

How the Story of the River Severn and Worcester Cathedral Can Help Promote Eco-Conscious Living

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Abstract

The goal of this project was to develop an Environmental Lifestyle Audit Tool with multiple engagement methods for the Worcester Cathedral. These engagement methods highlight the Cathedral's historical connection with the River Severn and encourage people to live a more sustainable lifestyle. To do this, we interviewed Worcester Cathedral visitors to determine how they would best engage with these tools. Additionally, we spoke to several staff members to determine the Cathedral's current sustainable practices. We determined that implementing the recommended engagement methods to promote the audit tool would be an effective way for Worcester Cathedral to engage visitors and enhance sustainability messaging.

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Executive Summary

The United Kingdom (UK) is one of many countries that joined the United Nations Race to Net Zero to reach net-zero carbon emissions by 2050. In 2008, the UK enacted its own Climate Change Act and created a Climate Change Committee (CCC) to help the country reach the United Nations goal. If the Act's objectives are not met, it could have detrimental consequences for local areas in the UK and, more specifically, the towns and cities along the River Severn that have already been affected by environmental changes. With rising surface temperatures and rising sea levels, the river is more prone to flooding, causing property damage and loss of habitats that make up the several environmentally protected areas of the Severn River (BBC, 2022). Among the affected areas is Worcester, UK.

Worcester Cathedral is a historical and spiritual landmark that has played a significant role throughout Worcester's history. Since 680 AD, the Cathedral has been a catalyst for the early development of Worcester, serving as a religious, economic, cultural, and educational centre (Worcester Cathedral, n.d.). Today, Worcester Cathedral stands as a reminder for visitors about the history of the region and the need to protect it. Due to current environmental issues, Worcester Cathedral declared a state of climate and environmental emergency in 2021, focusing its efforts on environmental impact and community outreach.

Background:

Climate change and pollution have had a detrimental impact on the River Severn, a significant landmark in the Worcester, UK area. Due to rising sea levels and increasing severity of storms, flooding of the River Severn has become a more common and dangerous occurrence (Severn Estuary Partnership, 2015). An example of this can be seen in Figure ES1.



Figure ES1: Depiction of a severe flooding event in Worcester, 2020.

The Severn has deeply influenced the region's history, particularly in Worcester, shaping the lives of millions. Worcester's location along a ford in the River Severn placed it within an important travel and trade junction, contributing to much of the city's economic success (Engel, 2007). Located along the banks of the River Severn, the Cathedral has had a vital role in every stage of Worcester's history (Fleming, 2013). Throughout its many iterations and reconstructions, the stones that were used to construct the Cathedral were sourced from various regions as there are no local deposits of these materials. This was only made possible by the River Severn that allowed for the transportation of these heavy stones over long distances.

Today, Worcester Cathedral has shifted its community influence to promoting greener living, primarily in collaboration with A Rocha. A Rocha is a Christian charity working to protect and restore the natural world, equipping Christians and churches in the UK to care for the environment (A Rocha UK, n.d.). As a part of their mission, they formed the Eco-Church scheme, which aims to create a network of churches across England and Wales to engage churches in caring for the Earth (A Rocha UK, n.d.).

Worcester Cathedral joined the A Rocha Eco-Church initiative in March 2022 and was awarded the bronze ranking for its dedication to, and promotion of, taking care of the environment (Worcester Cathedral n.d.). In conjunction with A Rocha's Eco-Church initiative, the Cathedral formed an Eco-Group with the main objective of Living Gently On The Earth. The Cathedral's efforts to refine their practices, and their efforts to educate the community on greener living, have awarded them the ranking of a silver Eco-Church as of March 2023 (Worcester Cathedral n.d.).

In one effort to engage the community, Worcester Cathedral was interested in creating Environmental Lifestyle Tools (ELT). In discussion with Worcester Cathedral officials, it was agreed that an Environmental Lifestyle Tool encompasses the ideas of a "sustainable lifestyle" and an "environmental tool".

Additionally, the Cathedral wanted the ELTs to incorporate an audit aspect, merging both ideas to create an Environmental Lifestyle Audit Tool (ELAT) that would be offered to Cathedral visitors and stakeholders. While ELTs focus on educating the audience about sustainable habits and greener living, an ELAT provides a method for individuals to take inventory of their existing habits and consider what changes they could make in their own lives.

Goals and Objectives:

The goal of this project was to develop or adapt an Environmental Lifestyle Audit Tool (ELAT) and Environmental Lifestyle Tools (ELTs) for the Worcester Cathedral community, visitors, and the wider city community to promote greener living. To achieve this goal, we identified the following objectives:

1. Interview Cathedral staff, visitors, and stakeholders to evaluate key audiences and Cathedral demographics.
2. Document historical connections between the Cathedral, the Severn River, and the city.
3. Develop or adapt an ELAT and ELTs, incorporating the historical narrative with engagement methods tailored to key audiences.
4. Conduct focus groups to evaluate if the ELAT and ELTs are engaging and encourage greener living.

To achieve these objectives, we conducted interviews with Cathedral visitors, staff, and established stakeholders, such as volunteers and Eco-Group members. Additionally, we conducted background research focused on documenting the historical relationship between the Cathedral, the river, and the wider Worcester community. Based on these findings, we developed an Environmental Lifestyle Audit Tool and recommendations for other Environmental Lifestyle Tools and their implementation.

Results:

We interviewed 70 Worcester Cathedral visitors. Several facts emerged from those interviews, such as 50% of those surveyed were visiting the Cathedral for the first time. Other findings included: 100% of respondents said they were interested in the historical relationship between the Cathedral and the river and most preferred to learn about the relationship via a tour, pamphlet, or website. The results of the delivery method question can be seen in Figure ES2.

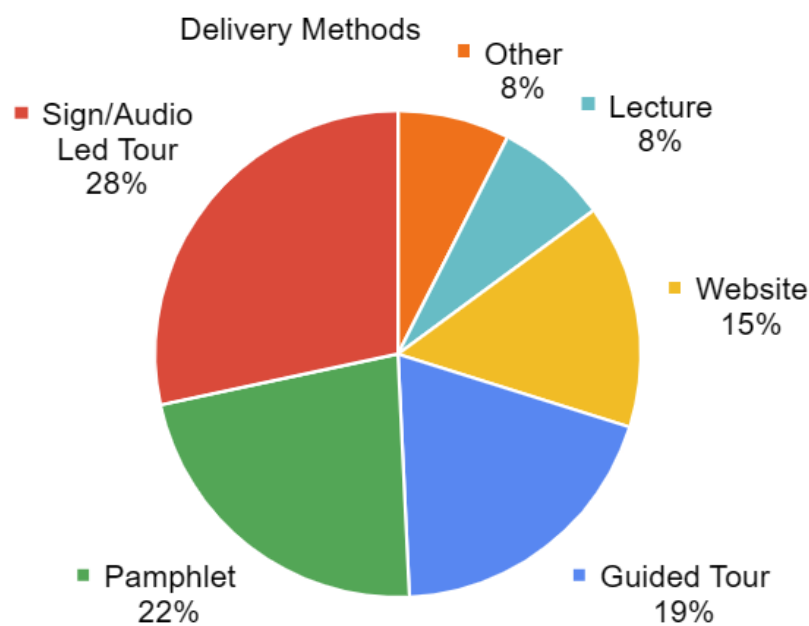


Figure ES2: Participant responses to delivery method they would find most engaging.

Additionally, we asked questions about visitor's sustainable living practices to determine what habits they were already participating in and what practices we should promote. When asked if they would take the Cathedral's guidance on how to live a more eco-conscious lifestyle, 75% of respondents indicated that they would consider the advice if it was reasonable.

We next interviewed ten Cathedral staff to determine their knowledge of Cathedral sustainability programming and effects of climate change on the surrounding area. Half of the staff surveyed had little knowledge of the sustainability events at the Cathedral.

To document the history of the river, Cathedral, and city, we studied and summarized relevant information from ten literary resources. In this research, we identified three primary categories of history that we utilized to form the historical narrative for the ELT drafts. These categories were: the utility of the River Severn as a means for trade and transportation; the cultural impact of the Worcester Cathedral; and the River Severn as a centre for cultural identity.

We then drafted an ELAT with multiple engagement methods consisting of a pamphlet, improved messaging, signs, and a riverwalk. These engagement methods incorporated learning methods that visitors preferred to highlight the rich history of the Cathedral, river, and city and to inspire climate-conscious living.

The last step in our process was to conduct a focus group with Cathedral staff and Eco-Group members to obtain feedback on the drafts and information that could be used to revise these tools.

Recommendations:

Based on our interview results, staff interviews, and focus group we offered several recommendations to the Cathedral.

- 1. We recommend that the Cathedral implement the online interactive Environmental Lifestyle Audit Tool.**
- 2. We recommend that the Cathedral implements the Environmental Lifestyle Tool pamphlet, dedicating one page to the Environmental Lifestyle Audit Tool.**
- 3. We recommend the Cathedral move sustainability messaging to a more prominent position on the website.**
- 4. We recommend the Cathedral encourage wider staff engagement in sustainability efforts.**
- 5. We recommend the Cathedral incorporate the Environmental Lifestyle Audit Tool/Environmental Lifestyle Tool messaging into the current Cathedral tours.**

6. **We recommend the Cathedral conducts a separate guide-led tour along the River Severn that highlights the Cathedral's relationship with the river and focuses on promoting sustainability and the ELAT.**
7. **We recommend the Cathedral implement a series of informational signs featuring facts about local history and climate change and to prompt visitors to engage with the ELAT.**
8. **We recommend the Cathedral seasonally install a series of signs along the River Severn near the Cathedral.**
9. **We recommend the Cathedral permanently install a series of signs along the River Severn near the Cathedral.**

Authorship

| Section | Author(s) | Editor(s) |
|-------------------|-----------|-----------|
| Executive Summary | EM/MA | ALL |
| 1 | JB/JS | ALL |
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| 2.1 | JB/JS | JS/MA |
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| 4.4 | JB | MA/JS |
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| 5 | JS | ALL |
| 5.1.1 | JS | ALL |
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| 5.2.1 | EM | ALL |
| 5.2.2 | JB | ALL |
| 5.2.3 | MA | ALL |
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| 5.3.2 | JS | ALL |
| 5.3.3 | JS | ALL |
| Appendix A | EM | - |
| Appendix B | MA | - |
| Appendix C | MA | - |
| Appendix D | MA | - |
| Appendix E | MA | - |
| Appendix F | MA | - |
| Appendix G | EM | - |

1.0 Introduction

The United Kingdom (UK) is one of many countries that joined the United Nations Race to Net Zero to reach net-zero carbon emissions by 2050. In 2008, the UK enacted its own Climate Change Act and created a Climate Change Committee (CCC) to help the country reach the United Nations goal. The CCC's official goal is to "advise the UK and devolved (local) governments on emissions targets and to report to Parliament on progress made in reducing greenhouse gas emissions and preparing for and adapting to the impacts of climate change" (Committee on Climate Change, n.d.). If the Act's objectives are not met, it could have detrimental consequences for local areas in the UK and, more specifically, the towns and cities along the River Severn that have already been affected by environmental changes. With rising surface temperatures and rising sea levels, the river is more prone to flooding, causing property damage and loss of habitats that make up the several environmentally protected areas of the Severn River (BBC, 2022). Among the affected areas is Worcester, UK.

