STREAM GAUGE STRUCTURE

ESTRELLA PARKWAY–GILA RIVER

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT _____ PAGE ____ OF ____

DETAIL _____ COMPUTED _____ DATE ____

_____ CHECKED BY _____ DATE ____

STREAM GAUGE STRUCTURE
ESTRELLA PKWY / GILA RIVER

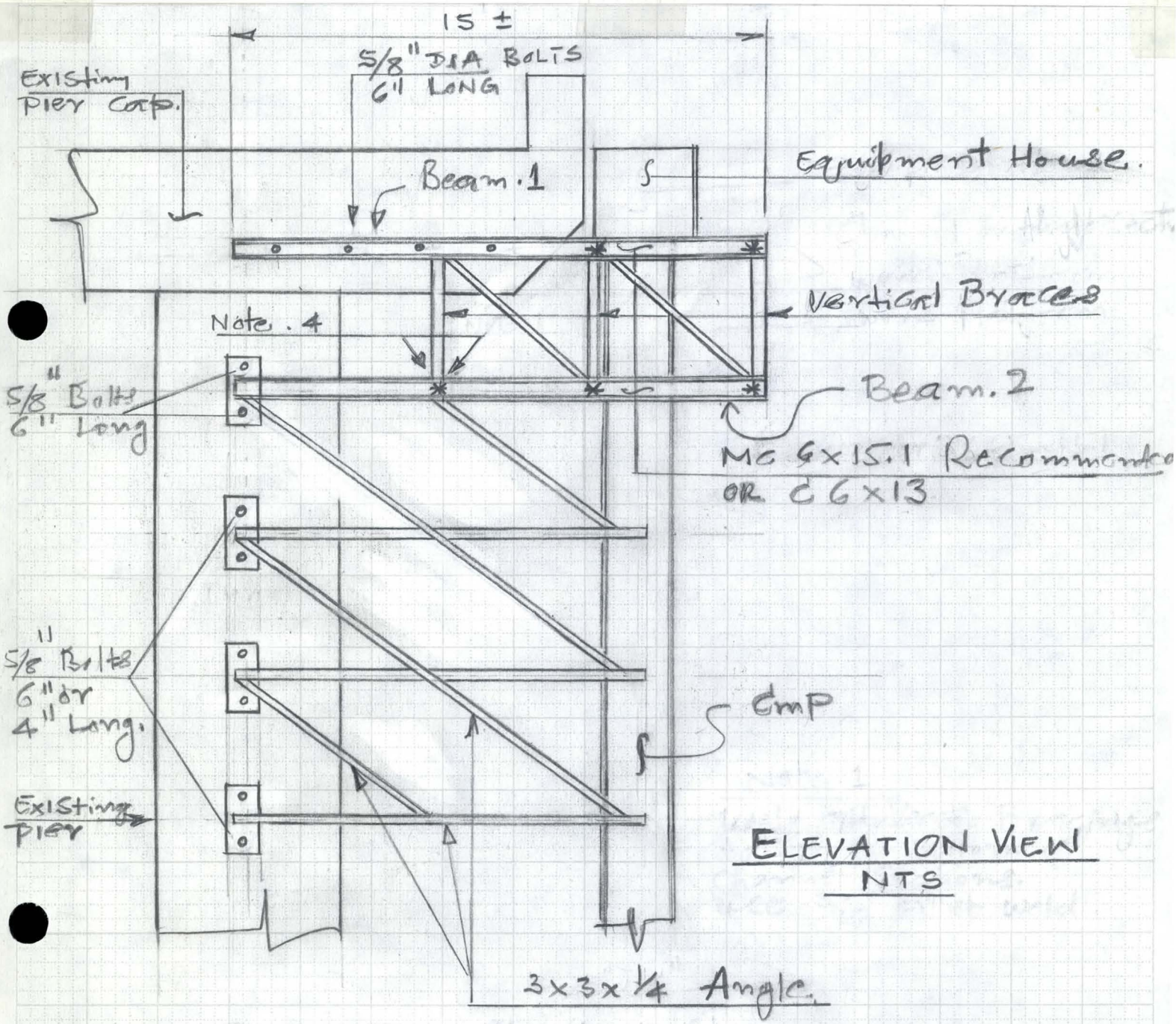
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @. PAGE 5 OF 5

DETAIL Estrella Pkwy - Gila Rivr COMPUTED KVH DATE Jan 9

CHECKED BY CWW DATE 2/4/9

KEY NOTES: 1) use 6" channel sections for both Bm.1 & Bm.2
2) Weld all vertical braces between two main Chl. Sects.
3) Provide horizontal braces at places marked with *
4) All weldings shall be a min. $\frac{3}{16}$" Fillet Weld.



ELEVATION VIEW
NTS

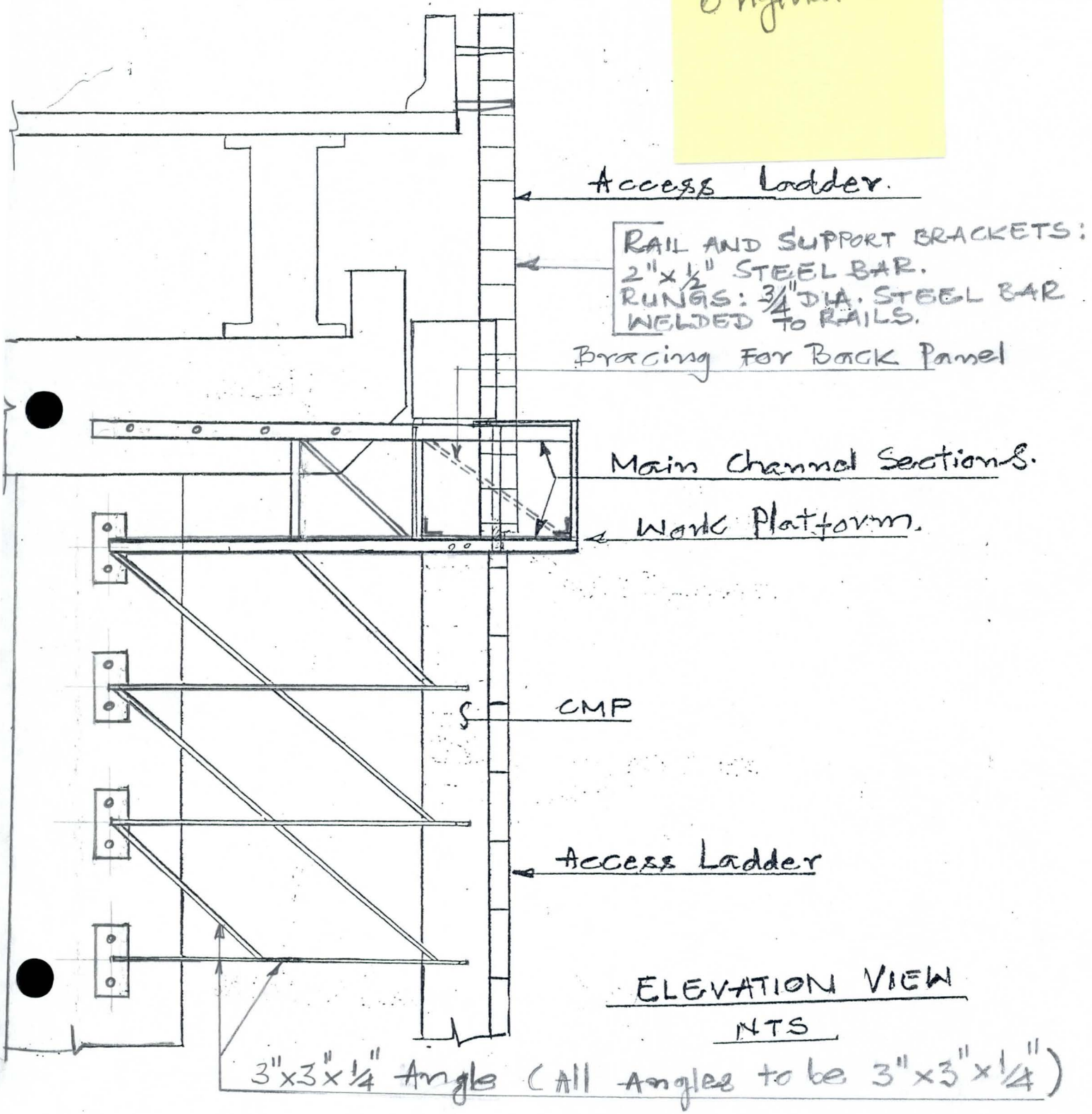
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @ PAGE 1 OF 5

DETAIL ____ COMPUTED TJK DATE Jan 92

Estrella Pkwy - Gila River CHECKED BY CAW DATE 3/92

Original Set



ELEVATION VIEW

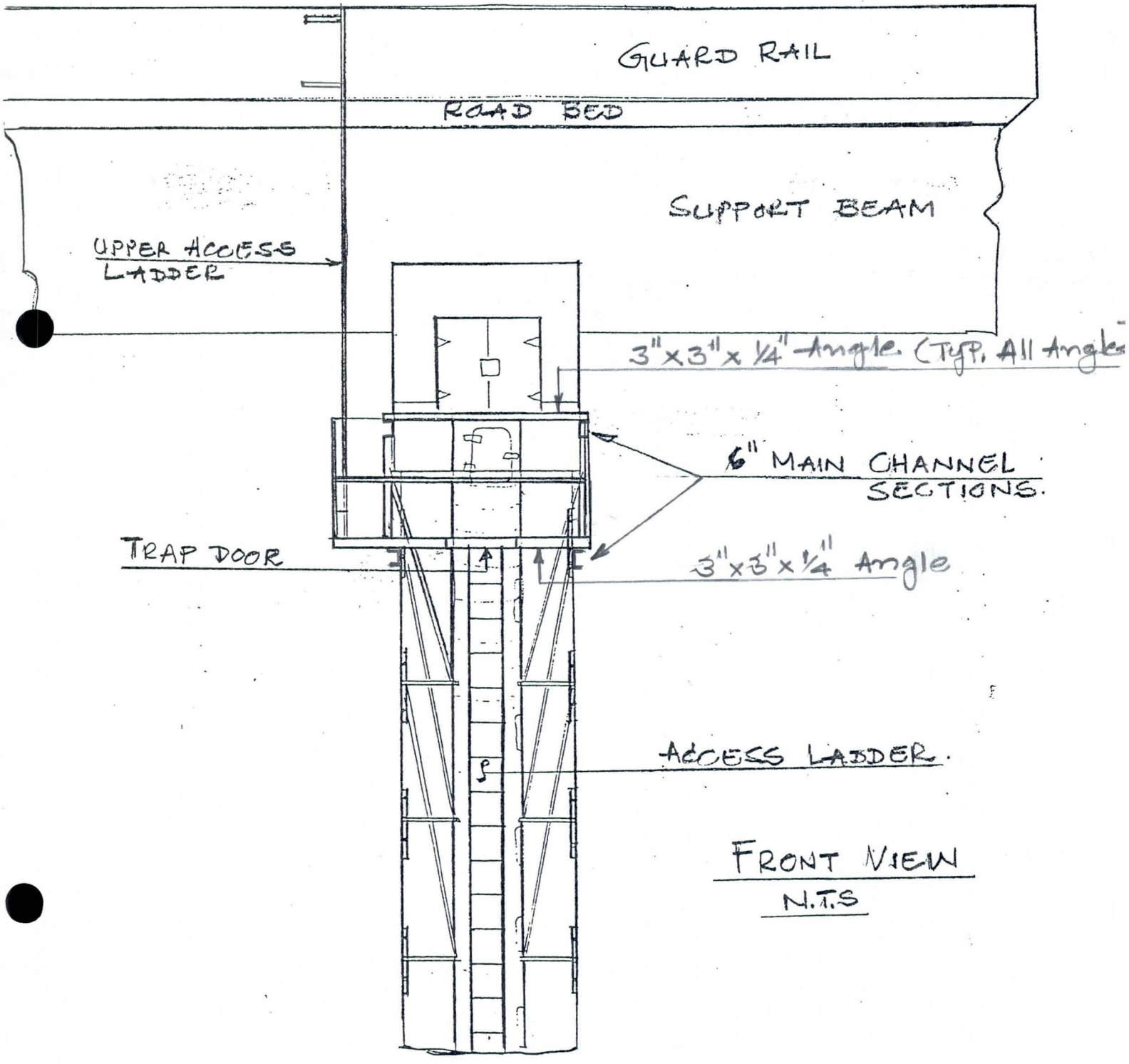
NTS

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE @ PAGE 2 OF 5

DETAIL ESTRELLA PKWY COMPUTED TJK DATE JAN 92

GILA RIVER CHECKED BY CGW DATE 3/92



FRONT VIEW

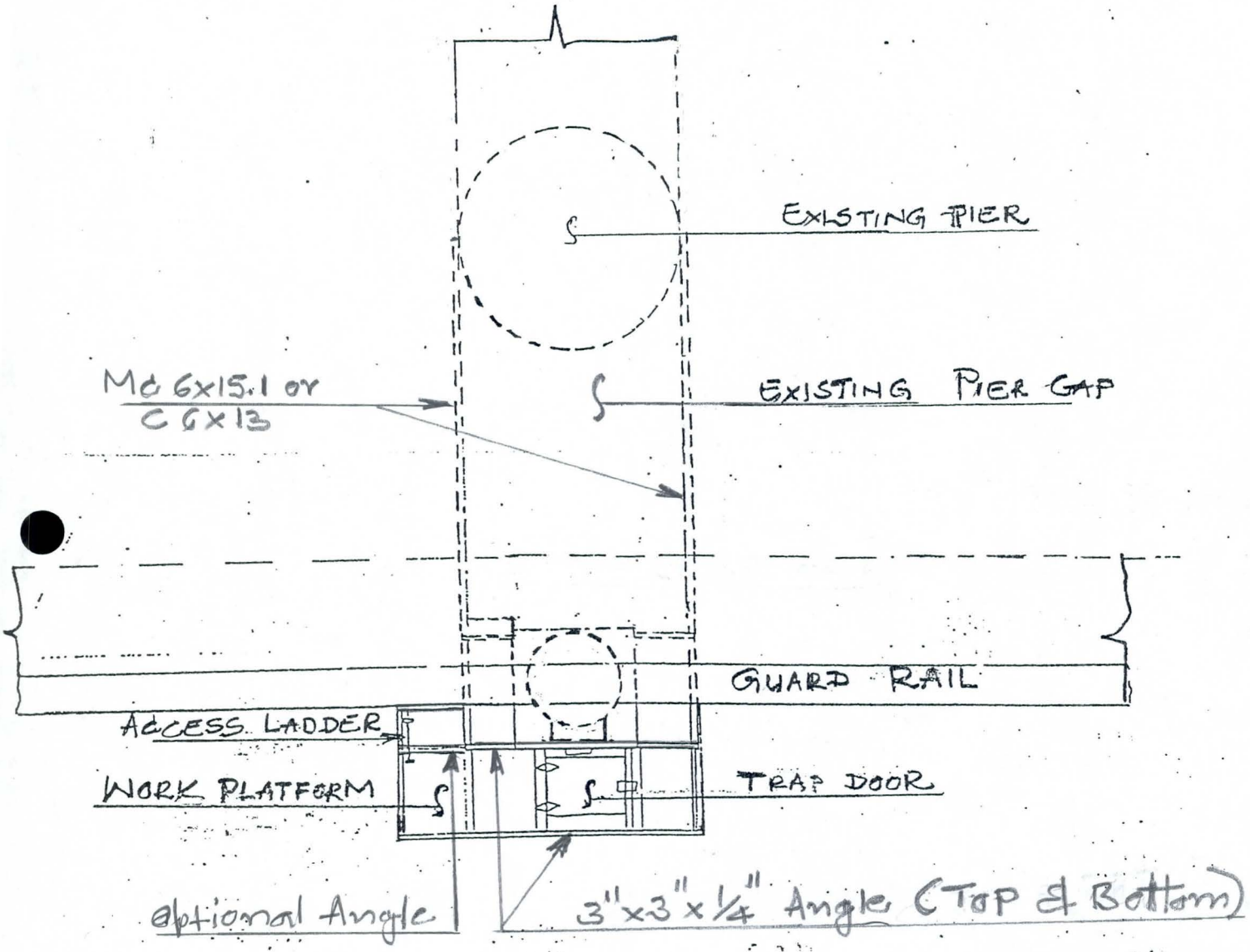
N.T.S

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @ PAGE 3 OF 5

DETAIL Estrella Pkwy/Gila River COMPUTED TJK DATE Jan 92

CHECKED BY CGW DATE 3/92



PLAN VIEW

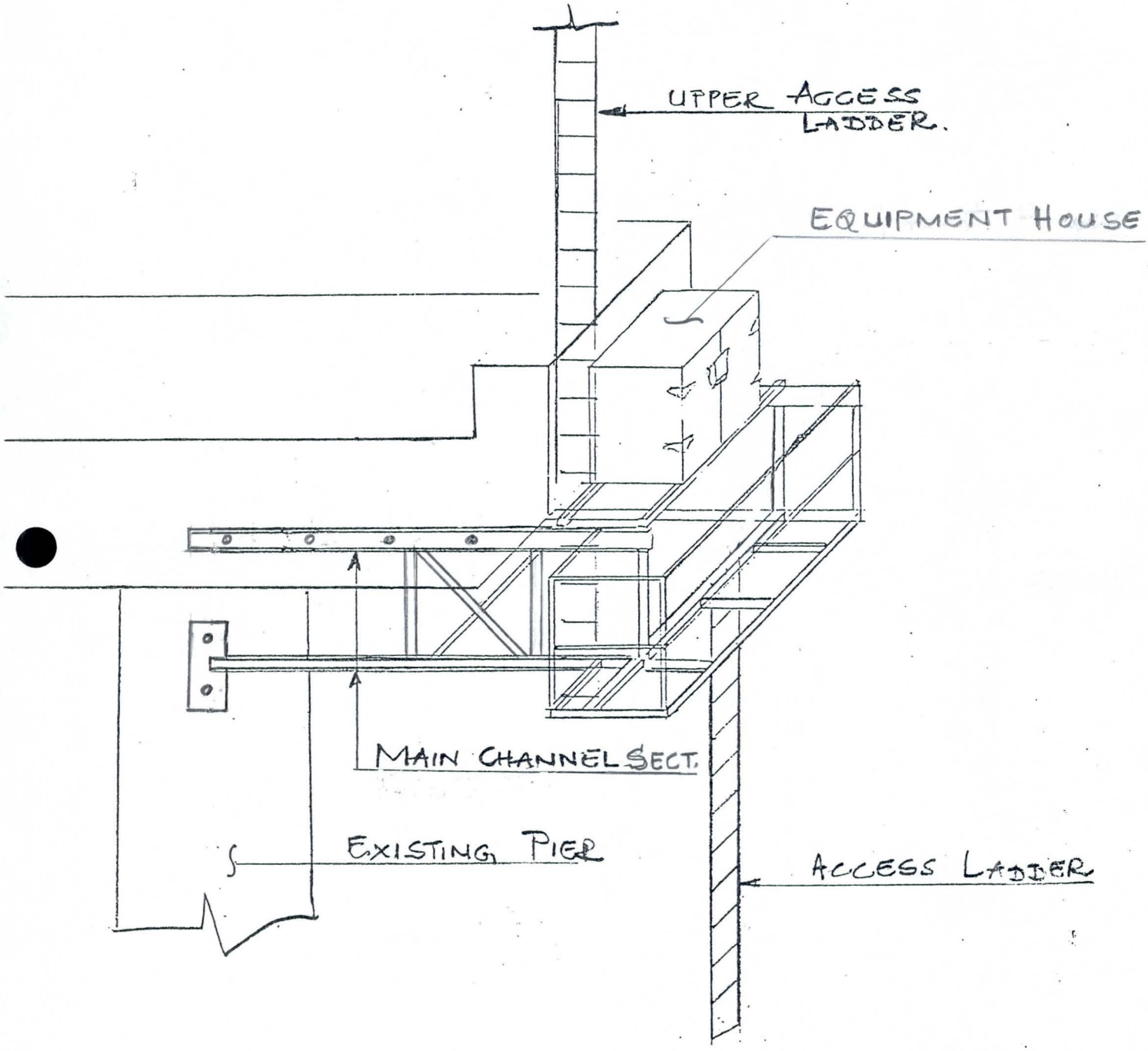
N.T.S.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE @ PAGE 4 OF 5

DETAIL ESTRELLA PKWY COMPUTED TJK DATE Jan 92

GILA RIVER CHECKED BY CGW DATE 3/92



ISOMETRIC VIEW

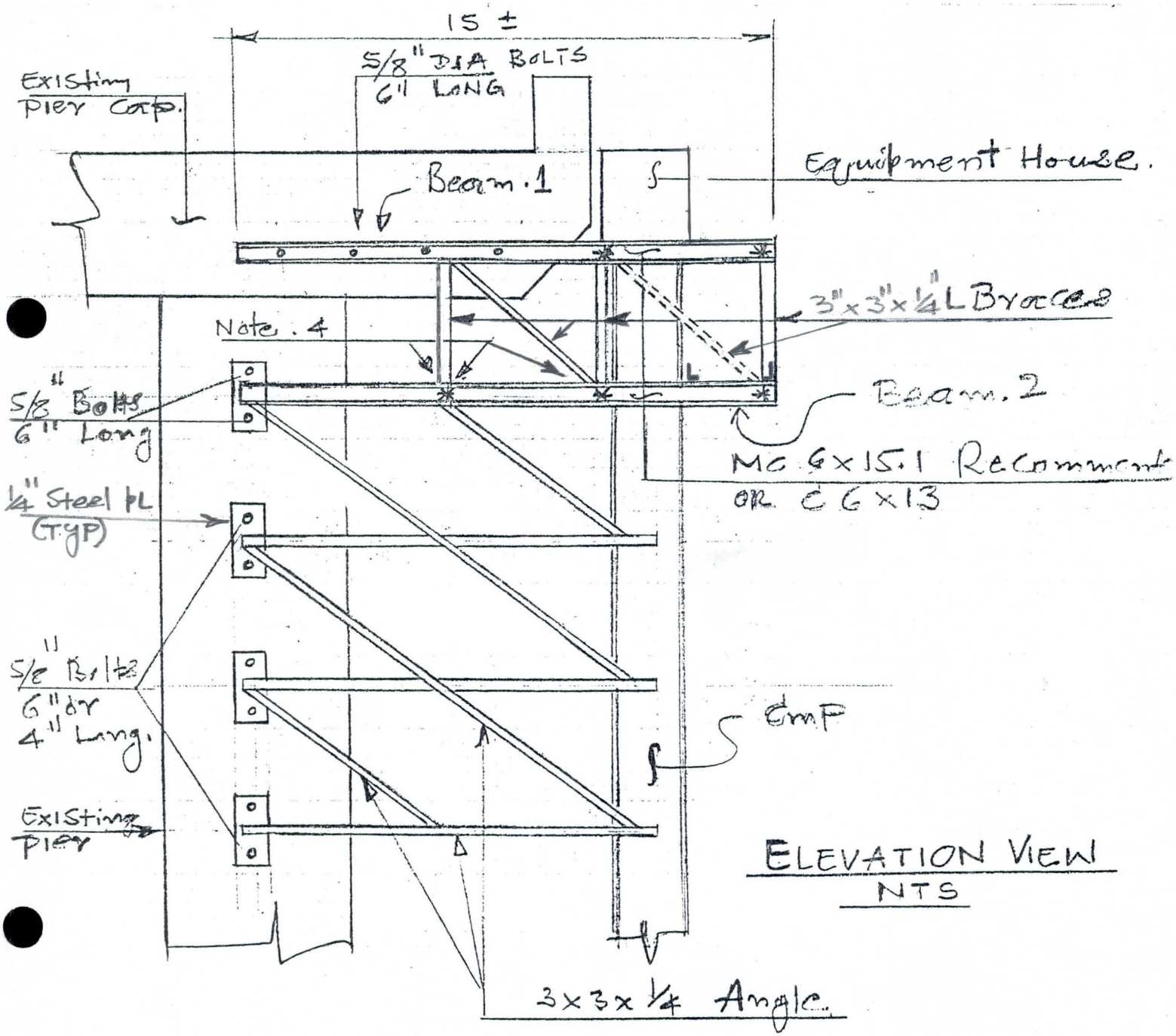
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @. PAGE 5 OF 5

DETAIL COMPUTED KVH DATE Jan 19

Estrella Pkwy - Gila Riv CHECKED BY CCC DATE 2/6/9

KEY NOTES: 1) use 6" channel Sections for both Bm.1 & Bm.2
2) Weld VERT & DIAG. braces between two main Chl. Sects
3) Provide horizontal braces at places marked with *
4) All weldings shall be a min. $\frac{3}{16}$" Fillet Weld.



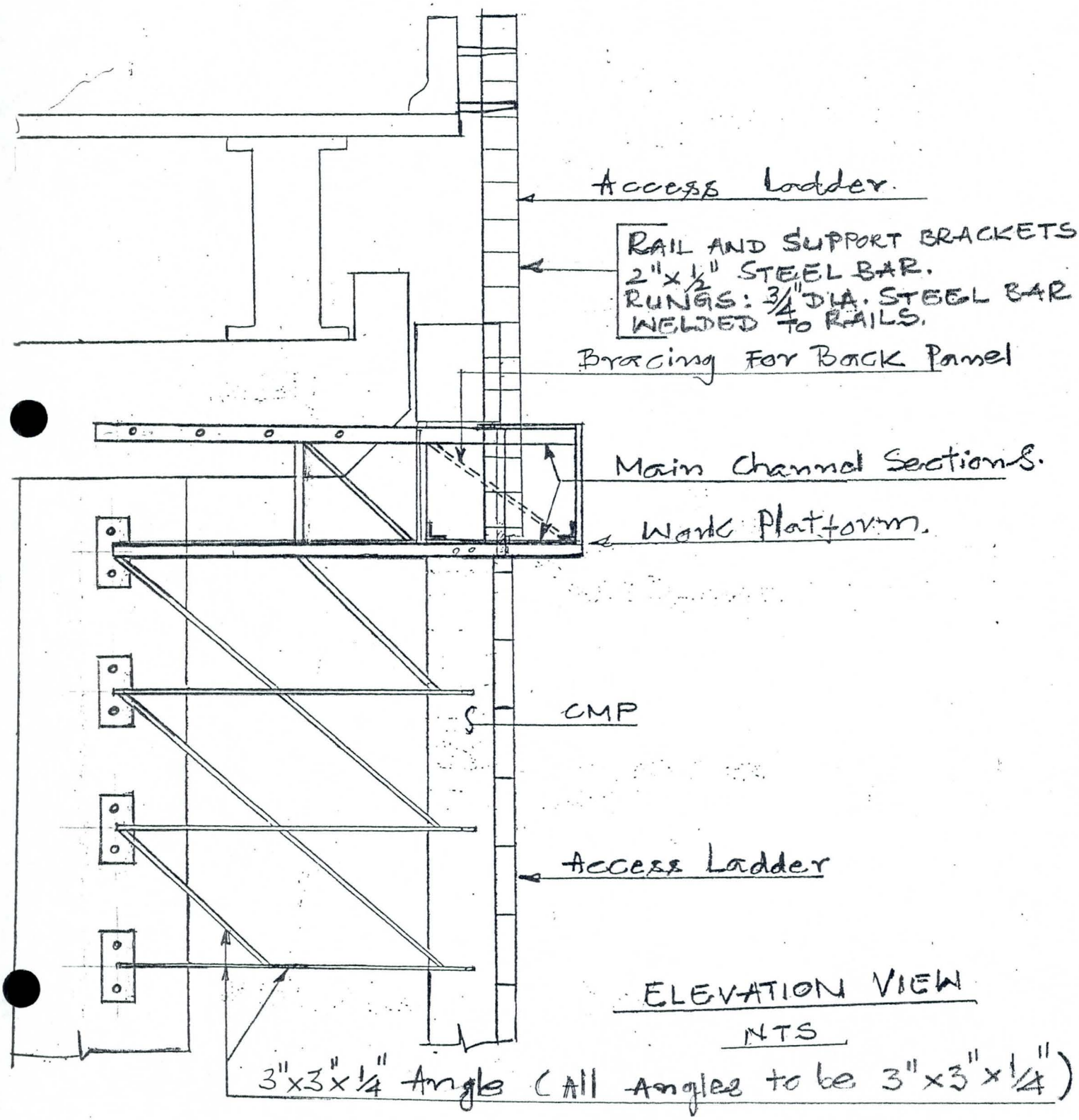
ELEVATION VIEW
NTS

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @ PAGE 1 OF 5

DETAIL Estrella Pkwy - Gila River COMPUTED TJK DATE Jan 12

CHECKED BY DATE



ELEVATION VIEW

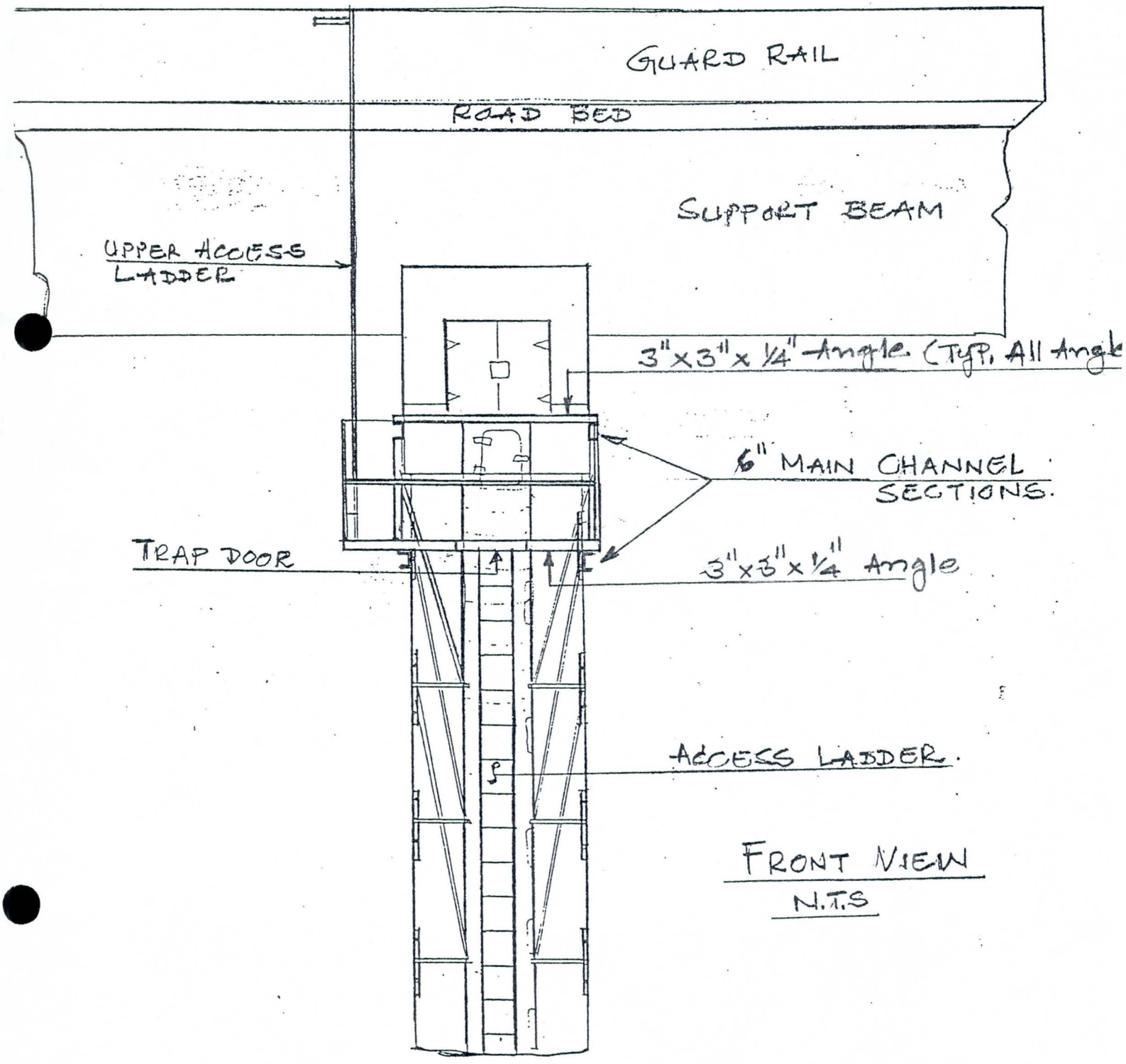
NTS

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE @ _____ PAGE 2 OF 5

DETAIL ESTRELLA PKWY COMPUTED TJK DATE JAN 92

GILA RIVER CHECKED BY _____ DATE _____



FRONT VIEW

N.T.S

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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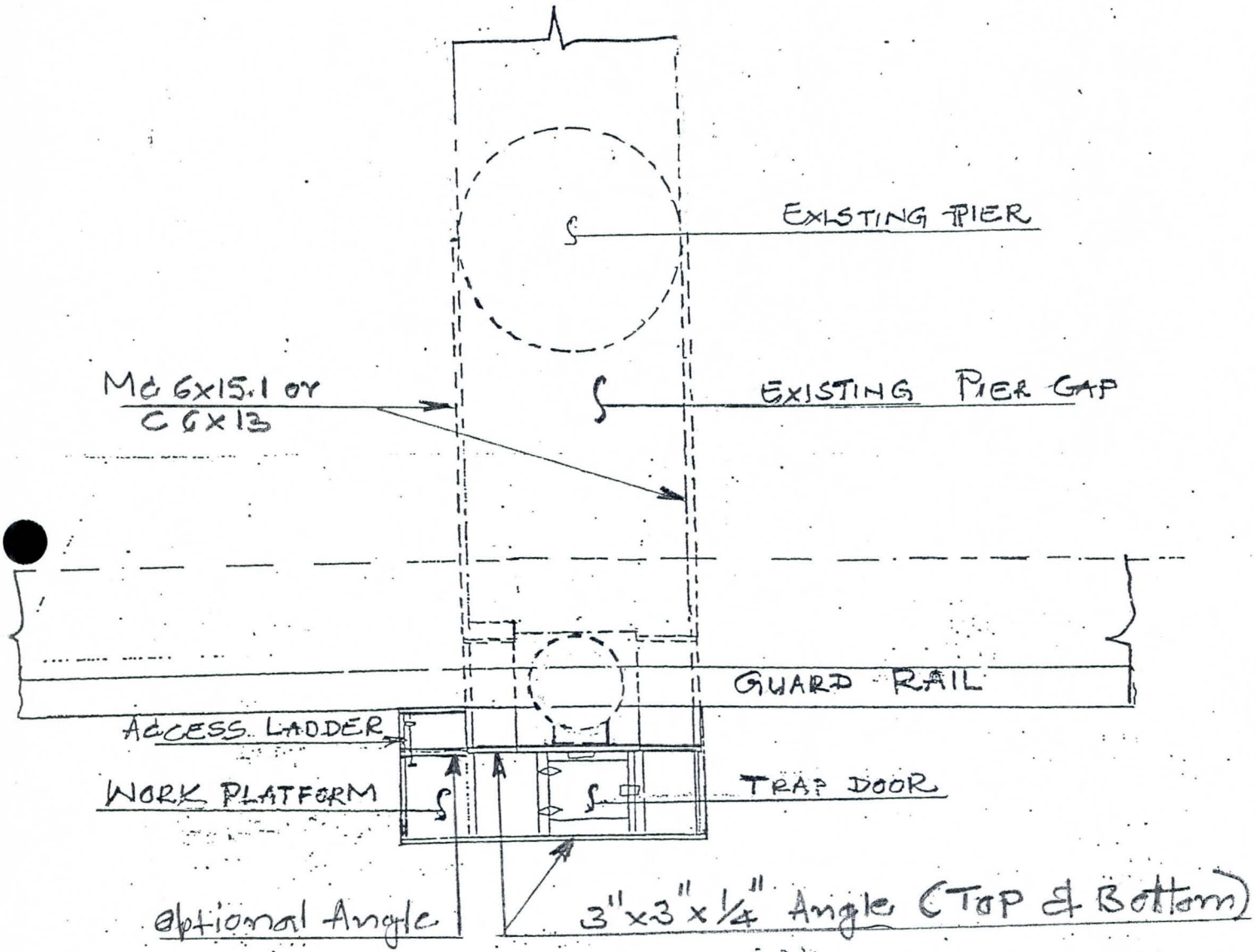
DETAIL Estrella Pkwy/Gila River COMPUTED T JK DATE Jan 92

