Ohio Environmental Protection Agency

Division of Drinking and Ground Waters

Asset Management Program –	Division:	DDAGW
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I. PURPOSE:

This guidance, applicable for home owners' associations, mobile home parks, villages, nursing homes, towns, and any other public water system of comparable size, summarizes the contents of an Asset Management Program for Small Community Water Systems.

II. BACKGROUND:

Asset management has many different definitions; in the end it boils down to getting the most out of your assets at the lowest cost to the system. In other words, a water system should be servicing assets frequently enough that the assets are not falling apart, but are doing what they are meant to, without spending more time or money than is necessary to achieve those results.

The Asset Management Rules in Chapters 3745-87 and 3745-92 of the Ohio Administrative Code (OAC) reflect the statutory change of Ohio Revised Code (ORC) Section 6109.24 which had an effective date of October 6, 2017, along with the existing capability rules to address the managerial, technical, and financial capability of water systems. These rules require all public water systems to have a written asset management program available for on-site inspection, however some water systems may be asked for a demonstration of their asset management program in more detail. A system may be asked for a demonstration in more detail if they are looking to receive a loan, are going through enforcement, or are otherwise struggling with capability issues.

For an asset management program to be effective, it needs to be a dynamic program that is implemented and adequately funded. Metrics will be used to ensure that asset management programs are being implemented. All water systems are required to track

and maintain a defined set of metrics. Required metrics are listed throughout the rules. One customer service-oriented metric will be determined by the water system. The Ohio Environmental Protection Agency (OEPA) will be looking for the water system to continue to improve on its metrics each year.

The purpose of requiring an asset management program is to reduce the number of disruptions in service that are due to lack of maintenance and planning. The asset management rules require an asset management program of all public water systems. The rules include specificity on what is required in an asset management program. OEPA sees asset management as a way to improve the capability of the state's water systems and improve the quality of service they provide. ORC Section 6109.24 required all public water systems to have an asset management program in place by October 1, 2018.

III. PROCEDURE:

The following outlines the contents of an Asset Management Program, providing first an overview of the program, followed by itemized, detailed instruction for each requirement.

Contents of an Asset Management Program
1. **Introduction**
   a. Ownership [OAC 3745-87-03(A)(1)]
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   c. Succession Planning [OAC 3745-87-03(A)(3)]
   d. Non-technical Description of Utility [OAC 3745-87-03(A)(4)(a)]
2. **Management**
Operational Plan [OAC 3745-87-03(A)(4)(b)]

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   b. Job Descriptions [OAC 3745-87-03(A)(4)(b)(i)]
   c. System Deficiencies [OAC 3745-87-03(A)(4)(b)(ii)]
   d. Licensed Operator/Staffing [OAC 3745-87-03(A)(4)(b)(i)]
   e. Ability to Address Violations [OAC 3745-87-03(A)(4)(c)]
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  d. Remaining Useful Life [OAC 3745-87-03(B)(3)(c)]
  e. Listing by Criticality and Condition Assessment [OAC 3745-87-03(B)(3)(d)]
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4. Financial
  a. Financial Information to Determine Capability [OAC 3745-87-03(C)]
   i. Publicly Owned Water Systems [OAC 3745-87-03(C)(1), (C)(2)]
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6. Long-term Implementation [OAC 3745-87-05]

1. Introduction

a. Ownership Accountability [OAC 3745-87-03(A)(1)]

Demonstration of ownership is to be included in the asset management program. The owner is the person or entity with the legal rights to make decisions on the construction, operation and maintenance of the system. By including this information, contractors, representatives of the agency, and customers will know who to address when there are questions or concerns. Documentation of any service contracts and cooperative agreements should be included. Examples of these types of contracts would be an agreement on the repainting of the water tanks or an agreement between a neighboring system to have a combined water system maintenance group.

