Revenue practices used by California's municipal water districts

John Wesley Gebb

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REVENUE PRACTICES USED BY CALIFORNIA'S MUNICIPAL WATER DISTRICTS

A Thesis
Presented to
the Faculty of the School of Administration
California State College
San Bernardino

In Partial Fulfillment
of the Requirement for the Degree
Master of Public Administration

by
John Wesley Gebb
November 1980
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Approved by:

Chairman, Department of Public Administration

Date
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CHAPTER I

INTRODUCTION

The biggest single policy determination faced by local self-governing boards is the adoption of the annual budget. This decision making process is influenced primarily by a system of values and politics used to determine the allocation of limited resources. A significant factor contributing to the budget's importance compared to the large number of other policy decisions is the serious financial problems faced by many local districts. In the early 1970's, California officials claimed that there were several major conditions complicating the budgetary process.

Local revenue continued to decline in relation to rising expenses, resulting primarily from increases in the cost of liability insurance, increases in employee wages, and the general inflation rate. With the passage of Senate Bill 90 in 1972, the property tax would no longer be a flexible source of additional revenue when needed. This property tax "reform" bill stated that the tax rate could not exceed the

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higher of the 1971-72 or the 1972-73 fiscal year tax rate, except the rate "can be increased to a level adjusted for inflation and population when the increase in property tax revenue due to increased assessed valuation, does not keep up with inflation plus population growth" and the rate may also be increased by "such exclusions as court and federally mandated costs." For fiscal years 1973 through 1976, the combined effect of the recession and inflation has caused a decline in the local government's revenue position. "While the net effect was not devastating, at the margin it was sufficient to cause some financial distress." In 1978, local agencies still had deep financial problems and the cost of government continues to increase.

The intensity of urbanization, which caused increased demands for new and additional services from local agencies, is also cited as a contributing factor. As urbanization

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expands, the intensity of interactions among people increase, and there is an associated increase in the number of externalities with which government must deal. Water, sewage treatment, street lighting, trash collection, etc., all demands intensify as urbanization continues and additional local agency expenditures become necessary to provide a continuing higher level of service. It is also probable that citizens will continue to look to their local agencies for assistance in meeting these types of needs and will increasingly come to depend upon government for services. 7

I. STATEMENT OF THE PROBLEM

The purpose of this study was to review the various changes that have occurred in the revenue practices utilized by California's municipally owned water districts, self governed and board governed special districts with water powers, since the early 1970's. Specifically, this paper aims: (1) to present a current account of the use of the property tax as a revenue source, its interrelationship to the use of bonds, and the transition in the various types of bonds that still may be utilized; (2) to compare the variety of intergovernmental loans and grants which are available as a source of additional financial assistance; (3) to point out

7Blair, op. cit., p. 326.
how those few methods of economizing on operating expenses can be used to offset revenue losses; and (4) to show how additional revenue can be obtained from implementing new types of water rate (service charges) structures.

II. IMPORTANCE OF THE STUDY

The municipal water districts, self governed and board governed special districts with water powers, are plagued with the elements combining to produce the financial problems alluded to earlier for local agencies as a whole. On a conservative basis, direct labor costs (wages) and labor related costs (fringe benefits) now account for more than fifty percent of the water utilities' total operating costs. Wages have increased by as much as eighty-two percent and the capital-labor ratio has decreased from 1.31 to 1.04. Similarly, water utilities are finding that the cost of liability insurance is not only skyrocketing, where increases of as much as seven hundred percent have occurred in some coverage areas, but also that some types of

liability insurance are not available any longer at any cost. Water districts are capital intensive and consequently have been severely effected by the continuing inflation of improvement project costs. Since capital expenditures most often require initial large sums, while operating expenditures occur in smaller amounts over a period of time, water districts must be concerned with obtaining sufficient capital investment money by issuing various types of bonds. Because of this particular importance of bonds for water districts, Proposition 13's passage in June 1978 has caused the most significant financial change of all. The provisions of Proposition 13 have not only affected the bond market, but have had other far-reaching financial consequences by limiting the agencies' ability to tax properties. Of the three major revenue sources, i.e., service charges, property tax levies, and bonds, the latter two have been adversely affected.


CHAPTER II

THE USE OF BONDS

As early as 1965, the water industry as a whole (investor, municipal, self and board governed districts, and mutual corporation ownerships) has adopted the policy that all water utilities, regardless of ownership, should operate on a self-sustaining basis. "Every water utility should receive sufficient revenues from those using water service to enable it to finance operating and maintenance expenses and all capital costs." The early history of municipal systems was characterized by facilities that were constructed and operated primarily from property taxes. Water revenue from customer service charges (primarily water rates) was not sufficient to cover operation and maintenance costs. Financing of capital improvements to allow system expansion and modernization was supported entirely by the property tax. Nationally, upwards of ninety percent of all municipal utilities report that they do not rely on property taxes today to finance operation, capital or debt


service costs. The trend to be self-sustaining has now gone to the far extreme, with municipal systems generating sufficient excess revenue to allow cash payments to the cities' general funds.  

The picture for self and board governed special districts is somewhat different. California statutes require all districts to be operated on a self-sustaining basis and assessment of general taxes is heavily used to supplement operation costs. Ad valorem tax on real property has been a major source of revenue to support capital improvements. The split between taxation and service charges varies greatly and was a matter of local policy until recently, i.e., Proposition 13 places restrictions on the use of taxes by municipalities and districts. The financial philosophy of publicly owned systems (municipalities, board and self governed districts) is basically different from investor-owned systems (investor and mutual corporations), in that the latter are intended to be operated so as to generate a reasonable profit. While the public owned utilities must provide its services at cost, they must also generate an adequate and steady flow of revenue to attract future capital for bonded indebtedness.

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13Roth, op. cit.
I. MOST COMMON TYPE OF BONDS UTILIZED

General obligation bonds carry the pledge of the issuing jurisdiction to use its full revenue-generating powers to guarantee repayment of the bonds in addition to the revenue which will come from tax levied against the property. The principle source of revenue is an ad valorem taxes on real property. Since these bonds presumably carry the least risk, they usually sell for the lowest interest rate. The bond obligation may not be issued without a public vote and the statutes limit the amount of debt that a local government can issue to a specified fraction of the taxable value of the property within its jurisdiction.