Increased precipitation due to climate change affects the River Severn through rising water levels and runoff pollutants (Zhao, 2013). The river's degradation negatively affects the surrounding community by making certain bridge crossings impassible during flooding and reducing the city's traversability. Agriculture runoff and sewage discharge from neighbouring and upstream cities contribute to the Severn's deterioration (Munro, 2023).

Worcester Cathedral is a historical and spiritual landmark that has played a significant role throughout Worcester's history. Since 680 AD, the Cathedral has been a catalyst for the early development of Worcester, serving as a religious, economic, cultural, and educational centre (Worcester Cathedral, n.d.). In addition, the Cathedral's location on the banks of the river adds to its picturesque setting, letting it shine as a beacon for the city. The Cathedral and the river have also been the epicentre of critical historical events that have affected the country. Specifically, Worcester Cathedral played a key role in the final battle of the United Kingdom's last Civil War in 1642-1651 (Worcester Cathedral Library, 2014). Today, Worcester Cathedral stands as a reminder for visitors about the history of the region and the need to protect it.

Due to current environmental issues, Worcester Cathedral declared a state of climate and environmental emergency, focusing its efforts on environmental impact and community outreach. To support these efforts, Worcester Cathedral joined the A. Rocha Eco-Church scheme in March of 2022. A. Rocha is a Christian charity working to protect and restore the natural world, equipping Christians and churches in the UK to care for the environment (A Rocha UK, n.d.).

In 2021, the Cathedral established an Eco-Group that brings together members of the congregation, volunteers, and staff to promote the idea of "Living Gently on the Earth" through a series of community events, talks, and workshops. These events are meant to

promote community engagement and highlight climate-conscious living. To further inspire greener living, the Eco-Group wished to explore the use of an Environmental Lifestyle Audit Tool (ELAT) that would encourage the community to consider adopting more sustainable habits.

The goal of this project was to develop or adapt an Environmental Lifestyle Audit Tool for Worcester Cathedral community, visitors, and the wider city community to promote greener living. For this report's purpose, an ELAT is defined as an activity that encourages and educates individuals about ways to evaluate their way of living and make more environmentally desirable decisions. Additionally, we designed several engagement methods, Environmental Lifestyle Tools (ELTs) that also encourage greener living and direct visitors to the audit tool (ELAT).

To achieve this goal, we conducted interviews with Cathedral visitors, staff, and established stakeholders, such as volunteers and Eco-Group members. Additionally, we conducted background research focused on documenting the historical relationship between the Cathedral, the river, and the wider Worcester community. Based on these findings, we developed an Environmental Lifestyle Audit Tool, recommendations for other Environmental Lifestyle Tools, and how they can be implemented.

2.0 Background

This section provides background information about topics related to the historical connection between the River Severn, the Worcester Cathedral, and the city of Worcester and how these entities are affected by the current environmental crisis. Topics covered will include climate change, the effects of climate change on the River Severn, the history of the river in relation to the city and the Cathedral, Eco-Church initiatives, and Environmental Lifestyle Tools (ELTs).

2.1: Climate Change in the UK

According to the United Kingdom National Weather Service Meteorological Office (Met Office), scientists have warned that humanity must limit the rise in global temperature to 1.5° Celsius to avoid climate change's worst impacts. From 1850-2023, global temperatures have increased by about 1° Celsius. If greenhouse emissions increase at current projections, the Met Office hypothesizes that temperatures will continue to increase. As shown in the hypothetical forecast in Figure 1, the average temperature in England on a normal day in July 2050 is projected to be about 37° Celsius. If this trend continues, flooding will become more common, and the severity of storms is projected to increase, causing more frequent flash flooding. Increased flash flooding is expected to put the entire nation's infrastructure at risk, including food and water supplies, green areas, and human health (Met Office, 2022).

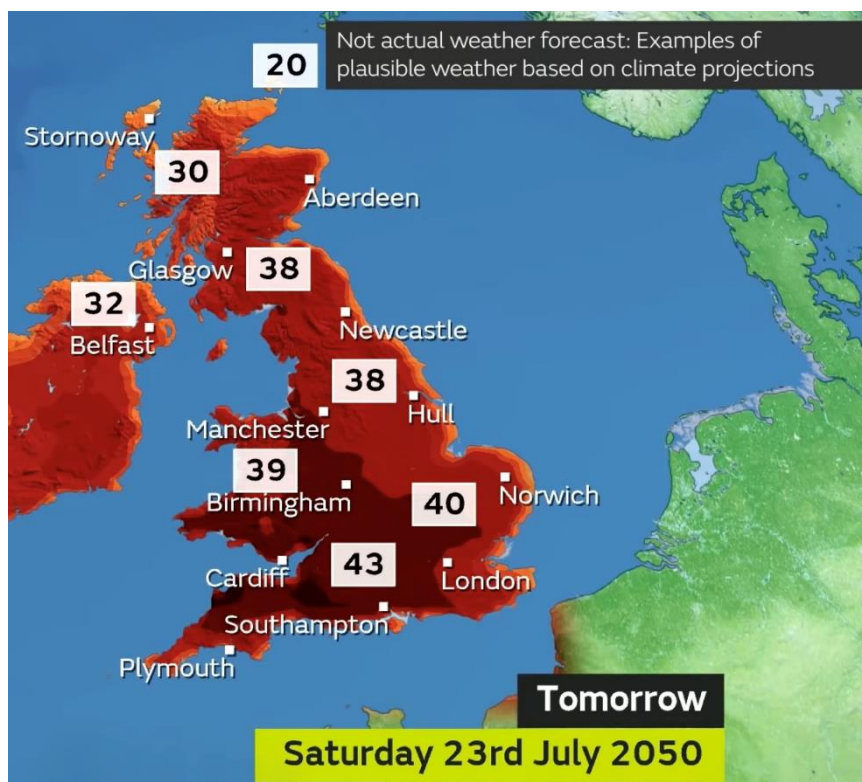


Figure 1: Hypothetical weather forecast for the year 2050 (2020, December 3).

The UK has taken steps to slow the country’s contribution to temperature increases through the Climate Change Act (Committee on Climate Change, n.d.). Specifically, the UK government implemented regional policies addressing climate change to significantly reduce UK greenhouse gas emissions by 2035. The Climate Change Act also established the Committee on Climate Change (CCC) which ensures that emissions targets are evidence-based and independently assessed (Committee on Climate Change, n.d.).

2.2 Climate Change Affects the River Severn

Climate change and pollution have had a detrimental impact on the River Severn, a significant landmark in the Worcester, UK area. Due to rising sea levels and increasing severity of storms, flooding of the River Severn has become a more common and dangerous occurrence (Severn Estuary Partnership, 2015). As shown in Figure 2, the UK Centre for Ecology and Hydrology predicts that flooding and flood peaks will be significantly higher if sustainability efforts fail. Increased flooding affects multiple aspects of the local community, such as endangering local crops, causing property damage, and disrupting transportation (BBC, 2022).

Climate change projected to increase flooding intensity along the River Severn

% increase in flood peaks, based on emissions scenarios

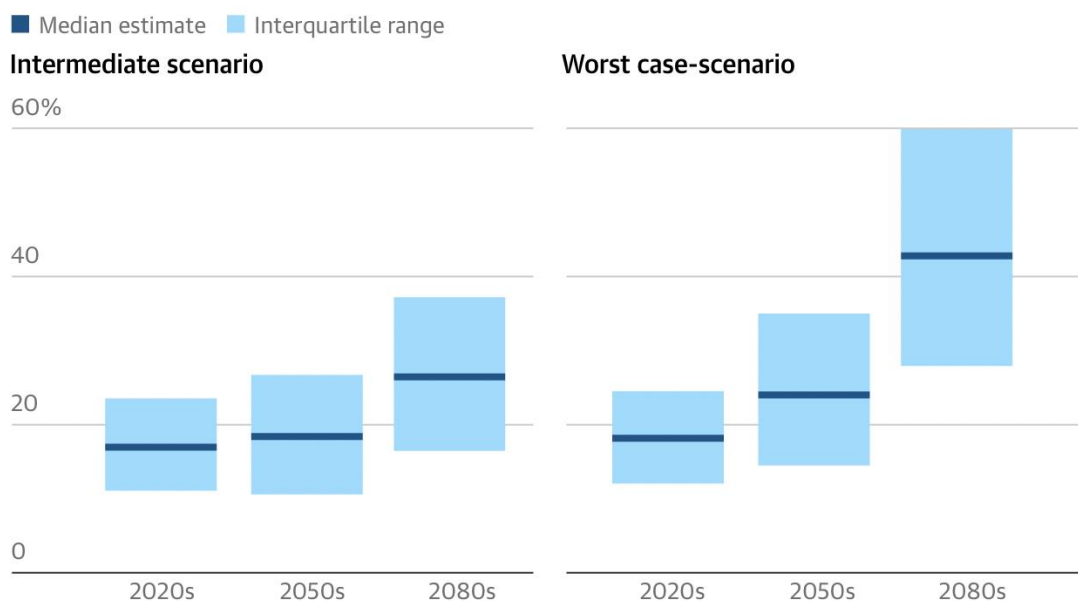


Figure 2: Hypothetical projected flooding trends. Source: UK Centre for Ecology and Hydrology.

Figure 3 shows the impact of flooding on Worcester. The image portrays a severe flood that occurred in 2020, causing significant damage to homes, businesses, and various areas of the city. The flood resulted in millions of pounds worth of damage and left many people without homes for several weeks until the floodwaters receded. Such major flooding also causes significant transportation problems for the city, with major bridges shutting down due to high water levels, leading to congestion in other traffic zones. This situation leaves the city without many of its key access points.



Figure 3: Depiction of a severe flooding event in Worcester, 2020.

2.3 History of the River Severn and Worcester Cathedral.

As shown in Figure 4, the River Severn originates in east central Wales and crosses the English border, flowing through Gloucester, Shrewsbury, and Worcester before ending at the Bristol Channel. At about 354 km, the Severn is the longest river in the UK and has the most significant volume of water flow in the country (The Editors of Encyclopaedia Britannica, 2024).

