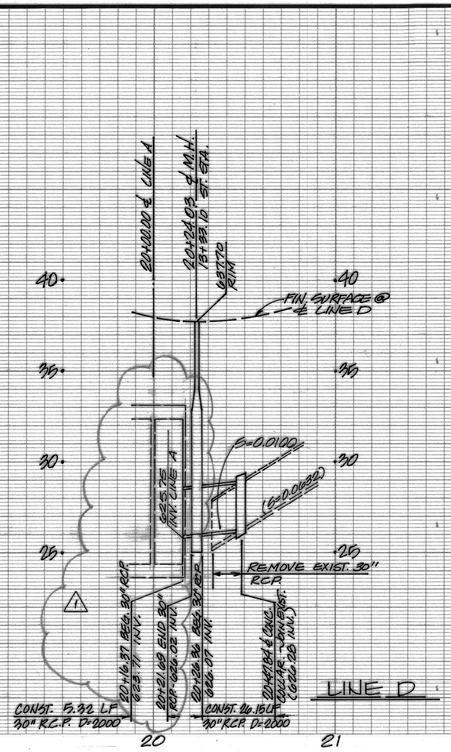
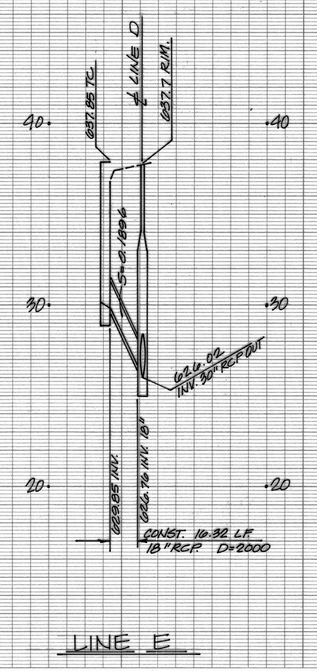
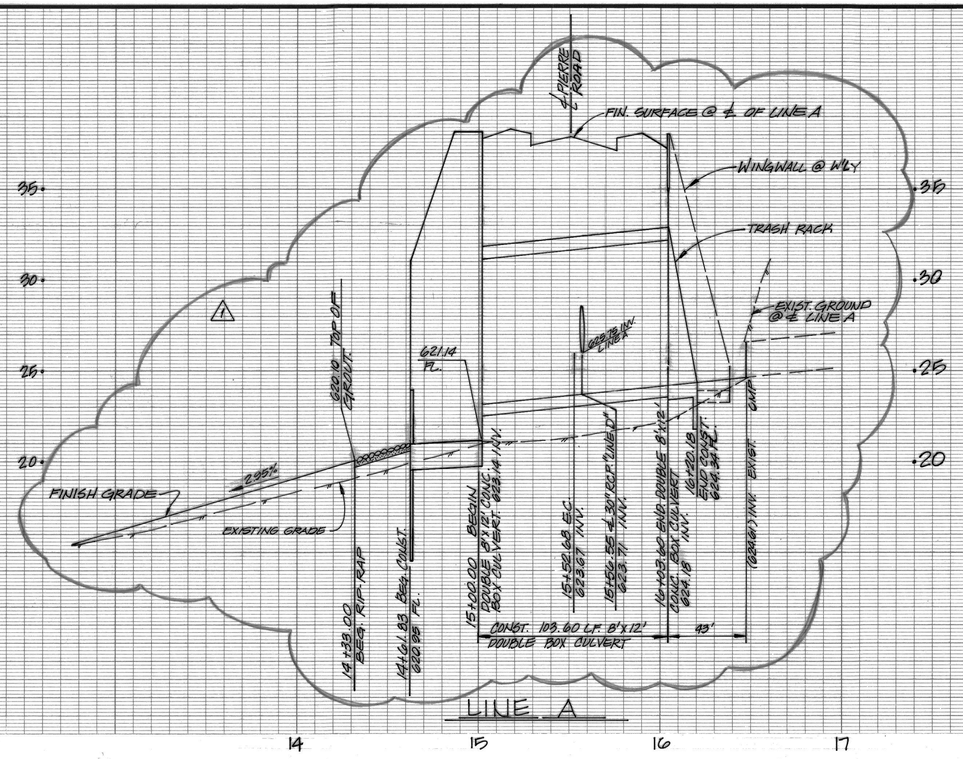
