

No. of Bonds	Serial Numbers	Denomination	Amount	Dates of Maturity.
3	808 to 810, inc.	\$1000.	\$3,000.	Jan. 1933
3	921 to 923, inc.	\$1000.	\$3,000.	Jan. 1934
3	1034 to 1036, inc.	\$1000.	\$3,000.	Jan. 1935
3	1147 to 1149, inc.	\$1000.	\$3,000.	Jan. 1936
3	1260 to 1262, inc.	\$1000.	\$3,000.	Jan. 1937
3	1373 to 1375, inc.	\$1000.	\$3,000.	Jan. 1938
3	1486 to 1488, inc.	\$1000.	\$3,000.	Jan. 1939
3	1599 to 1601, inc.	\$1000.	\$3,000.	Jan. 1940
3	1712 to 1714, inc.	\$1000.	\$3,000.	Jan. 1941
3	1825 to 1827, inc.	\$1000.	\$3,000.	Jan. 1942
3	1938 to 1940, inc.	\$1000.	\$3,000.	Jan. 1943
3	2051 to 2053, inc.	\$1000.	\$3,000.	Jan. 1944
3	2164 to 2166, inc.	\$1000.	\$3,000.	Jan. 1945
3	2277 to 2279, inc.	\$1000.	\$3,000.	Jan. 1946
3	2390 to 2392, inc.	\$1000.	\$3,000.	Jan. 1947
3	2503 to 2505, inc.	\$1000.	\$3,000.	Jan. 1948
3	2616 to 2618, inc.	\$1000.	\$3,000.	Jan. 1949
3	2729 to 2731, inc.	\$1000.	\$3,000.	Jan. 1950
3	2842 to 2844, inc.	\$1000.	\$3,000.	Jan. 1951
3	2955 to 2957, inc.	\$1000.	\$3,000.	Jan. 1952
3	3068 to 3070, inc.	\$1000.	\$3,000.	Jan. 1953
3	3181 to 3183, inc.	\$1000.	\$3,000.	Jan. 1954
3	3294 to 3296, inc.	\$1000.	\$3,000.	Jan. 1955
3	3407 to 3409, inc.	\$1000.	\$3,000.	Jan. 1956
3	3519 to 3521, inc.	\$1000.	\$3,000.	Jan. 1957
3	3632 to 3634, inc.	\$1000.	\$3,000.	Jan. 1958
3	3745 to 3747, inc.	\$1000.	\$3,000.	Jan. 1959
3	3859 to 3861, inc.	\$1000.	\$3,000.	Jan. 1960
3	3972 to 3974, inc.	\$1000.	\$3,000.	Jan. 1961
3	4085 to 4087, inc.	\$1000.	\$3,000.	Jan. 1962
3	4198 to 4200, inc.	\$1000.	\$3,000.	Jan. 1963
3	4298 to 4300, inc.	\$1000.	\$3,000.	Jan. 1964
3	4411 to 4413, inc.	\$1000.	\$3,000.	Jan. 1965:

and upon the delivery to him of said bonds by the officer in whose custody they are, he is hereby authorized to pay therefor the sum of ninety-nine thousand dollars (\$99,000.00), with accrued interest to the date of delivery.

BE IT FURTHER RESOLVED, that said City Treasurer shall upon delivery to him and payment therefor as hereinabove provided, hold said \$99,000.00 El Capitan Dam Bonds for and on behalf of said City to the credit of the Sutherland Dam Bond Fund, subject to the direction of the Council of said City as to the resale thereof, in order that the resale of said bonds by said City may be made and authorized by the Council from time to time, so that the proceeds thereof may be applied to the purposes for which the money, with which said \$99,000.00 of El Capitan Dam Bonds was originally purchased, was placed in the Treasury of said City.

Presented by _____

Approved as
to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 58739 of the Council of The City of San Diego, California, as adopted by said Council August 1, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 58740

RESOLUTION OF ACCEPTANCE OF THE TERMS AND CONDITIONS OF THE GRANT OF THAT CERTAIN ACT OF CONGRESS, ENTITLED, "AN ACT GRANTING TO THE CITY OF SAN DIEGO CERTAIN LANDS IN THE CLEVELAND NATIONAL FOREST AND THE CAPITAN GRANDE INDIAN RESERVATION FOR DAM AND RESERVOIR PURPOSES FOR THE CONSERVATION OF WATER, AND FOR OTHER PURPOSES," AS AMENDED BY AN ACT OF CONGRESS, ENTITLED, "AN ACT AMENDING AN ACT OF CONGRESS APPROVED FEBRUARY 28, 1919 (40 STAT. L. 1206), GRANTING THE CITY OF SAN DIEGO CERTAIN LANDS IN THE CLEVELAND NATIONAL FOREST AND THE CAPITAN GRANDE INDIAN RESERVATION FOR DAM AND RESERVOIR PURPOSES FOR THE CONSERVATION OF WATER, AND FOR OTHER PURPOSES, SO AS TO INCLUDE ADDITIONAL LANDS."

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That pursuant to the terms of Section Seven of that certain Act of Congress, entitled, "An Act granting to The City of San Diego certain lands in the Cleveland National Forest and the Capitan Grande Indian Reservation for dam and reservoir purposes for the conservation of water, and for other purposes," as amended by that certain Act of Congress, entitled, "An Act amending an Act of Congress approved February 28, 1919 (40 Stat. L. 1206), granting the city of San Diego certain lands in the Cleveland National Forest and the Capitan Grande Indian Reservation for dam and reservoir purposes for the conservation of water, and for other purposes, so as to include additional lands," approved May 4th, 1932, the Council of The City of San Diego, being the single legislative body of said municipality, hereby expresses this, its acceptance of the terms and conditions of the grant set forth in said bill and said amended bill.

That the City Clerk of The City of San Diego be, and he is hereby authorized and directed to immediately file with the Honorable Ray Lyman Wilbur, Secretary of the Interior, a certified copy of this resolution.

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 58740 of the Council of the City of San Diego, California, as adopted by said Council August 1, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 58817

BE IT RESOLVED by the Council of the City of San Diego
as follows:

That \$2000 of Mr. H. N. Savage's salary shall be
allocated to the tax rate and \$8000 shall be allocated
to El Capitan funds.

I HEREBY CERTIFY the above to be a full, true, and correct
copy of Resolution No. 58817 of the Council of the City of
San Diego, as adopted by the said Council August 15, 1932.

ALLEN H. WRIGHT,
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 58963

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That H. N. Savage be, and he is hereby authorized and directed to take full charge of all details of construction of the El Capitan Dam.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 58963 of the Council of the City of San Diego, as adopted by the said Council September 19, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 59040

BE IT RESOLVED by the Council of the City of San Diego,
as follows:

That the Purchasing Agent be authorized to advertise
for bids for the following items in accordance with the
request of H. N. Savage, Hydraulic Engineer:

One 30" x 30" sliding gate, estimated cost \$1600.00
to be installed in the outlet tower of the El
Capitan Reservoir.

One auxiliary valve 6", estimated cost \$300.00,
also for installation in the outlet tower of the
El Capitan Reservoir.

To be in accordance with specifications filed with the City
Clerk bearing Documents Nos. 278621 and 278622.

I HEREBY CERTIFY the above to be a full, true, and
correct copy of Resolution No. 59040 of the Council of the
City of San Diego, as adopted by the said Council October
3, 1932.

ALLEN H. WRIGHT,
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 59152

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That H. N. Savage is hereby requested to furnish a detailed report in writing on what has been spent for supervising and engineering work, to date, on the El Capitan project.

Mr. H. N. Savage is also requested to be present at the Council meeting to be held on Friday, October 28th, 1932, at 10:00 A.M., in connection with two \$6000 ordinances submitted.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59152 of the Council of the City of San Diego, as adopted by the said Council October 24, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 59224

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the Hydraulic Engineer is hereby authorized and directed to furnish weekly labor reports on the work being done at El Capitan Reservoir.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59224 of the Council of the City of San Diego, as adopted by the said Council November 7, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 59263

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That H. N. Savage, Hydraulic Engineer, is hereby authorized to proceed to Washington, D. C., to assist in securing a loan from the Reconstruction Finance Corporation in connection with the El Capitan Dam project; his expenses to be paid by the City.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59263 of the Council of the City of San Diego, as adopted by the said Council November 14, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 59265

BE IT RESOLVED by the Council of The City of San Diego, as follows:

That the City Manager of The City of San Diego, be and is hereby authorized and directed to institute and prosecute with diligence, work of clearing El Capitan Reservoir Basin of all "dead and down" trees, logs and brush.

That said City Manager be and is hereby authorized and directed to employ any necessary labor in and about the prosecution of such work and to permit any and all laborers employed in and about such work to camp on the lands owned by the City in and about the vicinity of El Capitan Reservoir Basin, and utilize all buildings owned by said City on such lands.

APPROVED as to form

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 59265 of the Council of the City of San Diego, California, as adopted by said Council November 14, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOPE, JR.
Deputy

RESOLUTION No. 59271.

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the Hydraulic Engineer is hereby authorized and directed to see that all workers, except miners, tunnelmen and foremen, are dismissed from the El Capitan project, who are not San Diego residents.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59271 of the Council of the City of San Diego, as adopted by the said Council November 14, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK H. FOOTE, JR.
Deputy

RESOLUTION NO. 59295

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the City Auditor is hereby instructed not to send any more money to City's representatives in Washington, D. C. regarding the sale of El Capitan Bonds to the Reconstruction Finance Corporation, until authorized by the Council.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59295 of the Council of the City of San Diego, as adopted by the said Council November 21, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK M. POOTE, JR.
Deputy

RESOLUTION NO. 59371

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the Hydraulic Engineer is hereby requested to report why truck drivers, electricians and welders at El Capitan Dam are employed from out of town.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59371 of the Council of the City of San Diego, as adopted by the said Council December 5, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 59401

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the thanks of this Council be and they are hereby extended City Attorney C.L. Byers, City Treasurer J.T. Milland and Hydraulic Engineer H.N. Savage for their successful handling of the city's application to the Federal Reconstruction Finance Corporation at Washington covering the purchase of the city's El Capitan Dam Bonds, thus assuring the continuance of the work upon that important project upon the city's water impounding system.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59401 of the Council of the City of San Diego, as adopted by the said Council December 12, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK M. POOTE, JR.
Deputy

RESOLUTION NO. 59402

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the City Attorney is hereby authorized and directed to prepare an ordinance appropriating necessary amounts for current expenditures at El Capitan Dam work, from the Unappropriated Balance Fund; to be repaid from the sale of bonds.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59402 of the Council of the City of San Diego, as adopted by the said Council December 12, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOSTER, JR.
Deputy

RESOLUTION NO. 59407

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the County Board of Supervisors are hereby requested to keep in repair the road between Lakeside and the El Capitan Reservoir site.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59407 of the Council of the City of San Diego, as adopted by the said Council December 12, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 59471

WHEREAS, heretofore and on or about November 27, 1931 representatives of The City of San Diego and the La Mesa, Lemon Grove and Spring Valley Irrigation District prepared, approved and executed on behalf of said parties a "Suggested Basis of Agreement between The City of San Diego and La Mesa, Lemon Grove and Spring Valley Irrigation District"; and

WHEREAS, on or about the 30th day of November, 1931, the Common Council of said City of San Diego, at a regular meeting, by its Resolution No. 57624, duly passed and adopted, approved and ratified said suggested basis of agreement; and further directed the City Attorney to proceed with the preparation of the detailed contract embodying the principles and terms of the said Suggested Basis of Agreement; and

WHEREAS, the City Attorney, pursuant to the terms of said resolution, has prepared a contract embodying the principles and terms of the said Suggested Basis of Agreement; and containing a provision requiring said District to pay one-half of the increased cost of an enlarged pipeline within ten (10) days after opening the bids for the construction of said pipeline and prior to any award; and further requiring said District to set aside in a special sinking fund a sum from revenues sufficient to provide for payment of principal and interest of the deferred payments as said payments become due, and has submitted the same to this Council for consideration; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That when the said contract so prepared and submitted has been duly and regularly executed by the Board of Directors of the said Irrigation District, that the Council of The City of San Diego be, and it is hereby authorized and empowered to enter into and execute said agreement with the La Mesa, Lemon Grove and Spring Valley Irrigation District, prepared and submitted in accordance with the direction contained in Resolution No. 57624, passed and adopted on the 30th day of November, 1931, and as herein recited, which contract contains the principles and terms of the "Suggested Basis of Agreement between The City of San Diego and La Mesa, Lemon Grove and Spring Valley Irrigation District" governing the diversion and use of the water of the San Diego River.

Approved
As to form by _____
City Attorney

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 59471 of the Council of the City of San Diego, California, as adopted by said Council December 27, 1932.

ALLEN H. WRIGHT
City Clerk

By CLARK H. FOOTE, JR.
Deputy

RESOLUTION NO. 59495

A RESOLUTION AUTHORIZING THE CITY TREASURER OF THE CITY OF SAN DIEGO TO INVEST ON BEHALF OF THE CITY OF SAN DIEGO, SURPLUS MONEYS IN THE TREASURY FOR THE PURCHASE OF EL CAPITAN DAM BONDS IN THE AMOUNT OF \$47,000.00.

WHEREAS, it appears to the Council of the City of San Diego that there is now in the City Treasury of said City to the credit of Sutherland Dam Bond Fund surplus moneys not required for the purposes for which the Sutherland Dam Bonds were authorized, in an amount to exceed Forty-seven Thousand Dollars (\$47,000.00); and

WHEREAS, it further appears to said Council that said City now has in its possession certain unsold El Capitan Bonds of The City of San Diego, drawing interest at the rate of five per cent (5%), in the amount of \$2,397,000; and

WHEREAS, it is deemed wise and expedient by this Council to invest a portion of said surplus moneys in the City Treasury in some of said El Capitan Dam Bonds, in order that the City may obtain the interest on said bonds; and

WHEREAS, it further appears to said Council that said bonds have heretofore been duly and regularly advertised for sale, and no bids of more than par and accrued interest have been received; and

WHEREAS, under the laws of the State of California said bonds must be sold for at least par and accrued interest; and

WHEREAS, there is a present need for a portion of the moneys for which said unsold El Capitan Dam Bonds were voted; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That J. T. Millan, City Treasurer, be, and he is hereby authorized and directed to invest, on behalf of The City of San Diego, surplus moneys in the City Treasury to the credit of the Sutherland Dam Bond Fund, not required immediately for the purposes for which the Sutherland Dam Bonds were authorized, in the following designated El Capitan Dam Bonds of The City of San Diego, in the amount of Forty-seven Thousand Dollars (\$47,000.00), face value thereof:

No. of Bonds.	Serial Numbers	Denomination	Amount	Date of Maturity
47	951 to 997, inc.	\$1000.	\$ 47,000.	Jan. 1934.

and upon the delivery to him of said bonds by the officer in whose custody they are, he is hereby authorized to pay therefor the sum of Forty-seven Thousand Dollars (\$47,000.00), with accrued interest to the date of delivery.

BE IT FURTHER RESOLVED, that said City Treasurer shall upon delivery to him and payment therefor as hereinabove provided, hold said \$47,000.00 El Capitan Dam Bonds for and on behalf of said City to the credit of the Sutherland Dam Bond Fund, subject to the direction of the Council of said City as to the resale thereof, in order that the resale of said bonds by said City may be made and authorized by the Council from time to time, so that the proceeds thereof may be applied to the purposes for which the money, with which said \$47,000.00 of El Capitan Dam Bonds was originally purchased, was placed in the Treasury of said City.

Presented by _____

Approved as
to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 59493 of the Council of the City of San Diego, California, as adopted by said Council January 3, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 59494

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the expenses incurred by Hydraulic Engineer H. N. Savage, and Assistant City Attorney Gilmore Tillman, in connection with appearing on behalf of the City at Sacramento, January 3d, for the purpose of taking the deposition of State Engineer Edward H. Hyatt, in connection with the trial of CROUCH v. CITY OF SAN DIEGO, No. 71202, be, and they are hereby authorized, approved and ordered to be paid.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59494 of the Council of the City of San Diego, as adopted by the said Council January 3, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK H. FOOTE, JR.
Deputy

RESOLUTION NO. 59561

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That Hydraulic Engineer H. N. Savage is hereby authorized and directed to have appropriation ordinances contained in Documents Nos. 280538, 280537, and 280536 itemized.

It is further requested that in future similar ordinances presented on El Capitan expenditures shall be itemized.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59561 of the Council of the City of San Diego, as adopted by the said Council January 16, 1933.

ALLEN H. WRIGHT
CITY CLERK

BY CLARK M. FOOTE, JR.
DEPUTY

RESOLUTION NO. 59708

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the Purchasing Agent of the City of San Diego be, and he is hereby authorized and directed to advertise for sealed proposals or bids for furnishing the City of San Diego with Two - 36" Cast Iron Saucer Valves and Cast Steel Covers with Brass Bypass, and Bronze Seat, and Miscellaneous Items, delivered F. O. B., San Diego, and

Two 42" Cast Iron Saucer Valves, and Cast Steel Covers with Brass Bypass, and Bronze Seat, and Miscellaneous Items, delivered F. O. B., San Diego,

all as per specifications furnished by the Hydraulic Engineer, and on file at the office of the City Clerk of said City and bearing Document No. 281227.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59708 of the Council of the City of San Diego, as adopted by the said Council February 20, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK N. FOSTER, JR.
Deputy

RESOLUTION NO. 59819

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That Hydraulic Engineer H. N. Savage is hereby requested to furnish the Council with a more up-to-date report on labor at the El Capitan Dam project that the one dated March 3, 1933, and contained in Document No. 281506.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59819 of the Council of the City of San Diego, as adopted by the said Council March 13, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 59830

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the Purchasing Agent of the City of San Diego be, and is hereby authorized to purchase in the open market from the Vernon Foundry Incorporated, 2 - 36" Cast Iron Saucer Valves, and 2 - 42" Cast Iron Saucer Valves, in accordance with specifications filed with the City Clerk bearing Document No. 381227, for the sum of \$1343.00.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59830 of the Council of the City of San Diego, as adopted by the said Council March 13, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 59845

BE IT RESOLVED By the Council of the City of San Diego, as follows:

That H. N. Savage, Hydraulic Engineer, be and he is hereby authorized to proceed at once to Sacramento in connection with the city's interests involving (a) waters from the Hoover Dam and (b) proposed repairs to Hodges Dam and possible state aid towards the latter as a flood control measure, and (c) designs for spillway for El Capitan Dam.

That he be and is hereby authorized to incur the necessary expenses incident to said trip.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59845 of the Council of the City of San Diego, as adopted by the said Council March 14, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 59963

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That an executive session is hereby called in the Mayor's Office for 2:00 P.M., Tuesday, April 11th, 1933, to consider matters regarding the construction of El Capitan Reservoir Dam, Spillway and Outlet Works.

Members of the Council, the City Attorney, the Hydraulic Engineer, the City Manager, the Contractors and representatives of the press are invited to attend this session.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 59963 of the Council of the City of San Diego, as adopted by the said Council April 10, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60011

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That, in connection with spillway specifications for El Capitan Reservoir, the Hydraulic Engineer is hereby requested to furnish the Council with the following information:

(1) Schedule of quantities, items and price and estimate of total original bid schedule price.

(2) Schedule of quantities, items and price and estimate of total cost of spillway as changed and extended to the elevation now desired by the Hydraulic Engineer and required by the State Engineer.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 60011 of the Council of the City of San Diego, as adopted by the said Council April 21, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60012

WHEREAS, the Hydraulic Engineer has, under date of March 22, 1933, March 30, 1933, and April 20, 1933, directed Messrs. H. W. Rohl and T. E. Connolly, contractors, El Capitan Dam, to remove certain earthy material, decomposed granite and rock from the rock embankment of the El Capitan Dam; and

WHEREAS, such direction has been given by said Hydraulic Engineer pursuant to the provisions of contract, dated April 25th, 1932, filed in the office of the City Clerk of said City as Document No. 275788, and particularly paragraph 30 of the Specifications - General Conditions, of said contract; and

WHEREAS, said contractors contend that said work has been performed as required by the terms of said contract, and that they should not be compelled to comply with said orders; and

WHEREAS, it is the desire of the Council of The City of San Diego to have said contractors comply with said orders of said Hydraulic Engineer, but to reserve to said contractors the right to collect compensation for said work in the event that it develops upon the completion or during the progress thereof that said work mentioned in said orders of said Hydraulic Engineer has been performed in compliance with the terms of said contract;

NOW, THEREFORE, BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the orders of the Hydraulic Engineer of March 22, 1933, March 30, 1933, and April 20, 1933, to Messrs. H. W. Rohl and T. E. Connolly, contractors, El Capitan Dam (Contract, Document No. 275788), to remove certain rock, earthy material and decomposed granite placed by said contractors in said downstream rock embankment, be observed, followed and performed by said contractors; provided, however, that said contractors shall be compensated for such work performed pursuant to said orders of said Hydraulic Engineer according to the provisions of paragraph 14 of the Specifications - General Conditions, El Capitan Dam, in event upon the completion of said work, or during the progress thereof, it shall be determined in the manner provided in said contract that the earthy material and decomposed granite placed by said contractors on the down stream rock embankment at about Elevation 600, prior to the issuance of said orders of March 22, 1933, March 30, 1933, and April 20, 1933, had been removed by said contractors, and that said rock embankment had been placed and constructed in accordance with said contract (Document No. 275788) and the plans and specifications attached thereto and made a part thereof; and provided, further, that no compensation whatever shall be made to said contractors for work performed in compliance with said orders of said Hydraulic Engineer in event

it shall be determined as provided in said contract that said
rock embankment has not been placed and constructed in accord-
ance with the terms of said contract and the plans and specifica-
tions attached thereto.

Presented by _____

Approved as
to form by _____

I HEREBY CERTIFY the above to be a full, true and correct
copy of Resolution No. 60012 of the Council of the City of San
Diego, California, as adopted by said Council April 21, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOPE, JR.
Deputy

RESOLUTION NO. 60035

WHEREAS, it appears to this Council from a report and recommendation of the Hydraulic Engineer, dated April 24th, 1933, on file in the office of the City Clerk of The City of San Diego, that it is necessary in the construction of El Capitan Reservoir Dam, Spillway and Outlet Works, to require the contractors Rohl & Connolly to perform certain extra work, the estimated cost of which is about fifteen hundred dollars (\$1500.00), not covered by contract schedule items, consisting of the drilling, shooting and removing of certain boulders from the natural slopes above and north of the excavation slopes of the spillway at said El Capitan Reservoir Dam; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the extra work described in the communication of the Hydraulic Engineer to this Council, dated April 24th, 1933, on file with the City Clerk, be, and the same is hereby authorized and approved; and that the Hydraulic Engineer be, and he is hereby authorized to require the contractors to drill, shoot and remove certain boulders from the natural slopes above and north of the excavation slopes of the spillway at El Capitan Reservoir Dam, to prevent possible future damage to the spillway structure; said work to be performed as, and paid for as, extra work under paragraph 14 of the contract specifications for the construction of said reservoir dam, spillway and outlet works, and to issue the required form of work order or orders required therefor.

Presented by _____

Approved as
to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60035 of the Council of the City of San Diego, California, as adopted by said Council April 24, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60036

WHEREAS, it appears to this Council from the report and recommendation of the Hydraulic Engineer, dated April 24, 1933, upon file with the City Clerk of The City of San Diego, that the State Engineer has requested The City of San Diego to install in the hydraulic fill portion of El Capitan Dam seven observation wells for determining the hydraulic gradient of lines of water saturation within the stability sections of the dam, the cost of installing which it is estimated will be about \$350.00 each, or a total of about \$2,500.00; NOW THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the installing of such observation wells in the hydraulic fill portion of El Capitan Dam, described and recommended in the communication of the Hydraulic Engineer hereinabove referred to, and required by the State Engineer, be, and the same is hereby authorized and approved; and that the contractors be, and they are hereby required to perform said work as extra work under paragraph 14 of the contract specifications for the construction of El Capitan Dam; and the Hydraulic Engineer, be, and he is hereby authorized to issue required work orders for the performance of said extra work under said paragraph 14 of the contract specifications.

Presented by _____

Approved
As to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60036 of the Council of the City of San Diego, California, as adopted by said Council April 24, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. POOTE, JR.
Deputy

RESOLUTION NO. 60037

ACCEPTING THE BID OF RECONSTRUCTION FINANCE CORPORATION FOR \$240,000.00 EL CAPITAN DAM BONDS OF THE CITY OF SAN DIEGO, CALIFORNIA.

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the bid of the Reconstruction Finance Corporation, of date April 22, 1933, to purchase two hundred forty thousand dollars (\$240,000.00) El Capitan Dam Bonds of The City of San Diego, which said bid has been filed in the office of the City Clerk of said City on April 24th, 1933, under Document No. 282430 be, and the same is hereby accepted.

That said bid hereby accepted is in the following words and figures, to-wit:

"RECONSTRUCTION FINANCE CORPORATION
Washington

April 22, 1933

Honorable John F. Forward, Jr.,
Mayor,
San Diego, California.

Dear Sir:

Subject to the terms and conditions of a resolution adopted by the Board of Directors of this Corporation on December 12, 1932 (a certified copy of which has heretofore been furnished you), we offer to purchase \$240,000 (being part of a total authorized issue of \$4,500,000) Municipal Improvement Bonds of the City of San Diego, California, designated El Capitan Dam Bond Fund, Special Election November 18, 1924, to be dated January 1, 1925, to be in the denomination of \$1,000 each, to bear interest at the rate of five per centum (5%) per annum, payable semi-annually on the first days of July and January in each year, to be payable as to both principal and interest in lawful money of the United States of America at the office of the Treasurer of said City, or at the East River National Bank of New York City, or at any branch of the Bank of Italy in California, at the option of the holder thereof, and to bear the serial numbers and to mature in the amounts and on the dates as follows:

<u>Numbers</u>	<u>Amounts</u>	<u>Maturity Dates</u>
924 to 931 inc.	\$8,000.00	January 1, 1934
1037 to 1044 "	8,000.00	" " 1935
1150 to 1157 "	8,000.00	" " 1936
1263 to 1270 "	8,000.00	" " 1937
1376 to 1383 "	8,000.00	" " 1938
1489 to 1496 "	8,000.00	" " 1939
1602 to 1609 "	8,000.00	" " 1940
1715 to 1722 "	8,000.00	" " 1941
1828 to 1835 "	8,000.00	" " 1942
1941 to 1948 "	8,000.00	" " 1943

<u>Numbers</u>	<u>Amounts</u>	<u>Maturity Dates</u>
2054 to 2061 inc.	38,000.00	January 1, 1944
2167 to 2174 "	8,000.00	" 1945
2280 to 2287 "	8,000.00	" 1946
2393 to 2400 "	8,000.00	" 1947
2506 to 2513 "	8,000.00	" 1948
2619 to 2626 "	8,000.00	" 1949
2732 to 2738 "	7,000.00	" 1950
2845 to 2851 "	7,000.00	" 1951
2958 to 2964 "	7,000.00	" 1952
3071 to 3077 "	7,000.00	" 1953
3184 to 3190 "	7,000.00	" 1954
3297 to 3303 "	7,000.00	" 1955
3410 to 3416 "	7,000.00	" 1956
3522 to 3528 "	7,000.00	" 1957
3635 to 3641 "	7,000.00	" 1958
3748 to 3754 "	7,000.00	" 1959
3862 to 3868 "	7,000.00	" 1960
3975 to 3981 "	7,000.00	" 1961
4088 to 4094 "	7,000.00	" 1962
4201 to 4207 "	7,000.00	" 1963
4301 to 4307 "	7,000.00	" 1964
4414 to 4420 "	7,000.00	" 1965

and to pay therefor \$240,000 and accrued interest at the rate borne by the bonds from the interest payment date immediately preceding the date of payment of the purchase price for such bonds to the date of payment of such purchase price (all matured coupons to be cut off and destroyed before delivery).

We shall be under no obligation to take up and pay for the bonds which we herein offer to purchase until we have been furnished, without cost to us, with the final approving opinion of Messrs. O'Neveny, Tuller & Myers of Los Angeles, California, to the effect that said bonds are valid and binding obligations of the City of San Diego, California, payable as to both principal and interest from ad valorem taxes which may be levied without limitation as to rate or amount upon all the taxable property within the territorial limits of said City.

Please notify us promptly of the action taken by the City in respect of this bid. If this bid is accepted, the bond closing will take place at the Los Angeles Branch of the Federal Reserve Bank of San Francisco, Los Angeles, California. Upon receipt of such acceptance, we will forward a letter of instruction relative to the bond closing to the Federal Reserve Bank of San Francisco and a copy to the Los Angeles Branch of that bank, and we will furnish you with a copy for your files.

Very truly yours,

(Signed) H. A. Mulligan
H. A. Mulligan
Treasurer.

That said El Capitan Dam Bonds are hereby sold and awarded to said Reconstruction Finance Corporation, upon the terms of said bid, as hereinabove set forth.

That the City Clerk of said City be, and he is hereby authorized and directed, upon receipt of the Treasurer's receipt for the amount of said bid, to deliver said bonds to said purchaser.

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60037 of the Council of the City of San Diego, California, as adopted by said Council April 24, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60118

WHEREAS, the Hydraulic Engineer has under date of March 22nd, March 30th and April 20th, 1933 directed Messrs. H. W. Rohl and T. E. Connolly, contractors, El Capitan Dam, to remove certain earthy material, decomposed granite and rock from the downstream rock embankment of the El Capitan Dam; and

WHEREAS, on the 21st day of April, 1933, this Council adopted its resolution No. 60012 reading as follows:

"Resolution No. 60012

"WHEREAS, the Hydraulic Engineer has, under date of March 22, 1933, March 30, 1933, and April 20, 1933, directed Messrs. H. W. Rohl and T. E. Connolly, contractors, El Capitan Dam, to remove certain earthy material, decomposed granite and rock from the rock embankment of the El Capitan Dam; and

WHEREAS, such direction has been given by said Hydraulic Engineer pursuant to the provisions of contract, dated April 25th, 1932, filed in the office of the City Clerk of said City as Document No. 275788, and particularly paragraph 30 of the Specifications - General Conditions, of said contract; and

WHEREAS, said contractors contend that said work has been performed as required by the terms of said contract, and that they should not be compelled to comply with said orders; and

WHEREAS, it is the desire of the Council of The City of San Diego to have said contractors comply with said orders of said Hydraulic Engineer, but to reserve to said contractors the right to collect compensation for said work in the event that it develops upon the completion or during the progress thereof that said work mentioned in said orders of said Hydraulic Engineer has been performed in compliance with the terms of said contract;

NOW, THEREFORE, BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the orders of the Hydraulic Engineer of March 22, 1933, March 30, 1933, and April 20, 1933, to Messrs. H. W. Rohl and T. E. Connolly, contractors, El Capitan Dam (Contract, Document No.

275788), to remove certain rock, earthy material and decomposed granite placed by said contractors in said down stream rock embankment, he observed, followed and performed by said contractors; provided, however, that said contractors shall be compensated for such work performed pursuant to said orders of said Hydraulic Engineer according to the provisions of paragraph 14 of the Specifications - General Conditions, El Capitan Dam, in event upon the completion of said work, or during the progress thereof, it shall be determined in the manner provided in said contract that the earthy material and decomposed granite placed by said contractors on the downstream rock embankment at about Elevation 600, prior to the issuance of said orders of March 22, 1933, March 30, 1933, and April 20, 1933, had been removed by said contractors, and that said rock embankment had been placed and constructed in accordance with said contract (Document No. 275788) and the plans and specifications attached thereto and made a part thereof; and provided, further, that no compensation whatever shall be made to said contractors for work performed in compliance with said orders of said Hydraulic Engineer in event it shall be determined as provided in said contract that said rock embankment has not been placed and constructed in accordance with the terms of said contract and the plans and specifications attached thereto.

and

WHEREAS, subsequent thereto the Hydraulic Engineer, under date of May 11th, 1933, directed the contractors to commence the removal of certain rock above elevation 600 on the downstream rock embankment; and

WHEREAS, pursuant thereto said contractors undertook and at the request of members of the Council subsequently stopped the work provided for and directed in said resolution of the Council and in said letter of the Hydraulic Engineer dated May 11th; and

WHEREAS, after several conferences and after hearing the available evidence, this Council believes that the abandonment of the work provided for in said resolution will advance and appreciably progress further construction work upon said El Capitan Dam without in any manner affecting the stability or safety of said structure, and in addition thereto will tend to promote cooperation between City engineering forces and the contractors' forces upon such work, and that the withdrawal of the letters of the Hydraulic Engineer addressed to said contractors under date of March 22nd, March 30th, April 20th and May 11th, and the rescinding of the resolution of the Council numbered 60012 as a compromise of the controversy relating thereto between the City and said contractors, is at this time advisable; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the Hydraulic Engineer be, and he is hereby directed to address a communication to Messrs. H. W. Rohl and T. E. Connolly, contractors, El Capitan Dam, countermanding the directions and orders contained in said letters dated March 22nd, March 30th, April 20th and May 11th, 1933, and to deliver said countermanding letter to the City Clerk of The City of San Diego who shall hold the same subject to further orders as herein set forth;

BE IT FURTHER RESOLVED, that said Hydraulic Engineer be, and he is hereby further directed to immediately assign an engineer to reside at the dam with complete authority under the terms of the contract to approve or disapprove the work on the structure as it progresses from hour to hour.

BE IT FURTHER RESOLVED, that when said communication from the Hydraulic Engineer addressed to the contractors, countermanding said previous orders, shall have been delivered to the City Clerk of The City of San Diego, the contractors shall thereupon, in writing, file with the City Clerk their waiver and release of any claim, enforceable or not, against said City for damages or standby charges growing out of or in any manner dependent upon the controversy concerning the conditions in the downstream rock embankment of said El Capitan Dam, as referred to in said Resolution No. 60012 and the letters of the Hydraulic Engineer herein referred to.

BE IT FURTHER RESOLVED, that when said countermanding order from the Hydraulic Engineer and the waiver and release from the contractors shall have been filed with the City Clerk, Resolution No. 60012 shall thereupon be rescinded and repealed and thereafter be of no force and effect.

BE IT FURTHER RESOLVED that immediately thereafter said contractors be, and they are hereby directed and authorized to proceed with the construction of said El Capitan Dam as provided in the contract between said City and said contractors.

Presented by _____

Approved
As to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60118 of the Council of the City of San Diego, California, as adopted by said Council May 15, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOPE, JR.
Deputy

RESOLUTION NO. 60119

WHEREAS, differences and controversies existing between the City and the contractors on the El Capitan Dam have resulted in conditions that have a tendency to delay, if they have not actually delayed, the progress of work on said structure; and

WHEREAS, the Council of said City is concerned because of the occurrence of such controversies with consequent interruption in the work on said structure; and

WHEREAS, said Council is desirous of making definite and certain its intention and purpose to require of the contractors a strict compliance with the terms of the contract specifications for such work; and

WHEREAS, it is the desire of the Council to make known its intentions and policies in the premises; NOW, THEREFORE,

BE IT RESOLVED by the Council of The City of San Diego, as follows:

That the construction work of the El Capitan Dam must be carried on by the contractors in strict compliance with the contract specifications, and that the provisions of said contract specifications relating to the authority of the Hydraulic Engineer and his representatives on the work shall be strictly and rigidly enforced by the City and adhered to by the contractors.

BE IT FURTHER RESOLVED, that the Hydraulic Engineer is directed to report immediately, and within a period of not to exceed twenty-four hours after the occurrence thereof, any failure or refusal of the contractor to comply with directions, written or oral, of the Hydraulic Engineer regarding the work on said structure.

Presented by _____

Approved
As to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60119 of the Council of the City of San Diego, California, as adopted by said Council May 15, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTK, JR.
Deputy

RESOLUTION NO. 60120

WHEREAS, differences and controversies existing between the City engineering force and the contractors on the El Capitan Dam have resulted in conditions that have a tendency to delay, if they have not actually delayed, the progress of work on said structure; and

WHEREAS, various disputes have arisen concerning the progress and quality of the work to be performed; and

WHEREAS, the Council of The City of San Diego is concerned because of the occurrence of such controversies with consequent interruption in the work on said structure; and

WHEREAS, this Council does not desire to in any way substitute its opinion for engineering advice; and

WHEREAS, under Article III of the Contract, it is the duty of the Council to give final approval to interpretations of the specifications, and in which article it is provided as follows:

"ARTICLE III. The contractor hereby agrees that he will be bound by each and every part of the plans and specifications, and do and cause to be done all of said work and improvement as specified in the specifications and as shown upon the plans, as the same may be interpreted by the Hydraulic Engineer in Charge Bureau of Water Development of said City, subject to approval by the Common Council;" and

WHEREAS, in order for this Council to have independent, impartial and competent engineering advice in connection with various disputes which have arisen between the contractors and the City's engineering force, this Council desires to employ an engineer of outstanding ability, having necessary qualifications to enable him to tender proper and competent engineering advice in connection with the construction of hydraulic earth and rock fill dams; and

WHEREAS, Mr. D. C. Henny, Vice-President of the American Society of Civil Engineers, of Portland, Oregon, is of outstanding ability in the field of dam construction and engineering, and who is now a member of the engineering advisory board of the Reconstruction Finance Corporation, Portland Federal Reserve District, and who is now consultant on Boulder Dam and for the United States Reclamation Service, and who has had for many years last past wide and extensive experience in the construction of hydraulic fill dams; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the City Clerk be, and he is hereby directed to communicate with Mr. D. C. Henny, of Portland, Oregon, requesting that he accept employment by The City of San Diego for the purpose only of furnishing to the City Council a report on the progress of the construction work on El Capitan Dam to date, dealing with the question of safety of structure, compliance with plans and specifications, costs to date as compared with bid schedule, and dealing with all disputes and controversies, known or unknown, that to date exist between the contractors and the City engineering forces; that his employment shall not be deemed to extend beyond the necessary time to enable him to furnish this Council a report as indicated; and his compensation shall not exceed one hundred dollars (\$100.00) per day, together with traveling expenses and living expenses from Portland, Oregon, to San Diego, and return; that said report shall be furnished as soon as possible, and shall be completed in not to exceed ten (10) days after this offer has been accepted.

Presented by _____

Approved as
to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60120 of the Council of the City of San Diego, California, as adopted by said Council May 15, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60121

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the Hydraulic Engineer is hereby authorized and directed to report on the matter of labor conditions at El Capitan Dam; regarding non-San Diegans and aliens purported to be on the job.

I HEREBY CERTIFY THE above to be a full, true and correct copy of Resolution No. 60121 of the Council of the City of San Diego, as adopted by the said Council May 15, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60122

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the Hydraulic Engineer is hereby authorized and directed to write a requisition covering one day's services by L. C. Hill, consulting engineer of Los Angeles, in connection with the El Capitan Dam construction work.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 60122 of the Council of the City of San Diego, as adopted by the said Council May 15, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60123

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the matter contained in a letter from H. N. Savage, Hydraulic Engineer, dated May 15th, to the effect that he does not choose to continue to carry on as Hydraulic Engineer to the City of San Diego after his contract expires, July 1, 1933, be and it is hereby continued until Mr. H. N. Savage can be interviewed regarding his reasons for this decision.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 60123 of the Council of the City of San Diego, as adopted by the said Council May 15, 1933.

ALLEN H. WRIGHT,
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60140

WHEREAS, under date of May 15th Resolution No. 60120 was duly and regularly passed and adopted tendering employment to Mr. D. C. Henny for the purposes therein set forth; and

WHEREAS, under date of May 16th Mr. D. C. Henny accepted employment on the terms stated in said resolution; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego as follows:

That Mr. D. C. Henny be, and he is hereby employed by The City of San Diego for the purpose only of furnishing to the City Council a report on the progress of the construction of work on El Capitan Dam to date, dealing with the question of safety of structure, compliance with plans and specifications, costs to date as compared with bid schedule, and dealing with the adequacy of the plans and specifications for the spillway and spillway extension, and dealing with all disputes and controversies, known and unknown, that to date exist between the contractors and the City engineering forces; that his employment shall not be deemed to extend beyond the necessary time to enable him to furnish this Council a report as indicated; and his compensation shall not exceed one hundred dollars (\$100.00) per day, together with traveling expenses and living expenses from Portland, Oregon, to San Diego, and return; that said report shall be furnished as soon as possible, and shall be completed in not to exceed ten (10) days after this offer has been accepted.

BE IT FURTHER RESOLVED that the City Manager and a majority of the members of the Council of said City be, and they are hereby authorized and directed to execute a contract between The City of San Diego and Mr. D. C. Henny, upon the terms herein contained.

Presented by _____

Approved
AS to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60140 of the Council of the City of San Diego, California, as adopted by said Council May 16, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy.

RESOLUTION NO. 60154

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the 30" x 30" Sliding Gate and 6" Extra Heavy duty Gate Valve with Floor Stem and Brass Extension Stems for El Capitan Reservoir Dam Outlet Tower furnished by the Western Metal Supply Company in accordance with Resolution No. 59444 bearing Document No. 280125 is hereby accepted.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 60154 of the Council of the City of San Diego, as adopted by the said Council May 22, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60170

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That a meeting shall be held on Thursday, May 25th, 1933, at 10:00 A.M. to hear and consider the D. C. Henny report on El Capitan Dam construction.

The interested City Departments are hereby requested to have representatives attend this meeting.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 60170 of the Council of the City of San Diego, as adopted by the said Council May 22, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy.

RE. RESOLUTION NO. 60226

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That Resolution No. 60018 of the Council of The City of San Diego, duly and regularly adopted on the 21st day of April, 1933, be, and it is hereby repealed.

BE IT FURTHER RESOLVED, that the City Clerk be, and he is hereby directed to deliver to H. W. Rohl and T. E. Connolly, contractors on the El Capitan Dam, the communications addressed to said contractors, and signed by H. N. Savage, Hydraulic Engineer in charge, and which communications countermand the directions and orders of the Hydraulic Engineer contained in letters from the Hydraulic Engineer addressed to the contractors, dated March 22nd, March 30th, April 20th, and May 11th, 1933.

BE IT FURTHER RESOLVED, that H. N. Savage, Hydraulic Engineer in charge of construction of El Capitan Dam, be, and he is hereby directed to immediately proceed and continue his instructions to the contractors under and pursuant to the terms of the contract specifications, without regard to the failure of Messrs. H. W. Rohl and T. E. Connolly to file a waiver or release of any damage or stand-by charge claimed by them as a result of a partial suspension of work by them on the construction of said dam, spillway and outlet works.

copy of Resolution No. 60227 of the Council of the City of San Diego, as adopted by said Council June 2, 1933.

Presented by _____
Approved as to form by _____

ALLEN H. WRIGHT
City Clerk

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60226 of the Council of the City of San Diego, California, as adopted by said Council June 2, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy.