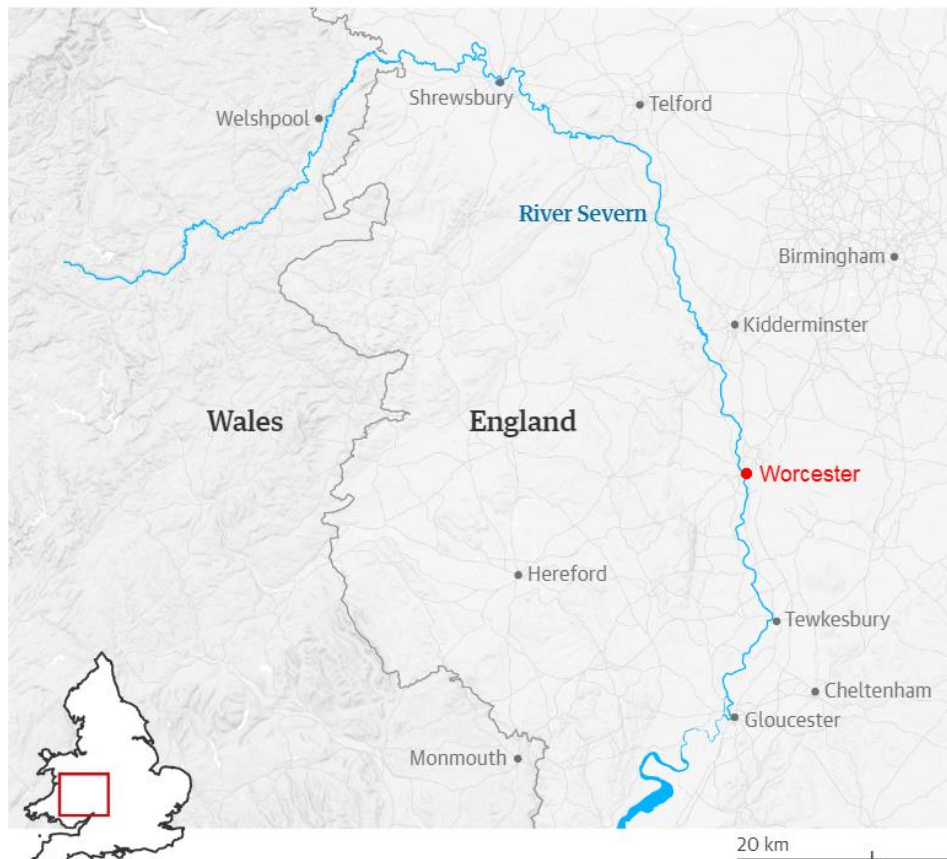


Figure 4: Location of the River Sever (Guardian Graphic, 2024).

The Severn has deeply influenced the region's history, particularly in Worcester, shaping the lives of millions. As stated by Holmes and Goodal, the historical and economic significance of the Severn to Worcester is profound: “The Romans crossed it to enter Wales ... In mediaeval times, the fertile flood lands of the Severn Vale were farmed...The river was one of Britain’s 'cherished veins of trade'” (Holmes et al., 2017). However, the water quality of the Severn has been severely impacted in recent years by increasing pollutant runoff. This has resulted in the Severn River becoming the most polluted river in England (Munro, 2023).

The City of Worcester has a rich and complex history tied to the Severn River, dating as far back as the Iron Age (1200 BC – 550 BC). Various communities throughout history have used the river for transporting people, goods, and materials. Furthermore, people likely settled in this area due to its proximity to a river crossing, which would have allowed them to easily ford the River Severn (Dalwood, 2003).

In 43-47 AD, the Romans settled the Worcester area following their invasion of England. During this period, Worcester was already being shaped as an important centre for Christianity. However, with the decline of Roman civilization during the 4th century, Worcester was likely abandoned shortly afterward (Dalwood et al., 2018). By 680 AD, the Anglo-Saxons established a new settlement by a ford in the River Severn. Worcester's location along this ford placed it within an important travel and trade junction, contributing to much of the city's economic success (Engel, 2007). Worcester flourished during this

period, gaining its name and the Cathedral that would become a focal point for religious and cultural life.

Located along the banks of the River Severn, the Cathedral has had a vital role in every stage of Worcester's history (Fleming, 2013). Throughout the mediaeval period, the Cathedral's influence extended to education and governance while continuing to symbolise religious devotion. Bishop Bosel took office in 680 AD, marking the establishment of Worcester as an important location for religious leadership within the church hierarchy (Barker et al., 2007). Under Bosel, the first iteration of Worcester Cathedral was constructed, likely in the same location of the present site. In 961 AD, Oswald became bishop and "replaced the secular priests who had served the Cathedral with a more formally organised monostatic community" (Barker et al., 2007). While in office, Oswald reconstructed the Cathedral to house this monostatic community. The newly reconstructed Cathedral remained in use until the mid-11th century when Bishop Wulfstan began construction of an entirely new Cathedral. Many segments of this structure are still standing today and have been incorporated into the present structure (Barker et al., 2007). Throughout its many iterations and reconstructions, the stones that were used to construct the Cathedral were sourced from various regions as there are no local deposits of these materials. This was only made possible by the River Severn, which allowed for the transportation of these heavy stones over long distances.

In the 19th century, Worcester experienced an industrial expansion that boosted its economic prosperity and brought about societal benefits in education, healthcare, and trade. Local canals facilitated this development, mainly due to their utility in trade and transportation (Fleming, 2013). The River Severn was again an important resource to Worcester for its industrial expansion, becoming the busiest waterway in Britain as it was the commercial outlet for coal and other goods. In the present day, the Cathedral continues to be a prominent area landmark and the river continues to shape the city's landscape and identity. Figure 5, seen below, highlights this visual impact of the Cathedral and the river's changing role from the late 18th to 20th century.

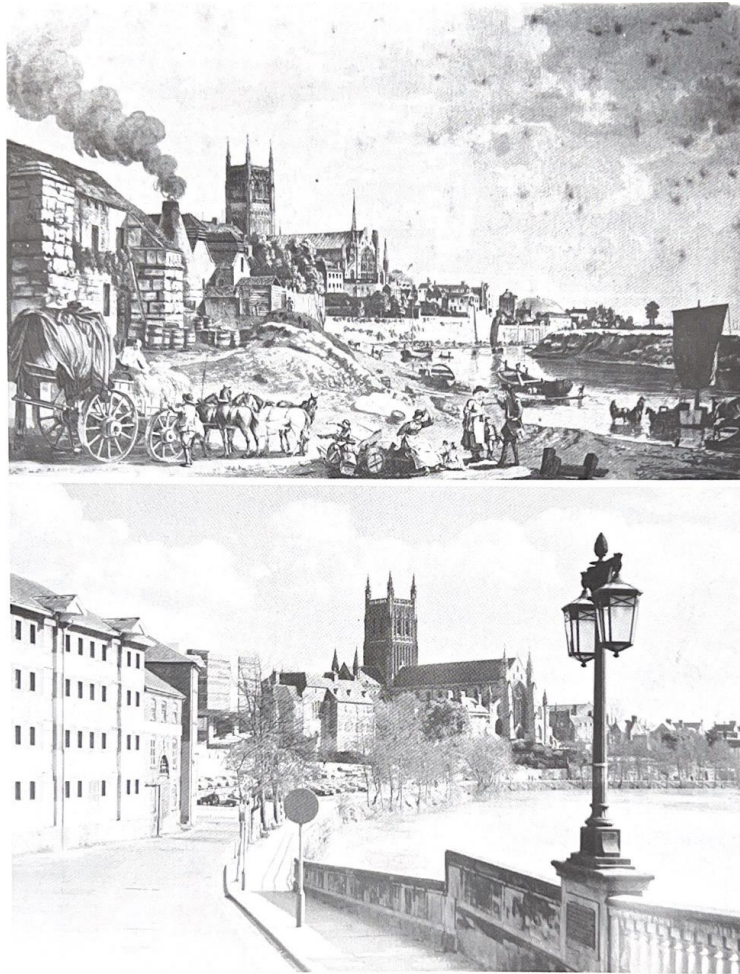


Figure 5: ABOVE: Worcester Cathedral as seen south of the Worcester Bridge in 1776. BELOW: The same view in 1978 (Engel, 2007).

2.4 Eco-Church

Today, Worcester Cathedral has shifted its community influence to promoting greener living, primarily in collaboration with [A Rocha](#). A Rocha is a Christian charity working to protect and restore the natural world, equipping Christians and churches in the UK to care for the environment (A Rocha UK, n.d.). As a part of their mission, they formed the Eco-Church scheme, which first started in 2016 at St Paul's Cathedral in London. The program aims to create a network of churches across England and Wales to engage churches in caring for the Earth (A Rocha UK, n.d.). Any church can apply to the program and is self-evaluated on church attributes, such as Worship and Teaching, Buildings, Land, Community and Global Engagement, and Lifestyle. Eco-Churches can then take actions to improve these aspects of their practices to score higher on the survey. Once these attributes have met a certain level, the church can apply for that corresponding level. The answers to the survey will be reviewed and, if the church passes, they will be awarded an Eco-Church ranking (A Rocha UK, n.d.). Currently, the 3 rankings for Eco-Churches are Bronze, Silver, and Gold. An example of an A Rocha silver award is shown below in Figure 6. As of the end of 2022, there

are 1155 Bronze, 401 Silver, and 23 Gold Church of England Eco-Churches (Church of England, n.d.).



Figure 6: Example of A Rocha Eco-Church Silver Award (A Rocha UK, n.d.).

Worcester Cathedral joined the A Rocha Eco-Church initiative in March 2022 and was awarded the bronze ranking for its dedication to, and promotion of, taking care of the environment (Worcester Cathedral n.d.). In conjunction with A Rocha’s Eco-Church initiative, the Cathedral formed an Eco-Group with the main objective of Living Gently On The Earth. This group invites the community to join events, held semi-monthly, in which participants develop plans and actions and are educated about how to help the community live more environmentally sound ("Living Gently on the Earth," n.d.). In conjunction with these monthly events, the Cathedral runs an annual Big Green Eco Family Fair in October, teaching environmental awareness in the community (Worcester Cathedral n.d.). The Cathedral also assisted local wildlife by installing a peregrine nest, building bug hotels, and installing water butts to “reuse rainwater for local vegetation during droughts” (Worcester Cathedral n.d.). The Cathedral’s efforts to refine their practices, and their efforts to educate the community on greener living, have awarded them the ranking of a silver Eco-Church as of March 2023 (Worcester Cathedral n.d.).

2.5 Environmental Lifestyle Tool

In one effort to engage the community, Worcester Cathedral was interested in creating Environmental Lifestyle Tools (ELT). In discussion with Worcester Cathedral officials, it was agreed that an Environmental Lifestyle Tool encompasses the ideas of a “sustainable lifestyle” and an “environmental tool”. Sustainable lifestyles are the social behaviours and choices that minimize environmental degradation, such as the overuse of natural resources, CO2 emissions, waste, and pollution, while supporting overall quality of life (UNEP, n.d.). Environmental tools are mechanisms used to meet sustainable objectives by encouraging environmentally desirable behaviour. Therefore, an ELT can be defined as a

mechanism that encourages and educates individuals about ways of living that are environmentally desirable (Alberta, n.d.).

