No Letter

REPORTS OF C. S. ALVERSON, AS FOLLOWS:

PAMO WATER COMPANY

REPORT OF C. S. ALVERSON, JUNE, 1914.

(1) SUBJECT: COST OF THE SURVEYS, CONSTRUCTION, ETC., ON THE OLD PAMO WATER COMPANY'S SYSTEM IN SAN DIEGO COUNTY, CALIFORNIA, NOW OWNED BY THE VOLCAN LAND & WATER COMPANY.

REPORT TO PAMO WATER COMPANY

(2) NOVEMBER 28, 1911.

SUPPLEMENTAL REPORT OF C. S. ALVERSON, C.E.

TO PAMO WATER COMPANY.

(3) Subject: Method of furnishing water to San Pasqual Valley.

REPORT ON AVAILABLE WATER SUPPLY OF SAN LUIS REY RESERVOIR.

(4) BY C. S. ALVERSON, TO COL. ED. FLETCHER.

APRIL 8, 1911.

VOLCAN LAND AND WATER COMPANY

REPORT OF C. S. ALVERSON, JUNE 22, 1914.

(5) Subject:
Stream measurements on San Luis Rey River
Stream measurements on Santa Ysabel River
Rainfall data various stations San Diego County.

PAMO WATER COMPANY

REPORT OF C. S. ALVERSON, JUNE, 1914

SUBJECT: COST OF THE SURVEYS; CONSTRUCTION, ETC., ON THE OLD PAMO WATER COMPANY'S SYSTEM IN SAN DIEGO COUNTY, CALIFORNIA, NOW OWNED BY THE VOLCAN LAND & WATER COMPANY.

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Volcan Land & Water Company,

San Diego, Cal.

Gentlemen:

I furnish you the following data and information in reference to the cost of surveys, construction, etc., made by the Pamo Water Company of San Diego County, California, from the spring of 1889 to April, 1892, at which time the Linda Vista Irrigation District purchased its water rights, reservoir sites, maps and profiles of surveys and all its interests.

The Linda Vista Irrigation District, after it acquired the above property, also made additional surveys, etc., which will appear later in this report.

ORGANIZATION OF PAMO WATER COMPANY

The Pamo Water Company was organized in the year 1889. J. D. Schuyler was Consulting Engineer and C. S. Alverson, Chief Engineer of the Company with an efficient corps of assistants. Most of the time there was three parties in the field.

The Company was formed for the purpose of supplying water for irrigation and domestic use to Escondido, Del Mar, San Diego and adjacent country.

Water filings were made on the San Luis Rey River, on the Pamo and Santa Ysabel Rivers, and the Santa Maria Creek, and in Dye Valley. Preliminary reports and examinations made,

reservoir lands bought, rights of way secured, and easements ob vested water rights in the San Pasqual Valley; and other arrangements necessary for the construction and operation of a complete water system.

ENGINEERING WORK:

On the 1st day of October, 1889, active engineering work commenced on the system, and continued in the field until May, 1890. The work performed was as follows:

A A complete contour survey of the Pamo Reservoir Site up to the 140 foot contour line.

B A preliminary level and transit line "designates 32 ft. contour" from the Pamo damsite near the 1/4 corner to Sections 27 and 28, T.12 S., R.1 E., to the City of SanDiego. together with some trial side lines to determine the most feasible route.

C A location line on the "32 ft. contour" from the Pamo damsite to Winn's Pass, a distance of about 10½ miles.

D A location line on the "80 ft. contour" from the Pamo damsite to Winn's Pass, a distance of about 10½ miles.

E The location and construction of a wagon road known as the "San Pasqual & Mesa Grande Wagon Road" from head of San Pasqual Valley along left bank of Santa Ysabel River to Clevenger Creek about 2½ miles.

F A preliminary level and transit line "Escondido Branch" from the main line above the Babcock place in San Pasqual Valley to the City of Escondido; also a second level line from the main line near Winn's Pass to Escondido.

G A preliminary survey of the "San Luis Rey River

branch", from a point near the west boundary of the Warner's Ranch to the Pamo Reservoir site including examination and survey of damsites on other portions of the San Luis Rey River.

H Examination of Dye Valley Reservoir Site and cost of land.

Included in the above items are the maps, profiles and field books on file in your office.

NOTE: The Pamo Water Company also made a preliminary survey for a railroad from near Moreno in San Diego to Escondido, at a cost of $1,282.02, as per books of the Company. (This is not included in the following schedule of cost.

PAMO WATER COMPANY COST OF SURVEYS, ETC.

A-BeC-D-F, per books of Company copied in 1891..	$ 9,905.05
E, or San Pasqual & Mesa Grande Wagon Road.....	4,112.35
G, or San Luis Rey River Branch.....	1,695.37
H, or Dye Valley surveys and cost of land.....	10,766.35
Total for A-B-C-D-E-F-G-H.....	$26,479.10

This does not include the salaries of the President, Treasurer, Secretary, legal expenses, or other overhead charges, but is the actual cost of engineering in the field and office, maps, profiles, etc.; also the cost of constructing the San Pasqual & Mesa Grande Wagon Road, and the purchase price of the following described lands in Dye Valley.

DYE VALLEY LANDS

S½ of NW¼ of Section	7, T.13 S., R.3 E.-	80 acres	purchased
N½ of SW¼ of "	7, T.13 S., R.3 E.-	80 "	
NE¼ of NE¼ of Section	13, T.13 S., R.2 E.	40 "	right to flood
S½ of NE¼ "	13, T.13 S., R.2 E.	80 "	
NW¼ of SE¼ "	13, T.13 S., R.2 E.	40 "	

PAMO VALLEY RESERVOIR LANDS

The following lands in Pamo Valley was acquired by the Pamo Water Company I have no reliable record of the price. A

portion of it was paid for in stock of the Pamo Water Company.

Description	Sec.	Twp.	Range	Acres	
W½	14	12 S.	1 E.	320	
NW¼	23	12 S.	1 E.	160	
W½ of SW¼	23	12 S.	1 E.	80	
SW¼ of NE¼	23	12 S.	1 E.	40	
W½ of NW¼	26	"	"	80	
SE¼ of NE¼	26	"	"	40	
NW¼ of SW¼	26	"	"	40	
SE¼ of NE¼	27	"	"	40	
N½ of SW¼	27	"	"	80	
N½ of NE¼	27	"	"	80	
SW¼ of NE¼	27	"	"	40	
SE¼ of NE¼	27	"	"	40	
SE¼ of NE¼	23	"	"	40	
N½ of SE¼	23	"	"	80	
NE¼ of SW¼	23	"	"	40	1200 acres Deeded land
SE¼ of SW¼	23	"	"	40	Right to flood up to the 150 ft. contour.
SW¼ of SE¼	23	"	"	40	
NE¼ of NW¼	26	"	"	40	
NW¼ of NE¼	26	"	"	40	
				160 acres	

Sum total Pamo Valley - 1360 acres

SANTA MARIA VALLEY RESERVOIR LANDS

Some time in the year 1890 the Pamo Water Company purchased the following land for reservoir purposes at the lower end of the Santa Maria Valley, viz:

NW¼ of SW¼ of Section 12, T.13 S., R.1 W.- 40 acres
E½ of SE¼ " 11 T.13 S., R.1 W.- 80 "
Total in Santa Maria Valley.....120 ".

They paid some $1000.00 cash and a mortgage note for balance. Later the Linda Vista Irrigation District paid this indebtedness of $5500.00 with bonds of the District, which will appear later in this report.

RIGHTS OF WAY SECURED BY PAMO WATER COMPANY FROM W. C. LATTA

For and in consideration of 1½ miners inches of water delivered to me without cost, I grant a perpetual right of way

50 ft. wide over the following described lands, towit:

N½ of SE¼ and N½ of SW¼ of Sec. 36, T.12 S.,R.1 W.

From Nester C. Young:

A strip of land 50 ft. wide as follows: SE¼ of SW¼ and SW¼ of SE¼ of Sec. 5, T.13 S., R.1 W.

From William Winn:

A strip of land 50 ft. wide as follows: NE¼ of SW¼ and NW¼ of SE¼ of Sec. 5, T.13 S., R.1 W. In case of damage to the improvements of the said William Winn, the Company is to pay the actual damage to the same, the amount to be determined by three arbitrators.
Book of Deeds 157, page 27

From Geo. W. Wolfe, Jr.

A strip of land 50 ft. wide as follows: E½ of NW¼ and W½ of NE¼ of Sec. 8, T.13 S., R.1 W.
Book of Deeds 157, page 25

From W. F. Thomson

A strip of land 50 ft. wide as follows: SE¼ of NW¼ and SW¼ of NE¼ of Sec. 4, T.13 S., R.1 W. The above is subject to damage to improvements same as Winn's tract.
Book of Deeds 155, page 434

From A. Klauber & S. Levi

A strip of land 50 ft. wide as follows: E½ of SW¼ of Sec. 30, T.13 S., R.1 W.