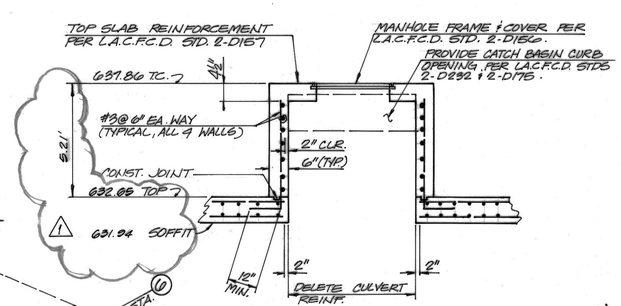
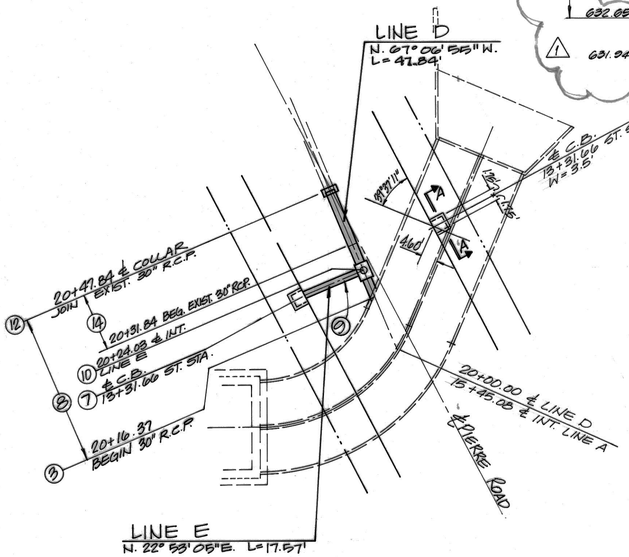