ELTs can take many forms, including tours, educational models, informational pamphlets, and websites. One example of an existing ELT is Take the Jump. This campaign provides advice on ways to reduce your environmental impact through six simple lifestyle changes. Take the Jump aims to engage individuals by emphasizing their personal impact on climate change and offering tangible steps to participate in greener living.

Additionally, the Cathedral wanted the ELTs to incorporate an audit aspect, merging both ideas to create an Environmental Lifestyle Audit Tool (ELAT) that would be offered to Cathedral visitors and stakeholders. While ELTs focus on educating the audience about sustainable habits and greener living, an ELAT provides a method for individuals to take inventory of their existing habits and consider what changes they could make in their own lives.

One example of an existing ELAT is Climate Stewards. This website provides resources to calculate your carbon footprint, learn how to reduce your environmental impact, and contribute to organisations that help to offset your carbon emissions. This three-factored approach aims to engage individuals by emphasising their personal impact on climate change and offering tangible steps to participate in greener living.

3.0 Methods

The goal of this project was to develop or adapt an Environmental Lifestyle Audit Tool (ELAT) and Environmental Lifestyle Tools (ELTs) for the Worcester Cathedral community, visitors, and the wider city community to promote greener living. To achieve this goal, we identified the following objectives:

1. Interview Cathedral staff, visitors, and stakeholders to evaluate key audiences and Cathedral demographics.
2. Document historical connections between the Cathedral, the Severn River, and the city.
3. Develop or adapt an ELAT and ELTs, incorporating the historical narrative with engagement methods tailored to key audiences.
4. Conduct focus groups to evaluate if the ELAT and ELTs are engaging and encourage greener living.

3.1 Interview Cathedral Staff, Visitors, and Stakeholders to Evaluate Key Audiences

To achieve this objective, we interviewed adult Cathedral visitors to determine key audiences and interests. The audiences were categorised by their environmental awareness, interest in greener living, and how people prefer to learn. Additionally, open-ended responses were recorded and reviewed for possible themes.

These interviews collected information about how often and why people visit the Cathedral. Additionally, we asked several environmental and history-related questions to gauge the interviewee's knowledge and interests. See sample interview questions in Appendix A and the consent form in Appendix B.

Informal interviews were conducted with Cathedral staff to gauge their opinions and collect personal experiences about how the Cathedral models greener living practices. Staff members were also asked about how the Cathedral engages its audience and what approaches have been effective in doing so. Additionally, we gathered insight into what environmental issues the staff have observed to identify which they believe are the most prominent. See sample interview questions in Appendix C.

Finally, we conducted informal interviews with volunteers and established Cathedral stakeholders, such as the Cathedral's Eco-Group. We asked them similar questions to those presented to staff and visitors, covering such topics as engagement, environmental issues, and historical interest. See sample interview questions in Appendix D.

3.2 Document Historical Connections of the Area

To address this objective, we conducted background research assisted by the Cathedral Archivist, David Morrison. Beginning with the archival resources he recommended, our research focused on the historical connection between the Cathedral, the River Severn, and the city and was documented in Appendix E.

3.3 Develop Environmental Lifestyle Tools and Audit Tool

To achieve this objective, we explored different ways to engage key audiences' interests. Examples of the tools we explored included staff-, map-, sign-, or audio-led tours. We also explored informational pamphlets, photo voice displays, or QR code-based informational signs. For younger audiences, we explored interactive digital tools, such as mobile apps with gamified elements that engage with environmental issues and historical knowledge. ELTs explored for other community segments, such as residents or older families, included educational kits for home use, community-led workshops, or interactive installations within the Cathedral. ELT development depended on community needs, demographic observations, and the resources available to us.

We were strategic in the development of these ELTs, ensuring that each tool was informative and resonated on a personal level with key audiences. By focusing on a multi-faceted ELT approach, we aimed to maximize reach and impact, fostering effective community participation in sustainability efforts.

To encompass the audit factor of the ELAT, we explored existing tools such as an [Environmental Footprint Calculator](#), [Carbon Emissions calculator](#), and educational modules like [Take the Jump](#). We determined that to gather the most data about community engagement and knowledge, it was best practice to design our own audit tool that pulls from multiple existing sources.

3.4 Conduct a Focus Group to Evaluate the ELAT and ELTs

To address this objective, we presented the draft ELAT and ELTs to a focus group that consisted of members of the Cathedral's Eco-Group and Cathedral staff. This focus group allowed us to explore different perspectives from stakeholders who were most likely to promote these tools. Discussions with stakeholders provided insight into how to successfully integrate and address acceptance of the ELTs and ELAT within the Cathedral and greater Worcester community. Feedback was recorded, analysed, and used to refine the proposed tools. Using these revised ELAT and ELTs, we presented recommendations to the Cathedral Chapter, offering insight into those which were expected to be most effective.

4.0 Results & Conclusions

This section presents the findings from interviews and research conducted in addition to the process for developing and revising the Environmental Lifestyle Audit Tool (ELAT) and Environmental Lifestyle Tools (ELTs).

4.1 Interview Results

4.1.1 Visitor Interviews

To complete the project objectives outlined in section 3.1, interviewing Cathedral visitors and staff, the team conducted 70 interviews with Cathedral visitors over two weeks. We completed 40 interviews Monday through Friday; 30 interviews were completed during weekends and Easter break. We chose a range of dates and times to acquire data about the average Cathedral visitor: where they live; their thoughts on environmental practices; interest in local history; desired engagement methods; overall involvement in sustainability; and engagement in local environment.

Respondents were asked what country they were from and the first three digits of their postcode. Of the 70 respondents, 62 were UK residents, while 8 visitors were from other countries, including: China, Germany, India, Vietnam, and the United States. Using respondents' postal codes, we mapped out the home locations of those who resided in the UK and produced the following map, seen in Figure 7.



Figure 7: A map of local interview participants' residences based on the first 3 digits of their post code, made using PinMaps.

The second interview question asked how frequently individuals visited the Cathedral. As shown in Figure 8, results indicated that 50% of visitors were visiting for the

first time. This data provided context for the relationship between visitors and the Cathedral, helping us to understand our audience and their relationship with the Cathedral.

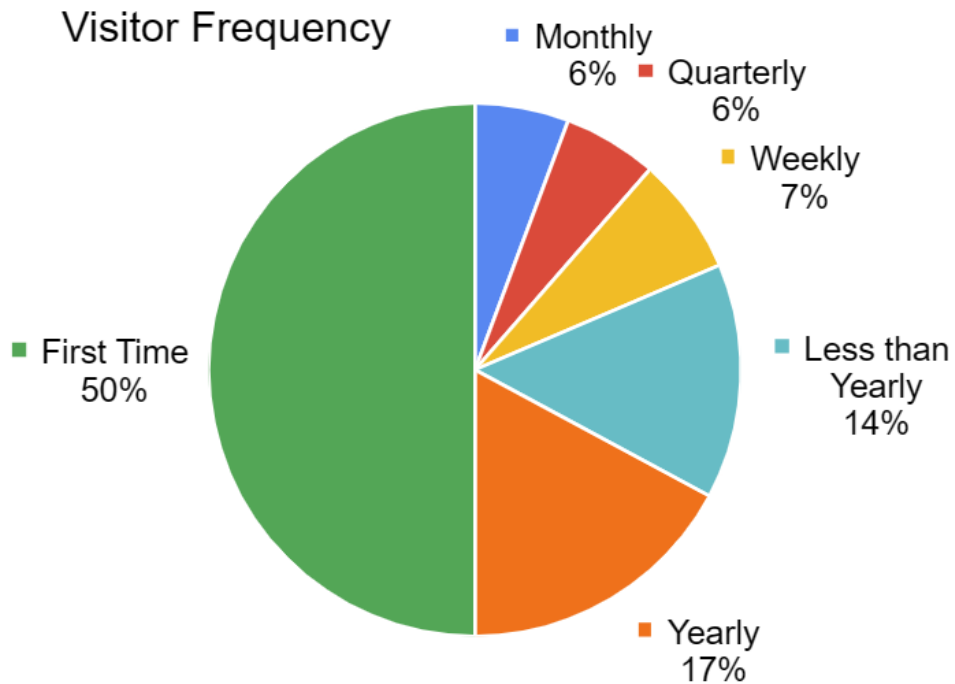


Figure 8: Cathedral visit Frequency of participants interviewed.

In a segment about sustainable transportation, as shown in Figure 9, 80% of those surveyed indicated that, when possible, they choose to walk and bike rather than driving. Additionally, 70% of participants said they try to travel by train or bus instead of driving and 16% answered that they owned an electric car. Regarding flights, 45% of respondents stated they consciously attempted to reduce how often they fly.

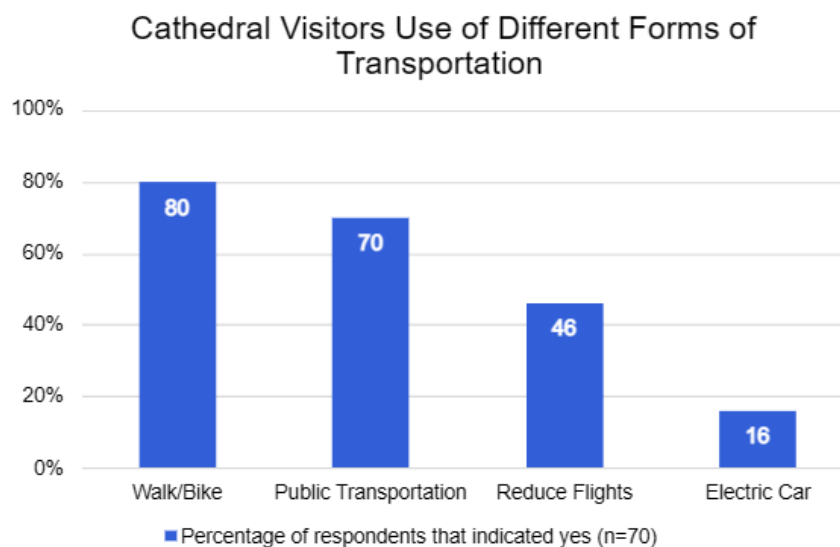


Figure 9: Percentages of surveyed visitors who participated in different forms of transportation.

Responses to questions about environmental practices revealed that 24% of surveyed visitors incorporated green heating or solar power solutions into their homes.

Some participants expressed confusion about what types of heating were considered green. This suggests that green heating is an opportunity for improvement within the community.

Of those surveyed, 100% expressed interest in learning about the River Severn's historical ties with Worcester Cathedral. Some visitors were unaware of any connection between the river and the Cathedral. Interest in learning about this historical connection indicates it is a strong narrative.

When asked whether they would implement the Cathedral's advice about eco-conscious living if it was presented to them, 75% of participants expressed that they would consider it. This trend indicates a willingness for visitors to engage with the Cathedral's sustainability mission.

