

## Budget Working Paper

TO: W. Calvin Horton, Town Manager  
FROM: Bruce Heflin, Public Works Director  
SUBJECT: Fleet Management Consultant Report  
DATE: May 20, 1998

Attached is a draft report from DMG-Maximus, who are our consultants for a study of the Town's fleet replacement needs and practices. The report discusses the study methodology, results of their analysis and makes recommendations for a method of replacing vehicles and equipment and for financing the replacement.

### Background

In January, the Town entered into a consulting services contract with David M. Griffith & Associates, a fleet management consulting firm (now merged with another firm and re-named DMG-Maximus), for the purpose of developing a long-term fleet replacement plan and to evaluate alternative approaches to financing fleet replacements. The preliminary results of this work were presented to Management and the largest fleet users in April. The attached report summarizes the findings and recommendations of DMG-Maximus with regard to the Town's fleet management practices.

### Discussion

Historically, the Town has used a "pay-as-you-go" strategy for the replacement of vehicles that have reached the end of their useful service life. One major shortcoming of this approach is that there is a great deal of variability in the vehicle replacement funding requirements from one year to the next. In those years in which very expensive items such as fire apparatus or garbage trucks are due for replacement, it can be very difficult to find the necessary funds. In addition, over time, vehicles have been added to the fleet due to growth in service requirements and annexations, or have been obtained from other funding sources. Also, the components of the fleet have changed in price due to inflation and changes in specifications. These changes resulted in the replacement value of the fleet growing. Over the past several years, funding for fleet replacement has not kept pace with the growth and changes to the fleet.

In their report, the consultant provides some funding alternatives that would address the backlog in fleet replacement and would keep our vehicle replacement costs relatively stable from one year to the next.



### Next Steps

The consultant recommends that we pursue a fleet replacement strategy that combines the financial advantages of lease-purchase agreements and the flexibility to be gained from accumulation of capital in a “vehicle replacement fund”. This is consistent with the Manager’s recommended budget. The consultant will make a presentation to the Council at their May 20 budget work session on their findings and recommendations.

## **INTRODUCTION**

The Town of Chapel Hill owns and operates a fleet of 255 vehicles and pieces of equipment. Historically, the Town has financed the purchase of most of these assets with cash from current income – that is, by means of ad hoc, lump-sum appropriations of funds sufficient to cover their full purchase prices at the time of their acquisition. A significant drawback of this method of financing fleet replacement costs is that it results in uneven and unpredictable replacement funding requirements from one year to the next. This is due to the fact that, over time, the replacement costs of virtually all governmental fleets are inherently volatile or lumpy. It is not uncommon for a municipality such as Chapel Hill to need to spend twice as much on fleet replacement purchases in one year as it did in the previous year. In other years, the inverse may be true.

Since the Town’s budget cannot easily accommodate such fluctuations in fleet replacement spending needs, the replacement of vehicles sometimes must be deferred. This study was precipitated by the concerns that such deferrals have resulted in some segments of the Town’s fleet becoming older than is prudent from the standpoints of vehicle safety, reliability, suitability, and cost. DMG-MAXIMUS was engaged by the Town to examine its fleet replacement practices and to determine, in particular, whether an alternative method of managing and financing fleet replacement costs would better enable Chapel Hill to replace all of its fleet assets in a timely manner.

## **STUDY METHODOLOGY**

In order to evaluate the Town's fleet replacement situation and financing options, we began by developing a long-term replacement plan for the fleet. This plan was developed using a computer program that employs a simulation model to project future replacement costs and salvage values – by year – for each vehicle in the fleet. We used a planning period of 20 years, starting in 1999, so that we could properly evaluate alternative financing approaches on the basis of a clear understanding of long-term replacement needs.

The first step in the planning process was to develop an accurate inventory of those vehicles and pieces of equipment to be included in our analysis. We obtained a copy of the inventory stored in the Department of Public Works' fleet management information system, and then met with the Fleet Manager and representatives of each major fleet user organization to "clean up" the inventory. This involved identifying vehicles awaiting disposal, vehicles that will not be replaced in the future, front-line and backup vehicles, and so forth

The second step in developing the replacement plan was to determine when during the planning period each unit in the fleet should be replaced. Our computer program automatically determines future replacement dates by comparing the age and/or life-to-date mileage of each unit in the fleet to recommended replacement cycles for units of that type. For example, if a vehicle of a particular type should be replaced every eight years, and it currently is six years old, the computer program would plan the next replacement of this vehicle for Fiscal Year 2000, the

second replacement for Fiscal Year 2008, and so forth.

The computer program also can plan for a particular vehicle to be replaced sooner than the age criterion for that type of vehicle calls for if its average annual utilization would cause it to reach the mileage threshold for replacement sooner than it would reach the age threshold. For example, if the replacement criteria for a particular type of vehicle are 7 years or 84,000 miles, and a particular vehicle in that category is driven 15,000 miles per year, that vehicle would be programmed for replacement every 6 years.

