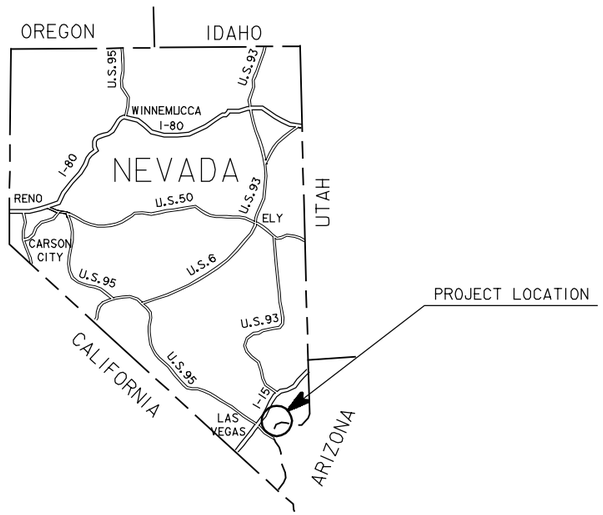
REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ-NV	HPP 93(3)		



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

PLANS FOR PROPOSED

AZ-NV HPP 93(3)

HOOVER DAM BYPASS
COLORADO RIVER BRIDGE

HOOVER DAM RESERVATION AREA
CLARK COUNTY
LENGTH 0.3916 MILES

TYPE OF CONSTRUCTION:
Grading, Drainage & Bridge

TYPE CODE: XXXX

DESIGN DESIGNATIONS:

ADT (2017)	25,800
SADT (2027)	32,100
D	53/47
T/B/RV	18%/2%/4%
e(max)	10%
Design Speed:	
Mainline	60 mph

ENGLISH DIMENSIONS:
Unless indicated otherwise, the presence of a decimal point in any dimension implies a "foot" unit. If no decimal point is present, the unit is "inch". All stationing is "hundreds of feet+feet". Slopes are expressed as RUN:RISE.

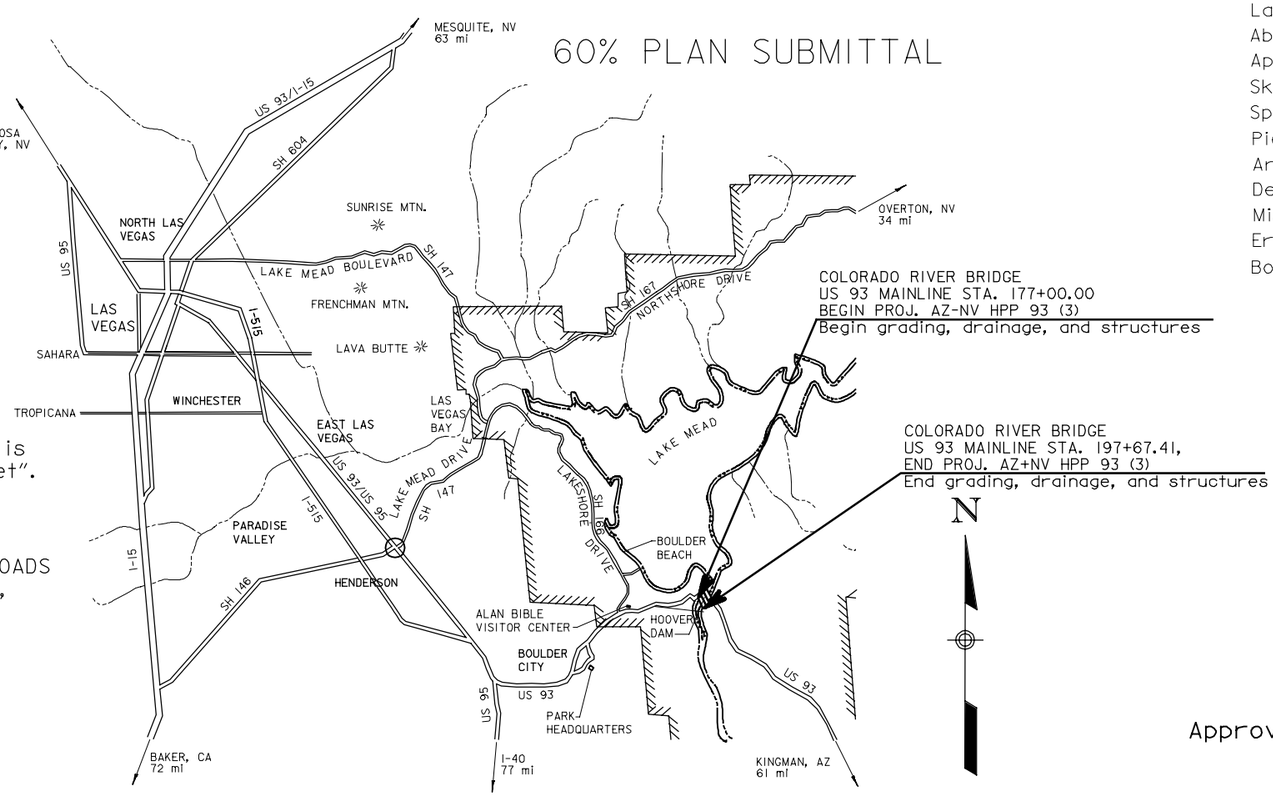
SPECIFICATIONS:
"STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP-96, ENGLISH UNITS"

PLANS PREPARED FOR

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

CENTRAL FEDERAL LANDS HIGHWAY DIVISION
DENVER, COLORADO

DATE



60% PLAN SUBMITTAL

COLORADO RIVER BRIDGE
US 93 MAINLINE STA. 177+00.00
BEGIN PROJ. AZ-NV HPP 93 (3)
Begin grading, drainage, and structures

COLORADO RIVER BRIDGE
US 93 MAINLINE STA. 197+67.41,
END PROJ. AZ+NV HPP 93 (3)
End grading, drainage, and structures

N

INDEX TO SHEETS

SHEET	DESCRIPTION
A.1	Title Sheet
A.2	Plan Symbols and Abbreviations
B.1.01	Summary of Quantities
NA	Tabulation of Quantities
NA	Grading Summary and Mass Haul Diagram
B.1.02-B.1.03	Drainage Summaries
C.2.01	Typical Sections
D.2.01-D.2.04	Mainline Plan & Profile Sheets
D.4.01	Roadway Details
NA	Erosion Control Details
H.2.01-H.2.04	Drainage Plans
H.3.01	Drainage Profiles
H.4.01-H.4.05	Drainage Details
N.1.01	Traffic Control General Notes & Quantities
N.2.01	Blasting Zone Layout
N.2.02-N.2.04	Construction Signing Plans
NA	Construction Phasing Plans
NA	Traffic Control Sheets
NA	Hoover Dam Colorado River Bridge
NA	Mainline Cross Sections

Bridge RG2741 Element	Drawing Series
General	A
Layout	B
Abutments	C
Approach Piers	D
Skewback Piers	E
Spandrel Piers	F
Pier Caps	G
Arch	H
Deck Superstructure	I
Misc Details	J
Erection	K
Boring Logs	L

FEDERAL LANDS HIGHWAYS



COMMITMENT TO EXCELLENCE

Approved

_____ DATE _____2003
Division Engineer,
Central Federal Lands Highway Division

PROJECT MANAGER	RDWY. DESIGN MGR.	STRUCTURAL MGR.
D. ZANETELL	E. HAMMONTREE	B. KLAMERUS

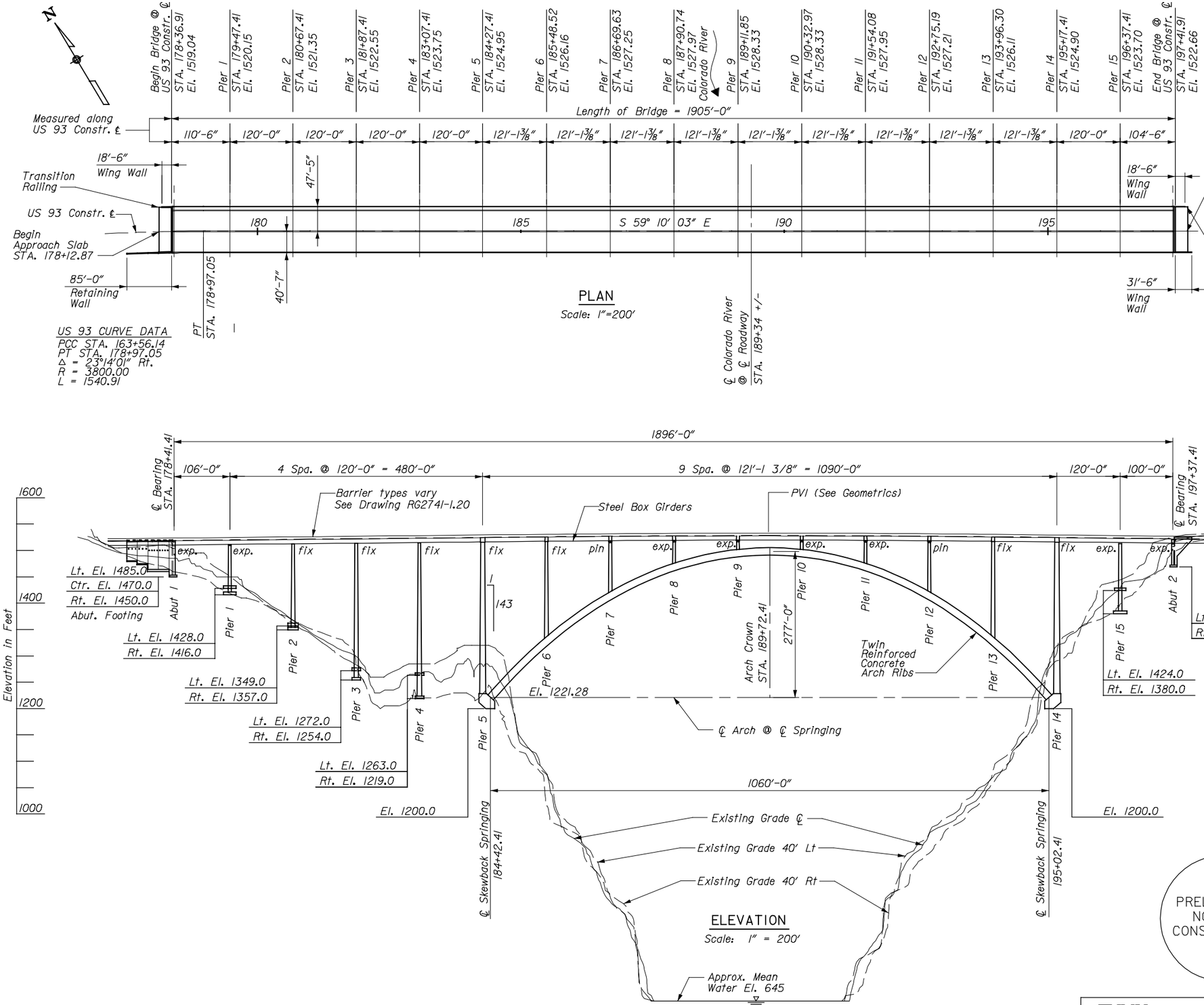
HOOVER DAM BYPASS — FULFILLING THE VISION
Hoover Support Team
HDR Sverdrup TY LIN INTERNATIONAL

LEGEND - TYPE IMPROVEMENT

Existing Road	Unimproved	Graded	Reinforced Subgrade	Base Course	Surface Treatment

$$$$DATE$$$$ 12:01:45 PM $$$$DGN$$$$

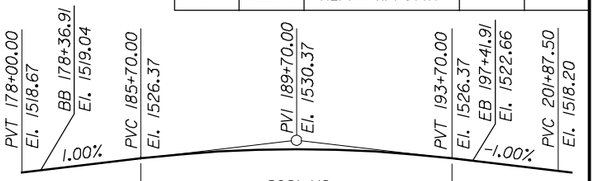
REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



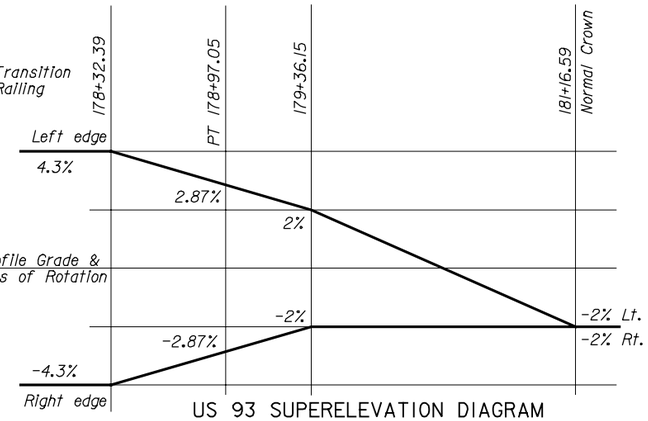
PLAN

Scale: 1"=200'

US 93 CURVE DATA
PCC STA. 163+56.14
PT STA. 178+97.05
Δ = 23°14'01" Rt.
R = 3800.00
L = 1540.91



US 93 PROFILE GRADE DIAGRAM



US 93 SUPERELEVATION DIAGRAM

ELEVATION

Scale: 1" = 200'

0 1 inch

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FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION, DENVER, COLORADO

BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

PLAN AND ELEVATION

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								DG	JJS, RJW	RT		David Goodyear, PE		4-04-03	RG2741-A.03

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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		

CONSTRUCTION SPECIFICATIONS:

Provide materials and perform work in accordance with Federal Highway Administration Standard Specifications for Construction of Roads and Bridges on Federal Highway Porjects, FP-96, English Units; as amended by project Special Contract Requirements (SCR's).

DESIGN SPECIFICATIONS: AASHTO LRFD Bridge Design Specifications, 2nd Edition (1998), customary U.S. units, with 2001 Interims; as amended by "Structural Design Criteria for Hoover Bam Bypass Colorado River Bridge", March 15, 2003. Where dates for standards are unlisted, the applicable standard shall be that in force on January 1, 2003.

Project specific criteria as noted on these Plans shall take precedence over the SCR's. All units shall be customary U.S./ English units.

DEAD LOADS:

General reinforced concrete*.....160 pcf

Arch Concrete*.....165 pcf

Structural Steel.....490 pcf

Future Wearing Surface.....25 psf

Future Wind Screen (north only).....25 plf

The design includes a surface area density of 7.5 psf for permanent metal deck forms. Include a cover plate (closed box) over the valley of the forms to prevent concrete from filling the void.

The design includes a 150 plf uniform load for utilities in each exterior longitudinal box.

*Includes allowance for reinforcing steel

LIVE LOADS:

HL-93 Standard Loading

HL-93 truck with β_{LL} = 2.2 applied to the wheel load for Strength I slab design only.

Single Caltrans P-13 permit vehicle applied on one interior lane, with an accompanying HL-93 truck in one adjacent lane
Live load distribution is based on refined analysis.

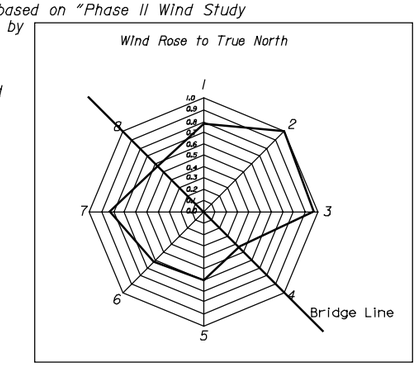
Fatigue design is based on the following:
ADTT = 3045 (one-directional)
Design year = 2027
The fatigue design life of the structure is 100-years.

WIND LOADS:

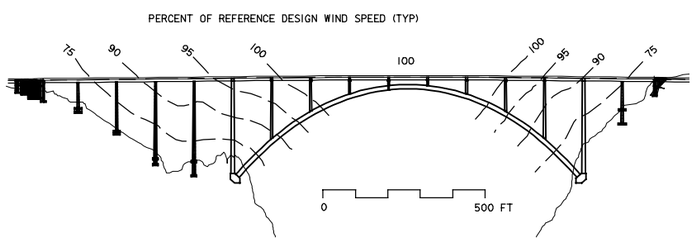
Wind loads for design are based on "Phase II Wind Study Hoover Dam Bypass Bridge" by West Wind Laboratory, December, 2002

100 year return period wind base hourly mean...98 mph

Gust factor.....2.41
Drag Coefficients:
Deck with barriers.....1.4
Columns transverse.....1.0
Columns longitudinal.....1.3
Arch.....1.0

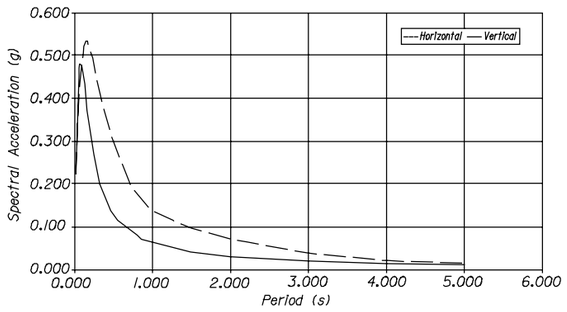


Boundary Effects:



SEISMIC CRITERIA:

Criteria based on "Seismic Exposure Evaluation Report", by AMEC, October, 2003.
Base Acceleration Coefficient: 0.20g based on a 1000 year return period.



THERMAL EFFECTS:

Mean temperature: 75°F

	Rise	Fall
Steel Components	55°F	65°F
Concrete Components	20°F	50°F

MATERIALS:

Concrete:

Arch Concrete Class A(R).....F'c = 10,000 psi at 56 days
Deck Concrete Class A.....F'c = 4,500 psi at 28 days
Column and Cap Concrete Class P(C)..F'c = 6,000 psi at 28 days
All other Concrete Class A.....F'c = 4,000 psi at 28 days

Creep and shrinkage of concrete is computed in accordance with the provisions of CEB/FIP '78 and an instantaneous concrete modulus at 28 days according to the following equation:

$E_o = (40{,}000 * f'c^{0.5} + 1{,}000{,}000) * (w_c / 145)^{1.5}$

$\varepsilon_{sl} = -.00052$ Wc = unreinforced unit weight

$\Phi_{fl} = 3.0$

Unless otherwise noted on the plans, clear cover for reinforcing shall be 2" typical, and 2-1/2" for the roadway deck surface. Where post-tensioning bars are shown on the plans, strand may not be substituted for bars.

Steel:

Structural Steel AASHTO M270, Gr HPS 70W, 50, or 36. All steel shall be painted in accordance with the SCR's.

Reinforcing Steel AASHTO M31, Grade 60 or ASTM A706, Grade 60

Post-tensioning Bar AASHTO M275, Type 2, Grade 150 (HS Bar)

7 wire low relaxation Post-tensioning Strand AASHTO M203, Grade 270

All fasteners are 7/8 in. diameter AASHTO M164 (ASTM A325) Type I high strength bolts, unless noted otherwise. Exclude threads from shear planes.

Provide welded stud shear connectors manufactured from steel conforming to AASHTO M169 (ASTM A108).

FOUNDATIONS:

Foundation design is based on the following factored ultimate bearing strength for rock:

Arizona arch footing (Pier 14).....86 TSF
All other footings.....144 TSF

Rock Anchor design is based on a service level rock bond stress of 150 psi, or pullout of the rock mass, whichever is less.

For boring logs and foundation information, see "Final Geotechnical Investigation Report, Colorado River Bridge", dated XXXXXXXXXXXXXXXXXX, by AMEC Earth & Environmental, Inc, Phoenix, Arizona.

0 1 Inch

ERECTION:

The bridge has been designed for the erection sequence shown on the plans. This sequence is not mandatory. The Contractor may propose an alternative sequence, subject to approval of the CO. All costs related to any alternative procedure, including but not limited to costs for additional material and labor for the permanent works, shall be borne by the Contractor. The Contractor is responsible for all static and dynamic stability of the bridge throughout the construction process.
See sheet K.1 for further requirements.

Concrete:

All concrete shall reach a strength of 4000 psi before removing falsework or form travelers, and prior to applying concentrated construction loadings.

All concrete shall receive a 7 day moist cure.

Precast components shall be a minimum of 60 days old prior to being installed in the structure.

All precast segmental joints shall be bonded with epoxy in accordance with the SCR's.

All concrete forms shall be designed for full fluid head for all P(C) and A(R) class concrete. Contractor may submit test results based on actual mix designs and placement conditions to the CO for consideration of project specific form design criteria that provide for a reduction of design pressure below full fluid head.

Construction Wind:

Wind loads assumed for the construction stage are based on a 10 year return period. Construction stage design hourly mean wind speed assumed for design is 70 mph. The Contractor shall make his own determination regarding construction stage risk, and adjust this value and temporary works designs accordingly.

LEGEND:

5 / 6.15 — Section Alpha or Detail Number
— See this Drawing Number for Section or Detail
("-" denotes: See same drawing for Section or Detail)

A / 6.15 — Section Alpha
— See this Drawing Number for Section
("-" denotes: See same drawing for Section)

LOAD RATING: (LRFR)

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FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION, DENVER, COLORADO

BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

GENERAL NOTES I

T-Y LIN INTERNATIONAL | HDR

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								D.G.				David Goodyear, PE		4-04-03	RG2741-A.4

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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		

BID ITEM TABULATION

<WORK IN PROGRESS>

GENERAL:

Vertical dimensions are measured plumb, unless noted otherwise.

