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The Determinants of Credit Quality

A Discussion Of Moody's Methodology For Rating General Obligation, Lease-Backed And Revenue Bonds

Summary

Issuers, investors and intermediaries often ask Moody's the same thought-provoking questions about our rating process. These questions generally seek additional information pertaining to the dominant factors in a Moody's credit rating assignment, which credit factors will most likely drive a future rating upgrade or downgrade, and how rating levels on proposed Certificates of Participation (COPs) and revenue secured transactions can be gauged. As a response to these questions, this article focuses on four key issues:

- The rating factors that support a General Obligation (GO) rating assignment
- Rating levels for leases and COPs
- Factors that drive rating upgrades or downgrades
- Credit fundamentals used to assign ratings on municipal water, wastewater, and stormwater systems

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Understanding The Primary Rating Factors And How They Support A Rating Assignment

The key factors Moody's considers when assigning credit ratings to general obligation and lease revenue bonds cover four primary areas: economy, debt, finances, and administration/ management strategies. However, because there is variation in the type and scope of capital needs determined by the unit of local government raising the debt (school, city or county) and the state in which the entity is located, there is always some variation in the credit factors evaluated. For example, a school typically issues debt to fund new buildings, while a city or county may issue debt to fund roads and bridges, social services, healthcare, courts and correctional facilities, and an enterprise system may issue debt to fund water and sewer system improvements or expansion.

STATISTICS MUST BE VIEWED IN CONTEXT

Although the various statistics discussed throughout this article play a significant role in Moody's evaluation of credit risk, data and ratio analysis is certainly not the sole determinant of a rating. As a result, there is no algebraic formula by which a rating can be predicted. At the start of the analysis, each of the four credit categories carries equal weight and many qualitative factors are considered including administration/management strategies (discussed in the section below). As analysis of an issue proceeds, however, one factor may become more important because it represents a particular strength or weakness for the credit or is more likely to have a significant impact on credit quality in the near term. In our view, the most useful tool for evaluating credit risk is examining the way that the four credit analysis areas interact.

Economic Factors

While probably the least controllable of the four credit factors, the economy remains critical to Moody's analysis because the economic base ultimately generates the resources that repay municipal debt. During the economic evaluation, Moody's analyzes the current economic profile in order to gauge specific economic strengths and weaknesses and to better set expectations for future performance. Ultimately, a clear vision of an issuer's current economic profile, coupled with anticipated future economic trends, is a key credit measure. We consider the credit quality and market position of a region's largest employers, and the strength, as well as the diversity, of its largest taxpayers. Moody's Public Finance Group consults regularly with our corporate group for information on the performance of an issuer's largest corporate employers or taxpayers, or for an overview of a particularly dominant industry.

Especially critical, are indicators of economic growth, such as retail sales, building permits, employment data, and various other measures of economic activity. As such, the economic statistics that Moody's examines for a given credit will vary, and depend upon the forces that drive the area's economy.

We also evaluate demographic and other economic data in order to assess the vitality of a given area's economy. A diverse economic base (one that is not highly concentrated in a single employer or type of industry) will be more likely to steadily expand and keep pace with (or even outpace) the national economy. An economy that is highly dependent on a cyclical industry may periodically surge, stagnate, or even experience declines. Unemployment rates are perhaps the most current measure of an area's economic health. Equally important are the unemployment trends over a period of time, which illustrate a municipality's demonstrated ability to withstand changes in national or regional economic fortunes and may provide an indication of future employment performance.

When examining an issuer's ability to tap resources to support debt and pay for services, we also evaluate the extent of a community's overall wealth. Although no single aggregate measure fully quantifies a community's wealth, the full value per capita – which is the full valuation of taxable property divided by a given population – is an important indicator. In addition to these figures, Moody's examines trends in full value as well as full value relative to such factors as a community's population and outstanding debt to better gauge leveraging of the local tax base and of the residents and businesses paying the tax bills.

In addition to examining overall measures of the economic base, Moody's also evaluates the resident population's socioeconomic characteristics. Moody's relies on a variety of data, some of which is provided by the U.S. Census Bureau. Additional information is also provided on behalf of local jurisdictions by various state agencies. One of the most useful statistics for determining an area's economic well-being is per capita and median family income. In our opinion, because there are significant variations in state and regional cost-of-living, it is important to compare these figures with state as well as national averages.