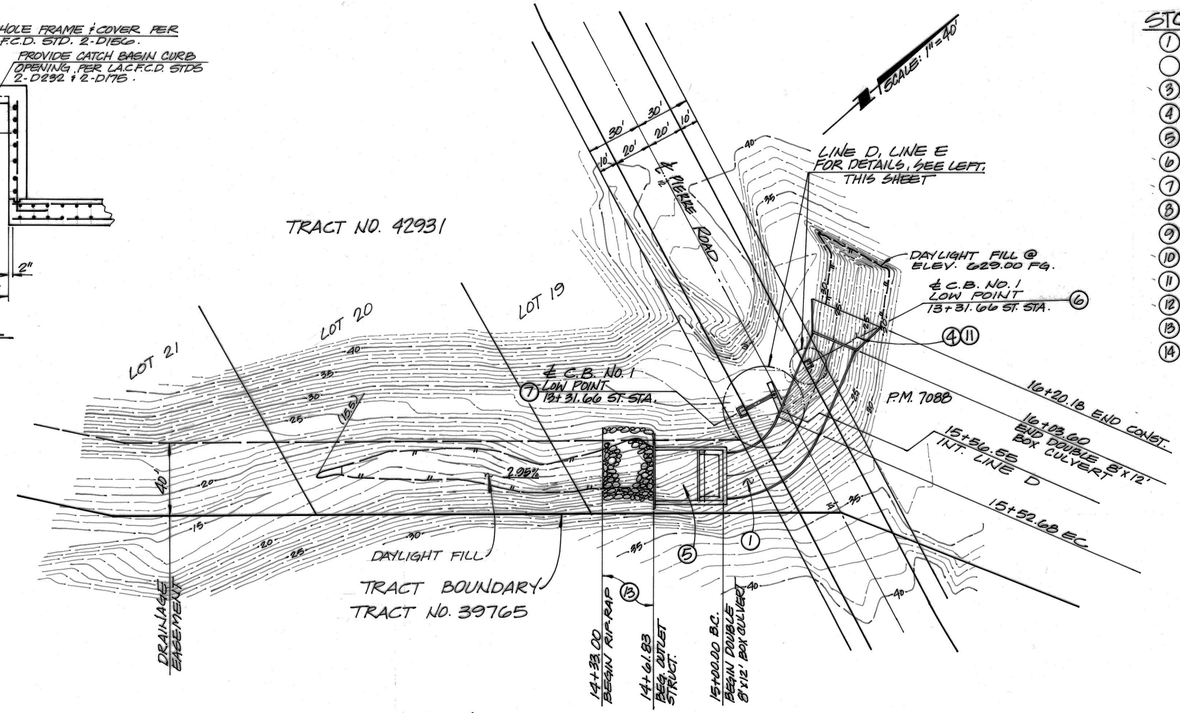




SCALES
VERT. 1"=4'
HORIZ. 1"=40'




DETAIL
1"=20'




## STORM DRAIN - CONSTRUCTION NOTES:

1. CONSTRUCT DOUBLE BOX CULVERT (8'H X12'W) PER DETAIL SHEET 6
2. 
3. CONSTRUCT JUNCTION STRUCTURE NO.3 PER L.A.C.D.P.W. STD. 3032.
4. CONSTRUCT INLET PER DETAIL, SHEET 5.
5. CONSTRUCT OUTLET STRUCTURE PER DETAIL SHEET 5.
6. CONSTRUCT CATCH BASIN NO.1 PER A.P.W.A. STD. 300-0 (W=3.5') AND DETAIL SHEET 6.
7. CONSTRUCT CATCH BASIN NO.1 PER A.P.W.A. STD. 300-0 (W=3.5')
8. CONSTRUCT 30" R.C.P. 2000-D.
9. CONSTRUCT 18" R.C.P. 2000-D.
10. CONSTRUCT MANHOLE NO.1 PER L.A.C.D.P.W. STD. 3020-0.
11. CONSTRUCT TRASH RACK PER L.A.C.D.P.W. STD. 3060-0.
12. CONSTRUCT CONC. COLLAR PER L.A.C.D.P.W. STD. 3088-0.
13. GROUTED RIP-RAP, PER DETAIL SHEET 5.
14. REMOVE EXIST. R.C.P. STORM DRAIN.



RKA civil engineers, inc.
398 S. LEMON CREEK DR. STE. E WALNUT CA. 91789
(714) 594-9702 (818) 331-8323
Jack G. Istik 4/17/91
JACK G. ISTIK, R.C.E. 26558 DATE

| NO. | DATE | BY | DESCRIPTION | APP.D | DATE |
|---|---|---|---|---|---|
| 1 | 2-14-91 | B.I. | LOWERED BOX STRUCTURE INVERT 1 2' | | |

REVISIONS

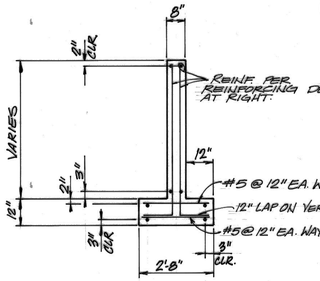
CITY OF WALNUT
PIERRE ROAD
STORM DRAIN IMPROVEMENTS

