REPORT TO THE CONGRESS

Savings Available Under The Program For Relocating Roads And Bridges At The Auburn Dam And Reservoir In California B-125045

Bureau of Reclamation
Department of the Interior

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

MAY 7,1971

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-125045

To the President of the Senate and the
Speaker of the House of Representatives

This is our report on the savings available under the program for relocating roads and bridges at the Auburn Dam and Reservoir in California, as administered by the Bureau of Reclamation, Department of the Interior.

Our review was made pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

Copies of this report are being sent to the Director, Office of Management and Budget, and to the Secretary of the Interior.

Comptroller General
of the United States

COMPTROLLER GENERAL'S REPORT TO THE CONGRESS

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D I G E S T

WHY THE REVIEW WAS MADE

Roads and bridges to be flooded as a result of water resources projects of the Bureau of Reclamation, Department of the Interior, may, by statutory authority, be relocated by the Bureau. The law directs that replacement of a road or bridge must be designed on the basis of current traffic and must be constructed in accordance with applicable State or county standards. If a replacement is constructed to higher standards, the additional cost must be paid by the owner, usually the local governmental unit having jurisdiction. (See p. 10.)

Because of the large amount of money--about $52 million--involved in relocating roads and bridges to be flooded following completion of the Auburn Dam and Reservoir (a part of the Central Valley Project near Auburn, California) and because of indications that these relocations were not being carried out as the law directed, the General Accounting Office (GAO) reviewed the policies, procedures, and practices followed by the Bureau in the relocation program.

FINDINGS AND CONCLUSIONS

The Auburn-Foresthill Bridge is being constructed to meet projected (not current) traffic needs and the Bureau is financing the entire cost. The additional cost of constructing the bridge to standards higher than required to meet current traffic needs--at least $1.5 million in this case--was not eligible for Federal participation under the Flood Control Act of 1960, as amended.

Although legislation enacted on December 31, 1970, specifically authorized the Bureau's version of the bridge, there is need for a Bureau policy to preclude the occurrence of similar relocation problems. (See p. 8.)

The Bureau is planning to replace certain, little-used, local dirt roads and bridges upstream from the Auburn Dam with a new highway system at an estimated cost of $26.2 million. GAO believes that, on the basis of the condition of the existing roads, the current traffic, the purposes served, and the availability of other roads and bridges to serve existing traffic,

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replacement is not justified and that the local upstream roads and bridges should be abandoned. (See p. 19.)

The Bureau is planning to relocate existing State Highway 49 across the crest of the Auburn Dam at an estimated cost of $10.5 million. On the basis of rough estimates by the Bureau, GAO believes that there is a possibility that $5.5 million could be saved by relocating the road downstream from the dam. More importantly, this alternative would permit annual benefits--the value of products or services resulting from the project--of as much as $59 million to begin to be realized from the Auburn project 3 years earlier. (See p. 34.)

RECOMMENDATIONS OR SUGGESTIONS

The Secretary of the Interior should require the Commissioner of Reclamation to

--establish policies and procedures for relocating roads and bridges in accordance with the Flood Control Act of 1960, as amended (see p. 18);

--abandon the existing, little-used, local dirt roads and bridges (see p. 33);

--develop criteria for determining when roads or bridges affected by Bureau projects should be abandoned rather than replaced (see p. 33);

--reconsider several alternatives for relocating the State Highway 49 bridge to determine which is the most economical when both costs and benefits are considered (see p. 40); and

--develop procedures for all Bureau water resources projects to provide for consideration of the effect that road and bridge relocations will have on the realization of project benefits (see p. 40);

AGENCY ACTIONS AND UNRESOLVED ISSUES

The Department of the Interior disagreed with GAO's recommendations and, in effect, took the position

--that, irrespective of the legislation enacted on December 31, 1970, regarding the construction of the Auburn-Foresthill Bridge, the Bureau did not agree with GAO's conclusion that construction of the bridge to meet projected traffic needs was a violation of law (see p. 16);

--that, in adopting the Bureau's feasibility report and authorizing the project, the Congress recognized the need for replacing the dirt roads and bridges upstream from the Auburn Dam (see p. 32);

--that a more detailed cost estimate for relocating Highway 49 downstream from the dam would probably be considerably higher than the $5 million rough estimate and that it appeared highly doubtful that the Office of Management and Budget and the Congress would be amenable to appropriating funds sufficient for the highway relocation and the dam construction to be undertaken at the same time (see p. 39).

GAO has evaluated the Department's views and continues to believe that the recommended actions should be implemented.

MATTERS FOR CONSIDERATION BY THE CONGRESS

These matters are being reported to the Congress because of the opportunity for substantial savings in the relocation of roads and bridges at the Auburn Dam and Reservoir and the need for the Bureau to adopt policies and procedures consistent with the intent of the Flood Control Act of 1960, as amended.

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CHAPTER 1

INTRODUCTION

The General Accounting Office has made a review of the policies, procedures, and practices of the Bureau of Reclamation, Department of the Interior, for road and bridge relocations necessitated by the construction of the Auburn-Folsom South Unit, Central Valley Project, California, which was authorized by Public Law 89-161, dated September 2, 1965 (79 Stat. 615).

The Bureau of Reclamation is authorized to construct, operate, and maintain facilities for the storage and distribution of water for irrigating arid and semiarid lands in 17 western States. In addition to providing water for irrigation, the Bureau is authorized to provide water for domestic and industrial uses and for the generation of hydroelectric energy.

The authority of the Bureau to acquire public service facilities, such as roads and bridges, for relocation necessitated by the construction of water resources projects is derived primarily from section 14 of the Reclamation Project Act of 1939 (43 U.S.C. 389) and section 207(c) of the Flood Control Act of 1960, as amended by Public Law 87-874, dated October 23, 1962 (33 U.S.C. 701r-1(c)).

Section 14 of the Reclamation Project Act of 1939 authorizes the Secretary of the Interior, in connection with the construction or operation and maintenance of any water resources project, to (1) purchase or condemn suitable lands or interests in lands for relocating highways and roads, the relocation of which is necessitated by the project, (2) perform any or all work involved in such relocations, and (3) enter into contracts with the owners of the highways and roads to acquire the property needed for the relocation or to perform any or all work involved in the relocation.

Section 207(c) of the Flood Control Act of 1960, as amended, authorizes the Bureau to relocate or replace existing roads which would interfere with the construction of water resources projects. The act also provides definitive

criteria as to the types of substitute roads to be constructed with Federal funds. Section 207(c) of the act provides that:

> "*** For water resources projects to be constructed in the future, when the taking by the Federal Government of an existing public road necessitates replacement, the substitute provided will, as nearly as practicable, serve in the same manner and reasonably as well as the existing road. The head of the Agency concerned is authorized to construct such substitute roads to design standards comparable to those of the State, or, where applicable State standards do not exist, those of the owning political division in which the road is located, for roads of the same classification as the road being replaced. The traffic existing at the time of the taking shall be used in the determination of the classification. In any case where a State or political subdivision thereof requests that such a substitute road be constructed to a higher standard than that provided in the preceding provisions of this subsection, and pays, prior to commencement of such construction, the additional costs involved due to such higher standard, such Agency head is authorized to construct such road to such higher standard. Federal costs under the provisions of this subsection shall be part of the nonreimbursable project costs."

The Bureau's policy for the relocation of roads in accordance with the Flood Control Act of 1960, as amended, states that the classification of a road is determined by the actual traffic volume existing at the time of taking, not by the projected traffic volume.

The Bureau's policy also provides for the use of applicable State, county, or local design standards when they exist; and, when applicable standards do not exist, the policy provides for the road to be relocated to standards comparable to those of the road being replaced.

The purposes of the Auburn-Folsom South Unit are irrigation, power production, municipal and industrial water,

recreation, fish and wildlife enhancement, and flood control. The costs allocated to irrigation, power production, municipal and industrial water, and a portion of the costs allocated to recreation and fish and wildlife enhancement are reimbursable to the Government from project revenues. The costs allocated to flood control and a portion of the costs allocated to recreation and fish and wildlife enhancement are not reimbursable.

The Bureau's policy for relocating roads and highways pursuant to the Flood Control Act of 1960, as amended, provides that:

1. The cost of a relocation in kind be allocated to both the reimbursable and nonreimbursable purposes of the project.

2. The additional cost associated with relocating roads to current standards for current traffic be a nonreimbursable project cost.

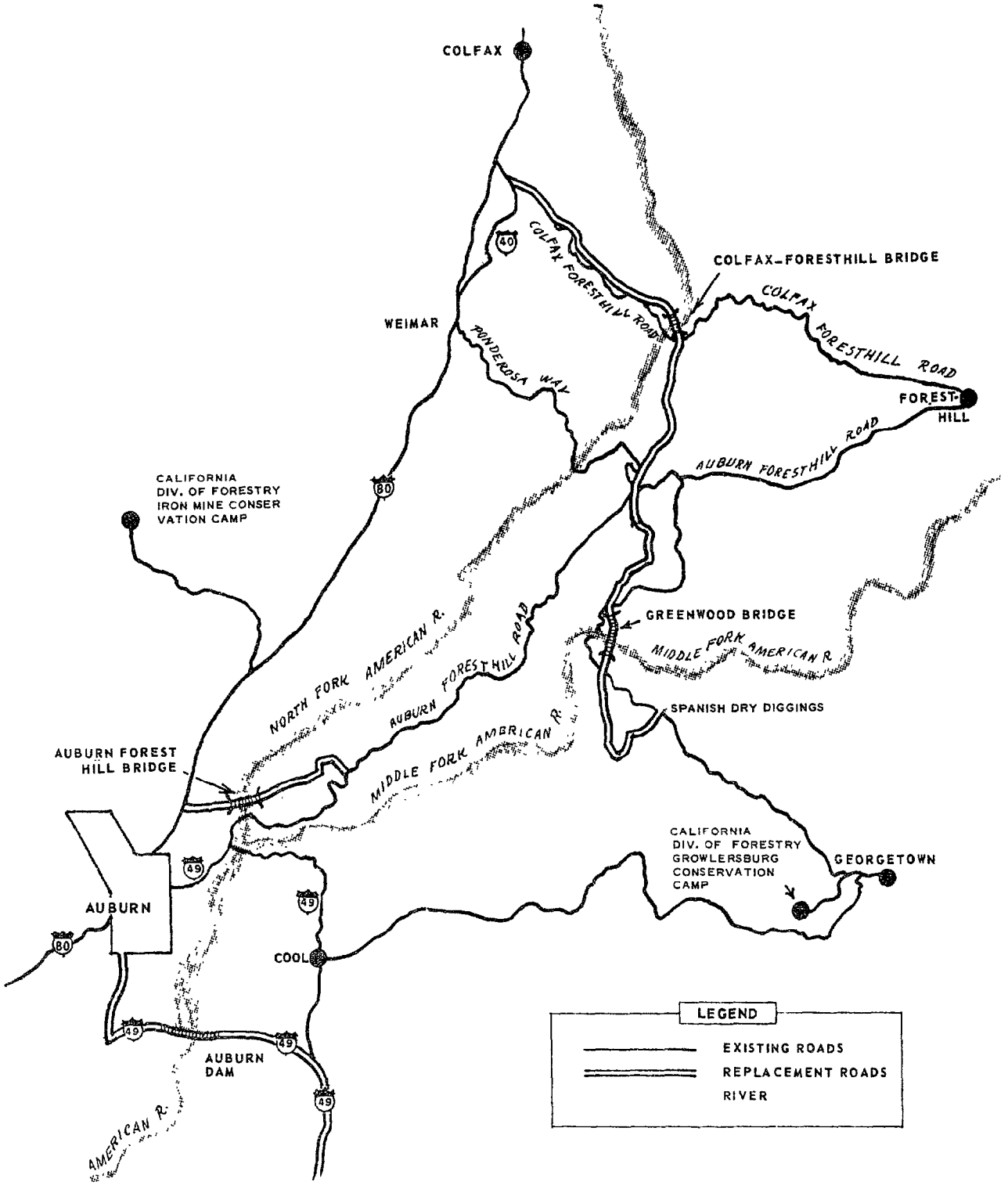
3. The additional cost of relocating roads to standards higher than current standards for current traffic be a nonproject cost and be borne by the State or political subdivision.

The prinicpal features of the Auburn-Folsom South Unit are the Auburn Dam and Reservoir which will be located near Auburn, on the American River. The reservoir will have a storage capacity of about 2.5 million acre-feet of water. In January 1970 the estimated cost of the Auburn-Folsom South Unit was $530 million. At that time the Unit was about 5-percent completed and was scheduled for completion sometime after 1976.