From T. R. Crawford

A strip of land 50 ft. wide as follows: NE¼ of NE¼ of Sec. 7, SW¼ of SW¼ of Sec. 5, S½ of SE¼ of Sec. 6, T.13 S., R.1 W.
Book of Deeds 157, page 26

From John A. McCulloch

A strip of land 50 ft. wide as follows: N½ of SW¼ of Sec., T.13 S., R.1 W.
Book of Deeds 155, page 429

From I. P. Ross

A strip of land 50 ft. wide as follows: NE¼ of Sec. 3, T.13 S., R.1 W.

From W. C. Ferris:

A strip of land 50 ft.wide as follows: W½ of NW¼ and W½ of SW¼ of Sec.11,T.15 S.,R.2 W.
Book of Deeds 155, page 428

From Allison Luco

A strip of land of reasonable width on ~~the~~ and over the following: Lot 73 Ex Mission Partition.
Book of Deeds 155, page 432

From W. C. Latta

Grants unto Pamo Water Company all of his rights as riparian owner and appropriator of the waters of the Santa Ysabel River in said County and State October 25th, 1882.
Book of Deeds 155, page 255

From O. B. Woods on Dec. 18th, 1889

Right to flood to any height on the following lands: NE¼ of NE¼ and S½ of NE¼ and NW¼ of SE¼ of Sec. 13, T.13 S., R.2 ~~W~~ E.
Book of Deeds 157, page 151

The next item being an important and valuable acquisition of water rights, etc., I copy in full from Records.

John B. Judson, et al

In consideration of the benefits to accrue from the building of the works of the Pamo Water Company upon the Bernardo or Isabel River in the County of San Diego, State of California, and of One Dollar ($1.00) to us paid, we hereby grant individually and collectively unto said company, a Corporation existing under the laws of California, and doing business at San Diego, California, all our rights of every description, both joint and several, either as riparian owners, or appropriators, or grantees of appropriators in and to the waters of the said stream or appertaining to the following described lands lying in the valley known as San Pasqual upon said River and in said County and State, towit: All lands owned by us in Sections 35 and 36, Tp. 12 South, Range 1 East, S.B.M.

This grant is to include all our rights under an appropriation of thirteen hundred and fifty (1350) miners inches of water, measured under a four (4) inch pressure, made under the laws of California in the year 1876, by John Judson, A. F. Brown, W. B. Stewart, John Clevinger, and Archibald Clevinger, and is to operate as a perpetual right to impound, divert and carry away the waters of said stream, at point on said stream within two miles of the lower end of Pamo Valley on said stream. And the said Company is hereby constituted the sole and perpetual * of ourselves and of the land above described and of its future owners,tenants, or possessors, to impound and divert the same, and all damages therefor are hereby expressly waived and released. And said grant and said agency shall be and run with the land in the nature of a covenant forever.

And in further consideration of the premises, we grant unto the said Company a strip of land fifty (50) feet wide, for a perpetual right of way, with right of ingress and egress across said land or any of our lands adjoining the same, upon such line as it may hereafter locate the same. Said right of way to be for the aqueduct of said Company and ingress and egress to be for building, maintenance and repairs.

By its acceptance hereof, said Company binds itself to allow the occupants or owners of said lands to take and use on and after January the first, and until June fifteenth of each year after the aqueduct is constructed and in operation, a sufficient amount of water to irrigate the lands heretofore irrigated by the several parties signing this instrument, or their assigns, from such points on its aqueduct above said lands, and in

in such quantities as they may select, but with connections to be made under the direction of said Company's Chief Engineer, and on and after the fifteenth day of June, and until January first of each and every year, ten (10) miners inches of water measured under a four inch pressure, above center of gravity, for use upon said lands, and taken from such points on its aqueduct above said lands, and in such quantities within the hereinafter mentioned ~~km~~ limits as the said owners and occupants or their assigns may ~~xk~~ select. Said water to be the equivalent of ten (10) miners inches steady flow from June fifteenth to January first of each and every year, but is not to be taken in quantities of less than one inch or more than two hundred inches at once, unless convenient for said Company.

All of the grants, covenants, obligations, rights, liabilities, etc., herein specified, are to be binding upon and enure to the benefit of the heirs, representatives, grantees and lessees of the grantors, and the successors, and assigns of said Corporation forever.

Upon failure to commence work within ninety days and to prosecute the same in good faith and with due diligence, the rights herein granted are to revert to the grantors until the works are completed, the rights of the grantors are to remain as they now are.

In witness whereof, we have hereunto set our hands and seal this 18th day of Sept., 1882.

JOHN B. JUDSON
HENRY JOHNSON
JEUS OSSON
A. M. STRIPLIN
A. D. TRUSSELL.

Recorded in Book of Deeds 155, page 106.

Further description of the water rights, etc., in San Pasqual Valley is given in my report to the "New" Pamo Water Company under date of November 28th, 1911. Special attention is called to information on pages 4, 5, 6, 7, 8, 9 of that report. Although I think you will find the report in full valuable data for future reference.

MISCELLANEOUS DATA

From December 1st, 1890, to April 26th, 1892, the date of the sale to the Linda Vista Irrigation District, I was not regularly employed by the Pamo Water Company, being absent most of the time on other work. In the summer of 1891 I personally copied from the books of the Pamo Water Company the totals for the schedule of costs on Page 3 of this report.

The Pamo Water Company paid to me personally for salary and expenses $1,537.75, which is included in the schedule on page 3 of this report.

I have ~~xp~~ no personal knowledge of the amount expended by the Pamo Water Company from July, 1891 to April 26, 1892, the date of sale. I do know that J. D. Schuyler, Consulting Engineer, did submit reports and other expenses were incurred in efforts to construct or sell the system.during that period.

LINDA VISTA IRRIGATION DISTRICT

Successors to

PROPERTY OF THE "OLD" PAMO WATER COMPANY.

In order to determine the cost and value of the above described water system, I submit a copy of a report made at a meeting of the Linda Vista Land Owners Association held January 29, 1897.

In compiling this report, Geo. K. Phillips, Secretary for the District, and myself as Chief Engineer for the District, together with the Executive Committee, who signed this report, carefully examined the accounts and books of the District covering the period from July, 1891, to January, 1897. The report was as follows:

"To the Officers and Members of the Linda Vista Land Owners Association:

Gentlemen: The Executive Committee elected by you at a meeting held January 6, 1897, offer the following report:

Having been instructed to do whatever in our opinion would advance the interests of the association, we concluded to make careful and exhaustive examination of the Linda Vista Irrigation District, including its organization; the issuance of bonds; the purchase of the Pamo Water System; the receipts and expenditures; the outstanding liabilities in bonds, interest and warrants; the assets, consisting of delinquent taxes due; the estimated cost of a water system with facts in regard to it; and any other item of interest; also our conclusions in regard to the present value of the property and prospects of the completion

of the proposed water works with its value to the land.

This is a very comprehensive plan,and to carry it out, has required a good deal of work in which we have been greatly aided by the officers of the District, who have very courteously given us access to the books and accounts and assisted us personally.

The Linda Vista Irrigation District was organized under the Wright Act by an election held July 15, 1891, at which there were cast 51 votes in favor and 8 votes against it. The Board of Supervisors of San Diego County confirmed this by resolution August 25, 1891, and no protest was filed against it. The officers designated by law having been duly elected, qualified and took their places as directors, etc.

October 10, 1891, the Board of Directors called an election in the District to vote on the proposition of issuing $1,000,000. in bonds, bearing 6 per cent interest, payable semi-annually, the principal payable in twenty years, for the purpose of supplying the District with water. The election was held November 28, 1891, at which 50 votes were cast in favor and 5 votes against. The Board canvassed this vote November 30, 1891, and the bonds were duly prepared bearing date January 1, 1892. December 31, 1891 the Superior Court duly confirmed this issue of bonds.

April 26, 1892, by resolution of the Board of Directors, a contract was made with the Pamo Water Company to purchase its water rights, reservoir sites, maps and profiles of surveys, and all its interests for the sum of $160,000. in bonds at par, the interest on said bonds to commence July 1, 1892, the interest

coupons for the previous six months to be cancelled. The bonds were issued and deeds taken in accordance with this resolution and contract.

May 3, 1892, by resolution of the Board, an election was called to vote on levying a special tax to raise $15,000 to pay general expenses in addition to the tax required by law to pay the interest on the bonds. The election was held May 28, 1892, when 31 votes were cast in favor and 12 against. This was canvassed by the Board May 31, 1892, and the special tax levied in accordance.

August 7, 1894, by resolution of the Board, $5,000. in bonds was issued to settle a mortgage already foreclosed on 120 acres in Santa Maria Valley for the sum of $5,500.

April 1895, by resolution of the Board, $11,000 in bonds was issued as part of a contract with the Mountain Stream Water Company. These bonds were sold for $10,000. cash and this was devoted to construction account. In order to prevent the water rights of the District from lapsing, some work was done on the reservoir site and a wagon road constructed necessary to make it accessible.