To demonstrate ownership, systems could include documentation they already have that outlines who has the responsibility of ownership of the system. It would also be acceptable if no current documentation was available to craft a statement and verify that the person with ownership accountability understands their responsibilities. The owners need to acknowledge the accountability they have for the water system.

b. Ownership and Proper Operation and Maintenance [OAC 3745-87-03(A)(2)]

Once the owner has been identified, the owner will need to demonstrate they have committed to the proper operation and maintenance of the water system. Examples of demonstration can be made by identifying that maintenance is occurring on a regular basis, assets are replaced before failure, or including a summary of completed items from the capital improvement plan. These are just a few items that could be used, but any documentation or information that shows the owner and system are putting time and money back into the system to ensure it continues to function as intended would suffice.

c. Succession Planning [OAC 3745-87-03(A)(3)]
Systems will need to have documentation that they are taking steps to ensure they will have the critical personnel needed to properly operate the water system. When thinking about succession planning, systems will want to have these objectives in mind:
- Identify key roles for succession or replacement.
- Define the competencies required to undertake those roles.
- Assess people against these criteria.
- Identify pools of talent that could potentially fill and perform highly in key roles.
- Develop employees to be ready for advancement into key roles.

Some examples of what the Agency would consider as succession planning include, but are not limited to:
- Creating a continuity plan that outlines how the system will fill a critical position.
- Having a contract in place with for a short-term operator/critical personnel in the event that a system's current staff member leaves.
- Coordinating with the local schools to come in to talk about water system careers at least once a year,
- Hosting tours for school children or the community,
- Having an apprenticeship program to train new operators,
- Working with a local trade school/community college to train future water operators.

These are a few ideas to get a community started. It is imperative water systems start thinking about succession planning now, so that when critical personnel leave or retire, the system is prepared, instead of being left without the ability to serve water. As seen from the examples provided, there is a broad range of what can be considered succession planning. The Agency realizes that water system's may not be able to hire another employee to train before the current employee leaves, but

the water system should be thinking about how staff will be replaced before it happens. Whether it is by gaining interest in a water career from those in the community, to having a plan in place to hire the next candidate.

d. Non-Technical Description of Utility [OAC 3745-87-03(A)(4)(a)]

Background information on the water system should be included in the program including a non-technical description of the water system. It should describe the major components, source type, active versus inactive capacity, number of service connections, and number of customers by use category (residential, commercial, non-profit/gov, industry, etc.). This provides basic information about the water system and builds a framework for the asset management program. The non-technical description can be helpful to give those unfamiliar with the water industry a basic understanding of the system.

2. Management

Operational Plan [OAC 3745-87-03(A)(4)(b)]

a. Organizational Structure [OAC 3745-87-03(A)(4)(b)(i)]

In the operating plan of the water system, a high-level table of organization is to be included and depict who reports to whom. In regard to high-level, it should include personnel that are critical to the operation of the water system. For small systems this may include everyone that is employed by the water system, for large systems it may be a handful of employees that are key to operations. The table of organization allows employees to know the structure of command and who to report to with inquiries. This provides initial information on who can best answer different questions or concerns. Systems should include a list of contacts including: the owner, council members, treasurer, clerk, mayor, operator, etc. as applicable.

a. Job Descriptions [OAC 3745-87-03(A)(4)(b)(i)]

Job descriptions should include the credentials of individuals. The written job description should define the duties and responsibilities of the position, supervisor, and staff supervised. The descriptions can help determine when another position should be created or if there are overlapping job duties.

b. System Significant Deficiencies [OAC 3745-87-03(A)(4)(b)(ii)]

Systems are also required to have a procedure to address any system significant deficiencies. A system may acquire a significant deficiency or violation during a sanitary survey, Level 1 or Level 2 Assessments, Limited Scope Site Visit (LSSV) if the requirements for a measure were not being met. If a system is given a significant deficiency they will be required to create a schedule and timeline of how that significant deficiency will be addressed. In the event of a significant deficiency

and the system is required to attend training, documentation of the training attendance should be included in the asset management program.