SHT 4 of 6 SHTS

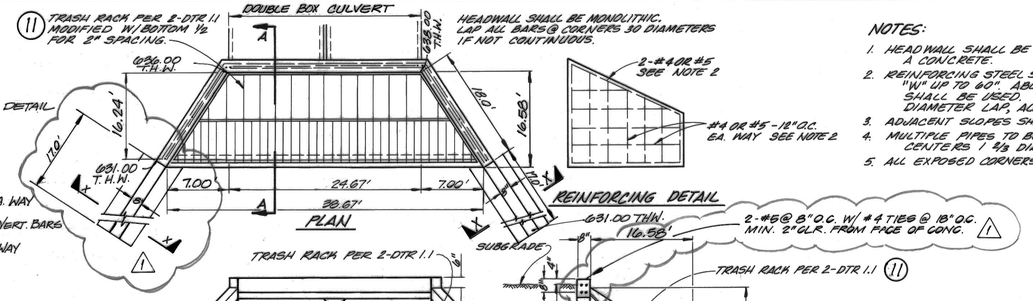
337D

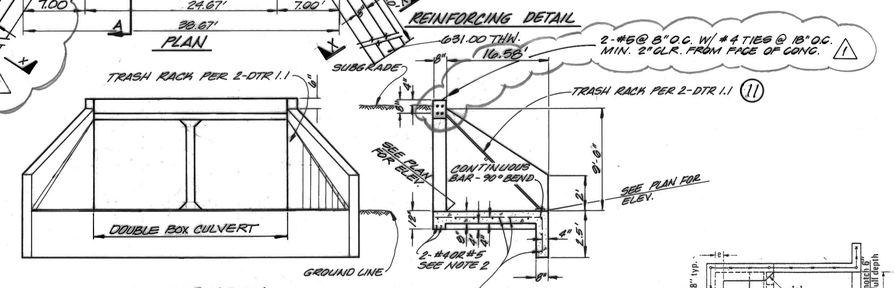
178.233

# STORM DRAIN PLANS IN PIERRE ROAD




SECTION X-X
NTS



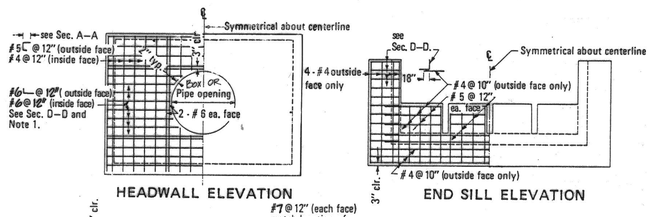



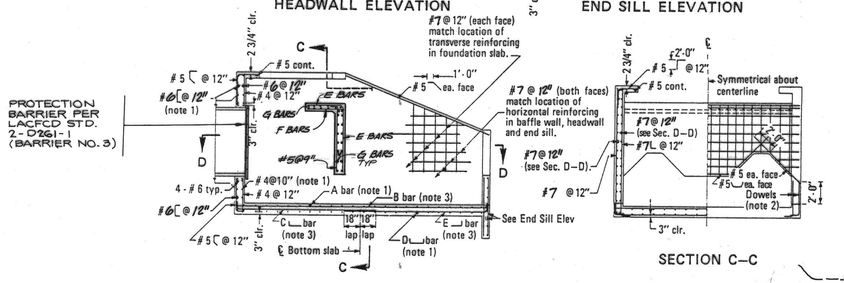

ELEVATION

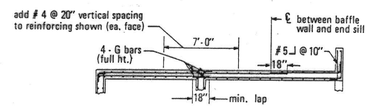
SECTION A-A

NOTES:
1. HEADWALL SHALL BE CONSTRUCTED OF CLASS A CONCRETE.
2. REINFORCING STEEL SHALL BE NO 4 BARS FOR "W" UP TO 60". ABOVE "W"=60" NO 6 BARS SHALL BE USED. 2" MIN. CLEARANCE, 30 DIAMETER LAP, ALL STEEL.
3. ADJACENT SLOPES SHALL BE 1½:1 OR FLATTER
4. MULTIPLE PIPES TO BE SET WITH LONGITUDINAL CENTERS 1 4/3 DIAMETERS APART
5. ALL EXPOSED CORNERS TO BE ROUNDED ¾" RADIUS.

