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**MEMORANDUM**

**SUBJECT:** Useful Life Financing of Environmental Facilities

**FROM:** Charles E. Johnson  
Chief Financial Officer

**TO:** Stephen L. Johnson  
Deputy Administrator

On behalf of the Environmental Financial Advisory Board (EFAB), I am pleased to transmit to you the attached White Paper entitled *Useful Life Financing of Environmental Facilities*. The paper examines the advantages and disadvantages of amortizing bonds issued for environmental facilities over longer periods of time, thus extending the loans to match the useful lives of such facilities, as opposed to the more typical municipal practice of amortizing debt over periods much shorter than the useful lives of such facilities.

By using an amortization period consistent with useful life financing, environmental facilities can be more affordable on a year to year basis, and the cost of those facilities can be distributed more equitably across current and future beneficiaries of the facility. By applying the useful life approach rather than a shorter amortization period, communities can significantly reduce annual debt service costs for new facilities, and the savings realized can be used to fund improved asset management or additional capital projects.

While it makes no formal recommendations, the Board believes these issues concerning environmental facilities are timely and pertinent to the financial climate challenging communities nationwide and encourages the Agency to support this concept and distribute this paper widely.

As a next step, the Board plans to consider whether the issues raised in this paper might have application to the Agency's continuing oversight of the state revolving loan programs for drinking water and wastewater infrastructure.

Attachment



## **Useful Life Financing of Environmental Facilities**

### **Background**

A major area of interest for the EPA is how to create new sources of funding or to leverage existing sources of funding in order to address the significant unmet environmental needs that face communities across the country. Such needs include funding both (i) for capital improvements necessary to achieve compliance with environmental laws and regulations and (ii) for asset management necessary to ensure that existing facilities are preserved and maintained. Federal and state funds available to assist localities are limited given current budgetary constraints. Material increases in local funding can be achieved only by significantly increasing the rates and charges or taxes imposed on local residents. Other alternatives involve (a) deferring the construction or acquisition of required capital improvements or (b) deferring necessary asset management, or both. Thus, the timely achievement of environmental goals and objectives is constrained by their affordability.

In a January 2003 Forum the EPA introduced its "Four Pillars of Sustainable Infrastructure" to promote sustainable water infrastructure for the 21<sup>st</sup> century. The "Four Pillars" includes an emphasis on better management, full-cost pricing, efficient water use, and watershed approaches to protection. The foundation of the "Four Pillars" is a focus on better management, to expand the use of innovative management practices including asset management and useful life approaches to planning and management.

Both the annual and aggregate cost to a municipality of financing capital improvements are significantly impacted by the period of time over which any bonds issued to fund such improvements are amortized. Extending the period over which such debt is amortized can significantly lower the annual payment. The lower cost realized by extending such period could be used to fund additional environmental needs. However, extending such period also increases the aggregate amount of debt service paid by the municipality over the term of the bonds. Also, the impact of extending the amortization period and of funding additional capital improvements would be to increase the cost imposed on future residents beyond the period over which such debt would be amortized if no extension were to occur.

The amortization periods used by municipalities are typically limited by state law. The periods used are further governed by local law and/or by formal or informal policies used by each locality, which in many cases are shorter than the periods actually permitted under state law. The use of shorter periods is also encouraged by bond rating agency criteria which generally view speedier amortization periods as a positive (but not dispositive) credit factor.

Under federal tax law applicable to tax-exempt municipal bonds, the amortization period that can be used is limited by the useful lives of the financed facilities. However, in general, the limitations imposed by both state and local laws and by local policies do not focus on the actual useful lives of the projects financed, but rather seek to assure a more rapid debt amortization. As noted above, this results in a higher annual cost for each project. This also results in the cost of

each project being imposed on only a subset of the residents who actually benefit from it over its useful life. However, the ratepayers or taxpayers in each year have the benefit of facilities the cost of which has already been fully amortized by prior generations of residents.

The question addressed herein is whether, in order to make environmental projects more affordable, it may be better for municipalities to amortize bonds issued for environmental facilities over longer periods of time more reflective of the useful lives of such facilities, as opposed to the more typical municipal practice of amortizing debt over a periods much shorter than the useful lives of such facilities.