The replacement cycles we used in developing the plan were jointly determined by the Town's Fleet Manager and members of our project team who are knowledgeable about fleet replacement practices in both public and private-sector fleet operations.

The third step in the planning process was to calculate the future acquisition cost of each vehicle in the fleet each time it was projected to be replaced during the 20-year planning period. These amounts were calculated based on the estimated purchase price in today's dollars of each type of vehicle multiplied by an expected inflation rate for the purchase price of that type of unit.

The final step in the process was to determine the funding requirements associated with financing projected fleet replacement costs under a number of different financing methods. One of these methods is to pay for replacement vehicles with cash – the financing approach that the Town currently employs. A second financing approach we explored involves using a sinking fund in which reserves are accumulated through regular monthly contributions or payments that are made over the life of each vehicle. Because the initial costs of implementing this financing

approach are quite high – about \$1.5 million per year in each of the next several years – this approach was quickly ruled out for serious consideration and is not discussed further in this report.

A third alternative we examined involves financing fleet replacement costs using lease-purchase agreements. Under this approach, the Town would borrow money from the capital markets – in all likelihood, one or more commercial banks – thereby permitting it to pay for vehicles over a period of five years. Chapel Hill has used this financing approach in the past to pay for some of its vehicles and equipment, as have a number of other cities in North Carolina and throughout the country.

The final alternative we examined involves using a reserve fund and charge-back system in conjunction with lease-purchase agreements. Under this approach, the Town would execute financing agreements with outside lenders as just described. Although it would repay these loans over five-year periods it would amortize the replacement cost of each vehicle over that vehicle's service life which, in most cases, will be well over five years. These costs would be amortized by making monthly payments or contributions on behalf of each vehicle in the fleet into a reserve fund. As will be seen shortly, one of the principal virtues of this approach is that it would make the Town's year-to-year fleet replacement *budget* quite smooth and predictable even though the Town's replacement *expenditures* would continue to be somewhat volatile or lumpy.

## PLANNING RESULTS

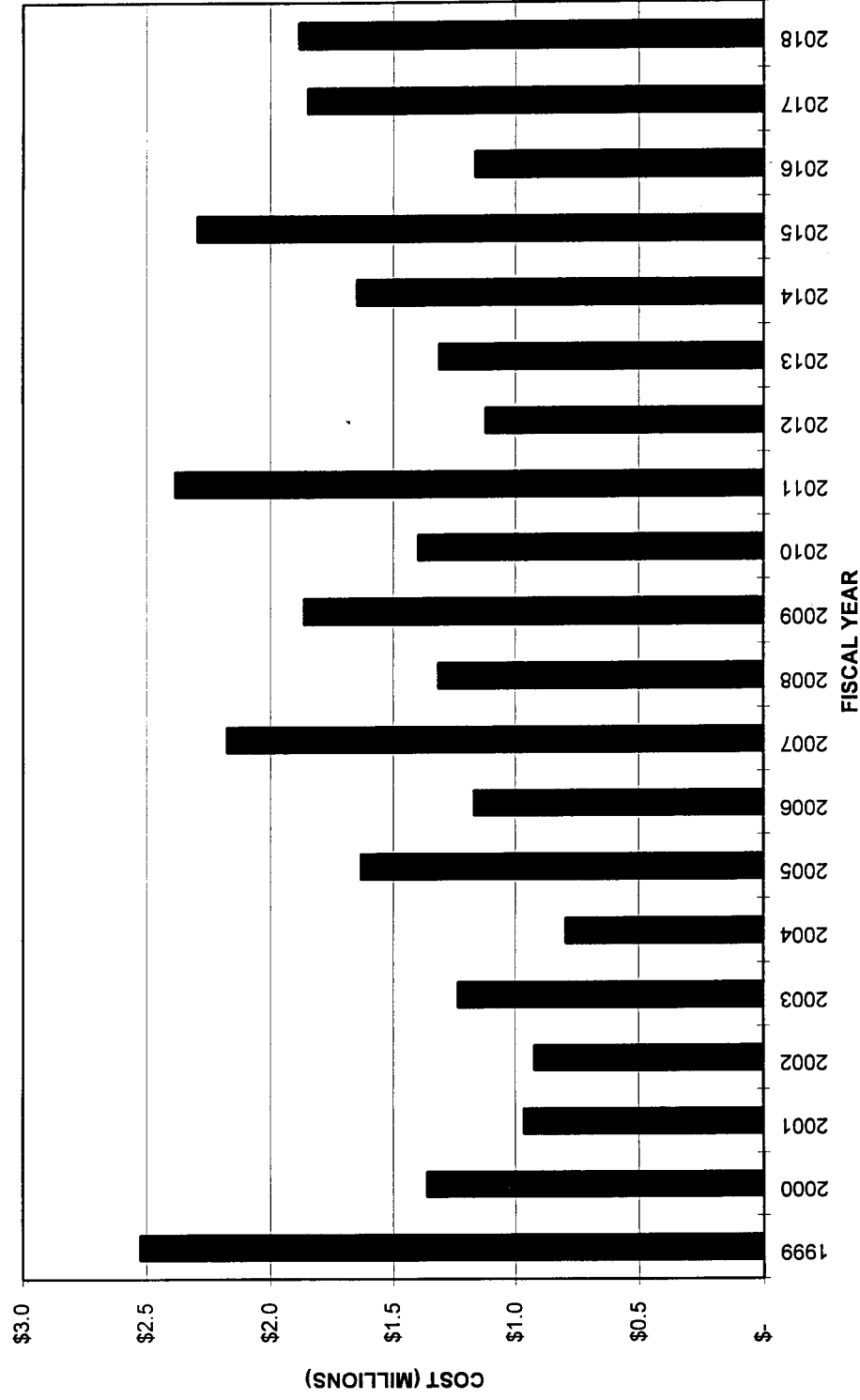
Exhibit 1 illustrates the initial results of the planning methodology described above; it is a *baseline* replacement plan for the Town of Chapel Hill's fleet. Before discussing this and other exhibits illustrating our findings, however, several key pieces of information about the fleet should be noted. The current replacement cost of the fleet is \$8.7 million and average annual replacement spending, based on a weighted average recommended replacement cycle of 88 months should be approximately \$1.2 million (in 1998 dollars). The Town reportedly has spent about \$600,000 to \$700,000 per year on fleet replacement in recent years.

