CAPITAL FACILITIES INVENTORY
AND ASSESSMENT STUDY
GRAFTON, MASSACHUSETTS

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Principal Investigators:
Jeanne Armstrong, MLA
Meir Gross, Ph.D.
John R. Mullin, Ph.D., AICP

The Center for Economic Development wishes to thank the Research Team

Martin E. Harper
John C. Maximuk
Robert L. Palmer

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I. Introduction

1.1 Purpose of Study

The purpose of this capital facilities study is threefold:

1. Provide a public facilities inventory component for the Grafton Master Plan;
2. Assess the existing levels of public services in relation to capital facilities; and:
3. Research an array of standards and guidelines through which Grafton can identify excess or deficient capital facilities.

A capital facilities plan is more than just a schedule of projects. It must include policies, criteria, standards and priorities. A comprehensive capital facilities inventory and assessment must therefore reflect these qualities in order to successfully implement a capital facilities plan. (Bowyer)

As the client indicated at the onset of the study, few towns or cities have a published analytical information database of their departmental capital facilities. The inventory component of this study serves this purpose. This component clarifies the relationship between departmental capital budgets and requests for financial allocations. The inventory component also serves to bridge the gap between the requests and the allocations. The research continues with the assessment of condition. The purpose of this section is to provide Grafton with a status report on the capital facilities in each department. The use of standards is introduced as the third step so that researchers can analyze the capital facilities. Departments may have their own guidelines for standards or they may utilize national, regional, state, technical, professional, trade or local standards. The planner's role is to initiate a responsive capital facilities management program. Service levels will increase through the introduction of standards. The key question to ask is “Do the current departmental standards satisfy the community's needs?”

1.2 Applicability to Other Municipalities

Communities within the entire Blackstone River Valley are experiencing growth. According to New England Business magazine, “the areas south of Worcester in the Blackstone Valley are proliferated with new subdivisions” (Focer). There have been over 5,000 new housing units built in the Blackstone Valley since 1980. Not surprisingly, most of the demand for new
housing comes from commuters who work outside of the area. With the development of Route 146 as a four-lane thruway, this region will have direct connections to Worcester, Massachusetts and Providence, Rhode Island. [Please see Figure 1 - Grafton Location Map on the next page]. The Massachusetts Turnpike already provides Grafton with direct access to Boston, Hartford, Albany and other points west. (Grafton Open Space and Recreation Plan)

Uncontrolled or unanticipated growth in rural New England towns is not unique. As the Boston metropolitan fringe extends its network of rail and highway systems into Western Massachusetts, development becomes a sudden reality. Quite often municipalities are caught off guard and spend years trying to catch up to extensive demands on capital facilities and public services. Regional planning theories suggest that with the addition of transportation links, growth is inevitable. The expansive growth of the Route 128 area is an example of the types of growth that can be anticipated. As longer commuting times become more acceptable and commuter-rail networks become more accessible, rural towns gain attractiveness as points of growth for all types of land use. The ability of a municipality to gauge itself against a set standard provides an invaluable planning tool to adequately predict capital facility demands.

1.3 What is a Capital Facility?

For the purpose of this study, a capital facility is defined as: any object purchased by the Town that possesses a large acquisition cost and have a multi-year life span. Beyond the obvious, such as roads, bridges and sewers, capital facilities include dump trucks, police cruisers, public buildings, voting booths, etc.
Figure 1:
Grafton Location Map
n.t.s.

Capital Improvement Inventory and Assessment
Grafton, Massachusetts
II. The Town of Grafton

2.1 Town Character

Comprising 22.5 square miles, Grafton is located in the north end of the Blackstone River Valley. This area stretches southeast of Worcester to Providence. After the World War II, Grafton's proximity to Worcester influenced the development of North Grafton as a suburban town. Additionally, with the Massachusetts Turnpike located in Grafton and the subsequent proximity of Route 495, further development pressures became relevant for the Town. Since 1970 the Town has experienced a fifty-eight percent (58%) increase in its housing stock. During the 1980s, other towns in the Blackstone Valley experienced similar surges in residential growth.

In response to Worcester's planned 1.1 million square foot bio-technology park, Grafton has received authority from the Massachusetts State Legislature to rezone the old Grafton State Hospital land for development and occupation by biotechnology companies. Tufts University School of Veterinary Medicine, which owns more than 600 acres abutting the hospital land, plans to develop another 200 acres for bio-technology use. As a result of these developments the projected increase in manufacturing and research employment will be by sixty percent (60%) within ten (10) years.

2.2 Population Estimates

In 1990, the average household size in Grafton was 2.64 persons. This number reflects a drop from the 1980 average household size of 2.87. This drop reflects both a decrease in family size, a nationally evident trend, and a response to the condominium and other multi-family housing that dominated the Grafton housing market during the 1980s. At present, Grafton has 5,350 housing units on approximately 3,600 acres. A build-out analysis under current zoning by-laws reveals that the developable land-base can support an additional 4,520 housing units. Of these additional units, the majority would be single-family units zoned at one (1) per 40,000 square feet. Based on Grafton's average household size of 2.64 and the regional average household size of 3.325, Grafton's projected total population at build-out could range between 25,343 and 28,536. These numbers are based on the 1990 census population of 13,035. As seen in Table 1 on the next page, Grafton experienced a sixteen percent (16%) population growth since 1985. The growth is in response to the outward expansion of Boston's rail and highway networks.
Year | Population | Numeric Change | % Change
--- | --- | --- | ---
1980 | 11,238 | | |
1985 | 11,239 | 1 | 0%
1990 | 13,035 | 1,796 | 16%

Table 1 - Population Growth Since 1980

Source: Grafton Open Space and Recreation Plan

The direct results of current and planned unit developments (PUD) are yet to be seen. However there are enough permitted developments to warrant this study. In south Grafton there are plans to build approx. 901 housing units. In North Grafton there are approx. 207 housing units. With a total of 1,108 projected housing units the demand placed on the capital facilities is substantial. The sizes of the proposed subdivisions range between a 26 PUD and a 298 PUD.

Further development opportunities will come with the implementation of a public transit rail stop in conjunction with the development at the old Grafton State Hospital, and Tufts University research park. The Boston Mass Transit Authority will connect Grafton with the “T” network of rail transportation.
III. Capital Facilities Inventory and Assessment

3.1 Method of Assessment

In order to accomplish the objectives of the study, a methodology was first developed and is provided below in Figure 2.

Figure 2 - Methodology of Study

The second step required data collection on each Town department via personal interviews with department personnel and other sources of data such as the 1991 Town Report, other Town departments and agencies of the Commonwealth of Massachusetts. A sample of the questions asked during the personal interviews with department personnel is provided in Appendix A.
The third step combined the information from the various data sources to arrive at an assessment of capital facilities. This assessment is primarily the opinion of the department head. The department head's experience was considered by the research team to be an accurate reflection on the status of capital facilities within their department since no formal assessment process is currently in place.

The fourth step was to research standards applicable for each department and to suggest a standard that each department could utilize in order to improve its capital facilities and services to the residents of Grafton.

3.2 Departmental Capital Facilities Inventory and Assessment

As described previously, each department head was interviewed by a member of the research team to determine the inventory and to assess the condition of the capital facilities. The results of the standards research for each department are presented within this section. Finally, a recommendation for each department is provided in relation to the management of its capital facilities.

Engineering Department

Introduction: The Engineering Department has responsibility for all civil engineering aspects of town capital facilities and is headed by Mr. Mark Santora. Mr. Santora is the only employee within the Department and utilizes consultants for some of the town's civil engineering work. However, in recent years he has tended to keep the work in-house in order to reduce costs. Areas of responsibility for this Department include the design of highways, sidewalks, drainage facilities, dams, landfills, and bridges, technical review of site plans and special permits, subdivision review and construction inspection. In addition, this Department serves as an agent to the town's Board of Health and Conservation Commission.

Assessment: Mr. Santora characterizes the overall condition of the capital facilities under his direction as "good". Problem areas exist where there is a lack of state or federal financial project aid. The Town provides limited funding for capital facilities improvements in the Engineering Department. The existing funds are therefore dedicated to fixing detrimental problems in a manner that minimizes costs while mitigating public safety and town maintenance concerns.
The use of engineering standards and guidelines varies within the Department, depending on the type of project and the source of project funding. A more in-depth description for each Department area of responsibility and the complex nature of this point is available in Appendix B. For example, highway engineering standards and guidelines mandated by the Federal Highway Administration (FHWA) for federal aid highway projects are typically adopted from the American Association of State Highway and Transportation Officials (AASHTO). These funds are usually intended for full-road reconstruction and include highway, bridge, drainage and sidewalk improvements.

On the state level, the Massachusetts Department of Public Works (DPW) provides project aid to towns for highway and bridge work and subsequently has their own set of engineering standards and guidelines. These guidelines are generally a modification of the AASHTO standards and are tailored for local conditions and materials availability. The DPW does not provide funding for sidewalks and drainage, though it does provide standards and guidelines for projects it undertakes itself. If a town project does not qualify for either of the two prior-mentioned funding sources, the town finances the project and utilizes general engineering standards and guidelines deemed acceptable and appropriate by Mr. Santora on a project-by-project basis. These town-funded projects typically utilize the minimalist level of accepted engineering standards and guidelines in order to address as many problem areas as possible.

Recommendation: The problem that arises from utilizing such a varied scheme of standards and guidelines is a discontinuity in the quality of capital facilities within the Town. This yields higher, more frequent maintenance costs and earlier replacement costs on those portions of the Department's capital facilities that are not designed to as high of standard as other portions. While Mr. Santora's utilization scheme of standards and guidelines is a valid and generally accepted practice, he himself comments that this approach is very reactive instead of proactive.

In order to achieve a proactive capital facilities management system for the Engineering Department, the Town must commit to utilizing standards and guidelines in a consistent manner throughout the town. The place to begin amassing these standards and guidelines is from the state agency responsible for that area of concern. Generally, the Commonwealth's standards and guidelines are adaptations of standards and guidelines adopted by a federal agency or well-respected and knowledgeable organization. These standards and guidelines possess a strong scientific and logical basis with specific provisions for prevailing local conditions, such as weather conditions.
conditions and materials availability. Alterations to the standards and guidelines will be necessary to customize a set of standards and guidelines appropriate for the Town and the Department.

Of course, this recommendation will require the Town to allocate more funding to the Engineering Department initially, but the long-term payoff will be realized with fewer repairs to and longer life-cycles for the capital facilities. The potential also exists for some untapped sources of funding and information regarding capital facility management to be discovered and are currently unexplored by the Town.

Sewer Department

Introduction: The Town sewer system, under the direction of Superintendent Fred G. Haffty Jr., served 1,800 customers in 1991 compared with 1,100 customers in 1986. The collection system and treatment plant are divided into three (3) separate sub-systems:

1) interceptor sewers,
2) pump stations, and
3) treatment plant.

Interceptor sewers are the main sewer lines that receive flows from lateral sewers and convey the flow directly to the pump station or treatment plant. The sewer lines have been designed to carry peak flows (those that exceed the high flow for a twenty-four [24] hour period) up to the year 2020. This is estimated on the basis of the total developed and developable acreage in their collection basins. The extension of the collection system is an on-going process by both the Town and developers.

Assessment: The pump stations are presently operating at fifteen to twenty-five percent (15-25%) of capacity during dry weather days and thirty to fifty percent (30-50%) during wet weather days, approximately sixty-two (62) days per year. The only design problem appears to be that the flow velocity in the discharge pipe may exceed the acceptable limit during peak flows. However, this is not an immediate problem and will be addressed when the pump station approaches capacity.
The treatment plant has a design capacity of 1.6 million gallons per day (MGD) when all tanks are in use. This is based on a conservative overflow rate of six-hundred (600) gallons per day per square foot (600 GPD/SF). Operations data show that the treatment plant can handle a higher flow than design capacity. The Grafton Treatment Plant has treated 1.6 MGD for a period of several days using one-half the tanks, but this may be too high a volume for the plant to handle on a consistent basis. Superintendent Haffty recognizes that the plant can treat 2.4 MGD, on a constant basis without violating any discharge permit conditions.

In terms of standards, the Grafton Treatment Plant is bound by the Environmental Protection Agency (EPA) and the Commonwealth of Massachusetts, Department of Environmental Protection (DEP). A Standard Discharge Permit is issued every five (5) years from the DEP. The plant must also comply with the National Pollutant Discharge Elimination System (NPDES) permit given by the EPA. As a dynamic and progressive organization, the EPA is constantly updating the permit requirements for allowable discharge into the Blackstone River. According to Mr. Haffty, there are a number of methods to meet these changes. The Grafton Sewer Department will attempt operational changes first to meet revised standards rather than capital investment.

**Recommendations:** Accurate population projections are essential to the Department to meet the ever-changing standards developed by the EPA. Discharge permits will continuously require that the Department meet strict criteria, and more notably, changes in the criteria. EPA guideline changes can mandate the Town to invest in additional capital facilities, even without an increase in population. Therefore, the Grafton Sewer Department must have direct information on permitted developments and zoning changes that will place increased demands on the sewer system. When the treatment plant was built, in 1979 the projected population for Grafton was 9,500 for the year 1990. In 1990, the population of Grafton was 13,035, surpassing that estimated population by 3,535. Maintaining population and land-use records will provide the Department with the planning tools required to maintain the current level of quality service.

**Water Service (Grafton Water District and South Grafton Water District)**

**Introduction:** Drinking water for the Town of Grafton is supplied from the Grafton Water District (GWD) for the northern and central portions, and the South Grafton Water District (SGWD) for the southern portion. Each District is a quasi-public agency and therefore does not fall under the scope of capital facilities holdings and service for the Town of Grafton. However,
for the purpose of this study and the relevance of water supply as a public utility, they are examined equally with other Town departments.

Eighty-five percent (85%) of the Town's population lives within the GWD service area, which was established in 1984. The District services sixty percent (60%) of the Grafton housing units through approximately 2,400 service connections. The number of connections is up 451 from 1,941 in 1986. In 1987 residents in the GWD voted to allocate three (3) million dollars to purchase the assets of the Massachusetts American Water Company. (Grafton Open Space and Recreation Plan)

In a quasi-public utility each customer is considered an owner. The organization is mandated by an official Charter. Both water districts are controlled by federal agencies, the Environmental Protection Agency (EPA), and the Commonwealth, Department of Environmental Protection (DEP). Regulations that determine the standards for drinking water quality are established in the Safe Drinking Water Quality Act.

Grafton Water District

Introduction: The GWD has spent over one (1) million dollars to upgrade its water system. Today, three (3) wells provide 268 million gallons per year (GPY) to the District's customers. Capacity is one (1) million gallons per day (GPD) at Well Number 1 on Worcester Street, one (1) million GPD at Well Number 2 on East Street, and 280,000 GPD at Well Number 3 on East Street. Two (2) standpipes, or storage tanks, are used in the system: the Brighton Hill Standpipe, built in 1957, with a 325,000 GPD capacity, and the Pigeon Hill Standpipe, built in 1971, with a capacity of 600,000 GPD. The average yield per day is 734,000 gallons, well within the systems 1.5 MGD safe yield capacity, but there is a peak-day deficit system wide.

Assessment: With the addition of the Follette Street Well an additional 500,000 GPD capacity will be added to the system resulting in a surplus of 250,000 GPD. However, by the year 2000, a new well with a capacity of one (1) million GPD, perhaps tapping the aquifer under the Miscoe Brook, will be required.

The GWD currently charges $4.01 per 1,000 gallons of drinking water. This represents a ten percent (10%) increase from last year (1992). This fee covers all capital, labor, and costs to the water delivery system. Other services provided by the District are the installation of fire hydrants,
as determined by the Fire Department and leased to the town. New developments are charged for water service on a “per connection” basis and are the responsibility of the developer.

The EPA Water Quality Division monitors and tests the water quality on a regular basis. In terms of standards, the Department is required to provide twenty-one pounds (21 lbs.) of pressure at the tap of safe drinking water. Standard engineering practices determine the location, function and operation of the pumping systems. “Because every situation is different, it is impossible to set a national or even a state standard.” states Dept. Head Matthew Pearson. This is due to the fact that water comes from so many different sources that there is no common characteristic that can be standardized, other than the quality once delivered to the public.

South Grafton Water District (SGWD)

Introduction: The SGWD's main well is Number 2 on Ferry Street and it delivers 150,000 GPD. A standpipe at Leland Hill has a capacity of 250,000 gallons and a new concrete tank on Keith Hill Road holds 750,000 gallons. The Providence Street Well (Number 1) is used exclusively as a back up. The present system can just meet the peak day demand of 2300,00 GPD, and any new service connections will require a new well. The SGWD contracted for a water delivery system study with Whitman & Howard, an engineering firm, and the result found an adequate level of service in the water delivery system.