### **Recommendation**

The use of extended amortization periods corresponding to the useful lives of the financed facilities is a reasonable approach both to making environmental facilities more affordable and to allocation of the costs of environmental facilities among various generations of taxpayers or ratepayers that benefit from such facilities. Under that approach, all users of environmental facilities would pay a ratable share of the cost thereof. Extending the amortization period does not increase the aggregate cost of financing such facilities since the cost to the ratepayers is independent of the amortization period. Most importantly, affordability of environmental goals and objectives can be significantly enhanced through improved debt management practices that reduce the current budgetary impact of funding capital expenditures.

Extending the period over which the costs of environmental projects are amortized more closely to match their useful lives could reduce annual debt service costs for new facilities by 10% to 34%. Budgetary savings realized from such improved debt management practices can be used to fund other needs, including additional capital improvements or increased asset management. The increased cost imposed by both the debt extension and the funding of additional projects on future ratepayers (as compared to the cost imposed using a shorter amortization period and without such additional projects) would be similar to the increased cost imposed on current ratepayers under current debt management practices. Moreover, such future ratepayers would have the benefit of using the additional facilities financed with budgetary savings. If the budgetary savings were used for asset management rather than for additional facilities, the cost increase to future ratepayers would be reduced and such ratepayers should benefit from the improved condition of the utilities physical plant. Use of an extended amortization period to make funds available for critical new environmental facilities or to improve asset management, rather than simply to defer costs to the future, should mitigate any adverse credit impacts arising from debt extension.

The concept of useful life financing is consistent with several new initiatives in the infrastructure intensive water and wastewater industry. These include asset management in which utilities are encouraged to systematically and continuously extend the useful life of facilities via accurate life history and preventative measures. Additionally, recent changes in accounting procedures such as Government Accounting Standards Board 34 encourage regular condition assessment in order to more accurately identify the current value and future useful life of facilities.

Many utilities are already moving in the direction of extending the amortization periods of their debt. However, the purpose of the recommendation contained herein is not to suggest that a particular approach is correct for all municipalities, but rather that use of an extended amortization period is an appropriate financial tool for municipalities to consider in conjunction with their advisors.

The general concept of extending the amortization period for environmental financings more closely to match the useful lives of the financed facilities may also have specific application in the context of State Revolving Fund (SRF) financings. Currently, the amortization period for SRF financings is generally limited to 20 years, by statute for drinking water financings and by EPA policy for clean water financings. However, the appropriate application of the general concept to SRF financings warrants additional consideration and is expressly excluded from recommendation herein.

### **Discussion**

Absent concerns regarding the affordability of critical environmental goals and objectives, there would be no reason for the Board to suggest reconsideration of current debt management practices. However, given that the alternatives include (1) deferring or even failing to achieve such goals and objectives and (2) imposing an untenable financial burden on current ratepayers, consideration of a revised approach is warranted.

#### *Current Debt Management Practices*

Statutory requirements and financial practices regarding funding capital improvements vary significantly across the country. Statutory provisions in various states authorize municipalities to fund water and wastewater improvements over a period as short as 20 years and as long as 40 years or more. Such statutory provisions require that many projects be financed or amortized over a period shorter than their useful lives.

Moreover, actual financial practices for debt management may be even more conservative than the applicable legal constraints. In some municipalities, significant portions of the cost of capital improvements is funded from current revenues. This practice, while appearing financially conservative, has the impact of minimizing affordability and imposes on today's ratepayers, the entire cost of improvements that will be used by other ratepayers over many years. The impact on annual rates and charges of funding a project with current revenue is more than 13 times the annual debt service on a 20 year bond issue.

Those municipalities whose projects are funded with debt typically amortize the project costs over a period that is shorter than the useful life of their projects and that is frequently shorter than the amortization period permitted by law. This practice, while also appearing financially conservative, reduces affordability since it results in higher current debt service than financing the same projects over their useful lives. It also imposes a disproportionate share of the project

costs on the ratepayers during the term of the bonds.

Available data suggests that the expected lives of certain components of water and wastewater systems exceed the normal financing period of 20 to 30 years by twice or more. Other components have expected lives consistent with a 20 to 30 year financing term. However, the actual decision regarding the appropriate financing term of any facilities should be based on the actual expectation of the borrowing municipality.