We have reviewed the Bureau's plans for constructing four bridges and relocating portions of (1) State Highway 49, (2) two county roads, and (3) a Federal fire road, each of which will be inundated when the Auburn Reservoir is filled. (See map of Auburn relocations on p. 7.) The Bureau estimates that it will cost about $52 million to construct the bridges and relocate the roads.

EXISTING AND PROPOSED ROADS AND BRIDGES

IN THE VICINITY OF AUBURN DAM AND RESERVOIR



CHAPTER 2

IMPROVEMENTS NEEDED IN RELOCATING ROADS AND BRIDGES

The Bureau is planning three separate relocations--including four bridges--at the Auburn-Folsom South Unit at an estimated cost to the Federal Government of $52 million. Two of the relocations involve one road and one bridge each; the other relocation involves one road and two bridges. One relocation, Auburn-Foresthill Road and Bridge, is currently under construction. The two remaining relocations have not been started.

We believe that the Bureau can modify its plans for the relocation of the roads and bridges, without affecting the manner in which existing traffic is being served, and can realize savings of about $31.7 million. For the relocation already under way--Auburn-Foresthill--we found that the bridge was being constructed to standards higher than required to meet current traffic needs and that the Bureau was financing the entire construction cost. Although the additional cost--at least $1.52 million--of relocating the road to standards higher than required to meet current traffic needs was not eligible for Federal participation under legislation existing at the time the construction contracts were awarded, specific legislation subsequently was enacted which gave the Bureau the authority to construct the bridge to higher standards at Government expense. We believe that a policy is needed, however, to prevent other similar relocation problems.

For one of the other relocations, the Bureau is planning to replace certain, little-used, local dirt roads and bridges with 13 miles of new highway, including two bridges, at an estimated cost of $26.2 million. Our review of the condition of the roads, the existing traffic, the purposes served, and the availability of other roads and bridges to serve existing traffic indicates that replacement of the roads and bridges is not justified and that they should be abandoned.

For the remaining relocation, the Bureau plans to route an existing State road across the crest of the Auburn Dam at an estimated cost of $10.5 million. On the basis of

an unrefined cost estimate of the Bureau, we believe that there is a possibility that $5.5 million could be saved by relocating the road on a different alignment downstream from the dam. More importantly, this alternative alignment would permit annual benefits--the value of products or services resulting from the project--of as much as $59 million to begin to be realized some 3 years earlier.

Our findings on the above matters are discussed in the following sections of the report.

NEED FOR IMPROVED GUIDANCE IN RELOCATING ROADS AND BRIDGES

Construction of the Auburn Dam will necessitate the relocation of a portion of the county-owned two-lane Auburn-Foresthill Road at an estimated cost of $1.9 million and the construction of a new bridge to carry the road across the North Fork of the American River at an estimated cost of $13.9 million. Although the Bureau recognized that traffic on the road did not justify more than a two-lane bridge, it awarded two contracts for the construction of the new bridge which provided for heavier piers and abutments (substructure) and a deck truss (superstructure) capable of supporting four lanes of traffic. The Flood Control Act of 1960, as amended, limits the Bureau's participation in the cost of the bridge to the cost of contructing a facility to accommodate two lanes of traffic. The additional cost of providing the heavier substructure and superstructure to support four lanes of traffic could not be borne by the Government under the Flood Control Act of 1960, as amended.

The existing two-lane road connects the communities of Auburn and Foresthill and covers a distance of about 20 miles. The road crosses the North Fork of the American River at the bottom of the American Canyon and will be inundated when the Auburn Dam begins to impound water. The new bridge will be 2,428 feet long and about 700 feet above the present level of the North Fork of the American River.

In a letter dated December 13, 1967, to the Commissioner of Reclamation, the Acting Regional Director, Region 2 of the Bureau of Reclamation, stated that the Bureau's legal obligation, under the Flood Control Act of

1960, as amended, was limited to the construction of a two-lane bridge but that traffic would require a four-lane bridge by 1985. The Acting Regional Director stated also that it would be much more economical to provide for future widening of the bridge at the time of contruction than to attempt the extremely difficult and costly task of building a second bridge at a later date. He stated further that the cost of providing for future widening of the bridge would, under normal circumstances, be financed by the owner--Placer County--but that, because the county could not finance the heavier bridge structure, he believed that the Bureau should bear the cost.

Under the Flood Control Act of 1960, as amended, the Bureau is authorized to construct substitute roads and bridges to applicable State or county standards for the classifications of roads being replaced; the classification must be based upon current, not projected, traffic. If a road is constructed to higher standards, the owner must pay the additional cost that is attributable to the higher standards. The Bureau recognized that traffic on the existing road, at the time of taking, was 2,000 vehicles a day and that, under State standards, a four-lane bridge would not be required until the traffic reached 7,500 vehicles a day.

The additional cost of providing a bridge structure capable of supporting four lanes, as opposed to two lanes, was estimated by the Bureau in March 1968 to be about $4.4 million. In accordance with the Flood Control Act of 1960, as amended, this additional cost should have been paid by Placer County prior to commencement of construction of the bridge.

However, in a letter dated May 7, 1968, to the Regional Director, Region 2, the Acting Commissioner of Reclamation approved the construction, at Bureau expense, of a two-lane bridge with a substructure and superstructure capable of supporting four lanes. The Acting Commissioner stated that, if the Bureau constructed the bridge as proposed, it would be not only a relocation under the Flood Control Act of 1960, as amended, but also a part of the project facilities under the general authorization for the project, Public Law 89-161. He stated also that the additional cost of constructing the heavier bridge structure

would be a reimbursable cost incurred for the benefit of the project and not a nonreimbursable cost pursuant to the Flood Control Act of 1960, as amended. He stated further that the additional two lanes would be constructed at a later date by the appropriate highway authority.

The primary reason given by the Acting Commissioner for considering the heavier bridge structure as beneficial to the project was the possible monetary losses to the Bureau if it was not provided. The Acting Commissioner concluded that, since Placer County could not finance the betterment, the only feasible alternative to the Bureau's financing the betterment would be the future construction of a second bridge by the County. Future construction of a second bridge would necessitate drawing down the Auburn Reservoir during construction of the second bridge and would result in (1) power revenue losses of about $10.5 million, (2) municipal and industrial water revenue losses of about $1 million, (3) potential losses due to possible damage to the reservoir basin from slides during the drawdown period, and (4) adverse effects of excessive water demands on Folsom Lake, which is located immediately downstream from Auburn Dam.

The Bureau's legal authority for financing the construction of a bridge structure capable of carrying four lanes rather than two was questioned in a draft report by Audit Operations, Office of Survey and Review, Department of the Interior, dated February 1969. The draft report noted that the assumption that future bridge construction would require a drawdown of the reservoir presupposed the fact that (1) a second bridge would be needed within about 15 years, (2) the County would elect to construct a bridge which would require drawing down the reservoir, and (3) the Bureau would be obligated to draw down the reservoir and bear the related financial losses. The draft report recommended that the Bureau either redesign the structure to a two-lane bridge or obtain an advance of funds from Placer County for the additional cost of providing the betterment. As a third choice, the draft report recommended the submission of the matter for congressional approval.

In commenting on the draft report, the Commissioner, in a letter dated March 28, 1969, stated:

"We do not agree with the recommendations of the auditors and we do not propose to follow the courses of action advocated. Section 14 of the 1939 Reclamation Act, as well as the Reclamation Act of 1902, as amended and supplemented, gives the Secretary broad administrative authority to determine what action should be taken in connection with the construction of Reclamation projects which are in the best interest of the Government. Under this authority the Bureau has on a number of occasions provided additional construction not directly related to initial developments, but which is necessary for future works, facilities or project operations, yet to be authorized or for which additional appropriations may be required."

* * * * *

"It is axiomatic that specific authorizations such as P.L. 89-161, which authorized the Auburn-Folsom South Unit of the Central Valley Project, only enumerate gross features and leave detailed decisions on construction and operation to the discretion of the Secretary operating within the framework of Reclamation law. The decision with regard to the construction of the substructure of the Foresthill Bridge is in this category. This heavier substructure and the additional cost as a reimbursable project expense (and not as a non-reimbursable P.L. 87-874 betterment cost) were carefully considered by the Solicitor's Office prior to our May 7, 1968, letter and that Office concurred therein."

In May 1969 the Bureau awarded a contract in the amount of $2.9 million for the construction of a substructure for the bridge capable of supporting four lanes of traffic.

An assistant solicitor in the Office of the Solicitor, Department of the Interior, advised us in September 1969 that no formal opinion had been rendered by the Solicitor's Office on the Bureau's authority to finance the entire cost of constructing the bridge but that the May 7, 1968, letter

of the Acting Commissioner to the Regional Director, Region 2, had been approved by the Solicitor's Office. He acknowledged, however, that Placer County could not legally require the Bureau to draw down the reservoir to permit the future construction of a second bridge.

By letter dated April 13, 1970, we advised the Secretary of the Interior that, in our opinion, the bridge was not an operational component of the Auburn-Folsom South Unit. We stated that the operation, maintenance, control, and ownership of the project would be vested in the U.S. Government while the ownership of the Auburn-Foresthill Bridge--as well as its operation, maintenance, and control--would be vested in Placer County. Moreover, the two additional lanes that may be added to the bridge at some indefinite future date would not be constructed by the Bureau of Reclamation but by the appropriate highway authority.

We stated that, since the bridge was not an operational component of the project, section 207(c) of the Flood Control Act of 1960, as amended, which relates specifically to road relocations necessitated by the construction of projects for the development of water resources, was the proper authority for constructing the bridge and that Bureau participation in the cost of the Auburn-Foresthill Bridge should be limited to the cost of constructing a two-lane bridge with a substructure and superstructure capable of supporting only two lanes. We recommended that the Bureau relocate the bridge in accordance with the provisions of the Flood Control Act of 1960, as amended, rather than Public Law 89-161.

In a letter to us dated July 15, 1970, the Director, Office of Survey and Review, stated that the matter had been referred to the Department's Solicitor for an opinion and that the opinion rendered by the Associate Solicitor, Reclamation and Power, on June 1, 1970, had sustained the Bureau's action and had concluded that the Bureau acted within the scope of its authority and in compliance with the act that authorized the Auburn-Folsom South Unit.

On July 31, 1970, the Bureau awarded a contract for $9 million for the construction of the superstructure which was designed with the capability of supporting four lanes of traffic. A Bureau official advised us that the work to

be accomplished under the contract for the superstructure would complete the bridge construction.

The opinion rendered by the Associate Solicitor, Reclamation and Power, on June 1, 1970, simply restated the basis for the Bureau's decision to construct the bridge (see pp. 10 to 12) and stated that the additional cost of making provision for future enlargement of the bridge was a project reimbursable cost under the Auburn-Folsom South Unit authorizing legislation. He concluded that the additional cost could be borne by the Federal Government.

The Associate Solicitor also stated that, because of earthquake stress requirements, the cost of constructing a substructure capable of supporting a four-lane bridge would be the same as that for a two-lane bridge. He stated that the additional cost of making provisions for future traffic needs therefore was reduced from $4.4 million to $1.52 million and that all of the $1.52 million was related to the cost of the enlarged superstructure.

The Associate Solicitor stated, as part of his opinion, that the cost of providing the substructure and superstructure necessary for future enlargement of the bridge was a project reimbursable cost. Our review of the Bureau's procedures indicated that, if the additional cost of constructing the bridge to higher standards was to be fully reimbursable, such cost would have to be allocated in a manner not presently provided for by the Bureau's procedures.

In a letter dated August 21, 1970, the Assistant Regional Director, Region 2, advised the Commissioner that, on the basis of recent cost estimates which included a factor for contingencies, it would cost $13,894,000 to construct the bridge substructure and superstructure. He provided the following information regarding the estimated cost for replacing the old bridge (1) in kind, (2) to current standards, and (3) with provision for expansion to four lanes.

	Sub-structure	Super-structure	Total	Cost in-crease
	(000 omitted)			
Replacement in kind	$4,008	$8,142	$12,150	$ -
Two-lane bridge to current standards	4,224	8,150	12,374	224
Two-lane bridge with provision for expansion to four lanes	4,224	9,670	13,894	1,520

Under the Bureau's normal allocation procedures and in accordance with the Flood Control Act of 1960, as amended, the cost of $12,150,000 for replacement in kind would be allocated as a project cost to the various reimbursable and nonreimbursable project purposes. The additional cost of $224,000 associated with going from a replacement in kind to a structure that meets current standards would be a nonreimbursable cost to be borne by the Federal Government. Any cost above that necessary to provide a facility to current standards, the $1.52 million, would be borne by the owning State or political subdivision.