CHECKED BY DATE



PLAN VIEW

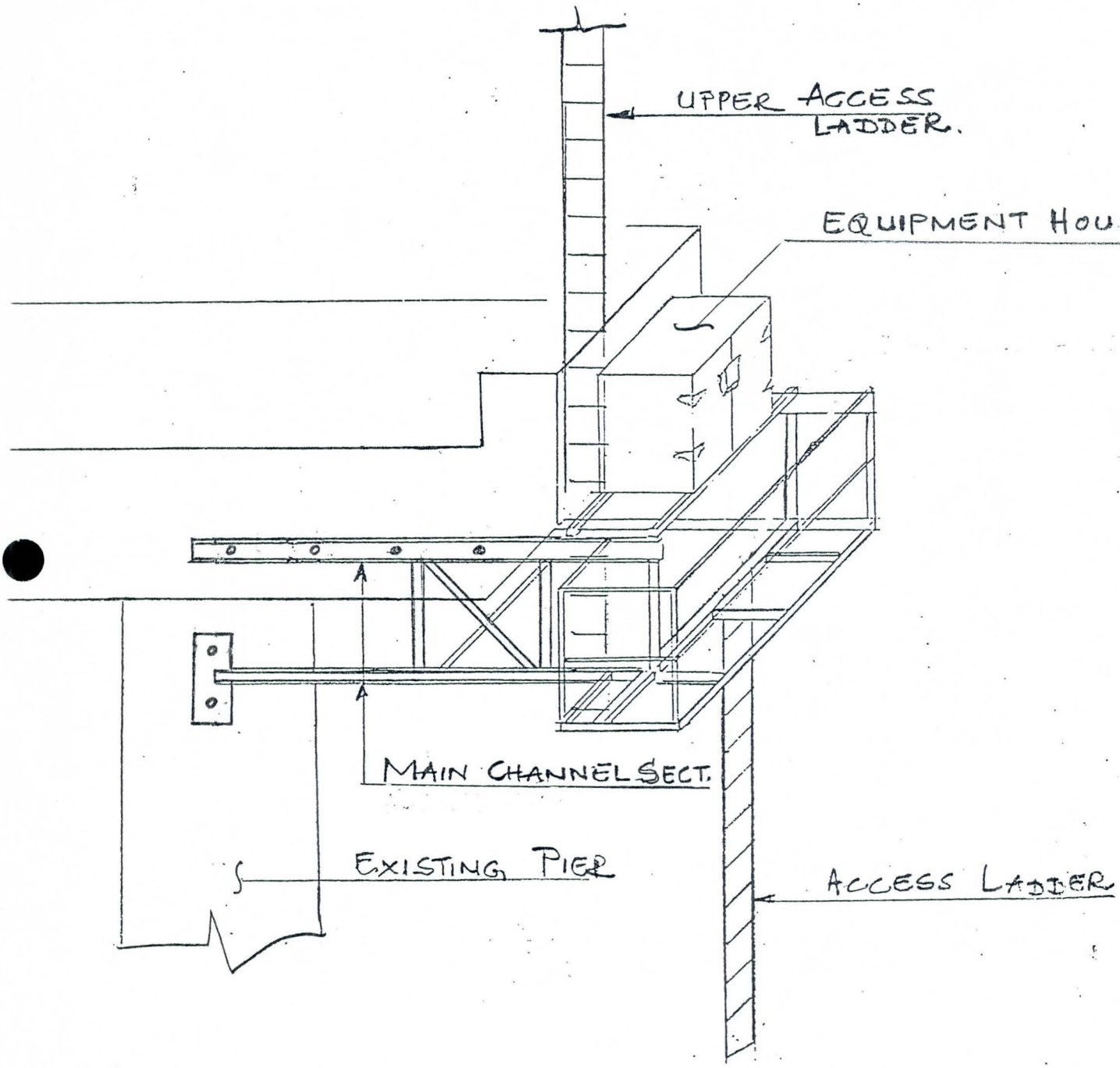
N.T.S.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE @ PAGE 4 OF 5

DETAIL ESTRELLA PKWY COMPUTED TJK DATE Jan 92

GILA RIVER CHECKED BY _____ DATE _____



ISOMETRIC VIEW

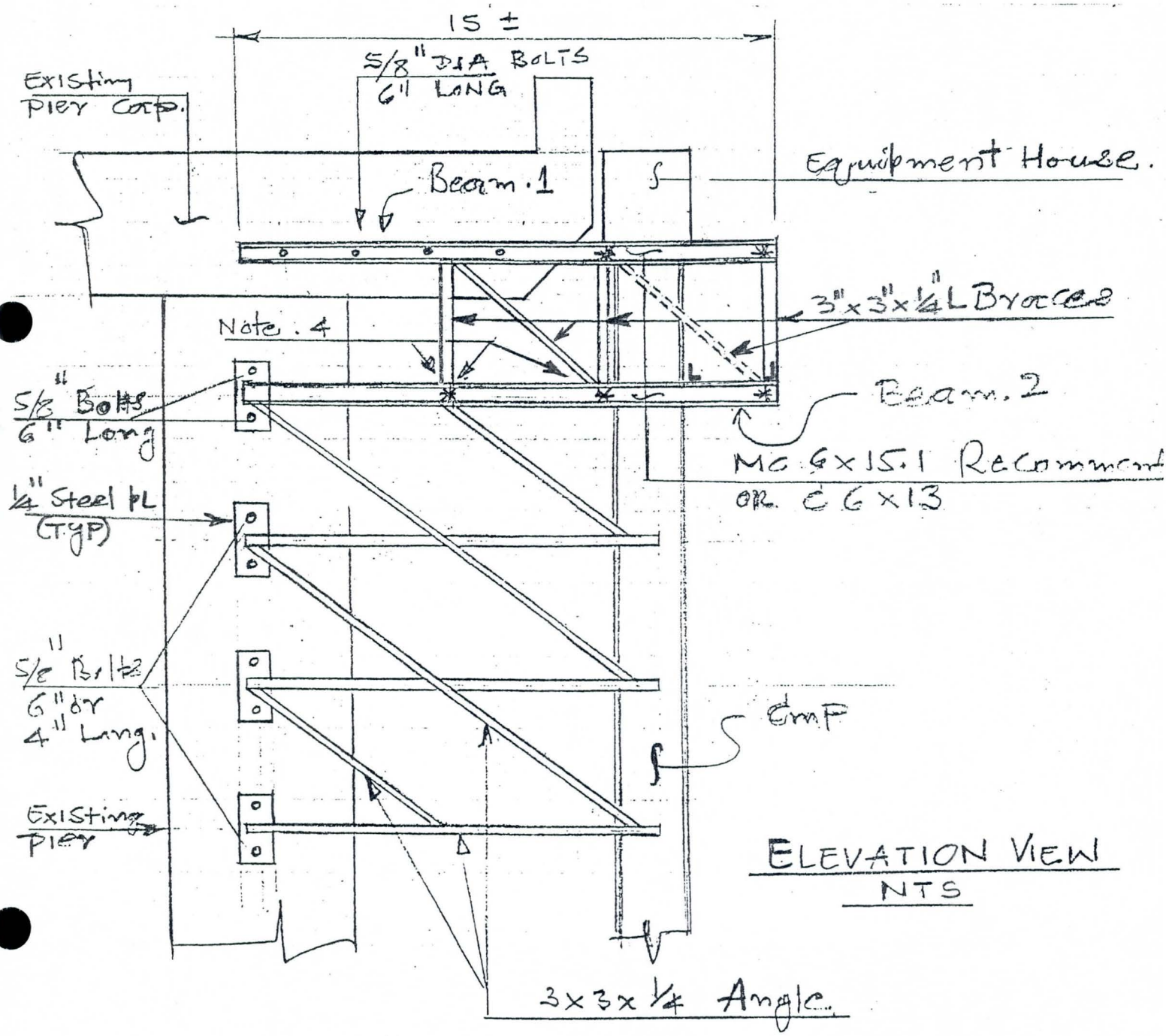
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @. PAGE 5 OF 5

DETAIL Estrella Pkwy - Gila River COMPUTED KVH DATE Jan/9

CHECKED BY CCW DATE 2/6/9

KEY NOTES: 1) use 6" channel Sections for both Bm.1 & Bm.2
2) Weld VERT & DIAG. braces between two main Chl. Sects
3) Provide horizontal braces at places marked with *
4) All weldings shall be a min. 3/16" Fillet Weld.



ELEVATION VIEW
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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @ PAGE ___ OF ___

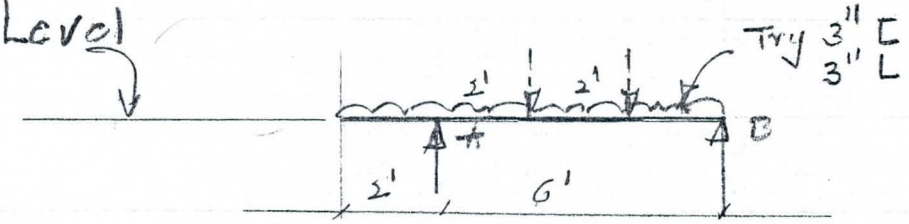
DETAIL Estrella Pkwy COMPUTED KVH DATE Feb 89

Gila River. CHECKED BY ___ DATE ___

2) Channel Section at Work platform Level:

Check Set

platform Level



Try C3x4.1,

L.L. @ 30 psf, width Contributing = 5/2 = 2.5'

@ (30×2.5) = 75 plf

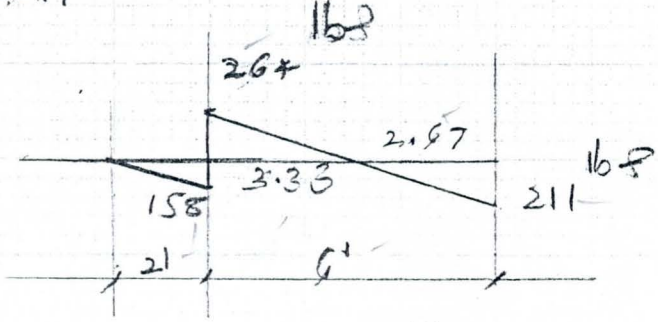
$\Sigma M_B = 0$, $R_A(6) = (75 \times 8 \times \frac{8}{2}) + (4.1 \times 8 \times \frac{8}{2})$

$= (2400 + 131)$

$R_A = 422$ lbs

$R_B = (75 \times 8) + (4.1 \times 8) - 422$

$= 211$ lbs.



$(75 + 4.1)2 = 158$,

$(75 + 4.1)6 = 475$,

$(475 - 264) = 211$

$\frac{264}{x} = \frac{211}{6-x}$

$211x + 264x = 264 \times 6$

$x = 3.33$

$M_{max}(POS) = 211 \times 2.67 - 75 \times 2.67 \times \frac{2.67}{2}$

$= 296$ lbs ft

$M = \frac{w}{8\ell^2}(\ell+a)^2(\ell-a)^2 = \frac{75}{(8)(6)^2}(8)^2(4)^2 = 266$

$M_{max} = \frac{75 \times 2 \times \frac{1}{2}}{} = 150$ lbs ft

Try C 3x4.1, S = 1.1, or L 3x3x1/4, S = 0.58

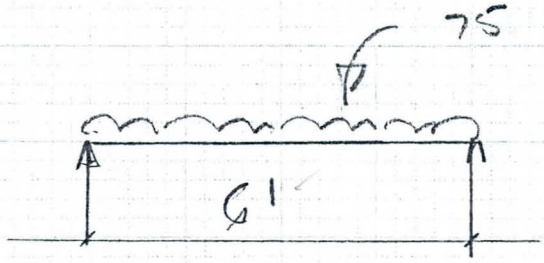
$M = fS$, $f = \frac{296 \times 12}{1.1} = 3.23$ K-si

using L 3x3x1/4, $f = \frac{295 \times 12}{0.58} = 6.12$ Ksi

$f_{(Allow)} = 0.6F_y = 0.6 \times 36 = 22$ Ksi (Non Compact)

∴ Either 3" Channel or 3" Angle is OK

b) Interior Beam at platform Level.



$M_{max} = \frac{75 \times 6^2}{8} = 338$ lbs ft

$M = fS$, using same C 3x4.1 or 3x3x1/4 L

$f = \frac{338 \times 12}{0.58} = 7.0$ Ksi.

∴ ok

or use Lightest 6" Channel [C 6x8.2] to match with Main Channel Member or 3" x 3" x 1/4 Angle.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge C PAGE ____ OF ____

DETAIL Estrella Pkwy. COMPUTED ____ DATE ____

Gila River CHECKED BY ____ DATE ____

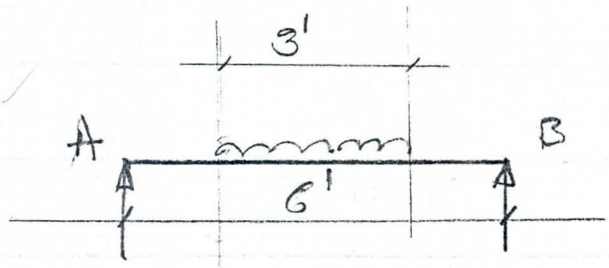
Beam Supporting Equipment House:

Approx. wt. Equipment House = 300 lbs

Wt on each Beam = $\frac{300}{2}$

= 150 lbs

UDL = $\frac{150}{3}$ = 50 plf



Try C 3x4.1 or 3x3x1/4 Angle, wt. 4.9 plf

$R_A = R_B = \left(\frac{50 \times 3}{2}\right) + \left(4.9 \times \frac{6}{2}\right) = 90$ lbs

$M_{max} = (90 \times 3) - (4.9 \times 3 \times \frac{3}{2}) - (50 \times 1.5 \times \frac{1.5}{2})$

= 192 lbs ft

(C 3x4.1) S = 1.1

(L 3x3x1/4) S = 0.58

$M = fS$, $f = \left(\frac{192 \times 12}{0.58}\right) = 4.0$ ksi

∴ OK

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @ PAGE ____ OF ____

DETAIL Estrella Pkwy COMPUTED KVH DATE Feb 9

Gila River CHECKED BY ____ DATE ____

Check Welding Lengths:

E60 Weld:

Allow. Stress $(0.3 \times 60) = 18$ Ksi

E70 Weld: $(0.3 \times 70) = 21$ Ksi

E60 Fillet weld: $\sin 45 (18 \text{ Ksi}) = 12.73$ Ksi

E70 Fillet weld: $\sin 45 (21 \text{ Ksi}) = 14.85$ Ksi

Allow. Base Metal Stress $= 0.4 F_y$

$= 0.4 \times 36 = 14.4$ Ksi

≈ 14.85 Ksi

Using E70 Electrode:

For $\frac{1}{16}$" Fillet weld: $(\frac{1}{16} \times 0.707 \times 21 \text{ Ksi})$

$= 0.928$ K/in

For $\frac{3}{16}$" Fillet weld $= (3 \times 0.928) = 2.78$ K/in

Using Min 1" Length of weld on each side

Allow Load $= 2" (2.78) = 5.56$ K

Max Reaction $= 422$ lbs < 5.56 K

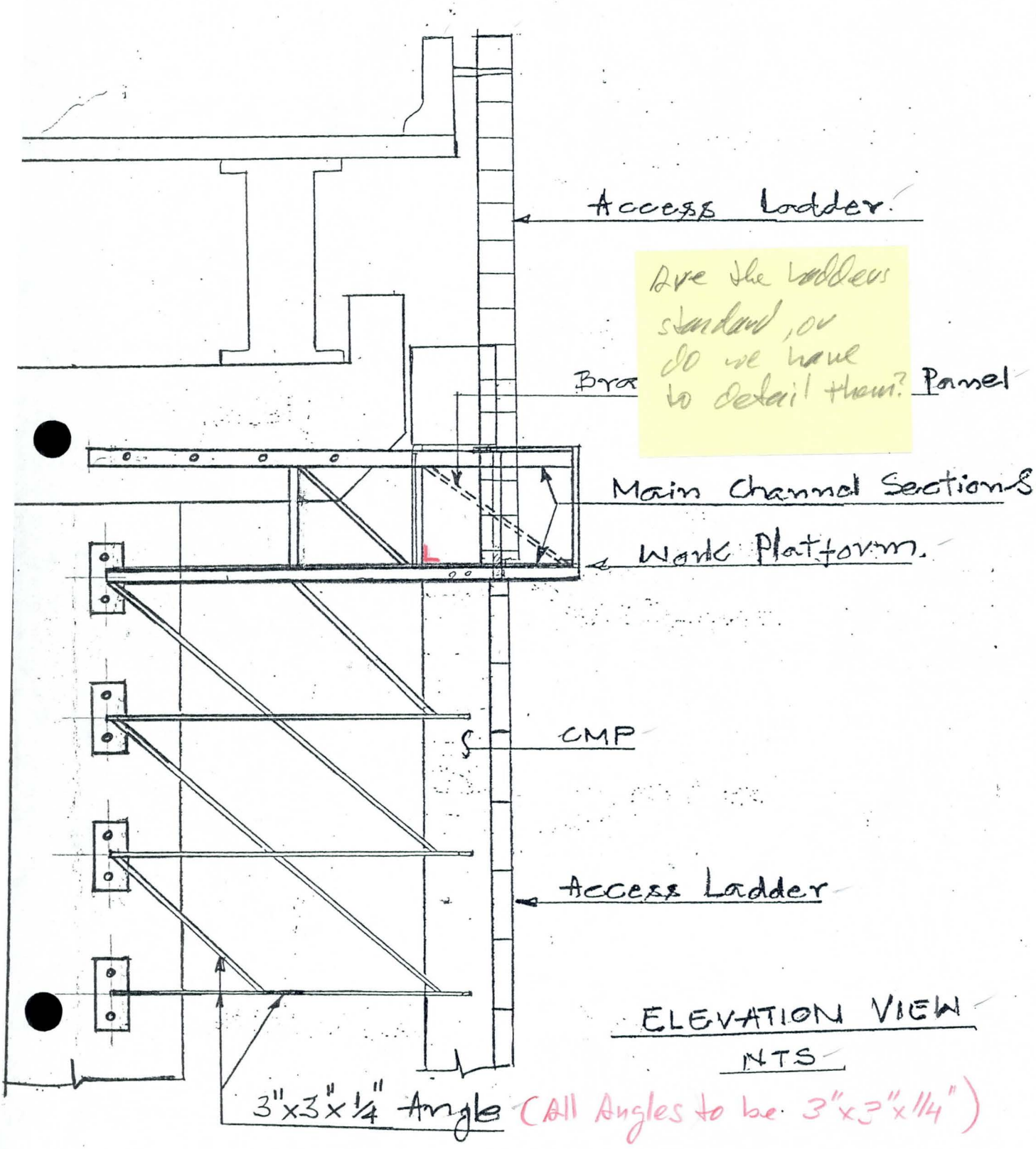
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @ PAGE 1 OF 5

DETAIL ____ COMPUTED TJK DATE Jan 12

Estrella Pkwy - Gila River CHECKED BY ____ DATE ____

Check SET



ELEVATION VIEW

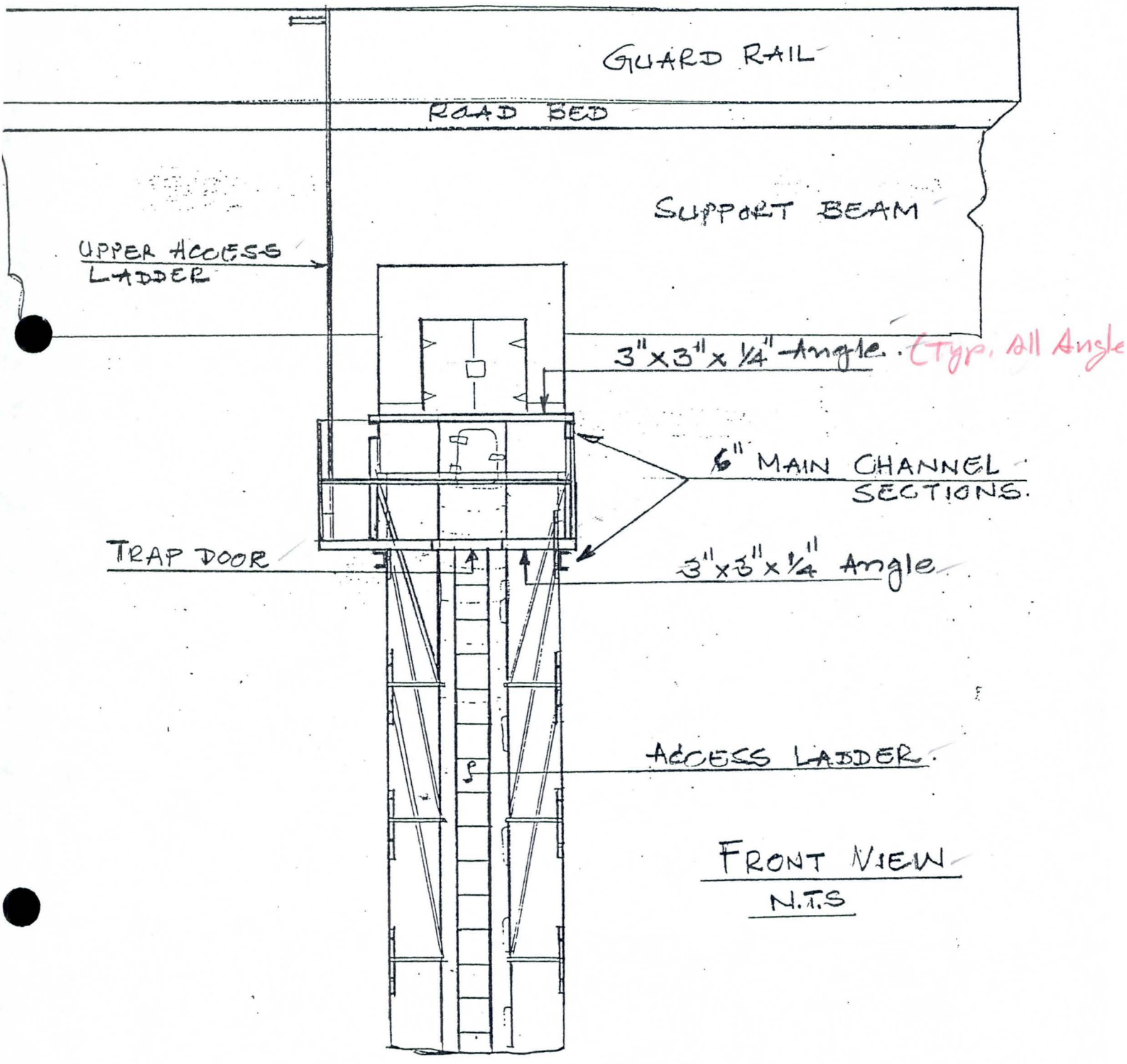
NTS

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE @ _____ PAGE 2 OF 5

DETAIL ESTRELLA PKWY COMPUTED TJK DATE JAN 92

GILA RIVER CHECKED BY _____ DATE _____



FRONT VIEW

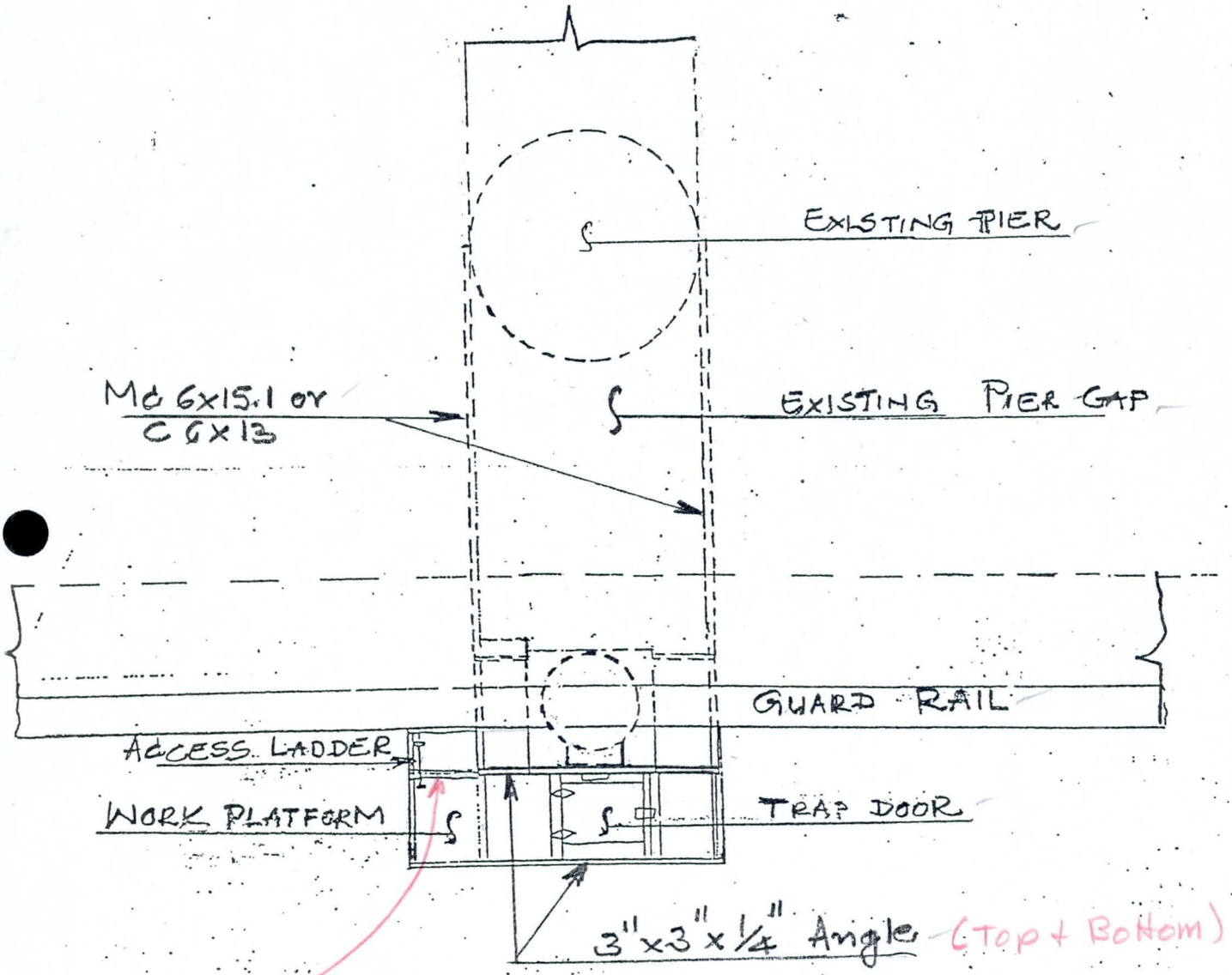
N.T.S

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @ PAGE 3 OF 5

DETAIL Estrella Pkwy/Gila River COMPUTED T JK DATE Jan 92

CHECKED BY _____ DATE _____



PLAN VIEW

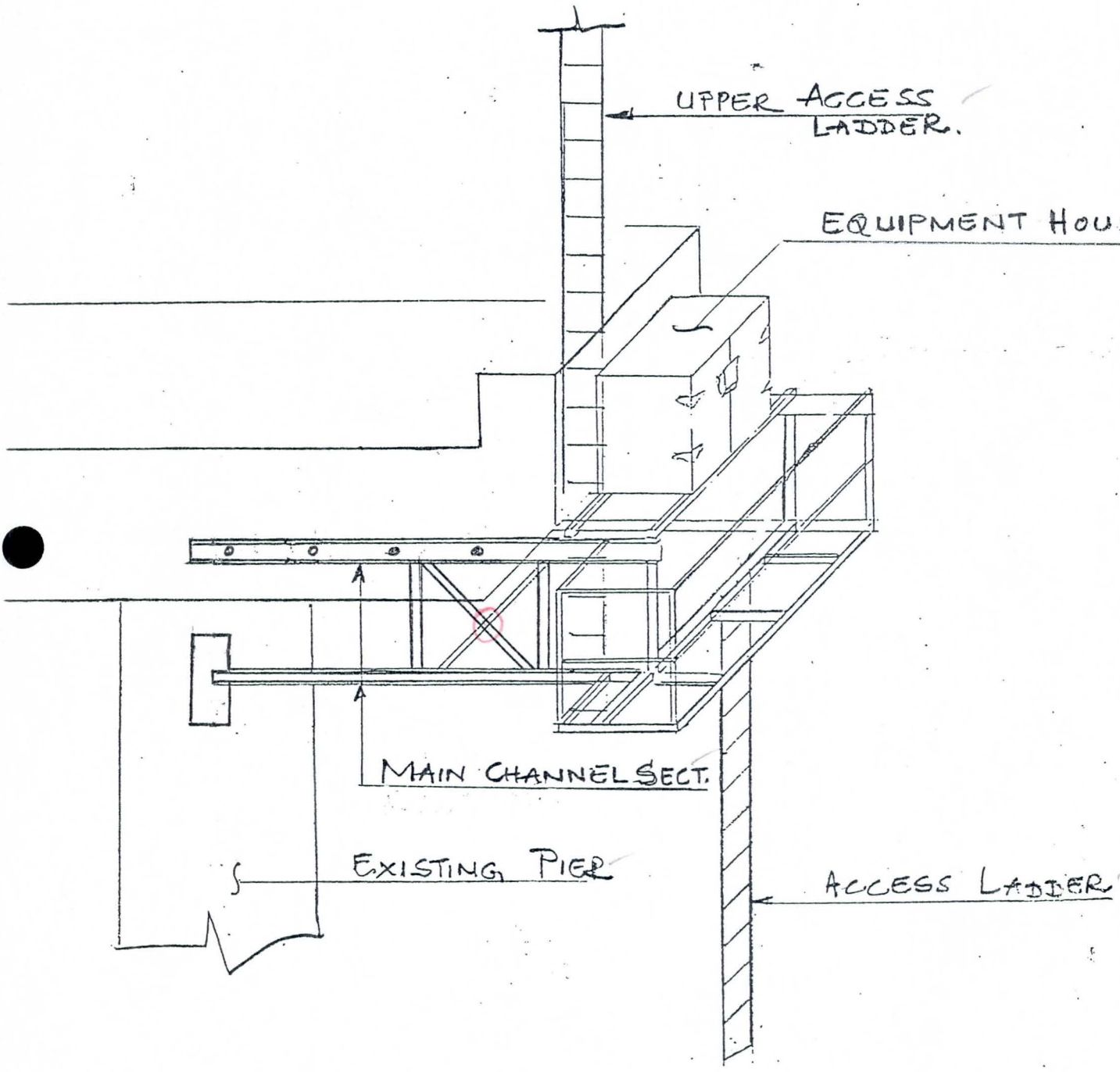
N.T.S.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE @ GILA RIVER PAGE 4 OF 5