#### *Analytic Framework for Evaluating Amortization Options*

In evaluating alternative amortization periods for environmental projects, three critical factors have been considered:

- Aggregate cost of financing the projects using each alternative. A distinction is made between (A) aggregate cost to a municipality and (B) aggregate cost to the ratepayers (used herein interchangeably with taxpayers) thereof. As described below, for certain financing options, the aggregate cost to the municipality overstates the aggregate cost to the ratepayers, which is the more appropriate measure of aggregate cost in this context.
- Fairness of each alternative in allocating costs among the beneficiaries of the projects. Fairness of each financing alternative is measured by the extent to which all ratepayers that benefit from a project or group of projects pay a ratable share of the project costs and financing costs thereof.
- The effect of each alternative upon the affordability of such projects. Affordability of each financing alternative is measured by the impact thereof on the annual costs payable by the ratepayers of the municipality.

We have also considered two other rationale advanced to support the use of shorter amortization periods:

- That what represent sound financial practices for individuals should also be employed with respect to public projects, and
- That use of a shorter amortization period creates savings or equity for the benefit of future ratepayers.

#### *Costs and Benefits of Alternative Amortization Periods*

##### Affordability of Specific Projects

Shortening the financing term for a particular project from 30 years to 20 years results in a 21% increase in the current budgetary expense during years 1 to 20. However, since the debt would be fully amortized by year 20, it results in savings to the ratepayers beginning in year 21 equal to 100% of the 30-year debt service. Shortening the term from 40 years to 20 years results in a 34% increase in budgetary expense in years 1 to 20 and savings beginning in year 21 equal to 100% of the 40-year debt service. Also, shortening the term from 40 years to 30 years increases debt

service by 10% in years 1 to 30 and results in savings in years 31 to 40 equal to 100% of the 40-year debt service. However, as long as an extended financing term does not exceed the useful life of the project, any future ratepayers whose cost are increased only bear an allocable share of the cost those projects that they actually use. The debt service calculations reflected in the percentages shown above reflect the additional interest costs associated with the use of a longer amortization period.

#### Aggregate Cost

In addition to the increased costs borne by future ratepayers given a longer amortization period, the aggregate dollars paid by the municipality for a project are greater if a longer amortization period is used. Minimizing the aggregate dollar amount paid by a municipality for a project is often cited as the rationale for a shorter amortization period or even for paying for projects from current revenues. However, the focus on the aggregate cost to the municipality ignores the real cost of the project to ratepayers. The cost to the ratepayers of using a shorter amortization period is actually the same or greater than it would be if a shorter amortization period were used.

For example, contrast two payment options that represent the polar opposite alternatives:

- Scenario I: The entire cost of a project is paid from current revenues in the first year of its useful life. No debt is issued by the municipality for the project.
- Scenario II: The cost of the same project is financed with debt the full principal amount of which matures in the last year of the projects useful life, assumed to be 40 years.

If the focus is solely on the cost to the municipality, the cost of funding the project is minimized in Scenario I. In Scenario I, the aggregate financing cost to the municipality equals the project cost. In Scenario II, the aggregate cost to the municipality is higher because it includes interest on the debt for 40 years plus the principal amount of the debt which equals the project cost.

However, if the focus is on the cost imposed upon the ratepayers as a result of undertaking the project, Scenario II results in an aggregate financing cost that is equal to or lower than aggregate financing cost in Scenario I. In Scenario I, funding the entire cost of the project from revenues in year 1 reduces the wealth of the ratepayers by an amount equal to the project cost. So, under Scenario II, the ratepayers are able to increase savings or reduce debt for an additional 40 years by an amount equal to the project cost. The additional investment earnings or avoided interest cost during the 40 year period would almost certainly equal or exceed the tax-exempt interest cost of the municipality on the debt issued under Scenario II. Thus, the true or net costs to the ratepayers during the 40 year period are essentially the same in both scenarios – the cost of the project.

The above example illustrates that the aggregate financing cost of a project from the perspective of the ratepayers is independent of the period over which the project is financed. The aggregate cost to the ratepayers is the same whether the project is financed (a) as described in Scenarios I and II, (b) using level principal amortized over 20, 30 or 40 years, or (c) using level debt service

over 20, 30, or 40 years. We believe that as a matter of financial policy, the most appropriate perspective from which to view the cost of environmental projects is the perspective of the ratepayers, rather than the perspective of the financing municipality. Accordingly, aggregate cost should not be viewed as a basis for recommending one amortization approach over another.

