Organizational and Management Assessment of the Public Works Department

CITY OF NORTHAMPTON, MASSACHUSETTS

matrix consulting group

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1. INTRODUCTION AND EXECUTIVE SUMMARY

This first chapter of this report introduces the analysis – outlining principal objectives, how the analysis was conducted and presents an executive summary.

1. SCOPE AND OBJECTIVES OF THE MANAGEMENT AND OPERATIONS STUDY

The Matrix Consulting Group conducted a comprehensive management and operations analysis of the Department's existing operations, service levels, infrastructure management, and staffing levels. The analysis was fact-based and included all aspects of services provided by the Department. The scope of the operations review was comprehensive. It included the following issues:

- **Management Practices –** The management philosophy, effectiveness of the management team, management and supervisory practices;
- **Organization –** The organizational structure and reporting relationships;
- **Staffing –** The number and allocation of staff, assigned job duties, and workforce planning;
- **Operations Management -** Operational planning, resource availability and capabilities (facility, equipment, tools, supplies, personnel), work scheduling, work reporting, quantity and quality of work produced, efficiency, and performance measures.

The objective of this assessment was to identify opportunities for improvement in the operational effectiveness and efficiency of the Department and practical opportunities for enhancing the quality of its product and services for the future.

2. PROJECT METHODOLOGIES

The Matrix Consulting Group utilized a fact-driven data collection and analytical process in conducting the operations review of the Public Works Department. The methodologies are summarized below.

- The Matrix Consulting Group conducted preliminary data collection for the operations review to ensure a clear understanding by the Public Works Department of the scope of the project, obtained the views and perspectives of Department management and staff, and obtained an initial understanding of the Public Works Department including goals, objectives, business processes, service level targets, performance indicators, and initial issues and opportunities for improvement.

- The Matrix Consulting Group conducted interviews of the Mayor, the Department Director, divisional managers, certain Department staff, selected City department heads.

- The project team collected data regarding service delivery by the Department including organization of services, the structure and functions of the Department, budgets, workload data, management systems, inventory of the infrastructure, etc.

- The project team compared the practices and programs of the Public Works Department to various industry practices in the Public Works industry.

The following section provides examples of the strengths of the Public Works Department.

3. THE PUBLIC WORKS DEPARTMENT EMPLOYS A NUMBER OF BEST PRACTICES.

A management and operations analysis, by its nature, focuses on opportunities for improvement. However, there are a number of strengths in the Public Works Department. Examples of these strengths are portrayed below.

- An inventory has been developed for many of the assets maintained by the Department such as the water and sewer lines, road network, catch basins, and others. This inventory has been entered into, and maintained in, a geographical information system (GIS).

- The Public Works Department conducts regular condition assessments of many of its paved surfaces on a regular basis.

- The Department generally makes effective use of contracted services in its field operations units to supplement full-time staff, provide access to specialized skills, and ensure services are provided in a cost-effective and timely manner.

These strengths provide a sound basis for further enhancement of operations and represent only selected best practices that are already in place.

4. KEY THEMES IDENTIFIED IN THE REPORT.

Before summarizing the major recommendations, it is important to put the recommendations into context. The evaluation of the Public Works Department resulted in some key themes emerging that are critical to understanding the resulting recommendations:

- Although the Department is clearly accomplishing work, it is failing to record the work or the resources that were utilized in accomplishing it. This inhibits any meaningful analysis of crew productivity, or the ability to place the cost of the work within the context of the cost of any alternative methods of delivering services.

- The Department is failing to plan field work in a proactive manner. There are no long-range schedules developed for work to be performed that show the dates of service, or the labor, equipment and materials needed to accomplish it.

- The Public Works facility is inadequate in many respects in providing for an efficient operation. This is particularly true of the space within which equipment maintenance tis performed, but the facility is also generally deficient in its size, layout, amenities and lack of covered storage for heavy equipment.

The following section outlines the key recommendations for the Public Works Department.

5. SUMMARY OF RECOMMENDATIONS

The table on the following pages summarizes the improvement opportunities identified and recommended by the Matrix Consulting Group in the management and operations study of the Public Works Department. The chapters within this report should be read, however, for a detailed discussion and analysis of each recommendation. Additional minor adjustments in operations, or minor improvement opportunities, are also contained in the detailed best practices assessment that is attached as Appendix B. For each recommendation listed below, a priority and recommended timeframe for initiating the effort has been provided.

Summary of Recommendations

Rec. No.	Recommendation	Priority	Timeframe
Chapter 2 – Planning and Management			
1.	The Department has taken a critical first step in the development of an asset management plan, which is the development of an asset inventory, and should continue to dedicate resources to maintaining this inventory in its geographical information system.	High	Continuing
2.	In preparation for the installation of a computerized maintenance management system, the Department should begin requiring all crew members in each division to report elements of their work each day on standardized forms.	Medium	Immediate
3.	The Department should purchase and install a computerized maintenance management system. The cost of the system will depend upon the functionality chosen, however in the project team's experience, the cost is estimated to be in the range of $80,000 to $100,000.	Medium	FY17
4.	The Department should begin to define work activities that are commonly performed.	High	Immediate and ongoing
5.	The Department should begin to define service levels for each of its major work activities.	High	Immediate and ongoing
6.	The Department should develop and implement a formal plan and schedule for all major maintenance events for the year.	Medium	FY17

Rec. No.	Recommendation	Priority	Timeframe
7.	The Department Director should generate a monthly performance report on the accomplishment of projected work, and discuss the work accomplished with the Mayor.	Medium	FY17
Chapter 3 – Administration and Organization			
8.	The City should consolidate the Water, Sewer and Stormwater maintenance functions under a newly-created Utilities Maintenance Division.	Medium	FY17
9.	The Department should create the position of Assistant Public Works Director, separate from that of the City Engineer, but assuming many of the roles and duties performed by the City Engineer. The total compensation for this position, including 40% for fringe benefits, is estimated to be approximately $137,025.	Low	FY17
10.	The Department should add one Principal Account Clerk position to assume responsibility for entering daily work activity sheets into the computerized maintenance management system. The cost of the position, including 40% for fringe benefits, is approximately $43,820.	Low	Spring, 2016
11.	The Public Works Department should evaluate the continued use of VueWorks against new technologies. Should the Department elect to retain this system, the project team recommends that it obtain training in the work tracking software for administrative staff responsible for entering work requests.	Low	Spring/Summer, 2016
12.	The Public Works Department should expand the number of work request categories to include all major work types reported by residents.	Low	After additional training is obtained
13.	The administrative staff members who enter the work requests into the work order tracking system should provide residents with a work request tracking number so that they can monitor the completion of their requests on-line.	Low	After expansion of work types incorporated into the system
14.	The Department Director should institute regular and frequent staff meetings.	Medium	Winter, 2016
15.	The Department should take proactive steps to make more accurate budget estimates.	Medium	Immediate and ongoing
16.	The Department should develop standard policies and procedures manual to guide departmental operations.	Low	FY17
Chapter 4 – Staffing and Operations			

Rec. No.	Recommendation	Priority	Timeframe
17.	The City should ensure that all capital projects involve the Engineering Division of Public Works. This involvement should include design, or design consultant section, design oversight and management, construction inspection and general project management.	Medium	FY17
18.	Billable targets should be established for all engineering staff outlining the percentage of time that should be billable to capital projects	Medium	Immediate
19.	The Engineering Division should use cost of construction guidelines to determine the ongoing and annual engineering staff requirements necessary to support adopted capital projects.	Low	Winter/Spring, 2016
20.	The Department should hire two Motor Equipment Operators to conduct sewer and stormwater preventive maintenance functions. The total compensation for these positions is estimated to be approximately $95,846, inclusive of salaries and benefits. The institution of a PM program for underground infrastructure can, over time, return $2 for every $1 invested, for a longer-term cost savings estimated at $191,692 in avoided emergency repairs.	Medium	Summer, 2016
21	The City should investigate the feasibility of transferring responsibility for the maintenance of athletic fields to the City Schools. If this is not a feasible option, however, the project team recommends that the Parks and Cemeteries section hire a Motor Equipment Operator and a Laborer to perform the detail work in the parks and athletic fields that is not currently occurring. The estimated cost of these positions is $85,573, including salary and benefits estimated at 40% of salaries.	Low	Summer, 2016
22.	The City should replace or modify the current Public Works Department facility. Although the facility is inadequate in many respects, this is particularly true of the Vehicle Maintenance Shop which is insufficient in terms of space for mechanics and equipment, but also in terms of the space in which automotive parts are stored.	Low	Placement in 10-year capital plan
23.	The Highway Division Superintendent and Working Foreman II in the Equipment Maintenance section should develop a vehicle and equipment replacement plan that identifies the most critical pieces of equipment for replacement. Each vehicle and piece of equipment in the 161-unit fleet should be placed in the replacement schedule based on criticality of need, and the age of the equipment.	Medium	Immediate

2. PLANNING AND MANAGEMENT

This section describes a process of successfully managing the Public Works Department and planning the work that will achieve success. A fundamental assumption in this discussion is that management is accountable for results that are pre-defined and agreed-upon by both the City and the Public Works Department. In short, if the elements of success are not defined at the outset, they cannot be achieved to the satisfaction of the maximum number of stakeholders.

The project team noted that the Public Works Department has management and staff who are dedicated to providing a high level of service to City residents. It is responsible for maintaining some of the City's largest investments, which include its roads, water and sewer lines, stormwater infrastructure, the fleet of vehicles and equipment, sidewalks, parks and cemeteries, and it is maintaining this infrastructure with a staffing contingent that is largely unchanged over the past several years, even as infrastructure maintenance requirements have increased and funding for their maintenance decreased over a significant portion of the previous 5-10 year period.

This section will describe methods to achieve a greater level of service through a more rigorous approach to management and planning the work of the Public Works Department. This approach can be graphically shown as follows.

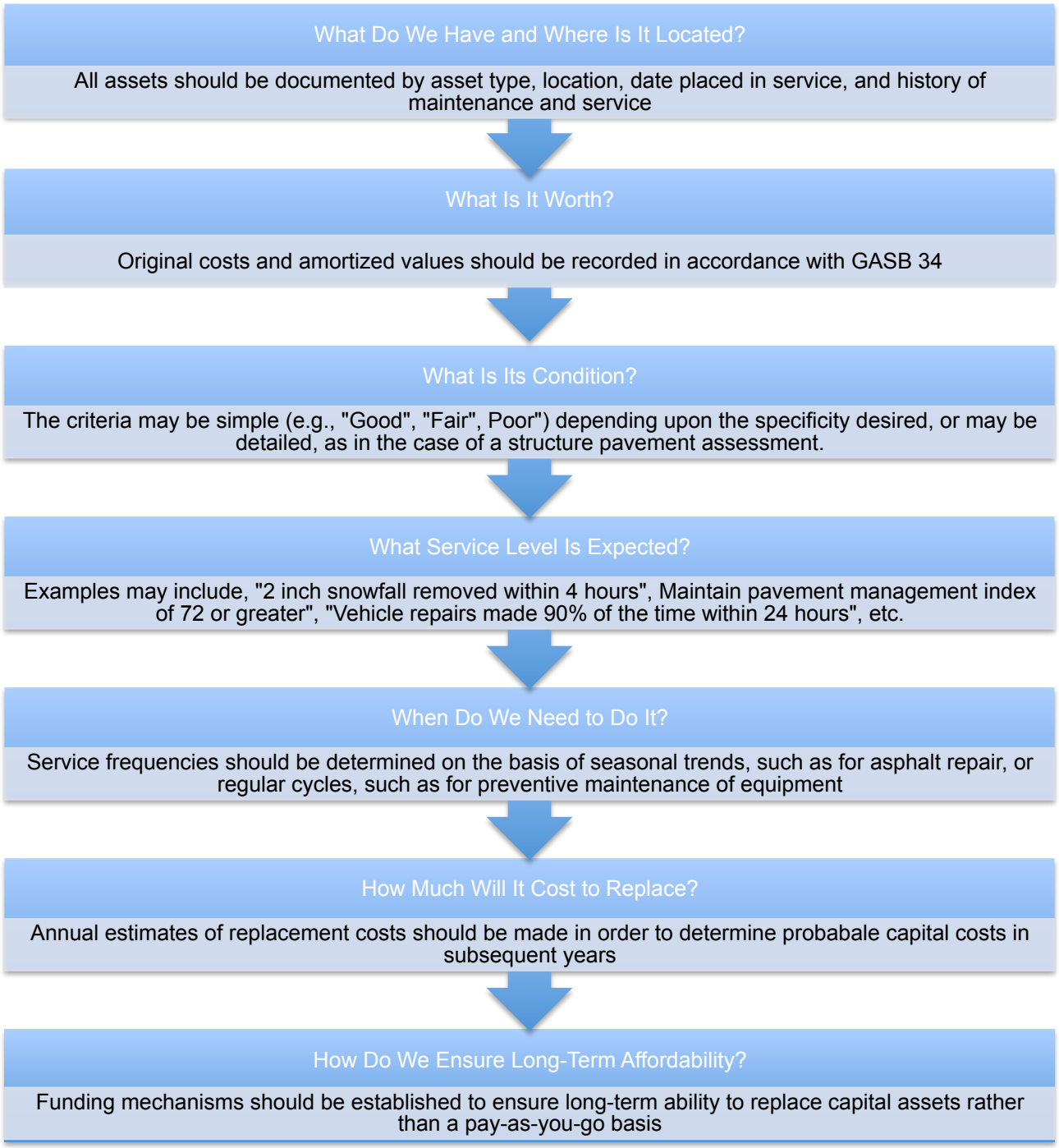
The following sections evaluate the management accountability practices within the Department, as well as the management system infrastructure required to ensure that managers can monitor and report their status and progress against accepted measures of accountability. This includes goals, objectives, and performance reporting.

1. THE PUBLIC WORKS DEPARTMENT HAS TAKEN AN IMPORTANT PRELIMINARY STEP IN THE DEVELOPMENT OF AN ASSET MANAGEMENT PROGRAM BY DOCUMENTING THE CITY'S INFRASTRUCURE.

In order to manage the infrastructure for which the Public Works Department has been entrusted with responsibility, it must first ensure that it accounts for all assets. The Department is generally up to date in the documentation of infrastructure, both in terms of the type (e.g., water distribution line, wastewater collection lines, bridges, etc.) and location. This is an important step in the development of a comprehensive asset

management plan, which relies upon accurate information to facilitate decision-making regarding the condition and performance of those assets with a long-term view of their preservation and renewal and replacement

Although the Department has taken this initial step, there are others that are necessary in the development of a comprehensive asset management plan. The framework for building from the development of an asset inventory to a true asset management plan includes the following chronologically-ordered questions



The overall goal of the asset inventory and management process is not to simply list all assets and their locations, but rather to minimize the life cycle cost associated with each asset. Therefore, each of the steps shown in the graphic above is a critical component of ensuring that all assets are recorded, that they are prioritized in terms of

condition assessment, that values are placed on current assets, that levels of service are established to prolong lives of assets, and that they are ranked in terms of risks associated with failing to replace the assets. Only then can the Public Works Department definitively state that life cycle costs have been minimized to the City.

Perhaps the most challenging element in the development of the asset inventory and management plan is the estimation of probable replacement costs. In the case of vehicles and equipment, this may be relatively straightforward, as current replacement costs are available for most equipment types. These costs may be extrapolated out several years, based on historical price escalations. So, although projecting the replacement cost of a tandem axle dump truck may be somewhat imprecise over a five to seven year period, the margin of error in this exercise is far lower than, for example, the cost of rehabilitating two sections of roadway that may deteriorate at uneven rates over an extended period of time. Further, these sections of roadway may require the City to address their rehabilitation in different ways. For example, one section may require a chip seal overlay, while one may deteriorate to the point of needing complete reconstruction. The point of this discussion is not to recommend that the Department anticipate in advance every possible scenario of asset replacement, but rather it is to ensure that a standard methodology is applied in the estimate of cost. Crack sealing, pavement rejuvenation, chip seal, micropaving and full reconstruction each have different estimated life cycles as well as costs. Whereas crack seal carries one of the lower costs per lane mile, it also has one of the shortest life cycles of any repair. Conversely, full reconstruction can cost as much as $400,000 or more per lane mile, however it carries a 20 year life cycle, or more. These may vary somewhat in

Northampton's particular conditions, however the point to be made is that the costs and life cycles should be tailored to these conditions, with the overall goal of maximizing the life cycle, and minimizing the cost, of each asset.

Recommendation 1: The Department has taken a critical first step in the development of an asset management plan, which is the development of an asset inventory, and should continue to dedicate resources to maintaining this inventory in its geographical information system.

2. THE PUBLIC WORKS DEPARTMENT SHOULD PURCHASE AND INSTALL A COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEM TO COLLECT AND REPORT WORK-RELATED DATA AND INFORMATION.

The Public Works Department currently does not possess a computerized maintenance management system (CMMS). The Department does utilize a software system, "VUEWorks" to record work requests that are called in by residents for tree work, potholes and signs, however this program is a data transfer solution, and does not function as a CMMS. However, no other work types are captured and monitored. The use of the system for this purpose may be helpful in enabling the Department to respond to residents who call in to check on the status of a previous request, however the failure to capture information related to all other types of work performed in the Department limits the usefulness of the software. Further, none of the divisions in the Department record any of their routine maintenance work in an automated system, which limits the Department's ability to analyze the productivity of crews, the cost of activities, and the efficiency with which work was accomplished.

There are many benefits of a CMMS, which include not just the obvious advantages associated with tracking and justifying the dates, employees, locations, and descriptions of work performed, but they also include the definition of appropriate service levels that are achievable with a given number of labor hours, and at a defined

level of productivity. Currently, work assignments are issued to crews and individual staff members with no instruction as to the expected duration of each. This has the effect of both allowing the employee or crew to determine the level of productivity required, and the potential expansion of time taken for the tasks into the amount of time available to perform them. The benefit of using the CMMS to accumulate standard times for specific tasks is that it leads to greater productivity of available resources, and increased productivity ensures that the same work levels may be accomplished at less cost. Alternatively, more work may be accomplished for the same cost, with work quality remaining constant.

The Public Works Department should utilize a CMMS to enable the identification of the services provided (e.g., street sweeping), the levels of service (e.g., each street is swept annually), the outputs of each of these services (e.g., the number of curb miles swept, and the percentage of the total system that this represents), and the cost of those services in terms of the total cost and the cost per unit of output.

This maintenance management system should be a standard one, and should incorporate the following basic elements:

- The ability to plan and schedule preventive maintenance. Preventive maintenance should constitute the majority of the Department's work. The staffing levels of the Department are generally sufficient to provide a relatively high service level that is based on proactive scheduling of work in a CMMS.

- The ability to monitor and report on the inventory and procurement processes of the Department. Currently, there are no automated systems to track the inventory of automotive parts, tools, supplies, and other consumables. A standard CMMS should provide the ability of the Department to electronically track the inventory on hand, and to reconcile this against purchase orders, as well as to routine physical inventory counts.

- The ability to record and manage the work performed in the Department. Work activities should be defined for the significant maintenance work that is

performed. The project team's analysis of the manual work activity sheets indicates that there is a manageable number of these major work activities, and they should be entered into the CMMS. As work is accomplished against these work activity codes data such as the crew member, date, labor hours, equipment hours and materials used should be entered as well.

- The ability to run and analyze reports on the maintenance of an asset, and on the productivity of the staff in maintaining it. Analysis of trends in maintaining an asset may indicate either a need to replace the asset, or the need for greater skills and training of the staff who maintain it. Anecdotal reports of these trends may suffice when there are relatively few assets being maintained by a few number of staff members, however they are insufficient in providing meaningful analysis of the number of assets under management by the Northampton Public Works Department. A CMMS would allow the Department to isolate these trends and to make decisions regarding asset replacement as well as skills development.

- The ability to measure performance. Currently, the Department issues certain statistics related to the accomplishment of its workload. Redesigning work practices to ensure that all work, materials and equipment are associated with specific jobs and categories of work will allow the Department to analyze and report on the efficiency with which the work was accomplished.

To ensure that the analysis of data is meaningful, it is necessary that all crew members in each division report work in the same manner, and against the same sets of activity codes. It is unrealistic to expect that the crews will immediately begin to report work in the consistent and comprehensive manner that will ultimately be necessary to maximize the usefulness of the CMMS. For this reason, the Department should begin to require employees to report time on manual forms that are standard across divisions as an interim step in acclimating them to the requirements of the new system. The basic information that should be required on each work order should include the following:

- Crew Member Name (or Numeric identifier).

- Location of Work. Ideally, this would incorporate a geo-coded location, however in the absence of this, a park name, a street segment or intersection will suffice.

- Job Number. This should be a unique numeric assignment associated with a definable activity. Should the work activity span multiple days, the same numeric identifier should be used, however different dates of activity should be noted, as in the next category.

- Date of Work.

- Equipment Used. This should reflect the number of hours a specific piece of equipment was used. It should reflect the total time at the work site, and not simply the number of engine hours or mileage accumulated.

- Materials Used. This should reflect the quantities and their costs.

- Contracted Costs. Bills from contractors should be reflected in the work order and should reflect the dates of accomplishment, hours, materials and equipment billed, and total labor hours.

- Activity Code. As will be described in the following section, the Department should develop activity codes that describe the work accomplished. For example, the alpha numeric code, "P-001" may describe pothole patching, whereas "C-001" may describe cemetery mowing.

In the early stages of development, the Director, in concert with each Division Manager, should analyze each crew member's input on these work orders to ensure a proper and consistent understanding and completion of each element. Any remedial instructions should be made at the earliest possible time to ensure that incorrect procedures are not ingrained into the process.

The cost of a CMMS will depend a great deal upon the functionality desired. The Public Works Department should develop specifications for a CMMS and work with the City's Purchasing Agent to issue a request for proposals. In the project team's experience, the cost of such a system should be in the range of $80,000 to $100,000 for an operation the size of Northampton's.

There are several steps that need to be accomplished before the automated maintenance management system can be effectively utilized, and these are described in the following sub-sections.

Recommendation 2: In preparation for the installation of a computerized maintenance management system, the Department should begin requiring all crew members in each division to report elements of their work each day on standardized forms.

Recommendation 3: The Department should purchase and install a computerized maintenance management system. The cost of the system will depend upon the functionality chosen, however in the project team's experience, the cost is estimated to be in the range of $80,000 to $100,000.

3. THE PUBLIC WORKS DEPARTMENT SHOULD DEVELOP AN INVENTORY OF MAJOR WORK ACTIVITIES IT PERFORMS IN MAINTAINING ASSETS.

Interviews and observations by the project team indicate that although work is clearly being accomplished by divisional crews, this work is not consistently reported. Although some work is reported on manual forms, the work activity descriptions do not facilitate meaningful analysis of production. The Sewer/Stormwater section of the Highway Division consistently records the work of its crew members, however the work activities reported on the manual forms are vague, and inconsistently reported, so that the same work activity may be reported in different activity descriptions. Examples of work accomplished by the crews in this section included such entries as "Sink Hole Repair S. Main St"", "Pick up cones and barrels", "Prep. Cuts on Smith St", "Stone Ridge Rd. Meadow St", "Saw Cut on Federal St.", "Odd Jobs", and many other similar entries.