Station and offset dimensions are horizontal, unless noted otherwise.

Reinforcing bar bend dimensions are out to out, unless noted otherwise. Reinforcing bar spacing is from centerline to centerline of bar, unless noted otherwise. Reinforcing bars with out to out bends that are shown to fit within clear cover shall be fabricated according to special tolerances as necessary in order to place reinforcing with the required cover as shown on the Plans.

The plans show construction joints with mechanical couplers for both mild steel and HS bar. In cases where these couplers allow reinforcing to cross between separate pours, tolerances on placing the initial bar and coupler are defined by the size of the bar and the need for alignment within the subsequent pour or segment. The contractor shall take note of these cases and apply special tolerances on placement, including but not limited to special jigs, templates or rigid extensions as are necessary to assure proper alignment of the splice and spliced bar within the second placement.

Where mechanical couplers are shown on the plans or otherwise approved for use, the bar supplier shall mark all bar ends with a paint or other non-desctructive marking that denotes the end of the threaded engagement length needed for proper installation of the coupler. The supplier shall assure that the method of marking does not impair the performance or durability of either the bar or the coupler.

Patch all construction holes, embeds, brackets and keys with approved concrete or epoxy patch, and provide min 1-1/2" cover over all metal items. Finish concrete surfaces to conceal patches and pour-backs.

Chamfer all exposed concrete edges 3/4" unless noted otherwise.

Do not weld deck forms or temporary works to permanent steel members.

Construct deck slab transverse construction joints parallel to bridge centerline.

DESIGN ALTERNATIVES

The plans show alternative designs for pier construction.
There are precast segmental, post-tensioned piers and cast-in-place reinforced piers as an alternative for all spandrel and approach piers.
Options may not be split (all piers must be same option.

PRESTRESSING NOTES

1. Post-tensioning characteristics assumed for design:
   - Prestressing strand
     - Friction curvature coefficient 0.20
     - Friction wobble coefficient 0.0002/ft
     - Anchor set 3/8"
   - Prestressing bars
     - Friction curvature coefficient 0.30
     - Friction wobble coefficient 0.0002/ft
     - Anchor set 1/20"

2. A minimum compressive strength of 4,000 psi shall be attained in the concrete prior to prestressing.

3. Force in all permanent high strength prestressing tendons shall not exceed:
   75% of the guaranteed ultimate strength of the tendon prior to seating.
   70% of the guaranteed ultimate strength of the tendon after seating.

4. Force in all permanent high strength prestressing bars shall not exceed:
   80% of the guaranteed ultimate strength of the bar prior to seating.
   70% of the guaranteed ultimate strength of the bar after seating.

5. Force in all temporary high strength prestressing bars shall not exceed:
   60% of the guaranteed ultimate strength of the bar after seating, if bars are to be re-used.

6. Prebent ducts shall be used for prestressing tendons with radius less than 30 feet.

7. Stressing of each individual tendon shall be within +/-5% of the theoretical jacking force (Pjack). Elongations shall be within +/-7% of the theoretical elongations.

8. Column precast segment joints shall be coated with epoxy and prestressed with a minimum of 4 bars in a doubly symmetric pattern and a minimum stress of 40 psi prior to placing the next segment.

9. Grouting of the precast column post-tensioning shall be done on each column following the stressing of all column bars in the top segment, Segment 1, for piers with bearings, and following the stressing of all column bars through the pier cap for fixed piers. See 553.09.

10. Grouting of the precast column post-tensioning shall commence at the bottom of the column and shall be performed in separate lifts from anchor plate to anchor plate.

11. After completion of all post-tensioning and grouting operations, the vents shall be sealed and blockouts filled with concrete of equal strength as the element being stressed.

12. All permanent high strength prestressing bars that have exposed ends in the final configuration shall be epoxy coated in accordance with ASTM D3963 to the first grouted coupler.

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 Inch

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CENTRAL FEDERAL LANDS HIGHWAY DIVISION, DENVER, COLORADO

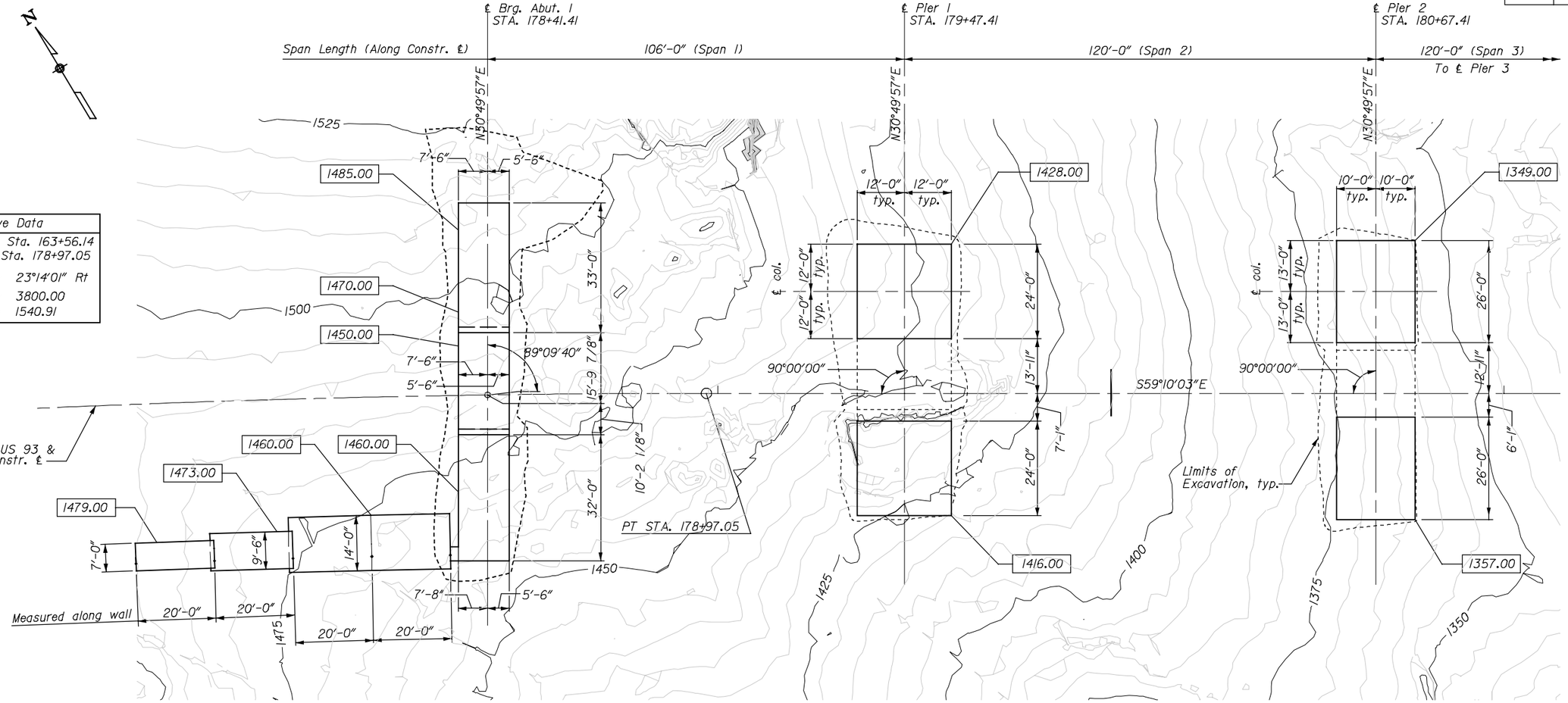
BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

GENERAL NOTES II

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	NAME		NAME		David Goodyear, PE		4-04-03	RG2741-A.5

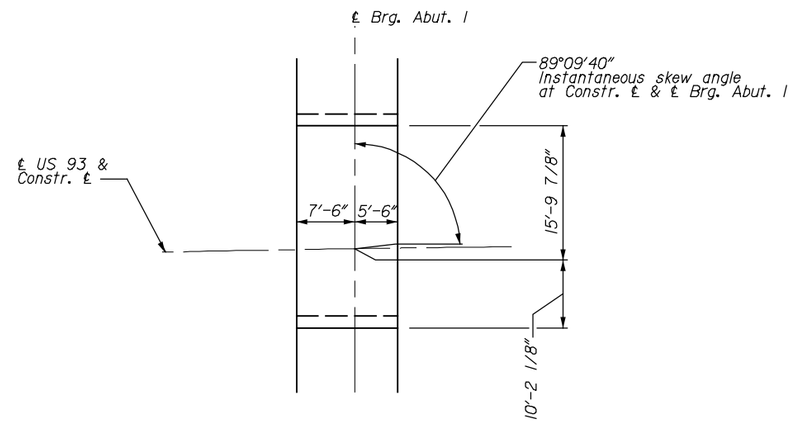
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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



FOUNDATION PLAN

(Contour Interval = 5'-0")
Scale: 1"=30'-0"



PARTIAL PLAN AT ABUTMENT 1

(Contour Interval = 5'-0")
Scale: 1"=20'-0"

Notes:

1. ▭ - Indicates bottom of footing elevation.
2. See Drawing B.04 for Limits of Excavation details.
3. See Drawings L.01 thru L.12 for Boring Log data and notes.

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 Inch

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BOR - HOOVER DAM RESERVATION AREA COLORADO RIVER BRIDGE AT HOOVER DAM

ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

NEVADA FOUNDATION PLAN ABUTMENT 1 - PIER 2

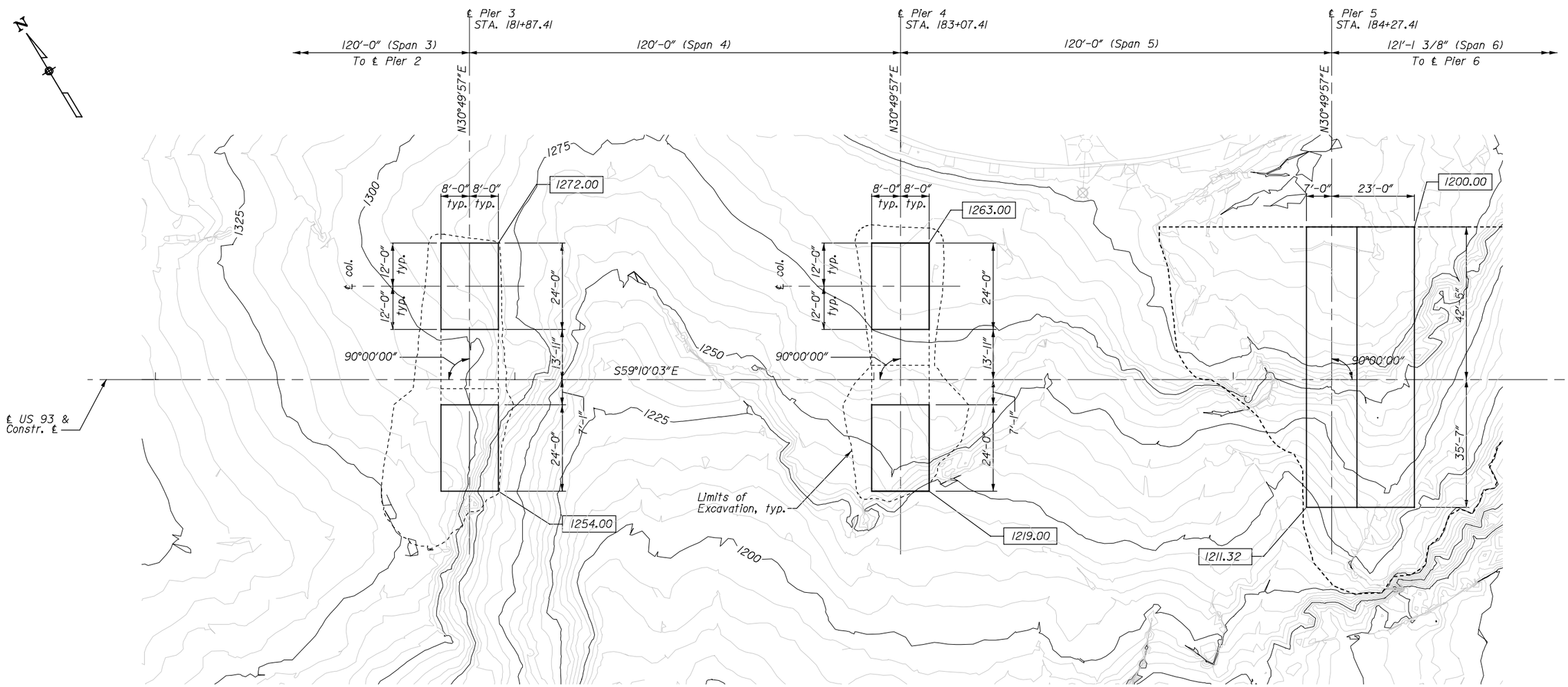
NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS

DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER
J.Nauman	T.King	K.Bormann	AS NOTED	David Goodyear, PE

BRIDGE DRAWING	DATE	DRAWING NO.
1 OF 99	4-04-03	RG2741-B.01

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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



FOUNDATION PLAN

(Contour Interval = 5'-0")
Scale: 1"=30'-0"

Notes:

1. ▭ - *Indicates bottom of footing elevation.*
2. *See Drawing B.04 for Limits of Excavation details.*
3. *See Drawings L.01 thru L.12 for Boring Log data and notes.*

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 Inch

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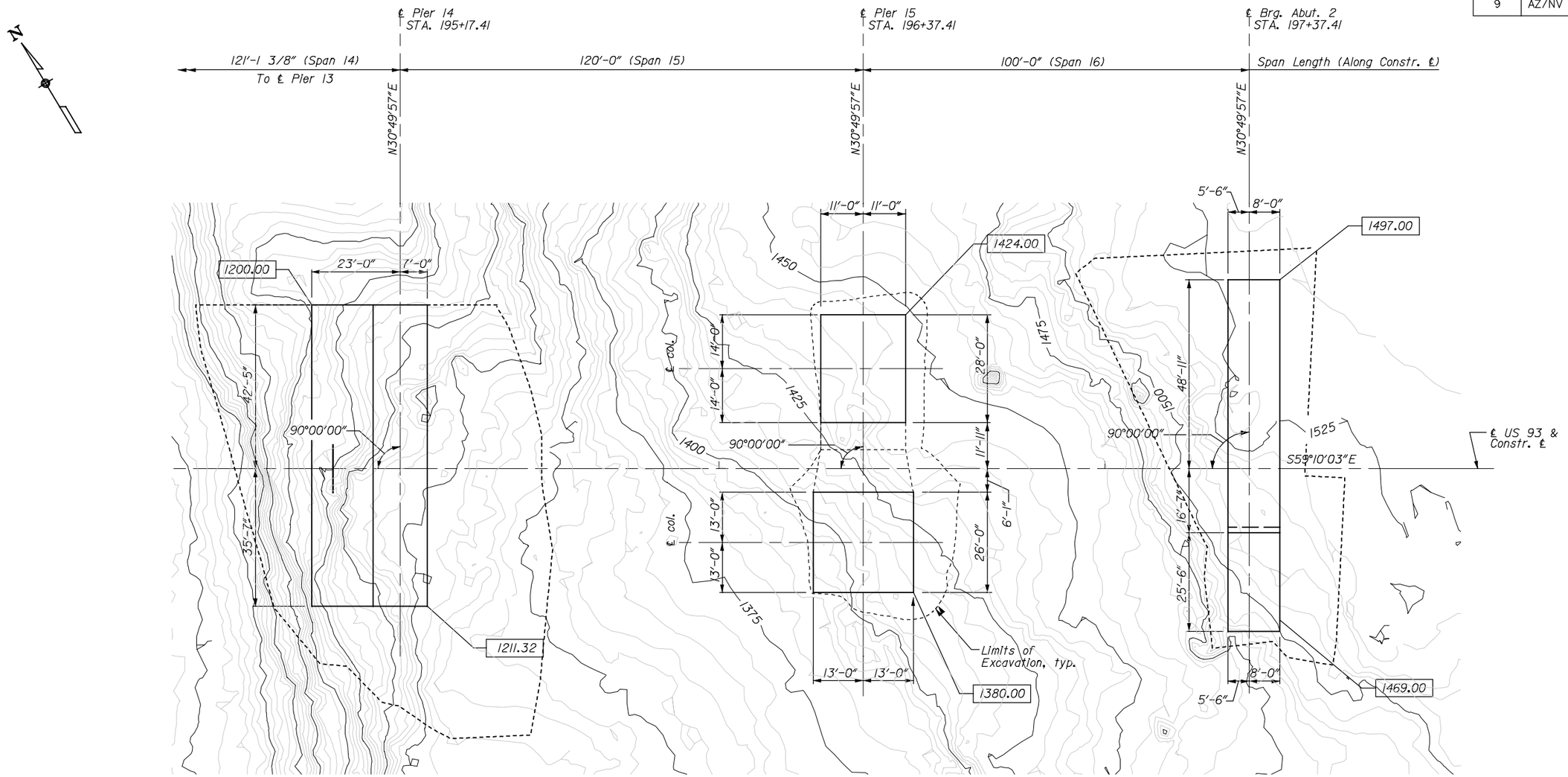
BOR - HOOVER DAM RESERVATION AREA
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AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

NEVADA FOUNDATION PLAN
PIER 3 - PIER 5

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								J.Nauman	T.King	K.Bormann	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-B.02

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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



FOUNDATION PLAN

(Contour Interval = 5'-0")
Scale: 1"=30'-0"

Notes:

1. ▭ - *Indicates bottom of footing elevation.*
2. *See Drawing B.04 for Limits of Excavation details.*
3. *See Drawings L.01 thru L.12 for Boring Log data and notes.*

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 Inch

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BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

ARIZONA FOUNDATION PLAN
PIER 14 - ABUTMENT 2

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								J.Nauman	T.King	K.Bormann	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-B.03

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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		

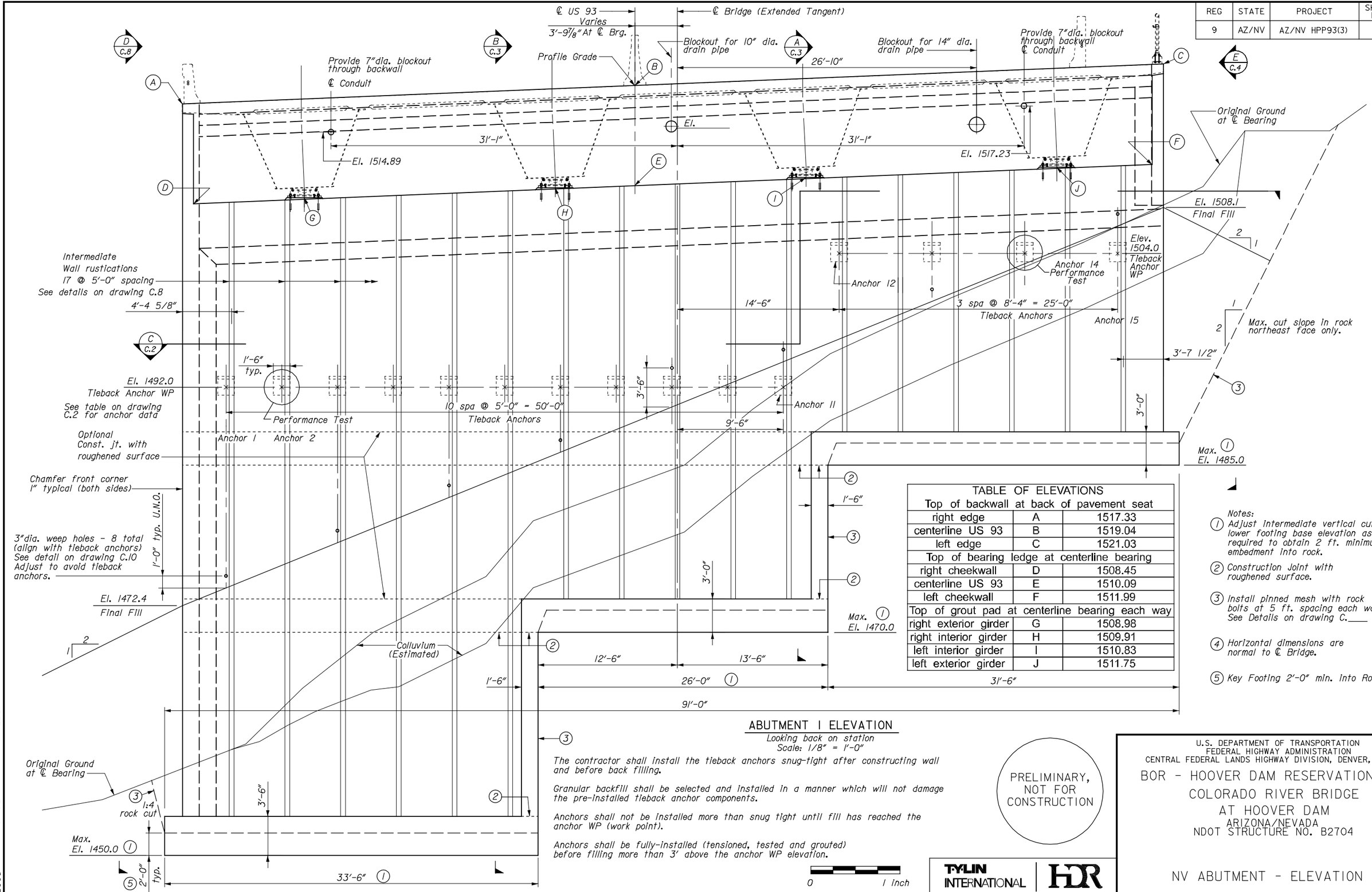


TABLE OF ELEVATIONS		
Top of backwall at back of pavement seat		
right edge	A	1517.33
centerline US 93	B	1519.04
left edge	C	1521.03
Top of bearing ledge at centerline bearing		
right cheekwall	D	1508.45
centerline US 93	E	1510.09
left cheekwall	F	1511.99
Top of grout pad at centerline bearing each way		
right exterior girder	G	1508.98
right interior girder	H	1509.91
left interior girder	I	1510.83
left exterior girder	J	1511.75

Notes:
1. Adjust intermediate vertical cuts or lower footing base elevation as required to obtain 2 ft. minimum embedment into rock.
2. Construction Joint with roughened surface.
3. Install pinned mesh with rock bolts at 5 ft. spacing each way. See Details on drawing C.____
4. Horizontal dimensions are normal to ℄ Bridge.
5. Key Footing 2'-0" min. into Rock, typ.