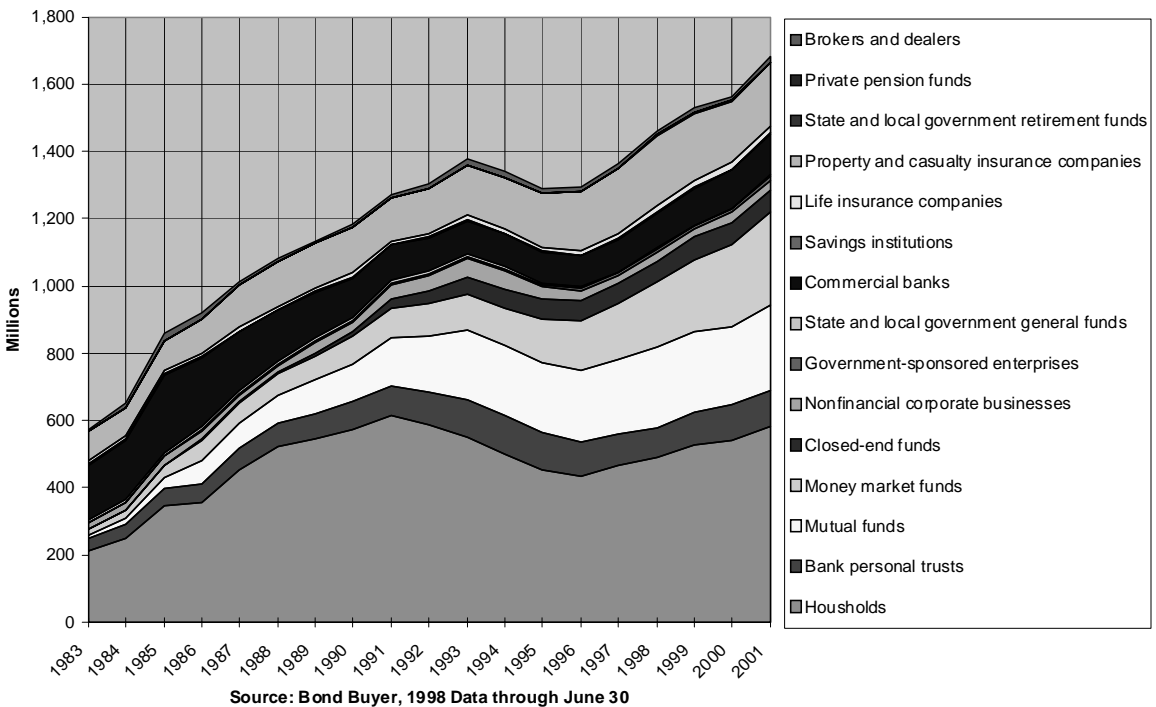
Debt Factors

With every new issuance of debt, Moody's re-evaluates the issuer's debt position in order to determine the impact of the increased debt load on credit quality. In rating debt, we calculate numerous ratios, which are detailed in the *Appendix: Municipal Tax-Backed Debt: Components and Ratios*. For General Obligation tax-supported or General Fund-supported debt, Moody's evaluates all the debt for which the issuer's tax base or citizens are the source of repayment, whether or not that issuer actually issued the debt. That is, in addition to reviewing debt obligations of the issuer, we also consider overlapping debt to determine the overall debt burden to the taxpayers. We do this because ultimately the same residents or businesses will be responsible for repaying direct and overlapping debt obligations.

Changing Market Dynamics Support An Investor's Need To Determine Drivers Of Rating Changes

The \$1.7 trillion municipal market place has shifted from the early 1980's, when commercial banks were the dominant purchasers of tax-exempt securities, to an environment in which money market and mutual funds and households collectively hold more than two-thirds of outstanding municipal paper. Up until the 1980's, banks purchased municipal debt often with the intention of holding the securities to maturity as they were afforded certain tax preferences. Now, however, given various tax reform initiatives, the market is dominated by funds and individual (retail) investors. Unlike the "buy and hold" mentality of the regional and national banking concerns, mutual funds are driven by the need to generate return for their clients. As a result, the municipal market has evolved a more frequently traded liquid secondary market. This has created a need for accurate and consistent credit evaluation during the life of an issue.

Holders of Municipal Debt: 1983-2001



Overlapping debt is debt issued by municipal entities that have geographic boundaries that overlap (in part or in whole) those of the issuer whose debt is being analyzed. For example, the debt of a city within a given county will be considered as overlapping debt for that county because the same tax base is responsible for supporting the debt. For measuring the burden of all tax-supported debt on the tax base, we calculate "over-all net debt," which excludes self-supporting debt that is not paid from the tax base itself because it has its own revenue stream (i.e., from water and sewer fees or other self-supporting enterprise earnings).

In general, counties have the lowest debt ratios among the three primary groups of local governmental units (counties, cities, and school districts). This is because even though underlying debt of cities and school districts is considered when calculating their ratios, counties often contain unincorporated areas that are generally not authorized to issue debt but contribute to the size of the tax base.

Debt structure is another area of focus when examining the issuer's credit profile. Moody's examines such debt characteristics as the amount of short-term debt an issuer has outstanding, the extent of reliance on variable rate debt obligations, and the overall structure of debt service payments.

A key analytic issue is the rate of debt repayment. This statistic measures the rate of principal retirement (payout) within a given period of time and can sometimes be indicative of an issuer's willingness to pay. If retirement is rapid, the issuer may be viewed as very willing to draw upon its resources to pay its obligations. Conversely, if debt is structured for a very slow payout, the opposite may be true. Debt structure, including the rate of retirement, can also reflect such considerations as debt limits, future borrowing plans, and political factors related to tax levies. As a general rule, issuers usually structure their issues so that all debt is repaid within the useful life of the asset(s) being financed.