DETAIL ESTRELLA PKWY COMPUTED TJK DATE Jan 92

CHECKED BY _____ DATE _____



ISOMETRIC VIEW

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @ PAGE 5 OF 5

DETAIL Estrella Pkwy - Gila River COMPUTED KVH DATE Jan 19

CHECKED BY CCCC DATE 2/6/19

KEY NOTES: 1) Use 6" channel Sections for both Bm.1 & Bm.2
2) Weld VERT & DIAG. braces between two main Chl. Sects
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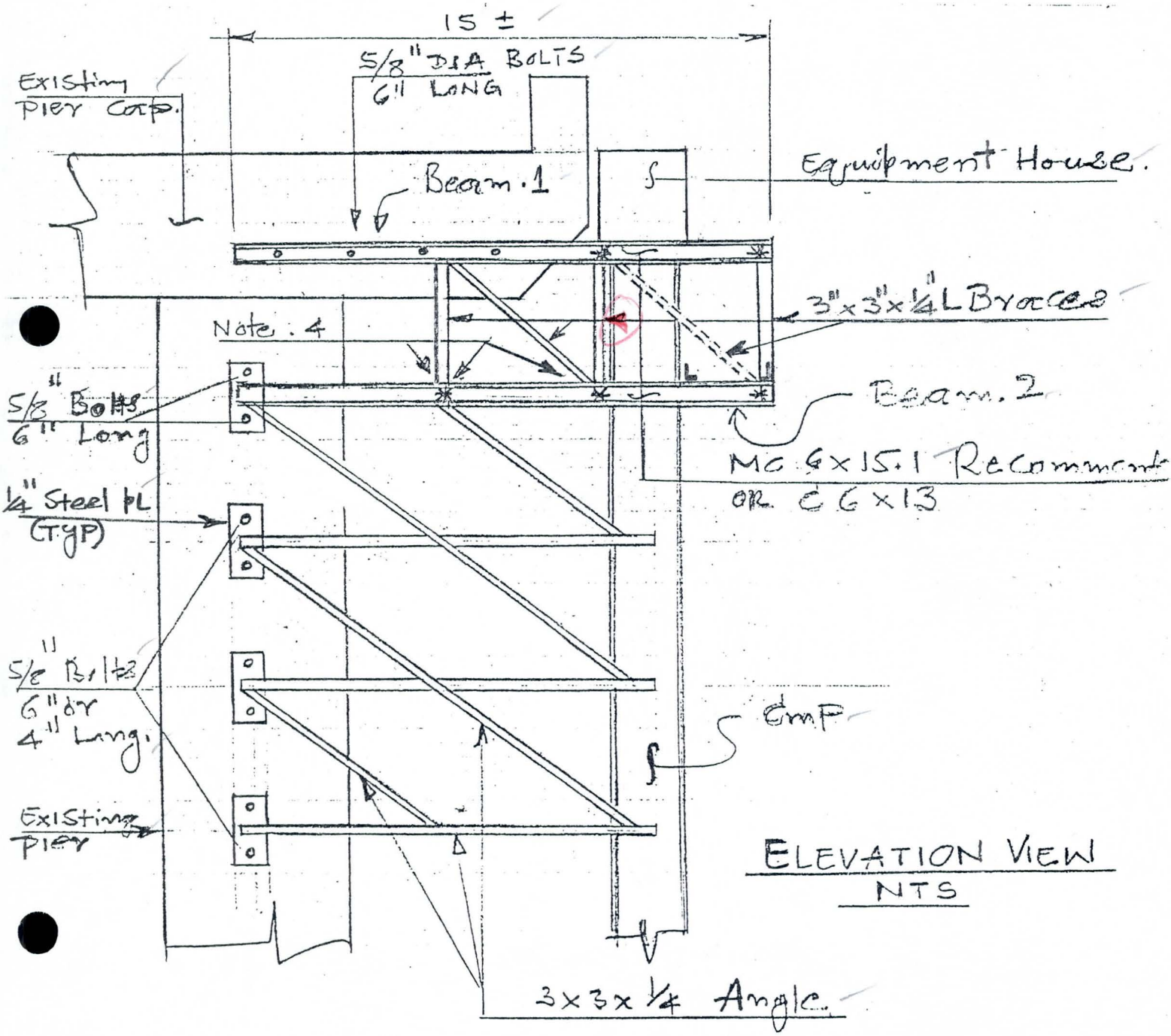


ELEVATION VIEW
NTS

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge Estrella Pkwy PAGE 1 OF ____

DETAIL Gila River COMPUTED KVH DATE Jan 92

Estrella Pkwy CHECKED BY CGW DATE 2/4/92

Corrugated Steel pipe:

24" — 0.052" — 1/20 — 20 lbs/ft

Hand Book of Steel Drainage Pipe

0.064 — 1/16" — 24 —"—

0.079 — 1/12" — 29 —"—

0.109 — 1/10 — 38 —"—

Contech Corrugated Steel pipe 24" Wt Varies from 20 lbs/ft to 38 plf

Use Av wt of 30 lbs/ft

Actual wt used 20 lbs/ft < 30 lbs used Now

Appx Length

a) Total Pipe wt = (18 × 30) = 540 lbs

b) Plat form: (5' × 8') = 40 sq ft

L.L @ 20 psf (40) = 800 lbs — Looks High
4 people — 200 lbs Each

(20 psf × 8') 160 lbs/ft uniform L.L

width

c) D.L: Metal Grate floor @ 10 psf

(10 psf × 8) = 80 plf

platform width

Total Load = (160 + 80) = 240 plf

Each side of Pier = $\frac{240}{2}$ = 120 plf

6910-153 4-90

1) Equipment House = 300 lbs/2 = 150 lbs Each End

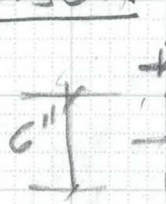
2) wt. of CMP = 540 lbs/2 = 270

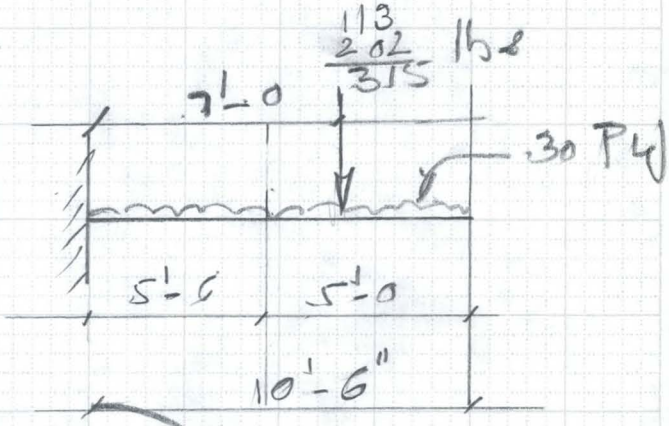
3) Platform Load (D.L + L.L) = $\frac{400}{2}$ = 200 PLF

	Beam 1	Beam 2
1) Equipment House	3/4 (150) = 113 lbs	1/4 (150) = 37 lbs
2) CMP	3/4 (270) = 202	1/4 (270) = 68
3) Platform Load (D.L + L.L)		200 PLF

Beam 1. At Top Level

Case. 1





Assume Self wt = 30 lbs/ft

$M = .315(7) + \left(30 \times 10.5 \times \frac{10.5}{2}\right) = 3860$ lbs-ft

$M = f_s$, Try C 6 x 10.5, $S_x = 5.06$

$f = \frac{3.86 \times 12}{5.06} = 9.2$ Ksi

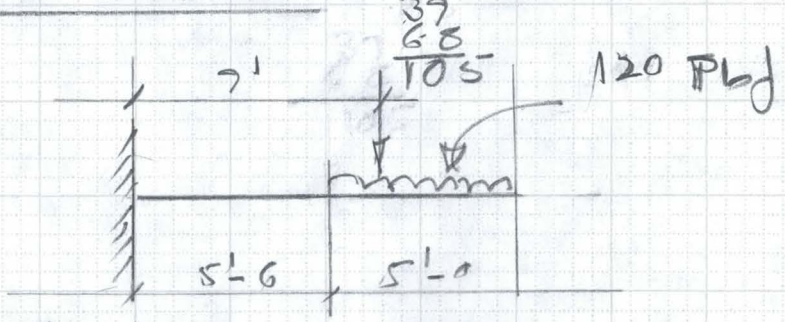
$f_{(Allow)} = .66\,F_y = 24$ Ksi Compact Sect.

$= .60\,F_y = 22$ ksi Non Comp.

$F.S = \left(\frac{22}{9.2}\right) = 2.4$ ∴ C 6 x 10.5 is ok

Beam 2 At Platform Level:

Check to see if all the platform load is taken by Beam. 2



Assume Self. wt = 30 lbs/ft

$M = (105 \times 7.0) + (120 \times 5 \times 8) + (30 \times 10.5 \times \frac{10.5}{2})$

$= 7188$ lbs ft

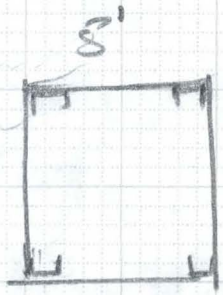
$M = fS$, Try C6x10.5, $S_x = 5.06$

$$f = \frac{7188 \times 12}{5.06} = 17.0 \text{ Ksi}$$

But the span may be as long as 14'-6 if the Beam bends at the real support.

∴ would be good to transfer some of this platform load to Beam. 1, using Vertical bracing from Beam. 2 to Beam. 1

Platform Load:



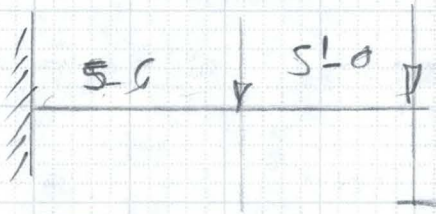
Total Load @ 240 plf

$(240 \times 5) = 1200$ lbs

Load @ Each Bracing $= 1200/4 = 300$ lbs

Addl. Loading from Bracing of Beam 2 to Bm. 1

Case 2:



$M_{additional} = (300 \times 5.5) + (300 \times 10.5)$

$= 4800$ lbs/ft

Mom. Total $= (3860 + 4800) = 8660$ lbs/ft

C6x10.5 $f = \frac{8660 \times 12}{5.06} = 20.5$ Ksi

$f_{(Allow)} = 22$ Ksi, F.S $= \frac{22.0}{20.5} = 1.1$

Try C6x13 $S_x = 5.8$

$f = \frac{8660 \times 12}{5.8} = 17.9$ Ksi

C6x13; $t_w = \frac{7}{16}$", $b_f = 2\frac{1}{8}$", $t_f = \frac{5}{16}$", $S_x = 5.8$ | F.S $= \frac{22}{17.9} = 1.23$

MC6x15.1: $t_w = \frac{5}{16}$, $b_f = 3$", $t_f = \frac{1}{2}$", $S_x = 8.32$

Using Mc 6x15.1 : $S_x = 8.32$

$$f = \frac{8660 \times 12}{8.32} = 12.5 \text{ ksi}$$

< 22 ksi

$$FS = \frac{22}{12.5} = 1.8$$

Shear check:

$V_1 = (315 + 30 \times 10.5) = 630$ lbs

$V_2 = 105 + (120 \times 5.0) + (30 \times 10.5) = 1020$ lbs

Allowable Shear Each Bolt = 1200 lbs $\therefore$ ok

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge PAGE 6 OF ____

DETAIL Gila River COMPUTED KVH DATE Jan 9

Estrella Pkwy CHECKED BY CLW DATE 2/4/9

Check Max. Ratio of $\left(\frac{KL}{r}\right)$

a) using 2" x 2" x 1/4" Angle.

L = 13', using K = 1.0, r = 0.609 (from Tables)

$$\frac{KL}{r} = \frac{(1.0 \times 13 \times 12)}{0.609} = 256 > 240$$

Max. Allow Main Memb. = 240

Secc. Memb = 300

b) Try (3 x 3 x 1/4)

$$\frac{KL}{r} = \frac{(1.0 \times 13 \times 12)}{0.93} = 168 < 240$$

$$FS = \frac{240}{168} = 1.5$$

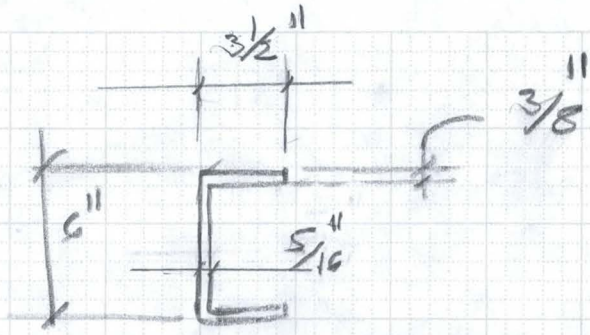
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge PAGE ____ OF ____

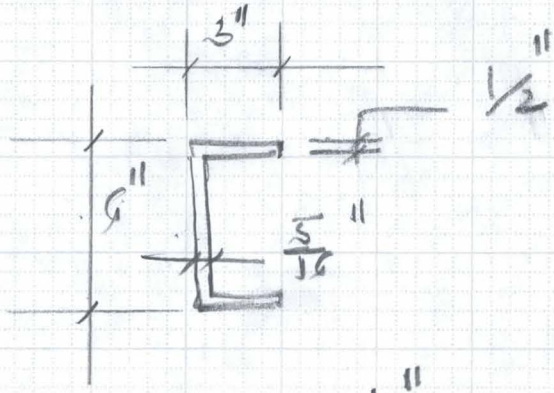
DETAIL Gila River COMPUTED KVH DATE Jan 92

Estrella Pkwy CHECKED BY ____ DATE ____

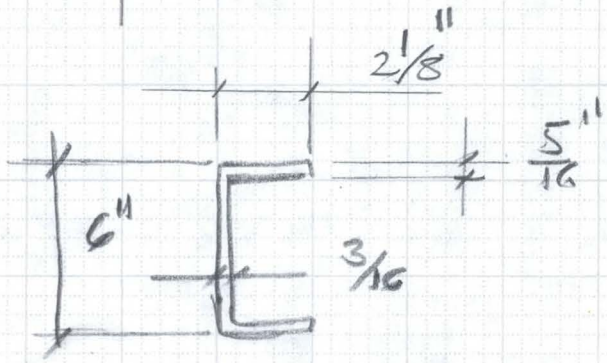
1) MC 6x15.3



2) MC 6x15.1



3) C 6x13



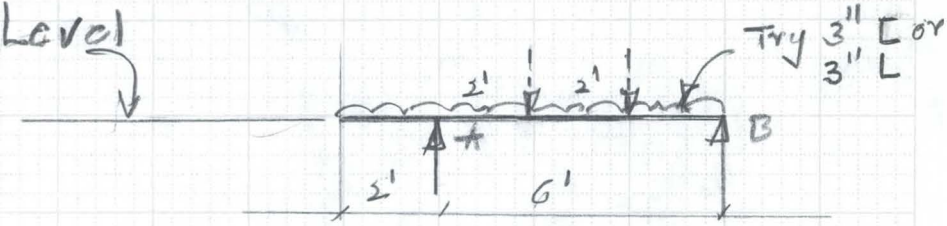
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @ PAGE ____ OF ____

DETAIL Estrella Pkwy COMPUTED IKVH DATE Feb 92

Gila River. CHECKED BY ____ DATE ____

a) Channel Section at Work platform Level:



Try C3 x 4.1,

U.L. @ 30 psf, width contributing = 5/2 = 2.5'

@ (30 x 2.5) = 75 plf

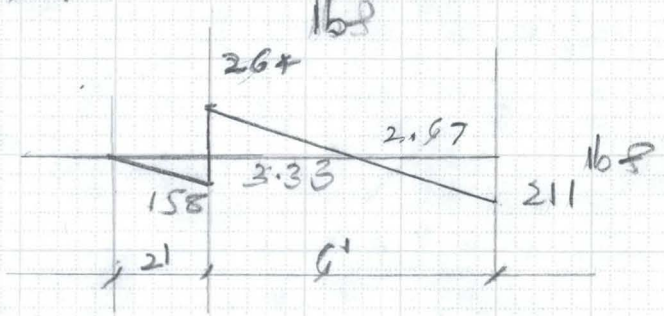
$\Sigma M_B = 0$, $R_A(6) = (75 \times 8 \times \frac{8}{2}) + (4.1 \times 8 \times \frac{8}{2})$

$= (2400 + 131)$

$R_A = 422$ lbs

$R_B = (75 \times 8) + (4.1 \times 8) - 422$

$= 211$ lbs.



$(75 + 4.1)2 = 158$,

$(75 + 4.1)6 = 475$,

$(475 - 264) = 211$

$\frac{264}{x} = \frac{211}{6 - x}$

$211x + 264x = 264 \times 6$

$x = 3.33$

$M_{max}(POS) = 211 \times 2.67 - 75 \times 2.67 \times \frac{2.67}{2}$

$= 296$ lbs ft

$M_{max} = (75 \times 2 \times \frac{2}{2}) = 150$ lbs ft

Try C 3x4.1, S = 1.1, or L 3x3x1/4, S = 0.58

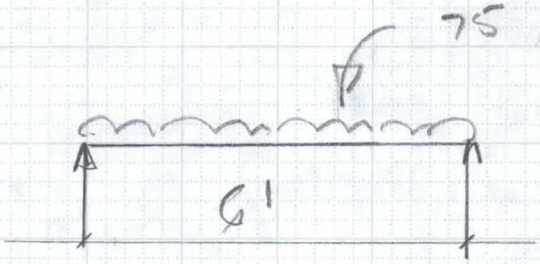
$M = fS$, $f = \frac{(296 \times 12)}{1.1} = 3.23$ K-si

using L 3x3x1/4, $f = \frac{296 \times 12}{0.58} = 6.12$ Ksi

$f_{(allow)} = 0.6F_y = 0.6 \times 36 = 22$ Ksi (Non Compact)

∴ Either 3" Channel or 3" Angle is OK

b) Interior Beam at platform Level.



$M_{max} = (\frac{75 \times 6^2}{8}) = 338$ lbs ft

$M = fS$, using same C 3x4.1 or 3x3x1/4 L

$f = \frac{(338 \times 12)}{0.58} = 7.0$ Ksi.

∴ ok,

or use Lightest 6" Channel [C 6x8.2] to match with Main Channel Member or 3"x3"x1/4 Angle.

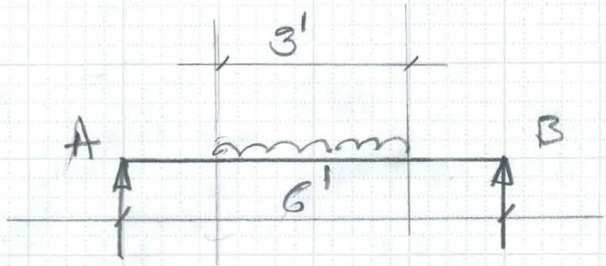
Beam Supporting Equipment House :

Approx. wt. Equipment House = 300 lbs

Wt on each Beam = $\frac{300}{2}$

= 150 lbs

UDL = $\frac{150}{3}$ = 50 plf



Try C 3x4.1 or 3x3x1/4 Angle, wt. 4.9 plf

$R_A = R_B = \left(\frac{50 \times 3}{2}\right) + \left(4.9 \times \frac{6}{2}\right) = 90$ lbs

$M_{max} = (90 \times 3) - (4.9 \times 3 \times \frac{3}{2}) - (50 \times 1.5 \times \frac{1.5}{2})$

= 192 lbs ft

(C. 3x4.1) S = 1.1

(L 3x3x1/4) S = 0.58

$M = fS$, $f = \left(\frac{192 \times 12}{0.58}\right) = 4.0$ ksi

∴ OK

Check Welding Lengths:

E 60 Weld:

Allow. Stress $(0.3 \times 60) = 18$ Ksi

E. 70 Weld: $(0.3 \times 70) = 21$ Ksi

E 60 Fillet weld: $\sin 45 (18 \text{ Ksi}) = 12.73$ Ksi

E 70 Fillet weld: $\sin 45 (21 \text{ Ksi}) = 14.85$ Ksi

Allow. Base Metal Stress $= 0.4 F_y$

$= 0.4 \times 36 = 14.4$ Ksi

≈ 14.85 Ksi

Using E.70 Electrode:

For $\frac{1}{16}$" Fillet weld: $\left(\frac{1}{16} \times 0.707 \times 21 \text{ Ksi}\right)$

$= 0.928$ K/in

For $\frac{3}{16}$" Fillet weld $= (3 \times 0.928) = 2.78$ K/in

Using Min 1" Length of weld on each side

Allow Load $= 2" (2.78) = 5.56$ K

Max Reaction $= 422$ lbs < 5.56 K

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

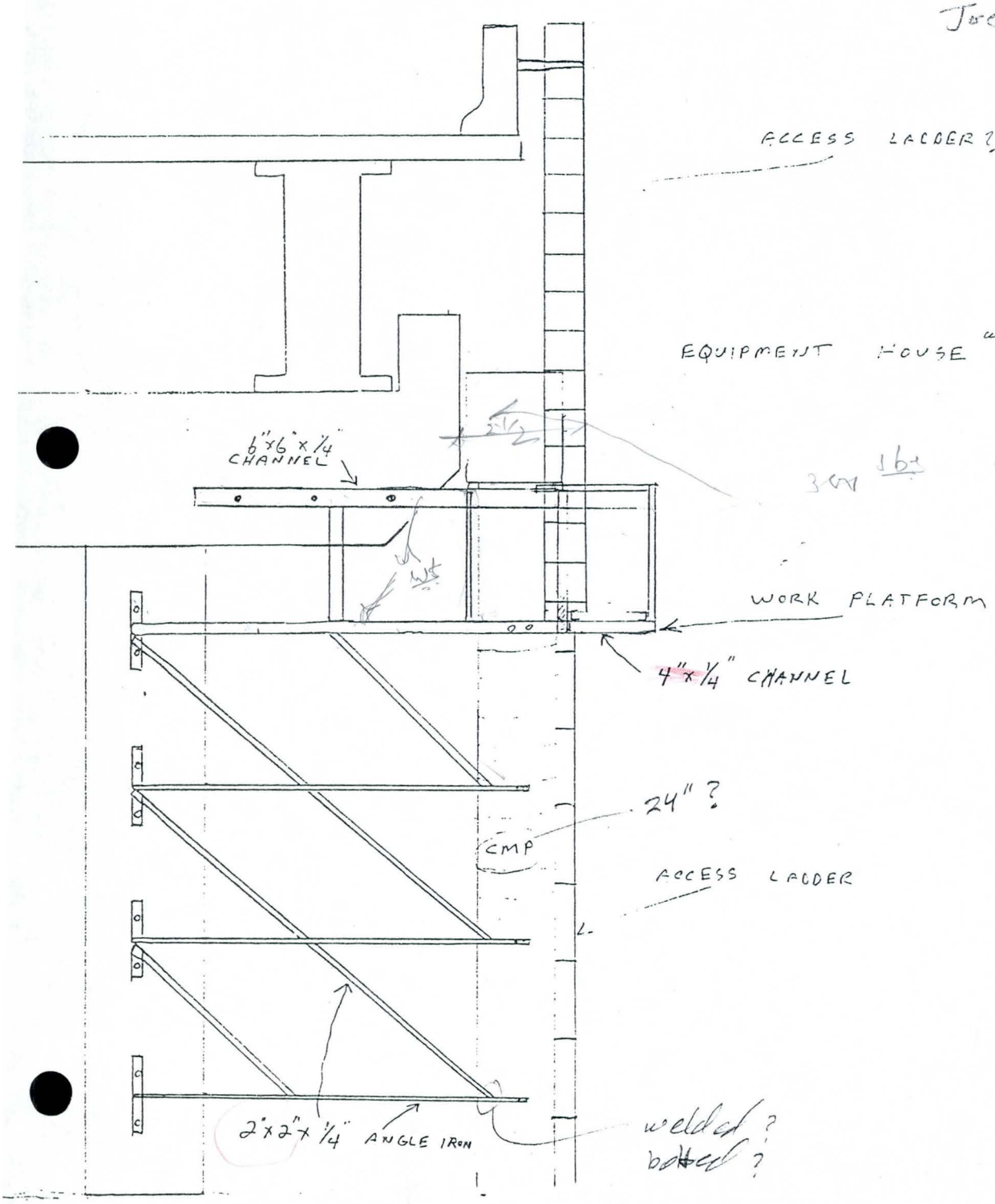
PROJECT STREAM GAUGE ESTRELLA PARKWAY/GILA R. PAGE 1 OF 4

DETAIL 1/4" = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

contact Alan Joe Traum
for questions + field trip to site
and other stream gauge sites.

Joe Traum 4607

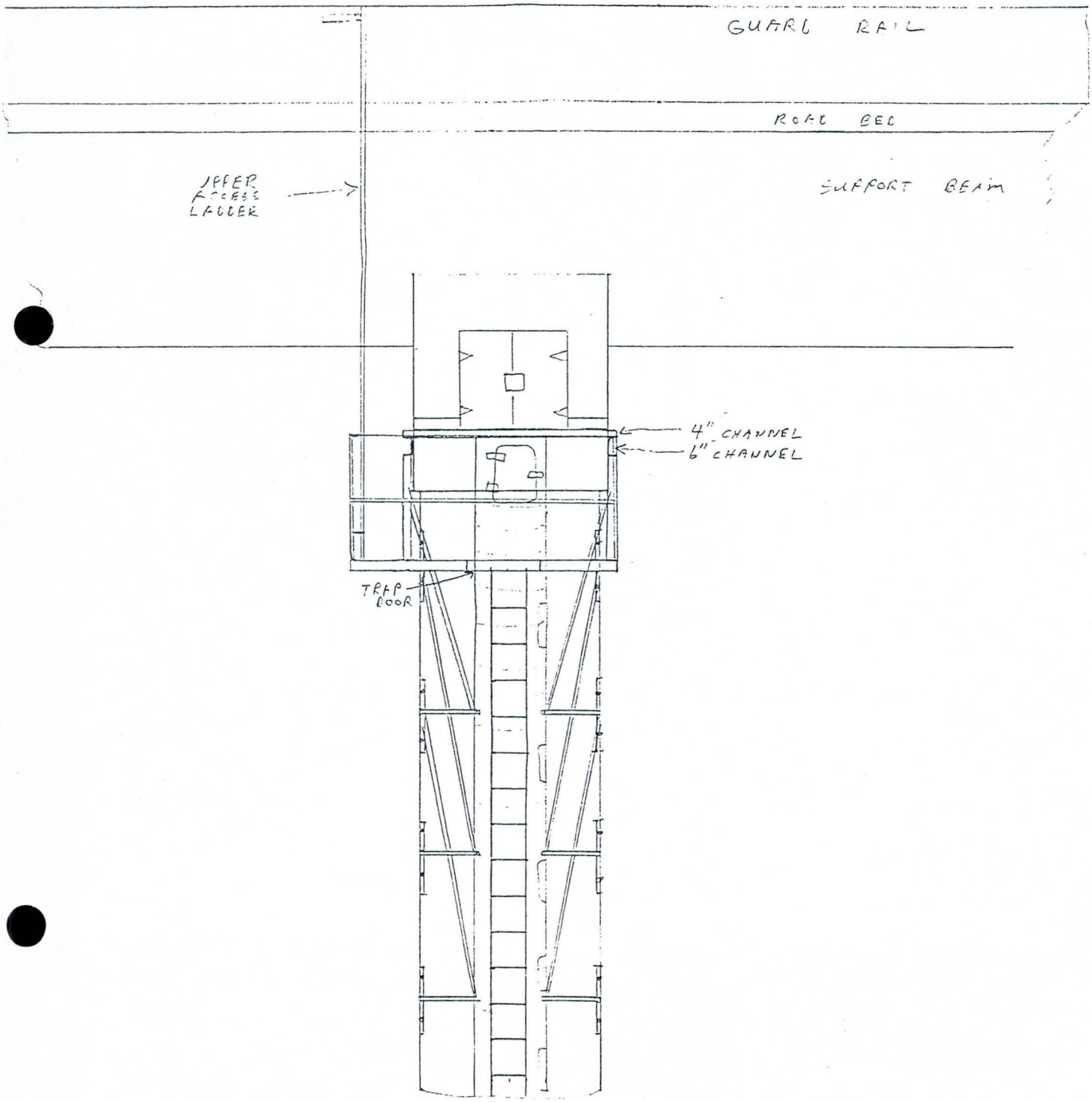


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE ESTRELLA FREEWAY / GILA R. PAGE 2 OF 4

DETAIL 1/4 = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

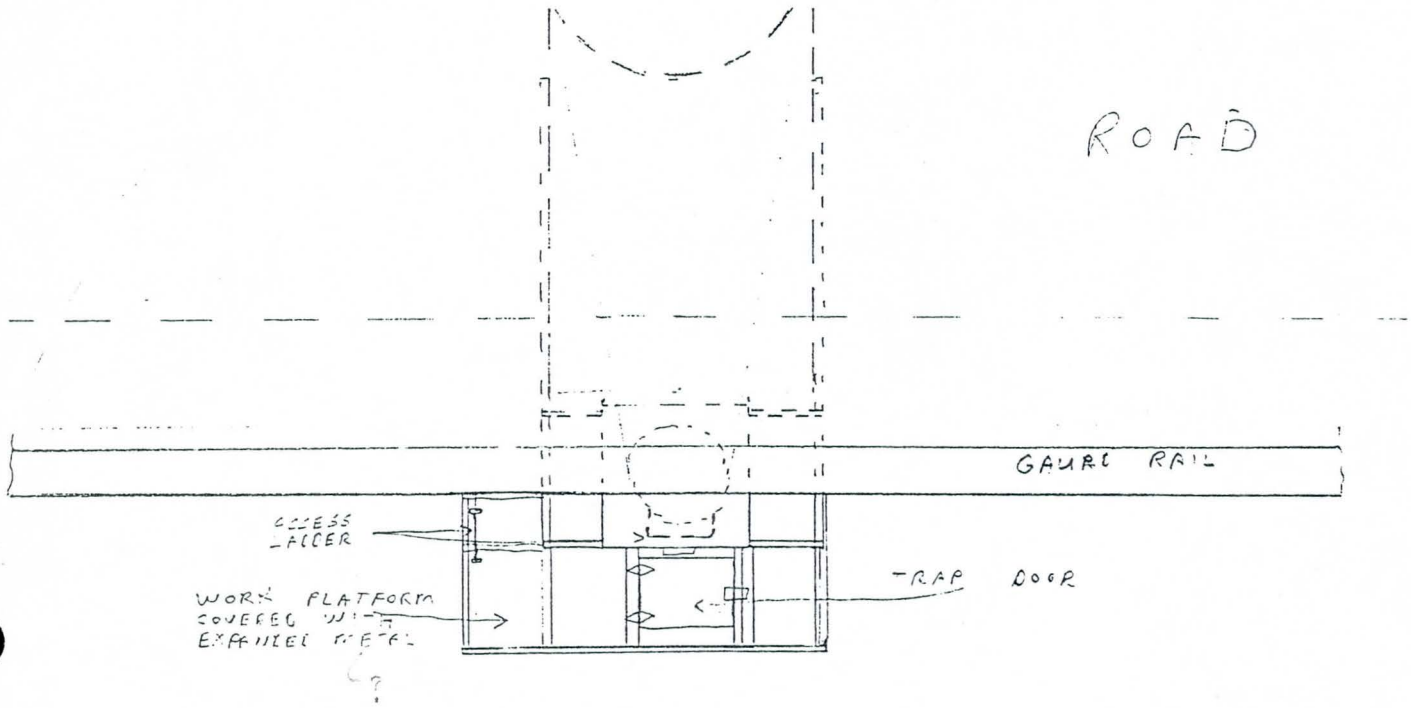


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE ESTRELLA PARKWAY/GILA R. PAGE 3 OF 4

DETAIL 1/4" = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

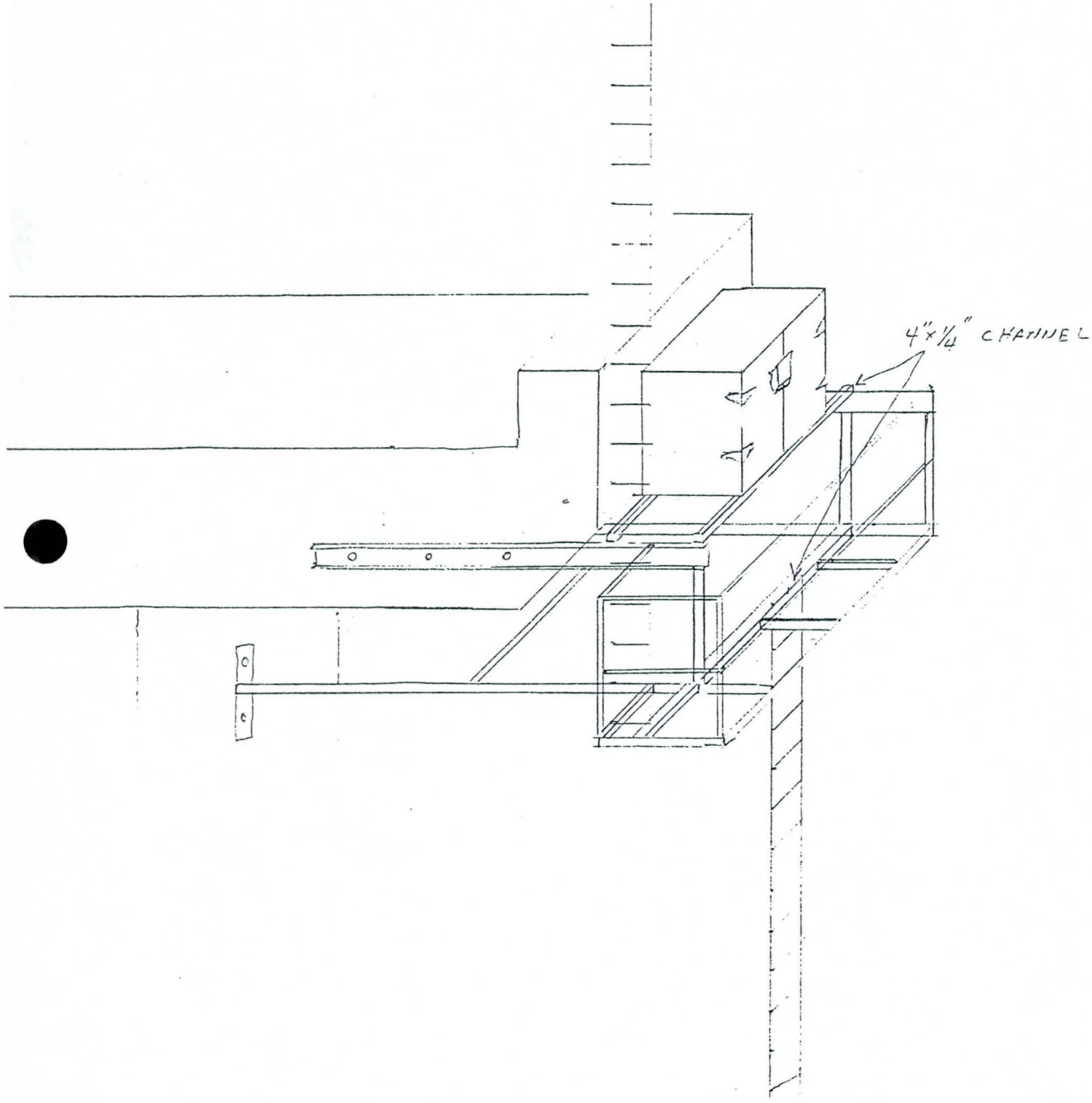


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE, ESTRELLA PARKWAY/GILA R. PAGE 4 OF 4

DETAIL WORK PLATFORM COMPUTED _____ DATE _____

1/4" = 1' CHECKED BY _____ DATE _____



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Strcam Gauge Estrella Pkwy PAGE 1 OF ____

DETAIL Gila River COMPUTED KVH DATE Jan 92

Estrella Pkwy CHECKED BY ____ DATE ____

CHECK SET

Corrugated Steel pipe:

24" — 0.052" — 1/20 — 20 lbs/ft

Handbook of Steel Drainage Pipe — 0.064 — 1/16" — 24 —"—

0.079 — 1/12" — 29 —"—

0.109 — 1/10 — 38 —"—

Contech Corrugated Steel pipe — 24" — Wt Varies from 20 lbs/ft to 38 plf

Use Av. wt of 30 lbs/ft

Actual wt used 20 lbs/ft ∠ 30 lbs used Now

a) Total Pipe wt = (18 × 30) = 540 lbs ← Approx Lengths

b) Platform: (5' × 8') = 40 sq ft

L.L @ 20 psf (40) = 800 lbs — Looks High 4 people — 200 lbs Each

(20 psf × 8') 160 lbs/ft uniform L.L

width

c) D.L.: Metal Grate floor @ 10 psf

(10 psf × 8) = 80 plf

platform width

Total Load = (160 + 80) = 240 plf

Each Side of Pier = 240/2 = 120 plf

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge - Estrella Pkwy PAGE 2 OF ____

DETAIL Gila River COMPUTED EVH DATE Jan 91

CHECKED BY ____ DATE ____

1) Equipment House = 300 lbs/2 = 150 lbs Each End

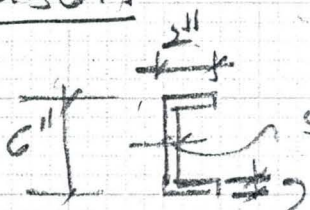
2) wt. of CMP = 540 lbs/2 = 270

3) Platform Load (D.L + L.L) = 400/2 = 200 Plf

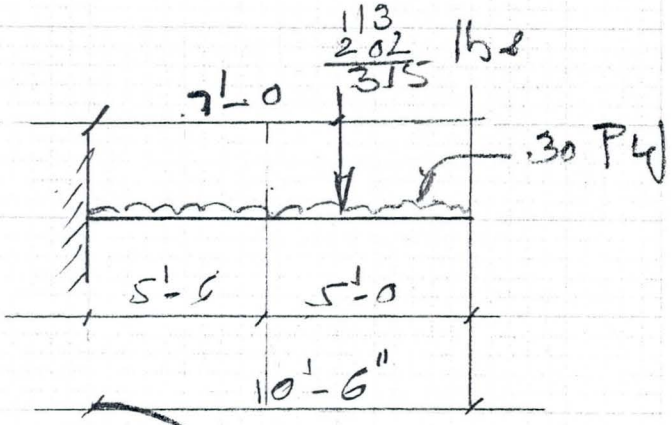
	Beam 1	Beam 2
1) Equipment House	3/4 (150) = 113 lbs	1/4 (150) = 37 lbs
2) CMP	3/4 (270) = 202	1/4 (270) = 68
3) Platform Load (DL + L.L)		200 Plf

Beam 1, At Top Level

Case 1



Assume self wt = 30 plf



$M = .315(7) + \frac{(30 \times 10.5 \times 10.5)}{2} = 3860$ lbs ft

$M = f_b$, Try C 6 x 10.5, $S_x = 5.06$

$f = \frac{3.86 \times 12}{5.06} = 9.2$ Ksi

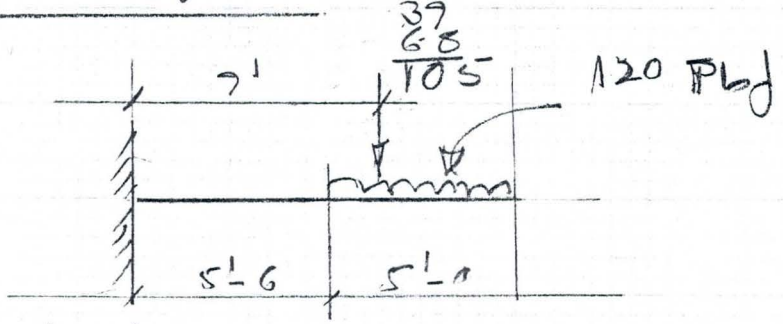
$f_{allow} = .66 F_y = 24$ Ksi Compact Sect.

