OFFICE OF THE STATE AUDITOR

# DIANA DIZOGLIO

Official Audit Report – Issued October 16, 2025

## Massachusetts Teachers' Retirement System

For the period July 1, 2023 through June 30, 2024

State House Room 230 ■ Boston, MA 02133 ■ auditor@massauditor.gov ■ www.mass.gov/auditor

OFFICE OF THE STATE AUDITOR

# DIANA DIZOGLIO

October 16, 2025

Jonathan Osimo, Executive Director
Massachusetts Teachers' Retirement System
500 Rutherford Avenue, Suite 210
Charleston, MA 02129

Dear Executive Director Osimo:

I am pleased to provide to you the results of the enclosed performance audit of the Massachusetts Teachers' Retirement System. As is typically the case, this report details the audit objective, scope, methodology, finding, and recommendations for the audit period, July 1, 2023 through June 30, 2024. As you know, my audit team discussed the contents of this report with agency managers. This report reflects those comments.

I appreciate you and all your efforts at the Massachusetts Teachers' Retirement System. The cooperation and assistance provided to my staff during the audit went a long way toward a smooth process. Thank you for encouraging and making available your team. I am available to discuss this audit if you or your team has any questions.

Best regards,

Diana DiZoglio
Auditor of the Commonwealth

# TABLE OF CONTENTS

# LIST OF ABBREVIATIONS

| | |
|---|---|
| EOTSS | Executive Office of Technology Services and Security |
| IT | information technology |
| MTRS | Massachusetts Teachers' Retirement System |
| W3C | World Wide Web Consortium |
| WCAG | Web Content Accessibility Guidelines |

# EXECUTIVE SUMMARY

In accordance with Section 12 of Chapter 11 of the Massachusetts General Laws, the Office of the State Auditor has conducted a performance audit of certain activities of the Massachusetts Teachers' Retirement System (MTRS) for the period July 1, 2023 through June 30, 2024.

The purpose of our audit was to determine whether MTRS's website adhered to the World Wide Web Consortium's Web Content Accessibility Guidelines (WCAG) 2.1 for user accessibility, keyboard accessibility, navigation accessibility, language accessibility, error identification, and color accessibility. Adherence to WCAG helps ensure that all users, regardless of ability, can access the content and functions of MTRS's website.

Below is a summary of our finding, the effect of that finding, and our recommendations, with hyperlinks to each page listed.

| | |
|---|---|
| **Finding 1**<br>**Page 11** | MTRS's website was not fully accessible to all website users. |
| **Effect** | Noncompliance with WCAG 2.1 reduces accessibility for individuals with disabilities and limits equitable access to MTRS information and services. Specific risks include the following:<br>• A lack of keyboard navigability means that users with mobility impairments cannot access certain content.<br>• Because MTRS's website does not make the first focusable control on a webpage a hyperlink that skips to the main content of the webpage, users who navigate sequentially through webpages are forced to navigate through repeated content every time a webpage loads. This increases the time needed to reach the desired information on a webpage and may, for users who have motor impairments, make navigating content cumbersome or difficult.<br>• Hyperlinks that do not have a 3:1 contrast ratio or a secondary identifiable component may be imperceptible to users and will prevent them from interacting with MTRS content.<br>• If MTRS's website cannot reflow at 400%, some users will not be able to read content if they zoom in to alleviate a visual impairment.<br>• Broken or faulty hyperlinks limit users from having access to critical information and key online services offered by MTRS. Broken or faulty hyperlinks also increase the likelihood that users may either access outdated or incorrect information or be directed to webpages that no longer exist.<br>• Improper use of headings and labels makes it difficult for users to navigate and read the website. Additionally, improper use of headers and labels negatively impacts users who rely on screen readers to navigate the website.<br>• Entry fields that are improperly labeled or that do not provide users with warnings about input errors or omissions prevent users from accessing MTRS content. |

| | |
|---|---|
| **Recommendations Page 14** | 1. MTRS should work with its vendor to resolve the issues directly identified in this report.<br>2. MTRS should select a new theme for its website with more accessible design elements.<br>3. MTRS should train staff members on website accessibility requirements and provide staff members with third-party website accessibility tools to monitor WCAG compliance.<br>4. MTRS should implement preventative controls to ensure that content on its website is posted in a WCAG-compliant manner.<br>5. MTRS should ensure that its third-party vendor monitors the website for instances of WCAG noncompliance, or MTRS should acquire tools to monitor WCAG compliance on its own. |

# OVERVIEW OF AUDITED ENTITY

The Massachusetts Teachers' Retirement System (MTRS) was established on July 1, 1914. According to its website, MTRS, which is the largest of the Commonwealth's 104 contributory retirement systems, provides retirement, disability, and survivor benefits to Massachusetts teachers, administrators, and their families.

