The CWWA’s Workforce Development Working Group sent out the *Workforce Development Survey* (2020). The results identified several areas where-in utilities stated a need for further guidance or assistance.

In response, the Working Group developed this series of checklists as simple aids to support utility leaders to list the core competencies they desire and assess the readiness of their workforce.

Recognizing that different types of employees require different approaches, the Working Group created these 4 specialized checklists:

* Management and Supervision Training Checklist (MS 1-5)
* Engineering Progression Checklist (EP 1-6)
* Maintenance Training Checklist (MT 1 - 4)
* Operator Training Checklist (OT 1 - 2)

Each of the checklists identify specific “Competencies”. To utilize the checklist, managers are invited to assess the “Readiness Level” of their workforce - either the utility as a whole, or by individual employee skill sets as appropriate. The “Readiness” to perform these competencies can be rated as follows:

❶ Needs Training Area  
❷ Skilled Area  
❸ Strength Area

The areas identified with “1’s” can be addressed either by training existing employees with the potential to take on the required competencies or through external hiring or consultants. For existing employees, a training plan can be documented in a personal development plan and re-assessed annually.

These Checklists, developed by the CWWA Utility Leadership Committee and their Workforce Development Working Group, were assembled to assist managers of water and wastewater utilities to use best practices and provide guidelines for developing their own workforce.

These Checklists, combined with using the Themes and Best Practices in this document, will aid managers to better manage their utilities for optimum performance, now and into the future. The working group members who developed these Checklists and Themes are long term senior utility managers with much expertise in the subject matter. It is hoped that the sharing these checklists will prove beneficial to managers with fewer resources or time to develop similar documents themselves.

The following table identifies the attributes and skill components that are deemed essential to running a good utility. These attributes and components are drawn from the Effective Utility Management (EUM) Primer developed by AWWA, WEF, PWAUS and other related bodies\*.

The “Readiness” to perform these competencies can be rated as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Municipal Utility name:** |  | **Manager/Supervisor:** |  |
| **Employee Name** |  | **Date:** |  |

MS 1

| ATTRIBUTE | COMPETENCIES | READINESS LEVEL |
| --- | --- | --- |
| **Product Quality** (i.e., water, wastewater and stormwater) | * Uses KPIs to analyze Water Utility’s performance * Understands regulatory requirements * Able to maintain operational quality to support customer, public health, economic, and ecological needs |  |
| **Customer Satisfaction** | * Facilitates timely customer feedback * Responsive to customer needs and emergencies * Provides tailored customer service to a range of customer groups (e.g., residential, commercial) |  |
| **Employee and Leadership Development** | * Reviews/creates role descriptions for employees * Identifies the difference between management and leadership * Demonstrates effective active listening skills * Demonstrates ability to build consensus * Builds effective work teams * Uses effective approaches to conflict management * Develops and implements systems for employee coaching and development |  |
| **Operational Optimization** | * Understands the benefits of annual and long-term planning * Understands/develops a Business Case as critical input to capital projects * Conducts ongoing, improvement-based performance monitoring * Minimizes resource use and loss from day-to-day operations * Is aware of and adopts, in a timely manner, operational and technology improvements (e.g., operational and information technology) * Manages and utilizes data from automated and manual processes * Develops and implements safe work and standard operating procedures |  |
| **Financial Viability** | * Understands the full life-cycle cost of assets * Develops cost benefit analyses for projects * Develops budgets and reports back on variances * Is able to set priorities in budgets * Understands and implements financial policies * Understands the approach for setting realistic rates * Develops a rates and tariffs program   MS 2 |  |
| **Infrastructure Strategy and Performance** | * Is able to fulfill Asset Management regulatory requirements * Quantifies and qualifies the assets within their utility * Develops a framework for conducting an asset inventory and a condition assessment * Understands how asset management fits with the long-term viability of the utility * Understands the condition of and costs associated with critical infrastructure assets * Develops an approach to maintaining assets over the long-term at the lowest possible life-cycle cost and acceptable risk * Coordinates repairs within the community to minimize disruptions * Develops plans for infrastructure investments consistent with community needs, growth, and system reliability, using a robust set of adaptation strategies |  |
| **Enterprise Resiliency** | * Identifies business risks. (e.g. legal, regulatory, financial, environmental, safety, cyber, knowledge-loss, etc.). * Assesses risks in the context of a regulations, environment, safety, security and operations * Prioritizes these risks using case studies and industry best practices * Performs operational risk assessments on their utility using industry best practices * Works with staff and external resources to anticipate and avoid problems * Proactively establishes tolerance levels and effectively manages risks * Develops plans for and actively manages business continuity   MS 3 |  |
| **Community Sustainability** | * Actively leads in promoting and organizing improvements to community and watershed health with external community partners * Actively leads in promoting welfare within the community for disadvantaged households * Uses operations to enhance natural environment * Ensures efficient use of water and energy resources * Supports maintaining and enhancing ecological and community sustainability (e.g., pollution prevention, watershed and source water) |  |
| **Water Resource Sustainability** | * Ensures water availability through long-term resource supply and demand analysis, conservation, fit-for-purpose water reuse, integrated water resource management, watershed management and protection, and public education initiatives * Manages operations to provide for long-term aquifer and surface water sustainability and replenishment * Understands and plans for future water resource variability (e.g. changing weather patterns, including extreme events, such as drought and flooding)   MS 4 |  |
| **Stakeholder Understanding and Support** | * Develop the process for stakeholder communication * Demonstrates the ability to communicate effectively - both orally and in written form * Develops relevant KPIs * Engenders understanding and support from oversight bodies, community and watershed interests, and regulatory bodies for service levels, rate structures, operating budgets, capital improvement programs, and risk management decisions * Actively engages in partnerships and involves stakeholders in the decisions that will affect them * Actively promotes an appreciation of the true value of water and water services, and water’s role in the social, economic, public and environmental health of the community |  |