The Department of the Interior maintains that, contrary to these procedures, the Government can provide a bridge that exceeds current standards and that the additional costs are fully reimbursable from project revenues.

Since the opinion of the Associate Solicitor did not contain any new facts or evidence which we had not considered in reaching the conclusion set forth in our letter to the Secretary of the Interior, dated April 13, 1970, we advised the Secretary by letter dated September 23, 1970, that the Bureau did not have the authority to finance the entire cost of a bridge capable of supporting four lanes.

Department of the Interior comments

On October 1, 1970, we proposed in a draft report that the Commissioner of Reclamation (1) limit the Bureau's participation in the cost of constructing the Auburn-Foresthill Bridge to the cost of constructing a two-lane

bridge with a substructure and superstructure capable of supporting only two lanes and (2) clarify the Bureau's policies to require that all roads and bridges be relocated under the provisions of section 207(c) of the Flood Control Act of 1960, as amended, when such roads and bridges are not an operational component of a project.

In commenting on our draft report, the Director, Office of Survey and Review, by letter dated December 22, 1970 (see app. I), agreed that the additional cost of the enlarged superstructure to provide for future traffic needs was $1.52 million. The Director stated that legislation had been introduced in the Congress to remove any question of the Bureau's authority to proceed with construction of the bridge. The Director added, however, that the Bureau had previously stated its reasons and justifications for proceeding with construction of the Auburn-Foresthill Bridge to standards capable of supporting a future four-lane divided highway and that the Bureau's position on construction of the bridge remained unchanged. The reasons and justifications referred to by the Director, which were known to us at the time we concluded that the Bureau did not have the authority to finance the entire cost of the bridge, are set forth in previous sections of this report.

The Director stated that the relocation of the Auburn-Foresthill Road and Bridge was no different from other relocations of State and county roads undertaken as a matter of course in connection with the construction of other reclamation projects. He stated also that (1) in almost all cases, relocated highway facilities were not operational components of reclamation projects and (2) reference to the bridge as a nonoperational component of the project was therefore not germane to accepted practices of the Bureau of Reclamation.

The legislation referred to by the Director--the Flood Control Act of 1970--was introduced in the Congress on November 30, 1970, and was enacted on December 31, 1970 (Public Law 91-611). Section 222 of the act states that the Secretary of the Interior, in financing the relocation of the existing Auburn-Foresthill Road,

> "*** may provide for the cost of construction of a two-lane river level bridge across the North Fork

of the American River with a substructure and deck truss capable of supporting a four-lane bridge."

The financing of the construction cost of the bridge conforms to the provisions of the Flood Control Act of 1970.

Although the question regarding the authority of the Bureau to finance the entire cost of the substructure and deck truss has now been resolved by legislation, we believe that similar relocation problems may be encountered in the future at other projects unless the Department changes its position and establishes policies and procedures for the guidance of Bureau officials in implementing the legislation that is applicable to the relocation of roads and bridges.

The basic issue is a definitization of the circumstances under which the Bureau can relocate roads and bridges pursuant to the legislation authorizing the construction of a project (Public Law 89-161, in this case) without regard to the conditions and limitations contained in the Flood Control Act of 1960, as amended.

We agree with the Director's comment that most relocated highway facilities are not operational components of projects and that in this respect the construction of the Auburn-Foresthill Bridge is no different from other relocations of State and county roads undertaken in connection with the construction of other Bureau projects. Since the Department agrees that the bridge is a nonoperational component of the project, we do not understand, nor can we accept, its position that the relocation can be performed under the provisions of the legislation authorizing the project.

If the Director's position regarding authority for relocation of the Auburn-Foresthill Bridge is valid, it appears that any relocation could be accomplished in the same manner. We cannot agree with this position. We believe that the relocation of any road facility that is not an operational component of the project must be performed under the provisions of the Flood Control Act of 1960, as amended. It appears that, if all road relocations could be performed under the legislation authorizing a project without regard to whether it is an operational component of that project,

the provisions of the Flood Control Act of 1960, as amended, would have no application to any Bureau projects.

The authority to decide upon the legality of Government expenditures is vested by law in the Comptroller General, and his decisions are final and conclusive with respect to executive agencies. In accordance with this authority, we have determined that any road or bridge which is not an operational component of a project must be relocated by the Bureau strictly in accordance with the provisions of the Flood Control Act of 1960, as amended.

In view of the facts discussed in this report regarding the relocation of the Auburn-Foresthill Bridge and the subsequent legislation specifically authorizing the construction to higher standards than those permitted by existing legislation, we are concerned with the Bureau's view that its position regarding the justification for its action is still valid.

Recommendation to the Secretary of the Interior

We recommend that the Secretary of the Interior require the Commissioner of Reclamation to establish policies and procedures, including specific criteria, for the guidance of Bureau officials in relocating roads and bridges in accordance with the provisions of the Flood Control Act of 1960, as amended.

REPLACEMENT OF EXISTING ROADS AND BRIDGES NOT JUSTIFIED

Filling of the Auburn Reservoir will result in inundation of portions of (1) a little-used dirt road and two river crossings that are owned by the Federal Government and (2) a similar dirt road and one river crossing that are owned by Placer County. The Bureau plans to replace these facilities with a single road and two bridges at an estimated cost of $26.2 million. In our opinion, however, present traffic is not sufficient to justify replacement of the roads and river crossings.

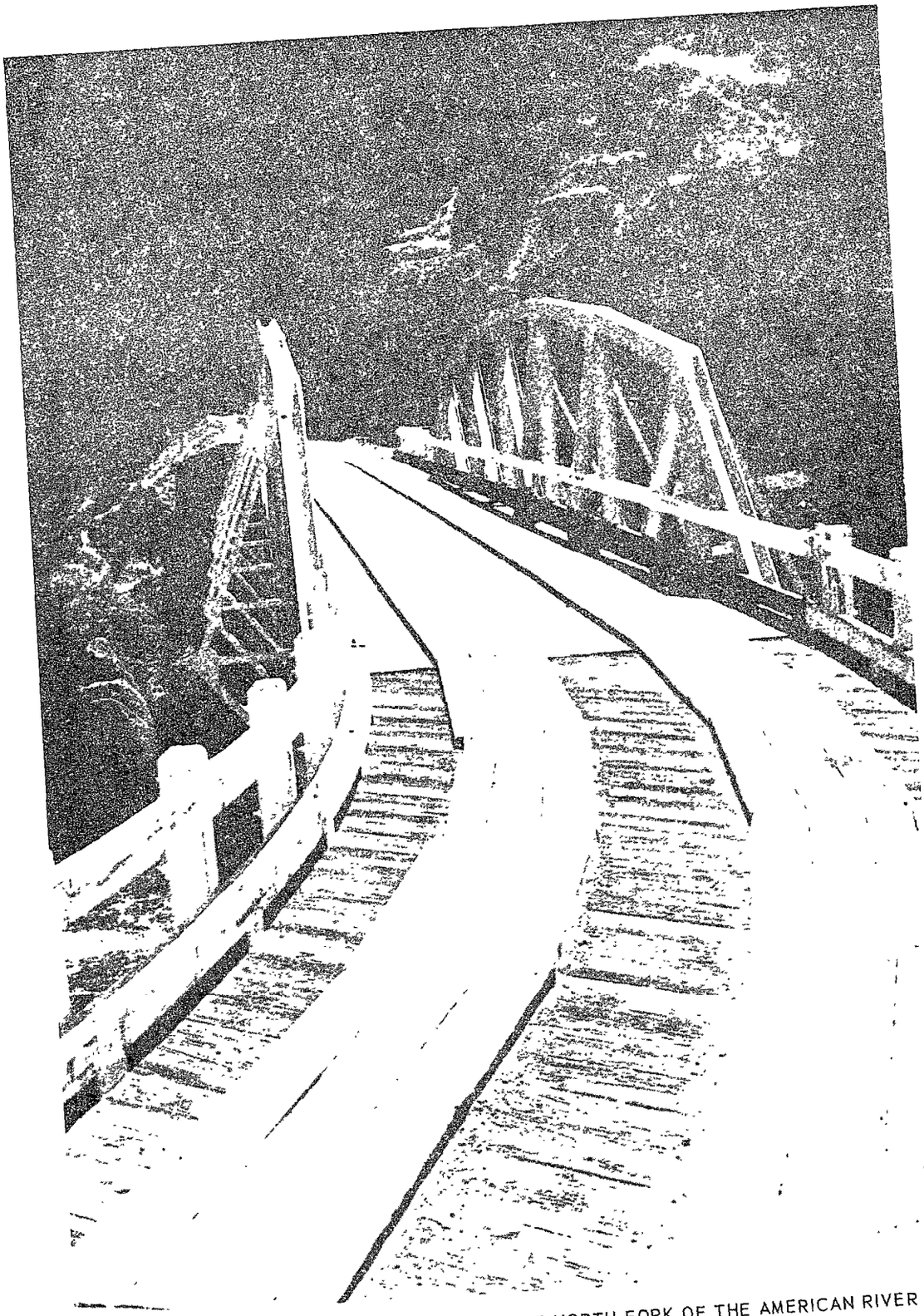
We believe that the relocated Auburn-Foresthill Road will serve the present rate of traffic reasonably as well as the existing road system does. Because of the insignificant amount of traffic on these dirt roads, we believe that the Bureau should abandon them rather than replace them. A description of the existing facilities and a discussion of the Bureau's basis for its plans and our views thereon follow.

Existing facilities

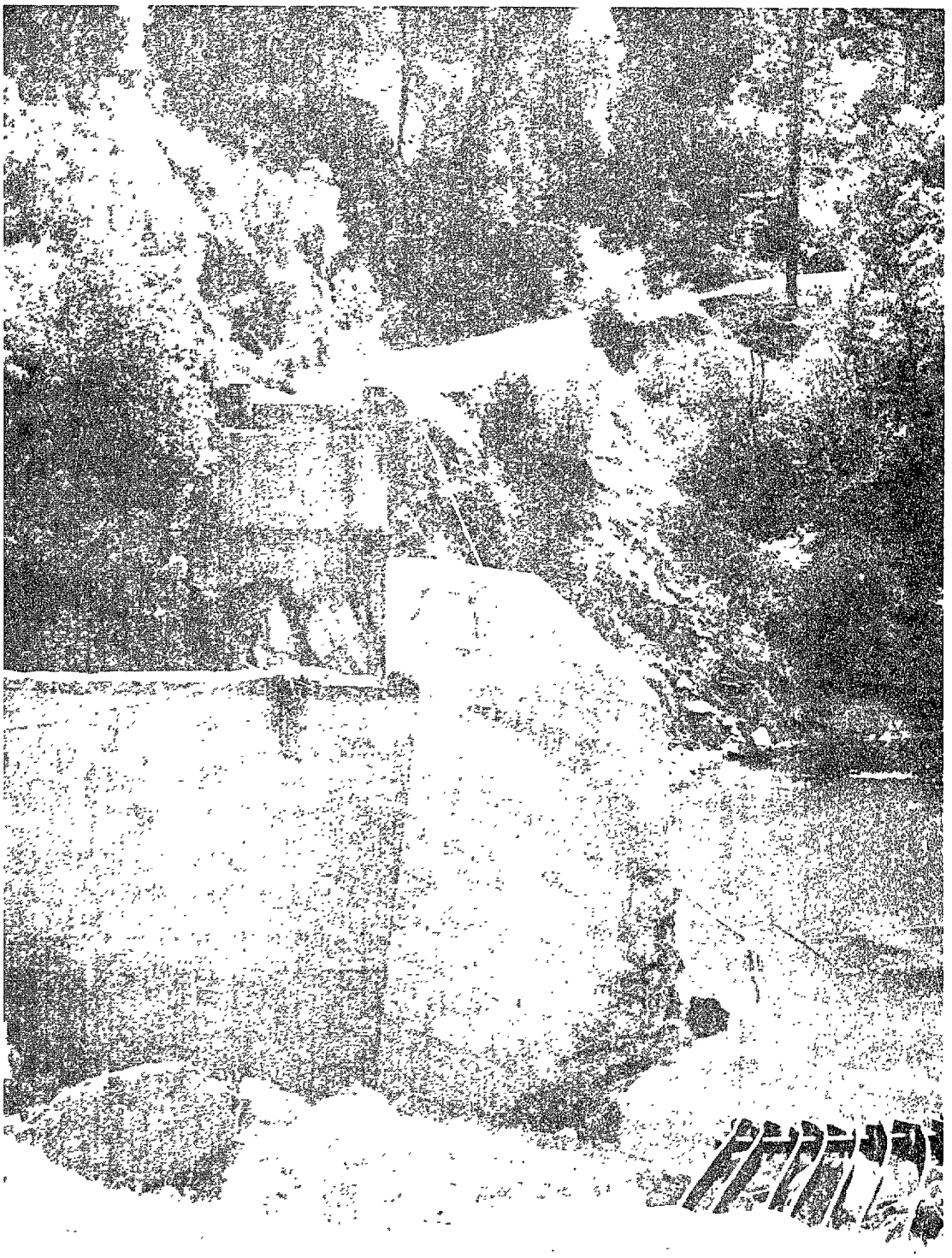
The so-called upstream crossings include (1) two crossings on Ponderosa Way which is owned by the Federal Government (only one of which has an existing bridge) and (2) one crossing on the Colfax-Foresthill Road which is owned by Placer County.

