



Digital Accessibility Centre

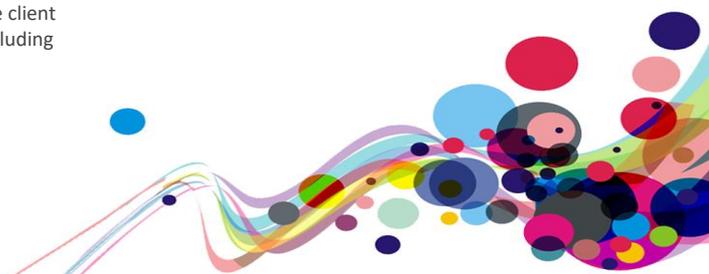
Accessibility Audit Report for High Speed Two (HS2) Learning Legacy

Company	HS2
Date	30 th July 2021
DAC Ref.	000119
Version	v1.0 Final
Standard	WCAG 2.1

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Executive Summary

An accessibility audit for HS2 Learning Legacy was carried out by the Digital Accessibility Centre (DAC) user/technical team on **19th July 2021**.

The HS2 Learning Legacy was assessed against the Web Content [Accessibility Guidelines WCAG 2.1](#).

This document incorporates the findings regarding any accessibility barriers identified during the testing process.

The issues reported are examples of any assistive technology barriers which were encountered during accessibility testing, and information has been provided detailing how to resolve them.

Please note: additional instances of these barriers may exist in other pages of the site wherever these barriers are present, they will also need to be resolved.

A high number of accessibility and usability issues were reported by both our automated testing tools and manual user testing team. The access issues reported were found to affect the majority of user groups but most specifically vision and mobility impaired user groups. Where validation errors identified by the automated tools did not directly impact on our testing team; it does not mean that they do not have the potential to impact on other users.

Numerous access issues were reported by users who require audio feedback to navigate and interact with page content. For example, some page elements either did not contain discernible text or were not descriptive enough for users to determine their function or purpose. As a result of this some users were unable to confidently interact with those page elements independently. Screen reader users also found the general navigation of pages difficult due to illogical heading structures, lack of headings and incorrect use of headings. These meant that users were often unable to accurately determine the topic or purpose of some pages and the structure of content therein.

Mobility impaired users encountered some elements that were not accessible to standard keyboard commands or voice activation software. Keyboard only users were also unable to track the order in which some page elements receive focus because the focus order was found to be illogical and unexpected. As a result of this some users were unable to complete tasks independently.

Some of the colour combinations found on the site are low contrast and are likely to be difficult for people with low vision to read. Because people perceive colour and contrast to different degrees, developers must take care to ensure that colour contrast meets the minimum contrast requirements.

Usability comments have been provided by our manual user testing team. These can be found near the end of the report and describe various aspects of the website that, although do not fail to meet the success criteria, could be improved to benefit the overall user experience.

Audit Summary

In order for the website to be eligible for a Digital Accessibility Centre certification, and fall in line with WCAG 2.1 requirements, improvements need to be made in the following areas.



A

- [Focus Order \(A\)](#)
- [Link Purpose \(A\)](#)
- [Accordion elements \(A\)](#)
- [Headings \(A\)](#)
- [Unlabelled select component \(A\)](#)
- [Non-Text Content \(A\)](#)
- [Image links \(A\)](#)
- [Invalid Aria-Label \(A\)](#)
- [Incorrect list mark-up \(A\)](#)
- [Images of text \(A\)](#)
- [Inaccessible content \(A\)](#)
- [Use of color \(A\)](#)
- [Sensory characteristics \(A\)](#)
- [Label in name \(A\)](#)
- [Illogical structure \(A\)](#)



AA

- [Content on hover or focus \(AA\)](#)
- [Contrast \(Minimum\) \(AA\)](#)
- [Non-text contrast \(AA\)](#)
- [Reflow \(AA\)](#)
- [Non-descriptive labels \(AA\)](#)
- [Text Resizing \(AA\)](#)



AAA

- [Non-descriptive links \(AAA\)](#)
- [Contrast Enhanced \(AAA\)](#)
- [Abbreviations \(AAA\)](#)

Scope

Tasks

Brief Task and/or URLs are listed below along with the specific browser and AT set.

URL: <https://learninglegacy.hs2.org.uk/>

See [Appendix I](#) for a full list of tasks and instructions



Browser matrix and Assistive Technology (AT) combinations

Desktop

User type	Operating System (OS)	Browser	Assistive Technology
Blind	Windows	IE11	JAWS 18 and 2019
		Firefox	NVDA
Mobility	Windows	IE11	Dragon Voice Activation v15
Mobility	Windows	Chrome	Keyboard
		Edge (Chromium)	Keyboard
Deaf	Windows	Chrome	-
Colour Blind/ Dyslexia	Windows	Chrome	-
Low Vision	Windows	Chrome	Screen Magnification, Reflow *, Text Spacing †
		IE11	System inverted colours
Cognitive Impaired/ Asperger's/ Anxiety	Windows	Chrome	-

* **Reflow** tests with screen size of 1280 x 1024px, at 400% browser magnification

† **Text Spacing** tests with larger Line height, and larger Paragraph, Word and Letter spacing.

Mobile/Tablet

User type	Operating System (OS)	Browser	Assistive Technology
Blind	iOS	Safari	VoiceOver
	Android	Android browser	TalkBack/ Voice Assistant
Mobility	iOS	Safari	-
	Android	Android Browser	-
Deaf	iOS	Safari	-
Colour Blind/ Dyslexia	Android/ iOS	Android browser/ Safari	-
Low Vision	Android	Android browser	Magnification
	iOS	Safari	System inverted colours



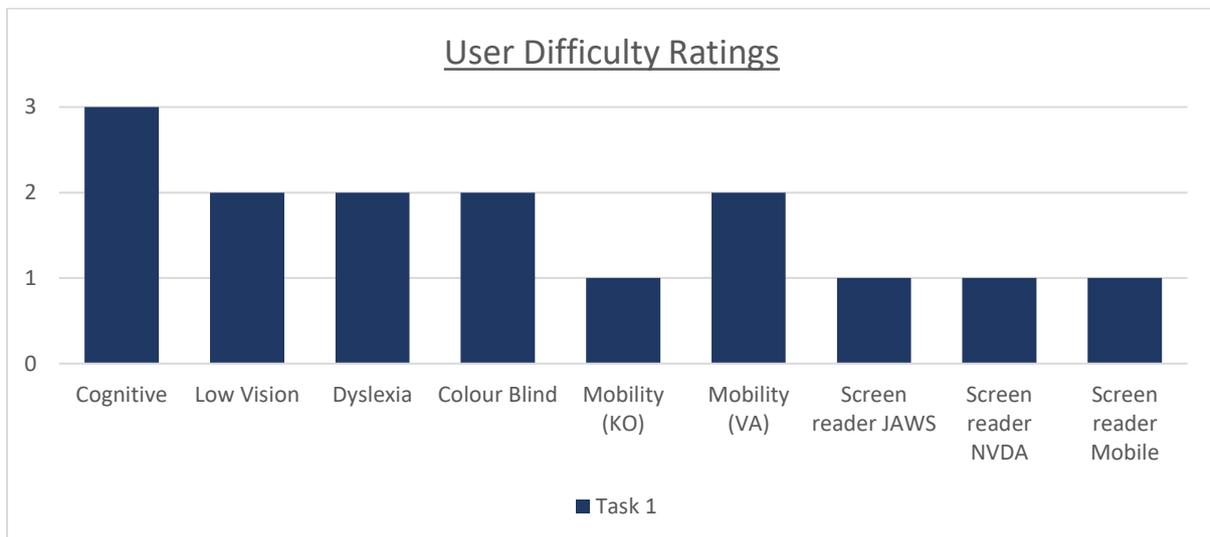
Summary Graphs

Analyst Feedback

Our analysts provided their overall feedback on the website.

This was rated from 0 – could not complete to 3 – Completed independently, no issues.

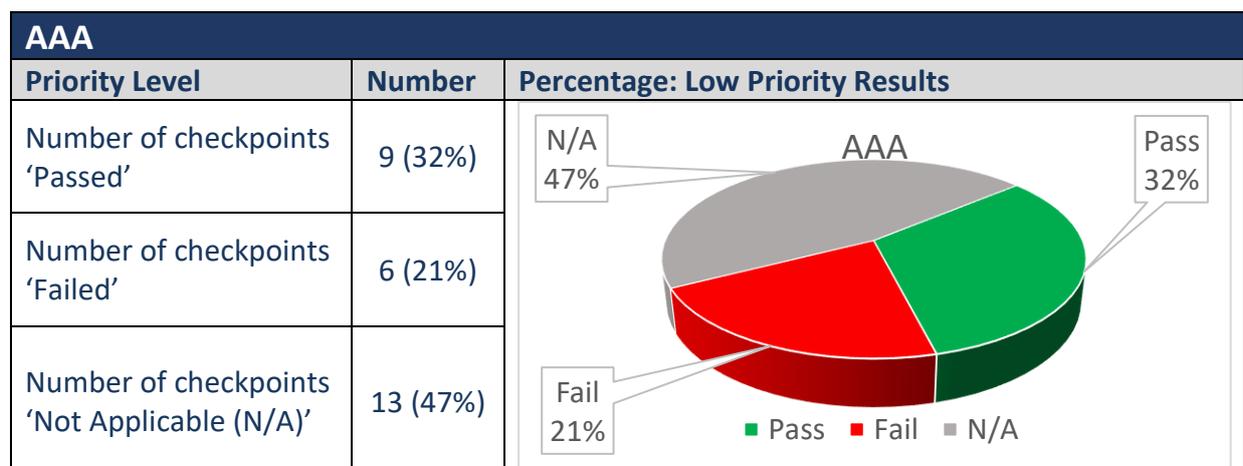
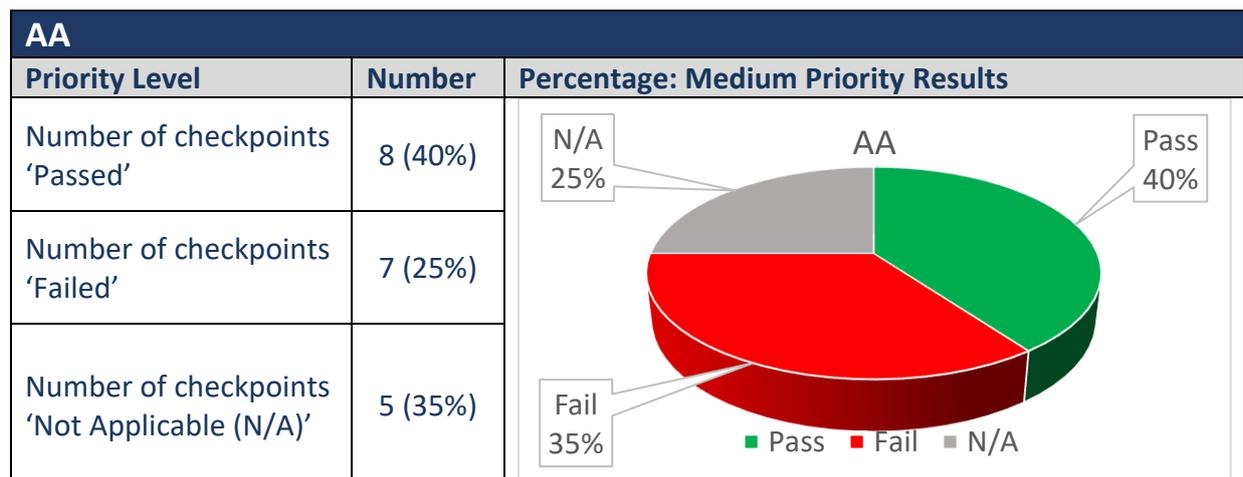
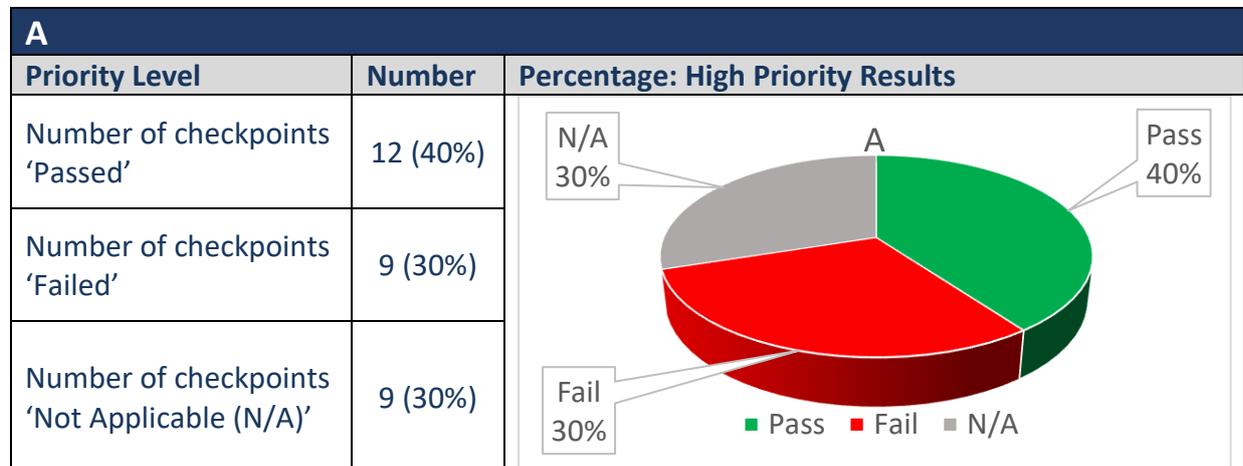
Key:	
0	Could not complete on my own
1	Completed independently but with major issues
2	Completed independently but with minor issues
3	Completed independently, no issues



WCAG 2.1 Breakdown

The graphs below detail the number of checkpoints that passed, failed or were not applicable to the website.

Please refer to the [Classification of Accessibility Issues](#) for more information.



Audit Results

These are the results of the Digital Accessibility Centre accessibility audit by section.

Each area contains a reference to the WCAG success criteria, a brief overview of the issue encountered, a description of issues found along with user testing commentaries and solutions.



Focus Order (A)

When the sequence in which content is presented affects its meaning, a correct reading sequence could not be programmatically determined.

WCAG Reference:

2.4.3 Focus Order (Level A)

[Understanding Focus Order](#) | [How to Meet Focus Order](#)

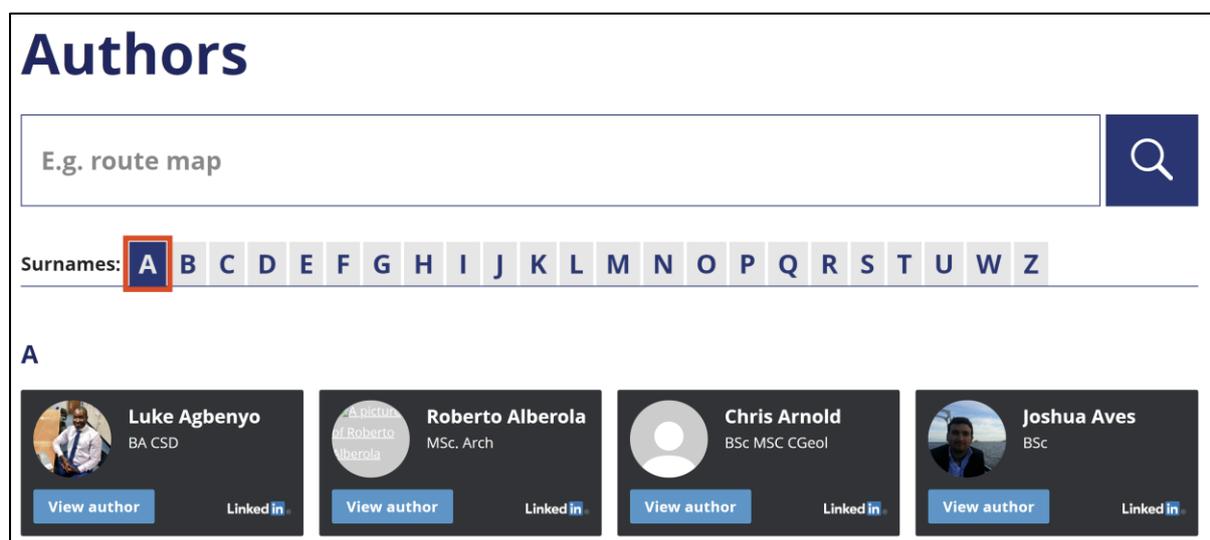
Issue ID: DAC_Focus_Order_Issue1

URL: <https://learninglegacy.hs2.org.uk/authors/>

Page title: Authors Archive - HS2 Learning Legacy

Journey: 4

Screenshot:



The sequence in which content is presented affects its meaning, but a correct reading sequence cannot not be programmatically determined. The order of the information in the DOM means that screen reader users will encounter the author sections before the A-Z 'Surnames' links.

Current Code Ref(s): #main > div > div > div > div.authors-page__lists

```
<div class="authors-page__lists">[...]</div>  
<div class="author-surnames">[...]</div>
```

Keyboard only user comments:

"I found that my focus goes straight from the header to the individual authors, completely skipping past the letter skip links for author's surnames. To access these links, I needed to tab through all of the authors that are displayed on the page before my focus goes back up to the A-Z letters for the author's surname. I found this confusing as they are rendered unnecessary when I am required to navigate through all of the authors prior to focusing onto the links."

Screen reader analyst comments:

“At the bottom of the page, I located same-page links from ‘a’ through ‘z’ to jump to authors starting with that letter. I would find it helpful if this navigation list were placed above the list of authors for easier access. This will mean that users have access to these navigation links before accessing the entire author list, thus making navigation more efficient.”

Solution:

To ensure that a correct reading order is programmatically determinable, include elements in the DOM in the order they would be expected to be encountered within the page.

Example:

```
<div class="author-surnames">[...]</div>  
<div class="authors-page__lists">[...]</div>
```

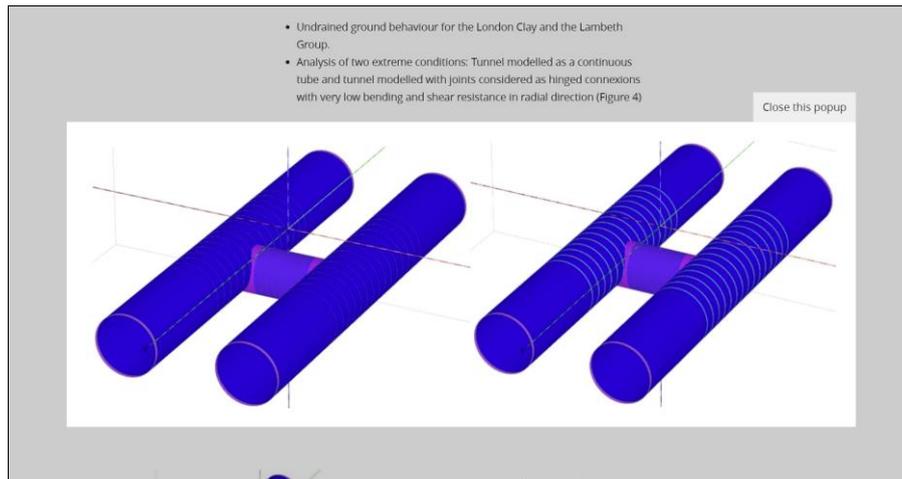


URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:



After a user enlarges an image and a popup appears, when trying to tab into the modal to close or activate the image again, a user's focus continues to tab through the content on the page behind the popup. It is not until the end of the tab order are they then able to navigate their focus into the popup. Users would expect their focus to be taken directly into the popup after opening it.

Current Code Ref(s):

#s24-modal

```
<div id="s24-modal" class="modal modal--visible"><div class="modal__inner" id="s24-modal__inner"><a href="https://learninglegacy.hs2.org.uk/wp-content/uploads/2020/09/word-image-115.jpeg"></a></div><button class="button modal__close">Close this popup</button></div>
```



The following list is an example of other pages where this issue occurs. Additional instances of this issue exist on other pages throughout the website; wherever this issue occurs, they too will need to be resolved.

- URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2

Learning Legacy

Journey: 5

- #main > article > div > div > div > div.document__main__content > figure:nth-child(13) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(15) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(21) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(25) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(32) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(35) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(38) > img
- #main > article > div > div > div > div.document__main__content > h2:nth-child(43) > img
- #main > article > div > div > div > div.document__main__content > figure.wp-block-image.is-resized > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(45) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(46) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(47) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(48) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(52) > img



Solution:

Ensure that a user's focus follows a logical and meaningful order, allowing for users who are reliant on a keyboard alone to navigate a page, to easily understand the order of their focus and what to expect.

The popup should receive focus after a user activates it, which will then not allow the users focus to leave the popup until after the user has actively closed the popup.



Link Purpose (A)

Users are unable to identify the purpose of the links.

WCAG Reference:

2.4.4 Link Purpose (In Context) (Level A)

[Understanding Link Purpose \(In Context\)](#) | [How to Meet Link Purpose \(In Context\)](#)

2.4.9 Link Purpose (Link Only) (Level AAA)

[Understanding Link Purpose \(Link Only\)](#) | [How to Meet Link Purpose \(Link Only\)](#)

4.1.2 Name, Role, Value (Level A)

[Understanding Name, Role, Value](#) | [How to Meet Name, Role, Value](#)

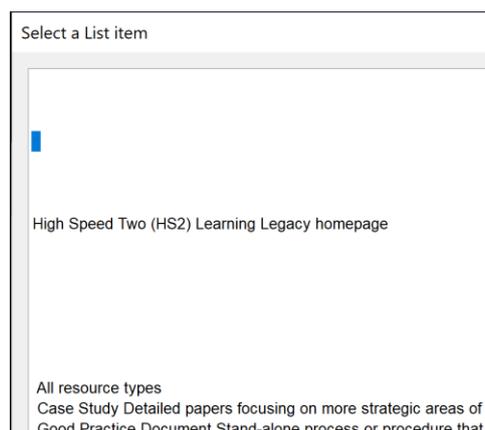
Issue ID: DAC_Link_Purpose_Issue1

URL:

https://learninglegacy.hs2.org.uk/?s=london&resource_type%5B%5D=439&orderSearchBy=relevance

Page title: You searched for london - HS2 Learning Legacy Journey 2

Screenshot:



On the search results page, there is no visible navigation region on the page, but when navigating the page using the keyboard tab key, a series of list items receive focus. On further inspection the list items are a group of empty link tags.

This issue may affect multiple users particularly keyboard only users who have no way of identifying the purpose of the links, but also screen reader users who are read out the series of empty links, without being provided any purpose of functionality of the links.

Current Code Ref(s):

```
#global-header>div.nav.nav--primary.group.group--tight.group--row>av.group__item.secondary-nav-container.margin--none
```

```
<nav class="group__item secondary-nav-container margin--none">
  <ul class="secondary-nav-list valign--center">
    <div class="nav__list nav--primary__list">
      <ul>
        <li class=" item-top-level "><a class="nav-item" href=""></a></li>
        <li class=" item-top-level "><a class="nav-item" href=""></a></li>
      </ul>
    </div>
  </ul>
  <form action="/" method="GET" class="search-form-compact search-form-compact--inline">[...]
</form>
</nav>
```

Keyboard only user comments:

"I found while tabbing through the header, there are numerous links being highlighted without any labels to them. They appear to the left of the 'Search Resources' as small orange boxes and there are about six of them, and then also underneath the search box next to the 'search resources' they are in the form of an orange rectangle and again there is about 5 to 6 of those. I found this confusing as there was no labels to indicate what the links were for when I click them, they all take me to the homepage."

Voice activation user comments:

"I found when using the command 'Click Link', I found that links labelled 2-17 are all clickable, but they have no visible labelling. They all direct me to the 'Homepage', which I found confusing as there are no labels visible to indicate what the links were supposed to be used for."

Screen reader analyst comments:

"Navigating in context, I located a 6-item list under the second navigation landmark. I found that the first item in this list was a heading, followed by various links. This layout disorientated me as I would not usually expect to locate a heading level 1 in a list. This layout was also particularly confusing as the heading was at level 1 and appeared directly after a landmark for a navigation region. Ensuring that the list starts with the link texts will avoid any potential disorientation or confusion."



Solution:

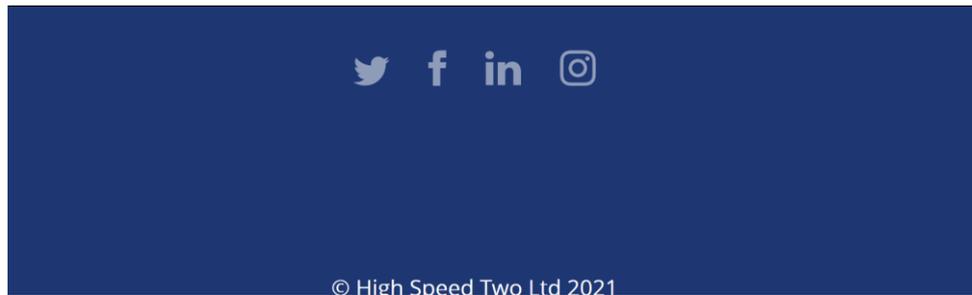
Ensure that all links are marked up with clear, descriptive, and discernible link text allowing users to easily identify and understand the links purpose and destination when navigating the page both in and out of context.