ABUTMENT 1 ELEVATION

Looking back on station
Scale: 1/8" = 1'-0"

The contractor shall install the tieback anchors snug-tight after constructing wall and before back filling.

Granular backfill shall be selected and installed in a manner which will not damage the pre-installed tieback anchor components.

Anchors shall not be installed more than snug tight until fill has reached the anchor WP (work point).

Anchors shall be fully-installed (tensioned, tested and grouted) before filling more than 3' above the anchor WP elevation.

PRELIMINARY, NOT FOR CONSTRUCTION

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COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

NV ABUTMENT - ELEVATION 1

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								Scroggins	R.Walters	NAME	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-C.1

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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		

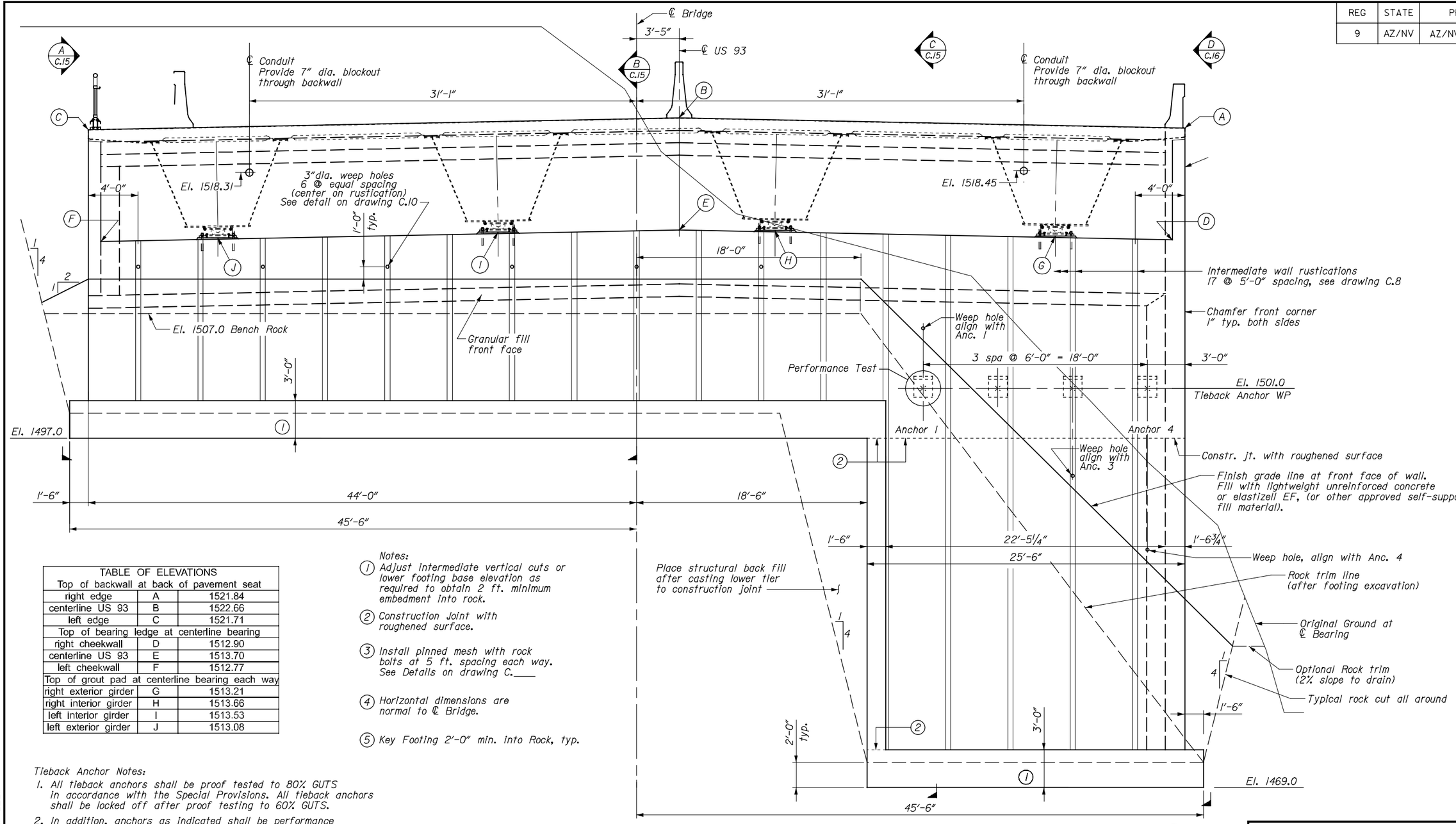


TABLE OF ELEVATIONS		
Top of backwall at back of pavement seat		
right edge	A	1521.84
centerline US 93	B	1522.66
left edge	C	1521.71
Top of bearing ledge at centerline bearing		
right cheekwall	D	1512.90
centerline US 93	E	1513.70
left cheekwall	F	1512.77
Top of grout pad at centerline bearing each way		
right exterior girder	G	1513.21
right interior girder	H	1513.66
left interior girder	I	1513.53
left exterior girder	J	1513.08

Notes:

(1) Adjust intermediate vertical cuts or lower footing base elevation as required to obtain 2 ft. minimum embedment into rock.

(2) Construction Joint with roughened surface.

(3) Install pinned mesh with rock bolts at 5 ft. spacing each way. See Details on drawing C.____

(4) Horizontal dimensions are normal to ℄ Bridge.

(5) Key Footing 2'-0" min. into Rock, typ.

Tieback Anchor Notes:

1. All tieback anchors shall be proof tested to 80% GUTS in accordance with the Special Provisions. All tieback anchors shall be locked off after proof testing to 60% GUTS.
2. In addition, anchors as indicated shall be performance tested in accordance with the Special Provisions.
3. The bonded length of tieback anchors required shall be determined by the Contractor using the tieback design loads provided herein. Minimum bonded length in rock = 10'-6".
4. The bonded length shall be located wholly outside of the "No Load Zone" defined as a plane rising at 55° from horizontal from a point at the intersection of the back face of the wall with the bottom of the footing.
5. Minimum stressing length (no-bond) length = 15 ft.
6. See drawing C.20 for tieback anchor details.

The contractor shall install the tieback anchors snug-tight after constructing wall and before back filling.

Granular backfill shall be selected and installed in a manner which will not damage the pre-installed tieback anchor components.

Anchors shall not be installed more than snug tight until fill has reached the anchor WP (work point).

Anchors shall be fully-installed (tensioned, tested and grouted) before filling more than 3' above the anchor WP elevation.

ABUTMENT 2 ELEVATION

Looking ahead on station
Scale: 1/8"=1'-0"
See Nevada Abutment drawings C.1 to C.7 for details not shown.

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 inch

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CENTRAL FEDERAL LANDS HIGHWAY DIVISION, DENVER, COLORADO

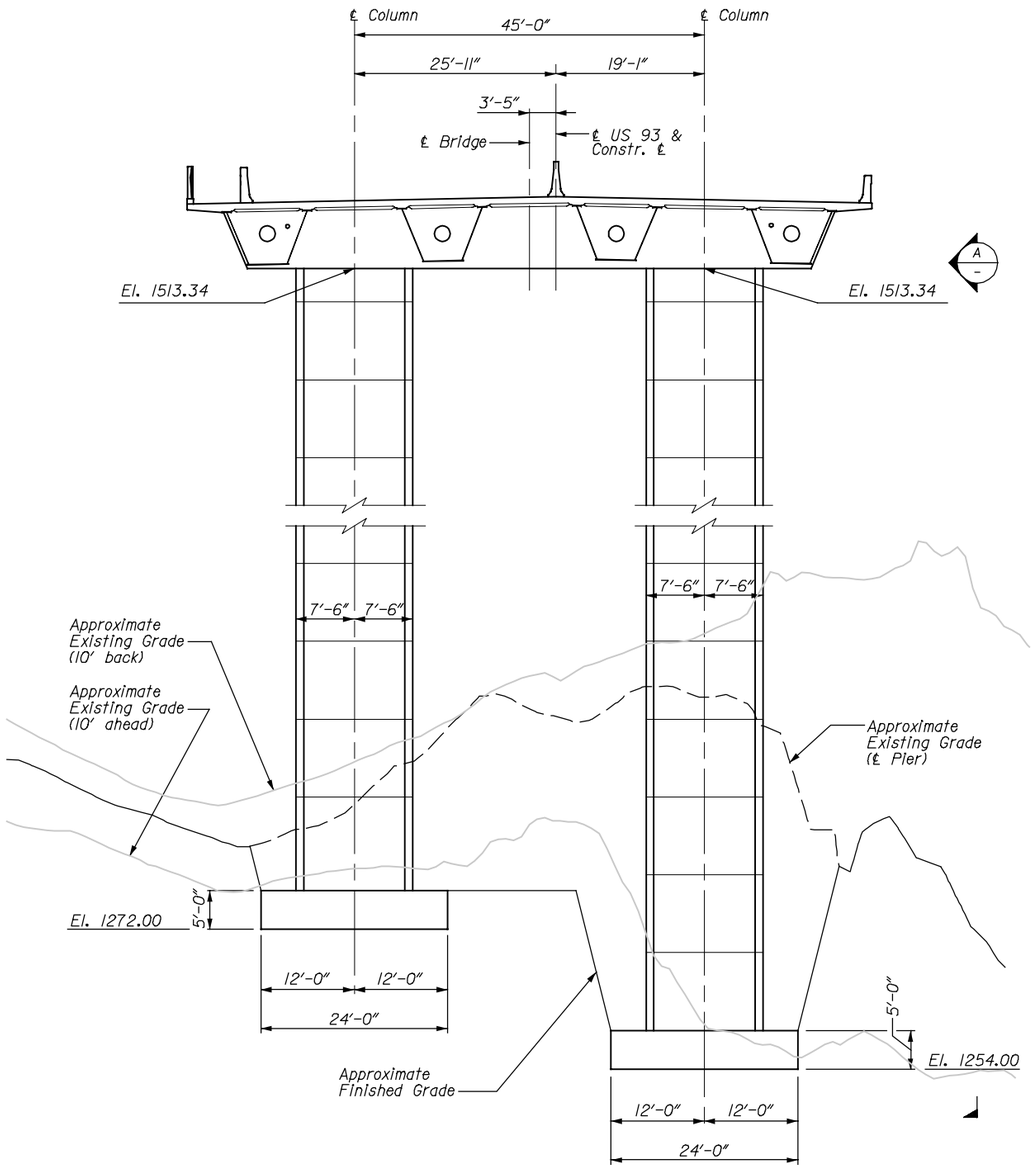
BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

AZ ABUTMENT - ELEVATION 1

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								Scroggins	R.Walters	NAME	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-C.13

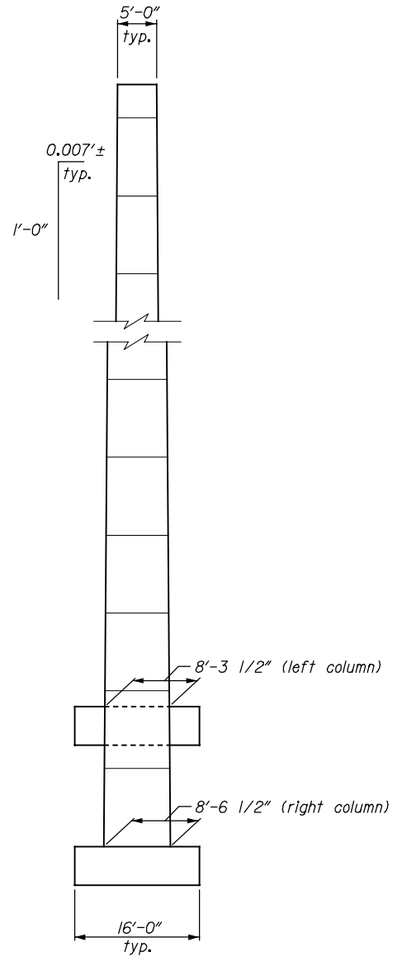
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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



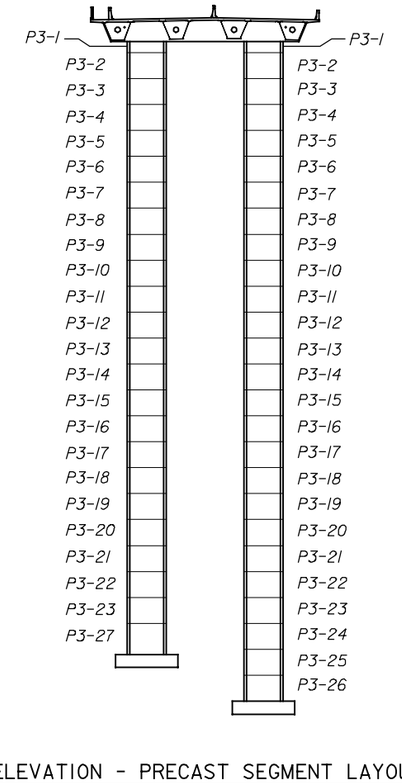
ELEVATION - PIER 3

(Looking ahead station)
Scale: 1"=20'-0"



VIEW A

Scale: 1"=20'-0"



ELEVATION - PRECAST SEGMENT LAYOUT

(Looking ahead station)
Scale: 1"=60'-0"

Notes:

1. *Top of columns shall be constructed level.*
2. *See Drawings D.06 thru D.08 for precast segment details.*
3. *See Drawings D.20 thru D.29 for footing reinforcement details.*

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 Inch

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FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION, DENVER, COLORADO

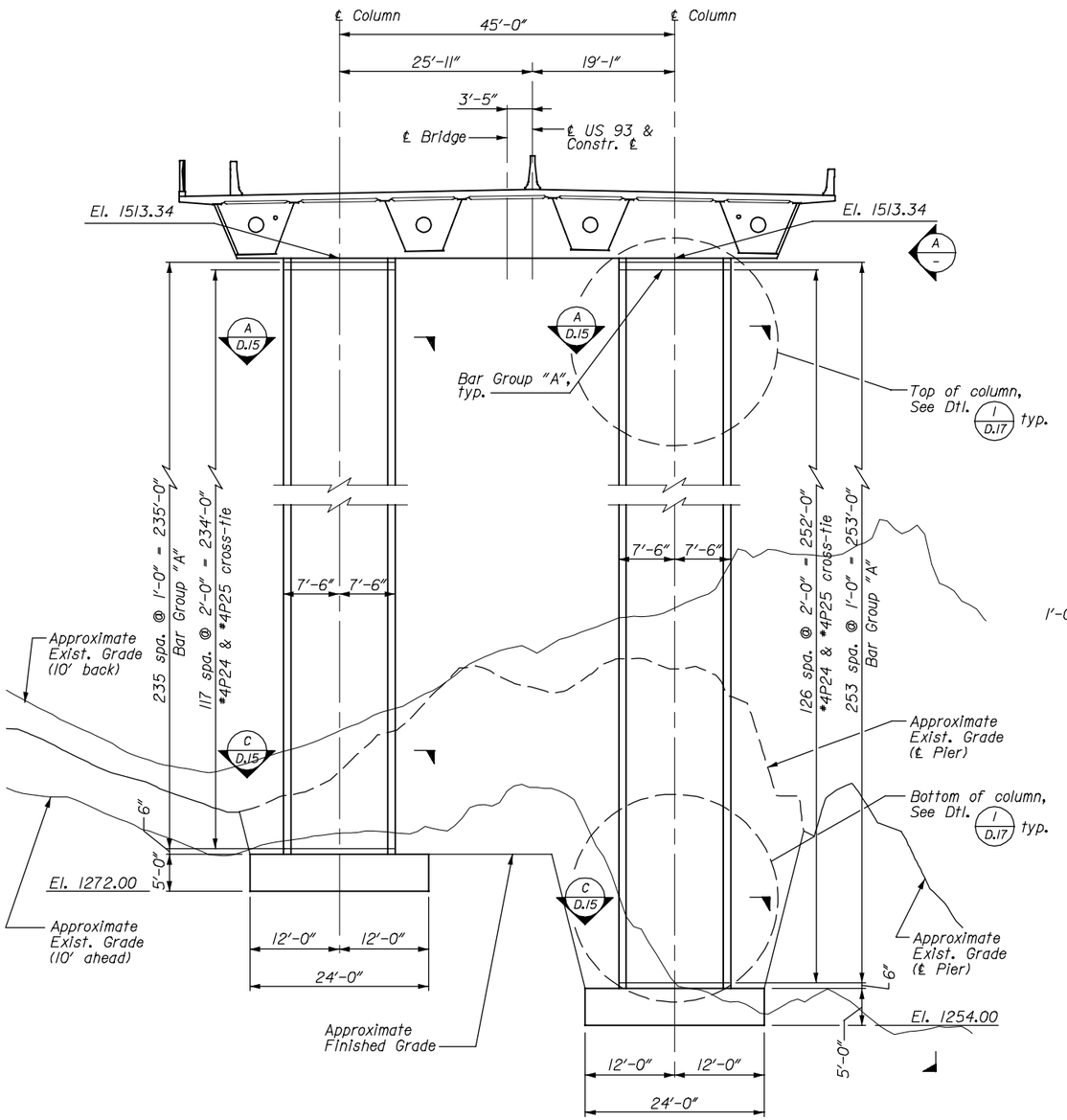
BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

PIER 3 (PRECAST ALTERNATIVE)
ELEVATIONS AND DETAILS

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								J.Nauman	T.King	K.Bormann	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-D.03

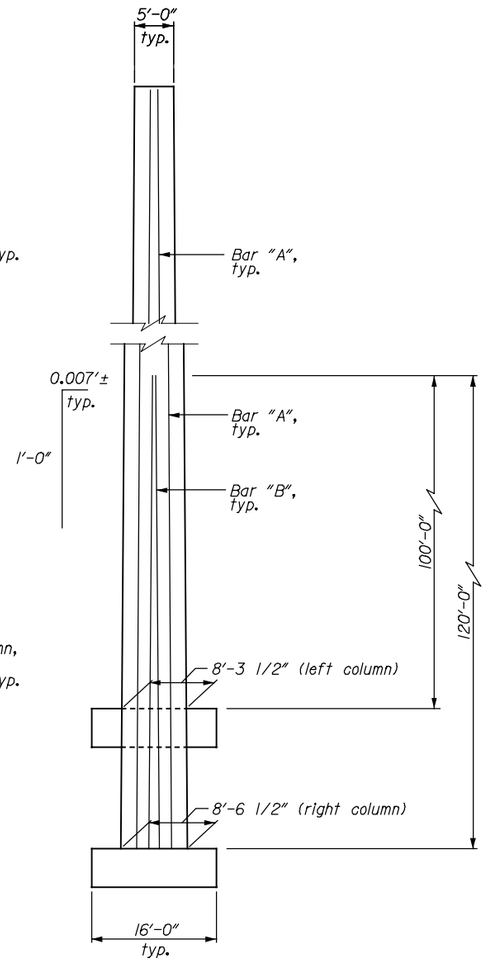
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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



ELEVATION - PIER 3

(Looking ahead station)
Scale: 1"=20'-0"



VIEW A -

Scale: 1"=20'-0"

Notes:

1. Top of columns shall be constructed level.
2. For column vertical reinforcement details not shown, see Drawings D.15 and D.17.
3. For foundation details, see Drawings D.24 and D.25.
4. Construction joints are allowed at the top and bottom of the column and at 16'-0" maximum intervals along the column, unless otherwise approved by CO.
5. For Bar "A", "B", "C", and "D", see Drawing D.15.
6. For Reinforcing Bar Group "A", see Drawing D.10.

