



Colorado Department
of Public Health
and Environment

Water Quality Control Division Capacity Building Unit

COLORADO
2015 PUBLIC WATER SYSTEM
TRAINING STRATEGY ADMINISTRATIVE
FRAMEWORK PROJECT

**TASK 6 REPORT:
WEB PORTAL SCOPE OF WORK**

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TASK 6 REPORT: WEB PORTAL SCOPE OF WORK

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This document was developed by the Web Portal Workgroup, consisting of:

- Elizabeth Carter, City of Aurora
- Zach Collins, Woodmoor Water and Sanitation District
- David Dani, Colorado Department of Public Health and Environment
- Sylvia Rottman, Operator Certification Program Office (OCPO)
- Jo Ann Vold, OCPO

THIS REPORT PREPARED BY:

Melanie Fahrenbruch, M.Ed. on behalf of the Rocky Mountain Section of American Water Works Association

Contact Information: mel@mjfconsult.com or (303) 912-3358

STRATUS CONSULTING REPORT PREPARED BY:

Holly Surbaugh, Jeff Oxenford and Joanna Pratt

Contact Information: joxenford@comcast.net

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OVERVIEW

Background

The Capacity Building Unit (CBU) of the Colorado Safe Drinking Water Program provides training, technical assistance, and management support services to public water systems so they can strengthen their ability to supply safe drinking water to the public. In July 2010, CBU prepared the 2015 Colorado Public Water System Training Strategy to guide the CBU's annual work planning and priority setting and to serve as a resource and reference for training partners and other external agencies. Important components of implementing the 2015 Training Strategy include promoting awareness of and collaboration around the Strategy among trainers and building trainer support services to the various trainers in the state.

In winter 2011, the CBU announced a new partnership with the Rocky Mountain Section of the American Water Works Association (RMSAWWA) to facilitate developing an Administrative Framework for the CBU's 2015 Training Strategy. The Administrative Framework will define the processes, guidelines, and expected outcomes for training activities supported by the CBU. It is intended to assist in making decisions regarding the allocation of funds and resources for public water system training services in the future. Several reports, including this one, are being prepared by work groups that have been formed to create the deliverables and provide input into all aspects of the project. The Web Portal Work Group was charged with preparing this report.

The CBU currently uses a sub-site of the CDPHE website to post documents and information. The implementation of the 2015 Strategy is going to require a more robust, coordinated and customer-friendly website. The CBU envisions a common web portal, linked from the CBU website, with information and tools for both customers and performance partners. For customers, there would be a training catalog, the Industry Career Pathways Roadmap, the Need-to-Know Criteria (NTKC), links to certification information and other tools. The performance partners would have access to the Core Curriculum, Train-the-Trainer Program, Training Assessment tools and other resources.

Description of Work

This report documents the requirements necessary to guide the development of a new statewide web portal intended for an audience of Colorado water operators, water training providers, and others interested in water career development materials. It is formatted as a **scope of work** that can be used to request proposals from vendors.

RMSAWWA contracted with Stratus Consulting, Inc. to conduct research and prepare a functional requirements document, project schedule, budget, process for controlling content and a long-term management plan for the web portal.

Stratus Consulting employed a two-step study approach that entailed (1) reviewing relevant online and print training resources, and (2) implementing a survey designed to define user needs and preferences concerning content, site organization, navigation, usability, and other functions and features. This approach, which is described in more detail in Appendix A, emphasizes the importance of avoiding

duplication of effort by building upon the existing endeavors of stakeholders and understanding the needs of the target audience for the web portal.

Based on the research, the mission of the new web portal resource should be to provide Colorado's current and future water professionals with a more robust, coordinated, and customer-friendly website that serves as a common web portal with information and tools for both water operators and water training providers. Its primary functions should be:

- ▶ Provide interactive tool(s) for operators to find training and manage their career development.
- ▶ Provide the opportunity to support and bolster a vibrant community of practice for trainers with a publicly accessible collection of tools, templates and documents.
- ▶ A compendium of available training courses with a consistently updated catalog and calendar containing more detailed information than is currently available through existing online resources. The intent is to consolidate information from disparate websites and to streamline processes for water operators and for water trainers and their students.

WEB PORTAL SCOPE OF WORK

The intent of this scope of work is to provide the CBU with specific language that could be incorporated into a formal request for proposals (RFP) in the future. This scope of work contains three distinct sections or bodies of work; a future RFP could contain all or just some of these sections:

A. Web Portal Design

- Functional Requirements Document

B. Web Portal Content Development

- Content Outline

D. Web Portal Long-term Management

Includes C. Suggested Project Schedule for A/B

Note to bidders: You may propose to work on 1) Web Portal Design and 2) Content Development and 3) Long-Term Management or separate the tasks and bid on just one or two components. This document is prepared to show the inter-connectivity of the three tasks. If the web development is conducted separately from the content development, it is expected that these two phases will be effectively coordinate between vendors.

A. Web Portal Design

The Operator Experience: “The Place to Go”

Operators should view the web portal as THE place to go for career and training information. The operator experience with the web portal should enable them to see an expanded view of their career and training options. The web portal should enlighten operators regarding the importance of participating in core curriculum training that will enhance their ability to perform successfully on the job and on certification exams.

The experience should be fast, intuitive, colorful, graphically pleasing and integrated with the newest technologies. Wizards should help them find their way quickly through the site. Operators will be welcomed by the Colorado Water Careers Roadmap, and will enter the web portal based on either their current or next certification level. The web portal will emphasize helping operators plan their career. It should also allow



users access to data about training programs and trainers.

The Trainer Experience: “The Place to Be”

Training providers should view the web portal as THE place to have their training information posted. First, the trainer should be welcomed by large, graphical options for how to interact with the portal (“I want to post training”, “I want to find out where training is needed” or, “I need help with a training function”). Secondly, the trainer experience should enable them to easily post their training events to a calendar, enter their training assessment results (for sharing) and help them market their programs. Lastly, the web portal should help trainers be better at what they do. With immediate access to training tools and templates and the ability to determine where additional training is needed, the trainer will be able to better meet the needs of operators. The experience should be fast, intuitive, colorful, graphically pleasing and integrated with the newest technologies.

Web Portal Design: Functional Requirements

The functional requirements documentation presented in this section is intended to guide the development of the web portal by delineating essential and non-essential features and functionality to include in the web portal design. Essential requirements include features and functionality that are necessary components of an effective training web portal. Non-essential requirements include items that would enhance the web portal but could be removed due to cost (or other constraints) or those items that could be added over time.

Essential Features:

1. A searchable database of Colorado water training courses (for operators and trainers) will provide the most critically important functionality of the web portal. Users will be able to search course listings that compile available courses offered by the following sources (at a minimum): OCPO, CDPHE, RMSAWWA, and affiliated training providers. The database will be populated with training course information collected through some combination of the following potential methods:
 - a. Semi-automated aggregation of course information accessible from existing online training resources (.). Because the level of detail for course information that is recommended in this report does not exist on currently available online resources, a site administrator will likely need to manually enhance and augment the information that is incorporated into the database via aggregation for the foreseeable future.
 - b. Submission of course information to the web portal by trainers through a web form. This information is approved by the site administrator before publication.
 1. Note that trainer submission of course information to the web portal is currently envisioned as completely separate from the OCPO application process to receive TU approval.