[URL:https://learninglegacy.hs2.org.uk/?s=london&resource_type%5B%5D=439&orderSearchBy=relevance](https://learninglegacy.hs2.org.uk/?s=london&resource_type%5B%5D=439&orderSearchBy=relevance)

Page title: You searched for london - HS2 Learning Legacy Journey 2

Screenshot:



Below the social media links is a list with series of empty links which may be picked up by screen reader users in their journey on the page. The list has been marked up incorrectly where a element has been nested inside another element, this may present difficulty to screen reader users navigating the page as the screen reading software may be unable to announce the list correctly.

Additionally, all of the links contained inside the list items are empty which means screen reader users would be unable to identify the purpose of the links in their journey.

Current Code Ref(s):

#main-content-container > footer > ul.inline-list.footer-nav

```
<ul class="inline-list footer-nav">
<div class=" "><ul>
<li class=" item-top-level ">
<a class="nav-item" href=""></a>
</li>
</ul></div></ul>
```



Solution:

Remove the list of links on the page as they have no purpose on the page and can cause confusion when identified by screen reader users.

Or

Ensure that all links are marked up with clear, descriptive, and discernible link text allowing users to easily identify and understand the links purpose and destination when navigating the page both in and out of context.



Accordion elements (A)

The expandable accordion elements do not receive keyboard focus and do not inform screen reader users that they have been expanded.

WCAG Reference:

2.4.3 Focus Order (Level A)

[Understanding Focus Order](#) | [How to Meet Focus Order](#)

2.1.1 Keyboard (Level A)

[Understanding Keyboard](#) | [How to Meet Keyboard](#)

4.1.2 Name, Role, Value (Level A)

[Understanding Name, Role, Value](#) | [How to Meet Name, Role, Value](#)

1.3.1 Info and Relationships (Level A)

[Understanding Info and Relationships](#) | [How to Meet Info and Relationships](#)

Issue ID: DAC_Accordion_Elements_Issue1

URL:

https://learninglegacy.hs2.org.uk/?s=london&resource_type%5B%5D=439&orderSearchBy=relevance

Page title: You searched for london - HS2 Learning Legacy Journey 2

Screenshot:



In the filter section of the search results page, the accordion elements for each section are not keyboard focusable so users are only able to expand the accordions using a mouse. This means that users who rely on a keyboard alone to navigate, have no way of focusing onto or accessing the accordion elements and the content contained within.

For screen readers navigating the page, the '+' symbol has been inserted into the page content using CSS and for screen reader users the software reads 'Resource type +', this does not provide a descriptive label for the function or purpose of the component, meaning screen reader users are unable to identify that this is an expandable element.



Current Code Ref(s): #search-filters__inner > div > h3

```
<h3 class="heading js-heading" aria-expanded="false">Resource types</h3>
```

Keyboard only user comments:

“I found when I was tabbing through the page, my focus went straight from the ‘Apply Filters’ button, to the ‘Case Study’ checkbox, completely missing the expandable link labelled ‘Resource Types’. I would have expected the focus to have gone to this link after the apply filters button.”

Keyboard only user comments:

“Focus completely bypasses all of the expandable links identified by a ‘+’, resulting in a keyboard only user not been able to expand any of the links, as they seem mouse dependant.”

Voice activation user comments:

“I was unable to action any of the expandable filters found under the heading ‘Filters - Apply Filters’. I tried various commands such as ‘Click Link’, ‘Click Button’, ‘Click (the Name of the Link)’, none of which worked, the only way I would be able to click on any of these expandable links would be to use commands such as ‘Mouse Grid’ & ‘Move Mouse Left’, ‘Right’, ‘up’ or ‘Down’. These expandable options are mouse dependent.”

Screen reader user comments:

“I found that the ‘plus’ and ‘minus’ elements used to expand the check boxes for various filter sections such as ‘resource types’ were not marked up as definable elements. This may mean that users are unaware that they can be interacted with. Ensuring that these are marked as elements such as buttons will avoid any potential confusion. I would also find it helpful if they were marked as expandable. This will help users to recognise that new content has appeared or disappeared once the elements have been activated.”

“It may be unclear to some users what the elements ‘plus’ and ‘minus’ are for, particularly as some screen reading software announce minus as ‘dash’. Ensuring that these elements are provided with a clear label such as ‘reveal filter options for community section’ will ensure users understand the purpose of these elements.”

Solution:

All actionable components should be focusable and accessible for all user groups and should not rely on a mouse to access.

Additionally, the components should also be descriptive and provide a clear purpose of the functionality for users of screen reading assistive technologies, who are navigating the page both in and out of context.

Users would expect a change or indication of a functionable component when hovering a mouse pointer over the said component, to indicate it can be expanded or actioned.

We recommend using the [Accordion Example - W3.org](https://www.w3.org/WAI/ARIA-practices/patterns/accordion/) to create expandable elements which are accessible to all user groups.



We strongly recommend using standard HTML elements to ensure that roles, states, and controls are exposed accessibly, enabling all users regardless of assistive technology to access and interact with them.

The main failings when implementing custom elements:

1. Elements are not focusable - users must be able to gain access via the keyboard and determine this clearly
 2. Elements are not operable via keyboard alone by default
 3. Elements do not operate as expected using standard keys
 4. Elements do not display a clear indication of focus
 5. Elements are not labelled and exposed with an accessible name in the accessibility APIs
 6. Roles are not exposed in accessibility APIs i.e. `role="button"`
 7. States and properties are not clearly defined and exposed in accessibility APIs
- In high contrast mode the control is not always visible and usable (colour inversion)



Headings (A)

The heading structure is illogical and may affect how screen readers identify sections of information on the page

WCAG Reference:

1.3.1 Info and Relationships (Level A)

[Understanding Info and Relationships](#) | [How to Meet Info and Relationships](#)

Issue ID: DAC_Headings_Issue1

URL: https://learninglegacy.hs2.org.uk/?s=london&resource_type%5B%5D=439&orderSearchBy=relevance

Page title: You searched for london - HS2 Learning Legacy Journey 2

Screenshot:

The screenshot shows a search interface with a search bar containing 'E.g. route map' and a magnifying glass icon. Below the search bar is a 'Filters' section with an 'Apply Filters' button. The filters include 'Resource types' (with a plus sign), 'Communications and Engagement' (with a minus sign), and a list of checkboxes for 'All in this theme', 'Art', 'Community Relations', 'Marketing Communications', and 'Media Relations'. To the right of the filters, it says 'Showing 1 - 7 of 7 results' and 'Relevance' with a dropdown arrow. The search results are listed below, with the first result dated '22 September 2020 - Technical Paper' and titled 'Technical Evidence for a Non-Technical Audience'. The second result dated '25 November 2020 - Journal Publication' is titled 'HS2 railway, UK – route development to hybrid bill: a collaborative approach'.

The heading list shows the following structure:

- Results : 2
- Showing 1 - 7 of 7 results : 3
- Technical Evidence for a Non-Technical Audience : 3
- HS2 railway, UK – route development to hybrid bill: a collaborative approach : 3
- Supporting materials : 4
- HS2 Railway, UK - route development to hybrid Bill: Technical and operational requirements : 3
- Supporting materials : 4
- HS2 railway, UK – route development to hybrid bill: consultation : 3
- Supporting materials : 4

When a search is completed on the page and the results are displayed on the page the heading structure is illogical. There is a visually hidden h2 heading 'Results' which has a sub-heading at level 3 which reads 'Showing 1-7 of 7 results'. The succeeding search results are also marked up as level 3 headings with level 4 sub headings.

Screen reader users require a logical, semantic heading structure to be able to identify and navigate different section of information on the page and be able to programmatically determine the relationships between each heading.

Current Code Ref(s): #main > form > div.page__main.search__main.container-inner > div.search-results > h2
<h2 class="visuallyhidden">Results</h2>

Current Code Ref(s): #main > form > div.page__main.search__main.container-inner > div.search-results > div.container-outer.search-results-header > div > div > h3
<h3 class="size--s search-results-header__heading">
 Showing 1 - 7 of 7 results
</h3>

Current Code Ref(s): #main > form > div.page__main.search__main.container-inner > div.search-results > div.container-outer.search-results-outer > ol > li:nth-child(1) > h3
<h3 class="heading size--l search-result__heading">
 Technical Evidence for a Non-Technical Audience
</h3>

Solution:

In this case, it would benefit screen reader users if the h2 'results' heading was incorporated with the 'Showing 1-7 of 7 results' as a level 2 heading, with the results headings can remain marked up as level 3 headings with level 4 sub-headings to ensure that the heading structure is programmatically determinable for screen reader user navigating the service.

Example:

```
<h2 class="size--s search-results-header__heading">  
    Results: Showing 1 - 7 of 7 results  
</h2>  
[...]  
<h3 class="heading size--l search-result__heading">  
    <a href="https://learninglegacy.hs2.org.uk/document/technical-evidence-for-a-non-technical-audience/">Technical Evidence for a Non-Technical Audience</a>  
</h3>  
[...]  
<h3 class="heading size--l search-result__heading">  
    <a href="https://learninglegacy.hs2.org.uk/document/hs2-railway-uk-route-development-to-hybrid-bill-a-collaborative-approach/">HS2 railway, UK - route development to hybrid bill: a collaborative approach</a>  
</h3>
```



URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:

CHARACTERISTICS OF THE SPECIAL SEGMENTS

The special segments are required to withstand more adverse loads structurally than typical segments, and therefore, heavier reinforcement is required:

- Special segments with reinforcement (17 ϕ 25 per side)
- Steel profiles embedded in the concrete to transfer and distribute the loads

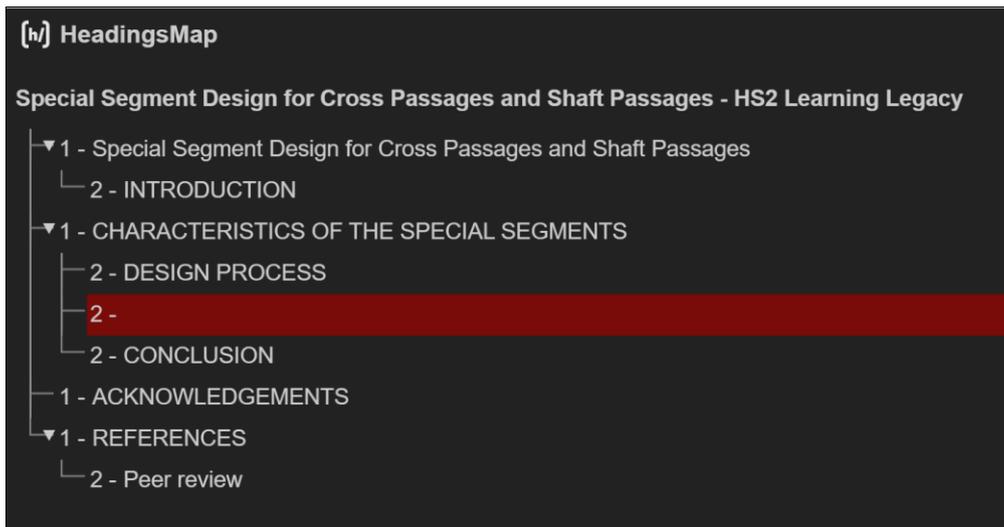
ACKNOWLEDGEMENTS

Special thanks to Skanska, Costain and Strabag (SCS JV) UK for their kind permission to reproduce some of the results studies that led to the current design solution for the Special Segments design.

REFERENCES

[1] Brierley, R. (2018) Design methodology for permanent complex structures: Secondary lining design of junctions. Crossrail Learning Legacy.





Multiple level 1 headings have been used on the ‘Special Segment Design for Cross Passages and Shaft Passages’ page, which do not provide a correct structure and purpose for screen reader users. Screen reader users who rely on a sole level 1 heading followed by subsequent level 2 headings allow the user to understand the structure and relation of the content to their respective headings.

Some users will navigate a page out of context, using headings to jump to different sections, and may bypass content introduced by multiple level 1 headings, as they attempt to skip to other subheadings.

Current Code Ref(s): #author-surname-heading--A

```
<p class="heading h3 authors-surname-heading" id="author-surname-heading--A"><span class="visuallyhidden">Authors whose surnames being with: </span>A</p>
```

The following list is an example of other pages where this issue occurs. Additional instances of this issue exist on other pages throughout the website; wherever this issue occurs, they too will need to be resolved.

- URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>
 Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy
 Journey: 5

Screen reader analyst comments:

“I located multiple headings at level 1 on this page. This may make it difficult for users to recognise the beginning of the main content and understand the layout of the page. Ensuring that a single heading level 1 is provided and that headings continue consecutively from 2 through 6 will enable users to better understand the page layout.”

Solution:

Please ensure that a sole descriptive level 1 heading is used on a page, providing users with the purpose of the page and the content it contains.



URL: <https://learninglegacy.hs2.org.uk/authors/>

Page title: Authors Archive - HS2 Learning Legacy
Journey 4

Screenshot:



There is text which introduces content and indicates regions within the page. The text 'Surnames:' introduces the links that follow but is not marked-up as a heading, so screen reader users will not be presented the purpose of this information as introductory.

Current Code Ref(s): #main > div > div > div > div.author-surnames

```
<div class="author-surnames">  
  <span class="author-surnames__label">Surnames:</span>  
  <ol class="nav author-surnames__list">  
    <li><a href="#author-surname-heading--A">A</a></li>  
    [...]   
  </ol>  
</div>
```

Solution:

In this case, it would benefit screen reader users if 'Surnames' was marked up as a h2 heading which introduces the list items.



Example:

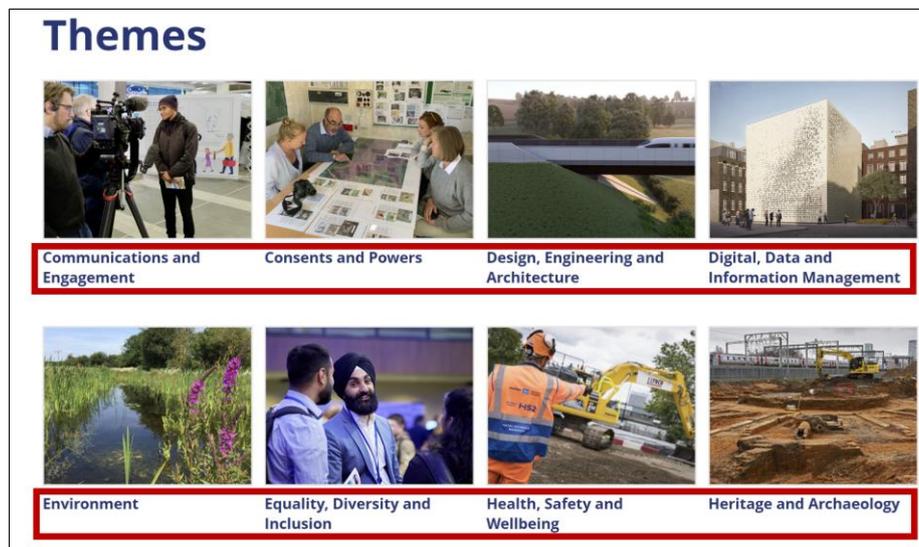
```
<div class="author-surnames" aria-labelledby="surnames" aria-describedby="info">
  <h2 id="surnames" >Surnames of HS2 Learning Legacy Authors (in alphabetical
order)</h2>
<p id="info">Please choose an author from the list of alphabetical surnames in the
list below:</p>

<ol class="nav author-surnames__list">
  <li><a href="#author-surname-heading--A">A</a></li>
  <li><a href="#author-surname-heading--B">B</a></li>
  <li><a href="#author-surname-heading--C">C</a></li>
  <li><a href="#author-surname-heading--D">D</a></li>
  <li><a href="#author-surname-heading--E">E</a></li>
  <li><a href="#author-surname-heading--F">F</a></li>
  <li><a href="#author-surname-heading--G">G</a></li>
  <li><a href="#author-surname-heading--H">H</a></li>
  <li><a href="#author-surname-heading--I">I</a></li>
  <li><a href="#author-surname-heading--J">J</a></li>
  <li><a href="#author-surname-heading--K">K</a></li>
  <li><a href="#author-surname-heading--L">L</a></li>
  <li><a href="#author-surname-heading--M">M</a></li>
  <li><a href="#author-surname-heading--N">N</a></li>
  <li><a href="#author-surname-heading--O">O</a></li>
  <li><a href="#author-surname-heading--P">P</a></li>
  <li><a href="#author-surname-heading--Q">Q</a></li>
  <li><a href="#author-surname-heading--R">R</a></li>
  <li><a href="#author-surname-heading--S">S</a></li>
  <li><a href="#author-surname-heading--T">T</a></li>
  <li><a href="#author-surname-heading--U">U</a></li>
  <li><a href="#author-surname-heading--W">W</a></li>
  <li><a href="#author-surname-heading--Z">Z</a></li>
</ol>
</div>
```



URL: <https://learninglegacy.hs2.org.uk/>
Page title: Homepage - HS2 Learning Legacy
Journey: 1

Screenshot:



Each of the themes presented on the 'Homepage', have been provided for users as images with text beneath each image acting as links. Each of these links have been marked up as headings, however, the links do not act visually or programmatically as headings. They do not provide structure, nor do they introduce any content.

Users rely on correct use of headings to provide structure and purpose for content contained on the page.

Current Code Ref(s):

```
#main > article > div:nth-child(1) > div > ul > li:nth-child(1) > article > div > a  
<a href="https://learninglegacy.hs2.org.uk/document-themes/communications-  
engagement/" class="clean-link clearfix">  
<div class="related-page__image">  
<picture class="related-page__image__pic">...</div>  
<div class="related-page__caption topic-area-list-item__caption">  
<h3 class="heading size--1">  
Communications and Engagement  
</h3>  
</div>  
</a>
```

Solution:

Ensure that headings are only used when necessary. The links do not visually act or function as headings so should not be marked up as such. Remove the heading tags allowing screen reader users to understand the content and its purpose on the page, as well as the structure of the content introduced by the heading 'Themes'.

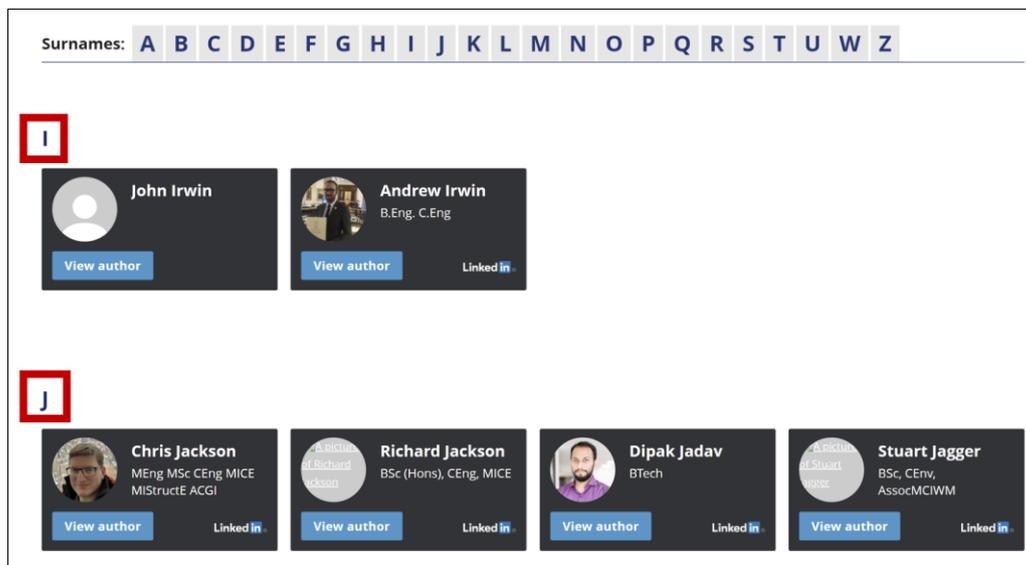


URL: <https://learninglegacy.hs2.org.uk/authors/#author-surname-heading--H>

Page title: Authors Archive - HS2 Learning Legacy

Journey: 4

Screenshot:



The letters introducing each of the grouped authors whose surnames begin with those letters, have not been marked up as headings. As they visually act and function as headings, it is important to also mark these letters up programmatically as headings, allowing screen reader users to understand the structure of the page and the purpose of both the letters and the content to which they introduce.

Current Code Ref(s):

#author-surname-heading--I

```
<p class="heading h3 authors-surname-heading" id="author-surname-heading--I"><span class="visuallyhidden">Authors whose surnames begin with: </span>I</p>
```

Solution:

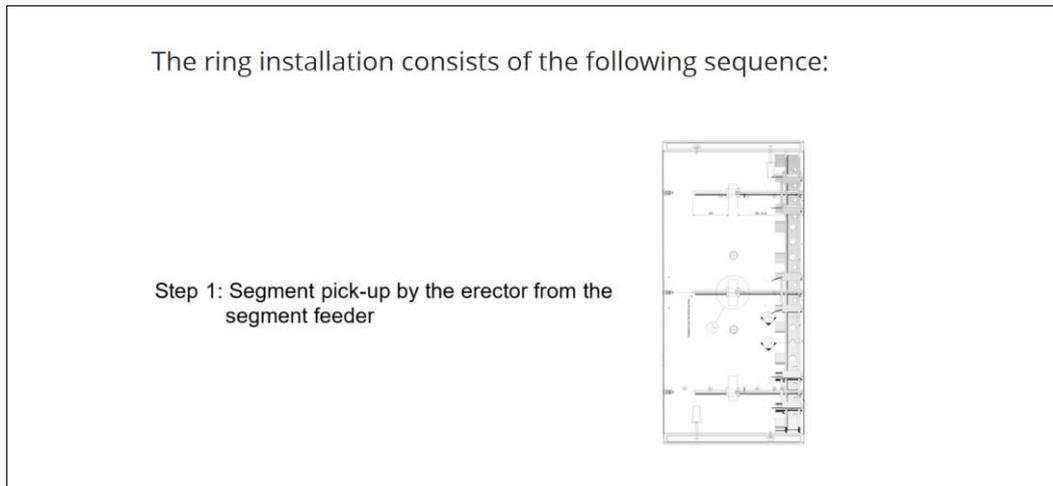
Ensure all text which visually acts and functions as a heading, is also programmatically marked up as such, allowing screen reader users to understand the layout and structure of content, with additionally purpose provided for the text and the content it introduces. Mark the letters introducing the authors up as level 2 headings.

URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:



Heading List

Special Segment Design for Cross Passages and Shaft Passages	: 1
INTRODUCTION	: 2
CHARACTERISTICS OF THE SPECIAL SEGMENTS	: 1
DESIGN PROCESS	: 2
09/word-image-118	: 2
CONCLUSION	: 2
ACKNOWLEDGEMENTS	: 1
REFERENCES	: 1
Peer review	: 2

On the 'Special Segment Design for Cross Passages and Shaft Passages' page, heading elements have been left empty. This can cause confusion for screen reader users, as empty headings are still picked up by screen reading assistive technologies and presented to users navigating in context. As the heading contains an image with no alt, some screen reading assistive technologies, will use the images source or relative attributes as the text for the heading, causing even more confusion.



Current Code Ref(s):

```
#main > article > div > div > div > div.document__main__content > h2:nth-child(43)
<h2></h2>
```

Solution:

Ensure that all heading elements contain descriptive text introducing content and providing purpose and structure to that said content. Remove the heading element from this image and change the text 'Study of the construction compatibility with TBM advance' to a level 3 heading.

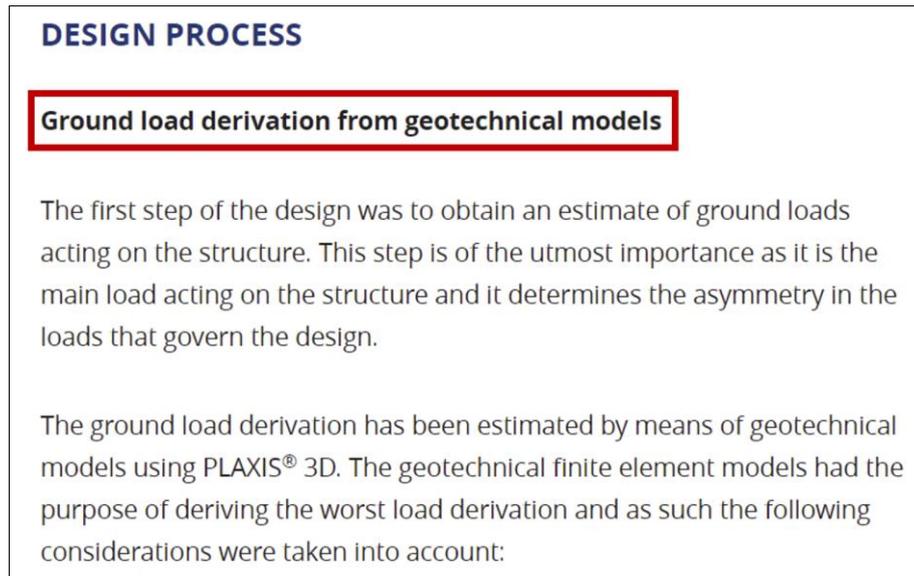


URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:



DESIGN PROCESS

Ground load derivation from geotechnical models

The first step of the design was to obtain an estimate of ground loads acting on the structure. This step is of the utmost importance as it is the main load acting on the structure and it determines the asymmetry in the loads that govern the design.

