Initial Technical Review of EPA's 1997 CSO Guidance for Financial Capability Assessment and Schedule Development

March 15, 2007
Draft

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Under Contract to:	Tetra Tech, Inc.
Contract No.:	EP-C-05-046
EPA Work Assignment Manager:	John Powers, Office of Water

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Executive Summary

Background

This paper provides a technical assessment of the U.S. Environmental Protection Agency's (EPA's) 1997 guidance document, *Combined Sewer Overflows—Guidance for Financial Capability Assessment (FCA) and Schedule Development* (henceforth referred to as *Guidance).* This Guidance describes the methods for EPA and state NPDES authorities to use in evaluating the financial resources that a permittee has available to implement controls for combined sewer overflows (CSOs). The analysis performed pursuant to the Guidance is principally used in an enforcement setting to develop the schedule under which a community affected by the 1994 CSO Control Policy (59 *Federal Register* 18688) must implement the projects in the community's Long-Term Control Plan (LTCP). It may also occasionally influence the set of CSO controls that are included in the LTCP. In general, a community with less financial capability is allowed a longer time period for implementing its set of CSO controls. Thus, the Guidance can have a significant impact on the timing and occasionally on the selection of water infrastructure investments and on the associated cost and financing burdens.

In recent years, important stakeholders have expressed concern that the Guidance fails to adequately reflect the challenges communities face in meeting their CSO and other wet weather control responsibilities. Negotiations between communities and state and EPA representatives are increasingly contentious because communities argue that the associated financial liabilities are excessive. With regard to the Guidance, they argue that the methods and scope of analysis do not reflect the economic realities they face, leaving them committed to CSO projects they might prefer not to undertake and to implementation schedules that are too aggressive.

In light of these concerns, EPA is reviewing the Guidance and considering possible changes. This paper provides an initial technical assessment of the Guidance in support of this effort.

Overview of the Guidance

The Guidance establishes two sets of indicators that together are used to assess the financial capability of a community:

- A single *Residential Indicator* is used to assess the financial impact that the CSO project and other wastewater costs entail for the residential (households) segment of a community. This indicator is calculated by comparing the cost per household for current and projected future CSO and wastewater projects to the community's annual median household income (MHI). If the cost per household exceeds 2 percent of the community's MHI, the indicator concludes that the financial impact is *high*. The burden is described as *mid-range* if the ratio is between 1 and 2 percent and *low* if less than 1 percent.
- A group of six *Permittee Financial Capability Indicators* is used to assess the community's ability to finance the CSO project and pay back its debt. The group consists of three subsets—debt indicators, socioeconomic indicators, and financial management indicators—with threshold values for each indicator that lead to the assignment of *strong*, *mid-range*, or *weak* scores. An overall conclusion regarding this aspect of a community's financial capability is determined by averaging the scores across the six indicators.

The judgments provided by the two sets of indicators are then combined into a final judgment

about the community's financial capability, which in turn guides expectations about the schedule under which the community will implement its CSO controls. A community facing a *low* financial burden is expected to complete implementation as rapidly as logical engineering sequencing and normal construction practices permit. A community facing a *medium* burden can be given up to 10 years to complete implementation, while a community facing a *high* burden can be given 15 years or, in unusually high burden situations and in negotiation with EPA and state NPDES authorities, up to 20 years.

Technical Assessment of the Guidance

We assess the Guidance against four criteria that we believe characterize a good government guidance document: consistency, efficiency, rationality, and transparency. We evaluate each major portion of the Guidance against these four criteria: the Residential Indicator, the Permittee Financial Indicators, and the process by which these indicators are combined and used to determine the boundaries for implementation schedules. We also provide a summary evaluation of the Guidance as a whole, taking into account the totality of its parts.

A principle question in evaluating the Guidance against these criteria is the degree to which the Guidance comports with the assessment methods and standards used by private-sector bond rating firms such as Standard and Poor's and Moody's. We base our evaluation, in part, on the assumption and expectation that these firms have strong incentives to develop rigorous and credible evaluation techniques to stay competitive in the debt ratings market. As a result, we believe that these firms' methods provide a good benchmark for comparison.

We also evaluate the degree to which the Guidance meets its implied public sector objective to determine whether requiring a community to incur the projected CSO compliance burden is fair. Because there is no private-sector analog for this aspect of the Guidance, our assessment here is more subjective and not based on a relative comparison to the bond ratings firms.

Using a Good/Fair/Poor scale to grade the Guidance across the four criteria categories, our overall assessment is as follows:

Consistency: Poor. There is little consistency in how the Residential Indicator is calculated from community to community and by permittees in contrast to EPA. The Guidance is not specific about how several important aspects of the calculations are to be performed (e.g., determining which potential future wastewater projects should be included in the cost calculation), leaving room for differing interpretations. Parties commonly conduct their analysis in whatever manner best serves their interests (e.g., communities have an incentive to inflate their cost estimates to show a higher burden, which can result in a longer implementation schedule). The Residential Indicator is logically inconsistent in its emphasis on the median household as an indicator of affordability for the community; clearly, households at the lower end of the income distribution are far more indicative of any affordability problems than the median household. The set of six Permittee Financial Capability Indicators is also redundant and inconsistent in important ways with the procedures used by bond rating firms in assessing a community's financial capability.

Efficiency: Poor. The Guidance appears procedurally efficient in telescoping an otherwise likely complex schedule-setting process into a relatively small and streamlined set of calculations.

It appears, though, that using the bond rating alone (when a bond rating exists) would be even more efficient than using the full set of indicators comprising the Permittee Financial Capability Indicators. More importantly, we do not believe that this relatively efficient calculation process consistently generates an accurate answer about communities' overall financial capability. The Guidance thus does not effectively meet its implied equity goal of identifying the communities most in need of schedule relief. Furthermore, the Guidance seems concerned only with this equity goal; it includes no provisions that move toward economically efficient implementation. It does not, for example, provide for consideration of the benefits of the CSO projects to the community and to others (e.g., downstream communities), nor does it examine the degree to which a revised rate structure and targeted subsidies for low income households could practicably mitigate affordability problems that could otherwise delay implementation. It also does nothing to encourage better financial management by communities and their water utilities.

Rationality: Poor. Although the FCA process is designed broadly to identify less financially capable communities and potentially offer them some schedule relief, the two sets of indicators fail to render an accurate, reliable judgment about the level of financial capability that a community has. Many communities are likely misclassified in terms of the burden imposed by their CSO projects. No rationale is provided to explain why particular indicators and thresholds have been chosen (e.g., why 2 percent of income as the threshold for high financial impact on a household), and there is no intended and well understood empirical relationship between the selected indicators, the thresholds, and the matrix that determines the bottom-line schedule boundaries.

Transparency: Fair. The Guidance brings more transparency to what could otherwise be a closed, unexplained process for setting CSO implementation schedules. The Guidance is unclear, however, in aspects related to the calculation of several indicators, including the determination of thresholds that affect burden determinations and the resulting implementation schedule boundaries.

In short, we give the Guidance relatively poor ratings with regard to its consistency, rationality, and efficiency, and a fair rating with respect to its transparency. We see little evidence that the Guidance accurately identifies the communities that should be given extended implementation schedules and doubt that it effectively meets its implied equity objectives. With respect to how it compares with the methods used by bond ratings firms, there is some correlation via the Permittee Financial Capability Indicators but also some important differences. Overall, setting aside the equity objective, which is a public sector issue that does not apply in the private bond markets, the lack of consistency, rationality, and efficiency suggest that the approach used in the Guidance falls short of the standards set by the private sector. In particular, the Guidance: (1) prescribes a static analysis that does not consider trends in the indicators, including the impact that the new debt for the CSO projects would have on the indicators; (2) does not have an underlying theory or rationale that allows for empirical validation and calibration (e.g., in establishing the thresholds); and (3) does not use readily available data (e.g., income distribution data, poverty rates) that would focus the analysis more closely on the affordability problem facing communities.

Comments on the Scope and Role of the Guidance

In our view, many of the criticisms by CSO communities of the Guidance are a result of the narrow scope of the Guidance relative to the broader range of concerns that communities have regarding their CSO programs. Several frequent concerns not addressed in the Guidance are:

- Whether it is feasible and realistic for the community to develop a pricing system with targeted subsidies and progressive rates that would make the expected increased wastewater costs affordable for all households in the community, particularly those with low incomes;

- Whether the benefits of the CSO program appear to exceed its costs, and whether the benefits can be made sufficiently apparent to community residents to win their support for the necessary investments; and

- Whether it is advisable to invest the sums required for the CSO program in view of competing demands for the community's financial capital.

In failing to systematically address these issues, the scope of the Guidance is significantly narrower than the set of concerns the parties to enforcement negotiations bring to the table. By missing these issues that the parties want addressed, the Guidance does not facilitate the decision process, and does not ensure that the outcomes are desirable.

In our view, the mismatch between the scope of the Guidance and the concerns of communities lies largely in the Guidance's emphasis on *financial capability* and its relative disregard for *affordability*. These terms have specific connotations in the Guidance. *Affordability* refers to the household and whether it is fair and appropriate to impose a financial burden on it. *Financial capability* refers to the community and whether it has the financial wherewithal to ensure that the debt and interest are paid back.

This usage of the terms *financial capability* and *affordability* corresponds to the two dimensions of the *demand* concept used in economic analysis. The first dimension—willingness to pay (WTP)—reflects the preferences of economic actors among their alternative choices, while the second dimension—ability to pay (ATP)—reflects the limits imposed on the pursuit of these preferences by income and wealth (i.e., budget) constraints. Thus, the WTP concept describes an economic actor's preferences among his or her consumption and savings alternatives, while the ATP concept describes the impact of the budget constraint on the actor's actual decisions.

In the Guidance, the financial capability concept, and thus the ATP concept, seems to dominate the choice of indicators and the implementation schedule boundaries derived from the analysis. To a limited extent, the affordability concept is accounted for in the Residential Indicator in the equity judgment determined by the burden-level thresholds for the cost-to-MHI ratio, but this is only a portion of the WTP concept. Importantly, this expression of WTP does *not* reflect the preferences of, and direct benefits to, the community incurring the costs. Instead, it reflects the interests and judgment of the external community (e.g., the national interest in each community providing sufficient wastewater treatment to meet minimum standards and avoid a "race-to-the-bottom" competition among jurisdictions, and perhaps also some national interest in the community treating its wastewater in order to provide option and/or existence values for the

external community). The Guidance neither requests information on the community's *own* private returns (benefits less explicit and implicit costs) from CSO control investments, nor does it indicate that such information should play any role in decisions about the schedule or selection of CSO investments.

WTP and affordability are also inadequately reflected in the Residential Indicator since: (1) the indicator benchmarks (1 percent and 2 percent of MHI) have not been established in any rational way that reflects consideration of what is foregone when wastewater spending approaches these benchmarks; and (2) the indicator is focused on MHI and thus likely misses affordability impacts on the lower income segment of the community.

The implication here is that the Guidance fails to account for WTP issues, which have become increasingly important to communities as the cost of CSO investments has grown and competing demands for communities' limited financial resources have intensified. Thus, it is easy to predict that the approach adopted by the Guidance leads to increasing conflict between communities and enforcement officials as implementation burdens grow.

It is also easy to see how such an incomplete analysis creates at least the perception of unfairness and inefficiency. While the *costs* of most CSO projects are borne largely by the CSO community (except for the share provided by Federal and state financial assistance), many of the *benefits* accrue to others outside the community, including downstream water users and, to some degree, the nation as a whole (e.g., through existence and option values). From the community's standpoint, these *external benefits* may seem unimportant compared to the returns from other investment alternatives (e.g., schools, roads), contributing to the perception that CSO controls are unaffordable. In this case, it may be that the economic rationale only becomes apparent when viewed more holistically – when a community understands that it is part of a spatially interdependent system where communities systematically create benefits for each other (e.g., investments by upstream communities create benefits for downstream communities). In these cases, community officials may be better able to justify CSO projects to local constituents if they have benefits information – both in terms of their own returns, and the returns to others.

We believe that the mismatch in scope between the Guidance and the concerns that communities express in actual CSO negotiations has grown over the decade since the Guidance was issued. Put into a historical context, we suspect that the external nature of CSO project benefits – with benefits of a local project accruing substantially to others outside of the local area – may have been less problematic a decade or two ago. At that time, municipal wastewater control spending was largely for the purpose of implementing secondary treatment, a uniform national goal in which communities willingly participated. Now, though, with this basic goal largely attained, additional costly CSO control obligations may seem inequitable and an unshared burden to the communities that face them. Furthermore, we are in a time when the nation increasingly demands performance and demonstrated benefits from public expenditures, implying that investments for CSO controls and water quality improvement must compete and be justified against alternative possible investments in education, transportation, social services and other priorities.

A fundamental question, then, is whether the Guidance should take a broader view of demand and account for both the WTP and ATP dimensions. This is a complex question. If faced with a

similar disconnect between the scope of their analyses and the needs of their clients, bond-rating firms would likely face strong incentives to adapt to changes in the marketplace and modify their methods to stay competitive. We will discuss how this public sector Guidance might likewise adapt to changes in its "marketplace."

On the one hand, using our evaluation criteria, there appears to be an opportunity to increase the consistency, efficiency, rationality and transparency of the Guidance by incorporating issues of critical importance to communities—such as (1) estimates of the benefits of CSO and other wastewater investments to the community and to others (e.g., downstream communities); (2) estimates of the opportunity costs of the investment capital that the community is asked to provide; and (3) an assessment of the likelihood in practice that wastewater costs can be distributed within the community in a manner that is affordable for all households, including low income households in particular.

On the other hand, expanding the scope of the Guidance to address these issues would require careful consideration of the mechanisms for doing so. For example, if the Guidance were to call for quantitative analysis on benefits, opportunity costs and workable low-income subsidy schemes, there would seemingly be a need for the development of standardized methods and modeling systems that could be widely distributed and used by communities to support these analytical requirements. Otherwise, computational questions and uncertainties could create an even greater opportunity than already exists to game the process and pursue narrow strategic interests at the expense of broader societal interests.

On balance, we see possibilities for how a broader guidance could effectively address the benefits and low income household affordability issues, but not the opportunity cost question. If this could be accomplished, the Guidance would offer a more complete and effective array of tools to address CSO implementation issues.

Furthermore, the *role* of the Guidance could be broadened in parallel with this broader *scope*. In its current form, the Guidance generally takes the set of projects included in a community's LTCP as given (i.e., determined by Clean Water Act technology and water quality-based requirements). As such, the Guidance now plays a role primarily in determining *how soon* these projects should be completed. A broader scope as described above might suggest an expanded and more explicit role for the Guidance in determining also *which* projects should be undertaken. If so, the implications of changes in the Guidance should be evaluated within the broader scope of water program implementation, and not merely within the scope of the CSO program.

1.0 Introduction

This paper provides an independent technical review of EPA's 1997 guidance document: *Combined Sewer Overflows—Guidance for Financial Capability Assessment and Schedule Development* (USEPA 1997).

This Guidance describes how EPA and state NPDES authorities should evaluate the financial resources a permittee has available to implement controls for combined sewer overflows (CSOs). The financial capability assessment (FCA) developed pursuant to the Guidance is commonly used in developing an enforceable schedule under which a community will implement its CSO controls. In general, a community with lesser financial capability to implement the needed CSO controls can be allowed a longer time to do so. The FCA conclusions pursuant to the Guidance have also occasionally had an informal influence on the choice of CSO controls that a community will implement.

In recent years, important stakeholders have expressed concern that the Guidance fails to adequately reflect the difficulty that many communities have in affording wet weather controls. Negotiations about wet weather controls and compliance schedules among communities, states, and EPA have been contentious, with communities arguing frequently that they cannot reasonably afford the control measures that regulators are requiring of them and that the Guidance does not adequately reflect this. The National Association of Clean Water Agencies (NACWA), representing mostly larger communities, has recently published a summary "White Paper" with many criticisms of the Guidance (CH2MHill 2005). The Wet Weather Partnership (formerly the CSO Partnership), including small and large communities and engineering firms that specialize in wet weather control work, has been arguing for several years that the Guidance misses important indicators of local fiscal stress that should be taken into account when making decisions on both the level of affordable control and implementation schedules.[1]

Stakeholders have raised affordability concerns like these in a drinking water context as well. EPA's Office of Water is now reviewing and will likely revise existing regulations somewhat similar to the Guidance that prescribe how affordability issues are to be considered when making decisions about variances from drinking water treatment requirements for small systems (USEPA 2006b; Rubin 2001). The Guidance is also very similar to existing economic analysis guidance affecting the water quality standards program (*Interim Economic Guidance for Water Quality Standards*, USEPA 1995a). If the Agency decides at some point to consider changes to the Guidance, for the sake of consistency similar changes would also then likely need to be considered for the water quality standards economic guidance and perhaps also for the drinking water small systems affordability variance regulation.

EPA is reviewing the Guidance and may or may not decide eventually to revise or expand it. This paper is intended to provide initial technical support to EPA in this review. In this paper, we consider how the Guidance has been used in practice, assess several issues that have been raised by stakeholders with respect to the guidance, and ask whether the Guidance reflects the current state-of-the-art in FCA.

[1] http://www.csop.com/Default.htm

2.0 Summary of the Guidance

EPA intended the Guidance to meet two goals.

> The first goal is to provide a planning tool for evaluating the financial resources a permittee has available to implement CSO controls...the financial indicators...provide a common basis for financial burden discussions between the permittee and EPA and state NPDES authorities. (US EPA 1997a, pages 6, 7)

The Guidance does not explain this goal further. There is no description of what the *financial burden discussions* are or might be expected to accomplish.

We might infer from this first goal statement that the Guidance and an evaluation of *the financial resources a permittee has available* may play some role in determining the set of CSO controls that the permittee must implement, but the Guidance does not say this explicitly. The second goal is clearer:

> The second goal is to assist the permittee, EPA and state NPDES authorities in cooperatively developing CSO control implementation schedules. ... This guidance does not recommend specific schedules for implementation of the CSO controls based on financial capability or other considerations identified in the CSO Policy. It does, however, provide general boundaries to aid all parties in negotiating reasonable and effective schedules for implementation of the CSO controls. (Page 7)

The guidance provides a matrix indicating generally how quickly the community's CSO controls must be implemented as a function of the financial burden (*high*, *medium* or *low*, as assessed based on the Guidance measures and methodology) the controls pose for the community. In general, a community with lesser financial capability to implement the needed CSO controls will be allowed a longer time to do so.

