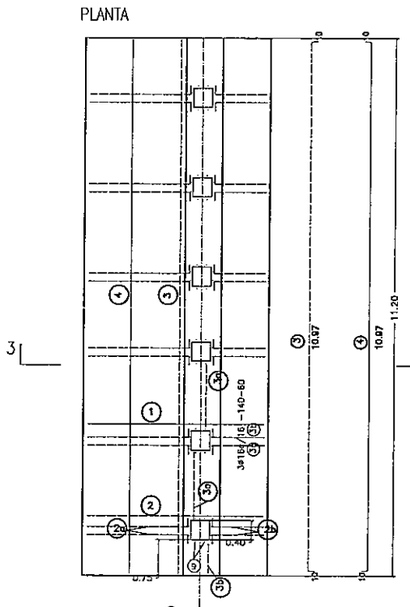
| | Φ | LONG TOTAL | kg/m | kg totales |
|---|---|---|---|---|
| | 16 | 2587.67 | 1.57 | 4062.64 |
| | 10 | 349.1764706 | 0.624 | 217.89 |
| | | | | 4280.53 |

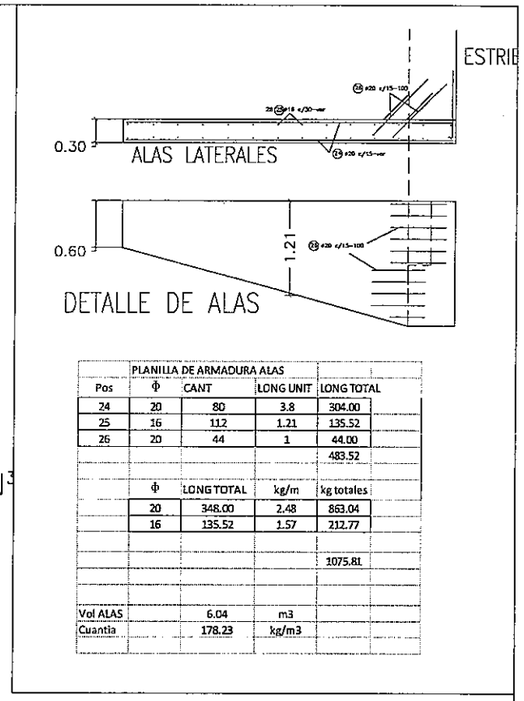
| | | |
|---|---|---|
| Vol 2 muros | 79.74 | m3 |
| Cuantia | 65.55 | kg/m3 |
| Vol 2 zapatas | 52.416 | m3 |
| Cuantia | 81.66 | kg/m3 |

| PLANILLA DE ARMADURA ESTRIBOS | | | | |
|---|---|---|---|---|
| Pos | Φ | CANT | LONG UNIT | LONG TOTAL |
| 7 | 20 | 6 | 11.05 | 66.30 |
| 8 | 16 | 4 | 11.05 | 44.20 |
| 10 | 16 | 10 | 11.05 | 110.50 |
| 11 | 20 | 8 | 11.05 | 88.40 |
| 12 | 10 | 112 | 3.53 | 395.36 |
| 13 | 12 | 112 | 2.22 | 248.64 |
| 14 | 12 | 112 | 3.03 | 339.36 |
| 15 | 16 | 40 | 11.92 | 476.80 |
| 15a | 16 | 38 | 11.4 | 433.20 |
| 16 | 16 | 140 | 4.27 | 597.50 |
| 18 | 16 | 112 | 4.3 | 481.60 |
| 19 | 16 | 2 | 11.05 | 22.10 |
| 20 | 16 | 4 | 4.29 | 17.16 |
| 21 | 16 | 4 | 4.3 | 17.20 |
| 22 | 16 | 32 | 11.05 | 353.60 |
| 23 | 16 | 4 | 11.05 | 44.20 |
| | | | | 3735.42 |

| | Φ | LONG TOTAL | kg/m | kg totales |
|---|---|---|---|---|
| | 25 | 0.00 | 3.98 | 0.00 |
| | 20 | 154.70 | 2.48 | 383.66 |
| | 16 | 2598.35 | 1.57 | 4079.43 |
| | 12 | 589.00 | 0.88 | 517.44 |
| | 10 | 395.36 | 0.624 | 246.70 |
| | | | | 5227.23 |



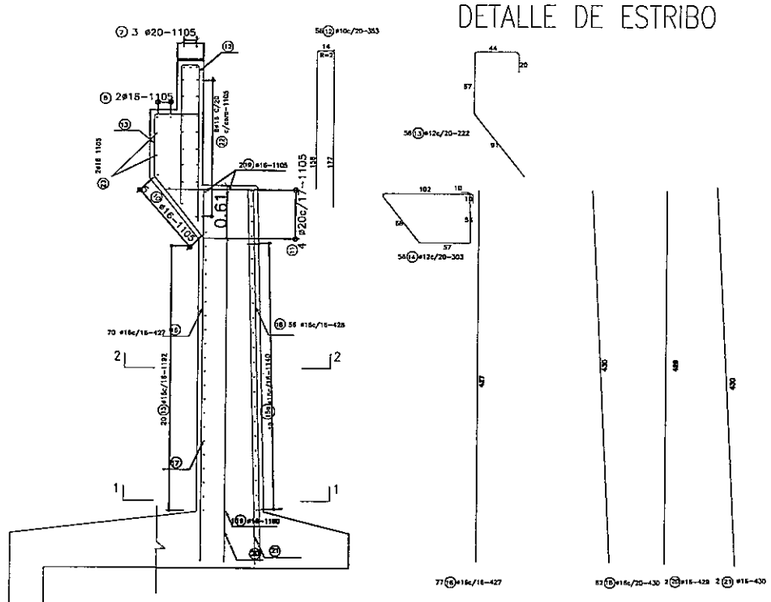




| PLANILLA DE ARMADURA ALAS | | | | |
|---|---|---|---|---|
| Pos | Φ | CANT | LONG UNIT | LONG TOTAL |
| 24 | 20 | 80 | 3.8 | 304.00 |
| 25 | 16 | 112 | 1.21 | 135.52 |
| 26 | 20 | 44 | 1 | 44.00 |
| | | | | 483.52 |

| | Φ | LONG TOTAL | kg/m | kg totales |
|---|---|---|---|---|
| | 20 | 348.00 | 2.48 | 863.04 |
| | 16 | 135.52 | 1.57 | 212.77 |
| | | | | 1075.81 |

| | | |
|---|---|---|
| Vol ALAS | 6.04 | m3 |
| Cuantia | 178.23 | kg/m3 |

## DETALLE DE ESTRIBO

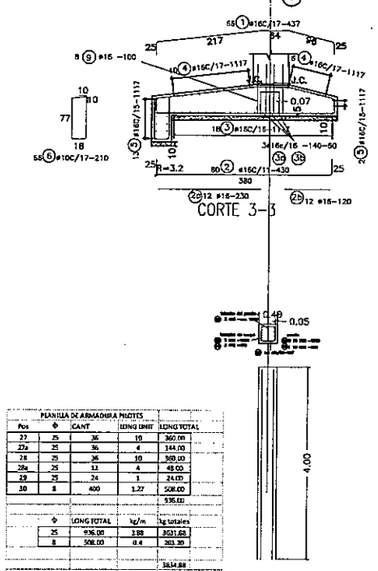



NOTAS

1– TODAS LAS MEDIDAS ESTAN EN cm SALVO LAS INDICADAS

2– MATERIALES
fck = 210 kg/cm2 fy = 4200 kg/cm2

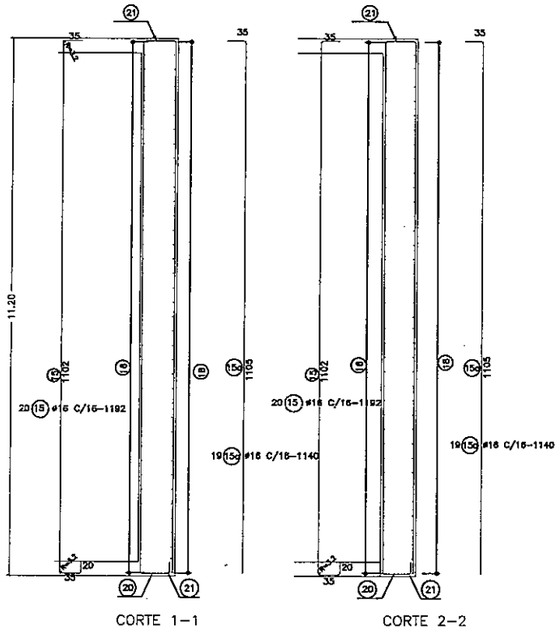
3– RECUBRIMIENTOS
RECUBRIMIENTO MÍNIMO=5cm




| PLANILLA DE ARMADURA PILOTES | | | | |
|---|---|---|---|---|
| Pos | Φ | CANT | LONG UNIT | LONG TOTAL |
| 27 | 25 | 36 | 10 | 360.00 |
| 27a | 25 | 36 | 4 | 144.00 |
| 28 | 25 | 36 | 10 | 360.00 |
| 28a | 25 | 12 | 4 | 48.00 |
| 29 | 25 | 24 | 1 | 24.00 |
| 30 | 8 | 400 | 1.27 | 508.00 |
| | | | | 936.00 |

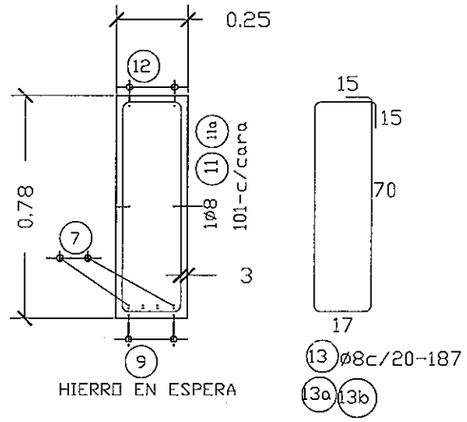
| | Φ | LONG TOTAL | kg/m | kg totales |
|---|---|---|---|---|
| | 25 | 936.00 | 3.98 | 3724.68 |
| | 8 | 508.00 | 0.4 | 203.20 |
| | | | | 3924.88 |

| | | |
|---|---|---|
| Vol PILOTES | 19.20 | m3 |
| Cuantia | 204.42 | kg/m3 |



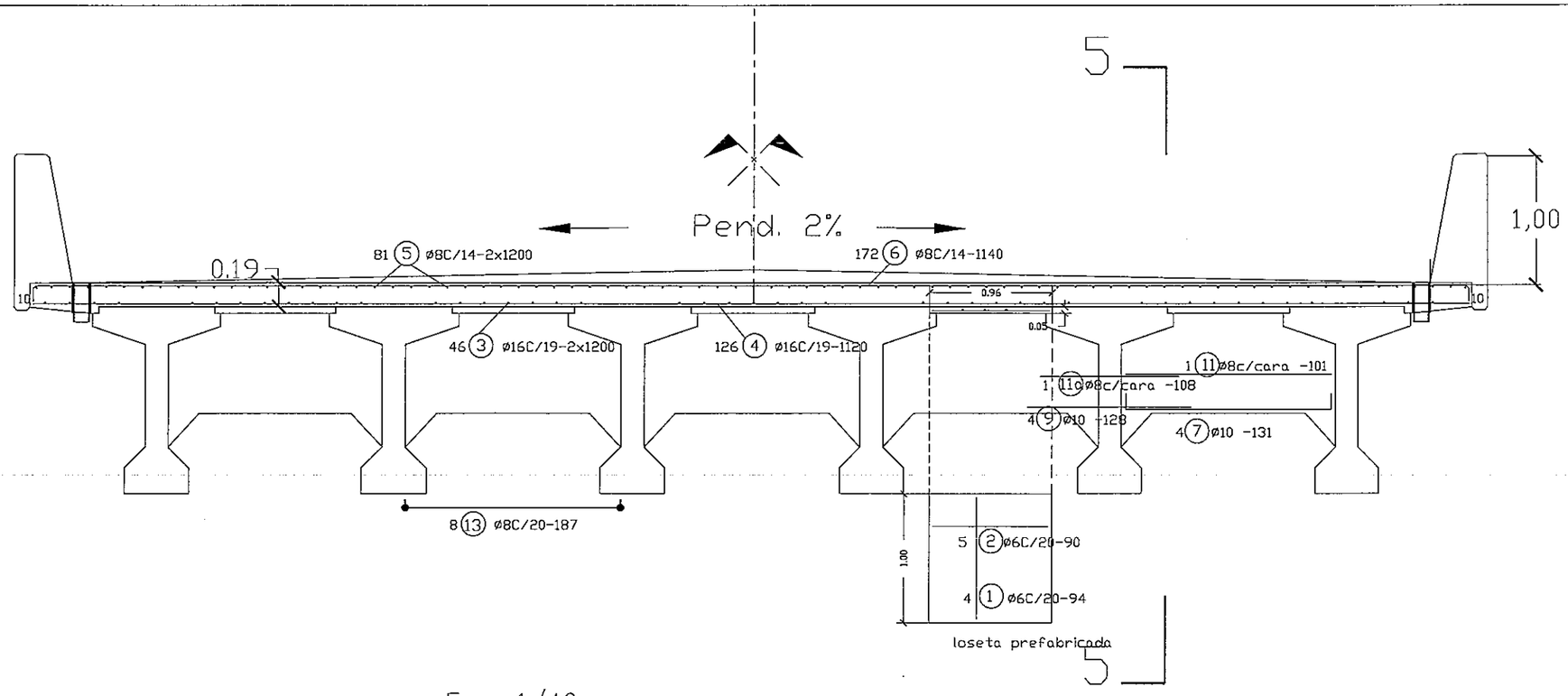

| | | | | |
|---|---|---|---|---|
| Consorcio Claipa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | ARMADURAS ESTRIBOS Y ALAS<br>PUENTE 24 m.<br>Escalas: SIN ESCALA<br>Lamina N° 24 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

7
(siete)




Esc: 1/40

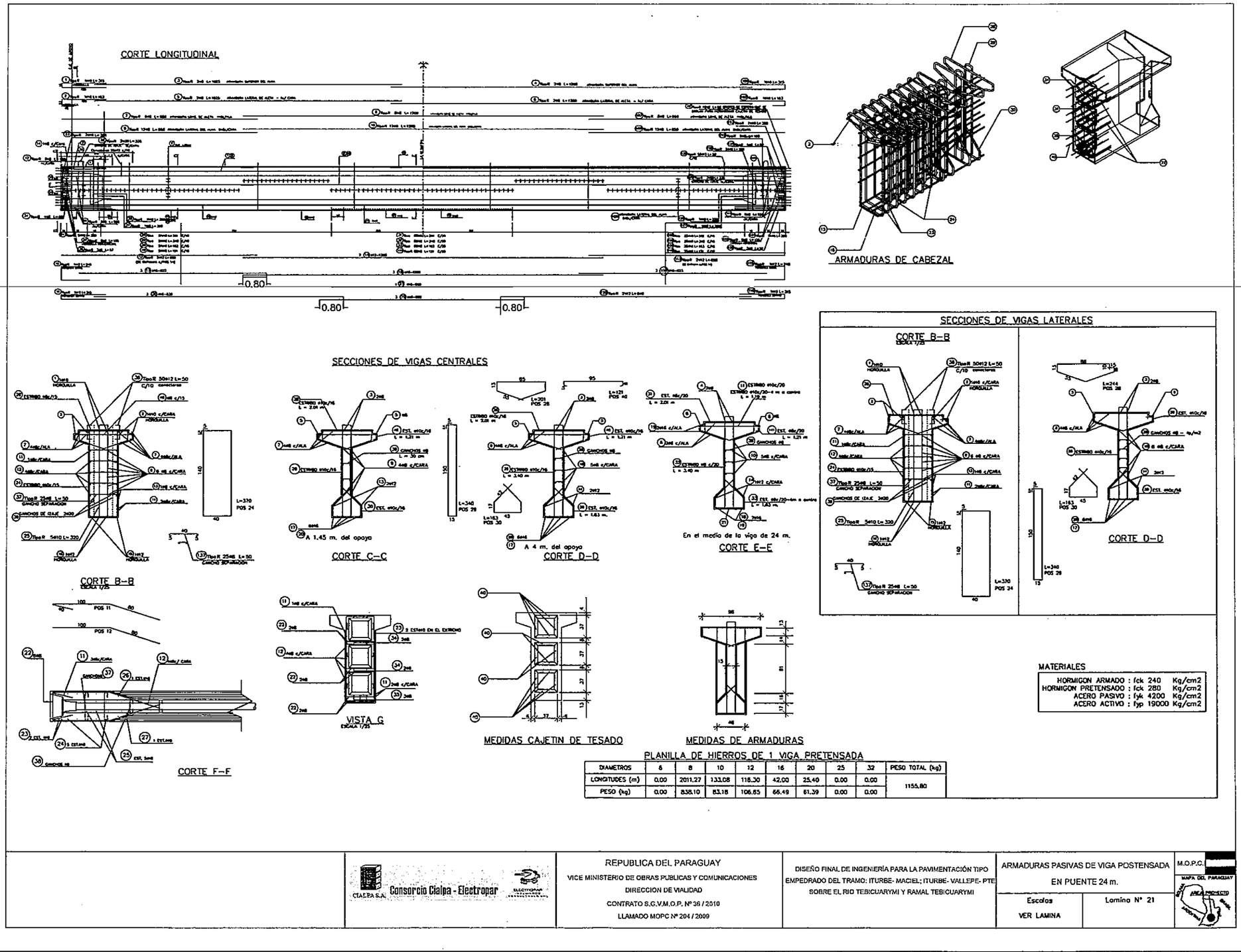
CORTE 5-5




Esc: 1/40

| | | | | |
|---|---|---|---|---|
| CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | ARMADURAS SUPERESTRUCTURA<br>PUENTE 24 m<br>Escalas: VER LAMINA<br>Lamina N° 20 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

8
(Ocho)


CORTE LONGITUDINAL
ARMADURAS DE CABEZAL
SECCIONES DE VIGAS CENTRALES
SECCIONES DE VIGAS LATERALES
CORTE B-B
CORTE C-C
CORTE D-D
CORTE E-E
CORTE F-F
VISTA G
MEDIDAS CAJETIN DE TESADO
MEDIDAS DE ARMADURAS
A 1,45 m. del apoyo
A 4 m. del apoyo
En el medio de la viga de 24 m.
MATERIALES
HORMIGON ARMADO : fck 240 Kg/cm2
HORMIGON PRETENSADO : fck 280 Kg/cm2
ACERO PASIVO : fyk 4200 Kg/cm2
ACERO ACTIVO : fyp 19000 Kg/cm2
PLANILLA DE HIERROS DE 1 VIGA PRETENSADA
DIAMETROS | 6 | 8 | 10 | 12 | 16 | 20 | 25 | 32 | PESO TOTAL (kg)
LONGITUDES (m) | 0.00 | 2011.27 | 133.08 | 118.30 | 42.00 | 25.40 | 0.00 | 0.00 | 1155.80
PESO (kg) | 0.00 | 838.10 | 83.18 | 106.65 | 66.49 | 61.39 | 0.00 | 0.00
Consorcio Cialpa - Electropar
REPUBLICA DEL PARAGUAY
VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION DE VIALIDAD
CONTRATO S.G.V.M.O.P. Nº 36 / 2010
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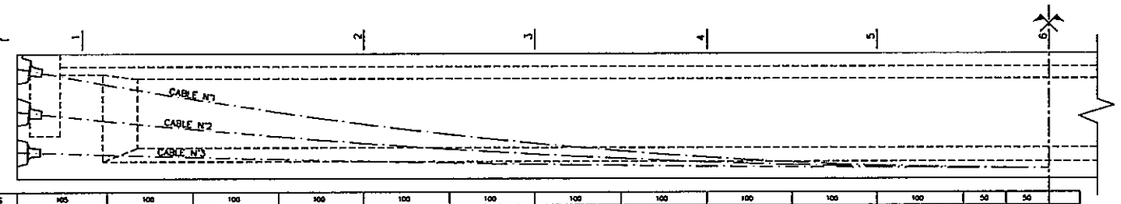
DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI
ARMADURAS PASIVAS DE VIGA POSTENSADA
EN PUENTE 24 m.
Escalas
VER LAMINA
Lamina Nº 21
M.O.P.C.
MAPA DEL PARAGUAY

9
(nueve)

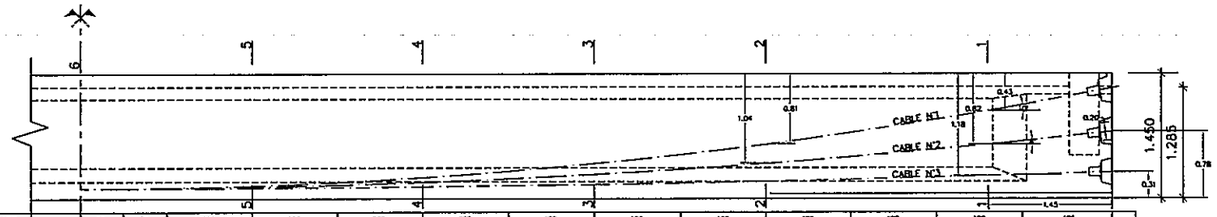
CORTE LONGITUDINAL




| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DISTANCIAS | PARCIALES | 105 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 50 | 50 | |
| | ACUMULADAS | 105 | 205 | 305 | 405 | 505 | 605 | 705 | 805 | 905 | 1005 | 1105 | 1155 | 1205 | |
| ALTURAS | CABLE N°2 | 26,0 (74,0) | 32,0 (33,0) | 37,5 (31,0) | 40,6 (40,3) | 41,1 (37,0) | 34,3 (35,0) | 28,4 (41,9) | 23,4 (40,9) | 18,3 (40,0) | 14,1 (32,0) | 13,6 (40,3) | 12,3 (19,0) | 12,1 (20,0) | 12,0 (21,3) |
| | CABLE N°1 | 130,5 (125,0) | 103,1 (140,0) | 82,2 (99,7) | 77,0 (72,5) | 63,3 (56,0) | 54,3 (47,0) | 46,0 (37,7) | 38,1 (30,0) | 31,0 (26,3) | 24,7 (19,7) | 19,3 (14,7) | 12,6 (11,3) | 12,7 (11,7) | 12,0 (11,3) |
| | CABLE N°3 | 34,0 (27,0) | 27,0 (24,3) | 25,1 (21,0) | 22,0 (19,7) | 20,4 (16,0) | 16,4 (14,0) | 14,7 (13,3) | 13,3 (11,0) | 14,1 (16,0) | 13,7 (9,7) | 13,5 (9,0) | 13,1 (8,0) | 12,0 (8,3) | 12,0 (8,3) |