The total amount originally paid for the vehicles in the Town's fleet was \$6.5 million. The estimated book value of the fleet (i.e., how much it is worth today based on straight-line depreciation of each vehicle's original purchase price) is \$2.6 million. Whereas the weighted average of the replacement *cycles* we used in developing the fleet replacement plan was 88 months (7.3 years), the current average *age* of the Town's fleet assets is 79 months (6.6 years). This clearly indicates that some vehicles are overdue for replacement since the average age of a fleet whose vehicles are normally distributed by age should be half of the average replacement cycle, in this case 44 months (3.65 years).

Turning our attention to the baseline replacement plan shown in Exhibit 1, two features of this plan stand out: the large dollar amount worth of vehicles programmed for replacement in FY 1999 and the peaks and valleys – the volatility – that characterize projected replacement costs throughout the 20-year planning period.



EXHIBIT 1  
BASELINE FLEET REPLACEMENT FUNDING REQUIREMENTS



Applying the replacement parameters we developed to the current fleet inventory suggests that slightly more than \$2.7 million worth of fleet assets are currently due or overdue for replacement (the amount shown in Exhibit 1 is smaller because it takes into account salvage proceeds for that year). Keeping in mind that the gross (before taking into account salvage proceeds) replacement cost of the Town's fleet is about \$1.2 million per year, the baseline plan clearly indicates that past fleet replacement practices have created a backlog of replacement needs. In fact, just under \$2 million of the \$2.7 million that should be spent in FY 1999 is attributable to vehicles that, based on our planning parameters, should have been replaced *before* FY 1999, and the balance is for vehicles that normally would come due for replacement in FY 1999.

As can be seen in Exhibit 1, year-to-year replacement spending requirements associated with the baseline plan are quite volatile. For example, projected expenditures for FY 2005 are twice as high as expenditures for FY 2004. Similar, albeit somewhat less pronounced, fluctuations in replacement requirements occur throughout the 20-year planning period. Such volatility is a characteristic of virtually every fleet replacement plan we develop.