The Department Director, Division Managers and Foremen should define the work activities performed by their crews, including those that consume the majority of staff work hours and all forms of leave. In other words, all staff hours for each

employee's year of work should be included within the system. The work activities need to be carefully defined to assure that the same terminology is used for the work performed by staff, so that the same activity is recorded the same way, and in the same category, each time it is performed. Each of these work activities should define the unit of measure in order to enable the Department to derive standard times and costs for specific activities.

The objectives in this particular step are to allow for an objective evaluation of productivity of staff, and to allow for job-costing on a standardized basis.

Recommendation 4: The Department should begin to define work activities that are commonly performed. These activity definitions should be utilized consistently and should not vary from employee to employee regarding the type of work that is performed. Further, the Department should ensure that the same field work activity is not defined in the inventory listing under different terms.

4. THE DEPARTMENT SHOULD DEFINE THE LEVELS OF SERVICE FOR ALL MAJOR WORK ACTIVITIES.

The main objectives of the Public Works Department are to maintain the infrastructure of the City, and to respond to resident requests for service related to this infrastructure. Without an agreed-upon set of service levels, however, the degree to which the Department achieves satisfactory results will be subjective, and will vary based on the individual making the assessment.

A major theme throughout the course of the study, as well as in this report, was that although the Department of Public Works reports the accomplishment of workloads, it does not report the efficiency with which the work was accomplished. Therefore, although the Department can, for example, report that a specific number of tons of asphalt were used in patching activities, there is no associated report on the labor hours and equipment that were used in accomplishing the work. If, for example, in one year,

the Highway section laid 200 of asphalt in patching activities, and in another year only 150 were laid in place, the presumption is that the year in which the greater number of tons were used was the more productive one. However, if 150% more labor and equipment were used in laying the 200 tons, the conclusions regarding productivity would be much different.

The Public Works Department should, in conjunction with the Mayor, develop levels of service that are commensurate with the financial and personnel resources at its disposal. These service levels should be defined in terms of response times to requests, how the services will be delivered, and how long they will take. Examples may include the following:

- Responses to requests for pothole patching will occur within 48 hours of request. Potholes will be filled with asphalt mix one to two inches higher than the road surface and rolled with a wheel roller or vibratory compactor to be level with the road surface. The use of a three-person crew will be used, including traffic flagger.

- Once requests for service have been accomplished, the service requestor shall be called or visited within 48 hours to ensure that services were accomplished in accordance with the request.

- Grass in parks shall be maintained at a height of two inches or less, and shall be mowed no less than weekly. Grass in rights of way in low-traffic areas shall be maintained at a level not exceeding six inches.

- All major maintenance equipment in facilities will receive preventive maintenance in accordance with manufacturers' guidelines, or in accordance with more frequent service levels defined by the Department's policy and procedures manual.

Some judgment will be needed in applying the standards, but they should provide specific and useful guidelines in terms of what maintenance should be performed and what maintenance can be deferred. The result of this step in the overall process of developing an asset management plan is to define the levels of service that can be

achieved with the levels of staff and financial resources available to the Department. Labor hours, materials and equipment should be estimated for each level of service. Should this exercise indicate that insufficient resources currently exist to provide these service levels, the service levels should either be reduced to be commensurate with available resources, or additional resources should be obtained to provide the agreed-upon service levels. The project team's experience in interviews with Department staff indicate that the Department has not developed or communicated these service levels either to City management or to its residents. In the absence of a formal definition of these service levels, each "customer" of Public Works Department services may have a different view as to the services to be provided.

Recommendation 5: The Department should begin to define service levels for each of its major work activities. These should define the desired level of service to be accomplished, and should be reflective of available personnel and financial resources. These service levels should be communicated to both internal and external stakeholders in the delivery of public works services in the City.

5. THE DEPARTMENT SHOULD DEVELOP AND IMPLEMENT A WORK PLANNING AND SCHEDULING SYSTEM

As noted earlier, some work in the Department is being recorded on manual forms, and some is recorded in VueWorks. The manual sheets on which work is recorded provide information regarding the date, crew member and a very brief description of the work assigned.

Although the assignments made on the activity sheets that were provided to the project team may be descriptive of the work that the individual crew member is to accomplish on a particular day, they are not helpful in identifying the work that was accomplished well after the fact. So, for example, the work description of "School", or "Drive Sweepers", may have been clearly understood by the crew member on the date

the work assignment was made, but it is difficult to determine what work was performed at a much later date, since the actual work was not described (e.g., “Schools”) and the quantity of work was not defined (e.g., “Drive Sweepers”).

The project team has, in a previous section of the report, made a recommendation to standardize these work activity identifiers, and reiterates that recommendation here. However, in addition to not being helpful in terms of describing the work, the descriptions are also reflective of work assignments that are made on a daily basis rather than in accordance with an overall plan.

The Department should develop a formal work scheduling system to both plan the work, and to ensure that the planned amount of work is done. The Director, Highway Division Manager, and Foremen should develop this plan based on a discussion of the work to be done, and with final approval by the Mayor. The Director should apply the standards for levels of service for these proactive tasks, as developed in an earlier task, assign resources and costs to them, and develop a schedule to accomplish the work.

After the annual work program is approved, the field Foremen must have a simple method of authorizing and scheduling work to ensure that the work program is carried out as planned. To accomplish this, a monthly schedule should be prepared, using the annual work calendar as a guide. To the extent possible, the planned work should be carried out and every effort should be made to stay on schedule. However, if activities such as storm damage repairs and cleanup, snow removal, etc., are greater than planned, the work program will have to be adjusted or additional funds will be

requested to complete the planned work. The plan should incorporate the following elements:

- Work description (e.g., hot top Washington Place between Maynard Rd. and Forbes Ave.)
- Planned dates of accomplishment (e.g., June 6 through July 12)
- Materials needed
- Equipment needed
- Personnel needed (this should be stated in terms of the crew sizes and position categories)

Each of the planned events should be developed in this manner and entered into a Gantt chart that matches available resources with the dates of their need. As unplanned event arise, schedules should be adjusted, and resources rearranged to fit the needs. Some unscheduled events may necessitate the movement of scheduled events so that a projected lack of resources occurs. As public works operations are, to a large extent, driven by unplanned occurrences, this will likely happen from time to time. However, the benefit of having developed a longer-term schedule for planned events is that it gives the Department the maximum amount of time to prepare for alternative methods of delivering services, which may include contracting for service or hiring temporary labor.

Recommendation 6: The Department should develop and implement a formal plan and schedule for all major maintenance events for the year.

6. THE DEPARTMENT SHOULD BEGIN TO REPORT THE ACTIVITIES IT ACCOMPLISHES

This last step of the planning and work programming initiative involves the development of a work reporting system. A system should be developed to summarize

the daily work reports on a monthly basis to produce performance measurement reports. The Public Works Director should be required to provide a monthly status report to the Mayor, which should be more than a simple statement of the work that was accomplished. It should reflect not only this, but also the efficiency and effectiveness of the resources utilized, and the degree to which the actual performance met the objectives stated in the monthly plan. For example, the performance measurement data generated by this report could include:

- A comparison of planned versus actual staff hours per work activity for the previous month and year-to-date for each work activity;
- A comparison of actual versus planned work output (e.g., numbers of vehicles scheduled for preventive maintenance vs. the number entering the garage for PM within 48 hours of schedule) per month and year-to-date for each work activity;
- A unit cost analysis that compares the planned versus actual unit costs for each work activity per month and year-to-date; and
- A comparison of actual productivity (work output per staff hour) versus the expected productivity as stated in the performance standards.

The activity report should be viewed as a discussion document between the Director and the Mayor to discuss the accomplishment of work, any reasons for not accomplishing the planned amount of work, and the action steps necessary to revise to work plan to ensure that the work is accomplished.

Recommendation 7: The Department Director should generate a monthly performance report on the accomplishment of projected work, and discuss the work accomplished with the Mayor. As plans change, adjustments to these plans should be discussed in this monthly meeting.

3. ADMINISTRATION AND ORGANIZATION

This chapter of the report analyzes the Public Works Department's administrative staffing and procedures, as well as its plan of organization.

1. THE DEPARTMENT SHOULD MAKE CERTAIN CHANGES IN ITS ORGANIZATIONAL STRUCTURE TO PROVIDE CLEARER LINES OF AUTHORITY AND CONTROL, AND TO PROVIDE MORE EQUITY IN MANAGERIAL SPANS OF CONTROL.

When evaluating any organizational structure, the purpose is to address questions regarding lines of authority, responsibility and accountability. Well-managed organizations are designed to deliver services to customers, maximize management control over service delivery, and provide for accountability of managers and staff through the provision of clarity of lines of reporting. The following tenets of organizational design frame the discussion relating to the future structure of the Public Works Department.

- **A Department should be organized on a form-follows-function basis with a clear, distinct and comprehensive sense of purpose or mission for each division.** Functions are grouped consistent with their periodic interaction, management systems, delivery of services, and are linked in some way, resulting in functional cohesion.

- **The organizational structure should foster accountability.** The organizational structure fosters accountability among management, supervisory staff and line staff.

- **The plan of organization should enhance communication and coordination**. The number of handoffs/exchanges required among different divisions providing service to the public is minimized. The structure enhances shared knowledge and understanding among divisions with similar mission goals and objectives. The channels of communication are clear and consistent.

- **Staff resources should be utilized efficiently.** The plan of organization minimizes administrative overhead. Workload can be distributed and shared to maximize the productivity of staff through peaks and valleys and offer cross-

utilization capabilities. Processes can be fully standardized to enhance the efficiency and customer responsiveness of services (e.g., the provision of field manicuring, striping, edging, etc.).

- **The potential of human capital should be maximized.** The plan of organization enhances career development opportunities, training, recruitment and retention.

- **The services provided to customers should be responsive.** The plan of organization enables staff to provide better and transparent service to the public. Customers are the hub – with the Department designed around them**.**

- **Each operating division/section should be placed at a level in accordance with its importance in achieving departmental goals.** Divisions have not been placed too high in the departmental structure or too low relative to their importance.

- **The number of layers of management should not result in a tall, narrow configuration for the organization.** Organizations with many layers of supervision are associated with vertical decision-making that is becoming less common due to the need to rapidly effectuate change. Flatter organizations facilitate decentralized decision-making, as more authority for making decisions is given to the front line employees.

Using the above criteria as the bases for designing the most efficient organizational structure, there are several that weigh in favor of altering the current organizational structure of the Public Works Department. These are summarized in the table below.

Organizational Design Criterion	Discussion
Form-follows-function with clear purpose and mission for each division.	The Department has three main divisions. These are the divisions of Administration and Purchasing, Engineering and Highways. The Administration and Purchasing Division has a clear mission and purpose, and functions are appropriately grouped within this Division. The Engineering Division has a large and diverse set of functions, some of which are unrelated, but have seemingly coalesced around the managerial and technical strengths of the incumbent City Engineer. The mission of the City Engineer generally is to provide technical engineering services and advice to the component divisions of the DPW, to other City departments, the administration, and the general public. Typically the technical support is related to design, inspection, and contract administration of public improvements and subdivisions, plan review, grading, draining and general construction information. Given the volume of this work, and the advisory nature of the function, the City Engineer is typically not directly responsible for the operational aspects of functional organizations, however in Northampton, the City Engineer directly oversees water and wastewater treatment, water distribution maintenance, solid waste, the new stormwater function, in addition to the classic engineering functions of the City. The Highway Superintendent is similarly responsible for a diverse set of functions, but which are somewhat more related in mission. The mission of the Sewers and Drains section is related more to the Stormwater section of the Engineering Division.
Enhanced accountability	The organizational structure, as currently constructed, does not impede accountability in most functions. The separation of the Stormwater section of the Engineering Division from the maintenance of the stormwater drains, however, does not foster accountability for the maintenance and repair of the City's drainage system.

Organizational Design Criterion	Discussion
Efficient communication and coordination	Although there are no physical impediments to communication between the Stormwater section of the Engineering Division and the Sewers and Drains section of the Highway Division, the organizational structure does not foster it. The Stormwater Manager in Engineering, in the absence of any direct control over the maintenance of the stormwater infrastructure, effectively functions only in a reporting and permitting role.
Efficient utilization of resources	The grouping of low and semi-skilled workers in the Highway Division does allow for the cross-utilization of this staff in the Streets section, the Sewers and Drains section and the Parks and Cemeteries section. The separation of the Sewers and Drains section of the Highway Division from the Distribution (Water) Maintenance section of the Water Division fails to capitalize on what could be an area of effective cross-training and utilization.
Maximize human capital	The current plan of organization neither fosters nor hinders the maximization of human capital through training and career development, although as mentioned above, the potential for cross-training between water distribution, sewer collection and stormwater crews is not maximized under the current structure.
Responsive to customer	The current organizational structure is sufficiently serving the customer.
Placement in organization in accordance with importance in achieving goals	The Public Works Department's organizational structure is relatively flat, with none of its functions buried deeply in the overall structure. However, the new Stormwater section in the Engineering Division is not "buried" in the structure, but is disconnected from the infrastructure over which it has responsibility.
Appropriate number of layers of management	The Public Works Department has a large and diverse set of functions for which it has responsibility. However, it functions with a Director and three Division managers, only two of whom oversee operational functions of the Department – the City Engineer and the Highway Superintendent, with only a single layer of supervision below these levels. This "flat" structure may foster accountability at the cost of a dilution of focus of the managers who must oversee very diverse functions.

In comparing the current Departmental organizational structure to optimum structural design criteria, certain themes emerge. These can be summarized in the following points.

- The Department has a relatively narrow organizational structure. There are only three functional divisions (Administration and Purchasing, Engineering and Highway), with the City Engineer and Highway Superintendent managing diverse sets of functions. This structure results in the division managers being responsible for the management of diverse sets of functions, and results in wide spans of control.

- The Engineering Division's focus has broadened from one of providing technical advice, permitting, and design and construction oversight, to one that also provides direct oversight of certain operational functions of the Department.

- The separation of the stormwater maintenance section from the Stormwater section of the Engineering Division dilutes the accountability for the infrastructure. The Highway Division's Sewers and Drains Division has responsibility for the maintenance of the infrastructure, yet the Stormwater Manager in the Engineering Division has responsibility for reporting of maintenance such as catch basin cleaning, street sweeping, etc., as well as plan review, permitting and inspection of construction that impacts the City's stormwater runoff.

- There are imbalances in the structure of the organization. The Engineering Division oversees both water and wastewater treatment, as well as the maintenance of the water distribution system. The Highway Division, however, repairs and maintains the sewer collection system and the stormwater drainage system. This fragmentation of functions not only reduces accountability, but fails to capitalize on opportunities for cross-training between sections of the Department that have staff with similar skill sets.

As the analysis shows, there are certain imbalances in the Public Works Department's current organizational structure that would, if altered, create a more efficient and effective organization, and one with more focused missions within the component divisions. The analysis and discussion of each of the recommended changes are presented in the following sub-sections.

(1) The Department Should Consolidate Water, Wastewater and Stormwater Maintenance and Repair into a Single Division.

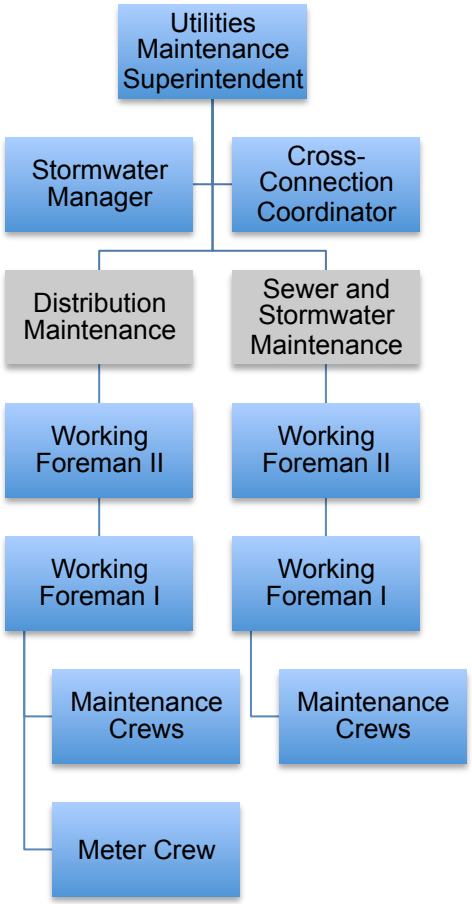
As was noted above, the maintenance and repair of the sewer collection system and the stormwater system are currently performed in the Highway Division, and the maintenance of the water distribution system is performed in the Water Division. Moreover, the Stormwater Manager responsible for the plan review, permitting, and inspection of construction sites to minimize stormwater runoff also reports to the City Engineer. The Stormwater Manager is also responsible for ensuring reporting and compliance with minimum standards for catch basin cleaning, street sweeping, etc., all of which are performed in the Highway Division currently.

The project team recommends the consolidation of the maintenance and repair of the water, sewer and stormwater infrastructure into a newly-formed Utilities Maintenance Division. The consolidation of the maintenance functions will allow for the cross-training and cross-utilization of staff. Further, it will consolidate the currently-fragmented stormwater functions being performed in the Highway and Engineering divisions.

This organizational change will require the creation of a new position of Utilities Maintenance Superintendent. This position will be responsible for the planning, scheduling and management of the preventive maintenance program for the distribution, collection and stormwater infrastructure. The position will also be responsible for allocating personnel and equipment resources to the maintenance and repair of the underground infrastructure based on the critical needs and the schedules of maintenance. Assuming that the incumbent starts at Step 1 of Grade 14 (the grade of other Superintendents in the DPW), the base salary of the position would be $45,634.

With benefits calculated at 40% of salaries, the total cost of the position is estimated to be $63,888.

The recommended Utilities Maintenance organizational structure is presented in the chart below.



Recommendation 8: Consolidate the Water, Sewer and Stormwater maintenance functions under a newly-created Utilities Maintenance Division. This new organization should also include the Stormwater Manager who currently is organizationally located in the Engineering Division. The new Division will require that the Department create the new position of Utilities Maintenance Superintendent. This position is estimated to cost approximately $63,888 annually.

(2) The Department Should Create the Position of Assistant Public Works Director to Assume Certain Operational and Administrative Duties.

As was noted earlier in this section, the Public Works Department's current organizational structure is a narrow one, with a Director and three Division Managers. One of these divisions, the Administration and Purchasing Division, performs functions that are relatively narrowly-defined, and is comprised of only eight (8) employees. The Highway and Engineering Divisions, however, perform a broad array of services covering the vast majority of the Department's employees. And although the spans of control for the Director (3:1) are not markedly different from those of the City Engineer (4:1) and the Highway Superintendent (4:1), there are mitigating factors underlying these spans of control that make their supervisory demands more complex than the actual direct reporting relationships would suggest.

The City Engineer directs the two treatment plant operations which are, themselves, extremely complex, with employees that are in geographically-separate locations. Further, these functions require frequent and detailed environmental reporting requirements. In addition to these functions, however, the City Engineer functions as the primary engineer of the City, as the title suggests, as well as the very new and complex stormwater district. Each of these functions alone constitutes a major investment in time and attention to detail. And although the City Engineer is assisted capably by Managers over each of these functions, the fact remains that the position is ultimately responsible for the performance of each of these very complex sections of the Engineering Division.

The Highway Superintendent is responsible for four functional sections, including

Fleet Management, Parks and Cemeteries, Sewer and Drains, and Streets. Although these functions do not involve the same level of complexity as the City Engineer, the position of Highway Superintendent is responsible for functions that are performed in a large geographical area that effectively includes the entirety of the City's 36 square miles.

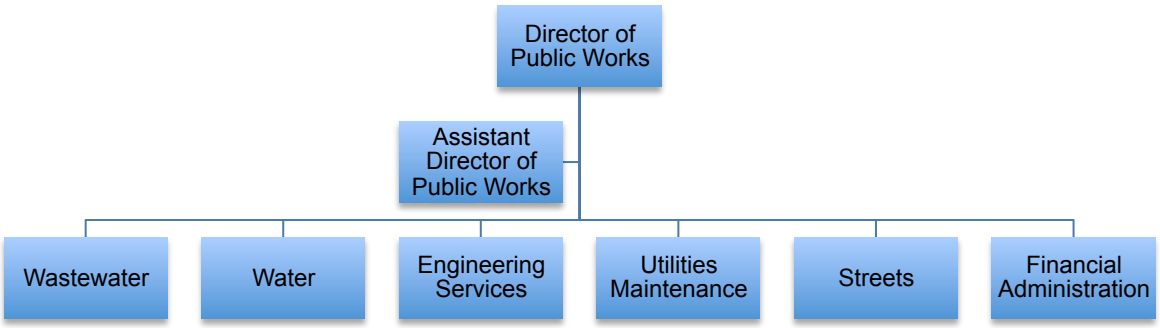
In the previous sub-section, the project team recommended the consolidation of the water distribution, sewer collection and stormwater maintenance functions, thereby reducing the span of control of the Highway Superintendent from 4:1 to a more manageable 3:1 ratio. The project team further recommends the creation of the position of Assistant Director to assist in the direction and oversight of the Public Works Department. This position would act as the Director in that position's absence, but would also serve as the primary director of internal operations, leaving the Director with a more external focus on City management, financial and budgetary matters, as well as residents and the business community.

In the Planning and Management chapter of this report, the project team made recommendations to enhance the asset management and reporting capabilities of the Department. These recommendations represent additional duties for personnel, and although they will result in better and more effective management over time, they will require consistent oversight, and the Assistant Director, working with the division managers, will play a vital role in ensuring that the asset management plan, as described in Chapter 2, is implemented and maintained.

The position of Assistant Director is one that currently does not exist in the Department and, as such, will require a new job description and pay scale. The project

team has provided a suggested job description in Appendix C of this report, although it should be modified to suit the needs of Northampton. Assuming that this position would be compensated at a base salary of 90% of that of the Public Works Director, this equates to $97,875. With 40% for fringe benefits, the total compensation for the position is estimated to be $137,025.

The following organization chart provides the proposed organizational structure of the Department.



Recommendation 9: The Department should create the position of Assistant Public Works Director. The position is separate from that of the City Engineer, but would assume many of the roles and duties performed by the City Engineer. The total compensation for this position is estimated to be approximately $137,025.

2. THE DEPARTMENT SHOULD ADD ONE PRINCIPLE ACCOUNT CLERK TO THE ADMINISTRATION AND PURCHASING DIVISION.

The Administration and Purchasing Division of the Department is managed by the Financial Administrator, who supervises an Office Manager, to whom six (6) Principal Account Clerks report. The eight (8) clerical and administrative staff members support a total of 74 full time and 14 part time staff. Assigning 0.5 FTE for each part time position, this equates to about a 1:10 ratio, which is at the lower end of the typical ratio of support. The Department has, however, assumed responsibility for billing for the Stormwater Utility, which is not a typical function of many Public Works Departments, and not one that factors into the typical support ratio. Further, the project team has made a recommendation in the previous chapter for the Department to procure and install a computerized maintenance management system (CMMS). The responsibility for entering the daily work reports from each of the divisions should be assigned to the Administration and Purchasing Division, and this responsibility, in conjunction with the additional workloads already experienced by the Division through the assumption of Stormwater billing, will require an additional clerical staff member.

