A FINANCIAL VALUATION OF THE PITTSBURGH WATER & SEWERS SYSTEM

by
William D. McDonald, MBA,M.S.
&
Daniel J. Hagan

Allegheny Institute Report #95-04
September 1995

EXECUTIVE SUMMARY

A financial valuation was performed in response to the recent capital asset acquisition of the City of Pittsburgh Water Department by the Pittsburgh Water and Sewer Authority. The transaction was structured as a capital lease arrangement with a $1 buyout at the conclusion of the lease term in the year 2025.

Based on discounted free cash flow techniques used in free market transactions, the intrinsic valuation of $152.3 to $211 million far exceeds the transfer price of $85 to $96 million. This transaction is not a true "privatization" of the Pittsburgh water system. Therefore, the price was negotiated as opposed to being set by "fair market prices", had it been sold to a business firm in the private sector.

Several public policy issues arise such as:

1. Understating the system's true value by basing it on the present value of debt payments instead of the present value of cash flows.

2. The trading of future dollars for present dollars offers no "real" deficit reduction.

3. The Authority, and no longer City leadership, are in ultimate control of water costs and quality of service.

4. Taxpayers should be differentiated from water ratepayers as the "stakeholders" at risk.

5. The excellent bond sale to finance the transaction at favorable interest rates may ultimately jeopardize both the Water System and City of Pittsburgh's borrowing capacity and financial flexibility.

In conclusion, short term solutions may be reached at the cost of longer term complications. Tangible City budget deficit actions are being postponed only to later reappear on the horizon.

I. INTRODUCTION

This paper contains a financial valuation of the Pittsburgh Water and Sewer System. At issue is the proposed sale of the City Water Department (System) to the Pittsburgh Water & Sewer Authority. Recent public announcements have indicated a selling price of $85 - 96 million. Few details have been made public and concern has risen as to the appropriateness of these amounts.

The purpose of this paper is to examine the financial reports and other information released by the Authority in order to independently derive an amount considered the "intrinsic value" of the System. This intrinsic value is based on the free cash flow stream of the water system. This is purported to be the fair market value, if the System had been privatized by being sold to a non-governmental entity.

Details of the entire valuation process are presented in the following sections. The results will be briefly stated here so the reader knows the outcome while the intermediary steps of the analysis are developed and presented. It is concluded that the System has a value greater than the stated amount of $85 million. The actual price represents a low amount when compared to its inherent financial value. The authors estimate the System valued conservatively at $152.3 million. The discounted cash flow value exceeds $200 million when the capitalization rate used by the federal government in similar water system transactions is applied.

II. BACKGROUND INFORMATION

On March 31, 1995 the Pittsburgh Water and Sewer Authority approved Resolution No. 47 of 1995. This resolution provided for authorization, issuance and sale of Water and Sewer System Subordinated Revenue Bonds (1995 Series B) to acquire the capital assets of the Water and Sewer System from the City of Pittsburgh, terminate the existing Lease and Management Agreement, enter into a Capital Lease Agreement (terms of the acquisition), and enter into a Cooperation Agreement.

On April 11, 1995, the Pittsburgh City Council approved this action at its regular meeting. Resolution No. 47 of 1995 stated an estimated sum of $85,000,000 to be paid to the City by the Authority to acquire the Pittsburgh Water and Sewer System through a capital lease arrangement with the proceeds deposited to the City General Fund. Additionally, roughly $7 million was deposited into a reserve account and $2 million of transaction costs were paid.

This transaction entails a full transfer from the City to the Authority. The Authority assumes complete operating control of the system. Employees associated with the City Water Department (operating, clerical, engineering, etc.) became employees of the Authority . Upon expiration of the lease in 2025, the Authority has the option to purchase the System for $1.

It is noted that this transfer is between governmental/political subdivisions and not a full fledged privatization in the true sense of the word. None-the-less, a sale has occurred. This paper intends to strike a value for which the system should have been sold if the acquisition was truly a free market transaction.