Defining Moody's Watchlist and Outlooks

Investors have told Moody's that in order to optimize trading decisions, their analysts want qualitative insights into our thinking that allow them to better comprehend what potential rating assignments will be as well as to appreciate what drives a Moody's upgrade or downgrade. In order to give the market an indication of the short-term and medium-term direction of a particular rating, Moody's employs a "watchlist" and has "outlooks" – to flag investors, issuers, and intermediaries of potential rating action. A rating review has only three discrete possible outcomes – the rating is confirmed, upgraded or downgraded.

The placement of a particular credit on "Watchlist" for possible upgrade or downgrade clearly signals the marketplace that Moody's believes a rating could change within a short period of time – 90 days. The reason that the rating action is not immediate is because a situation may be evolving (such as potential loss of a major tax payer or litigation that may be pending) and decisive information will not be known for a short period of time. Therefore, the Watchlist designation represents our timely notification to the capital markets that the changing credit fundamentals – positive or negative – will be resolved within three months.

By comparison, Moody's use of an outlook (positive, negative, or stable) signals to the market place our belief that trends or events effecting a particular issuer's credit profile over the medium term, typically based on an 18-month horizon, may place pressure on the current rating assignment. As a result, the outlook tells the issuer, intermediary, and investor the probable direction of a potential rating change – up, down, or stay the same - given continuation of current trends.

Financial Factors

At Moody's, financial analysis involves a great deal more than just reviewing year-end financial statements. This is because financial statements reflect only a snap shot in time. Therefore, while they are important, analysis of operating results and year-end financial position need to be placed in a proper context. For example, a large budget surplus may appear impressive, but could actually have negative implications if it results from a municipality's inability to execute certain spending programs or from a large infusion of a nonrecurring revenue, or results in taxpayers' taking legislative action to limit taxation. Conversely, a planned draw-down of a prior surplus, particularly to fund one-time expenditures such as capital, may not signify fiscal problems. In fact, an established trend of financial performance and control is more important to Moody's than year-end figures alone. Budgetary planning and projecting, in conjunction with daily spending control, as well as an issuer's policies on spending growth, use of surplus, and shortfall contingency plans, are all incorporated into our credit analysis. For additional information on fund balance analysis please refer to our special comment entitled "*Moody's Approach to Local Government Financial Analysis*" dated January 2002 and "*Your General Fund Balance-One Size Does Not Fit All*" dated February 2002.

One financial statistic that is key to evaluating financial strength is the General Fund balance as percent of revenues. This ratio provides a measure of the financial reserves potentially available to fund unforeseen contingencies. The level of fund balance should be related to the likelihood that such reserves will be needed, as well as the issuer's revenue raising flexibility. Larger balances may be warranted if budgeted revenues and expenditures are economically sensitive and therefore not easily forecasted. Moody's likes to see a General Fund balance sufficient to address *normal* contingencies, a level which, as a general guideline, is typically *between* 5-10% of annual revenues. It is important to emphasize, however, that the appropriate level of fund balance varies depending upon the particular issuer and its respective operating environment. Moody's

examines a range of other financial data, such as annual growth in revenues and expenditures; the amounts of and reasons for interfund transfers; primary revenue sources and expenditures items; the composition of assets and liabilities; cash position; and actual financial performance relative to budget.

Although General Fund operations are often a key focus in the analysis of general obligation debt, Moody's is interested in the financial position of all funds, including special revenue funds and enterprise funds. Moody's will focus on how an issuer funds expenditures from its own resources. Therefore, in the analysis of financial operations, we place special emphasis on those funds over which the issuer has discretion, rather than funds that are simply state or federal pass-throughs.

Management Strategies/Administrative Factors

Administrative factors are perhaps the most difficult credit fundamentals to assess because they are not easily quantifiable. An evaluation of management is, however, crucial because ultimately it will be management's responsibility to seize upon economic opportunities, adopt a budget, and take corrective action as may be necessary, to realize targeted results. Despite the qualitative nature of a management assessment, there are a number of elements that Moody's regards as indicators of management strength which are important to our evaluation. They are: an issuer's organization; division of responsibilities; professional qualifications; and, sufficiency of power for an issuer to perform its functions.

In many ways, management strength can be judged from looking at the other three factors:

1. Good management strategies will help ensure that financial practices, such as tax collection procedures, budgeting and investments, are appropriate and responsive to the municipality's needs
2. Debt practices will be thoughtfully structured and in line with statutory and voter prescribed debt limits
3. Good economic development policies will be adopted and government officials will be balanced in response to the demands for services relative to the needs of business and residential taxpayers

In addition, strong management strategies often include institutionalized means of coordinating and/or cooperating with other government agencies, particularly if those agencies must come together to provide services to a common group of citizens.

It should be noted that most issuers, both large and small, are well managed. Despite this fact, they may not all achieve high ratings because the ultimate rating outcome reflects the synthesis of all credit factors.