Assessment: The South Grafton Water District charges a user-fee per 1,000 gallons of drinking water. This fee covers all capital, labor, and costs to deliver the water. Other services provided by the District are the installation of fire hydrants, emergency repair, and new construction hook-ups. Fire hydrants are located by the Fire Department and leased to the Town. Water service for new development is charged on a “per connection” basis and is the responsibility of the developer. Large installations and extensions are contracted out to private companies.

The Grafton water supply is relatively easy to access through underground aquifers. The two water districts do not have to go search beyond this source for an adequate drinking water supply. However, some areas of town are difficult to serve due to their remote locations, and will require additional capital expense, i.e. another pumping station.

Recommendation: Both water districts provide satisfactory service levels to existing customers. Concern over the ability to keep satisfactory service levels in light of development is an issue. One water district has expressed the need for a central maintenance yard including a shop in order to
store and repair its equipment. If substantial growth is realized, the Town can justify a cooperative
effort between the two (2) water districts in order to maintain adequate service levels. The ability
of the water districts to provide service to new development is an area of concern. Service
expansion was denied on at least one occasion to a large condominium complex. As a result, the
complex maintains its own wells. With projected growth in population and land use, any service
deficiencies are an indication of vulnerability. The ability to keep up with growth can be severely
affected. There is also a need to understand the comprehensive demands of the water system and
evaluate it on a regular basis. System upgrades should precede normal depreciation levels to avoid
gaps in services. See Appendix K for a listing of sources for current standards of practice.

Public Works Department, Highway Division

Introduction: The Highway Division is part of the Public Works Department and is headed by
Mr. Roy Charbonneau. The division is responsible for the physical upkeep of Town highways
and associated facilities, including drainage and sidewalk facilities. The division performs
operations such as snow removal, sweeping, storm drain cleaning, highway repairs and
construction, sidewalk construction and repairs, and tree removal and pruning. The division also
assists many other Town departments when required.

There are approximately 180 miles of roadway that the Town is responsible for
maintaining. In addition to the roadways themselves the Highway Division's major capital
facilities include equipment used to maintain the highway network and buildings used to house and
repair equipment, store supplies and provide office space for the highway operations staff.

Assessment: Mr. Charbonneau rates the overall condition of the Highway Division's equipment
and buildings as "good." Mr. Charbonneau attributes the good condition of the equipment, despite
its age, to having a full-time mechanic on his staff of seven (7). An immediate need exists to
replace the 1974 Mack Dump Truck due to extensive body rot. The condition of the buildings is
described as good, with the salt storage shed needing some repairs or replacement within the next
few years. Mr. Charbonneau also felt another bay should be added to the garage facility in order to
keep most of the equipment inside. A complete listing of the capital facilities for the Division is
provided in Appendix C.
No standards are utilized in assessing the capital inventory in the Highway Division nor was Mr. Charbonneau aware of any available types of standards. Mr. Charbonneau depends upon his experience and an aggressive preventive maintenance schedule to keep the Division's equipment in good condition. He recognizes they are adequately equipped to perform the designated duties but realizes the fiscal constraints the Town is under and works with what he has to accomplish the Division's tasks.

**Recommendation:** The age of the division's fleet is a concern. Though an aggressive preventive maintenance program extends the life of mechanical equipment, there is a point in a machine's life cycle where it becomes financially inefficient to keep that equipment in use. While no set standards exist to dictate when to replace equipment, there exist guidelines to assist municipalities with implementing an equipment management system that will maximize equipment usefulness and minimize costs. The American Public Works Association (APWA) has provided a printout of reference materials available from that organization that will assist the Division in implementing a beneficial program for equipment replacement. The printout is include in Appendix C. Combining this information with Mr. Charbonneau's expertise will ensure the continuation of a well-run and well-equipped Highway Division.

**Public Works Department, Cemetery Division**

**Introduction:** The Cemetery Division resides within the Department of Public Works and is responsible for the maintenance and operation of all town-owned cemeteries. The division is headed by Mr. Bob Angell.

**Assessment:** There are six (6) cemeteries managed by the town that occupy almost 112 acres. Three (3) cemeteries are currently active. An equipment inventory for the Division is currently not available. A inventory for the division's property is provided in Appendix D.

Mr. Angell states there is enough land to accommodate the town's cemetery needs for the next 150 years. Mr. Angell does not base this estimate on any type of standard employed within the cemetery management field nor is he aware of any standards to this fact. Mr. Angell said there is a lack of proper record keeping, as evidenced by the lack of an equipment inventory. The Department is working in conjunction with the Engineering Department to re-survey all town cemeteries and is conducting a physical inventory at this time.
**Recommendation:** In terms of published material very little literature exists on cemetery management or on standards for cemetery management. The American Public Works Association (APWA) has provided a few references from their library and these are available in Appendix D. The Division should explore these articles and implement the methods utilized by other municipalities in order to assure a well-run, well-maintained and adequate amount of land for the Town's cemetery needs.

**Police Department**

**Introduction:** The Grafton Police Department is a non-accredited law enforcement agency. The Department employs nineteen (19) sworn police officers, four (4) part-time dispatchers and one (1) civilian secretary, and is headed by Chief Russell Messier. The Grafton Police Station is the Department's only station house and includes jail cells certified to hold male, female and juvenile prisoners. From July 1990 to June 1991 the Department made four-hundred thirty-five (435) arrests, investigated one-hundred thirty-five (135) accidents, answered 3,844 complaints, and issued 3,266 citations. Over thirty-one (31) different types of investigations were conducted ranging from domestic violence to missing persons.

For purposes of the development of effectiveness measures, the overall police objective in crime control is assumed to be the following:

*To promote the safety of the community and a feeling of security among the citizens, primarily through the deterrence/prevention of crime and the apprehension of offenders, providing service in a fair, honest, prompt, cooperative, helpful, sensitive, and courteous manner to the satisfaction of the citizens.* (Hatry)

**Assessment:** According to Chief Messier, there is a gap in the level of police service. This statement does not however indicate that there is un-met criminal activity. This does explain the lack of police patrols in more remote areas of Town. According to the Chief, the Department has lost four (4) officers since 1992 from circumstances such as sickness or injury. This directly effects the Department's ability to adequately patrol the Town.
For most departments, standards come in the form of studies and reports conducted by professional agencies or organizations. For the Grafton Police Department, official policy and procedure come from the Massachusetts Police Chiefs Association. The Federal Bureau of Investigation (FBI) publishes averages and trends in crime. Based on FBI studies, the average police department has 2.2 sworn officers per 1,000 in population. These data do not necessarily translate to other capital need as patrol cars, firearms, etc. At 2.2 officers per 1,000, Grafton would require a police force of 28.7 officers.

**Recommendation:** As population increases, so does the need for police services. Because there are no formal standards set for law enforcement agencies, each must establish its own based on need. Using national crime statistics provided by the FBI, the Grafton Police Department can establish standards by which it can measure itself. Undergoing this process will assist in the justification for additional personnel and capital facilities such as patrol cruisers.

The Law Enforcement Accreditation Commission (LEAC) further establishes that as smaller agencies become accredited, the level of service increases. The LEAC confirms that for the most part, all standards are voluntary and set by the individual department. The LEAC is currently working on an accreditation process geared towards smaller towns and explaining the benefits of professional accreditation. This accreditation will provide Grafton with its own standards for personnel requirements, budget and allocation and distribution of capital. Through a continuous self-evaluation, the Department can determine precisely where gaps in service occur and determine the reasons for the gaps.

**Fire and Forest Fire Department**

**Introduction:** The Grafton Fire Department operates on a call/volunteer basis commanding the services of fifty-five (55) trained fire fighters and one secretary and is headed by Chief Philip Gauthier. Like many modern fire departments, it provides services outside the realm of fire safety including emergency management and disaster assistance. Modern fire departments are referred to as "fire and rescue" service to reflect their expanded role. The majority of calls for service in fire departments nationwide are for these "other" services and not for fires. (Hatry, 93). In 1991, the
Department responded to approximately two-hundred and ten (210) incidents of which one-hundred thirteen (113) were tire-related (1991 Town Report). Ambulance service is contracted out by the Town of Grafton and is not considered for capital expenses.

The suggested measures for fire protection are based on the assumption that the objective of fire protection services is:

To minimize casualties and losses of property from fire by helping to prevent fires from occurring and to reduce losses and casualties from fires that do occur. (Hatry)

**Assessment:** The Grafton Fire Department operates from three (3) station houses located strategically throughout the Town. There are eleven (11) pieces of fire fighting capital equipment including pumpers, trucks, and fire-related vehicles (see Appendix F). The age of the equipment ranges from a 1953 Reo Pumper to a 1989 Ford F700 Pumper. Based on experience, Chief Gauthier and the Grafton Fire Department have maintained an adequate level of service. However, the Chief notes that the Department is operating with the same equipment as when the Town's population was 10,000.

Currently the Department can reach any point in Town within five (5) minutes from one of its three station houses. However, the Chief noted that the aging fleet of fire engines and equipment does require special attention. Rather than replacement, the older engines can and have been retrofitted with updated equipment. A retrofitted fire engine requires testing every year for efficiency and strength. The Chief has noted that the fire stations are, in some cases, too small to accommodate the newer and larger fire trucks. The fire headquarters is over forty (40) years old, and will require modification to accommodate a modern aerial ladder truck, which the Department hopes to purchase someday.

**Recommendation:** The standards for volunteer fire departments are set by the fire chief. The National Fire Protection Agency (NFPA), a non-profit membership agency, provides equipment standards to departments that request them. As a non-regulatory agency, the NFPA writes these standards based on an intensive collaboration of studies. This is to ensure that a department is properly trained for use of specialized or highly sophisticated equipment. In order to maintain a high level of standard, the Grafton Fire Department subscribes to this practice. Each member of the Grafton Fire Department attends various training courses, some sponsored through the Massachusetts Fire Fighting Academy. More recently, the Department joined the Call/Volunteer
Firefighters Association which increases awareness of regulatory changes, investigates benefits and inventories laws affecting the call/volunteer firefighter.

The immediate concern for the Grafton Fire Department’s future capital needs will be in response to population and land-use expansion. Most notable is the anticipated development of the Tufts University Bio-Technology Park and subdivision developments. In terms of vulnerability, the level of service provided by the Grafton Fire Department will fall if:

1) occurrences of fire increases,
2) demands for further expansion of non-fire related services increases, and
3) land uses increase.

The Chief explained that with the addition of a bio-technology park, land uses change substantially and the types of emergencies created will require special training and equipment.

Established standards, either national, state or local, do not exist for call/volunteer fire departments. However, there are various professional organizations that research and provide firefighters with fire statistics and equipment standards. In the case of the Grafton Fire Department, several professional standards are employed for training and equipment use, which contributes to the high level of service provided. In terms of projected growth, the Department must determine through self-evaluation what will be the appropriate standard levels. This refers to response time, search and rescue performance, and disaster management. Because the Department must decide the level of service that is adequate for Grafton, the inventoried apparatus and equipment should be measured against more tangible standards or statistics. As in the case with NFPA, standards are provided on a volunteer basis which any municipality can adopt as standard or law.

Another factor considered in Grafton is the Town’s fire insurance rating. This is a rating system used by insurance underwriters to set the rates of fire insurance. The Insurance Service Office (ISO) is a national service with branch offices in each of the states. The ISO collects data on fire losses nation wide and evaluates the results. The rating system starts at one (1) and ends at ten (10), with one being the best rating possible. The ISO rates a town every fifteen years and evaluates criteria such as response time, water pressure, hydrant location, and level of training. Grafton was last evaluated in 1980 and given the rating of 6/9. This rating gives all structures within one-thousand feet (1000’) of a hydrant, or within five (5) miles of a station house the rating of six (6). All others receive the rating of nine (9). Grafton is scheduled for a review in 1995, and
Chief Gauthier notes that many of the newer developments are now within the water districts and serviced by fire hydrants.

The net financial impact of having a rating drop even two points is significant in terms of fire insurance costs, according to the ISO. The ability of Grafton to lower the current rating of six (6) should be considered when making capital improvements and assessments. All new developments located outside criteria boundaries will continually keep Grafton at an undesirable fire rating level. Therefore, there is a direct link between the Water Departments and the Fire Department. All new developments not located within the water districts, or not provided water service (i.e. maintaining on site wells) should be considered closely.

School Department

Introduction: The superintendent of Grafton schools is Mr. William Compton. The school system is comprised of five (5) buildings: the high school, middle school, intermediate school and two (2) elementary schools. Current enrollment is 1,928 students and the Town spent $3,545 per student for the 1991-1992 school year. The national average for 1989-1990 was $4,890 per student. In comparison, Grafton spent $3,196 per student that year.

Assessment: The primary goal for this assessment of the School Department is to determine capital facility needs over time. For the forecast, the town planner established a maximum number of future students as a build-out parameter. Based on these planning parameters, two questions were poised to the School Department. First, what is the general condition of the Department’s capital facilities? Second, how could Grafton support a student population of 2,000 to 4,000 students fifty (50) years from now?

Beginning with the elementary schools, the Superintendent reported very good to excellent building conditions. Some specific needs include the partial roof replacement at the North Grafton Elementary School. A substantial window replacement is also necessary there. He also mentioned a copper piping problem at the South Grafton Elementary School.

With a newly constructed roof, the middle school is in excellent condition. More improvements are forthcoming as Grafton is number thirty-six (36) on the School Building Assistance Board (SBAB) list of approved projects from the Commonwealth of Massachusetts. This allocation will benefit the library where media concerns are imminent. The intermediate
school is located inside the municipal center building. No comments were made about the municipal center or the school portion of the facility, but both areas were recently renovated to provide services for students beginning in 1991. In reference to the high school, the superintendent considers that this facility is the weakest of all school buildings. He explained that the poor construction quality of the high school is due to the tilt slab external construction form.

Superintendent Compton has maintained a managerial philosophy about the Grafton School District. The basis of this opinion is that excellent infrastructure does not necessarily correlate with excellent academic performance. While the Town of Grafton does not ignore its capital facilities, it does favor performance factors such as teachers and supplies.

Based on the general guidelines for students per classroom, the Superintendent provided a forecast of facility needs. If the student population increases from 1,928 students to 2,500 students, no buildings will be needed. The school district could accommodate three-hundred (300) to four-hundred (400) additional students with the current space available. If the student population increases to a level between 2,500 and 3,000, additional space would certainly be required, but the school system would not necessarily require a new facility. According to superintendent Compton, options such as space rental and portable classrooms would be acceptable for the school system. Within the no-build options, the Superintendent included the reallocation of students within the existing school facilities. This is considered possible because the high school has some excess space. These options would not be available with a student population greater than 3,000. At that point, a new facility will be absolutely necessary.

The school system is not bound to any standards beyond those mandated by the Board of Selectmen and the Commonwealth of Massachusetts. The Grafton Board of Selectmen do not ask very much. The only regulations Mr. Compton could cite was students per classroom and the state-wide building code. The current standard mandates a maximum of twenty-five (25) students per classroom. The state-wide building code is one of the foremost sets of standards for schools. Grafton also supports this code in all its school facilities. A copy of these standards is kept at the municipal center.

The Commonwealth of Massachusetts does have a lot of concern for local school authorities. Recommendations are given to the school districts by the Commonwealth. Where capital improvements are concerned, the School Building Assistance Bureau directs applications to the Commonwealth Board of Education through the guidelines of Commonwealth regulation 603 CMR. The process facilitates approval of both project applications and a priority list of
applications. These recommendations are usually applied because Commonwealth funding requires it. This principal is inherent in the 1993 Educational Reform Act. The Grafton School District supports its passage into law. Some Commonwealth standards apply to school building facilities. These standards are provided by at least two agencies. (see Appendix G for school standards)

**Recommendation:** The School Board and Superintendent appear to be very organized as a major Town department, but also appear to need a closer working connection with the Town’s planning for growth. The School Department is fully adequate at the present time, but large changes in student population will necessitate a more stringent set of growth standards. The estimates for growth were new for the School Department. If growth occurs too quickly, Grafton may have to adjust its fiscal policy toward the physical environment. Academics could suffer if the school facilities are not ready for the town’s growth.

**Library Department**

**Introduction:** This Department is responsible for the operation of the three (3) town libraries, a main library located in the center and two (2) branches located in the north and south portions of Town. The library is headed by Ms. Barbara Braley in conjunction with the Library Board of Trustees. The libraries provide recreational reading, reference and information services to the citizens of Grafton and the citizens of other communities through reciprocity. A wide variety of special programs are offered from children’s story hours to exhibits of items of local interest.

**Assessment:** Capital facilities for the libraries include the three (3) library buildings and their associated collections. An inventory and assessment of the three librarie’s capital facilities is provided in Appendix H.