Chapter 32 of the Massachusetts General Laws establishes the system's benefits, contribution requirements, and accounting structure. Teachers and administrators in Massachusetts public schools (except those employed by the City of Boston), educational collaboratives, and charter schools are eligible for membership.

During fiscal year 2024, MTRS received a funding appropriation of $2,352,500,000 and, as of January 1, 2024, managed assets with a market value of $38,228,453,000. As of June 30, 2024, MTRS had a total pension liability of $65,779,000,000 and a net pension liability of $25,356,461,000.

As of December 2023, MTRS had 98 full-time and 17 part-time employees, and it has offices in Charlestown and Springfield.

MTRS's website provides several utilities to its users. It provides online enrollments, information about benefits, the ability to update member information, access to funds, and general information about its various programs.

## Massachusetts Requirements for Accessible Websites

In 1999, the World Wide Web Consortium (W3C), an international nongovernmental organization responsible for internet standards, published the Web Content Accessibility Guidelines (WCAG) 1.0 to provide guidance on how to make web content more accessible to people with disabilities.

In 2005, the Massachusetts Office of Information Technology,[1] with the participation of state government webpage developers, including developers with disabilities, created the Enterprise Web Accessibility Standards. These standards required all executive branch state agencies to follow the guidelines in Section 508 of the Rehabilitation Act amendments of 1998. These amendments went into effect in 2001 and

1. The Massachusetts Office of Information Technology became the Executive Office of Technology Services and Security in 2017.

established precise technical requirements to which electronic and information technology (IT) products must adhere. This technology includes, but is not limited to, products such as software, websites, multimedia products, and certain physical products, such as standalone terminals.

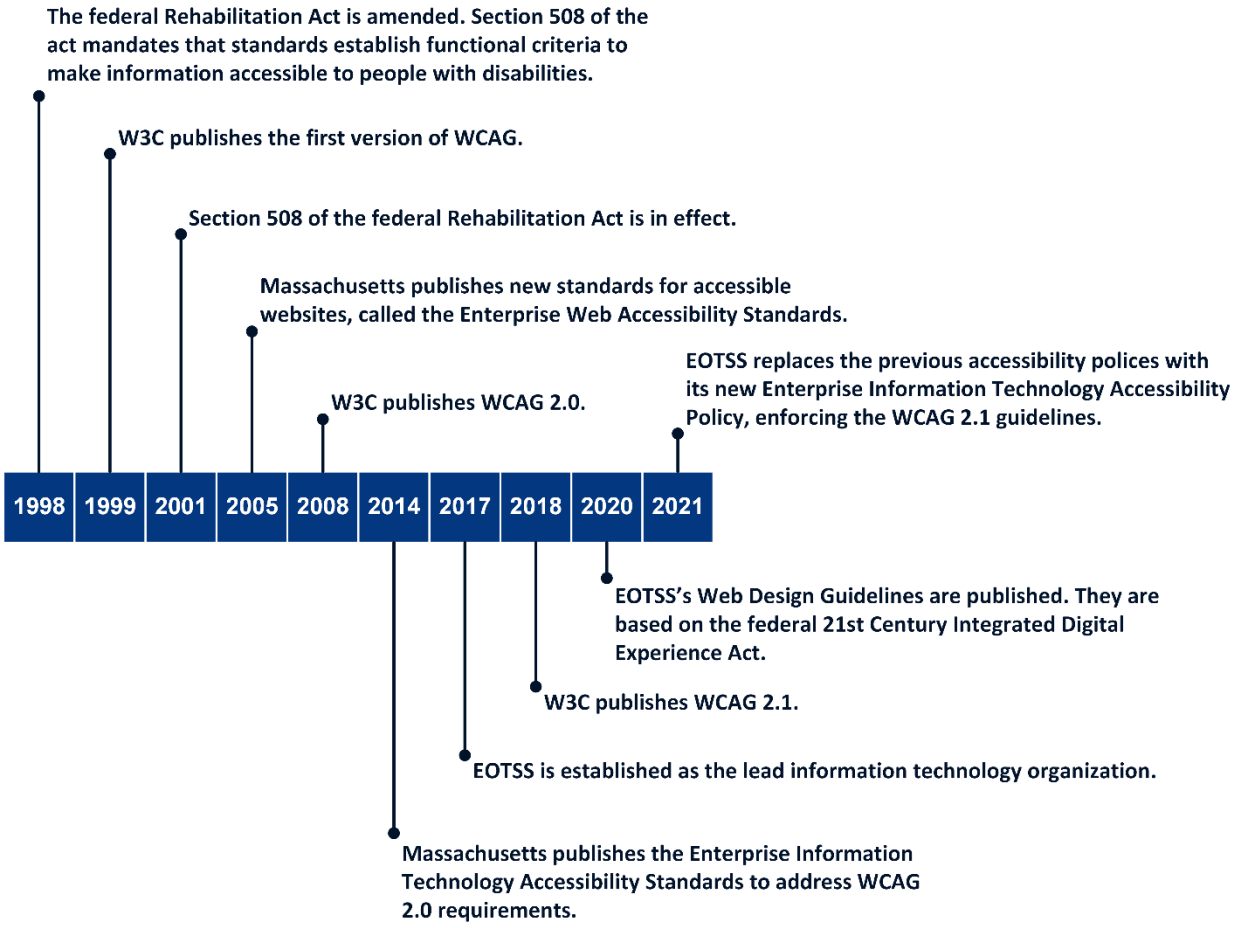
In 2008, W3C published WCAG 2.0. In 2014, the Massachusetts Office of Information Technology added a reference to WCAG 2.0 in its Enterprise Information Technology Accessibility Standards.