Revenue bonds are guaranteed by the revenue which is generated from the facilities constructed from the bond proceeds, i.e., the income from a specific enterprise is pledged. Since there is a limited commitment to bond repayment, the bonds carry more risk and the interest rates are slightly higher than general obligation bonds. These bonds may be issued without a vote. If an election is called, a simple majority of those voting on the matter would confirm the bond authorization. Debt finance by revenue bonds is not subject to the local government debt limitation statutes.
Assessment district bonds most commonly used, as presented in the California Streets and Highways Code, are the Improvement Act of 1911, Municipal Improvement Act of 1913, and the Improvement Bond Act of 1915. These bonds are guaranteed by the revenue from a specified assessment levied only against the specific area benefited by the improvement that was constructed from the bond proceeds. They usually bear a higher interest rate than general obligation or revenue bonds. This type of bond does not require a vote, but a protest hearing is required. A majority protest is defined as owners of more than one-half of the area of the property to be assessed for the improvements. The protest may be overruled by an affirmative vote of four-fifths of the members of the local legislative body. Debt financed by assessment bonds is also not subject to the debt limitation statutes. The rate of interest shall not exceed eight percent (amended from seven percent in 1974) per annum and the maximum term of the bonds shall not extend over a period exceeding twenty-four years.

There are some significant differences between these three acts. The 1911 Act contains provisions for the issuance of bonds and procedure for performance of work, public notice, protest hearings, and assessments. The contractor must finance the improvement project himself and
receives payment from the bond revenue only when the work is completed. The 1913 Act also contains provisions for issuing bonds and sections governing procedures, but the contractor may collect payment for the project work as it proceeds. The 1915 Act only contains provisions for issuing bonds. Procedures for the improvement project can follow the procedures contained in either of the other two acts. In addition to the bond repayment being secured by the assessments, payment of the bond debt may be further guaranteed by the use of a redemption fund. This fund includes an ad valorem tax collected from all of the assessment district properties and is used to cover any delinquent assessment payments.

Lease revenue bonds and tax allocation bonds are both secured by the revenue from facility leases. The facilities are constructed from the bond proceeds and the facilities are leased to other local government units. These types of bonds may be issued without a vote and they would rarely be used by water agencies. Both types of bonds constitute a significant portion of the California bond market and, therefore, their market status indirectly affects the other type of bonds which are routinely used by water agencies.
II. EARLY BOND PRACTICES

The use of general obligation and revenue bonds, to support capital investment projects, became popular nationally in the 1940's. Because of its newness, the initial bond indenture requirements were quite expensive until the water utilities had an opportunity to establish a history of financial stability. As the confidence of investors built up, the bond costs gradually declined. General obligation bonds have been the most widely used type bonds for water projects and revenue bonds have become increasingly popular also during the last twenty years. Assessment districts bonds are also being used to a much greater extent to help finance capital projects, in addition to surplus revenues that might be available from other revenue activities or from a variety of changing intergovernmental aid programs. As interest rates change, the ratio between short-term and long-term borrowing has varied, but there has been a steady increasing use of bonds by public utilities. The pressure on water agencies from

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15 Schreiner, op. cit.

urbanization, along with the requirement of the Federal Safe Drinking Water Act (PL 93-523) for new treatment facilities, probably contributes to this financing trend.

Water Utilities require massive investments in source, treatment, storage, and distribution facilities that normally have a long operation expectancy of fifty years or more. When total annual system costs are categorized into operating versus capital costs, for systems with new facilities, capital costs may exceed fifty percent of the budget. The cost of bonds, therefore, has an important impact on service charges (water rates), since the bond debt (both principle and interest) must be paid for annually from the utilities' revenues, considering that the revenues must also be used to directly finance (cash payments) some portion of the improvements and cover the daily operating costs. The refinancing of outstanding bond debt and the heavy use of short-term notes when long-term bond interest rates have not been favorable are a significant consideration when facing the problem of minimizing rate increases to cover capital costs. Since capital expenditures involve large sums, while operating expenditures occur in smaller amounts over a period of time, utility management tends to be preoccupied with obtaining capital funds and, to some
extent, overlook operation costs. This may also explain why the industry has been involved in so few innovative revenue generation programs or programs designed to reduce operation costs.

III. FINANCING UNDER PROPOSITION 13

Once the Howard Jarvis and Paul Gann property tax initiative qualified for the California ballot (December 28, 1977), a heated debate ensued up to election day (June 6, 1978). The proponents of the estimated sixty percent tax cut cited the continuing rapid inflation in property values followed by annual re-assessment and higher tax bills, a state fund surplus that was too large and still rapidly growing, and the public's overall discontent with the size, number, and quality of state and local programs. These supporters were claiming that the initiative would help reduce waste in government, allow landlords to reduce rental rates, and even lower the excessive benefits given to public employees. The opponents, on the other hand, attempted to convince the voters of the economic and

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17 Clark, op. cit.


government service chaos that would result if the measure passed. Local services would have to be cut, particularly by the special districts because they were so heavily dependent on property tax revenue. Cities, counties, and special districts would lose more control over the local budget decisions by accepting and becoming more dependent upon state and federal funds.20

Almost two years later, Proposition 13 has had very few of the effects which were predicted by its opponents. The conclusion is that the state surplus has been of an ample size to forestall most of the forecasted changes. Some of the opponents would disagree, however, pointing out the loss of "home rule" and "local control" that has resulted from the spending limitations contained in the 1978 state revenue sharing plan, Senate Bill 154.21 The approximate four thousand seven hundred special districts in California were in financial trouble and the state legislature responded by providing revenue sharing funds and some supplemental emergency funds to the districts. Along with the funds, SB 154 also required that the "pre-existing"


level of police and fire services must be maintained and to cut health services no more than the proportionate reduction in net county revenue. Thus, the state has now gained more control over these areas which have always been a matter of local discretion and dealt with as the local entities found appropriate.