## (4) STANDARD INLET DETAIL
(NO SCALE)




SECTION D-D

NOTES
1. Match location of sidewall reinforcing.
2. Dowels having same size and spacing as wall reinforcing may be used in lieu of continuous bars at contractors option.
3. Match location of headwall or end sill reinforcing.

| Pipe dia. (in.) | | 8'x 12' Double Box |
|---|---|---|
| A bar | | #8 @ 4" |
| B bar | | #4 @ 12" |
| C bar | | #4 @ 12" |
| D bar | | #8 @ 4" |
| E bar | | #8 @ 11" |
| F bar | | #8 @ 4" |
| G bar | | #9 @ 4" |

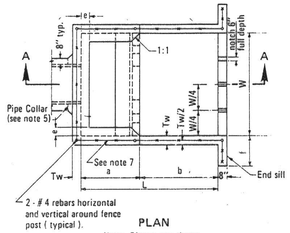
## (5) CONCRETE ENERGY DISSIPATOR (REINFORCEMENT)
(NO SCALE)

(OUTLET STRUCTURE)

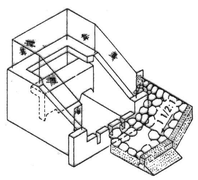

SECTION "A-A"
N.T.S.

RIP-RAP NOTES:
1. ROCK FOR RIP-RAP SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONST. 1988 EDITION. THE SMALLEST DIMENSION SHALL EXCEED 6 INCHES, AND THE LARGEST SHALL NOT EXCEED 30 INCHES. THE LARGEST DIMENSION SHALL NOT EXCEED 4 TIMES THE SMALLEST DIMENSION. EMBED ROCK ⅓ OF ITS LENGTH.

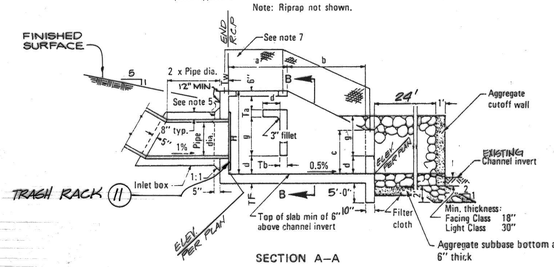
## (13) RIP-RAP DETAIL
N.T.S.



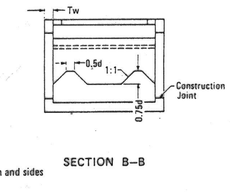

PLAN
Note: Riprap not shown.



PICTORIAL VIEW




SECTION A-A




SECTION B-B

NOTES
1. Design:
   Equivalent Fluid Pressure = 60 p.c.f.
   Maximum Outlet Velocity = 35 f.p.s.
2. Concrete shall be 564 - C - 3000.
3. Reinforcing shall conform to ASTM designation A615 and may be grade 40 or 60. Reinforcing shall be placed with 2" clear concrete cover unless noted otherwise. Splices shall not be permitted except as indicated on the plans.
4. For pipe grades not exceeding 20%, inlet box may be omitted.
5. ~~If inlet box is omitted, construct pipe collar as shown.~~
6. Unless noted otherwise, all reinforcing bar bends shall be fabricated with standard hooks.
7. Five foot high chain link fencing PER A.P.W.A. 600-O
8. In Sandy and Silty soil:
   a) Riprap and aggregate base cutoff wall required at the end of rock apron.
   b) Filter cloth (Polyfilter X or equivalent) shall be installed on native soil and base, minimum of 1 ft. overlaps at joints.
9. Rip rap and subbase classification shall be as shown on plans.