In this section, we briefly summarize the specific measures and the overall methodology for FCA that are established by the Guidance. Appendix A contains a detailed summary of the methodology and indicators.

The Guidance establishes two sets of indicators that together are used to assess the financial capability of the community:

- A single *Residential Indicator* is used to assess the financial impact that the CSO project and other wastewater costs entails for the residential (households) segment of a community. This indicator is calculated by comparing the cost per household for current and projected future CSO and wastewater projects to the community's annual median household income (MHI). If the cost per household exceeds 2 percent of the community's MHI, the indicator concludes that the financial impact is *high*. The financial impact is described as *mid-range* if the ratio is between 1 percent and 2 percent, and *low* if less than 1 percent.

- A group of six *Permittee Financial Capability Indicators* is used to assess the community's ability to finance the CSO project and pay back its debt. The group consists of three subsets – debt indicators, socioeconomic indicators, and financial management

indicators – with threshold values for each indicator that lead to assignment of *strong*, *mid-range*, or *weak* scores. An overall conclusion regarding this aspect of a community's financial capability is determined by averaging the scores across the six indicators.

The judgments provided by the two indicators are combined into a summary judgment about the community's financial capability, which then guides expectations about the schedule under which the community will implement its CSO controls. A permittee for whom the CSO controls pose a *low* financial burden should be expected generally to complete implementation of the controls as rapidly as logical engineering sequencing and normal construction practices permit. A permittee facing a *high* financial burden could be given as much as 15 years (or in some circumstances 20 years) in which to complete the CSO controls.

In Exhibit 1, we provide a flow chart summarizing the measures established in the Guidance and how they are evaluated in the process of FCA for CSO projects.

The FCA process as described in the Guidance is somewhat more flexible than the preceding discussion and the flow chart might suggest. The Guidance notes:

> It must be emphasized that the financial indicators found in this guidance might not represent the most complete picture of a permittee's financial capability to fund the CSO controls. However, the financial indicators do provide a common basis for financial burden discussions between the permittee and EPA and state NPDES authorities. Since flexibility is an important aspect of the CSO Policy, permittees are encouraged to submit any additional documentation that would create a more accurate and complete picture of their financial capability. (Page 7)

Also, in terms of scheduling, the Guidance notes:

> The time boundaries are not intended to replace the negotiations and deliberations necessary to balance all of the environmental and financial considerations that influence the site-specific nature of the controls and implementation schedules. (Page 46)

CSO discharges to sensitive areas and to impaired waters are expected to be addressed on a high priority basis, without regard to the maximum time limits specified in the Guidance.

Exhibit 1: The Financial Capability Assessment Process under the Guidance

Residential Indicator

1

Assess impact:

WW and CSO control costs per household as a % of MHI

Financial Impact	Residential Indicator (CPH as % MHI)
Low	Less than 1 Percent of MHI
Mid-Range	1.0 to 2.0 Percent of MHI
High	Greater than 2.0 Percent of MHI

Permittee Financial Capability Indicators

Combine Indicators into single financial capability judgment:

	Indicator	Strong	Mid-Range	Weak
Debt Indicators:	Bond Rating	AAA-A (S&P) or Aaa-A (Moody's)	BBB (S&P) Baa (Moody)	BB-D (S&P) Ba-C (Moody's)
	Overall Net Debt as a Percent of Full Market Property Value	Below 2%	2% - 5%	Above 5%
Socioeconomic Indicators:	Unemployment Rate	More than 1 Percentage Point Below the National Average	Within 1 Percentage Point of the National Average	More than 1 Percentage Point Above the National Average
	Median Household Income	More than 25% Above the Adjusted National MHI	Within 25% of the Adjusted National MHI	More than 25% Below Adjusted National MHI
Financial Management Indicators:	Property Tax Revenues as a Percent of Full Market Property Value	Below 2%	2% - 4%	Above 4%
	Property Tax Collection Rate	Above 98%	94 - 98%	Below 94%

Calculate average score:

Strong indicator: 3 points
Mid-range indicator: 2 points
Weak indicator: 1 point

2

Combined Sewer Overflows – Existing Process for Financial Capability Assessment and Schedule Development

Summary judgment of financial capability:

Permittee Financial Capability Indicators Score (Socioeconomic, Debt and Finanacial	**Residential Indicator** (Cost per Household as a % of MHI)		
	Low (Below 1.0%)	**Mid-Range (Between 1.0 and 2.0%)**	**High (Above 2.0%)**
Weak (Below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (Between 1.5 and 2.5)	Low Burden	Medium Burden	High Burden
Strong (Above 2.5)	Low Burden	Low Burden	Medium Burden

Determine schedule for CSO project:

Financial Capability Matrix Category	Implementation Period
Low Burden	Normal Engineering/Construction
Medium Burden	Up to 10 years
High Burden	Up to 15 years*

*Schedule up to 20 years based on negotiation with EPA and State NPDES authorities

Establish Boundaries for Schedule

3

3.0 How the Guidance Has Been Used

We conducted limited research to investigate how the Guidance has been used in practice in CSO decisions. We held several discussions with EPA Office of Water staff and with consultants who have supported the Agency over many years on economic issues that have arisen in CSO enforcement proceedings. We reviewed a variety of written materials that were selected to represent various approaches to water and wastewater FCA. These written materials are listed in the Bibliography at the end of this paper. We also reviewed as case studies several financial capability submissions by CSO communities and the nine case studies of wet weather consent decrees for major cities that were published as Appendix 2 to the NACWA report on *Financial Capability and Affordability in Wet Weather Negotiations*. (CH2MHill 2005)

This research, though, was limited relative to what we might have done for a full technical review of the Guidance. For example, we did not interview community representatives, OECA staff, Regional Office staff, or bond agency personnel. We investigated in detail how the Guidance was applied in no more than a handful of specific CSO enforcement proceedings. This level of research is sufficient to give us broad impressions about the role that the Guidance has played, but insufficient to provide specific quantitative data about the frequency with which CSO financial capability analysis has been conducted in one particular way or another.

Based on our research, the Guidance appears to have been a significant factor in decisions for many large CSO communities, and for some smaller ones. It has also occasionally been cited in SSO proceedings and Federal grant awards for water infrastructure, even though the Guidance is nominally applicable only to CSOs. The Guidance has played a role at two stages in the process of determining a community's wet weather programs: occasionally in affecting the set of controls that the community will implement, and commonly in determining the schedule for implementing these controls.

In several instances the Guidance has been an important factor affecting the set of CSO controls that the community will implement. Some communities, because of the high cost of CSO controls, have sought to implement a less extensive set of control measures than was desired by the state, EPA and/or plaintiffs in a lawsuit. Such communities have often argued against the more extensive set of control measures on the basis of affordability concerns, using the measures and doing the calculations prescribed by the Guidance as support for their argument. These communities have attempted to portray the more extensive set of control measures as posing a *high burden*, and have argued for a less extensive set of controls that would pose only a *medium* or lesser burden.

In some instances these arguments appear to have had some impact – the set of controls ultimately required of the community seems, because of affordability concerns, to be less extensive than it otherwise might be. For Cincinnati, for example, the settlement included a decree on CSOs and a partial decree on SSOs with a limit of $1.5 billion on total spending through the program completion date in 2022. The cap on total program cost was based at least in part on financial impact concerns; holding program costs to 1.5 percent of county-wide MHI. As another example, for the Boston area (Massachusetts Water Resources Authority—MWRA), financial impact calculations involving the 2 percent of MHI threshold for *high* financial impact

have clearly affected both the water quality standards for CSO-receiving waters[2] and the set of CSO controls expected to be implemented. At one point, EPA and the state withdrew tentative approval of some MWRA CSO control plans and sought more extensive controls when sewer rates did not increase as fast as expected and fell below the 2 percent threshold.

In most CSO proceedings with larger communities, the Guidance has been an important factor in determining the schedule for implementation of CSO controls. Many communities have performed the Guidance calculations in a manner so as to indicate a *high burden* for CSO and/or SSO controls, and have sought long implementation schedules on this basis. EPA and occasionally states have pushed back, objecting to or revising the permittee's calculations and concluding that the burden is something less than *high.* Atlanta, for example, prepared four rounds of FCA submissions to EPA seeking to justify a *high burden* rating and a corresponding longer implementation schedule. EPA's technical review in each instance determined that the financial impact represented only a *medium burden* and Atlanta continues to be held to shorter implementation schedules (9 years for CSOs, 15 years for SSOs) than the City would like. Many communities have sought to extend their implementation schedules over periods longer than 20 years, including Northeast Ohio/Cleveland (30 years), Washington, D.C. (40 years) and Columbus, Ohio (40 years, for both CSOs and SSOs). EPA has required schedules extending no more than 20 years for *high burden* situations, consistent with the Guidance.

In seeking schedule relief or perhaps even a reduction in the necessary controls, many large communities involved in CSO enforcement negotiations seemingly "game" their FCA calculations, performing them in a manner aimed at showing that the costs of their CSO control program pose a high burden under the Guidance. EPA has often responded that the data and calculations, if performed correctly, would show a lower burden than the community has alleged. Numerous technical debates have taken place about exactly how to calculate the measures and apply the Guidance. The focus has nearly always been the Residential Indicator—whether or not wastewater plus CSO control costs per household exceed 2 percent of MHI—rather than the Permittee Financial Capability Indicators. This is likely because most of the Permittee Financial Capability Indicators are straightforward and only minimally subject to interpretation or different methods of calculation. Bond ratings, property tax performance, unemployment rates and household income compared with national averages, and the other Permittee Financial Capability Indicators are calculated external to any CSO debate. There is little latitude for disagreement about what values these indicators take on. In contrast, the Residential Indicator involves a calculation with several steps and several data sources, each of which may be subject to a surprising variety of interpretations. If a permittee can succeed in establishing that the Residential Indicator shows *high* financial impact (wastewater plus CSO costs exceed 2 percent of MHI), then the summary judgment under the Guidance process will be that the CSO program poses a *high burden* in all instances except when the Permittee Financial Capability Indicators show the permittee as having *strong* financial capability.

In general, smaller CSO communities have participated less vigorously in the FCA process than have larger communities. They appear commonly to accept EPA's or the state's view of how the

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[2] EPA's guidance for determining when there is "widespread economic and social impact" as a basis for revising water quality standards is very similar to the CSO FCA guidance, including testing whether the cost of the control measures needed to achieve the existing water quality standards would exceed 2 percent of MHI.

calculations should be done and what the financial capability conclusions should be. This might be because smaller communities typically have less at stake in decisions on their CSO control programs and/or less in the way of staff and consultant resources that they can devote to the FCA process. Or, perhaps they have less commonly been the subjects of EPA enforcement actions, and thus have successfully avoided the issue thus far.

3.1 Issues in Calculating the Residential Indicator

We have identified numerous issues that have been a source of disagreement in discussions between permittees and EPA about how to calculate the Residential Indicator (annual wastewater plus CSO costs per household as a percentage of MHI), including the following.

- What projects in addition to the CSO project should be included in calculating total current and future wastewater costs?
- For what year or years should the comparison of wastewater costs to MHI be made?
- How should wastewater costs be allocated among residential, commercial, industrial and other users?
- Should projected future changes in population or MHI be taken into account?
- What criteria should govern the degree to which "soft" wastewater or CSO project costs are included in the calculation, such as contingencies, reserves, and allowances for inflation?
- What interest rate should be assumed for a community's future borrowing?
- Can the Residential Indicator calculation be done based on rates rather than based on costs?
- How should the Residential Indicator be calculated when the permittee is multi-jurisdictional?
- What should be done about portions of the project cost that may be paid by parties other than the community/ratepayers, such as Federal or state grant funds?
- Should the calculations reflect local constraints when they conflict with the manner in which the Guidance specifies doing the calculations?

These issues are discussed in greater detail in Appendix B. In sum, difficult and contentious issues have often arisen in doing what appears at first to be a straightforward set of required calculations for estimating the Residential Indicator for a CSO community.

3.2 Broader Issues

In addition to disagreeing about how to perform the financial capability calculations prescribed

by the Guidance, communities have also often disagreed with fundamental elements of the Guidance.

Often, because of competing priorities for scarce dollars, communities would prefer not to implement some or all of the CSO projects in question, without regard to whatever the Guidance may suggest as the schedule over which the projects may be implemented. This position reflects whether the community is *willing* to pay rather than whether it is *able* to pay. The projected costs for CSO controls are often very large (over $1 billion for many larger communities), the benefits often accrue to downstream users more than to community residents, and communities have sometimes contended that they would prefer to invest such sums for schools, transportation or other higher priority needs. This is an issue that is beyond the scope of the Guidance. The Guidance presumes existing Clean Water Act requirements—states have established their water quality standards and, unless there is some valid reason for downgrading those standards, whatever projects (including CSO projects) are needed to achieve those standards must be implemented. This Guidance is not intended to provide a mechanism for adjusting the set of projects the permittee is expected to implement. The water quality standards economic guidance, discussed earlier, is where such a possibility is addressed.

A second broad objection that communities have raised with regard to the Guidance involves the deadlines for completion of CSO projects. Communities have sometimes argued for financial or other reasons that they should be able to stretch the CSO project timetable out beyond the 20-year maximum prescribed under the Guidance. Some communities have sought 30 years, while others have sought as much as 50 years. These communities do not appear simply to want to stretch out the financing for the project (e.g., to issue 50-year bonds rather than 20-year bonds). Such longer-term borrowing would save little and might even cost money. Instead, what is motivating the communities is more likely the possibility that delaying the deadline for completing a project could result in delaying (or even avoiding altogether) the project's initiation. Delaying initiation of a project by some 20 years could reduce its present discounted cost by 50 percent or more, so a longer schedule could provide important cost savings for a community's current population.[3] Of course, delaying implementation of a project delays not only its costs, but its benefits also. As far as we know, no CSO community has yet explicitly been given a project implementation schedule extending beyond 20 years.[4]

Third, communities have consistently argued that comparison of wastewater plus CSO costs against *median* household income across the entire service area does not reflect whether these costs are affordable for lower income jurisdictions or for lower income households within the community. Communities have argued that affordability is of most concern for lower income segments of the community, and affordability should be assessed relative to the income of these

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[3] Assuming construction costs do not increase faster than the general rate of inflation and assuming a 3% real discount rate, a 20-year delay in initiating a project would reduce the net present value of its costs to the current population by nearly half.

[4] However, several CSO and/or SSO settlements have involved a community being required to invest a specified amount of funds by a future date, with an expectation that this level of project investment will suffice for attainment of water quality standards. If standards are not attained, the settlement is to be reopened and further investment will likely be necessary. Such a settlement could, if standards were not attained with the initial investment and if the subsequent necessary projects stretched out beyond 20 years, be regarded as potentially exceeding the maximum schedule flexibility allowed by the Guidance.

lower income groups, not relative to median income across the entire community.

The final broad objection that communities have frequently raised regarding the Guidance is that the procedure for judging whether or not a community and its residents are financially capable of implementing a CSO project should address what the project would mean for future water and sewer rate increases in the community, and whether these rate increases will be acceptable to ratepayers. The Guidance focuses only on the impact of the CSO project on future wastewater costs and does not also consider the likely impact on rates, which communities contend provides a seriously incomplete picture.

4.0 Technical Assessment of the Guidance

In this chapter, we provide our initial, independent technical assessment of the Guidance.

4.1 Assessment Criteria

A substantial portion of the Guidance, the Permittee Financial Capability Indicators, is intended to evaluate the degree to which the community is able to finance the CSO project costs. This evaluation that EPA and permit authorities want to perform is essentially the same as the evaluation that is performed in financial markets when any community seeks to issue bonds. Are the community's financial strength and managerial capabilities sufficient to make it likely that the principal and interest on the bonds will be paid? For the financial markets, bond rating firms (e.g., Standard and Poor's, Moody's Investor Services) have developed widely accepted procedures for making this judgment. We thus evaluate the Permittee Financial Capability portion of the Guidance against the state-of-the-art that has been established in this area by the bond rating firms. How do the Permittee Financial Capability Indicators compare in evaluating a community's financial capability against the procedures successfully used for this purpose by bond rating firms?

The remainder of the Guidance is intended to serve inherently governmental functions—judging whether households are being asked to spend too much of their income for wastewater and CSO controls, and setting compliance schedules in view of both environmental needs and fiscal capabilities—for which there are no clear state-of-the-art private sector counterpart procedures against which the Guidance can be evaluated. Thus, we evaluate the remainder of the Guidance and the Guidance as a whole against a set of more general principles that we believe should characterize a good government guidance document, whatever the subject. In our view, a good guidance should be: (1) Consistent; (2) Efficient; (3) Rational; and (4) Transparent. We describe each of these four evaluation criteria in the box on the next page. In evaluating each major portion of the Guidance against these four criteria, we use a simple three-step scoring system: each portion of the Guidance is judged as *good*, *fair* or *poor* in terms of how it measures up against each of the four criteria.

The remainder of this chapter is organized to provide our technical assessment of the following portions of the Guidance: (1) the Residential Indicator; (2) the Permittee Financial Capability Indicators; (3) the process for establishing CSO project schedule boundaries; and (4) the Guidance as a whole.