The entry of the daily work reports that cover approximately 60 field crew members will entail an expenditure of nearly three to four hours each day, and cannot be absorbed by existing staff, some of whom, again, have assumed the responsibility for Stormwater billing duties with no additional staff. The project team recommends that the Department be authorized to add one Principal Account Clerk whose primary responsibility is the daily entry of work activity sheets from the component divisions of the Department. In addition, the new position should assume at least partial responsibility for Stormwater billings and for the data entry and tracking of resident work

requests in the Department's work request software, discussed in the following section of the report. Principal Account Clerks are classified as a pay grade 6 in the current AFSCME collective bargaining agreement, with an entry-level hours rate of $15.0492. This equates to a base wage of $31,302.34 at 2,080 hours per year. Adding 40% as an estimate for fringe benefits, this equates to a total compensation of $43,823.28

Recommendation 10: The Department should add one Principal Account Clerk position to assume responsibility for entering daily work activity sheets into the computerized maintenance management system. The position should also assume partial duties for Stormwater billing and entry and tracking of resident work requests in the Department's work request tracking system. The cost of the position, including 40% for fringe benefits, is approximately $43,820.

3. THE DEPARTMENT SHOULD EXPAND ITS USE OF ITS WORK ORDER SYSTEM TO ENABLE IT TO REPORT ON ALL WORK REQUESTS.

The Administrative staff in the DPW have used several systems in the past to record work requests from the public. Initially, the Department utilized an Access database, but in 2008 the Department consulted with the City's MIS Department and decided to issue a bid for a new work order and asset management system. The VueWorks system was selected during this process.

The VueWorks system has proved to be limited in its use in the Department, as only a few work requests are entered into it, and it cannot accommodate public input of work requests. (The City did investigate the VueWorks Request Portal, however, it was rejected due to the fact that only one other municipality in the country had installed it, but had never used it. Thus, there were no customer attestations as to its usefulness and effectiveness). In 2013, the City obtained a Challenge Grant for the Commonwealth Connect application. Commonwealth Connect, working with See-Click-Fix, was a smart phone application that allowed residents to report problems that they

observed in the public rights of way, such as potholes and other issues for resolution by the Public Works Department. However, the VueWorks and See-Click-Fix applications were unable to share data, and in late 2013, the City launched a new web site which included an on-line complaint system for residents, called Request Tracker. At the conclusion of the See-Click-Fix grant, the City elected to discontinue its use and use only the web site feature for on-line and smart phone requests, thereby making a transition to a free service rather than a fee-based service.

Since 2014, the Public Works Department has added potholes and sign repair to the service requests that can be entered into VueWorks, however there are still many features in this system that are either not utilized or are under-utilized. Clerical efforts are duplicated due to the fact that requests that are reported via Request Tracker must be manually re-entered into VueWorks.

The relatively frequent transition from one system to another has undoubtedly delayed the Administrative staff's ability to learn the systems, and to maximize the capabilities of any one of these systems. However, it is also true that the Department may have enhanced the utility of any of these systems by expanding the number of work categories that are input into the system. Currently, for example, the only categories of work requests that are recorded in the VUEWorks system are those that relate to trees (overhanging branches, fallen trees and limbs, etc.), potholes, and sign damage. The reason given for the relatively narrow set of work categories listed is that the Administrative staff lack both the time and the training to expand the utility of the system into all other categories of work such as, for example, blocked sewer lines, graffiti, dead animal pick up, illegal dumping grounds, and many others.

The main purposes of an on-line work request system are to:

- Expand the Department's awareness of critical issues in the field that are either dangerous or are creating nuisances or potential damage to the City's infrastructure. Allowing residents to easily report these circumstances effectively multiplies the number of individuals scanning the City from a limited number of Public Works Department employees to the entire City population.
- Track the locations at which repetitive problems occur.
- Allow for a convenient way by which the Department can communicate the resolution of reported problems back to the individual making the work request.

By limiting the number of work request types that are tracked within the VUEWorks system, the Department is limiting its capabilities to track the locations of problems, and to conveniently report the resolution of these problems. When residents make work requests, either by phone or on-line, they have expended their time to do so and generally expect that these requests will be investigated and corrected, and further, that they will receive some communication when the resolution occurs. It is not always feasible to make a phone call to each resident when small work requests have been investigated and completed, however posting the resolution on-line would allow residents to view either the completion of the work, or an estimate as to when the work will be completed.

The project team recommends that the Department re-evaluate its use of VueWorks as a data transfer solution against new technologies that are available. Should the Department elect to retain VueWorks, the project team recommends that it obtain training for the Principal Account Clerks who are responsible for entering work requests into VUEWorks. Concurrent with this training, however, the Department should expand the number of work requests that are entered into the system. Residents who make work requests should be provided a work request tracking number

to enable them to view the progress of the completion of their request.

Recommendation 11: The Public Works Department should evaluate the continued use of VueWorks against new technologies. Should the Department elect to retain this system, the project team recommends that it obtain training in the work tracking software for administrative staff responsible for entering work requests.

Recommendation 12: The Public Works Department should expand the number of work request categories to include all major work types reported by residents.

Recommendation 13: The administrative staff members who enter the work requests into the work order tracking system should provide residents with a work request tracking number so that they can monitor the completion of their requests on-line.

4. THE DEPARTMENT DIRECTOR SHOULD INSTITUTE A REGULAR SCHEDULE OF MEETINGS WITH MANAGEMENT AND STAFF.

The Northampton Public Works Department encompasses a full array of public works activities that are not only functionally diverse, but are performed in a wide geographical area that effectively covers the entire 36 square mile area of the City. No other City department provides such a diverse set of services throughout the entire area of the City.

The varied and distributed nature of the Public Works Department's service provision demands that the upper management of the Department be informed of the activities of each division at regular and frequent intervals. The fact that there are multiple facilities from which these activities are performed means that many employees at remote locations may interact with Department management only on infrequent or, at best, irregular intervals.

The absence of personal interaction with upper management can create feelings among employees at remote locations that they are disconnected from the Department,

which may in turn leave impressions that the services performed at these locations are of lesser importance than those at headquarters.

The presence of management and the dissemination of information are critical in ensuring not only that employees develop a sense that their contributions are valued and connected to the success of the Department, but that they are further impressed that there are uniform standards of conduct and performance that are expected from each.

The project team recommends that the Department Director institute a regular staff meeting that includes each of the division managers and superintendents. Further, however, this meeting should take place at each of the Department's locations on a rotating basis, and the employees assigned to that location should be a part of the meeting as well.

The agenda for each meeting will necessarily vary depending upon the activities occurring at any point in time. However, the Director should establish an agenda that not only disseminates information relating to the work in all divisions, but receives input from division managers and employees as well. The Director should begin the meeting with general announcements that have relevance to all in attendance, such as information relating to human resources communications, safety and risk concerns, staff retirements or new hires, new projects, and others. This should be followed by a discussion of budget issues, and reports of progress (or problems encountered) by all division managers on important projects in their areas. The meeting should always conclude with a discussion of issues of relevance to the employees at each location.

This may take the form of a question and answer session, or a less formal free-style discussion.

The objectives of the staff meeting are to disseminate important information, to receive information that is of relevance to each division and their employees and, importantly, to engender a sense among employees that their contributions are valued, and that their opinions matter to the management of the Department.

Recommendation 14: The Department Director should institute regular and frequent staff meetings.

5. THE DEPARTMENT HAS CONSISTENTLY OVERESTIMATED ITS BUDGETARY REQUIREMENTS IN RECENT YEARS.

Each year, the Public Works Department estimates its budgetary requirements for the upcoming fiscal year in its General Fund divisions, as well as its Water enterprise and Sewer enterprise funds. A review of the expenditures in many of the line items in each of these budgets, however, indicates that the Department is greatly overestimating its budgetary requirements. The following table provides comparisons of selected budgets and actual expenditures.

Year/Division	Amount Budgeted	Unspent Amount	Percent Unspent	Expenditure Type
2012				
Engineering	$429,059.00	$36,007.48	8.4%	Salaries
Highway	$740,649.00	$25,401.66	3.4%	Salaries
Storm Drains	$348,916.00	$41,103.36	11.8%	Salaries
Parks & Rec	$175,374.00	$36,478.00	20.8%	Salaries
Sewer Entrprs.	$744,875.00	$83,966.63	11.3%	Salaries
	$1,477,500.00	$342,703.99	23.2%	O&M
	$595,000.00	$125,000.00	21.0%	Debt
	$354.143.00	$224,460.43	63.4%	Interest
Water Entrprs.	$691,772.00	$111,313.17	16.1%	Salaries
	$491,000.00	$62,612.80	12.8%	O&M
	$285,842.00	$28,159.31	9.9%	Salaries
	$593,000.00	$110,311.77	18.6%	O&M
	$1,925,008.00	$67,412.66	3.5%	Debt
	$753,194.00	$51,057.80	6.8%	Interest
2013				
Engineering	$441,484.00	$27,651.28	6.3%	Salaries
Highway	$744,070.00	$41,427.08	5.6%	Salaries
	$435,938.00	$109,056.64	25.0%	O&M
Storm Drains	$54,050.00	$33,482.84	62.0%	O&M
Cemetery	$120,658.00	$28,415.78	23.6%	Salaries
Parks & Rec	$175,991.00	$14,730.58	8.4%	Salaries
Sewer Entrprs.	$48,880.00	$43,471.29	88.9%	Salaries
	$147,200.00	$25,686.21	17.5%	O&M
	$729,575.00	$42,940.23	5.9%	Salaries
	$1,475,500.00	$445,120.80	30.2%	O&M
	$589,000.00	$79,000.00	13.4%	Debt
Water Entrprs	$719,808.00	$201,864.80	28.0%	Salaries
	$497,000.00	$140,241.79	28.2%	O&M
	$291,118.00	$24,473.27	8.4%	Salaries
	$626,000.00	$183,835.55	29.4%	O&M
	$1,928,162.00	$64,905.00	3.4%	Debt
	$739,769.00	$92,705.88	12.5%	Debt
2014				
Highway	$764,326.00	$95,415.02	12.5%	Salaries
Parks & Rec	$178,492.00	$17,877.02	10.0%	Salaries
Sewer Entrprs.	$67,817.00	$28,167.49	41.5%	Salaries
	$728,819.00	$73,606.18	10.1%	Salaries
	$1,645,000.00	$296,989.04	18.1%	O&M
Water Entrprs.	$717,574.00	$87,235.41	12.2%	Salaries
	$822,000.00	$72,251.29	8.8%	O&M
	$935,000.00	$96,400.00	10.3%	Capital
	$264,780.00	$20,501.69	7.7%	Salaries
	$525,000.00	$162,292.79	30.9%	O&M

As the table shows, the Department is overestimating its budgetary needs by substantial amounts in many categories of expenditure. An analysis of expenditures

indicates that the Department is far more likely to overestimate its budgetary needs than to underestimate, and this is problematic for several reasons. In a later section of this report, the project team will discuss the deficit in performing necessary preventive maintenance of its water distribution and sewer collection infrastructure. With large amounts of unspent funds for operation and maintenance ("O&M" in the table above) in the Water and Sewer enterprise funds, this indicates that at least part of this preventive maintenance could be occurring if the funds were spent from these accounts.

Another concern in the overestimation of budgetary needs, particularly in the enterprise accounts, is that the budgeted amounts are used in the calculation of water and sewer rates. With such large volumes of unspent funds, this may be inflating the rates unnecessarily. These unspent funds do revert back to free cash, which may be spent on capital projects, however the rates should accurately reflect the cost of providing the services.

There are many reasons for over and under-estimating budgetary needs every fiscal year, however the analysis above indicates a pattern of sometimes substantial amounts of overestimation. Although the Department's volume of unspent funds was reportedly lower in 2015[1] than in previous years, the Department should nonetheless take proactive steps to ensure that the previous pattern of overestimation does not recur.

Recommendation 15: The Department should take proactive steps to make more accurate budget estimates.

[1] The 2015 fiscal year was the first in which the Administrative Code was changed to place the now former Board of Public Works in an advisory position, giving the Mayor and Finance Director more direct budgetary control over Public Works' finances.

6. POLICIES AND PROCEDURES FOR THE DEPARTMENT SHOULD BE CLEARLY DOCUMENTED

Other than in the Water Treatment Plant, the Public Works Department is operating without formal policies and procedures to guide managers and supervisors in areas such as personnel rules, risk assessment, rate-setting, budgetary analysis, media contact, snow removal, and more.

In developing policies and procedures, the Department should use the following approach:

- **Minimize.** The policies and procedures should be kept to a minimum.
- **Best methods.** Make certain the procedure represents the "best method." This means the procedure has undergone detailed analysis and is reviewed annually.
- **Keep current.** The problem with many policies and procedures is that they have outlived their usefulness. No one may remember why the policies and procedures were created in the first place. Sometimes they contradict each other and create even more confusion. Responsibility for updating these policies and procedures should be clearly established in the appropriate job descriptions.
- **Short is better than long.** It is not the quantity but the quality of information that is key.
- **Be ready to change.** The key to organizational effectiveness and efficiency is finding a better way. The Department must always be ready to challenge current policy or change it.

Once complete, the policies should be readily available to employees, supervisors, support staff, and managers electronically.

The broad general topics that should be considered in a policies and procedures manual, based on the American Public Works Association's (APWA) Management Practices Manual, are as follows:

- Organization and Strategic Planning
- Human Resource Management
- Occupied Facilities (Security, Risk Assessment, Environmental Controls)

- Finance
- Risk Management
- Communications
- Information Technology and Telecommunications
- Emergency Management
- Safety
- Planning and Development
- Engineering Design
- Bid Process
- Project Management
- Right-of-Way Management
- Utility Coordination
- Facilities Management
- Equipment and Fleet Management
- Parks, Grounds and Forestry
- Solid Waste Management
- Solid Waste Collection
- Solid Waste Recycling and Reuse
- Solid Waste Disposal
- Street Maintenance
- Street Cleaning Management
- Environmental Compliance
- Snow Removal and Ice Control
- Storm Water and Flood Management Service Levels
- Vector Control
- Potable Water
- Traffic Operations
- Parking

These policies should be adapted to the working environment in Northampton.

Recommendation 16: The Public Works Department should establish a policies and procedures committee from all divisions to identify the appropriate topics for coverage in a policies and procedures manual. The committee should develop standard policies and procedures for these topics. Sample policies and procedures may be purchased through APWA or other providers. Other policies may be borrowed from other cities and towns either within or outside Massachusetts, and may be modified to suit the particular operating environment in Northampton.

4. STAFFING AND OPERATIONS

This chapter of the report analyzes the Public Works Department's staffing and operations.

1. THE ENGINEERING DIVISION SHOULD ASSUME A GREATER ROLE IN MANAGING DESIGN AND INSPECTION OF ALL CITY CAPITAL PROJECTS.

The Engineering Division of Public Works is comprised of multiple functions that include solid waste collection and landfill management, water treatment and distribution maintenance, stormwater management, GIS coordination and maintenance, and engineering design and contract management. Within the Engineering section of the Division, there is a City Engineer, a Senior Engineer (who also serves as the Landfill Manager), four (4) Assistant Civil Engineers, a GIS Coordinator and a part-time GIS Technician.

Interviews indicate that the Engineering section's philosophy is to design the majority of its projects with internal design staff, and has sufficient engineers to do so. Interviews also indicated that, although the Division is well staffed, it is not performing all design and management of projects that occur in the City. Although there have been others, one major project that was occurring during the project team's on site visits was the Pleasant Street Futures project, which was under the direction of the Office of Planning and Sustainability (OPS). The project team's scope of services did not include an analysis of the latter organization, and therefore does not possess information related to the capabilities of staff in OPS. However, the Engineering Division staff of engineers is sufficient to enable it to assume a greater role in the design, inspection and project management of all construction projects in the City. Although projects should

naturally originate in "owning" departments' organizations, the Engineering Division should be involved in the definition of project scopes, design and/or consultant selection, inspection and project management in order to ensure conformance to City design standards for all projects.

Recommendation 17: The City should ensure that all capital projects involve the Engineering Division of Public Works. This involvement should include design, or design consultant section, design oversight and management, construction inspection and general project management.

2. "BILLABLE" TARGETS SHOULD BE ESTABLISHED FOR ENGINEERING DESIGN PROFESSIONALS.

To assure the staff of the Engineering Division is efficiently utilized (and to provide data regarding future staffing requirements), the City Engineering should set internal billable targets for staff, including the Senior Engineer, the four (4) Assistant Civil Engineers, the GIS Coordinator and the part-time GIS Technician. These targets should represent that proportion of their work time that these staff would be billable to capital projects. All time charged should be tracked for each project on which the employee is working.

The billable targets should be based upon a reasonable annual hour total that takes into consideration the use of leave time (vacation, sick, holiday), training time, and a reasonable estimation of time required for administrative functions not related to a specific capital project. The following table shows the calculation utilized to estimate this level of availability.

Description	Amount
Total Available Hours	2,080
Less: Time Off / Training Hours [2]	(224)
Less: Administrative Work	(200)
Less: Non-billable CIP management	(200)
Net Available Hours	**1,456**

Based upon this analysis, the appropriate maximum billability target for engineering and project management staff in the Engineering Division would be approximately 1,456 hours annually or about 121 hours per month or 71% of time allocated to billable work, which is within the "typical" range for similar positions.

This target represents an aggregate for all projects under the control of an individual engineer/project manager. Depending upon the number and size of the projects on which these employees work, some may be charging time to a small number of projects and others to a larger number. What is critical is the monitoring of the total time per employee that is spent on direct service provision that can be allocated to a project.

The project accounting system should be utilized to monitor the performance of these staff against these targets. The utilization of these targets will also enable the Public Works Department to make comparisons between the effectiveness of internal staff versus consulting engineers. The billability targets should be used as one measure of staff efficiency and effectiveness – i.e., how fully utilized they are on projects. It is important to note, however, that there are subjective considerations beyond simple staff availability that will determine when projects are conducted in-house versus with contractual staff. These include political sensitivity of the project,

[2] This includes the actual average for CY 2014 (200.6 per employee) plus an estimated 24 hours of training each year.

risk, public visibility, complexity, extent of public outreach required, etc. In some cases projects may be conducted using internal staff to ensure greater control over these intangible aspects of project management and greater staff effort will be required on select projects than would be indicated through the use of standard cost of construction guidelines.

Interviews indicate that the principle objection to an increased use of consulting engineers, particularly in design activities, is the poor quality of design, and the volume of corrections that internal staff must make to their drawings. The project team cannot verify or refute this assertion, however it is not typical in our experience that a majority of engineering design consultants in a non-rural environment is incapable of providing engineering design work that is consistently sub-standard. The primary justification for the use of internal design staff rather than consulting engineers is that the internal staff are fully utilized. If this is not the case, it can be more cost-effective to utilize consulting engineers even considering their relatively greater hourly rates. The implementation of a time-keeping system to record and monitor internal engineering billable rates to projects is an effective management tool to ensure that the most financially-beneficial services are rendered.

Recommendation 18: Billable targets should be established for all engineering staff outlining the percentage of time that should be billable to capital projects. The minimum standard should initially be established at or near 71%.

3. COST OF CONSTRUCTION GUIDELINES SHOULD BE UTILIZED TO DOCUMENT RESOURCE REQUIREMENTS FOR THE DESIGN AND INSPECTION OF ALL CAPITAL PROJECTS UNDER THE CONTROL OF THE ENGINEERING DIVISION.

The following exhibit presents an example of guidelines for the design and inspection of capital improvement projects. These guidelines are based upon data

developed by the American Society for Civil Engineers (ASCE) in its publication, *Consulting Engineering: A Guide for the Engagement of Engineering Services.* The following points should be noted on utilizing cost of construction guidelines:

- Two different levels of complexity are noted: average and above average. An above average level of complexity should be based upon the need to deal with other agencies (e.g., MassDOT), the design complexities of the project, or problems with planning and construction determining the compensation of consulting engineers on assignments where the principal responsibility is the design of various works, and the preparation of drawings, specifications, and other contract documents as necessary.

- These guidelines are customized to fit the different types of construction jobs handled by public works departments including street construction, street reconstruction, sanitary sewer, etc.

- These guidelines were developed to fit the different types of work activities in each capital project. These include planning and scoping, design development, design survey, design administration, construction survey, construction inspection, construction management, and project closure.

- The guidelines are expressed as a percentage of construction (e.g., the cost of staffing as a percentage of construction). To determine the number of staff hours required, divide the cost of the work activity based upon the cost of construction guidelines by the current hourly cost of an internal staff member or the consulting engineer for engineering work activities.

- The guidelines identify resource requirements for each work activity associated with a project. These include design development, design survey, design administration, etc.

- If a consulting engineer is accomplishing the design, the project manager in the Engineering Division would utilize the guideline for design administration, and not design development.

- Project managers within the Engineering Division should utilize these guidelines to project and determine staffing level requirements for each project in terms of total person hours required for design and construction inspection.

- These cost of construction guidelines should be continually evaluated and modified to ensure consistency and applicability for the Engineering Division and existing local circumstances and conditions. However, they provide a suitable starting point for implementing standards for evaluating staff needs, by phase, based upon total project cost.

An annual review of actual experience to the planned experience for staff time based upon the cost of construction guidelines should be conducted by Department Director, City Engineer and, when the position is adopted, the Assistant Department Director. Based upon experience, the standards should be further modified, based upon past experience to serve a useful purpose in making future projections of staff resource needs.

Recommendation 19: The Engineering Division should use cost of construction guidelines to determine the ongoing and annual engineering staff requirements necessary to support adopted capital projects.

Allocation of Staff Resources for Design and Inspection As A Median Percentage of Net Construction Costs

Type of Project	Street Construction				Street Reconstruction				Traffic Control		Wastewater			
Level of Complexity	Above Average		Average		Above Average		Average		Average		Above Average		Average	
Construction Cost (+/-)	$0.25 million	$1 million	$0.25 million	$1 million	$0.25 million	$1 million	$0.25 million	$1 million	$0.25 million	$1 million	$0.25 million	$1 million	$0.25 million	$1 million
Planning and Scoping	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Design Development	10%	8%	9%	7%	13%	11%	10%	8%	8%	6%	9%	8%	8%	6%
Design Survey	1 ½%	1%	1 ½%	1%	1 ½%	1%	1%	½%	1 ½%	½%	1%	½%	1%	½%
Design Administration	2%	2%	1 ½%	1 ½%	2%	2%	1 ½%	1 ½%	1 ½%	1 ½%	1½%	1½%	1 ½%	1 ½%
Construction Survey	3%	2 ½%	2 ½%	2%	2%	1 ½%	1 ½%	1%	0.1%	0.1%	2½%	2%	2½%	2%
Construction Inspection	5%	5%	4%	4%	5%	5%	4%	4%	3%	3%	4%	4%	4%	4%
Construction Management	3%	3%	2%	2%	3%	3%	1 ½%	1 ½%	2%	2%	3%	3%	2%	2%
Project Closure	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%	0.4%	0.1%
Total	25.4%	22.1%	21.4%	18.1%	27.4%	24.1%	20.4%	17.1%	17%	13.7%	21.9%	19.6%	19.9%	16.6%

4. THE DEPARTMENT SHOULD INSTITUTE A PREVENTIVE MAINTENANCE PROGRAM FOR ITS WATER DISTRIBUTION, SEWER COLLECTION, AND STORMWATER INFRASTRUCTURE.

