TECHNICAL DATA NOTEBOOK

Property of
Flood Control District of MC Li
Please Return to
2801 W. Durango
Phoenix, AZ 85009

VOLUME 3

CAVE CREEK BELOW CAREFREE HIGHWAY FIS

FLOODPLAIN DELINEATION STUDY

FOR

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

F.C.D. Contract No. 95-30

FEMA FORMS

Registered Professional Engineer (Civil)
CERTIFICATE NO.
13248
EILEEN M.
ABBOTT
Date Signed 6/23/97
ARIZONA, U.S.A.

Prepared for:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 W. Durango
Phoenix, Arizona 85009
(602) 506-1501

Prepared by:

WILLDAN ASSOCIATES
1717 W. Northern Avenue, Suite 112
Phoenix, Arizona 85021
(602) 870-7600

June 23, 1997

Project No. 08855-1008

TECHNICAL DATA NOTEBOOK

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Carefree Highway Bridge As-builts

Registered Professional Engineer (Civil)
CERTIFICATE NO.
13248
EILEEN M.
ABBOTT
Date Signed 6/23/97
ARIZONA, U.S.A.

Eileen M. Abbott

FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTOR AND COMMUNITY OFFICIAL FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*	*FEMA USE ONLY*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

1. OVERVIEW

1. The basis for this revision request is (are): *(check all that apply)*
   - ☒ Physical change
     - ☒ Existing
     - ☐ Proposed
   - ☒ Improved methodology
   - ☒ Improved data
   - ☒ Floodway revision
   - ☒ Other Initial Flood Insuance Study (FIS)

     Explain Firm Maps reflect the approximate New Topo generated.
2. Flooding Source: Cave Creek
3. Project Name/Identifier: Cave Creek, below Carefree Highway, Floodplain Delineation Study/FED 95-30
4. FEMA zone designations affected: A, AE
   (example: A, AH, AO, A1-A30, A99, AE, V, V1-30, VE, B, C, D, X)
5. The NFIP map panel(s) affected for all impacted communities is (are): SEE ATTACHED TABLE

Community No.	Community Name	County	State	Map No.	Panel No.	Effective Date
EX: 480301	Katy,City	Harris, Fort Bend	TX	480301	0005D	02/08/83
480287	Harris County	Harris	TX	48201C	0220G	09/28/90

6. The area of revision encompasses the following types of flooding, structures, and associated disciplines: *(check all that apply)*

Types of Flooding	Structures	Disciplines*
☒ Riverine	☐ Channelization	☒ Water Resources
☐ Coastal	☐ Levee/Floodwall	☒ Hydrology
☐ Alluvial Fan	☒ Bridge/Culvert	☒ Hydraulics
☐ Shallow Flooding *(e.g. Zones AO and AH)*	☐ Dam	☐ Sediment Transport
☐ Lakes	☐ Coastal	☐ Interior Drainage
	☐ Fill	☐ Structural
Affected by wind/wave action	☐ Pump Station	☐ Geotechnical
☐ Yes	☐ None	☒ Land Surveying
☐ No	☐ Channel Relocation	☐ Other *(describe)*
	☐ Excavation	
	☐ Other *(describe)*	

☐ Other(describe)_____

*** Attach completed "Certification by Registered Professional Engineer and/or Land Surveyor" Form for each discipline checked. (Form 2)**

2. FLOODWAY INFORMATION

7. Does the affected flooding source have a floodway designated on the effective FIRM or FBFM? ☒ Yes ☐ No
8. Does the revised floodway delineation differ from that shown on the effective FIRM or FBFM ☒ Yes ☐ No

   If yes, give reason:_____

5. The NFIP map panel(s) affected for all impacted communities are:

Community No.	Community Name	County	State	Map No.	Panel No.	Effective Date
040037	Unincorporated Areas	Maricopa	Az.	04013C	0815G	09/30/95
040051	Phoenix, City	Maricopa	Az.	04013C	0815G	09/30/95
040051	Phoenix, City	Maricopa	Az.	04013C	0795F	09/30/95
040051	Phoenix, City	Maricopa	Az.	04013C	01210E	12/03/93
040129	Cave Creek, Town	Maricopa	Az.	04013C	0815G	09/30/95

Attach copy of either a public notice distributed by the community stating the community's intent to revise the floodway or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions.

9. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP? ☐ Yes ☒ No

If yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

3. PROPOSED ENCROACHMENTS

10. With floodways:

1A. Does the revision request involve fill, new construction, substantial improvement, or other development in the floodway? ☐ Yes ☒ No

1B. If yes, does the development cause the 100-year water surface elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No

11. Without floodways: N/A

2A. Does the revision request involve fill, new construction, substantial improvement, or other development in the 100-year floodplain? ☐ Yes ☐ No

2B. If yes, does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the 100-year water surface elevation to increase at any location by more than one foot (*or other surcharge limit if community or state has adopted more stringent criteria*)? ☐ Yes ☐ No

If the answer to either Items 1B or 2B is yes, please provide documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

4. REVISION REQUESTOR ACKNOWLEDGMENT

12. Having read NFIP Regulations, 44 CFR Ch. I, parts 59, 60, 61, and 72, I believe that the proposed revision ☒ is ☐ is not in compliance with the requirements of the aforementioned NFIP Regulations.

5. COMMUNITY OFFICIAL ACKNOWLEDGMENT

13. Was this revision request reviewed by the community for compliance with the community's adopted floodplain management ordinances? ☒ Yes ☐ No

14. Does this revision request have the endorsement of the community? ☒ Yes ☐ No

If no to either of the above questions, please explain: _____

Please note that community acknowledgment and /or notification is required for all requests as outlined in Section 65.4 (b) of the NFIP Regulations.

6. OPERATION AND MAINTENANCE

15. Does the physical change involve a flood control structure (e.g., levees, floodwalls, channelization, basins, dams)? ☐ Yes ☒ No

If yes, please provide the following information for each of the new flood control structures:

A. Inspection of the flood control project will be conducted periodically by _____ (entity)

_____ with a maximum interval of _____ months between inspections.

B. Based on the results of scheduled periodic inspections, appropriate maintenance of the flood control facilities will be conducted by _____ (entity)

to ensure the integrity and degree of flood protection of the structure.

C. A formal plan of operation, including documentation of the flood warning system, specific actions and assignments of responsibility by individual name or title, and provisions for testing the plan at intervals not less than one year, ☐ has ☐ has not been prepared for the flood control structure.

D. The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the _____
(Name)

flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Attach operation and maintenance plans

7. REQUESTED RESPONSE FROM FEMA

16. After examining the pertinent NFIP regulations and reviewing the document entitled "Appeals, Revisions, and Amendments to Flood Insurance Maps: A guide for Community Officials," dated January 1990, this request is for a:

_____	a.	CLOMR	A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision *(LOMR or PMR)*, or proposed hydrology changes *(see 44 CFR Ch. I, Parts 60, 65, and 72)*.
_____	b.	LOMR	A letter from FEMA officially revising the current NFIP map to show changes to floodplains, floodways, or flood elevations. LOMRs typically depict decreased flood hazards. *(See 44 CFR Ch. I Parts 60 and 65.)*
X	c.	PMR	A reprinted NFIP map incorporating changes to floodplains, floodways, or flood elevations. Because of the time and cost involved to change, reprint, and redistribute an NFIP map, a PMR is usually processed when a revision reflects increased flood hazards or large-scope changes. *(See 44 CFR Ch. I, Parts 60 and 65.)*
_____	d.	Other:	Describe_____

8. FORMS INCLUDED

17. Form 2 entitled, "Certification By Registered Professional Engineer and/or Land Surveyor" must be submitted.

The following forms should be included with this request if (check the included forms):

• Hydrologic analysis for flooding source differs from that used to develop FIRM	☒ Hydrologic Analysis Form (Form 3)
• Hydraulic analysis for riverine flooding differs from that used to develop FIRM	☒ Riverine Hydraulic Analysis Form (Form 4)
• The request is based on updated topographic information or a revised floodplain or floodway delineation is requested	☒ Riverine /Coastal Mapping Form (Form 5)
• The request involves any type of channel modification	☐ Channelization Form (Form 6)
• The request involves new bridge or culvert or revised analysis of an existing bridge or culvert	☒ Bridge/Culvert Form (Form 7)
• The request involves a new revised levee/floodwall system	☐ Levee/Floodwall System Analysis Form (Form 8)
• The request involves analysis of coastal flooding	☐ Coastal Analysis Form (Form 9)
• The request involves coastal structures credited as providing protection from the 100-year flood	☐ Coastal Structures (Form 10)
• The request involves an existing, proposed, or modified dam	☐ Dam Form (Form 11)
• The request involves structures credited as providing protection from the 100-year flood on an alluvial fan	☐ Alluvial Fan Flooding Form (Form 12)

9. INITIAL REVIEW FEE

18. The minimum initial review fee for the appropriate request category has been included. ☐ Yes ☐ No

Initial fee amount: $ _____

Check or money order only. Make check or money order payable to : **National Flood Insurance Program.** If paying by Visa or Mastercard please refer to the credit card information form which follows this form.

or

19. This request is for a project that is for public benefit and is primarily intended for flood loss reduction to insurable structures in identified flood hazard areas which were in existence prior to the commencement of construction of the flood control project. ☐ Yes ☒ No

or

20. This request is to correct map errors, to include the effects of natural changes within the areas of special flood hazard, or solely to provide more detailed data. ☒ Yes ☐ No

Note: I understand that my signature indicates that all information submitted in support of this request is correct.

Signature of Revision Requester

Printed Name and Title of Revision Requester

Company Name

Telephone No. Date

Note: Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.

Signature of Community Official

Printed Name and Title of Community Official

Community Name

Date

Does this request impact any other communities? ☒ Yes ☐ No

If yes, attach letters from all affected jurisdictions acknowledging revision request and approving changes to floodway, if applicable. Town of Cave Creek Approval

Note: Although a photograph of physical changes is not required, it may be helpful for FEMA's review.

FEDERAL EMERGENCY MANAGEMENT AGENCY

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR FORM

O.M.B. Burden No. 3067-0148 Expires July 31, 1997

FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average . 23 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067- 0148), Washington, DC 20503.

1. This certification is in accordance with 44 CFR Ch. I, Section 65.2
2. I am licensed with an expertise in Water Resources (Hydrology, Hydraulics, Drainage)
   [example: water resources *(hydrology, hydraulics, sediment transport, interior drainage)** structural, geotechnical, land surveying.]
3. I have 20 + years experience in the expertise listed above.
4. I have ☒ prepared ☐ reviewed the attached supporting data and analyses related to my expertise.
5. I ☒ have ☐ have not visited and physically viewed the project.
6. In my opinion, the following analyses and /or designs, is/are being certified:

   Hydrology Analysis and Supporting Data
7. Base upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

   Basis for above statement: (check all that apply)

   a. ☐ Viewed all phases of actual construction.

   b. ☐ Compared plans and specifications with as-built survey information.

   c. ☐ Examined plans and specifications and compared with completed projects.

   d. ☒ Other Produced Hydrology study and Plans
8. All information submitted in support of this request is correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Eileen Marie Abbott
(please print or type)

Title: Project Manager
(please print or type)

Registration No. 13248 Expiration Date: March 31, 1999

State Arizona

Type of License Professional Engineer (Civil)

Eileen M. Abbott
Signature

3-21-97
Date

Registered Professional Engineer (Civil) CERTIFICATE NO. 13248 EILEEN M. ABBOTT Date Signed ..... Arizona, U.S.A.

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

FEDERAL EMERGENCY MANAGEMENT AGENCY

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Expires July 31, 1997

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1. This certification is in accordance with 44 CFR Ch. I, Section 65.2
2. I am licensed with an expertise in Water Resources (hydrology & hydraulics), Structural
   [example: water resources *(hydrology, hydraulics, sediment transport, interior drainage)** structural, geotechnical, land surveying.]
3. I have 25 years experience in the expertise listed above.
4. I have ☒ prepared ☐ reviewed the attached supporting data and analyses related to my expertise.
5. I ☒ have ☐ have not visited and physically viewed the project.
6. In my opinion, the following analyses and /or designs, is/are being certified:
   Flood Plan Delineation of Cave Creek below Carefree Highway FIS
7. Base upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

   Basis for above statement: (check all that apply)

   a. ☐ Viewed all phases of actual construction.
   b. ☐ Compared plans and specifications with as-built survey information.
   c. ☐ Examined plans and specifications and compared with completed projects.
   d. ☒ Other Hydrology & Hydraulics Study for Flood Plan Delineation Study.
8. All information submitted in support of this request is correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: David R. Anderson
(please print or type)

Title: Vice President
(please print or type)

Registration No. 27771 Expiration Date: 3-31-97

State Arizona

Type of License Professional Engineer (Civil)

Signature

3-18-97
Date

Registered Professional Engineer (Civil) CERTIFICATE NO. 27771 DAVID R. ANDERSON Date Signed ARIZONA U.S.A.

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

FEDERAL EMERGENCY MANAGEMENT AGENCY
CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR FORM

O.M.B. Burden No. 3067-0148
Expires July 31, 1997

FEMA USE ONLY

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1. This certification is in accordance with 44 CFR Ch. I, Section 65.2
2. I am licensed with an expertise in Land Surveying
   [example: water resources *(hydrology, hydraulics, sediment transport, interior drainage)** structural, geotechnical, land surveying.]
3. I have 34 years experience in the expertise listed above.
4. I have ☑ prepared ☐ reviewed the attached supporting data and analyses related to my expertise.
5. I ☑ have ☐ have not visited and physically viewed the project.
6. In my opinion, the following analyses and /or designs, is/are being certified:
   N/A
7. Base upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

   Basis for above statement: (check all that apply)

   a. ☐ Viewed all phases of actual construction.
   b. ☐ Compared plans and specifications with as-built survey information.
   c. ☐ Examined plans and specifications and compared with completed projects.
   d. ☐ Other N/A
8. All information submitted in support of this request is correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Valentine M. Padilla
(please print or type)

Title: President
(please print or type)

Registration No. 18552 R.L.S. Expiration Date: 12/31/97

State Arizona

Type of License Reg. Land Surveyor

Valentine M. Padilla
Signature

April 3, 97
Date

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

RECEIVED
APR 5 1997
WILLDAN ASSOCIATES

FEDERAL EMERGENCY MANAGEMENT AGENCY **HYDROLOGIC ANALYSIS FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*	*FEMA USE ONLY*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.67 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: City of Phoenix, Maricopa County, Town of Cave Creek

Flooding Source: Cave Creek
(One form for each flooding source)

Project Name /Identifier: Cave Creek, Below Carefree Highway, Floodplain Delineation Study/FCD 95-1

1. HYDROLOGIC ANALYSIS IN FIS

☒ Approximate study stream (Zone A) (portion of study area)
☒ Detailed study stream (briefly explain methodology) HEC-1 Model (upper portion of study area)

2. REASON FOR NEW HYDROLOGIC ANALYSIS

☒ No existing analysis
☒ Improved data *(see data revision on page 3)*
☒ Changed physical conditions of watershed *(explain)* 100-year Floodplain and Flooding delineation in a natural channel. Change Zone A to Zone AE

☐ Alternative methodology *(justify why the revised model is better than model used in the effective FIS)*

☐ Evaluation of proposed conditions (CLOMRs only) (explain)

☐ Other

If a computer program/model was used in revising the hydrologic analysis, please provide a diskette with the input files for the 10-, 50-, 100 - and 500-year recurrence intervals.

Only the 100-year recurrence interval need be included for SFHAs designated as Zone A.

3. APPROVAL OF ANALYSIS

☐ Approval of hydrologic analysis, including the resulting peak discharge value (s) has been provided by the appropriate local, state, or Federal Agency. (i.e.,)
Attach evidence of approval.

☒ Approval of the hydrologic analysis is not required by any local, State, or Federal Agency.

Stream: Cave Creek

Comparison of 100-year Discharges

Location:	Drainage area (Sq mi.)	FIS (cfs):	Revised (cfs):
Below Carefree Highway	126.9	*36,860(100yr)	33,800 (100 yr.)

Note: When revised discharges are not significantly different than FIS discharges, FEMA may require a confidence limits analysis on attachment D at a later date to complete the review.

As is often the case with revision requests, only a portion of a stream may actually be revised or be affected by a revision. Therefore, transition to the unrevised portion is important to maintain the continuity of the study. NFIP regulations stipulate that such a transition must be assured. What is the transition from the proposed discharges to the effective discharges? Please explain how the transition was made *(attach separate sheet if necessary)*

The drainage area above Carefree Highway was studied simultaneouly by George V. Sabol, Consulting Engineers, Inc. The hydrograph from their HEC- 1 model was used at the beginning of Willdan Associates HEC-1 model to ensure continuity throughout the entire study area.

The drainage area at the furtherest point downstream joins the Cave Buttes Dam ponding area.

*Ref: FIS, Maricopa County, Arizona and Incorporated Areas, Volume 1 of 12, page 52, 1995.

ATTACH A COMPLETED REVIEW OF RESULTS PAGE FOR EACH FLOODING SOURCE.

Is the new hydrologic analysis being developed solely to revise the flow values presented in the FIS *(i.e. no changed hydraulic conditions)*? ☒ Yes ☐ No

If yes, does the 100-year water surface elevation change by 1.0 foot or more? ☒ Yes ☐ No

FEMA does not normally revise NFIP maps solely due to insignificant flow changes where changes in 100-year water surface elevation are less than 1.0 foot.

5. HISTORICAL FLOODING INFORMATION

Is historical data available for the flooding source? ☐ Yes ☒ No

If yes, provide the following:

Location along flooding source: _____

Maximum peak discharge: _____ cfs

Second highest peak discharge: _____ cfs

Source of information: _____

6. GAGE RECORD INFORMATION

Location of nearest gage to project site *(along flooding source or similar watershed; specify)*
None available

Gaging Station: N/A

Drainage area at gage: _____ mi^2

Number of years of data: _____

7. DATA REVISION

Please use the following table to list all the data and/or parameters affected by this request and identify them as new data (*New*) or as revising existing data (*Revised*). *(If necessary, attach a separate sheet.)*

Data Parameter	New	Revised	Data Source
Soils	☒	☐	Soil Conservation Service
Land Use	☒	☐	Maricopa Association of Governments
Hydrologic Features	☒	☐	USGS Maps/Field Survey
	☐	☐	
	☐	☐	

- Data source can be from a Federal, State, or local government agency, or from a private source. Some State and local governments may have less strict data requirements than Federal agencies, in which case the hydrologic data may not be accepted by FEMA unless it is demonstrated that the data give a better estimate of the flood discharge.
- Attach documentation corroborating each data source *(i.e., certified statement, report, bibliographical reference to a published document)*. In the case of a published document or a government report, providing copies of the cover and pertinent pages may be helpful.

8. METHODOLOGY FOR NEW ANALYSIS

☐ Statistical Analysis of Gage Records (*use Attachment A*)

☐ Regional Regression Equations *(use Attachment B)*

☒ Precipitation/Runoff Model *(use Attachment C)*

☐ Other *(specify; attach backup computations and supporting data)* _____

Gaging Station: N/A

Gage Location (latitude and longitude): _____

	FIS:	Revised:
1. Number of years of data	_____	_____
Systematic	_____	_____
Historical	_____	_____
2. Homogeneous data	☐ Yes ☐ No	☐ Yes ☐ No
3. Data adjustments	☐ Yes ☐ No	☐ Yes ☐ No
4. Number of high outliers	_____	_____
Low outliers	_____	_____
Zero events	_____	_____
5. Generalized skew	_____	_____
6. Station skew	_____	_____
7. Adopted skew	_____	_____
8. Probability distribution used (justify if log-Pearson III was not used)	_____	_____
9. Transfer equations to ungaged sites		☐ Yes ☐ No

If yes, specify method

_____

_____

_____

10. Expected probability* ☐ Yes ☐ No

11. Comparison of results with other analyses ☐ Yes ☐ No

If yes, describe comparison

_____

_____

_____

*FEMA does not accept expected probability analyses for the purpose of reflecting flood hazard information in a FIS.

If any data is not available, indicate by N/A.

Attach analysis including plot of flood frequency curve.

1. Bibliographical Reference:

_____

_____

_____

(Attach a copy of title page, table of contents, and pertinent pages including equations.)

2. Gaged or ungaged stream: _____

3. Hydrologic region(s): _____
Attach backup map.

4. Provide parameters, values, and source of data used to define parameters.

_____

_____

_____

		FIS:		Revised:	
5.	Urbanized conditions calculations	☐ Yes	☐ No	☐ Yes	☐ No
6	Percent of watershed urbanization	_____		_____	
7.	Is the watershed controlled?	☐ Yes	☐ No	☐ Yes	☐ No
8.	Comparison with other analyses	☐ Yes	☐ No	☐ Yes	☐ No

If the answer to 5, 7, or 8 is yes, explain methodology in Comments.

If data is not available, indicate by N/A.

Comments

_____

_____

_____

_____

Attach computation and supporting maps, delineating the watershed boundary and drainage area divides.

		FIS:	Revised
1.	Method or model used:	UnKnown	HEC-1
	Version:	UnKnown	4.0.1E
	Date:	Unknown	May 1991
2.	Source of rainfall depth:	Unknown	NOAA Atlas
3.	Source of rainfall distribution:	Unknown	SCS Type 2 Storm
4.	Rainfall duration:	Unknown	24 Hour
5.	Areal adjustment to precipitation (%):	Unknown	91.6%
6.	Maximum overland flow length	Unknown	4.0 miles
7.	Hydrograph development method:	Unknown	Clark Unit
8.	Loss rate method:	Unknown	Green and Amp
	Source of soils information:	Unknown	SCS
	Source of land use information	Unknown	MAG
9.	Channel routing method:	Unknown	Normal-Depth
10.	Reservoir routing:	☐ Yes ☐ No	☒ Yes ☐ No
11.	Baseflow considerations:	☐ Yes ☐ No	☐ Yes ☒ No

If yes, explain how baseflow was determined:

12.	Snowmelt considerations:	☐ Yes ☐ No	☐ Yes ☒ No
13.	Model calibration:	☐ Yes ☐ No	☐ Yes ☒ No

If yes, explain how calibration was performed

14. Future land use condition: ☒ Yes ☐ No

If yes, explain why

Known subdivisions approved for construction and presently being developed were included with the MAG Land Use information.