Lease Revenue/Certificate Of Participation (COP) Ratings And Their Linkages To A General Obligation Or Issuer Rating

Lease revenue obligations are linked to the overall general obligation (GO) credit worthiness of an issuer but present a fundamentally different legal security than does a GO bond. This is because the issuer's full faith and credit and/or the issuer's power to levy property taxes secures the GO bond while in general only General Fund annual budget appropriations generally secure debt service payments on the lease. Furthermore, in the case of a voter approved GO issue, there is typically a dedicated revenue stream (often property taxes or user fees) isolated to fund debt service. Conversely, in the case of a lease, a dedicated revenue stream is generally not available and lease payments, which are often subject to annual appropriation, are carved from operating revenues. As a result, although issuers may have very strong obligation and motives to honor lease backed obligations, lease payments often compete with other governmental priorities.

Because of the close link between GO credit worthiness and the security of a lease obligation, the analysis of a lease shares many elements of the GO analysis. But, because of the greater dependence of lease financings on General Fund finances, the analysis of financial factors and management carries a greater weight in the lease analysis than in a GO analysis.

EVALUATION OF APPROPRIATION RISK AND PROJECT ESSENTIALITY IS CRITICAL TO LEASE RATINGS

When assigning a rating to an issue secured by a lease revenue bond or Certificates of Participation (COP), the first step is to assess the fundamental credit quality of the issuer (also known as the obligor). After determining the GO rating of the issuer (as either a public or confidential rating) lease ratings will then be assigned by factoring two criteria:

1. legal structure: this includes the nature of the lease obligation (appropriation or abatement); provisions for insurance (title, property, and rental interruption) on the lease asset, bondholder remedies including ability to take title to the lease asset, and other security features such as the presence of a reserve fund,
2. project essentiality: this includes an assessment of the leased asset, its importance relative to the government's operation, and the relative risk of non-appropriation or that an event of default may not be corrected; and
3. obligor financial strength/flexibility: this draws upon the financial analysis done to determine the GO rating but focuses on the obligor's ability to raise taxes and other revenues, its level of fixed expenditures including schedule debt service payments on lease obligations and other debt paid from the General Fund, and the size and availability of reserves.

Lease obligations secured by real property which is deemed to be essential to the obligor's operations and services (such as schools, courthouses, jails, or municipal offices) will typically be rated one or two notches below the obligor's GO rating depending upon the obligor's financial strength and flexibility. In general, in the case of an obligor with normal or high financial strength and flexibility the lease obligation will be rated one notch below the GO rating. In the case of an obligor with lower than average financial strength or impaired financial flexibility, the lease obligation will typically be rated two notches below the GO rating. Lease obligations secured by real property which is deemed to be less essential (such as athletic fields, most golf courses, or parking facilities intended to serve private facilities) or by equipment will typically be rated two or three notches below the obligor's GO rating, depending again upon its financial strength and flexibility.

The notching convention discussed in the preceding paragraph is not an absolute rule and should be viewed as a guideline to gauging rating outcomes. We believe there are certain times in which a smaller distinction from the GO rating is warranted; for example, in the case where dedicated revenue sources have been isolated - thereby eliminating competition for payment of debt service with payment of other program priorities. Another exception to the notching convention may arise in the case of clear and demonstrated political support for a project that, while important, may not be defined as essential to overall municipal operations. On the other hand, larger distinctions from the GO rating may be warranted in cases where the legal provisions of the lease obligation are weaker than standard, the obligor's finances are particularly weak, or there appears to be an absence of political consensus surrounding the financing. .

Why Issuers Sell Lease Revenue Debt Or COPs To Finance Projects

The difficulty in garnering voter approval for the issuance of general obligation debt and the need to fund necessary, but unpopular, projects (such as jails) has led to increased utilization of lease debt to finance city, county, school district infrastructure, and even equipment programs. Because leases typically do not require voter approval and do not typically count toward statutory debt limitations, lease issuance can enable governments to generate capital funds despite constraints upon the issuance of GO bonds.

Factors That Drive Rating Upgrades And Downgrades

This section discusses issues that most often drive rating changes – either up or down. It will refer to the credit fundamentals depicted in the preceding sections and describe how these issues are actually synthesized to support a rating change. Ultimately, a rating will be driven up or down when one or more credit factors are significantly altered from the time of the last rating assignment.

A STRENGTHENING, DIVERSIFYING, OR GROWING LOCAL ECONOMY CAN PLACE UPWARD PRESSURE ON A RATING

Location, size, and diversity of the local tax base are the predominant factors assessed when assessing the issuer's fundamental economic strength. These factors, however, are certainly not static and will most likely change over the life of the bond rating. That being said, significant growth in assessed values could eventually drive ratings up – simply because the growth results in a larger tax base supporting debt obligations – with a correlating decrease in debt burden (assuming additional debt to meet development needs is not growing at the same or a faster pace than the tax base). Conversely, should the tax base decline, reflecting successful tax appeals or property demolition, debt burden could be driven up; this may result in downward rating pressure as there will be less taxable values to support government operations and pay debt service.