RESOLUTION NO. 60227

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the communication, together with an alleged claim for damages, dated May 31, 1933, from H. W. Rohl and T. E. Connolly, filed with the City Clerk and addressed to the Honorable Mayor and City Council, be, and it is hereby referred to H. N. Savage, Hydraulic Engineer.

Presented by _____

Approved
As to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60227 of the Council of the City of San Diego, California, as adopted by said Council June 2, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy.

RESOLUTION NO. 60377

BE IT RESOLVED by the Council of the City of San Diego,
as follows:

That Supervisor Trussell is hereby requested to endeavor
to have the road from Lakeside to El Monte Grove repaired.

I HEREBY CERTIFY the above to be a full, true and correct
copy of Resolution No. 60377 of the Council of the City of San
Diego, as adopted by the said Council June 26, 1933.

ALEEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60454

BE IT RESOLVED By the Council of The City of San Diego as follows:

That the location of that portion of the El Capitan Reservoir spillway discharge, pipe conduit, works and headquarters for resident reservoir forces situate on United States National Forest lands required and described as follows:

Portion of the south half of the northwest quarter of Section 7, Township 15 south, Range 2 east, S.B.B. & M.,

be and it is hereby definitely designated, approved and adopted at the points and places as shown and represented on official drawings of The City of San Diego, Water Department Division of Development and Conservation Number WD-463, sheets 1 and 4 of 4 and by accompanying field notes made and compiled under the direction of H. N. Savage, Hydraulic Engineer in Charge Division of Development and Conservation, of the Water Department, City of San Diego, and filed in the office of the City Clerk of the City of San Diego July 12th, 1933, under Document No. 283849.

Presented by _____

Approved
AS to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60454 of the Council of the City of San Diego, California, as adopted by said Council July 17, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60455

BE IT RESOLVED, By the Council of The City of San Diego as follows:

That the location of that portion of the El Capitan Reservoir and El Capitan Dam Site situate on United States National Forest lands required and described as follows:

Portion of the northeast quarter of the northeast quarter of Section 7, and portion of the northwest quarter of the northwest quarter of Section 8, both in Township 15 south, Range 2 east, S. B. B. & M, excepting right of way for reservoir flowage lands to reservoir contour 160 previously granted;

be, and it is hereby definitely designated, approved and adopted as the points and places as shown and represented on official drawings of The City of San Diego, Water Department, Division of Development and Conservation, Number WD-463, sheets 2 of 4, and by accompanying field notes made and compiled under the direction of H. N. Savage, Hydraulic Engineer in Charge Division of Development and Conservation of the Water Department, City of San Diego, and filed in the office of the City Clerk of the City of San Diego July 12th, 1933, under Document No. 283857.

Presented by _____

Approved
AS to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60455 of the Council of the City of San Diego, California, as adopted by said Council July 17, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK H. FOOTE, JR.
Deputy

RESOLUTION NO. 60456

BE IT RESOLVED By the Council of The City of San Diego as follows:

That the location of that portion of the El Capitan Reservoir situate on United States National Forest lands required and described as follows:

Portion of the southwest quarter of the southeast quarter, and portion of the northeast quarter of the southeast quarter of Section 5, Township 15 south, Range 2 east, S.B.B. & M.

be, and it is hereby definitely designated, approved and adopted at the points and places as shown and represented on official drawings of The City of San Diego, Water Department, Division of Development and Conservation Number WD-463 sheet 3 of 4; and by accompanying field notes made and compiled under the direction of H. N. Savage, Hydraulic Engineer in Charge Division of Development and Conservation of the Water Department, City of San Diego, and filed in the office of the City Clerk of the City of San Diego July 12th 1933, under Document No. 283856.

Presented by _____

Approved
As to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60456 of the Council of the City of San Diego, California, as adopted by said Council July 17, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60457

WHEREAS, it is deemed necessary to file an amended application to the Secretary of Interior of the United States for a right of way for the construction and maintenance of El Capitan Dam, reservoir and appurtenances for municipal and domestic purposes; and

WHEREAS, said amended application has been prepared and presented to this Council for consideration; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

"In the Matter of the application of The City of San Diego for a right of way for the construction and maintenance of dam and reservoir for municipal and domestic purposes", heretofore filed with the General Land Office, Washington, D. C., and as heretofore addressed to the Secretary of the Interior of the United States, that an amended application, a copy of which is on file in the office of the City Clerk of said City under Document No. 283854, be presented to the Secretary of Interior of the United States, together with the necessary drawings and engineering data in support thereof.

BE IT FURTHER RESOLVED, that the Mayor of said City be, and he is hereby authorized and directed on behalf of said City to execute the amended application as presented, and to execute the original tracings of drawings WD-463, sheets 1 and 4 of 4; WD-463 sheet 3 of 4; WD-463, sheet 2 of 4, copies of which drawings have been heretofore filed in the office of the City Clerk of said City under Document Nos. 283849, 283856 and 283857.

Presented by _____

Approved
As to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60457 of the Council of the City of San Diego, California, as adopted by said Council July 17, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60483

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the City Attorney and the Hydraulic Engineer are hereby authorized and directed to take the necessary steps to ascertain whether or not additional financing can be accomplished for the El Capitan Dam Project through negotiations with the Federal Government under the Industrial Recovery Act.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 60483 of the Council of the City of San Diego, as adopted by the said Council July 24, 1933.

ALLEN H. WRIGHT,
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60527

ACCEPTING THE BID OF RECONSTRUCTION FINANCE
CORPORATION FOR \$610,000.00 EL CAPITAN DAM
BONDS OF THE CITY OF SAN DIEGO, CALIFORNIA.

BE IT RESOLVED By the Council of The City of San Diego
as follows:

That the bid of the Reconstruction Finance Corporation,
of date August 1, 1933, to purchase six hundred ten thousand
dollars (\$610,000.00) El Capitan Dam Bonds of The City of San
Diego, which said bid has been filed in the office of the City
Clerk of said City on August 1, 1933, under Document No. 284205,
be, and the same is hereby accepted.

That said bid hereby accepted is in the following words
and figures, to-wit:

"WESTERN UNION

1933 Aug. 1 AM 11 26

Washington DC

Hon. John Forward, Jr., Mayor,
San Diego, Calif.

Subject to the terms and conditions of our directors' resolutions adopted December twelfth, nineteen thirty two, and the official notice of sale published in the San Diego Sun in the issues of that paper appearing on April nineteenth to April twenty-ninth nineteen thirty-three inclusive (excepting April twenty-third), which resolution and notice are made a part of this proposal, we offer to purchase six hundred and ten thousand dollars municipal improvement bonds (being part of an authorized issue of four million five hundred thousand dollars bonds) of the City of San Diego, California, designated El Capitan Dam Bond Fund Special Election November eighteen, nineteen twenty-four, (more particularly described in said notice of sale), to be dated January one nineteen twenty-five, to bear interest at the rate of five per cent per annum, payable semi-annually on the first days of July and January in each year, to mature in the amounts and on the dates as follows: nineteen thousand dollars on January one in each of the years nineteen thirty-four to nineteen fifty-three, inclusive, twenty thousand dollars on January one in each of the years nineteen fifty-four and nineteen fifty-five, and nineteen thousand dollars on January one in each of the years nineteen fifty-

six to nineteen sixty-five, inclusive, in the denomination of one thousand dollars each, to be payable as to both principal and interest in lawful money of the United States of America at the office of the City Treasurer of said City, or at the East River National Bank in New York City, or at any branch of the Bank of Italy in California, at the option of the holder thereof; and to pay therefor six hundred ten thousand dollars and accrued interest at the rate borne by the bonds from the interest payment date immediately preceding the date of payment of the purchase price for such bonds to the date of payment of such purchase price (all matured coupons thereon to be cut off and destroyed before delivery). This bid is subject to the condition that we will be under no obligation to pay for the bonds under the terms of this bid until we have been furnished, without cost to us, with the legal opinion of Messrs. O'Melveny, Tuller and Myers of Los Angeles, California, to the effect that the bonds are valid and binding obligations of said City, payable as to both principal and interest from ad valorem taxes which may be levied without limit as to rate or amount upon all the taxable property within the territorial limits of said City.

Reconstruction Finance Corporation,

By H. A. Mulligan, Treasurer."

That the said El Capitan Dem Bonds referred to in the bid submitted by the Reconstruction Finance Corporation, hereinabove described and incorporated, and which bonds are more particularly designated and described in the official notice of sale published in the San Diego Sun in the issues of that paper appearing on April 19th to April 29, 1933, inclusive, (excepting April 23rd, as follows, to-wit:

<u>No. of Bonds</u>	<u>Serial Numbers</u>	<u>Amount</u>	<u>Maturities</u>
19	932 to 950, inc.	\$19,000.00	Jan. 1, 1934
19	1045 to 1063, inc.	19,000.00	Jan. 1, 1935
19	1158 to 1176, inc.	19,000.00	Jan. 1, 1936
19	1271 to 1289, inc.	19,000.00	Jan. 1, 1937
19	1384 to 1402, inc.	19,000.00	Jan. 1, 1938
19	1497 to 1515, inc.	19,000.00	Jan. 1, 1939
19	1610 to 1628, inc.	19,000.00	Jan. 1, 1940
19	1723 to 1741, inc.	19,000.00	Jan. 1, 1941
19	1836 to 1854, inc.	19,000.00	Jan. 1, 1942
19	1949 to 1967, inc.	19,000.00	Jan. 1, 1943
19	2062 to 2080, inc.	19,000.00	Jan. 1, 1944

<u>No. of Bonds</u>	<u>Serial Numbers</u>	<u>Amount</u>	<u>Maturities</u>
19	2175 to 2193, inc.	\$19,000.00	Jan. 1, 1945
19	2288 to 2306, inc.	19,000.00	Jan. 1, 1946
19	2401 to 2419, inc.	19,000.00	Jan. 1, 1947
19	2514 to 2532, inc.	19,000.00	Jan. 1, 1948
19	2627 to 2645, inc.	19,000.00	Jan. 1, 1949
19	2739 to 2757, inc.	19,000.00	Jan. 1, 1950
19	2852 to 2870, inc.	19,000.00	Jan. 1, 1951
19	2965 to 2983, inc.	19,000.00	Jan. 1, 1952
19	3078 to 3096, inc.	19,000.00	Jan. 1, 1953
20	3191 to 3210, inc.	20,000.00	Jan. 1, 1954
20	3304 to 3323, inc.	20,000.00	Jan. 1, 1955
19	3417 to 3435, inc.	19,000.00	Jan. 1, 1956
19	3529 to 3547, inc.	19,000.00	Jan. 1, 1957
19	3642 to 3660, inc.	19,000.00	Jan. 1, 1958
19	3755 to 3773, inc.	19,000.00	Jan. 1, 1959
19	3869 to 3887, inc.	19,000.00	Jan. 1, 1960
19	3982 to 4000, inc.	19,000.00	Jan. 1, 1961
19	4095 to 4113, inc.	19,000.00	Jan. 1, 1962
19	4208 to 4226, inc.	19,000.00	Jan. 1, 1963
19	4308 to 4326, inc.	19,000.00	Jan. 1, 1964
19	4421 to 4439, inc.	19,000.00	Jan. 1, 1965

are hereby sold and awarded to said Reconstruction Finance Corporation, upon the terms of said bid as hereinabove set forth.

That the City Clerk of said City be, and he is hereby authorized and directed, upon receipt of the Treasurer's receipt for the amount of said bid, to deliver said bonds to said purchaser.

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60527 of the Council of the City of San Diego, California, as adopted by said Council August 2, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60588

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That pursuant to paragraph 13 of the contract specifications in re construction of El Capitan reservoir dam, spillway and outlet works, the Hydraulic Engineer is hereby authorized to issue the necessary change order to the contractors H. W. Rohl and T. E. Connolly, in order to effect a change in the location of the outlet tower, as recommended by the Hydraulic Engineer under Document No. 284249, on file in the office of the City Clerk of said City.

Presented by _____

Approved as
to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60588 of the Council of the City of San Diego, California, as adopted by said Council August 15, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK H. FOOTE, JR.
Deputy

RESOLUTION NO. 60664

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That H. N. Savage, Hydraulic Engineer, is hereby authorized to secure the services of Mr. L. C. Hill of Los Angeles as Consulting Engineer, and Dr. John P. Buwaida of Los Angeles as Consulting Geologist, for a limited time, as recommended under Document No. 284684.

That the City Attorney is hereby authorized and directed to prepare an ordinance making \$500.00 available from the El Capitan bond fund for the services and expenses of Messrs. L. C. Hill and John P. Buwaida.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 60664 of the Council of the City of San Diego, as adopted by the said Council September 5, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60727

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the claims of H. W. Rohl and T. E. Connolly, filed under Documents numbered 283178 and 283179, be and they are hereby denied in their entirety, as recommended by H. N. Savage, Hydraulic Engineer, under Document No. 284870.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 60727 of the Council of the City of San Diego, as adopted by the said Council September 18, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60736

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That H. N. Savage, Hydraulic Engineer, is hereby requested to furnish the Council with a report on the El Capitan Dam Bond Fund, regarding inspection, supervision, etc.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 60736 of the Council of the City of San Diego, as adopted by the said Council September 18, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60827

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the City Attorney is hereby authorized and directed to prepare an ordinance appropriating \$10,000 from the El Capitan Dam Bond Fund for the continuation of the El Capitan reservoir site clearing.

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60827 of the Council of the City of San Diego, as adopted by the said Council October 9, 1933.

ALEEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60828

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That H. N. Savage, Hydraulic Engineer, is hereby requested to furnish a report on the cost to date of clearing the El Capitan Reservoir Site; the cost per acre; and the probable ultimate cost of the entire project.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 60828 of the Council of the City of San Diego, as adopted by the said Council October 9, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60923

WHEREAS, The City of San Diego is desirous of making application to the Federal Administrator of Public Works for a grant under the terms of the National Industrial Recovery Act for the purpose of furnishing funds to complete the El Capitan dam project; and

WHEREAS, in connection with said application it will be necessary to incorporate therein plans, drawings, specifications and form of contract for the main pipeline in connection with said project and for the construction of a road around said damsite; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the Hydraulic Engineer be, and he is hereby authorized and directed to immediately prepare form of notice inviting bids, proposal, information for bidders; plans, drawings and specifications; and form of contract for The City of San Diego's El Capitan pipeline, necessary to complete the project; also, to prepare separate drawings, plans and specifications for the construction of a roadway around said damsite. That the above documents shall be furnished to the City Attorney in such form and number in order to comply with the rules and regulations of the Federal Administrator of Public Works.

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60923 of the Council of the City of San Diego, California, as adopted by said Council October 24, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60937

WHEREAS, The City of San Diego is now engaged in the construction of the El Capitan Dam Reservoir, Spillway and Outlet Works on the San Diego River, San Diego County, for the purpose of developing water for use of the inhabitants of said The City of San Diego; and

WHEREAS, in connection with said project The City of San Diego must construct a main pipeline to transport water from said reservoir to the corporate limits of said City; and

WHEREAS, there are not sufficient funds in the El Capitan Dam Bond Fund available to complete the project; and

WHEREAS, the City Attorney of The City of San Diego is now preparing an application on behalf of said City to the Federal Emergency Administration of Public Works for the purpose of securing a grant from the United States of an amount of money sufficient to complete the entire project; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That C. L. Byers, City Attorney of The City of San Diego be, and he is hereby appointed as the official representative of The City of San Diego, to represent said City in all negotiations with the United States looking toward the securing of the funds necessary to complete the El Capitan Dam project; and he is hereby authorized and directed to prepare, present and deliver the application on behalf of said City to the Federal Emergency Administration through regular channels.

That he is authorized and directed to seek to obtain approval of the State Advisory Board appointed for the purpose of considering California projects, and thereafter proceed to Washington, D. C., in an effort to advance the interests of the City relative to said application and in an effort to expedite said application and secure said funds on behalf of the City if possible.

He is further authorized to perform and accomplish all acts and things required by the Federal Emergency Administration relative to the securing of a grant in favor of the City from the United States Government.

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60937 of the Council of the City of San Diego, California, as adopted by said Council October 30, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60953

BE IT RESOLVED By the Council of the City of San Diego, as follows:

That the City Attorney is hereby authorized and directed to prepare an ordinance appropriating \$1,000 from the El Capitan Bond Fund for the services and expenses of L. C. Hill, Dr. John P. Buwalda, and Dr. C. F. Tolman as consultants, as recommended by the Hydraulic Engineer under Document No. 285601.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 60953 of the Council of the City of San Diego, as adopted by the said Council October 30, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 60976

WHEREAS, more than two-thirds of the qualified electors of The City of San Diego, at an election duly held on the 18th day of November, 1924, authorized the issuance and sale of bonds totaling \$4,500,000.00 for the acquisition of lands, dam site, reservoir, reservoir site, rights of way, pipe lines, conduits and water filtering plant for a dam, and the acquisition, construction and completion of a dam at the El Capitan Dam Site, located on the San Diego River, in the County of San Diego, State of California, and the acquisition, construction and completion of a pipe line from the El Capitan Dam to the University Heights Reservoir, in The City of San Diego, for the purpose of developing, impounding, conserving, storing and distributing the waters of the San Diego River and its tributaries, for the use of the inhabitants of The City of San Diego; and

WHEREAS, of said issue bonds having a par value of \$1,500,000 remain at this date unsold; and

WHEREAS, the Reconstruction Finance Corporation has heretofore agreed to purchase said unsold bonds; and

WHEREAS, the proceeds of the sale of the remaining unsold bonds will not be sufficient to complete the project authorized and directed by the electors of the City of San Diego at the election of November 18, 1924; and

WHEREAS, unless said project is completed The City of San Diego and its inhabitants can obtain no beneficial use therefrom; and

WHEREAS, unless additional funds are obtained it will be necessary to cease construction work when the available funds are exhausted, and consequently place many men out of employment; and

WHEREAS, an application on behalf of The City of San Diego has been duly prepared requesting the United States to make a grant to The City of San Diego of funds to be combined with the funds on hand so as to enable the City to complete the El Capitan Dam project; and

WHEREAS, such application is annexed hereto; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That a majority of the members of the Council be, and they are hereby authorized and directed to execute on behalf of The City of San Diego the aforesaid application and exhibits annexed thereto to the Federal Emergency Administration of Public Works.

That C. L. Byers, City Attorney of The City of San Diego, be, and he is hereby authorized to deliver and present on behalf of The City of San Diego the aforesaid application and exhibits annexed thereto; and that C. L. Byers, City Attorney, be, and he is hereby authorized to supply to the Federal Emergency Administration of Public Works any other instruments or data which the United States may request in connection with such application; and the said officers, or any of them, be, and they are hereby authorized to execute on behalf of The City of San Diego any papers in addition to the foregoing application, or to do any act on behalf of said City which may be required by the Administrator in connection with the grant applied for in such application. That any of the powers granted to said officers by this resolution may be exercised by said officers jointly or by any one of them singly.

Presented by _____

Approved
as to form by _____

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 60976 of the Council of the City of San Diego, California, as adopted by said Council November 8, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 61037

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the City Attorney is hereby authorized and directed to prepare an ordinance appropriating \$150 from the El Capitan Bond Fund for the purchase of materials required to fence the right of way to be occupied by the El Capitan-Lakeside Pipe Line, through and alongside the lands belonging to the Riverside Cement Company in the vicinity of El Monte Park.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 61037 of the Council of the City of San Diego, as adopted by the said Council November 24, 1935.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 61100

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the City Manager is hereby authorized and directed to furnish a report on the waiver of the stand-by charges, in connection with the rescinding of the Council's orders to the Contractors on the El Capitan Dam project.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 61100 of the Council of the City of San Diego, as adopted by the said Council November 27, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK H. FOOTE, JR.
Deputy

RESOLUTION NO. 61115

ACCEPTING THE BID OF THE RECONSTRUCTION FINANCE CORPORATION FOR \$1,500,000.00 EL CAPITAN DAM BONDS OF THE CITY OF SAN DIEGO.

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the bid of the Reconstruction Finance Corporation, of date November 23, 1933, to purchase one million five hundred thousand dollars (\$1,500,000.00) El Capitan Dam Bonds of The City of San Diego, which said bid has been filed in the office of the City Clerk of said City on November 25, 1933, under Document No. 285968, be, and the same is hereby accepted.

That said bid hereby accepted is in the following words and figures, to-wit:

*RECONSTRUCTION FINANCE CORPORATION
Washington

Nov 23 1933

Allen H. Wright, City Clerk
The City of San Diego
San Diego, California

Re: The City of San Diego Municipal Improvement Bonds, El Capitan Dam Bond Fund,
Special Election November 18, 1924.

Dear Sir:

Subject to the terms and conditions of a resolution adopted by this Corporation on December 12, 1932, we offer to purchase \$1,500,000 (being part of a total authorized issue of \$4,500,000), Municipal Improvement Bonds of The City of San Diego, California, designated El Capitan Dam Bond Fund, Special Election November 18, 1924, to be dated January 1, 1925, to be in the denomination of \$1,000 each, to bear interest at the rate of five per centum (5%) per annum, payable semi-annually on the first day of July and January of each year, to be payable as to both principal and interest in lawful money of the United States of America, at the office of the Treasurer of the said City or at the East River National Bank of New York City, or at any branch of the Bank of Italy in California, at the option of the holder thereof, and to bear the serial numbers and to mature in the amounts and on the dates set forth in that certain Notice Inviting Sealed Bids, published in The San Diego Union, a newspaper published daily in the City of San Diego, County of San Diego,

State of California, and of general circulation in said City for a period of ten (10) days, to wit: upon the 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th and 14th days of October, 1933. Such bonds shall be delivered to us from time to time in amounts acceptable to us and upon each such delivery we will pay therefor the per or face value thereof and accrued interest at the rate borne by the bonds from the interest payment date immediately preceding the date of payment of the purchase price.

We shall be under no obligation to take up and pay for any installment of said bonds until we have been furnished, without cost to us, with the final approving opinion of Messrs. O'Kelveny, Tuller & Myers of Los Angeles, to the effect that said bonds constitute the valid and binding obligations of The City of San Diego and are payable, as to both principal and interest, from ad valorem taxes which may be levied without limitation as to rate or amount upon all the taxable property within the territorial limits of said City.

If this bid is accepted, please send us promptly a certified copy of proceedings taken in connection therewith. Arrangements will then be made immediately to take up \$407,000 of said bonds at the Los Angeles Branch of the Federal Reserve Bank of San Francisco, California.

Very truly yours,

H. A. Mulligan
H. A. MULLIGAN
Treasurer"

That the said El Capitan Dam Bonds referred to in the bid submitted by the Reconstruction Finance Corporation, hereinabove described and incorporated, and which bonds are more particularly designated and described in the official notice of sale published in the San Diego Union in the issues of that paper appearing on October 5th to 14th, inclusive, as follows, to-wit:

<u>No. of Bonds.</u>	<u>Serial Numbers.</u>	<u>Amount.</u>	<u>Maturities</u>
47	1064 to 1110, inc.	\$47,000.00	Jan. 1, 1935
47	1177 to 1223, inc.	47,000.00	Jan. 1, 1936
47	1290 to 1336, inc.	47,000.00	Jan. 1, 1937
47	1403 to 1449, inc.	47,000.00	Jan. 1, 1938
47	1516 to 1562, inc.	47,000.00	Jan. 1, 1939
47	1629 to 1675, inc.	47,000.00	Jan. 1, 1940
47	1742 to 1788, inc.	47,000.00	Jan. 1, 1941
47	1855 to 1901, inc.	47,000.00	Jan. 1, 1942
47	1968 to 2014, inc.	47,000.00	Jan. 1, 1943

<u>No. of Bonds.</u>	<u>Serial Numbers</u>	<u>Amount</u>	<u>Maturities</u>
47	2081 to 2127, inc.	\$47,000.00	Jan. 1, 1944
47	2194 to 2240, inc.	47,000.00	Jan. 1, 1945
47	2307 to 2353, inc.	47,000.00	Jan. 1, 1946
47	2420 to 2466, inc.	47,000.00	Jan. 1, 1947
47	2533 to 2579, inc.	47,000.00	Jan. 1, 1948
47	2646 to 2692, inc.	47,000.00	Jan. 1, 1949
48	2758 to 2805, inc.	48,000.00	Jan. 1, 1950
48	2871 to 2918, inc.	48,000.00	Jan. 1, 1951
48	2984 to 3031, inc.	48,000.00	Jan. 1, 1952
48	3097 to 3144, inc.	48,000.00	Jan. 1, 1953
47	3211 to 3257, inc.	47,000.00	Jan. 1, 1954
47	3324 to 3370, inc.	47,000.00	Jan. 1, 1955
48	3436 to 3483, inc.	48,000.00	Jan. 1, 1956
49	3548 to 3596, inc.	49,000.00	Jan. 1, 1957
49	3661 to 3709, inc.	49,000.00	Jan. 1, 1958
49	3774 to 3822, inc.	49,000.00	Jan. 1, 1959
48	3888 to 3935, inc.	48,000.00	Jan. 1, 1960
48	4001 to 4048, inc.	48,000.00	Jan. 1, 1961
48	4114 to 4161, inc.	48,000.00	Jan. 1, 1962
48	4227 to 4274, inc.	48,000.00	Jan. 1, 1963
61	4327 to 4387, inc.	61,000.00	Jan. 1, 1964
61	4440 to 4500, inc.	61,000.00	Jan. 1, 1965

are hereby sold and awarded to said Reconstruction Finance Corporation, upon the terms of said bid as hereinabove set forth.

That the City Clerk of said City be, and he is hereby authorized and directed to deliver said bonds to said purchaser from time to time in amounts requested by said purchaser upon receipt of the Treasurer's receipt for the amount of said bid on said bonds so delivered. That said bid herein contained requests immediate delivery of \$407,000.00 of said bonds; and said City Clerk is hereby authorized and directed to deliver to said purchaser \$407,000.00 of said bonds, described as follows:

<u>No. of Bonds</u>	<u>Serial Numbers</u>	<u>Amount</u>	<u>Maturities</u>
47	1064 to 1110, inc.	\$ 47,000.00	Jan. 1, 1935
12	1177 to 1188, inc.	12,000.00	Jan. 1, 1936
12	1290 to 1301, inc.	12,000.00	Jan. 1, 1937
12	1403 to 1414, inc.	12,000.00	Jan. 1, 1938
12	1516 to 1527, inc.	12,000.00	Jan. 1, 1939
12	1629 to 1640, inc.	12,000.00	Jan. 1, 1940
12	1742 to 1753, inc.	12,000.00	Jan. 1, 1941
12	1855 to 1866, inc.	12,000.00	Jan. 1, 1942
12	1968 to 1979, inc.	12,000.00	Jan. 1, 1943
12	2081 to 2092, inc.	12,000.00	Jan. 1, 1944
12	2194 to 2205, inc.	12,000.00	Jan. 1, 1945
12	2307 to 2318, inc.	12,000.00	Jan. 1, 1946
12	2420 to 2431, inc.	12,000.00	Jan. 1, 1947
12	2533 to 2544, inc.	12,000.00	Jan. 1, 1948
12	2646 to 2657, inc.	12,000.00	Jan. 1, 1949
12	2758 to 2769, inc.	12,000.00	Jan. 1, 1950

<u>No. of Bonds</u>	<u>Serial Numbers</u>	<u>Amount</u>	<u>Maturities</u>
12	2871 to 2882, inc.	\$ 12,000.00	Jan. 1, 1951
12	2984 to 2995, inc.	12,000.00	Jan. 1, 1952
12	3097 to 3108, inc.	12,000.00	Jan. 1, 1953
12	3211 to 3222, inc.	12,000.00	Jan. 1, 1954
12	3224 to 3335, inc.	12,000.00	Jan. 1, 1955
12	3436 to 3447, inc.	12,000.00	Jan. 1, 1956
12	3548 to 3559, inc.	12,000.00	Jan. 1, 1957
12	3661 to 3672, inc.	12,000.00	Jan. 1, 1958
12	3774 to 3785, inc.	12,000.00	Jan. 1, 1959
12	3888 to 3899, inc.	12,000.00	Jan. 1, 1960
12	4001 to 4012, inc.	12,000.00	Jan. 1, 1961
12	4114 to 4125, inc.	12,000.00	Jan. 1, 1962
12	4227 to 4238, inc.	12,000.00	Jan. 1, 1963
12	4327 to 4338, inc.	12,000.00	Jan. 1, 1964
12	4440 to 4451, inc.	12,000.00	Jan. 1, 1965

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 61115 of the Council of the City of San Diego, California, as adopted by said Council November 29, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 61140

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the Hydraulic Engineer is hereby authorized and directed to issue an extra work order to the contractor under the provisions of paragraph 14 of the contract specifications for the construction of a concrete reinforced water-way through the south abutment end of El Capitan dam to replace a portion of the La Mesa, Lemon Grove and Spring Valley Irrigation District's old wooden flume, as recommended under Document No. 286036.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 61140 of the Council of the City of San Diego, as adopted by the said Council November 29, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 61188

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the City Attorney and the Hydraulic Engineer are hereby authorized and directed to file a complete report on the alleged increased cost of El Capitan Dam, from both the legal and technical aspects.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 61188 of the Council of the City of San Diego, as adopted by the said Council December 11, 1933.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 61225

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the Hydraulic Engineer is hereby requested to furnish the Mayor and each member of the Council a copy of his communication dated December 16, 1933, and contained in Document No. 286343, regarding the cost of El Capitan Dam.

Consideration of this Document is hereby continued until January 2nd, 1934.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 61225 of the Council of the City of San Diego, as adopted by the said Council December 26, 1933.

ALLEN H. WRIGHT, City Clerk

By CLARK M. FOOTE, JR., Deputy

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the Patent of the United States of America, dated February, 14, 1934, granting to The City of San Diego the following described lands, to-wit:

The southwest quarter of the southwest quarter, the east half of the southwest quarter, the northwest quarter of the southeast quarter, and the west half of the northeast quarter of the southeast quarter of Section eleven, the north half of the northwest quarter and the southwest quarter of the northwest quarter of Section fourteen, the east half of the southwest quarter of the southwest quarter, the northeast quarter of the southwest quarter, the east half of the southeast quarter of the northwest quarter, the east half of the northeast quarter of the northwest quarter, the northwest quarter, the north half of the southeast quarter, and the southeast quarter of the southeast quarter of Section fifteen, the west half of the northeast quarter of the northeast quarter and the south half of the northeast quarter of Section twenty-two, the east half of the northeast quarter of the southwest quarter, the east half of the southeast quarter of the southwest quarter, and the east half of the northwest quarter of the northeast quarter of Section twenty-eight, and the east half of the northeast quarter of the northwest quarter of Section thirty-three in Township fourteen south and the west half of the northwest quarter of the southeast quarter, the west half of the southwest quarter of the southeast quarter, and the north half of the southeast quarter of the southwest quarter of Section three in Township fifteen south all in Range two east of the San Bernardino Meridian, California, containing nine hundred twenty acres, according to the Official Plat of the Survey of the said Land, on file in the General Land Office;

be, and the same is hereby accepted.

That the City Clerk of said City be, and he is hereby authorized and directed to file the said Patent, together with a certified copy of this resolution, for record in the office of the County Recorder of San Diego County, California.

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 61600 of the Council of the City of San Diego, California, as adopted by said Council April 30, 1934.

ALLEN H. WRIGHT
City Clerk
By CLARK M. FOOTE, JR.
Deputy

RESOLUTION NO. 61766

WHEREAS, under date of May 3, 1934, the Hydraulic Engineer of the City of San Diego addressed communication No. S-106 to Messrs. H. W. Rohl and T. E. Connolly, contractors for the construction of El Capitan Dam, as follows:

"Messrs. H. W. Rohl & T. E. Connolly S-106
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature Hydraulic Fill, correction
of unsatisfactory condition in the
impervious puddle core section.

Gentlemen:

Your attention is invited to my letter S-98 dated March 21, 1934, reading as follows:

'You are hereby notified to discontinue the placing of material in the hydraulic fill section of the El Capitan reservoir dam until you have corrected, to the satisfaction of the Hydraulic Engineer, the condition that exists in a large portion of the impervious puddle core area due to the existence of sand strata resulting from your methods of construction.'

and

To my formal verbal requirement to you in my office May 1, 1934 for further correction of the existing unsatisfactory conditions in the impervious puddle core section of the El Capitan dam, which it is understood you have not accomplished or undertaken.

You are hereby again directed to refrain from and/or to stop if you have again commenced placing material in the hydraulic fill area of the El Capitan reservoir dam until you have corrected the unsatisfactory condition in the impervious puddle core section to the satisfaction of the Hydraulic Engineer, and subject to approval by the State Engineer.

Very truly yours,

H. N. Savage,
Hydraulic Engineer."

HNS/f

and

WHEREAS, upon receipt of said communication and pursuant

thereto said contractors discontinued the placing of material in the hydraulic fill portion of said dam, and have since said date placed no material in said hydraulic fill, and have discontinued work thereon; and

WHEREAS, subsequent to the cessation of work upon the hydraulic fill portion of said dam, and under date of May 21, 1934, said contractors addressed a communication to the City Council, as follows:

"City Council,
City of San Diego,
San Diego, California.

Gentlemen:

We have just been advised that the Hydraulic Engineer's Order eliminating the reinforced concrete core wall from the El Capitan Dam was made without authority or approval of the City Council.

In order that the contractor may proceed with the construction of the Dam, we respectfully request the City Council to at once approve the Hydraulic Engineer's Order eliminating the reinforced concrete core wall.

Will you kindly at once advise us in writing as to your action in this matter.

Very truly yours,

H. W. ROHL & T. E. CONNOLLY
By T. E. Connolly."

and

WHEREAS, in order to make the record clear that any order of the Hydraulic Engineer eliminating the further construction of the reinforced thin masonry core wall above elevation 559 across the base of the dam from abutment to abutment has nothing to do with, nor any relation to either his order of May 3, 1934, communication S-106, hereinabove quoted, or the discontinuance of work by the contractors upon the hydraulic fill portion of said dam, and in order to further clarify the record with respect to the order of the Engineer eliminating the construction of the aforesaid core wall, it is deemed desirable to adopt this resolution confirming said order of the Engineer, last above mentioned, and referring, first, to the original plans and drawings for said dam, as filed with the State Engineer; and, second, to the original instructions of the Hydraulic Engineer given sometime prior to December 23, 1932, eliminating the further construction of said reinforced thin masonry core wall above elevation 559, across the base of

the dam from abutment to abutment; and, third, to the fact that all parties to the contract had knowledge of said instructions, complied therewith, and proceeded with the construction of said dam to date without protest; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That inasmuch as the drawings and specifications for the El Capitan Dam Reservoir, Spillway and Outlet Works, as originally filed with the Department of Public Works, State of California, contained therein provisions for the construction of a reinforced thin masonry core wall extending from below stream bed to approximately elevation 770; and

Inasmuch as subsequent thereto, and on or about December 23, 1932, the Hydraulic Engineer of The City of San Diego obtained approval from the State Engineer of the State of California for the revision of the plans for the construction of said reinforced thin masonry core wall by limiting the height thereof across the base of the dam to elevation 559; and

Inasmuch as the Hydraulic Engineer of The City of San Diego had theretofore notified H. W. Rohl and T. E. Connolly, contractors for the construction of said dam, that the height of the reinforced thin masonry core wall across the base of the dam would be limited to elevation 559, and had directed them to discontinue the construction of said core wall above said elevation across the base of the dam; and

Inasmuch as said contractors, pursuant to such directions, constructed the said core wall across the base of the dam to the height designated by the Engineer, and discontinued the construction of said core wall above said height, and have since placed hydraulic fill above said elevation; and

Inasmuch as the Council of the City has not heretofore formally approved the elimination of the further construction of said core wall; and

Inasmuch as all parties to the contract have had knowledge that the Hydraulic Engineer directed the elimination of the further construction of the said core wall from sometime prior to December 23, 1932, have acted in accordance therewith, and have proceeded under the terms of said contract with the construction work since said date;

THAT THEREFORE, the Hydraulic Engineer's order to H. W. Rohl and T. E. Connolly, contractors for the construction of the El Capitan Dam, directing the discontinuance of the further construction of the reinforced thin masonry core wall above elevation 559, across the base of the dam from abutment to abutment, orally given to said contractors some-

time prior to December 23, 1932, be, and the same is hereby confirmed and ratified.

It is intended that this resolution of ratification shall have the same legal force and effect as though the Hydraulic Engineer had obtained the approval of the Council to such change in design as he directed relative to the construction of said core wall at the time such directions were given to the contractors.

Presented by _____

Approved as
to form by _____
City Attorney

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 61766 of the Council of the City of San Diego, California, as adopted by said Council June 5, 1934.

ALLEN H. WRIGHT, City Clerk

By CLARK M. FOOTE, JR., Deputy

RESOLUTION NO. 61903

BE IT RESOLVED by the Council of the City of San Diego,
as follows:

That the claim of Rohl & Connolly for \$129,247.50 for
alleged stand-by charges on the El Capitan Dam Contract, con-
tained in Document No. 288701, be and it is hereby denied; as
recommended by the Hydraulic Engineer in Document No. 288836.

I HEREBY CERTIFY the above to be a full, true, and correct
copy of Resolution No. 61903 of the Council of the City of
San Diego, as adopted by the said Council July 23, 1934.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR., Deputy

RESOLUTION NO. 61938

RESOLUTION AUTHORIZING CERTAIN CHANGES AND MODIFICATIONS TO BE MADE IN THE DESIGN FOR THE TOP PORTION OF EL CAPITAN DAM.

WHEREAS, it appears from a communication and recommendation to the Mayor and Council from the Hydraulic Engineer of The City of San Diego, which said communication is on file with the City Clerk as Document No. 288844, that certain changes and modifications in the design for the top portion of El Capitan Dam are desirable and necessary; and

WHEREAS, such changes and modifications affect the cost of the work in an amount exceeding One Thousand Dollars (\$1000.00), and by the requirements of paragraph 13 of the contract specifications for El Capitan Reservoir Dam, Spillway and Outlet Works, the approval of the Council is required; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the changes and modifications in the design for the top portion of the El Capitan Dam, recommended by the Hydraulic Engineer in his communication of July 20th, 1934, being official document No. 288844, and as shown on Drawing WD 501, approved by the State Engineer July 10, 1934, be, and the same are hereby authorized and approved; and the Hydraulic Engineer is authorized and empowered to make said changes and modifications.

Presented by _____

Approved as
to form by C. L. BYERS, City Attorney

By _____
Deputy City Attorney

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 61938 of the Council of the City of San Diego, California, as adopted by said Council July 30, 1934.

ALLEN H. WRIGHT, City Clerk

By CLARK M. FOOTE, JR. Deputy

RESOLUTION NO. 61973

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That F. D. Pyle, Hydraulic Engineer, be, and he is hereby authorized to secure the services of Mr. L. C. Hill, Consulting Engineer, Dr. John P. Duwalda, Consulting Geologist, and Dr. C. F. Tolman, Consulting Geologist, for a limited time as recommended under Document No. 289116, in connection with the matters alleged in Cases numbered 77843 and 78204, in the Superior Court of the State of California, in and for the County of San Diego.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 61973 of the Council of the City of San Diego, as adopted by the said Council August 13, 1934.

ALLEN H. WRIGHT, City Clerk

By CLARK M. FOOTE, JR., Deputy

RESOLUTION NO. 62005

RESOLUTION AUTHORIZING CERTAIN CHANGES AND MODIFICATIONS TO BE MADE IN THE DESIGN FOR COMPLETING THE CONSTRUCTION OF EL CAPITAN RESERVOIR DAM SPILLWAY AND OUTLET WORKS.

WHEREAS, it appears from a communication and recommendation to the Mayor and Council from the Hydraulic Engineer of The City of San Diego, which said communication is on file with the City Clerk as Document No. 289248, that certain changes and modifications in the design for the completion of the construction of El Capitan Dam are necessary; and

WHEREAS, such changes and modifications affect the cost of the work in an amount exceeding One Thousand Dollars (\$1000.00) and by the requirements of paragraph 13 of the contract specifications for El Capitan Reservoir Dam, Spillway and Outlet Works the approval of the Council is required; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the recommendations of the Hydraulic Engineer, contained in his communication of August 24th, 1934, being official document No. 289248, be, and the same are hereby approved.

BE IT FURTHER RESOLVED, that the Hydraulic Engineer is authorized and empowered to make such changes and modifications in the design of El Capitan Dam as are shown upon Drawing WD 511, approved by the State Engineer of the State of California August 14th, 1934.

Presented by _____

Approved as to
form by _____

I HEREBY CERTIFY that the above and foregoing is a full, true and correct copy of Resolution No. 62005, as adopted by the Council of the City of San Diego on August 27, 1934.

ALLEN H. WRIGHT, City Clerk
By CLARK M. FOOTE, JR., Deputy

1-9-35
P

571

RESOLUTION NO. 62076

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That the Hydraulic Engineer is hereby requested to report if employees of the Bodenhamer Construction Company have all had at least one year's residence in the City of San Diego.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 62076 of the Council of the City of San Diego, as adopted by the said Council September 11, 1934.

ALLEN H. WRIGHT,
City Clerk

By CLARK M. FOOTE, JR.
Deputy

1-9-35
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572

RESOLUTION NO. 62123

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That an extension of time, from September 30th, 1934, be and it is hereby granted to the Bodenhamer Construction Company, within which to complete their contract for constructing the El Capitan Spillway Extension; as recommended by the City Manager and by the Hydraulic Engineer under Document No. 289632.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 62123 of the Council of the City of San Diego, as adopted by the said Council September 28, 1934.

ALLEN H. WRIGHT,
City Clerk

By CLARK M. FOSTER, JR.
Deputy

RESOLUTION NO. 62179

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the Purchasing Agent of The City of San Diego be, and he is hereby authorized and directed to advertise for sealed proposals or bids, to be received at the office of the City Clerk of The City of San Diego, California, until ten o'clock A.M. of the 30th day of October, 1934, for the construction of El Capitan Reservoir Dam Tunnel Inner Lining, involving about 3220 cubic yards of concrete, about 4650 barrels of cement, about 142,000 pounds of reinforcing steel and about 2000 cubic feet grouting and miscellaneous items; all as more particularly and in detail set forth in those certain drawings and specifications contained in Document No. 289826, on file in the office of the City Clerk of said City.