Establishing relationships with management, customers, service providers, and regulatory agencies are also important to running a water system. Examples of establishing and keeping up these relationships could be resolving significant deficiencies found during a sanitary survey. Another example would be keeping in touch with the agency regarding progress on addressing significant deficiencies found during a sanitary survey.

c. Certified Operator/Staffing [OAC 3745-87-03(A)(4)(b)(ii)]

A certified operator is required to be in compliance with OAC Chapter 3745-7. This is to ensure that the correct personnel are operating the water system and have the necessary credentials, along with the knowledge and experience to be in operation of the water system. This would also include documentation of the operator attending trainings and meeting the credit hours required to keep the appropriate certification. While this is included in another rule, it is important to recognize that having a licensed operator is part of an asset management program.

d. Ability to Address Violations [OAC 3745-87-03(A)(4)(c)]

Systems will need to be able to show they are able to address violations. This could mean the system has a written procedure on how violations and compliance issues are communicated. Systems would also be able to show examples of how violations have been communicated in the past. Along with communicating internally regarding violations, the system should also keep the lines of communication open with service providers, customers, and applicable regulatory agencies. Keeping the contact information of these parties on hand or a procedure of when they should be contacted would also contribute to a system's ability to address violations. Systems must provide an explanation of how they will establish and maintain effective communications and relationships between other water systems management, customers, professional service providers and regulatory agencies.

e. Inventory of External Contacts [OAC 3745-87-03(A)(4)(d)]

Systems are already required to have a list of external contacts in their contingency plan, they can reference where it is located in the plan to meet this portion of the rule. These could include, but not be limited to: police, bank, well maintenance, contract operator, etc.

f. Description of Contracting and Purchasing Procedures [OAC 3745-87-03(A)(4)(e)]

Systems will need to have a procedure in place that describes how they go about contracting and purchasing items. The system should have procedures in place for routine purchases and emergency purchases for repairs and replacements.

g. Written Policies [OAC 3745-87-03(A)(4)(f)]

Written policies provide direction on how to address situations and ensure that similar situations are handled consistently. Written policies are important to the running of an efficient water system.

Systems should have a policy in place for each of the listed areas, but the details of each policy may differ between systems

- Security
  - Procedures for securing the treatment plant, who has access, who is in charge of locking/unlocking the building, etc.
- Use of System Equipment
  - When equipment can/should be used, who is allowed to use what equipment, etc.
- Billing Practices and Revenue Collection
  - Including a backup billing system;
    - What are the typical billing procedures? What is the procedure in the event that the main billing system goes down? (Example: handwriting bills, etc.)
  - Customer deposits and payments;
    - When and how do customers make deposits and payments for their water usage?
  - Collections; customer service disconnection and shutoff notices;
    - What is the process of collecting payments? Can an account go to collections? When and how does the water system decide to give shutoff notices and disconnect services for non-payment?
  - Connection charges;
    - What is the charge to connect to water service? If there is no charge, what is the reasoning behind it.
- Purchasing Authority;
  - Who is able to make decisions on purchases, authorizing spending, etc.

3. **Technical**
   a. *Treatment and Distribution Schematic [OAC 3745-87-03(B)(1)]:*

A map of the water source, treatment, storage, and distribution is required in a system's asset management program. We recognize that systems have differing needs and differing levels of detail are useful and available to each system. For small systems we would at least be looking for a schematic grouping based on owner's knowledge of inventory. Assets that should be included in the schematic are, at least, the location and the name of an asset.

The map of assets should include the major items from the asset inventory, but not every asset on the inventory needs to be depicted on the map. It is recommended that if existing maps, as-built drawings, or construction documents are available, that those are used to generate the inventory and map. Systems should already have a map identifying lead pipes, this would be a good map to start with and add information to.

b. *Inventory [OAC 3745-87-03(B)(2)]*

Asset Inventory List

An inventory of the system's assets leads to awareness of what the system owns, uses, and the repairs or replacements that are likely to occur. An asset will be defined by the system, but they will want to include items that are necessary for the delivery of water and are of substantial value. A system will decide for itself what will be included in the inventory (outside of what is required: wells, reservoir, intake; treatment works; storage (tank/tower); distribution piping; valves; hydrants; pump stations; meters; auxiliary power, as applicable) and can vary depending on the system. Systems should include major assets in the inventory initially, such as the ones required in the schematic, and can add more assets later on.

The extent of the inventory is up to system discretion. The water system will need to include enough assets to be able to make sound decisions about their system. The inventory should include items of substantial monetary value and assets that are critical to the operation of the system.