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 inch

TY LIN INTERNATIONAL | HDR

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CENTRAL FEDERAL LANDS HIGHWAY DIVISION, DENVER, COLORADO

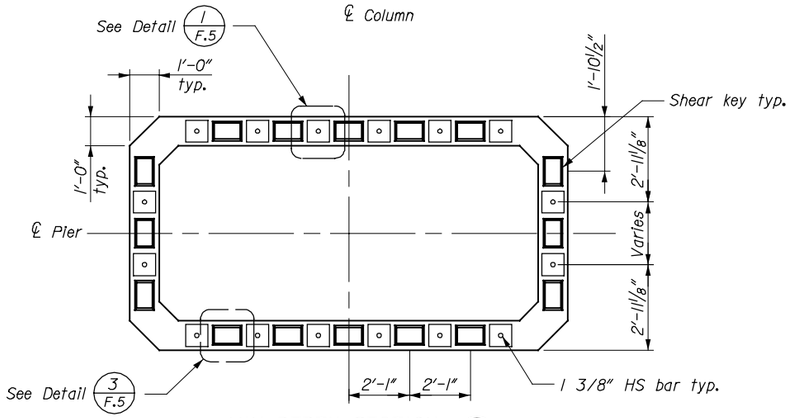
BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

PIER 3 (CIP ALTERNATIVE)
ELEVATIONS AND DETAILS

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								T.Bush	T.King	K.Bormann	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-D.12

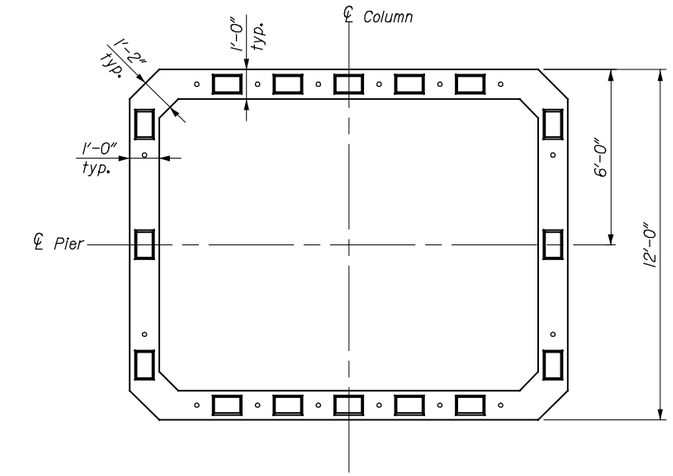
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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



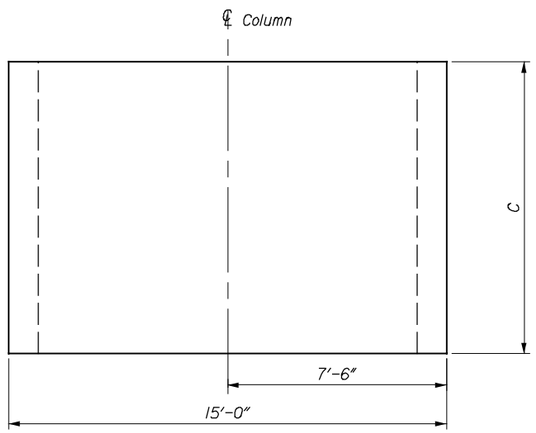
MIN DEPTH SECTION (A/–)

Scale: 3/16"=1'-0"



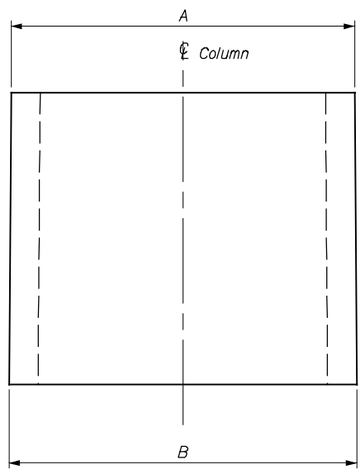
MAX DEPTH SECTION (B/–)

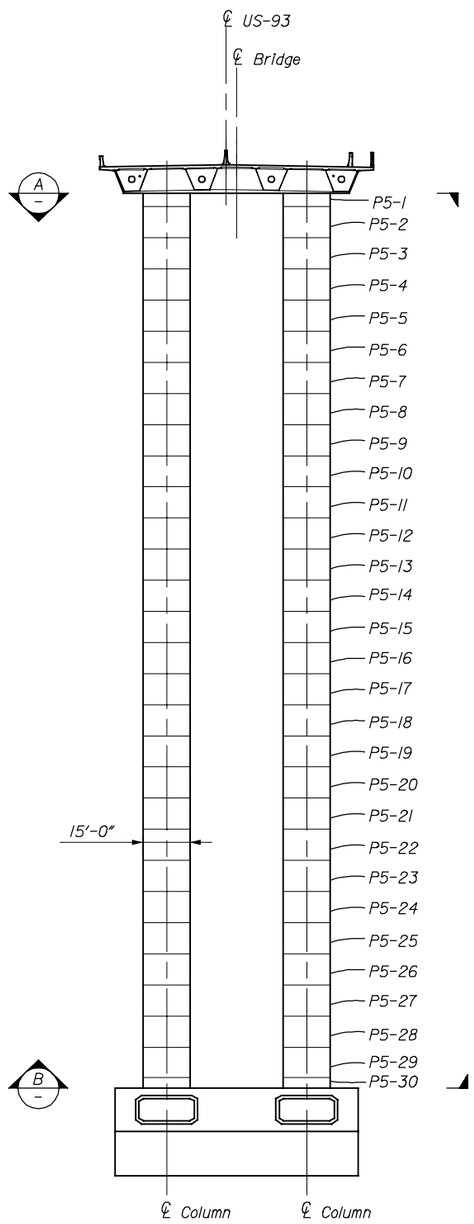
Scale: 3/16"=1'-0"



SKEWBACK COLUMN SEGMENT ELEVATION

Scale: 3/16"=1'-0"





PIER 5 & 14 VIEW

Pier 5 shown, Pier 14 similar
Looking back station
No Scale

SKEWBACK COLUMN SEGMENTS TABLE			
	Pier 5 & 14		
Segment	A	B	C
1	8'-0"	8'-0 3/4"	4'-4"
2	8'-0 3/4"	8'-2 3/8"	10'-0"
3	8'-2 3/8"	8'-4 1/8"	10'-0"
4	8'-4 1/8"	8'-5 3/4"	10'-0"
5	8'-5 3/4"	8'-7 3/8"	10'-0"
6	8'-7 3/8"	8'-9 1/8"	10'-0"
7	8'-9 1/8"	8'-10 3/4"	10'-0"
8	8'-10 3/4"	9'-0 3/8"	10'-0"
9	9'-0 3/8"	9'-2 1/8"	10'-0"
10	9'-2 1/8"	9'-3 3/4"	10'-0"
11	9'-3 3/4"	9'-5 3/8"	10'-0"
12	9'-5 3/8"	9'-7 1/8"	10'-0"
13	9'-7 1/8"	9'-8 3/4"	10'-0"
14	9'-8 3/4"	9'-10 3/8"	10'-0"
15	9'-10 3/8"	10'-0 1/8"	10'-0"
16	10'-0 1/8"	10'-1 3/4"	10'-0"
17	10'-1 3/4"	10'-3 3/8"	10'-0"
18	10'-3 3/8"	10'-5 1/8"	10'-0"
19	10'-5 1/8"	10'-6 3/4"	10'-0"
20	10'-6 3/4"	10'-8 1/2"	10'-0"
21	10'-8 1/2"	10'-10 1/8"	10'-0"
22	10'-10 1/8"	10'-11 3/4"	10'-0"
23	10'-11 3/4"	11'-1 1/2"	10'-0"
24	11'-1 1/2"	11'-3 1/8"	10'-0"
25	11'-3 1/8"	11'-4 3/4"	10'-0"
26	11'-4 3/4"	11'-6 1/2"	10'-0"
27	11'-6 1/2"	11'-8 1/8"	10'-0"
28	11'-8 1/8"	11'-9 3/4"	10'-0"
29	11'-9 3/4"	11'-11 1/2"	10'-0"
30 NV	11'-11 1/2"	12'-0"	3'-3 1/4"
30 AZ	11'-11 1/2"	12'-0"	3'-2 5/8"

NOTES:

1. Bottom Segment 30 NV and 30 AZ will be set into a 2" grout inset, which is reflected in the length C shown in the data table.
2. Bottom Segment 30 NV and 30 AZ may be constructed cast in place as an option.
3. See Drawing RG2741-E.2 and RG2741-E.3 for precast segment details.
4. Precast segment height (C) is based upon a maximum pick weight of 40 tons.

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 Inch

T-Y LIN INTERNATIONAL | HDR

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CENTRAL FEDERAL LANDS HIGHWAY DIVISION, DENVER, COLORADO

BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM

ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

SKEWBACK PIERS (PRECAST)
LAYOUT SCHEDULE

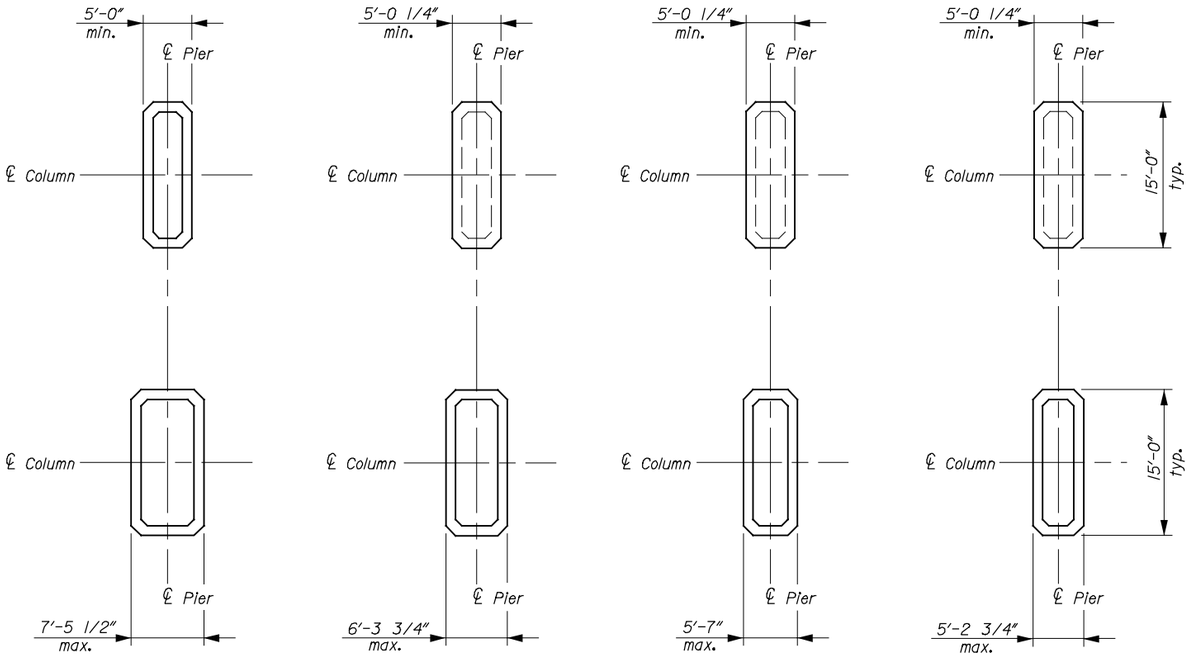
NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS

DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER
C.WERTS	B.MASON	-	AS NOTED	David Goodyear, PE

BRIDGE DRAWING	DATE	DRAWING NO.
1 OF 99	4-04-03	RG2741-E.1

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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



PIERS 6 &13
Scale: 1/16"=1'-0"

PIERS 7 & 12
Scale: 1/16"=1'-0"

PIERS 8 & 11
Scale: 1/16"=1'-0"

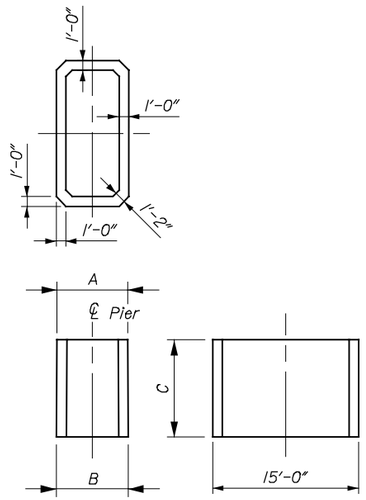
PIERS 9 & 10
Scale: 1/16"=1'-0"

SPANDREL COLUMN SEGMENTS TABLE			
	Pier 6 & 13		
Segment	A	B	C
1	5'-0"	5'-0 3/4"	4'-4"
2	5'-0 3/4"	5'-2 3/8"	10'-0"
3	5'-2 3/8"	5'-4 1/8"	10'-0"
4	5'-4 1/8"	5'-5 3/4"	10'-0"
5	5'-5 3/4"	5'-7 3/8"	10'-0"
6	5'-7 3/8"	5'-9 1/8"	10'-0"
7	5'-9 1/8"	5'-10 3/4"	10'-0"
8	5'-10 3/4"	6'-0 3/8"	10'-0"
9	6'-0 3/8"	6'-2 1/8"	10'-0"
10	6'-2 1/8"	6'-3 3/4"	10'-0"
11	6'-3 3/4"	6'-5 3/8"	10'-0"
12	6'-5 3/8"	6'-7 1/8"	10'-0"
13	6'-7 1/8"	6'-8 3/4"	10'-0"
14	6'-8 3/4"	6'-10 3/8"	10'-0"
15	6'-10 3/8"	7'-0 1/8"	10'-0"
16	7'-0 1/8"	7'-1 3/4"	10'-0"
17	7'-1 3/4"	7'-3 3/8"	10'-0"
18 NV	7'-3 3/8"	7'-5 1/2"	12'-4 1/4"
18 AZ	7'-3 3/8"	7'-5 1/2"	12'-3 3/4"

SPANDREL COLUMN SEGMENTS TABLE			
	Pier 7 & 12		
Segment	A	B	C
1	5'-0 1/4"	5'-0 3/4"	3'-0"
2	5'-0 3/4"	5'-2 3/8"	10'-0"
3	5'-2 3/8"	5'-4 1/8"	10'-0"
4	5'-4 1/8"	5'-5 3/4"	10'-0"
5	5'-5 3/4"	5'-7 3/8"	10'-0"
6	5'-7 3/8"	5'-9 1/8"	10'-0"
7	5'-9 1/8"	5'-10 3/4"	10'-0"
8	5'-10 3/4"	6'-0 3/8"	10'-0"
9	6'-0 3/8"	6'-2 1/8"	10'-0"
10 NV	6'-2 1/8"	6'-3 3/4"	9'-5 1/2"
10 AZ	6'-2 1/8"	6'-3 5/8"	9'-5 1/8"

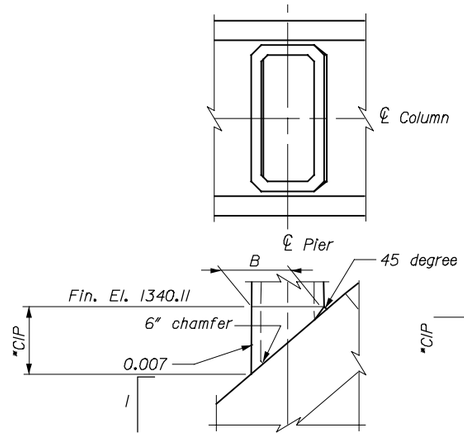
SPANDREL COLUMN SEGMENTS TABLE			
	Pier 8 & 11		
Segment	A	B	C
1	5'-0 1/4"	5'-0 3/4"	3'-0"
2	5'-0 3/4"	5'-2 3/8"	10'-0"
3	5'-2 3/8"	5'-4 1/8"	10'-0"
4	5'-4 1/8"	5'-5 3/4"	10'-0"
5 NV	5'-5 3/4"	5'-7"	7'-0 5/8"
5 AZ	5'-5 3/4"	5'-6 7/8"	7'-0 3/8"

SPANDREL COLUMN SEGMENTS TABLE			
	Pier 9 & 10		
Segment	A	B	C
1	5'-0 1/4"	5'-0 3/4"	3'-0"
2 NV	5'-0 3/4"	5'-2 3/4"	11'-11"
2 AZ	5'-0 3/4"	5'-2 3/4"	11'-10 7/8"

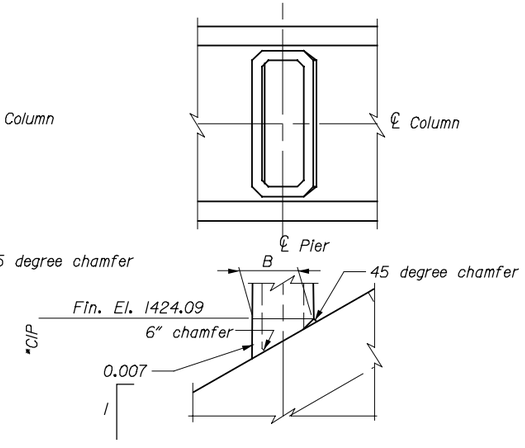


NOTES:

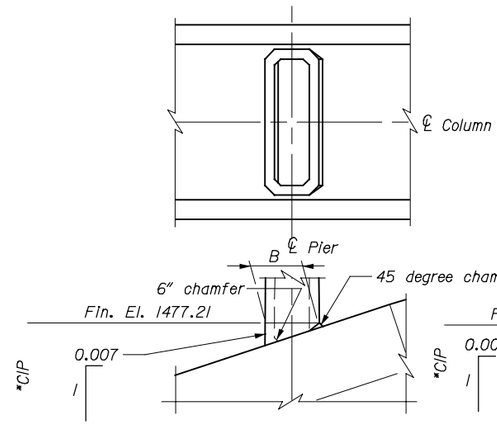
1. *See Drawing No. RG2741-H.1 for segment layout.*
2. *Left & Right Spandrel Columns are symmetrical about CL Deck.*
3. *Inside face of walls of columns are parallel to outside face of walls of columns.*
4. *See Drawing RG2741-F.3 and RG2741-F.6 for precast segment details.*



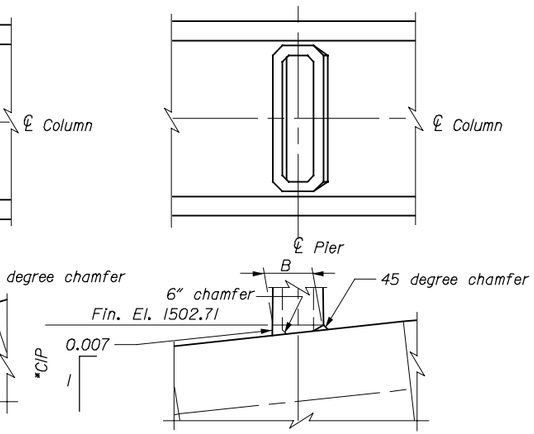
PIER 6 & 13 PLINTH
Scale: 1/16"=1'-0"



PIER 7 & 12 PLINTH
Scale: 1/16"=1'-0"



PIER 8 & 11 PLINTH
Scale: 1/16"=1'-0"



PIER 9 & 10 PLINTH
Scale: 1/16"=1'-0"

* *See Drawing RG2741-F.2 for C.I.P. Plinth*

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 inch

TYLIN INTERNATIONAL | HDR

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
CENTRAL FEDERAL LANDS HIGHWAY DIVISION, DENVER, COLORADO

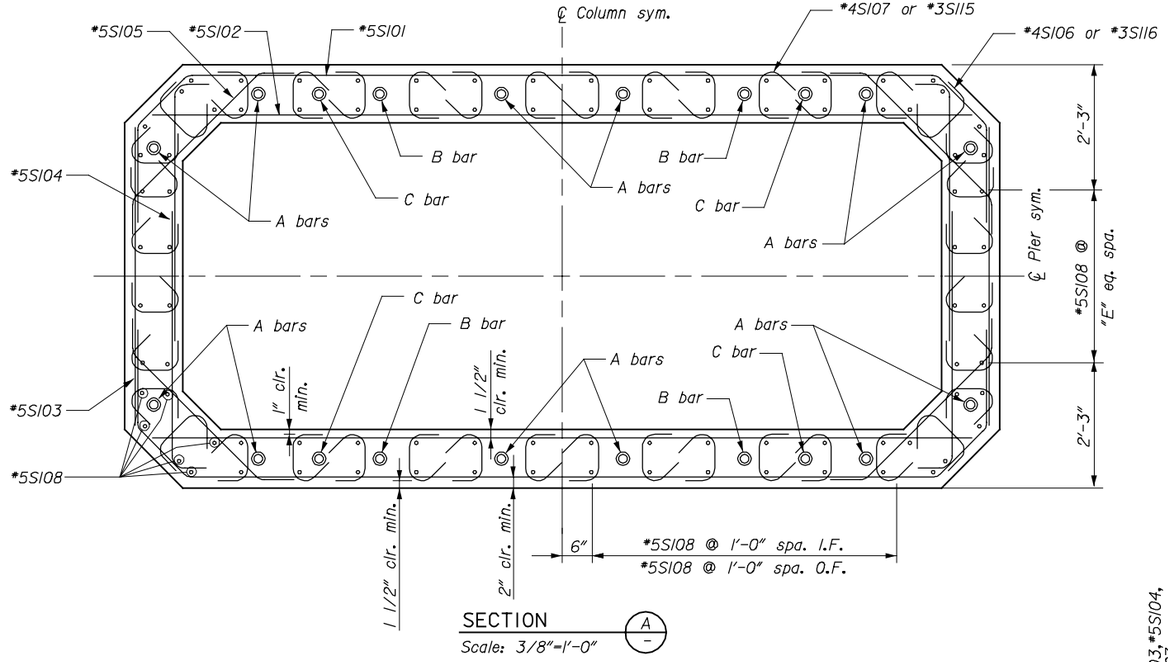
BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

SPANDREL PIERS (PRECAST) LAYOUT SCHEDULE

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								C.WERTS	J.SCHIEWE	-	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-F.1

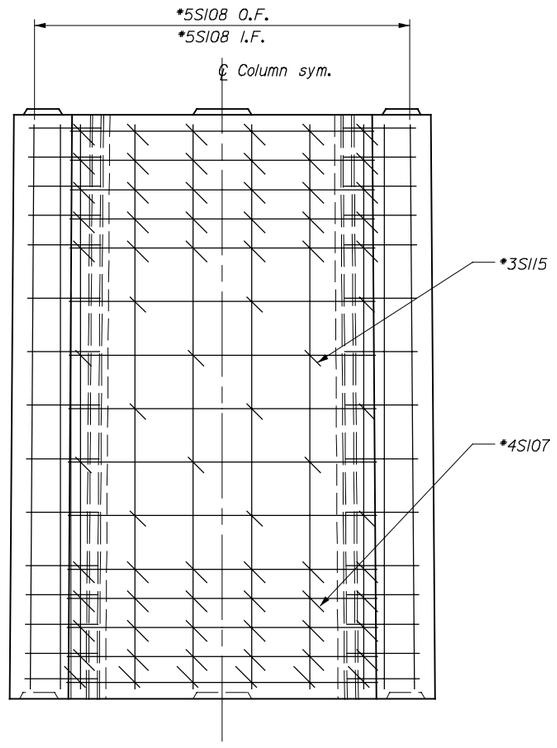
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04/30/2003

REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



SECTION A–A

Scale: 3/8"=1'-0"



TYPICAL SEGMENT - ELEVATION

Pier 6 Column Base Segment shown, other Spandrel Column Base Segments similar.

