SOLICITATION/SPECIFICATIONS
NO. 5-SI-30-03280

MAIN CANAL AND LATERALS

TONOPAH IRRIGATION DISTRICT, ARIZONA
CENTRAL ARIZONA PROJECT

DRAWINGS
VOL. 2 OF 2

Registered Professional Engineer (Civil)
CERTIFICATE NO.
11587
TIMOTHY E.
KELLY
Date Signed 7/14/77
ARIZONA, U.S.A.

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF RECLAMATION

Prepared by Franzoy · Corey Engineering Company

MAIN CANAL AND LATERALS

TONOPAH IRRIGATION DISTRICT, ARIZONA
CENTRAL ARIZONA PROJECT

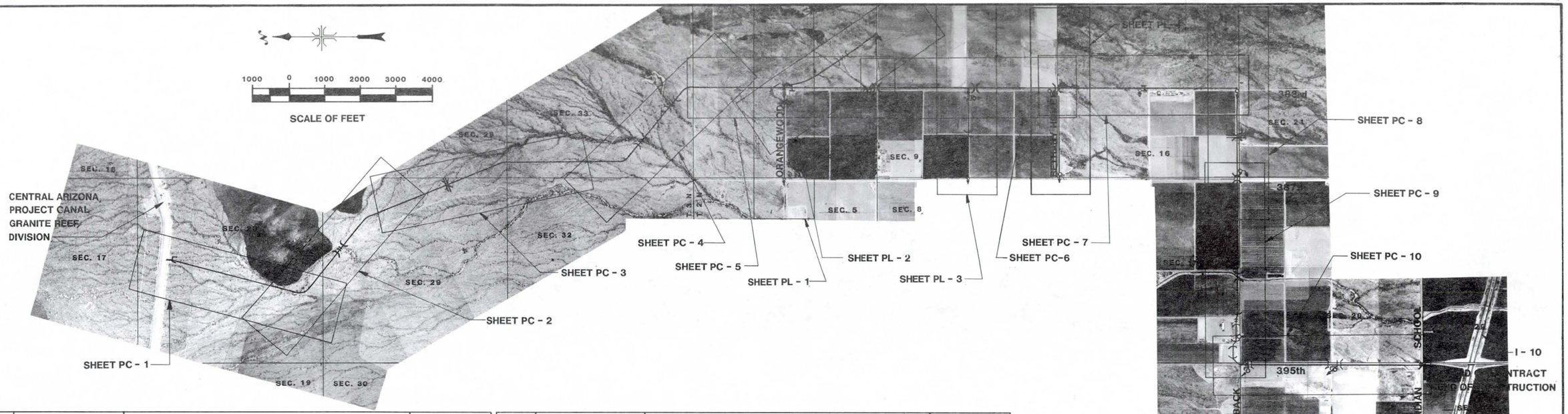
DRAWINGS
VOL 2 OF 2

PREPARED BY:

FRANZOY • COREY
ENGINEERING COMPANY
TEMPE, ARIZONA

ADMINISTERED BY:

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION



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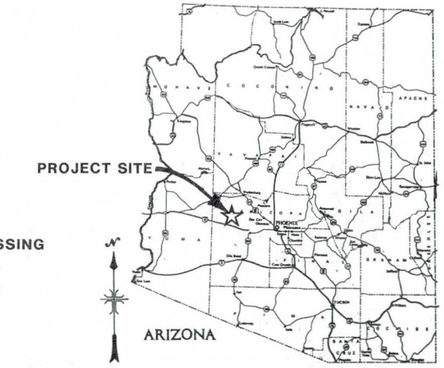
LEGEND

- CANAL
- SIPHON
- TURNOUT
- CHECK
- CHECK DROP
- DIVISION BOX
- WEIR
- WASTEWAY
- WILDLIFE/BRIDGE CROSSING
- WILDLIFE ESCAPE RAMP
- TRANSITION STRUCTURE
- SECTION CORNERS
- G - 1 F.C.E.C. SHEET NUMBER



GENERAL LOCATION MAP

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

LOCATION MAP AND SHEET INDEX

Date	FEB. 1985
Designed	M.A.F.
Drawn	J.J.C.
Checked	R.F.N.
Revised	

Franzoy•Corey
ENGINEERS & ARCHITECTS
• PHOENIX • MESA • TUCSON • PRESCOTT
Corporate Headquarters • 5030 E. Sunrise Drive, Phoenix, Arizona 85044 • (602) 838-8626

DESIGNED MAF SUBMITTED
DRAWN JJC RECOMMENDED
CHECKED RFN APPROVED

10407/G-1

344-330-6851

GENERAL NOTES

(1) CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY NOT TO DESTROY BOUNDARY CORNERS, SECTION CORNERS AND EXISTING AERIAL TARGETS. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING DESTROYED CORNERS AND TARGETS AT HIS OWN EXPENSE.

(2) ATTENTION IS CALLED TO THE EXISTENCE OF BURIED WATER LINES, TELEPHONE LINES, ELECTRICAL LINES, AND OTHER UTILITIES WITHIN THE CONSTRUCTION LIMITS. THE CONTRACTOR ASSUMES FULL RESPONSIBILITY FOR THE LOCATION AND PROTECTION OF ALL EXISTING FACILITIES, BURIED OR OVERHEAD, DURING THE CONSTRUCTION OPERATION. HE SHALL BE RESPONSIBLE FOR ALL DAMAGES OR INJURY OF ANY CHARACTER, DONE BY THE EXECUTION OF THE WORK. HE SHALL RESTORE, AT HIS OWN EXPENSE, SUCH UTILITIES TO A CONDITION SIMILAR OR EQUAL TO ITS CONDITION BEFORE SUCH DAMAGE OR INJURY WAS DONE. REPAIRS OR REPLACEMENT SHALL BE AS DIRECTED.

A PARTIAL LISTING OF GOVERNING BODIES AND PHONE NUMBERS ARE AS FOLLOWS:

(A) MARICOPA COUNTY HIGHWAY DEPARTMENT
PHOENIX, ARIZONA
PH. 262-3621

(B) MOUNTAIN BELL
GLENDALE, ARIZONA
PH. 842-7722

(C) AMERICAN TELEPHONE AND TELEGRAPH
PHOENIX, ARIZONA
PH. 271-5803

(D) ARIZONA PUBLIC SERVICE COMPANY
PHOENIX, ARIZONA
PH. 263-1100

(3) ANY DISCREPANCIES FOUND BETWEEN THE DRAWINGS AND SPECIFICATIONS AND SITE CONDITIONS OR ANY INCONSISTENCIES OR AMBIGUITIES IN THE DRAWINGS OR SPECIFICATIONS SHALL BE IMMEDIATELY REPORTED TO THE CONSTRUCTION ENGINEER, IN WRITING, WHO WILL PROMPTLY CORRECT SUCH INCONSISTENCIES OR AMBIGUITIES IN WRITING. WORK DONE BY THE CONTRACTOR AFTER HIS DISCOVERY OR SUCH DISCREPANCIES, INCONSISTENCIES OR AMBIGUITIES SHALL BE DONE AT THE CONTRACTOR'S RISK.

(4) STRUCTURE LOCATIONS AND SYMBOLS ARE NOT SHOWN TO SCALE.

(5) MINIMUM PIPE COVER SHALL BE 3' UNLESS OTHERWISE SHOWN OR DIRECTED.

(6) WHERE A PIPELINE CROSSES AN EXISTING CONDUIT, A MINIMUM CLEAR DISTANCE BETWEEN PIPELINE AND CONDUIT OF 1' OUTSIDE TO OUTSIDE SHALL BE PROVIDED UNLESS OTHERWISE SHOWN OR DIRECTED.

(7) THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS, FOR THE CONSTRUCTION ENGINEER'S REVIEW, AS MAY BE NECESSARY FOR THE EXECUTION OF THE WORK AND AS REQUIRED BY THE DOCUMENTS.

AT LEAST 30 DAYS BEFORE SCHEDULED CONCRETE PLACEMENT, THE CONTRACTOR SHALL SUBMIT TO THE CONSTRUCTION ENGINEER, FOR APPROVAL FOUR PRINTS OF EACH OF HIS REINFORCEMENT DETAIL DRAWINGS. THE CONSTRUCTION ENGINEER WILL REQUIRE 25 CALENDAR DAYS FOR REVIEW OF REINFORCEMENT DETAIL DRAWINGS AND THIS REVIEW TIME WILL APPLY TO EACH SEPARATE SUBMITTAL OR RESUBMITTAL.

THE CONTRACTOR'S REINFORCEMENT DETAIL DRAWINGS SHALL BE PREPARED FOLLOWING THE RECOMMENDATIONS ESTABLISHED BY THE AMERICAN CONCRETE INSTITUTE'S "MANUAL OF STANDARDS PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURE" (ACI 315-80) UNLESS OTHERWISE SHOWN ON THE REINFORCEMENT DESIGN DRAWINGS. THE CONTRACTOR'S DRAWINGS SHALL SHOW NECESSARY DETAILS FOR CHECKING THE BARS DURING PLACEMENT.

(8) ACCESS ROADS-WHERE EXISTING ROADS ARE NOT AVAILABLE WITHIN THE CONSTRUCTION LIMITS, OR FOR ACCESS TO THE CONSTRUCTION LIMITS, OR BORROW AREAS, IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO CONSTRUCT AND MAINTAIN SUITABLE ROADS NECESSARY FOR CONSTRUCTION. THE CONTRACTOR SHALL MAINTAIN THE ROAD UNTIL COMPLETION AND ACCEPTANCE OF ALL WORK UNDER THIS CONTRACT.

MAINTENANCE IS CONSIDERED TO INCLUDE REPAIR OF ANY OF THE ROADS AS REQUIRED TO KEEP THEM IN GOOD, SAFE, SERVICEABLE CONDITION. THE USE OF EXISTING ROADS SHALL BE AT THE CONTRACTOR'S OWN EXPENSE AND RISK. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ANTICIPATE AND MEET ALL CONDITIONS PROPERLY IMPOSED UPON THE USE OF EXISTING ROADS BY THOSE HAVING JURISDICTION THEREOVER, INCLUDING (WITHOUT LIMITATION OF THE GENERALITY OF THE FOREGOING) SEASONAL OR OTHER LIMITATIONS OR RESTRICTIONS, THE PAYMENT OF EXCESS SIZE AND WEIGHT FEES, AND THE POSTING OF BONDS CONDITIONED UPON REPAIR OF ROAD DAMAGE CAUSED BY CONTRACT-GENERATED TRAFFIC. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SATISFY ALL LAWFUL DEMANDS FOR REPAIR OF DAMAGE TO EXISTING ROADS CAUSED BY CONSTRUCTION-GENERATED TRAFFIC.

(9) REFERENCE TO OTHER DRAWINGS IS MADE BY THE FOLLOWING NOTATION WITHIN THE PLANS:

(1) PC-2 DENOTES A MAIN CANAL PLAN AND PROFILE IS SHOWN ON SHEET 10407/PC-2.
PL-2 DENOTES A LATERAL PLAN AND PROFILE IS SHOWN ON SHEET 10407/PL-2.

(2) C-2 DENOTES THE CIVIL PLAN, SECTION OR DETAIL IS SHOWN ON SHEET 10407/C-2.

(3) S-2 DENOTES THE STRUCTURE IS SHOWN ON SHEET 10407/S-2.

(4) V-2 DENOTES THE MISCELLANEOUS PLAN SECTION OR DETAIL IS SHOWN ON SHEET 10407/V-2.

(10) DEFINITIONS OF ABBREVIATIONS FOR HYDRAULIC PROPERTIES:

A = AREA OF FLOW (FT.^{2})
V = VELOCITY (FT./SEC.)
Q = FLOW (FT.^{3}/SEC.)
R = HYDRAULIC RADIUS (FT.)
N = MANNING "N"
B = BASE WIDTH OF CANAL (FT.)
D = DEPTH OF WATER (FT.)
H = HEIGHT OF LINING (FT.)
S = SLOPE (FT./FT.)
S:S = SIDE SLOPES (FT./FT.)
FL = LINING FREEBOARD (FT.)
FE = EARTH FREEBOARD
RL = ROAD WIDTH ON LEFT (FT.)
RR = ROAD WIDTH ON RIGHT (FT.)

(11) DEFINITIONS OF MISCELLANEOUS ABBREVIATIONS:

L.F. = LINEAL FEET
R.C.P.P. = REINFORCED CONCRETE PRESSURE PIPE
R.C.P. = REINFORCED CONCRETE PIPE
N.R.C.P. = NON-REINFORCED CONCRETE PIPE
INV. = INVERT
EXIST. = EXISTING
T.O.C. = TOP OF CONCRETE
R.O.W. = RIGHT OF WAY
I.D. = INSIDE DIAMETER
DIA. = DIAMETER
S.R.V.W.U.A. = SALT RIVER VALLEY WATER USERS ASSOCIATION
G.B. = GRADE BREAK

(12) ELEVATIONS ARE IN FEET ABOVE SEA LEVEL, U.S.G.S. DATUM.

(13) ALL STATIONING REFERS TO THE DESIGNATED CENTERLINE OF CONSTRUCTION AND IS THE MEASURED HORIZONTAL DISTANCE.

(14) MAILING ADDRESS-ALL DRAWINGS AND DATA SUBMITTED BY THE CONTRACTOR FOR WHICH A SPECIFIC MAILING ADDRESS IS NOT GIVEN IN THESE SPECIFICATIONS SHALL BE SUBMITTED TO THE CONSTRUCTION ENGINEER, FRANZOY COREY, ENGINEERS AND ARCHITECTS, P.O. BOX 50039, PHOENIX, ARIZONA, 85076-0039.

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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION-ARIZONA

TONOPAH DISTRIBUTION SYSTEM

GENERAL NOTES

Date FEB. 1985
Designed MAF
Drawn RJB
Checked RFN
Revised

Franzoy·Corey
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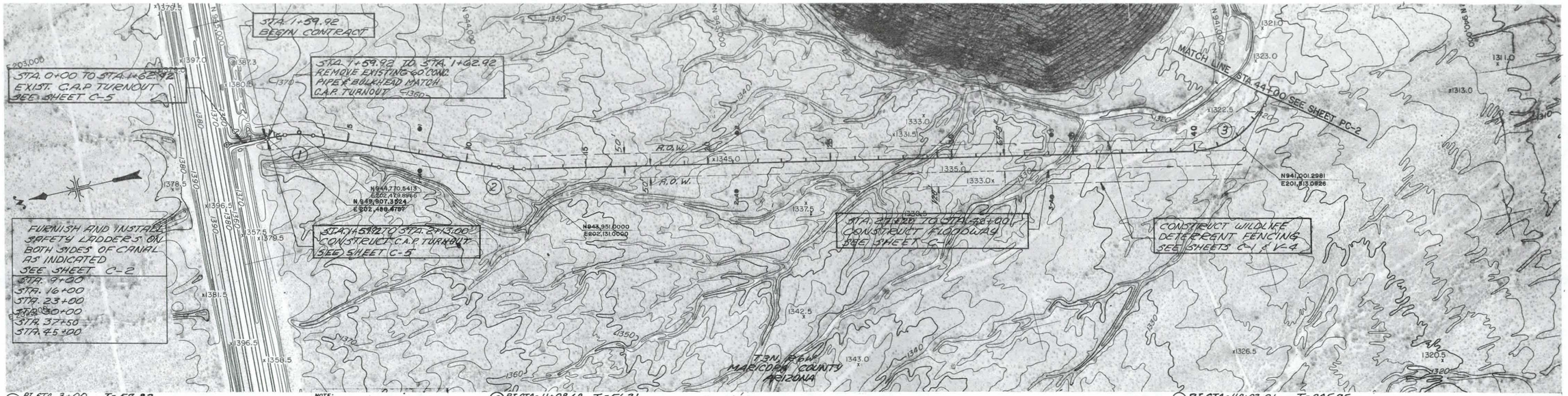
10407/G-2

DESIGNED MAF SUBMITTED
DRAWN RJB RECOMMENDED
CHECKED RFN APPROVED

344-330-6852

NOTE:
FOR GEOLOGICAL EXPLANATION AND NOTES SEE SHEET X-1



① P.I. STA. 3+00 T=57.82
Δ=19°28'16" RT. LC=114.54
D=17° PC=2+42.18
R=337.03' PT.=3+56.72

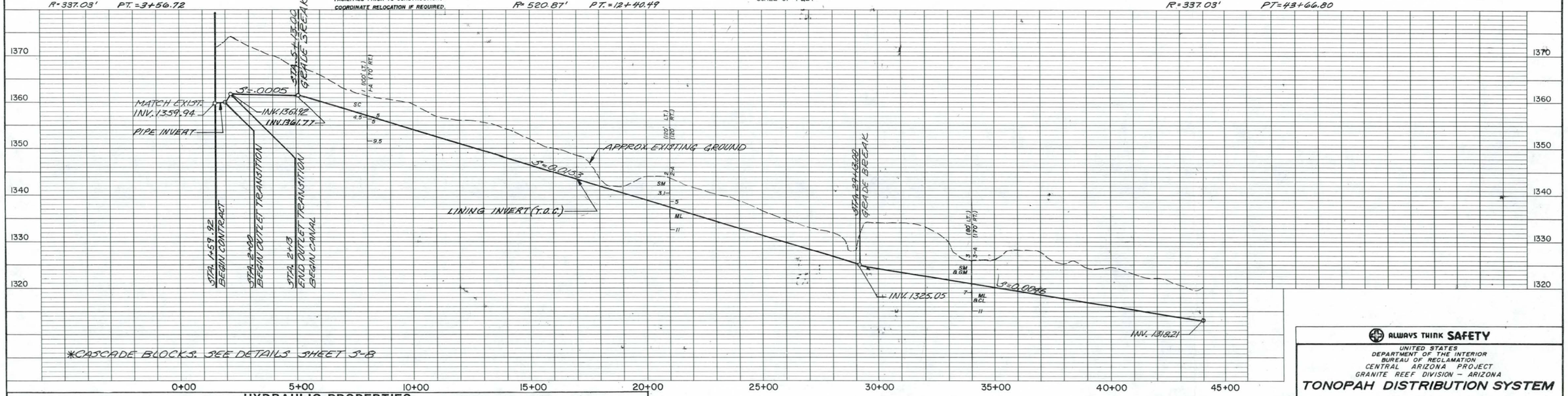
NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.

② P.I. STA.=11+89.62 T.=51.21
Δ=11°13'45" LT. LC.=102.08
D=11° P.C.=11+38.41
R=520.87' P.T.=12+40.49

200 0 200 400
SCALE OF FEET

③ P.I. STA.=42+03.01 T=205.95
Δ=62°51'20" LT. LC=369.74
D=17° PC=39+97.06
R=337.03' PT=43+66.80

ARIZONA STATE PLANE COORDINATES, CENTRAL ZONE
NOTE: COORDINATES ARE COMPUTED FROM UNADJUSTED GROUND DISTANCES



HYDRAULIC PROPERTIES

STATION STA. TO STA.	A FT.²	V FT./S	Q FT.³/S	R FT.	n	B FT.	d FT.	H FT.	S FT./FT.	S:S FT./FT.	FL FT.	FE FT.	RL FT.	RR FT.
2+13.00 TO 5+13.00	22.75	3.30	75	1.64	.014	3	3.02	3.67	.0005	1.5	.65	1.33	8	16
5+13.00 TO 29+13.00	*	*	75	*	.0125	3	*	3.67	.0153	1.5	.65	1.33	8	16
29+13.00 TO 45+50.18	*	*	75	*	.0125	3	*	3.67	.0046	1.5	.65	1.33	8	16

Two working days before you dig
CALL FOR THE BLUE STAKES
263-1100
Blue Stake Center
CALL COLLECT

Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

Franzoy·Corey
ENGINEERS & ARCHITECTS
• PHOENIX • MESA • TUCSON • PRESCOTT
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10407/PC-1

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GRANITE REEF DIVISION – ARIZONA

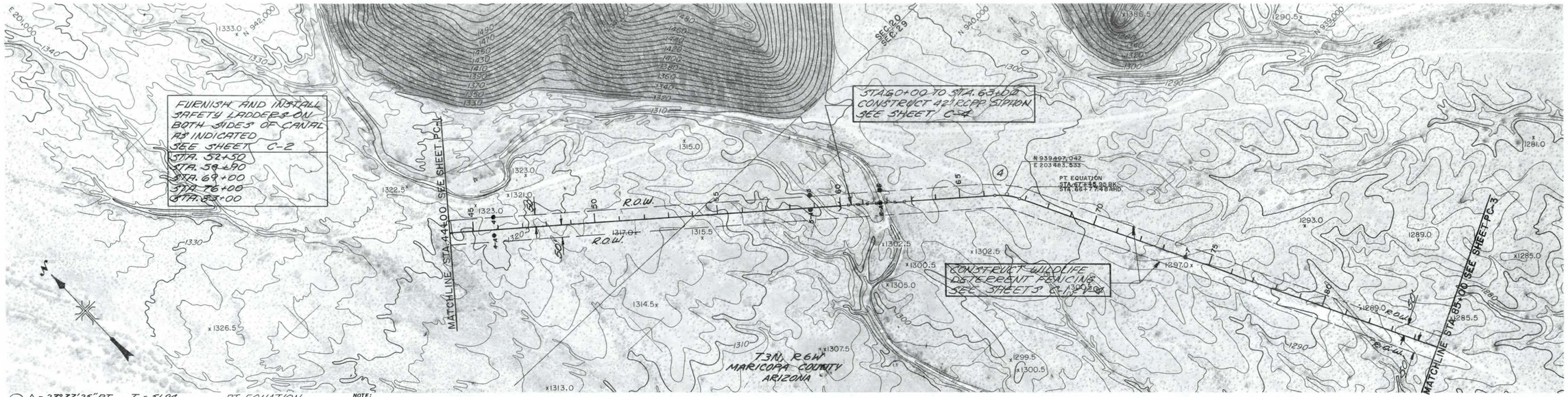
TONOPAH DISTRIBUTION SYSTEM

PLAN AND PROFILE
STA. 1+59.92 TO STA. 44+00

DESIGNED M.A.F. SUBMITTED Bruce E. Hutchison
DRAWN J.J.C. RECOMMENDED Bruce E. Hutchison
CHECKED R.F.N. APPROVED

344-330-6853

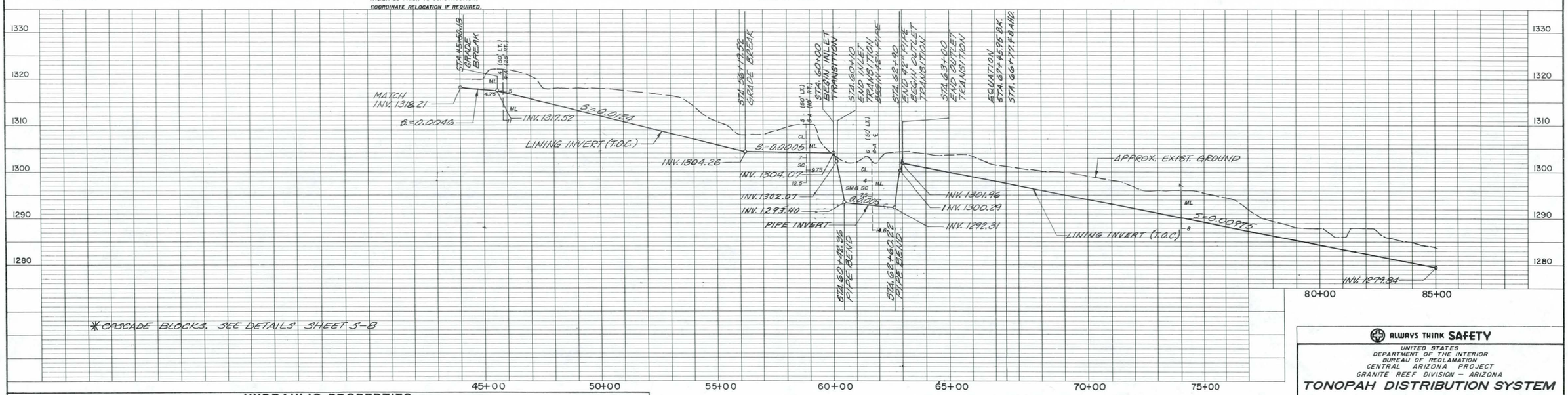
NOTE:
FOR GEOLOGICAL EXPLANATION AND NOTES, SEE SHEET X-1.



(4) Δ = 23°33'25" RT.
D = 23°
R = 249.11'
T = 51.99
LC = 102.42
PC = 66+43.53
P.T. EQUATION
PT. = 67+45.95 BK.
PT. = 66+77.48 AHD.

NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.

ARIZONA STATE PLANE COORDINATES, CENTRAL ZONE
NOTE: COORDINATES ARE COMPUTED FROM UNADJUSTED GROUND DISTANCES



*CASCADE BLOCKS, SEE DETAILS 3 SHEET 3-8

HYDRAULIC PROPERTIES

STATION STA. TO STA.	A FT.²	V FT./S	Q FT.³/S	R FT.	n	B FT.	d FT.	H FT.	S FT./FT.	S:S FT./FT.	F_L FT.	F_E FT.	R_L FT.	R_R FT.
29+13.00 TO 45+50.18	*	*	75	*	.0125	3	*	3.67	.0046	1.5:1	*	1.33	8	16
45+50.18 TO 56+19.52	*	*	75	*	.0125	3	*	3.67	.0124	1.5:1	*	1.33	8	16
56+19.52 TO 60+00.00	22.75	3.30	75	1.64	.014	3	3.02	3.67	.0005	1.5:1	.65	1.33	8	16
63+00.00 TO 123+56.92	*	*	75	*	.0125	3	*	3.67	.00975	1.5:1	*	1.33	8	16

Two working days before you dig. CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center CALL COLLECT

Date FEB. 1986
Designed MAF
Drawn JJC
Checked RFN
Revised

Franzoy·Corey ENGINEERS & ARCHITECTS
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10407/PC-2

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GRANITE REEF DIVISION – ARIZONA

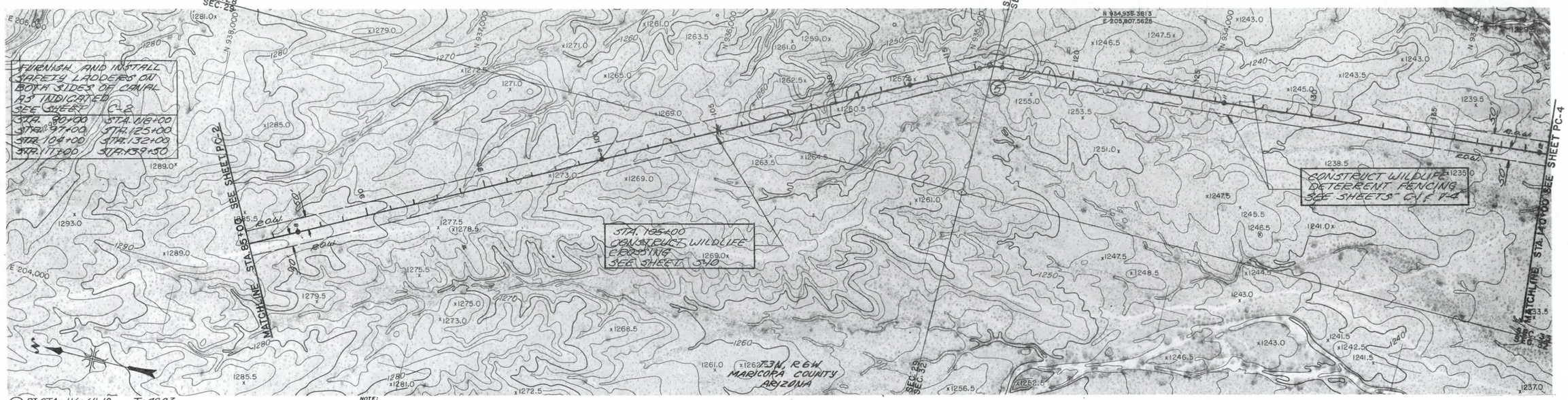
TONOPAH DISTRIBUTION SYSTEM

PLAN AND PROFILE
STA. 44+00 TO STA. 85+00

DESIGNED MAF SUBMITTED Bruce J. Hutchins
DRAWN JJC RECOMMENDED Larry E. Anderson
CHECKED RFN APPROVED Donald E. Gibson

344-330-6854

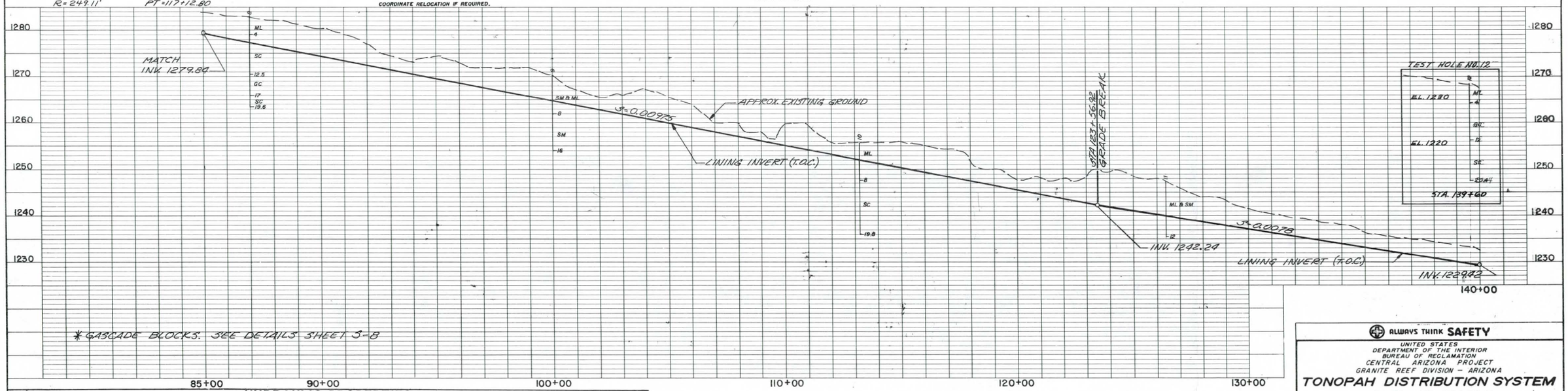
NOTE:
FOR GEOLOGICAL EXPLANATION AND NOTES SEE SHEET X-1.



(5) P.I. STA = 116+64.18
Δ = 22°40'03" RT.
D = 23°
R = 249.11'
T = 99.93
LC = 98.55
PC = 116+19.25
PT = 117+12.80

NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.

ARIZONA STATE PLANE COORDINATES, CENTRAL ZONE
NOTE: COORDINATES ARE COMPUTED FROM UNADJUSTED GROUND DISTANCES



* CASCADE BLOCKS: SEE DETAILS SHEET 3-8

HYDRAULIC PROPERTIES

STATION STA. TO STA.	A FT.²	V FT./S	Q FT.³/S	R FT.	n	B FT.	d FT.	H FT.	S FT./FT.	S:S FT./FT.	F_L FT.	F_E FT.	R_L FT.	R_R FT.
63+00.00 TO 123+36.92	*	*	75	*	.0125	3	*	3.67	.00975	1.5	*	1.33	8	16
123+36.92 TO 146+30.00	*	*	75	*	.0125	3	*	3.67	.0078	1.5	*	1.33	8	16

Two working days before you dig. CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center CALL COLLECT

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 11587 TIMOTHY E. KELLY ARIZONA, U.S.A.

Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

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10407/PC-3

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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

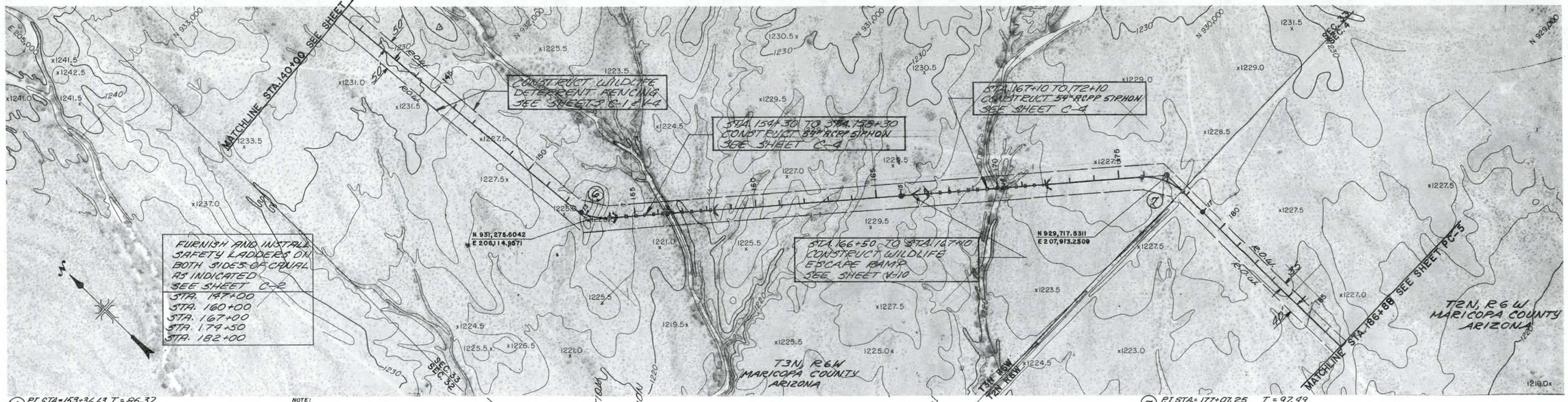
TONOPAH DISTRIBUTION SYSTEM

PLAN AND PROFILE
STA. 85+00 TO STA. 140+00

DESIGNED MAF SUBMITTED Bruce J. Hutchison
DRAWN JJC RECOMMENDED Raymond E. Anderson
CHECKED RFN APPROVED

344-330-6855

NOTE:
FOR GEOLOGICAL EXPLANATION AND NOTES, SEE SHEET X-1.



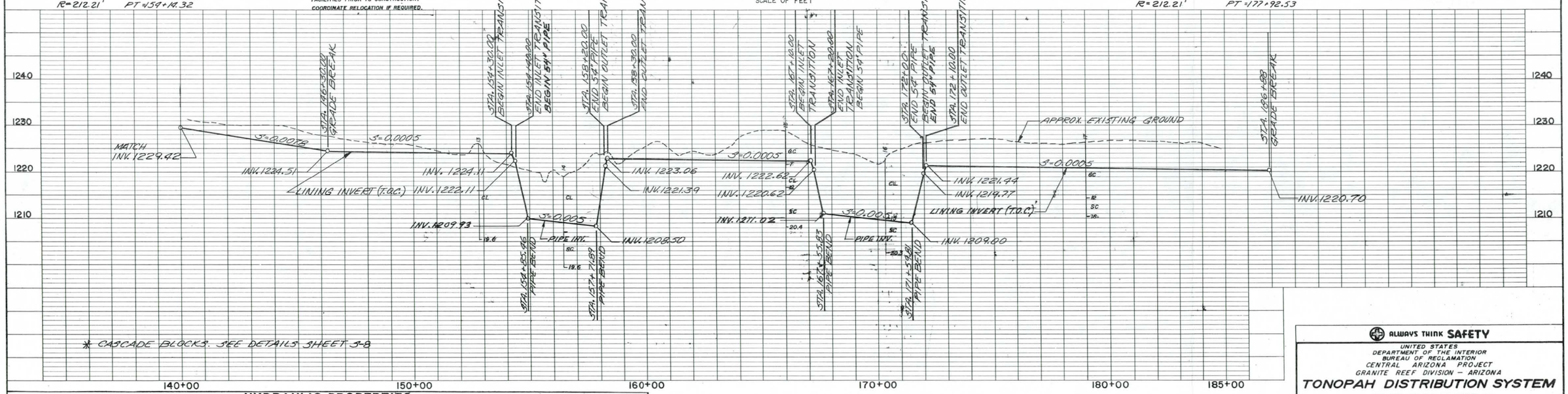
(6) P.I. STA. = 153+36.63 T = 86.37
Δ = 44°17'44" LT. LC = 164.06
D = 27° PC = 152+50.26
R = 212.21' PT = 154+14.32

NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.

SCALE OF FEET: 200 0 200 400

(7) P.I. STA. = 177+07.25 T = 97.49
Δ = 49°20'54" RT. LC = 182.77
D = 27° PC = 176+09.76
R = 212.21' PT = 177+92.53

ARIZONA STATE PLANE COORDINATES, CENTRAL ZONE
NOTE: COORDINATES ARE COMPUTED FROM UNADJUSTED GROUND DISTANCES



* CASCADE BLOCKS. SEE DETAILS SHEET 3-8

HYDRAULIC PROPERTIES

STATION STA. TO STA.	A FT.²	V FT./S	Q FT.³/S	R FT.	n	B FT.	d FT.	H FT.	S FT./FT.	S:S FT./FT.	F_L FT.	F_E FT.	R_L FT.	R_R FT.
123+56.92 TO 146+30.00	*	*	75	*	.0125	3	*	3.67	.0078	1.5:1	*	1.33	8	16
146+30.00 TO 154+30.00	22.75	3.30	75	1.64	.014	3	3.02	3.67	.0005	1.5:1	.65	1.33	8	16
158+30.00 TO 167+10.00	22.75	3.30	75	1.64	.014	3	3.02	3.67	.0005	1.5:1	.65	1.33	8	16
172+10.00 TO 186+88.00	22.75	3.30	75	1.64	.014	3	3.02	3.67	.0005	1.5:1	.65	1.33	8	16

Two working days before you dig CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center CALL COLLECT

PHILIP TIMOTHY KELLY CERTIFICATE NO. 11587 REGISTERED PROFESSIONAL ENGINEER (CIVIL) ARIZONA, U.S.A.

Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

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TONOPAH DISTRIBUTION SYSTEM

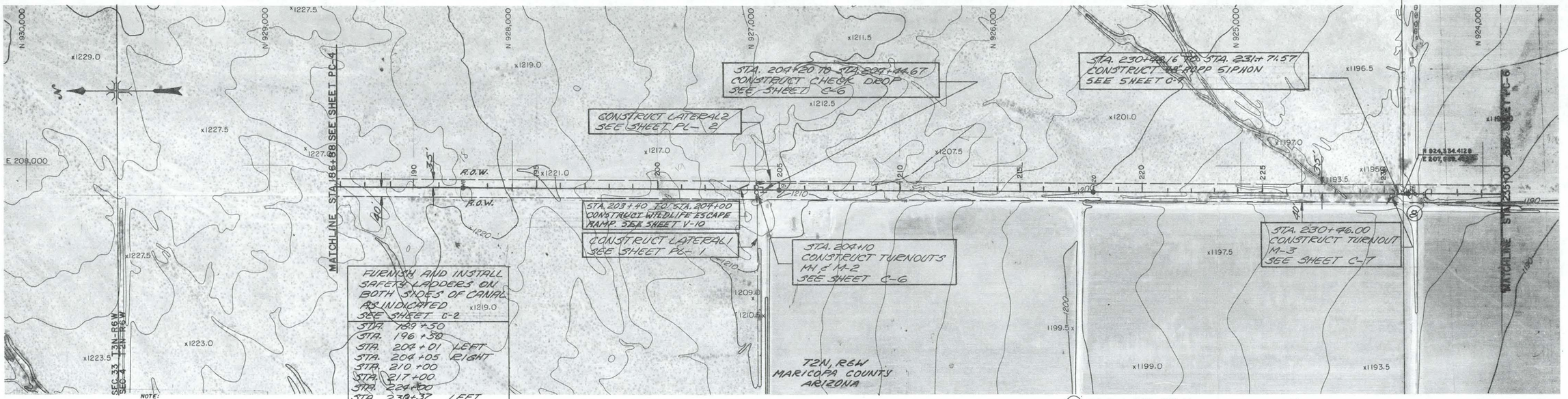
PLAN AND PROFILE

STA. 140+00 TO STA. 186+88

DESIGNED MAF SUBMITTED Bruce F. Hutchison
DRAWN J.J.C. RECOMMENDED Raymond E. Anderson
CHECKED R.F.N. APPROVED Donald C. Johnson

344-330-6856

NOTE:
FOR GEOLOGICAL EXPLANATION AND NOTES, SEE SHEET X-1.

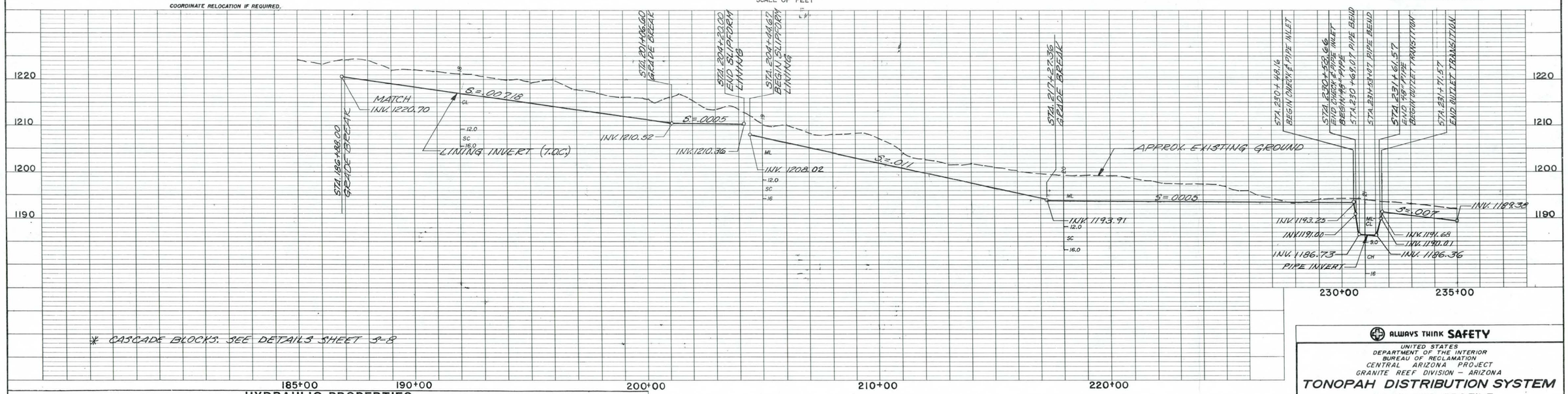


NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.

200 0 200 400
SCALE OF FEET

(8) PI STA= 230+78.21
$\Delta = 0°10'59''$ RT.

ARIZONA STATE PLANE COORDINATES, CENTRAL ZONE
NOTE: COORDINATES ARE COMPUTED FROM UNADJUSTED GROUND DISTANCES



* CASCADE BLOCKS: SEE DETAILS SHEET S-8

HYDRAULIC PROPERTIES

STATION STA. TO STA.	A FT.²	V FT./S	Q FT.³/S	R FT.	n	B FT.	d FT.	H FT.	S FT./FT.	S:S FT./FT.	F_L FT.	F_E FT.	R_L FT.	R_R FT.
186+88.00 TO 201+06.60	*	*	75	*	.0125	3	*	3.67	.00718	1.5:1	*	1.33	8	16
201+06.60 TO 204+20.00	22.75	3.30	75	1.64	.014	3	3.02	3.67	.0005	1.5:1	.65	1.33	8	16
204+44.67 TO 217+27.36	*	*	54	*	.0125	3	*	3.33	.011	1.5:1	*	1.00	12	16
217+27.36 TO 230+48.16	17.81	3.03	54	1.44	.014	3	2.59	3.33	.0005	1.5:1	.7	1.00	12	16
231+71.57 TO 249+83.61	*	*	52	*	.0129	3	*	3.33	.007	1.5:1	*	1.00	8	16

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Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

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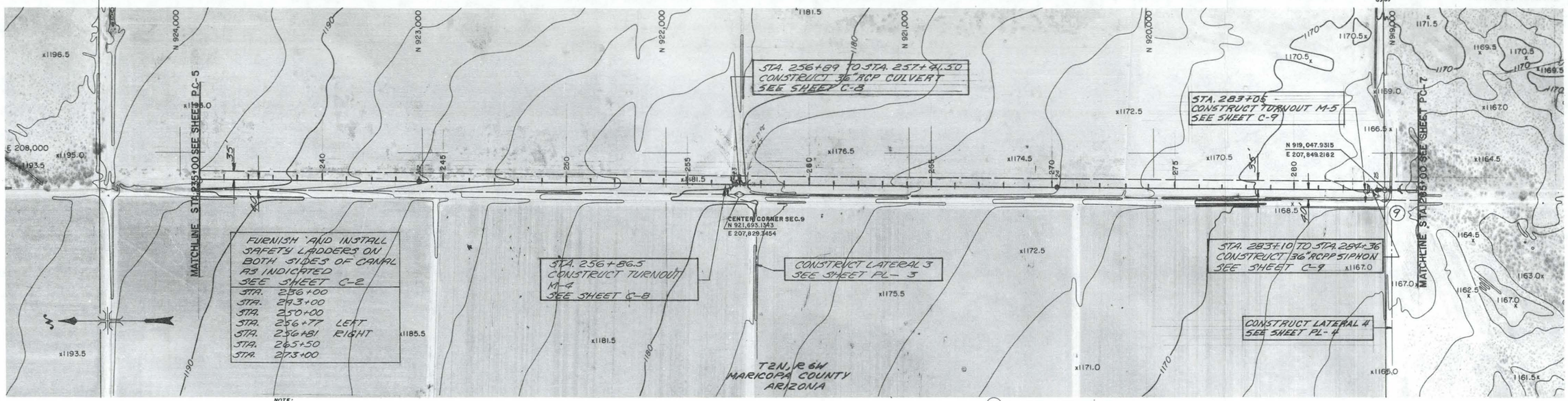
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM
PLAN AND PROFILE
STA. 186+88 TO STA. 235+00

DESIGNED MAF SUBMITTED Bruce F. Hutchison
DRAWN JJC RECOMMENDED Wayne E. Anderson
CHECKED RFN APPROVED [illegible]

344-330-6857

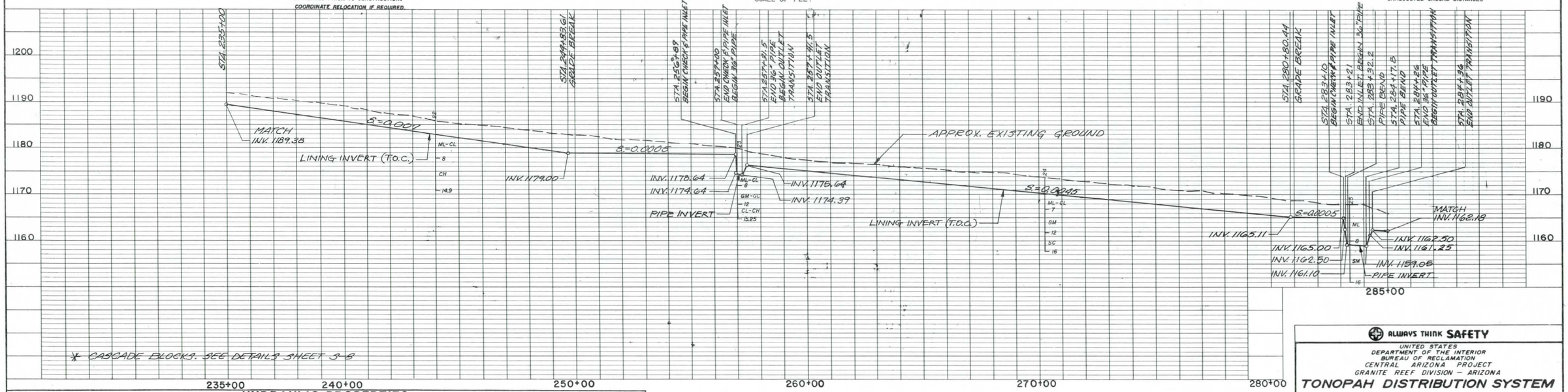


NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.

200 0 200 400
SCALE OF FEET

(9) P.I. STA. = 283+64.84
Δ = 0°01'21" LT.

ARIZONA STATE PLANE COORDINATES, CENTRAL ZONE
NOTE: COORDINATES ARE COMPUTED FROM UNADJUSTED GROUND DISTANCES



HYDRAULIC PROPERTIES

STATION STA. TO STA.	A FT.²	V FT./S	Q FT.³/S	R FT.	n	B FT.	d FT.	H FT.	S FT./FT.	S:S FT./FT.	F_L FT.	F_E FT.	R_L FT.	R_R FT.
231+71.57 TO 249+83.61	*	*	52	*	.0125	3	*	3.33	.007	1.5:1	*	1.00	8	16
249+83.61 TO 256+89.00	17.31	3.00	52	1.42	.014	3	2.54	3.33	.0005	1.5:1	.79	1.00	8	16
257+41.51 TO 280+80.44	*	*	41	*	.0125	3	*	3.00	.0045	1.5:1	*	0.80	8	16
280+80.44 TO 283+10.00	12.88	2.72	41	1.30	.014	3	2.26	3.00	.0005	1.5:1	.74	0.80	8	16
284+36.00 TO 301+31.35	*	*	35	*	.0125	3	*	3.00	.005	1.5:1	*	0.80	8	16

Two working days before you dig
CALL FOR THE BLUE STAKES
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Blue Stake Center
CALL COLLECT

REGISTERED Professional Engineer (Civil)
CERTIFICATE NO. 11637
TIMOTHY E. McELLY
ARIZONA, U.S.A.

