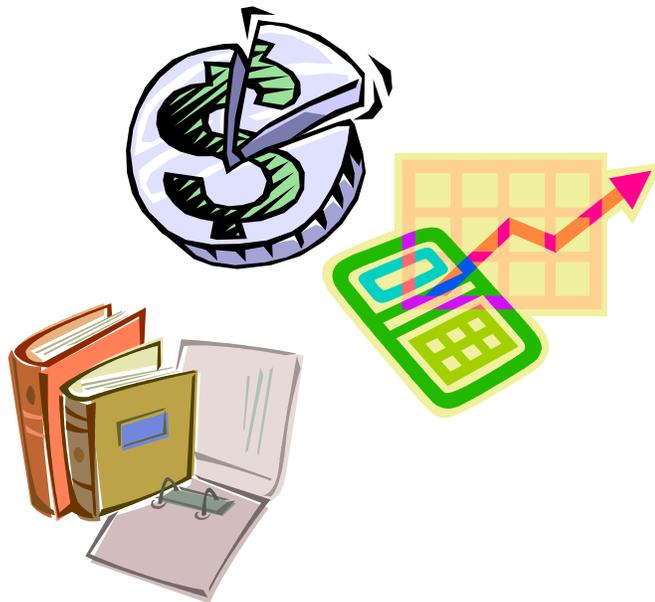


# Module 10

## Project Management Overview for Small Water Systems

### Workbook



### Financial/Managerial Series

This course includes content developed by the Pennsylvania Department of Environmental Protection in cooperation with the following grantees:

RCAP Solutions, Inc.  
Penn State Harrisburg Environmental Training Center



# Training Module 10

## Project Management Overview for Small Water Systems



### Objectives:

The purpose of this training module is to enable you to:

- Identify and list anticipated project management tasks prior to beginning a water treatment project.
- Demonstrate and develop confidence to successfully manage a water project.
- Explain concepts and terms associated with water treatment project management.
- Identify common challenges associated with managing a water treatment project.

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## Introduction



During this training module, we'll be describing:

- what to expect before starting a project
- the general process associated with project management
- how to avoid some of the common pitfalls and problems while managing a project

Obviously, there are innumerable types of projects and you could spend countless hours learning about them. During this module we'll be discussing a project that was started by Smallville, which has never had a water system and will be starting from ground zero. Your project may be similar or may fall anywhere in between the start and finish of the project described here. Additionally, the process described in the module isn't in exact order. Many of the phases of the project can and do occur concurrently even though we may cover one after the other. If you want more detailed information on the issues presented in this module, you may want to consider taking other training modules or investigating other information sources.

## Need for a Water System



Smallville doesn't currently have a public water system to provide water to its residents. The residents currently obtain water through private wells. That's not necessarily a bad thing, but the powers that be suspect they may need a water system.

There is little point in building a water system just for the sake of it. Smallville needs to determine whether there is a genuine need for a public water system.



The following are some reasons why Smallville may need to investigate the feasibility of a water system further:

- Polluted groundwater/wells
  - Polluted water can be a health hazard to residents.
  - Common pollutants found in Pennsylvania that can trigger the need for constructing a new water system include the identification of fecal coliform bacteria or a high level of nitrates.
- Other quality or quantity issues
  - The water obtained through wells may be poor tasting or provide unreliable quantities.
- Poor fire service from existing sources
  - Existing sources may be insufficient or unsuitable for adequate protection resulting in higher insurance premiums for residents.
- Promotion of growth
  - A public water system can attract additional residents, businesses, and industry.
- Residential complaints
  - The residents of Smallville may have complaints about their well water related to quality, quantity, or other reasons.

The list isn't comprehensive but it should give you a good idea of the various justifications for investigating a water system further.

## Administrative



The reasons above certainly justify digging deeper; however they don't necessarily mean that Smallville needs a water system.

This is the point in the project when Smallville will want to possibly bring in some outside help and iron out a few administrative items ahead of time.