$= .60 F_y = 22$ ksi Non Comp

$F.S = \frac{22}{9.2} = 2.4$ ∴ C 6 x 10.5 is ok

Beam 2 At Platform Level:

Check to see if all the platform load is taken by Beam. 2



Assume Self. wt = 30 lbs/ft

$M = (105 \times 7.0) + (120 \times 5 \times 8) + \left(30 \times 10.5 \times \frac{10.5}{2}\right)$

$= 7188$ lbs ft

$M = fS$, Try C6x10.5, $S_x = 5.06$

$$f = \frac{7188 \times 12}{5.06} = 17.0 \text{ Ksi}$$

But the span may be as long as 14'-6 if the Beam bends at the real support. ∴ would be good to transfer some of this platform load to Beam. 1, using Vertical bracing from Beam. 2 to Beam. 1

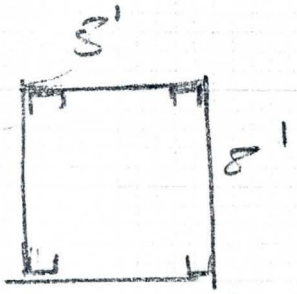
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauges PAGE 4 OF ____

DETAIL Gila River COMPUTED KVH DATE Jan 92

Estrella Pkwy CHECKED BY ____ DATE ____

Platform Load:



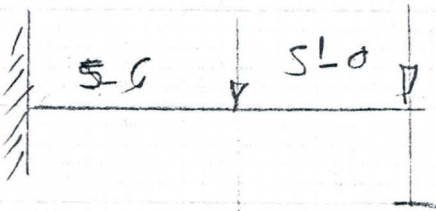
Total Load @ 240 plf

$(240 \times 5) = 1200$ lbs

Load @ Each Bracing $= 1200/4 = 300$ lbs

Addt'l Loading from Bracing of Beam 2 to Bm. 1

Case 2:



$M_{additional} = (300 \times 5.5) + (300 \times 10.5)$

$= 4800$ lbs/ft

Mom. Total $= (3860 + 4800) = 8660$ lbs/ft

C6x10.5 $f = \frac{8660 \times 12}{5.06} = 20.5$ Ksi

$f_{(Allow)} = 22$ Ksi, F.S $= \frac{22.0}{20.5} = 1.1$

Try C6x13 $S_x = 5.8$

$f = \frac{8660 \times 12}{5.8} = 17.9$ Ksi

C6x13: $t_w = \frac{7}{16}$", $b_f = 2\frac{1}{8}$", $t_f = \frac{5}{16}$", $S_x = 5.8$

MC6x15.1: $t_w = \frac{5}{16}$, $b_f = 3$", $t_f = 1\frac{1}{2}$", $S_x = 8.32$

F.S $= \frac{22}{17.9} = 1.23$

Using Mc 6x15.1 : $S_x = 8.32$

$$f = \frac{8660 \times 12}{8.32} = 12.5 \text{ ksi}$$

$$< 22 \text{ ksi}$$

$$FS = \frac{22}{12.5} = 1.8$$

Shear check:

$V_1 = (315 + 30 \times 10.5) = 630$ lbs

$V_2 = 105 + (20 \times 5.0) + (30 \times 10.5) = 1020$ lbs

Allowable Shear Each Bolt = 1200 lbs $\therefore$ OK

Check Max. Ratio of $\left(\frac{KL}{r}\right)$

a) using $2'' \times 2'' \times \frac{1}{4}''$ Angle.

$L = 13'$, using $K = 1.0$, $r = 0.609$ (from Table)

$$\frac{KL}{r} = \frac{1.0 \times 13 \times 12}{0.609} = 256 > 240$$

Max. Allow Main Memb = 240

Secc. Memb = 300

b) Try $(3 \times 3 \times \frac{1}{4})$

$$\frac{KL}{r} = \frac{1.0 \times 13 \times 12}{0.93} = 168 < 240$$

$$FS = \frac{240}{168} = 1.5$$

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

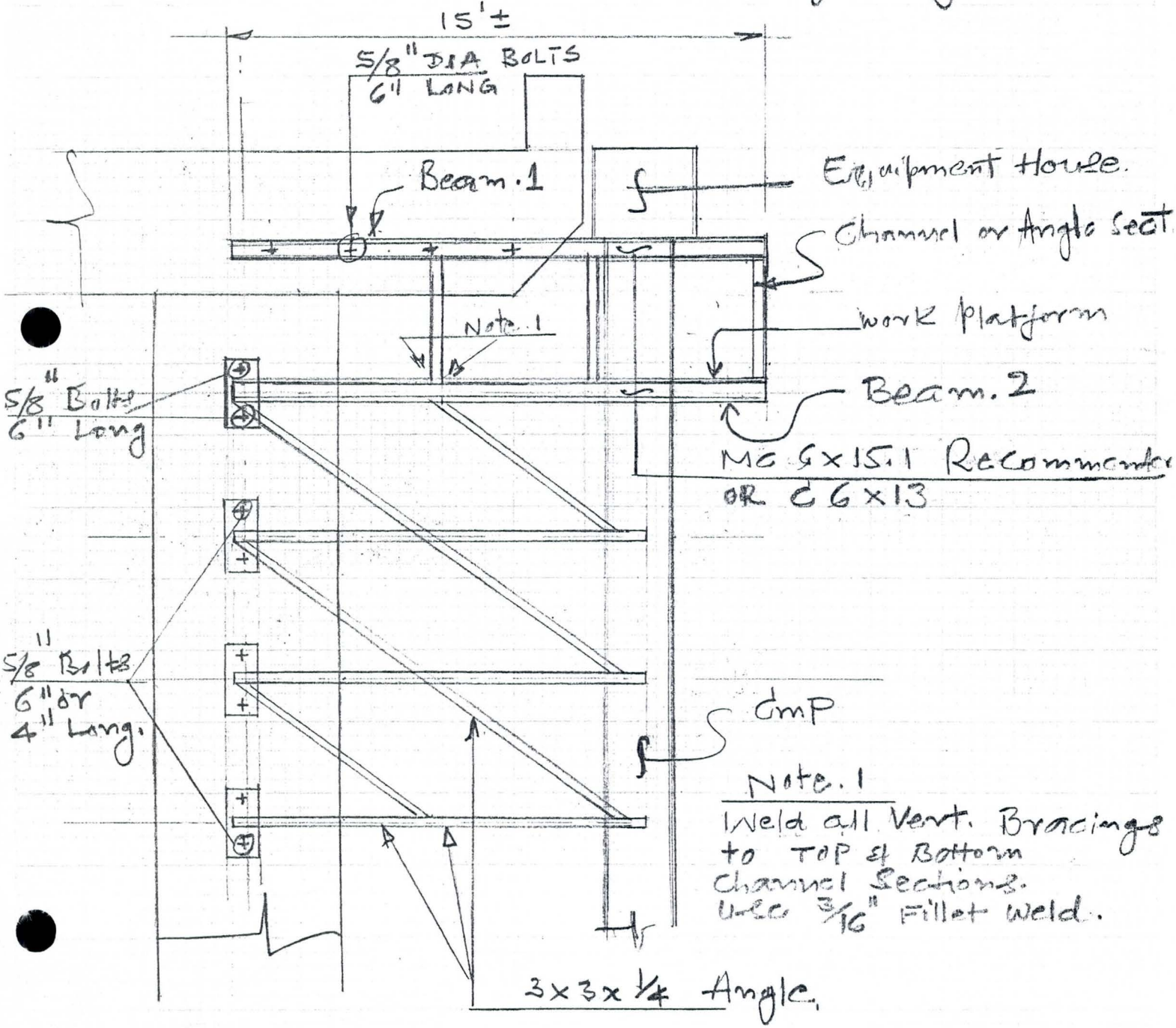
PROJECT Stream Gauge PAGE 7 OF ____

DETAIL ____ COMPUTED KVH DATE Jan 9

E/Estrella Pkwy - Gila River CHECKED BY ____ DATE ____

KEY NOTES

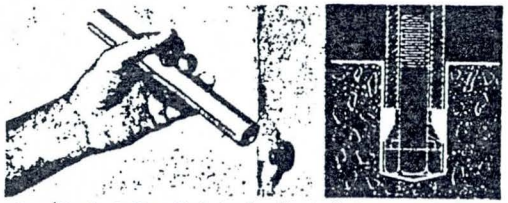
1. use 6" Channel Sections for Both Bm. 1 & Bm. 2
2. Weld Vertical Braces to the top & Bott. Channels, as shown on Page. 1 and Horizontal Bracings to Channel Sections are shown on Page. 2 of T. KIEFER



Very important — (Order Plain type (Not threaded))

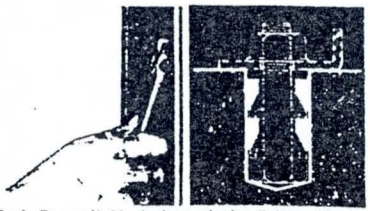
Installation of Plain Type
bolt-head imbedded in masonry

1. Place bolt for fastening through Slugin, **cone next to bolt-head.** Insert into drilled hole with bolt-head down.



2. Place Slugin Setting Tool (or length of pipe) over bolt. Strike Setting Tool with solid hammer blows to expand lead sleeve.

3. Remove Setting Tool. To compound anchorage, place second plain unit of Slugin over bolt, **cone first,** and expand as in Step 2.



4. Remove Setting Tool. Two-unit Slugin is ready for fixture attachment.

Special Notes:

Increased holding power is obtained by compounding additional units of Slugin Plain Type to each installation. Expand as indicated in Steps 3 for both types. Be sure hole is drilled to proper depth to accommodate all units.

A bearing sleeve may be used to take up void from top of Slugin and surface of masonry. Use of bearing sleeve provides greater holding power in softer masonry materials. See installation specifications.

Star Slugin Setting Tools

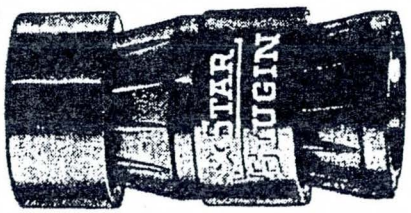
Recommended for best results when installing Slugin Anchors. If Star Setting Tools are not at hand, ordinary pipe of proper length and diameter may be used.

STAR

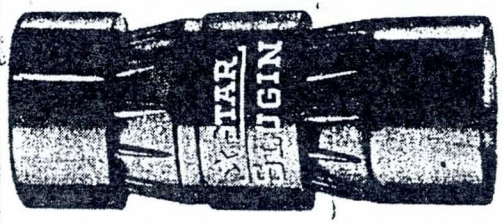
MORE FASTENERS FOR MORE USES THAN ANY OTHER BRAND YOU CAN THINK OF

STAR • MOUNTAINVILLE, N. Y. 10953

STAR SLUGIN
COMPOUNDED ANCHORS

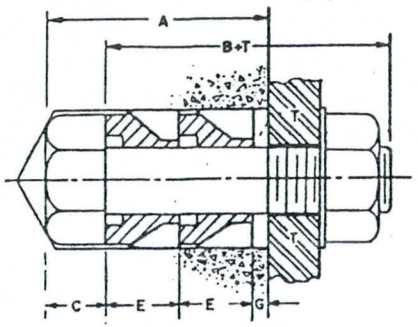


TWO UNIT PLAIN TYPE

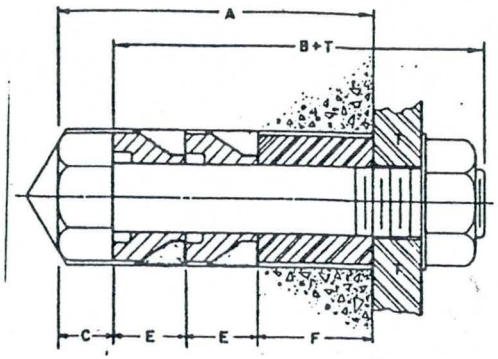


TWO UNIT THREADED TYPE

INSTALLATION INSTRUCTIONS



1. Standard Installation Plain Set



2. Installation with Bearing Sleeve Plain Set

(X) Bolt 5/8" X 6"
Bolt 5/8 X 4"

DRAWING SYMBOLS

A. Hole depth for recommended number of units
B. Dimension to be added to "T" (thickness of fixture) to determine length of bolt
C. Height of bolt head
D. Height of Slugin Threaded Unit compacted in hole
E. Height of Slugin Plain Unit compacted in hole
F. Length of bearing sleeve (not supplied)
G. Clearance between top of anchor and surface of masonry
H. Depth of counterbore in threaded unit
T. Thickness of fixture to be fastened

Special Notes:

1. For installation of Slugin Plain Type, use square-head bolts for sizes up to ½" diameter. For sizes ⅝" diameter and larger, use hexagon-head bolts only.

2. Bearing sleeve is recommended to take up void between top of Slugin and surface of masonry. Ordinary pipe of proper length and diameter is satisfactory. Deep-setting of Slugin increases holding power.

3. Safe working loads are dependent on proper installation of Slugin in good quality masonry. A four-to-one safety factor is allowed.

Catalog Number	Bolt Dia. Inches	Ultimate Strength of Standard Bolts		Drill Size and Hole Dia.	Recommended No. of Units	*Allowable Safe Loads (in 3000 lb. concrete)		STANDARD INSTALLATION										
								PLAIN SET See Drawing 1					THREADED SET See Drawing 2					
		Tension	Shear			Tension in Lbs.	Shear (Bearing) in Lbs	A	B	C	E	G	A	B	D	E	G	H
		65000	45000															
6815	¼	1750	1200	½	2	400	200	1 1/16	1 1/8	3/16	1/8	1/8	1/8	1 3/16	1/8	1/8	1/8	3/32
6815-1																		
6825	⅜	4400	3055	¼	2	1000	500	1 7/16	1½	5/16	½	1/8	1 5/16	1	1 1/4	½	1/8	1/8
6825-1																		
6835	½	8200	5670	1	2	2000	900	1 11/16	1 1/8	7/16	7/16	1/8	1 7/16	1 3/16	1/8	7/16	1/8	7/16
6835-1																		
6845	⅝	13150	9100	1⅛	3	3000	1200	2 1/8	2 7/16	9/16	9/16	1/8	2 1/16	1 13/16	1 3/16	9/16	1/8	7/16
6845-1																		
6855	¾	19650	13600	1⅛	3	†5500	1350	2 1/8	2 13/16	1 1/16	1 1/16	1/8	2 13/16	2 1/16	1 3/16	1 1/16	1/8	1/8
6855-1																		
6860	⅞	27250	18900	1½	3	†6200	1500	3 1/16	3 1/16	1 3/16	1/16	1/8	3	2 1/8	1 1/8	1/8	1/8	7/16
6860-1																		
6865	1	35800	24800	1⅛	4	†7000	1700	3 1/8	3 1/16	1 5/16	1 1/4	1/8	3 1/8	2 1/16	1 1/8	1 1/16	1/8	1/4
6865-1																		

* 4 to 1 Safety Factor

† Allowable Safe Loads in 4000 P.S.I. Concrete

(X) Allow Shear

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

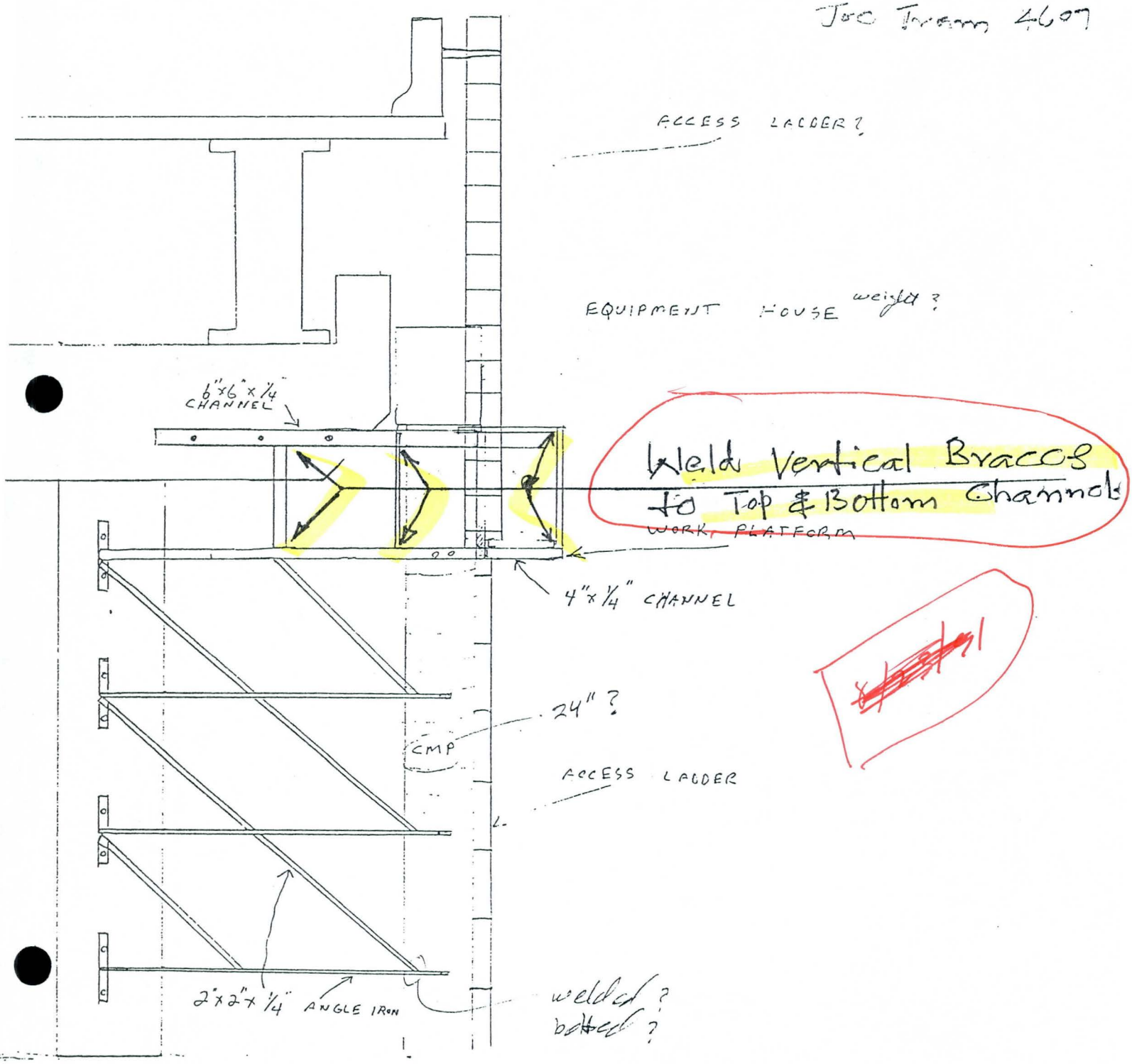
PROJECT STREAM GAUGE ESTRELLA PARKWAY/GILA R. PAGE 1 OF 4

DETAIL 1/4" = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

contact thru Joe Tram
for questions + field trip to site
and other stream gauge sites.

Joe Tram 4607

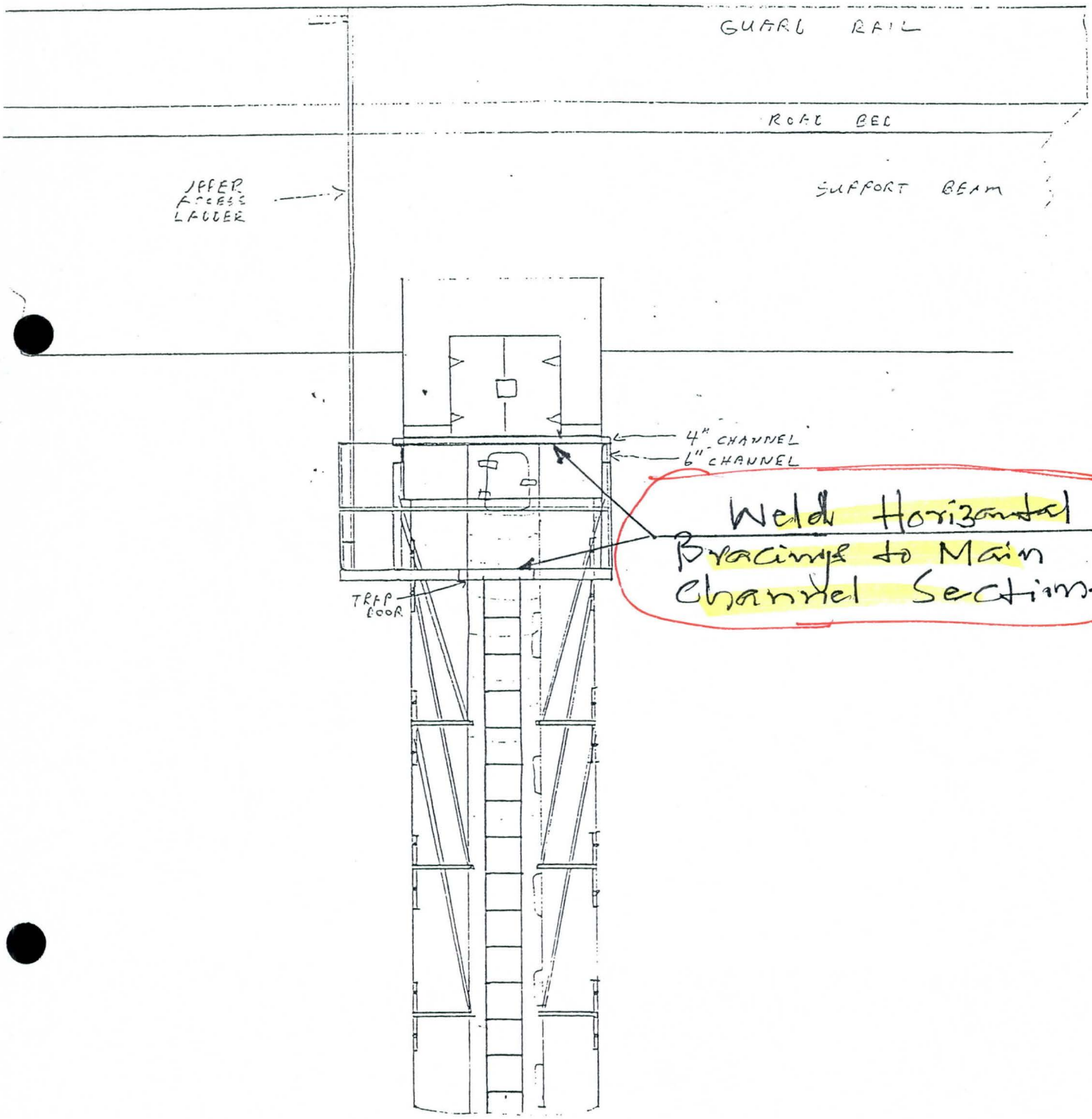


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE ESTRELLA FREEWAY / GILA R. PAGE 2 OF 4

DETAIL 1/4 = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

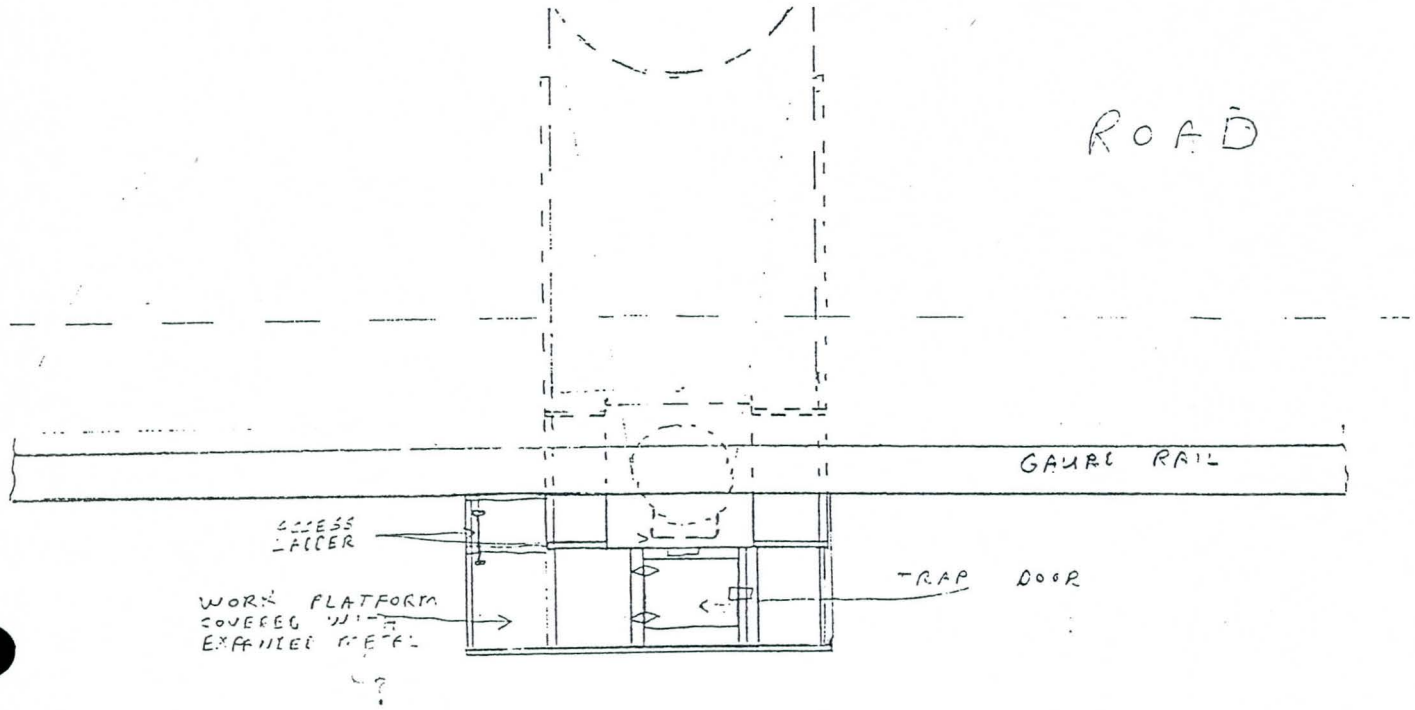


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE ESTRELLA PARKWAY/GILA R. PAGE 3 OF 4

DETAIL ~ 1/4" = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

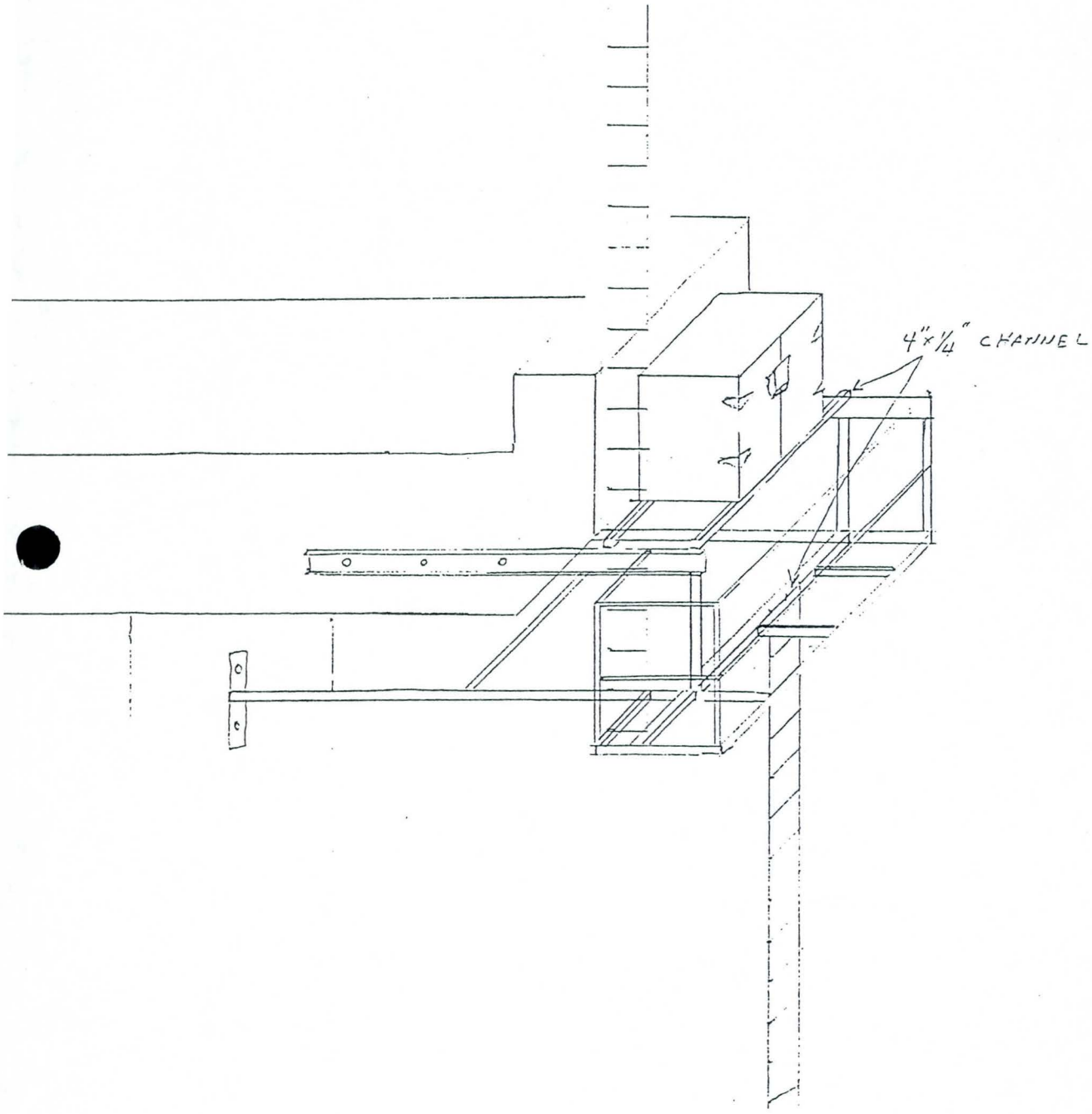


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE, ESTRELLA PARKWAY/GILA R. PAGE 4 OF 4

DETAIL WORK PLATFORM COMPUTED _____ DATE _____

1/4" = 1' CHECKED BY _____ DATE _____



PDF PRECISION BUSINESS FORMS 602/254-6655

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TEST PAINTS
-YOURSELF SUPPLIES

LUMBERJACK T.M.