Prior to the passage of the initiative, there is another very significant concern which got lost in the flood of "show-the-politicians" rhetoric. The bond market, which municipalities and districts are so heavily dependent upon, would be adversely affected by Proposition 13. This concern takes on an added significance due to the effect of the initiative over the bond market well before the measure's passage, the state revenue sharing funds were not designed or intended to deal with this problem, and the ambiguities of the Proposition 13 language has led to further general confusion as to which funding mechanisms are legal. The courts have validated the measure as a whole; however, they have provided very little guidance regarding the interpretations and application of the many sections which directly or indirectly affect the revenue mechanisms used by local entities. These questions will

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only be resolved by further litigation. As a consequence, the market for most of the type bonds used for capital projects has been wiped out. Those provisions of the measure which are pertinent to the bond market are as follow:

The maximum ad valorem tax on real property shall be limited to one percent of the assessed market value;

Except the one percent limit does not apply to bonded debt "approved by the voters" prior to July 1, 1978;

Establishes 1975-76 (assessments as of March 1, 1975) assessed valuation as the base value of the property for tax purposes and limits annual increases to two percent;

Any tax measures by the legislature designed to increase revenues must be passed by a two-thirds vote (previously required a simple majority);

Prohibits the imposition of new state ad valorem, sales, or transaction taxes on real property; and

Local entities are entitled to impose "special taxes" on real property, but only by a two-thirds vote of "qualified electors."

Given these particular provisions of the measure and the uncertainties of such terms as "approved by the voters," "special taxes," and "qualified electors," which were not clarified by the courts' initial ruling, what has been the impact on municipalities and special districts financing, i.e., when considering current outstanding obligations and future finances?

Prior to December 28, 1977, California had been a major influence in the municipal bond market. During 1977, California entities issued in excess of two billion dollars in bonds, which accounts for approximately 4.5 percent of the total tax-exempt bond debt issued in the country. The individual local agency debt ratios compared favorably with those jurisdictions in the other states, as was indicated by nationally recognized rating institutions such as the Standard and Poor's Corporation and Moody's Investors Service Incorporated. Both of these agencies rated the

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24 Subbotin, op. cit.
wide rate of bond financing used in California well into the investment grade, i.e., BBB and Baa or better, with the rating scale from Aaa (Moody's rating scale) or AAA (Standards and Poor's rating scale) for the best secured bonds to C for the worst. Baa or BBB are the lowest rating which a bond can receive while still being considered worthy of investment. The California bond market was a good one, with water bonds being sold that received interest rates as low as 5.23 percent. The very flexible combinations of property taxes, service charges, connection charges, and standby service charges used by the districts as revenue sources, along with the low operating costs, was reflected by both the large size of the bond issues and the low interest rates.

Proposition 13 qualified for the ballot on December 28, 1977, and as the June election approached and it became increasingly evident that the measure had an excellent chance of passing, the municipal bond market began to react. Buyers started to shy away from tax increment, lease revenue, 1915 Act bonds and other non-voted securities if

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26 Subbotin, op. cit.
they were partially or totally secured by the power to levy ad valorem property tax. As individuals and investment companies showed their unwillingness to invest in what was becoming a potentially shaky situation, the interest rates on these types of securities started to climb. Rates rose to 6.37 in January to 6.92 in February, 7.28 in March, 8.21 in April, and over 9 percent by the end of May. Just before the election, these types of bonds were not marketable at all.

During the same period, general obligation bonds and revenue bonds were not adversely affected to any degree. The uncertainties surrounding other types of bonds may have benefited these types of bonds and partially explain the sudden increase in the number of these bonds issued just prior to the election. A good portion of this increase can also be accounted for by the number of California entities that were in the midst of large construction projects and sought the additional financing necessary to complete the project should the measure pass, i.e., general obligation bonds could not be used since they will not qualify as "special taxes."

On June 6, 1978, the measure was approved by almost sixty-five percent of the voters and Proposition 13 took effect on July 1, 1978. The Standards and Poor's
Corporation quickly responded by issuing a statement that in response to the passage of the Jarvis-Gann initiative, all existing ratings on California tax allocation, lease rental, general obligation, and assessment district bonds (broader classification including 1915 Act bonds) are immediately suspended and no new bonds in these categories would be rated. Moody's Investors Service Incorporated followed a short time thereafter in a similar fashion and suspended its ratings on all tax allocation and lease rental bonds. Ratings for bonds whose repayment was insured by the Municipalities Bond Insurance Corporation of the American Municipal Bond Assurance Corporation were still continued, however.

The suspension of existing and/or new bond ratings for the various types of bond issues reflected several unresolved problem areas. The California Senate Bill 154 revenue sharing plan for 1978-79 and 1979-80 fell short of providing the amount of revenue necessary to rescue the municipalities and special districts. Tax allocation bonds and lease revenue bonds were particularly vulnerable to default because of the issuing redevelopment agencies and leasees were so heavily dependent on property tax revenue. Since water agencies' revenue sources are more diversified, they were not in as critical a position because of SB 154
shortcomings. Service charges, standby service connection fees, etc., can be increased to help eliminate their revenue problems. Since the water agencies' budgets were only temporarily disrupted and it was expected that they would be capable of continuing to generate sufficient revenue to operate on a self-sustaining basis, the bond market continued purchasing those remaining unissued general obligation bonds which were authorized prior to July 1. Proposition 13 has eliminated the local agencies' authority to levy any new ad valorem property tax. With the issuance of general obligation bonds being totally dependent upon this type of financing mechanism, new general obligation bonds could not be issued any longer.27

Part of the general obligation market will probably be replaced with the use of revenue bonds by the local agencies. The revenue bonds will have to be structured so as to be fully supported by revenue generated by the bond funded facilities and not dependent upon any ad valorem taxes. Bonds supported in this manner will be in conformance with the limits established by Proposition 13 and should be acceptable by bond underwriters and their clients.

The position of the assessment bonds is somewhat different, however. The California courts' review of Proposition 13 consisted of validating the measure as a whole and did not provide any specific guidance to resolve the problem surrounding the interpretation of the section which allowed local government to impose "special taxes" if passed by two-thirds of the "qualified electors." The initial concern after passage of the measure was that assessment bonds may be subject to the one percent assessment limit, or they may be considered "special taxes" which are dependent upon a vote of the "qualified electors." This last unresolved problem involving what does the term "qualified electors" mean was seen as the central issue upon which the initiative would be thrown out by the courts because of its vagueness. Bond underwriters, bond counsel, financial consultants, and the courts have now reached the conclusion that these types of bonds are not subject to the one percent limit and they are not supported by a special tax. The 1911 Act bonds are secured by fixed lien assessments of only the individual properties which are benefited by the project the issued bonds have been used to finance. Consequently, 1911 bonds have now regained

28"Jarvis-Gann Initiative," op. cit.
their original legal position in the municipal bond market. How they will be accepted by the investors in the future is not known.