- c. Manual entry by the site administrator, who routinely monitors existing online training resources for relevant information.
 - d. The web portal will provide multiple search options. Users will search using a basic keyword search functionality (single text box) and an advanced search, including the following search limiters (at a minimum): topic category (e.g., water systems, small water systems, water distribution), **location**, certification level, content level (e.g., beginner, advanced), cost range, date range (see additional information below), time range (e.g., daytime, evening), TUs earned, description or subject (possibly incorporating assigned tags), course duration and length, training provider, and setting (i.e., online or traditional classroom course).
 - e. The web portal will provide the ability to search for Administrative Framework Compliant core courses and electives by clicking on specific graphics (listed in content outline).
 - f. The web portal will augment users' search capability with a calendar feature that, at a minimum, will contain training course information. It may also include information related to other events of interest to the web portal audience.
 - g. The web portal will augment users' search capabilities by integrating online mapping and a wizard (e.g., Google Maps or similar). Users will be able to see a map with markers pinpointing locations where upcoming available courses will be held. Clicking on markers will allow users to access a pop-up window with selected course details. Users will also be able to search by distance from a specific address and subsequently access route directions.
2. The web portal will allow multiple audience segments to access targeted content (e.g., through tabs or other mechanisms). Audience segments include current water professionals seeking training courses or other career development materials, students or others considering entering the water sector, and trainers.
 3. The web portal will accommodate multiple levels of access permissions via account registration and log-in features. Access permissions will govern users' ability to access and (in some cases) edit web portal content according to the following access levels (at a minimum):
 - a. General user. No log-in required. The majority of web portal content is accessible.
 - b. Registered user (operator). Log-in required to access portions of the web portal designed to provide a customized experience (see additional information below).
 - c. Registered trainer. Log-in required to access content restricted to trainers. It will enable them to submit, review, and edit course listings, and participate in collaborative interactions with other trainers (see additional information below).
 - d. Site administrator(s). Log-in required to edit content, alter web portal format or organization, grant permissions to users, and other activities.
 4. The web portal will efficiently organize large amounts of different types of content, such as static documents (e.g., downloadable PDFs); dynamic, editable articles and events; and libraries of relevant links. The web portal will also accommodate an effective search of all

content (possibly incorporating tags), and multiple portions of the web portal will be able to repurpose the same content for different audience segments (e.g., some career development information content items will be available in the dedicated portal sections for current and potential water professionals because they are applicable to both groups).

5. The web portal will allow users who provide contact information to opt to receive email updates on recently added course information, upcoming deadlines, and other relevant information.
6. The developer will select a platform for the web portal that accommodates alteration and administration by non-technical staff.
7. The developer will incorporate search engine optimization in the web portal design and implementation.
8. The web portal platform will accommodate a version of the portal that is optimized for mobile devices.

Non-essential features and functionality

9. The web portal can incorporate an interactive tool that allows registered users to set personal training goals, track their progress, maintain training records (e.g., TUs earned), and streamline the process for preparing to submit records for certification/recertification. Note that this progress tracking feature is currently envisioned as a tool for the users' information only. The official OCPO process for renewal of certification would remain completely separate. However, the progress tracking feature could still help make the renewal process easier for operators by allowing them to keep all their information in one place. This tool's development can be based on career pathway information, need-to-know criteria, and other career development documentation.
10. The web portal can integrate popular social media tools (e.g., Facebook).
11. The web portal can integrate analytical tools (e.g., Google Analytics) that can help track performance metrics and provide additional audience insights.
12. In an area restricted to registered trainers, the web portal can provide a collaborative space for trainers, which can accommodate discussion and professional networking among Colorado's water training community.
13. The web portal can allow users to submit feedback on training courses they have attended. This feature could be implemented using a variety of techniques, including but not limited to:
 - a. Users submit private messages through a web form to the site administrator. The site administrator then forwards the feedback to the appropriate recipients (e.g., trainer or supervisor, OCPO).
 - b. Users submit feedback-related comments and/or specific scale ratings on a public board. This option is likely to require the site administrator to review feedback for appropriateness.

- c. The web portal can integrate with a centralized online course evaluation system in which (1) course/instructor evaluations are collected electronically, and (2) aggregated information is available on the web portal. It is recommended that trainers have the option to display their evaluation information if desired.
- 14. The web portal can allow registered users to opt to receive customized email updates with reminders of start dates for their courses, relevant deadlines or alerts regarding the next time a course in which they are interested is offered, and other personalized information.
- 15. The developer can provide hosting and domain name administration of the web portal on behalf of the 2015 Strategy partners. Additionally, the 2015 Strategy partners can consider entering into an extended service agreement with the developer for long-term web maintenance service (e.g., troubleshooting technical issues).

B. Web Portal Content Development: Outline

This section presents a list of content items to be included in the web portal, organized by content categories. All of the content listed below is considered essential to include in the web portal.

Basic information (For All Users)

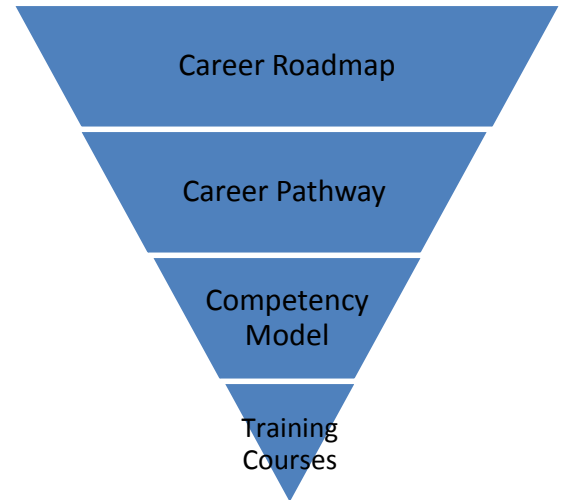
- 1. The web portal will include an “About the Site” article. This is a standard practice, and the article will include routine information about the purpose and background of the web portal, as well as information about its governing organization and site administrator.
- 2. The web portal will include guidelines for user-submitted content, including moderation policies, necessary disclaimers, or other information.
- 3. The web portal will include a site map that shows the organization and contents of the web portal.
- 4. The web portal will include a “Contact Us” page.
- 5. The web portal will include functionality for users to provide feedback regarding the web experience.

Career Development Information (for Operators)

- 6. Operators will enter the web portal via the *Colorado Drinking Water Career Roadmap*. This will take the operator to additional interactive documents including the *Competency Model* and *Career Pathways* with direct links to relevant training for their respective

7. certification level.

TOP PRIORITY: The web portal will assist current operators in assessing their training needs in comparison to career pathway and certification process documentation (e.g., determining what course to take to meet personal goals). This will constitute a large amount of information that will be incorporated into an interactive tool (as described in Section 4, *Functional Requirements*).



8. *Need-to-Know Criteria, Job Descriptions* (from *getintowater.org*) and other similar documents, as well as occupational outlook or average salary information will be provided.
9. The web portal will include a compendium of links specifically of interest to prospective water professionals. Users will be able to submit suggestions for resource links to include.

Training information (for Operators)

10. The web portal will provide a searchable database of Colorado water training courses (linking back to Career Pathway schematic) consolidate information on available water training courses offered by a wide variety of training providers, as described in more detail above, *Functional Requirements*.
11. The web portal will also provide information on other types of career development opportunities, such as workshops, conferences, presentations, networking events, or on-campus information sessions.
12. The web portal will provide or link to water certification examination information. This can include test preparation materials, self-tests, or interactive learning tools.
13. The web portal will provide or link to information on coaching assistance from the CBU.
14. The web portal will publish profiles of training providers that could potentially include contact information, aggregated course feedback/ratings, or links to their websites.
15. The web portal will provide links to the official websites of prominent water industry and environmental organizations (e.g., OCPO, RMSAWWA, EPA), with an emphasis on their available training resources.
16. The web portal will provide a Frequently Asked Questions (FAQs) resource that will answer operators' questions about the web portal, training courses, the certification process, and other topics of interest to users. Some content for this resource will be pre-populated and available at the site launch, but it is important to allow users to submit their own questions through an "ask an expert" web form, a dedicated email address, the site administrator's contact information, or another method.

Information Relevant to Trainers

17. The web portal will consolidate information on available water training courses offered by a wide variety of training providers, as described in more detail in Section 4, *Functional Requirements*. This will allow trainers to identify where and what type of additional training is needed.
18. The web portal will provide the *Core Curriculum Program Plan* and *Curriculum Guides* for use by trainers.
19. The web portal will collect resources to provide a toolkit of materials relevant to trainers, including the current contents of the *Trainers' Toolkit*.
20. The web portal will include information on the *Training Standards, Expectations and Competencies*.
21. The web portal will include information on the *Annual Water Training Providers Seminar*.
22. The web portal will provide or link to information on seminars, webinars, and other events of interest to training providers.