Date	FEB. 1985
Designed	MAF
Drawn	JJC
Checked	RFN
Revised	

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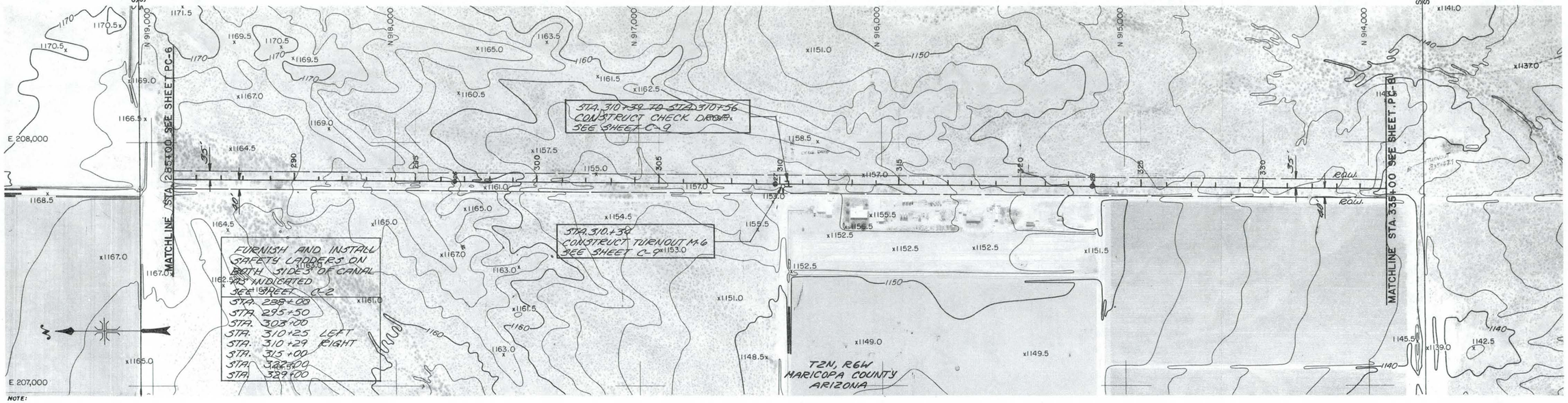
TONOPAH DISTRIBUTION SYSTEM

PLAN AND PROFILE

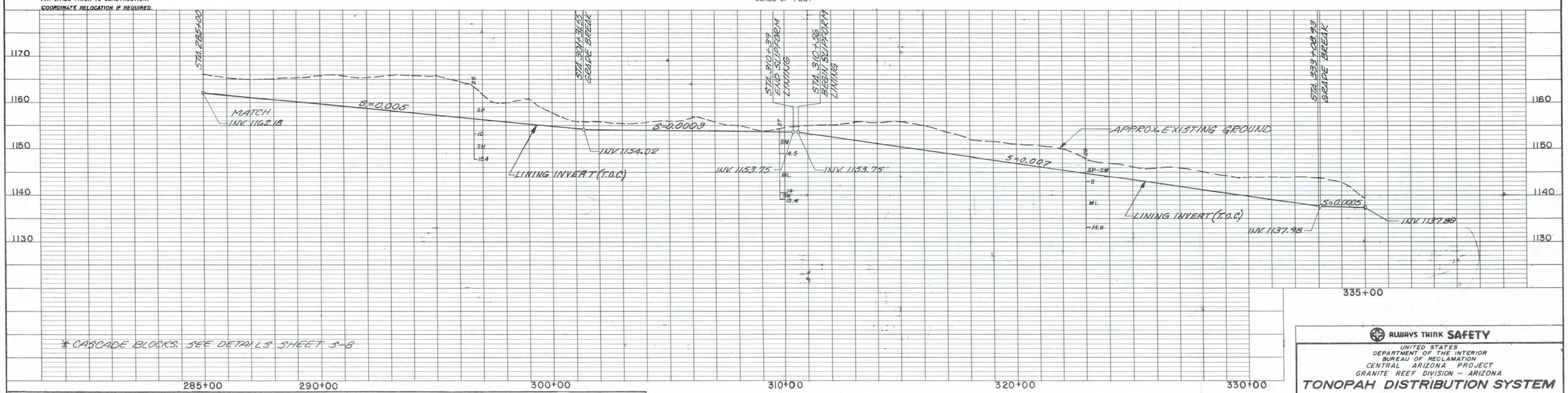
STA. 235+00 TO STA. 285+00

DESIGNED MAF
DRAWN JJC
CHECKED RFN
SUBMITTED Bruce J. Hutchison
RECOMMENDED Harold E. Cordova
APPROVED [illegible]

344-330-6858



NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.



HYDRAULIC PROPERTIES

STATION	A	V	Q	R	n	B	d	H	S	S:S	F_L	F_E	R_L	R_R
STA. TO STA.	FT.^{2}	FT./S	FT.^{3}/S	FT.		FT.	FT.	FT.	FT./FT.	FT./FT.	FT.	FT.	FT.	FT.
289+36.00 TO 301+31.55	*	*	35	*	.0125	3	*	3.00	.0050	1.5:1	*	.80	8	16
301+31.55 TO 310+39.00	15.60	2.24	35	1.35	.014	3	2.38	3.00	.0003	1.5:1	.62	.80	8	16
310+56.00 TO 333+08.93	*	*	28	*	.0125	2	*	3.00	.0070	1.25:1	*	.80	8	16
333+08.93 TO 335+88.90	10.65	2.63	28	1.17	.014	2	2.23	3.00	.0005	1.25:1	.77	.80	8	16

Two working days before you dig. CALL FOR THE BLUE STAKES
263-1100
Blue Stake Center CALL COLLECT

Registered Professional Engineer (Civil) CERTIFICATE NO. 11697 TIMOTHY E. KELLY ARIZONA, U.S.A.

Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

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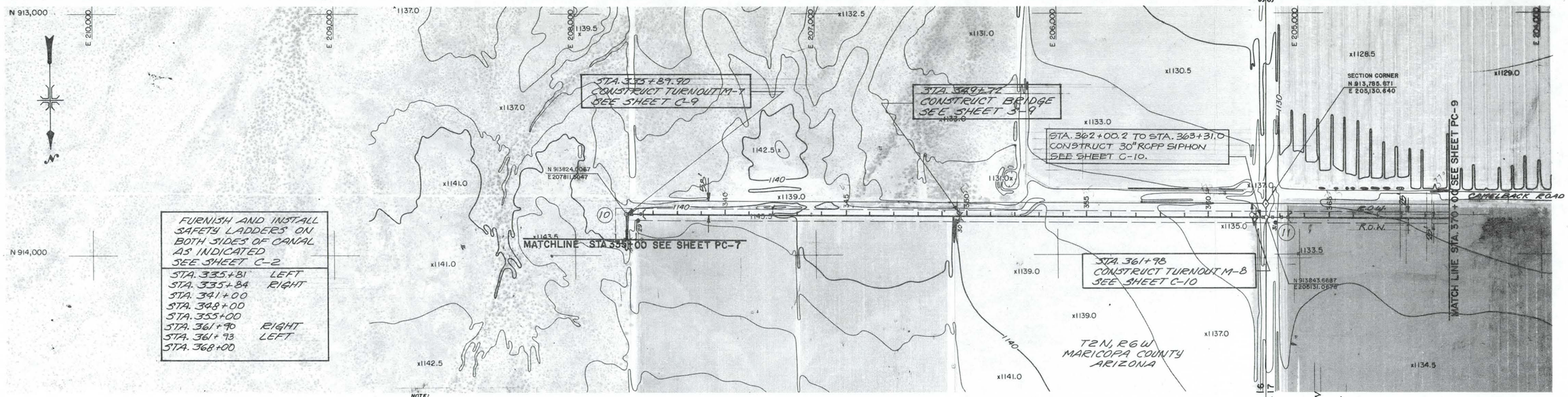
TONOPAH DISTRIBUTION SYSTEM

PLAN AND PROFILE

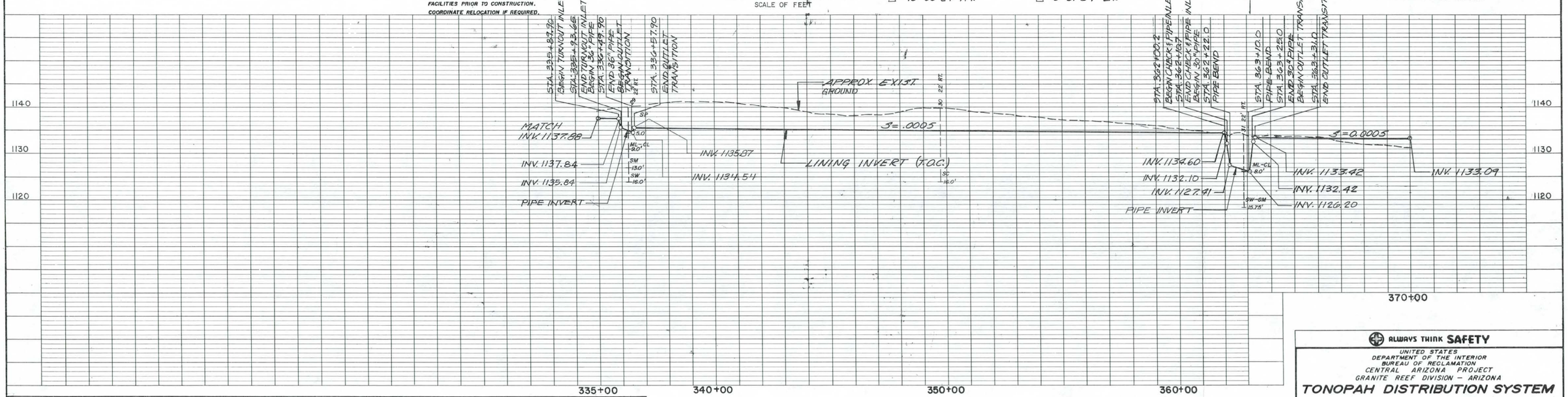
STA. 285+00 TO STA. 335+00

DESIGNED MAF SUBMITTED Bruce J. Hutchison
DRAWN JJC RECOMMENDED Wayne E. Anderson
CHECKED RFN APPROVED

344-330-6859



NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.



HYDRAULIC PROPERTIES

STATION STA. TO STA.	A FT.²	V FT./S	Q FT.³/S	R FT.	n	B FT.	d FT.	H FT.	S FT./FT.	S:S FT./FT.	F_L FT.	F_E FT.	R_L FT.	R_R FT.
333+08.93 TO 335+88.90	10.65	2.63	28	1.17	.014	2	2.23	3.00	.00050	1.25:1	.77	.80	8	16
336+57.90 TO 362+00.2	10.65	2.63	28	1.17	.014	2	2.23	3.00	.00050	1.25:1	.77	.60	4	4
363+31.00 TO 389+33	7.65	2.35	18	.99	.014	2	1.80	2.67	.00050	1.25:1	.87	.60	4	4

Two working days before you dig. CALL FOR THE BLUE STAKES
263-1100
Blue Stake Center CALL COLLECT

PRINCIPAL PROFESSIONAL ENGINEER CERTIFICATE NO. 11587 TIMOTHY E. KELLY ARIZONA, U.S.A.

Date	FEB 1985
Designed	MAF
Drawn	JJC
Checked	RFN
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TONOPAH DISTRIBUTION SYSTEM

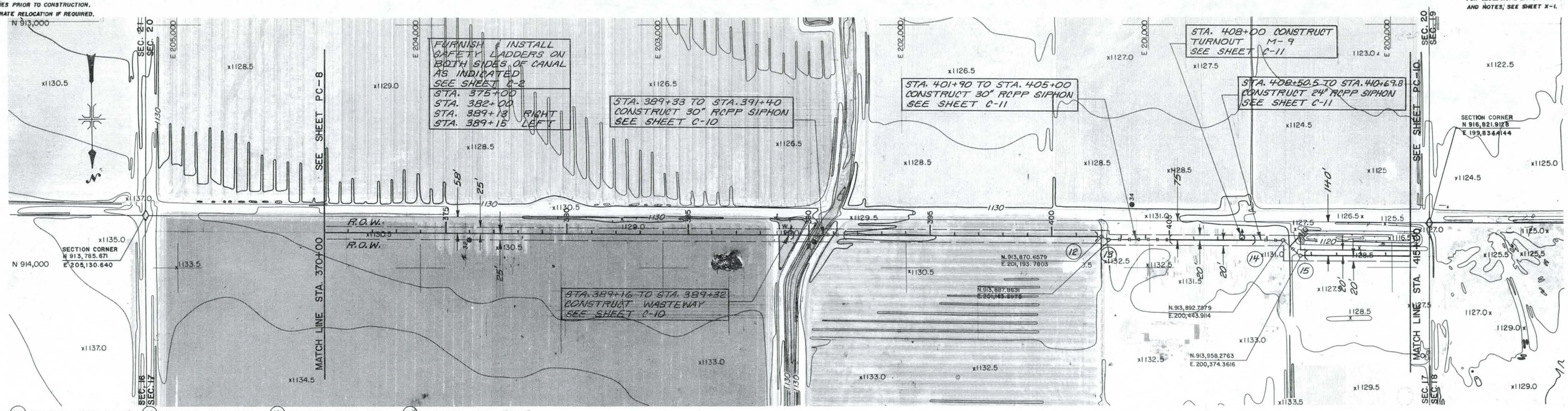
PLAN AND PROFILE
STA. 335+00 TO STA. 370+00

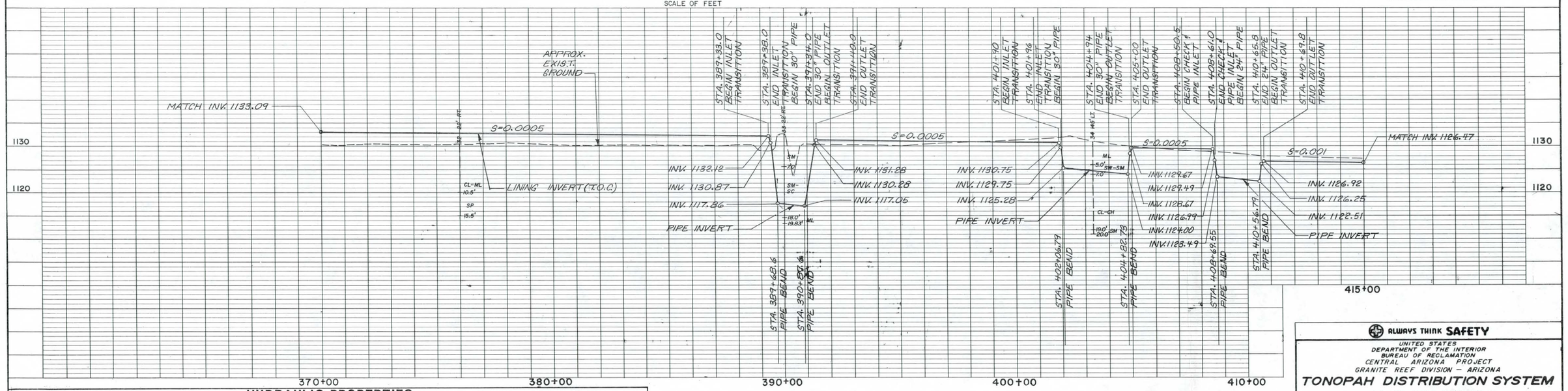
DESIGNED MAF SUBMITTED Bruce F. Hutchison
DRAWN JJC RECOMMENDED Harold E. Anderson
CHECKED RFN APPROVED Lloyd S. Johnson

344-330-6860

NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.

NOTE:
FOR GEOLOGICAL EXPLANATION AND NOTES, SEE SHEET X-1.





HYDRAULIC PROPERTIES

STATION STA. TO STA.	A FT.²	V FT./S	Q FT.³/S	R FT.	n	B FT.	d FT.	H FT.	S FT./FT.	S:S FT./FT.	F_L FT.	F_E FT.	R_L FT.	R_R FT.
333+08.93 TO 389+33	7.65	2.35	18	.99	.014	2.0	1.80	2.67	0.0005	1.25:1	.87	.60	4	4
391+40 TO 401+90	7.65	2.35	18	.99	.014	2.0	1.80	2.33	0.0005	1.25:1	.53	.75	4	4
405+00 TO 408+50.5	7.65	2.35	18	.99	.014	2.0	1.80	2.33	0.0005	1.25:1	.53	.75	4	4
410+69.8 TO 415+15	4.80	2.92	14	.81	.014	1.0	1.75	2.33	0.001	1:1	.58	.60	4	4

Two working days before you dig, CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center CALL COLLECT

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 11587 TIMOTHY E. KELLY STATE OF ARIZONA U.S.A.

Date	FEB. 1985
Designed	MAF
Drawn	JJC
Checked	RFN
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TONOPAH DISTRIBUTION SYSTEM

PLAN AND PROFILE

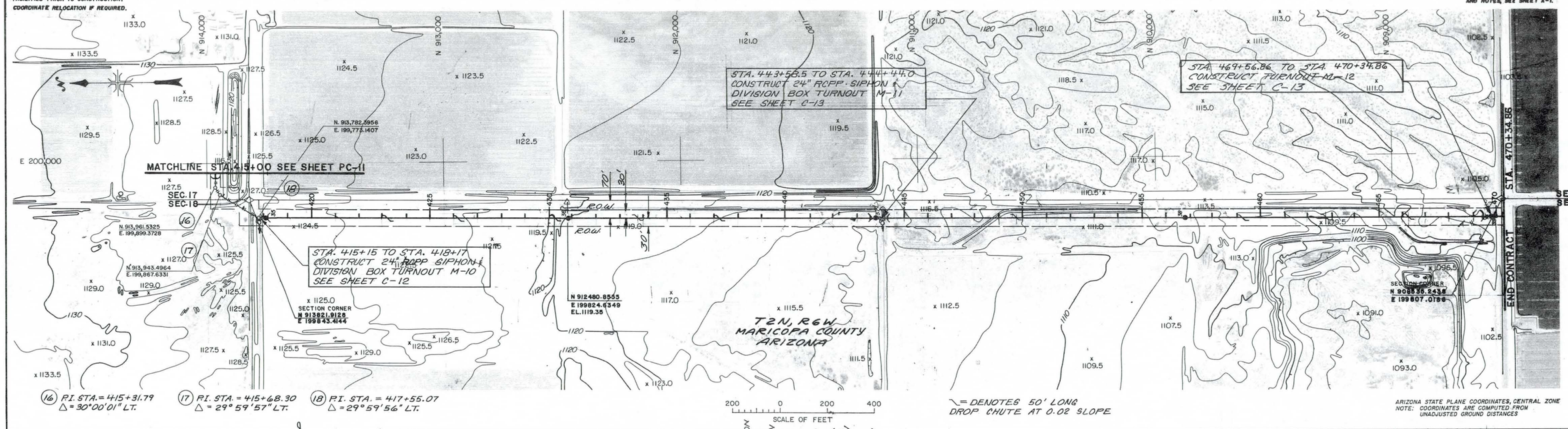
STA. 370+00 TO STA. 415+00

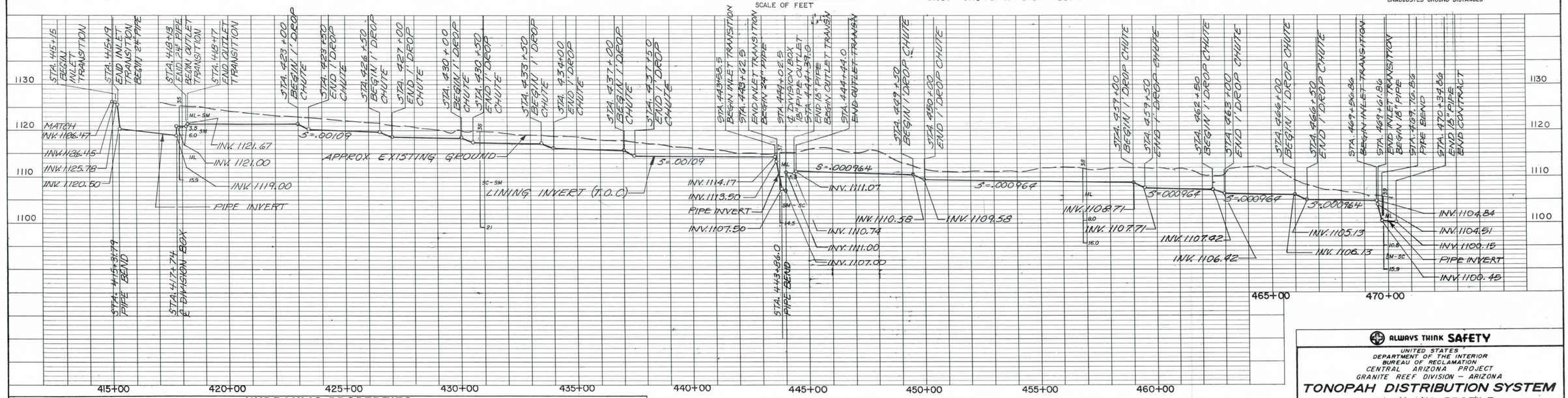
DESIGNED MAF SUBMITTED
DRAWN JJC RECOMMENDED
CHECKED RFN APPROVED

344-330-6861

NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.

NOTE:
FOR GEOLOGICAL EXPLANATION AND NOTES, SEE SHEET X-1.





HYDRAULIC PROPERTIES

STATION STA. TO STA.	A FT.^{2}	V FT./S	Q FT.^{3}/S	R FT.	n	B FT.	d FT.	H FT.	S FT./FT.	S:S FT./FT.	F_L FT.	F_E FT.	R_L FT.	R_R FT.
410+69.8 TO 415+15	4.80	2.92	14	.81	.014	1	1.75	2.33	.001	1:1	.58	.60	12	4
418+17 TO 443+58.5	4.40	2.95	13	.77	.014	1	1.66	2.33	.00109	1:1	.67	.60	12	4
444+44 TO 470+34.86	3.20	2.50	8	.66	.014	1	1.36	2.33	.000964	1:1	.97	.60	12	4

Two working days before you dig. CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center CALL COLLECT

Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

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TONOPAH DISTRIBUTION SYSTEM

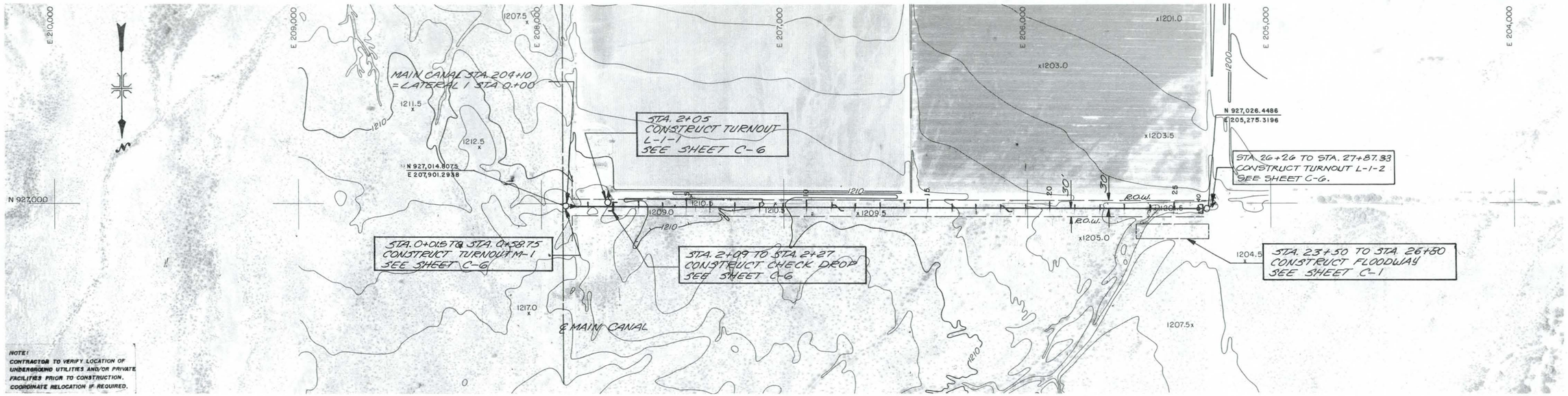
PLAN AND PROFILE

STA. 415+00 TO STA. 470+34.86

DESIGNED MAF SUBMITTED Bruce T. Hutchison
DRAWN JJC RECOMMENDED Wayne E. Anderson
CHECKED RFN APPROVED

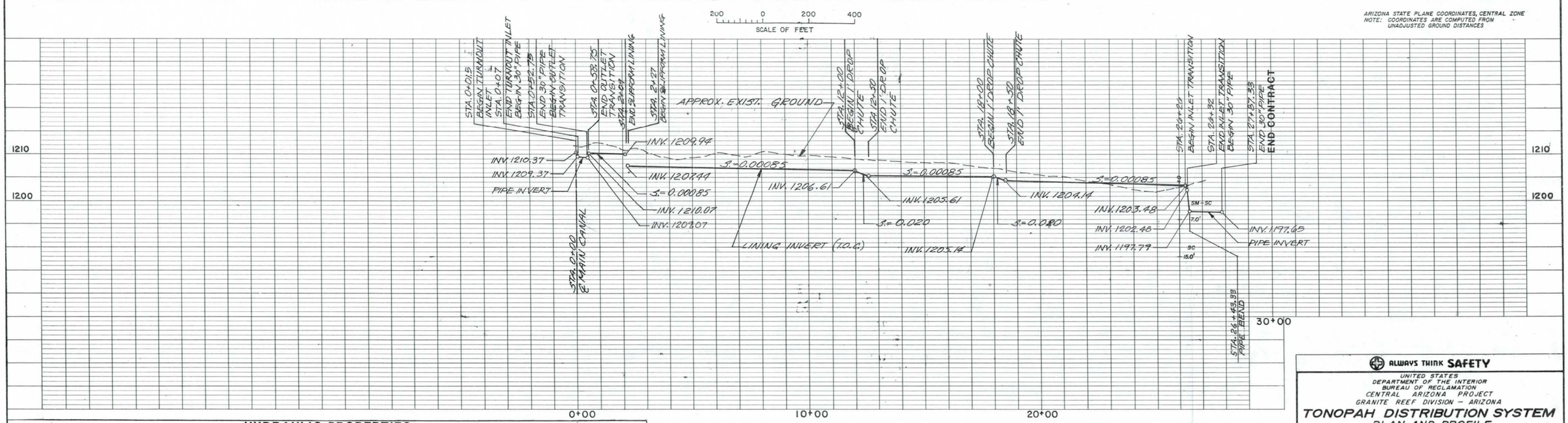
344-330-6862

NOTE:
FOR GEOLOGICAL EXPLANATION AND NOTES, SEE SHEET X-1.



NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.

ARIZONA STATE PLANE COORDINATES, CENTRAL ZONE
NOTE: COORDINATES ARE COMPUTED FROM UNADJUSTED GROUND DISTANCES



HYDRAULIC PROPERTIES

STATION STA. TO STA.	A FT.^{2}	V FT./S	Q FT.^{3}/S	R FT.	n	B FT.	d FT.	H FT.	S FT./FT.	S:S FT./FT.	FL FT.	FE FT.	RL FT.	RR FT.
0+58.75 TO 26+26	6.01	2.83	17	.87	.017	2	1.53	2.33	.00085	1.25:1	.80	.75	12	4

Two working days before you dig. CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center CALL COLLECT

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 11587 TIMOTHY E. CAMPBELL ARIZONA, U.S.A.

Date	FEB 1985
Designed	MAF
Drawn	JJC
Checked	RFN
Revised	

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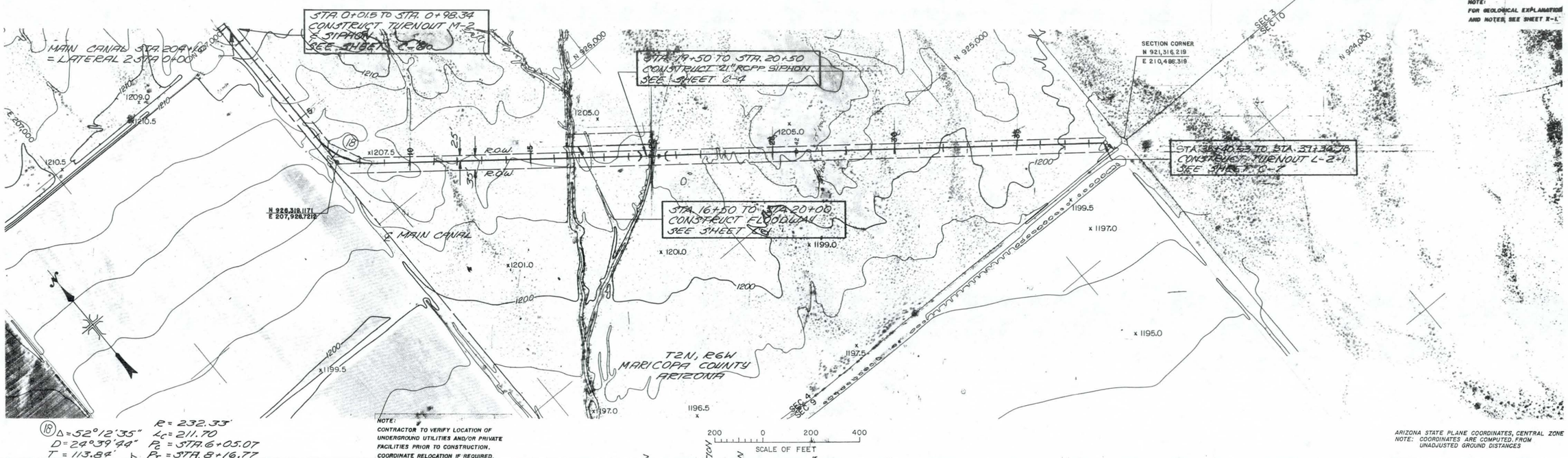
TONOPAH DISTRIBUTION SYSTEM
PLAN AND PROFILE
LATERAL 1
STA. 0+00 TO STA. 27+87.33

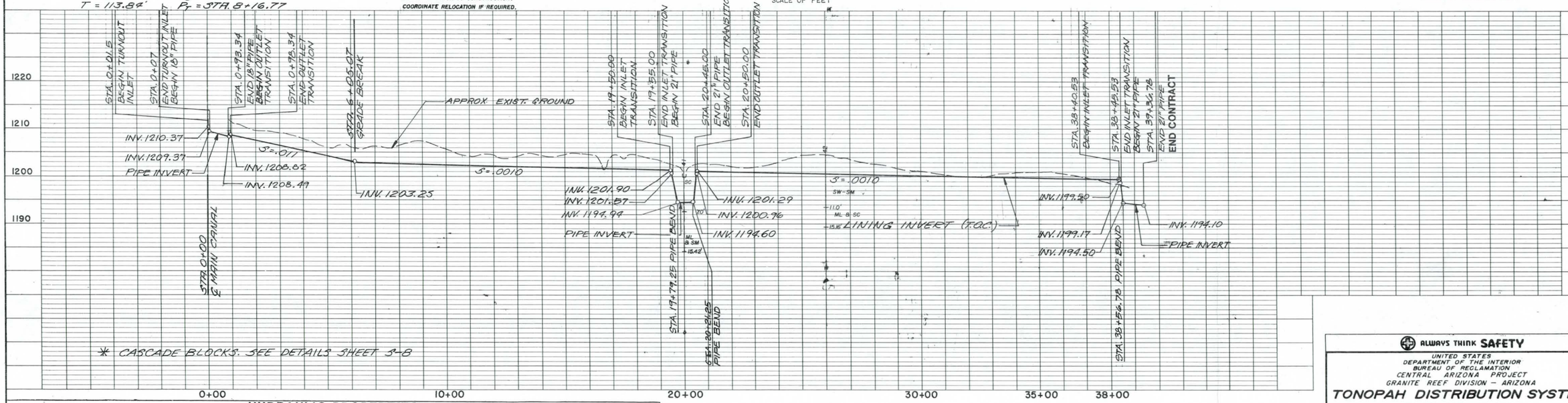
DESIGNED MAF SUBMITTED Bruce F. Hutchison
DRAWN JJC RECOMMENDED Wayne E. Anderson
CHECKED RFN APPROVED Donald S. Duncan Jr.

344-330-6863



(18) Δ = 52°12'35" R = 232.33'
D = 24°39'44" L_C = 211.70
T = 113.84' P_C = STA. 6+05.07
P_T = STA. 8+16.77

NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.



* CASCADE BLOCKS. SEE DETAILS SHEET S-8

HYDRAULIC PROPERTIES

STATION	A	V	Q	R	n	B	d	H	S	S:S	F_L	F_E	R_L	R_R
STA. TO STA.	FT.^{2}	FT./S	FT.^{3}/S	FT.	—	FT.	FT.	FT.	FT./FT.	FT./FT.	FT.	FT.	FT.	FT.
0+98.34 TO 6+05.07	*	*	9	*	.0125	1	*	2.33	0.0110	1:1	*	0.60	4	.12
6+05.07 TO 19+50	3.45	2.61	9	.69	.019	1	1.42	2.33	0.0010	1:1	0.91	0.60	4	.12
20+50 TO 38+40.53	3.45	2.61	9	.69	.019	1	1.42	2.33	0.0010	1:1	0.91	0.60	4	.12

Two working days before you dig. CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center CALL COLLECT

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 11587 TIMOTHY E. KELLY Date Signed 4-8-85 ARIZONA, U.S.A.

Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

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GRANITE REEF DIVISION – ARIZONA

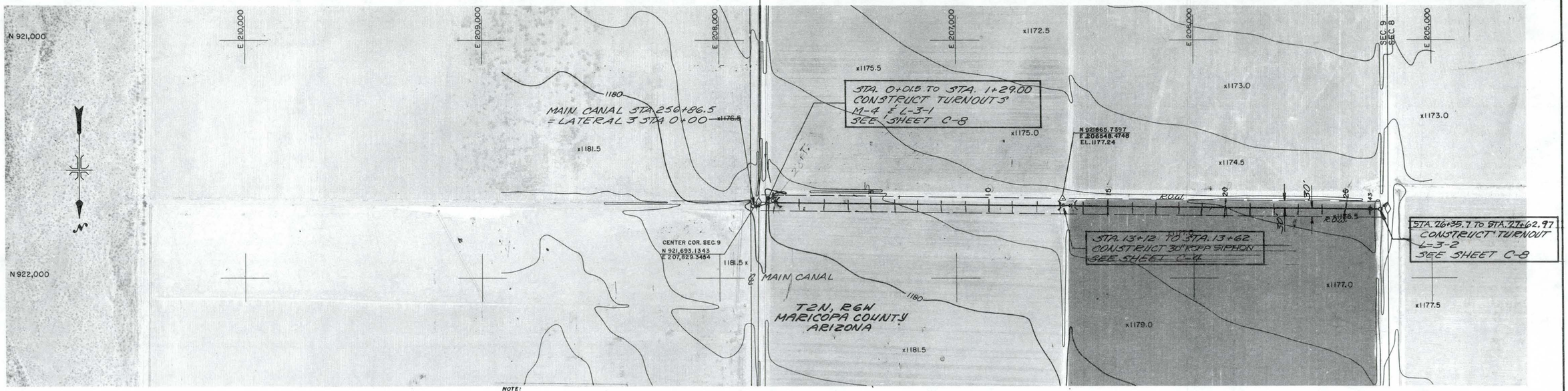
TONOPAH DISTRIBUTION SYSTEM

PLAN AND PROFILE
LATERAL 2
STA. 0+00 TO STA. 39+36.78

DESIGNED MAF SUBMITTED Bruce J. Hutchison
DRAWN JJC RECOMMENDED Lloyd E. Anderson
CHECKED RFN APPROVED

344-330-6864

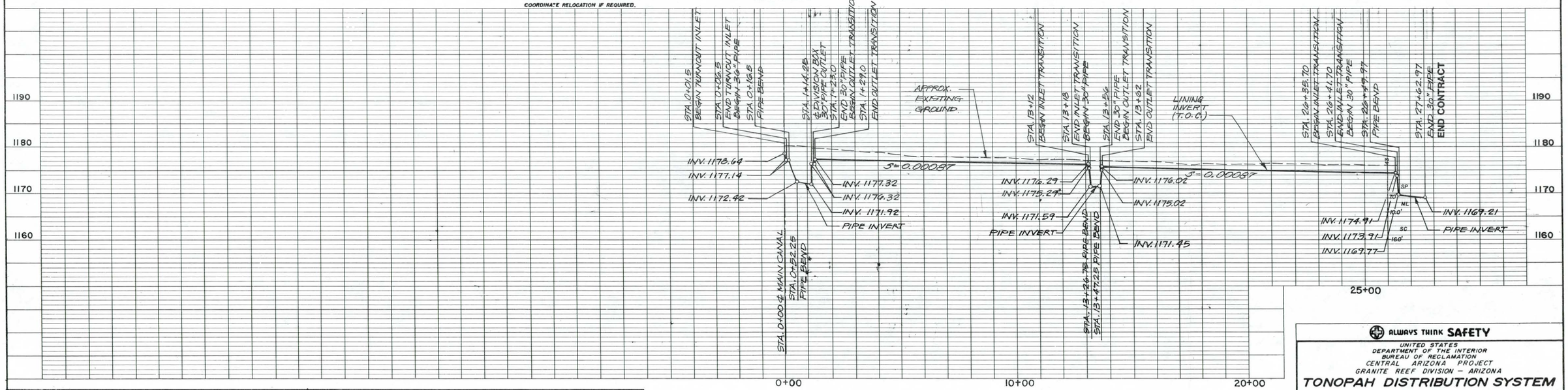
NOTE:
FOR GEOLOGICAL EXPLANATION AND NOTES, SEE SHEET X-1.



NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.

200 0 200 400
SCALE OF FEET

ARIZONA STATE PLANE COORDINATES, CENTRAL ZONE
NOTE: COORDINATES ARE COMPUTED FROM UNADJUSTED GROUND DISTANCES



HYDRAULIC PROPERTIES

STATION	A	V	Q	R	n	B	d	H	S	S:S	F_L	F_E	R_L	R_R
STA. TO STA.	FT.^{2}	FT./S	FT.^{3}/S	FT.		FT.	FT.	FT.	FT./FT.	FT./FT.	FT.	FT.	FT.	FT.
1+29 TO 13+12	6.23	2.89	18	.89	.014	2.0	1.57	2.33	.00087	1.25:1	0.76	0.75	12	4
13+62 TO 26+35.7	6.23	2.89	18	.89	.014	2.0	1.57	2.33	.00087	1.25:1	0.76	0.75	12	4

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REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 11937 TIMOTHY E. KELLY ARIZONA, U.S.A.

Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

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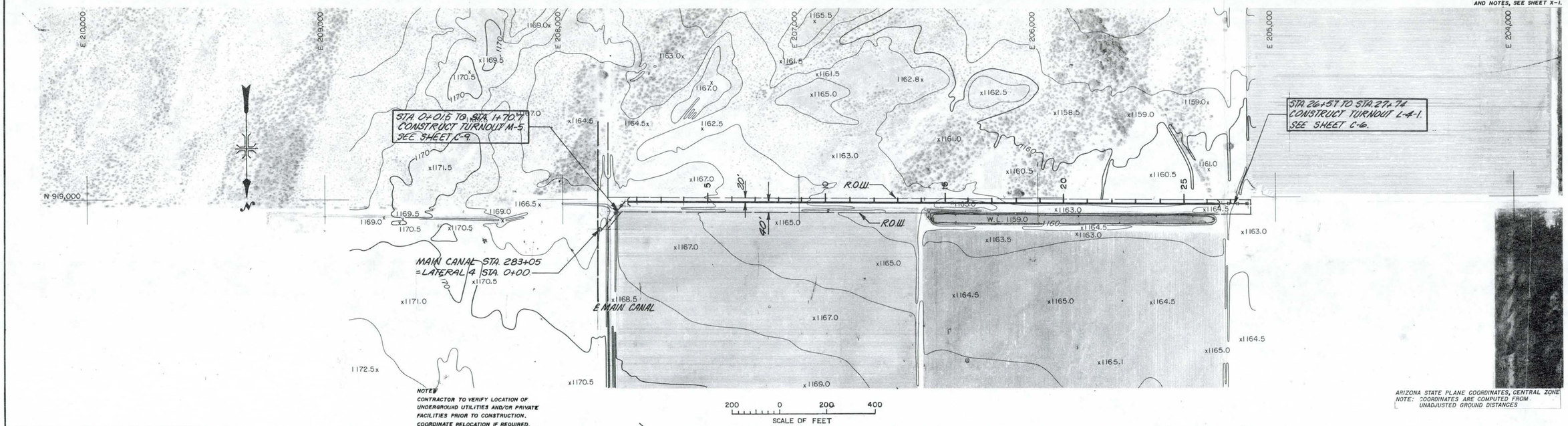
TONOPAH DISTRIBUTION SYSTEM

PLAN AND PROFILE
LATERAL 3
STA. 0+00 TO STA. 27+62.97

DESIGNED MAF SUBMITTED
DRAWN J.J.C. RECOMMENDED
CHECKED RFN APPROVED

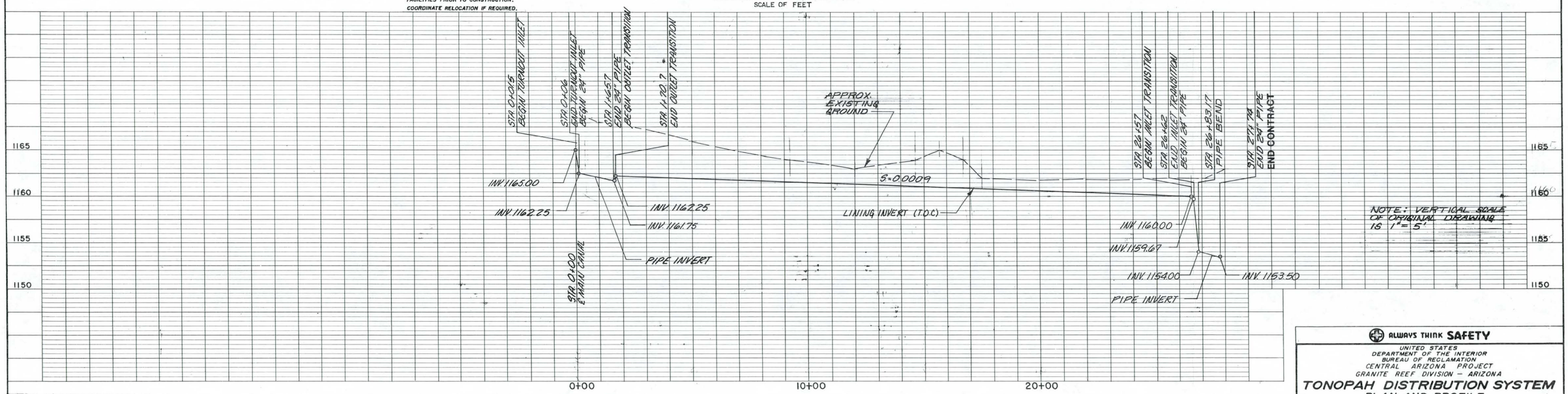
344-330-6865

NOTE:
FOR GEOLOGICAL EXPLANATION AND NOTES, SEE SHEET X-1.



NOTE:
CONTRACTOR TO VERIFY LOCATION OF UNDERGROUND UTILITIES AND/OR PRIVATE FACILITIES PRIOR TO CONSTRUCTION. COORDINATE RELOCATION IF REQUIRED.

ARIZONA STATE PLANE COORDINATES, CENTRAL ZONE
NOTE: COORDINATES ARE COMPUTED FROM UNADJUSTED GROUND DISTANCES



NOTE: VERTICAL SCALE OF ORIGINAL DRAWING IS 1" = 5'

HYDRAULIC PROPERTIES

STATION	A	V	Q	R	n	B	d	H	S	S:S	F_L	F_E	R_L	R_R
STA. TO STA.	FT.^{2}	FT./S	FT.^{3}/S	FT.		FT.	FT.	FT.	FT./FT.	FT./FT.	FT.	FT.	FT.	FT.
1+70.7 TO 26+57	4.72	2.75	13	0.80	.014	1.0	1.73	2.33	.0009	1:1	0.60	0.60	4	12

REGISTERED Professional Engineer CERTIFICATE NO. 11587 TIMOTHY E. KELLY Date Signed 2-22-85 ARIZONA, U.S.A.

Date	FEB. 1985
Designed	MAF
Drawn	RJB
Checked	RFN
Revised	

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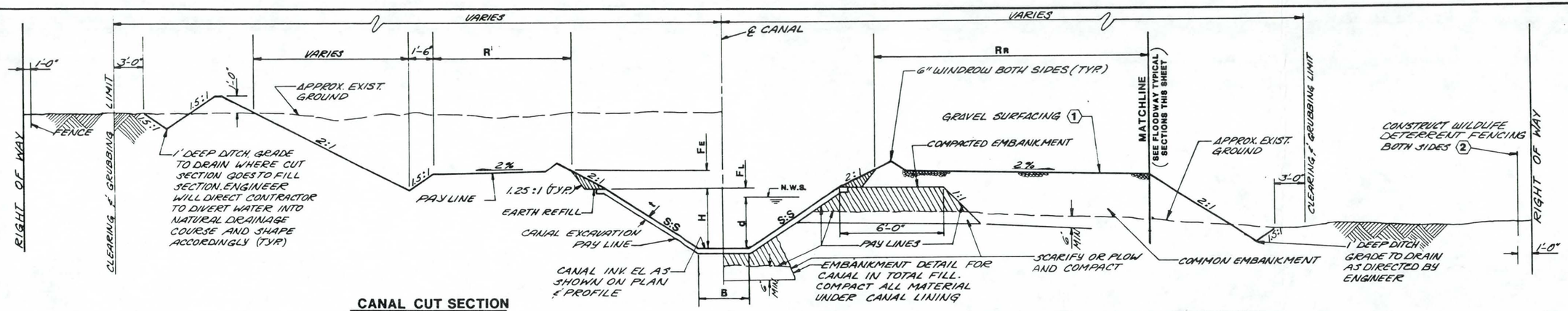
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM
PLAN AND PROFILE
LATERAL 4
STA. 0+00 TO STA. 27+74

DESIGNED M.A.F. SUBMITTED Bruce J. Hutchinson
DRAWN R.J.B. RECOMMENDED Miguel E. Andrade
CHECKED R.F.N. APPROVED Donald C. Schroeder

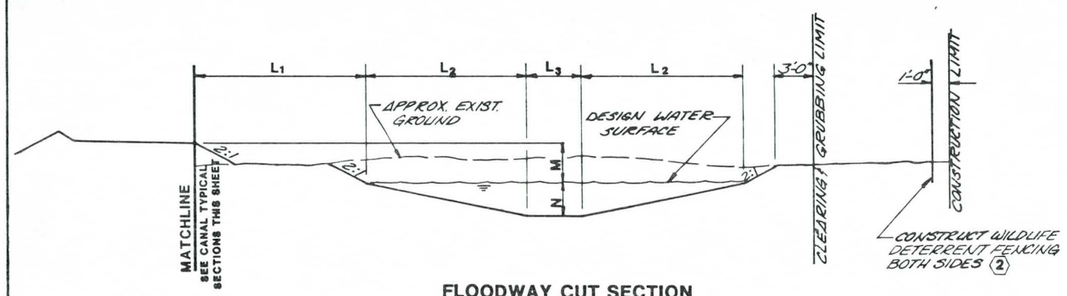
344-330-6899



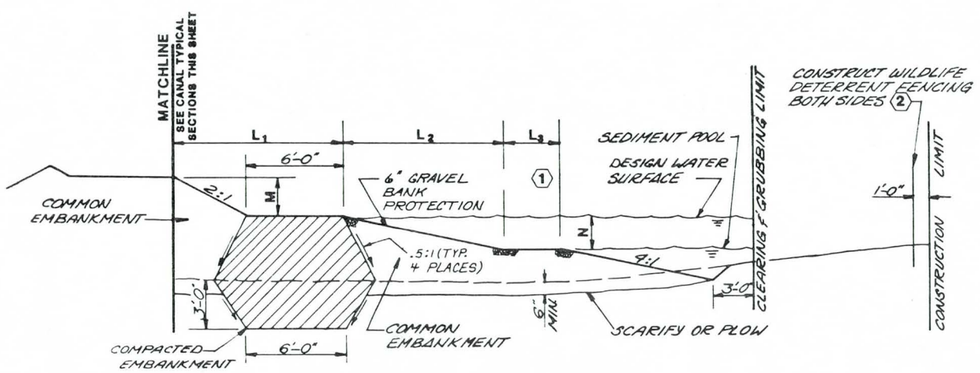
CANAL CUT SECTION

CANAL FILL SECTION

CANAL - TYPICAL SECTIONS



FLOODWAY CUT SECTION



FLOODWAY FILL SECTION

FLOODWAY - TYPICAL SECTIONS

HYDRAULIC PROPERTIES

NAME OF CHANNEL	BEGINNING STATION	ENDING STATION	Q	d 3	A 3	V 3	R 3	n	B	H	S:S	t	S 3	F_L 3	F_E	R_L	R_R
			FT/SEC	FT	FT	FT/SEC	FT		FT	FT	FT:FT	IN	FT/FT	FT	FT	FT	FT
MAIN CANAL	2+13	204+20	75	3.02	22.75	3.30	1.64	.014	3	3.67	1.5:1	2.5	.0005	0.65	1.33	8	16
MAIN CANAL	204+44.67	230+48.16	54	2.59	17.81	3.03	1.44	.014	3	3.33	1.5:1	2.5	.0005	0.74	1.33	12	16
MAIN CANAL	231+71.57	256+89	52	2.54	17.31	3.00	1.42	.014	3	3.33	1.5:1	2.5	.0005	0.79	1.00	8	16
MAIN CANAL	257+41.6	283+10	41	2.26	14.48	2.83	1.30	.014	3	3.00	1.5:1	2.5	.0005	0.74	0.80	8	16
MAIN CANAL	284+36	310+39	35	2.38	15.60	2.24	1.35	.014	3	3.00	1.5:1	2.5	.0003	0.62	0.80	8	16
MAIN CANAL	310+56	335+88.9	28	2.23	10.65	2.63	1.17	.014	2	3.00	1.25:1	2.5	.0005	0.77	0.80	8	16
MAIN CANAL	336+57.9	362+00.2	28	2.23	10.66	2.63	1.17	.014	2	3.00	1.25:1	2.5	.0005	0.77	0.60	4	4
MAIN CANAL	363+31	389+33	18	1.80	7.65	2.35	0.99	.014	2	2.67	1.25:1	2.5	.0005	0.87	0.60	4	4
MAIN CANAL	391+40	408+50.5	18	1.80	7.65	2.35	0.99	.014	2	2.33	1.25:1	2.5	.0005	0.53	0.75	4	4
MAIN CANAL	410+69.8	415+15	14	1.75	4.80	2.92	0.81	.014	1	2.33	1:1	2.0	.00100	0.58	0.60	4	4
MAIN CANAL	418+17	443+58.5	13	1.66	4.40	2.95	0.77	.014	1	2.33	1:1	2.0	.00109	0.67	0.60	12	4
MAIN CANAL	444+44	469+56.86	8	1.36	3.20	2.50	0.66	.014	1	2.33	1:1	2.0	.00096A	0.97	0.60	12	4
LATERAL 1	0+58.75	26+26	17	1.53	6.01	2.83	0.87	.014	2	2.33	1.25:1	2.5	.00085	0.80	0.75	12	4
LATERAL 2	0+98.34	38+40.53	9	1.42	3.45	2.61	0.69	.014	1	2.33	1:1	2.0	.001	0.91	0.60	4	12
LATERAL 3	1+29	26+35.7	18	1.57	6.23	2.89	0.89	.014	2	2.33	1.25:1	2.5	.00087	0.76	0.75	12	4
LATERAL 4	1+70.7	26+57	13	1.73	4.72	2.75	0.80	.014	1	2.33	1:1	2.0	.0009	0.60	0.60	4	12

FLOODWAY DATA TABLES

NAME OF CHANNEL	BEGINNING STATION	ENDING STATION	L_1	L_2	L_3	M	N	REMARKS
			FT.	FT.	FT.	FT.	FT.	
MAIN CANAL								
	27+20	28+30	9	6	48	1.5	1.5	CONFLUENCE
	28+30	33+50	9	30	0	1.5	1.5	
	33+50	34+50	9	6	48	1.5	1.5	CONFLUENCE
	34+50	39+97	9	30	0	1.5	1.5	
	39+97	42+00	VARIES	30	0	1.5	1.5	
LATERAL 1	23+50	26+80	11	12	70	2.5	4	
LATERAL 2	16+50	20+00	9	9	40	1.5	3	

NOTES

1. APPLY GRAVEL PER SPECIFICATIONS ON FLOODWAYS AT STREAM CONFLUENCES AND ON BERMS 12 FEET WIDE OR MORE.
2. CONSTRUCT WILDLIFE DETERRENT FENCE AS SHOWN ON SHEET V-4 ON BOTH SIDES OF MAIN CANAL BEGINNING AT STATION 1+67 AND ENDING AT STATION 154+47
3. TYPICAL VALUE SHOWN; ACTUAL VALUE MAY VARY AT SOME LOCATIONS. SEE PLAN AND PROFILE SHEETS.

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TONOPAH DISTRIBUTION SYSTEM

TYPICAL CANAL & FLOODWAY SECTIONS

REGISTERED PROFESSIONAL ENGINEER CERTIFICATE 11587 TIMOTHY E. KELLY ARIZONA, U.S.A.