Earlier in this report, the project team recommended that the Department develop and institute an asset management plan for all assets for which it has responsibility. A key facet of the asset management plan is the development of a preventive maintenance program. In the case of the City's underground assets, which include its water distribution, sewer collection and stormwater systems, this may be especially true given that the City has not replaced these systems on a timely basis. The table below shows that the City is replacing its underground infrastructure far less frequently than the 1% to 2% that the American Water Works Association (AWWA) recommends.

Description	Water	Sewer
Linear Feet Replaced (2013 – 2015)	8,145	9,965
Total Miles Replaced (2013 -2015)	1.54	1.89
Total Miles in System	150	90
Avg. Annual Percent of System Replaced	0.34%	0.70%

As the table shows, the City has replaced only about one-third of 1% of its water distribution system on an annual basis over the past three years, and between two-thirds and three-quarters of 1% of its sewer collection system during that time. The failure to replace the City's underground infrastructure on a timely basis is, at least partially, contributing to the reactive nature of the maintenance staff members who are responsible for maintaining the systems. Although the project team does not possess data relating to sewer main breaks, and has only partial data for the water system, these partial data indicate that the water maintenance crews are responding to about six water main breaks per year (about one per 25 miles of main) which, although in the middle of the typical range for New England municipalities, will become more

problematic as the system ages and, importantly, is not preventively maintained on a regular basis.

Interviews with the Water Maintenance and Sewer/Stormwater Maintenance staff indicate that little preventive maintenance is occurring in either system, with most of the daily activities of the respective crews spent in reactive maintenance efforts. In a well-functioning maintenance organization, preventive maintenance is not only performed on a routine cycle, but these efforts constitute the majority of time expended by crews on an annual basis. Studies have shown that, over time, an investment in preventive maintenance returns $2 for every $1 expended[3]. The City has not performed preventive maintenance on a routine basis for many years on its underground infrastructure, so this general rule of thumb would not immediately apply, however in the longer-term, the Utilities Maintenance Division will experience a sharp decline in reactive maintenance events due to the proactive maintenance of the systems.

A basic preventive maintenance program for water maintenance crews would consist of at least a regular valve exercising program and a periodic flushing of the system. The program should also consist of a leak detection program, and the Department contracts for this service each year. The flushing program involves controlled flow of water through the distribution mains at pressure great enough to remove sediments from hydrants at the downstream end of each section of water main. The American Water Works Association (AWWA) recommends that the full inventory of distribution lines be flushed once per three to four years. Flushing ensures high water quality, and keeps flow capacity of pipes at optimum levels. It also helps to reduce the

[3] "From Preventive to Proactive", Public Works Magazine, November, 2007.

number of plugged stopped meters, and reduces wear on pumps and control valves. This activity typically requires a two-person crew with a pickup truck equipped with assorted hand tools and wrenches to operate valves and hydrants and should be targeted toward areas of the system that exhibit poor flow.

The valve exercising program ensures the operability of the system during events that require water flow to be stopped or diverted away from problem areas such as main breaks. The AWWA recommends that gate valves be turned once every two years, and interviews indicate that this is not currently being done by the Department. Given that there are approximately 1,000 gate valves in the City's system, this activity should consume no more than about 160 hours of a single crew member each year. The Water Maintenance section is staffed adequately to accomplish this additional effort, which will reduce the time expended on those occasions when water main breaks occur.

The preventive maintenance program for the City's sewer collection and stormwater systems generally consist of more varied activities than that of the distribution system. The Sewer and Drains section of the Highway Division should be performing the following activities to preventively maintain these systems.

- Televising the systems. Televising the collection system can identify areas of inflow and infiltration (I&I), existing failures, as well as potential failures in the system. Televising the stormwater system can help identify system cracks that can result in seepage of contaminants into the City's receiving waters. Televising the system, and archiving the results, helps to prioritize the investments in system replacement. The City's sewer collection system should be televised on a seven year cycle, and its stormwater system should be televised on a 10-year cycle.

- Catch basin cleaning. The Sewer and Drains section reportedly is cleaning about 25% of the City's 4,835 catch basins, which corresponds to a four-year cycle. Catch basins are designed to catch leaves, debris, sediment and

contaminants, and cleaning these on a frequent basis prohibits flooding, and also minimizes the potential for non-point source contamination of receiving waters. The Sewer and Drains section reportedly is cleaning about 25% of the City's 4,835 catch basins, which corresponds to a four-year cycle. However, the project team recommends that all catch basins be cleaned on a three-year cycle.

- Sewer and stormwater main cleaning. Although the Sewer and Drains section does clear the lines using a jet rodder or Vac All, this is typically accomplished only when problems occur. The routine cleaning of the system reduces the incidence of emergency response to blocked lines. The sewer collection system should be cleaned on a five-year cycle, and the stormwater system should be cleaned on a 10-year cycle.

The following table shows the total number of hours that would be required of the Sewer and Drains section of the Highway Division to be able to accomplish the preventive maintenance tasks described above.

Activity	Annual Work Volume	Estimated Time to Complete	Crew Size	Required Crew Hours
Sewer TV	47,520 ft	3,000 ft/day	3	1,140
Stormwater TV	60,192 ft.	3,000 ft/day	3	1,445
Catch Basin Clean	1,612 basins	0.44 hours/basin	1	976
Sewer Clean	67,886 ft	200 ft/hour	2	678
Stormwater Clean	60,192 ft	200 ft/hour	2	602
Total Crew Hours Required				4,841
Less: Hours Currently Expended in Catch Basin Cleaning (estimated)				(537)
Total Deficit in Preventive Maintenance Hours				**4,304**

As the table shows, there is a 4,304 hour deficit in the number of hours currently expended in preventive maintenance of the sewer and stormwater system. To determine the number of actual personnel this figure represents, it is necessary to determine the average number of hours a Maintenance Worker in the Sewer and Drains section is available on an annual basis. This calculation is provided below.

Description	Amount
Total Available Hours	2,080
Less: Sick, Vacation, Personal[4]	(335)
Less: Workers Comp.	(16)
Less: Training/Administrative	(40)
Net Available Hours	**1,689**

The table shows that, on average, each of the employees in the Sewer and Drains section of the Highway Division is available for field work for 1,689 hours per year. Given that there is a deficit of 4,304 preventive maintenance hours in the section, this equates to about 2.5 FTE.

In a previous section of this report, the project team has recommended that the Department consolidate the Water Maintenance section of the Water Division with the Highway Division's Sewer and Drains section. This consolidation will result in the new Utilities Division's ability to cross-train and cross-utilize the Maintenance Workers in the Division to enable it to compensate for the half-FTE in the calculated need for 2.5 FTE. The average hourly rate of the Sewer and Drains employees, excluding the Working Foreman II who supervises the section), is $16.46. Adding 40% for benefits equates to an average total compensation rate of $23.04 per hour. Therefore, adding to staff members to handle preventive maintenance activities in the section is estimated to cost approximately $95,846.

However, rather than adding permanent staff for catch basin cleaning, televising and cleaning sewer and stormwater lines, the Department may consider the alternative of contracting for these functions through a local private service provider. This alternative is likely more expensive, but offers the flexibility of paring back services

[4] The "Sick, Vacation, Personal" and the "Workers Comp" lines represent actual averages per employee from 2014 data.

during periods of economic decline. If, for example, private contractors charge an average hourly rate of $80, the total cost of these preventive maintenance services would be approximately $344,320 ($80 per hour * 4,304 hours) rather than the $95,846 cost of internal staff. It is possible that private contractors could perform these services more efficiently than internal staff, thereby potentially reducing the estimated cost. However, the project team would recommend that the Department allocate some portion of a staff member's time to monitoring the performance of the contractor, thereby effectively increasing the cost of the service.

The project team recommends that the Department hire the two additional staff members to perform the preventive maintenance activities that are not currently being provided. This option represents a longer-term, and less flexible arrangement than contracting for these services, however it is also the less costly option. Further, these preventive maintenance services are ones that are performed on a routine cycle, and thus are not as subject to seasonal variations in workloads.

As was noted above, a longer-term investment in preventive maintenance can produce positive financial results. Over time, the investment of $95,846 in the recommended preventive maintenance staff members can return $191,692 in avoided emergency and other unscheduled repairs.

Recommendation 20: The Department should hire two Motor Equipment Operators to conduct sewer and stormwater preventive maintenance functions. The total compensation for these positions is estimated to be approximately $95,846, inclusive of salaries and benefits. The investment in these positions may return as much as $191,692, or double their salary and benefits costs due to the avoidance of emergency and other unscheduled repairs.

5. THE DEPARTMENT SHOULD ALLOCATE ADDITIONAL EFFORT TO THE MAINTENANCE OF THE CITY'S PARKS AND ATHLETIC FIELDS.

The Parks and Cemetery Section of the Highway Division is staffed with eight full time employees, including the following.

- 1 Working Foreman II
- 2 Working Foremen I
- 2 Special Motor Equipment Operators
- 1 Heavy Motor Equipment Operator
- 1 Motor Equipment Operator
- 1 Laborer

In addition to these full time employees, the Parks and Cemetery section is supplemented by seven (7) seasonal part time workers during the late spring and summer.

The Parks and Cemetery Section is responsible for the maintenance of 16 baseball and softball fields, nine (9) soccer and lacrosse fields, three (3) facilities, and 19 street parks. These parks and athletic fields cover approximately 145 developed acres.

Additionally, the Section is responsible for the maintenance and care of four (4) cemeteries covering approximately 36 acres.

The project team observed certain parks and athletic fields during the course of the study, and found that some fields were in poor condition. Although infield and outfield grass was generally at an even height, it was clear that there was less attention to detail in such tasks as edging and weed control. The following photograph shows a baseball field at Ryan Road fields. Note the heavy clover at this field.

The following picture, also taken at Ryan Road fields shows heavy weed and clover infestation around the pitching mound.

The next photograph shows weeds under the dugout bench at Ryan Road fields,

as well as the erosion of the ground covering.

The following picture of the infield at a baseball field at Florence Fields, which was open to the public in 2015.

As can be seen in the photograph (taken in July, 2015), the grass height is relatively even except at the edges of the base path, which has crabgrass at the edges, and which has not been edged properly. The photograph also shows a substantial amount of clover. As clover can destroy the root system of the grass, it is vital to treat this particular problem as early as possible. Clover grows at an uneven pace with the grass, and can result in an un-cut appearance even when grass has been recently mowed.

The following photograph of the same field shows that the pitching mound had been recently raked, indicating some attention to detail, however note the encroachment of weeds at the edges of the mound. In addition, the pitching rubber appeared to be excessively worn for the short period of time the field had been open.

The following photograph shows a bench at the playground area of Florence Fields. Note that this area, too, is infested heavily with clover, and weeds are appearing through the cracks of the concrete and asphalt joint.

The above photographs illustrate that although the Parks and Cemetery crews are performing the necessary tasks of mowing and lining fields for play, there are insufficient numbers of these crew members to perform the detailed work necessary to make these fields visually pleasing, and a source of pride for the City.

In the experience of the project team, maintenance workers in parks and cemeteries should be responsible, on average, for between eight (8) and twelve (12) developed acres in order to provide a "B" level of service. The Highway Division's Parks and Cemetery section, however, is staffed with 4.5 FTE in the Parks Maintenance unit (including half time for the Working Foreman II). These staff members are responsible for 145 developed acres. If it can be assumed that five (5) of the seven (7) seasonal part time workers in the spring and summer are primarily dedicated to parks maintenance activities, the ratio of developed acreage to maintenance workers is about 15.3 to 1. This is inadequate to provide anything more than a "C" level of service.

The project team recommends that the City approach the School Department regarding its capacity to assume the responsibility for the maintenance of athletic fields. If that is an option from the Schools' standpoint, this may result in a more optimal arrangement, as the detailed work on these fields is not occurring to the desired level under the current organizational arrangement. If this is not a feasible option, however, the project team recommends that the Parks and Cemeteries section hire two crew members to complete the detailed work on fields such as edging, weeding and herbicide removal. This may necessitate one or both of these employees obtaining a herbicide application license, as there is a substantial volume of clover and other weeds infesting the fields.

Recommendation 21: The City should investigate the feasibility of transferring responsibility for the maintenance of athletic fields to the City Schools. If this is not a feasible option, however, the project team recommends that the Parks and Cemeteries section hire a Motor Equipment Operator and a Laborer to perform the detail work in the parks and athletic fields that is not currently occurring. The estimated cost of these positions is $85,573, including salary and benefits estimated at 40% of salaries.

6. THE FLEET MAINTENANCE SECTION IS ADEQUATELY STAFFED, HOWEVER SEVERAL FACTORS INHIBIT THE PRODUCTIVITY OF MECHANICS.

The Northampton Public Works Department is responsible for the maintenance and repair of 161 vehicles and pieces of equipment. It performs these duties with a Working Foreman II, a Working Foreman I, two Vehicle Maintenance Technician/Vehicle Inspectors and one Vehicle Maintenance Technician. The Working Foreman II reportedly spends about 10 hours per week in maintenance and repair services, with the bulk of the incumbent's time spent in administrative functions, coordinating with vendors, etc. The Vehicle Maintenance Technician does not perform direct maintenance and repair duties, but rather assists mechanics in their duties by retrieving parts, and other similar duties in addition to some direct maintenance. This effectively equates to 3.25 mechanic positions.

In order to determine the amount of maintenance effort required to keep a fleet in good condition, the project team converted the Northampton fleet to "Vehicle Equivalent Units" (VEU). The use of VEUs is an improvement over the simple statement of the numbers of vehicles and pieces of equipment since not all require the same maintenance intensity, and thus have varying cost and required mechanic staffing associated with maintenance and repair. The baseline for maintenance and repair is a sedan, which is defined as requiring one VEU. A piece of heavy equipment, such as a

backhoe or front end loader, on the other hand, requires more maintenance, and is assigned a VEU of 3, and a small engine such as a mower or pump is assigned a VEU of 0.5. Although the City of Northampton's Public Works Department has 161 total vehicles and pieces of equipment, the calculation of VEU for its fleet is 314.5.0, as the table below indicates.

Equipment Type	Number	Vehicle Equivalent Units
Sedans/Light Vans	9	9.0
Heavy Van/Pickup	42	63.0
Heavy Equipment	61	199.0
Trailer	20	10.0
Pump/Generator	10	5.5
Mower/Small Engine	3	1.5
Small Tractor/Forklift	14	25.5
Golf Cart/Motorcycle	2	1.0
TOTAL	**161**	**314.5**
Number of Mechanics		**3.25**
VEU per Mechanic		**96.8**

The typical range of VEUs per mechanic is between 90 and 110. As can be seen from the table, the ratio falls within this range, indicating that the Vehicle Maintenance shop is staffed appropriately.

The mechanic staff, however, are operating under sub-optimal conditions, both in terms of the facility and the relatively advanced age of the fleet. The facility itself is poorly equipped to accommodate sufficient numbers of vehicles and equipment, and there is also insufficient space in which to stock automotive parts. Although the Vehicle Maintenance section does not track the frequency with which automotive parts are not available when needed by mechanic staff, it is likely that this is far greater than would be the case if adequate storage space for these parts existed.

Another limiting factor regarding the productivity of mechanics is the relatively advanced age of the fleet. The calculation of VEUs per mechanic is a useful metric to

determine mechanic staffing requirements, however it assumes that the age of the fleet is within acceptable ranges. As the fleet ages, however, unscheduled repairs become more frequent, and thus the demands on mechanics' time becomes greater as the fleet ages.

The project team calculated the average ages of the fleet for the same categories of vehicles and equipment that were utilized above in the VEU calculation. The following table provides the results of these calculations.

Equipment Type	Number	Average Age
Sedans/Light Vans	9	9.0
Heavy Van/Pickup	42	15.0
Heavy Equipment	61	16.6
Trailer	20	12.7
Pump/Generator	10	19.8
Mower/Small Engine	3	9.7
Small Tractor/Forklift	14	16.2
Golf Cart/Motorcycle	2	2.5
TOTAL	**161**	**15.2**

As the table shows, almost all categories in the fleet exhibit average ages that are far beyond typical levels. Heavy vans and pickup trucks, for example average 15 years per unit, whereas the average economic life of this category is typically 7 to 8 years. The Heavy Equipment category exhibits an average age of 16.6 years per unit, with the typical economic life cycle for this category is typically between 10 and 12 years.

The age of the fleet, as well as the facility limitations within which maintenance and repair are conducted, are clearly impacting the effectiveness of the mechanic staff to properly maintain it. The project team is aware that the City and the Public Works Department investigated the feasibility of constructing a new Public Works facility and that it was found to be cost-prohibitive at that time. Economic conditions have not improved in the City to the point that constructing a new facility is feasible even today,

however the project team recommends that the construction of a new facility, or the modification of the existing one, at least for the vehicle maintenance shop area, be placed at a relatively high priority as conditions do change.

The project team also recommends that the City begin to replace its equipment on a more regular basis, as the ages of many pieces of equipment are well beyond their economic life cycles. These advanced ages are impacting the efficiency of the mechanics in the shop. The Highway Division Superintendent and Working Foreman II in the Equipment Maintenance section should develop a vehicle replacement schedule that places each vehicle and piece of equipment in the inventory on a planned replacement schedule. The advanced age of the current fleet will necessitate identifying the most critical pieces of equipment for replacement first. Then, the ages of individual pieces of equipment should be the next highest priority. Although the optimum replacement cycle for each piece of equipment should be a product of the operating characteristics of the Department as well as the usage of the equipment, the project team has provided on the following pages an exhibit that shows typical life cycles and, in the case of rolling stock, the mileages that are typical for vehicle at the ends of their life cycles.

Recommendation 22: The City should replace or modify the current Public Works Department facility. Although the facility is inadequate in many respects, this is particularly true of the Vehicle Maintenance Shop which is insufficient in terms of space for mechanics and equipment, but also in terms of the space in which automotive parts are stored.

Recommendation 23: The Highway Division Superintendent and Working Foreman II in the Equipment Maintenance section should develop a vehicle and equipment replacement plan that identifies the most critical pieces of equipment for replacement. Each vehicle and piece of equipment in the 161-unit fleet should be placed in the replacement schedule based on criticality of need, and the age of the equipment.

EXHIBIT
Economic Life Cycles for Various Fleet Categories

Equipment Type	Years	Mileage
Automobiles		
Administrative	7	125,000
Emergency	4	125,000
Pursuit	4	110,000
Buses		
Buses	15	NA
Motorcycles		
Motorcycle	5	50,000
Non-Motorized		
Trailer, Cargo	10	NA
Trailer, Equipment Transport	15	
Trucks		
Animal Control	7	150,000
Bucket, under 45’	7	110,000
Bucket, over 45’	10	110,000
Crane	10	175,000
Dump, under 15 ton	8	175,000
Dump, over 15 ton	10	175,000
Pumper	15	NA
Ladder	15	NA
Flatbed/Stake Body	8	150,000
Pole Digger	12	150,000
Pickup, under 1 ton	6	150,000
Pickup, 1 ton and over	7	150,000
Tractor	10	250,000
Packer	7	150,000
Sewer Cleaner and Rodder	7	150,000
Utility Body	7	150,000
Vans		
Cargo and Passenger	6	150,000
Law Enforcement	5	125,000

EXHIBIT
Economic Life Cycles for Various Fleet Categories (2)

Non-Rolling Stock		
Compressor, Air	8	NA
Boat	10	NA
Boat Motor	7	NA
Bulldozer	12	NA
Chipper	7	NA
Excavator	12	NA
Forklift	12	NA
Generator	10	NA
Grader	12	NA
Loader, Backhoe	10	NA
Loader, Front End	10	NA
Mower, Riding	7	NA
Mower, Self-Propelled	4	NA
Mower, Towed, Rotary	7	NA
Mower, Towed, Flail	7	NA
Pumps	5	NA
Roller, under 8 ton	6	NA
Roller, over 8 ton	8	NA
Scraper	10	NA
Sweeper, Street	6	NA
Tractor, Agricultural	10	NA
Tractor, Side Arm Mower	10	NA
Tractor, Flail Mower	10	NA
Trencher	7	NA
Utility Cart	6	NA

APPENDIX A – DESCRIPTIVE PROFILE OF THE NORTHAMPTON PUBLIC WORKS DEPARTMENT

The purpose of the descriptive profile is to document the project team's understanding of the Northampton Department of Public Works (DPW). The profile includes a summary of the roles and responsibilities for each Division, organizational structure, allocation of staff by function, the principal assigned responsibilities of staff, budgets, and workload data. Data contained in the profile were developed based on work conducted by the project team, including:

- Interviews with Northampton DPW staff to discuss roles and responsibilities, services provided, existing policies and procedures guiding work activities, communication and coordination, technology utilized, etc.
- Interviews with Department management to gain an overview of services provided, issues of concern, background and history of the DPW, etc.
- Interviews with the Mayor and selected department heads to gain insights into inter-departmental communications.
- Collection and review of various data describing organization and staffing, work processes, workload and service levels as well as costs.

The structure of this descriptive profile for the Northampton DPW is as follows:

- Introduction
- Organizational chart for the Department.
- Budgets for the Department at the divisional level of detail.
- Summary descriptions of key roles and responsibilities of Divisions.
- Technology utilized by the Department.
- Infrastructure maintained by the Department and summary workloads of the staff.

The descriptions of responsibilities provided in the "Summary of Key Roles and Responsibilities" section summarize the team's understanding of the major programs and service activities to which staff in the DPW are assigned. These descriptions are not intended to provide the level of detail of a typical job description. Rather, the

descriptions provide the basic responsibilities and reporting relationships within each Division.

1. DEPARTMENT OF PUBLIC WORKS

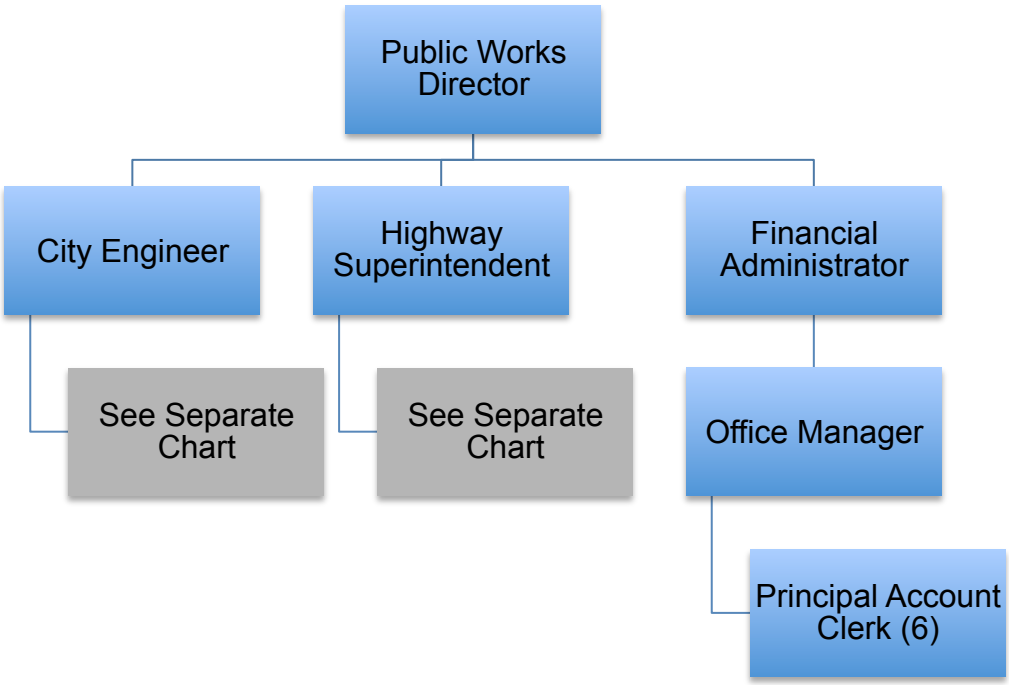
The Department of Public Works provides a full array of services to the City's residents, businesses and other City departments, including water production, water distribution system maintenance, wastewater treatment, wastewater collection system maintenance, engineering, solid waste disposal and planning, stormwater system maintenance and management, flood control, street maintenance, equipment maintenance and repair, and parks and cemetery maintenance. Additionally, the Department provides administrative, budgetary and financial support to each of the operating divisions through the services of an Administration and Purchasing Division.