Resources (for All Users)

23. The web portal will collect a library of publicly available materials on topics of interest to the its audience. Content items in the library could be hosted directly or linked from other websites. Content items could include downloadable PDFs of government documents, links to recommended resources, or descriptions of or brief reviews of books, with links to where they are available for purchase. Emphasis will be placed on locating free resources. Users will be able to submit suggestions for materials to include.
24. The web portal will include educational resources for basic math, including study guides, self-tests, interactive learning tools, or links to where this type of information can be found elsewhere on the web.

C. Web Portal Project Schedule

The proposed project schedule provides a broad timeline for meeting project objectives based on important milestones. Designed around a 12-month development schedule, the web portal project schedule could be adjusted as necessary with demonstrated justification. This schedule is intended to accommodate multi-phase planning, cooperation with iterative content development, and an appropriate level of usability testing at different stages of development.

If the web development is conducted separately from the content development, it is expected that these two phases will be effectively coordinated.

The web development will advance more quickly if the content development is as complete as possible beforehand. We recommend as an early milestone of content development an assessment of content items (e.g., identify existing content, such as the documents developed as part of the *Administrative Framework*; identify the percentage of total content for the web portal

that is new content to be developed). Information gathered during this assessment will assist in obtaining accurate bids from web developers.

Table 1: Suggested Project Schedule

	Estimated deadline
Pre-portal development (content development)	3 months
Project administration and meetings	
Collect and review resources	
Assess content items	
Develop draft content	
Compile link lists	
Develop final content	
Iterative work with web developer(s)	Continues throughout development phase
Portal development	8 months
Web development kickoff meeting	
Draft concept 1	
Draft concept 2	
Pre-test ideas with target audience (organization, usability)	
Final concept agreement (no additional functionality added)	
Beta site completed	
Beta testing	
Site launch	
Post-portal development	1 month
Training	Some marketing continues
Marketing	throughout portal lifetime

D. Web Portal Long-Term Management

This section recommends a process for controlling the content and the long-term management of the web portal.

In order to maximize flexibility and responsiveness to user needs while minimizing administrative burdens, the web portal will be hosted as a separate entity unconnected to any of the official websites of the sponsoring organization(s). After the web development is complete and the web portal is successfully launched, the vendor will oversee its management, including

ongoing decisions about how to market the portal, determine appropriate content, coordinate with the trainer community, and other key decisions. The web developers will provide full ownership, access, and editorial control to the vendor.

The vendor will regularly assess and provide reports on the performance of the web portal using Google Analytics. The vendor will also conduct day-to-day web portal maintenance tasks, including the tasks listed in numbers 1-11 below.

1. Monitor web portal activity.
2. Update content, as appropriate.
3. Curate the catalog of course listings. Provide oversight for trainer-submitted course information.
4. Approve users for registered trainer status and assign other types of access permissions as necessary.
5. Periodically review links for relevancy and check for dead links.
6. Review and approve user-submitted content.
7. Moderate training community discussions.
8. Manage ongoing usability testing or other post-development user needs/satisfaction assessment efforts (e.g., user surveys).
9. Evaluate web portal performance using established metrics and web analytics tools.
10. Conduct marketing efforts.
11. Develop and implement a community engagement strategy.

E. Recommendations

1. CBU should meet with Colorado Water Facility Operators Certification Board to inform them and explore future partnerships.
2. The CBU should consider issuing this as one request for proposals and not provide the option for vendors to bid on subparts. The CBU should allow bidders to form teaming and subcontract arrangements (with only one vendor receiving contract).

APPENDIX A: STRATUS CONSULTING, INC. REPORT

Requirements for a Scope of Work to Develop a Colorado Water Training Portal

Final

Prepared for:

American Water Works Association
Rocky Mountain Section
1685 S. Colorado Blvd. Unit 315
Denver, CO 80222

Prepared by:

Stratus Consulting Inc.
PO Box 4059
Boulder, CO 80306-4059
303-381-8000

1920 L St. NW, Suite 420
Washington, DC 20036

Contacts:

Jeffrey Oxenford
Joanna Pratt
Holly Surbaugh

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1.0 Introduction

This report documents the requirements necessary to guide the development of a new statewide web portal intended for an audience of Colorado water operators, water training providers, and others interested in water career development materials.

The mission of this new resource is to provide Colorado's current and future water professionals with a more robust, coordinated, and customer-friendly website that serves as a common web portal with information and tools for both water operators and water training providers. Its primary functions are as:

- ▶ A compendium of available training courses with a consistently updated catalog and calendar containing more detailed information than is currently available through existing online resources. The intent is to consolidate information from disparate websites and to streamline processes for water operators and for water trainers and their students.
- ▶ A publicly accessible collection of documents related to water career development, such as the Colorado Department of Public Health and Environment (CDPHE) *Task 1 Report: Need-to-Know Criteria Usage Guidelines & Prioritization*.

The web portal will also provide the opportunity to support secondary goals (contingent upon project constraints and priorities), including bolstering a vibrant community of practice for trainers and providing interactive tool(s) for operators to manage their career development. These ideas are explored in more detail throughout the report.

1.1 Project Background

Colorado has more than 2,000 public water systems that rely on responsible and knowledgeable certified water professionals to ensure the treatment and distribution of safe drinking water. The Colorado Safe Drinking Water Program in the CDPHE envisions a highly skilled water workforce in its *Colorado 2015 Public Water System Training Strategy* (the 2015 Strategy), which states that “in 2015, public water system training supported by the Colorado Safe Drinking Water Program is consistently high quality, relevant, and well-coordinated statewide.”

CDPHE cooperates with the Rocky Mountain Section of the American Water Works Association (RMSAWWA) and other water organizations (the 2015 Strategy partners) on the development of an *Administrative Framework* to support the 2015 Strategy by defining processes, guidelines, and expected outcomes. As a part of the *Administrative Framework* project, RMSAWWA is assisting CDPHE in creating a scope of work (SOW) for the development of a new training web portal. This SOW will identify and describe the requirements for the new web portal.

The *Administrative Framework* project relies on various work groups to create deliverables and provide input into all aspects of the project. Many of the critically important content items for the web portal (see Section 5, *Content Outline*) are deliverables from the 2015 Strategy project work. In producing this report, Stratus Consulting supported the Web Portal Work Group, which is composed of representatives of CDPHE, the Operator Certification Program Office (OCPO), RMSAWWA, and the Woodmoor Water & Sanitation District No. 1.

1.2 Report Organization

The remainder of this document is organized as follows:

- ▶ Section 2, *Approach*, describes Stratus Consulting's approach to the project
- ▶ Section 3, *Findings*, describes key findings from a survey of operators and training providers, as well as additional research and analysis
- ▶ Section 4, *Functional Requirements*, lists the functional requirements for the web portal
- ▶ Section 5, *Content Outline*, provides a list of content items for the web portal
- ▶ Section 6, *Project Schedule*, defines the project schedule for the web portal development phase
- ▶ Section 7, *Budget*, identifies a projected budget for costs associated with both the web portal development phase and ongoing maintenance for five years after the site launch
- ▶ Section 8, *Long-term Web Portal Management*, recommends activities to maintain the web portal over time and discusses questions raised during the research that are beyond the scope of this project
- ▶ Appendix A summarizes Sections 4–8
- ▶ Appendix B presents a summary of websites that provide training opportunities for water operators and training providers, as well as websites on other training topics that can provide examples and ideas for developing the new web portal
- ▶ Appendix C provides additional information obtained from the survey.

2. Approach

Stratus Consulting employed a two-step study approach that entailed (1) reviewing relevant online and print training resources, and (2) implementing a survey designed to define user needs and preferences concerning content, site organization, navigation, usability, and other functions

and features. This approach, which is described in more detail below, emphasizes the importance of avoiding duplication of effort by building upon the existing endeavors of stakeholders and understanding the needs of the target audience for the web portal, which includes current and future operators of water systems, training providers, and others.