Date FEB. 1985
Designed MAF
Drawn JJC
Checked REN
Revised

Franzoy·Corey ENGINEERS & ARCHITECTS
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DESIGNED MAF SUBMITTED
DRAWN JJC RECOMENDED
CHECKED REN APPROVED

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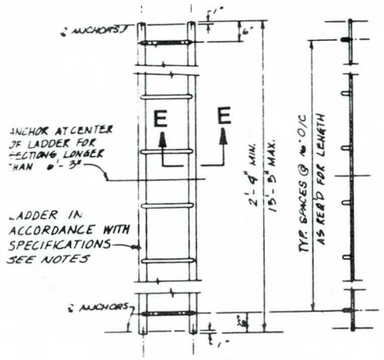
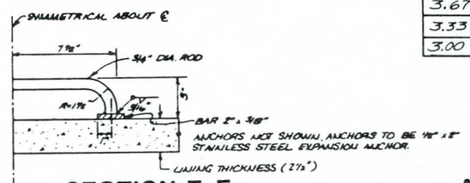
344-330-6866

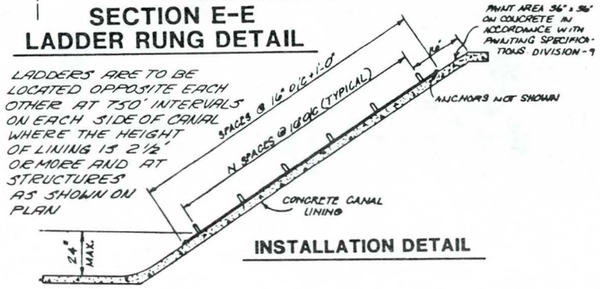


LADDER SECTION



SECTION E-E
LADDER RUNG DETAIL

LADDERS ARE TO BE LOCATED OPPOSITE EACH OTHER AT 750' INTERVALS ON EACH SIDE OF CANAL WHERE THE HEIGHT OF LINING IS 2 1/2' OR MORE AND AT STRUCTURES AS SHOWN ON PLAN



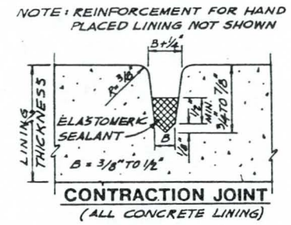
INSTALLATION DETAIL

LADDER TABLE					
LINING HEIGHT	SIDE SLOPE	N	LINING HEIGHT	SIDE SLOPE	N
3.67	1.5:1	2	3.00	1.25:1	1
3.33	1.5:1	2	2.67	1.25:1	1
3.00	1.5:1	2	2.67	1.25:1	1

SAFETY LADDER DETAILS

NOTES.

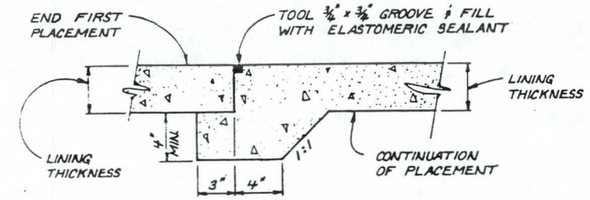
Ladders to be used on sides of canal where the vertical lining height is 2 1/2 feet or more.
Ladders to be located opposite each other at 750-foot intervals on each side of the canal, and upstream of structures as directed.
Ladders to be fabricated from steel or 6061-T6 aluminum.
Ladders shall be anchored to the canal lining with stainless steel expansion type anchors, subject to the approval of the contracting officer.
Ladders to be painted yellow after fabrication.



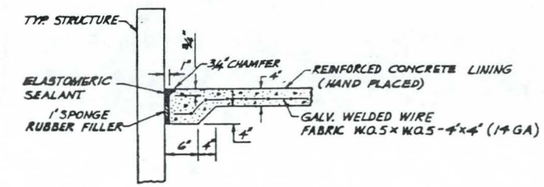
CONTRACTION JOINT
(ALL CONCRETE LINING)

NOTES

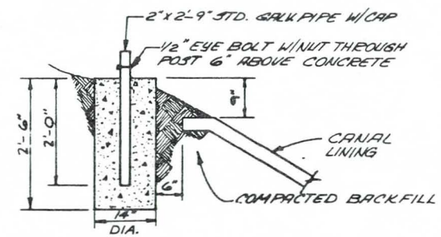
1. GROOVES FOR CONTRACTION JOINT SHALL BE FORMED AND CONCRETE CURING COMPOUND IN GROOVES SHALL BE REMOVED BY SANDBLASTING.
2. CONTRACTION JOINTS IN CONCRETE LINING SHALL BE PLACED TRANSVERSELY AT 10' INTERVALS.



CONSTRUCTION JOINT IN LINING

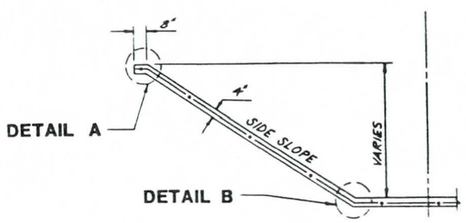


TYPICAL JOINT AT STRUCTURE
EXPANSION JOINT

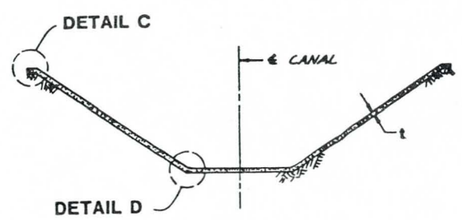


SAFETY CABLE ANCHOR DETAIL

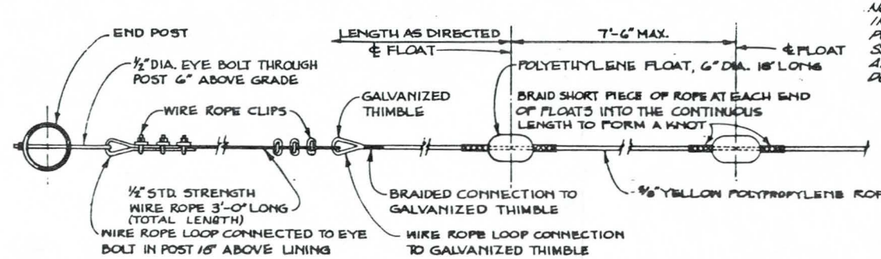
SAFETY CABLE ANCHOR SCHEDULE							
MAIN CANAL						LATERAL 1	
STA.	SIDE	STA.	SIDE	STA.	SIDE	STA.	SIDE
204+02	LEFT	310+26	LEFT	282+96	LEFT	1+98	RIGHT
204+06	RIGHT	310+30	RIGHT	283+00	RIGHT	2+01	LEFT
230+38	LEFT	335+82	LEFT	389+14	RIGHT		
230+42	RIGHT	335+85	RIGHT	389+16	LEFT		
256+78	LEFT	361+91	RIGHT	408+69	RIGHT		
256+82	RIGHT	361+94	LEFT	408+72	LEFT		



TYPICAL HAND PLACED LINING

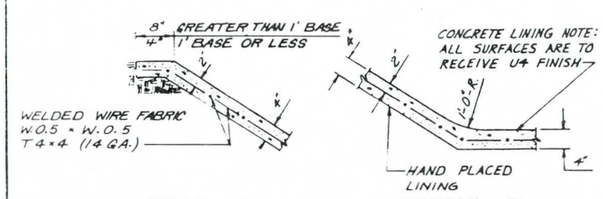


TYPICAL SLIPFORMED LINING

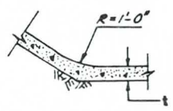


NOTE:
INSTALL SAFETY CABLE ANCHOR POSTS 1' DOWNSTREAM OF THE SAFETY LADDERS IMMEDIATELY ABOVE ALL STRUCTURES THAT DO NOT HAVE SAFETY RACKS.

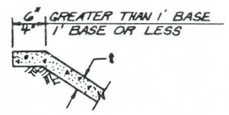
SAFETY CABLE WITH FLOAT



DETAIL A
DETAIL B



DETAIL D



DETAIL C

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GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

TYPICAL CANAL DETAILS

DESIGNED MAF
DRAWN JJC
CHECKED RFN
SUBMITTED
RECOMMENDED
APPROVED

Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

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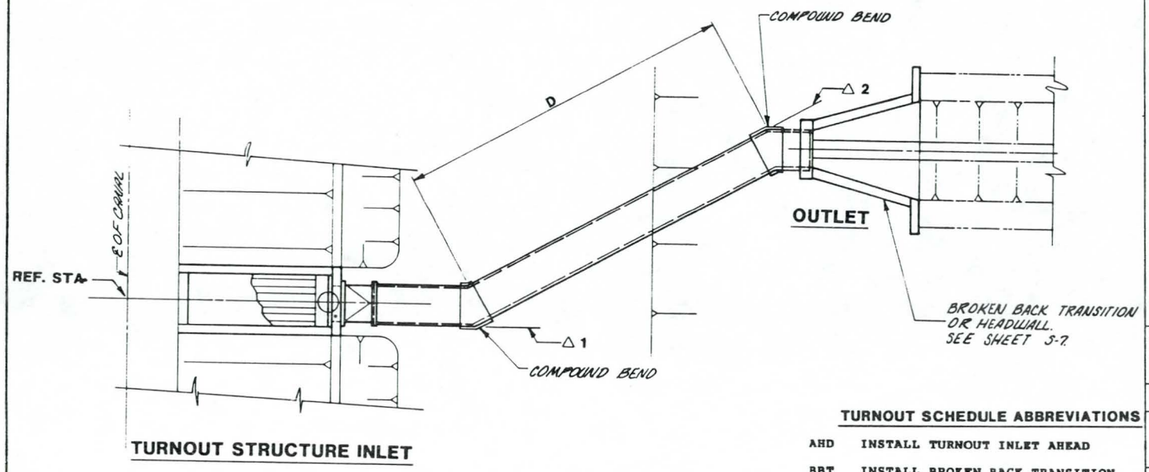


TURNOUT STRUCTURE INLET

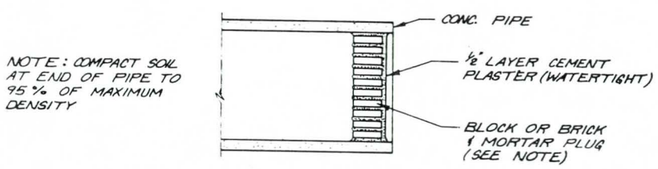
PLAN

TURNOUT SCHEDULE

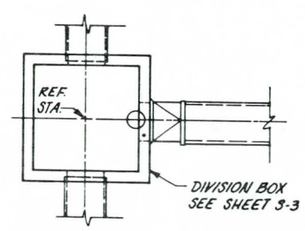
CANAL	REF. STA.	SIDE	TURN OUT	I.D.	INLET	A	B	C	D	E	F	ELEV. A	ELEV. B	ELEV. C	ELEV. D	ELEV. E	ELEV. F	Δ 1	Δ 2	OUT-LET
MAIN	204+10	RT	M-1	30"	TS	1'-6"	5'-6"	45'-9"	0	0	6'-0"	1210.37	1209.37	—	—	1209.07	1210.07	—	—	BBT
	204+10	LT	M-2	18"	TS	1'-6"	5'-6"	12'-8 1/2"	12'-5	6'-2 1/2"	5'-0"	1210.37	1209.37	1209.26	1209.13	1208.99	1208.82	45° R.T.	45° R.T.	HW
	230+46	RT	M-3	24"	TS		IRREGULAR		PIPE ALIGNMENT — SEE SHEET C-7											PLUG
	256+86.5	RT	M-4	36"	TS		IRREGULAR		PLAN — SEE SHEET C-8											BBT
	283+05	RT	M-5	24"	TS	1'-6"	4'-6"	10'-3"	141'-1 1/2"	8'-4"	5'-0"	1165.00	1162.25	1162.23	1161.75	1161.75	1162.25	45° L.T.	45° R.T.	HW
	310+34	RT	M-6	24"	TS	1'-6"	4'-6"	66'-6"	0	0	0	1153.75	1150.25	1149.71	—	—	—	—	—	PLUG
	335+88.9	RT	M-7	36"	TS	1'-0"	3'-9"	56'-3"	0	0	8'-0"	1137.84	1135.84	—	—	1134.54	1135.87	—	—	BBT
	361+98	LT	M-8	24"	TS	1'-0"	3'-9"	10'-3"	10'-9"	126'-0"	0	1134.60	1132.60	1132.50	1128.05	1127.45	—	22.5° R.T.	30° R.T.	PLUG
	408+00	LT	M-9	24"	TS	1'-0"	2'-11"	6'-9"	13'-6"	99'-3"	0	1129.52	1128.62	1128.50	1122.91	1122.41	—	0	0	PLUG
	417+74	RT	M-10	18"	DB	0	4'-0"	4'-0"	6'-0"	6'-0"	0	—	1124.35	1124.32	1124.26	1124.20	—	45° R.T.	45° R.T.	OPEN
	444+02.5	RT	M-11	18"	DB	0	4'-0"	4'-0"	6'-0"	6'-0"	0	—	1112.25	1112.22	1112.16	1112.10	—	45° R.T.	45° R.T.	OPEN
	469+56.86	AHD	M-12	18"	HW	0	5'-0"	15'-0"	58'-0"	0	0	1104.84	1104.51	1100.45	1100.15	—	—	0	—	PLUG
LAT. 1	2+05	LT	L-1-1	24"	TS	1'-0"	2'-11"	10'-6"	8'-0"	8'-0"	0	1209.95	1208.95	1208.95	1206.81	1206.77	—	0	0	PLUG
	26+26	AHD	L-1-2	30"	BBT	0	6'-0"	11'-4"	144'-0"	0	0	1203.48	1202.48	1197.79	1197.65	—	—	38° L.T.	—	PLUG
LAT. 2	38+40.53	AHD	L-2-1	21"	HW	0	5'-0"	11'-3"	80'-0"	0	0	1199.50	1199.17	1194.50	1194.10	—	—	40° R.T.	—	PLUG
LAT. 3	1+14.25	LT	L-3-1	24"	DB	0	4'-3"	22'-6"	0	0	0	—	1175.60	1175.50	—	—	—	—	—	PLUG
	26+35.7	AHD	L-3-2	30"	BBT	0	6'-0"	8'-3"	113'-0"	0	0	1174.91	1173.91	1169.77	1169.21	—	—	38° L.T.	—	PLUG
LAT. 4	26+57	AHD	L-4-1	24"	HW	0	5'-0"	21'-2"	90'-10"	0	0	1160.00	1159.67	1154.00	1153.50	—	—	0	—	PLUG

TURNOUT SCHEDULE ABBREVIATIONS

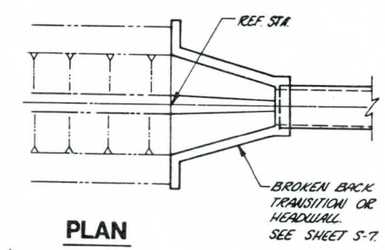
AHD	INSTALL TURNOUT INLET AHEAD
BBT	INSTALL BROKEN BACK TRANSITION SEE SHEET S-7
DB	INSTALL DIVISION BOX SEE SHEET S-3
HW	INSTALL HEADWALL SEE SHEET S-7
LT	INSTALL TURNOUT INLET ON LEFT
OPEN	END OF PIPE SHALL BE LEFT OPEN. NO OTHER OUTLET STRUCTURE IS REQUIRED.
PLUG	INSTALL TEMPORARY CONCRETE BLOCK AND GROUT PLUG AT END OF PIPE. NO OTHER OUTLET STRUCTURE IS REQUIRED.
RT	INSTALL TURNOUT INLET ON RIGHT
TS	INSTALL TURNOUT STRUCTURE SEE SHEET S-5



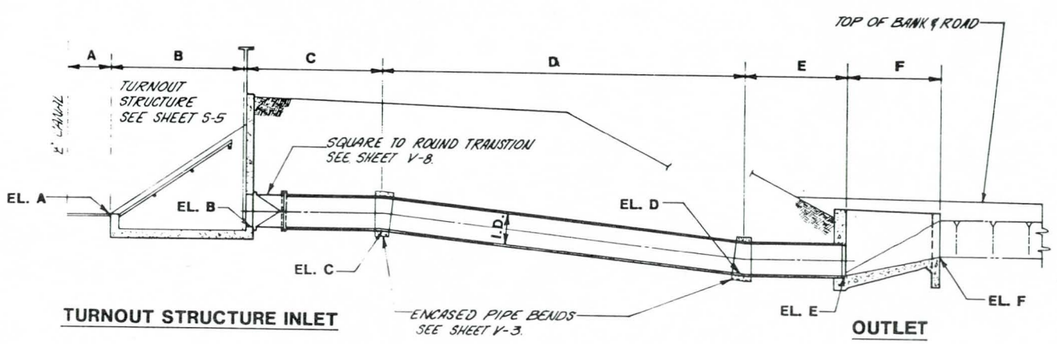
WATERTIGHT BULKHEAD PIPE PLUG DETAIL



PLAN



PLAN

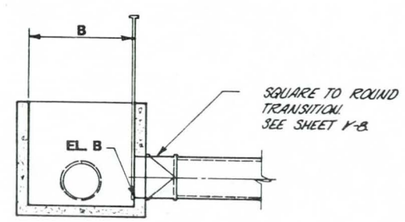


TURNOUT STRUCTURE INLET

OUTLET

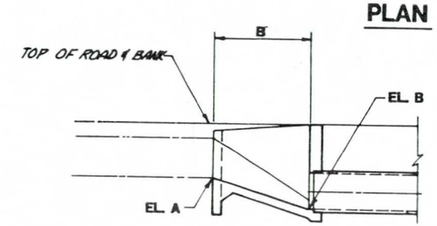
LONGITUDINAL SECTION

TYPICAL TURNOUT



LONGITUDINAL SECTION

DIVISION BOX INLET



LONGITUDINAL SECTION

TRANSITION INLET

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT

TONOPAH DISTRIBUTION SYSTEM

TYPICAL TURNOUT

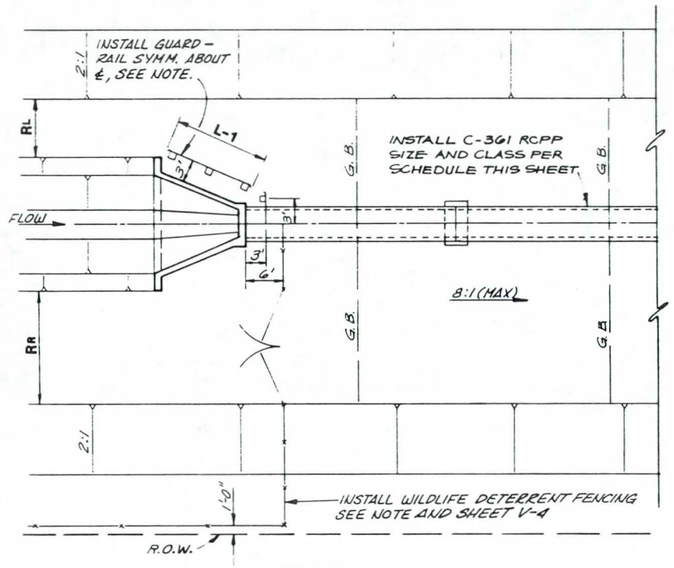
Date	MAY 1985
Designed	MAF
Drawn	RJB
Checked	TSK
Revised	

Franzoy·Corey
ENGINEERS & ARCHITECTS

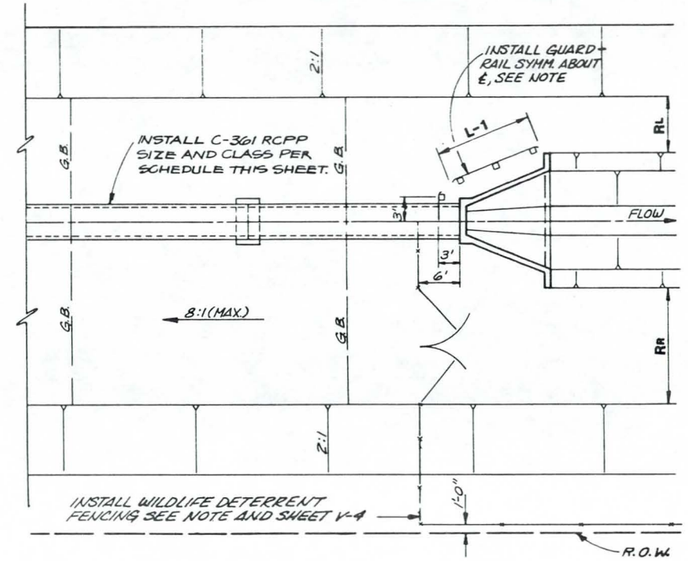
DESIGNED — SUBMITTED
DRAWN — RECOMMENDED
CHECKED — APPROVED

10 407/C-3

344-330-6868

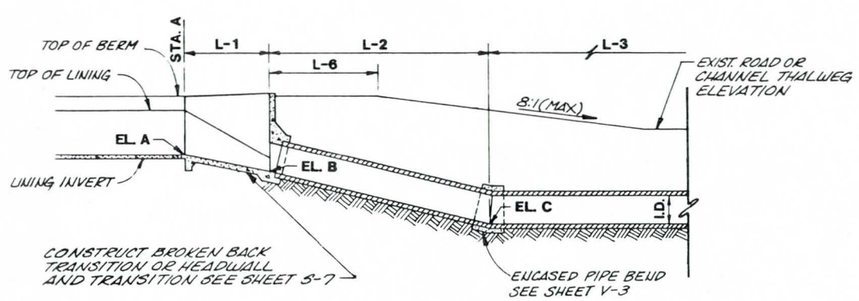


PLAN - INLET

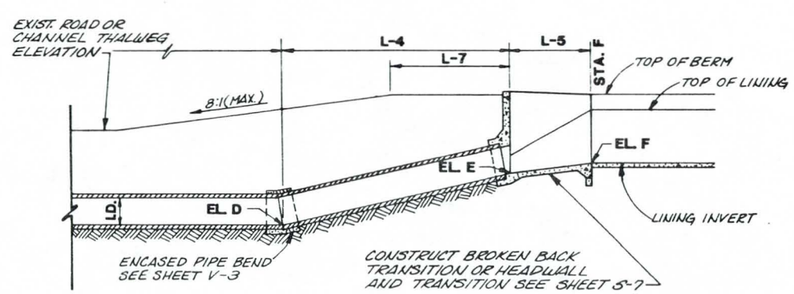


PLAN - OUTLET

NOTE:
Wildlife deterrent fencing shall be installed at the inlet and outlet of the first siphon in the schedule and at the inlet of the second siphon in the schedule. Fencing shall run perpendicular to the centerline of the siphon and shall be joined to the fencing running parallel to the construction limits on both sides of the canal. Fencing will be symmetrical about the centerline of the siphon, except that a gate opening 16 feet wide shall be installed only on one side of the siphon as shown. Electrified fencing may not be used between the outer edges of the berms on either side of the canal. See sheet V-4 for fencing details. Guardrail shall be installed at siphon inlets and outlets where wildlife fencing is not required. See sheet V-5 for guardrail details.



LONGITUDINAL SECTION



LONGITUDINAL SECTION

INVERTED SIPHON SCHEDULE

CANAL	STA. A	STA. F	I.D.	CLASS	L-1	L-2	L-3	L-4	L-5	L-6	L-7	EL. A	EL. B	EL. C	EL. D	EL. E	EL. F	RL	RR	FENCING
MAIN	60+00	63+00	42"	C25	10.00'	32.36'	217.86'	29.78'	10.00'	26.00'	26.00'	1304.07	1302.07	1293.40	1292.31	1300.29	1301.96	8	16	REQ'D.
	154+30	158+30	54"	C25	10.00'	45.46'	286.43'	48.11'	10.00'	26.00'	5.00'	1224.11	1222.11	1209.93	1208.50	1221.39	1223.06	8	16	REQ'D
	167+10	172+10	54"	C28	10.00'	35.83'	403.98'	40.19'	10.00'	5.00'	5.00'	1222.62	1220.62	1211.02	1209.00	1219.77	1221.44	8	16	NONE
LAT. 2	19+50	20+50	21"	B25	5.00'	24.75'	41.50'	23.75'	5.00'	0	0	1201.90	1201.57	1194.94	1194.60	1200.96	1201.29	4	12	NONE
LAT. 3	13+12	13+62	30"	B25	6.00'	8.75'	20.50'	8.75'	6.00'	0	0	1176.29	1175.29	1171.59	1171.45	1175.02	1176.02	12	4	NONE

Date FEB. 85
Designed M.A.F.
Drawn S.B.M.
Checked R.F.N.
Revised

Franzoy•Corey
ENGINEERS & ARCHITECTS

10407/ C-4

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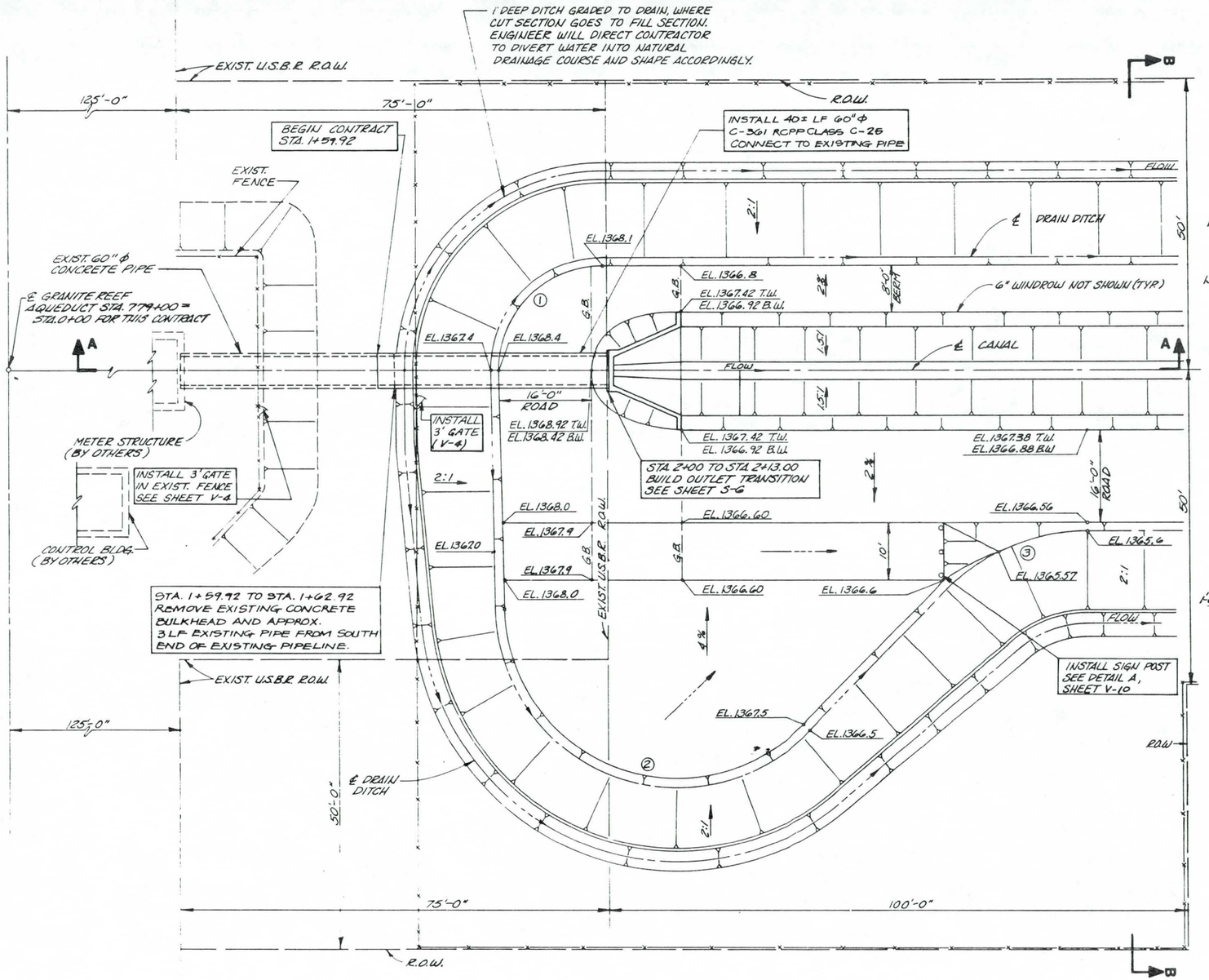
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION - ARIZONA

TONOPAH DISTRIBUTION SYSTEM

INVERTED SIPHON

DESIGNED M.A.F. SUBMITTED Bruce J. Hutchison
DRAWN S.B.M. RECOMMENDED Wayne E. Anderson
CHECKED R.F.N. APPROVED

344-330-6869



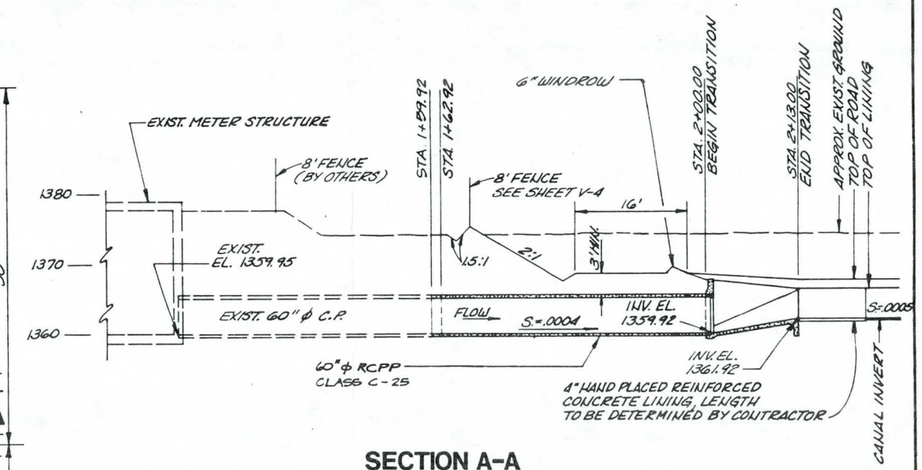
SITE PLAN

① Δ=90°00'00" R=18' T=18' L=28.27'

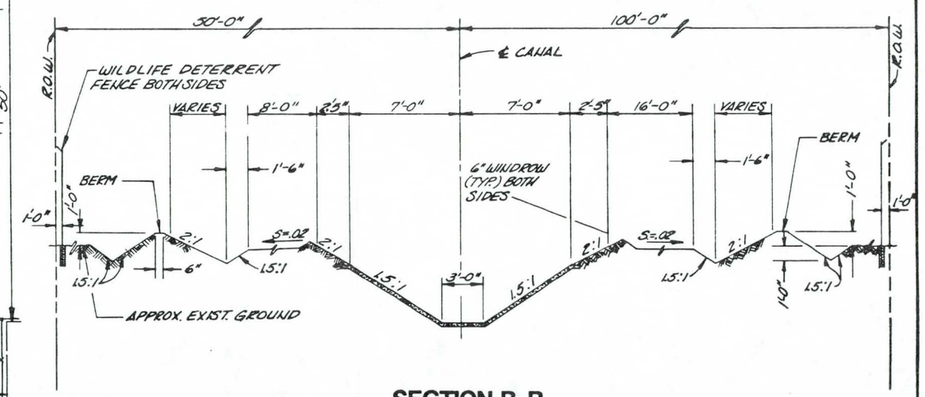
② Δ=135°00'00" R=30' T=72.43' L=70.69'

③ Δ=45°00'00" R=34' T=14.08' L=26.70'

10 0 10 20 30
SCALE OF FEET



SECTION A-A



SECTION B-B

LEGEND

T. W.	TOP OF WINDROW
B. W.	BOTTOM OF WINDROW
------→	DIRECTION OF FLOW

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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION-ARIZONA

TONOPAH DISTRIBUTION SYSTEM

C.A.P. TURNOUT

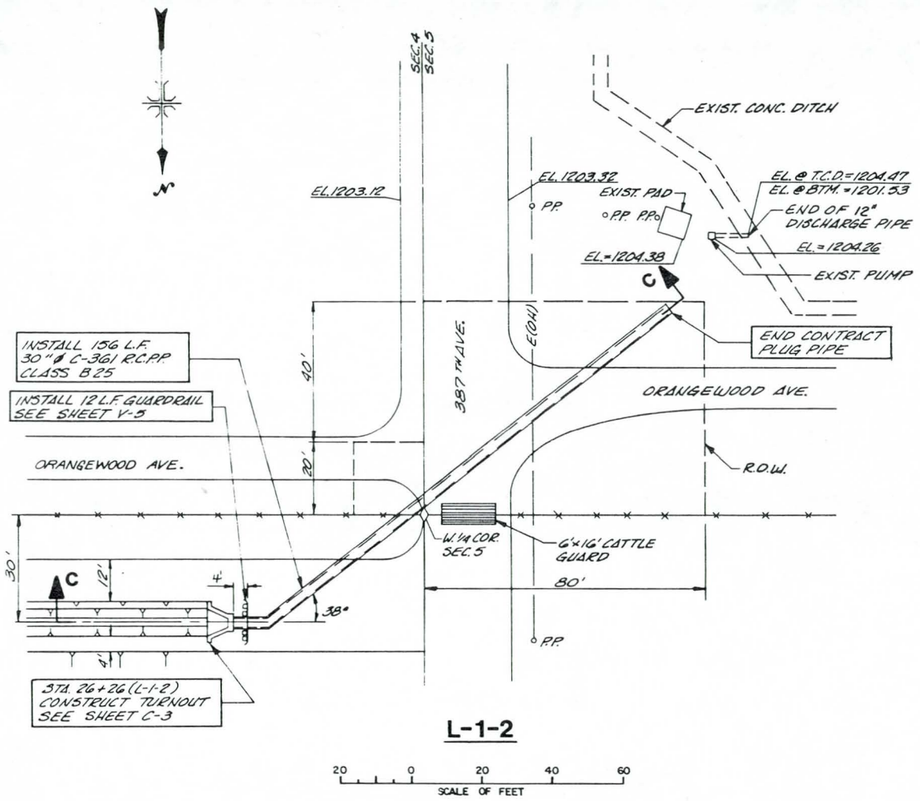
Date FEB. 85
Designed HVM
Drawn SBM
Checked MAF
Revised

Franzoy•Corey ENGINEERS & ARCHITECTS

DESIGNED HVM SUBMITTED
DRAWN SBM RECOMMENDED
CHECKED MAF APPROVED

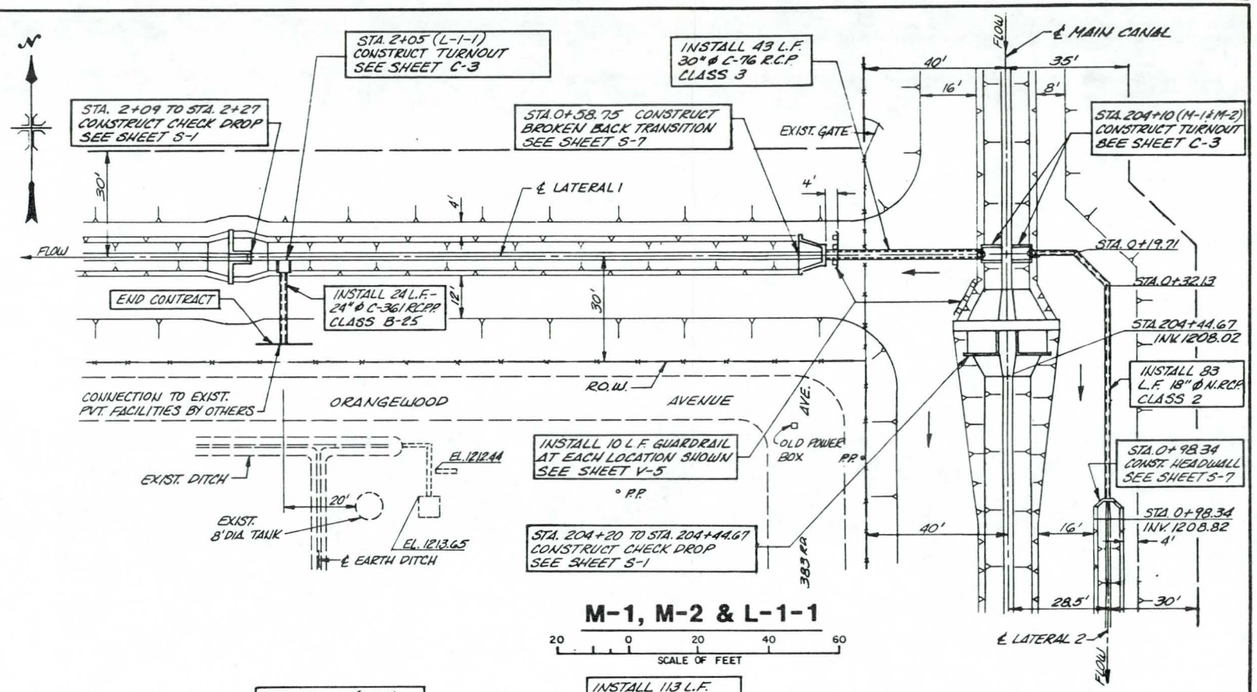
10407/C-5

344-330-6870



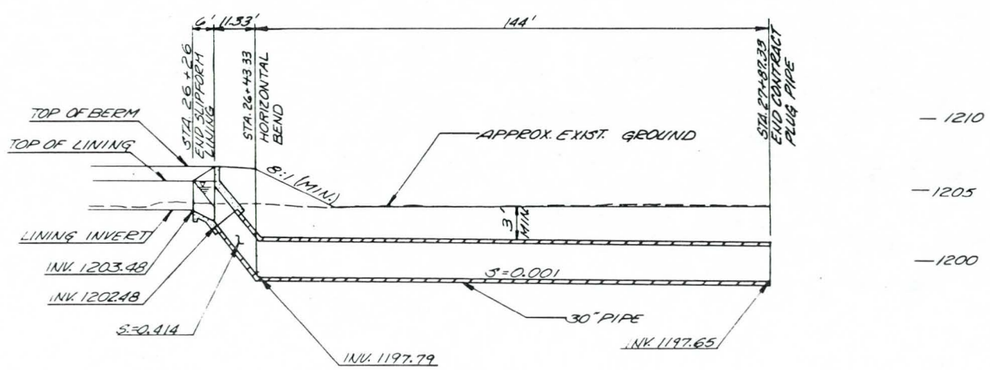
L-1-2

20 0 20 40 60
SCALE OF FEET

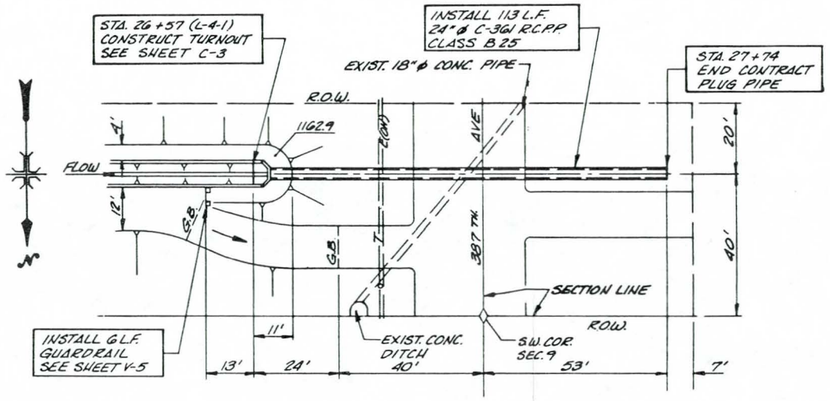


M-1, M-2 & L-1-1

20 0 20 40 60
SCALE OF FEET



SECTION C - C



L-4-1

20 0 20 40 60
SCALE OF FEET

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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM
SITE PLANS
TURNOUTS M-1, M-2, L-1-1, L-1-2 & L-4-1

DESIGNED	MAF	SUBMITTED	Bruce J. Hutchinson
DRAWN	JJC	RECOMMENDED	Wayne E. Anderson
CHECKED	RFN	APPROVED	Howard S. Johnson

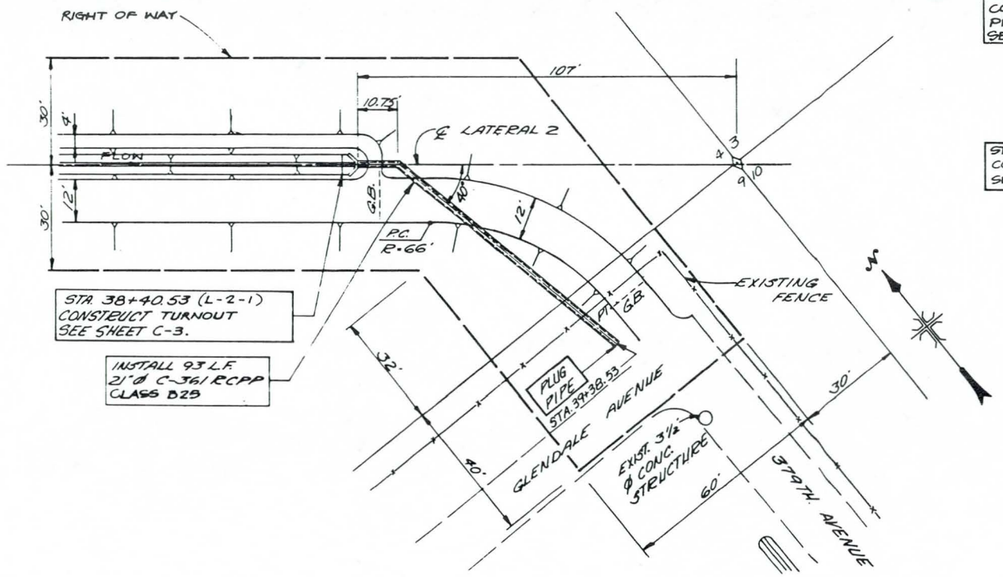
Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

Franzoy·Corey
ENGINEERS & ARCHITECTS
Corporate headquarters • 5030 E. Survey Drive, Phoenix, Arizona 85044 • (602) 838-8686

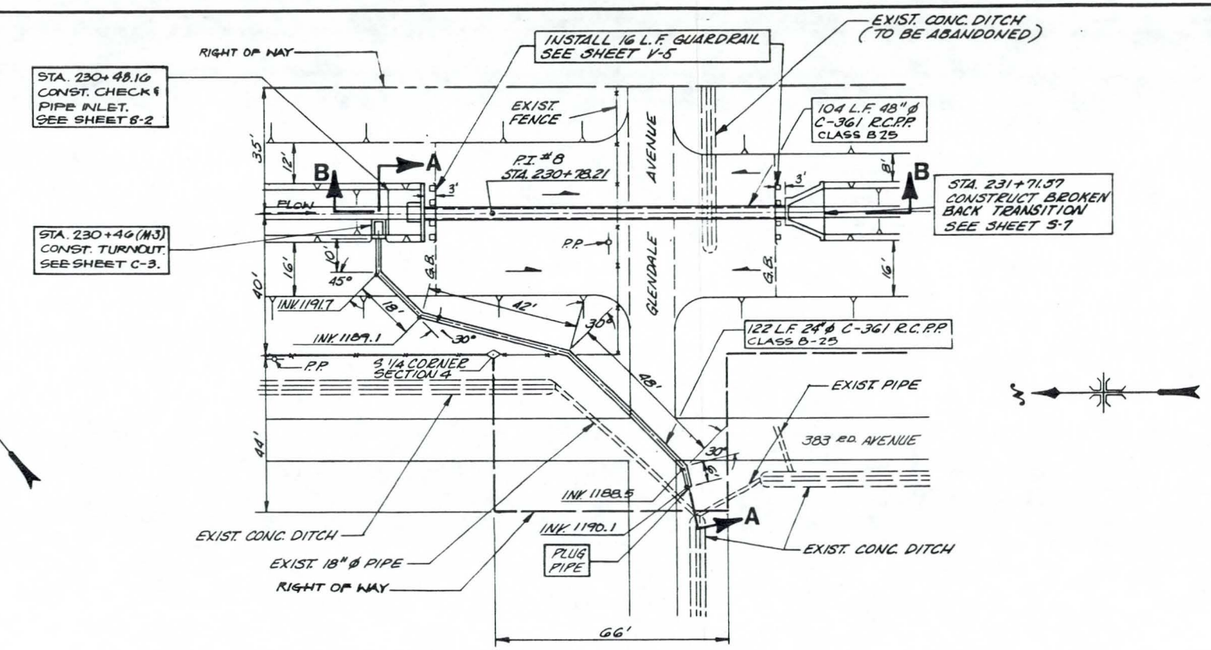
10407/C-6

344-330-6871

Two working days before you dig CALL FOR THE BLUE STAKES 263-1100 Blue Stake Center CALL COLLECT

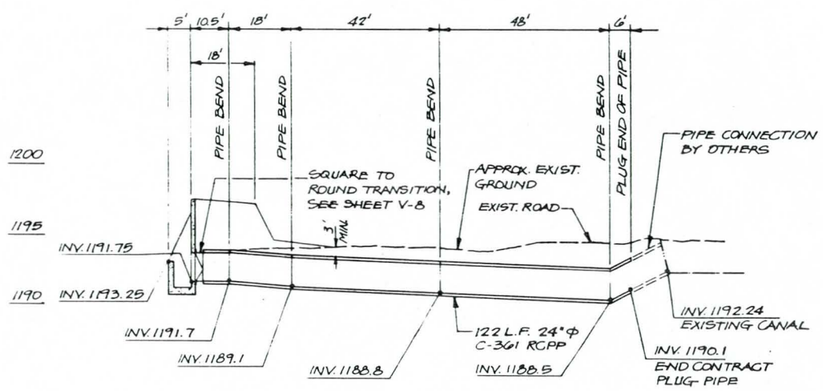


L-2-1



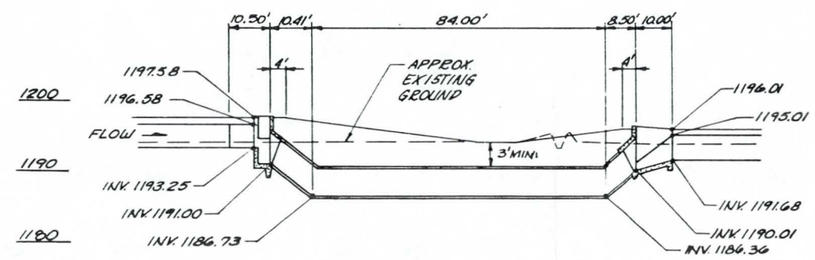
M-3

SCALE OF FEET



SECTION A - A

SCALE OF FEET



SECTION B - B

ALWAYS THINK SAFETY

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DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

SITE PLANS

TURNOUTS M-3 & L-2-1

DESIGNED M.A.F.	SUBMITTED Bruce J. Hutchison
DRAWN J.J.G.	RECOMENDED Wayne E. Anderson
CHECKED R.F.N.	APPROVED

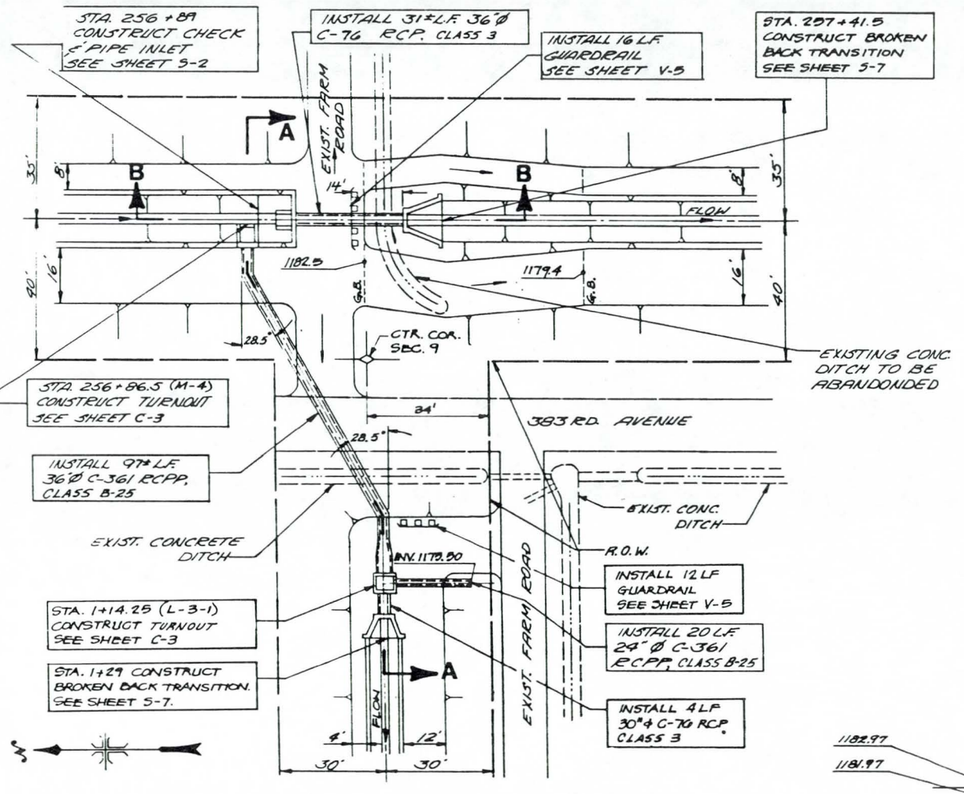
Date FEB 1985
Designed M.A.F.
Drawn J.J.G.
Checked R.F.N.
Revised

Franzoy·Corey
ENGINEERS & ARCHITECTS
Corporate headquarters • 3030 E. Sunrise Drive, Phoenix, Arizona 85044 • (602) 839-8636

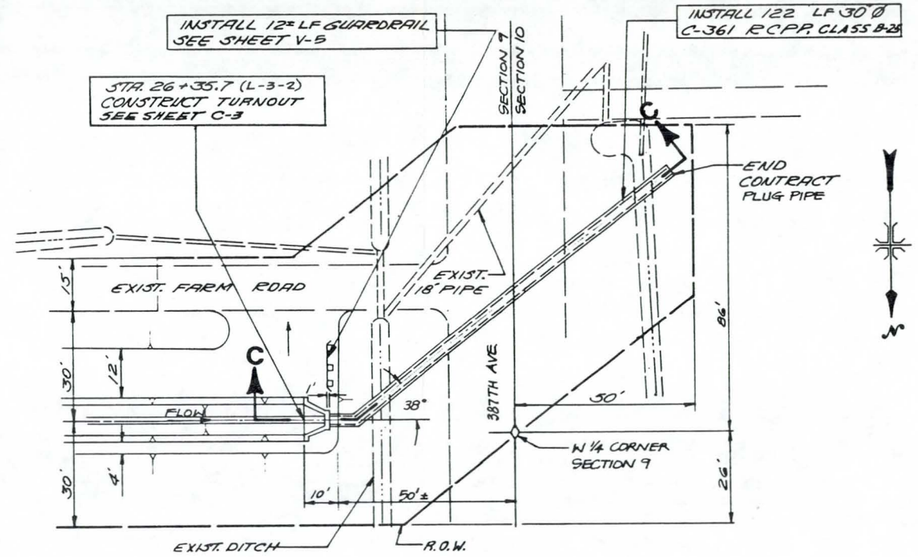
10407/C-7

344-330-6872

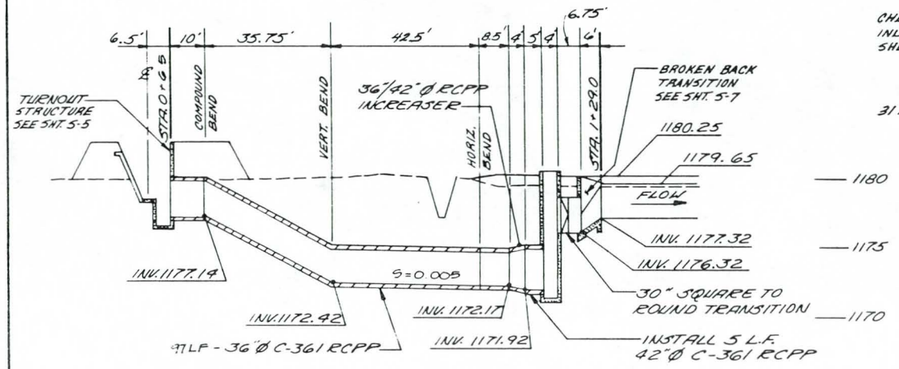
Two working days before you dig
CALL FOR THE BLUE STAKES
263-1100
Blue Stake Center
CALL COLLECT