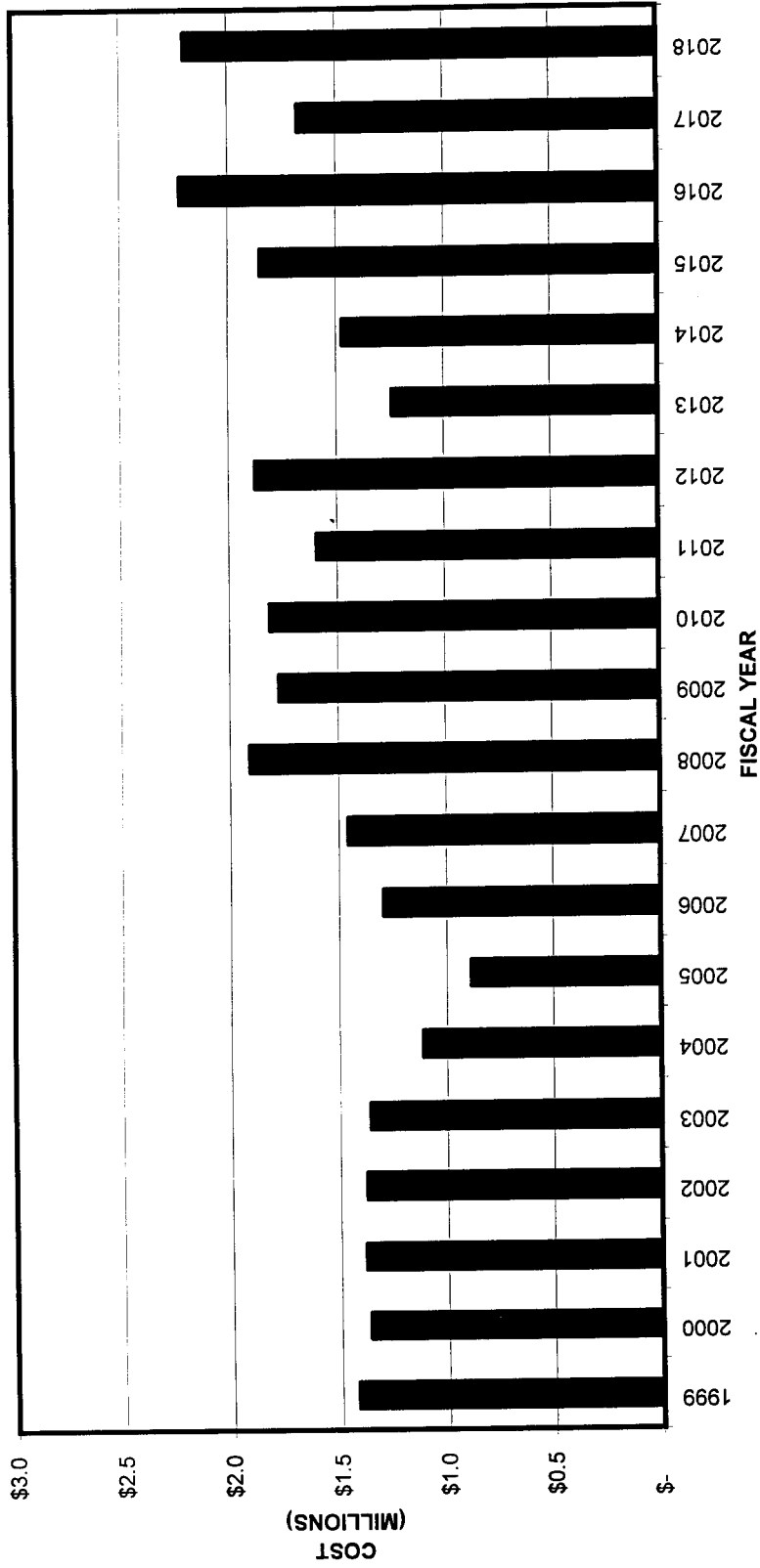
Although the baseline plan suggests that the Town should purchase about \$2.7 million worth of replacement vehicles and equipment next year, we do *not* recommend that this plan be implemented. Even if the Town were willing and able to fund the replacement of 29 percent of its fleet assets in a single year, it would not be desirable to do so for three reasons. The first is that it would be difficult if not impossible logistically for the Fleet Manager to process this

quantity of purchases in a single year. The second is that it would wreak havoc on the Town's fleet maintenance budget in future years as the large group of vehicles purchased in 1999 aged simultaneously. The third is that it would create "ripple effects" in the future fleet replacement budget since many of these assets would come due for replacement at the same time. Indeed, these ripples can be seen in Exhibit 1 in the large dollar amounts of purchases programmed for FY 2008 and FY 2018.

In order to avoid these problems, we developed a modified replacement plan that spreads out the costs of renewing the fleet (that is, eliminating the \$2-million backlog) over the next several years. This "smoothed" plan, which is shown in Exhibit 2, was developed by overriding the initial replacement dates of specific vehicles that were established by our computer program and postponing these replacements until later years. The vehicles whose replacement was postponed were selected by the Fleet Manager and our project team based on a combination of first-hand knowledge of the assets' physical condition and a review of their life-to-date and average annual usage.

As can be seen in Exhibit 2, the result of this smoothing process is that first-year fleet replacement costs were reduced by more than \$1 million from the amount called for in the baseline replacement plan. The review of alternative replacement financing approaches described below was based on this revised fleet replacement plan.

**EXHIBIT 2**  
**PROJECTED FLEET REPLACEMENT FUNDING REQUIREMENTS (SMOOTHED PLAN)**  
**Purchases Financed with Cash from Current Income**



## **ALTERNATIVE FINANCING APPROACHES**

As noted above, we explored three alternative approaches for financing projected fleet replacement costs:

1. Continuation of the current approach of financing replacement purchases with cash from current income;
2. Financing replacement purchases with lease-purchase agreements; and
3. Financing replacement purchases with lease-purchase agreements and a reserve fund and charge-back system.

Significant strengths and weaknesses of each approach are discussed in the following sections.

### **Option 1: Financing Fleet Replacement Costs with Cash from Current Income**

Under this financing approach, replacement *funding* requirements are the same as net *spending* requirements because vehicles are paid for in full at the time they are acquired and placed in service. Exhibit 2, the smoothed plan, illustrates these funding requirements over the next 20 years.

The principal advantage of financing replacement purchases with cash from current income is that it is very conservative from a fiscal standpoint, in the sense that the Town owns an asset “free and clear” the day it puts that asset into service. There is no further financial obligation associated with its *ownership and availability* (although there are, of course, obligations associated with its *operation and use*).