The 1915 Act bonds are very similar, except these bonds were also secured by a bond redemption fund. This feature greatly reduced the investor's risk and consequently enhanced the marketability of this type of bond over the 1911 Act bonds. The redemption fund consisted of assessments collected from all the properties within the district as a whole. The redemption fund functions by the local agency imposing an ad valorem tax on the district to purchase the properties which have become delinquent in their assessment payments. This added security feature of the 1915 Act bonds is prohibited by Proposition 13. While the 1915 Act bonds may still be issued, without the redemption fund provision, they will now sell at a higher interest rate to compensate the buyer for the increased risk.

IV. FUTURE FINANCING PRACTICES

There is no guarantee that the state will continue the replacement of the lost local property tax revenue resulting from Proposition 13. The remaining unissued general obligation bonds are dwindling quickly. This source of revenue will disappear permanently in the very near
future. The California tax limitation in 1978 turned the state's municipal bond market into a financial disaster.\textsuperscript{29} Investors recognized the potential risks involved and turned from the municipal bond market to other investments. The marked inflation and high interest rates in 1979 and the first portion of 1980 also helped drive investors away from the municipal bond market to other short-term investments that pay a higher interest rate.\textsuperscript{30} Revenue and assessment bonds could be issued within the new legal constraints of Proposition 13, but local agencies could not count on the size or dependability of this revenue source because of the bond market's overall poor condition. The entire long-term financing system relied upon by the water utilities was greatly diminished and as of the first quarter this year, the market has not made any substantial improvement. The February 21, 1980 "Bond Buyer" index average of twenty municipal bonds (rated AA, A, and Baa) was 8.46\%, the highest rate in the history of the municipal market.


In the meantime, California's local agencies must preserve their fragile credit. They must place a high priority on generating ample revenue to make payment on all debt service. Coverage, i.e., the ratio of new revenue generated by the utility which is available for debt service to the amount of cash required for debt service, is the part of the agencies' credit analysis that is given considerable importance by bond analysts.\(^3^1\) Underwriter and rating agencies watch for willingness and ability to meet debt requirement. Once a district's or municipality's credit rating is lost, New York City for example, it is very difficult to return to the bond market.\(^3^2\) Maintaining a favorable credit base for future use requires debt-management techniques which maintain not only a proper coverage for the existing debt level, but plan on adequate coverage for needed future debt levels. Analysts are particularly concerned with previous revenue history and not just projected revenue. If future financial needs dictate increasing debt levels, higher consumer rates should be put into affect at least one year in advance in order to


\(^{3^2}\)Subbotin, op. cit.
establish a revenue history upon which analysts can be reasonably assured that adequate coverage can be maintained.

The planning of future bond issues has taken on added importance. When a local government decides to use long-term debt, it establishes a fixed obligation which must be met for many years. A fiscal advisor, bond counsel, auditor, paying agent, and other specialists should be utilized in helping to design, market, and administer the debt. The fiscal (bond) advisor's assistance is particularly necessary for proper structuring of the bond issue. They must consider the existing bond covenants, bond reserve requirements, amount of current outstanding bonds, bond market conditions, maturity schedule, bond denominations, call privilege, and the amount of bonds needed. Careful consideration of each of these many factors may result in a significant savings to the utilities consumers.

The marketability of bonds must not be overlooked, considering that a change of only one-tenth of one percent in the amount of interest which must be paid on a long-term bond issue can result in a very large additional financial burden for the water system customers. However, the degree of marketability, i.e., achieving the minimum effective interest rate, should not be gained at the expense of
maintaining optimum borrowing results.\textsuperscript{33} The ability to redeem bonds prior to maturity date ("callable"), the capability to issue additional bonds, and the flexibility to use any surplus net revenue are also important features of a bond issue. Having a bond issue marketed during a period of high interest rates which is non-callable, will help in obtaining the best possible level of marketability, but it also places the utility in the position of having to pay for high interest bonds long after the market may have moved to a lower interest level. Depending upon the size of the bond issue, the length of the issue's life, and the level of the prevailing interest rate, "there are those circumstances where in the interest of optimum borrowing results, an early call date is warranted even though the maximum degree of marketability cannot be achieved."\textsuperscript{34} This type of planning must also be coupled with the timing requirements of the capital improvement program.

Long range capital planning which carefully prioritizes projects and establishes in what order(s) the projects can be initiated will make the improvement plan more flexible and allow for projects to be quickly started when the financing conditions are optimum. This procedure

\begin{itemize}
\item \textsuperscript{33}Tinsley, \textit{op. cit.}
\item \textsuperscript{34}Tinsley, \textit{op. cit.} p. 271.
\end{itemize}
can also result in significant savings. The local governmental entities can no longer afford to plan on a given project starting on a specified date and just accept whatever the market conditions are at that time. Rather, the expected continuation of the fiscal problems for the water utilities will necessitate "financial management policies" and a capital improvement program (CIP) to be prepared and implemented.

A financial policy should include components which deal with issues such as: designating the level at which property taxes will be held, i.e., not withstanding statutory requirements; establishing use or service charges that approach or exceed the level of funding necessary for the utility to operate on a self-sustaining basis; determining what will be the limiting debt service levels; and establishing the limit for the use of grant funds and intergovernmental loans. From the financial policy, a capital improvement program can be established which will list the proposed capital items to be undertaken, when the projects will be started, the amount of finances that will be needed, and the proposed method(s) of financing. It is this all-important latter part, i.e., the capital improvement
budget (CIP), from which the authorizing of necessary bond issues to fund the various portions of future improvements should come.\(^{35}\)

The CIP is enacted and updated annually and covers the proposed project scheduling during a six-year period. The actual enacted capital budget will vary from the proposed amounts contained in the CIP. Changes in market financing conditions, inflation and cost overruns will cause the budget to vary from the capital improvement program's forecasted budget. The CIP allows a mechanism to begin projects which were scheduled for future years on short notice, delay projects, or change the order of the projects, to take full advantage of unexpected beneficial financing conditions or avoid poor market conditions. The CIP also fulfills the requirement of providing a document from which bond investors, underwriters, and rating agencies can assess the risk associated with the bond issue the utility is attempting to issue.\(^{36}\)