\* Further information can be obtained via the following links:

The EUM Primer: Effective Utility Management Program | American Water Works Association (awwa.org)

The EUM Certificate Program which offers a comprehensive schedule of workshops covering all attributes: www.worldwatertraining.com

The following identifies a progression and evaluation approach developed by Professional Engineers Ontario.

MS 5

**Progression Path: Senior Engineer, Engineering experience approximately 11+ years**

The “Readiness” to perform these competencies can be rated as follows:

❶ Needs Training Area (Address through training or external hiring)   
❷ Skilled Area  
❸ Strength Area

|  |  |  |  |
| --- | --- | --- | --- |
| **Municipal Utility name:** |  | **Manager/Supervisor:** |  |
| **Employee Name** |  | **Date:** |  |

EP 1

| ATTRIBUTE | COMPENTENCIES | READINESS LEVEL |
| --- | --- | --- |
| **Professional Designation** | * **P. Eng.** criteria met |  |
| **Knowledge and Experience** | * Related university degree **plus progressively responsible (broad scope) experience** |  |
| **Planning and Project Management** | * **Prepares** 1-3 yr. overall plans and inputs into long range planning |  |
| **Engineering Designs** | * **Prepares/reviews** designs and drawings * Assumes **professional responsibility** for project integrity |  |
| **Budgeting** | * **Estimates** costs and **manages** project budgets |  |
| **Supervision** | * **Supervises** technical staff * **Administers** contracts with consultants and contractors |  |
| **Consultant Selection** | * **Leads/participates** in the tender and consultant selection process |  |
| **Project Control** | * **Establishes** monitoring programs and **interpretation** of monitoring results |  |
| **Technical Support** | * **Researches and advises** on technical issues |  |
| **Contract Administration** | * **Negotiates and approves** consultant budget * **Manages** consulting and construction budgets |  |
| **Presentations** | * **Conducts** public meetings * **Prepares and presents** to various committees |  |

EP 2

The following identifies a progression and evaluation approach developed by the Region of Waterloo and based on guidance from Professional Engineers Ontario.