#### Fairness

The fairness of any method of debt amortization can be considered both with respect to a particular facility of the municipality and with respect to all facilities of the municipality in aggregate. In either case, the fairest amortization method is one that results in a ratable amortization of costs among all users of the facility or facilities, as the case may be.

Viewing Scenarios I and II, above, from the perspective of intergenerational fairness, the two scenarios are similarly fair or unfair to the ratepayers in years 1 and 40. In Scenario I, the ratepayers in year 1 get to use the project for one year and bear the full cost of the project, including lost investment earnings. Ratepayers in later years get the benefit of the project without funding any of its cost. In Scenario II, the ratepayers in the final year of the useful live get to use the project for one year and pay the principal amount of the debt (equal to the project cost). The debt interest is payable annually over the useful life of the project by the ratepayers who have the benefit of using the project. The ratepayers prior to year 40 get the benefit of the project but fund only an allocable portion of the debt interest. If anything, Scenario II produces a fairer result because the loan interest is allocated fairly among the different generations of ratepayers. In Scenario I, the ratepayers in year 1 bear the entire impact of the lost earnings or increased debt required to fund the project.

With respect to a particular facility, a fairer approach would be to use level debt service over the useful live of the facility. However, for a municipality with ongoing annual financing requirements that are roughly equal (in constant or inflation adjusted dollars), any amortization method will (after a ramp up period) result in equal annual financing cost. Examples of the ramp up periods for various amortization approaches are as follows:

<u>Amortization Method</u>	<u>Ramp Up Period</u>
Level debt service over 20 years	20 years
Level debt service over 40 years	40 years
Fund projects from current revenues in year 1	1 year
Fund projects with debt maturing in year 40	40 years

All of the indicated approaches are equally fair to all ratepayers in the years after the respective ramp up periods. So, even if a particular amortization method may be unfair when viewed with respect to particular facilities, it may nevertheless be fair when viewed with respect to all facilities, provided that the costs of facilities are fully amortized during their useful lives. Accordingly, it is difficult to make significant distinctions between amortization methods based on fairness.

#### Equity Accumulation



Another perceived benefit of funding projects from current revenues is that there is a benefit to future rate payers as a result of the accumulation of equity funded from current revenues. To examine that belief, assume in each of Scenarios I and II that the same financing approach has been used over a 40 year period to finance \$100 of project cost in each year. Further assume that the debt issued in each year under Scenario II has a 40-year bullet maturity.

In year 40, the cost to the ratepayers under Scenario I is \$100 (the project cost funded from revenues of that year). Under Scenario II, the cost to ratepayers equals (i) \$100 representing the principal of the bond issued in year 1 plus (ii) interest on the \$3900 of debt issued in years 1 to 39. However, viewed from the perspective of the ratepayers (as opposed to the municipality) the debt interest is offset by the investment earnings on the \$3900 retained by the ratepayers in years 1 to 39. So, the true cost under both scenarios in year 40 is \$100. In each succeeding year, the cost under both scenarios will be identical to the cost in year 40.

Under Scenario II, the costs imposed on the ratepayers in years 1 to 39 were lower by \$100 annually and \$3900 in aggregate. In Scenario I, the savings or equity accumulation realized from funding projects with current revenues in years 1 to 39 equals the \$3900 in additional costs that have been imposed on the ratepayers in years 1 to 39. The existence of the equity accumulation does not reduce the true annual costs to the ratepayers. Also, since the purpose of building the projects is to use them, not to sell them, no benefit will be realized from a sale of the financed assets. In fact, no economic value can be realized from the equity accumulation except by converting to another financing approach. For example, if in year 40, the municipality were to covert from the approach in Scenario I to the approach in Scenario II, the ratepayers would realize savings of \$100 annually over the succeeding 39 years.

Without a change in financing approach, no ratepayers would ever benefit from the equity accumulation under Scenario I. Similarly, for municipalities that have used other "conservative" amortization methodologies in the past (i.e., an amortization shorter than the average lives of the financed facilities) the only way for any current or future ratepayers to benefit from any equity accumulation is for the municipalities to adopt a less conservative approach to debt amortization or to restructure and extend their debt. Preserving the flexibility to move to a lower cost amortization approach in the future is not a compelling rationale for imposing a higher cost approach on current ratepayers.