Ms. Braley and the Library Board of Trustees feels the Department is under budgeted. Circulation figures for the past few years have been growing in response to the recession and a public relations campaign. (See Appendix H). The Library Board of Trustees would also like to see an addition to and parking and safety concerns addressed at the main library.

The Library Department receives some funding from the Commonwealth of Massachusetts Board of Library Commissioners (BLC), and conforms to that organization’s standards in order to
receive the funding. These standards were adopted from the American Library Association's (ALA) standards and are currently undergoing revision to conform with recent revisions to ALA standards.

The BLC uses seven (7) criteria for establishing compliance with its standards. The standards and Grafton's performance are detailed in Appendix H. In general, Grafton exceeds the minimum required standards to qualify for funding from the Commonwealth and is not in jeopardy of losing funds from the Commonwealth.

**Recommendation:** Recommended action for the library is to explore further the standards and guidelines of the ALA in order to improve its services and capital facilities for Town residents. Specific areas of concentration include quantifying the number of internal circulation, assessing public opinion of library services and its collection via a survey. There are others areas that can be addressed as deemed appropriate, and there exists extensive ALA literature on these issues.

**South Grafton Community House**

**Department Information:** The South Grafton Community Houses is located in South Grafton and accommodates the American Legion, the Council on Aging (COA) and the Veterans of Foreign Wars (VFW). The building is also used by the Grafton Little League for storage and meetings and by the South Grafton Water District for meetings. The South Grafton Community house is utilized by several groups within the community. Therefore, the Community House is considered in “good” shape but is a continuous capital responsibility of the Town.

**Recreation Commission**

**Introduction:** The Recreation Commission is unique in that it has no permanent staff and is administered by a volunteer group headed by Ms. Nellie Harrington. The Commission manages town-owned recreation lands and provides a variety of recreational opportunities on town-owned and non-town owned properties. Facilities provided on town-owned lands include tennis courts, baseball/softball fields, soccer fields, swimming areas and beaches, playground equipment, and hiking/walking/biking trails. The Commission provides residents with the following recreational opportunities: swimming, tennis, arts and crafts, skiing, baseball/softball, picnicking, biking,
hiking, and walking. The Public Works Department, Highway Division, provides maintenance services to all properties managed by the Recreation Commission.

Assessment: There are five (5) parks owned by the town and managed by the Recreation Commission. They are listed in Appendix I, with their associated facilities and conditions as provided by Ms. Harrington. Ms. Harrington characterized the overall condition of the parks capital facilities as good, with Airport Park being the notable exception. Ms. Harrington noted that the Town was currently unable to properly maintain all the lands that were under the jurisdiction of the Recreation Commission. A public survey conducted by in 1991 found the amount of town-owned recreation facilities adequate, but the maintenance of such facilities was insufficient. Of particular concern by residents were tennis and basketball court and field conditions. Ms Harrington offered the same comments but was unaware of the survey.

Recommendation: The Recreation Commission currently utilizes no standards in evaluating their capital facilities. The recommendation to the Recreation Commission is to establish a prioritization of needs in relation to capital facilities. This would require a two step process. The first step would be to establish desired service standards of park and recreation services for Town residents. Another survey of Town residents would be warranted since the sample size of the 1991 survey was small (n=88) and the population sampled was mostly elderly (50% were over age 55). Several organizations provide park and recreation service standard levels. For example, the National Recreation and Park Association has literature relevant to this subject and information regarding that organization is available in Appendix I.

Step two of the process would be to verify the amount of park and recreation land that is appropriate for the size of the town. Again, there are several sources of information to assist in this task. The American Park and Recreation Society provides a book entitled "Recreation, Park, and Open Space Standards and Guidelines" and would provide a good starting point. Information for contacting that organization is provided in Appendix I.

Board of Registrars of Voters

Introduction: Town Clerk Maureen Clark is responsible for the Board of Registrars. Capital facilities for this Department are limited. The Town operates four (4) voting locations covering two (2) precincts. Precincts are established by population with borders delineated by the Board of Selectmen. These precincts must be approved by the State. Restrictions apply for equitable
delineation. This information is relevant because the number of precincts determines the amount of equipment needed for each election. While operating costs are $1100 per year, capital facilities costs do not accrue each year.

Assessment: The present voting equipment is seven (7) years old. The current punches and booths cost $2500 per precinct in 1993 dollars. Ballot boxes are provided by the Commonwealth. A new system has been ordered in the budget for fiscal years 1994 and 1995. The total budget allocation is $25,000. The present equipment will be replaced because of costly maintenance and antiquated technology. A cost of approximately $25,000 would be necessary to maintain the equipment. Town officials are sceptical about keeping the current system which would require increasingly scarce replacement parts. In the past, tally equipment could be shared between voting locations, but multiple problems could result in a reliance on other towns for voting equipment. The Town has decided not to risk an untimely malfunction. The current budget reflects this assessment, as new equipment is on order.

Recommendation: The Board of Registrars abides by the standards of the Commonwealth. By Massachusetts law, no precinct shall exceed 4000 people. The federal census is currently being used in Grafton and in the Commonwealth as a whole.

This raises the point of the build-out estimate for precincts. The Department of Planning has provided a future parameter for the assessment. Given a range of population between 25,000 and 28,000 in 50 years, the Town of Grafton will need to operate at least seven (7) to eight (8) precincts. However, the Grafton voting population is well below the 16,000 which is the maximum amount of people for its four (4) precincts. The 1991 Town Report reported a voting population of 7,117. If Massachusetts standards are used in this regard, it appears Grafton has room to expand within the four precincts it maintains. Their efforts to replace equipment are prudent. No recommendation seems warranted for the Board of Registrars.

Administration and Municipal Center

Background: Town Administrator Daniel Morgado answered questions about the Town of Grafton as well as the administration of the municipal center. This section is only an overview of the town as a whole, since the departments had been assessed individually by all members of the research team. However, Mr. Morgado covered several topics related to capital facilities and town administration.
Assessment: According to Mr. Morgado, the condition of capital facilities in Grafton is reported to be “good.” He mentioned three (3) problem areas: sidewalks, drainage and road surfaces. While bridges and culverts have been problematic in the recent past, these two areas no longer burden the Town. Mr. Morgado mentioned that Grafton has undertaken a $4.8 million dollar renovation project for its high school. The endeavor is spread over fiscal years 1994 to 1996.

As a whole, the Town of Grafton does not employ any specific municipal standards. However, the Town Administrator, Town Planner, Board of Selectmen, Finance and Budget Committees and the School Board are reportedly all committed to effective reinvestment. These four (4) departments recognize that strong reinvestment ensures delivery of services, healthy bond ratings and continued accreditation in various areas. The Town government understands that adequate municipal services can also sustain good public morale and positive public perception. The town administrator thinks that reinvestment often reflects both a public will to do so and an adequate credit rating. Mr. Morgado stressed the importance of excellent infrastructure. He believes that strong facilities and services benefit the public, but also encourage businesses to remain in Town.

While the town administrator could not provide any other standard of measure for capital facilities, he emphasized the value of educated guesses and good judgment. He mentioned that productivity is difficult to quantify. The town administrator does not expect a formidable growth potential in the near future. The goal for Grafton is to maintain services and infrastructure within the operating budget. The town administrator commented that bond raters appreciate this kind of fiscal management. For this kind of assessment, the town administrator cited Standard and Poor's Co. Municipal Finance Criteria as a guide to adequate capital facilities. This corporation has been used as a guide to maintain a suitable credit rating for Grafton.

While national and regional standards for small cities and towns are scarce, Standard and Poor's is a major consideration for Grafton. Standard and Poor's Inc. assigns municipal credit ratings. Once a rating is established, the corporation disseminates it through the financial and news media. (See Appendix J for a complete description of Standard and Poor's Municipal Finance Criteria.)

Recommendation: The Town Administrator could seek municipal standards to complement Standard and Poor's for an ideal combination. Standards for all town departments could improve the annual negotiations for budget allocations. A sound fiscal condition is very important and no standard should detract from that administrative goal. The Municipal Finance Criteria also
recognizes this within their ratings criteria: "Capital and long range planning methods: how well prepared are capital improvements plans?" (see Appendix J for sources of municipal standards)
IV. Findings and Recommended Courses of Action

4.1 The Lack of Standards for Municipalities

Research into standards for the capital facilities for municipalities has found that there is a lack of standards. The reasons for this deficiency are unclear, but there exist several organizations that provide guidelines for municipalities to follow in the management of their capital facilities.

4.2 Findings of the Study

In general, this study has determined that the municipal departments of the Town of Grafton only utilize standards in the management of their capital facilities when required by law and/or to qualify for funding. In Table 2, entitled "Grafton Capital Facilities Growth Vulnerability Matrix," the "Minimum Standards" column details those departments currently utilizing standards, but only when imposed upon them to qualify for funding.

The use of additional standards or guidelines was found to be non-existent under the scope of this study. The method used to assess the overall condition of capital facilities within each department is primarily based upon the institutional knowledge of the department head. Most department heads assessed their department's overall capital facilities as "good" and based this decision mostly on their work experience. As shown in Table 2 in the "Assessment" column, the Police Department and Board of Registrars assessed the condition of their departments as "fair." The Police Department based this assessment on the condition of their cruiser fleet and the Board of Registrars based their assessment on the condition of the voting equipment. While this type of assessment is valid and considered the norm in municipal capital facilities assessment, there should be an integration of this assessment method with standards. This is necessary in order to better substantiate the deficiencies within each department. This would provide a consistent manner that allows for a fair comparison methodology between years and between departments and thereby creates a fair compilation and prioritization of capital facility needs in the Town.
<table>
<thead>
<tr>
<th>DEPARTMENT</th>
<th>MINIMUM STANDARDS</th>
<th>ASSESSMENT</th>
<th>STATUS</th>
<th>OTHER STANDARDS</th>
<th>VULNERABLE TO GROWTH</th>
</tr>
</thead>
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<tr>
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<td>YES</td>
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<tr>
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<td>CAPACITY</td>
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<td>YES</td>
</tr>
<tr>
<td>RECREATION COMMISSION</td>
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<td>GOOD</td>
<td>DEFICIENT</td>
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<td>YES</td>
</tr>
<tr>
<td>BOARD OF REGISTRARS</td>
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<td>FAIR</td>
<td>CAPACITY</td>
<td>NO</td>
<td>YES</td>
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<tr>
<td>SCHOOL</td>
<td>YES</td>
<td>GOOD</td>
<td>EXCESS</td>
<td>YES</td>
<td>NO</td>
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<tr>
<td>LIBRARY</td>
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<td>GOOD</td>
<td>CAPACITY</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>
4.3 Vulnerability to Growth

With regard to their capital facilities the major concern for Town departments, is the vulnerability to growth. Table 2 highlights eight (8) departments in the “Status” column whose capital facilities are at “capacity” or are currently “deficient” in their service levels. While the majority of the Town’s capital facilities and their service levels are adequate for the current population, a growth spurt based upon existing permitted developments in Grafton will place these departments into or even further into the “deficient” category. As noted earlier, the Grafton area is once again poised for growth as the Boston metropolitan area continues its western expansion.

4.4 Standards

Currently, the assessment of capital facilities is made by the department head based on that individual’s institutional knowledge, or a “gut feeling”. The department heads includes in this assessment:

1. Their perspective of how the Town is developing.
2. What the residents of the Town desire for service levels from their capital facilities, and
3. An inventory of the department’s capital facilities.

At the time of this assessment, most standards appeared to be underutilized in Grafton. The major reasons for under utilizing standards were:

1. The perception that currently imposed standards are just bureaucratic rules in order to qualify for funding.
2. Standards being too complex and costly to apply at the town level and
3. Department heads being unaware that standards exist.

To overcome barriers and implement standards, the department heads must understand that most guidelines and standards are based upon a compilation of accepted national practices and techniques. The cost of implementing these standards initially involves some added costs, but the long-term benefits are worthwhile. A town must tailor national standards or guidelines to local conditions. The town must tailor its needs with available standards and guidelines. Department heads should maintain an active interest in standards and guidelines within their fields. To
accomplish this, association with professional, work-related organizations will expose them to the current standards and guidelines.

4.5 Benefits of Standards

There are several benefits associated with the use of standards. They include a proactive management style, a method by which to quantify capital facilities and invoke public participation in the management of capital facilities.

Standards will allow the Town to move to a proactive capital facilities management process. The benefit of being proactive versus reactive is longer life-cycles for capital facilities. This decreases the frequency of repair and replacement of capital facilities, and thereby decreases the overall cost of these capital facilities over their lifetime and results in a savings to the taxpayer.

Standards set parameters for capital facilities improvements. Parameters are easily quantifiable and understood. Therefore, the department heads will improve communication between the departments and the public. For example, the fire department is purchasing a new pumper. If the citizens are more aware of the fire department standards, the budget process may be easily justified. Ideally, the utilization of standards will reveal vulnerability in the level of service. Therefore, the Town’s decisions become less subjective as formidable department needs are emphasized.

Public participation in the management of capital facilities will increase with the implementation of standards. Many standards include a component to assess the public service levels of capital facilities. Currently public service levels of capital facilities are not assessed on a routine basis in Grafton. By introducing a public component, Grafton can monitor department performance based on citizen participation.

4.6 Drawbacks of Standards

Standards can present some drawbacks. Implementation problems include the costs associated with revisions to existing record keeping systems and negative public perception. The record keeping systems of most Town departments will need to be revised concurrently with the implementation of standards. This will initially require additional staff time to implement changes
in data gathering and reporting techniques. These additional costs are most likely to be perceived by the public as wasteful. The implementation of standards could be presented at Town Meeting. In any case, citizens must be given an opportunity to evaluate the benefits of standards. For example, capital improvements which lower the Town’s fire rating, (i.e. give a better rating) can justify the additional expense.

The dynamic nature of standards implies another drawback. The Town departments must be willing to continually update standards and revise operations in order to accommodate changes. Again, the impacts on public perception must be addressed.
V. Summary

This study has provided the Town of Grafton with:

1. A public facilities inventory component for the Grafton Master Plan;
2. An assessment of the existing levels of public services in relation to capital facilities; and:
3. A thorough search for an array of standards and guidelines through which Grafton can measure its capital facilities.

The overall assessment of the capital facilities in the Town has been characterized as "good". This indicates that the Town's capital facilities are adequate for the current population level. However, when the Town's population begins to grow again, as in the late 1980s, the Town's capital facilities will become deficient in many departments.

In order to address this inevitable problem, it is suggested that Grafton implement standards for each department. While direct standards for each department are not available, there exist three (3) ways in which they can proceed.

• **First**, several departments currently utilize standards imposed upon them by agencies of the Commonwealth of Massachusetts to qualify for funding. These standards often reflect a minimal compliance of existing standards. These departments should further explore these standards and adopt relevant components into their operations.

• **Second**, some departments use guidelines provided through professional organizations. These guidelines can be used to develop applicable standards for the department.

• **Finally**, departments without standards or guidelines will be required to develop customized standards.

Implemented standards do not provide immediate results. Capital facilities are items that have a large acquisition cost and are expected to last a long time. Likewise, a program to manage these assets will require time to implement and show progress. However, by utilizing standards, the Town will be better able to substantiate and prioritize the need for capital facilities.
improvements and will be managing their capital facilities in the most effective and efficient manner possible.
VI. BIBLIOGRAPHY


VII. Appendices
Appendix A - Grafton Capital Facilities Inventory and Assessment Questionnaire
1. Ask for a copy of their capital facilities inventory - written format preferred. Send to your attention at:

   LARP
   109 Hills North
   UMASS
   Amherst, MA 01003

   PHONE 413/545-2255
   FAX 413/545-1772

   Document promised by ___ / ___ / ___ via mail / fax / phone.

2. How would they rate the overall adequacy and condition of the capital facilities in their Department?
3. What standards, if any, did they use to arrive at their response in question 2 (i.e. professional association, federal model standards, regulatory standards, funding minimums)? Are there any special circumstances that influence why these standards are used?

4. Are they aware of any other standards for assessing capital facilities? If so, why are they not utilized in Grafton and where could we obtain a copy of such standards?

5. If applicable, do they know the cost per unit of capacity of the service their Department provides?

6. List any additional comments and notes below.
Appendix B - Engineering Department
Listed below are the major categories of capital facilities that the Engineering Department is responsible for. A narrative description of their condition and standards currently employed in the management of each category of capital facility is included.

**Highways**

There are approximately 180 miles of highway that the town is responsible for maintaining. The overall condition of the network is described as "good." The majority of funding for highway improvements is derived from the Commonwealth and these improvements must conform to Massachusetts Department of Public Works (DPW) standard specifications and guidelines. Improvements funded via the federal government must meet the American Association of State Highway and Transportation Officials (AASHTO) standard specifications and guidelines. The town funds projects that do not qualify for federal or state aid and utilizes standard engineering practices that will provide for public safety and town maintenance concerns.