| Pipe Dia (in) | | 8'x 12' Double Box |
|---|---|---|
| Area (sq.ft.) | | 192.00' |
| Max. Q (cfs) | | |
| W | | 28.00' |
| H | | 16.00' |
| L | | 37.50' |
| a | | 14.00' |
| b | | 13.50' |
| c | | 9.00' |
| d | | 2.00' |
| e | | 2.33' |
| f | | 5.00' |
| g | | 10.50' |
| Tf | | 19" |
| Tb | | 10" |
| Tw | | 20" |
| Ta | | 6" |

## (5) CONCRETE ENERGY DISSIPATOR
(NO SCALE)

(OUTLET STRUCTURE)

| NO. | REVISION | REVISED BY | APPROVED BY | DATE |
|---|---|---|---|---|
| 1 | REVISED DETAILS 4 & 5 | B. INMAN | | |
| | | | | |
| | | | | |
| | | | | |

REGISTERED PROFESSIONAL ENGINEER
JACK GEORGE ISTIK
26558
3-31-92
CIVIL
STATE OF CALIFORNIA


R K A civil engineers, inc.
398 Lemon Creek Dr. Walnut, Ca. 91789
(714) 594-9702 (818) 331-6323
Jack G. Istik R.C.E. 26558 4/17/91
JACK G. ISTIK R.C.E. 26558 DATE

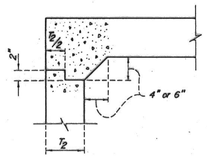

CITY OF WALNUT

PIERRE ROAD
STORM DRAIN
DETAILS "A"

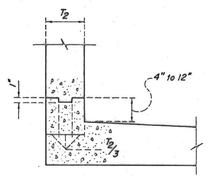
SHT 5 OF 6 SHTS

178 233

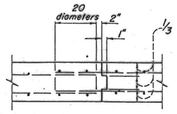
337E



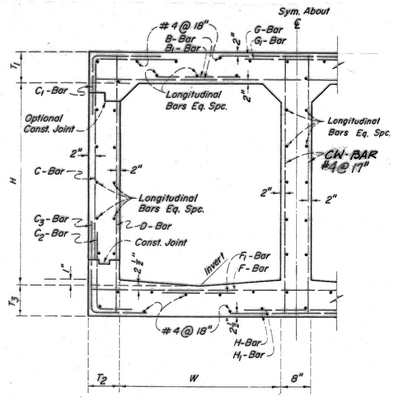

TOP OF WALL




BASE OF WALL




TRANSVERSE JOINT




TYPICAL R.C. BOX SECTION

NO SCALE

DESIGN DATA:

LIVE LOAD:
H20-S16-44 unless otherwise noted

DEAD LOAD:
Earth load per Marston's formula: w = 110 p.c.
Ku = Ka' = 0.150
Bd = Outside width of box plus 3 feet
Side earth 37 p.s.f. per foot of depth
Internal water pressure: 62.4 p.s.f. per foot
Weight of Concrete: 150 p.c.f.

ALLOWABLE STRESSES:
$f_c'$ = 4000 p.s.i. at 28 days
$f_c$ = 1800 p.s.i.
$f_s$ = 24,000 p.s.i.
n = 8
shear and bond stresses per A.C.I. 318-63