The principal disadvantage of this approach, however, is that funding requirements can be

quite volatile from year to year, as can be seen even in the “smoothed” plan shown in Exhibit 2. For example, projected funding requirements in FY 2008 are more than double those in FY 2005. Fluctuations in year-to-year funding needs are difficult to accommodate with appropriations from the Town’s General Fund whose level of resources is relatively constant from year to year. Consequently, funding requests in years of peak need – such as FY 2008 – may not be met under this financing approach with the result that some vehicle replacements might have to be deferred. It is likely that the replacement backlog currently confronting Chapel Hill stems in part from circumstances such as these.

Another disadvantage of this financing approach is that it is a costly way to renew a fleet that has been permitted to age, in the sense that it entails an immediate and significant increase in funding commitments. As can be seen in Exhibit 2, the Town would need to budget about \$1.5 million for fleet replacement in each of the next five years under this approach in order to renew the fleet and continue replacing vehicles in a timely manner.

A final disadvantage of this approach is that it does a poor job of fostering awareness on the part of the Town’s fleet users of the ongoing capital cost of a vehicle’s availability and, hence, does not create an economic incentive to optimize vehicle assignment and usage practices. Once a vehicle has been paid for under this approach, its user does not need to worry about the cost of the vehicle’s availability until it needs to be replaced. Indeed, there is a tendency to view the vehicle’s original acquisition cost as a “sunk” cost; a notion that often deters user agencies from disposing of under-utilized vehicles.

### **Option 2 – Financing Fleet Replacement Costs with Lease-Purchase Agreements**

One way to mitigate most of the drawbacks of the Town's current approach to fleet replacement financing is to employ lease-purchase agreements. These are fixed-term loans executed with a commercial lender (such as BB&T with whom the Town executed such an agreement a few years ago) at either a fixed or a floating interest rate. Because they contain language which allows the borrower to cancel the agreement in the event of non-appropriation of funds to make principal and interest payments, amounts borrowed under these agreements typically are not counted as part of a municipality's debt "load."

Exhibit 3 illustrates the Town's fleet replacement funding requirements over the next 20 years if the replacement costs shown in Exhibit 2 are financed with lease-purchase agreements. The specific assumptions reflected in this exhibit are that all purchases would be financed over five years at an interest rate of five percent. The financing period could be lengthened in order to more closely match the expected service lives of the different types of vehicles and equipment in the Town's fleet, but lease-purchase agreements of more than five year's duration would require the approval of the State's Local Government Commission. In the interest of simplicity, therefore, we have limited the financing period to this amount of time.

There are a number of advantages for the Town of adopting this replacement financing approach. One is that it permits the Town to renew the fleet at a relatively low up-front cost. For instance, the Town can acquire the \$1.5 million worth of replacement vehicles in FY 1999 called for in the smoothed plan with an initial outlay for principal and interest payments of only

\$345,000. Over the next five years, the Town could acquire \$7.4 million worth of vehicles for a total outlay of \$5.1 million. In essence, this approach would buy the Town some time to adjust to the increased level of funding required to replace its fleet assets in a timely manner.

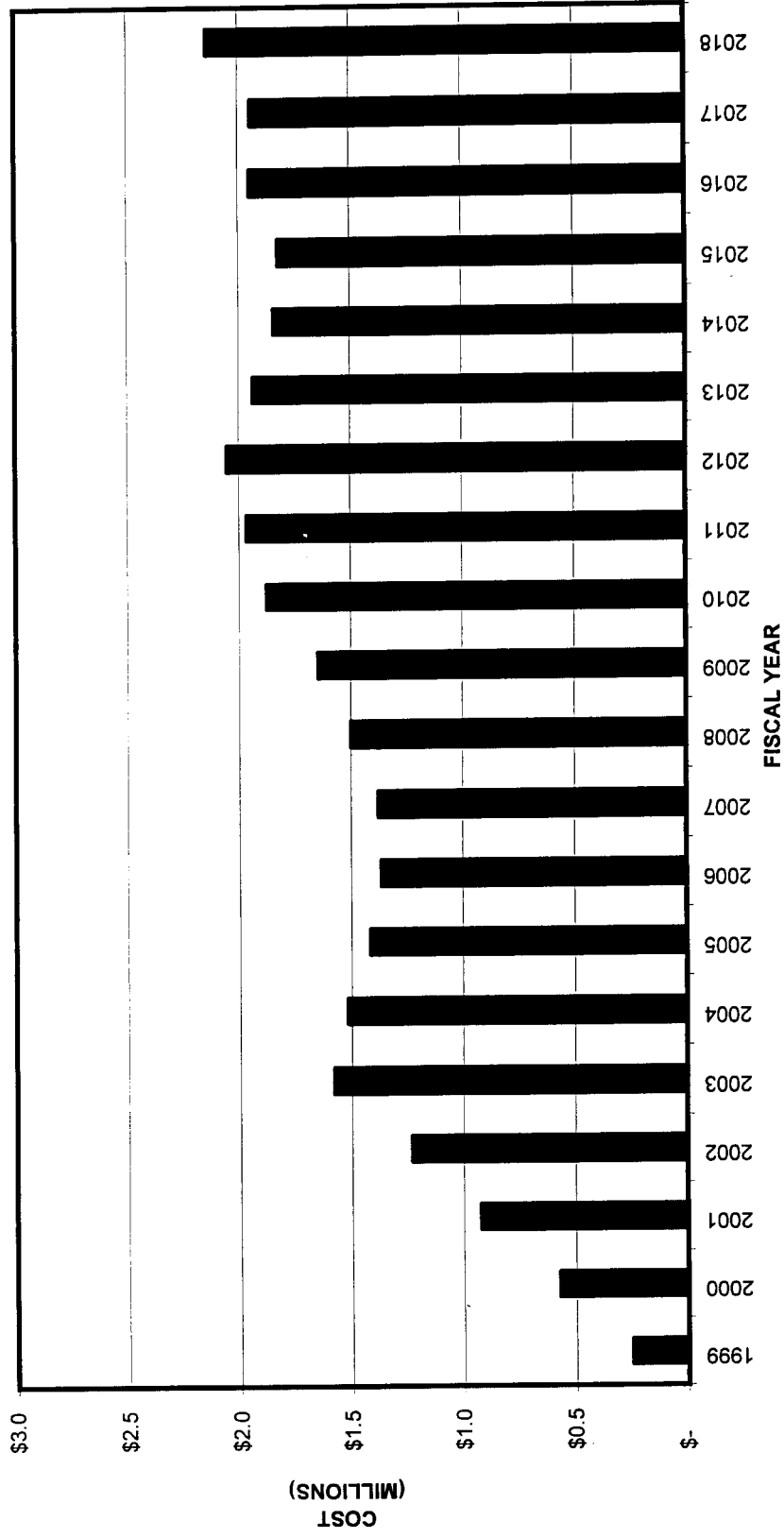
A second advantage of this approach is that it eliminates much, albeit not all, of the volatility associated with funding the Town's fleet replacement costs. Although replacement expenditures are the same as those shown in Exhibit 2, funding requirements are smoother and more predictable. This greatly reduces the likelihood that some vehicle replacements will be deferred in years of peak need due to a lack of funds.