Criteria For Evaluating Guidance

Consistency -- A good guidance leads to consistent results:

- The various parties involved can follow the guidance and come to the same conclusions
- Parties cannot easily "game" the analysis
  - i.e., it is difficult to distort the analysis to pursue private (self) interests
- The outcomes associated with use of the guidance can be reliably predicted over time and across applications

Efficiency -- A good guidance is efficient:

- *Procedurally* if it includes the minimum set of indicators necessary to predict with reasonable accuracy the outcomes relevant to the overarching policy objectives
  - A "correct" set of indicators, calculable at reasonable cost, and aimed at meeting the overarching policy objectives
- …in terms of *Incentives*, if it aligns public and private interests and encourages parties to:
  - Pursue the overarching policy objectives
  - Manage their organizations (public and private) efficiently
  - Be truthful and collect and share unique and valuable information
- …in terms of *Outcomes*, if it "works" in producing desirable social outcomes such as
  - Public health, environmental quality, economic vitality of communities and the nation, social justice, equity
  - Economic efficiency (net benefits are maximized)

Rationality -- A good guidance reflects rational design principles:

- The overall policy objectives are clear and sensible
- The various process elements specified by the guidance (procedures, indicators, calculation steps, etc.) combine to accurately reflect the key causal relationships determining the degree to which the policy objectives are met
  - The process elements and how they are interrelated are: intuitive, logical, internally consistent, quantitative (if possible), well understood, testable, and can be validated

Transparency -- A good guidance is transparent:

- In terms of its objectives
  - Why the guidance exists and the objectives it is intended to serve are clear
- ... and requirements
  - The analytic tasks are clear and directly linked to the overarching policy objectives
- …and outcomes
  - The guidance can be evaluated empirically; it is possible to determine whether or not it is working

4.2 Residential Indicator

This portion of the Guidance is the source of much of the controversy. We believe that several of the criticisms that communities have raised regarding this Indicator have merit. In our view, this

indicator does not perform well in portraying the financial impact of current and proposed wastewater treatment and CSO controls on residential users.

4.2.1 Lack of Specificity Yields Inconsistent Results

On first impression, the Residential Indicator appears simple and sensible. The worksheets and examples provided in the Guidance on how to do the calculations are helpful and straightforward. However, many questions arise when actually doing the calculations. There are several important gray areas where the Guidance does not specify exactly how the calculations are to be done, and different approaches in these areas can yield strikingly different final values for the indicator. In addition to the gray areas, there are other areas where communities have often diverged in practice from calculation procedures that are specified by the Guidance, and EPA has occasionally accepted the communities' calculations using these divergent approaches. Areas in which the Guidance does not specify how to do the calculations include:

- What projects should be included in addition to the CSO project in calculating total current and future wastewater costs?
- For what year or years should the comparison of wastewater costs to MHI be made?
- Should pre-tax or post-tax income be used to calculate the MHI?
- To what extent can "soft" wastewater and CSO project costs be included (e.g., contingencies, overheads)?
- What interest rate should be assumed for the calculations?

The following are some additional areas where the Guidance does specify how to do the calculations, but communities have often diverged from the specified approach and have sometimes been allowed to do so:

- Can the Indicator be calculated separately for different segments of the community?
- What is the residential share of WWT and CSO costs?
- Should *costs* or *rates* be used in the calculations?

Appendix B describes in more detail each of these areas where the Guidance is imprecise or where EPA's practice has been inconsistent in requiring analyses consistent with the specifications of the Guidance.

Many CSO communities—typically larger ones that have more at stake in decisions on their CSO control programs and more in the way of staff and consultant resources that they can devote to the FCA process—seek to take advantage of these areas of imprecision and perform their Residential Indicator calculations in a manner that yields a conclusion of *high* financial impact on households in the community. EPA and the Department of Justice (DOJ) tend to perform the calculations in a different manner, yielding lower estimated financial impacts. Highly

inconsistent results ensue, with wide differences in approach and conclusions from one community to the next and between the communities and EPA/DOJ. Parties tend to "game" their analysis to reflect their interests. Variations in calculation procedures can lead to a one- or even two-level difference in the Residential Indicator conclusion (e.g., *high* financial impact rather than *mid-range*; or even *high* financial impact rather than *low*).

In our view, the complexity of the Residential Indicator calculations under the Guidance leads to some inequities even if communities were to make no attempt to game their analyses. For some communities the Residential Indicator calculations can be highly data-intensive and difficult. In general, the calculations will yield a more favorable outcome for the community that puts more effort into developing them, even assuming no attempt to game the analysis. Some examples:

- The larger the future wastewater costs that can be added to current wastewater costs, the higher the value of the Residential Indicator that will result. Most wastewater utilities have prepared some form of long-term plan or capital improvement plan that provides information on planned future capital investments as a portion of "future wastewater costs". Few utilities, though, have estimated the future operating and maintenance costs that will accompany these future capital costs. Developing a full estimate of future wastewater costs, including additional operating and maintenance expenditures, can require substantial effort.

- For some CSO communities, wastewater conveyance and treatment are the responsibility of a regional wastewater utility, while the collection sewers may be owned and operated by numerous local sewer districts or other governmental entities. In the Seattle, WA, area, for example, the regional King County Wastewater Treatment Division receives sewage flows from some 27 local sewerage agencies. Estimating "current plus future wastewater costs" would thus involve estimating and adding present and future capital and O&M costs for the regional wastewater utility plus all the local agencies. The local agencies may or may not have such information available. In some areas of the country, this large data acquisition/estimation problem is complicated by the fact that the local agencies that provide wastewater collection may also provide a variety of other services (water supply, fire protection, sanitation) with all these services paid for by a variety of taxes, user charges and intergovernmental transfers. Ascertaining these agencies' costs specifically for wastewater collection can be very difficult.

- Some communities with substantial recent wastewater collection and treatment investments may have chosen to "back-load" them – to finance them in a manner such that debt service costs are low in the years immediately following the investments and increase in years out into the future. For these communities, the current cost of current wastewater treatment is relatively low, while the future cost of current wastewater treatment is much higher. To portray the costs of current wastewater treatment in the Residential Indicator calculation, such a community should not simply cite its current costs, but instead should perform a more complex calculation in which low current costs and higher future costs are combined into some sort of a levelized/discounted average annual cost.

In these instances, a community that fails to collect and analyze the full set information that can be included in the Residential Indicator calculation, including the data elements that can be particularly difficult to acquire, will end up with a less desirable conclusion. This strikes us as inequitable, if the reason preventing a community from collecting and analyzing the full set of information is insufficient staff, expertise, and/or budget.

In other instances, the set of calculations prescribed by the Residential Indicator can simply be difficult, without there being an expectation for a less desirable result if full data are not acquired and full calculations are not performed. For example, the Guidance prescribes that the MHI against which costs are compared should reflect the permittee's entire service area. If the permittee serves multiple geographic jurisdictions, the Guidance prescribes that system-wide MHI be calculated as the weighted average of the MHIs across the component jurisdictions. This can be difficult if there are multiple jurisdictions and the boundaries of the utility service area do not correspond to political boundaries for which income information is collected. A regional wastewater treatment utility may, for example, serve portions of several counties, comprising dozens of cities and towns and additional unincorporated areas. The Guidance similarly prescribes that the residential share of costs be calculated based on the residential share of wastewater flow across the utility's entire service area. Wastewater flows from residential vs. commercial vs. industrial users are often calculated based on water use information for different categories of accounts from drinking water utilities. When the boundaries of the drinking water utility do not correspond closely to those of the wastewater utility (e.g., when multiple drinking water utilities serve the wastewater utility's area, as is the case on average nationally), this calculation can be difficult.

4.2.2 Lack of Rationale for the Cost-to-MHI Benchmark

No rationale is provided in the Guidance or in any broadly available supporting materials for the choice of benchmarks for the Residential Indicator: costs exceeding 2 percent of household income constituting a *high* impact and costs of less than 1 percent of household income constituting a *low* impact. Why 2 percent for *high* and 1 percent for *medium* rather than, say, 1 percent and one-half percent, or 4 percent and 2 percent? The only statement in the Guidance as to why these benchmarks have been chosen is that they "reflect EPA's previous experience with water pollution control programs." No further explanation is provided.

There is similarly little explanation for the identical 2 percent for *high* and 1 percent for *medium* figures applied in the *Interim Economic Guidance for Water Quality Standards*:

> ... If the total annual cost per household ... is less than 1.0 percent of MHI, it is assumed that the project is not expected to impose a substantial economic hardship on households. ... If the average annual cost per household exceeds 2.0 percent of MHI, then the project may place an unreasonable financial burden on many of the households within the community. (USEPA 1995a. pp 2–7)

No evidence is cited to support the assertion that a cost of less than 1 percent of MHI will not impose a substantial hardship, nor the assertion that a cost exceeding 2 percent will pose an unreasonable burden.

NACWA asserts that the 2 percent figure as the threshold for high impacts has its origin prior to

enactment of the Clean Water Act:

> The use of MHI as an economic indicator originated with the Farm Home Loan program before the passage of the CWA in 1972. It served as a test of financial viability of potential recipients of wastewater construction grants, providing a measure of assurance that local communities could support ongoing costs to sustain the operation of a wastewater treatment facility. A level of 1.5 percent of MHI (rather than the 2.0 percent level now employed) was viewed as the point of potential *rate refusal* whereby higher burdens could result in widespread failure of customers to pay their sewer bills, shortfalls in expected revenues, and the inability of the grant recipient to pay for proper operation and maintenance of the facilities constructed with federal funds. As the federal government sought to ensure that its investments did not deteriorate due to lack of local support, the concept of MHI percentage as an indicator of a locale's ability to pay for water and wastewater improvements emerged. (CH2MHill 2005. Page 8)

A clearer rationale is available for the choice of 2.5 percent of income as the household affordability threshold for drinking water small system variances (USEPA 1988).[5] In choosing this figure, EPA decided that the fraction of income that a household might reasonably be expected to spend for drinking water ought to be at least as high as average spending on alcohol and tobacco (1.5 percent of household income, according to a 1995 Bureau of Labor Statistics survey), not as high as average spending on energy and fuels (3 percent of income in the same survey), and in the same range as average spending on telephone services (2 percent of income). EPA further considered Congressional direction in the SDWA to the effect that Point-of-Entry and Point-of-Use treatment units should be viewed as options for compliance technologies. Economic studies indicated that these technologies might cost roughly 2.5 percent of income for a typical household served by a small drinking water system, so this level of cost was also judged as not unreasonable. Further studies on the cost of bottled water indicated that many households choose to spend more than 2.5 percent of income for drinking water (i.e., the water bill from the utility plus cost of purchased bottled water substantially exceeds 2.5 percent of income for many households). The final reason offered for choice of the 2.5 percent threshold was that small system variances "are intended to be very rare, based on the requirements of the SDWA. ... Thus, the affordability criteria should be set, in EPA's view, high enough that the majority of the systems will proceed down the compliance pathway" rather than qualify for a variance. (USEPA 1988)

We do not believe that any of the lines of reasoning that were applied in the drinking water context have much relevance to the issue of what percentage of a household's budget might reasonably be devoted to spending on wastewater services. We see little basis for judging how the percentage of income a household can reasonably be asked to spend on wastewater services (or on drinking water plus wastewater services) should compare with the percentages that are spent on other utilities (e.g., energy, telecommunications), on "necessities" (food, education, medications), or on "non-necessities" (tobacco, liquor, entertainment). In our view, it is difficult to draw any useful normative conclusions from looking at data on how households spend their income and judging some categories of spending as more worthy and others as less worthy. There are some categories of seeming necessities on which households now spend less than what the Guidance presumes that they can afford to spend on wastewater services (e.g., drugs, public transportation), as well as conversely some categories of seeming non-necessities on which

[5] On pages 38–50, this document summarizes how the 2.5 percent figure was chosen.

households now spend much more than what the Guidance presumes they can afford to spend on wastewater services (e.g., entertainment, meals at restaurants).

Exhibit 2 shows information on household expenditures for water and wastewater services contrasted with expenditures on other items, drawn from the Bureau of Labor Statistics' 2005 Consumer Expenditure Survey (CES).[6] We do not believe that any useful conclusion can be drawn from such data about either the minimum or maximum amounts that households might reasonably be asked to spend on water and wastewater services. It is apparent that spending on water and wastewater services is higher than spending on some sorts of "necessities" and lower than spending on some other sorts of "necessities", and it is similarly higher than spending on some sorts of "non-necessities" and lower than spending on some others.

We believe that more appropriate lines of inquiry in determining what fraction of income a household might reasonably be asked to spend for wastewater services (or for drinking water plus wastewater services) would include:

1) Investigating what happens at the margin as the price for water and wastewater services changes. If water/wastewater rates were to increase in a community, to what extent would use of these services decrease (e.g., via water conservation) and how would households reallocate their budgets? What expenditure categories would be cut back if households had to spend more on water and wastewater services? In economic terms, the issue involves a household making saving and expenditure decisions so as to maximize utility subject to an income constraint. Key relationships that could be assessed include the price elasticity of demand for water and wastewater services and the cross-price elasticities of demand for saving and other expenditure categories. Appropriate data bases exist for econometric investigation of these questions (e.g., longitudinal and cross-sectional consumer expenditure surveys conducted by the Bureau of Labor Statistics). Answers to these questions likely vary with the income of the households being considered; lower income households would likely respond somewhat differently to increased water/wastewater rates than would higher income households. Rubin (2001), for example, cites research in this area and argues that higher water utility rates would force low income households to make unfortunate tradeoffs that harm their health and well-being.

2) Investigating the degree to which the utility would suffer undesirable consequences if rates were increased sharply. Higher rates carry some risk of rate refusal, non-payment of bills, illegal connections and water theft and other problems that are costly for a utility to deal with. Sharply higher rates (i.e., "rate shock") intensify these risks. To what degree will such problems occur if rates are increased?

We believe these issues are worth investigating as a basis for developing a judgment about the fraction of income that a household might reasonably be asked to spend for water and

[6] The CES includes an expenditure category titled, "Expenditures on water and other public services." This category includes any amounts billed and spent for: "piped-in water, sewerage maintenance, trash/garbage collection, water softening service, and septic tank cleaning." We believe the expenditure amounts reported for this category reflect almost exclusively water and sewer bills, since trash and garbage collection service is rarely billed directly to and paid for by a household, and water softening service and septic tank cleaning are relatively infrequent.

wastewater services. In our view, the lack of any persuasive rationale for the current 1 percent and 2 percent thresholds represents an important shortcoming in the Residential Indicator.

Exhibit 2: Household Expenditures for Water vs. Other Items, 2005

	Avg. Across All Households	Lowest Income 20% of Households
Income after taxes	$56,304	$9,688
Expenditures on Common Items		
Water and other public services	$366	$201
(Water, etc. adjusted for renters) (1)	**$546**	**$479**
Other utilities		
Energy	$1,770	$1,112
Telephone	$990	$562
Other "necessities"		
Fruits and vegetables (fresh & processed)	$552	$333
Footwear	$320	$193
Gasoline and motor oil	$2,013	$882
Public transportation	$448	$137
Health care total	$2,644	$1,448
Drugs (included in health care)	$521	$351
Education	$940	$530
Non-"necessities"		
Tobacco products and smoking supplies	$319	$260
Alcoholic beverages	$426	$174
Food away from home	$2,634	$1,067
Entertainment fees and admissions	$588	$145
Audio and visual equipment and services (e.g., TV)	$888	$459

(1) Assumes that only homeowners pay identifiable bills for water and other public services; that renters pay for water as part of their rent. Thus, the expenditures reported in the Survey are for homeowners only.
Source: Bureau of Labor Statistics, Consumer Expenditure Survey, 2005

4.2.2.1 Wastewater Costs are Much Less Affordable for Low Income Households than for MHI Households

We believe that the benchmarks distinguishing *low* financial impact on households from *medium* and from *high* should not be defined with reference to *median* household income. Wastewater costs are much less affordable for lower income households than for median or upper income households. The Residential Indicator is logically inconsistent in its choice of the median household as the indicator of affordability for the community. Households at the lower end of the income distribution are far more indicative of any affordability problems than the median household.

There are two reasons why wastewater costs are less affordable for lower income households than for median or upper income households:

1. Lower income households pay a much higher fraction of their income for wastewater services than do median and upper income households; and

2. The opportunity cost of spending on wastewater services – what is foregone in order to pay for wastewater services – seems higher for lower income households than for median and upper income households.

We will provide further detail on these two points.

First, with respect to the percentage of income spent on wastewater services by households at various income levels, nationally representative data exist on spending for water plus wastewater services but not for spending on wastewater services alone. However, water charges and wastewater charges are highly correlated in most communities, and we are confident that the relationship between spending on wastewater and income is quite similar to whatever relationship can be found between spending on water plus wastewater and income.

Lower income households generally spend a significantly higher percentage of their incomes on water and wastewater services than do middle income or upper income households. See, for example, Exhibit 3 which provides the most recent available data from the Bureau of Labor Statistics' (BLS') Consumer Expenditures Survey. Exhibit 3 shows that households in the middle income quintile spend about 1.3 percent of their disposable income on water and wastewater services, compared with households in the lowest income quintile who spend a much greater percentage of their disposable income for water and wastewater, about 4.9 percent.[7]

Exhibit 3: Household Spending on Water and Wastewater, by Income Quintile, 2005

	All Households	Lowest Income 20% of Households	Second 20%	Third 20%	Fourth 20%	Highest Income 20% of Households
Income after taxes	$56,304	$9,688	$25,200	$41,557	$65,275	$139,644
Expenditures on water and other public services	$366	$201	$289	$349	$422	$568
Percentage of households that are renters	33%	58%	43%	33%	20%	8%
(Water, etc. without renters) [a]	$546	$479	$507	$521	$528	$617
Expenditures as percent of income after taxes:						
For water and other public services	0.7%	2.1%	1.1%	0.8%	0.6%	0.4%
For water, etc. for homeowners (renters excluded) [a]	1.0%	4.9%	2.0%	1.3%	0.8%	0.4%

[a] Assumes that only homeowners pay identifiable bills for water and other public services; that renters pay for water as part of their rent. Thus, the expenditures reported in the Survey are for homeowners only.
Source: Bureau of Labor Statistics, Consumer Expenditure Survey, 2005

This regressive nature of water and wastewater charges is a result of two factors. First, the income elasticity of demand for water is positive, but low. This means that as income increases, demand for water increases also, but at a less than proportional rate. Estimates of the long-run

[7] The BLS figures are adjusted to reflect the fact that most renters do not pay an identifiable bill for water/wastewater services. We assume that all renters in each income quintile report zero payments in response to water and wastewater bills, but that they actually pay a similar amount as homeowners do, except with their payments included in rent. Detailed calculations are available upon request. Our expenditure estimates generated in this manner match very well with AWWA estimates developed by surveying their members. (Warburton 2004)

income elasticity of water demand for the U.S. are roughly 0.2 to 0.3,[8] meaning that a 10 percent increase in income results in only roughly a 2 to 3 percent increase in water demand. Higher income households thus do not use much more water than lower income households. Second, there is no significant progressivity in most water rate structures, and thus higher income households, who on average use somewhat more water than lower income households, do not typically pay a higher unit price for this water.[9] The result from the interaction of usage and price is that higher income households spend somewhat more each year for water and wastewater services than do lower income households, but that this spending amounts to a significantly lower share of their disposable income.