True Value HARDWARE STORES

"You will appreciate our prices, quality & service"

ALL MAIL:
P. O. Box 20188
Phoenix, AZ 85036

YARD:
1405 W. Broadway Rd.
Phoenix, AZ 85041

SALES: 602-276-2424 A/C: 602-243-4288 FAX: 602-276-2864

"If we don't have it, we'll get it"

- FREE BLUEPRINT TAKE OFF
- STATEWIDE DELIVERY
- REMODELING DEPARTMENT
- CUSTOM CUTTING

A 159006

DATE	TICKET CK / LOAD CK
9-27-89	
SOLD BY: STEVE WEBER	LIC. PLATE #
LOADED BY	TAX #

THIS INVOICE MUST ACCOMPANY ALL RETURNS WITHIN 30 DAYS. HANDLING CHARGE WILL BE MADE ON ALL RETURNS. NO RETURNS ON SPECIAL ORDERS.

CAPITAL IMPROVEMENT

.FLOOD CONTROL

ORDERED	SHIPPED	SIZE	LGTH.	DESCRIPTION	FOOTAGE	PRICE	UNIT	AMOUNT
		X						
36		X		SAFETY HASPS		2.69	ea.	96.84
		X						
		X						
		X						
		X						
		X		CREDIT BALANCE ON RETURN OF GATE LATCHES				- 79.56
		X		(INVOICE #08003 P.O. #Y 05823)				
		X		(THIS BALANCE INCLUDES A 15% RESTOCKING				
		X		CHARGE/SEE INVOICE #4996)				
		X						
		X						
		X						
		X						
		X						
		X						

Check # _____

CASH SALE

2 003 REV. 2/89 6M

ORIGINAL

We give special prices on off grade materials (shop, seconds, "B" grade, #3 & #4 studs, etc.) which are based on taking **AS-IS NO SELECTING.** We have better materials for more money in most cases. **PLEASE DO NOT ASK OUR YARD MEN TO SELECT.**

DRAY	
SUB-TOTAL	17.28
TAX	1.16
TOTAL	18.44

WE APPRECIATE YOUR BUSINESS

NUTS
WASHERS
SCREWS
NON-CORROSIVE FASTENERS

INDUSTRIAL

BOLT AND SCREW SUPPLY

214 S. 14th ST. - PHONE 602-258-5815 - PHOENIX, ARIZONA 85034

513618

SOLD TO Mariana County

DATE 9/23/89

ADDRESS

DELIVERY ADDRESS Capitol Equipment Fuel Control

CITY

CITY 3335 W. Durango

CUSTOMER ORDER NO.	CHARGE	CASH	COMPLETE YES	COMPLETE NO	BACKORDER YES	BACKORDER NO	RESALE	TAXABLE
D17205	X			6	YES			X

QUANTITY	DESCRIPTION		UNIT PRICE	AMOUNT
100	3/8 x 3/4 ccg	c		3 86
100	5/8 x 4 Neoch Wl/mut	c		93 10
	Thank you			
	REC'D SEP 26 1989			
		TAX		5 16

TERMS 1% 10th PROX. NET 30th

MERCHANDISE NOT RETURNABLE WITHOUT THIS SLIP

TOTAL ▶ 82 12

A FINANCE CHARGE OF 1½% PER MONTH, 18% PER ANNUM WILL BE MADE ON ALL INVOICES THAT ARE 60 DAYS OR MORE PAST DUE.

76 96

RECEIVED THE ABOVE IN GOOD CONDITION

BY [signature]

CUSTOMER COPY

BOLTS
NUTS
WASHERS
SCREWS
NON-CORROSIVE FASTENERS

Teks®

INDUSTRIAL

BOLT AND SCREW SUPPLY

214 S. 14th ST. - PHONE 602-258-5815 - PHOENIX, ARIZONA 85034

513345

SOLD TO Maricopa County

DATE 9/28/89

ADDRESS Flood Control 3335 W Durango

DELIVERY ADDRESS Capitol Improvement / Flood Control

CITY Phx 85009

CITY 3335 W Durango

CUSTOMER ORDER NO.	CHARGE	CASH	COMPLETE YES	COMPLETE NO	BACKORDER YES	BACKORDER NO	RESALE	TAXABLE
D17015	X			(NO)	(YES)			X

QUANTITY	DESCRIPTION	UNIT PRICE		AMOUNT	
100	5/8 x 1 1/2 NC gr 8 w/nuts			41	88
100	x 5			86	30
89	x 6	99	69	88	72
				216	90
	Thank You				
	216 90				
	TAX			14	53

TERMS 1% 10th PROX. NET 30th

MERCHANDISE NOT RETURNABLE WITHOUT THIS SLIP

TOTAL ▶ 231 43

A FINANCE CHARGE OF 1½% PER MONTH, 18% PER ANNUM WILL BE MADE ON ALL INVOICES THAT ARE 60 DAYS OR MORE PAST DUE.

RECEIVED THE ABOVE IN GOOD CONDITION

BY E. Stone 9-28-89

CUSTOMER COPY

JH | DATE 09/22/89 | CODE TO 130D | SPOT NO. 26

ABF FREIGHT SYSTEM, INC. (ABFS)

CONSIGNEE COPY ABQ NM 120326130 CONT.

ROUTING	C/L REFERENCE	TRAILER NO.	REVENUE	RECEIVABLE	PAYABLE
ABF-PHX DIRECT		42176			

NO. PIECES	DESCRIPTION	WEIGHT	RATE	FREIGHT
	20 FT	778		
2 PCS	CSP BAND 3-C RVTD GALV 16 GA 24" 1 PC	26		
	CUSTOMER CONTACT: BOB NODD 262-1501			
	SUPPLIED COPY B/L REQ'D FOR PAYMT	SCBL		
	/ THANKS FOR SHIPPING ABF	TKS		
	/ SEND FRT BILL 094025-249A,2146000	SFB		

8775

COMPUTREX INC
PO BOX 13020
LEXINGTON KY 40583

7 TTL PIECES 2044 SHIPPERS NO. 844065F PPD

SHIPPER: CONTECH CONSTRUCTION PRODUCTS INC
150 WOODWARD SE
ALBUQUERQUE NM 87106

CONSIGNEE: MARICOPA COUNTY FLOOD CONTROL
DIST BOB NODD 262-1501
3335 W DURANGO
PHOENIX AZ 85009

DATE DELIVERED 083489 DRIVER 120A FIRM 000000-0000 BY

AB104936

JH | DATE 09/22/89 | CODE TO 130D | SPOT NO. 26

ABF FREIGHT SYSTEM, INC. (ABFS)

CONSIGNEE COPY ABQ NM 120326130 CONT.

ROUTING ABF-PHX DIRECT | C/L REFERENCE | TRAILER NO. 42176 | REVENUE | RECEIVABLE | PAYABLE

NO. PIECES | DESCRIPTION | WEIGHT | RATE | FREIGHT

PO LS#269A

7 TTL PIECES 2044 SHIPPERS NO. 844065F PPD

SHIPPER: CONTECH CONSTRUCTION PRODUCTS INC
150 WOODWARD SE
ALBUQUERQUE NM 87106

CONSIGNEE: MARICOPA COUNTY FLOOD CONTROL
DIST BOB NODD 262-1501
3335 W DURANGO
PHOENIX AZ 85009

DATE DELIVERED 083489 DRIVER 120A FIRM 000000-0000 BY

AB104936

9-25-89

CONTECH
CONSTRUCTION PRODUCTS INC.

Request

ACKNOWLEDGEMENT

PAGE: 1

SALES NO.	REV. NO.	SALES DATE	BUYER'S NUMBER	BUYER'S DATE	SHIP FROM	DATE WANTED
54-7042-00	0	09/11/89	DA 3480	09/11/89	ALBUQUERQUE	09/18/89

09/13/89 W/O

SOLD TO:

MARICOPA COUNTY FLOOD CONTROL
DISTRICT
3335 W. DURANGO
PHOENIX AZ 85009

SHIP TO:

MARICOPA COUNTY FLOOD CONTROL
DISTRICT-BOB NODD @ 262-1501
3335 W. DURANGO
PHOENIX AZ 85009

09 013 11

EST. SHIP DATE	PLANT ORDER NO
/ /	84-5760-00

REGION	DEST.	SELLING	SPECIFICATIONS	INFOCOPY	MARKET	CREDIT REF.	CUST. NO.	ROUTE/F.O.B.
4354	5421	5421	5421		06H	W 2	54-60285	TRUCK

ORIGIN, FREIGHT PREPAID & ADD

TERMS 1/2 10 NET 30

INTEREST CHARGED ON OVERDUE INVOICES AT 18% PER ANNUM OR AT THE LEGAL RATE IF THAT IS LESS THAN 18%. ITEMIZED TRANSPORTATION AND SALES TAX ARE NOT SUBJECT TO CASH DISCOUNT.

SALES TAX ☐ YES, IF NOT SHOW EXEMPTION OR REASON
NO.

11-TAXABLE

ACKNOWLEDGEMENT OF ORDER

THIS ACKNOWLEDGEMENT (QUOTATION) SUPERSEDES ALL PREVIOUS COMMUNICATIONS. ACCEPTANCE OF YOUR PURCHASE OR IS EXPRESSLY MADE CONDITIONAL ON YOUR ACCEPTANCE OF THE TERMS AND CONDITIONS, INCLUDING "WARRANTIES" AND "EXCLUSIVE REMEDIES"; APPEARING ON THE REVERSE SIDE HEREOF BY YOUR ACCEPTANCE OF THE PRODUCTS HEREIN DESCRIBED OTHERWISE. UNLESS TIMELY NOTICE TO THE CONTRARY IS RECEIVED, THE PRODUCTS HEREIN DESCRIBED WILL BE MANUFACTURED AND DELIVERED IN ACCORDANCE HEREWITH IN RELIANCE UPON YOUR ACCEPTANCE OF SUCH TERMS.

THIS MATERIAL IS MANUFACTURED SPECIAL FOR THIS PARTICULAR ORDER. ONCE THIS ORDER HAS BEEN ENTERED FOR FABRICATION IT IS NOT SUBJECT TO CANCELLATION OR CHANGE FOR ANY REASON WITHOUT APPROVAL OF THE DISTRICT SALES OFFICE. THE DETERMINATION OF CANCELLATION CHARGES. ONCE SHIPPED, IT CANNOT BE RETURNED FOR CREDIT.

ITEM	DESCRIPTION	PIECES	WEIGHT	QUANTITY	PRICE	AMT
001	RIV PIPE 2 2/3x1/2 GALV 16GA 24" 8,00FT	1	0	8,00	18,000	144
002	RIV PIPE 2 2/3x1/2 GALV 16GA 24" 12,00FT	1	233	12,00	18,000	216
003	RIV PIPE 2 2/3x1/2 GALV 16GA 24" 16,00FT	1	0	16,00	18,000	
004	RIV PIPE 2 2/3x1/2 GALV 16GA 24" 20,00FT	2	778	40,00	18,000	
005	CSP BAND 3-C RVTD GALV 16GA 12" 1PC	2	0	2,00	18,000	

TOTAL WEIGHT 1,011 LBS.

SUB-TOTAL 94,07

STATE TAX 6,700

TOTAL AMOUNT

RECEIVED
SEP 15 1989

	CH ENG		P & PM
	DEP		HYDRO
	ADMIN		LMGT
/	FINANCE		FILE
	C & O		
	ENGR		

REMARKS
REC'D SEP 18 1989

CUSTOMER CONTACT: BOB NODD @ 262-1501

$\frac{233}{12} = 19.5$ lbs/ft

NUTS & BOLTS

		Quantity	Unit Price	Extended Price
CARRIAGE BOLTS 3/8" x 3/4"		100	$3.86/c	$ 3.86
HEX HEAD, ZINC PLATE, GRADE 8				
5/8" x 1 1/2"	Bolts w/nuts	100	41.88/c	41.88
5/8" x 4"	Bolts w/nuts	100	73.10/c	73.10
5/8" x 5"	Bolts w/nuts	100	86.30/c	86.30
5/8" x 6"	Bolts w/nuts	100	99.69/c	99.69
STAR SLUG-IN COMPOUND ANCHOR Smooth Finish 3000 lb. #6845		500	65.00/c	325.00
			Total	629.83

Metra Steel

METAL ITEMS	Quantity	Unit Price	Extended Price
ANGLE IRON:			
2"x2"x 1/4"	460 ft	$ .73/ft	$335.80
2"x2"x 1/8"	60 ft	.41/ft	24.60
1"x1"x 1/8"	140 ft	.23/ft	32.20
HOT ROLL PLATE 4'x8'x 3/16"	11 sheets	$ 70.71/sht	$777.81
CHANNEL IRON c6" x 10.5	80 ft	$ 2.68/ft	$214.40
ROUND STOCK 5/8"	460 ft	.27/ft	$124.20
		Total	$1,509.01

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge Estrella Pkwy PAGE 1 OF ____

DETAIL Gila River COMPUTED KVH DATE Jan 9

Estrella Pkwy CHECKED BY ____ DATE ____

Corrugated Steel pipe:

24" — 0.052" — 1/20 — 20 lbs/ft

Handbook of Steel Drainage Pipe — 0.064 — 1/16" — 24 —»—

0.079 — 1/12" — 29 —»—

0.109 — 1/10 — 38 —»—

Contech Corrugated Steel pipe — 24" — Wt Varies from 20 lbs/ft to 38 plf

Use Av. wt of 30 lbs/ft

Actual wt used 20 lbs/ft < 30 lbs used Now

a) Total Pipe wt = (18 × 30) = 540 lbs (Approx Lengths)

b) Plat form: (5' × 8') = 40 sq/ft

L.L @ 20 psf (40) = 800 lbs — Looks High OK

4 people — 200 lbs Each

(20 psf × 5') 160 lbs/ft uniform L.L

width

c) D.L: Metal Grate floor @ 10 psf

(10 psf × 8) = 80 plf UDL

platform width

Total Load = (160 + 80) = 240 plf UDL + ULL

(LL) (DL)

Each side of Pier = 240/2 = 120 plf

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge-Estrella Pkwy PAGE 2 OF ____

DETAIL Gila River COMPUTED KVH DATE Jan 9.

CHECKED BY ____ DATE ____

1) Equipment House = 300 lbs/2 = 150 lbs Each End

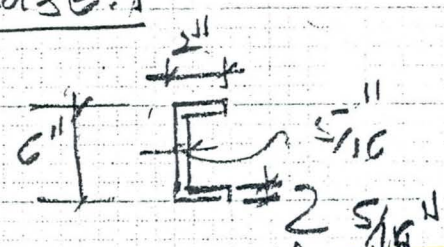
2) wt. of CMP = 540 lbs/2 = 270

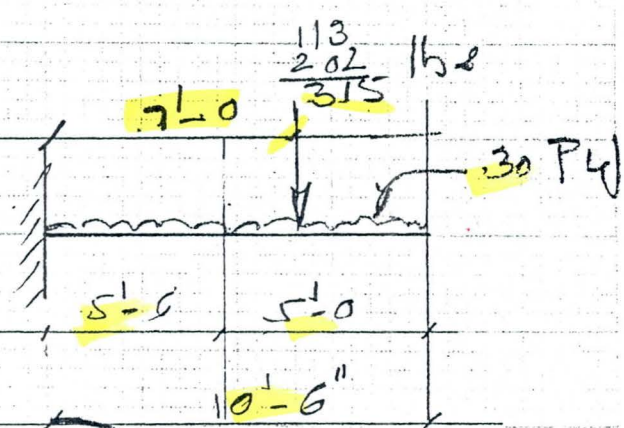
3) Platform Load (DL + L.L) = $\frac{400}{2}$ = 200 PLf (?)

	Beam 1	Beam 2
1) Equipment House	3/4 (150) = 113 lbs	1/4 (150) = 37 lbs
2) CMP	3/4 (270) = 202	1/4 (270) = 68
	315	
3) Platform Load (DL + L.L)		200 PLf

Beam 1. At Top Level

Case 1





Assume Self wt = 30 plf

$M = 315(7) + \left(30 \times 10.5 \times \frac{10.5}{2}\right) = 3860$ lbs ft

$M = fs$, Try C6x10.5, $S_x = 5.06$

$f = \frac{3.86 \times 12}{5.06} = 9.2$ Ksi

f (Allow) = 0.66 Fy = 24 Ksi (Compact Seat)

= 0.60 Fy = 22 Ksi (Non Comp)

$F.S = \left(\frac{22}{9.2}\right) = 2.4$ ∴ C6x10.5 is ok

Luz 5.4'

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

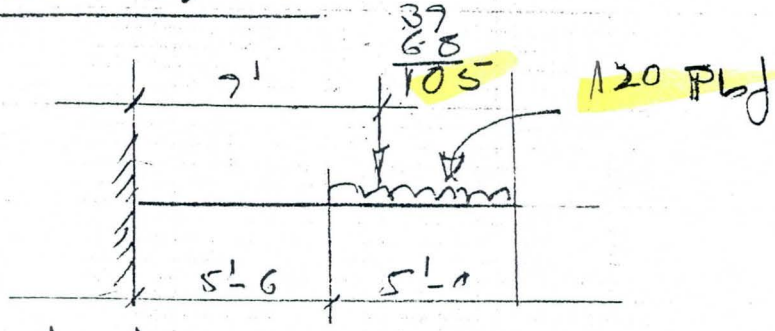
PROJECT Stream Gauge PAGE 3 OF ____

DETAIL ____ COMPUTED K.V.H DATE Jan 9

Estrella Pkwy - Gila River CHECKED BY ____ DATE ____

Beam 2 ~~At~~ Platform Level:

Check to see if all the platform load is taken by Beam. 2



Assume Self. wt = 30 lbs/ft

$M = (10.5 \times 7.0) + (120 \times 5.5 \times 8) + \left(30 \times 10.5 \times \frac{10.5}{2}\right)$

$= 7188$ lbs ft

$M = fS$, Try C6x10.5, $S_x = 5.06$

$$f = \frac{7188 \times 12}{5.06} = 17.0 \text{ Ksi}$$

But the span may be as long as 14'-6 if the Beam bends at the real support. I would be good to transfer some of this platform load to Beam. 1, using Vertical bracing from Beam. 2 to Beam. 1

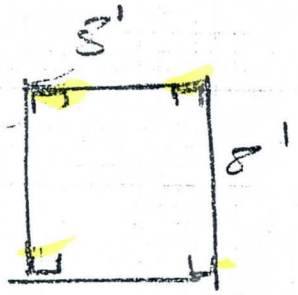
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge PAGE 4 OF ____

DETAIL Gila River COMPUTED KVH DATE Jan 92

Estrella Pkwy CHECKED BY ____ DATE ____

Platform Load:



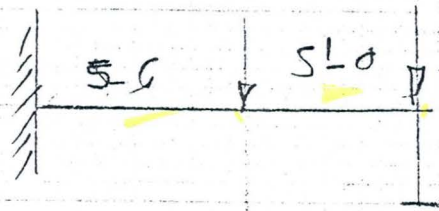
Total Load @ 240 PLF

$(240 \times 5) = 1200$ lbs

Load @ Each Bracing $= 1200/4 = 300$ lbs

Addt'l Loading from Bracing of Beam 2 to Bm, 1

Case 2:



$M_{additional} = (300 \times 5.5) + (300 \times 10.5)$

$= 4800$ lbs/ft

Mom Total $= (3860 + 4800) = 8660$ lbs/ft

C6x10.5 $f = \frac{8660 \times 12}{5.06} = 20.5$ ksi

$f_{(Allow)} = 22$ ksi, F.S $= \frac{22.0}{20.5} = 1.1$

Try C6x13 $S_x = 5.8$

$f = \frac{8660 \times 12}{5.8} = 17.9$ ksi

C6x13: $t_w = \frac{7}{16}$", $b_f = 2\frac{1}{8}$", $t_f = \frac{5}{16}$", $S_x = 5.8$

MC6x15.1: $t_w = \frac{5}{16}$", $b_f = 3$", $t_f = \frac{1}{2}$", $S_x = 8.32$

F.S $= \frac{22}{17.9} = 1.23$

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge PAGE 5 OF ____

DETAIL Gila River COMPUTED KVH DATE Jan 9.

Estrella Pkwy CHECKED BY ____ DATE ____

Using Mc 6x15.1: $S_x = 8.32$

$$f = \frac{8660 \times 12}{8.32} = 12.5 \text{ ksi}$$

< 22 ksi

$$FS = \frac{22}{12.5} = 1.8$$

Shear Check:

$$V_1 = (315 + 30 \times 10.5) = 630 \text{ lbs}$$

$$V_2 = 105 + (20 \times 5.0) + (30 \times 10.5) = 1020 \text{ lbs}$$

Allowable Shear Each Bolt = 1200 lbs ∴ ok

4 bolts

$$M = (7)\left(\frac{2040}{2}\right) + (5)\left(\frac{600}{2}\right) = 7140 + 1500 = 8640 \text{ lb-ft}$$ ok

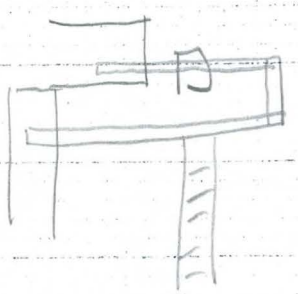
CMP = 540 lb Beam Self Load = 30×2×10 = 600 lb

LL = 800

Grate = 400

House = 300

Σ = 2040 lb



$$\Sigma V = 2040 + 600 = 2640 \text{ lb}/2 = 1320 \text{ lb}$$

1 bolt = 1200 lb, 4 bolts = 4800 lb ok

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge PAGE 6 OF ____

DETAIL Gila River COMPUTED KVH DATE Jan 92

Estrella Pkwy CHECKED BY ____ DATE ____

Check Max. Ratio of $\left(\frac{KL}{r}\right)$

a) using $2'' \times 2'' \times 1/4''$ Angle.

$L = 13'$, using $K = 1.0$, $r = 0.609$ (from Tables)

$$\frac{KL}{r} = \frac{(1.0 \times 13 \times 12)}{0.609} = 256 > 240$$

Max. Allow Main Memb = 240

Secc. Memb = 300

b) Try $(3 \times 3 \times 1/4)$

$$\frac{KL}{r} = \frac{(1.0 \times 13 \times 12)}{0.93} = 168 < 240$$

$$FS = \frac{240}{168} = 1.5$$

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

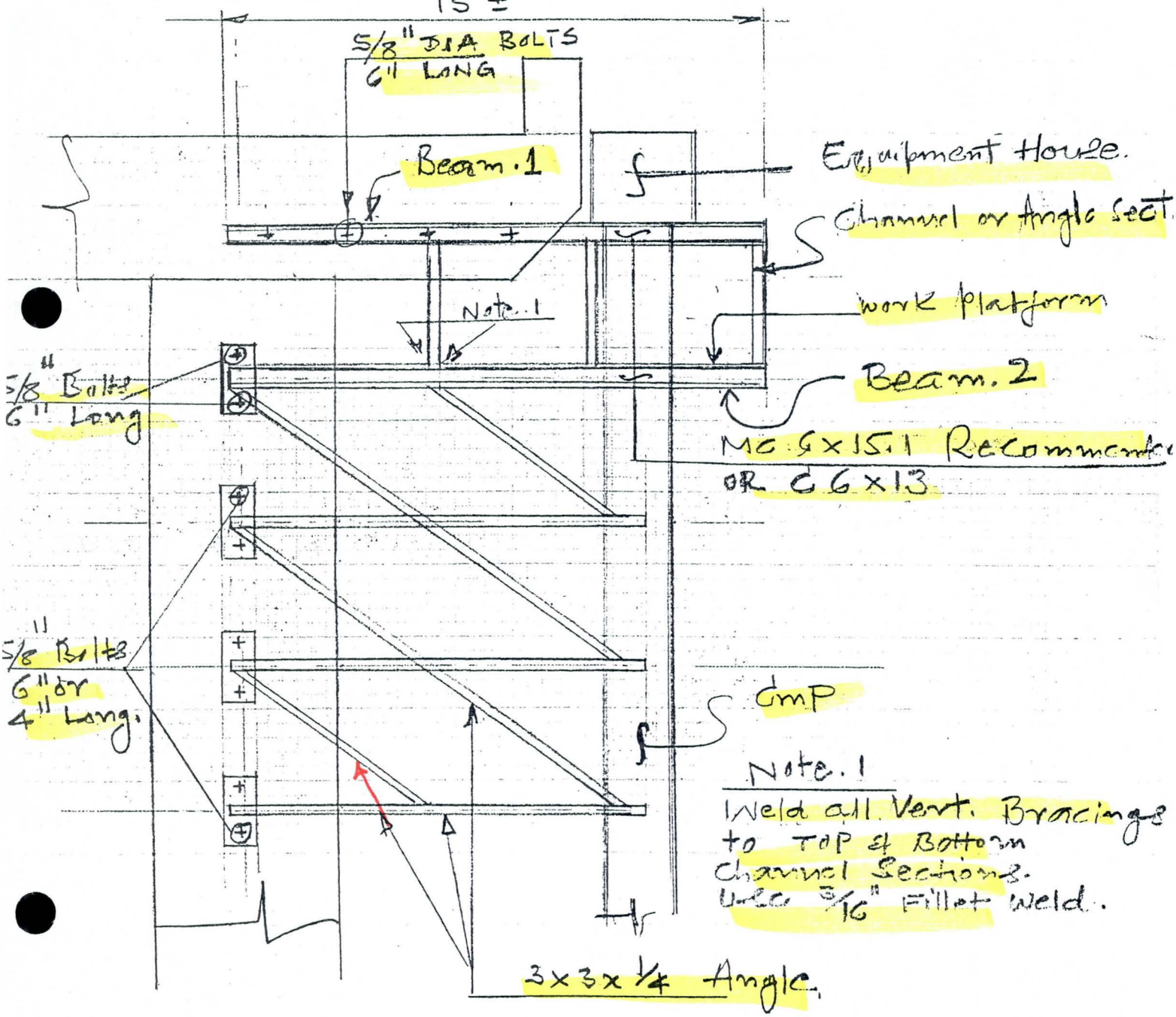
PROJECT Stream Gauge PAGE 7 OF ____

DETAIL ____ COMPUTED KVH DATE Jan 9

E. Estrella Pkwy - Gila River CHECKED BY ____ DATE ____

KEY NOTES

1. use 6" Channel Sections for Both Bm. 1 & Bm. 2
2. Weld Vertical Braces to the top of Both. Channels, as shown on Page. 1 and Horizontal Bracings to channel sections are shown on Page. 2 of T. KIEFER



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

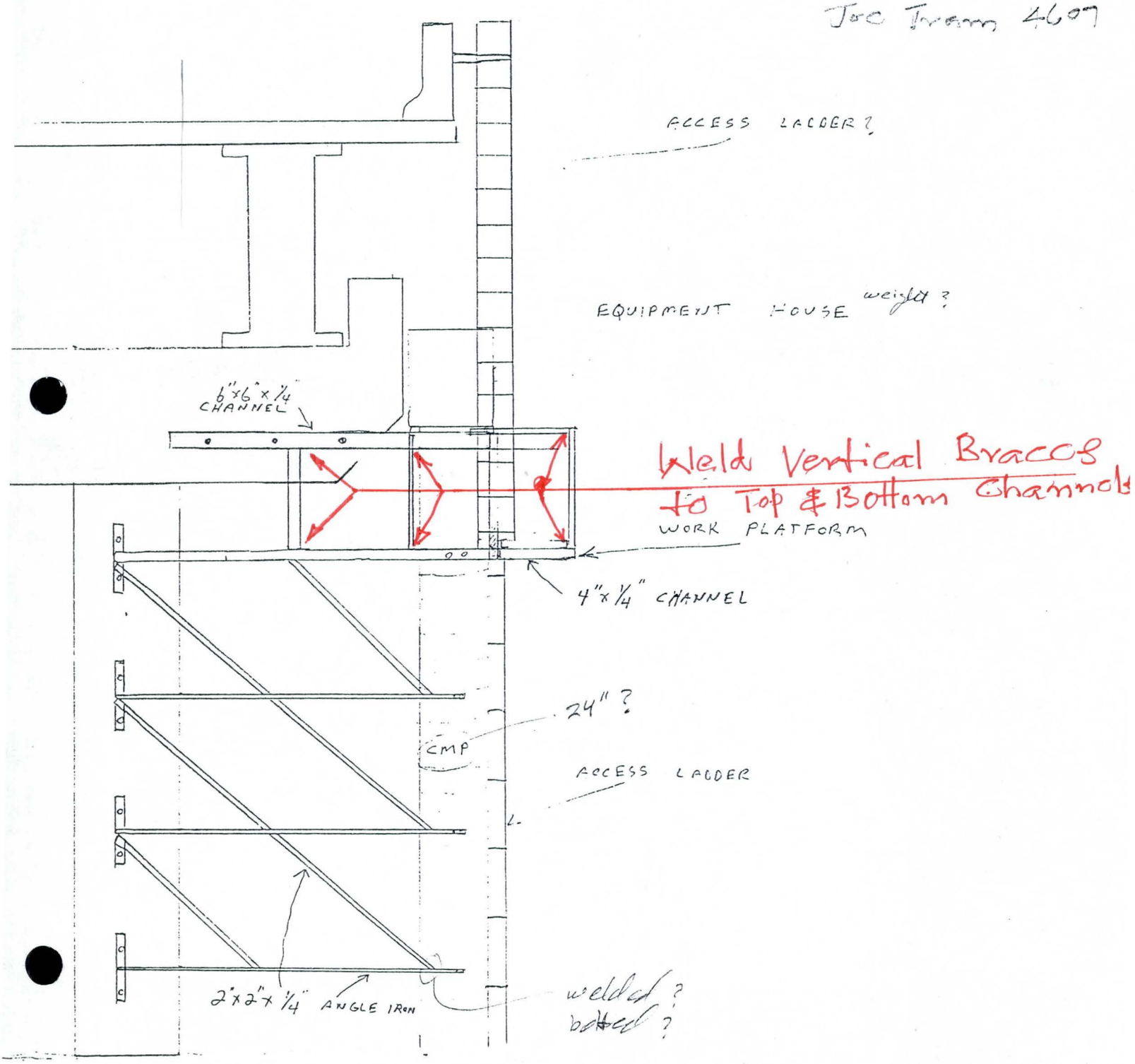
PROJECT STREAM GAUGE ESTRELLA PARKWAY/GILA R. PAGE 1 OF 4

DETAIL 1/4" = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

contact thru Joe Tram
for questions + field trip to site
and other stream gauge sites.