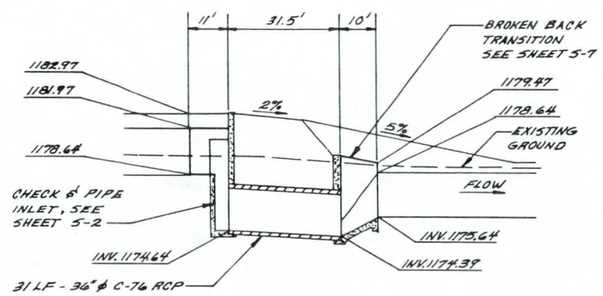
M-4 & L-3-1



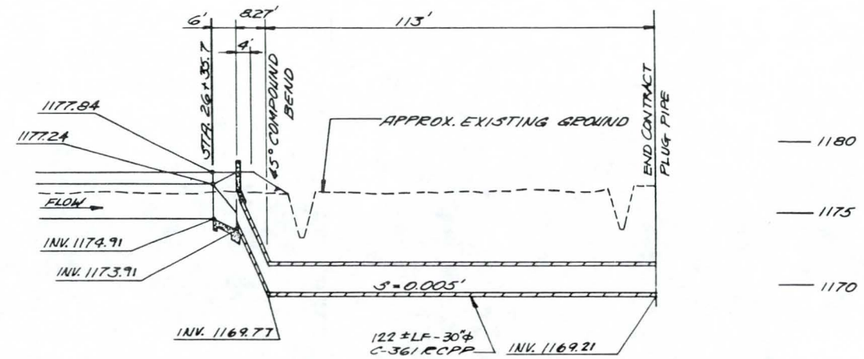
L-3-2



SECTION A-A



SECTION B-B



SECTION C-C

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

SITE PLANS

TURNOUTS M-4, L-3-1 & L-3-2

Date	FEB 1985
Designed	MAF
Drawn	JJC
Checked	RFN
Revised	

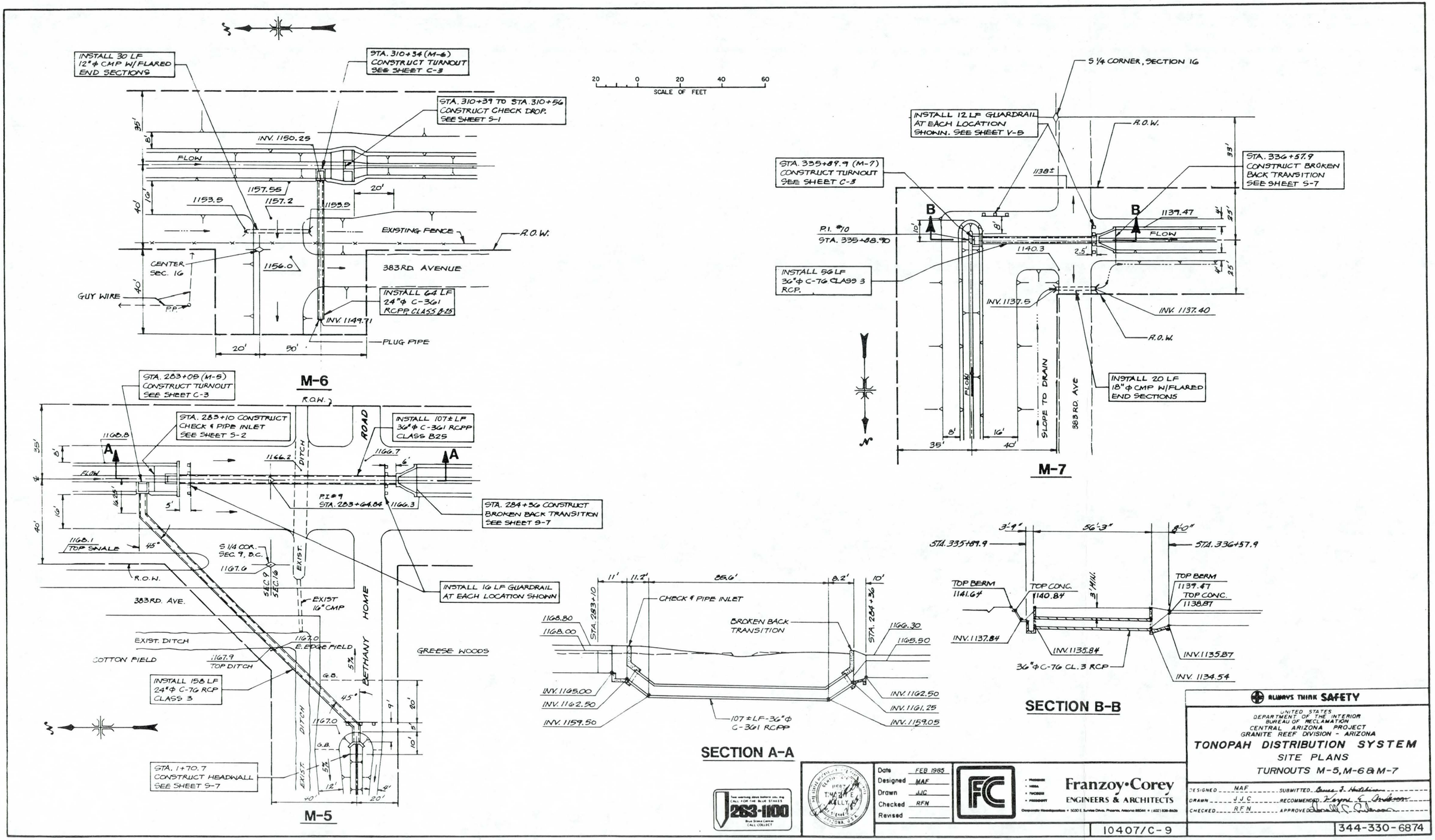
Franzoy•Corey
ENGINEERS & ARCHITECTS
PHOENIX • MESA • TUCSON • PRESCOTT
Corporate headquarters • 3030 S. Sunrise Drive, Phoenix, Arizona 85044 • (602) 838-8626

DESIGNED ____ SUBMITTED Bruce J. Hutchison
DRAWN ____ RECOMMENDED Kenneth J. Anderson
CHECKED ____ APPROVED [illegible]

10407/C-8

344-330-6873

Your notifying Blue Stakes is the law. CALL FOR THE BLUE STAKES 263-1100 Blue Stakes Center CALL COLLECT


SCALE OF FEET
INSTALL 30 LF 12"φ CMP W/FLARED END SECTIONS
STA. 310+34 (M-6) CONSTRUCT TURNOUT SEE SHEET C-3
STA. 310+39 TO STA. 310+56 CONSTRUCT CHECK DROP. SEE SHEET S-1
INV. 1150.25
FLOW
1157.55
1157.2
1153.5
1153.5
20'
EXISTING FENCE
R.O.W.
CENTER SEC. 16
1156.0
383RD AVENUE
GUY WIRE
P.P.
INSTALL 64 LF 24"φ C-361 RCPP CLASS B-25
INV. 1149.71
PLUG PIPE
M-6
STA. 283+08 (M-5) CONSTRUCT TURNOUT SEE SHEET C-3
STA. 283+10 CONSTRUCT CHECK & PIPE INLET SEE SHEET S-2
INSTALL 107± LF 36"φ C-361 RCPP CLASS B25
1168.8
1166.2
1166.7
DITCH
ROAD
FLOW
P.I. #9 STA. 283+64.84
1166.3
STA. 284+36 CONSTRUCT BROKEN BACK TRANSITION SEE SHEET S-7
1168.1 TOP SWALE
45°
S 1/4 COR. SEC. 9, B.C.
1167.6
SEC. 9 SEC. 16
EXIST.
R.O.W.
INSTALL 16 LF GUARDRAIL AT EACH LOCATION SHOWN
383RD. AVE.
EXIST 16" CMP
HOME
EXIST. DITCH
1167.0
E. EDGE FIELD
COTTON FIELD
1167.9 TOP DITCH
GREESE WOODS
BETHANY
INSTALL 158 LF 24"φ C-76 RCP CLASS 3
G.B.
STA. 1+70.7 CONSTRUCT HEADWALL SEE SHEET S-7
M-5
5 1/4 CORNER, SECTION 16
INSTALL 12 LF GUARDRAIL AT EACH LOCATION SHOWN. SEE SHEET V-B
R.O.W.
STA. 335+89.9 (M-7) CONSTRUCT TURNOUT SEE SHEET C-3
1138±
STA. 336+57.9 CONSTRUCT BROKEN BACK TRANSITION SEE SHEET S-7
1139.47
P.I. #10 STA. 335+88.90
FLOW
1140.3
INSTALL 56 LF 36"φ C-76 CLASS 3 RCP.
INV. 1137.5
INV. 1137.40
R.O.W.
INSTALL 20 LF 18"φ CMP W/FLARED END SECTIONS
SLOPE TO DRAIN
383 RD. AVE
M-7
STA. 283+10
11'
11.2'
85.6'
8.2'
10'
CHECK & PIPE INLET
BROKEN BACK TRANSITION
1168.80
1168.00
1166.30
1165.50
INV. 1165.00
INV. 1162.50
INV. 1159.50
INV. 1162.50
INV. 1161.25
INV. 1159.05
107 ± LF-36"φ C-361 RCPP
SECTION A-A
3'-9"
56'-3"
8'-0"
STA. 335+89.9
STA. 336+57.9
TOP BERM 1141.64
TOP CONC. 1140.84
TOP BERM 1139.47
TOP CONC. 1138.87
INV. 1137.84
INV. 1135.84
INV. 1135.87
36"φ C-76 CL. 3 RCP
INV. 1134.54
SECTION B-B
263-1100
Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised
Franzoy•Corey
ENGINEERS & ARCHITECTS
10407/C-9
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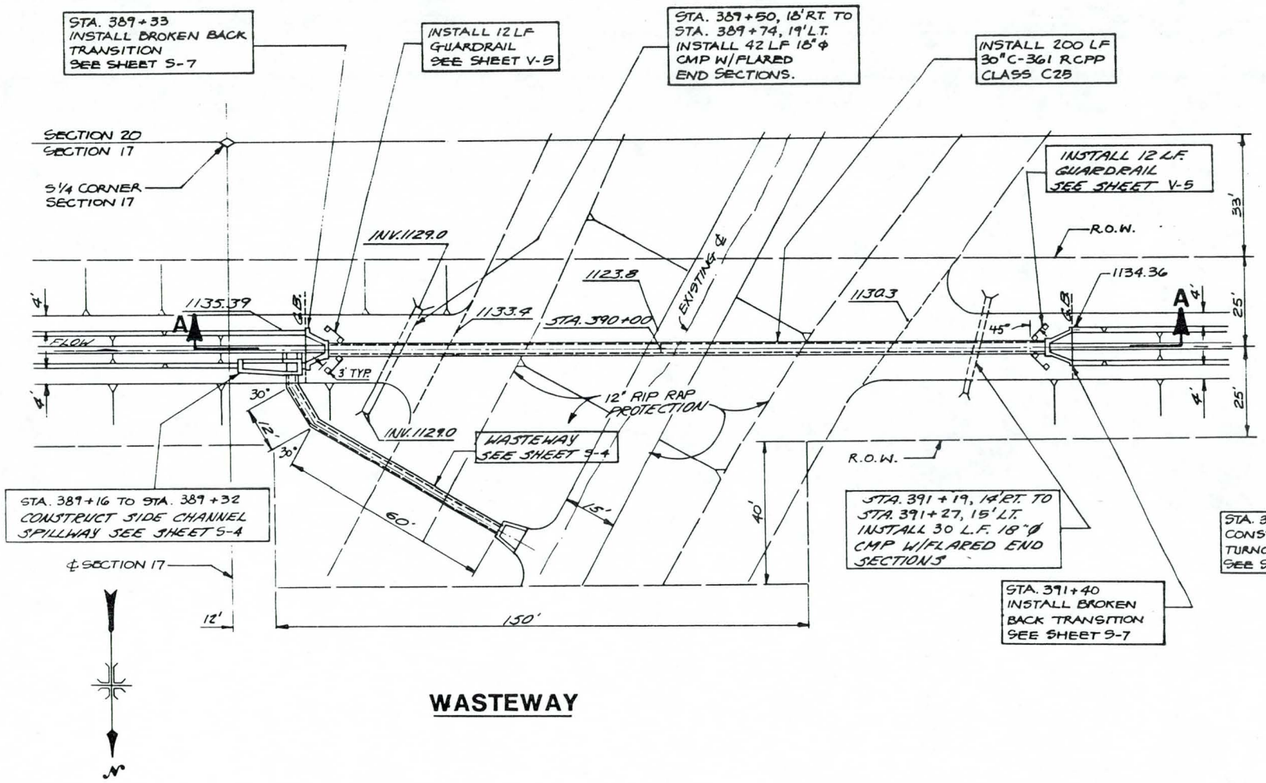
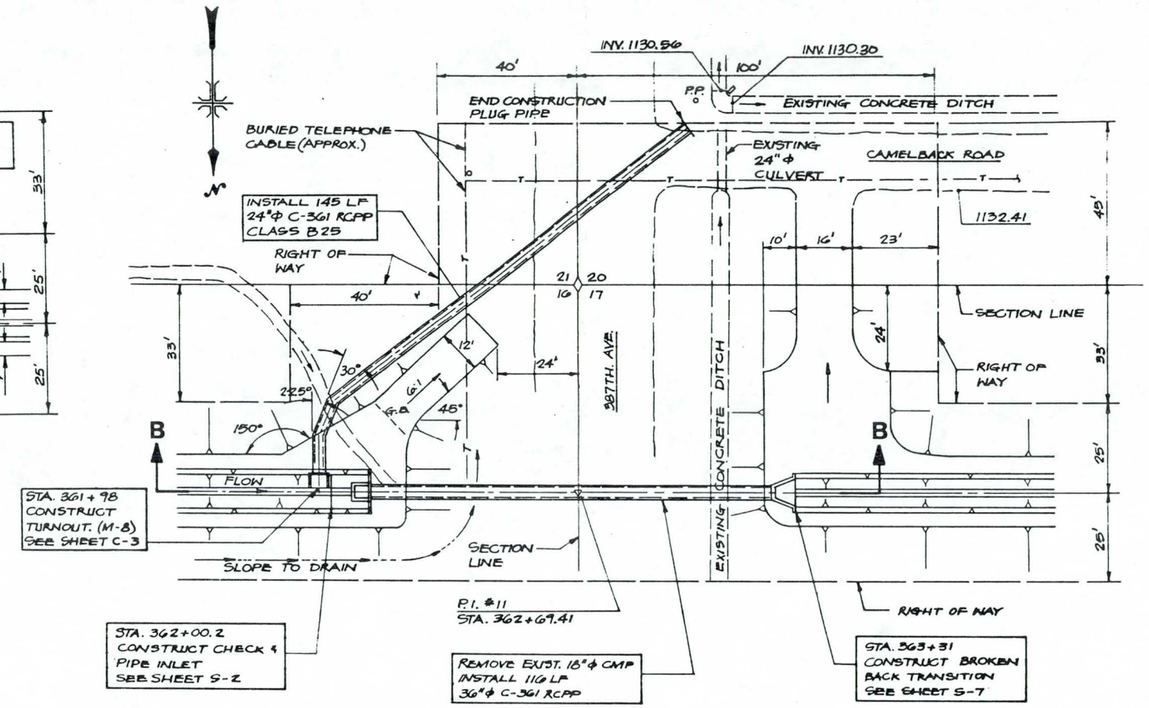
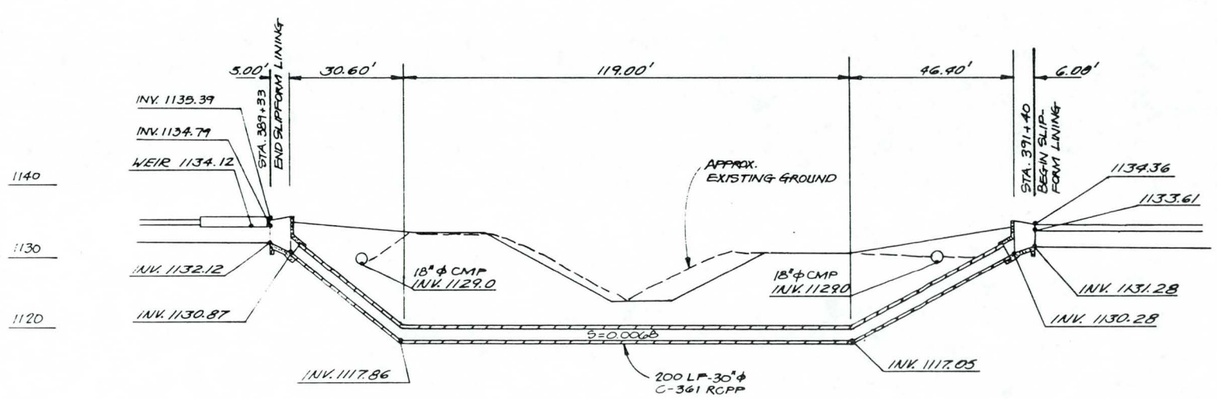
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION - ARIZONA
TONOPAH DISTRIBUTION SYSTEM
SITE PLANS
TURNOUTS M-5, M-6 & M-7
DESIGNED MAF
DRAWN JJC
CHECKED RFN
SUBMITTED
RECOMMENDED
APPROVED
344-330-6874



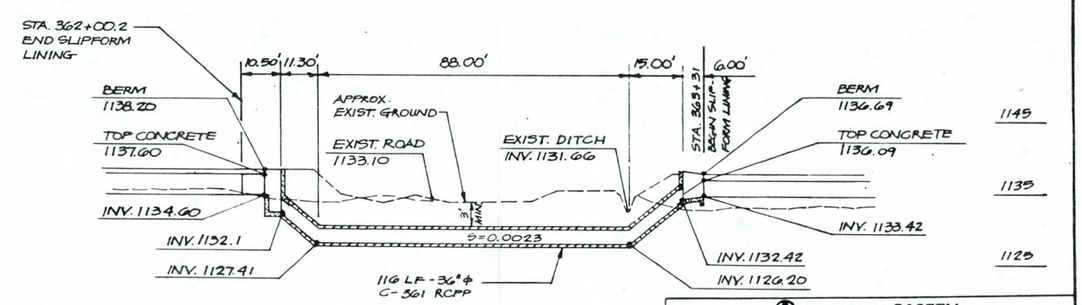
WASTEWAY



M-8



SECTION A - A



SECTION B - B

SCALE OF FEET: 20 0 20 40 60

263-1100

Date	FEB 1985
Designed	MAF
Drawn	JJC
Checked	RFN
Revised	

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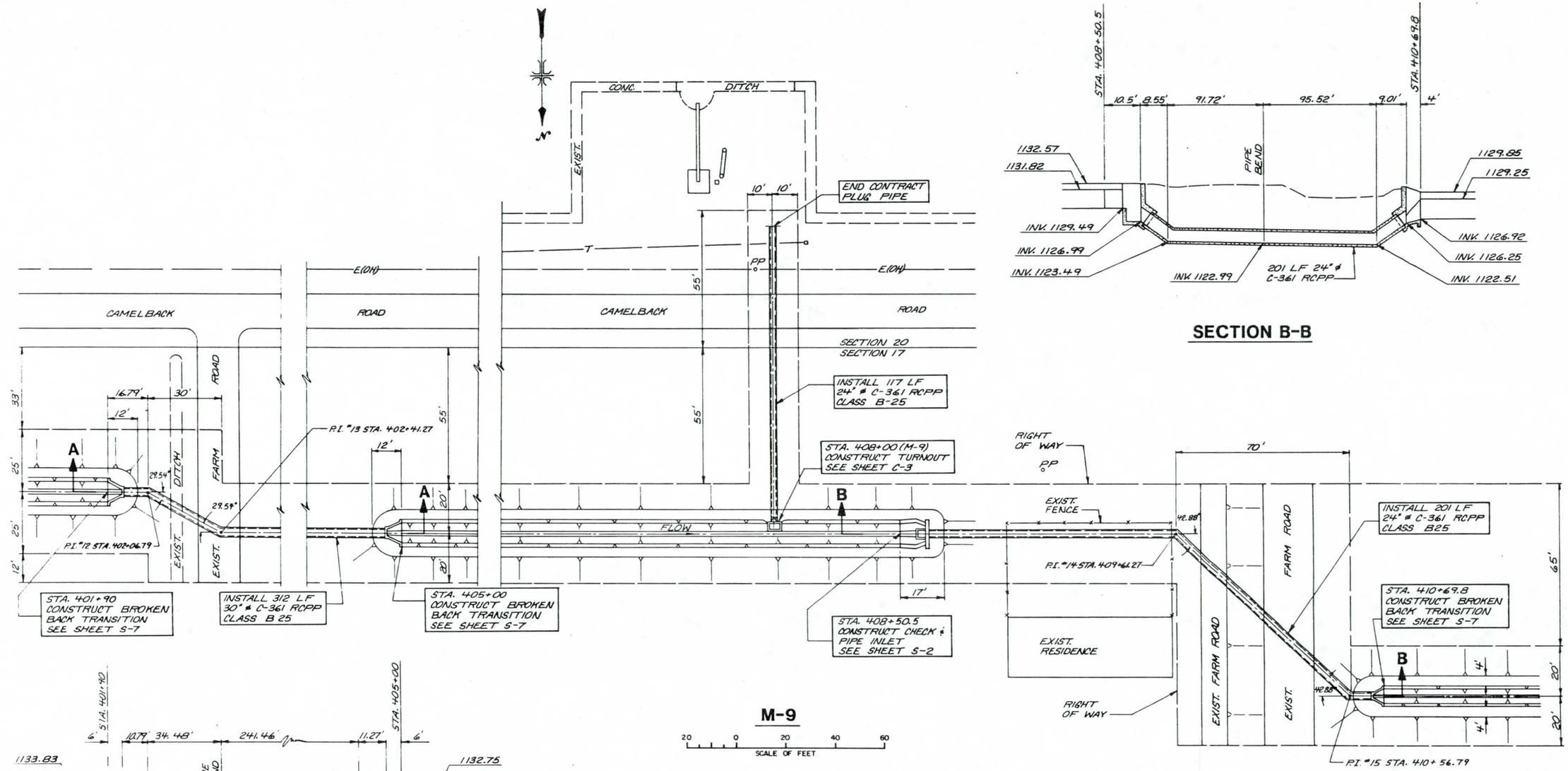
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION - ARIZONA

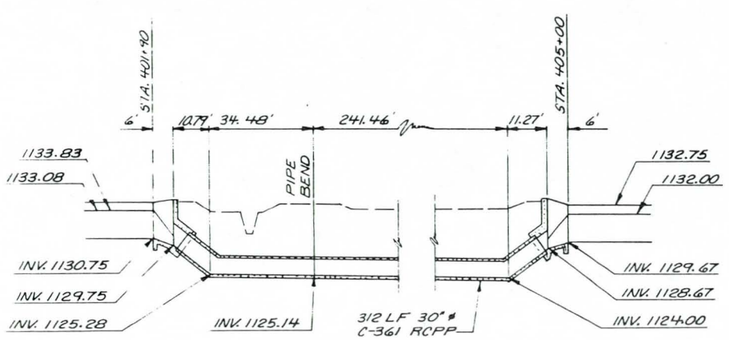
TONOPAH DISTRIBUTION SYSTEM
SITE PLANS
TURNOUT M-8 & WASTEWAY

DESIGNED MAF SUBMITTED
DRAWN JJC RECOMMENDED
CHECKED RFN APPROVED

344-330-6875



SECTION B-B



SECTION A-A

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DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT

TONOPAH DISTRIBUTION SYSTEM

SITE PLAN

TURNOUT M-9

Date	FEB. 1985
Designed	MAF
Drawn	DEJ
Checked	RFN
Revised	

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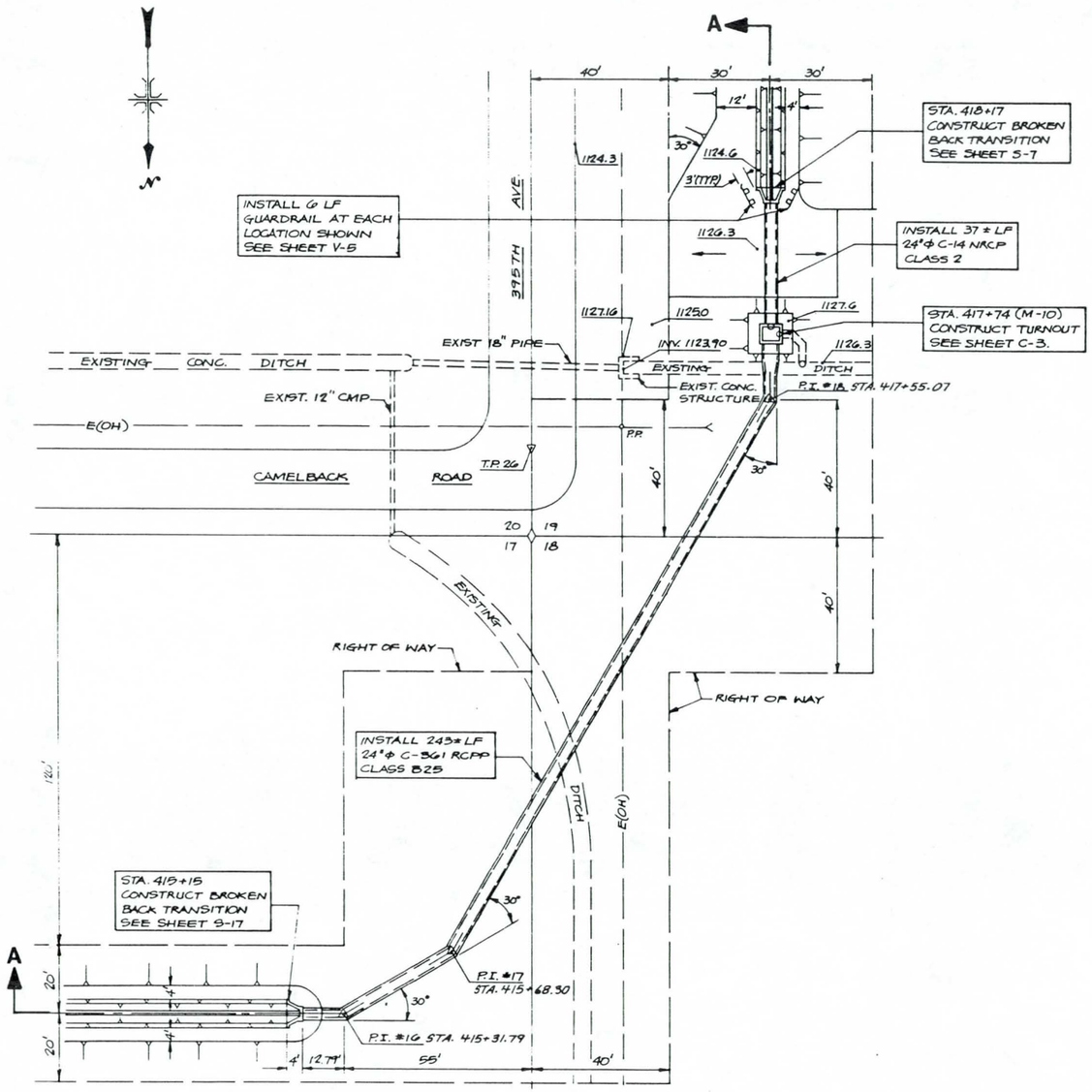
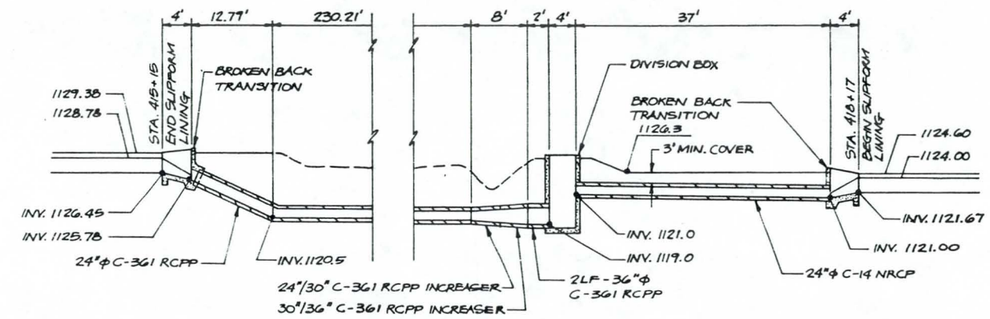
10407/C-11

DESIGNED MAF SUBMITTED
DRAWN DEJ RECOMMENDED
CHECKED RFN APPROVED

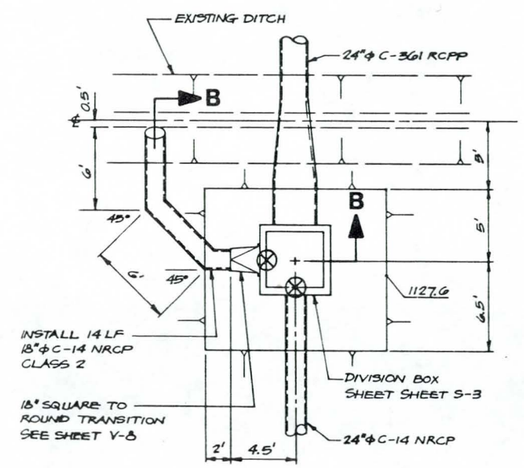
344-330-6876



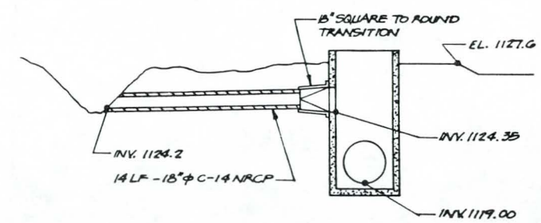
M-10



SECTION A-A



PLAN



SECTION B-B

TURNOUT DETAILS

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BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM
SITE PLAN & DIVISION BOX DETAILS
TURNOUT M-10

DESIGNED MAF SUBMITTED
DRAWN SBM RECOMMENDED
CHECKED RFN APPROVED

Two working days before you dig
CALL FOR THE BLUE STAKES
263-1100
Blue Stake Center
CALL COLLECT

Date	FEB. 1985
Designed	MAF
Drawn	SBM
Checked	RFN
Revised	

Franzoy•Corey
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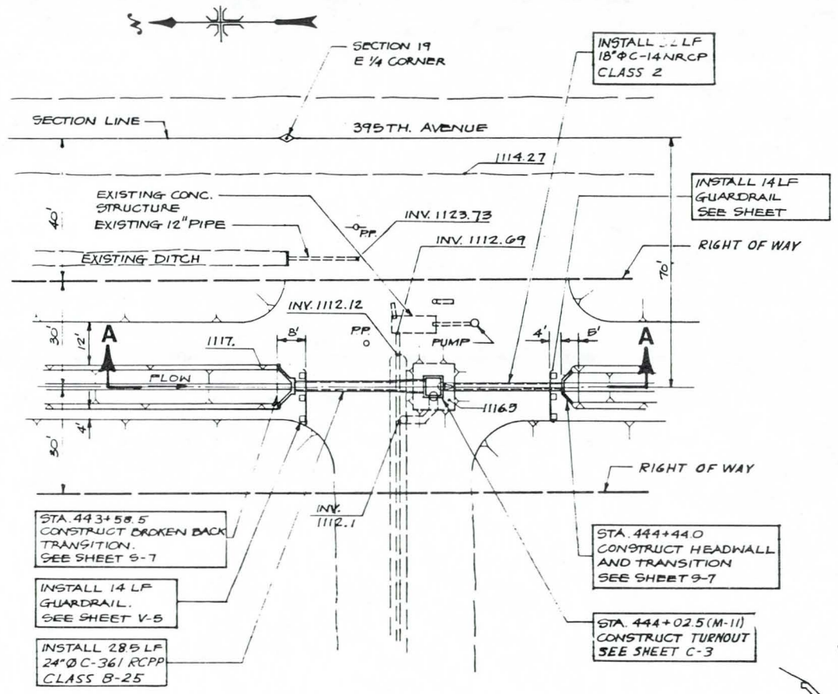
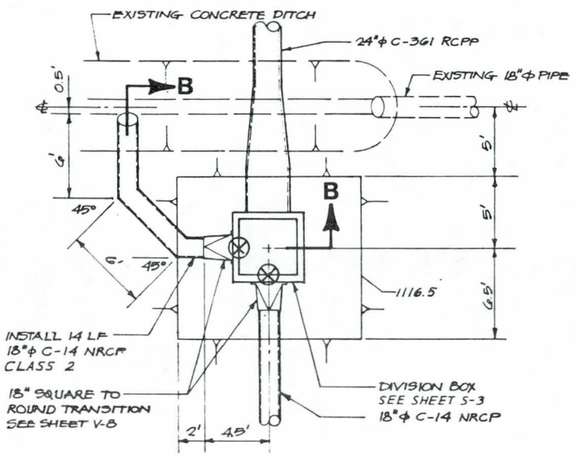
10407 / C-12

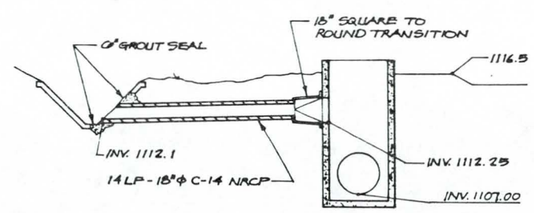
344-330-6877



M-11

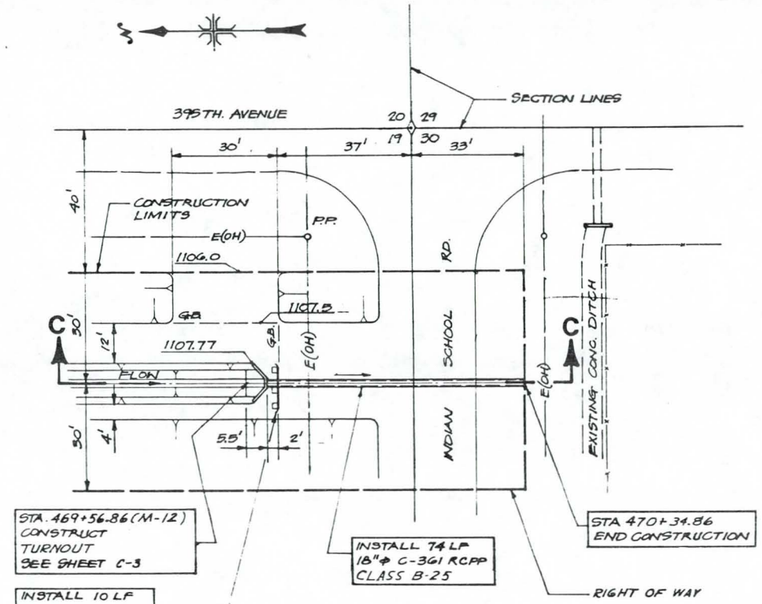


PLAN

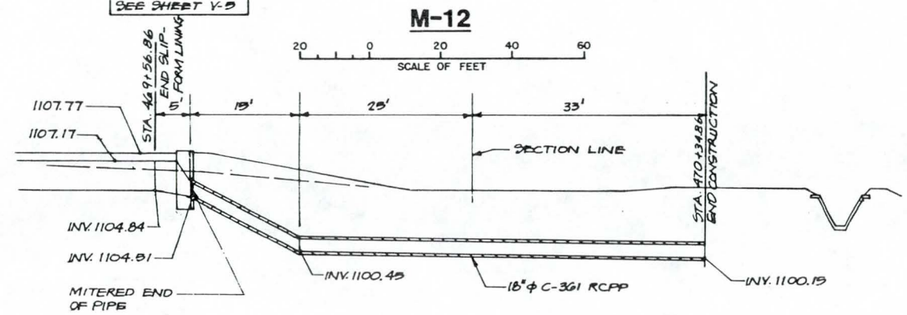


SECTION B-B

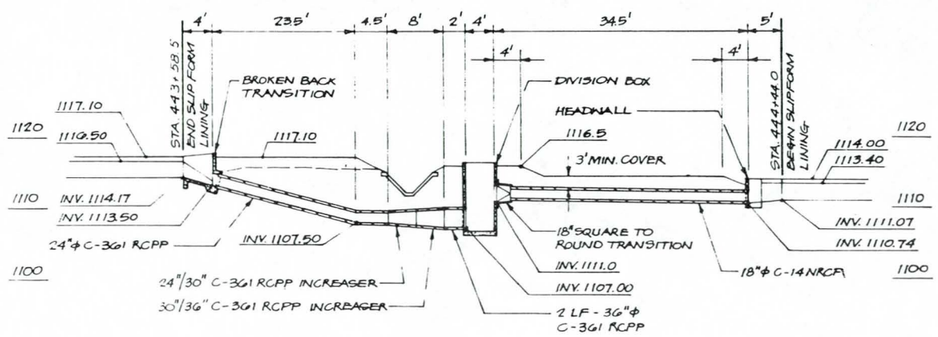
TURNOUT DETAILS



M-12



SECTION C-C



SECTION A-A

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIRIBUTION SYSTEM

SITE PLANS
TURNOUTS M-11 & M-12

Date	FEB 1985
Designed	MAF
Drawn	JRA
Checked	RFN
Revised	

Franzoy•Corey
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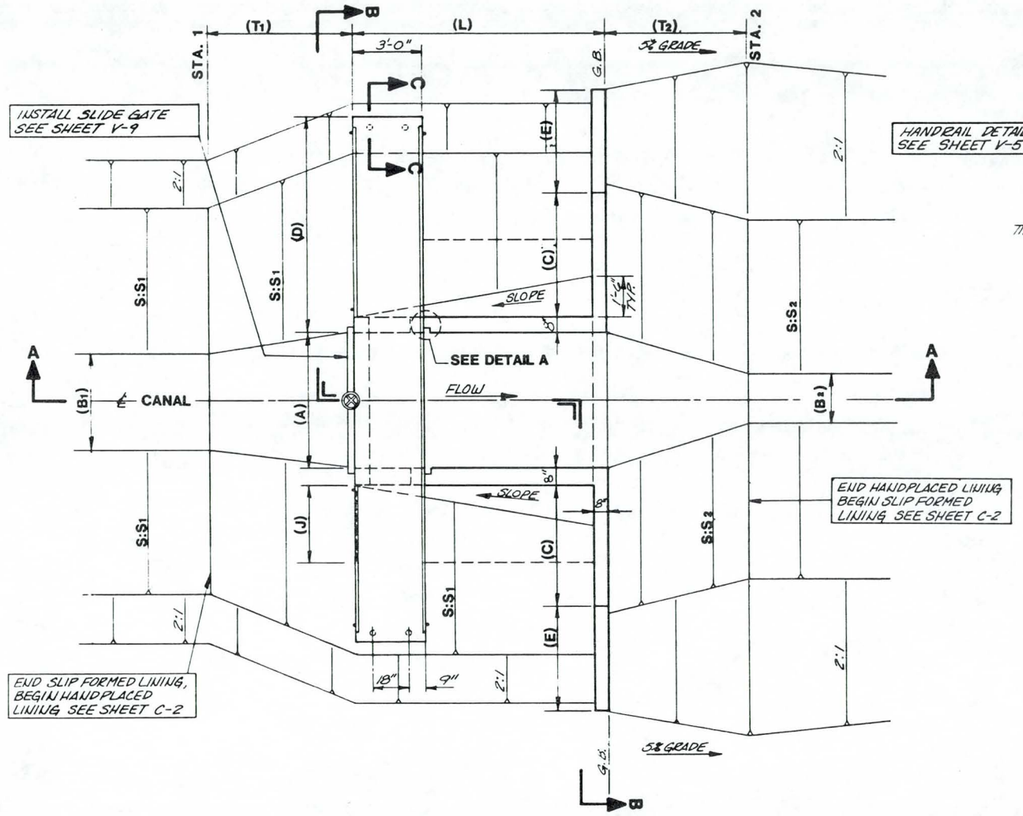
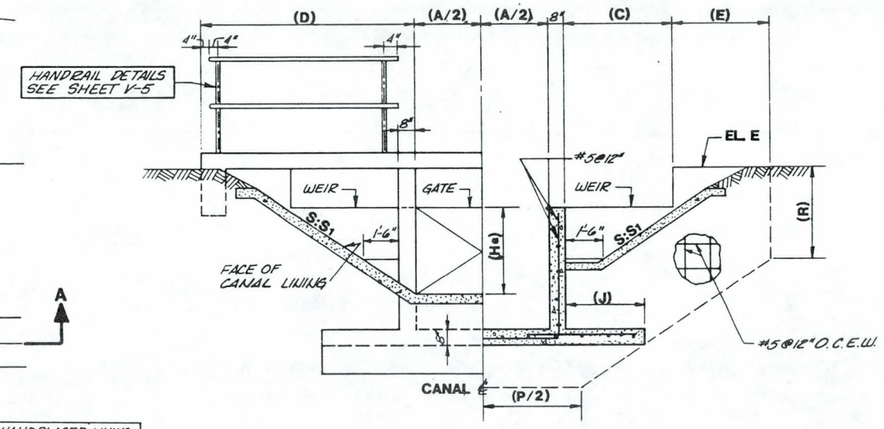
DESIGNED MAF SUBMITTED
DRAWN JBA RECOMMENDED
CHECKED RFN APPROVED

344-330-6878

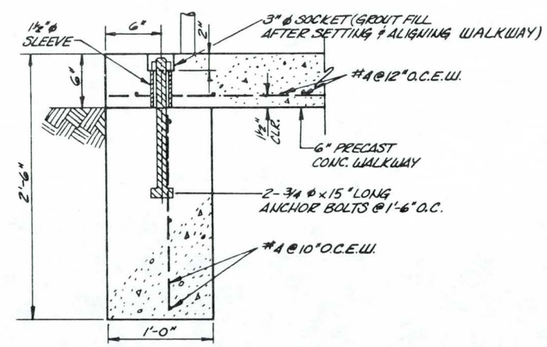
Two working days before you dig
CALL FOR THE BLUE STAKES
263-1100
Blue Stake Center
CALL COLLECT



PLAN - CHECK DROP STRUCTURE

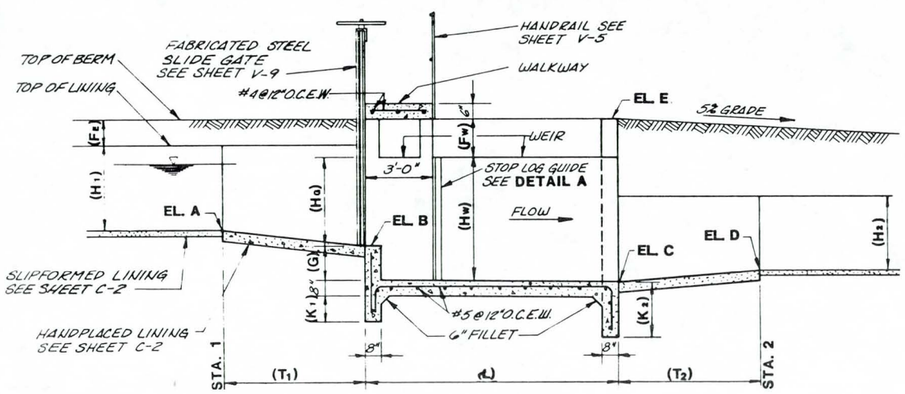


SECTION B - B

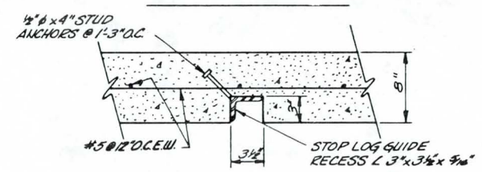


SECTION C - C

CHECK DROP SCHEDULE				
CANAL	MAIN	MAIN		LAT.1
STA. #1	204+20	310+39		2+09
STA. #2	204+44.67	310+56		2+27
A	3'-6"	3'-0"		2'-0"
B1	3'-0"	3'-0"		2'-0"
B2	3'-0"	2'-0"		2'-0"
C	4'-4"	3'-0"		1'-6"
D	8'-0"	8'-0"		5'-6"
E	5'-3"	3'-6"		6'-10"
FE	1'-4"	0'-9.50"		0'-9"
FW	2'-0"	1'-6"		1'-8"
G	2'-6"	-0-		2'-6"
H1	3'-8"	3'-0"		2'-4"
H2	3'-8"	3'-0"		2'-4"
HQ	3'-6"	3'-0"		2'-0"
HW	6'-0"	3'-0"		4'-6"
J	4'-4"	-0-		3'-6"
K1	1'-10"	1'-10"		1'-10"
K2	2'-6"	2'-6"		2'-6"
L	10'-0"	5'-0"		6'-0"
P	8'-0"	4'-6"		6'-0"
R	5'-3"	2'-9"		4'-0"
S:S1	1.5:1	1.5:1		1.25:1
S:S2	1.5:1	1.25:1		1.25:1
T1	8'-8"	6'-0"		6'-0"
T2	6'-0"	6'-0"		6'-0"
EL. A	1210.36	1153.75		1209.94
EL. B	1209.94	1153.00		1209.44
EL. C	1207.44	1153.00		1206.94
EL. D	1208.02	1153.75		1207.44
EL. E	1215.19	1157.50		1213.11



SECTION A - A



DETAIL A

Date	FEB 1985
Designed	MAF
Drawn	SBM
Checked	RFN
Revised	

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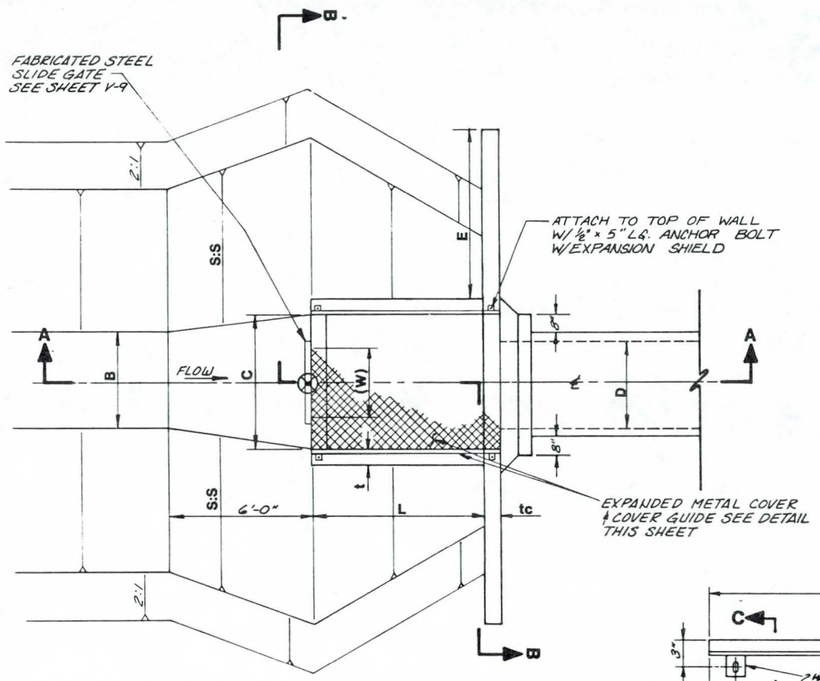
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

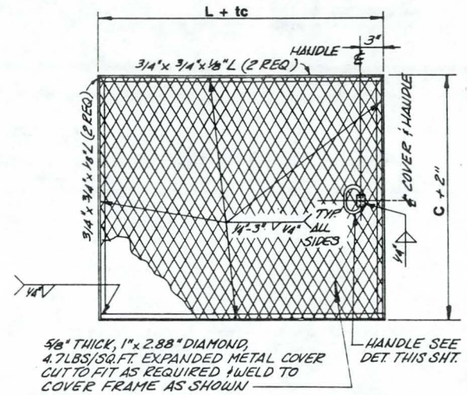
CHECK DROP STRUCTURE

DESIGNED MAF SUBMITTED
DRAWN SBM RECOMMENDED
CHECKED RFN APPROVED

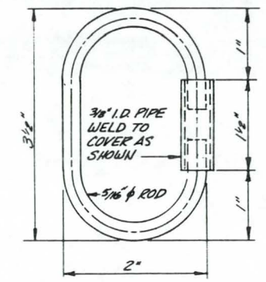
344-330-6879



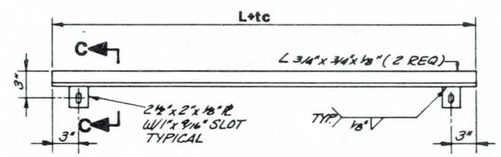
PLAN



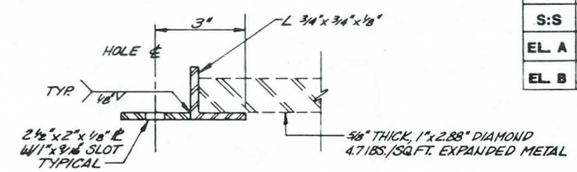
COVER DETAIL



HANDLE DETAIL



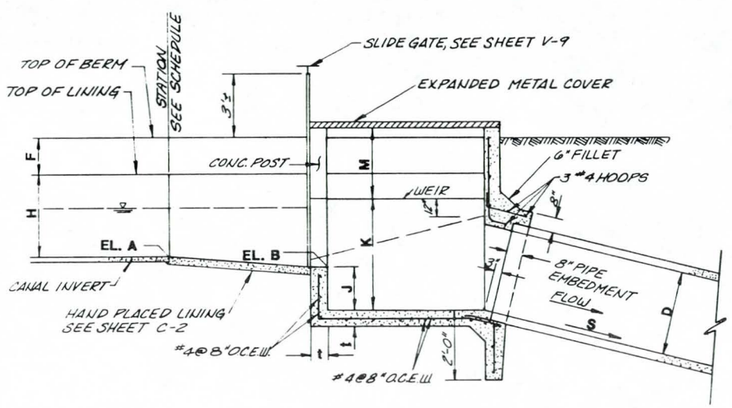
PLAN - COVER GUIDE



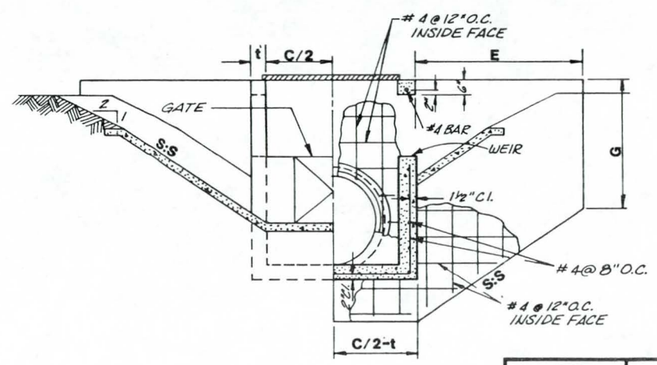
SECTION C-C

CHECK AND PIPE INLET SCHEDULE

STA.	230+48.16	256+89	283+10	362+00.2	408+50.5
B	3'-0"	3'-0"	3'-0"	2'-0"	2'-0"
C	4'-0"	3'-0"	3'-0"	3'-0"	3'-0"
D	4'-0"	3'-0"	3'-0"	3'-0"	2'-0"
E	6'-6"	5'-0"	6'-8"	5'-0"	4'-0"
F	1'-0"	1'-0"	0'-9.5"	0'-7.25"	0'-9"
G	4'-5"	7'-2"	4'-5"	4'-2"	4'-7"
H	3'-4"	3'-4"	3'-0"	3'-0"	2'-4"
J	2'-3"	3'-6"	2'-6"	2'-6"	2'-6"
K	3'-9"	6'-6"	3'-6"	4'-0"	4'-6"
L	4'-6"	5'-0"	5'-0"	4'-6"	4'-6"
M	3'-0"	2'-0"	3'-4"	2'-2"	1'-8"
S	0.410	0.008	0.268	0.415	0.414
t	0'-6"	0'-8"	0'-6"	0'-6"	0'-6"
tc	0'-8"	0'-8"	0'-8"	0'-6"	0'-6"
W	1'-6"	3'-0"	1'-0"	1'-6"	2'-0"
S:S	1.5:1	1.5:1	1.5:1	1.25:1	1.25:1
EL. A	1193.25	1178.14	1165.00	1134.60	1129.49
EL. B	1193.25	1178.14	1165.00	1134.60	1129.49



SECTION A-A



SECTION B-B

ALWAYS THINK SAFETY

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DEPARTMENT OF THE INTERIOR
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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION - ARIZONA

TONOPAH DISTRIBUTION SYSTEM

CHECK AND PIPE INLET

Date FEB. 1985
Designed MAF
Drawn SBM
Checked RFN
Revised

Franzoy·Corey
ENGINEERS & ARCHITECTS
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DESIGNED MAF SUBMITTED
DRAWN SBM RECOMMENDED
CHECKED RFN APPROVED

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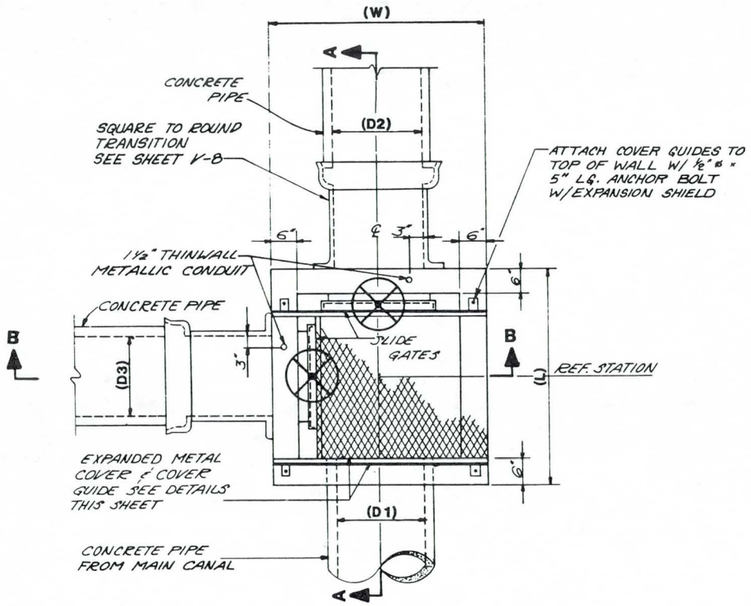
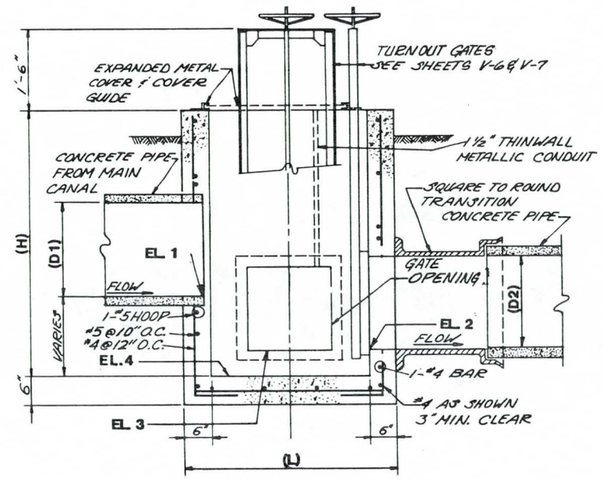
344-330-6880

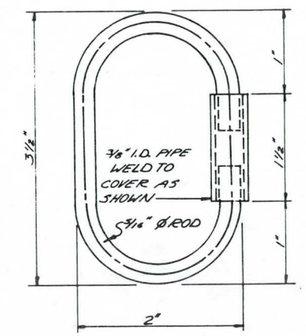


PLAN - DIVISION BOX

NOTE: DIVISION BOX SHOWN BRANCHING LEFT. DIVISION BOX BRANCHING RIGHT SHALL BE REVERSED ABOUT ℄.