Since this is the first time Smallville will be investigating a water project, it's likely that they don't know what to expect. It may be a good idea for Smallville to contact a technical assistance (TA) provider to help them through the process. There are numerous TA providers that can help and these include:

- DEP Capability Enhancement program
- RCAP Solutions
- PA Rural Water Association
- DEP Engineering Services program
- PSU Environmental Training Center
- And a number of others

These TA providers generally will assist you for free or for a nominal fee. You may want to contact the DEP Capability Enhancement program first since they will be able to assess your needs and possibly refer you to other TA providers that can best serve those needs. Another training module (Module 4, Dealing with Consultants, Technical Assistance Providers, Regulators, and Funding Agencies) goes into greater detail about these TA providers and the services they provide.



### **Project Management Tip:**

- You don't have to go it alone! You can get assistance from TA providers, engineers, and consultants.
- TA providers assist communities for free or a nominal cost because they work under a number of different grants. As a result, it is possible that your community will have to meet certain income- or need-based requirements to be eligible for this type of assistance.



This is also the time to consider starting a Business Plan. What's a Business Plan?

A Business Plan is a long-range plan that demonstrates how a water system will function from a financial, managerial, and technical standpoint.

Completing a Business Plan is a requirement of the DEP permitting process. Every new water system must complete one before DEP will issue an operating permit.



The Business Plan must:

- Identify the water supply needs of the area
- Identify alternatives to address those needs
- Evaluate the alternatives

- Recommend a specific alternative
- Identify how the organization which will implement that alternative will be structured and operate
- Demonstrate that the operation of the proposed alternative will be financially viable for a period of at least five years



Additionally, the Business Plan must contain the following three components:

- Facilities Plan - an assessment of the current and future water supply needs, and a description of alternatives with both construction and operating costs and a rationale for the approach.
- Management Plan – must include documentation that the applicant has the legal right and authority to construct, operate, and maintain the system, a management and administrative plan, and an operation and maintenance plan.
- Financial Plan - projections and assurances that the system's revenues and cash flow will be sufficient for meeting the costs of construction, operation, and maintenance for at least five full years from initiation of operations.

More information on preparing a Business Plan can be found in another training module (Module 6, Business Planning for Small Water Systems).



Given these components, it's obvious you can't complete the Business Plan without some additional work. However, by starting it

now, you will begin thinking about many of the components contained in a Business Plan.

You may want to think about forming a municipal authority to handle the water project or assigning other roles and responsibilities for local officials and personnel. An authority has certain advantages such as the ability to fund the project through the issuance of tax-free municipal bonds that are generally considered to be safe and good investments. Additionally, authority personnel can handle part of the initial responsibilities of the project since there will be plenty for everyone to do. You will want to consult legal counsel for the process of forming an authority. Another training module (Module 2, Responsibilities of Governing Boards) covers this in greater detail.

You should also think about what ordinances you will need to pass associated with the water project. If the next door community has similar problems or has an existing plant, you will want to start looking at inter-municipal agreements.

You will likely want to address these administrative issues at the same time as the feasibility study, which is the topic of our next section.

## Feasibility Study



The feasibility study is an engineering report that addresses the following issues:

- Source
- Treatment type
- Distribution system
- Construction, O&M, and other costs
- Customer base
- Capacity vs. need/demand

Since this is an engineering report, before you can start the study you will need to hire an engineer. You can skip this step if you already have an engineer on staff.

Before you get to this point, you may want to consider learning a bit more about water sources and how a basic water treatment plant operates. This is covered in greater detail in another training module (Module 1, Water Supply System Basics Operations).



Smallville doesn't have an engineer on staff so they needed to hire one. Since Smallville was already working with a TA provider, they were able to get help with this as well.

There is a good deal involved in the hiring process. You begin by sending a Request For Proposals (RFP) to engineering firms. Interested firms will respond to the RFP and you will need to interview your top choices. Engineering services DO NOT need to be bid competitively so you don't have to base your decision solely on cost. Additionally, there are a number of questions you should ask the engineering firm that relate to your study and to their past work history. This is covered in much greater detail in another training module (Module 4, Dealing with Consultants, Technical Assistance Providers, Regulators, and Funding Agencies).