NOTE: FEMA policy is to base flooding on existing conditions.
If data is not available, indicate by N/A.

Attach precipitation/runoff model, hydrologic model schematic, curve number calculations, time of concentration calculations, and supporting maps, delineating the watershed boundary and drainage area divides.

See volume 1, section 3: Hydrologic analysis and volume 5, maps.

ATTACHMENT D: CONFIDENCE LIMITS EVALUATION

Stream: _____

Select one location for Confidence Limits Evaluation (*describe location*): _____

_____

Discharges for selected location:

Exceedance Probability		FIS	Revised
10%	(10-year)	_____ cfs	_____ cfs
2%	(50-year)	_____ cfs	_____ cfs
1%	(100-year)	_____ cfs	_____ cfs
0.2%	(500-year)	_____ cfs	_____ cfs

1% (100-year) Flood Confidence Intervals

90% Confidence Interval: 5% limit _____ cfs

95% limit _____ cfs

50% Confidence Interval: 25% limit _____ cfs

75% limit _____ cfs

If the value of the 100-year frequency flood in the FIS is beyond the 50% confidence interval but within the 90% confidence interval, does the 100-year water surface elevation change by 1.0 foot or more? ☐ Yes ☐ No

An example of confidence limits analysis can be found in Appendix 9 of Bulletin 17B.

Attach Confidence Limits Analysis.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*	**FEMA USE ONLY**

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: City of Phoenix, Town of Cave Creek, Maricopa County(unincorporated areas)

Flooding Source: Cave Creek
(One form for each flooding source)

Project Name/Identifier: Cave Creek, Below Carefree Highway, Floodplain Delineation Study/FCD 95-3

1. REACH TO BE REVISED

Downstream limit: Cave Buttes Dam Ponding Area

Upstream limit: 1700 feet upstream of Carefree Highway

2. EFFECTIVE FIS

☒ Not studied

☐ Studied by approximate methods

Downstream limit of study _____

Upstream limit of study _____

☐ Studied by detailed methods

Downstream limit of study _____

Upstream limit of study _____

☐ Floodway delineated

Downstream limit of Floodway _____

Upstream limit of Floodway _____

3. HYDRAULIC ANALYSIS

Why is the hydraulic analysis different from that used to develop the FIRM. *(Check all that apply)*

☒ Not studied in FIS

☐ Improved hydrologic data/analysis. Explain: _____

☐ Improved hydraulic analysis. Explain: _____

☐ Flood control structure. Explain: _____

☐ Other. Explain: _____

For areas which have detailed flooding:

Full input and output listings along with files on diskette (if available) for each of the models listed below (items 1, 2, 3, 4, and 5) and summary of the source of input parameters used in the models must be provided. The summary must include a complete description of any changes made from model to model (e.g. duplicate effective model to corrected effective model) At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.

For areas which do not have detailed flooding:

Only the 100-year flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses for existing or pre-project conditions and revised or post-project conditions must be submitted. All calculations must be submitted for these analyses. (See item 6 below)

1. Duplicate Effective Model — Natural ☐ Floodway ☐

Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models *(10-, 50-, 100-, and 500-year multi-profile runs and the floodway run)* must be obtained and then reproduced on the requestor's equipment to produce the duplicate effective model. This is required to assure that the effective model input data has been transferred correctly to the requestor's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model — Natural ☐ Floodway ☐

The corrected effective model is the model that corrects any errors that occur in the duplicate effective model, adds any additional cross sections to the duplicate effective model, or incorporates more detailed topographic information than that used in the currently effective model. The corrected effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model — Natural ☐ Floodway ☐

The duplicate effective or corrected model is modified to produce the existing or pre-project conditions model to reflect any modifications that have occurred within the floodplain since the date of the effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the corrected effective or duplicate effective model.

4. Revised or Post-Project Conditions Model — Natural ☐ Floodway ☐

The existing or pre-project conditions model *(or duplicate effective or corrected effective model, as appropriate)* is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for proposed project this model should reflect proposed conditions.

5. Other: Please attach a sheet describing all other models submitted. — Natural ☒ Floodway ☒
(New Model - no former study)

6. Hydraulic Analyses (Only if Hydraulic Models are not developed)

Please attach all calculations for the existing or pre-project conditions and the revised or post-project conditions. Proceed to Form 5, "Riverine/Coastal Mapping Form".

4. MODEL PARAMETERS *(from model used to revise 100-year water surface elevation)*

1. Discharges:

	Upstream Limit	Downstream Limit
10-year		
50-year		
100-year	33,800 cfs	38,200 cfs
500-year		

Attach diagram showing changes in 100-year discharge

2. Explain how the starting water surface elevations were determined The Cave Buttes Dam Ponding Area Water Surface Elevation 1657.10 determined by distance from the Dam and interpretation on the 200' scale flood maps.

3. Give range of friction loss coefficients (*Manning's "N"*) Channel ..... 0.022 to 0.08

Overbanks ..... 0.022 to 0.12

If friction loss coefficients are different anywhere along the revised reach from those used to develop the FIRM, give location, value used in the effective FIS, and revised values and an explanation as to how the revised values were determined.

Location	FIS	Revised

Explain: There is no detailed FIS study of the entire area to compare differences.

4. Describe how the cross section geometry data were determined *(e.g., field survey, topographic map, taken from previous study)* and list cross sections that were added.

New field survey, new aerial mapping, and cross-section verification.

5. Were natural channel banks selected as the location of the left and right channel banks in the model?

☒ Yes ☐ No If no, explain why not:

6. Explain how reach lengths for channel and overbanks were determined:

Computer generated on 200' scale maps.

5. RESULTS (*from model used to revise 100-year water surface elevations*)

1. Do the results indicate:

a. Water surface elevations higher than end points of cross sections? ..... ☐ Yes ☒ No

b. Supercritical depth? ..... ☐ Yes ☒ No

c. Critical depth? ..... ☐ Yes ☒ No

d. Other unique situations ..... ☐ Yes ☒ No

If yes to any of the above, attach an explanation that discusses the situation and how it is presented on the profiles, tables, and maps.

2. What is the maximum change in energy gradient between cross-sections? ..... 6.41 ft.

Specify location ..... Sta. 27.797

3. What is the distance between the cross-sections in 2 above? ..... 550 ft.

4. What is the maximum distance between cross-sections? ..... 1304 ft.

Specify location ..... Sta. 30.10

5. Floodway determination

a. What is the maximum surcharge allowed by the community or State? ..... N/A foot

b. What is the maximum surcharge for the revised conditions? ..... N/A foot

Specify location ..... N/A

c. What is the maximum velocity? ..... 18.26 fps

Specify location ..... Sta. 25.099

d. Are there any negeative surcharge values at any cross-section? ☐ Yes ☒ No

If yes, the floodway may need to be widened. If it is not widened, please explain and indicate the maximum negative surcharge.

Explain:

6. Is the discharge value used to determine the floodway anywhere different from that used to determine the natural 100-year flood elevations? ..... ☐ Yes ☒ No

If Yes, explain:

_____

_____

_____

7. Do 100-year water surface elevations increase at any location? ..... ☐ Yes ☒ No

If yes, please attach a list of the locations where the increases occur, state whether or not the increases are located on the requestor's property, and provide an explanation of the reason for the increases. *(For example: State if the increase is due to fill placed within the floodway fringe or placed within the currently adopted floodway limits)*

_____

_____

_____

Please attach a completed comparison table entitled: Water Surface Elevation Check (See page 6)

6. REVISED FIRM/FBFM AND FLOOD PROFILES

A. The revised water surface elevations tie into those computed by the effective FIS Model *(10-, 50-, 100-, and 500-year)*, downstream of the project at cross-section_____ within_____feet *(vertical)* and upstream of the project at cross section_____within_____feet *(vertical)*. N/A

B. The revised floodway elevations tie into those computed by the effective FIS model, dowstream of the project at cross section_____within_____feet *(vertical)* and upstream of the project at cross section_____ within_____feet *(vertical)*. N/A

C. Attach profiles, at the same vertical and horizontal scale as the profiles in the effective FIS report, showing stream bed and profiles of all floods studied (without encroachment). Also, label all cross sections, road crossings (including low chord and top-of-road data), culverts, tributaries, corporate limits, and study limits. If channel distance has changed, the stationing should be revised for all profile sheets. N/A

D. Attach a Floodway Data Table showing data for each cross section listed in the published Floodway Data Table in the FIS report. N/A

Proceed to Riverine /Coastal Mapping Form

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER
City of Phoenix, Arizona	Cave Creek	Cave Creek, below Carefree Highway, FCD #95-30

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
										1997 Study			N/A		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]
24.525	No Previous Study Available									1657.1	1657.1	.0	N/A	N/A	N/A
24.646										1657.1	1657.1	.0	N/A	N/A	N/A
24.752										1657.1	1657.1	.0	N/A	N/A	N/A
24.845										1657.1	1657.1	.0	N/A	N/A	N/A
24.919										1657.1	1657.1	.0	N/A	N/A	N/A
25.010										1657.1	1657.1	.0	N/A	N/A	N/A
25.099										1657.1	1657.1	.0	N/A	N/A	N/A
25.180										1659.8	1659.8	.0	N/A	N/A	N/A
25.233										1661.8	1661.8	.0	N/A	N/A	N/a
25.326										1665.3	1665.8	.5	N/A	N/A	N/A
25.388										1669.2	1670.0	.8	N/A	N/A	N/A
25.458										1673.3	1674.3	1.0	N/A	N/A	N/A
25.519										1674.7	1675.6	.9	N/A	N/A	N/A

COMMENTS:

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER
City of Phoenix, Arizona	Cave Creek	Cave Creek, below Carefree Highway, FCD #95-30

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
										1997 Study			N/A		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]
25.580	No Previous Study Available									1676.3	1677.0	.7	N/A	N/A	N/A
25.644										1678.5	1679.0	.5	N/A	N/A	N/A
25.699										1682.5	1682.9	.4	N/A	N/A	N/A
25.750										1684.9	1685.0	.1	N/A	N/A	N/A
25.843										1685.9	1686.2	.3	N/A	N/A	N/A
25.919										1689.0	1689.6	.6	N/A	N/A	N/A
26.044										1695.3	1696.3	1.0	N/A	N/A	N/A
26.137										1698.9	1699.7	.8	N/A	N/A	N/A
26.239										1701.2	1702.1	.9	N/A	N/A	N/A
26.335										1705.6	1706.5	.9	N/A	N/A	N/A
26.430										1707.8	1708.4	.6	N/A	N/A	N/a
26.529										1711.5	1711.6	.1	N/A	N/A	N/A
26.623										1716.4	1717.0	.6	N/A	N/A	N/A

COMMENTS:

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER
City of Phoenix, Arizona	Cave Creek	Cave Creek, below Carefree Highway, FCD 95-30

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
										1997 Study			N/A		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]
26.695	No Previous Study Available									1720.6	1721.2	.6	N/A	N/A	N/A
26.775										1724.0	1724.1	.1	N/A	N/A	N/A
26.845										1727.7	1728.2	.5	N/A	N/A	N/A
26.921										1731.0	1731.1	.1	N/A	N/A	N/A
27.008										1734.5	1734.7	.2	N/A	N/A	N/A
27.106										1738.5	1738.5	.0	N/A	N/A	N/A
27.169										1741.5	1741.8	.3	N/A	N/A	N/A
27.226										1743.1	1743.4	.3	N/A	N/A	N/A
27.265										1749.3	1750.1	.8	N/A	N/A	N/A
27.320										1752.4	1753.4	1.0	N/A	N/A	N/A
27.366										1755.3	1756.2	.9	N/A	N/A	N/A
27.417										1757.2	1757.9	.7	N/A	N/A	N/A
27.502										1764.6	1764.9	.3	N/A	N/A	N/A

COMMENTS:

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER
City of Phoenix, Arizona	Cave Creek	Cave Creek, below Carefree Highway, FCD #95-30

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
										1997 Study			N/A		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]
27.604	No Previous Study Available----------									1768.5	1769.2	.7	N/A	N/A	N/A
27,693										1774.3	1774.3	.0			
27.797										1779.8	1780.8	1.0			
27.913										1783.2	1784.0	.8			
28.023										1787.5	1788.4	.9			
28.091										1790.4	1791.0	.6			
28.157										1794.1	1794.1	.0			
28.241										1799.1	1799.2	.1			
28.326										1803.4	1803.7	.3			
28.390										1807.4	1808.3	.9			
28.462										1810.0	1810.6	.6			
28.555										1814.0	1814.4	.4			
28.657										1820.0	1820.5	.5			

COMMENTS:

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER
City of Phoenix, Arizona	Cave Creek	Cave Creek, below Carefree Highway, FCD #95-30

	EFFECTIVE a			DUPLICATE EFFECTIVE b			CORRECTED EFFECTIVE c			EXISTING/PRE-PROJECT			REVISED/PROJECT		
										1997 Study			N/A		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]
28.750	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1822.9	1823.9	1.0	N/A	N/A	N/A
28.847	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1825.5	1826.4	.9			
28.934	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1829.4	1830.2	.8			
29.012	1832.9	N/A	N/A	1833.3	1833.0	.3	1833.77	1833.47	.3	1832.9	1833.1	.2			
29.130	1838.1	N/A	N/A	1837.9	1838.0	-.1	1838.37	1838.47	-.1	1836.9	1837.0	.1			
29.258	1844.0	N/A	N/A	1843.3	1843.6	-.3	1843.77	1844.07	-.3	1842.9	1842.9	.0			
29.351	1848.8	N/A	N/A	1846.6	1847.3	-.7	1847.07	1847.77	-.7	1848.8	1848.8	.0			
29.387	1849.2	N/A	N/A	1848.4	1849.3	-.9	1848.87	1849.77	-.9	1849.6	1850.0	.4			
29.493	1854.1	N/A	N/A	1852.6	1853.5	-1.1	1853.6	1853.97	-1.1	1852.3	1853.3	1.0			

COMMENTS:

a) Flood elevations from FEMA-Firm maps, interpolated

b) Elevations from Harris-Toups Associates; 1978 HEC-2 rerun on HEC-2, version 4.6.2; May 1991

c) Elevations corrected by +0.47 to raise the model to current datum

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME/IDENTIFIER
City of Phoenix and Maricopa County, Arizona	Cave Creek	Cave Creek, below Carefree Highway, FCD #95-30

	EFFECTIVE a			DUPLICATE EFFECTIVE b			CORRECTED EFFECTIVE d			EXISTING/PRE-PROJECT			REVISED/PROJECT		
										1997 Study			N/A		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]
29.538	1857.0	N/A	N/A	1855.9	1856.8	.9	1856.37	1857.27	-.9	1855.0	1855.2	.2	N/A	N/A	N/A
29.601	1860.5	N/A	N/A	1859.3	1859.3	0	1859.77	1859.77	0	1859.7	1860.4	.7	N/A	N/A	N/A
29.663	1864.8	N/A	N/A	1863.2	1863.3	.1	1863.67	1863.77	-.1	1864.5	1864.5	.0	N/A	N/A	N/A
29.710	1867.6	N/A	N/A	1869.6	1868.9	-.7	1870.07	1869.37	.7	1865.6	1866.5	.9	N/A	N/A	N/A

COMMENTS:

a) Flood elevations from FEMA-firm maps, interpolated

b) Elevations from Harris-Toups Associates, 1978 HRC-2 rerun on HEC-2, Version 4.6.2, May 1991

d) Elevations corrected by +0.47 to raise the model to current datum

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME	FLOODIND SOURCE	PROJECT NAME /IDENTIFIER
Town of Cave Creek, Arizona	Cave Creek	Cave Creek, below Carefree Highway, FCD #95-30

	EFFECTIVE a			DUPLICATE EFFECTIVE b			CORRECTED EFFECTIVE c			EXISTING/PRE-PROJECT			REVISED/PROJECT		
										1997 Study			N/A		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]
29.720	1868.3	N/A	N/A	1868.6	1869.9	.7	1869.07	1870.37	.7	1866.2	1867.0	.8	N/A	N/A	N/A
29.770	1868.7	N/A	N/A	1869.6	1870.4	.8	1870.07	1870.87	.8	1867.5	1867.9	.4	N/A	N/A	N/A
29.850	1872.1	N/A	N/A	1871.5	1871.6	.1	1871.97	1872.07	.1	1871.8	1871.8	0	N/A	N/A	N/A
30.100	1880.0	N/A	N/A	1880.2	1880.0	-.2	1880.67	1880.47	.2	1880.2	1880.5	.3	N/A	N/A	N/A
30.200	1885.0	N/A	N/A	1885.2	1885.0	-.2	1885.67	1885.47	.2	1885.7	1886.2	.5	N/A	N/A	N/A

COMMENTS:

a) Flood elevations from FEMA-firm maps, interpolated

b) Elevations from Harris-Toups Associates, 1978 HRC-2 rerun on HEC-2, Version 4.6.2,May 1991

c) Elevations corrected by +0.47 to raise the model to current datum

1-100-year (natural) Water Surface Elevation 2-Encroachment (floodway) Water Surface Elevation 3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE/COASTAL MAPPING FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*	*FEMA USE ONLY*

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

Community Name: Maricopa County

Flooding Source: Cave Creek

Project Name/Identifier: Cave Creek, below Carefree Highway, Floodplain Delineation Study/FCD 95-30

1. MAPPING CHANGES

1. A topographic work map of suitable scale, contour interval, and planimetric definition must be submitted showing *(indicate N/A when not applicable):*

		Included		
A.	Revised approximate 100-year floodplain boundaries (Zone A)	☒ Yes	☐ No	☐ N/A
B.	Revised detailed 100- and 500-year floodplain boundaries	☒ Yes	☐ No	☐ N/A
C.	Revised 100-year floodway boundaries	☒ Yes	☐ No	☐ N/A
D.	Location and alignment of all cross sections used in the revised hydraulic model with stationing control indicated	☒ Yes	☐ No	☐ N/A
E.	Stream alignments, road and dam alignments	☒ Yes	☐ No	☐ N/A
F.	Current community boundaries	☒ Yes	☐ No	☐ N/A
G.	Effective 100- and 500-year floodplain and 100-year floodway boundaries from the FIRM/FBFM reduced or enlarged to the scale of the topographic work map	☒ Yes	☐ No	☐ N/A
H.	Tie-ins between the effective and revised 100- and 500-year floodplains and 100-year floodway boundaries	☒ Yes	☐ No	☐ N/A
I.	The requestor's property boundaries and community easements	☐ Yes	☐ No	☒ N/A
J.	The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
K.	Location and description of reference marks	☒ Yes	☐ No	☐ N/A
L.	Vertical datum (example: NGVD, NAVD etc.)	☒ Yes	☐ No	☐ N/A
M.	Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
N.	Location and alignment of all coastal transects used to revise the coastal analyses	☐ Yes	☐ No	☒ N/A

If any of the items above are marked no or N/A, please explain: I.) Requestor os not a property owner. M.N.) Boundaries are not near coastal waters.

2. What is the source and date of the updated topographic information *(example: orthophoto maps, July 1985; field survey, May 1979, beach profiles, June 1987, etc.)*? Aerial Topo

3. What is the scale and contour interval of the following workmaps?
   a. Effective FIS 400' scale 4' Contour interval (upper Part
   b. Revision Request 200' scale 2' Contour interval

   NOTE: Revised topographic information must be of equal or greater detail.

4. Attach an annotated FIRM and FBFM at the scale of the effective FIRM and FBFM showing the revised 100-year and 500-year floodplains and the 100-year floodway boundaries and how they tie into those shown on the effective FIRM and FBFM downstream and upstream of the revision or adjacent to the area of revision for coastal studies.

   Attach additional pages if needed.

5. Flood Boundaries and 100-year water surface elevations:

Has the 100-year floodplain been shifted or increased or the 100-year water surface elevation increased at any location on property other than the requestor's or community's ? ☐ Yes ☒ No

If yes, please give the location of shift or increase and an explanation for the increase.

a. Have the affected property owners been notified of this shift or increase and the effect it will have on their property? ..... ☐ Yes ☒ No

If yes, please attach letters from these property owners stating they have no objections to the revised flood boundaries if a LOMR is being requested.

b. What is the number of insurable structures that will be impacted by this shift or increase? 0

6. Have the floodway boundaries shifted or increased at any location compared to those shown on the effective FBFM or FIRM? ..... ☒ Yes ☐ No

If yes, explain:

The firm maps reflect only an approximation of the floodway boundaries as there is no detailed F/S study of the area.

7. If a V- zone has been designated, has it been delineated to extend landward to the heel of the primary frontal dune? ☐ Yes ☒ No

If no, explain:

8. Manual or digital map submission:

☒ Manual

☐ Digital

Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance of submission as possible.

2. EARTH FILL PLACEMENT

1. The fill is: ☐ Existing ☐ Proposed N/A

2. Has fill been/will be placed in the regulatory floodway? ..... ☐ Yes ☒ No
   If yes, please attach completed Riverine Hydraulic Analysis Form.

3. Has fill been/will be placed in floodway fringe *(area between the floodway and 100-year floodplain boundaries)*? ..... ☐ Yes ☒ No

   If yes, then complete A, B, C, and D below.

   A. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ..... ☐ Yes ☐ No

   If yes, justify steeper slopes_____

   B. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? *(Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)* ..... ☐ Yes ☐ No

   If no, describe erosion protection provided_____

   C. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

   D. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

   If yes, provide certification of fill compaction (item C. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer.

4. Has fill been/will be placed in a V-zone? ☐ Yes ☒ No

   If yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall? ☐ Yes ☐ No

   If yes, attach the coastal structures form.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*	**FEMA USE ONLY**

PUBLIC BURDEN DISCLOSURE NOTICE

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Community Name: City of Phoenix, Town of Cave Creek, Maricopa County

Flooding Source: Cave Creek

Project Name/Identifier: Cave Creek, below Carefree Highway, FCD #95-30

1. IDENTIFIER

1. Name of roadway, railroad, etc.: Carefree Highway
2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier): Section 29.710 (downstream), Section 29.720 (upstream)
3. This revision reflects *(check one of the following)*:

   ☐ New bridge/culvert not modeled in the FIS

   ☐ Modified bridge/culvert previously modeled in the FIS

   ☒ New analysis of bridge/culvert previously modeled in the FIS

   (Explain why new analysis was performed) New analysis of the bridge was required to complete the HEC-2 model and tie into the study above Carefree Highway. The FIS HEC-2 model was based on a 1978 study (20ft. wide), bridge was replaced in 1981 (plans date) with a 36 ft. wide bridge.

