STRUCTURE SELECTION REPORT

MC-85 BULLARD WASH BRIDGE

Bullard Wash Channel Improvements and MC Highway 85 / Estrella Parkway - W.O. 68877

MARICOPA COUNTY 1871 ARIZONA

Flood Control District of Maricopa County
Contract FCD 95-39

Registered Professional Engineer (Civil) CERTIFICATE NO. 13769 JOHN F. FISCHER Date Signed 3-20-98 ARIZONA, U.S.A.

March 1998 Revision

Sverdrup

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Contract No. FCD 95-39
Bullard Wash Channel Improvements
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March 1998 Revision

Prepared by:

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Job No. 13884

For:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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PROJECT DESCRIPTION

This revised report supersedes the Structure Selection Reports dated November 18, 1997 and December 19, 1997.

The design of the new MC-85 Bullard Wash Bridge is part of Contract FCD 95-39, Bullard Wash Channel Improvements and MC Highway 85 / Estrella Parkway Improvements. This project includes relocation of the Bullard Wash Channel to approximately 2,280 feet west of the existing location at MC-85, and widening of the MC-85 roadway from a two-lane roadway to a four-lane arterial roadway with left turn lanes, requiring replacement of the existing Bullard (Avondale) Wash bridge. The Location Map and Vicinity Map are shown in Figures 1 and 2.

EXISTING STRUCTURE

The General Plan of the existing structure is shown in Figure 8. Constructed by the Arizona Highway Department in 1937 under Project No. WPG-46(B), and widened in 1961 under Project No. S-371(2), the structure was called the Avondale Wash Bridge, Structure No. 190. The bridge rail was replaced by the Arizona Department of Transportation in 1992 under Project No. RS-RSR-371(13)P. With the completion of Interstate 10, this section of highway SR 85 was turned over to the Maricopa County Department of Transportation and designated as MC-85, and the Avondale Wash Bridge became a Maricopa County bridge with a new structure number, Structure No. 7820. The existing structure is a three-span continuous steel girder bridge with

spans of 30'-0", 40'-0", and 30'-0", with a total bridge length of 104'-0" back-to-back of abutments. The curb-to-curb roadway width on the existing structure is 40'-0". The bridge foundations consist of steel H-piles driven to a tip elevation of approximately 893. Because the channel crossing under MC-85 is being relocated approximately 2,280 feet to the west, it is necessary to replace the existing structure.

BRIDGE GEOMETRICS

The new bridge will be on a tangent alignment with a bearing of N 81°39'43" E, and the roadway profile across the structure will be at a constant grade of +0.6343%. The relocated Bullard Wash Channel will be on a tangent alignment at MC-85 with a bearing of N 0°05'32" E. The skew angle of the new structure will be 8°25'49" right. The new MC-85 Interim and Ultimate Roadway Sections are shown in Figure 3. Although at this time the new roadway will be designed and constructed with the interim roadway section, the new bridge will be designed and constructed to conform with the ultimate roadway section, with a curb-to-curb width of 100'-0" and an out-to-out width of 116'-10". This provides for six traffic lanes, two bike lanes, a raised median, and a 6'-0" sidewalk on each side. Because the design speed is 65 mph, the sidewalk will be separated from the roadway by a concrete barrier. The bridge Typical Section is shown on the General Plans of the proposed alternative structure types in Figures 4 through 7.

Although the bridge will be on a tangent alignment, a curve east of the bridge will have a superelevation transition extending back onto the bridge, but only affecting the south side of the

bridge deck. From the centerline of roadway the north side of the bridge deck will slope down at a constant -2%. From the centerline of roadway the south side of the bridge deck will slope down at -0.59% at the Abutment 1 Station 661+34.80, and will slope up at +0.71% at the Abutment 2 Station 662+35.80, with the point of zero cross-slope occurring at Station 661+80.41.

DRAINAGE CONSIDERATIONS

A hydraulic study was done by Wood, Patel & Associates for Stanley Consultants in 1995 for the relocated and improved Bullard Wash Channel. The study established a Q_{100} of 3,200 cfs. Using a flow of 3,200 cfs Sverdrup has done a preliminary FHWA HY-8 analysis which indicates a water surface elevation of 919.42 at the new bridge with a corresponding flow velocity of approximately 5.9 feet per second. At the bridge, the new channel will be trapezoidal with 1:1 side slopes and will be concrete lined, with a bottom width of 80 feet.

Water on the roadway approaches to the bridge will be drained off the roadway into ditches. Water on the bridge deck will flow off the west end of the structure and will be drained off into ditches on both sides of the roadway.

BRIDGE SUBSTRUCTURE

The foundation data and recommendations presented in this report are based on geotechnical investigations performed by ATL, Inc. under ATL Job Number 196020-2. Four borings were

drilled at the bridge site, one at each of the proposed new abutments and piers. Lean and sandy-silty clays comprise several layers from existing grade to a depth of about 15 feet below existing grade. The material exists in a medium dense condition, with higher densities in a layer 12 to 17 feet below existing grade. Laboratory consolidations were less than 3% at loading s of 1.5 tsf. Ground water was encountered between 33 and 38 feet below existing grade at the time of drilling on September 18 and November 3, 1997.

The geotechnical report recommends using either concrete spread footings or drilled shafts for the foundations of the new structure. This report will compare the cost of the two foundation types. For spread footings the geotechnical report recommends an allowable maximum bearing pressure of 3,900 psf with a minimum footing width of 11 feet, founded 15 feet below existing grade. The geotechnical report provides plotted curves for drilled shaft capacities. The capacities are plotted versus embedment depth for drilled shaft diameters of 30", 36", and 42". In this report a 36" diameter is assumed.

Deep wall-type abutments will be used for the alternatives on spread footing foundations, and shallow stub abutments will be used for the alternatives on drilled shaft foundations. Integral abutments will be used to eliminate the need for deck expansion joints. Wingwalls will be integral with the abutments and extend 8 feet beyond the catch points of the embankment slopes.

Each of the piers will consist of five round concrete columns with a diameter of 2'-0" and a center-to-center spacing of 25'-0". Concrete wall piers were analyzed in previous submittals, but

discontinued from further evaluation because of cost considerations and a County preference for round columns.

Upstream from the bridge and at the bridge the new channel will be concrete lined, providing scour protection for the foundations.

BRIDGE SUPERSTRUCTURE

To avoid raising the roadway profile to provide adequate freeboard and clearance for equestrian usage under the structure, only shallow slab structure types are considered for the new bridge. Precast-prestressed concrete I-girders would require raising the roadway profile an additional 2.5 feet to provide adequate freeboard above the Q_{100} water surface elevation and adequate clearance for equestrian usage under the structure. For steel girders the roadway would need to be raised an additional 1.5 feet. Raising the roadway profile was objected to by the developer who owns the property along the south side of MC-85. Two superstructure types are considered: cast-in-place, continuous concrete slab; and precast-prestressed concrete slabs with a cast-in-place concrete topping slab. For each of the superstructure types both spread footings and drilled shafts are considered. General Plans for each of the four alternatives are presented in Figures 4 through 7:

Figure 4 - Cast-in-Place Concrete Slab - Drilled Shaft Foundations

Figure 5 - Cast-in-Place Concrete Slab - Spread Footing Foundations

Figure 6 - Precast-Prestressed Concrete Slab - Drilled Shaft Foundations

Figure 7 - Precast-Prestressed Concrete Slab - Spread Footing Foundations

UTILITIES

No existing utilities will be supported by the new Bullard Wash bridge. Existing utilities within the MC-85 right-of-way will cross under the new Bullard Wash Channel. However, the new bridge will be designed for an assumed utility dead load of 50 pounds per foot for any utilities that might be added to the structure in the future. Empty conduit will be embedded in the deck slab under the sidewalks to carry future electric, telephone, or cable TV wire installations.

ARCHITECTURAL TREATMENTS

No architectural treatments or colored concrete are planned for the new structure. The pedestrian railing will consist of a 4-foot chain link fence on top of a 6-inch concrete curb, the same as used on many other County bridges.

CONSTRUCTION PROCEDURES

To maintain traffic on MC-85, it will be necessary either to construct the new bridge in two phases or to construct the entire bridge at one time with a temporary detour roadway. For this project it has been decided that the entire bridge will be constructed at one time with a temporary detour roadway. The detour roadway will be paved for two lanes of traffic and will be designed for a speed of 40 mph.

