CLIMATE VULNERABILITY INDEX ASSESSMENT FOR THE OLD AND NEW TOWNS OF EDINBURGH WORLD HERITAGE PROPERTY

Authors
Jenny Bruce[1], Yann Grandgirard[2], Jon C. Day[3], David Harkin[4], Rebecca H. Jones[5], Mairi Davies[4], Ewan Hyslop[4] and Scott F. Heron[3]

Affiliations
[1] City of Edinburgh Council
[2] Edinburgh World Heritage
[3] James Cook University
[4] Historic Environment Scotland
[5] Heriot-Watt University

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Contact
Enquiries regarding this report should be addressed to:
Historic Environment Scotland, Longmore House, Salisbury Place, Edinburgh EH9 1SH, United Kingdom

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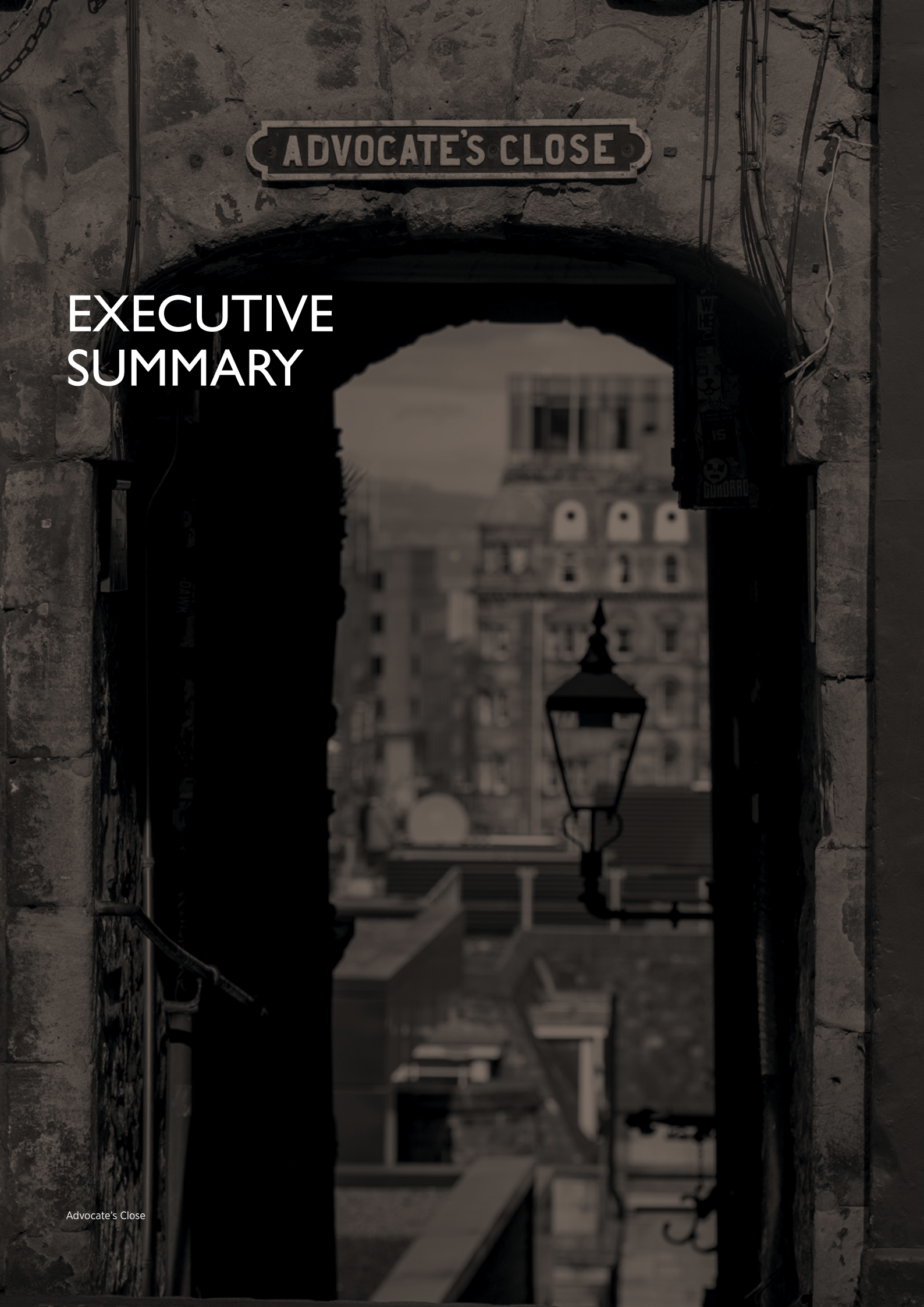

Advocate's Close

Climate change is the fastest growing threat to World Heritage (WH). WH properties around the world are already experiencing significant negative impacts, damage, and degradation. These and many others are vulnerable to climate impacts, including from rising temperatures, sea level rise, extreme precipitation, flooding, coastal erosion, drought, worsening wildfires, and human displacement, and will be at risk in the future. Recently observed trends are expected to continue and accelerate as climate change intensifies, potentially impacting the values for which properties were inscribed, including their integrity and authenticity, and their potential for economic and social development at their local level.

This report describes outcomes from a workshop in Edinburgh, Scotland (May/June 2021) to apply the Climate Vulnerability Index (CVI). The CVI is an established methodology developed to rapidly assess climate impacts – both to Outstanding Universal Value (OUV) and the associated 'community' (local, domestic, and international) – for all types of WH properties (natural, cultural, or mixed). In its first application to a cultural WH property, the CVI process was undertaken for the 'Heart of Neolithic Orkney' (HONO). The 'Old and New Towns of Edinburgh' (ONTE) is the first application of the CVI process for a WH property comprising a major urban city. The award of a Research Network grant from the Royal Society of Edinburgh (RSE) enabled the ONTE workshop.

ONTE encompasses both the Old Town and the New Town together with the ancient mill settlements of Bell's Mill, the village of Dean and part of Stockbridge on the Water of Leith; it was inscribed on UNESCO's WH List in 1995. Today the WH property has retained its urban form and character to a remarkable extent. The integrity of the street layout is a key defining factor of the character of the New Town, whilst in the Old Town the 'spine and ribs' pattern of the High Street, and its closes and wynds, maintains the medieval street and its associated land holding pattern.

The CVI workshop for ONTE:

- involved site managers, researchers, community representatives, business owners, management agency representatives, and other stakeholders
- identified the three climate stressors that present the greatest threat: Precipitation Trend, Temperature Trend; and Storm Intensity and Frequency
- determined that the OUV Vulnerability was in the middle category (Moderate) overall, indicating loss or alteration of some key WH values will occur, but not leading to a significant decline in OUV
- assessed the Community Vulnerability to be in the middle category (Moderate), acknowledging the moderate level of adaptive capacity within the community
- concluded that climate impacts are increasingly likely to add to a wide range of compounding pressures including the economic dependence of key business types upon the property, and the local population's connection with the property impacting ONTE's heritage and cultural resources.

The ONTE CVI workshop highlighted the value of a transparent and repeatable framework for rapid assessment of climate impacts on heritage properties. The management partners of the ONTE WH property (the City of Edinburgh Council, CEC; Historic Environment Scotland, HES; and Edinburgh World Heritage, EWH) will integrate the findings from the CVI workshop and report into the 2023 Management Plan revision with a recommendation that the CVI process be considered as part of the management review cycle in the future.

There are currently six WH properties in Scotland and climate change has been identified as a current or potential future risk to all. Detailed assessments of climate impacts have now been undertaken for four of these properties, with some form of climate assessment being considered for the remaining two. There is also scope to employ the CVI methodology to inform the development of future WH nominations in Scotland and beyond, and a 'CVI Snapshot' for the forthcoming Flow Country nomination was completed in March 2022.

INTRODUCTION

Dugald Stewart Monument on Calton Hill

1.1 Background to this report

This report outlines the results of applying the Climate Vulnerability Index (CVI) to assess the Old and New Towns of Edinburgh (ONTE), one of Scotland's six WH properties*.

"...climate change has become one of the most significant and fastest growing threats to people and their heritage worldwide..."
(ICOMOS 2017[1])

Climate change is the fastest growing global threat to WH properties[1,2], many of which – natural, cultural, and mixed – are already being impacted. The Intergovernmental Panel on Climate Change (IPCC) has predicted with 'high confidence' that *'Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate'*[3]. The IPCC has therefore stated that *"Climate-related risks for natural and human systems (will)... depend on the magnitude and rate of warming, geographic location, levels of development and vulnerability, and on the choices and implementation of adaptation and mitigation options"*[3].

This is the first time the CVI has been applied in a WH property comprising a major urban city. Historic Environment Scotland (HES) was keen to apply the CVI process following the success of a similar CVI workshop for another Scottish WH property, the Heart of Neolithic Orkney, in 2019[4]. The CVI co-developers, Dr Scott Heron and Dr Jon Day from James Cook University (JCU), Australia, were therefore engaged to apply the full CVI framework to the ONTE, following a successful bid for Research Network funding from the Royal Society of Edinburgh.