2. BACKGROUND

Provide the following information about the structure:

1 Dimension, material, and shape (e.g. two 10 x 5 feet reinforced concrete box culvert; three 30-foot span bridge with 2 rows of two 3- foot diameter circular piers; 40-foot wide ogee shape spillway) span, reinforced concrete

2. Entrance geometry of culvert/type of bridge opening (e.g. 30°-75° wing walls with square top edge, sloping embankments and vertical abutments) 60 degrees 22'00" skew wingwalls, sloping embankments and vertical abutments

3. Hydraulic model used to analyze the structure *(e.g., HEC-2 with special bridge routine, WSPRO, HY8)* HEC-2 with special bridge routine

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*

Note: If any items do not apply to submitted hydraulic analysis, indicate by N/A
*** One form per new/revised bridge/culvert**

Sketch the downstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, minimum top of road elevation, and ineffective flow widths.

See Attached As-Built Plans

Sketch the upstream face of the structure together with the road profile. Show, at a minimum, the maximum low chord elevation, invert elevation, and minimum top of road elevation.

See Attached As-Built Plans

Sketch the plan view of the structure(s) Show, at a minimum, the skew angle, cross-section locations, distances between cross sections, and length of structure (s).

See Attached As-Built Plans

← flow

Attach plans of the structure (s) certified by a registered Professional Engineer.

Culvert length or bridge width (ft)	36 Ft.
Calculated culvert/bridge area (ft ^{2}) by the hydraulic model, if applicable	4032 Sq. Ft.
Total culvert/bridge area (ft ^{2})	4032 Sq. Ft.

Elevations Above Which Flow is Effective for Overbanks

	Left Overbank	Right Overbank
Upstream face	1876.0	1876.10
Downstream face	1862.50	1859.40

Minimum Top of Road Elevation

	Left Overbank	Right Overbank
Upstream face	1879.80	1879.79
Downstream face	1879.80	1879.79

100-Year Elevations	Water Surface Elevations	Energy Gradient Elevations
Upstream face	1866.2	1869.54
Downstream face	1865.3	1868.60

Discharge	Low Flow	Pressure Flow	Weir Flow	Total Flow
Amount of flow through/over the structure (s) (cfs)	33,800	N/A	0	33,800

The maximum depth of flow over the roadway/railroad (ft.) 0

Weir length (ft.) 0

Top Widths	Total Floodplain Width	Total Effective Flow Width	Floodway Width
Upstream face	274.65 ft.	274.65 ft.	272.02 ft.
Downstream face	309.00 ft.	309.00 ft.	300.00 ft.

Loss Coefficients

Entrance loss coefficient	N/A
Manning's "n" value assigned to the structure(s)	0.037
Friction loss coefficient through structure (s)	N/A
Other loss coefficients (e.g., bend manhole, etc.)	N/A
Total loss coefficient	N/A
Weir coefficient	2.6
Pier coefficient	0.65
Contraction loss coefficient	0.1
Expansion loss coefficient	0.3

4. SEDIMENT TRANSPORT CONSIDERATIONS

1. A. Is there any indication from historical records that sediment transport *(including scour and deposition)* can affect the 100-year water surface elevations? ..... ☐ Yes ☒ No

   B Based on the conditions *(such as geomorphology, vegetative cover and development of the watershed and stream bed, and bank conditions)*, is there a potential for debris and sediment transport *(including scour and deposition)* to affect the 100-year water surface elevations and/or conveyance capacity through the bridge/culvert? ..... ☐ Yes ☒ No

2. If the answer to either 1A or 1B is yes:

   A. What is the estimated sediment *(bed material)* load?
   _____cfs *(attach gradation curve)*

   Explain method used to estimate the sediment transport and the depth of scour and/or deposition_____

   B. Will sediment accumulate anywhere through the bridge/culvert? ☐ Yes ☐ No

   If yes, explain the impact on the conveyance capacity through the bridge/culvert?_____

5. FLOODWAY ANALYSIS

Explain method of bridge encroachment (floodway run) HEC-2 model, Special bridge routine

Comments *(explain any unusual situations)*:

N/A

CAREFREE HIGHWAY BRIDGE AS-BUILTS

FHWA	STATE	PROJ NO.	SHEET	OF	AS BUILT
9	ARIZ.	ER-RS-571(5)P	13	29	6-23-86

M.C.H.D. Proj. No. 07100

CAREFREE HIGHWAY
BRIDGE OVER CAVE CREEK WASH
MARICOPA COUNTY

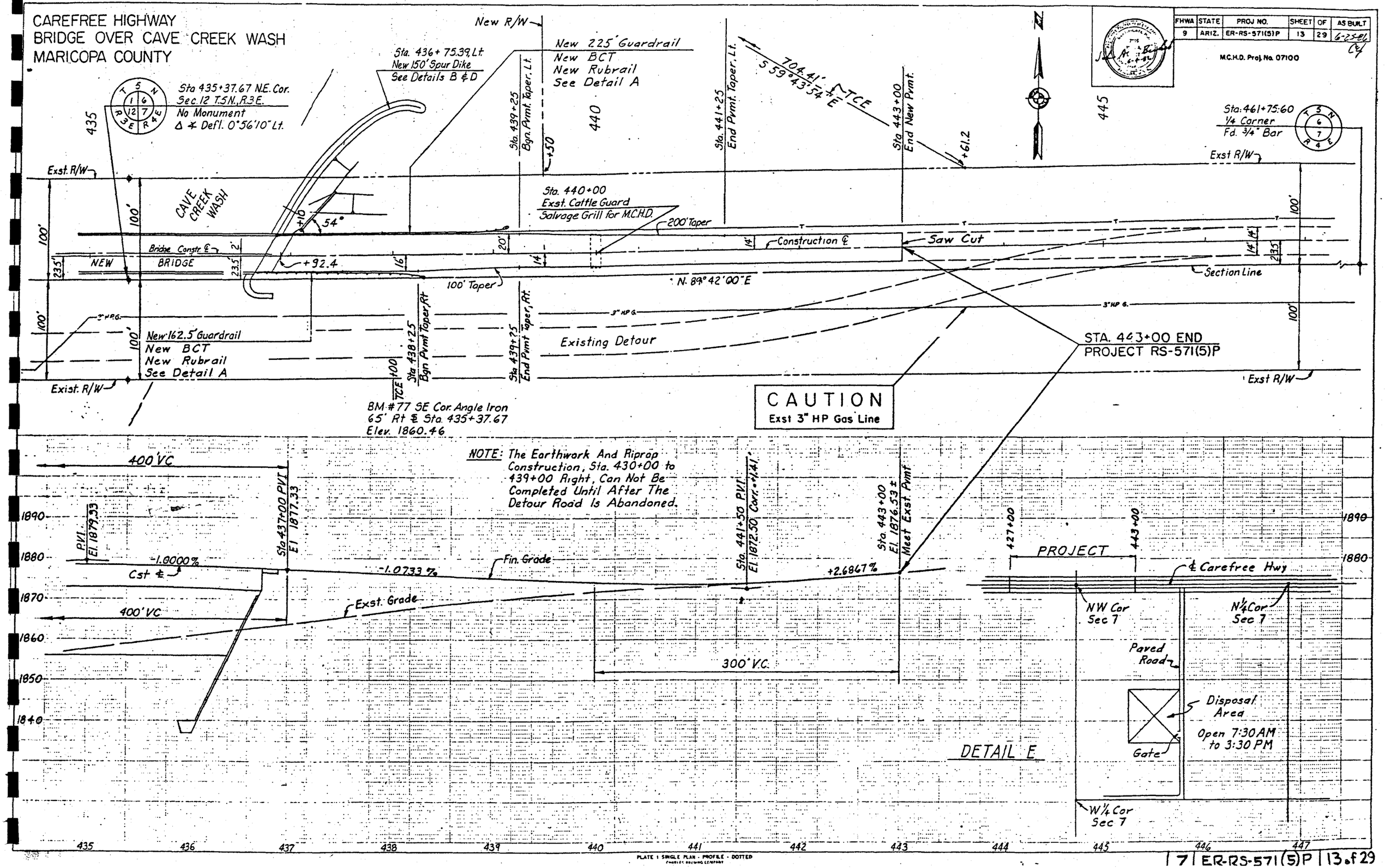
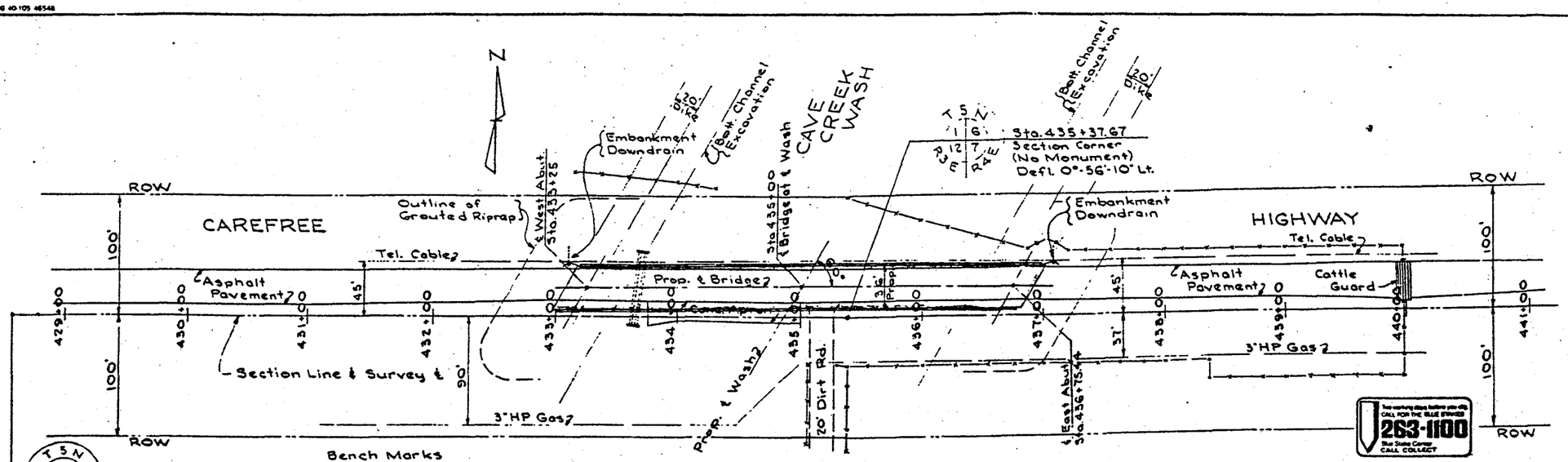


PLATE 1 SINGLE PLAN - PROFILE - DOTTED

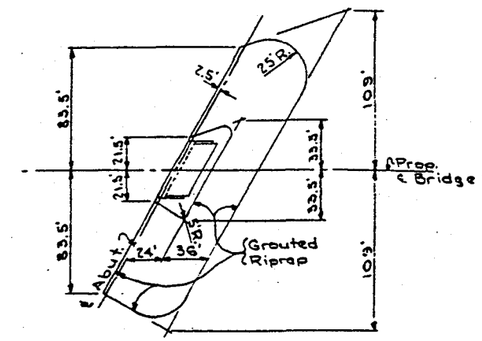
FED. ROAD DIV. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	REV. DATE
7	ARIZONA	ER-RS-571(5)P	14	29	6-25-81



PLAN

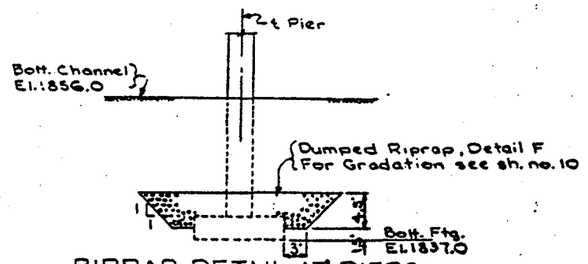
Scale:- 1" = 50'

For Details of Channel Excavation and Dike Construction See sh. no. 9



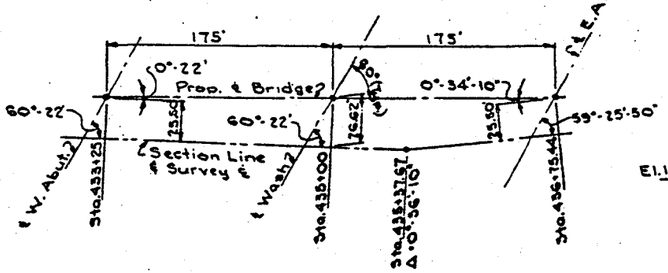
PLAN - GROUTED RIPRAP AT ABUTMENT

Scale:- 1" = 50'



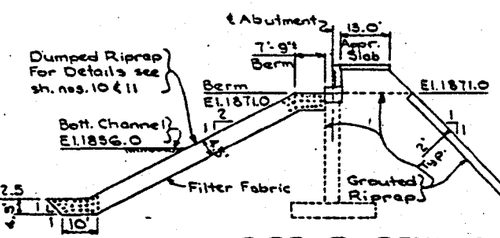
RIPRAP DETAIL AT PIERS

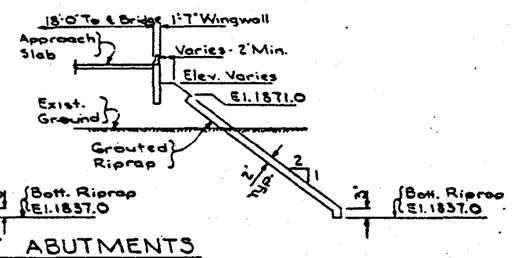
Scale:- 1" = 10'



BRIDGE ALIGNMENT DIAGRAM

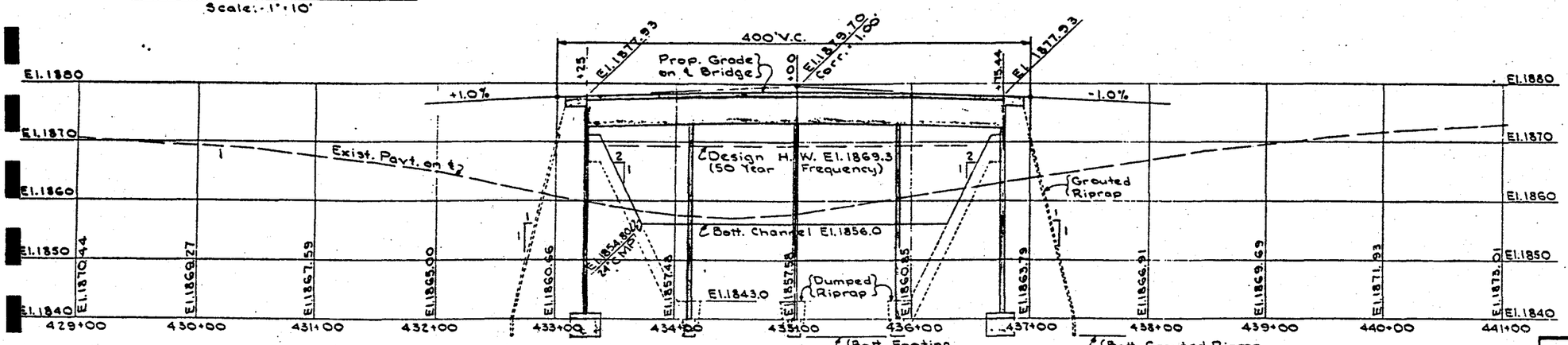
Not To Scale





RIPRAP DETAILS AT ABUTMENTS

Scale:- 1" = 20'



PROFILE

Scales:- 1" = 50' Horz.
1" = 10' Vert.

Note:- All Slopes are normal to Abutments

GENERAL NOTES

Datum - Elevations on MCHD Datum

Detour Road by MCHD

Approaches - See sheet nos. 12 & 13

Hydraulic Data
- 50 Year Frequency - Q = 33,000 cfs
- 100 Year Frequency - Q = 36,900 cfs
- Design H.W. El. 1870.2
- Drainage Area - 127 sq. miles

MISCELLANEOUS QUANTITIES

Dumped Riprap at Piers ~~350~~ C.Y. 293

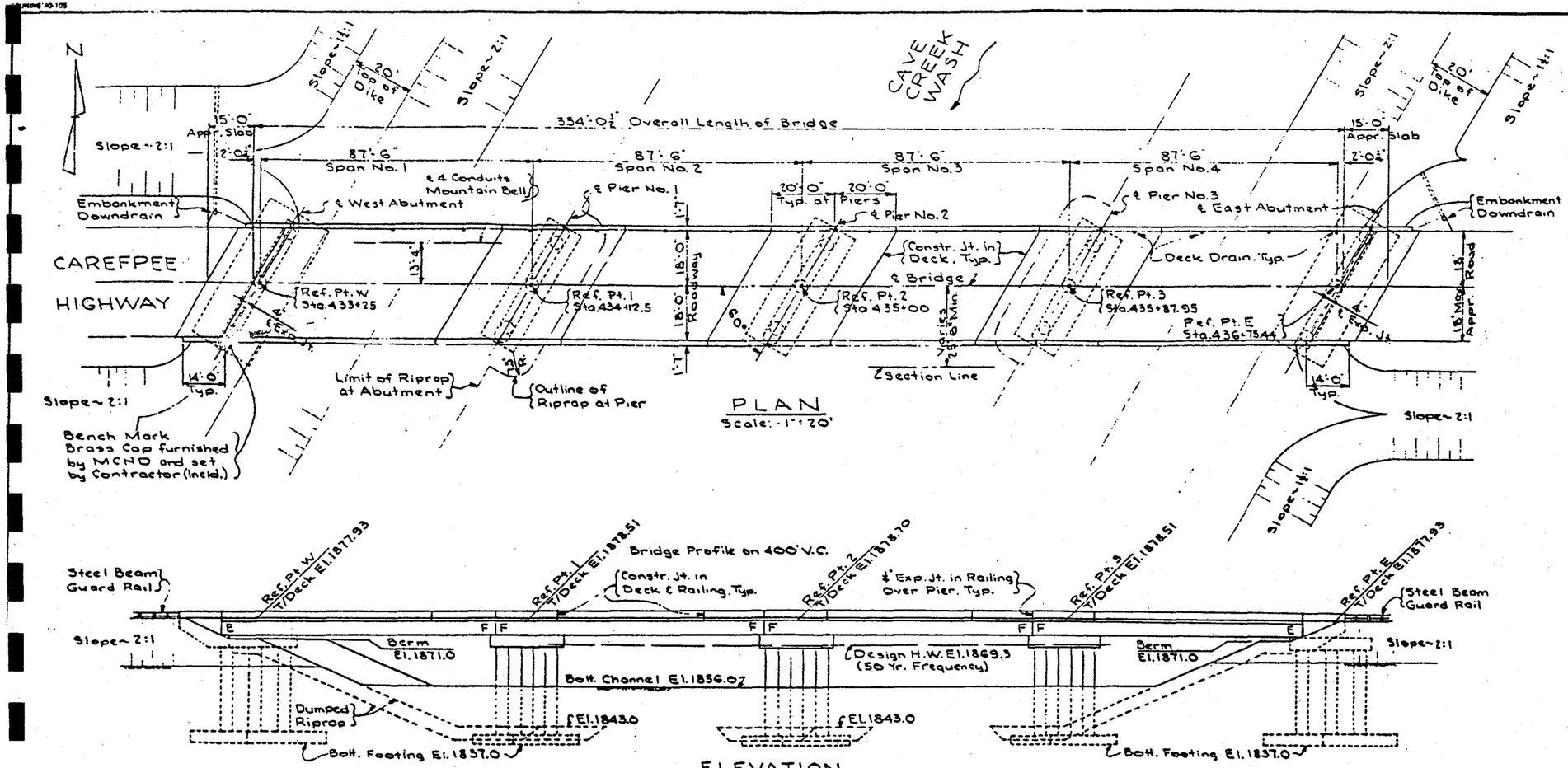
Grouted Riprap _____ ~~860~~ C.Y. 2,217.5

LOCATION PLAN

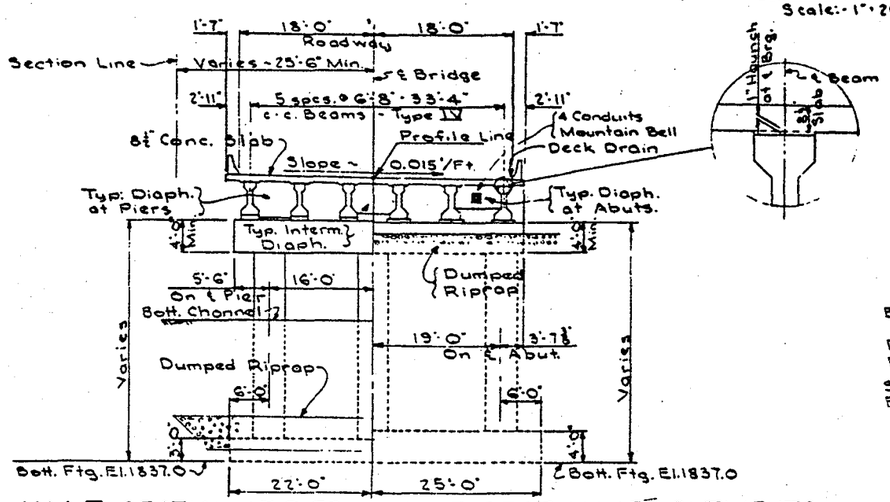
MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE As shown	APPROVED BY:	DRAWN BY PR
DATE: 3-2-81		CHECKED:
CAREFREE HWY. - CAVE CREEK		
M.C.H.D. Project No. 07100		DRAWING NUMBER 14

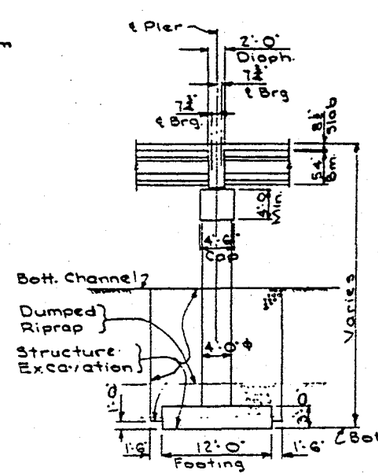
Fed. Aid Proj. No.	STATE	PROJECT NO	SHEET NO.	TOTAL SHEETS	LS & INT
7	ARIZONA	[illegible]	6	[illegible]	[illegible]



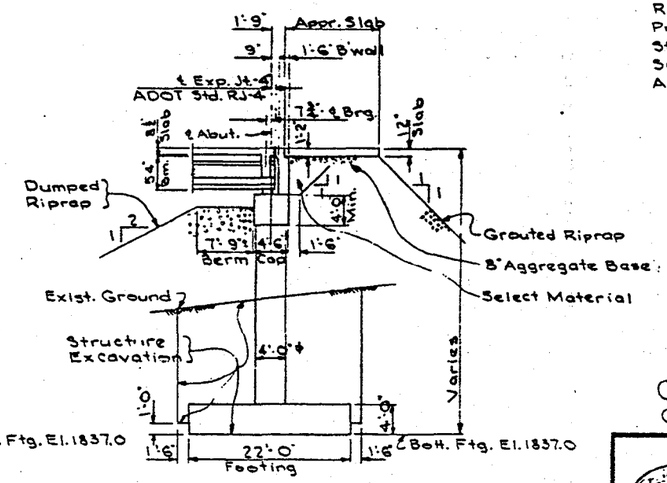
ELEVATION
Scale: 1" = 20'



HALF-SECTION AT PIERS HALF-SECTION AT ABUTMENTS
TYPICAL DECK SECTION
Scale: 1" = 10'



TYPICAL SECTION AT PIERS
Scale: 1" = 10'



TYPICAL SECTION AT ABUTMENTS
Scale: 1" = 10'

GENERAL NOTES

Construction - Arizona D.O.T. Std. Specs. for Road and Bridge Constr., 1969, revised to date

Design - AASHTO Std. Specs. for Hwy. Bridges, 1977 Edition and Current Supplements
Simple Non-composite Spans for Dead Load
Simple Composite Spans for Live Load and Future Wearing Surface

Loading - HS20-44

Reinforcing Steel - ASTM A-615, Grade 60
(Except fs: 20000 psi for Deck

Structural Steel - ASTM A-36

Concrete - Class S
Substructure shall be 4000 psi concrete
Bridge Deck shall be 4500 psi concrete
(Except fc: 1400 psi, n: 8)
Bridge Railing and Approach Slabs shall be 3500 psi concrete

Precast Concrete Beams
Ultimate Strength of Concrete at 28 Days shall be 5000 psi
Minimum Strength at Release shall be 4000 psi
Prestressing Steel - ASTM A-416, Grade 270
Beams shall be prestressed by pretensioning method only

Footing Pressures
Allowable - 6000 psf
Pier
Max. DL + LL - 5700 psf
Max. DL + EQ - 8120 psf
Abutment
Max DL + LL - 6500 psf
Max. DL + EQ - 6560 psf

Mountain Bell Conduits
Conduits and Fasteners not a part of this contract.
Contact Mountain Bell, D.W. Brundage, phone no. 255-1628.