**Sidewalks**

There are approximately 100 miles of sidewalks (rough estimate) and the overall condition is rated as poor. A majority (70%) of the sidewalks are constructed from asphalt versus concrete (30%) and this is a major contributor to the deteriorated condition of the sidewalk network. There is little funding for sidewalks. Under federal programs, sidewalk construction is included in full-road reconstruction projects and standard construction specifications must be met. The Commonwealth provides no funding for sidewalk improvements. The town provides some funding for sidewalk repairs and labor for this task is donated by the Job Corps program. Mr. Santora has devised a standard of four inches of gravel with four inches of concrete with reinforcement wire as the standard to meet public safety and town maintenance concerns.

**Drainage**

The number of drainage facilities in town is unknown. The overall drainage facilities are described as in "fair" condition. Under federal programs, drainage facilities are included in full-road reconstruction projects and AASHTO construction specifications must be met. The Commonwealth provides little funding for drainage improvements. The town provides some
funding for drainage repairs through the Highway Division's Long Range Drainage capital budget line item. Mr. Santora utilizes the U.S. Department of Agriculture, Soil Conservation Commission, as provided in publication TR20, for a standard in drainage design.

Dams

There are two town-maintained dams in town. The Silver Lake dam is an earth fill dam and is described as in "excellent" condition. The Lake Ripple dam is a concrete dam with the structure described in excellent condition and the mechanical facilities listed in "fair" to "poor" condition due to the two race gates being swelled shut. The standards utilized are from the Massachusetts Department of Environmental Management (DEM), Office of Dam Safety.

Landfills

There are three (3) landfills owned by the Town:

1. Crosby Road.
2. Milford Road and
3. Adams Landfill.

All are non-operational and only the Crosby Road landfill has been capped. The condition of the landfills is described as good since they are not leaching at this point in time. Only capped landfills require monitoring and the standards utilized by the town for monitoring are provided by the Massachusetts Department of Environmental Protection (DEP).

Bridges

There are eleven town-maintained bridges in the town. They are listed below with their assessed condition:

1. Creeper Hill  
   Excellent
2. Depot Street #1  
   Satisfactory
3. Depot Street #2  
   Very Good
4. Brigham Hill #1
5. Brigham Hill #2
6. Millbury Street
7. East Street Culvert
8. Baptist Bridge (Pleasant Street)
9. Pleasant Street Canal
10. Pleasant Street (Blackstone River)
11. Main Street

Excellent
Poor
Excellent
Excellent
Fair
Excellent
Fair
Good

Grafton is unique in that it has two major rivers in the town and therefore has many more bridges than most similar towns. Bridges are inspected periodically by the DPW. The majority of funding for bridge improvements is derived from the Commonwealth and these improvements must conform to DPW standard specifications and guidelines. Improvements funded via the federal government must meet the AASHTO standard specifications and guidelines. The town funds projects that do not qualify for federal or state aid and utilizes standard engineering practices that will provide for public safety and town maintenance concerns.
Appendix C - Public Works Department, Highway Division
Public Works Department, Highway Division

There are approximately 180 miles of highway in which Grafton is responsible for maintaining. The Highway Division's major capital facilities include equipment and buildings that are used to house and repair the equipment as well as store supplies and provide office space for the highway operations staff. Listed below are the equipment and building capital facilities of the Division and their condition.

Equipment

<table>
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<tr>
<th>Type / Purpose</th>
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<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility Trailer (Army Surplus)</td>
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</tr>
<tr>
<td>Utility Trailer (Homemade)</td>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>Dodge 3/4 Ton Pick-Up (Army Surplus)</td>
<td>1953</td>
<td>Good</td>
</tr>
<tr>
<td>White Reo Water Truck</td>
<td>1963</td>
<td>Good</td>
</tr>
<tr>
<td>Tag-A-Long Trailer</td>
<td>1965</td>
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</tr>
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</tr>
<tr>
<td>Bombadier Tractor (Sidewalk Plow)</td>
<td>1970</td>
<td>Good</td>
</tr>
<tr>
<td>Hough Front-End Loader</td>
<td>1973</td>
<td>Good</td>
</tr>
<tr>
<td>John Deere Loader</td>
<td>1973</td>
<td>Good</td>
</tr>
<tr>
<td>GMC 12' Dump Truck (Tree Truck)</td>
<td>1974</td>
<td>Good</td>
</tr>
<tr>
<td>Mack Diesel Dump Truck - Basin Cleaner</td>
<td>1974</td>
<td>Fair</td>
</tr>
<tr>
<td>Mack Diesel Dump Truck</td>
<td>1977</td>
<td>Good</td>
</tr>
<tr>
<td>Gardner Denver Air Compressor (Portable)</td>
<td>1977</td>
<td>Good</td>
</tr>
<tr>
<td>Mack Diesel Dump Truck</td>
<td>1979</td>
<td>Good</td>
</tr>
<tr>
<td>Elgin Street Sweeper</td>
<td>1979</td>
<td>Good</td>
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<tr>
<td>Wayne Brush Chipper</td>
<td>1980</td>
<td>Good</td>
</tr>
<tr>
<td>Ford 1 Ton Dump Truck</td>
<td>1982</td>
<td>Good</td>
</tr>
<tr>
<td>GMC Pick-Up</td>
<td>1983</td>
<td>Good</td>
</tr>
<tr>
<td>Mack Diesel Dump Truck</td>
<td>1984</td>
<td>Good</td>
</tr>
<tr>
<td>GMC Pick-Up</td>
<td>1983</td>
<td>Good</td>
</tr>
<tr>
<td>Holder Diesel Tractor (Sidewalk Plow)</td>
<td>1985</td>
<td>Good</td>
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</tbody>
</table>
Ford 1 Ton Dump Truck 1986 Good
John Deere 644D 3 Yard Loader 1987 Good
John Deere Backhoe 1987 Good
Ford 1/2 Ton Pick-Up 1987 Good
Mack Diesel Dump Truck 1990 Good
Roller Trailer (Homemade) 1990 Good
Razorback Tandem Trailer 1991 Excellent
Chipper 1992 Excellent

Buildings

<table>
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<tr>
<th>Description</th>
<th>Square Footage</th>
<th>Condition</th>
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<tbody>
<tr>
<td>Office / Garage (6 Bay)</td>
<td>7944</td>
<td>Good</td>
</tr>
<tr>
<td>Tree Barn (Equipment Storage)</td>
<td>2240</td>
<td>Good</td>
</tr>
<tr>
<td>Storage Shed (Salt)</td>
<td>216</td>
<td>Fair</td>
</tr>
</tbody>
</table>
April 23, 1993

Robert Palmer
P.O. Box 1213
Amherst, MA 01004-1213

Dear Mr. Palmer:

In response to your request for information on replacement analysis, life cycle costing and standards of equipment maintenance, I have enclosed printouts of our database on specific areas under this topic. I hope this provides an efficient tool to assist you in your project.

Along with the printouts, I have enclosed a brochure which describes our subscription service and lists our fee schedule for photocopied material. For example, an Agency InfoLink member can receive any or all of the articles/reports listed in these printouts for a flat annual fee. There are no additional charges for photocopying or handling services. Please refer to this brochure to select an InfoLink subscription or APWA Document fee option. If you have any questions, please contact me at 816/472-6100 ext. 584.

Information from the APWA database will generate cost savings by identifying how others have implemented a program or solved a problem resulting in increased productivity. You will also save time by using sample documents, contracts, specifications, and agreements that have worked for other agencies. To promote the sharing of information and experiences we would like to encourage you to send information regarding your agency's operations and maintenance practices including reports, standards or specifications.

Your support of APWA is greatly appreciated so that we can continue to serve the field of public works.

We appreciate your patience during this transitional period.

Sincerely,

Carol A. Doms
Reference Librarian, Information Services

Enclosures

Quality of Life Through Public Works
**APWA MEMBERSHIP APPLICATION**  
*Please Print or Type*

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
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<tr>
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<tr>
<td>Date</td>
<td></td>
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</tr>
<tr>
<td>State</td>
<td>Zip + 4 Code</td>
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<td>Organization</td>
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<tr>
<td>Phone</td>
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<tr>
<td>Home Street Address</td>
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</tr>
<tr>
<td>Signature</td>
<td></td>
</tr>
<tr>
<td>APWA Sponsor</td>
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</tr>
<tr>
<td>Payment Enclosed</td>
<td></td>
</tr>
<tr>
<td>Send Invoice to:</td>
<td></td>
</tr>
<tr>
<td>Send Mail to:</td>
<td></td>
</tr>
<tr>
<td>Membership Will Begin Upon Receipt of Payment</td>
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<table>
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<th>Membership Categories</th>
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<td>Active Group</td>
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<td>Utility</td>
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<tr>
<td>Student</td>
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<tr>
<td>Sustaining</td>
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<tr>
<td>Add to Existing Group Membership</td>
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</tr>
<tr>
<td>to fill vacant position</td>
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<tr>
<td>additional member (APWA will invoice)</td>
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</tr>
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</table>

Applicants for group membership should attach a separate list (names/titles/addresses) of official representatives.

If payment is enclosed return to: American Public Works Association, P.O. Box 27-290, Kansas City, MO 64110; All other correspondence should be directed to: American Public Works Association, 106 W. 11th Street, Suite 1500, Kansas City, MO 64105-1806

**Member Status Form:** The Member Status System is a profile of the Association. It is used to develop a carry out professional programs most responsive to member interests and APWA Goals. Completion of this section of the membership application is optional.

<table>
<thead>
<tr>
<th>Type of Organization</th>
<th>Type of Membership</th>
<th>Population Served</th>
<th>Reps.</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 Federal Employee</td>
<td>01 Consultant</td>
<td>10,000 - 10,000</td>
<td>2</td>
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<tr>
<td>02 State Employee</td>
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<td>25,000 - 50,000</td>
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<td>$220</td>
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<tr>
<td>03 City Employee</td>
<td>03 Bachelor's Degree</td>
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<td>6</td>
<td>$330</td>
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<tr>
<td>04 Special District</td>
<td>04 Master's Degree</td>
<td>100,000 - 300,000</td>
<td>10</td>
<td>$550</td>
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<tr>
<td>05 County Employee</td>
<td>05 Other(Specify)</td>
<td>300,000 - 500,000</td>
<td>16</td>
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<tr>
<td>06 University Employee</td>
<td>06 Doctorate</td>
<td>500,000 - 1,000,000</td>
<td>20</td>
<td>$1,100</td>
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<tr>
<td></td>
<td></td>
<td>More than 1,000,000</td>
<td>25</td>
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<td>Caucasian</td>
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<tr>
<td>Hispanic</td>
<td>50,000 - 100,000</td>
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<td>$330</td>
</tr>
<tr>
<td>Native American</td>
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<td>$550</td>
</tr>
<tr>
<td>Asian</td>
<td>300,000 - 500,000</td>
<td>16</td>
<td>$860</td>
</tr>
<tr>
<td>Other(Specify)</td>
<td>500,000 - 1,000,000</td>
<td>20</td>
<td>$1,100</td>
</tr>
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<td>Date of Birth</td>
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**FEE SCHEDULE**

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<th>Group Memberships</th>
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<th>Fee</th>
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<td>Public Agency</td>
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<td>$110</td>
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<tr>
<td>University, Council of Government, or public works related agency</td>
<td>3</td>
<td>$165</td>
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<tr>
<td>Sustaining</td>
<td>5</td>
<td>$1,725</td>
<td></td>
</tr>
</tbody>
</table>

For counties, use 50% of population; for special districts, 20%; for state/provincial agencies, 10%. Each public agency member may designate one representative or active member for each $55 of service fee paid. The Public Utility minimum of five members. Each public utility member may designate one representative/associate member for each $55 of service fee paid.

Any Questions? Call (816) 472-6100, ext. 532
Information Services

Information Services provides comprehensive information on management and maintenance of streets, highways, drainage, flood control, water supply, underground utilities, buildings, grounds, solid wastes, equipment, administration and other civil engineering topics. This information provides Public Works Directors, Engineers, Traffic Engineers, District Engineers, Building Officials, Equipment Managers, and Landscape Architects the necessary information to make cost effective solutions to the financial, political, and environmental constraints facing government today.

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APWA InfoLink

Entitles public agency or company subscribers to receive unlimited access to all of APWA's library reference facilities. Reference facilities include bibliographies, clipping service, technical session papers, government documents, peer matching, APWA Reporter, InfoLink*Notables and Pro-Views articles, video tapes, and abstracts. Also available are library reference specialists and public works technicians who have access to over 100 computerized bibliographic databases and more than 350 periodicals.

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Population (check one) Member Non-Member

1,000,000+ $675 $1,013
500,000-999,999 585 878
300,000-499,999 450 675
100,000-299,999 360 540
50,000-99,999 225 338
25,000-49,999 135 203
10,000-24,999 90 135
Under 10,000 45 67
Individual 35 60
Private Company 225 338

Counties same as above based on 50% of county population; special district 20%; for state/provincial agencies 10%.

YES!

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American Public Works Association
106 West 11th Street, Suite 1800
Kansas City, MO 64105-1806
EXTENDING LIFE SPANS OR "TWICE THE LIFE FOR HALF THE MONEY" (PAPER PRESENTED AT THE AMERICAN PUBLIC WORKS ASSOCIATION 1991 INTERNATIONAL PUBLIC WORKS CONGRESS AND EQUIPMENT SHOW, SAN FRANCISCO, CALIFORNIA, AUGUST 24-29, 1991)

AUTHOR: ANDREWS J A

NUMBER OF PAGES: 6P YEAR: 1991

ABSTRACT: THE CITY OF PHOENIX IS LIKE MOST OTHER MUNICIPALITIES; REDUCED REVENUES HAVE DILUTED ITS EQUIPMENT REPLACEMENT BUDGET. TO COMPENSATE FOR REDUCED FUNDING, SEVERAL ALTERNATIVES TO BUYING NEW EQUIPMENT HAVE BEEN TAKEN; THESE INCLUDE LEASE PURCHASE, LEASE WITH OPTION TO BUY, SHORT TERM RENTAL, MAJOR REPAIR AND MAJOR REBUILD. THE CITY'S REBUILD PROGRAM WILL BE DISCUSSED IN THIS PAPER.

KEY WORDS: COST ESTIMATION/ FLEET MANAGEMENT/ GARBAGE TRUCKS/ REPLACEMENT ANALYSIS/ TRUCKS; MAINTENANCE/

ORDER NUMBER: 0034899 LOCATION: C91-4

TO STRETCH MACHINE LIFE OR NOT

AUTHOR: STEWART L

SOURCE: CONSTRUCTION EQUIPMENT

NUMBER OF PAGES: 3P YEAR: 1990

KEY WORDS: BULLDOZERS/ EQUIPMENT/ EXCAVATORS/ LOADERS/ OFF-ROAD VEHICLES/ PREVENTIVE MAINTENANCE/ REPLACEMENT ANALYSIS/ VENDORS/

ORDER NUMBER: 0034725

COMPACTORS, LOADERS IMPORTANT TO CONTRACTORS

AUTHOR: EATON M

SOURCE: ROADS AND BRIDGES

NUMBER OF PAGES: 4P YEAR: 1990

ABSTRACT: IN A SURVEY OF 73 CONTRACTORS AND 84 GOVERNMENT AGENCIES WERE ASKED ABOUT THE TYPES OF EQUIPMENT THEY OWN. STATES AND MUNICIPALITIES REPORTED THEY MOST OFTEN OWN MOVERS, SMALL TRACTORS, AND WHEEL LOADERS. COUNTIES/TOWNSHIPS SHOWED HIGH NUMBERS IN MOVERS AS WELL, WITH BACKHOE LOADERS, SMALL TRACTORS, GRADERS, WHEEL LOADERS AND TRUCK CRANES ALSO RANKING HIGH. CONTRACTORS SHOWED HIGH NUMBERS OF ASPHALT AND SOIL COMPACTORS AND DOZERS, AS WELL AS WHEEL LOADERS, BACKHOE LOADERS AND GRADERS. SIXTY PERCENT OF GOVERNMENT AGENCIES AND 63% OF CONTRACTORS SAID THEY WOULD PAY A PREMIUM FOR FEATURES THAT IMPROVE THE OPERATOR'S ENVIRONMENT WHEN WORKING WITH THE EQUIPMENT. SIXTY-SEVEN PERCENT OF GOVERNMENTS AND 52% OF CONTRACTORS WOULD CONSIDER PURCHASING LOW EMISSION DIESEL EQUIPMENT.