The CVI process is best undertaken through a workshop of diverse stakeholders (including site managers, researchers, community representatives, dependent business owners, management agency representatives, and other stakeholders). Due to the pandemic and time zone differences between Australia and ONTE, a virtual workshop over five mornings was undertaken, with 40 attendees from different sectors engaged in the process.

1.2 Overview of the Climate Vulnerability Index (CVI)

The CVI is a systematic and rapid assessment tool that is values-based, science-driven, and community-focused. It was initially developed to assess the impacts of climate change upon all types of WH areas, considering the Outstanding Universal Value (OUV) and the associated 'community' (local, domestic, and international).

The CVI methodology is based on a risk assessment approach and builds upon the vulnerability framework described by the Intergovernmental Panel on Climate Change (IPCC)[3]. The CVI process works sequentially through the steps outlined in Chapter 5, enabling a systematic evaluation of the threats of climate change. Unlike the IPCC approach, the CVI comprises two distinct primary outcomes (see Tables 5.2 and 5.3), assessing:

+ **OUV Vulnerability,** evaluating potential impacts to the values and attributes for which the property has been internationally recognised; and
+ **Community Vulnerability,** assessing the level of economic, social, and cultural dependence that associated communities (local, national, and international) have on the WH property (collectively referred to as 'ESC dependencies') and their adaptive capacity to cope with climate change.

Both assessments of vulnerability are highly relevant for key stakeholders, including site managers, responsible management agencies, businesses that are dependent on the property, and the local communities that live around the property. The Community Vulnerability component of the CVI is an integral and fundamental component and is one key aspect that distinguishes the CVI from other risk assessment approaches. Through its application, the CVI enables managers and stakeholders to consider, in conjunction with the community, what may be appropriate adaptive capacities for the management of their natural, cultural, and community assets.

* In this report we use the international convention of referring to World Heritage 'properties' whilst acknowledging local usage of 'sites'

While the CVI was initially developed in Australia, input and guidance for the CVI has subsequently come from many experts around the world. This includes the International Council on Monuments and Sites (ICOMOS) and the International Union for Conservation of Nature (IUCN), two of the advisory bodies for the WH Committee.

1.3 Why was Edinburgh chosen for the CVI?

Following the successful trial of the CVI on the Heart of Neolithic Orkney (HONO) WH property in 2019[4], Historic Environment Scotland (HES) stated its intention to hold CVI workshops for all six WH properties in Scotland and build in the results into future management planning.

HES and James Cook University (JCU) submitted an application to the Royal Society of Edinburgh's Arts and Humanities Research Networks fund in Autumn 2020. This application was successful with the grant award running from 2021-23. The network is intended to aid the refinement of the CVI methodology, to provide a platform to build capacity and train those involved in managing Scotland's WH properties, and support their global partner networks. Two CVI workshops were planned in Scotland in 2021-22: the Old and New Towns of Edinburgh (ONTE) and the Frontiers of the Roman Empire – the Antonine Wall (FRE-AW). Together, these two properties represent different challenges in terms of understanding and management of the threats from climate change, and represent very different characteristics of heritage (e.g. from different time periods, different international partners).

ONTE was chosen for the first workshop as it provided the opportunity to apply the CVI to a WH City for the first time, and it linked into Edinburgh World Heritage's Climate Change Risk Assessment project, which has recently completed.

Cited references

1 ICOMOS (2017) Resolution 19th General Assembly of ICOMOS, 2017

2 IUCN (2017) IUCN World Heritage Outlook 2. DOI: https://doi.org/10.2305/IUCN.CH.2017.17.en

3 IPCC (2019) Global Warming of 1.5°C: Summary for Policy-makers (Revised January 2019). Intergovernmental Panel on Climate Change, Switzerland. Available at: https://www.ipcc.ch/sr15/

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2

OLD AND NEW TOWNS OF EDINBURGH

The Dome, Old College, University of Edinburgh

2.1 Location

The ONTE property is located in the centre of Edinburgh, which sits on the southern shore of the Firth of Forth. Edinburgh is Scotland's capital and second most populous city (Figure 2.1).

The WH property covers a total area of around 4.5 km^2. It comprises almost 4,500 individual buildings, of which over 75% are listed for their special architectural or historic interest.

2.2 The World Heritage property

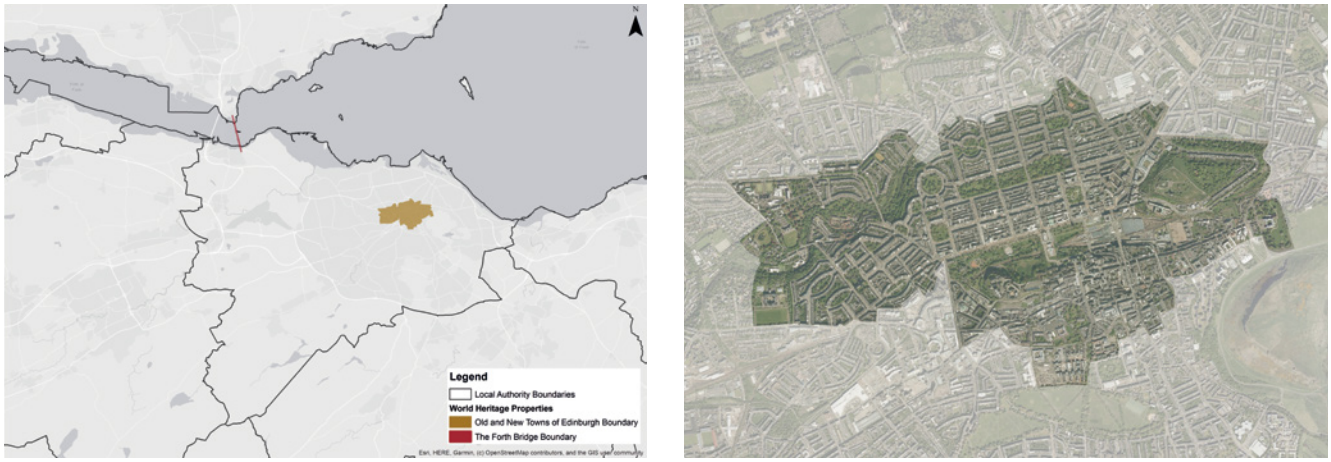
The WH property encompasses both the Old Town and the New Town together with the ancient mill settlements of Bell's Mill, the village of Dean and part of Stockbridge on the Water of Leith (Figure 2.2), where it cuts through high ground to the northwest of the area.

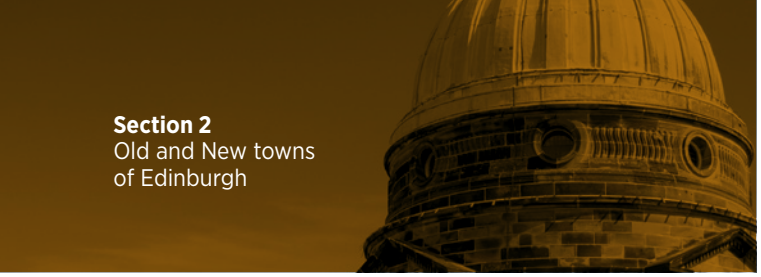
It covers the very centre of the city, encompassing many institutions of national significance including museums and galleries, the Court of Session, and much of the city's public administration, along with its office-based activity and its retail core. Prior to the Covid-19 pandemic it was the daily place of work for over 70,000 people and is home to around 23,500 residents (about 5% of the city's total population).

The WH property has retained its historic urban form and character to a remarkable extent. In the New Town the integrity of the street layout is a key defining factor of its character, while in the Old Town the 'spine and ribs' pattern of the High Street and its closes and wynds maintains the medieval street and its associated land holding pattern. Equally important is the overlaying of the Old Town in the late 18th and early 19th centuries with wide streets as a result of City Improvement Acts and commercial ventures. There are many open spaces and graveyards throughout the property.

The **urban landscape setting** is formed by the ridges and valleys of ancient glacial terrain within the property that created the Old Town ridge and the glacial hollows that form the Grassmarket, Princes Street Gardens and the Waverley Valley. The North and Waverley Bridges and the Mound cross the Waverley Valley and link the Old and New Towns.

Figure 2.1 The location of the Old and New Towns of Edinburgh World Heritage property





The most important elements of the **contrasting characters** of the two towns include:

+ **Edinburgh Castle** as an international icon, the original defensible site of the city and its most distinctive feature
+ the **medieval street pattern** centred on, around, and below the Old Town, overlaid by the late Eighteenth century 'improvement streets' (such as Cockburn Street) with their distinctive architecture
+ **the scale, integrity, discipline, and elegance of the planned New Town,** complemented by later phases being built into the 19th century, which set new standards in planning and architecture throughout the world, and which remains consistent and substantially intact.