Potential Signs of Credit Distress

- Declines or large swings in collection of economically sensitive taxes – e.g. sales and income tax collections
- Trend of operating losses; fund balance draw down
- Declining financial margins
- Deficit ending fund balance
- Increasing reliance on operating transfers
- Rising mandated or fixed cost as % of budget
- At or close to tax ceiling (no margin)
- Increasing employee benefits
- Pension deferrals or assumption changes
- Decreasing capital project outlay
- Self-insured with no corresponding reserves
- Significant litigation or settlement
- Sale of asset for operating revenue
- Interest earnings as % of cash on hand
- Current tax collections less than 95% or declining trend
- Declining taxable values
- Loss of major employer
- Sharply increased debt obligations
- Debt structure not consistent with useful life of financed asset

Furthermore, continued valuation growth can also yield tax base diversification – a credit positive that enhances the other favorable products of growth such as a decreasing debt burden and typically greater revenue generation brought on by a growing tax base. This may offset a previous economic weakness such as concentration in one industry or having one particular business be the predominant employer and taxpayer. For example, when economic development efforts by a city dominated by a particular industry (such as automotive or steel) are successful in attracting various support businesses to the area, many positive benefits occur. This is because while the new businesses are often connected to the original industry, they typically have components in entirely new or simply related business enterprises. The presence of the additional business benefits the local economy through new jobs and municipal tax revenues (including income, sales and property taxes). Additionally, they also provide a more positive operating and economic environment for the original industry and the region as a whole.

Although many may believe that the issue of location cannot be surmounted when considering a potential credit upgrade, this, Moody's would argue, is not the case. Over the past several years, the nation has benefited from interest rates that have been at record lows and, as a result, growth in annual new housing starts has been significant. Because many large cities and regional hubs are fully developed or are subject to relatively strict zoning laws, some residents and businesses have chosen to develop properties in areas previously considered primarily agricultural or remote. Local, state and federal governments have responded, in turn, with grants and loans to construct new arteries connecting the previously developed areas with the developing areas. Therefore, location, while fixed in absolute terms, can experience significant economic changes that can lead to strong development and improved transportation networks. Together, this key credit factor, along with expectations that the trend in a particular area will continue, can place upward pressure on a rating assignment. Conversely, given enhanced infrastructure, some mature communities are facing challenges associated with population out-migration and deterioration in housing stock and commercial office space. This trend, if not carefully managed, could result in a trend of valuation declines – a situation that could eventually place downward pressure on a rating.

The absolute size of a municipality – whether it is valued in dollars or in population – is a tangible factor. However, the function and implications of size on a rating (potentially stronger for mid-to-large-sized entities and perhaps somewhat weaker for particularly small credits) are also, in our opinion, fluid. Issuers, intermediaries and investors may concur that a municipality with an extremely modest tax base has fewer taxable resources supporting its general obligation debt than another municipality with the same debt (in an

absolute dollar amount) and a larger tax base. The smaller issuer may also face certain challenges that a neighboring but larger entity will not face. This includes the ability to generate greater tax revenues or flexibility in expenditure reduction, which often results in the need for even stronger management strategies. However, in our opinion, the prospects for rating upgrades are certainly present if economic trends point to continued valuation or population growth. Conversely, the issuer may feel downward rating pressure if confronted with the dual obstacle of a declining revenue base in a modest or limited local economy.

A TREND OF PRUDENT AND SUSTAINABLE FISCAL MANAGEMENT STRATEGIES COUPLED WITH CAREFULLY MANAGED RESERVE LEVELS CAN PLACE UPWARD PRESSURE ON A RATING

Moody's believes that careful, institutionalized budgeting policies contribute to an issuer's ability to withstand economic downturns without compromising recurring structural balance (annual revenues equal to or greater than annual expenditures). We also believe that cautious financial policies enable many local issuers to maintain or build their reserves and invest in technologies which, in turn, support more timely and accurate accounting, reporting, and oversight procedures.

Because Moody's focuses on expected financial trends and anticipated fiscal flexibility (often determined by state legislation and type of governmental unit), Moody's does not prescribe that cash or fund balance be augmented to a particular level prior to a rating upgrade. However, we do focus on the factors that have resulted in a particular level of reserves being reached, with careful scrutiny placed on an issuer's expected ability to maintain the higher level of financial cushion in the future. To the extent that reserves are bolstered and are expected to be maintained (and the prior financial position detracted from other favorable credit fundamentals), a rating upgrade may be warranted. Similarly, a change in management strategies or political environment that supports expectations for future reserve augmentation or depletion could also be sufficient to drive a rating change.

An increase in Fund Balance is not the only way to warrant an upgrade. In fact, the ability of the issuer to aggressively manage and limit fiscal volatility or augment financial flexibility – without changing reserve levels – could also lead to one. For example, an issuer may be able to decrease volatility, if it gains greater expenditure control or decreases financial vulnerability, perhaps through the elimination of a service that historically proved to be expensive and difficult to budget such as a nursing home or hospital. In our opinion, this could be a key credit strength that leads to a rating upgrade. Similarly, the ability of an issuer to garner additional fiscal resources and promote future fiscal flexibility – perhaps through referendum approval of a dedicated property tax millage or through council approval to augment certain fees or taxes – could also result in a rating upgrade. Both of these issues (decreasing fiscal vulnerability or increasing financial flexibility) could drive a rating upgrade without a corresponding increase in reserve levels because, by limiting vulnerabilities or augmenting flexibility, the need for larger reserves is decreased.