NOTA: LAS ALTURAS INDICADAS EN PARENTESIS SON DESDE EL FONDO DEL MOLDE HASTA EL NIVEL DE APOYO DE LA VIGA

| CABLES DE PRETENSADO CON 8 CABOS ø1/2" DE ACERO CP-190RB 12,7mm | | | |
|---|---|---|---|
| CABLE | CANT. | LONGITUD DEL DUCTO ( m ) | LONGITUD DEL CABLE ( m ) |
| 1 | 1 | 23,92 | 26,00 |
| 2 | 1 | 23,87 | 26,00 |
| 3 | 1 | 23,85 | 26,00 |
| LONGITUD TOTAL PARA UNA VIGA : 624 m. PESO DE ACERO PARA UNA VIGA : 625 Kg. | | | |

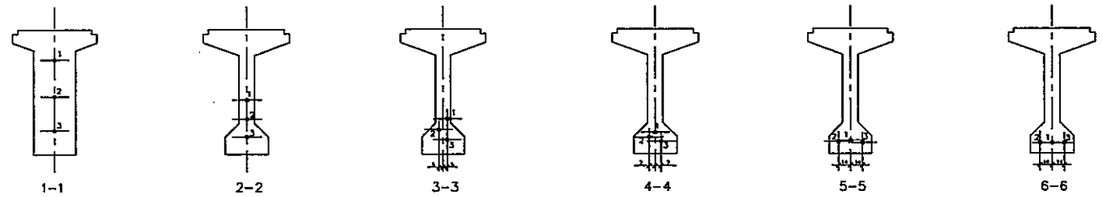



| ORDEN DE PRETENSADO | |
|---|---|
| CABLE | tiempo despues de hormigonar ( dias ) |
| 3 | 7 |
| 2 | 7 |
| 1 | 26 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DISTANCIAS | PARCIALES | | 50 | 50 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 105 | |
| | ACUMULADAS | | 1205 | 1255 | 1305 | 1405 | 1505 | 1605 | 1705 | 1805 | 1905 | 2005 | 2105 | 2205 | 2310 | 2410 |
| ALTURAS | CABLE N°2 | | 12,0 (21,3) | 12,1 (21,0) | 12,3 (21,0) | 13,0 (19,3) | 14,1 (12,0) | 16,3 (10,0) | 23,4 (10,9) | 28,4 (14,0) | 34,3 (20,0) | 41,1 (27,0) | 46,0 (40,3) | 51,5 (34,0) | (33,3) 52,0 | (74,0) 75,0 |
| | CABLE N°1 | | 12,0 (21,0) | 12,3 (21,7) | 12,0 (21,3) | 12,3 (11,7) | 13,3 (15,7) | 24,0 (21,3) | 33,1 (28,0) | 46,0 (37,7) | 54,3 (47,0) | 63,3 (56,0) | 77,0 (73,3) | 92,7 (88,7) | (105,0) 106,1 | (125,0) 124,5 |
| | CABLE N°3 | | 12,0 (21,3) | 12,0 (21,3) | 12,1 (21,0) | 12,3 (21,0) | 13,3 (21,7) | 14,1 (16,0) | 15,3 (17,0) | 16,7 (13,7) | 18,4 (14,0) | 20,4 (16,0) | 23,0 (19,7) | 25,1 (21,0) | (24,3) 27,0 | (27,3) 31,0 |

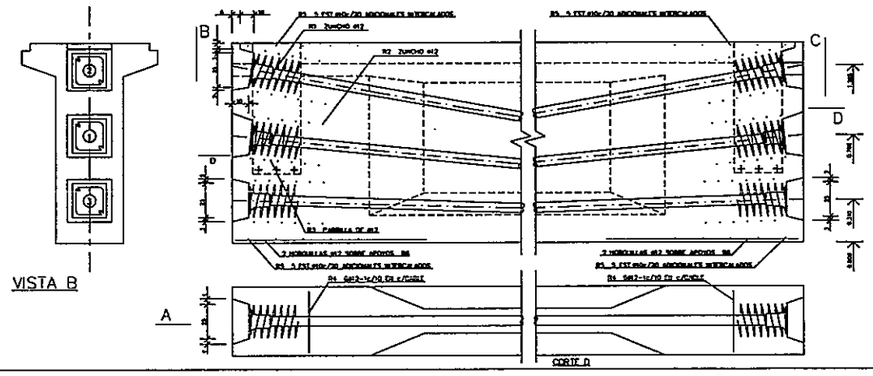
NOTA: LAS ALTURAS INDICADAS EN PARENTESIS SON DESDE EL FONDO DEL MOLDE HASTA EL NIVEL DE APOYO DE LA VIGA

SECCIONES TRANSVERSALES
ESCALA 1/20



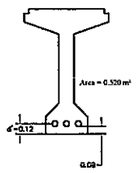

CORTE LONGITUDINAL DERECHO
ESCALA 1/20

CORTE A
ESC.: 1/12,5




REFUERZOS EN ANCLAJES

| POS | ø | LARGO A CORTAR | CANTIDAD PARCIAL | CANTIDAD TOTAL | LONG. TOTAL | PESO Kg. | FORMA |
|---|---|---|---|---|---|---|---|
| R1 | 12 | 4,70 | 3 | 84 | 394,8 | | |
| R2 | 12 | 3,80 | 3 | 84 | 319,2 | | |
| R4 | 12 | 1,15x2 | 696x28 | 1008 | 2318,4 | | |
| R5 | 10 | 3,98 | 592x28 | 336 | 1337,3 | | |
| R6 | 12 | 3,00 | 292x28 | 112 | 336,0 | | |
| R7 | 20 | 0,28 | 513x28 | 504 | 141,1 | | |




MATERIALES:
HORMIGON ARMADO: fck 240 kg/cm2
HORMIGON PRETENSADO: fck 280 kg/cm2
ACERO PASIVO: fyk 4200 kg/cm2
ACERO ACTIVO: fyp 19000 kg/cm2

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CONTRATO S.G.V.M.O.P. Nº 36 / 2010
LLAMADO MOPC Nº 204 / 2009

DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI

CABLES POSTENSADOS
PUENTE 24 m.

Escalas: VER LAMINA

Lamina N° 22

M.O.P.C.

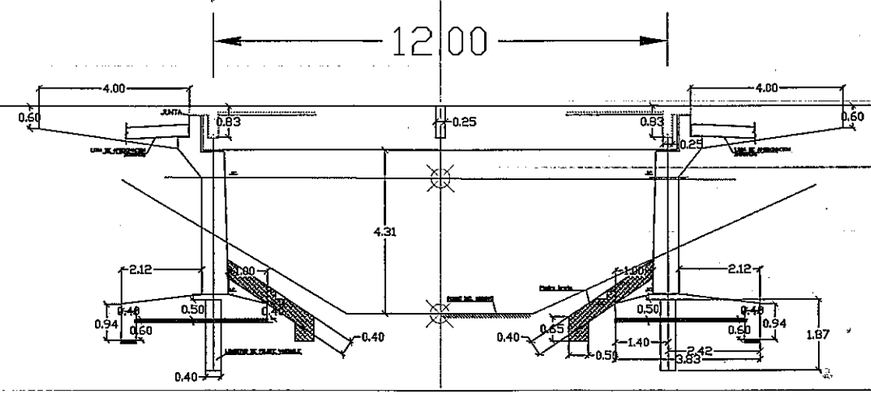
MAPA DEL PARAGUAY — AREA PROYECTO

10
(DIEZ)

PUENTES DE LONGITUD = 12M.

# VALLEPE-CIUDAD DE TEBICUARYMI

## PUENTE DE 12 m. PROG 12+353




12+353 SPT >50 A 5m

119.35 aumenta la progresiva 119.35 rasante

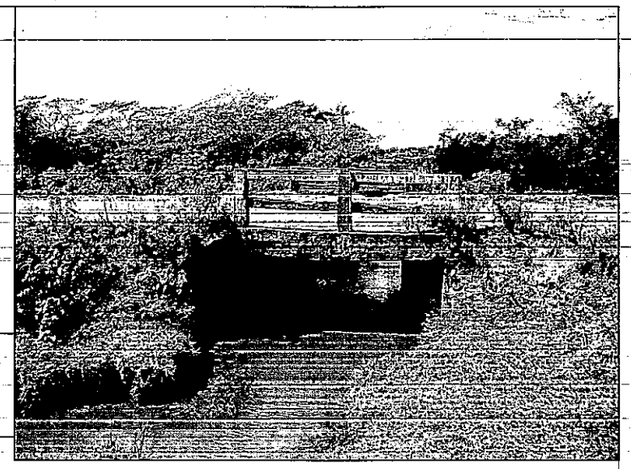
117.55 113.90 F arroyo 117.34 terreno

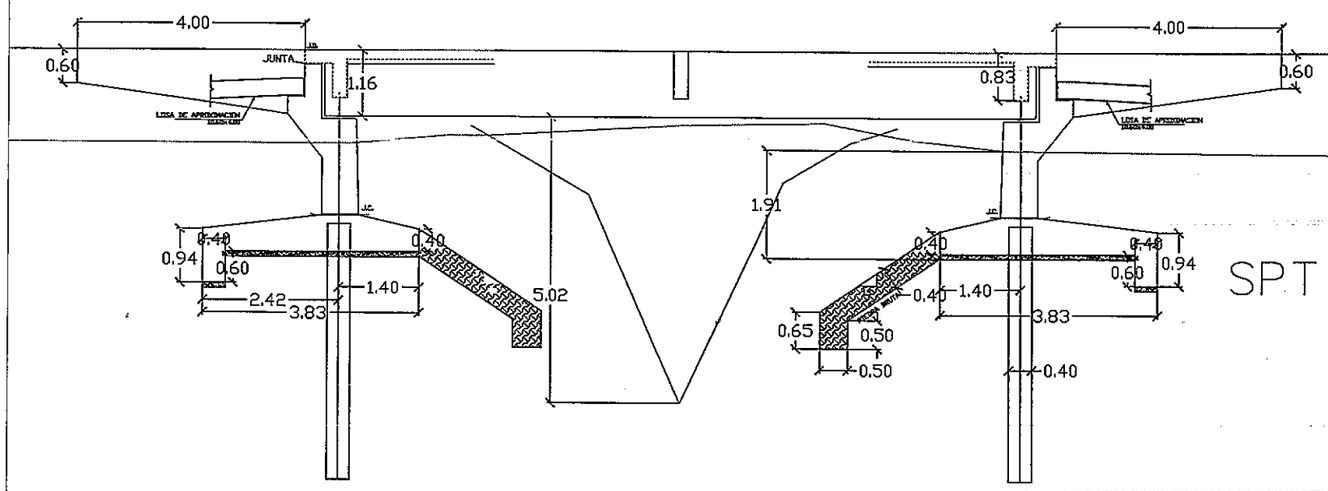
Esc: 1/150

| | | | | | |
|---|---|---|---|---|---|
| | CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 35 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | PUENTE DE 12 m. PROG 12+380<br>CORTE LONGITUDINAL<br>Escalas: VER LAMINA<br>Lamina Nº2 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

# ITURBE- MACIEL

## PUENTE DE 12 m. PROG 9+120






SPT >5 a 2 m

SPT >50 a 6.20 m

98.67
F arroyo

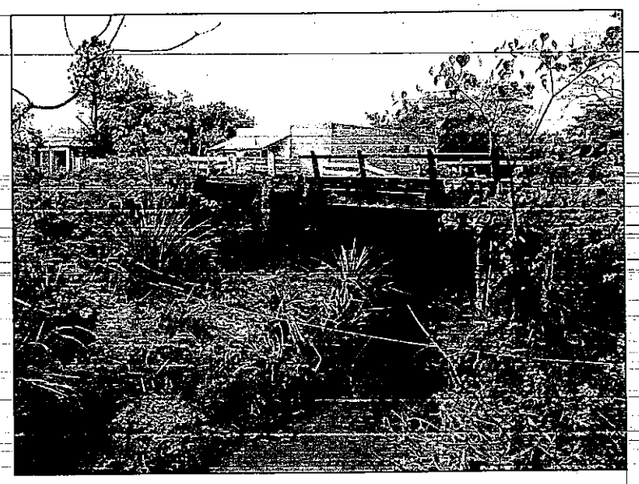
104.85 rasante 104.85
9+120

103.55 103.08
terreno

Esc: 1/100

| | | | | | |
|---|---|---|---|---|---|
| | CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | PUENTE DE 12 m. PROG 9+300<br>CORTE LONGITUDINAL<br>Escalas: VER LAMINA<br>Lamina Nº 11 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

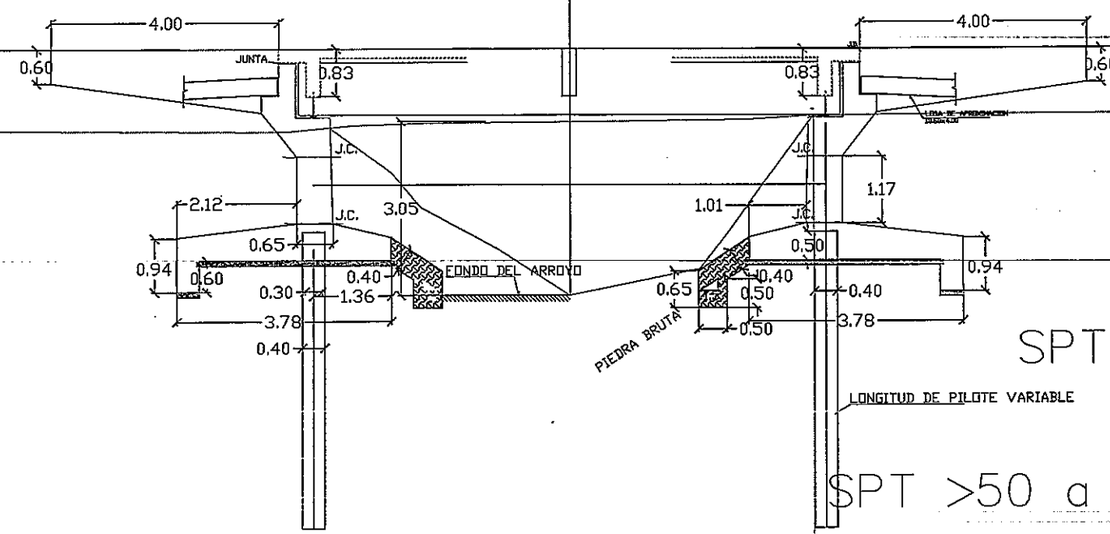
13
(trece)



# ITURBE- VALLEPE- PTE RIO TEBICUARYMI

PUENTE DE 9 m. PROG 13+175.71

comendacion: Hacer el puente de 12 m.




SPT >5 a 2 m

SPT >50 a 7,25 m

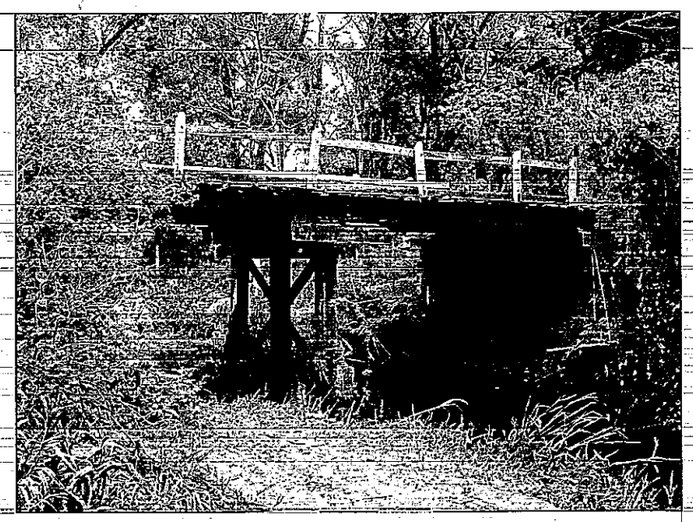
Esc: 1/150

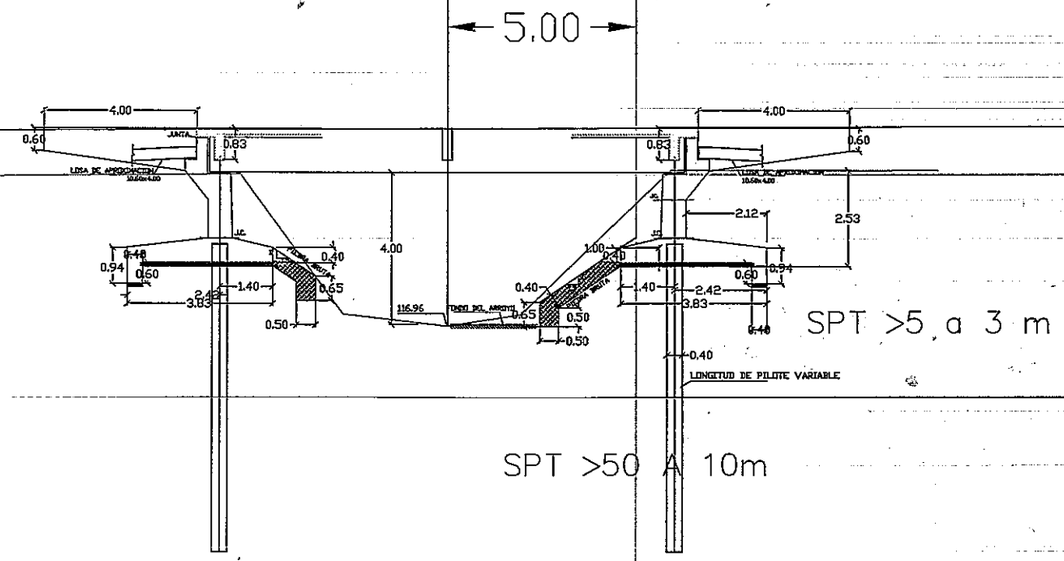
| | | | | | |
|---|---|---|---|---|---|
| | CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 35 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | PUENTE DE 9 m. PROG 13+175.71<br>CORTE LONGITUDINAL<br>Escalas: VER LAMINA<br>Lamina N° 5 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

14
(catorce)

VALLEPE-CIUDAD DE TEBICUARYMI

PUENTE DE 12 m. PROG 13+089






SPT >5 a 3 m

SPT >50 A 10m

121.64

121.71 rasante

120.43

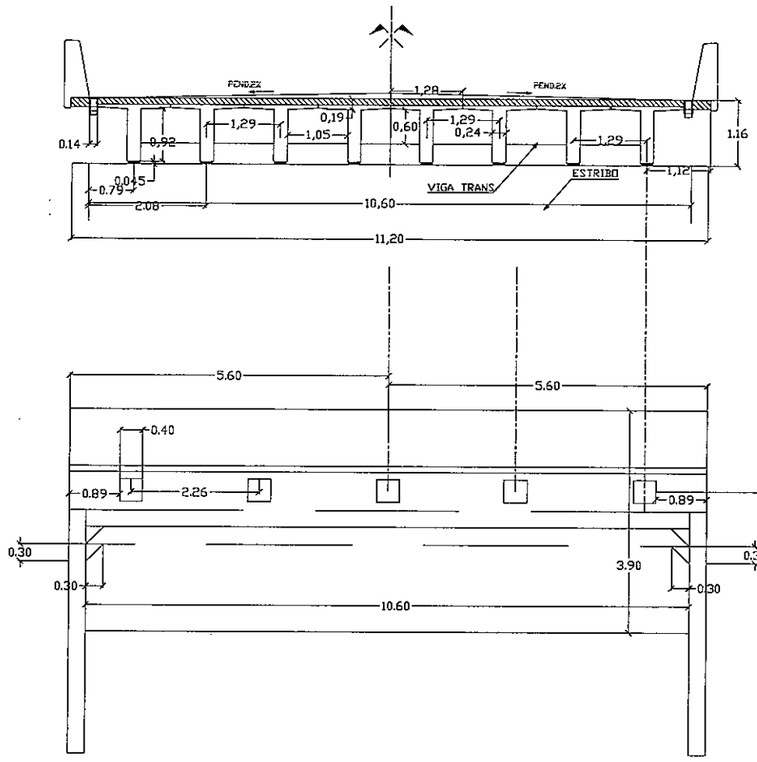
116.96 120.59 terreno

F arroyo

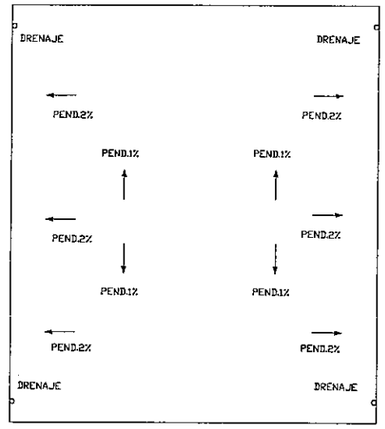
Esc: 1/150

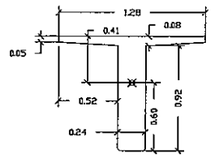
| | | | | | |
|---|---|---|---|---|---|
| | CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 35 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | PUENTE DE 12 m. PROG 13+115<br>CORTE LONGITUDINAL<br>Escalas: VER LAMINA | Lamina N° 3 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