The ground load derivation has been estimated by means of geotechnical models using PLAXIS® 3D. The geotechnical finite element models had the purpose of deriving the worst load derivation and as such the following considerations were taken into account:

The text ‘Ground load derivation from geotechnical models’ visually acts as a heading introducing the text content beneath, however, it has not been programmatically marked up as a heading providing the same structure and purpose for screen reader users.

Current Code Ref(s):

```
#main > article > div > div > div > div.document__main__content > p:nth-child(17) > strong <strong>Ground load derivation from geotechnical models</strong>
```

The following list is an example of other pages where this issue occurs. Additional instances of this issue exist on other pages throughout the website; wherever this issue occurs, they too will need to be resolved.

- URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>
Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy
Journey: 5
 - #main > article > div > div > div > div.document__main__content > p:nth-child(29) > strong
 - ‘Structural calculation of the member forces and stepping between segments’



Solution:

Ensure that all text which visually acts as a heading for sighted users, is also marked up programmatically marked up as headings to provide screen reader users the same information and structure.



Unlabelled select component (A)

The select component on the page is unlabelled

WCAG Reference:

4.1.2 Name, Role, Value (Level A)

[Understanding Name, Role, Value](#) | [How to Meet Name, Role, Value](#)

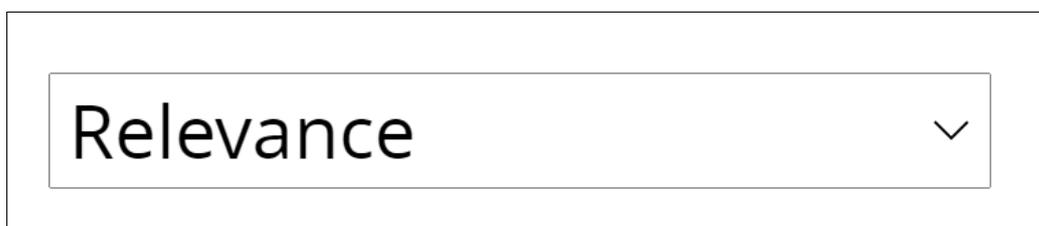
Issue ID: DAC_Unlabelled_Select_Component_Issue1

URL:

https://learninglegacy.hs2.org.uk/?s=&resource_type%5B%5D=&themes%5B%5D=418&themes%5B%5D=414&themes%5B%5D=416&themes%5B%5D=419&themes%5B%5D=415&themes%5B%5D=301&themes%5B%5D=700&orderSearchBy=relevance

Page title: You searched for - HS2 Learning Legacy
Journey 2

Screenshot:



The select component on the page has no visible label or an accessible name which means that users of multiple user groups are unable to identify the select component and users of assistive technologies are unable to programmatically determine and identify the purpose of the component in their journey.

Current Code Ref(s): #orderDropdown

```
<select name="orderSearchBy" id="orderDropdown">  
  <option value="relevance" selected="selected">Relevance</option>  
  <option value="titleAsc">Title ascending</option>  
  <option value="titleDesc">Title descending</option>  
  <option value="dateAsc">Publish date ascending</option>  
  <option value="dateDesc">Publish date descending</option>  
</select>
```

Solution:

Please ensure the select component has a visible and accessible label, which can be programmatically determinable by users of assistive technologies. Further information can be found in the [Labelling Controls section of the W3.org website](#).



Example:

```
<label for="orderDropdown">Sort by:</label>
<select name="orderSearchBy" id="orderDropdown">
  <option value="relevance" selected="selected">Relevance</option>
  <option value="titleAsc">Title ascending</option>
  <option value="titleDesc">Title descending</option>
  <option value="dateAsc">Publish date ascending</option>
  <option value="dateDesc">Publish date descending</option>
</select>
```



Non-Text Content (A)

A decorative image contains an alt attribute containing a description.

WCAG Reference:

1.1.1 Non-text Content (Level A)

[Understanding Non-text Content](#) | [How to Meet Non-text Content](#)

Issue ID: DAC_Non_Text_Content_Issue1

URL: <https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/#main>

Page title: Design, Engineering and Architecture Archives - HS2 Learning Legacy Journey 3

Screenshot:



There is a decorative image on the page where the alt-text attribute has been implemented and does not provide a literal description of the information conveyed within the image. Only images which contain important information relative to the page should be assigned clear, descriptive alternative text.

Decorative images should be assigned the null attribute which allows screen readers to bypass the image in their journey.

Current Code Ref(s): #main > div > div > picture > img

```

```



The following list is an example of other pages where this issue occurs. Additional instances of this issue exist on other pages throughout the website; wherever this issue occurs, they too will need to be resolved.

- URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>
Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy
Journey: 5
 - #main > article > div > div > div > div.document__main__content > figure:nth-child(35) > img
 - 'cid:image003.png@01D5F18F.4567DE30'
 - #main > article > div > div > div > div.document__main__content > figure:nth-child(15) > img
 - 'Diagram description automatically generated'
- URL: <https://learninglegacy.hs2.org.uk/>
Page title: Homepage - HS2 Learning Legacy
Journey: 1
 - #main > div > div > picture > img
 - 'Computer generated images of Interchange Station'

Screen reader comments:

"Directly below the main region marker when navigating in context, I located a graphic reading 'computer generated images of interchange station.' Since this information is not needed to understand the main content of the page some users may prefer it if this graphic were made invisible to screen reader users."

Solution:

All images which serve as decoration alone, should not contain any text within the 'alt' attribute, this will enable screen reading assistive technologies to bypass the image and not portray the unnecessary information to screen reader users.

Note: An 'alt' attribute should always be used, however, when serving decorative purposes, a null value should be used.

Example:

```

```

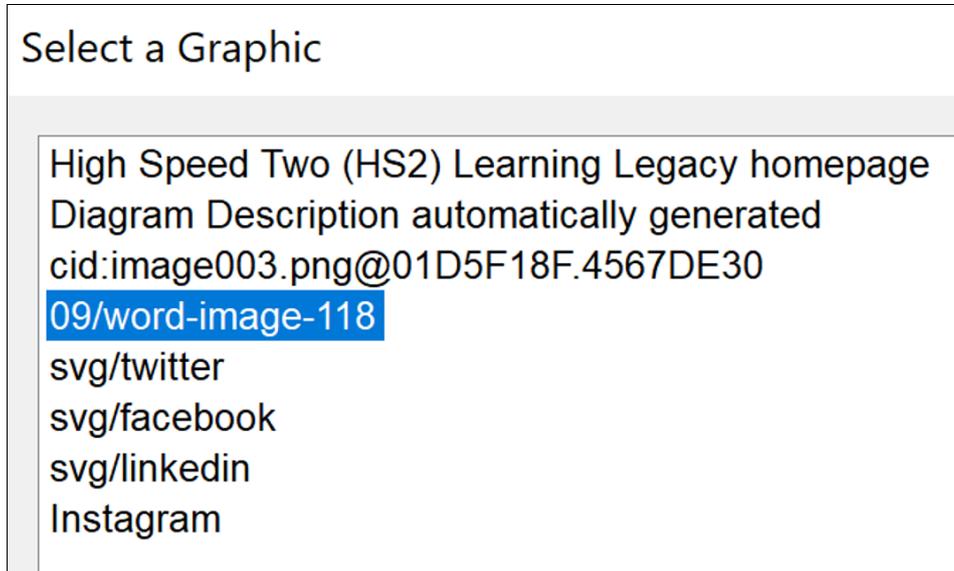
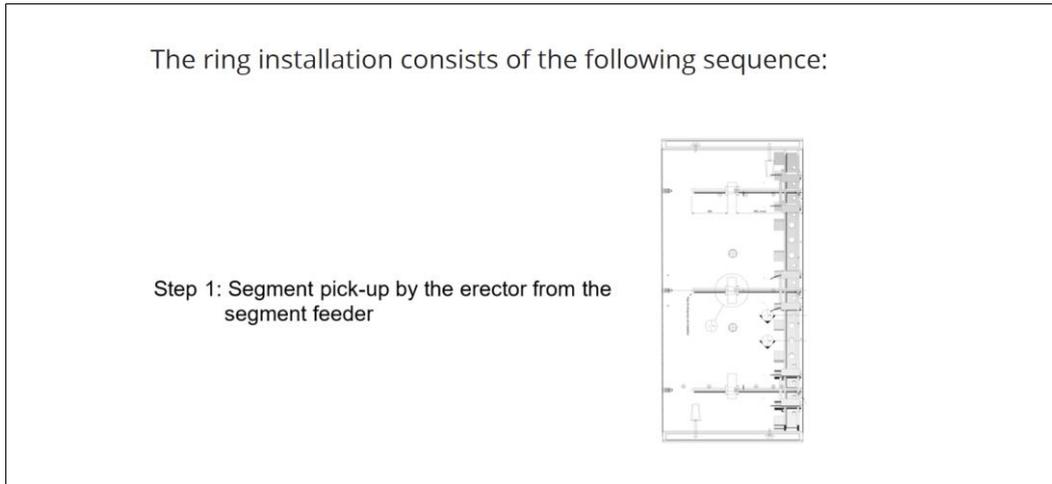


URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:



On the 'Special Segment Design for Cross Passages and Shaft Passages' page, an image does not contain an 'alt' attribute, meaning that screen reading assistive technologies use other attributes as the description provided for users. This can cause confusion for screen reader users, as this results in non-descriptive text and information being portrayed to the user, both in and out of context. In this instance the image is portrayed to users as '09/word-image-118'.



Current Code Ref(s):

```
#main > article > div > div > div > div.document__main__content > h2:nth-child(43)
<h2></h2>
```

Solution:

Ensure that all images contain 'alt' attributes, however, this image should contain a null 'alt'.

Example:

```

```

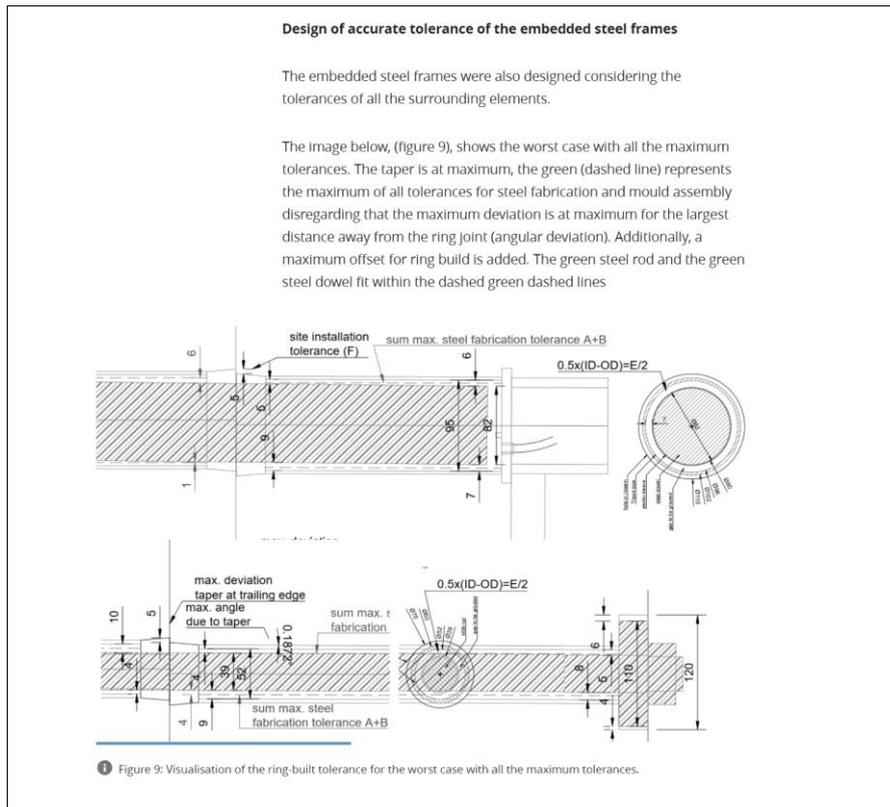


URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:



The image provided as ‘Figure 9’ displaying the ‘Visualisation of the ring-built tolerance for the worst case with all the maximum tolerances’, contains information which seems necessary for users to know. However, this information is not provided in text or as alt text for screen reader users. All valuable and necessary information must be portrayed and accessible for all users.

Current Code Ref(s):

```
#main > article > div > div > div > div.document__main__content > figure:nth-child(52) > img

```

Solution:

Ensure that all images which portray information and provide necessary information for users, that this is also conveyed in alt text for users of screen reading assistive technologies. Consider adding more information into the <figurecaption> if required.

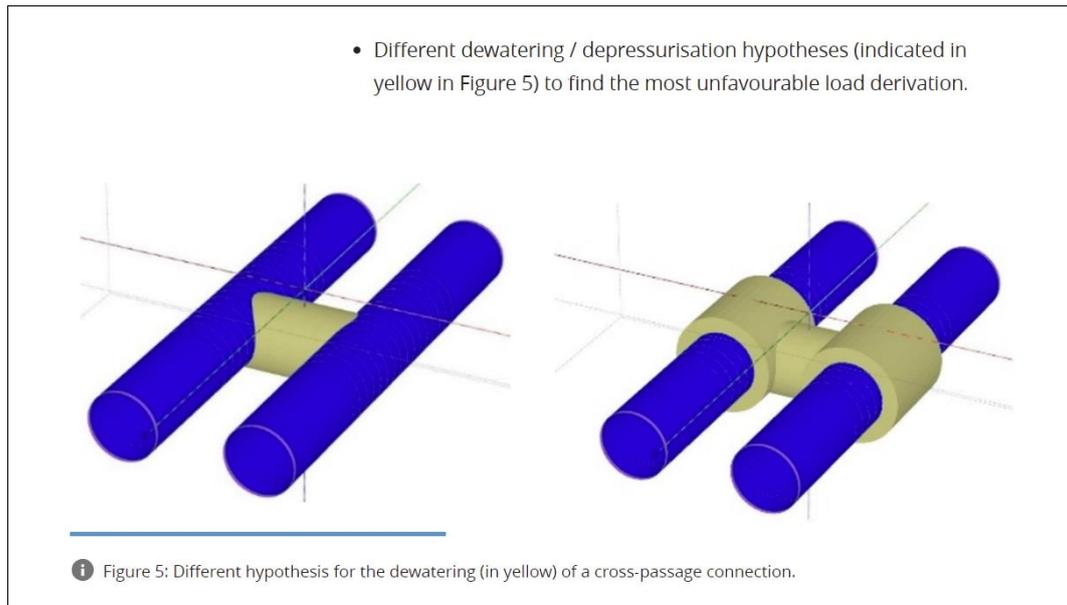


URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:



The image provided for users as 'figure 4' contains information on different connection methods, however, no information on the two methods is provided other than as visual diagrams. The 'alt' attribute has been used with a null value, as a <figurecaption> has been used, however, within the <figurecaption>, no description of the methods used have been provided for users. Screen reader users rely on descriptive 'alt' attributes, in order to have the information provided visually in the diagram to them and clearly understand the images purpose.



Current Code Ref(s):

```
#main > article > div > div > div > div.document__main__content > figure:nth-child(25) > img

```

Solution:

Ensure that all images which portray information and provide necessary information for users, that this is also conveyed in alt text for users of screen reading assistive technologies. Consider adding more information into the <figurecaption> if required.



Image links (A)

Image links were found with no discernible link text.

WCAG Reference:

1.1.1 Non-text Content (Level A)

[Understanding Non-text Content](#) | [How to Meet Non-text Content](#)

2.4.4 Link Purpose (In Context) (Level A)

[Understanding Link Purpose \(In Context\)](#) | [How to Meet Link Purpose \(In Context\)](#)

2.4.9 Link Purpose (Link Only) (Level AAA)

[Understanding Link Purpose \(Link Only\)](#) | [How to Meet Link Purpose \(Link Only\)](#)

Issue ID: DAC_Image_Links_Issue1

URL: <https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/>

Page title: Design, Engineering and Architecture Archives - HS2 Learning Legacy Journey 3

Screenshot:



The screenshot shows a journal article. On the left is a thumbnail image of a civil engineering journal cover with the title 'Civil Engineering'. To the right of the image, the article title is 'HS2 project creates and updates British Standards and guidance to improve delivery'. Below the title is a short summary: 'Inefficient and inconsistent use of codes, standards and guidance documents can hamper effective delivery of infrastructure projects. Colin Rawlings of CH2M/High Speed Two Ltd (HS2) summarises initiatives taken on the project to deliver new and updated standards and guidance.' Below the summary, the 'Resource type' is listed as 'Journal Publication'. Under 'Tags', there are two tags: 'Codes of practice and standards' and 'Standards'.

Links List
Aerodynamic design of HS2 tunnels
hs2-project-creates-and-updates-british-standards-and-guidance-to-improve-deli...
Journal Publication
Codes of practice and standards
Standards
HS2 project creates and updates British Standards and guidance to improve deliv...
birmingham-curzon-street-station-a-21st-century-station-roof
Technical Paper
design

There are image links on the page which have used null alts within the images, which is correct for accessibility purposes and allows screen reader users to bypass the images in their journey. However, the images contain links which are keyboard focusable and have the same destination as the adjacent h3 heading link next to the image 'HS2 project creates and updates British Standards and guidance to improve delivery'. This means that they are picked up by screen reading assistive technologies and due to the null 'alt' attributes, resort to using the 'href' as the discernible link text provided for users both in and out of context. In this case, JAWS read out 'hs2-project-creates-and-updates-british-standards-and-guidance-to-improve delivery'.

This issue is consistent for all image links used for each of the resources presented.

Current Code Ref(s): #post-3163 > article > aside > a

```
<a href="https://learninglegacy.hs2.org.uk/document/hs2-project-creates-and-updates-british-standards-and-guidance-to-improve-delivery/"></a>
```

Current Code Ref(s): #post-1903 > article > aside > a

```
<a href="https://learninglegacy.hs2.org.uk/document/birmingham-curzon-street-station-a-21st-century-station-roof/"></a>
```

Solution:

Remove the links from the images as the links have been presented correctly on the page in the level 3 heading links adjacent to the images. This will enable screen readers to identify the links correctly in the adjacent headings on the page and bypass the decorative images which already have the null attribute set.

Example:

```

```

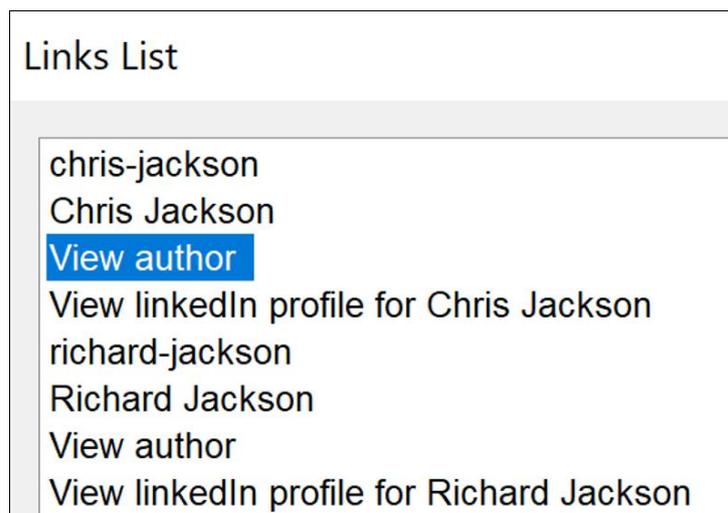
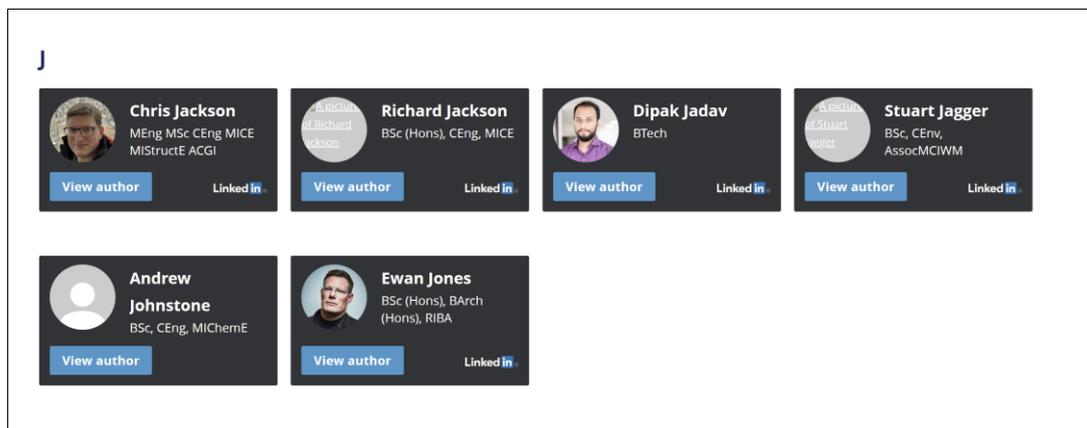


URL: <https://learninglegacy.hs2.org.uk/authors/#author-surname-heading--H>

Page title: Authors Archive - HS2 Learning Legacy

Journey: 4

Screenshot:



On the 'Authors' page, each of the authors have been marked up with three links all directing users to the same destination and serving the same purpose. The image of the author, the name of the author and the 'View author', have all been marked up as links. This is unnecessary and causes more confusion for screen reader users as each of the links do not contain the same link text.

Additionally, as each of the authors contain 'View author' links, these are then duplicated for each author meaning screen reader users are not able to discern the difference and to which author the links are relating to.



Current Code Ref(s):

```
#main > div > div > div > div.authors-page__lists > ol:nth-child(20) > li:nth-child(1)
<li class="group__item topic-area-list-item author-badge">
<a class="author-badge__picture author-rounded"
href="https://learninglegacy.hs2.org.uk/authors/chris-jackson/">

</a>

<div class="author-badge__summary">
<a href="https://learninglegacy.hs2.org.uk/authors/chris-jackson/" class="author-
badge__title">Chris Jackson</a>
<p class="author-badge__subtitle">MEng MSc CEng MICE MIMStructE ACGI</p>
</div>

<div class="author-badge__actions">
<a href="https://learninglegacy.hs2.org.uk/authors/chris-jackson/" class="button
button--tertiary">View author</a>

<a class="author-badge__actions__linkedin"
href="https://www.linkedin.com/in/chris-jackson-2aa12634/">
<span class="visuallyhidden">View linkedIn profile for Chris Jackson</span>
</a>
</div>
</li>
```

Screen reader analyst comments:

“Navigating in context above each linked author, I located graphics with alt text that duplicated the author’s name. I would find it helpful if these graphics were made invisible to screen reader users. This will mean that the name of the author will only be encountered once as part of the link text which will help to make navigation more efficient as the information will not need to be encountered twice.”

“Navigating out of context I located multiple links with the duplicated text ‘view author.’ Some users may find it helpful if these links were provided with specific link text that describes the associated author. This will ensure that all users are able to make an informed selection.”



Solution:

Ensure that all links are marked up with unique and descriptive link text allowing users to easily identify the links purpose and destination. This will allow screen reader users to understand and relate links to the respective content and activate each link with confidence, displaying only unique links both in and out of context.

Consider removing all links from each of the authors, leaving only the 'View author' as the sole link. Each link should then contain additional visually hidden text to include the authors' name.

When removing the link from the image, ensure to also remove the 'alt' attribute from the image allowing screen reader users to bypass this information.

Additionally, consider marking the authors name up as a level 3 heading, introducing the individual author and the information contained.