The second point in arguing that wastewater costs are less affordable for lower income households than for median or upper income households involves opportunity costs. Spending on wastewater and/or water appears to displace spending on other necessities to a greater degree for lower income households than for higher income households. Rubin (2006) cites data to the effect that "as the cost of drinking water increases – purportedly to improve public health – it will further diminish the already limited resources available to low-income households to provide for their other health needs." For example, increased spending on water and wastewater by the poor likely reduces their spending on food. "USDA's most recent data on food insecurity show that 34% of households with incomes less than 130% of the poverty level were food insecure in 2004. Moreover, 12.3% -- 1 in every 8 households – at that income level experienced hunger (the most severe form of food insecurity) during 2004. The level of food insecurity is 7 times higher for low-income households than it is for higher-income households…"

Looking at opportunity costs in a different way, one might seek to contrast using the data in Exhibit 2 how a low income household and an average income household might attempt to pay for an increase in their water and wastewater costs. To pay for a hypothetical 50% increase in their water/wastewater costs (i.e., $239.50/year), a lowest 20th percentile income could forego 16.5% of their health care spending, or 45% of their education spending, or 22% of their spending on food eaten away from the home. In contrast, an average income household facing a 50% increase in their water/wastewater costs (i.e., $273/year), would have to forego only 10.3% of their health care spending, or 29% of their education spending, or 10% of their spending on food eaten away from the home. The lower income household could not come close to paying for this increase in water and wastewater costs by foregoing all consumption of alcoholic beverages, whereas the average income household could pay for the increased costs by foregoing only 64% of their alcoholic beverage consumption. The conclusion seems clear whether it is viewed in terms of necessities or in terms of non-necessities; a lower income household will likely have to make greater sacrifices than a higher income household if water and wastewater costs increase.

In sum, lower income households have much more difficulty affording water and/or wastewater

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[8] See, for example, Dziegielewski 2002, NAS 2002, and Ringskog 2000.

[9] About one-third of U.S. water utilities have increasing block rates (a progressive rate structure where the unit price of water is higher the more one uses); another one-third have decreasing block rates (regressive, where the unit price of water declines the more one uses); and about one-third have rates that do not vary with the volume used. (Ringskog/World Bank, 2000) Furthermore, many water utilities have some form of connection charge. The overall result is that households using less water (e.g., lower income households) pay roughly the same or slightly more per gallon used than households using more water (e.g., higher income households).

services than do higher income households. Focusing the Residential Indicator on the *median* income household rather than lower income households thus presents an inaccurate picture of whether there is an affordability issue in a community.

The nationwide data in Exhibit 3 show that, on average, a lowest income quintile household spends a percentage of its income on water and wastewater services that is nearly four times higher than that spent by a middle income quintile household (4.9 percent of income after taxes in contrast to 1.3 percent of income after taxes). Assuming this average relationship, in a community where wastewater treatment expenditures by households at the MHI amounted to just short of 2 percent of MHI, then wastewater treatment expenditures by the lowest 20 percentile income households in this community would amount to nearly 8 percent of their income. The Guidance would classify this community by looking at the impact on the MHI and would conclude that its households face only a *mid-range* financial impact (i.e., 1 to 2 percent of MHI) from the wastewater costs. The Guidance would overlook the seemingly extremely high, nearly 8 percent, impact on lower income households in this community.

In our view, because it compares costs against only *median* household income, the Residential Indicator yields conclusions that are likely to be incorrect (both irrational and inconsistent) for many communities. For communities for which projected per household wastewater treatment plus CSO costs are somewhere between 0.5 percent and 2 percent of MHI, the Residential Indicator will conclude that there is *low* or *mid-range* financial impact on households. For most of these communities, though, a substantial portion of the population (at least those households with the lowest 20th percentile income) will incur costs exceeding 2 percent of their income, a financial impact that might more appropriately be termed *high* rather than *low* or *mid-range*. In short, we think in a great many instances that the Residential Indicator will be inaccurate in its conclusion—wrongly portraying wastewater treatment plus CSO costs as posing *low* or *mid-range* financial impacts when they instead should best be viewed as posing *high* financial impacts.

4.2.2.2 EPA SAB's Advice Regarding Small Drinking Water Systems

EPA's drinking water program has established 2.5 percent of MHI as the benchmark for affordability of drinking water costs when considering variances for small systems from drinking water treatment technology requirements. The Office of Water is now considering revising the variance procedure, partly because the requirements for granting such a variance have never been met. In the course of this review OGWDW requested advice from the SAB (Science Advisory Board). In their report, the SAB concluded that the current indicator approach does not adequately reflect affordability of drinking water costs for economically disadvantaged households:

> EPA's basic approach to assessing the *affordability* of National Primary Drinking Water Regulations (NPDWRs) for small systems is intended to address the reality that small systems frequently face higher costs of meeting given standards. If the anticipated cost of compliance would put small systems (on average, on a national basis) above an *affordability threshold*, such systems are allowed to apply for variances. The Committee finds that this basic approach is justified on the basis of equity and efficiency considerations, as well as considerations of administrative practicality. ... If the basic approach is maintained, the Agency should consider measures other than median income that better capture impacts on disadvantaged households. Within-district income inequalities (to the extent that the poor are not protected from cost

> increases) and between-district income inequalities argue for the use of lower income percentiles than median income. The effect of such a lower percentile, either within water districts or across water districts, would be to make it easier to trigger the affordability threshold. (USEPA SAB, 2002, page 4)

The SAB recommended that the Agency consider several options for revising the indicator to better reflect impacts on lower income households and increase availability of the variance, including:

- Option 1: Keep the current formula (2.5 percent of household income) but specify a lower income percentile (for example, 10^{th} or 25^{th} percentile rather than MHI);

- Option 2: Set a threshold that represents a certain percentage of systems (for example, 10 percent or 25 percent) so that a guaranteed percentage of systems would fall below the threshold and qualify for the variance; and

- Option 3: Base the threshold on some measure of dispersion of income, such as variance or standard deviation, rather than on the median income. For example, instead of the current threshold based on median income level, an alternative would be to base the threshold on the income level at 1, 1.5, or 2 standard deviations below the mean.

The SAB preferred either Options 2 or 3.

On another issue, the SAB also suggested that the 2.5 percent figure might be too high a threshold for identifying systems with affordability problems:

> The Agency should also consider lower percentages than the current 2.5 percent as the income percentage for the national level affordability threshold. The national affordability threshold has never been exceeded, but some small water systems appear to have genuinely struggled with costs, suggesting that the 2.5 percent rule is too high. EPA should consider a lower percentage than 2.5, but a change should be made only in conjunction with the development of clear and formal guidelines about when variances should be provided at the local level. (USEPA SAB 2002, page 5)

4.2.2.3 Insufficient Subsidization of Low Income Households to Mitigate Affordability Problems

With respect to the affordability of wastewater treatment requirements, EPA has traditionally concerned itself with a community's overall financial capability. The Agency has established some broad requirements regarding the user charge systems implemented by communities that have received federal grant assistance—user charges must produce revenues sufficient in the aggregate to cover costs of operation, maintenance and replacement of wastewater facilities; and each individual user and each user class should pay a share of costs proportionate to their contribution to total wastewater loadings. The Agency has traditionally not wanted to specify further details about how the community chooses to structure its rates. With respect to rate affordability for low income households, for example, the Agency authorizes rate systems that provide lower user charges for low income residential users (Title 40 of the *Code of Federal Regulations* (CFR) Ch. I §2140(i)) and has supported research and technical assistance on the subject (e.g., EFAB 2006; EPA 2002), but the Agency has not required such systems.

This option for communities to subsidize wastewater costs for low income residential users is one argument that has been advanced to support basing the affordability benchmarks on MHI. If wastewater costs are affordable for the MHI in a community, then it is likely true that the utility could structure rates and assistance programs such that wastewater costs would be affordable for households at all income levels. Costs for lower income residential households could be subsidized by assistance programs and/or higher rates paid for by middle and higher income residential customers. The amount of the subsidy would be sufficient to make the subsidized wastewater costs affordable for lower income households, while the costs of providing the subsidy would not be so high as to make wastewater service unaffordable for the middle and higher income groups that generate the subsidy.

Although this sort of low income assistance or subsidy approach is possible in theory, in practice few utilities go as far as would be necessary to bring the burden of water and wastewater costs on lower income households down to near the level facing a median income household. We have already cited data to the effect that decreasing block rate structures (regressive with respect to income) are as prevalent as increasing block rate structures (progressive with respect to income). A 2004 survey of American Water Works Association (AWWA) utility members found only 6 percent offering a low-volume discount and 15 percent offering a low income discount (266 responding utilities). (Brandt, 2004) The same survey found the following proportion of utilities that would offer some form of assistance to a low-income residential customer that is having trouble paying their bill (Warburton, 2004, 338 responding utilities):

- One-time bill credit from utility funds 3%
- Change in the rate customer is charged 8%
- Special billing arrangements 21%
- In-home conservation assistance 25%
- Education 35%
- Referral to a local government agency 49%
- Referral to a private, non-utility agency 54%
- Pay amount due over time 76%
- Other 8%

While these figures suggest that low income assistance programs of one or another sort are relatively common, their overall impact is limited. Despite all these programs, lowest 20th percentile income households still devote a fraction of their income to water and wastewater services that is nearly four times higher than that which median income households spend. Even with the possibility of expanding these programs in the future, it seems likely that low income households will continue to pay a much higher portion of their disposable income for water and wastewater services than do median income households. As a practical matter, when there is an affordability problem it will likely continue to be felt by lower income households much more than by median income households. With its focus on MHI, the Residential Indicator does not reflect this sizable difference in burden.

4.2.3 Additional Shortcomings

In addition to the major concerns we have raised in the preceding sections regarding the Residential Indicator, there are several smaller issues that appear to further reduce the accuracy

with which the Indicator assesses household affordability:

- It is not fully clear from the Guidance whether the Indicator is intended to be calculated relative to before-tax household income or relative to after-tax (i.e., disposable) household income. The Guidance does not specify one or the other. Circumstantial evidence, however, suggests that pre-tax income is intended; the Census data source suggested in the Guidance for obtaining information on household income features pre-tax income much more prominently than post-tax income. We believe, though, that taxes constitute non-discretionary expenditures for a household. The burden posed by water and wastewater charges can best be gauged relative to disposable income and against other post-tax discretionary expenditures.

- There might similarly be some adjustment to the indicator to account for regional differences in income and purchasing power. Because of declining marginal utility of income, wastewater costs that amount to 2 percent of income in a high income community seem perhaps less burdensome than costs that amount to 2 percent of income in a low income community. Perhaps the benchmark percentages of income that differentiate *low* from *medium* from *high* financial impact should vary with what that income is. And, perhaps that income should be adjusted on a regional basis to reflect real purchasing power. The quantity against which wastewater costs might most appropriately be compared would be real, disposable income.

- We see some merit to arguments by communities to the effect that calculation of the Residential Indicator should reflect the rates charged to households and household expenditures for wastewater treatment rather than only the costs of wastewater treatment divided by the number of households. As noted previously, doing the calculation based on rates: (1) reflects whatever constraints or idiosyncrasies in rate structures actually exist in the community; and (2) highlights the important issue of the degree to which future wastewater and CSO costs will cause rates to increase (i.e., rate shock). Note, though, that the base from which rates might increase is important also; a sizable rate increase above low current rates would be of less concern than a rate increase above high current rates.

4.2.4 Assessment Conclusions

The following is our summary rating of the Residential Indicator against the four evaluation criteria: consistency, efficiency, rationality, and transparency.

The Residential Indicator:
Assessment Relative to the Four Criteria

Consistency:	Poor. Parties can rather easily distort or "game" the analysis to suit their interests. EPA and the community often perform the calculations differently, arriving at substantially differing conclusions about the level of financial impact posed by a CSO project. Smaller communities typically do not have the resources or expertise to "game" their analysis as larger communities do. EPA's record in enforcing consistency is mixed.
Efficiency:	Poor. This indicator is efficient in the sense that it captures via a relatively small and streamlined set of calculations the complex issue of whether the community's planned set of wastewater treatment and CSO projects is affordable for households in the community. It seems, though, that this efficient calculation process ultimately generates answers that are frequently inaccurate for a substantial lower income segment of the community. Furthermore, the indicator does not succeed in aligning the incentives of the community and the regulatory/enforcement agency.
Rationality:	Poor. The SAB in a drinking water context has concluded that the basic approach of comparing costs or expenditures to household income is justified in terms of equity, efficiency and administrative rationality. However, no rationale is offered for the particular benchmarks that are chosen distinguishing *low* from *mid-range* from *high* financial impact. Also, the choice of MHI as the income measure against which costs or expenditures are compared results in a logical inconsistency, where costs or expenditures that are judged as affordable for the community as a whole based on MHI will often prove to be the opposite for a substantial lower income segment of the community.
Transparency:	Fair. The function that the indicator is intended to serve is clear, as are the broad outlines of the steps in the calculation. However, the details of many of the calculation steps are not at all clear, and little advice is provided in the Guidance about how to proceed when dealing with a gray area. In some areas where the Guidance is clear about how to perform a calculation step, EPA appears to have allowed some communities to diverge from the required procedures. The worksheets and examples in the Guidance document are helpful and straightforward.

4.3 Permittee Financial Capability Indicators

The set of six Permittee Financial Capability Indicators is intended to evaluate a community's financial capability. Together the six indicators are supposed to provide a judgment on whether the community can successfully finance the required wastewater and CSO capital improvements; pay for ongoing utility operation, maintenance and reinvestment needs; and repay the borrowed funds plus interest. Bond rating firms such as Standard & Poor's (S&P) and Moody's Investor Services (Moody's) have been making exactly such judgments about community and/or utility financial capability for decades, and have accurate, market-tested procedures for generating these judgments. In assessing the set of Permittee Financial Capability Indicators, a primary question we ask is how well they measure up against the state-of-the-art in municipal FCA that has been established by the bond rating firms.

We conclude that the set of six indicators does not work well relative to the methods used by the bond firms. Most of the six indicators are among or are related to those used by the bond rating firms, but the full set of indicators used by the bond rating firms is more sophisticated and much more extensive. Furthermore, there are important differences between the Guidance and the bond rating firms both in how the indicators are calculated and in how they are weighted to reach an overall conclusion about financial capability. Absent much empirical research, it is difficult to

estimate exactly how the financial capability conclusion provided by the Guidance indicators would match that of the bond rating firms. Our sense is that the six indicators provide an aggregate judgment that correlates only roughly with the conclusions from S&P and Moody's, with sharp differences likely in many instances. In our view, the unexplored, "black box" nature of the Permittee Financial Capability Indicators and the resulting unpredictable differences from what bond rating firms would conclude about a community constitute significant issues.

4.3.1 Comparison With Methods Used by Bond Rating Firms

At first glance, most of the six Guidance indicators are among those or seem similar to those used by the bond rating firms. Further scrutiny reveals major differences, however.

Two of the six indicators in the Guidance are identical to ones used by S&P and Moody's: Bond Rating and Overall Net Debt as a Percent of Full Market Property Value. Three of the six indicators seem similar to ones used by the bond rating firms, but in fact have important differences: Unemployment Rate; MHI; and Property Tax Revenues as a Percent of Full Market Property Value. As defined in the Guidance, Unemployment Rate and MHI are evaluated relative to national averages, while S&P and Moody's evaluate them in terms of absolute level and trend. As a result, the financial capability that the Guidance assesses a community as having using these indicators may be quite different from what the bond firms would conclude.

Likewise, the Property Tax Revenues as a Percent of Full Market Property Value indicator used in the Guidance seems similar to one used by the bond firms, but the subtle difference will result in a identification of a different set of communities as financially highly capable. This indicator used in the Guidance assesses the degree to which the community's taxing capacity has been used up, while the seemingly parallel bond firm indicator assesses the community's total taxing capacity and not the degree to which it has been used up. Finally, the sixth of the Guidance indicators is identical to one used by the bond rating firms, but is interpreted in an entirely opposite manner: Property Tax Collection Rate.

Exhibit 4 provides some detail in comparing each of the six Guidance indicators against specific counterpart measures used by the bond firms. Appendix C to this paper lists all of the much longer set of indicators evaluated by the bond rating firms and shows how the six Guidance indicators compare against the firms' full set.