THE PRESENCE OR ELIMINATION OF A MAJOR VULNERABILITY MAY DRIVE A FUTURE RATING CHANGE

In addition to the upward credit pressure that strengthening economic and financial position may place on a particular issuer rating, Moody's believes that the presence or elimination of a major vulnerability can also drive a rating change. The vulnerability can come in the form of litigation, implementation of electric deregulation (which could potentially and significantly reduce valuable taxable resources and user-generated revenues), and various tax appeals. For example, when a municipality is involved in litigation on a controversial issue, significant resources (both dollars and time) may be allocated to the cause and projects may be delayed until a municipality is more confident of a projected outcome. Therefore, when a ruling is eventually rendered, a municipality could reallocate resources previously dedicated to litigation to improving its credit-worthiness. Although a municipality may be the beneficiary of a significant cash payment at the conclusion of litigation, receipt of the settlement will probably not drive an immediate rating upgrade since an analytic determination assessing the future availability of those funds to provide overall financial cushion must be made. Ultimately, any rating action will synthesize the decisions of local officials with the rest of the issuer's credit profile.

While a significant and favorable outcome to years of litigation may drive a rating upward, not all adverse settlements will drive a rating downgrade. This is because we will want to ascertain the implications of the judgment. Will there be a one-time draw in Fund Balance to meet settlement costs or a one-time increase in debt burden if judgment-funding bonds are issued? In many cases of an adverse settlement, issuers have some time and some flexibility in repaying settlements. For example, an issuer may not be forced to

spend its entire fund balance repaying a tax-payer who successfully appealed its assessments over a prolonged period of time. Rather, an issuer, with the court's permission, may orchestrate some repayment scenario (perhaps a credit against future taxes, repayment over time, or even funding through issuance of judgment bonds) that is agreeable to all involved parties; therefore, the issuer would not alter its credit profile sufficiently to warrant a downgrade. However, if the issuer is afforded no flexibility or chose not to prepare for a worst-case scenario in advance (for example by saving and designating reserves), a rating downgrade may be warranted.

Factors That Drive Rating Changes:	
Economy	<ul style="list-style-type: none"> • Significant development in the local tax base driving continued growth in total property values • Increased or decreased diversification of local economic base • Loss of key industry or employer with no workout plan • Expected augmentation or loss of financial flexibility • Expectation that significant growth or decline of reserves will continue • Significant increase in debt obligations without correlating development to off-set tax-base leveraging • Utilization of debt structure not appropriately matched to asset's useful life • Implementation of new strategies expected to augment or detract from operating flexibility • Change in political environment which affects ability to react to unanticipated events.
Finances	
Debt	
Administration/ Management	

Understanding The Revenue Bond Rating Factors

Revenue bonds have been issued since the 1930's to finance many purposes including environmental needs (water, sewer, storm water and solid waste), transportation facilities (airports, toll roads, parking facilities, rapid transit, ports, etc.), and a myriad of other activities (stadiums, hospitals, convention centers, higher education, etc.). Although once considered highly innovative securities, the capital intensive nature of most enterprise systems, in conjunction with growing government mandates, have made revenue bonds an important financing vehicle. Unlike general obligation bonds, revenue bonds pledge repayment from a limited source that is typically the revenue generated by an enterprise system such as water, sewer, electric, and, solid waste.

While ratings on these bonds generally trend near the general obligation ratings in the systems' service areas, there is no rule that the rating assignment be capped by an issuer's general obligation rating. In fact, ratings on municipal enterprise systems can be higher, lower, or even the same as an issuer's general obligation bond rating. Moody's average rating for water and/or wastewater systems is an A2, which largely reflects the essential nature of these enterprise systems as well as their extensive capital requirements, which are driven by intergovernmental regulation.

This section will focus on water and sewer bonds, which, by far, constitute the largest category of revenue bonds. The issuance of water and/or sewer revenue bonds has been largely driven by government regulations and mandates arising from the Clean Water Act (1972) and the Safe Drinking Water Act (1974) and subsequent amendments.

Meeting federal and state standards on issues such as wastewater treatment or drinking water filtration is always costly and often complicated. Many older, urban sewer enterprises must address problems stemming from their combined stormwater and wastewater systems, which create serious overflow problems during stormy weather. Separation of the systems is often not economical; thus system administrators often look for alternative measures to reduce overflows. Ultimately, in the case of sewer systems, the ability for plants to create sufficient capacity is a critical determinant of future area development. By comparison, for water systems, the ability to secure and retain water rights sufficient to meet current as well as future needs, while maintaining water quality, is of paramount importance.

Moody's considers five rating factors when assigning a credit rating to a water or sewer system: system size, local economy and customer base; management and strategic planning; operations and rates; debt levels and structure; and, legal provisions. At the inception of the analysis, each of these factors is weighted equally.

However, during the course of credit evaluation the relative strengths and weaknesses of each system will become evident, and one or more of these factors may become predominant, and ultimately support the final rating assignment.