15
(Quince)



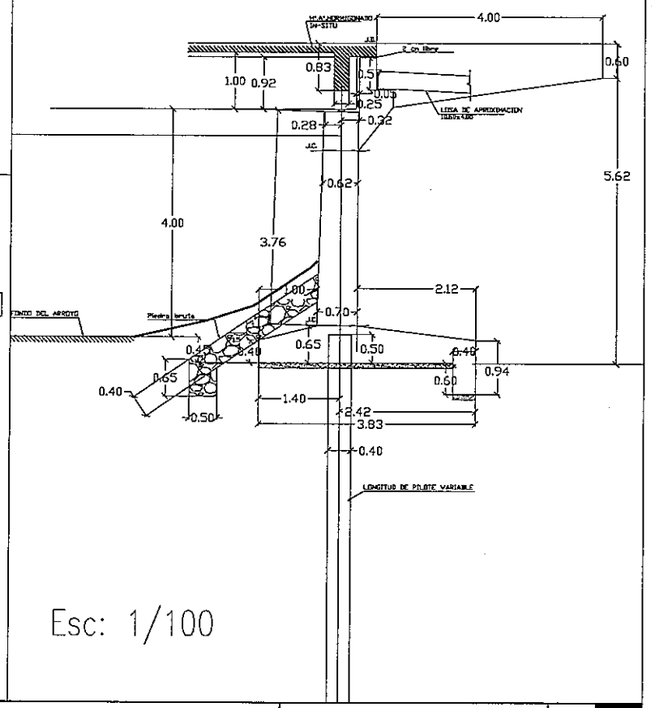

Esc: 1/100




AREA = 0.30 m2
PESO = 0.74 ton/m

Esc: 1/50



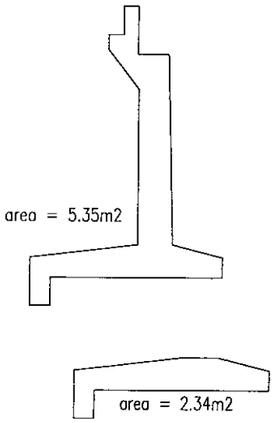

Esc: 1/100

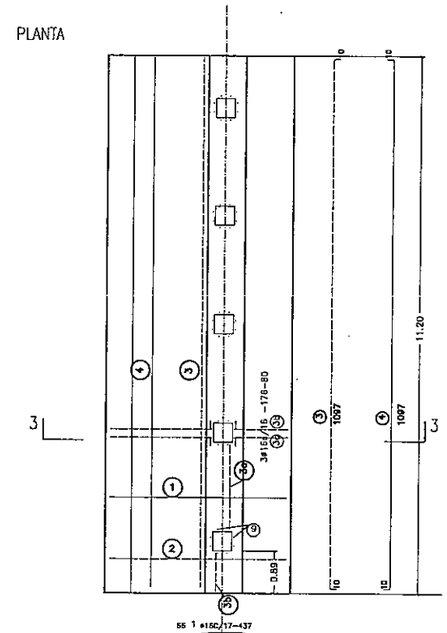
| | | | | |
|---|---|---|---|---|
| CIALPA S.A. Consorcio Cialpa - Electrepar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 35 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | PUENTE 12 METROS<br>CORTES TRANSVERSALES<br>Escalas: VER LAMINA<br>Lamina N° 15 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

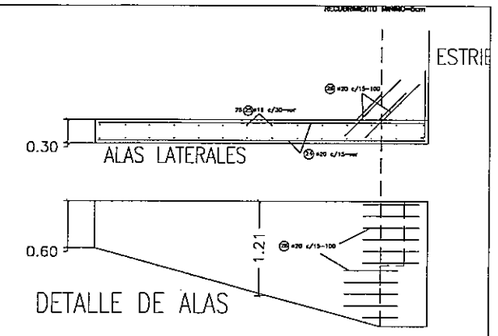
16
(Diez y seis)

| Armaduras en estribos de apoyo puente de 12m. | | | | |
|---|---|---|---|---|
| | PLANILLA DE ARMADURA ZAPATA | | | |
| Pos | Φ | CANT | LONG UNIT | LONG TOTAL |
| 1 | 16 | 132 | 4.37 | 575.81 |
| 2 | 16 | 167 | 4.3 | 719.27 |
| 2a | 16 | 20 | 2.3 | 46.00 |
| 2b | 16 | 20 | 1.2 | 24.00 |
| 3 | 16 | 36 | 11.17 | 402.12 |
| 3a | 16 | 24 | 1.76 | 42.24 |
| 3b | 16 | 12 | 0.8 | 9.6 |
| 4 | 16 | 32 | 11.17 | 357.44 |
| 5 | 16 | 30 | 11.17 | 335.1 |
| 6 | 10 | 132 | 2.65 | 349.1764706 |
| 9 | 16 | 96 | 1 | 96 |
| | | | | |
| | | | | |
| | Φ | LONG TOTAL | kg/m | kg totales |
| | 16 | 2607.58 | 1.57 | 4093.91 |
| | 10 | 357.44 | 0.624 | 223.04 |
| | | | | |
| | | | | 4316.95 |
| Vol 2 muros | | 67.42 | m3 | |
| Cuantia | | 72.44 | kg/m3 | |
| | | | | |
| Vol 2 zapatas | | 52.416 | m3 | |
| Cuantia | | 82.36 | kg/m3 | |

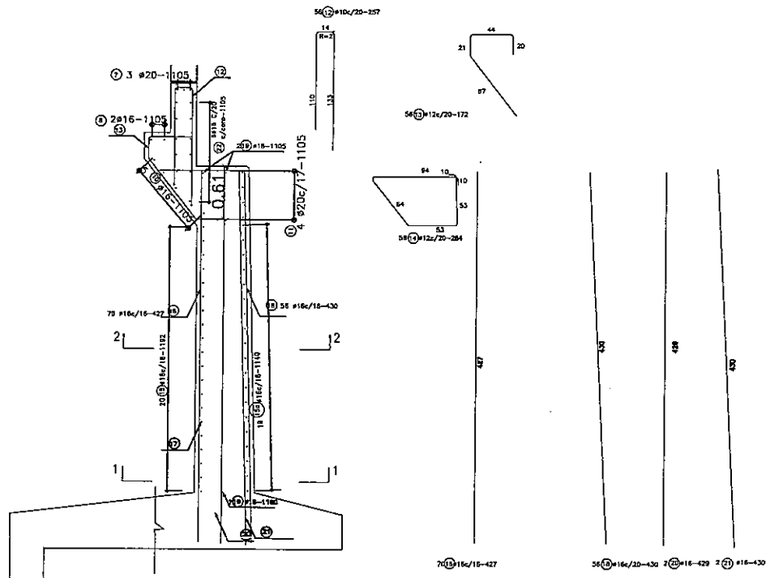
| | PLANILLA DE ARMADURA ESTRIBOS | | | |
|---|---|---|---|---|
| Pos | Φ | CANT | LONG UNIT | LONG TOTAL |
| 7 | 20 | 6 | 11.05 | 66.30 |
| 8 | 16 | 4 | 11.05 | 44.20 |
| 10 | 16 | 10 | 11.05 | 110.50 |
| 11 | 20 | 8 | 11.05 | 88.40 |
| 12 | 10 | 112 | 2.57 | 287.84 |
| 13 | 12 | 112 | 1.72 | 192.64 |
| 14 | 12 | 112 | 2.84 | 318.08 |
| 15 | 16 | 43 | 11.02 | 473.86 |
| 15a | 16 | 38 | 11.4 | 433.20 |
| 16 | 16 | 140 | 4.27 | 597.80 |
| 18 | 16 | 112 | 4.3 | 481.60 |
| 19 | 16 | 2 | 11.05 | 22.10 |
| 20 | 16 | 4 | 4.29 | 17.16 |
| 21 | 16 | 4 | 4.3 | 17.20 |
| 22 | 16 | 24 | 11.05 | 265.20 |
| | | | | 3419.02 |
| | | | | |
| | Φ | LONG TOTAL | kg/m | kg totales |
| | 25 | 0.00 | 3.88 | 0.00 |
| | 20 | 154.70 | 2.48 | 383.66 |
| | 16 | 2469.76 | 1.57 | 3873.24 |
| | 12 | 510.72 | 0.88 | 449.43 |
| | 10 | 287.84 | 0.624 | 179.61 |
| | | | | |
| | | | | 4883.94 |




| | PLANILLA DE ARMADURA ALAS | | | |
|---|---|---|---|---|
| Pos | Φ | CANT | LONG UNIT | LONG TOTAL |
| 24 | 20 | 80 | 3.8 | 304.00 |
| 25 | 16 | 112 | 1.21 | 135.52 |
| 26 | 20 | 44 | 1 | 44.00 |
| | | | | 483.52 |
| | | | | |
| | Φ | LONG TOTAL | kg/m | kg totales |
| | 20 | 348.00 | 2.48 | 863.04 |
| | 16 | 135.52 | 1.57 | 212.77 |
| | | | | |
| | | | | 1075.81 |
| | | | | |
| Vol ALAS | | 6.04 | m3 | |
| Cuantia | | 178.23 | kg/m3 | |

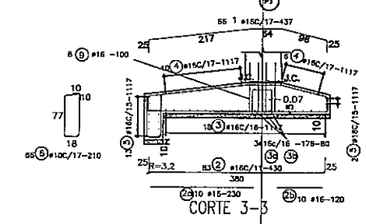



NOTAS

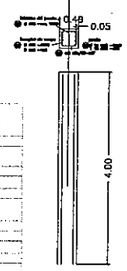
1– TODAS LAS MEDIDAS ESTAN EN cm SALVO LAS INDICADAS

2– MATERIALES
fck = 210 kg/cm2 fy = 4200 kg/cm2

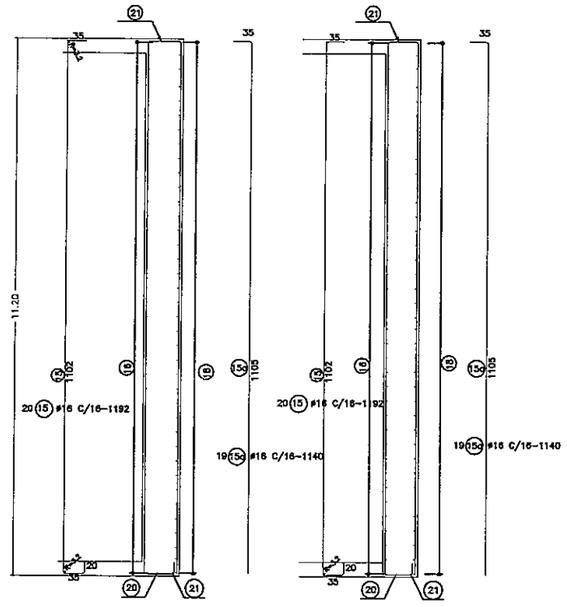
3– RECUBRIMIENTOS
RECUBRIMIENTO MÍNIMO=5cm




CORTE 3–3




| | PLANILLA DE ARMADURA PILOTES | | | |
|---|---|---|---|---|
| Pos | Φ | CANT | LONG UNIT | LONG TOTAL |
| 27 | 25 | 36 | 10 | 360.00 |
| 27a | 25 | 36 | 4 | 144.00 |
| 28 | 25 | 36 | 10 | 360.00 |
| 28a | 25 | 12 | 4 | 48.00 |
| 29 | 25 | 24 | 1 | 24.00 |
| 30 | 8 | 400 | 1.27 | 508.00 |
| | | | | 936.00 |
| | | | | |
| | Φ | LONG TOTAL | kg/m | kg totales |
| | 25 | 936.00 | 3.88 | 3631.68 |
| | 8 | 508.00 | 0.4 | 203.20 |
| | | | | |
| | | | | 3834.88 |
| | | | | |
| Vol PILOTES | | 19.20 | m3 | |
| Cuantia | | 199.73 | kg/m3 | |

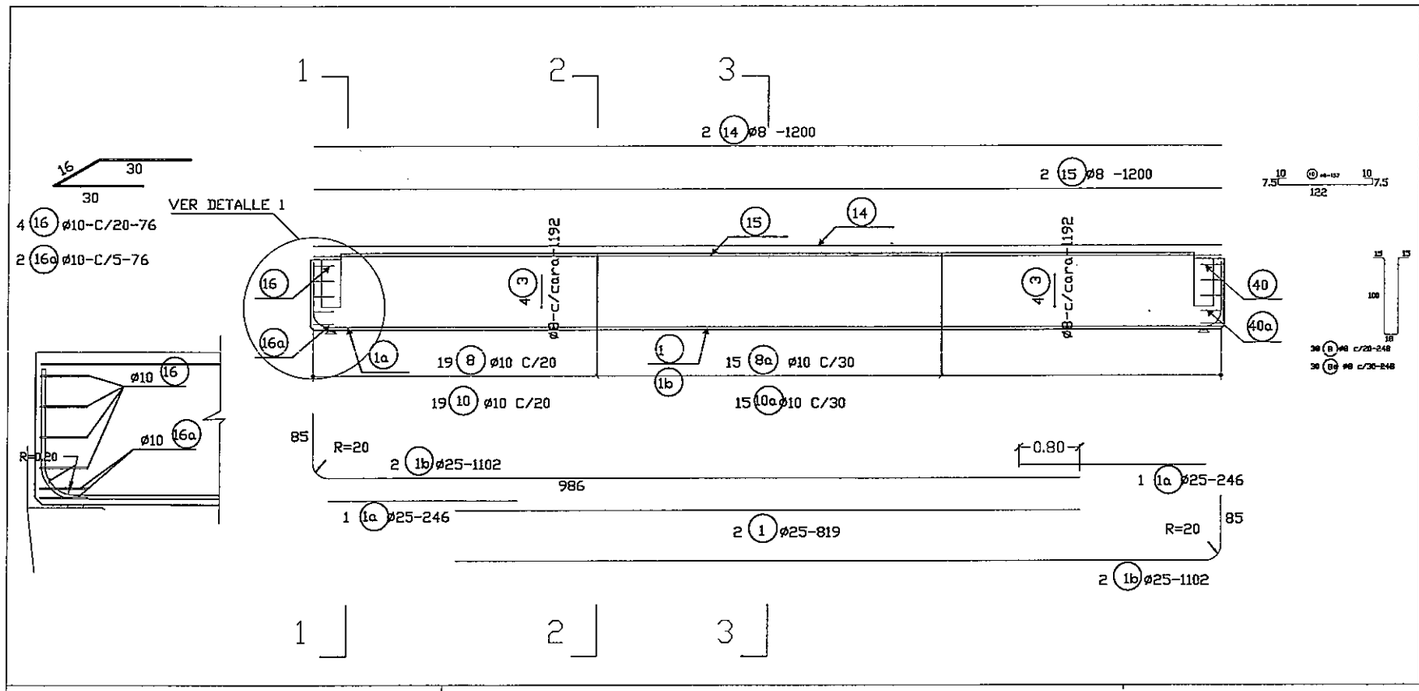


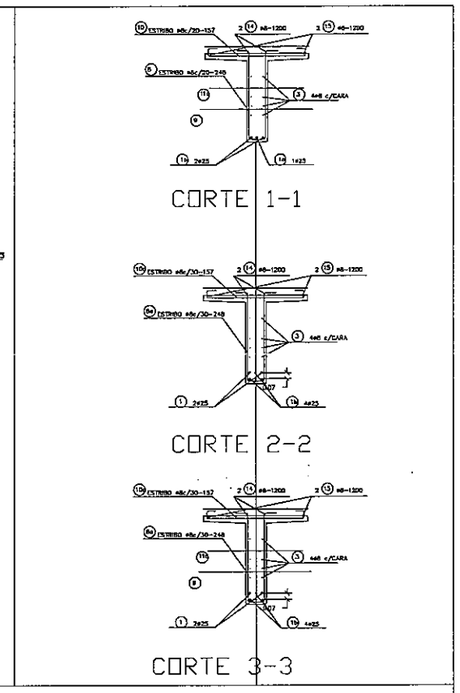

CORTE 1–1

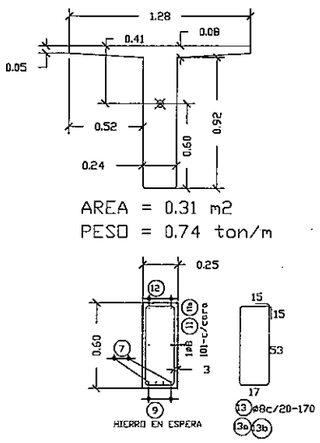
CORTE 2–2

| | | | | |
|---|---|---|---|---|
| **Consorcio Cialpa - Electropar** | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO; ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | ARMADURAS ESTRIBOS Y ALAS<br>PUENTE 12 m.<br>Escalas: SIN ESCALA<br>Lamina Nº 25 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

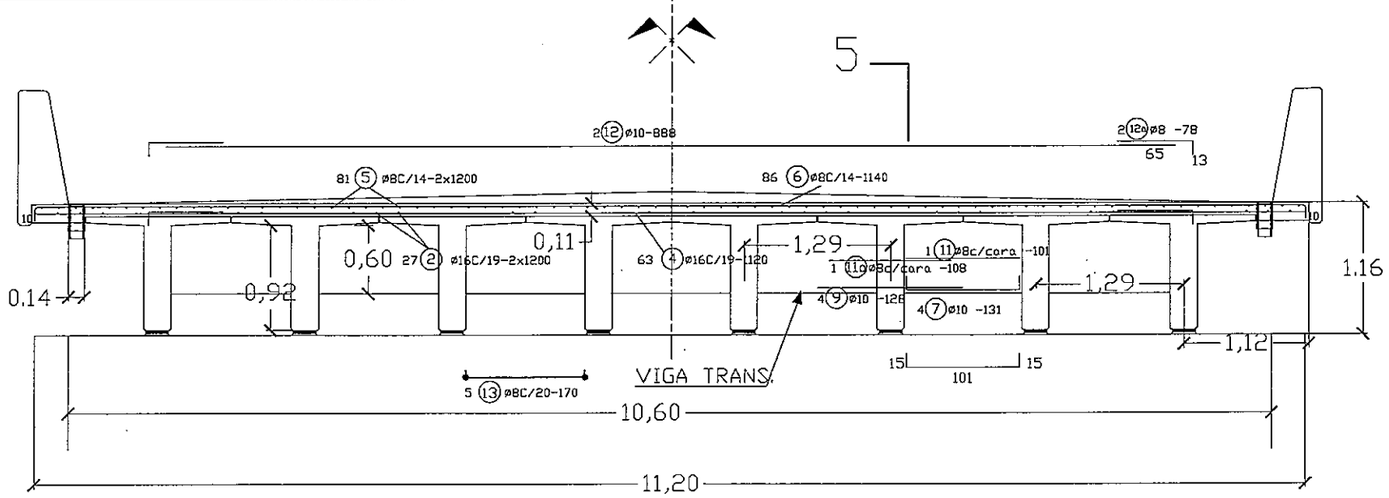
17
(Diez y Siete)




Esc: 1/40

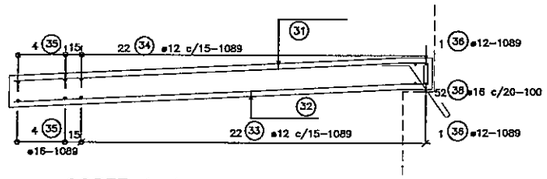



Esc: 1/50

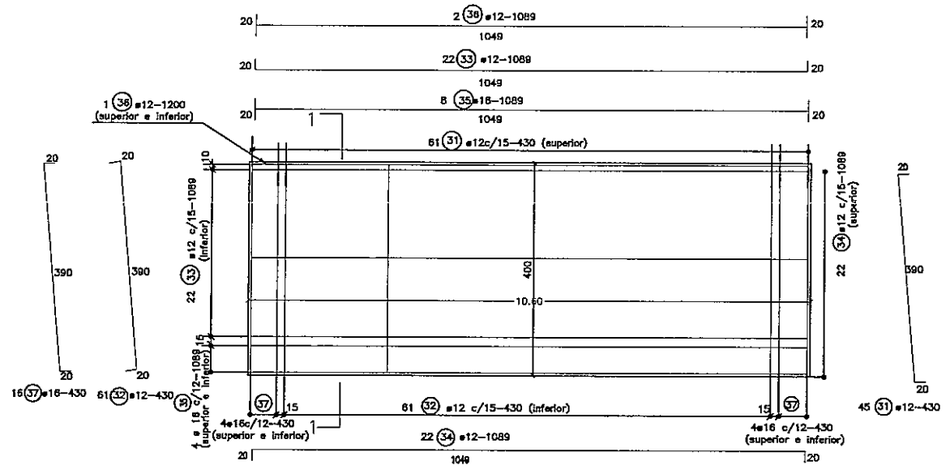
| | | | | |
|---|---|---|---|---|
| CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | ARMADURAS SUPERESTRUCTURA<br>PUENTE 12 m<br>Escalas: VER LAMINA | M.O.P.C.<br>MAPA DEL PARAGUAY<br>Lamina N° 23 |

18
(Diez y ocho)

# LOSA DE APROXIMACION ARMADURAS




CORTE 1–1




PLANILLA DE ARMADURA 2 LOSAS DE APROXIMACION

| Pos | Φ | CANT | LONG UNI | LONG TOTAL |
|---|---|---|---|---|
| 31 | 12 | 122 | 12 | 1464.00 |
| 32 | 12 | 122 | 4.3 | 524.60 |
| 33 | 12 | 44 | 10.89 | 479.16 |
| 35 | 16 | 16 | 10.89 | 174.24 |
| 36 | 16 | 4 | 10.89 | 43.56 |
| 37 | 16 | 32 | 2.22 | 71.04 |
| 38 | 20 | 104 | 3.03 | 315.12 |
| | | | | 3072.72 |

| Φ | LONG TOTAL | kg/m | kg totales |
|---|---|---|---|
| 25 | | 3.85 | 0.00 |
| 20 | 315.12 | 2.48 | 781.50 |
| 16 | 288.84 | 1.57 | 453.48 |
| 12 | 2467.76 | 0.88 | 2171.68 |
| 10 | | 0.624 | 0.00 |
| | | | 3406.66 |

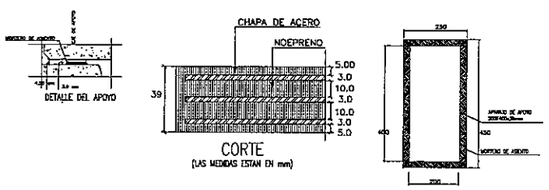
NOTAS

1– TODAS LAS MEDIDAS ESTAN EN cm SALVO LAS INDICADAS EXPRESAMENTE.