There are many options regarding financing methods and many opportunities to minimize costs. The decision to incur long term debt, i.e., the use of bonds, is a significant one because it commits the issuing entity to making fixed interest and principal payments for a substantial period of time. Before deciding on the use of a bonds issue, however, every local government should carefully consider the advantages and disadvantages of the various other forms of financing that may be available.
CHAPTER III

FINANCIAL ASSISTANCE FROM LOANS & GRANTS

A local government's "financial management policy" should outline the legislative body's position on the use of grants and intergovernmental loans. The policy position must be based on a thorough familiarization with the various types of financial assistance programs available to assist in dealing with emergencies or capital improvements that are mandated by various regulatory agencies. Several types of loans and grants are available from the Environmental Protection Agency, Farmers Home Administration, and the California Department of Water Resources. These programs only provide assistance for a very limited scope of projects and each contain complex requirements which the water utilities must not only anticipate, but be prepared to deal with.

Federal and state financial assistance has become a major source of funding for local government.37 "Federal aid as a percent of state and local government own source

general revenue rose from 11% in 1957 to 28% in 1976."\textsuperscript{38}

The need for alternate sources of revenue to finance projects traditionally supported by service charges and property tax revenue has been compounded by the customer's demand for additional improved services without increasing local costs, in addition to the public's attitude toward seeking their full share of all available federal money. When emergencies, new regulations, or demands by the customers for new facilities cause a sudden and large financial burden, seeking federal and state aid may be justified.

Though intergovernmental financial assistance can lessen local revenue problems, the use of federal and state grants does have several drawbacks. Grants can disguise the cost of services and destroy local commitment to operate on a self-sustaining basis along with maintaining equitable utility rates.\textsuperscript{39} Since most grants require local matching funds, there is a tendency for too many low cost, low priority projects to be entered into while causing the local priorities specified in the capital improvement program to

\textsuperscript{38}United States Advisory Commission on Intergovernmental Relations, \textit{op. cit.}, p. 4.

\textsuperscript{39}Graeser, \textit{op. cit.}; Lane, \textit{op. cit.}; Roth, \textit{op. cit.}, p. 623-627.
be ignored. The number of conditions contained in a grant can be so extensive that the financial advantage offered by the grant becomes insignificant. When intergovernmental financial assistance does become necessary, assistance furnished in the form of loans may be the better form of monetary aid for the local entity. Low interest, long-term government loans allow the utility to phase in the rate increases and continue operating on an independent, self-sustaining basis, while still meeting the financial needs for constructing necessary facilities and making needed improvements.

The allocation of funds differs between the California loan/grant programs and the federal ones. Each program has its own unique requirements, but most intergovernmental aid schemes share some or all of the following characteristics:

1. Require local entities to provide matching funds for both loans and grants.

2. Applicant must be unable to obtain funds from other sources at reasonable interest rates and terms.

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40 Stallings, op. cit.
41 Graeser, op. cit.
3. Borrowers must have the ability to insure repayment of the loan.

4. Grants are usually limited to public subdivisions and reserved for only the most needy applicants.

The ultimate selection of a loan or grant program will depend upon the exact requirements of the selected aid program and the amount of the remaining available appropriated funds during any given year.

Pursuant to the Federal Safe Drinking Water Act of 1974 (PL 92-523), the Environmental Protection Agency is administering special study and demonstration project grants and guaranteed loans. Study and demonstration grants are limited to those projects which will develop or demonstrate a new or improved method, approach, or technology for providing a dependable safe supply of drinking water, i.e., the projects are limited to the construction and operation of water treatment facilities involving new treatment technologies. Grants cannot exceed 66.6% of the total cost of constructing the facilities and 75% of any other costs associated with the project. Priority for grants are given to projects where there is a known or potential public health hazard(s) and the hazard cannot be dealt with by ordinary
treatment technology. The agency's program of guaranteeing loans made by private lenders is for the purpose of enabling small water systems to meet the national drinking water standards. To be eligible, the applicant must demonstrate an inability to obtain other financial assistance and the maximum loan guarantee is limited to $0.05 million for any single project. In both of these programs, all applicants are eligible irregardless of their type of ownership.

The Farmers Home Administration is the primary source of federal assistance for small rural water utilities, i.e., water systems supplying communities with a population of less than 10,000. Both public entities and non-profit corporations may receive loans and grants. Applicants must not have been able to obtain funds from other sources at reasonable rates/terms and must have the capacity to repay the loan. Current financing is at 5% interest for a maximum term of forty years. The maximum project limit is normally for four million dollars. Grant funds are available for up to 75% of the project cost and are limited to only the most financially needy communities.

The California Department of Water Resources currently offers two financial aid programs with both containing loan and grant provisions. The California Safe Drinking Water
Bond Law of 1976 (AB 121, 1975) is commonly referred to as "Proposition Three." The legislation was based on the premise that "a number of domestic water supply systems are inadequate and do not meet minimum bacteriological, chemical, or other basic health standards for domestic water supplies, and that it is in the best interest of the people that the State of California provide technical and financial assistance..." Priority for loans would be based upon a list supplied by the State Health Department of those "suppliers with the most critical health problems." The Department of Water Resources was charged with the responsibility of administering the loan program to include promulgating such rules and criteria for establishing the eligibility of a supplier, i.e., the supplier's inability to secure reasonable alternative financing and financial ability to insure repayment of the loan. All water suppliers, irregardless of their type of ownership, are eligible for a loan, but grants are limited to political subdivisions of the state. The bond law provides for a 6.0 percent interest, up to a fifty year term, with a maximum loan amount of 1.5 million dollars to any individual supplier. The maximum grant is limited to 0.4 million

42California Water Code, Division 7, Chapter 10.5, Section 13854.

43Ibid., Section 13864 and 13868.3.
dollars and shall only be provided for that portion of the loan the applicant is not capable of repaying.