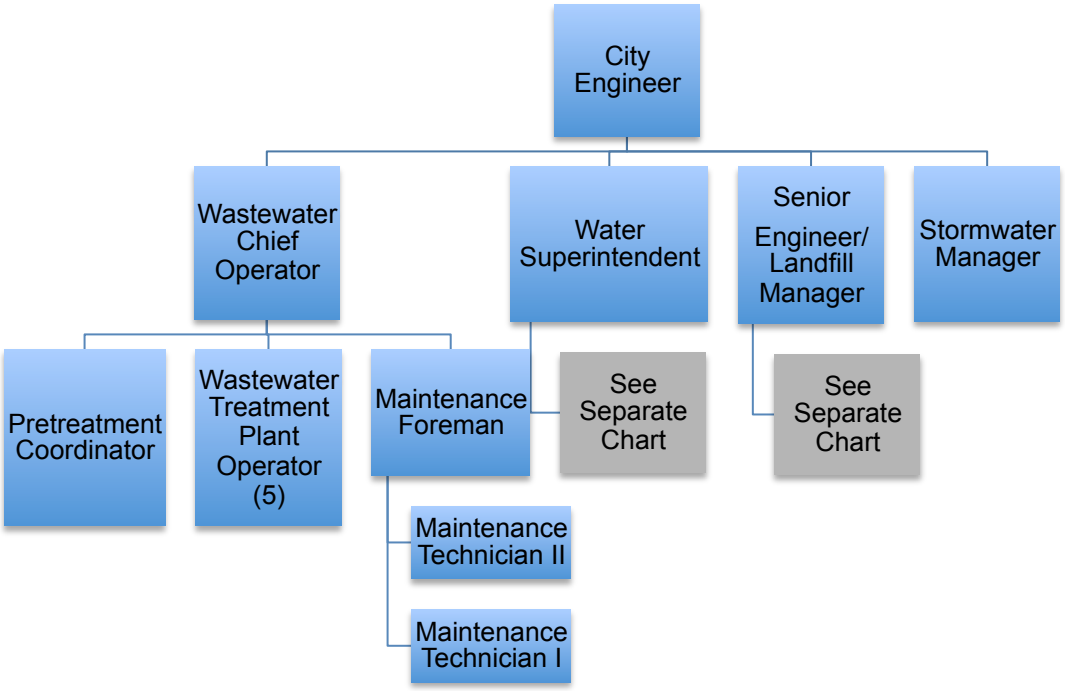
The next section shows the organizational structure of the Department of Public Works.

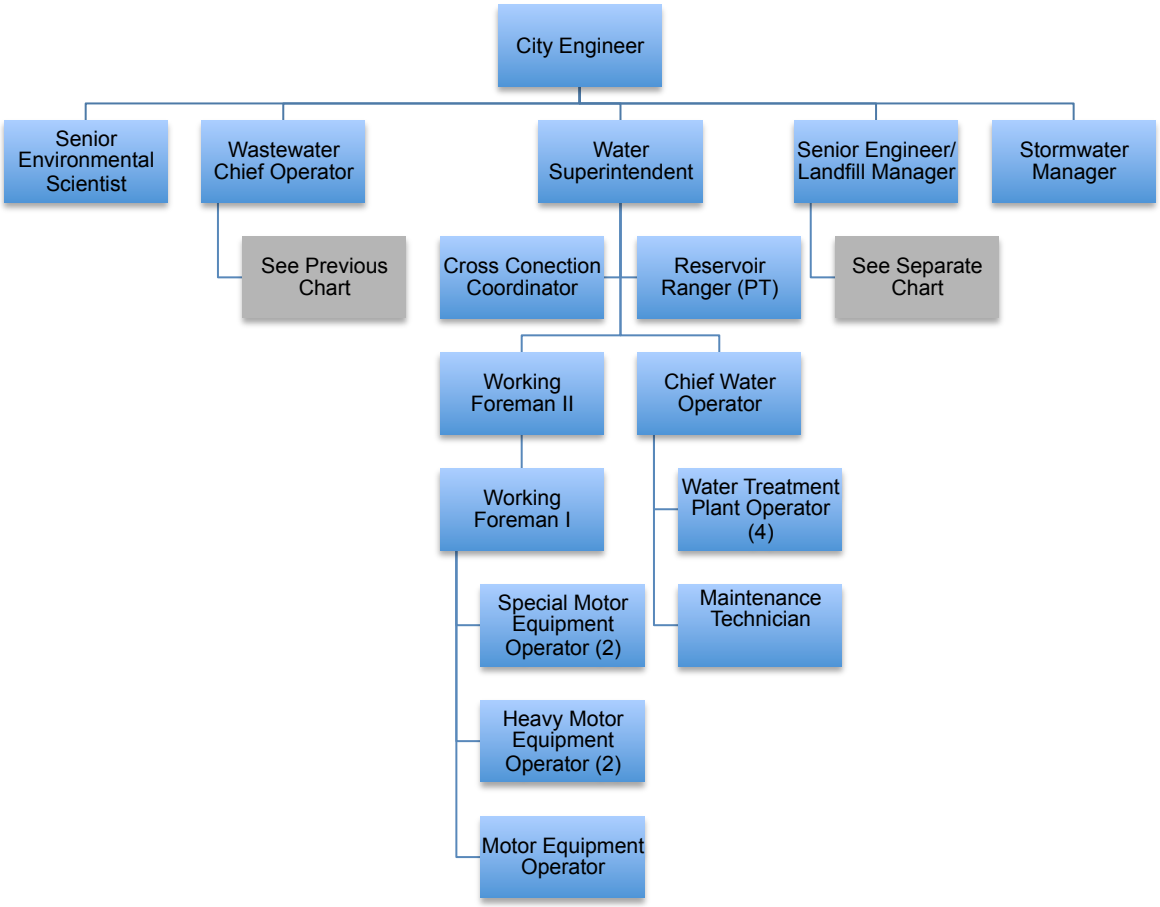
(1) Organizational Structure of the Department

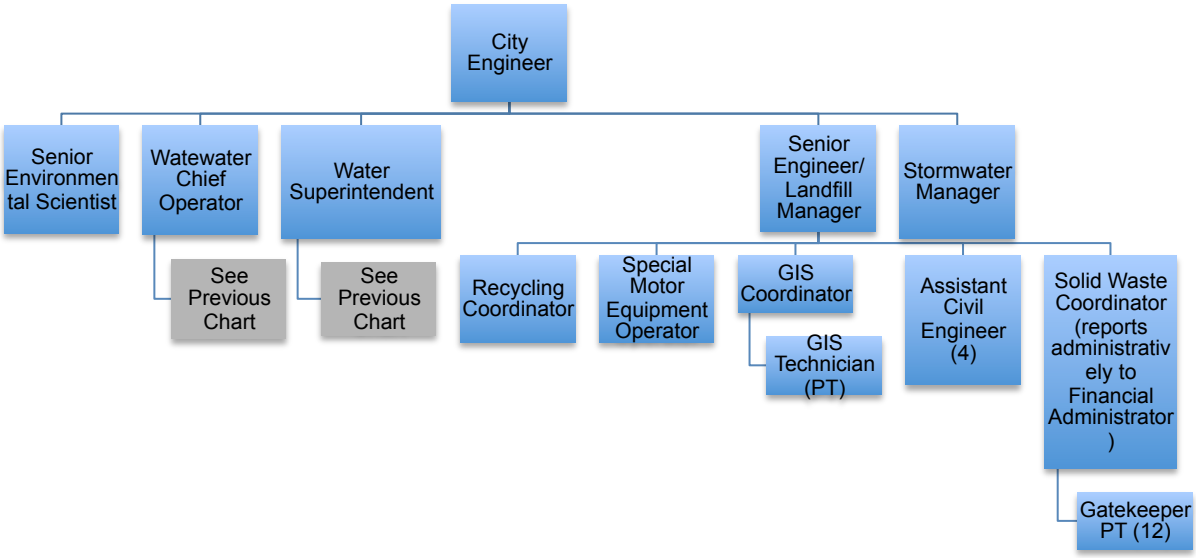
The following charts show the current organizational structure of the Public Works Department.

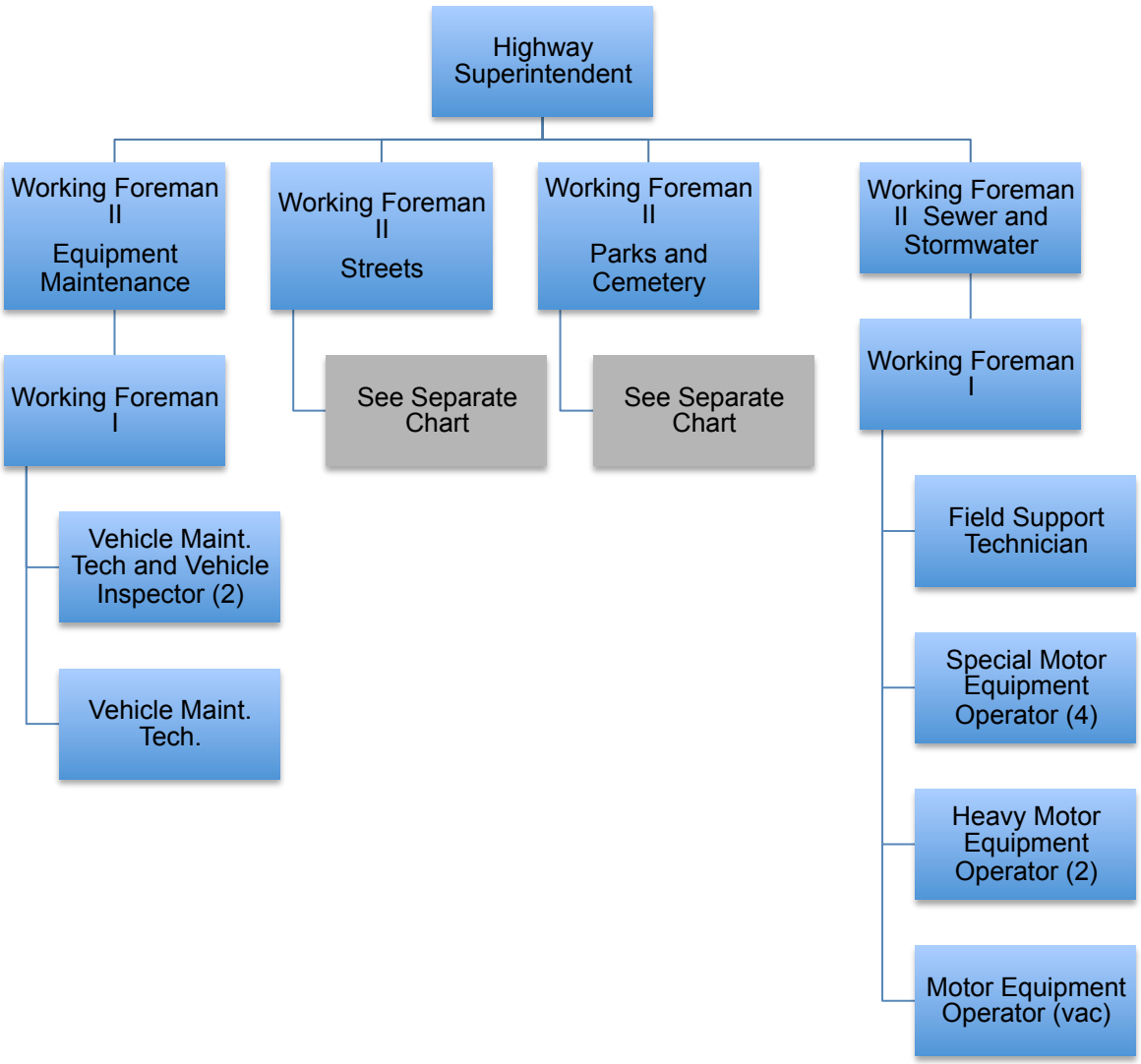
Public Works Department Organizational Chart

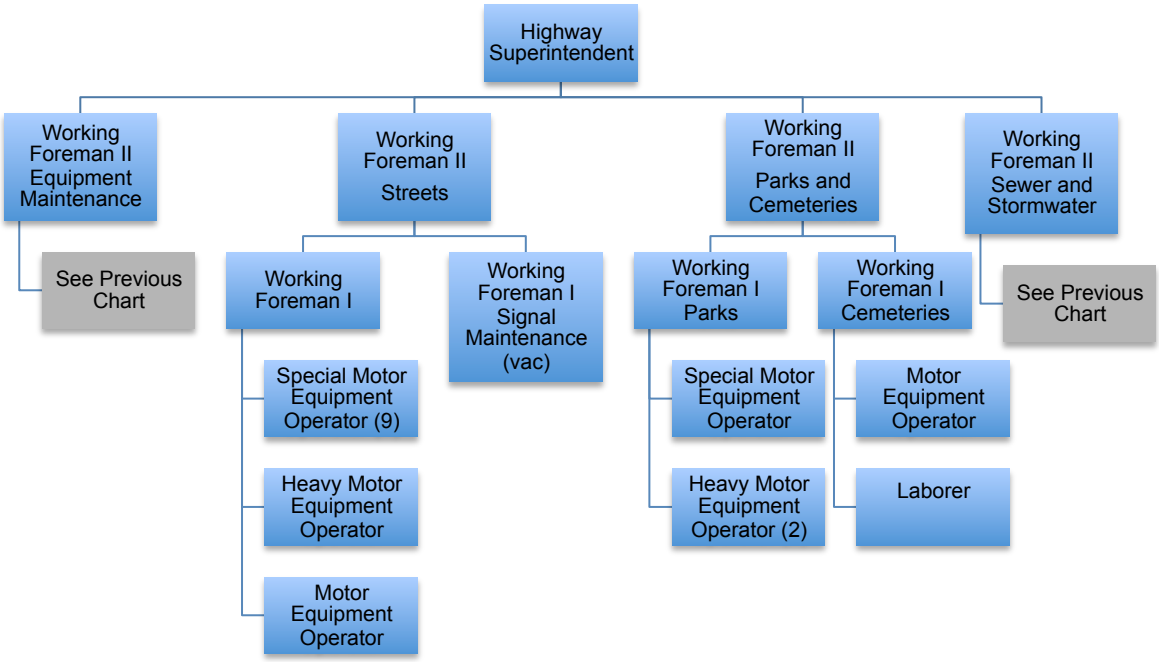



City Engineer
Wastewater Chief Operator
Water Superintendent
Senior Engineer/ Landfill Manager
Stormwater Manager
Pretreatment Coordinator
Wastewater Treatment Plant Operator (5)
Maintenance Foreman
See Separate Chart
See Separate Chart
Maintenance Technician II
Maintenance Technician I


City Engineer
Senior Environmental Scientist
Wastewater Chief Operator
Water Superintendent
Senior Engineer/ Landfill Manager
Stormwater Manager
See Previous Chart
Cross Conection Coordinator
Reservoir Ranger (PT)
See Separate Chart
Working Foreman II
Chief Water Operator
Working Foreman I
Water Treatment Plant Operator (4)
Special Motor Equipment Operator (2)
Maintenance Technician
Heavy Motor Equipment Operator (2)
Motor Equipment Operator


City Engineer
Senior Environmental Scientist
Watewater Chief Operator
Water Superintendent
Senior Engineer/ Landfill Manager
Stormwater Manager
See Previous Chart
See Previous Chart
Recycling Coordinator
Special Motor Equipment Operator
GIS Coordinator
GIS Technician (PT)
Assistant Civil Engineer (4)
Solid Waste Coordinator (reports administratively to Financial Administrator)
Gatekeeper PT (12)


Highway Superintendent
Working Foreman II Equipment Maintenance
Working Foreman II Streets
Working Foreman II Parks and Cemetery
Working Foreman II Sewer and Stormwater
Working Foreman I
See Separate Chart
See Separate Chart
Working Foreman I
Vehicle Maint. Tech and Vehicle Inspector (2)
Vehicle Maint. Tech.
Field Support Technician
Special Motor Equipment Operator (4)
Heavy Motor Equipment Operator (2)
Motor Equipment Operator (vac)


Highway Superintendent
Working Foreman II Equipment Maintenance
See Previous Chart
Working Foreman II Streets
Working Foreman I
Special Motor Equipment Operator (9)
Heavy Motor Equipment Operator
Motor Equipment Operator
Working Foreman I Signal Maintenance (vac)
Working Foreman II Parks and Cemeteries
Working Foreman I Parks
Special Motor Equipment Operator
Heavy Motor Equipment Operator (2)
Working Foreman I Cemeteries
Motor Equipment Operator
Laborer
Working Foreman II Sewer and Stormwater
See Previous Chart

(2) Department Budgets and Expenditures

The following chart provides the actual personal services and operating and maintenance (O&M) expenditures for FY 2010 through FY 2013, and the budgeted expenditures for FY 2014 for the Department of Public Works.

Function	FY10 Actual	FY11 Actual	FY12 Actual	FY13 Actual	FY14 Budget
Engineering	$402,200	$410,863	$403,616	$409,148	$463,160
Administration	$298,778	$276,846	$266,873	$271,034	$275,633
Highways	$1,176,499	$1,144,358	$1,067,559	$1,031,728	$1,210,264
Snow and Ice	$486,403	$811,541	$363,757	$580,238	$426,350
Cemetery	$135,270	$138,090	$123,195	$120,357	$145,137
Parks and Rec	$199,427	$176,773	$185,485	$216,451	$230,392
Water Entprs	$1,584,215	$1,724,776	$1,698,656	$1,524,418	$2,030,354
Sewer Entrps	$2,201,688	$2,042,318	$1,903,050	$1,858,265	$2,614,136
Solid Waste	$1,593,337	$1,378,456	$1,242,546	$1,233,219	$535,465
Stormwater	$-	$-	$-	$-	$-
Total	**$8,077,817**	**$8,104,021**	**$7,254,737**	**$7,244,858**	**$7,930,891**

Highlights from a review of the budgetary table, above, include the following:

- Although not shown in the table above, the City of Northampton created a Stormwater Utility in FY 2015, and began billing residents and businesses based on impervious surface areas. Therefore, there are no budgeted or actual expenditures for this Utility in years prior to FY 2015.

- Overall, the Department's FY14 personal services and operating budget declined by $146,926, or 1.8%, from the actual expenditures in FY10.

- The largest increase was in the Water Enterprise function, which increased by $446,139 from FY 2010 actuals to FY 2014 budget. This equates to a 28.2% increase.

- The largest decrease in budgeted FY 2014 budgeted expenditures as compared to FY 2010 actuals is in the Solid Waste/Transfer Station function, which decreased by $1,057,872, or by 66.4%.

- For FY15, the City changed the way in which it budgets for personal services in the DPW. This creates an inaccurate depiction of budgeted figures as compared to prior years' budgets. Personal services are now allocated from general fund functions such as engineering and administration to the enterprise funds, which invalidates comparisons of these budgets from year to year. Therefore, the table above portrays budgeted and actual figures only through FY14.

- Capital costs are also not shown in the table above, as these fluctuate from year to year. However, the table below provides these.

Year	Amount
FY10 Actual	$2,151,426
FY11 Actual	$2,217,849
FY12 Actual	$1,751,993
FY13 Actual	$2,081,458
FY14 Budget	$3,162,364
FY15 Budget	$4,289,664

The next section provides a summary description of staffing, roles and responsibilities of the divisions of the Department.

(3) Summary of Key Roles and Responsibilities.

Position	Number of Staff	Responsibilities/Roles
Administration		
Public Works Director	1.0	• Provides overall guidance to the Department of Public Works • Interacts with the Mayor on departmental matters such as budgets, capital projects, resident concerns, performance objectives, etc. • Develops and approves contracts with service providers. • Interacts with residents on all departmental matters. • Directs the development of water, sewer and stormwater rates. • Ensures that all operating divisions possess materials, supplies and personnel necessary to conduct their separate responsibilities.
Administration and Purchasing		
Financial Administrator	1.0	• Oversees the staff and activities of the Division of Administration and Purchasing • Oversees the Department budget, payroll, payables, contractual reporting, construction project reporting, financial reporting to the City. • Develops rates for water, sewer and stormwater.

Position	Number of Staff	Responsibilities/Roles
Office Manager	1.0	• Supervises the activities of five Principal Account Clerks and one Department Secretary in the Division, two of whom have functional responsibilities within the Solid Waste/Transfer Station section and Water Division. • Ensures that payroll, purchasing, work order input, payables and receivables, contracts etc., are performed correctly, accurately and in conformance with City and Department policy. • Completes Workers Comp claims, driver accidents, for the DPW, and reports to RMV, City Auditor and Police. • Conformance with Public Open Meeting Law for meetings, post agendas and takes minutes. • Checks to ensure proper explanations for low/high meter reads. Makes calls to owners in cases of extraordinary reads.
Principal Account Clerk Department Secretary	6.0 1.0	• All Clerks answer phones, take complaints and create work orders, greet the public, issue permits. • One employee processes accounts payable, ensuring proper codings, and obtains supervisor signature. • Two Clerks process payroll • Two Clerks bill for water and sewer, which is done quarterly. • One Principal Account Clerk processes stormwater utility billing. • One Department Secretary issues permits for landfill; sells blue garbage bags to retail stores and walk in customers; sells recyclable containers and rain barrels, support the Re-Use Committee. Water and Highway clerks work 7-3. All others work 8:30 – 4:30
Highway Division - Administration		

Position	Number of Staff	Responsibilities/Roles
Superintendent	1.0	• Coordinates the Highway Division's rapid response to snow and ice events, deploying staff members in the pretreatment, sanding, plowing removal of snow and ice. Coordinates with contractors in the removal of snow on certain routes. • Serves as City Tree Warden • Makes Dig Safe utility mark outs • Coordinates work with contractors and utility companies conducting work in City streets and rights of way. • Inspects roads, rights of way, trees and other areas of the City to determine work requirements. Prioritizes work and discusses with Director. • Inspects the work performed by staff in the Division to ensure conformance to City and Department standards. Inspects the work of contractors to ensure conformance to contractual terms. • Develops work assignments and transmits these to Foremen in Equipment Maintenance, Parks/Cemeteries, Sewer/Stormwater and Streets • Oversees the Highway Division budget. • Coordinates the purchase of vehicle purchasing for all Divisions • Organizes and provides staff training • Ensures that Working Foremen have materials, supplies and personnel resources to complete assigned duties. • Assesses City public shade trees
Highway Division – Equipment Maintenance		
Working Foreman II	1.0	• Orders and stores automotive parts. • Coordinates repairs with contractors. • Coordinates the scheduling of preventive maintenance of equipment. • Maintains records of repairs and maintenance performed on vehicles and equipment. • Spends approximately 10 hours per week in repair and maintenance activities. • Works M-F 7:00 am – 3:00 pm. May work on Sat to perform vehicle services.