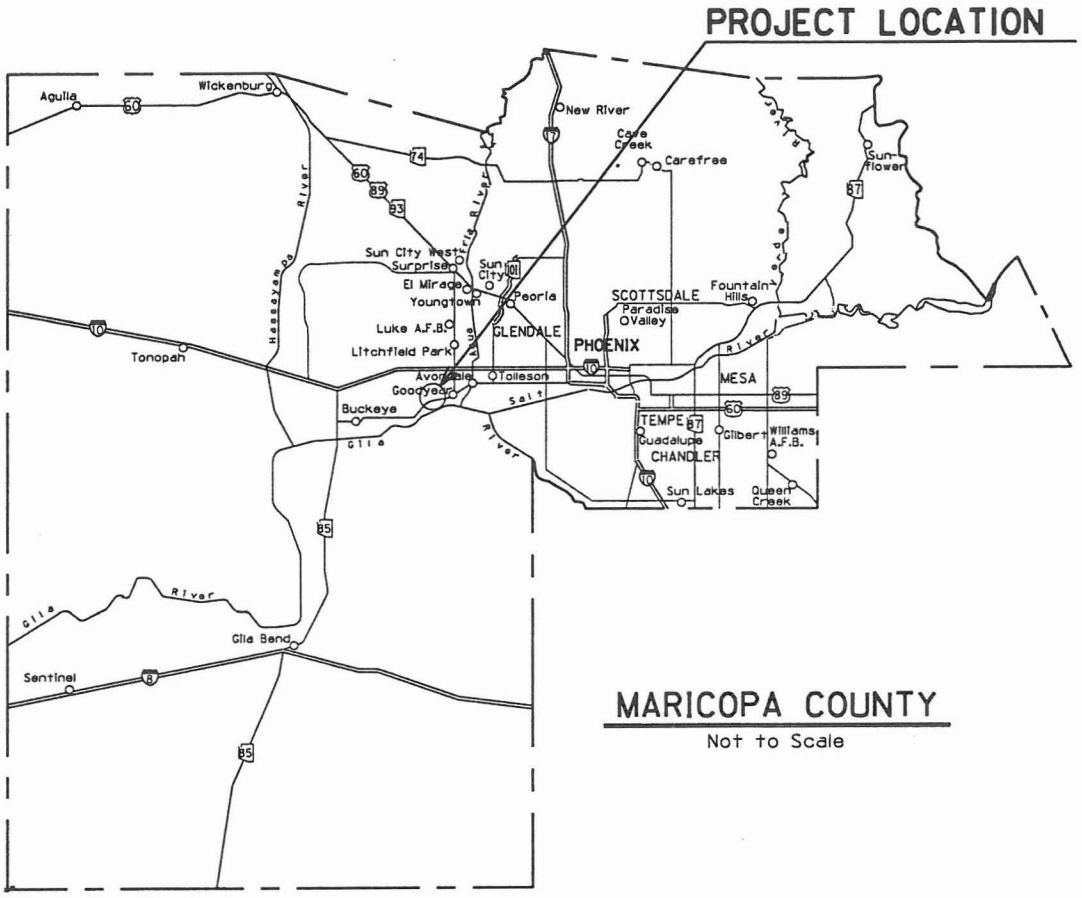
COMPARISON OF ALTERNATIVES

The Appendix contains calculations of approximate quantities and construction cost estimates for the four alternatives considered. The estimated construction costs of the four alternatives are:

Fig. 4 - Cast-in-Place Concrete Slab - Drilled Shaft Foundations	$508,000
Fig. 5 - Cast-in-Place Concrete Slab - Spread Footing Foundations	$533,000
Fig. 6 - Precast-Prestressed Concrete Slab - Drilled Shaft Foundations	$619,000
Fig. 7 - Precast-Prestressed Concrete Slab - Spread Footing Foundations	$644,000

RECOMMENDATION

Based on estimated construction cost, the cast-in-place continuous concrete slab on drilled shaft foundations is recommended for final design and construction, as shown in Figure 4.



LOCATION MAP

FIGURE 1

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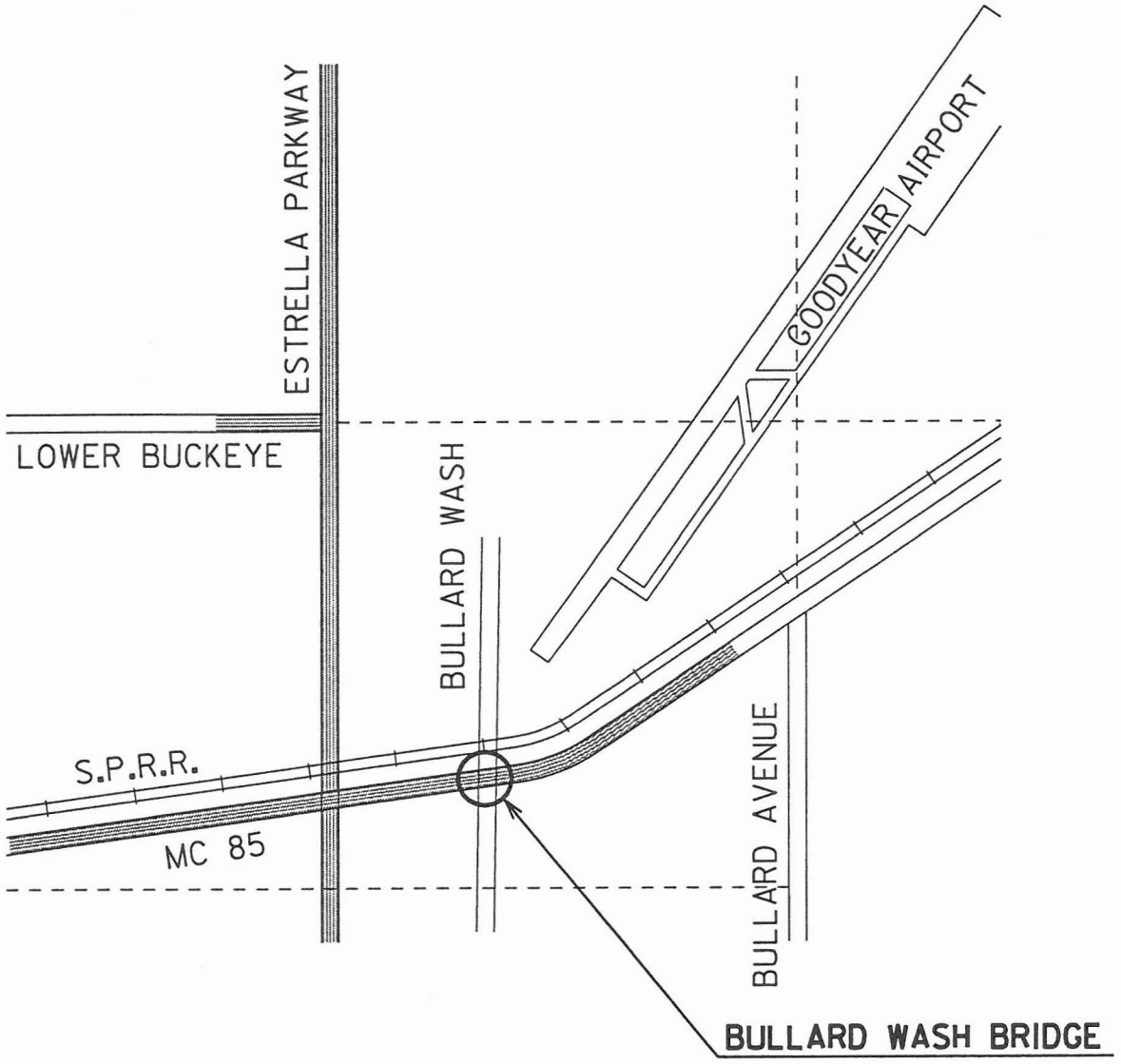