KEY WORDS: COMPACTORS/ CONTRACTORS/ LEADERS/ PURCHASING/ REPLACEMENT ANALYSIS/ STATISTICS/ SURVEYS/

ORDER NUMBER: 0034680 LOCATION: P3298
DECIDING THE BEST TIME TO REPLACE YOUR EQUIPMENT

AUTHOR: STAFF
SOURCE: PENNSYLVANIA TOWNSHIP NEWS
NUMBER OF PAGES: 5P YEAR: 1990
ABSTRACT: ALWAYS IMPORTANT, REPLACEMENT SCHEDULES HAVE BECOME CRITICAL SINCE THE DEMISE OF GENERAL REVENUE SHARING IN 1986. REVIEWED ARE SOME SUGGESTIONS ON HOW TO DEVELOP A REPLACEMENT POLICY THAT WORKS: 1) KEEP DETAILED FILES FOR EACH PIECE OF EQUIPMENT, COVERING SUCH ISSUES AS OPERATING HOURS REPAIRS, COSTS, AGE, AND PURCHASE PRICE; 2) CHECK GUIDES TO DETERMINE DEPRECIATION VALUES. THE AUTHOR CITES INDUSTRY EXPERTS WHO PREDICT AN AVERAGE LIFE OF 10,000 HOURS FOR MOST EQUIPMENT AND AN AVERAGE MUNICIPAL USE OF 1,000 A YEAR. BUT MAJOR REPAIRS START TO INCREASE DRAMATICALLY AFTER SIX YEARS OR 6,000 MILES; AND 3) AS A GENERAL RULE OF THUMB, IT'S TIME TO REPLACE WHEN THE DEPRECIATED VALUE REACHES 10% OF THE PURCHASE PRICE OR IF REPAIR COSTS EXCEED 10% OF THE VALUE. SOME DECISIONS MAY BE OBVIOUS, BUT SEVERAL COMPUTER PROGRAMS ARE AVAILABLE.

KEY WORDS: EQUIPMENT/ REPLACEMENT ANALYSIS/ TOWNSHIP GOVERNMENT/
ORDER NUMBER: 0034424 LOCATION: P2999

SAVE MONEY ON REPAIRS
AUTHOR: BUCKINGHAM F
SOURCE: CONSTRUCTION EQUIPMENT
NUMBER OF PAGES: 9P YEAR: 1991
KEY WORDS: DRAWINGS/ EQUIPMENT/ EXCAVATIONS;EQUIPMENT/ MAINTENANCE;COSTS/
REPLACEMENT ANALYSIS/ STATISTICS/
ORDER NUMBER: 0034008

COMPREHENSIVE EQUIPMENT MANAGEMENT PROGRAM
AUTHOR: FARINA C
SOURCE: APWA REPORTER
NUMBER OF PAGES: 2P YEAR: 1977
KEY WORDS: EQUIPMENT;MANAGEMENT/ FLEET MANAGEMENT;COSTS/ FLEET
MANAGEMENT;RECORDS/ REPLACEMENT ANALYSIS/ STATISTICS/
ORDER NUMBER: 0031672

MAKING EQUIPMENT REPLACEMENT DECISIONS
AUTHOR: HACKAMACK L C
NUMBER OF PAGES: 69P YEAR: 1969
KEY WORDS: CAPITAL INVESTMENTS/ COSTS/ EQUIPMENT;MANAGEMENT/ FLEET
MANAGEMENT;PLANNING/ PRODUCTIVITY/ REPLACEMENT ANALYSIS/
ORDER NUMBER: 0031519 LOCATION: UNCATALOGUED REPORTS
WAYS TO STRETCH THE SERVICE LIFE OF LIGHT-DUTY TRUCKS

AUTHOR: STAFF
SOURCE: AUTOMOTIVE FLEET
NUMBER OF PAGES: 4P YEAR: 1990

ABSTRACT: SERVICE LIFE CYCLES DEPEND ON THE LOCATION OF THE FLEET, ITS WORK APPLICATION, VEHICLE AND ENGINE TYPES, AND WHETHER THE FLEET RELIES ON CENTRALIZED IN-HOUSE MAINTENANCE OR OUTSIDE SHOPS. PREVENTIVE MAINTENANCE IS THE KEY TO REDUCING DOWNTIME, MAINTAINING FUEL ECONOMY, AND ENHANCING RESALE VALUE. A BROAD ESTIMATE FOR GASOLINE ENGINES IS FIVE YEARS OR 150,000 KILOMETERS. MORE SPECIFIC CRITERIA FOR REPLACING LIGHT DUTY TRUCKS INCLUDE: VEHICLE TYPE, MILEAGE, MONTHS IN SERVICE, FLEET APPLICATIONS, CORPORATE IMAGE, AND AREA OF OPERATION. LIFE CYCLES FOR LIGHT TRUCKS HAVE BEEN INCREASING IN RECENT YEARS BECAUSE OF AN INCREASE IN POWERTRAIN LIFE, IMPROVED GALVANIZING AND PAINTING, AND THE INCREASED USE OF DIESEL ENGINES. OPTIONAL EQUIPMENT CAN ALSO IMPROVE WORKER PRODUCTIVITY AND IMPROVE THE VEHICLE'S RESALE VALUE. SATISFIED DRIVERS WILL TAKE BETTER CARE OF THEIR EQUIPMENT. THE BEST RETURN AT RESALE INVOLVES A COMBINATION OF DISPOSAL AT AUCTIONS, TO SPECIALIZED BUYERS IN SPECIFIC SECONDARY MARKETS, AND SOMETIMES TO EMPLOYEES.

KEY WORDS: FLEET MANAGEMENT/ LIFE EXPECTANCY/ MOTOR EQUIPMENT/ PERFORMANCE/ REPLACEMENT ANALYSIS/ TRUCKS/

ORDER NUMBER: 0031392 LOCATION: P2789

BIG GROWTH IN SMALLER TRUCKS?

AUTHOR: GOLDBERG D
SOURCE: WASTE AGE
NUMBER OF PAGES: 3P YEAR: 1989

KEY WORDS: EQUIPMENT/ FLEET MANAGEMENT; MANAGEMENT/ FLEET MANAGEMENT; PLANNING/ REPLACEMENT ANALYSIS/ TRUCKS/

ORDER NUMBER: 0029207
MAKING REBUILD/REPLACE DECISIONS

AUTHOR: STAFF
SOURCE: CONSTRUCTION EQUIPMENT
NUMBER OF PAGES: 6P YEAR: 1989

ABSTRACT: FIVE VETERAN EQUIPMENT MANAGERS PARTICIPATED IN A SPECIAL SURVEY ABOUT MAINTAINING AND MANAGING CONSTRUCTION MACHINES AND TRUCKS. AMONG OTHER MATTERS, THE EXPERTS WERE ASKED TO COMMENT ON WHAT THEY DO WITH EQUIPMENT THAT IS NEARING THE END OF ITS ECONOMICALLY USEFUL LIFE. THE ARTICLE PROVIDES THEIR ANSWERS TO SEVEN QUESTIONS, INCLUDING, "HOW MUCH WOULD YOU BE WILLING TO SPEND ON A REBUILD, COMPARED TO A NEW MACHINE?" HERE'S A SAMPLING OF REPLIES: "WE WOULD PROBABLY OPT FOR REPLACEMENT INSTEAD OF REBUILDING. BUT WE WOULD BE WILLING TO SPEND UP TO A QUARTER OF THE COST OF A NEW MACHINE." "IN A GENERAL REBUILD OF A MACHINE, WE WOULD BE WILLING TO SPEND ONE-HALF OR LESS OF A NEW MACHINE'S PRICE." "THE MONEY WE'RE WILLING TO SPEND ON A REBUILD VARIES WITH THE CLASS AND TYPE OF EQUIPMENT. BUT IN GENERAL TERMS, THE FIGURE WOULD PROBABLY BE FROM 40% TO 60%." HOW DO THESE EXPERIENCED EQUIPMENT MANAGERS DECIDE THAT A MACHINE SHOULD BE REBUILT? "OBSOLESCENCE, RELIABILITY, RESALE VALUE, AND ANTICIPATED FUTURE USE," SAID ONE. OTHERS: "WE BASE THE REBUILD DECISION ON AN ANALYSIS OF THE REBUILD COST, WEIGHING THE TECHNICAL DEVELOPMENT THAT IS AVAILABLE IN NEW MACHINES AGAINST PRODUCTIVITY AND RELIABILITY WE CAN EXPECT FROM A REBUILT MACHINE." OTHER CONSIDERATIONS DISCUSSED HERE ARE TAX ADVANTAGES, BASIC PHILOSOPHIES OF REPAIR/REBUILD, AND HOW "REBUILD" IS DEFINED.

KEY WORDS: CONSTRUCTION; EQUIPMENT/ FLEET MANAGEMENT/ MOTOR EQUIPMENT/ REPLACEMENT ANALYSIS/ REPLACEMENT POLICIES/

ORDER NUMBER: 0031343 LOCATION: P2692

SORTING OUT AFTERMARKET PARTS

AUTHOR: WALKER K; GREEN L
SOURCE: EQUIPMENT MANAGEMENT
NUMBER OF PAGES: 4P YEAR: 1989

ABSTRACT: THREE PRIMARY PARTS SOURCES ARE AVAILABLE TO EQUIPMENT MANAGERS: ORIGINAL EQUIPMENT MANUFACTURERS (OEM'S), ORIGINAL EQUIPMENT ASSEMBLERS (OEA'S), AND AFTERMARKET OR WILL-FIT MANUFACTURERS. THE CATEGORIES OF PARTS AVAILABLE TO EQUIPMENT MANAGERS INCLUDE OEM MANUFACTURED PARTS, ORIGINAL EQUIPMENT COMPONENT PARTS, "SAME AS" OEM PARTS, REBUILT PARTS, USED PARTS, AND COUNTERFEIT PARTS. MANAGERS CAN USE THIS MULTI-SOURCE MIX TO FIND SOME LATITUDE WITHIN TIGHT BUDGETS. AFTERMARKET PARTS DISTRIBUTORS, U.S. MASTER DISTRIBUTORS, AND INDEPENDENT DEALERS ARE INCREASING THE QUALITY AND RANGE OF AFTERMARKET PARTS. WHEN MANAGERS LEAVE THE OEM/OEA PARTS NETWORK, THE RISK OF LOSS BECAUSE OF REDUCED QUALITY AND DURABILITY INCREASES. THOSE RISKS MAY BE OUTWEIGHED FOR MANAGERS WHO DEVELOP SOURCES AND INCREASE THEIR NEGOTIATING POWER. MAINTENANCE RECORDS ARE INVALUABLE IN MAKING COMPARISONS BETWEEN ORIGINAL PARTS AND REPLACEMENTS.

KEY WORDS: EQUIPMENT; MANAGEMENT/ FLEET MANAGEMENT/ MANUFACTURING/ REPLACEMENT ANALYSIS/

ORDER NUMBER: 0022554 LOCATION: P2090
MICROCOMPUTER PROGRAM ASSISTS PLANNING FOR FLEET FUNDING

AUTHOR: MAGNUSON M P
JURCSE: PUBLIC WORKS
NUMBER OF PAGES: 4P YEAR: 1988

ABSTRACT: TO IMPROVE THE LONG-RANGE PLANNING OF REPLACEMENT/REHABILITATION FUNDING ATTEMPT TO FORECAST THE FUTURE EFFECT OF IMPLEMENTING VARIOUS BUDGET SCENARIOS, THE LAKE COUNTY (ILLINOIS) DIVISION OF TRANSPORTATION HAS DEVELOPED A CAPITAL EQUIPMENT REPLACEMENT ANALYSIS PROGRAM AS A PLANNING TOOL. THE PROGRAM IS WRITTEN IN BASIC AND RUNS ON THE IBM-PC. PRINTING AND GRAPHIC FUNCTIONS ARE HANDLED BY LOTUS SYMPHONY SPREADSHEET MACROS. THE DATA COLLECTION PROCESS IS DESCRIBED. ALL EQUIPMENT WITH REPLACEMENT COST OVER $300 WAS INVENTORIZED. DATA INCLUDED ID NUMBERS, VEHICLE MAKE/MODEL, AND VEHICLE TYPE. THE ANALYSIS ALLOWS FOR VEHICLES TO BE REPLACED ON A COMBINED PRIORITY CONDITIONS BASIS WHEN IT IS NECESSARY TO BALANCE THE TOTAL EXPENDITURES WITH THE BUDGET. THE ANALYSIS IS ACCOMPLISHED BY TWO PROCEDURES: BUDGET CONSTRAINED AND UNCONSTRAINED. THE UNCONSTRAINED ANALYSIS IS RUN FIRST AND SERVES AS A STARTING POINT FOR THE BUDGET CONSTRAINED PROCEDURE. AFTER RUNNING THE PROGRAM, MANAGERS INVESTIGATE OTHER AREAS OF REPLACEMENT ANALYSIS NOT COVERED BY THE PROGRAM, INCLUDING ALTERNATIVE CAPITAL VALUE, TECHNOLOGICAL LIFE, AND SERVICE LIFE.

KEY WORDS: EQUIPMENT; MAINTENANCE/ FLEET MANAGEMENT; AUTOMATION/ FLEET MANAGEMENT; PLANNING/ REPLACEMENT ANALYSIS/

ORDER NUMBER: 0022551 LOCATION: P2093
THINK BIG: ALTHOUGH SMALL FLEETS MAY NOT HAVE THE SAME QUANTITY OF EQUIPMENT AS THEIR LARGER COUNTERPARTS, THEY HAVE THE SAME NEED FOR MANAGEMENT QUALITY

AUTHOR: ARRIGUNAGA R D
SOURCE: EQUIPMENT MANAGEMENT
NUMBER OF PAGES: 5P YEAR: 1988

KEY WORDS: COMPUTERS/ EQUIPMENT MANAGEMENT/ FLEET MAINTENANCE/ FLEET MANAGEMENT/ AUTOMATION/ FLEET MANAGEMENT/ ORGANIZATION/ FLEET MANAGEMENT/ PLANNING/ REPLACEMENT ANALYSIS/ SCHEDULING/

ORDER NUMBER: 0022322 LOCATION: P1861

EQUIPMENT POLICY: THE EFFECT OF DOWNTIME AND OBsolescence on the Life of Public Works Equipment; for Presentation to the APWA International Public Works Congress and Equipment Show; Sept 1972, Minneapolis, Minnesota.

AUTHOR: DOUGLAS J
NUMBER OF PAGES: 19P YEAR: 1972
KEY WORDS: FLEET MANAGEMENT/ COSTS/ FLEET MANAGEMENT/ FINANCE/ MODELS/ PERFORMANCE/ REPLACEMENT ANALYSIS/ TRUCKS/
ORDER NUMBER: 0021610 LOCATION: UNCATALOGUED REPORTS

SEARCH ON EQUIPMENT REPLACEMENT/ PREVENTIVE MAINTENANCE
AUTHOR: STAFF APWA
NUMBER OF PAGES: 16P YEAR: 1985
KEY WORDS: BIBLIOGRAPHIES/ FLEET MANAGEMENT/ PREVENTIVE MAINTENANCE/ REPLACEMENT ANALYSIS/
ORDER NUMBER: 0019511
MAXIMIZING RESALE VALUES

AUTHOR: STAFF
SOURCE: AUTOMOTIVE FLEET
NUMBER OF PAGES: 8P YEAR: 1987
ABSTRACT: THE TIME TO WORRY ABOUT RESALE VALUES IS BEFORE YOU BUY, ACCORDING TO A PANEL OF SIX FLEET DISPOSAL EXPERTS WHO WERE ASSEMBLED BY AUTOMOTIVE FLEET. AUCTIONS SEEM TO BE THE WAY TO GO FOR LARGER FLEETS IN BOTH THE PUBLIC AND PRIVATE SECTORS. GENERAL MOTORS SELLS ABOUT 45% OF ITS FLEET TO THE GENERAL PUBLIC THROUGH AUCTIONS, 23% TO GM EMPLOYEES, ANOTHER 23% THROUGH DEALERS, AND 9% THROUGH BROKERS. SEVERAL PRAGMATIC OBSERVATIONS EMERGED FROM THE ROUNDTABLE DISCUSSION, INCLUDING THE POPULARITY OF LIGHT VANS AND TRUCKS, ESPECIALLY IN RURAL COMMUNITIES. CONTEL SERVICE CORP., FOR EXAMPLE, TRIES TO DISPOSE OF ITS LIGHT TRUCKS BETWEEN 60,000 AND 70,000 MILES. OPTIONAL EQUIPMENT, CONTENT THE EXPERTS, SHOULD FIT THE CAR'S ORIGINAL NEEDS. MOST FEEL THAT POWER WINDOWS, FOR EXAMPLE, ARE SUPERFLUOUS IN A SUBCOMPACT OR PICKUP TRUCK WHILE THE OPTION WOULD BE EXPECTED IN A "LUXURY-STYLE" SEDAN. LAST, BUT NOT LEAST, STAY AWAY FROM EXTERIOR COLORS THAT ARE PRONE TO OXIDATION, INCLUDING METALLIC BLACKS, REDS, AND SILVERS. SOME COLOR PREFERENCES ARE REGIONAL. IN THE MIDWEST, DRIVERS REPORTEDLY SHY AWAY FROM WHITE CARS THAT CANNOT BE SPOTTED IN SNOWSTORMS.