Position	Number of Staff	Responsibilities/Roles
Working Foreman I		• Preventively maintains and repairs all DPW vehicles and equipment, as well as six School buses. • Diagnoses vehicular problems and makes unscheduled repairs to vehicles and equipment. • Serves as lead worker in the shop, providing guidance to other mechanics as necessary. • Works M-F 7:00 am – 3:00 pm. May work on Sat to perform vehicle services.
Vehicle Maintenance Technician and Vehicle Inspector Vehicle Maintenance Technician	2.0 1.0	• Preventively maintains and repairs all DPW vehicles and equipment, as well as six School buses. Performs MA vehicles inspections of City Vehicles • Diagnoses vehicular problems and makes unscheduled repairs to vehicles and equipment. • Works M-F 7:00 am – 3:00 pm. May work on Sat to perform vehicle services.
Highway Division – Sewer/Stormwater		
Working Foreman II	1.0	• Makes daily assignments to staff in the Sewer/Stormwater Section. Records the assignments and their completion on manual "Daily Attendance Record". • Communicates with contractors, homeowners, Engineers, Division Superintendent on matters related to the Sewer and Stormwater services in the City. • Makes Dig Safe utility mark outs.
Working Foreman I	1.0	• As most experienced member of crews, acts as knowledge resource for the section. • Operates the section's heavy equipment in cleaning and repairing culverts, sewer and stormwater pipe, service lines, catch basins. • Investigates sewer backups in sewer lines. Uses sewer jet to clear line and determine the location of stoppage. • Fills in for Working Foreman II in that position's absence.
Special Motor Equipment Operator	4.0	• Operates the section's heavy equipment in cleaning and repairing culverts, sewer and stormwater pipe, service lines, catch basins. • Investigates sewer backups in sewer lines. Uses sewer jet to clear line and determine the location of stoppage.

Position	Number of Staff	Responsibilities/Roles
Heavy Motor Equipment Operator	2.0	• Works as member of crew hauling debris with dump truck. • Cleans and repairs culverts, sewer and stormwater lines, catch basins.
Field Support Technician	1.0	• Inspects sewer lines for stoppages. Uses TV camera equipment. • Works as member of crew in repairing pipes. Uses backhoe, jet rodder, Vac All.
Motor Equipment Operator	1.0 (vac)	• Works as Laborer using primarily hand tools in cleaning and repairing culverts, sewer and stormwater lines, catch basins.
Highway Division - Streets		
Working Foreman II	1.0	• Makes daily assignments to crews performing activities such as pothole patching, sign installation and repair, street sweeping, pavement marking, tree trimming and brush cutting. • May work as part of crews patching potholes. • Ensures that crews have appropriate supplies, equipment and materials to perform duties.
Working Foreman I	2.0 (1 vac)	• Primarily works as lead worker on tree crew, cutting limbs and branches, feeding into chipper, shoveling debris. • One Working Foreman I position has been vacant for an extended period. The position was reportedly responsible for the maintenance and repair of traffic signals in the City.
Special Motor Equipment Operator	9.0	• All in the position are required to operate machinery in the pre-treatment and removal of snow and ice • Three of the SMEOs conduct street sweeping operations. • Winter operations has one is on schedule from 3:00 pm till 11:00 pm, one is on schedule from 11:00 pm till 7:00 am. • One SMEO mows the rights of way in the City and picks up and disposes of dead animals. • One SMEO presses signs, installs and maintains signs, paints pavement markings (crosswalks, school crossings, long lines) • One SMEO performs facilities maintenance, guard rail and sidewalk repair

Position	Number of Staff	Responsibilities/Roles
Heavy Motor Equipment Operator	1.0	• All in the position are required to operate machinery in the pre-treatment and removal of snow and ice. • Operates the Department's heavy equipment such as backhoes, loaders, etc., as well as all other DPW equipment, and may use hand tools at times. • Work as parts of crews in the performance of such activities as tree trimming and brush removal, pothole patching, guardrail maintenance, curbing, inspecting sidewalks for trip hazards, crosswalk painting, sign installation and maintenance, mowing rights of way, hauling debris generated by street sweepers, etc.
Motor Equipment Operator	1.0	• Operates machinery in the pre-treatment and removal of snow and ice. • Works as part of crew in such activities as tree trimming and brush removal, pothole patching, guardrail maintenance, curbing, inspecting sidewalks for trip hazards, crosswalk painting, sign installation and maintenance, mowing rights of way, hauling debris generated by street sweepers, etc.
Highway Division – Parks and Cemeteries		
Working Foreman II	1.0	• Makes daily assignments of tasks and activities to crews involved in cemetery and parks/athletic fields. Maintains manual records of task assignments and the accomplishment of tasks. • Interacts with contractors at cemeteries and parks. Interacts with funeral home directors and burial needs • Sells cemetery lots and accepts payments. • Maintains electronic records of payments and ownership of cemetery plots, names of individuals buried in plots, date of burial and death, name of funeral home performing burial, etc. • Enforces cemetery rules and regulations.

Position	Number of Staff	Responsibilities/Roles
Working Foreman I	2.0	• Serves as most experienced members on crews performing parks, athletic field and cemetery maintenance. • Mows and trims fields, cemeteries and parks. • Performs landscaping at parks. • Maintains bath houses at parks. • Maintains irrigation systems. • Maintains beach sand, guard chairs. • Prepares City Parks fields for athletic play by lining fields, dragging sand, mowing, etc. • Digs graves. • Paints and repairs equipment in winter
Special Motor Equipment Operator	1.0	• Digs graves • Mows; trims bushes, hedges, headstones, etc. • Mows, lines and manicures fields. • Performs landscaping at parks. • Maintains bath houses at parks. • Maintains irrigation systems. • Maintains beach sand, guard chairs. • Paints and repairs equipment in winter. • One SMEO will reportedly be stationed at the new Florence Field, which will encompass about 25 acres.
Heavy Motor Equipment Operator	2.0	• Mows parks with gang mower. • Greases, oils mower. • Mows; trims bushes, hedges, headstones, etc. • Paints and repairs equipment in winter
Motor Equipment Operator	1.0	• Mows; trims bushes, hedges, headstones, etc. • Paints and repairs equipment in winter.
Laborer	1.0	• Stationed at Bridge Street Cemetery. • Mows; trims bushes, hedges, headstones, etc. • Maintains cemetery equipment. • Paints and repairs equipment in winter.
Engineering		

Position	Number of Staff	Responsibilities/Roles
City Engineer	1.0	• Provides overall guidance and technical support to staff in the Engineering Division as well as in the Water Treatment, Water Distribution, Wastewater Treatment, Stormwater and Solid Waste divisions. • Ensures adherence to design specifications, contract specifications, etc. • Ensures an efficient flow of work in the Engineering Division. • Tracks project budgets, progress and schedules. Manages the larger capital projects of the City. • Determines the feasibility of outsourcing project design; oversees the work of contractors. • With Financial Administrator, determines rate structure for the Stormwater Utility.
Senior Engineer	1.0	• Allocates engineering staff to project design and monitors progress of staff. • Oversees the work of the solid waste/transfer station employees. • Conducts groundwater and gas monitoring and reporting. • Provides technical site plan review and comments to Office of Planning and Sustainability for proposed projects • Manages in house design projects • Makes monthly report on landfill flare. • Partially responsible for the leachate system at landfill. Monitors condensation. • Ensures that the City conforms to regulations related to methane gas-to-energy conversion. • Prepares public notifications on large projects. Responds to public and private requests for information. • Solicits proposals from consultants for contracted design work, and reviews work. • Determines the ownership status of trees and the limits of street right of ways. • Supports the permit and utility connection process.

Position	Number of Staff	Responsibilities/Roles
Assistant Civil Engineer	4.0	• Performs design of projects assigned by the Senior Engineer. • One A.C.E. focuses primarily on transportation projects related to pavement – roadways, pedestrian and bicycle projects, traffic lights, signalization, etc. This employee attends the Bicycle and Pedestrian Committee meetings and Transportation and Parking Commission • One A.C.E. works primarily on flood control and levee work with the Corps of Engineers, and works on streets acceptance and water line design. • One A.C.E. works primarily on roadway reconstruction projects, replacing utilities, making pedestrian accommodations, re-routing drainage, etc. • One A.C.E. works with the Engineer and Senior Engineer on sewer, comprehensive wastewater management plan, and in assisting with landfill closure.
GIS Coordinator GIS Technician	1.0 0.5	• Provides control points for surveys. • Updates the GIS based on infrastructure and assets found in the field, such as water and sewer lines, hydrants, valves, etc. • Generates maps as requested.
Senior Environmental Scientist	1.0	• This position receives funding from the Water Division, but functionally reports to Engineering Division. • Administers the City's watershed resource protection plan, • Oversees the City's raw water quality monitoring program for feeder streams and surface drinking water reservoirs. • Project Permitting for City capital projects Manages forestry stewardship program Manages land acquisition program
Solid Waste Division		
Department Secretary (the City changed this recently)	1.0	• This position reports functionally to the Senior Engineer, and administratively to the Office Manager in the Administration and Purchasing Division. • Oversees the daily operations of the transfer station. • Develops schedules for the Gatekeepers. • Tracks all bags that are distributed to local stores. • Issues vehicle stickers for entry to the transfer station.

Position	Number of Staff	Responsibilities/Roles
Gatekeeper	12.0	• Monitor the activities at the transfer station. • Sell permit stickers. • Provide information to the public regarding waste and recyclables. • Gatekeepers cover the DPW transfer station from Mon – Sat, and the landfill on Wed. from 8:00 am till noon, and on Sat, from 7:00 am till noon. • Gatekeepers each work fewer than 20 hours per week.
Recycling Coordinator	0.5	• Position also referred to as the Solid Waste Planner • Incumbent is working part time, however the position is currently funded for full time status • Schedules the annual household hazardous waste event • Works with the Re-Use Committee for the public to pick up and drop off materials and goods that can be re-used by others.
Special Motor Equipment Operator	1.0	• Operates the flare at the landfill, takes gas readings, identifies drainage and slope issues at landfill. • Work performed at landfill is performed out of class for 20 hours per week. • Hauls trash, metals and recyclables from transfer station to Springfield.
Wastewater Treatment		
Chief Operator	1.0	• Makes assignments to Operators, Pretreatment Coordinator and Maintenance personnel, and ensures that work is performed in accordance with directions and regulations. • Oversees the tests for the control of plant operations. • Ensures that adequate chemicals, supplies are available to Operators. • Responsible for the development of protocol, and supervises the implementation of data production in lab analysis, pollutant monitoring, etc. • Inventories the pollutant loading, necessary reductions, treatability and costs, and prepares an annual report. • Position requires the possession of a Grade 6 license. Incumbent possesses a Grade 7-C.

Position	Number of Staff	Responsibilities/Roles
Pretreatment Coordinator	1.0	• Position also serves as lab director. • Performs quality assurance over lab processes and results. • Monitors industries regarding their discharges into the treatment plant. • Monitors one industry daily to determine BOD, TSS, pH.
Wastewater Treatment Plant Operator	5.0	• Monitors the performance of all equipment, gauges and charts in the treatment plant. • Records statistical data concerning plant operations. • Maintains, operates, repairs and replaces equipment as necessary. • Operates, maintains, and repairs malfunctions at the wastewater treatment plant; repairs gauges, pumps, filters and other controls and equipment. • Maintains, modifies or repairs instrumentation and control equipment. • Check 7 pump stations on daily basis. • One WWTPO works Sun – Thur from 7:00 am till 3:00 pm • Three WWTPOs work Mon – Fri from 7:00 am till 3:00 pm. • One WWTPO works Tue – Sat from 7:00 am till 3:00 pm. • WWTPOs work one month in the lab on a 5-month rotation. • WWTPOs must possess a minimum of a Grade 5 license. One possesses a Grade 6 and one possesses a Grade 7. • Two of the WWTPOs operate the flood control plant on a 12-hour shift when the plant is in operation.
Maintenance Foreman	1.0	• Makes job assignments to Maintenance Technicians and ensures smooth flow of maintenance operations. • Orders parts needed for maintenance and repair of plant equipment. • Performs maintenance on pumps, filter press, etc. • Trains workers in the maintenance of equipment at the Plant. • Welds and fabricates parts and equipment.
Maintenance Technician II	1.0	• Assists Maintenance Foreman in the tear-down and rebuild of equipment. • Performs yard work at the Treatment Plant. • Maintains pump station equipment.

Position	Number of Staff	Responsibilities/Roles
Maintenance Technician I	1.0	• Maintains pump station equipment. • Performs yard and custodial work at the Plant.
Stormwater Utility		
Stormwater Manager	1.0	• Implements the City's stormwater program in accordance with EPA requirements. • With City Engineer and Financial Administrator, assisted in the development of stormwater fees for residents and businesses. • Reviews plans for any development that disturbs one acre or more in the City. Inspects the construction for conformance to stormwater regulations.
Water Division		
Water Superintendent	1.0	• Oversees the operations of the Division, including the Water Treatment Plant, the lab, cross connection program, maintenance of the distribution system and meter reading and repair. • Corresponds and coordinates with contractors on a variety of issues such as establishing temporary water connections, leak detection, water line repair, etc. • Interacts with the State DEP and engineers. • Ensures compliance with DEP regulations. • Ensures that crews in the Plant and in the field have necessary materials, supplies and equipment to perform assigned duties. • Monitors water quality, process control. • Works with Engineering on capital projects relating to water plant, treatment processes and distribution. • Prepares and monitors the Water Division budget.

Position	Number of Staff	Responsibilities/Roles
Principal Account Clerk This is covered earlier in clerks and does not report to the water superintendent	1.0	• This position reports functionally to the Water Superintendent. Administratively, however, the position reports to the Office Manager in the Administrative and Purchasing Division. • Performs utility billing for half of the sections in the City. • Answers Department phones from 7:00 am till 8:30 am at which time other Department administrative staff assume this duty. • Codes Water Division bills according to correct line item codes. • Assists with the processing of divisional payroll.
Cross Connection Coordinator	1.0	• Tests cross connection devices in industrial and commercial establishments. • Installs cross connection devices. • Determines the appropriate types of devices that will sufficiently mitigate hazards.
Reservoir Ranger	0.5	• Checks gates at reservoirs. • Observes reservoir area for unusual circumstances. • Checks each watershed . • Watches film taken by motion sensor cameras on trails leading to reservoirs to monitor unauthorized entry. • Works 20 hours per week with a focus on weekends
Chief Water Treatment Plant Operator	1.0	• Enforces quality control over processes in water treatment plant; monitors plant processes and makes necessary changes. • Performs QC analysis on treatment chemicals. • Conducts finished water testing • Adjusts flows • Schedules Operators and their assignments • Maintains weekly, monthly, quarterly and annual checklists for maintenance of the plant. • Position requires possession of T4 license.

Position	Number of Staff	Responsibilities/Roles
Water Treatment Plant Operator	4	• Positions work Mon – Fri from 7:00 am till 3:00 pm. One WTPO is on call each week, and this individual works from the weekend through the following Thursday, with Friday off. • Fills chemical storage. • Adjusts flows. • Cleans the plant. • Maintains generators, pumps. • Checks chlorine, turbidity levels at different stations. Checks pressure valves at pump station.
Maintenance Technician	1.0	• Position is used for training Water Treatment Plant Operators. • Mows and trims small trees at reservoir.
Working Foreman II - Distribution	1.0	• Makes assignments to staff and ensures that work is performed in accordance with directions. • Performs hydrant replacements. • Performs grounds maintenance. • Makes Dig Safe utility mark outs • With a crew, performs smaller pipe replacements. • Responds to water main breaks.
Working Foreman I - Distribution	1.0	• Serves as lead worker on a crew performing hydrant and valve repairs.
Special Motor Equipment Operator	1.0	• Operates backhoe and grader on water line replacements, hydrant repairs, valve repairs.
Heavy Motor Equipment Operator	2.0	• Trims grass and weeds. • Repairs hydrants and replaces valves. • Drives dumps to haul debris from work sites. • Uses chain saw to clear brush at watersheds.
Motor Equipment Operator	1.0	• Performs general maintenance, such as painting buildings, hydrants. • Checks hydrants for freezing conditions. • Shovels around hydrants. • Maintains small equipment.

Position	Number of Staff	Responsibilities/Roles
Water Meter Repairman	1.0	• Reads meters quarterly via manual and radio read formats. • Reads meters for specific industrial customers once monthly. • Repairs radio-read meters. • Installs radio-read meters. • Checks for leaks at residential and commercial accounts.
Meter Reader	1.0	• Reads manual and radio-read meters. • Periodically works as member of water maintenance crew. • Checks hydrants for leaks and determines need for shoveling.

(4) Technology Utilized.

The following table summarizes the current technology and software systems utilized by the Public Works Department to provide services.

Technology / Software Name	Version	Summary of utilization
Munis		• City General Ledger system • Payroll input • Budget input and reporting
ArcGIS and ArcReader	10.3	• Utility and roadway locations
Traxpro		• Traffic counts
Civil 3D 2010		• AutoCAD • Civil and Survey design software
Trimble GPS		• Survey and field data collection
GPMS		• Pavement management (runs in GIS) • Provided by VHB
Crystal Reports		• Converts GPMS database into reports
Microsoft Office		• Word processing • Data input and analysis • Excel spreadsheets

Technology / Software Name	Version	Summary of utilization
Vueworks		• Work order processing
Civic Plus		• Work request system • Resides on City website
Sensus		• Water meter reads • Imports into Munis
Wasteworks		• Landfill software prior to 2013 • Used for recording bag and sticker sales for transfer station

(5) Workloads and Performance Measures

The following table summarizes the major workloads and performance measures of the Public Works Department.

Workload/Infrastructure	Quantity
Water	
Treatment Plant	• 6 MGD capacity • T3 Plant • SCADA-controlled plant with 96 different alarm levels
Distribution System	• 150 linear miles of distribution line. • 2 groundwater wells
Meters	• 8,000 total meters • 5,800 (or about 73%) are radio read meters
Gate Valves	• 1,000
Hydrants	• 1,200
Pump Stations	• 3
Reservoir Dams	• 6
Watersheds	• 3 active • 3 inactive • 3,600 acres
Backflow Devices	• 1,233 devices in 341 buildings • 957 of the devices are inspected twice annually

Workload/Infrastructure	Quantity
Wastewater	
Treatment Plant	• 8.6 MGD capacity – handling about 4 MGD • Flood control pump plant on site
Lift Stations	• 7 – not on SCADA system
Collection System	• 90 linear miles of sewer line • 114 linear miles of stormwater line • All lines are maintained by the Sewer/Stormwater section of the Highway Division
Solid Waste	
Solid waste disposed	• 1,086 tons (2014) • 1,209 tons (2013)
Recyclable materials processed - tons	• 1,224 tons (2014) Includes paper, mixed containers, metals, food waste, textiles • 1,304 tons (2013) Includes paper, mixed containers, metals, food waste, textiles, books
Transfer station permits issued	• 3,700 through 12/29/15.
Highways	
Linear miles of roadway	• 126.5
Sidewalks	• 70 miles
Linear miles of road reconstruction and overlay	• Linear miles unavailable, however the City has allocated $500,000 annually for the past two years for rubberized chip seal to supplement Chapter 90 funding
Crack sealing	• 55,690 linear feet in 2014 (10.5 miles) • Additionally, 274,000 sq ft of City parking lots were crack sealed in 2014
Tons of asphalt used in patching	• 1,900 tons of asphalt utilized each year for pothole patching and utility cuts
Street Sweeping	• Once yearly for all paved roads Downtown 2 – 3 times per month

Workload/Infrastructure	Quantity
Traffic Signals	• 24
Bridges	• 20
Equipment Maintenance	
Units Maintained	42 Heavy Van/Pickups 61 Heavy Equipment 20 Trailers 10 Pumps/Generators 3 Mowers/Small Engines 14 Small Tractors/Forklifts 2 Golf Cart/Motorcycles **152 Total Active Units**
Fleet Average Age (years)	Heavy Van/Pickup = 15.0 Heavy Equipment = 16.6 Trailer = 12.7 Pump/Generator = 19.8 Mower/Small Engine = 9.7 Small Tractor/Forklift = 16.2 Golf Cart/Motorcycle = 2.5 **Average Age of Fleet = 15.2**
Parks and Cemeteries	
Recreational Fields	• 16 baseball and softball fields • 9 soccer, lacrosse fields • Total of 145 maintainable acres, including new Florence Fields
Bath Houses Maintained	• 4 (includes new bath house at Florence Field)
Cemeteries	• Bridge St. (18.75 acres) • Park St. (2.1 acres) • Spring Grove (31.0 acres) • West Farms (1.0 acre) • **Total = 35.85 acres**
Sewer and Stormwater	
Sewer System	• 90 linear miles
Stormwater System	• 114 linear miles
Outfalls	• 326
Culverts	• 190
Catch Basins	• 4,835

APPENDIX B – BEST PRACTICES ASSESSMENT OF NORTHAMPTON'S DEPARTMENT OF PUBLIC WORKS

While the Management Audit is designed to provide an analysis of operations, organizational structure, management and staffing, this interim report represents an important step for the project team to report its preliminary findings and issues. In order to make the assessments of operational strengths and improvement opportunities, the project team developed a set of performance measures which we call "best management practices" against which to evaluate these various divisions. These performance measures comprise the main thrust of this best practices assessment.

The measures utilized have been derived from the project team's collective experience and represent the following ways to identify divisional strengths as well as improvement opportunities:

- Statements of "effective practices" based on the study team's experience in evaluating operations in other agencies or "industry standards" from other research organizations.

- Identification of whether and how divisions meet the performance targets.

The purpose of the diagnostic assessment was to develop an overall assessment of these various divisions.

1. ADMINISTRATION

Performance Target	Strengths	Potential Improvements
Clerical and administrative functions are centralized in the Department, and workloads are balanced by a central authority	Although one Clerk is physically assigned to the Water Division and one at the Highway garage, all other clerical and administrative staff are located in the main building of the DPW complex on Locust Drive. All, however, report administratively to the Office Manager.	
The payroll process is automated	The payroll process is automated, with two of the Clerks handling this for the Department.	
Support staff as a ratio to technical staff is in the range of 1:9 to 1:25, depending upon the degree of automated systems in use	The eight (8) clerical and administrative staff members support a total of 74 full time and 14 part time staff. Assigning 0.5 FTE for each part time position, this equates to about a 1:10 ratio which, while within the typical range, is at the lower end.	The Department has recently added billing for the stormwater utility to the tasks of the Administrative Division, which has increased workloads. However, it is also notable that some work activities performed by field crews are input into multiple information systems, thereby duplicating work.
The Division maintains a vendor file which reflects vendor histories.		Although current and historical files are maintained of all contracts, there is no separate vendor file that contains the performance histories of any single vendor, other than the cost of the contracts. The maintenance of these files is considered a best practice both because the files provide substantiation for any justifiable deviation from stated award criteria such as low-bid, but also for purposes of transferring information to new administrative staff.
Regular, ongoing financial reports are provided to divisional management and supervisors.	Division managers receive regular financial reports on their respective operations.	