The Davis-Grunsky Act is the older state aid program, but it is very similar to Proposition Three. The program is administered by the Department of Water Resources and is designed to provide financial assistance to public agencies for the construction of water projects where there is a "statewide interest." Under this statewide interest policy, loans for domestic water systems to meet public health and safety needs are given preference over grants for water recreation, fish enhancement and storage projects. A project is eligible for a loan if it conforms to the California Water Plan, is economically justified, and there is reasonable assurance that the applicant can repay the loan. Loans may be made for the entire cost of the project, but the maximum loan to any single agency may not exceed four million dollars. Interest is charged at a rate of approximately 2.5 percent and the loan terms may extend up to fifty years. The loan may also cover the costs of the loan feasibility study and land acquisition, in addition to the cost of the project facilities. Grants are limited to a maximum of 0.4 million dollars for any one project.
CHAPTER IV

ECONOMIZING ON OPERATING EXPENSES

Water rates essentially determine the net revenue of a utility and its capability for bond coverage. An equitable and adequate proposed water rate may not be sufficient for the utility to operate on a self-sustaining basis if management does not avoid unnecessary or extravagant operating expenses. A national survey of water utilities concluded that operating costs have steadily increased until they now dominate the utilities' budget. Operating expenses will vary from one utility to another depending upon the size and age of the facilities, but the average operating costs now constitute over seventy percent of the water system's total annual budget. Careful control over operating expenses is essential.

Economizing on operating expenses can be used as a method to help offset revenue losses. Water conservation and water line leak detection are two separate, but similar, programs which not only offer an immediate reduction in operating costs, but may also help defer the construction of new facilities necessary to support additional growth in the utility's service area. Support services or labor

44 Clark, op. cit.
costs now constitute upward of almost fifty percent of a typical utility's operating costs. Utility self-insurance and risk management is a combined program which might be utilized to help reduce indirect labor costs. Managers must think of reducing both capital and operating costs in order to balance the total budget.

I. WATER CONSERVATION

Water conservation as a management technique to reduce operating costs is a relatively new one. In the past, conservation measures have only been resorted to as a means of dealing with declines in the utilities' water supply capacity as occurred during California's 1976-77 drought. The use of large amounts of water was encouraged by the use of "decreasing block rate," i.e., each additional increment of water may be purchased at a slightly lower cost than the preceding amount during a given billing period. Selling large amounts of water was considered synonymous with generating additional revenue and maintaining a financially healthy industry. Environmentalists, consumers, and public authorities are now questioning the need to

45 Dyer, op. cit.; Clark, op. cit.

continue expanding facilities since conservation can be implemented to delay system expansion. Conservation of water, as one of the nation's natural resources, is being promoted by federal and state legislation. Applicants for the California's Safe Drinking Water Bond Law loans and grants, for example, are not eligible unless they can substantiate that their utility has an active program promoting water conservation. Conservation is now becoming a factor in more utilities' financial planning as management continues to adopt "increasing block rates."

Aside from being forced by legislation and public pressure to conserve water, management should be aware of the economic benefits generated by conserving a natural resource. In most cases, conservation is advantageous to the utility from the standpoint of providing an opportunity to reduce operation costs. Conservation allows more customers to be served without expanding facilities and the additional operation costs related with them. This is aside from the capital improvement costs, i.e., principle and interest payments, which can be avoided by not building the facilities. Less water being provided means lower energy (electrical) costs because of the reduction in the pumping

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necessary to supply the water. Decreases in the amount of water needed also translates into avoiding the high treatment costs connected with having to use water sources of poorer quality to meet consumer water demand requirements.

Conservation does have a severe drawback, however. As less water is sold, if the water rates are not adjusted, the utilities' revenue from water sales will also decrease. Obviously, a reduction of revenue has a severe impact on the water utility because of its high level of fixed costs. A water system is not like other businesses where a portion of a plant can be closed when consumer demand drops off. The water utility must still continue to operate and maintain the predominance of the entire facility even though the requirement for the delivery of water has declined. If water conservation is to be practiced, basic water rates must be increased and a surcharge on excessive water consumption may also be necessary.

Phasing in a conservation program will allow customers time to understand the purpose of the increased

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rate structure, assess its economic impact on the household budget, and make necessary changes in their water usage. Phasing in the water conservation objectives can eliminate the need for sudden rate increase needed to prevent revenue losses and minimize adverse public reaction. "Adverse conservation impacts can be eliminated by including conservation in utility plans and by effective marginal cost pricing."  

II. WATER LINE LEAK DETECTION

Until very recently, the water utility has mostly ignored the problem of lost or unaccounted-for water resulting from leakage in the distribution system. There was little interest to locate and repair leaks until the leakage presented a safety or health hazard. As late as 1970, lost or unaccounted-for water in the range of eight to ten percent was accepted nationally as being within acceptable limits.  

Unaccounted-for water is defined as the difference between the volume of water stated in the customer billings plus other known uses from the total amount of water produced by the combined water supply

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50 Sharpe, op. cit., p. 479.

facilities. Water shortages resulting from the 1976-77 California drought and higher chemical and electric costs for water treatment and pumping has prompted municipalities and self-governed districts to adopt water leakage control programs as a means of reducing operating expenses.

Reducing the amount of unaccounted-for water and operating expenses are the most immediate and noticeable benefits of a leak detection program. Money spent on eliminating leaks, rather than continuing to pump more water into the system as a means of compensating for the water losses, will also pay for itself in the reduced need for additional capital expenditures required for new facilities. Water conservation and a leakage control program can be used simultaneously to serve additional customers with the same volume of water produced from the existing facilities, while deferring the construction of new facilities.

Additionally, a leak detection and repair program has several other benefits. Leak detection surveys provide data which may be used to verify the accuracy of the water system "as built" maps and determine the physical condition
of the system. If funds are not available to complete all the necessary repairs and line replacement, the survey data can be used to establish priorities for the portion of the operating budget which has been allocated for maintenance. Leak detection programs also help improve public relations.