Ponderosa Way, on which the two Federal crossings are located, is a U.S. Forest Service road which crosses both the North and Middle Forks of the American River and connects the communities of Weimar in the north with Spanish Dry Diggings in the south. (See map on p. 7.) The single-lane roadway is unsurfaced and has numerous hairpin curves and some grades exceeding 15 percent. The single-lane, suspension-type bridge which formerly crossed the Middle Fork of the American River on Ponderosa Way was washed out by a flood in 1964 and has not been replaced. There is a single-lane, truss-type bridge crossing the North Fork, which was constructed in 1936 and has a weight limit of 8 tons and a deck width of 13 feet 2 inches.

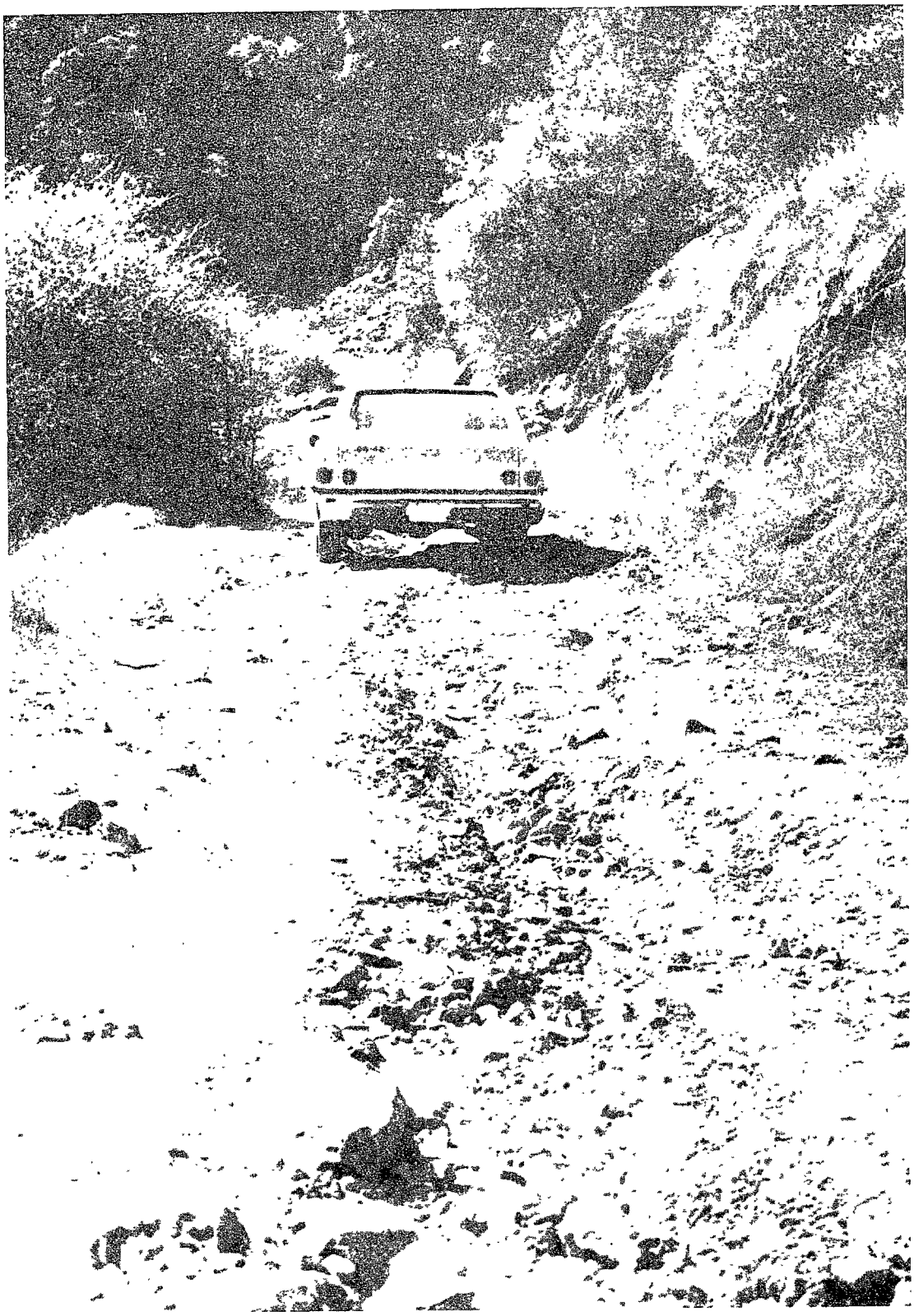
The following photographs show the condition of Ponderosa Way and the two river crossings.



PONDEROSA WAY – EXISTING BRIDGE ACROSS NORTH FORK OF THE AMERICAN RIVER



PONDEROSA WAY – BRIDGE ACROSS MIDDLE FORK OF THE AMERICAN RIVER WAS WASHED OUT IN 1964



PONDEROSA WAY – APPROACHING WASHED OUT CROSSING OF THE MIDDLE FORK OF THE AMERICAN RIVER

Ponderosa Way is used primarily for fire prevention and suppression activities. A few recreationists, estimated by the Forest Service as of June 1969 at the rate of six or eight cars a day per weekend, do use the existing bridge and road in the summer. Although Ponderosa Way is a Forest Service road, the boundaries of the national forests in the area have been contracted since the road was built and the Forest Service has come to rely on it less and less. The California Division of Forestry[1] now operates and maintains the road under a special use permit from the Forest Service.

Although the major purpose of the road is for use in fire control, the weight limitations of the existing bridge will not permit the movement of heavy equipment and the movement of manpower is very slow because of the poor condition of the road. Any equipment needed for fire suppression on the Foresthill Divide (the area between the North and Middle Forks of the American River) must be brought in by way of the Auburn-Foresthill Road discussed in the previous section of this report. The new bridge on the Auburn-Foresthill Road will improve access to the Foresthill Divide and will improve the area's firefighting posture.

The river crossing owned by Placer County is located on a road connecting the communities of Colfax and Foresthill and crosses the North Fork of the American River about 3 miles upstream of the bridge on Ponderosa Way. This road, like the Forest Service's Ponderosa Way, is an unsurfaced single-lane road with numerous hairpin curves. An indication of the road's condition is the fact that the U.S. Post Office stopped using it for mail service in 1954 "due to bad road conditions." We were told by a Bureau official that the road was originally a wagon trail over which gold miners moved their supplies.

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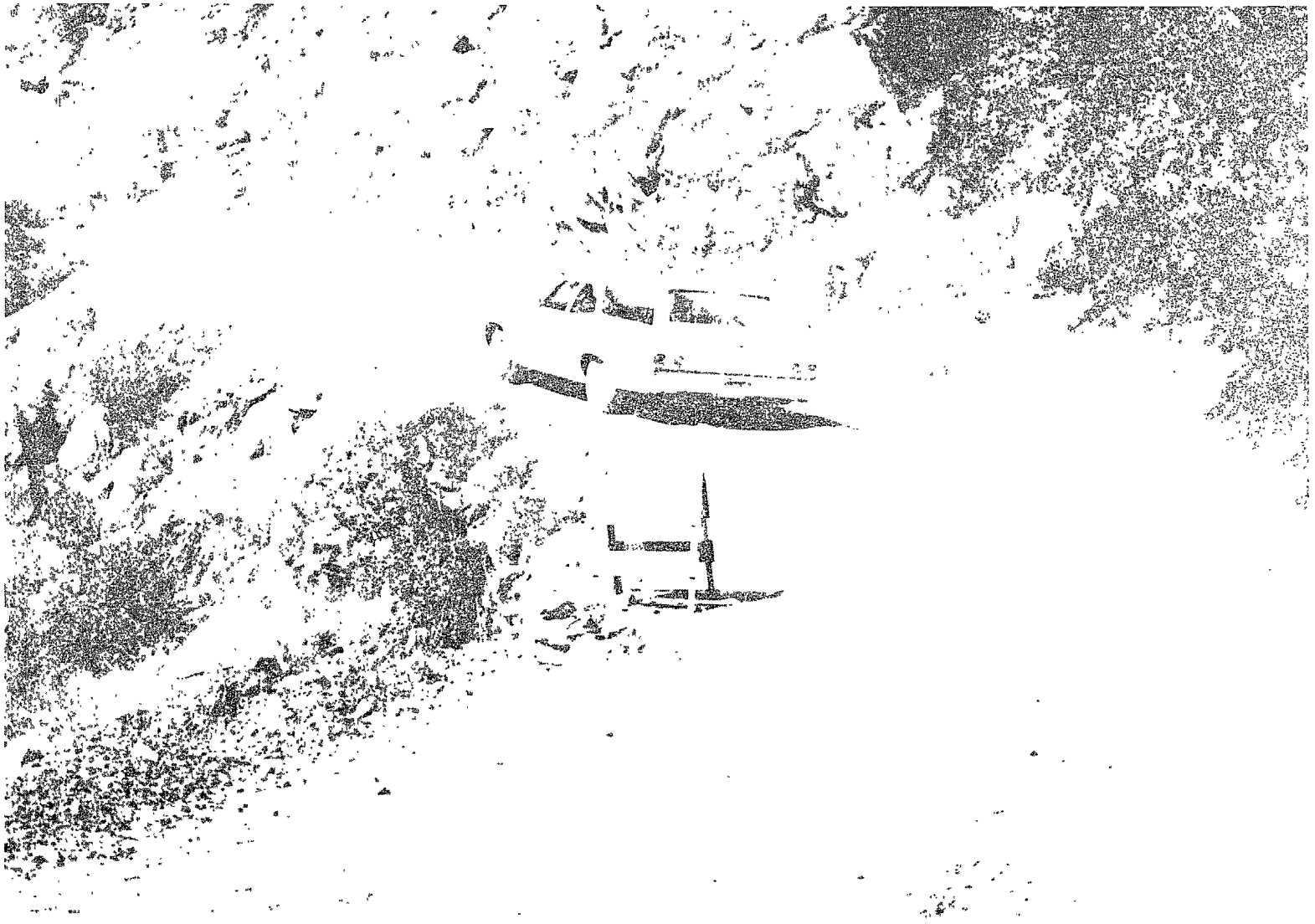
[1]The California Division of Forestry is the agency responsible for fire control west of the National Forests, which includes most of the Auburn Dam and Reservoir area. The Forest Service continues to maintain an interest in the area because of threats to the National Forests (Tahoe and El Dorado) from fires originating in the area of California Division of Forestry jurisdiction.

A Bureau official advised us that no traffic count had ever been taken on this road. The bridge on this road was constructed in 1857 and was moved to new piers and rehabilitated in the 1920's. This bridge also has a weight limit of 8 tons but the deck width is only 12 feet 6 inches.

The following photographs show the condition of the county road and bridge.

COLFAX – FORESTHILL BRIDGE ACROSS THE NORTH FORK OF THE AMERICAN RIVER



COUNTY ROAD BETWEEN COMMUNITIES OF COLFAX AND FORESTHILL

Proposed new road system

To replace the existing little-used dirt roads and bridges, which the Bureau has referred to as "little more than bulldozed trails," the Bureau is planning to construct a modern, two-lane, all-weather, paved road system from old U.S. Highway 40 about halfway between Weimar and Colfax, across the North Fork of the American River, over the Foresthill Divide, across the Middle Fork of the American River, and then to an El Dorado County road near Spanish Dry Diggings--a distance of about 13 miles. (See map on p. 7.) The proposed road, estimated by the Bureau to cost $26.2 million, will have a design speed of 30 miles per hour with provision for being upgraded to 45 miles per hour and will have two bridges--one across the North Fork and one across the Middle Fork of the American River. The new road and bridges will be owned either by the State of California or by Placer County.