III. THE FINANCIAL VALUATION AND ANALYSIS

A. METHODOLOGY

There are a variety of valuation methods. The selected method must be appropriate in terms of both the nature of its basis for comparison and the type of information available. The selected method is the Discounted-Cash-Flow Approach to Valuation. This method generates a cash flow amount per period and then reduces those cash flows (CF) to their present value using a compound interest term as the discount rate. The "intrinsic value" of the entity is the sum of the present values of the cash flows from time period 1 to infinity.

The concept of infinity (infinite cash flow) is often difficult to apply to a business firm. The *business firm* must "estimate" what the firm can be sold for at some distant point in time. However, it is appropriate to use the infinity assumption in this case. The City of Pittsburgh will exist forever, short of the end of the world as we know it. This is a good assumption because it makes the analysis cleaner. Proven financial concepts can be applied without having to make the additional assumption about its "market value" 20, 50 or 100 years from now that private sector business enterprises must do.

The discounted cash flow technique followed for the valuation is the Gordon Model using the 2 Stage Growth format. Shown below is the equation used in the model.

$$\text{Value} = \sum_{n=1}^{t} \frac{CFn}{(1+i)^{n}} + \frac{TVt}{(1+i)^{t}}$$

Where:

CF = Cash Flow
i = Discount rate
n = time periods, time =1 to t
TV = terminal value

B. FREE CASH FLOWS

- **Restatement of Financial Information**

  Cash flow amounts used in the valuation are the result of restatement as opposed to estimation. Estimates imply the creation of monetary values by the analyst based primarily on best guesses. Restatement, on the other hand, implies the use of existing financial information and facts that are "rearranged" in order to derive new values. The annual cash flow amounts used are based solely on the financial information prepared by Department, Authority, and their engineering consultants. The information was obtained from the "Preliminary Official Statement Dated June 23, 1995" which is the prospectus submitted to the SEC for the issuance of Series A and Series B municipal bonds by the Pittsburgh Water and Sewer Authority.

- **Derivation of Cash Flows** - Consistent with original calculations by the Authority, the concept of free cash flow (FCF) is used. Free cash flow is defined as operating income less expenditures to maintain the asset base and less required existing debt service. The resulting FCF represents the amount of cash generated annually over and above all necessary commitments are met. This concept and analytical technique is the preferred method used by merger and acquisition specialists in the private sector for commercial enterprises.

  The financial data in Figure 1 and subsequent restatement are drawn directly from information contained in the Engineering and Financial Feasibility Study which is part of the bond offering prospectus.

- **Water Revenue Forecast** - Revenue amounts were used verbatim without adjustment. Water revenues are forecasted by the Authority to increase 6.02 % per year for five years (1995 - 1999). Water revenues will grow from $53.3 million in 1994 to $71.4 million in 1999. Revenue increases will come from two sources:

  1 - ANNUAL WATER RATE INCREASES OF 9.5%, 9.5%, 0%, 5.3% AND 4.4% FOR YEARS 1995 THROUGH 1999, RESPECTIVELY.

  2 - AN AGGRESSIVE SALES PROGRAM TO MARKET WATER TO SURROUNDING MUNICIPALITIES (E.G. BOROUGH OF FOX CHAPEL, SHALER TOWNSHIP, ETC.)

- **Operating Expense Forecast** - Again, published costs and expenses were used without adjustment based on the logic that detailed scrutiny was expended by engineering experts in their original development. The rate of increase in expenses averaged 2.91% per year.

Two categories were restated - Interest Income and Debt Service. The structure of the analysis is to "back out" of their financials the effects of the Series B bonds. Series A finances a capital

improvement program, whereas Series B finances the acquisition of the System. Once these Series B effects are removed, cash flow values will relate solely to the operation of the System.

- **Interest Income** - Various "funds" hold moneys for reserves, contingencies or disbursement timing differences. Interest income is earned on the moneys and is added into the pool of available money to meet financial commitments. As shown in Figures 5.1 and 5.2, interest income from Series B moneys is identified from both the Debt reserve Fund and the Forward Float Fund. These amounts are carried forward to Figure 1 and shown as separate line items. These adjustments lowered cash flows by an average of $312,000 per year from 1995 - 1999. The Net Interest Income in Figure 1 are moneys earned on invested funds from Series A bond funds and prior existing fund moneys.