KEYWORDS: COSTS/ FLEET MAINTENANCE/ FLEET MANAGEMENT; FINANCE/ LEASING/ REPLACEMENT ANALYSIS/

ORDER NUMBER: 0015061 LOCATION: P1182

METRO DADE COUNTY FLEET REPLACEMENT PROGRAM (PAPER PRESENTED AT THE AMERICAN PUBLIC WORKS ASSOCIATION 1988 INTERNATIONAL PUBLIC WORKS CONGRESS AND EQUIPMENT SHOW, TORONTO, CANADA, SEPTEMBER, 1988)

AUTHOR: DINNEEN J T
NUMBER OF PAGES: 10P YEAR: 1988
KEYWORDS: EQUIPMENT/ FLEET MAINTENANCE/ FLEET MANAGEMENT; PLANNING/ REPLACEMENT ANALYSIS/ REPLACEMENT POLICIES/ REVENUE/

ORDER NUMBER: 0013688 LOCATION: C88-17

REHABILITATION OF EQUIPMENT REBUILD OR REPLACE PANEL DISCUSSION

AUTHOR: ANSELMI J
NUMBER OF PAGES: 8P YEAR: 1981
KEYWORDS: FLEET MAINTENANCE; REBUILDING/ MOTOR EQUIPMENT; MAINTENANCE/ REPLACEMENT ANALYSIS/

ORDER NUMBER: 0013399

EQUIPMENT REPLACEMENT ANALYSIS

AUTHOR: MURPHY P
SOURCE: CALIFORNIA FLEET NEWS
NUMBER OF PAGES: 2P YEAR: 1987
KEYWORDS: FLEET MANAGEMENT/ REPLACEMENT ANALYSIS/

ORDER NUMBER: 0013328
EQUIPMENT REPLACEMENT POLICY
AUTHOR: BROOKS C
SOURCE: INTERNATIONAL ROAD FEDERATION PROCEEDINGS OF SYMPOSIUM ON MANAGEMENT OF ROAD EQUIPMENT
NUMBER OF PAGES: 9P YEAR: 1987
KEY WORDS: EQUIPMENT; MANAGEMENT; FLEET MANAGEMENT; REPLACEMENT ANALYSIS
ORDER NUMBER: 0013310

EQUIPMENT REBUILDING: "THE SECOND LIFE" (FRESNO, CALIFORNIA) (PRESENTED SEPTEMBER 13, 1983 AMERICAN PUBLIC WORKS ASSOCIATION, INTERNATIONAL PUBLIC WORKS CONGRESS AND EQUIPMENT SHOW DETROIT, MICHIGAN)
AUTHOR: PENNINGTON D
NUMBER OF PAGES: 14P YEAR: 1983
KEY WORDS: CONTRACTORS; COSTS; FLEET MAINTENANCE; REBUILDING; FLEET MANAGEMENT; REMANUFACTURING; REPLACEMENT ANALYSIS; STATISTICS
ORDER NUMBER: 0013216

EFFECTIVE EQUIPMENT MANAGEMENT
AUTHOR: STAFF
SOURCE: ASIAN NATIONAL DEVELOPMENT
NUMBER OF PAGES: 5P YEAR: 1986
KEY WORDS: EQUIPMENT; MANAGEMENT; FLEET MANAGEMENT; FOREIGN; MANAGEMENT INFORMATION SYSTEMS; REPLACEMENT ANALYSIS
ORDER NUMBER: 0013179

EQUIPMENT DECISIONS—REBUILD OR REPLACE: PORT AUTHORITY OF NEW YORK AND NEW JERSEY
AUTHOR: ANSELMI J
SOURCE: APWA REPORTER
NUMBER OF PAGES: 1P YEAR: 1982
KEY WORDS: FLEET MAINTENANCE; REBUILDING; FLEET MANAGEMENT; REPLACEMENT ANALYSIS
ORDER NUMBER: 0013103

EQUIPMENT REPLACEMENT: WILL SUPPLIERS MATCH DEMAND?
AUTHOR: STAFF
SOURCE: AMERICAN CITY AND COUNTY
NUMBER OF PAGES: 2P YEAR: 1982
KEY WORDS: FLEET MANAGEMENT; INVENTORIES; PURCHASING; REPLACEMENT ANALYSIS; VENDORS
ORDER NUMBER: 0013099
EQUIPMENT REPLACEMENT: WHERE AND WHEN?
AUTHOR: KENNEDY L
SOURCE: PUBLIC WORKS
NUMBER OF PAGES: 2P YEAR: 1982
KEY WORDS: FLEET MANAGEMENT/ NUMERIC DATA/ REPLACEMENT ANALYSIS/
ORDER NUMBER: 0013098

EQUIPMENT RELIABILITY AND MAINTENANCE
AUTHOR: JARDINE A K S; BUZACOTT J A
SOURCE: EUROPEAN JOURNAL OF OPERATIONAL RESEARCH
NUMBER OF PAGES: 12P YEAR: 1985
KEY WORDS: BIBLIOGRAPHIES/ FLEET MAINTENANCE/ FLEET MANAGEMENT/ REPLACEMENT ANALYSIS/ STATISTICS/
ORDER NUMBER: 0013065

HEAVY EQUIPMENT AND AUTOMOTIVE
AUTHOR:
SOURCE: PUBLIC WORKS MANUAL
NUMBER OF PAGES: 5P YEAR: 1988
KEY WORDS: FLEET MANAGEMENT; FINANCE/ FLEET MANAGEMENT; PURCHASING/ MOTOR EQUIPMENT; LEASING/ RENTAL EQUIPMENT/ REPLACEMENT ANALYSIS/
REPLACEMENT POLICIES/ VENDORS/
ORDER NUMBER: 0010849

MASTER OF EQUIPMENT MANAGEMENT: A WORKING MANUAL FOR USERS OF HEAVY EQUIPMENT
AUTHOR:
YEAR: 1987
KEY WORDS: ACCOUNTING/ AUCTIONS/ BACKHOES/ BULLDOZERS/ BULLDOZERS/
CONSTRUCTION; EQUIPMENT/ EXCAVATIONS; EQUIPMENT/ FLEET MANAGEMENT; PURCHASING; GRADING; EQUIPMENT/ INVENTORIES/ LEASING/
LOADERS/ MARKETS/ MARKETS/ MOTOR EQUIPMENT/ DISPOSAL/ MOTOR EQUIPMENT; LEASING/ NEGOTIATION/ PURCHASING/ REPLACEMENT ANALYSIS/
SURPLUS PROPERTY/ TRUCKS/
ORDER NUMBER: 0009154 LOCATION: L 7500 K29

AUTHOR: ANSELMI J
NUMBER OF PAGES: 9P YEAR: 1981
KEY WORDS: CONTRACTING/ EQUIPMENT; COSTS/ EQUIPMENT; MAINTENANCE/
EQUIPMENT; MANAGEMENT/ RENOVATION/ REPLACEMENT ANALYSIS/
ORDER NUMBER: 0007958 LOCATION: C81-1
EQUIPMENT REBUILDING: "THE SECOND LIFE" (PAPER PRESENTED AT THE AMERICAN PUBLIC WORKS ASSOCIATION 1983 INTERNATIONAL PUBLIC WORKS CONGRESS AND EQUIPMENT SHOW, DETROIT, MICHIGAN, SEPTEMBER 1983)
AUTHOR: PENNINGTON D
NUMBER OF PAGES: 15P YEAR: 1983
KEY WORDS: CONTRACTING/ EQUIPMENT; COSTS/ EQUIPMENT; MAINTENANCE/
EQUIPMENT; MANAGEMENT/ LANDFILLS; EQUIPMENT; LANDFILLS; MANAGEMENT/
PRIVATIZATION/ REPLACEMENT ANALYSIS/ SPECIFICATIONS/ TRACTORS/
TRUCKS/
ORDER NUMBER: 0007858 LOCATION: C83-54

EQUIPMENT REPLACEMENT/CAPITAL RECOVERY FACTORS: DIALOG SEARCH
AUTHOR:
NUMBER OF PAGES: 16P YEAR: 0000
KEY WORDS: AUTOMOBILES/ BIBLIOGRAPHIES/ CAPITAL COST RECOVERY/
CONSTRUCTION; EQUIPMENT/ FLEET MAINTENANCE; COSTS/ FLEET MANAGEMENT/
INVENTORIES/ LIFE CYCLE COSTING/ MODELS/ REPLACEMENT ANALYSIS/
TRUCKS/
ORDER NUMBER: 0005079

OPTIMAL EQUIPMENT REPLACEMENT STRATEGIES
AUTHOR: BEAN J C; LOMMANN J R; SMITH R L
YEAR: 1986
KEY WORDS: BUSES/ FLEET MANAGEMENT/ MOTOR BUSES/ REPLACEMENT ANALYSIS/
ORDER NUMBER: 0004663 LOCATION: 87-0456

MAKE MONEY FROM SURPLUS EQUIPMENT
AUTHOR: LACHMAN C A
SOURCE: APWA REPORTER
NUMBER OF PAGES: 1P YEAR: 1987
KEY WORDS: FLEET MAINTENANCE; OPERATING EXPENSES/ FLEET MANAGEMENT/ MARKETING/
REPLACEMENT ANALYSIS/
ORDER NUMBER: 0002529
FUNDAMENTALS OF EQUIPMENT LIFE CYCLES PRIORITY NUMBER ONE -- DEVELOPING A PLAN
PAPER PRESENTED AT THE AMERICAN PUBLIC WORKS ASSOCIATION 1991 INTERNATIONAL
PUBLIC WORKS CONGRESS AND EQUIPMENT SHOW, SAN FRANCISCO, CALIFORNIA, AUGUST
24-29, 1991)

AUTHOR: DENNY C; BRASHEAR J
NUMBER OF PAGES: 1P YEAR: 1991
ABSTRACT: DESCRIPTION OF FLEET MANAGEMENT REVOLVING FUNDS AND ORGANIZATIONAL
STRUCTURE IN LOUISVILLE, KY.
KEY WORDS: FLEET MANAGEMENT; FINANCE; FLEET MANAGEMENT; PLANNING; LIFE CYCLE
COSTING; TRUCKS;
ORDER NUMBER: 0034914 LOCATION: C91-18

DO YOU KNOW YOUR REAL EQUIPMENT COSTS?
AUTHOR: MOORE W
SOURCE: CONSTRUCTION EQUIPMENT
NUMBER OF PAGES: 6P YEAR: 1990
ABSTRACT: THE NUMBER OF EQUIPMENT RELATED EXPENSES IS LIKELY TO INCREASE AS
THE FLEET GREWS LARGER, BECOMES MORE DIVERSE, AND WORKS FURTHER
FROM HOME BASE. REVIEWS ARE SOME OF THE "HIDDEN" COSTS OF
EQUIPMENT OPERATION THAT SHOULD BE CALCULATED INTO YOUR POLICIES ON
USER CHARGES AND REPLACEMENT COSTS. AMONG THE MOST FREQUENTLY
OVERLOOKED EXPENSES ARE STORAGE, SHOP OVERHEAD AND SUPPLIES, FIELD
SERVICE TRUCKS, MECHANIC SUPERVISION, PARTS INVENTORY AND
MANAGEMENT, GENERAL ADMINISTRATIVE COSTS, OPERATOR AND MECHANIC
TRAINING, SPECIAL SERVICE EQUIPMENT AND TOOLS, REPAIR MANUALS, AND
FUEL AND LUBRICANT STORAGE AND MANAGEMENT.
KEY WORDS: COSTS; EQUIPMENT; MAINTENANCE; EQUIPMENT; MANAGEMENT; FUELS; LIFE
CYCLE COSTING; LUBRICATION; PREVENTIVE MAINTENANCE;
ORDER NUMBER: 0034546 LOCATION: P3065

MAINTENANCE PRACTICES FOR LOCAL ROADS: PROGRAM ADMINISTRATION
AUTHOR:
NUMBER OF PAGES: 32P YEAR: 0000
KEY WORDS: EQUIPMENT; MAINTENANCE; FLEET MAINTENANCE; FLEET
MAINTENANCE; OPERATING COSTS; FLEET MANAGEMENT; COSTS; FLEET
MANAGEMENT; FINANCE; LIFE CYCLE COSTING; MOTOR
EQUIPMENT; MAINTENANCE; PREVENTIVE MAINTENANCE; SPECIFICATIONS;
TRAINING;
ORDER NUMBER: 0024927

COUNTY FIGURES SERVICE PACT IN EQUIPMENT BIDS
AUTHOR: STAFF
SOURCE: ROADS AND BRIDGES
NUMBER OF PAGES: 3P YEAR: 1985
KEY WORDS: BIDDING; LIFE CYCLE COSTING; PURCHASING;
ORDER NUMBER: 0015397
IMPACTS OF STANDARDIZED VERSUS NONSTANDARDIZED BUS FLEETS

AUTHOR: STAFF
SOURCE: TRANSPORTATION RESEARCH RECORD
NUMBER OF PAGES: 25P YEAR: 1990

ABSTRACT: THIS REPORT WILL BE OF INTEREST TO TRANSIT AGENCY STAFFS CONCERNED WITH THE PROCUREMENT AND MAINTENANCE OF TRANSIT BUSES. THE REPORT PROVIDES AGENCIES WITH TWO UNCOMPLICATED METHODS TO ESTIMATE AND EVALUATE THE COSTS AND BENEFITS OF STANDARDIZED VERSUS NONSTANDARDIZED BUS FLEETS IN THEIR PROCUREMENT PROGRAMS. ONE OF THE TWO METHODS CAN BE USED TO ANSWER THE QUESTION, "WHAT IS THE LIKELY COST IMPACT OF FLEET STANDARDIZATION VERSUS NONSTANDARDIZATION OF FULL SIZE COACHES?" THE SECOND METHOD ADDRESSES THE QUESTION OF, "HOW CAN THE COST IMPACTS DETERMINED IN THE FIRST METHOD BE USED IN COMPETITIVE PROCUREMENT DECISIONS?" THE METHODS CAN BE APPLIED TO EACH FLEET BID IN A GIVEN PROCUREMENT AND THE RESULTS CAN BE COMPARED TO ASCERTAIN WHICH BID WOULD RESULT IN THE LOWEST TOTAL COST FLEET. PRIOR TO USE IN A NEW PROCUREMENT, TRANSIT AGENCIES CAN APPLY THE METHODS TO THEIR LAST PROCUREMENT AS A TEST AND CALIBRATION FOR FUTURE USE. IN SUMMARY THE METHODS PRESENTED WERE FOUND TO BE SIMPLE, REPEATABLE AND APPEAR ACCURATE.