The new bridge over the North Fork of the American River will cross the river near Placer County's existing Colfax-Foresthill Bridge, and the new bridge over the Middle Fork of the American River will cross the river near the site of the U.S. Forest Service's Middle Fork bridge which was washed out in 1964.

The Bureau's justification for the new road system is based on (1) future project-generated traffic, (2) fire protection purposes, and (3) the fact that there are existing bridges which will be inundated. Each of these is discussed below.

1. With regard to the need to accommodate future project-generated traffic, the Flood Control Act of 1960, as amended, provides that traffic at the time of taking, not future traffic, be used to determine the type of road to be constructed. Bureau policy states that current traffic, not projected traffic, is the sole criterion to be used in determining the type of road to be constructed. In view of the existing legislation and policy, we believe that the construction of a new road system based on future traffic is not justified.

We believe, furthermore, that the small amount of traffic now using the existing roads will be served reasonably as well by the relocation of the Auburn-Foresthill Road discussed in the previous section of this report. For example, driving time and distance from Colfax to Foresthill, using Placer County's existing Colfax-Foresthill Road, are about 33 minutes and 15 miles, respectively. Travel time and distance on the proposed replacement would be about 41 minutes and 17 miles, respectively. Comparable figures using the relocated Auburn-Foresthill Road would be about 41 minutes and 31 miles, respectively.

2. Concerning the second point, fire protection, the California Division of Forestry has responsibility for fire protection in the area served by the existing roads. As indicated previously the California Division of Forestry maintains the existing Ponderosa Way for fire protection purposes through a special use permit granted by the U.S. Forest Service.

   Included in a report submitted to the Bureau in December 1967 by El Dorado and Placer Counties on their recommended road replacement plan was a study prepared by the California Division of Forestry on its fire protection needs. In the study, the California Division of Forestry indicated a need to replace the washed-out Middle Fork crossing on Ponderosa Way. According to information that the State furnished to the Department in April 1969, a Middle Fork crossing was needed for fire-fighting forces located south of the reservoir to be used for initial attack on any fires on the Foresthill Divide (the area between the North and Middle Forks of the American River).

   According to data developed by the Bureau, fire fighters located at the State's Growlersburg Conservation Camp--the major fire-fighting force south of the reservoir--will experience an increase in distance and time of 5.3 miles and 8 minutes, respectively, to reach the community of Foresthill if a Middle Fork crossing is not provided. The California

Division of Forestry also has indicated that, without a Middle Fork crossing, it may be forced to construct a fire-fighting facility on the Foresthill Divide. From the information that the State furnished to the Department in April 1969, it appears that the initial construction cost plus cost of operation and maintenance of such facilities would be significantly less than the cost of replacing the roads.

Although the fire-fighting forces south of the reservoir may experience an increase in time and distance to reach Foresthill, our review showed that the fire-fighting forces north of the reservoir area would be able to reach the Foresthill Divide in less time by using the relocated Auburn-Foresthill Road. For example, a Bureau study shows that it presently takes State fire fighters at the Iron Mine Conservation Camp--the major fire-fighting force north of the reservoir--about 55 minutes traveling over 29.1 miles of road to reach the community of Foresthill.

Iron Mine fire fighters will be able to reach Foresthill by the relocated Auburn-Foresthill Road, a distance of 24.6 miles, in 44 minutes--a reduction of 4.5 miles and 11 minutes. It presently takes Growlersburg fire fighters 59 minutes to reach Foresthill from the area south of the reservoir.

Therefore, although it will take the fire-fighting forces on the south side of the reservoir about 8 minutes longer to reach the community of Foresthill than it presently takes, the fire-fighting forces on the north side will be able to reach the community, using the relocated Auburn-Foresthill Road, 11 minutes sooner than they presently can. We believe that the California Division of Forestry requirements would be served reasonably as well by the relocated Auburn-Foresthill Road and Bridge.

3. During negotiations in 1969 with Federal, State, and county officials for replacement of the upstream crossings, the Bureau advised the officials that, under the Flood Control Act of 1960, as amended, it

had a "basic obligation" to provide a one-lane bridge at each of the three crossings (including the crossing previously washed out) at an estimated cost of $21.4 million.

The Bureau subsequently revised the estimate to $24.4 million in recognition of 1970 prices. The Bureau decided, however, that this replacement plan:

> "*** would not be too practical, and it would certainly develop adverse public reaction to have millions of dollars worth of work accessible only by several miles of truck trails." (Emphasis added.)

The Bureau developed plans for the new, two-lane, paved replacement road which conforms essentially to a plan requested in December 1967 by Placer and El Dorado Counties to accommodate future traffic. According to the Bureau, interested Federal, State, and county agencies have advised the Bureau that they are willing to support and justify the plan for the new two-lane road but are not in a position to contribute any funds to carry out the plan. The Bureau therefore is seeking ways and means of obtaining additional authorization for the expenditure of appropriated funds for financing the replacement plan.

Inasmuch as the Bureau considered its "basic obligation" to provide a one-lane bridge at each of the three crossings as impractical, it appears to us that the Bureau should have considered abandoning the crossings rather than developing plans which exceeded its basic obligation. According to Bureau officials, abandonment of the crossings was never considered. The Bureau's policies provided that, in special situations, facilities be abandoned rather than replaced; but no guidance is provided for determining whether a special situation exists. The policies provide also that, if facilities are abandoned, nominal or salvage value of the abandoned facilities will be the basis for settlement with the owner.

The Bureau's policy is to relocate facilities to current standards in conformity with the Flood Control Act of 1960,

as amended, but, if no applicable standards exist for the facility being relocated, as in the case of the upstream crossings, the policy provides for "replacement in kind." It was on this basis that the Bureau developed the single-lane bridge replacement plan which it considered to be its "basic obligation" but which was found to be impractical.

Although the Flood Control Act of 1960, as amended, does not discuss abandonment, it does state that, "when the taking *** of an existing public road necessitates replacement, the substitute provided will *** serve" (emphasis added), which implies that all roads taken may not necessarily have to be replaced. In October 1962 the Senate Committee on Public Works, in commenting on the provisions of a proposed amendment to the Flood Control Act of 1960, stated "It is not the intention of the committee to construe that every road taken in a reservoir area should be replaced ***."

It appears therefore that the Congress did not expect the Bureau to replace each and every road and bridge that would be taken in constructing water resources projects.

We believe that the limited traffic and the other factors considered by the Bureau are not sufficient to justify replacement of the roads at an estimated cost to the Federal Government of about $26.2 million.

We believe also that the Bureau's inadequate policies and procedures for determining whether an existing road should be replaced or abandoned contributed to the decision to provide the new road. Guidance should be provided, in our opinion, for determining, in similar situations, when facilities should be abandoned or replaced. Such guidance would provide a sounder basis for planning for replacement roads and bridges as well as for reducing the possibility of unnecessary relocation costs being incurred under future Bureau projects. We believe that such guidance should be directed toward determining whether traffic on a road that is to be inundated could be served reasonably as well through (1) an existing road system or (2) the relocation of other roads in the area that would be affected by construction and operation of the project.

Department of the Interior comments

We brought these matters to the attention of the Department in our draft report and proposed that the Commissioner of Reclamation (1) abandon the existing roads without replacement and (2) develop procedures setting forth specific criteria for determining when roads or bridges affected by Bureau projects should be abandoned rather than replaced.

In commenting on this matter (see app. I), the Director of Survey and Review reiterated the Bureau's position that the new road system was needed for fire protection. This position and our views thereon have been discussed on pages 28 and 29 of this report.

With regard to our proposal to develop procedures setting forth specific criteria for determining when roads and bridges should be abandoned rather than replaced, the Director stated that:

> "*** the question is given full consideration in the planning stage before authorization of the project. The determination of which procedure to follow is reached after carefully weighing all the purposes and needs of the roads and this is documented in the feasibility reports submitted to the Congress."

With respect to our proposal to abandon the upstream crossings, the Director stated that we had not given proper consideration to the feasibility report which was the basis for the legislation authorizing the project and which specifically recognized the need to replace the upstream crossings. He stated that the Congress had recognized the need for replacing the upstream crossings and, in adopting the feasibility report, had approved such replacements and had authorized the Bureau, by enactment of Public Law 89-161, to carry them out. The Director also referred to language contained in House Report 295, dated May 6, 1965, of the Commitee on Interior and Insular Affairs, which reads:

> "*** Several roads cross the reservoir site at present and would have to be relocated. Bridges would be provided as necessary to carry these roads across the reservoir."

We cannot agree with the Director's comment that the Congress approved the relocation of the upstream crossings by adopting, through enactment of Public Law 89-161, the feasibility report. It appears from the language contained in the feasibility report that the Bureau intended to further evaluate ways of meeting the traffic needs of the area. For example, in commenting on the upstream crossings, the report stated that the cost of relocating the roads was included in the cost estimates for the project but that more detailed studies in the future could result in a reduction of the relocation requirements and cost.

Further, we do not agree with the Director's view that the language contained in House Report 295 specifically implies that the upstream crossings must be relocated. We believe that neither the feasibility report nor the legislation authorizing construction of the Auburn-Folsom South Unit--which contained no reference to the relocation of roads--requires the replacement of all existing roads and bridges or restricts the Bureau from abandoning the crossings if such action is indicated as a result of more detailed studies of the traffic needs of the area.

Although the Bureau's policies state that in special situations facilities can be abandoned rather than replaced, no guidance is provided for determining whether a special situation exists. We found no other policies relating to the question of abandoning roads, and Bureau officials were unable to furnish any policies relating to this matter. Moreover, Bureau officials advised us during our audit that, in the case of the upstream crossings, abandonment was never considered. We believe therefore that the Bureau needs specific criteria for the guidance of Bureau officials in weighing alternatives for the purpose of determining the need for replacement of existing roads and bridges versus their abandonment.

Recommendations to the Secretary of the Interior

We recommend that the Secretary of the Interior require the Commissioner of Reclamation to (1) abandon the existing upstream crossings without replacement and (2) develop procedures setting forth criteria for determining when roads or bridges affected by Bureau projects should be abandoned rather than replaced.

UNECONOMICAL RELOCATION OF STATE HIGHWAY ACROSS CREST OF DAM

Construction of the Auburn Dam and Reservoir will necessitate relocating about 8.3 miles of State Highway 49 which presently crosses the North Fork of the American River about 2 miles upstream from the Auburn Dam site. The Bureau plans to relocate that portion of Highway 49 by providing a road between the communities of Auburn and Cool, which will utilize an elevated crossing above the crest of the dam and a connection to Interstate 80 in Auburn at an estimated cost of $10.5 million.

Our review showed that, if the highway were relocated so that it crossed the river at a site below the dam, the project would begin to realize, about 3 years earlier, benefits of as much as $59 million annually. Rough estimates prepared by the Bureau indicate that such a relocation plan could cost as little as $5 million, or $5.5 million less than the plan adopted by the Bureau.

The State of California and the Bureau exchanged letters dated September 14 and October 12, 1965, in which they agreed to study various possible routes for relocating State Highway 49. Under an agreement dated June 20, 1967, the Bureau requested the State of California to make studies and report on the possible relocation alternatives for that portion of State Highway 49 which would be affected by the construction of the Auburn Dam and Reservoir. On June 22, 1967, the Bureau advised the Division of Highways, State of California, that:

> "We have previously indicated it to be inconvenient for the relocation of Highway 49 to be across the crest of the concrete arch dam. However, data developed during the course of our comparative dam studies indicates that the savings which would result from constructing Highway 49 on the arch crest far outweigh any inconvenience. We, therefore, intend to establish the limit of our obligation as the cost of a location on the dam crest. Other locations are possible but they will require financial participation by an agency other than the Bureau of Reclamation to cover costs in excess of those for the crest location."

On October 11, 1967, the California Division of Highways submitted its report to the Bureau, which included cost estimates for five possible relocation routes for Highway 49, ranging from $9.5 million to $19.3 million. The low estimate was for the road to be relocated across the crest of the dam.

By letter dated December 14, 1967, the Bureau forwarded the information contained in the California Division of Highways' report to the Commissioner of Reclamation after adding one more alternate relocation route, referred to as J, and after reducing, on the basis of its own study, the estimated cost of relocating the road across the crest of the dam from $9.5 million to $7 million. The Bureau's alternate relocation route J--considered as a "rough reconnaissance" low-level alternative--was estimated to cost about $5 million and would require a bridge about 750 feet long located as close to the river level as practicable downstream from the dam.