#### Public versus Individual Financing Approaches

In evaluating the revised approach an issue that arises is why is it prudent and appropriate to the extend the amortization period for public debt when as individuals we generally consider it fiscally responsible to accelerate debt repayment. The reason is that the issues which affect and constrain individual financing decisions are very different from those that govern public financing decisions. The different issues should rationally result a different approach for public financings from those that we follow as individuals.

#### *Individual Considerations*

- The period for which financing is readily available may substantially shorter than the

useful life of purchased assets

- o Auto financing generally limited to 5 years
  - o Home mortgages limited to 30 years
  - o In each case, there is a possibility that the asset may be sold prior to the amortization of the loan and that the market value may be less than the unamortized cost
- When we purchase assets, we anticipate that if the assets are held over their useful lives, the same person will use them during all portions of such lives. Thus, there is no inequity if the cost is amortized on an accelerated basis. Accelerated payment is in effect a form of savings for the person who makes the payment. So, any opportunity cost related to greater expenditure of funds is offset by the investment return.
  - The work life of individuals is limited. There is an ongoing risk of unemployment due to poor health, economic downturns, and the vagaries of the employers business. Even during periods of continued employment, an individuals income may decline significantly. So, both from the standpoint of the individual and any creditors, it makes sense to accelerate the amortization of debt to limit the period of exposure to these risk.
  - In cases of houses, which represent an individuals largest investment, it is only necessary to finance one house. There is no continuing requirement to finance additional facilities.

#### *Public Considerations*

- Longer financing terms, such as 40 years, are readily available. The employment and economic risks associated with extended payment periods for individuals do not exist for public entities. This fact is reflected in the availability of such longer financing terms.
- The ability of a public utility to raise revenue (in current dollars) grows over time due to inflation. So, if facilities are financed with level debt service, in later years the same debt service can be funded with a smaller portion of the utilities revenues. In other words, the real (inflation-adjusted) cost of funding a particular facility will decline in any event due to inflation. This phenomenon is further exacerbated in most cases by population growth so that the lower real costs are spread over a larger number of people.
- The users of public facilities vary significantly over time. So the users who bear disproportionately high cost in the early years of a shortened financing term are certain to be different from those who get the benefit of lower real cost during the later years of the financing term and from those who use such facilities after their financing term. As discussed above, the choice of amortization period does not affect the aggregate cost to the ratepayers thereof, but only the allocation of such costs. Rather than being a form of savings for users of the utility, accelerated payment for facilities is an intergenerational wealth transfer – (a form of taxation on the users during the early years). Since the financed facilities will not typically be sold during their useful lives, there is not way for the users of public facilities to realize an investment return thereon.

- Unlike individuals, municipalities will typically have ongoing needs for additional facilities.

#### Impact of Longer Amortization Periods on Affordability of Ongoing Capital Needs

In order to analyze the impact of various amortization periods over time, rather than only with respect to particular projects, we analyzed the impact of using 20, 30, and 40 year amortization periods on various generations of ratepayers over an 80 year period. To reflect the need of a utility to meet ongoing capital needs, the analysis assumed the issuance in each year of bonds representing the same amount of purchasing power assuming a 2% inflation rate. So, assuming the issuance of \$100 million bonds in year 1, \$108 million would be issued in year 5 and \$148 million would be issued in year 21. Based on the above, the aggregate debt service on the bonds issued during the period was separately calculated for each year given each of the three amortization periods, permitting a comparison of the impact of each approach in each year over the 80 year period. In particular, this analysis allowed us to address the concern that the use of a longer amortization period would over time either (a) exhaust an issuers debt capacity, resulting in an inability to fund future capital needs or (b) place an inappropriate financial burden on future ratepayers by disproportionately increasing their rates and charges relative to those borne by current ratepayers. The analysis also shows the impact over the entire 80-year period of applying the budgetary savings achieved by using a longer amortization period to fund additional projects. Finally, the analysis shows what the impact would be if the same additional projects were funded using a shorter amortization period.