VICINITY MAP

Not to Scale

FIGURE 2

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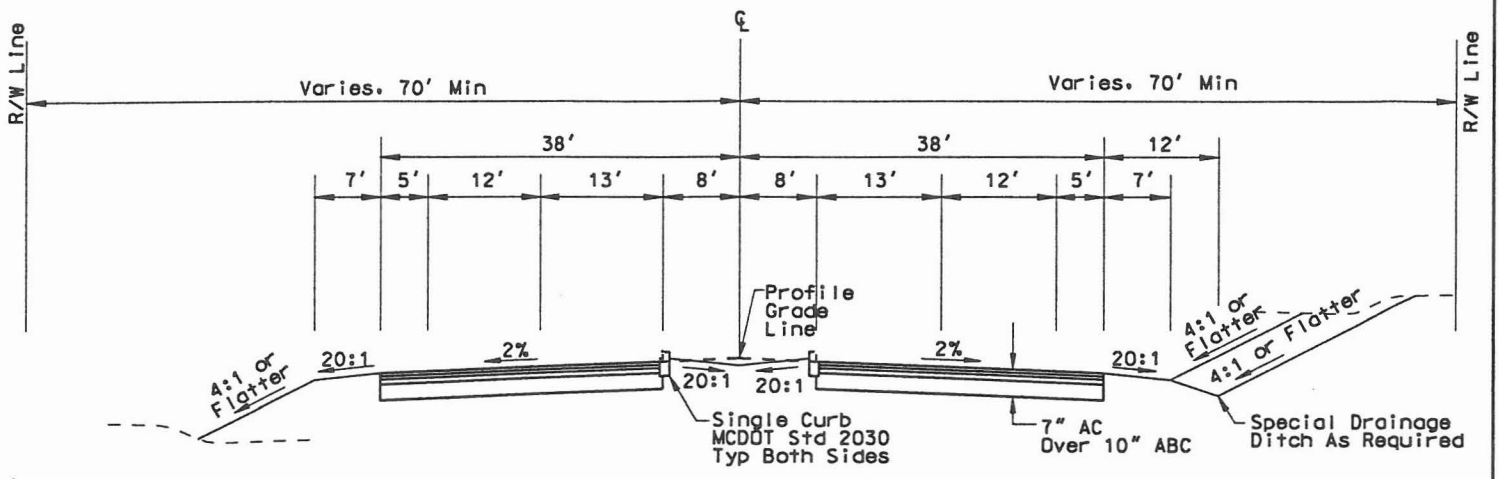
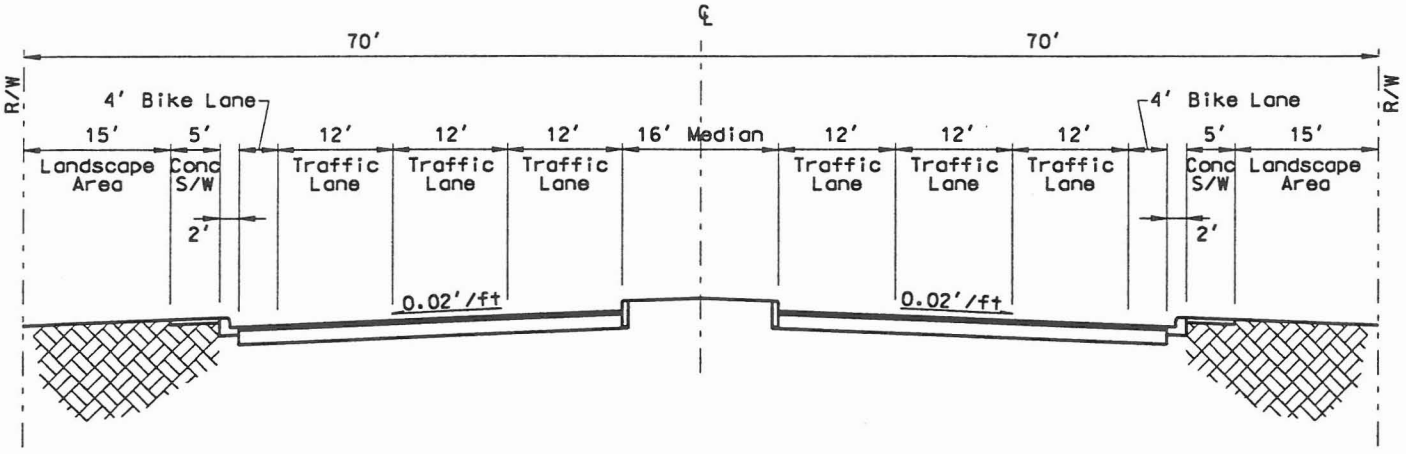


MC 85 INTERIM ROADWAY SECTION



MC 85 ULTIMATE ROADWAY SECTION

FIGURE 3

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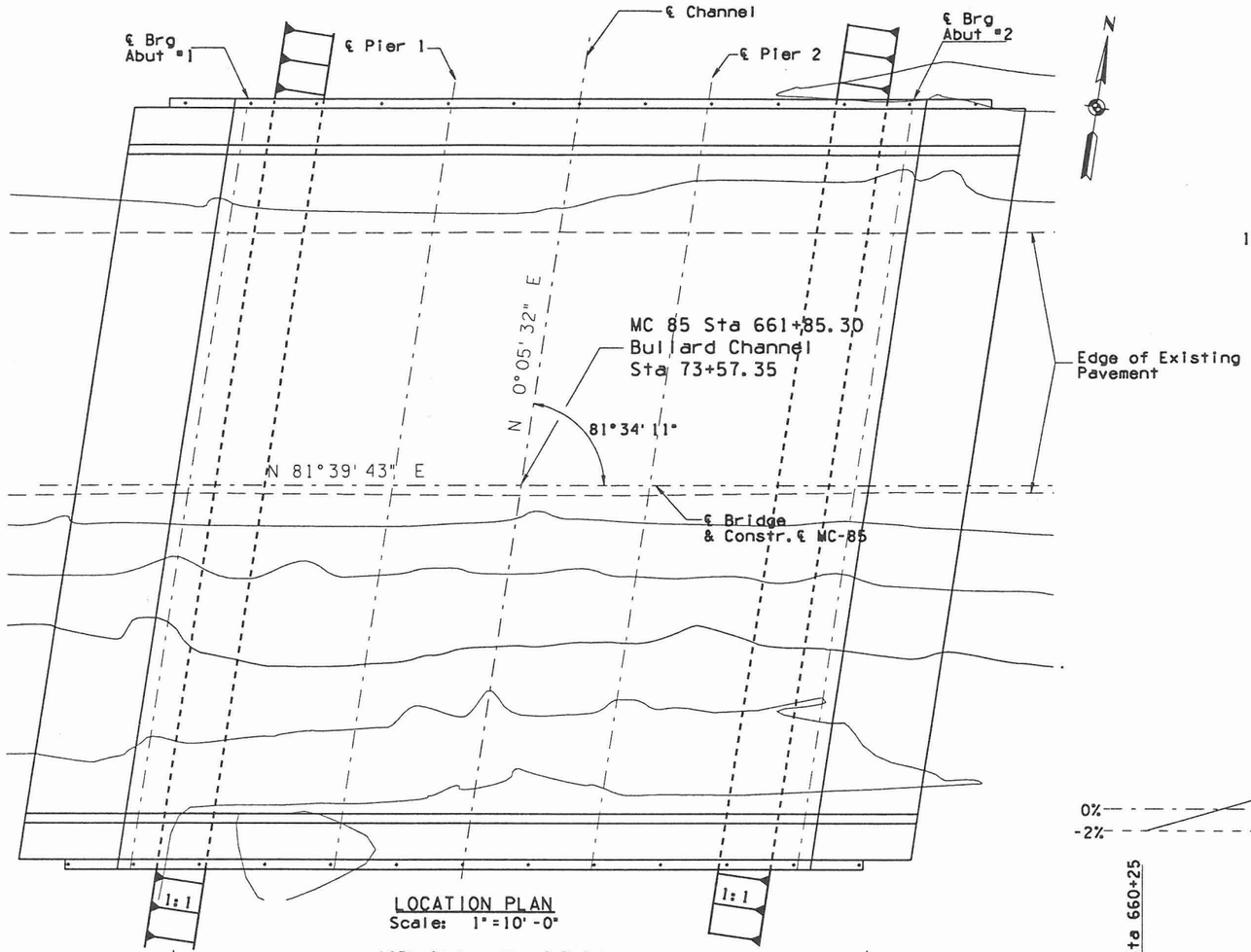
9	AZ.	68877	-	-	-



LOCATION PLAN
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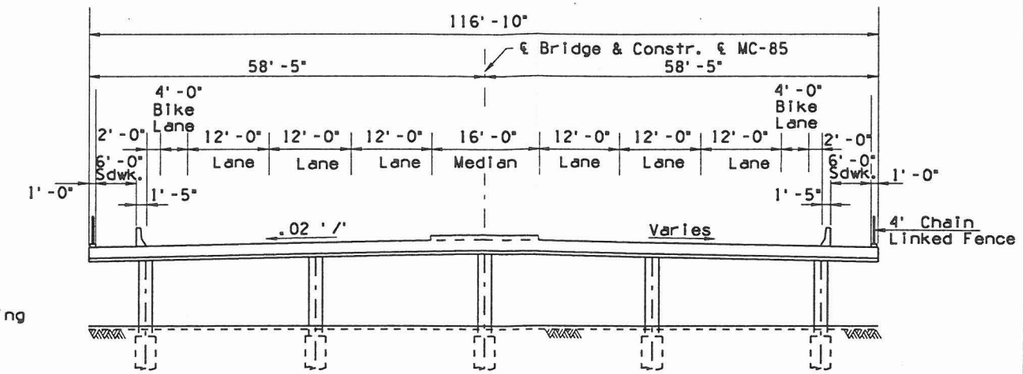

TYPICAL SECTION
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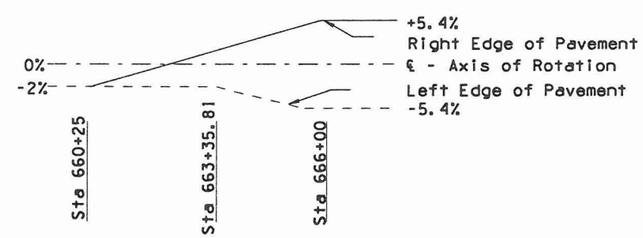
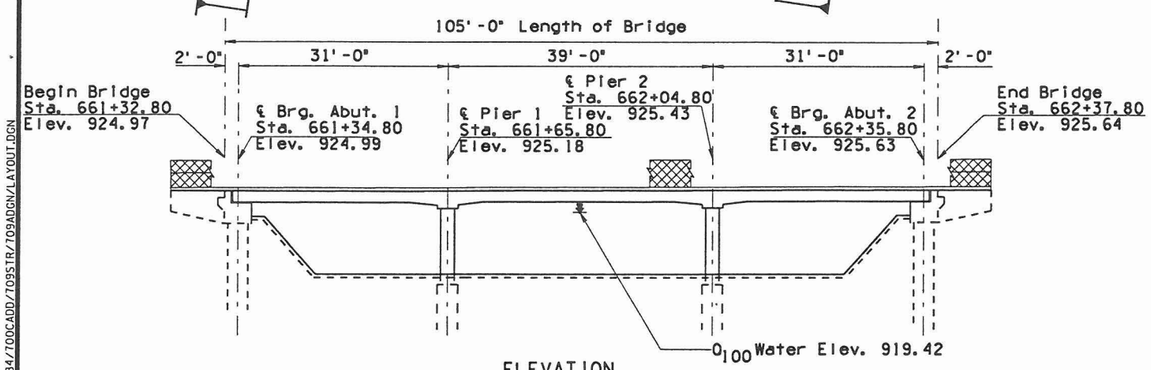