Asset Attributes [OAC 3745-87-03(B)(2)(a-d),(B)(3)(a-d)]

Assets should each be given a unique name to ensure there are not duplications and make it easier to link maintenance data to specific assets. This is also when systems will want to take information for a conditions assessment and record the location of the assets. When collecting information for the inventory, the system should have the following information recorded about it:

- name

- the known purchase date, installation date, or estimated age of the asset, if different,
- the status of the asset (e.g. in use, available for use, etc.),
- location,
- condition (e.g. excellent, good, etc.),
- remaining useful life,
- criticality
- history of maintenance/repair, and cost of repair/replacement.
- size and material of pipe.

All of this information can be used to evaluate the assets and prioritize them based on criticality.

Asset attributes can be incorporated into maps allow for efficiency when making repairs and maintenance on the system, especially if there is an emergency. It can also make it easier for the system to perform updates and figure out where problems may be occurring. When attributes are incorporated into the map, the system is better able to know of all their assets and maintain them.

c. Condition Assessment [OAC 3745-87-03(B)(3)(a), 3745-87-03(B)(3)(b)]
The condition of each asset on the inventory (e.g. excellent, good, fair, poor, needs replacement) will need to be determined. Condition rankings should give an idea of the state an asset in regard to the wear and tear it has received. Other than a visual examination of the asset, documentation from previous maintenance and repairs, if available, should also be used to determine condition. In the case that a system does not already have documentation for the history of maintenance and repair of the asset, the system should start keeping a record and use previous knowledge to determine prior repairs and maintenance of assets. The tracking of repairs will help in determining the condition of an asset to take the best route of action whether it is repair, rehabilitation, or replacement.

Systems have differing abilities when it comes to identifying information about their assets. It would be acceptable for small systems to base the condition of their assets on age, remaining useful life, maintenance/repairs, and best management practices selection. As systems get more information about their system, they will be able to make a better assessment of their assets and be able to rely less on just the age of assets.

d. Remaining Useful Life [OAC 3745-87-03(B)(3)(c)]

The average life span of an asset and the known information about its age can be used to determine the remaining useful life of the asset. To determine the remaining useful life of the asset, subtract the known or estimated age of the asset from the average life of the asset. The average life of most assets has already been determined by the US EPA. When determining the remaining useful life of the asset it is best to be on the conservative side in case an asset fails early, then most of the funds to replace it should already be collected and set aside. Systems will want to take into account the condition assessment and what they know from experience on how or when certain assets tend to fail and use that information to adjust the remaining useful life.

e. *Listing by Criticality and Condition Assessment [OAC 3745-87-03(B)(3)(d)]*

Systems will need to list their assets based on their criticality and condition assessment. To determine the criticality of an asset, systems will want to use information regarding maintenance history, how likely the asset is to fail, and importance to system functions. After the criticality of an asset has been is determined, assets should be prioritized based on their criticality and condition in comparison to the other assets. This prioritization will help a system determine which assets are most in need of funding for future rehabilitations and replacements. Systems may wish to prioritize their most critical assets if they have an extensive inventory.

f. *Operation & Maintenance Program [OAC 3745-87-03(B)(4)]*

An operating plan is to be included, to ensure others are aware of how the system operates and its procedures. This will be useful in the event of new hires or retirements. It should include the daily procedures employees encounter to ensure the safe delivery of water. The following are some procedures which apply to small water systems. The water system must develop its own procedures that are relevant to its system.

- plant start up,
- measuring day tank,
- sampling,
- valve exercises,
  - o Distribution valve operation
    - See Ohio EPA guidance on asset management webpage.
- flushing,
  - o AWWA 6200-15 outlines recommended items to include in a flushing program including:
    - Flushing program should take into account the needs of the utility, considering the condition of the system, hydraulic capacity, treatment, water quality, etc.