Performance Target	Strengths	Potential Improvements
Clerical and administrative staff receive ongoing training in the use of necessary tools such as word processing, financial spreadsheets, customer service, etc.	Administrative staff have received Customer Service Excellence training.	No administrative staff member reports any recurring job-specific training.
Vacancies are filled expeditiously		The Department reports that many positions remain open and vacant for many weeks.
All utilities are billed on one combined bill to the greatest extent possible to minimize billing and collection costs	Water, sewer and stormwater customers are billed on a single statement. Only those customers without water and sewer accounts are billed separately for stormwater.	

2. HIGHWAY DIVISION

Best Management Practice	Strengths	Opportunities for Improvement
STREET MAINTENANCE		
Managerial responsibility for the maintenance and repair of streets, sidewalks, street sweeping and signals has been centralized.	National Grid owns and maintains some of the street lights in the City, and the City also maintains some, although National Grid maintains most of these. The Highway Division does maintain street lights at Pulaski Park and the DPW complex on Locust Street, using its bucket truck.	The Division should analyze the cost-effectiveness of paying National Grid for the maintenance of the City's street lights. As is shown below, there are sufficient numbers of staff to adequately maintain the roadways in the City, and the Division has access to a bucket truck to perform this function, and also has a trained Tree Climber.
Ratio of supervisory and support positions to line or service delivery position is reasonable.	There are nine SMEOs, an HMEO and an MEO in the Streets section of the Division, with a Working Foreman I and a Working Foreman II supervising the activities of these 11 field employees. (Another Working Foreman I position has been vacant for an extended period of time and is unlikely to be filled in the near term). This equates to a ratio of 5.5 to 1, which is somewhat less than typical for highway maintenance activities, however the two Foremen are, themselves, working members of crews.	
The number of street and sidewalk maintenance staff approximates 1 staff for every 15 to 20 centerline miles of paved streets.	Including the two working foreman positions, there are 11 total field worker positions in the Street Maintenance section of the Highway Division. With 126.5 center line miles of roadways, this equates to 11.5 miles per position.	

Best Management Practice	Strengths	Opportunities for Improvement
Service requests for street and sidewalk maintenance and repair are closed promptly.	The Division places high priority on reports of tripping hazards on sidewalks, as well as major potholes.	There is no proactive inspection program to identify tripping hazards or street failures, with the Highway Division relying instead on residents' reports of problems. The City's sidewalks are in generally poor condition in most areas, with some of the newer ones in the downtown area approximately 30 to 35 years old.
The crew sizes utilized for street maintenance are appropriate to the work performed. • Two-person crews are utilized for pothole patching; and • Four-person crews are utilized for skin patching, base repair, and crack sealing	The Streets section utilizes appropriate crew sizes for each of these activities.	
The productivity of the pothole patching crews meets reasonable standards or 1.5 to 2.5 tons per crew day.	The Division reports that its crews accomplish about 10 tons per day in early spring when most of the pothole patching is accomplished. During pothole season, the crews reportedly average 20 to 25 tons per day. Later in the season, crews reportedly average 5 to 10 tons per day.	The Division does not record or report the number of hours per day worked in this or other tasks except for pothole repairs made in response to complaints. The figures reported at left are Division estimates that were not verified by the project team. If accurate, however, these figures reflect extremely high productivity rates.
Streets are crack sealed on an ongoing annual basis to mitigate the penetration of water into the street base.	The Engineering Division procures an annual contract for crack sealing streets based on the VHB pavement condition index with a typical value of $100,000.	

Best Management Practice	Strengths	Opportunities for Improvement
A sidewalk inspection and repair program is in place that includes: • A systematic inspection of sidewalks once every three to five years to identify tripping hazards; • Temporary patches of the tripping hazards within thirty days of hazard identification; • Use of sidewalk replacement or grinding to eliminate tripping hazards.		As noted earlier, there is no proactive inspection program conducted by the Highway Division. The Division sends a two-person crew to grind and/or patch when it receives a work request from residents, but these are not proactively identified prior to complaint, reportedly due to insufficient staffing levels.
The sidewalk maintenance crew uses a sidewalk grinder on an ongoing / monthly basis to address small displacements.		Although the Division has a grinder, it is reportedly not used to abate tripping hazards on a regular basis.
The crew size used for sidewalk maintenance and repair ranges from 1-staff for sidewalk grinding, 2-staff for base and construct forms and forms removal, 3-staff for sidewalk removal to 4-staff for sidewalk placement and finishing.		The Division uses 2-person crews for grinding. The Division has not constructed concrete forms or replaced sidewalk in a number of years, and a determination of crew sizes for these activities is not possible at this time.
The productivity of the sidewalk maintenance and repair crew meets reasonable standards of 1 – 3 cubic yards of ready mix concrete per crew day.		The Division reports that it has not poured concrete in the construction of sidewalks recently enough to provide a comparison to this metric.
Regenerative air street sweepers are utilized for street sweeping to reduce equipment maintenance costs and downtime.		Both sweepers are Elgin broom sweepers which are relatively high-maintenance pieces of equipment.
The level of service for street sweeping is: • Once monthly for residential; • Once daily for primary downtown area	Downtown areas are swept weekly.	All non-downtown areas of the City are swept annually.

Best Management Practice	Strengths	Opportunities for Improvement
Street sweepers have GPS units installed.		Sweepers are not equipped with GPS. GPS can be a valuable tool to monitor driver productivity, route efficiency, and to respond to questions from residents who inquire as to whether a sweeper has swept a particular area of the City.
Street sweeper operators are assigned routes for sweeping.	There are only two sweepers in the fleet, and most of the sweeping is in the downtown area which is relatively confined.	
Drop boxes are located at strategic locations throughout the City to minimize lost time for street sweeper operators to dump their sweep	Sweeper debris is collected by a 5 ton dump that follows the sweepers. Debris is contained at the Public Works yard and then hauled to the Chicopee landfill. Other sweeper debris goes to the Glendale Road leaf and yard waste fill.	
Street sweepers have large hoppers to minimize lost time for street sweeper operators to dump their sweeper loads.		The Division's sweepers have 3.5 cu. yd. hoppers, which are relatively small. Sweepers with larger hoppers, while generally more expensive, also reduce the unproductive downtime associated with more frequent dumps.
A parking ban has been adopted to aid street sweeping.		The City has not adopted a parking ban for street sweeping.
Street sweeper productivity meets acceptable levels of productivity in terms of curb miles swept and the proportion of time spent sweeping.		The Department does not collect or report the numbers of curb miles swept during the year, nor the amount of time taken in sweeping them. Therefore, this metric is unknown.
The Section periodically evaluates the cleanliness of streets to evaluate the effectiveness of the street sweeping program.	This is done on an ongoing basis.	

Best Management Practice	Strengths	Opportunities for Improvement
Crew sizes for street sweeping are appropriate to the work performed.	Sweepers are driven by a single driver who sweeps, and the sweeper moistens the pavement in front of the vehicle. A single 5-ton dump is driven between the two sweepers to collect debris.	
The streetlights are owned and maintained by the City (and not owned and maintained by private electrical utilities).		National Grid does own a certain number of street lights in the City, and also maintains these, as well as many owned by the City.
The number of staff required for street light maintenance and repair approximates 6,500 streetlights per technician.	The City maintains relatively few street lights, with National Grid responsible for the majority. The project team does not possess data to allow a comparison of the private contractor's staffing to determine this metric.	
The bulbs used in the light fixtures are high-pressure sodium. These bulbs are energy efficient and provide approximately five years of service life.	The City is currently evaluating converting to LED street lights with a third party vendor.	
Streetlights on arterial and other major streets are inspected for "burnouts" once a quarter.		Streetlights are not proactively checked for burnouts, but rather are replaced on reports from the public that a light is out.
A CMMS is installed and utilized including a work order system, annual work program, a reporting system to report actual versus planned performance, asset management system, and defined service levels and performance standards for each work activity.		The Department has no information system that records all work performed by the Streets Division, or any other division in the DPW. VueWorks and Request Tracker are currently used and these systems have historically been used only to record call-in work from residents, and others, and only records work requests for tree work, potholes and signs.

Best Management Practice	Strengths	Opportunities for Improvement
Levels of service have been developed that define the frequency with which maintenance tasks are to be performed.	Certain functions, such as street sweeping, are performed on a routine cycle. Potholes are filled during defined times during the year, as is mowing.	
An annual maintenance calendar has been developed that identifies when seasonal tasks will be performed		There is no formal calendar that is prepared for all functions performed by the Street section of the Division.
The section has identified the maintenance activities and staff hours required to maintain the infrastructure using the inventory information, levels of service, and annual maintenance calendar.		The Street section, like all other sections and divisions of the DPW, is inhibited in the development of standardized labor hours, materials and equipment for tasks and activities related to the maintenance of the City's infrastructure. This is a major opportunity for the Department, as much of its work is planned and scheduled, however there is no associated maintenance plan that defines levels of service for each task and activity. The lack of automation in the reporting of work efforts results in a lack of ability to determine the levels of service that could be achieved for each incremental expenditure of labor hours, materials and equipment.

Best Management Practice	Strengths	Opportunities for Improvement
Work orders are used to record all maintenance activities and staff hours.		The only work orders created in the Street section are those that are performed in response to work requests. This is another major opportunity for the Streets section, as well as the Department as a whole. The VUEWorks system has far more functionality than is currently being utilized. The system has the capability of recording not only work requests, but also other daily work performed by the DPW, and can be used to manage assets to a defined service level. The DPW should invest in training of its administrative staff to take advantage of the relatively greater functionality offered by this program than is currently being used.
Quality standards have been developed for the maintenance of street, sidewalk and lighting infrastructure.	The Street section does rate the City streets for purposes of pavement management.	Beyond a visual check of quality, there are no defined standards such as those for sign reflectivity, grass height in ROW, etc.
The Highway section has a clear formal written outsourcing strategy that focuses on core competencies and service improvements.	Major road construction and resurfacing projects are routinely outsourced.	The Street section does not have a formal outsourcing strategy. Rather, as the workloads exceed the abilities of staff the handle them, work may be outsourced from time to time.
The CMMS is utilized to track customer service requests and document response time.	VUEWorks is used to record and monitor work requests related to trees, potholes and signs.	There are many other categories of work performed by the Street section that are not monitored or reported by the administrative staff in VUEWorks.

Best Management Practice	Strengths	Opportunities for Improvement
Policies and procedures are well documented.	The Highway Division has developed and instituted policies and procedures related to safety, and the DPW has General Safety, Conduct Rules and Regulations that were developed by a committee of employees. This is used as a guideline for the DPW.	Safety is only one of many elements of a comprehensive documented policies and procedures. Others include organization and strategic planning, human resource management, occupied Facilities (security, risk assessment, environmental controls), finance, risk management, communications, information technology and telecommunications, as well as others. These are discussed within the body of the report.
An up-to-date computerized geographic information system is available that provides records of the components of the infrastructure system directly on laptops and/or maps	The Engineering Division maintains a robust GIS system for underground infrastructure such as water, sewer and stormwater lines.	Responsibility for the maintenance and update of the City's infrastructure within GIS is fragmented between the DPW and Planning, the latter of which is reportedly responsible for the maintenance of property lines and street layouts. Street center lines are reportedly unreliable in GIS and are not aligned with the underground infrastructure. Street section crews do not have access to GIS in the field on laptops.
TREE MAINTENANCE		
A tree inventory exists of all trees including location, size species, and condition.	The City in conjunction with DCR and volunteers completed a tree inventory of the downtown central business district. There was also a sampling inventory of the City shade trees done in 2014.	The Street section does not maintain a comprehensive city-wide tree inventory.

Best Management Practice	Strengths	Opportunities for Improvement
The Forestry Section has established a tree canopy target of at least 20%.	The Division reports that a recent study indicated that the tree canopy cover is well over 50%. There are many advantages to the City with this degree of canopy, including cooler temperatures, enhanced windbreaks which can reduce home heating and cooling costs, enhanced water filtration and retention, and others	The City has not established a tree canopy target, and the canopy has reportedly been decreasing in recent years.
A user-friendly CMMS is utilized that is easily accessible by Forestry staff to regularly update the urban forest inventory, record maintenance activities, manage the maintenance program, and evaluate the value and costs of each urban forest management and maintenance activity.		Tree complaints are logged in VUEWorks, however there is no record of the accomplishment of ongoing maintenance related to tree trimming, pruning, checks for disease, stump grinding, etc.
Work for the staff in Forestry is planned and scheduled on a bi-weekly basis.		Work is generally not planned on a two-week time frame, but rather the Streets section of the Division responds to complaints of diseased trees, trees removals and trimming needs as they are reported. The Division reports that if crews are not needed for other duties, they will then prune and trim the block in which the complaint was received.
A tree ordinance has been adopted that covers planting and removal of trees within public rights-of-way, maintenance or removal of private trees which pose a hazard, tree planting requirements such as those requiring tree planting in parking lots, and providing protection for trees requiring that a permit be obtained before trees can be removed, encroached upon, or in some cases, pruned.	The City has posted all ordinances on line. Those pertaining to trees cover all relevant information regarding the planting and taking down of trees on public property.	

Best Management Practice	Strengths	Opportunities for Improvement
City trees located along streets and in parks receive an annual inspection to evaluate their condition and potential hazard.	Diseased trees are either reported by residents or noted by DPW staff during other work activities.	There is no formal program to inspect each tree on the ROW or in parks.
When trees are removed, the stumps are removed as well.		Although stumps are removed, they are removed once annually, and not at the time of tree removal.
All trees that are removed are replaced.	The Public Shade Tree Commission and the Arborist/Tree Warden are currently re-evaluating the tree replacement policy.	Only about 2 of every 3 trees that are removed have been replaced in recent years.
Tree planting is provided proactively, not just for removals, within established neighborhoods planting areas where tree stocking is inadequate based on existing canopy coverage.	Tree canopy is more than adequate currently, so this is not an issue for immediate concern. However, as stated earlier, the tree canopy has been decreasing in recent years.	This has not been done in recent years.
Forestry purchases street trees at local nurseries and does not operate its own nursery.	The Department does not operate its own nursery, and purchases trees and other vegetation from local businesses.	
A plan exists to cost-effectively recycle and utilize green waste and debris created by urban forest maintenance activities through such methods as milling products from large wood and re-cycling of wood chips as mulch for use within landscapes or as soil enhancement.	Green waste is transported to the DPW complex, placed in a bin and provided to residents free of charge.	
A regular professionally managed in-service training program to keep step with state-of-the-art advances and continuously improve workers' knowledge and skills in safety, tree planting, and care and maintenance practices.	The Division provides in service Electrical Hazards Awareness training for employees of the Tree Crew. The Tree Crew also attends outside training programs on an annual basis.	

Best Management Practice	Strengths	Opportunities for Improvement
Trees are trimmed on a proactive, block-by-block basis.		The Division reports that if crews are not needed for other duties, they will prune and trim the block in which any tree-related complaints are received.
Tree complaints are inspected within one workday, and scheduled for trimming based upon a risk assessment.	The Arborist/Tree Warden responds to tree complaints, generally within 24 to 48 hours to make a determination as to the proper course of action to address the complaint.	
PARKS MAINTENANCE		
Staff periodically inspects the condition of the parks and related facilities.	Parks Maintenance staff are in the parks daily during the growing season and note any deficiencies.	
Quality standards have been developed for park-related maintenance.		There are no documented standards for, for example, parks grass height, mulch depth, ballfield grass height and edging standards, etc.
Levels of service have been developed that define the frequency in which various maintenance tasks are to be performed.	The staff attempt to mow parks and cemeteries on a weekly basis during growing season.	
The levels of service provided have been formally adopted and classified as level "A," level "B," level "C," or "level D" (or similar classification system) to ensure a linkage between policy-level decision-making and actual service delivery.		The Parks and Cemeteries section has not developed formal maintenance standards for the assets for which it is responsible. Staffing levels are insufficient to conduct maintenance beyond the minimal mowing and lining of fields. The Parks Maintenance section reports that crews also periodically perform other tasks such as fence building, repairing comfort stations, irrigation systems, etc.

Best Management Practice	Strengths	Opportunities for Improvement
Sufficient resources have been provided to maintain at least a "B" level of maintenance such as weekly mowing, bi-weekly edging, weekly inspection of playground equipment, daily restroom cleaning, aeration 2 to 3 times annually, fertilization once annually, etc.		The eight staff members in the Parks and Cemeteries section are responsible for 16 baseball and softball fields, 9 soccer fields, and 4 cemeteries encompassing nearly 181 acres of developed land. This equates to a ratio of about 23 developed acres per maintenance staff member, which is insufficient for even a minimal level of maintenance. However, during the growing season, the eight full time staff members are supplemented by seven part time workers, which increases the total contingent to 15, equating to about 12 developed acres per staff member, which is sufficient for at least a "C" level of maintenance. The project team noted examples of poor conditions in parks and, particularly, in ballfields at Ryan Road and Florence fields. It is clear that staffing is insufficient to provide many services other than the basic mowing and lining of fields, and even these are minimally provided,
The section keeps a comprehensive list of park-related inventory such as the square feet of turf, linear feet of edging, square feet of sidewalks, number of picnic areas, etc.	The Department does maintain records of the developed acreage at each park.	
The Department maintains and uses information on the full unit costs of maintenance activities.		The Parks and Cemeteries section does not record the time expended by its crews in any particular activity, and does not have access to a computerized maintenance management system that would facilitate the analysis of the data to be able to determine, for example, the cost of maintenance per acre of developed parkland.

Best Management Practice	Strengths	Opportunities for Improvement
An annual maintenance calendar has been developed that identifies when seasonal tasks will be performed (e.g., turf will be fertilized in March and September, color planting in Spring, etc.).	The Parks and Cemeteries Working Foreman works with the Recreation Department to develop a seasonal calendar for field use, and the dates on which mowing and lining of fields is required.	
Parks has identified the maintenance tasks and staff hours required to maintain service areas using specific inventory information, desired levels of service, and an annual maintenance calendar. As a result, Parks is able to deploy staffing levels to meet targeted service levels.	The section has identified the tasks that are required to be performed in each park, athletic field and cemetery.	The section has not developed standard hours required for the maintenance of these assets to specified service levels. This prohibits the calculation of the service levels that are achievable with more, or fewer, resources. As has been noted above, the staffing levels in this section of the Department are insufficient to provide much more than a very minimal level of maintenance, and it has focused on simply providing these services rather than managing assets and the resources applied to their maintenance.
A computerized maintenance management system (CMMS) is in place to handle and schedule preventive, routine, and emergency maintenance service requests.		The section has no access to a CMMS.
Alternative service delivery methods are periodically assessed to determine if there are cost-effective alternative service delivery options.		The Parks and Cemeteries section of the Division rarely utilizes contractors for any services, reportedly due to insufficient funding. Contractors can, however, be a cost-effective supplement to internal work crews for certain functions, as they can allow staff to focus on services for which it possesses greater expertise. The section, however, has not “shopped” these services in the recent past and, in fact, does not possess an adequate management information system to do so.

Best Management Practice	Strengths	Opportunities for Improvement
Seasonal part-time and volunteer staff are utilized.	Seven seasonal and part time workers who supplement the eight full time staff in the section.	
An integrated pest management program is utilized that includes a range of treatment strategies including setting action thresholds, monitoring and identifying pests, preventing the damage specific pest types are likely to cause, and choosing the right and least damaging option.	The section does apply pre- and post-emergent crab grass/broadleaf control as required.	Although pesticides are sometime applied, the Parks and Cemeteries section does not practice integrated pest management as a method of combating pests.
Management, supervisory, and line staff have obtained appropriate certification in their profession. Pesticide applicators possess state-required applicators licenses.	The section has at least three staff members who are certified to apply herbicides.	
Safety reviews of facilities, parks, playground equipment and other resources are conducted at an appropriate frequency level (such as: playground equipment – daily to weekly; facilities and parks – monthly, etc.)		The section inspects playgrounds for safety-related issues only once annually, and has no certified playground inspectors.
Continuous training programs are provided to keep step with state-of-the-art advances and continuously improve workers' knowledge and skills in safety, park care and maintenance practices.		No ongoing training is provided to staff to acquire and maintain state of the art methods for park care.
CEMETERY MAINTENANCE		
Existence of regulations regarding unsightly decorations.	Rules and Regulations exist that address conditions under which decorations can be placed at gravesites, times during which flags may be placed on graves, prohibition of dogs, picking flowers, placement of markers, and other rules.	

Best Management Practice	Strengths	Opportunities for Improvement
Existence of regulations regarding length of time live decorations may remain at gravesites.	This is the case, as all summer floral displays and containers shall be removed by the first Monday in October and all winter floral displays and containers are to be removed by the first Monday in April. The Parks and Cemetery section will remove any displays or containers remaining after these days.	
Searches for grave sites may be accomplished through the Cemetery web site.		Searches for grave sites cannot be accomplished on line. These must be done in person at a specific cemetery.
The Cemetery utilizes GIS to enter land information and spatial data for all grave sites.		GIS is not used to store information regarding graves, ownership, locations, etc.
Maintenance activities are documented in sufficient detail to allow managers the ability to analyze workloads and productivity of crew members.		Maintenance activities are not recorded or stored in a computerized maintenance management system to facilitate the analysis of crew member productivity.
Web site provides residents with helpful information in user-friendly format		The web site would benefit from the posting of Cemetery Rules and Regulations, an aerial map (or sketch) of the cemeteries, and a list of fees for services. Although the cemeteries are limited in the amount of electronic data available for each grave, it should be a longer-term objective to provide an interactive site at which users may input the name of the deceased, and determine the exact location of the grave site.
EQUIPMENT MAINTENANCE		

Best Management Practice	Strengths	Opportunities for Improvement
Existence of centralized fleet management program for the City.		Fleet maintenance is not centralized in the City, as the DPW maintains only departmental vehicles and equipment, as well as six buses for the Schools. The DPW does inspect Police cruisers
Existence of funded vehicle replacement program?		There is no fleet replacement fund that is funded with a dedicated funding source. The City has allocated $500,000 annually over the next three years for vehicle and equipment replacement, however this method of funding fails to ensure that sufficient funds will be available for equipment replacements as vehicles reach the ends of their economic lives.
Centralized and standardized system of identifying vehicles and equipment for replacement.	The fleet maintenance section does develop a replacement plan.	The plan is not always funded by the City, and the average age of the fleet is, in fact, very advanced, at about 15 years per unit.
Existence of fleet management information system to monitor vehicle repair history, mechanic utilization, etc.?		The Vehicle Maintenance section of the Division does not utilize the functionality of the VueWorks system to track labor, parts, supplies, and vendor costs. This inhibits the analysis of mechanic productivity, cost of repairs, total vehicle operational costs, as well as other indicators of performance in the section.
Existence of automated fuel dispensing system?	The DPW has an automated fuel dispensing system that identifies users and their vehicles. It also records the amount and type of fuel (gasoline, diesel) dispensed.	The system does not require users to input odometer readings at the time of fueling, thereby prohibiting any analysis of fuel efficiency or vehicle utilization.