The total amount of bonds now outstanding is $176,000. During the years 1891 to 1895, several notices were published asking for bids for the construction of the water works and contracts were entered into, but all of them failed of completion and were cancelled, there being a distrust of the legality of the Wright Act. At the present time the District is free from all agreements and in a condition to sell its bonds and let contracts. During this period a good many legal questions and some

suits came up that required legal advice; considerable engineering work was done that enabled the directors to form plans and proposals for contracts, and but for the decision of Judge Ross of United States District Count in June, 1895, progress would have been made on construction. This decision put a stop to all proceedings until it was reversed by the United States Supreme Court in October, 1896. Several elections have been held of officers of the District, and for the issuance of bonds and other purposes. So far as we can learn, all the proceedings of the District have been conducted in accordance with law, and there seems to be no probability of any attack being made on the legality of the organization of the District, or the issuance of bonds,or other proceedings.

The second part of our investigation relates to the financial affairs of the District with results as follows:

The assessed valuation of the whole District is from $500,000. to $540,000. in different years. The rate of taxation per $100. of valuation has been for the different years as follows:

1892, on bond account, $1,861;; on special account $3,420; total $5.281--- 1893 on bond account $1.790;; on special account $0.6581; total $2.448-- 1894 on bond account $1.951; 1895 on bond account $2.127; 1896 on bond account $2.024.

The total amount of these assessments is $67,600. to which has been added for penalities, interest, etc., $36,604, making a total revenue,if all was collected, of $104,204. Amount collected to date $43,268; due on delinquent taxes, costs, etc., $60,936; total $104,204.

The total expenses to date are: Interest on bonds

issued to January 1, 1897, $48,900; warrants issued on general fund, $48,175; warrants issued on construction fund $10,000; total $107,075.

The receipts are from taxes collected, costs, etc. $43,268.; for sale of bonds for cash $10,000; due interest account $27,765; due on warrants $26,042; total $107,075.

The assets consisting of taxes due are $60,936; liabilities, warrants and coupons outstanding, $53,807; leaving a balance on hand, if all taxes were paid and debts discharged, of $7,129.

The payment of the delinquent taxes would place our bonds in so good a position that they could be readily sold and the work constructed. The details of expenditures are as follows:

Election expenses	$ 409.50
Attorneys	5,307.40
Advertising	2,419.40
Printing	1,023.25
Typewriting	255.20
Rents and miscellaneous	3,244.43
Salaries and mileage of Directors	4,703.60
Assessor	3,151.25
Secretary	4,066.33
Collector	4,565.60
Treasurer	3,202.51
Organization of District	2,422.94
Construction account	8,375.43
Engineering	4,749.67
TOTAL.....	$48,135.56

Part of the Engineering item was charged to construction account on the books.

The items of printing and advertising are largely due to delinquent taxes and have been or will be recovered out of future collections, so that out of this total about $13,000 should be deducted from the general expense account, leaving about $35,000.

as the total general expenses for a period of five years, or an average of $7,000. per year including organization.

The third part of our investigation is in reference to the engineering features, such as the water supply, cost of proposed construction, etc.

NOTE:- By C. S. Alverson, June, 1914, then follows a general description of the entire system and proposed future developments, etc. The report closes as follows:

In conclusion, your committee is of the opinion that, all things considered, the Linda Vista Irrigation District offers the most certain, cheapest, and every way best plan for supplying the lands with water that can possibly be carried out.

It is very necessary that land owners should be desirous of carrying out this plan and should, by united and cordial co-operation, enable the Directors to let contracts for construction. If this is done, and in this the holders of bonds should assist, a plan can be devised by which our beautiful district can soon be made valuable to its owners; profitable to settlers, and add greatly to the propperity of San Diego City and County.

Respectfully submitted by the Executive Committee.

CHARLES J. FOX, C.E.
A. H. FROST.
F. F. WRIGHT"

The following engineering and construction was done by the Linda Vista Irrigation District from April 26, 1892 to January, 1897:

"A". Completing the survey of the Pamo Reservoir Site

from the 140 ft. contour to the 175 ft. contour and making maps, etc. of the same.

"B". Excavating at the Pamo Damsite and work on the wagon road in the reservoir lines and clearing same of the brush and timber in the reservoir.

"C". Constructing a wagon road westerly from the Pamo Damsite to Clevinger Creek, a distance of 2 3/4 miles.

"D". A complete survey of the Santa Maria Reservoir Site up to the 80 ft. contour, with maps, etc. of the same.

"E". Preliminary examination of the Santa Ysabel River above the Pamo Valley to the west boundary of the Santa Ysabel grant, for the purpose of diverting water into the Santa Maria Reservoir at the lower end of the valley.

"F". General examination and running of lines on the system for future reference and use.

MISCELLANEOUS DATA OF COST.

The following data is taken from personal records.

EXCAVATION, ETC. ON PAMO DAMSITE

"B"	Labor on damsite	$ 648.38
	Supplies from Todd & Hawley	101.84
	" " Klaber & Levi	68.80
	Team and hauling, T.B.Wible	44.25
	Powder used on work	174.00
	TOTAL.....	$1,037.27

This is only part of "B"

"C" Wagon road from Pamo Dam to Clevenger Creek constructed in 1894 by District 2 3/4 miles, total cost.....$4,717.96

The personal account of C. S. Alverson, for engineering and cash expenses, April 1892 to December 31,1896...$2,142.00

NOTE:- The above 3 memorandums included in statement on page 14.

Account of C. S. Alverson not included in any previous statement in this report:

Salary of C. S. Alverson Jan.1,1897 to Dec.31,1897.$505.00

NOTE:- Additional expenses were incurred by the District from January 1897 to date of sale to the "New" Pamo Water Company now "Volcan Land & Water Company.

ADVANTAGES OF ABOVE REFERRED TO WATER SYSTEM

It is the province of the Engineer to study how best he can utilize the forces of nature for the benefit of mankind. The imperative necessity for the use of water in all ages and climes and especially where large communities are banded together for mutual benefit and protection, and this often times makes it a difficult problem to determine from what source to obtain an adequate supply of water.

At the present time the City of San Diego is confronted with that problem; and it is forcibly impressed upon our minds from the fact that for more than a quarter of a century the water supply has been for one cause or another unreliable and unsatisfactory. If we expect the City and surrounding country to grow and develop along progressive lines we must acquire a suitable supply of water.

We are preparing the "Harbor of the Sun" for its share of the commerce of the world; we are improving and completing our lines of transportation to the north, to the south, and to the east, uniting ourselves with bands of steel to the great inland trade and traffic of the nation; but in the matter of water development we have been sluggards and imbeciles.

GENERAL DESCRIPTION OF SYSTEM

An examination of the maps, profiles and records of this system shows the following conditions:

First: That the building of a dam near the west boundary of the Warner Ranch will create a storage reservoir to impound the flood waters of the upper portion of the San Luis Rey River, some 208 square miles of drainage area, still leaving a large supply of water for vested rights and riparian owners below. From the reservoir above described, convey the impounded waters by conduit and a tunnel through the summit to a point above the Pamo Valley. From this point there will be a drop of over 1500 feet to the upper end of the proposed Pamo Reservoir.

Second: Across the Santa Ysabel River and near the lower end of the Pamo Valley build a dam and create a storage reservoir for the flood waters of the upper Santa Ysabel; some 114 square miles of drainage area. From the above described reservoir convey the impounded water by conduit to the Ex-Mission and Pueblo Lands of San Diego City lying north of the San Diego River. Also connect by pipe line across the river with the present distributing system of the City of San Diego. (NOTE:- The water from the San Luis Rey River will flow into the Pamo

Reservoir, and thence by the conduit together with the Pamo Valley water to the City of San Diego by gravity.)

Third: The Sutherland Reservoir Site on the Santa Ysabel River damsite in SE¼ of Section 20, T.12 S., R.2 E., elevation 1933 ft. 0 contour. Capacity at 100 ft. contour, 2,870,000,000 gallons. ~~or8811~~ acre feet. The water so impounded can be conveyed by conduit or bed of stream to the Pamo Reservoir or to the proposed Santa Maria Reservoir.

Fourth: The San Clemente Reservoir site located in Section 2, T.14 S., R.2 W., Elevation 595 ft. 0 contour. Capacity at 100 ft. contour, 3,630,000,000 gallons, or 11,144 acre feet. This reservoir would serve as a distributing or safety reservoir.

Fifth: The Carroll Damsite on the Santa Ysabel or San Dieguito River in Section 18, T.13 S., R.2 W., elevation at 0 contour 215 ft. Capacity 90 ft. contour, 7,500,000,000 gallons, or23025 acre feet. Drainage area 300 square miles, which includes the Sutherland, Pamo and Santa Maria drainage. This is an additional or alternative proposition in case the Pamo and Sutherland reservoirs were eliminated.

Sixth: The riparian and other water rights which have been secured and held intact up to the present time; and its freedom from legal complications as compared with adjoining water supplies, certainly give great added tangible value to the system.