2.1 Resource Review

Stratus Consulting staff conducted a two-phase review of websites that offer training courses and materials. In the first phase (conducted before developing the online survey of water operators and trainers – see Section 2.2, *Survey*), we reviewed the CDPHE, RMSAWWA, and OCPO websites to identify features and content that could benefit users of the proposed web portal. We also reviewed a collection of relevant materials (e.g., the *Colorado Drinking Water Career Roadmap*) obtained from the Web Portal Work Group or through our own research. We used these training resources to discover important context and identify best practices, which were channeled into the development of survey questions about possible web portal requirements.

We conducted the second phase of the website review after survey completion. The survey asked respondents to identify websites they have used to find information about water operator training. We reviewed these websites and subsequently identified (1) training websites recommended as resource links for the new web portal, and (2) websites that should be reviewed in more depth to inform the development of the training portal because they provide examples of best practices in terms of navigation, features, and content that could be emulated in the new web portal. A list of these websites is presented in Appendix B.

2.2 Survey

Stratus Consulting based the majority of our recommendations for the web portal requirements on information we gathered about potential users, their use of existing training resources, and their needs and preferences for a future updated tool. We used the SurveyMonkey online software (www.surveymonkey.com) to create a multi-part, 50-question survey instrument. All respondents were asked to answer a set of questions about their role in the water industry (e.g., certified water operators, non-certified water utility staff, training providers), their level of Internet access, and demographics. Because training providers have different needs as a sub-group within the larger web portal target audience, Stratus Consulting incorporated conditional branching into the survey design that directed respondents to one of two distinct sets of questions based on their roles. Respondents who identified themselves as training providers were given a unique set of questions related to training that were unavailable to respondents who identified themselves in the other role categories. Similarly, respondents who identified themselves as certified water operators and other roles were directed to a set of questions relevant to their roles. Section C.1 in Appendix C displays the final survey instrument.

Stratus Consulting distributed requests to complete the survey to 6,371 email addresses provided by members of the Web Portal Work Group. The email addresses were compiled from CDPHE mailing lists of water operators, previous invitees to a Training Roundtable, and trainer email addresses obtained from the Boulder Operator School. Using this sample may have influenced the results because our survey requests reached those certified water operators (and others) most likely to have membership in leading state water organizations and familiarity with web-based tools. Further research may be helpful (see Section 8.2, *Future Issues*). Of the survey recipients, 354 completed it in its entirety and 111 partially completed it. The 465 total survey responses equal a 7% response rate. A complete summary of all survey responses is in Section C.2 in Appendix C.

3. Findings

This section presents Stratus Consulting's key findings from the survey and, where relevant, supporting concepts drawn from the website review. These findings are organized under the following headings: *Target Audience Characteristics*, *Features/Functionality*, and *Content/Organization*.

3.1 Target Audience Characteristics

This section summarizes characteristics of the survey respondents. These observations inform the recommendations for the web portal documentation in Section 4, *Functional Requirements*.

Certified drinking water operators constituted the vast majority of respondents. Table 1 displays a breakdown of survey respondents into audience sub-groups by their self-identified role in the water industry. For the remainder of the report, we will refer to the following survey respondent categories:

- ▶ *Respondents*, which refers to all who responded to the survey
- ▶ *Trainer respondents*, which refers only to those who identified themselves as training providers
- ▶ *Operator respondents*, which includes certified drinking water operators and all other audience sub-groups.

Table 1. Respondent roles

Role	Number	Percentage
Certified drinking water operator	354	76%
Other	66	14%
Wastewater professional	38	
Student/intern	7	

Utility management	5	
Non-utility person seeking certification	4	
Retired water professional	4	
Industry consultant/supplier/vendor	3	
Other certified water utility staff	3	
Water locator	1	
Inspector/regulatory staff	1	
Non-certified water utility staff	30	6%
Training provider	15	3%
Total	465	99%
Total percentage does not equal 100% due to rounding.		

As described above, the structure of the survey required respondents to identify themselves in one role so that they could be directed to the questions appropriate to that role. Four respondents indicated in the comments section that they consider themselves both certified drinking water operators and training providers. They received the set of questions dedicated to operator respondents, and we incorporated their responses into the certified drinking water operator results.

For the most part, web access is not problematic for survey respondents. The majority said they are able to access the Internet at work (72%) and at home (71%). Also, 60% of the respondents reported that they use mobile devices. In one question, we asked respondents to gauge their familiarity with various types of web-based tools. The majority of respondents (i.e., 50–75%) stated that they are familiar or very familiar with online *information* tools (e.g., search engines, news websites, maps, calendars). However, with the exception of email, far fewer respondents (i.e., 25–45%) reported that they are familiar with online *communication* tools (e.g., social media, instant messaging, blogs, message boards). Additionally, respondents cover a broad spectrum, from heavy users (41% use online tools and services multiple times per day) to those who use online tools rarely (7% use online tools only a few times per year). Although the latter group is small, the web portal will benefit from a design that is easy for these potential users to operate, while accommodating the needs of users with more technical savvy.

The survey responses indicate that a new training portal could provide a valuable resource to water professionals. The majority of operator respondents are pursuing professional development, with 60% reporting that they had attended one or more drinking-water-related courses in the past year. Over one-half of operator respondents (68%) stated that they sometimes or often proactively search for training information, and 48% of trainer respondents reported that they search for training information online. Of all respondents, 78% reported that they would be likely or very likely to use a new statewide online training portal if one is developed.

Currently, respondents attempt to resolve their training information needs using a variety of websites and other tools. Table 2 summarizes respondents' use and opinions of selected existing online resources for training information. Respondents' activities on these sites include:

- ▶ Obtaining information on the Capacity Building Unit (CBU) "Coaching for TUs" program
- ▶ Obtaining contact information for coaching assistance
- ▶ Obtaining information about available training opportunities/events
- ▶ Locating/following links to other training resources
- ▶ Obtaining testing information (e.g., dates, locations)
- ▶ Obtaining training unit (TU) information (e.g., number of TUs per training session per location).

Special considerations for operator respondents

Table 3 lists challenges or obstacles faced by operator respondents when seeking training information. Although a significant number of operator respondents stated that nothing impeded their ability to find the necessary training information, many of them also admitted in the free text portions of the survey that the survey provided their first exposure to one or more of the existing online resources. A lack of awareness of available training resources may thus be an invisible obstacle. Operator respondents who did identify challenges were most likely to indicate difficulties related to finding the information they need.

Table 2. Respondents' use and opinions of existing training resources (n = 465)

	CDPHE training opportunities website	OCPOweb	RMSAWWA training website
Respondents who use the resource sometimes or often	52%	74%	45%
Respondents who rate the resource's content as useful or very useful	40%	53%	35%
Respondents who rate the resource as easy to use or very easy to use	25%	37%	26%
Respondents who rate the resource's design as attractive or very attractive	20%	22%	19%
These percentages reflect the results of multiple survey questions.			

Table 3. Challenges or obstacles encountered by operator respondents (n = 450)

Challenges/obstacles	Number	Percentage
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Table 3. Challenges or obstacles encountered by operator respondents (n = 450)

Challenges/obstacles	Number	Percentage
There are no challenges or obstacles	149	33%
No answer given	109	24%
Don't know where to look for information	90	20%
Too many conflicting sources of information	85	19%
Can't find needed course information	71	16%
Information is difficult to understand	29	6%
Training is too expensive	15	3%
Cannot find training in my location	14	3%
Sources of information are not user-friendly	9	2%
Cannot find training that fits my schedule	9	2%
Cannot find information/training/materials for my position or field	8	2%
Confusion about the process for certification/submitting course credits	7	2%
Cannot find information/training/materials sufficiently tailored to certification level	4	< 1%
Have found inaccurate information	3	< 1%
Cannot find training information far enough in advance	2	< 1%
Course curriculum not pertinent to required exams	2	< 1%
Sources of information are not updated frequently enough	1	< 1%
Course curriculum is inaccurate	1	< 1%
No access to internal training of organizations	1	< 1%
Percentages do not add to 100% because respondents could select multiple responses.		