Example:

```
<li class="group__item topic-area-list-item author-badge">
<a class="author-badge__picture author-rounded"
href="https://learninglegacy.hs2.org.uk/authors/chris-jackson/">

</a>

<div class="author-badge__summary">
<h3>Chris Jackson</h3>
<p class="author-badge__subtitle">MEng MSc CEng MICE MIStructE ACGI</p>
</div>

<div class="author-badge__actions">
<a href="https://learninglegacy.hs2.org.uk/authors/chris-jackson/" class="button
button--tertiary">View author
<span class="visuallyhidden">Chris Jackson</span>
</a>

<a class="author-badge__actions__linkedin"
href="https://www.linkedin.com/in/chris-jackson-2aa12634/">
<span class="visuallyhidden">View linkedIn profile for Chris Jackson</span>
</a>
</div>
</li>
```

Invalid Aria-Label (A)

An aria-label has been placed on a div element which is invalid and will not be read out to screen reader users

WCAG Reference:

4.1.2 Name, Role, Value (Level A)

[Understanding Name, Role, Value](#) | [How to Meet Name, Role, Value](#)

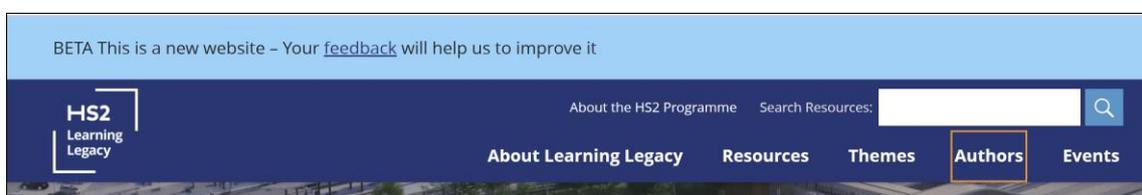
Issue ID: DAC_Invalid_Aria_Label_Issue1

URL: <https://learninglegacy.hs2.org.uk/#main>

Page title: Homepage - HS2 Learning Legacy

Journey 1 – This issue is present throughout the service

Screenshot:



```
<div class="note bg bg--tertiary no-margin" aria-label="Helpdesk notice"> == $0
```

An aria-label has been placed on a <div> element which is invalid. This attribute can be used to define an accessible name of some semantic elements, and particularly, user interface controls. Non-semantic elements which are ignored by assistive technology should not be assigned a label. This is not a sufficient way of including hidden text alternatives for screen reader users as these tags themselves are generally ignored by assistive technology as they have no associated semantics. Where they are not ignored, they may cause inconsistent behaviour, including preventing any text within the element from being read.

Current Code Ref(s): #global-header > div.note.bg.bg--tertiary.no-margin

```
<div class="note bg bg--tertiary no-margin" aria-label="Helpdesk notice">
<div class="container">
BETA This is a new website - Your <a
href="http://learninglegacy.hs2.org.uk/feedback-survey/">feedback</a> will help us
to improve it<br>
</div>
</div>
```

Solution:

Ensure aria-labels are used on compatible elements. For more information, please refer to [Deque University: Elements must only use allowed ARIA attribute](#).

Incorrect list mark-up (A)

The incorrect list mark-up had been used.

WCAG Reference:

1.3.1 Info and Relationships (Level A)

[Understanding Info and Relationships](#) | [How to Meet Info and Relationships](#)

Issue ID: DAC_Incorrect_List_Mark-up_Issue1

URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:

In the NTW, the design of the special segments has been achieved with the following procedure:

- **Ground load derivation: Accurate estimation of the loads acting on the segments around the opening using Plaxis® 3D, considering the ground properties, the construction stages and the most unfavourable dewatering hypothesis.**
- **Member forces and stepping between segments calculation: Accurate structural analysis carried out using SAP2000® considering the derived ground loads, non-linear links between rings acting under compression only and a remaining residual propulsion force.**
- **Study of the construction compatibility with TBM advance, with low interference in the TBM advance ratio and feasibility to be executed from the TBM.**
- **Design based on accurate tolerances of the embedded steel frames inside the special segments compatible with the construction sequence.**

This design procedure allows, although with a higher design effort, a more effective construction process with no additional temporary structures required around the openings to prop the tunnel lining and little interference in the TBM advancement ratio.

Content had been presented to users visually as a list of four items, each introduced with bullet points, however, this text and information has not been programmatically marked up as a list. Screen reader users rely heavily on correct mark-up for lists, allowing them to understand the information presented and how it relates to the surrounding content.



Current Code Ref(s):

```
#main > article > div > div > div > header > div.group__item.page__inner > div.document__excerpt > p:nth-child(4)
```

<p>In the NTW, the design of the special segments has been achieved with the following procedure:

- Ground load derivation: Accurate estimation of the loads acting on the segments around the opening using Plaxis® 3D, considering the ground properties, the construction stages and the most unfavourable dewatering hypothesis.

- Member forces and stepping between segments calculation: Accurate structural analysis carried out using SAP2000® considering the derived ground loads, non-linear links between rings acting under compression only and a remaining residual propulsion force.

- Study of the construction compatibility with TBM advance, with low interference in the TBM advance ratio and feasibility to be executed from the TBM.

- Design based on accurate tolerances of the embedded steel frames inside the special segments compatible with the construction sequence.</p>

Solution:

Ensure that all content which has been presented in a list format for users, is also programmatically marked up as such, allowing for screen reader users to understand the structure of the information and the context in which it is presented. Use an unordered list this list.

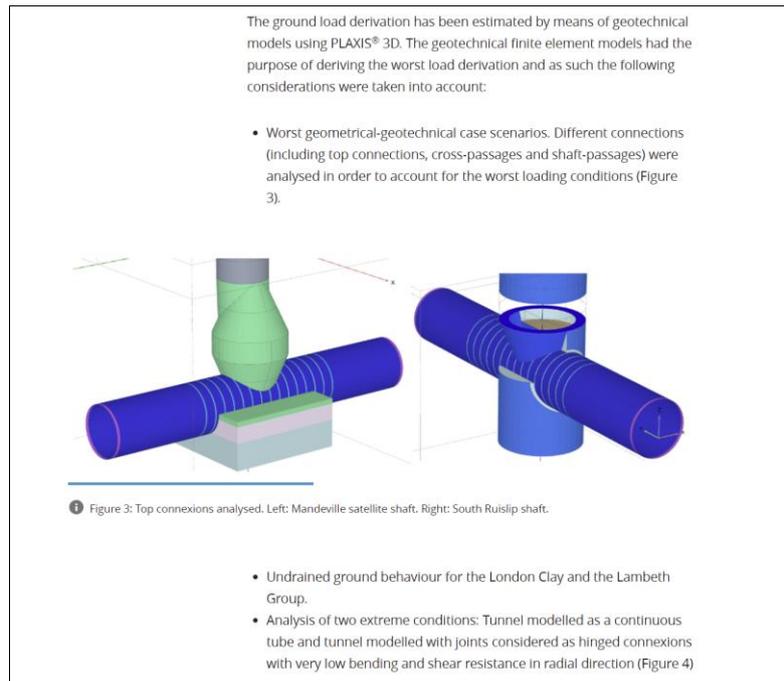


URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:



Listed content had been separated into two different lists, with an image in between the two lists. This means that screen reader users are not provided with the correct structure and relation between the listed content, as they have been portrayed to the user as two separate lists.

Screen reader users rely on correct and sufficient list mark-up to allow them to understand the structure of a list and which content relates to other listed items. As these have been split into multiple lists, it is difficult for screen reader users to be able to discern the relation of the two lists.

Current Code Ref(s):

```
#main > article > div > div > div > div.document__main__content > ul:nth-child(20)
<ul><li>Worst geometrical-geotechnical case scenarios. Different connections
(including top connections, cross-passages and shaft-passages) were analysed in
order to account for the worst loading conditions (Figure 3).</li></ul>

<figure class="wp-block-image size-large">...</figure>

<ul><li>Undrained ground behaviour for the London Clay and the Lambeth
Group.</li><li>Analysis of two extreme conditions: Tunnel modelled as a continuous
tube and tunnel modelled with joints considered as hinged connexions with very low
bending and shear resistance in radial direction (Figure 4)</li></ul>
```

This issue also occurs on other lists present on the same page.

Solution:

Ensure that lists are not broken up into two separate unordered list elements when they are related and supposed to be one continuous list, allowing for screen reader users to be able to distinguish the relation and understand the structure of the list. Consider adding the image and figure caption to the list.

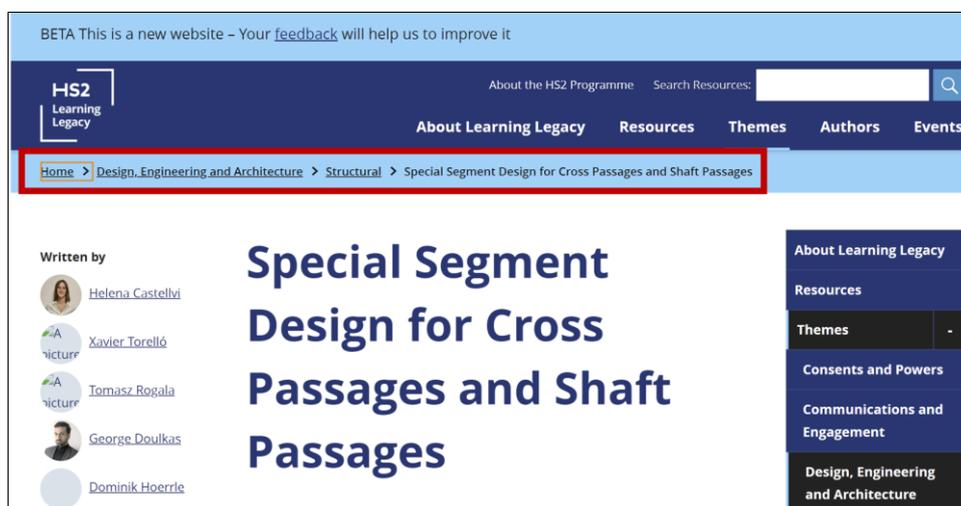


URL: <https://learninglegacy.hs2.org.uk/#main>

Page title: Homepage - HS2 Learning Legacy

Journey 1

Screenshot:



The breadcrumb links provided for users throughout the site have not been marked up as a list. Because of this, no relation is obtainable between the links provided in the breadcrumb trail for screen reader users.

Users rely on the correct mark-up to allow them to understand the structure and purpose of the links provided.

Current Code Ref(s):

#breadcrumbs

```
<div class="breadcrumbs" id="breadcrumbs"><span><span><a href="http://learninglegacy.hs2.org.uk/">Home</a> <span><a href="/document-themes/design-engineering-architecture/">Design, Engineering and Architecture</a> <span><a href="/document-themes/structural/">Structural</a> <span class="breadcrumb_last" aria-current="page">Special Segment Design for Cross Passages and Shaft Passages</span></span></span></span></span></div>
```

Solution:

Ensure breadcrumb links are marked up sufficiently allowing screen reader users to understand the structure of the component and the purpose of the links contained. Implement a `<nav>` containing the breadcrumb, adding an 'aria-label' to the `<nav>` providing a label for screen reader users to understand the purpose of the list of links. Please see an ['accessible example of breadcrumb links by W3C'](#)

Images of text (A)

Text had been displayed on images alone, with no other means of obtaining that information without the image.

WCAG Reference:

1.4.5 Images of Text (Level AA)

[Understanding Images of Text](#) | [How to Meet Images of Text](#)

1.4.9 Images of Text (No Exception) (Level AAA)

[Understanding Images of Text \(No Exception\)](#) | [How to Meet Images of Text \(No Exception\)](#)

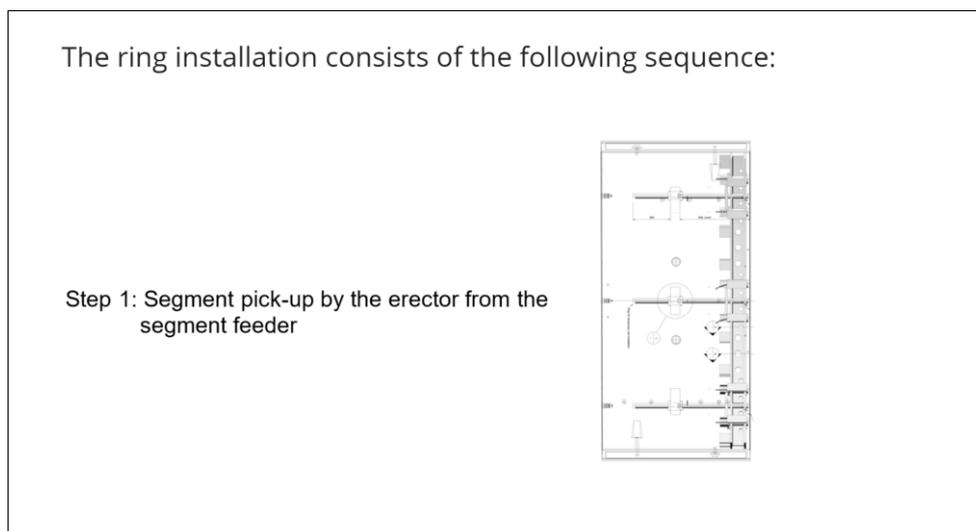
Issue ID: DAC_Images_Of_Text_Issue1

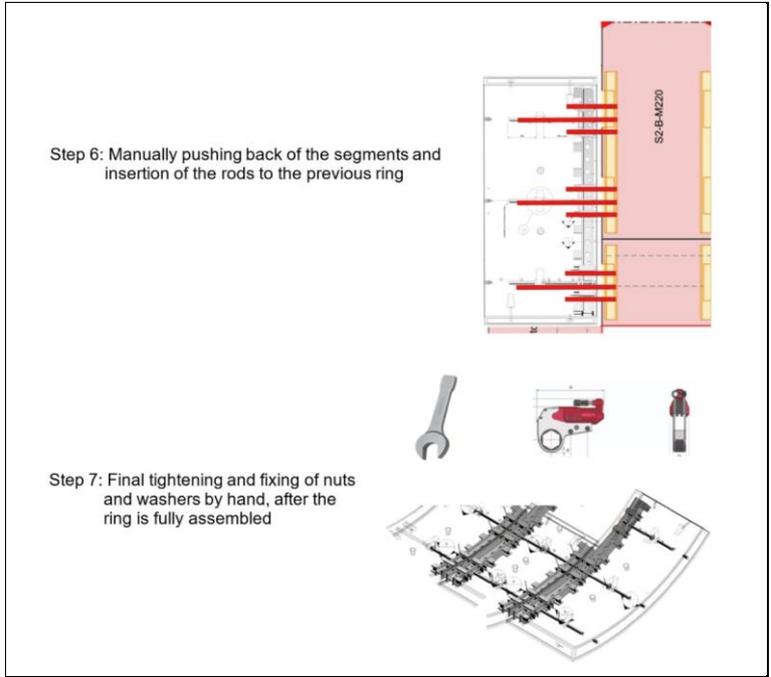
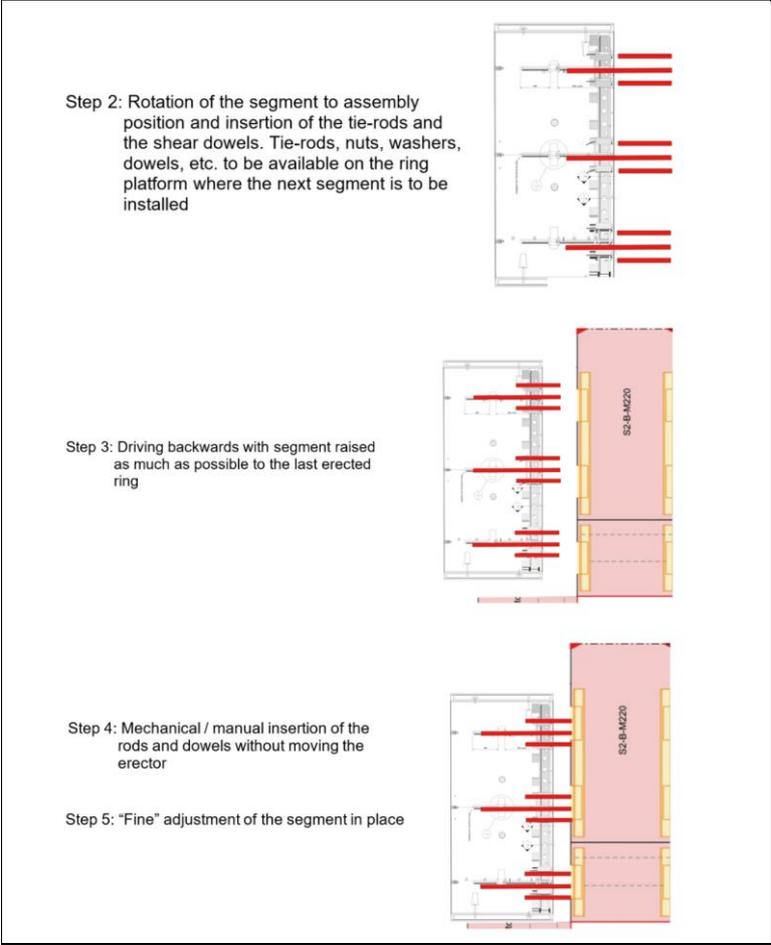
URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:





Images of the different steps are provided for users, however, the text and information relating to each step has been provided as an image. This means that not only can screen reader users not access this information as the images have been hidden from the user, but also other users who require the ability to alter the size, weight and colour of text in order to distinguish and easily understand the content, cannot do so when the text is an image.

Current Code Ref(s):

#main > article > div > div > div > div.document__main__content > figure.wp-block-image.is-resized

```
<figure class="wp-block-image is-resized"></figure>
```

Solution:

Ensure to provide all information and text in a way which is accessible for all user groups. Consider providing the instructions presented in each image as standard text on the page, allowing for screen reader users to still bypass the images but have the instructions presented to them. Additionally, allowing other users who require it, to be able to alter the style of the text.

The instructions should be marked up as an ordered list, to inform screen reader users that it is a step process, with a logical order to the list.

Most images on this page seem to provide instructions for users, however as the images have been provided with null 'alt' attributes, screen reader users are unable to obtain this information. If the information provided in each of the images is informative, then this information should be portrayed and accessible for all users.

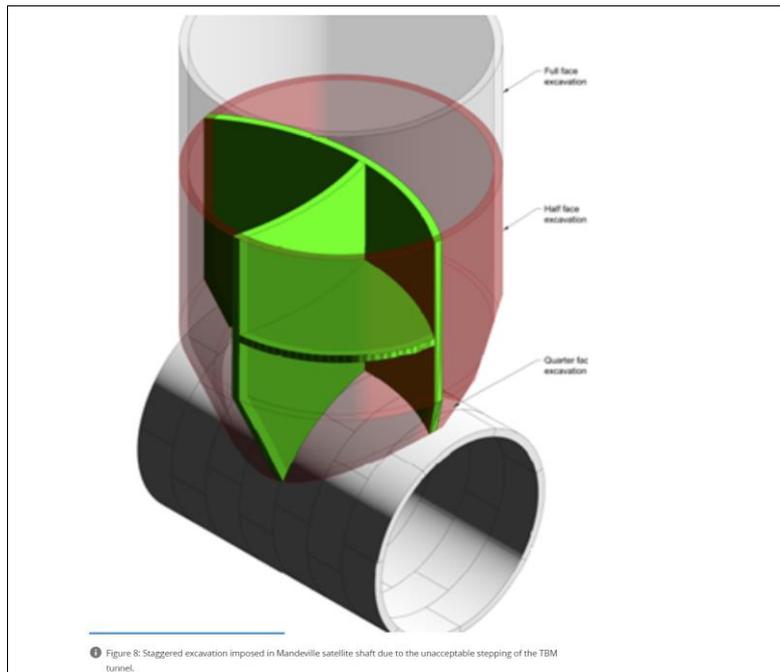


URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:



The image provided for users as 'Figure 8', contains text as labels indicating different sections of the diagram, however, the quality of the image is so low, the text is extremely difficult for users to distinguish and increasingly so for users with low vision or other vision impairments. Additionally, one of the labels, is truncated and is not provided in its full length for users.

Current Code Ref(s):

```
#main > article > div > div > div > div.document__main__content > figure:nth-child(38) > img  

```



Solution:

Ensure that all text within an image is accessible for all users. The text should be clear and distinguishable and where a necessity, should be marked up in such a way to allow users who require the need to adjust the text in order to read it, can be done so.



Inaccessible content (A)

Content could not be accessed using a keyboard alone.

WCAG Reference:

2.1.1 Keyboard (Level A)

[Understanding Keyboard](#) | [How to Meet Keyboard](#)

2.1.3 Keyboard (No Exception) (Level AAA)

[Understanding Keyboard \(No Exception\)](#) | [How to Meet Keyboard \(No Exception\)](#)

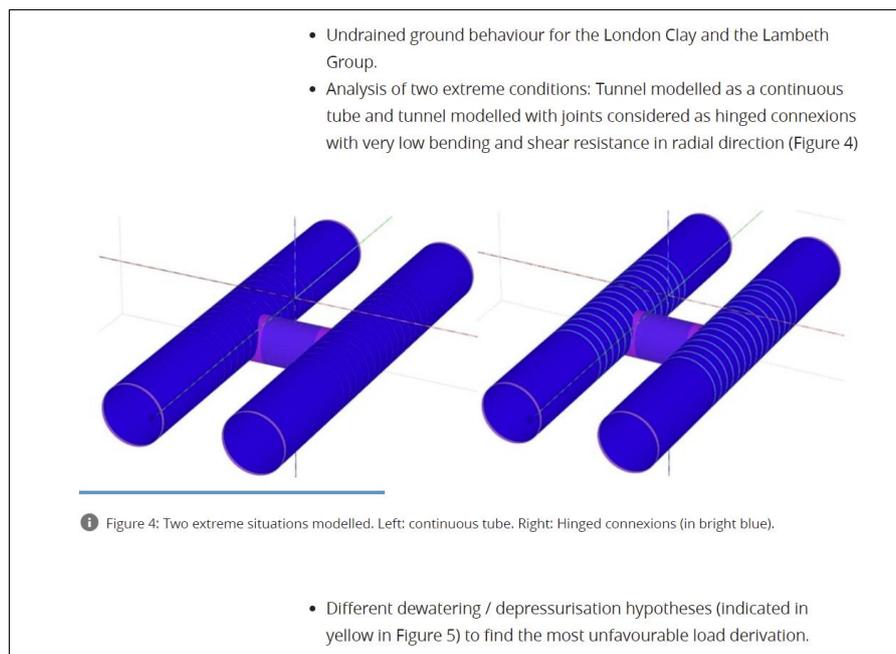
Issue ID: DAC_Innaccessible_Content_Issue1

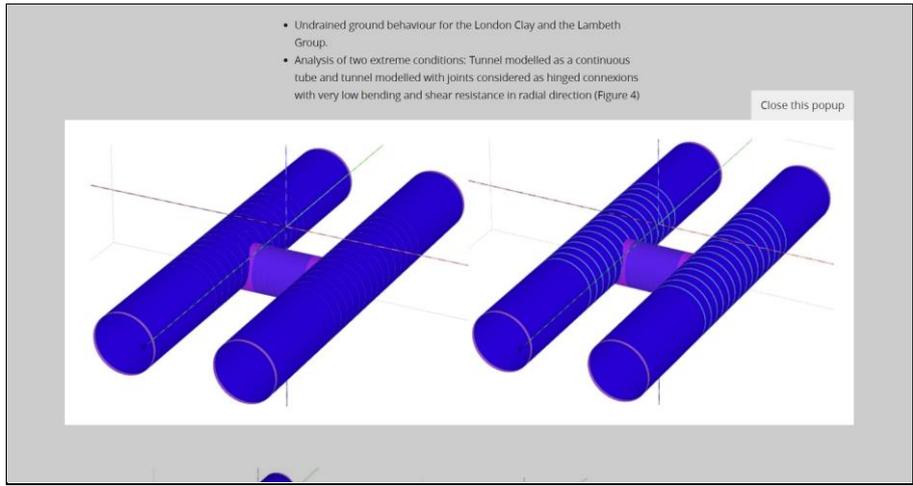
URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:





The images presented throughout all of the information contained on the page, can be enlarged and open as a pop-up when clicked on, however, this is not achievable when a user is navigating the page using a keyboard alone, because the images have not been added to the focus order.

Current Code Ref(s):

```
#main > article > div > div > div > div.document__main__content > figure:nth-child(23) > img

```



The following list is an example of other pages where this issue occurs. Additional instances of this issue exist on other pages throughout the website; wherever this issue occurs, they too will need to be resolved.

- URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2

Learning Legacy

Journey: 5

- #main > article > div > div > div > div.document__main__content > figure:nth-child(13) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(15) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(21) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(25) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(32) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(35) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(38) > img
- #main > article > div > div > div > div.document__main__content > h2:nth-child(43) > img
- #main > article > div > div > div > div.document__main__content > figure.wp-block-image.is-resized > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(45) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(46) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(47) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(48) > img
- #main > article > div > div > div > div.document__main__content > figure:nth-child(52) > img



Solution:

Ensure that all content is not mouse dependant and can be accessed by a user who relies on a keyboard alone. The images which can be enlarged must also be focusable for keyboard users to allow users who rely on a keyboard alone to also be able to enlarge the image. Additionally, after the user has enlarged the image, the user should be able to focus onto the close button.

Consider removing this function as it is superfluous and does not serve any additional help for users. In order to make this image popup accessible for keyboard users, it would then also allow screen reader users to access the popup, being provided with a descriptive label and informing them of the modal, its function and current state. Once activated, the user would then need to be provided with a descriptive alt attribute of the image being displayed.