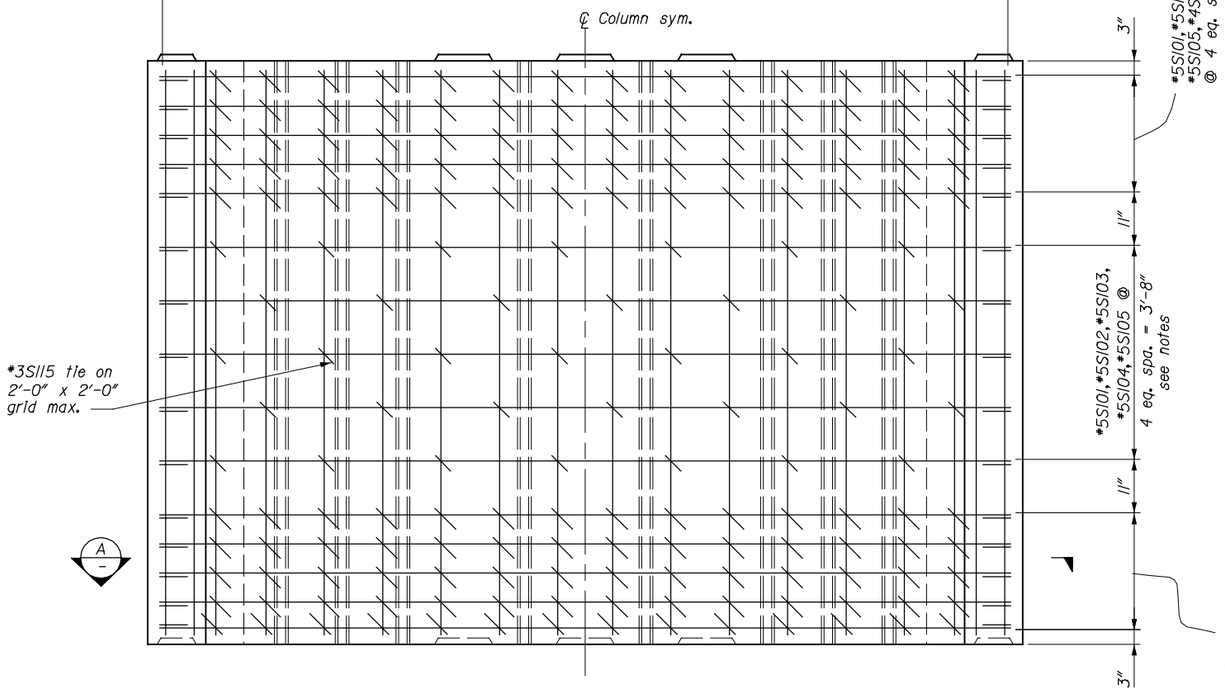
Scale: 3/8"=1'-0"

NOTES:

1. *For segments other than 10'-0" in length, maximum spacing of transverse reinforcing is 1'-0".*
2. *See Drawing RG2741-A.5 for prestressing notes.*
3. *See Drawings RG2741-F.4 and RG2741-F.5 for prestressing details.*

SPANDREL COLUMN
HS BAR REINFORCING SCHEDULE

Segment	Piers 6 & 13	Pier 6	Pier 13	Piers 6 & 13
	E	HS Bars	HS Bars	Bar Size
1	1	A,B	A,B,C	1.75"
2	1	A,B	A,B,C	1.75"
3	1	A,B	A,B,C	1.75"
4	1	A,B	A,B,C	1.75"
5	2	A,B	A,B,C	1.75"
6	2	A,B	A,B	1.75"
7	2	A,B	A,B	1.75"
8	2	A,B	A,B	1.75"
9	2	A,B	A,B	1.75"
10	2	A,B	A,B	1.75"
11	2	A,B	A,B	1.75"
12	3	A,B	A,B	1.75"
13	3	A,B	A,B	1.75"
14	3	A,B	A,B	1.75"
15	3	A,B	A,B	1.75"
16	3	A,B	A,B	1.75"
17	3	A,B	A,B	1.75"
18	3	A,B	A,B	1.75"



TYPICAL SEGMENT - END VIEW

Pier 6 Column Base Segment shown, other Spandrel Column Base Segments similar.

Scale: 3/8"=1'-0"

SPANDREL COLUMN
HS BAR REINFORCING SCHEDULE

Segment	Piers 7 & 12			Piers 8 & 11			Piers 9 & 10		
	E	HS Bars	Bar Size	E	HS Bars	Bar Size	E	HS Bars	Bar Size
1	1	A	1.75"	1	A	1.375"	1	A	1.375"
2	1	A	1.75"	1	A	1.375"	1	A	1.375"
3	1	A	1.75"	1	A	1.375"			
4	1	A	1.75"	1	A	1.375"			
5	2	A	1.75"	2	A	1.375"			
6	2	A,B	1.75"						
7	2	A,B	1.75"						
8	2	A,B	1.75"						
9	2	A,B	1.75"						
10	2	A,B	1.75"						

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 Inch

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CENTRAL FEDERAL LANDS HIGHWAY DIVISION, DENVER, COLORADO

BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

SPANDREL PIERS (PRECAST)
TYPICAL SEGMENT REINFORCING DETAILS

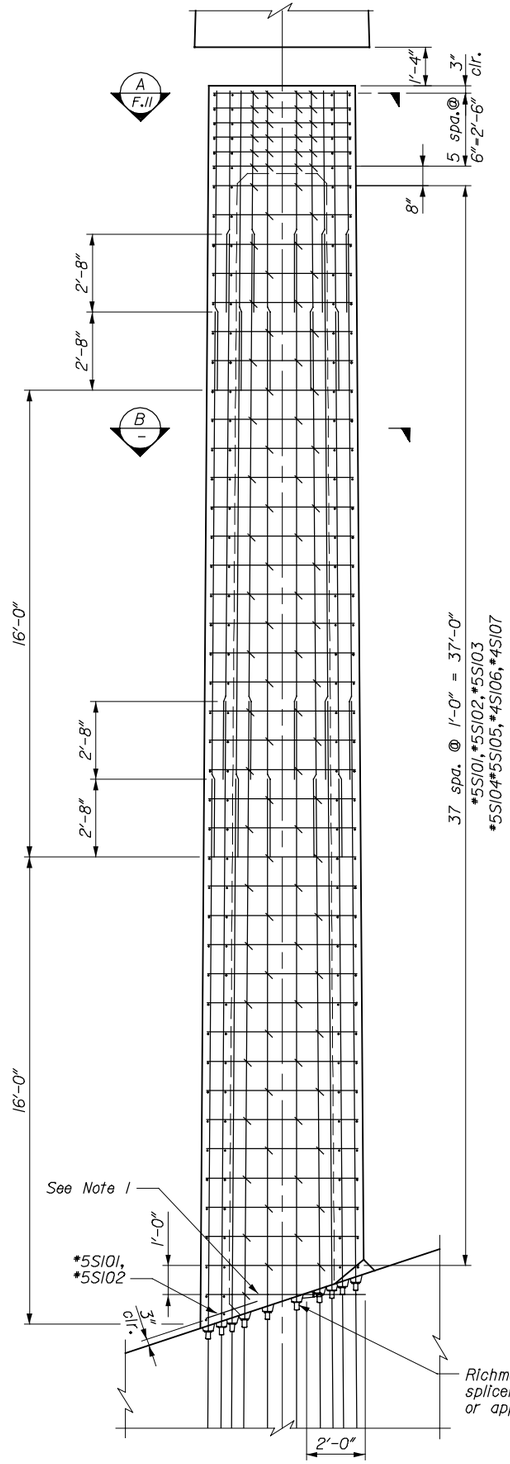
NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS

DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER
C.Werts	J.Schiewe	-	AS NOTED	David Goodyear, PE

BRIDGE DRAWING	DATE	DRAWING NO.
1 OF 99	4-04-03	RG2741-F.3

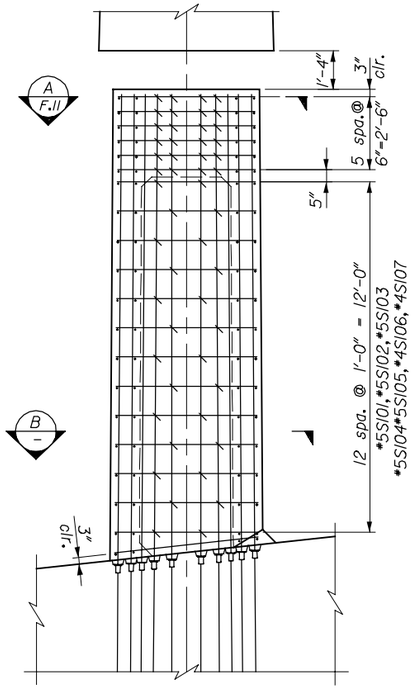
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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



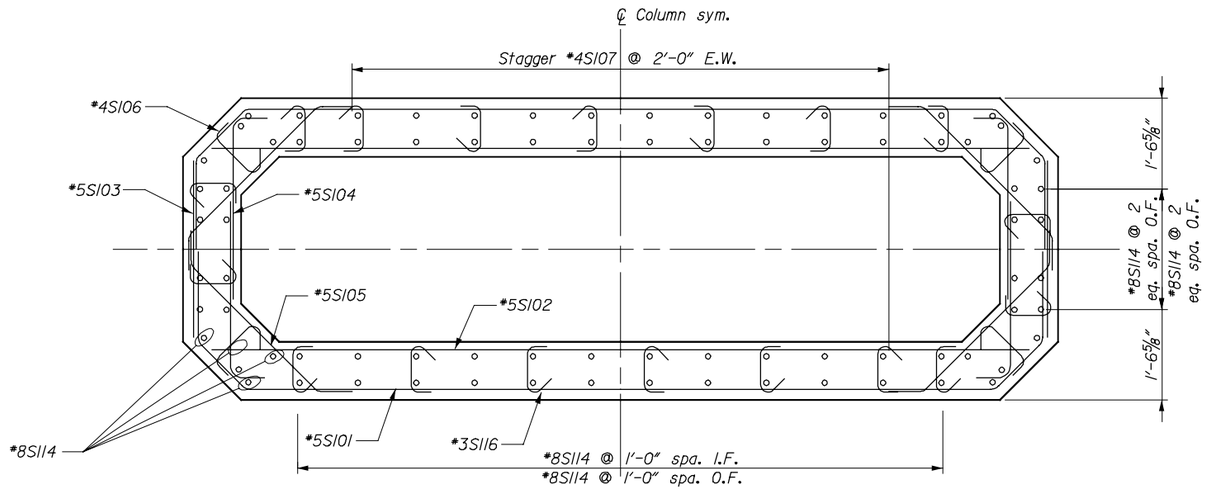
PIER 8&11 ELEVATION

Scale: 3/16"=1'-0"



PIER 9&10 ELEVATION

Scale: 3/16"=1'-0"



SECTION B –

Scale: 3/8"=1'-0"

NOTES:

1. *Reinforcing *5S101, *5S102, *5S105, *4S106, *4S107.*
2. *Wall ties shown to be placed at 2'-0" vertical spacing, and staggered as shown laterally not to exceed 2'-0" spacing.*
3. *Construction joints are allowed at 16'-0" maximum intervals along the column, unless otherwise approved by the CO.*

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 Inch

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COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

SPANDREL PIERS (CAST IN PLACE)
PIERS 8,9,10&11 REINFORCING DETAILS

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								C.Werts	B.Mason	-	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-F.10

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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		

HALF SECTION F
Scale: 1/4"=1'-0"

Top Flange Connection
See drawing G.7
for details.

Grout pad at steel girder/
concrete pier cap interface.
See drawing G.7 for details.

℄ Pier
(sym.)

℄ Pier
(sym.)

Ducts for H.S. bars to be grouted
per specifications after stressing.

Bottom Flange
Connection
See drawing G.7
for details.

℄ Column

Girders stressed to concrete
pier caps with H.S. bars.
See drawing G.7 for details.

℄ Bridge

HALF SECTION G
Scale: 1/4"=1'-0"

℄ Bridge

Match Line on drawing G.2.

Top Flange Connection
See drawing G.7
for details.

℄ Column

2.0% Slope

℄ Girder 4

℄ Girder 3

F

Pier Cap const. jt.
See drawing G.2
for details.

2'-4 3/8"

1'-0"

6" dia. steel pipe
O.D. = 6 5/8"
I.D. = 6.065"

2'-0" dia.
Access Opening (typ.)

Web Connection
See drawing G.7
for details.

1 3/8" dia. H.S. bar
(typ.)

pl. 1 3/4x7x0'-7 1/2
(typ.)

5'-4 7/8"

4'-5 1/2"
(typ.)

G

Bottom Flange
Connection
See drawing G.7
for details.

Pier Cap Soffit (Level)

11'-2 1/4" (Access Opening)

31'-1" (Future Conduit)

33'-8 3/8" (Access Opening)

36'-3 1/8"

ELEVATION
Looking ahead on Station
Scale: 1/4"=1'-0"

0 1 inch

PRELIMINARY,
NOT FOR
CONSTRUCTION

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AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

CONCRETE PIER CAP
PIERS 3,4,6 & 13
PLAN & ELEVATION 1

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS

DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER
J.PATTY	J.SCHIEWE	-	AS NOTED	David Goodyear, PE

BRIDGE DRAWING	DATE	DRAWING NO.
1 OF 99	4-04-03	RG2741-G.1

04/30/2003 11:57:39 AM $FILE1$

REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		

HALF SECTION F
Scale: 1/4"=1'-0"

Note: Typical deck reinforcing (Top Mat) and (Btm Mat Longitudinal) not shown for clarity.

℄ Bridge

℄ Pier (sym.)

℄ Pier (sym.)

See drawing G.6 for tendon layout.

HALF SECTION G
Scale: 1/4"=1'-0"

2-*7C116, *7C100 1 spa.

DETAIL (PIER 13 ONLY) 1
Scale: 1/4"=1'-0"

*8C??? @ 6" spa. (btm. mat)

2-*7C115, *7C100 1 spa.
2-*7C113, *7C100
2-*7C112, *7C100 2 spa.
2-*7C108, *7C100
2-*7C110, *7C100 1 spa.
2-*7C108, *7C100
2-*7C107, *7C100 1 spa.
2-*7C106, *7C100
2-*7C105, *7C100
2-*7C104, *7C100
2-*7C103, *7C100
2-*7C102, *7C100

2-*7C116, *7C100 15 spa. = 14'-6 3/4"
2-*7C117, *7C100 11 spa. = 14'-6 3/4"

2-*7C121, *7C100 1 spa.
2-*7C119, *7C100
2-*7C119, *7C100
2-*7C124, *7C100 22 spa. @ 8" max.

4'-9" Lap Splice
*10C174
*10C165
*10C160
℄ Bridge
Match Line on drawing G.4
4'-9" Lap Splice
4'-9" Lap Splice
const. jt.

2-*7C118, *7C100 4 spa.
2-*7C123, *7C100 4 spa.

*10C173
*10C169
*10C164
*10C159
℄ Column
pl. 9x9x2

See drawing 1.21 for typical deck reinforcing. (top mat)

*6C185
*7C183 @ 6" spa.
*10C180
*10C176
*10C172
*10C168
*10C163
*10C158

*6C186 bundled (stagger splice within bundle)
4'-9" Lap Splice
*10C150 or *10C151 bundled (stagger splice within bundle)

See drawing G.6 for H.S. bar layout.

2-*7C109, *7C100
2-*7C111, *7C100 1 spa.
2-*7C109, *7C100
2-*7C114, *7C100

See Detail 1.
See Detail 2.
See drawing F.4 for Column H.S. bar layout.

*7C101 typ.
2-*7C120, *7C100
2-*7C122, *7C100 1 spa.
2-*7C120, *7C100

*10C156
*10C154
*10C152

ELEVATION
Looking ahead on station @ ℄ Pier.
Scale: 1/4"=1'-0"

2-*7C116, *7C100 1 spa.

F

G

DETAIL (PIER 13 ONLY) 2
Scale: 1/4"=1'-0"

Note: All vertical stirrups are 7" max. spa. unless otherwise noted.

0 1 inch

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CONCRETE PIER CAP
PIERS 3,4,6 & 13
REINFORCING DETAILS 1

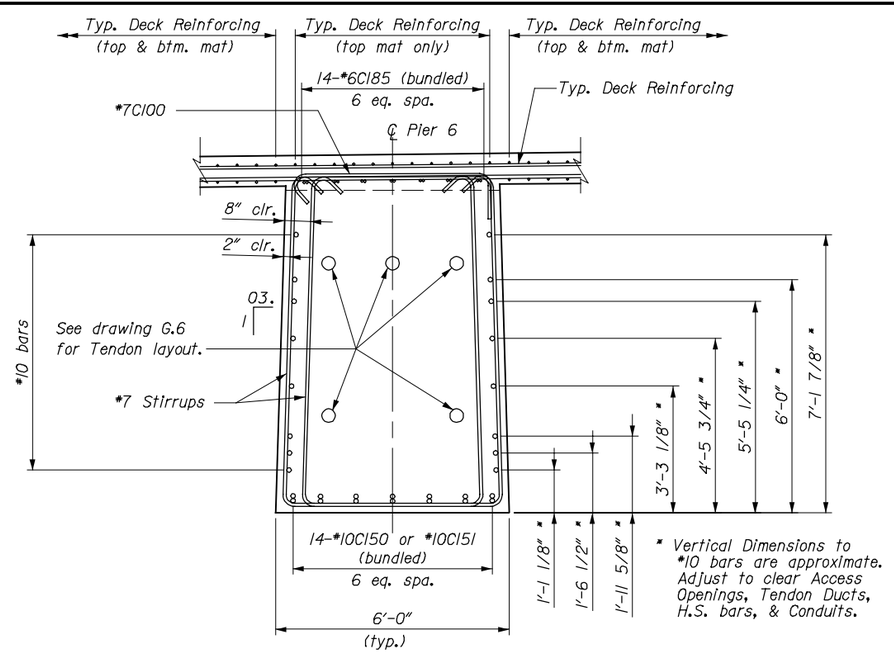
NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS

DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER
J.PATTY	J.SCHIEWE	-	AS NOTED	David Goodyear, PE

BRIDGE DRAWING	DATE	DRAWING NO.
1 OF 99	4-04-03	RG2741-G.3

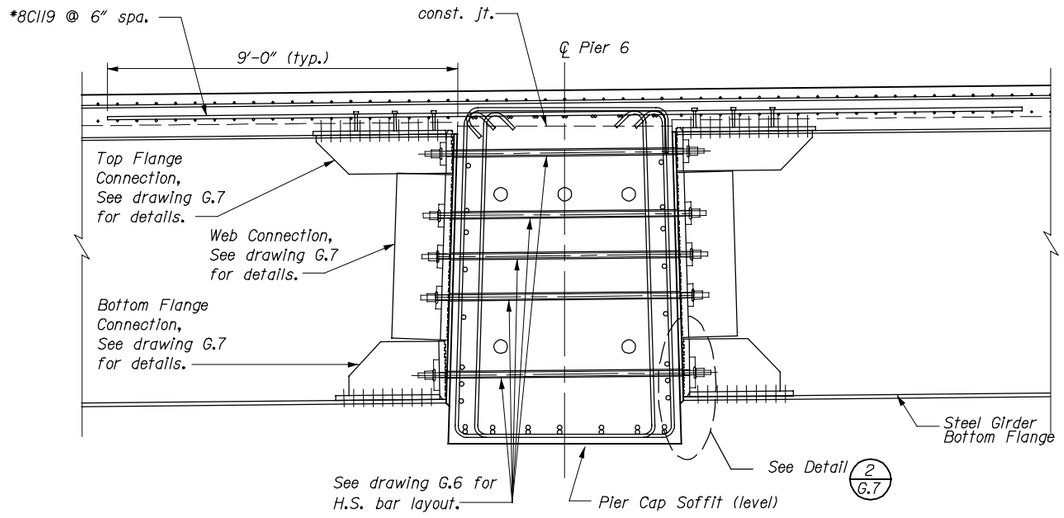
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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		

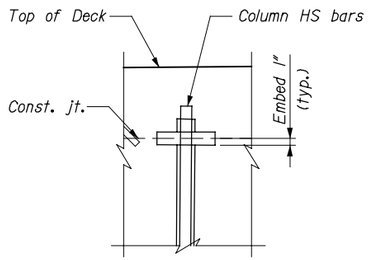


SECTION A / G.4
Scale: 1/4"=1'-0"

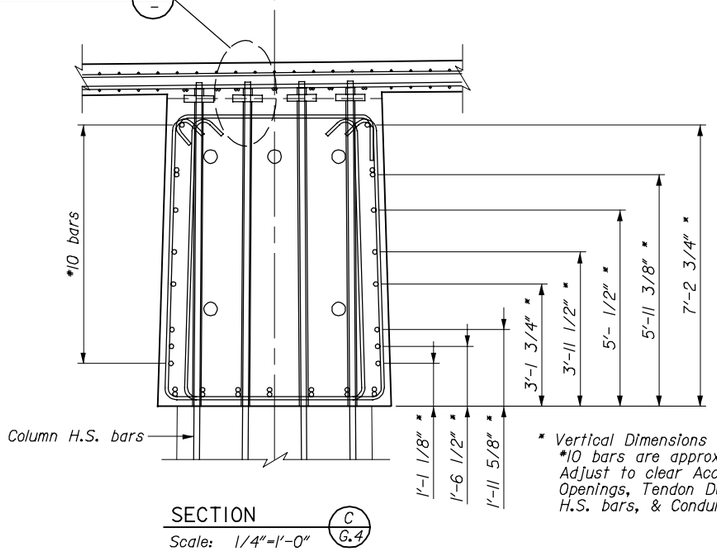
See drawing 1.21 for Typical Deck Reinforcing Details.