A thorough detection program, however, cannot be started unless the system's customers are metered. Without individual meters, the utility will not be able to determine its percentage of unaccounted-for water. "A water loss control program is difficult to justify without obtaining data from metering." In order to establish the program, money must be spent on metering all water service connections and maintaining existing meters so they accurately register the water consumption. The leak location and repair program requires increases in maintenance and

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53 Laverty, op. cit.

metering costs, but these are offset by reduced operating and capital expenses. 55

III. RISK MANAGEMENT

Water utilities are like most other types of business organizations when it comes to the problem of preventing and controlling "risk" as well as financing the resulting losses. An inseparable part of the utilities' construction projects and daily operation activities include the opportunities for personnel injury, property damage, and legal liability. There are cost-effective methods of dealing with these risks, i.e., exposure of the organization to potential losses of assets, other than purchasing the various types of insurance. Risk management is the method or technique which is used by business to identify areas of potential risk, reducing potential losses, and transferring the remaining risk in the most cost efficient manner.

The concept of risk management and its formal utilization by the water industry, was adopted only as far back as the mid 1970's. "For decades managers were conditioned through lack of perceptive analysis to regard insurance as the providing of a highly competitive and

55 Laverty, op. cit.
relatively inexpensive commodity."56 It was the consecutively larger insurance premium increases since 1977 that have forced management to seek other, less costly alternatives.57 From 1973 to 1977, the insurance industry suffered through the worst financial losses in its history. The insurance companies reacted to these losses by requiring higher premiums and eliminating less profitable forms of insurance. The water utilities were left with the problem of paying for extremely high rates, and in some cases, not being able to obtain certain types of policies at any cost. Procuring needed insurance, while holding the line or reducing the personnel, property, and liability loss portion of their operation expenses, could only be achieved through good risk management.58

A risk management program includes the areas of physical property damage, general liability, vehicle/heavy equipment liability, indemnity bonds, workman's compensation, and health, life, and disability insurance for employees. The first task is to identify and evaluate all the areas of


58 Moore, op. cit., p. 290-293.
risk by reviewing the type of losses that have occurred over the last several years and the extent or severity of the various losses. The next portion is directed toward activities concentrated at avoiding or eliminating as many of the risks as possible and reduce the severity of the loss, i.e., a continuous safety program designed to reduce the number of accidents. The last step is to transfer the remaining risk. Management will decide on the type of losses the utility can afford to directly pay as these losses occur. This is referred to as non-insuring. They will then select outside coverage for those remaining potential losses which have been determined as carrying excessive financial risk. The submitted insurance policy proposals must be compared with one another for the best acceptable coverage at the lowest price before a given policy is selected.

The one other way to possibly transfer risk is to utilize independent contractors for construction and maintenance work, with the contract including a "hold harmless" clause. The utility is then held harmless for any damage or claims arising out of the work which has been contracted for. Again, the cost of the utility performing work and assuming the full risk must be carefully weighed against the cost of the contract before a decision is made to utilize this method. Special precautions must be taken to
assure that the contractor has "adequate" coverage. Adequate insurance coverage will depend upon the type and scope of the work being performed.

Present insurance market conditions seem to indicate that water utilities will be faced with high insurance costs for the near future and some types of coverage will not be available at all.\(^{59}\) Risk management programs cost money, but they may be the only alternatives available to help reduce insurance expenses. How much risk the utility will non-insure, self-insure, or transfer can only be determined by management's review of the utilities' total financial capabilities.

\(^{59}\) Chase, op. cit.
CHAPTER V

ADDITIONAL REVENUE FROM INNOVATIVE RATE STRUCTURES

Establishment of adequate and equitable water rates is the policy area which receives more critical attention than any other portion of the budget. The determination of customer water prices will remain so because there are so many complex variables involved in setting appropriate water rates. Water utilities must generate sufficient revenue from its rates to enable it to finance all operating and capital costs. With the loss of the general obligation bonds to finance capital projects and the poor condition of the remaining municipal bonds which may be used for long-term improvements, water rates will be relied upon more heavily to directly finance future projects. The imposition of higher service charges to support certain public services is a remedial and realistic alternative to continuing with the use of intergovernmental aid and various local taxes. Operating and capital costs to


maintain and expand the existing system are continuing to rise and it is only reasonable that the cost of water service will also increase proportionately. However, increased revenue does not necessarily have to come from increasing the customer's basic water rate. Fire protection service charges, connection charges, seasonal service charges, and zonal charges are some of the innovative rate structures that are being adopted to help increase the utilities' revenue generating capabilities, while still maintaining both sensible and equitable water rates.

Early water systems collected their revenue through a single charge or "flat rate" which was applicable to all customers. A flat rate is the service charge of a fixed amount regardless of the amount of water used. Recognizing the need for greater equity, rates were revised to more closely reflect the amount of water consumed by charging a fixed rate based upon the number of rooms or some other physical features of the customer's property. The development of the water meter allowed further refinement to fixing charges on the basis of the amount of water consumed. With water systems eventually being designed to meet the "peak-hour" or the maximum rate of use, various types of "block rates" have been adopted to reflect not only the volume of water used, but also the cost of serving those customers who place a large hourly demand (load requirement
factor) upon the system. The "decreasing block rate" is currently the most widely accepted type of rate.\textsuperscript{62} This rate attempts to charge classes of customers on the basis of volume and demand characteristics and allow declining unit charges as the usage increases. "The lower charge for large-volume use is generally made possible by better load factors, resulting in more economical use of plant facilities, and in the economics of large-volume distribution."\textsuperscript{63}

Water utilities must consider a number of issues when contemplating modification of existing rate structures or the adoption of an entirely new rate structure concept. The rates established must provide sufficient revenue for the utility to meet its total financial obligation. The rate should not only reflect the immediate revenue requirement, but anticipate future operation and capital costs for as much as five years in the future. As the volume of supply and the peak-hour demand requirement varies among customers, so does the cost of providing service to the various classes of customers. To maintain equity in the service charges to different types of customers, the rate

\textsuperscript{62}Ide, op. cit.

schedule must accurately reflect the cost of providing water service. The rate must conform to the various applicable court decisions and must be simple and understandable if public acceptability is to be achieved.

The steps involved in rate-making fall into at least three categories. The first part is to establish the utility's revenue requirement. For municipalities and self/board governed special districts, the revenue requirement is derived from the following budget items: operating and maintenance expenses, debt interest, and amounts for scheduled major improvements. The second portion consists of determining the "cost of service," i.e., the allocation of the various revenue requirements among the customers or classes of customers. Those costs are distributed to the customers on the basis of their particular requirement for service. There are as many methods as there are opinions on how service costs should be distributed. To minimize controversy and judgment type decisions, a "cost of service study" may provide a means of evaluating service level requirements and associated costs. The most commonly used methods are the commodity-demand method and the base-extra capacity method.