Joe Tram 4607

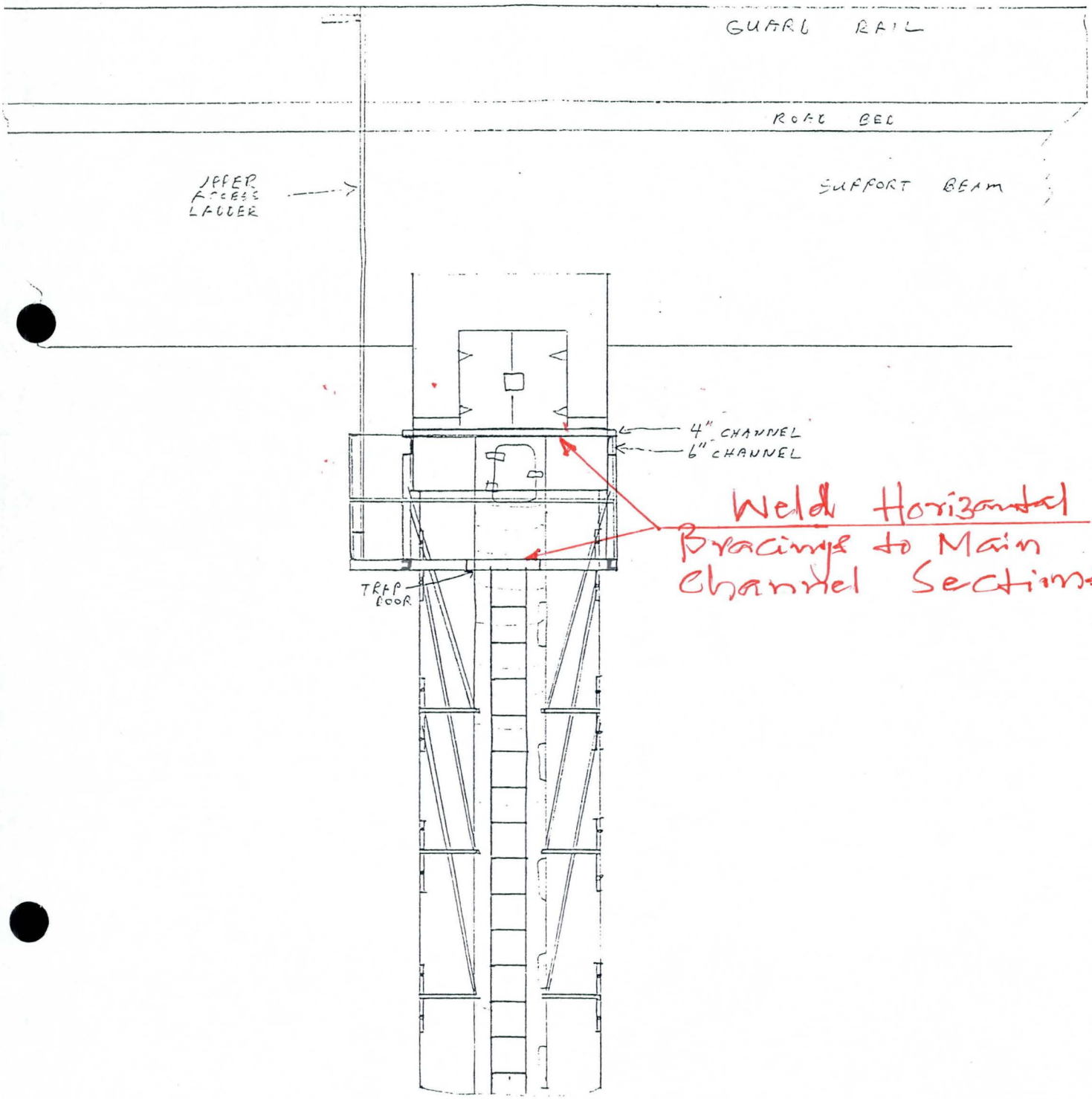


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE ESTRELLA FREEWAY / GILA R. PAGE 2 OF 4

DETAIL 1/4 = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

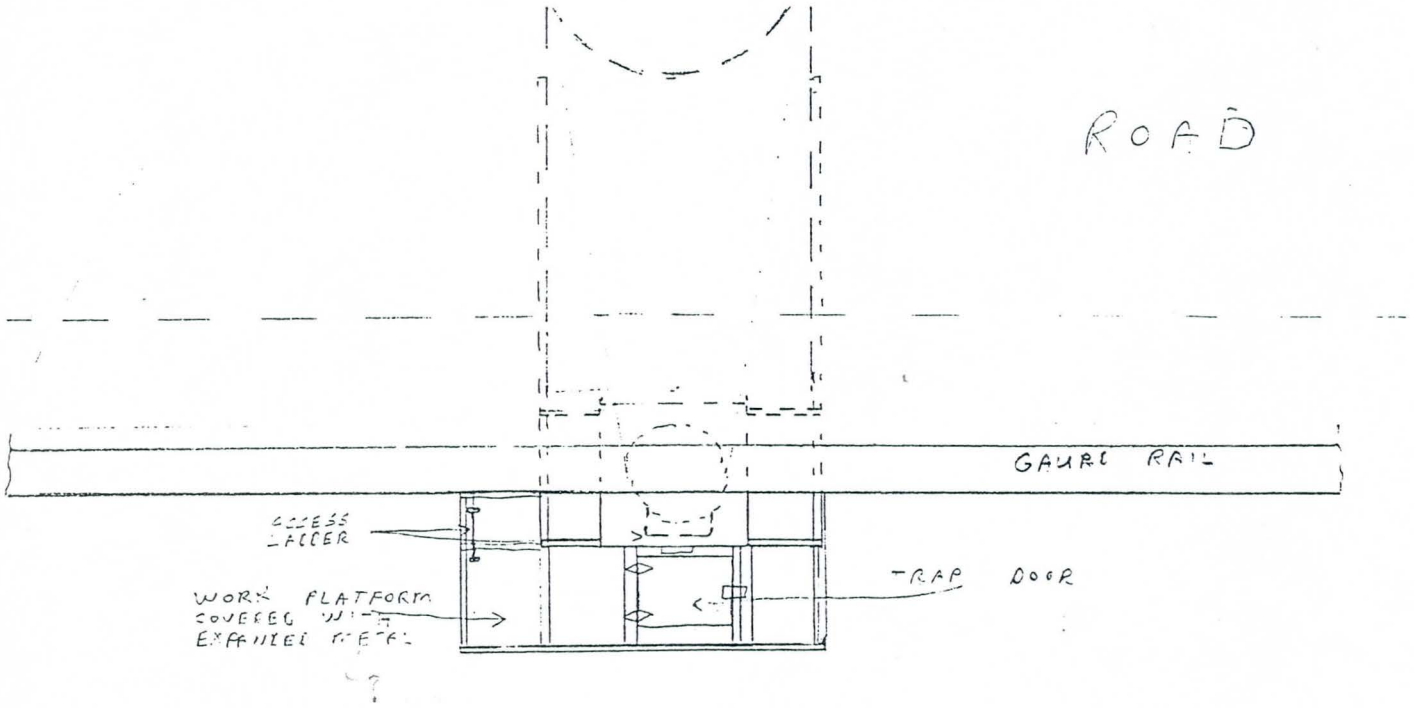


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE ESTRELLA PARKWAY/GILA R. PAGE 3 OF 4

DETAIL 1/4" = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____



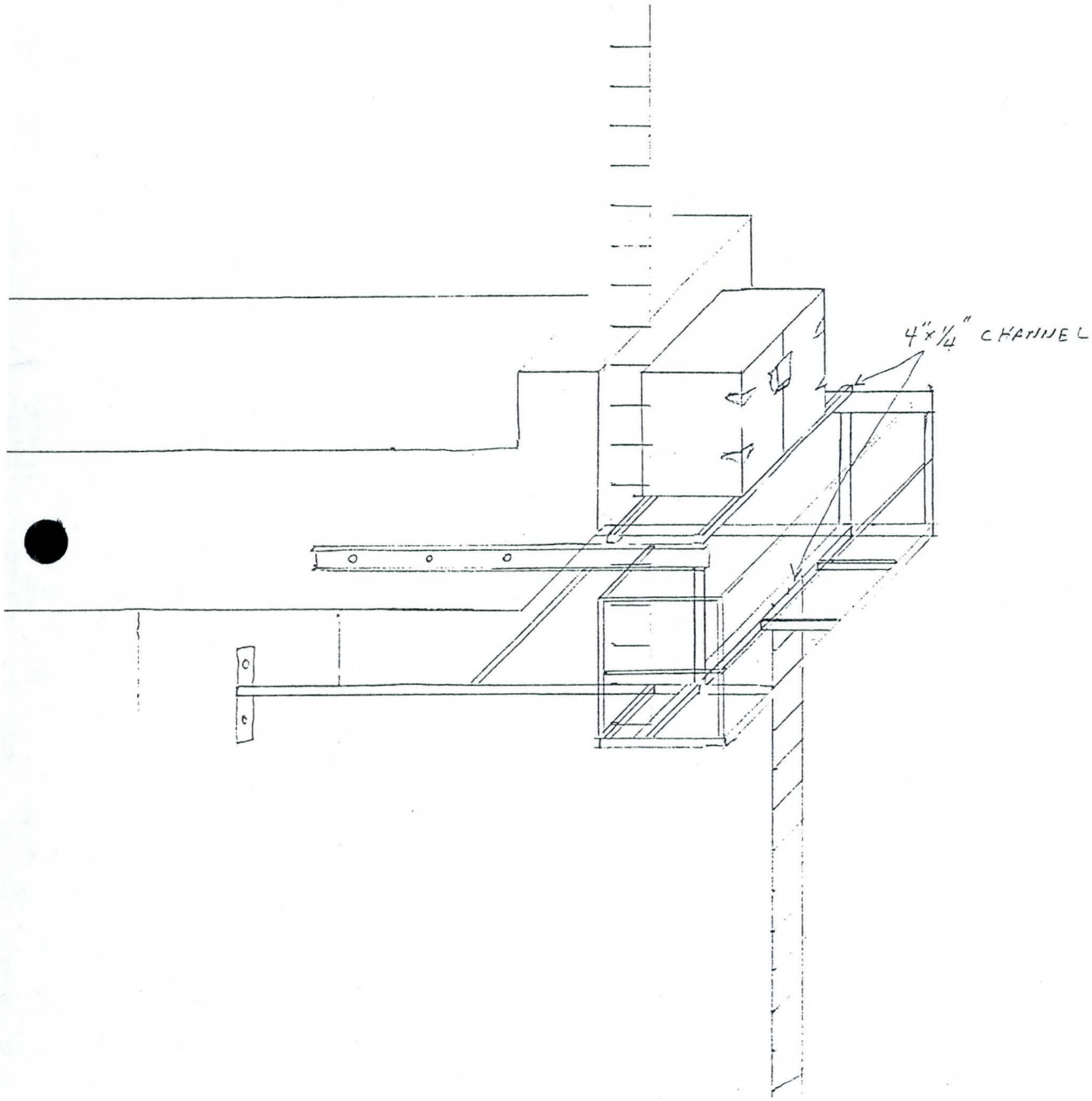
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE, ESTRELLA PARKWAY/GILA R. PAGE 4 OF 4

DETAIL WORK PLATFORM COMPUTED _____ DATE _____

1/4" = 1'

CHECKED BY _____ DATE _____



DOCUMENT HEADER

ument name: Stream Gauge Document type: CWT

Drawer: Hanumaiah Folder: Kumar
Received from: Kumar Hanumaiah

Last modified on Feb 06,92 1:09 PM by ENG.KVH

Author: Kumar Hanumaiah Typist: Kumar Hanumaiah

Filed on: Feb 06,92 1:09 PM Message attached

Subject: Stream Gauge at Estrella Pkwy / Gila River

Summary:

Tom, I have your project completed with the sizes of all structural members and it is all yours for a small fee. You can give me a call or stop by at any time you want to. I will be here today till 4.00 p.m and all day tomorrow.

Comments:

Mailed to:
TJK RWN JJT
CGW

(This document is currently empty.)

DOCUMENT HEADER

ument name: Stream Gauge Document type: CWT

Drawer: Hanumaiah Folder: Kumar
Received from: Kumar Hanumaiah

Last modified on Feb 06,92 1:09 PM by ENG.KVH

Author: Kumar Hanumaiah Typist: Kumar Hanumaiah

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Mailed to:
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CGW

(This document is currently empty.)

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G DOORS
U-TEST PAINTS
I-IT-YOURSELF SUPPLIES

LUMBER JACK T.M.

True Value HARDWARE STORES

"You will appreciate our prices, quality & service"

ALL MAIL:
P. O. Box 20188
Phoenix, AZ 85036

YARD:
1405 W. Broadway Rd.
Phoenix, AZ 85041

SALES: 602-276-2424 A/C: 602-243-4288 FAX: 602-276-2864

A 159006

DATE	TICKET CK / LOAD CK
9-27-89	
SOLD BY	LIC. PLATE #
STEVE WEBER	
LOADED BY	TAX #

CAPITAL IMPROVEMENT

FLOOD CONTROL

"If we don't have it, we'll get it"

- **FREE BLUEPRINT TAKE OFF**
- **STATEWIDE DELIVERY**
- **REMODELING DEPARTMENT**
- **CUSTOM CUTTING**

THIS INVOICE MUST ACCOMPANY ALL RETURNS WITHIN 30 DAYS. HANDLING CHARGE WILL BE MADE ON ALL RETURNS. NO RETURNS ON SPECIAL ORDERS.

ORDERED	SHIPPED	SIZE	LGTH.	DESCRIPTION	FOOTAGE	PRICE	UNIT	AMOUNT
		X						
36		X		SAFETY HASPS		2.69	ea.	96.84
		X						
		X						
		X						
		X						
		X		CREDIT BALANCE ON RETURN OF GATE LATCHES				- 79.56
		X		(INVOICE #08003 P.O. #Y 05823)				
		X		(THIS BALANCE INCLUDES A 15% RESTOCKING				
		X		CHARGE/SEE INVOICE #4996)				
		X						
		X						
		X						
		X						
		X						
		X						

Check # _____

CASH SALE

J2 003 REV. 2/89 6M

ORIGINAL

We give special prices on off grade materials (shop, seconds, "B" grade, #3 & #4 studs, etc.) which are based on taking **AS-IS NO SELECTING.** We have better materials for more money in most cases. **PLEASE DO NOT ASK OUR YARD MEN TO SELECT.**

DRAY	
SUB-TOTAL	17.28
TAX	1.16
TOTAL	18.44

WE APPRECIATE YOUR BUSINESS

NUTS
WASHERS
SCREWS
NON-CORROSIVE FASTENERS

BOLT AND SCREW SUPPLY

214 S. 14th ST. - PHONE 602-258-5815 - PHOENIX, ARIZONA 85034

513618

SOLD TO Mi[illegible] County

DATE 9/22/89

ADDRESS

DELIVERY ADDRESS Capitol Equipment [illegible] Central

CITY

CITY 3335 W. Durango

CUSTOMER ORDER NO.	CHARGE	CASH	COMPLETE YES	COMPLETE NO	BACKORDER YES	BACKORDER NO	RESALE	TAXABLE
D17205	X			✓	✓			X

QUANTITY	DESCRIPTION		UNIT PRICE	AMOUNT
100	3/8 x 3/4 ccg	c		3 86
100	5/8 x 4 Vegdr w/nut	c		93 10
	Thank You			
	REC'D SEP 26 1989			
		TAX		5 16

TERMS 1% 10th PROX. NET 30th

MERCHANDISE NOT RETURNABLE WITHOUT THIS SLIP

TOTAL ▶ 82 12

A FINANCE CHARGE OF 1½% PER MONTH, 18% PER ANNUM WILL BE MADE ON ALL INVOICES THAT ARE 60 DAYS OR MORE PAST DUE.

76 96

RECEIVED THE ABOVE IN GOOD CONDITION

BY [signature]

CUSTOMER COPY

BOLTS
NUTS
WASHERS
SCREWS
NON-CORROSIVE FASTENERS

Teks®

INDUSTRIAL

BOLT AND SCREW SUPPLY

214 S. 14th ST. - PHONE 602-258-5815 - PHOENIX, ARIZONA 85034

513345

SOLD TO Maricopa County

DATE 9/28/89

ADDRESS Flood Control 3335 W Durango

DELIVERY ADDRESS Capitol Improvement / Flood Control

CITY Phx 85009

CITY 3335 W Durango

CUSTOMER ORDER NO.	CHARGE	CASH	COMPLETE YES	COMPLETE NO	BACKORDER YES	BACKORDER NO	RESALE	TAXABLE
D17015	X			(NO)	(YES)			X

QUANTITY	DESCRIPTION	UNIT PRICE		AMOUNT	
100	5/8 x 1 1/2 NC gr 8 w/nuts			41	88
100	x 5			86	30
89	x 6	99	69	88	72
				216	90
	Thank You				
	216 90				
	TAX			14	53
	TOTAL ▶			231	43

TERMS 1% 10th PROX. NET 30th

MERCHANDISE NOT RETURNABLE WITHOUT THIS SLIP

A FINANCE CHARGE OF 1½% PER MONTH, 18% PER ANNUM WILL BE MADE ON ALL INVOICES THAT ARE 60 DAYS OR MORE PAST DUE.

RECEIVED THE ABOVE IN GOOD CONDITION

BY E. Stone 9-28-89

CUSTOMER COPY

JH | DATE 09/22/89 | CODE TO 130D | SPOT NO. 26

ABF FREIGHT SYSTEM, INC. (ABFS)

CONSIGNEE COPY

ABQ NM 120326130 CONT.

ROUTING	C/L REFERENCE	TRAILER NO.	REVENUE	RECEIVABLE	PAYABLE
ABF-PHX DIRECT		42176			

NO. PIECES	DESCRIPTION	WEIGHT	RATE	FREIGHT
	20 FT	778		
2 PCS	CSP BAND 3-C RVTD GALV 16 GA 24" 1 PC	26		
	CUSTOMER CONTACT: BOB NODD 262-1501			
	SUPPLIED COPY B/L REQ'D FOR PAYMT	SCBL		
	/ THANKS FOR SHIPPING ABF	TKS		
	/ SEND FRT BILL 094025-249A,2146000	SFB		

58775

COMPUTREX INC
PO BOX 13020
LEXINGTON KY 40583

7 TTL. PIECES 2044 SHIPPERS NO. 844065F PPD

SHIPPER	CONSIGNEE
CONTECH CONSTRUCTION PRODUCTS INC 150 WOODWARD SE ALBUQUERQUE NM 87106	MARICOPA COUNTY FLOOD CONTROL DIST BOB NODD 262-1501 3335 W DURANGO PHOENIX AZ 85009

DATE DELIVERED 083489-12UA DRIVER FIRM 000000-0000 BY

AB104936

JH | DATE 09/22/89 | CODE TO 130D | SPOT NO. 26

ABF FREIGHT SYSTEM, INC. (ABFS)

CONSIGNEE COPY

ABQ NM 120326130 CONT.

ROUTING	C/L REFERENCE	TRAILER NO.	REVENUE	RECEIVABLE	PAYABLE
ABF-PHX DIRECT		42176			

NO. PIECES	DESCRIPTION	WEIGHT	RATE	FREIGHT
	PO LS#269A			

7 TTL. PIECES 2044 SHIPPERS NO. 844065F PPD

SHIPPER	CONSIGNEE
CONTECH CONSTRUCTION PRODUCTS INC 150 WOODWARD SE ALBUQUERQUE NM 87106	MARICOPA COUNTY FLOOD CONTROL DIST BOB NODD 262-1501 3335 W DURANGO PHOENIX AZ 85009

DATE DELIVERED 083489-12UA DRIVER FIRM 000000-0000 BY

AB104936

9-25-89

CONTECH
ONSTRUCTION PRODUCTS INC.

Request

ACKNOWLEDGEMENT

SALES NO.	REV. NO.	SALES DATE	BUYER'S NUMBER	BUYER'S DATE	SHIP FROM	DATE WANTED
84-7042-00	0	09/11/89	DA 3480	09/11/89	ALBUQUERQUE	09/18/89

09/13/89 W/O

SOLD TO:

MARICOPA COUNTY FLOOD CONTROL
DISTRICT
3335 W. DURANGO
PHOENIX AZ 85009

SHIP TO:

MARICOPA COUNTY FLOOD CONTROL
DISTRICT-BOB NODD @ 262-1501
3335 W. DURANGO
PHOENIX AZ 85009
02 013 11

EST. SHIP DATE	PLANT ORDER NO
/ /	84-5760-00

REGION	DEST.	SELLING	SPECIFICATIONS	INFOCOPY	MARKET	CREDIT REF.	CUST. NO.	ROUTE/F.O.B.
4354	5421	5421	5421		06H	W 2	54-60285	TRUCK

ORIGIN, FREIGHT PREPAID & ADD

TERMS 1/2 10 NET 30

INTEREST CHARGED ON OVERDUE INVOICES AT 18% PER ANNUM OR AT THE LEGAL RATE IF THAT IS LESS THAN 18%. ITEMIZED TRANSPORTATION AND SALES TAX ARE NOT SUBJECT TO CASH DISCOUNT.

SALES TAX ☐ YES, IF NOT SHOW EXEMPTION OR REASON

NO.

11-TAXABLE

ACKNOWLEDGEMENT OF ORDER

THIS ACKNOWLEDGEMENT (QUOTATION) SUPERSEDES ALL PREVIOUS COMMUNICATIONS. ACCEPTANCE OF YOUR PURCHASE O... IS EXPRESSLY MADE CONDITIONAL ON YOUR ACCEPTANCE OF THE TERMS AND CONDITIONS, INCLUDING "WARRANTIES" AND "R... REMEDIES"; APPEARING ON THE REVERSE SIDE HEREOF BY YOUR ACCEPTANCE OF THE PRODUCTS HEREIN DESCRIBED OTHERWISE. UNLESS TIMELY NOTICE TO THE CONTRARY IS RECEIVED, THE PRODUCTS HEREIN DESCRIBED WILL BE MANUF... AND DELIVERED IN ACCORDANCE HEREWITH IN RELIANCE UPON YOUR ACCEPTANCE OF SUCH TERMS.

THIS MATERIAL IS MANUFACTURED SPECIAL FOR THIS PARTICULAR ORDER. ONCE THIS ORDER HAS BEEN ENTERED FOR FA... IT IS NOT SUBJECT TO CANCELLATION OR CHANGE FOR ANY REASON WITHOUT APPROVAL OF THE DISTRICT SALES O... THE DETERMINATION OF CANCELLATION CHARGES. ONCE SHIPPED, IT CANNOT BE RETURNED FOR CREDIT.

ITEM	DESCRIPTION	PIECES	WEIGHT	QUANTITY	PRICE	AMT
001	RIV PIPE 2 2/3x1/2 GALV 16GA 24" 8.00FT	1	0	8.00	18.000	144
002	RIV PIPE 2 2/3x1/2 GALV 16GA 24" 12.00FT	1	233	12.00	18.000	216
003	RIV PIPE 2 2/3x1/2 GALV 16GA 24" 16.00FT	1	0	16.00	18.000	
004	RIV PIPE 2 2/3x1/2 GALV 16GA 24" 20.00FT	2	778	40.00	18.000	
005	CSP BAND 3-C RVTD GALV 16GA 12" 1PC	2	0	2.00	18.000	

TOTAL WEIGHT 1,011 LBS.

SUB-TOTAL 94.07

STATE TAX 6.700

TOTAL AMOUNT

RECEIVED
SEP 15 1989

	CH ENG		P & PM
	DEP		HYDRO
	ADMIN		LMGT
/	FINANCE		FILE
	C & O		
	ENGR		

REMARKS
REC'D SEP 18 1989

CUSTOMER CONTACT: BOB NODD @ 262-1501

$\frac{233}{12} = 19.5$ lbs/ft

NUTS & BOLTS

		Quantity	Unit Price	Extended Price
CARRIAGE BOLTS				
3/8" x 3/4"		100	$3.86/c	$ 3.86
HEX HEAD, ZINC PLATE, GRADE 8				
5/8" x 1 1/2"	Bolts w/nuts	100	41.88/c	41.88
5/8" x 4"	Bolts w/nuts	100	73.10/c	73.10
5/8" x 5"	Bolts w/nuts	100	86.30/c	86.30
5/8" x 6"	Bolts w/nuts	100	99.69/c	99.69
STAR SLUG-IN COMPOUND ANCHOR Smooth Finish 3000 lb. #6845		500	65.00/c	325.00
			Total	629.83

Metra Steel

METAL ITEMS

	Quantity	Unit Price	Extended Price
ANGLE IRON:			
2"x2"x 1/4"	460 ft	$ .73/ft	$335.80
2"x2"x 1/8"	60 ft	.41/ft	24.60
1"x1"x 1/8"	140 ft	.23/ft	32.20
HOT ROLL PLATE 4'x8'x 3/16"	11 sheets	$ 70.71/sht	$777.81
CHANNEL IRON c6" x 10.5	80 ft	$ 2.68/ft	$214.40
ROUND STOCK 5/8"	460 ft	.27/ft	$124.20
		Total	$1,509.01

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

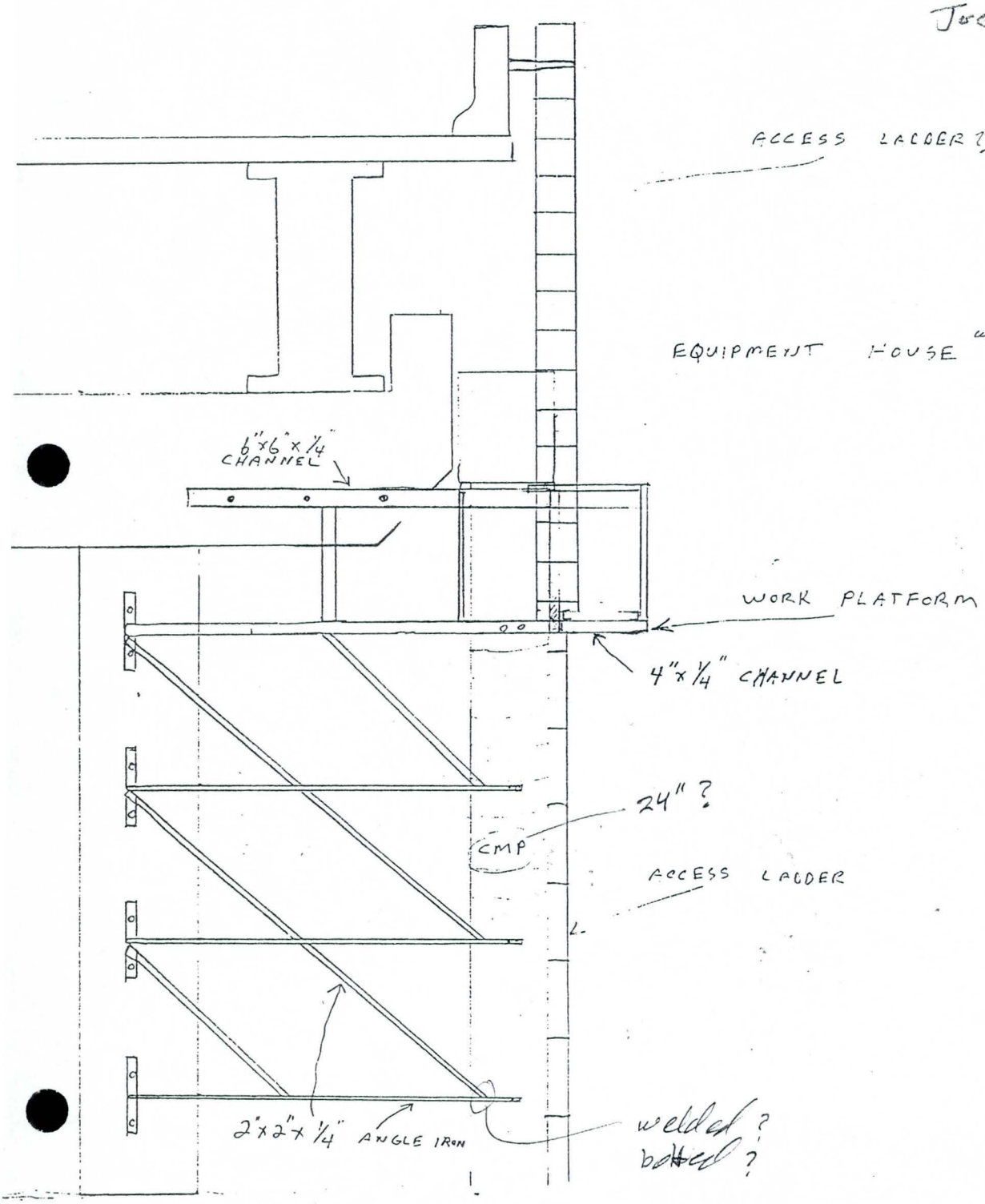
PROJECT STREAM GAUGE ESTRELLA PARKWAY/GILA R. PAGE 1 OF 4

DETAIL 1/4" = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

contact Thru Joe Traun
for questions + field trip to site
and other stream gauge sites.

Joe Traun 4607

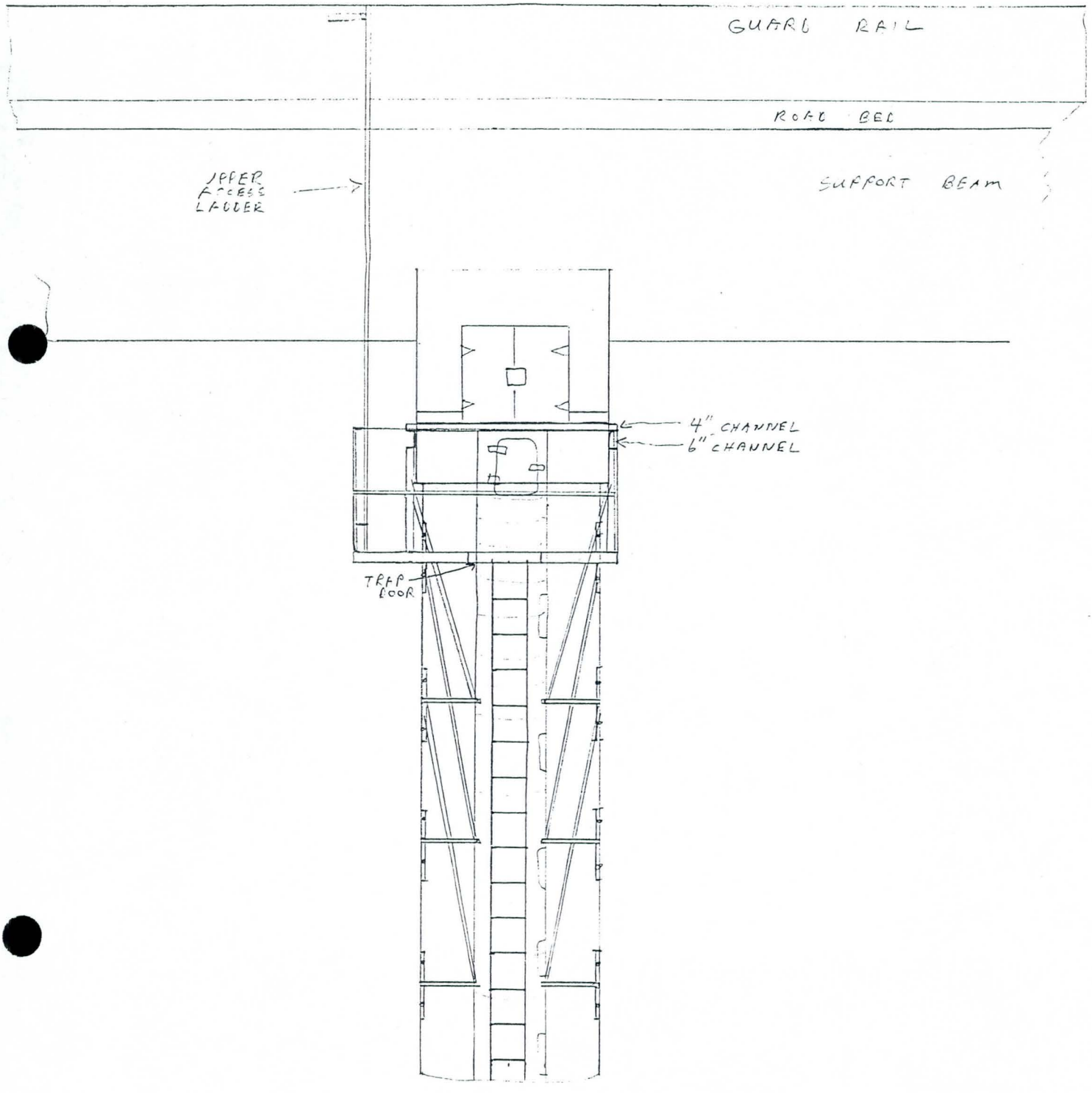


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE ESTRELLA PARKWAY / GILA R. PAGE 2 OF 4

DETAIL 1/4 = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

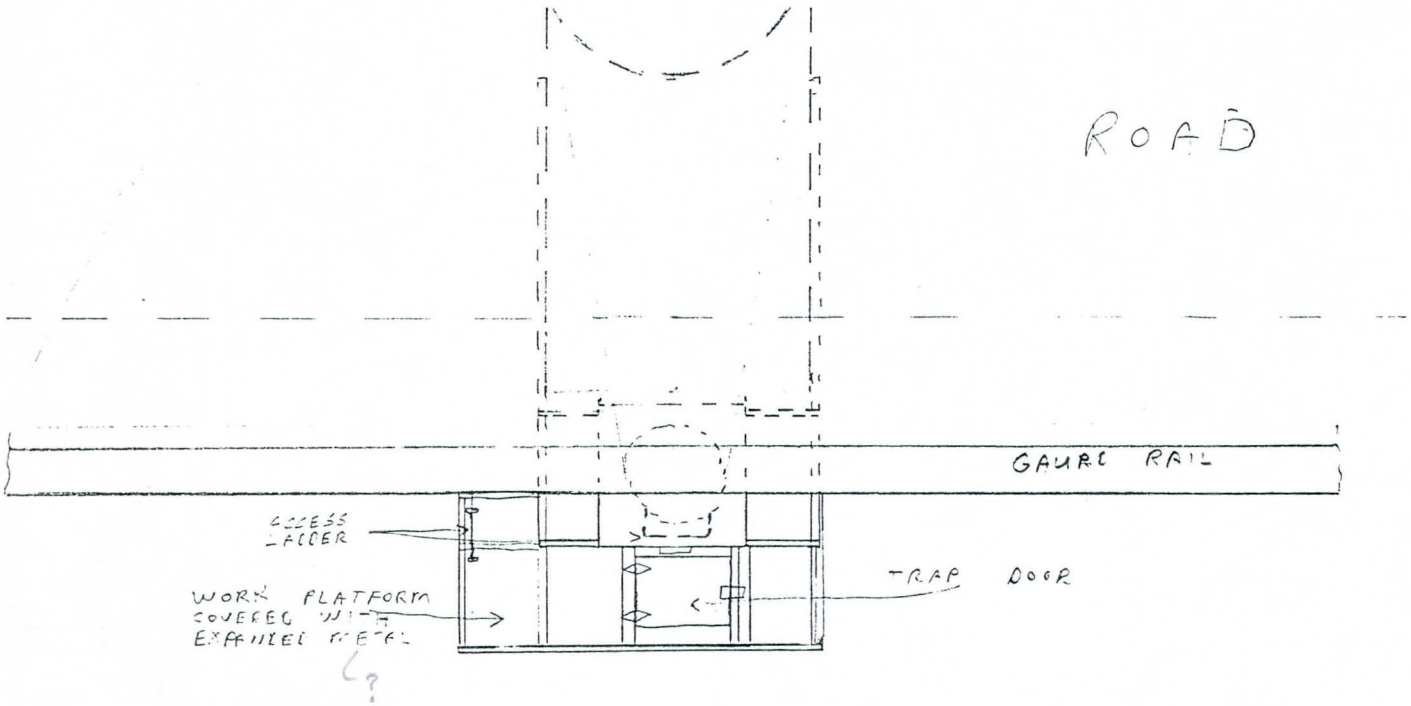


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE ESTRELLA PARKWAY/GILA R. PAGE 3 OF 4