Exhibit 4: Comparison of the Six Permittee Financial Capability Indicators Against Bond Firms' Measures

EPA Indicators and Description of Them	Corresponding Bond Agency Measure and Comments
Bond Rating. The rating assigned by S&P or Moody's to the permittee's most recently issued bond. A higher bond rating signifies greater permittee financial capability.	Bond Rating. Identical measure. But note that in the bond firms' approach, the bond rating is not a single indicator but instead the final summary judgment from combining all indicators. It is possible in EPA's approach for the judgment rendered by the bond rating indicator to be outweighed by whatever conclusions are drawn from the other five indicators.
Overall Net Debt as a Percent of Full Market Property Value. Shows the extent to which the community has already borrowed relative to its property tax base. A lower value signifies greater financial capability.	Overall Net Debt as a Percent of Full Market Property Value. Identical measure, used in the same manner.
Unemployment Rate. The community's unemployment rate is compared with the national average. A local unemployment rate more than 1 percentage point below the national average signifies strong financial capability.	Unemployment Rate. Used (among many others) as a general measure of the economic health and thus financial capability of the community. However, the bond rating firms focus more on the absolute level and trend of the local unemployment rate rather than its relationship to the national average. Thus, for example, if the community's unemployment rate was 10 percent and the national average was 12 percent, the bond firms would view this as evidence of weak financial capability whereas the Guidance would view it as strong financial capability.
Median Household Income. The community's MHI is compared with the national average. A local MHI more than 25 percent above the national average MHI signifies strong financial capability. (Note that there is no accounting here for cost of living differentials. A community's MHI may be above the national average, but this apparent strength could be more than outweighed by a local cost of living higher than the national average.)	Median Household Income. Used (among many others) as a general measure of the economic health and thus financial capability of the community. However, as for Unemployment Rate, the bond rating firms focus more on the absolute level and trend of MHI rather than its relationship to the national average.
Property Tax Revenues as a Percent of Full Market Property Value. A measure of the taxes collected by the community relative to its property tax base, indicating how heavily taxed the community already is. A lower value signifies potentially untapped taxing capacity and greater financial capability.	Full Market Property Value Per Capita. A somewhat similar measure to EPA's. A higher value signifies greater taxing capacity, greater economic strength, and greater financial capability. This indicator used by the bond firms measures how much taxing capacity the community ultimately has, without regard to whether it has already been used or not; the EPA indicator measures the extent to which the community's taxing capacity has already been used up.
Property Tax Collection Rate. A measure of the amount of taxes collected by the community relative to the amount of taxes assessed, indicating how successful the community is in collecting the taxes it has levied. A higher value is taken as a sign that taxpayers are not objecting to what they are asked to pay; hence they can perhaps pay more, signifying greater financial capability.	Property Tax Collection Rate. The identical measure to EPA's. However, it is used and interpreted in a different manner. The bond firms interpret the tax collection rate as a measure of the quality of the community's financial management. A higher collection rate signifies better financial management and greater financial capability; such a community is rewarded for good management with a higher bond rating. Note that good financial management is rewarded in the bond firms' scheme; but in EPA's approach good management means greater financial capability and the community will be penalized by being asked to complete its CSO projects sooner.

The difference in how bond rating is treated represents a significant contrast between the Guidance approach and S&P/Moody's. In the Guidance, the bond rating is only one of six indicators that go into assessing the community's financial capability. It is possible under the Guidance that for some particular community the bond rating could suggest one judgment about financial capability while the other five indicators point in the opposite direction. The Guidance would conclude in this case that the community has a financial capability opposite to what the bond rating would suggest. This cannot happen in the bond firms' approach, where the bond rating is the summary judgment resulting from considering all the financial indicators.

Another way to look at this issue is as a significant difference in how various indicators are weighted in arriving at a final judgment about the community's financial capability. The bond rating firms consider dozens of indicators and weight them in an undisclosed manner,[10] arriving at a summary judgment about the community's financial capability that is expressed as the community's bond rating. The Guidance instead assigns one-sixth weight to the bond rating (and thus, in effect, one-sixth weighting to the entire set of indicators considered by the bond firms), and assigns one-sixth weights also to each of five additional indicators. Each of these five additional Guidance indicators is either among the set of indicators considered by the bond firms, or related to one of the indicators considered by the bond firms. It is as if, assuming for the purposes of this discussion that the bond firms consider 40 indicators, the Guidance chooses five of these indicators, assigns a one-sixth weight to each, and then assigns the final one-sixth weight to whatever the bond firms conclude when they consider all 40 indicators. Compared with the bond firms' approach in which there is some sort of weighting scheme applied to all 40 indicators, the Guidance approach singles out 5 of the 40 indicators and drastically overweights them with a one-sixth weight each, leaving only a final one-sixth weight to be assigned to the result from the bond firms' consideration of all 40 indicators.

One might ask why the Guidance does not simply use the bond firms' Bond Rating as the sole indicator of a community's financial capability. This would seem to be the approach that best matches the analysis and conclusions of the bond rating firms. Under the Guidance, only a few of the bond firms' indicators are used and many others are not, resulting in what is potentially a very different weighting of indicators in determining the final FCA.

One answer to why the Guidance can not simply use the bond rating as the sole indicator of a community's financial capability is that some communities have never received a bond rating or have not received one recently enough so as to be representative of current conditions. Bond ratings are typically generated by a rating agency when a community or its utility is going to issue a bond. The underwriters for the bond issue will usually pay S&P or Moody's to develop the bond rating, which helps the underwriters and community price the bond and/or determine its coupon. Some communities, though, particularly small ones, have never gone through this process by issuing a bond and selling it into a market where a bond rating is needed.

This suggests perhaps a two-track approach to permittee FCA: (1) For permittees who have

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[10] Although Standard and Poor's and Moody's disclose the long list of factors they consider in developing a community's bond rating, they do not disclose the *formula* or weighting scheme or methodology by which they combine the various factors and arrive at a conclusion.

recently obtained a bond rating, that rating would be the sole FCA indicator; and (2) For permittees who have not recently obtained a bond rating, several indicators would be used that together replicate to the degree possible the approach used by the bond rating firms.

Standard and Poor's and Moody's use many more indicators than the five (excluding bond rating) that are included in the Guidance. Important areas that are evaluated by the bond rating firms that are not included among the six Permittee Financial Capability indicators include: trends in the indicators rather than simply a snapshot in time; utility rates (particularly trends in utility rates and rate sufficiency), a broader set of general indicators of community economic health (e.g., diversity of economic base, trends in building permits and retail sales, outlook for major employers), and quality of financial management.

4.3.2 Additional Shortcomings

The Permittee Financial Capability Indicators reflect the permittee's capability before whatever CSO investment is under consideration. S&P and Moody's, in contrast, assess financial capability after the impact of whatever bond issue is being considered. The Guidance Permittee Financial Capability Indicators do not account for whatever impact the CSO investment will have on the community's financial condition; S&P and Moody's *would* account for this. This is curious—in the Guidance, the Residential Indicator does take into account how large the CSO (and other future wastewater) investments will need to be, but the Permittee Financial Capability Indicators as they are currently written do not. A community will get the same Permittee Financial Capability Indicators scores whether the community is faced with massive CSO needs or minimal needs, but the same is not true for the Residential Indicator score. This appears to be a significant problem in how the Permittee Financial Capability Indicators are defined, at least in cases where the projected CSO investment is large enough to make some difference to the community's overall financial position.

The set of Permittee Financial Capability Indicators in the Guidance poses what we believe to be another significant issue regarding the quality of financial management by a community and its water utility. Ideally one would like any set of indicators to reward a community for good financial management, thus providing an incentive for improvement. Indeed, better management is one of EPA's *four pillars* of sustainable water infrastructure.[11] The bond rating firms' methods provide such positive incentive for better management: better scores on the firms' financial management indicators result in a better bond rating for the community. The indicators in the Guidance, though, insofar as they address the quality of the community's financial management (specifically the indicator involving the percentage of assessed taxes that are collected), go in exactly the opposite direction by rewarding (with lesser CSO obligations) a community that has poor financial management.

A final observation about the Permittee Financial Capability Indicators involves the benchmarks and scoring system. The specific benchmarks chosen to divide *strong* from *mid-range* from *weak* for each indicator and the manner in which the six indicators are combined into a single financial capability judgment (the point system and calculating the average score) represent an

[11] See <http://www.epa.gov/water/infrastructure/>

unexplained and uninvestigated "black box". We do not believe that EPA or anyone else has any idea how the choice of specific benchmarks for each indicator and the point system/averaging process affect the number of communities that are ultimately classified as financially *strong* vs. *mid-range* vs. *weak*. Does the benchmark chosen for each indicator result in roughly 1/3 of all communities getting classified as *strong*, as *mid-range* and as *weak*? No one knows. Perhaps the benchmarks for some indicator are established such that nearly all communities are classified in one or the other of the *strong*, *mid-range* or *weak* categories. If so, this indicator has little impact in discriminating across communities, but a disproportionate impact relative to other indicators in how many communities are ultimately classified (across all six indicators) as *strong*, *mid-range* or *weak*. What if the weights assigned to the scores for each of the six indicators were unequal rather than equal in an attempt to emphasize better indicators more than poorer ones (e.g., perhaps overweighting *bond rating*, which is clearly the single indicator that is closest to what the bond rating firms do)? No one knows the answers to such questions. Empirical research could illuminate this black box.

4.3.3 Assessment Conclusions

The following is our summary rating of the Permittee Financial Capability Indicators against the four evaluation criteria: consistency, efficiency, rationality, and transparency.

The Permittee Financial Capability Indicators: Assessment Relative to the Four Criteria

Consistency:	Fair. In contrast to the situation regarding the Residential Indicator, there has been very little controversy or uncertainty about how to calculate the Permittee Financial Capability Indicators. They are calculated and aggregated in a consistent manner by both EPA and permittees. On the other hand, there are important areas of inconsistency between the Guidance approach to financial capability assessment and the approach employed by bond rating firms.
Efficiency:	Poor. The set of six indicators appears substantially inferior to the much simpler approach of relying on *bond rating* as a single indicator; at least for those communities that have recently received a bond rating. The set of six indicators does not serve to encourage better financial management by communities and water utilities.
Rationality:	Poor. Though each of the chosen indicators is individually sensible and the indicators in combination are likely to yield results in the same general direction as the bond firms' procedures, there are some very important shortcomings in the Guidance approach relative to the bond firms. 1) The indicators evaluate financial capability without taking into account the magnitude of the needed CSO/wastewater financing and the degree to which it will "use up" some of the community's financing capability. 2) The indicators fail to reflect some key factors that the bond rating firms find important, including trends in the indicators, water utility rates, a broader set of community economic indicators, and quality of the community/utility financial management. 3) The indicators are combined into an overall financial capability judgment using different weights than the bond rating firms use. Finally, the quantitative impact of the indicators – what fraction of communities will end up classified as *strong* vs. *mid-range* vs. *weak* – is unknown and the impact of alternative approaches appears not to have been investigated.
Transparency:	Fair. The function that these indicators are intended to serve is clear, as are the steps by which the individual indicators are to be calculated and then combined. The rationale behind some of the particular indicator definitions is unclear however; why, for example are deviations from national averages used for the two socioeconomic indicators (unemployment rate and MHI) rather than absolute level and trend? Also both unexplained and unexamined are: 1) The choice of six particular indicators from among the many that might be used; 2) The choice of benchmarks for each of the six indicators; and 3) The weighting/scoring scheme for combining them into a summary judgment about the community's financial capability.

4.4 Establishing CSO Project Schedule Boundaries

This portion of the Guidance specifies how the schedule for completing the community's CSO projects is to be developed. Assessments made through the two sets of indicators about: (1) the financial impact of projected wastewater and CSO project costs on households in the community; and (2) the community's ability to finance the CSO project costs; are combined into an overall judgment about the community's financial capability and the burden the CSO project will pose for the community. A project that poses a *low* burden is expected to be completed as rapidly as a normal engineering and construction schedule allows. A project that poses a *medium* burden will be given a schedule allowing for up to 10 years for completion. A CSO project that poses a *high* burden will be given up to 15 years, though in unusual *high-burden* situations an implementation schedule of up to 20 years may be negotiated with state NPDES and EPA authorities.

This portion of the Guidance reflects several policy decisions that EPA has made and that are not within the appropriate scope of what we address in this technical assessment. EPA has decided that the discretion of enforcement authorities in establishing deadlines for completion of necessary CSO projects should be somewhat constrained—the Guidance indicates that financial capability should be considered along with several other factors (e.g., the need to protect critical areas and address significant use impairments promptly) in setting a schedule and has provided rough boundaries for what the schedule might be given different levels of financial capability. An overall assessment of this portion of the Guidance would depend on: (1) how broad one thought enforcement discretion should be in this area; (2) the degree to which one believes financial capability should play a role in establishing the project schedule; and (3) how long one is willing to allow for completion of a community's CSO responsibilities and how much delay can be tolerated in realization of the benefits from these investments. We will not address these policy issues and will instead assess this portion of the Guidance against our four technical criteria.

Processes where enforcement discretion plays a significant role by their nature tend to be inconsistent and non-transparent. The outcomes of enforcement processes often differ from case to case, for reasons that are not readily apparent. Two communities of similar financial capability posing similar environmental problems and needing similar control measures may nevertheless be given quite different enforcement responses, for reasons ranging from whether the enforcement agency believes the community has or has not been making a good faith compliance effort to variations over time in what the enforcement agency's priorities are. Enforcement outcomes from community to community are frequently different (inconsistent) and rarely fully explained (non-transparent). In this context, we would be inclined to give relatively high marks to any guidance such as this one that specifies in more detail (while still leaving substantial discretion) how enforcement decisions are supposed to weigh various factors and that limits the range of possible outcomes.

The schedule boundaries portion of the Guidance has succeeded in consistently holding the schedules that have been established for completing CSO projects to a maximum of 20 years.[12] At

[12] As far as we know, no CSO community has yet explicitly been given a project implementation schedule extending beyond 20 years. However, several CSO and/or SSO settlements have involved a community being

the other boundary, it makes sense that a community, even one with high financial capability and a CSO project that poses low burden, should be required to implement the project no more rapidly than on a normal engineering and construction schedule (subject also to the requirement that discharge to sensitive areas and impaired waters should be addressed on a high priority basis). In other respects, the CSO project schedule outcomes that have resulted from this Guidance do not appear so consistent. There are some cases where the community has been given a schedule that is more lenient than what the financial capability matrix would suggest (e.g., Indianapolis appears fairly clearly to face a *medium burden* according to the matrix, yet it was given a 20-year schedule as if it were *high burden*). And, among the *high-burden* communities, there has been a strong tendency to allow a 20-year schedule rather than the 15-year figure despite the Guidance prescription that 20 years be allowed only in "unusually high burden situations."

In terms of process efficiency, this part of the Guidance succeeds in organizing an intrinsically complex set of financial capability considerations into a streamlined process for setting schedule boundaries. It is thus procedurally efficient in helping enforcement authorities and stakeholders arrive in a relatively smooth manner at an otherwise likely difficult decision about the CSO project schedule. However, in terms of outcome efficiency—whether this portion of the Guidance tends to yield desirable social outcomes—we give a different assessment. The matrix and schedule determination procedure will result in those communities judged by the indicators as less financially capable being allowed more time to implement their CSO projects. While this overall structure for the schedule-setting process would be both equitable and desirable if the indicators served accurately to identify the communities that really are less financially capable, we believe that the indicators render judgments that are quite often inaccurate. The schedule-setting process does not appear to us to identify consistently the communities most warranting schedule relief, it is thus not efficient in achieving desirable social outcomes.

In terms of rationality, this portion of the Guidance presents a mixed picture. The Guidance appropriately focuses on both household affordability and the permittee's financial capability as the two key dimensions of financial capability more generally. A community may well be in a different condition with respect to these two different dimensions (i.e., the community may be fiscally sound and easily able to take on new debt at the same time as its households would have difficulty affording projected wastewater and CSO costs; or vice versa) and it is important that the Guidance and the process of establishing a schedule recognize both of these dimensions.

On the other hand, there is no empirical rationale offered for any of the specific quantitative elements of this portion of the Guidance. Why should a *high-burden* community be allowed a maximum of 20 years to implement CSO controls, as opposed to, say, 50 years, or perhaps only 10 years? Why should a *medium-burden* community, presumably thus a community of average financial capability, be given any more time to complete its necessary CSO projects than a normal engineering and construction schedule would require? Perhaps relief in the form of a

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required to invest a specified amount of funds by a future date, with an expectation that this level of project investment will suffice for attainment of water quality standards. If standards are not attained, the settlement is to be reopened and further investment will likely be necessary. Such a settlement could, if standards were not attained with the initial investment and if the subsequent necessary projects stretched out beyond 20 years, be regarded as potentially exceeding the maximum schedule flexibility allowed by the Guidance.

CSO project schedule that is stretched-out beyond a normal engineering and construction timetable should be made available only on an exceptions basis—only to communities that are particularly financially stressed, and not to the average community. We do not presume here either to answer such questions or to judge the appropriateness of how EPA has answered them in the Guidance; instead our point is only that the Guidance appears irrational or less rational to the extent that there is no indication why EPA has answered these questions as the Agency has. A highly rational guidance will offer conceptually and empirically sound justifications for the key decisions that it reflects.

Another element of rationality when applied to a guidance is that there be some understanding of the impact of applying the guidance. Here again this portion of the Guidance is lacking. We do not believe that EPA has a quantitative understanding regarding the fraction of communities that will get put into the *high-burden, medium-burden* and *low-burden* categories as a result of the particular way the Agency has structured the two sets of indicators and the matrix combining them. Will each of the three burden categories comprise roughly a third of all CSO communities, or does the FCA procedure tend to put most communities into a particular one of the three categories? No one knows, and a Guidance with such uncertain and unexamined impacts cannot appear particularly rational.

4.4.1 Assessment Conclusions

The following is our summary rating of the overall process for setting schedule boundaries against the four evaluation criteria: consistency, efficiency, rationality, and transparency.

The Process for Establishing CSO Project Schedule Boundaries: Assessment Relative to the Four Criteria

Consistency:	Fair. The suggested approach for setting schedule boundaries brings more consistency to an activity that can be very inconsistent as a matter of enforcement discretion. There are some elements of inconsistency, though, in that the schedules set for some communities are different from what the indicator values would suggest, and communities seem to be given 20-year schedules more often than in only "unusually high burden situations".
Efficiency:	Fair. This portion of the Guidance is procedurally efficient in telescoping an otherwise likely complex decision process into a straightforward matrix and set of decision rules. However, because of shortcomings in the indicators, the schedule-setting process does not appear to identify consistently the communities most warranting schedule relief, and hence it is not efficient in achieving desirable social outcomes.
Rationality:	Fair. The schedule-setting process is rational in its broad outline – it involves a seemingly reasonable way of combining two importantly different indicators of financial capability. However, there is no empirical rationale offered for any of the specific elements of this portion of the Guidance, and EPA has little quantitative idea what the impact in practice might be of this or alternative approaches to establishing schedule boundaries
Transparency:	Good. The suggested approach similarly brings more transparency to what is often a closed, unexplained process for setting schedule requirements in an enforcement context. The formula and matrix for combining the indicators and determining schedule boundaries are clear, but not explained.