- Program should take a preventative approach to flushing at a frequency appropriate for the utility.
- Flushing should be performed at a velocity appropriate to address water quality concerns.
- The program should contain written procedures addressing all activities associated with flushing including: water quality and hydraulic monitoring, and frequency, location, and duration of flushing as well as adherence to all regulatory requirements.
- hydrant inspections,
- chemical feed,
- gallons and hours the plant is operated per day,
- pressure and chlorine residual monitoring,
- component mapping,
- backwashing, and
- control procedures.

The operation and maintenance program must include maintenance schedules for each of the following, as applicable:
- wells, all raw-water reservoirs, and intakes;
- pump stations;
- electrical equipment and controls;
- water storage tanks and/or hydropnuematic tanks;
- distribution system components; including valves and hydrants
- water treatment facilities; and
- auxiliary power.

The schedules should be written in enough detail that a different operator would be able to come in and understand the system. The operation and maintenance program should be one set of documents and in an accessible area.

For components with existing manufacturer maintenance frequencies recommendations, systems should incorporate those recommendations for their maintenance schedules. The frequency commonly used in the water works industry, such as those recommended by the American Water Works Association, or performance testing should also be incorporated into the maintenance schedule of an asset. In the event that none of the former exist, other acceptable basis as determined by the PWS can be used to determine a maintenance schedule. If maintenance schedules are

determined by the PWS, a description of how that basis was determined should be included in the asset management program. Software maybe available for a tracking system for maintenance, but it is not required.

Along with maintenance schedules, the water system must demonstrate an adequate maintenance log is being maintained. The log should be maintained in enough detail that another operator could come in and know what repairs and maintenance have occurred to which assets. The system should be checking the asset often enough to see if something may go wrong before it actually does, allowing more preventative maintenance to be performed instead of reactive maintenance. Preventative maintenance gives a better understanding of when repairs and rehabilitations are needed.

For a small systems operation and maintenance plan can be based on best management practices. The owner will then select, establish, and maintain the best management practices and schedule. While proper operation and maintenance of a system is already required by rule, it is included here because it is a key part of an asset management program.

g. Emergency Preparedness / Contingency Plan [OAC 3745-87-03(B)(5)]
Compliance with the contingency plan requirements in Chapter 3745-85 of the Administrative Code prepares the water system for possible situations affecting the delivery of clean water.

Contingency plans and emergency preparedness are required in another rule, but they are an important part of an asset management program.

h. Source Water Assessment [OAC 3745-87-03(B)(6)]
A source water assessment is the written report documenting a public water system's drinking water source protection area, the potential contaminant sources within this area and the source water's susceptibility to contamination.

A drinking water source protection plan or checklist documents the activities undertaken by the public water system and its partners to minimize the risk of contaminating the systems source water through source control strategies, information sharing, contingency planning and water quality monitoring. Source Water Assessment review are required to be reviewed annually and evaluated every 5 years for revisions in consultation with Ohio EPA.

For public water systems with an Endorsed Drinking Water Source Protection Plan with a review schedule, review the plan as stated in the review schedule in the

plan. For public water systems with an Endorsed Drinking Water Protection Plan without a review schedule, review the plan every 3 years.

For public water systems that have a Drinking Water Source Protection Checklist that has been accepted by Ohio EPA, review and update the checklist every 5 years.

> NOTE: Revised Drinking Water Source Protection Plans and Checklists must be submitted to Ohio EPA within 60 days of any revisions.

i. *Capacity Projections [OAC 3745-87-03(B)(7)]*
Capacity projections are required for the asset management program. The written capacity projections must meet the requirements of Approved Capacity Planning and Design Criteria for Establishing Approved Capacity for: 1) Surface Water And Ground Water Supply Sources, 2) Drinking Water Treatment Plants (WTPs), and 3) Source/WTP Systems. Written approved capacities of small public water systems using only ground water (such as factories, mobile home parks, office buildings, restaurants, condominiums, and the like) will be established in accordance with Ohio EPA's "Guidelines for Design of Small Public Water Systems".