DETAIL 1/4" = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

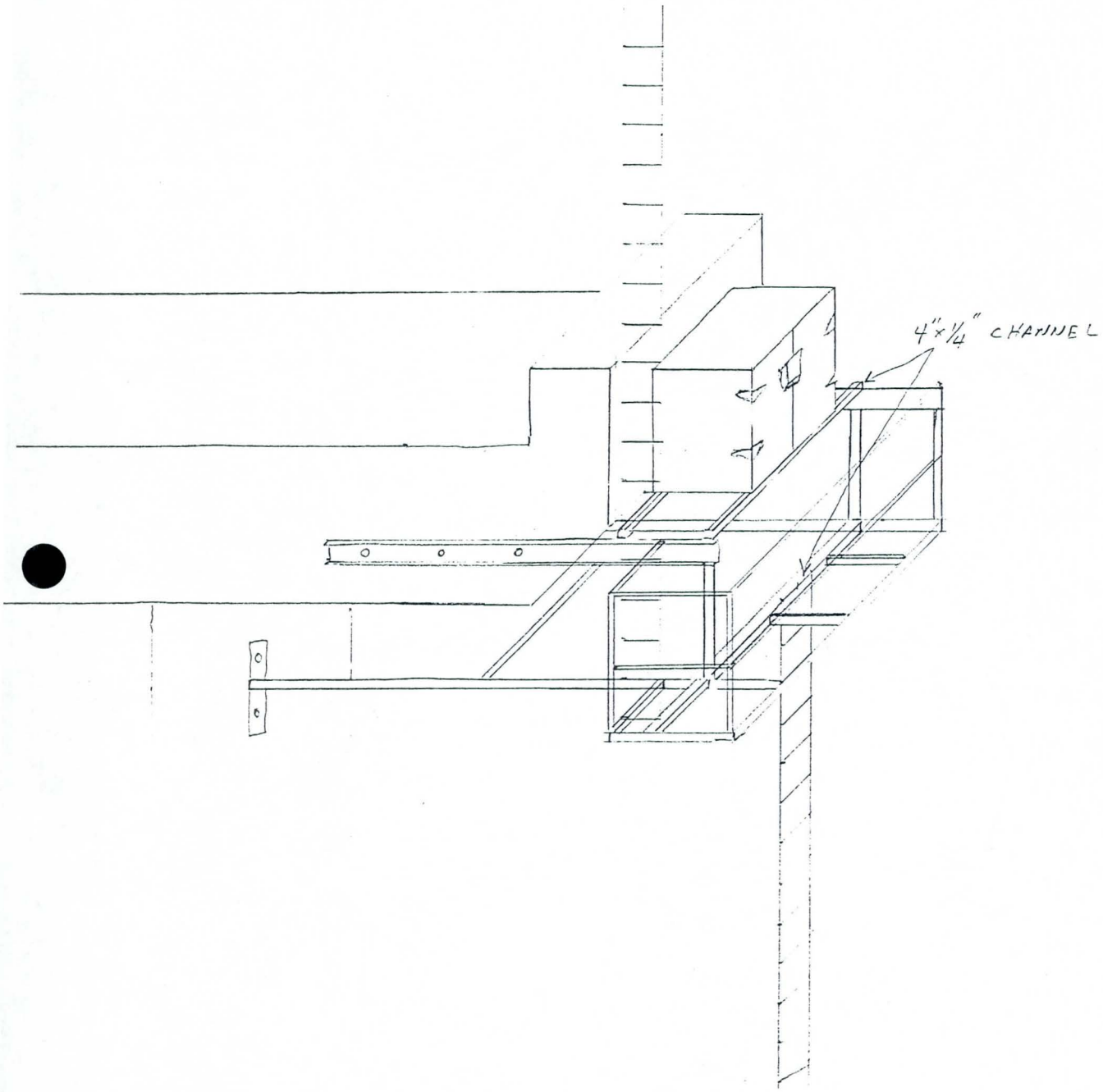


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE, ESTRELLA PARKWAY/GILA R. PAGE 4 OF 4

DETAIL WORK PLATFORM COMPUTED _____ DATE _____

1/4" = 1' CHECKED BY _____ DATE _____



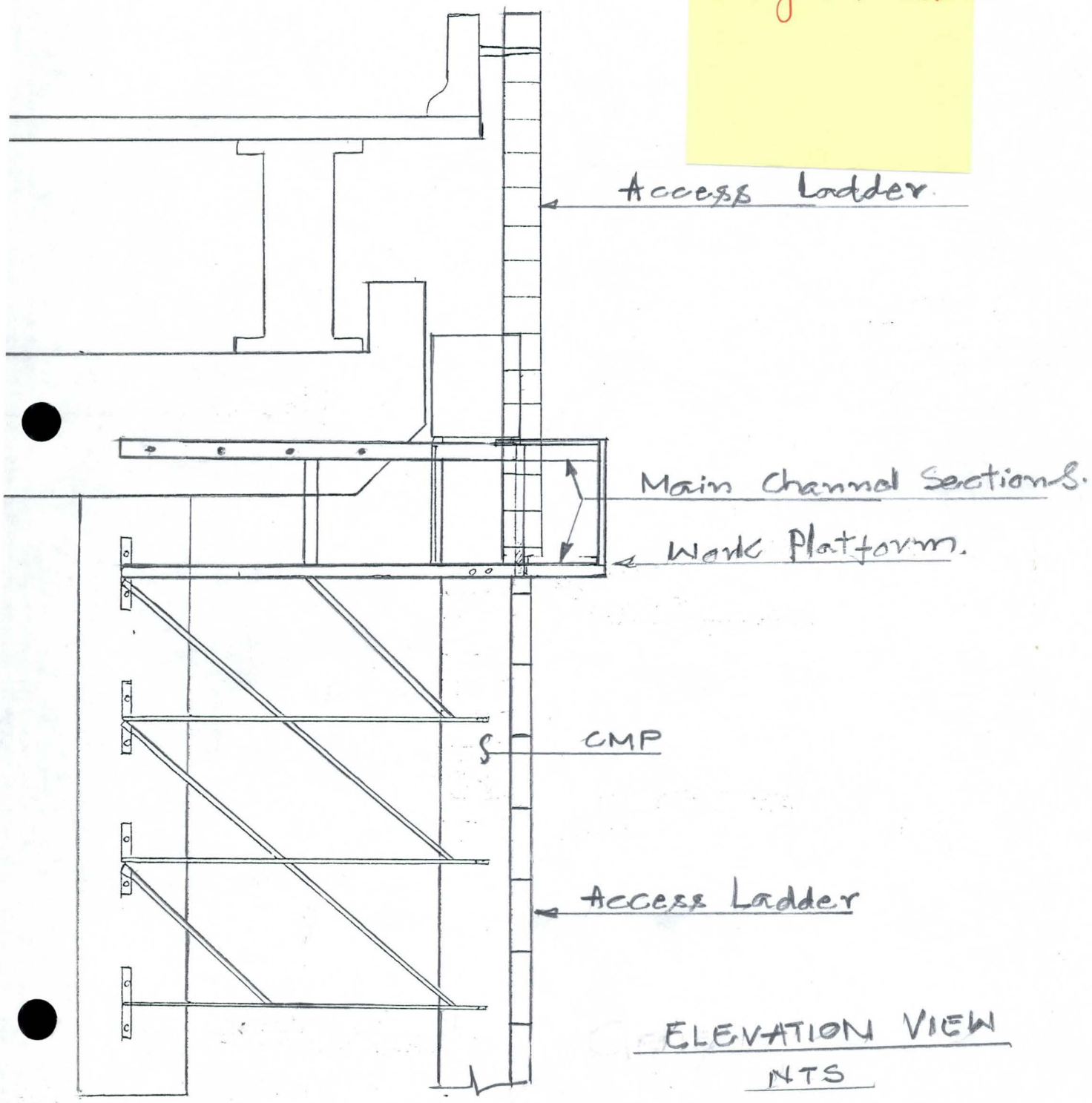
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @ PAGE 1 OF 5

DETAIL ____ COMPUTED TJK DATE Jan 92

Estrella Pkwy - Gila River CHECKED BY ____ DATE ____

original Set



ELEVATION VIEW

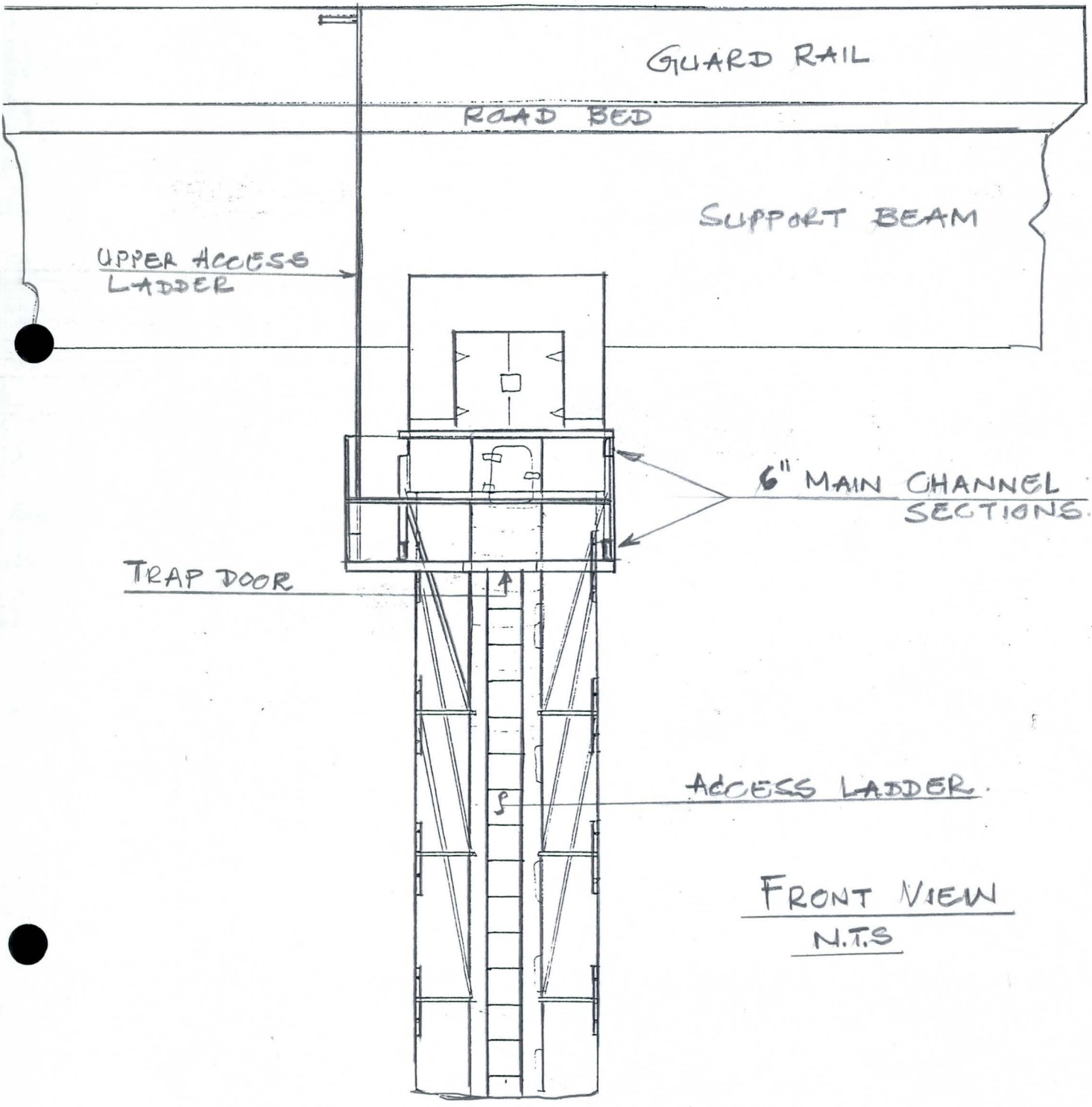
NTS

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE @ _____ PAGE 2 OF 5

DETAIL ESTRELLA PKWY COMPUTED TJK DATE JAN 92

GILA RIVER CHECKED BY _____ DATE _____



FRONT VIEW

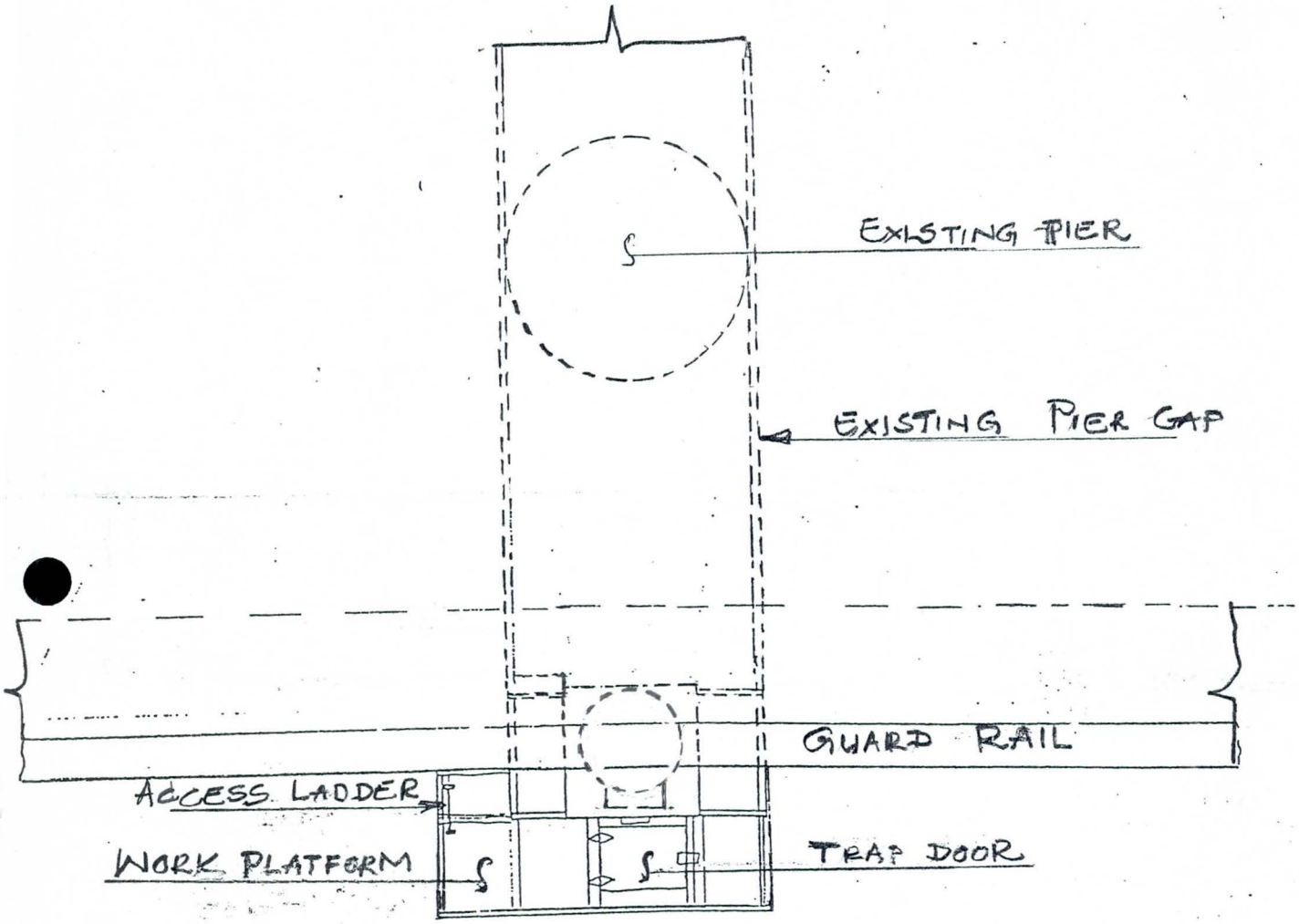
N.T.S

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @ PAGE 3 OF 5

DETAIL Estrella Pkwy/Gila River COMPUTED TJK DATE Jan 92

CHECKED BY _____ DATE _____



PLAN VIEW

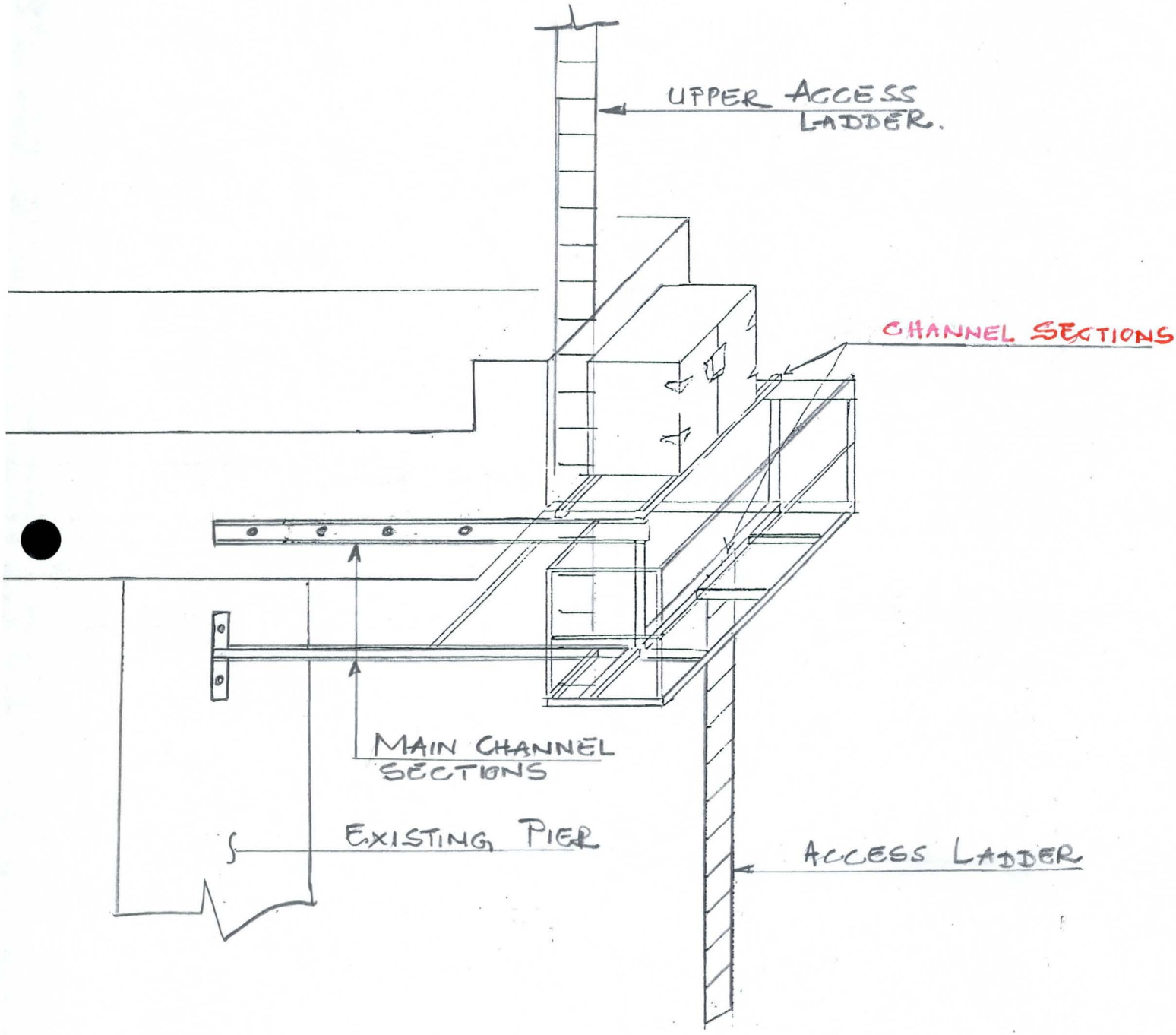
NTS.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE @ PAGE 4 OF 5

DETAIL ESTRELLA PKWY COMPUTED TJK DATE Jan 92

GILA RIVER CHECKED BY _____ DATE _____



ISOMETRIC VIEW

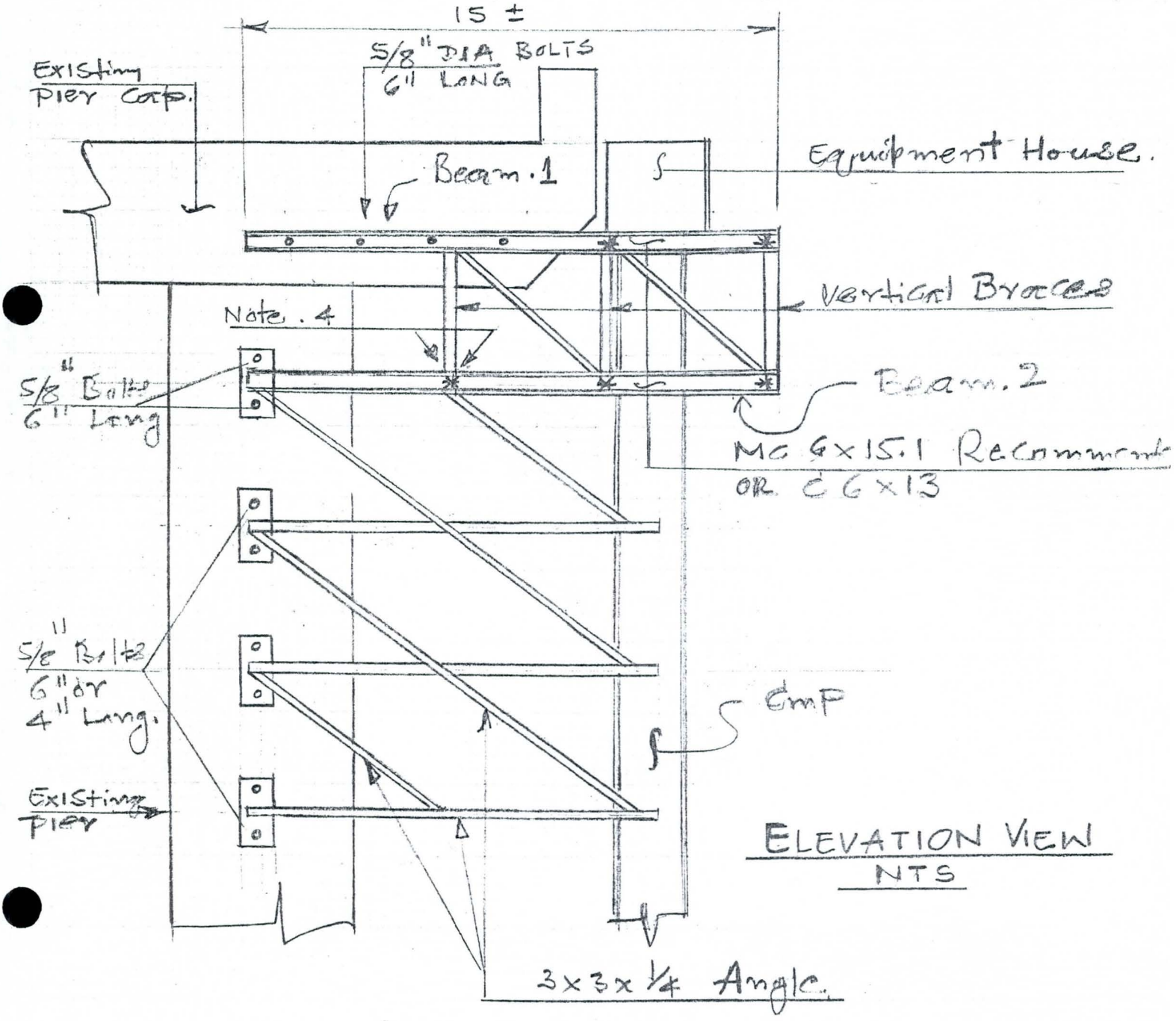
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT Stream Gauge @. PAGE 5 OF 5

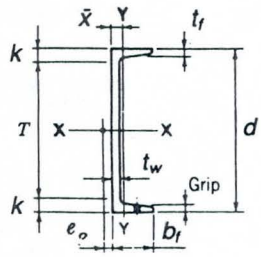
DETAIL _____ COMPUTED KVH DATE Jan. 19

E/Strella Pkwy - Gila River CHECKED BY CCC DATE 2/6/19

KEY NOTES: 1) use 6" channel Sections for both Bm.1 & Bm.2
2) Weld all vertical braces between two main Chl. Sects
3) Provide horizontal braces at places marked with *
4) All weldings shall be a min. $\frac{3}{16}$" Fillet Weld.



ELEVATION VIEW
NTS

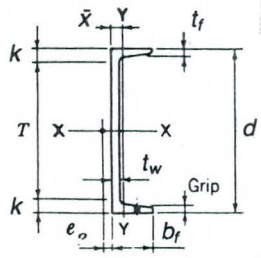


CHANNELS MISCELLANEOUS Dimensions

Designation	Area A	Depth d	Web			Flange				Distance		Grip	Max. Flge. Fastener
			Thickness t_w		$\frac{t_w}{2}$	Width b_f		Average Thickness t_f		T	k		
	In.^{2}	In.	In.		In.	In.		In.		In.	In.	In.	In.
MC 9×25.4	7.47	9.00	0.450	7/16	1/4	3.500	3 1/2	0.550	9/16	6 5/8	1 3/16	9/16	7/8
×23.9	7.02	9.00	0.400	3/8	3/16	3.450	3 1/2	0.550	9/16	6 5/8	1 3/16	9/16	7/8
MC 8×22.8	6.70	8.00	0.427	7/16	3/16	3.502	3 1/2	0.525	1/2	5 5/8	1 3/16	1/2	7/8
×21.4	6.28	8.00	0.375	3/8	3/16	3.450	3 1/2	0.525	1/2	5 5/8	1 3/16	1/2	7/8
MC 8×20	5.88	8.00	0.400	3/8	3/16	3.025	3	0.500	1/2	5 3/4	1 1/8	1/2	7/8
×18.7	5.50	8.00	0.353	3/8	3/16	2.978	3	0.500	1/2	5 3/4	1 1/8	1/2	7/8
MC 8× 8.5	2.50	8.00	0.179	3/16	1/16	1.874	1 7/8	0.311	5/16	6 1/2	3/4	5/16	5/8
MC 7×22.7	6.67	7.00	0.503	1/2	1/4	3.603	3 5/8	0.500	1/2	4 3/4	1 1/8	1/2	7/8
×19.1	5.61	7.00	0.352	3/8	3/16	3.452	3 1/2	0.500	1/2	4 3/4	1 1/8	1/2	7/8
MC 6×18	5.29	6.00	0.379	3/8	3/16	3.504	3 1/2	0.475	1/2	3 7/8	1 1/16	1/2	7/8
×15.3	4.50	6.00	0.340	5/16	3/16	3.500	3 1/2	0.385	3/8	4 1/4	7/8	3/8	7/8
MC 6×16.3	4.79	6.00	0.375	3/8	3/16	3.000	3	0.475	1/2	3 7/8	1 1/16	1/2	3/4
×15.1	4.44	6.00	0.316	5/16	3/16	2.941	3	0.475	1/2	3 7/8	1 1/16	1/2	3/4
MC 6×12	3.53	6.00	0.310	5/16	1/8	2.497	2 1/2	0.375	3/8	4 3/8	13/16	3/8	5/8

C
MISC
F

Nominal Wt. per Ft	$\bar{x}$	Shear Center Location e_o	$\frac{d}{A_f}$
Lb.	In.	In.	
25.4	0.970	0.986	4.68
23.9	0.981	1.04	4.74
22.8	1.01	1.04	4.35
21.4	1.02	1.09	4.42
20	0.840	0.843	5.29
18.7	0.849	0.889	5.37
8.5	0.428	0.542	13.7
22.7	1.04	1.01	3.89
19.1	1.08	1.15	4.06
18	1.12	1.17	3.60
15.3	1.05	1.16	4.45
16.3	0.927	0.930	4.21
15.1	0.940	0.982	4.29
12	0.704	0.725	6.41

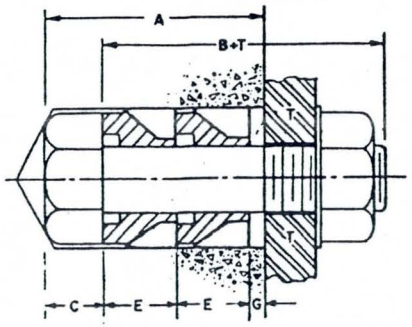


CHANNELS
AMERICAN STANDARD
Dimensions

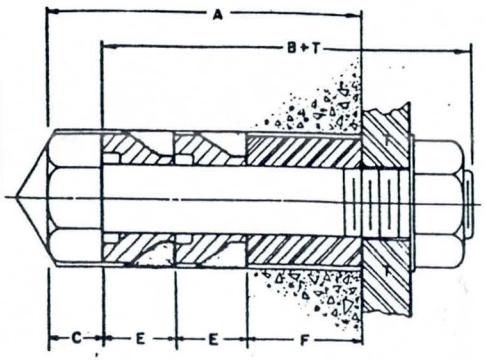
Designation	Area A	Depth d	Web			Flange				Distance		Grip	Max. Flge. Fastener
			Thickness t_w		$\frac{t_w}{2}$	Width b_f		Average thickness t_f		T	k		
	In.^{2}	In.	In.		In.	In.		In.		In.	In.	In.	In.
C 15×50	14.7	15.00	0.716	11/16	3/8	3.716	3 3/4	0.650	5/8	12 1/8	1 7/16	5/8	1
×40	11.8	15.00	0.520	1/2	1/4	3.520	3 1/2	0.650	5/8	12 1/8	1 7/16	5/8	1
×33.9	9.96	15.00	0.400	3/8	3/16	3.400	3 3/8	0.650	5/8	12 1/8	1 7/16	5/8	1
C 12×30	8.82	12.00	0.510	1/2	1/4	3.170	3 1/8	0.501	1/2	9 3/4	1 1/8	1/2	7/8
×25	7.35	12.00	0.387	3/8	3/16	3.047	3	0.501	1/2	9 3/4	1 1/8	1/2	7/8
×20.7	6.09	12.00	0.282	5/16	1/8	2.942	3	0.501	1/2	9 3/4	1 1/8	1/2	7/8
C 10×30	8.82	10.00	0.673	11/16	5/16	3.033	3	0.436	7/16	8	1	7/16	3/4
×25	7.35	10.00	0.526	1/2	1/4	2.886	2 7/8	0.436	7/16	8	1	7/16	3/4
×20	5.88	10.00	0.379	3/8	3/16	2.739	2 3/4	0.436	7/16	8	1	7/16	3/4
×15.3	4.49	10.00	0.240	1/4	1/8	2.600	2 5/8	0.436	7/16	8	1	7/16	3/4
C 9×20	5.88	9.00	0.448	7/16	1/4	2.648	2 5/8	0.413	7/16	7 1/8	15/16	7/16	3/4
×15	4.41	9.00	0.285	5/16	1/8	2.485	2 1/2	0.413	7/16	7 1/8	15/16	7/16	3/4
×13.4	3.94	9.00	0.233	1/4	1/8	2.433	2 3/8	0.413	7/16	7 1/8	15/16	7/16	3/4
C 8×18.75	5.51	8.00	0.487	1/2	1/4	2.527	2 1/2	0.390	3/8	6 1/8	15/16	3/8	3/4
×13.75	4.04	8.00	0.303	5/16	1/8	2.343	2 3/8	0.390	3/8	6 1/8	15/16	3/8	3/4
×11.5	3.38	8.00	0.220	1/4	1/8	2.260	2 1/4	0.390	3/8	6 1/8	15/16	3/8	3/4
C 7×14.75	4.33	7.00	0.419	7/16	3/16	2.299	2 1/4	0.366	3/8	5 1/4	7/8	3/8	5/8
×12.25	3.60	7.00	0.314	5/16	3/16	2.194	2 1/4	0.366	3/8	5 1/4	7/8	3/8	5/8
× 9.8	2.87	7.00	0.210	3/16	1/8	2.090	2 1/8	0.366	3/8	5 1/4	7/8	3/8	5/8
C 6×13	3.83	6.00	0.437	7/16	3/16	2.157	2 1/8	0.343	5/16	4 3/8	13/16	5/16	5/8
×10.5	3.09	6.00	0.314	5/16	3/16	2.034	2	0.343	5/16	4 3/8	13/16	3/8	5/8
× 8.2	2.40	6.00	0.200	3/16	1/8	1.920	1 7/8	0.343	5/16	4 3/8	13/16	5/16	5/8
C 5× 9	2.64	5.00	0.325	5/16	3/16	1.885	1 7/8	0.320	5/16	3 1/2	3/4	5/16	5/8
× 6.7	1.97	5.00	0.190	3/16	1/8	1.750	1 3/4	0.320	5/16	3 1/2	3/4	—	—
C 4× 7.25	2.13	4.00	0.321	5/16	3/16	1.721	1 3/4	0.296	5/16	2 5/8	11/16	5/16	5/8
× 5.4	1.59	4.00	0.184	3/16	1/16	1.584	1 5/8	0.296	5/16	2 5/8	11/16	—	—
C 3× 6	1.76	3.00	0.356	3/8	3/16	1.596	1 5/8	0.273	1/4	1 5/8	11/16	—	—
× 5	1.47	3.00	0.258	1/4	1/8	1.498	1 1/2	0.273	1/4	1 5/8	11/16	—	—
× 4.1	1.21	3.00	0.170	3/16	1/16	1.410	1 3/8	0.273	1/4	1 5/8	11/16	—	—

CH
AMERICA
Pr

Nominal Wt. per Ft	$\bar{x}$	Shear Center Location e_o	$\frac{d}{A_f}$
Lb.	In.	In.	
50	0.798	0.583	6.21
40	0.777	0.767	6.56
33.9	0.787	0.896	6.79
30	0.674	0.618	7.55
25	0.674	0.746	7.85
20.7	0.698	0.870	8.13
30	0.649	0.369	7.55
25	0.617	0.494	7.94
20	0.606	0.637	8.36
15.3	0.634	0.796	8.81
20	0.583	0.515	8.22
15	0.586	0.682	8.76
13.4	0.601	0.743	8.95
18.75	0.565	0.431	8.12
13.75	0.553	0.604	8.75
11.5	0.571	0.697	9.08
14.75	0.532	0.441	8.31
12.25	0.525	0.538	8.71
9.8	0.540	0.647	9.14
13	0.514	0.380	8.10
10.5	0.499	0.486	8.59
8.2	0.511	0.599	9.10
9	0.478	0.427	8.29
6.7	0.484	0.552	8.93
7.25	0.459	0.386	7.84
5.4	0.457	0.502	8.52
6	0.455	0.322	6.87
5	0.438	0.392	7.32
4.1	0.436	0.461	7.71



1. Standard Installation Plain Set



2. Installation with Bearing Sleeve Plain Set

(X) Bolt 5/8" X 6"
Bolt 5/8 X 4"

DRAWING SYMBOLS

A. Hole depth for recommended number of units
B. Dimension to be added to "T" (thickness of fixture) to determine length of bolt
C. Height of bolt head
D. Height of Slugin Threaded Unit compacted in hole
E. Height of Slugin Plain Unit compacted in hole
F. Length of bearing sleeve (not supplied)
G. Clearance between top of anchor and surface of masonry
H. Depth of counterbore in threaded unit
T. Thickness of fixture to be fastened

Special Notes:

1. For installation of Slugin Plain Type, use square-head bolts for sizes up to ½" diameter. For sizes ⅝" diameter and larger, use hexagon-head bolts only.