SUMMARY OF QUANTITIES

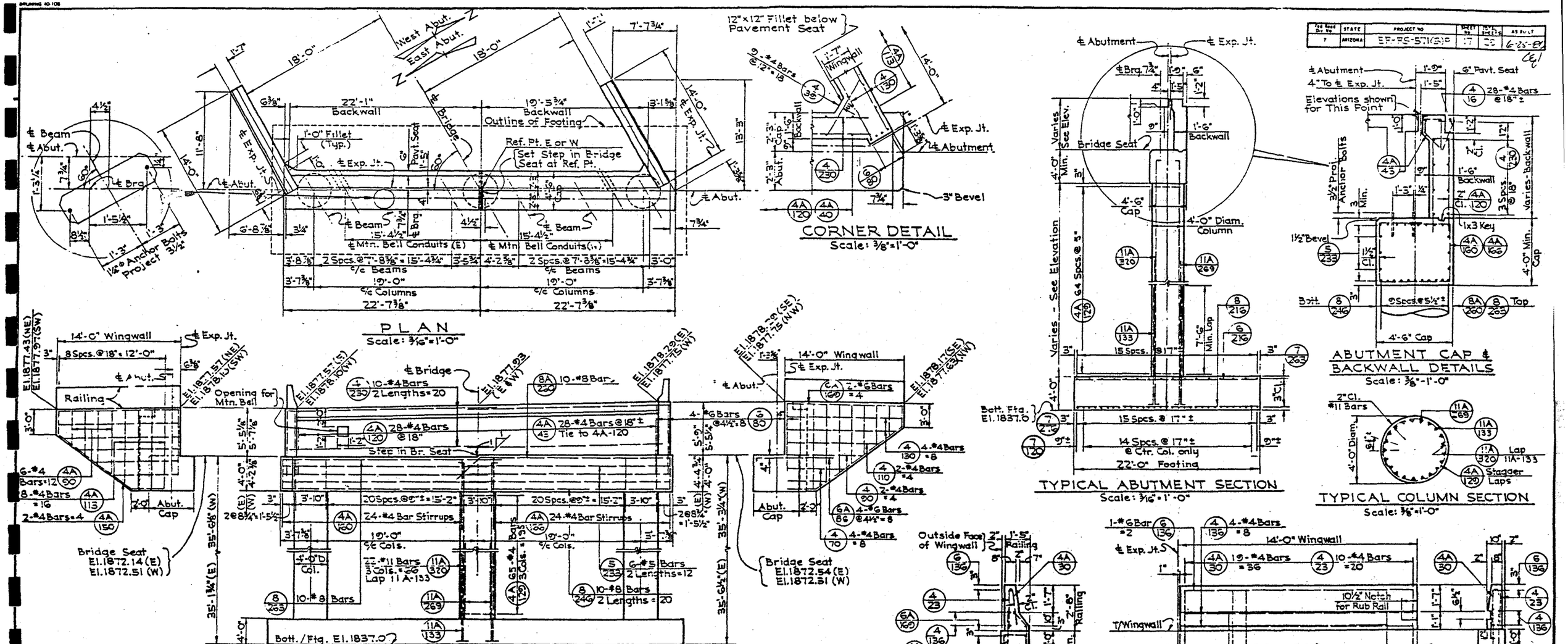
Class S Concrete (4500 psi) ____ 138 ~~143~~ C.Y.
Class S Concrete (4000 psi) ____ 87.2 ~~89~~ C.Y.
Class S Concrete (3500 psi) ____ 109 108 C.Y.
Reinforcing Steel _____ 238,5~~18~~ Lbs.
Precast Concrete Beams _____ 24 Ea.
Structure Excavation ____ 4,025 ~~3900~~ C.Y.
Select Material _____ 70 Tons
Aggregate Base _____ 50 Tons

GENERAL PLAN OF BRIDGE
CONCRETE BEAM ALTERNATE

MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE As shown	APPROVED BY:	DRAWN BY PE
DATE: 12-21-81		CHECKED BY:
CAREFREE HWY. - CAVE CREEK		
M.C.H.D. Project No. 07100		DRAWING NUMBER 16

FED. ROAD DIV. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
7	ARIZONA	EF-RS-571(5)P	17	29	6-25-84



NOTES

Concrete - Class S
Substructure shall be 4000 psi concrete.
Bridge Railing shall be 3500 psi concrete.
Bridge Seat shall be finished in a true plane at the elevation shown and shall not vary by more than 1/16" under any bearing.

Reinforcing Steel - Bar Marks shown for one abutment.

Anchor Bolts shall be set accurately to a template.

Bridge Railing - For Details of Transition and Guard Rail attachment see Drawing No. 29.

Abbreviations
(E) - East Abutment
(W) - West Abutment

QUANTITIES FOR ONE ABUTMENT

Class S Concrete (4000 psi)	
East Abutment	257 C.Y.
West Abutment	256 C.Y.
Class S Concrete (3500 psi)	2 C.Y.
Reinforcing Steel	40230 Lbs.

ABUTMENT DETAILS
CONCRETE BEAM ALTERNATE

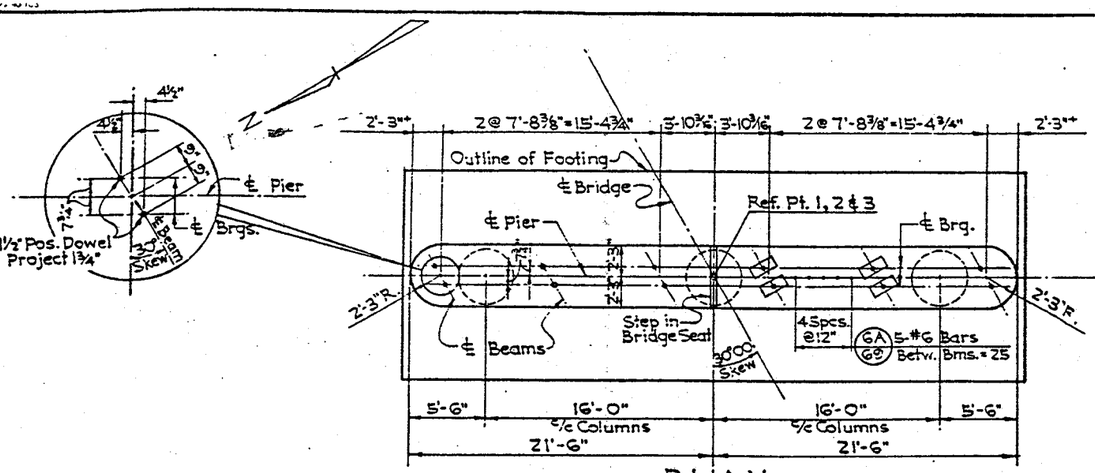
MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE As Shown	APPROVED BY	DRAWN BY H.C.M.
DATE 3-19-82		CHECKED P.E.

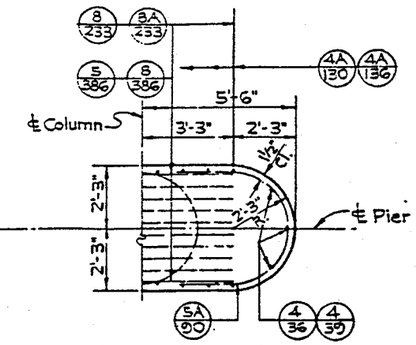
CAREFREE HWY. CAVE CRK.

M.C.H.D. Project No. 07100 — DRAWING NUMBER 17

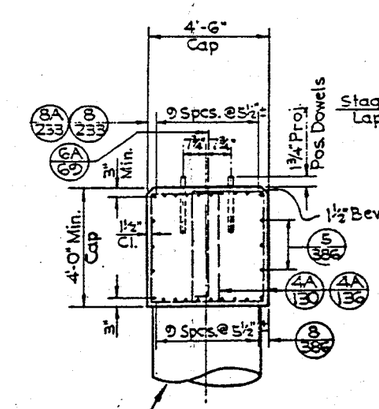
FED. ROAD DIV. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
7	ARIZONA	ER-RS-571(5)P	18	29	

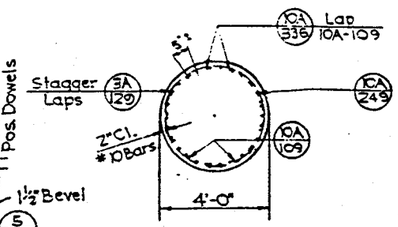


PLAN
Scale: 3/16"=1'-0"

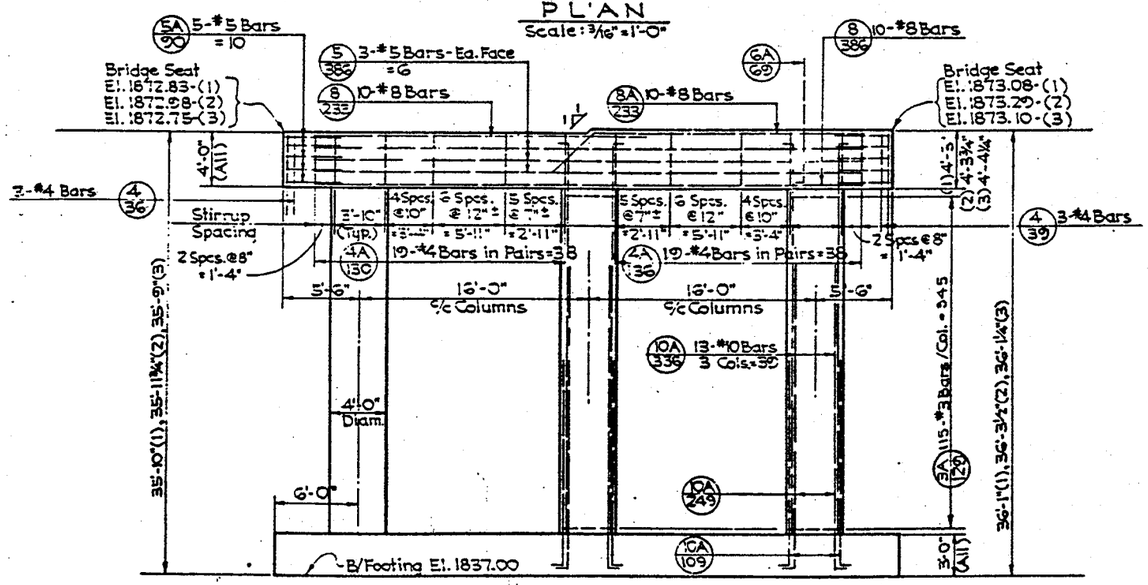


END OF PIER DETAIL
Scale: 3/8"=1'-0"

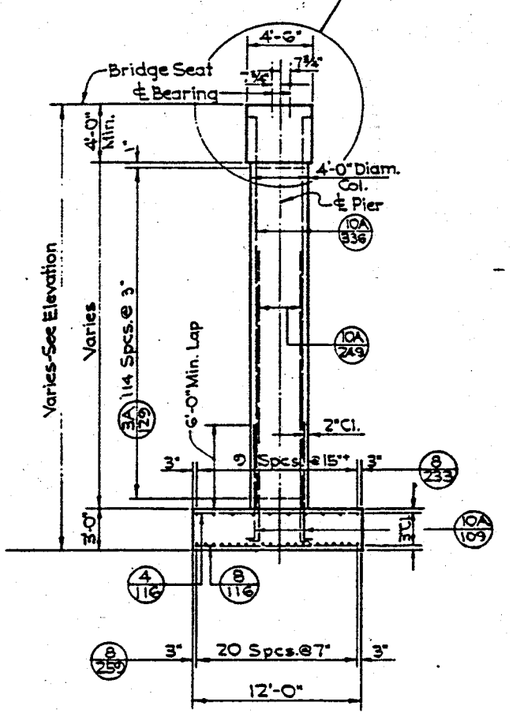




TYPICAL COLUMN SECTION
Scale: 3/8"=1'-0"



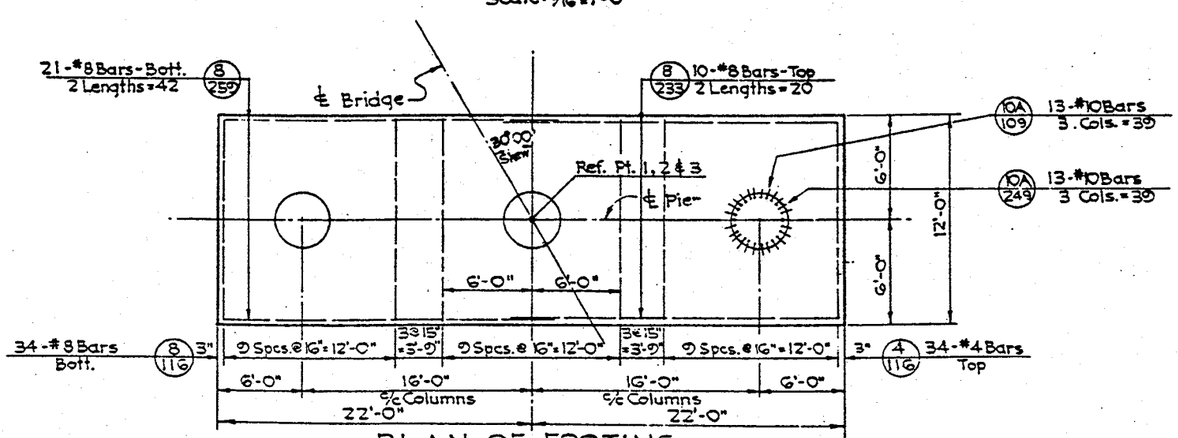
ELEVATION
Scale: 3/16"=1'-0"



TYPICAL PIER SECTION
Scale: 3/16"=1'-0"

NOTES

Concrete: Class S, 4000 psi.
All exposed corners shall be beveled ¾", unless otherwise noted.
Bridge Seat shall be finished in a true plane at the elevation shown and shall not vary by more than 1/16" under any bearing.
Reinforcing Steel - ASTM A-615, Grade 60. Bar Marks shown for one pier.
Position Dowels - Set accurately to template.
Abbreviations:
(1) - Pier No. 1
(2) - Pier No. 2
(3) - Pier No. 3



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

QUANTITIES FOR ONE PIER

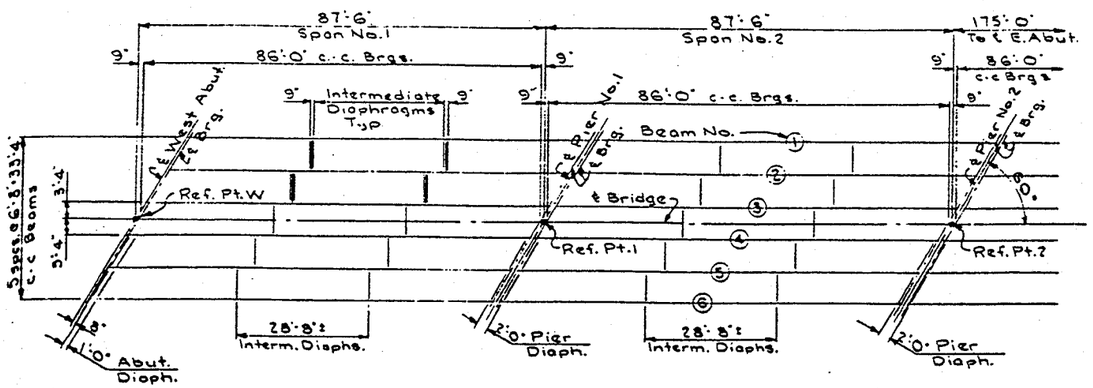
Class S Concrete 4000 psi
Pier No. 1 _____ 128 C.Y.
Pier No. 2 _____ 128 C.Y.
Pier No. 3 _____ 128 C.Y.
Reinforcing Steel _____ 22210 Lbs.

PIER DETAILS
CONCRETE BEAM ALTERNATE

MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE: AS SHOWN	APPROVED BY:	DRAWN BY: H.C.M.
DATE: 5-17-82		CHECKED: P.E.
CAREFREE HWY-CAVE CRK.		
M.C.H.D. Project No. 07100		DRAWING NUMBER 18

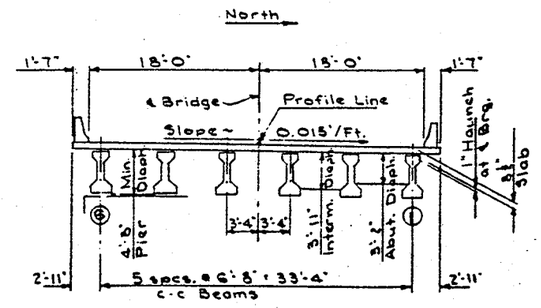
FED. ROAD DIV. NO.	STATE	PROJECT NO	SHEET NO.	TOTAL SHEETS	AS BUILT
7	ARIZONA	ER-RS-571.5 P	19	22	6-23-82



PARTIAL PLAN

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

West Half of Bridge shown
East Half symmetrical about ℄ Pier No.2
by rotation thru 180°



TYPICAL DECK SECTION

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

NOTES

Construction - Arizona D.O.T. Std. Specs. for Road and Bridge Constr., 1969 Edition, revised to date. Beams shall be prestressed by the pretensioning method only.

Concrete - Ultimate Strength at 28 Days = 5000 psi
Minimum Strength at Release = 4000 psi

Prestressing Steel - ASTM A-416, Grade 270

Reinforcing Steel - ASTM A-615, Grade 40

Structural Steel - ASTM A-36
Bearing Plates 3" or more in thickness may be fabricated from thinner plates, bevel welded together and ground smooth.

Bearing Pads - AASHTO, Division 2, Section 25, Elastomeric Bearings, 60 Durometer.

Prestress Force per Beam
Initial - 926 kips (28.9 Kips/strand)
Final - 706 kips (22.0 kips/strand)

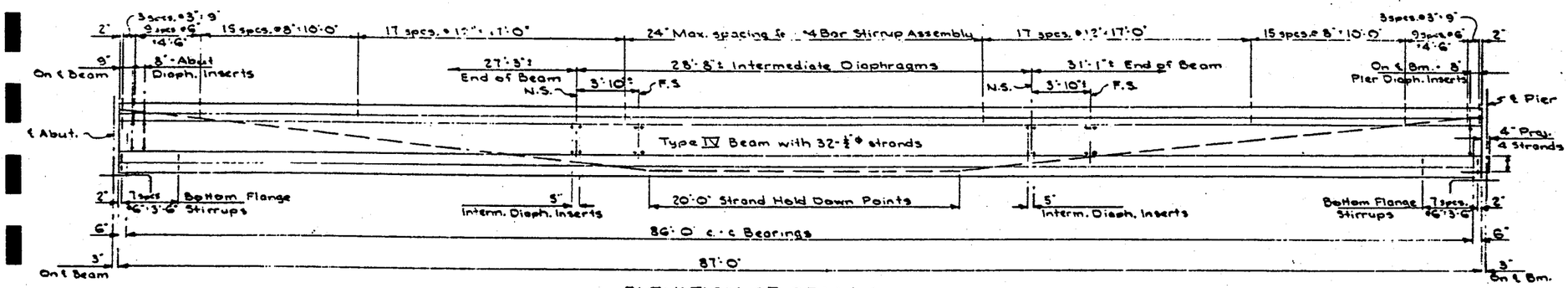
Inserts, Insert Bars, Anchor Bolts, Position Dowels and Bearing Details are incidental to Precast Beams

Painting - No shop paint required
After erection, 2 coats of approved paint required on all exposed bearing plates and bolts.