The **Medieval Old Town** is significant in its own right. It contains two planned 12th century burghs with two early royal palaces (one within the Castle), a medieval abbey, and a wealth of early buildings (e.g. John Knox's House, Figure 2.3). Some of the exceptional features of the Old Town include:

+ the high ridge from the castle, stretching down to the Royal Palace at Holyrood (the Royal Mile). This route goes past an impressive array of architecturally and historically outstanding buildings such as Parliament House, The City Chambers (Edinburgh City Council's headquarters since 1811 and, prior to that, the Royal Exchange), and the Canongate Tolbooth
+ the fishbone street pattern and the closes and wynds (Figure 2.4)
+ early public buildings (St Giles Cathedral)
+ the survival of a number of houses belonging to the City's merchant elite.

A further important element of the Old Town is the tradition of tall buildings, which were limited to five storeys on the main streets through by-laws in the 17th century, but the sloping nature of the ridge allowed for tenements that extended much higher.

The **Neo-Classical New Town** is important for two main reasons: the high concentration of world-class neo-classical buildings; and the sheer extent of the area (Figure 2.5). The classical stone architecture is remarkable for its intactness and has an unparalleled degree of consistency. The New Town consists of seven successive major developments, each different from, but closely related to, its predecessors and built in a continuous programme of construction from 1767 until 1890.

+ The first New Town was the work of James Craig
+ The successive New Towns broke away from Craig's strictly rectangular plan, incorporating curved terraces and other features
+ The fourth New Town, planned by William Henry Playfair, exploits the contours, view and trees of Calton Hill in a romantic manner.

Whilst remarkable for its planned ensemble (Figure 2.5), the New Town also has its share of notable buildings, including The Georgian House (Figure 2.6), Royal Scottish Academy (Playfair), the Royal High School (Thomas Hamilton).

The numerous **public and privately managed gardens** are a particular feature of the New Town (e.g. Figure 2.7), highlighting the green environment in and surrounding the WH property as an important part of the planned urban space. Princes Street Gardens was originally laid out as a pleasure ground and offers an uninterrupted garden view from a one-sided street, as does Queen Street at the northern edge of the first New Town. Calton Hill is the most prominent landscape feature within the property. Deemed unsuitable for development, it hosts a collection of monuments instead (Figure 2.8) and is framed by a continuous terrace of housing, which compounds its character as a romantic wilderness.

Figure 2.2 Dean Village and the Water of Leith

Figure 2.3 John Knox's House and the Scottish Storytelling Centre on the High Street (Royal Mile)

Figure 2.4 View down the Advocates Close in the Old Town

Figure 2.5 Aerial view of the New Town in Edinburgh

Figure 2.6 The Georgian House in Charlotte Square

The Old Town also contains gardens, or 'pocket parks', laid out by Sir Patrick Geddes, which are significant for the part they played in the early regeneration of the Old Town. The property also contains an exceptional group of historic graveyards (including St Cuthbert's, Canongate, Greyfriars, Old Calton, and New Calton Burial Grounds).

The Public and Commercial Monuments in Edinburgh are the finest of the Neo-classical revival in Europe and take advantage of the topography and planned alignments of the townscape. They are notable for their range and importance and include the National Monument, the Scott Monument, numerous statues of celebrated local and national figures, a few animals (including Greyfriars Bobby), and a spectacular grouping on Calton Hill, which contributes to its nickname as the 'Athens of the North'.

The natural landscape in which central Edinburgh lies is remarkable for its **Topography and Iconic Skyline**. The city is built around Castle Rock and Calton Hill, with Arthur's Seat and Salisbury Crags forming a boundary on the east side. Edinburgh's skyline is an internationally recognised icon of the city. To the north, the landform provides views to the Firth of Forth and the hills of Fife beyond, eastwards to North Berwick Law and the Bass Rock, and to the South, the Pentland Hills. The crag-and-tail formation of the Old Town, the valley of the Nor' Loch (Princes Street Gardens) and the South Loch (the Meadows) provide exceptional opportunities for vistas and panoramas out of, and into, the WH property.

Edinburgh, as **Scotland's Capital**, represents the cultural traditions of Scotland as a European city. It is a Royal and ceremonial capital. It bears testimony to the growth of Scottish civilisation, to its religious faiths, its government, its culture, and to its educational and legal systems. The cultural traditions of the city emerge from a long tradition of storytelling (Figure 2.3) and intellectual enquiry in subjects ranging from geology, medicine, philosophy, law, the sciences, and literature, as well as architecture and planning, with many people of global renown associated with them. Edinburgh is also a UNESCO Creative City of Literature.

The WH property is the beating heart of the city. It has retained its residential vitality, and its communities reflect the complexity of its social and economic fabric. The city centre has been a tourist destination since at least the middle of the nineteenth century. The first Edinburgh Festival was held in 1947 and this annual arts festival is now internationally renowned.

Conservation within the WH property is complex and dominated by concern over the consistency of materials. From the early 17th century, all roofs had to be slate, and all facades had to be stone, which has left a legacy of high-quality buildings that have been maintained and conserved to a high standard. This need for conservation and restoration of the New Town was recognised in the 1960s, leading to the formation of the New Town Conservation Committee which initiated a programme of repair with Government and City Council funding. The problems of the Old Town were recognised in the 1980s and the Old Town Renewal Trust was formed in 1985. In 1999 these two organisations merged to form Edinburgh World Heritage Trust, to focus on the conservation of the whole property.

2.3 The implications of World Heritage status

The 1972 WH Convention[1] deals with the identification, protection, and preservation of cultural and natural heritage around the world that is of outstanding value to all of humanity. The WH Convention has now been ratified by 194 States Parties[2] and, as of 2022, there are currently 1,154 properties on the WH List – 897 cultural, 218 natural, and 39 mixed.

Inscription of a property on the WH List obligates the relevant State Party to ensure the protection, preservation, and transmission of its Outstanding Universal Value (OUV) to future generations. The Convention also describes the shared duty of the international community of signatories to protect all WH properties. Each property has a Statement of OUV, which is the principal reference for protection and management of the property, and a baseline for monitoring and reporting.

Figure 2.7 West Register House and the Albert Memorial in the Charlotte Square Garden

Figure 2.8 The Nelson Monument on Calton Hill looking across towards Holyrood Park

In order to be inscribed on the WH List, a property has to meet at least one of ten criteria (of which six are cultural and four are natural).

ONTE was inscribed under criteria (ii) and (iv):

- Criterion (ii) – to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town planning or landscape design
- Criterion (iv) – to be an outstanding example of a type of building or architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.

All WH properties must also demonstrate that they possess integrity. Integrity is defined as a measure of the completeness or intactness of the attributes that convey OUV; key words to understand integrity include 'wholeness', 'intactness' and the 'absence of pressures that threaten the property'.

For properties like ONTE inscribed under any of the six cultural criteria, UNESCO's Operational Guidelines require that 'the physical fabric of the property and/or its significant features should be in good condition, and the impact of deterioration processes controlled. A significant proportion of the elements necessary to convey the totality of the value conveyed by the property should be included'[3].

In addition to meeting the relevant criteria, cultural WH properties must also demonstrate authenticity. This condition is met where cultural values are truthfully and credibly expressed through their attributes, both tangible and intangible. The Guidelines identify attributes as including 'form and design; materials and substance; use and function; traditions, techniques, and management systems; location and setting; language, and other forms of intangible heritage; spirit and feeling; and other internal and external factors'[3]. While attributes like spirit and feeling can be difficult to define and apply, these can be important indicators of character and sense of place.

In addition to its OUV, ONTE has a range of other important values of national, regional, and local significance. The Guidelines make it clear that heritage should have a function in the life of the community, and that access and facilities for visitors appropriate to the protection and management needs of the property should be provided. However, management must ensure that sustainable use or any other change does not impact adversely on the OUV. This has implications for prioritisation and decision-making in management and protection of the property.

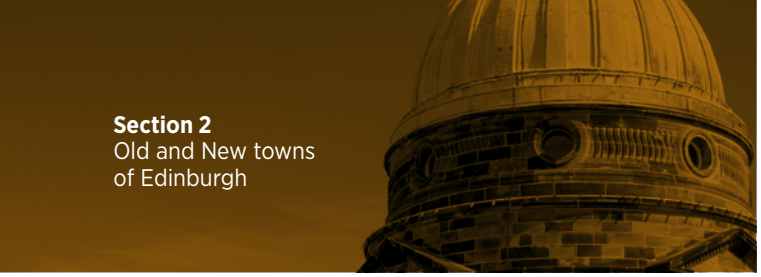
The vulnerability of ONTE to the impacts of climate change has previously been highlighted by the management partners as a concern[4]. Delivering on Convention commitments to preserve and transmit the WH property for future generations requires ensuring that continuing integrity of the site as a whole, maintaining the attributes that express authenticity, and managing impacts on the key values that combine to give the site OUV. Applying the CVI for cultural WH properties is a useful step in identifying the potential impacts, adaptive capacity, and vulnerability of the OUV.

2.4 Identifying the values of the World Heritage property

ONTE was inscribed by UNESCO in 1995. The *Statement of Outstanding Universal Value (SOUV) for ONTE* was retrospectively developed and adopted by the WH Committee in 2008. The SOUV highlights the way the city dramatically reflects significant changes in European urban planning and is reproduced in Appendix 1.

The WH property encompasses the:

- inward-looking and defensive medieval city
- expansive Enlightenment planning of the 18th and 19th centuries in the New Town
- 19th century rediscovery and revival of the Old Town, with Scottish Baronial architecture adapted for an urban setting.