BE IT FURTHER RESOLVED, that pursuant to the provisions of the Charter of The City of San Diego, the Council has determined and does hereby declare that the prevailing or current rate of per diem wages paid by private employers in The City of San Diego for each craft or type of workmen or mechanic needed to execute said work is as follows:

<u>Craft or Type</u>	<u>Per Diem Wage</u>
Auto Mechanics	\$6.40
Blacksmiths	6.40
Blacksmith Helpers	5.00
Carpenter foremen	9.00
Carpenters	8.00
Carpenter Apprentices	5.00
Clerks	5.00
Cement Finishers	7.00
Compressor Operators	6.00
Concrete Finishers	7.00
Concrete Finisher Helpers	5.00
Concrete Foremen	6.00
Concrete Form Builders	8.00
Concrete Spreaders	5.50
Concrete Tampers	5.00
Concrete Mixermen	8.00
Cooks	5.50
Crane Operators	7.00
Drill Sharpeners	6.00
Electricians	8.00
Electrician Helpers	6.50
Flunkys	5.00
General Foremen	9.00
Laborers	5.00
Materialmen	5.00
Mechanics	6.40
Mechanics Helpers	5.00
Mechanic Trouble Shooters	6.00
Pump Men	5.00

Craft or Type

Per Diem Wage

Reinforcing Steel Workers	\$8.00
Reinforcing Steel Foremen	9.00
Superintendents	9.00
Tractor Operators over 50 H.P.	7.20
Tractor Operators under 50 H.P.	6.80
Timekeepers	5.00
Truck Drivers under 15,500 pounds	5.50
Truck Drivers over 15,500 and under 25,000 pounds	6.00
Truck Drivers over 25,000 pounds	6.50
Watchmen	4.50
Other classes not less than	5.00

For overtime work, when the same is permitted by law, one and one-half times the foregoing rates.

For work performed on Sundays and legal holidays, as set forth in Section 10 of the Political Code of the State of California, one and one-half times the foregoing rates.

BE IT FURTHER RESOLVED that said advertisement for bids shall be published for at least ten (10) consecutive days in the official newspaper of said city prior to the time specified herein up to which sealed proposals shall be received; and such notice shall also be posted for the same length of time in a conspicuous place on or near the door of the Council Chamber in the City Hall, and also at or near the entrance of the City Hall, in said City; and that said advertisement shall specify the per diem rate of wages as fixed in this resolution.

Presented by _____

Approved as to form by C. L. BYERS, City Attorney

By _____
Deputy City Attorney

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 62179 of the Council of the City of San Diego, California, as adopted by said Council October 16, 1934.

ALLEN H. WRIGHT, City Clerk

By CLARK H. FOOTE, JR. Deputy

RESOLUTION NO. 62545

BE IT RESOLVED by the Council of the City of San Diego, as follows:

That an extension of time, from January 15th, 1935, to February 14th, 1935, be and it is hereby granted to M. H. Golden within which to complete his contract for the El Capitan Reserfoir Dam Tunnel Inner Lining.

I HEREBY CERTIFY the above to be a full, true, and correct copy of Resolution No. 62545 of the Council of the City of San Diego, as adopted by the said Council January 15, 1935.

ALLEN H. WRIGHT
City Clerk

By CLARK M. FOOTE, JR.
Deputy.

RESOLUTION NO. 62379

RESOLUTION ACCEPTING THE WORK PERFORMED UNDER
EL CAPITAN RESERVOIR DAM, SPILLWAY AND OUTLET
WORKS CONTRACT.

WHEREAS, it appears by communication from the City Hydraulic Engineer, dated November 23, 1934, on file with the City Clerk as Document No. 290464, that the work to be performed by H. W. Rohl and T. E. Connolly under their contract for the construction of El Capitan Reservoir Dam, Spillway and Outlet Works, which said contract is dated April 23, 1932 and is on file with the City Clerk as Document No. 275755, has been performed and completed in accordance with the plans, drawings and specifications therefor to the satisfaction of the City's Hydraulic Engineer, who, together with the City Manager, recommends the acceptance thereof by the City; NOW, THEREFORE,

BE IT RESOLVED By the Council of The City of San Diego, as follows:

That the materials furnished and the work performed in the erection, construction and completion of the El Capitan Reservoir Dam, Spillway and Outlet Works by H. W. Rohl and T. E. Connolly, the contractors under said contract, be, and the same hereby are accepted by The City of San Diego;

And that any and all moneys withheld from said contractors under the provisions of said contract shall be payable at the time, in the manner, upon the conditions, and subject to the provisions, all as set forth in paragraphs numbered 43 and 50 of said contract specifications.

BE IT FURTHER RESOLVED, that the City Clerk be, and he is hereby instructed forthwith to file for record, or cause to be filed for record on behalf of the City of San Diego with the County Recorder of the County of San Diego a copy of the said Contract, together with a notice of the completion and acceptance of said contract work.

I HEREBY CERTIFY the above to be a full, true and correct copy of Resolution No. 62379 of the Council of the City of San Diego, California, as adopted by said Council December 4, 1934.

ALLEN H. WRIGHT, City Clerk

By CLARK M. FOOTE, JR., Deputy

EXCAVATION AND STRIPPING FOR DAM

June 25, 1932

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Outlet tunnel excavated material

1. The material being excavated from the outlet tunnel at El Capitan dam is being wasted because no space is now available within the dam to place this material.

2. Ben F. Wells, contractor's superintendent, made the statement on June 23 that he did not consider it practical to utilize any of the outlet tunnel excavated material in any portion of the dam. The material is considered by him to be unsuitable for hydraulic fill and the outlet tunnel rock excavation will not be suitable for rock fill in the dam proper.

3. The increased cost of the work to the City because of this will be the cost of material sorted and placed in the dam as excavated from the borrow pits to replace that volume of material which might be used from the tunnel but which is being or to be wasted.

4. The contractor is making no attempt to segregate the spoil from the outlet tunnel as from the open cut. To my knowledge the contractor has no record of the disposition of either Class 1 Item 10 or Class 2 Item 11. The materials under these items are being wasted at different places and at various times.

5. The outlet tunnel excavation Class 5 will therefore be paid under Schedule Item 14 and in accordance with paragraph 101-b of the specifications.

6. The contractor expects to have to set permanent timbers for the entire length of the tunnel. If this is done then the outlet tunnel excavation Schedule Item 14 will be in accordance with the lines indicated on drawing WD-414 for timbered tunnel section.

Harold Wood
Resident Engineer

HW/p

July 5, 1932

579

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature, Excavation for rock embankment at downstream toe of dam

1. On July 1, 1932 the contractor at the El Capitan dam requested that stakes be set by the City's forces indicating the excavation required downstream of the downstream toe wall.

2. The excavation has been made to about elevation 538 and about 8 feet at the north end and 2 feet at the south end of excavation into decomposed granite over the area upon which the rock embankment is to be placed.

3. The elevation of the lowest of this excavation is about 4 feet lower than the invert of the outlet tunnel and is not considered sufficiently deep along the outer toe of the rock embankment.

4. In paragraph 2 of a letter dated May 13, 1932 from the Resident Engineer to the Hydraulic Engineer is stated: "It is recommended that six feet of depth of stripping be required as a minimum in order that the edge of rock embankment be not brought out to a feather edge. The edge of this stripping to be kept as near vertical as possible along the line of contact of rock embankment and abutment, both inside the dam and at the outside marginal line."

5. It is therefore recommended that an additional depth of six feet be excavated around the outer edge of the rock embankment at the downstream toe wall to carry the toe of the rock embankment well below the possible erosion due to outlet tunnel or spillway discharge. This extra depth of six feet to be gained by excavating a trench just sufficiently wide for the shovel to operate in it; that is 26 feet wide on the bottom and 29 feet wide on the top of the trench.

6. This width of trench was decided upon after conference with Ben F. Wells, superintendent for the contractors.

7. The width of excavation as staked before excavation was begun contemplated an ultimate depth to elevation 530. Since the decomposed granite is higher than this, the downstream toe of the rock embankment will be a considerable distance upstream from the foot of the slope of the downstream river bed fill material.

8. It is further recommended that the rock excavated from the outlet tunnel heading be placed in this space and over the toe of the rock embankment downstream of the downstream toe wall. This can be done at no extra cost to the City. The contractor should be so instructed.

9. A letter outlining these pay limits as staked in accordance with paragraph 51 should be written to the contractor.

10. The sketch below indicates the pay lines for the downstream toe wall excavation as established on the ground by stakes set July 5, 1932 and recorded in Field Book 340, page 31.

HW/mg

Harold Wood, Resident Engineer

July 14, 1932

H. W. Rohl and T. E. Connolly
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Reservoir Dam Contract Construction.

Gentlemen:

The California State Engineer is requiring the excavation of material in place in the foundation area of the El Capitan dam down to the surface of the indurated gravel strata.

The quantity of material required by the State Engineer to be excavated increases the estimated quantity indicated in the drawings and specifications.

On account of the character of the material it is assumed that you will be pleased to accomplish the excavation of the material as required by the State Engineer at the unit price bid by you in your contract.

It is also assumed that it will be agreeable to you in excavating the material not to request an extension of time beyond October 31, 1934 in which to complete the contract work.

Provided the foregoing is acceptable to you, please so indicate and return the attached copy of this communication for the files of this office.

Respectfully,

H. N. Savage,
Hydraulic Engineer.

HNS/p

The foregoing is acceptable.

H. W. ROHL and T. E. CONNOLLY

By T. E. CONNOLLY (Signature)

November 11, 1932

H. W. Rohl and T. E. Connolly
Contractor, El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project El Capitan
Feature. Removal of overburden from
foundation plan of dam.

Gentlemen:

In compliance with the provisions of contract specifications Paragraph 59 for the El Capitan Reservoir Dam, Spillway and Outlet Works, before placing rock embankment on the foundation you are required to strip and excavate to such lines and grades as directed by the Engineer as the work proceeds.

Your specific attention is called to stripping required vicinity the southwest side of your road ramp leading from your road at about Elevation 575 down, vicinity coordinate East 4720 and North 3740 before placing rock embankment.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HW/f

cc H.W.Rohl & T.E.Connolly, El Capitan Dam
Contractor's Resident Representative
Resident Engineer

November 14, 1932

Messrs. H. W. Rohl and T. A. Connolly
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, Stripping and excavation
for embankment.

Gentlemen:

Your attention is directed to paragraph 58 of the Contract specifications for the El Capitan Reservoir Dam, Spillway and Outlet Works relative to stripping overburden from the foundation of the dam, including from along the abutments under the rock embankment and under hydraulic fill and/or rolled embankment areas.

All durable rock encountered in the above excavation shall be deposited in the rock embankment of the dam.

Earth, overburden, sand, gravel and other excavation not suitable for rock embankment, may be wasted until its disposal is otherwise directed.

All the above work is to be done in accordance with the Contract drawings and specifications and will be paid for under appropriate schedule items.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/p
cc Resident Engineer Harold Wood
Superintendent Ben F. Wells
Attorney John M. Martin

December 16, 1932

H. W. Rohl & T. E. Connolly
Contractors, El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, Excavation of Cutoff Trench
under Dam; Disposition of Material

Gentlemen:

You are advised that all of the material hereafter excavated from the trench for the six foot wide concrete cutoff wall under the El Capitan Dam shall be placed in the rock embankment or in the hydraulic fill at specific locations as designated from time to time by the Engineer and no further material originating in the cutoff trench may be wasted.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/f
cc H.W.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
Resident Engineer

December 21, 1932

H. W. Rohl & T. E. Connolly
Contractors, El Capitan Dam
4351 Alhembra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, Stripping.

Gentlemen:

You are hereby advised that it is indicated that the following stripping will be required on the abutments of the El Capitan Reservoir Dam:

General stripping over entire area to decomposed granite only, a depth seldom in excess of 4 feet below natural ground surface on the south abutment and 3 feet on the north abutment.

Where boulders are thickly strewn on the surface over the area of ground to be covered with rock embankment, it is only necessary to remove all vegetation and soil, leaving the boulders in place.

Under the area to be occupied by the puddle core it will be necessary to excavate to firm material. This may require excavation to a depth of from 6 to 10 feet below the top soil.

Under the outer limits of the rock embankment a trench 6 feet deep from the surface and 18 feet wide will be required, except when such trench encounters hard material.

No rock or boulders that are firmly bedded in the material underlying the stripping are to be removed except as instructed by the engineer.

All suitable rock removed from stripping and excavation and suitable, in the opinion of the engineer, for rock embankment shall be deposited therein, and all other stripping and excavation except for vegetable material shall, as soon as hydraulic fill is properly under way, be deposited in the hydraulic fill at places designated in the field by the engineer.

No payment will be made for material excavated below depths and/or beyond lines designated in the field by the engineer, and any additional quantity of rock embankment and/or hydraulic fill required because of excavation made by the contractor below designated depths and/or beyond lines designated by the engineer will be at the contractor's own expense.

The above matters are brought to your attention so that you may plan and carry on your contract stripping operations accordingly.

Very truly yours,

H. N. Savage,
Hydraulic Engineer

HNS/f

cc H.W.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer
State Engineer
Senior Engineer of Dam Inspection

December 22, 1932

586

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature Stripping staked.

1. The letter of the Hydraulic Engineer dated December 21, 1932 to the contractor on the El Capitan Dam was received by the Resident Engineer on the morning of December 22, 1932.

2. It is desired to direct your attention to possible confusion in this letter which may react later against the City's best interests in this very important matter of non-payment of materials actually being moved by the contractor, because of the methods he is employing in accomplishing the stripping.

3. In the letter of the Resident Engineer to the Hydraulic Engineer, dated December 14, 1932, it was stated that "The contractor should be furnished definite instructions as to depth of stripping of overburden required from the three areas of the dam foundation."

4. On December 19, 1932, in accordance with instructions given orally by the Hydraulic Engineer on December 16, to set cut stakes in accordance with Geo. W. Hawley's indicated depths, cut stakes were set on the south abutment for the width of the base of the dam on coordinates N 3280 and N 3300. On December 20, 1932 cut stakes were set and are now being set on the north abutment for a 3.0 foot cut under the hydraulic fill areas. The puddle core area could not be staked because of men at work in the core trench below. The rock embankment areas have previously been completed to elevation 625.

5. Paragraph 2 of this letter to the contractor dated December 21 is not in accordance with stakes set, as indicated by Geo. W. Hawley. (See letter of Resident Engineer dated December 15 on State Inspection.) Paragraph 5 states "A trench 6 feet deep . . . and 18 feet wide." Stakes are set for 5.5 foot cut under both the rock embankments on the south abutment. It is understood that "designated lines" means depths below the natural surface as shown by cut stakes set by the Resident Engineer.

6. It has been the Resident Engineer's understanding that the depth of cuts would be definitely staked and marked on the ground and payment would be limited both in cut and fill and embankment thereto.

7. Care is being used to define limit of the puddle core area and the stakes for the core trench will not be made until puddle core area is stripped and the contractor will be told this. It is thought this will avoid any misunderstanding on the part of the contractor on what is actually core trench.

HW/p

Harold Wood
Resident Engineer

December 23, 1932
Telephoned 10:50 A.M.

From : Resident Engineer
To : Hydraulic Engineer
Subject: San Diego River Project, El Capitan Feature

1. The contractor at the El Capitan Dam is proceeding to dump rock on the south end of the upstream rock embankment and are covering an area which has not been stripped to the satisfaction of the State's Inspector nor of the Resident Engineer.

2. This area lies south of coordinate N 3460 and between the downstream toe of the upstream rock embankment and coordinate E 5480.

3. The contractor was notified by letter dated November 11, 1932 of the placement of rock embankment over an area not as yet stripped which lies north of a line described as follows:

Beginning at coordinate N 3790 E 4590; thence in a straight line to N 3740 E 4680; thence to N 3630 E 4720; thence to N 3710 E 4720; thence to N 3710 E 5730; thence to N 3690 E 4740.

This is in the vicinity of the contractor's road ramp leading from his road about elevation 575 down toward the puddle core area in the river bed.

4. The contractor's attention was called to this orally this morning by the Resident Engineer.

Harold Wood
Resident Engineer

HW/P

December 28, 1932

Messrs. H. W. Rohl & T. E. Connolly
Contractors, El Capitan Dam,
4351 Alhambra Avenue,
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, removal of overburden from
foundation plan of dam.

Gentlemen:

In compliance with the provisions of contract specifications paragraph 59 for the El Capitan Reservoir Dam, Spillway and Outlet Works, before placing rock embankment on the foundation, you are required to strip and excavate to such lines and grades as directed by the engineer as the work proceeds.

Your specific attention is called to stripping required south of coordinate N 3460 and between the downstream toe of the upstream rock embankment and coordinate E 5480, before placing rock embankment.

Your attention is also called to letter dated November 11, 1932, relative to stripping required vicinity the southwest side of your road ramp leading from your road at about elevation 575 down vicinity of coordinate N 3740 E 4720. This stripping has not been completed.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/P

cc H.W. Rohl & T. E. Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

January 6, 1933

From : Engineer Fred D. Pyle
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Foundation for hydraulic fill

1. On December 1, 1932, in making an inspection of the work at the El Capitan dam in company with Gerald McKinlay, Senior Engineer of Dam Inspection, the amount of stripping for hydraulic fill westerly of the core wall was discussed with him and Resident Engineer Harold Wood on the ground. Mr. McKinlay advised that considerable material, especially the sand and gravel under the southerly portion of this area, would have to be removed but could probably be placed along the rock embankment; and

That the slope of the gravel cut westerly of the 50-foot stripping would have to be made flatter in order to prevent gravel lenses washing into the puddle core.

2. On December 14 the same situation was discussed on the ground with Deputy State Engineer in Charge of Dams George W. Hawley, Mr. McKinlay and Mr. Wood.

3. It is my understanding that the slope of the gravel bank westerly of the coordinate E 4950, being the westerly limits of the stripping for the puddle core, should be sloped back on a slope of about 4 on 1; the sand and gravel bank covering part of the southerly portion should be removed and piled along the upstream side of the rock embankment. On my return to the office this was so indicated on a print of Drawing WD-443.

4. It was also pointed out by the State's representatives that the excavation could be made in such a way that the foundation for placing hydraulic fill would be relatively level parallel to the core wall.

5. Several days later Mr. Wood discussed over the telephone with me the understanding that the contractor apparently had from a conference with the State's engineers, i.e., that there was considerable gravelly material to be brought in from the spoil banks or other locations to fill a considerable area over the westerly portion of the stripping for the hydraulic fill, the highest point of this fill to be at the top of the present rock fill or about elevation 575.

I advised Mr. Wood it was not my understanding that any material of this nature was to be brought in from the outside.

6. Mr. Wood, in paragraph 10 of letter dated December 15 on State Inspection, gives the easterly elevation of the completed foundation stripping for hydraulic fill as 552, the

westerly elevation to be 575 - the top of the downstream rock embankment, which differs materially from my understanding of the situation.

7. It is understood that Mr. H. W. Rehl then discussed with you personally his understanding of the State's engineers' views in order to settle the matter before the excavation was undertaken.

8. The matter was brought to the attention of the State engineer in letter dated December 24 which was accompanied by print of Drawing WD-443 on which my understanding of the situation was indicated.

9. On December 28 you telephoned Sacramento but were unable to contact either Mr. Hawley or Mr. McKinlay.

10. On December 28 Mr. Hawley acknowledged receipt, probably by Mr. Hart, of the letter dated December 24, stating

"The plan proposed would appear to satisfy this condition so far as can be determined prior to hydraulic operations."

11. With this understanding the excavation and filling was undertaken by the contractor along the lines indicated on the drawing sent to the State Engineer's office, which excavation and fill was not satisfactory to Mr. McKinlay on his visit to the dam on January 3.

Fred D. Pyle
Engineer

FDP/p

February 3, 1933

From : Resident Engineer
To : Hydraulic Engineer
Subject: San Diego River Project, El Capitan Feature
Stripping of abutments.

1. On February 2, 1933 the Hydraulic Engineer, J. B. Lippincott, Consulting Engineer for H. W. Rohl and T. E. Connolly, Allen Rowe, Civil Engineer, associated with J. B. Lippincott, and the Resident Engineer met on the north abutment of El Capitan dam and conferred relative to removal of boulders from the abutments of the dam.

2. Mr. Connolly explained that it was the plan of the contractors to do the stripping of the abutments progressively upward and out just ahead of the hydraulic fill placement.

3. Mr. Lippincott stated that it was his opinion that the boulders should be removed from the abutments before any hydraulic fill placement was begun to prevent any rock entering the hydraulic fill.

4. This was also stated by Mr. L. C. Hill upon his visit to the dam on January 31, 1933 with Mr. Fred D. Fyle.

5. While riding in the car back to the Resident Engineer's office, Mr. Lippincott present, the Hydraulic Engineer instructed the Resident Engineer to draft a letter to the contractor instructing him to strip the rock from the abutments before proceeding with hydraulic operations. This letter was drafted on February 3, 1933.

HAROLD WOOD (Signature)

Harold Wood
Resident Engineer

HW/P

February 3, 1933

Messrs. H. W. Rohl and T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature. Dam abutments, overburden
stripping and removal.

Gentlemen:

Your attention is again directed to the letters sent you dated November 14, 1932 and December 21, 1932 relative to stripping overburden from the foundation areas at the El Capitan dam in accordance with the contract drawings and specifications.

Your purported program for plan of operations, dated February 1, 1933, in reply to my letter of January 6, 1933, makes no mention of the stripping of the abutments.

Before the hydraulic placement of any material in the hydraulic fill or puddle core of the El Capitan dam is commenced, it is required that all overburden, including all boulders or rock fragments, which may find their way into the hydraulic fill or puddle core, be removed from both abutments.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/f
cc H.W. Rohl & T.E. Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

El Capitan Dam
March 14, 1933.

Messrs. H. W. Nohl & T. E. Connolly
Contractors, El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan Feature
Excavation of cutoff trench under dam;
Disposition of Material

Gentlemen:

In accordance with paragraph 65 of the Contract Specifications, you are hereby directed to deposit all rock fragments and boulders from the excavation of cutoff trench under the dam, into the rock embankments of the dam and all decomposed granite shall be deposited in the hydraulic fill portion of the dam and there sorted and placed by hydraulic means in accordance with paragraph 63 of the Contract specifications.

All of the above is to be done in accordance with the Contract specifications for the El Capitan Reservoir Dam, Spillway and Outlet Works.

Harold Wood
Resident Engineer

HW/W

cc H. W. Nohl & T. E. Connolly
El Capitan Dam
Contractor's Resident Representative
Hydraulic Engineer
Assistant Hydraulic Engineer

March 22, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, stripping of abutments.

Gentlemen:

Your attention is again invited to the official letters sent you and dated November 14, 1932, December 21, 1932, February 3, 1933 and February 10, 1933 relative to stripping of abutments of El Capitan reservoir dam.

Your progress of this stripping is not satisfactory.

You are directed to immediately comply with the above instructions and accomplish stripping of abutments.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/p
cc H.W.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

April 21, 1933

Messrs. H. W. Rohl & T. E. Connolly
4351 Alhambra Avenue
Los Angeles, California

S. 3

Subject: San Diego River Project, El Capitan
Feature, stripping of abutments.

Gentlemen:

You are directed to immediately accomplish the complete stripping of overburden material from the abutments of El Capitan Dam within the limits of the puddle core and such portions of the adjoining areas from which, in the opinion of the Engineer, material is not removed in advance may find its way onto the portion of the abutments to be covered by puddle core and fall into the puddle core.

The minimum areas to be stripped will be staked by the City.

The material removed in stripping shall be deposited in the rock embankment and hydraulic fill portions of the dam, respectively. The detached masses of solid rock shall be placed in the rock embankment. The surface soil, and decomposed granite shall be placed in the hydraulic fill in the same locations and in the same manner as hydraulic fill material originating in borrow pits or spillway excavation is required to be deposited, and sorted and placed by hydraulic means.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/p

cc H.W.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
City Manager
City Attorney
City's Resident Engineer

June 28, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California

S-19

Subject: San Diego River Project, El Capitan Feature,
Contract Construction, Foundation Preparation.

Gentlemen:

Research discloses the following tabulated statistics of preparation of foundations for hydraulic fill dams:

Name of Dam	Stripping of overburden from abutments before placing hydraulic fill material
Dobbins	Complete
Terrace	About 50% Stripped
Santa Maria	Complete
Clear Creek	About 50% Stripped
Necaxa	Complete
Tezcapa	Complete
Tenango	Complete
Los Reys	Complete
Laguna	Complete
Coquitlan	Complete
Bear Creek	Complete
Sevier Bridge	Complete
Lake Almanor	Complete
Magalia	Complete
Messelback	Complete
San Pablo	About 2/3 Stripped
Upper San Leandro	Complete
Ridgewood	Complete

Very truly yours,

H. N. Savage
Hydraulic Engineer

HNS/f

October 16, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractor El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-54

Subject: San Diego River Project, El Capitan
Feature, Excavation of cutoff trenches,
Disposition of Material.

Gentlemen:

You are hereby directed, until further notice, to
place all disintegrated granite material originating in
cutoff trench excavation under the El Capitan dam in spoil
banks designated by the Engineer.

Solid rock originating in the above excavation, when
suitable in the opinion of the Engineer shall be placed in
the rock embankment.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f
cc H.W.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
City Manager
City Attorney
City's Resident Engineer

HYDRAULIC FILL

MODIFICATION TOP OF DAM

November 21, 1932

Messrs. H. W. Rohl & T. E. Connolly
4351 Alhambra Avenue
Los Angeles, California

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill.

Gentlemen:

You are hereby directed to construct the hydraulic fill in the lower central portion of the El Capitan Dam as required by the contract and specifications for El Capitan Reservoir Dam Spillway and Outlet Works, with particular reference to paragraph 63 thereof, and as shown on contract drawing WD-383.

You are further directed to construct the lower portion of this hydraulic fill below about elevation 555 from materials derived only from borrow pits A, B, and/or C shown on contract drawing WD-351. The material to be taken from places in the borrow pits as directed from time to time.

No overburden stripped from the foundation abutments of the dam will be permitted in the hydraulic fill below about elevation 555.

Particular attention shall be given in the stripping of overburden from the foundation of the abutments of the dam so that no rock will find its way into any part of the hydraulic fill or puddle core.

Very truly yours,

Fred D. Pyle
Acting Hydraulic Engineer.

FDP/f

cc H.W.Rohl & T.E.Connolly El Capitan Dam
Contractor's Resident Representative El Capitan Dam
Hydraulic Engineer, Washington, D.C.
City's Resident Engineer

January 6, 1933

Messrs. H. W. Rohl and T. E. Connolly
Contractors, El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, hydraulic operations.

Gentlemen:

The placing of the hydraulic fill in the El Capitan reservoir dam shall not be undertaken until your complete plan of operation and dates has been submitted to and approval is given by the Hydraulic Engineer.

In this connection your attention is called to Paragraph 52 of the contract specifications and to letters from the Hydraulic Engineer to your Company dated November 11, November 14, November 21 and December 21, 1932.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/P

cc H.W.Rohl and T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

February 1, 1933.

Mr. H. N. Savage
Hydraulic Engineer
City of San Diego
California.

Dear Sir:

In compliance with your request for plan of operation proposed to be used in placing the hydraulic fill material in the El Capitan Dam, we submit the following:

All material will be deposited and segregated hydraulically as specified in Par. 63 - "Hydraulic Fill", detailed specifications for El Capitan Reservoir Dam, Spillway and Outlet Works. Our method of placing this material will be substantially as follows:

Hydraulic fill material will be derived from structure excavation or borrow pits as directed by the engineer. Material will be excavated, loaded on trucks and transported onto the rockfill toes of the dam. It will then be dumped off of their inner slope, from which position it will be segregated hydraulically as follows:

A settling pool will be maintained of the proper width and depth in the center of the dam. Electrically driven centrifugal pumps for delivery of water from the summit pool through hydraulic giants will be located on steel barges floating in this pool. Giants will play upon the hydraulic fill material as it is deposited on the rockfill toes resulting in an hydraulic segregation of the material, the coarser particles being deposited against the rockfill and the fines carried to the center to form the puddle clay core of the dimensions shown on the plans. The jetting units will be equipped with nozzles varying from 1-1/8 inches to 3 inches in diameter having capacities varying from 650 to 1700 gallons per minute, the size nozzle used depending upon the width of beach and reach required.

The material will be dumped uniformly along the edge of the rockfill in order to maintain beaches as nearly level as possible. The elevation of the summit pool will be maintained at the proper elevation to secure the best possible segregation of material and to control the dimensions of the core section. The leakage from the summit pool will be counterbalanced by pumping from a pool at the lower portal of the diversion tunnel. The rate of progress will be as rapid as possible consistent with the securing of a stable structure.

Very truly yours,
H. W. ROHL and T. E. CONNOLLY

H. W. ROHL (Signature)

February 3, 1933

From : Resident Engineer

To : Hydraulic Engineer

Subject: San Diego River Project, El Capitan Feature
Hydraulic fill placement methods.

1. On February 2, 1933, the Hydraulic Engineer, J. B. Lippincott, Consulting Engineer for H. W. Rohl and T. E. Connolly, Allen Rowe, Civil Engineer associated with J. B. Lippincott, H. W. Rohl, T. E. Connolly and the Resident Engineer met on the upstream rock embankment of El Capitan dam and conferred relative to methods of placement of the hydraulic fill.
2. Mr. H. W. Rohl had addressed a letter dated February 1, 1933 to the Hydraulic Engineer in reply to the Hydraulic Engineer's letter requesting from the contractor "plan of operation and dates" dated January 6, 1933.
3. Mr. Rohl explained that hydraulic fill material was being brought from borrow pit "A" and was being dumped from the top of the upstream rock embankment - elevation 625, over the downstream slope. Material from the downstream spoil bank would be dumped from the top of the downstream rock embankment over its upstream slope. Hydraulic monitors operating from berges on the summit pool maintained over the puddle core area would wash the hydraulic fill material from the lower inside toes of the rock embankments onto beaches on each side of the pool.
4. The Resident Engineer called the attention of those present at the conference to the material being brought from borrow pit "A". It was not entirely sufficient in clay content for the lower portion of the hydraulic fill. The material required for the hydraulic fill was that from within borrow pit "A" containing highest percent of silt and clay obtainable. Mr. Rohl explained that the sandy material being then deposited on the rock embankment slope was for blanketing over the rock and that the higher clay content material would be deposited over this more sandy material. The Hydraulic Engineer then asked how thick this blanket would be. Mr. Rohl replied that the thickness of 20 to 30 feet was desired at the toe of the slope, and that to secure this thickness at the toe might require a 50-foot horizontal thickness of blanket at the top of the slope.
5. Mr. Lippincott stated that in his opinion this was too great a thickness of blanket material. He said it should not be greater in thickness at the toe than 10 feet measured horizontally.

6. It is recommended that a letter be sent the contractor instructing him from what area in borrow pit "A" this hydraulic fill material to be placed in the lower portion of the dam should be obtained. Copies of drawings WD-351 sheets 2 and 3 have been prepared showing in color the outline of areas represented by certain numbered samples of which the silt and clay content is known. It is shown by these drawings that the material to be hydraulically placed in the lower portion of the dam should in general be taken from the surface of the area south of coordinate N 3000 and east of coordinate E 10400. In other words, from the vicinity of the north and east sides of the knoll at E 10300 N 2700. No material except for blanketing should be taken from west and due south of this knoll.

7. Accompanying this letter is a rough draft of a letter to the contractor as recommended.

Harold Wood
Resident Engineer

HW/p
encl.

February 4, 1933

Messrs. H. W. Rohl and T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, hydraulic fill material.

Gentlemen:

Your attention is directed to paragraph 63 of the contract specifications for El Capitan Reservoir Dam, Spillway and Outlet works relative to hydraulic fill.

The relatively less clayey material from borrow pit "A" being placed by you as a blanket over the downstream slope of the upstream rock embankment shall not be at any place of a thickness greater than ten feet, measured horizontally, at the toe of the slope.

The relatively clayey hydraulic fill material shall be obtained from borrow pit "A" from surface of the area south of coordinate N 3000 and east of coordinate E 10400, that is, from vicinity of the north and east sides of the "knoll" at E 10300 N 2700, until otherwise directed.

Except for approved stripping from dam abutments, no material for hydraulicking shall be placed over the blanketing material until approval is given to proceed with hydraulic operations.

In accordance with letter of January 6, 1933, no hydraulic operations shall be undertaken until approval is given by the Hydraulic Engineer.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

cc H. W. Rohl & T. E. Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

February 7, 1933

From : Resident Engineer

To : Hydraulic Engineer

Subject: San Diego River Project, El Capitan Feature
Contractor's plan for hydraulic fill operations

1. On February 6, 1933 a copy of letter from H. W. Rohl and T. E. Connolly, dated February 1, 1933, which purports to be plan of operation to be used in placing hydraulic fill at El Capitan Dam and in answer to request dated January 6, 1933 of the Hydraulic Engineer for "complete plan of operation and dates."

2. The Hydraulic Engineer's letter of January 6, 1933 has subject heading "Hydraulic operations" although the other letters referred to are letters pertaining to excavation of overburden and stripping.

3. The contractor's letter of February 1, 1933 makes no mention of any plan for excavation of overburden or stripping of abutments. No dates or time element schedule is given. No mention is made of the number of shifts to be worked. The organization for carrying on the work is not stated. It would be desirable to know who will be in charge as foreman for the contractor. The rate of progress is indefinite.

4. It is realized that all of the time element depends on the drainage of the material, but at least some statement could have been made.

5. The City's representatives do not know when the material excavated from the spillway will be placed in the dam or to what elevation the hydraulic fill will be at the time this material is to be placed in the hydraulic fill.

6. The letter, in the opinion of the resident engineer, is deficient in information required and requested in the letter of the Hydraulic Engineer dated January 6, 1933, in that it is not complete, and gives no dates.

Harold Wood
Resident Engineer

HW/p

El Capitan Dam
February 8, 1933

Messrs. H. W. Rohl and T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan Feature
Hydraulic Fill Material

Gentlemen:

On February 2, 1933, a conference was had at the El Capitan dam between your engineers J. B. Lippincott and Allen Rowe, Hydraulic Engineer for the City, Resident Engineer for the City and yourselves. At this conference it was the understanding of those present, that the blanketing material over the downstream slope of the upstream rock embankment should be not more than 10 feet in thickness, measured horizontally, at the toe of the rock embankment.

At 4:00 P.M. on February 8, 1933 the above blanketing material had been deposited to a thickness of 10 feet or more.

In accordance with the understanding had with you on February 2, 1933 and referred to above, you are hereby directed to place no more blanketing material on the downstream slope of the upstream rock embankment below elevation 625, until directed to do so.

You may proceed with the placement of material from the spoil bank over borrow pit area C, as a blanket over the upstream slope of the downstream rock embankment to a thickness of ten feet or more as directed. The thickness to be measured horizontally from the toe of the rock embankment.

Material from the borrow pit A as outlined in the letter of the Hydraulic Engineer, dated February 4, 1933, may be used as a blanket on the upstream slope of the downstream rock embankment if desired.

All of the above work is to be done in accordance with the Contract drawings and specifications and will be paid for under appropriate schedule items.

Very truly yours,

Harold Wood
Resident Engineer

HR/HW

Copy to Hydraulic Engineer
Copy to Contractor's Resident Representative

H.W.ROHL & T.E.CONNOLLY
CONTRACTORS

February 8, 1933

Mr. H. N. Savage,
Hydraulic Engineer,
City of San Diego, California.

Dear Sir:-

Replying to your letter of February
4th, 1933 in which you state, -

"In accordance with letter of
January 6, 1933 no hydraulic operations shall be
undertaken until approval is given by the hydraulic
Engineer".

In response to above request, we sub-
mitted in writing under date of February 1, 1933 our
plan of operations generally following the methods
discussed with you in the spring of 1932. Pursuant
to your verbal instructions given at the dam February
2, 1933, hydraulic fill material has been placed on
the rock fill toes and we are now delayed from pro-
ceeding with hydraulic sluicing.

We respectfully direct your attention to
paragraph 31, general contract specifications, whereby
the contractor is made responsible for the care of all
work until its completion and final acceptance. If it
is your intention by your letter of February 4th that
the city shall assume such responsibility and at its
own expense replace damaged or lost material and repair
damaged parts of the work on account of our complying
with your order of February 4th, we will be pleased to
have you so advise us in order that we may be adequately pro-
tected and the City obligated to reimburse us for any
materials lost or portions of work damaged while we await
approval of the Hydraulic Engineer.

Very truly yours,

H. W. ROHL (Signature)

H. W. Rohl,

T. E. CONNOLLY (Signature)

T. E. Connolly.

February 9, 1933

Telephoned 11:45 A.M.

San Diego River Project, El Capitan Feature
Hydraulic Fill

Contractors will begin hydraulic fill operations this afternoon. Clayey material still being deposited on downstream slope of upstream rock embankment. Thickness of this material now about 20 feet at the toe of the slope. This information received from Mr. T. E. Connolly.

Harold Wood
Resident Engineer

HW/p

February 10, 1933

Messrs. H. W. Rohl and T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan Feature
Contract construction policies, methods,
requirement.

Gentlemen:

Receipt is acknowledged of your letter dated February 8, 1933 directing attention to Paragraph 31 of the General Specifications for El Capitan Reservoir Dam, Spillway and Outlet Works.

The City of San Diego's engineers will continue to refrain from assuming any of the responsibilities placed by the contract specifications upon the Contractor for the construction of El Capitan Dam; and will continue to endeavor not to neglect to exercise the responsibilities placed by the contract specifications upon them.

Your attention is respectfully invited to my letter dated February 3, 1933, subject "San Diego River Project, El Capitan Feature, dam abutments, overburden, stripping and removal"; and

To my letter dated February 4, 1933, subject "San Diego River Project, El Capitan Feature, hydraulic fill material".

In response to an invitation initiated by your Consulting Engineer J. B. Lippincott, accompanied by Contractor H.W.Rohl, Mr. Lippincott and your Engineer Allen Rowe, I traveled to the El Capitan Dam work Thursday, February 2, 1933 P.M.

At a conference pre-arranged by Mr. Lippincott on the work, there were present H. W. Rohl and T. E. Connolly contractors, J. B. Lippincott and Allen Rowe, together with the City's Resident Engineer Harold Wood and Hydraulic Engineer H. N. Savage;

Mr. Lippincott specifically enunciated the fundamental and construction advisable requirement that the potentially rolling boulders which might otherwise find their way into the hydraulic fill portion of the embankment should be removed from the foundation plan of the earth embankment portion of the dam before hydraulic placement of earth embankment material is commenced.

Mr. Lippincott also specifically enunciated the requirement that blanketing and/or placing of other earth embankment material on the downstream face of the upstream rock embankment should not be made to extend out in excess of ten feet horizontally measured from the toe of the rock slope as then constructed.

The restriction not to exceed ten feet horizontal thickness of blanketing and/or hydraulic earth material from the toe of the rock slope as then constructed was based on the fact that decreasing the length of the hydraulic beach would interfere with the proper hydraulic placement of the hydraulic fill and might materially decrease the controlled limits of the puddle core of fine material essential for the integrity of the structure.

Contractor H. W. Rohl specifically notified me by telephone at my residence February 3, 1933 about 8:00 P.M. that he had not, did not intend to, and would not place blanketing and/or earth embankment material over and on the downstream face of the upstream rock embankment as then constructed, more than ten feet measured horizontally from the toe of the rock slope toward the concrete masonry reinforced toe wall.

In view of the above you are requested to remove from both abutments all boulders, which may find their way into the hydraulic fill or puddle core before commencing hydraulic fill; and

To dump no more material for hydraulic fill from borrow pits over the downstream side of the upstream rock embankment until approval is given.

Permission to begin hydraulic fill operations has been awaiting your compliance with the foregoing requirements.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/f

cc H.W.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

February 20, 1933

From : Hydraulic Engineer
To : Resident Engineer
Subject : San Diego River Project, El Capitan Feature,
Hydraulic fill, earth embankment method of delivering
hydraulic placing

The Contractor H. W. Rohl and T. E. Connolly in a letter dated February 1, 1933, outlined an election of a method of hauling hydraulic fill material from structure excavation and/or borrow pits with automobile trucks, dumping it over the inside faces of the rock embankments and saturating it with water by means of hydraulic giants mounted on barges floating on a summit pool of water, to be maintained at required heights in the central plan of the earth embankment area of the structure, copy of which was furnished you, and copy of which was transmitted with my letter dated February 4, 1933 to the State Engineer.

Enclosed is copy of the State Engineer's reactions dated February 17, 1933 to the Contractor's elected method.

It had been my conception, based on multiple personal responsible experience since 1882, and multiple observation, that one of the surest methods to positively insure the required hydraulic dam material placement results and equally economical if the required results be accomplished, would be by hauling and delivering the raw material from structure excavation and/or borrow pits and dumping it into hog box arrangements to be installed as required at successive higher elevations up the abutments, and wherein the raw material could be positively saturated with the required quantity of water before tunning it out and carrying it by gravity through flumes into the earth embankment area of the dam, and thereby positively accomplish delivery of the saturated material on sloping beaches of the required length and the deposition of the coarser particles of the material on the beaches farthest away from the core wall, and also insure the assembly and deposition of the fines within the limits of the impervious core.

H. N. Savage
Hydraulic Engineer

HNS/r
encl. copy letter from
Deputy State Engineer 2-17-33

El Capitan Dam
February 21, 1933

H. W. Rohl & T. E. Connolly
Contractors, El Capitan Dam
Los Angeles, California.

SUBJECT: San Diego River Project, El Capitan Feature.
Hydraulic Fill.

Gentlemen:

On account of insufficient hydraulic equipment to thoroughly wash material delivered to both embankments, as fast as now being delivered, you are to decrease the shovel output to such an output as will allow thorough washing of material as fast as delivered and to reduce the present blanket over both upper and lower rock slopes to such a thickness as will be satisfactory to the Hydraulic Engineer.

All of the above in accordance with the Contract Specifications, El Capitan Reservoir Dam, Spillway and Outlet Works, Item 63, Page 34.

Very truly yours,

D. W. ALBERT (Signature)
D. W. Albert,
Hydraulic Fill Engineer

cc H. W. Rohl & T. E. Connolly, El Capitan Dam
Contractor's Resident Representative
Resident Engineer
H. N. Savage, Hydraulic Engineer
Fred D. Lyle, Assistant Hydraulic Engineer.

February 22, 1933

H. W. Rohl & T. E. Connolly
Contractors, El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, Contract Construction
Hydraulic Fill.

Gentlemen:

The Contractors plan and method of placing hydraulic fill material is not approved unless the hauling and delivering of earth material on inside slope of the two rock embankments is discontinued until sufficient hydraulic equipment is installed and operated to insure proper saturation and placement of the already excess earth blanket on the two inside rock slopes.

The Hydraulic Engineer will be unable to certify estimate of work performed by the Contractor from this date; and until the improperly dumped excess earth blanket has been properly saturated and placed in hydraulic fill and written approval of the work given to you by the Hydraulic Engineer.

Very truly yours,

H. N. Savage,
Hydraulic Engineer

HNS/f

cc H.W.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
Resident Engineer

February 25, 1933

Messrs. H. W. Rohl and T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature. Hydraulic Fill.