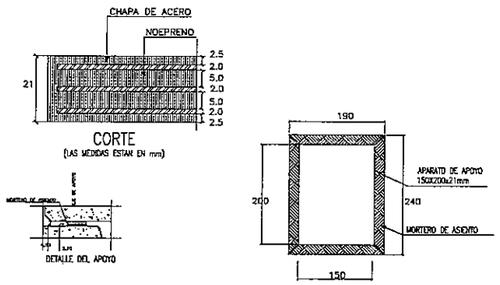
2– RECUBRIMIENTOS
RECUBRIMIENTO MINIMO=8cm

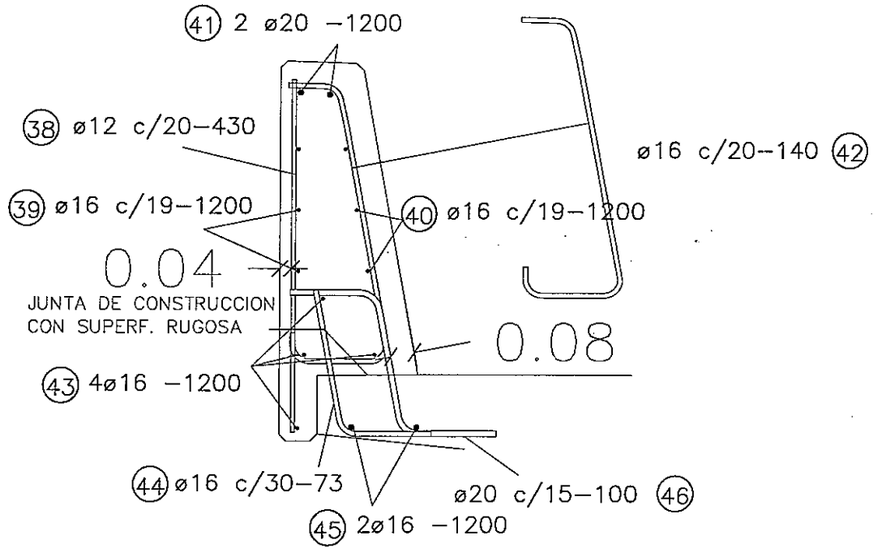
SALVO EN LA BARANDA
RECUBRIMIENTO MINIMO=4cm

APOYO 24 m




APOYO 12 m




CIALPA S.A. Consorcio Cialpa - Electropar

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VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION DE VIALIDAD
CONTRATO S.G.V.M.O.P. Nº 36 / 2010
LLAMADO MOPC Nº 204 / 2009

DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI

MISCELANEAS PUENTE 24 y 12 m.

Escalas: SIN ESCALA

Lamina Nº 30

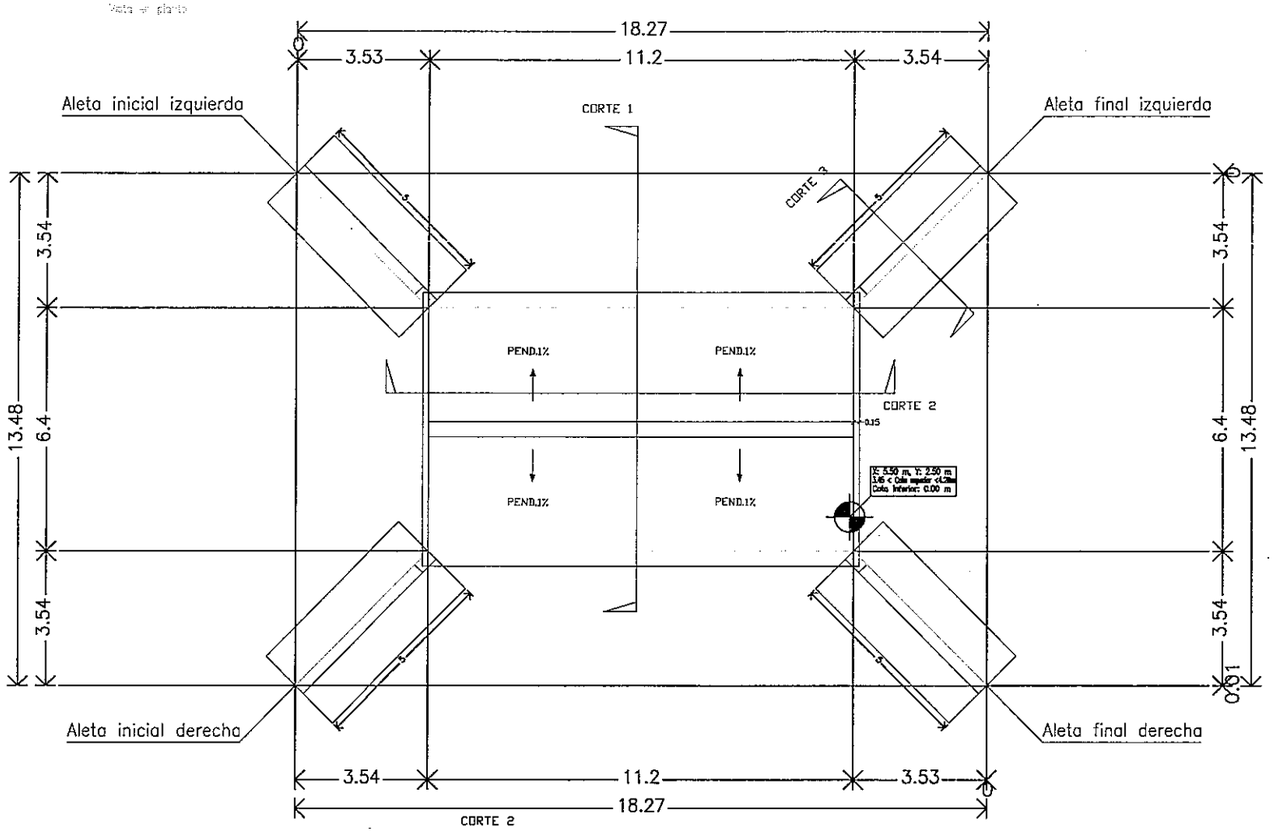
M.O.P.C.

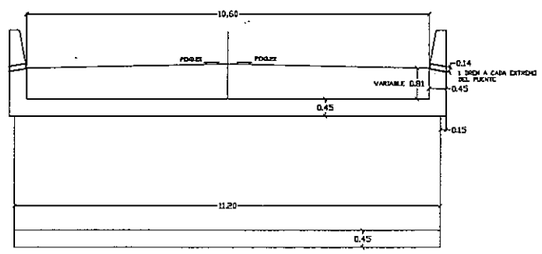
MAPA DEL PARAGUAY



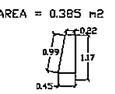
(Diez y nueve

# ALCANTARILLAS CELULARES



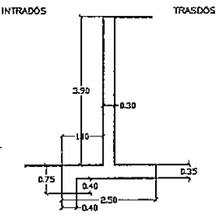




AREA = 0.385 m2

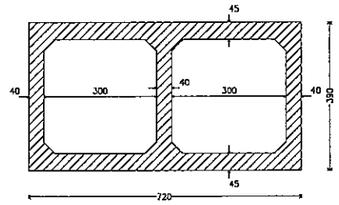



CORTE 3

Aleta final izquierda

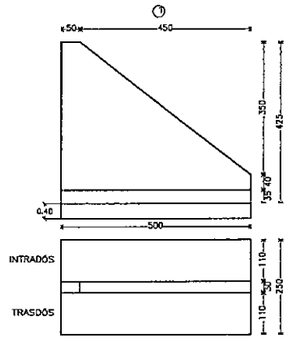



CORTE 1



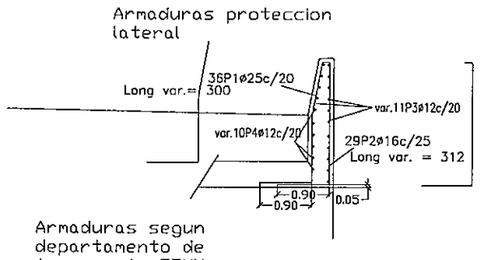

Aleta final izquierda y Aleta final derecha

Aleta inicial derecha y Aleta final derecha



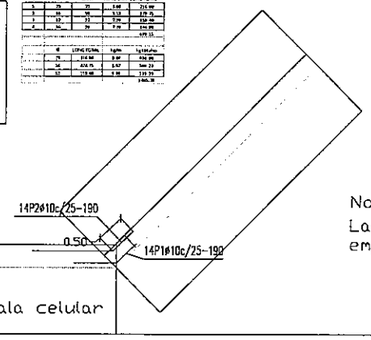

| | | | | |
|---|---|---|---|---|
| CALPA S.A. Consorcio Calpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 35 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | CELULAR 3X3X2 unid.<br>GEOMETRIA<br>Escalas: Esc: 1/150 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO<br>Lamina Nº 16 |

21
(veinte y uno




| PLANILLA DE ARMADURA PROTECCION LATERAL | | | | |
|---|---|---|---|---|
| Pos. | Ø | Cant. | LONG.UNIT. (cm) | LONG.TOTAL |
| 1 | 25 | 72 | 3.00 | 216.00 |
| 2 | 20 | 40 | 5.12 | 204.80 |
| 3 | 12 | 72 | 2.00 | 144.00 |
| 4 | 16 | 24 | 2.00 | 48.00 |
| | | | | 612.80 |

| Ø | LONG.TOTAL | kg/m | kg totales |
|---|---|---|---|
| 25 | 216.00 | 3.85 | 831.60 |
| 16 | 48.00 | 1.58 | 75.84 |
| 12 | 144.00 | 0.89 | 128.16 |
| | | | 1035.60 |




Esc: 1/100

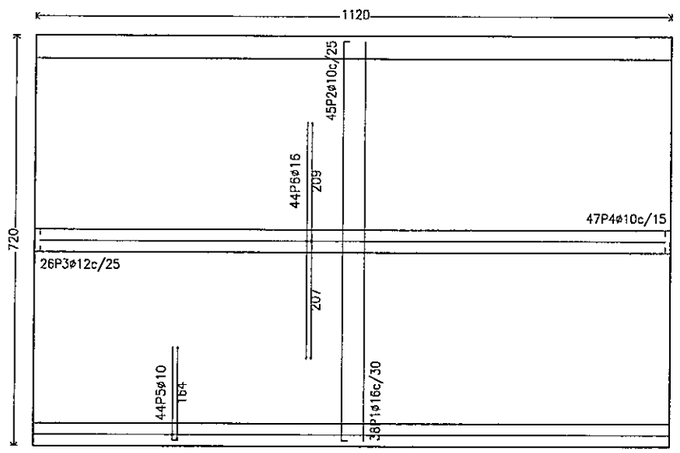
Detalle union ala celular

Nota:
Las alas van empotradas al celular

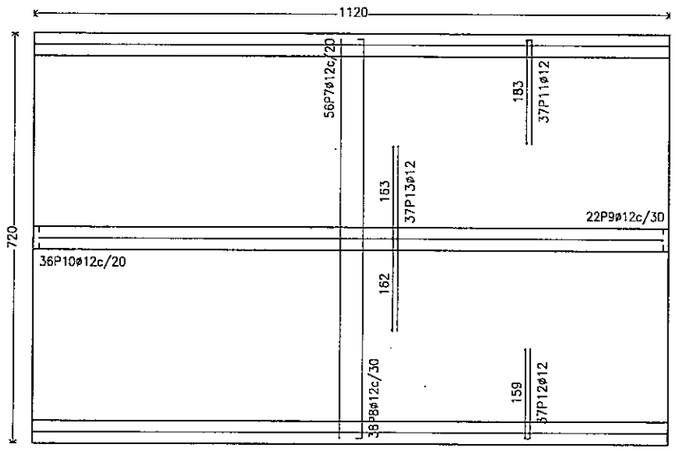
| Aleta final derecha | | | | | | | |
|---|---|---|---|---|---|---|---|
| POSICION | ø mm | NRO. PIEZAS | LONGITUD m | FORMA L=cm | LONGITUD TOTAL m | PESO kg/m | PESO kg |
| 1 | 10 | 14 | 1.03 – 5.33 | 20 62 – 492 20 | 46.35 | 0.62 | 28.57 |
| 2 | 10 | 14 | 1.05 – 5.33 | 20 64 – 492 20 | 46.54 | 0.62 | 28.69 |
| 3 | 12 | 10 | 5.14 | 11 492 11 | 51.38 | 0.89 | 45.62 |
| 4 | 12 | 10 | 5.14 | 11 492 11 | 51.38 | 0.89 | 45.62 |
| 5 | 12 | 18 | 0.57 – 3.59 | 17 34 – 342 | 39.71 | 0.89 | 35.26 |
| 6 | 12 | 18 | 0.84 | 20 64 | 15.03 | 0.89 | 13.34 |
| 7 | 12 | 17 | 0.98 – 1.96 | 20 78 – 178 | 30.62 | 0.89 | 27.19 |
| 8 | 10 | 18 | 0.57 – 3.58 | 18 34 – 342 | 39.72 | 0.62 | 24.49 |
| 9 | 10 | 18 | 0.69 | 20 49 | 12.35 | 0.62 | 7.61 |
| 10 | 12 | 18 | 2.43 | 243 | 43.74 | 0.89 | 38.83 |
| 11 | 12 | 18 | 2.43 | 243 | 43.74 | 0.89 | 38.83 |
| | | | | | ø10 | 164.96 | 0.62 | 89.36 |
| | | | | | ø12 | 275.60 | 0.89 | 244.69 |
| γs = 4200 kg/cm2 | | | | | Peso total | | | 334.05 |
| | | | | | Peso total con mermas (10.00%) | | | 367.46 |

| Aleta inicial izquierda y Aleta final izquierda | | | | | | | |
|---|---|---|---|---|---|---|---|
| POSICION | ø mm | NRO. PIEZAS | LONGITUD m | FORMA L=cm | LONGITUD TOTAL m | PESO kg/m | PESO kg |
| 1 | 10 | 28 (2x14) | 1.03 – 5.33 | 20 62 – 492 20 | 92.69 | 0.62 | 57.15 |
| 2 | 10 | 28 (2x14) | 1.05 – 5.33 | 20 64 – 492 20 | 93.08 | 0.62 | 57.38 |
| 3 | 12 | 20 (2x10) | 5.14 | 11 492 11 | 102.76 | 0.89 | 91.23 |
| 4 | 12 | 20 (2x10) | 5.14 | 11 492 11 | 102.76 | 0.89 | 91.23 |
| 5 | 12 | 36 (2x18) | 0.57 – 3.58 | 17 34 – 342 | 79.42 | 0.89 | 70.52 |
| 6 | 12 | 36 (2x18) | 0.84 | 20 64 | 30.06 | 0.89 | 26.69 |
| 7 | 12 | 34 (2x17) | 0.98 – 1.96 | 20 78 – 178 | 61.24 | 0.89 | 54.37 |
| 8 | 10 | 36 (2x18) | 0.57 – 3.58 | 18 34 – 342 | 79.44 | 0.62 | 49.98 |
| 9 | 10 | 36 (2x18) | 0.69 | 20 49 | 24.70 | 0.62 | 15.23 |
| 10 | 12 | 36 (2x18) | 2.43 | 243 | 87.48 | 0.89 | 77.87 |
| 11 | 12 | 36 (2x18) | 2.43 | 243 | 87.48 | 0.89 | 77.87 |
| | | | | | ø10 | 299.91 | 0.62 | 185.94 |
| | | | | | ø12 | 551.20 | 0.89 | 489.38 |
| γs = 4200 kg/cm2 | | | | | Peso total | | | 675.32 |
| | | | | | Peso total con mermas (10.00%) | | | 742.85 |

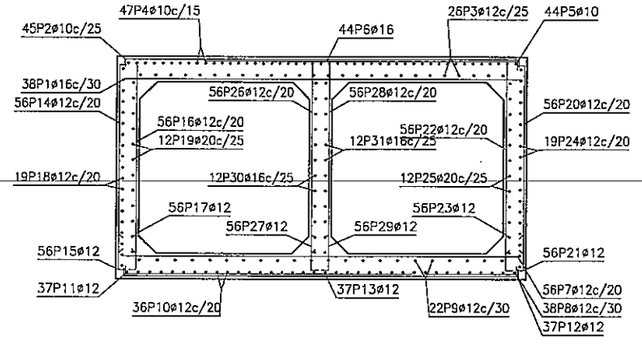
Módulo
Losa superior




Módulo
Losa inferior

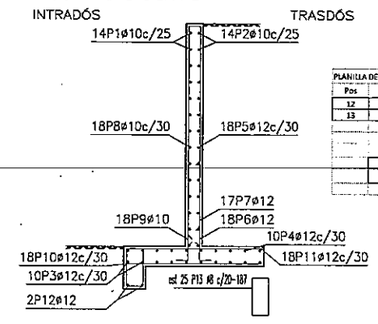



Módulo
Sección




Esc: 1/100

Aleta detalle




| PLANILLA DE ARMADURA VIGA FUND. ALETAS | | | | |
|---|---|---|---|---|
| Pos | Ø | CANT | LONG UNIT | LONG TOTAL |
| 12 | 12 | 8 | 5.00 | 40.00 |
| 13 | 8 | 100 | 1.87 | 187.00 |
| | | | | 227.00 |

| Ø | LONG TOTAL | kg/m | kg totales |
|---|---|---|---|
| 12 | 40.00 | 0.88 | 35.20 |
| 8 | 187.00 | 0.4 | 74.80 |
| | | | 110.00 |

| Módulo | | | | | | | |
|---|---|---|---|---|---|---|---|
| POSICION | ø mm | NRO. PIEZAS | LONGITUD m | FORMA L=cm | LONGITUD TOTAL m | PESO kg/m | PESO kg |
| 1 | 16 | 36 | 7.08 | 708 | 289.14 | 1.58 | 424.79 |
| 2 | 10 | 45 | 7.27 | 10 707 10 | 327.27 | 0.62 | 201.77 |
| 3 | 12 | 25 | 11.60 | 24 1112 24 | 301.55 | 0.89 | 267.72 |
| 4 | 10 | 47 | 11.52 | 20 24 1112 20 24 | 541.44 | 0.62 | 333.82 |
| 5 | 10 | 44 | 1.74 | 10 164 | 76.53 | 0.62 | 47.18 |
| 6 | 16 | 44 | 4.15 | 416 | 183.05 | 1.58 | 288.91 |
| 7 | 12 | 56 | 7.08 | 708 | 396.52 | 0.89 | 352.14 |
| 8 | 12 | 38 | 7.30 | 11 707 11 | 277.35 | 0.89 | 246.24 |
| 9 | 12 | 22 | 11.60 | 24 1112 24 | 255.16 | 0.89 | 226.94 |
| 10 | 12 | 36 | 11.60 | 24 1112 24 | 417.53 | 0.89 | 370.70 |
| 11 | 12 | 37 | 1.55 | 11 153 11 | 72.00 | 0.89 | 63.92 |
| 12 | 12 | 37 | 1.70 | 11 159 11 | 62.98 | 0.89 | 55.92 |
| 13 | 12 | 37 | 3.25 | 325 | 120.35 | 0.89 | 106.85 |
| 14 | 12 | 56 | 3.50 | 11 339 11 | 196.17 | 0.89 | 174.15 |
| 15 | 12 | 56 | 0.84 | 11 72 11 | 46.76 | 0.89 | 41.52 |
| 16 | 12 | 56 | 3.40 | 340 | 190.12 | 0.89 | 168.80 |
| 17 | 12 | 56 | 0.83 | 11 72 11 | 46.54 | 0.89 | 41.32 |
| 18 | 12 | 19 | 11.89 | 11 11 27 1112 27 | 225.83 | 0.89 | 200.50 |
| 19 | 20 | 12 | 12.45 | 41 41 26 1111 26 | 149.40 | 2.47 | 368.44 |
| 20 | 12 | 56 | 3.50 | 11 339 11 | 196.17 | 0.89 | 174.15 |
| 21 | 12 | 56 | 0.84 | 11 72 11 | 46.76 | 0.89 | 41.52 |
| 22 | 12 | 56 | 3.40 | 340 | 190.12 | 0.89 | 168.80 |
| 23 | 12 | 56 | 0.83 | 11 72 11 | 46.54 | 0.89 | 41.32 |
| 24 | 12 | 19 | 11.89 | 11 11 27 1112 27 | 225.83 | 0.89 | 200.50 |
| 25 | 20 | 12 | 12.45 | 41 41 26 1111 26 | 149.40 | 2.47 | 368.44 |
| 26 | 12 | 56 | 3.40 | 340 | 190.12 | 0.89 | 168.80 |
| 27 | 12 | 56 | 0.83 | 11 72 11 | 46.54 | 0.89 | 41.32 |
| 28 | 12 | 56 | 3.40 | 340 | 190.12 | 0.89 | 168.80 |
| 29 | 12 | 56 | 0.83 | 11 72 11 | 46.54 | 0.89 | 41.32 |
| 30 | 16 | 12 | 12.03 | 19 19 27 1111 27 | 144.41 | 1.58 | 227.92 |
| 31 | 16 | 12 | 12.03 | 19 19 27 1111 27 | 144.41 | 1.58 | 227.92 |
| | | | | ø10 | 945.24 | 0.62 | 582.77 |
| | | | | ø12 | 3787.70 | 0.89 | 3362.87 |
| | | | | ø16 | 741.01 | 1.58 | 1169.54 |
| | | | | ø20 | 298.60 | 2.47 | 736.88 |
| γs = 4200 kg/cm2 | | | | Peso total | | | 5852.06 |
| | | | | Peso total con mermas (10.00%) | | | 6437.27 |