4.5 Summary Assessment of the Guidance as a Whole

We conclude with an assessment of the Guidance as a whole—the Residential Indicator, the Permittee Financial Capability Indicators, and the process for combining the indicators and establishing boundaries for the CSO project schedule—relative to the four criteria.

The overall structure of the Guidance seems both rational and procedurally efficient. Two important and somewhat different perspectives on financial capability (household affordability and community credit-worthiness) are assessed and combined into a unified judgment on the burden the permittee/community will face in undertaking the CSO project. This judgment is then used to inform the schedule under which the CSO project is to be performed, such that communities with lesser financial capability will generally be allowed a longer period to complete the project. This Guidance process is procedurally efficient in the sense that it organizes into a modest set of calculations a schedule-setting process that otherwise would likely be complex, highly contentious and difficult. The Guidance also promises to offer the benefits of increased consistency and transparency, in substituting a more clearly defined process for schedule-setting for the often inconsistent, unexplained outcomes that arise from leaving this task to enforcement discretion.

Although the overall approach embodied in the Guidance could thus score well in terms of the four criteria, we believe there are serious problems inherent in both of the two sets of financial capability indicators through which the overall approach is implemented. Both sets of indicators are faulty. In our view, neither set captures accurately the fundamental aspect of financial capability that it is intended to reflect. As a result, notwithstanding the sound overall thrust of the Guidance, we believe the results from applying the particular chosen indicators are generally inconsistent, non-transparent, irrational and inefficient.

The Residential Indicator is intended to reflect the degree to which the eventual total wastewater treatment plus CSO costs are affordable for households in the community. The specific indicator that has been chosen appears to us to be logically inconsistent, in that it will often render an assessment that the CSO project costs are generally affordable for households in the community based on comparison with MHI, despite the fact that these costs are nevertheless clearly not affordable for a large lower income segment in the community. Another problem is that the Residential Indicator has been calculated in a highly inconsistent manner from community to community and by EPA/DOJ in contrast to permittees. There is also no rationale apparent for the choice of the 1 percent and 2 percent of MHI benchmarks dividing *low* from *mid-range* from *high* financial impacts. The SAB has recommended against use of a similar indicator in a drinking water context.

The set of six Permittee Financial Capability Indicators is intended to represent the permittee's ability to finance the CSO project costs. The financial capability judgment that EPA seeks to make here is identical to the judgment that bond rating firms such as Standard and Poor's and Moody's make about the likelihood that a community will be able successfully to pay the interest and repay the principal after borrowing funds. If the bond rating firms' approach represents the state-of-the-art in FCA, we find some important respects in which the six Financial Capability Indicators fall short. In contrast to the bond rating firms' approach, the six indicators established by the Guidance:

- Involve important differences in definition, interpretation or usage relative to the nearest parallel indicators used by the bond firms;

- Evaluate financial capability without taking into account the magnitude of the wastewater/CSO financing and degree to which it will "use up" some of the community's financing capability;

- Fail to reflect some key factors that the bond rating firms find important, including trends in the indicators, water utility rates, a broader set of community economic indicators, and financial management quality;

- Are combined into an overall financial capability judgment by using different weights than the bond rating firms use; and

- Do not serve to encourage good financial management by communities.

The result is that the six indicators established by the Guidance offer an overall FCA for a community that likely correlates only roughly with what the bond rating firms would conclude, with unpredictable and sometimes important inconsistencies. The inconsistency would be particularly significant when the magnitude of the financing necessary to meet future wastewater treatment and CSO requirements is sufficiently large to affect the community's overall capacity to issue debt.

Two final observations about the FCA process established by the Guidance involve the relationship between this Guidance and the parallel process and set of indicators used in assessing a community's financial capability when considering whether there can be a variance from or change to water quality standards. The Guidance addresses the schedule under which CSO projects will be implemented, while the water quality standards economic guidance addresses the standards themselves and, in effect, the intensity of the CSO control projects that must be implemented to attain the standards. We believe it is important that the two FCA processes for these closely related parts of the water program remain consistent. Any changes to one of these two sets of financial capability indicators should probably be matched with similar changes in the other.

Second, we believe the two FCA processes share a common shortcoming. One of the major tests of the efficiency of a program or guidance is the degree to which it yields economically efficient outcomes—do the aggregated benefits to all those affected by the policy or guidance exceed the aggregated costs, and is this excess of social benefits over social costs maximized? Neither of these two FCA guidances includes provisions to pursue this form of efficiency. Neither, for example, includes any sort of provision that the water quality standards, CSO projects, or schedules be examined using benefit-cost analysis in an attempt to ensure that they are economically efficient. NACWA makes this point in their critique of the Guidance:

> Another limitation in EPA's FCA approach is the omission of benefit-cost analysis. In the early 1970s when the CWA was being debated, the basic concern that no community or region should obtain unfair economic advantage was ameliorated by the technology requirements of the Act that

> every clean water agency and every city must provide secondary treatment. With the change in focus from treatment plants to collection systems and on attaining specific water quality standards in specific water bodies, there is no longer meaning to the notion that all communities can and will benefit equally from investments in CWA compliance. Benefit-cost analyses of investments in water quality improvements, in conjunction with FCAs, may help to ensure that water quality expenditures are appropriately evaluated and prioritized based on economic merit. (CH2MHill, 2005, page 11)

Several of EPA's other CSO guidance documents (e.g., the guidance documents for LTCPs [USEPA 1995b] and for permit writers [USEPA 1995c]) clearly suggest use of benefits analysis and benefit-cost analysis in the cost-to-performance comparisons that are made in deciding which CSO projects to include in a community's LTCP.[13] The other CSO guidance documents are silent on whether benefits analysis or benefit-cost analysis are to have any role in scheduling CSO projects. It seems that there is nothing to preclude EPA from somehow including benefits analysis or benefit-cost analysis in the Agency's FCA procedure, if the Agency wished to do so.

4.5.1 Assessment Conclusions

The following is our summary rating of the entire Guidance against the four evaluation criteria: consistency, efficiency, rationality, and transparency.

Exhibit 5: Summary Rankings of the Component Parts of the Guidance Against the 4 Criteria

	Consistency	Efficiency	Rationality	Transparency
Residential Indicator	Poor	Poor	Poor	Fair
Permittee Financial Capability Indicators	Fair	Poor	Poor	Fair
Establishing CSO schedule boundaries	Fair	Fair	Fair	Good
Overall	Poor	Poor	Poor	Fair

Note that our overall rankings for the Guidance are not obtained by averaging the rankings for the component parts. Instead, we believe that a "weakest link in the chain" analogy is apt. The outcomes from application of the Guidance depend jointly on the accuracy of the two sets of indicators and the method by which these two judgments are combined in establishing schedule expectations. Although the process for establishing the CSO schedule boundaries appears structurally sound, the inaccurate and/or erratic nature of the two sets of indicators used in this process make the outcomes from applying the Guidance generally inconsistent, inefficient and irrational.

The following table elaborates on this overall assessment.

[13] For example, the CSO Guidance for LTCP (USEPA 1995b) seems to suggest something like benefit-cost analysis as a requirement for communities that choose the "demonstration approach" to attaining water quality standards. "Under the demonstration approach, the municipality would be required to successfully demonstrate compliance with each of the following criteria: … iii. the planned control program will provide the maximum pollution reduction benefits reasonably attainable…" The CSO Guidance for Permit Writers (USEPA 1995c) defines the term "reasonably attainable" as referring to the "cost of implementing the planned control program in relation to the pollution reduction benefit achieved."

The Guidance as a Whole:
Assessment Relative to the Four Criteria

Consistency:	Poor. There is little consistency in how the Residential Indicator is calculated from community to community and by permittees vs. by EPA. Parties commonly "game" the process. This indicator also appears logically inconsistent in not considering impacts on the poorest households in a community when providing a judgment about the entire community's financial capability. The set of six Permittee Financial Capability Indicators is inconsistent in some important ways with the time-tested procedures used by bond rating firms in assessing a community's financial capability.
Efficiency:	Poor. This Guidance appears procedurally efficient in telescoping an otherwise likely complex decision process into a relatively small and streamlined set of calculations. It appears, though, that using the bond rating alone (when a bond rating exists) would be even more efficient than the Permittee Financial Capability portion of the Guidance process. More importantly, we do not believe that this relatively efficient calculation process consistently generates an accurate answer about many communities' overall financial capability. The Guidance thus does not effectively meet its equity goal of identifying the communities most in need of schedule relief. The Guidance is concerned only with this equity goal; it includes no provisions that move toward economic efficiency by subjecting decisions on water quality standards, CSO projects, and/or schedules to examination with regard to whether benefits are likely to exceed costs. It also does nothing to encourage better financial management by communities and their water utilities.
Rationality:	Poor. Although the FCA process is designed broadly to identify less financially capable communities and potentially offer them some schedule relief, the two sets of indicators fail to render an accurate, reliable judgment about the level of financial capability that a community has. Many communities are likely mis-classified as to whether their CSO projects pose a *low*, *medium* or *high* burden. No rationale is available for why particular indicators and thresholds have been chosen (e.g., why 2% of income as the threshold for *high* financial impact on a household), and there is no empirical understanding of how the chosen set of indicators, thresholds and matrices affects CSO project schedules relative to possible alternative indicator/calculation procedures.
Transparency:	Fair. The Guidance brings much more transparency to what would otherwise usually be a closed, unexplained process for setting schedule requirements in an enforcement context. The Guidance is unclear, however, in several aspects of how the indicator calculations are to be performed and in why the various thresholds and ways of weighting and combining different measures have been chosen.

5.0 Closing Comments on the Scope and Role of the Guidance

In our view, many of the criticisms by CSO communities of the Guidance are a result of the narrow scope of the Guidance relative to the broader range of concerns that communities have regarding their CSO programs. Several frequent concerns not addressed in the Guidance include:

- Whether it is feasible and realistic for the community to develop a pricing system with targeted subsidies and progressive rates that would make the expected increased wastewater costs affordable for all households in the community, including low income households in particular;

- Whether the benefits of the CSO program appear to exceed its costs, and whether the

benefits can be made sufficiently apparent to community residents to win their support for the necessary investments; and

- Whether it is advisable to invest the sums required for the CSO program in view of competing priorities and competing demands for the community's financial capital.

In failing to systematically address these issues, the Guidance may be even more inconsistent, inefficient, irrational, and nontransparent than the previous assessment concludes.[14] In particular, it may fail to do what good guidance should do – facilitate the decision-making process, and ensure that the outcomes are desirable.

When the scope of a guidance is significantly narrower than the set of concerns the parties bring to the table, one must ask what impact the selected, limited set of decision criteria has on outcomes. In terms of the implementation schedules established pursuant to the Guidance, does shining the light on only a subset of the relevant issues cause schedules to be longer or shorter? Are communities treated equitably? What impact does the limited set of decision criteria have on water quality, public health and, more generally, social welfare? It is not clear.

In our view, the mismatch between the scope of the Guidance and the concerns of communities lies largely in the Guidance's emphasis on *financial capability* and its relative disregard for *affordability*. Within the context of this Guidance, these terms have very specific connotations. *Affordability* refers to the household and whether it is fair and appropriate to impose a financial burden on it. *Financial capability* refers to the community and whether it has the financial wherewithal to ensure that the debt and interest are paid back.

While language often has nuanced interpretations when applied in different settings, the specific use of the terms here conveniently corresponds to the two dimensions of the *demand* concept used in economic analysis. The first dimension – willingness to pay (WTP) – reflects the preferences of economic actors among alternative choices, while the second dimension – ability to pay (ATP) – reflects the limits imposed on the pursuit of these preferences by income and wealth (i.e., budget) constraints.

In the Guidance, the financial capability concept, and thus the ATP concept, seems to dominate the choice of indicators and the implementation schedule boundaries derived from the analysis. To a limited extent, the affordability concept is accounted for in the Residential Indicator in the equity judgment determined by the burden-level thresholds for the cost-to-MHI ratio, but this is only a portion of the WTP concept. Importantly, this expression of WTP does *not* reflect the preferences of, and direct benefits to, the community incurring the costs. Instead, it reflects the interests and judgment of the external community (e.g., the national interest in each community

[14] One might argue that the Guidance allows for the introduction of such issues, since the Guidance states: "Since flexibility is an important aspect of the CSO Policy, permittees are encouraged to submit any additional documentation that would create a more accurate and complete picture of their financial capability." However, despite this invitation, we believe that submittal of information on issues such as these that are unanticipated by the Guidance would meet with little success. Given the cost and uncertainties associated with producing information on these issues without standardized methods, and the lack of any clear indication of how such information would be factored into CSO project implementation schedule decisions, it is not surprising that communities rarely choose to develop and submit this sort of information.

providing sufficient wastewater treatment to meet minimum standards and avoid a "race-to-the-bottom" competition among jurisdictions, and perhaps also some national interest in the community treating its wastewater in order to provide option and/or existence values for the external community). The Guidance neither requests information on the community's *own* private returns (benefits less explicit and implicit costs) from CSO control investments, nor does it indicate that such information should play any role in decisions about the schedule or selection of CSO investments.

WTP and affordability are also inadequately reflected in the Residential Indicator since: (1) the indicator benchmarks (1 percent and 2 percent of MHI) have not been established in any rational way that reflects consideration of what is foregone when wastewater spending approaches these benchmarks; and (2) the indicator is defined in a manner that likely misses affordability impacts on the lower income segment of the community.

The implication here is that the Guidance fails to fully account for WTP issues, which have become increasingly important to communities as the cost of CSO investments has grown and competing demands for communities' limited financial resources have intensified. Thus, it is easy to predict that the approach adopted by the Guidance leads to increasing conflict between communities and enforcement officials as implementation burdens grow.

It is also easy to see how such an incomplete analysis creates at least the perception of unfairness and inefficiency. While the *costs* of most CSO projects are borne largely by the CSO community (except for the share provided by Federal and state financial assistance), many of the *benefits* accrue to others outside the community, including downstream water users and, to some degree, the nation as a whole (e.g., through existence and option values). From the community's standpoint, these *external benefits* may seem unimportant compared to the returns from other investment alternatives (e.g., schools, roads), contributing to the perception that CSO controls are unaffordable. In this case, it may be that the economic rationale only becomes apparent when viewed more holistically – when a community clearly understands that it is part of a spatially interdependent system where communities systematically create benefits for each other (e.g., investments by upstream communities create benefits for downstream communities). In these cases, community officials may be better able to justify CSO projects to local constituents if they have benefits information – both in terms of their own returns, and the returns to others.

We suspect that the mismatch in scope between the Guidance and the concerns that communities express in actual CSO negotiations has grown over the decade since the Guidance was issued. Put into a historical context, we suspect that the external nature of CSO project benefits – with benefits of a local project accruing substantially to others outside of the local area – may have been less problematic a decade or two ago. At that time, municipal wastewater control spending was largely for the purpose of implementing secondary treatment, a uniform national goal in which communities willingly participated. Now, though, with this basic goal largely attained, additional costly CSO control obligations may seem inequitable and an unshared burden to the communities that face them. Furthermore, we are in a time when the nation increasingly demands performance and demonstrated benefits from public expenditures, implying that investments for CSO controls and water quality improvement must compete and be justified against alternative possible public investments in education, transportation, social services and

other priorities.

In this context, the scope of the Guidance seems quite narrow. The Guidance focuses almost exclusively on the ATP dimension of demand, and in so doing, ignores many of the most important WTP concerns that communities bring to the negotiating table.

A fundamental question, then, is whether the Guidance should take a broader view of demand and account for both the WTP and ATP dimensions. This is a complex question. If faced with a similar disconnect between the scope of their analyses and the needs of their clients, bond-rating firms would likely face strong incentives to adapt to changes in the marketplace and modify their methods to stay competitive. We will speculate about how this public sector guidance might likewise adapt to changes in its "marketplace."

On the one hand, using our evaluation criteria, there appears to be an opportunity to increase the consistency, efficiency, rationality and transparency of the Guidance by incorporating issues of critical importance to communities—such as (1) estimates of the benefits of CSO and other wastewater investments to the community and to others (e.g., downstream communities); (2) estimates of the opportunity costs of the investment capital that the community is asked to provide; and (3) an assessment of the likelihood in practice that wastewater costs can be distributed within the community in a manner that is affordable for low income households. Given that a fundamental role of government guidance is to facilitate the standardization and adoption of best practices, an expanded Guidance may be desirable.

On the other hand, expanding the scope of the Guidance to address these issues would require careful consideration of the mechanisms for doing so. For example, if the Guidance were to call for quantitative analysis on the benefits and opportunity costs of CSO projects, there would seemingly be a need to develop standardized methods and modeling systems that could be widely distributed (e.g., over the internet) and used by communities to support these analytical requirements. Otherwise, computational questions and uncertainties could create an even greater opportunity than already exists to make errors or game the process in pursuit of narrow strategic interests.

Similarly, careful consideration would be needed if the scope of the Guidance were to be expanded to address mitigation of any low income affordability problems through targeted subsidies or other means. A key question here would be whether an expanded Guidance would simply provide a better, more accurate metric for *calculating* household affordability, or might it also provide *incentives to mitigate* household affordability problems when they pose an impediment to implementation of a community's LTCP?

We believe this question fundamentally affects whether the Guidance meets several of our four evaluation criteria. This question involves the relationship between the Guidance and the behavioral response it induces. Ideally, the Guidance would not only provide a method of calculating metrics of household affordability and community financial capability, but it would also establish incentives that encourage efficient and rational outcomes (as noted in our evaluation criteria). To do this, the Guidance would address and mitigate three *reciprocal*

externality problems that all relate to the broader issues described here (benefits, opportunity costs, and targeted subsidies to address low income affordability concerns).

The problem of reciprocal externalities was first identified by the Nobel Prize winning economist, Ronald Coase in 1960 (Coase 1960). To illustrate its nature, consider an example in which two college students live in adjacent rooms in a residence hall, and one student, Loud, likes to play loud music, while the other student, Quiet, prefers peace and quiet. The reciprocal externality concept pertains to the harm each student can impose on the other. Thus, when Loud plays his music, Loud imposes an external cost on Quiet. Similarly, when Quiet complains to the dorm master who then prevents Loud from playing loud music, Quiet imposes an external cost on Loud, who must forego the benefits of listening to loud music.