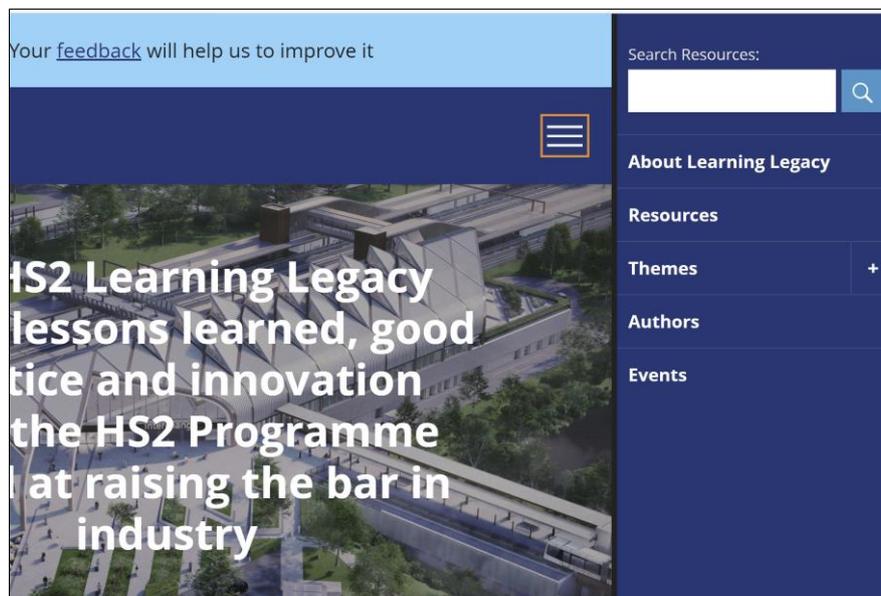
The added steps required to make these popup images accessible for everyone, outweighs the need for enlarging the image, when users have multiple ways of doing so with standard software.



URL: <https://learninglegacy.hs2.org.uk/#main>

Page title: Homepage - HS2 Learning Legacy
Journey 1

Screenshot:



If the viewport size on the page is reduced a toggle menu appears on the page, but when the menu is activated using the space bar on the keyboard, the menu expands but users are unable to enter the expanded menu using the keyboard tab key command. JavaScript event handlers have been attached to the button, but assistive technologies may not be able to recognise the functionality of such components in order to present their full purpose users.

This issue may cause difficulty to keyboard only users but also screen reader users who use keyboard commands to navigate web pages. In this case, screen reader users are informed that the toggle menu has been expanded and would then expect to use the tab key to navigate through the search input and menu items but when users press the tab key, the focus is taken to the 'Search for:' input in the main content of the page.

Current Code Ref(s): #mobile-nav-toggle

```
<button class="nav-toggler" id="mobile-nav-toggle" aria-expanded="true">  
<svg class="icon" height="18" viewBox="0 0 30 18" width="30"  
xmlns="http://www.w3.org/2000/svg">  
<path d="M2 2.3H0V0h30v2.3H2zM2 10H0V8h30V10H2zM28 18H0v-2.3h30V18h-2z"></path>  
</svg> <span class="visuallyhidden">Toggle navigation</span>  
</button>
```

Solution:

Ensure that all components are accessible for all users and do not rely on the use of a mouse alone to access. After a user expands the menu while navigating using a keyboard alone, they should be able to tab onto the components contained within the menu to access the content.

Further information on accessible hamburger menus can be found in: [Accessible Hamburger Menu Demo for Responsive Web Design.](#)



Use of color (A)

Instructions were provided using colour as a means of identifying the information.

WCAG Reference:

1.4.1 Use of Color (Level A)

[Understanding Use of Color](#) | [How to Meet Use of Color](#)

1.3.3 Sensory Characteristics (Level A)

[Understanding Sensory Characteristics](#) | [How to Meet Sensory Characteristics](#)

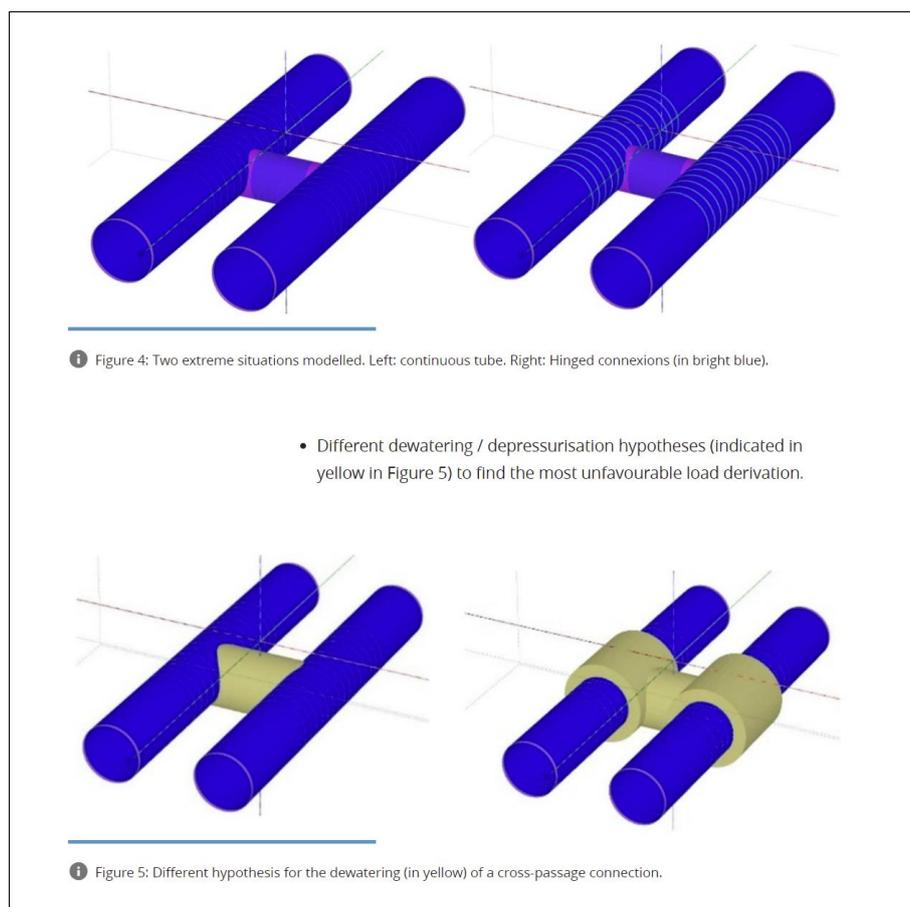
Issue ID: DAC_Use_Of_Color_Issue1

URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:



Images were provided for users illustrating and portraying information, with a caption underneath providing indication of which image refers to particular instances, however, this information is provided by means of using colour alone to indicate which diagram the instruction is referring to.

People perceive colour and contrast to different degrees, with some users unable to distinguish certain colours at all. Because of this, they are unable to rely on instructions which are provided in the means of using colour alone to relate with the relative area on the diagram.

Current Code Ref(s):

```
#main > article > div > div > div > div.document__main__content > figure:nth-child(23) > figcaption  
<figcaption>Figure 4: Two extreme situations modelled. Left: continuous tube. Right: Hinged connexions (in bright blue).</figcaption>
```

Current Code Ref(s):

```
#main > article > div > div > div > div.document__main__content > figure:nth-child(25) > figcaption  
<figcaption>Figure 5: Different hypothesis for the dewatering (in yellow) of a cross-passage connection.</figcaption>
```

The following list is an example of other pages where this issue occurs. Additional instances of this issue exist on other pages throughout the website; wherever this issue occurs, they too will need to be resolved.

- URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>
Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy
Journey: 5
 - #main > article > div > div > div > div.document__main__content > figure:nth-child(32) > figcaption
 - 'Figure 6: Non-linear links between rings (pink elements) (Example corresponds to cross-passage calculation).'

Solution:

Ensure that colour alone is not the only means used to portray information. Do not use colour alone as the sole way of portraying instructions to the relative diagrams. Consider adding labels within the image indicating the relevant parts of the diagram.



Sensory characteristics (A)

Users were required to rely on sensory characteristics to distinguish information.

WCAG Reference:

1.3.3 Sensory Characteristics (Level A)

[Understanding Sensory Characteristics](#) | [How to Meet Sensory Characteristics](#)

Issue ID: DAC_Sensory_Characteristics_Issue1

URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:

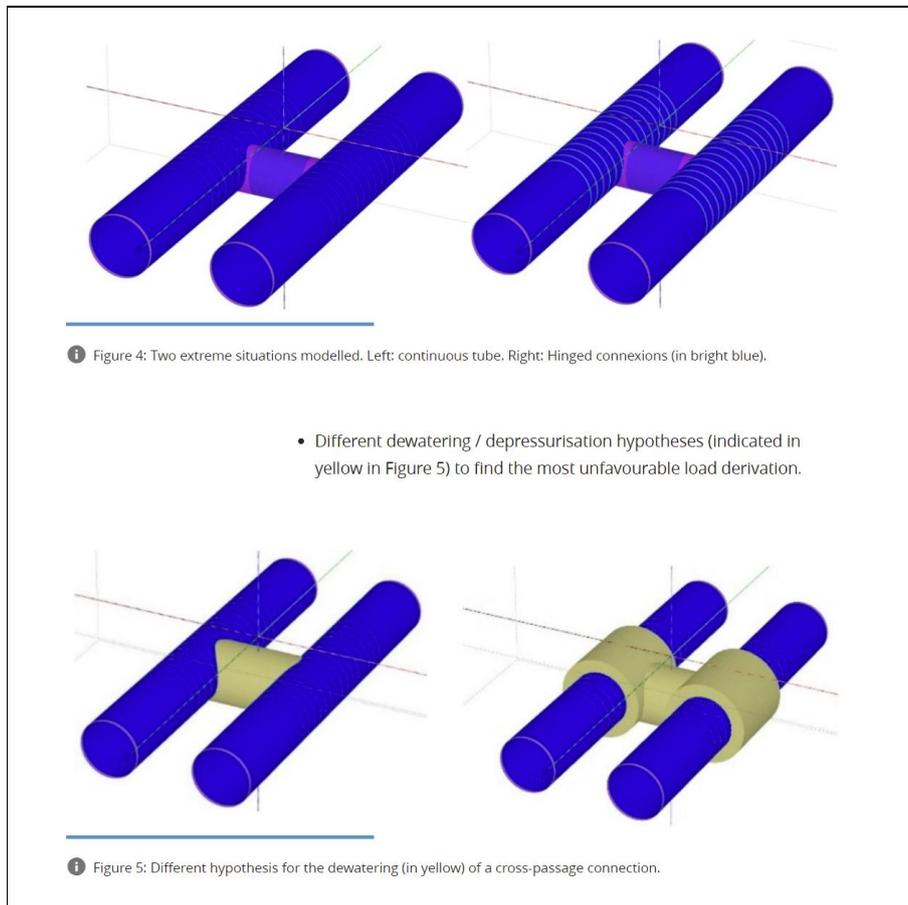


Figure 4 contains multiple diagrams, which are referenced in the figure caption explaining their purpose, however, the figure caption indicates which image is which by informing the user using 'left' and 'right' descriptions. Some users cannot rely on particular senses, others navigate a page in linear order and are not presented with left and right indications. It is crucial to avoid these terms, preventing any information being misinterpreted or inaccessible for some user groups.

Current Code Ref(s):

```
#main > article > div > div > div > div.document__main__content > figure:nth-child(23) > figcaption  
<figcaption>Figure 4: Two extreme situations modelled. Left: continuous tube.  
Right: Hinged connexions (in bright blue).</figcaption>
```

Solution:

Ensure a user does not need to rely on sensory characteristics to distinguish information and instructions. Consider using the terms 'first' and 'second' in place of 'left' and 'right', allowing users who navigate the page in a linear method, such as screen readers, to easily identify and distinguish the relevant instructions.



Label in name (A)

A components visible label was found to be different from is accessible label.

WCAG Reference:

2.5.3 Label in Name (Level A)

[Understanding Label in Name](#) | [How to Meet Label in Name](#)

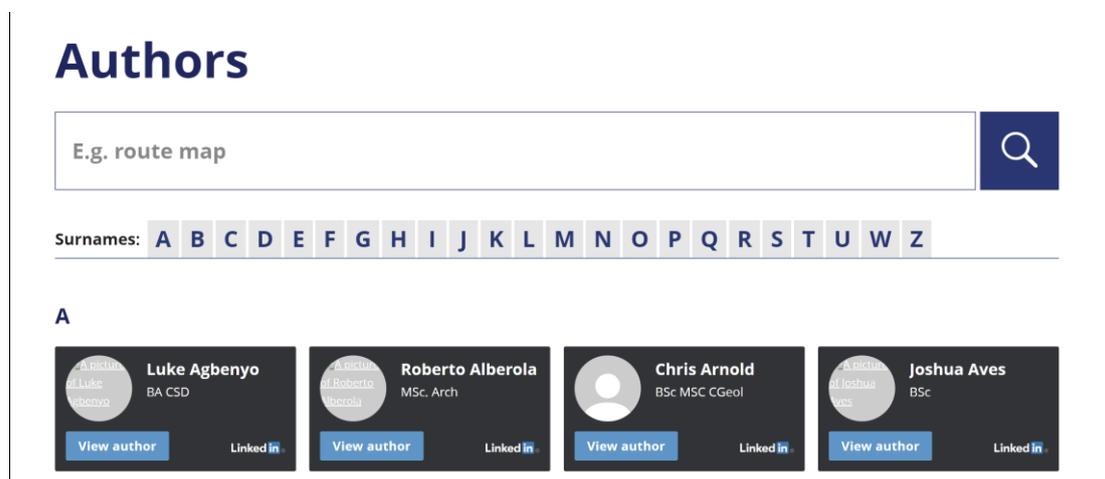
Issue ID: DAC_Label_In_Name_Issue1

URL: <https://learninglegacy.hs2.org.uk/authors/>

Page title: Authors Archive - HS2 Learning Legacy

Journey: 4

Screenshot:



The visible label for the search field presented on the authors page for users, appears as 'Authors', however, the accessible label is 'search for'. It is important that visible labels and accessible labels are matching to allow voice activation users the ability to function and access the component using the correct and expected commands.

Current Code Ref(s):

```
#main > div > div > div > form > div.input--styled-container.group__item
```

```
<div class="input--styled-container group__item">  
  <label for="author_name_param" class="field-label  
screen-reader-text visuallyhidden">Search for: </label>  
  <input class="field-input searchform__input"  
type="text" name="author_name_param" id="author_name_param" placeholder="E.g.  
route map" value="">  
</div>
```

Voice activation analyst comments:

"I found the only way that I was able to access the input field labelled 'Authors' was by using the command 'Click Box', I would have expected to have been able to use the command 'Click Authors' as this is the text that was visible to me."

Solution:

Ensure that visible labels and accessible labels are matching for users of all assistive technologies, to access and function as expected. Accessible labels can contain additional text; however, they must contain the visible label as visually displayed on the screen, without being split up or broken.

Consider showing the label for the search field on the page, acting as the visible label instead of the 'Authors' heading.

Additionally, change the placeholder text to relate to the current page and not previous search fields found on other pages.



Illogical structure (A)

Content had been incorrectly structured with headings and article elements.

WCAG Reference:

1.3.1 Info and Relationships (Level A)

[Understanding Info and Relationships](#) | [How to Meet Info and Relationships](#)

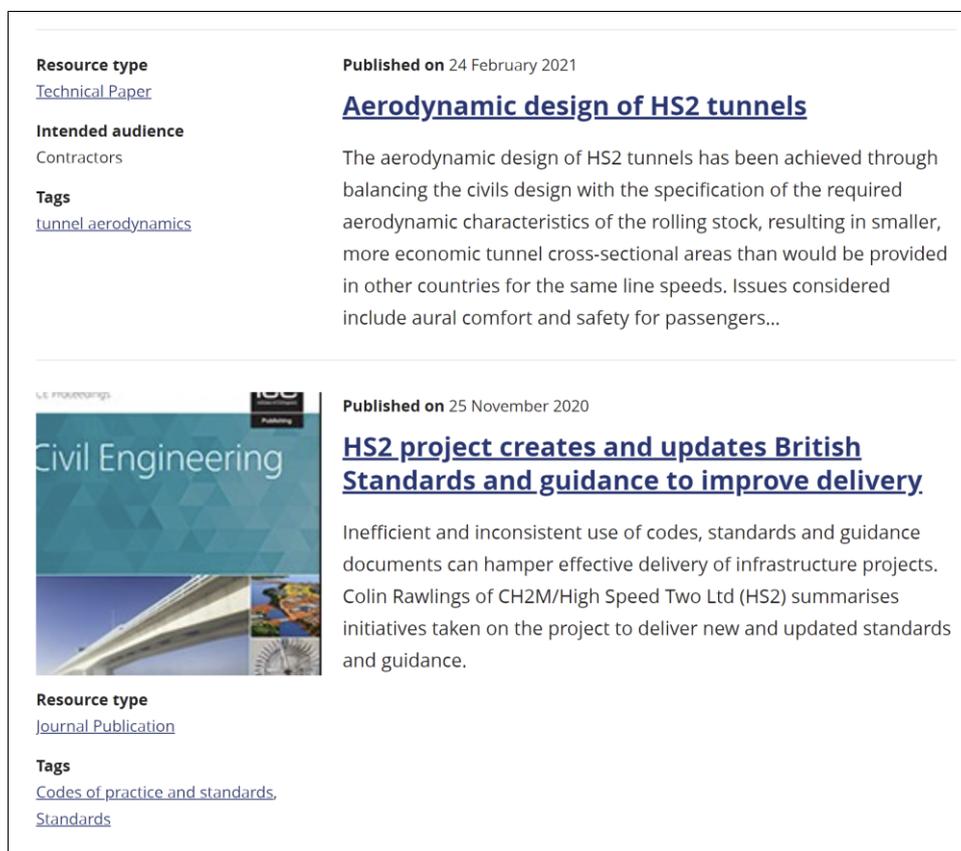
Issue ID: DAC_Illogical_Structure_Issue1

URL: <https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/>

Page title: Design, Engineering and Architecture Archives - HS2 Learning Legacy

Journey: 3

Screenshot:



Resource type
[Technical Paper](#)

Intended audience
Contractors

Tags
[tunnel aerodynamics](#)

Published on 24 February 2021

[Aerodynamic design of HS2 tunnels](#)

The aerodynamic design of HS2 tunnels has been achieved through balancing the civils design with the specification of the required aerodynamic characteristics of the rolling stock, resulting in smaller, more economic tunnel cross-sectional areas than would be provided in other countries for the same line speeds. Issues considered include aural comfort and safety for passengers...

Resource type
[Journal Publication](#)

Tags
[Codes of practice and standards](#)
[Standards](#)

Published on 25 November 2020

[HS2 project creates and updates British Standards and guidance to improve delivery](#)

Inefficient and inconsistent use of codes, standards and guidance documents can hamper effective delivery of infrastructure projects. Colin Rawlings of CH2M/High Speed Two Ltd (HS2) summarises initiatives taken on the project to deliver new and updated standards and guidance.

On the 'Design, Engineering and Architecture Archives' page, the sections of content have been separated using article elements, which contain information including resource type and 'Tags'. However, this information has been provided for users prior to the headings. This means that screen reader users encounter this information first as well, meaning that the 'Resource type' and 'Tags' are actually introduced by the heading from the previous article and resource.

Current Code Ref(s):

#post-3163 > article

```
<article class="document--card">
<aside class="document--card__meta">
<a href="https://learninglegacy.hs2.org.uk/document/hs2-project-creates-and-
updates-british-standards-and-guidance-to-improve-delivery/"></a>
<dl class="sidebar-info-list">
<dt>Resource type</dt>
<dd><a href="/?s=&resource_type[]=440">Journal Publication</a></dd>
<dt>Tags</dt>
<dd class="dd--inline"><a href="/tag/codes-of-practice-and-standards/">Codes of
practice and standards</a></dd>
<dd class="dd--inline"><a href="/tag/standards/">Standards</a></dd>
</dl>
</aside>
<div class="document--card__intro">
<p class="document--card__meta-summary">
<strong>Published on</strong>
<time datetime="2020-11-25">
25 November 2020                                </time>
</p>
<h3 class="document--card__heading h2"><a
href="https://learninglegacy.hs2.org.uk/document/hs2-project-creates-and-updates-
british-standards-and-guidance-to-improve-delivery/">HS2 project creates and
updates British Standards and guidance to improve delivery</a></h3>
Inefficient and inconsistent use of codes, standards and guidance documents can
hamper effective delivery of infrastructure projects. Colin Rawlings of CH2M/High
Speed Two Ltd (HS2) summarises initiatives taken on the project to deliver new and
updated standards and guidance.                                </div>
</article>
```

Screen reader analyst comments:

"I found the layout of many of the entries in the articles list, such as 'aerodynamic design of hs2 tunnels' confusing. Before each heading which includes the article title, I located a definition list including information relating to resource type, intended audience and tags followed by the date of publication. I would find it helpful if this information were included after the heading which describes the article title. This would make it easier for me to recognise which article the information is associated with"

Solution:

Ensure that all content is structured correctly, being introduced correctly by the relative heading. The 'resource type' and 'tags' should be situated after the headings introducing the sections and different resources. This will allow screen reader users to understand the sections and which links are related to which resource.

Consider removing the article elements which can be misleading regarding the purpose of each resource, as the heading alone is enough to provide adequate structure to the resources.



Content on hover or focus (AA)

Content did not behave as expected when receiving hover or focus.

WCAG Reference:

1.4.13 Content on Hover or Focus (Level AA)

[Understanding Content on Hover or Focus](#) | [How to Meet Content on Hover or Focus](#)

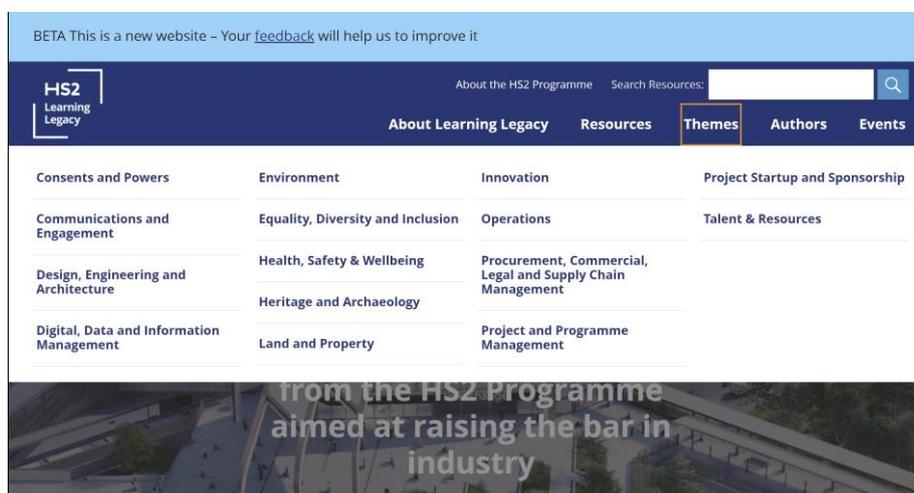
Issue ID: DAC_Content_On_Hover_Or_Focus_Issue1

URL: <https://learninglegacy.hs2.org.uk/>

Page title: Homepage - HS2 Learning Legacy

Journey: 1

Screenshot:



The link 'Themes' within the header navigation, is an expandable link, presenting users with multiple options to choose from. When navigating the page using a keyboard alone, a user can access the expandable menu, however, once they have done so, their focus can move through the list of links and then continue onto the next link within the header navigation without closing the expanded 'Themes' link. This means that the link remains in its expanded state covering other content contained on the page.

Users would expect these components to close when no longer receiving focus and additionally, be able to be closed using the escape key, which users are unable to do. The only means of collapsing the expanded menu, is to activate the 'Themes' link again.

Current Code Ref(s):

#primary-nav-list > li:nth-child(4)

```
<li class=" item-top-level "><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-themes/" aria-
expanded="true">Themes</a><div class="sub-menu" aria-hidden="false"><ul
class="sub-menu__nav"><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-themes/consents-powers/">Consents
and Powers</a></li><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-themes/communications-
engagement/">Communications and Engagement</a></li><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-themes/design-engineering-
architecture/">Design, Engineering and Architecture</a></li><li><a class="nav-
item" href="https://learninglegacy.hs2.org.uk/document-themes/digital-data-
information-management/">Digital, Data and Information Management</a></li><li><a
class="nav-item" href="https://learninglegacy.hs2.org.uk/document-
themes/environment/">Environment</a></li><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-themes/equality-diversity-and-
inclusion/">Equality, Diversity and Inclusion</a></li><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-themes/health-safety-
wellbeing/">Health, Safety & Wellbeing</a></li><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-themes/heritage-
archaeology/">Heritage and Archaeology</a></li><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-themes/land-and-property/">Land
and Property</a></li><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-
themes/innovation/">Innovation</a></li><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-
themes/operations/">Operations</a></li><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-themes/procurement-commercial-
legal-management/">Procurement, Commercial, Legal and Supply Chain
Management</a></li><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-themes/project-and-programme-
management/">Project and Programme Management</a></li><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-themes/project-startup-and-
sponsorship/">Project Startup and Sponsorship</a></li><li><a class="nav-item"
href="https://learninglegacy.hs2.org.uk/document-themes/talent-resources/">Talent
& Resources</a></li></ul></div></li>
```

Solution:

Where receiving and then removing pointer hover or keyboard focus triggers additional content to become visible and then hidden, the following are true:

- **Dismissible:** A mechanism is available to dismiss the additional content without moving pointer hover or keyboard focus, unless the additional content communicates an input error or does not obscure or replace other content;
- **Hoverable:** If pointer hover can trigger the additional content, then the pointer can be moved over the additional content without the additional content disappearing;
- **Persistent:** The additional content remains visible until the hover or focus trigger is removed, the user dismisses it, or its information is no longer valid.