| BOX SECTION NO. | | I | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Design Cover | | 1.2' | | | | | | |
| Width | W | 12' | | | | | | |
| Height | H | 8' | | | | | | |
| Live Load | | 92 k | | | | | | |
| Top Slab Thickness | $T_1$ | 8.25" | | | | | | |
| Side Wall Thickness | $T_2$ | 7.75" | | | | | | |
| Bottom Slab Thickness | $T_3$ | 8.75" | | | | | | |
| B Bars | Bar No. & Spacing | #4@12" | | | | | | |
| | Length | 25'-9" | | | | | | |
| $B_1$ Bars | Bar No. & Spacing | #4@12" | | | | | | |
| | Length | 25'-9" | | | | | | |
| C Bars | Bar No. & Spacing | #6@12" | | | | | | |
| | Horiz. Length | 5' | | | | | | |
| | Vert. Length | 8'-11" | | | | | | |
| $C_1$ Bars | Bar No. & Spacing | #6@12" | | | | | | |
| | Horiz. Length | 1'-9" | | | | | | |
| | Vert. Length | 8'-10" | | | | | | |
| $C_2$ Bars | Bar No. & Spacing | #7@12" | | | | | | |
| | Horiz. Length | 3'-8" | | | | | | |
| | Vert. Length | 7'-1" | | | | | | |
| $C_3$ Bars | Bar No. & Spacing | #7@12" | | | | | | |
| | Horiz. Length | 1'-10½" | | | | | | |
| | Vert. Length | 8'-1" | | | | | | |
| D Bars | Bar No. & Spacing | #4@18" | | | | | | |
| | Length | 9'-1" | | | | | | |
| F Bars | Bar No. & Spacing | #10@12" | | | | | | |
| | Length | 25'-9" | | | | | | |
| $F_1$ Bars | Bar No. & Spacing | #6@12" | | | | | | |
| | Length | 18'-9" | | | | | | |
| G Bars | Bar No. & Spacing | #7@12" | | | | | | |
| | Length | 18'-8" | | | | | | |
| $G_1$ Bars | Bar No. & Spacing | #7@12" | | | | | | |
| | Length | 8'-1" | | | | | | |
| H Bars | Bar No. & Spacing | #6@12" | | | | | | |
| | Length | 8'-7" | | | | | | |
| $H_1$ Bars | Bar No. & Spacing | #6@12" | | | | | | |
| | Length | 8'-10" | | | | | | |
| NUMBER LONGITUDINAL REINFORCEMENT #4 BARS | | | | | | | | |
| Top Slab (Includes Distrib.) | | 62 | | | | | | |
| Ext. Walls | | 20 | | | | | | |
| Int. Walls | | 10 | | | | | | |
| Inv. Slab | | 32 | | | | | | |
| TOTAL | | 116 | | | | | | |
| QUANTITIES | | | | | | | | |
| Concrete Cu. Yds./Lin. Ft. | | 1.93 | | | | | | |
| Steel Lbs./Lin. Ft. | | 314.6 | | | | | | |

| R.C. BOX LOCATION SCHEDULE | | |
|---|---|---|
| Box Sect. | Station FROM | Station TO |
| I | 15+54.23 | 17+57.00 |
| | | |
| | | |
| | | |
| | | |