1. **System Size, Local Economy, Customer Base** – Generally, stronger systems that benefit from a robust local economy are better positioned to meet the ongoing capital requirements of the enterprise venture. Economic strength can also be imputed from a diverse customer base, which can insulate the system from the risks that are evident when a few customers or a single industry dominates.
2. **Management and Strategic Planning** – Management’s skill in adapting to a dynamic regulatory environment, while making the capital investments that will maintain the system’s long-term viability, are key to the assignment of higher-grade ratings. Moody’s believes these factors are reflected in effective multi-year plans, which encompass ongoing capital needs and anticipated system upgrades or expansions.
3. **Operations and Rates** – Stable operations reflect management’s expertise in maximizing efficiencies despite its inevitably politicized environment. Management has to meet the ongoing practical needs of its system while balancing the political limitation of raising rates and charges. This process includes the maintenance of sufficient operating capacity at periods of peak usage and flexibility to raise rates in order to maintain facilities or handle unanticipated requirements.
4. **Debt Levels and Structure** – Moody’s utilizes several ratios to determine how heavily the system is leveraged. Debt structures usually reflect the useful life of the assets being financed, thereby creating a payment schedule in which future required debt does not unduly stress system revenues or system customers (via excessive rate increases).
5. **Legal Provisions** – Legal provisions are important because they support Moody’s expectations of rate increases, additional debt, and reserve levels through the life of the debt. In this section we focus on: the pledge of gross or net revenues; flow of funds; size and structure of reserves; rate covenant; and, additional bonds test.

SYSTEMS AND SERVICE AREA CONSIDERATIONS

Moody’s believes that water enterprises are essential components of a community’s economic health as the availability, quality and price of water can dictate an area’s rate of growth. Similarly, if a wastewater system is at or near capacity, moratoriums may preclude new construction (housing developments, food processing plants, etc.).

In its analysis of the service area, Moody’s assesses the local economy’s continued ability to support system operations. This includes analysis of the customer profiles and whether the system’s clients are residential, commercial, or industrial. A key consideration is the degree of concentration in the user-base as this lessens the system’s susceptibility to economic shifts or downturns. Resident wealth levels are also analyzed to determine the local population’s ability to pay the system’s rates. Excessive growth in a service area could tax a system’s capacity. Conversely, a decline in customer base could leave the system with excess capacity, which could undermine finances.

MANAGEMENT AND STRATEGIC PLANNING ARE IMPORTANT FACTORS IN EVALUATING OPERATIONS

In Moody’s view, management is an important factor in the analysis of credit quality. This is because management’s flexibility to create an adequate rate structure and effectively dictate the direction of the enterprise despite the existence of political pressures is critical to assessing the system’s expected pressures and strengths. Given these inherent pressures, water and sewer systems are often administered by independent boards. Thus, management’s skill in interacting with both political and regulatory agents, while maintaining an agenda focused on best practices, is a key credit consideration. The institutionalization of good management practices can diminish the impact of a change in key personnel as reflected in budgeting techniques, methodologies used for capital planning, and responsiveness to regulatory shifts.

OPERATIONS AND RATES

Though management is a critical credit factor, a number of practical points must also be examined. For example, water systems that are simply distribution conduits are far less capital intensive than systems that treat water. Regardless of the type of operation, management considers whether the enterprise has sufficient water rights to meet both current and reasonably projected near-term demands. Wastewater operations also range from simple collection systems to collection, treatment, and disposal systems. Though collection systems lack the heavy capital requirements associated with treatment systems, they face additional risks associated with unanticipated rate increases from their treatment providers. Because a water or sewer system can be either a wholesale client or wholesale service provider, an important factor in the operational analysis is the number, structure, and length of any service agreements.

In general, Moody's believes that systems which are able to set rates and charges independently of regulatory bodies or local government boards are better positioned to meet the ongoing needs of their system because of their greater autonomy. Moody's believes that risk is reduced when rates are sufficient to support the costs associated with maintenance and operations, debt service, and, to a certain extent, ongoing improvements as well as funding needs arising from unanticipated events. Though water and sewer systems generally function as monopolies within their service areas, relatively high rates can increase risk by limiting management's future flexibility to raise rates. In addition, unusually high rates can mask inefficiencies within the system or diminish the potential for future expansion. Conversely, unusually low rates can reflect a trend of deferred maintenance or result in extremely narrow debt service coverage levels—both factors often reflect management flexibility and political environment and are carefully considered in a rating assignment.

DEBT LEVELS AND STRUCTURE OF DEBT

A common measurement for evaluating the debt load of an enterprise system is the “debt ratio”, which is derived by dividing total outstanding system debt (net of the DSRF) by its fixed assets and net working capital. This ratio reflects the system's reliance on debt relative to its asset base. The debt ratio also reflects the system's ability to support future debt. Generally speaking, the lower this ratio, the less leveraged is the system.

Debt structure is as important as debt levels. Debt structures that are heavily reliant on short-term or variable rate debt can subject the system to fluctuating interest rate environments, which can make planning, forecasting, and rate setting more difficult. In addition, while short-term and variable-rate debt instruments may generate interest rate savings for an issuer they require greater flexibility and autonomy to set rates.

LEGAL PROVISIONS

The primary legal document defining a revenue bond structure is the “indenture” or “master resolution”. This document specifies the assets pledged to debt service (principal and interest) requirements. Generally, these are revenues generated by the service provided by the system for which debt is being issued; they are typically sufficient to cover both operations and debt service. As a rule, net revenues (those remaining after operating and maintenance [O&M] expenses are paid) are pledged first to debt service.