A comparison of the costs of the various alternative routings in the California Division of Highways' study and the Bureau's December 14, 1967, letter is shown below.

Alternate	Routing	California Division of Highways study October 1967	Bureau letter December 1967
A[a]	Across crest of earth dam	$18,200,000	$18,200,000
B	Over reservoir via high-level bridge	19,300,000	19,300,000
E[b]	Across crest of concrete arch dam	9,500,000	7,000,000
F	Downstream from dam via high-level bridge	15,900,000	15,900,000
G	Over reservoir via high-level bridge	16,400,000	16,400,000
J	Downstream from dam via low-level bridge	-	5,000,000

[a]Originally an earth dam was being considered, but, by the time the State study was issued, the Bureau had decided to construct a concrete arch dam.

[b]The Bureau reduced the California Division of Highways' estimate by $2.5 million after developing a more detailed cost study for the routing. The $7 million estimate was subsequently revised to $10.5 million.

From the time the State study was issued in October 1967, there has been considerable controversy concerning which alternate route should be selected and the extent of the Government's contribution. El Dorado and Placer Counties have stated that they want (1) the highway relocated over the reservoir (alternate G) rather than across the crest of the dam and (2) the Bureau to pay the entire cost, estimated at $16.4 million. Throughout this controversy the Bureau has consistently maintained that it has no objection to the selection of an alternate route other than across the crest of the dam but that the Bureau's contribution would be limited to the cost of the crest location. The position taken by the Bureau is that it will contribute to the lowest cost relocation of Highway 49 that can be constructed in accordance with existing law and Bureau policy.

Because alternate J appeared to be the least costly plan for relocating Highway 49, we asked the Bureau in March 1970 their reasons for not giving more consideration to this plan.

The Bureau advised us that (1) alternate J was eliminated as an acceptable route because it would not serve the communities of Cool and Georgetown in the same manner, and reasonably as well, as the existing road and (2) the estimated cost of alternate J was not developed in the same manner or detail as the other estimates developed by the State and therefore the costs were not comparable.

Although the distance from the communities of Cool and Georgetown to Auburn would be about 5 miles longer by alternate route J than by the existing highway, it appears that the travel time would be about the same since the new route would be constructed to current standards, as required by the Flood Control Act of 1960, as amended. Any inconvenience to the residents of Cool and Georgetown--which in 1960 had populations of about 50 and 700, respectively--would, in our opinion, be offset to some extent by the additional convenience to through travelers, because alternate route J provides more direct access to the town of Auburn, which has a population of about 6,000, from other more populated areas, such as the town of Placerville with a population of about 4,500.

Although the Bureau's estimated cost of alternate J may not have been developed in the same detailed manner as the State estimates, we believe that, in view of the indicated significant cost difference between alternates E and J, the Bureau should make a more detailed evaluation of the cost of alternate J to determine whether that alternative would be in the best interest of the Government.

Alternate J has the additional advantage of providing greater project benefits at a lower cost than the plan selected by the Bureau. If Highway 49 is relocated across the crest of the dam, road construction cannot begin until the dam is completed. As a result, water cannot be impounded until the relocation is completed as the existing Highway 49 cannot be inundated until the new route is constructed.

The type of dam finally selected for Auburn is a concrete arch dam which, unlike the earth fill dam originally considered, can begin storing water during construction.

The Bureau currently estimates that it will take 3 years to construct the dam, another 1-1/4 years to construct the relocated highway over the crest of the dam, and a minimum of 2 additional years to fill the reservoir. Therefore, under the Bureau's plan, it would be 6-1/4 years before the reservoir would be filled and project benefits could begin to be realized.

If route J were adopted, the road could be relocated during the time the dam was being constructed and the reservoir (1) could begin storing water 1-1/4 years after the start of dam construction and (2) would be full 3-1/4 years after the start of dam construction. Therefore, the advantage of route J would be that project benefits could begin to be realized 3 years sooner than if the road were relocated over the crest of the dam.

According to the Secretary of the Interior's supplemental report on the Auburn project, dated October 1963, the total average annual benefits for irrigation, flood control, power, etc., would be about $59 million. Although the full value of these benefits may not be realized during the initial years of operation, we believe that the amount realized would be substantial and, together with the estimated

construction costs of alternative J, should have been considered by the Bureau in determining the least costly alternative for relocating Highway 49.

We believe that, in evaluating alternative relocation plans, the Bureau should have given consideration not only to the estimated cost of the various plans but also to the benefits that would result under each plan. An evaluation relating the costs with the benefits of each plan would show which plan would be in the best interest of the Government from an overall economic standpoint.

On the basis of our review, it appears that alternate J is the most economical plan for relocating Highway 49 since it has the advantage of providing significantly more project benefits at the least cost. Although the cost estimates for alternate J may not be as refined as the estimates for the other plans, we believe that there is sufficient evidence to warrant the Bureau's reconsidering its plan for relocating Highway 49.

Department of the Interior comments

We proposed in our draft report that the Commissioner of Reclamation have a detailed study made of the estimated cost of alternate route J to determine which of the various alternative plans was the most economical when both costs and project benefits were considered.

We proposed also that the Commissioner of Reclamation have procedures developed that require, for all Bureau water resources projects, that consideration be given to the effect that road and bridge relocations will have on the realization of project benefits.

In commenting on our draft report, the Director of Survey and Review stated that no detailed cost estimate had been prepared for route J but that, if the estimated cost of alternate J had been prepared in the same manner and detail as the estimated costs for the other alternatives, the estimate for alternate J would have far exceeded the $5 million "rough reconnaissance" estimate.

The Director stated also that to achieve the project benefits associated with alternate J would require substantial amounts of money for relocating the road at the same time that large amounts were required for constructing the dam. He stated that it was highly doubtful that the Office of Management and Budget and the Congress would appropriate amounts sufficient for work to go forward on two such expensive activities at the same time. The Director stated that the Bureau intended to proceed with the plan to relocate the road over the crest of the dam because it believed that this route would prove to be the most economical of all routes considered.

Although we recognize that the $5 million estimate of the alternate route J is not as refined as the estimates for the other alternatives, we believe that the potential savings are significant enough to justify having a more detailed estimate prepared for use in determining the alternative most advantageous to the Government.

We believe also that the least costly alternative is not necessarily the most advantageous from an overall economic standpoint since the project benefits to be realized

from each plan vary. We believe further that the advantages of providing benefits at an earlier date should be considered, even if a detailed cost estimate for alternate J showed that it would cost more than alternate E, across the crest of the dam. All the other alternatives have the advantage of permitting project benefits to be realized sooner than alternate E.

The Director's comment that the Congress and the Office of Management and Budget would not appropriate, simultaneously, the substantial amounts needed for relocating the road and constructing the dam is, in our opinion, somewhat speculative. We believe that the Bureau should, on the basis of an evaluation of the benefits and costs of the various alternatives, decide the most economical plan for relocating the highway and provide justification for that plan when requesting the necessary appropriations. Such a procedure would provide a more reasonable basis for decisionmaking than would an attempt to anticipate the actions that might be taken by the Office of Management and Budget or the Congress.

Recommendations to the Secretary of the Interior

We recommend that the Secretary of the Interior require the Commissioner of Reclamation to make a detailed study of the estimated cost of alternate route J and to determine which of the several alternatives is the most economical when both costs and benefits are considered.

We recommend also that the Secretary of the Interior direct the Commissioner to develop procedures that will provide that, for all Bureau water resources projects, consideration be given to the effect that road and bridge relocations will have on the realization of project benefits.

CHAPTER 3

SCOPE OF REVIEW

Our review was performed at the Bureau of Reclamation regional office in Sacramento, California (Region 2), and Bureau headquarters in Washington, D.C.

We examined applicable legislation, pertinent Bureau instructions, planning reports, relocation agreements, plans and specifications, and cost estimates. We also reviewed correspondence and other pertinent documents and interviewed Bureau officials on (1) determinations of design standards of the facilities to be relocated, (2) records of negotiations, and (3) justifications for the replacement facilities provided.

APPENDIXES

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

DEC 22 1970

Dear Mr. Voss:

The Department of the Interior has reviewed the October 1, 1970 GAO draft report to Congress entitled, "Savings Available in Relocating Roads and Bridges at the Central Valley Project, Bureau of Reclamation, Department of the Interior." Our comments take cognizance of the General Accounting Office's letters of April 13, and September 23, 1970.

The GAO draft report is a review with conclusions and recommendations of (1) the relocation of the Auburn-Foresthill Road, including construction of the Auburn-Foresthill Bridge across the north fork of the American River; (2) the replacement of existing Forest Service and county roads within the Auburn Reservoir area; and (3) the proposed relocation of California State Highway 49 in connection with the construction of Auburn Dam.

The Comptroller General's letter of September 23, 1970, as well as the Director, Civil Division's letter of April 13, 1970, is addressed to the issue of whether the Bureau of Reclamation is authorized to proceed with construction of the Auburn-Foresthill Bridge with the substructure (piers and abutments) and the superstructure to standards sufficient to carry a future four-lane divided highway but with provision for only two lanes in the initial construction.

The Comptroller General has advised in his September 23 letter that "should the Department proceed as presently planned (with construction of the Auburn-Foresthill Bridge), we will be required to issue a Notice of Exception against the account of the certifying officer. Formal exception will be taken against the total amount paid for the bridge until a determination has been made by the Department of the amount paid in excess of the amount that should have been paid for a two-lane facility * * *."

Our comments on the issues raised by the GAO are set forth hereinafter under headings and in the order as they appear in the draft report.

BRIDGE CONSTRUCTED TO HIGHER STANDARDS THAN PERMITTED BY LAW

This section of the GAO report reviews the authority available to the Bureau of Reclamation for constructing the relocated Auburn-Foresthill road, including a high-level bridge across the North Fork of the American River, and the Bureau's determination to provide in this case a bridge structure capable of supporting four traffic lanes at some future date but with only two lanes completed initially. The procedure adopted in this case was first examined by Interior's auditors of the Office of Survey and Review (OSR) in the early part of 1969. The views and conclusions of that office are set forth in a report of February 1969 entitled, "Review of Proposed Relocation of Auburn-Foresthill Bridge, Placer County, California, Region 2 - Bureau of Reclamation." In commenting on this report, the Bureau of Reclamation, in a memorandum of March 28, 1969, to OSR stated:

> "We do not agree with the recommendations of the auditors and we do not propose to involve the courses of action advocated. Section 14 of the 1939 Reclamation Act, as well as the Reclamation Act of 1902 as amended and supplemented, gives the Secretary broad administrative authority to determine what action should be taken in connection with the construction of Reclamation projects which are in the best interest of the Government. Under this authority, the Bureau has on a number of occasions provided additional construction not directly related to initial developments but which is necessary for future works, facilities or project operations yet to be authorized or for which additional appropriations may be required.
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> * * * * *
>
> "It is axiomatic that specific authorizations such as P.L. 89-161, which authorized the Auburn-Folsom South Unit of the Central Valley Project, only enumerate gross features and leave detailed decisions on construction and operation to the discretion of the Secretary operating within the framework of Reclamation Law. The decision, with regard to the construction of the substructure of the Foresthill Bridge, is in this category. This heavier substructure and the additional cost as a reimbursable project expense (and not as a nonreimbursable P.L. 87-874 betterment cost) was carefully considered by the Solicitor's Office prior to our May 7, 1968, letter and that office concurred therein."

The Solicitor's Office reviewed and concurred in our March 28, 1969, memorandum which contained the language quoted. The GAO draft report refers to that statement but makes no comment thereon.

Nevertheless, and in spite of the Associate Solicitor's opinion of June 1, 1970, which supported the procedure adopted by the Bureau, the Comptroller has concluded and has recommended that the Secretary of the Interior direct the Bureau of Reclamation (1) to limit its participation in the construction cost of the Auburn-Foresthill Bridge to the cost of constructing a two-lane bridge with a substructure and superstructure which will support only two lanes and (2) to clarify its instructions to require that all roads and bridges be relocated under the provisions of Section 207(c) of the Flood Control Act of 1960, as amended, when roads and bridges are not an operational component of a project.

The Bureau of Reclamation's reasons and justifications for proceeding with the construction of the Auburn-Foresthill Bridge to standards capable of supporting a future four-lane divided highway but with only two lanes initially are fully set forth in letters of August 18, 1970, to the Chairmen of the House and Senate Appropriations Committees, signed by the Assistant Secretary of the Department of the Interior, Water and Power Development. The considerations and conclusions of the Bureau to proceed in the manner it has are explained in that letter and its enclosures. The Bureau's position on construction of the Auburn-Foresthill Bridge remains unchanged, and it would be unnecessary to repeat here the considerations leading to that position.