The New Town's planning and architectural quality set standards for Scotland and beyond. Edinburgh had a major influence on the development of urban architecture and town planning throughout Europe in the 18th and 19th centuries.

A detailed list of attributes for use in the day-to-day management of the site has been created. It was formed using the 1994 Nomination Document (HES), the 1995 Advisory Body Evaluation (ICOMOS), the SOUV, the results of the joint World Centre/ICOMOS reactive monitoring mission 2008/2009 and the ONTE Management Plans (2005-10; 2011-16; 2017-22).

As an urban WH property, the numerous stakeholders include both residents and visitors. Conveying what is important about the property and the reasons for its inscription can be challenging to those dealing with the day-to-day issues of living in, managing, and visiting a WH City. In order to clarify the SOUV for the CVI workshop participants, key excerpts from the Statement were identified and grouped together in a tabular form (see Table 2.1). These eight key values were the basis for the assessments made throughout the CVI process, including assessing potential impacts upon them from the key climate stressors.

+ Urban Planning Landscape (Figure 2.9)
+ Medieval Old Town (Figure 2.10)
+ Neo-classical New Town (Figure 2.11)
+ Gardens and Public Open Spaces (Figure 2.12)
+ Public and Commercial Monuments (Figure 2.13)
+ Topography and Iconic Skyline (Figure 2.14)
+ Scotland's Capital (Figure 2.15)
+ Conservation (Figure 2.16)

2.5 Managing the World Heritage property

The WH property boundary was drawn to include the best examples of buildings and streets that reflect the inscription criteria. The surrounding context is also important to the understanding of the property (such as immediate conservation areas, hills and valleys, and views to the Forth). Historic Environment Scotland (HES) manages Edinburgh Castle; the City of Edinburgh Council (CEC) manages several key buildings – including the City Chambers, six museums and galleries, and numerous monuments and statues in the public realm. The remainder of the property is in multiple ownership: private, commercial, and institutional, including Edinburgh University. There is no buffer zone surrounding the WH property.

The property is managed through a partnership, which agrees upon a Management Plan to provide the framework for the preservation of the OUV. This Plan is a collaborative document developed and delivered by the partners, who are critical to supporting the integrated management of the property as a whole.

The Management Partners for the 2017-2022 Management Plan are: CEC, HES and Edinburgh World Heritage (EWH). A wide variety of stakeholders have important roles in enabling the management and protection of the property. The current Management Plan is under review by the ONTE management partners as part of the creation of a new plan for 2023.

The central purpose of the Management Plan is to maintain the OUV of the property and ensure its effective protection, conservation, and presentation, and its transmission to future generations. Such a management system also informs UNESCO that the property has appropriate mechanisms in place.

The current Management Plan (2017-22)[5] includes the shared vision, long-term goals, and short-term actions to preserve the WH property. It helps to explain its special qualities and values, advocates existing protective policies, and influences day-to-day management issues. It provides supporting information on managing the opportunities and threats facing the property and provides a framework to monitor the condition of the built environment.

2.6 Cumulative pressures on the management of the property

The success of the city creates pressures for development within the WH property. Approximately 1,000 planning applications are determined within the property boundary each year. A small number of those are major developments associated with the natural growth of a thriving and dynamic city centre. These proposals have the potential to continually divide opinion. The majority of planning applications are for small-scale changes that represent positive investment in the WH property (such as window replacements, alterations, extensions, and changes of use) but these must be managed carefully to avoid incremental harm.

2.7 Evaluation of current condition and recent trend of the key World Heritage values

There was considerable discussion during the workshop as to the current condition and recent trend of the key values since the time of inscription (1995). The subject was revisited during the workshop and the finalised current condition and recent trend is presented in Table 2.1. Whilst there was concern around specific aspects of the WH property, particularly the cumulative impacts of lots of small-scale developmental changes, it was recognised that some of these did not have a significant detrimental impact on the overarching key values.

The workshop participants commented that the complexity of the property made it difficult to assess the overall current condition. For example, whilst the urban landscape itself might not change, views and vistas could be altered over time. The current condition and trend for the Neo-classical New Town was partitioned to consider the First New Town separately from the others; it was assessed by workshop participants as good with some concerns, and deteriorating as a result of development pressures, and pressure to commercialise the gardens and public open spaces.

Cited references

1 UNESCO 1972

2 https://whc.unesco.org/en/statesparties/stat/#sp3

3 UNESCO (2017) Operational Guidelines for the Implementation of the World Heritage Convention. Available at: https://whc.unesco.org/en/guidelines/

4 Guide to Building Maintenance in a Changing Climate, Available at: The-Guide-to-Building-Maintenance-in-a-Changing-Climate-full-publication-1.pdf (ewh.org.uk)

5 Old and New Towns of Edinburgh World Heritage Site, Management Plan 2017-2022, Available at: Managing a World Heritage Site (ewh.org.uk)

Table 2.1 Key values for ONTE, derived from excerpts of the Statement of Outstanding Universal Value (OUV), together with their assessed current condition and recent trend by workshop participants (based on change since inscription in 1995).

Key values	Excerpts taken directly from Statement of OUV	Current condition & recent trend
Urban Planning Landscape	+ remarkable juxtaposition of two clearly articulated urban planning phenomena + contrast between the organic medieval Old Town and the planned Georgian New Town provides a clarity of urban structure unrivalled in Europe + juxtaposition of two distinctive townscapes, each of exceptional historic and architectural interest, linked across the landscape divide, the 'great arena' of Sir Walter Scott's Waverley Valley, by the urban viaduct, North Bridge, and by the Mound, creates the outstanding urban landscape + successive planned extensions from the first New Town + high quality of the architecture set standards for Scotland and beyond, and exerted a major influence on the development of urban architecture and town planning throughout Europe in the 18th and 19th centuries + dramatic reflection of significant changes in European urban planning, from the inward looking, defensive walled medieval city of royal palaces, abbeys and organically developed burgage plots in the Old Town, through the expansive formal Enlightenment planning of the 18th and 19th centuries in the New Town, to the 19th century rediscovery and revival of the Old Town with its adaptation of a distinctive Baronial style of architecture in an urban setting + significant town-planning components, including layout, buildings, open spaces, and views, that demonstrate the distinctiveness between the organic growth of the Old Town and the planned terraces and squares of the New Town with the wide landscaped valley between	→

Good
The property's values are in good condition and are likely to be maintained for the foreseeable future, provided that current conservation measures are maintained.

Good with some concerns
While some concerns exist, with minor additional conservation measures the property's values are likely to be essentially maintained over the long-term.

Significant concerns
The property's values are threatened and/or may be showing signs of deterioration. Significant additional conservation measures are needed to maintain and/or restore values over the medium to long-term.

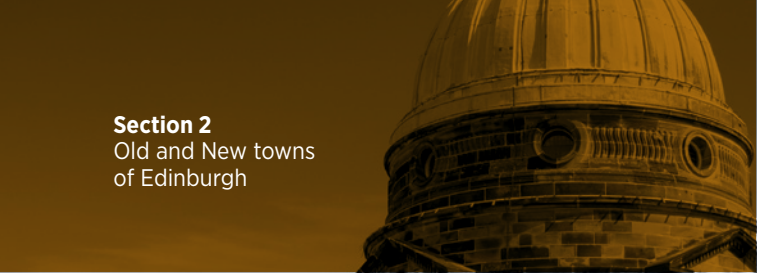
Critical
The property's values are severely threatened and/or deteriorating. Immediate large-scale additional conservation measures are needed to maintain and/or restore the property's values over the short to medium-term or the values may be lost.

→ **Stable**

↗ **Improved**

↘ **Deteriorated**

Figure 2.9 Aerial view of the **Urban Planning Landscape** looking south-east across the New Towns to the Old Town © City of Edinburgh Council



Key values	Excerpts taken directly from Statement of OUV	Current condition & recent trend
Medieval Old Town	+ stretches along a high ridge from the Castle on its dramatically situated rock down to the Palace of Holyrood + form reflects the burgage plots of the Canongate, founded as an 'abbatial burgh' dependent on the Abbey of Holyrood, and the national tradition of building tall on the narrow 'tofts' or plots separated by lanes or 'closes', which created some of the world's tallest buildings of their age, the dramatic, robust, and distinctive tenement buildings + 16th and 17th century merchants' and nobles' houses such as the early 17th century restored mansion house of Gladstone's Land, which rises to six storeys, and important early public buildings such as the Canongate Tolbooth and St Giles Cathedral + survival of the little-altered medieval 'fishbone' street pattern of narrow closes, wynds, and courts leading off the spine formed by the High Street, the broadest, longest street in the Old Town + enclosed space derived from its width, the height of the buildings lining it, and the small scale of any breaks between them	→
Neo-classical New Town	+ constructed between 1767 and 1890: collection of seven new towns on the glacial plain to the north of the Old Town, framed and articulated by an uncommonly high concentration of planned ensembles of world-class, ashlar-faced, neo-classical buildings, associated with renowned architects	↘ 1st New Town → others
Gardens and Public Open Spaces	+ integrated with the townscape are gardens, designed to take full advantage of the topography + extensive system of private and public open spaces	↘
Public and Commercial Monuments	+ finest public and commercial monuments of the New-classical revival in Europe	→

Good
The property's values are in good condition and are likely to be maintained for the foreseeable future, provided that current conservation measures are maintained.