Contrast (Minimum) (AA)

The colour contrast ratio does not meet guidelines requiring that the visual presentation of standard text.

WCAG Reference:

1.4.3 Contrast (Minimum) (Level AA)

[Understanding Contrast \(Minimum\)](#) | [How to Meet Contrast \(Minimum\)](#)

Issue ID: DAC_Colour_Contrast_Issue1

URL: <https://learninglegacy.hs2.org.uk/#main>

Page title: Homepage - HS2 Learning Legacy

Journey 1

Screenshot:



The white text which has been presented over a background image may be problematic for low-vision users navigating the service as the contrast ratio fails to meet the minimum contrast ratio of 3:1 for large text (it is currently 2.7:1).

Current Code Ref(s): #main > div > div > div

```
<div class="media_inner__caption heading">
```

```
The HS2 Learning Legacy shares lessons learned, good practice and innovation from  
the HS2 Programme aimed at raising the bar in industry
```

```
</div>
```

CSS:

```
.media_inner__caption {  
color: #fff;
```

Background colour:

```
#A29DA3
```

Please note: The background colour is an approximate taken from a sample of the background image.

Low vision user comments:

“When I was reading through the banner information, I struggled to read the font against the background because I found that the white font would blend in with the background, as the text has been placed over an image.”

Solution:

It is recommended not to place text over background images as low-vision users can find difficulty in distinguishing the text as different areas of background images may have different colour contrast ratios. Consider placing the text adjacent to the image or providing a solid contrasting background for the text.

If the text is placed over the image, please ensure that the visual presentation of text has a colour contrast ratio of at least 3.1.

For sites to pass AA, they must comply with WCAG 2.1 checkpoint 1.4.3 for colour contrast, which specifies the following minimum contrast ratios:

- if text is not bold and its size is less than 18pt: 4.5:1 for AA level;
- **if text is not bold and its size is at least 18pt: 3:1 for AA level;**
- if text is bold and its size is less than 14pt: 4.5:1 for AA level;
- if text is bold and its size is at least 14pt: 3:1 for AA level



URL: https://learninglegacy.hs2.org.uk/?s=london&resource_type%5B%5D=439&orderSearchBy=relevance

Page title: You searched for london - HS2 Learning Legacy Journey 2

Screenshot:



The white text which has been presented over a pink background colour may be problematic for low-vision users navigating the service as the contrast ratio fails to meet the minimum contrast ratio of 4.5:1 for regular text (it is currently 4.2:1).

Current Code Ref(s): #search-filters__inner > button:nth-child(2)

```
<button class="button search-submit">Apply Filters</button>
```

CSS:

```
.search-submit {  
background: #bb579b;  
color: #fff;  
display: block;  
font-weight: 700;  
max-width: 16.66667rem;  
margin-top: .55556rem;  
text-align: left;  
width: 100%;  
}
```

font-size: 18px;

Ratio: 4.2:1

Low vision user comments:

“The ‘Apply filters’ button was difficult to read as the white text had been used against a light purple background.”

Solution:

For sites to pass AA, they must comply with WCAG 2.1 checkpoint 1.4.3 for colour contrast, which specifies the following minimum contrast ratios:

- if text is not bold and its size is less than 18pt: 4.5:1 for AA level;
- if text is not bold and its size is at least 18pt: 3:1 for AA level;
- if text is bold and its size is less than 14pt: 4.5:1 for AA level;
- if text is bold and its size is at least 14pt: 3:1 for AA level

URL: https://learninglegacy.hs2.org.uk/?s=london&resource_type%5B%5D=439&orderSearchBy=relevance

Page title: You searched for london - HS2 Learning Legacy Journey 2

Screenshot:



When focus is placed on the labels for the checkboxes, the black text which has been presented over an orange background colour. This may be problematic for low-vision users navigating the service as the contrast ratio fails to meet the minimum contrast ratio of 4.5:1 for regular text (it is currently 4.3:1).

Current Code Ref(s): #search-filters__inner > ol > li:nth-child(1) > div > ol > li:nth-child(1) > label

```
<label for="filter-theme-413"><input type="checkbox" data-all-checkbox-selector="true" class="input--checkbox" name="themes[]" id="filter-theme-413" value="413"><span class="checkbox-label">All in this theme</span></label>
```

CSS:

foreground colour: #222;
background colour: #F04819;

Ratio: 4.3:1

Solution:

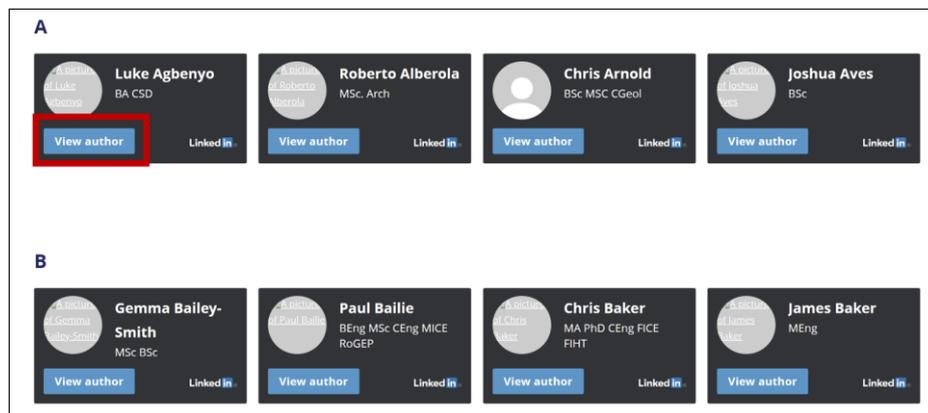
For sites to pass AA, they must comply with WCAG 2.1 checkpoint 1.4.3 for colour contrast, which specifies the following minimum contrast ratios:

- if text is not bold and its size is less than 18pt: 4.5:1 for AA level;
- if text is not bold and its size is at least 18pt: 3:1 for AA level;
- if text is bold and its size is less than 14pt: 4.5:1 for AA level;
- if text is bold and its size is at least 14pt: 3:1 for AA level;



URL: <https://learninglegacy.hs2.org.uk/authors/>
Page title: Authors Archive - HS2 Learning Legacy
Journey: 4

Screenshot:



The 'View author' links provided on the 'Authors archive' page, have been displayed using a white text against a light blue background, because of these colour choices the text fails to meet the required contrast ratio against the background. The text only achieves a 3.2:1 ratio, when a 4.5:1 is needed at minimum.

Current Code Ref(s):

```
#main > div > div > div > div.authors-page__lists > ol:nth-child(2) > li:nth-child(1) > div.author-badge__actions > a.button.button--tertiary  
<a href="https://learninglegacy.hs2.org.uk/authors/luke-agbenyo/" class="button button--tertiary">View author</a>
```

CSS:

```
.button--secondary.button--secondary, .button--tertiary.button--tertiary {  
  font-size: 1rem;  
  line-height: 1.77778;  
  font-weight: 700;  
  background-color: #3c96c8;  
  color: #fff;  
  padding: .27778rem 1.66667rem .27778rem 1.66667rem;  
  text-decoration: none;
```

Color: #FFFFFFF

Background: #3C96C8

Ratio: 3.2:1

Colour blind/ Dyslexic analyst comments:

"The "view author" underneath each of the names are all white font on a light blue background which was difficult to read due to the contrast."

Solution:

For sites to pass AA, they must comply with WCAG 2.1 checkpoint 1.4.3 for colour contrast, which specifies the following minimum contrast ratios:

- if text is not bold and its size is less than 18pt: 4.5:1 for AA level;
- if text is not bold and its size is at least 18pt: 3:1 for AA level;
- **if text is bold and its size is less than 14pt: 4.5:1 for AA level;**
- if text is bold and its size is at least 14pt: 3:1 for AA level;



Non-text contrast (AA)

The focus indicator fails to meet WCAG 2.1 guidelines for non-text contrast

WCAG Reference:

1.4.11 Non-text Contrast (Level AA)

[Understanding Non-text Contrast](#) | [How to Meet Non-text Contrast](#)

Issue ID: DAC_Non_Text_Contrast_Issue1

URL: <https://learninglegacy.hs2.org.uk/#main>

Page title: Homepage - HS2 Learning Legacy

Journey 1

URL: https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/#document-list-container_tabs

Page title: Design, Engineering and Architecture Archives - HS2 Learning Legacy

Journey: 3 – Home link in breadcrumb region

Screenshot:



BETA This is a new website – Your **feedback** will help us to improve it

The focus indicator for the ‘feedback’ link fails to meet WCAG 2.1 guidelines for non-text contrast. This issue may affect low-vision and keyboard only users who may find difficulty in distinguishing the orange focus indicator against the light blue background.

The minimum contrast ratio to meet AA non-text contrast guidelines is 3.1 (it is currently 1.4:1).

Current Code Ref(s): #global-header > div.note.bg.bg--tertiary.no-margin > div > a href="http://learninglegacy.hs2.org.uk/feedback-survey/">feedback

CSS:

```
.bg--tertiary {
background-color: #8cd2fa;
color: #222;
}

.global-header a:focus, .global-header button:focus {
background: 0 0;
outline: 2px solid #f3902c;
outline-offset: -2px;
}
```

Ratio: **1.4:1**



Solution:

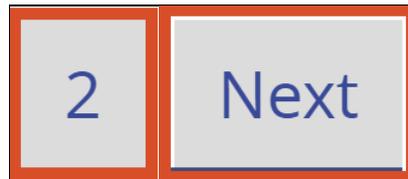
Ensure that the colour contrast of the focus indicator meets a minimum colour contrast ratio of 3.1 against the background colour of the banner to meet WCAG AA guidelines for non-text contrast. We recommend using [WebAim colour contrast checker](#) to check that foreground and background colours meet the necessary ratios to meet the WCAG 2.1 guidelines.



URL: https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/#document-list-container_tabs

Page title: Design, Engineering and Architecture Archives - HS2 Learning Legacy Journey 3

Screenshot:



The focus indicator for the 'feedback' link fails to meet WCAG 2.1 guidelines for non-text contrast. This issue may affect low-vision and keyboard only users who may find difficulty in distinguishing the orange focus indicator against the grey background colour of the pagination links.

The minimum contrast ratio to meet AA non-text contrast guidelines is 3.1 (it is currently 2.7:1).

Current Code Ref(s): #main > article > div > div > div > div.document-list-container > nav.navigation.pagination > div

```
<div class="nav-links"><span aria-current="page" class="page-numbers current">1</span>
  <a class="page-numbers" href="https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/page/2/">2</a>
  <a class="next page-numbers" href="https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/page/2/">Next</a>
</div>
```

CSS:

```
a:focus {
  outline: .2em solid #f04819;
  -webkit-transform: translateZ(0);
  transform: translateZ(0);
  z-index: 900;
}
.page-numbers {
  background: #dcdcdc;
  color: #212121;
  display: inline-block;
  line-height: 1.16667rem;
  padding: .55556rem .66667rem;
  text-decoration: none;
}
```



Solution:

Ensure that the colour contrast of the focus indicator meets a minimum colour contrast ratio of 3.1 against the background colour of the banner to meet WCAG AA guidelines for non-text contrast. We recommend using [WebAim colour contrast checker](#) to check that foreground and background colours meet the necessary ratios to meet the WCAG 2.1 guidelines.



Reflow (AA)

Content lost functionality when navigating the service using reflow options.

WCAG Reference:

1.4.10 Reflow (Level AA)

[Understanding Reflow](#) | [How to Meet Reflow](#)

Issue ID: DAC_Reflow_Issue1

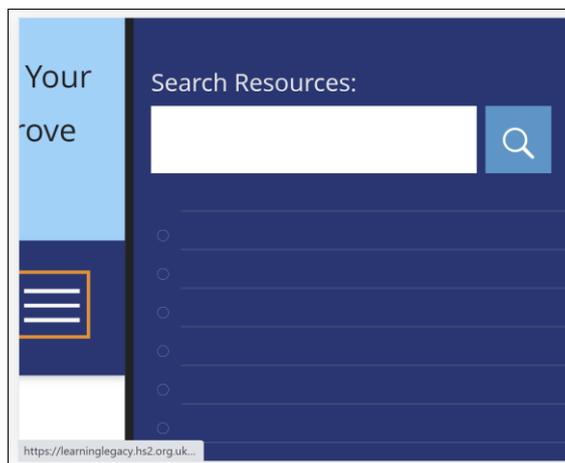
URL: <https://learninglegacy.hs2.org.uk/#main>

Page title: Homepage - HS2 Learning Legacy

Journey 1

This is encountered globally.

Screenshot:



Some users require the ability to read the page content in a one column format with a browser width of 1280px whilst resizing the content to 400%. However, it was not possible to read all the page content when these settings were implemented.

When navigating using these settings and opening the expandable hamburger menu, content on the page is not accessible, with the components within the menu not visually appearing for users.

Solution:

Ensure that all content maintains its structure and functionality when a user navigates the page with the browser width set to 1280px, whilst resizing the content to 400%.

URL: <https://learninglegacy.hs2.org.uk/#main>

Page title: Homepage - HS2 Learning Legacy

Journey 1

Screenshot:



Some users require the ability to read the page content in a one column format with a browser width of 1280px whilst resizing the content to 400%. However, it was not possible to read all the page content when these settings were implemented, as the text at the top of the page overlaps onto a white background.

Current Code Ref(s):

#main > div > div > div

```
<div class="media_inner_caption heading">
```

```
    The HS2 Learning Legacy shares lessons learned, good practice and innovation from the HS2 Programme aimed at raising the bar in industry
```

```
</div>
```

Low vision analyst comments:

"When I was zoomed in with my window dimensions set to 1280x1024, I noticed that most of the banner font is not clearly visible. This makes seeing and reading the font difficult because I had to zoom out to 300% to see and read the font properly."

Solution:

Ensure that content can be presented in a single column without a loss of information and without requiring horizontal scrolling (except for content that requires it; such as tables and images) so that it can be read by people with low vision without requiring the use of assistive technology; such as a screen magnifier.

Text Resizing (AA)

When resizing text up to 200%, the items in the menu were not visible.

WCAG Reference:

1.4.4 Resize text (Level AA)

[Understanding Resize text](#) | [How to Meet Resize text](#)

1.4.8 Visual Presentation (Level AAA)

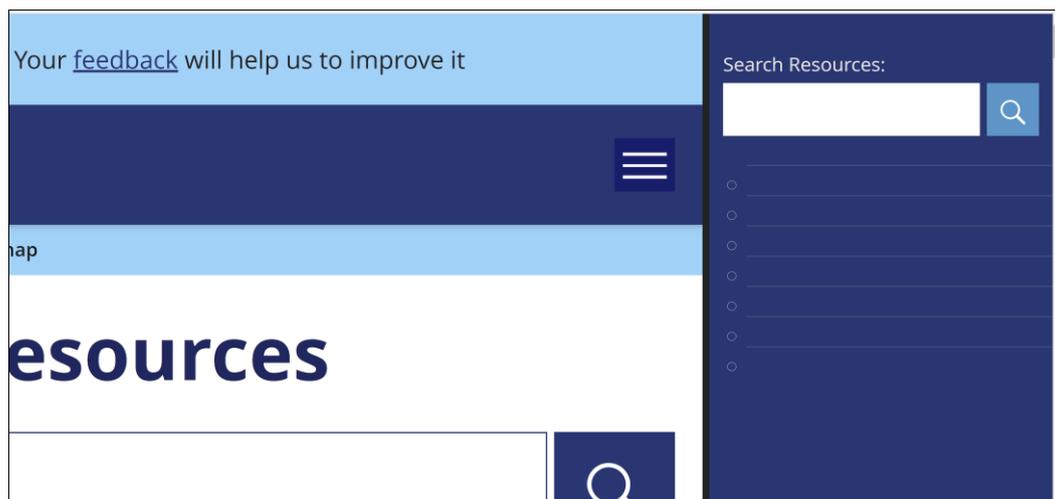
[Understanding Visual Presentation](#) | [How to Meet Visual Presentation](#)

Issue ID: DAC_Magnification_Issue1

URL: <https://learninglegacy.hs2.org.uk/#main>

Page title: Homepage - HS2 Learning Legacy
Journey 1

Screenshot:



When navigating using browser magnification options set to 200% and opening the expandable hamburger menu.

Solution:

Ensure that content contains its structure, functionality and is accessible when navigating using browser magnification options set to 200%.

Non-descriptive labels (AA)

Labels were found to be non-descriptive.

WCAG Reference:

2.4.6 Headings and Labels (Level AA)

[Understanding Headings and Labels](#) | [How to Meet Headings and Labels](#)

Issue ID: DAC_Non-descriptive_Label_Issue1

URL:

https://learninglegacy.hs2.org.uk/?s=route+map&resource_type%5B%5D=439&resource_type%5B%5D=442&resource_type%5B%5D=440&resource_type%5B%5D=702&orderSearchBy=titleDesc

Page title: You searched for route map - HS2 Learning Legacy

Journey: 2

Screenshot:

The screenshot shows a search results page with a sidebar on the left and a main content area on the right. The sidebar is divided into two sections: 'Communications and Engagement' and 'Consents and Powers'. Each section has a list of checkboxes, with the 'All in this theme' checkbox highlighted in red in both sections. The main content area displays the search results for the selected criteria.

25 November 2020 - Journal Publication

Communications and Engagement

- All in this theme
- Art
- Community Relations
- Marketing Communications
- Media Relations
- Public Relations
- Stakeholder Management

Consents and Powers

- All in this theme
- Authorisations Process
- Environmental Consents
- Pre-application Consultation
- Town Planning and Heritage

HS2 Railway, UK - route development to hybrid Bill: Technical and operational requirements

...the railway. In order to get a consistent and coherent design across the 225 km route from London to Birmingham a high-level set of design principles and guidelines were established.

Supporting materials

HS2 Railway, UK - route development to hybrid Bill: Technical and operational requirements - Access sponsored by ICE Publishing

Select a Form Field

- All in this theme check box not checked
- Art check box not checked
- Community Relations check box not checked
- Marketing Communications check box not checked
- Media Relations check box not checked
- Public Relations check box not checked
- Stakeholder Management check box not checked
- All in this theme check box not checked
- Authorisations Process check box not checked
- Environmental Consents check box not checked
- Pre-application Consultation check box not checked
- Town Planning and Heritage check box not checked
- Traffic and Highways Consents check box not checked
- Undertakings and Assurances check box not checked
- Equality, Diversity and Inclusion check box not checked
- All in this theme check box not checked
- Archaeology check box not checked

The filter options provided for users on the resources page, have each been separated into different sections and listed checkboxes. Each section contains ‘All in this theme’ checkbox, however, no indication is provided for screen reader users as to which theme these checkboxes are related to and refer to when selecting the box. This is also the case when navigating the page out of context.

Current Code Ref(s):

```
#search-filters__inner > ol > li:nth-child(1) > div > ol > li:nth-child(1) > label
<label for="filter-theme-413"><input type="checkbox" data-all-checkbox-selector="true" class="input--checkbox" name="themes[]" id="filter-theme-413" value="413"><span class="checkbox-label">All in this theme</span></label>
```

Solution:

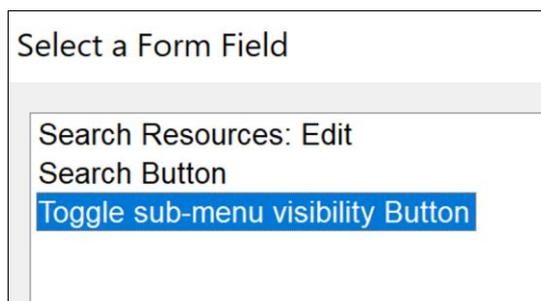
Ensure that all labels are descriptive of the forms purpose and function, allowing users to easily distinguish the difference between other forms of the same function on the page. Make sure the forms contain unique labels allowing screen readers to distinguish which each checkbox relates to. This can be done by using ‘aria-label’ attributes.



URL: https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/#document-list-container_tabs

Page title: Design, Engineering and Architecture Archives - HS2 Learning Legacy
Journey: 3

Screenshot:



The label for the expandable themes button on the side navigation, does not provide screen reader users with enough description to be able to distinguish its purpose and to which section it relates. The label does not include the fact it relates to the ‘Themes’ options.

Current Code Ref(s):

```
#main > article > div > div > aside > div > ol > li.item-current.item-top-level > div > button  
<button class="stacked-nav__toggle" aria-expanded="true"><span  
class="visuallyhidden">Toggle sub-menu visibility</span></button>
```

Screen reader analyst comments:

“Navigating out of context I located an expandable button labelled ‘toggle submenu visibility.’ Though when navigating in context I was able to recognise that this referred to the ‘themes’ section of the menu at the bottom of the page this was not the case when situated out of context. Alternatively marking the link ‘themes’ as expandable will avoid any potential confusion as to the purpose of this button and help to make navigation consistent across the site, since an expandable ‘themes’ link is present elsewhere on the page”



Solution:

Ensure that all labels are descriptive and inform all users of their purpose and function. The label should inform users that it is to expand the 'themes' options.

We recommend using the [Accordion Example - W3.org](https://www.w3.org/WAI/ARIA-practices/p/practices/aria1.2/practices/accordion) to create expandable elements which are accessible to all user groups.



Non-descriptive links (AAA)

A mechanism was not available to allow the purpose of each link to be identified from link text alone.

WCAG Reference:

2.4.9 Link Purpose (Link Only) (Level AAA)

[Understanding Link Purpose \(Link Only\)](#) | [How to Meet Link Purpose \(Link Only\)](#)

Issue ID: DAC_Non_Descriptive_Links_Issue1

URL: https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/#document-list-container_tabs

Page title: Design, Engineering and Architecture Archives - HS2 Learning Legacy Journey 3

Screenshot:



Resource type
[Technical Paper](#)

Tags
[design](#), [roof](#), [station](#)

Links List

- Codes of practice and standards
- Standards
- HS2 project creates and updates British Standards and guidance to improve deliv...
- [birmingham-curzon-street-station-a-21st-century-station-roof](#)
- Technical Paper
- [design](#)
- [roof](#)
- [station](#)



There are several areas on the page with 'Resource type' and 'Tags' sections with non-descriptive links relating to the 'Resource type' and 'Tags'. This issue may affect screen reader users navigating the page out of context using the links dialog list as the links are non-descriptive and read as 'Technical paper' 'design' 'roof' and 'station'.

Screen reader users may be unable to identify the purpose and expected behaviour of the link without being able to understand the additional context of the 'Resource type' and 'Tags' which is presented when users are navigating in context on the page.

Current Code Ref(s): #post-1903 > article > aside > dl > dd:nth-child(2) > a
Technical Paper

Current Code Ref(s): #post-1903 > article > aside > dl > dd:nth-child(4) > a
design

Current Code Ref(s): #post-1903 > article > aside > dl > dd:nth-child(5) > a
roof

Current Code Ref(s): #post-1903 > article > aside > dl > dd:nth-child(6) >
station

Solution:

Add more description to the links, this will allow screen reader users to understand the purpose of the links and expected behaviour of the links when navigating the page out of context using the links dialog list.

Example:

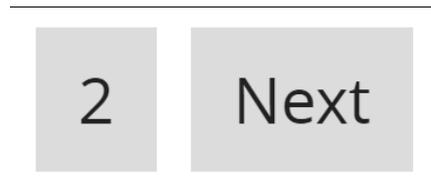
Current Code Ref(s): #post-1903 > article > aside > dl > dd:nth-child(4) > a
Read technical papers on design



URL: https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/#document-list-container_tabs

Page title: Design, Engineering and Architecture Archives - HS2 Learning Legacy Journey 3

Screenshot:



The links '2' and 'Next' in the pagination region are non-descriptive for screen reader user navigating the page out of context using the links dialog list, who may be unable to distinguish the purpose and expected behaviour of links.

Current Code Ref(s): #main > article > div > div > div > div.document-list-container > nav.navigation.pagination > div > a:nth-child(2)

```
<a class="page-numbers" href="https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/page/2/">2</a>
```

Current Code Ref(s): #main > article > div > div > div > div.document-list-container > nav.navigation.pagination > div > a.next.page-numbers

```
<a class="next page-numbers" href="https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/page/2/">Next</a>
```

Screen reader comments:

“In the pagination navigation region at the bottom of the page I found that the links to further pages of results were written as single numbers. For the benefit of users navigating out of context I would find it helpful if it were made clear within the link texts that these refer to pages. This will ensure that users can make an informed selection regardless of the navigational method being used.”



Solution:

Add more description to the links, this will enable screen reader users to identify the purpose and expected behaviour of the links when navigating the page both in and out of context using the links dialog list.