When asked "When learning about the Cathedral and River Severn, what delivery method would you find the most engaging?", participants provided a wide range of responses. The top three responses were a self-guided sign or audio tour, a pamphlet, or a guided tour, as illustrated in Figure 10. Respondents also requested one other noteworthy engagement method, an addition to the website that highlighted the story of the Cathedral and river. A small minority of respondents expressed interest in lectures about this story. The remaining responses varied and were classified as "other".

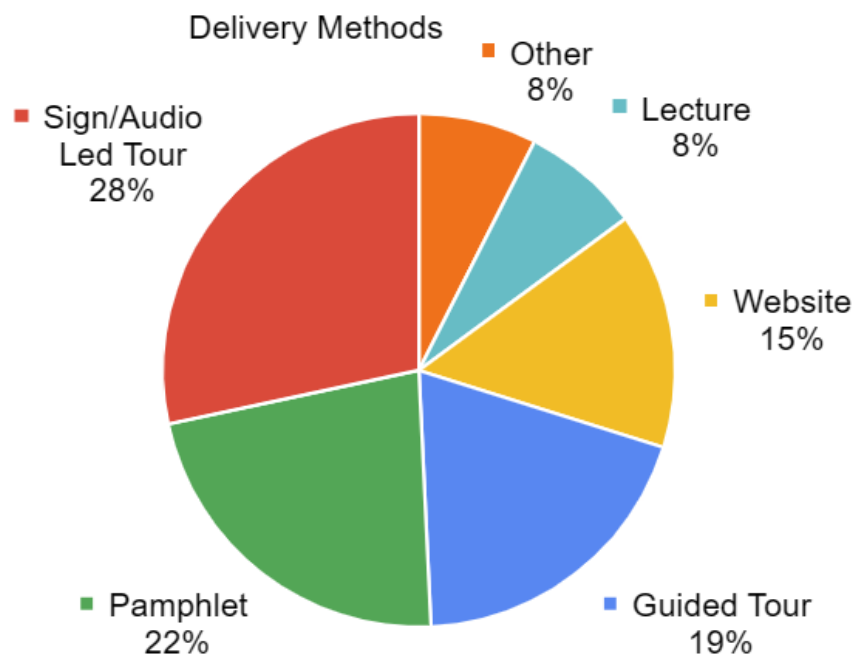


Figure 10: Participant responses to delivery method they would find most engaging.

A little more than half of those surveyed, 53%, noted that the river floods more often than in the past. Additionally, 4% of participants said that the river is more polluted or smells worse than it did previously. This may indicate that some respondents are already aware of local environmental changes. The remaining respondents, 43%, did not know of any changes or declined to answer because they are not from Worcester and, by extension, are not familiar with the River Severn. This is of note because there are a significant number

of respondents who are not native to Worcester and are not aware of the current state of the river, meaning messaging must cater to both demographics.

As for questions relating to the Cathedral’s relationship with the river, there was a range of interests, as illustrated in Figure 11. It was demonstrated that 52% of respondents were interested in learning about the historical connection between the Cathedral and the river. The second most expressed interest, at 22% of participants, was how the river was instrumental in the Cathedral's construction, indicating an interest in the Cathedral's design and structure. Lastly, 11% of respondents said that they were interested in the relationship the Cathedral has with the River Severn and the local environment. This leads us to conclude that when creating the Environmental Lifestyle Audit Tool, we should incorporate these elements to engage the audience and encourage them to participate in the audit.

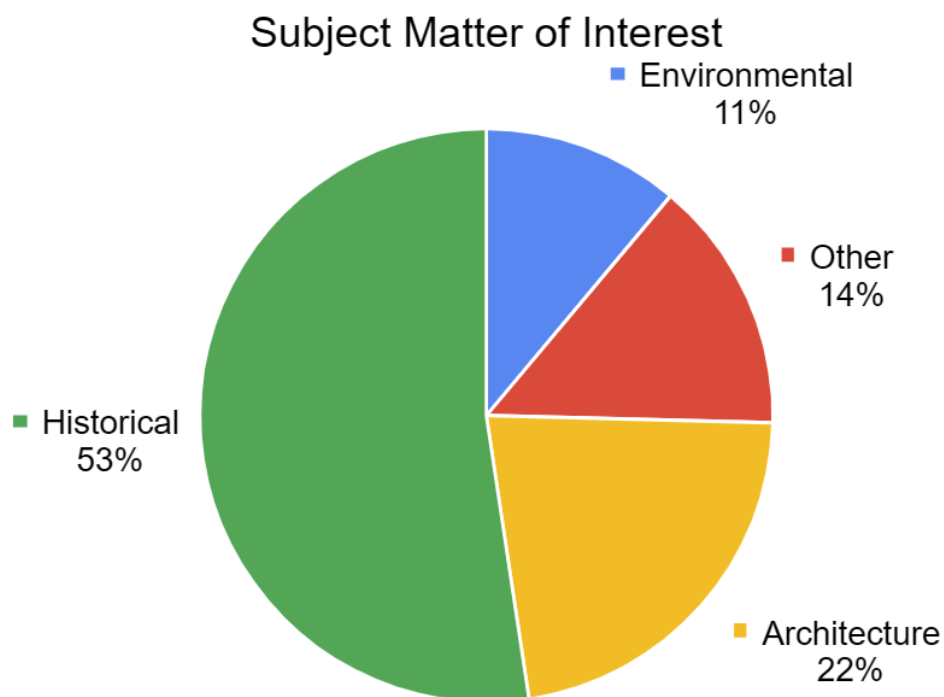


Figure 11: Participant responses when asked about preferred subject matter.

4.1.2 Staff and Stakeholder Interviews

We interviewed ten Cathedral staff members to aid us in understanding their perspectives on effective engagement methods, local environmental issues, and to determine what environmental events the Cathedral already had in place. The ten staff interviewed included members of the Eco Group, volunteer guides, front desk workers, and the events and public outreach teams, all of which offered diverse opinions. When asked about what environmentally focused events the Cathedral staff had attended, five employees noted they had little or no involvement with any environmentally focused events organized by the Cathedral. Those staff who were aware of such events provided the team with detailed information about various Cathedral initiatives related to sustainability. They pointed out events like the Eco fair, organized by the Cathedral in the spring and autumn, as

well as its involvement with environmental organizations, such as Take the Jump. It was also noted that, although these events raised awareness about climate change on a global level, they failed to highlight any immediate climate problems facing the river.

We queried the staff about the most notable environmental incidents in the region and how they, as individuals, were impacted by them. Without exception, each staff member identified the flooding of the Severn River as the most pressing issue. When prompted to delve into how they were personally affected, their responses varied, ranging from the inability to commute on foot, witnessing deceased wildlife in the river, heightened pollution levels, and an uptick in debris floating downstream.

4.2 Historical Research

To complete the objective of documenting historical connections between the Cathedral, the Severn River, and the city, we studied four literary resources and read excerpts from an additional two. Topics included: the architectural history of the Worcester Cathedral; personal accounts of what living in Worcester was like and how that experience has changed over time; the history of the River Severn; and the cultural impact of this river. Richard Taylor, a Cathedral library volunteer, also provided us with notes he had taken on four supplemental resources, many of which offered information on the utility of the river in different time periods. These sources are noted in Appendix E.

While researching the history of the Worcester Cathedral, River Severn, and the city, we considered the relevancy of historical information for this project. As we produced a summary that spanned over 1,300 years (beginning in 680 AD), we needed to summarize the most inspiring, interesting, and helpful information for future visitors. We identified the following categories of historical research as the most relevant to our project:

- The utility of the River Severn as a means for trade and transportation
- The cultural impact of the Worcester Cathedral
- The River Severn as a centre for cultural identity

These topics were selected due to their relevancy to our project goal or expressed interest from interview responses. For example, highlighting together the history and environmental issues that impact the river will help build awareness about the need to preserve its historic and symbolic roles. Summaries of these topics are provided in Appendix F.

4.3 Environmental Lifestyle Tools and Audit Tool

Based on the results outlined in section 4.1 and 4.2, we developed an Environmental Lifestyle Audit Tool and drafted concepts for Environmental Lifestyle Tools, highlighting the rich history of the Cathedral, river, and the city to inspire climate-conscious living by utilizing learning methods that visitors preferred. Our interviews revealed that 75% of respondents

would consider the Cathedral's advice on eco-conscious living. Most respondents also said that they would only consider the Cathedral's advice if they thought it was reasonable. Consequently, we focused on messaging that would be considered reasonable to an unbiased observer.

4.3.1 Environmental Lifestyle Audit Tool

The primary goal was to create an Environmental Lifestyle Audit Tool (ELAT), which was made accessible through a QR code and designed to be easily implemented into various ELTs. The Audit tool tests an individual's sustainable habits and recommends ways to change them. The survey is organized on a Google form which will be owned by the Cathedral's Eco-Group, allowing the Cathedral to collect and analyse responses. This tool consists of eight questions that touch on the environmental habits of participants. When creating the ELAT, we took inspiration from various carbon footprint calculators and audit tools, such as the [World Wide Fund for Nature](#) carbon footprint calculator. Information was also gathered from organizations such as the [Environmental Energy Trust](#), and various other trusted sources.

Our goal was to have many distinct aspects of sustainable living discussed while keeping the survey as brief as possible, with a maximum run time of 5 minutes. Based on each response, the participant is presented with facts about their carbon emissions and how they could reduce their carbon footprint. The wording was designed to encourage participants to examine current habits and consider realistic options they could incorporate to live more eco-consciously. We primarily focused on habits that interviewed participants did not tend to practice, such as reducing flights, switching to an electric vehicle, and utilizing green heating. An example of a question with its corresponding responses can be seen in Figure 12. In this example, respondents are asked if their home has solar panels. If they say yes, as in their home does have solar panels, they are presented with a positive answer and sources with information about solar panels and their impact. If they say no, they are encouraged to see if solar panels are a good option for them and are presented with facts about how solar panels can aid in saving respondents' money on their electric bill while lowering the respondent's carbon footprint. The full audit tool can be found in Appendix G.

Sample ELAT Question

Electricity

Does your home have solar panels?

- Yes
- No

Great Job

By having solar panels, your home is much more climate friendly than the average UK home! On average, solar panels save .8 tons of CO2 from entering the atmosphere each year.

Source: <https://energysavingtrust.org.uk/advice/solar-panels/#:~:text=Cut%20your%20carbon%20footprint,London%20to%20Bristol%2030%20times.>

See If Solar Panels Are Right For You

Solar panels can reduce your home's CO2 emissions by up to one ton per year. Additionally, you can lower your electric bill by over 500 pounds a year. Consider if this switch fits you and your lifestyle!

Source: <https://energysavingtrust.org.uk/advice/solar-panels/#:~:text=Cut%20your%20carbon%20footprint,London%20to%20Bristol%2030%20times.>

Figure 12: Sample Environmental Lifestyle Audit Tool question with its corresponding responses.