The “Readiness” to perform these competencies can be rated as follows:

❶ Needs Training Area (Address through training or external hiring)   
❷ Skilled Area

|  |  |  |  |
| --- | --- | --- | --- |
| **Municipal Utility name:** |  | **Manager/Supervisor:** |  |
| **Employee Name** |  | **Date:** |  |

EP 3

| ATTRIBUTE | COMPENTENCIES | READINESS LEVEL |
| --- | --- | --- |
| **Professional Designation** | * **P. Eng**. criteria met |  |
| **Knowledge and Experience** | *  Related university degree **plus related program specific experience** |  |
| **Planning and Project Management** | * **Assists with** planning and project management of projects |  |
| **Engineering Designs** | * **Develops preliminary designs** and budgets including preliminary specifications and contracts |  |
| **Budgeting** | * **Develops** budgets for projects |  |
| **Supervision** | * **Monitors** work of Regional staff assigned to project * **Oversees** the work of contractors and consultants working on projects **across division** |  |
| **Consultant Selection** | * **Participates** in the consultant selection process |  |
| **Project Control** | * **Monitors progress** and provides input to project team during the **design** and **construction phases** of assigned **projects** |  |
| **Technical Support** | * **Prepares** technical specifications |  |
| **Contract Administration** | * Provides **contract administration** and inspection |  |
| **Presentations** | * **Participates** in public meetings * **Occasionally** presents to Committee |  |

EP 4

The following identifies a progression and evaluation approach developed by the Region of Waterloo and based on guidance from Professional Engineers Ontario.

The “Readiness” to perform these competencies can be rated as follows:

❶ Needs Training Area (Address through training or external hiring)   
❷ Skilled Area

|  |  |  |  |
| --- | --- | --- | --- |
| **Municipal Utility name:** |  | **Manager/Supervisor:** |  |
| **Employee Name** |  | **Date:** |  |

EP 5

| ATTRIBUTE Quality of Experience | COMPENTENCIES Five Competencies must be met over the course of the 48-month period | READINESS LEVEL |
| --- | --- | --- |
| **Application of Theory** | * To qualify as engineering work, at least one component of the following must be present in the tasks as a significant percentage of the assignment function:   + Analysis, Design & Synthesis, Testing Methods, Implementation methods * The work should involve the use of engineering principles taught during an engineering degree program |  |
| **Experience** | * Provides interns with an appreciation of the fundamental roles of the function, time, cost, reliability, reparability, safety & environmental impact of their work, through the opportunity to experience/understand/acquire knowledge about the following:   + function of components within a system, limitations of practical engineering & related human systems, significance of time in the engineering process, codes, standards, regulations & laws that govern the applicable engineering activities |  |
| **Management of Engineering** | * **Planning -** including the development of a concept & evaluation of alternatives * **Scheduling** - including the allocation of resources to assessment of cost escalation * **Supervision** - including leadership, organizational & motivation skills * **Project control** - including coordination monitoring & taking corrective action * **Risk assessment -** including performance, social & environmental impacts |  |
| **Communication Skills** | * **Written work -** including briefs or formal reports * **Oral Reports or Presentations -** to peers, management, scientific community and/or general public |  |
| **Societal Implications of Engineering** | * Awareness of potential consequences both **Positive** and **Negative** of a project * Recognition of Value to the Public * **Safeguards** to mitigate adverse impacts, Role of **Regulatory Agencies** and **Responsibility** to Guard Against Conditions Dangerous or Threatening to Life, Limb, Property or the Environment |  |

EP 6

The following identifies a progression and evaluation approach developed by the Region of Waterloo and based on guidance from Professional Engineers Ontario.

The “Readiness” to perform these competencies can be rated as follows:

❶ Needs Training Area (Address through training or external hiring)   
❷ Skilled Area  
❸ Strength Area

|  |  |  |  |
| --- | --- | --- | --- |
| **Municipal Utility name:** |  | **Manager/Supervisor:** |  |
| **Employee Name** |  | **Date:** |  |