2. Bearing sleeve is recommended to take up void between top of Slugin and surface of masonry. Ordinary pipe of proper length and diameter is satisfactory. Deep-setting of Slugin increases holding power.

3. Safe working loads are dependent on proper installation of Slugin in good quality masonry. A four-to-one safety factor is allowed.

Catalog Number	Bolt Dia. Inches	Ultimate Strength of Standard Bolts		Drill Size and Hole Dia.	Recommended No. of Units	*Allowable Safe Loads (In 3000 lb. concrete)		STANDARD INSTALLATION										
								PLAIN SET See Drawing 1					THREADED SET See Drawing 2					
		Tension	Shear			Tension in Lbs.	Shear (Bearing) in Lbs	A	B	C	E	G	A	B	D	E	G	H
		65000	45000															
6815	¼	1750	1200	½	2	400	200	1 1/16	1 1/8	3/16	⅜	⅛	⅛	1 3/16	⅛	⅜	⅛	3/32
6815-1																		
6825	⅜	4400	3055	¼	2	1000	500	1 7/16	1 ½	3/16	½	⅛	1 3/16	1	1 1/16	½	⅛	⅜
6825-1																		
6835	½	8200	5670	1	2	2000	900	1 11/16	1 ¼	7/16	9/16	⅛	1 9/16	1 3/16	⅛	9/16	⅛	7/16
6835-1																		
6845	⅝	13150	9100	1⅛	3	3000	1200	2 1/16	2 7/16	9/16	9/16	⅛	2 3/16	1 13/16	1 3/16	9/16	⅛	7/16
6845-1																		
6855	¾	19650	13600	1⅛	3	†5500	1350	2 5/16	2 13/16	1 1/16	1 1/16	1/16	2 13/16	2 1/16	1 3/16	1 1/16	1/16	5/16
6855-1																		
6860	⅞	27250	18900	1½	3	†6200	1500	3 1/16	3 ¼	1 3/16	¼	⅛	3	2 1/16	1 1/16	¼	⅛	7/16
6860-1																		
6865	1	35800	24800	1⅛	4	† 7000	1700	3 1/16	3 15/16	1 5/16	1 5/16	⅛	3 1/16	2 15/16	1 1/16	1 5/16	1/16	¼
6865-1																		

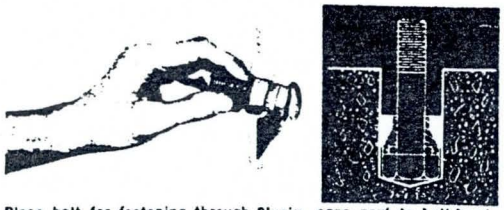
* 4 to 1 Safety Factor

† Allowable Safe Loads in 4000 P.S.I. Concrete

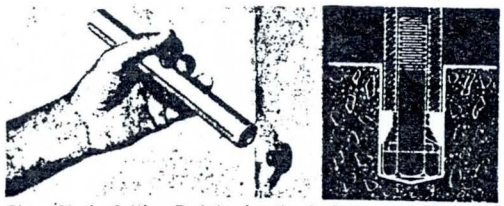
Allow Shear

Very important ← Order Plain type (not threaded)

Installation of Plain Type
bolt-head imbedded in masonry

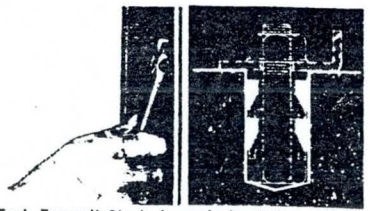


1. Place bolt for fastening through Slugin, **cone next to bolt-head.** Insert into drilled hole with bolt-head down.



2. Place Slugin Setting Tool (or length of pipe) over bolt. Strike Setting Tool with solid hammer blows to expand lead sleeve.

3. Remove Setting Tool. To compound anchorage, place second plain unit of Slugin over bolt, **cone first,** and expand as in Step 2.



4. Remove Setting Tool. Two-unit Slugin is ready for fixture attachment.

Special Notes:

Increased holding power is obtained by compounding additional units of Slugin Plain Type to each installation. Expand as indicated in Steps 3 for both types. Be sure hole is drilled to proper depth to accommodate all units.

A bearing sleeve may be used to take up void from top of Slugin and surface of masonry. Use of bearing sleeve provides greater holding power in softer masonry materials. See installation specifications.

Star Slugin Setting Tools

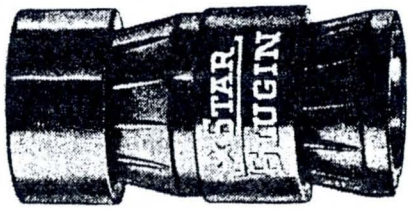
Recommended for best results when installing Slugin Anchors. If Star Setting Tools are not at hand, ordinary pipe of proper length and diameter may be used.

STAR

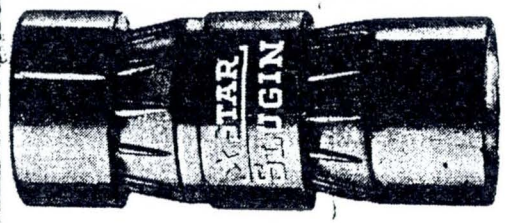
MORE FASTENERS FOR MORE USES THAN ANY OTHER BRAND YOU CAN THINK OF

STAR • MOUNTAINVILLE, N. Y. 10953

STAR SLUGIN
COMPOUNDED ANCHORS



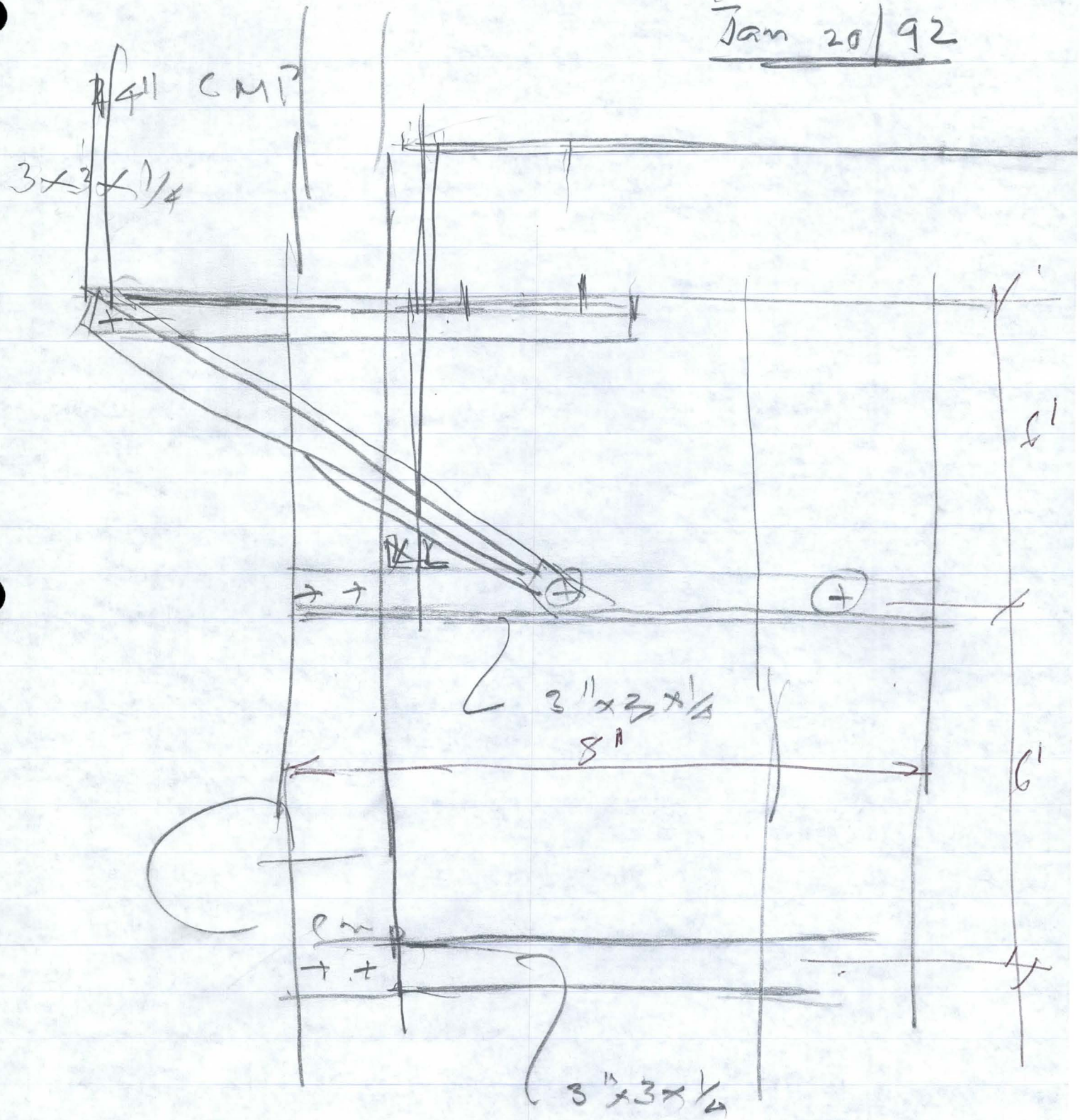
TWO UNIT PLAIN TYPE



TWO UNIT THREADED TYPE

INSTALLATION INSTRUCTIONS

Jan 20/92



New Roof at Glendale
— " Bell Rd
24th St

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

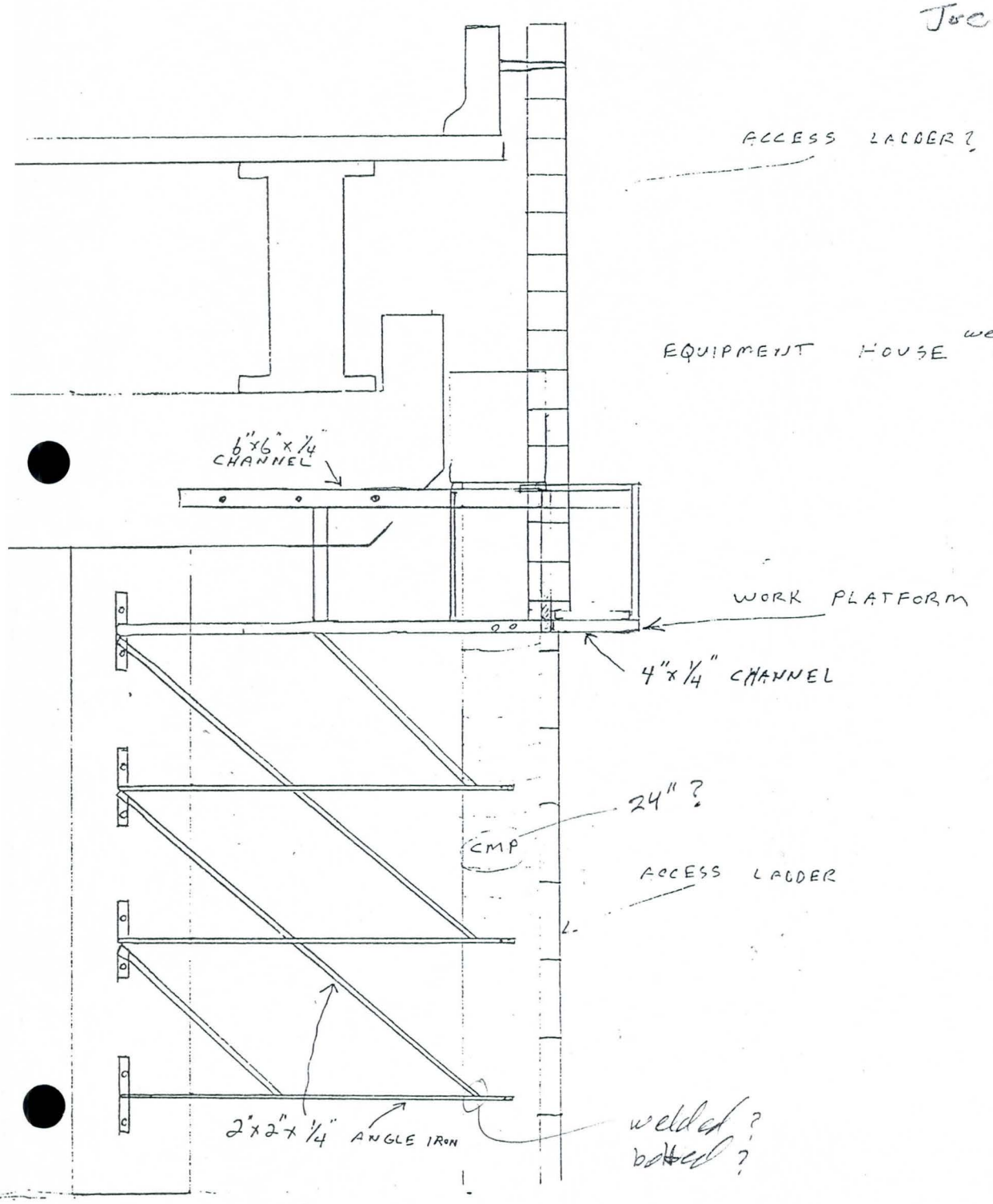
PROJECT STREAM GAUGE ESTRELLA PARKWAY/GILA R. PAGE 1 OF 4

DETAIL 1/4" = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

contact Tim Joe Traun
for questions + field trip to site
and other stream gauge sites.

Joe Traun 4607

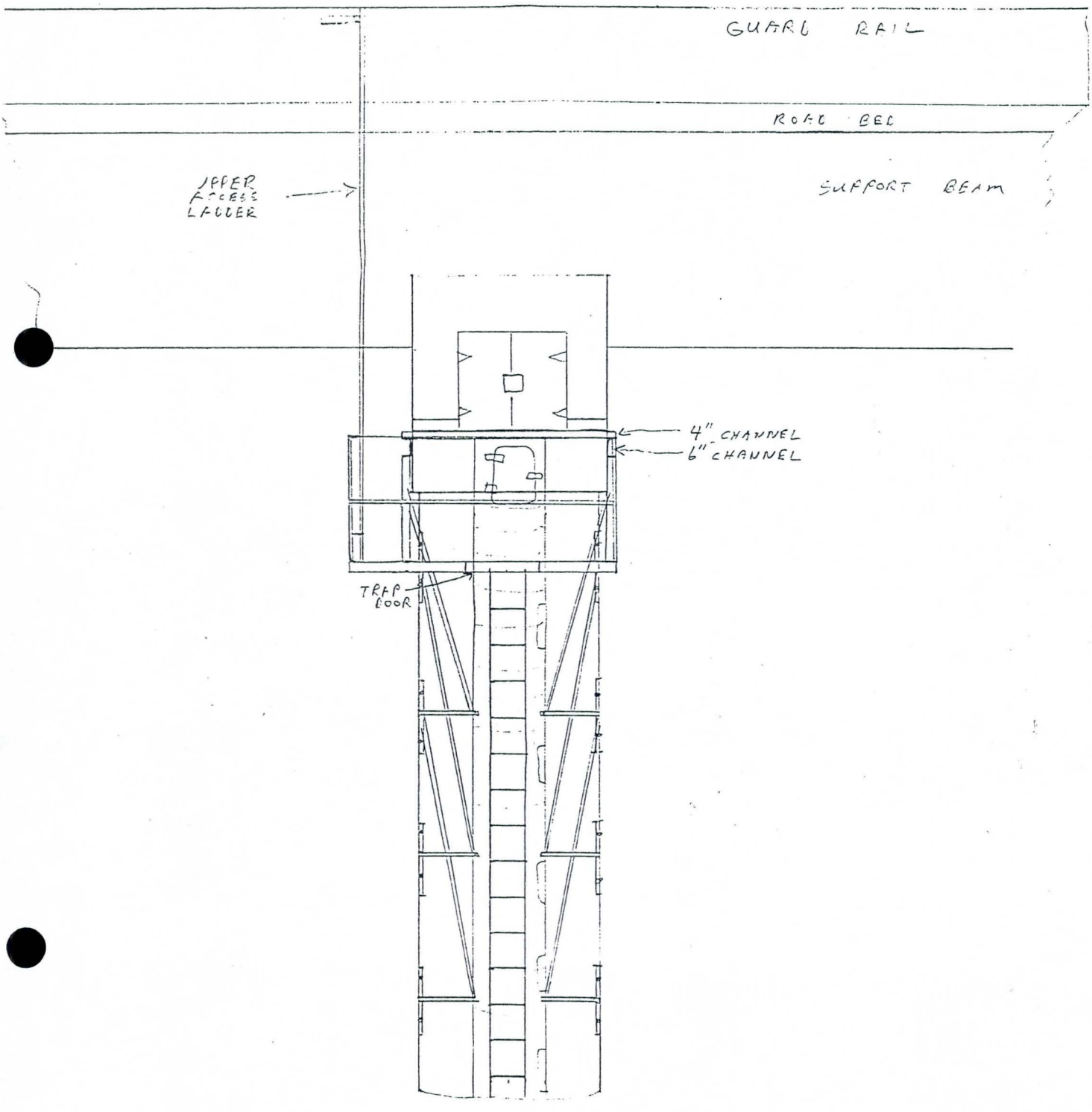


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE ESTRELLA PARKWAY / GILA R. PAGE 2 OF 4

DETAIL 1/4 = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____

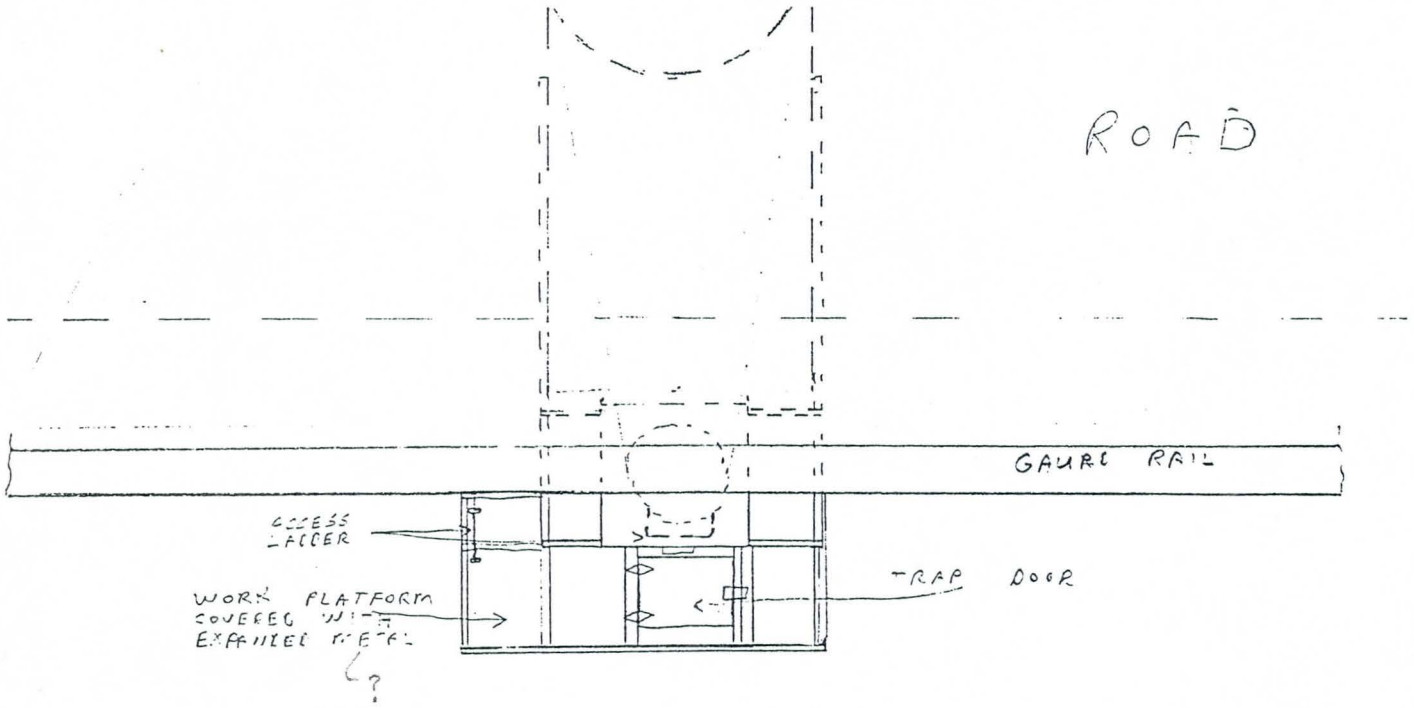


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE ESTRELLA PARKWAY/GILA R. PAGE 3 OF 4

DETAIL ~ 1/4" = 1' COMPUTED _____ DATE _____

T. KIEFER CHECKED BY _____ DATE _____



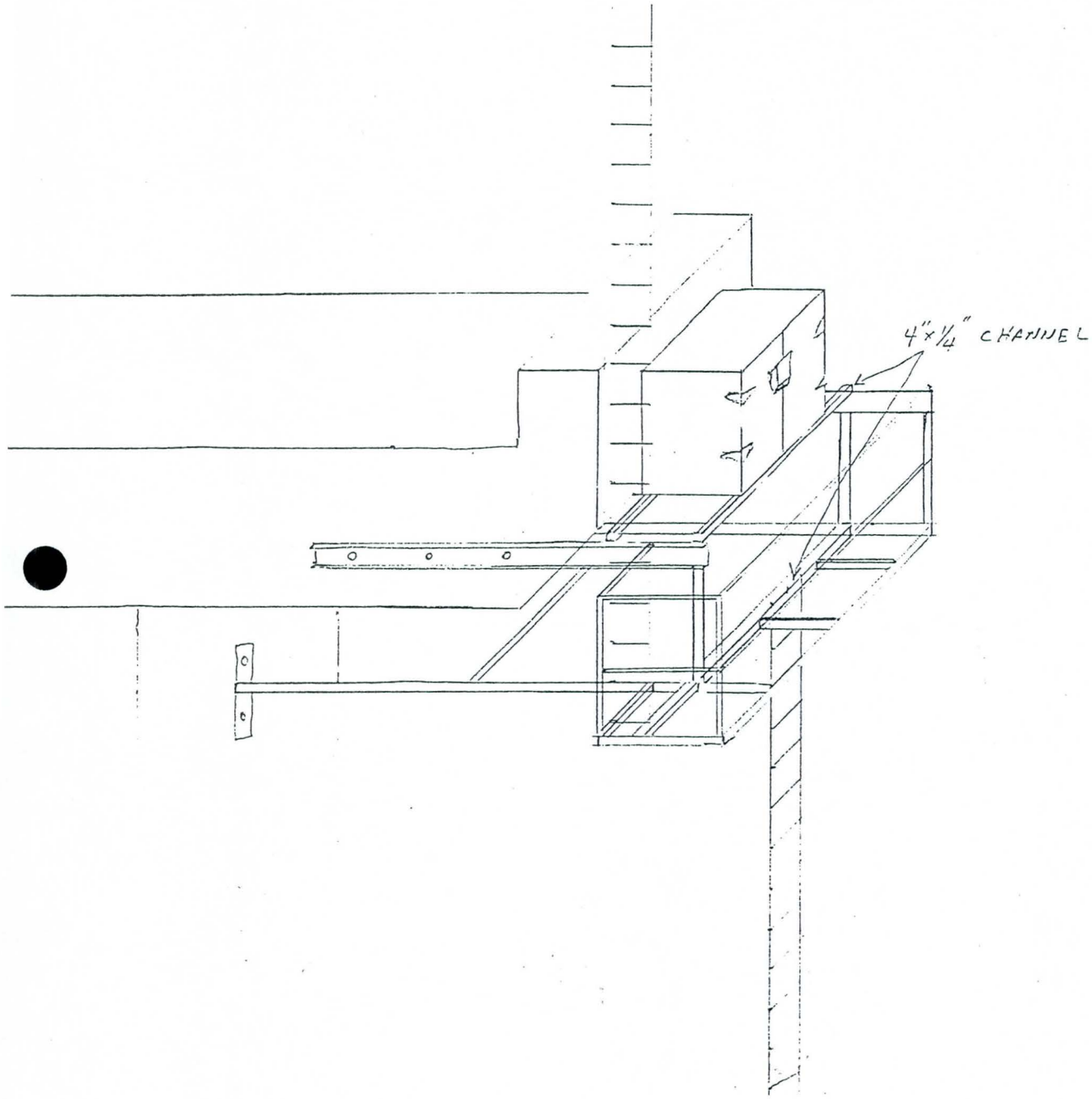
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE, ESTRELLA PARKWAY/GILA R. PAGE 4 OF 4

DETAIL WORK PLATFORM COMPUTED _____ DATE _____

1/4" = 1'

CHECKED BY _____ DATE _____



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT STREAM GAUGE ESTRELLA PARKWAY/GILA R. PAGE 1 OF 4

DETAIL 1/4" = 1' COMPUTED _____ DATE _____

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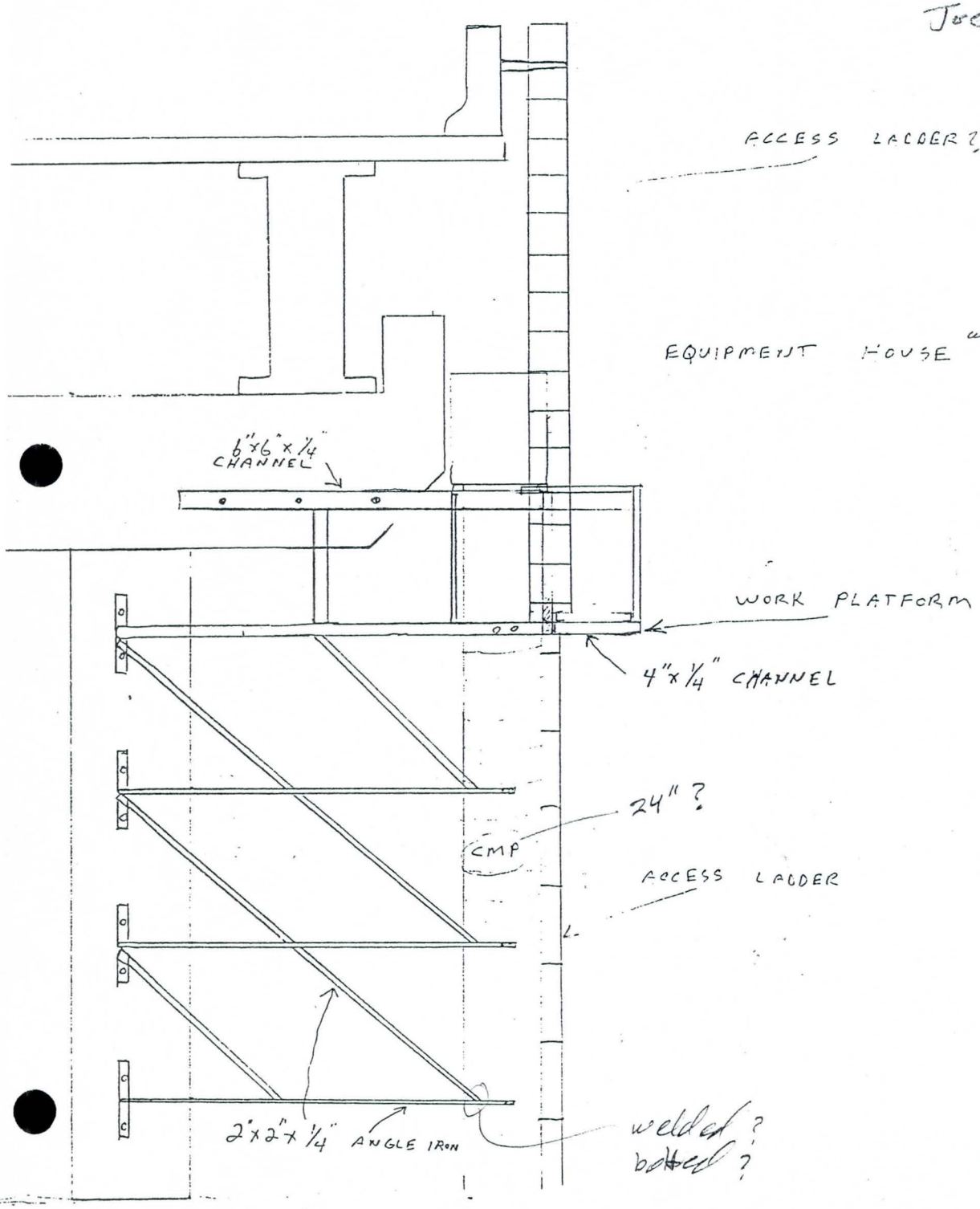
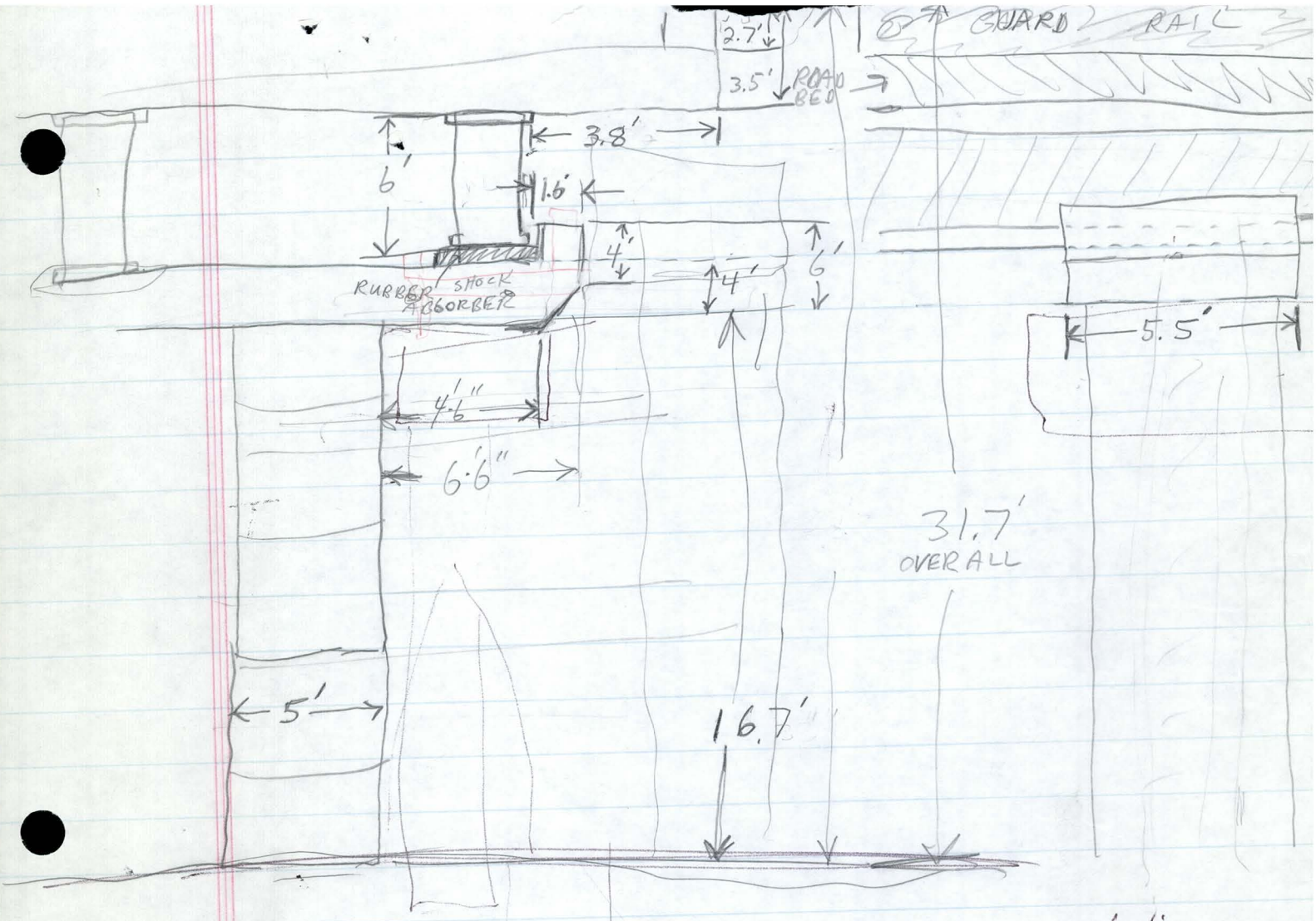
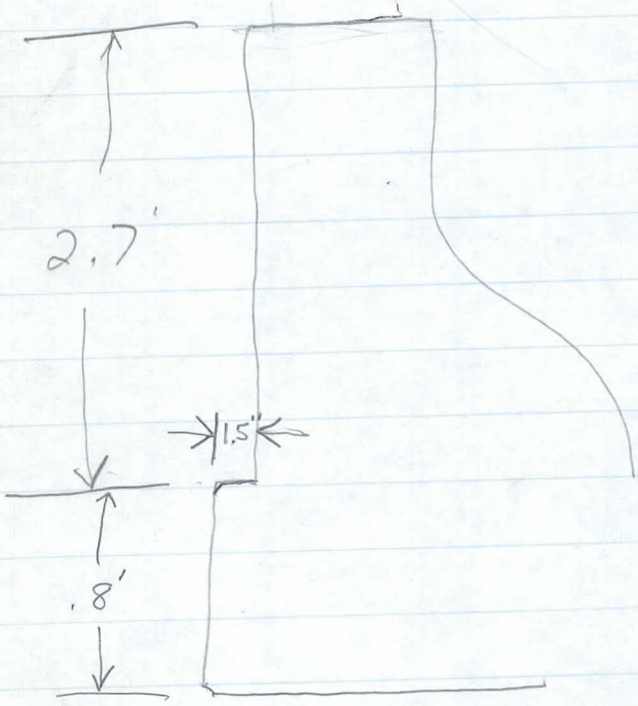




CMP = 20'1"

1½" × ¼"
FOR LADDER