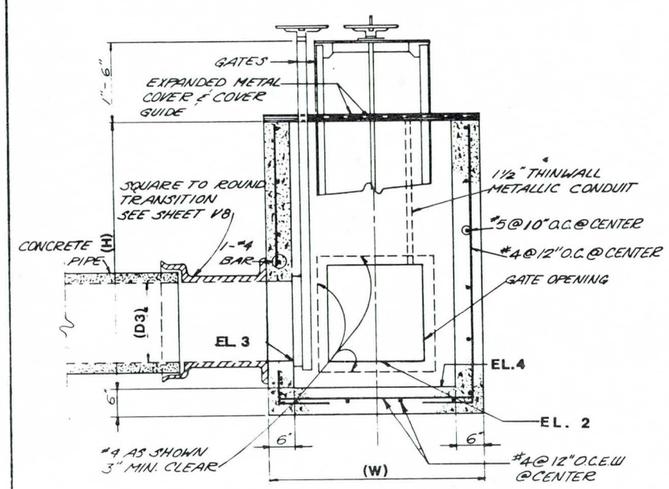
SECTION A-A



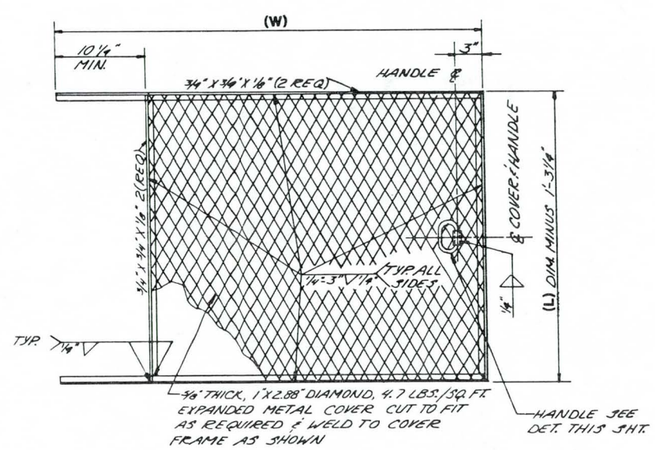
HANDLE DETAIL

DIVISION BOX SCHEDULE			
CANAL	MAIN	MAIN	LATERAL 3
REF. MARK	417+74	444+02.5	1+14.25
BRANCH SIDE	RIGHT	RIGHT	LEFT
L	5'-0"	5'-0"	5'-0"
W	5'-0"	5'-0"	5'-3"
H	10'-2"	10'-2"	10'-6"
D1	3'-0"	3'-0"	3'-6"
D2	2'-0"	1'-6"	2'-6"
D3	1'-6"	1'-6"	2'-0"
EL. 1	1119.00	1107.00	1171.92
EL. 2	1121.00	1111.00	1176.32
EL. 3	1124.35	1112.25	1175.60
EL. 4	1118.77	1106.67	1171.54
REMARKS	SEE NOTE	SEE C-13	SEE C-8

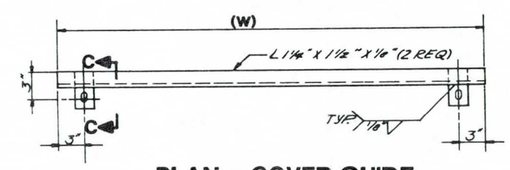
NOTE: SQUARE TO ROUND TRANSITION NOT REQUIRED ON "D2" SIDE OF DIVISION BOX AT STA. 417+74 SEE SHEET C-12.



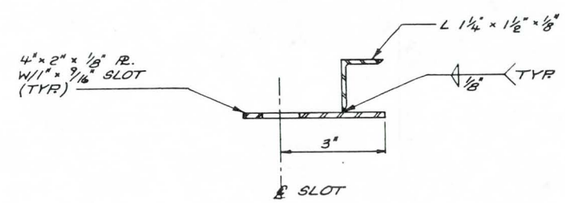
SECTION B-B



COVER DETAIL



PLAN - COVER GUIDE



SECTION C - C

COVER GUIDE DETAIL

ALWAYS THINK SAFETY

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION - ARIZONA

TONOPAH DISTRIBUTION SYSTEM

DIVISION BOX

Date	FEB 1985
Designed	MAF
Drawn	JJG
Checked	RFN
Revised	

Franzoy·Corey
ENGINEERS & ARCHITECTS
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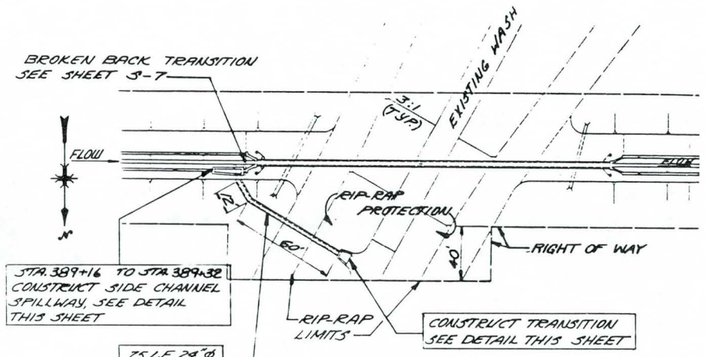
DESIGNED MAF — SUBMITTED Bruce J. Hutchinson
DRAWN JJG — RECOMENDED Wayne F. Anderson
CHECKED RFN — APPROVED

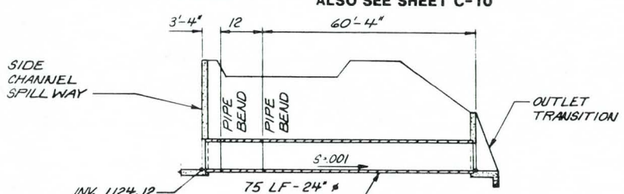
10407/S-3

344-330-6881

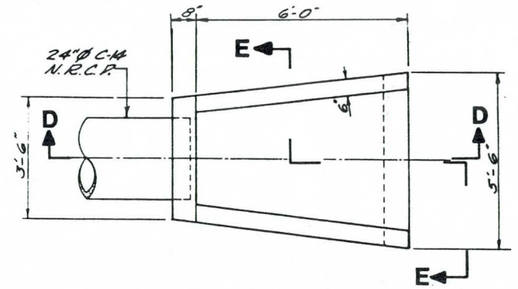


PLAN-WASTEWAY

ALSO SEE SHEET C-10



LONGITUDINAL SECTION



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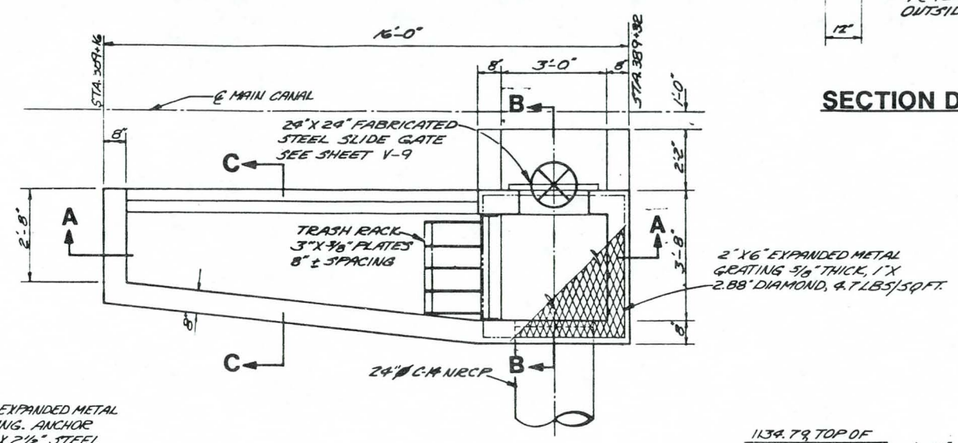
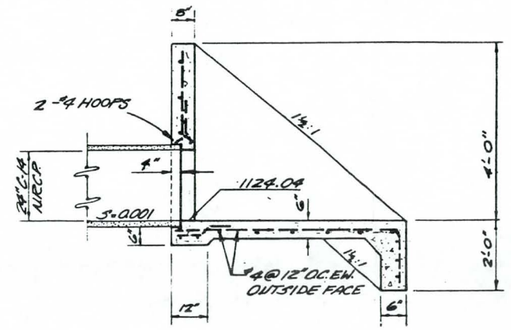
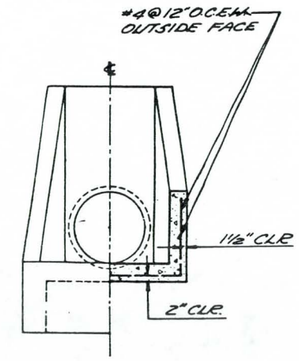


PLAN- SIDE CHANNEL SPILLWAY

N.T.S.



SECTION D - D



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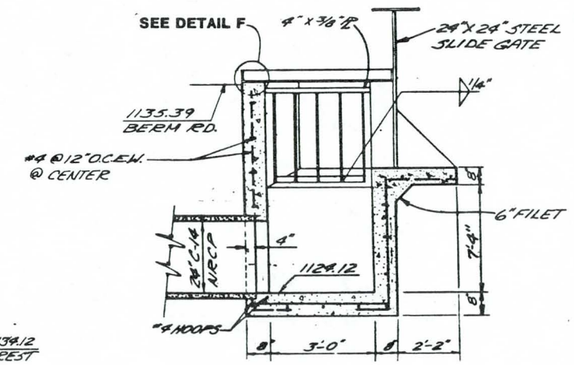

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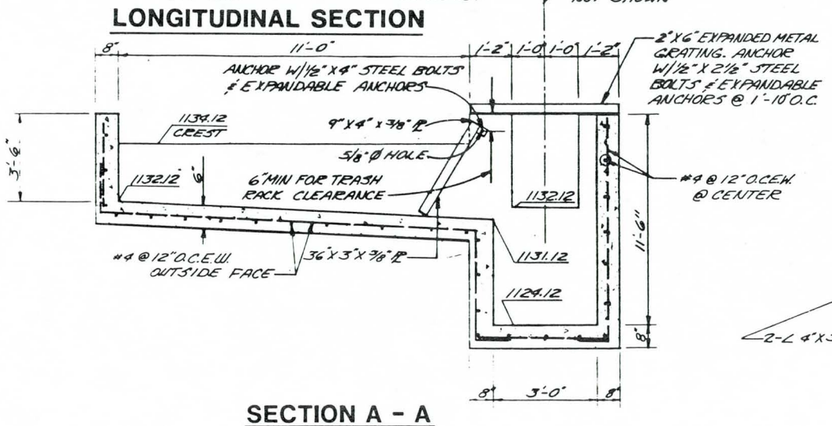
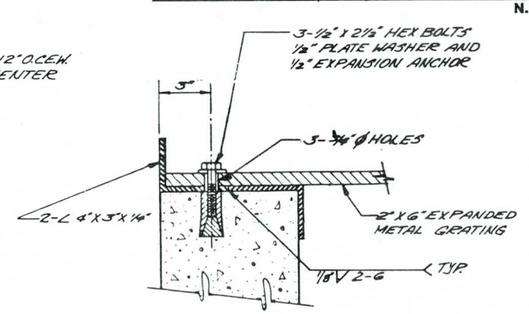
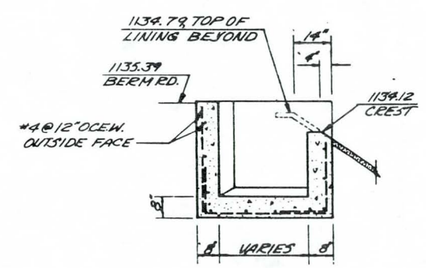


SECTION A - A



DETAIL F



SECTION C - C

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DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

WASTEWAY

DESIGNED	M A F	SUBMITTED	Bruce J. Hutchison
DRAWN	J J C	RECOMENDED	Kenneth E. Anderson
CHECKED	R F N	APPROVED	

Date FEB. 1985
Designed M A F
Drawn J J C
Checked R F N
Revised

Franzoy•Corey
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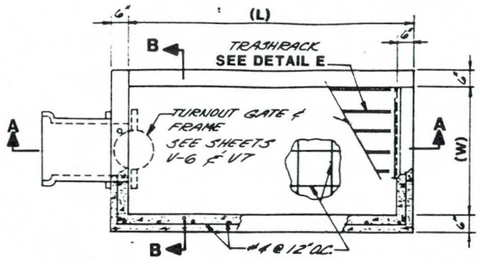
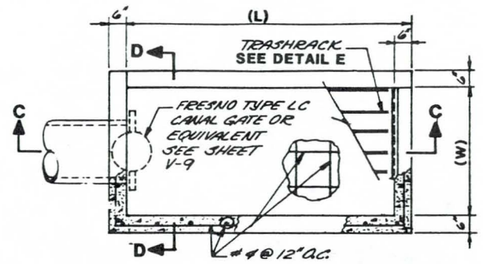


PLAN - TYPE I TURNOUT STRUCTURE



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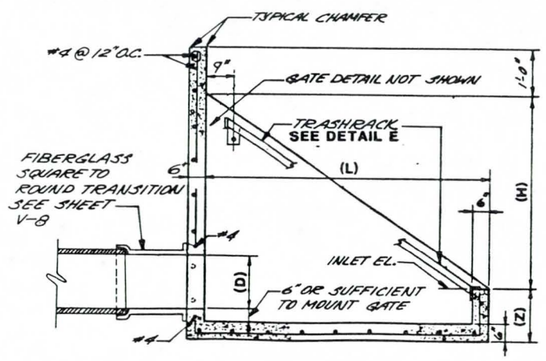
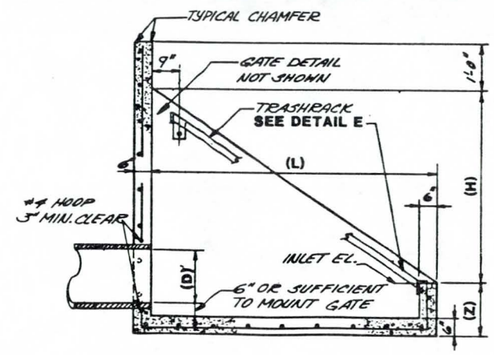
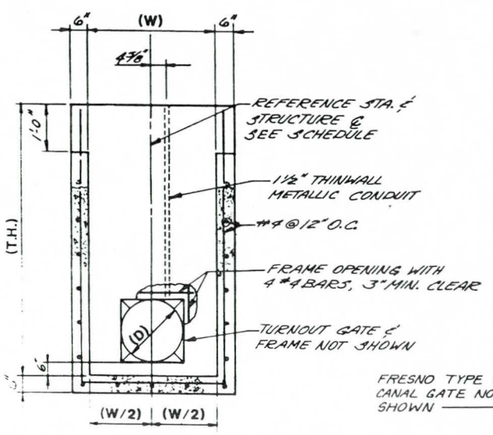


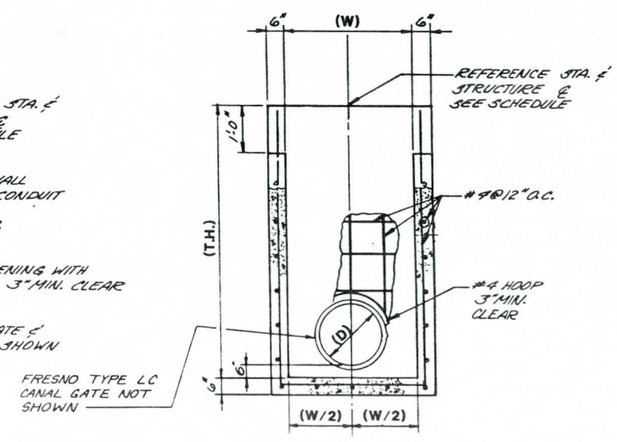
SECTION A - A



SECTION C - C



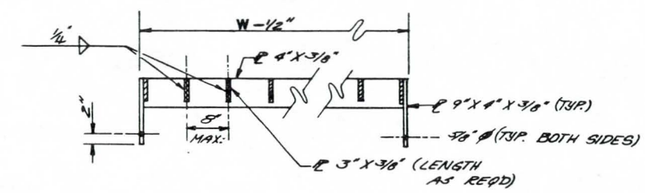
SECTION B - B



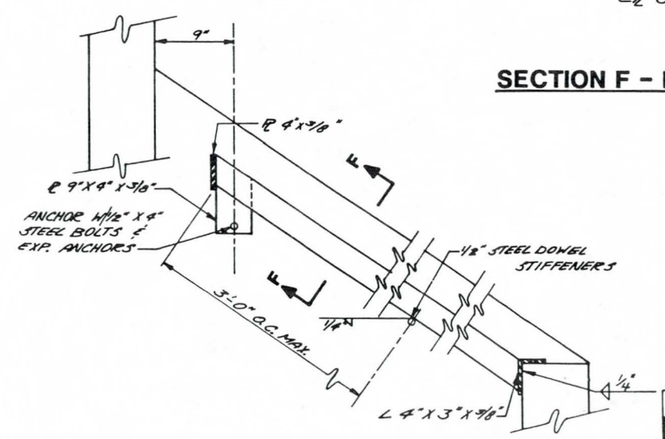
SECTION D - D

TURNOUT STRUCTURE SCHEDULE

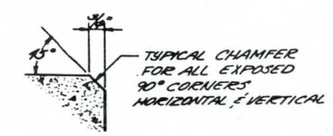
CANAL	STATION	TURNOUT	TYPE	L	W	H	Z	T.H.	D	INLET EL.	REMARKS
MAIN	204+10 RT.	M-1	I	5'-6"	3'-6"	3'-8"	2'-0"	6'-2"	2'-6"	1210.37	LAT. 1 HEADGATE
MAIN	204+10 LT.	M-2	I	5'-6"	3'-6"	3'-8"	2'-0"	6'-2"	1'-6"	1210.37	LAT. 2 HEADGATE
MAIN	230+46	M-3	I	5'-0"	4'-0"	3'-4"	2'-6"	6'-4"	2'-0"	1193.25	FIELD TURNOUT
MAIN	256+86.5	M-4	II	5'-0"	4'-0"	3'-4"	2'-6"	6'-4"	3'-0"	1178.64	LAT. 3 HEADGATE
MAIN	283+05	M-5	I	4'-6"	3'-0"	3'-0"	3'-9"	7'-3"	2'-0"	1165.00	LAT. 4 HEADGATE
MAIN	310+34	M-6	I	4'-6"	3'-0"	3'-0"	4'-6"	8'-0"	2'-0"	1153.75	FIELD TURNOUT
MAIN	335+89.9	M-7	II	3'-9"	4'-0"	3'-0"	3'-0"	6'-6"	3'-0"	1137.84	GATE NOT REQ'D
MAIN	361+98	M-8	I	3'-9"	4'-0"	3'-0"	3'-0"	6'-6"	2'-0"	1134.60	FIELD TURNOUT
MAIN	408+00	M-9	I	2'-11"	3'-0"	2'-4"	2'-0"	4'-10"	2'-0"	1129.52	FIELD TURNOUT
LAT. 1	2+05	L-1-1	I	2'-11"	3'-0"	2'-4"	2'-0"	4'-10"	2'-0"	1209.95	FIELD TURNOUT



SECTION F - F



DETAIL E



CHAMFER DETAIL

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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION - ARIZONA

TONOPAH DISTRIBUTION SYSTEM

TURNOUT STRUCTURE -

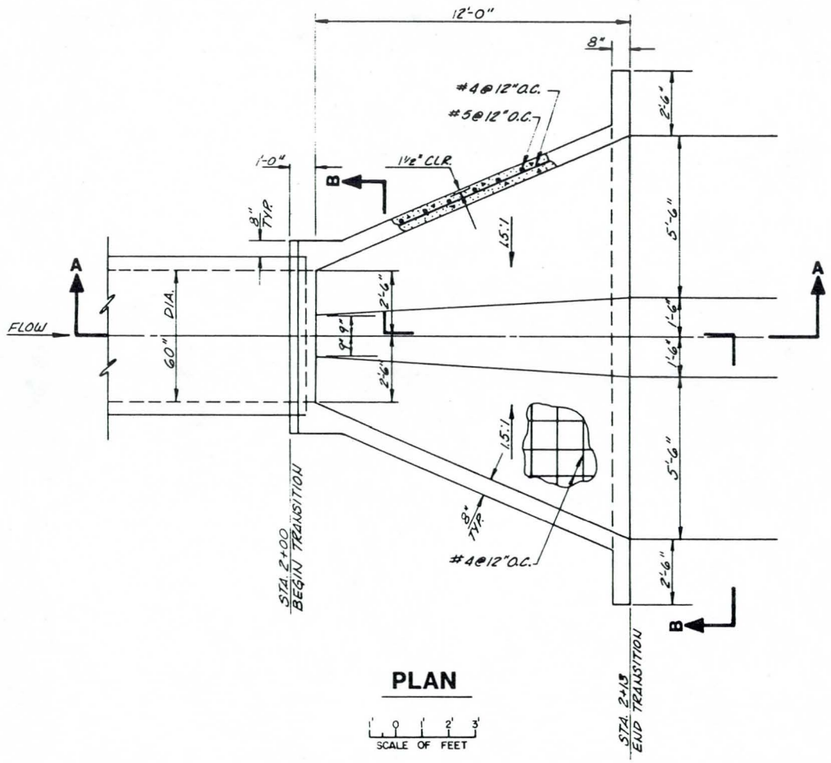
Date	FEB 1985
Designed	M.A.F.
Drawn	J.V.C.
Checked	R.F.N.
Revised	

Franzoy•Corey
ENGINEERS & ARCHITECTS
Cooperative Stewardspositions • 3030 E. Sunrise Drive, Phoenix, Arizona 85044 • (602) 838-8626

DESIGNED M.A.F. SUBMITTED
DRAWN J.V.C. RECOMMENDED
CHECKED R.F.N. APPROVED

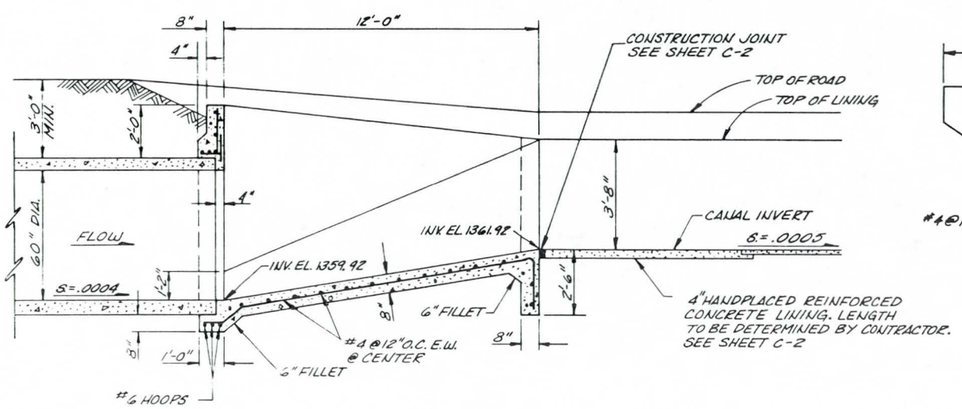
10407/S-5

344-330-6883

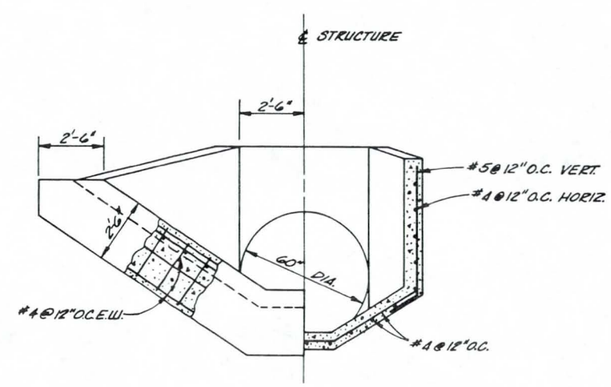


PLAN

SCALE OF FEET



SECTION A - A



SECTION B - B

ALWAYS THINK SAFETY

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION - ARIZONA

TONOPAH DISTRIBUTION SYSTEM

C.A.P. TURNOUT TRANSITION STRUCTURE

Date	FEB 1985
Designed	MAF
Drawn	SBM
Checked	RFN
Revised	

Franzoy•Corey
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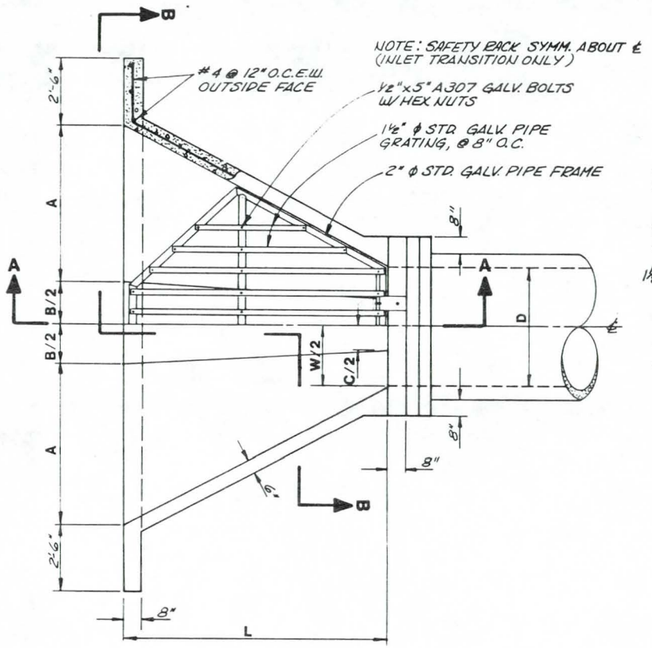
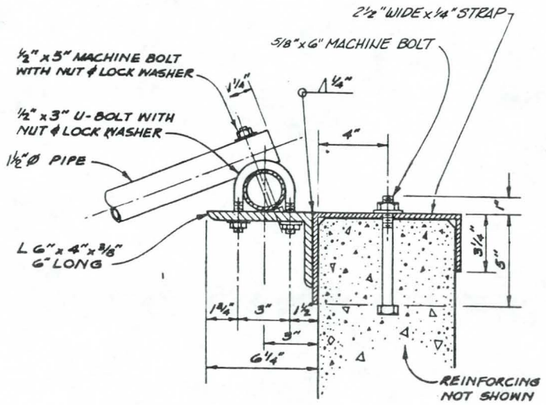
DESIGNED MAF SUBMITTED
DRAWN SBM RECOMMENDED
CHECKED RFN APPROVED

344-330-6884



BROKEN BACK PLAN TRANSITION

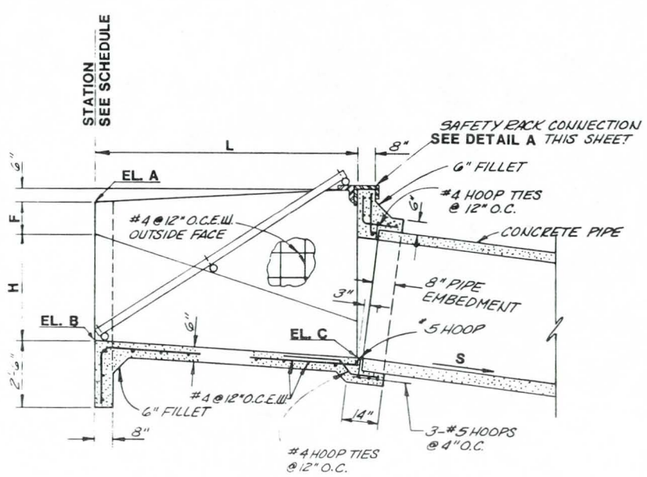


DETAIL A

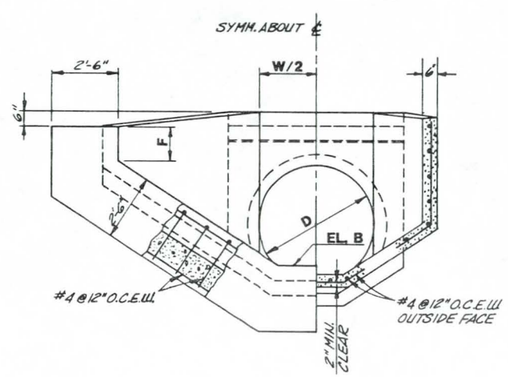
HEADWALL SCHEDULE		
CANAL	STATION	REMARKS
MAIN	444+44	SEE C-13
MAIN	469+56.86	SEE C-13
LAT. 2	0+98.34	SEE C-6
LAT. 2	19+50	SEE C-4
LAT. 2	20+50	SEE C-4
LAT. 2	38+40.53	SEE C-7
LAT. 4	1+70.7	SEE C-9
LAT. 4	26+57	SEE C-6

BROKEN BACK TRANSITION SCHEDULE

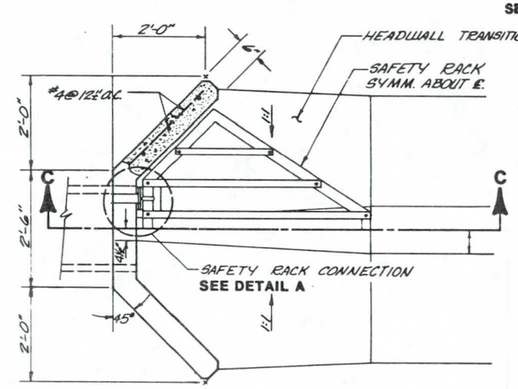
	STATION	EL. A	EL. B	EL. C	A	B	C	D	F	H	L	S	W	REMARKS
MAIN CANAL	60+00	1309.07	1304.07	1302.07	5'-6"	3'-0"	1'-1"	3'-6"	1'-4"	3'-8"	10'-0"	0.268	3'-6"	
	63+00	1306.96	1301.96	1300.29	5'-6"	3'-0"	1'-1"	3'-6"	1'-4"	3'-8"	10'-0"	0.268	3'-6"	
	154+30	1229.11	1224.11	1222.11	5'-6"	3'-0"	1'-4½"	4'-6"	1'-4"	3'-8"	10'-0"	0.268	4'-6"	
	158+30	1228.06	1223.06	1221.39	5'-6"	3'-0"	1'-4½"	4'-6"	1'-4"	3'-8"	10'-0"	0.268	4'-6"	
	167+10	1227.62	1222.62	1220.62	5'-6"	3'-0"	1'-4½"	4'-6"	1'-4"	3'-8"	10'-0"	0.268	4'-6"	
	172+10	1226.44	1221.44	1219.77	5'-6"	3'-0"	1'-4½"	4'-6"	1'-4"	3'-8"	10'-0"	0.268	4'-6"	
	231+71.57	1196.01	1191.68	1190.01	5'-0"	3'-0"	1'-3"	4'-0"	1'-0"	3'-4"	10'-0"	0.429	4'-0"	
	257+41.5	1179.47	1175.64	1174.39	4'-6"	3'-0"	0'-11"	3'-0"	0'-10"	3'-0"	10'-0"	-0.008	3'-0"	
	284+36	1166.33	1162.50	1161.25	4'-6"	3'-0"	0'-11'	3'-0"	0'-10"	3'-0"	10'-0"	0.273	3'-0"	
	336+57.9	1139.54	1135.87	1134.54	3'-9"	2'-0"	1'-1"	3'-0"	0'-8"	3'-0"	8'-0"	-0.023	3'-0"	
	363+31	1136.75	1133.42	1132.42	3'-4"	2'-0"	1'-1"	3'-0"	0'-8"	2'-8"	6'-0"	0.415	3'-0"	
	389+33	1135.45	1132.12	1130.87	3'-4"	2'-0"	3'-0"	2'-6"	0'-8"	2'-8"	5'-0"	0.425	3'-0"	SAFETY RACK NOT REQ'D INSTALL GATE (SHEET V-9)
	391+40	1134.36	1131.28	1130.28	2'-11"	2'-0"	0'-10½"	2'-6"	0'-9"	2'-4"	6'-0"	0.285	2'-6"	
	401+90	1133.83	1130.75	1129.75	2'-11"	2'-0"	0'-10½"	2'-6"	0'-9"	2'-4"	6'-0"	0.414	2'-6"	
	405+00	1132.75	1129.67	1128.67	2'-11"	2'-0"	0'-10½"	2'-6"	0'-9"	2'-4"	6'-0"	0.414	2'-6"	
	410+69.8	1129.85	1126.92	1126.25	2'-4"	1'-0"	0'-10"	2'-0"	0'-8"	2'-4"	4'-0"	0.414	2'-0"	
	415+15	1129.45	1126.45	1125.78	2'-4"	1'-0"	0'-10"	2'-0"	0'-8"	2'-4"	4'-0"	0.413	2'-0"	
	418+17	1124.67	1121.67	1121.00	2'-4"	1'-0"	0'-10"	2'-0"	0'-8"	2'-4"	4'-0"	0.000	2'-0"	
	443+58.5	1117.50	1114.17	1113.50	2'-4"	1'-0"	0'-10"	2'-0"	0'-8"	2'-4"	4'-0"	0.255	2'-0"	
LAT. 1	0+58.75	1213.15	1210.07	1209.07	2'-11"	2'-0"	0'-10½"	2'-6"	0'-9"	2'-4"	6'-0"	-0.007	2'-6"	
	26+26	1206.56	1203.48	1202.48	2'-11"	2'-0"	0'-10½"	2'-6"	0'-9"	2'-4"	6'-0"	0.414	2'-6"	
LAT. 3	1+29	1180.40	1177.32	1176.32	2'-11"	2'-0"	0'-10½"	2'-6"	0'-9"	2'-4"	6'-0"	0.001	2'-6"	
	13+12	1179.37	1176.29	1175.29	2'-11"	2'-0"	0'-10½"	2'-6"	0'-9"	2'-4"	6'-0"	0.424	2'-6"	SAFETY RACK NOT REQ'D
	13+62	1179.10	1176.02	1175.02	2'-11"	2'-0"	0'-10½"	2'-6"	0'-9"	2'-4"	6'-0"	0.404	2'-6"	
	26+35.7	1177.96	1174.88	1173.88	2'-11"	2'-0"	0'-10½"	2'-6.	0'-9"	2'-4"	6'-0"	0.500	2'-6"	



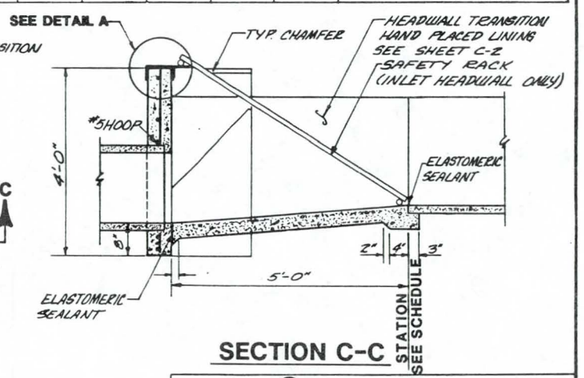
SECTION A - A



SECTION B - B



PLAN



SECTION C-C

HEADWALL W/TRANSITION AND SAFETY RACK

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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

BROKEN BACK TRANSITION & HEADWALL

Date	FEB. 1985
Designed	MAF
Drawn	SBM
Checked	RFN
Revised	

Franzoy•Corey ENGINEERS & ARCHITECTS
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DESIGNED MAF SUBMITTED
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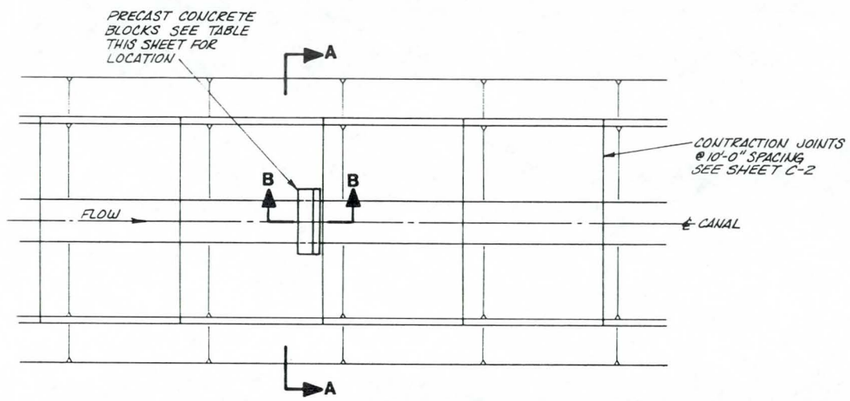
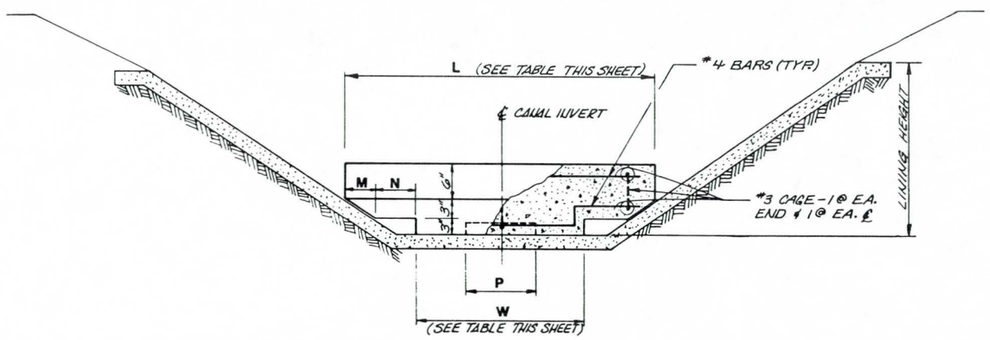
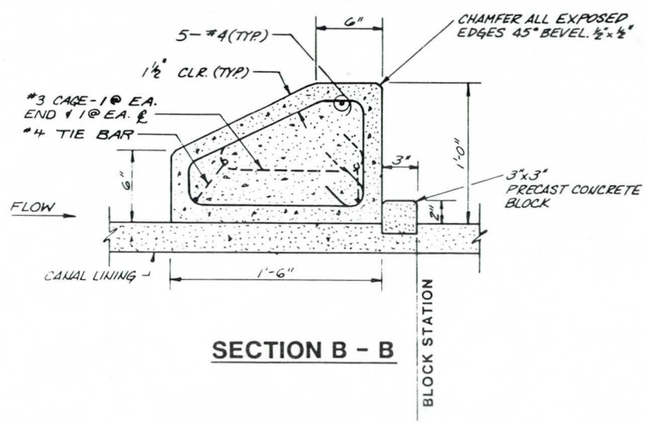


PLAN - CANAL WITH CASCADE BLOCK



SECTION A - A



SECTION B - B

CASCADE BLOCK LOCATION SCHEDULE

FROM STA.	TO STA.	Q cfs.	SLOPE	BASE WIDTH FT.	V MAX FT./SEC.	V MIN. FT./SEC.	D MAX. FT.	D MIN. FT.	BLOCK SPACING FT.	NUMBER OF EQUAL SPACES	UPSTREAM BLOCK STATION	DOWNSTREAM BLOCK STATION
MAIN												
5+13.00	29+13.00	75	.0153	3	4.42	3.16	3.10	2.51	30	79	5+23.00	28+93.00
29+13.00	45+50.18	75	.0046	3	4.89	3.28	3.03	2.35	120	13	29+33.00	44+93.00
45+50.18	56+19.52	75	.0124	3	4.80	3.26	3.04	2.38	40	25	45+75.18	55+75.18
63+00.00	123+56.92	75	.00975	3	4.56	3.20	3.08	2.46	50	122	63+18.00	123+49.53
123+56.92	146+30.00	75	.0078	3	4.70	3.23	3.06	2.41	65	33	124+21.92	145+66.92
186+88.00	201+06.60	75	.00718	3	4.62	3.21	3.07	2.44	70	19	186+98.00	200+28.00
204+44.67	217+27.36	54	.011	3	4.43	2.90	2.66	2.02	45	27	204+72.36	216+87.36
231+71.57	249+83.61	52	.0070	3	4.14	2.81	2.65	2.06	70	25	231+76.57	249+26.57
257+41.51	280+80.44	41	.0045	3	4.06	2.61	2.39	1.78	120	19	257+51.51	280+31.51
284+36.00	301+31.55	35	.0050	3	3.65	2.39	2.28	1.72	100	16	284+41.00	300+41.00
310+56.00	333+08.93	28	.0070	2	4.10	2.53	2.28	1.67	70	31	310+76.00	332+46.00
LATERAL 2												
0+98.34	6+05.07	9	.011	1	3.32	1.87	1.75	1.22	40'	12	1+08.34	5+88.34

SUMMARY OF CASCADE BLOCKS

NO. BLK'S.	BASE WIDTH	L	M	N	P	W	LOCATION
388	3'-0"	4'-5"	0'-4½"	0'-9"	1'-0"	2'-2"	MAIN CANAL
32	2'-0"	3'-2"	0'-3¾"	0'-9"	0'-8"	1'-0½"	MAIN CANAL
13	1'-0"	1'-9"	0'-3"	0'-6½"	0'-4"	0'-4"	LATERAL 2

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GRANITE REEF DIVISION - ARIZONA

TONOPAH DISTRIBUTION SYSTEM

CASCADE BLOCK DETAIL

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 11587 TIMOTHY E. KELLY ARIZONA U.S.A.

Date	FEB 1985
Designed	CDS
Drawn	SBM
Checked	RFN
Revised	

Franzoy, Corey & Associates
Consulting Engineers
1030 E. Guadalupe Road
Tempe, Arizona 85283
602 - 838 - 8626

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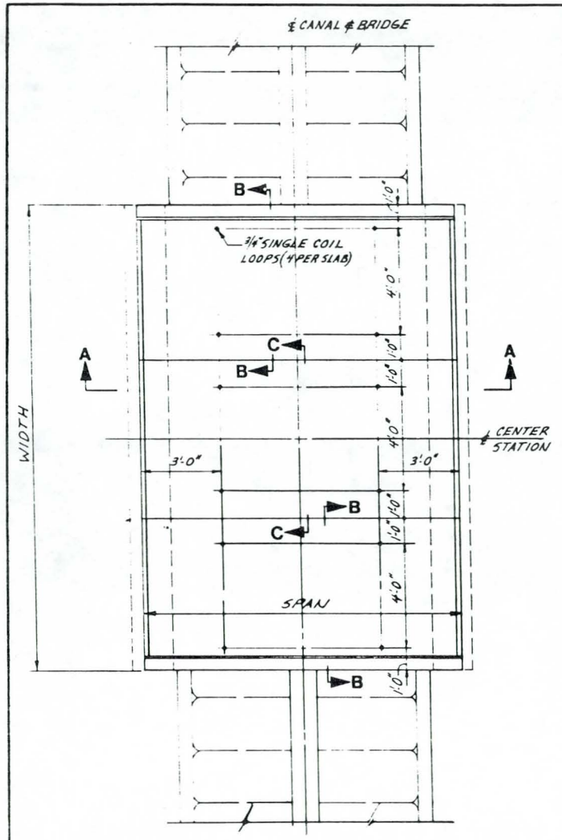
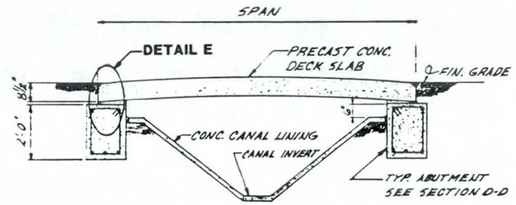
DESIGNED CDS SUBMITTED
DRAWN SBM RECOMMENDED
CHECKED RFN APPROVED

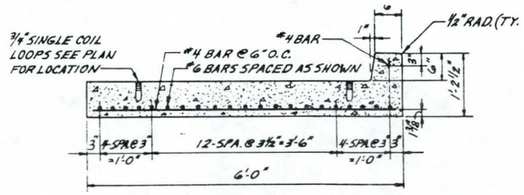
344-330-6886



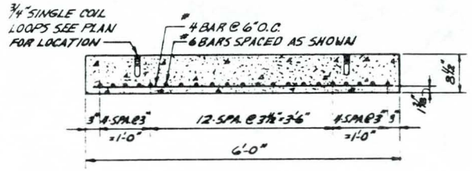
PLAN



SECTION A-A



SECTION B-B



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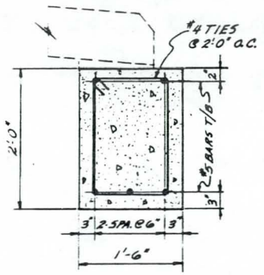

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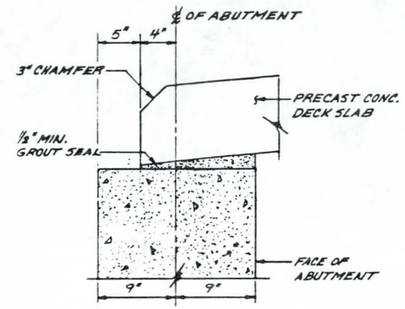
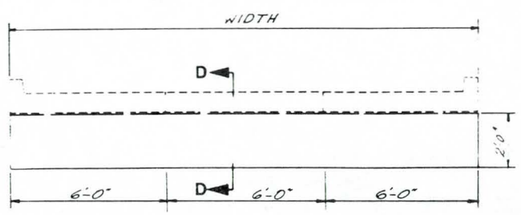


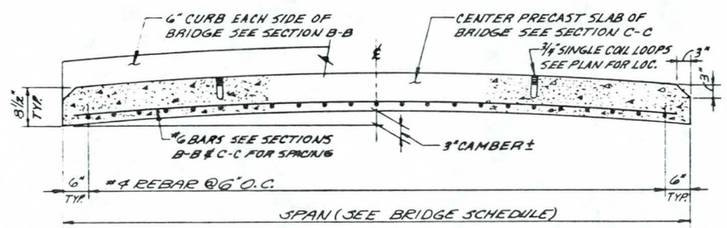
DETAIL E

BRIDGE SCHEDULE

	CENTER STATION	SPAN FT.	WIDTH FT.	FINISH GRADE
CANAL	349+72	13	18	1139.46



ABUTMENT ELEVATION



TYPICAL PRECAST CONCRETE UNIT

LONGITUDINAL SECTION

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GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

BRIDGE

REGISTERED PROFESSIONAL ENGINEER (CIVIL) 11587 TIMOTHY E. SALLY ARIZONA U.S.A.