Camber at Transfer due to Prestress and Weight of Beam is 1 1/8" up (±).

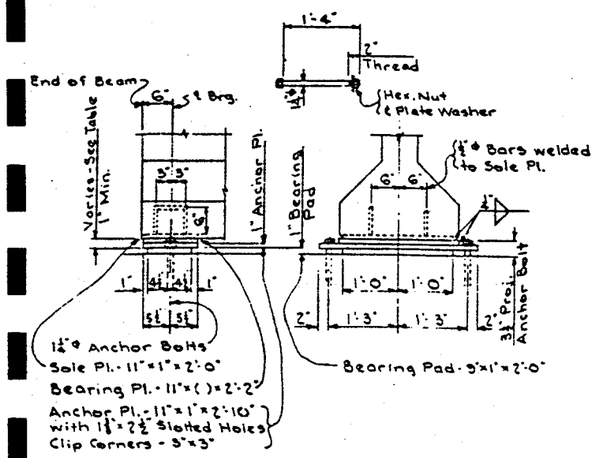
QUANTITIES

Precast Concrete Beams -- 24 Ea.



ELEVATION OF BEAM

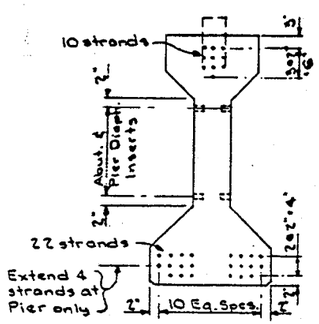
Scale:- 1/4" = 1'-0"



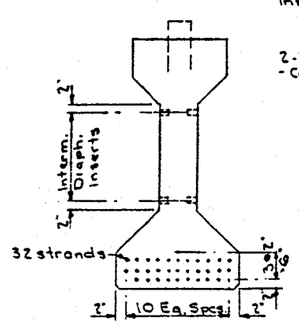
BEARING DETAILS AT ABUTMENTS

Scale. 3/4" = 1'-0"

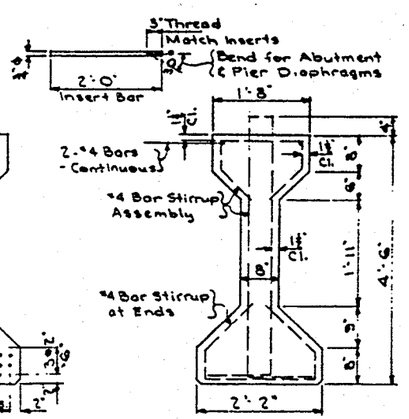
BEARING THICKNESS TABLE						
BEAM NOS.	1	2	3	4	5	6
West Abut.	1"	1⅞"	2⅝"	1⅛"	1⅞"	2⅝"
East Abut.	1"	2⅝"	4¼"	1"	2⅝"	4¼"



AT ENDS



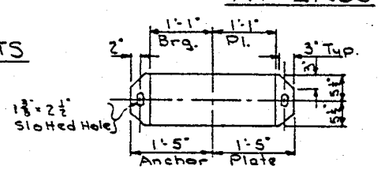
AT CENTER



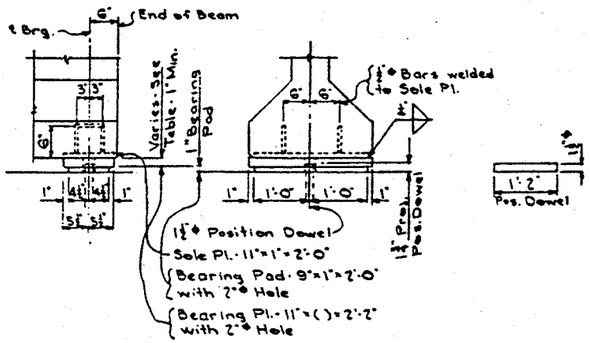
NORMAL REINFORCEMENT

BEAM SECTIONS

Scale:- 3/4" = 1'-0"



BEARING PLATE THICKNESS TABLE							
BEAM NOS.		1	2	3	4	5	6
Pier No.1	Span No.1	1⅛"	2⅝"	3⅝"	1⅛"	2⅝"	3"
	Span No.2	1⅛"	2⅝"	3⅝"	1⅛"	2⅝"	3⅝"
Pier No.2	Span No.2&3	1⅛"	2⅝"	3⅝"	1"	2⅝"	3⅝"
Pier No.3	Span No.3	1⅛"	2⅝"	3⅝"	1⅛"	2⅝"	3⅝"
	Span No.4	1"	2⅝"	3⅝"	1"	2⅝"	3⅝"



BEARING DETAILS AT PIERS

Scale:- 3/4" = 1'-0"

PRECAST CONCRETE BEAMS
CONCRETE BEAM ALTERNATE

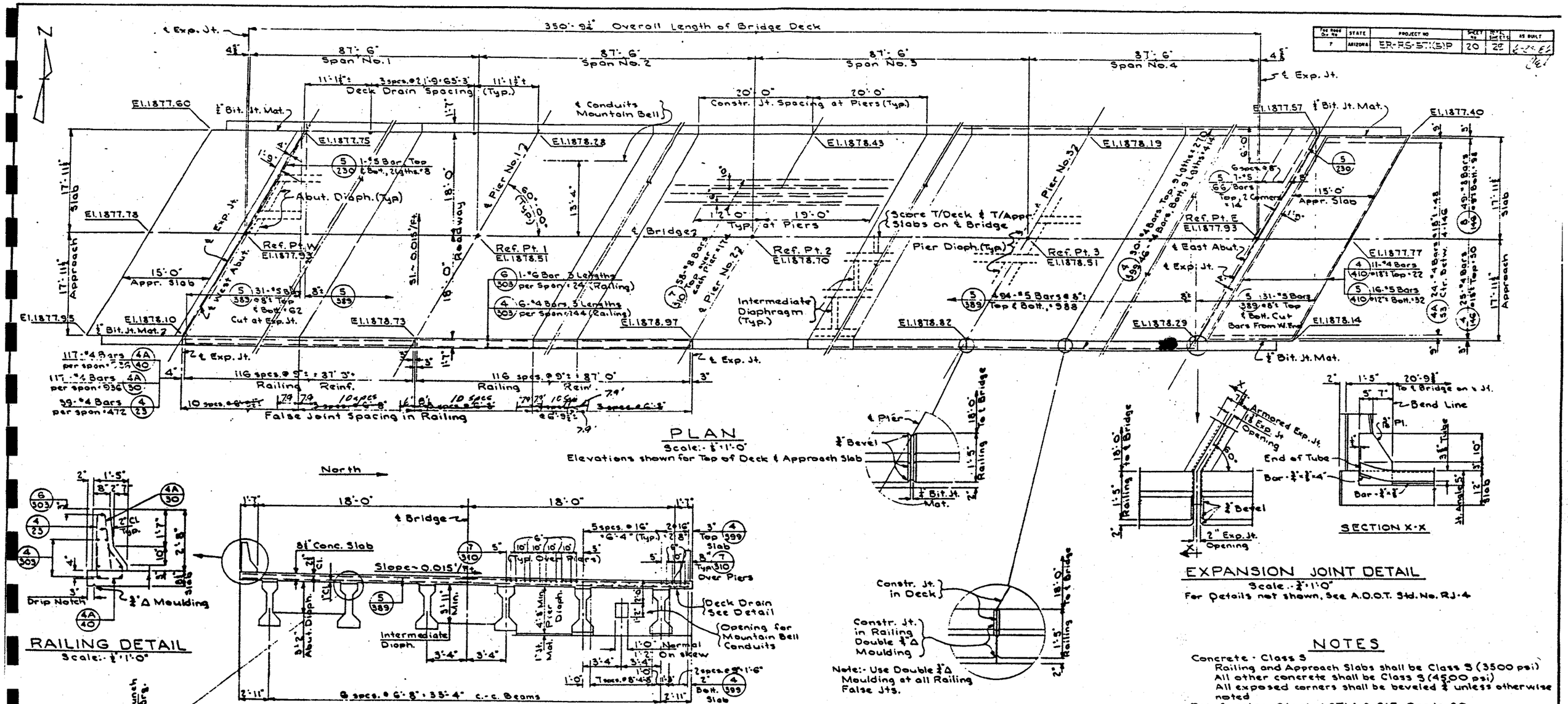
MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE AS shown | APPROVED BY: | DRAWN BY PE
DATE 2-9-82 | CHECKED:

CAREFREE HWY. - CAVE CREEK

M.C.H.D. Project No. 07100 | DRAWING NUMBER 19

FED. ROAD Div. No.	STATE	PROJECT NO	SHEET No.	TOTAL SHEETS	AS BUILT
7	ARIZONA	ER-RS-571(5)P	20	29	6-29-82



PLAN

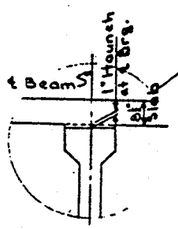
Scale:- ⅛"=1'-0"

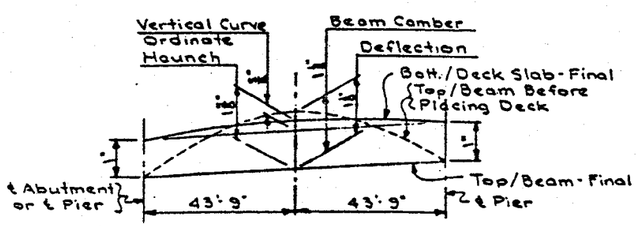
RAILING DETAIL

Scale:- ½"=1'-0"

DECK SECTION

Scale:- ½"=1'-0"



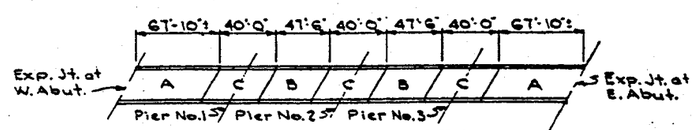


HAUNCH DIAGRAM

Not To Scale

Note:- Adjust Haunch for Actual Beam Camber

Note:- Use Double ¾" Δ Moulding at all Railing False Jts.



DECK POUR DIAGRAM

Not To Scale

Deck Pours shall be made in alphabetical order.

Railing shall not be poured until all deck pours are completed.

EXPANSION JOINT DETAIL

Scale:- ½"=1'-0"

For Details not shown, See A.D.O.T. Std. No. RJ-4

NOTES

Concrete - Class S
Railing and Approach Slabs shall be Class S (3500 psi)
All other concrete shall be Class S (4500 psi)
All exposed corners shall be beveled ¾ unless otherwise noted

Reinforcing Steel - ASTM A-615, Grade 60
Minimum Bar Laps - #6 Bar = 1'-8"
#5 Bar = 1'-6"
#4 Bar = 1'-0"

Armored Expansion Joint - Incidental to Deck Concrete
For Details not shown, See A.D.O.T. Standard No. RJ-4
1¾" Joint Opening is set for 70°. For every 10° difference in temperature at time of installation adjust joint opening by ⅛"

Work this sheet with sheet no. 21

QUANTITIES

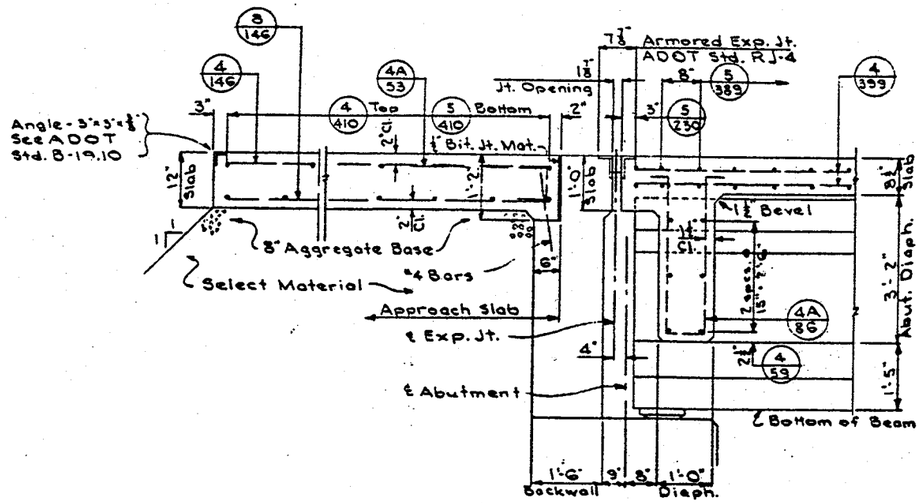
Class S Concrete (3500 psi) — 104 C.Y.
Class S Concrete (4500 psi) — 445 C.Y.
Reinforcing Steel — 91 280 Lbs.
Aggregate Base — 50 Tons

CONCRETE DECK DETAILS
CONCRETE BEAM ALTERNATE

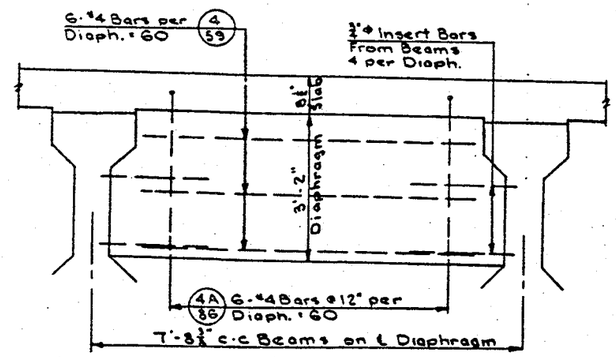
MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE As Shown	APPROVED BY	DRAWN BY PE
DATE 11-30-79		CHECKED
CAREFREE HWY. - CAVE CREEK		
M.C.H.D. Project No. 07100		DRAWING NUMBER 20

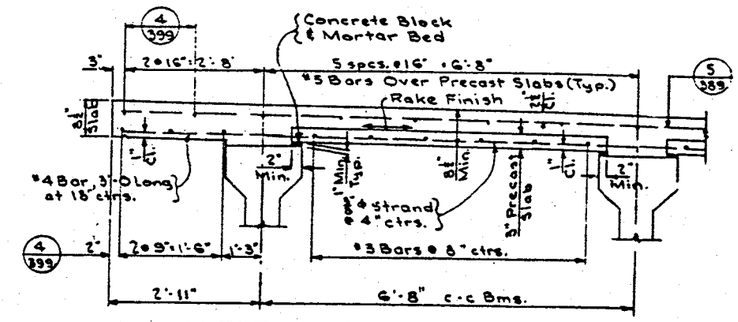
Fed Road Div No	STATE	PROJECT NO	SHEET No	TOTAL SHEETS	AS BUILT
7	ARIZONA	ER-RS-571(5)P	21	29	6-25-81



SECTION AT END OF BRIDGE
Scale:- ¼"=1'-0"



ELEVATION OF ABUTMENT DIAPHRAGM
Scale:- ¼"=1'-0"



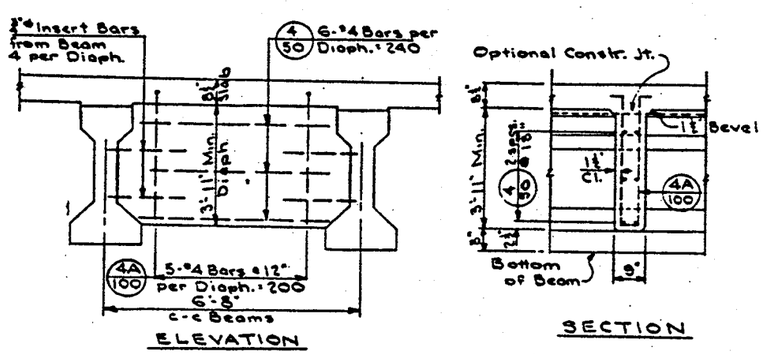
ALTERNATE DECK SECTION
Scale:- ¼"=1'-0"

PRECAST SLAB NOTES

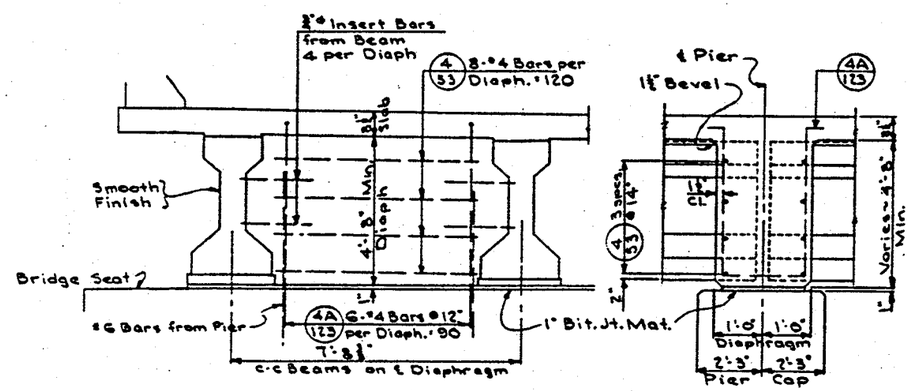
Contractor may use precast concrete slabs, but no separate payment will be made and payment will be made on basis of cast-in-place deck, as if no precast slabs were used.

Fabrication of Slabs shall be equal to Precast Concrete Beams. (See Notes on sheet no. 19)

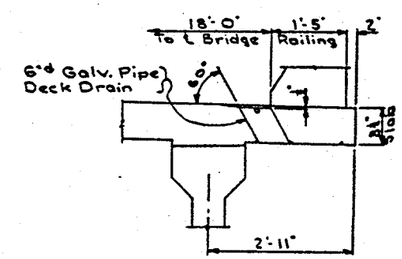
Prestress Force
Initial -48.2 kips per lin. ft. (16.1 kips per strand)
Final -36.7 kips per lin. ft. (12.3 kips per strand)



INTERMEDIATE DIAPHRAGM
Scale:- ¼"=1'-0"



DIAPHRAGM AT PIER
Scale:- ¼"=1'-0"



DECK DRAIN DETAIL
Scale:- ¼"=1'-0"
For Details see ADOT Std. BM-1

Note:- Provide opening in diaphragms for Mountain Bell Conduits as shown on sheet no. Adjust reinforcing bars to clear opening by 2" min.

Note:- Work this sheet with sheet no. 20

CONCRETE DECK DETAILS
CONCRETE BEAM ALTERNATE

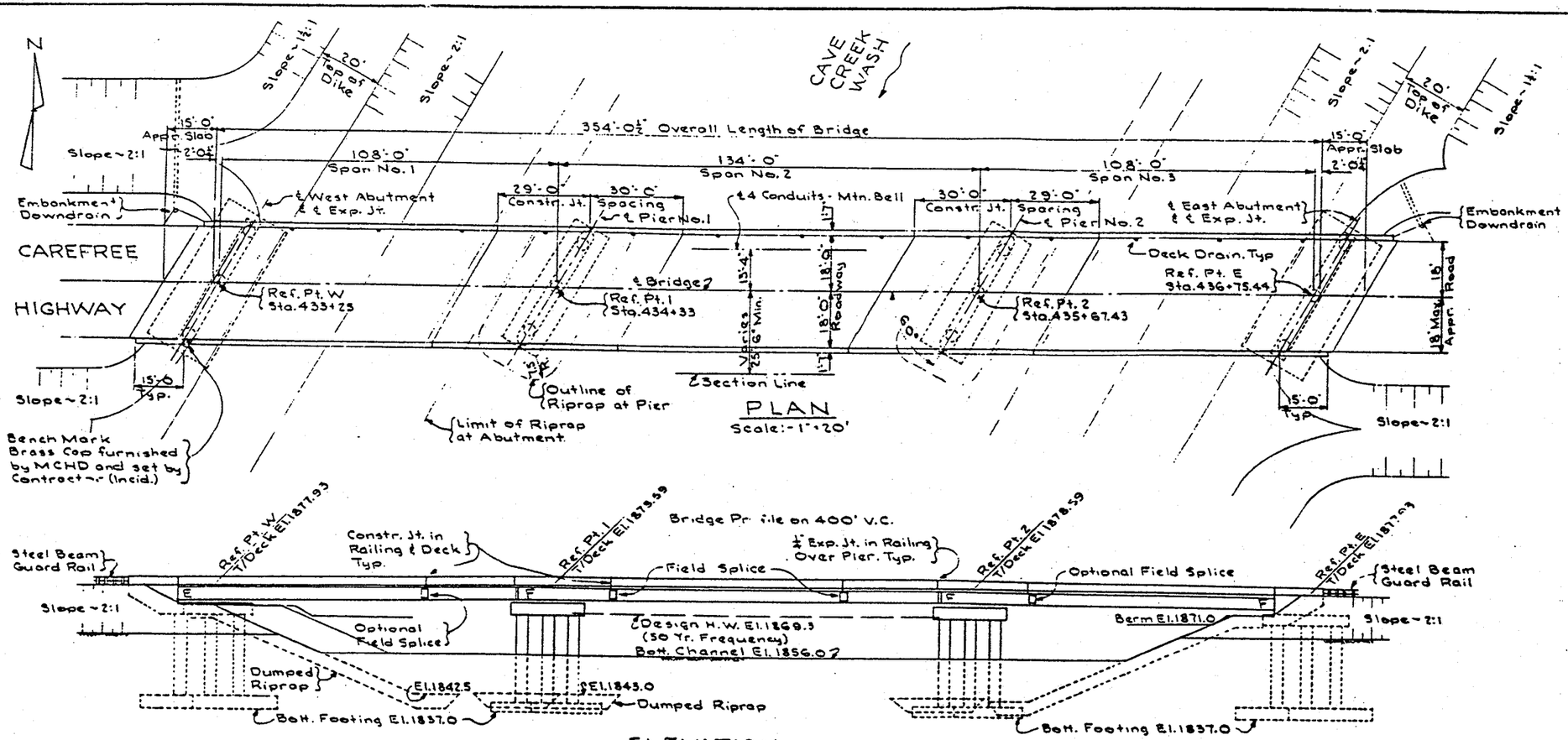
MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE As shown	APPROVED BY:	DRAWN BY P.E.
DATE: 12-3-79		CHECKED:

CAREFREE HWY. - CAVE CRK.