KEY WORDS: BIBLIOGRAPHIES/ BUSES; EQUIPMENT/ COST ESTIMATION/ COSTS/ DATA/ ENGINES/ EQUIPMENT/ FLEET MAINTENANCE; COSTS/ FLEET MANAGEMENT/ FORMS/ INVENTORIES/ LIFE CYCLE COSTING/ MASS TRANSIT; FINANCE/ PERSONNEL; TRAINING/ RESEARCH/ SPARE PARTS/ STATISTICS/ SURVEYS/

ORDER NUMBER: 0032884 LOCATION: 91-0077 17
HOW TO MANAGE A GOVERNMENT FLEET

AUTHOR: UTZINGER D

SOURCE: AUTOMOTIVE FLEET

NUMBER OF PAGES: 5P YEAR: 1990

ABSTRACT: THE GROWING TRENDS TO PRIVATIZE GOVERNMENT FLEETS ISN'T THE ONLY ROUTE TO GETTING A COST-EFFECTIVE OPERATION. FLEET MANAGERS WHO ARE GIVEN PROPER AUTHORITY CAN APPROACH THE JOB AS IF THEY WERE RUNNING A SMALL BUSINESS. THEY CAN ECONOMIZE AND CENTRALIZE OPERATIONS, STRETCH EQUIPMENT RECYCLING PERIODS, MAXIMIZE RETURNS ON RESALES, AND GENERALLY GET MORE FOR EVERY DOLLAR SPENT. MANY SMART MANAGERS ARE USING RENTALS, EVEN ADVOCATING TAXIS FOR THEIR OCCASIONAL DRIVERS. SOME HAVE FOUND FULLY LOADED -- AND COMFORTABLE -- USED CARS PREFERABLE TO STRIPPED DOWN NEW MODELS FOR PART OF THE FLEET. REFURBISHING SPECIALIZED EQUIPMENT SUCH AS FIRE TRUCKS, EVEN IF IT MEANS A GROUND UP REBUILD, MAY SAVE THOUSANDS OF DOLLARS. IF SELLING IS THE ANSWER, CONSIDER THE READY MARKET OF SMALLER MUNICIPALITIES WHO ALSO NEED TO STRETCH TAX DOLLARS. WHEN DECIDING WHEN TO CYCLE VEHICLES, CONSIDER THAT THE LONGER THE VEHICLE IS DRIVEN, THE CHEAPER EACH MILE BECOMES, BUT THE MAXIMUM WILL DEPEND ON LOCAL DRIVING CONDITIONS. HAVE A FLEXIBLE POLICY AND RELY ON THE GARAGE FORMAN'S ADVICE. ASSIGN OLDER VEHICLES TO DEPARTMENTS REQUIRING LITTLE EMPLOYEE DRIVING, OR KEEP THE HIGH MILEAGE VEHICLES AS SPARES. CHOOSING STANDARD FACTORY PAINT COLORS AND MOVING THE DECAL FROM THE DOOR TO THE WINDOW MAY IMPROVE RESALE, TOO. BY ALL MEANS, COMPUTERIZE. TODAY'S MOTOR POOL OPERATIONS ARE TOO COMPLEX NOT TO.

KEY WORDS: FLEET MANAGEMENT/ COSTS/ LIFE CYCLE COSTING/ LIFE EXPECTANCY/ LOCAL GOVERNMENT/ MOTOR POOLS/ STATISTICS/

ORDER NUMBER: 0031790 LOCATION: P3299

EQUIPMENT BIDS: SHOULD THEY INCLUDE MORE THAN JUST SELLING PRICE?

AUTHOR: O'Connor J

SOURCE: AMERICAN CITY AND COUNTY

NUMBER OF PAGES: 3P YEAR: 1981

KEY WORDS: BIDDING/ LIFE CYCLE COSTING/ PURCHASING/ TOTAL COST BIDDING/

ORDER NUMBER: 0015396

PAY AS YOU GO FOR VEHICLES AND EQUIPMENT

AUTHOR: Campbell W

SOURCE: ALABAMA MUNICIPAL JOURNAL

NUMBER OF PAGES: 3P YEAR: 1984

KEY WORDS: ACCOUNTING/ LIFE CYCLE COSTING/ LOCAL GOVERNMENT; MANAGEMENT/ PURCHASING/

ORDER NUMBER: 0015395
MANAGING PUBLIC EQUIPMENT

AUTHOR: Knorr R E; Green H
NUMBER OF PAGES: 153 P
YEAR: 1989

ABSTRACT: The development of information for managing public equipment was based on data from two written questionnaires sent to public works managers responsible for equipment services, as well as a search of over 400 references and telephone interviews. Good practices in equipment management procedures are reflected in this publication and cover the following areas: administrative procedures, procurement, management information systems, preventive maintenance practices, life-cycle and replacement analyses.


ORDER NUMBER: 0021651 LOCATION: 89-1014 SPECIAL REPORT 55

PURCHASING ENERGY-EFFICIENT EQUIPMENT THROUGH COMPETITIVE BIDDING (SELMA-KINGSBURG-FOWLER COUNTY, CALIFORNIA)

AUTHOR: Garber G L; Whitley R D
SOURCE: The construction specifier
NUMBER OF PAGES: 5 P
YEAR: 1983

KEY WORDS: Bidding/ energy conservation/ life cycle costing/ performance/ purchasing/ vendors/ wastewater treatment/ contracting/

ORDER NUMBER: 0014630

LIFE CYCLE COSTING IN SELECTING MAINTENANCE STRATEGIES (PAPER PRESENTED AT THE AMERICAN PUBLIC WORKS ASSOCIATION 1983 INTERNATIONAL PUBLIC WORKS CONGRESS AND EQUIPMENT SHOW, DETROIT, MICHIGAN, SEPTEMBER 1983)

AUTHOR: Byrd L G; McMullen C C
NUMBER OF PAGES: 18 P
YEAR: 1983

KEY WORDS: Costs/ life cycle costing/ maintenance/ numeric data/ pavement life/

ORDER NUMBER: 0007812 LOCATION: C83-4
RESEARCH ON EQUIPMENT TECHNOLOGY UTILIZED BY LOCAL GOVERNMENT: STREET CLEANING;
PHASE ONE - FINAL REPORT
AUTHOR: HINKLE G J
NUMBER OF PAGES: 184P YEAR: 1977
KEY WORDS: GLOSSARIES/ LIFE CYCLE COSTING/ LITTER MEASUREMENT/ PERFORMANCE/
PRODUCTIVITY; MEASUREMENT/ PRODUCTIVITY; STANDARDS/ SPECIFICATIONS/
STORMWATER; MANAGEMENT/ STREET CLEANING; EQUIPMENT/ SWEEPERS/
VENDORS/ WATER POLLUTION/ WORK MEASUREMENT/
ORDER NUMBER: 0006896 LOCATION: X 66207 H58

PAVEMENT MAINTENANCE AND REHABILITATION: TECHNIQUES USING ASPHALT
AUTHOR:
NUMBER OF PAGES: 97P YEAR: 1984
KEY WORDS: AGGREGATES/ ASPHALT RECYCLING/ ASPHALT; EQUIPMENT/
ASPHALT; MAINTENANCE/ CRACK SEALING/ CRACKS/ EQUIPMENT/ LIFE CYCLE
COSTING/ LOW-VOLUME ROADS/ OVERLAYS/ PAVEMENT MANAGEMENT/
PAVEMENT; MAINTENANCE/ REJUVENATORS/ SEAL COATING/ STATISTICS/
TEMPERATURE/
ORDER NUMBER: 0006008 LOCATION: 85-0041
FALL PROTECTION IS MAKING THE RIGHT CONNECTION

AUTHOR: ELLIS J N
SOURCE: SAFETY AND HEALTH
NUMBER OF PAGES: 4P YEAR: 1989
ABSTRACT: WHEN IT COMES TO MAINTAINING FALL EQUIPMENT, DO NOT LIVE BY THE AXIOM, "IF IT AIN'T BROKE, DON'T FIX IT." WHEN A COMPANY IS WILLING TO MAKE PROGRESS IN PRACTICAL SAFETY BY CREATING A FALL PROTECTION PLAN FOR BOTH EMPLOYEES AND SUBCONTRACTOR EMPLOYEES, IT CAN ANSWER THE ISSUE OF INSPECTION, MAINTENANCE, AND TRAINING. EACH COMPANY NEEDS ITS OWN FALL EQUIPMENT MAINTENANCE AND LIFETIME POLICY THAT IS BASED ON SOME SCIENTIFIC RATIONALE DOCUMENTED IN ITS RECORDS. THE POLICY SHOULD REFERENCE BOTH OSHA AND ANSI STANDARDS. INSPECTION BY THE WORKER WILL ONLY BE AS GOOD AS HIS TRAINING. PREVIOUSLY EXPERIENCED HANDS-ON KNOWLEDGE OR FEEL FOR THE EQUIPMENT IS NOT GOOD ENOUGH. MAINTENANCE CAN BE DONE EFFECTIVELY ONLY BY AUTHORIZED PERSONNEL, AND SHOULD BE LIMITED TO VERY SPECIFIC OBJECTIVES.

KEY WORDS: EMPLOYEE SAFETY/EQUIPMENT;MAINTENANCE/EQUIPMENT;MANAGEMENT/EQUIPMENT;SAFETY/INSPECTION/PERSONNEL;TRAINING/SAFETY;MANAGEMENT/WORK ZONES;SAFETY/

ORDER NUMBER: 0022805 LOCATION: P2296

ONE CODE FOR ALL

AUTHOR: CULLEN D
SOURCE: FLEET OWNER
NUMBER OF PAGES: 3P YEAR: 1989
ABSTRACT: FLEET MANAGERS CAN MAKE THE MOST EFFECTIVE USE OF COMPUTERIZED VEHICLE MAINTENANCE TRACKING SYSTEMS WHEN TRUCK EQUIPMENT DATA IS TRANSCRIBED INTO INDUSTRY STANDARD REPORTING CODES. THE CHALLENGE IS TO DEVELOP A CODE GENERAL ENOUGH TO BE AN INDUSTRY STANDARD BUT SPECIFIC ENOUGH TO PROVIDE USEFUL INFORMATION FOR INDIVIDUAL FLEETS. THE ATA VEHICLE MAINTENANCE REPORTING STANDARDS (VMRS) ARE EFFECTIVE. VMRS CODES STANDARDIZE THE LABELLING OF RAW DATA, SUCH AS PARTS NUMBERS, VEHICLE TYPES, AND APPLICATIONS SO THEY CAN BE QUICKLY AND EASILY ORGANIZED AND ACCESSED. MORE THAN 750 FLEETS USE THE VMRS CODES AND MANY SUPPLIERS HAVE ADOPTED THEM FOR PARTS CODING AS WELL. HOWEVER, VMRS CODES ARE NOT COMPREHENSIVE ENOUGH. FOR INSTANCE, THEY DON'T FIT WELL IF YOU WANT TO PURCHASE A COMPUTERIZED MAINTENANCE REPORTING PACKAGE. ONE AVENUE OF EXPANSION MIGHT BE TO COMBINE VMRS WITH ANOTHER EQUIPMENT CODING SYSTEM SUCH AS THE APWA EQUIPMENT CODE FOR GOVERNMENTAL FLEETS. THE APWA CODE IS INTENDED TO FACILITATE INTERAGENCY COMPARISONS OF DATA ON SIMILAR PIECES OF EQUIPMENT FOUND IN GOVERNMENTAL FLEETS.

KEY WORDS: CODE ADMINISTRATION/EQUIPMENT;MAINTENANCE/FLEET MAINTENANCE;MANAGEMENT/FLEET MAINTENANCE;STANDARDS/REPLACEMENT ANALYSIS/

ORDER NUMBER: 0022515 LOCATION: P2088
HELPING ENGINES PERFORM ON OIL

AUTHOR: FUNICELLA G

SOURCE: EQUIPMENT MANAGEMENT

NUMBER OF PAGES: 1P YEAR: 1988

ABSTRACT: IF THE OIL IN YOUR DIESEL ENGINE IS TOO VISCIOUS, YOU MAY EXPERIENCE DIFFICULT STARTS, REDUCED ENGINE POWER, INCREASED ENGINE COOLING, AND HOTTER MOVING PARTS. BUT IF THE OIL IS TOO THIN, YOU WILL HAVE PROBLEMS WITH HIGHER CONSUMPTION, INCREASED OIL LEAKS, GREATER WEAR RESULTING FROM METAL ABRASION, AND MORE ENGINE NOISE. THE WAY TO FIND THE OIL THAT IS "JUST RIGHT" IS TO FOLLOW THE ENGINE MANUFACTURER'S RECOMMENDED GUIDELINES. OIL CONTAMINATION ALSO IS A SERIOUS PROBLEM FOR REFUSE VEHICLES. BETWEEN DRAIN INTERVALS, THE PRIMARY VARIABLES THAT AFFECT OIL CHANGES INCLUDE: 1) BY-PRODUCTS OF INTERNAL COMBUSTION, I.E., GASES THAT LEAK PAST INTERNAL ENGINE PARTS AND THE TURBOCHARGER AND SEAL INTO THE CRANKCASE. THESE GASES CONTAIN PARTICLES OF CARBON, WATER, VARNISH, LACQUER, AND FUEL; 2) ABRASIVES OR FOREIGN MATERIALS FROM AIR, FUELS, WORN ENGINE PARTS, OR POOR SERVICE PRACTICES; 3) ACID, VARNISH, AND SLUDGE CREATED AS LUBE OIL COMES IN CONTACT WITH HOT ENGINE PARTS OR TRAPPED AIR; 4) DILUTED FUEL; AND 5) DUST OR ROAD SALT. WHAT ARE THE MAINTENANCE IMPLICATIONS FOR REFUSE HAULERS? WHILE OIL AND FILTERS CAN BE CHANGED IN MOST TRUCKS EVERY 12,000 TO 20,000 MILES, ADDITIONAL SERVICING IS CRITICAL FOR REFUSE HAULERS. YOU SHOULD CHANGE THE OIL AT LEAST EVERY FOUR TO SIX WEEKS.

KEY WORDS: CONTAMINATION/ DIESEL/ EQUIPMENT;MAINTENANCE/ FLEET MANAGEMENT/ LUBRICANTS/ MOTOR OIL/ TROUBLESHOOTING/

ORDER NUMBER: 0020430 LOCATION: P1318

COST-EFFECTIVE MAINTENANCE MANAGEMENT: PRODUCTIVITY IMPROVEMENT AND DOWNTIME REDUCTION

AUTHOR: HERBATY F

NUMBER OF PAGES: 260P YEAR: 1983

KEY WORDS: EQUIPMENT;MAINTENANCE/ EQUIPMENT;MANAGEMENT/ FLEET MAINTENANCE;PRODUCTIVITY/ FORMS/ INVENTORIES/ PLANNING/ PREVENTIVE MAINTENANCE/ PRODUCTIVITY/ SCHEDULING/ STANDARDS/ TROUBLESHOOTING/

ORDER NUMBER: 0009226 LOCATION: T 2504 H42
UNDERSTANDING EQUIPMENT MAINTENANCE: A KEY TO GREATER PROFITABILITY

AUTHOR: HALE T C

SOURCE: CONSTRUCTION DIGEST

NUMBER OF PAGES: 5P YEAR: 1986

ABSTRACT: "THE ODDS ARE PRETTY GOOD THAT YOU DON'T LIE AWAKE AT NIGHT WORRYING ABOUT OIL AND FILTER CHANGES," SAYS THE AUTHOR. BUT A LITTLE INSOMNIA MAY BE GOOD FOR YOU, HE CONTENDS, ARGUING THAT A WELL-ORGANIZED PREVENTIVE MAINTENANCE PROGRAM WILL SAVE MONEY, TIME, AND THE TROUBLE OF UNEXPECTED DOWNTIME AND REPAIRS.

HIGHLIGHTED IN THIS ARTICLE ARE THE KEY ELEMENTS OF ANY PREVENTIVE MAINTENANCE PROGRAM: DEVELOPMENT OF A MAINTENANCE CHECKLIST, BASED ON YOUR OWN EXPERIENCE AND THE MANUFACTURER'S RECOMMENDATIONS; REGULARLY SCHEDULED INSPECTIONS; AND WELL-TRAINED OPERATORS, MECHANICS, AND GREASERS. ALSO INTERVIEWED FOR THIS ARTICLE WERE SEVERAL MANUFACTURERS, WHO ADDED THE FOLLOWING TIPS: 1) USE QUALIFIED MECHANICS FOR MAINTENANCE 2) CONSIDER THE RECOMMENDED MAINTENANCE LEVELS AS MINIMUM STANDARDS; 3) LOOK AT THE SERVICE FEATURES WHEN BUYING A MACHINE; AND 4) IF YOUR HAVE A QUESTION, CALL THE DISTRIBUTOR OR THE MANUFACTURER BEFORE TACKLING THE PROBLEM WITH YOUR WRENCH. WHILE COMPUTERIZATION MAY FACILITATE YOUR MAINTENANCE PROGRAM, "KEEP IT SIMPLE" IS THE ADVICE FROM ONE DISCOURAGED FLEET MANAGER WHO STREAMLINED AN OFF-THE-SHELF PROGRAM TO INCLUDE ONLY THOSE FEATURES HE REGARDED AS IMPORTANT. ALSO INCLUDED IN THIS ARTICLE IS A BRIEF DISCUSSION OF THE BEST TIME TO REPLACE EQUIPMENT. THE DETERMINING FACTOR SHOULD NOT BE AGE, BUT THE EXPENSE OF KEEPING A VEHICLE IN OPERATING CONDITION.