The results of the analysis support the conclusion that the use of a longer amortization period consistent with the useful lives of the projects financed would enhance the ability to fund critical environmental needs today without unreasonably burdening future ratepayers:

- Using a 20-year amortization period increases the aggregate debt service payable by ratepayers in years 1 to 20 by 21% versus debt service using a 30-year period and by 34% versus debt service using a 40-year amortization period. On the other hand, the annual dissavings to ratepayers beyond year 20 from using a longer amortization period represent 13% and 24% of the aggregate debt service, that would be payable if a 20-year amortization period were used. Put differently, using a 20-year amortization period imposes a 21% or 34% increase on ratepayers today (through year 20) in order to avoid imposing a lesser increase (13% or 24%) on future ratepayers who also have the benefit of using the financed facilities. In each case, the percentages are calculated versus the more favorable option for the particular generation of ratepayers (i.e., aggregate 20-year debt service for future ratepayers and either 30-year or 40-year debt service for current ratepayers.)
- Similarly, using a 30-year amortization period increases the cost to ratepayers in years 1 to 30 by 11% versus 40-year debt. The annual dissavings to ratepayers beyond year 30 from using a longer amortization period would also be 11%. So, using a 30-year amortization imposes an 11% increase on ratepayers today (through year 30) in order to avoid imposing a similar increase on future ratepayers who also have the benefit of using the facilities finances. Again, the percentage increases are calculated versus the most

favorable option for the particular generation of taxpayers (i.e., aggregate 30-year debt service for future ratepayers and 40-year debt service for current ratepayers).

- Even without regard to the ability to fund additional needs, we would be tempted to conclude that the use of a longer amortization period would result in a more equitable distribution of costs among various generations of ratepayers. The longer amortization period reasonably allocates the cost of environmental facilities among all users thereof. Although future ratepayers would bear higher costs than if a shorter amortization were used, they would have the benefit of additional facilities and would only pay an allocable portion of the cost of facilities they actually benefit from.
- If the savings realized in years 1 to 20 by using a 40-year amortization period, rather than a 20-year period, were used to fund additional projects, the projects funded in each year during that period could be increased by 34%. In total, the increase is equivalent to six additional years of funding. As a result of the increase in projects financed, aggregate debt service payable in years 1 to 20 would be equivalent to the higher debt service on 20-year debt, i.e., 34% higher than for 40-year debt. Aggregate debt service after year 20 would be higher than it would have been if 20-year debt were used and no additional projects were funded by an amount that exceeds 34% in several years and peaks at 40% of the 20-year debt service with no additional projects. However, in those same years, the percentage increase in aggregate debt service payable by future ratepayers as compared to 40-year debt service without any additional projects, does not exceed 15%. Substantially less than the 34% increase borne by current ratepayers. If the same additional projects were funded using 20-year debt service, the result would be a 79% increase for current ratepayers as compared 40-year debt service with no additional projects.
- If the savings realized in years 1 to 30 by using a 40-year amortization period, rather than a 30-year period, were used to fund additional projects, the projects funded in each year during that period could be increased by 11%. In total, the increase is equivalent to two additional years of funding. As a result of the increase in projects financed, aggregate debt service payable in years 1 to 30 would be equivalent to the higher debt service on 30-year debt, i.e., 11% higher than for 40-year debt. Aggregate debt service after year 30 would be higher than it would have been if 30-year debt were used and no additional projects were funded by an amount that exceeds 11% in several years and peaks at 16% of the 30-year debt service with no additional projects. However, in those same years, the percentage increase in aggregate debt service payable by future ratepayers as compared to 40-year debt service without any additional projects, does not exceed 5%. Substantially less than the 11% increase borne by current ratepayers. If the same additional projects were funded using 30-year debt service, the result would be a 23% increase for current ratepayers as compared 40-year debt service with no additional projects.

Our analysis of the impact of (a) using a longer amortization period and (b) applying the

budgetary savings from to fund additional projects suggests the following:

- This approach would substantially moderate the impact of funding additional projects on current ratepayers. It would reduce by more than 50% the impact on current ratepayers of funding such projects versus funding them using a shorter amortization period.
- This approach would not inappropriately burden future ratepayers. The cost of each project would be fairly allocated among those who benefit from it. The aggregate cost increase borne by future ratepayers who also benefit from the additional facilities would not be disproportionate relative to the aggregate cost borne by current ratepayers.
- Funding of such additional projects using a shorter amortization period would place a disproportionate burden on current ratepayers.