To mitigate such a reciprocal externality problem, some arrangement must exist such that each party recognizes the disutility that their action may cause for the other party. This recognition of impacts beyond oneself is known as "internalizing" the externality. Coase describes the general conditions that would allow the two parties to negotiate an acceptable outcome that is efficient. Applied to the problem facing the two students, these conditions state that, in the absence of transaction costs, the extent to which Loud is able to play his music loudly can be negotiated satisfactorily and an efficient outcome can be reached if the baseline rights are well-defined, transferable, and enforceable. Negotiations can lead to an efficient outcome whether Loud has the right to play his music (in which case Quiet must compensate him not to) or Quiet has the right to quiet (in which case Loud must compensate Quiet in order for Quiet to allow him to play his music). As anyone who has faced a similar situation knows, the real world is rarely so idealistic, as transaction costs are usually present, and rights are often poorly defined, not easily transferred, and not well enforced. Coase, in fact, points this out. Coase argues that in cases where reallocating these rights is difficult because such impediments prevent effective negotiations, achieving an efficient outcome requires having the baseline property rights allocated correctly in the first place (to the highest valued user).

Now, how does this relate to the Guidance? We see three sets of reciprocal externalities that many communities must address in establishing their CSO control program, yet which the Guidance does not recognize. The three sets of reciprocal externalities are: (1) between the community in general and any lower income subgroup in the community that has difficulty affording the wastewater plus CSO costs; (2) between the community and downstream communities that will benefit from better water quality if CSOs are controlled; and (3) between those in the community that would benefit from CSO controls and those who would benefit from alternative investments (e.g., in schools, in transportation). We will describe each of these three reciprocal externalities in more detail and then examine them in light of Coase's conditions – how are the baseline property rights allocated, and are they well-defined, transferable, and enforceable.

Consider first the relationship between a community and its low income subgroup. Assume that the community as a whole wants to achieve "high" water quality, but the low income subgroup can only afford to pay for "low" water quality. On the one hand, if the community sets the water quality goal as "high" and forces the low income subgroup to pay its share, then the community harms the low income subgroup by requiring that it devote a disproportionately large fraction of

its income toward meeting water quality goals. The harm manifests in the form of reduced consumption by the low income subgroup of other goods and services, including necessities such as food, shelter, clothing, and health care that exceed the reach of low income budgets. On the other hand, if the community sets the water quality goal as "low" to prevent harming the low income subgroup, the community is effectively harmed by the low income subgroup, since it must forego the beneficial impacts of the desired higher water quality goal.

The Coasian solution to this problem is straightforward if the ideal conditions exist (no transaction costs and well-defined, transferable, and enforceable property rights). Negotiation between the parties would lead to an efficient water quality goal that reflects the relative harm done by the reciprocal externalities. Unfortunately, this is not the case in practice, as it is often the case that baseline property rights (or, inversely, liabilities) are often not well-defined, transferable and enforceable, and transaction costs are often high enough to make negotiation difficult.

As applied to the Guidance, these questions highlight structural problems of the broader setting in which the Guidance operates. First, baseline rights or liabilities are often not well-defined. Even for communities with LTCPs, it is often the case that the set of needed controls is described in general terms, leaving sufficient ambiguity and/or substitutability between projects such that the baseline for negotiations is highly flexible. Second, the parties are often poorly informed about important aspects of possible solutions, including the expected benefits (e.g., local, downstream/regional, national) from the controls and the opportunity costs of the investment capital. Third, it is difficult to imagine how a low income subgroup could compensate the rest of the community for its inability to afford the cost of new wet weather controls. Thus, imposing excessive liabilities on the low income subgroup is functionally impractical (setting aside any environmental justice concerns). And fourth, the cost of negotiation is not inconsequential, implying that allocating baseline rights efficiently may be the only way to ensure an efficient outcome, since reallocation of those rights may not be economically feasible.

Thus, when the efficient water quality goal is “high”, a strategy to mitigate the reciprocal externality problem could involve an *intra-community transfer payment* (i.e., targeted subsidy[15]) from the remainder of the community to the low income subgroup. The cost to the low income subgroup of the community meeting the “high” water quality goal would then be their wastewater charges less the amount of the subsidy. Although the sewer use charges alone would be unaffordable for the low income subgroup, the subsidy would be large enough so that the charges less the subsidy would be affordable. For the remainder of the community, the cost of “high” water quality would be the sum of their water charges plus the cost of the subsidy, a total that would still be small enough to be affordable because of the higher income profile of this group.

A revised Guidance might contribute to this sort of solution to a low income affordability problem by: (1) calling for an analysis of household-level impacts that will accurately identify an

[15] Note that we suggest a subsidy or transfer payment rather than reducing the wastewater rate that the low income subgroup pays. Reducing the rate that some households pay for wastewater service or water use can have undesirable incentive effects, such as encouraging wasteful use of water. A lump sum subsidy or transfer payment can resolve the affordability problem without affecting existing price-related incentives.

affordability problem when it is likely in a community; and (2) providing to any community where the CSO investment does pose a low-income affordability problem some incentive to resolve the problem in the manner we are suggesting. Regarding the second of these two steps, the Agency has already supported the development of several approaches to mitigating low-income affordability problems (e.g., EFAB 2006, USEPA 2002), and could do more. It could be useful also to think about the specific incentive(s) that the Guidance could offer to communities to resolve these problems. The Guidance already discusses some very limited circumstances under which a community's investigation of sewer use fees and other viable funding mechanisms can affect the schedule for implementation of CSO controls (page 47); perhaps this set of circumstances could be expanded.

Next, consider the second reciprocal externality, involving the relationship each community has with other communities. For illustrative purposes, let community A be the community that is faced with CSO liabilities, and let community B be a second community (e.g., downstream) that realizes benefits from community A's CSO investments. If community A makes CSO investments, it incurs costs and receives benefits, while community B simply receives benefits. For illustrative purposes, assume that community A's costs are greater than its benefits, but less than the benefits of the two communities combined. From community A's standpoint, investing in CSO controls is inefficient. Only when viewed holistically (i.e., for both communities) is investment efficient.

The nature of the reciprocal externality problem can now be defined with respect to baseline property rights. If community B has a right to clean water and can force community A to invest so as to provide it, then community B imposes an external cost on community A in the form of excessive expenditure, since the private return to A is negative. Alternatively, if community A has a right to invest only when its private returns are positive, then given the assumed negative private returns, its failure to invest in CSO controls imposes an external cost on community B in the form of foregone benefits.

A Coasian solution to this problem depends on the baseline rights between the two communities and hinges importantly on their ability to negotiate a settlement. If community B is entitled to clean water and to the benefits created by community A's CSO investments, community A must invest in the CSO controls even if it is privately inefficient. Alternatively, if community A is only liable for investments that are privately efficient, it may be necessary for community B to make an *intercommunity transfer payment* to community A to subsidize community A's investment.

The current situation is akin to the first of these hypotheticals, where community A must invest in CSO controls so as to meet water quality standards, and the downstream community B is entitled to clean water without needing to make any transfer payment in order to have it. Community A, though, is dissatisfied and may not want to invest in the CSO controls: even though the total benefits of A's investment exceed A's costs, some of the benefits accrue to community B, and the benefits specifically to A may be less than A's costs. Community A will be displeased with the Guidance. The Guidance allows community A some schedule flexibility if the community is not *able* to pay (ATP) for the CSO investment, but the Guidance does not recognize the fact that community A is not *willing* to pay (WTP) for the CSO controls.

Is there a way the Guidance could be modified to rectify this situation and provide community A with an incentive to make the CSO investment when total benefits to A and B exceed A's costs, even though A's private benefits are less than A's costs? Yes, if the Guidance were somehow able to leverage a subsidy for A in recognition of the downstream benefits resulting from A's investment. Perhaps the Guidance could be modified to: (1) require some analysis that identifies the pattern of costs and benefits that would result from the community's investment in CSO controls; and (2) direct some subsidy to A when the downstream benefits of the CSO controls are substantial and A would otherwise not want to make the investment. There is some possibility that these two changes could be implemented. The first is certainly feasible: methods exist for this benefit-cost comparison, and this sort of analysis is being employed more frequently to support performance-based budgeting and environmental trading schemes. Regarding the second change, the existing Federal and state wastewater treatment subsidy programs (e.g., SRF) could perhaps be directed to some degree in this manner. The transfer payment that would subsidize community A in recognition of the externality might derive from the Federal and state governments rather than the downstream communities.

Finally, consider the third reciprocal externality problem that a CSO community may face involving its CSO investments relative to other ("non-CSO") investments. In this case, the nature of the externality problem pertains to the subgroups within the community who are affected by the two sets of investments. Assuming that a finite pool of community resources is available for public investments, investing in one category pulls resources from the other category, imposing an external cost in the form of foregone benefits associated with the foregone investment. Setting aside the implications for external communities, the privately efficient outcome for the community will involve finding the right balance between the two investment categories, as well as ensuring that each investment is privately rational (i.e., its private benefits are at least as high as its private costs).

Compared to the two previous cases, the nature of the reciprocal externality problem here pertains to the impacts on various subgroups within the community who may reap differential net impacts (benefits minus costs) across the two investment categories. Importantly, baseline liabilities may or may not be the same across these categories, preventing the simple solution described above where a transfer payment from one party to the other party mitigates the reciprocal externalities. In this case, the community faces simultaneous challenges involved with meeting baseline liabilities for each project that are independent of the investment categories, as well as mitigating the reciprocal externalities associated with the finite resource pool. To mitigate this problem, a community may need to use an *intra-community/inter-project transfer payments*.

In conclusion, we pose the question of whether the Guidance might address these reciprocal externality issues and the outlines of the Coasian solutions for mitigating them. Each of these issues involves the consideration of benefits and costs to various subgroups, as well as institutional mechanisms for using transfer payments to mitigate the harm done when baseline property rights or liabilities are not allocated efficiently. Communities bring these concerns to the negotiating table when discussing their CSO control responsibilities with EPA and states. Should the Guidance acknowledge these concerns and encourage CSO communities toward

efficient solutions to them? It would likely require a significant effort to develop a workable Guidance covering such a broadened scope.

On balance, we believe it is more likely that concerns about benefits and low income household affordability issues could successfully be incorporated into an expanded Guidance than concerns about opportunity costs. Methods for analyzing benefits and low income subsidy programs are reasonably well developed, and we see some possibilities for how an expanded Guidance could provide incentives for resolving these two issues efficiently in CSO communities. However, the opportunity cost question – whether making the contemplated CSO control investment will displace other higher valued investments by the community – strikes us as much more difficult to address in the Guidance. If the Guidance could be expanded to address two of these three important issues, we believe it would offer a more complete and effective array of tools to address CSO implementation issues.

Furthermore, the *role* of the Guidance could be broadened in parallel with this broader *scope*. In its current form, the Guidance generally takes the set of projects included in a community's LTCP as given (i.e., determined by Clean Water Act technology and water quality-based requirements). As such, the Guidance now plays a role primarily in determining *how soon* these projects should be completed. A broader scope as described above might suggest an expanded and more explicit role for the Guidance in determining also *which* projects should be undertaken. If so, the implications of changes in the Guidance should be evaluated within the broader scope of water program implementation, and not merely within the scope of the CSO program.

In the end, the performance of any guidance should be measured with respect to its bottom-line. This sounds simple, but our technical assessment suggests that there is significant ambiguity with respect to this point. Is the bottom-line measured with respect to the rate at which CSO or wet weather controls are implemented? Is it measured with respect to meeting watershed-based goals and objectives? Or is it measured more broadly, with respect to water quality, human health, and overall social welfare? Only with a clear sense of the bottom-line is it possible to fully satisfy our assessment criteria in which good guidance is consistent, efficient, rational, and transparent.
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Appendix A: Detailed Description of the Guidance

The Guidance establishes two sets of indicators that together are used to assess the financial capability of the community:

- A *Residential Indicator*, which is intended to assess the financial impact that the CSO project and other wastewater costs entail for households in the community

- A set of six *Permittee Financial Capability Indicators*, getting at the ability of the community to finance the project costs

A.1 The Residential Indicator

The *Residential Indicator* reflects the combined impact of wastewater and CSO control costs on individual households in the community. The indicator is defined for a community specifically as total annual wastewater plus CSO control costs per household as a percentage of the community's median household income (MHI). Current annual costs for wastewater collection, conveyance and treatment and projected future annual costs for planned CSO and wastewater projects are summed and then allocated among residential, commercial and industrial users. The summed wastewater and CSO costs that are allocable to residential users are then divided by the number of households served to determine the expected annual total wastewater plus CSO costs per household. This average per household annual cost for wastewater plus CSO control is then compared against annual MHI for the community. The Residential Indicator calculated in this manner characterizes whether the wastewater plus CSO costs would constitute a *low*, *mid-range*, or *high* impact on residential users in the community:

- Low impact if wastewater + CSO costs are < 1 percent of MHI
- Medium impact if wastewater + CSO costs are 1–2 percent of MHI
- High impact if wastewater + CSO costs are > 2 percent of MHI

A.2 The Permittee Financial Capability Indicators

The six *Permittee Financial Capability Indicators* reflect the ability of the permittee to finance the CSO project costs. The six indicators consist of three sets of two. They include:

- Debt indicators—these provide indicators of the community's current debt burden and ability to issue more. They include specifically:

  - The community's *bond rating*, as established by Standard & Poor's and/or Moody's

  - *Overall net debt as % of full market property value*. This indicator provides a measure of the community's outstanding debt burden relative to the full market value of real property in the community that could be used to support existing and additional debt

- Socioeconomic indicators—these provide indicators of the general economic well-being

of residential users in the permittee's service area. These two indicators include:

- *Unemployment rate*. The unemployment rate in the community is compared against the national average unemployment rate

- *Median household income*. MHI in the community is compared against MHI for the nation as a whole to provide a second indicator of economic conditions in the community

- Financial management indicators—these provide indicators of the permittee's overall ability to manage its financial operations. The two indicators include:

  - *Property tax revenues as % of full market property value*. This indicates the degree to which real property in the community is already taxed. If the value of this indicator is low, it suggests that the community's current tax burden is light and additional tax revenues might be obtained relatively easily.

  - *Property tax revenue collected as % of property tax assessed*. This indicates the efficiency of the permittee's tax collection system and the acceptability of tax levels to residents. A low percentage of property taxes collected relative to the amount assessed indicates that the permittee has difficulty collecting taxes currently, and would presumably have even more difficulty if taxes were increased.

The Guidance establishes benchmark ranges for each of the six Permittee Financial Capability Indicators. The ranges indicate the values for each indicator that signify strong, mid-range or weak financial capability. The benchmark ranges are shown in the Exhibit below.

Exhibit A-1: Benchmark Ranges for Financial Indicators

Indicator	Strong	Mid-Range	Weak
Bond Rating	AAA-A (S&P) or Aaa-A (Moody's)	BBB (S&P) Baa (Moody's)	BB-D (S&P) Ba-C (Moody's)
Overall Net Debt as a Percent of Full Market Property Value	Below 2%	2%–5%	Above 5%
Unemployment Rate	More than 1 Percentage Point Below the National Average	Within 1 Percentage Point of the National Average	More than 1 Percentage Point Above the National Average
Median Household Income	More than 25% Above the Adjusted National MHI	Within 25% of the Adjusted National MHI	More than 25% Below Adjusted National MHI
Property Tax Revenues as a Percent of Full Market Property Value	Below 2%	2%–4%	Above 4%
Property Tax Collection Rate	Above 98%	94%–98%	Below 94%

The Guidance then specifies a procedure for arriving at a single judgment across the six indicators regarding the community's financial capability. For each of the six indicators, 1 point is assigned for a value in the *weak* range, 2 points are assigned for a value in the *mid-range*, and 3 points are assigned for a value in the *high* range. Points are totaled across the indicators and the average point score is computed. If data are not available for scoring each indicator, the average is computed across only those among the six indicators for which scores have been obtained. The community's overall Financial Capability Indicator is said to be:

- Low if the scores for the individual indicators average less than 1.5;
- Mid-range if the scores average anywhere from 1.5 to 2.5, inclusive; and
- High if the scores average more than 2.5.

A.3 The Financial Capability Matrix

The results of the Residential Indicator and the Permittee Financial Capability Indicator analyses are combined in a Financial Capability Matrix to characterize the overall financial burden that the CSO controls may impose on a permittee. The matrix is shown below.

Exhibit A-2: Financial Capability Matrix

Permittee Financial Capability Indicators Score (Socioeconomic, Debt and Financial Indicators)	**Residential Indicator** (Cost per Household as a % of MHI)		
	Low (Below 1.0%)	**Mid-Range (Between 1.0 and 2.0%)**	**High (Above 2.0%)**
Weak (Below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (Between 1.5 and 2.5)	Low Burden	Medium Burden	High Burden
Strong (Above 2.5)	Low Burden	Low Burden	Medium Burden

A.4 CSO Project Schedule Development

The Guidance describes how this overall judgment about the financial burden of CSO controls is to be used in establishing a schedule for implementation of the CSO controls. A permittee for whom the CSO controls pose a low financial burden should be expected generally to complete implementation of the controls as rapidly as logical engineering sequencing and normal construction practices permit. At the other extreme, a permittee for whom the CSO controls pose a high financial burden could be given as much as 15 years (or in some circumstances 20 years) in which to complete the CSO controls. The Guidance provides the following table outlining the limits for CSO project implementation schedules as a function of the permittee's financial capability.

Exhibit A-3: CSO Project Implementation Schedules

Financial Capability Matrix Category	**Implementation Period**
Low Burden	Normal Engineering/Construction
Medium Burden	Up to 10 years
High Burden	Up to 15 years*

*Schedule up to 20 years based on negotiation with EPA and state NPDES authorities

In Exhibit A-4, we provide a flow chart summarizing the various measures established in the Guidance and how they are evaluated in the process of FCA for CSO projects.