Good with some concerns
While some concerns exist, with minor additional conservation measures the property's values are likely to be essentially maintained over the long-term.

Significant concerns
The property's values are threatened and/or may be showing signs of deterioration. Significant additional conservation measures are needed to maintain and/or restore values over the medium to long-term.

Critical
The property's values are severely threatened and/or deteriorating. Immediate large-scale additional conservation measures are needed to maintain and/or restore the property's values over the short to medium-term or the values may be lost.

→ **Stable**

↗ **Improved**

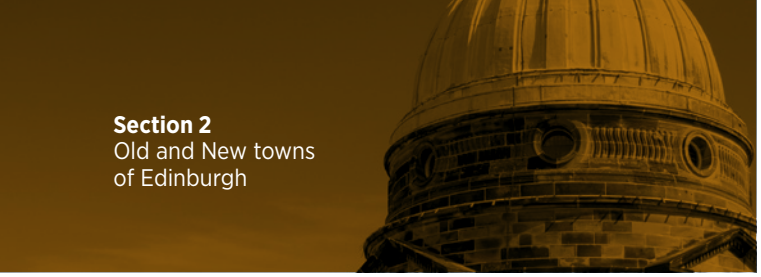
↘ **Deteriorated**

Figure 2.10 Aerial view of the **Medieval Old Town** looking west up the Royal Mile from Holyrood Palace

Figure 2.11 St Bernard's Crescent in the **Neo-classical New Town**

Figure 2.12 View of the Quartermile development from the Meadows, one of the **Gardens and Public Open Spaces** in Edinburgh

Figure 2.13 The Mercat Cross and City Chambers, two of the **Public and Commercial Monuments** in the Old Town



Key values	Excerpts taken directly from Statement of OUV	Current condition & recent trend
Topography and Iconic Skyline	+ dramatic topography of the Old Town + planned alignments of key buildings in both the Old and the New Town + spectacular views and panoramas + crucial topographic features, such as Arthur's Seat and the Firth of Forth	↘
Scotland's Capital	+ capital of Scotland since 1437 + major centre of thought and learning in the 18th century Age of Enlightenment + close cultural and political links with mainland Europe + historic role as the administrative and cultural capital of Scotland, vibrant economic centre and living capital city centre	→
Conservation	+ The renewal and revival of the Old Town in the late 19th century, and the adaptation of the distinctive Baronial style of building for use in an urban environment, influenced the development of conservation policies for urban environments + high-quality buildings of all dates have been conserved to a high standard + layout of streets and squares maintain their intactness + Old Town, New Town, Dean Village, and West End Conservation Areas + 75% of buildings within the property are category A, B, or C listed buildings	→

Good
The property's values are in good condition and are likely to be maintained for the foreseeable future, provided that current conservation measures are maintained.

Good with some concerns
While some concerns exist, with minor additional conservation measures the property's values are likely to be essentially maintained over the long-term.

Significant concerns
The property's values are threatened and/or may be showing signs of deterioration. Significant additional conservation measures are needed to maintain and/or restore values over the medium to long-term.

Critical
The property's values are severely threatened and/or deteriorating. Immediate large-scale additional conservation measures are needed to maintain and/or restore the property's values over the short to medium-term or the values may be lost.

→ **Stable**

↗ **Improved**

↘ **Deteriorated**

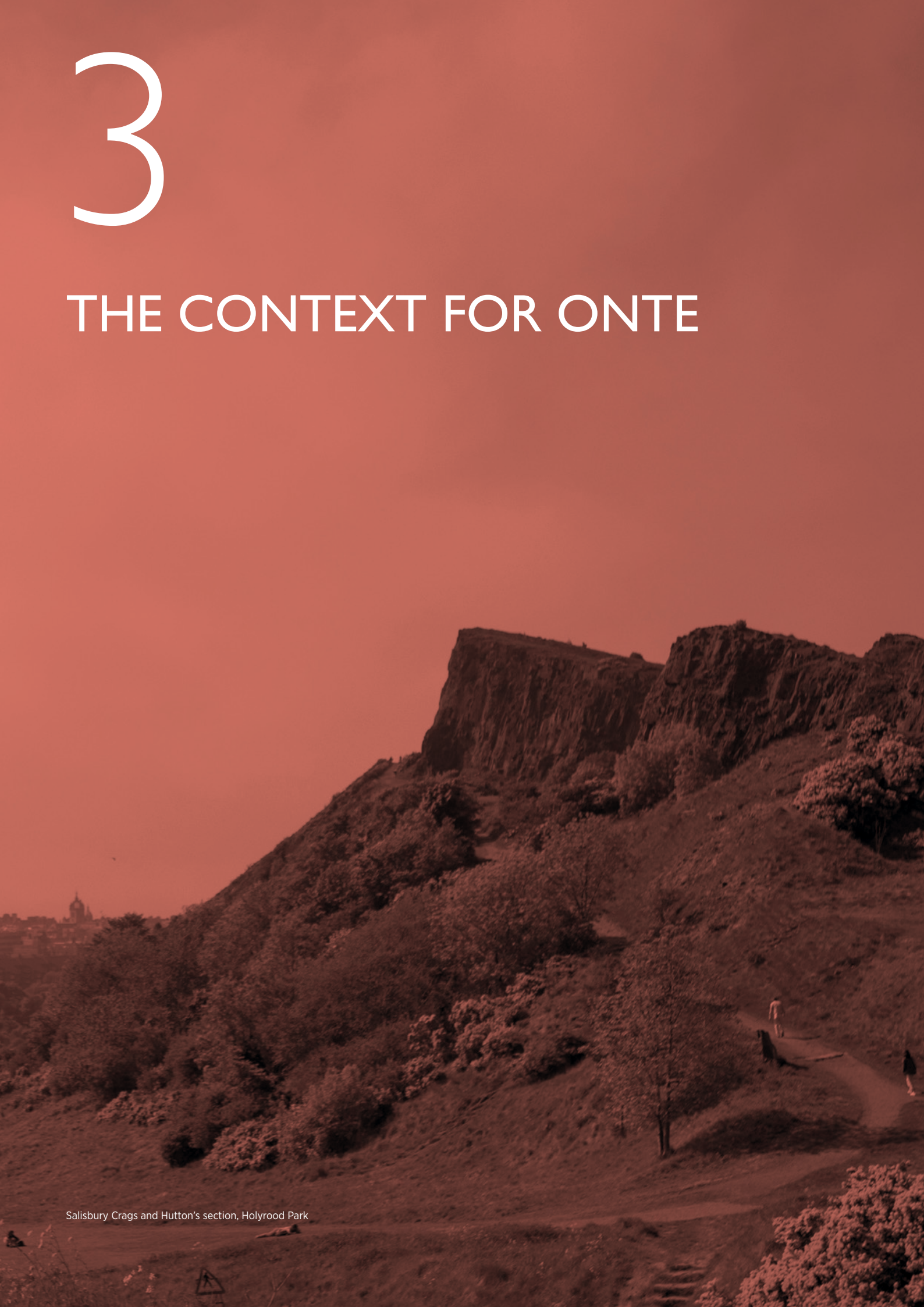
Figure 2.14 The **Topography and Iconic Skyline** of Edinburgh, viewed from Calton Hill © City of Edinburgh Council

Figure 2.15 A gathering in **Scotland's Capital** outside the Parliament

Figure 2.16 Well Court in the Dean Valley an example of a successful **conservation** project

3

THE CONTEXT FOR ONTE



Salisbury Crags and Hutton's section, Holyrood Park

3.1 Physical geography and geological landscape

The City of Edinburgh possesses dramatically varied terrain resting on a complicated geological pattern of sediments, extinct volcanoes, lava flows and igneous intrusions. This pattern has been emphasised by the differential weathering of hard and soft rocks.

Hard igneous rock outcrops form various areas of high ground in and around the property. These include the old volcanic cores of Arthur's Seat and the Castle Rock, igneous intrusions such as Salisbury Crags and Corstorphine Hill, and the old lava flows of the Braid Hills, Craiglockhart Hill, Calton Hill and the slopes of Arthur's Seat.

During the Ice Age, the hard rocks that form these high points were shaped by eastward moving ice, creating the crag-and-tail structure of the Castle Rock and Old Town Ridge, and the scooped-out hollows of the Nor' (North) Loch to its north and the Grassmarket to its south. This erosion also formed a glacial lake, the drained remains of which now form 'the Meadows', an area of public parkland on the southern boundary of the property.

The City's topography is central to the character of the property. It shaped the City's spectacular townscape and creates the dramatic views into, out of, and through the property, including key views out to the 'mountain' of Arthur's Seat; down to the Firth of Forth (the estuary of the River Forth); towards the green slopes within the City; to open countryside up to 30 kilometres beyond; and to views down from high vantage points onto roofscapes (Figure 3.1) and open spaces (Figure 3.2).