Special considerations for trainer respondents

The trainer segment of the survey respondents is composed of water industry veterans. Only three out of the 15 trainer respondents reported that they have less than one decade of experience as a drinking water trainer, and eight of the respondents have more than 20 years of experience in the water industry. Also, 60% of these respondents have had at least some education designed for trainers or instructors (e.g., a “train the trainer” type of course or a class in instructional design). The trainer respondents face challenges in (1) developing, delivering, and marketing their training courses, as well as recruiting students; (2) engaging students and accommodating students at differing skill levels; (3) developing relevant curricula; (4) keeping courses affordable; (5) arranging logistics; (6) locating accurate, complete contact lists for potential students; and (7) marketing courses in many different venues.

3.2 Features/Functionality

This section summarizes findings related to the potential features or functionality of the web portal. These observations inform the recommendations listed in Section 4, *Functional Requirements*.

The survey asked respondents to list and rank the top three online training resources they consider most useful for meeting their needs. Table 4 summarizes the results of this inquiry.

Table 4. Online training resources ranked as top three most useful

Resource	Score ^a	Total mentions	Ranked #1 mentions	Ranked #2 mentions	Ranked #3 mentions
OCPOweb	328	143	71	43	29
CDPHE	199	104	22	51	31
Colorado Rural Water Association (CRWA)	194	75	52	15	8
RMSAWWA	132	72	20	20	32
American Water Works Association (AWWA)	40	20	6	8	6
Indigo Water Group	33	14	7	5	2
Rocky Mountain Water Environment Association (RMWEA)	17	8	2	5	1
Montana Water Training Center	16	6	5	0	1
Red Rocks Community College	13	5	3	2	0
Google	12	5	3	1	1
U.S. Environmental Protection Agency (EPA)	9	4	2	1	1
Technical Learning College (TLC)	9	4	1	3	0

Table 4. Online training resources ranked as top three most useful (cont.)

Resource	Score ^a	Total mentions	Ranked #1 mentions	Ranked #2 mentions	Ranked #3 mentions
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Colorado Intergovernmental Risk Sharing Agency (CIRSA)	8	3	2	1	0
360 Water	6	2	2	0	0
The Water Sifu	6	2	2	0	0
Great Events TEAMS (getteams.com)	6	2	2	0	0
California State University, Sacramento (Sacramento State)	5	4	0	1	3
Water Environment Federation (WEF)	5	3	0	2	1
Colorado Backflow Prevention Association (CBPA)	3	1	1	0	0
Pure Safety	3	1	1	0	0
Colorado Springs Utilities training site	3	1	1	0	0
Rocky Mountain Water and Wastewater School	3	1	1	0	0
Fred Pryor Seminars	3	1	1	0	0
Rocky Mountain Water Environment Federation (RMWEF)	3	1	1	0	0
Utah Division of Drinking Water	3	1	1	0	0
EduMine	3	1	1	0	0
International Association of Plumbing and Mechanical Officials (IAPMO)	2	1	0	1	0
Oklahoma Rural Water	2	1	0	1	0
Tetra Tech	2	1	0	1	0
EPA Contaminated Site Clean-Up Information (Clu-in.org)	2	1	0	1	0
Wastewater Education & Training (WWET)	2	1	0	1	0
Front Range Standards Committee	1	1	0	0	1
Rural Community Assistance Corporation (RCAC)	1	1	0	0	1
Region 8 Pretreatment Association (R8PA)	1	1	0	0	1
Colorado University	1	1	0	0	1
Rocky Mountain Association of Environmental Professionals (RMAEP)	1	1	0	0	1

a. Scores are based on the number of times respondents ranked a website as their first, second, or third choice. Websites received three points for a #1 mention, two points for a #2 mention, and one point for a #3 mention.

Other websites mentioned by survey respondents but not listed among their top three include Emily Griffith Technical College, Hach, Pikes Peak Community College, and the American Backflow Prevention Association (ABPA). Appendix C provides a list of the websites mentioned in the survey and identified during our website review, along with brief descriptions of the sites and the uniform resource locators (URLs). These sites can be considered for inclusion as links in the new web portal, with examples of possible portal content provided as well.

The respondents were asked to elaborate on why they rated specific resources as most useful, which provided insight into the factors that increase the value of an online training resource. The respondents gave the following reasons:

- ▶ Provides clear, complete, accurate, and high-quality information about training opportunities, certification requirements, testing dates/locations, etc.
- ▶ Helps them manage/record/submit TUs according to their needs.
- ▶ Provides a wide variety of information/opportunities to earn broadly applicable TUs.
- ▶ Allows easy access to information and demands low effort to find it.
- ▶ Has an easy-to-use, intuitive interface.
- ▶ Provides information specific to their position or field.
- ▶ Provides free educational materials.
- ▶ Provides links to other resources; interconnectedness.
- ▶ Remains active and current.
- ▶ Provides information that helps them minimize training costs.
- ▶ Does not obligate them to receive messages through a mass email list.
- ▶ Provides information directly to users in convenient email format.
- ▶ Follows consistent, logical organization.
- ▶ Makes it easy to contact a real person, if necessary.
- ▶ Is recommended by a trusted source of information (e.g., peers, training institution).
- ▶ Follows the water industry closely.
- ▶ Provides useful content for developing course material.
- ▶ Connects directly with water operators.

Given a list of specific potential features for a new web portal, more than 50% of the respondents rated all but two of the suggestions as useful or very useful. Table 5 provides more detail.

Table 5. Respondents rating potential web portal features as useful or very useful (n = 465)

Feature	Number	Percentage
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Calendar of available training courses	333	72%
Library of publicly available training materials	327	70%
List of webinars, conferences, and other resources	318	68%
Method to track courses taken/TUs earned (for operators)	317	68%
Map of locations of available training courses	312	67%
Ability to post feedback on courses taken	293	63%
Ability to provide ideas for courses to be offered	292	63%
Ability to see others' posted feedback on courses taken	289	62%
A centralized course evaluation system	287	62%
Collaborative spaces/tools to facilitate communication with other training providers (for trainers)	238	51%
Ability to post courses to web portal (for trainers)	204	44%
Self-assessment tool (for trainers)	190	41%
No answer given	116	25%
Percentages do not add to 100% because respondents could select multiple responses.		

Respondents also submitted the following feature suggestions in free-text portions of the survey:

- ▶ Automate processes such as certification renewal and exam applications
- ▶ Foster peer-to-peer learning and communication among operators
- ▶ Provide ability to track training goals/progress and access records from previous courses taken
- ▶ Provide ability to search for courses by cost
- ▶ Provide ability to sort classes by online vs. in-person
- ▶ Web portal should accommodate people who do not have advanced computer skills
- ▶ Web portal should accommodate people who do not have high bandwidths
- ▶ Help accommodate online courses
- ▶ Provide easy and clear site navigation and search tools
- ▶ Provide ability to search for courses by anticipated class size (e.g., lecture hall vs. conference room)
- ▶ Tailor email messages to recipients' needs according to user profile (e.g., interests, classification)

- ▶ Offer automated deadline/course reminders
- ▶ Provide ability to ask questions about the training before registration
- ▶ Provide ability to search for courses by level (e.g., advanced, basic)
- ▶ Use advertising sales to fund course costs or web portal costs
- ▶ Provide ability to ask operating professionals specific questions
- ▶ Provide ability to suggest links for the web portal
- ▶ Accommodate operators seeking reciprocal certification in other states
- ▶ Allow unregistered users to access most features except for those enabled by logging in
- ▶ Provide ability to give feedback on courses taken
- ▶ Provide ability to submit practice test questions.

One final, potentially relevant observation about trainer respondents is that they use a relatively even mix of a variety of methods to publicize the courses they offer. However, none reports currently using social media to publicize course offerings.

3.3 Content/Organization

This section summarizes findings related to the potential content for the web portal. These observations inform the recommendations presented in Section 5, *Content Outline*.