Gentlemen:

Notwithstanding written instructions from the Hydraulic Engineer to the Contractor dated February 21, and February 22, 1933, and prior both verbal and written instructions, and in deliberate disregard thereof, quantities of earth material in excess of the capacity of the hydraulic operations to handle have been and until the morning of February 24, 1933, were dumped over the inside faces of both the upstream and downstream slopes of the rock embankment of El Capitan Dam, thereby preventing the proper and required saturation and disposition of much of the hydraulic fill material in accordance with the requirements of the contract specifications, and gravely imperiling the safety of the structure.

The Contractor is hereby again notified to refrain from dumping such material upon the inside faces of either the upstream or downstream rock embankments until written authorization from the Hydraulic Engineer to resume dumping shall be issued.

The Contractor shall at his own expense remove so much of the excess material heretofore dumped contrary to instructions and without approval as cannot, in the judgment of the Hydraulic Engineer, now be properly hydraulicked and deposited into place. Written instructions in this regard will be issued by the Hydraulic Engineer as soon as the Contractor shall have demonstrated by approved hydraulic methods whether or not such unauthorized excess material heretofore deposited can be satisfactorily placed as required by the specifications.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

cc H. W. Rohl & T. E. Connolly
El Capitan Dam
Contractor's Resident Representative
Resident Engineer

February 28, 1933

MEMORANDUM

Subject: San Diego River Project, El Capitan Dam

On the afternoon of February 28, 1933 Mr. J. B. Lippincott Consulting Engineer for the contractor for El Capitan Dam, called at the office of the Resident Engineer and there conferred with Mr. H. N. Savage in the presence of the Resident Engineer as follows:

Mr. Lippincott stated that in his opinion there were two major considerations to be satisfied in constructing this type of dam. (1) Stability. (2) Tightness. He stated that he was of the opinion that thus far both of these considerations had been amply satisfied.

Mr. Lippincott stated that the gravelly material brought in from the downstream spoil bank, which was washed material, had been deposited on the upstream slope of the downstream rock embankment, had there been washed until the beach was completely riprapped with cobbles and that the contractor was now wanting to proceed with dumping of more earth material over the upstream face of the downstream rock embankment.

Mr. Savage stated the contractor had, since the beginning of the job "resisted everything and everybody" and cited several examples to show the nature of the contractor. Mr. Savage stated it was his duty to protect the City's interests first, and then protect the contractor from himself.

At this point Mr. Savage suggested they go to the dam. I left to get my car and drove Mr. Savage and Mr. Lippincott up to the downstream rock embankment. While here we were joined by Mr. D. W. Albert.

A sample was taken with a shovel by Inspector Carter from the clay in the pool about 16 feet from the shore line and about coordinate N 3500. This sample was examined by Mr. Savage, Mr. Lippincott, Mr. Albert and the Resident Engineer.

The Resident Engineer then drove Mr. Savage, Mr. Lippincott and Mr. Albert to the upstream rock embankment and then he returned to his office to make computations of unwashed material on the downstream rock embankment slope. This estimate of material was reported to Mr. Savage and Mr. Lippincott as 16730 cubic yards. Mr. Savage requested a computation of quantity of unwashed material on the slope of the upstream rock embankment be prepared.

The Resident Engineer then drove Mr. Savage and Mr. Lippincott to the contractor's camp where Mr. Lippincott agreed to meet with Mr. Savage at Mr. Savage's office tomorrow - March 1 A.M. Mr. Savage then returned with the Resident Engineer to the Resident Engineer's office and conferred with the Resident Engineer and Mr. Albert about these unwashed materials.

HW/p

Harold Wood

March 1, 1933

Messrs. H. W. Rohl and T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan Dam
Contract Construction Hydraulic Fill
Portion

Gentlemen:

No provision is seen in the specifications for El Capitan Dam whereby payment can be made to the contractor for material from structure excavation and/or approved borrow pits and dumped over the inside faces of the two rock embankments unless the material as dumped is properly sorted and placed by hydraulic means in the hydraulic fill portion of the structure.

The contractor has now sorted and hydraulically placed the majority of the excess material which was placed by him on the inside face of the downstream rock embankment in opposition to the repeated oral and written instructions of the Engineer and his Resident Representatives.

It is now hereby made optional to the contractor to remove and satisfactorily replace any incompletely placed material at his expense or he may immediately resume placing material on the inside face of the downstream rock embankment from structure excavation and/or selected borrow pits in the relative proportions and rate of delivery satisfactory to the Engineer, provided he properly sorts and places by hydraulic means the material as delivered in the hydraulic fill portion of the dam. In the event that the contractor elects not to remove the incompletely sorted and placed material it is understood that the contractor assumes all risk and responsibility therefor, and that such material will not be included in the monthly estimates.

It is obviously necessary and required that the sorting and placing by hydraulic means of the existing excess material heretofore dumped on the inside face of the upstream rock embankment proceed simultaneously with the sorting and placing by hydraulic means of additional material when and as placed on the inside face of the downstream rock embankment.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/P
cc H. W. Rohl and T. E. Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

Approved 3/1/33
H. B. Daniel, Deputy City Attorney

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

March 2, 1933.

Mr. H. N. Savage
Hydraulic Engineer
City of San Diego
San Diego, California.

Subject: San Diego River Project,
El Capitan Dam Contract Construction
Hydraulic Fill Portion

Dear Sir:

In reply to your letter of March 1st relative to
resumption of work on the El Capitan dam, the Contractor
will proceed immediately with the building of the dam
in accordance with the terms of his contract but
declines to assume any risk or responsibility in
relation thereto not required by the terms of his contract.

Very truly yours,

H. W. ROHL & T. E. CONNOLLY

By H. W. ROHL (signature)

El Capitan Dam
March 5, 1933

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Hydraulic fill, rate of progress

1. In the preparation of the statement of the amounts of structure excavation to be placed in the hydraulic fill of the El Capitan Dam, it was necessary to study the whole operation of building the hydraulic fill, rolled embankment and the rock embankments. The following table and graph shows the assumed rate of placement of material in the hydraulic fill per month and the height of the dam each month.

2. It is assumed that the portion of the dam above elevation 730 will be rolled embankment.

3. The ratio of structure excavation to borrow pit material is considered as 1 to 2 and the maximum rate is fixed by the available summer water supply and the maximum rate at which it is considered practicable to build the height of the dam per month.

4. The bulk of the structure excavation must be placed in the dam at elevation at which the ratio of puddle core material to hydraulic fill coarse material is the least. This will be between elevation 590 and 680.

5. The rate of progress shown on the table and graph will require the placement of rock embankment at a maximum rate of 100,000 cubic yards per month to keep ahead of the hydraulic fill placement, provided the full section of the rock embankment is built as the hydraulic fill is placed.

D. W. Albert
Hydraulic Fill Engineer

Harold Wood
Resident Engineer

HW/w

March 5, 1933

EL CAPITAN DAM
Hydraulic Fill
Anticipated Progress

Month	Cubic yards				Elevations
	Structure excavation	Borrow pit material	Total per month	Total yardage	
1933					
February	7,000	24,000	131,000	131,000	561
March	67,000	133,000	200,000	331,000	587
April	80,000	160,000	240,000	571,000	612
May	80,000	160,000	240,000	811,000	634
June	80,000	160,000	240,000	1,051,000	656
July	43,000	87,000	130,000	1,181,000	671
August	23,000	47,000	70,000	1,251,000	678
September	20,000	40,000	60,000	1,311,000	684
October		60,000	60,000	1,371,000	691
November		60,000	60,000	1,431,000	699
December		50,000	50,000	1,481,000	706
1934					
January		40,000	40,000	1,521,000	712
February		30,000	30,000	1,551,000	717
March		30,000	30,000	1,581,000	723
April		20,000	20,000	1,601,000	727
May		13,000	13,000	1,614,000	730
June				1,614,000	730
July			56,000x	1,670,000	744
August			50,000x	1,720,000	765

x Rolled embankment

El Capitan Dam
March 12, 1933

Messrs. H. W. Rohl and T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill
Contract construction.

Gentlemen:

In accordance with paragraph 63 of the Contract specifications, you are hereby directed to dump sand and gravel upstream of the downstream rock embankment and between elevations 600 and about 615. This gravel to be dumped in a lift progressing from the north or right abutment southerly and with a top width not to exceed 30 feet. The sand and gravel so dumped shall be sorted and placed by hydraulic means simultaneously with the dumping.

All of the above is to be done in accordance with the Contract specifications for the El Capitan Reservoir Dam, Spillway and Outlet Works.

HAROLD WOOD (Signature)

Harold Wood
Resident Engineer

D. W. ALBERT (Signature)

D. W. Albert
Hydraulic Fill Engineer

HW/W

cc H. W. Rohl and T. E. Connolly
El Capitan Dam
Contractor's Resident Representative
H. N. Savage, Hydraulic Engineer
Resident Engineer

El Capitan Dam
March 15, 1933

From : Resident Engineer

To : Hydraulic Engineer

Subject: San Diego River Project, El Capitan Feature
Hydraulic Fill - Sink holes on beach.

1. Between March 4 and 15, 1933, 10 sink holes have occurred in the upstream beach of the hydraulic fill of the El Capitan Dam. These holes have ranged in size from 2 feet diameter and 2 feet deep to 6 feet diameter and 4 feet deep. They are apparently the result of material finding its way into the voids in the rock embankment. When the jet water is turned into them, they quickly fill by the caving action of the earth material and disappear.

2. The sink holes call attention to the very important and fundamental matter of void spaces left in the rock embankment adjacent to the hydraulic fill.

3. On February 2, 1933 the resident engineer called attention to the desirability of using quarry waste material for the material adjacent to the rock embankment because of the rock fragments it contained.

4. On February 8, 1933 the hydraulic fill engineer pointed out to the Hydraulic Engineer, that gravel should be used to cover the inside slopes of the rock embankments instead of the silt and clay material that had been deposited.

5. It is the opinion of the hydraulic fill engineer and the resident engineer that if the void spaces of the upstream rock embankment be not filled with hydraulic fill material, then settlement will probably occur which will cause settlement in the relative thin rock embankment section above elevation 625.

6. It would be impractical to fill these voids now and according to the State not permissible. It therefore forces us to the next best solution, that of bridging the voids spaces on the surface of the rock embankment slope adjacent to the hydraulic fill with gravel or quarry waste and trusting to the bridging action of the material to prevent escape of hydraulic fill beach material into the voids in the rock embankment.

7. It is recommended that the contractor be instructed to immediately place gravel or quarry waste on the downstream slopes of the upstream rock embankment in an amount not to exceed 35000 cubic yards uniformly distributed over the slope between the top of the rock embankment at elevation 625 and the present beach at elevation about 595.

D.W. Albert (Signature)

D. W. Albert

Hydraulic Fill Engineer

Harold Wood (Signature)

Resident Engineer

March 17, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, hydraulic fill.

Gentlemen:

Until further notice and in accordance with contract specifications, paragraph 63, El Capitan reservoir dam, you are hereby directed to place on the downstream slope of the upstream rock embankment and uniformly distribute along its length, and simultaneously sort and place by hydraulic means approved spoil bank material at a rate not to exceed the output from one power shovel.

Before this material is placed, the material on the downstream slope of the upstream rock embankment shall be hydraulicked down into the fill to the satisfaction of the Engineer.

The delivery of the spoil bank material shall commence with the morning shift on March 20, 1933.

All the above to be done in accordance with contract specifications El Capitan Reservoir Dam, Spillway and Outlet Works.

Very truly yours,

H. N. Savage,
Hydraulic Engineer

HNS/P
cc H. W. Rohl & T. E. Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

4/24/33
copy /f

623

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

March 18, 1933.

Mr. H. N. Savage,
Hydraulic Engineer,
City of San Diego.

Re: EL CAPITAN RESERVOIR DAM SPILLWAY
AND OUTLET WORKS

Dear Sir:

Kindly advise us whether your order of the 17th with reference to placing of material on the downstream slope of the upstream rock embankment is a change order, or an extra order, and as to the authorization for payment for such work.

Very truly yours,

H. W. ROHL & T. E. CONNOLLY

By H. W. ROHL (Signature)

March 22, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, hydraulic fill material.

Gentlemen:

In reply to your letter dated March 16, 1933 inquiring whether my letter dated March 17, 1933 "with reference to placing of material on the downstream slope of the upstream rock embankment is a change order, or an extra order, and as to authorization for payment for such work."

My letter was a direction by the Engineer to the Contractor to insure the use of the required material and its placement and was made in accordance with the contract specifications paragraph 63 El Capitan Reservoir Dam, Spillway and Outlet Works.

The spoil banks from which material is to be taken are considered borrow pits and payment will be made under schedule item 5 in accordance with paragraph 63 contract specifications.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/P
cc H.W.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

COPY

March 30, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, excavation - spillway.

Gentlemen:

Your attention is invited to letter dated January 6, 1933 relative to El Capitan reservoir dam spillway excavation, in which you were instructed to plan your work to comply with the City's policy that "it is intended to use all suitable materials in the spillway directly in the dam."

On March 22, 1933 your Engineer, Mr. Allen Rowe, was provided with a comprehensive estimate of hydraulic fill material considered available from the spillway excavation.

Mr. J. B. Lippincott, Consulting Engineer for the Contractor, considers spillway excavation may be placed in hydraulic fill provided it is placed simultaneously with suitable selected borrow pit materials in ratio of one part spillway excavation to two parts selected borrow pit materials.

You are directed to place spillway excavation suitable for hydraulic fill, in the opinion of the Engineer, and clayey material from approved borrow pits simultaneously in the hydraulic fill in the ratio of one part of spillway excavation to two parts borrow pit materials, until further notice.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HW/p
cc HW.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

April 3, 1933

MEMORANDUM

San Diego River Project, El Capitan Feature
Hydraulic fill

The Contractor for El Capitan Dam has recently completed a lift within the westerly limits of the hydraulic fill. This lift was made to elevation 633 or about 17 feet above the top of the first lift and is about 30 feet wide on top. The face of the dump where it overlapped on to the beach was about 25 feet high. It was constructed of spoil bank material consisting of gravel, sand and some decomposed granite and rock fragments.

The material as end dumped was thoroughly wetted and a considerable portion of the sand and finer material was washed on to the beach.

As the dump progressed, rock for rock embankment was dumped over the downstream side, and clayey borrow pit material and approved spillway excavation was dumped over the upstream side and simultaneously washed.

On March 31, 1933 when lift was about three-fourths completed Mr. Gerald McKinlay, Senior Engineer of Dam Inspection, State of California, while observing the method of placing and washing, stated to Mr. Harold Wood and myself that it was a very satisfactory method of constructing the lift.

On April 1, 1933 Mr. D. W. Albert, in discussion of this lift with Mr. H. B. Daniel, Mr. Wood and myself, stated that the lift as constructed was very satisfactory as to safety of the dam.

Mr. Daniel advised that he could see no reason for withholding from the monthly estimate for March 1933 any of the material in the lift.

Fred D. Pyle
Engineer

FDP/p
cc Resident Engineer

April 5, 1933

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature, Hydraulic Fill, material at downstream side not sorted and placed by hydraulic means.

As requested on April 4, 1933, calculations have been made to show the quantities of material at the downstream side of the hydraulic fill at El Capitan Dam which remains not sorted and placed by hydraulic means.

On March 30, 1933 the Resident Engineer stated that in his opinion about 10 per cent of material in the above dumped material might have been actually sorted and placed in accordance with contract specifications.

The calculations of quantities from cross sections show that 18,846 cubic yards were dumped on the downstream side of the hydraulic fill above the beach line of April 1 produced downstream. From this must be deducted the about 10 per cent considered sorted and placed in accordance with the specifications at this location which leaves as not sorted and placed by hydraulic means about 16,961 cubic yards.

Harold Wood
Resident Engineer

HW/r

April 5, 1933

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Hydraulic fill - seepage water

1. An inspection of the seepage conditions in the outlet tunnel at El Capitan Dam was reported in letter of Mr. L. H. Hill dated April 3, 1933.

2. The following tabulations of elevations of water about the dam are here given for record, as measured on April 5, 1933:

<u>Location</u>	<u>Water surface elevations</u>
At upstream toe of dam	566.2
At downstream toe of dam	552.7
Water in outlet tower shaft	564.1
At entrance to outlet tunnel	562.4
Storage pool above contractor's temporary dam	574.7
Summit pool	607.5

Harold Wood
Resident Engineer

HW/r

EL CAPITAN DAM

Daily Work Report
Hydraulic Fill

Ratio Earth to Water, April 1 - 8, inclusive, 1933.

	<u>Borrow Pit</u>	<u>Spill-way</u>	<u>Earth Total</u>	<u>No. Giants</u>	<u>Pump Hours</u>	<u>Water Total</u>	<u>Hydraulic Fill to Water</u>
1	9,113	4,405	13,518	3	47	18,800	1 1.4
2	9,120	2,734	11,854	3	40	16,000	1 1.35
3	8,178	3,092	11,270	4	51	20,400	1 1.8
4	10,060	3,605	13,665	3	52	20,800	1 1.5
5	9,300	3,330	12,630	4	59	23,600	1 1.87
6	8,606	4,804	13,410	4	63	25,200	1 1.88
7	7,960	4,982	12,942	4	60	24,000	1 1.86
8							
	62,337	26,952	89,289			148,800	1 1.56
	69.8%	30.2%					Ratio 1 to 1 2/3 water

Ratio 2.3 to 1

	<u>Elevation of Pool</u>	<u>Coordinate average beach Upstream</u>	<u>Downstream</u>
1	605.5	5,080	4,940
2			
3	607.5	5,095	4,920
4	609.0	5,080	4,945
5	610.0	5,100	4,940
6	610.0	5,090	4,930
7	612.5	5,080	4,935
8 and 9	613.0	5,080	4,940
10	614.7 x	5,090	4,950

When work was stopped by contractor

H.W.

April 7, 1933

Messrs. H. W. Rohl & T.E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill Material

Gentlemen:

Your persistent taking of material from that portion of Borrow Pit "A" westerly of coordinate E 10100 in direct disregard of letter of February 4, 1933 on Hydraulic Fill Material and repeated verbal instructions constitutes a violation of your contract, and the material so taken will be deducted from Embankment Class 2 and not paid for.

Very truly yours,

H. N. Savage,
Hydraulic Engineer

HNS/f
cc H.W.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

April 7, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California

Subject: San Diego River Project, El Capitan
Feature, Stripping abutment of
cutoff trench material.

Gentlemen:

Material excavated by you from the cutoff trench at El Capitan Dam has been deposited on the north or right abutment within the area of the hydraulic fill without sorting and placing by hydraulic means.

You are directed to remove this material above elevation 602 at your own expense and place it in the hydraulic fill by sorting and placing by hydraulic means.

All future material excavated from cutoff trench and stripping of abutments suitable for hydraulic fill shall be deposited in the same places and manner as material from borrow pit and sorted and placed by hydraulic means.

Very truly yours,

H. N. Savage
Hydraulic Engineer

HNS/f

cc H.W.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

April 8, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

Subject: San Diego River Project, El Capitan
Feature, hydraulic fill, excavation,
spillway.

Gentlemen:

Supplementing letter dated March 30, 1933, subject:
Excavation-spillway; you are directed until further notice
to change the ratio of materials delivered to El Capitan
Dam for hydraulic fill so that you will place spillway
excavation suitable for hydraulic fill, in the opinion of
the Engineer, and only clayey material from approved borrow
pits simultaneously in the ratio of one part of spillway
excavation to one part borrow pit materials respectively.

The borrow pits are to be excavated only to the depths
deemed proper by the Engineer.

Any material placed in the dam from unauthorized
borrow pits or from depths below those deemed proper by the
Engineer will not be paid for.

You are directed to restrict your delivery of hydraulic
fill material to the amount which you can and will effect-
ively sort and place by hydraulic means to the satisfaction
of the Hydraulic Engineer.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HN/p
cc H.W.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
City's Resident Engineer

April 9, 1933

MEMORANDUM

San Diego River Project, El Capitan Feature
Comments of Engineers

Mr. J. B. Lippincott, Consulting Engineer for the Contractor El Capitan Dam, who frequently visits the structure, has consistently declared to the City's Engineers that the dam is a good structure but has not in any instance supported his conclusions by any statement that the Contractor has complied with the specifications.

Mr. George A. Elliott, Consulting Engineer for the Contractor, who visited the dam April 7, 1933, also declared to the Hydraulic Engineer that he thought the dam was satisfactory but when asked advised that he did not have a copy of the specifications.

Mr. George W. Hawley, Deputy State Engineer, after inspecting the job on April 7, 1933, stated to the City's Engineer D. W. Albert that the hydraulic fill material was not being properly sorted and washed.

Mr. D. W. Albert, City's Engineer Hydraulic Fill, has very strongly and repeatedly stated to the Hydraulic Engineer that the hydraulic fill material was not being properly sorted and washed.

H. N. Savage

HNS/p

April 21, 1933

Messrs. H. W. Rohl & T. E. Connolly
4351 Alhambra Avenue
Los Angeles, California

S 5

Subject: San Diego River Project, El Capitan
Feature, hydraulic fill

Gentlemen:

The hydraulic fill material for El Capitan dam shall be derived from excavation for structures, spillway, outlet tower, cutoff trench, stripping of foundation and from borrow pits.

The material from borrow pits shall be taken from areas and to depths as designated by the engineer. Material from the borrow pits shall be transported to the work, and sorted and placed by hydraulic means in the hydraulic fill in the ratio of one part borrow pit material to one part of spillway material or material from excavation for structures, until directions to change this ratio may be hereafter given in writing by the Engineer.

The ratio of water used in sorting and placing the material to the quantity of materials reaching the fill daily shall be such that the material shall be sorted and placed by hydraulic means simultaneously as the material reaches the dam to the satisfaction of the Engineer.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/p

cc H.W.Rohl & T.E.Connolly
El Capitan Dam
Contractor's Resident Representative
City Manager
City Attorney
City's Resident Engineer

May 4, 1933

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Hydraulic fill between elevations 625 and 700.

1. Assuming the contractor may shortly resume operations of building the hydraulic fill at El Capitan Dam by semi-hydraulic placement method and uses equipment as heretofore, it is considered that the following could be accomplished:

2. Sluicing water: Capacity of 4 pump units - 12 second feet. 3,000 cubic yards per 8-hour shift gives the ratio of water to earth of 5:1.

3. Construction methods: If rock embankment 10 feet high 30 foot minimum crest width along inner face of rock embankments be constructed, then from this embankment hydraulic fill material could be dumped and washed into place and unwashed material at no time to exceed a width on top of the dump of more than 10 feet.

4. Reason for placing rock embankment instead of decomposed granite for lift across dam: It is impossible to thoroughly sort decomposed granite when making lift. Decomposed granite lift must be placed entirely within hydraulic fill area, thereby reducing width of beach and cutting down available washing and segregating area.

5. Time element: Between elevation 625 and 700 there is required about 720,000 cubic yards of hydraulic fill material. With output of 3,000 cubic yards per shift, 240 shifts will be required. Allow 50 shifts per month, 5 months required. Allow 1.5 months for unavoidable delays gives 6.5 months, or beginning May 15 finishing to elevation 700 December 1 (see letter from Resident Engineer to Hydraulic Engineer dated March 5, 1933).

6. Semi-hydraulic fill limitations: It is impossible to secure a thorough sorting and placing of material by the semi-hydraulic method due to fact that in dumping from embankment and washing material into place, some material becomes trapped at toe of embankment and is buried beyond reach of jet by the ever changing beach elevation. It is thought that this unwashed material may amount to as much as 5 per cent of the hydraulic fill. Should objection be made to this 5 per cent of unsorted material the semi-hydraulic fill can not be used. If full hydraulic operations were used, it is considered probable that about 5 per cent of unsorted material might be deposited into the hydraulic fill in the form of lumps of decomposed granite.

7. It is believed that by the City permitting the usual tolerance in the placing of hydraulic fill materials by semi-

5/4/33

-2

hydraulic methods and close observance by the contractor as to placing and washing of hydraulic fill materials that this method may give satisfactory results up to elevation 700 for the outer limits of the embankment.

8. RECOMMENDATION: It is recommended that the contractor be permitted to continue the construction of the hydraulic fill by the semi-hydraulic fill method. It is understood that tolerance relative to sorting and placing by semi-hydraulic methods subject to results satisfactory to the Engineer be permitted in the construction.

That the contractor be permitted to construct rock embankment lifts to a depth not to exceed 10 feet and situated so as to cause no increase or decrease in rock embankment quantities.

Harold Wood
Resident Engineer

D. W. Albert
Hydraulic Fill Engineer

HW-DWA/T

June 30, 1933

From : Hydraulic Engineer
To : Resident Engineer
Subject: San Diego River Project, El Capitan Feature,
Hydraulic Fill Operations.

You are hereby authorized and directed to require the Contractor to restrain his rate of delivery of hydraulic fill material to the quantity which he can timely, properly and fully saturate, separate and deposit in the beaches and the impervious puddle core of the El Capitan Dam to the satisfaction of the Engineer.

H. N. Savage
Hydraulic Engineer.

HNS/f

El Capitan Dam
July 24, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California

El C 3

Subject: San Diego River Project, El Capitan
Feature, hydraulic fill, spillway material

Gentlemen:

You are hereby notified to discontinue the placement of decomposed granite from the spillway excavation into the hydraulic fill portion of El Capitan Dam.

The material being excavated at this time is deficient in clay and not suitable for hydraulic fill.

This order is effective 3:00 P.M. July 24, 1933 and until such time as you are directed to again place suitable clay content material from the spillway into the hydraulic fill.

The material being excavated from the spillway may be wasted at the location upstream and downstream of the dam which have been designated.

Harold Wood
Engineer

D. W. Albert
Hydraulic Fill Engineer

Delivered to Lee Tetzl of H. W. Rohl & T. E. Connolly, at 9:45 A.M. by July 26, 1933 in presence of D. W. Albert.

Directions complied with at 3 P.M. July 24, 1933.

October 19, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractor El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-56

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill Portion of
Dam already placed.

Gentlemen:

You are hereby directed and required not to remove or
displace any of the hydraulic fill material heretofore sat-
urated, separated and placed by hydraulic methods in the
hydraulic fill portion of the City of San Diego's El Capitan
reservoir dam.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

September 7, 1933

From : Resident Engineer
 To : Hydraulic Engineer
 Subject : San Diego River Project, El Capitan Feature
 Hydraulic fill, material placement

1. As requested by you in letter dated August 30, 1933, here is report of material placed by the contractor in the hydraulic fill of El Capitan dam.

2. On February 1, 1933, the contractor addressed a letter to the Hydraulic Engineer giving a very general "plan of operations proposed to be used in placing hydraulic fill material."

3. On March 5, 1933 the Resident Engineer outlined in letter addressed to the Hydraulic Engineer, anticipated progress and statement of anticipated hydraulic fill material from structure excavation. This statement was based upon an assumed ratio of structure excavation to borrow pit material of 1 to 2.

4. On August 2, 1933 the Resident Engineer and Hydraulic Fill Engineer D. W. Albert addressed a letter to the contractor ordering him to "maintain the ratio of decomposed granite from spillway excavation to borrow pit material at 1:3".

5. The following table shows the daily amounts of materials reaching the dam since April 1, 1933 from the contractor's records of truck loads.

Date 1933	Cubic yards		
	Borrow pit	Structure excavation	Water
April 1	9,113	4,405	18,800
3	9,120	2,734	16,000
4	8,178	3,092	20,400
5	10,060	3,605	20,800
6	9,300	3,330	23,600
7	8,606	4,804	25,200
8	7,960	4,982	24,000
June 1		70	
2		506	
3		61	
4		102	
10		1,018	
11		275	
12		153	
13-14		1,860	
15		1,004	
16 (resumed hydraulic	3,466	2,121	
17 sorting and	3,273	2,333	
19 placing)	3,204	2,015	
20	3,626	2,541	

Date 1933	Cubic yards		
	Borrow pit	Structure excavation	water
June 21	2,909	2,226	
22	3,213	5,794	
23	6,195	5,924	
24	3,466	6,195	
26	7,008	6,906	
27	5,908	7,797	
28	9,390	6,279	
29	9,355	7,078	
30	9,181	6,383	341,600 June 1 to 30
July 1	9,870	5,482	
3	8,736	3,966	
4	8,529	4,836	
6	8,573	4,122	
7	5,898	5,607	
8	1,989	4,640	
9	2,816	4,918	
10	1,341	3,534	
12	began rock lift El. 650-662	530	
15		1,325	
16		417	
17		1,704	
18		2,472	
19		2,350	
20	2,863	1,807	
21	2,934	2,751	
22	6,023	3,947	
24	5,360	3,535	
25	6,006		
26	9,245		
27	10,562		
28	10,151		
29	10,178		
31	10,117		576,000 July 1 to 31

July 24, 3 P.M. Resident Engineer and Hydraulic Fill Engineer ordered placement of decomposed granite from spillway into hydraulic fill discontinued.

August 1	10,082	3,959
2	10,433	3,453
3	10,454	6,553
4	9,099	5,499
5	2,689	1,378
7		6,559
8	5,378	6,399
9	5,871	5,711
10	6,196	1,111
11	6,995	
12	5,159	
13	began rock lift El. 662 to 675	

Date 1933	Cubic Yards		
	Borrow pit	Structure excavation	Water
August 18		4,122	
19		995	
20		2,438	
22		1,571	
23		1,302	
24	2,441		
25	6,159	1,604	
26	7,149	384	
28	11,111	85	
29	11,727	195	
30	11,053		
31	11,671		
			527,853 August 1 to 31

On August 2, 1933 the contractor was ordered to resume placement of decomposed granite from spillway excavation into hydraulic fill and to maintain ratio of decomposed granite to borrow pit material at 1:3.

On August 10, 1933 the contractor was ordered to discontinue placement of decomposed granite from spillway excavation into the hydraulic fill portion of the dam.

6. Spillway excavation to amount of about 105,000 cubic yards has been wasted since 3 P.M. July 24 to August 31, 1933. It is considered impossible with present method of sorting and placing to use any decomposed granite in the hydraulic fill.

HW/p

Harold Wood
Resident Engineer

September 15, 1933

From : Engineer Fred D. Pyle
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Top of dam, modification

Drawing WD-383, San Diego River Project, El Capitan Dam, as approved by the State Engineer February 29, 1932, shows a 5-foot berm on each side of the dam at elevation 750, upstream slope 1 on 2; downstream slope 1 on 1.5; top of embankment at elevation 766; a 16-inch concrete parapet wall, being the upper portion of the concrete core wall with top at elevation 770 on the upstream side of the top of the dam and a concrete curb on the downstream side, and rock embankment above spillway crest only 18 inches thick normal to the slope.

The concrete core wall has been eliminated except in the vicinity of the contract between the dam and the abutments. If concrete parapet and curb walls are constructed they will settle with the dam and will soon be out of line and elevation and may crack due to unequal settlement.

The parapet wall, if constructed, would require a substantial footing and reinforcing.

The rock embankment on the reservoir side of the dam will be exposed to wave action and is inadequate.

There is a deficiency of fines in the borrow pits from which the hydraulic fill is being secured so that there is considerable advantage if the beaches in the upper portion of the dam can be lengthened.

Two plans for modifying the dimensions of the upper portion of the dam have been considered.

- (a) Elimination of the two 5-foot berms at elevation 750.
- (b) Elimination of the two 10-foot berms at elevation 700 and of the two 5-foot berms at elevation 750.

The elimination of the two 5-foot berms at elevation 750 and of concrete parapet and curb walls, and the widening of the crown of the dam to 23.75 feet with top at elevation 770 and thickness of rock embankment on reservoir side increased to 5 feet measured normal to the surface, will increase the rock required by 5000 cubic yards and hydraulic fill material by 11000 cubic yards, and decrease the amount of concrete required by 1000 cubic yards.

On the basis of concrete being paid for as schedule item 21 - formed portion of core wall - the increase in cost due to making the change, not counting boulders or fence on each side of the top of the dam, would be \$2500 provided that the rock all came from the quarry.

The elimination of the berms at elevation 700 and 750, the elimination of the concrete parapet and curb walls, the widening of the crown of the dam to 20 feet each side of the core wall axis of the dam, downstream slope 1 on 2.044, upstream slope 1 on 1.794, and the construction of rock embankment so that the downstream rock embankment will be 4.5 feet thick measured normal to the surface and upstream rock embankment 10 feet thick measured normal to the surface, would not increase the rock required but would increase the hydraulic fill required by 80000 cubic yards, the amount of concrete required would be reduced by 1000 cubic yards.

On the basis of concrete being paid for as schedule item 21 - formed portion of core wall - the increase in cost due to making the change would be \$24,500.

The contractor may or may not consider that he is entitled to a change order under paragraph 13 of the contract specifications if the crown of the dam is widened to 40 feet.

The increased width of the dam would materially increase the width of the beaches and thus permit the hydraulic fill to be constructed to a higher elevation than would otherwise be possible with the material available in borrow pits "A", "B" and "C".

The safety of the dam, both from percolation thru the puddle core and the effect of wave action on the reservoir side of the dam would be increased.

The increase in cost is not excessive and may be somewhat reduced if it develops that material would have to be brought from more distant borrow pits for the upper portion of the dam if the dimensions of the dam were not changed.

Fred D. Pyle
Engineer

FDP/p

San Diego River Project, El Capitan Feature, Hydraulic fill, construction above elevation 680.

All hydraulic fill material placed in the El Capitan reservoir dam after the summit pool reaches elevation 680, should be placed by the full hydraulic process, i.w. in hydraulicking the materials should be run thru properly constructed pipes or flumes onto the outer edges of the hydraulic fill.

The change from the semi-hydraulic method to the full hydraulic method is advisable and necessary for the following reasons:

(a) The hydraulic fill material will be in turbulent contact with water for a longer period than when placed by semi-hydraulic methods which will result in the dissolving of lumps and the separation of a larger portion of the fine materials.

(b) There will be full use of beaches for deposition of the coarser materials.

(c) There will be more washing as the water ratio will be increased from about one part of hydraulic fill material to two and one-half parts of water to about ten parts of water.

(d) There will be almost continuous construction of the hydraulic fill portion of the dam instead of 10 to 12 day periods when no hydraulic fill material is being placed and all the fines in suspension in the pool settle. With the summit pool thick with clay in suspension there will be less tendency for the sand on the edge of the pool to crowd or move into the puddle core area.

(e) The construction by full hydraulic methods will proceed somewhat slower than by semi-hydraulic methods, which is desirable.

(f) There will be a better disposition of fines in the puddle core due to better control of the smaller yardage placed per shift and to more continuous operations which will permit of reduction in width of the puddle core.

In view of the above it is recommended that the contractor be required to place all hydraulic fill material in the El Capitan dam, after the summit pool reaches elevation 680, by full hydraulic methods and that the contractor be notified to that effect at the earliest practicable date so that the contractor may make necessary changes in his equipment so as not to delay the work.

Harold Wood (signed)
Resident Engineer

Fred D. Pyle (signed)
Engineer

D. W. Albert (not signed)
Engineer Hydraulic Fill

9-25-33

Statements a, b, c, d, e and f are true. Analysis of beach material shows about 5 per cent silt and clay. Allowing that all of the 5 per cent of silt and clay will be recovered by full hydraulic fill method I am of the opinion that the expense and delay of changing from present method to full hydraulic fill method is not warranted.

That the full hydraulic fill method will not solve the problem is evident. At present time I have no statement to make or recommendations as to what can be done toward solution of problem. Within a few days it will be demonstrated whether the puddle section can be successfully narrowed or not. I recommend that result of this demonstration be awaited.

D. W. Albert (signed)

El Capitan Dam
September 21, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

El C 11

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill Material

Gentlemen:

You are hereby notified to stop the placing of hydraulic fill material on the inside slopes of the rock embankments of El Capitan Dam which you are placing there in a thickness in excess of 10 feet measured horizontally and which is not being placed by hydraulic means.

H. L. Harper
Inspector

Harold Wood
Resident Engineer

HW/hw
cc Hydraulic Engineer

Delivered to Superintendent Swansen of H. W. Rohl & T. E. Connolly at 9:00 P.M. September 21, 1933, by H. L. Harper in the presence of ---.

Directions complied with at (x) 9:20 P.M. September 21, 1933.

(x) Directions were complied with by diverting silt to the downstream embankment to a portion of the rock embankment which had been built during the first half of the shift, excepting that Shovel #7 which was excavating for road on the north abutment, just west of the upstream embankment, continued to load two 5 yard trucks which were dumped on the upstream embankment.

September 23, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-47

Subject: San Diego River Project, El Capitan Feature
Hydraulic Fill Material and Placing.

Gentlemen:

The up-building of the puddle core fine impervious material section in the hydraulic fill portion of the El Capitan dam has materially fallen behind the up-building of the coarse material portion of the hydraulic fill area in the beaches.

It is imperative that the maximum portion of the clay and fine silt in the hydraulic fill material being brought in from the borrow pits be saturated and separated and hydraulicked into the fine impervious puddle core section.

You were directed by Hydraulic Engineer's letter dated March 29, 1933 to carry on hydraulic sluicing practically simultaneously with the dumping of material.

You were directed by Hydraulic Engineer's letter dated April 8, 1933 to "restrict your delivery of hydraulic fill material to the amount which you can and will effectively sort and place by hydraulic means to the satisfaction of the Hydraulic Engineer".

You were directed by Resident Engineer's letter dated September 21, 1933 to stop placing dry material for hydraulic fill to a thickness in excess of 10 feet measured horizontally. This direction was given in order that all of the hydraulic fill material being delivered may be fully saturated, sorted and placed by hydraulic means to secure the maximum delivery of the clay and fine silt in the puddle core fine impervious section of the hydraulic fill.

Owing to the material shortening up of the reaches of the beach portion of the hydraulic fill portion of the dam due to its advancing heightening, it is indicated that in order to secure maximum separation and proper deposition of the clay and fine silt in the hydraulic fill material from the borrow pits it may be necessary to change the method of placing hydraulic fill material from semi-hydraulic to full hydraulic in the near future.

It was observed September 22, 1933, 6:00-7:00 o'clock P.M. that hydraulic fill material had been and was being dumped to widths much in excess of 10 feet measured horizontal and that no hydraulicking whatever was being carried on.

You are hereby directed to refrain from dumping hydraulic fill material to a thickness in excess of 10 feet on the inside slopes of the rock embankment, and

You are requested and directed to carry on hydraulic sluicing practically simultaneously with the dumping of hydraulic fill material.

Very truly yours,

Fred D. Fyle
Acting Hydraulic Engineer.

HNS/f

cc H.W.Rohl & T.E.Connolly, El Capitan Dam
Contractor's Resident Representative
City Manager
City Attorney
City's Resident Engineer

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

September, 30, 1933

Mr. H. N. Savage, Hydraulic Engineer,
San Diego,
Cal.

Dear Sir:

We acknowledge receipt of your letter of Sept. 23, which was signed by D. W. Albert, Harold Wood and Fred D. Pyle but not signed by the Hydraulic Engineer. Letter received is a copy that was handed to Mr. Steves, neither the original nor any copy has been received at our Los Angeles office nor through the mail at our Lakeside address. In that letter the following statement is made:

"Owing to the material shortening up of the reaches of the beach portion of the hydraulic fill portion of the dam due to its advancing heightening, it is indicated that in order to secure maximum separation and proper deposition of the clay and fine silt in the hydraulic fill material from the borrow pits it may be necessary to change the method of placing hydraulic fill material from semi-hydraulic to full hydraulic in the near future."

The contractor desires definitely to know whether the Hydraulic Engineer intends to require a change in the method of placing hydraulic fill material from semi hydraulic to full hydraulic.

If the above mentioned letter which the Hydraulic Engineer did not sign, is to be construed as an order for the contractor to change the method of placing the hydraulic fill material from semi-hydraulic to full hydraulic, kindly advise us at once in order that we may have definite instructions from the Hydraulic Engineer in respect thereto.

Yours very truly,
H. W. Rohl & T. E. Connolly

by T. E. CONNOLLY (Signature)

TEC

October 3, 1933

From : Engineer Hydraulic Fill
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Hydraulic fill methods

Late in the afternoon of Wednesday, September 27, 1933, Mr. H. W. Rohl, contractor for El Capitan Dam, informed me that the contractor was ready to proceed with full hydraulic operations, and asked when the engineer would demand or order him to go ahead with full hydraulic fill operations.

He asked me if there was any objection to using the east end, or such portion of the east end of the ogge section of the spillway for hog box arrangement for the full hydraulic fill, his plan being to install a mud pump of such capacity as would handle four or five thousand yards per day. This calls for a 12-inch mud pump with 12-inch discharge lines out across the fill with proper gates and bypass arrangement.

Mr. Rohl informed me that they were scouting for such hydraulic equipment as was necessary and that all equipment needed could be on the job and installed within thirty days. He asked to be given sufficient notice in which to make this installation.

Mr. Rohl indicated that they would like to make this change when the dam had reached elevation 700.

He also stated that it had always been their intention or idea that the method would have to be changed at elevation 700 and desired that this information be conveyed to the Hydraulic Engineer.

D. W. Albert
Engineer Hydraulic Fill

DWA/p

October 3, 1933

MEMORANDUM

San Diego River Project, El Capitan Feature, Hydraulic Fill

The amount of silt and clay recoverable by using a full hydraulic fill method over that recoverable by the semi-hydraulic method will be some part of the silt and clay now remaining in the unwashed portion of the embankment and beaches at El Capitan Dam.

That this amount is small is shown by the Testing Engineer's reports on beach samples. The last of these reports show less than 2 per cent. As to what part of this 2 per cent can be recovered by a full hydraulic method I do not know. Should it be possible to recover the entire 2 per cent there still remains a deficit of 12 to 15 per cent. That by going to a full hydraulic fill method will not overcome this deficit in silt and clay is evident.

That some difficulty will develop in handling the higher water to earth ratio in full hydraulic fill method than that of the semi-hydraulic fill method is to be expected, and before any material from present borrow pits is sluiced into the fill, a sufficient amount of high clay content material must first be introduced into the puddle area to reduce the depth of water to about 7 to 8 feet. Today the depth of water in the summit pool is 13 feet at the north end and 15 feet at the south end.

It will be necessary to add clay at short intervals during the raising of the hydraulic fill until elevation 750 is reached and to such additional height as is decided necessary.

The nearest known deposit of high percentage clay is about 10 miles or more from the damsite. What the cost of purchase and delivery of this material may be is not known.

There remains about 500,000 cubic yards of hydraulic fill material to be placed. Of this amount about 40 per cent is in the puddle section. Assuming that 25 per cent of clay can be recovered from borrow pits located within limits of the contract plans and specifications, the remaining 15 per cent will have to be brought from outside sources. It is evident that bringing in this clay material will be expensive.