Example:

```
<a class="page-numbers" href="https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/page/2/">Page 2 (of 2)</a>
```

```
<a class="next page-numbers" href="https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/page/2/">Next page</a>
```

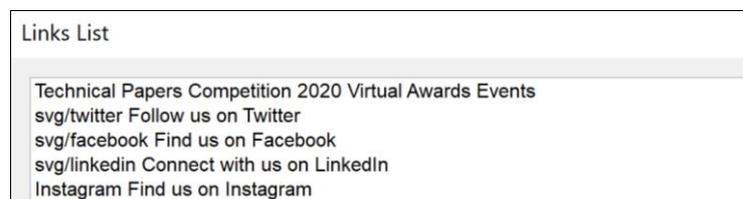


URL: <https://learninglegacy.hs2.org.uk/#main>

Page title: Homepage - HS2 Learning Legacy

Journey 1 – This issue is present throughout the service

Screenshot:



The social media image links in the footer region contain the image 'src' information. This may cause confusion to screen reader users navigating the page out of context using the links dialog list as they may be unable to distinguish the purpose of the link correctly.

Current Code Ref(s): #main-content-container > footer > ul.inline-list.social-icons

```
<ul class="inline-list social-icons">
  <li class="social-icons__twitter">
    <a href="https://twitter.com/HS2ltd">
      <svg viewBox="0 0 24 20" width="24" height="20" focusable="false">
        <image xlink:href="//learninglegacy.hs2.org.uk/wp-content/themes/hs2-
learning-legacy/dist/assets/svg/twitter.svg" src="//learninglegacy.hs2.org.uk/wp-
content/themes/hs2-learning-legacy/dist/assets/svg/twitter.svg" width="24"
height="20"></image>
      </svg>
      <span class="visuallyhidden">Follow us on Twitter</span>
    </a>
  </li>[...]
</ul>
```



Solution:

Add `aria-hidden="true"` to the svg images contained in the links. This will ensure that the image source information is not read out to screen reader users in their journey.

Example:

```
<ul class="inline-list social-icons">
  <li class="social-icons__twitter">
    <a href="https://twitter.com/HS2Ltd">
      <svg viewBox="0 0 24 20" width="24" height="20" focusable="false" aria-
hidden="true" focusable="false">
        <image xlink:href="//learninglegacy.hs2.org.uk/wp-content/themes/hs2-
learning-legacy/dist/assets/svg/twitter.svg" src="//learninglegacy.hs2.org.uk/wp-
content/themes/hs2-learning-legacy/dist/assets/svg/twitter.svg" width="24"
height="20"></image>
      </svg>
      <span class="visuallyhidden">Follow us on Twitter</span>
    </a>
  </li>[...]
</ul>
```



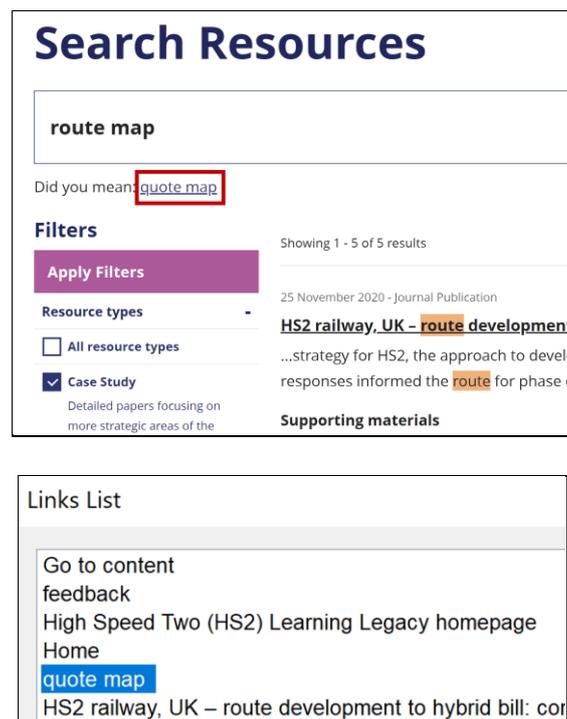
URL:

https://learninglegacy.hs2.org.uk/?s=route+map&resource_type%5B%5D=439&resource_type%5B%5D=442&resource_type%5B%5D=440&resource_type%5B%5D=702&orderSearchBy=relevance#main

Page title: You searched for route map - HS2 Learning Legacy

Journey: 2

Screenshot:



The link 'Quote map' has been provided for users as a 'Did you mean' option, however, for screen reader users who are navigating out of context, this information is not provided. This means that the link does not provide users who do navigate the page out of context with any purpose of the link.

Current Code Ref(s):

#main > form > div.container-outer.search-header > div > p > a

```
<a href="https://learninglegacy.hs2.org.uk/?s=quote%20map&resource_type[]=439&resource_type[]=442&resource_type[]=440&resource_type[]=702">quote map</a>
```

Solution:

Ensure that all links are descriptive for screen reader users, providing them with the links purpose and destination when not only navigating in context, but also out of context. The user must be able to discern that the links purpose is that it is provided as a 'Did you mean' option.

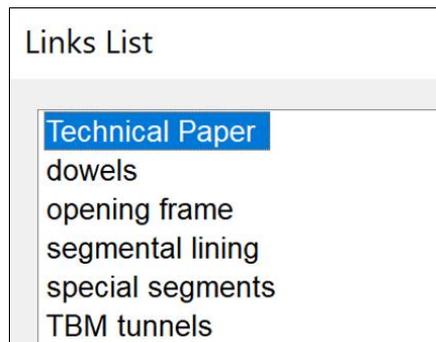


URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:



The link provided for users indicating the resource type, is clearly understandable when navigating the page in context, however, for screen reader users navigating out of context, the link is not descriptive enough to be able to discern the purpose of the link.

Current Code Ref(s):

```
#main > article > div > div > div > header >
```

```
div.group__item.page__aside.document__summary > dl > dd:nth-child(8) > a
```

```
<a href="/?s=&resource_type[]=438">Technical Paper</a>
```



The following list is an example of other pages where this issue occurs. Additional instances of this issue exist on other pages throughout the website; wherever this issue occurs, they too will need to be resolved.

- URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2

Learning Legacy

Journey: 5

- #main > article > div > div > div > header > div.group__item.page__aside.document__summary > dl > dd:nth-child(12) > a
 - 'dowels'
- #main > article > div > div > div > header > div.group__item.page__aside.document__summary > dl > dd:nth-child(13) > a
 - 'opening frame'
- #main > article > div > div > div > header > div.group__item.page__aside.document__summary > dl > dd:nth-child(14) > a
 - 'segmental lining'
- #main > article > div > div > div > header > div.group__item.page__aside.document__summary > dl > dd:nth-child(15) > a
 - 'special segments'
- #main > article > div > div > div > header > div.group__item.page__aside.document__summary > dl > dd:nth-child(16) > a
 - 'TBM tunnels'

Solution:

Ensure that links are marked up with descriptive link text for screen reader users to easily identify the purpose when navigating out of context as well as in context. To achieve this consider adding the word 'resource' to the link text, which can be done using visually hidden text.



Contrast Enhanced (AAA)

Text on the page failed to meet WCAG 2.1 colour contrast guidelines.

WCAG Reference:

1.4.6 Contrast (Enhanced) (Level AAA)

[Understanding Contrast \(Enhanced\)](#) | [How to Meet Contrast \(Enhanced\)](#)

Issue ID: DAC_Contrast_Enhanced_Issue1

URL: <https://learninglegacy.hs2.org.uk/#main>

Page title: Homepage - HS2 Learning Legacy

Journey 1

Screenshot:



BETA This is a new website – Your [feedback](#) will help us to improve it

The 'feedback' link text in the banner does not meet the required colour contrast ratios with a current ratio of 5:1, this issue may affect low vision users navigating the page who may be unable to distinguish the dark blue link text against the light blue background.

The minimum contrast ratio for regular text to meet AAA standard is 7.1 for normal sized text.

Current Code Ref(s): #global-header > div.note.bg.bg--tertiary.no-margin > div > a
feedback

CSS:

```
.bg--tertiary a {  
  color: #1e3773;  
}  
  
.bg--tertiary {  
  background-color: #8cd2fa;  
  color: #222;  
}
```

Ratio: 5:1



Solution:

Ensure that where possible all text achieves a ratio as high as possible.
For sites to meet AAA, they must comply with WCAG 2.1 checkpoint 1.4.6 for colour contrast.

As far as contrast ratio is concerned, it must at least be:

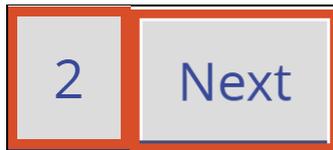
- **if text is not bold and its size is less than 18pt: 7:1 for AAA level;**
- if text is not bold and its size is at least 18pt: 4.5:1 for AAA level;
- if text is bold and its size is less than 14pt: 7:1 for AAA level;
- if text is bold and its size is at least 14pt: 4.5:1 for AAA level.



URL: https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/#document-list-container_tabs

Page title: Design, Engineering and Architecture Archives - HS2 Learning Legacy Journey 3

Screenshot:



When focus or hover is placed on the links in the pagination region, the link text changes from a black to a blue colour with a contrast ratio of 6.1.

The minimum contrast ratio for regular text to meet AAA standard is 7.1 for normal sized text.

Current Code Ref(s): #main > article > div > div > div > div.document-list-container > nav.navigation.pagination > div

```
<div class="nav-links"><span aria-current="page" class="page-numbers current">1</span>
  <a class="page-numbers" href="https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/page/2/">2</a>
  <a class="next page-numbers" href="https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/page/2/">Next</a>
</div>
```

CSS:

```
.link:active, .link:focus, .link:hover, a:active, a:focus, a:hover {
  color: #294a9b;
}

.page-numbers {
  background: #dcdcdc;
  color: #212121;
  display: inline-block;
  line-height: 1.16667rem;
  padding: .55556rem .66667rem;
  text-decoration: none;
}
```



Solution:

Ensure that where possible all text achieves a ratio as high as possible.

For sites to meet AAA, they must comply with WCAG 2.1 checkpoint 1.4.6 for colour contrast.

As far as contrast ratio is concerned, it must at least be:

- **if text is not bold and its size is less than 18pt: 7:1 for AAA level;**
- if text is not bold and its size is at least 18pt: 4.5:1 for AAA level;
- if text is bold and its size is less than 14pt: 7:1 for AAA level;
- if text is bold and its size is at least 14pt: 4.5:1 for AAA level.



URL: <https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/>

Page title: Design, Engineering and Architecture Archives - HS2 Learning Legacy

Journey: 3

Screenshot:



On the 'Design, Engineering and Architecture' page, text has been presented for users using a light purple colour against a white background, because of these colour choices, the text fails to meet the required contrast ratio of 4.5:1, as it achieves 4.2:1 only.

Current Code Ref(s):

```
#main > article > div > div > div > header > div > div > p
```

```
<p>This theme covers the technical design, engineering and architecture for the HS2 Programme</p>
```

CSS:

```
@media screen and (min-width: 42.5em)
```

```
.lead {  
  font-size: 1.55556rem;  
  line-height: 2.22222rem;  
}
```

```
.lead {  
  color: #bb579b;  
  font-family: opensans,sans-serif;  
  font-size: 1.44444rem;  
  font-weight: 600;  
  line-height: 1.72222rem;  
  margin-top: .88889rem;  
  max-width: 38.88889rem;
```

Color: #BB579B

Background: #FFFFFF

Ratio: 4.2:1



Low vision analyst comments:

“When I was reading through the content on the ‘Themes’ page, I struggled to read the purple text at the top of the page. This was because the text blends into the white background making it difficult to distinguish.”

Solution:

Ensure that where possible all text achieves a ratio as high as possible.

For sites to meet AAA, they must comply with WCAG 2.1 checkpoint 1.4.6 for colour contrast.

As far as contrast ratio is concerned, it must at least be:

- if text is not bold and its size is less than 18pt: 7:1 for AAA level;
- **if text is not bold and its size is at least 18pt: 4.5:1 for AAA level;**
- if text is bold and its size is less than 14pt: 7:1 for AAA level;
- if text is bold and its size is at least 14pt: 4.5:1 for AAA level.



Abbreviations (AAA)

Abbreviations had been used without providing the term in its expanded state firstly.

WCAG Reference:

3.1.4 Abbreviations (Level AAA)

[Understanding Abbreviations](#) | [How to Meet Abbreviations](#)

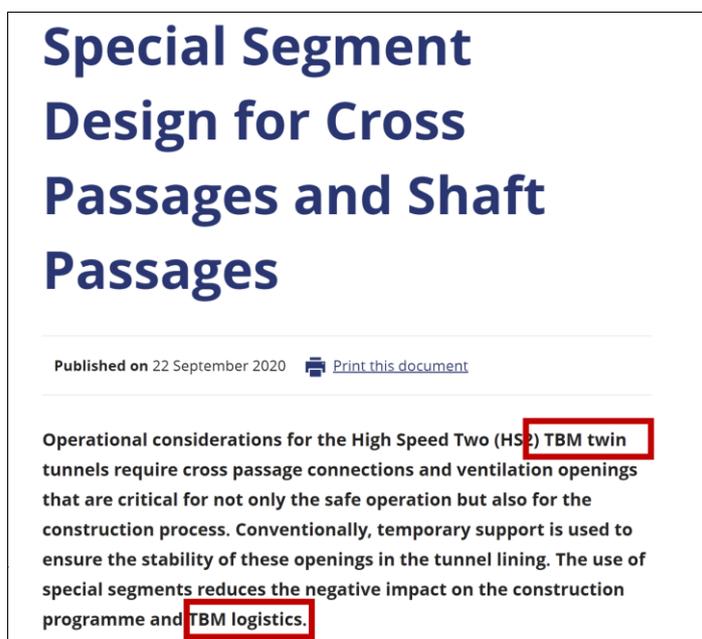
Issue ID: DAC_Abbreviations_Issue1

URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:



The acronym 'TBM' has been used throughout the 'Special Segment Design for Cross Passages and Shaft Passages' page, without firstly being provided for users in its expanded state. Although, it may be expected for users visiting this page to understand the acronym, it should not be assumed. Some users do not have the capability to memorise all acronyms and rely on them to be displayed in their entirety firstly to remind them, or to refer to when needed.



Current Code Ref(s):

```
#main > article > div > div > div > header > div.group__item.page__inner > div.document__excerpt > p:nth-child(1)
```

```
<p>Operational considerations for the High Speed Two (HS2) TBM twin tunnels require cross passage connections and ventilation openings that are critical for not only the safe operation but also for the construction process. Conventionally, temporary support is used to ensure the stability of these openings in the tunnel lining. The use of special segments reduces the negative impact on the construction programme and TBM logistics. </p>
```

Dyslexic user comment:

“When reading through the page there are multiple TMB abbreviations. This was an issue for myself as I did not understand the meaning. Acronyms and abbreviations should be expanded in their first instance, this can be confusing for users. I would suggest, having the information next to abbreviations to explain what each of them means.”

Solution:

Ensure that all abbreviations are presented to users in their full terminology on a page firstly before being used.



Usability

Although these issues did not fail WCAG success criteria, some may either cause difficulty for users of assistive technologies or user groups of various impairments.

WCAG Reference:

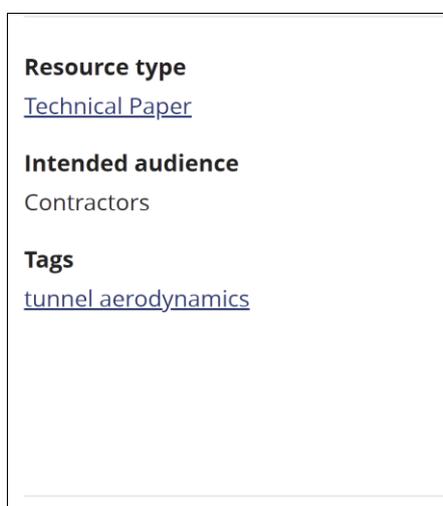
N/A - Advisory

Issue ID: DAC_Usability_Issue1

URL: https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/#document-list-container_tabs

Page title: Design, Engineering and Architecture Archives - HS2 Learning Legacy Journey 3

Screenshot:



The page has several aside complimentary landmarks which don't have unique, descriptive labels. This issue may affect how screen reader users identify and navigate different regions on the page.

Current Code Ref(s): #post-4398 > article > aside

```
<aside class="document--card__meta">
  <dl class="sidebar-info-list">
    <dt>Resource type</dt>
    <dd><a href="/?s=&resource_type[]=438">Technical Paper</a></dd>
    <dt>Intended audience</dt>
    <dd>Contractors</dd>
    <dt>Tags</dt>
    <dd class="dd--inline"><a href="/tag/tunnel-aerodynamics/">tunnel
aerodynamics</a></dd>
  </dl>
</aside>
```



Solution:

Ensure all aside content has unique, descriptive labels. Further information can be found in [Landmarks must have a unique role or role/label/title \(i.e. accessible name\) combination - DEQUE University](#)

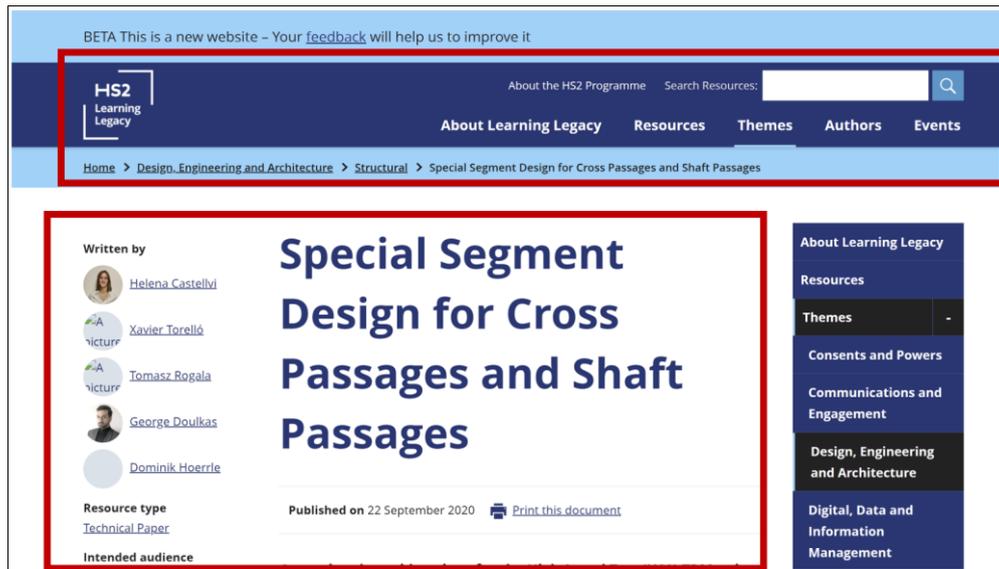


URL: <https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>

Page title: Special Segment Design for Cross Passages and Shaft Passages - HS2 Learning Legacy

Journey: 5

Screenshot:



Multiple header tags have been used to section content on the page. Multiple header tags should not be used as it can cause confusion for screen reader users who use landmarks and other elements to understand the structure of presented content.

Current Code Ref(s):

#global-header

```
<header class="global-header" id="global-header">...</header>
```

Current Code Ref(s):

#main > article > div > div > div > header

```
<header class="document_intro group">...</header>
```

Solution:

Ensure to use a single <header> on a page, allowing for screen reader users to understand the structure of content and their location within a page.

End of Report



Appendix I

Journeys

Username: hs2
Password: khwY8G6t

Journey 1 - Homepage

<https://learninglegacy.hs2.org.uk/>

1. Test Search
2. Test Main navigation

Journey 2 – Search Results

<https://learninglegacy.hs2.org.uk/?s=route+map>

1. Test Filters

Journey 3 – Theme

<https://learninglegacy.hs2.org.uk/document-themes/design-engineering-architecture/>

Journey 4 - Authors

<https://learninglegacy.hs2.org.uk/authors/>

Journey 5 – Technical Paper

<https://learninglegacy.hs2.org.uk/document/special-segment-design-for-cross-passages-and-shaft-passages/>



Classification of Accessibility Issues

The following scoring system was used to indicate the status of the sites with regards to each W3C WAI checkpoint up to and including Level AAA:

Status	Description
Pass (L) Low Priority Pass (M) Medium Priority Pass (H) High Priority	The site meets the requirements of the checkpoint.
Fail (L) Low Priority	The site almost meets the requirements of the checkpoint. Only a small number of minor problems were identified. The site fails to meet the requirements against AAA criteria measured against WCAG 2.1
Fail (M) Medium Priority	The site fails to meet the requirements against AA criteria measured against WCAG 2.1
Fail (H) High Priority	The site fails to meet the requirements against A criteria measured against WCAG 2.1 and more severe accessibility issues were identified.
Not Applicable (N/A)	No content was found on the site to which the checkpoint would relate.



Principle 1: Perceivable – Information and users interface components must be presentable to users in ways they can perceive.

<p>Non-text Content: 1.1.1 All non-text content that is presented to the user has a text alternative that serves the equivalent purpose. (Level A)</p>	<p>Fail (H)</p>
<p>Audio-only and Video-only (Pre-recorded): 1.2.1 For pre-recorded audio-only and pre-recorded video-only media, the following are true, except when the audio or video is a media alternative for text and is clearly labelled as such: Understanding Success Criterion 1.2.1</p> <ul style="list-style-type: none"> • Pre-recorded Audio-only: An alternative for time-based media is provided that presents equivalent information for pre-recorded audio-only content. • Pre-recorded Video-only: Either an alternative for time-based media or an audio track is provided that presents equivalent information for pre-recorded video-only content. <p>(Level A)</p>	<p>(N/A)</p>
<p>Captions (Pre-recorded): 1.2.2 Captions are provided for all pre-recorded audio content in synchronized media, except when the media is a media alternative for text and is clearly labelled as such. (Level A)</p>	<p>(N/A)</p>
<p>Audio Description or Media Alternative (Pre-recorded): 1.2.3 An alternative for time-based media or audio description of the pre-recorded video content is provided for synchronized media, except when the media is a media alternative for text and is clearly labelled as such. (Level A)</p>	<p>(N/A)</p>
<p>Captions (Live): 1.2.4 Captions are provided for all live audio content in synchronized media. (Level AA)</p>	<p>(N/A)</p>
<p>Audio Description (Pre-recorded): 1.2.5 Audio description is provided for all pre-recorded video content in synchronized media. (Level AA)</p>	<p>(N/A)</p>
<p>Sign Language (Pre-recorded): 1.2.6 Sign language interpretation is provided for all pre-recorded audio content in synchronized media. (Level AAA)</p>	<p>(N/A)</p>

<p>Extended Audio Description (Pre-recorded): 1.2.7 Where pauses in foreground audio are insufficient to allow audio descriptions to convey the sense of the video, extended audio description is provided for all pre-recorded video content in synchronized media. (Level AAA)</p>	<p>(N/A)</p>
<p>Media Alternative (Pre-recorded): 1.2.8 An alternative for time-based media is provided for all pre-recorded synchronized media and for all pre-recorded video-only media. (Level AAA)</p>	<p>(N/A)</p>
<p>Audio-only (Live): 1.2.9 An alternative for time-based media that presents equivalent information for live audio-only content is provided. (Level AAA)</p>	<p>(N/A)</p>
<p>Info and Relationships: 1.3.1 Information, structure, and relationships conveyed through presentation can be programmatically determined or are available in text. (Level A)</p>	<p>Fail (H)</p>
<p>Meaningful Sequence: 1.3.2 When the sequence in which content is presented affects it's meaning, a correct reading sequence can be programmatically determined. (Level A)</p>	<p>Pass (H)</p>
<p>Sensory Characteristics: 1.3.3 Instructions provided for understanding and operating content do not rely solely on sensory characteristics of components such as shape, size, visual location, orientation, or sound. (Level A)</p>	<p>Fail (H)</p>



<p>Orientation: (WCAG 2.1) 1.3.4 Content does not restrict its view and operation to a single display orientation, such as portrait or landscape, unless a specific display orientation is essential.</p> <p>Note: Examples where a particular display orientation may be essential are a bank check, a piano application, slides for a projector or television, or virtual reality content where binary display orientation is not applicable. (Level AA)</p>	<p>Pass (M)</p>
<p>Identify Input Purpose: (WCAG 2.1) 1.3.5 The purpose of each input field collecting information about the user can be programmatically determined when :</p> <ul style="list-style-type: none"> • The input field serves a purpose identified in the Input Purposes for User Interface Components section; and • The content is implemented using technologies with support for identifying the expected meaning for form input data. <p>(Level AA)</p>	<p>Pass (M)</p>
<p>Identify Purpose: (WCAG 2.1) 1.3.6 In content implemented using mark-up languages, the purpose of User Interface Components, icons, and regions can be programmatically determined. (Level AAA)</p>	<p>Pass (L)</p>
<p>Use of Colour: 1.4.1 Colour is not used as the only visual means of conveying information, indicating an action, prompting a response, or distinguishing a visual element. (Level A)</p>	<p>Fail (H)</p>
<p>Audio Control: 1.4.2 If any audio on a Web page plays automatically for more than 3 seconds, either a mechanism is available to pause or stop the audio, or a mechanism is available to control audio volume independently from the overall system volume level. (Level A)</p>	<p>(N/A)</p>