In conclusion I would say, here are streams,the greater portion of whose waters run unused to the sea; here are thousands of acres of mesa and valley land which only need water, labor and

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industry to make it produce abundantly; here is a City with a great future whose brown hills and mesas will remain a semi-desert unless every available water supply is fully developed. Of what avail is the flood waters in our streams if they are not conserved and utilized? Again,in the deep beds of sand and gravel along the streams, nature has provided great underground storage reservoirs to be utilized in times of drought as well as in years of abundant rainfall. Then build,not only for the present, but also for the future. By united and intelligent action you not only advance the interests of your home, city and community, but also those of the great commonwealth of California.

Accompanying this report is also the report of the writer made November 28, 1911. Subject "San Pasqual Water Rights, etc."

Also supplemental report on same subject under date of November 30, 1911.

Also diagram showing the irrigation ditches, etc., in San Pasqual Valley from reliable data obtained from personal examination extending over a period of some 25 years.

All of which will be of use in studying the problem of the value of water rights, etc.

Respectfully submitted,

C S Aliverson

Civil & Hydraulic Engineer.

Subject - San Pasqual Valley Water Rights Etc.

Report C. S. Alverson, C. E. November 28, 1911

Pamo Water Co.,

San Diego, Calif.

Gentlemen:-

I submit the following report on the San Pasqual Valley Water Rights, Lands etc.

Location.

The greater portion of the San Pasqual Valley is located in Sections 31, 32, 33, 34, 35, 36, T. 12 S., R.1 W., San Bernardino Meridian, San Diego County, California. The head of the valley is some three miles below the proposed Pamo Dam Site.

Description.

San Pasqual Valley is traversed its entire length by the Bernardo River. Above the head of the valley it is called Santa Ysabel Creek. Santa Maria Creek from the South joins the Bernardo River near the ¼ corner between Sections 32-5; the old channel originally came in near the ¼ corner to Secs. 33-4. Guejito Creek from the north joins Bernardo river near the line between Secs. 34-35. Both of these streams furnish considerable flood waters; also underground water that keeps the plane of saturation near the surface during the summer months. It is almost certain that San Pasqual Valley before the barrier or dyke at the lower end broke away was a lake. Proof of this is shown in the character of the material found at different depths in digging and boring the wells that are scattered over the valley.

Character of Soil.

The river bottom lands are alluvial deposits; in the upper portion of the valley the surface is generally very loose and sandy; part of the lower portion is more firm and compact. The benches above the river bottom are generally red sandy soil formed by erosion from the hills.

The greater part of the land is rich in plant food producing excellent crops of alfalfa, corn, vegetables and other cereals also deciduous fruits. Although a portion of the land and crops in the lower end of the valley have been damaged by excessive irrigation in the spring and early summer months.

From personal observation and information obtained from the older settlers, it is evident that the extreme wet seasons are a detriment to the crops, for the following reasons: The heavy rains and floods saturate the ground in the bottom lands causing the plane of saturation to remain at or near the surface. This rots the alfalfa roots that have penetrated to the plane or water level of the previous summer and fall, also excessive irrigation on the depressions and low places brings the sodium carbonates and other alkalines to the surface and destroys plant life.

It is reasonable to assume that the building of the Pamo Dam and the holding back of the flood waters would benefit a greater portion of the valley.

Drainage Area or Watershed.

The approximate area of the watershed directly tributary to San Pasqual Valley is as follows:

Above Pamo Dam Site	120	sq. mi.
Pamo dam site to San Bernardino Meridian	15	"
San Bernardino Meridian to center line of Sec. 31 from the north side of valley	45	"
" " south " " "	65	"
Total drainage area	245	"

or 125 square miles below Pamo dam
or 110 " " " San Bernardino Meridian.

Available runoff below Pamo Dam.

The available runoff from any watershed is problematical varying with the seasons and the character of the watershed and climatic conditions.

Assume the average rainfall to be twelve inches in depth; and the available surface and underground storage to be 25% or three miner's inches depth.

1 Sq. mi.	3 miners inches	depth			6,969,600	cu.ft.
1 " "	3 "	"	"	4032 mi.ins.	for 1 day	
1 " "	3 "	"	"	134.4 " "	" 30 "	
1 " "	3 "	"	"	22.4 " "	" 180 "	
15 " "	3 "	"	"		104,544,000	" "
15 " "	3 "	"	"	336 " "	" 180 days.	

On the basis that the 110 Sq. miles tributary to San Pasqual Valley below the San Bernardino Meridian will yield 16 2/3% or 2 inches in depth it would give 1643 Mi. ins for 180 days perpetual flow.

This does not take into consideration the waste or overflow water from the Pamo Reservoir which will be available in the years when the rainfall is above normal.

Quantity of Underground Water.

In the San Pasqual Valley you have not less than 2500 acres of saturated area of low land from east line section 36 to center line section 31. With a saturated mass of 2500 acres and 30 ft. in depth; the mass would be 3,267,000,000 cu. ft. Assume that 3/10 of the material is water and you would have 980,100,000 cu. ft. or 6,850,000,000 gallons of water or 1554 mi. ins. continuous flow

for one year of 22498 acre feet. This would equal 32,670,000 cu. ft. or 52 mi. ins. for every foot in depth of saturated area.

Your saturated area is being continuously recharged by rainfall, runoff, percolation and seepage from irrigation.

Experiments made in various parts of the country show that from 20 to 30 per cent of the water used on land of this character is returned to the soil in the form of seepage or underground water, and would keep up the plane of saturation at the lower end of the valley.

Elevation Plane of Saturation.

On Oct. 15th 1911 the water level in the well with windmill of F. S. Potts near U. S. Gaging Sta. and near center Sec. 31 T. 12 S., R.1 E. was 12½ ft. below surface or 7 ft. below surface of river bed on October. 19th 1911 at Henry Johnsons' pumping plant located near the S.W. Cor. Sec. 25, T.12 S., R.1 W; the water level in the well was 13 ft. below the surface of the ground or about 7 ft. below the river bed.

On Oct. 19th 1911 at Everett Peet's pumping plant located in the N.E. Cor. of the N.W.¼ Sec. 35, T.12 S., R.1 W., the water level was 4 ft. below the center of pump and about three feet below the surface of river bed.

On Oct. 19th 1911 at Andrew Judson's pumping plant located near the S.E.Cor. of N.W.¼ Sec. 35, T.12 S., R.1 W., the water level was 8 ft. below the surface of ground at that point which is level bottom land.

On Oct. 18th 1911 at Fred Robert's pumping plant located in the N.E.¼ of S.W.¼ of Sec. 33, T.12 S., R.1 W., the water level was 3 ft. below the surface of river bed.

On Oct. 18th 1911 at E. Ward's pumping plant located in the N.E.¼ Sec. 5, T.13 S., R.1 W., the water level was about 6 ft. below pump or 1 ft. below surface of river bed.

In the N.W.¼ of and at the west line of Sec. 35, T.12 S., R.1 W., is a slough or ceniga that furnishes running water the entire year and is used to irrigate a portion of the lands of Mr. Myer's.

On Oct. 13th and 17th 1911 there was about 40 miner's inches of water running in the ditch at this point.

Present Method of Diversion.

For some years past the general method of diversion and distribution of the water flowing in the Bernardo River has been as follows:

For the early part of the season when there is plenty of water flowing on the surface of the river bed; the water is diverted from the river at a point about 900 ft. north of the center of Sec. 36, T.12 S., R.1 W., into an open unpaved ditch which is called the main ditch for East San Pasqual. This ditch follows the contour of the foot of the high hill that lays to the south; for about 2125 ft; thence westerly through Sec. 35 to its west line a total distance of about one and a half miles. At this point the East San Pasqual ends and the west San Pasqual begins. This point is about 1820 ft. south of the N.W. Cor. Sec. 35.

West San Pasqual Distribution.

From the west line of Sec. 35 there is 108 ft. of ditch and flume which bring it to the left branch of the river; at this point the water is dropped into the sandy bed of the low water channel for 300 ft. in distance thence across the sandy high

water channel of the river an additional 1200 ft. or 1608 ft. in all from the west line of Sec. 35 where it is turned into the head of the main west San Pasqual ditch located on the right bank of the high water channel of the river and near the center of the N.E.¼ of Sec. 34.

For the above 1608 ft. of right of way and additional right of way the west San Pasqual ditch Co. gives Mr. Myers the owner of the land water to irrigate thirty acres.

History of Water Rights.

The following is a synopsis of the history of the water rights in San Pasqual Valley.

In the year 1876 John Judson, A. F. Brown, W. B. Stewart, John Clevenger and Archibald Clevenger appropriated thirteen hundred and fifty (1350) miner's inches of water measured under a four inch pressure. Only a portion of this water was used.

On the 18th day of Sept 1882 John B. Judson et al to whom the above rights had been transferred, granted individually and collectively to the Pamo Water Company all these rights as riparian owners as appropriators to the waters of the said stream to be used on the lands by them owned in Secs. 35 and 36, T.12 S., R.1 W., also a strip of land 50 ft. wide for a right of way,under the following conditions.