There are, however, several points in the GAO draft report which deserve comment. On page 11 reference is made to the statement in the Associate Solicitor's memorandum of June 1, 1970, that the cost of constructing a substructure capable of supporting a four-lane bridge would be the same as the cost for a two-lane bridge because of the design considerations necessary to meet the earthquake stress requirements. The report then goes on to state that "based on discussions with officials of the Federal Highway Administration, and a review of cost estimates for a comparable bridge designed by the Corps of Engineers in the same geological area, we believe that the difference in cost of the substructure between a two-lane and a four-lane bridge could be as high as 10 percent."

The Bureau is not informed of the nature of the data or designs developed by the two Federal agencies mentioned, which led to the stated conclusion. The Bureau would be interested in having such data and designs for review by its design office, although it is questionable whether either the Corps of Engineers or the Federal Highway Administration has had comparable experience in designing and constructing bridge piers of heights similar to those in the Auburn Reservoir in an active earthquake area. On the other hand, the Bureau of Reclamation has built piers of substantially the same design for the Pit River Bridge over the Pit River Arm of Shasta Reservoir on the Sacramento River in Northern California. On the basis of this experience and the application of the most advanced technology, its design engineers have determined that the cost of the piers of the substructure for the Auburn-Foresthill Bridge is practically the same as it would be for piers to support only a two-lane bridge.

On pages 12 and 13 of the GAO draft, reference is made to the estimates of cost furnished by the Bureau's Regional Director in Sacramento for construction of the substructure and superstructure for three different types of bridges. These estimates are the latest of many studies over the last several years on various designs of bridges to be provided at this location. Enclosed is a chronology of cost estimates for the Foresthill Bridge from the time estimates were prepared based on preliminary data to the current estimates based on firm data and design criteria. Your attention is called particularly to the subparagraph at the bottom of page 3 of the statement which explains the reasons why the cost of piers for a two-lane road or a four-lane road is practically the same, and therefore the cost differential between piers for a two-lane and a four-lane bridge is infinitesimal. The difference in total cost for a two-lane bridge and a four-lane bridge (with two lanes constructed) has been reduced to $1,520,000. Irrespective of this fact, we understand that legislation has been or will be introduced in the present session of Congress to remove any question of the Bureau's authority to proceed with construction of the bridge.

One further conclusion in the GAO report with respect to the Auburn-Foresthill Bridge deserves comment. On page 14 of the draft this statement appears:

> "In our opinion, the bridge is not an operational component of the project. The operation, maintenance, control, and ownership of the Auburn project will be vested in the United States Government while the ownership of the Auburn-Foresthill Bridge - as well as its operation, maintenance, and control - will be vested in Placer County."

The relocation of the Auburn-Foresthill road, including construction of the bridge, is no different in this case than the relocation of State and county roads undertaken as a matter of course in connection with construction of other Reclamation projects. In almost all cases, relocated highway facilities are not operational components of Reclamation projects and upon completion of the relocated facilities, they are turned over to States or counties for permanent operation and maintenance. We therefore believe that the GAO statement referring to the bridge as a nonoperational component of the project is not germane to accepted practice of the Bureau of Reclamation, nor of other Federal construction agencies, and confuses the issue.

REPLACEMENT OF EXISTING ROADS AND BRIDGES NOT JUSTIFIED

This section of the GAO draft is concerned with the upstream roads in the Auburn Reservoir area including (1) two crossings on the Ponderosa Way Road owned by the Federal Government (Forest Service) and (2) one crossing on the Colfax-Foresthill Road which is owned by Placer County.

The roads are as described in the GAO draft, one-lane unpaved roads with sharp curves and very steep grades. They are carried across the North Fork of the American River on a single-lane, truss-type bridge. The bridge across the Middle Fork, also a one-lane bridge, was washed out by a flood in 1964 and has not been replaced in view of the imminent construction of the Auburn Dam and Reservoir.

These roads have been used by the Forest Service and the California Division of Forestry for fire control and forest management of the forested region north and east of the proposed reservoir area.

The GAO has stated that the relocated Auburn-Foresthill road could be used for fire fighting and forest management purposes almost as effectively as would be the case if the existing upstream roads were relocated. The GAO has further suggested that an expenditure by the California Division of Forestry of $6,000,000 for a fire-fighting facility on the Foresthill Divide would provide adequate fire protection for a period of 50 years. Such an installation and activity would not be in keeping with the proposed recreational development on the Foresthill Divide as planned jointly by the Bureau and the State.

The GAO has concluded that the volume of traffic using the existing road is not sufficient to justify replacement of the system in an estimated cost of the Federal Government of about $30,000,000. The GAO is also of the belief that the decision to provide a new road system has resulted from inadequate Bureau policies and procedures for determining whether an existing road should be replaced or abandoned.

The GAO has recommended that the Secretary of the Interior direct the Commissioner of Reclamation to (1) abandon the existing roads without replacement and (2) develop procedures setting forth specific criteria for determining when roads or bridges affected by Bureau projects should be abandoned rather than replaced.

Extensive studies by the Bureau of Reclamation, the two counties involved, the Forest Service and other interested parties have led to the conclusion that the replacement road system across the upstream arms of Auburn Reservoir is clearly the best alternative. Any plan which does not include a replacement

crossing over the upper North Fork arm is unacceptable to the agencies concerned since such replacement access is essential to assure the safety of the public in the event of fire. The Middle Fork replacement crossing is also needed for public safety and, in addition, is vitally important to the efficient use of fire protection resources. Studies conducted by the U. S. Forest Service and the State Division of Forestry indicate that the initial cost and present worth of the annual O&M expenses of the facilities needed to provide the same level of fire protection as now exists without the Middle Fork replacement crossing would be almost $11 million. The GAO report indicates on page 23 a cost of $6 million as being "adequate" for fire protection.

In addition to the fire protection and public safety requirements, other important values and considerations which establish the need to restore the upstream road system, including crossings over both arms of the reservoir, include watershed protection, the maintenance of water quality, the maintenance of aesthetic values, and the protection of fish and wildlife; all of which are directly related and of vital concern to the Auburn project. Unless these values are protected and maintained, a large Federal investment in the project might well be negated. On page 19, 2d sentence of the GAO report it is stated that the (poor) condition of the road is indicated by the fact that the U. S. Post Office stopped using it for mail service in 1954 "due to bad road conditions." Evidently, this statement was intended to show that the road is impassable, If so, it is not correct as the road is passable and is in use.

We do not believe that the GAO has given proper weight to the feasibility report on the Auburn-Folsom South Unit of the Central Valley Project, which was the basis for the authorization of the project.

Public Law No. 89-161, which authorized the construction of the Auburn Dam and Reservoir, was based on the project feasibility reports contained in H.D. 305, 87th Congress, 2d Session, and H.D. 171, 88th Congress, 1st Session. These feasibility reports specifically recognized the need to replace the upstream crossings, although the definite plan (including standards) of replacement was not identified. The comments of the Department of Agriculture appended to both House Documents, especially emphasized the need to replace the Middle Fork (Greenwood) crossing primarily for fire protection.

The comments of the Department of Agriculture on this matter as contained in H.D. 171 are particularly pertinent:

> "All other bridge replacements in this general area should provide for appropriate road connections needed for administrative, recreational, and fire control purposes. Also, it should be noted that the road replacements designated, "Greenwood Branch road and

> and bridge," in the project report are essential for fire control needs of the California Division of Forestry and the United States Forest Service and for access by the Eldorado and Tahoe National Forest." (Emphasis added)

Recognition by the Congress of the need to replace roads crossing the reservoir site, as well as the particular river crossings to be inundated, is contained in Report No. 295 of May 6, 1965, to the Committee of the whole House from the Committee on Interior and Insular Affairs. The language reads:

> "Several roads cross the reservoir site at present and would have to be relocated. Bridges would be provided as necessary to carry out these roads across the reservoir."

It is therefore evident that Congress recognized the need for replacing or relocating the upstream roads and in adopting the feasibility reports approved such replacements and authorized the Bureau by enactment of P.L. 89-161 to carry them out.

Under the authority available to the Bureau of Reclamation for relocating these roads, the roads and bridges would be constructed to standards of "replacement-in-kind," that is one-lane roads and bridges will replace one-lane roads and bridges. The Bureau and other agencies concerned with this problem recognize that the relocation of the roads to one-lane standards would be a very costly undertaking, amounting to some $24,400;000 at 1970 prices. In view of modern highway policy and the prospective uses of the relocated roads, constructing one-lane bridges would be an inefficient use of Federal funds.

Accordingly, in July 1969 a meeting of the several interested agencies and entities was held to discuss the replacement of the upstream road system. As a result, a Task Force was created to study alternate replacement plans and to recommend a plan to the various governing bodies and administrators. Several meetings were held during the following months, and eventually, a plan (designated plan P-4) evolved which would provide for a two-lane, all-weather paved road extending from old United States Highway 40 near Weimar across the North Fork and Middle Fork of the American River to the Eldorado County road near Spanish Dry Diggings. This plan,including two-lane bridges, provides for a 30 m.p.h. standard road constructed initially on an alignment which could be upgraded to a 45 m.p.h. standard at a later date. Construction according to this plan would cost about $26.2 million based on 1970 prices. At a meeting on June 25, 1970, the members of the Task Force unanimously adopted a plan and requested that the Bureau initiate action to carry out the plan as adopted.

The Bureau has asked each member of the Task Force whether and to what extent its agency is willing to contribute to the cost of the relocation plan over and above the cost for replacement-in-kind. The Bureau is willing to contribute to the plan the estimated amount it would cost for replacement-in-kind. All members of the Task Force have advised that while they are willing and ready to support and justify the relocation plan, none are in a position to contribute any funds for carrying out the plan. Accordingly, the Bureau is seeking ways and means of obtaining additional authorization for the expenditure of appropriated funds for the plan or other means of financing the relocation project.

With respect to the GAO's recommendation that the Bureau of Reclamation develop procedures setting forth specific criteria for determining when roads and bridges affected by Bureau projects should be abandoned rather than replaced, the question is given full consideration in the planning stage before authorization of the project. The determination of which procedure to follow is reached after carefully weighing all the purposes and needs of the roads and this is documented in the feasibility reports submitted to the Congress.

UNECONOMICAL RELOCATION OF STATE HIGHWAY ACROSS CREST OF DAM

This section of the GAO draft report deals with the relocation of about 8.3 miles of California State Highway 49 from a point near Cool to a junction with Interstate 80 within the city limits of Auburn. The existing highway now crosses the North Fork of the American River about 1.5 miles upstream of the Auburn Damsite. This site will be inundated when the Auburn Reservoir is formed; hence, the necessity for relocating the highway.

The GAO report indicates that the so-called "J route," one of several routes for the relocated highway studied by the Bureau of Reclamation and the State of California, should be used rather than relocating the highway over the top of the dam as presently contemplated. The GAO report states that such a route would cost about $5,000,000 or $5.5 million less than the relocation over the top of the dam.

It is further suggested that adoption of the "J route" would result in additional benefits to the Government as a highway in this location could be constructed and utilized while water was being stored behind Auburn Dam. If the highway was located on top of the dam, no storage could commence until the dam and the highway relocation were contemplated.

It is recommended that the Secretary of the Interior require the Bureau to reconsider the alternatives and make a detailed study of the cost for the "J route" to determine if a low-level crossing below the Auburn Dam is the most economical alternative when both cost and benefits are considered. It is further recommended that the Secretary instruct the Commissioner of Reclamation to develop procedures requiring that consideration be given to the effect road and bridge relocations would have on the realization of project benefits.

Shortly after authorization of the Auburn Dam and Reservoir, the California State Division of Highways made studies of various alternative routes for the relocation of Highway 49 under a route study agreement financed by the Bureau of Reclamation. In October 1967 the State Highway engineer furnished the Bureau copies of the Division's report which describes the alternatives considered and the Division's view on each. This report was supplemented by a later report from the Division of Highways, which provides additional information on two of the alternatives considered in its report.

In addition, the Bureau of Reclamation made studies of possible relocation routes both upstream and downstream of the dam. The route studies and estimated cost of each as developed by the State Division of Highways and the Bureau of Reclamation are shown in the tabulation below. The information is also shown on page 29 of the GAO report.