<p>Contrast (Minimum): 1.4.3 The visual presentation of text and images of text has a contrast ratio of at least 4.5:1, except for the following:</p> <ul style="list-style-type: none"> • Large Text: Large-scale text and images of large-scale text have a contrast ratio of at least 3:1; • Incidental: Text or images of text that are part of an inactive user interface component, that are pure decoration, that are not visible to anyone, or that are part of a picture that contains significant other visual content, have no contrast requirement. • Logotypes: Text that is part of a logo or brand name has no minimum contrast requirement. <p>(Level AA)</p>	<p>Fail (M)</p>
<p>Resize text: 1.4.4 Except for captions and images of text, text can be resized without assistive technology up to 200 percent without loss of content or functionality.</p> <p>(Level AA)</p>	<p>Fail (M)</p>
<p>Images of Text: 1.4.5 If the technologies being used can achieve the visual presentation, text is used to convey information rather than images of text except for the following: Understanding Success Criterion 1.4.5</p> <ul style="list-style-type: none"> • Customizable: The image of text can be visually customized to the user's requirements; • Essential: A particular presentation of text is essential to the information being conveyed. <p>Note: Logotypes (text that is part of a logo or brand name) are considered essential.</p> <p>(Level AA)</p>	<p>Fail (M)</p>



<p>Contrast (Enhanced): 1.4.6 The visual presentation of text and images of text has a contrast ratio of at least 7:1, except for the following:</p> <ul style="list-style-type: none"> • Large Text: Large-scale text and images of large-scale text have a contrast ratio of at least 4.5:1; • Incidental: Text or images of text that are part of an inactive user interface component, that are pure decoration, that are not visible to anyone, or that are part of a picture that contains significant other visual content, have no contrast requirement. • Logotypes: Text that is part of a logo or brand name has no minimum contrast requirement. <p>(Level AAA)</p>	<p>Fail (L)</p>
<p>Low or No Background Audio: 1.4.7 For pre-recorded audio-only content that (1) contains primarily speech in the foreground, (2) is not an audio CAPTCHA or audio logo, and (3) is not vocalization intended to be primarily musical expression such as singing or rapping, at least one of the following is true:</p> <p>Understanding Success Criterion 1.4.7</p> <ul style="list-style-type: none"> • No Background: The audio does not contain background sounds. • Turn Off: The background sounds can be turned off. • 20 dB: The background sounds are at least 20 decibels lower than the foreground speech content, with the exception of occasional sounds that last for only one or two seconds. <p>Note: Per the definition of "decibel," background sound that meets this requirement will be approximately four times quieter than the foreground speech content.</p> <p>(Level AAA)</p>	<p>(N/A)</p>



<p>Visual Presentation:</p> <p>1.4.8 For the visual presentation of blocks of text, a mechanism is available to achieve the following:</p> <p>Understanding Success Criterion 1.4.8</p> <ol style="list-style-type: none"> 1. Foreground and background colours can be selected by the user. 2. Width is no more than 80 characters or glyphs (40 if CJK). 3. Text is not justified (aligned to both the left and the right margins). 4. Line spacing (leading) is at least space-and-a-half within paragraphs, and paragraph spacing is at least 1.5 times larger than the line spacing. 5. Text can be resized without assistive technology up to 200 percent in a way that does not require the user to scroll horizontally to read a line of text on a full-screen window. <p>(Level AAA)</p>	<p>Fail (L)</p>
<p>Images of Text (No Exception):</p> <p>1.4.9 Images of text are only used for pure decoration or where a particular presentation of text is essential to the information being conveyed.</p> <p>Note: Logotypes (text that is part of a logo or brand name) are considered essential.</p> <p>(Level AAA)</p>	<p>Fail (L)</p>
<p>Reflow: (WCAG 2.1)</p> <p>1.4.10 Content can be presented without loss of information or functionality, and without requiring scrolling in two dimensions for :</p> <ul style="list-style-type: none"> • Vertical scrolling content at a width equivalent to 320 CSS pixels; • Horizontal scrolling content at a height equivalent to 256 CSS pixels. <p>Except for parts of the content which require two-dimensional layout for usage or meaning.</p> <p>Note: 320 CSS pixels is equivalent to a starting viewport width of 1280 CSS pixels wide at 400% zoom. For web content which are designed to scroll horizontally (e.g. with vertical text), the 256 CSS pixels is equivalent to a starting viewport height of 1024px at 400% zoom.</p> <p>Note: Examples of content which require two-dimensional layout are images, maps, diagrams, video, games, presentations, data tables, and interfaces where it is necessary to keep toolbars in view while manipulating content.</p> <p>(Level AA)</p>	<p>Fail (M)</p>



<p>Non-text Contrast: (WCAG 2.1) 1.4.11 The visual presentation of the following have a contrast ratio of at least 3:1 against adjacent color(s):</p> <ul style="list-style-type: none"> • User Interface Components Visual information required to identify user interface components and states, except for inactive components or where the appearance of the component is determined by the user agent and not modified by the author; • Graphical Objects Parts of graphics required to understand the content, except when a particular presentation of graphics is essential to the information being conveyed. <p>(Level AA)</p>	<p>Fail (M)</p>
<p>Text Spacing: (WCAG 2.1) 1.4.12 presentation of graphics is essential to the information being conveyed.</p> <p>In content implemented using mark-up languages that support the following text style properties, no loss of content or functionality occurs by setting all of the following and by changing no other style property:</p> <ul style="list-style-type: none"> • Line height (line spacing) to at least 1.5 times the font size; • Spacing following paragraphs to at least 2 times the font size; • Letter spacing (tracking) to at least 0.12 times the font size; • Word spacing to at least 0.16 times the font size. <p>Exception: Human languages and scripts that do not make use of one or more of these text style properties in written text can conform using only the properties that exist for that combination of language and script.</p> <p>(Level AA)</p>	<p>Pass (M)</p>



Content on Hover or Focus: (WCAG 2.1)

[1.4.13](#) Where receiving and then removing pointer hover or keyboard focus triggers additional content to become visible and then hidden, the following are true:

- **Dismissible**
A [mechanism](#) is available to dismiss the additional content without moving pointer hover or keyboard focus, unless the additional content communicates an [input error](#) or does not obscure or replace other content;
- **Hoverable**
If pointer hover can trigger the additional content, then the pointer can be moved over the additional content without the additional content disappearing;
- **Persistent**
The additional content remains visible until the hover or focus trigger is removed, the user dismisses it, or its information is no longer valid.

Exception: The visual presentation of the additional content is controlled by the user agent and is not modified by the author.

Note: Examples of additional content controlled by the user agent include browser tooltips created through use of the HTML [title attribute](#).

Note: Custom tooltips, sub-menus, and other nonmodal popups that display on hover and focus are examples of additional content covered by this criterion.

(Level AA)

Fail (M)



Principle 2: Operable – User interface components and navigation must be operable.

<p>Keyboard:</p> <p>2.1.1 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.</p> <p>Note: This exception relates to the underlying function, not the input technique. For example, if using handwriting to enter text, the input technique (handwriting) requires path-dependent input but the underlying function (text input) does not.</p> <p>Note: This does not forbid and should not discourage providing mouse input or other input methods in addition to keyboard operation.</p> <p>(Level A)</p>	<p>Fail (H)</p>
<p>No Keyboard Trap:</p> <p>2.1.2 If keyboard focus can be moved to a component of the page using a keyboard interface, then focus can be moved away from that component using only a keyboard interface, and, if it requires more than unmodified arrow or tab keys or other standard exit methods, the user is advised of the method for moving focus away.</p> <p>Note: Since any content that does not meet this success criterion can interfere with a user's ability to use the whole page, all content on the Web page (whether it is used to meet other success criteria or not) must meet this success criterion.</p> <p>(Level A)</p>	<p>Pass (H)</p>
<p>Keyboard (No Exception):</p> <p>2.1.3 All functionality of the content is operable through a keyboard interface without requiring specific timings for individual keystrokes.</p> <p>(Level AAA)</p>	<p>Fail (L)</p>



<p>Character Key Shortcuts: (WCAG 2.1)</p> <p>2.1.4 If a keyboard shortcut is implemented in content using only letter (including upper- and lower-case letters), punctuation, number, or symbol characters, then at least one of the following is true:</p> <ul style="list-style-type: none"> • Turn off: A mechanism is available to turn the shortcut off; • Remap: A mechanism is available to remap the shortcut to use one or more non-printable keyboard characters (e.g. Ctrl, Alt, etc); • Active only on focus: The keyboard shortcut for a user interface component is only active when that component has focus. <p>(Level A)</p>	<p>(N/A)</p>
<p>Timing Adjustable:</p> <p>2.2.1 For each time limit that is set by the content, at least one of the following is true:</p> <ul style="list-style-type: none"> • Turn off: The user is allowed to turn off the time limit before encountering it; • Adjust: The user is allowed to adjust the time limit before encountering it over a wide range that is at least ten times the length of the default setting; • Extend: The user is warned before time expires and given at least 20 seconds to extend the time limit with a simple action (for example, "press the space bar"), and the user is allowed to extend the time limit at least ten times; • Real-time Exception: The time limit is a required part of a real-time event (for example, an auction), and no alternative to the time limit is possible; • Essential Exception: The time limit is essential and extending it would invalidate the activity; • 20 Hour Exception: The time limit is longer than 20 hours. <p>Note: This success criterion helps ensure that users can complete tasks without unexpected changes in content or context that are a result of a time limit. This success criterion should be considered in conjunction with Success Criterion 3.2.1, which puts limits on changes of content or context as a result of user action.</p> <p>(Level A)</p>	<p>(N/A)</p>



<p>Pause, Stop, Hide: 2.2.2 For moving, blinking, scrolling, or auto-updating information, all of the following are true: Understanding Success Criterion 2.2.2</p> <ul style="list-style-type: none"> • Moving, blinking, scrolling: For any moving, blinking or scrolling information that (1) starts automatically, (2) lasts more than five seconds, and (3) is presented in parallel with other content, there is a mechanism for the user to pause, stop, or hide it unless the movement, blinking, or scrolling is part of an activity where it is essential; and • Auto-updating: For any auto-updating information that (1) starts automatically and (2) is presented in parallel with other content, there is a mechanism for the user to pause, stop, or hide it or to control the frequency of the update unless the auto-updating is part of an activity where it is essential. <p>Note: For requirements related to flickering or flashing content, refer to Guideline 2.3.</p> <p>Note: Since any content that does not meet this success criterion can interfere with a user's ability to use the whole page, all content on the Web page (whether it is used to meet other success criteria or not) must meet this success criterion.</p> <p>Note: Content that is updated periodically by software or that is streamed to the user agent is not required to preserve or present information that is generated or received between the initiation of the pause and resuming presentation, as this may not be technically possible, and in many situations could be misleading to do so.</p> <p>Note: An animation that occurs as part of a preload phase or similar situation can be considered essential if interaction cannot occur during that phase for all users and if not indicating progress could confuse users or cause them to think that content was frozen or broken.</p> <p>(Level A)</p>	<p>(N/A)</p>
<p>No Timing: 2.2.3 Timing is not an essential part of the event or activity presented by the content, except for non-interactive synchronized media and real-time events. (Level AAA)</p>	<p>Pass (L)</p>



<p>Interruptions: 2.2.4 Interruptions can be postponed or suppressed by the user, except interruptions involving an emergency. (Level AAA)</p>	<p>(N/A)</p>
<p>Re-authenticating: 2.2.5 When an authenticated session expires, the user can continue the activity without loss of data after re-authenticating. (Level AAA)</p>	<p>(N/A)</p>
<p>Timeouts: (WCAG 2.1) 2.2.6 Users are warned of the duration of any user inactivity that could cause data loss, unless the data is preserved for more than 20 hours when the user does not take any actions. Note: Privacy regulations may require explicit user consent before user identification has been authenticated and before user data is preserved. In cases where the user is a minor, explicit consent may not be solicited in most jurisdictions, countries or regions. Consultation with privacy professionals and legal counsel is advised when considering data preservation as an approach to satisfy this success criterion. (Level AAA)</p>	<p>(N/A)</p>
<p>Three Flashes or Below Threshold: 2.3.1 Web pages do not contain anything that flashes more than three times in any one second period, or the flash is below the general flash and red flash thresholds. Note: Since any content that does not meet this success criterion can interfere with a user's ability to use the whole page, all content on the Web page (whether it is used to meet other success criteria or not) must meet this success criterion. (Level A)</p>	<p>Pass (H)</p>
<p>Three Flashes: 2.3.2 Web pages do not contain anything that flashes more than three times in any one-second period. (Level AAA)</p>	<p>Pass (L)</p>



<p>Animation from Interactions: (WCAG 2.1) 2.3.3 Motion animation triggered by interaction can be disabled, unless the animation is essential to the functionality or the information being conveyed. (Level AAA)</p>	(N/A)
<p>Bypass Blocks: 2.4.1 A mechanism is available to bypass blocks of content that are repeated on multiple Web pages. (Level A)</p>	Pass (H)
<p>Page Titled: 2.4.2 Web pages have titles that describe topic or purpose. (Level A)</p>	Pass (H)
<p>Focus Order: 2.4.3 If a Web page can be navigated sequentially and the navigation sequences affect meaning or operation, focusable components receive focus in an order that preserves meaning and operability. (Level A)</p>	Fail (H)
<p>Link Purpose (In Context): 2.4.4 The purpose of each link can be determined from the link text alone or from the link text together with its programmatically determined link context, except where the purpose of the link would be ambiguous to users in general. (Level A)</p>	Fail (H)
<p>Multiple Ways: 2.4.5 More than one way is available to locate a Web page within a set of Web pages except where the Web Page is the result of, or a step in, a process. (Level AA)</p>	Pass (M)
<p>Headings and Labels: 2.4.6 Headings and labels describe topic or purpose. (Level AA)</p>	Fail (M)



<p>Focus Visible: 2.4.7 Any keyboard operable user interface has a mode of operation where the keyboard focus indicator is visible. (Level AA)</p>	<p>Pass (M)</p>
<p>Location: 2.4.8 Information about the user's location within a set of Web pages is available. (Level AAA)</p>	<p>Pass (L)</p>
<p>Link Purpose (Link Only): 2.4.9 A mechanism is available to allow the purpose of each link to be identified from link text alone, except where the purpose of the link would be ambiguous to users in general. (Level AAA)</p>	<p>Fail (L)</p>
<p>Section Headings: 2.4.10 Section headings are used to organize the content. Note: "Heading" is used in its general sense and includes titles and other ways to add a heading to different types of content. Note: This success criterion covers sections within writing, not user interface components. User Interface components are covered under Success Criterion 4.1.2. (Level AAA)</p>	<p>Pass (L)</p>
<p>Pointer Gestures: (WCAG 2.1) 2.5.1 All functionality that uses multipoint or path-based gestures for operation can be operated with a single pointer without a path-based gesture, unless a multipoint or path-based gesture is essential. Note: This requirement applies to web content that interprets pointer actions (i.e. this does not apply to actions that are required to operate the user agent or assistive technology). (Level A)</p>	<p>Pass (H)</p>



<p>Pointer Cancellation: (WCAG 2.1) 2.5.2 For functionality that can be operated using a single pointer, at least one of the following is true:</p> <ul style="list-style-type: none"> • No Down-Event The down-event of the pointer is not used to execute any part of the function; • Abort or Undo Completion of the function is on the up-event, and a mechanism is available to abort the function before completion or to undo the function after completion; • Up Reversal The up-event reverses any outcome of the preceding down-event; • Essential Completing the function on the down-event is essential. <p>Note: Functions that emulate a keyboard or numeric keypad key press are considered essential. Note: This requirement applies to web content that interprets pointer actions (i.e. this does not apply to actions that are required to operate the user agent or assistive technology). (Level A)</p>	<p>Pass (H)</p>
<p>Label in Name: (WCAG 2.1) 2.5.3 For user interface components with labels that include text or images of text, the name contains the text that is presented visually. Note: A best practice is to have the text of the label at the start of the name. (Level A)</p>	<p>Fail (H)</p>



<p>Motion Actuation: (WCAG 2.1) 2.5.4 Functionality that can be operated by device motion or user motion can also be operated by user interface components and responding to the motion can be disabled to prevent accidental actuation, except when:</p> <ul style="list-style-type: none"> • Supported Interface The motion is used to operate functionality through an accessibility supported interface; • Essential The motion is essential for the function and doing so would invalidate the activity. <p>(Level A)</p>	<p>(N/A)</p>
<p>Target Size (WCAG 2.1): 2.5.5 The size of the target for pointer inputs is at least 44 by 44 CSS pixels except when:</p> <ul style="list-style-type: none"> • Equivalent The target is available through an equivalent link or control on the same page that is at least 44 by 44 CSS pixels; • Inline The target is in a sentence or block of text; • User Agent Control The size of the target is determined by the user agent and is not modified by the author; • Essential A particular presentation of the target is essential to the information being conveyed. <p>(Level AAA)</p>	<p>Pass (L)</p>
<p>Concurrent Input Mechanisms (WCAG 2.1): 2.5.6 Web content does not restrict use of input modalities available on a platform except where the restriction is essential, required to ensure the security of the content, or required to respect user settings.</p> <p>(Level AAA)</p>	<p>Pass (L)</p>



Principle 3: Understandable – Information and the operation of user interface must be understandable.

<p>Language of Page: 3.1.1 The default human language of each Web page can be programmatically determined. (Level A)</p>	<p>Pass (H)</p>
<p>Language of Parts: 3.1.2 The human language of each passage or phrase in the content can be programmatically determined except for proper names, technical terms, words of indeterminate language, and words or phrases that have become part of the vernacular of the immediately surrounding text. (Level AA)</p>	<p>Pass (M)</p>
<p>Unusual Words: 3.1.3 A mechanism is available for identifying specific definitions of words or phrases used in an unusual or restricted way, including idioms and jargon. (Level AAA)</p>	<p>(N/A)</p>
<p>Abbreviations: 3.1.4 A mechanism for identifying the expanded form or meaning of abbreviations is available. (Level AAA)</p>	<p>Fail (L)</p>
<p>Reading Level: 3.1.5 When text requires reading ability more advanced than the lower secondary education level after removal of proper names and titles, supplemental content, or a version that does not require reading ability more advanced than the lower secondary education level, is available. (Level AAA)</p>	<p>Pass (L)</p>
<p>Pronunciation: 3.1.6 A mechanism is available for identifying specific pronunciation of words where meaning of the words, in context, is ambiguous without knowing the pronunciation. (Level AAA)</p>	<p>(N/A)</p>



<p>On Focus: 3.2.1 When any component receives focus, it does not initiate a change of context. (Level A)</p>	<p>Pass (H)</p>
<p>On Input: 3.2.2 Changing the setting of any user interface component does not automatically cause a change of context unless the user has been advised of the behaviour before using the component. (Level A)</p>	<p>Pass (H)</p>
<p>Consistent Navigation: 3.2.3 Navigational mechanisms that are repeated on multiple Web pages within a set of Web pages occur in the same relative order each time they are repeated, unless a change is initiated by the user. (Level AA)</p>	<p>Pass (M)</p>
<p>Consistent Identification: 3.2.4 Components that have the same functionality within a set of Web pages are identified consistently. (Level AA)</p>	<p>Pass (M)</p>
<p>Change on Request: 3.2.5 Changes of context are initiated only by user request or a mechanism is available to turn off such changes. (Level AAA)</p>	<p>Pass (L)</p>
<p>Error Identification: 3.3.1 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. (Level A)</p>	<p>(N/A)</p>
<p>Labels or Instructions: 3.3.2 Labels or instructions are provided when content requires user input. (Level A)</p>	<p>Pass (H)</p>
<p>Error Suggestion: 3.3.3 If an input error is automatically detected and suggestions for correction are known, then the suggestions are provided to the user, unless it would jeopardize the security or purpose of the content. (Level AA)</p>	<p>(N/A)</p>



<p>Error Prevention (Legal, Financial, Data): 3.3.4 For Web pages that cause legal commitments or financial transactions for the user to occur, that modify or delete user-controllable data in data storage systems, or that submit user test responses, at least one of the following is true:</p> <ul style="list-style-type: none"> • Reversible: Submissions are reversible. • Checked: Data entered by the user is checked for input errors and the user is provided an opportunity to correct them. • Confirmed: A mechanism is available for reviewing, confirming, and correcting information before finalizing the submission. <p>(Level AA)</p>	<p>(N/A)</p>
<p>Help 3.3.5 Context-sensitive help is available.</p> <ul style="list-style-type: none"> • Provide instructions and cues in context to help inform completion and submission. <p>(Level AAA)</p>	<p>(N/A)</p>
<p>Error Prevention (All): 3.3.6 For Web pages that require the user to submit information, at least one of the following is true:</p> <ul style="list-style-type: none"> • Reversible: Submissions are reversible. • Checked: Data entered by the user is checked for input errors and the user is provided an opportunity to correct them. • Confirmed: A mechanism is available for reviewing, confirming, and correcting information before finalizing the submission. <p>(Level AAA)</p>	<p>(N/A)</p>



Principle 4: Robust – Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies

<p>Parsing: 4.1.1 In content implemented using mark-up languages, elements have complete start and end tags, elements are nested according to their specifications, elements do not contain duplicate attributes, and any IDs are unique, except where the specifications allow these features.</p> <p>Note: Start and end tags that are missing a critical character in their formation, such as a closing angle bracket or a mismatched attribute value quotation mark are not complete. (Level A)</p>	<p>Pass (H)</p>
<p>Name, Role, Value: 4.1.2 For all user interface components (including but not limited to: form elements, links and components generated by scripts), the name and role can be programmatically determined; states, properties, and values that can be set by the user can be programmatically set; and notification of changes to these items is available to user agents, including assistive technologies.</p> <p>Note: This success criterion is primarily for Web authors who develop or script their own user interface components. For example, standard HTML controls already meet this success criterion when used according to specification. (Level A)</p>	<p>Fail (H)</p>
<p>Status Messages (WCAG 2.1) 4.1.3 In content implemented using mark-up languages, status messages can be programmatically determined through role or properties such that they can be presented to the user by assistive technologies without receiving focus. (Level AA)</p>	<p>(N/A)</p>



The Process

The website is measured against the Web Accessibility Initiative's (WAI) Web Content Accessibility Guidelines 2.1 (WCAG 2.1) to give an accurate feedback on any non-compliant issues. To attain our standard accreditation all A and AA criteria must be achieved.

To give a more accurate review of the website the DAC team employ two differing testing processes.

The first is a manual technical audit using automated tools and the second a dedicated team of user testers with differing disabilities test using a range of adaptive technologies. The findings of both testing teams are then combined to give the client far more accurate feedback on the website.

By using the testing team in conjunction with an automated procedure a more accurate set of results are made available.

This report combines technical auditing with disabled user feedback. The test does not list each specific area that requires change but highlights patterns of problems where they exist. Each section of the report includes a qualifying statement of pass, fail or recommendation to help developers quickly identify which parts of the website need the most urgent attention.



CRITERIA

High

The digital product has one or more issues that urgently need remediation. There will be a list of actions that the developers need to address to make sure that the product is functional for users of assistive technology.

Medium

The digital product has one or more issues that need remediation before meeting the WCAG 2.1 AA Standard. There will be a list of actions that the developers need to address to make sure that the product meets the expectations of the DAC testing team.

Low

The digital product has one or more issues that would cause minor barriers to users of assistive technology. While not necessary to meet the WCAG 2.1 AA Standard, these issues affect users negatively and should be remediated.

Usability

The digital product may have one or more issues that could cause minor difficulties to users of assistive technology. While not necessary to meet the WCAG 2.1 AA Standard, these issues were found to hinder users.



DAC Testing Procedure

The website is tested by a team of experienced auditors and analysts, many of who are disabled individuals and users of adaptive technology. The combination of subjective pan-disability user feedback and comprehensive technical auditing allows us to measure how the website performs technically and practically, thereby offering an essential added dimension to our test results that other methods of testing cannot provide.

User Testing

Manual accessibility checking was conducted by a team of disabled individuals, using a range of adaptive technologies (hardware and software designed to facilitate the use of computers by people with disabilities). This may include:

NVDA: a screen reader and application used by those who are blind.

ZoomText: a magnification application used by those with low vision.

JAWS: a screen reader used by blind people to access pages.

Dragon Naturally Speaking: voice activated software used by those that do not use a conventional input device such as a keyboard or mouse.

Switch Access: used by those with severe mobility impairments to input commands to a computer.

Keyboard Only: some users with mobility impairments have difficulty making precise movements required by pointing devices such as a mouse; therefore, a keyboard is used as the exclusive input device.

Readability: Manual checks were made to assess the suitability of a page for those with colour blindness and dyslexia.

Deaf/Hard of hearing: Manual checks were made to assess the suitability of a page for those with hearing impairments.

Learning difficulties: Manual checks were made to assess the suitability of a page for those with learning difficulties.

Technical Auditing

Technical auditing involves the experienced application of a number of technical auditing and standards compliance assessment tools. This combined with an extensive knowledge of WCAG, its application and wider global practice provides the DAC website with further credibility and quality.