That the said Pamo Water Company allow the occupants or owners of said lands to take and use on and after January the first and until June fifteenth of each year after the aqueduct is constructed and in operation, a sufficient amount of water to irrigate the lands heretofore irrigated by the several parties signing this instrument, or their assigns from such points on its aqueduct above said lands and in such quantities as they may select, etc.

also and on and after the 15th of June and until January first of each year ten (10) miner's inches of water for use on such lands, etc.

The above recorded in Book of Deeds 155, Page 106.

There have been several law suits between the West San Pasqual and the East San Pasqual water users and other parties; the most important one was entitled Huffner vs. Judson; the plaintiff representing West San Pasqual and the defendant those living in East San Pasqual. Judgment was rendered in the Superior Court (Judge Torrence) of San Diego, April 15th 1898 as follows:

That the east San Pasqual shall have the full flow of the river at the head of the East San Pasqual ditch from Aug. 15th to January 15th of each year and from January 15th to Aug. 15th the two parties shall alternate in the use of the water. The plaintiffs or West San Pasqual having the full flow the first twenty days and the ~~x~~ defendants the last ten days of each month. Henry Johnson one of the defendants, shall have the use of the water one day in each month.

In accordance with the above decision the water is distributed as follows:

For the west San Pasqual Water users.

H. G. Myers for right of way in Secs. 33 & 34			30 acres
Wm. Dyer for land in SE ¼ of N.E.¼ ~~of~~ Sec. 33			5 "
Winthrop Dyer " "	N.W.¼ S.E.¼ Sec. 33		5 "
F. H. Roberts " "	W.½ Sec. 33		60 "
" " "	E.½ Sec. 32		20 "
Mrs. J. H. Lewes "	N.E.¼ Sec. 32		20 "
Nelson Olds " "	Sec. 30		40 "
Mrs. Smith " "	N.E.¼ Sec. 32		6 "
M. Mantiel" " "	E.½ of N.W.¼ Sec. 32		9 "
Huffner " " "	S.W.¼ Sec. 32		50 "
S.F.Wood " " "	N.W.¼ Sec. 32		80 "
Henry Pratt " "	S.½ of N.E.¼ Sec. 31		20 "
Norman Hall " "	S.½ of Sec.32		30 "
E. Ward " "	S.½ Secs.32 &Sec.4&5 T.13S.R.1 W		75 "
William Little " "	N.E.¼ of N.W.¼ Sec. 32		1½ "
		Total	[illegible] "

On the basis that West San Pasqual people have 451½ acres and 120 days of 24 hrs. frun from Jan 1st to July 10th would be as follows:

1 mi. in .	for one day	1728 cu. ft.
1 " "	for 120 days	207360 " "
250" "	" 120 "	51,840,000 " "

451½ acres equal 19, 667, 340 sq. ft., then the 51,840,000 cu. ft. of water will cover the entire 451½ acres 2.63 ft. in depth during the period from Jan 10th to July 10th of each year which is ample for alfalfa or intense cultivation.

For the East San Pasqual Water Users.

The distribution of the water under the 1898 judgment to be arrainged as follows:

Assuming that they actually irrigate 225.75 acres of land would give the following results.

1 Mi. in.	for 1 day	1728 cu. ft.
1 " "	" 60 days	103680 " "
250 " "	" 60 "	25,920,000 " "

225.75 acres equals 9,833,670 sq. ft. then the 25,920,000 cu. ft. of water will cover the entire 225.75 acres 2.63 ft. in depth during the period from Jan. 10th to July 10th of each year.

The water has been distributed in East San Pasqual under the agreement between the water users on the basis of a certain number of hours per month for the full flow in the main ditch. The East San Pasqual having the last ten days of each month.

The following is a partial list of users and hours run.

Name	Hours run	Acres represented.
Fred Judson	16	
Andrew Judson	35	
Herbert Judson	43	
Gorgson		
Ray Trussell		
E. E. Harris	6	

Area that can be irrigated in East San Pasqual.

The following is the approximate area that it is practicable to irrigate in Secs. 35 and 36 under the present system of conduits and diversion.

In N½ of N.W.¼ of Sec. 35	20	acres
" S.½ of N.W.¼ of Sec. 35	70	"
" N.½ of S.W.¼ of Sec. 35	65	"
" N.E.¼ of Sec. 35	115	"
" N.W.¼ of S.E.¼ " 35	10	"
Total in Sec. 35	280	"

In N.W.¼ of N.W.¼ Sec. 36	25	acres
" N.E.¼ of N.W.¼ " 36	20	"
" S.W.¼ of N.W.¼ " 36	10	"
" N.E.¼ of " 36	40	"
" S.E.¼ of " 36	25	"
Total in Sec. 36	120	"

The land in Sec 31, T.12 S., R.1 E., that can be irrigated is owned by the San Pasqual Ditch Co. which is the East and West San Pasqual water users as joint owners. That land and water rights to same was acquired by deed from Chas. Oliver, S.E.¼ of N.E.¼ Sec. 36, T.12 S., R.1 W., and S.W.¼ of N.W.¼ and N.W.¼ of S.W.¼ Sec. 31 and from Spencer F. Potts, N.½ of S.W.¼ and W.½ of S.E.¼ Sec. 31, T.12 S., R.1 E.

I would recommend that the Pamo Water Company purchase the above lands and water rights viz: 40 acres in Sec. 36 and 200 acres in Sec. 31. These water rights will be valuable to the Pamo Water Company in the future and the portion of land tillable can be made profitable and will prevent any other parties acquiring rights.

Proposition to the San Pasqual water and Riparian owners.

I respectfully submit for your consideration the following proposition to be made to the San Pasqual water users and riparian owners. In my judgment after a careful consideration of the con-

ditions that exist, and that will exist in the future, the proposition will be better for the San Pasqual people than the present supply, which is irregular and uncertain varying with the seasons. Under this proposition they are assured of a uniform supply of water that will be ample (if properly applied) to irrigate all of the land now irrigated under the system.

Proposes Proposition.

The Pamo Water Company to deliver at or near the head of the present main ditch located about 900 feet north of the center of Section 36, T.12 S., R.1 W., S.B.M. 250 miner's inches of water (one miner's inch being the equivalent of 1528 cubic feet of water per 24 hours) continuous flow from the 10th of January to the 10th day of July of each and every year. Provided that the Pamo Water Company shall have the privilege and right of diverting a portion or all of this amount of water into the above referred to conduit from the Bernardo river when the water is flowing in the same, at such times as the East San Pasqual people are using the water, viz: the last ten days of each month above referred to except the month of July.

For such times as the West San Pasqual people are using the water, viz: the first 20 days of the month, the Pamo Water Company to deliver the above referred to 250 miner's inches of water at the West boundary line of Sec. 35, T.12 S., R.1 W., at the point where the present main conduit crosses said line which is about 1820 feet south of the N.W. Cor. of said Section 35.

The same privilege applies to the diversion of water into the conduit from the Bernardo river.

It is understood that the East and West San Pasqual pepple retain the right and privilege to the use of any surplus water that may be flowing in the river through their lands over and above the 250 miner's inches the same as heretofore.

The Pamo Water Company to have the present ditch line from its head about 900 feet north of the center of Section 36 to the west line of Section 35, a distance of about one and a half miles; or to lay in the present ditch a 24 in. diameter concrete pipe with proper outlets and to backfill and wover the pipe retaining the privilege of ingress and egress to examine and repair the same.

The Pamo Water Company to purchase or acquire the right to use the upper conduit line from its present point of diversion near the S.E.Cor. of the S.W.¼ of N/E.¼ Section 31, T.12 S., R.1 E. to its junction with the main ditch a distance of about ¾ of a mile.

It may be that additional arrangements will have to be made with E. R. Harris for the irrigation of the 20 acres in the N.½ of the S.E.¼ of Sec. 36. Under the present diversion of water he had 6 hours run each month for the full flow. If he is allowed an additional 6 hours run per month for the 250 miner's inches, making 12 hours's run per month it would give him sufficient to irrigate the tract.

The usual provisions should be made for the extraordinary periods of drought, riot, insurrection, unavoidable accidents, etc.

In conclusion I would say, here is a river the greater portion of whose waters run uselessly to the sea; adjacent and tributary to the same are thousands of acres of mesa and valley land that only needs the magic touch of water, labor and industry to make it produce abundantly. Store these waste waters; utilize the same

for irrigation and power and Lo' the desert of today becomes the gardon of tomorrow; the brown hills and mesas become the homes of a happy and prosperous people.

The great problem of the day is not only the proper conservation of our natural reserves, but also the proper development of our latent resources. Of what avail is the water in our streams, the forests on the mountains, the mineral wealth buried under the hills, or climate and soils adapted to the raising of the products of the semi-tropic zone if they are not utilized.

Here are millions of people to be fed, clothed, and furnished a livelihood; how can this be accomplished if our resources are not fully developed; and how can they be developed without capital; they have only a prospective value until capital, brains, energy and origination utilize them. Without capital and origination none of our resources can be made available.