In 2017, the Executive Office of Technology Services and Security (EOTSS) was designated as the Commonwealth's lead IT organization for executive branch state agencies. EOTSS is responsible for the development and maintenance of the Enterprise Information Technology Accessibility Standards[2] and the implementation of state and federal laws and regulations related to accessibility. As the principal executive agency responsible for coordinating the Commonwealth's IT accessibility compliance efforts, EOTSS supervises executive branch state agencies in their efforts to meet the Commonwealth's accessibility requirements.

In 2018, W3C published WCAG 2.1, which built on WCAG 2.0 to improve web accessibility on mobile devices and to further improve web accessibility for people with visual impairments and cognitive disabilities. EOTSS published the Enterprise Information Technology Accessibility Policy in 2021 to meet Levels A and AA of WCAG 2.1.

2. EOTSS has since changed the titles and numbers of at least some of its policies and standards between the end of the audit period and the publication of this report. In this report, we reference the titles and numbers of EOTSS's policies and/or standards as they were during the audit period (unless stated otherwise).

## Timeline of the Adoption of Website Accessibility Standards by the Federal Government and Massachusetts




Executive branch state agencies, such as MTRS, must comply with EOTSS's policies and standards when using an EOTSS web domain,[3] as established by EOTSS's Website Domain Policy. Part of this policy states that any government organization using an EOTSS web domain must comply with EOTSS's Web Design Guidelines, which were published in 2020 and were based on the federal 21st Century Integrated Digital Experience Act. This law helps state government agencies evaluate their website design and implementation decisions to meet state accessibility requirements.

3. EOTSS web domains, according to its Website Domain Policy, include Mass.gov, Massachusetts.gov, Ma.gov, State.ma.us, related subdomains (e.g., example.mass.gov), and all domains that EOTSS owns and manages.

## Web Accessibility

Government websites are an important way for the general public to access government information and services. Deloitte's[4] 2023 Digital Citizen Survey found that 55% of respondents preferred to interact with their state government services through a website instead of face-to-face interaction or a call center. Commonwealth of Massachusetts websites have millions of webpage views each month.

However, people do not interact with the internet uniformly. The federal government and nongovernmental organizations have established web accessibility standards intended to make websites more accessible to people with disabilities, such as visual impairments, hearing impairments, and others. The impact of these standards can be significant, as the federal Centers for Disease Control and Prevention estimates that 1,488,012 adults (26% of the adult population) in Massachusetts have a disability, as of 2022.[5] Among the estimated 26% of the adult population, 14% reported having serious difficulty with cognition, 10% reported having serious difficulty with mobility, 6% reported having deafness or serious difficulty hearing, and 5% reported having blindness or serious difficulty seeing (even when wearing glasses).[6] Examples of web accessibility measures include, but are not limited to, having captioning on videos to help people with difficulty hearing understand the contents of the video, having form fields describe what data needs to be input into them to help people who have cognitive difficulties, and ensuring that people can interact with a webpage using keyboard commands alone to help people who have difficulty with mobility.