This approach also promotes fleet user recognition of the full, ongoing costs of vehicle availability, thereby providing incentives for Town agencies to optimize vehicle assignment and usage decisions. In addition, lease-purchase agreements are easy to administer in conjunction with a charge-back system because user charges (to the agencies that use vehicles) can be based on the annual principal and interest payments for specific vehicles.

A final advantage of lease-purchase agreements is that they are less costly in economic terms than is cash financing of fleet replacement purchases. Since the Town can invest cash that it otherwise would spend to purchase vehicles at taxable interest rates (currently about 5.75 percent), and can borrow cash at tax-exempt interest rates (estimated a 5 percent for the type of lease-purchase agreements contemplated in this approach), lease-purchase financing is actually cheaper than cash financing.



**EXHIBIT 3**  
**PROJECTED FLEET REPLACEMENT FUNDING REQUIREMENTS**  
**Purchases Financed with Lease-Purchase Agreements**



■ PRINCIPAL AND INTEREST PAYMENTS

The only significant drawback of this approach is that once the Town commits itself to the use of lease-purchase agreements, it can be rather costly in the short-term to transition to a financing approach that does not involve borrowing (although we are not aware of any particular reason why the Town might want to do this). This is because eliminating its reliance on debt would require the Town to simultaneously retire outstanding debt while paying for some new vehicles with cash.

**Option 3 – Financing Fleet Replacement Costs with Lease-Purchase Agreements and a Reserve Fund**

The final replacement financing approach explored in this study, and the one we recommend the Town adopt involves using the lease-purchase agreements described under Option 2 in conjunction with a reserve fund and charge-back system. The funding requirements over the next 20 years associated with this approach are illustrated graphically in Exhibit 4 and are tabulated, along with other key financial attributes of this approach, in Exhibit 5.

This approach has all the virtues of Option 2 while further reducing the volatility associated with funding future fleet replacement costs. Rather than take advantage of the temporary “windfall” created in Option 2 by having to budget only \$350,000 in FY 1999 and \$680,000 in FY 2000 (see Exhibit 5, Line 3), this approach provides for the creation of a reserve fund whose balances reduce the year-to-year volatility in replacement funding requirements – seen in Exhibit 3 – over the long term.