Exhibit A-4: The Process for Financial Capability Assessment Under the Guidance

Residential Indicator

1

Assess impact:

WW and CSO control costs per household as a % of MHI

Financial Impact	Residential Indicator (CPH as % MHI)
Low	Less than 1 Percent of MHI
Mid-Range	1.0 to 2.0 Percent of MHI
High	Greater than 2.0 Percent of MHI

Permittee Financial Capability Indicators

Combine Indicators into single financial capability judgment:

	Indicator	Strong	Mid-Range	Weak
Debt Indicators:	Bond Rating	AAA-A (S&P) or Aaa-A (Moody's)	BBB (S&P) Baa (Moody)	BB-D (S&P) Ba-C (Moody's)
	Overall Net Debt as a Percent of Full Market Property Value	Below 2%	2% - 5%	Above 5%
Socioeconomic Indicators:	Unemployment Rate	More than 1 Percentage Point Below the National Average	Within 1 Percentage Point of the National Average	More than 1 Percentage Point Above the National Average
	Median Household Income	More than 25% Above the Adjusted National MHI	Within 25% of the Adjusted National MHI	More than 25% Below Adjusted National MHI
Financial Management Indicators:	Property Tax Revenues as a Percent of Full Market Property Value	Below 2%	2% - 4%	Above 4%
	Property Tax Collection Rate	Above 98%	94 - 98%	Below 94%

Calculate average score:

Strong indicator: 3 points
Mid-range indicator: 2 points
Weak indicator: 1 point

2

Combined Sewer Overflows – Existing Process for Financial Capability Assessment and Schedule Development

Summary judgment of financial capability:

Permittee Financial Capability Indicators Score (Socioeconomic, Debt and Finanacial	Residential Indicator (Cost per Household as a % of MHI)		
	Low (Below 1.0%)	**Mid-Range (Between 1.0 and 2.0%)**	**High (Above 2.0%)**
Weak (Below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (Between 1.5 and 2.5)	Low Burden	Medium Burden	High Burden
Strong (Above 2.5)	Low Burden	Low Burden	Medium Burden

Determine schedule for CSO project:

Financial Capability Matrix Category	Implementation Period
Low Burden	Normal Engineering/Construction
Medium Burden	Up to 10 years
High Burden	Up to 15 years*

*Schedule up to 20 years based on negotiation with EPA and State NPDES authorities

Establish Boundaries for Schedule

3

Appendix B: Areas of Controversy in Calculating the Residential Indicator

We have divided this list of issues into two sections. The first is a list of issues where the Guidance does not specify how to do the calculation, and communities have taken advantage of this imprecision and performed the calculation in a manner that suits their interest. EPA and DOJ have often objected to these approaches. The second is a list of issues where the Guidance does specify how to do the calculation, but communities have chosen frequently to do it instead in a different manner. Perhaps because there may be some merit to the communities' approach, EPA and DOJ in some instances have allowed a community to use this manner of calculation that differs from what the Guidance prescribes.

Issues Where the Guidance Does not Specify How to Do the Calculation

1. *What projects in addition to the CSO project should be included in calculating total wastewater costs?* The Guidance indicates that the permittee should add together "the current costs for existing wastewater treatment operations and the projected costs for any proposed WWT and CSO controls," but provides no detail on how to decide which future projects to include as "proposed". Increasing the set of wastewater projects for which costs are included serves to increase the numerator of the Residential Indicator and thus the calculated value that the indicator takes on. Some permittees have therefore attempted to include costs in the calculations for future wastewater projects that may be optional or speculative – large sewer renewal projects, projects to replace septic systems with public sewerage, etc.. How firm must the commitment be to a "proposed" control in order for its cost to be included in this calculation? Can a project be included in the calculation simply because the community asserts that such a project will likely be needed in the future, or should there be some higher standard?

2. *For what year or years should the comparison of WWT costs to MHI be made?* The Guidance is clear that future WWT and CSO projects and their costs should somehow count. If so, at what point in time should WWT + CSO costs per household be compared against MHI? Possibilities might include:

    a. The present year; thus comparing current year WWT + CSO costs against current year MHI. In our view, this would not make sense, since the future projects whose costs the Guidance is clear should be included have not yet begun, and costs are not yet being incurred for them in the present year. Focusing on only the present year would ignore the costs of important future, not-yet-implemented projects, which should be reflected in the calculation.

    b. In some future year, after the future projects have been implemented and costs are being incurred for them. This would make some sense, but would involve projecting into whatever future year the comparison was being made for estimates of MHI, costs, population, number of households, residential vs. industrial vs.

commercial shares of wastewater flow, etc.. This would raise potentially difficult questions about how to make each of these projections. For example, is it acceptable to project WWT project construction costs as escalating more rapidly than the overall inflation rate while MHI increases at less than the overall inflation rate? One community projected in its calculations that the population served and MHI would both decrease over time while wastewater costs would increase, yielding a dramatic projected increase in the projected future value of the Residential Indicator.

Another difficult question if the comparison of WWT + CSO costs against MHI is to be done for some future year would then be which future year to choose for making the comparison. Some communities have done the calculation so as to focus on the particular year in which the comparison looks most advantageous from their point of view; generally some year after all the planned projects will have been implemented and costs are at their peak. However, such a focus on the single future year in which the ratio of WWT + CSO costs to MHI is the highest seems inappropriate to us, since we believe one would want also to reflect somehow in the calculation all the other years in which the ratio of WWT + CSO costs to MHI is lower than in this peak year.

c. This raises the possibility of doing the calculation on some averaged basis – comparing average annual WWT + CSO costs against average annual MHI across some number of years. Presumably the period of time covered in the averaging should include both the present and the time in the future after all planned WWT + CSO projects have been implemented and costs have peaked.

d. Another possibility in this vein might be to do some sort of present value calculation; comparing the discounted present value of present and future WWT + CSO costs against the discounted present value of present and future MHI. This approach would raise the further question of what discount rate to select.

We will not presume to recommend one or another of these approaches for establishing the time period for which WWT + CSO costs should be compared against MHI. We note only that the Guidance states that future costs for future WWT and/or CSO projects should count in the calculation, but does not specify which year or years should be the focus for the comparison. Nor does the Guidance suggest the procedures to be used if projections for future years are necessary.

3. *Should MHI be defined pre-tax or post-tax*? The Guidance does not say, but the source to which the Guidance points the reader for data on MHI shows pre-tax income information more prominently than post-tax. Arguably, though, post-tax income would provide a better indication of the burden that spending on WWT + CSO costs would pose relative to disposable income. One might also ask whether there could be some geographically-based cost-of-living adjustment included in the indicator, to reflect the fact that a particular income or a particular percentage of that income has different purchasing power in different areas of the country. Surprisingly, in our view, we are not aware of any communities that have raised either of these issues.

4. *To what extent can "soft" WWT + CSO project costs be included*? The Guidance does not indicate whether overheads, contingencies, reserves and other soft costs can be included in the calculation.

5. *What interest rates should be assumed?* The Guidance provides no suggestion about the interest rates to assume for the community's future project debt service costs, either for subsidized (e.g., by the state) or unsubsidized borrowing. The interest rate on borrowed funds is a key input in calculating the costs of debt service for future wastewater and CSO projects, which in turn comprise a substantial share of future wastewater plus CSO costs in calculating the Residential Indicator. The interest rate that will be paid for future borrowing, however, is a matter of speculation. Will interest rates increase from their current levels or decrease? How much of future project costs will the permittee finance through general obligation bonds (which typically carry a lower interest rate) instead of revenue bonds (which typically carry a higher interest rate)? What share of project costs might be financed through subsidized loans at lower-than-market interest rates through the SRF?

6. *What should be done about portions of the project cost that may be paid by parties other than the community/ratepayers*, such as Federal or state grant funds? The answer presumably is to exclude such externally paid-for costs from the calculations – costs that are paid for by others will not be paid for by the permittee's residential users, and such costs should not be included in the Residential Indicator calculations. The situation becomes much more difficult, though, if the future contributions from Federal or state sources are uncertain.

<u>Issues Where the Guidance Specifies How to Do the Calculation, But Communities Often Diverge and Have Sometimes Been Allowed to Do So</u>

1. *Calculating the Indicator separately for different segments of the community*. The Guidance specifies that the Indicator is to be calculated for the permittee's entire service area: comparing the average per household cost for WWT + CSO controls (the permittee's total projected costs x residential share of costs ÷ number of households in the service area) against the median household income (MHI) across the service area. Nevertheless, communities have very frequently calculated the Indicator separately for different segments of the community, in an attempt to show that significant portions of the community will incur costs exceeding 2 % of their household income, thus facing a "high" financial impact. Communities often perform the calculation separately for middle income and for lower income groups (e.g., for households in the lowest 20th percentile of income), and often perform separate calculations for the different political jurisdictions within the service area (thus potentially showing a "high" impact on the poorer jurisdictions). Communities typically contend that they are prevented by various constraints from allocating costs across households, jurisdictions and user groups in a manner that will yield the averaged sort of impact that the Guidance calculation foresees. For example, a permittee may have long-term rate agreements with the various jurisdictions that are served that result in some actually having costs per household that

are higher than the service-area-wide average, and some having costs that are lower. Or, a permittee may have both combined and separate sanitary sewers in different portions of the service area, with projected future costs per household being much higher in the combined sewer area. With respect to impacts particularly on lower income households, communities often contend that they cannot practicably implement subsidy programs and/or progressive rate structures that serve to reduce the percentage burden on poorer households to anywhere near the burden calculated by the Residential Indicator for median income households. Communities thus often choose to calculate and display the cost burden separately for lower income households.

2. *Determining the residential share of WWT + CSO project costs.* The Guidance specifies that costs should be allocated among user groups based on the fraction of total wastewater flow that each user group contributes. Thus, in a community where residential users are responsible for, say, 80% of total wastewater flow (including I/I), the Guidance would require in the course of calculating average per household costs that 80% of total WWT + CSO costs be allocated to residential users. Communities often calculate the residential share differently, though, reflecting whatever procedure actually prevails for allocating costs across user groups. Many communities in fact charge residential users a share of total costs that exceed their share of total wastewater flow. Reasons can include charges that are based on water use rather than wastewater flow (significant outdoor water use by residential customers means that their share of water use exceeds their share of wastewater flow) and fee schedules that include significant connection charges; declining block rates; and/or negotiated discounts for large customers, all of which result in large users (e.g., industrial, commercial) paying a lower rate per gallon than small customers (e.g., residential). In many cities, then, residential users actually incur a share of costs that exceeds that which results from application of the cost allocation procedure specified in the Guidance. If there are good reasons why residential users now and in the future will pay more than their flow-based share of costs, then, these communities argue, the Residential Indicator calculation should recognize the higher share of costs that households actually pay rather than the lower share of costs that a flow-based allocation would assign to them. Another sometimes difficult issue in allocating costs among user groups in the flow-based manner the Guidance prescribes is determining the flows attributable to each class of user. How, for example, should one determine the portion of CSO or SSO flow that is attributable to each class of user (if one must allocate CSO or SSO project costs to user groups)?

3. *Whether to perform the residential burden calculation based on <u>costs</u> or based on <u>rates</u>.* The Guidance prescribes a procedure by which total WWT + CSO costs are allocated by formula to residential users, and this residential share is then divided by the number of households and compared against MHI. This procedure is based on costs, and does not account for any issues relating to rates. The Guidance procedure does not reflect idiosyncrasies or constraints in the community's rate structure, and does not illuminate any change in rates (e.g., rate shock) that may be necessary to pay for the WWT + CSO costs. This is perhaps because of EPA's traditional preference not to get involved in community rate-setting issues. Communities, in contrast, often want to perform their calculation differently – they estimate what a household currently pays for wastewater

service (sewer usage in gallons x sewer rate per gallon), and then estimate what the household will eventually need to pay assuming rates sufficiently high to cover the total projected WWT + CSO project costs (usage x new rate/gallon). In this calculation the community will reflect whatever rate structure idiosyncrasies actually exist, and will highlight how much more the household will eventually need to pay to cover the new WWT + CSO projects, showing the extent of any projected rate shock. The community wants this calculation to reflect whatever realities the community will need to deal with. NACWA cites the inattention to rate impacts as a major shortcoming of the Guidance: "Absence of Financial Planning. The FCA Guidance provides for neither the development of a summary-level financial plan delineating system-wide cash flow requirements, nor a forecast of wastewater rates, focusing instead on the specific costs associated with program implementation." (Page 8) A focus in the Residential Indicator analysis on rates rather than costs may yield a substantially different picture of the burden posed by upcoming new WWT + CSO projects particularly for communities where: (1) Current water and wastewater costs are subsidized to a greater degree than future costs will be; (2) Costs for financing large recent wastewater investments have been "back-loaded", such that future costs and rates for current wastewater services will be significantly higher than current costs and rates for current wastewater services; and (3) There are important constraints in the rate system that may prevent cost increases from being shared proportional to flow across jurisdictions, user classes and income classes.

Appendix C: Detailed Comparison of EPA and Bond Rating Firm Indicators

Category	Moody's	Standard & Poor's	EPA CSO FCA Guidance
Economic	• Unemployment rates • Unemployment trends over time • Socioeconomic characteristics (including median family income compared with national and state averages) • Indicators of economic growth (retail sales, building permits, employment data) • Diversity and composition of economic base (number of major employers, type of industry of major employers) • Community's overall wealth (full valuation of taxable property per capita, trends in fully value, full value relative to debt outstanding)	• Unemployment patterns and labor force growth • Industry mix and employment by sector • Concentration in major employers or reliance on particular industries • Employer commitment to the community • Regional patterns of employment and growth • Level of retail sales • Historical trends more important than a specific point in time	• Unemployment rate relative to national average • Median household income relative to national average
Financial	• Primary revenue sources and expenditure items • Trends in financial performance and control • Budgetary planning and projecting • Policies on spending growth, use of surplus, and shortfall contingency plans • General fund balance as a percent of revenue • Annual growth in revenues and expenditures • Amounts and reasons for interfund transfers	• Revenue and expenditure structure and patterns • Annual operating and budgetary performance • Financial leverage and equity position • Budget and financial planning • Contingent financial obligations, such as off-balance sheet debt or pension liabilities	• Property tax revenue collected as % of property tax assessed • Property tax revenues as % of full market property value

Category	Moody's	Standard & Poor's	EPA CSO FCA Guidance
	• Composition of assets and liabilities • Cash position • Actual financial performance relative to budget		
Debt	• Net Direct Debt Burden -- Net direct debt, divided by the estimated full value of taxable property • Net Overall Debt Burden -- Net overall debt, divided by the estimated full value of taxable property • Net Direct Debt per Capita -- Net direct debt, divided by total population • Net Overall Debt per Capita -- Net overall debt, divided by total population • Full Value per Capita -- Estimated full value of taxable property, divided by total population	• The tax base • The wealth and income of the community • Total budget resources	• Overall net debt as % of full market property value • Bond ratings
Management	• Organization • Division of responsibilities • Professional qualifications • Sufficiency of power to perform functions • Institutionalized means of coordinating with other agencies	• Tax policies • Risk management-operational and investment • Governmental accounting practices • Financial strategies • Debt management.	N/A

Comparison of Financial Capability Evaluation Factors—Water and Sewer Bonds

Category	Moody's	Standard & Poor's	EPA 1997 CSO FCA Guidance
Economic	• Service area size • Economic diversity • Growth trends • Number of Industrial customers • Ability to deal with growth pressures (impact fees and long-range strategic planning)	• Employment trends • Income trends • Housing values • Property tax base • Growth trends • Retail sales activity • Job base • Population • Housing starts • Building permits • Occupancy rates • System connections	• Unemployment rate relative to national average • Median household income relative to national average
Financial	• Net funded debt: Long-term debt (gross long-term debt plus the current portion of long-term debt) plus accrued interest payable, less the balance in both the debt service reserve fund and the debt service fund. • Net fixed assets: Fixed assets, less accumulated depreciation. • Working capital: Net current assets and net assets of all funds and accounts not devoted to debt service. • Debt Ratio (%): Net funded debt, divided by the sum of net fixed assets, plus net working capital • Gross revenue and income: Operating revenue, plus non-operating revenue. • Operating and maintenance expenses: Operating and maintenance expenses, net of depreciation, amortization and interest requirements. • Net revenues: Gross revenue and	• Debt factors • Accounts receivable • Liquidity • Income • Capital improvement plan	• Property tax revenue collected as % of property tax assessed • Property tax revenues as % of full market property value • Overall net debt as % of full market property value • Bond ratings

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	income, less operating and maintenance expenses. • Operating ratio (%): Operating and maintenance expenses, divided by total operating revenues. • Net take-down (%): Net revenues, divided by gross revenue and income. • Interest coverage (x): Net revenues, divided by interest requirements for the period. • Debt service coverage (x): Net revenues, divided by principal and interest requirements for the period. • Debt service safety margin (%): Net revenues, less principal and interest requirements for period, divided by gross revenue and income.		
Rates	• Rates and revenues reflect full cost of service at a level that can be supported by the customer base • Revenues should cover operating and maintenance expenses, debt service, contributions to reserve funds and retained earnings for future system improvements, expansions or replacements. • Sufficient revenues, or reserves, should be available for unexpected emergencies such as flood damage or water main breaks. • Fixed costs covered by fixed charges such as connection fees, variable costs covered by per volume charge based on metered usage. • Reasonableness and affordability of rates	• Rates compared with neighboring communities and/or similar systems • Rates in relation to the service area's economic wealth and income levels • Rate-setting process	

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Management	• Staffing practices (adequate training, operator certification, employing appropriate number of employees) • Ability to meet demands of changing regulatory environment • Successfully manage with limited financial resource • Strong regulatory compliance record • Asset maintenance • Source water protection • Multi-year capital improvement plans that reflect deferred maintenance • Well-planned and executed capital projects	• Quality of planning techniques, such as demographic and rate studies, financial forecasts, and capital improvement programs • Extent to which these documents are factored into current budgets and long-term plans • Plans are examined against the actual results. • Long Range Planning	
Legal		• Rate covenants • Security	

Operational Characteristics		• Customer profile and usage trends
		• Compliance with environmental regulations
		• Adequacy of system capacity taking into account the following:
		  • Compliance with environmental regulations; and
		  • Water system's source and available supply of dependable water;
		  • Long term commitments for wholesale delivery.	