It is my belief that a less expensive and satisfactory fill can be made by the rolled fill method. This belief is based on observing the effect of traffic on the borrow pit material with possible excess water content. These observations can be verified by laboratory tests. Laboratory tests show on puddle core material that percolation decreases as compaction increases and at weight of 140 pounds per cubic foot under 50 foot head with 12 per cent moisture the percolation is slight or negligible.

I am convinced that with material such as is at this time being used in the hydraulic fill, an impervious fill can be made by compacting to about 140 pounds per cubic foot with water content of about 15 per cent.

That a great amount of rolling will be required is evident. The greatest difficulty will be the proper bonding of the rolled embankment with the hydraulic fill.

Should tests show that the excessive amount of water in the puddle section is undesirable and any apprehension as to its suitability for immediate placement of filled fill, there remains sufficient time, according to the contract plans and specifications, to allow the present hydraulic fill a period of at least 6 to 9 months in which to drain and consolidate. At the expiration of this period it is believed that the puddle core area will be consolidated sufficiently to sustain traffic.

I am firm in my belief that an impervious bond can be affected without the use of sheet piling, but should piling be necessary, the saving over importing about 75,000 cubic yards of clay for making hydraulic fill will be appreciable.

I am doubtful of the result of continuing the present semi-hydraulic fill method beyond the existing rock embankment elevation 685, without importing clay.

Today - October 3, 1933 - the depth of water in the summit pool averages 13 feet. The grade from the toe of the rock embankment to center line of dam is of such steepness that with every precaution taken there is a decided tendency toward stratification in the puddle zone. It is inevitable that under present conditions and method that within a short time stratification entirely across the puddle zone will take place.

It is my judgment, therefore, that a decision be made with as little delay as possible as to what method is to be adopted. The contractor is now scouting equipment for full hydraulic fill and I understand that all equipment could be on the ground and installed in 30 days or less. Mr. Rohl is now awaiting word from the City as to the time of changing methods. I can see little if any benefit in changing from semi-hydraulic fill to full hydraulic fill method at this stage of the work. In any event, with either semi or full hydraulic fill method, the importation of clay will be necessary.

With the rolled fill method, should it be found that a satisfactory fill could not be made without importing clay, much less would be required than in the hydraulic fill method.

D. W. Albert
Engineer Hydraulic Fill

DWA/D

October 3, 1933

Messrs. H. W. Rohl and T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California

S-50

Subject: San Diego River Project, El Capitan
Feature. Hydraulic Fill Material
and Placing.

Gentlemen:

Receipt is acknowledged of your letter dated September 30, 1933, advising of the non-receipt by your Los Angeles office of original of letter S-47 from this office to you dated September 23, 1933, subject "El Capitan Feature. Hydraulic Fill Material and Placing" signed by Fred D. Pyle, Acting Hydraulic Engineer. Also of non-receipt of copies of letter S-47 at your Lakeside address.

You also expressed a desire to know whether the Hydraulic Engineer intends to require a change in method of placing hydraulic fill material in El Capitan Dam from semi-hydraulic to full hydraulic; and

Also to be advised if the letter of September 23, 1933 (S-47) is to be construed as an order for the Contractor to change the method of placing hydraulic fill material from semi-hydraulic to full hydraulic.

The letter of September 23, 1933, S-47, subject: "San Diego River Project, El Capitan Feature, Hydraulic Fill Material and Placing" was dictated by me and in compliance with my specific direction was officially signed in my absence by Fred D. Pyle, Acting Hydraulic Engineer in accordance with my letter to you dated January 24, 1933, subject "El Capitan Feature, Authority of City Employees", copy enclosed.

The original of letter S-47 was timely mailed to your Los Angeles office and the two copies for your El Capitan office in two envelopes addressed in the customary manner for mailing to your Lakeside address were on September 23, 1933 handed by Resident Engineer Harold Wood to your Mr. O. C. Steves, whom you named in letter dated January 23, 1933, "as the designated agent of the Contract on occasions when the Contractor is not represented on the works in person".

10/3/33

The letter of September 23, 1933 (S-47) officially invited your attention to the falling behind of the upbuilding of the puddle core area of the hydraulic fill portion of the dam as compared with upbuilding of the beach area and to the requirement for placing hydraulic fill material in such manner as to secure the maximum separation and delivery of the clay and fine silt portion to the puddle core area of the dam and to timely indicate to you that in order to secure such results it may become necessary for you to change your method of placing hydraulic fill material from the semi-hydraulic to full hydraulic method in the near future.

The letter of September 23, 1933 was not an order to change the method of placing material from the semi-hydraulic to full hydraulic.

Mr. Louis C. Hill, C.E., Consulting Engineer for the City of San Diego has been invited after his return from Washington D. C. to come to San Diego immediately and collaborate with the City's Resident Engineers in determining several important pending policies and methods affecting the construction of the El Capitan reservoir dam, spillway and outlet works.

Very truly yours,

H. N. Savage
Hydraulic Engineer

HNS/f
Encl.

cc H.W.Rohl & T.E.Connolly, El Capitan Dam
Contractor's Resident Representative
City Manager
City Attorney
City's Resident Engineer

October 6, 1933

MEMORANDUM

San Diego River Project, El Capitan Feature
Hydraulic fill - difficulties and remedies

As the construction of El Capitan dam proceeds under the contractor's present methods, using present materials, upbuilding of the puddle core area of the hydraulic fill portion of the dam lags behind the upbuilding of the beach areas. This condition has prevailed for some time and is now becoming serious due to the decrease in width of the beaches.

The rock embankment is now constructed to elevation about 687. The surface pool is now at elevation about 680. About 500,000 cubic yards of material will be required to complete the earth portion of the dam.

The beaches are relatively narrow - east beach about 60 feet wide and the west beach about 100 feet wide; the summit pool is comparatively wide - about 140 feet - and the pool varies in depth from 13 to 16 feet making a very unsatisfactory condition and one that should not be permitted to continue. The depth of the summit pool has a tendency to increase the amount of coarse material entering the puddle core area due to the slopes of the material deposited under water. The deficiency in the puddle core is now about 30,000 cubic yards.

While the surface of the summit pool is 140 feet wide, it is indicated that the effective width of the impervious puddle core is much less - probably not much in excess of 35 feet where coarse material has crowded its way down the outer slopes of the pool.

As a considerable quantity of silt and clay is deposited in the entire area covered by the pool it is evident that, due to the width of the pool, a large quantity of silt and clay is not going into the effective portion of the puddle core.

In other words, in considering the effective width of the puddle core as affecting the stability of the dam the width is 35 feet, but in considering the width of the puddle core in determining the quantity of clay and silt required, the width is about 120 feet with a portion of the total value made up of relatively coarse material.

It has proven impossible to narrow the puddle core and have the bottom brought up with the present materials and methods of placing.

In correcting the condition the following factors should be considered:

- (a) Change of method of building the hydraulic fill portion of the dam from the present semi-hydraulic to the full hydraulic method.

- (b) Increase in top width of dam from 27 to 40 feet by eliminating the berms at elevations 700 and 750 and changing the outside slopes.
- (c) Limit the excavation of the borrow pits to those portions containing the largest percentage of clays and silts.
- (d) Narrow the puddle core to the least width practicable consistent with the permeability and percolation tests.
- (e) Addition of clay and silt obtained by washing the material from borrow pit areas A, B, C, and waste the excess of coarse material; or
Importation of relatively pure clay and silt from remote sources.
- (f) Change from hydraulic fill to rolled fill.

DISCUSSION

A change from semi-hydraulic fill to full hydraulic fill may decrease the amount of clay and silt in the beach area and correspondingly increase the volume of clay and silt deposited in the puddle core.

An increase in the width of the top of the dam from 27 to 40 feet will increase the width of the beaches, the amount of hydraulic fill material required and thus increase the volume of clay and silt available for the puddle core.

Tests indicate that portions of the borrow pits contain more clay and silt than other portions and that the percentage of clay and silt available for the puddle core may be increased somewhat by limiting the location of the borrow pit excavation and paying particular attention to the depth of excavation to prevent disintegrated granite or coarse sand from being placed in the hydraulic fill.

It is probable that a relatively narrow but uniform puddle core built with relatively shallow summit pool will resist percolation more satisfactorily than a puddle core formed under a relatively wide and a deep summit pool where there is a marked tendency for the coarse materials to move down the slopes into the middle portion of the puddle core.

It is becoming evident that even with the above suggested changes made, there will be a deficiency of clay and silt to maintain the upbuilding of the puddle core in its proper relationship to the upbuilding of the beaches, in which event it will be necessary to wash all or a portion of the hydraulic fill material obtained from borrow pits A, B, C, and waste the excess of coarse materials, thus increasing the proportion of puddle core material entering the hydraulic fill portion of the dam; or to import

relatively pure clay and silt from remote sources. The first method may involve the handling and washing of 250,000 cubic yards of material and wasting of 175,000 cubic yards in order to obtain 75,000 cubic yards of material suitable for introduction into the puddle core. The second method may involve a 12 or 15-mile haul of 75,000 cubic yards of material rich in clay and silt and suitable for introduction into the puddle core. Either of these methods involves costs that were not contemplated at the time the contract for the construction of the dam was entered into and the responsibility of the City and/or the contractor for such additional costs will have to be determined. In any event the amount of extra silt and clay to be secured from borrow pit material or imported should be held at a minimum until the maximum reasonable amount of clay and silt is obtained under factors (a), (b), (c) and (d). Whether additional clay should be obtained from borrow pit material or by importation from remote sources will depend upon the quantity required, the availability of material from each source and the comparative costs of obtaining the additional clay and silt.

If the present deficiency of materials in the puddle core is overcome by the introduction of 30,000 cubic yards of proper puddle core material so that the pool is made both narrower and shallower, it may be possible to maintain it in that condition for some time with the present materials.

Consideration should be given to the relative costs and stability of the dam if a change be made from semi-hydraulic fill method to rolled fill before the summit pool is raised above elevation about 680. Before conclusions may be reached as to the advisability of changing to rolled fill method for completion of the remainder of the dam, it will be necessary to determine:

- (1) The suitability of the present available borrow pit material for the construction of rolled fill;
- (2) The cross section of the rolled fill portion of the dam;
- (3) The amount, if any, and the availability of decomposed granite from spillway excavation that may be placed in the outer portions of the fill;
- (4) The methods to be employed in changing from the puddle core area to the rolled fill area which may involve the use of considerable sheet steel piling;
- (5) The possibility of dangerous cracks appearing in the rolled fill as the puddle core and the beaches consolidate at different rates;
- (6) The time required to make the change and to complete the dam;
- (7) Extent of reimbursements the contractor may be entitled to because of additional costs.

Fred D. Pyle
Engineer

FDP/v

October 9, 1933

From : Resident Engineer
 To : Hydraulic Engineer
 Subject : San Diego River Project, El Capitan Feature
 Hydraulic fill, puddle core material

At conference held at El Capitan dam on October 6, 1933, at which the Hydraulic Engineer, Engineer Fred D. Pyle, Louis C. Hill, D. W. Albert and Resident Engineer were present, some discussion relative to core material was had. The Hydraulic Engineer requested a statement from the Resident Engineer of what in his opinion should be the maximum and minimum and desirable percentages of clay, silt and sand present in the puddle core at El Capitan Dam.

A graph prepared by Mr. Louis C. Hill of the combined percentages of silt and clay of 4 samples of puddle core material tested for percolation when plotted, with combined percentage clay and silt as abscissa, and value of C in expression $V=Ch$, where $h = 1$, as ordinate, show that satisfactory puddle core permeability is obtained with clay and silt combined in percentage ranging from 40 to 70.

Sample 381 of core material as reported by Mr. J. Y. Jewett was considered satisfactory core material by Louis C. Hill. This sample contained: Clay 19%, Silt 28%, Sand 53%.

With materials derived from granite such as at El Capitan, it is my opinion that the following sets out the proper limits recoverable by practical field conditions:

<u>Minimum</u>		<u>Maximum</u>	<u>Desirable</u>		
Clay 18%)	40%	80%)	90%	30%)	60%
Silt 22%)		10%)		30%)	
Sand 60%		10%		40%	

Mr. E. W. Lane of the U. S. Reclamation Service has published his opinion on this matter in Engineering News-Record December 18, 1930, page 965.

Mr. Joel D. Justin, Hydro-Electric Engineer, The United Gas Improvement Company, in his book "Earth Dam Projects" also expresses his opinion on page 92, figure 59.

I believe it rather misleading to treat all kinds of core materials such as that derived from granite, shales or limestones with the same consideration of size of particles only. There is much difference in the way materials perform when being placed by the usual practical field methods.

HW/m

Harold Wood
Resident Engineer

October 11, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-53

Subject: San Diego River Project, El Capitan
Feature, Hydraulic fill material.

Gentlemen:

As the construction of the El Capitan dam proceeds, the upbuilding of the impervious puddle core section of the hydraulic fill has been lagging behind the upbuilding of the beach areas. This condition is due to insufficient hydraulic saturating and insufficient hydraulic separating and washing by the Contractor in placing the borrow pit materials in the hydraulic fill portion of the dam. This has resulted in much of the clay and silt, which should be in the puddle core, remaining in the beaches.

The existing unsatisfactory condition of the puddle core and beaches as above explained can not safely be allowed to continue.

You are directed to so saturate, sort and place the remainder of the hydraulic fill material going into the dam that the clay and silt hereafter remaining in the beaches will be materially reduced.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/P
cc H. W. Rohl & T. E. Connolly
El Capitan Dam
Contractor's Resident Representative
City Manager
City Attorney
City's Resident Engineer

October 13, 1933

From : Hydraulic Fill Engineer
To : Resident Engineer
Subject : San Diego River Project, El Capitan Feature,
Hydraulic fill

Your attention is called to the condition of the hydraulic fill at present time. The surface elevation of the summit pool is 683. The depth of water and liquid mud in the summit pool is about 15 feet. The slopes from margin of puddle zone to surface of puddle material is around 1 to 1. At the north and south ends of the puddle zone, a greater depth of water is found, about 20 feet at present. This greater depth is caused partially by the contour of the north and south abutments. It has been observed that when the depth of water in the summit pool reaches 18 to 20 feet that slides in the sidewalls of the summit pool occur. On October 5, 1933 a small slide from the west side near the north end of the pool occurred. This slide extended from the north abutment south along the beach line a distance of about 20 feet. These slides crowd out to within a few feet of the center line of the fill, and are entirely surrounded by the liquid mud in the summit pool and lay in the puddle material as lenses. All these small slides observed have taken place when the depth of water in the summit pool is from 18 to 20 feet. These slides indicate that when depth of water in the summit pool gets around 18 feet that the side walls of the summit pool are in danger of collapsing.

The puddle zone at present elevation (687) occupies about 35% of the hydraulic fill area. In order that this puddle area be impervious at least 40% must be silt and clay.

That a mixture consisting of 40% silt and clay with 60% of coarser material can be obtained in field operations is improbable. It is impracticable to follow the exact line demarking the puddle zone limits. A zone of varying width depending on the character of material used in making fill exists along margins of puddle zone in which the transition from coarse to fine material takes place. That this zone contains a considerable amount of silt and clay is shown by laboratory tests. The extent of this transition zone depends largely on the amount of water used in hydraulic operations and character of material. Sands and silt which differ little in specific gravity being difficult to separate. Should the contractor at this time change to full hydraulic fill method, depositing material from borrow pits A, B or C at rate of 4 or 5 thousand cubic yards per day, which requires 10 or 12 second feet of water, it will be difficult to control this volume of water and material on the beaches. The width of summit pool will have to be increased in order to cut down the velocity of the material entering the puddle zone in order to prevent stratification in the puddle. This may result in considerable clay and silt being retained in the transition section laying either side of the puddle zone. It is therefore recommended that a maximum limit of 4000 cubic yards per day of 24 hours be placed on material deposited in the hydraulic fill area.

I am thoroughly convinced that the material in present borrow pits do not contain sufficient silt and clay to maintain a puddle zone as wide as called for in Plans and Specifications, and that the narrowing of the puddle zone at this time is a hazardous undertaking with material of such clay and silt content as is known to exist in borrow pits A, B, and C.

D. W. Albert
Hydraulic Fill Engineer

DWA/m

October 16, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractor El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-55

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill.

Gentlemen:

You are hereby directed to discontinue the dumping of dry material for hydraulic fill on the inside slopes or on the top of the rock embankments of El Capitan Dam for sluicing into the hydraulic fill, and instead thereof, to hereafter place the material by the full hydraulic process by fully saturating and running the material through properly constructed transporting equipment--pipes or flumes--on to the outer reaches of the hydraulic fill.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

October 18, 1933

From : Resident Engineer
 To : Hydraulic Engineer
 Subject : San Diego River Project, El Capitan Feature
 Hydraulic fill, survey

On October 18, 1933 a survey of the hydraulic fill portion of El Capitan dam was made and a drawing made from this survey is herewith transmitted. The survey discloses the following facts:

Summit Pool

Maximum width at ordinate N 3200	155 feet
Minimum " " " " N 3850	90 "
Elevation of water surface	681
" " top of slope at edge of beach	682±

Puddle Core

Elevation of top at ordinate N 3900	670.2
Depth	10.8 feet
Elevation of top at ordinate N 3630	669.5
Depth	11.5
Elevation of top at ordinate N 3230	665
Depth	16.0 feet
Theoretical width of limits at elevation 681	63.4 "

Downstream beach

Average width	70± "
Minimum width at ordinate N 3205	25 "
Maximum width at ordinate N 3770	80± "

Upstream beach

Average width between ordinates N3425 and N4025	24± "
Minimum width at ordinate N 3600	15 "
Maximum width at ordinate N 3810	29 "

Hydraulic fill portion of dam

Theoretical width between rock embankments at elevation 687.5 per letter of Resident Engineer October 8, 1933	234 "
Downstream width from axis	128
Upstream width from axis	106
The limit flags are set apart	83.4 "

Harold Wood
 Resident Engineer

HW/f

October 20, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-57

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill Materials.

Gentlemen:

In compliance with the requirements of paragraphs 53, 62 and 63 of the contract drawings and specifications for the construction of the City of San Diego's El Capitan reservoir dam, you are hereby directed and required to immediately secure, furnish and place suitable fines of clay and silt material in the hydraulic fill portion of the dam to accomplish the immediate up-building of the puddle core which has been lagging behind the up-building of the beaches.

Very truly yours,

H. N. Savage
Hydraulic Engineer

HNS/f

cc H.W. Rohl & T.E. Connolly, El Capitan Dam.
Contractors Resident Representative.
City Manager
City Attorney
City Resident Engineer
Special Water Counsel
State Engineer
Senior Engineer, Dam Inspection.

October 23, 1933

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Hydraulic fill - contractor's purported plan

1. Hydraulic Fill Engineer D. W. Albert learned from the contractor's resident representative O. C. Steves, on El Capitan dam, on October 20, 1933, that the contractors plan to use the upper portion of the spillway channel for a hog box.

2. On October 21, 1933 the Resident Engineer informed O. C. Steves that the Hydraulic Engineer would insist on the portion of the spillway channel to be used as a hog box be concrete lined on the floor and sides.

3. It is recommended that the contractor be given this information in a letter from the Hydraulic Engineer.

Harold Wood
Resident Engineer

HW/e

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

Lakeside, Cal, October, 25, 1933

Mr. H. N. Savage,
Hydraulic Engineer,
San Diego,
Cal.

Dear Sir:

We understand your letter of Oct., 16th. (S-55) to mean that the Contractor is directed to scrap one set of hydraulic equipment and purchase a new and different kind of equipment.

You approved the present method of constructing the hydraulic fill portion of the El Capitan Dam and our plan of operation before we purchased and installed the equipment now being used and to the extent that our costs are increased by your present withdrawal of approval we will claim damages and increased compensation from the City of San Diego.

Yours very truly,
H.W.Rohl & T.E.Connolly.

by T. E. CONNOLLY (Signature)

TEC

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

Lakeside, Cal.
October, 25, 1933.

Mr. H. N. Savage, Hydraulic Engineer,
San Diego,
Cal.

Dear Sir:

We wish to acknowledge your letter of Oct. 11 (S-53) and your letter of Oct. 27 (S-57) and respectfully direct your attention to the fact that the puddle core has been lagging behind the upbuilding of the beach areas as a direct result of your setting of puddle core stakes beyond the specified limits of the puddle core as fixed by our contract and not through any fault on the part of the contractor.

It is difficult for us to understand why you have at all times set stakes for the puddle core beyond the puddle core limits fixed by our Contract (Drawing W.D.383) if you did not want the upbuilding of the puddle core to lag behind the upbuilding of the beaches.

While under paragraph 63 of the Specifications, the City has the right to specify the width and depth of the settling pool, it must be kept in mind that by designating the width of the settling pool the City has determined and assumed full responsibility for the width of the puddle core and the width of the beach areas. By narrowing the puddle core so that it does not extend beyond the limits specified in our contract, the level of the puddle core could be raised so that it would not lag behind the upbuilding of the beaches. If the City had set the puddle core stakes and permitted us to confine the puddle core to the width specified in our Contract, the fines which we have already placed in the dam would be sufficient to raise the puddle core to an elevation far above the present elevation of the beach areas.

Inasmuch as the setting of the puddle core stakes by the City automatically controls the respective elevations of puddle core and beaches, your letters S-53 and S-57 must have been written under the erroneous impression that the contractor is obligated to furnish fines sufficient to build the puddle core any width desired by the City without regard to the terms of our contract wherein the puddle core limits are definitely fixed (See Drawing W.D.383).

HNS-2

Our contract does not obligate us to furnish or place materials containing any specified or guaranteed percentage of fines. Even if our Contract required us to guarantee a specified percentage of fines the elevation of the puddle core would still lag behind the elevation of the beach areas so long as the City arbitrarily sets the puddle core stakes beyond the limits specified in our contract.

All borrow pits used to date were designated and approved by the specifications and drawings upon which we bid and which form a part of our contract.

The City has continuously wasted and is now wasting a very large portion of the fines which we relied upon in making our bid by arbitrarily setting the puddle core stakes beyond the specified limits of the puddle core.

To the extent that our cost of performing the work and completing the hydraulic fill portion of the dam is in any manner increased by your extension of the puddle core beyond the limits specified in drawing W.D.383 we will demand increased compensation in accordance with the terms of our contract.

The City has directed the movement of our shovels in borrow pits from day to day and at times from hour to hour and required us to put the best material in the bottom of the dam. While this action on the part of the City resulted in the puddle core being widened and extended far beyond the limits specified in our contract, it also resulted in a very substantial waste of fines.

We protested the wasting of fines by the City and now feel that any shortage of fines is a matter relative to which the City must assume the full responsibility.

Yours very truly,
H.W.Rohl & T.E.Connolly.

T. E. CONNOLLY (Signature)

TEC

October 25, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractor El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-59

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill Materials.

Gentlemen:

Supplementing my letter dated October 20, 1933, S-57, subject: "San Diego River Project, El Capitan Feature, Hydraulic Fill Materials", the City of San Diego's Hydraulic Engineer; the City's El Capitan Dam engineering staff and the City's Testing Engineer J. Y. Jewett will all take pleasure in constructively cooperating in locating and testing in advance suitable fines of clay and silt material to be furnished and placed by the Contractor in the hydraulic fill portion of the El Capitan Dam to accomplish the immediate upbuilding of the puddle core which has been lagging behind the upbuilding of the beaches and to insure the continued upbuilding of the puddle core section in proper relation with the beaches.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

November 20, 1933

Messrs. H. W. Nohl & T. E. Connelly
Contractors El Capitan Dam
4381 Alhambra Avenue
Los Angeles, California.

S-63

Subject: San Diego River Project, El Capitan Feature,
Hydraulic Fill Materials.

Gentlemen:

Before resuming the placing of material from borrow pit areas "A" and "B" or from areas producing material containing similar amounts of fines, in the hydraulic fill portion of El Capitan Dam, you are hereby directed and required to comply with my letter S-57, dated October 20, 1933, as follows:

"In compliance with the requirements of paragraphs 53, 58 and 63 of the contract drawings and specifications for the construction of the City of San Diego's El Capitan reservoir dam, you are hereby directed and required to immediately secure, furnish and place suitable fines of clay and silt material in the hydraulic fill portion of the dam to accomplish the immediate up-building of the puddle core which has been lagging behind the up-building of the beaches."

So there will be no delay to you this office should be advised as soon as possible of the location of the borrow pits from which you expect to secure the fine material necessary to first accomplish the up-building of the impervious puddle core. Proper tests will then be made by the City of material from these borrow pits and if satisfactory, approval will be given in accordance with the provisions of paragraph 53 of the contract specifications.

Very truly yours,

H. H. Savage
Hydraulic Engineer

HMS/f

cc H.W.Nohl & T.E.Connelly, El Capitan Dam
Contractor's Resident Representative

December 4, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-70

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill Materials.

Gentlemen:

Your attention is hereby invited to the Hydraulic Engineer's letter dated November 20, 1933, S-63, subject: "San Diego River Project, El Capitan Feature, Hydraulic Fill Materials".

It is observed that you have resumed excavating and bringing in hydraulic fill material exclusively from borrow pit areas "A" and/or "B", and placing it into the hydraulic fill section of the dam in obvious opposition to the instructions and requirements given you in my above referred to letter S-63.

You are hereby specifically notified that exclusive use of hydraulic fill material from the sources from which you are now obtaining it is specifically and definitely disapproved of.

You are hereby notified to immediately discontinue your present practice and comply with the requirements of my above referred to letter S-63.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/f

HW/J

HAROLD WOOD
Resident Engineer

2. Work of placing hydraulic fill material stopped at 9:30 A.M. December 5, 1933.

November 27, 1933	28	192	"	"	540 cubic yards
"	29	1,676	"	"	
"	30	0	"	"	
December 1	1	4,659	"	"	
"	2	4,512	"	"	
"	3	0	"	"	
"	4	4,389	"	"	
"	5	491	"	"	
		<hr/>			
		16,459	"	"	

1. The following tabulation shows the material for hydraulic fill removed from borrow pit "A" and deposited in the hog box at El Capitan Dam:

From : Resident Engineer
 To : Hydraulic Engineer
 Subject: San Diego River Project, El Capitan Feature,
 Hydraulic fill material to Hog Box.

December 6, 1933

December 8, 1933

From : Hydraulic Engineer
To : Resident Engineer
Subject : San Diego River Project, El Capitan Feature,
Hydraulic Fill, samples of material.

1. At a conference held at the City's El Capitan Dam December 7, 1933, Deputy State Engineer George W. Hawley and the State's Consulting Engineer Fred C. Herrmann were pronounced in their declarations of the necessity of and immediate requirement for securing and analyzing a comprehensive number of samples of the hydraulic fill material recently obtained by the Contractor exclusively from borrow pits "A" and/or "B" and placed by him in the impervious section of the hydraulic fill area, and with special reference to the about left and/or southerly half of the hydraulic fill area.

2. I have gained the impression that before the sampling is completed it may be necessary to secure samples on 10-foot squares and to the depth of the recently placed material and from such immediate and adjacent areas and depths as may be necessary to disclose the extent, boundary and depth of the lenses and/or stratification of pervious material.

3. You are hereby requested and directed to secure at the earliest at all practicable date comprehensive samples of the material deposited by the Contractor in the impervious puddle core area since October 25, 1933.

4. Samples at first may be taken on lines across impervious puddle core area at about 100-foot intervals in a north and south direction, and at 10-foot intervals along the above lines.

5. Additional samples should be secured of the material adjacent to the lenses of pervious material in the puddle core area both horizontally and vertically.

6. All samples should be specifically located (a) with reference to coordinate system and (b) in elevation referred to sea level.

7. The samples should be properly identified by number and delivered at the earliest practicable date to the Testing Laboratory. The Testing Laboratory will operate two shifts daily to expedite the analysis and determination of the characteristics of the samples.

Resident Engineer

--2

12/8/33

8. The necessary new core recovering sampling tool should be obtained immediately and used to speed up the work of sampling.

9. Samples for percolation and permeability tests should be secured of the puddle core material deposited since October 25, 1933 at N 3230 E 5000, and from elsewhere as you may find advisable.

10. It is deemed advisable that H. L. Harper cooperate with and/or supplement D. W. Albert in securing the samples and accurately recording their location in three dimensions.

H. N. Savage
Hydraulic Engineer

HNS/f

December 14, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-74

Subject: San Diego River Project, El Capitan
Reservoir Dam, Impervious Puddle
Core Section.

Gentlemen:

Receipt is acknowledged of your letter dated December 12, 1933 in which you advise that inspection of the material recently placed by you in the puddle core section of the City of San Diego's El Capitan Dam discloses that a strata of sand has been created, and that you feel the condition should be remedied, and that you will at once proceed to do so.

I shall be pleased to receive an outline of the policy and methods you propose to adopt for remedying the existing sand strata and other defects in the impervious core section of the dam incident to your use from November 27 to December 5, 1933 of hydraulic fill material exclusively from borrow pit "A".

Pending my formal approval of a comprehensive policy and methods for remedying the conditions, you are hereby directed to refrain from physically changing or removing any material, other than core borings and samples from the hydraulic fill portion of the dam.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS
4351 Alhambra Ave., Los Angeles

December 12, 1933.

Mr. H. N. Savage,
Hydraulic Engineer,
City of San Diego,

Subject: San Diego River Project,
El Capitan Reservoir Dam,
Spillway and Outlet Works.

Dear Sir:

Inspection of the puddle core placed by the full hydraulic method - under your orders - discloses the fact that a strata of sand has been created by this method.

While this strata of sand has been caused by your order requiring us to shut down and change to full hydraulic method, nevertheless, we feel that this condition should be remedied and we will at once proceed to do so.

Very truly yours,

H.W. ROHL & T.E. CONNOLLY

By T. E. CONNOLLY (Signature)

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

December 15, 1933

Mr. H. N. Savage, Hydraulic Engineer
San Diego,
Cal.

Dear Sir:

The method proposed to remove sand strata from the puddle core is by excavating with a clam shell and depositing on the beaches. There the material excavated will be washed by a giant, returning the fines to the puddle core and leaving the sand on the beaches.

Whereas this condition in full hydraulic fill dams is usually corrected with a drag line, we believe more positive control is offered, in the central portion of the pool, by a clam shell.

Kindly advise us in this matter at once.

Yours truly,
H. W. Rohl & T. E. Connolly

by T. E. CONNOLLY (Signature)

December 15, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-76

Subject: San Diego River Project, El Capitan
Reservoir Dam, Impervious Puddle
Core Section. Status, Remedy.

Gentlemen:

Upon receipt from you of an outline of your contemplated policy and methods for remedying the defective conditions existing in the hydraulic fill material recently placed by you in the puddle core section of the City of San Diego's El Capitan Dam, I will invite State Engineer Edward Hyatt and the City's Consulting Engineer Louis C. Hill to join with the City's engineers in a conference with you at the El Capitan Dam at their earliest practicable date.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

December 15, 1933

Mr. H. N. Savage, Hydraulic Engineer,
San Diego,
Cal.

Dear Sir:

Your letter S-74 contains the following-"
"remedying the existing sand strata and other
defects in the impervious core section".

What are the "other defects"?

Yours very truly,
H. W. Rohl & T. E. Connolly

T. E. CONNOLLY (Signature)

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

December 16, 1933

Mr. H. N. Savage, Hydraulic Engineer,
San Diego,
Calif.

Dear Sir:

"Testing in advance suitable fines of clay and silt material"; is an offer you make upon behalf of your testing department.

Obviously you must have a set standard in mind. Would you please favor us with an analysis of that standard at your earliest convenience- per centage by weight passing screens of given size similar to the analysis you now make of the beaches and puddle core is what is requested.

Yours very truly,

H.W.Rohl & T.E.Connolly

T. E. CONNOLLY (Signature)

December 21, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhembra Avenue
Los Angeles, California.

S-78

Subject: San Diego River Project, El Capitan
Feature, impervious core section.

Gentlemen:

Receipt is acknowledged of your letter dated December
15, 1933, reading:

"Your letter S-74 contains the following-
'remedying the existing sand strata and other
defects in the impervious core section'. What
are the 'other defects'?"

Investigations and gradation tests of material placed by
you between November 27 and December 5, 1933 in the impervious
puddle core section of the City's El Capitan dam indicated
that in addition to lenses and strata of sand it was justified
to believe that portions of the puddle core area would be found
to be deficient in suitable fines of clay and silt.

Very truly yours,

H. N. Savage
Hydraulic Engineer

HNS/f

December 21, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-77

Subject: San Diego River Project, El Capitan Dam
impervious core section. Contractor's
method of remedying puddle core section.

Gentlemen:

Receipt is acknowledged of your letter dated December
15, 1933, in which you advise:

"The method proposed to remove sand strata from
the puddle core is by excavating with a clam shell
and depositing on the beaches. There the material
excavated will be washed by a giant, returning the
fines to the puddle core and leaving the sand on
the beaches."

The City of San Diego's engineers have already completed
obtaining cores from the left or southerly three-quarters of
the length of the puddle core section from the material
placed by you in El Capitan Dam between November 27 and
December 5, 1933.

No objection is seen to your announced policy and method
of endeavoring to remove sand lenses and strata from the puddle
core by excavating with a clam shell machine.

Your proposed disposition of the excavated material is
not approved of at this time.

Permission for you to try your policy and method for re-
moval of sand lenses and strata with clam shell machine is con-
ditional upon your assuming full responsibility for the removal
of the sand, including the effect of your operations on the im-
pervious core section and other portions of the dam which may be
influenced directly or indirectly thereby.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

December 21, 1933

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-79

Subject: San Diego River Project, El Capitan
Feature, impervious core section.

Gentlemen:

Receipt is acknowledged of your letter dated December 16, 1933 asking for the standard of suitable fines of clay and silt material required for the impervious puddle core section of the City's El Capitan Dam.

The consolidation and percolation tests made by the City of San Diego of the materials in the puddle core section of the hydraulic fill portion of the El Capitan Dam have shown that when the puddle core contains 50 to 75 per cent by weight dry of clay and silt as proportioned passing a 200 mesh screen, and provided that the coarser materials are not stratified, an impervious core is formed; and that

When the puddle core section contains less than 50 per cent of clay and silt, it is not deemed sufficiently impervious.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

January 6, 1934

From : Engineer Fred D. Pyle
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Inspection

On January 5, 1934, I held a conference with Contractor T. E. Connolly in his office at El Capitan dam and discussed with him the matter of modification of the top portion of El Capitan dam as shown on drawing WD-485 and of issuing a change order for the work.

Mr. Connolly stated that while he considered it impossible to have constructed the top portion of the dam as shown on contract specification drawing WD-383 on account of the dimensions of the impervious puddle core, it might be possible but very difficult to construct the top portion of the puddle core as indicated on drawing WD-485.

He was also of the opinion that the top of the puddle core shown on drawing WD-383 was at elevation 763 and that drawing WD-485 indicates the top at elevation 767, or 4 feet higher, and that while the puddle core had been narrowed considerably, trouble was anticipated in its construction with full hydraulic method.

He indicated that the increase in the lift of the additional 25,000 cubic yards of hydraulic fill material over the average lift of similar material would somewhat increase the contractor's costs and that there would be practically no increase in the cost of delivery of the additional 13,000 cubic yards of rock.

He acknowledged that the additional length of beach on the upstream side of the puddle core would be of some advantage to the contractor, also the additional fines that would be available from the additional 25,000 cubic yards of hydraulic fill material to be placed.

He finally agreed that the net result of the changes would not materially increase or decrease the contractor's unit cost and was agreeable to performing the work at contract schedule prices, also that he would take the matter up with Mr. H. W. Rohl by telephone and advise me as soon as practicable.

Mr. Connolly said it would take some three or four weeks to secure the steel for the installation of the concrete reinforced temporary waterway thru the south abutment of the El Capitan dam for carrying the water supply for the La Mesa, Lemon Grove & Spring Valley Irrigation District, and that he would like to have the work order covering this as soon as practicable.

I was at the dam at about 1:30 P.M. with Resident Engineer Harold Wood, Hydraulic Fill Engineer D.W. Albert, Contractor T.E. Connolly and contractor's foreman hydraulic fill Adolph Beck.

Apparently no difficulty was being had in reaching the sand with the clamshell buckets where the machines were working one on each side of the puddle core at station about 36+50, but the material when brought out and dumped on the back side of the beach appeared to be mostly clay which in 35 per cent of the material was in large gobs of firm material with sand mixed up with the remaining material which was very sloppy with tendency to run back towards the pool with slope not much greater than the ordinary beach.

The work had started in the middle of the forenoon and not sufficient work had been accomplished to determine if the areas being worked on were satisfactory.

Mr. Connolly was quite doubtful as to the possibility of securing satisfactory results with the use of the clamshells. There was a strip thru the middle of the puddle core about 10 to 15 feet wide that they were unable to reach with the clamshells. No attempt was being made to re-wash the material being placed on the beaches. It is indicated that if the material which is dense enough to hang together is permitted to dry, some difficulty may be had in washing it.

Mr. Connolly stated that Mr. Alan Rowe would be on the job January 6.

Progress was being made on the excavation and concreting of the concrete core wall in the north abutment of the dam; the excavation of the lower end of the spillway channel near station 7+00 and the excavation for the east end of the ogee section of the spillway and floor and side lining in that vicinity.

Fred D. Pyle
Engineer

FDP/p

January 10, 1934

From : Engineer Fred D. Pyle
Resident Engineer Harold Wood
Hydraulic Fill Engineer D. W. Albert

To : Hydraulic Engineer

Subject : San Diego River Project, El Capitan Feature
Hydraulic fill - contrary to orders

The following is a report of dutiful reaction of Engineer Fred D. Pyle, Hydraulic Fill Engineer D. W. Albert and Resident Engineer Harold Wood to the contractor's placement of hydraulic fill material in El Capitan contrary to orders.

On October 20, 1933 the contractor was delivered letter S-57 of the Hydraulic Engineer requiring him "to immediately secure, furnish and place suitable fines . . . to accomplish the immediate up-building of the puddle core which has been lagging behind the up-building of the beaches."

On November 20, 1933 the contractor was delivered letter S-63 of the Hydraulic Engineer in part as follows: "Before re-suming the placing of material from borrow pit areas A and B or from areas producing material containing similar amounts of fines, . . . you are hereby directed and required to comply with my letter S-57 . . ."

On November 27, 1933 the newly installed hydraulic equipment was tried out for the first time. This was done under the direction of the contractor's hydraulic fill engineer J. C. Greely. The hauling of silt from borrow pit A was begun to fill the hog box bottom. Mr. Greely told Resident Engineer Wood that he had not read the specifications and had not seen letters of the Hydraulic Engineer directing the work. On November 28, 1933 Resident Engineer Wood reported to the Hydraulic Engineer by telephone the details of the trial of the contractor's hydraulic equipment made November 27, 1933.

The hydraulic equipment was operated 7 A.M. to 8 A.M. when work on the dam was stopped by rain on November 28, 1933.

On November 29, 1933 hydraulic fill placement operations by full hydraulic method was begun.

November 30, 1933 was a holiday and there was no work.

On December 1, 1933 hydraulic fill operations were under way but no measurable puddle core was placed. Arrangements were made today for three shifts of work on hydraulic fill placement.

On December 2, 1933 the contractor was hauling from borrow pit A to the hog box. Resident Engineer Wood went to San Diego office and conferred with the Hydraulic Engineer about the contractor's non-compliance with the Hydraulic Engineer's letter S-57.

On December 3, 1933 - Sunday - there was no work.

On December 4, 1933 Resident Engineer Wood reported details of hydraulic fill operations to the Hydraulic Engineer. The Hydraulic Engineer visited and inspected the hydraulic fill operations. Mr. O. C. Steves, Resident Representative for the contractor, asked the Hydraulic Engineer if the hydraulic operations were satisfactory. The Hydraulic Engineer asked Mr. Steves if he had copies of his letters. Mr. Steves said "yes". The Hydraulic Engineer stated "The hydraulic operations are not in accordance with my directions." This conversation was about 2 P.M. The Hydraulic Engineer phoned Resident Engineer Wood at 5 P.M. to come to his residence to get letter for the contractor. Resident Engineer Wood delivered to the contractor's hydraulic fill engineer J. C. Greely in the presence of Mr. D. W. Albert at 7 :55 P.M. letter of the Hydraulic Engineer S-70 "to immediately discontinue Your present practice and comply with the requirements of my above referred to letter S-63." This letter was delivered to J. C. Greely because there was no one in the contractor's office.

The contractor continued hydraulic fill operations until 9:30 A.M. December 5, 1933. This was 13.5 hours after stop order S-63 was delivered.

Up to 2 P.M. December 4, 1933 when the Hydraulic Engineer visited the work, no damage had been actually done the puddle core although the beaches had encroached so the toes of slopes therefrom were inside the puddle core limit lines. At about 10 A.M. Mr. D. W. Albert conferred with the contractor's foreman Adolph Bock and later with the contractor's resident representative O. C. Steves relative to sufficient number of men to operate header boards and properly take care of hydraulic fill material being discharged on the beaches. Again at about 2:30 P.M. Mr. Albert again called Mr. Bock's attention to sand being forced into the puddle core area. Operations continued with increased amounts of sand finding its way into the puddle core and insufficient labor on the beaches.

On December 4, 1933 there was no way to communicate from the beaches to the operator at the mud pump. Delays due to mechanical failures and delays due to delivery of proper material to the hog box caused several and frequent delays in delivery of hydraulic fill material to the beaches which delays necessitated the running thru of large quantities of water from the hog box resulting in sluicing of material already placed on the beaches into the puddle core.

HW/p

Fred D. Pyle
Engineer

D. W. Albert
Hydraulic Fill
Engineer

Harold Wood
Resident Engineer

January 10, 1934

From : Engineer Fred D. Pyle
Hydraulic Fill Engineer D. W. Albert
Resident Engineer Harold Wood

To : Hydraulic Engineer

Subject : San Diego River Project, El Capitan Feature
Hydraulic fill, contractor's corrections to puddle
core

On January 5, 1934 T. E. Connolly was on the job at El Capitan dam and two draglines were moved, one on each beach. These draglines began operating about $3/4$ cubic yard clamshell buckets at about 10 A.M. Work of removal of sand from the puddle core was carried on from N 3675 to N 3775 but mostly N 3700 to N 3775.

The clamshells could not remove material for a width of about 15 feet along the axis of the dam. The material removed was deposited on the beaches. It appeared to be mostly clay which in about 35 per cent of the material was in large gobs of semiplastic material with sand mixed with it, all of which was very sloppy with tendency to run back towards the puddle core with slope not much greater than the usual beach, this especially on the narrow upstream beach.

This clamshell operation continued with two machines until 2:20 P.M. January 5, 1934 when the upstream machine discontinued.

On the shift 3 P.M. to 11 P.M. January 5, 1934 the downstream machine continued to operate. On the shift 11 P.M. January 5 to 7 P.M. January 6 this downstream machine continued to operate until about 6 A.M. when the extension boom failed. Clamshell operations were then abandoned. At 3 P.M. January 6 water was added to summit pool. About 7 P.M. a monitor began washing this clamshell excavated material back into the puddle core.