CIALPA S.A. Consorcio Cialpa - Electropar

REPUBLICA DEL PARAGUAY
VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES
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DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI

ARMADURAS CELULAR 3X3X2 unid

Escalas: Esc: 1/150

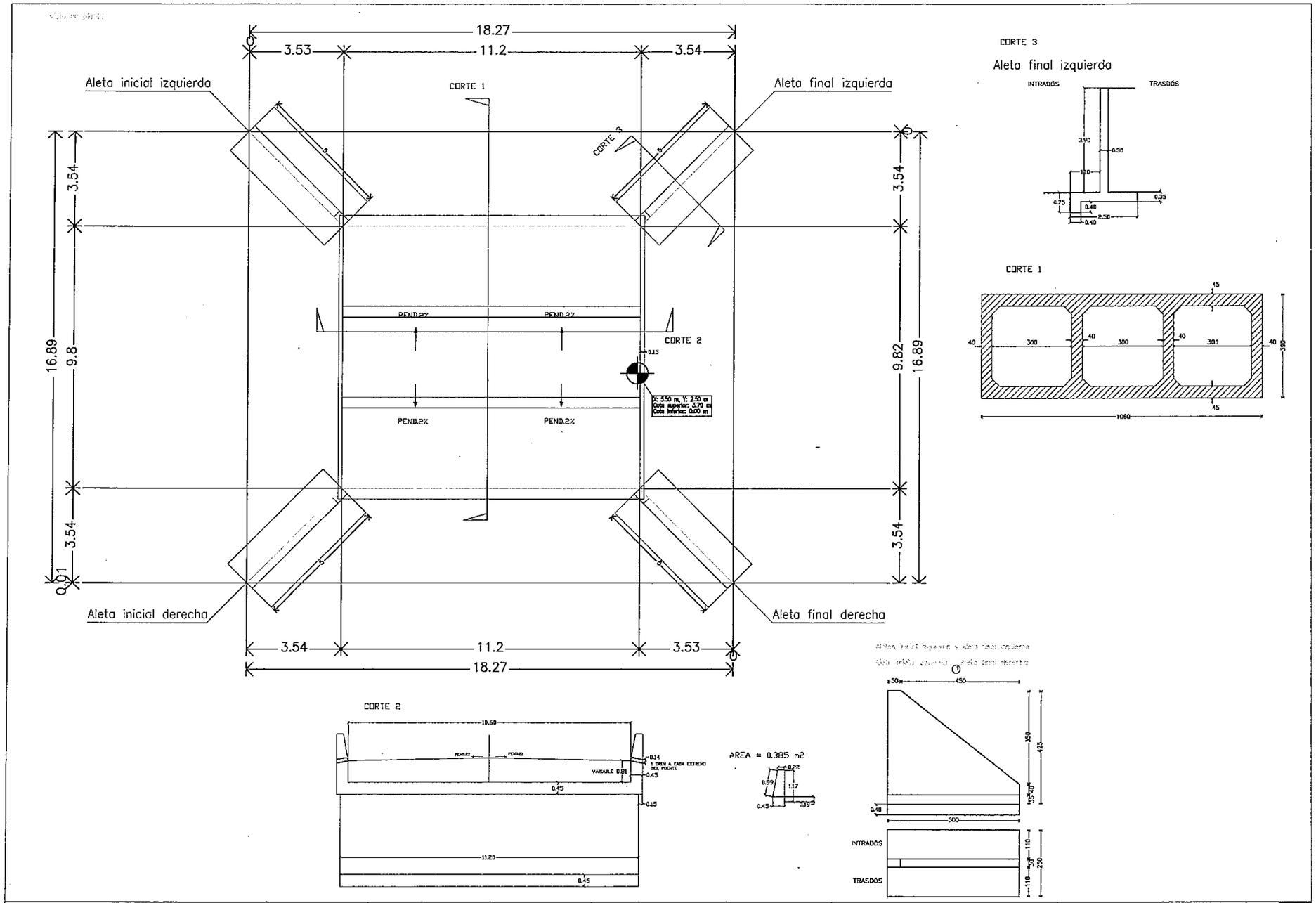
Lamina N° 26

M.O.P.C.

MAPA DEL PARAGUAY

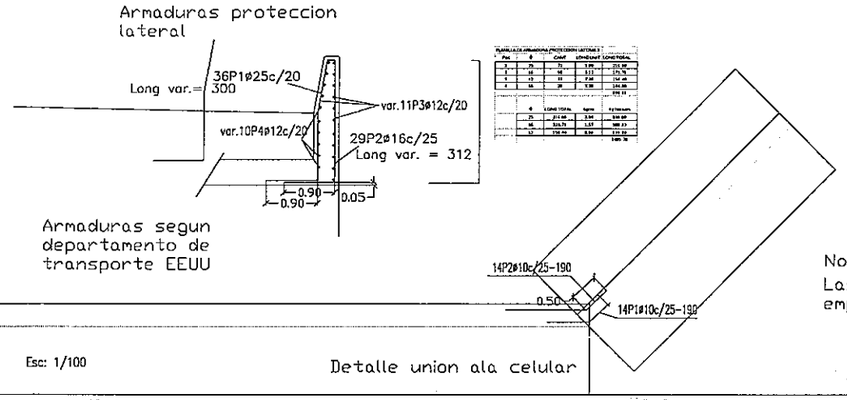
AREA PROYECTO

22
(veinte y dos




| | | | | |
|---|---|---|---|---|
| CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | CELULAR 3X3X3 unid.<br>GEOMETRIA<br>Escalas: Esc: 1/150<br>Lamina N° 17 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

23
(veinte y tres)




Nota:
Las alas van empotradas al celular

| PLANILLA DE ARMADURA PROTECCION LATERAL | | | | |
|---|---|---|---|---|
| Pos | Ø | CANT | LONGUNIT | LONGTOTAL |
| 1 | 25 | 36 | 3.00 | 108.00 |
| 2 | 16 | 58 | 3.12 | 179.76 |
| 3 | 12 | 10 | 7.00 | 84.00 |
| 4 | 16 | 20 | 3.00 | 60.00 |
| | | | | 431.76 |

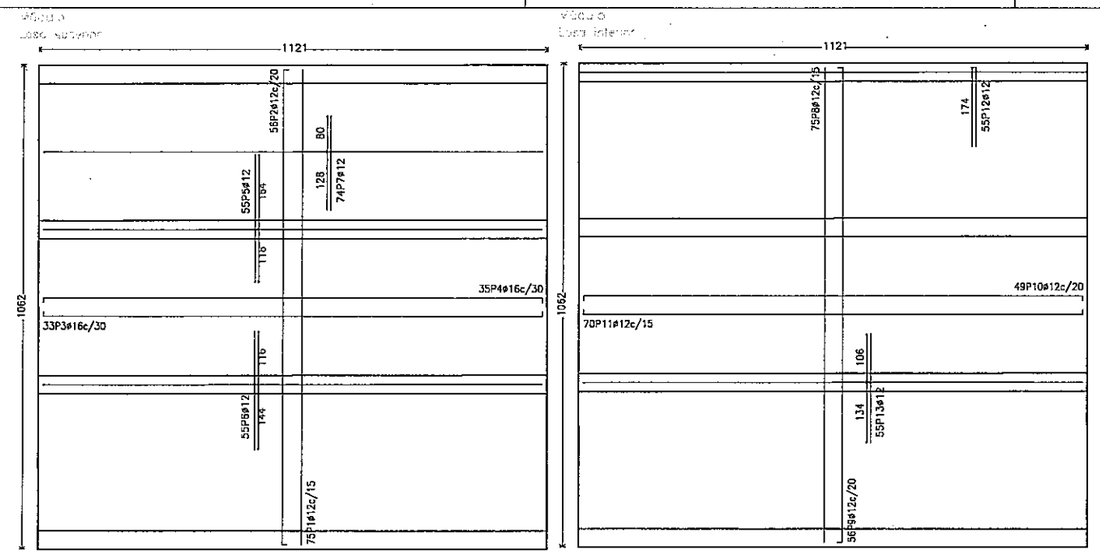
| Ø | LONG TOTAL | kg/m | kg totales |
|---|---|---|---|
| 25 | 216.00 | 3.85 | 831.60 |
| 16 | 239.76 | 1.57 | 376.33 |
| 12 | 84.00 | 0.88 | 73.92 |
| | | | 1281.85 |

## Aleta final derecha

| POSICIÓN # mm | NÚM. PIEZAS | LONGITUD m | FORMA Lmm | LONGITUD TOTAL m | PESO kg/m | PESO kg |
|---|---|---|---|---|---|---|
| 1 | 10 | 14 | 1.03 – 5.33 | 46.23 | 0.62 | 28.50 |
| 2 | 10 | 14 | 1.04 – 5.33 | 46.42 | 0.62 | 28.62 |
| 3 | 12 | 9 | 5.14 | 46.24 | 0.89 | 41.05 |
| 4 | 12 | 9 | 5.14 | 46.24 | 0.89 | 41.05 |
| 5 | 16 | 16 | 0.57 – 3.59 | 39.70 | 1.58 | 62.65 |
| 6 | 16 | 16 | 0.57 – 0.83 | 16.73 | 1.58 | 26.40 |
| 7 | 10 | 17 | 0.98 – 1.99 | 30.85 | 0.62 | 18.98 |
| 8 | 10 | 16 | 0.57 – 3.59 | 39.72 | 0.62 | 24.49 |
| 9 | 10 | 16 | 0.69 | 12.35 | 0.62 | 7.61 |
| 10 | 12 | 16 | 2.23 | 40.14 | 0.89 | 35.64 |
| 11 | 12 | 16 | 2.23 | 40.14 | 0.89 | 35.64 |
| | | | ø10 | 175.37 | 0.62 | 108.12 |
| | | | ø12 | 172.76 | 0.89 | 153.38 |
| | | | ø16 | 56.43 | 1.58 | 89.05 |
| B 400 S, CH | | | | | Peso total | 350.55 |
| | | | | Peso total con merma (10.00%) | | 385.61 |

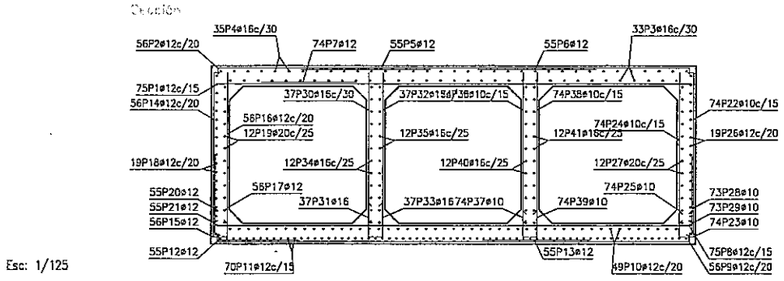
## Aleta inicial izquierda y Aleta final izquierda

| POSICIÓN # mm | NÚM. PIEZAS | LONGITUD m | FORMA Lmm | LONGITUD TOTAL m | PESO kg/m | PESO kg |
|---|---|---|---|---|---|---|
| 1 | 10 | 28 (2x14) | 1.03 – 5.33 | 92.47 | 0.62 | 57.01 |
| 2 | 10 | 28 (2x14) | 1.04 – 5.33 | 92.85 | 0.62 | 57.25 |
| 3 | 12 | 18 (2x9) | 5.14 | 92.48 | 0.89 | 82.11 |
| 4 | 12 | 18 (2x9) | 5.14 | 92.48 | 0.89 | 82.11 |
| 5 | 16 | 35 (2x18) | 0.57 – 3.59 | 79.39 | 1.58 | 125.31 |
| 6 | 16 | 36 (2x18) | 0.57 – 0.83 | 33.46 | 1.58 | 52.81 |
| 7 | 10 | 34 (2x17) | 0.98 – 1.99 | 61.30 | 0.62 | 37.79 |
| 8 | 10 | 36 (2x18) | 0.57 – 3.59 | 79.44 | 0.62 | 48.98 |
| 9 | 10 | 36 (2x18) | 0.69 | 24.70 | 0.62 | 15.23 |
| 10 | 12 | 36 (2x18) | 2.23 | 80.28 | 0.89 | 71.28 |
| 11 | 12 | 36 (2x18) | 2.23 | 80.28 | 0.89 | 71.28 |
| | | | ø10 | 350.76 | 0.62 | 216.25 |
| | | | ø12 | 345.52 | 0.89 | 306.76 |
| | | | ø16 | 112.85 | 1.58 | 178.12 |
| B 400 S, CH | | | | | Peso total | 701.15 |
| | | | | Peso total con merma (10.00%) | | 771.28 |

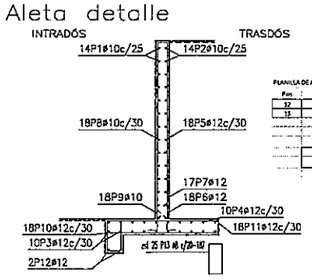



## Módulo

| POSICIÓN # mm | NÚM. PIEZAS | LONGITUD m | FORMA Lmm | LONGITUD TOTAL m | PESO kg/m | PESO kg |
|---|---|---|---|---|---|---|
| 1 | 12 | 75 | 10.49 – 10.50 | 787.10 | 0.89 | 698.51 |
| 2 | 12 | 56 | 10.83 – 10.84 | 606.63 | 0.89 | 538.59 |
| 3 | 18 | 33 | 11.75 | 387.66 | 1.58 | 612.20 |
| 4 | 18 | 35 | 11.75 | 411.39 | 1.58 | 649.31 |
| 5 | 12 | 55 | 2.61 | 154.42 | 0.89 | 137.10 |
| 6 | 12 | 55 | 2.60 | 143.00 | 0.89 | 126.96 |
| 7 | 12 | 74 | 2.08 | 153.83 | 0.89 | 136.60 |
| 8 | 12 | 75 | 10.49 – 10.50 | 787.10 | 0.89 | 698.51 |
| 9 | 12 | 58 | 10.70 – 10.72 | 599.20 | 0.89 | 532.52 |
| 10 | 12 | 49 | 11.60 | 568.30 | 0.89 | 504.56 |
| 11 | 12 | 70 | 11.60 | 811.86 | 0.89 | 720.80 |
| 12 | 12 | 55 | 1.86 | 102.13 | 0.89 | 90.67 |
| 13 | 12 | 55 | 2.40 | 132.00 | 0.89 | 117.19 |
| 14 | 12 | 55 | 3.50 | 195.63 | 0.89 | 173.67 |
| 15 | 12 | 56 | 0.83 | 46.54 | 0.89 | 41.32 |
| 16 | 12 | 56 | 3.39 | 190.01 | 0.89 | 168.70 |
| 17 | 12 | 56 | 0.83 | 46.54 | 0.89 | 41.32 |
| 18 | 12 | 19 | 11.80 | 225.83 | 0.89 | 200.50 |
| 19 | 20 | 12 | 12.45 | 149.40 | 2.47 | 368.44 |
| 20 | 12 | 55 | 1.51 | 83.04 | 0.89 | 73.73 |
| 21 | 12 | 55 | 0.83 | 45.71 | 0.89 | 40.58 |
| 22 | 10 | 74 | 3.49 | 258.04 | 0.62 | 159.99 |
| 23 | 10 | 74 | 0.77 | 56.68 | 0.62 | 34.95 |
| 24 | 10 | 74 | 3.39 | 251.01 | 0.62 | 154.76 |
| 25 | 10 | 74 | 0.77 | 56.68 | 0.62 | 34.95 |
| 26 | 12 | 19 | 11.89 | 225.99 | 0.89 | 200.64 |
| 27 | 20 | 12 | 12.45 | 149.40 | 2.47 | 368.44 |
| 28 | 10 | 73 | 1.47 | 107.30 | 0.62 | 66.15 |
| 29 | 10 | 73 | 0.77 | 55.92 | 0.62 | 34.48 |
| 30 | 18 | 37 | 3.40 | 125.62 | 1.58 | 198.26 |
| 31 | 18 | 37 | 0.98 | 36.30 | 1.58 | 57.29 |
| 32 | 18 | 37 | 3.40 | 125.62 | 1.58 | 198.26 |
| 33 | 18 | 37 | 0.98 | 36.30 | 1.58 | 57.29 |
| 34 | 18 | 12 | 12.03 | 144.41 | 1.58 | 227.92 |
| 35 | 18 | 12 | 12.03 | 144.41 | 1.58 | 227.92 |
| 36 | 10 | 74 | 3.39 | 251.01 | 0.62 | 154.76 |
| 37 | 10 | 74 | 0.77 | 56.68 | 0.62 | 34.95 |
| 38 | 10 | 74 | 3.39 | 251.01 | 0.62 | 154.76 |
| 39 | 10 | 74 | 0.77 | 56.68 | 0.62 | 34.95 |
| 40 | 18 | 12 | 12.03 | 144.41 | 1.58 | 227.92 |
| 41 | 18 | 12 | 12.03 | 144.41 | 1.58 | 227.92 |
| | | | ø10 | 1401.01 | 0.62 | 863.80 |
| | | | ø12 | 5905.45 | 0.89 | 5243.07 |
| | | | ø16 | 1700.75 | 1.58 | 2684.25 |
| | | | ø20 | 296.80 | 2.47 | 735.88 |
| B 400 S, CH | | | | | Peso total | 9526.04 |
| | | | | Peso total con merma (10.00%) | | 10480.64 |




## Aleta detalle




| PLANILLA DE ARMADURA VIGA FUND. ALETAS | | | |
|---|---|---|---|
| Pos | Ø | CANT | LONG UNIT | LONG TOTAL |
| 12 | 12 | 8 | 5.00 | 40.00 |
| 13 | 8 | 100 | 1.87 | 187.00 |
| | | | | 227.00 |

| Ø | LONG TOTAL | kg/m | kg totales |
|---|---|---|---|
| 12 | 40.00 | 0.88 | 35.20 |
| 8 | 187.00 | 0.4 | 74.80 |
| | | | 110.00 |

REPUBLICA DEL PARAGUAY
VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION DE VIALIDAD
CONTRATO S.G.V.M.O.P. Nº 36 / 2010
LLAMADO MOPC Nº 204 / 2009

CIALPA S.A. Consorcio Cialpa - Electropar

DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI

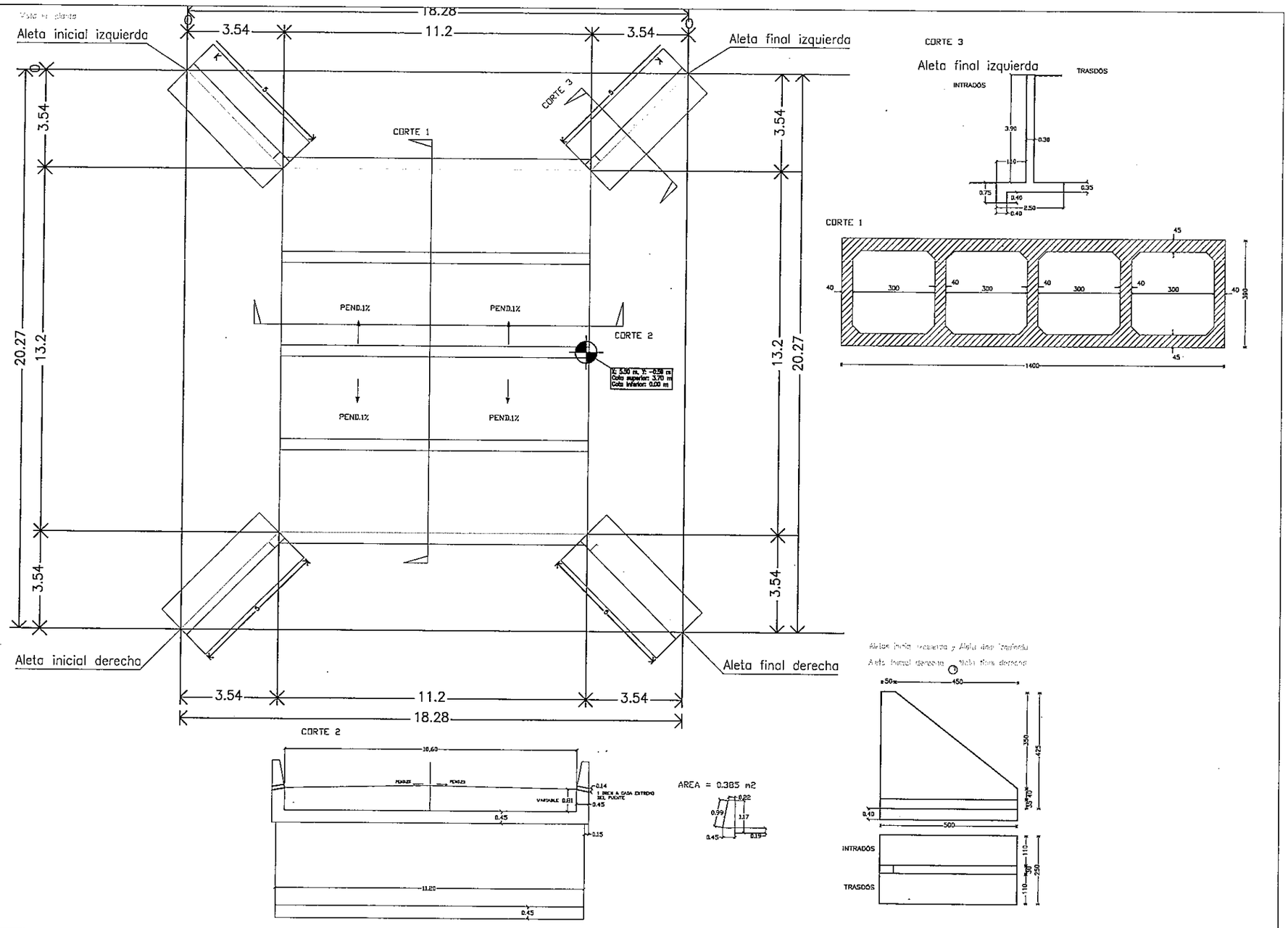
ARMADURAS CELULAR 3X3X3 unid

Escalas
Esc: 1/150

Lamina N° 27

M.O.P.C.
MAPA DEL PARAGUAY

24
(veinte y cuat



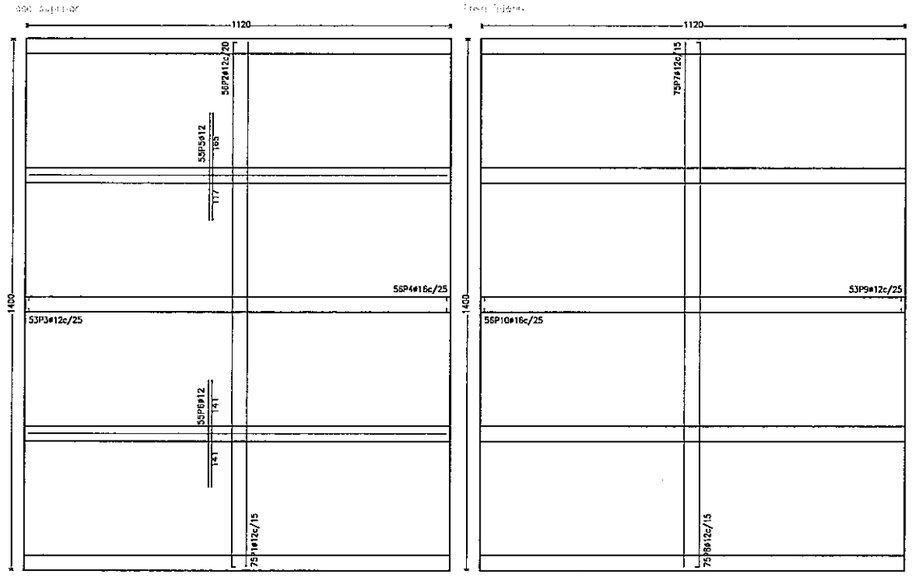

| | | | | |
|---|---|---|---|---|
| CIALPA S.A. Consorcio Cialpo - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | CELULAR 3X3X4 unid.<br>GEOMETRIA<br>Escalas: Esc: 1/150<br>Lamina N° 18 | M.O.P.C.<br>MAPA DEL PARAGUAY |