Within the property the landforms created the setting for the dramatic juxtaposition of the Old and New Towns across the green valley of Princes Street Gardens (the drained Nor' Loch). The Castle Rock and its geological 'tail' provided the perfect location for the original settlement of the medieval planned burgh, shaping its subsequent development pattern of narrow property holdings on a single main street. Its steep, rocky slopes also ensured that a highly visible 'island' of natural landscape has been retained in the heart of the property[1].

3.2 The history of Edinburgh's built heritage and culture

Edinburgh is a built embodiment of the evolution of Scottish society and settlements, indicating how they have adapted and changed over time to take advantage of the physical constraints and opportunities. Furthermore, by virtue of being the focus of the Scottish Reformation, the Scottish Enlightenment, the Athens of the North and the Scottish Renaissance, Edinburgh is pre-eminently an associative cultural landscape enjoying powerful resonance of religious, artistic, and cultural history of international significance.

Edinburgh retains its strong sense of authenticity. Using the principal Scottish building materials (stone and slate), the design and the workmanship grow from the geological setting in the Old Town, so that the tenements appear to be extrusions from the rock itself. Equally authentically, the New Towns settle on their plateaux and hillsides to form a perfect, and almost unspoilt, 18th and early 19th century environment of an extent unmatched elsewhere.

Edinburgh's architecture and its historical importance set it apart from most other cities in the world. This uniqueness is partly a consequence of its historic existence as a significant European capital from the Renaissance period onwards, but there are also other reasons. From an early date the city saw itself as great and whenever this status seemed threatened Edinburgh responded in a grand manner. After a consequential period of decline and political instability (loss of its royal presence by the Union of the Crowns in 1603, and loss of its parliament through the Union of the Parliaments in 1707), the city began a spectacular programme of civic expansion: driven by a desire for national prestige, and yet international in character. What should have been setbacks were turned, paradoxically, to bring out a staggeringly brilliant and exciting response. And then much later, when in the 1860s parts of the Old Town had degenerated into slums, the civic response was a pioneering one for its time: prestigious architecture of national stature was to result from their action.

Figure 3.1 View to Waverley Valley and the New Town from the Old Town

Figure 3.2 View to Edinburgh Castle and the Old Town from Blackford Hill

The particular nature of Edinburgh's duality is unusual. On the one hand, on a high ridge, is the ancient Old Town, while in contrast and set apart on a fresh site, the 18th century New Town. The former is on its spectacular site, the skyline punched through by the castle, the soaring neo-gothic spire of Highland Tolbooth St John's and the robust, nationally-symbolic imperial crown spire of St Giles'. This feast of ancient architecture looks down on the New Town, which in contrast is a calm sea of ordered classicism, the whole framed and articulated by neo-classical buildings of world-class distinction.

Scotland is associated with many things: one of the greatest of these is the intellectual tradition, which her scholars carried abroad. The importance of the role which Scotland had on the European stage is well recognised. But this can be focused yet further, for Edinburgh holds a key role in this tradition, in that this city was for a time the centre of the Scottish Enlightenment, that period during which such enormous intellectual advances were made. This is the same city which these philosophers and others of this 'Hotbed of Genius' helped to create. There is a respect for the old (to the extent that revived 'Old Scots' architecture is throughout much of the Old Town), while simultaneously pioneering the new, with sometimes astonishing new ideas. Such new ideas were worked through at the Scott Monument, the Royal High School, and many others; consciously contributing to the collective idea of city as monument.

Scotland's reassertions of Edinburgh's status led at last to its role as capital being reassessed, in the 1880s, when a Scottish Office was established. Culture, to a degree, was nationalised and firmly centred in Edinburgh, with the creation of institutions such as the National Library: all emphasising the validity of Edinburgh's claim to be called national capital.

The Old Town is also of substantial interest. It contains two new-planned 12th century burghs – Edinburgh (founded c.1125), and the once separate burgh of Canongate (founded c.1140). It also contains two early royal palaces (one within the spectacular castle), a medieval abbey and a wealth of early buildings.

The national tradition of building tall reaches its climax in Edinburgh with tenements that were surely the world's tallest domestic buildings of their age – and some of which are still to be seen. This tradition was powerfully reinvigorated in the 19th century with the Improvement Act, and tenements are important for their sociological interest as well as for their architectural quality. There were also buildings which were the subject of Patrick Geddes's pioneering experiments in town planning: early tenements revitalised for new and socially sensitive uses. The New Town is important for principally two reasons: having an uncommonly high concentration of neo-classical, ashlar-faced architecture, all consistent to a degree without parallel; and – perhaps crucially – all of these now surviving remarkably intact.

Edinburgh exerted great influence of the development of urban architecture through the development of the New Town. Firstly, the plan of the New Town became highly influential throughout the rest of Scotland in the way it separates the uses and classes that had mingled in the Old Town. Of comparable importance, the particular influence of Robert Adam at Charlotte Square was to show how grandeur could be imposed on an otherwise plainly orthodox row of terraced houses, so as to raise rationalist urban design to a new pitch.

Edinburgh is an outstanding example of the development of human settlement and land use. It is possible to witness the growth of a Renaissance capital city, its limitations and its opportunities, and its rejection by changing social patterns and different aspirations in the 18th century.

Edinburgh is tangibly associated with events – being the host of the world's largest number of annual cultural festivals – and with living traditions – being the home of Scottish law, the Scottish legal, medical, and architectural professions, and the Scottish church. It is the site of the nation's national museums, galleries, archives, and library, and of its heritage administration. It contains Scotland's only active Royal Palace and is the centre of the country's civil administration.

3.3 Edinburgh's economic context – Scotland's capital city

Edinburgh has a vibrant economy that relies on highly educated workforce, high productivity, and low levels of unemployment[2]. In 2020, 15.5% of Scottish jobs were located in Edinburgh[3]. ONTE comprises a working population of 105,800, five times the number of the resident population[4] with, pre-Covid-19 pandemic, around 70,000 people commuting to the WH property daily.

The city is internationally renowned for key industries such as finance and insurance, and research and technology[5]. Its economy is widely diversified (Table 3.1, Figure 3.3) as reflected by key employers from sectors such as health, tourism/hospitality, finance and insurance, education, technology and research, administrative and support services (legal, accountancy, contact centres), retail, and information and communication (film and television). Other important employers are public administration and cultural institutions due to Edinburgh's status as the capital of Scotland.

Edinburgh has been an international finance centre since the 17th century and is ranked 17th in the world and 2nd in the UK[6]. The finance sector has a longstanding link with ONTE which is home to major finance and insurance company headquarters including the Bank of Scotland, Standard Life, Baillie Gifford and, formerly, the Royal Bank of Scotland.

Building on Edinburgh's long tradition of excellence in innovation and entrepreneurship, research and technology is a particularly dynamic sector that leads the way in data science, cyber security, robotics and stem cell research, enabling the creation of successful business start-ups[7]. The sector benefits from an ecosystem combining a strong higher education sector, comprising four universities and 64,000 students, with world class researchers. Edinburgh University, founded in 1583, has the late 18th century Robert Adam and William Henry Playfair designed Old College (formerly the New College) near the South Bridge in the heart of the Old Town. There are 21,335 digital technology jobs in the city[8] that include software development, financial technology (Fintec) and gaming[3]. The Edinburgh Futures Institute (part of the University of Edinburgh) is currently restoring part of the Old Royal Infirmary (Figure 3.4) to create a new interdisciplinary institute to tackle the challenges facing society.

Tourism is a key contributor to the economy of Edinburgh and Scotland with an estimated tourist expenditure of £1.87 billion in 2019[2]. In the last ten years, before being strongly impacted by the Covid-19 pandemic, visitor numbers continuously increased to reach 4.9 million visitors (2019), benefiting from the major growth in traffic at Edinburgh Airport[9]. According to a visitor survey carried out in 2015 assessing the reasons for visiting Edinburgh, 77% of respondents mentioned 'historic city', 62% 'Edinburgh Castle' and 2% 'Edinburgh's World Heritage property status'[9]. In 2019, seven of the top ten visitor attractions in Edinburgh were located within ONTE, with number one being the National Museum of Scotland (2,210,114 visitors) and number two, Edinburgh Castle (2,167,366)[2]. The city is also a primary visitor destination due to the international reputation of its festivals, or for business tourism through a high number of international conferences and corporate events.