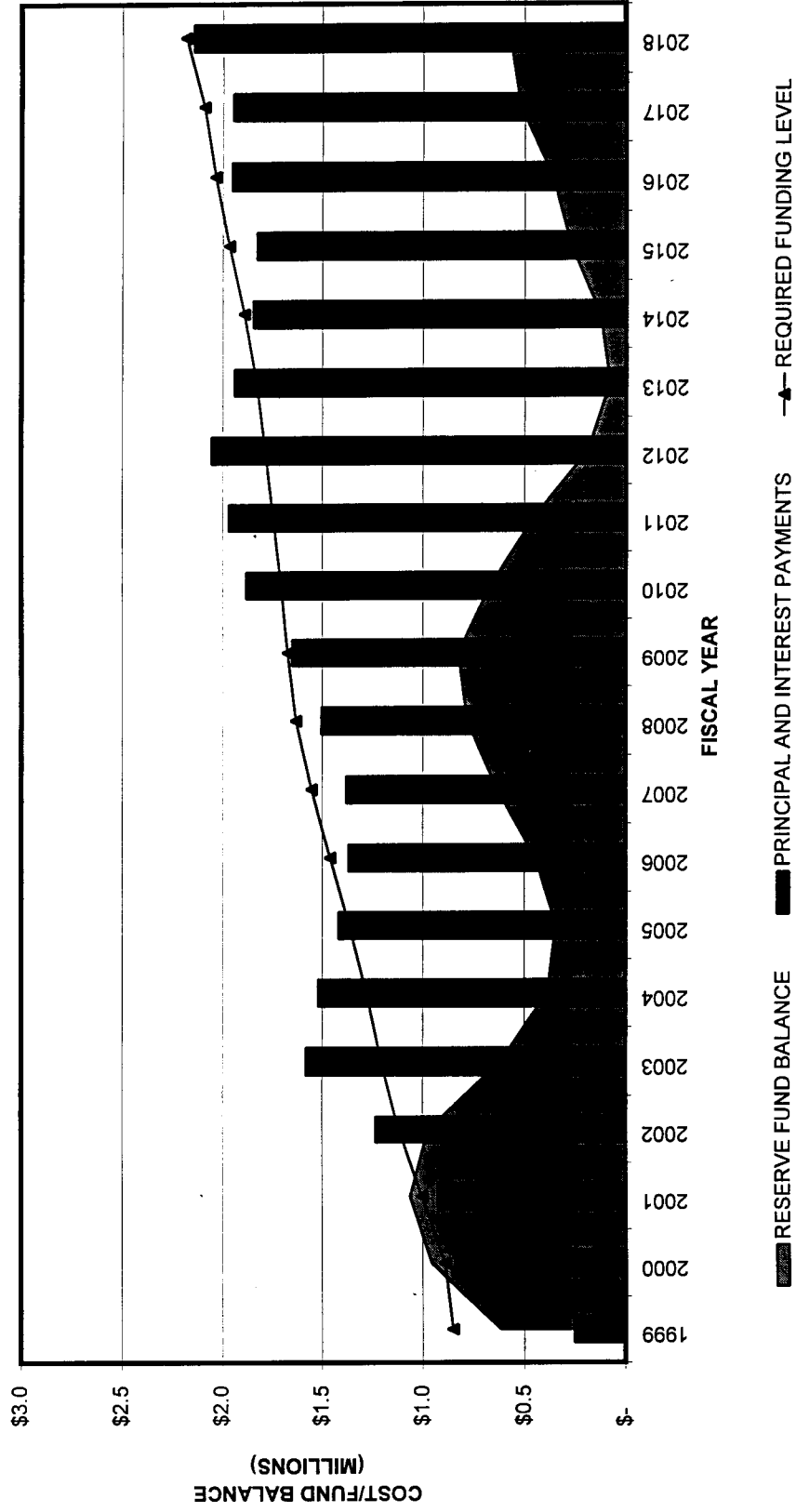
Specifically, this scenario assumes that the Town would appropriate a total of \$850,000 in FY 1999 and deposit the difference between this amount and the \$350,000 needed for P&I payments in a formally designated fleet replacement reserve fund. In subsequent years, the Town would need to increase its level of fleet replacement funding by about five percent per year.

As can be seen in Exhibit 4, the reserve fund balance would grow in years in which contributions to the fund exceed outlays for principal and interest payments and would shrink in years in which P&I payments exceed contributions. The fund balance, in short, serves as a shock absorber, making fleet replacement funding requirements smooth, predictable, and relatively invulnerable to budgeting decisions that require some replacement purchases to be deferred.

A reserve fund balance also would make it easier for the Town to switch from lease-purchase agreements to a replacement financing approach employing a sinking fund if it decided for some reason in the future that it no longer wanted to rely on the capital markets for fleet replacement funds. As can be seen in Exhibit 5, Line 2, the Town also could reduce its principal and interest expenditures by \$200,000 to \$500,000 in a given year if unforeseen fiscal constraints mandated that fleet-related spending be curtailed. Coupled with the ability to refinance outstanding debt at any time, this capability means that this financing approach in no way reduces the Town's flexibility when it comes to obligating funds for fleet replacement.