## How People with Disabilities Use the Web

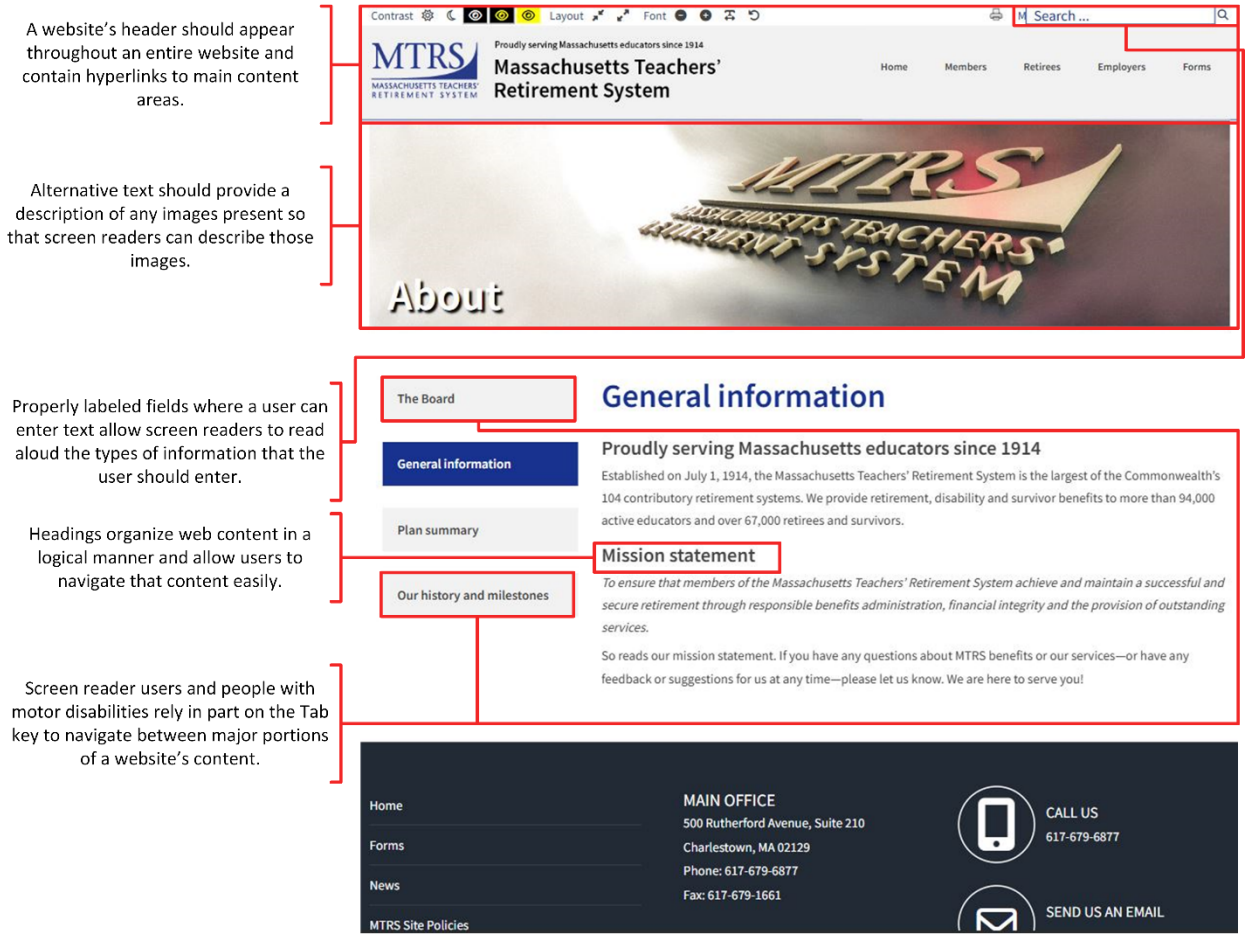
According to W3C, people with disabilities use assistive technologies and adaptive strategies specific to their needs to navigate web content. Examples of assistive technologies include screen readers, which read webpages aloud for people who cannot read text; screen magnifiers for individuals with low vision; and voice recognition software for people who cannot (or do not) use a keyboard or mouse. Adaptive

4. Deloitte is an international company that provides tax, accounting, and audit services to businesses and government agencies.
5. This data is collected from surveys conducted using both landline telephones and cellular telephones, and all responses are self-reported.
6. The percentages do not add up to 26%, as estimated by the federal Centers for Disease Control, because of overlapping data. The self-reported survey allows individuals to report having multiple disabilities.

strategies refer to techniques that people with disabilities employ to enhance their web interactions.[7] These strategies might involve increasing text size, adjusting mouse speed, or enabling captions.