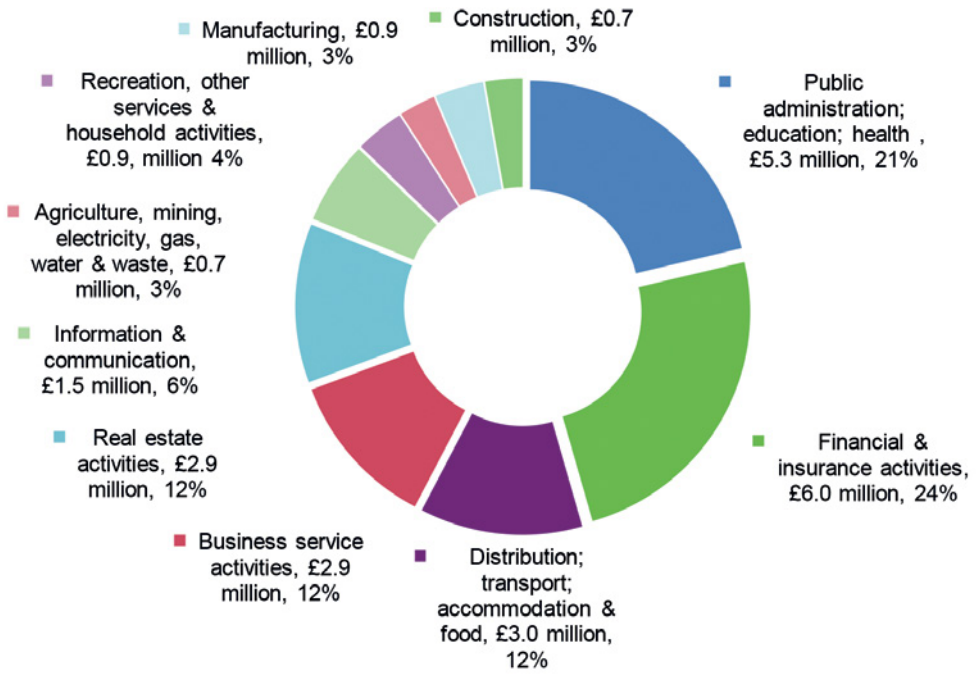
The WH property, as part of a modern living city centre, has been subject to numerous multimillion-pound developments (Figure 3.4) over the last ten years in both the Old Town (New Waverley, Holyrood North, Cowgate Fire Site) and the New Town (St James Centre, Haymarket, tram works). This is reflected in the number of planning applications within the WH property submitted, around 1,000 applications per year and over 5,000 across the whole of the city.

Table 3.1 People in employment by industry – 2019 Edinburgh, UK city average and Scotland

Industry	Edinburgh Number	Edinburgh %	UK city average %	Scotland %
Health	51,000	14.9%	15.3%	15.8%
Accommodation & food services	33,000	9.6%	6.9%	8.2%
Financial & insurance	33,000	9.6%	4.7%	3.3%
Education	33,000	9.6%	10.1%	8.2%
Professional, scientific & technical	29,000	8.5%	9.4%	7.1%
Administrative & support services	29,000	8.5%	9.5%	8.1%
Retail	27,000	7.9%	8.8%	9.0%
Information & communication	22,000	6.4%	4.1%	3.4%
Public administration & defence	19,000	5.5%	5.1%	6.2%
Arts, entertainment & recreation	18,000	5.2%	4.3%	4.4%
Transport & Storage	12,000	3.5%	4.5%	4.2%
Construction	9,000	2.6%	3.7%	5.4%
Manufacturing	8,000	2.3%	6.3%	6.7%
Wholesale	5,000	1.5%	3.4%	2.5%
Motor Trades	4,000	1.2%	1.4%	1.9%
Mining Quarrying & utilities	4,000	1.2%	1.0%	2.6%
Agriculture, forestry & fishing	400	0.1%	0.05%	1.7%
Total	343,400			

Note: Industries where Edinburgh is substantially larger (+20% larger) than other UK cities by employment share are highlighted in light peach and include: Accommodation and food services; financial and insurance and information and communication. Sectors where Edinburgh is substantially lower (+20% less) than other UK cities are highlighted in dark peach, and include: transport and storage, manufacturing and construction..

Figure 3.3 Gross value added (GVA) in Edinburgh 2018 Source: *Edinburgh by Numbers 2020*[2]



Note: GVA is a measure of the total value of output produced by an economy.

3.4 Social and cultural context

In 2019, Edinburgh had a population of c.525,000 that has increased by 13.3% over the prior ten years. Whilst the current population is predominantly white and UK born, the main driver of population growth has been migration, mostly from Europe, South Asia, East Asia, and Africa. According to the 2011 census, 31.6% of the population was aged 25 to 44 and 23.8% 45 to 64. The WH property is home to 23,500 inhabitants according to that census, about 4.5% of the city's total population.

Due to its rich history and status of Scotland's capital since the 15th century, Edinburgh is a source of pride and identity for both its inhabitants and Scottish people. The WH property through its historic fabric acts as reminder of the significant historical events and notable royal, political, military, religious, academic, and cultural figures who lived there, immediately connecting the resident or the visitor to the past in an immersive manner.

The WH property has a strong link with the monarchy. Edinburgh Castle has been the residence of many Scottish monarchs for centuries and still hosts the Honours of Scotland and the Stone of Destiny. At the other end of the Royal Mile stands the Palace of Holyroodhouse, Scotland's only official royal palace, which the royal family visits every summer during the Royal week. Her Majesty Queen Elizabeth's coffin lay at rest in St Giles' Cathedral (Figure 3.6) in September 2022 prior to her state funeral in London and Windsor.

As a capital city, Edinburgh is also home to Scotland's most important civic institutions, all located within the boundaries of the Old and the New Towns and in prominent buildings – most of them of historical and architectural significance. This includes the Scottish Government, the National Health Service (NHS) and the National Archives in the New Town; and the Scottish Parliament, the Scottish Courts, and the City of Edinburgh Council in the Old Town.

Figure 3.4 The conversion of the Old Royal Infirmary to a mix of residential, commercial and academic uses

Figure 3.5 Ainslie Place in the New Town

The Old and the New Towns have been the crucible for Scottish intellectual life for many centuries. Edinburgh has been a university town since the 1580s and has retained many of its historic academic buildings within the Old Town, where famous scholars such as Charles Darwin, Sir James Clerk Maxwell, and Alexander Graham Bell studied. This prestigious history attracts many talented students and researchers from all around the world. In the 18th century, the city was labelled as 'The Athens of the North' due to the effervescence of its cultural and scientific life and was the centre of the Scottish Enlightenment, whose ideals were profoundly embedded in the fabric of the city. Many statues or monuments commemorate influential thought leaders such as Robert Burns, David Hume, Adam Smith, and Dugald Stewart, whose influence reached far beyond Scotland.

Scotland's most prominent and much-loved cultural institutions, the National Galleries, and the National Museum of Scotland, are located within the WH property, displaying some of the most important artistic and archaeological collections for Scotland, the UK, and beyond. They are complemented by a great number of city museums, historic concert venues, and private art galleries that play a key role in the city's cultural vibrancy.

Edinburgh is internationally known as the 'festival city', where the Old and the New Towns provide a fantastic backdrop for the world's largest number of annual cultural events (Figure 3.7) that attracted slightly less than 5 million people before the Covid-19 pandemic. Key festivals include the International Festival, the Fringe, and the Royal Edinburgh Military Tattoo. Edinburgh also holds a UNESCO City of Literature designation (UNESCO's Creative Cities Network) that reflects the city's tradition of worldwide famous writers including Sir Arthur Conan Doyle, Robert Louis Stevenson, Sir Walter Scott and, more recently, Ian Rankin and JK Rowling; it has its own Poet Laureate, the Edinburgh Makar, and is home to important libraries, publishers, and the Edinburgh International Book Festival. The Old and the New Towns have also been used as the setting for famous movies such as *Trainspotting*, the *Outlander* series, and major blockbusters such *Avengers: Infinity War* and *Fast & Furious 9*.

The WH property continues to influence many people's lives as a place to live, work, or for leisure, where they make memories throughout their life and develop an emotional attachment to it. As such, the Old and the New Towns still play a central role in the city's traditions and host many events such as Hogmanay celebrations, the Torchlight Procession, or military parades on the Royal Mile. It is a place that favours oral traditions where local stories, some shared by many – like Greyfriars Bobby, Burke & Hare, Deacon Brodie – or more personal ones, are passed from generation to generation. This attachment to the WH property is reflected in the strong involvement of Edinburgh residents to support the preservation of the historic fabric of the city (Figure 3.5), perpetuating a tradition of heritage custodians championed by prominent figures such as Lord Cockburn and Sir Patrick Geddes.

Cited references

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2 Edinburgh by Numbers 2020 (City of Edinburgh Council, 2020)
3 Why Edinburgh matters 2021 – Scottish Election Priorities (Chamber of Commerce 2021)
4 Business Register and Employment Survey (NOMIS) 2014
5 https://www.investinedinburgh.com/
6 https://www.thecityuk.com/news/edinburgh-shoots-up-the-global-financial-centre-rankings-while-london-holds-on-to-2-position/
7 https://scottishbusinessnews.net/britains-best-cities-for-business-report-includes-edinburgh-glasgow-and-aberdeen-in-top-20/
8 https://www.edinburgh.gov.uk/downloads/file/25922/2018-full-version (City of Edinburgh Council, 2018)
9 Tourism in Edinburgh – Key figures (ETAG, 2016)

Figure 3.6 St Giles Cathedral and the High Street

Figure 3.7 Central Edinburgh at Christmas

4

CLIMATE AND ITS INFLUENCE ON ONTE

Raindrops

Scotland has a 'temperate maritime climate' – meaning a cool and mild climate that is often quite changeable. Day-to-day weather is influenced by a variety of factors, including its location on the edge of the Atlantic Ocean and proximity to continental Europe[1]. The following sections look at the climate of Edinburgh specifically, and how it compares with the expected conditions across Scotland and the UK.