Date	FEB. 1985
Designed	MAF
Drawn	JJC
Checked	RFN
Revised	

Franzoy•Corey
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• PHOENIX • MESA • TUCSON • PRESCOTT
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DRAWN JJC RECOMMENDED
CHECKED RFN APPROVED

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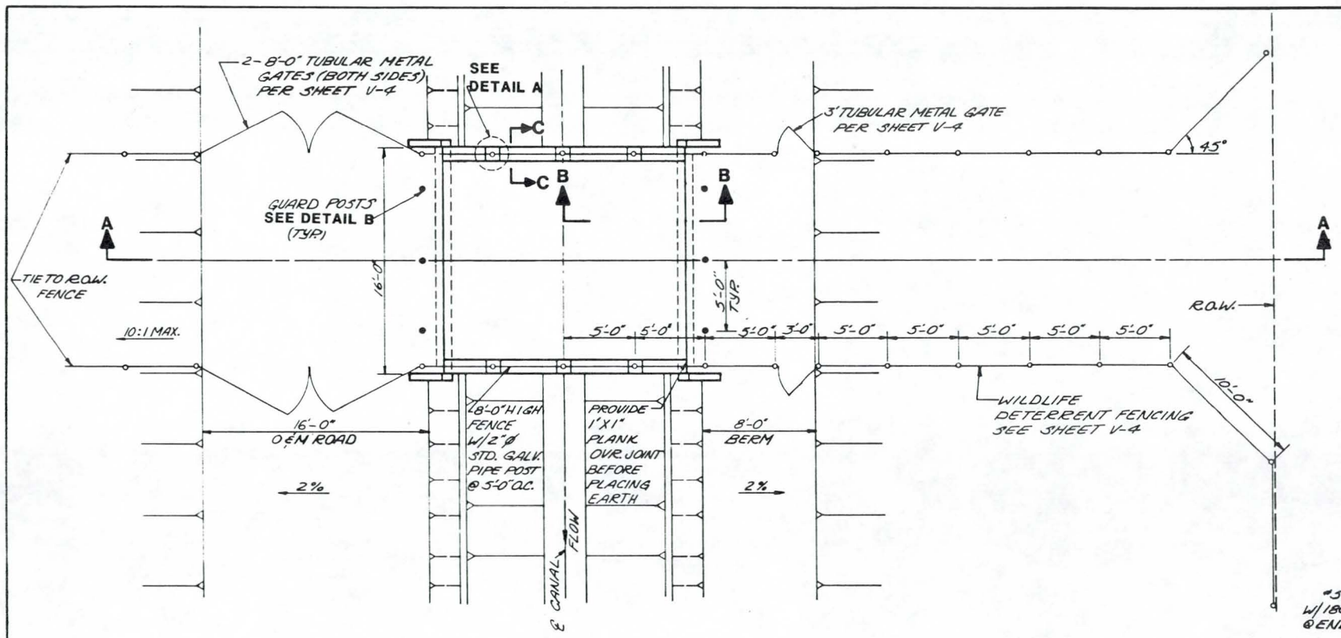
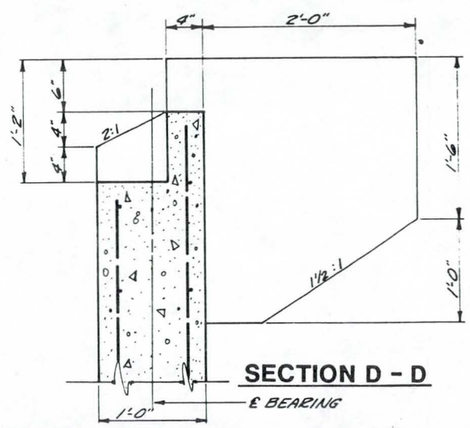
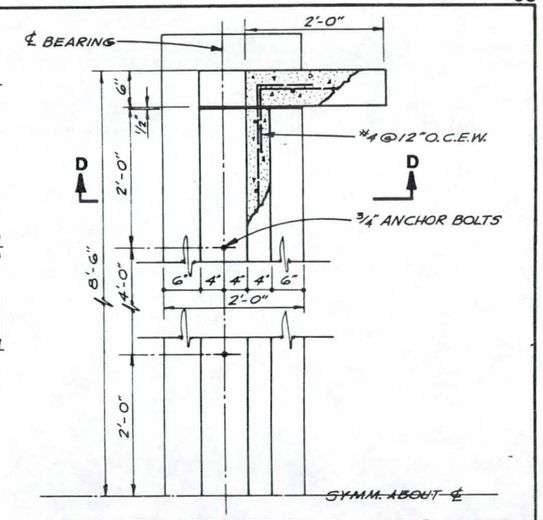


PLAN

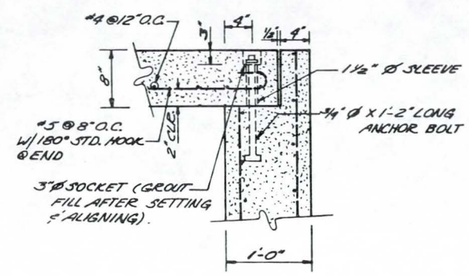
5 0 5 10 15
SCALE OF FEET



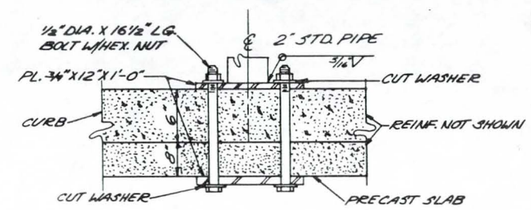
SECTION D - D



PLAN OF ABUTMENT AT WING WALL



DETAIL C



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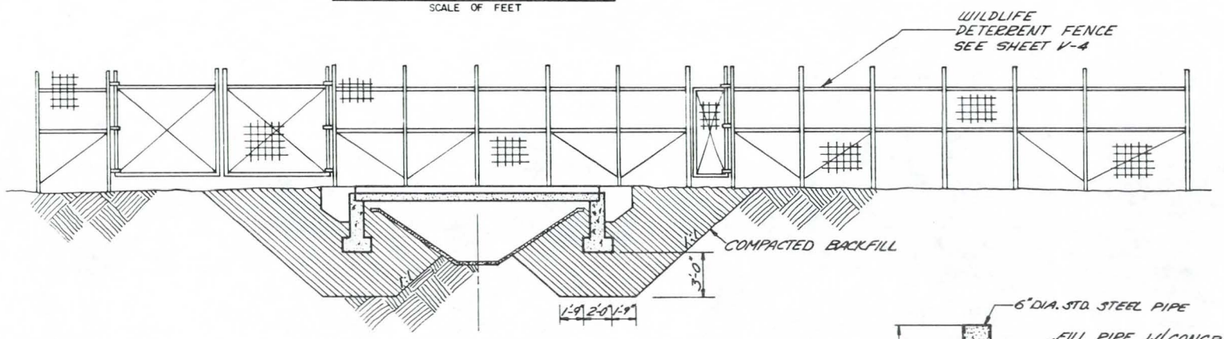
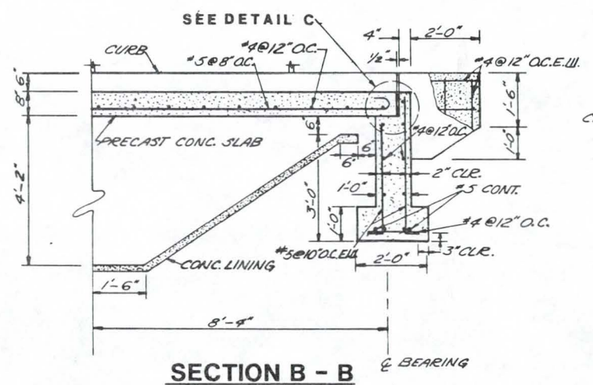
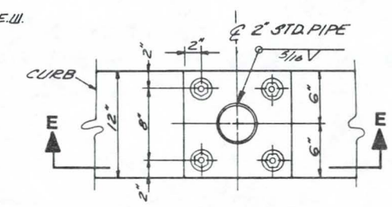


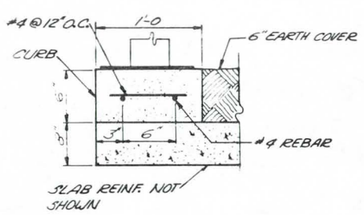
SECTION A - A



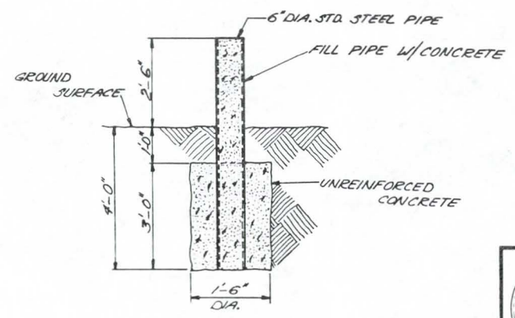
SECTION B - B



DETAIL A



SECTION C - C



DETAIL B

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GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

WILDLIFE CROSSING

Date	FEB. 1985
Designed	M.A.F.
Drawn	J.J.C.
Checked	R.E.N.
Revised	

Franzoy·Corey
ENGINEERS & ARCHITECTS
Corporate headquarters • 10310 E. Sunrise Drive, Phoenix, Arizona 85044 • (602) 838-8628

DESIGNED M.A.F. SUBMITTED
DRAWN J.J.C. RECOMENDED
CHECKED R.E.N. APPROVED

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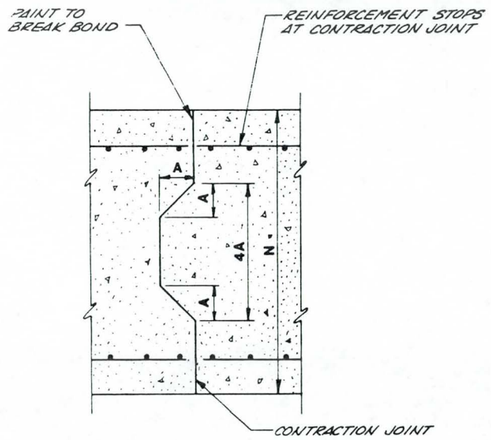
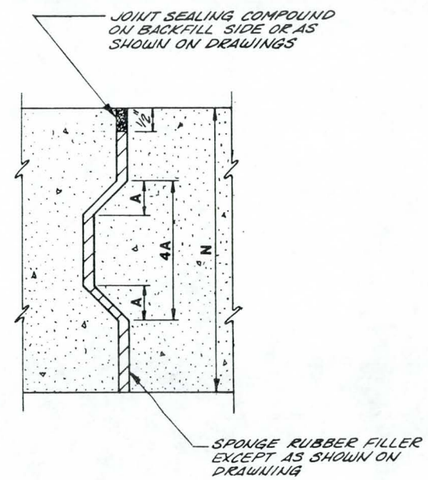


CONTRACTION JOINT



EXPANSION JOINT

DIMENSION OF KEYS	
N	A
LESS THAN 12"	NO KEY
12" TO 17"	1½"
17" TO 22"	2"

GENERAL CONCRETE NOTES

UNLESS OTHERWISE SHOWN, THESE NOTES ARE TYPICAL FOR ALL DRAWINGS

ABBREVIATIONS

- CJ = CONSTRUCTION JOINT
- OCJ= OPTIONAL CONSTRUCTION JOINT
- VCJ = VERTICAL CONSTRUCTION JOINT
- WSA = RUBBER WATERSTOP--TYPE A
- WSB = RUBBER WATERSTOP--TYPE B
- WSG = RUBBER WATERSTOP--TYPE G
- WSH = RUBBER WATERSTOP--TYPE H
- CRJ = CONTRACTION JOINT
- EJ = EXPANSION JOINT
- EL = ELEVATION
- WS = WATER SURFACE
- TW = TAILWATER

CHAMFER

CHAMFER EDGES OF PERMANENTLY EXPOSED CONCRETE SURFACES WITH A 45° BEVEL, 1/2" x 1/2"

CONCRETE PLACEMENT

BEFORE PLACING CONCRETE SEE ALL DRAWINGS RELEASED TO THE CONTRACTOR OR PREPARED BY THE CONTRACTOR INCLUDING MANUFACTURER'S DRAWINGS, FOR ALL EMBEDDED MATERIAL WHICH IS REQUIRED IN THE PLACEMENT.

DIMENSIONS

ALL DIMENSIONS TO A JOINT ARE TO THE CENTERLINE OF THE JOINT. BEAM AND SLAB DEPTHS SHALL BE MEASURED FROM THE TOP OF THE STRUCTURAL SLAB. DIMENSIONS GIVEN FOR THE DEPTH OF RECESSES ARE FROM THE SURFACE OF THE STRUCTURAL CONCRETE. THICKNESS SHOWN FOR WALLS AND SLABS ADJACENT TO UNDISTURBED SOIL OR ROCK ARE MINIMUM DIMENSIONS.

EMBEDDED MATERIALS

BEFORE PLACING CONCRETE, CARE SHALL BE TAKEN THAT ALL EMBEDDED ITEMS ARE IN POSITION AND SECURELY FASTENED IN PLACE. CONDUITS AND GROUNDING CABLES ARE SHOWN ON THE MANUFACTURER'S DRAWINGS AND THE ELECTRICAL DRAWINGS. ALL PROJECTING RUBBER WATERSTOPS SHALL BE SUPPORTED AND PROTECTED FROM DAMAGE AND EXPOSURE DURING CONSTRUCTION.

FINISHES

FOR LOCATION AND CLASSES OF FINISHES FOR FORMED AND UNFORMED CONCRETE SURFACES, SEE THE DRAWINGS AND/OR SPECIFICATIONS.

JOINTS

ALL CONSTRUCTION JOINTS, IDENTIFIED CJ, SHALL BE PROVIDED WHERE SHOWN ON THE DRAWINGS. ADDITIONAL CONSTRUCTION JOINTS MAY BE USED SUBJECT TO APPROVAL.

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TONOPAH DISTRIBUTION SYSTEM

GENERAL CONCRETE NOTES & DETAILS

DESIGNED MAF SUBMITTED
DRAWN JJC RECOMMENDED
CHECKED RFN APPROVED

Date FEB. 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

Franzoy•Corey
ENGINEERS & ARCHITECTS
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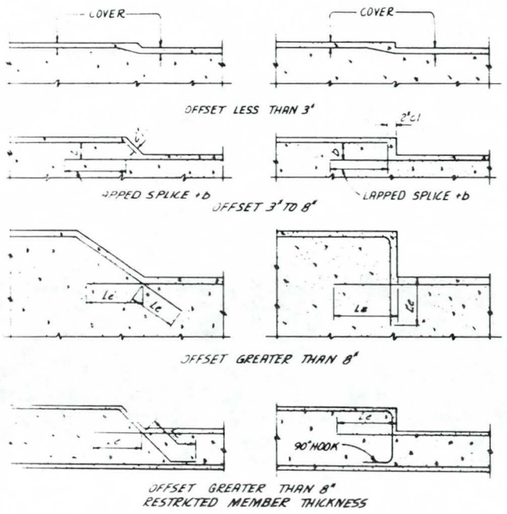
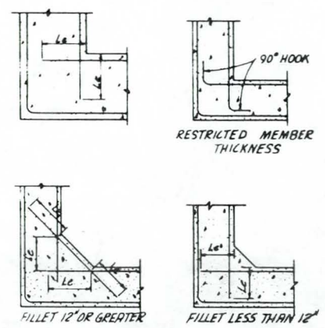
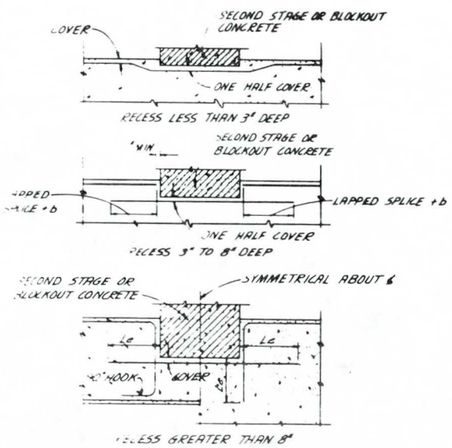


TYPICAL OFFSET DETAILS

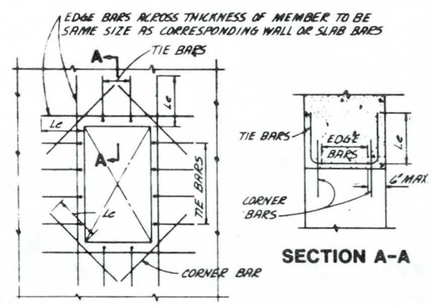


TYPICAL CORNER DETAILS



TYPICAL BLOCKOUT RECESS DETAILS

(SECOND STAGE CONCRETE SHOWN)



SECTION A-A

TABLE FOR REINF AROUND OPENINGS

MEMBER THICKNESS	TIE BARS	EDGE BARS	CORNER BARS
LESS THAN 10"	NONE	1-ctr.	1-#4 ctr.
10" THRU 18"	NONE	2.(1-ct)	2-#4(1ct)
19" THRU 36"	#4@12	3-eq.spc	2-#6(1ct)
OVER 36"	#6@12	Spc.@12	2-#8(1ct)

OMIT EDGE AND TIE BARS ALONG SIDES OF OPENINGS WHERE DIMENSION IS LESS THAN 18"
OMIT CORNER BARS AT SIDES OF OPENINGS ADJACENT TO FLOORS, WALLS, OR BEAMS
CORNER BARS REQUIRED IF EITHER DIMENSION OF OPENING IS GREATER THAN 18"
USE CORNER BARS IN FACE OF RECESSES DEEPER THAN 4" IF EITHER DIMENSION OF RECESS IS GREATER THAN 18"

ADDITIONAL REINFORCEMENT AROUND OPENINGS

GENERAL NOTES

UNLESS OTHERWISE SHOWN ON THE REINFORCEMENT DESIGN DRAWINGS, THE DETAILS AND NOTES SHOWN ARE TYPICAL FOR ALL REINFORCEMENT DRAWINGS THAT REFER TO THIS DRAWING.

ABBREVIATIONS:

bf =BOTTOM FACE	br=BOTTOM ROW	bl =BOTTOM LAYER
tf =TOP FACE	tr=TOP ROW	tl =TOP LAYER
nf =NEAR FACE	nr=NEAR ROW	ml =MIDDLE LAYER
ff =FAR FACE	fr=FAR ROW	ns =NEAR SIDE
ef =EACH FACE	er=EACH ROW	fs =FAR SIDE
if =INSIDE FACE	ir=INSIDE ROW	es =EACH SIDE
of =OUTSIDE FACE	or=OUTSIDE ROW	ew =EACH WAY
	mr=MIDDLE ROW	ec =EACH CORNER

spc =SPACE OR SPACES
eq.spc =EQUALLY SPACED, EQUAL SPACES
D=NOMINAL DIAMETER OF REINFORCING BAR
unr=UNIFORMLY VARYING LENGTHS OF BARS BETWEEN LENGTHS SHOWN
cl =CLEAR
ctr =CENTER OR CENTERS

SYMBOLS:
BARS SHOWN THUS #8@12 OR #6@7½, INDICATE A GROUP OF IDENTICAL BARS EQUALLY SPACED. AN OPEN CIRCLE AT THE END OF A BAR INDICATES A BEND WITH THE BAR TURNED AWAY FROM THE OBSERVER. A CLOSED CIRCLE AT THE END OF A BAR INDICATES A BEND WITH THE BAR TURNED TOWARDS THE OBSERVER. SPLICES SHOWN THUS INDICATE A LAPPED SPLICE, NOT A BEND IN THE BAR.

DIMENSIONS:
DIMENSIONS ARE TO THE CENTER LINES OF THE BARS UNLESS OTHERWISE SHOWN. CLEAR COVER DIMENSIONS ARE MARKED "Cl."

COVER:
PLACE THE REINFORCEMENT SO THAT THE CLEAR DISTANCE BETWEEN FACE OF CONCRETE AND NEAREST REINFORCEMENT IS 1½" FOR #5 BARS AND SMALLER AND 2" FOR #6 BARS AND LARGER; EXCEPT PROVIDE A CLEAR DISTANCE FROM FACE OF CONCRETE PLACED AGAINST EARTH OR ROCK OF 2" WHERE MEMBER THICKNESS IS 9" OR LESS AND 3" WHERE MEMBER THICKNESS IS GREATER THAN 9", THE CLEAR DISTANCE BEING TO THE DESIGN DIMENSION LINE.
REINFORCEMENT PARALLELING CONSTRUCTION JOINTS SHALL HAVE A MINIMUM OF 2" CLEAR COVER.

PLACING:
REINFORCEMENT AT SMALL OPENINGS (MAX.18") IN WALLS AND SLABS MAY BE SPREAD APART NOT MORE THAN 1½ TIMES THE BAR SPACING.
REINFORCEMENT MAY BE ADJUSTED LATERALLY TO MAINTAIN A CLEAR DISTANCE OF AT LEAST 1" BETWEEN THE REINFORCEMENT AND KEYS, WATERSTOPS, ANCHOR BOLTS, FORM TIES, CONDUITS, AND OTHER EMBEDDED MATERIAL IN HEAVILY REINFORCED AREAS RELOCATION OF THE EMBEDDED MATERIAL MUST BE CONSIDERED. WHEN BARS ARE BENT DUE TO OFFSETS LESS THAN 3 INCHES AND RECESSES LESS THAN 3 INCHES DEEP, THE SLOPE OF THE INCLINED PORTION MUST NOT EXCEED 6 TO 1.

REINFORCEMENT PARALLEL TO ANCHOR BOLTS OR OTHER EMBEDDED MATERIAL SHALL BE PLACED TO MAINTAIN A CLEAR DISTANCE OF AT LEASE 1 1/3 TIMES THE MAXIMUM SIZE AGGREGATE.

SPACING:
THE FIRST AND LAST BARS IN WALLS AND SLABS, STIRRUPS IN BEAMS, AND TIES IN COLUMNS ARE TO START AND END AT A MAXIMUM OF ONE HALF OF THE ADJACENT BAR SPACING.

STANDARD HOOKS:
HOOKS SHALL HAVE 180° BENDS AND EXTENSIONS OF 4-BAR DIAMETERS BUT NOT LESS THAN 2½" PARALLEL TO THE MAIN LEG OF THE BAR OR 90° BENDS AND EXTENSIONS OF AT LEAST 12-BAR DIAMETERS. HOOKS FOR STIRRUP AND TIE ANCHORAGE ONLY SHALL HAVE A 90° BEND PLUS AN EXTENSION OF AT LEAST 6-BAR DIAMETERS FOR #5 BARS AND SMALLER AND AT LEAST 12-BAR DIAMETERS FOR #6 THROUGH #8 BARS, OR A 135° BEND PLUS AN EXTENSION OF AT LEAST 6-BAR DIAMETERS. RADIUS OF BEND TO BE AS SPECIFIED IN THE TABLE OF PIN DIAMETERS.
A BAR ( ) WITH A STANDARD 180° HOOK ON ONE END IS REFERRED TO AS AN "A" BAR.
A BAR ( ) WITH A STANDARD 180° HOOK ON BOTH ENDS IS REFERRED TO AS A "B" BAR.

BENT BARS:
ONLY BILLET STEEL OR AXLE STEEL SHALL BE USED FOR BARS TO BE BENT. UNLESS OTHER RADIUS BENDS ARE INDICATED ON THE DESIGN DRAWINGS, ALL REINFORCEMENT REQUIRING BENDING SHALL BE BENT AROUND A PIN HAVING THE FOLLOWING DIAMETER.

REINFORCEMENT DOWELS:
DOWELS INDICATED ON THE DRAWING, SUCH AS #8(D), SHALL HAVE AN EMBEDMENT EQUAL TO Le AND A PROJECTION EQUAL TO THAT REQUIRED FOR LAP SPLICING A BAR OF THE SAME DIAMETER.

PLAIN DOWELS:
PLAIN DOWELS ACROSS CONTRACTION JOINTS SHALL BE SMOOTH BARS UNIFORMLY COATED WITH A FILM OF OIL BEFORE CONCRETE PLACEMENT. VISCOSITY OF THE OIL SHALL HAVE A SAE RATING OF NOT LESS THAN 250.

ACCESSORIES:
BAR SUPPORTS, SPACERS, AND OTHER ACCESSARIES ARE NOT SHOWN ON THE DESIGN DRAWINGS. THE RECOMMENDATIONS OF ACI 315 OR OTHER APPROVED SUPPORTING SYSTEMS MAY BE USED.

REFERENCES:
NUMERALS IN PARENTHESES ( ) FOLLOWING NOTES AND SECTION LETTERS OF NUMBERS INDICATE THE NUMBER OF THE DRAWING UPON WHICH THE SECTION OR DETAIL IS SHOWN; FOR EXAMPLE .036 DENOTES DRAWING NO.C05009.036
UNLESS OTHERWISE SHOWN FOLLOW THE RECOMMENDATIONS ESTABLISHED BY AMERICAN CONCRETE INSTITUTE'S MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES, (ACI 315).

NOTES TO DESIGNERS:
SPLICE LENGTHS SHOWN IN THE TABLES ON THIS DRAWING ARE FOR CLASS B SPLICES, SPACED AT LEAST 6 INCHES ON CENTERS, (0.8 x 1.3 Ld) IN ACCORDANCE WITH ACI 318-71. SPLICES REQUIRING LAP LENGTHS OTHER THAN THOSE FOR .CLASS B MUST BE DETAILED ON THE REINFORCEMENT DESIGN DRAWINGS.
EMBEDMENT LENGTH Le, IN THE ABOVE TABLES IS BASED ON "OTHER" BARS SPACED AT LEAST 6 INCHES OR 6 BAR DIAMETERS.

SPLICES:
UNLESS OTHERWISE SHOWN THE MINIMUM LENGTH OF LAP FOR SPLICING PARALLEL BARS SHALL BE AS GIVEN IN THE APPLICABLE TABLE.
SPLICES SHALL BE STAGGERED TO GIVE 12 INCHES CLEAR BETWEEN END OF ADJACENT SPLICES, IF BARS ARE SPACED CLOSER THAN 6 INCHES OR 6 BAR DIAMETERS.
NONCONTACT LAP SPLICES SHALL NOT BE SPACED FARTHER APART THAN ONE-FIFTH THE REQUIRED LENGTH OF LAP OR 6 INCHES.
WHEN REINFORCING BARS OF DIFFERENT SIZE ARE TO BE SPLICED, THE LENGTH OF LAP SHALL BE GOVERNED BY THE SMALLER DIAMETER BAR.
SPLICES ARE TO BE MADE SO THAT THE GIVEN DISTANCES TO FACE OF CONCRETE WILL BE MAINTAINED.

TABLE 3-60

fc = 3000 psi fy = 60,000 psi

BAR SIZE NO	LENGTH OF LAPPED SPLICE IN INCHES TOP BARS*	OTHER BARS	EMBEDMENT LENGTH, Le
3	16	16	12
4	22	16	12
5	27	20	12
6	35	25	16
7	48	34	21
8	63	45	28
9	80	57	35
10	101	72	45
11	124	89	55

TABLE 4-60

fc = 4000 psi fy = 60,000 psi

BAR SIZE NO	LENGTH OF LAPPED SPLICE IN INCHES TOP BARS*	OTHER BARS	EMBEDMENT LENGTH, Le
3	16	16	12
4	22	16	12
5	27	20	12
6	33	24	14
7	41	30	18
8	55	39	24
9	69	49	30
10	88	63	39
11	108	77	47

*TOP BARS ARE HORIZONTAL BARS IN BEAMS AND SLABS SO PLACED THAT MORE THAN 12 INCHES OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR.

TABLE OF PIN DIA. IN INCHES

BAR NO	3	4	5	6	7	8	9	10	11	14	18
STANDARD BENDS	2¼	3	3¾	4½	5¼	6	9	10	11	17½	22½
STIRRUP & TIE BENDS	1½	2	2½	4½	5¼	6	9	10	11		

NO	DATE	BY	REVISION	CHK.

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DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM
MAIN CANAL

REINFORCEMENT DETAILING & NOTES

DESIGNED MAF SUBMITTED
DRAWN VF RECOMMENDED
CHECKED RFN APPROVED

Date FEB 1985
Designed MAF
Drawn VF
Checked RFN
Revised

Franzoy•Corey
ENGINEERS & ARCHITECTS
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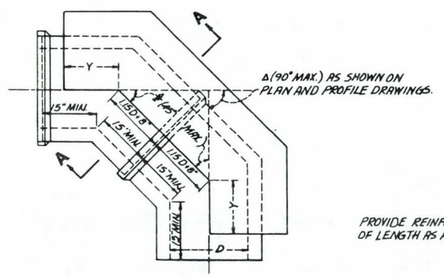
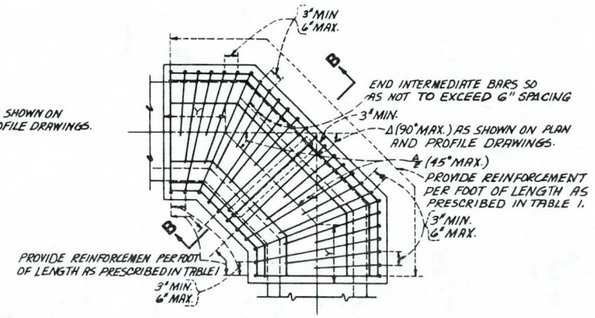
344-330-6890



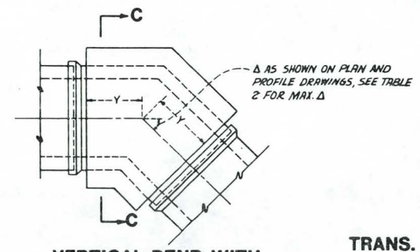
HORIZONTAL BEND WITH BLOCKING

Δ = 90° MAX.
FOR HEADS 50 FT AND UNDER
Y = 0.90 D FOR 12" THRU 48" PIPE,
Y = 0.75 D FOR 51" PIPE AND LARGER
BEND FABRICATION DIMENSIONS SIMILAR FOR ALL Δ = 90° MAX BENDS.



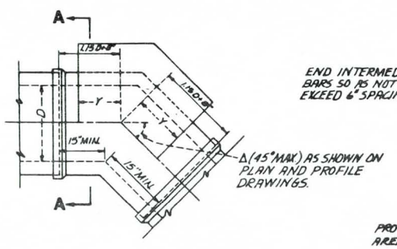
HORIZONTAL BEND WITH ENCASEMENT

Δ = 90° MAX.
FOR HEADS OVER 50 FT.
Y = 1.15 D (12" – 60" PIPE WITH 150 ft HEAD)
Y = 0.90 D (ALL PIPE WITH 75 ft – 125 ft HEAD)



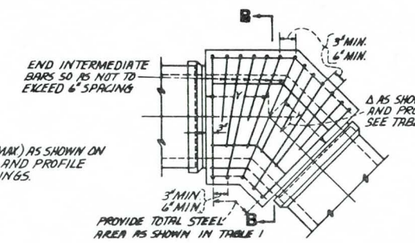
VERTICAL BEND WITH ENCASEMENT-CONVEX UP

FOR HEADS 50 FT. AND UNDER
Y = 0.90 D FOR 12" THRU 48" PIPE,
Y = 0.75 D FOR 51" PIPE AND LARGER



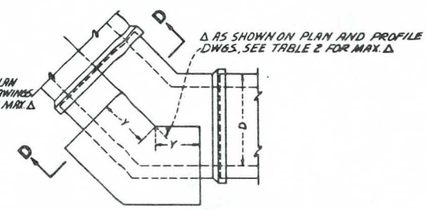
HORIZONTAL BEND WITH BLOCKING

Δ = 45° MAX.
FOR HEADS 50 FT AND UNDER
Y = 0.90 D FOR 12" THRU 48" PIPE,
Y = 0.75 D FOR 51" PIPE AND LARGER
BEND FABRICATION DIMENSIONS SIMILAR FOR ALL Δ = 45° MAX. BENDS.



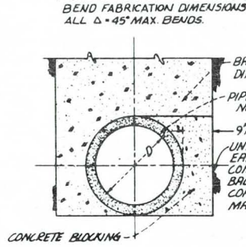
HORIZONTAL AND VERTICAL BEND WITH ENCASEMENT

FOR HEADS OVER 50 FT –
Y = 1.15 D (12" – 60" PIPE WITH 150 ft HEAD)
Y = 0.90 D (ALL PIPE WITH 75 ft – 125 ft HEAD)

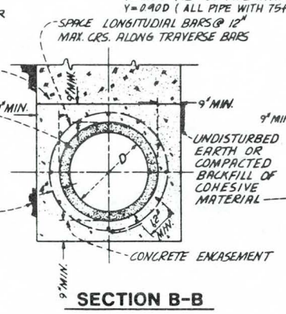


VERTICAL BEND WITH BLOCKING-CONCAVE UP

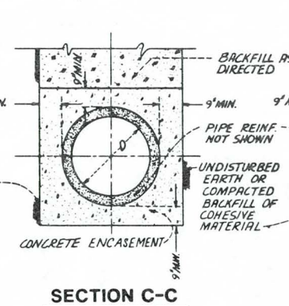
FOR HEADS 50 FT. AND UNDER
Y = 0.90 D FOR 12" THRU 48" PIPE,
Y = 0.75 D FOR 51" PIPE AND LARGER



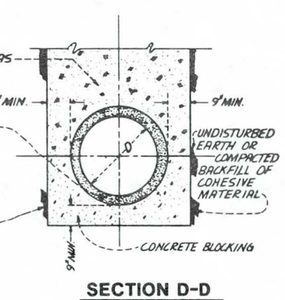
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

TABLE 2

BENDS WHERE Δ IS 45° AND LESS

MAX. HEAD FEET	HORIZONTAL BEND MAX. Δ	VERTICAL BENDS CONVEX UP MAX. Δ	VERTICAL BENDS CONCAVE UP MAX. Δ
25 - 50	45° 00'	30° 00'	30° 00'
75	"	27° 30'	"
100	"	25° 00'	"

THE VERTICAL COMPONENT ANGLE FOR COMBINED BENDS SHALL NOT EXCEED MAXIMUM Δ SHOWN.

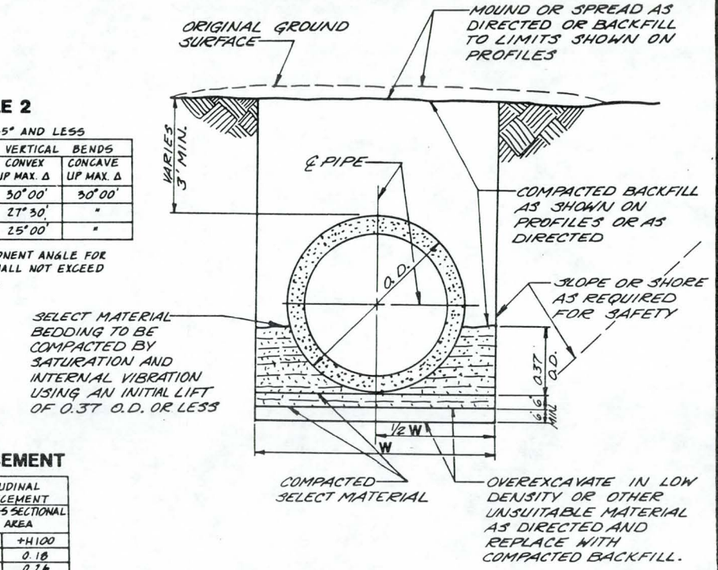
TABLE 1

TRANS. & LONG. REINFORCEMENT

PIPE DIA.	TRANSVERSE REINFORCEMENT PER FOOT OF LENGTH		LONGITUDINAL REINFORCEMENT TOTAL CROSS SECTIONAL STEEL AREA	
	+H75	+H100	+H75	+H100
12"	0.21	0.31	0.12	0.18
15"	0.25	0.38	0.17	0.26
18"	0.24	0.44	0.24	0.35
21"	0.38	0.56	0.34	0.58
24"	0.42	0.63	0.48	0.72
27"	0.46	0.69	0.58	0.87
30"	0.50	0.75	0.69	1.04
33"	0.55	0.82	0.82	1.22
36"	0.59	0.88	0.95	1.41
39"	0.63	0.94	1.09	1.62
42"	0.67	1.00	1.24	1.84
45"	0.75	1.13	1.56	2.33
48"	0.80	1.19	1.74	2.54
51"	0.84	1.25	1.93	2.87
54"	0.88	1.31	2.13	3.17
57"	0.92	1.38	2.34	3.48
60"	0.96	1.44	2.56	3.81
63"	1.01	1.50	2.78	4.14
66"	1.09	1.63	3.26	4.85
69"	1.13	1.68	3.52	5.23
72"	1.17	1.75	3.79	5.63
75"	1.21	1.81	4.06	6.05
78"	1.26	1.88	4.34	6.46
84"	1.34	2.00	4.95	7.36
90"	1.46	2.19	5.62	8.30
96"	1.56	2.33	6.73	10.00

"H" DESIGNATES THE HEAD IN FEET OF WATER AT ℄ OF PIPE.

BAR AREAS SHOWN ARE IN SQUARE INCHES AND ARE MINIMUM AREAS REQUIRED.



TYPICAL EARTHWORK

FOR REINFORCED CONCRETE PIPE-

PIPE I.D. INCHES	Do INCHES	W
6" AND LESS	I.D. + 2"	2.0'
OVER 6" THUR 18"	I.D. + 4"	0.083 I.D. + 2.0'
OVER 18" THUR 24"	I.D. + 4"	0.083 I.D. + 3.33'
OVER 24"	1.167 I.D.	0.097 I.D. + 3.0'

GRADATION FOR SELECT MATERIAL	
SIZE	PERCENT OF WEIGHT
PASSING NO. 200 SIEVE	5 OR LESS
PASSING NO. 50 SIEVE	LESS THAN 20
PASSING NO. 4 SIEVE	AT LEAST 25 BUT LESS THAN 50
MAXIMUM SIZE SHALL NOT EXCEED 3/4 INCH	

NOTES

1. CONTRACTOR MAY SUBMIT ALTERNATIVE DESIGNS FOR APPROVAL.
2. FOR GENERAL NOTES AND MINIMUM REQUIREMENTS FOR DETAILING REINFORCEMENT, SEE SHEET V-1.
3. D= PIPE BEND DIAMETER.
4. IF COMPACTED BACKFILL FOR BEDDING IS COMPACTED BY TAMPING, ROLLING, OR SURFACE VIBRATION, THE TRENCH WIDTH "W" IS THE MINIMUM WIDTH ALLOWED.
5. IF COMPACTED BACKFILL FOR BEDDING IS COMPACTED BY SATURATION AND INTERNAL VIBRATION, THE MINIMUM TRENCH WIDTH IS "Do+18".
6. I.D. IS INSIDE DIAMETER OF PIPE IN INCHES, AND SIZES OF PIPE SHOWN REFER TO I.D., O.D. IS OUTSIDE DIAMETER OF PIPE.

REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 15878 TIMOTHY E. MELLY JR. ARIZONA U.S.A.

Date FEB 1985
Designed MAF
Drawn JJG
Checked RFN
Revised

Franzoy•Corey
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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION ARIZONA

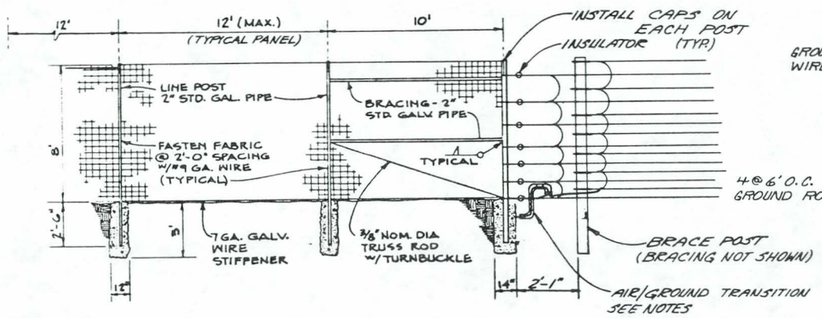
TONOPAH DISTRIBUTION SYSTEM

PIPE BEND DETAILS & PIPE TRENCH EARTHWORK

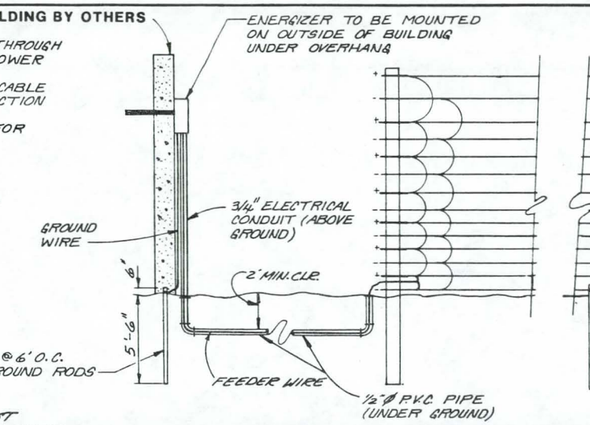
DESIGNED MAF SUBMITTED
DRAWN JJG RECOMMENDED
CHECKED RFN APPROVED

344-330-6891

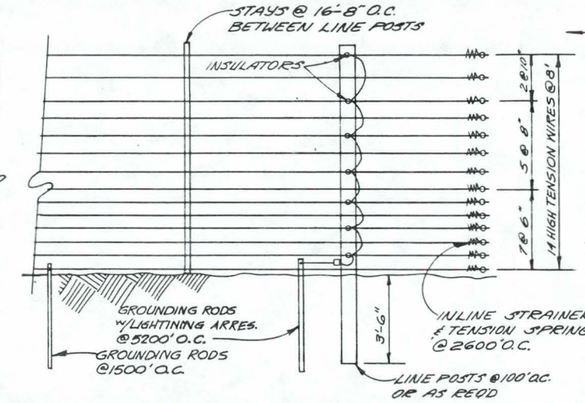
NOTES:
1.) POWER CONNECTION TO INTERIOR OF BUILDING WILL BE BY WAY OF "CABLE THROUGH WALL BARRIER SEAL", TO BE CO-ORDINATED WITH C.A.W.C.D. PERSONNEL. POWER CABLE TO INTERIOR OF BUILDING WILL BE PROTECTED BY CONDUIT.
2.) CONTRACTOR SHALL PROVIDE A MINIMUM OF 20' OF CONDUCTOR FROM "CABLE THROUGH WALL BARRIER SEAL" FOR CONNECTION TO POWER SOURCE. CONNECTION WILL BE BY OTHERS.
3.) CONTRACTOR WILL BE RESPONSIBLE TO CONTACT CONCERNED AGENCY FOR LOCATION OF POWER & CONTROL CABLES PRIOR TO TRENCHING.



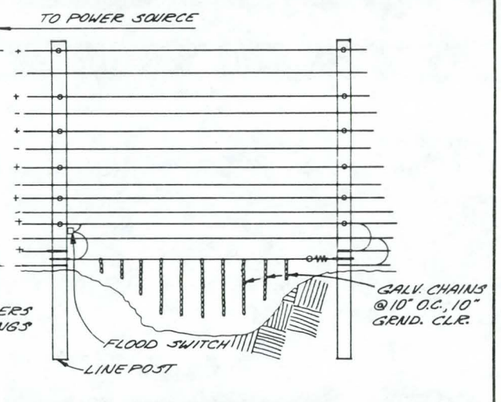
TRANSITION TO ELECTRIFIED FENCING



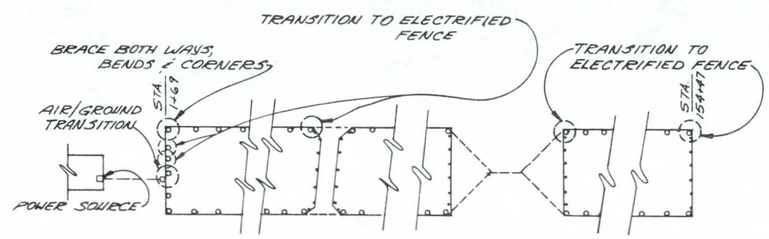
POWER SOURCE AIR/GROUND TRANSITION



TYPICAL SEGMENT

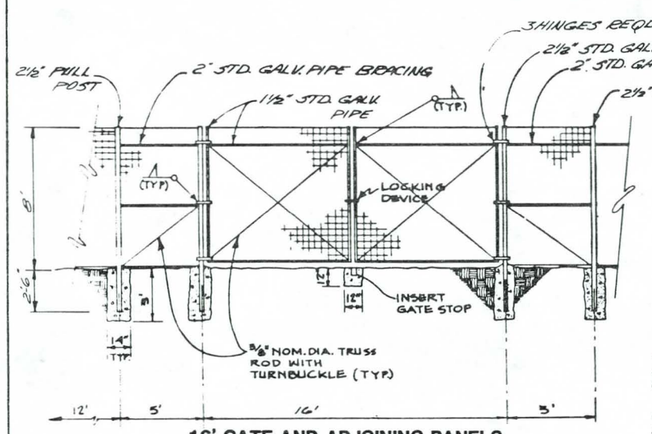


STREAM OR SINK

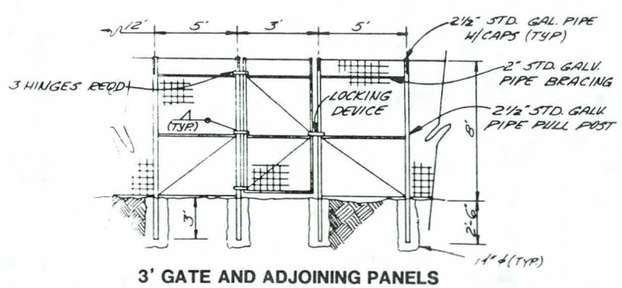


POWER SOURCE CATTLE CROSSING STREAM CROSSING END

PLAN - FENCING SYSTEM



16' GATE AND ADJOINING PANELS



3' GATE AND ADJOINING PANELS

MECHANICAL FENCE ELEVATIONS

NOTES

MAXIMUM LENGTH OF FENCE WITHOUT A CORNER, END, GATE, OR BRACE POST SHALL BE 1000 FT. ADDITIONAL BRACE POST SHALL BE PLACED WHERE DIRECTED BY CONTRACTING OFFICER

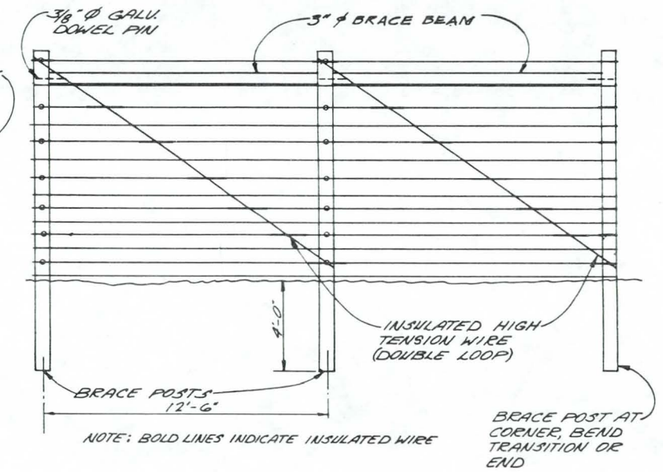
FENCE ON CURVE SHALL HAVE BRACE POSTS SPACED AS FOLLOWS
CURVE RADIUS LESS-THAN 500 FT. EVERY 2ND POST
CURVE RADIUS 500 FT. – 1000 FT. EVERY 5TH POST
CURVE RADIUS OVER 1000 FT. EVERY 7TH POST

WHERE FENCE PASSES UNDER TRANSMISSION LINES, GROUND AS PER SPECIFICATIONS.

AIR/GROUND TRANSITION IS NOT REQUIRED AT END OF FENCING SYSTEM

LEGEND

ELECTRIFIED FENCE
MECHANICAL FENCE
FEEDER WIRE & 1/2" Ø POLYETHYLENE PIPE



NOTE: BOLD LINES INDICATE INSULATED WIRE

BRACING

ELECTRIFIED FENCE ELEVATIONS

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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

WILDLIFE DETERRENT FENCING

Date	FEB 1985
Designed	MAF
Drawn	JJC
Checked	RFN
Revised	

Franzoy·Corey
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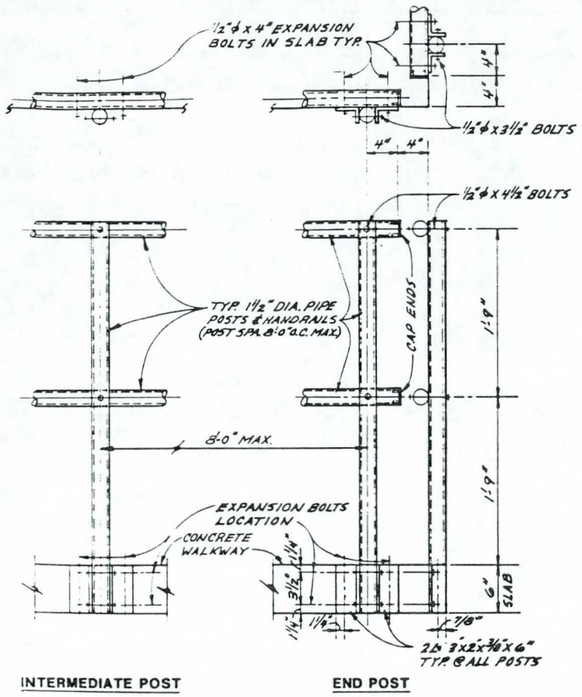
10407/V-4

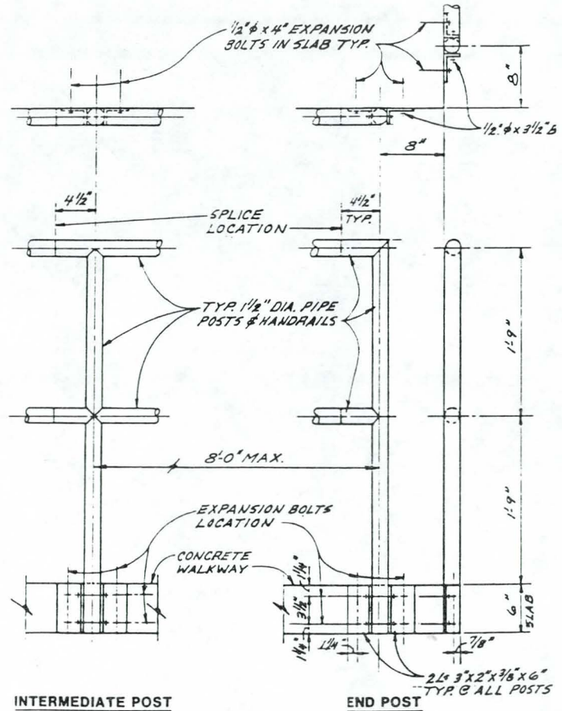
DESIGNED MAF SUBMITTED Bruce J. Hutchison
DRAWN JJC RECOMMENDED Wayne E. Anderson
CHECKED RFN APPROVED

344-330-6892



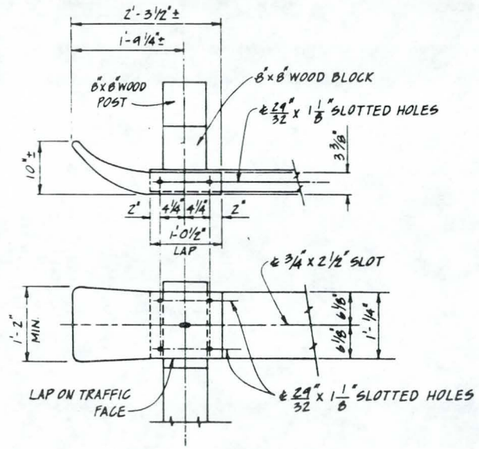
INTERMEDIATE POST END POST

ALTERNATE NO.1

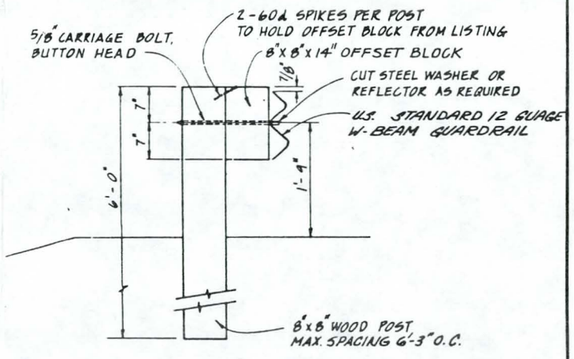


INTERMEDIATE POST END POST

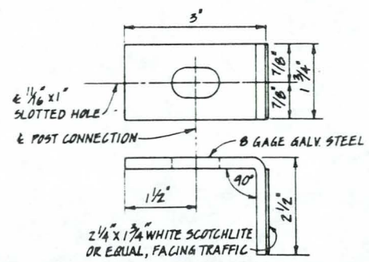
ALTERNATE NO.2



TERMINAL SECTION



TYP. GUARDRAIL POST



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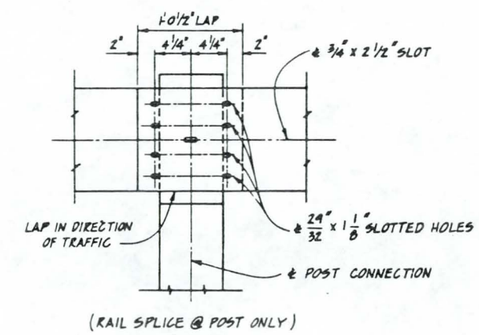
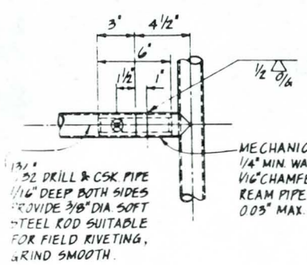


(RAIL SPLICE @ POST ONLY)

RAIL SPLICE

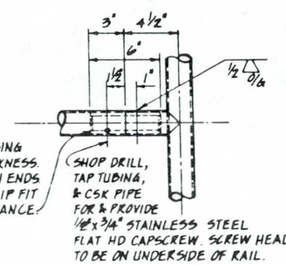
GUARDRAIL DETAIL



(SPLICE No. 1 FOR FIXED HANDRAIL)

SPLICE NO. 1

ALTERNATE NO.2 ONLY



(SPLICE No 2 REQUIRED WITH FLANGE MOUNTED REMOVABLE HANDRAIL.)