It also needs to identify infrastructure needed to meet the written approved capacity projections, which could include items such as more distribution pipe, a pump station, or a back-up treatment system to name a few. These types of projections allow the system adequate time to prepare to add more infrastructure or adjust rates if it is needed. Systems should be aware of their projected usage for upcoming years to have accurate plans in place regarding whether they expect the service area's population to grow or if the population is expected to decline and prepare to ensure adequate revenue to continue operation. This may mean adjusting rates, increasing business, or connecting with another system.
Overall, system capacity will depend on the limiting factor in the water system. For example, some systems may have their wellfield be the limiting factor, while others have a component in their treatment train that is the limiting factor.

j. *Criteria and Timeline for Infrastructure Rehabilitation and Replacement [OAC 3745-87-03(B)(8)]*
The system must include in their asset management program a timeline for the rehabilitation and replacement of its infrastructure. To determine the schedule, a system will want to look at the criticality of their assets, remaining useful life, and

the condition assessments of their assets. The costs and ability to raise funds for assets is also to be considered in the timeline. Systems must develop their own criteria to determine when and what items are placed on the timeline. Using this information and their criteria, they can prioritize the most critical needs first and also address any expansion of assets that may need to occur.

Along with a schedule of replacements, systems must identify funds that will be used to complete the rehabilitation timeline. Information on how the funds will be collected and used for the repair, rehabilitation, replacement, and expansion of assets is to be included. A loan could be obtained for partial funding depending on the scale of the project. Rates should cover operation and maintenance along with any loan repayments.

k. Capital Improvement Plan [OAC 3745-87-03(B)(9)]
Asset management programs shall include a capital improvement plan (CIP). Projections should be included for a three to five-year timeframe. The CIP should be reviewed and updated annually by the water system. The CIP should include planning and detailed expenditures to aid the water system in deciding the amount of money they should be saving and setting aside in a separate account each year. It is important to include details on the project, so that an accurate estimate of the total project cost and its benefits can be determined. For the CIP, systems should consider compliance, replacing worn-out treatment, adequacy of storage/pressure, and water treatment updates. Projects are to be listed by the year they are planned and include at least the following: description of the project; need for and benefits of the project; estimate of project cost; and funding source(s).

Water systems must have a description and estimated cost of significant projects for the next five to twenty years. Projects on this list may change, but it is important the water system be planning for these larger projects.
The system needs to have a long-term funding strategy to ensure it is sustainable and maintained properly. An important part of the CIP is determining the cost of projects and how they will be funded. Funding should be identified to cover the financing of repairs, rehabilitations, replacement and expansion of assets, along with the repayment of any debt. A water system's funding will likely be a mix of rates and loans. The water system should also have a reserve fund set up that is specifically for the water system and its needs. The rates set by a system should cover their operation and maintenance costs along with providing funds for a reserve account. Loans should be used for projects and rehabilitations, such as those listed in the capital improvement plan.

4. Financial

a. *Financial Information to Determine Capability [OAC 3745-87-03(C)]*

i. ***Publicly Owned Water Systems [OAC 3745-87-03(C)(1), (C)(2)]***

New public water systems must include a five-year pro forma statement of the next five years of operation. The pro forma statement takes information from a typical year(s) and uses statistics, revenues, and expenditures to project financial information for the next five years. New public systems must include an income statement, balance sheet, and statement of cash flow in relation to the water operating fund. The water information should be separated from other accounts. If for some reason the system does not have these specific documents, the system should know where to find the information that would be contained on the specified documents. An amortization schedule, or a breakdown of how the system is paying loans, interest, etc. on a monthly basis is to be included. The current water rate ordinance along with any planned periodic increases must be included. Water rates should be reviewed at least triennially with documentation of the review included as well. Documentation of all customers being billed is also to be included. This could be per metered usage or if the system uses a flat rate. Information regarding current credit or bond rating must be included.