The results of the feasibility study will confirm whether you need a water system or not. In Smallville's case, they did need a public water system.

You do not have to use the same engineering firm later if a water system has to be designed. Let the engineer doing the feasibility

study know that you will send out an RFP for the design work. This can help ensure that you are spending your money wisely and it can also prevent bias in the feasibility study. If the engineer knows that their firm will receive the design work, it is much more likely the feasibility study finds that you definitely need a water system.

Also, make certain that the count for the number of customers or Equivalent Dwelling Units (EDUs) is as accurate as possible. Otherwise you may wind up with a system that's too large or too small!



The feasibility study provides a lot of data that can be used later to complete the Business Plan and guide the final design.



#### **Feasibility Study Tips:**

- Make sure that all costs of the proposed treatment types are provided, not just construction costs.
- Certain treatment technologies may be cheaper up front but can have higher O&M and other costs. Make sure these costs are listed and are as accurate as possible.

Remember, you have to pay the engineer to complete the feasibility study. The money has to come from somewhere. You may be able to use existing funds or take a loan. You might even be able to get some grant or low-interest loan funding.

## Funding



You know you have to pay for the feasibility study. Unfortunately, it doesn't end there. With the possible exception of help from some TA providers, everything from here on out costs you money. You still have to pay for the design and the construction. However, if planned properly, many of these costs can be absorbed in the grant/loan package from the funding entity that finances the project. If you thought the feasibility study was expensive, you'd better brace yourself because we're going to get into some serious money now. Fortunately, help is available.



You will fund the rest of your project in three main ways: loans, grants, or a loan/grant combination. While you should certainly apply for any available grants, don't count on them since competition for free money is always steep.

You have a few options when it comes to the funding source for the rest of the project. These include:

- The Pennsylvania Infrastructure Investment Authority (PENNVEST)
- U.S. Department of Agriculture's Rural Utilities Service (RUS)
- Bond issues
- Bank loans
- Community Development Block Grant (CDBG) program
- Community partnerships
- Various other grant programs

There are advantages and disadvantages to each of these and certain funding sources will require planning meetings or even joint meetings with other funders. The RUS, PENNVEST, and CDBG programs are discussed at length in another training module (Module 4, Dealing with Consultants, Technical Assistance Providers, Regulators, and Funding Agencies).



You may be able to combine a number of funding sources so be sure you investigate as many as possible in order to get the best funding package available.

Additionally, some funding sources may require an income survey of your residents to determine eligibility for grants or low-interest loans. Depending on the funding source, different income survey methodologies may be required. If you plan to do an income survey, you may want to do both kinds of survey at the same time. You can get more information on income survey requirements from the funding source or TA providers.



Let's take a few minutes to work through an exercise to see what you've learned so far.

### **Exercise #1**

1. Every proposed water system must complete a \_\_\_\_\_ as a requirement of the DEP permitting process.
2. Polluted \_\_\_\_\_ is a good justification for further investigating the need for a public water system.
3. If you qualify, you may be able to receive low- or no-cost assistance with managing the project from a \_\_\_\_\_ provider.

4. A Business Plan contains three main sections: the \_\_\_\_\_ Plan, the \_\_\_\_\_ Plan, and the \_\_\_\_\_ Plan.
5. RFP stands for \_\_\_\_\_.
6. \_\_\_\_\_ surveys may be required by some funding sources.

## Design and Permitting



While you're working on funding, you're going to want to get the design underway. Once again you need to send out an RFP and interview engineers, then select your top choice. The selection process is similar to that for the feasibility study; however, there is a lot more money at stake here so you want to be extra careful. Some funding sources may have specific requirements, such as standard contracts, when their funds are used to pay for design.

For more information, review Module 4.



The design of the water system will finalize many of the issues from the feasibility study:

- Source
- Treatment type
- Distribution system
- Customer base
- Capacity
- Costs

Make certain that your engineer stays on schedule. In many instances, smaller projects do not receive the attention they deserve.