Individuals or communities possess nothing until they have given just compensation for the benefits derived. It may be in the form of labor, knowledge, development or capital. In equity, justice, and common sense no one has the right to obstruct or prevent the development of the use of a commodity that is going to waste.

The power that brought matter and force into existence has created certain conditions over which we have no control. It remains for us, in a united, intelligent and scientific manner, to utilize the forces of nature for our benefit. Other sections of the great commonwealth of California are forging ahead; uniting capital and brains to develop their dormant resources and increase their wealth. We have been fools and sluggards long enough, let

us wake up and take our proper position in the community; as becomes sensible men and women. This is no visionary dream, but the practical solution of the problem that upbuilds and strengthens the nation, and is the fulfillment of the duty of every loyal American citizen.

Respectfully yours,

(Signed) C. S. ALVERSON

Civil & Hydraulic Engineer

San Diego, Calif. Nov. 28th, 1911

S U P P L E M E N T A L R E P O R T

O F

C. S. ALVERSON, C.E.

SUBJECT: METHOD OF FURNISHING WATER TO SAN PASQUAL VALLEY.

PAMO WATER CO.

San Diego, Calif.

Gentlemen:-

I submit the following supplemental report for your personal consideration as to the best method of furnishing water to the irrigators and land owners of San Pasqual Valley.

As stated in my previous report there is some 15 square miles of watershed between the proposed Pamo Dam site and the head of San Pasqual Valley.

Assume the average rainfall to be 12 inches in depth; and the available surface and underground storage to be 25 per cent of 3 inches in depth.

1 sq. mi.	3 inches in depth equals	6,969,600 cu. ft.
15 " "	3 inches in depth equals	104,544,000 " "
1 " "	3 inches in depth equals 22.4 mi.ins.	for 180 days
15 " "	3 inches in depth equals 336 " "	" 180 days

In addition you have the overflow water from the Pamo reservoir in the years of heavy rainfall.

On the basis that the 110 sq. miles of watershed tributary to the San Pasqual Valley below the San Bernardino Meridian will yield 16-2/3 per cent, or 2 inches in depth for underground storage, it would give 1643 mi. inches perpetual flow for 180 days in the year. This with the waters from above used for irrigation should keep the plane of saturation at its present normal elevation in the

middle and lower portion of the valley.

The Pamo Water Company to acquire the land and water rights jointly owned by the East and West San Pasqual Ditch Company located in the S.E.¼ of N.E.¼ Sec. 36, T.12 S., R.1 W., and S.W.¼ of N.W.¼ and N.W.¼ of S.W.¼ and N.½ of S.W.¼ and W.½ of S.E.¼ Sec. 31, T.12 S., R.1 E.

Also the water rights on the river in S.E.¼ of N.W.¼ Section 32, T.12 S., R.1 E., owned by Harriet M. Mtnyre where Clevenger Creek from the south joins the Bernardo River. This will prevent other parties from coming in and using the underground waters of the stream, and at the same time furnish the Company with water to divert and pump into the head of the San Pasqual conduit and obviate the necessity of drawing from the storage water in the Pamo Reservoir, except in small amount.

Install a pumping plant in the right bank of the river and near the S.E. corner of the N.E.¼ of Section 36, T.12 S.,R.1 W.

Seven 12-inch diameter driven wells from 50 to 60 ft. in depth and about 60 feet apart, equipped with a 10-inch centrifugal pump motive power 50 H.P. gas engine or electrical dynamo that will carry a load of about 45 H.P.

For the site in the S.E.¼ of N.E.¼ Sec. 32, install a second pumping plant with a capacity of about 100 miners inches or put in a submerged flume and bring the water by gravity to head of the San Pasqual conduit. About 2 miles in distance.

By adopting the above method the Company can utilize a portion of the surface and underground waters flowing in the river and avoid complications in the future and at the same time conserve the water stored in the Pamo Reservoir.

COST OF PUMPING.

The following is the (approximate) cost for fuel to raise one cu. ft. of water per second. Total lift 30 feet.

One cu. ft. of water per sedond equals 50 miners inches or 450 gallons per minute. The theoretical H.P. would be 3.4 add 75 per cent. to compensate for friction, etc., gives 6 actual H.P. required.

It takes about 1/8 gallon engine distillate per H.P. per hour. This would be 9 gallons for 12 hours at 8 1/3¢ per gallon would be 75¢

For 75¢ you have lifted 30 feet in height 43,200 cu. ft. of water or approximately a quantity of water that would cover an acre of land one foot in depth, or 2.5¢ per foot of lift, or one-fourth of a cent per one thousand gallons.

Your engine, pump, wells, interest on cost, etc., are a fixed charge, that varies with the local conditions that exist.

The following reference notes illustrate the cost of pumping under favorable conditions.

U.S.Geo.Sur. Part 4 Hy'dry. page 469.

The Kern Co. (Calif.) Land Company's pumping plant on the Kern River near mouth of canyon is a centrifugal pump run by electric power lift from 30 to 40 feet. They sell the water so obtained for 75¢ per acre-foot, or less than 1/4¢ per 1000 gallons.

RIVERSIDE WATER COMPANY.

Riverside owns its own water; and sells it for 15¢ in summer and 5¢ in winter per mi-ins. of 24 hours run equal to 12926 gallons or 1.16¢ per 1000 gallons.

Per William A. Correll,Sec'y. Riverside Water Co.Aug.14/99.

WATER SUPPLY & IRRIGATION PAPER NO. 83.

Series J. Water Storage 9 Page 81.

The Soledad Land & Water Co. on south side of Salinas River has a pumping plant. Capacity of the centrifugal pump 10,000 gallons per minute with 20 ft. lift Power 85 H.P. tandum compound Corliss engine belted to the pump. Plant cost $10,000. exclusive of the ditches. The irrigate about 800 acres.

Actual running expenses per hour as follows:

Engineer - - - - - - - - - - - -	$0.30
Superintendent - - - - - - - - -	0.25
Fuel - - - - - - - - - - - - - -	0.25
Oil --- - - - - - - - - - - - -	0.10
Incidentals - - - - - - - - - -	0.10
Total per hour - -	$1.00

or 1/6¢ per 1000 gallons when running full capacity.

NEW BEAR VALLEY MUTUAL WATER COMPANY.

Note: The old company was the Bear Valley Water Company.

56 shares of stock at $15. - - - - - - - - - - - -	$840.00
Interest on above at 7 per cent	$58.00
Assessment 65¢ per share	36.40
Total per year.....$92.20	

184 mi-ins. from May 1st to November 1st would make average cost per mi.ins. 51-3/4¢ or about 4¢ per one thousand gallons.

The water users in the valley during the late summer and fall months can use their pumping plants the same as they are at the present time.

COST OF PUMPING 250 MINERS INCHES.

250 mi-ins. for 180 days would be 77,760,000 cu-ft. or 561,670,000 gallons at 1/4¢ per 1000 gals. equals $1,454.13 or $5,816.00 per miners inch for the 180 days for fuel.

If the motive power was electrical the total cost for power operating, expenses and interest should not exceed 1/4¢ per 1000 gallons.

A portion of the time in January, February and March and some years later in the season, you will have water flowing on the surface of the river in sufficient quantities to supply the full amount without pumping. This will save considerable expense, and at the same time keep up the plane of saturation in the upper portion of the valley which usually drops several feet below the surface soon after the water ceases to flow.

If the Company concludes to purchase the above referred to land and water rights , I would recommend that measurements be taken and the corners definitely located. Some of the Government corners are in place and others are obliterated.

There should be some understanding with reference to the main West San Pasqual Ditch line; it should be paved the entire length. In its present condition there is too much loss from seepage and from gopher holes that develop along the line.

In my judgment, if the above defects are remedied, 250 miners inches will give better results than the present wasteful method.

If arrangements could not be made with the East San Pasqual water users on the basis of 250 miners inches, the following method could be adopted by the Company:

For the 60 days that they use the water from Jan. 10th to July 10th of each year, allow them a flow of 275 miners-inches.

275 mi-ins. for 60 days equal 28,512,000 cu.ft. or 677.5 acre-feet; this would cover 260 acres 2.6 feet in depth in the period above referred to. This will tend to satisfy some of the owners of the land in Section 36 whose present supply would be effected by the building of the Pamo Dam; and at the same time will not materially increase the expense of the Pamo Water Company for pumping, which would be less than $50.00 for the 60 days, at 1/4¢ per thousand gallons, provided you had to pump continuously.

This additional 25 mi-ins. for the East San Pasqual water users is recommended for the reason that for several years past additional land in Section 36 has been irrigated over and above that irrigated in 1898. By using the water they have probably acquired some rights to the water.

If a settlement can be made on a reasonable basis, it will be cheaper than condemnation or law suits that usually drag along in the courts for years.

In Southern California and especially in San Diego County the people must be educated and made to understand that the proper method to develop this section of the country and to utilize the water supply is to develop the underground waters by pumping where it is possible and irrigate the bottom and valley lands with the same; and conserve the upper and flood waters for use on the mesas and uplands.