SUPERELEVATION DIAGRAM



ELEVATION
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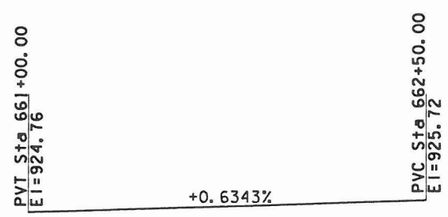
Stations, elevations, and dimensions are measured along ℄ Bridge



PROFILE GRADE

NO.	REVISION	BY	DATE
3	-	-	-
2	-	-	-
1	-	-	-

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

BULLARD WASH BRIDGE
CAST - IN - PLACE CONCRETE SLAB
DRILLED SHAFT FOUNDATION

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	-	-
DRAWN	-	-
CHECKED	-	-

Sverdrup CORPORATION

GENERAL PLAN
STA 661+23.29 TO 662+47.31

FIGURE 4

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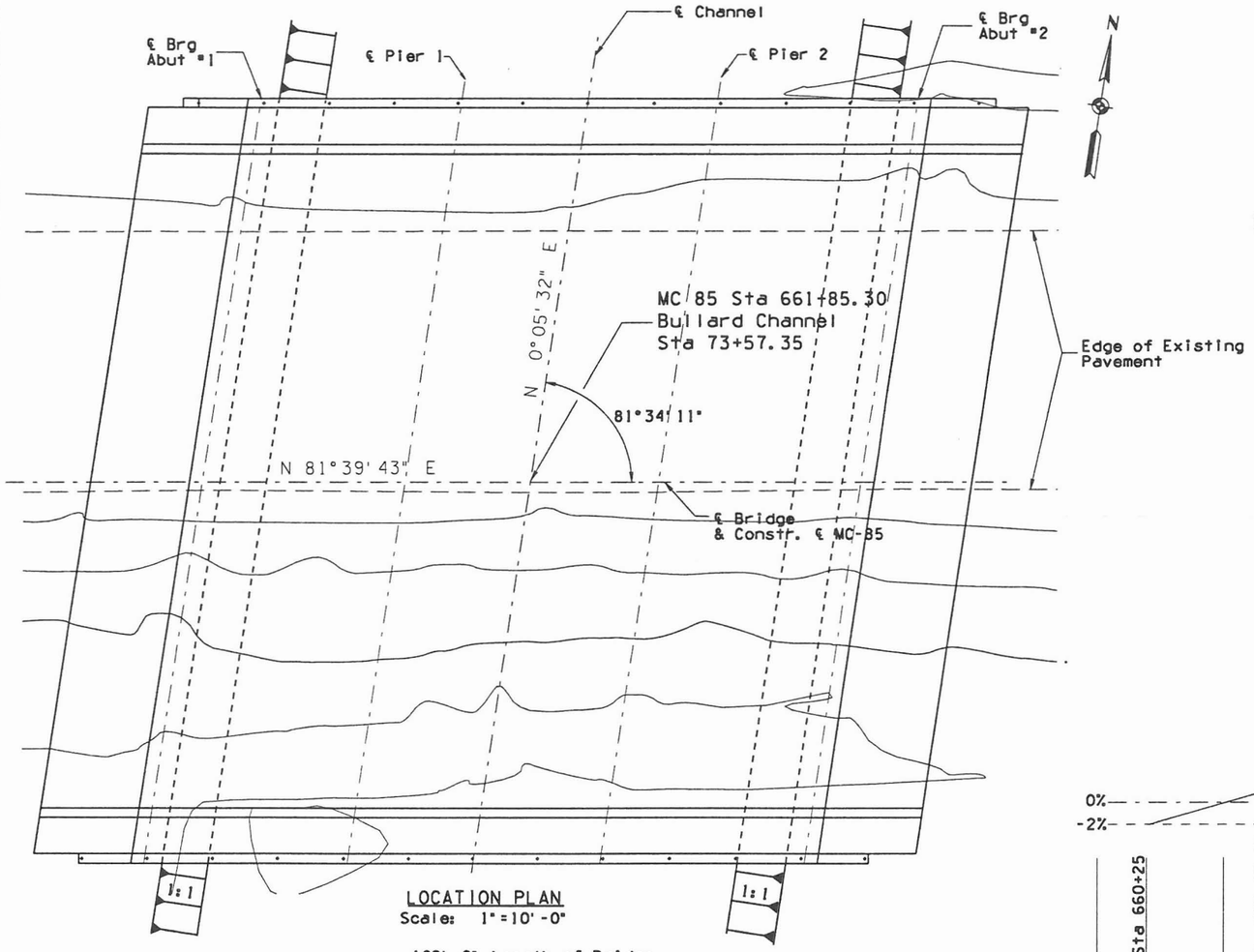

LOCATION PLAN
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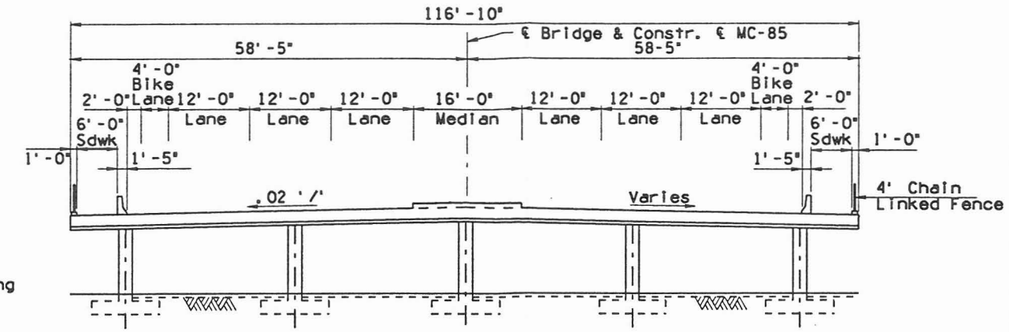

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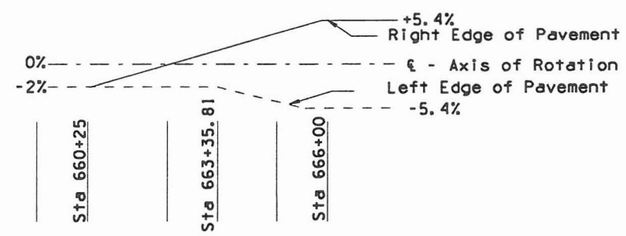
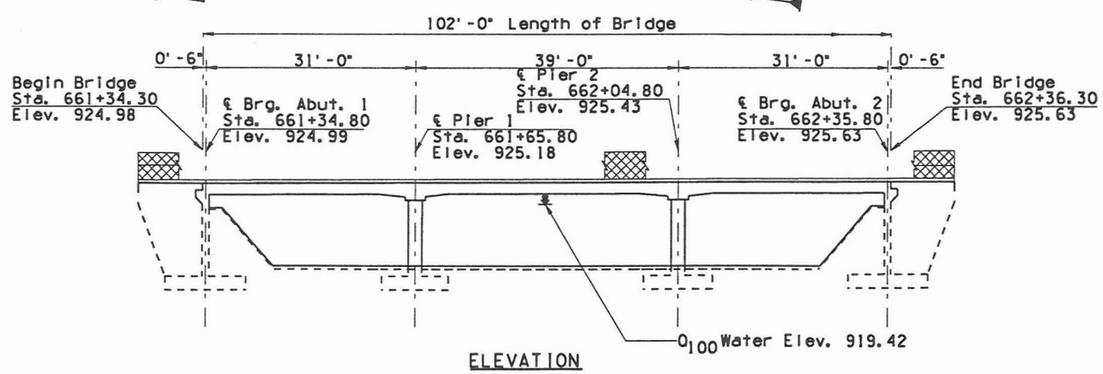


SUPERELEVATION DIAGRAM



ELEVATION
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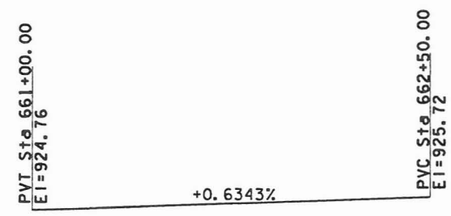
Stations, elevations, and dimensions are measured along ℄ Bridge