Existing public water systems will be required to provide everything that a new public water system should include that is listed in the paragraph above. Existing systems must provide the most recent five years of annual financial statements including all assets, liabilities, income, expenditures, and balances. A schedule of water system indebtedness is to be included. The most recent five years of financial statements should be used to determine a typical year and then the typical year is used to project out five years. If emergencies occurred in the last five years, they should still be included in the determination of a typical year because it is likely that in the next five years, something similar may happen again.

ii. ***Non-Publicly Owned Water Systems [OAC 3745-87-03(C)(3), (C)(4)]***

must include a demonstration of the cost of the water treatment components and conveyance system including capitalization cost or lump sum debt retirement. It must also demonstrate there is an adequate budget and revenue source to support the annual operation and maintenance costs for the next 5 years. Included in the operation and maintenance costs must be the cost of hiring the required level certified operator and the terms of

long term debt, such as the interest rate and whether it is compounded, etc. Existing non-publicly owned water systems should provide the same items that are required for a new public water system. An existing non-public water system should also include the type of business organization it is, the historical origination date and include legal documents regarding the corporate structure of the business. The system should also provide the most recent five years of annual financial statement. This documentation should include and describe all assets, liabilities, income, expenditures, balances, and the equity of the owner of the water system.

It is important to keep the water system finances separate to help determine financial viability. When water finances are separate it is easier to identify if a system is having financial trouble in certain areas, such as collecting service fees or being able to pay for debt. The finances can also be used to determine if there is a cost benefit to running your own water system or if hooking into another system should be considered (if possible), or shared services.

5. **Asset Management Program Evaluation [OAC 3745-87-04]**
A system's asset management program must contain all of the items listed in rule 3745-87-03 in an acceptable format. Along with the program, a system will track metrics that will be used to aid in the determination of proper implementation of the program. Information and management practices to track the progress towards meeting the goals and overall system efficiency should also be provided. The director will accept the program at the time of review only after proper implementation of the asset management program has been demonstrated.
A copy of the asset management program will be available for inspections by representatives of the director.

6. **Asset Management Program Long-term Implementation [OAC 3745-87-05]**
The asset management program will be reviewed annually and updated as needed by the water system. These will be kept onsite and available for review at the discretion of the director. Metrics will be reviewed annually by the water system, unless otherwise directed by the director. Metrics will be used to gauge the improvement of a water system. Metrics have been determined by the Ohio EPA with one metric being determined by the water system.

The following are required for community public water systems:
1. *Operating ratio.*
An operating ratio can give a system information as to whether or not they are producing enough revenue to cover all of their expenses. If the ratio is

1, then the system has the revenue to meet all of their expenses, with none leftover. A ratio greater than 1, would indicate that expenses are greater than the revenue. If this is the case the system will need to look into ways to reduce their expenses or increase their revenues. Ideally, a system would want to have an operating ratio below 1, because then their revenue would be greater than expenses. The extra amount from revenues after expenses were covered could then be used for a reserve or emergency fund.

To calculate operating ratio: Operating ratio = Expenses divided by Revenue.

For expenses: this should include any item that costs the system money. This would be items such as operation and maintenance costs, wages and benefits for personnel, chemicals, debt expense etc. It may be useful for the system to indicate which line items went into the expense total.

For revenues: this should include any item that brings in money. This would be the sale of water to customers, payments received for connecting customers, etc.

2. *Operating cost to produce water per service connection.*
   The cost per customer, connection, or person can be used by the system to compare to industry standards. This will allow a system to determine if their costs are higher than what should be expected for a system of their size. The operating cost must include all expenses associated with the production of water. For example: chemical expenses, wages of operators, etc.

3. *Breaks per 10 miles of distribution pipe.*
   Breaks can be an indicator of issues in the system. If a system can gather this information over time, they will be able to see trends as they develop. Systems should track the number and locations of breaks to determine if there are certain areas that are susceptible to having breaks. This information can be used to prioritize areas for waterline replacements. Breaks should be tracked on an on-going basis.

4. *Non-revenue water (percentage loss).*
   The recorded water loss should account for any water that is leakage on transmission and distribution mains, leakage and overflows at utility's storage tanks, or leakage on service connections up to the point of customer metering. It is the difference between the system input volume and billed authorized consumption. If systems decide to do a formal water audit AWWA M36 details the process to do so.