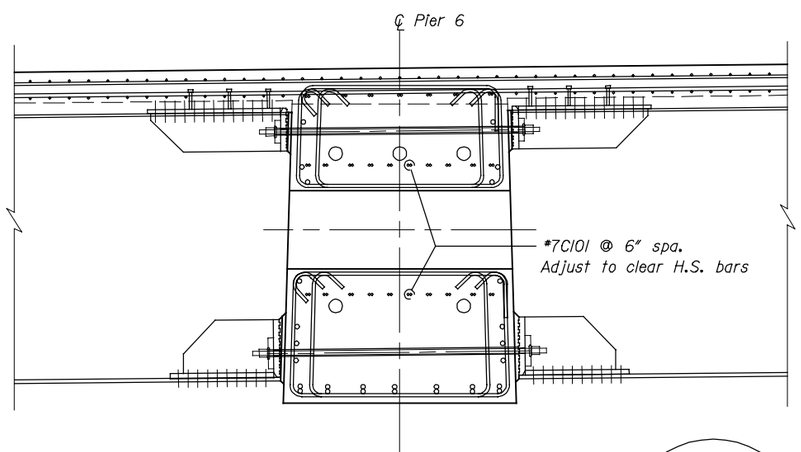
SECTION B / G.4
Scale: 1/4"=1'-0"



DETAIL 1 / - / 1 / G.12 / 1 / G.27
Scale: 1/2"=1'-0"



SECTION C / G.4
Scale: 1/4"=1'-0"



SECTION D / G.4
Scale: 1/4"=1'-0"

Note:
Sections taken @ Pier 6, Piers 3,4 & 13 similar.

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0 1 Inch

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NDOT STRUCTURE NO. B2704

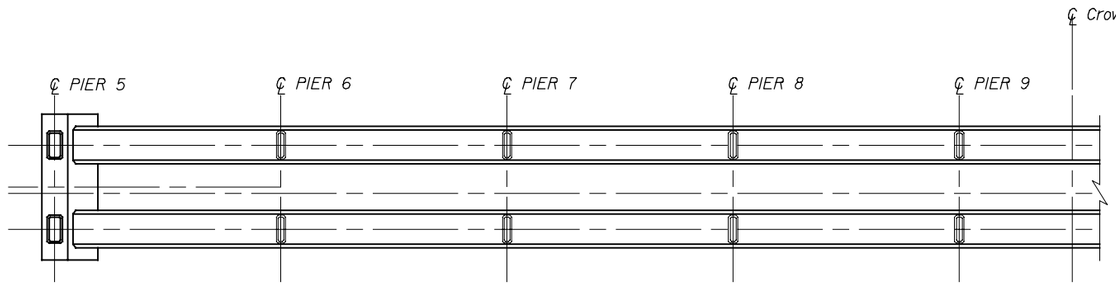
CONCRETE PIER CAP
PIERS 3,4,6 & 13
REINFORCING DETAILS 3

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								J.PATTY	J.SCHIEWE	-	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-G.5

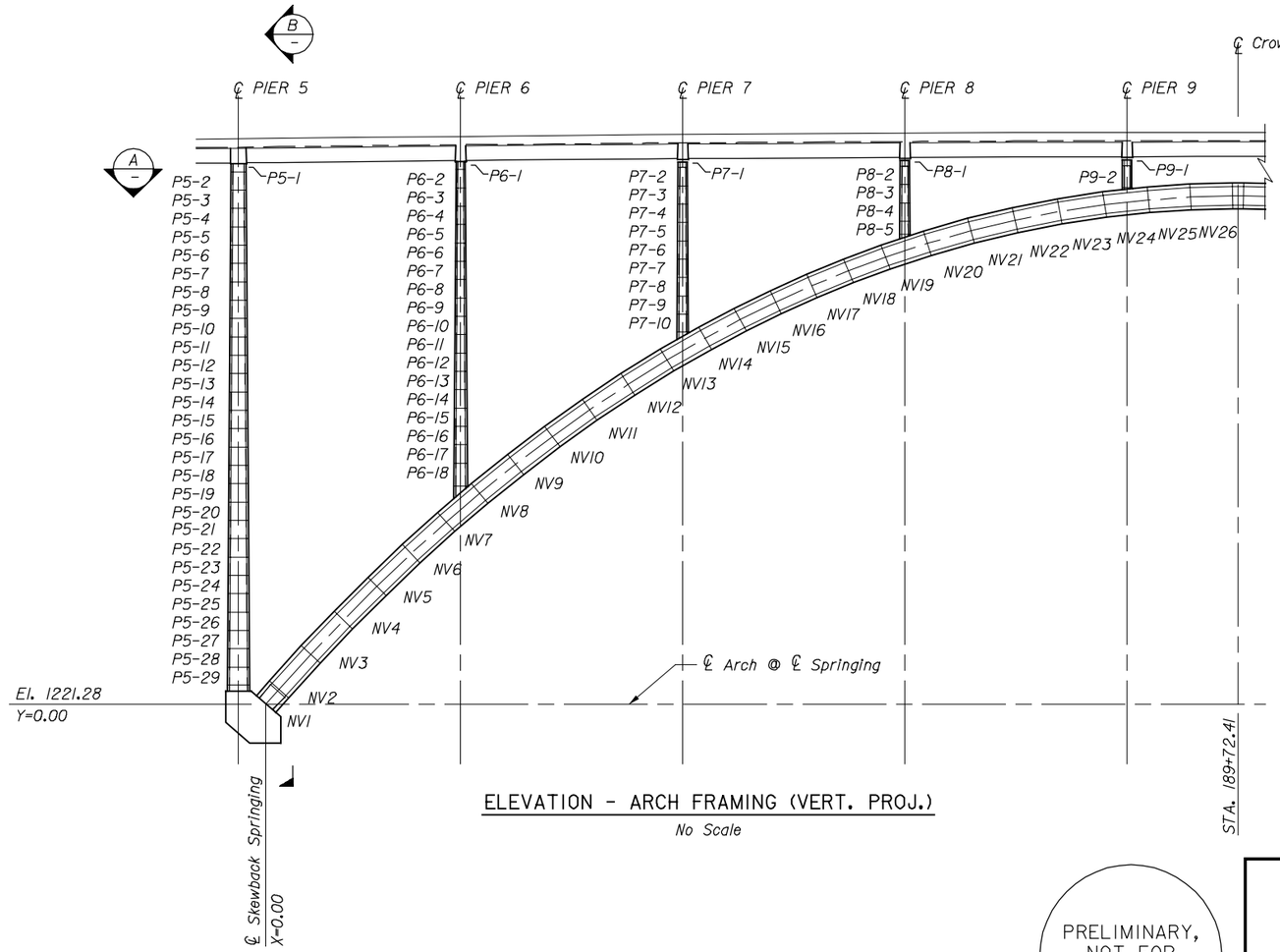
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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		

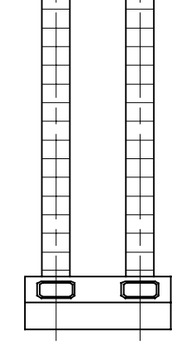
ARCH SEGMENT FINAL GEOMETRY			
Segment	Length	X (ft)	Y (ft)
		0.00	0.00
NV1	10'-7 5/8"	7.05	7.97
NV2	25'-10"	24.41	27.10
NV3	25'-10"	42.19	45.84
NV4	25'-10"	60.46	64.11
NV5	25'-10"	79.16	81.92
NV6	25'-10"	98.33	99.24
NV7	24'-0"	116.56	114.85
NV8	25'-1"	136.08	130.61
NV9	25'-1"	156.03	145.81
NV10	25'-1"	176.45	160.38
NV11	25'-1"	197.33	174.27
NV12	25'-1"	218.65	187.48
NV13	24'-0"	239.46	199.44
NV14	21'-7"	258.54	209.53
NV15	21'-7"	277.92	219.05
NV16	21'-7"	297.59	227.91
NV17	21'-7"	317.56	236.11
NV18	21'-7"	337.79	243.64
NV19	24'-0"	360.58	251.18
NV20	24'-9"	384.37	257.98
NV21	24'-9"	408.43	263.77
NV22	24'-9"	432.72	268.55
NV23	24'-9"	457.19	272.28
NV24	24'-0"	481.05	274.86
NV25	23'-0"	504.00	276.38
NV26	23'-0"	526.99	276.97
CL Closure	6'-0 1/4"	530.00	277.00
AZ26	23'-0"	533.01	276.97
AZ25	23'-0"	556.00	276.38
AZ24	24'-0"	578.95	274.86
AZ23	24'-9"	602.81	272.28
AZ22	24'-9"	627.28	268.55
AZ21	24'-9"	651.57	263.77
AZ20	24'-9"	675.63	257.98
AZ19	24'-0"	699.42	251.18
AZ18	21'-7"	722.21	243.64
AZ17	21'-7"	742.44	236.11
AZ16	21'-7"	762.41	227.91
AZ15	21'-7"	782.08	219.05
AZ14	21'-7"	801.46	209.53
AZ13	24'-0"	820.54	199.44
AZ12	25'-1"	841.35	187.48
AZ11	25'-1"	862.67	174.27
AZ10	25'-1"	883.55	160.38
AZ9	25'-1"	903.97	145.81
AZ8	25'-1"	923.92	130.61
AZ7	24'-0"	943.44	114.85
AZ6	25'-10"	961.67	99.24
AZ5	25'-10"	980.84	81.92
AZ4	25'-10"	999.54	64.11
AZ3	25'-10"	1017.81	45.84
AZ2	25'-10"	1035.59	27.10
AZ1	10'-7 5/8"	1052.95	7.97
		1060.00	0.00



SECTION A
No Scale



ELEVATION - ARCH FRAMING (VERT. PROJ.)
No Scale



SECTION B
No Scale

NOTES:

1. *Length of Arch Segment is measured along ℄ Arch.*
2. *Origin of coordinates is at ℄ Arch and ℄ Skewback Springing at face of NV skewback.*
3. *Arch geometry is chorded between segments along ℄ Arch.*
4. *Arch bulkhead at leading edge of each segment is constructed perpendicular to chorded ℄ Arch.*
5. *Coordinates shown in table represent final geometry at ℄ Arch at leading edge of segment.*
6. *See Drawing RG2741-K.38 for Arch erection work point elevations.*
7. *See Drawing RG2741-E.1 for Skewback Column geometry.*
8. *See Drawing RG2741-F.1 for Spandrel Column geometry.*
9. *Arch segment length is based on safety index during construction and geometry.*

0 1 Inch

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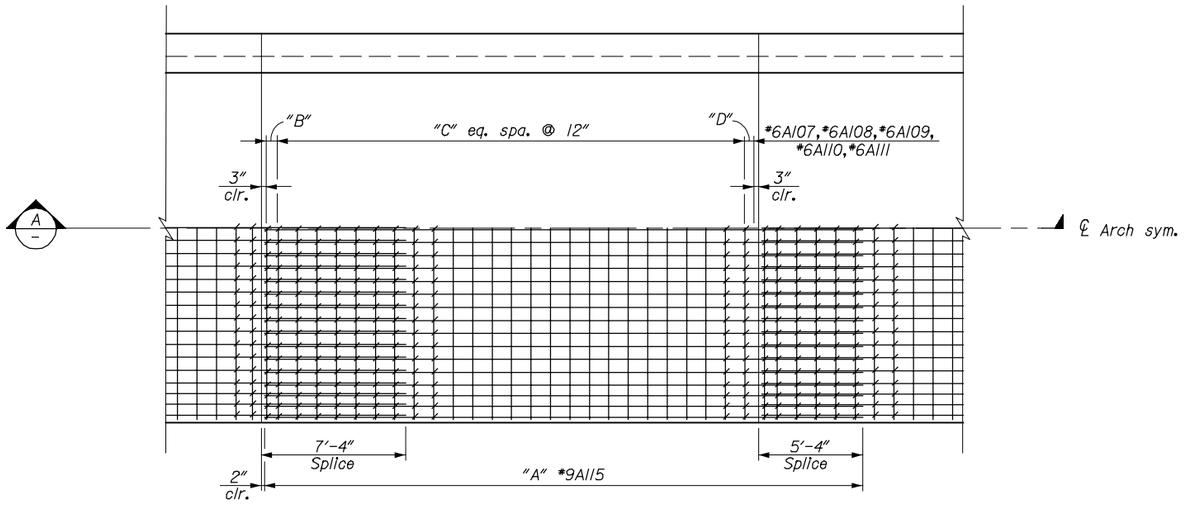
BOR - HOOVER DAM RESERVATION AREA
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NDOT STRUCTURE NO. B2704

ARCH
FRAMING PLAN AND SEGMENT LAYOUT

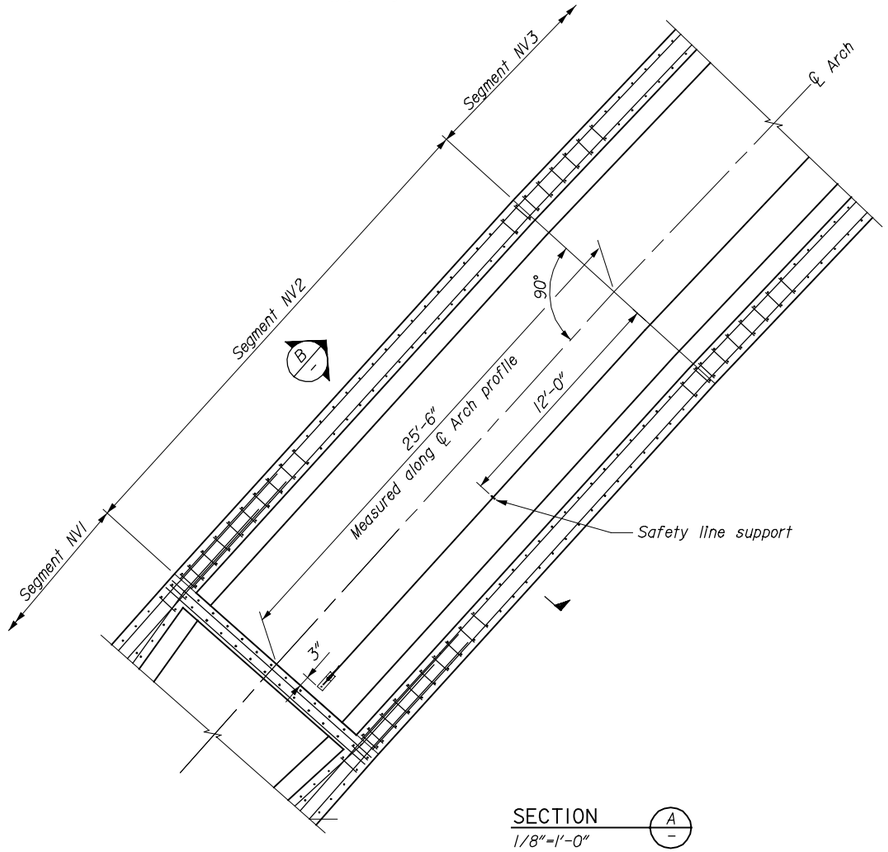
NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								C.WERTS	J.SCHIEWE	-	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-H.1

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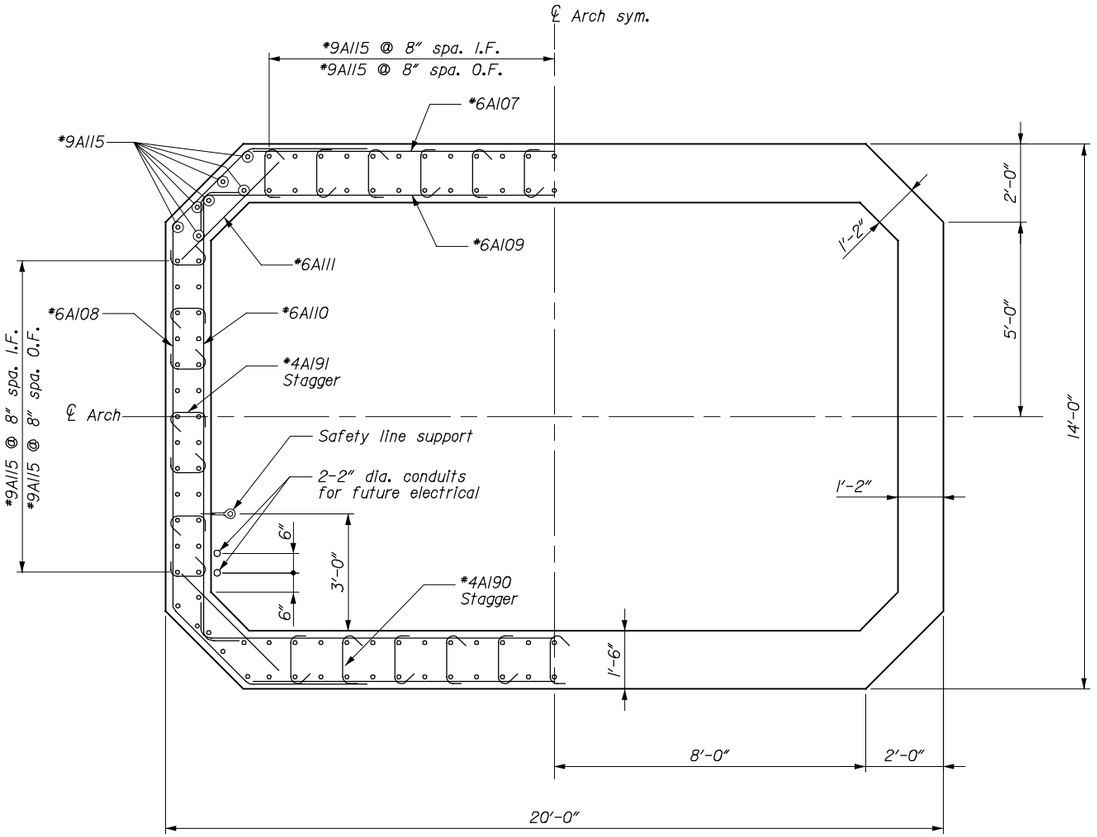
REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



TYPICAL ARCH SEGMENT VIEW
1/8"=1'-0"



SECTION A
1/8"=1'-0"



SECTION B
1/4"=1'-0"

NOTES:

1. Wall ties to be placed in staggered pattern over lap region and last 2 transverse groups in a segment.

0 1 inch

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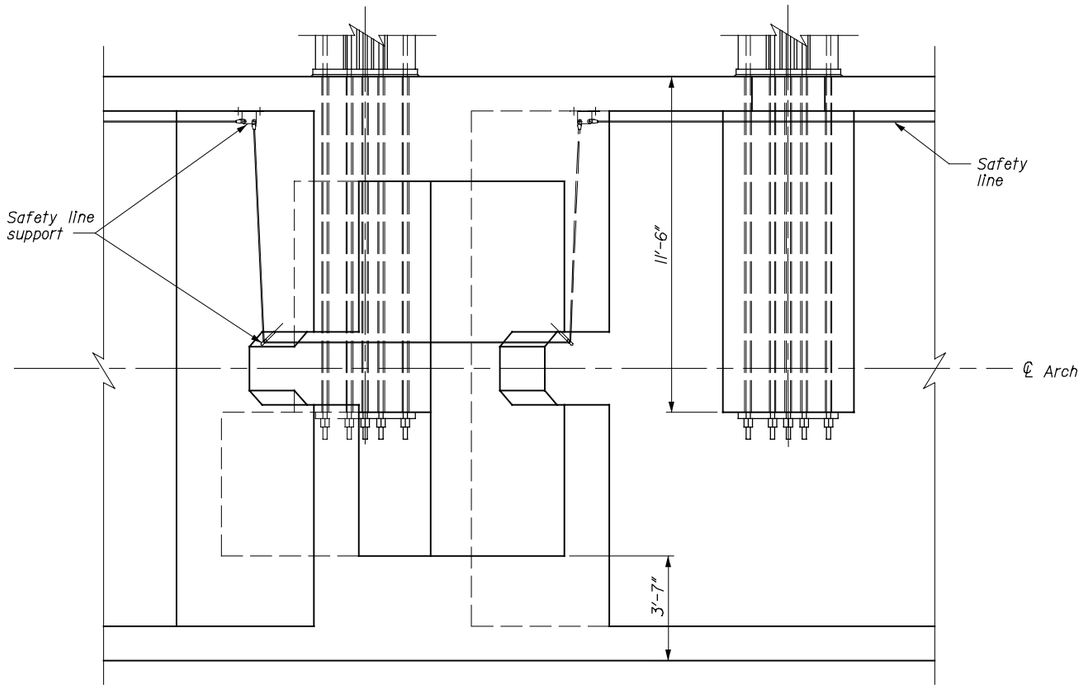
BOR - HOOVER DAM RESERVATION AREA
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AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