PROFILE GRADE

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

BULLARD WASH BRIDGE
CAST - IN - PLACE CONCRETE SLAB
DRILLED SHAFT FOUNDATION

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	·	·
DRAWN	·	·
CHECKED	·	·

Sverdrup CORPORATION

GENERAL PLAN
STA 661+23.29 TO 662+47.31

FIGURE 5
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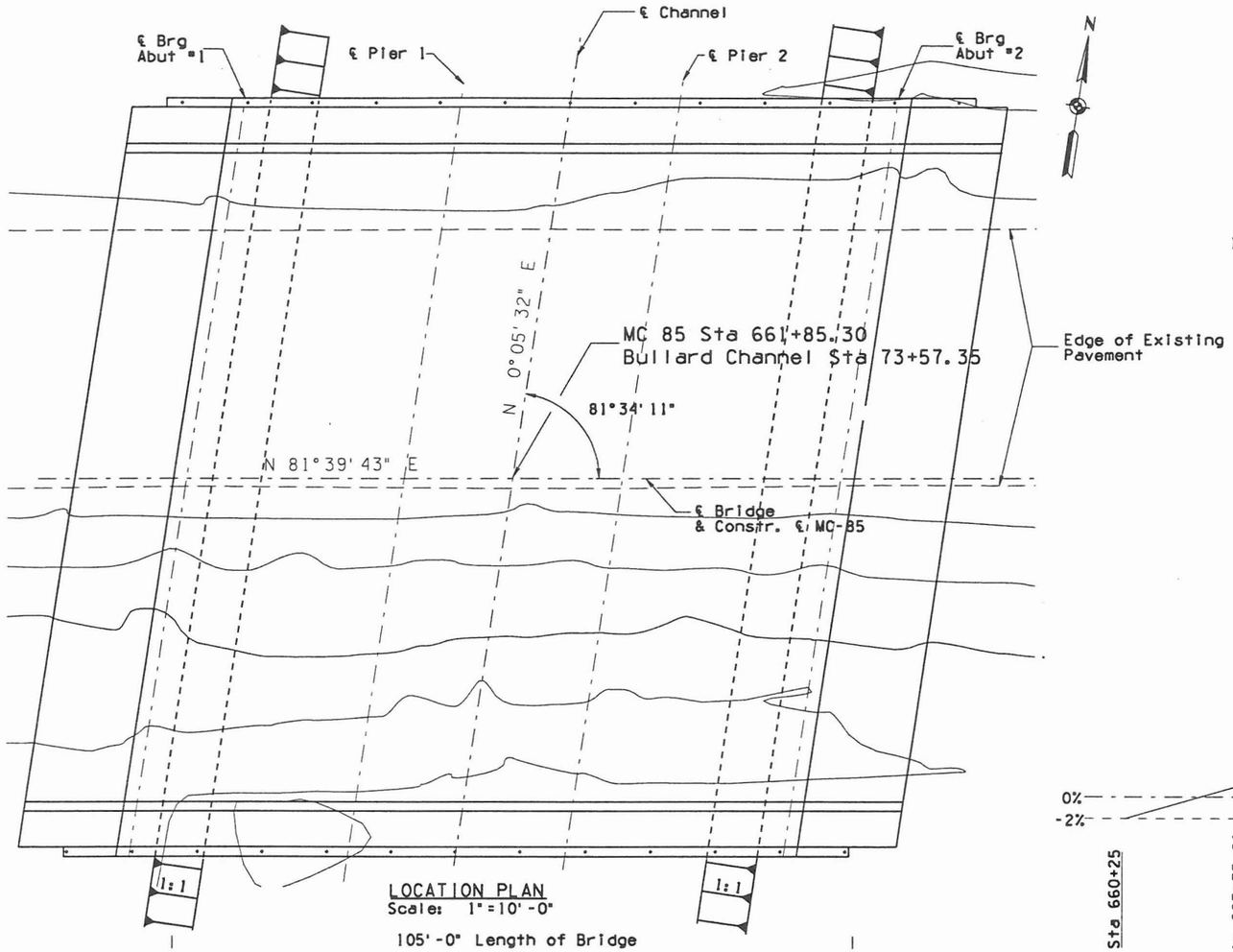

LOCATION PLAN
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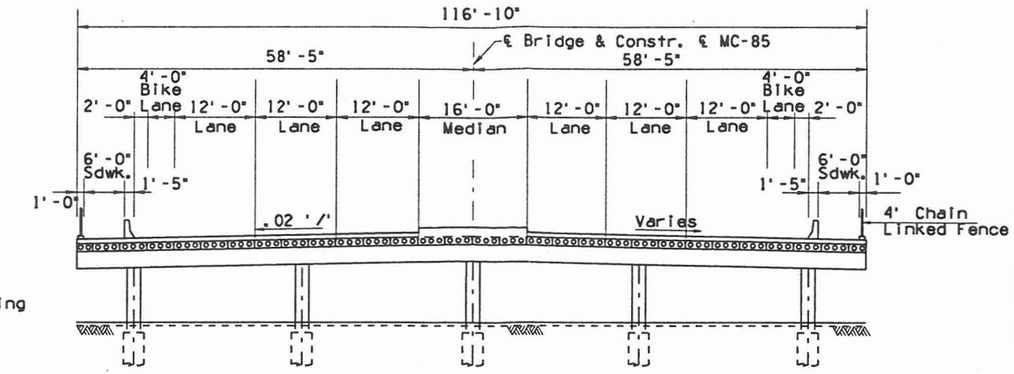

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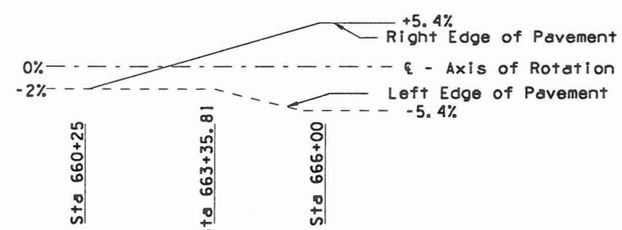

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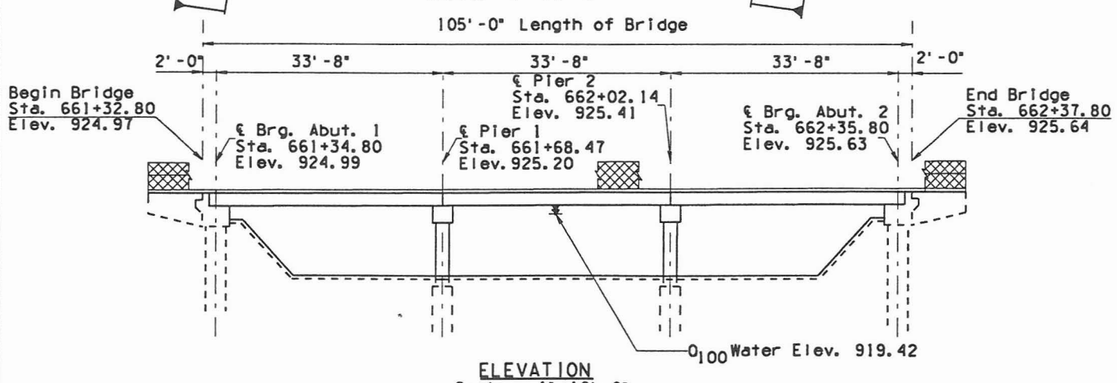

ELEVATION
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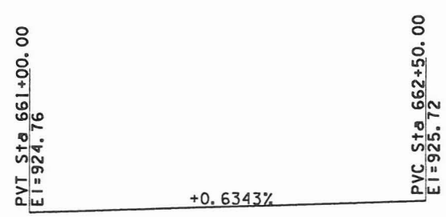
Stations, elevations, and dimensions are measured along ℄ Bridge



PROFILE GRADE

NO.	REVISION	BY	DATE
3	-	-	-
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1	-	-	-

MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

BULLARD WASH BRIDGE
PRECAST PRESTRESSED CONCRETE SLAB
DRILLED SHAFT FOUNDATION

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	-	-
DRAWN	-	-
CHECKED	-	-

Sverdrup CORPORATION

GENERAL PLAN
STA 661+23.29 TO 662+47.31

FIGURE 6
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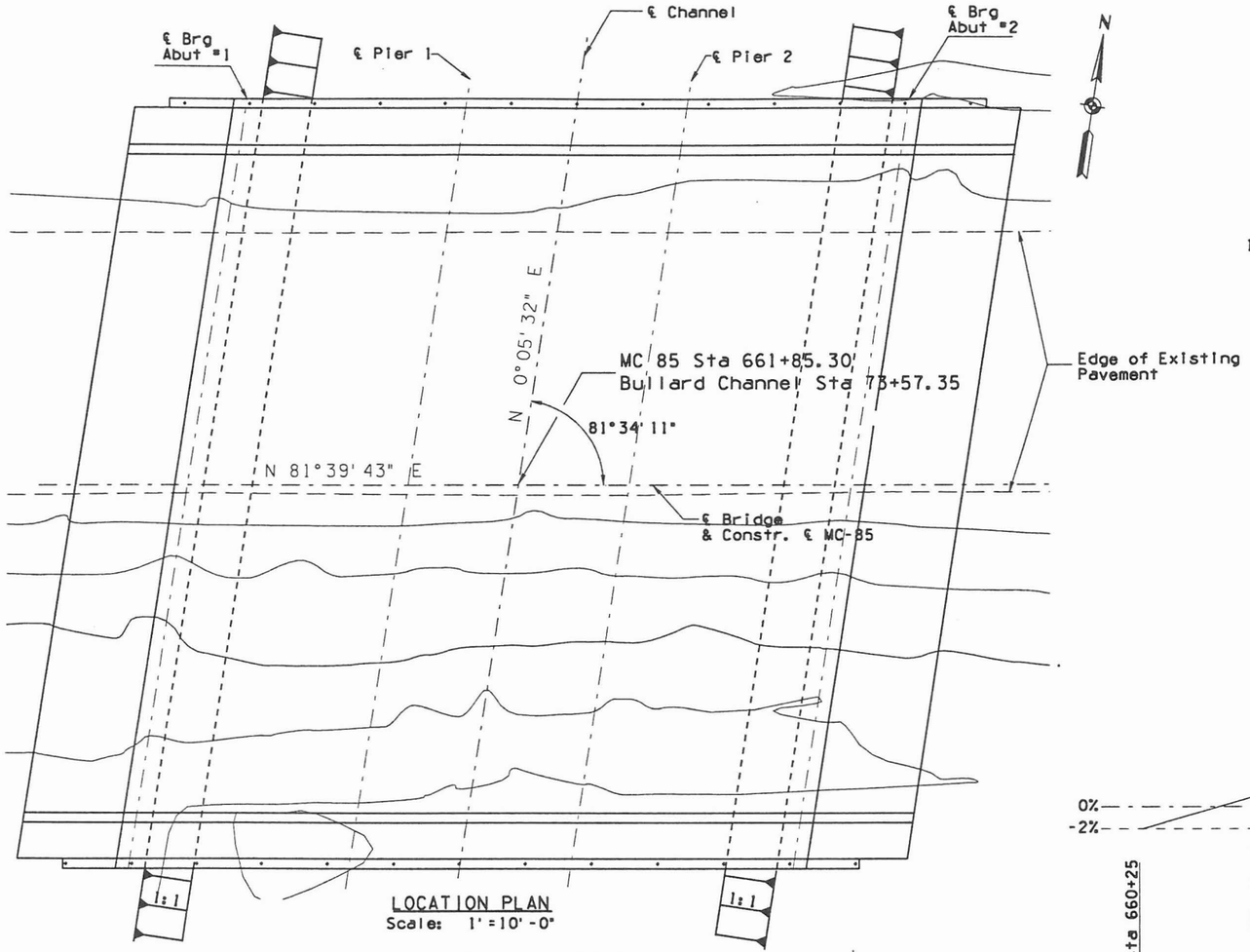

LOCATION PLAN
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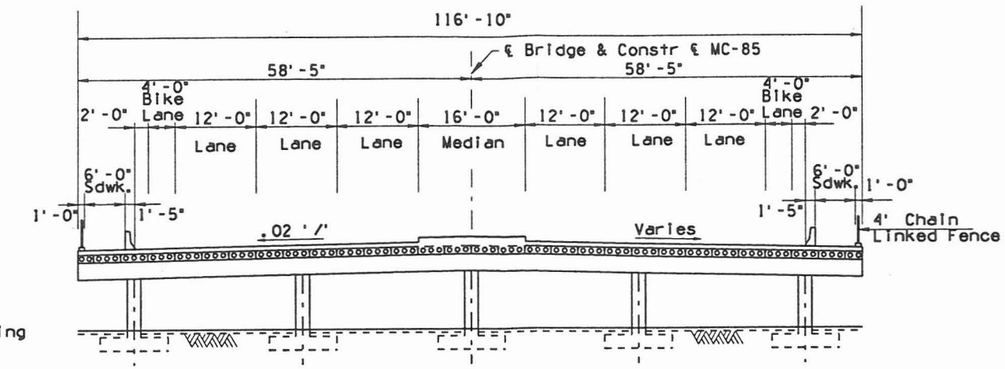

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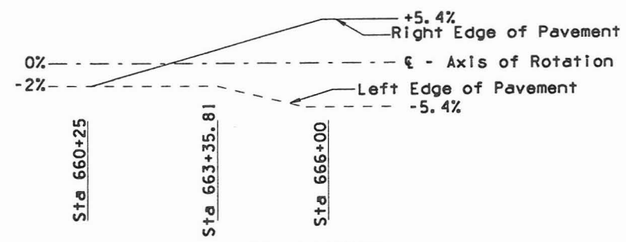
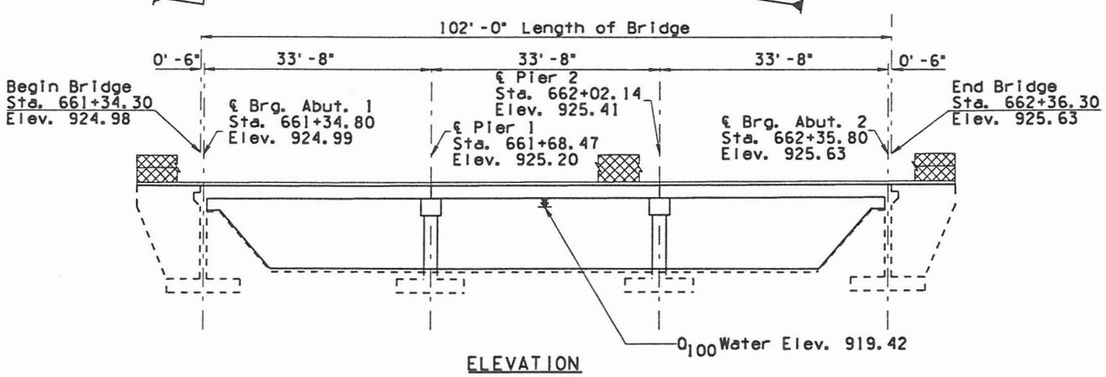
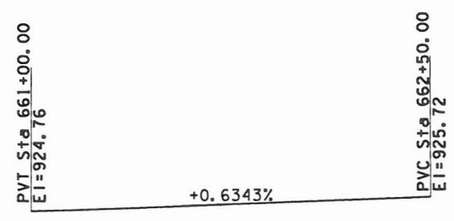


SUPERELEVATION DIAGRAM



ELEVATION
Scale: 1" = 10'-0"
Stations, elevations, and dimensions are measured along ℄ Bridge



PROFILE GRADE

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MARICOPA COUNTY
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