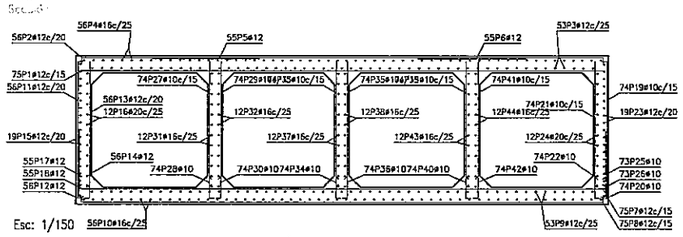
## Aleta inicial izquierda y Aleta final derecha

| POSICIÓN | ø mm | NÚM. PIEZAS | LONGITUD m | FORMA L=cm | LONGITUD TOTAL m | PESO kg/m | PESO kg |
|---|---|---|---|---|---|---|---|
| 1 | 12 | 24 (2x12) | 1.15 ~ 5.41 | 25 / 65 ~ 492 / 25 | 81.49 | 0.89 | 72.25 |
| 2 | 12 | 24 (2x12) | 1.17 ~ 5.41 | 25 / 67 ~ 492 / 25 | 81.86 | 0.89 | 72.89 |
| 3 | 16 | 20 (2x10) | 5.21 | 15 / 491 / 15 | 104.20 | 1.58 | 164.64 |
| 4 | 16 | 20 (2x10) | 5.21 | 15 / 491 / 15 | 104.20 | 1.58 | 164.64 |
| 5 | 16 | 36 (2x18) | 0.62 ~ 3.64 | 25 / 40 ~ 342 | 81.19 | 1.58 | 128.15 |
| 6 | 16 | 36 (2x18) | 0.86 ~ 0.83 | 20 / 68 ~ 73 | 33.17 | 1.58 | 52.35 |
| 7 | 16 | 34 (2x17) | 0.97 ~ 1.96 | 20 / 77 ~ 178 | 50.93 | 1.58 | 80.17 |
| 8 | 10 | 36 (2x18) | 0.62 ~ 3.64 | 25 / 39 ~ 342 | 81.24 | 0.62 | 50.09 |
| 9 | 10 | 36 (2x18) | 0.68 | 20 / 48 | 24.41 | 0.62 | 15.05 |
| 10 | 16 | 36 (2x18) | 2.26 | 226 | 82.08 | 1.58 | 129.55 |
| 11 | 16 | 36 (2x18) | 2.26 | 226 | 82.08 | 1.58 | 129.55 |
| | | | | ø10 | 105.65 | 0.62 | 65.14 |
| | | | | ø12 | 163.37 | 0.89 | 145.04 |
| | | | | ø16 | 547.99 | 1.58 | 865.82 |
| B 400 S, CN | | | | | | Peso total | 1075.00 |
| | | | | | | Peso total con mermas (10.00%) | 1183.00 |

## Aleta final izquierda

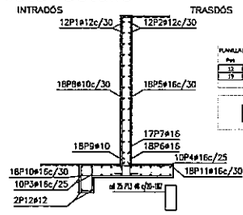
| POSICIÓN | ø mm | NÚM. PIEZAS | LONGITUD m | FORMA L=cm | LONGITUD TOTAL m | PESO kg/m | PESO kg |
|---|---|---|---|---|---|---|---|
| 1 | 12 | 12 | 1.05 ~ 5.31 | 20 / 65 ~ 492 / 20 | 39.54 | 0.89 | 35.10 |
| 2 | 12 | 12 | 1.07 ~ 5.31 | 20 / 67 ~ 492 / 20 | 39.73 | 0.89 | 35.27 |
| 3 | 16 | 10 | 5.21 | 15 / 491 / 15 | 52.10 | 1.58 | 82.32 |
| 4 | 16 | 10 | 5.21 | 15 / 491 / 15 | 52.10 | 1.58 | 82.32 |
| 5 | 16 | 18 | 0.74 ~ 3.76 | 15 / 18 / 40 ~ 342 | 42.78 | 1.58 | 67.48 |
| 6 | 16 | 18 | 0.86 ~ 0.83 | 20 / 20 / 68 ~ 73 | 16.59 | 1.58 | 26.18 |
| 7 | 16 | 17 | 0.97 ~ 1.96 | 20 / 20 / 77 ~ 178 | 30.47 | 1.58 | 48.09 |
| 8 | 10 | 18 | 0.68 ~ 3.71 | 10 / 18 / 39 ~ 342 | 41.83 | 0.62 | 25.79 |
| 9 | 10 | 16 | 0.68 | 20 / 48 | 12.20 | 0.62 | 7.52 |
| 10 | 16 | 18 | 2.23 | 223 | 40.14 | 1.58 | 63.35 |
| 11 | 16 | 18 | 2.23 | 223 | 40.14 | 1.58 | 63.35 |
| | | | | ø10 | 54.03 | 0.62 | 33.31 |
| | | | | ø12 | 79.27 | 0.89 | 70.37 |
| | | | | ø16 | 295.20 | 1.58 | 466.42 |
| B 400 S, CN | | | | | | Peso total | 570.10 |
| | | | | | | Peso total con mermas (10.00%) | 627.10 |




Esc: 1/150

## Aleta detalle




## Módulo

| POSICIÓN | ø mm | NÚM. PIEZAS | LONGITUD m | FORMA L=cm | LONGITUD TOTAL m | PESO kg/m | PESO kg |
|---|---|---|---|---|---|---|---|
| 1 | 12 | 75 | 13.88 | 1388 | 1041.30 | 0.89 | 924.50 |
| 2 | 12 | 56 | 14.22 | 16 / 1387 / 16 | 796.43 | 0.89 | 707.10 |
| 3 | 12 | 53 | 11.60 | 24 / 1112 / 24 | 614.69 | 0.89 | 545.75 |
| 4 | 16 | 56 | 11.75 | 32 / 1111 / 32 | 658.22 | 1.58 | 1038.89 |
| 5 | 12 | 55 | 2.82 | 282 | 154.89 | 0.89 | 137.52 |
| 6 | 12 | 55 | 2.82 | 282 | 155.09 | 0.89 | 137.69 |
| 7 | 12 | 75 | 13.88 | 1388 | 1041.30 | 0.89 | 924.50 |
| 8 | 12 | 75 | 14.10 | 11 / 1387 / 11 | 1057.50 | 0.89 | 938.89 |
| 9 | 12 | 53 | 11.60 | 24 / 1112 / 24 | 614.69 | 0.89 | 545.75 |
| 10 | 16 | 56 | 11.75 | 32 / 1111 / 32 | 658.22 | 1.58 | 1038.89 |
| 11 | 12 | 56 | 3.50 | 11 / 339 / 11 | 195.83 | 0.89 | 173.87 |
| 12 | 12 | 56 | 0.83 | 11 / 72 / 11 | 46.31 | 0.89 | 41.12 |
| 13 | 12 | 56 | 3.39 | 339 | 190.01 | 0.89 | 168.70 |
| 14 | 12 | 56 | 0.83 | 11 / 72 | 46.31 | 0.89 | 41.12 |
| 15 | 12 | 19 | 11.89 | 27 / 11 / 1112 / 11 / 27 | 225.83 | 0.89 | 200.50 |
| 16 | 20 | 12 | 12.45 | 26 / 41 / 1111 / 41 / 26 | 149.40 | 2.47 | 368.44 |
| 17 | 12 | 55 | 1.51 | 151 | 83.28 | 0.89 | 73.94 |
| 18 | 12 | 55 | 0.83 | 11 / 72 | 45.49 | 0.89 | 40.38 |
| 19 | 10 | 74 | 3.49 | 10 / 339 | 258.04 | 0.62 | 159.09 |
| 20 | 10 | 74 | 0.76 | 10 / 56 | 56.39 | 0.62 | 34.77 |
| 21 | 10 | 74 | 3.39 | 339 | 251.01 | 0.62 | 154.76 |
| 22 | 10 | 74 | 0.76 | 10 / 56 | 56.39 | 0.62 | 34.77 |
| 23 | 12 | 19 | 11.89 | 28 / 11 / 1112 / 11 / 28 | 225.99 | 0.89 | 200.64 |
| 24 | 20 | 12 | 12.45 | 27 / 40 / 1111 / 40 / 27 | 149.40 | 2.47 | 368.44 |
| 25 | 10 | 73 | 1.47 | 147 | 107.61 | 0.62 | 66.35 |
| 26 | 10 | 73 | 0.76 | 10 / 66 | 55.63 | 0.62 | 34.30 |
| 27 | 10 | 74 | 3.39 | 339 | 251.01 | 0.62 | 154.76 |
| 28 | 10 | 74 | 0.76 | 10 / 66 | 56.39 | 0.62 | 34.77 |
| 29 | 10 | 74 | 3.39 | 339 | 251.01 | 0.62 | 154.76 |
| 30 | 10 | 74 | 0.76 | 10 / 66 | 56.39 | 0.62 | 34.77 |
| 31 | 16 | 12 | 12.03 | 28 / 18 / 1111 / 18 / 28 | 144.41 | 1.58 | 227.92 |
| 32 | 16 | 12 | 12.03 | 28 / 18 / 1111 / 18 / 28 | 144.41 | 1.58 | 227.92 |
| 33 | 10 | 74 | 3.39 | 339 | 251.01 | 0.62 | 154.76 |
| 34 | 10 | 74 | 0.76 | 10 / 66 | 56.39 | 0.62 | 34.77 |
| 35 | 10 | 74 | 3.39 | 339 | 251.01 | 0.62 | 154.76 |
| 36 | 10 | 74 | 0.76 | 10 / 66 | 56.39 | 0.62 | 34.77 |
| 37 | 16 | 12 | 12.03 | 28 / 18 / 1111 / 18 / 28 | 144.41 | 1.58 | 227.92 |
| 38 | 16 | 12 | 12.03 | 28 / 18 / 1111 / 18 / 28 | 144.41 | 1.58 | 227.92 |
| 39 | 10 | 74 | 3.39 | 339 | 251.01 | 0.62 | 154.76 |
| 40 | 10 | 74 | 0.76 | 10 / 66 | 56.39 | 0.62 | 34.77 |
| 41 | 10 | 74 | 3.39 | 339 | 251.01 | 0.62 | 154.76 |
| 42 | 10 | 74 | 0.76 | 10 / 66 | 56.39 | 0.62 | 34.77 |
| 43 | 16 | 12 | 12.03 | 28 / 18 / 1111 / 18 / 28 | 144.41 | 1.58 | 227.92 |
| 44 | 16 | 12 | 12.03 | 28 / 18 / 1111 / 18 / 28 | 144.41 | 1.58 | 227.92 |
| | | | | ø10 | 2629.47 | 0.62 | 1621.22 |
| | | | | ø12 | 6534.94 | 0.89 | 5801.97 |
| | | | | ø16 | 2182.90 | 1.58 | 3445.30 |
| | | | | ø20 | 298.80 | 2.47 | 738.88 |
| B 400 S, CN | | | | | | Peso total | 11605.37 |
| | | | | | | Peso total con mermas (10.00%) | 12765.91 |

CIALPA S.A. Consorcio Cialpa - Electropar

REPUBLICA DEL PARAGUAY
VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES
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DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI

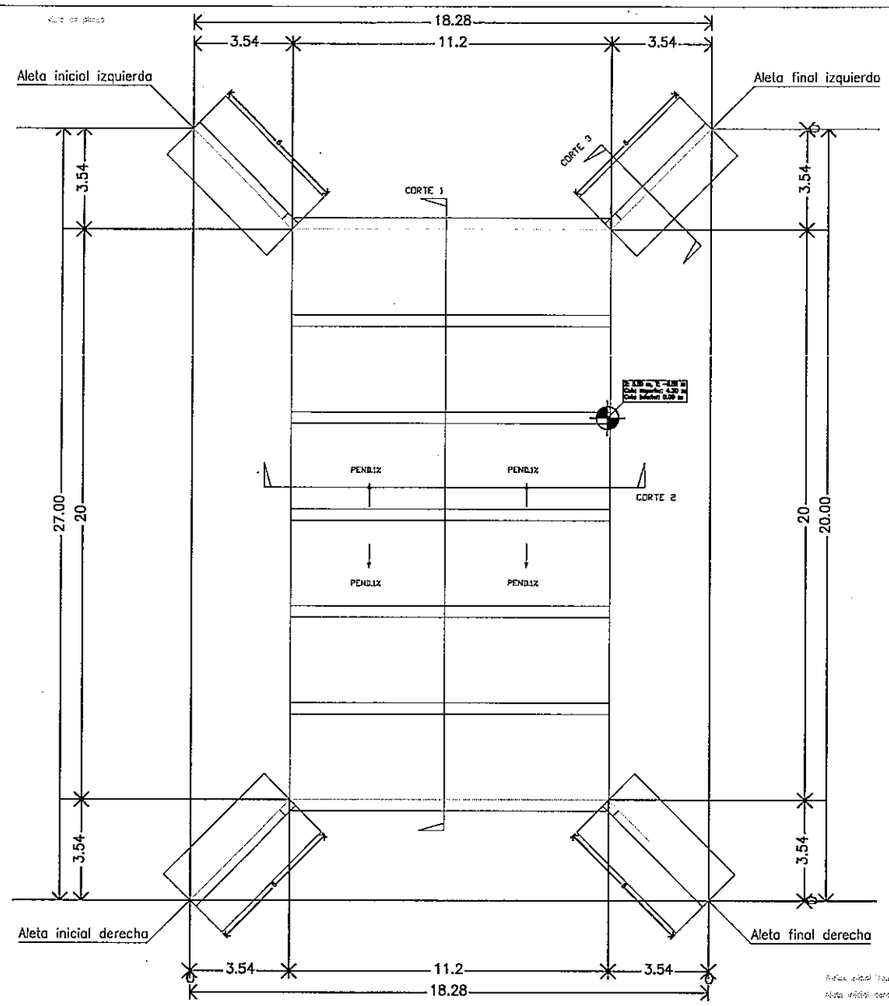
ARMADURAS CELULAR 3X3X4unid

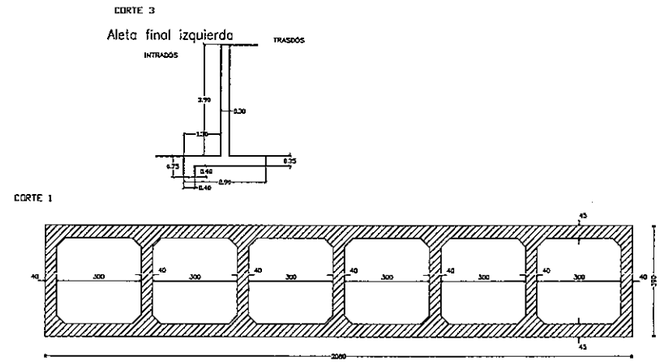
Escalas: Esc: 1/150

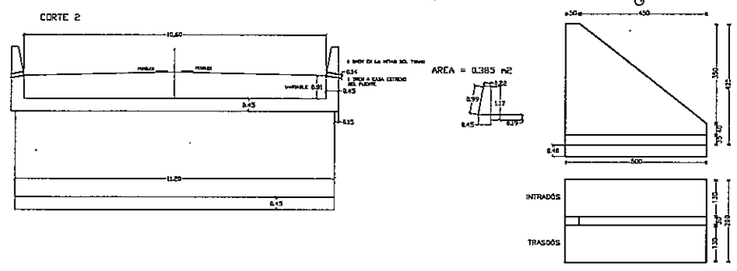
Lamina N° 28

M.O.P.C.

26
(veinte y seis)




CIALPA S.A. Consorcio Cialpa - Electropar

REPUBLICA DEL PARAGUAY
VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES
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CONTRATO S.G.V.M.O.P. Nº 36 / 2010
LLAMADO MOPC Nº 204 / 2009

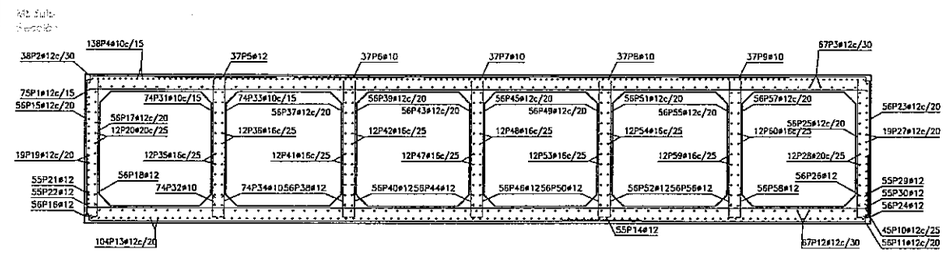
DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI

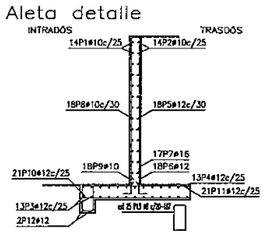
CELULAR 3X3X6 unid.
GEOMETRIA

Escalas: Esc: 1/200
Lamina N° 19

M.O.P.C.
MAPA DEL PARAGUAY
AREA PROYECTO

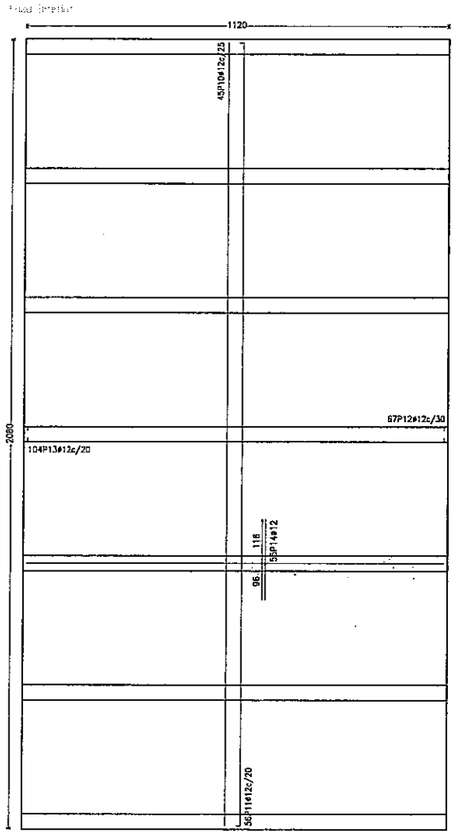
27
(veinte y siete)