The survey asked operator respondents to assess the usefulness of various types of information in helping them select training courses or meeting other career development needs. Table 6 summarizes the results of this inquiry. These results are also relevant to Section 3.2, *Features/Functionality*, because the information users will need to select available courses is both recommended content and the foundation for developing useful search terms/limiters for the web portal's search functionality.

Table 6. Information useful for course selection (n = 450)

Information	Number	Percentage
Location	339	75%
Training units earned	317	70%
Cost	271	60%
Date/time	252	56%
Description/subject	249	55%

Table 6. Information useful for course selection (n = 450)

Information	Number	Percentage
Class length	135	30%
Training provider	102	23%
No answer given	73	16%
Online or in-person	5	1%
Internal/external to organization	2	< 1%
No information needed	1	< 1%
“To learn about other systems”	1	< 1%
Content level (e.g., beginner, advanced)	1	< 1%
Quality/feedback on course/trainer	1	< 1%
Available open slots	1	< 1%
Percentages do not add to 100% because respondents could select multiple responses.		

The survey provided respondents with a list of potential content items for the new web portal, and asked them to rate the usefulness of each item. Table 7 provides a summary of the findings.

Table 7. Respondents rating potential web portal content as useful or very useful (n = 465)

Content item	Number	Percentage
Certification information	337	72%
Course curricula (text descriptions and other materials used in courses)	329	71%
Information on essential tasks, capabilities, and core competencies for water operators (on national and state levels)	311	67%
Information explaining how each course relates to potential career paths	277	60%
Information explaining potential career paths within the water industry (career roadmap)	276	59%
Trainer standards, competencies, and expectations	267	57%
Information to help trainers identify gaps in currently available courses/new courses	260	56%
Online Trainer’s Toolkit (containing adult learning information, instructional design information, forms, and checklists)	243	52%
Information about train-the-trainer events	230	49%

Respondents also submitted the following content suggestions (some of which reiterate the need for the content listed in Tables 6 and 7) in the free-text portions of the survey:

- ▶ For all courses/exams: fee/cost, payment method, class size, one-year schedule, location, deadlines, and TUs
- ▶ Links to training providers’ websites

- ▶ Greater clarity in determining courses appropriate for certification types, levels, and departments (e.g., specific manuals and separate training opportunities by level of certification)
- ▶ Links to certification applications
- ▶ Information about process for transferring credits between states
- ▶ Links to similar online resources in other states
- ▶ Graphic content, including clip art and photographs
- ▶ Exam study materials, including study guides, interactive practice tests, “flashcard” tool
- ▶ Up-to-date contact information
- ▶ Section of the site dedicated to basic math, interactive learning tools
- ▶ Employment opportunities and available internships
- ▶ Information for utility management
- ▶ Information for wastewater professionals
- ▶ Information for utility maintenance workers
- ▶ Information on available software
- ▶ Career path information (e.g., what should be studied for each certification?)
- ▶ Course information from private training companies.

4. Functional Requirements

The functional requirements documentation presented in this section is intended to guide the development of the web portal by delineating essential and non-essential features and functionality to include in the web portal design. Essential requirements include features and functionality that are necessary components of an effective training web portal. Non-essential requirements include items that would enhance the web portal but could be eliminated because of cost or other constraints or added to the portal over time.

4.1 Documentation

Recommended essential features and functionality

12. A searchable database of Colorado water training courses will provide the most critically important functionality of the web portal. Users will be able to search course listings that compile available courses offered by the following sources (at a minimum): OCPO, CDPHE, RMSAWWA, and affiliated training providers. The database will be populated with training course information collected through some combination of the following potential methods:
 - h. Semi-automated aggregation of course information accessible from existing online training resources (e.g., OCPOweb). Because the level of detail for course information that is recommended in this report does not exist on currently available online resources, a site administrator will likely need to manually enhance and augment the information that is incorporated into the database via aggregation for the foreseeable future.
 - i. Submission of course information to the web portal by trainers through a web form. This information is approved by the site administrator before publication. Note that trainer submission of course information to the web portal is currently envisioned as completely separate from the OCPO application process to receive TU approval.
 - j. Manual entry by the site administrator, who routinely monitors existing online training resources for relevant information.
13. The web portal will provide multiple search options. Users will search using a basic keyword search functionality (single text box) and an advanced search, including the following search limiters (at a minimum): topic category (e.g., water systems, small water systems, water distribution), location (see additional information below), certification level, content level (e.g., beginner, advanced), cost range, date range (see additional information below), time range (e.g., daytime, evening), TUs earned, description or subject (possibly incorporating assigned tags), course duration and length, training provider, and setting (i.e., online or traditional classroom course).
14. The web portal will augment users' search capability with a calendar feature that, at a minimum, will contain training course information. It may also include information related to other events of interest to the web portal audience.
15. The web portal will augment users' search capabilities by integrating online mapping (e.g., Google Maps or similar). Users will be able to see a map with markers pinpointing locations where upcoming available courses will be held. Clicking on markers will allow users to access a pop-up window with selected course details. Users will also be able to search by distance from a specific address and subsequently access route directions.
16. The web portal will accommodate multiple levels of access permissions via

account registration and log-in features. Access permissions will govern users' ability to access and (in some cases) edit web portal content according to the following access levels (at a minimum):

- e. General user. No log-in required. The majority of web portal content is accessible.
- f. Registered user. Log-in required to access portions of the web portal designed to provide a customized experience (see additional information below).
- g. Registered trainer. Log-in required to access content restricted to trainers. It will enable them to submit, review, and edit course listings, and participate in collaborative interactions with other trainers (see additional information below).
- h. Site administrator(s). Log-in required to edit content, alter web portal format or organization, grant permissions to users, and other activities.

- 17. The web portal will allow multiple audience segments to access targeted content (e.g., through tabs or other mechanisms). Audience segments include current water professionals seeking training courses or other career development materials, students or others considering entering the water sector, and trainers.
- 18. The web portal will efficiently organize large amounts of different types of content, such as static documents (e.g., downloadable PDFs); dynamic, editable articles and events; and libraries of relevant links. The web portal will also accommodate an effective search of all content (possibly incorporating tags), and multiple portions of the web portal will be able to repurpose the same content for different audience segments (e.g., some career development information content items will be available in the dedicated portal sections for current and potential water professionals because they are applicable to both groups).
- 19. The web portal will allow users who provide contact information to opt to receive email updates on recently added course information, upcoming deadlines, and other relevant information.
- 20. The web portal will belong to the 2015 Strategy partners or (potentially) affiliated entities and not the web developer. Designees of the 2015 Strategy partners will have the ability to edit or alter the web portal platform, files, code, or other components. Throughout the development phase, the web developer will generate detailed documentation that is sufficient to enable the efficient transfer of the web portal administration to the 2015 Strategy partners or their designee(s), as necessary. This documentation will be presented in an electronic format at project completion.
- 21. The developer will select a platform for the web portal that accommodates alteration and administration by non-technical staff.

22. The developer will incorporate search engine optimization in the web portal design and implementation.
23. The web portal platform will accommodate a version of the portal that is optimized for mobile devices.

Recommended non-essential features and functionality

24. The web portal can incorporate an interactive tool that allows registered users to set personal training goals, track their progress, maintain training records (e.g., TUs earned), and streamline the process for preparing to submit records for certification/recertification. Note that this progress tracking feature is currently envisioned as a tool for the users' information only. The official OCPO process for renewal of certification would remain completely separate. However, the progress tracking feature could still help make the renewal process easier for operators by allowing them to keep all their information in one place. This tool's development can be based on career pathway information, need-to-know criteria, and other career development documentation.
25. The web portal can integrate popular social media tools (e.g., Facebook).
26. The web portal can integrate analytical tools (e.g., Google Analytics) that can help track performance metrics and provide additional audience insights.
27. In an area restricted to registered trainers, the web portal can provide a collaborative space for trainers, which can accommodate discussion and professional networking among Colorado's water training community.
28. The web portal can allow users to submit feedback on training courses they have attended. This feature could be implemented using a variety of techniques, including but not limited to:
 - d. Users submit private messages through a web form to the site administrator. The site administrator then forwards the feedback to the appropriate recipients (e.g., trainer or supervisor, OCPO).
 - e. Users submit feedback-related comments and/or specific scale ratings on a public board. This option is likely to require the site administrator to review feedback for appropriateness.
 - f. The web portal can integrate with a centralized online course evaluation system in which (1) course/instructor evaluations are collected electronically, and (2) aggregated information is available on the web portal. It is recommended that trainers have the option to display their evaluation information if desired.
29. The web portal can allow registered users to opt to receive customized email

updates with reminders of start dates for their courses, relevant deadlines or alerts regarding the next time a course in which they are interested is offered, and other personalized information.