To make web content accessible to people with disabilities, developers must ensure that various components of web development and interaction work together. This includes text, images, and structural code, users' browsers and media players, and various assistive technologies.

## Accessibility Features of a Website[8]




7. Web interaction refers to the various actions that users can take while navigating and using the internet. It encompasses a wide range of online activities, including, but not limited to, clicking on hyperlinks, submitting forms, posting comments on webpages, and engaging with web content and services in other forms.
8. We resized this webpage to fit in this audit report. To see the unaltered webpage, visit https://mtrs.state.ma.us/about/#general-information.

# AUDIT OBJECTIVES, SCOPE, AND METHODOLOGY

In accordance with Section 12 of Chapter 11 of the Massachusetts General Laws, the Office of the State Auditor has conducted a performance audit of certain activities of the Massachusetts Teachers' Retirement System (MTRS) for the period July 1, 2023 through June 30, 2024.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objective. We believe that the evidence obtained provides a reasonable basis for our finding and conclusion based on our audit objective.

Below is our audit objective, indicating the question we intended our audit to answer, the conclusion we reached regarding our objective, and where our objective is discussed in the audit finding.

| Objective | Conclusion |
|---|---|
| 1. Did MTRS's website (mtrs.state.ma.us) comply with the Executive Office of Technology Services and Security's Enterprise Information Technology Accessibility Policy and the Web Content Accessibility Guidelines (WCAG) 2.1 for user accessibility, keyboard accessibility, navigation accessibility, language accessibility, error identification, and color accessibility? | **No; see Finding 1** |

To accomplish our audit objective, we gained an understanding of the MTRS internal control environment relevant to our objective by reviewing applicable policies and procedures and by interviewing MTRS staff members and management. In addition, to obtain sufficient, appropriate evidence to address our audit objective, we performed the procedures described below.

## Web Accessibility

To determine whether MTRS's website adhered to WCAG 2.1, for user accessibility, keyboard accessibility, navigation accessibility, language accessibility, error identification, and color accessibility during the audit period, we performed the following procedures for a random, nonstatistical[9] sample of 50 webpages from a population of 511 MTRS webpages:

9. Auditors use nonstatistical sampling to select items for audit testing when a population is very small, the population items are not similar enough, or there are specific items in the population that the auditors want to review.

## User Accessibility

- We determined whether content on each webpage could be viewed in both portrait and landscape modes.
- We determined whether content on each webpage was undamaged and remained readable when zoomed in to both 200% and 400%.

## Keyboard Accessibility

- We determined whether all elements[10] on each webpage could be navigated using only keyboard commands.
- We determined whether any elements on each webpage prevented a user from moving to a different element when using only keyboard commands to navigate the webpage in question.
- We determined whether the first focusable control[11] on each webpage was a hyperlink that would redirect users to the main content of the webpage.

## Navigation Accessibility

- We determined whether each webpage contained a title that was relevant to the webpage's content.
- We determined whether there was a search function present to help users locate content across the whole website.
- We determined whether hyperlinks correctly navigated to the intended webpages.
- We determined whether headings within webpages related to the content of the section below the header.

## Language Accessibility

- We determined whether any video content found on each webpage had all important sounds and dialogue captioned.
- We determined whether the words that appeared on each webpage matched the language attribute[12] to which the webpage in question was set.
- We determined whether any webpage sections that contained language differing from that to which the webpage was set contained their own specified language attribute.

10. An element is a part of a webpage that contains data, text, or an image.
11. The first focusable control is the first element a user will be brought to on a webpage when navigating with a keyboard. If the first focusable control also redirects users to the main content of a webpage, then it is known as a bypass block or a skip link.
12. A language attribute (also known as a language tag) identifies the native language of the content on the webpage or PDF (e.g., a webpage in English should have an EN language attribute). The language attribute is listed in the webpage's or PDF's properties. This, among other things, is used to help screen readers use the correct pronunciation for words.