SPLICE NO. 2

ALTERNATE NO.2 ONLY

HANDRAIL DETAIL

NOTES:

1. WELDING SYMBOLS APPLY TO THE JOINTS OF ALL MEMBERS OF SIMILAR INDENTIFICATION.
2. WELD ALL PIPE JOINTS WITH 1/8" REINFORCED WELDS & DRESS SMOOTH.
3. ALL HANDRAILS SHALL BE FABRICATED WITH NEW 1 1/2" STANDARD WEIGHT BLACK PIPE OR TUBING.
4. SEE SPECIFICATIONS FOR PRINTING REQUIREMENTS.

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TONOPAH DISTRIBUTION SYSTEM

GUARDRAILS AND HANDRAILS

Date	FEB 1985
Designed	MAF
Drawn	JJC
Checked	RFN
Revised	

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DESIGNED MAF SUBMITTED
DRAWN JJC RECOMENDED
CHECKED RFN APPROVED

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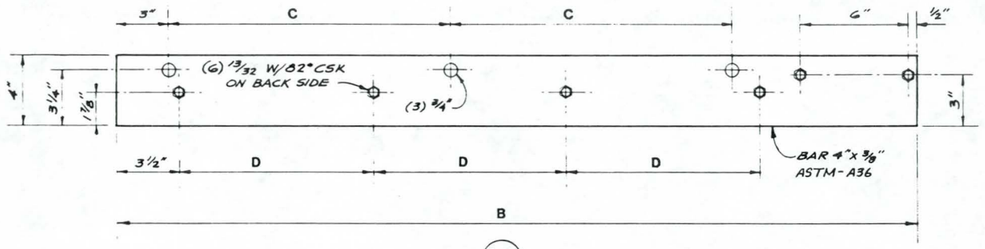
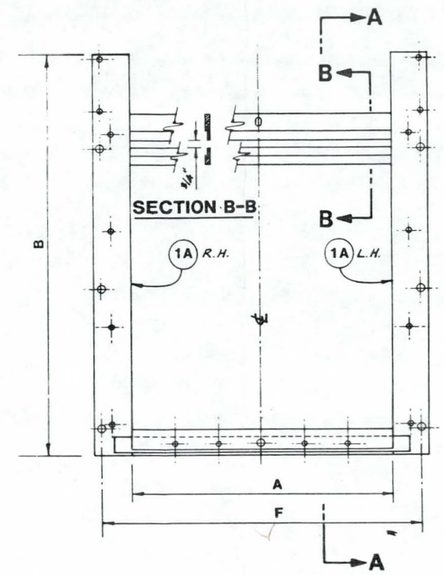


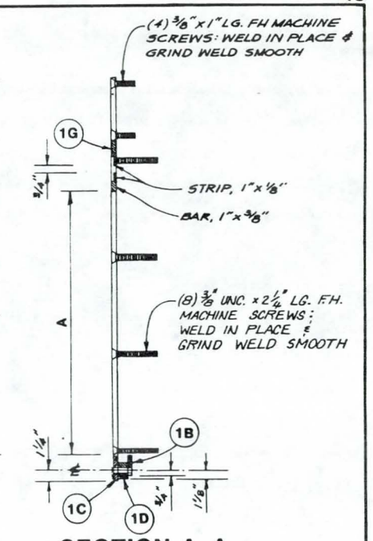
1A

(1 REQ'D. AS SHOWN R.H.)
(1 REQ'D. OPPOSITE L.H.)

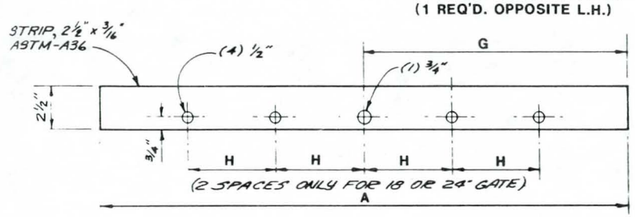
DIMENSION SCHEDULE									
A	B	C	D	E	F	G	H	J	K
18"	33-1/2	9	7	23-1/2	29-1/2	9	4 1/2	21-3/4	10-7/8
24	39-1/2	12	9	29-1/2	30-1/2	12	6	27-3/4	13-7/8
30	45-1/2	16	11	35-1/2	36-1/2	15	5	33-3/4	16-7/8
36	51-1/2	19	13	41-1/2	42-1/2	18	6	39-3/4	19-7/8
42	57-1/2	22	15	47-1/2	48-1/2	21	7	45-3/4	22-7/8
48	63-1/2	25	17	53-1/2	54-1/2	24	8	51-3/4	25-7/8

NOTE: ALL DIMENSIONS ARE GIVEN IN INCHES



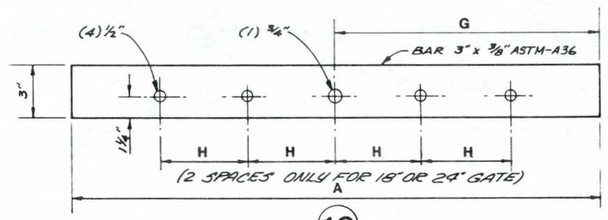


GATE FRAME ASSEMBLY



1B

(1 REQ'D)



1C

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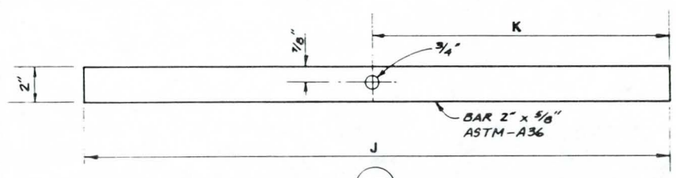
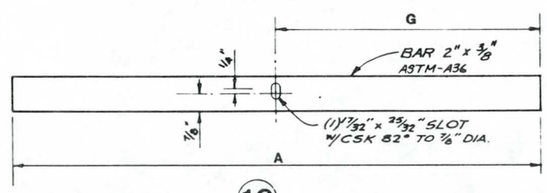


1D

(1 REQ'D.)



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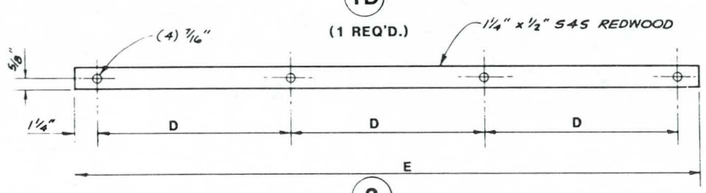
(1 REQ'D.)



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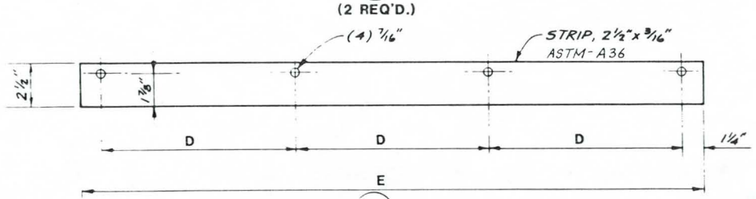
(2 REQ'D.)



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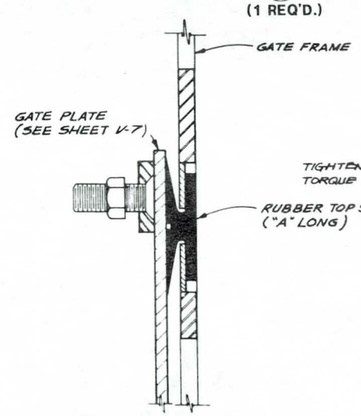
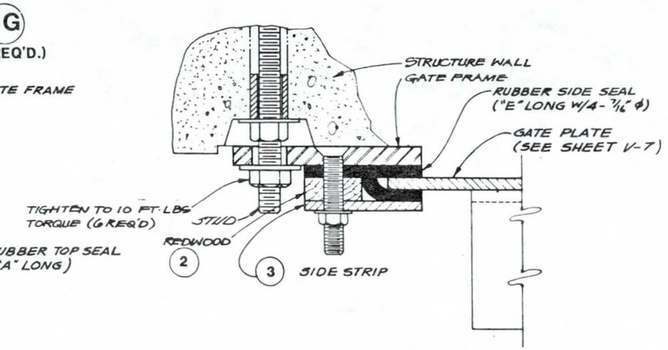
(2 REQ'D)



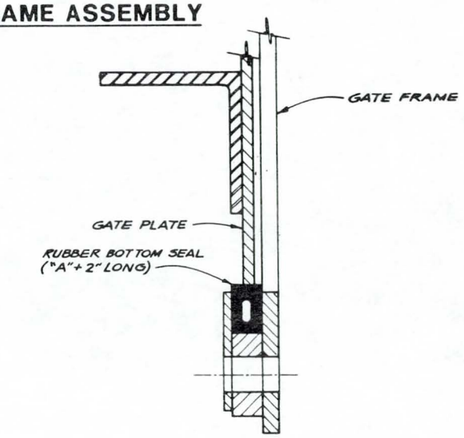
TOP SEAL DETAIL

(1 REQ'D)



SIDE SEAL & MOUNTING DETAIL

(2 REQ'D.)



BOTTOM SEAL DETAIL

(1 REQ'D.)

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GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

TURNOUT GATE FRAME ASSEMBLY

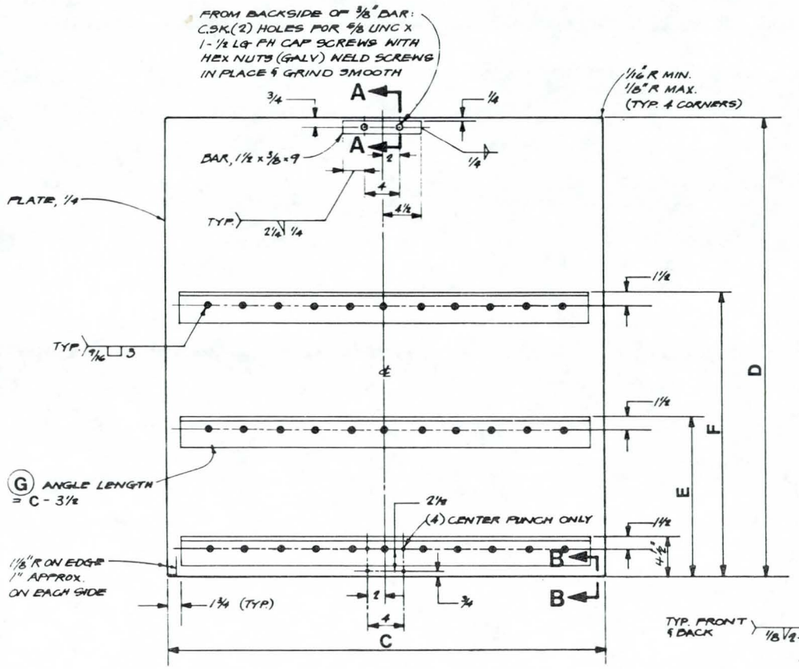
Date	FEB 1985
Designed	MAF
Drawn	JJC
Checked	RFN
Revised	

Franzoy•Corey
ENGINEERS & ARCHITECTS

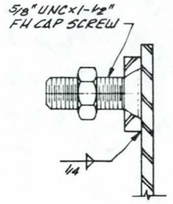
DESIGNED MAF SUBMITTED
DRAWN JJC RECOMMENDED
CHECKED RFN APPROVED

10407/V-6

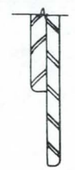
344-330-6894



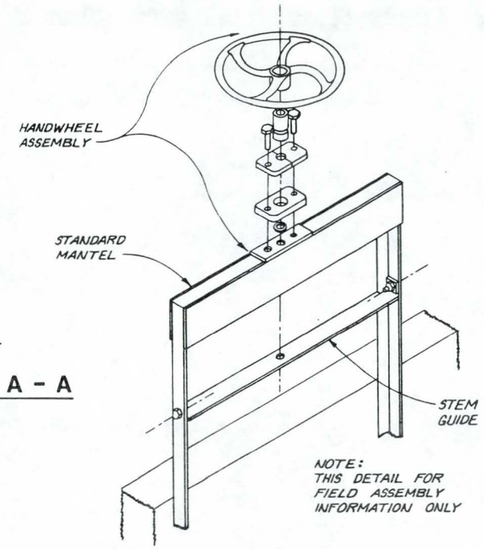
GATE PLATE ASSEMBLY



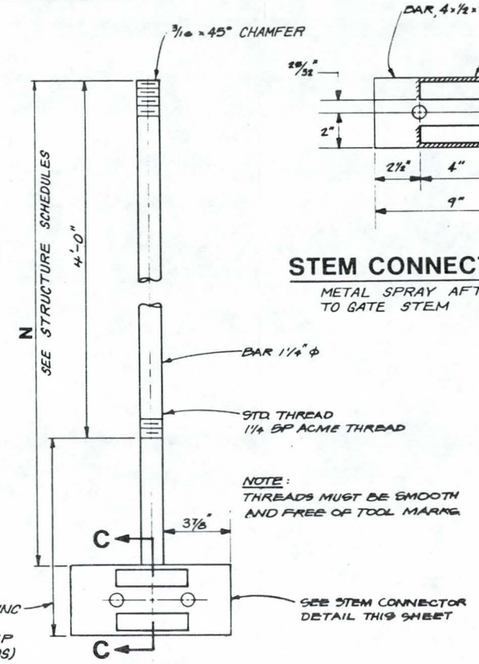
SECTION A - A



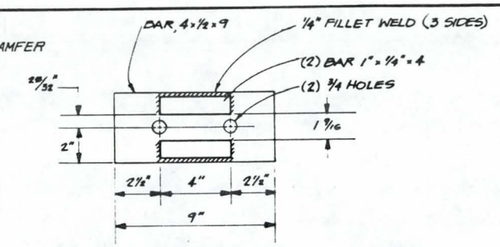
SECTION B - B



MANTEL ASSEMBLY DETAIL

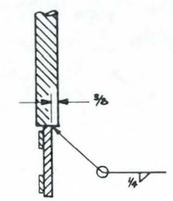


1 - 1/4" SCREW STEM & CONNECTOR

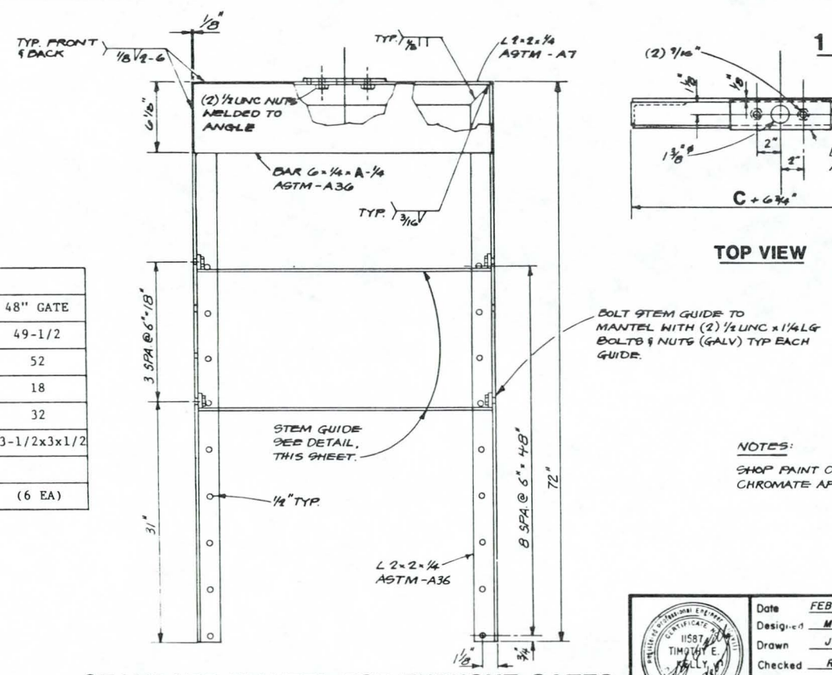


STEM CONNECTOR DETAIL

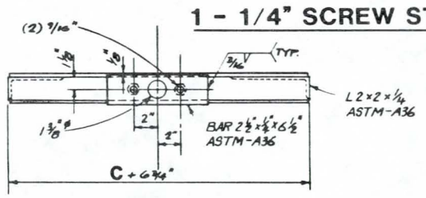
METAL SPRAY AFTER WELDING TO GATE STEM



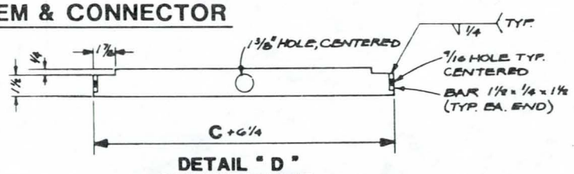
SECTION C - C



STANDARD MANTEL FOR TURNOUT GATES



TOP VIEW



DETAIL "D"
STEM GUIDE

(USED WITH STANDARD MANTEL)

DIMENSIONS FOR GATE PLATE ASSEMBLIES						
DIM	18" GATE	24" GATE	30" GATE	36" GATE	42" GATE	48" GATE
C	19-1/2	25-1/2	31-1/2	37-1/2	43-1/2	49-1/2
D	22	28	34	40	46	52
E	--	12	15	18	16	18
F	--	--	--	--	28	32
G	(1)3x3x1/4	(2)3x3x3/8	(2)3x3x3/8	(2)3x3x1/2	(3)3x3x1/2	(3)3-1/2x3x1/2
1/2 UNC x 2 LG MACH BOLTS & FLAT WASH.	(6 EA)	(6 EA)	(6 EA)	(6 EA)	(6 EA)	(6 EA)

NOTE: ALL DIMENSIONS ARE GIVEN IN INCHES.

NOTES:

SHOP PAINT ONE COAT ZINC CHROMATE AFTER ASSEMBLY.

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BUREAU OF RECLAMATION
CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION - ARIZONA

TONOPAH DISTRIBUTION SYSTEM

TURNOUT GATES, STEM & MANTEL

DESIGNED	MAF	SUBMITTED	
DRAWN	JJC	RECOMMENDED	
CHECKED	RFN	APPROVED	

Date FEB. 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

Franzoy•Corey
ENGINEERS & ARCHITECTS
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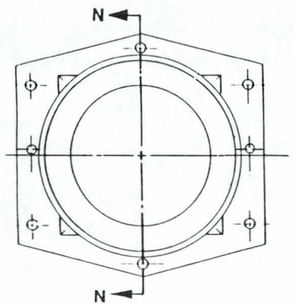
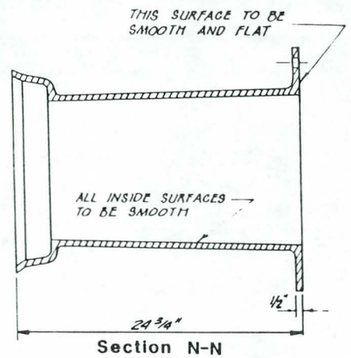
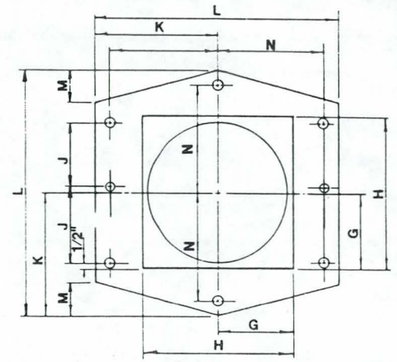


BELL END
See Details

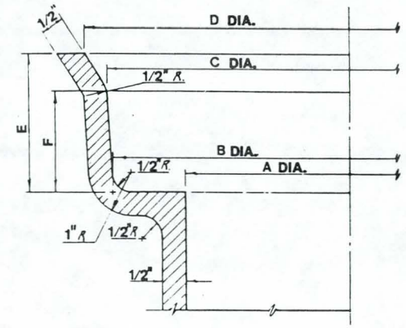


Section N-N

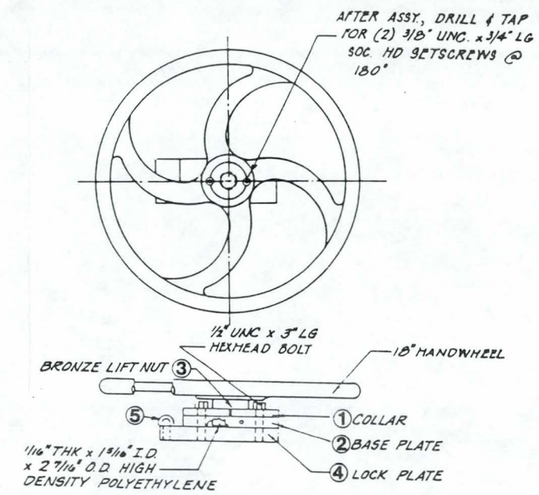
S.R.V.W.U.A. SQUARE TO ROUND TRANSITION



FLANGE DETAIL



BELL DETAIL



18" HANDWHEEL ASSEMBLY

TRANSITION NOTES

SPECIFICATION:

ALL FIBERGLASS CHOPPER GUN CONSTRUCTION.
CHOP ROVING 1" TO 1-1/2" LG FIBERS AND ROLL TO APPROXIMATELY .05 LB/CU IN. DENSITY. (36% GLASS)

MATERIAL: (AS BELOW OR EQUIVALENT)

ROVING, SRP CAT. NO. 04-1935 FIBERGLASS FILAMENT CONTINUOUS, PITTSBURG PLATE GLASS CO. NO. X-5113 GR-63270-3Q560 RESIN, SRP CAT. NO. 04-1936 SELECTRON, LAMINATING RESIN PITTSBURG PLATE GLASS CO. NO. RE-58502.

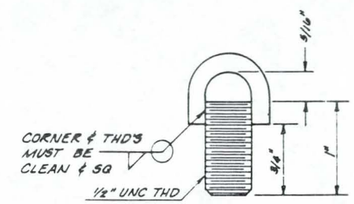
CATALYST, MEC PEROXIDE NOROX CO.

FILL VOIDS, SMOOTH AND SEAL ALL EDGES.

SQUARE TO ROUND TRANSITION SCHEDULE

PIPE I.D.	A	B	C	D	E	F	G	H	N	J	K	L	M
12	12	15-1/4	15-7/16	16-7/16	5	4-1/8	6-1/2	13	9-1/4	6	10-1/2	21	2-3/4
18	18	21-3/4	21-15/16	22-15/16	5	4-1/8	9-1/2	19	12-1/4	9	13-1/2	27	2-3/4
24	24	28-1/4	28-1/2	29-1/2	4-3/4	4	12-1/2	25	15-1/4	12	16-1/2	33	2-3/4
30	30	34-1/4	34-5/8	36-1/16	6	4-1/2	15-1/2	31	18-1/4	16	19-1/2	39	--

NOTE: ALL DIMENSIONS ARE GIVEN IN INCHES.



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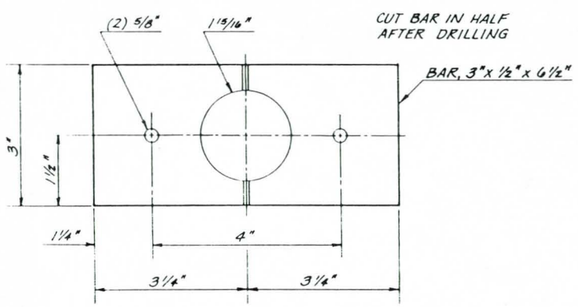

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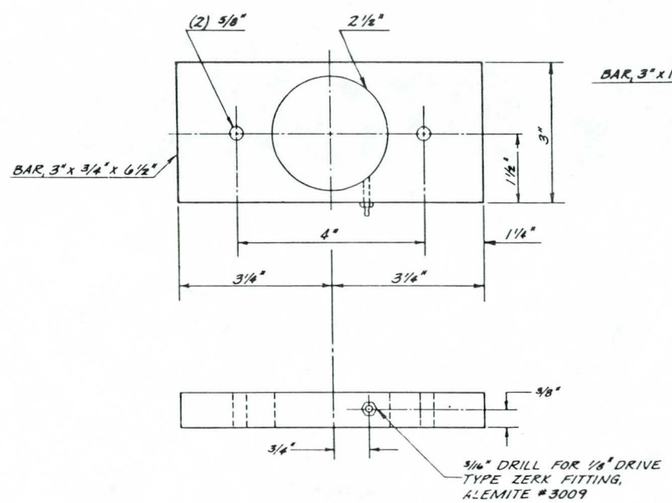

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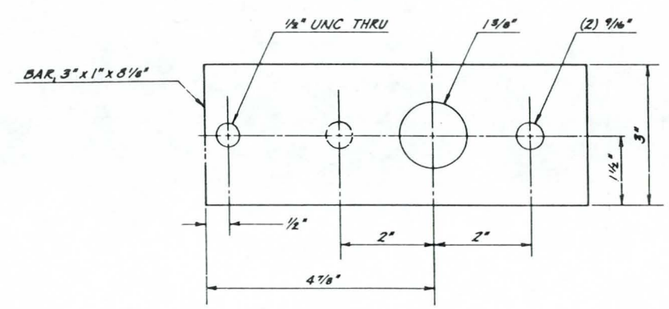

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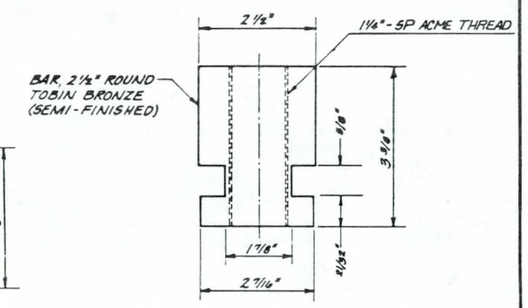

③
(1) REQ'D

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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

TURNOUT HANDWHEEL & TRANSITION

DESIGNED	MAF	SUBMITTED	
DRAWN	JJC	RECOMMENDED	
CHECKED	RFN	APPROVED	

Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

Franzoy·Corey
ENGINEERS & ARCHITECTS
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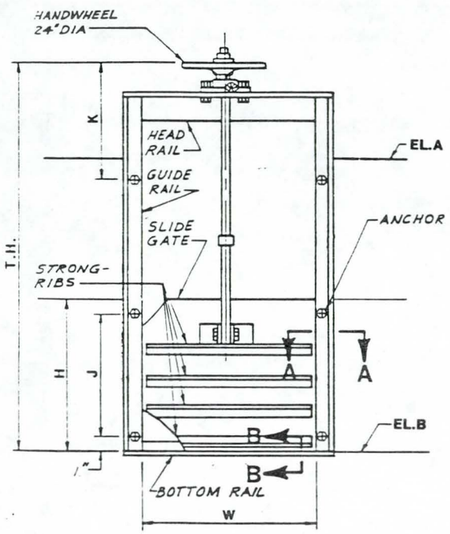
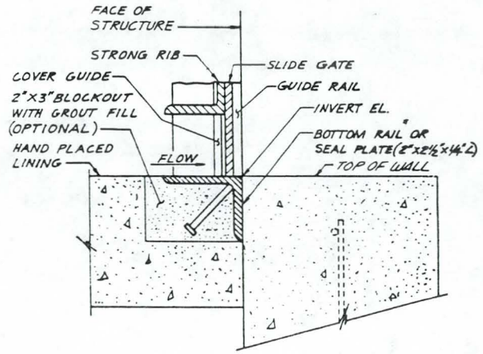
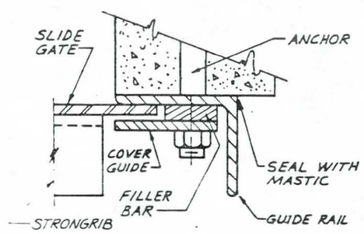


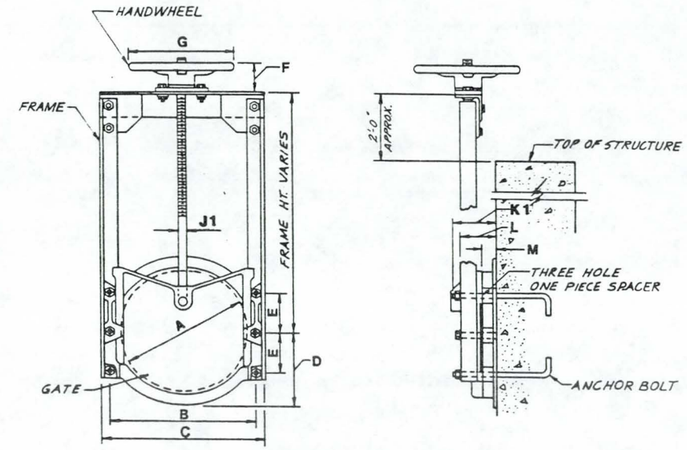
SLIDE GATE DETAIL



SECTION B-B



SECTION A-A



CANAL GATE DETAIL

FRESNO TYPE LC OR EQUIVALENT

CANAL GATE DIMENSIONS

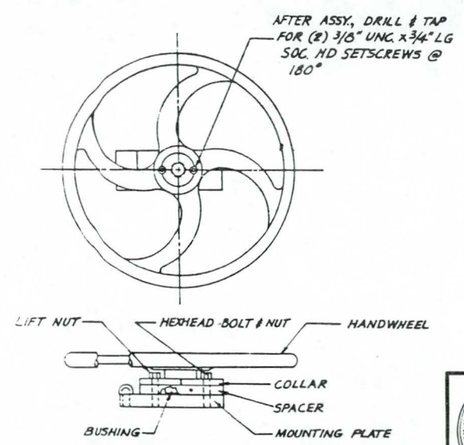
	A	B	C	D	E	F	G	J1	K1	L	M
INCHES	18	21	23¾	10¾	6	3⅛	12	1	4⅝	4¼	1⅝
	24	27	29¼	14	8	3⅛	12	1	4⅝	4¼	1⅝
	36	39¾	42½	20½	12	5⅝	18½	1½	7¼	5⅞	2½

CANAL GATE SCHEDULE

CANAL	STATION	A	REMARKS
MAIN	256+86.5	36"	TURNOUT M-4
MAIN	417+76	24"	DIVISION BOX AT TURNOUT M-10

SLIDE GATE SCHEDULE

CANAL	STATION	H.	T.H.	W.	J.	K.	EL.A	EL.B	REMARKS
MAIN	204+28.67	3'-6"	8'-9"	3'-6"	1'-1"	3'-3"	1215.69	1209.94	CHECK DROP
MAIN	230+54.16	1'-6"	7'-3"	1'-6"	0'-10"	3'-0"	1197.75	1193.25	CHECK AND PIPE INLET
MAIN	256+95	3'-0"	8'-4"	3'-0"	0'-11"	3'-8"	1183.14	1178.14	CHECK AND PIPE INLET
MAIN	283+16	1'-0"	7'-4"	1'-0"	1'-0"	3'-3"	1169.33	1165.00	CHECK AND PIPE INLET
MAIN	310+45	3'-0"	8'-4"	3'-0"	0'-11"	3'-8"	1158.00	1153.00	CHECK DROP
MAIN	362+06.2	1'-6"	7'-3"	1'-6"	0'-10"	3'-10"	1138.27	1134.60	CHECK AND PIPE INLET
MAIN	389+29.83	2'-0"	7'-3"	2'-0"	1'-0"	4'-2"	1135.62	1132.12	WASTEWAY
MAIN	389+38	2'-6"	8'-3"	2'-6"	0'-11"	3'-7"	1135.95	1130.87	BROKEN BACK TRANSITION
MAIN	408+56.5	2'-0"	6-8"	2'-0"	0'-10"	3'-3"	1133.16	1129.49	CHECK AND PIPE INLET
LAT. 1	205+15	2'-0"	7'-3"	2'-0"	0'-11"	3'-11"	1213.61	1209.44	CHECK DROP



TYPICAL HANDWHEEL LIFT

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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

GATE DETAILS

Date FEB 1985
Designed MAF
Drawn JJC
Checked RFN
Revised

Franzoy·Corey
ENGINEERS & ARCHITECTS
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DESIGNED MAF SUBMITTED
DRAWN JJC RECOMMENDED
CHECKED RFN APPROVED

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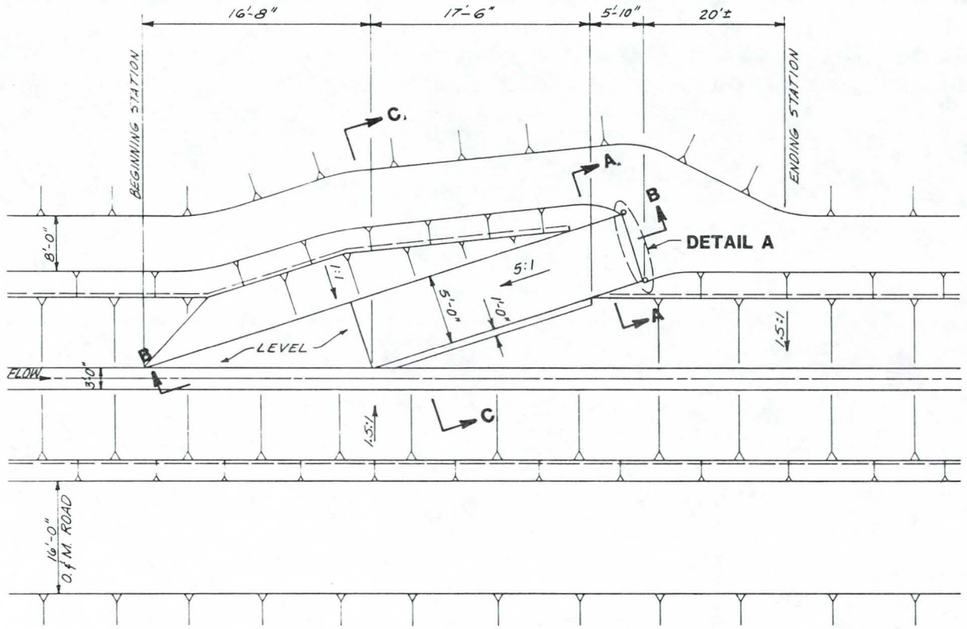
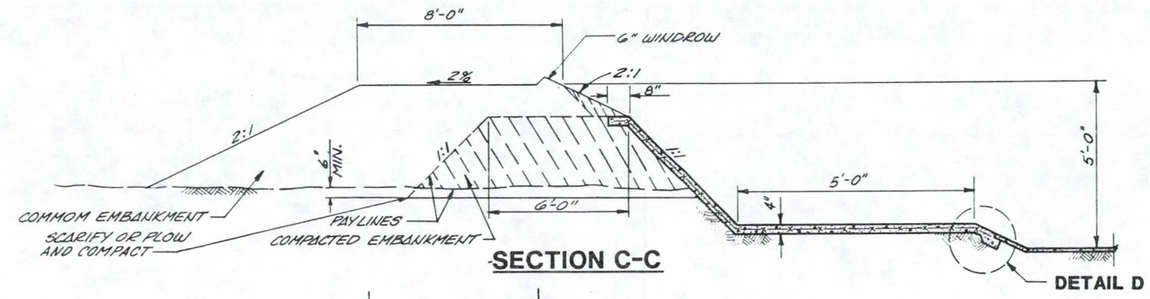
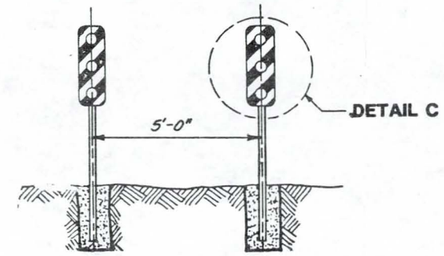
334-330-6897



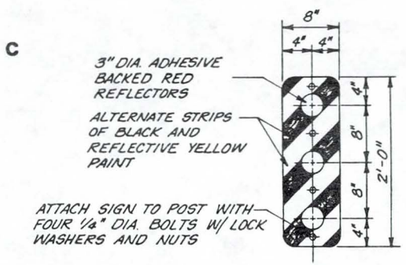
PLAN
N.T.S.



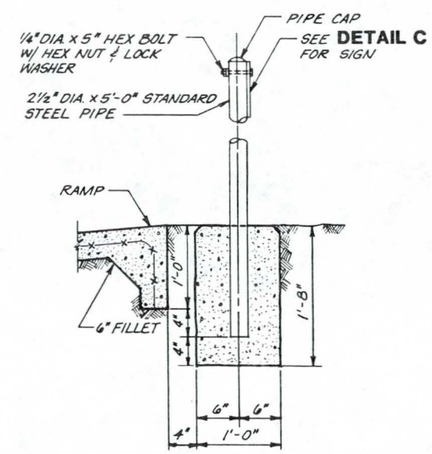
SECTION C-C



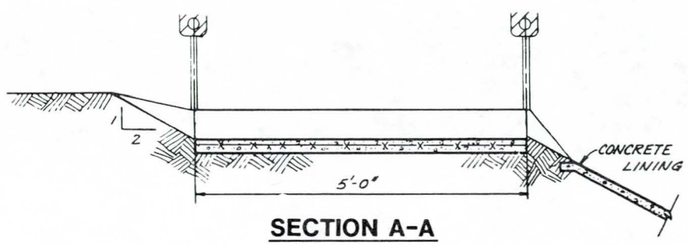
DETAIL A



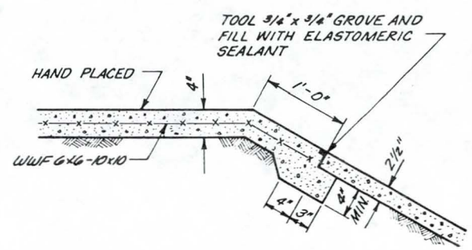
DETAIL C



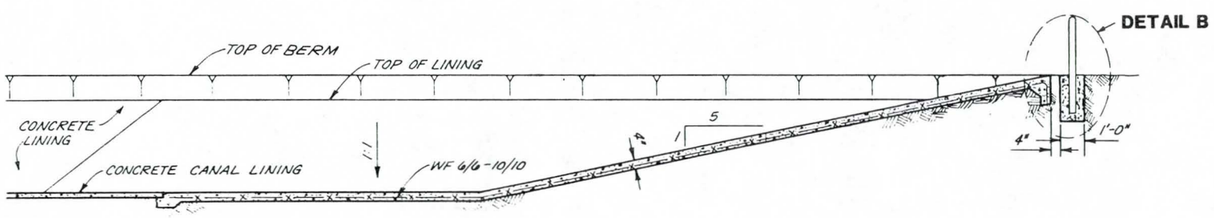
DETAIL B



SECTION A-A



DETAIL D



SECTION B-B

Date	FEB. 85
Designed	MAF
Drawn	CLB
Checked	RFN
Revised	

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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM

WILDLIFE ESCAPE RAMP

DESIGNED MAF SUBMITTED
DRAWN CLB RECOMMENDED
CHECKED RFN APPROVED

344-330-6898

GENERAL GEOLOGIC LEGEND

EMBANKMENT

EMBANKMENT FILL

EMBANKMENT: Suitable earth materials obtained from construction activities for the Tonopah Distribution system, including canal prism excavation, floodway excavation and borrow area excavation. These materials are Tertiary to Quaternary alluvial deposits as follows:

ALLUVIAL FAN DEPOSITS: Loose to variably caliche-cemented silty to clayey sand and gravel with cobbles and some boulders; locally clayey silt to silty clay; some sandy gravel and gravelly sand; contains some thin zones of sandy silt and gravelly silt; well-developed drainage channels contain up to 3 feet of surface gravel and cobbles.

BASIN FILL DEPOSITS: Loose to strongly claiche-cemented silty to clayey sand, sandy silt, lean clay, clayey silt and silty clay; some poorly graded sand and gravel, sandy and silty gravel, sandy clay and gravelly silt; some cobbles; covered in places by a veneer of lag gravel.

SCARIFIED AREA

SCARIFIED AREA: A surface disturbance and roughening by equipment travel to prevent or reduce erosion.

LEGEND

SOIL CLASSIFICATION ASTM: D2487

COARSE-GRAINED SOIL

MORE THAN 50% LARGER THAN 200 SIEVE SIZE

Symbol		Description	Major Divisions
	GW	WELL-GRADED GRAVELS OR GRAVEL SAND MIXTURES LESS THAN 5% - 200 FINES	GRAVELS More than half of coarse fraction is larger than No. 4 Sieve size
	GP	POORLY-GRADED GRAVELS OR GRAVEL SAND MIXTURES LESS THAN 5% - 200 FINES	
	GM	SILTY GRAVELS GRAVEL-SAND-SILT MIXTURES MORE THAN 12% - 200 FINES	
	GC	CLAYEY GRAVELS GRAVEL-SAND-CLAY MIXTURES MORE THAN 12% - 200 FINES	
	SW	WELL-GRADED SANDS OR GRAVELLY SANDS LESS THAN 5% - 200 FINES	SANDS More than half of coarse fraction is smaller than No. 4 Sieve size
	SP	POORLY-GRADED SANDS OR GRAVELLY SANDS LESS THAN 5% - 200 FINES	
	SM	SILTY SANDS SAND-SILT MIXTURES MORE THAN 12% - 200 FINES	
	SC	CLAYEY SANDS SAND-CLAY MIXTURES MORE THAN 12% - 200 FINES	

FINE-GRAINED SOIL

MORE THAN 50% SMALLER THAN 200 SIEVE SIZE

Symbol		Description	Major Divisions
	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	SILTS AND CLAYS Liquid limit less than 50
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY	
	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	SILTS AND CLAYS Liquid limit greater than 50
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	

log denotes visual approximation unless accompanied by mechanical analysis and Atterberg limits.

GRAIN SIZES

	U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENINGS			
	200	40	10	4	¾"	3"	12"	
SILTS & CLAYS DISTINGUISHED ON BASIS OF PLASTICITY	SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE			

MOISTURE CONDITION (INCREASING MOISTURE →)

DRY — SLIGHTLY DAMP — DAMP — MOIST (PL) — VERY MOIST — WET (SATURATED) (LL)

DEFINITIONS

Penetration Resistance — Blows per foot using 'A' rod and 140 lb. hammer with 30 inch free fall unless otherwise noted.

N Standard Penetration Resistance (ASTM D1586), 2.0 inch O.D. split barrel sampler.

C Continuous Penetration Resistance, 2.0 inch O.D. Bull Nose.

R Penetration Resistance, 2.42 inch I.D. Ring Sampler

Sample Type

R - Ring T - Shelby Tube S - Standard Split Barrel B - Block
G - Grab C - Cutting V - Vertical Face Cut

CONSISTENCY			RELATIVE DENSITY	
CLAYS & SILTS	BLOWS/FOOT*	STRENGTH‡	SANDS & GRAVELS	BLOWS/FOOT*
VERY SOFT	0-2	0-½	VERY LOOSE	0-4
SOFT	3-4	½-1	LOOSE	4-10
FIRM	4-8	1-2	MEDIUM DENSE	10-30
STIFF	8-16	2-4	DENSE	30-50
VERY STIFF	16-32	4-8	VERY DENSE	OVER 50
HARD	OVER 32	OVER 4		

* Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586).

‡ Unconfined compressive strength in tons/sq. ft. Read from a pocket penetrometer.

GENERAL GEOLOGIC EXPLANATION

Qaf / QTv — Contact between geologic units; dashed where approximate; querried where inferred; dotted where concealed.

55° / 80° — Strike and dip of multiple dominant joints and joint sets observations located near points of intersection.

65° — Strike and dip of joint or joint set.

SILT SAND — Stick log. Indicates approximate location of exploration hole; dashed where projected. Only selected stick logs are shown on drawings.

14 — Depth (feet).

SANDY SILT — Typical name of material. See log for entire description.

18

SILTY GRAVEL — Total depth (feet).

25

HOLE STOPPED BY CALICHE — Reason for not drilling to required depth.

T.D. 497 — Total depth of hole. Shown where entire stick log does not plot in profile.

GENERAL GEOLOGIC NOTES

Some of the logs of exploration that are included in these specifications may not conform to present-day format and criteria of the Bureau of Reclamation.

Letter classification symbols used in some of the logs of exploration are group symbols of the Unified Soil Classification System based on field identification; see drawing 103-D-347 for explanation.

The graphic classification symbols shown on some of the exploration logs represent only the predominant materials; read the entire description for a complete delineation of the materials.

Only selected stick logs are shown on the profiles. Only the typical name of the material shown on the complete log is indicated on the stick log. The typical name is based on recovered material and may not accurately reflect the in-place condition of the material in all instances. For the entire description of the material, drilling and sampling methods, augering conditions, etc., and exact location of the hole, see the complete log.

The gradation test results listed in the "Particle-Size Fractions in Percent" columns in the summaries of physical properties test results represent only the gradation of the minus 3-inch material submitted to the laboratory for testing; the plus 3-inch material was removed in the field prior to testing. See the complete log for information on the plus 3-inch material.

Where used in these specifications, the terms "weakly", "moderately", and "strongly" cemented refer to materials that could be easily crushed with finger pressure, broken manually, or required a hammer blow to break, respectively.