- **Debt Service Requirements** - Debt Service is an industry term referring to interest and principal repayments. These reported requirements were reduced by deducting the principal and interest payments of the Series B bonds. Figure 6 contains these annual amounts which average between $7 and $8 million per year. They are shown as a separate line item in Figure 1 as well. The reduction of debt service effectively increases the cash flow annually.

- **Annual Free Cash Flow** - The last line of Figure 1 shows the yearly cash flow amount ('95 - '99). The net result of the restatement adjustments is the development a set of values that are unencumbered by the Series B bonds. These cash flows show moneys generated from the business of "selling water and providing sewer service." These operating activities include selling water, operating the sewage treatment plant, proceeding with the new Capital Improvement Program and servicing existing debt (including the new Series A bonds.)

  This cash flow stream is what is available free and clear. It is the "excess" cash stream that is acquired by a purchaser. These amounts constitute the "value" of the asset - the Water and Sewer System which is being acquired by the Authority. Ownership of the asset entails sole claim to all the cash flows generated by that asset. They average $9.2 million per year from 1995 - 1999.

C. DISCOUNT RATE

A rate must be derived in order to convert the future cash flows to their present value today. It usually consists of two components: a risk free rate and a risk premium. The risk free rate used is the 30 year US Treasury Bond. The August 28, 1995 issue of the Wall Street Journal listed the August - 2025 bond to yield 6.71%.

A risk premium must be indicated. This is an additional amount of yield the market compensates the investor for bearing higher risk of default than for US Treasury debt. Risk premiums typically range from 1 to 2 %. This analysis used 1% as the risk premium based on the mid-range of values. Therefore, a discount rate (k) of 7.71% is used in the discounted cash flow calculations (See Figures 2 and 3).

D. TERMINAL VALUE

Cash flows beyond year 5 were not calculated. Proven financial theory holds that a single lump sum called a *terminal value* can be accurately derived using the Gordon Model in constant growth rate applications for infinite time period analysis.

Essentially, the year 5 cash flow of $8.9 million is increased by the Normalized Growth Rate (g) to get a cash flow of $9.4 for year 6. This amount is divided by the Capitalization Rate (k - g) of 2.83% to get the terminal amount of $205.4 million. This represents the "nominal" value of the System's cash flows from year 6 through infinity.

E. MODEL OF THE VALUATION OF THE DISCOUNTED FREE CASH FLOWS

Figure 3 contains the details of the intrinsic value of the Water and Sewer System. The terminal value amount along with the other cash flows for years 1 - 5 (1995 - 1999) are discounted at the 7.71% rate to render a stream of discounted cash flow amounts. As the time period until receipt increases, the present value of money to be received in the future diminishes. The present value at 7.71% drops from .9284 in 1995 to .6898 in 1999.

The discounted cash flows are summed together for periods 1 - 5 plus the terminal value to an "intrinsic value" of $179.2 million. This valuation amount is more than twice the sales price of $85 million quote in Resolution 47 of 1995 by the Authority.

IV. *SCENARIO ANALYSIS*

The calculated valuation of $179.2 million is subject to the variables in the model as well as the estimated amounts of those variables. The nominal cash flows used for each year did result from minor restatements. However, the entire set of financials on which those annual dollar amounts were based, along with calculated revenue and expense growth rates were based on documents prepared and released by the Authority itself.

The other variables in the model: Risk Free Rate and Risk Premium are reliable and conservative in nature. The amount of uncertainty surrounding the inputs and corresponding results is quite small. However, any situation is subject to some variability. Therefore, key variables were changed to reflect a more conservative "worse case scenario" in order to gauge their down side impact on the valuation results.

The results of this sensitivity analysis is presented in Figure 4. Four (4) worse case scenario's along with the base case scenario indicate that the value of the System far exceeds its sale price.

Also, the impact of the capitalization rate of 7% currently used in federally-owned asset sales of water and electric utilities is shown.

The highlights are as follows: Higher operating expenses ($176.5), higher risk premium ($147.7), lower revenue growth ($140.7), even zero growth in cash flows beyond year 5 ($117.2) resulted in a value exceeding Resolution 47. An average of the five scenarios renders a conservative valuation of at least $152.3 million. This is 79% higher than the $85 million acquisition price. The value of $211.4 million using federal government standards is 2.5 time the capital lease value.