You now have a design completed but you're not through yet. It still has to be reviewed and approved by DEP. Depending on the quality of the design and adherence to requirements, this can be a lengthy process.



### **Permitting Tips:**

- Don't forget to finish and submit your Business Plan. You can't get a permit for a new system without it!
- Don't let your engineer submit a partially completed design or incomplete permit application. This can add considerable time to the review and approval process.
- DEP has a Business Plan workbook available that can be used to prepare the plan.



Don't forget to specify ownership of the design drawings. If you're not careful, you could pay a lot of money for drawings you don't own.

Additionally, make sure that the engineering firm considers your input on the design and justifies the chosen treatment technology.

## Construction



Unlike engineering and other professional services, the construction of the water system will need to be bid competitively. There are extensive bidding requirements and certain funding sources may have their own requirements. These must be followed to ensure a fair and competitive bidding process and to prevent conflicts of interest and legal complications. If you are working with a TA provider, they may be able to assist you with this process. Your engineering firm and solicitor can also likely offer assistance.

More information on bidding can be found in another training module (Module 9, Bidding, Purchasing, and Leasing) and in the “Purchasing Handbook” available from the Department of Community and Economic Development. Additionally, the PA State Association of Township Supervisors offers extensive training in this area.



After everything related to the construction has been bid, make sure you keep an eye on the contractors. Require that change orders be submitted in written form and approved by the board. Change orders are unanticipated additional work and subsequent cost changes over and above the original bid proposal. Change orders are common in all projects, but need to be controlled. Cost considerations for the change order may require input from your professional staff. Your engineer may provide input to determine if cost changes are appropriate and if the costs are excessive, your solicitor may be needed to determine if the project or the change order should be re-bid. Verbal change orders are unacceptable.

Also, ensure that inspections are made and any necessary corrections are made promptly. Certain funding sources may conduct

their own inspections or have other requirements for construction inspections. These inspections can help ensure that your system will work properly in the future and that you will meet certain legal requirements. For example, when trenching along state roads, premium backfill is required. You can run into legal complications down the road if this specific type of backfill isn't used.



The construction will take a while and in some cases it may seem like it takes forever, but the day will come when construction is completed. At this point make sure you receive the as-built drawings. As-built drawings include any deviations from the original design drawings. Copies of these drawings will be very helpful in the future when you have to find lines, valves, and other components of the system. Make certain the initial contract ensures that you will receive these drawings.

## **Start-up and Operations**



While construction is ongoing, there are a few administrative items you need to address. Also, there are a lot of responsibilities that go along with running a water system. See Module 2 for more information.

You should set up an office, if you don't already have one. This may be part of the plant or a separate building nearby or across town. Regardless of its location, it's just a room if you don't fill it with people and equipment. You will need to begin thinking about computer equipment, photocopiers, desks, chairs, filing cabinets, etc. You will also need to get computer software such as billing and accounting

programs. Often times, these items can be included in your grant/loan package from your funding source.

You may also need to hire staff. Maybe you can get by with a part-time operator or maybe you need three. You might only need a part-time secretary or you might need two or three. The design of your system and the number of customers will determine the number of staff you need. It is possible to contract the Operations and Maintenance (O&M) to an outside service instead of hiring staff. You can also do this for the billing.



You also need to determine a tap-fee amount and a rate structure.

The tap-fee is the lump sum amount your customers will pay when they first connect to the system. It should be justified by an associated expense to the system. In many cases, such as dealing with PENNVEST or RUS, the tap-fee is determined as part of the funding package.

The rate structure will determine how much you will bill your customers each billing cycle. You might have a flat rate where every customer pays the same or you might have a rate that charges every customer a service fee and a water consumption fee based on meter readings. In many cases, such as dealing with PENNVEST or RUS, the rate structure is determined during the funding stage earlier on. There are advantages and disadvantages to each type of rate structure.

More information on rate structures can be found in another training module (Module 8, Rate Design Overview for Small Water Systems).