4.3.2 Pamphlet

Insights from our results and talks with our sponsors suggested that a pamphlet would be the most feasible deliverable. We designed a sample pamphlet, shown in Figure 13, to teach Cathedral visitors about the history of the region and promote eco-conscious living. In addition to being the quickest to implement, visitor interviews indicated that reading material or a pamphlet was the second most requested engagement method. This pamphlet was developed with visuals and facts intended to educate the reader about the history of the Cathedral, river, and city, and how the reader can change their Environmental practices to help protect the local environment. The front side of the pamphlet includes a hand-drawn map of the River Severn and historical facts about how the river influenced the Cathedral and city. The last page on this side promotes preserving this history and how climate change is impacting the river. This leads the reader to the second half of the pamphlet, which delves into: how the river is being affected by climate change; what the Cathedral is doing to improve its environmental impact; offers advice about what the reader can do to improve their environmental impact; and concludes by inviting the reader to take the audit, accessible by the QR code. Modifications to the pamphlet should be made by members of the Cathedral staff to keep the pamphlet relevant.

The Cathedral's Eco-Mission and the River's Story

There is archeological evidence of Worcester being a religious centre as far back as the 5th century, when the Roman settlement was likely called "Vertis". Worcester's strategic location, along one of the only fords in the River Sever, placed it in a junction of traffic and trade. This attracted new settlers to the area, allowing for the establishment and growth of Worcester. This growth provided opportunity for the construction of Worcester Cathedral.

In 680 AD, construction began on the first Worcester Cathedral, marking Worcester as an important location for religious leadership. Throughout its many iterations, stones were sourced from across England (primarily from Highly, Alveley, Arley, Ombersley, Holt, and Hadly) and transported via the river. The Severn continued to play an influential role in the Cathedral's history- from bringing pilgrims and goods to the community, to providing jobs and recreational opportunities.

Today, the Severn remains a vital part of Worcester and the Cathedral's story. How can we preserve and share this legacy for generations to come?

Learn about Climate Change and the role it plays in our story.

Climate Change

The rise in temperature due to climate change has led to more frequent flooding of the River Severn, resulting in significant damage to infrastructure and costing the local community millions of pounds in damages. In addition, climate change has had an adverse impact on wildlife that calls the river home. We can mitigate these effects by being active participants in climate initiatives and eco-conscious living.

What can you do to help rewrite the history of today?

What is Worcester Cathedral Doing?

In March of 2023, Worcester Cathedral was awarded the Silver Eco-Church status by A Rocha, an international Christian organization focused on engaging communities in nature and conservation. The Cathedral is now working towards achieving the Gold status. A Rocha was established in the UK in 2001 and remains centered toward conservation efforts.

Worcester Cathedral's Eco Group is committed to raising awareness about environmental issues and taking action to address them within the community. By 2025, the group aims to establish the Cathedral as a center for environmental and social justice campaigns. It also strives to achieve net zero carbon emissions by the year 2030.

To protect the local Peregrine falcon population, Worcester Cathedral has set up a nest on its grounds, currently available on live stream!

What can you do?

Try taking the train over flying. For example, taking the train from Birmingham to Paris rather than flying emits 10 times less CO2.

Opt for reusable bags over single use plastic ones. Doing so can save you money and help the environment.

Insulating your hot water tank and primary pipes, can be done for about £40 and can save over £150 a year, preventing 0.7 tons of CO2 from entering the atmosphere.

Try to repair items you own rather than buying something new. Repairing clothes and items can save you money and reduce waste!

Take The Environmental Lifestyle Audit!

Learn more:

Figure 13: Pamphlet ELT sample.

4.3.3 Website Observations

Based on our survey, ten respondents said they would prefer to learn about the historical relationship via a website. From our observations and personal experiences, the website can be challenging to navigate, making locating Eco-Group messaging and events difficult. This suggests that the current website needs to be improved in several areas.

4.3.4 Tour Additions

Our interview results indicated that the third most preferred engagement method was an in-person guided tour and there is a significant interest in the history of the Cathedral. This finding suggests that an environmentally focused Cathedral tour would be an effective way to encourage engagement in learning about sustainability. Such a tour would combine the history of the Cathedral and how the River Severn is deteriorating, due to climate change, and would present a narrative about how visitors can make sustainable changes in their own lives to preserve these landmarks. From personal experiences in taking Cathedral tours, we also observed that there is an opportunity to incorporate abbreviated sustainability messaging into existing tours.

4.3.5 Riverwalk

Our interview results indicated that the most preferred engagement method was a sign-led tour. We explored the concept of a sign-lead riverwalk. From observing the Cathedral riverside walkway and taking inspiration from other signage in the area, we considered a sign-led tour highlighting points of interest along the river. We considered the importance of incorporating sustainability advice into this concept. We explored the idea of how the riverwalk would engage the significant foot traffic along the river and the riverside park. We developed an example of what a riverwalk sign could look like, which can be found in Figure 14.



Figure 14: Sample signage to be placed on the river walk.

4.3.6 Raindrops

Our interview results indicate that visitors are responsive to both sign-lead tours and other reading materials. One way to accommodate this interest is to create a series of signs that include messaging about sustainability and the history of the river, Cathedral, and city. Inspired by other local engagement methods, we determined that these signs could be placed throughout the Cathedral and along the riverside to encourage visitors to find as many as they can. This acts as an interactive way to lead visitors to facts which encourage them to consider the changes they could make to live more sustainably, appealing to younger and older audiences alike. A sample of what these signs could look like is shown in Figure 15.

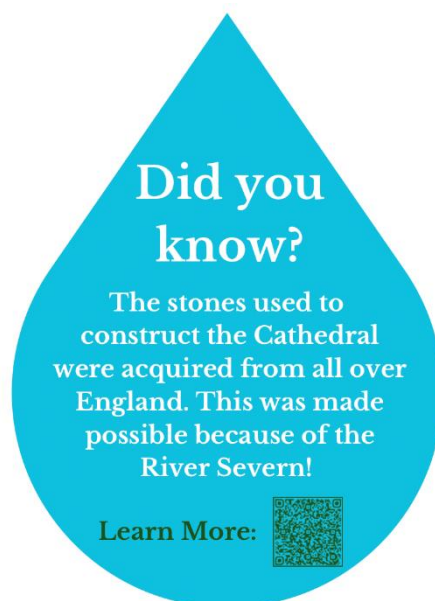


Figure 15: Sample signage to be placed around the Cathedral and river side.

4.4 Focus Group Results

To complete the objectives outlined in section 3.4, we presented the draft ELAT to a focus group consisting of the Cathedral's Eco-Group members and Cathedral staff. This focus group was comprised of six people, allowing us to explore different perspectives from stakeholders who would be promoting the ELAT. Discussions with stakeholders provided insight into the possible successful integration and acceptance of the ELAT within the Cathedral and the greater Worcester community.

We also presented concepts for potential ELTs that the Cathedral could implement. Feedback about the style and information presented in the ELTs was recorded, analysed, and used to refine the proposed ELAT and ELTs. We presented our final ELTs as recommendations and the audit tool to the Cathedral Chapter, which consists of three residential cannons and four lay cannons. Primary feedback included: making the advice and information available in the pamphlet more specific to the region and local community; creating more specific answer choices for the ELAT questions; and minor design-related

concerns such as ensuring that the fonts used were compliant with the Cathedrals style guide.

4.5 Conclusion

The data collected from interviewing Worcester Cathedral visitors indicated that the historical relationship of the River Severn and the Cathedral is an engaging element of Worcester's history. This historical relationship provides a compelling narrative that can inspire multiple engagement opportunities to educate the community about local environmental issues, increasing social awareness while encouraging action.

5.0 Recommendations

Based on our findings we offer the following recommendations to the Cathedral to help them engage visitors and stakeholders in climate-conscious living and guide them to the audit tool.

5.1 Short-term Recommendations

1. We recommend that the Cathedral implement the online interactive Environmental Lifestyle Audit Tool (ELAT). Access to the audit tool would be through the Worcester Cathedral's website, or by scanning a physical QR code attached to multiple engagement methods. We recommend attaching the audit tool to the other Environmental Lifestyle Tools, discussed below, to further promote messaging about the importance of community involvement in sustainability. The Worcester Cathedral would own the audit tool, which is a Google Form, allowing the administration to record visitor responses and update the tool as needed to maintain relevance to the community. This method is easy to use and implement, allows for easy maintenance, and is low-cost.

2. We recommend that the Cathedral implement the Environmental Lifestyle Tool pamphlet. Visitor feedback indicated an interest in reading material. The sample pamphlet should first be edited and approved by the Cathedral's professional staff to ensure accuracy and relevance. An ELT pamphlet is low-cost and provides an immediate method to better promote the Cathedral's sustainability messaging. The pamphlet includes a page dedicated to the audit tool, encouraging readers to take the audit. This pamphlet should be printed and distributed within the coming months.

3. We recommend the Cathedral move sustainability messaging to a more prominent position on the website. The website in its current form makes it very difficult to find the Eco-Group's section and its current sustainability messaging. We recommend the Cathedral add a dedicated tab to the website home page to enable easier access to sustainability messaging and to highlight the Cathedral's commitment to helping the environment. This would allow easy access to the Eco- Cathedral page and its various elements, such as the Eco-Blog and public outreach events. Additionally, adding the Environmental Lifestyle Audit Tool to the website in a prominent position would help the audit tool reach a larger audience. This recommendation can be implemented rapidly with minimal cost using existing infrastructure.

4. We recommend the Cathedral encourage wider staff engagement in sustainability efforts. During staff interviews, it was said that many members did not attend or have any knowledge of events held by the Cathedral's Eco-Group. Further, staff highlighted important local environmental issues that, if shared, would be invaluable to include in the Cathedral's sustainability messaging. Involving these individuals in Eco-Group efforts would provide additional insight. We recommend that the Cathedral encourage staff to attend Eco-Group informational lectures through direct invitations if those events take

place during working hours. Additionally, we suggest that the Cathedral incorporate a sustainability segment into their required quarterly staff meetings. This would begin building an internal culture around environmental interest and involvement.

5.2 Medium-term Recommendations

5. We recommend the Cathedral incorporate the Environmental Lifestyle Audit Tool and Environmental Lifestyle Tool messaging into current Cathedral tours.

Implementing messaging in the existing guided tours is a cost-effective way to lead visitors to take the audit tool and teach about the river's connection to the Cathedral and the city.

This could be a 2 to 5-minute segment incorporated into current Cathedral tours.

Implementing messaging that highlights environmental awareness and how the Cathedral is modelling good sustainability practices would promote greener-living concepts.

6. We recommend the Cathedral conducts a separate guide-led tour along the River Severn that highlights the Cathedral's relationship with the river and focuses on promoting sustainability and the ELAT. This tour would highlight points of interest along the river, while also leading visitors to take the audit tool. A separate tour will take longer to develop and implement as it will require content development. We believe the benefits of a standalone tour, highlighting the river's connection to the Cathedral, would add to the visitor experience.