## NOTES FOR BOX CULVERT

1. LONGITUDINAL STEEL SHALL BE CONTINUOUS AND EXTEND THROUGH ALL CONSTRUCTION JOINTS.
2. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, TRANSVERSE JOINT KEYWAYS (IN BOTH SLABS AND WALLS), AS DETAILED FOR LONGITUDINAL KEYWAYS AT THE BASE OF THE WALLS, SHALL BE PLACED AT THE END OF EACH POUR, BUT THE SPACING THEREOF SHALL NOT EXCEED 50 FEET OR BE LESS THAN 10 FEET. SPACING MAY BE DECREASED TO AVOID PROXIMITY TO INLETS. ALL CONSTRUCTION JOINTS IN BOTTOM SLAB, TOP SLAB, AND SIDE WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.
3. UNLESS OTHERWISE SHOWN ON THE DETAILS, IN CURVED SECTIONS TRANSVERSE BARS SHALL BE PLACED RADIALLY. STRAIGHT TRANSVERSE BARS IN TOP AND BOTTOM SLABS SHALL BE SPACED AS SHOWN ON THE TYPICAL SECTIONS; SPACING SHALL BE AT THE CENTERLINE OF CONSTRUCTION FOR SINGLE-BARREL BOXES, AND AT THE CENTERLINE OF THE BARREL ON THE OUTSIDE OF THE CURVE FOR MULTI-BARREL BOXES. STRAIGHT BARS AND L-BARS IN WALLS SHALL BE SPACED AS SHOWN ON THE TYPICAL SECTIONS, WITH THE SPACING MEASURED BETWEEN THE VERTICAL LEGS OF BARS.
4. AT THE BEGINNING AND ENDING OF ALL POURS, A COMPLETE CURTAIN OF MAIN REINFORCEMENT SHALL BE PLACED THREE INCHES FROM THE TRANSVERSE CONSTRUCTION JOINT.
5. THE VERTICAL WALL STEEL IN INTERIOR WALLS AND IN THE INTERIOR FACE OF THE EXTERIOR WALLS MAY BE SPLICED AT THE CONSTRUCTION JOINT AT THE BASE OF THE WALL. THE SPLICE SHALL BE 20 BAR DIAMETERS IN LENGTH.
6. DIMENSIONS FROM FACE OF CONCRETE TO STEEL ARE TO CENTER OF BAR UNLESS OTHERWISE SHOWN.
7. CONCRETE DIMENSIONS SHALL BE MEASURED HORIZONTALLY OR VERTICALLY ON THE PROFILE, AND PARALLEL TO OR AT RIGHT ANGLES (OR RADIALLY) TO CENTERLINE OF CONDUIT ON THE PLAN EXCEPT AS OTHERWISE SHOWN.
8. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE 1963 AMERICAN CONCRETE INSTITUTE'S "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" SECTION 801.
9. PLACING OF REINFORCEMENT SHALL CONFORM TO THE 1963 AMERICAN CONCRETE INSTITUTE'S "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" SECTION 803.
10. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 30 INCHES OF MANHOLE OR JUNCTION STRUCTURE OPENINGS.
11. TRANSVERSE CONSTRUCTION JOINTS IN WALLS AND SLABS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED. TRANSVERSE CONSTRUCTION JOINTS SHALL BE NORMAL OR RADIAL TO THE CENTERLINE OF CONSTRUCTION.
12. THE TRANSVERSE REINFORCING STEEL SHALL TERMINATE 1-1/2 INCHES FROM THE CONCRETE SURFACES UNLESS OTHERWISE SHOWN ON THE STRUCTURAL DETAILS.
13. EXPOSED EDGES OF CONCRETE MEMBERS SHALL BE ROUNDED OR BEVELED.
14. NO SPLICES IN TRANSVERSE STEEL REINFORCEMENT WILL BE PERMITTED OTHER THAN SHOWN ON THE DRAWINGS WITHOUT APPROVAL OF THE ENGINEER. NO MORE THAN 2 SPLICES WILL BE PERMITTED IN ANY LONGITUDINAL BAR BETWEEN TRANSVERSE JOINTS. SPLICES SHALL BE STAGGERED.
15. LONGITUDINAL STEEL SHALL BE LAPPED 20 BAR DIAMETERS AT SPLICES. TRANSVERSE STEEL SHALL BE LAPPED 30 BAR DIAMETERS AT SPLICES.

# 8'H x 12'W DOUBLE BOX CULVERT DETAILS

(1) NTS

REGISTERED PROFESSIONAL ENGINEER — JACK GEORGE ISTIK — 26558 — 3-31-92 — CIVIL — STATE OF CALIFORNIA

PLANS PREPARED BY:
RKA civil engineers, inc.
398 Lemon Creek Dr. Walnut, Ca. 91789
(714) 594-9702 (818) 331-8323
Jack G. Istik
JACK G. ISTIK R.C.E. 26558 DATE

| NO. | DATE | BY | DESCRIPTION | APP,D | DATE |
|---|---|---|---|---|---|
| | | | | | |

REVISIONS

CITY OF WALNUT

PIERRE ROAD
STORM DRAIN DETAILS "B"

SHT 6 of 6 SHTS

337F 178-233