64Ide, op. cit.
The last step involves the mechanics of preparing the actual rate structure. This particular step is quite detailed and complex. The American Water Works Association water rates manual is helpful in analyzing the methods which may be used to design a rate schedule so as to recover the necessary costs from each customer class, while the utility operates on a self-sustaining basis and maintains reasonable equity between the customer classes.

One might desire to add one additional step to the rate-making process which would involve the area of consumer education. Due to the wide range of variables such as the density of the service area, source of water supply, service area topography, age of the facilities, and energy costs, the cost at which water is supplied will vary between water agencies just as the charges for services will vary between the classes of customers. It is difficult for the consumer to understand how these variables affect the cost of their water service.\textsuperscript{65} If a utility intends to adjust rates as frequently and in the amounts necessary to keep pace with rising costs, the customer must be able to understand and compare his service charge to those of other

customers and the costs charged by other water utilities. Customers will reluctantly accept a rate increase if they believe it is based on valid needs and that they will only be paying their proper share of the costs. If the rate-making process is to be implemented with the minimum amount of adverse comment and resistance, consumer education should be practiced.

The flat rate and the various types of block rates are being replaced or modified so utilities can generate additional revenue to meet future needs and allow full recovery of costs from the customer without one class of customer subsidizing the cost of service to any other customer class. Several types of new rates, or rates that may be used to supplement existing rate structure, have been devised and are being implemented more frequently in order to achieve one or both of these objectives.

"Connection charges" is another and recent rate method used by water utilities to gain additional revenue

and postpone rate increases.67 This type of service charge or rate is built upon the concept that a new customer to a system paid for by other existing customers, should pay "fair" value for purchasing a portion in the existing system and pay the cost for any necessary enlargements to the system. In public owned systems, it is customary for new customers or developers to pay for this latter cost. The customer would totally finance those facilities which were of exclusive benefit to him, i.e., they would pay for or donate the installation of the water system facilities in a new subdivision. The connection charge philosophy is then extended to those new or existing facilities which were necessary to serve new customers, but were not for the exclusive benefit of the new customer. For example, a new customer is expected to pay for his portion of an existing or new well that is required in order to provide him with water service. This method is used in lieu of the existing ratepayers having to finance all the long-term financing costs for growth facilities. There are two commonly used methods for determining this portion of the connection charge. The first method bases the amount on the capital investment for replacement and expansion facilities projected in the

capital improvement program (CIP) budget. The other method is much more detailed and utilizes the value of paid-up equity in the total existing facilities, at the original historical cost plus accrued interest.

"Fire protection service charges" are those charges for fire hydrant rental and/or charges for all water system facilities necessary for fire protection. Many utilities have recognized the dual nature of the system—that of providing domestic water service and fire protection. Since a fire hydrant is only used for fire service, utilities have often charged the fire protection district a rental fee to cover installation and maintenance costs. The fire districts have opposed these charges, but the courts have substantiated the right of the water district to charge a special fee in order to maintain a more equitable service charge to the water district's customers. The same logic has now been applied to source, pumping, storage, and transmission facilities of which a portion or all is necessary for fire protection. For example, a piece of clear land which uses water for agricultural purposes has a very low need for fire protection, whereas an industrial facility may need very little water on a normal basis but has an extremely high fire protection requirement. The system of paying for the fire protection facilities with
the rate base itself is not equitable to all customer
classes. Recognizing this problem, some water utilities
have now adopted a rate schedule covering domestic water
use and levy a separate rate or charge to cover the cost of
fire protection services.

"Seasonal service charges" are not yet that common.
This type of rate structure is normally the result of the
pressure from the general public and environmentalist
groups to promote water conservation. Seasonal rates are
regularly found being used by those utilities which have
implemented a water conservation program. The higher water
rates during the season of greatest water demand help to
curtail excessive water use, i.e., the amount of water
sold, while still maintaining the same revenue level to
cover fixed costs. By reducing seasonal demand, the cost
of constructing additional source and storage facilities
may also be delayed.

"Zonal charges" are currently under consideration.
Studies have concluded that the cost of providing water
does vary throughout the service area.\textsuperscript{68} Average values
have usually been used for setting the rate for a customer
class, thus creating the illusion of uniform cost. This

\textsuperscript{68}Hanke, \textit{op. cit.}
is not the case if the cost analysis takes into consideration topography, density of the service areas, and the distance(s) to source and treatment facilities. Zonal charges should be adopted in some areas to maintain equity among the utility's customers. For example, the cost of pumping water to a few customers on a high distant hill would be far greater than the cost of supplying the same or greater number of services located in the immediate vicinity and same elevation of the water treatment plant which serves the entire water system. Although higher levels of revenue are not generated by this type of rate structure, a greater level of equity among the customers is achieved.
Since Proposition 13, the remaining revenue available to public owned water systems for capital projects has been limited to revenue and assessment bonds. The use of assessment bonds is still not practical because of continuing poor bond market conditions. The ability of districts to use property tax levies and general obligation bonds is no longer feasible unless there is a constitutional amendment which would change the one percent property tax limitation. It is unrealistic for the municipalities and self/board governed water entities to impose a "special tax" on real property due to the two-thirds vote of the "qualified electors" that is now required. Instead, various types of intergovernmental aid in the form of loans and grants may help provide some additional revenue for capital projects. Economizing on operating expenses with leak detection, water conservation, and risk management programs is another approach which may be used to help reduce costs and balance the budget. Additionally, connection charges, fire protection service charges, and other new water rate structures can be put into action to help raise additional needed revenue for both operation and capital costs.
BIBLIOGRAPHY

A. BOOKS


B. PUBLICATIONS OF THE GOVERNMENT AND OTHER ORGANIZATIONS

California Streets and Highways Code. Division 7, Section 5000 et seq.; Division 10, Section 8500 et seq.; Division 11, Section 9000 et seq.

California Water Code. Division 7, Section 13850 et seq.


C. PERIODICALS


"Coping with Less After Proposition 13," American City & County, January 1979, 49-52.


D. NEWSPAPERS