30. The developer can provide hosting and domain name administration of the web portal on behalf of the 2015 Strategy partners. Additionally, the 2015 Strategy partners can consider entering into an extended service agreement with the developer for long-term web maintenance service (e.g., troubleshooting technical issues).

4.2 Platform

The nature of the project indicates a strong likelihood of using a content management system (CMS) as the web portal platform, with some degree of customization depending on the specific features ultimately prioritized by the 2015 Strategy partners. The level of customization from a standard “out of the box” CMS installation will affect the budget required (see also Section 7, *Budget*).

However, we recommend that the SOW not limit the potential ingenuity of the web developer by mandating a specific platform for the web portal, particularly in light of the decision to host the web portal independently of any of the 2015 Strategy partners’ websites (see also Section 8, *Long-term Web Portal Management*). This decision eliminates the need to accommodate existing infrastructure. Web developers responding to the web portal Request for Proposal will be expected to submit a technical approach to the project that includes a recommendation for a web portal platform which satisfies the requirements set forth in this report. A successful technical approach will include a clear rationale for the proponent’s platform selection.

4.3 Discussion

The relatively low-satisfaction rankings that survey respondents assigned to existing online training resources suggest that the web portal development should maximize ease of use, attractive design, and graphic content, as appropriate. Survey respondents’ views about the information most useful for selecting courses (Table 6) inform our recommendations for design of the web portal’s search functionality.

We recommend prioritizing the users’ perspective and convenience over accommodating internal business processes. For example, operator respondents repeatedly expressed a need for greater clarity in determining the courses appropriate for certification level. Enabling a search by certification level may become logistically complex for the web developers, partly because courses regularly cover multiple certification levels, but users will benefit from the effort to include this option.

We recommend balancing the need to attract users to the web portal with activities intended to proactively deliver important information to the audience. We offer two suggestions for types of email communication, with the caveat that the target audience is likely to respond more favorably to opt-in rather than opt-out mailing lists.

Neither the operator respondents nor the trainer respondents use social media heavily, and one commenter in a free-text portion of the survey disparaged the usefulness of these tools. The maintenance of social media account(s) could also add to the task of ongoing site administration. However, future industry demographic shifts could cause changes in workforce opinions, increasing the importance of popular social media in communicating with the web portal's target audience. Also, a scaled-down social media presence could provide the web portal with an additional venue in which to disseminate announcements and other relevant information to interested members of the audience. Therefore, although social media remains a low priority for now, we nevertheless recommend its consideration as a nonessential component of the web portal.

It is important to note that many of the challenges and obstacles encountered by respondents are beyond the purview of the web portal to resolve (e.g., lack of training offered in an operator's region, trainers looking for instructional methods that engage students). However, open discussion and effective collaboration among trainers could help address these issues in the future. The web portal can support solving big-picture problems by implementing tools to help build an effective community for Colorado trainers. For example, it can provide a venue at which trainers could cooperate to identify curriculum gaps in the current course offerings, or increase training coverage in remote parts of the state.

For now, we recommend limiting the collaborative space to registered trainers. However, one commenter in a free-text portion of the survey suggested a similar idea for operators as well. Contingent upon successfully bolstering the trainers' community of practice, the 2015 Strategy partners could explore expanding this service to operators.

5. Content Outline

This section presents a list of content items to be included in the web portal, organized by content categories. All of the content listed below is considered essential to include in the portal.

5.1 Documentation

Basic information

31. The web portal will include an "About the Site" article. This is a standard practice, and the article will include routine information about the purpose and background of the web portal, as well as information about its governing

organization and site administrator.

- 32. The web portal will describe the water certification process, with links to additional information.
- 33. The web portal will include guidelines for user-submitted content, including moderation policies, necessary disclaimers, or other information.
- 34. The web portal will include a site map that shows the organization and contents of the web portal.

Resources

- 35. The web portal will collect a library of publicly available materials on topics of interest to the its audience. Content items in the library could be hosted directly or linked from other websites. Content items could include downloadable PDFs of government documents, links to recommended resources, or descriptions of or brief reviews of books, with links to where they are available for purchase. Emphasis will be placed on locating free resources. Users will be able to submit suggestions for materials to include.
- 36. The web portal will include educational resources for basic math, including study guides, self-tests, interactive learning tools, or links to where this type of information can be found elsewhere on the web.

Training information

- 37. The web portal will consolidate information on available water training courses offered by a wide variety of training providers, as described in more detail in Section 4, *Functional Requirements*. The web portal will also provide information on other types of career development opportunities, such as workshops, conferences, presentations, networking events, or on-campus information sessions.
- 38. The web portal will provide or link to water certification examination information. This can include test preparation materials, self-tests, or interactive learning tools.
- 39. The web portal will provide or link to information on coaching assistance.
- 40. The web portal will publish profiles of training providers that could potentially include contact information, aggregated course feedback/ratings, or links to their websites.
- 41. The web portal will provide links to the official websites of prominent water industry and environmental organizations (e.g., OCPO, RMSAWWA, EPA),

with an emphasis on their available training resources.

42. The web portal will provide a Frequently Asked Questions (FAQs) resource that will answer operators' questions about the web portal, training courses, the certification process, and other topics of interest to users. Some content for this resource will be pre-populated and available at the site launch, but it is important to allow users to submit their own questions through an "ask an expert" web form, a dedicated email address, the site administrator's contact information, or another method.

Career development information

43. The web portal will provide or link to information intended to assist current operators in assessing their training needs in comparison to career pathway and certification process documentation (e.g., determining what course to take to meet personal goals). This will constitute a large amount of information that may be incorporated into an interactive tool (as described in Section 4, *Functional Requirements*); published in a library of static, downloadable materials; or linked to on another online resource.
44. The web portal will provide or link to career exploration/development information, such as the *Colorado Drinking Water Career Roadmap*, the *Colorado Task 1 Report: Need-to-Know Criteria Usage Guidelines & Prioritization*, and other similar documents, as well as occupational outlook or average salary information.
45. The web portal will include a compendium of links specifically of interest to prospective water professionals. Users will be able to submit suggestions for resource links to include. There will be cross-over content with #33 above.

Information relevant to trainers

46. The web portal will collect resources to provide a toolkit of materials relevant to trainers, including the current contents of the Trainers' Toolkit.
47. The web portal will provide or link to information on seminars, webinars, and other events of interest to training providers.
48. The web portal will include information on training standards and expectations.

5.2 Discussion

All content will need to be well organized, clearly written, and easy to understand in order to overcome the obstacles listed in Table 3, such as “Don’t know where to look for information” (20% of operator respondents) and “Information is difficult to understand” (6% of operator respondents).

One important purpose of the web portal is to provide access for Colorado’s water professional community to tap into the 2015 Strategy and its resulting guidance and information products. Deliverables from projects related to the *Administrative Framework*, including the *Colorado Drinking Water Career Roadmap* and the *Colorado Task 1: Need-to-Know Criteria Usage Guidelines & Prioritization*, are considered critically important content to include in the web portal. This information may be included directly as presented in deliverables and/or incorporated in the form of interactive tools built by the web developer.

Operator respondents consistently expressed concerns about the affordability of training and the difficulty in justifying training expenses to their work supervisors. To serve this pressing audience need, efforts should be made to locate or create free or low-cost resources. Once these are collected, the web portal’s organization should highlight these resources using at least one of many possible methods, such as collecting them on a separate portion of the web portal or using keyword tags to enable effective searches.