ARCH
TYPICAL SEGMENT

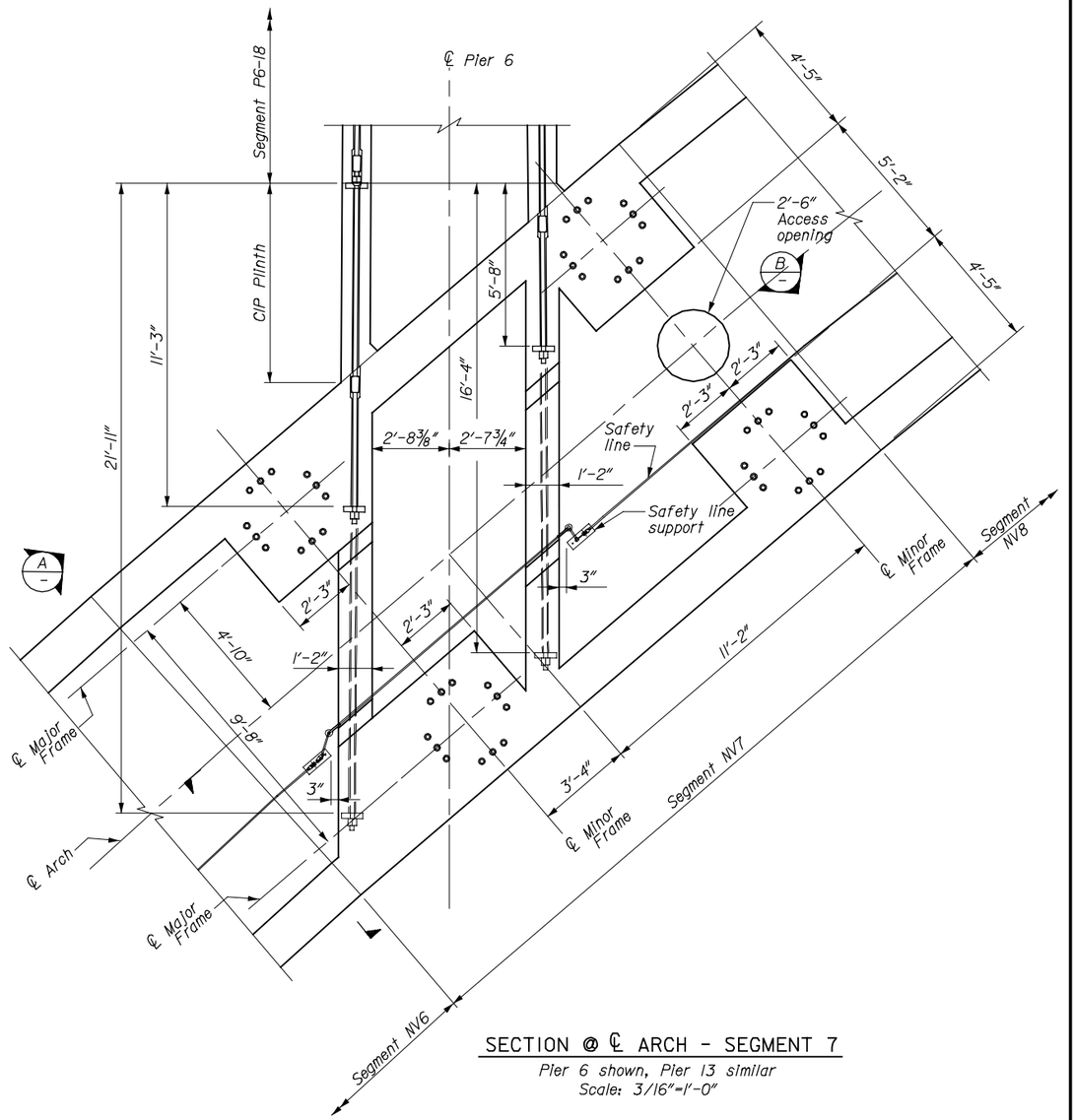
NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								C.Werts	B.Mason	-	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-H.3

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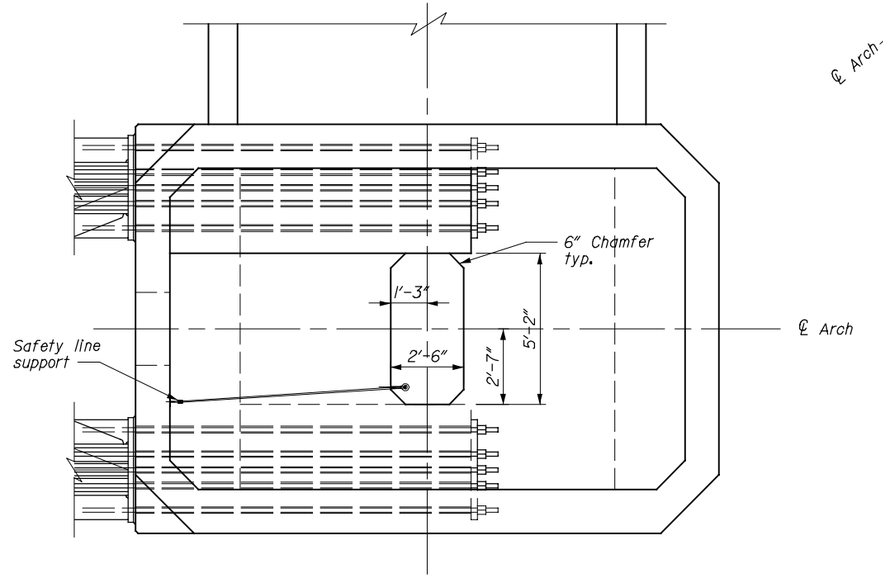
REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



SECTION (B)
Scale: 3/16"=1'-0"



SECTION @ ℄ ARCH - SEGMENT 7
Pier 6 shown, Pier 13 similar
Scale: 3/16"=1'-0"



SECTION (A)
Scale: 3/16"=1'-0"

0 1 inch

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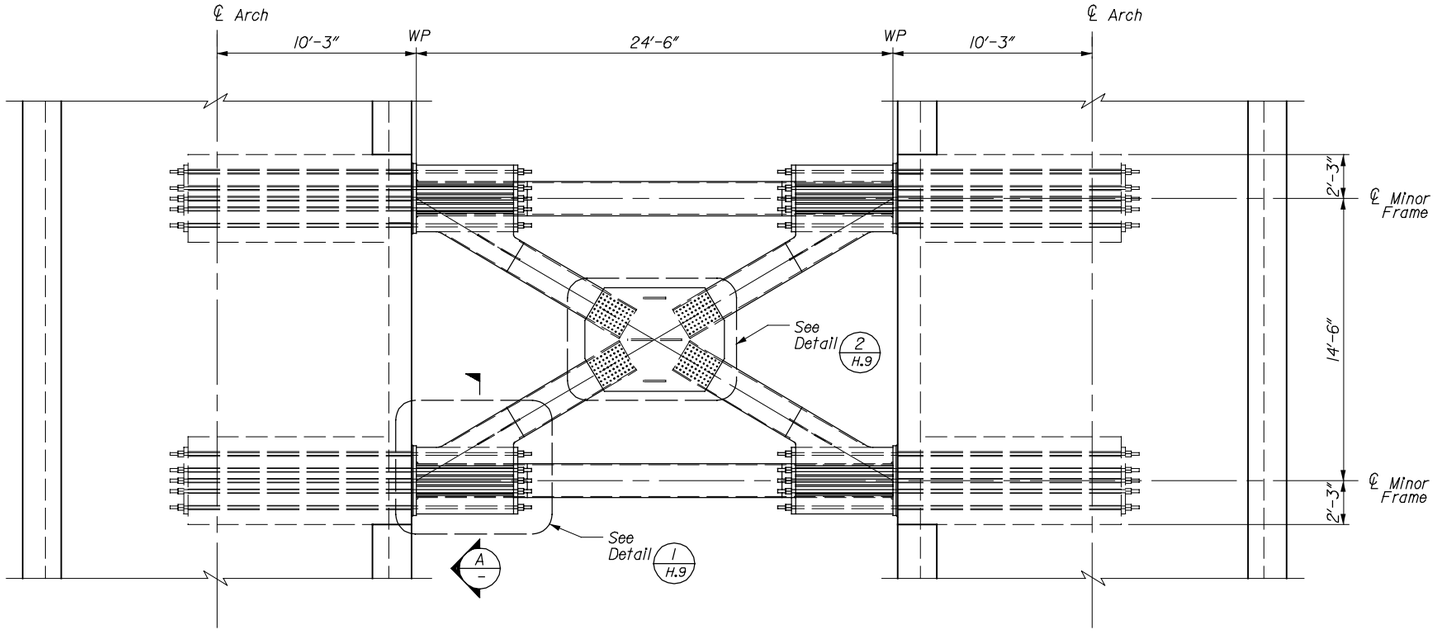
BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

ARCH SEGMENT 7
CONCRETE GEOMETRY

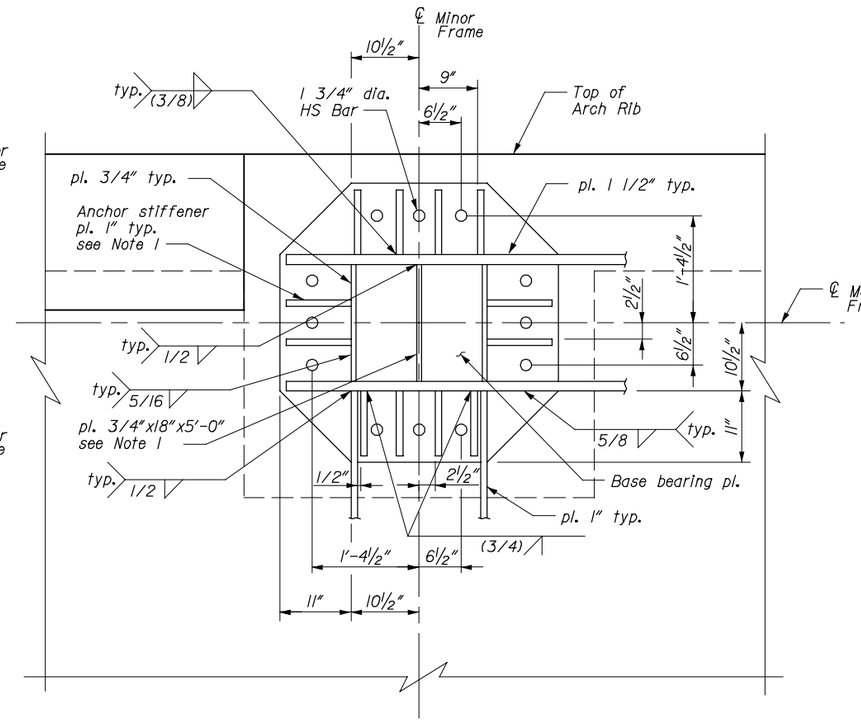
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								C.Werts	B.Mason	-	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-H.5

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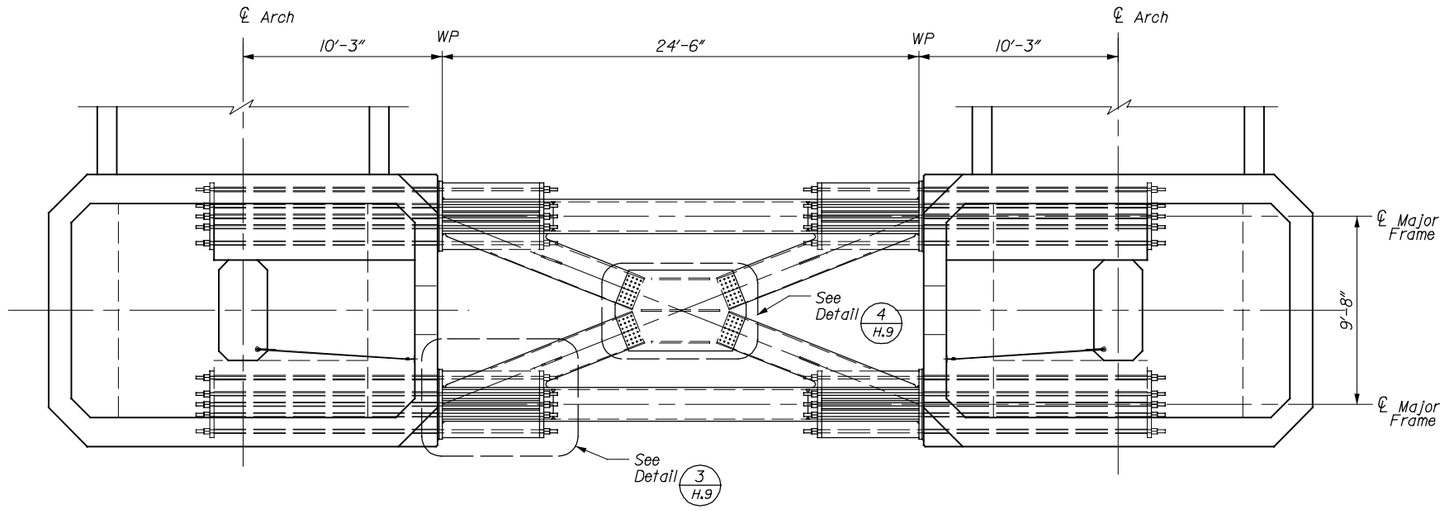
REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



MAJOR FRAME VIEW
Scale: 1/8"=1'-0"
(Pier not shown for clarity)



SECTION A
Scale: 1/2"=1'-0"



MINOR FRAME VIEW
Scale: 1/8"=1'-0"

NOTES:

1. Mill to bear against base bearing plate.
2. Contractor shall install a rigid spreader beam with match-drilled bolt template in between the form travelers for each rib during casting in order to assure proper rib separation and fit-up of strut connections.
3. All steel used shall be HPS Gr 70 (ASTM A709 Gr 70W)

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 Inch

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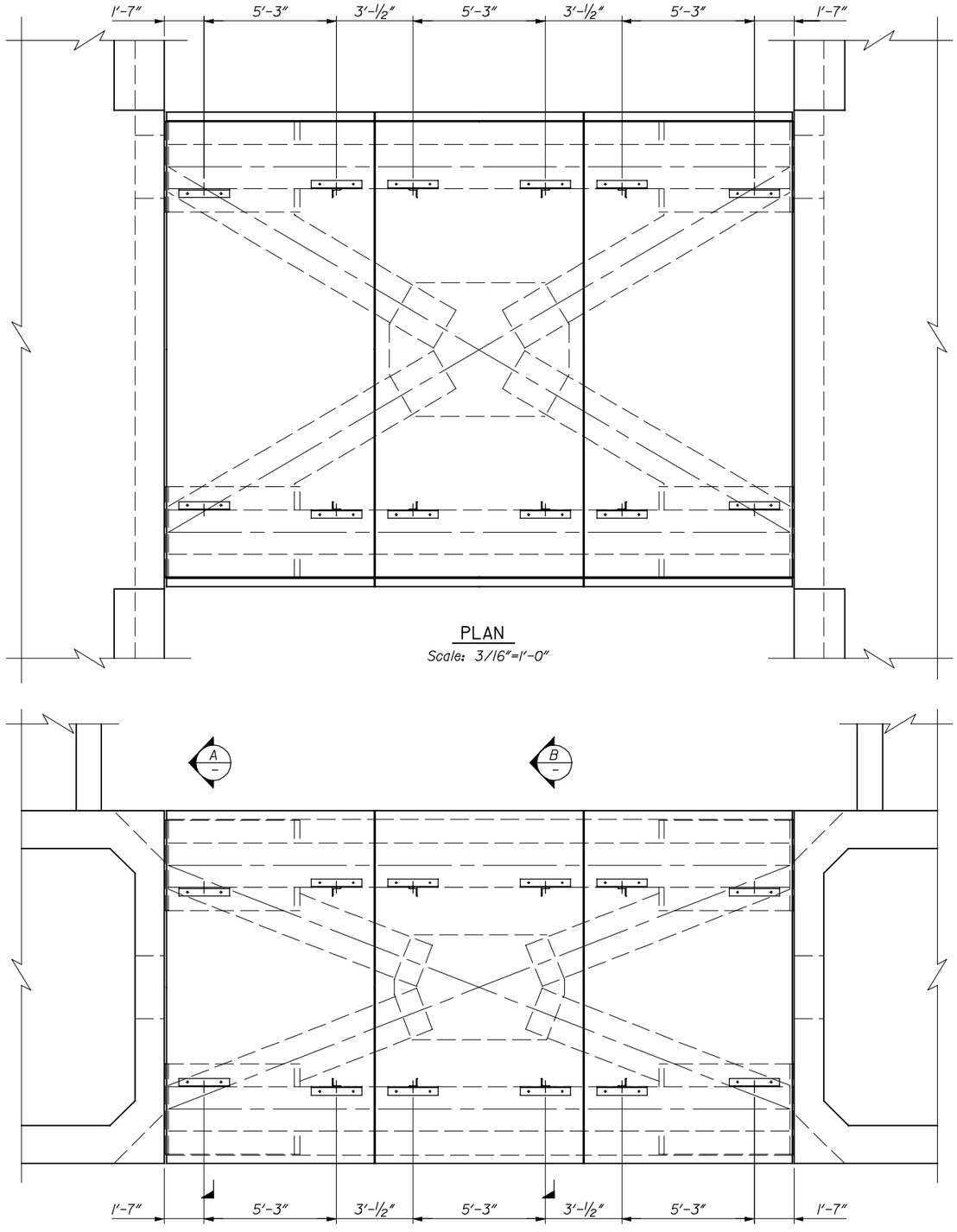
BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

ARCH SEGMENT 7
STEEL FRAME LAYOUT

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								C.Werts	B.Mason	-	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-H.8

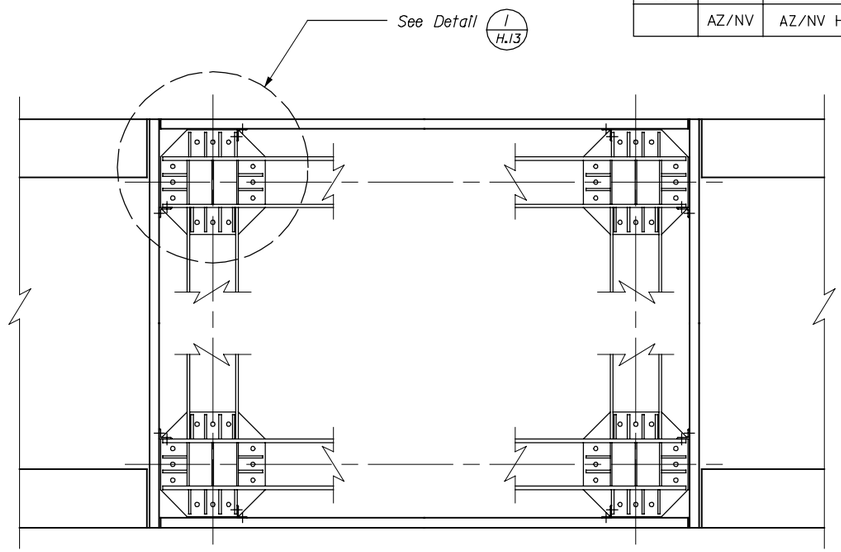
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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		

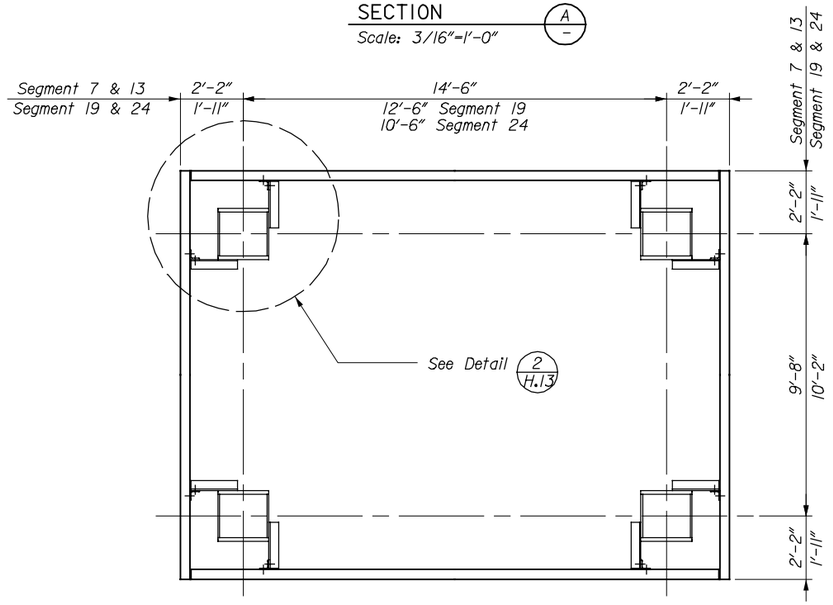


PLAN
Scale: 3/16"=1'-0"