Once again, if you're working with a TA provider, they can likely help you here. Your engineer will also provide assistance.



While you likely had a budget that was put together by the funding source or your engineer for use during construction, don't think you're done with budgets. You're NEVER done with budgets. Budgets are powerful financial management tools and it is extremely important to keep a close eye on your finances during start-up. If you get in the hole right away, you will have trouble climbing back out. It is very tempting to believe that you are in good shape financially at start-up when you are receiving tap-fees from your customers. However, those customers never pay another tap-fee and if you're not careful, those funds can disappear quickly. Additionally, loan repayment will begin shortly after start-up, so make certain all your customers are connected and paying their bills as soon as possible.

If you need more information on the basics of finance, you can consult another training module (Module 5, The Basics of Accounting and Finance for Small Water Systems).



Your TA provider or engineer can assist you with your budgeting. Additionally, certain funding sources require annual budgets along with other financial reports. Make sure that your budget is as comprehensive as possible and includes emergency and other reserves that can help prevent financial shortfalls in the future. More information on budgets can be found in another training module (Module 7, Budgeting and Capital Improvements Planning Overview for Small Water Systems).



When you are supplying water to your customers, you will be required to test the water frequently to ensure that you are providing safe drinking water to your customers. You may have a sufficiently large water system to justify your own lab or more likely you will have to send samples to an external lab. More information on the variety of substances to be tested can be found in another training module (Module 3, The Safe Drinking Water Act) or from DEP.

## Summary



If you want more information on some of the items addressed throughout the module, don't hesitate to sit through additional training modules or seek out additional training or information.

Well, we've tried to cover a lot in this short time so unfortunately we could only be very brief. Before we cover the key points of the module, let's see what you've learned so far.

### **Exercise #2**

1. Change orders should always be in \_\_\_\_\_ form.
2. It is important to specify the \_\_\_\_\_ of the design drawings.
3. The construction of the water system will have to be \_\_\_\_\_ competitively and there are extensive requirements associated with this process.
4. You want to make certain you receive the \_\_\_\_\_ drawings following construction.
5. The fee paid by customers when first connecting to the system is the \_\_\_\_\_.
6. It is critical to keep a close eye on your \_\_\_\_\_ at start-up or you may wind up with cash flow problems.



The key points of this module are:

- Project Management is a complex process that follows a general, although not always linear, order. The included graphic illustrates this.
- Water system board members and personnel can avoid a painful learning curve by being familiar with the Project Management process and knowing what to expect.
- This familiarity can result in avoidance of problems and cost overruns throughout the project.
- You aren't on your own. Technical assistance providers, consultants, and engineers can help you through the process.
- Successful Project Management requires a long list of skills and abilities. Many of these are addressed at greater length in other training modules.

## Resources and References



The following are references and resources you can use when you have to manage a project for your water system:

PA Department of Environmental Protection, Technical Assistance and Outreach, Capability Enhancement program, Dennis Lee, (717) 772-4058

RCAP Solutions, Don Schwartz, PA/NJ Program Manager, (814) 861-6093

The complete list of training modules includes:

- Module 1, Water Supply System Basics Operations
- Module 2, Responsibilities of Governing Boards
- Module 3, The Safe Drinking Water Act
- Module 4, Dealing with Consultants, Technical Assistance Providers, Regulators, and Funding Agencies
- Module 5, The Basics of Accounting and Finance for Small Water Systems
- Module 6, Business Planning for Small Water Systems
- Module 7, Budgeting and Capital Improvements Planning Overview for Small Water Systems
- Module 8, Rate Design Overview for Small Water Systems
- Module 9, Bidding, Purchasing, and Leasing
- Module 10, Project Management Overview for Small Water Systems

## Appendix 1: Project Management Overview for Small Water Systems

The following diagram outlines the generic process involved in managing typical water treatment system projects such as:

- Developing a new water system
- Line extensions
- Upgrading a water treatment system
- Installing water meters

For the purposes of this training module, we used the example of developing a new water system to demonstrate the process.