BULLARD WASH BRIDGE
PRECAST PRESTRESSED CONCRETE SLAB
DRILLED SHAFT FOUNDATION

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	·	·
DRAWN	·	·
CHECKED	·	·

Sverdrup CORPORATION

GENERAL PLAN
STA 661+23.29 TO 662+47.31

FIGURE 7
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BUCKEYE - PHOENIX HIGHWAY
MARICOPA COUNTY

FED. ROAD DIV. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
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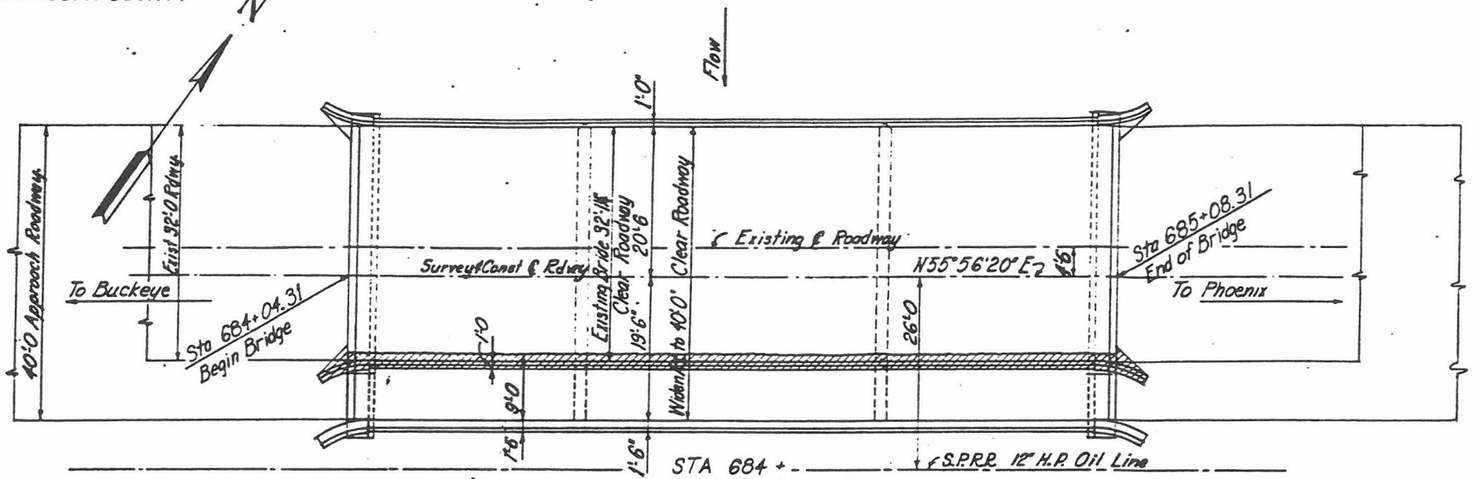
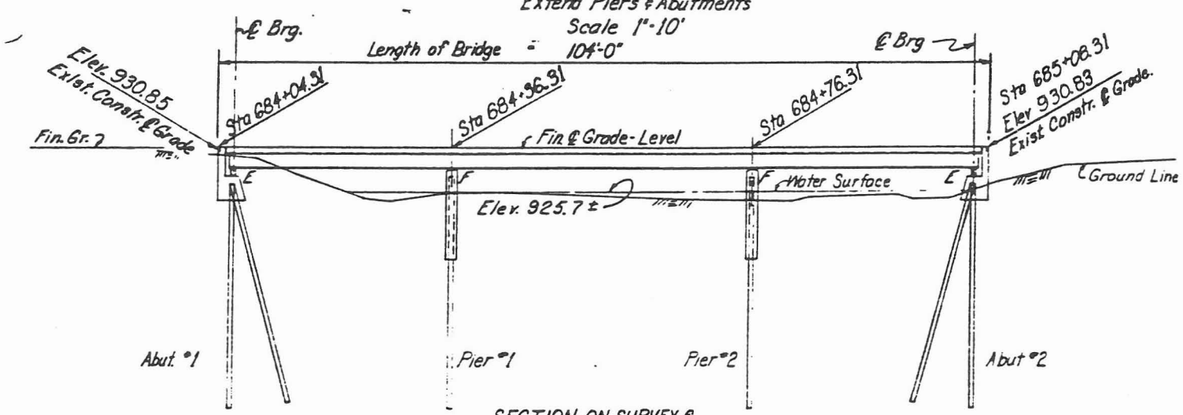
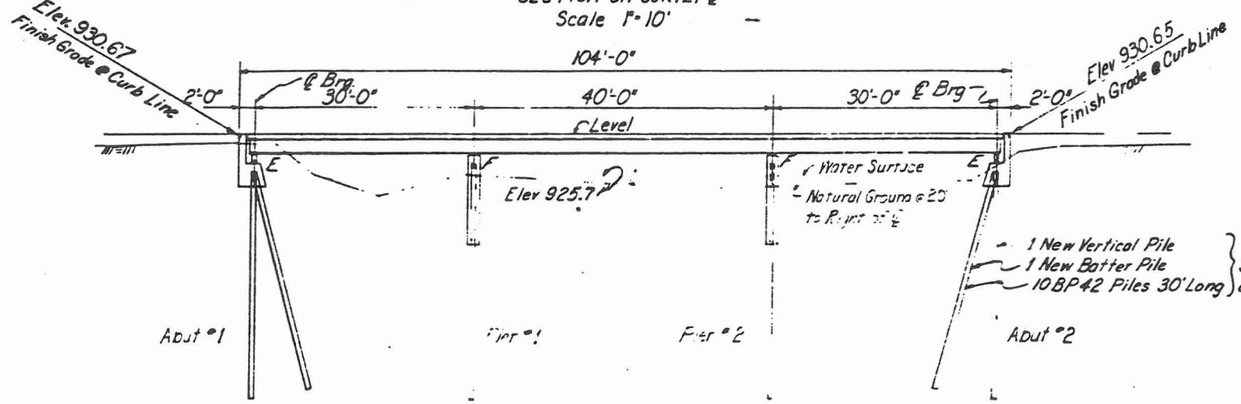


LOCATION PLAN
Existing 3 Cont Span, 32'-1¼" Clr. Rdwy-5 Girder Deck Bridge
Widen Rt 10'-0" to 40'-0" Clr Rdwy.
Extend Piers & Abutments
Scale 1"=10'

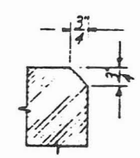


SECTION ON SURVEY ℄
Scale 1"=10'



SECTION @ NEW RIGHT CURB LINE
Scale 1"=10'

REDUCED SIZE
DO NOT SCALE



Chamfer all exposed corners thus, unless otherwise noted.

APPROXIMATE QUANTITIES

ITEM	Std. No.	Sheet No.	Struct. Excav. Cu. Yds.	Class A Conc. Cu Yds	Steel - Lbs. Reinf.	Steel - Lbs. Struct.	Steel H Piling No.	Steel H Piling Lin. Ft.	Place Dowels Each.	Remove Old Conc. Cu. Yds.
2 Abutments	Spec.	25	30	17.18	1715	—	4	120	—	8
2 Piers	Spec.	25	30	10.55	925		4	120	14	—
Deck & Curb	Spec.	26-27	-	30.24	5960	12,645	-	—	-	10
Handrail	Spec.	26-27	-	—	—		-	—	-	
Totals			60	57.97	8600	12,645	8	240	14	18

GENERAL NOTES-

Construction- Standard Specifications Arizona Highway Department, Edition of 1948.
Design- AASHO Specifications 1953- Revised to date.
Loading- Class H20-S16-1944
Class A Concrete f'c-1000 psi, n-12
No wearing surface allowance in deck slab design.
Reinforcing Steel shall be intermediate grade and shall conform to ASTM Specs. A-15 & A 305 - f_s = 20,000 psi
Structural steel shall conform to ASTM Spec A-7 - f_s = 18000 psi.
All welding shall conform to American Welding Society Specifications for Welded Highway and Railway Bridges
Payment for the structural steel item shall be made on the basis of computed weights in accordance with Standard Specifications - Edition of 1948
Paint & Painting shall conform to Standard Specifications.
Contact surfaces shall not be painted
Shop - One coat of paint #1A or #1B
Field - 1st coat-paint #3, 2nd Coat-paint #10

PILE NOTE

All new piles 10 BP42
Estimated length - 30'-0"
Minimum Penetration for Abutments & Piers El 893.65
Abut. Pile Design Load-22 Ton, Pier Pile Design Load 22 Ton
Abutment piles shall be driven after fill has been built & compacted to elevation top of berm. Excavation for abutment concrete shall be made after piles are in place.

ALL CONCRETE CLASS A

		DATE
LAYOUT		
DESIGN		
ARCHITECTURE		
DRAWN	R.J.P.	3-57
TRACED		
CHECKED	C.W.M.	5-23-57
SHEET NO. 1 OF 4		

ARIZONA HIGHWAY DEPARTMENT
BRIDGE DIVISION
STATION 684+
AVONDALE WASH BRIDGE
LOCATION PLAN

S-371(2)

FIGURE 8

APPENDIX

SVERDRUP

JOB 13884 / Bullard Wash Bridge

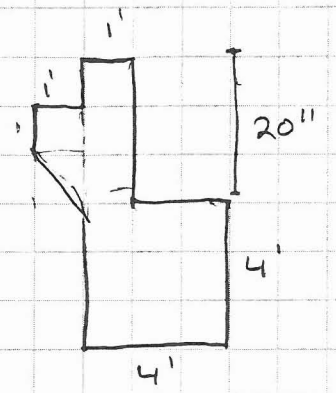
COMPUTATIONS FOR Quantites For Drilled Shaft Option

SHEET NO. 1 OF 5

DATE 2/18/98

BY CR CHKD JFF

Stub / Abutments



3000 psi

Abut = [(4')(4')(116.83') + (1')(20/12')(116.83') + (1')(1')(116.83') + (1/2)(1)(116.83)] * 2

Abut = 4480 Cuft => 165.9 Cuyd

Bot of Cap To Bot of Channel

Abut Drilled Shafts = 150 Linft + (5)(12')
= 210 Linft

Abut Reinf ≈ (150 lbs/cu yd) => Abut. Reinf. = (150 lbs/cu yd)(165.9 cu yd)

= 24885 lbs

Deck 4000 psi

Deck Concrete = (101')(116.83')(1.625') = 19175 cu ft
= 710 cu yd

Deck Reinf = (200 lbs/cu yd)(710 cu yd) = 142,000 lbs

Barrier = (101')(2) = 202 Linft

SVERDRUP

JOB 13884 / Bullard Wash Bridge

COMPUTATIONS FOR Quantities For Drilled Shaft Option

SHEET NO. 2 OF 5

DATE 2/18/98

BY CR CHKD JFF

Piers

Column - 2'ø

3000 psi

Concrete Column $= \left(\left[\frac{\pi (2)^2}{4}\right] * 18'\right)(5)(2) = 565.5$ cu ft

Concrete Column = 21 Cuyd

Reinf Column ≈ 8,000 lbs

Drilled Shaft Lin ft = 190 ft

Approach Slabs - 3000 psi

Concrete Approach = $[(1)(15)(116.83)] * 2 = 3505$ cu ft
= 130 Cuyd

Reinf Approach = $\frac{(86 \text{ lbs})}{\text{foot width}}(116.83')(2) = 20095$ lbs