### Error Identification

- We determined whether mandatory form fields alerted users if they left these fields blank.
- We determined, for form fields that required a limited set of input values, whether users were alerted if invalid values were entered into these types of fields.
- We determined whether there were labels for any elements that required user input. We also determined whether these labels were programmed correctly.
- We determined whether examples were presented to assist users in correcting mistakes (for example, a warning when entering a letter in a field meant for numbers).

### Color Accessibility

- We determined whether there was at least a 3:1 contrast in color and additional visual cues to distinguish hyperlinks, which WCAG recommends for users with colorblindness or other visual impairments.

We used nonstatistical sampling methods for testing and therefore did not project the results of our testing to any corresponding populations.

For our objective, we found certain issues during our testing of the accessibility of MTRS's website. See Finding 1 for more information.

## Data Reliability Assessment

To determine the reliability of the URL list that we received from MTRS management, we interviewed knowledgeable MTRS staff members and checked that certain variable formats (e.g., dates, unique identifiers, and abbreviations) were accurate. Additionally, we ensured that none of the following issues affected the URL list: abbreviation of data fields, missing data (e.g., hidden rows or columns, blank cells, or absent records), and duplicate records. We also ensured that all values in the dataset corresponded with expected values.

We selected a random sample of 20 URLs from the URL list and traced each to the corresponding webpages on MTRS's website, checking that each URL and webpage title from the URL list matched the information on the MTRS website. We also selected a random sample of 20 URLs from MTRS's website and traced the URL and webpage title to the URL list to ensure that there was a complete and accurate population of URLs on the URL list.

Based on the results of the data reliability procedures described above, we determined that the URL list was sufficiently reliable for the purposes of our audit.

# DETAILED AUDIT FINDINGS WITH AUDITEE'S RESPONSE

## 1. The Massachusetts Teachers' Retirement System's website was not fully accessible to all website users.

The Massachusetts Teachers' Retirement System's (MTRS's) website was not fully accessible to all website users. We reviewed a sample of 50 webpages and found that none of these webpages were compliant with Web Content Accessibility Guidelines (WCAG) 2.1. We determined the following issues within our sample:

- Of these 50 webpages, all 50 had content that could not be navigated to via a keyboard;
- Of these 50 webpages, all 50 did not have the first focusable control be a hyperlink that skips to the main content of the webpage;
- Of these 50 webpages, all 50 had hyperlinks that did not have any secondary identifiable component to distinguish themselves;
- Of these 50 webpages, 24 contained content that was illegible when zoomed in to 400%;
- Of these 50 webpages, 5 had broken hyperlinks;
- Of these 50 webpages, 5 misused headers;
- Of these 50 webpages, 1 did not provide users with warnings when they left entry fields blank; and
- Of these 50 webpages, 1 did not properly label input fields.

Noncompliance with WCAG 2.1 reduces accessibility for individuals with disabilities and limits equitable access to MTRS information and services. Specific risks include the following:

- A lack of keyboard navigability means that users with mobility impairments cannot access certain content.
- Because MTRS's website does not make the first focusable control on a webpage a hyperlink that skips to the main content of the webpage, users who navigate sequentially through webpages are forced to navigate through repeated content every time a webpage loads. This increases the time needed to reach the desired information on a webpage and may, for users who have motor impairments, make navigating content cumbersome or difficult.
- Hyperlinks that do not have a 3:1 contrast ratio or a secondary identifiable component may be imperceptible to users and will prevent them from interacting with MTRS content.

- If MTRS's website cannot reflow[13] at 400%, some users will not be able to read content if they zoom in to alleviate a visual impairment.

- Broken or faulty hyperlinks limit users from having access to critical information and key online services offered by MTRS. Broken or faulty hyperlinks also increase the likelihood that users may either access outdated or incorrect information or be directed to webpages that no longer exist.

- Improper use of headings and labels makes it difficult for users to navigate and read the website. Additionally, improper use of headers and labels negatively impacts users who rely on screen readers to navigate the website.

- Entry fields that are improperly labeled or that do not provide users with warnings about input errors or omissions prevent users from accessing MTRS content.