M.C.H.D. Project No. 07100 — DRAWING NUMBER 21

FED. ROAD DIV. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
7	ARIZONA	ER-RS-571(5)P	22	29	6-25-81



PLAN
Scale: 1" = 20'

ELEVATION
Scale: 1" = 20'

GENERAL NOTES

Construction - Arizona D.O.T. Std. Specs for Road and Bridge Constr., 1969 revised to date.

Design - A.A.S.H.T.O. Std. Specs. for Hwy. Bridges, 1977 Edition and Current Supplements.
Continuous Non-composite Spans for Dead Load.
Continuous Composite Spans for Live Load and Future Wearing Surface.

Loading - HS20-44

Reinforcing Steel - ASTM A-615, Grade 60
(Except fs = 20000 psi for Deck)

Structural Steel - ASTM A-36

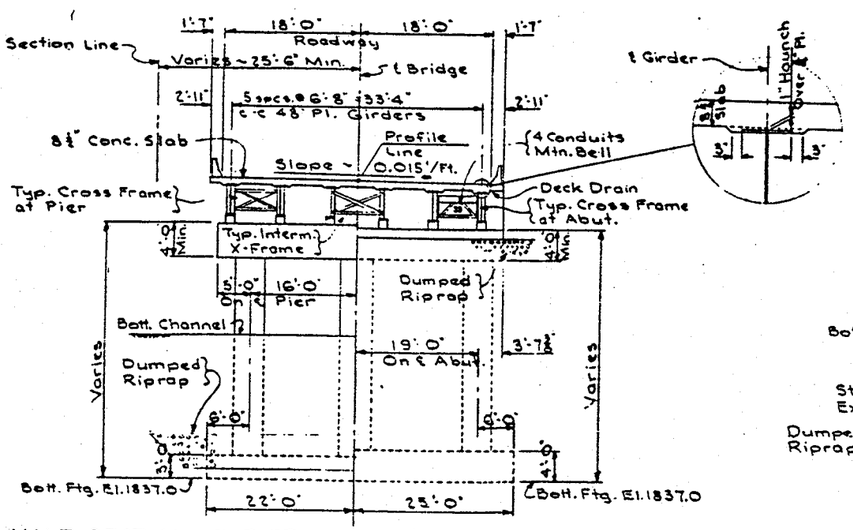
Concrete - Class S
Substructure shall be 4000 psi concrete
Bridge Deck shall be 4500 psi concrete
(Except fc = 1400 psi, n = 8)
Bridge Railing and Approach Slabs shall be 3500 psi concrete.

Footing Pressures
Allowable - 6000 psf
Pier
Max. DL + LL - 4760 psf
Max. DL + EQ - 7310 psf
Abutment
Max. DL + LL - 6290 psf
Max. DL + LL - 6360 psf

Mountain Bell Conduits
Conduits and Fasteners not a part of this contract.
Contact Mountain Bell, D.W. Brundage, phone no. 255-1628

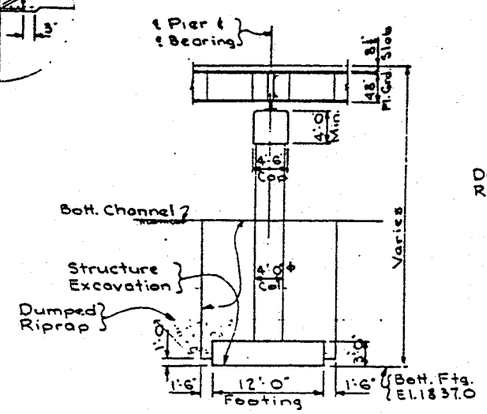
SUMMARY OF QUANTITIES

Class S Concrete (4500 psi)	377 C.Y.
Class S Concrete (4000 psi)	772 C.Y.
Class S Concrete (3500 psi)	110 C.Y.
Reinforcing Steel	207490 Lbs.
Structural Steel	441500 Lbs.
Structure Excavation	3400 C.Y.
Select Material	90 Tons
Aggregate Base	50 Tons

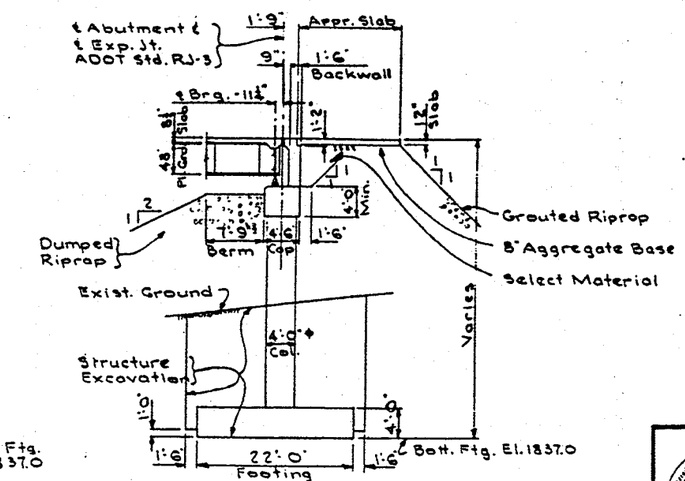


HALF-SECTION AT PIERS
HALF-SECTION AT ABUTMENTS

TYPICAL DECK SECTION
Scale: 1" = 10'



TYPICAL SECTION AT PIERS
Scale: 1" = 10'



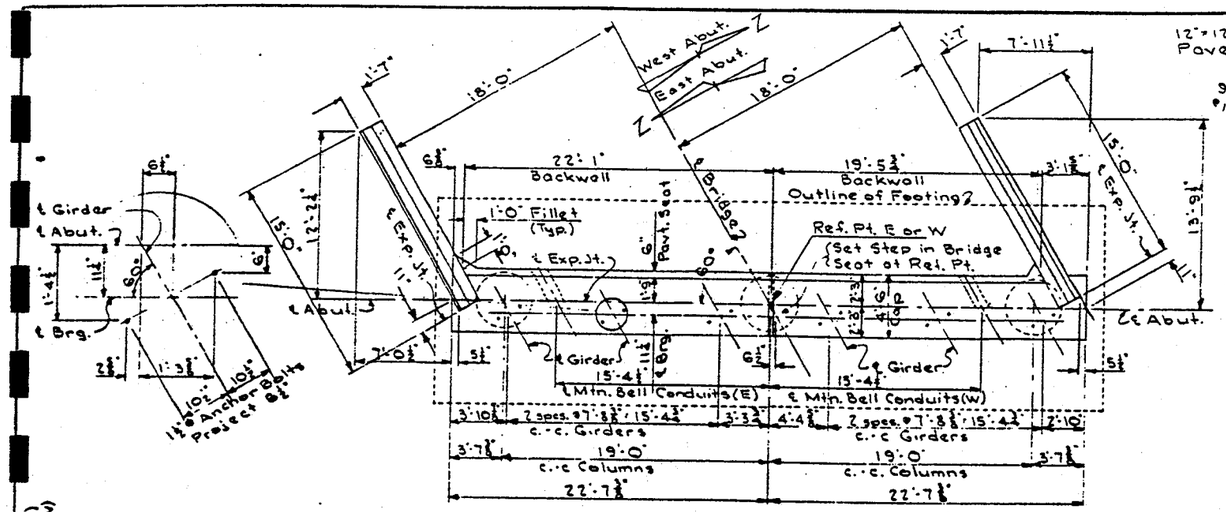
TYPICAL SECTION AT ABUTMENTS
Scale: 1" = 10'

GENERAL PLAN OF BRIDGE
STEEL BEAM ALTERNATE

MARICOPA COUNTY HIGHWAY DEPARTMENT

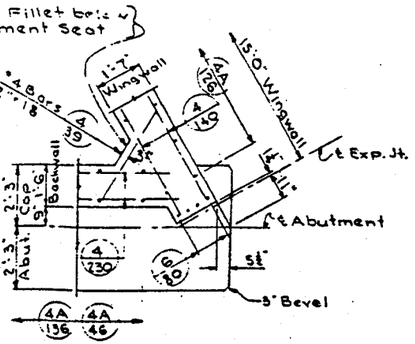
SCALE: As shown	APPROVED BY:	DRAWN BY: P.E.
DATE: 2-5-82		CHECKED:
CAREFREE HWY. - CAVE CREEK		
M.C.H.D. Project No. 07100		DRAWING NUMBER 22

Fed Aid Div No	STATE	PROJECT NO	SHEET No	TOTAL SHEETS	15 PLAN
7	ARIZONA	ER-RS-571(5)P	23	29	6-25-81



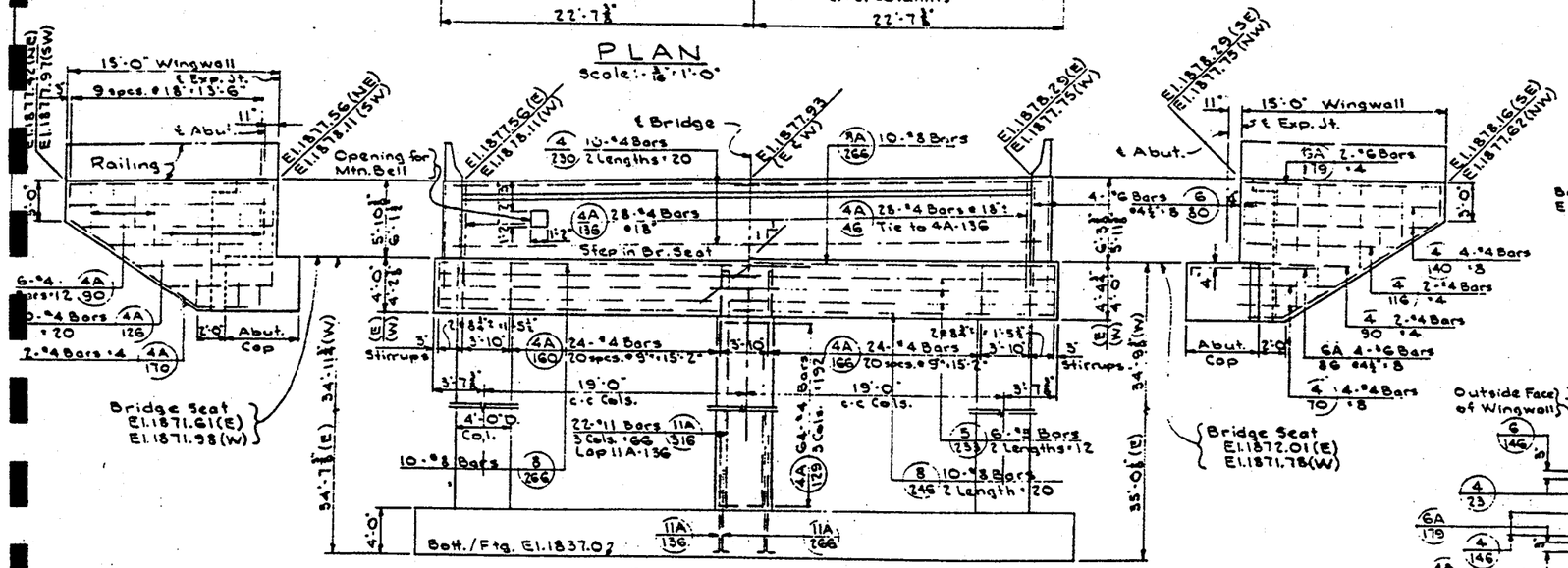
PLAN

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



CORNER DETAIL

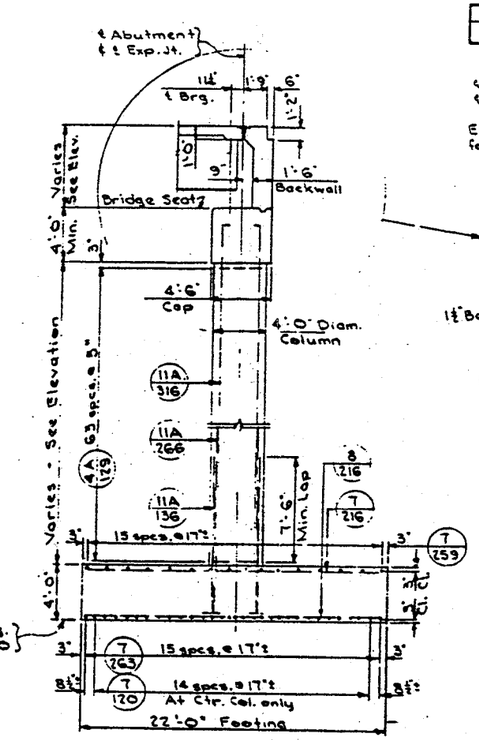
Scale: - 1/8" = 1'-0"



ELEVATION

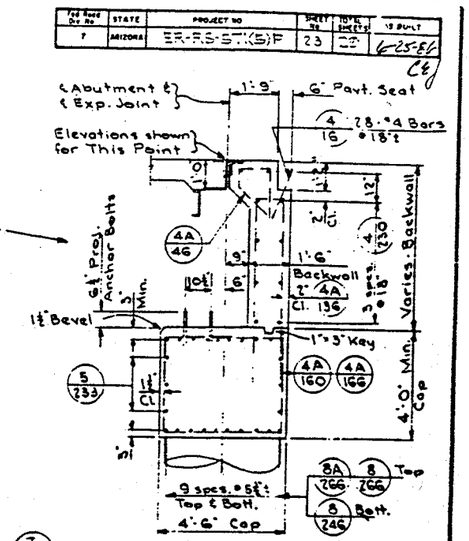
Scale: - 1/16" = 1'-0"

East Abutment shown, West Abutment similar as noted



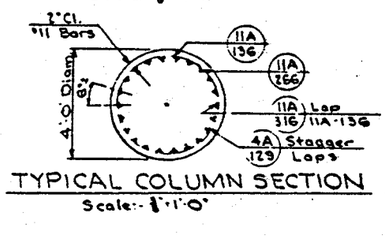
TYPICAL ABUTMENT SECTION

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



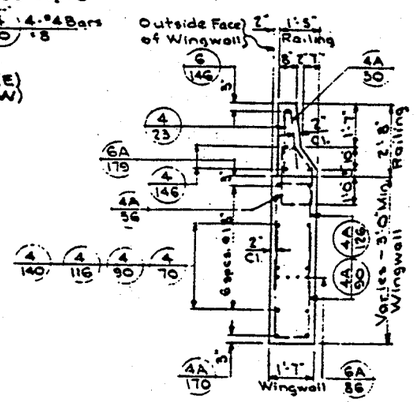
ABUTMENT CAP & BACKWALL DETAILS

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



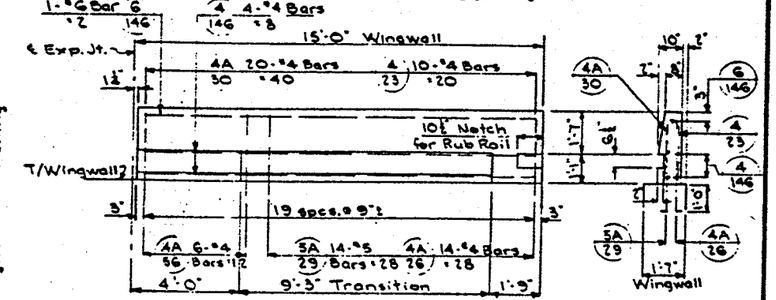
TYPICAL COLUMN SECTION

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



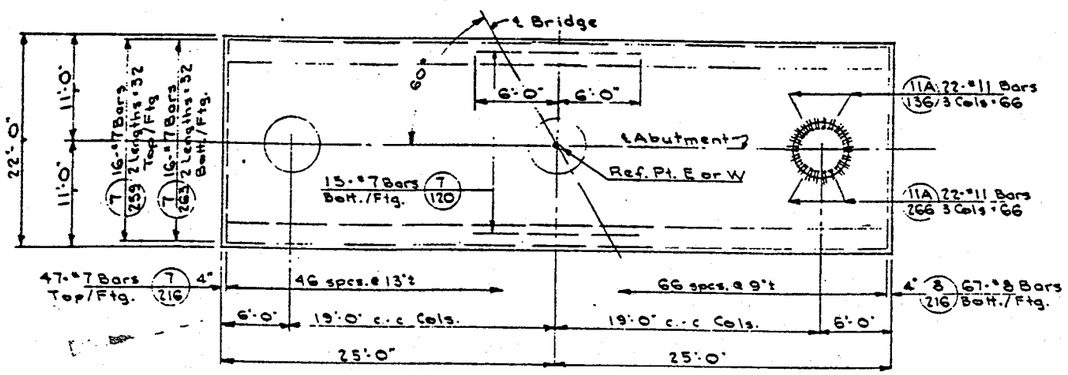
TYPICAL WINGWALL SECTION

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



RAILING ELEVATION

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



PLAN OF FOOTING

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

QUANTITIES FOR ONE ABUTMENT

Class S Concrete (4000 psi)

East Abutment	259 C.Y.
West Abutment	259 C.Y.
Class S Concrete (3500 psi)	3 C.Y.
Reinforcing Steel	41 800 Lbs.

NOTES

Concrete - Class S
- Substructure shall be 4000 psi concrete
- Bridge Railing shall be 3500 psi concrete
- Bridge Seat shall be finished in a true plane at the elevation shown and shall not vary by more than 1/8" under any bearing

Reinforcing Steel - Bar Marks shown for one abutment

Anchor Bolts shall be set accurately to a template

Bridge Railing - For Details of Transition and Guard Rail attachment see Drawing No. 29

Abbreviations
- (E) - East Abutment
- (W) - West Abutment

ABUTMENT DETAILS
STEEL BEAM ALTERNATE

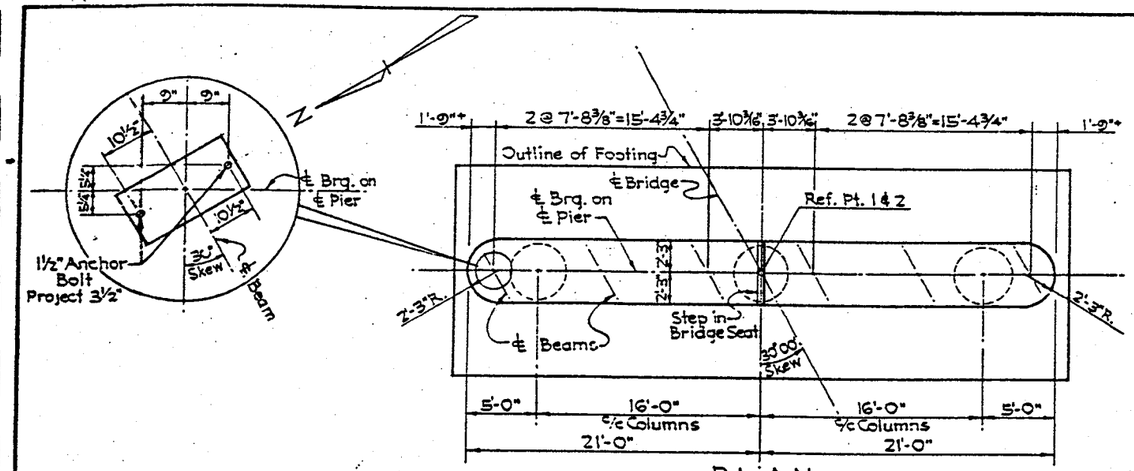
MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE As shown	APPROVED BY:	DRAWN BY P.E.
DATE: 3-4-82		CHECKED:

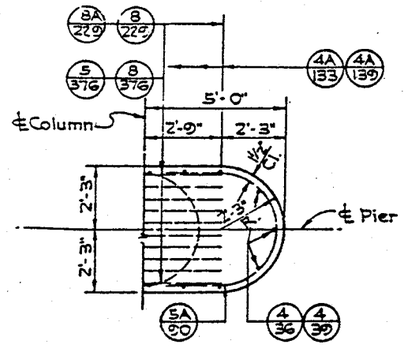
CAREFREE HWY. - CAVE CREEK

M.C.H.D. Project No. 07100 — DRAWING NUMBER 23

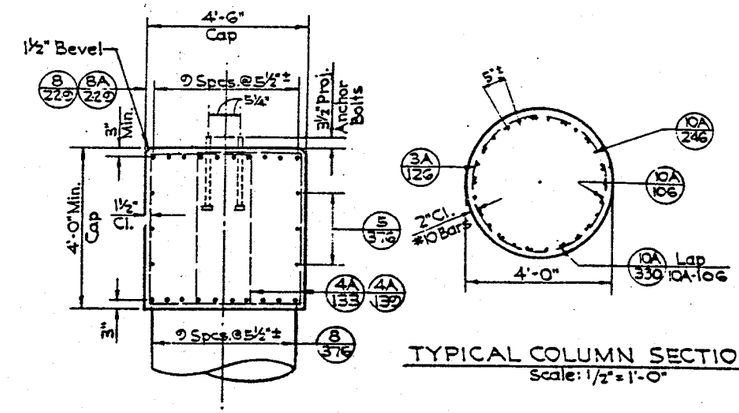
Fed Road Div. No	STATE	PROJECT NO	SHEET No	TOTAL SHEETS	ISSUED
7	ARIZONA	ER-RS-571(5)P	24	29	6-25-84



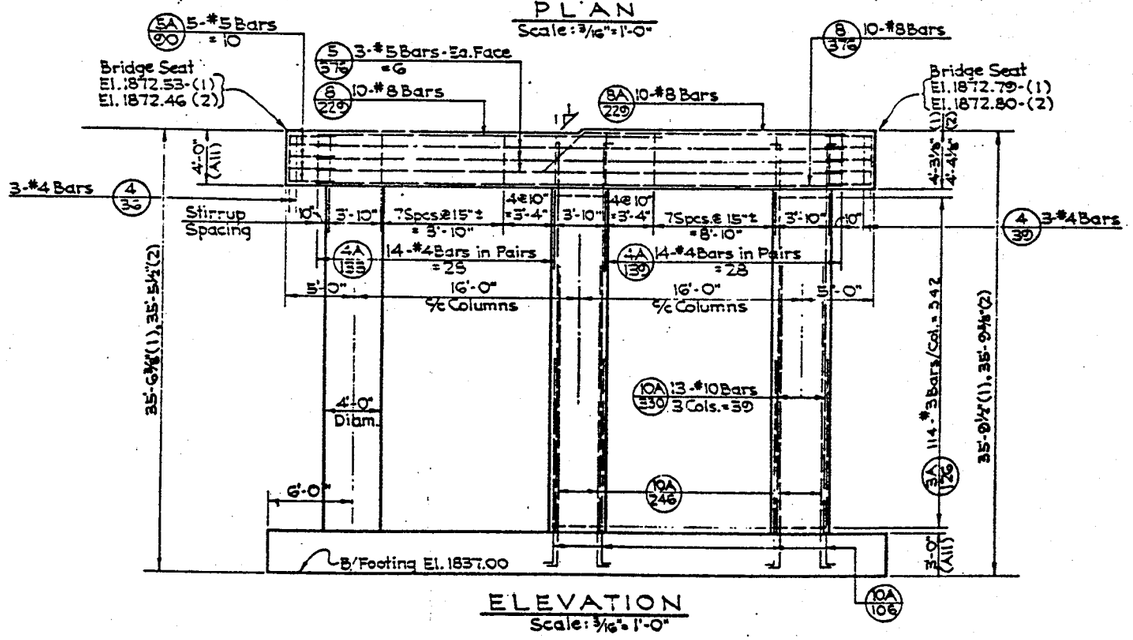
PLAN
Scale: 3/16" = 1'-0"