On the forenoon of January 6 about 15 small charges of dynamite were exploded in the bottom of the summit pool - supposed to be on top of the puddle core. This accomplished nothing as determined by soundings.

There was no work Sunday January 7.

On January 8, 1934 the slack line rig was being installed between a dragline machine on each beach. This slack line was rigged to operate from the downstream machine. Shift 11 P.M. January to 7 A.M. January 9 start was made about N 3200 to remove sand and deposit same on the downstream beach. This work has continued until 7 A.M. January 10 and was advanced to N 3400 or about 200 feet in length of puddle core.

The clamshell operations failed to remove about 15 feet of width of puddle core material along about the axis of the dam.

-2-

The charges of dynamite were entirely effectual. The slack line bucket excavation begins about 20 feet upstream of the axis of the dam and to the downstream summit pool shore line with a gradual increasing bottom depth to a deeper portion near the downstream puddle core limit. The appearance of the material is a sloppy mixture of clay with some sand and having appearance as described in paragraph above.

Samples and sounds taken at about N 3700 where clamshell work was done still indicates presence of sand stratum.

Samples and soundigg will be taken today over area N 3200 to N 3400 or as close to slack line as safe.

HW/p

Fred D. Pyle
Engineer

Harold Wood
Resident Engineer

D. W. Albert
Hydraulic Fill Engineer

January 17, 1934

From : Engineer Fred D. Pyle
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Inspection trip.

Inspection trip to El Capitan Dam was made January 17, 1934, arriving about 10:30 A.M.

After discussing matters with Resident Engineer Harold Wood at the office, I went to the dam where I found Contractor T. E. Connolly and Engineer Alan Rowe, and Hydraulic Fill Engineer D. W. Albert on the east embankment.

The Contractor has temporarily discontinued operation of the slack line method of removing sand strata from the puddle core of the northerly portion of the dam; has washed down the material which has been deposited on the beaches by the slack line work; has cut down the upstream beach by means of clam-shell bucket operating on the upstream rock embankment, placing the sand on the upstream side of the rock embankment.

The sand has been taken from the beach in such a way that additional material taken from the puddle core by slack line methods could be washed, leaving the sand on the beaches, which sand could also be readily moved to the outside of the rock embankment. This is rather a slow process, and Mr. Connolly was considering the lowering of the pool and the lowering of the beaches, then after practically draining the pool, mix the materials within the limits of the impervious section so as to eliminate the sand strata. However, he apparently has no definite plan of action.

It is understood that Mr. Kohl will arrive on the work soon.

Fred D. Pyle
Engineer

FDP/p

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

January 19, 1934

Mr. H. N. Sevege, Hydraulic Engineer,
San Diego,
Cal.

Dear Sir:

Your letter, 3-79, wherein you state I asked for the standard of suitable fines of clay and silt material for the impervious puddle core section of the El Capitan dam, misconstrues my request of Dec., 16, 1933.

I asked for your set standard for a borrow pit analysis- not for an analysis of the core.

"Proper tests will then be made by the City of material from these borrow pits and if satisfactory, approval will be given"- is an offer made in a letter from the Hydraulic Engineer.

Bearing in mind that the puddle core at the present level is slightly less than 21% of the whole hydraulic area; what percentage of materials passing standard screens from 1/4 to 200 mesh is your standard for an approved borrow pit?

This information would be appreciated at your early convenience.

Yours very truly,
H.W.Rohl & T.E.Connolly.

T. E. CONNOLLY (Signature)

January 23, 1934

From : Engineer Fred D. Pyle
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Inspection trip

On January 22, 1934 I met the City's Consulting Engineer L. C. Hill at the Embassy Hotel about 7:45 A.M. and after a few minutes conference with the Hydraulic Engineer at his home, Mr. Hill and I proceeded to El Capitan Dam where we met the City's Resident Engineer Harold Wood in his office and reviewed the work of construction of El Capitan Dam to date including the results of sampling, extent of sand strata in the puddle core area, progress of the contractor in removing the sand strata from the puddle core and the correspondence with the contractor following the Hydraulic Engineer's letter of instructions S-57 dated October 20, 1933 on the upbuilding of the puddle core.

Mr. Hill, Mr. Wood and I then went to the dam where we met Contractor T. E. Connolly, Contractor's Engineer E. Alan Rowe and the City's Engineer Hydraulic Fill D. W. Albert.

Mr. Albert was taking samples at N 3650 where material had been removed from the puddle core by drag line buckets working on a slack line. This rig was working at about N 3700. The material was being washed in a trench along the toe of the inside slope of the upstream rock embankment. A portion of the sand removed by clamshell bucket was being placed on the outside of the upstream rock embankment, and a portion of it was being hauled from the dam in trucks and wasted over the side of the road on the east side of the north abutment.

Mr. Hill and I accompanied Mr. Albert and his crew while they took samples on N 3650. Practically no material was encountered that appeared to contain less than 50 per cent of fines. The water was deep; the 6-pound weight going one to two feet below the level of the puddle core as determined before the full hydraulic placement of materials was undertaken.

After lunch the laboratory equipment developed by E. Alan Rowe for quick determination of the percentage of fines in any sample passing a 200 mesh screen and for determination of the percentage of voids in puddle core material was examined and conference was held in front of the contractor's mess with Mr. Connolly, Mr. Rowe, Mr. Hill, Mr. Wood, Mr. Albert and Mr. Pyle.

Mr. Connolly stated that he expected to complete the work of removing the sand strata from the upstream portion of the puddle core within 24 hours and to shift his operations to the downstream beach starting at the north end and working south, which he expected would take about a week. Several days may be required to remove a lense of sand vicinity north end of the puddle core and a considerable larger sized lense of sand near the south end of the

puddle core, both of these being in such position that the slack line cannot be brought into operation because of the concrete cut-off wall.

Nothing was said at any time to the contractor or by him as to the next step after the removal of the sand is completed.

A conference was then held between Mr. Hill and the City's representatives, later joined by Deputy State Engineer W.H. Holmes on the spillway. It was the concensus that the contractor was making progress in removing the sand strata and would probably complete the removal in less than ten days; that it was necessary to either bring up the lagging puddle core with material rich in fines, or to lower the beaches.

Mr. Albert stated that if material rich in fines was to be brought in and that if it was to be placed by full hydraulic method trouble could be expected because of the lack of ability to control the discharge from the pipes and he advised that the material should be placed on the downstream beach direct by trucks and that it be washed in by the semi-hydraulic method where the control is almost instantaneous as the stream of water from the monitor can be deflected very quickly. If too much of the fines remained on the beaches, the water could be lowered and the beaches could be re-washed.

It was Mr. Albert's opinion that after the puddle core and the beaches had been brought into proper relationship, which would mean a depth of water in the pool of about four feet, that the placing of materials from borrow pit areas A and B and C could be resumed with full hydraulic process.

Fred D. Pyle
Engineer

FDP/D

January 23, 1934

MEMORANDUM

Subject: San Diego River Project, El Capitan Feature, borrow pit material placed in hydraulic fill

On October 16, 1933 the Hydraulic Engineer, by letter S-55, directed the contractor at El Capitan dam to discontinue the dumping of dry material for hydraulic fill on the inside slopes of the rock embankments and to place the material by full hydraulic process. Previous to that time material from borrow pits, as well as from structure excavation, had been placed in the dam by semi-hydraulic methods which shortened the beaches because of the blanket of material over the inside slopes of the rock embankment and left considerable fines on the beaches.

The upbuilding of the puddle core had been continuously and increasingly lagging behind the upbuilding of the beaches with the result that the pool was very deep and consequently excessively wide with the danger of sand sliding from the edges of the beaches into the puddle core area becoming more imminent.

On October 20, 1933 by letter S-57 the contractor was directed and required to furnish and place suitable fines of clay and silt material in the hydraulic fill portion of the dam to accomplish the upbuilding of the puddle core.

On November 20, 1933 by letter S-63 the contractor was directed to comply with letter S-57 before resuming the placing of material from borrow pits A and B or areas producing similar amounts of fines.

Between November 27 and December 5 the contractor placed about 16,000 cubic yards of material from borrow pit area A in the dam by the full hydraulic method.

On December 4, 1933 the contractor was notified by letter S-70 to discontinue the placing of material in the hydraulic fill exclusively from borrow pit areas A and/or B and to comply with the requirements of letter S-63.

Examinations made showed sand strata generally in the southerly three-fourths of the puddle core area. The removal of the sand strata was not attempted by the contractor until after the first of January 1934. Little progress was made in the removal of the objectionable material up to January 15 and fair progress has been made since that date. It is indicated that the removal of the sand may be completed by January 31, 1934.

Inspection of the records shows only 16,459 cubic yards of borrow pit material have been placed in the El Capitan dam since October 17, 1933 as compared with from 8 to 12 thousand cubic yards per day placed previous to October 17. There was no material from borrow pits placed in the hydraulic fill between October 17 and November 27 because the equipment for full hydraulic placement was being installed. No material from borrow pits was placed since December 5 because of the stratification of sand and the contractor's efforts to remove the sand strata from the puddle core. It is indicated that 5 to 6 thousand cubic yards of material will be removed from the hydraulic fill portion of the dam incident to the removal of the sand strata.

FDP/p

Fred D. Pyle, Engineer

January 24, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-85

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill Materials
of Construction.

Gentlemen:

Receipt is acknowledged of your letter dated January 19,
1934, reading in part as follows:

"Bearing in mind that the puddle core at the
present level is slightly less than 21% of the whole
hydraulic area; what percentage of materials passing
standard screens from 1/4 to 200 mesh is your
standard for an approved borrow pit?"

It has not been deemed practicable to prescribe in ad-
vance a specific per cent of materials in a borrow pit pass-
ing standard screens from 1/4" to 200 mesh regardless of
relative quantities of clay and silt in the fines and rela-
tive quantity of over-sized coarse materials, and to expect,
irrespective of the Contractor's policies, methods and pro-
cedure of delivery, saturation, separation and deposition by
hydraulic means, that a satisfactory impervious core section
would be assured throughout the height of El Capitan Dam or
at any specific height in the Dam's advancing construction.

Quoting from my letter S-79, dated December 21, 1933:

"The consolidation and percolation tests made by
the City of San Diego of the materials in the puddle
core section of the hydraulic fill portion of the
El Capitan Dam have shown that when the puddle core
contains 50 to 75 per cent by weight dry of clay and
silt as proportioned passing a 200 mesh screen, and
provided that the coarser materials are not stratified,
an impervious core is formed; and that

"When the puddle core section contains less than
50 per cent of clay and silt, it is not deemed suf-
ficiently impervious."

Messrs. H.W.Rohl & T.E.Connolly - S-85

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1/24/34

I am constrained to the opinion that the "proof of the pudding must finally be in the eating", that is, size, consolidation and percolation as indicated by analysis and tests of the material placed by the Contractor in the impervious core section of the hydraulic fill portion of the dam will determine the fitness of borrow pit material to produce an impervious puddle core.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

From : Engineer Fred D. Pyle
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Inspection trip

I met Deputy State Engineer George W. Hawley, and Assistant Deputy State Engineer W. H. Holmes at the City's engineer camp at El Capitan dam at 9 A.M. January 30, 1934 and, accompanied by Resident Engineer Harold Wood, went to the spillway of the dam where we were joined by Contractor T. E. Connolly and Contractor's Engineer E. Alan Rowe, then to the upstream rock embankment, then to the south end of the dam where Engineer Hydraulic Bill D. W. Albert, and crew were taking samples of puddle core material.

The drag bucket working on the slack line was removing sand in about fourteen feet of water about as near as it could work to the core wall at the south end of the dam. This material was being washed in the usual way in a ditch in the downstream beach, the fines flowing several hundred feet north, then back into the puddle core and the sand being removed from the ditch by clamshell which was throwing the material on the upstream side of the downstream rock embankment.

Mr. Albert was of the opinion that the sand was very well removed from the puddle core except for a comparatively small amount in the vicinity of the present operations.

Mr. Albert started to take samples at a section about 50 feet north of the place where the dragline bucket was operating and encountered considerable sand east of the axis of the dam. Mr. Connolly said that it would be necessary to work over this again where the sample was taken with a drag bucket.

When we first met Mr. Connolly he gave the impression that the sand would be out of the puddle core before noon today. The indications are that it can not be out much before the evening of 31st.

Mr. Hawley advised that Mr. Holmes would spend a day investigating the puddle core by soundings and otherwise as soon as it was indicated that the sand was out of the pool to the satisfaction of the City.

The contractor had removed considerable sand from the back portion of the upstream beach and intends to wash the remaining portion of the beach back into the area from which the sand was removed, reducing the beach level to correspond to a water depth of about elevation 680. The contractor also intends to carry on the same operations on the downstream beach. The water in the pool is about elevation 680. It is indicated that the analysis of the samples should be completed as quickly as possible and at 1 o'clock January 30 another laboratory assistant, Mr. Mabry Van Reed, reported to Mr. J. Y. Jewett, Testing Engineer, and work will be also carried on an evening shift for several days. On returning from El Capitan dam I accompanied Mr. Hawley and Mr. Holmes to the residence of the Hydraulic Engineer for a conference.

Fred D. Pyle
Engineer

February 1, 1934

From : Engineer Fred D. Pyle
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Inspection trip

On January 31, 1934, I went to El Capitan dam and conferred at the spillway with Resident Engineer Harold Wood, Engineer Hydraulic Fill D. W. Albert, Contractor T. E. Connolly and Contractor's Engineer E. Alan Rowe on the results of analysis of samples Nos. 1855 to 1948, being samples from the sections taken in the northerly half of the puddle core and taken after this portion of the puddle core was supposed to be satisfactory. The sections were taken across the puddle core at 25-foot intervals, and of the material containing the most sand at each point sampled.

Between N 3800 and N 3675 the analyses indicated a reasonable satisfactory condition, but between N 3675 and N 3500, the most southerly section for which analyses were available, the results were not satisfactory because very few samples showed over 50 per cent fines, the range being generally from 25 per cent to 45 per cent with many samples showing about 35 per cent. This condition does not agree with Mr. Albert's anticipation of the condition as determined by soundings. In a number of instances Mr. Rowe had determined the percentages of fines by his field process. With few exceptions the laboratory analyses indicated higher percentages of fines than the field analyses which may be expected because of the standard treatment given the sample in the laboratory.

It is indicated that in attempting to remove sand strata with dragline buckets, the materials containing an excess of sand readily break up in the water and are crowded out of the bucket by the material which is rich in fines and tends to hold together.

It is apparent that the sand strata have not been removed from a considerable portion of the puddle core to make a satisfactory impervious puddle core.

One dragline machine was working on the extreme south end of the downstream beach removing sand close to the concrete core wall. Two machines were removing sand from the downstream beach and placing it on the upstream side and top of the downstream rock embankment. One machine was removing sand from the upstream beach and placing it on the outside of the upstream rock embankment. A monitor was washing a portion of the downstream beach.

Fred D. Pyle
Engineer

FDP/p

El Capitan Dam
February 3, 1934

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Hydraulic fill, puddle core

1. On January 31, 1934 Engineer Fred D. Pyle, Hydraulic Fill Engineer D. W. Albert, Contractor T. E. Connolly, Contractor's Engineer E. Alan Rowe and the Resident Engineer met and conferred on the dam relative to conditions of the puddle core as now dug into by the contractor for El Capitan Dam.

2. At this conference on January 31, 1934 T. E. Connolly said that they allowed sand to get into the puddle core and they were doing all possible to remove it but the operations of removing the sand were producing a mixture in the top three feet of the puddle core.

3. At conference on the dam on February 2, 1934 with the same persons present and in addition W. H. Holmes, Hydraulic Engineer for the State, Mr. T. E. Connolly stated that his man Greely was responsible for sand getting into the puddle core, that Greely was in Yuma on the day of the opening of the bids for the All American Canal - December 4, 1934. Connolly said he thought Greely a good man on building hydraulic fill dams as he had built several. Connolly said he had allowed Greely to send and get his own man to look after the placement of the hydraulic fill material on the dam but that all this had not prevented the sand from getting into the puddle core.

D. W. Albert

Fred D. Pyle

Harold Wood
Resident Engineer

February 5, 1934

From : Engineer Fred D. Pyle
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Inspection trip

Assistant Deputy State Engineer W. H. Holmes arrived at the office of the Hydraulic Engineer before 8 A.M. February 2, 1934. After 1-1/2 hours conference between the Hydraulic Engineer, Mr. Holmes and Engineer Fred D. Pyle, Mr. Pyle went with Mr. Holmes to El Capitan dam by way of the City's laboratory where analyses were secured of the last samples taken of puddle core material.

A fifteen minute conference was held in the office of the City Resident Engineer Harold Wood at El Capitan dam.

After lunch a conference was held in the contractor's office between Contractor T. E. Connolly, Contractor's Engineer E. Alan Rowe, Resident Engineer Harold Wood, Engineer Hydraulic Fill D. W. Albert, Engineer Fred D. Pyle and Assistant Deputy State Engineer W. H. Holmes at which were discussed the results of the analyses of samples, percolation and consolidation tests and hydraulic fill dams in general.

The party went to the top of the downstream rock embankment. The dragline bucket working from a slack line was removing material between N 3500 and N 3600.

There was much discussion as to results accomplished and to be accomplished. Mr. Connolly stated that the contractor's hydraulic fill engineer J. C. Greely was supposed to have known all about hydraulic fill dams and when Mr. Connolly left for Thanksgiving everything was in good shape. Mr. Greely went to Yuma in reference to the All American Canal bidding and everything "went haywire".

The contractor's attention was called to the fact that analyses of samples indicated much material remaining in the puddle core contained more than 50 per cent of sand.

Messrs. Holmes, Albert, Connolly and Rowe went over the puddle core area in a boat and barge, Mr. Holmes making a number of soundings and taking several samples, the sandiest of which when analysed late that afternoon by Testing Engineer J. Y. Jewett showed 39 per cent clay and silt.

Analysis of the samples taken over the pool since the slack line has been operating from the downstream beach and from the south and northerly from the puddle core have shown very few samples from inside the limits of the puddle core area with less than 40 per cent of clay and silt. Further investigation of the

results of consolidation and percolation tests indicate that with 40 per cent of clay and silt, percolation, while considerably more rapid than for 50 per cent, would not be excessive and would in no way endanger the integrity of the structure.

The percolation test made by the laboratory of the City of Los Angeles Department of Water and Power March 1933 was very satisfactory and indicated that 35.1 per cent passed a 200 mesh sieve. No analysis was made by the City of San Diego laboratory of this material but it is probable that the sum of the clay and silt, if determined by Mr. Jewett's method, would be considerably greater than the 35 per cent.

The City's Engineers Albert, Wood and Pyle reached the conclusion that if the material remaining in the puddle core area on top of the material placed previous to November 27, 1933, contained 40 per cent or more of fines, the safety of the dam would not be unduly decreased.

Fred D. Pyle
Engineer

FDP/p

February 5, 1934

From : Engineer Fred D. Pyle
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Inspection trip

On February 3, 1934, Engineer Fred D. Pyle went to El Capitan Dam in the early morning and met the Hydraulic Engineer, the City's Legal Counsel T. B. Cosgrove and Resident Engineer Harold Wood in the latter's office at the dam where there was a general discussion of the situation, especially as affecting the puddle core of the El Capitan Dam. Consideration was given to the analyses of the samples taken recently, many of which containing from 40 to 50 per cent of fines.

Later, a conference was held at the south end of the downstream rock embankment participated in by the Hydraulic Engineer, Messrs. Cosgrove, Wood and Pyle, and Contractor T. E. Connolly, and Contractor's Engineer E. Alan Rowe. The City's Hydraulic Fill Engineer D. W. Albert was taking samples at N 3225.

A drag line was removing material from the downstream beach at about N 3700, placing it on top of the downstream rock embankment. A monitor was washing and leveling up the remaining portion of the downstream beach. The water surface was at elevation about 681.

Mr. Connolly explained how the work had been carried on during the past month, how the sand strata were eliminated, except for a small amount in the south end of the puddle core and several lenses of sandy material which projected into the impervious puddle core section 10 to 12 feet and in several places 30 to 50 feet long.

He also explained that the pool was becoming very deep in several places, and that sandy material was following down the removal of the firm clayey material, and that he was unable to accomplish the removal of the material; that the depth of the pool greatly increased the possibility of slides from the beaches.

The Hydraulic Engineer returned to San Diego. Mr. Pyle then took Mr. Cosgrove to Station about 7+60 of the spillway; to the quarry, calling his attention to the various types of rock exposed; to the upper portion of the spillway; to the hog box; and deep excavation at the north end of the concrete core wall; to the gate located on the road to the borrow pits, a short distance from the mouth of Chocolate Creek, which gate was locked and no gate keeper in evidence.

After returning to the south end of the downstream rock embankment, Mr. Connolly and Mr. Pyle went down on the beach and later Mr. Connolly discussed briefly with Mr. Cosgrove the situation.

Mr. Pyle then examined the apparatus being made in the contractor's shops under the direction of Mr. Rowe for carrying on percolation tests.

-2-

Later there was a conference in the contractor's office between Messrs. Cosgrove, Connolly, Rowe and Pyle on lenses of sandy material, percentage of fines, width of puddle core and hydraulic fill dams in general. Most of the discussion was by Mr. Connolly and Mr. Rowe, with occasional questions by Mr. Cosgrove and comparatively little participation by Mr. Pyle.

Later there was a conference in the office of the Resident Engineer, participated in by Messrs. Cosgrove, Wood, Albert and Pyle, in which the same items were discussed.

The City's engineers Wood, Albert and Pyle expressed themselves as favorable to the contractor going ahead with the upbuilding of the puddle core, as the small amount and location of the sandy material remaining within the limits of the impervious core section of the dam was not considered sufficient to materially affect the safety of the structure.

Mr. Albert said that it would be very dangerous to attempt the upbuilding of the puddle core by placing material from borrow pit areas "A" and "B", or from areas containing similar material and he was very strong in his belief that the upbuilding should be accomplished by the securing and placing of materials rich in clay and silt.

Mr. Cosgrove and Mr. Pyle returned to San Diego about 5 P.M.

Fred D. Pyle
Engineer

FDP/p

February 6, 1934

From : Engineer Hydraulic Fill
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Hydraulic fill

The removing of objectionable material from the puddle core section of the El Capitan dam has resulted in a mixture of sand, silt and clay of wide range silt and clay content. Some of this mixture is extremely poor in silt and clay and would not in itself be impervious, but in no instance does this poor silt and clay mixture extend entirely across the puddle core section.

It is my best judgment that the puddle core as now exists is reasonably impervious, and meets the requirements of the plans and specifications insofar as imperviousness and safety are involved, and that the City is justified in ordering the work of hydraulic filling to proceed in compliance with instructions as stated in letter S-57 dated October 20, 1933 relative to upbuilding of puddle core and with additional instructions that in upbuilding of the puddle core, the elevation of the beaches must not be raised above their present elevations more than three feet until the puddle core had upbuilt to such extent that the six pound weight now used for determining the depth of water in the summit pool will not show more than 9 feet depth; and

That no attempt towards narrowing the puddle core would be permitted until all the above requirements were fulfilled.

Upbuilding of the beaches without first upbuilding the puddle is extremely hazardous and this upbuilding of beaches should not be permitted under any circumstances.

D. W. Albert
Engineer Hydraulic Fill

DWA/p

4/19/34
copy /f

707

February 6, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-87

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill Portion,
Topography, Surface and Subsurface,
as of February 6, 1934.

Gentlemen:

Enclosed for your information and files is drawing
showing topography of the hydraulic fill section of the
El Capitan reservoir dam as of February 6, 1934.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f
Encl.

February 8, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California

S-88

Subject: San Diego River Project, El Capitan
Feature, Hydraulic fill materials and
methods of placement.

Gentlemen:

In view of the existing condition in the impervious core section of the City's El Capitan Reservoir Dam resulting from the unsuitable material recently placed therein at the Contractor's own risk, and from which he has succeeded in removing relatively large quantities of the objectionable stratified sand, I do not deem it justifiable for me to accept for the City of San Diego the responsibility for the material and conditions resulting in the impervious core section of the dam.

No objection will be offered to the Contractor immediately accomplishing the up-building of the logging impervious core section of the El Capitan Dam with suitable fine materials from local borrow pits and adjacent areas, by full hydraulic process, provided the excess of the coarse sand is removed and wasted from such local material incident to its treatment in the "hog box".

The City's Engineers have been requested to determine the quantity of excess sandy material as wasted and also to take frequent samples thereof for analysis.

The Contractor will be paid only for suitable and approved material placed in the hydraulic fill section of the dam.

The excess sand and its wasting from the "hog box" will be at the Contractor's expense.

The excess sand being wasted must, for obvious reasons, be dumped independent from the material being excavated and wasted from spillway excavation.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

February 9, 1934

From : Engineer Fred D. Pyle
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Inspection trip

About 8 A.M. February 7, 1934, Engineer Fred D. Pyle met Deputy State Engineer George W. Hawley, Assistant Deputy State Engineer W. H. Holmes, City's Consulting Engineer L. C. Hill at the Hotel Embassy and the party proceeded to El Capitan Dam, stopping at the City's guest house and were met there by City's Engineer Hydraulic Fill D. W. Albert, and Resident Engineer Harold Wood.

Data and analyses showing the extent of the removal of objectionable sand strata from the puddle core of the dam were reviewed; percolation tests and hydraulic fill construction were discussed. It was the general conclusion that the possible loss of water thru the puddle core in its present condition would be negligible from a monetary standpoint, provided the remainder of the puddle core were properly constructed; also that the removal of the sand strata had been sufficiently complete to assure the absolute safety of the dam.

Mr. Albert explained that the contractor had placed some 2000 cubic yards of select material from the vicinity of borrow pit area "C" in the hogbox and had been wetted down intending to remove from the hogbox the coarser materials as they collected during the hydraulicking operations, and if the beaches came up appreciably the contractor would lower them by removing beach material; that additional material would be placed in the hogbox as necessary.

Mr. Albert believed that if the contractor was careful and used judgment in carrying on his operations, he could bring up the lagging puddle core to proper relationship to the beaches. He stated that the contractor intended to throttle the pump placing hydraulic fill material as much as practicable; that he had installed slide control gate outlets on the sides of several joints of pipe used in placing the hydraulic fill material; also that the contractor expected, while bringing up the puddle core, to keep the water in the summit pool well up on the beaches in order to prevent sand reaching the puddle core.

It was the general belief of the conference that the raising of the summit pool over the beaches would not materially increase the saturation of the pervious portion of the hydraulic fill and would not endanger the stability of the structure during the short time required by the contractor to accomplish the upbuilding of the puddle core.

The group then went to the north end of the downstream rock embankment and later, except for the Resident Engineer, went out on the barge which was towed by a boat handled by Contractor T. E. Connolly.

A number of sample cores were taken from the puddle core area by the City's Chiefs of Party George Converse and L. H. Hill for examination but no samples were taken for analyses. No strata of sand were indicated by the samples which were generally taken along the axis of the dam at intervals of about 100 feet. Near the south-east corner of the pool the water was so deep that samples could not be secured.

After lunch the group, including Contractor Connolly, examined the excavation made by the contractor in securing material for puddle core from borrow pit area "C". Much of the material appeared to be red blocky clay which broke up in large lumps and appeared to contain considerable clay and silt. The contractor had been careful in selecting the best of the material. The clay analyses of samples taken in the immediate vicinity of the contractor's operations a few weeks ago indicated a range of fines varying from 40 to 47 per cent for the best samples with many samples containing less than 30 per cent; an average of 33 samples indicate 12 per cent clay, 20 per cent silt and 68 per cent sand.

The party went to the spillway and examined the material which had been wet down in the hogbox and found that it softened readily when wet for some little period of time.

The group was joined here by the contractor's Consulting Engineer J. B. Lippincott and Engineer E. Alan Rowe. After consideration of the gradation analyses of the puddle core materials as then existing in the puddle core, Mr. Lippincott expressed himself well satisfied with the extent to which the objectionable sand strata had been removed. He stated that the employment of his office was for the purpose of assuring the contractor of the safety of the dam during construction.

The party went back to the City's guest house where a conference was held between Hydraulic Engineer H. B. Savage, L. C. Hill, G. W. Hawley, W. H. Holmes, Harold Wood, D. W. Albert and Fred D. Pyle.

Mr. Savage was advised of the conclusions reached in the forenoon and as to the contractor's proposed method of handling material, removing sand and placing material in the puddle core which Mr. Connolly had also reiterated to Mr. L. C. Hill during the day.

Mr. Savage, Wood, Albert and Pyle contacted Mr. Connolly near the west end of the spillway where Mr. Savage advised Mr. Connolly that the Hydraulic Engineer would hold the contractor responsible for the puddle core section of the dam; that the contractor could proceed with the upbuilding of the puddle core and could use local material, provided coarse sands were washed out and removed from the hogbox.

Fred D. Pyle
Engineer

February 23, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California

5-90

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill, Logging
Puddle Core.

Gentlemen:

Cross sections recently taken vicinity of Station
N 3200 of the hydraulic fill section of El Capitan Dam
indicates water depth of 19 feet, with relatively little
upbuilding since February 7, 1934 of the puddle core area
as indicated by soundings with a 6 pound weight.

The under water slope of the upstream beach is very
steep and there is grave danger of a sand slide from the
beach section into the puddle core impervious section.

Your attention is invited to this danger in order
that you may immediately correct the condition.

Very truly yours,

H. E. Savage
Hydraulic Engineer

HHS/f

March 6, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-93

Subject: San Diego River Project, El Capitan
Feature, hydraulic fill, lagging
puddle core.

Gentlemen:

Examination and tests of the Hydraulic Fill portion of the El Capitan reservoir dam indicates:

The upbuilding of the lagging impervious core section in relation to the beaches is not being accomplished.

The summit pool is too wide, too deep and the beaches too narrow to secure proper results.

There is danger of slides occurring from the beaches, especially in the southerly third reach of the impervious puddle core section.

You have been heretofore directed to correct the existing unsatisfactory relationship between the elevation of the beaches and the elevation of the material in the impervious puddle core section.

This is to notify you that the surface of the water in the summit pool shall not be brought up higher than at present until the material in the impervious puddle core section, as determined in the usual manner, by a 6-pound weight coming to rest on and/or in the puddle core material has been brought up to within about 7 feet of the elevation of the surface of the water in the summit pool.

Thereafter the depth of the summit pool, as indicated in the usual manner as above outlined, shall not be more than about 7 feet.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/f

March 8, 1934

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Hydraulic fill

1. The following facts are here recorded for the benefit of the City's records of the construction of El Capitan dam.

2. The Hydraulic Engineer's letter S-93 dated March 6, 1934 addressed to the contractors, after being approved by the City Attorney C. L. Byers, was delivered by the Resident Engineer to the contractor T. E. Connolly in his office at 5:35 P.M. on March 6, 1934. The water surface in the summit pool, as shown by P. O. Gottschling on his daily report, was elevation 690.4.

3. The contractor's engineer Alan Rowe, about April 1933, shortly after the hydraulic fill operations were well under way began the use of a 6-pound weight for taking soundings to determine the top of the puddle core or the silt line. This weight is of steel 3 5/8 inches in diameter, 2 inches high and provided with a 1/2 inch eye bolt in the top to which the metallic tape used in measuring the depths, is attached. This weight was adopted for use by the City's staff for their sounding so that the records would be always comparable. Considerable variation in the depths are obtainable depending on the rapidity of the descent of the weight. The weight has been lowered gently to rest for all soundings taken for the City's records. The weight is either operated by Hydraulic Fill Engineer D. W. Albert or in his presence by one of City's staff for all records for the City. Frequently soundings are taken by Alan Rowe or his man in the presence of a City man who acts as recorder for both City and Contractor. Alan Rowe copies these recorded notes for his use.

4. The following conditions existed in the hydraulic fill portion of the dam on the afternoon of March 6, 1934 at about the time the contractor received letter S-93.

- (1) Elevation water surface of summit pool 690.4.
- (2) Maximum depth of pool 22 feet at N 3200.
- (3) Maximum width of pool 220 feet at N 3200 both beaches submerged.
- (4) Maximum width of hydraulic fill at elevation 690.4 is about 239 feet at N 3630.
- (5) Maximum width of upstream beach was about 30 feet at N 3200. This beach was submerged.
- (6) Maximum width of downstream beach was about 60 feet at N 3400. This beach was submerged.
- (7) Maximum height of upstream beach was elevation 689.9 at N 3300.
- (8) Maximum height of downstream beach was elevation 690.4 at N 3500

NOTE: (2) should be not over about 7 feet; (3) should be about 102 feet; (5) should be about 54 feet; (6) should be about 83 feet.

5. The following conditions exist in the hydraulic fill portion of the dam in the afternoon of March 8, 1934. The fresh water supply pumps 1 and 2 were stopped at 10 A.M.

- (1) The elevation of the water surface in the summit pool 691.5.
- (2) Maximum depth of pool 23 feet at N 3200.
- (3) Maximum width of pool is 220 feet at N 3200.
- (4) Maximum width of hydraulic fill at elevation 691.5 is 241 feet at N 3630.
- (5) Maximum width of upstream beach is about 30 feet at N 3500.
- (6) Maximum width of downstream beach is about 50 feet at N 3500.
- (7) Maximum height of upstream beach is elevation 693 at N 3450.
- (8) Maximum height of downstream beach is elevation 693.5 at N 3450.

6. It should be remembered that the point at which the break in the slope of the pool side of the beaches occurs is usually near the elevation of the water surface of the summit pool at the time of building the beach and varies horizontally both with the amount of water and the material carried by the water reaching the beach. In general the under water slope from the break point to the puddle core is about 1 on 3 as shown by the numerous cross sections of the hydraulic fill.

HW

Harold Wood
Resident Engineer

4/16/34
copy/f

715

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

March 8, 1934

Mr. H. N. Savage,
Hydraulic Engineer
San Diego,
Cal.

Dear Sir:

I would call your attention to the fact that your letter S-91 ordered us to abandon a portion of the richest material in borrow pit C which was set forth as approved and available material for hydraulic fill; all as set forth in the plan and specifications and delineated upon the maps therein as well as separate prints furnished the contractor.

Yours very truly,
H.W.Rohl & T.E.Connolly

T. E. CONNOLLY (Signature)

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

March, 8, 1934.

Mr. H. N. Savage,
Hydraulic Engineer,
San Diego,
Cal.

Dear Sir:

In your letter, S-93, paragraph two, you state-

"The summitt pool is too wide, too deep and the beaches too narrow to secure proper results." These three faults can be corrected by narrowing the puddle core impervious section sufficiently. Is this an instruction to narrow the impervious section and if so how much?

The condition you cite above will become increasingly aggravated as the height of the dam increases from this point up, by the nature of the design; the beaches are becoming proportionately less to the entire area as the height increases until you have no beach whatever on the upstream side of the core and the core area increases until it becomes practically two thirds of the entire area.

As the core thickness cannot be cut down too abruptly, but must be done in successive moderate stages, I presume you indicate commencement of such an operation at this point but I ask further enlightenment on this point and the thickness you wish the core reduced too.

Yours very truly,
H.W.Rohl & T.E.Connolly.

T. E. CONNOLLY (Signature)

March 10, 1934

From : Engineer Fred D. Pyle
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Inspection trip March 9, 1934

Arrived at El Capitan Reservoir dam spillway about 9:15 A.M. where I met the Hydraulic Engineer, City Attorney, Resident Engineer, Hydraulic Fill Engineer, Contractor T. E. Connolly, Contractor's Engineer E. Alan Rowe and Contractor's Consulting Engineer J. B. Lippincott.

A conference was had with the exception of the Hydraulic Engineer and Mr. Lippincott, until noon on how the upbuilding of the lagging puddle core section of the dam could be accomplished in accordance with the Hydraulic Engineer's letter S-93 to the contractor.

The contractor stated that if permitted he would crowd out the beaches thus not only narrowing the puddle core but would tend to force fines now outside the theoretical limits into the puddle core and thus decrease the depth of the summit pool. He thought this could be done without much risk and, if sand strata did enter the puddle core section, he would remove it. He thought he had some better method than by use of dragline bucket but did not describe his proposed methods of removing the sand strata.

Mr. Albert did not agree with the contractor, stating that the bottom of the summit pool should be brought up before attempting to crowd in the beaches.

Considerable discussion on other methods of bringing up the puddle core took place, one of them being placing boulders directly in the puddle core section. It was agreed that this would be a satisfactory means provided, the boulders could be kept isolated, but that the cost would be high.

The question of placing borrow pit material directly in the puddle core section was discussed. Mr. Albert recommended placing material directly in the puddle core section but did not explain the methods in detail, except that the material would probably have to be crowded into the puddle core section in order to prevent separation and stratification.

The contractor wished to know if it would be permitted to do this and was advised that if he thought it practical, to outline his program in a letter to the Hydraulic Engineer and request permission to try it out.

There was some discussion on the possibility of the theoretical width of the puddle core section being narrowed. It does not appear proper to narrow the puddle core section until the depth of the

depth of the summit pool has been decreased to about seven feet and narrowed accordingly.

Steepening of the beaches by the addition of decomposed granite in order to increase the velocity of the water on the beaches thus decreasing the amount of fines remaining in the beaches was discussed but without conclusions. It has occurred to me that there may be some advantages in accomplishing the bringing up of the lagging puddle core by introducing into the hog box one load of decomposed granite for each load of imported borrow pit material having in excess of 65 percent fines. I believe this would accomplish better results than the direct introduction of fines into the puddle core area by direct dumping on the beaches and crowding it in.

After lunch the Hydraulic Engineer and the City Attorney returned to San Diego.

Conferred with Mr. Lippincott and Mr. Rowe in the contractor's office in regard to analysis of beach and puddle core materials, and in the contractor's shops where Mr. Rowe had carried on experiments in a tank with one glass side to show the upbuilding of the beaches puddle core area and the crowding of silt from the under-water slopes of the beaches and the sliding of sandy material from the under-water slopes of the beaches into the puddle core section.

I returned to the Resident Engineer's office where discussed with Mr. Wood the contractor's operations for the past several days and especially the encroachment of sand into the puddle core section.

Later I returned to the upstream embankment and discussed for considerable time with Mr. Albert many points that had been brought up in the morning. Mr. Lippincott and Mr. Rowe were taking soundings in the vicinity of N 3200 and reported that the depth of the summit pool was about 17 feet at the deepest point. At about Station 3500 two of the contractor's men were taking soundings and reported the deepest point as being about ten feet. Water surface about elevation 691.5. The material was being deposited on the beaches by full hydraulic method at station about N 3225.

Fred D. Pyle
Engineer

FDP/p

El Capitan Dam
March 11, 1934

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Hydraulic fill, water discharged over downstream
slope

1. On March 10, 1934 the Contractor at El Capitan dam discharged the downstream hydraulic fill pipe line into the rock embankment near the south abutment at about elevation 694. The flow of about 10 second feet ran down into the rock embankment. This flow was divided and at the 575 elevation berm a stream of about 2 second feet ran around the south side of the exit portal structure and a stream of about the same amount found its way out of the rock embankment a few feet above the above berm and then flowed into the rock directly below the berm and near the north side wall of the outlet tunnel. Both these streams followed old channels made by rain water and sluicing water before.

2. On the south 20 feet of the 600 elevation berm the sand filled the rock and the water flowed out on the berm at this point. At this location the rock is very shallow and fills an old natural ravine. About 1 second foot of flow reached the surface of the berm at this point.

3. There was no visible settlement in the rock embankment and no harm done.

4. At Mr. W. H. Holmes' request this information is being sent to him attached to his drawing of the progress of the dam which was posted for him as of March 9, 1934 when the last cross sections were taken.

Harold Wood
Resident Engineer.

March 13, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-95

Subject: San Diego River Project, El Capitan
Feature, Hydraulic Fill, sand strata
in impervious puddle core area.

Gentlemen:

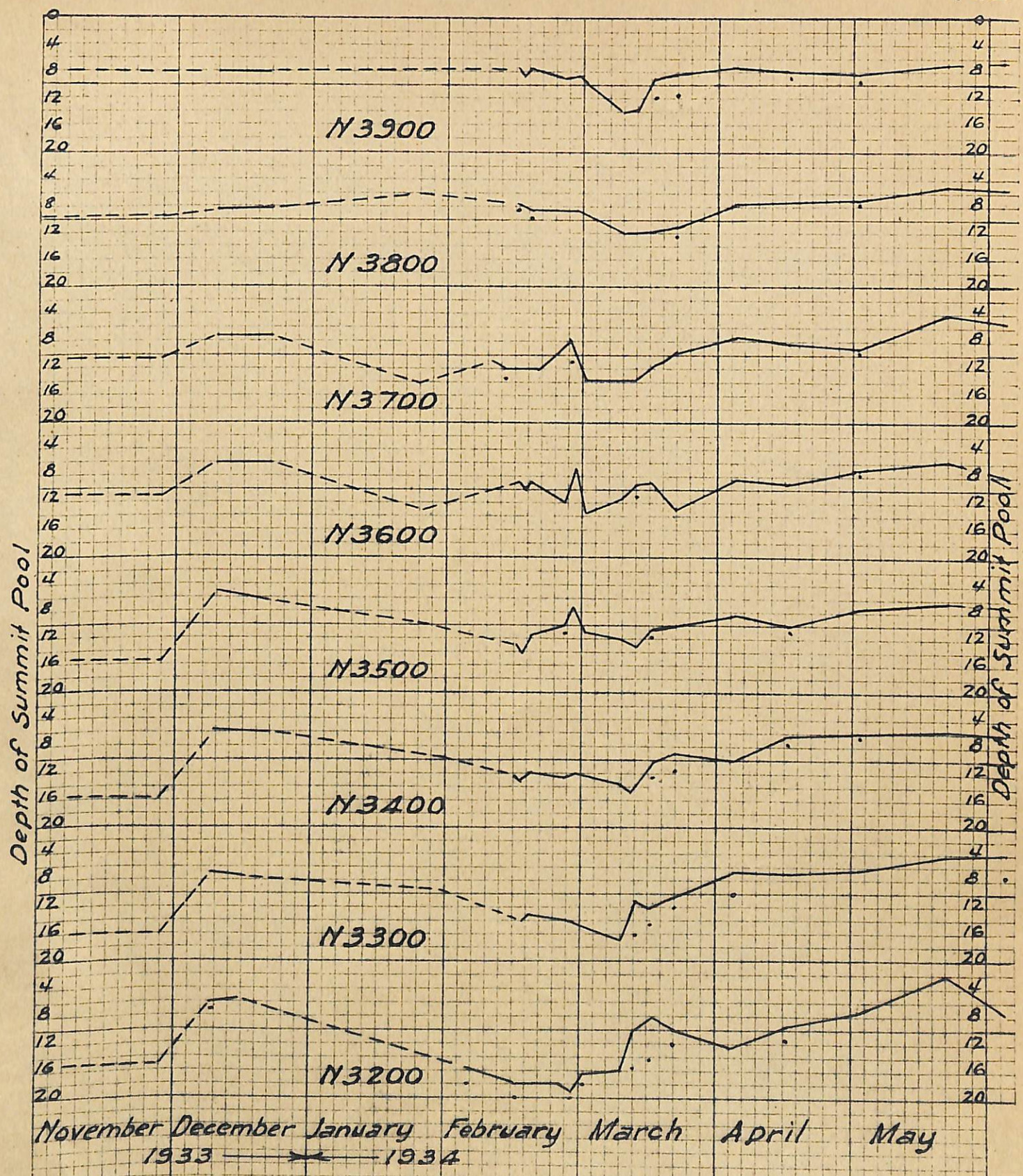
The analyses of samples taken from the puddle core section of the El Capitan reservoir dam on March 10, 1934, disclose the existence of sand strata in the impervious puddle core section vicinity N 3200 and N 3300.