It must be remembered that in San Diego County, that when all of the available water supply is fully developed and

utilized that there will be tens of thousands of acres of good arable land without water for irrigation.

Elaborate reports have been made by those who should have known better; and others by those who did not know; as to the vast and unlimited quantities of water than can be developed. But the fact remains that it takes a goodly supply of capital with an abundance of knowledge and experience to successfully construct and operate a water system. Theories and experiments are costly matters to deal with. And we of Southern California have a large supply to draw from.

Respectfully yours,

(Signed) C. S. Alverson

Civil and Hydraulic Engineer.

San Diego, Cal.,
November 30th, 1911.

Report of C. S. Alverson, C. E.
On available water supply of San Luis Rey Reservoir.

Col. Ed. Fletcher

San Diego, Calif.

Sir:

Replying to your request for information on the available water supply of the proposed San Luis Rey Reservoir in San Diego Co., California, I submit the following personal and official data.

Dam Site

The proposed dam site is located on the San Luis Rey River at the West boundary of the Valle de San Jose, or as it is commonly called Warner's Ranch.

Watershed

The elevation of the Watershed is from 2700 to 6000 feet above sea level. Area above dam site 210 sq. miles. A considerable portion of this area is abrupt and mountainous and is favorable for a large per cent of available runoff.

Rainfall

The annual rainfall is characteristic of Southern California and varies from 20 to 75 inches in depth. Proff. Davidson in his report several years ago estimated the annual mean rainfall to be 50 inches in depth. Personally I consider this too high for a 20 year period; and in the following estimates my basis is an annual mean rainfall of 30 inches in depth.

Storage Capacity

The storage capacity of this reservoir at the 100 ft. contour is abnormal for Southern California and this is an important element in considering the reliability of the water supply. The following is the storage capacity etc. at different contours.

San Luis Rey Reservoir.

Contour Feet	Acres Flooded	Mi-ins. 365 days	Acre feet
20	228	107	1549
30	739	441	6385
40	1200	1008	14595
50	1532	2050	29684
60	2036	3278	47465
70	2695	4907	71053
80	3237	7114	103010
90	4437	9806	141990
100	5335	13273	192193

(Note) The mi-in herein referred to is one-fiftieth (1/50) part of a cu-ft. per sec. or 1728 cu. ft. per 24 hrs. or one miner inch for 365 days equals 14.48 acre feet.

The equivalent of 13200 mi-ins. for 365 days would be 17 plus inches in depth of runoff from an area of 210 square miles. It follows then that the reservoir has a storage capacity far in excess of the runoff in an ordinary year and is a safe guard against dry years.

The estimated total evaporation for one year on a basis of 5 feet in depth and an average of 2500 acres exposed area equals 544,500,000 cu. ft. or 875 mi-ins (daily) or 17.5 sec. cu-ft or about 6 6/10 per cent per annum of the total storage. If the reservoir is only partially filled the exposed area is less and will materially reduce the total amount of evaporation. Another element to be considered in estimating the amount of seepage and evaporation is the condition of the floor of the reservoir with

its perennial springs and wet areas that an examination of the U. S. Geo. sheet (Ramona Quadrangle) will show.

1 inch depth runoff from 210 sq. mi. 487,872,000 cu.ft.
12 " " " " 210 " 5,854,464,000 "

(Appor) This reduced to mi-ins.and acre feet would be for 1 inch in depth equals 773.5 mi-ins or 11200 acre ft.

1 inch in depth equals 773.5 mi-ins. or 11200 acre ft.
6 " " " " 4641. " " 67200 " "
12 " " " " 9282. " " 134400 " "

The above estimates show that with a mean annual runoff of only 6 ins. in depth that you would have 1141 mi.ins. for evaporation and other losses and still have available 3500 mi.ins. perpetual flow.

Measured Runoff

The following measurements at the proposed dam site were made by the writer personally.

June 3, 1890 surface flow 1700 mi.in. or 34 sec.cu.ft.
" 14 " " " 780 " " 15.6 " "
July 7 " " " 408 " " 8.16 " "
Sept.2, 1897 " " 150 " " 3.0 " "
Dec.13, 1899 " " 110 " " 2.2 " "

(Note) the years 1897-99 were very dry.

The U. S. gauging station on the San Luis Rey River at Sickler's Mills 4 miles above Pala gave the following official record.

1905 mean discharge 60.9 sec. ft. total acre ft. 43840
1906 " " 15.2 " " " " " 111000
1907 " " 112. " " " " " 81600
1908 " " 30.6 " " " " " 21800

making the annual average discharge for four years 88.875 sec. ft. or 64560 acre ft. per annum.

The records for 1909-10 I have not received up to the time of writing but from comparison with the records of the runoff of the Santa Ysabel River which joins it on the south I would estimate the San Luis Rey River runoff to be not less than 85,000 acre feet for each of the above years.

On this basis it would make the average for six years 71373 acre feet per annum.

Trusting the above will furnish you the necessary data, I remain,

Respectfully yours,

(Signed) C. S. Alberson

Civil & Hydraulic Engr.

San Diego, April 8, 1911.

INDEX TO REPORT.

VOLCAN LAND & WATER COMPANY

REPORT OF C. S. ALVERSON, JUNE 22? 1914.

Subject: Stream measurements on the San Luis Rey and Santa Ysabel Rivers in San Diego County, California. Also Rainfall data in San Diego County.

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Volcan Land & Water Company;

San Diego, California.

Gentlemen:-

I furnish you the following data in reference to discharge measurements made on the San Luis Rey and Santa Ysabel Rivers; in San Diego County, California.

The measurements were made by cross-section of the stream and floats and is approximately correct. They were made by myself personally or under my direction.

San Luis Rey River
area watershed 212

In Section 5; T.11, S, R 2 W about 1 ½ miles below west boundary Grant.

Date.	Hydrographer.	Discharge Sec.ft.	Accuracy
1890.			
June 3.	T. B. Hartzel	34.0	B
June 14.	" "	15.6	B
July 1.	" "	8.2	B
	At West Bdy. Warners Ranch. Elev. 2618 ft. above sea level. Area watershed 208 sq. mi.		
1897.			
Sept. 2,	Barr Bassel	3.0	B
1899.			
Dec. 13,	C S Alverson	2.2	B

Date.	Hydrographer.	Discharge Sec.ft.	Accuracy.
1900.			
April 28.	C S Alverson	W Bdy Pauma Ranch	6.5 sec-ft.
April 20th.	" "	In Sec.36,T 9 S, R 1 W	18.0 Sec-ft.

San Luis Rey River

Measurements on [illegible] branches of the San Luis Rey River.

In April, 1900 during my investigation in reference to obtaining an underground water supply in the vicinity of Pala, the following stream measurements were made by myself, viz. :
(By C S Alverson)

PAUMA CREEK

April 28, 1900, 11:15 A. M. on Pauma (or Doane) Creek, Elev. (per Aneroid Barometer) 1400 ft. above sea level and at foot of lower falls, there was 14.0 sec. ft. of water running.

At foot of Mountain where trail first crosses the Creek Elev. per (A B R) 1260 ft. there was 13.0 sec. ft. running.11:40 A M

About 3/4 mile above point where the Creek empties into the San Luis Rey River at 2:10 P.M. On West Branch 1.6 sec. ft. and on East Branch 2.4 sec. ft. Total 4.0 sec ft. of water running.

MARION CREEK

On Marion Creek about 1/4 mile above Maj. Utt's house, there was 1.6 sec. ft. of water flowing. About 1/3 mile below this point a branch of living water comes in from the right. On this date, viz., April 29, 1900, no surface water reaches the San Luis Rey River.

AGUA TIBIA CREEK

April 29, 1900 at 10:30 A. M. on the Agua Tibia Creek just above the point of diversion of Maj. Utt's ditch, there is about 1.8 sec. ft. of water flowing. Elv. per (A B R) 1200 ft.

Maj. Utt's ditch takes out about 0.5 sec. ft. and still 300 yds below there is about 1.9 sec ft. of water flowing. The additional water evidently coming in from the sides.
(NOTE) About 0.8 sec. ft of water was running into the San Luis Rey River from the Agua Tibia Creek.

SAN LUIS REY RIVER

Frank A. Salmons (Testimony)

The following is a synopsis of the testimony of Frank A. Salmons given April 20th, 1900.
(Note) Mr. Salmons was a resident of Pala and vicinity for several years prior to the above date and was certainly familiar with the local water conditions.

He testified as follows:

Beginning at the Rincon, First stream Sparkman Creek, Stream heads on west side of Palamar Mountain on north line of Cuca Ranch average summer flow at foot of mountain 40 to 50 min. ins. There is also a spring of about 10 M.I. near my Mother's house.

Next creek, about one mile north of this, do not know the name, ordinary years flows about 25 M.I.

PAUMA CREEK

Next stream Pauma Creek (or Doane Cr.) rises in Doane Valley on Palamar Mountain. Flows westerly and empties into the San Luis Rey River. Summer flow at the lower Falls is about 250 M.I. The Pauma Indians own 35 M.I. for irrigation, etc.