Therefore, it is determined that the Water and Sewer System is being sold at 79% - 250% lower than its intrinsic value. The free cash flows of the System justify a valuation far in excess of the agreed upon transaction price.

V. *PUBLIC POLICY IMPLICATIONS*

The consequences of a transaction structured in this manner are many. Listed below are some of the more dominant issues to be addressed:

1. The City is liquidating an asset of tremendous value at "fire sale prices." The replacement cost of the facilities, equipment, human capital, lines and reservoirs may well be in the billions of dollars. Asset value should be based on the "cash flow" generated over its useful life. Basing a price on the present value equivalent of debt payments violates the free market approach of the private sector by understating market value.

2. The citizens of Pittsburgh will suffer financial hardship by selling their water system at a deep discount from its intrinsic value, thus incurring a loss in excess of $80 million. Once the lease proceeds are used up in financing part of the City operating budget, other taxes must be raised or services curtailed to make up for the depletion of funds. The bond proceeds contribute nothing to real deficit reduction. When the transaction is priced at the present value of debt payments and not the present value of free cash flows, the amount received up front is the same as the amounts to be received over time. There is no "net gain: from merely trading dollars.

3. The Authority eventually acquires not only sole ownership of the assets belonging to Pittsburgh taxpayers, but also the right to establish user fees and charges without being subject to the approval of any department, board or agency of Pennsylvania or the City. A concentration of power is being created outside the direct reach of the City leadership. Control is lost over the quality, quantity and cost of water and sewer services imposed upon the taxpayers and ratepayers of Pittsburgh and affected municipalities.

4. The stakeholders with a vested interest are the city taxpayers and the water ratepayers. They are not necessarily left unchanged or unaffected by the transaction. The appearance of low City water rates compared to certain private water companies is not a blessing. History has shown that privatization normally increases efficiencies thereby lowering costs. It is conceivable that City water rates are abnormally low and are being subsidized by taxpayers.

Taxpayers should pay the costs of city municipal services and water users should pay the true cost of water and sewage services. Granted, when jurisdictions overlap as they do in Pittsburgh, taxpayers are the water ratepayers and vice versa. However, their volume of usage and level of water conservation can vary greatly. Thus, heavy water users are net beneficiaries and taxpayers are unduly burdened.

5. The 1995 Series B bonds represents an ingenious financial arrangement. The funds were easily obtained at enviable interest rates. The borrowing power of the Authority was used instead of the City attempting to float "general obligation" bonds for the purpose of deficit financing. In the short run, financial needs are met. But in the long run, both entities are compromised. The Authority used up a measure of its borrowing capacity and reduced its financial flexibility in the process. The City avoids the difficult and unpleasant job of "righting the wrongs" that cause deficit spending. Solutions have not been achieved. The problems will ultimately have to be addressed in the not-so-distant future.

VI. *CONCLUSION*

Benefit in the short run may come from costs incurred in the long run. Focus on today's problem compromises the future integrity of financial and social well being of the citizens of Pittsburgh. The sale of the Water and Sewer System at "fair market value: could be a tremendous windfall to the City under the right circumstances. Tax burden could stabilize or maybe even be reduced. If water rates rise to pay for the System, then costs are equitably being incurred at the point of service. Any such transfer of ownership and control of this magnitude must be fashioned as a Win/Win situation for all parties involved. The Powers-To-Be appear to be the winners by benefiting financially and professionally contrary to their purpose of serving the public good.

Figure 1
RESTATED CASH FLOW FORECAST
AMOUNTS IN THOUSANDS

	1995	1996	1997	1998	1999
Revenue	$57,855	$59,773	$64,183	$68,434	$71,407
Forecasted Expenses	34,014	31,913	33,122	34,381	35,788
Operating Income	23,841	27,860	31,061	34,053	35,619
Interest Earnings	3,462	6,185	4,333	2,950	2,024
Less: Series B Debt Service Fund	(39)	(171)	(178)	(174)	(172)
Forward Float Agreement	(95)	(139)	(156)	(150)	(150)
Net Interest Income	3,327	5,875	4,000	2,626	1,702
Plus:					
Transfer - Construction Fund	235	246	253	261	271
Net Available for Debt Service	27,403	33,981	35,314	36,940	37,592
Debt Service Requirements	18,263	34,246	33,780	36,389	36,280
Less: Series B Bonds (P & I)	(3,343)	(7,436)	(7,828)	(7,675)	(7,599)
Adjusted Debt Service Requirements	14,920	26,810	25,952	28,714	28,681
Free Cash Flow – Years 1 to 5	$12,483	$7,172	$9,362	$8,226	$ 8,910