6. Project Schedule

The proposed project schedule in Table 8 provides a broad timeline for meeting project objectives based on important milestones.

Table 8. Project schedule

Phase and milestone	Estimated deadline
Pre-portal development (content development)	3 months
Project administration and meetings	
Collect and review resources	
Assess content items	
Develop draft content	
Compile link lists	
Develop final content	
Iterative work with web developer(s)	Continues throughout development phase
Portal development	8 months
Web development kickoff meeting	
Draft concept 1	
Draft concept 2	

Pre-test ideas with target audience (organization, usability)
 Final concept agreement (no additional functionality added)
 Beta site completed
 Beta testing
 Site launch

Post-portal development	1 month
Training	Some marketing continues throughout portal lifetime
Marketing	

Designed around a 12-month development schedule, the web portal project schedule could be adjusted as necessary with demonstrated justification. This schedule is intended to accommodate multi-phase planning, cooperation with iterative content development, and an appropriate level of usability testing at different stages of development.

If the web development is conducted separately from the content development, it is expected that these two phases will be effectively coordinated. The web development will advance more quickly if the content development is as complete as possible beforehand. We recommend as an early milestone of content development an assessment of content items (e.g., identify existing content, such as the documents developed as part of the *Administrative Framework*; identify the percentage of total content for the web portal that is new content to be developed). Information gathered during this assessment will assist in obtaining accurate bids from web developers.

7. Budget

The web portal development will likely require a prioritization of the services provided (to the audience). It may be necessary to restrict the web portal development to include only essential components, or to implement a phased development in which prioritized features are developed first.

As indicated above, factors that may result in increased costs include:

- ▶ Incorporating options into the web portal design that require a more sophisticated information architecture
- ▶ Creating interactive tools, including customization of the mapping tool
- ▶ Negotiating with the web developers for a service agreement continuing past the web portal's launch
- ▶ Implementing the collaborative community for trainers
- ▶ Increasing the level of effort assigned to the site administrator, which can range from a short list of duties that can be fulfilled by one or more people in addition to their primary job functions, to a role that requires full-time effort (see Section 8, *Long-term Web Portal*)

Management).

Table 9 provides an estimate of the anticipated cost of meeting the project objectives.

Table 9. Budget

Task	Estimated project cost (essentials only)	Estimated project cost (essentials and non-essentials)
Content development	\$42,500	\$57,000
Web development	\$75,000	\$100,000
IT administration/hosting costs for five years	\$2,500	\$18,500
Marketing/community engagement strategy	\$5,000	\$10,000
Total	\$125,000	\$185,500

With the exception of some ongoing costs related to information technology (IT) administration (see line 3 of Table 9), this budget only accounts for external costs associated with startup/development costs for building and launching the web portal. The budget does not account for internal costs, such as staff time for the site administrator(s).

To develop the budget, Stratus Consulting conducted an initial project cost estimate based on internal research. We then gathered information from three web development firms to verify the validity of our estimates. One web development firm provided estimates significantly higher than the others, totaling as much as \$300,000. While we believe that Table 9 presents a reasonable estimation of costs associated with the requirements collected in this report, it is possible that our estimates could be on the lower end of the potential cost spectrum. Also, the OCPO representative on the Web Portal Work Group suggested that IT administration/hosting costs for a web portal with a sophisticated database backend could reach as high as \$7,000 a year.

8. Long-term Web Portal Management

This section recommends a process for controlling the content and the long-term management of the web portal.

8.1 Recommendations

49. In order to maximize flexibility and responsiveness to user needs while minimizing administrative burdens, the web portal will be hosted as a separate entity unconnected to any of the official websites of the sponsoring organization(s). Currently, CDPHE intends to fund the web portal project for five years.

50. Explore options for partnering with a wastewater-related organization(s) to share future funding and long-term maintenance responsibilities in order to expand the scope of the web portal. In the free-text portion of the survey dedicated to the discussion of roles, many respondents reported that from an operator perspective, there is significant crossover between the water and wastewater sectors. Many certified operators are certified in both areas in order to maintain versatility on the job market. Consequently, it is possible the web portal could launch with a note that the content currently emphasizes drinking water, but that more varied content will be developed and available in the future.
51. After the web development is complete and the web portal is successfully launched, the Web Portal Work Group or a similar governing committee can continue to oversee its management, including ongoing decisions about how to market the portal, determine appropriate content, coordinate with the trainer community, and other key decisions. The web developers will provide full ownership, access, and editorial control to the Governing Committee.
52. One or more site administrators will report to the Governing Committee and conduct day-to-day web portal maintenance tasks, including but not limited to the tasks listed in numbers 42–50 below.
53. Monitor web portal activity.
54. Update content, as appropriate.
55. Curate the catalog of course listings. Provide oversight for trainer-submitted course information.
56. Approve users for registered trainer status and assign other types of access permissions as necessary.
57. Periodically review links for relevancy and check for dead links.
58. Review and approve user-submitted content.
59. Moderate trainer community discussions.
60. Manage ongoing usability testing or other post-development user needs/satisfaction assessment efforts (e.g., user surveys).
61. Evaluate web portal performance using established metrics and web analytics tools.
62. Conduct marketing efforts. Many survey respondents demonstrated a lack of awareness of existing online training resources. This shows the critical

importance of marketing the web portal effectively both as it launches and continuing into the future (e.g., ensure that other training- and water-related websites link to the web portal; actively promote it to water foundations, agencies, utilities, and other organizations).

63. Develop and implement a community engagement strategy. A successful web portal will stand at the center of a user community even if the recommended collaborative space for trainers is not implemented. However, implementing this feature will increase the importance of developing an engagement strategy. Unlike marketing efforts designed to increase awareness of and lure new users to the web portal (i.e., building an audience), an engagement strategy will focus on delivering increased value through users' continued interactions with the web portal (i.e., building a community). Creating a strategy for heightening user engagement will ensure user-centric decision choices from the beginning and will maximize site traffic throughout the lifetime of the web portal.

8.2 Future Issues

The survey raised a number of ideas and issues that are beyond the scope of this project. These issues are summarized below.

As discussed in Section 2.2, *Survey*, our survey sample may have influenced the survey results in favor of respondents with increased access to and familiarity with web-based tools. Further research using non-web-based survey methods or alternate sources of contact information might provide additional relevant information about the potential audience for the web portal.

Similarly, Stratus Consulting invited as many trainers as possible to complete the survey within the constraints of this project. However, their needs and preferences remain under-represented in the survey results. If possible, we encourage more research to delve further into the user needs of this important audience, possibly drawing on OCPO contact resources for future surveys. Note that if OCPO contact lists are used, future information-gathering efforts must adhere to OCPO's communication governance (e.g., approval of text).

The free-text portions of the survey indicate that respondents experience a great deal of confusion regarding the overall certification and career development process. They encounter problems when verifying needed course information and submitting earned credits to appropriate authorities. They experience frustration with inconvenient timetables, education/testing cycles, and their perception of a problematic disparity between course curriculum and exam preparation. They expressed concerns about trainer accountability, with worries about finding "inaccurate" or "deceptive" course information online, and they desire more accommodation for different locations, schedules, learning styles, and experience levels. For example, several respondents expressed the desire for more options for online training courses. It is beyond the scope currently envisioned to use the web portal to host online training opportunities, and the web portal cannot

directly address common barriers that prevent online training courses from receiving TU approval. Many of these concerns will need to be addressed through a coordinated effort by the various agencies and organizations that provide operator training.

However, the web portal can assist (to some extent) by clarifying complex processes for users through increased transparency, and providing trainers with the information needed to identify and fill gaps in training topics, locations, and schedules. Using the example of online training courses, discussion among trainers and increased coordination between trainers and the 2015 Strategy partners could help generate solutions (such as best practices for monitoring applicants' attendance) that could help trainers align their online offerings more closely with state regulations. Finally, the web portal could benefit from considering other potential audiences, e.g., including human resources staff or in-house trainers at utilities as part of the trainer community.