3000 Wingwalls

Concrete = 32 Cuyd

Reinf = 4785

SVERDRUP

JOB 13884 Bullard Wash Bridge

COMPUTATIONS FOR Quantities For Drilled Shaft Option

SHEET NO. 3 OF 5

DATE 2/18/98

BY CR CHKD JFF

Structural Excavation

Using 922' as Average Elevation

Channel = (922' - 912.00')(82')(116.83') = 958000 cuft
= 3548 cuyd

Slopes = (920' - 912')(7.5')(116.83')(2)(1/2) = 7010 cuft
= 260 cuyd

Abutments = (5')(6')(116.83')(2) = 7010 cuft
= 260 cuyd

Channel Total = 3808 Total = 4068 Cuyd

SVERDRUP

JOB 13884 / Bullard Wash Bridge

COMPUTATIONS FOR Quantities For Spread Footing Option

SHEET NO. 4 OF 5

DATE 2/18/98

BY CK CHKD JFF

Tall / Abutments

4000 psi Deck

Deck Concrete = 710 Cuyd
Deck Reint = 142,000 lbs

3000 psi Abutment

Con = (1')(18.16')(116.83')(2) + (11')(116.83')(2')(2)

Abut Concrete = 9384 Cuft = 348 Cuyd

Abut Reinf = (150 lbs/Cuyd)(348 Cuyd) = 52200 lbs

3000 psi Piers

Concrete Columns = 21 Cuyd
Reint Columns = 8000 lbs

Concrete Spread Footing = (10')(10')(2')(10) ← # of Footing

= 2000 Cuft = 74 Cuyd

Reint Spread Footing = (150 lbs/Cuyd)(74 Cuyd) = 11,100 lbs

3000 psi Approach Slabs
Concrete = 130 Cuyd
Reint = 20095 lbs

3000
Wingwalls
Concrete = 32 Cuyd
Reinf = 4785 lb

SVERDRUP

JOB 138841 Bullard Wash Bridge

COMPUTATIONS FOR Quantities

SHEET NO. 5 OF 5

DATE 2/18/98

BY CR CHKD JFF

Precast Bridge:

4500 psi Deck

$$\text{Deck} = \left[(116.83')(101')(8.5''/12') + (.5/12)(116.83)(101) \right]$$

$$\text{Deck} = 8850 \text{ cuft}$$
$$= 328 \text{ cuyd}$$

APPROXIMATE QUANTITIES

CAST-IN-PLACE CONTINUOUS CONCRETE SLAB WITH ROUND COLUMNS ON DRILLED SHAFTS

ITEM	STRUCT. EXCAV.	STRUCT. BKFILL.	CLASS S CONCRETE		REINF. STEEL
			3,000 psi	4,000 psi	
UNIT	Cu. Yd.	Cu. Yd.	Cu. Yd.	Cu. Yd.	Lbs.
Abutments	435	330	166		29670
Piers	1130	705	21		8000
Superstructure				710	142000
Approach Slabs			130		20095
Barriers			22.8		2170
TOTALS	1565	1035	339.8	710	201935

CAST-IN-PLACE CONTINUOUS CONCRETE SLAB WITH ROUND COLUMNS ON SPREAD FOOTINGS

ITEM	STRUCT. EXCAV.	STRUCT. BKFILL.	CLASS S CONCRETE		REINF. STEEL
			3,000 psi	4,500 psi	
UNIT	Cu. Yd.	Cu. Yd.	Cu. Yd.	Cu. Yd.	Lbs.
Abutments	435	330	348		56985
Piers	1130	705	95		19100
Superstructure				710	142000
Approach Slabs			130		20095
Barriers			22.8		2170
TOTALS	1565	1035	595.8	710	240350

APPROXIMATE QUANTITIES

PRECAST/PRESTRESSED CONCRETE SLAB WITH ROUND COLUMNS ON DRILLED SHAFTS

ITEM	STRUCT. EXCAV.	STRUCT. BKFILL.	CLASS S CONCRETE		REINF. STEEL
			3,000 psi	4,500 psi	
UNIT	Cu. Yd.	Cu. Yd.	Cu. Yd.	Cu. Yd.	Lbs.
Abutments	435	330	198		29670
Piers	1130	705	21		8000
Superstructure				328	41325
Approach Slabs			130		18575
Barriers			22.8		2170
TOTALS	1565	1035	371.8	328	99740

PRECAST/PRESTRESSED CONCRETE SLAB WITH ROUND COLUMNS ON SPREAD FOOTINGS

ITEM	STRUCT. EXCAV.	STRUCT. BKFILL.	CLASS S CONCRETE		REINF. STEEL
			3,000 psi	4,500 psi	
UNIT	Cu. Yd.	Cu. Yd.	Cu. Yd.	Cu. Yd.	Lbs.
Abutments	435	330	380		52200
Piers	1130	705	95		19100
Superstructure				328	41325
Approach Slabs			130		20095
Barriers			22.8		2170
TOTALS	1565	1035	627.8	328	134890

CONSTRUCTION COST ESTIMATE

CAST-IN-PLACE CONTINUOUS CONCRETE SLAB WITH ROUND COLUMN PIERS ON DRILLED SHAFTS

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
Channel Excavation	Cu. Yd.	3808	5.00	19,040
Structural Excavation	Cu. Yd.	260	10.00	2,600
Structure Backfill	Cu. Yd.	1035	15.00	15,525
Structural Concrete (Class A) (f'c=3,000 psi)	Cu. Yd.	349	225.00	78,525
Structural Concrete (Class A) (f'c=4,000 psi)	Cu. Yd.	723	275.00	198,825
Reinforcing Steel	Lbs.	199765	0.50	99,883
Concrete Channel Lining	Sq. Yds.	1078	25.00	26,950
Pedestrian Rail (4' Chain Link Fence, MAG 160)	Ft.	205	15.00	3,075
3' Diameter Drilled Shafts	Lin ft	400	160.00	64,000
TOTAL				$ 508,423

CAST-IN-PLACE CONTINUOUS CONCRETE SLAB WITH ROUND COLUMN PIERS ON SPREAD FOOTINGS

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
Channel Excavation	Cu. Yd.	3635	5.00	18,175
Structural Excavation	Cu. Yd.	1565	10.00	15,650
Structure Backfill	Cu. Yd.	1035	15.00	15,525
Structural Concrete (Class A) (f'c=3,000 psi)	Cu. Yd.	605	225.00	136,125
Structural Concrete (Class A) (f'c=4,000 psi)	Cu. Yd.	723	275.00	198,825
Reinforcing Steel	Lbs.	238180	0.50	119,090
Concrete Channel Lining	Sq. Yds.	1078	25.00	26,950
Pedestrian Rail (4' Chain Link Fence, MAG 160)	Ft.	202	15.00	3,030
TOTAL				$ 533,370

CONSTRUCTION COST ESTIMATE

PRECAST/PRESTRESSED CONCRETE SLAB WITH ROUND COLUMN PIERS ON DRILLED SHAFTS

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
Channel Excavation	Cu. Yd.	3808	5.00	19,040
Structural Excavation	Cu. Yd.	260	10.00	2,600
Structure Backfill	Cu. Yd.	1035	15.00	15,525
Structural Concrete (Class A) (f'c=3,000 psi)	Cu. Yd.	349	225.00	78,525
Structural Concrete (Class A) (f'c=4,000 psi)	Cu. Yd.	328	250.00	82,000
Reinforcing Steel	Lbs.	199765	0.50	99,883
Concrete Channel Lining	Sq. Yds.	1078	25.00	26,950
Pedestrian Rail (4' Chain Link Fence, MAG 160)	Ft.	205	15.00	3,075
3' Diameter Drilled Shafts	Lin ft	400	160.00	64,000
Precast, P/S Member (AASHTO SII-48 Slab)	Ft.	3030	75.00	227,250
TOTAL				$ 618,848

PRECAST/PRESTRESSED CONCRETE SLAB WITH ROUND COLUMN PIERS ON SPREAD FOOTINGS

ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
Channel Excavation	Cu. Yd.	3635	5.00	18,175
Structural Excavation	Cu. Yd.	1565	10.00	15,650
Structure Backfill	Cu. Yd.	1035	15.00	15,525
Structural Concrete (Class A) (f'c=3,000 psi)	Cu. Yd.	605	225.00	136,125
Structural Concrete (Class A) (f'c=4,000 psi)	Cu. Yd.	328	250.00	82,000
Reinforcing Steel	Lbs.	238180	0.50	119,090
Concrete Channel Lining	Sq. Yds.	1078	25.00	26,950
Pedestrian Rail (4' Chain Link Fence, MAG 160)	Ft.	202	15.00	3,030
Precast, P/S Member (AASHTO SII-48 Slab)	Ft.	3030	75.00	227,250
TOTAL				$ 643,795

MC-85 BULLARD WASH BRIDGE

SUMMARY OF CONSTRUCTION COST ESTIMATES

STRUCTURE	AMOUNT
Cast-in Place Continuous Concrete Slab with Round Column Piers on Drilled Shafts	$508,423
Cast-in Place Continuous Concrete Slab with Round Column Piers on Spread Footings	$533,370
Cast-in Place Continuous Concrete Slab with Wall Piers on Spread Footings*	$562,000
Precast/Prestressed Concrete Slab with Round Column Piers on Drilled Shafts	$618,848
Precast/Prestressed Concrete Slab with Wall Piers on Spread Footings*	$635,000
Precast/Prestressed Concrete Slab with Round Column Piers on Spread Footings	$643,795

*From Structure Selection Report, December 1997 Revision