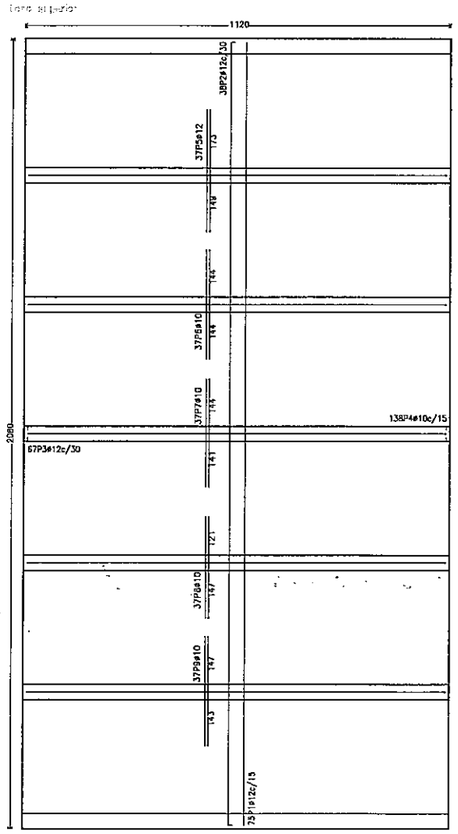



| PLANILLA DE ARMADURA VIGA FONDO ALETAS | | | | |
|---|---|---|---|---|
| Pos | Ø | CANT | LONGITUD | LONG.TOTAL |
| 12 | 12 | 8 | 3.80 | 45.60 |
| 13 | 8 | 380 | 3.97 | 1507.92 |
| | | | | 1553.52 |

| Ø | LONG.TOTAL | kg/m | kg.MASA |
|---|---|---|---|
| 12 | 45.60 | 0.89 | 40.58 |
| 8 | 1507.92 | 0.4 | 602.97 |
| | | | 643.55 |




Esc: 1/150

| Aleta inicial izquierda, Aleta inicial derecha, Aleta final izquierda y Aleta final derecha | | | | | | |
|---|---|---|---|---|---|---|
| POSICIÓN | # mm | NRO. PIEZAS | LONGITUD m | FORMA L=cm | LONGITUD TOTAL m | PESO kg/m | PESO kg |
| 1 | 10 | 56 | (4x14) | 1.22 – 3.32 | 20 42 – 492 20 | 184.93 | 0.62 | 114.62 |
| 2 | 10 | 56 | (4x14) | 1.24 – 3.32 | 20 64 – 492 20 | 185.70 | 0.62 | 114.49 |
| 3 | 12 | 52 | (4x13) | 5.14 | 11 11 492 | 267.18 | 0.89 | 237.21 |
| 4 | 12 | 52 | (4x13) | 5.14 | 11 11 492 | 267.18 | 0.89 | 237.21 |
| 5 | 12 | 72 | (4x18) | 0.57 – 3.56 | 17 36 – 342 | 156.85 | 0.89 | 141.03 |
| 6 | 12 | 72 | (4x18) | 0.89 | 20 69 | 63.72 | 0.89 | 56.57 |
| 7 | 16 | 68 | (4x17) | 1.02 – 2.03 | 20 32 – 183 | 125.76 | 1.58 | 198.48 |
| 8 | 10 | 72 | (4x18) | 0.57 – 3.56 | 18 36 – 342 | 156.88 | 0.62 | 97.26 |
| 9 | 10 | 72 | (4x18) | 0.74 | 20 54 | 52.99 | 0.62 | 32.87 |
| 10 | 12 | 84 | (4x21) | 2.83 | 283 | 237.72 | 0.89 | 211.06 |
| 11 | 12 | 84 | (4x21) | 2.83 | 283 | 237.72 | 0.89 | 211.06 |
| | | | | | #10 | 582.50 | 0.62 | 359.14 |
| | | | | | #12 | 1232.37 | 0.89 | 1094.14 |
| | | | | | #16 | 125.76 | 1.58 | 198.48 |
| B 400 S. CH | | | | | Peso total | 1651.76 |
| | | | | | Peso total con merma (10.00%) | 1816.94 |

| Módulo | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| POSICIÓN | # mm | NRO. PIEZAS | LONGITUD m | FORMA L=cm | LONGITUD TOTAL m | PESO kg/m | PESO kg |
| 1 | 12 | 75 | 20.68 | 2068 | 1551.04 | 0.89 | 1377.06 |
| 2 | 12 | 38 | 21.02 | 18 2067 18 | 798.70 | 0.89 | 709.12 |
| 3 | 12 | 67 | 11.50 | 24 1112 24 | 777.07 | 0.89 | 689.91 |
| 4 | 10 | 138 | 11.52 | 20 1112 20 | 1589.76 | 0.62 | 980.15 |
| 5 | 12 | 37 | 3.22 | 322 | 119.32 | 0.89 | 105.93 |
| 6 | 10 | 37 | 2.69 | 269 | 106.85 | 0.62 | 65.87 |
| 7 | 10 | 37 | 2.85 | 285 | 105.48 | 0.62 | 65.03 |
| 8 | 10 | 37 | 2.68 | 268 | 99.08 | 0.62 | 61.09 |
| 9 | 10 | 37 | 2.90 | 290 | 107.15 | 0.62 | 66.06 |
| 10 | 12 | 45 | 20.68 | 2068 | 930.62 | 0.89 | 826.24 |
| 11 | 12 | 58 | 20.90 | 11 2067 11 | 1170.20 | 0.89 | 1038.95 |
| 12 | 12 | 67 | 11.60 | 24 1112 24 | 777.07 | 0.89 | 689.91 |
| 13 | 12 | 104 | 11.60 | 24 1112 24 | 1206.19 | 0.89 | 1070.90 |
| 14 | 12 | 55 | 2.11 | 211 | 116.11 | 0.89 | 103.09 |
| 15 | 12 | 56 | 3.51 | 11 339 | 196.39 | 0.89 | 174.36 |
| 16 | 12 | 56 | 0.84 | 11 72 | 46.76 | 0.89 | 41.52 |
| 17 | 12 | 56 | 3.40 | 340 | 190.34 | 0.89 | 168.99 |
| 18 | 12 | 56 | 0.83 | 11 72 | 46.54 | 0.89 | 41.32 |
| 19 | 12 | 19 | 11.89 | 27 11 1112 11 27 | 225.83 | 0.89 | 200.50 |
| 20 | 20 | 12 | 12.45 | 41 41 28 25 1111 | 149.40 | 2.47 | 368.44 |
| 21 | 12 | 55 | 1.36 | 136 | 74.79 | 0.89 | 66.40 |
| 22 | 12 | 55 | 0.84 | 11 72 | 45.93 | 0.89 | 40.77 |
| 23 | 12 | 56 | 3.51 | 11 339 | 196.39 | 0.89 | 174.36 |
| 24 | 12 | 56 | 0.84 | 11 72 | 46.76 | 0.89 | 41.52 |
| 25 | 12 | 56 | 3.40 | 340 | 190.34 | 0.89 | 168.99 |
| 26 | 12 | 56 | 0.83 | 11 72 | 46.54 | 0.89 | 41.32 |
| 27 | 12 | 19 | 11.89 | 27 11 1112 11 27 | 225.83 | 0.89 | 200.50 |
| 28 | 20 | 12 | 12.45 | 41 41 28 25 1111 | 149.40 | 2.47 | 368.44 |
| 29 | 12 | 55 | 1.36 | 136 | 74.79 | 0.89 | 66.40 |
| 30 | 12 | 55 | 0.84 | 11 72 | 45.93 | 0.89 | 40.77 |
| 31 | 10 | 74 | 3.40 | 340 | 251.45 | 0.62 | 155.03 |
| 32 | 10 | 74 | 0.77 | 10 67 | 56.68 | 0.62 | 34.95 |
| 33 | 10 | 74 | 3.40 | 340 | 251.45 | 0.62 | 155.03 |
| 34 | 10 | 74 | 0.77 | 10 67 | 56.68 | 0.62 | 34.95 |
| 35 | 16 | 12 | 12.03 | 18 18 28 25 1111 | 144.41 | 1.58 | 227.92 |
| 36 | 16 | 12 | 12.03 | 18 18 28 25 1111 | 144.41 | 1.58 | 227.92 |
| 37 | 12 | 56 | 3.40 | 340 | 190.34 | 0.89 | 168.99 |
| 38 | 12 | 56 | 0.83 | 11 72 | 46.54 | 0.89 | 41.32 |
| 39 | 12 | 56 | 3.40 | 340 | 190.34 | 0.89 | 168.99 |
| 40 | 12 | 56 | 0.83 | 11 72 | 46.54 | 0.89 | 41.32 |
| 41 | 16 | 12 | 12.03 | 19 19 27 22 1111 | 144.41 | 1.58 | 227.92 |
| 42 | 16 | 12 | 12.03 | 19 19 27 22 1111 | 144.41 | 1.58 | 227.92 |
| 43 | 12 | 56 | 3.40 | 340 | 190.34 | 0.89 | 168.99 |
| 44 | 12 | 56 | 0.83 | 11 72 | 46.54 | 0.89 | 41.32 |
| 45 | 12 | 56 | 3.40 | 340 | 190.34 | 0.89 | 168.99 |
| 46 | 12 | 56 | 0.83 | 11 72 | 46.54 | 0.89 | 41.32 |
| 47 | 16 | 12 | 12.03 | 19 19 27 22 1111 | 144.41 | 1.58 | 227.92 |
| 48 | 16 | 12 | 12.03 | 19 19 27 22 1111 | 144.41 | 1.58 | 227.92 |
| 49 | 12 | 56 | 3.40 | 340 | 190.34 | 0.89 | 168.99 |
| 50 | 12 | 56 | 0.83 | 11 72 | 46.54 | 0.89 | 41.32 |
| 51 | 12 | 56 | 3.40 | 340 | 190.34 | 0.89 | 168.99 |
| 52 | 12 | 56 | 0.83 | 11 72 | 46.54 | 0.89 | 41.32 |
| 53 | 16 | 12 | 12.03 | 19 19 27 22 1111 | 144.41 | 1.58 | 227.92 |
| 54 | 16 | 12 | 12.03 | 19 19 27 22 1111 | 144.41 | 1.58 | 227.92 |
| 55 | 12 | 56 | 3.40 | 340 | 190.34 | 0.89 | 168.99 |
| 56 | 12 | 56 | 0.83 | 11 72 | 46.54 | 0.89 | 41.32 |
| 57 | 12 | 56 | 3.40 | 340 | 190.34 | 0.89 | 168.99 |
| 58 | 12 | 56 | 0.83 | 11 72 | 46.54 | 0.89 | 41.32 |
| 59 | 16 | 12 | 12.03 | 19 19 27 22 1111 | 144.41 | 1.58 | 227.92 |
| 60 | 16 | 12 | 12.03 | 19 19 27 22 1111 | 144.41 | 1.58 | 227.92 |
| | | | | #10 | 2624.58 | 0.62 | 1618.16 |
| | | | | #12 | 10994.51 | 0.89 | 9761.31 |
| | | | | #16 | 1444.10 | 1.58 | 2279.20 |
| | | | | #20 | 298.80 | 2.47 | 736.88 |
| B 400 S. CH | | | | | Peso total | 14385.55 |
| | | | | | Peso total con merma (10.00%) | 15823.11 |

CALPA S.A. Consorcio Calpa - Electropar

REPUBLICA DEL PARAGUAY
VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION DE VIALIDAD
CONTRATO S.G.V.M.O.P. Nº 36 / 2010
LLAMADO MOPC Nº 204 / 2009

DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI

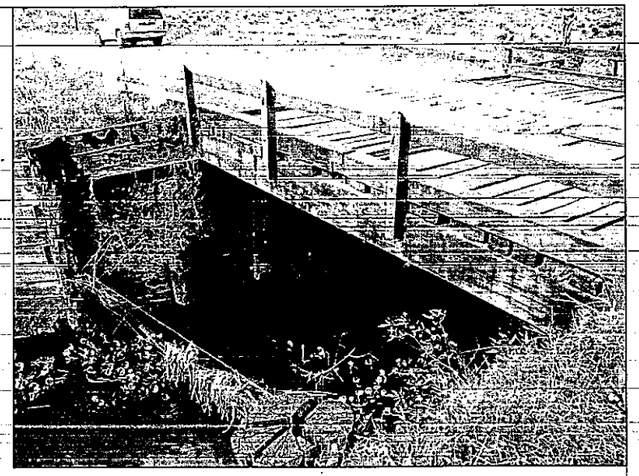
ARMADURAS CELULAR 3X3X6unid

Escalas: Esc: 1/150

Lamina Nº 29

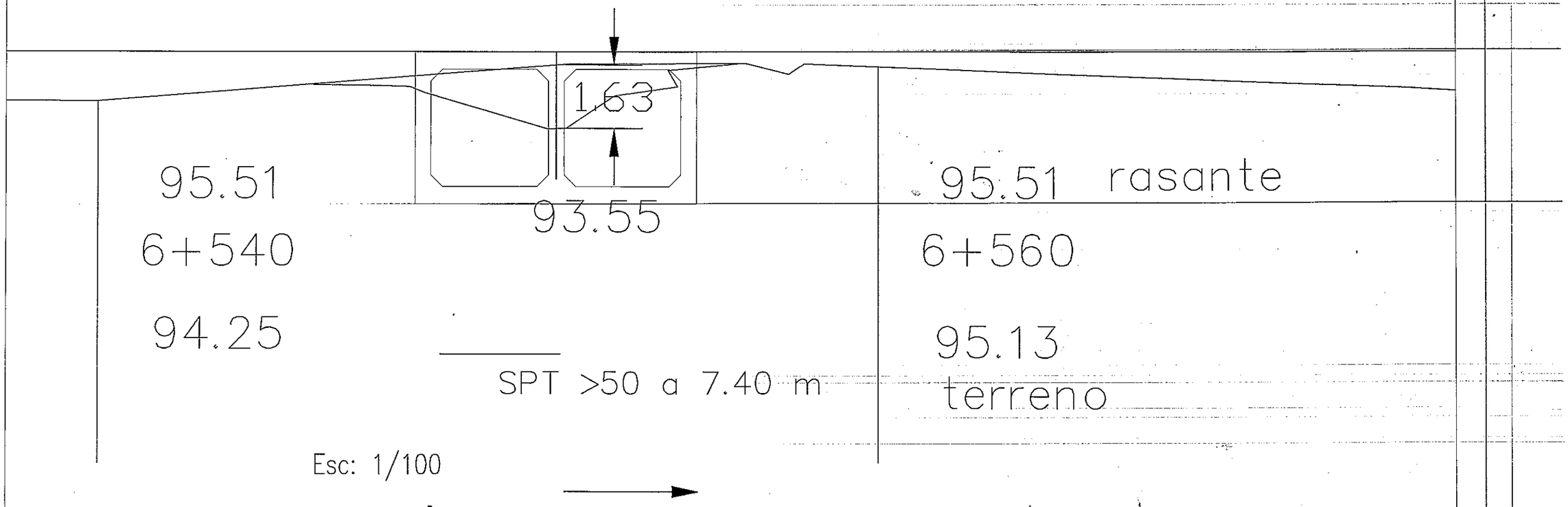
M.O.P.C.
MAPA DEL PARAGUAY
AREA PROYECTO

# ITURBE- VALLEPE- PTE RIO TEBICUARYMI



CELULAR 3X3X2 unid. 6 m. PROG 6+556.75

Verificar una capacidad de 1 kg/cm2
para fundar sin pilotes

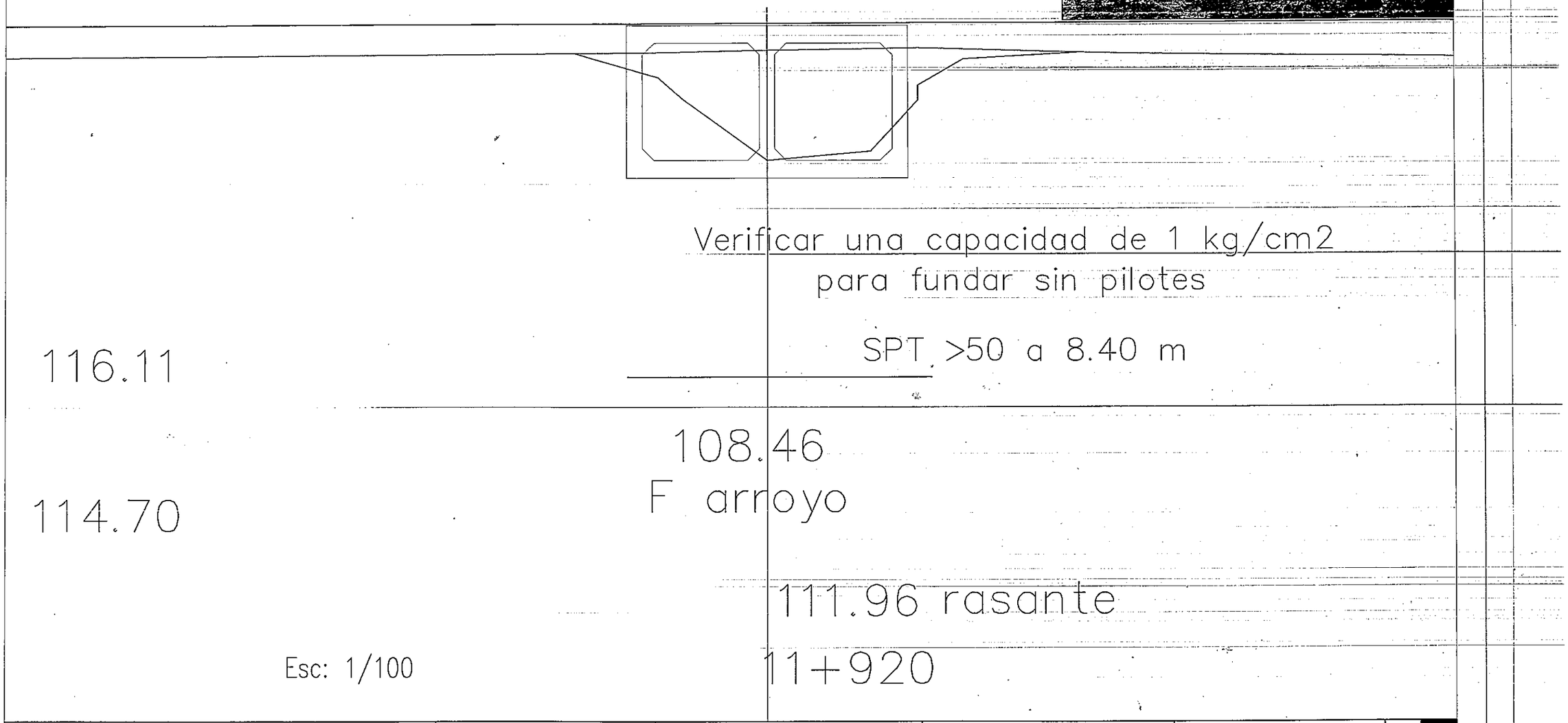



| | | | | | |
|---|---|---|---|---|---|
| | CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 35 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | CELULAR 3X3X2 unid. 6 m. PROG 6+556.75<br>CORTE LONGITUDINAL<br>Escalas: VER LAMINA<br>Lamina Nº 10 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

29
(veinte y nueve

# ITURBE- VALLEPE- PTE RIO TEBICUARYMI

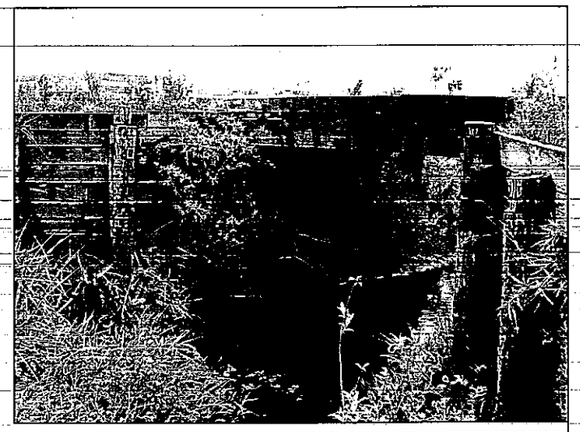
CELULAR 3X3X2 unid. 6 m. PROG 11+920

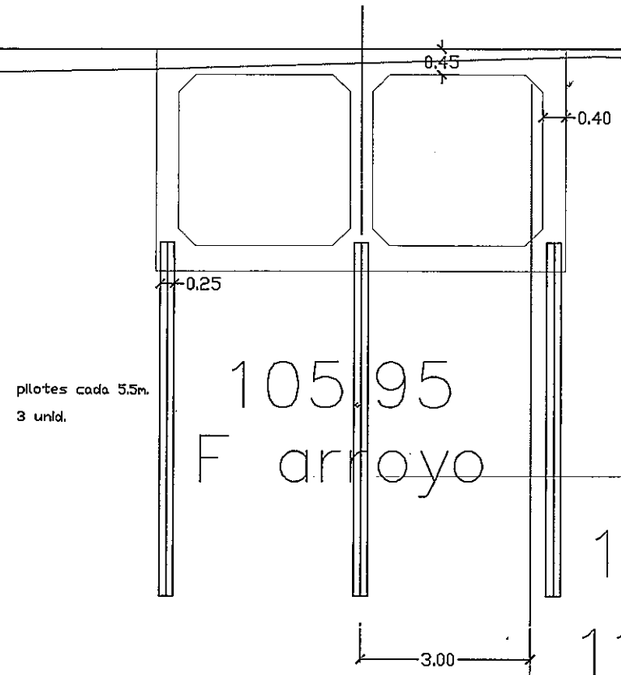



| | | | | |
|---|---|---|---|---|
| CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | CELULAR 3X3X2 unid. 6 m. PROG 11+920<br>CORTE LONGITUDINAL<br>Escalas: VER LAMINA<br>Lamina N°6 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

# ITURBE- VALLEPE- PTE RIO TEBICUARYMI

CELULAR 3X3X2 unid. 6 m. PROG 11+037






105.95
F arroyo

Hay bolson

verificar en nuevos sondeos
que el suelo tenga minimo
una capacidad de 1 kg/cm2

108.08 rasante
11+040

108.04
11+060

SPT >50 a 9.30 m

107.91
terreno

107.60

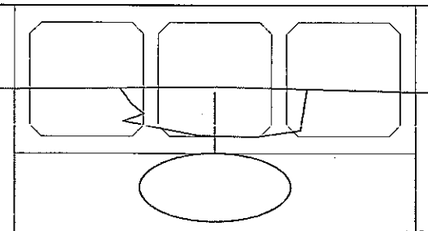
Esc: 1/100

| | | | | | |
|---|---|---|---|---|---|
| | CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | CELULAR 3X3X2 unid. 6 m. PROG 11+037<br>CORTE LONGITUDINAL<br>Escalas: VER LAMINA<br>Lamina N° 7 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