5.3 Long-term Recommendations

7. We recommend the Cathedral implement a series of informational signs featuring facts about local history and climate change and to prompt visitors to engage with the ELAT. This series of raindrop shaped signs should be placed in various locations around the Cathedral grounds and would increase visitor engagement by introducing an interactive element of finding as many signs as possible. Approximately half of the signs should include messaging about sustainability and habits that the viewer could adopt to live an eco-conscious lifestyle. Other signs should present a historical narrative of the interconnected relationship between the river, Cathedral, and the city to prompt visitors to feel a responsibility for preserving the river. At least one sign should link to the ELAT via a QR code.

8. We recommend the Cathedral seasonally install a series of signs along the River Severn near the Cathedral. These signs would focus on significant historical areas and facts about the river while promoting climate-conscious behaviour and directing visitors to the ELAT. We recommend a series of ten signs be placed between Worcester Bridge and the Diglis Weir. Placing these signs between the river and the Cathedral will immerse the audience in the local environment, bring more attention to the area, and will capitalize on the foot traffic the riverside garners, providing an effective way to present visitors with historical and environmental information. These signs will be visible to anyone using the riverside park. One of these signs would focus on the audit tool. If these signs are

implemented in the next several years, design and messaging development, and points of interest will be needed. As this would be a seasonal installation, signs would be protected from year-round weather and flooding damage and would garner more attention as they are a limited-time attraction. Cathedral staff would manage the maintenance of these signs. This recommendation will take longer to develop and implement and would come at a higher financial cost as the signs would be larger and stand on their own. However, we believe it is worth the cost given the larger audience it will reach, and the engagement possibilities.

9. We recommend the Cathedral permanently install a series of signs along the River Severn near the Cathedral. This recommendation would focus on pointing out significant historical areas and facts about the river while promoting climate-conscious behaviour and directing visitors to the ELAT. We recommend that the Cathedral implement a series of ten signs along the River Severn between Worcester Bridge and the Diglis Weir. The messaging would be the same as the seasonal signs, which would be in place until this recommendation is implemented. The rationale is the same as for the seasonal installation, differing in that it would be a permanent feature which would reinforce the need for sustainable practices, given flooding of the river would make these signs inaccessible. Implementation of these signs would involve a longer planning process due to the various approvals required. We believe this is a worthwhile investment since this recommendation has the potential to reach more people.

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Appendix A- Sample Interview Guide for Cathedral Visitors

This appendix presents a representative interview guide used to collect data focused on gaining insight from Cathedral visitors into how we should teach, inspire, and engage people with the story of the Cathedral, River Severn, and Worcester.

1. What country do you live in?
 - a. If you are from the UK, what are the first three digits of your postcode?
2. How often do you visit the Cathedral?
 - a. Weekly
 - b. Monthly
 - c. Yearly
 - d. First Time
 - e. Other
3. **What brought you to Worcester Cathedral today?**
4. Do you practise any of the following environmental activities? (Ask why or not)
 - a. Recycling
 - b. Transportation
 - i. Walking, cycling over driving
 - ii. Electric car or bike
 - iii. Using public transportation – buses/trains
 - iv. Reduced the number of flights you take
 - c. Reduced use of plastics (reusable bags etc.)
 - d. Altered diet (i.e. less meat or veggie)
 - e. Green heating and power (e.g. air source heat pump, solar panels)
 - f. Green buying – energy, local suppliers, organic
 - g. Composting / bio digestion
 - h. Other
5. When learning about the Cathedral and River Severn, what delivery method would you find the most engaging?
 - a. (Audio based educational tours? Visuals? Person-led education? Other?)
6. Recall a tour you have taken in the past. What information resonated with you and why?
 - a. What about the tour made it inspiring?
 - b. What was the name and location of the tour?
7. What are your thoughts on learning about the subject of carbon emissions?
8. Do you think that people might find the concept of the Cathedral's historical relationship to the river interesting?
 - a. How would you like to learn about that relationship and its modern-day implications? (Audio based educational tours? Visuals? Person-led education? Other?)
9. If the Cathedral gave guidance on how to live more sustainably, would you take their advice?
10. Have you seen any changes in the River Severn over the past several years? If yes, what are they?
11. What other groups have you seen effectively promote more sustainable living? List them.
12. If someone was trying to teach about the Cathedral's relationship to the river, what would you tell them to include?

Appendix B- Consent form for interview

This appendix presents the consent form presented to Cathedral visitors prior to their participation in our interview from Appendix A.

Informed Consent Agreement for Participation in a Research Study

We are a team of student researchers from Worcester Polytechnic Institute in Massachusetts, USA conducting research in collaboration with Worcester Cathedral to gauge interest in sustainability and determine how the Worcester Community can best encourage greener living in the community.

Title of Research Study: How the Story of the River Severn and Worcester Cathedral Can Help Promote Eco-Conscious Living

Procedures to be followed: The interview will take about 10 minutes.

Record keeping and confidentiality: No personal information will be collected or correlated.

For more information about this research or about the rights of research participants, contact:

Researcher: McKenzie Anderson, Tel. +1 575 329-2165, Email: mlanderson@wpi.edu

IRB Manager: Ruth Mckeogh, Tel. +1 508 831-6699, Email: irb@wpi.edu

Human Protection Administrator: Gabriel Johnson, Tel. +1 508 831-4989, Email: gjohnson@wpi.edu

Chief Operating Officer Worcester Cathedral: Matthew Hall, Tel. 01905 732907

Your participation in this research is voluntary. Your refusal to participate will not result in any penalty to you or any loss of benefits to which you may otherwise be entitled. You may decide to stop participating in the research at any time. without penalty or loss of other benefits.

Do you acknowledge that you have been informed about and consent to be a participant in the study described above? Make sure that your questions are answered to your satisfaction before participating.

Appendix C- Sample Interview Guide for Cathedral Staff

This appendix serves as an informal interview guide for Cathedral staff to gather insight surrounding current Cathedral engagement practices, the history of the area, and environmental issues they deem most prominent.

1. What environmentally focused events at the Cathedral have you participated in or helped organise?
 - a. Did you feel like there was adequate community engagement? Was it effective?
 - b. What do you think the event did well?
 - c. What do you feel could have been done better?
 - d. Did this event highlight immediate local environmental issues?
2. What are some of the things the Cathedral currently does to try and promote sustainability?
3. Is there anything you feel that the Cathedral could do better regarding sustainability?
4. What about the historical connection between the Cathedral, River Severn, and the city of Worcester do you find most interesting?
 - a. Do you believe that Cathedral visitors would be interested in learning about this connection?
 - b. Is this connection being highlighted within the Cathedral?
5. What environmental impacts do you believe are most prominent in this region? (Flooding, pollution, other?)
 - a. How does this affect you as an individual?
6. Other insights into historical and environmental interest regarding the Cathedral?

Appendix D- Sample Interview Guide for Established Stakeholders

This appendix serves as an informal interview guide for volunteers and other established Cathedral stakeholders to gauge their perspectives surrounding visitor engagement, environmental issues, and historical interest.

1. What environmentally focused events at the Cathedral have you participated in?
 - a. Did you feel like there was adequate community engagement? Was it effective?
 - b. What do you think the event did well?
 - c. What do you feel could have been done better?
 - d. Did this event highlight immediate local environmental issues?
2. What about the historical connection between the Cathedral, River Severn, and the city of Worcester do you find most interesting?
 - a. Do you believe that Cathedral visitors would be interested in learning about this connection?
 - b. Is this connection being highlighted within the Cathedral?
 - c. When learning about the Cathedral and River Severn, what delivery method would you find the most engaging? (Audio based educational tours? Visuals? Person-led education? Other?)
3. What environmental impacts do you believe are most prominent in this region? (Flooding, pollution, other?)
 - a. How does this affect you as an individual?
4. Recall a tour you have taken in the past. What information resonated with you and why?
 - a. What about the tour made it inspiring?
 - b. What was the name and location of the tour?

Appendix E- Historical Connections Documentation

This appendix serves as a record of the literary references used in our background research, as well as a brief explanation of their relevance to the historical connection between the Cathedral, the River Severn, and the city of Worcester.

Barker, P., & Guy, C. (1991). *Worcester Cathedral Report of the First Annual Symposium on the Precinct*. Logaston Press.

- Discusses where, why, and how the stones to construct the Cathedral were acquired.

Barker, P., Romain, C., & Guy, C. (2007). *Worcester Cathedral: A short history*. Logaston Press.

- Provides a general overview of the history of Worcester Cathedral with brief acknowledgements of the role that the city and River Severn played during its development.

Dyer, A. D. (1973). *The City of Worcester in the Sixteenth Century*. U.P.

- Details the economic utility of the river in terms of trade, traffic, and creating jobs.

Engel, U. (2007). *Worcester Cathedral: An architectural history*. Phillimore.

- Provides a detailed account of the architectural history of Worcester Cathedral and discusses how Worcester served as a religious centre within the region.

Haynes, C., & Haynes, M. (1986). *Old Worcester: As seen through the camera*. Barracuda Books.

- Offers insight into the connection that the local community has with the history and overall city of Worcester.

Haynes, C., Haynes, M., & Adlam, B. (1978). *Yesterday's Town: The Changing Face of Worcester*. Barracuda Books.

- Serves as a call to action for the local community to participate in preserving local heritage through discussing the history of the region, including the River Severn and Cathedral.

Hughes, P., & Leech, A. (2011). *The story of Worcester*. Logaston Press.

- Provides a broad overview of the history of Worcester, including the role that the River Severn played in the development of the city.

Nadel, B. (2001). *Memories of Worcester*. True North Books.

- Provides insight into what the city of Worcester and River Severn means to the local community.

Owen, S. M. (2005). *Rivers and the British Landscape*. Carnegie.

- Discusses the history of the River Severn in addition to the role it plays in culture, spirituality, identity, and the overall community of Worcester.

Worcestershire Archaeological Society. (1980). *Transactions of the Worcestershire Archaeological Society* (Vol. 7, Ser. third).

- Discusses the early history of Worcester and the role that the River Severn played in this development.

Appendix F- Summary of Historical Connection Summary

This appendix briefly summarizes the three historical research categories conducted in section 4.2. This information comes from sources listed in appendix E.

The utility of the River Severn as a means for trade and transportation:

Although the river first served as a barrier to east-west movement for early settlers, it quickly became a primary trade artery. In 43-47 AD, the Romans settled in what is now Worcester due to its location adjacent to a ford on the river. This was one of the three primary crossings in the surrounding area and was a major trade junction that served as a key advantage for this civilization. In fact, it is likely that Worcester was only located where it is because of its strategic location along the river. It served this purpose throughout the Anglo-Saxon period of the 5th through 11th century. In the late 18th and early 19th centuries, “the Severn became the commercial outlet for coal and all the vast range of goods produced in the heart of industrial Britain, and was described as the busiest waterway in Britain” (Clive et al., 1978). Lastly, the river allowed transportation of the stones used to build Worcester Cathedral throughout its many iterations.