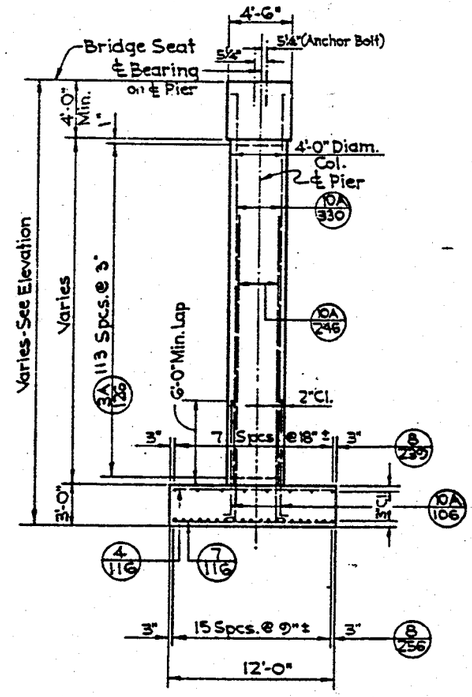
END OF PIER DETAIL
Scale: 3/8" = 1'-0"



TYPICAL COLUMN SECTION
Scale: 1/2" = 1'-0"



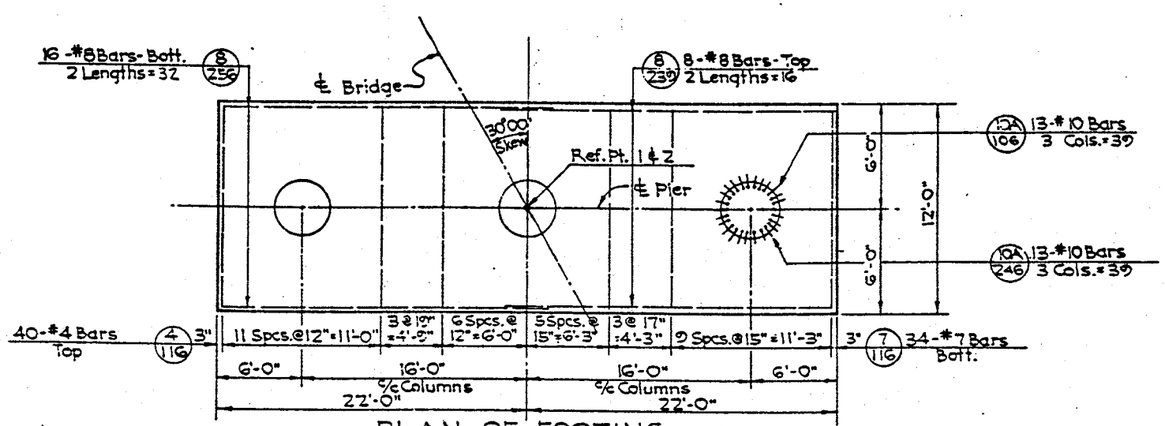
ELEVATION
Scale: 3/16" = 1'-0"



TYPICAL PIER SECTION
Scale: 3/16" = 1'-0"

NOTES

Concrete: Class S, 4000 psi.
All exposed corners shall be beveled ¾", unless otherwise noted.
Bridge Seat shall be finished in a true plane at the elevation shown and shall not vary by more than 1/16" under any bearing.
Reinforcing Steel - ASTM A-615, Grade 60. Bar Marks shown for one pier.
Anchor Bolts shall be set accurately to template.
Abbreviations:
(1) - Pier No. 1
(2) - Pier No. 2



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

QUANTITIES FOR ONE PIER

Class S Concrete 4000psi
Pier No. 1 _____ 127 C.Y.
Pier No. 2 _____ 127 C.Y.

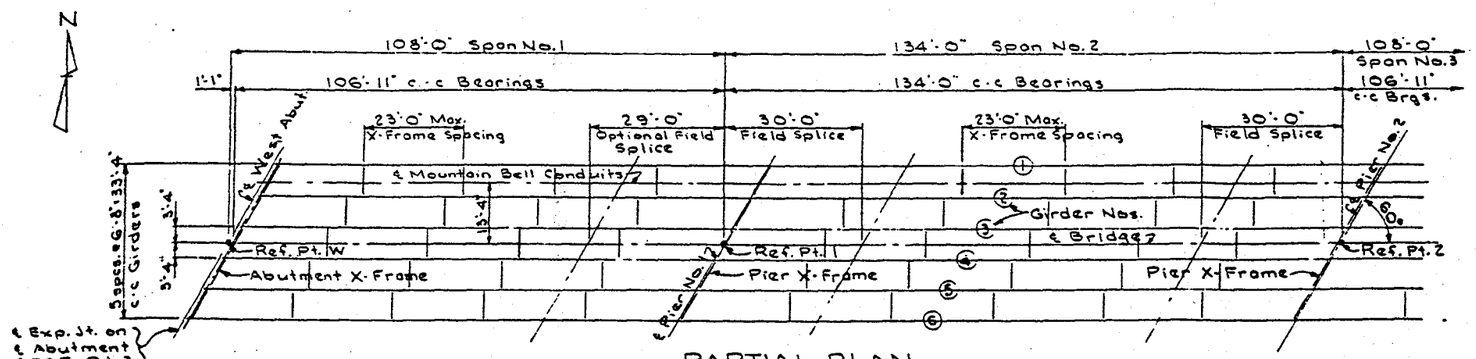
Reinforcing Steel _____ 20380 Lbs.

PIER DETAILS
STEEL BEAM ALTERNATE

MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE As Shown	APPROVED BY	DRAWN BY H.C.M.
DATE 3/4/82		CHECKED P.E.
CAREFREE HWY-CAVE CRK.		
M.C.H.D. Project No. 07100		DRAWING NUMBER 24

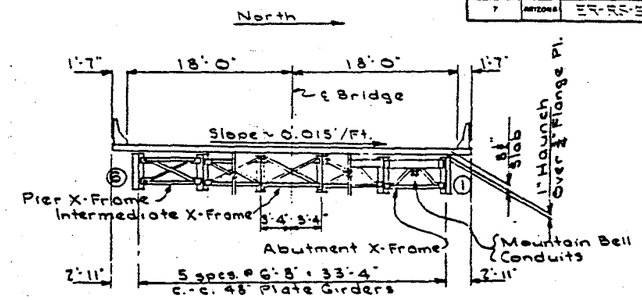
FED. ROAD DIV. NO.	STATE	PROJECT NO	SHEET NO.	TOTAL SHEETS	AS BUILT
7	ARIZONA	ER-RS-571(5)P	25	29	6-25-82



PARTIAL PLAN

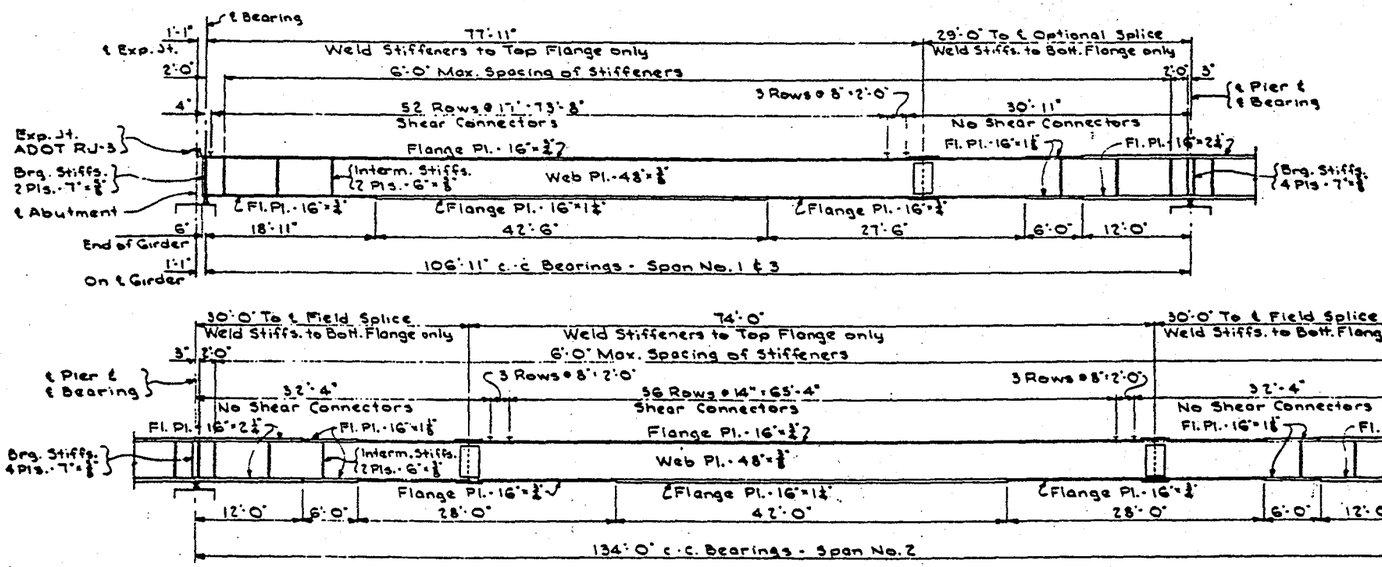
Scale:- 1/16" = 1'-0"

Span No. 3 similar to Span No. 1 by rotation thru 180°



TYPICAL SECTION

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



GIRDER ELEVATIONS

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

Note:- Fascia Girders ① & ⑥, Intermediate Stiffeners on Inside Face only

NOTES

Construction - Arizona D.O.T. Std. Specs. for Road and Bridge Constr., 1969 Edition, revised to date.

Structural Steel - ASTM A-36
Pay weight includes bearing details, shear connectors and expansion joints.
If Contractor decides to use optional field splice, pay weight will be adjusted accordingly.

Shop Connections shall be welded as shown on the Plans.
All welds shall conform to the current A.W.S. Specs., D1.1-80, revised to date.
A shop splice will be permitted in flange plates over 50 feet in length and must be located at a minimum distance of 10 feet from the center of the plate.
The web plate may be spliced at the option of the fabricator.
Minimum size of fillet welds shall be ¼"

Field Connections shall be bolted with high strength bolts, except for expansion joints, of the size indicated on the Plans
All bolts in field splices of fascia girders shall be inserted so that the nuts will be located either up or in.

Shear Connectors shall be Solid Flux Studs and shall be automatically end welded to the top flange

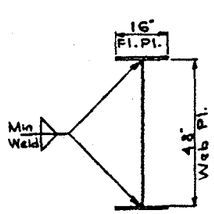
Camber - Girders shall have a parabolic camber as indicated on the Girder Control Diagram.
Camber tolerance shall be as specified by AWS Specs. and heating is to be used, if necessary, to assure camber permanency within these tolerances.

Painting
Shop Coat - 1 Coat Paint No.1
Field Coats - 1 Coat Paint No.2
Final - 1 Coat Paint No.10

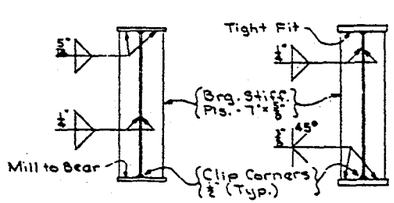
Work this sheet with sheet no. 26

QUANTITIES

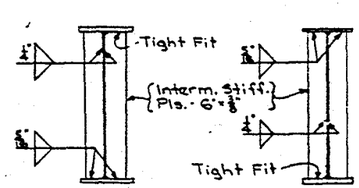
Structural Steel _____ 441,500 Lbs.



TYPICAL



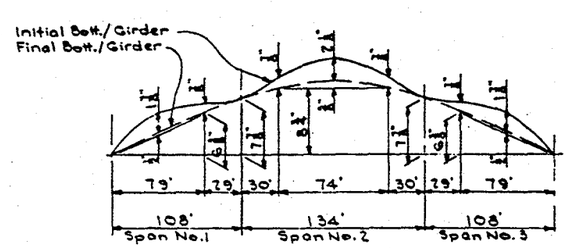
ABUTMENTS PIERS



NEAR PIERS MID-SPAN

GIRDER SECTIONS

Scale:- ½" = 1'-0"



GIRDER CONTROL DIAGRAM

Not to Scale

STRUCTURAL STEEL DETAILS
STEEL BEAM ALTERNATE

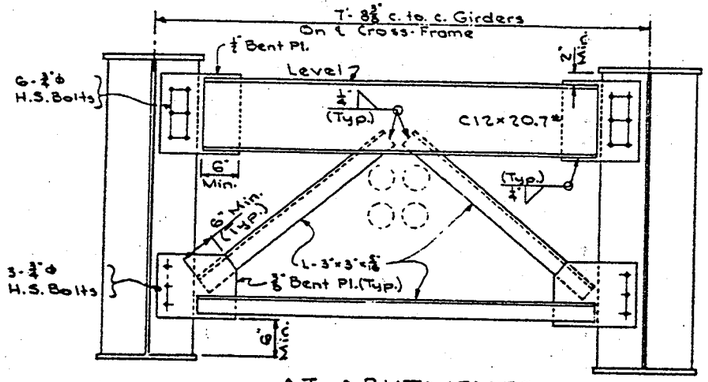
MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE As shown	APPROVED BY:	DRAWN BY P.E.
DATE 2-18-82		CHECKED

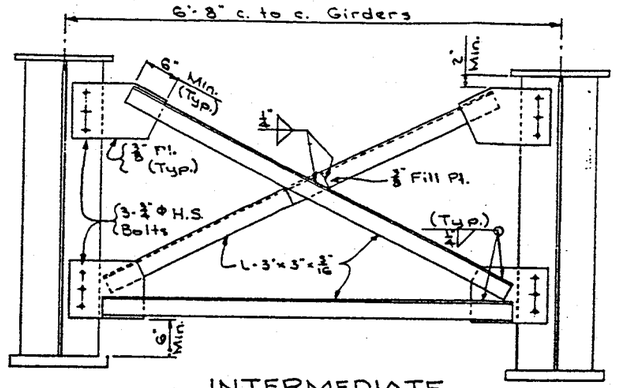
CAREFREE HWY. - CAVE CREEK

M.C.H.D. Project No. 07100 — DRAWING NUMBER 25

Fed Road Div No	STATE	PROJECT NO	SHEET No	TOTAL SHEETS	AS BUILT
7	ARIZONA	ER-RS-571(5)P	26	29	62596



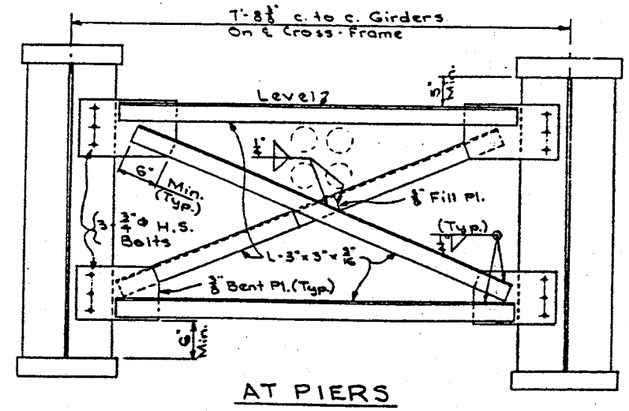
AT ABUTMENTS



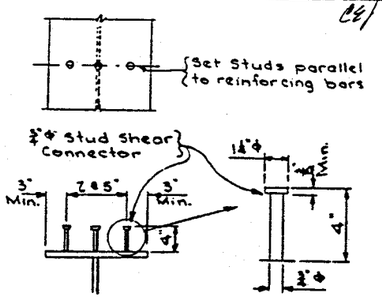
INTERMEDIATE

CROSS-FRAME DETAILS

Scale:- 1"=1'-0"

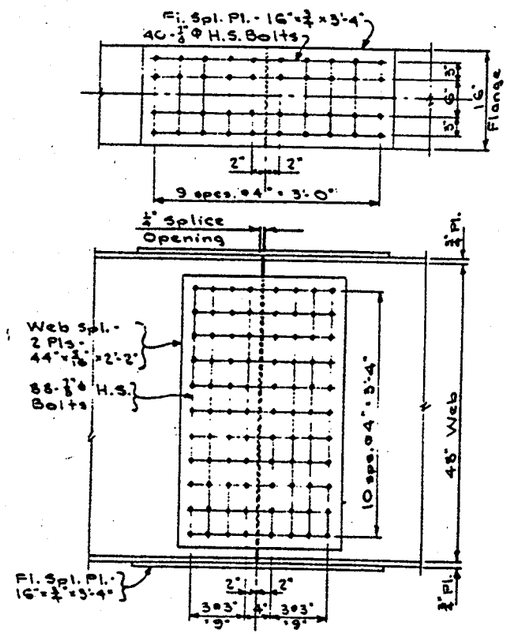


AT PIERS



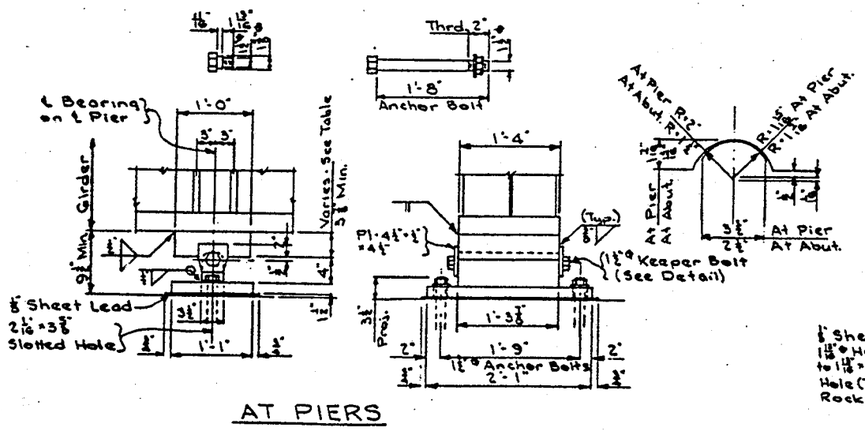
SHEAR CONNECTOR DETAILS

Scale:- 1"=1'-0"

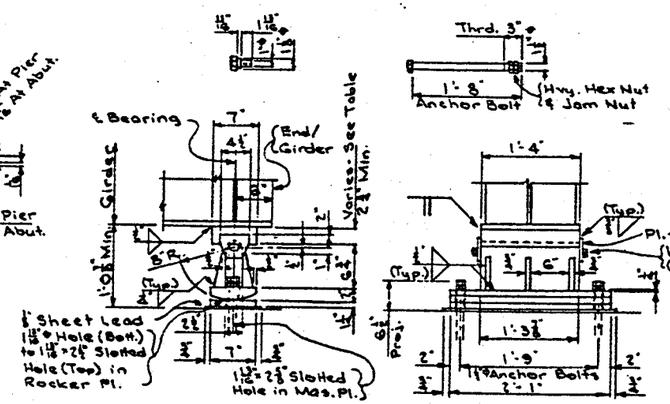


SPLICE DETAIL

Scale:- 1"=1'-0"



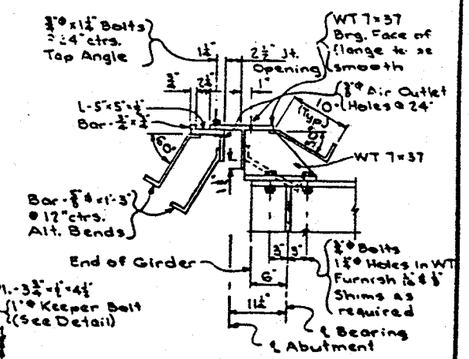
AT PIERS



AT ABUTMENTS

BEARING DETAILS

Scale:- 1"=1'-0"



EXPANSION JOINT DETAIL

Scale:- 1"=1'-0"

For Details not shown see ADOT Std. No RJ-3

BEARING THICKNESS TABLE						
Girder No.	1	2	3	4	5	6
West Abut.	2 3/4"	3 3/8"	4 1/8"	2 3/4"	3 3/8"	4 1/8"
Pier No. 1	3 7/8"	5"	6"	4"	5"	6"
Pier No. 2	4"	5 3/8"	6 3/8"	4"	5 3/8"	6 3/8"
East Abut.	2 3/4"	4 1/8"	6"	2 3/8"	4 1/8"	6"