31
(Treintayun

## ITURBE- MACIEL

CELULARES 3X3X3unid. PROG 8+678



verificar en nuevos sondeos
que el suelo tenga minimo
una capacidad de 1 kg/cm2

SPT >50 a 7 m que no haya bolson para fundar superficialmente

aumenta la progresiva

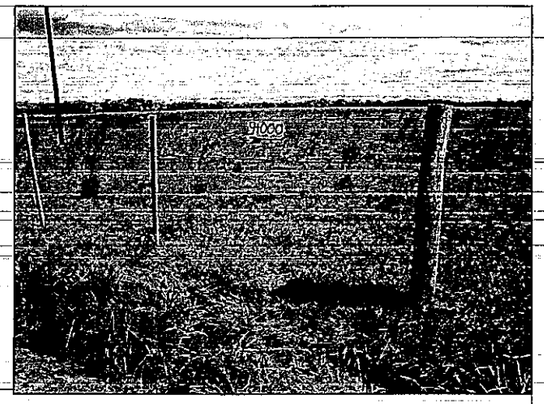
| | |
|---|---|
| 104.85 | 104.85 rasante |
| 8+672.70 | 8+683.30 |
| 102.65 | 102.57 terreno |

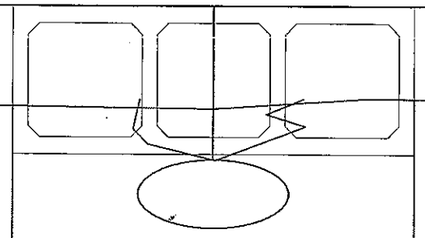
Esc: 1/150

| | | | | | |
|---|---|---|---|---|---|
| | CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | CELULARES 3X3X3unid. PROG 8+855<br>CORTE LONGITUDINAL<br>Escalas: VER LAMINA<br>Lamina Nº 12 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

# ITURBE- MACIEL

CELULARES 3X3X3unid. PROG 8+885





verificar en nuevos sondeos
que el suelo tenga minimo
una capacidad de 1 kg/cm2
que no haya bolson para fundar superficialmente

SPT >50 a 7 m

104.85

104.85 rasante

104.85

102.34

102.41
terreno

102.39

aumenta la progresiva

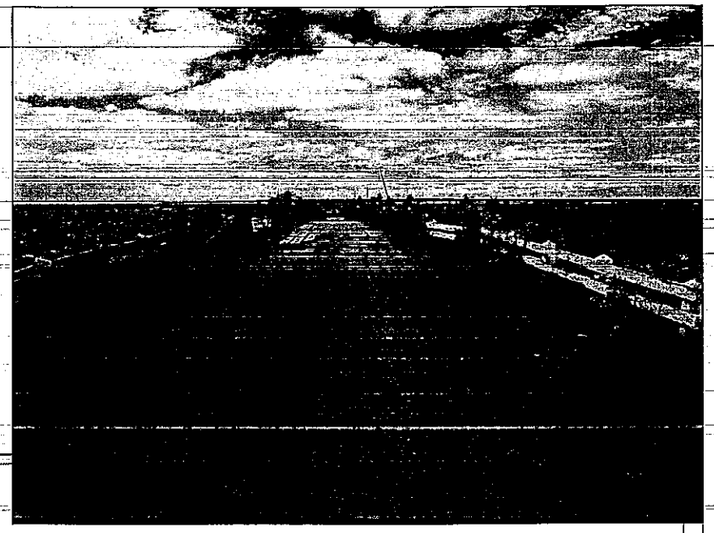
Esc: 1/150

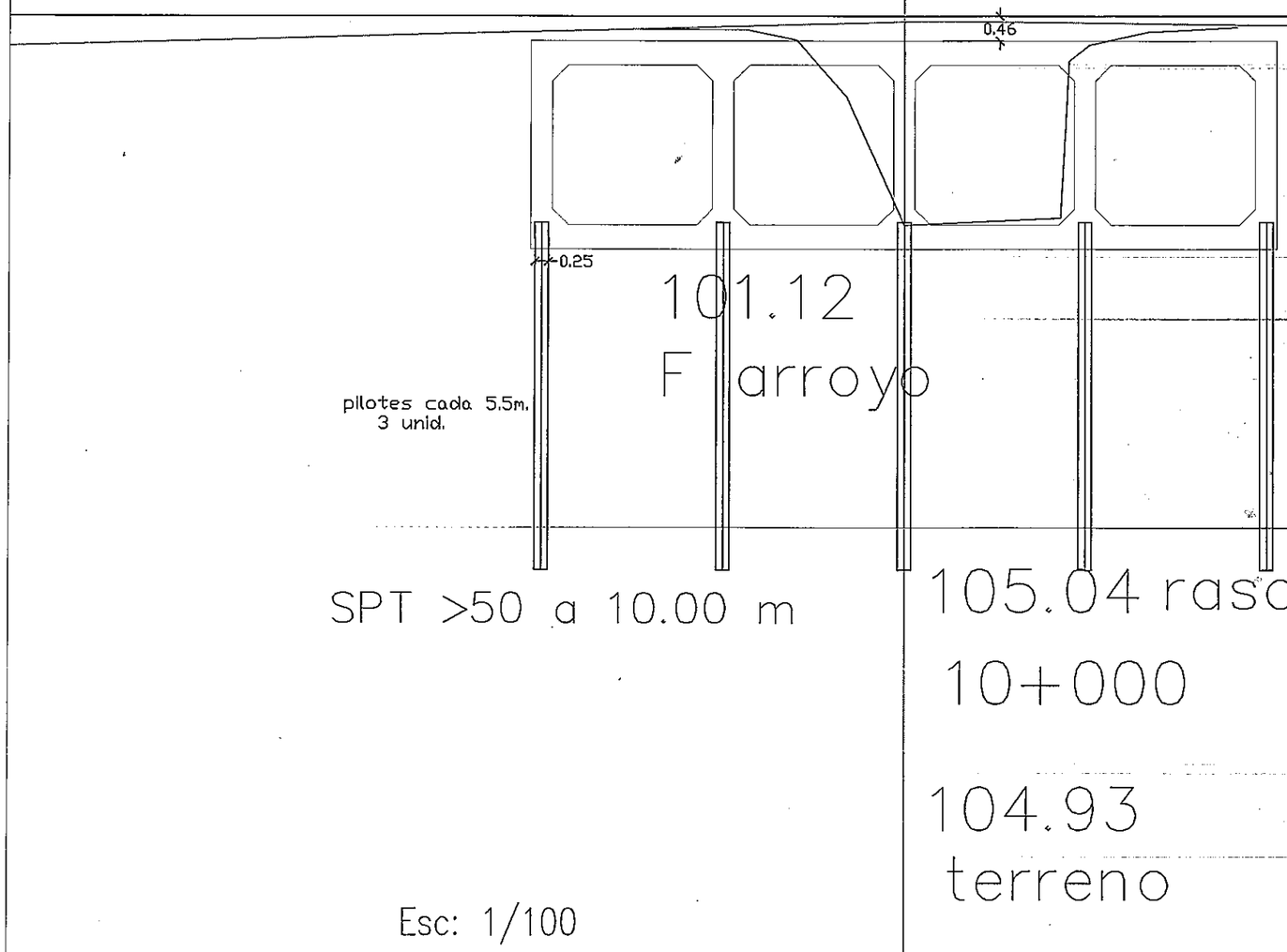
| | | | | | |
|---|---|---|---|---|---|
| | CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | CELULARES 3X3X3unid. PROG 9+080<br>CORTE LONGITUDINAL<br>Escalas: VER LAMINA<br>Lamina N° 13 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

# ITURBE- VALLEPE- PTE RIO TEBICUARYMI

CELULAR 3X3X4 unid. 12 m. PROG 10+000

opcion in situ






Hay bolson

verificar en nuevos sondeos

que el suelo tenga minimo

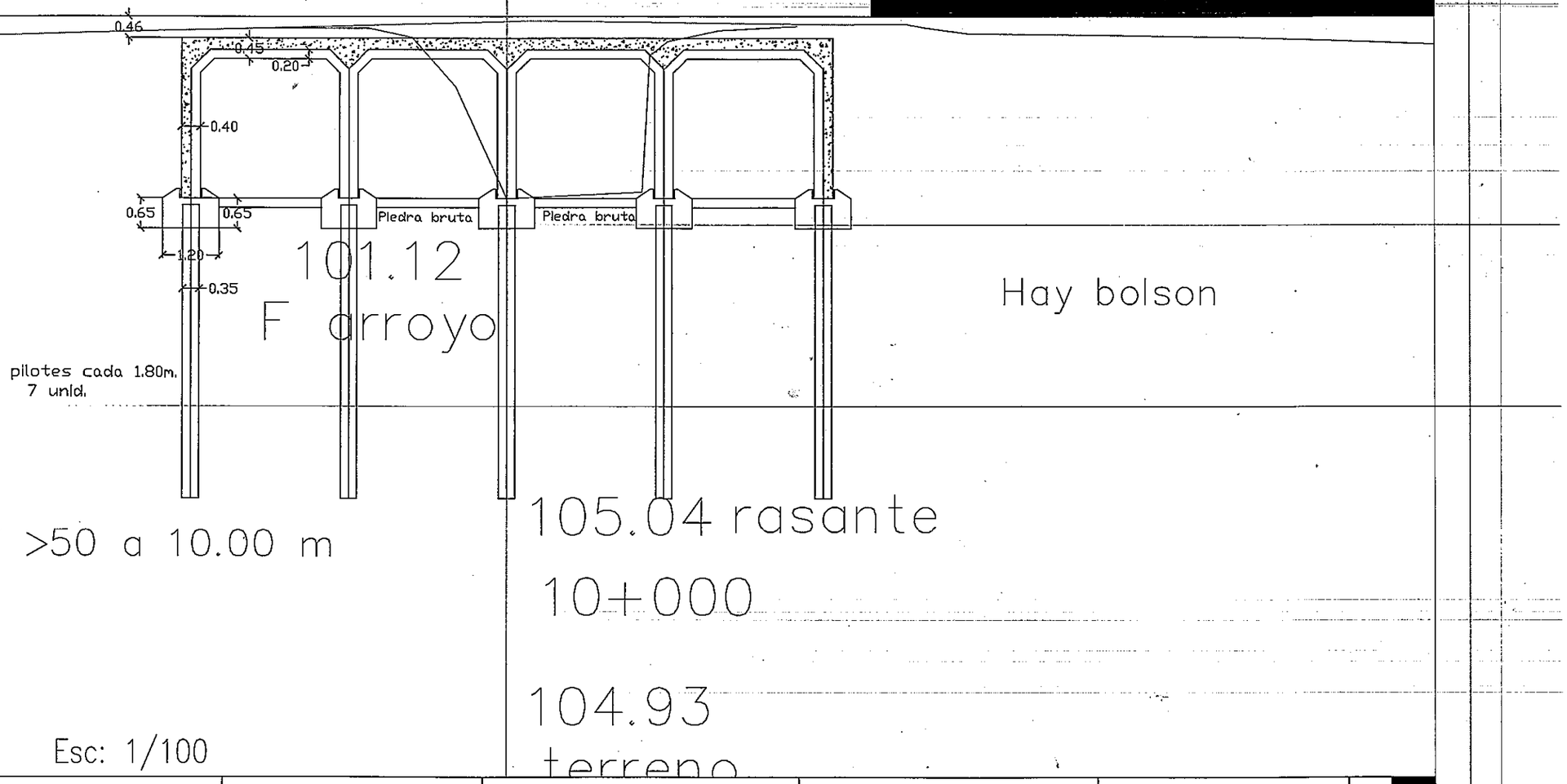
una capacidad de 1 kg/cm2

| | | | | | |
|---|---|---|---|---|---|
| | CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | CELULAR 3X3X4 unid. 12 m. PROG 10+000<br>CORTE LONGITUDINAL<br>Escalas: VER LAMINA<br>Lamina N° 8 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

34
treinta y cuat

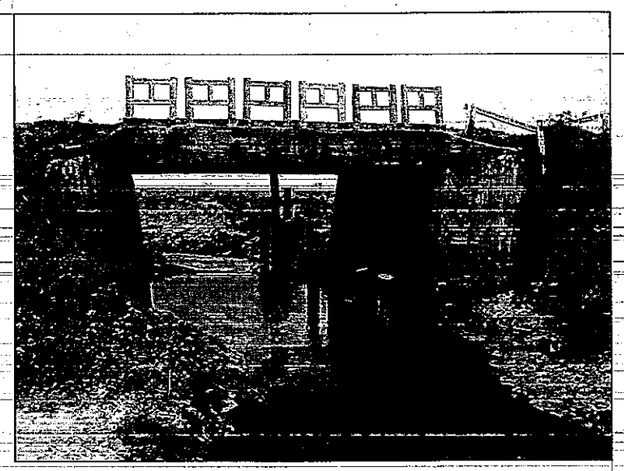
# ITURBE- VALLEPE- PTE RIO TEBICUARYMI

CELULAR 3X3X4 unid. 12 m. PROG 10+000
opcion prefabricada sin losa de fondo



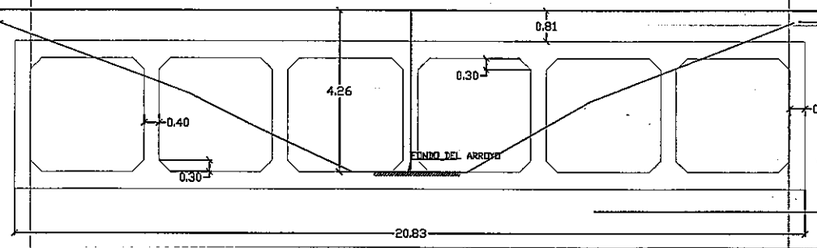

Esc: 1/100

| | | | | |
|---|---|---|---|---|
| CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 35 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | CELULAR 3X3X4 unid. 12 m. PROG 10+000<br>CORTE LONGITUDINAL-OPCION2<br>Escalas: VER LAMINA<br>Lamina N° 9 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |



ITURBE- VALLEPE- PTE RIO TEBICUARYMI

CELULAR 3X3X6 unid. 18 m. PROG 19+330




Verificar una capacidad de 1 kg/cm2
SPT >50 a 5 m

97.26

97.26 rasante

aumenta la progresiva

96.96

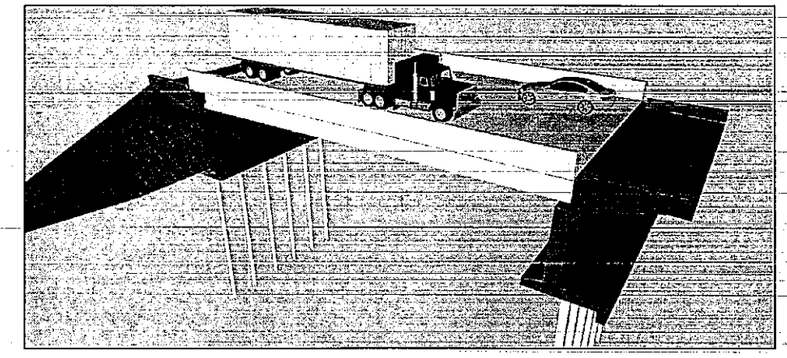
93.00
F arroyo

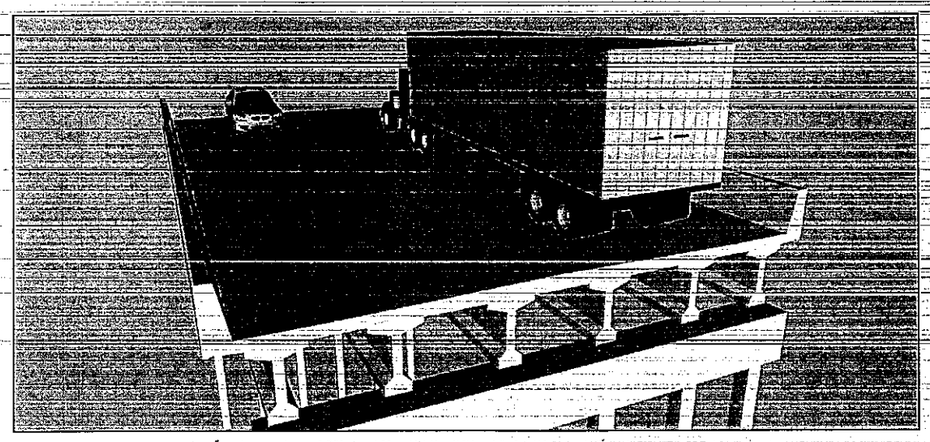
96.98
terreno

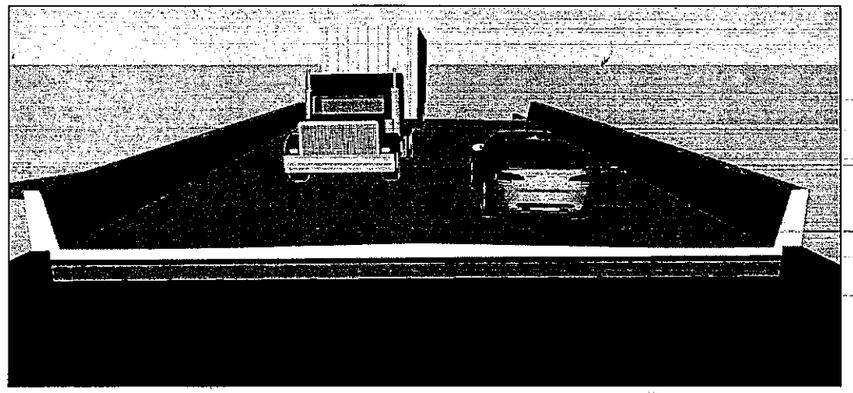
Esc: 1/150

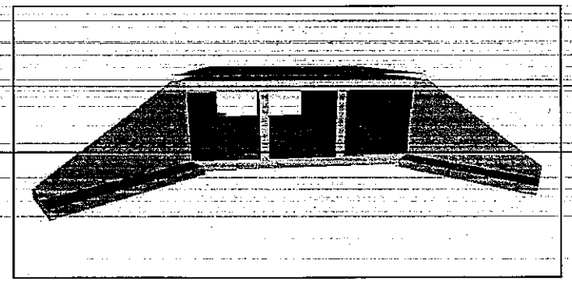
| | | | | | |
|---|---|---|---|---|---|
| | CIALPA S.A. Consorcio Cialpa - Electropar | REPUBLICA DEL PARAGUAY<br>VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES<br>DIRECCION DE VIALIDAD<br>CONTRATO S.G.V.M.O.P. Nº 36 / 2010<br>LLAMADO MOPC Nº 204 / 2009 | DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI | CELULAR 3X3X6 unid. 18 m. PROG 19+330<br>CORTE LONGITUDINAL<br>Escalas: VER LAMINA<br>Lamina Nº 4 | M.O.P.C.<br>MAPA DEL PARAGUAY<br>AREA PROYECTO |

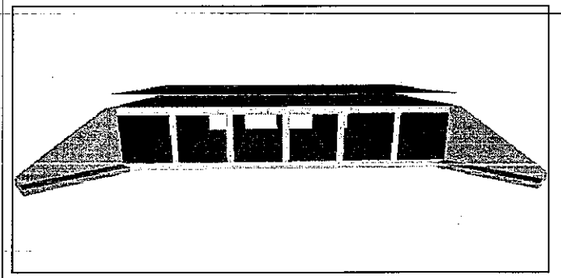
36
(treinta y seis)

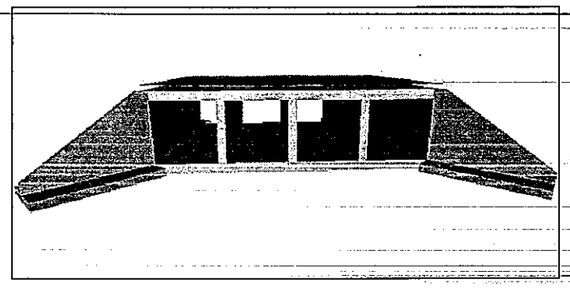


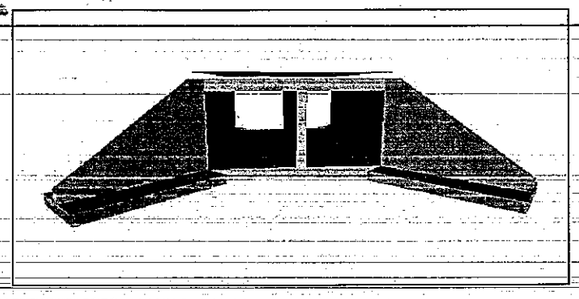












CIALPA S.A. Consorcio Cialpa - Electropar

ELECTROPAR INGENIERIA CONSULTORA S.A.L.

REPUBLICA DEL PARAGUAY
VICE MINISTERIO DE OBRAS PUBLICAS Y COMUNICACIONES
DIRECCION DE VIALIDAD
CONTRATO S.G.V.M.O.P. Nº 36 / 2010
LLAMADO MOPC Nº 204 / 2009

DISEÑO FINAL DE INGENIERÍA PARA LA PAVIMENTACIÓN TIPO EMPEDRADO DEL TRAMO: ITURBE- MACIEL; ITURBE- VALLEPE- PTE SOBRE EL RIO TEBICUARYMI Y RAMAL TEBICUARYMI

FOTO MONTAJE DE ESTRUCTURAS PROYECTADAS

Escalas: VER LAMINA

Lamina Nº 31

M.O.P.C.

MAPA DEL PARAGUAY

AREA PROYECTO

37
(treinta y siete)