Best Management Practice	Strengths	Opportunities for Improvement
Fleet Maintenance is organized and established as in Internal Service Fund, charging user departments for parts and services.		The DPW primarily repairs and maintains only its own fleet of vehicles and equipment, with other departments, primarily Police and Fire, responsible for the maintenance of their own units and apparatus.
An effective preventive maintenance program is in place.	The Equipment Maintenance section has established PM intervals and checklists for all units in the fleet. The Working Foreman calls in units based on odometer readings.	
An effective facility is available for Fleet Services that enhances their productivity.		The facility in which the mechanics perform maintenance and repairs is a limitation on productivity. There is insufficient space for either the number and size of the units being repaired, or the stocking of a sufficient inventory of automotive parts.
The size of the fleet and the vehicle equivalency units are balanced with the number of authorized staff.		There are 152 active units in the DPW fleet, with an additional six buses in the School fleet. These equate to 332.5 vehicle equivalent units (VEU). With four (4) Mechanics on staff, this equates to 83.1 VEU per mechanic, which is below the typical 90 to 110 VEU per mechanic. Under typical circumstances, this would indicate that the mechanics have excess capacity. However in the case of the Northampton fleet, there are mitigating circumstances that indicate that there is no excess capacity. First, the fleet is relatively old, with an average age of over 15 years per unit. Second, the facility in which repairs are performed is very restrictive, and inhibits productivity.
Fleet maintenance staff are ASE certified.	Two of the mechanics are ASE certified.	Two of the mechanics are not ASE certified.

3. ENGINEERING DIVISION

Performance Target	Strengths	Potential Improvements
ENGINEERING		
A five-year capital improvement program has been developed and adopted by the City Council.	The City has established a five-year capital plan that outlines each proposed capital project over this planning horizon, with funding sources identified for each. The CIP process requires each requesting department to identify the phased costs of each project, as well as the impact of the project of the operating budget.	
Policies and procedures for the Engineering Division are well documented.		The Division has not documented its policies and procedures.
Responsibility for project management of capital improvement projects has been centralized within the Engineering Division.		Although the Engineering Division does manage most capital projects, some, such as the Pleasant Street Futures project, are managed by other departments. Capital projects of sufficient size and complexity should be managed by the Engineering Division of DPW, as its personnel have the expertise in engineering standards and project management. Centralizing this function ensures that all projects are managed in a standard fashion.
Full-time staff are dedicated to the issuance and inspection of street closure, excavation, and encroachment permits.		This is not the case, as the Director of Public Works issues trench permits. Individual crews mark out the utilities, and individual division managers sign off of the permits, with the Director giving final approval. A Clerk notifies the applicant after assembling the appropriate documentation.

Performance Target	Strengths	Potential Improvements
Contractors are required to submit proof that their first level supervisors have been trained in work zone safety.	Contractors are required to send all crew members to 10-hour OSHA training.	
A traffic control plan must be submitted for the issuance of street closure permits.	Traffic Control Plans are included as an appendix to all specifications. These show traffic flow plans, flagging requirements, etc.	
Fees are charged for the issuance and inspection of street closure, excavation, and encroachment permits to fully recover the cost of administration	The Department has established fees for such functions as water, sewer and stormwater entry, trenching, driveways, sidewalk occupancy, and others.	Fees have not been updated since 2010, when trench permits and driveway permits were increased from $25 to $250. Water meter fees were also updated to reflect actual costs. Other fees were left unchanged. The Department should determine the time expended in the issuance of permits to calculate the actual cost of issuance. The Department should also compare fee levels to those in the geographic area to determine comparability.
Requests for street closure, excavation, or encroachment permits may be submitted by customers on-line or by fax.	Trench permits, with fillable forms, are available on the Department's web site.	Permits are not available on line, and cannot be submitted via the Department's web page. In the short term, the Department should provide both a pdf copy of all permits on line, as well as the requirements for the issuance of permits. Longer term, the Department should provide the ability for applicants to not only download permit applications, but to submit and pay their fees as well.
Requirements for issuance of street closure, excavation, or encroachment permits are available at the Engineering Division's web site.	Trench permit policies and requirements are contained in the trench permit application that is available on the website.	The DPW web site does not provide requirements for the issuance of any permit other than the trench permit.

Performance Target	Strengths	Potential Improvements
Design and inspection staffing requirements have been identified for the all of the capital projects in the first year of the five-year capital improvement program.		Although projects have been identified over a five year period, with costs and funding sources provided in the CIP, the Engineering Division does not forecast the inspection staffing requirements for these projects to identify any "bottlenecks" or potential need for contractors in managing and inspecting projects.
Staffing for design and inspection of capital projects is based upon cost of construction guidelines.		The Engineering Division does not forecast the staffing requirements for design, survey, inspection and project management for any projects under management.
A Gantt chart schedule been developed for capital improvement projects for the next two to three year period.	The Engineering Division develops Gantt charts for capital improvement projects.	
A project cost accounting system is utilized to enable comparisons of planned versus actual staff hours for the design and inspection of capital projects.		The Department is not maximizing its use of the City's financial software system, Munis, to track and report planned versus actual expenses, instead using an Excel spreadsheet for this task.
A long-term information technology plan has been developed for the Engineering Division.	The City has recently hired a new Information Technology Director who will be working with the Engineering Division on a multi-year plan.	There is no current information technology plan.
A transportation master plan has been developed	A pavement database, traffic calming and priority sidewalk plan each exist.	There is no comprehensive transportation master plan in existence, although the Transportation Parking Commission will reportedly be addressing this in the near future. Additional elements of this Plan should include those for bicycles, pedestrians, parking and curb space, and plans to manage the demands on the total transportation system.

Performance Target	Strengths	Potential Improvements
Existing levels of service are known for arterial and collector streets that identifies the performance of streets in terms of traffic congestion and delay.	These are conducted as intersections are redesigned. Pioneer Valley Planning Commission (PVCPC) conducts two free studies for the City annually, and has recently conducted one at Chestnut Street and Pine. These studies incorporate pedestrian counts, turning movements, traffic counts, etc.	No studies have been done internally, however the Division is reportedly hiring a traffic engineer who may conduct these in the future.
Traffic counts are routinely conducted for arterial and collector streets	The Department obtains these from Mass DOT and PVPC, and these are available on line.	
A traffic safety program is in place to proactively identify high accident intersections and to develop mitigation measures.	Mass DOT has worked with the Department on these in the past year, and identified the six highest-accident intersections in the City. Mass DOT provided mitigation measures such as advance markings, signal time changes and other measures.	
There are clear, easily read capital improvement program and project status reports that match the level of detail needed by the expected audience.	Field construction managers provide "Daily Construction Reports" on materials used, visitors to the project, personnel used, equipment used, weather, hours of work, numbers of crew members, etc.	Chapter 90 projects are done on a more consistent basis than others which are tracked and reported less frequently.
A project management procedures manual has been developed that defines, at a minimum, a communication plan, project management and reporting processes for monitoring scope, schedule and budget; processes for handling change orders, claims, and project issues; document management.		The Engineering Division has not formalized these in documented form.
SOLID WASTE AND RECYCLING		

Performance Target	Strengths	Potential Improvements
The Department has developed a comprehensive solid waste management plan.	A Stantec/HDR Solid Waste Management Alternatives Study was completed July 2009	
An aggressive recycling rate goal has been set, with specific time frames for accomplishment of the goal.	The 2014 Solid Waste Facility Report indicates that the diversion rate is above 53%, which is an excellent achievement.	There is no stated goal for recycling.
Waste reduction efforts have been focused on programs that educate businesses and residents.	Businesses contract privately for both solid waste and recycling.	The Department does not provide active educational programs for residents, however the recycling rate is exceptionally high.
The Division has instituted a program to manage certain household hazardous wastes (HHW) and problem materials through recycling, diversion, reusing, reduction or proper disposal methods.	The Department holds a HHW collection event annually in mid-May, for which pre-registration is required. The web site provides a link that describes the household materials considered to be hazardous waste.	
Web site provides residents with helpful information in user-friendly format	All necessary information for residents is provided on the web site related to locations, hours of operation, types of materials accepted, fees, etc. The annual Reduce, Reuse, Recycle Guide, provided as a newspaper supplement and available on the web site, provides information and education on the benefits of recycling.	
WATER UTILITY		
Goals, objectives, and performance measures have been developed to provide a guide for decision-making, link actions to the broad goals of the Department Director and Mayor and define what resources ought to be allocated to what utility services.	The Department has recently developed a master plan that addresses all major components of the environment in which it operates, population, projections of need, and other facets.	

Performance Target	Strengths	Potential Improvements
Managers provide regular progress reports (e.g. monthly or quarterly) relative to individualized performance objectives.		The Water Division, like others in the Department, has not developed performance measures on which to report. Measures should include those that cover, for example, environmental stewardship, safety, flood protection, water quality, financial measures, regulatory compliance, human resources, project management, and others.
An effective asset management system has been installed that includes an inventory of the plant to be maintained with details (e.g., size) about components to be maintained and where the components are located, a computerized maintenance management system, condition assessments, maintenance and rehabilitation strategies, and sustainable funding levels for maintenance and rehabilitation for the plant.	The Water Division has established a sound maintenance program for the plant that includes weekly, monthly, quarterly and annual maintenance of all plant equipment, including pumps, flow measuring devices, filters, gauges, etc.	The accomplishment of work performed is not recorded in an automated system, but rather in manual form.
An effective cross connection inspection program is in place.	This is the case, as the Water Division has a dedicated Cross Connection Inspector who has an electronic inventory of all devices, along with schedules of inspections. The Division charges $100 annually for two inspections of reduced pressure devices, and $75 for annual inspections of double check devices.	There have been some recent concerns that not all revenues have been collected, as the inspections had previously been conducted by a private entity. However, these are now done by internal staff, and the billing will soon be on utility bills rather than being billed annually on a separate billing.
Quality assurance and validation procedures for water sampling and testing have been installed and are utilized.	The Division samples 19 different points in the system bi-monthly for bacteria and coliform, and tests monthly and quarterly for THM.	There are no documented procedures for QA/QC protocols relating to chain of custody and sample collection.

Performance Target	Strengths	Potential Improvements
1% to 2% of water mains are replaced annually. This formal program is linked directly to a long-term capital and financial planning program to assure adequate funding.		The City has replaced far less than 1% of its water mains on an annual basis in the past three years. Of the 150 total linear miles, only 1.54 miles have been replaced in the last three years, equating to about 0.3% annually.
The extent of unaccounted for water falls within AWWA guidelines	The Water Division reports that only 8.9% of water is unaccounted for, which is well below the thresholds established by AWWA.	
Distribution valves are exercised routinely according to a schedule.		The Division does not proactively exercise distribution valves.
Water meter replacement is within 15 to 20 years and larger commercial meters are tested for registration accuracy in accordance with AWWA recommendations.	The City has recently replaced about 5,800 of the total 8,000 meters with radio read technology.	
Water pump stations are checked weekly. Detailed PM of the pump stations is conducted in accordance with mfg. recommendations.	The three pump stations are on the SCADA system and are continuously monitored.	
Water storage tanks are inspected and cleaned no less than once every five years.	The two storage tanks are both inspected once every five years.	
Fire hydrants are flushed annually.	. Hydrants are flushed annually by a licensed Distribution Operator.	
Water treatment staff hold appropriate certification.	The Chief Operator possesses the required T4 treatment license and D1 Operator license. Water Treatment Plant Operators all possess T2 treatment licenses and D1 Operator licenses.	

Performance Target	Strengths	Potential Improvements
The water treatment plant meets state water quality standards.	The Plant meets all water quality standards.	
Existence of a formal maintenance management work planning and scheduling system.		There is little documentation to enable an analysis of the time expended in the Distribution Unit regarding its workloads, crew sizes, etc., however much of the work appears to be reactive, and therefore unplanned
An automated maintenance management system is utilized to track and report work output, service levels and productivity.		The Water Division does not utilize or possess an automated system to record and report work output.
The Utility has automated meter reading (AMR) technology	The City has recently installed about 5,800 radio read meters, and is in the process of converting the remainder.	
The Utility periodically evaluates the feasibility of outsourcing certain functions.	The Water Division has determined that it is more financially feasible to outsource such functions as water main replacement, leak detection and HVAC maintenance.	The City has a Central Services Department that provides HVAC repair and maintenance for other municipal buildings. Can this Department provide similar maintenance at the waster treatment plant more cost-effectively than outsourcing these services?

Performance Target	Strengths	Potential Improvements
The Water Utility cost-effectively treats water and maintains the treatment facility.	This appears to be a particular strength of the Utility. The 2013 Benchmarks of Performance issued by the American Water Works Association (AWWA) indicates that the median operation and maintenance (O&M) cost per 100 miles of distribution line was $2,501,486. With O&M costs of $432,127 in FY13, and 150 miles of distribution line, Northampton's cost is approximately $288,085, or about 11.5% of the median, and about 20% of the top quartile of respondents to the 2013 survey. This is likely due in large part to the presence of a SCADA that allows for the operation of the plant on a single shift, with rotating on call plant operators at other hours.	

Performance Target	Strengths	Potential Improvements
Web site provides residents with helpful information in user-friendly format		The web site could be significantly enhanced through the provision of a simplified description of the water treatment process, perhaps even including a schematic that describes, at a very high level, the raw water intake (and a description of the source), addition of coagulants (and their utility), transmission to the coagulation/flocculation process, movement to sedimentation (and what happens in this process), polymerization (and what is used), filtration, disinfection, corrosion control, storage, and finally, consumption. The site could also benefit from the inclusion of information on backflow prevention program description (as well as types of devices and how installed, and what to expect in an inspection), water rates, conservation measures, typical consumption rates for various family sizes, information on treatment plant tours, as well as others.
WASTEWATER UTILITY		

Performance Target	Strengths	Potential Improvements
Goals, objectives, and performance measures have been developed to provide a guide for decision-making, link actions to the broad goals of the Department Director and Mayor, and define what resources ought to be allocated to what utility services.		The Wastewater Division has not established a set of objectives, performance measures or a wastewater utility master plan (WWUMP). The WWUMP should minimally address overarching goals for the wastewater utility, and outline objectives related to wastewater conservation, technical aspects of water treatment and the volumes anticipated over a multi-year period, an evaluation of each of the major components of the various parts of the wastewater system (pumps, structures, pipes, valves, monitoring systems, lift stations, etc.) and determine the likely useful life of each as well as their replacement cycles, debt repayment schedules and the likely need for debt issuance, potential future sources of water and the likely costs, and multi-year financial plans.
Managers provide regular progress reports (e.g. monthly or quarterly) relative to individualized performance objectives.		The Wastewater Division, like others in the Department, has not developed performance measures on which to report. Measures should include those that cover, for example, environmental stewardship, safety, , water quality, financial measures, regulatory compliance, human resources, project management, and others.

Performance Target	Strengths	Potential Improvements
An effective asset management system has been installed that includes an inventory of the plant to be maintained with details (e.g., size) about components to be maintained and where the components are located, a computerized maintenance management system, condition assessments, maintenance and rehabilitation strategies, and sustainable funding levels for maintenance and rehabilitation for the plant.	The Wastewater Division has established a sound maintenance program for the plant that includes weekly, monthly, quarterly and annual maintenance of all plant equipment, including pumps, filters, gauges, the flood control plant, etc.	The accomplishment of work performed is not recorded in an automated system, but rather in manual form.
An effective industrial pretreatment program is in place.	The Division has instituted an effective pretreatment program administered by the Lab Director. The program calls for the self-reporting for five separate industrial concerns in the City, some of which report quarterly, and some bi-annually. One other industry has a composite sampler for the monitoring of BOD, TSS and pH. This firm pays the City $3,100 monthly for the daily testing.	
The Wastewater Utility cost-effectively treats wastewater and maintains the treatment facility.	The Wastewater Treatment Plant's O&M budgeted costs for the current year are $1,870,380, which equates to 2,078,200 per 100 miles of pipe, which is below the median cost of $2,939,393 for treatment as measured by the AWWA's latest benchmarking, "Performance Indicators for Water and Wastewater."	
1% to 2% of sewer mains are replaced annually. This formal program is linked directly to a long-term capital and financial planning program to assure adequate funding		The City has replaced far less than 1% of its sewer mains on an annual basis in the past three years. Of the 90 total lineal miles, only 1.89 miles have been replaced in the last three years, equating to about 0.7% annually.

Performance Target	Strengths	Potential Improvements
Wastewater lift stations are checked weekly. Detailed PM of the stations is conducted in accordance with mfg. recommendations.	The seven lift stations are physically checked on a daily basis.	Unlike the Water Division's pump stations, the lift stations are not monitored via SCADA.
Wastewater mains are cleaned on a three-year cycle.	The Wastewater section has established a list of trouble areas that are flushed annually using a Vactor.	Other mains are not cleaned on any regular cycle.
There is a wastewater main televising program (CCTV) based upon condition assessment information.	The Division does televise the collection system as conditions warrant investigation.	There is no proactive televising program by which all 90 miles of sewer line are inspected on a regular cycle. Each section of the system should be proactively inspected, with the conditions of each segment categorized in terms of the defects found, such as: □ Failed coatings or linings □ Residential connection leaks □ Illegal connections □ Pipe Corrosion □ Fats, Oils and Grease (FOG) □ Broken Pipes □ Debris □ Line Deflection □ Joint Separation □ Crushed/Collapsed Pipe □ Offset Joints □ Root Intrusion □ Minor Cracks □ Other
An automated maintenance management system is utilized to track and report work output, service levels and productivity.		As is the case in all other divisions of the DPW, the Wastewater Utility does not have access to a computerized maintenance management system to document all work performed in the treatment plant.

Performance Target	Strengths	Potential Improvements
15% to 20% of the manholes are inspected annually		Manholes are inspected only as problems are identified.
Catch basins are cleaned on a 2-year cycle.		The Division reports that only about 25% of the 4,835 catch basins in the City are cleaned on an annual basis.
The Wastewater Utility periodically evaluates the feasibility of outsourcing certain functions.		This is not done on a regular basis, reportedly due to the lack of funding for private contractors.
Web site provides residents with helpful information in user-friendly format		The web site could be significantly enhanced through the provision of a simplified description of the wastewater treatment process, perhaps even including a schematic that describes, at a very high level, the intake, screening and grit removal, aeration, sludge removal and processing, clarification, disinfection and return to the waterway. The site could also benefit from the inclusion of information on capital improvements (both recently completed, as well as planned, and the costs of each), the industrial pretreatment program (and its benefits), as well as other descriptive information.

APPENDIX C – ASSISTANT DIRECTOR OF PUBLIC WORKS JOB DESCRIPTION

General Duties of the Position

This position, under the general supervision of the Director of Public Works, assists in the management, planning, organization and direction of management work in the Department of Public Works. Work requires exercise of considerable professional judgment and initiative within the framework of established regulations, policies, and Department Strategic Plan. In the absence of the Director of Public Works, this position may assume the duties of the department director when assigned.

Essential Job Functions

- Assist in the direction of operations, employees, programs, projects, and activities of the Public Works Department
- Assist and make recommendations for the preparation and implementation of the department's budget, capital improvement plan, and City fleet management, consistent with standard operating procedures and department priorities.
- Research and prepare detailed management reports and conduct departmental analyses for various purposes, including intradepartmental, interdepartmental, City Council, outside regulatory agencies, contractors, consultants, vendors, the general public, etc.
- Suggest, analyze, and design departmental record keeping procedures to efficiently manage department records and utilize computer information system to maintain and effectively utilize department databases.
- Analyze and assist in designing departmental work processes, operations, and construction project approaches to continuously address effective and efficient service delivery.
- Develop, recommend, revise, and enforce organizational and departmental standard operating procedures including City policies, and safety rules and regulations.
- Participate and make recommendations in personnel matters including, but not limited to, interviewing and selecting employees, appraising productivity and efficiency of employees, reviewing performance evaluations completed by division managers of their subordinates and offering advice and assistance when necessary; and handling employee complaints.
- Assist in administering the union contracts, including addressing grievances and recommending discipline when necessary.
- Assist with the establishment of departmental priorities and the assignment of work to the appropriate division manager.

- Keep abreast of problems, circumstances, activities or events which may affect the department and keep the Director apprised of concerns.
- Coordinate with the Procurement Office to maintain a competitive purchasing process.
- Provide ongoing administration and oversight of various City contracts and agreements for which the Department is responsible.
- Review and respond to questions, comments, complaints and requests for service lodged by the general public and recommend, establish, and implement revisions to departmental rules, regulations, policies, and procedures where deemed appropriate.
- Assist in the determination of resources to be devoted to various needs on a short and long-term basis.
- Advise subordinates and supervisors on non-routine matters requiring special knowledge and/or expertise.
- Assist with the development, implementation, administration and enforcement of departmental emergency operation, policies, and procedures.
- Administer a comprehensive program of required and discretionary safety and skills enhancement and professional development training and other related activities.
- Prepare and assist in making presentations before the City Council and Council Committees on matters pertaining to the Department when assigned.
- Serve as the department's point person in the event of an OSHA inspection.
- Evaluate programs and projects for applications for grants.

Knowledge Required

- Thorough knowledge of the principles and practices, laws, ordinances, and statues of Public Works administration.
- Thorough knowledge of the methods and procedures of Public Works, utility maintenance and repair, and of the types and uses of modern maintenance and related equipment, tools, and materials.
- Cross-functional knowledge in the areas of Finance and Human Resources as it relates to assisting with the management of the department.

Skills Required

- Effective leadership skills to efficiently organize, direct, and coordinate the activities, personnel, and equipment of a multi-functional Public Works department, including strong project management skills.

Abilities Required

- Demonstrated ability to handle confidential material and information in an ethical, professional manner.
- Demonstrated ability to handle multiple tasks simultaneously and in a timely manner.
- Demonstrated ability to perform basic mathematical calculations, including the ability to add, subtract, multiply, and divide in all units of measure, using whole numbers, common fractions, and decimals, and to compute percentages.
- Ability to function under general supervision and operate within policy guidelines using
- independent judgment in achieving assigned objectives.
- Ability to develop work methods and procedures with initiative and good judgment and to use resourcefulness and tact in meeting new challenges.
- Ability and willingness to receive, handle, and complete confidential submissions, records, reports, and data with utmost honesty, integrity, and confidentiality.
- Ability to speak and communicate clearly in an office environment.
- Ability to speak effectively before groups of customers or employees.

Education Required

- Bachelor of Science degree in civil engineering, construction engineering, public administration, business or other field closely related.
- Master's degree desirable.
- Eight (8) years of experience in the administration and management of a municipal public works department or closely related field.
- Five (5) years of supervisory experience.
- Possession of a Professional Engineering license from the Commonwealth of Massachusetts is desirable.
- Any equivalent combination of experience and education that provides the required knowledge, skills, and abilities.