The cultural impact of Worcester Cathedral:

There is evidence that Worcester was a religious centre as far back as 416 AD (pre-Anglo-Saxon times). Consequentially, religion and Worcester Cathedral have had a lasting impact on Worcester. In 680 AD, Bishop Bosel took office and began construction on the first iteration of the Cathedral, solidifying Worcester as an important location for religious leadership within the church hierarchy. Worcester Cathedral also dominates the local landscape due to its sheer size, magnificence, and historical significance.

The River Severn as a centre for cultural identity:

The river holds profound cultural significance through its role as a focal point for economic, social, and cultural life. It serves as a geological boundary between England and Wales and has been the backdrop for several historical battles. The river's history is full of symbolism and has inspired myths, legends, and artistic works. Among the most notable of these artistic works is Edward Elgar's music. Elgar's close connection to the Severn is shown in his compositions and reflects the community's deep attachment to the river and its surroundings. As noted by Colin Pooley (2007), the river fosters connections through shared experiences of work and leisure, contributing to both material and social aspects of culture. The River Severn serves as a powerful symbol of identity and belonging within the local community, shaping the culture of the region.

Appendix G- Environmental Lifestyle Audit Tool

This appendix provides a preview of the Environmental Lifestyle Audit Tool (ELAT). The ELAT asks eight questions and gives a different response based on the answer to each question.

Environmental Lifestyle Audit Tool

Welcome to the Worcester Cathedral's Environmental Lifestyle Audit Tool. This form will ask you some questions about your daily life and then give tips on how to live more sustainably (and potentially save you some money). Please remember to click submit at the end as it helps the Worcester Cathedral's mission of living gently on the Earth.

1) How Often Do You Fly?

a) I don't fly

- i) By not flying you're saving the planet. Flying is one of the most Carbon intensive activities people can do in their daily lives.

b) 1-2 Times Per Year

- i) Just one return flight from Birmingham to Paris emits .1 ton of CO2. By taking the train, you can reduce your carbon emissions to just .01 ton of CO2.
Source: <https://www.iata.org/en/services/statistics/intelligence/co2-connect/#:~:text=IATA%20CO2%20Connect%20is%20an,be%20integrated%20into%20your%20operations>.

c) 3-5 Times Per Year

- i) Just one return flight from Birmingham to Paris emits .1 ton of CO2. By taking the train, you can reduce your carbon emissions to just .01 ton of CO2.
Source: <https://www.iata.org/en/services/statistics/intelligence/co2-connect/#:~:text=IATA%20CO2%20Connect%20is%20an,be%20integrated%20into%20your%20operations>.

d) 6+ Times Per Year

- i) Just one return flight from Birmingham to Paris emits up to .1 ton of CO2. By taking the train you can reduce your carbon emissions to .01 ton of CO2. One return flight to Mexico can emit over 1 ton of CO2. If possible you can also consider going on holiday to a closer destination which can potentially reduce your carbon footprint by several tons a year.
Source: <https://www.iata.org/en/services/statistics/intelligence/co2-connect/#:~:text=IATA%20CO2%20Connect%20is%20an,be%20integrated%20into%20your%20operations>

2) What type of car do you own?

a) Plug-in Hybrid

- i) Your vehicle is already much more sustainable than a petrol car. However, you have the opportunity to be even more green by switching to an electric car. Compared to an electric car, plug-in hybrids emit .8 more tons of CO₂. Consider if this switch is right for you! Source: <https://climate.mit.edu/ask-mit/are-electric-vehicles-definitely-better-climate-gas-powered-cars>

b) Petrol or Diesel

- i) Plug in hybrids still allow for the convenience of petrol while also saving, on average, 2 tons of CO₂ from entering the atmosphere. If you're feeling really ambitious, you can even switch to an electric car which, on average, saves 3 tons of CO₂ a year from entering the atmosphere. Consider if either of these options work for you and your lifestyle! Source: <https://climate.mit.edu/ask-mit/are-electric-vehicles-definitely-better-climate-gas-powered-cars>

c) Electric

- i) You're already making an impact in reducing your carbon footprint! On average, an electric car emits 3 tons less CO₂ than a petrol car does in a year. Source: <https://climate.mit.edu/ask-mit/are-electric-vehicles-definitely-better-climate-gas-powered-cars>

d) I do not own a car

- i) By not driving, you aren't producing any CO₂ from a personal vehicle which can save, on average, 5 tons of CO₂ per year from entering the atmosphere. Source: <https://climate.mit.edu/ask-mit/are-electric-vehicles-definitely-better-climate-gas-powered-cars>

3) Does your home have solar panels?

a) Yes

- i) By having solar panels, your home is much more climate friendly than the average UK home! On average, solar panels save .8 tons of CO₂ from entering the atmosphere each year. Source: <https://energysavingtrust.org.uk/advice/solar-panels/#:~:text=Cut%20your%20carbon%20footprint,London%20to%20Bristol%20030%20times.>

b) No

- i) Solar panels can reduce your home's CO2 emissions by up to one ton per year. Additionally, you can lower your electric bill by over 500 pounds a year. Consider if this switch fits you and your lifestyle!

Source: <https://energysavingtrust.org.uk/advice/solar-panels/#:~:text=Cut%20your%20carbon%20footprint,London%20to%20Bristol%2030%20times.>

4) Does your home use green heating such as heat pumps?

a) Yes

- i) By using a heat pump, you are saving hundreds of pounds a year compared to traditional heating methods. Additionally, you're preventing 3 tons of CO2 from entering the atmosphere annually on average.

Source: <https://energysavingtrust.org.uk/advice/air-source-heat-pumps/>

b) No

- i) Heat pumps can save, on average, 3 tons of CO2 a year from being emitted into the atmosphere when compared to a gas heating system. Additionally, they can reduce your energy costs by hundreds of pounds each year!

Source: <https://energysavingtrust.org.uk/advice/air-source-heat-pumps/>

5) Does your home use measures to reduce heat loss such as loft insulation?

a) Yes

- i) Using efficient home insulation is one of the best things you can do to reduce your carbon footprint. Below is a list of places in your home that insulation can be added to to reduce your heating cost by hundreds of pounds and potentially save tons of CO2.

Pipes, Radiator, and Tank Insulation: For approximately 40 pounds you can insulate your pipes, radiators, and tanks. On average this saves .7 tons of CO2 from entering the atmosphere and can reduce your heating bill by over 150 pounds annually. Source: <https://energysavingtrust.org.uk/advice/insulating-tanks-and-radiators/>

Loft Insulation:

If your home does not already have loft insulation this is a great way to save money and reduce carbon emissions. A typical installation can cost under 1000 pounds but can reduce your heating bill by over 200 pounds annually. This can also save over half a ton of CO2 from being released into the atmosphere by reducing your home's heat loss.

Source: <https://energysavingtrust.org.uk/advice/roof-and-loft-insulation/>

For other opportunities to make your home more efficient please refer to the links below.

<https://energysavingtrust.org.uk/advice/cavity-wall-insulation/>

<https://energysavingtrust.org.uk/advice/solid-wall-insulation/>

b) No

- i) Although this might sound like a large task it is very affordable and provides fast results. By insulating your some pipes, radiators, and hot water tank you can save over 150 pounds a year. Additionally, this can reduce your CO2 emissions by .7 tons. All of this can be accomplished for an investment of around 40 pounds. Source: <https://energysavingtrust.org.uk/advice/insulating-tanks-and-radiators/>

If your feeling particularly ambitious insulating other arts of your home such as the loft can also have a large impact. A typical installation can cost under 1000 pounds but can reduce your heating bill by over 200 pounds annually. This can also save over half a ton of CO2 from being released into the atmosphere by reducing your home's heat loss.

Source: <https://energysavingtrust.org.uk/advice/roof-and-loft-insulation/>

For other opportunities to make your home more efficient please refer to the links below.

<https://energysavingtrust.org.uk/advice/cavity-wall-insulation/>

<https://energysavingtrust.org.uk/advice/solid-wall-insulation/>

6) Do you use reusable shopping bags?

a) Yes

- i) By using reusable shopping bags rather than paying for a single use bag, you are saving money and reducing waste each time you shop.

b) No

- i) Reusable bags cost about 1 pound and last for 500 uses. When compared to purchasing single use bags, that is a savings of 50 pounds over the life of the bag!

- 7) How often do you buy new goods such as electronics and clothing?
- a) Rarely
 - i) By avoiding purchasing new products, you are saving up to 2 tons of CO₂ from entering the atmosphere annually!
Source: <https://www.wwf.org.uk/sites/default/files/2022-05/WWFFootprintCalculator-MethodologyDocument-2021.pdf>
 - b) Average
 - i) You are already making an impact and preventing, on average, 1 ton of CO₂ per year from entering the atmosphere. If you try to avoid buying unnecessary items and repairing broken ones, you can potentially save an additional ton of CO₂ from entering the atmosphere each year.
Source: <https://www.wwf.org.uk/sites/default/files/2022-05/WWFFootprintCalculator-MethodologyDocument-2021.pdf>
 - c) Frequently
 - i) By repairing broken items and buying less consumer goods, such as clothing, you can reduce your CO₂ emissions by up to one ton each year!
Source: <https://www.wwf.org.uk/sites/default/files/2022-05/WWFFootprintCalculator-MethodologyDocument-2021.pdf>
- 8) How many days a week do you eat meat?
- a) 6-7
 - i) By eating fish instead of beef for even just one or two nights a week, you can reduce your carbon footprint by up to 1 ton of CO₂ per year. If your feeling ambitious you can cut out meat all together for those nights saving potentially another .2 tons of CO₂. Source: <https://www.bbc.co.uk/news/science-environment-46459714>
 - b) 3-5
 - i) By eating fish instead of meat for even just one or two nights a week, you can reduce your carbon footprint by up to 1 ton of CO₂ per year. If your feeling ambitious you can cut out meat all together for those nights saving potentially another .2 tons of CO₂. Source: <https://www.bbc.co.uk/news/science-environment-46459714>

c) 1-2

- i) You are already saving, on average, over half a ton of CO₂ from entering the atmosphere annually. By avoiding meat entirely, you have the potential to prevent up to half a ton of CO₂ per year from entering the atmosphere.

Source: <https://www.wwf.org.uk/sites/default/files/2022-05/WWFFootprintCalculator-MethodologyDocument-2021.pdf>

d) 0

- i) By not eating any meat, you are saving up to 1 ton of CO₂ per year from entering the atmosphere. Source: <https://www.wwf.org.uk/sites/default/files/2022-05/WWFFootprintCalculator-MethodologyDocument-2021.pdf>

<https://www.wwf.org.uk/sites/default/files/2022-05/WWFFootprintCalculator-MethodologyDocument-2021.pdf>