Table 1. IWA/AWWA Water Balance (All data in volume for the period of reference, typically one year)

System Input Volume (corrected for known errors)	Authorized Consumption	Billed Authorized Consumption	Billed Metered Consumption (including water exported)	Revenue Water
			Billed Unmetered Consumption	
		Unbilled Authorized Consumption	Unbilled Metered Consumption	Non-Revenue Water (NRW)
			Unbilled Unmetered Consumption	
	Water Losses	Apparent Losses	Unauthorized Consumption	
			Customer Metering Inaccuracies	
			Systematic Data Handling Errors	
		Real Losses	Leakage on Transmission and Distribution Mains	
			Leakage and Overflows at Utility's Storage Tanks	
			Leakage on Service Connections up to point of Customer metering	

5. *Maintenance tasks per year (planned vs. unplanned) on vertical assets.*
   Systems must track maintenance tasks on vertical assets. Vertical assets are above ground assets within pump stations, treatment plants, storage facilities or other facilities associated with the water system. Tasks should be tracked on an on-going basis. This can be accomplished with a computer program or by hand. Tasks must be identified as planned or unplanned.

6. *One additional customer service metric to be tracked. Metric to be determined by water system.*
   Below are a few examples of customer service metrics. Systems can choose from these or others. When deciding on a metric it is important that systems have a way to track the metric and to choose one that will be meaningful and useful to the system.
   - Service complaints
     o Customer service complaints/1,000 accounts
     o Technical service complaints/1,000 account
   - Call Center indicators
     o Average wait time (minutes)
     o Average talk time (minutes)
     o Abandoned call ratio (%)
     o Average calls per call center representative
     o First call resolution (%)
       ▪ Percentage of calls that address the customer's need the first time a customer calls
   - Residential service charges

- o Residential cost of water service ($/month)
- Customer service cost per account ($/account)
  - o Total annual customer service costs/number of active residential accounts + number of nonresidential accounts
  - o Customers service costs would include:
    - New account activation
    - Meter reads, maintenance, repair, or replacement
    - Bill preparation and delivery
    - Payment receipt and processing
    - Records maintenance
    - Delinquent account collections
    - Bankruptcy processing
    - Provision of turn-on/turn-off services
    - Receipt, investigation, and resolution of complaints
    - Preparation and provision of outreach and education materials, including the Consumer Confidence Report
- Billing accuracy (errors/10,000 billings)
- Per capita consumption (gal/person/day)
- Service affordability
  - o Average residential monthly water bill x 12/Real median annual household income
- Delinquency rate (%)
  - o Percentage of total accounts delinquent over past 12 months
- Low-income billing assistance rate
  - o # of customers in low-income assistance program/# of customers eligible for program
- Customer service contact
  - o Tracking whether customers contact the system by phone, in-person, email, social media, other
- Water service disruptions
  - o Disruptions of water service (outages/1,000 accounts)
    - Planned by event duration (<4, 4-12 hr, >12 hr)
    - Unplanned by event duration (<4, 4-12 hr, >12 hr)
  - o Average time to address water service disruptions (hr)
  - o Disruption frequency water service

IV. ATTACHMENTS:

Appendix A – Additional Resources and Guides

V. HISTORY:

The Division of Drinking and Ground Waters first issued this document on November 8th, 2018. This document was revised on November 9th, 2018.

Ohio
Ohio Environmental
Protection Agency

APPENDIX A: ADDITIONAL RESOURCES AND GUIDES

ADDITIONAL RESOURCES AND GUIDES

OHIO EPA

- Valve Exercising Program Guidance

U.S. EPA

- Asset Management for Water and Wastewater Utilities
- Asset Management: A Best Practices Guide
- Building an Asset Management Team
- Asset Management: A Handbook for Small Water Systems

AMERICAN WATER WORKS ASSOCIATION (AWWA)

- Asset Management webpage
- AWWA Free M36 Water Audit Manual

RURAL COMMUNITY ASSISTANCE PROGRAM

- Training and Tools
- Asset Management Webinar Series
  - Asset Inventory (Slides) (Slides with Audio)
  - Condition Assessments (Slides) (Slides with Audio)
  - Capital Improvement Plan (Slides) (Slides with Audio)
  - Preventative and Predictive Maintenance (Slides) (Slides with Audio)
  - Budgeting (Slides) (Slides with Audio)

ENVIRONMENTAL FINANCE CENTER NETWORK (EFCN)

- Homepage
- Asset Management webpage