ELEVATION
Scale: 3/16"=1'-0"



SECTION A –
Scale: 3/16"=1'-0"



SECTION B –
Scale: 3/16"=1'-0"

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 Inch

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BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

ARCH SEGMENT 7
PRECAST PANEL LAYOUT

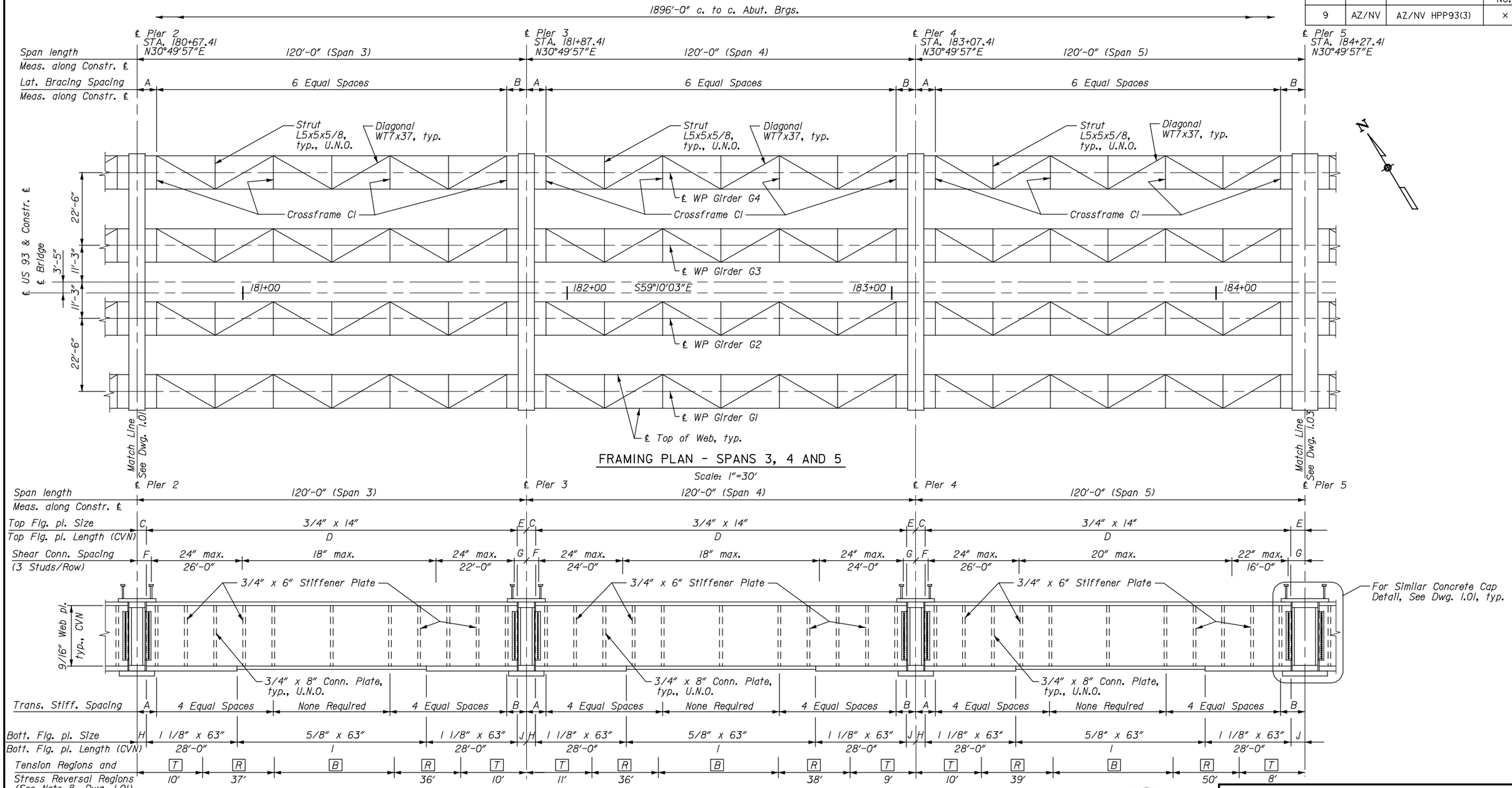
NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS

DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER
C.Werts	B.Mason	-	AS NOTED	David Goodyear, PE

BRIDGE DRAWING	DATE	DRAWING NO.
1 OF 99	4-04-03	RG2741-H.11

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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)	×	×



FRAMING PLAN - SPANS 3, 4 AND 5

Scale: 1"=30'

GIRDER ELEVATION - SPANS 3, 4 AND 5

Horiz. 1"=30'
Vert. No Scale

Notes:

1. For General Notes, see Drawings A.04 and A.05.
2. For Framing Plan notes, see Drawing 1.01.
3. For dimensions not shown, see Table on Drawing 1.07.

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 Inch

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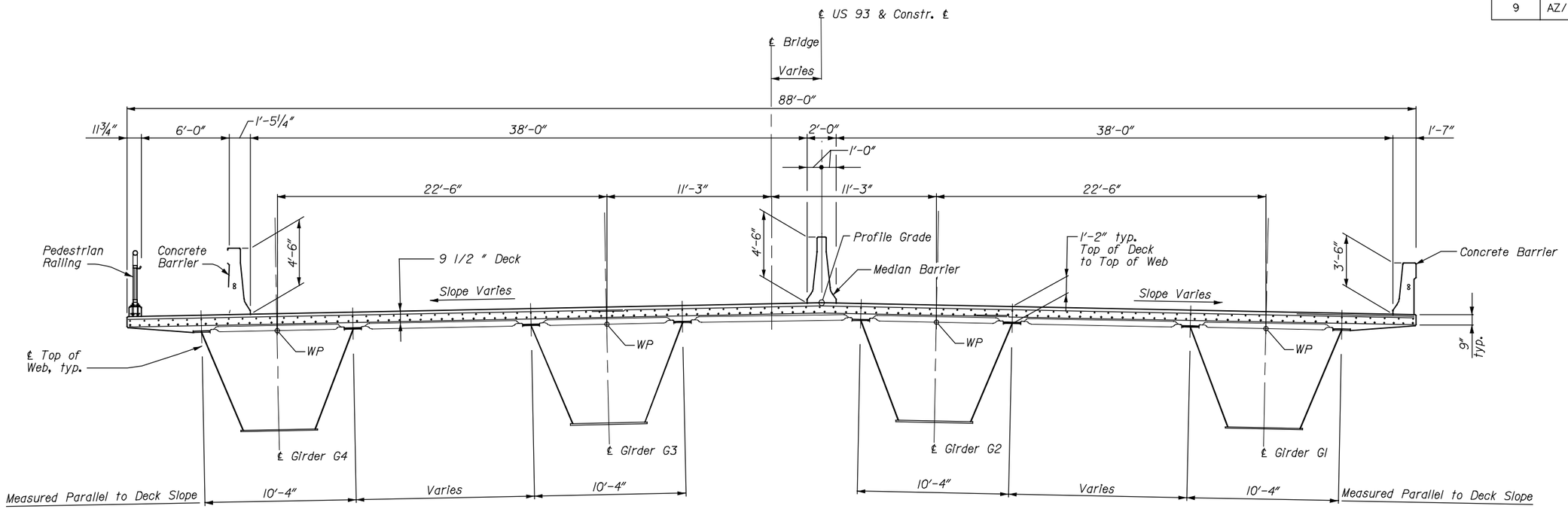
BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

GIRDER FRAMING PLAN & ELEVATION
SPAN 3, 4 & 5

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								J. Bintrim	S. Magill	R. Eaton	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-1.02

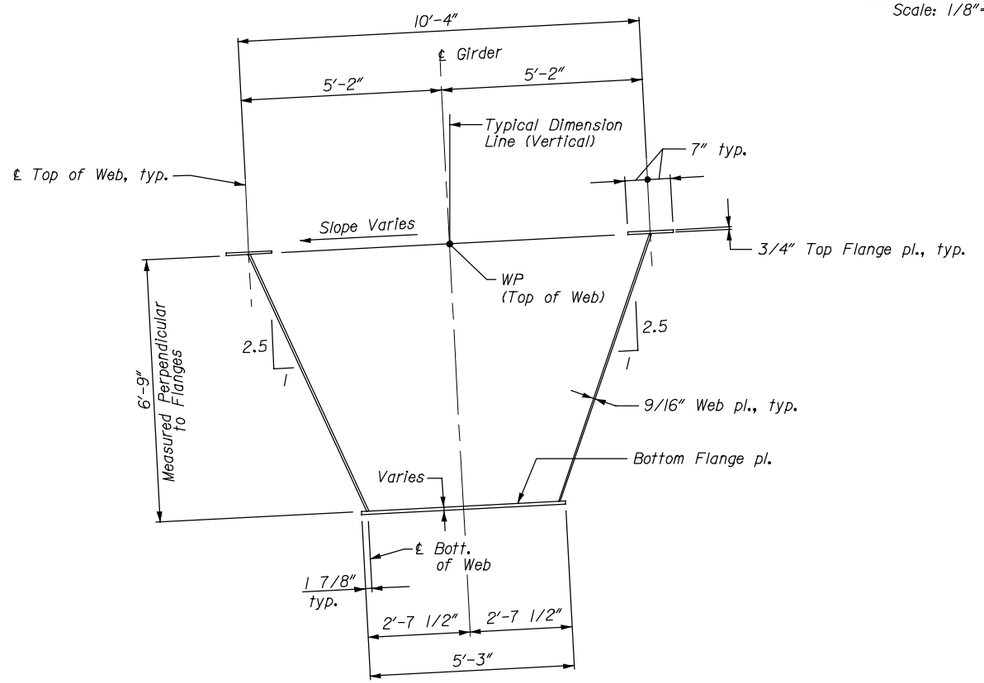
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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



TYPICAL SECTION

Scale: 1/8″=1′-0″



TYPICAL GIRDER SECTION

Scale: 1/4″=1′-0″

Notes:

1. *For General Notes, see Drawings A.04 and A.05.*
2. *Cross Frames and lateral bracing not shown for clarity.*
3. *All dimensions are perpendicular to ℄ Bridge, unless noted otherwise.*
4. *For Deck Reinforcing, see Drawings 1.18 through 1.31.*

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 inch

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COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

GIRDER
TYPICAL SECTION

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								J. Bintrim	S. Magill	R. Eaton	AS NOTED	David Goodyear, PE	1 OF 99	4-04-03	RG2741-1.08

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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		

ERECTION SEQUENCE NOTES

1. The bridge has been designed for the erection scheme shown on these plans. The design has considered the following elements of temporary works:
   a. One form traveler for each heading (4 total). Form traveler including form weight and lid = 110 tons.
   b. Twin stay cables for every second segment or as shown.
   c. Stay anchorages post-tensioned to arch ribs.
   d. Stay tower over piers 5 and 14.
   e. Backstay cables anchored into rock as shown.

2. The bridge is designed for the construction sequence shown on the plans. This sequence includes the following steps:
   a. Construction of the approach spans from each abutment to piers 5 and 14.
   b. Construction of arch ribs simultaneously from each skewback, resulting in a 12 month erection schedule for closing the arch.
   c. Erection of the spandrel columns.
   d. Casting the pier caps.
   e. Setting steel girders in the sequence shown.
   f. Casting the deck in the sequence shown.

   The scheme shown on the plans is not complete in all details. The Contractor shall provide all additional temporary works, equipment and devices necessary in order to erect the bridge. In general, temporary works and devices not part of or critical to permanent works design are not shown on these plans. Jacking and other alignment controls may be necessary in order to erect deck girders and set bearings as shown on the plans, even though columns have been erected within tolerance.

3. Changes to the erection sequence and scheme shown on the plans will require a complete engineering evaluation for long term dead loads by the Contractor and approval by the CO.
   All changes that increase either intermediate or final force demands on the bridge structure will require engineering verification of the additional capacity provided by the Contractor to the satisfaction of the CO without any additional cost to the Owner. Changes in architectural form or final geometry will not be accepted. The Contractor will be responsible for all costs related to alternative erection schemes, including but not limited to direct costs of engineering; costs of engineering review; all costs related to the schedule impacts of the alternative scheme; and all costs for additional manpower, equipment and materials for or related to the alternative scheme.

4. Changes to the erection scheme that will invoke note 3 above, include but are not limited to the following:
   a. Changes in the segment length of arch segments
   b. Changes to the number or layout of stay cables
   c. Changes to the sequence of arch construction
   d. Changes to delete the stay cable erection method shown in favor of an alternative scheme
   e. Changes to the deck erection or deck casting sequence
   f. Changes to the form traveler scheme for casting arch segments, including but not limited to multistage travelers, or double length stay supported travelers
   g. Changes from the CIP form traveler construction method for the arch

5. The Engineer has designed all permanent works for the erection scheme shown on the plans. All temporary works shall be designed by an Engineer licensed in the United States, employed by the contractor. For the purposes of this provision, temporary works are defined as those structural items not remaining on or within the bridge structure at completion of the construction contract. If the Contractor's form traveler is heavier than that assumed for design, the Contractor shall include all additional labor and materials necessary to accommodate the heavier traveler weight, whether using the plan erection scheme or any other scheme.

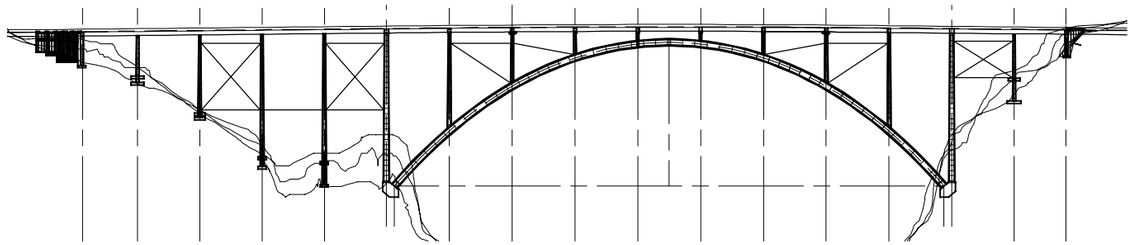
6. The bridge structure shall be constructed so as to conform to the geometry shown on the plans. The plan geometry describes the bridge profile at 4000 days after completion of the arch. All columns shall be cambered to be vertical, and all deck sections shall be set to achieve the profile grade at day 4000. The camber shown on the plans for the completed bridge deck represents the profile at completion of the superstructure construction, before long term deformations and at 75 degrees F. This camber applies only to the plan erection scheme.

7. Whether or not precast columns are used, the contractor shall include both time dependent deformations and construction tolerances in determining segment dimensions. Construction tolerances shall include accommodation of epoxy joint thickness. Dimensions shown on the plans are final dimensions for the structural member.

8. Erection tolerances shown on the plans or called out in the Specifications shall not accumulate. Tolerances for any item shall be absolute relative to final geometry or dimension. See Special Contract Requirements for erection tolerances.

9. The contractor shall use templates, spreaders or other alignment devices as required in order to assure that the as-fabricated steel strut frames fit accurately in between the cast in place arch sections within the tolerances called for on the plans. Special attention shall be given to assure alignment of the PT bars attaching the strut members to the concrete arch.

10. Design for access is exclusively the duty of the contractor. The contractor shall include all additional labor, equipment and materials necessary for his access design in accordance with accepted codes and standards for access design.



GENERAL COLUMN TEMP BRACING SCHEME

11. Alternative erection schemes submitted by the Contractor will be evaluated against the following criteria:

   i) resulting dead load demands on entire structure must be within the envelope of the plan scheme.
   ii) resulting load demands during construction must be within the envelope of the plan scheme, or within a margin created by additional capacity provided by the Contractor.
   iii) maximum rib moment during erection shall be less than 30,000 ft-k per rib
   iv) maximum dead load moment in any arch rib at completion of construction shall be less than 10,000 ft-k in general, and less than 6,000 ft-k at the skewbacks.
   v) the fully developed scheme for geometry adjustment at closure of the arch ribs must provide for a +/- 1 foot (2 foot range) adjustment of arch rib tips at closure, while maintaining vertical profile of all piers within the contract tolerance.

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 inch

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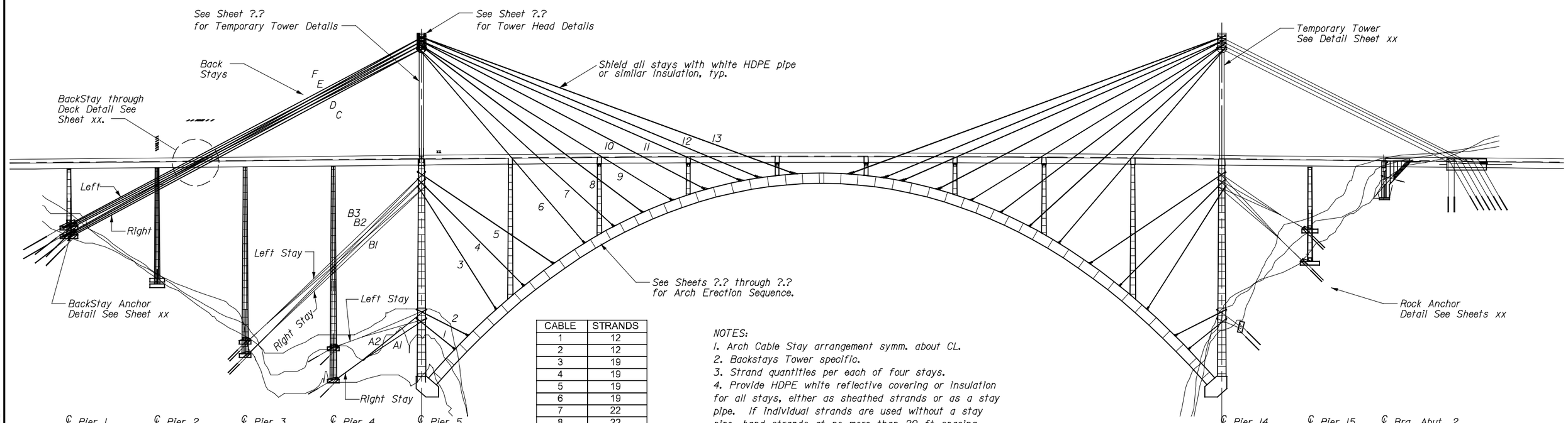
BOR - HOOVER DAM RESERVATION AREA
COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

ARCH ERECTION NOTES

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								J.PATTY	J.SCHIEWE	NAME		David Goodyear, PE		4-04-03	RG2741-K.1

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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		



CABLE	STRANDS
1	12
2	12
3	19
4	19
5	19
6	19
7	22
8	22
9	31
10	31
11	38
12	38
13	42
A1	12
A2	12
B1	15
B2	15
B3	14
C	30
D	38
E	44
F	44

NOTES:
1. Arch Cable Stay arrangement symm. about CL.
2. Backstays Tower specific.
3. Strand quantities per each of four stays.
4. Provide HDPE white reflective covering or insulation for all stays, either as sheathed strands or as a stay pipe. If individual strands are used without a stay pipe, band strands at no more than 20 ft spacing, or as required to prevent strand vibrations and rattling in the wind.

ELEVATION
No Scale

PRELIMINARY, NOT FOR CONSTRUCTION

0 1 inch

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COLORADO RIVER BRIDGE
AT HOOVER DAM
ARIZONA/NEVADA
NDOT STRUCTURE NO. B2704

ARCH ERECTION
PLAN & ELEVATION

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS

DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER
J.PATTY	J.SCHIEWE	NAME		David Goodyear, PE

BRIDGE DRAWING	DATE	DRAWING NO.
	4-04-03	RG2741-K.2

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REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
9	AZ/NV	AZ/NV HPP93(3)		

"Boneyard" Laydown Area

Temporary Construction Easement (TCE)

A+N Switchyard Laydown Area

Switchback Access
(Contractor to provide moveable guardrail)

220'-0"

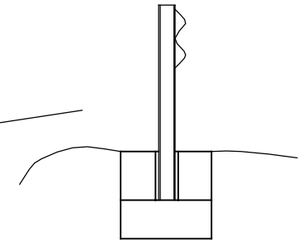
Responsibility Zone (RZ)

ROW

Temporary Construction Easement (TCE)

AZ Laydown - TCE

PRELIMINARY
NOT FOR
CONSTRUCTION



Drop-in guardrail gate
by contractor.

0 1 Inch

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SITE WORK ZONES

NO.	DATE	BY	REVISIONS	NO.	DATE	BY	REVISIONS	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	PROJECT TEAM LEADER	BRIDGE DRAWING	DATE	DRAWING NO.
								NAME		NAME		David Goodyear, PE		4-04-03	RG2741-K.38

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