You are hereby notified and required to correct this condition at your own expense, before depositing other material on that portion of the impervious puddle core section where sand strata exists.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f



KEUFFEL & ESSER CO., N. Y. NO. 354-S
100 x 10 to the inch.

EL CAPITAN RESERVOIR DAM
 Depth of Summit Pool on Axis of Dam
 as indicated by soundings with 6# weight.
 Dr. by H.C. 3/16/34 *HC* • = Depth at low point.

March 17, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-96

Subject: San Diego River Project,
El Capitan Feature, hydraulic
fill, sand strata in impervious
puddle core area

Gentlemen:

The analyses of samples taken from the puddle core section of the El Capitan reservoir dam on March 13, 14 and 15, 1934 disclose the existence of sand strata in the impervious puddle core section between N 3200 and N 3700.

You are hereby notified and required to correct this condition at your own expense, before depositing other material on that portion of the impervious puddle core section where sand strata exists.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/P

March 17, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-97

Subject: San Diego River Project, El Capitan
Feature, hydraulic fill portion,
impervious puddle core section and
materials.

Gentlemen:

Receipt is acknowledged of your letter dated March 8,
1934.

The purpose of my letter dated March 6, 1934, S-93,
among other things, was to emphasize and call your atten-
tion to the obvious fact that the hydraulic fill summit
pool was too wide, too deep and the beaches too narrow;
and that

The upbuilding with suitable materials of the lagging
impervious core section in relation to the beaches was not
being accomplished; and to

The impending danger of slides from the beaches into
the impervious puddle core section.

It is not seen how any decrease in the thickness of the
impervious puddle core section as shown on the contract draw-
ings would be proper nor to be tolerated until the material
in the impervious puddle core section as determined in the
usual manner, by a 6-pound weight coming to rest on and/or
in the puddle core material has been brought up to within
about 7 feet of the elevation of the surface of the water
in the summit pool.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

March 17, 1934

724

From : Hydraulic Engineer

To : City Attorney

Subject: San Diego River Project, El Capitan Feature, Hydraulic
Fill.

H. W. Rohl & T. E. Connolly, contractor who is constructing the City's El Capitan Reservoir Dam, Spillway and Outlet Works, under contract entered into April 23, 1932, Document No. 274788, was directed by the Hydraulic Engineer's letter S-57 dated October 20, 1933, as follows:

"In compliance with the requirements of paragraphs 53, 62 and 63 of the contract drawings and specifications for the construction of the City of San Diego's El Capitan reservoir dam, you are hereby directed and required to immediately secure, furnish and place suitable fines of clay and silt material in the hydraulic fill portion of the dam to accomplish the immediate upbuilding of the puddle core which has been lagging behind the upbuilding of the beaches."

Despite the above directions, which have been repeatedly re-stated and amplified, the Contractor has not to date relatively and materially advanced the upbuilding of the lagging impervious puddle core section.

A number of conferences have been held at the dam between the City's engineering staff--Resident Engineer Harold Wood, Hydraulic Fill Engineer D. W. Albert, Assistant Engineer Fred D. Pyle, Hydraulic Engineer H. N. Savage--the City's Consulting Engineer L. C. Hill, and the California State Engineer's staff including Deputy State Engineer George W. Hawley, Assistant Deputy State Engineer W. H. Holmes and the State's Consulting Engineer F. C. Herrmann.

The engineers were unanimous in their conclusions at each conference that the upbuilding of the lagging impervious core section of the dam was unsatisfactory, detrimental and unsafe, and should have been and must be fully remedied to insure reasonable safety of the structure.

On March 6, 1934, the Contractor was notified by the Hydraulic Engineer's letter S-93 as follows:

*Examination and tests of the hydraulic fill portion of the El Capitan reservoir dam indicates:

"The upbuilding of the lagging impervious core section in relation to the beaches is not being accomplished.

"The summit pool is too wide, too deep and the beaches too narrow to secure proper results.

"There is danger of slides occurring from the beaches, especially in the southerly third reach of the impervious puddle core section.

"You have been heretofore directed to correct the existing unsatisfactory relationship between the elevation of the beaches and the elevation of the material in the impervious puddle core section.

"This is to notify you that the surface of the water in the summit pool shall not be brought up higher than at present until the material in the impervious puddle core section, as determined in the usual manner, by a 6-pound weight coming to rest on and/or in the puddle core material has been brought up to within about 7 feet of the elevation of the surface of the water in the summit pool.

"Thereafter the depth of the summit pool, as indicated in the usual manner as above outlined, shall not be more than about 7 feet."

At the time the above letter was delivered, the surface of the water in the summit pool was at elevation 690.4, and the maximum depth of the summit pool, as determined in the usual manner, about 20 feet, or 13 feet deeper than it should be.

Thirty-six hours after the delivery of the above letter, the Contractor had raised the surface of the water in the summit pool to elevation 691.4 or one foot, and the maximum depth of the summit pool had increased to 21 feet.

The surface of the summit pool is now (March 17, 1934) at elevation 691.5 and the maximum depth of the summit pool is 15.5 feet, below which stratum of sand exists having a depth thickness upwards of four feet, and its base is 24 feet below the surface of the summit pool.

On March 13, 1934 sand stratum was found extending nearly across the puddle core section at N 3600.

On March 10, 1934 sand stratum of material thickness was found at N 3200 and N 3300 with considerable sand at N 3400. This condition was verified on March 13 and the Contractor was notified on March 13 by the Hydraulic Engineer's letter 5295 as follows:

"The analyses of samples taken from the puddle core section of the El Capitan reservoir dam on March 10, 1934, disclose the existence of sand strata in the impervious puddle core section vicinity N 3200 and N 3300.

"You are hereby notified and required to correct this condition at your own expense, before depositing other material on that portion of the impervious puddle core section where sand strata exists."

Since letter S-95 was delivered to the Contractor, he has continued to deposit material on that portion of the puddle core in which sand stratum exists.

The Contractor has made no effort thus far to remove the sand strata and is not upbuilding the lagging puddle core section to any material extent, except where sand strata exist.

Your consideration of the above and advice as to how to enforce the Contractor's compliance with the contract specification requirements to insure reasonable safety of the dam is invited.

H. N. Savage
Hydraulic Engineer.

HNS/f

March 21, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-98

Subject: San Diego River Project,
El Capitan Reservoir Dam
Hydraulic fill, sand strata in
impervious puddle core area

Gentlemen:

You are hereby notified to discontinue the placing of material in the hydraulic fill section of the El Capitan reservoir dam until you have corrected, to the satisfaction of the Hydraulic Engineer, the condition that exists in a large portion of the impervious puddle core area due to the existence of sand strata resulting from your methods of construction.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

FDP/p

April 17, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-103

Subject: San Diego River Project, El Capitan
Feature, hydraulic fill, lagging
puddle core.

Gentlemen:

On September 23, 1933 in my letter S-47, and repeatedly thereafter, your attention was formally invited to the lagging of the up-building of the impervious puddle core section of El Capitan Dam in relation to the beaches.

This objectionable condition, uncorrected even to date, contributed to the development of extensive sand strata in the impervious puddle core section early in December 1933, which was not sufficiently corrected until February 7, 1934 to permit the continued placement of hydraulic fill material in the dam.

On March 6, 1934 in my letter S-93 you were notified not to raise the surface of the water in the summit pool until the depth of the pool, as determined in the usual manner, had been reduced to 7 feet.

Notwithstanding the purport of my letter S-93, you continued the methods you were then employing in placing hydraulic fill material without material change, with the result that by March 21, 1934 sand strata had again developed in a large portion of the impervious puddle core section of the dam and you were notified to discontinue the placing of material in the hydraulic fill portion of the dam until the unsatisfactory condition due to the sand strata in the impervious puddle core section had been corrected.

You are hereby directed that after satisfactory removal of objectionable sand strata and before the placing of hydraulic fill material may again be undertaken to submit for consideration by the Hydraulic Engineer the policy and method you expect to follow to accomplish full compliance with the contract drawings and specifications and my letter S-93 dated March 6, 1934.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

8/6/34
copy/f

729

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

April 17, 1934

Mr. H. N. Savage,
Hydraulic Engineer,
San Diego,
Cal.

Dear Sir:

In building the rock lift above elevation 700 of the El Capitan Dam, the stakes set and the material deposited in accordance with them, is at variance with the plans and specifications.

Would you kindly furnish me with plans, specifications, and details conforming to the staking as now set forth on the ground, together with all other pertinent facts and information.

Thanking you for your earliest attention to this matter,

Yours truly,
H. W. Rohl & T. E. Connolly.

T. E. CONNOLLY (Signature)

April 18, 1934

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Hydraulic fill, sand piled on beaches

1. The placing of hydraulic fill material in El Capitan had been stopped on December 5, 1933 by letter S-70 of the Hydraulic Engineer dated December 4, 1933. At this time sand strata had been allowed to form in the impervious core section of the dam.

2. The contractor proceeded to remove with clamshell and drag line buckets the sand strata and on February 7, 1934 a conference was held at the dam between the City's engineers, the contractor's engineers and the City's Consulting Engineer L. C. Hill. Following conference in the afternoon, another conference was held between the City's engineers and Mr. Hill at which time it was decided to permit the contractor to proceed with the upbuilding of the hydraulic fill.

3. On February 8, 1934 the Hydraulic Engineer, by letter S-88, stated that

"No objection will be offered to the contractor immediately accomplishing the upbuilding of the lagging impervious core section of the El Capitan Dam with suitable fine materials from local borrow pits and adjacent areas, by full hydraulic process, provided the excess of the coarse sand is removed and wasted from such local material incident to its treatment in the hog box."

4. The contractor proceeded to placement of the hydraulic fill material obtained from borrow pit within the reservoir basin and from borrow pit C. Sand to the extent of about 9100 cubic yards was deleted from the hog box and off the beaches and wasted outside of the dam. Material was excavated from the beaches and piled on the inside slope of the rock embankment, the sand on the upstream embankment encroaching an average of about 24 feet on to the upstream beach, the sand on the downstream embankment encroaching an average of about 18 feet on to the downstream beach. The effect of this was to reduce the width of the beaches required for effective washing and separation of fines required in the impervious puddle core.

5. The contractor on April 12, 1934 began constructing an 8-foot lift on the upstream rock embankment. The work began at the north abutment and has proceeded southerly. A levee is being constructed on the inside shoulder of the rock embankment at elevation 700 and the rock for the lift being end dumped and

to elevation 708. This has now progressed southerly to N 3650. Considerable large rock rolled down the inside slope to the hydraulic fill area. The levee along the rock embankment shoulder is being constructed by clamshell from sand excavated from the beach. This leaves a trench along the upstream beach.

6. Accompanying this letter is standard size drawing showing existing topography of the puddle core and cross section across the hydraulic fill and rock embankment at N 3330, N 3630 and N 3900. Also the sand encroachment on the beaches and the 8-foot rock embankment lift. The maximum depth of the summit pool is 11.5 feet and the average elevation of the puddle core is 682.3. The water surface of the pool is elevation 689.5.

Harold Wood
Resident Engineer

HW/p
encl.

Date Samples Taken	3200	3300	3400	3500	3600	3700	3800	3900	4000
E 4973	33	34	35	36	37	38	39	40	41
E 5000	34	35	36	37	38	39	40	41	42
E 5035	39	40	41	42	43	44	45	46	47
	48	49	50	51	52	53	54	55	56
	57	58	59	60	61	62	63	64	65
	66	67	68	69	70	71	72	73	74
	75	76	77	78	79	80	81	82	83
	84	85	86	87	88	89	90	91	92
	93	94	95	96	97	98	99	100	

E 4973
 415
 160
 90
 70
 68
 69
 56, 55, 14
 10, 51
 E 5035
 31
 38
 N 3400 = 3500

← Latest Samples

EL CAPITAN RESERVOIR DAM

Intrusion of Sand Into
 Impervious Puddle Core Section

Percentage of Fines . 23
 Sand Strata
 Dr. by N.C. 4/25/34

H. W. ROHL & T. E. CONNOLLY

Contractors

El Capitan Dam

Via Lakeside, California.

April 30, 1934

H. N. Savage, Hydraulic Engineer,
City of San Diego,
San Diego, California.

Re: El Capitan Reservoir, Dam, Spillway
and Outlet Works

Dear Sir:

In your letter S-103 of April 17, 1934, you directed us as follows:

"You are hereby directed that after satisfactory removal of objectionable sand strata and before the placing of hydraulic fill material may again be undertaken to submit for consideration by the Hydraulic Engineer the policy and method you expect to follow to accomplish full compliance with the contract drawings and specifications and my letter S-93 dated March 6, 1934."

1. Inasmuch as you have repeatedly and arbitrarily invaded the contractor's rights by ordering the contractor to use methods prescribed by you, it is very difficult for us to understand why you should at this late date ask us to advise you as to the methods we expect to follow in order to accomplish full compliance with the contract drawings and specifications.

2. Before we filed our bid for the above work, we submitted to you personally and you personally approved our proposed method for placement of hydraulic material in the dam. The method which we submitted and which you approved was by use of hydraulic giants. After the contract was awarded and the work had been prosecuted to the point where we were ready to purchase and install our hydraulic equipment, we again submitted to you for your personal approval our proposed method of placement of hydraulic material by the hydraulic giant method. This method was outlined to you in detail in our letter of February 1, 1933. You again approved, not only our proposed method of placing hydraulic material, but you and your representatives approved the installation of the machinery and equipment for use in such placement.

3. In reliance upon your approval of our proposed method of placement of hydraulic material, we, at great expense, installed the barges, pumps, hydraulic giants and other equipment required for the satisfactory accomplishment of the hydraulic fill portion of the work by the hydraulic giant method.

4. By use of the hydraulic giant method, we successfully placed under your approval 1,225,456 cubic yards of hydraulic fill between the date when we commenced placement in February, 1933, and October 16, 1933, when you by your Order S-55 ordered us to discontinue hydraulic giant method for sluicing in the hydraulic fill.

5. On October 16, 1933, by your Order S-55, you ordered us to change our method from the hydraulic giant method for sluicing in the hydraulic fill to a method which required the saturating and running of the material through what you designated as properly constructed transporting equipment - pipes or flumes - on to the outer reaches of the hydraulic fill, this latter method being commonly described and referred to as the hog box or full hydraulic method as distinguished from the method which we had theretofore used commonly referred to as the semi-hydraulic method.

6. Upon receipt of your order S-55 of October 16, 1933, directing us to change from the semi-hydraulic method, which you had theretofore approved, to the full hydraulic method as set forth in your Order, we immediately notified you that the full hydraulic method set forth in your order of October 16th would not work. We notified you that the change in method would cause excessive sand strata to come into the puddle core and render necessary a large amount of expensive corrective work in connection with the removal thereof. We notified you that the method you prescribed was wrong. By prescribing methods you have assumed the responsibility for results obtained. The fault is yours.

7. By our letter to you of October 25, 1933, we advised you that to the extent that our costs were increased by your order of October 16, 1933, which in substance directed us to scrap one set of hydraulic equipment and purchase a new and different kind of equipment, that we would claim damages and increased compensation from the City of San Diego.

8. Under date of October 28, 1933, we notified you personally that while the full hydraulic method which you had specified would injure the puddle core by placing a large amount of sand in the core, that nevertheless we were going to do as you had ordered, namely, install the necessary equipment and proceed to place hydraulic material by the full hydraulic method as described in your order to us of October 16, 1933.

9. On or about November 28, the work of installing the new hydraulic equipment was completed and the work of placing materials in the hydraulic fill portion of the dam was resumed, and continued until December 4, 1933, on which date the contractor stopped the hydraulic work for the reason that the delay occasioned by the installation of the new equipment and the resultant use thereof had caused a very substantial amount of sand to find its way into the puddle core.

10. By our letter to you of December 12, 1933, we advised you that inspection of the puddle core placed by the full hydraulic method - under your order - disclosed the fact that a strata of sand had been created. We further advised you that while the strata of sand had been caused by your order requiring us to shut down and change to full hydraulic method, that nevertheless we felt that the condition should be remedied and that we would at once proceed to do so. For all expense occasioned thereby we shall hold the City responsible.

11. During the period between February, 1933, and October, 1933, and while we were placing 1,225,456 cubic yards of hydraulic fill material in the dam, the quality of the core or the beaches was never at any time questioned; in fact, they merited and received nothing but the highest praise from every engineer who viewed the structure.

12. By our letter of December 15, 1933, we advised you of the method we proposed to use in order to remove the sand strata from the puddle core, and diligently thereafter prosecuted such method of removal until on or about the 7th day of February, 1934.

13. On or about February 7, 1934, we again resumed hydraulic placement by the full hydraulic method as specified in your order of October 16, 1933. From then on you have continuously found fault with results obtained by the method of placement specified in your order of October 16, 1933. We told you at the time you specified the full hydraulic method that it was wrong. The results subsequently accomplished by the use of such method under your daily inspection and direction have proved that the method is wrong. From the commencement of the use of such method to the present time we have been able to place only 66,690 yards of hydraulic material in the dam. A comparison of this yardage with the 1,225,456 yards placed in a seven months' period by the contractor's method speaks for itself.

14. We are accordingly quite surprised to have you at this late date ask us, as per your letter of April 17, 1934, to specify the method we expect to follow in order to accomplish full compliance with the contract drawings and specifications.

15. You have by your arbitrary, unreasonable and wrong orders prevented us from using our own methods, which under the terms of our contract were clearly entitled to use. We have felt we had no alternative but to follow the specific orders issued by you, though we have at all times advised you in so doing we would claim increased compensation and damages from the City of San Diego to the extent that you had by such orders increased our costs.

16. So far as the contractor knows, or any of your assistants here at the dam know or will tell the contractor, no stratification exists in the puddle core area. An impervious core section exists there now, which is of a character and quality that is in full compliance with the contract specifications.

17. However, as we advised you in our letter of October 25, 1933, the puddle core has been lagging behind the upbuilding of the beach area as a direct result of your arbitrarily setting the puddle core stakes beyond the specified limits of the puddle core as fixed by our contract and not through any fault on the part of the contractor. All borrow pits used to date were designated and approved by the specifications and drawings upon which we bid and which form a part of our contract. The city wasted a very large portion of the fines contained in these borrow pits and upon which we relied in making our bid, by arbitrarily extending the puddle core beyond the limits specified in our contract.

18. In our letter of October 25, 1933, we further advised you that to the extent our costs of performing the work and completing the hydraulic fill portion of the dam was in any manner increased by your extension of the puddle core beyond the limits specified in Drawing WD-383, we would demand increased compensation.

19. You have directed the movement of our shovels in borrow pits from day to day, and at times from hour to hour, and required us, over our protest, to put the borrow pit material containing the highest percentage of fines in the bottom of the dam. While this action on your part resulted in the puddle core being widened and extended far beyond the limits specified in our contract, it also resulted in a very substantial waste of fines and is now the occasion of your desire to have us at our own cost and expense import fines from outside sources in order to complete the hydraulic fill portion of the structure.

20. We protested the wasting of fines by the City, and now feel that any shortage of fines is a matter relative to which the City must assume the full responsibility. The contractor proposes to continue to use the method dictated by you, and to hold the City responsible for the increased cost occasioned by the wrongful methods which you have dictated.

21. The last corrective work done in the puddle core was on April 18. Since April 18 we have asked you for specific directions and instructions. We asked you at noon on April 24, 1934, if the puddle core pool was O.K., and your answer was that you did not know. We asked you if you knew of anything that needed correction, and your answer was that you did not know. We asked you if you had results coming from further tests and as to whether the results thereof would be available by the 25th, to which question you answered "probably".

22. Your failure to advise us and definitely instruct us relative to proceeding with the work has rendered it impossible for us to proceed with any work whatsoever in connection with the hydraulic fill portion of the structure.

23. The upbuilding of the puddle core which you have referred to from time to time has now been definitely accomplished and the depth of the water in the summit pool has been reduced to approximately seven feet. While we consider your requirement that the depth of the summit pool be reduced to seven feet as altogether arbitrary, unreasonable and of no significance, we are nevertheless complying with such order, and will likewise make claim against the City of San Diego for all increased costs and damages occasioned thereby.

24. If the puddle core in its present status is not satisfactory or does not meet with your approval, will you kindly at once advise us, in writing, as to the specific details in which the puddle core fails to meet the specification requirements for an impervious core as set forth in our contract.

25. We are ready to at once resume placement of hydraulic fill material, and will on the 3rd day of May, 1934, resume the placement of materials in the hydraulic fill portion of the structure unless we are advised by you that we are not so to proceed.

26. We shall consider your failure so to advise us as a distinct approval by you of the puddle core in its present state of completion.

Yours very truly,

H. W. ROHL & T. E. CONNOLLY

By T. E. Connolly (Signature)

May 2, 1934

From : Hydraulic Fill Engineer
: Resident Engineer

To : Hydraulic Engineer

Subject : San Diego River Project, El Capitan Feature, Hydraulic
Fill, Contractor's letter of April 30, 1934

1. As requested by the Hydraulic Engineer on May 1, 1934 a review was made of the letter dated April 30, 1934 of H. W. Kohl and T. E. Connolly to the Hydraulic Engineer. Attached to this letter is a memorandum on the contractor's letter and referred thereto by numbered paragraphs.
2. Mr. D. W. Albert has also reviewed this contractor's letter and has also prepared the attached memorandum thereon and referred to same numbered paragraphs.
3. It is recommended that if any reply to the letter of the contractor is made that it should be only to advise him of what the City requires the contractor to do to make the puddle core impervious and to comply with the contract drawings and specifications.
4. There seems only one comment to make on the contractor's letter of April 30, 1934 and that is: All directions and instructions given by the Hydraulic Engineer have been given in accordance with provisions of the contract specifications.

DWA-HW/p

D. W. Albert
Hydraulic Fill Engineer.

Harold Wood
Resident Engineer

May 2, 1934
H.W.

El Capitan Dam

Hydraulic Fill

Memorandum

on

Rohl-Connolly's letter April 30, 1934

(Paragraphs numbered refer to paragraphs in above letter)

1. Dates, numbers of letters and quotation are correct. Letter S-103 of Hydraulic Engineer asking contractors for policy and method they expect to use is in accordance with specifications paragraph 52.

"The construction program shall at all times be subject to the approval of the engineer. The capacity of the construction plant, sequence of operations and method of operation shall be such as to insure the completion of the work within the time of completion specified."

Letter S-93 dated March 6, 1934 of the Hydraulic Engineer limits elevation of summit pool "until the material in the impervious puddle section, has been brought up to within about 7 feet of the elevation of the surface of the water in the summit pool."

No instructions or directions have been given the contractors which are not in accord with the specification requirements. It is true that these directions have been repeatedly given. They probably invade rights which the contractor would like to have and probably do appear arbitrary to him because of his apparent desire to ignore specification requirements.

2. The Contractor's letter of February 1, 1933, which purports to state in detail their proposed method of placing hydraulic material, gives no time element nor quantity schedule whatever. This letter was read on the ground on February 2, 1933 at a conference reported by the Resident Engineer in letter to the Hydraulic Engineer dated February 3, 1933. It became necessary for the Hydraulic Engineer, by letter dated February 4, 1933, to limit area from which hydraulic fill material should be obtained. The contractor attempted deviation from specification requirements on the start of building of the hydraulic fill in the first part of February 1933.

On August 22, 1932, the Resident Engineer was told by Mr. H. W. Rohl that he was sending D. W. Albert, Engineer for the contractors, to buy pumps for hydraulic operations on the dam.

3. Mr. D. W. Albert on August 23, 1932 was told by the Hydraulic Engineer that any hydraulic fill equipment purchased should be such that it could be ultimately used for the full hydraulic method.

4. This is not entirely a correct statement. The contractors were permitted to place by the semi-hydraulic method 1,235,602 cubic yards of hydraulic fill between 11 A.M. February 12, 1933 and October 16, 1933 but 3544 cubic yards were not paid for as it was not satisfactorily placed. The letter S-55 of the Hydraulic Engineer did not order contractors to discontinue hydraulic giant method but directed contractors to "discontinue the dumping of dry material for hydraulic fill on the inside slopes or on the top of the rock embankments of El Capitan Dam for sluicing into the hydraulic fill, and instead thereof, to hereafter place the material by the full hydraulic process by fully saturating and running the material thru properly constructed transporting equipment - pipes or flumes - on to the outer reaches of the hydraulic fill." This is entirely in accordance with contract specifications paragraphs 7, 62 and 63.

5. This statement is substantially correct. The hydraulic giant method is defined by the contractor as the semi-hydraulic method.

6. On September 27, 1933, Mr. H. W. Kahl informed D. W. Albert Hydraulic Fill Engineer for the City, that the contractor was ready to proceed with full hydraulic operations, and asked when the Engineer would demand or order him to go ahead with full hydraulic operations. He asked Mr. Albert about use of east end of spillway channel for hog-box and discussed plan to install mud pump which they were then scouting for. It is evident that the contractors contemplated changing to full hydraulic method before they received letter S-55 of the Hydraulic Engineer dated October 16, 1933. The responsibility for the building of El Capitan dam according to contract specifications is the contractor's.

7. See statement relative to Hydraulic Engineer's statement to D. W. Albert when he left to purchase equipment. No copy of contractor's letter of October 25, 1933 in field office.

8. No comments to make. No copy of contractor's letter of October 28, 1933 in field office.

9. This statement is not correct. The placement of material in hydraulic fill portion of the dam was stopped at 9:30 A.M. December 5, 1933. Letter S-70 of the Hydraulic Engineer was delivered to the contractor's foreman J.C. Greely at 7:55 P.M. December 4, 1933.

10. This is substantially a correct statement.

11. The City's Hydraulic Fill Engineer was continually insisting on more thorough washing of the beaches to reduce the fines being left. Deputy State Engineer George W. Hawley said he wanted to see less clay in the beaches. The results of laboratory tests on 249 samples of beach material showed that 19 percent of fines were not being recovered even with the relative wide beach space available for washing by the semi-hydraulic method. A deduction of 3544 cubic yards was made in estimate No. 11 for the month of March 1933, because of improper placing.

12. This is substantially a correct statement.

13. The contractor resumed placement of hydraulic fill material by full hydraulic method at 7 A.M. February 8, 1934 and after the Hydraulic Engineer on February 7, 1934 had told Mr. T. E. Connolly on the dam in the presence of D. W. Albert, and the Resident Engineer that the contractor may proceed to build up the puddle core using materials from pits A, B and/or C, provided the coarse material was wasted at the hog-box. This was confirmed by Hydraulic Engineer's letter S-88 dated February 8, 1934.

The contractor, in spite of all directions continued the up-building of the beaches and by his methods reduced the width of both beaches which in turn prevents his properly recovering all practicable fines and had not appreciably built up the lagging puddle core until he did so by permitting sand strata to get into the puddle core which he has endeavored to mix to some extent with the excess fines present.

The City is not concerned with the quantities placed by the contractor by any method but are concerned with the quality of results secured. The Hydraulic Engineer's letters S-93 dated March 6, 1934 and S-97 dated March 17, 1934 not having been heeded, resulted in the Hydraulic Engineer's letter S-98 of March 21, 1934 notifying the contractor to discontinue the placing of material in the hydraulic fill until conditions in the puddle core had been corrected.

14. The request of the Hydraulic Engineer made in his letter S-103 dated April 17, 1934 for policy and method the contractors expect to follow to accomplish full compliance with the contract drawings and specifications is in view of the contractor's persistent non-compliance with directions of the Hydraulic Engineer, a very proper request and in accordance with contract specifications paragraph 52. It must be remembered that the original request for this information was most incompletely complied with on February 1, 1933 and failed to mention any dates or time element schedule, number of shifts to be worked organization for carrying on the work or the rate of progress.

15. It is obvious that any methods which the Hydraulic Engineer has directed in accordance with contract specifications would be considered unreasonable and wrong orders by the contractor.

16. The contractor has had access to and has availed himself at all times to the City's records pertaining to the work. The contractor, therefore, is mistaken when he says that he does not know that stratification exists in the impervious puddle core.

17. Stakes were set for control of the width of the summit pool from February 13, 1933 to October 7, 1933. It should be understood that the width of the summit pool has very little if any relation to the width of the "puddle core fine, impervious material" as shown on Drawing WD-383. The summit pool width was staked so that the coarse materials would not encroach on the puddle core section even with the great depth of summit pool which the contractor persisted in maintaining. There was nothing arbitrary about this. On December 2, 1933 and again on March 13, 1934, stakes were set for the width of the puddle core.

Borrow pits designated D and K were not shown nor approved by the specifications and drawings but were made and material used therefrom by the contractors.

Samples along the outer limits of the puddle core taken February 1933 to October 1933 show the necessity for the width as staked for the summit pool.

18. No comment to make.

19. Paragraph 52 of the contract specifications provides for the construction program at all times to be subject to the approval of the engineer.

20. Paragraph 53 provides for all clay required to be taken from approved borrow pits. Any payments required to be made for materials taken from pits located elsewhere than on City property shall be made by the contractor. The methods dictated by the Hydraulic Engineer are not wrong but their execution are entirely wrong as shown by the two failures to build a proper impervious puddle core.

21. No comment to make on this for lack of knowledge of questions or answers. Samples taken on April 21, 1934 at questionable point were not conclusive of satisfactory puddle core condition. Samples were taken on April 30, 1934 and were reported on May 1, 1934.

-5-

22. The Resident Engineer has received no copies of any instructions to the contractor relative to proceeding with the work.

23. The hydraulic fill operations under contract specifications paragraph 63 shall be subject at all times to approval of the engineer.

24. No comment to make as this is a matter of policy which rests with the Hydraulic Engineer. The puddle core is not acceptable under the contract specifications in its present condition, in the opinion of the Resident Engineer.

25. The contractors placed no hydraulic fill up to 4 P.M. May 2, 1934.

26. No comment to make as this is a matter of policy which rests with the Hydraulic Engineer.

Harold Wood
Resident Engineer

HW/p

May 2, 1934
DWA

M E M O R A N D U M

El Capitan Reservoir Dam, Contractor's letter 4-30-34

1. No comments.
2. No comments.
3. No knowledge of contractor's proposed method as of February 1, 1933. I entered employ of City February 9, 1933. Equipment on job at time of my entering employ of City was not suitable and was replaced by suitable but not adequate units after my entering City employ.
4. No comment.
5. I did not approve of ordering full hydraulic fill method.
6. No consequence.
7. No comments.
8. No equipment scrapped in changing methods.
9. No comment.
10. Stop order issued about 7 P.M. December 4, 1933. Hydraulic operations continued until 9:30 P.M. December 5, 1933. Sand entering puddle section not caused by full hydraulic method but by manipulation of method. No control over delivery of material to beaches by dump foreman except by traveling on foot from beaches to pump station an average distance of about 1000 feet requiring not less than five minutes time to change delivery of material during which interval with no control over material being delivered, sand could and was deposited in puddle section.
11. No comment.
12. Statement contrary to statement made in paragraph 18.
13. No comment.
14. Any hydraulic method used would produce similar results when using material from borrow pits A, B, C or similar material.
15. Nothing surprising about question.
16. Statement which can not be verified.
17. No positive evidence as to existence or non-existence of stratification in puddle core section. Specifications show a definite width of puddle at point in question. Positive evidence that an impervious puddle section of width as shown on plans and specifications does not exist.

18. In paragraph 18 the statement "The quality of the core or beaches was never at any time questioned. In fact they merited and received nothing but the highest praise from every engineer who viewed the structure." Stakes were set 10 feet out from puddle section margin and designated the minimum width of summit pool. Due to depth of water and liquid mud in summit pool, sand would upon reaching the margin or shore line of summit pool slide or be carried to under water toe of beaches which was within the puddle zone section. No wasting of fines occurred from this condition. Any wasting of fines was caused by retention of silt and clay in beaches caused by using insufficient water in hydraulicking operations. At no time did the puddle core extend into the beach area except at south end of dam which was direct result of contractor's operations and which was objected to by the City.

19. Reaffirm that puddle section never at any time extended beyond limits specified in Drawing WD-383.

20. Never gave any directions as to movements of shovel. It is true that the portions of the borrow pits which contained most suitable material was pointed out to the contractor and wishes expressed as to what material was desirable, and no direct orders were ever given to move shovels, except in one instance where contractor persisted, contrary to all agreement, in keeping the shovel in sand.

21. Reaffirm no fines were wasted by City.

22. Purely personal matter between Mr. Savage and contractors.

23. Same as paragraph 22.

24. No objection to present depth of water in summit pool provided proper material is used in upbuilding and maintaining puddle section to completion of dam.

25. Sketch now in hands of Mr. Savage showing what is desirable and required.

26. Taken care of in paragraph 25.

DWA/p

D. W. Albert
Engineer Hydraulic Fill

May 3, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-106

Subject: San Diego River Project, El Capitan Feature
Hydraulic Fill, correction of unsatisfactory
condition in the impervious puddle core
section.

Gentlemen:

Your attention is invited to my letter S-98 dated March
21, 1934, reading as follows:

"You are hereby notified to discontinue the
placing of material in the hydraulic fill section
of the El Capitan reservoir dam until you have
corrected, to the satisfaction of the Hydraulic
Engineer, the condition that exists in a large
portion of the impervious puddle core area due to
the existence of sand strata resulting from your
methods of construction."

and

To my formal verbal requirement to you in my office May
1, 1934 for further correction of the existing unsatisfactory
conditions in the impervious puddle core section of the El
Capitan dam, which it is understood you have not accomplished
or undertaken.

You are hereby again directed to refrain from and/or to
stop if you have again commenced placing material in the
hydraulic fill area of the El Capitan reservoir dam until you
have corrected the unsatisfactory condition in the impervious
puddle core section to the satisfaction of the Hydraulic
Engineer, and subject to approval by the State Engineer.

Very truly yours,

H. N. Savage
Hydraulic Engineer.

HNS/f

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

May 7, 1934

Mr. H. N. Savage
Hydraulic Engineer
San Diego, California

Re: EL CAPITAN RESERVOIR DAM,
SPILLWAY & OUTLET WORKS

Dear Sir:

Your stop order S-106 of May 3rd was received on May 3rd at 7:30 P.M. and promptly complied with.

In our letter to you of April 30th we wrote you as follows:

"If the puddle core in its present status is not satisfactory or does not meet with your approval, will you kindly at once advise us, in writing, as to the specific details in which the puddle core fails to meet the specification requirements for an impervious core as set forth in our contract."

You have failed and refused to answer the foregoing request. If the State Engineer is not satisfied with the results of the methods of construction which you have arbitrarily ordered, why don't you order us to return to our own methods which gave results that the State Engineer did approve?

The only impervious core which we contracted to build was one containing an impervious concrete diaphragm or core wall. You ordered us not to construct this concrete core wall and by the elimination thereof saved the City more than \$150,000.

You have no right to increase the standard of the puddle core for the purpose of requiring the Contractor at his own cost and expense to supplant with other and different materials the concrete core wall eliminated, construction of which would have cost the City more than \$150,000.

We again respectfully request that you at once advise us, in writing, as to the specific details relative to which you contend that the puddle core in its present status does not meet the specification requirements of our contract.

Yours very truly,

H. W. ROHL & T. E. CONNOLLY

By T. E. CONNOLLY (Signature)

City of San Diego, California
El Capitan Reservoir Dam, Spillway and Outlet Works
Contract construction. Engineer Fred D. Pyle's
report on Contractor H. W. Rohl and T. E. Connolly's
letter dated April 30, 1934.

M E M O R A N D U M

May 7, 1934

Subject: San Diego River Project, El Capitan Feature
Hydraulic fill, policies and methods

Consideration has been given to the reply of H. W. Rohl and
T. E. Connolly dated April 30, 1934 to your letter to them of
April 17, 1934, S-103, reading in part as follows:

"You are hereby directed that after satisfactory
removal of objectionable sand strata and before
the placing of hydraulic fill material may again
be undertaken to submit for consideration by the
Hydraulic Engineer the policy and method you ex-
pect to follow to accomplish full compliance with
the contract drawings and specifications and my
letter S-93 dated March 6, 1934."

Letter S-93 dated March 6, 1934, reads, in part, as follows:

"This is to notify you that the surface of the water
in the summit pool shall not be brought up higher
than at present until the material in the imperv-
ious puddle core section, as determined in the
usual manner, by a 6-pound weight coming to rest
on and/or in the puddle core material, has been
brought up to within about 7 feet of the elevation
of the surface of the water in the summit pool.

"Thereafter the depth of the summit pool, as indi-
cated in the usual manner as above outlined, shall
not be more than about 7 feet."

The Contractor discusses at considerable length the following
items:

(a') The interference of the Hydraulic Engineer in
ordering the contractor to use methods prescribed
by the Hydraulic Engineer. (Paragraphs 1, 15)

(a) The undertaking of the work and accomplishing
with the semi-hydraulic method of placing material
which he was permitted to use previous to October
1, 1933. (Paragraphs 2, 3, 4, 11)

(b) The order dated October 16, 1933, S-55 requir-
ing the contractor to change to the full hydraulic
method of placing materials. (Paragraph 5)

- (c) His objections and claims on receipt of 8-55 and later that the full hydraulic method could not be successfully used. (Paragraphs 6, 8, 13)
- (d) His expectation to hold the City responsible for all increase in costs due to change from semi-hydraulic to full hydraulic methods. (Paragraphs 7,15)
- (e) His stopping of work December 4, 1933 because of sand strata caused by delay in changing to full hydraulic methods and use of full hydraulic methods.(Paragraph 9)
- (f) His claims that the sand strata have resulted because of change from semi to full hydraulic methods. (Paragraph 9,10)
- (g) His expectation to hold the City responsible for all increase in costs due to occurrence of sand strata. (Paragraph 10)
- (h) Waste of fines due to engineers extending the puddle core beyond the limits specified in contract. (By staking the outer limits of the summit pool). (Paragraph 17, 20)
- (i) Waste of fines due to engineers requiring him to place borrow pit material rich in fines in the bottom of the dam producing a wider puddle core than the specifications requirements. (Paragraph 17, 19)
- (j) His expectation to hold the City responsible for all increase in costs due to wasting of fines due to (h) and (i). (Paragraph 18, 20)
- (k) His claims that the correction work of removing sand strata has been completed but he has not been so advised. (Paragraph 16, 21, 22)
- (l) His proposal to continue the method (full hydraulic) dictated by the Hydraulic Engineer. (Paragraph 20)
- (m) His expectation to hold the City responsible for increased costs due to such method. (Paragraph 20)
- (n) His claim that the upbuilding of the puddle core to a summit pool depth of 7 feet has been accomplished. (Paragraph 23)
- (o) His claim that the requirement for reducing depth of summit pool to depth of 7 feet is unreasonable. (Paragraph 23)
- (p) His expectation to hold the City responsible for all increase in costs due to reducing the depth of the summit pool to 7 feet. (Paragraph 23)
- (q) He requests that he be notified in writing at once as to approval of the puddle core or in the event of its disapproval the reasons for its disapproval. (Paragraph 24)

(r) His readiness to proceed on May 3, 1934 with placement of hydraulic fill unless advised not to proceed. (Paragraph 25, 26)

The Contractor in letter S-103 was asked to state the policies and methods which he expected to follow to accomplish full compliance with certain requirements in regard to the upbuilding of the lagging puddle core. His reply was

"the Contractor proposes to continue to use the method (full hydraulic) dictated by you (Hydraulic Engineer),"

No objection is seen to the use of the full hydraulic method but in order to accomplish the upbuilding of the lagging puddle core and in the future insure a proper relationship between the puddle core and the beaches it may be necessary for the contractor to:

(a) Use a system which will, by removal of coarse materials and without excessive waste, materially increase the percentage of fines in material originating in local borrow pit areas located on property owned by the City of San Diego, reaching the hydraulic fill section of the dam; or

(b) Import sufficient material rich in fines from borrow pit areas to be located by the contractor on lands not owned by the City of San Diego; or

(c) Provide a method of mixing the material in the impervious puddle core section so that sand strata when formed are removed; or

(d) Provide some other method which will produce a satisfactory impervious puddle core section without sand strata.

Inasmuch as there are a number of policies and methods which will unquestionably result in the satisfactory upbuilding of the impervious puddle core when properly executed, it is not deemed proper to direct the contractor as to the use of any one policy or method but to hold him responsible for a satisfactory puddle core.

The contractor claims that the depth of the summit pool is now in full compliance with the requirements of S-93. Soundings and measurements taken indicate that when the level of the pool is raised to normal level for hydraulic operations that the depth will, in many places, be 2 feet or more in excess of the required 7 feet.

The contractor throughout his letter of April 30, 1934, lays stress on the fact that he was ordered to change from semi to full hydraulic method of construction;

The impracticability of the full hydraulic method;

Additional costs due to such change;

Additional costs due to attempting to carry on construction with full hydraulic method;

Cost of correcting sand strata.

For all of which he expects to hold the City responsible.

While the contractor was permitted to use the semi-hydraulic method in the wide lower portions of the dam, he was never in my knowledge advised that he could expect to use the semi-hydraulic method throughout the construction of the dam.

When certain unsatisfactory conditions began to develop, the Hydraulic Engineer, in accordance with the contract specifications, saw fit to order the change to full hydraulic methods.

The difficulties which have been encountered since the change from semi to full hydraulic method have been due to the contractor's disregard of ordinary hydraulic practice and the instructions of the Hydraulic Engineer.