An important credit factor addressed in the indenture is the rate covenant. The rate covenant mandates that the governing body assess rates sufficient to generate revenues at a designated threshold level. For instance, a system with a net revenue pledge of 1.1 times, covenants that net system revenues will be sufficient (during every year in which bonds are outstanding) to cover O&M expenses with a multiple of \$1.10 of net revenues available for every \$1.00 of debt service due. Moody's generally views covenanted requirements as a “floor” and looks for greater flexibility for high-grade ratings.

The additional bonds test (ABT) is another legal provision. The ABT specifies that the issuer's revenue stream must demonstrate sufficiency to provide coverage of both existing and proposed debt service. The most conservative ABT is purely historical in nature, however, it is not uncommon for the ABT to factor in adjustments for future rate increases. The ABT is important because its intent is to ensure that future debt issuance does not erode bondholder security by creating too great a burden on the system's revenue stream. While not legally required, the ABT is often expressed as a coverage level equivalent to the rate covenant discussed above.

Municipal Enterprise Components And Ratios

Balance Sheet Components and Ratios

Net fixed assets	Fixed assets, less accumulated depreciation
Net working capita	Current assets adjusted for current liabilities not restricted to debt service
Long-term debt	Gross long-term debt, plus the current portion of long term debt
Net funded debt	Long-term debt, plus accrued interest payable, less the balance in both the debt service reserve fund and the debt service fund
Debt ratio (%)	Net funded debt, divided by the sum of net fixed assets, plus net working capital
Projected debt ratio (%)	Pro forma net funded debt, divided by the sum of projected net fixed assets, plus projected net fixed assets, plus projected net working capital for the first full fiscal year following completion of the capital project financed from the new bonds

Income Statement Components and Ratios

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 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 revenues and income
Interest coverage (x)	Net revenues, divided by interest requirements for year
Debt-service coverage (x)	Net revenues, divided by principal and interest requirements for year
Debt-service safety margin (%)	Net revenues, less principal and interest requirements for year divided by gross revenue and income
Peak debt-service coverage by historical net revenues (x)	Net revenues, divided by estimated maximum annual principal and interest requirements on all outstanding debt and the bonds to be issued
Peak debt-service coverage by projected net revenues (x)	Projected net revenues for the first full fiscal year, following completion of the capital project financed from the new bonds, divided by estimated maximum annual principal and interest requirements on all outstanding debt and the bonds to be issued

The flow of funds requirements reflect the process by which revenues are allocated to various system funds created within the indenture. Usually, monies are deposited into a general revenue fund from which monies flow into other funds. This generally occurs in the following order: first, Operations and Maintenance (O&M); second, debt service; third, debt service reserve fund replenishment; and, fourth, any other authorized system uses. Even gross pledges, when debt service is paid first, are evaluated on a net basis because Moody's views operations as paramount to longer-term viability. It is important to note that, if allowed, unrestricted transfers to funds outside the system (particularly to the issuers' General Fund) should be closely monitored as they can diminish system liquidity and create political pressures to lower rates if they are viewed by the residents as too high.

The debt service reserve fund (DSRF) is another important structural component of a revenue bond. First, the DSRF creates a fiscal cushion typically sufficiently sized to prevent an immediate default when revenues are insufficient to cover debt service requirements. Second, utilization of the DSRF serves as a warning that operations and/or service rates may not be sufficient. The DSRF is typically funded in one of three ways:

1. from bond proceeds
2. incrementally from system revenues over a pre-determined period (traditionally 5-years)
3. with a surety bond.

The size of the debt service reserve fund is limited by provisions of the 1986 Tax Reform Act which reduced the maximum amount to be funded from bond proceeds to 10% of issue size. As a result, the DSRF is often maintained at a level equivalent to the lesser of 10% of bond proceeds, Average Annual Debt Service, or Maximum Annual Debt Service (MADS).

For additional information refer to Moody's rating methodology piece "Water and Sewer Sector outlooks" dated February 2000.

Appendix

MUNICIPAL TAX-BACKED COMPONENTS AND RATIOS:

Components:

Direct Debt or Gross Bonded Debt – The sum of the total bonded debt and any unfunded debt (typically short-term notes) of the issuer. Direct debt may be incurred in the government's own name or assumed through the annexation of territory or consolidation with another governmental unit.

Net Direct Debt or Net Bonded Debt – Net direct debt less sinking fund accumulations and all self supporting debt.

Total Overall Debt – Net direct debt plus the issuer's applicable share of the net direct debt of all overlapping jurisdictions.

Net Overall Debt – Net direct debt plus the issuer's applicable share of the net direct debt of all overlapping jurisdictions.

Overlapping Debt – The issuer's proportionate share of the debt of other local governmental units which either overlap it (the issuer is located either wholly or partly within the geographic limits of the other units) or underlie it (the other unit are located within the geographic limits of the issuer). The debt is generally apportioned based upon relative assessed value.

Key Debt and Economic Ratios:

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

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