The only disadvantage of this approach in comparison to Option 2, the pure lease-purchase approach, is that it is somewhat more complicated to administer due to the way that

**EXHIBIT 4**  
**PROJECTED FLEET REPLACEMENT FUNDING REQUIREMENTS**  
Purchases Financed with Lease-Purchase Agreements and Reserve Fund



**EXHIBIT 5**  
**CASH FLOWS AND FINANCIAL POSITION UNDER RECOMMENDED FINANCING APPROACH**

FISCAL YEAR, ENDING ...	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	10 Year Total
<b>REPLACEMENT EXPENDITURES</b> (Amount Borrowed)	\$ 1.52	\$ 1.47	\$ 1.47	\$ 1.50	\$ 1.47	\$ 1.21	\$ 0.97	\$ 1.41	\$ 1.59	\$ 2.05	\$ 14.66
<b>NEW PRINCIPAL &amp; INT PAYMENTS</b>	\$ 0.35	\$ 0.33	\$ 0.33	\$ 0.34	\$ 0.33	\$ 0.27	\$ 0.22	\$ 0.32	\$ 0.36	\$ 0.47	N/A
<b>TOTAL PRINCIPAL &amp; INT PAYMENTS</b>	\$ 0.35	\$ 0.68	\$ 1.01	\$ 1.35	\$ 1.69	\$ 1.62	\$ 1.50	\$ 1.49	\$ 1.51	\$ 1.64	\$ 12.84
<b>SALVAGE PROCEEDS</b>	\$ 0.09	\$ 0.10	\$ 0.09	\$ 0.12	\$ 0.10	\$ 0.10	\$ 0.08	\$ 0.12	\$ 0.13	\$ 0.14	\$ 1.07
<b>NET OUTLAYS (P&amp;I - SALVAGE)</b>	\$ 0.25	\$ 0.58	\$ 0.93	\$ 1.24	\$ 1.58	\$ 1.52	\$ 1.42	\$ 1.37	\$ 1.38	\$ 1.50	\$ 11.77
<b>DEPRECIATION-BASED CHARGES</b>	\$ 0.72	\$ 0.89	\$ 0.99	\$ 1.08	\$ 1.15	\$ 1.18	\$ 1.21	\$ 1.25	\$ 1.29	\$ 1.34	\$ 11.10
<b>REPLACEMENT SURCHARGE</b>	\$ 0.13	\$ 0.01	\$ 0.02	\$ 0.05	\$ 0.08	\$ 0.13	\$ 0.18	\$ 0.23	\$ 0.25	\$ 0.25	\$ 1.35
<b>TOTAL FUNDING REQUIRED</b>	\$ 0.85	\$ 0.90	\$ 1.01	\$ 1.13	\$ 1.23	\$ 1.32	\$ 1.39	\$ 1.48	\$ 1.54	\$ 1.60	\$ 12.45
<b>FUND BALANCE CALCULATION</b>											
<b>BEGINNING FUND BALANCE</b>	\$ -	\$ 0.62	\$ 0.96	\$ 1.08	\$ 1.00	\$ 0.67	\$ 0.48	\$ 0.46	\$ 0.59	\$ 0.77	\$ -
<b>CHARGE-BACK REVENUE</b>	\$ 0.85	\$ 0.90	\$ 1.01	\$ 1.13	\$ 1.23	\$ 1.32	\$ 1.39	\$ 1.48	\$ 1.54	\$ 1.60	\$ 12.45
<b>OUTLAYS</b>	\$ (0.25)	\$ (0.58)	\$ (0.93)	\$ (1.24)	\$ (1.58)	\$ (1.52)	\$ (1.42)	\$ (1.37)	\$ (1.38)	\$ (1.50)	\$ (11.77)
<b>INTEREST EARNINGS</b>	\$ 0.02	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.02	\$ 0.01	\$ 0.01	\$ 0.02	\$ 0.02	\$ 0.02	\$ 0.20
<b>ENDING FUND BALANCE</b>	\$ 0.62	\$ 0.96	\$ 1.08	\$ 1.00	\$ 0.67	\$ 0.48	\$ 0.46	\$ 0.59	\$ 0.77	\$ 0.88	\$ 0.88
<b>OUTSTANDING LOAN BALANCE</b>	\$ 1.38	\$ 2.37	\$ 3.03	\$ 3.38	\$ 3.36	\$ 3.11	\$ 2.71	\$ 2.83	\$ 3.13	\$ 3.82	\$ 3.82

*All values stated in millions of dollars.*

contributions to the reserve fund are determined. These contributions would be obtained through internal lease payments to the reserve fund made by each department for each vehicle and piece of equipment they own. These lease charges would have two components: a depreciation charge, based on the straight-line amortization of the net (of salvage value) capital cost of each asset in the fleet; and a replacement surcharge, based on a long-term forecast of the difference between lease-purchase costs (i.e., spending requirements) and fleet depreciation costs.

In reality, the Town could simply make lump-sum transfers of cash from the General Fund to the Fleet Replacement Fund rather than utilize such internal lease charges, but this approach would not foster recognition by the Town's fleet users of the fixed costs of the fleet assets they use. Thus, it would miss a major opportunity to promote the cost-effective assignment and use of vehicles and equipment.

Once processes are established for developing and updating long-term replacement plans and calculating and levying associated charge-back rates, this financing approach will enable the Town to 1) predict and make provisions to meet year-to-year fleet replacement costs well in advance; 2) avoid deferring replacement purchases as is sometimes necessary in the absence of a systematic replacement funding process; and, consequently, 3) promote the safety, reliability, suitability, and efficiency of its fleet assets. For these reasons, we recommend that the Town implement this fleet replacement financing approach.