KEY WORDS: CONSTRUCTION; EQUIPMENT/ CRANES/ EQUIPMENT; MAINTENANCE/ FILTERS/ INSPECTION/ MAINTENANCE; MANAGEMENT/ OILS/ TIRES/

ORDER NUMBER: 0015057 LOCATION: P1178
Appendix D - Public Works Department, Cemetery Division
<table>
<thead>
<tr>
<th>Cemetery Name</th>
<th>Acres</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bruce Hollow</td>
<td>0.16</td>
<td>Inactive</td>
</tr>
<tr>
<td>Riverside Cemetery</td>
<td>21.3</td>
<td>Active</td>
</tr>
<tr>
<td>Pine Grove Cemetery</td>
<td>62.2</td>
<td>Active</td>
</tr>
<tr>
<td>Oak Street Cemetery (Old)</td>
<td>4.0</td>
<td>Inactive</td>
</tr>
<tr>
<td>Little Riverside Cemetery</td>
<td>8.1</td>
<td>Inactive</td>
</tr>
<tr>
<td>Fairview Cemetery</td>
<td>17.0</td>
<td>Active</td>
</tr>
<tr>
<td><strong>Total Acres</strong></td>
<td><strong>112.6</strong></td>
<td></td>
</tr>
</tbody>
</table>
April 26, 1993

Robert Palmer
P.O. Box 1213
Amherst, MA 01004-1213

Dear Mr. Palmer:

In response to your request for information on cemetery management, I have enclosed printouts of our database on specific areas under this topic. I hope this provides an efficient tool to assist you in your project.

Along with the printouts, I have enclosed a brochure which describes our subscription service and lists our fee schedule for photocopied material. For example, an Agency InfoLink member can receive any or all of the articles/reports listed in these printouts for a flat annual fee. There are no additional charges for photocopying or handling services. Please refer to this brochure to select either an InfoLink subscription or APWA Document fee option. If you have any questions, please contact me at 816/472-6100 ext. 584.

Information from the APWA database will generate cost savings by identifying how others have implemented a program or solved a problem resulting in increased productivity. You will also save time by using sample documents, contracts, specifications, and agreements that have worked for other agencies. To promote the sharing of information and experiences we would like to encourage you to send information regarding your agency’s operations and maintenance practices including reports, standards or specifications.

Your support of APWA is greatly appreciated so that we can continue to serve the field of public works.

We appreciate your patience during this transitional period.

Sincerely,

Carol A. Domo
Reference Librarian, Information Services

Enclosures
IMPROVING MUNICIPAL CEMETARY MANAGEMENT
AUTHOR: GRAUBART J I
SOURCE: MANAGEMENT INFORMATION SERVICE REPORT
NUMBER OF PAGES: 12P YEAR: 1983
ABSTRACT: REVIEWS THE BASICS OF EFFECTIVE AND PROFITABLE MUNICIPAL CEMETARY MANAGEMENT. IT EXAMINES LAND USE PLANNING, ADMINISTRATIVE OPERATIONS, MAINTENANCE ISSUES, AND FINANCING.
KEY WORDS: CEMETERIES/ LAND USE/ MAINTENANCE/ MUNICIPAL SERVICE;FINANCE/
MUNICIPAL SERVICES/ PLANNING/ REGULATIONS/ SITING/
ORDER NUMBER: 0034246

MANAGEMENT OF CEMETERIES GOBLIN UP CITY RESOURCES
AUTHOR: FITZGERALD S
SOURCE: TENNESSEE TOWN AND CITY
NUMBER OF PAGES: 2P YEAR: 1990
KEY WORDS: CEMETERIES/ MUNICIPAL GOVERNMENT;FINANCE/
ORDER NUMBER: 0033250

PUBLIC WORKS -- WE CARE: PROJECT ACTIVITY SCHEDULE
AUTHOR: STAFF
SOURCE: CITY OF GREELEY, COLORADO DEPARTMENT OF PUBLIC WORKS
NUMBER OF PAGES: 63P YEAR: 1989
ABSTRACT: THIS DOCUMENT HAS BEEN PREPARED IN AN EFFORT TO SET FORTH A COMPENDIUM OF ALL ACTIVITY ON SCHEDULED PROJECTS REQUIRING INVOLVEMENT ON BEHALF OF THE DEPARTMENT OF PUBLIC WORKS. THIS NOMENCLATURE, "PROJECTS" IS INTENDED TO ENCOMPASS ALL MAJOR AND IDENTIFIABLE UNDERTAKINGS INTENDED TO ACHIEVE AN IMPROVEMENT IN THE ORGANIZATION, SERVICES, OR PHYSICAL FACILITIES FALLING WITHIN THE DEPARTMENT'S RESPONSIBILITIES. THIS DOCUMENT ADDRESSES ONLY THE MOST SALIENT OF THE MANY ON-GOING SERVICE OR OPERATIONAL ACTIVITIES IN WHICH THE DEPARTMENT IS INVOLVED AND WHICH RECOGNIZABLY REQUIRE A CONSIDERABLE AMOUNT OF STAFF TIME AND EFFORT. PROJECTS AND SCHEDULES SET FORTH THEREIN MUST BE BALANCED WITH STAFFING DEMANDS IN THESE AREAS. IT IS INTENDED TO ESTABLISH A COMMON AND CONSISTENT BASE FROM WHICH ALL DEPARTMENTAL PROJECTS CAN BE DEFINED, PRIORITIZED, AND MONITORED AND TO SERVE AS A MANAGEMENT TOOL FOR ALL PERSONNEL.
KEY WORDS: CASE STUDIES/ CEMETERIES/ DRAINAGE/ ENGINEERING/
EQUIPMENT;MAINTENANCE/ PUBLIC WORKS/ STREETS/ TRAFFIC/ TRANSIT/
ORDER NUMBER: 0032905 LOCATION: 91-0042

THE ULTIMATE OPEN SPACE
AUTHOR: KNACK R E
SOURCE: PLANNING
NUMBER OF PAGES: 3P YEAR: 1990
KEY WORDS: CEMETERIES/ CITY PLANNING/ OPEN SPACE/ PLANNING/
ORDER NUMBER: 0029734
MODERN PARK CEMETERIES
AUTHOR: WEED H E
NUMBER OF PAGES: 57P YEAR: 0000
KEY WORDS: CEMETERIES/ CONSTRUCTION/ MANAGEMENT/ CREMATION/ LANDSCAPING/ PARKS/ FINANCE/ PRIVATIZATION/ ROADS/ SPECIFICATIONS/
ORDER NUMBER: 0026334

THE FOREST LAWN MEMORIAL PARK
AUTHOR: ADAIR H H
SOURCE: APWA REPORTER
NUMBER OF PAGES: 4P YEAR: 1964
KEY WORDS: CEMETERIES/ COMMUNITY DEVELOPMENT/ MUNICIPAL GOVERNMENT/
ORDER NUMBER: 0026310

CONSTRUCTION: CEMETERY DESIGN STANDARDS
AUTHOR: ANNESE D
SOURCE: LANDSCAPE ARCHITECTURE
NUMBER OF PAGES: 3P YEAR: 1983
KEY WORDS: CEMETERIES/ CONSTRUCTION/
ORDER NUMBER: 0018476
Appendix E - Police Department
Suggested Sources Of Standards Information

Law Enforcement Accreditation Commission
Phone # 1-800-368-3757

Hindelang Criminal Justice Research Center
State University of New York, University at Albany
135 Western Ave.
Albany NY 12222
(518) 442-5608

Crime Justice Data 1-800-732-3277

US Department of Justice
Office of Justice Programs
Bureau of Justice Statistics
10 Causeway Street Rm. 472
Boston MA 02222-1043
PH: (617) 565-6360

Source Book of Criminal Justice Statistics 1991
Appendix F - Fire and Forest Fire Department
Fire and Forest Fire Department

Organizations offering Standards Information:

Commonwealth of Massachusetts Fire Marshall
1010 Commonwealth
Boston MA 02139

National Fire Protection Association (NFPA),
1 Battery March Park
Quincy MA
1-800-344-3555

Occupational Safety and Health Review Commission
1825 K Street NW
Washington DC 20006
PH: (202) 634-7943

National Association of Fleet Administration, NJ
(908) 494-8100

Insurance Service Office (Insurance Rating)
100 Newport Ave.
CS 1700 Quincy MA 02269
PH: (617)-770-3550

Inventory of Apparatus in Service:

1989  Ford F7000 Pumper -  Engine 10
1988  Ford Heavy-duty Rescue  Squad 1
1986  Ford Crown Victoria  Car 1
1984  American LaFrance Pumper -  Engine 2
1977  Ford Pumper -  Engine 3
1977  Dodge Hose reel Truck-  Truck 7
1976  Chevrolet Light/Air Truck-  Truck 6
<table>
<thead>
<tr>
<th>Year</th>
<th>Model</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973</td>
<td>American LaFrance Pumper</td>
<td>Engine 5</td>
</tr>
<tr>
<td>1969</td>
<td>Maxim Pumper</td>
<td>Engine 4</td>
</tr>
<tr>
<td>1965</td>
<td>American LaFrance Ariel Ladder</td>
<td>Ladder 1</td>
</tr>
<tr>
<td>1953</td>
<td>Reo Pumper</td>
<td>Truck 9</td>
</tr>
</tbody>
</table>
School Department

Regulation Governing School Building Assistance # 16991
Office of Media Services, Department of Education.

Commonwealth of Massachusetts, General Regulations
603 CMR 38.00: Department of Education: School Construction

Section 38:

38.01: Definitions
38.02: Priorities
38.03: Procedures and Program and Cost Standards
38.04: Program and Cost Standards
38.05: School Improvement Projects
38.06: Leasing of Space for Vocational Programs
38.07: Waiver

Additional Standards:

New England Association of Schools and Colleges, Inc.
Sanborn House, 15 High Street, Winchester, MA 01890.
Tel: 617 / 729 - 6762
Fax: 617 / 729 - 0924

School Facilities: General Statement:

"The site, plant and equipment shall support all aspects of the educational program of the school and shall be maintained to ensure the safety and the health of the occupants. There shall be evidence of on-going planning to address future facility needs."

A Comprehensive School Improvement Process: Standards For Accreditation:

School Facilities and Related Services: Section 9
9.1 The building, site, and equipment support the school's programs and provide the setting for a positive and safe learning environment.

9.2 Proper documentation is on file to indicate the school's compliance with local/state fire, health, and safety regulations. All occupants of the building are familiar with procedures to follow in case of fire, emergencies, or accidents.

9.3 There is a planned program of building and site maintenance to ensure the health and safety of the occupants.

9.4 If food services are provided, the area and equipment ensure that the well-being of students is a priority.

9.5 If transportation services are provided, appropriate procedures are in place to ensure the safety of students.
Appendix H - Library Department
Library Department

Listed below are the capital facilities inventory and assessments of the Department’s buildings. Followed by that are the circulation figures for 1991, the latest year available. Last, a description of the standards and relevant information utilized by the Commonwealth to allocate funding to the Library Department is provided.

Buildings

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>SQUARE FOOTAGE</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheelock (Center)</td>
<td>3156</td>
<td>Good</td>
</tr>
<tr>
<td>Nelson (North Grafton)</td>
<td>5649</td>
<td>Good</td>
</tr>
<tr>
<td>South Grafton</td>
<td>1489</td>
<td>Good</td>
</tr>
</tbody>
</table>

Source: Town of Grafton, Assessor Office

Collection

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>TOTAL HOLDINGS</th>
<th>CIRCULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheelock (Center)</td>
<td>34419</td>
<td>47890</td>
</tr>
<tr>
<td>Nelson (North Grafton)</td>
<td>10946</td>
<td>13707</td>
</tr>
<tr>
<td>South Grafton</td>
<td>11765</td>
<td>11775</td>
</tr>
</tbody>
</table>

Commonwealth Standards

The Commonwealth of Massachusetts, Board of Library Commissioners (BLC), utilizes standards in order to determine state aid to municipal libraries. The enabling legislation for the BLC is under Massachusetts Code 60 CAR 4.00 and the corresponding Commonwealth general laws are in Chapter 78, Sections 19A and 19B. The seven (7) evaluative criteria categories and associated figures used to calculate the state aid to Grafton Libraries for fiscal 1993 are provided below.

<table>
<thead>
<tr>
<th>Minimum Requirement</th>
<th>Town Average*</th>
<th>State Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>POPULATION</td>
<td>N/A</td>
<td>13,000</td>
</tr>
<tr>
<td>HOURS OPEN PER WEEK</td>
<td>45</td>
<td>.45</td>
</tr>
<tr>
<td>MATERIALS EXPENDITURE FROM TOTAL BUDGET</td>
<td>16 %</td>
<td>20.9 %</td>
</tr>
<tr>
<td>EDUCATION LEVEL OF LIBRARY DIRECTOR MEETS REQUIREMENTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECIPROCITY MEETS REQUIREMENTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPEN ACCESS MEETS REQUIREMENTS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBMISSION OF ANNUAL REPORT MEETS REQUIREMENTS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
* The state average is a comparison of towns with a similar population, in this case it for a population between 10,000 and 14,999.

** BLC requires a budget of $150,521 and the town had allocated $158,000.

Source: Commonwealth of Massachusetts, Board of Library Commissioners

Additional Standards

Additional information is available on library standards from:

American Library Association (ALA)
50 East Huron Street
Chicago, IL 60611

Telephone: 312 / 944 - 7680 or 800 / 454 - 2433
# Recreation Facilities

<table>
<thead>
<tr>
<th>PARK NAME</th>
<th>ACRES</th>
<th>FACILITIES</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport Park</td>
<td>33.6</td>
<td>1 ball field</td>
<td>fair</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 basketball nets</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>playground area</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>picnic tables</td>
<td></td>
</tr>
<tr>
<td>Fisher Park</td>
<td>11.2</td>
<td>3 ball fields</td>
<td>fair</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 tennis court</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>lighted basketball court</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>bleachers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>playground area</td>
<td></td>
</tr>
<tr>
<td>Nelson Park</td>
<td>10.1</td>
<td>2 ball fields</td>
<td>very</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 basketball net</td>
<td>good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>playground area</td>
<td></td>
</tr>
<tr>
<td>Norcross Park</td>
<td>4.3</td>
<td>1 ball field</td>
<td>good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 basketball net</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>playground area</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>picnic tables</td>
<td></td>
</tr>
<tr>
<td>Silver Lake</td>
<td>19.4</td>
<td>beach</td>
<td>very</td>
</tr>
<tr>
<td></td>
<td></td>
<td>swimming</td>
<td>good</td>
</tr>
<tr>
<td></td>
<td></td>
<td>boating/canoeing</td>
<td></td>
</tr>
</tbody>
</table>

Organizations offering information regarding standards for parks and recreation:

American Park and Recreation Society

Local Branch Office
1800 Silas Deane Highway, Number 1
Rocky Hill, CT 06067

Telephone: 203 / 721 - 1055

National Office
2775 South Quincy Street, Suite 300
Arlington, VA 22206

Telephone: 703 / 820 - 4940

National Recreation and Park Association
3101 Park Center Drive
12th Floor
Alexandria, VA 22302

Telephone: 703 / 820 - 4940
Appendix J - Administration and Municipal Center
Administration and Municipal Center

• The Standard and Poor’s Standard:

Virtually all types of debt are rated, both long and short term, in the forms of general obligation and revenue issues. These include debt issued by states, counties, cities, school districts and special purpose districts. Both limited and tax general obligation bonds are rated. In addition, enterprise revenue debt issues include: electric, water, sewers, gas airports, parking, ports, solid waste, resource recovery, toll facilities, transit, hospitals, housing agencies, race tracks, stadiums (under some conditions), telephone, marina, auditoriums, some nursing home chains, and others.

Overall, Standard and Poor’s considers the economic base and operating account analyses to be the most critical elements in determining municipal bond debt ratings. Another important index is the comparison of fiscal results over a three to five year period with planning and budgeting procedures. A current or total operating deficit is cause for further evaluation. Other credit measurements are also taken to complete the rating.

• Other Sources For Standards:

Town and municipal standards for capital facilities are fairly scarce. However, the following agencies do support such needs for an annual service or membership fee.

• International City and County Management Association, Washington, D.C.
• National League of Cities, Washington, D.C.

• Agencies Which Could Not Provide Standards:

A major part of the findings revealed a lack of town and municipal standards for capital facilities and services. The following agencies were contacted, but could not provide standards.

• National Information Standards Organization, Bethesda, MD
• Urban and Regional Information Systems Association, Washington, D.C.
• National Academy of Public Administration, Washington, D.C.
• Institute of Public Administration, New York, NY
• National Associations of Towns and Townships, Washington, D.C.
• The Professional Local Government Management Association, Washington, D.C.
• United States Conference of Mayors, Washington, D.C.
Appendix K - Water Department
Suggested sources of standards and guidelines

U.S. Department of Housing and Urban Development (HUD)
Thomas C. O’Neill Federal Building
10 Causeway Street
Boston, MA 02222

Environmental Protection Agency (EPA)
National Primary Drinking Water Regulations For Community Water Supplies -

Environmental Protection Agency (EPA)
Water Quality Division, Washington DC

Commonwealth of Massachusetts
Board of Certification of Operators of Drinking Water Supply Facilities
Department of Environmental Protection (DEP)

American Water Works Association