MT 1

| ATTRIBUTE | COMPENTENCIES | READINESS LEVEL |
| --- | --- | --- |
| **Apprenticeship** | * Apply for program (e.g. millwright, electrician, plumber)Attend training annuallyWork under/shadow a journeyperson |  |
| **Maintenance Management** | * Learn about work orders and request systemsIdentify critical equipmentLearn about “preventative maintenance”Learn about “predictive maintenance”Learn about “reliability-engineered maintenance” |  |
| **Asset Management** | * Understand policy, strategy and approach to governance * Understand current levels of service, risks and lifecycle management approach * Review Inventory listing * Review rebuilding equipment plan * Review plan to installing new equipment/technology * Review short & long-term budgeting |  |
| **Equipment** | * Attend supplier training for components (e.g. bearings, valves) * Attend vendor training for systems (e.g. filters, pumps, compressors * Attend industry and equipment conferences (e.g. MWWA, WCW) * Review P&C/P&ID’s to learn about the plant process * Review distribution drawings to understand distribution system |  |
| **Equipment (continued)** | * Review equipment manuals * Review operating manuals * Identify mobile equipment * Learn about equipment reports used to document work that occurred at shutdowns or during rebuilds * Lessons Learned reports |  |
| **Safety** | * Review critical task lists * Review SOP’s and JHA’s * Review Workplace Health and Safety Regulations * Review Site Safety Procedures |  |
| **Operations** | * Review operating licenses * Review past compliance to licenses * Shadow operator to cross-train * Understand the impact of changes in critical equipment on the process |  |
| **Process Control** | * Understand SCADA system overview at plans * Understand distribution system SCADA * Programming training |  |
| **Regulatory** | * Identify municipal, provincial or federal regulations related to equipment | MT 2 |
| **HR Management** | * Quality onboarding review to learn about organization and meet people for relationship building * Review Workplace HR Policies * Attend annual performance review * Discuss career development with management, identify future possibilities and create employee development plan |  |
| **Resources** | * Identify key mechanical and electrical contractors to support during breakdowns (a list with contact information to access during weekends and holidays) * Identify key suppliers to support during breakdowns (a list with contact information to access during weekends and holidays) * Identify key utility contacts in other municipalities to obtain support during a breakdown * Identify online training support * Identify local college training support * Identify online troubleshooting support * Understand the process and authority levels to hire contractors |  |
| **Business Continuity Planning** | * Understand the approach to managing disasters * Be familiar with the Business Continuity Plan for the utility |  |

MT 3

The following identifies a progression and evaluation approach developed by the Region of Waterloo and based on guidance from Professional Engineers Ontario.

The “Readiness” to perform these competencies can be rated as follows:

❶ Needs Training Area (Address through training or external hiring)   
❷ Skilled Area  
❸ Strength Area

|  |  |  |  |
| --- | --- | --- | --- |
| **Municipal Utility name:** |  | **Manager/Supervisor:** |  |
| **Employee Name** |  | **Date:** |  |

# Training Checklist

OT 1

|  |  |  |
| --- | --- | --- |
| ATTRIBUTE | COMPENTENCIES | READINESS LEVEL |
| **ON-BOARDING** |  |  |
| **New Employee Orientation:** | * Ensure internal policies and procedures are understood such as Security access, Fleet and Environmental Management System documents |  |
| **Programs such as Computerized Work Management Systems** | * Ensure Computerized Work Management System (CWMS) expectations are understood including access and training |  |
| **Review of Procedures:** | * Ensure internal corporate policies and procedures are understood such as Health & Safety, Standard Operating and Emergency Response |  |
| **ON-THE-JOB** |  |  |
| **Plant Tour:** | * Identify the support systems in place, either in-house or contracted, and how to access them (millwrights, electrical, process optimization etc.) * Identify and understand critical control points |  |
| **Operations:** | * Understand how the facilities operate through review of Operations Manual, Process Narratives, Process Control Narratives, SCADA training and linear infrastructure while identifying problem areas and areas of focus |  |
| **Maintenance:** | * Understand Computerized Work Management System work ordersIdentify the critical equipment and work orders associated |  |
| **System Training:** | * Understand systems through training (hydraulics, topography, process by process, from source to tap and source to treatment etc.) |  |
| **Continuous Improvements Training** | | |
| **Training:** | Develop skills through training required by:   * Provincial/Territorial Regulatory Labour Requirements (for all employees) * Provincial/Territorial Regulatory Environmental Requirements (for licensed operators) * Federal Fisheries Regulations * Process / Equipment / Capital Training * Management of Change * Incident investigation |  |

OT 2