Route A - State Highway Department Study - $ 18,200,000

Route B - State Highway Department Study - 19,300,000

Route E 1/ - State Highway Department Study - 7,000,000
(across top of Auburn Dam)

Route F - State Highway Department Study - 15,000,000

Route G - State Highway Department Study - 16,400,000

Modified Route G - Bureau of Reclamation Study - 16,400,000

Route J - Bureau of Reclamation Study - 5,000,000

1/ This estimate has been subsequently revised to about $10.5 million.

The modified "Route G" was one selected by the Bureau for the Auburn-Foresthill County road relocation, and which utilized a different bridge location than the State Highway Department's "Route G," and was not considered in the State's report. The State studied an alignment similar to the Bureau's "Modified Route G" and found it was not acceptable for State Highway purposes.

The Bureau's "Route J" consisted of a low-level bridge crossing the river approximately 2½ miles downstream from the concrete damsite. The cost estimate for this route was based on data of a rough reconnaissance nature.

The GAO's contention that the Bureau should give further consideration to the "J Route" evidently originated from a letter from the Bureau's Regional Director in Sacramento dated December 14, 1967, to the Commissioner, which showed that "Route J" would be $2,000,000 cheaper to construct than the

relocation over the concrete dam. When asked by the GAO's regional office for comments on this matter, the Bureau's field people replied, in effect, that "Route J" was not an acceptable alternative and that its cost estimate was extremely rough; hence, it was not comparable in quality to those of the other relocation plans.

Additional circumstances bearing on the rejection of the "J Route" by the Bureau of Reclamation are that the route study was projected on 1" = 2,000' United States Geological Survey topography (having a contour interval of 40 feet) at a time when an earth dam was under consideration at a site several miles downstream from the damsite finally selected. Several alternative routes were projected during this rough study, one across the earth dam itself and others upstream and downstream from it. The "J Route" as projected on the 1" = 2,000' topography assumed a river crossing by a low-level bridge and was essentially a "replacement-in-kind" investigation. Although a uniform grade of 6 percent was assumed in projecting the "paper location" up and down the steep canyon walls, the minimum radius of curvature was assumed to be that of the existing State Highway 49, which in places has curve radii as low as 90 feet and in one case only 75 feet. These were the standards (far below current State Highway Standards) used in arriving at the $5,000,000 cost estimate quoted by GAO in reference to the Regional Director's letter of December 14, 1967, for the "J Route."

An alignment with the assumed standards would permit highway speeds of perhaps 15 to 25 miles per hour. Any attempt to impose 50 miles per hour standards of curvature requiring minimum radii of 850 feet would have resulted in very heavy cuts and fills exceeding 150 feet. Aside from the additional cost of such heavy construction, the effect on the landscape and the environment generally would be unacceptable.

No cost estimate was prepared during the "J Route" study or subsequently for a location based upon both a 6 percent grade (the minimum required by the State for highways of this class) and 850 feet radius curves which are the minimum standards for 50 m.p.h. speeds. If one had been prepared, the Bureau is confident that because of the exceptionally heavy cuts and fills involved and the generally high standards for the road and bridge, the estimate would have far exceeded the "rough reconnaissance" estimate developed at the time. We believe this judgement is corroborated by the State Division of Highways' estimate of $15.5 million for their "Route F," which was in generally similar terrain and involved cuts and fills up to 50 feet even though a longer and higher bridge was assumed. The State's estimate for the "F Route" was based on a design speed of 50 m.p.h., with maximum gradient of 6 percent and a maximum radius of curvature of 850 feet.

The "F Route" or plan was the southern-most alternative considered by the State Division of Highways. We conclude from this that the State could not find an acceptable alternative further to the south. As noted in the State' report, the State abandoned the "F Route" as being an unacceptable alternati

and the final comparison made by the State Highway Commission was actually between the basic "E and G alternatives." The alternatives considered in the State reports were based on good topography and are detailed estimates of feasibility grade which can be compared with confidence. On the other hand, the Bureau's "J Route" estimate is not only based on meager data, without good topography, and on rough reconnaissance methods but most importantly it assumed only 15-25 m.p.h. standards in contrast to the 50 m.p.h. standards for the other alternatives.

It is unfortunate that the tabulation included in the Regional Director's December 14, 1967, letter included the "J Route" cost estimate without a full discussion and explanation of this basic difference in assumption. As a matter of fact, the "J Route" was never seriously considered by the Bureau and was rejected as an undesirable location from the start. It should never have been included in any part of the record.

At a meeting of the California Highway Commission on February 20, 1969, after more than a year of study of possible alternate routes for the relocation of Highway 49, the Commission voted unanimously in favor of routing the Highway over the crest of Auburn Dam as being the most economical and in the public interest.

With respect to the GAO's observations that greater project benefits would accrue if the "J Route" was adopted by allowing the relocation work and the filling of the reservoir to proceed at an earlier date, such a procedure would require substantial sums of money for the relocation at the same time that large amounts are required for continuing the work on the dam. It is therefore highly doubtful, in view of the prevailing tight fund situation which is expected to continue for several years, that the Bureau of the Budget and the Congress would be amenable to appropriating sums sufficient for work to go forward on these two expensive activities at the same time. On the other hand, with the dam substantially completed, the need of funds therefore would be drastically reduced and lesser appropriations would be required to carry out the relocation over the top of the dam.

In view of the foregoing explanation, we believe that the relocation over the top of the dam will prove to be the most economical of all routes considered and will serve the people in the area as well as the traveling public in the most effective manner. The Bureau therefore proposes to proceed with the relocation involving the road across the top of the dam, subject to such minor variation in the location between Cool and the left abutment of the dam as the California Highway Commission may determine.

APPENDIX I

Chronology of Cost Estimates
for
Auburn-Foresthill Bridge
Auburn-Folsom South Unit, CVP

The initial cost estimates for Auburn-Foresthill Bridge were prepared in the Chief Engineer's Office of the Bureau of Reclamation in November 1967. The estimated costs for the bridge with a deck truss superstructure were as follows:

	Substructure	Superstructure	Total
2-lane bridge	$6,088,000	$6,942,000	$13,030,000
4-lane bridge (2-lane deck)	8,011,000	8,789,000	16,800,000
4-lane bridge	7,994,000	10,006,000	18,000,000

The above initial estimates were based on earthquake design criteria with piers similar to those used in the design of the Pit River Bridge near Redding, California (357-foot 6-inch pier height). A36 and A441 steels were used for the deck truss. On March 20, 1968, the initial estimate was revised for a deck arrangement similar to that shown in the issued Specifications No. DC-6834. The revised costs were:

	Substructure	Superstructure	Total
2-lane bridge (4-lane truss)	$7,994,000	$9,476,000	$17,470,000
4-lane bridge	7,994,000	9,876,000	17,870,000

After bids were received, the Office of the Director of Design and Construction repriced the quantities used for the November 1967 estimates with unit prices obtained by averaging the bid prices of the three low bids. The revised cost estimates obtained are:

	Substructure	Superstructure	Total
2-lane bridge	$5,218,000	$10,543,000	$15,761,000
4-lane bridge (2-lane deck)	5,231,000	14,459,000	19,690,000
4-lane bridge	5,217,000	16,259,000	21,476,000

The above revised substructure costs support the conclusion that the substructure costs are essentially the same for the 2-lane and 4-lane bridges.

The Bureau of Reclamation actually has not prepared a detailed design for a 2-lane bridge. Therefore, it does not have a cost estimate for that kind of a bridge based on detailed designs. Considerable time would be required to prepare that kind of estimate. The nearest estimate is for bridge number (2) prepared in August 1970. The estimates

prepared in May 1970 included an estimate for replacement-in-kind bridge as follows:

	Substructure	Superstructure	Total
(1) Replacement-in-kind bridge	$4,008,000	$8,142,000	$12,150,000
(2) 2-lane bridge	4,224,000	8,150,000	12,374,000
(3) 4-lane bridge (2-lanes constructed)	4,224,000	9,670,000	13,894,000

The replacement-in-kind bridge (1) was based on estimated quantities with unit prices obtained by averaging the three low bid unit prices. The substructure for the 2-lane (2) and 2-lane with provisions for expansion to 4-lane (3) is based on predicted bid cost considering extra work orders for unforeseen requirements. The superstructure for the 2-lane bridge (2) is based on estimated quantities and unit prices. The superstructure for the 2-lane with provisions for expansion to 4-lane (3) is based on actual quantity takeoff from specifications drawings with estimated unit prices. In addition each of the August 21, 1970, estimates includes an allowance of 20 percent for contingencies.

During the period of final bridge design, major cost savings were accomplished by the use of digital computers and modern earthquake technology. The following items contributed to the greater share of cost savings in the estimates:

1. Use of continuous composite design of deck system.

2. Truss design using all welded members with high-strength, bolted connections and utilizing high-strength, quenched and tempered alloy steels. This permitted an economical reduction in member costs with a corresponding reduction in their dead loads.

3. Rolled sections were used in lieu of laced members within the bracing systems.

4. The most significant substructure savings were obtained by adopting an hourglass configuration for the piers. This shape reduced the effect of earthquake loading from water acting on the pier shafts and reduced the required size of the pier base. The total volume of concrete for the two tall piers was reduced by approximately 25,000 cubic yards.

The substructure for either a 2- or 4-lane bridge was shown to be the same in the May 15, 1970, figures for the following reasons:

> The pier design for the bridge is governed by the earthquake loadings. The width of the top of pier is controlled by spacing

of trusses center to center of piers. When proper allowance is made for bearing shoe and inspecting clearance, there is no appreciable difference between the 2- or 4-lane pier tops. The width of the pier 60 feet below the top is a minimum and is the same for both lane cases; therefore, earthquake loading due to the 380 feet of water submergence acting on the pier is the same for either a 2- or 4-lane bridge. The effect of any decrease in the vertical reaction transmitted to the expansion bearing which causes rocker friction could add to the overturning effect on the pier. There is some righting effect due to the decreased vertical reaction which tends to counterbalance this overturning effect. We believe that these forces are offsetting and are so indeterminate that their minor effect from either the 2-lane or the 4-lane deck would result in an insignificant change in the piers. The abutments for 2 lanes could be decreased in width with a savings in deck concrete. However, since the total reduction in concrete for the abutments between 2-lane and 4-lane amounts to about six-tenths of one percent of the total concrete for the complete substructure of the bridge, the costs for the substructure would remain essentially the same.

The estimate for a replacement-in-kind bridge is for a bridge having a 2-lane substructure and a 2-lane superstructure located parallel to the present bridge. However, the deck is 40 feet lower, decreasing the total truss length by 60 feet. Also, the truss depth at the piers was decreased by 15 feet but the piers remained at the same height of 400 feet. The net result of all these changes produced a truss which costs approximately the same as previously calculated for a 2-lane truss at the higher roadway elevation. The reduction in pier width, since the span length was decreased, and depth along with the reduction in abutment width and length yielded a cost estimate of $4,008,000 or five percent less than the $4,224,000 cost for a 2-lane bridge at the higher deck elevation.

We appreciate the opportunity afforded us in resolving the issues raised in the draft, as well as the extensive consultation with your auditors on the report comments. As the result of the several conferences on this draft, it is our understanding that the final report will be revised to exclude the portion relating to the legality of the Bureau's actions. Because of the interest expressed and at your request the Bureau of Reclamation's comments on all aspects of the draft report are submitted.

Sincerely yours,

J. V. Ward Jr.

Director of Survey and Review

Mr. Allen R. Voss
Associate Director, Civil Division
General Accounting Office
Washington, D. C. 20548

PRINCIPAL OFFICIALS OF THE DEPARTMENT OF THE INTERIOR AND THE BUREAU OF RECLAMATION RESPONSIBLE FOR ADMINISTRATION OF ACTIVITIES DISCUSSED IN THIS REPORT

	Tenure of office	
	From	To
DEPARTMENT OF THE INTERIOR		
SECRETARY OF THE INTERIOR:		
Rogers C. B. Morton	Jan. 1971	Present
Fred J. Russell (acting)	Nov. 1970	Dec. 1970
Walter J. Hickel	Jan. 1969	Nov. 1970
Stewart L. Udall	Jan. 1961	Jan. 1969
ASSISTANT SECRETARY FOR WATER AND POWER DEVELOPMENT:		
James R. Smith	Mar. 1969	Present
Kenneth Holum	Jan. 1961	Jan. 1969
BUREAU OF RECLAMATION		
COMMISSIONER:		
Ellis L. Armstrong	Nov. 1969	Present
Floyd E. Dominy	May 1959	Oct. 1969

U.S. GAO Wash., D.C.