Fred D. Pyle
Engineer

FDP/p

May 11, 1934

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MEMORANDUM

Subject: San Diego River Project, El Capitan Feature
Hydraulic fill, impervious puddle core

The contract specifications for the El Capitan Reservoir Dam, Spillway and Outlet Works provide, paragraph 63, that

" fine materials in the central portion of the dam, as indicated on the drawings, or as prescribed by the engineer, shall be sorted and placed by hydraulic means or such methods as may be acceptable to the engineer. . . . The materials, their gradation, their disposition and manner of transportation and equipment shall be subject to the engineer's approval. . . . The width and slope of the outer flanks and the depth and width of the settling pool will largely control the gradation of materials and shall be subject at all times to the direction of the engineer. The materials for the main body of the embankment shall be delivered near the outer edge of the embankment slopes and so manipulated that the coarser materials, free from clay and silt, will remain near the outer slopes and the finer materials carried toward the center, the impervious materials being deposited next to the core wall so as to form an impervious core. Stratification in the hydraulic fill section will not be permitted. . . . No strata or lenses of sand, gravel or other open or porous material will be permitted in the central section."

The limits of the puddle core of fine impervious material, i.e. the central section referred to above are shown on Drawing WD-383, as being 125 feet wide at the bottom of the dam and 30 feet wide at the top. Gradation analyses of hundreds of samples taken from the puddle core, except for sand strata, show 50 to 70 per cent of materials passing 200 mesh screen. Percolation and consolidation tests of this puddle core material indicate under a pressure equal to 75 feet of hydraulic fill and with a hydraulic gradient of unity a percolation velocity of less than one tenth of a foot per year which indicates that the puddle core may properly be considered as impervious.

Gradation analyses of undisurbed sand strata within the puddle core section show only 15 to 25 per cent of materials passing 200 mesh screen; and percolation and consolidation tests on the same basis as above show a percolation velocity of from 32 to 68 feet per year or 320 to 680 times as much as the puddle core material.

As the sand strata is disturbed in the process of removing or mixing, the percentage of fines in the strata increases. On February 7, 1933 when puddle core material containing more than 40 per cent passing 200 mesh screen was at least 20 feet wide in the vicinity of the axis of the dam and the remaining material in the strata located along the beaches contained 30 to 40 per cent of material passing a 200 mesh screen, the Hydraulic Engineer and the State's Engineers deemed that the sand strata was sufficiently

corrected to assure the safety of the structure and permitted the contractor to resume the placing of hydraulic fill.

Percolation and consolidation tests for materials having 30 to 40 per cent passing 200 mesh screen gave percolation velocities of 2 feet to 16 feet per year.

Except for sand strata, the puddle core proper has been very satisfactory.

Sand strata have generally occurred because the summit pool was too wide and too deep.

The excessive depth and width of the summit pool are due to comparatively short beaches, excessive quantity of fines left in the beach section, insufficient fines in the borrow pit materials and insufficient coarse material in excess of 1/4" in the borrow pit material.

The contractor has consistently conducted operations so as to shorten the beaches, by piling borrow pit material on the rock embankment side of the beach and by permitting the summit pool to become too deep with resulting increase in width which also tends to decrease the beach length and to increase the amount of fines that are wasted in the summit pool by being deposited outside the theoretical limits of the puddle core.

The contractor could have corrected this condition by utilizing the beaches practically to the rock embankment, by scalping out or deleting sufficient coarse material from the borrow pit material available in the vicinity of the dam to overcome the excessive depths of the summit pool or by importation of material containing sufficient fines to accomplish the same result.

CONCLUSION

Sand strata occur in the puddle core as the result of the contractor's operations and in accordance with the contract specifications are not permitted to remain.

Except for the sand strata, the puddle core has always been sufficiently impervious to justify approval so that it is not necessary to attempt to accurately define the minimum limits of imperviousness which would be acceptable. Furthermore, a considerable factor of safety above the actual theoretical tests is necessary and advisable in a structure of the type of the El Capitan dam where it is difficult to locate and test all sand strata, a portion of which are more than 20 feet below the surface of the summit pool; and particularly in view of the cost of the dam and the great loss of life and property in the event of its failure.

No precedent of practice has been established by engineers as to degree of imperviousness deemed necessary and the contract specifications provide that the judgment of the Hydraulic Engineer shall control. In the construction of a majority of hydraulic fill dams, an excess of fines makes it necessary to waste fines in order to prevent the puddle core section from becoming excessively wide and thus reducing the stability of the dam.

Fred D. Pyle
Engineer

May 12, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-108

Subject: San Diego River Project, El Capitan Feature
Hydraulic fill, correction of sand strata.

Gentlemen:

Receipt is acknowledged of your letter dated May 7, 1934 requesting information as to wherein the impervious puddle core section of the El Capitan Dam does not comply with the contract specification requirements.

Analysis of samples taken from the impervious core section indicate a number of sand strata and/or lenses still projecting into the impervious puddle core section from both the upstream and downstream beaches, contrary to the specific requirement of the specifications.

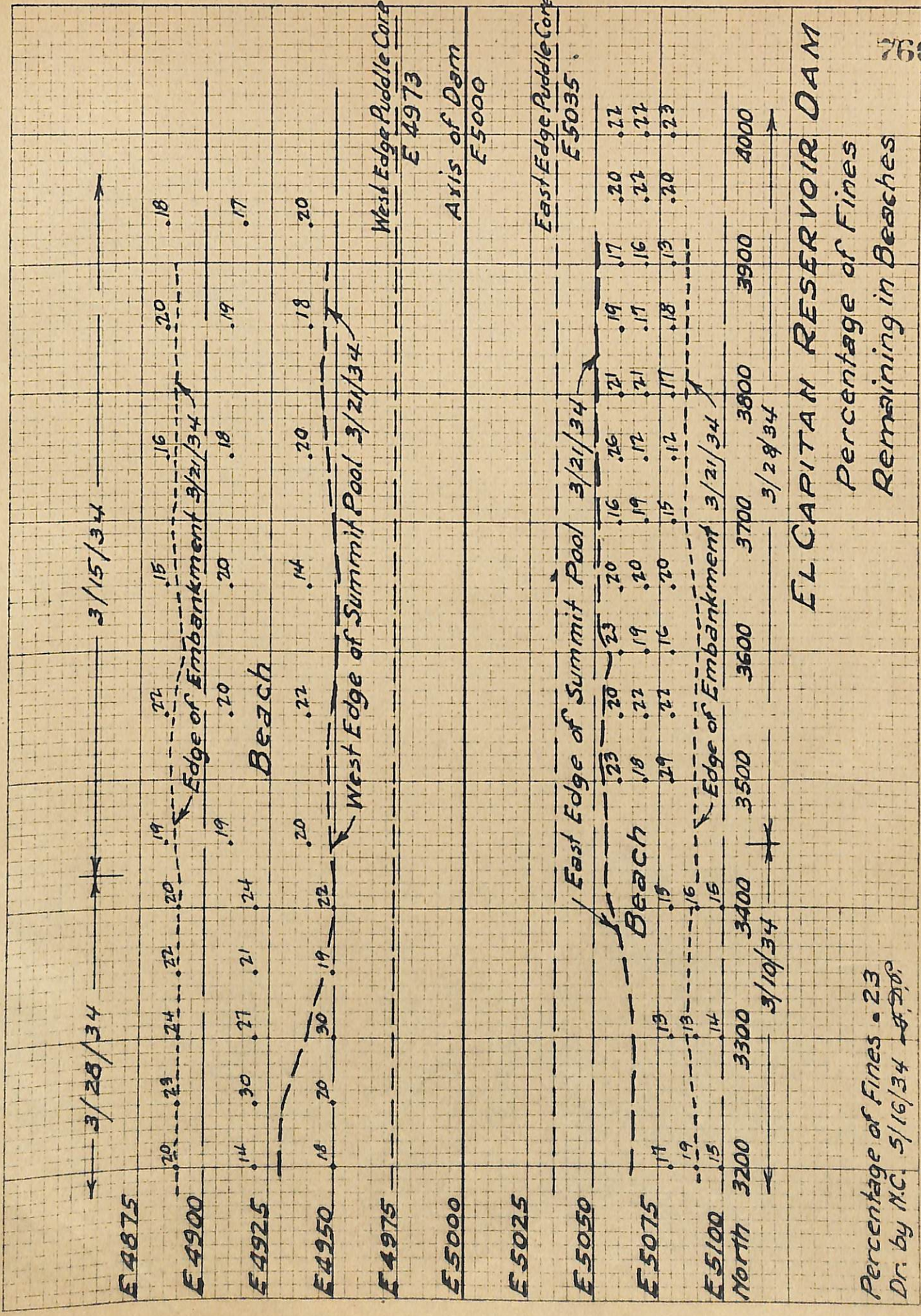
You were comprehensively and specifically advised in my office May 1, 1934 as to this condition.

As then stated to you I again state that provided you will run your core mixing rotator machine, or other efficient machine, effectively in depth to elevation 672, or to a lesser depth if directed, and for the entire length of the summit pool from abutment to abutment, and on both sides of the central alignment of the structure, zones of operation of machine runs to be separated by upwards of 15 feet, all to the satisfaction of the Hydraulic Engineer; the Hydraulic Engineer will approve the work subject to the State Engineer's deeming the structure to be safe.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/f



EL CAPITAN RESERVOIR DAM
Percentage of Fines Remaining in Beaches

Percentage of Fines = 23
Dr. by N.C. 5/16/34

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

May 25, 1934.

H. N. Savage, Hydraulic Engineer,
City of San Diego,
San Diego, California.

Dear Sir:

We wish to acknowledge receipt of your letter S-108 of May 12, 1934, wherein you state:

"Analysis of samples taken from the impervious core section indicate a number of sand strata and/or lenses still projecting into the impervious puddle core section from both the upstream and downstream beaches, contrary to the specific requirement of the specifications.

You were comprehensively and specifically advised in my office May 1, 1934, as to this condition."

You are in error in stating that we were comprehensively and specifically advised in your office that sand strata and/or lenses still projecting into the impervious puddle core section from both the upstream and downstream beaches, contrary to the specific requirement of the specifications, exist. On the contrary, your sample analysis there presented showed no sand strata to exist, and your statement for operating the rotory machine was that there might be some sand strata there which your samples failed to locate or reveal.

In your letter of the 12th you further state:

"As then stated to you I again state that provided you will run your core mixing rotator machine, or other efficient machine, effectively in depth to elevation 672, or to a lesser depth if directed, and for the entire length of the summit pool from abutment to abutment, and on both sides of the central alignment of the structure, zones of operation of machine runs to be separated by upwards of 15 feet; all to the satisfaction of the Hydraulic Engineer; the Hydraulic Engineer will approve the work subject to the State Engineer's deeming the structure to be safe."

Since receipt of your letter of May 12th we have endeavored to arrive at some agreement with the City whereby we might agree upon a method satisfactory to all parties for proceeding with the construction of El Capitan Dam. We, however, have been unable to arrive at an understanding agreeable

to all parties. Inasmuch as the contractor desires to complete the construction of the El Capitan Dam and fully perform the terms of his contract and deliver to the City of San Diego a completed structure, we respectfully advise you that we will immediately proceed to operate the mixing rotator machine referred to in your letter of May 12th. Your order of May 12th is neither reasonable nor a proper obligation under our contract with the City. We will proceed to follow that order and to keep a record of costs, and as soon as the costs are ascertained, will demand payment from the City for all costs occasioned the contractor in compliance with such order.

Your previous orders, both verbal and in writing, whereby you have precluded us from using borrow pit areas A, B and C exclusively as a source for suitable material for use in the hydraulic fill portion of the structure has effectually prevented us from proceeding with the hydraulic fill portion of the dam in accordance with the terms of our contract. We are under no obligation to import fines from outside sources, but we propose to complete the dam and to comply with the terms of our contract relative to the delivery of a completed structure, and we likewise propose to charge all costs occasioned by your arbitrary and unreasonable orders to the City of San Diego.

We will, therefore, immediately upon completion of the work referred to in your order of May 12th and upon approval by the City Council of the Hydraulic Engineer's order eliminating the core wall as set forth in our letter of May 21st, commence the importation of fines, which you should be prepared to inspect, and either accept or reject.

To the extent that our construction costs are increased by the importation of fines from outside sources, we will make demand for payment against the City of San Diego, as we are under no obligation to import fines from outside sources and accept payment therefor at the unit prices bid for the approved borrow pit areas A, B and C as specified in our contract.

Very truly yours,

H. W. ROHL & T. E. CONNOLLY

By T. E. CONNOLLY (Signature)

CC: City Council
City Manager
City Attorney

May 26, 1934

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M E M O R A N D U M

San Diego River Project, El Capitan Feature
Hydraulic fill, progress of work

Dumping of dry material for semi-hydraulic placing stopped on October 16, 1933 after delivery of S-55 requiring full hydraulic fill placing.

Last operation of monitors on semi-hydraulic placing of material October 8, 1933.

Material deposited in hog box for full hydraulic placing about 16,500 cubic yards November 27 to December 5, 1933.

Full hydraulic placing of material from November 27, 1933 to December 5, 1933, with practically no material placed on November 27 and 28. Work stopped on morning of December 5, 1933 following delivery of S-70 on evening of December 4, 1933. Hog box about empty of material when work stopped.

Work of removing sand strata undertaken January 5, 1934 with clamshell buckets operated from dragline machines and later by drag buckets operated from slack lines. Material deposited on beach and rewashed. Some coarse material removed from the section of the dam and wasted. This method left a deep summit pool.

Removal of sand strata completed February 7, 1934.

Work of placing hydraulic fill material again undertaken February 8, 1934.

Sand strata found in puddle core area vicinity N3200 on March 10, 1934 and northward to vicinity N3700 on March 13.

Hydraulic placing stopped March 21, 1934.

Work of mixing sand strata with adjacent puddle core material undertaken March 24, 1934 with a rotator puddle core mixing machine which did not deepen the summit pool.

The contractor discontinued the use of the core mixing machine on April 17 and has not worked it since that date, although he was told on May 1 that the removal of sand strata was not complete and that the core mixing machine should be run once on each side of the axis of the dam and for the entire length of the summit pool and where necessary effectively to elevation 672.

About 600 cubic yards of material was sluiced from the hog box to the hydraulic fill contrary to instructions of the Hydraulic Engineer on May 3 and was stopped upon receipt of letter S-106.

Fred D. Pyle
Engineer

FDP/p

May 29, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-111

Subject: San Diego River Project, El Capitan
Reservoir Dam, Spillway and Outlet Works
Contract construction.

Gentlemen:

Receipt is acknowledged of, and consideration carefully weighted, has been given to your letter dated May 25, 1934 in which you outline a number of matters and indicate policies and methods which you declare you are assuming for your future guidance in carrying on the contract construction of the City of San Diego's El Capitan Reservoir Dam, Spillway and Outlet Works.

The City of San Diego has throughout endeavored to measure up to and carry out its obligations fairly to the Contractor under the contract drawings and specifications for the construction of the El Capitan Reservoir Dam, Spillway and Outlet Works.

The City of San Diego has and will continue to expect and require the Contractor to measure up to and carry out in a reasonable compliant manner the undertakings assumed by him and his sureties under the drawings and specifications for the construction of the El Capitan Reservoir Dam, Spillway and Outlet Works.

The required construction progress of the work has already been arbitrarily delayed by the Contractor by a total of several months and on account of the potential value to the City of San Diego of the use of the El Capitan reservoir for impounding the potential water resources during the coming winter runoff season, the City of San Diego finds itself constrained to take any and every step found required to accomplish the completion of the El Capitan Reservoir Dam, Spillway and Outlet Works timely as set forth in the contract drawings and specifications.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/f

June 8, 1934

From : Resident Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan Feature
Hydraulic fill, completion of dam

1. As requested by the Hydraulic Engineer on June 1, 1934 here is statement on completion of El Capitan dam after completion of corrective work to puddle core in accordance with letter S-108 and after approval by the City.

2. Quantities: To complete the dam from its present elevation will require 372,000 cubic yards of hydraulic fill of which 112,600 cubic yards will be puddle core if the core is built as per drawing WD-485 approved by the State. To accomplish the up-building of the lagging puddle core and to complete the core will require about 45,000 cubic yards of material containing in excess of 60 per cent of fines.

3. Existing Conditions: The contractor has left the beaches in such shape that it will be difficult to carry on the construction. Sand was removed from the upstream beach and deposited on the inside slope of the upstream rock embankment and rock was placed thereon to elevation about 708. This sand covers an average width of 28 feet of the former 59 foot width of beach, or a reduction of about 48 per cent in the available width of beach. This upstream beach is now at an average elevation of 691.

Sand was removed from the downstream beach and deposited on the inside slope and on top of the downstream rock embankment. This sand covers an average width of 22 feet of the former 71 foot width of beach or a reduction of about 31 per cent in the available width of beach. This downstream beach is now at an average elevation of 692.7.

The reduction in width of beach reduces in direct ratio the amount of recoverable fines for any given heightening of the beaches.

The puddle core must be built up faster than the beaches until the proper relationship of 4 to 5 feet of difference in elevation of puddle core to the shore line of beach is established and then this relationship must be maintained. It is evident that the reduction of the beach width has defeated the desirable and formerly available working space required to effectually sort the fines by hydraulic method. Both beaches have been dug into during times when the summit pool was higher and this has resulted in objectionable quantities of puddle core material being deposited on the beaches. Not all of this fine material is on the surface but some has been trapped and covered up by the contractor's placement of materials on the south end of the upstream beach on May 3, 1934 in defiance of the Resident Engineer's orders EIC.13 and Hydraulic Engineer's orders S-98.

4. Policies: The Hydraulic Engineer's orders S-55 requires the hydraulic fill to be constructed by full hydraulic process. This is in accordance with Paragraph 63 of the contract specifications. It seems questionable to recommend that any work now be done which is not in accordance with this policy. It is assumed that all future placement of material in the hydraulic fill must be done in accordance with these orders as any semi-hydraulic or other method of placement permitted would certainly weaken the position of the City. Just because the contractor was not stopped from using the semi-hydraulic method for placing the major portion of the yardage, certainly could not possibly be construed as contributing to the results which are entirely up to the contractor.

5. Hydraulic Fill Placement: The fines present on and in the beaches should be thoroughly sluiced off by jets operated from a barge on the summit pool, and left in proper shape transversely and longitudinally level.

It is assumed that the contractor will use the same equipment he has been using until it is worn out. He should be required to so restrict the flow in the pipe lines leading to the beaches that no gushing or intermittent flow conditions would be possible. The flow should be reduced in volume and divided to the two beaches. The deflecting vanes at the discharge ends of the pipes, and sufficient header boards and men to operate same should be used.

The summit pool should be raised to edge of beaches or about elevation 691.5.

The imported material, rich in fines, should be deposited in the hog box and pumped to the beaches. As the material is deposited on the beaches it should be washed by a jet from a barge on the summit pool so that a maximum amount of these fines may be deposited in the summit pool. The jet from the barge should scatter and tend to fan out the stream flowing from the discharge pipe line on the upstream beach where the available working width is so small. It may be necessary to discontinue placing operations so the jet washing may catch up and leave the beaches as free of fines as possible. A tendency at all times should be to crowd the beach towards the pool but this must be done with great care and all operations must be correlated and under one man with responsibility and instant control of all operations.

6. Water Supply: Past experience has shown that about 2 second feet of continuous flow is necessary to supply the "make-up" water. With the moist imported material it may not require more than 1.5 second foot. There is no surface flow in the river above the contractor's storage dams. About 0.5 second foot is flowing in Chocolate Creek. The contractor has about 112 acre feet of water in storage, which will hold out until about the second week of August 1934. Preparations should be made for augmenting his supply so there may be no more delays.

7. New Equipment: New equipment will be required to provide additional water supply and to replace present hydraulic equipment which will soon be worn out. A mud pump and pipe lines are good for about 100,000 cubic yards which means that two complete new

discharge pipe lines and mud pumps will be required.

8. Narrowing Puddle Core: The puddle core above elevation 700 should be narrowed to 40 feet in accordance with recommendation of Resident Engineer made in letter dated February 28, 1934. This will reduce the fines required for the core from about 93,100 cubic yards, required per drawing WD-485, to about 55,000 cubic yards. The narrow core will have the more important advantage of increasing the width of the beaches.

9. Local Borrow Pits: It is still considered proper that the contractor be required to completely exhaust the better clay content materials known to remain in borrow pits A, B and C. His disregard of the orders of the Hydraulic Engineer now makes it imperative that material richer in fines than that available in pits A, B and C be obtained and used first.

10. Construction of Rock Fill: After the hydraulic fill is constructed to elevation 708 at the outer limits, then the downstream rock embankment may be constructed to elevation 708 running the trucks on the beach. From this elevation the hydraulic fill should be constructed ahead of the rock embankments and the rock lifts, of 10 foot height, added after the hydraulic fill has been placed. This will provide the maximum beach width and the inside sawtooth effect of the rock embankment slopes will be eliminated and the horizontal thickness of the rock at the several lifts will be as called for on drawing WD-485.

11. Progress: On March 5, 1933 the Resident Engineer and D. W. Albert prepared jointly an anticipated progress schedule, as we were not able to get one from the contractor. This anticipated progress schedule contemplated the hydraulic fill completed to elevation 691 by November 1, 1933. This is about the height now or eight months late. It is not considered practicable to increase the rate of progress of the original anticipated schedule-- if anything it should be slower because of the conditions at the dam now. Assuming however, that rate of the original anticipated progress schedule can be maintained and hydraulic fill placement begins on June 20, 1934, then the dam might be completed in eight months.

12. Conclusions: With proper construction control, centralized in one man with authority to act instantly, this dam may be completed according to contract specifications by February 20, 1935.

HW/r

Harold Wood
Resident Engineer

June 8, 1934

From : Hydraulic Fill Engineer
To : Hydraulic Engineer
Subject : San Diego River Project, El Capitan feature
Hydraulic Fill, completion of

How high clay content materials - 40% or over - can be introduced into the puddle section of El Capitan Dam.

- Method No. 1. Dumped in hog box and delivered to downstream beach through 12-inch mud line.
- Method No. 2. Dumped along shore line both beaches and bulldozed into puddle section.
- Method No. 3. Dumped on shore line and by use of clam-shell rig dumped into puddle section.
- Method No. 4. Dumped on inner slope of downstream rock embankment and semi-hydraulicked into puddle section.

When necessary amount of high clay content material has been deposited in the puddle section by any one of the above mentioned methods, the resumption of dam building will be possible by any one of the following methods.

First, full hydraulic method can be used on the downstream side where sufficient width of beach for proper handling of materials delivered by 12-inch mud pipe line exists.

On the upstream side the use of full hydraulic method is hazardous. The short beach upstream does not permit proper handling of material and a large amount of water.

Some corrective work is advised on the upstream beach especially the southern half, also near the south abutment downstream.

Before sluicing operations start, sufficient water will be added to bring the summit pool to about elevation 692. This raising of the summit pool will submerge the upstream beach and this must be corrected immediately by building up the upstream beach sufficient to crowd the beach or shore line back to about East 5050. This crowding out of the shore line will require great care if full hydraulic method is used. If semi-hydraulic method is used there is danger of washing away the loose sand fill supporting the upstream rock embankment causing the rock to fall within the hydraulic fill area.

It can be said of the semi-hydraulic method that absolute control of the amount of water used in sluicing is under control at all times which can not be said of the full hydraulic fill method. In any event the abnormal conditions now existing will require great care in proceeding with the dam construction. It is anticipated that considerable trouble in pumping the heavy silt laden water in the summit pool after the high clay content material has been deposited will develop.

D. W. Albert, Hydraulic Fill
Engineer

June 12, 1934

769

MEMORANDUM

Subject: El Capitan Dam, impervious puddle core section
Conference D.W.A.; H.I.W.; W.D.P.; H.B.S.; El Capitan guest
house.

1.
(a) Upstream beach - remove clay material from surface and entrapped due to contractor's methods of work.
(b) Downstream beach - remove clay material from surface and entrapped due to contractor's methods of work.
2. Upbuild upstream beach - average width 30 feet, length 800 feet, depth upwards of 2 feet. Require about 2000 cubic yards. D.W.A. deems semi-hydraulic method advisable in upbuilding narrow upstream beach as is and use raw material from borrow pits A, B and C and vicinity to insure necessary perfect control of the water.
3. Summit pool elevation 6-12-34 - El. 689. Summit pool surface elevation to be heightened as upstream beach is raised by hydraulic placement of local material by semi-hydraulic method up to elevation 692 and above.
4. In any semi-hydraulic operation it is imperative that the ratio of water be at least 5 to 1 of earthy material.
5. No further rock embankment may be placed on El Capitan faces ahead of hydraulic fill placement of material, thereby insuring maximum length of beaches and uniform thickness of rock raprap paving.
6. It is estimated that the contractor will be unable to properly place to exceed an average of about 60,000 cubic yards of earthy material a month in the remaining top portion of the El Capitan dam hydraulic fill area. It is estimated that about 372,000 cubic yards of material will be required to be placed to finish the dam, of which theoretically about 94,000 cubic yards will be in the impervious puddle core section as shown on drawing WD-501.

The width of the impervious puddle core section as now recommended by the City's engineers and tentatively approved by the State engineers will be 40 feet at El. 700 and 20 feet at El. 750.

It is estimated that it may be necessary, in order to provide the necessary richer in clay and silt material, to supplement the local material available from borrow pits A, B, and C, and vicinity in the impervious puddle core section to import from vicinity Lakeside about 40,000 cubic yards of material.

The local material from borrow pits A, B, C and vicinity averages about 34 per cent of fines passing a 200 mesh sieve. The Lakeside vicinity material from 18 samples, excluding the top foot, and down to a depth of 8 feet, averages 20 per cent silt, 45 per cent clay, total 65 per cent of fines passing 200 mesh sieve.

H. N. Savage
Hydraulic Engineer

HNS/f

July 9, 1934

From : Resident Engineer
 To : Hydraulic Engineer
 Subject : San Diego River Project, El Capitan Feature, Hydraulic Fill, puddle core material from Lakeside to puddle core June 11 to July 7, 1934.

1. On June 25, 1934, the Resident Engineer reported 10,465 cubic yards of material excavated from the contractor's Lakeside borrow pit and hauled to El Capitan dam. This letter is to supplement the letter of June 25, 1934.

2. The contractors began hauling the Lakeside material on June 11 and placed about 2,065 cubic yards in the hogbox between 7 A.M. June 11 and 8 P.M. June 15, 1934. On June 19, 1934 at 4:15 P.M. the first material from Lakeside was placed directly into the puddle core by dragline unloading skips from trucks on the upstream beach. Assistant Deputy State Engineer W. H. Holmes was present. This operation and also trucks dumping on the downstream beach with bulldozer pushing the material into the pool continued until 6 A.M. June 24, 1933 when the dragline broke down. The operation of placing material into the pool from the upstream side by dragline unloading skips progressed from the north abutment to the south abutment. The operation of unloading trucks on the downstream beach and bulldozing the Lakeside material into the pool also progressed from the north abutment southerly. Both these operations are shown in photographs EC-712 and EC-713 taken June 21, 1934.

3. About 8400 cubic yards of Lakeside material was placed directly into the puddle core. Tests showed this material to be composed of an average of 20 per cent clay, 45 per cent silt and 35 per cent fine sand. The silt and clay combined is well over requirement for puddle core.

4. The following tabulation shows materials hauled from Lakeside pit June 11 to July 7, 1934 inclusive:

Date	Cubic yards	Remarks
1934		
June 11	435	(All truck count)
12	1,043	
13	985	
14	1,092	
15	506	
19	566	
20	1,131	
21	1,196	
22	2,061	8,400 cubic yards
23	2,209	
24	1,237	Adjusted for swell. From hogbox to core
July 5	897	To upstream beach
6	1,396	To upstream beach
7	415	To downstream beach near north abutment
Total to date	15,189	quit hauling 11:30 A.M.

5. On the afternoon of July 2, 1934 the Lakeside material stored in the hogbox was moved hydraulically onto the southerly half of the length of the downstream beach.

6. On July 5, 6 and 7, 1934 Lakeside material was hauled to both hogbox and to the beaches and this was all placed hydraulically into the dam.

Harold Wood
Resident Engineer

HW/p

June 15, 1934

Messrs. H. W. Rohl & T. E. Connolly
Contractors El Capitan Dam
4351 Alhambra Avenue
Los Angeles, California.

S-113

Subject: San Diego River Project, El Capitan
Feature, Materials and Methods of
Construction.

Gentlemen:

1. You have requested permission to place earth material imported from vicinity Lakeside in bulk and unprocessed directly into the lagging impervious puddle core section of the El Capitan reservoir dam.
2. You are required to remove clay material from surface of upstream beach of the El Capitan Dam earth fill area, and entrapped, due to your previous methods of work.
3. You are required to remove clay material from surface of downstream beach of the El Capitan Dam earth fill area, and entrapped, due to your previous methods of work.
4. The upstream beach recently reduced by you from about 58 feet, right angle length to the summit pool, to about 30 feet presents a major problem. It must be upbuilt to about the same elevation as the downstream beach before material may be placed to upbuild the impervious puddle core section.
5. The reduction thickness of the impervious puddle core section of the El Capitan Dam has been officially referred to the State Engineer with favorable recommendations.
6. No further rock embankment may be placed ahead of hydraulic fill placement of earthy material, thereby preventing the rock embankment from intruding into the hydraulic fill and the hydraulic fill from intruding into the rock embankment and insuring maximum length of beaches and uniform thickness of rock rip rap paving.

Very truly yours,

H. N. Savage,
Hydraulic Engineer.

HNS/m

June 16, 1934

TO THE HONORABLE, THE MAYOR AND COUNCIL
OF THE CITY OF SAN DIEGO, CALIFORNIA

Subject: San Diego River Project, El Capitan Feature
Hydraulic Fill.

Gentlemen:

Throughout the placement of hydraulic fill material by semi-hydraulic process in El Capitan Reservoir Dam, the contractor failed to extract the majority of the fines - clay and silt - from the local borrow pit A, B, C, and vicinity material for the upbuilding of the impervious puddle core section of the dam.

Due to leaving the majority of the fines of clay and silt from the borrow pit material on the beaches, and shoulders of the hydraulic fill area, the impervious puddle core section continuously lagged down until a maximum depth of summit pool of over 20 feet occurred in October 1933. Thereupon the contractor was directed to immediately accomplish the upbuilding of the lagging impervious puddle core section and to install and use the full hydraulic method in treating and placing the material, and either delete the excess coarses from the local borrow pit material or to import material rich in fines.

The contractor did not accomplish the upbuilding of the lagging impervious puddle core, but did change to full hydraulic method which when used without the upbuilding of the impervious puddle core resulted in the deposition of material quantities of sand in strata and lenses in the impervious puddle core section and the work had to be discontinued December 5, 1933 to remove the surplus sand from the impervious puddle core section, which was not accomplished until February 7, 1934, to the satisfaction of the Hydraulic Engineer. The removal of sand strata was deemed by the State Engineer as sufficient to insure a safe dam.

The contractor resumed hydraulic fill operations, using local material only without correcting the lagging puddle core situation by deleting the excess of sand, or importing material high in silt and clay content. On March 10, 1934 sand strata and lenses of sand again began to appear in the impervious puddle core section of the dam and by March 21 were so prevalent that it became necessary to stop the work until the sand strata was removed.

The contractor assembled a puddle core mixing machine which has been in operation most of the time since March 21, and completed its work yesterday, June 15, to the satisfaction of the Hydraulic Engineer, and also to the satisfaction as to the safety of the dam in opinions expressed by Deputy State Engineer Geo. W. Hawley in

To the Honorable, the Mayor
and Council

- 2 -

6/16/34

Charge Division of Dams, State's Consulting Geologist Fred C. Herrmann and Assistant Deputy State Engineer W. H. Holmes.

The contractor has acquired a tract of land in Lakeside which is rich in fines of clay and silt, and has begun to import material therefrom deemed suitable with which to upbuild the lagging impervious puddle core section of the dam, and to hereafter maintain the proper relationship between the puddle core section and the beaches by mixing this material from time to time with the local materials from borrow pits A, B, C, and vicinity as required.

It is deemed that the contractor may, if he uses proper methods, accomplish, without further delay, the completion of a safe dam to the satisfaction of both the City's Hydraulic Engineer and the State's Engineers.

Respectfully submitted,

H. N. Savage,
Hydraulic Engineer.

HNS/p

July 18, 1934

TO THE HONORABLE, THE MAYOR AND COUNCIL
OF THE CITY OF SAN DIEGO, CALIFORNIA.

Subject: San Diego River Project, El Capitan Feature,
Modification of Top Portion of Dam.

Gentlemen:

Requirement for modifying the dimensions of the top portion of the El Capitan Dam, including the thickness of the impervious puddle core has been under consideration for sometime.

The minimum cross section, thought to be safe and proper, was developed after considerable discussion with City's Consulting Engineer L. C. Hill and representatives from the State Engineer's office, and was submitted to the California State Engineer on Document 23, 1933 and approved by him January 16, 1934.

The changes consisted of: (a) The heightening of the top of the embankment from elevation 766 to 770 without change in the width of the top; (b) The elimination of the upstream berms at elevation 700 and 750; (c) The shifting of the top of the dam until it was centered directly over the puddle core area which slightly changed the outside slopes, and (d) The thickening of the rock embankment on the upstream face of the dam.

The rock embankment on the upstream face of the dam between spillway level, elevation 750 and the top of the dam was thickened from 18 inches to about 7 feet, with a small amount of thickening below elevation 750.

During the construction of the dam the advisability of narrowing the impervious puddle core section of the dam above elevation 700 became apparent and was a matter of discussion with the City's Consulting Engineer L. C. Hill and representatives of the State Engineer's office.

On June 19, 1934 there was submitted to the California State Engineer for approval drawing WD-501, showing both the modifications of the cross section of the dam and rock embankment and the modification of the impervious puddle core. This drawing, copy attached, received the official approval of the State Engineer on July 10, 1934.

To the Honorable, the Mayor
and Council

--2

7/18/34

The quantity of material required will be increased by about 25,000 cubic yards for hydraulic fill and by about 13,000 cubic yards for rock embankment.

The increase in cost at the appropriate contract unit prices will be about \$23,000, which was taken into account in preparing the estimated cost of El Capitan Dam as submitted to your Honorable Body in letter dated December 16, 1933.

The cost of the change being in excess of \$1,000, in accordance with paragraph 13 of the contract specifications, requirement exists for approval of the change by the Council.

RECOMMENDATION: It is recommended that the modification of the dimensions of the top portion of the El Capitan Dam and of the impervious puddle core section as indicated on drawing WD-501, as approved by the State Engineer July 10, 1934, be approved by the Council.

Very respectfully,

Fred D. Pyle
Hydraulic Engineer

FDP/f
Encl. WD-501

8/6/34
copy/f

777

H. W. ROHL & T. E. CONNOLLY
CONTRACTORS

July 27, 1934

Mr. F. D. Pyle, Hydraulic Engineer
San Diego,
Cal.

Dear Sir:

Would you please favor me with a plan for the completing of the El Capitan Dam. I requested a plan or copies of plans from you on April 17, 1934 but have received nothing to date. It would seem that the builder should have a plan of the structure he is building.

While you tell me the State has approved a change in plan, I have received no copy of such plan. Would you please favor me with one at your early convenience.

Yours very truly,
H. W. Rohl & T. E. Connolly

by T. E. CONNOLLY (Signature)

August 3, 1934

MEMORANDUM

Subject: San Diego River Project, El Capitan Feature
Conference August 2, 1934

I met Assistant Deputy State Engineer Geo. W. Hawley, State's Consulting Engineer Fred C. Herrmann and Assistant Deputy State Engineer W. H. Holmes at El Capitan dam at 8:30 A.M. August 2, 1934, and proceeded to top of the spillway where we met Resident Engineer Harold Wood, Hydraulic Fill Engineer D. W. Albert and Contractor T. E. Connelly.

The group examined conditions on the upstream embankment. The hydraulic fill discharge pipes were about one-third the distance across the dam but the pump was down for repairs so there were no hydraulic fill operations in progress while the inspection of the dam was being made.

The surface beaches appeared to contain more silt than usual, with numerous pockets between the pipe line and the outer edge of the hydraulic fill containing one-half inch of silt. Water surface was 712.6.

At the south end of the upstream embankment the upbuilding of the rock embankment about elevation 708 to elevation about 715 lacked about 50 feet of being completed to the south abutment.

The top of the sand levee was about elevation 714, the outer slopes of which were about 1 on 1-1/2. A considerable amount of water was coming out of the lower one-third of the sand levee and running into the rock embankment, which indicated that the beach was saturated and considerable water was passing from the summit pool through the beach and draining from the outer slopes of the beach into the rock embankment. No doubt this flow of water was increased by the raising of the summit pool from elevation 712, where it was when the beach was made, to elevation 712.6, so that the water extended over a portion of the beach. This condition was considered alarming by all parties present.

The beach appeared to contain about the normal amount of fines, that is 16 to 18 per cent and was not particularly quaky.

There was considerable conjecture as to the extent of the drainage down the outside of the beaches under the rock embankment on that portion of the upstream embankment which was covered by the rock embankment. The entire group investigated the southerly end of the summit pool from boat and penton; 6 pound weight generally came to rest about 6 feet below the surface of the pool.

Samples of the puddle core material taken about N 3400, 20 feet below the surface of the pool were not as firm as it was desirable to have them; samples taken 10 to 16 feet were decidedly soft; and samples taken at higher elevations were generally sloppy. Samples were also taken adjoining the core wall at the south abutment from Lakeside material which had been crowded into the pool by dumping alongside the core wall. These samples were solid and broke with very little bending. A sample taken some distance from the abutment, while not so solid, was very firm and pliable.

The dipping of the oars invariably brought muddy water to the surface of the pool, and by reaching down two feet handfuls of sloppy mud could be brought to the surface, and a surprising amount of vegetable matter could be felt in the water.

An examination was made of the downstream beach, which was found to be in a very satisfactory condition.

After lunch at the contractor's camp, the group, except for Mr. Connolly, met in the guest house at the City's engineers camp and discussed the situation. The group was joined later by Mr. Connolly and the discussion continued.

Mr. Albert pointed out that conditions were somewhat more favorable near the north end of the pool, perhaps because of Lakeside material placed directly in the pool each side of the north end of the core wall.

Mr. Albert stated that as soon as the present hydraulic operations reached the south end of the pool, he expected to add Lakeside material to the hogbox, together with the local borrow pit material, to see if the puddle core could not be stiffened up in that vicinity.

Mr. Albert explained that, due to the lack of consolidation of the puddle core, it had not been advisable to narrow the summit pool because of the danger of sand passing into the impervious puddle core at considerable depths.

Briefly, it was indicated that the conditions were unsatisfactory.

Owing to the extremely narrow cross section of the dam, due to the steep outer slopes, even the upstream beach is now exceedingly short.

The narrow upstream beach consisting of very little material coarser than coarse sand and containing a relatively high amount of materials, 16 to 18 per cent, passing 200 mesh screen is not conducive of proper drainage which tends to reduce the stability of the upstream embankment. The soft puddle core also tends to decrease the stability of the upstream embankment. It was indicated that if the puddle core did not materially stiffen up with the addition of Lakeside material, it would be necessary to devise some means other than hydraulic placement to accomplish the construction of the stability section of the dam and some means of continuing the construction of the impervious puddle core section.

FDP/E

Fred D. Pyle, Hydraulic Engineer

August 29, 1934

From : Resident Engineer
 To : Hydraulic Engineer
 Subject : San Diego River Project, El Capitan Feature
 Hydraulic fill, cross section upon completion

1. The hydraulic placement of material in El Capitan dam stopped on August 13, 1934. Cross sections taken on August 15 are as follows:

Ordinates		Elevations	Ordinates		Elevations
N	E		N	E	
3200	4912	721.2	3600	4920	719.8
	4925	720.8		4930	719.8
	4963	717.7		4973	718.1
	5045	718.4		5030	718.3
	5080	719.9		5080	720.1
3300	4913	720.7	3700	4920	720.9
	4932	720.5		4974	717.8
	4965	717.8		5032	718.5
	5040	718.2		5080	721.4
	5080	719.7			
3400	4912	720.3	3800	4913	720.9
	4925	720.2		4920	721.1
	4960	717.9		4970	718.0
	5036	718.7		5038	718.6
	5080	720.4		5080	720.8
3500	4920	719.6	3900	4911	720.4
	4970	718.2		4920	720.0
	5030	718.4		4956	717.9
	5080	720.3		5032	718.3

For all sections E 5000 was elevation 716 by agreement
 D. W. Albert, Geo. Converse and O. C. Steve.

Harold Wood
 Resident Engineer

HW/p

CUBIC YARDS OF MATERIAL (x)

TO

HYDRAULIC FILL AND PUDDLE CORE

Year Month	Structure Excavation					Borrow Pits			Total
	Spill- way	Ogee Cutoff	Strip- ping	Core Wall	Outlet Tunnel	A,B,C, D,K,L,	Lake- side	X.Y.	
1933									
January			4884			13935			18819
February	13986		8151	1377	26	148693			172233
March	35259		2533	141	1595	316199			355727
April	20492		9060	140		63715			93407
May			2289	930					3219
June	68631		1632	193	252	70274			140982
July	58870		4563	432		121191			185056
August	53318				68	133667			187053
September	3151	702	16			108286			112155
October	3788	274	3788	472		54375			65198
November		160	1171	573		2408			4312
December		22		454		14051			14527
1934									
January		103		156					259
February		39		64		35852			35955
March		26		458		46617			47101
April				228					228
May				68					68
June						33065	11224		44289
July	15					124333	8715		133063
August	4304					90327	14292	22822	131745
September	9702		675			69986	14840	39452	134655
October	4864					30289	2864	18373	56390
November	4523							3515	8038
Totals	283404	1326	38762	5686	1941	1477263	51935	84162	1944479

(x) Truck count

EL CAPITAN RESERVOIR DAM, SPILLWAY & OUTLET WORKS
 H. W. Rohl and T. E. Connolly
 Contractors

Estimate of cubic yards, by truck count, of material placed in hydraulic & rolled fill

Date	Borrow Pits				Structure Excavation				Total				
	A-B	C	D	K	L	I-Y	Lake-	Spill-		Strip-	Core-	Tunnel	Cutoff
1933													
January	13935							13986	4884	8151	11177	2626	18319
February	148693							35259		2533	141	1595	172233
March	316199							20492		9066	140		355727
April	63715									2289	930		93407
May										1632	193	252	3219
June	70274							68641		4563	432		140992
July	121191							58870				68	189056
August	133667							53318	16				187053
September	108286							3151	3788				112155
October	54375							6289	1171	472			65198
November	2468									573			4312
December	14051									454			14527
1934													
January										156			259
February	6654					22543				64			35955
March	11562					30989				458			47101
April										228			228
May										68			68
June	25407												44289
July	118018												133063
August	87269												131745
September	60367						9619		675				134655
October	22854						18373						56390
November							3515						8038
Total	1378925	32937	2250	53532	9619	84162	51935	283414	38762	5686	1941	1326	1944489

Total structure excavation 331,129

Total borrow pit 1,613,360

H. D. Williams
 Cost Accountant

2/2000
 5-5-4