Figure 2

Terminal Value Cash Flow for Years 6 to Infinity

AMOUNTS IN THOUSANDS

Cash Flow for Year 5	$8,910
Growth Rate of Cash Flows:	
Revenue Growth Rate	6.02%
Expense Growth Rate	2.91%
Normalized Growth Rate (g)	3.11%
Discount Rate:	
Risk Free Rate: 30 Yr. Treasury Bond	6.71%
Plus: Risk Premium	1.00%
Normalized Discount Rate (k)	7.71%
Capitalization Rate (k - g)	4.60%
Cash Flow - Yr. 6	9,447
Divisor - (k - g)	0.0460
Terminal Value Cash Flow	**$205,362**
Intrinsic Value of the Cash Flows	**$179,179**

Figure 3
Intrinsic Value Calculation
AMOUNTS IN THOUSANDS

Year	1	2	3	4	5	Terminal Value
Cash Flow	$12,483	$7,172	$9,362	$8,226	$8,910	$205,362
Discount Rate	7.71%	7.71%	7.71%	7.71%	7.71%	7.71%
Present Value Factor	0.9284	0.8620	0.8003	0.7430	0.6898	0.6898
Discounted Cash Flow Stream	$11,590	$6,182	$7,492	$6,112	$6,146	$141,657

Intrinsic Value of the Cash Flows: $179,179

Figure 4

Sensitivity Analysis Of Different Assumptions

AMOUNTS IN THOUSANDS

	Valuation
Base Case Scenario	**$179,179**
Scenario A	**$176,461**
Increase expense growth rate to 3% - the expected long term inflation rate.	
Scenario B	**$147,70**
Increase the risk premium to 2% from 1%.	
Scenario C	**$140,683**
Lower revenue growth rate to 4.4% - the 1999 water rate.	
Scenario D	**$117,239**
No growth in cash flows beyond year 5	
Average of all Scenarios- Worst Case Only	**$152,253**
Scenario E	**$211,346**
Federal government 7% capitalization rate	

Figure 5.1
Interest Earned on 1995 Series - Debt Service Fund
Amount in Thousands

	Capital Improvement Bonds 1995 A		Water Dept. Buyout Bonds 1995 B	
	Amount	% of Total	Amount	% of Total
1995	$34.5	46.7%	$39.4	53.3%
1996	$111.5	39.5%	$170.7	60.5%
1997	$100.9	36.2%	$177.6	63.8%
1998	$144.0	45.3%	$173.9	54.7%
1999	$145.4	45.8%	$172.1	54.2%

Figure 5.2
Allocation of Total Forward Float Interest Income to Series B Bonds
Amount in Thousands

	Combined Interest Income	Series B %	Allocated to Series B
1995	$178.8	53.3%	$95.4
1996	$229.5	60.5%	$138.9
1997	$243.9	63.8%	$155.5
1998	$273.6	54.7%	$149.7
1999	$277.1	54.2%	$150.2

Figure 6
1995 Series B Bonds
Principal & Interest Amortization Schedule
Amounts in Thousands

Calendar Year	Number of Months	Interest Amount	Principal Amount	Extended Amount
1995	2	470	-	939
	4	470	131	2,404
	Total Debt Service for 1995			**$3,343**
1996	8	470	131	4,807
	4	463	194	2,629
	Total Debt Service for 1996			**$7,436**
1997	8	463	194	5,258
	4	454	189	2,571
	Total Debt Service for 1997			**$7,828**
1998	8	454	189	5,142
	4	445	189	2,533
	Total Debt Service for 1998			**$7,675**
1999	8	445	189	5,066
	4	435	198	2,532
	Total Debt Service for 1999			**$7,599**