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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION - ARIZONA

TONOPAH DISTRIBUTION SYSTEM

GENERAL GEOLOGIC LEGEND, EXPLANATION & NOTES

DESIGNED M.A.F. SUBMITTED
DRAWN J.J.C. RECOMMENDED
CHECKED R.F.N. APPROVED

Date FEB 1985
Designed M.A.F.
Drawn J.J.C.
Checked R.F.N.
Revised

Franzoy•Corey
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344-330-6900

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ____ Project: Tonopah Irrigation Canal Area Designation: Canal
Hole No.: 1; STA 8+00 Coordinates N. ____ E. ____ Ground Elevation: ____ Approx. Dimensions: ____
Depth to Water Level*: none Method of Excavation: 6½" Hollow Stem Auger Date: 2-5-85 Logged by: NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material
SC	0–5	A; S 50/2" NR; A	CLAYEY SAND, some gravel & cobbles, trace of silt, predominantly fine grained subrounded sand, well graded subrounded to subangular gravel, nonplastic to low plasticity, brown note: considerable gravel & cobbles below 1' moist; hard
			Auger refused at 4'6"

REMARKS: A-5

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled)
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ____ Project: Tonopah Irrigation Canal Area Designation: Canal
Hole No.: 2; STA 21+00 Coordinates N. ____ E. ____ Ground Elevation: ____ Approx. Dimensions: ____
Depth to Water Level*: none Method of Excavation: 6½" Hollow Stem Auger Date: 2-5-85 Logged by: TJF

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material
SM	0–5	U 12; A; S 50/3"	SILTY SAND, some gravel, low plasticity, dark brown note: strongly cemented gravel at 3' moist; moderately firm to hard
			Auger refused at 3'2" Sampler refused at 3'3"

REMARKS: A-6

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled)
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ____ Project: Tonopah Irrigation Canal Area Designation: Canal
Hole No.: 3; STA 34+00 Coordinates N. ____ E. ____ Ground Elevation: ____ Approx. Dimensions: ____
Depth to Water Level*: none Method of Excavation: 6½" Hollow Stem Auger Date: 2-5-85 Logged by: TJF

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material
SM & GM	0–5	S 45; S 24	SILTY SAND grading to SILTY GRAVEL, angular, nonplastic to low plasticity, brown note: strongly cemented gravel at 7' moist; very firm to firm
	10		Auger refused at 7' Hole collapsed to 3'2" note: auger sample from 2'6" to 3'

REMARKS: A-7

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled)
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ____ Project: Tonopah Irrigation Canal Area Designation: Canal ℄
Hole No.: 4; STA 45+00 Coordinates N. ____ E. ____ Ground Elevation: ____ Approx. Dimensions: ____
Depth to Water Level*: none Method of Excavation: 6½" Hollow Stem Auger Date: 2-5-85 Logged by: NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material
ML	0–5	U 98; A	SANDY SILT, trace of gravel, angular, weak cementation, low plasticity, light brown note: strongly cemented at 4'6" slightly moist; hard
			Auger refused at 4'9" note: auger sample from auger cuttings from 2'6" to 3'6"

REMARKS: A-8

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled)
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ____ Project: Tonopah Irrigation Canal Area Designation: Canal
Hole No.: 5; STA 58+00 Coordinates N. ____ E. ____ Ground Elevation: ____ Approx. Dimensions: ____
Depth to Water Level*: none Method of Excavation: 6½" Hollow Stem Auger Date: 2-5-85 Logged by: NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material
CL	0–5	A; S 50/5"; S 38	SANDY CLAY, trace of silt, predominantly fine grained, low plasticity, dark brown note: gravels & cobbles at surface very slightly moist; hard to very firm
SC	10	S 50/4"	CLAYEY SAND, some gravel, poorly graded, subangular, medium plasticity, light brown note: strongly cemented at 12'6" dry to very slightly moist; hard
	15		Auger refused at 12'6" Hole collapsed to 7'10"

REMARKS: A-9

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled)
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ____ Project: Tonopah Irrigation Canal Area Designation: Canal
Hole No.: 6; STA 60+84 Coordinates N. ____ E. ____ Ground Elevation: ____ Approx. Dimensions: ____
Depth to Water Level*: none Method of Excavation: 6½" Hollow Stem Auger Date: 2-5-85 Logged by: NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material
CL	0	A; U 14 NR	SANDY CLAY, rounded sand, low plasticity, dark brown moist; moderately firm
SM-SC	5	U 31 NR	SILTY, CLAYEY SAND, well graded, rounded, nonplastic, brown note: strongly cemented at 7'6" moist; very firm
	10		Auger refused at 7'6" Hole caved to 2'

REMARKS: A-10

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled)
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

Date FEB 1985
Designed MAF
Drawn RJB/VF
Checked RFN
Revised ____

Franzoy·Corey ENGINEERS & ARCHITECTS
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GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM
MAIN CANAL
LOG OF TEST PITS OR AUGER HOLES
1 THROUGH 6

DESIGNED MAF SUBMITTED [signature]
DRAWN RJB/VF RECOMMENDED [signature]
CHECKED RFN APPROVED [signature]

344-330-6901

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project Tonopah Irrigation Canal Area Designation Canal ℄
Hole No. 7; STA 74+00 Coordinates N. ______ E. ______ Ground Elevation ______ Approx. Dimensions ______
Depth to Water Level* none Method of Excavation 6½" Hollow Stem Auger Date 2-5-85 Logged by NJL

Classification Symbol (Letter)	Depth (feet)	Size and type of sample taken	Classification and description of material (See chart - "Unified Soil Classification") Give geologic and in-place description for foundation investigations	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
ML	0–8	U 68; S 52	SILT, trace of sand & gravel, weakly cemented, low plasticity, light brown note: thin gravel layer at surface note: strongly cemented at 7'9" very slightly moist; hard					
			Auger refused at 8' Hole collapsed to 6'					

REMARKS: A-11

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled)
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project Tonopah Irrigation Canal Area Designation Canal ℄
Hole No. 8; STA 87+00 Coordinates N. ______ E. ______ Ground Elevation ______ Approx. Dimensions ______
Depth to Water Level* none Method of Excavation 6½" Hollow Stem Auger Date 2-5-85 Logged by NJL

Classification Symbol (Letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
ML	0–4	A; S 44	SANDY SILT grading to SANDY CLAY, low plasticity, brown to light brown slightly moist; very firm					
SC	4–13	S 55; S 50/2"	CLAYEY SAND, considerable to some gravel, subangular, low to medium plasticity, light brown very slightly moist; hard					
GC	13–17	S 50/2"	CLAYEY GRAVEL, trace of cobbles, subrounded, medium plasticity, brown very slightly moist; hard					
SC	17–19.6	S 50/1"	CLAYEY SAND, medium plasticity, light brown dry to very slightly moist; hard					
			Stopped auger at 19'6" Sampler refused at 19'7" Hole collapsed to 9'4"					

REMARKS: A-12

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled)
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project Tonopah Irrigation Canal Area Designation Canal ℄
Hole No. 9; STA 100+00 Coordinates N. ______ E. ______ Ground Elevation ______ Approx. Dimensions ______
Depth to Water Level* none Method of Excavation 6½" Hollow Stem Auger Date 2-5-85 Logged by NJL

Classification Symbol (Letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
SM & ML	0–8	U 48; S 45	SILTY SAND to SANDY SILT, some gravel, poorly graded, angular, nonplastic to low plasticity, light brown note: surface covered with gravel sized flat rocks to 3" depth very slightly moist; very firm					
SM	8–16	S 50/5"; S 50/4"; NR	SILTY SAND, considerable gravel, poorly graded, low plasticity, light brown note: strongly cemented at 15'6" very slightly moist; hard					
			Auger refused at 16' Hole collapsed to 5'8"					

REMARKS: A-13

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled)
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project Tonopah Irrigation Canal Area Designation Canal ℄
Hole No. 10; STA 113+20 Coordinates N. ______ E. ______ Ground Elevation ______ Approx. Dimensions ______
Depth to Water Level* none Method of Excavation 6½" Hollow Stem Auger Date 2-5-85 Logged by TJF

Classification Symbol (Letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
ML	0–8	U 84; S 67	SILT, trace of sand, weakly lime cemented, low plasticity, light brown very slightly moist; hard					
SC	8–19.6	S 50/5"; S 97; S 50/4"	CLAYEY SAND, considerable gravel, angular, medium plasticity, light brown note: gravel content increases from 10' to 15' very slightly moist; hard					
			Stopped auger at 19'6" Sampler refused at 19'10" Hole collapsed to 9'4"					

REMARKS: A-14

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled)
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project Tonopah Irrigation Canal Area Designation Canal ℄
Hole No. 11; STA 126+40 Coordinates N. ______ E. ______ Ground Elevation ______ Approx. Dimensions ______
Depth to Water Level* none Method of Excavation 6½" Hollow Stem Auger Date 2-6-85 Logged by TJF

Classification Symbol (Letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
ML & SM	0–12	S 89; U 70; S145	SANDY SILT grading to SILTY SAND, weakly to moderately cemented, low plasticity, light brown note: 3" surface cover of gravel to small cobbles note: strongly cemented at 11'9" very slightly moist; hard					
			Auger refused at 12' Hole collapsed to 9'2"					

REMARKS: A-15

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled)
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project Tonopah Irrigation Canal Area Designation Canal ℄
Hole No. 12; STA 139+60 Coordinates N. ______ E. ______ Ground Elevation ______ Approx. Dimensions ______
Depth to Water Level* none Method of Excavation 6½" Hollow Stem Auger Date 2-7-85 Logged by TJF

Classification Symbol (Letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
ML	0–4	U 100/10"	SILT, trace of sand, weakly cemented, low plasticity, light brown note: ground surface sparsely covered with large gravel sized flat rock slightly moist; hard					
GC	4–12	S 76; S 50/5"	CLAYEY GRAVEL, trace of silt, poorly graded, angular gravel, low plasticity, light brown slightly moist; hard					
SC	12–19.6	S 50/5"; S 50/5"	CLAYEY SAND, some sand & gravel, angular, low plasticity, light brown note: gravel size increases from 5' - 15' very slightly moist; hard					
			Stopped auger at 19'6" Sampler refused at 20'5" Hole collapsed to 8'					

REMARKS: A-16

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled)
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

Date FEB 1985
Designed MAF
Drawn RJB/VF
Checked RFN
Revised ______

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TONOPAH DISTRIBUTION SYSTEM
MAIN CANAL
LOG OF TEST PITS OR AUGER HOLES
7 THROUGH 12

DESIGNED MAF SUBMITTED [signature]
DRAWN RJB/VF RECOMMENDED [signature]
CHECKED RFN APPROVED [signature]

344-330-6902

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ____ Project: Tonopah Irrigation Canal Area Designation: Canal ℄
Hole No.: 13; STA 152+80 Coordinates N. ____ E. ____ Ground Elevation: ____ Approx. Dimensions: ____
Depth to Water Level*: none Method of Excavation: 6½" Hollow Stem Auger Date: 2-7-85 Logged by: TJF

Classification symbol (letter)	Depth (feet)	Size and type of sample taken	Classification and description of material (see chart - "Unified Soil Classification"; give geologic and in-place description for foundation investigations)	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
CL	0, 5, 10	S 105; U 84; S 50/4"	SANDY CLAY, considerable silt, weakly lime cemented, low plasticity, light brown note: surface covered with large gravel to approximately 3" depth very slightly moist; hard					
CL	15, 20	S 50/3"; S 50/1" NR	SANDY CLAY, some gravel, angular, medium plasticity, light brown very slightly moist; hard					
			Stopped auger at 19'6" Sampler refused at 19'7" Hole collapsed to 8'8"					

REMARKS: A-17

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ____ Project: Tonopah Irrigation Canal Area Designation: Canal ℄
Hole No.: 14; STA 156+41 Coordinates N. ____ E. ____ Ground Elevation: ____ Approx. Dimensions: ____
Depth to Water Level*: none Method of Excavation: 6½" Hollow Stem Auger Date: 2-8-85 Logged by: TJF

Classification symbol (letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
CL	0, 5, 10	A; U 53; S 71; S 50/4" NR	SANDY CLAY, predominantly fine grained, low plasticity, light brown note: gravel below 3' very slightly moist; hard					
SC	15, 20	S 50/5"; S 50/1	CLAYEY SAND, some to considerable gravel, poorly graded, angular, weakly cemented, low to medium plasticity, light brown very slightly moist; hard					
			Stopped auger at 19'6" Sampler refused at 19'7" Hole collapsed to 10'2"					

REMARKS: A-18

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ____ Project: Tonopah Irrigation Canal Area Designation: Canal ℄
Hole No.: 15; STA 166+00 Coordinates N. ____ E. ____ Ground Elevation: ____ Approx. Dimensions: ____
Depth to Water Level*: none Method of Excavation: 6½" Hollow Stem Auger Date: 2-8-85 Logged by: TJF

Classification symbol (letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
GC	0, 5	S 39; S 80	CLAYEY GRAVEL, low to medium plasticity, light brown note: ground surface covered with gravel to 3" depth very slightly moist; very firm to hard					
CL	10	S 102	SANDY CLAY, weakly cemented, low to medium plasticity, light brown slightly moist; hard					
SC	15, 20	S 65; S 50/5" NR	CLAYEY SAND, some to considerable gravel, poorly graded, subangular, low to medium plasticity, gray to light brown slightly moist; hard					
	25		Stopped auger at 19'6" Sampler refused at 20'5" Hole collapsed to 7'3"					

REMARKS: A-19

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ____ Project: Tonopah Irrigation Canal Area Designation: Canal ℄
Hole No.: 16; STA 170+30 Coordinates N. ____ E. ____ Ground Elevation: ____ Approx. Dimensions: ____
Depth to Water Level*: none Method of Excavation: 6½" Hollow Stem Auger Date: 2-8-85 Logged by: TJF

Classification symbol (letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
CL	0, 5, 10	S 50; U 50; S 36 NR	SANDY CLAY, trace of gravel, low to medium plasticity, light brown very slightly moist; hard to very firm					
SC	15, 20	S 144; S 50/4"	CLAYEY SAND, considerable gravel, poorly graded, subangular, low to medium plasticity, gray very slightly moist; hard					
	25		Stopped auger at 19'6" Sampler refused at 20'4" Hole collapsed to 6'2"					

REMARKS: A-20

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ____ Project: Tonopah Irrigation Canal Area Designation: Canal ℄
Hole No.: 17; STA 179+00 Coordinates N. ____ E. ____ Ground Elevation: ____ Approx. Dimensions: ____
Depth to Water Level*: none Method of Excavation: 6½" Hollow Stem Auger Date: ____ Logged by: TJF

Classification symbol (letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
GC	0, 5, 10	S 37; S 31; S 69	CLAYEY GRAVEL grading to CLAYEY SAND, poorly graded, angular, weakly cemented, low plasticity, light brown note: increasing amount of gravel in size & amount from 3' - 6' very slightly moist; very firm to hard					
SC	15	S 34	CLAYEY SAND, some gravel, poorly graded, subrounded, low plasticity, light brown very slightly moist; very firm					
	20		Stopped auger at 14'6" Stopped sampler at 16'					

REMARKS: A-21

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: ____ Project: Tonopah Irrigation Canal Area Designation: Canal ℄
Hole No.: 18; STA 192+00 Coordinates N. ____ E. ____ Ground Elevation: ____ Approx. Dimensions: ____
Depth to Water Level*: none Method of Excavation: 6½" Hollow Stem Auger Date: ____ Logged by: TJF

Classification symbol (letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
CL	0, 5, 10	U 40; U 43; S 40	SANDY CLAY, trace of silt & gravel, weakly cemented, low plasticity, light brown note: increasing amount of sand & gravel from 2'6" to 6' very slightly moist; very firm					
SC	15	S 49	CLAYEY SAND, trace of gravel, medium plasticity, light brown very slightly moist; very firm to hard					
	20		Stopped auger at 14'6" Stopped sampler at 16' Hole collapsed to 8'2"					

REMARKS: A-22

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

Date: FEB 1985
Designed: MAF
Drawn: RJB/VF
Checked: RFN
Revised: ____

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TONOPAH DISTRIBUTION SYSTEM
MAIN CANAL
LOG OF TEST PITS OR AUGER HOLES
13 THROUGH 18

DESIGNED: MAF SUBMITTED: [signature]
DRAWN: RJB/VF RECOMMENDED: [signature]
CHECKED: RFN APPROVED: [signature]

344-330-6903

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: | Project: Tonopah Irrigation Canal | Area Designation: Canal ℄
Date Dig.: 19; STA 205+00 | Coordinates N: | E: | Ground Elevation: | Approx. Dimensions:
Depth to Water Level*: none | Method of Excavation: 6¼" Hollow Stem Auger | Date: | Logged by: TJF

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See Chart - "Unified Soil Classification" Give Geology and In-Place Description for Foundation Investigations)	Percentage of Cobbles and Boulders ** (Volume of Hole Sampled; Weight of 3 to 5-inch Sampled; Percentage by Volume of 3 to 5-inch; Weight of Plus 5-inch Sampled; Percentage by Volume of Plus 5-inch)
ML	0	U 87	SANDY SILT, predominantly fine grained, weakly cemented, low plasticity, light brown	
	5	U 63	note: some gravel below 5' very slightly moist; hard	
	10	S 50/5"		
SC	15	S 21	CLAYEY SAND, considerable coarse grained sand & gravel, subangular, medium plasticity, gray very slightly moist; hard to firm	
	20		Stopped auger at 14'6" Stopped sampler at 16' Hole collapsed to 8'	

REMARKS:
A-23

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs of rock sampled) 100 / (Bulk specific gravity of rock) x (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: | Project: Tonopah Irrigation Canal | Area Designation: Canal ℄
Date Dig.: 20; STA 218+00 | Coordinates N: | E: | Ground Elevation: | Approx. Dimensions:
Depth to Water Level*: none | Method of Excavation: 6¼" Hollow Stem Auger | Date: | Logged by: TJF

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See Chart - "Unified Soil Classification" Give Geology and In-Place Description for Foundation Investigations)	Percentage of Cobbles and Boulders ** (Volume of Hole Sampled; Weight of 3 to 5-inch Sampled; Percentage by Volume of 3 to 5-inch; Weight of Plus 5-inch Sampled; Percentage by Volume of Plus 5-inch)
ML	0	U 53	SANDY SILT occasionally grading to SANDY CLAY, trace of gravel, weakly cemented, low plasticity, light brown	
	5	U 67	very slightly moist; hard to very firm	
	10	S 34		
SC	15	S 53	CLAYEY SAND, poorly graded, subangular, medium plasticity, dark brown slightly moist; hard	
	20		Stopped auger at 14'6" Stopped sampler at 16' Hole collapsed to 9'5"	

REMARKS:
A-24

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs of rock sampled) 100 / (Bulk specific gravity of rock) x (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: | Project: Tonopah Irrigation Canal | Area Designation: Canal ℄
Date Dig.: 21; STA 231+00 | Coordinates N: | E: | Ground Elevation: | Approx. Dimensions:
Depth to Water Level*: none | Method of Excavation: 6¼" Hollow Stem Auger | Date: | Logged by: TJF

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See Chart - "Unified Soil Classification" Give Geology and In-Place Description for Foundation Investigations)	Percentage of Cobbles and Boulders ** (Volume of Hole Sampled; Weight of 3 to 5-inch Sampled; Percentage by Volume of 3 to 5-inch; Weight of Plus 5-inch Sampled; Percentage by Volume of Plus 5-inch)
ML-CL	0	U 19	SANDY SILT TO SANDY CLAY, occasional gravel, weakly cemented, low plasticity, light brown	
	5	U 15	very slightly moist; moderately firm	
CH	10	S 92	SILTY CLAY, some sand, predominantly fine grained, high plasticity, dark brown very moist; hard to very firm	
	15	S 35		
	20		Stopped auger at 14'6" Stopped sampler at 16' Hole collapsed to 13'	

REMARKS:
A-25

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs of rock sampled) 100 / (Bulk specific gravity of rock) x (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: | Project: Tonopah Irrigation Canal | Area Designation: Canal ℄
Date Dig.: 22; STA 244+00 | Coordinates N: | E: | Ground Elevation: | Approx. Dimensions:
Depth to Water Level*: none | Method of Excavation: 6¼" Hollow Stem Auger | Date: | Logged by: TJF

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See Chart - "Unified Soil Classification" Give Geology and In-Place Description for Foundation Investigations)	Percentage of Cobbles and Boulders ** (Volume of Hole Sampled; Weight of 3 to 5-inch Sampled; Percentage by Volume of 3 to 5-inch; Weight of Plus 5-inch Sampled; Percentage by Volume of Plus 5-inch)
ML-CL	0	U 24	SANDY SILT TO SANDY CLAY, some gravel, low plasticity, brown	
	5	U 28	slightly moist; firm	
CH	10	S 58	SILTY CLAY, some sand, moderately cemented, high plasticity, dark brown very slightly moist; hard	
	15	S 50/3"		
			Stopped auger at 14'6" Sampler refused at 14'11" Hole collapsed to 12'6"	

REMARKS:
A-26

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs of rock sampled) 100 / (Bulk specific gravity of rock) x (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: | Project: Tonopah Irrigation Canal | Area Designation: Canal ℄
Date Dig.: 23; STA 257+00 | Coordinates N: | E: | Ground Elevation: | Approx. Dimensions:
Depth to Water Level*: none | Method of Excavation: 6¼" Hollow Stem Auger | Date: | Logged by: TJF

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See Chart - "Unified Soil Classification" Give Geology and In-Place Description for Foundation Investigations)	Percentage of Cobbles and Boulders ** (Volume of Hole Sampled; Weight of 3 to 5-inch Sampled; Percentage by Volume of 3 to 5-inch; Weight of Plus 5-inch Sampled; Percentage by Volume of Plus 5-inch)
ML-CL	0	U 70	SANDY SILT TO SANDY CLAY, some to considerable gravel, weakly cemented, low plasticity, light brown	
	5	U 45 NR	very slightly moist; hard to very firm	
GM-GC	10	S 30	SILTY, CLAYEY GRAVEL, considerable sand, well graded, subangular, low plasticity, light brown very slightly moist; very firm	
CL-CH	15	S 50/3"	SILTY CLAY, some sand, medium to high plasticity, gray very slightly moist; hard	
	20		Stopped auger at 14'6" Sampler refused at 15'3" Hole collapsed to 12'	

REMARKS:
A-27

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs of rock sampled) 100 / (Bulk specific gravity of rock) x (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: | Project: Tonopah Irrigation Canal | Area Designation: Canal ℄
Date Dig.: 24; STA 270+20 | Coordinates N: | E: | Ground Elevation: | Approx. Dimensions:
Depth to Water Level*: none | Method of Excavation: 6¼" Hollow Stem Auger | Date: | Logged by: TJF

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See Chart - "Unified Soil Classification" Give Geology and In-Place Description for Foundation Investigations)	Percentage of Cobbles and Boulders ** (Volume of Hole Sampled; Weight of 3 to 5-inch Sampled; Percentage by Volume of 3 to 5-inch; Weight of Plus 5-inch Sampled; Percentage by Volume of Plus 5-inch)
ML-CL	0	U 26	SANDY SILT TO SANDY CLAY, trace of gravel, low plasticity, brown	
	5	U 38	moist; firm to very firm	
SM	10	S 18	GRAVELLY SAND, considerable silt, poorly graded, subangular, moderately cemented, low to medium plasticity, brown slightly moist; firm	
SC	15	S 17	CLAYEY SAND, some gravel, poorly graded, subrounded, medium plasticity, gray very slightly moist; firm	
	20		Stopped auger at 14'6" Stopped sampler at 16' Hole collapsed to 13'4"	

REMARKS:
A-28

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs of rock sampled) 100 / (Bulk specific gravity of rock) x (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

Date	FEB 1985
Designed	MAF
Drawn	RJB/VF
Checked	RFN
Revised	

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TONOPAH DISTRIBUTION SYSTEM
MAIN CANAL
LOG OF TEST PITS OR AUGER HOLES
19 THROUGH 24

DESIGNED MAE | SUBMITTED
DRAWN RJB/VF | RECOMMENDED
CHECKED RFN | APPROVED

344-330-6904

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project: Tonopah Irrigation Canal — Area Designation: Canal ℄
Hole No.: 25 ; STA 283+40 — Coordinates N. ____ E. ____ — Ground Elevation ____ — Approx. Dimensions ____
Depth to Water Level*: none — Method of Excavation: 6¼" Hollow Stem Auger — Date: 2-12-85 — Logged by: NJL

Classification Symbol (Letter)	Depth (feet)	Size and type of sample taken	Classification and description of material (See chart - "Unified Soil Classification") Give geologic and in-place description for foundation investigations	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
ML	0–5	S 11; S 35; A	CLAYEY SILT, trace of fine grained sand, low plasticity, brown note: trace of very weak lime cementation at 5' moist; moderately firm to very firm					
SM	10–15	U 27; S 56	SILTY SAND, trace of fine grained gravel, poorly graded, fine grained subrounded sand, subrounded gravel, nonplastic, brown note: thin lenses of coarse grained well graded sand & lenses of silt encountered at 14'6" - 16' slightly moist to moist; medium dense to very dense					
	20		Stopped auger at 14'6" Stopped sampler at 16' Hole caved to 13'3"					

REMARKS: A-29

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project: Tonopah Irrigation Canal — Area Designation: Canal ℄
Hole No.: 26 ; STA 296+60 — Coordinates N. ____ E. ____ — Ground Elevation ____ — Approx. Dimensions ____
Depth to Water Level*: none — Method of Excavation: 6¼" Hollow Stem Auger — Date: 2-12-85 — Logged by: NJL

Classification Symbol (Letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
SP	0–10	S46; S43; A; S50	SAND, trace of silt & fine grained gravel, poorly graded, predominantly fine grained subrounded sand, fine grained subrounded gravel, nonplastic, brown note: more & coarser grained subrounded to subangular gravel below 2' note: light brown below 4' note: very weakly lime cemented at 6' slightly moist; dense					
SM	15	U 100/11"	SILTY SAND, trace of fine grained gravel, poorly graded, predominantly fine to medium grained subrounded to subangular sand, subangular gravel, weakly to moderately lime cemented, low plasticity, light brown note: more gravel, coarser grained more angular sand at 15', reddish brown slightly moist; hard					
	20		Stopped auger at 14'6" Stopped sampler at 15'5" Hole caved to 10'2"					

REMARKS: A-30

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project: Tonopah Irrigation Canal — Area Designation: Canal ℄
Hole No.: 27 ; STA 309+80 — Coordinates N. ____ E. ____ — Ground Elevation ____ — Approx. Dimensions ____
Depth to Water Level*: none — Method of Excavation: 6¼" Hollow Stem Auger — Date: 2-12-85 — Logged by: NJL

Classification Symbol (Letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
SM	0–5	S 23; U41 NR; S 45; A	SILTY SAND, trace of clay & fine grained gravel, poorly graded, predominantly fine grained subrounded sand, subangular gravel, low plasticity, brown note: increase in gravel content at 5' note: lens of coarse grained angular, well graded sand at 5' - 5'6" moist; firm					
ML	10	S 50/5"	SILT, trace of fine grained sand, weakly to moderately cemented, low plasticity to nonplastic, brown to light brown slightly moist; hard					
SM	15	U 100/11"	SILTY SAND, poorly graded, predominantly fine to medium grained sand, moderately to strongly lime cemented, nonplastic, brown to light brown slightly moist; hard					
	20		Stopped auger at 14'6" Stopped sampler at 15'5" Hole caved to 15'					

REMARKS: A-31

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project: Tonopah Irrigation Canal — Area Designation: Canal ℄
Hole No.: 28 ; STA 323 — Coordinates N. ____ E. ____ — Ground Elevation ____ — Approx. Dimensions ____
Depth to Water Level*: none — Method of Excavation: 6¼" Hollow Stem Auger — Date: 2-12-85 — Logged by: NJL

Classification Symbol (Letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
SP-SM	0–5	S 30; U 31; A	SAND, small amount of silt & fine grained gravel, poorly graded, fine grained subrounded sand, subangular gravel, low plasticity to nonplastic, brown slightly moist; medium dense					
ML	10–15	S118; S 50/5"	SILT, trace of fine grained sand, low plasticity, brown to light brown note: trace of very weak lime cementation at 10' note: some gravel at 12' - 14' note: very strongly lime cemented at 15' slightly moist; very firm to hard					
			Stopped auger at 14'6" Sampler refused at 14'11" Hole caved to 10'3"					

REMARKS: A-32

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project: Tonopah Irrigation Canal — Area Designation: Canal
Hole No.: 29 , STA 336+20 — Coordinates N. ____ E. ____ — Ground Elevation ____ — Approx. Dimensions ____
Depth to Water Level*: none — Method of Excavation: 6¼" Hollow Stem Auger — Date: 2-12-85 — Logged by: NJL

Classification Symbol (Letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
SP	0–5	S 36; S 69; A	SAND, small amount of fine grained gravel, trace of silt, poorly graded, predominantly fine grained subrounded sand, subrounded to subangular gravel, nonplastic, brown note: more silt, highly plasticity below 2' slightly moist to moist; dense					
ML-CL			SILTY CLAY TO CLAYEY SILT, trace of fine grained sand, weakly to very strongly lime cemented, medium plasticity, light brown slightly moist; hard					
SM	10	U 63; S 24 NR; U 22 NR	SILTY SAND, small amount of fine grained gravel, poorly graded, predominantly fine to medium grained sand, subrounded to angular, nonplastic, light brown slightly moist; firm					
SW	15	S 62	SAND, small amount of fine grained gravel, well graded, subrounded to angular sand, subrounded to subangular gravel, nonplastic, light brown slightly moist; very dense					
	20		Stopped auger at 14'6" Stopped sampler at 16' Hole caved to 8'6"					

REMARKS: A-33

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project: Tonopah Irrigation Canal — Area Designation: Canal
Hole No.: 30: STA 349+40 — Coordinates N. ____ E. ____ — Ground Elevation ____ — Approx. Dimensions ____
Depth to Water Level*: none — Method of Excavation: 6¼" Hollow Stem Auger — Date: 2-12-85 — Logged by: NJL

Classification Symbol (Letter)	Depth (feet)	Size and type of sample taken	Classification and description of material	Volume of hole sampled (cubic feet)	Weight of 3 to 5-inch sampled (lbs)	Percentage by volume of 3 to 5-inch	Weight of plus 5-inch sampled (lbs)	Percentage by volume of plus 5-inch
SC		S25; S10; A; U31; S66	CLAYEY SAND, some gravel, well graded, predominantly fine grained subangular gravel, subrounded to subangular sand, low plasticity, brown note: lenses of fine grained clayey sand from 3' - 15' moist; moderately firm to firm to hard					
			Stopped auger at 14'6" Stopped sampler at 16' Hole caved to 12'6"					

REMARKS: A-34

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

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TONOPAH DISTRUTION SYSTEM
MAIN CANAL
LOG OF TEST PITS OR AUGER HOLES
25 THROUGH 30

DESIGNED MAF — SUBMITTED [signature]
DRAWN RJB/VF — RECOMMENDED [signature]
CHECKED RFN — APPROVED [signature]

Date: FEB. 1985
Designed: MAF
Drawn: RJB/VF
Checked: RFN
Revised:

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344-330-6905

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: | Project: Tonopah Irrigation Canal | Area Designation: Canal
Hole No.: 31; STA 362+60 | Coordinates N. ___ E. ___ | Ground Elevation: | Approx. Dimensions:
Depth to Water Level*: none | Method of Excavation: 6¼" Hollow Stem Auger | Date: 2-12-85 | Logged by: NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See Chart - "Unified Soil Classification" Give Geologic and In-Place Description for Foundation Investigations)	Percentage of Cobbles and Boulders ** (Volume of Hole Sample; Weight of Sample 3 to 5-inch; Percentage of Volume of 3 to 5-inch; Weight of Sample Plus 5-inch; Percentage of Volume of Sample Plus 5-inch)
ML-CL	0–5	U 25; S 14	CLAYEY SILT, trace of sand, low to medium plasticity, brown note: small amount of fine grained angular gravel at 3' note: very weakly lime cemented at 5' moist; moderately firm to hard	
SW-SM	5–15	S 50/5"; S135	GRAVELLY SAND TO SILTY SAND, well graded subangular to angular sand, predominantly fine subangular to angular gravel, moderately lime cemented, low plasticity, reddish brown moist; very dense	
	15–20		Stopped auger at 14'6" Sampler refused at 15'9" Hole caved to 12'	

REMARKS: A-35

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated).

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: | Project: Tonopah Irrigation Canal | Area Designation: Canal
Hole No.: 32; STA 375+80 | Coordinates N. ___ E. ___ | Ground Elevation: | Approx. Dimensions:
Depth to Water Level*: none | Method of Excavation: 6¼" Hollow Stem Auger | Date: 2-12-85 | Logged by: NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See Chart - "Unified Soil Classification" Give Geologic and In-Place Description for Foundation Investigations)	Percentage of Cobbles and Boulders ** (Volume of Hole Sample; Weight of Sample 3 to 5-inch; Percentage of Volume of 3 to 5-inch; Weight of Sample Plus 5-inch; Percentage of Volume of Sample Plus 5-inch)
CL-ML	0–5	S11; S12	SILTY CLAY TO CLAYEY SILT, some lenses of clayey coarse grained sand, trace of sand, low to medium plasticity, dark brown to brown moist to very moist; moderately firm	
SP	5–15	619; U135	SAND, trace to some gravel, trace of clay & silt, predominantly fine to medium grained subrounded to subangular sand, low plasticity to nonplastic, brown note: weakly cemented at 15' moist; medium dense	
	15		Stopped auger at 14'6" Stopped sampler at 15'6" Hole caved to 13'	

REMARKS: A-36

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated).

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: | Project: Tonopah Irrigation Canal | Area Designation: Canal
Hole No.: 33; STA 390+00 | Coordinates N. ___ E. ___ | Ground Elevation: | Approx. Dimensions:
Depth to Water Level*: none | Method of Excavation: 6¼" Hollow Stem Auger | Date: 2-13-85 | Logged by: NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See Chart - "Unified Soil Classification" Give Geologic and In-Place Description for Foundation Investigations)	Percentage of Cobbles and Boulders ** (Volume of Hole Sample; Weight of Sample 3 to 5-inch; Percentage of Volume of 3 to 5-inch; Weight of Sample Plus 5-inch; Percentage of Volume of Sample Plus 5-inch)
SM	0–5	S 21; S 7	SILTY SAND, trace of clay & gravel, poorly graded, predominantly fine subrounded sand, low plasticity, brown moist; firm to soft	
SM-SC	5–15	U 48; S 36	SILTY, GRAVELLY SAND, trace of clay, well graded, subrounded to subangular sand, predominantly fine grained subangular to angular gravel, low plasticity, dark brown note: coarser grained sand, reddish brown below 10' (more clay) note: some very weak lime cementation throughout note: very strongly lime cemented from 17' - 18' moist; very firm to hard	
ML	15–20	S 50/6"	SANDY SILT, very strongly lime cemented, low plasticity, light brown slightly moist; hard	
			Stopped auger at 19'6" Sampler refused at 19'10" Hole caved to 16'	

REMARKS: A-37

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated).

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: | Project: Tonopah Irrigation Canal | Area Designation: Canal
Hole No.: 34; STA 403+65 | Coordinates N. ___ E. ___ | Ground Elevation: | Approx. Dimensions:
Depth to Water Level*: none | Method of Excavation: 6¼" Hollow Stem Auger | Date: 2-13-85 | Logged by: NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See Chart - "Unified Soil Classification" Give Geologic and In-Place Description for Foundation Investigations)	Percentage of Cobbles and Boulders ** (Volume of Hole Sample; Weight of Sample 3 to 5-inch; Percentage of Volume of 3 to 5-inch; Weight of Sample Plus 5-inch; Percentage of Volume of Sample Plus 5-inch)
ML	0–5	S17; S 7	CLAYEY SILT, some fine grained gravel, low plasticity, brown moist; soft to firm	
SW-SM	5–10	S36	SILTY SAND, some fine grained gravel, trace of clay, well graded, subrounded to subangular sand, low plasticity, brown moist; soft to firm	
CL-CH	10–20	S62; U 100/9"	SILTY CLAY, trace of fine grained sand, medium to high plasticity, brown note: lens of gravelly silty sand from 10' - 15' note: lens of strongly lime cemented silty sand at 15'6" note: very strongly lime cemented from 17' to 20' slightly moist to moist; very firm to hard	
SM	20–25			

REMARKS: A-38

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated).

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: | Project: Tonopah Irrigation Canal | Area Designation: Canal
Hole No.: 34 cont. | Coordinates N. ___ E. ___ | Ground Elevation: | Approx. Dimensions:
Depth to Water Level*: | Method of Excavation: 6¼" Hollow Stem Auger | Date: 2-13-85 | Logged by: NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See Chart - "Unified Soil Classification" Give Geologic and In-Place Description for Foundation Investigations)	Percentage of Cobbles and Boulders ** (Volume of Hole Sample; Weight of Sample 3 to 5-inch; Percentage of Volume of 3 to 5-inch; Weight of Sample Plus 5-inch; Percentage of Volume of Sample Plus 5-inch)
			SILTY, GRAVELLY SAND, well graded, subrounded to subangular sand, subangular to angular fine grained gravel, nonplastic, brown note: strongly lime cemented at 20' moist; hard	
			Stopped auger at 19'6" Stopped sampler at 20'3" Hole caved to 17'6"	

REMARKS: A-39

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated).

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature: | Project: Tonopah Irrigation Canal | Area Designation: Canal &
Hole No.: 35; STA 416+80 | Coordinates N. ___ E. ___ | Ground Elevation: | Approx. Dimensions:
Depth to Water Level*: none | Method of Excavation: 6¼" Hollow Stem Auger | Date: 2-13-85 | Logged by: NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See Chart - "Unified Soil Classification" Give Geologic and In-Place Description for Foundation Investigations)	Percentage of Cobbles and Boulders ** (Volume of Hole Sample; Weight of Sample 3 to 5-inch; Percentage of Volume of 3 to 5-inch; Weight of Sample Plus 5-inch; Percentage of Volume of Sample Plus 5-inch)
ML-SM	0–5	S12; U22	CLAYEY SILT TO SILTY SAND & GRAVEL, predominantly fine grained subrounded to subangular sand, fine grained subangular gravel, low plasticity, brown moist; moderately firm	
SM				
ML	5–15	S40; S108	GRAVELLY, SILTY SAND, well graded, subrounded to subangular sand, subangular gravel, low plasticity, brown note: trace of weak lime cementation at 4' note: more silt, less sand at 5' (SM&ML) moist; firm SANDY SILT, trace of clay, weakly to moderately lime cemented, low to medium plasticity, brown note: very strongly cemented below 13' note: lens of silty well graded sand at 15' - 15'6", lime cemented slightly moist; very firm to hard	
	15–20		Stopped auger at 14'6" Sampler refused at 13'11" Hole caved to 12'	

REMARKS: A-40

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated).

Date	FEB 1985
Designed	MAF
Drawn	RJB/VF
Checked	RFN
Revised	

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TONOPAH DISTRIBUTION SYSTEM
MAIN CANAL
LOG OF TEST PITS OR AUGER HOLES
31 THROUGH 35

DESIGNED MAF | SUBMITTED
DRAWN RJB/VF | RECOMMENDED
CHECKED RFN | APPROVED

344-330-6906

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ______ Project: Tonopah Irrigation Canal — Area Designation: Canal ¢
Hole No.: 36; STA 429+80 — Coordinates N. ______ E. ______ — Ground Elevation ______ — Approx. Dimensions ______
Depth to Water Level*: none — Method of Excavation: 6½" Hollow Stem Auger — Date: 2-13-85 — Logged by: NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See chart - "Unified Soil Classification") Give geologic and in-place description for foundation investigations
SC-SM	0–19'6"	S 25; A S 23 (5); U 75 (10); S 50/5" (15); S 67 (20)	CLAYEY SAND TO SILTY SAND, trace to considerable fine grained gravel, poorly graded, predominantly fine grained subrounded to angular sand, low to medium plasticity, reddish brown to brown note: sand is well graded below 3' note: trace of very weak lime cementation at 5'6" note: moderately cemented at 10' note: strongly lime cemented from 15' - 17', very strongly cemented from 17' - 19' note: increase in clay content from 17' - 20' note: occasional high plasticity lens moist to slightly moist; firm to hard
			Stopped auger at 19'6" Stopped sampler at 21' Hole caved to 16'6"

Percentage of Cobbles and Boulders **: Volume of hole sampled (cubic feet) | Weight of 3 to 5-inch samples (lbs) | Percentage by volume of 3 to 5-inch | Weight of plus 5-inch sampled (lbs) | Percentage by volume of plus 5-inch — (blank)

REMARKS: A-41

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Project: Tonopah Irrigation Canal — Area Designation: Canal ¢
Hole No.: 37; STA 442+80 — Depth to Water Level*: none — Method of Excavation: 6½" Hollow Stem Auger — Date: 2-13-85 — Logged by: NJL

Classification Symbol	Depth (Feet)	Sample Taken	Classification and Description of Material
ML	0–5	S 93; A S 22 (5)	SANDY SILT, low plasticity, brown note: very strongly lime cemented at 3'6" - 4' moist; very firm to hard
SM-SC	5–14'6"	S 31 (10); S 50/0 NR (15)	GRAVELLY, SILTY SAND, well graded, subrounded to angular sand, predominantly fine grained gravel, nonplastic to low plasticity, brown note: weakly to moderately lime cemented at 10' - 11' note: occasionally grades to clayey sand, medium plasticity slightly moist; very firm to hard
			Stopped auger at 14'6" Sampler refused at 14'6" Hole caved to 11'6"

REMARKS: A-42

NOTES: Record water test and density test data, if applicable, under remarks. * Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks. ** Applicable only to borrow pits and to foundations which are potential sources of construction materials. *** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Project: Tonopah Irrigation Canal — Area Designation: Canal ¢
Hole No.: 38; STA 455+80 — Depth to Water Level*: none — Method of Excavation: 6½" Hollow Stem Auger — Date: 2-13-85 — Logged by: NJL

Classification Symbol	Depth (Feet)	Sample Taken	Classification and Description of Material
ML	0–8	S16; A U47 (5)	SANDY SILT, trace of fine grained gravel, low plasticity, reddish brown note: weakly cemented at 5' moist; firm to hard
SC	8–16	S140 (10); S75 (15)	CLAYEY, GRAVELLY SAND, well graded, subrounded to angular sand, predominantly fine grained subangular to angular gravel, low to medium plasticity, brown slightly moist; hard
			Stopped auger at 14'6" Stopped sampler at 16' Hole crved to 11'6"

REMARKS: A-43

NOTES: Record water test and density test data, if applicable, under remarks. * Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks. ** Applicable only to borrow pits and to foundations which are potential sources of construction materials. *** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Project: Tonopah Irrigation Canal — Area Designation: Canal ¢
Hole No.: 39; STA 468+80 — Depth to Water Level*: none — Method of Excavation: 6½" Hollow Stem Auger — Date: 2-13-85 — Logged by: NJL

Classification Symbol	Depth (Feet)	Sample Taken	Classification and Description of Material
ML	0–10	U38; A S52 (5); S37 (10)	SANDY SILT, trace of fine grained gravel, low plasticity, reddish brown to brown note: trace of weak cementation at 3', moderately lime cemented from 5' - 6' moist; very firm to hard
SM-SC	10–15'11"	S91 (15)	GRAVELLY SILT TO CLAYEY SAND, predominantly fine to medium grained subrounded to subangular sand, predominantly fine grained subrounded to subangular gravel, nonplastic, light brown note: strongly lime cemented at 15' - 16' slightly moist; very firm to hard
			Stopped auger at 14'6" Stopped sampler at 15'11" Hole caved to 10'6"

REMARKS: A-44

NOTES: Record water test and density test data, if applicable, under remarks. * Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks. ** Applicable only to borrow pits and to foundations which are potential sources of construction materials. *** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Project: Tonopah Irrigation Canal — Area Designation: Canal ¢
Hole No.: 40; STA 26+00 Lat 1 — Depth to Water Level*: none — Method of Excavation: 6½" Hollow Stem Auger — Date: ______ — Logged by: TJF

Classification Symbol	Depth (Feet)	Sample Taken	Classification and Description of Material
SM-SC	0–7	U 35; A U 32 (5)	SILTY TO CLAYEY SAND, weakly cemented, low to medium plasticity, brown slightly moist; very firm
SC	7–15	S 35 (10); S 50/5" (15)	CLAYEY SAND, trace to considerable gravel, poorly graded, subangular, low plasticity, gray very slightly moist; very firm
			Stopped auger at 14'6" Sampler refused at 14'11" Hole caved to 11'2"

REMARKS: A-45

NOTES: Record water test and density test data, if applicable, under remarks. * Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks. ** Applicable only to borrow pits and to foundations which are potential sources of construction materials. *** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Project: Tonopah Irrigation Canal — Area Designation: Canal ¢
Hole No.: 41; STA 20+00 LAT 2 — Depth to Water Level*: none — Method of Excavation: 6½" Hollow Stem Auger — Date: 2-13-85 — Logged by: NJL

Classification Symbol	Depth (Feet)	Sample Taken	Classification and Description of Material
SC	0–7	S 22; A S 24 (5)	CLAYEY SAND, trace of gravel, low plasticity, light brown note: some gravel, trace of cobbles below 5' note: weakly lime cemented at 5' slightly moist; firm
ML & SM	7–15'5"	U 100/9" NR; S 67 NR (10); S 50/5" (15)	SANDY SILT WITH GRAVEL & COBBLES, low plasticity to nonplastic, light brown note: occasionally grades to silty sand note: strongly lime cemented at 15', trace of clay slightly moist; hard
			Stopped auger at 14'6" Sampler refused at 15'5" Hole caved to 5'6"

REMARKS: A-46

NOTES: Record water test and density test data, if applicable, under remarks. * Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks. ** Applicable only to borrow pits and to foundations which are potential sources of construction materials. *** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

Date	FEB 1985
Designed	MAF
Drawn	RJB/VF
Checked	RFN
Revised	

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TONOPAH DISTRIBUTION SYSTEM
MAIN CANAL
LOG OF TEST PITS OR AUGER HOLES
36 THROUGH 41

DESIGNED MAF — SUBMITTED Bruce J. Hutchison
DRAWN RJB/VF — RECOMMENDED Wayne E. Anderson
CHECKED RFN — APPROVED [signature]

344-330-6907

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ____ Project Tonopah Irrigation Canal Area Designation Canal ℄
Hole No. 42: STA 26+00 LAT.2 Coordinates N. ____ E. ____ Ground Elevation ____ Approx. Dimensions ____
Depth to Water Level* none Method of Excavation 6½" Hollow Stem Auger Date 2-13-85 Logged by NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material (See chart - "Unified Soil Classification") Give geologic and in-place description for foundation investigations
SW-SM	0–11	S 18; A; S 48; S 79	GRAVELLY, SILTY SAND, well graded, subrounded to angular sand, subrounded to subangular gravel, nonplastic, light brown note: lens of fine grained silty sand with trace of fine grained gravel at 10' - 11' slightly moist; medium dense to very dense
ML & SC	11–15	S 50/2"	SANDY SILT TO CLAYEY SAND, well graded, moderately to very strongly lime cemented, low to medium plasticity, light brown slightly moist; hard
			Stopped auger at 14'6" Sampler refused at 15'2" Hole caved to 3'6"

Percentage of Cobbles and Boulders**: Volume of Hole Sampled (Cubic Feet) | Weight of 3 to 5-inch Sampled (Lbs.) | Percentage by Volume of 3 to 5-inch | Weight of Plus 5-inch Sampled (Lbs.) | Percentage by Volume of Plus 5-inch

REMARKS: A-47

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ____ Project Tonopah Irrigation Canal Area Designation Canal ℄
Hole No. 43: STA 26, Lat 3 Coordinates N. ____ E. ____ Ground Elevation ____ Approx. Dimensions ____
Depth to Water Level* none Method of Excavation 6½" Hollow Stem Auger Date 2-13-85 Logged by NJL

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material
SP	0–7	U11; A; S10 NR	SAND, small amount of silt, poorly graded, fine grained sand, subrounded, nonplastic, brown note: coarser grained sand, some gravel below 2' moist; loose to medium dense
ML	7–9		CLAYEY SILT, some sand, low plasticity, brown with lenses of well graded gravelly, silty sand, very weakly cemented slightly moist; firm to very firm
SC	9–16	S31; S28	GRAVELLY, CLAYEY SAND, well graded subrounded to angular sand, predominantly fine grained subangular to angular gravel, low to medium plasticity, reddish brown
	20		Stopped auger at 14'6" Stopped sampler at 16' Hole caved to 12'6"

REMARKS: A-48

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ____ Project Tonopah Irrigation Canal Area Designation Canal
Hole No. 1-A: STA 8+00, 170' Coordinates N. ____ E. ____ Ground Elevation ____ Approx. Dimensions ____
Depth to Water Level* none WNW of 1 Method of Excavation 6½" Hollow Stem Auger Date 3-11-85 Logged by TJF

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material
ML	0–9.5	S 50/4"; S 67; S 50/1"	CLAYEY, GRAVELLY SILT, some sand, weakly to moderately cemented, low plasticity, light brown note: cementation increases with depth slightly moist; hard
	10		Stopped auger at 9'6" Sampler refused at 9'7" Hole caved to 2'

REMARKS: A-49

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ____ Project Tonopah Irrigation Canal Area Designation Canal
Hole No. 2-A: STA 21+00, 240' Coordinates N. ____ E. ____ Ground Elevation ____ Approx. Dimensions ____
Depth to Water Level* none WNW of 2 Method of Excavation 6½" Hollow Stem Auger Date 3-11-85 Logged by TJF

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material
ML	0–11	S 50/1"; S 50/4"; S 50/5"	GRAVELLY, CLAYEY SILT, some fine grained sand, poorly graded, subangular gravel, moderately cemented, nonplastic, light brown slightly moist; hard
	15		Auger refused at 11' Hole caved to 8'

REMARKS: A-50

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ____ Project Tonopah Irrigation Canal Area Designation Canal
Hole No. 3-A: STA 34+00, 250' Coordinates N. ____ E. ____ Ground Elevation ____ Approx. Dimensions ____
Depth to Water Level* none WNW of 3 Method of Excavation 6½" Hollow Stem Auger Date 3-11-85 Logged by TJF

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material
ML-CL	0–11	S 73; S 50/5"; S 50/5"	CLAYEY SILT TO SILTY CLAY, gravel below 2', poorly graded, subangular to angular gravel, moderately cemented, low plasticity, light brown dry to slightly moist; hard
	15		Auger refused at 11' Hole caved to 5'

REMARKS: A-51

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature ____ Project Tonopah Irrigation Canal Area Designation Canal
Hole No. 4-A: STA 45+00, 75' Coordinates N. ____ E. ____ Ground Elevation ____ Approx. Dimensions ____
Depth to Water Level* none WSW of 4 Method of Excavation 6½" Hollow Stem Auger Date 3-11-85 Logged by TJF

Classification Symbol (Letter)	Depth (Feet)	Size and Type of Sample Taken	Classification and Description of Material
ML	0–11	S 50/5"; S 19; S 50/4"	CLAYEY SILT, some sand & gravel below 2'6", poorly graded, subangular gravel, moderately cemented, nonplastic to low plasticity, light brown dry to slightly moist; hard
	15		Auger refused at 11' Hole caved to 3'

REMARKS: A-52

NOTES: Record water test and density test data, if applicable, under remarks.
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Lbs. of rock sampled) 100 / (Bulk specific gravity of rock) 62.4 (Cubic feet of hole sampled). Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

Date FEB 1985
Designed MAF
Drawn RJB/VF
Checked RFN
Revised ____

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CENTRAL ARIZONA PROJECT
GRANITE REEF DIVISION – ARIZONA

TONOPAH DISTRIBUTION SYSTEM
MAIN CANAL
LOG OF TEST PITS OR AUGER HOLES
42 THROUGH 4-A

DESIGNED MAF SUBMITTED Bruce J. Hutchison
DRAWN RJB/VF RECOMMENDED Wayne E. Anderson
CHECKED RFN APPROVED Donald S. Sederson

10407/ X-9

344-330-6908

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature _____ Project Tonopah Irrigation Canal Area Designation Canal ℄
Hole No. 5-A; STA 58+00, 60' Coordinates N _____ E _____ Ground Elevation _____ Approx. Dimensions _____
Depth to Water Level none W of 5 Method of Excavation 6¼" Hollow Stem Auger Date 3-11-85 Logged by TJF

CLASSIFICATION SYMBOL (LETTER)	DEPTH (FEET)	SIZE AND TYPE OF SAMPLE TAKEN	CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE CHART "SUMMARY OF SOIL CLASSIFICATION" GIVE GEOLOGIC AND IN-PLACE DESCRIPTION FOR FOUNDATION INVESTIGATIONS)	PERCENTAGE OF COBBLES AND BOULDERS **				
				VOLUME OF HOLE SAMPLE (CUBIC FEET)	WEIGHT OF 3 TO 5-INCH SAMPLES (LBS)	PERCENTAGE BY VOLUME OF 3 TO 5-INCH SAMPLES	WEIGHT OF PLUS 5-INCH SAMPLES (LBS)	PERCENTAGE BY VOLUME OF PLUS 5-INCH SAMPLES
ML	0		CLAYEY SILT, some sand, gravel below 4', moderately cemented, low plasticity, light brownish tan dry to slightly moist; hard					
	5	S 50/4" S 50/4"						
	10	S 50/3"	Auger refused at 9'6" Sampler refused at 9'9" Hole caved to 4'					

REMARKS:
A-53

NOTES: Record water test and density test date, if applicable, under remarks
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Bulk specific gravity of rock) (Cubic feet of hole sampled) / (lbs. of rock sampled) 100
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

LOG OF TEST PIT OR AUGER HOLE
FOR BORROW AND FOUNDATION INVESTIGATIONS

Feature _____ Project Tonopah Irrigation Canal Area Designation Canal ℄
Hole No. 6-A; STA 60+84, 50' Coordinates N _____ E _____ Ground Elevation _____ Approx. Dimensions _____
Depth to Water Level none W of 6 Method of Excavation 6¼" Hollow Stem Auger Date 3-11-85 Logged by TJF

CLASSIFICATION SYMBOL (LETTER)	DEPTH (FEET)	SIZE AND TYPE OF SAMPLE TAKEN	CLASSIFICATION AND DESCRIPTION OF MATERIAL (SEE CHART "SUMMARY OF SOIL CLASSIFICATION" GIVE GEOLOGIC AND IN-PLACE DESCRIPTION FOR FOUNDATION INVESTIGATIONS)	PERCENTAGE OF COBBLES AND BOULDERS **				
				VOLUME OF HOLE SAMPLE (CUBIC FEET)	WEIGHT OF 3 TO 5-INCH SAMPLES (LBS)	PERCENTAGE BY VOLUME OF 3 TO 5-INCH SAMPLES	WEIGHT OF PLUS 5-INCH SAMPLES (LBS)	PERCENTAGE BY VOLUME OF PLUS 5-INCH SAMPLES
ML	0		SANDY SILT, some clay, gravel below 2', moderately cemented, low plasticity, light brown note: possible cobbles dry to slightly moist; firm to hard					
	5	S 21 S 35						
	10	S 50/0" NR						
	15	S 50/1"	Stopped auger at 14'6" Sampler refused at 14'7" Hole caved to 3'6"					

REMARKS:
A-54

NOTES: Record water test and density test date, if applicable, under remarks
* Record after water has reached its natural level; give date of reading adjacent to graphic symbol or in remarks.
** Applicable only to borrow pits and to foundations which are potential sources of construction materials.
*** (Bulk specific gravity of rock) (Cubic feet of hole sampled) / (lbs. of rock sampled) 100
Record bulk specific gravity in Remarks, stating how obtained (measured or estimated)

Date FEB 1985
Designed MAF
Drawn RJB/VF
Checked RFN
Revised

Franzoy•Corey
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TONOPAH DISTRIBUTION SYSTEM
MAIN CANAL
LOG OF TEST PITS OR AUGER HOLES
5-A AND 6-A

DESIGNED MAF SUBMITTED
DRAWN RJB/VF RECOMMENDED
CHECKED RFN APPROVED

344-330-6909