## Authoritative Guidance

The World Wide Web Consortium's WCAG 2.1 states,

> *Success Criterion 1.4.1 Use of Color*
>
> *(Level A)*
>
> *Color is not used as the only visual means of conveying information, indicating an action, prompting a response, or distinguishing a visual element. . . .*
>
> *Success Criterion 1.4.10 Reflow*
>
> *(Level AA)*
>
> *Content can be presented without loss of information or functionality, and without requiring scrolling in two dimensions for:*
>
> - *Vertical scrolling content at a width equivalent to 320 [cascading style sheet (CSS)] pixels;*
> - *Horizontal scrolling content at a height equivalent to 256 CSS pixels.*
>
> *Except for parts of the content which require two-dimensional layout for usage or meaning. . . .*
>
> *Success Criterion 2.1.1 Keyboard*
>
> *(Level A)*
>
> *All functionality of the content is operable through a keyboard interface without requiring specific timings for individual keystrokes, except where the underlying function requires input that depends on the path of the user's movement and not just the endpoints. . . .*

13. Reflow is defined as the rearrangement of content when type size, line length, spacing, etc. changes.

*Success Criterion 2.4.1 Bypass Blocks*

*(Level A)*

*A mechanism is available to bypass blocks of content that are repeated on multiple web pages. . . .*

*Success Criterion 2.4.5 Multiple Ways*

*(Level AA)*

*More than one way is available to locate a web page within a set of web pages except where the Webpage is the result of, or a step in, a process.*

*Success Criterion 2.4.6 Headings and Labels*

*(Level AA)*

*Headings and labels describe topic or purpose. . . .*

*Success Criterion 3.3.1 Error Identification*

*(Level A)*

*If an input error is automatically detected, the item that is in error is identified and the error is described to the user in text.*

*Success Criterion 3.3.2 Labels or Instructions*

*(Level A)*

*Labels or instructions are provided when content requires user input.*

## Reasons for Issue

MTRS management provided us with the following reasons for the findings identified in this audit:

- MTRS management stated that they chose a theme[14] for their website that created accessibility challenges. MTRS was unable to alter website characteristics like text and hyperlink color and continued to create webpages using this problematic theme.
- MTRS management stated that, in 2017, MTRS made the decision to host its own website and contract with a third-party vendor to create it. MTRS management stated that the original third-party vendor contracted to create its website did not have the required expertise to create an accessible website. Additionally, MTRS stated that subsequent contracts for website hosting and maintenance services did not include provisions for assessing or improving website accessibility.

14. A website's theme is the stylistic framework used to design the front-end appearance of the website for a user. It includes a website's colors, fonts, headers, footers, text boxes, layout, and the way graphics are displayed. Web content creators and developers use themes so that webpages across a website appear uniform and can be created and launched faster.

- MTRS management stated that they did not provide website accessibility training to MTRS staff members, and that those staff members were unable to identify accessibility shortcomings on the website.
- MTRS management stated that their content management system[15] does not have preventative controls in place to ensure that content is posted in a WCAG-compliant fashion and that they do not perform periodic accessibility reviews.

## Recommendations

1. MTRS should work with its vendor to resolve the issues directly identified in this report.
2. MTRS should select a new theme for its website with more accessible design elements.
3. MTRS should train staff members on website accessibility requirements and provide staff members with third-party website accessibility tools to monitor WCAG compliance.
4. MTRS should implement preventative controls to ensure that content on its website is posted in a WCAG-compliant manner.
5. MTRS should ensure that its third-party vendor monitors the website for instances of WCAG noncompliance, or MTRS should acquire tools to monitor WCAG compliance on its own.

## Auditee's Response

*The MTRS acknowledges the audit findings and agrees that our website was not fully compliant with the Web Content Accessibility Guidelines (WCAG) 2.1 at the time of review.*

*We recognize the importance of ensuring equitable access for all website visitors, including individuals with disabilities, and we take these findings very seriously. Corrective actions are already underway. These include immediately addressing critical issues such as broken links and mislabeled input fields, improving keyboard navigability, and correcting header structures.*

*Most significantly, we plan to work with our website hosting vendor to implement a modern, fully accessible WordPress theme. WordPress themes determine much of the website's underlying code, including accessibility functions. Selecting an "accessibility-ready" theme will provide a strong foundation for achieving full compliance. This initiative, combined with staff training and regular scheduled third-party accessibility scans, will help ensure ongoing compliance and equitable access for all users.*

## Auditor's Reply

Based on its response, MTRS has taken measures to address our concerns regarding this matter. As part of our post-audit review process, we will follow up on this matter in approximately six months.

15. Organizations use content management systems to create, publish, and modify the content on their website.