FREY CREEK

Next stream is Frey Creek where there is the most water. It will average about 50 M.I.

AGUA TIBIA CREEK

Next stream Agua Tibia, average flow about 200 m.i. In

5.

summer sinks about one mile from the San Luis Rey River.

MARION CREEK.

Next stream is Marion Creek. Flows about 50 M.I. Water used to irrigate Agua Tibia Ranch.

MAGEE CREEK

Next Magee Canyon or Magee Creek. Flows about 125 or 150 M.I. Also sinks about two miles from San Luis Rey River.

MAGEE SPRING BRANCH

Next is the spring about Magee's house. Flows about 50 M.I. continuously.

LITTLE MAGEE CREEK

Next is Little Magee Canyon. Flows about 25 M.I. and is not used for irrigation.

Next stream also flows about 25 M.I. and is used for irrigation.

JENNIE MAGEE CREEK

Next stream is the Jennie Magee Creek. Flows about 20 M.I. Not used for irrigation.

PAUMA RANCH FLOW.

Ordinarily no summer in San Luis Rey River for about five miles through the Pauma Ranch water reappears on the surface about a mile above Sickler's Mill.

SANTA YSABEL RIVER

The following is the approximate discharge of the Santa Ysabel River for the year 1890.

Station about 600 ft. west of San Bernardino Meridian near the upper end of the San Pasqual Valley.

Measurement made by regular cross-section of the stream and guges on each bank and floats. Accuracy B +.

During months of January, February, March and April frequent measurements were taken as the Chief Engineer's camp was located at that place. Most of the measurements were made by Chief Engineer, C S Alverson and Assistant Engineer, B F Levet.

Estimated monthly Discharge Santa Ysabel River 1890.

Drainage area 135 square miles.

Month.	Discharge in sec. ft. Max.	Min.	Mean.	Total in acre feet.
January	5800	90	385	23674
February	3500	110	290	16108
March	2200	75	245	15066
April	650	95	112	6665
May	110	35	48	2952
June	26	18	20	1190
July	18	18	11	676
August	8	2	5	307
September	4	2	3	178
October	7	2	4	246
November	15	4	6	357
December	150	4	11	676
The year	5800	2	95	68095

SANTA YSABEL RIVER

(Note) The following personal memorandum I found on my book for discharge at the above station.

Jan. 26, 1890	Flow in river,	1967 sec. ft.
Feb. 16, 1890	No rain for 20 days	1190 " "
April 8, 1890	No rain for 10 days	1300 " "

Also the following memorandum taken at the Pamo Dam Site area of watershed 120 square miles.

June 24, 1890	On the surface,	220.0 sec. ft.
Aug. 31, 1893	" " "	1.2 " "
Aug. 31, 1893	1½ miles above Dam Site	2.0 " "
May 17, 1894	W Bdy Santa Ysabel Grant 123 sq. mi.	7.0 sec. ft.
May 18, 1894	at Pamo Dam Site.	8.0 " "

I have no personal record for 1891-92.

The following record of rainfall may be of assistance in determining (approximately) the runoff at the Pamo Dam Site.

At Cuyamaca Dam as follows:

Feb. 20, 1891.	9.60	inches in	24 hours.
" 21, 1891.	12.80	" "	24 "
" 22, 1891.	1.00	" "	6 "
Total for storm	23.40	" "	54 "

Season	1889-90	rain	and	snow	64.51 inches.
"	1890-91	"	"	"	64.96 "
"	1891-92	"	"	"	45.01 "
"	1892-93	"	"	"	43.62 "
"	1893-94	"	"	"	26.85 "

Rainfall Data in San Diego County, California.

San Diego City, Elev. 87 ft. (approx) above sea level.

1885-86	16.96	inches.
1886-87	8.32	"
1887-88	9.82	"
1888-89	11.02	"
1889-90	15.02	"
1890-91	10.47	"
1891-92	8.70	"
1892-93	9.26	"
1893-94	4.97	"
1894-95	11.90	"
1895-96	6.21	"
1896-97	11.78	"
1897-98	4.99	"
1898-99	5.24	"
1899-00	5.97	"
1900-01	10.45	"
1901-02	6.17	"
1902-03	11.76	"
1903-04	4.40	"
1904-05	14.32	"
Annual average for 20 years	10.38	inches.

Rainfall Data in San Diego County, California.

Sweetwater Dam Elv. 250 ft. (Approx) above sea level.

1888-89	14.02	Inches.
1889-90	17.12	"
1890-91	12.65	"
1891-92	9.98	"
1892-93	11.48	"
1893-94	6.86	"
1894-95	16.19	"
1895-96	7.27	"
1896-97	12.05	"
1897-98	7.05	"
1898-99	5.84	"
1899-00	6.50	"
1900-01	9.24	"
1901-02	7.06	"
1902-03	10.45	"
1903-04	5.11	"
1904-05	15.36	"
1905-06	16.68	"
1906-07	13.08	"
1907-08	10.51	"
1908-09	12.09	"
1909-10	10.29	"
Annual average for 22 years	10.70	inches.

Rainfall Data in San Diego County, California.

Escondido Elv. 700 ft. (Approx) above sea level.

1885-86	20.87	inches.
1886-87	10.52	"
1887-88	15.83	"
1888-89	18.47	"
1889-90	20.89	"
1890-91	14.95	"
1891-92	11.60	"
1892-93	18.36	"
1893-94	5.90	"
1894-95	18.57	"
1895-96	7.92	"
1896-97	15.50	"
1897-1898	7.51	"
1898-99	9.46	"
1899-00	13.88	"
1900-01	14.46	"
1901-02	11.66	"
1902-03	17.72	"
1903-04	8.07	"
1904-05	23.47	"
Annual average for 20 years	14.28	inches.

Rainfall Data in San Diego County, California.

Valley Center Elv. 1350 ft. (approx) above sea level.

1872-73	11.65 inches	
1873-74	37.80 "	
1874-75	13.30 "	
1875-76	19.40 "	
1876-77	8.80 "	
1877-78	26.51 "	
1878-79	8.46 "	
1879-80	24.55 "	
1880-81	16.03 "	
1881-82	16.61 "	
1882-83	11.94 "	
1883-84	50.51 "	
1884-85	13.36 "	Average for 13 years 19.92 in.
1885-86	30.55 "	
1886-87	13.71 "	
1887-88	22.80 "	
1888-89	26.50 "	
1889-90	30.48 "	
1890-91	26.56 "	
1891-92	18.07 "	
1892-93	20.60 "	
1893-94	9.90 "	
1894-95	24.70 "	
1895-96	11.94 "	
1896-97	24.00 "	
1897-98	10.93 "	Average for 13 years 20.06 in.
1898-99	14.34 "	(Note) up to Nov. 22nd.

Annual average for 27 years 20.15 inches.

up to Nov. 22nd.

12.

Rainfall Data in San Diego County, California.

Guyamaca Dam Elv. 4643 ft. (approx) above sea level.

1887-88	24.40	inches.
1888-89	52.83	"
1889-90	61.51	"
1890-91	63.34	"
1891-92	39.61	"
1892-93	39.21	"
1893-94	16.05	"
1894-95	54.78	"
1895-96	23.38	"
1896-97	38.96	"
1897-98	27.69	"
1898-99	23.35	"
1899-00	27.70	"
1900-01	42.81	"
1901-02	36.00	"
1902-03	37.60	"
1903-04	23.37	"
1904-05	57.83	"
1905-06	56.24	"
1906-07	44.37	"

Annual average for 20 years 39.56 inches.

CONCLUSION

The within data may be taken as reliable. Nearly all of the measurements were made personally by the writer.

SANTA YSABEL RIVER

The above measurements together with the records of the U. S. Geo. gaging Stations for the last seven years show that the discharge of the Santa Ysabel River is excellent as compared with other streams in Southern California.

Also that the building of a dam in the Pamo Valley will not materially affect the summer flow in San Pasqual Valley. See my report to Pamo Water Company under date of November 28, 1911, subject: San Pasqual Water Right, etc. Also Supplemental report under date of Nov. 30th, 1911 "Method of furnishing water."

SAN LUIS REY RIVER

The following record of stream measurement at Warner's Dam Site and Pala Station show that the former method of computing discharge quantities by proportioned area of watershed in ordinary stage of the stream or especially in dry years is not correct.

Warner's Dam Site watershed 208 sq. mi. Date.	Acre feet.	Pala Station Watershed 318 sq.mi.	Pala Station Should have been acre feet.
1912.			
April	4,730	5,200	7,231
1913.			
March	1,758	1,398	2,687
April	744	569	1,138
1914.			
February	12,600	14000	19,264
March	2,210	3,280	3,368
April	1,313	2,500	2,007
	22,375	26,947	35,695

Respectfully submitted,

C S Aluson

Civil and Hydraulic Engineer.

Ed Fletcher Papers

1870-1955

MSS.81

Box: 35 Folder: 30

Business Records - Reports - Alverson, C.S - Four Reports