Work This Sheet with Sh. No. 25

STRUCTURAL STEEL DETAILS
STEEL BEAM ALTERNATE

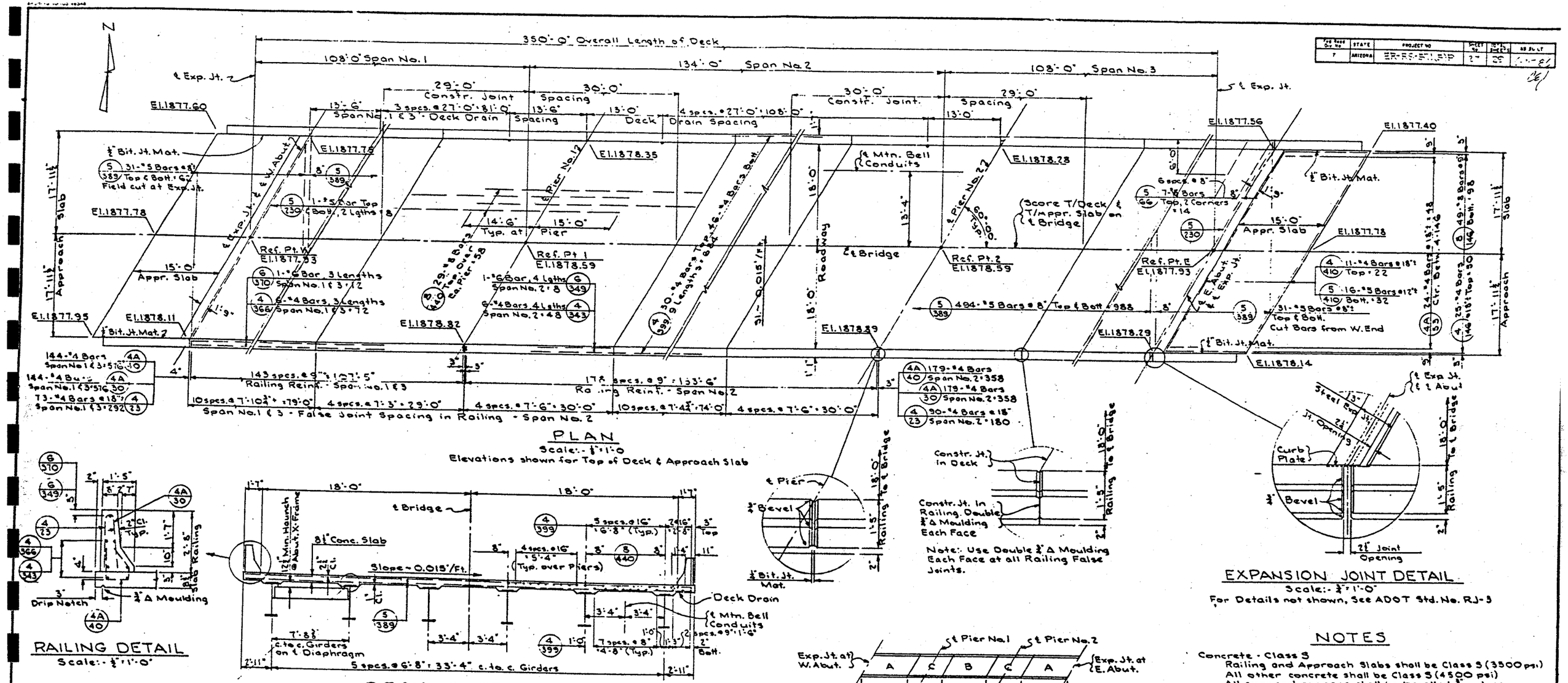
MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE As shown	APPROVED BY	DRAWN BY P.E.
DATE: 2-18-82		CHECKED

CAREFREE HWY.-CAVE CREEK

M.C.H.D. Project No. 07100 | Drawing number 26

FED ROAD DIV NO	STATE	PROJECT NO	SHEET NO	TOTAL SHEETS	AS BUILT
7	ARIZONA	ER-RS-571(5)P	27	29	



PLAN

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

Elevations shown for Top of Deck & Approach Slab

RAILING DETAIL

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

DECK SECTION

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

EXPANSION JOINT DETAIL

Scale:- 3/4" = 1'-0"

For Details not shown, See ADOT Std. No. RJ-3

DECK POUR DIAGRAM

Not to Scale

Deck Pours shall be made in alphabetical order

Railing shall not be poured until all deck pours are completed

DECK DRAIN DETAIL

Scale:- 3/4" = 1'-0"

For Details see ADOT Std. BM-1

QUANTITIES

Class S Concrete (3500 psi) ___ 104 C.Y.
Class S Concrete (4500 psi) ___ 377 C.Y.
Reinforcing Steel _____ 83130 Lbs.
Aggregate Base _____ 50 Tons

NOTES

Concrete - Class S
Railing and Approach Slabs shall be Class S (3500 psi)
All other concrete shall be Class S (4500 psi)
All exposed corners shall be bevelled 3/4" unless otherwise noted.

Reinforcing Steel - ASTM A-615, Grade 60
Minimum Bar Laps - #6 Bar = 1'-8"
#5 Bar = 1'-6"
#4 Bar = 1'-0"

Steel Expansion Joint - Included in Structural Steel
2 1/2" Joint Opening is set for 70°. For every 10° difference in temperature at time of installation adjust joint opening by 1/8"

For Details of End of Deck, Approach Slabs and Alternate Deck Section, see sheet no. 28

CONCRETE DECK DETAILS
STEEL BEAM ALTERNATE

MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE: As shown	APPROVED BY:	DRAWN BY: P.E.
DATE: 3-30-81		CHECKED:

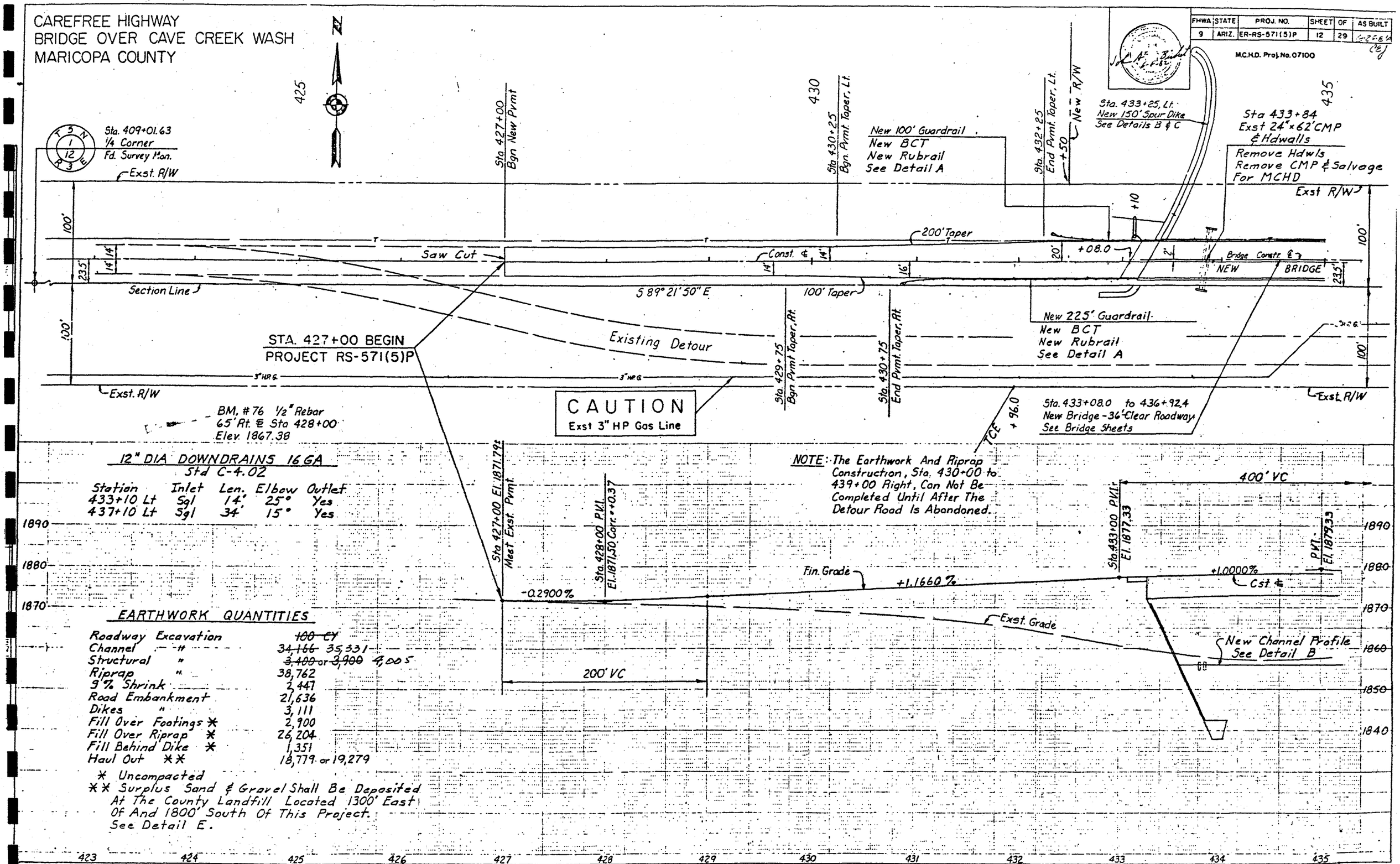
CAREFREE HWY. - CAVE CREEK

M.C.H.D. Project No. 07100 — DRAWING NUMBER 27

FHWA	STATE	PROJ. NO.	SHEET	OF	AS BUILT
9	ARIZ.	ER-RS-571(5)P	12	29	

M.C.H.D. Proj. No. 07100

CAREFREE HIGHWAY
BRIDGE OVER CAVE CREEK WASH
MARICOPA COUNTY



EARTHWORK QUANTITIES

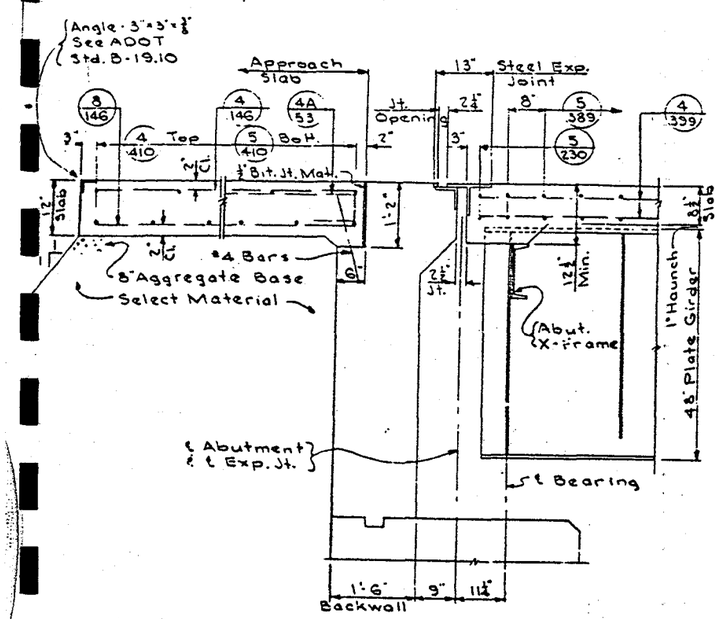
Roadway Excavation	~~100 CY~~
Channel "	~~34,166~~ 35,331
Structural "	~~3,400~~ or ~~3,900~~ 4,005
Riprap "	38,762
9% Shrink	2,447
Road Embankment	21,636
Dikes "	3,111
Fill Over Footings *	2,900
Fill Over Riprap *	26,204
Fill Behind Dike *	1,351
Haul Out **	18,779 or 19,279

* Uncompacted

** Surplus Sand & Gravel Shall Be Deposited At The County Landfill Located 1300' East Of And 1800' South Of This Project. See Detail E.

PLATE 1 SINGLE PLAN - PROFILE - DOTTED
CHARLES BRUNING COMPANY

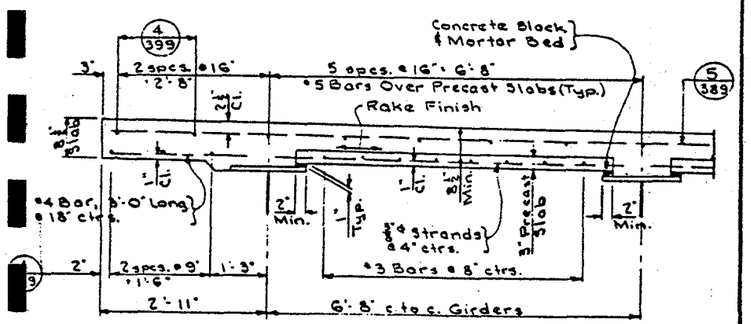
Fed. Road Div. No.	STATE	PROJECT NO	SHEET No.	TOTAL SHEETS	AS BUILT
7	ARIZONA	ER-RS-571(5)P	28	29	



SECTION AT END OF DECK

INCLUDING APPROACH SLAB

Scale:- 3/4" = 1'-0"



ALTERNATE DECK SECTION

Scale:- 3/4" = 1'-0"

PRECAST SLAB NOTES

Contractor may use precast concrete slabs, but no separate payment will be made and payment will be made on basis of cast-in-place deck, as if no precast slabs were used.

Fabrication of Slabs shall be equal to Precast Concrete Beams (See Notes on sheet no. 19)

Prestress Force
Initial - 48.2 kips per lin. ft. (16.1 kips per strand)
Final - 36.7 kips per lin. ft. (12.3 kips per strand)

CONCRETE DECK DETAILS
STEEL BEAM ALTERNATE

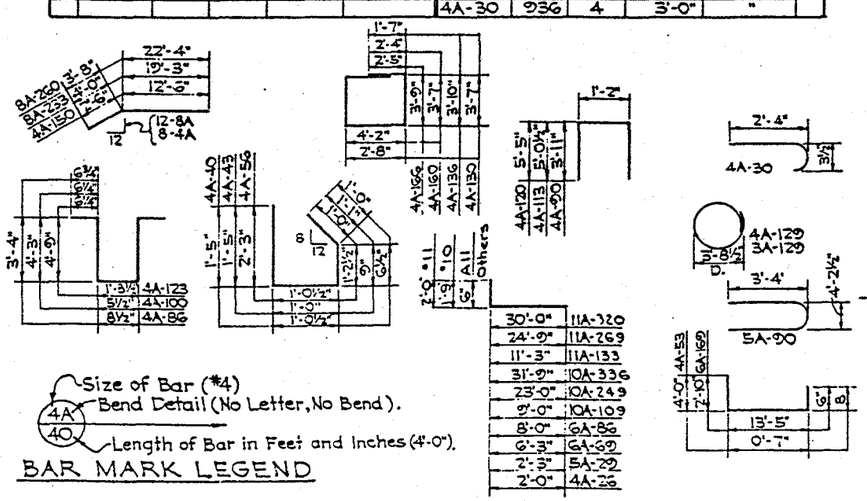
BILL OF REINFORCING BARS

CONCRETE BEAM ALTERNATE

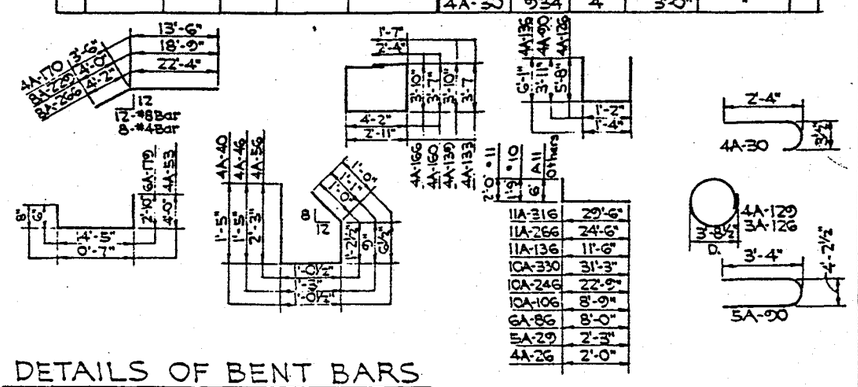
MARK	No.	Size	Length	Remarks	MARK	No.	Size	Length	Remarks	
11A-320	126	11	32'-0"	Bent	10A-336	117	10	33'-6"	Bent	ABUTMENTS (2)
11A-269	126	11	26'-9"	"	10A-249	117	10	24'-9"	"	
11A-133	126	11	13'-3"	"	10A-109	117	10	10'-9"	"	
8-263	20	8	26'-3"	Straight	8-386	30	8	38'-6"	Straight	
8-246	40	8	24'-6"	"	8-259	126		25'-9"	"	
8-216	134	8	21'-6"	"	8-233	90		23'-3"	"	
8A-260	20	8	26'-0"	Bent	8-116	102		11'-6"	"	
					8A-233	30	8	23'-3"	Bent	
7-276	64	7	27'-6"	Straight						
7-263	64	7	26'-3"	"	6A-69	75	6	6'-9"	Bent	
7-120	30	7	12'-0"	"						
					5-386	18	5	38'-6"	Straight	
6-216	94	6	21'-6"	Straight	5A-90	30	5	9'-0"	Bent	
6-136	4	6	13'-6"	"						
6-80	16	6	8'-0"	"	4-116	102	4	11'-6"	Straight	
6A-169	8	6	16'-9"	Bent	4-39	9	4	3'-9"	"	
6A-86	16	6	8'-6"	"	4-36	9	4	3'-6"	"	
					4A-136	114	4	13'-6"	Bent	
5-233	24	5	23'-3"	Straight	4A-130	114	4	13'-0"	"	
5A-29	56	5	2'-9"	Bent						
					3A-129	1035	3	12'-9"	Bent	
4-230	40	4	23'-0"	Straight						DECK & APPROACH SLABS
4-136	16		13'-6"	"	8-146	98	8	14'-6"	Straight	
4-130	16		13'-0"	"						
4-110	8		11'-0"	"	7-310	174	7	31'-0"	Straight	
4-90	8		9'-0"	"						
4-70	16		7'-0"	"	6-303	24	6	30'-3"	Straight	
4-23	40		2'-3"	"						
4-16	56		1'-6"	"	5-410	32	5	41'-0"	Straight	
4A-166	48		16'-6"	Bent	5-389	1050	5	38'-9"	"	
4A-160	48		16'-0"	"	5-230	8	5	23'-0"	"	
4A-150	8		15'-0"	"	5-66	14	5	5'-6"	"	
4A-129	390		12'-9"	"						
4A-120	56		12'-0"	"	4-410	22	4	41'-0"	Straight	
4A-113	32		11'-3"	"	4-399	684		39'-9"	"	
4A-90	24		9'-0"	"	4-303	144		30'-3"	"	
4A-56	20		5'-6"	"	4-146	50		14'-6"	"	
4A-43	56		4'-3"	"	4-59	60		5'-9"	"	
4A-30	72		3'-0"	"	4-53	120		5'-3"	"	
4A-26	56	4	2'-6"	"	4-50	240		5'-0"	"	
					4-23	472		2'-3"	"	
					4A-123	90		12'-3"	Bent	
					4A-100	200		10'-0"	"	
					4A-86	60		8'-6"	"	
					4A-53	48		5'-3"	"	
					4A-40	936		4'-0"	"	
					4A-30	936	4	3'-0"	"	

STEEL BEAM ALTERNATE

MARK	No.	Size	Length	Remarks	MARK	No.	Size	Length	Remarks	
11A-316	132	11	31'-6"	Bent	10A-330	78	10	33'-0"	Bent	ABUTMENTS (2)
11A-266	132	11	26'-6"	"	10A-246	78	10	24'-6"	"	
11A-136	132	11	13'-6"	"	10A-106	78	10	10'-6"	"	
8-266	20	8	26'-6"	Straight	8-376	20	8	37'-6"	Straight	
8-246	40	8	24'-6"	"	8-256	64		25'-6"	"	
8-216	134	8	21'-6"	"	8-229	32		23'-9"	"	
8A-266	20	8	26'-6"	Bent	8-229	20		22'-9"	"	
					8A-229	20	8	22'-9"	Bent	
7-263	64	7	26'-3"	Straight						
7-259	64	7	25'-9"	"	7-116	68	7	11'-6"	Straight	
7-216	94	7	21'-6"	"						
7-120	30	7	12'-0"	"	5-376	12	5	37'-6"	Straight	
					5A-90	20	5	9'-0"	Bent	
6-146	4	6	14'-6"	Straight						
6-80	16	6	8'-0"	"	4-116	80	4	11'-6"	Straight	
6A-169	8	6	17'-9"	Bent	4-39	6		3'-9"	"	
6A-86	16	6	8'-6"	"	4-36	6		3'-6"	"	
					4A-139	56		13'-9"	Bent	
5-233	24	5	23'-3"	Straight	4A-133	56	4	13'-3"	"	
5A-29	56	5	2'-9"	Bent						
					3A-126	684	3	12'-6"	Bent	
4-230	40	4	23'-0"	Straight						DECK & APPROACH SLABS
4-146	16		14'-6"	"	8-440	58	8	44'-0"	Straight	
4-140	16		14'-0"	"	8-146	98	8	14'-6"	"	
4-116	8		11'-6"	"						
4-90	8		9'-0"	"	6-370	12	6	37'-0"	Straight	
4-70	16		7'-0"	"	6-349	8	6	34'-9"	"	
4-39	36		3'-9"	"						
4-23	40		2'-3"	"	5-410	32	5	41'-0"	Straight	
4-16	56		1'-6"	"	5-389	1050		38'-9"	"	
4A-170	8		17'-0"	Bent	5-230	8		23'-0"	"	
4A-166	48		16'-6"	"	5-66	14	5	6'-6"	"	
4A-160	48		16'-0"	"						
4A-136	36		13'-6"	"	4-410	22	4	41'-0"	Straight	
4A-129	384		12'-9"	"	4-399	684		39'-9"	"	
4A-126	40		12'-6"	"	4-366	72		36'-6"	"	
4A-90	24		9'-0"	"	4-343	48		34'-3"	"	
4A-56	24		5'-6"	"	4-146	50		14'-6"	"	
4A-46	56		4'-6"	"	4-23	472		2'-3"	"	
4A-30	80		3'-0"	"	4A-53	48		5'-3"	Bent	
4A-26	56	4	2'-6"	"	4A-40	934		4'-0"	"	
					4A-30	934	4	3'-0"	"	



30'-0"	11A-320
24'-9"	11A-269
11'-3"	11A-133
31'-9"	10A-336
23'-0"	10A-249
9'-0"	10A-109
8'-0"	6A-86
6'-3"	6A-69
2'-3"	5A-29
2'-0"	4A-26



29'-6"	11A-316
24'-6"	11A-266
11'-6"	11A-136
31'-3"	10A-330
22'-9"	10A-246
8'-9"	10A-106
8'-0"	6A-86
2'-3"	5A-29
2'-0"	4A-26

DETAILS OF BENT BARS

Not to Scale

Note: All dimensions are center to center.

REINFORCING STEEL DETAILS

MARICOPA COUNTY HIGHWAY DEPARTMENT

SCALE: As Shown	APPROVED BY	DRAWN BY H.C.M.
DATE: 5-14-82		CHECKED
CAREFREE HWY. - CAVE CREEK		
M.C.H.D. Project No. C7100		DRAWING NUMBER 28