4.1 Current climate

i. Temperature

Variations in temperature across Scotland are due to the combined effects of proximity to the coast, topography and, to a lesser extent, urban development. Edinburgh is slightly warmer than both the Scotland and UK average with an annual-average temperature of 9.3°C. Temperature in Edinburgh varies seasonally (Table 4.1) with annual-average daily maximum and minimum values of 12.7°C and 5.9°C, respectively. July is, on average, the warmest month while the coolest month tends to be December.

There are 46 days of air frost on average each year in Edinburgh; this is fewer than the Scotland and UK averages and likely due to the city's proximity to the coast. December tends to record the most days an air frost occurs, with June through to September often remaining air frost free (Figure 4.1).

Table 4.1 Annual maximum, minimum and average temperature averages at Edinburgh Royal Botanic Garden weather station, between 1981 to 2010 (Source – Met Office UK climate averages)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg max. temp (°C)	7	7.5	9.5	11.8	14.7	17.2	19.1	18.9	16.5	13.1	9.6	7
Avg. temp (°C)	4.2	4.5	6.15	8.05	10.75	13.45	15.3	15.15	12.95	9.8	6.65	4.15
Avg min. temp (°C)	1.4	1.5	2.8	4.3	6.8	9.7	11.5	11.4	9.4	6.5	3.7	1.3

Figure 4.1 Number of days where an air frost is recorded at the Edinburgh Royal Botanic Garden weather station, between 1981 to 2010 (Source – Met Office UK climate averages)

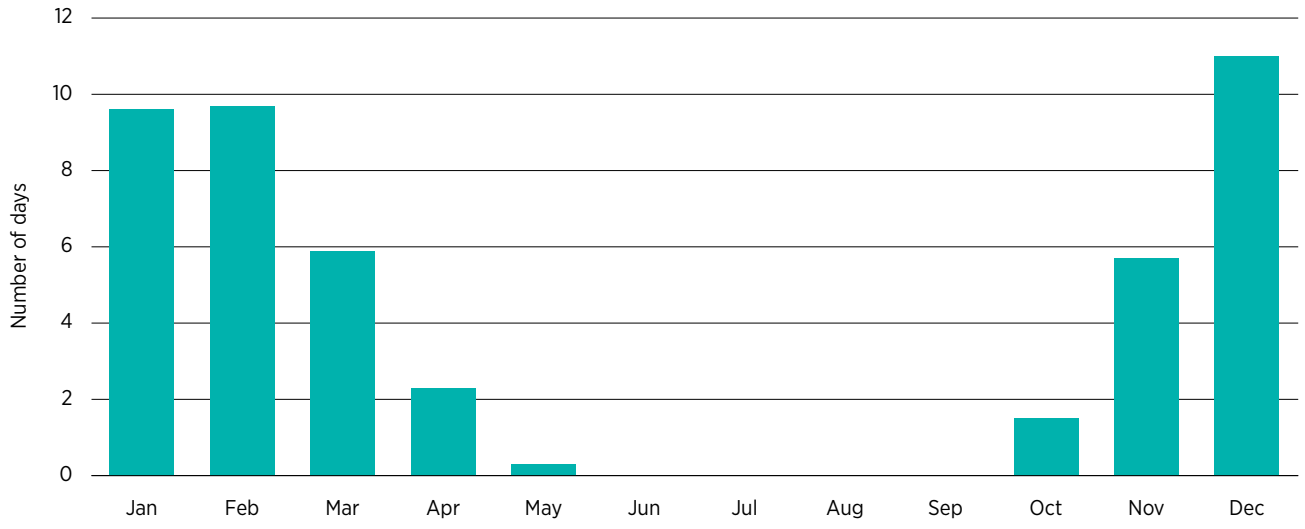
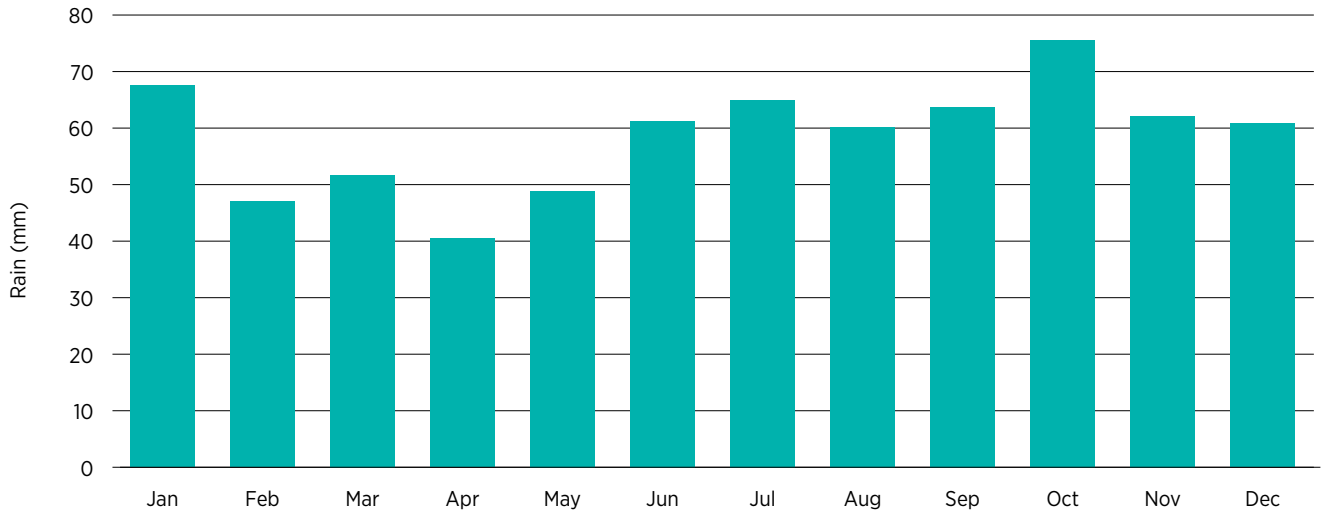


Figure 4.2 Average rainfall per month in mm at the Edinburgh Royal Botanic Garden weather station, between 1981 to 2010 (Source – Met Office UK climate averages)



ii. Rainfall

Much of eastern Scotland is sheltered from rain-bearing westerly winds. This shelter reaches its greatest potential along the coasts of East Lothian, Fife, and the Moray Firth. Many of these areas receive less than 700 mm of rainfall in an average year. Edinburgh records 727.7 mm of rainfall a year on average; the Scotland average is 1,551 mm. Parts of Scotland routinely record more than 3,000 mm per year (particularly northwest locations), demonstrating that Edinburgh is considerably drier than other parts of Scotland. There are, on average, 128 days a year with rain totals of >1 mm and rainfall is generally well distributed throughout the year (Figure 4.2). On average, the driest month is April and the wettest October.

iii. Other climate variables

With 1,426 hours of **sunshine** on average each year, Edinburgh is sunnier than the Scotland average, and slightly sunnier than the UK average. The sunniest places on the mainland UK are along the south coast of England, with over 1,750 hours per year on average. Eastern Scotland more generally includes the sunniest places in Scotland, these being on the coast of Fife where the average is about 1,500 hours of sunshine per year. In Edinburgh, December is typically the least sunny month and June the sunniest.

Wind records for the Royal Botanic Garden Met Office weather station are not available. Though eastern Scotland is one of the windier parts of the UK, being relatively close to the track of Atlantic depressions, the strongest winds are associated with deep areas of low pressure close to or across the UK. The frequency and strength of these depressions is greatest in the winter half of the year, especially from December to February.

- Edinburgh is warmer than both the Scottish and UK averages
- Edinburgh records fewer days of frost compared to the Scottish and UK averages
- Edinburgh is drier than both the Scottish and UK averages
- Edinburgh is sunnier than the Scottish and UK averages

4.2 Observed climate trends

Over the 20th century, and in recent decades, Scotland's climate has changed, with warmer conditions and shifted rainfall patterns. As reported in Adaptation Scotland's Climate Projections for Scotland handbook[2]:

- Scotland's ten warmest years on record have all occurred since 1997
- the average temperature in the decade 2010-2019 was 0.69°C warmer than the 1961-1990 average
- rainfall totals have increased, with an increasing proportion of rainfall coming from heavy rainfall events
- annual average rainfall during 2010-2019 was 9% wetter than the 1961-1990 average, with winters 19% wetter.

These national scale trends are apparent in the data recorded by the Met Office for the East Scotland region, where Edinburgh is located. Annual temperature data shows an increase close to 1°C in the past century (Figure 4.3). Seasonal rainfall data indicate significant increases in autumn and winter, whilst spring and summer rainfall has no significant trend (Figure 4.4).

Figure 4.3 Average annual temperature for East Scotland between 1884 to 2019, with a positive linear trendline indicating increasing average temperatures through time (Source – Met Office regional series).

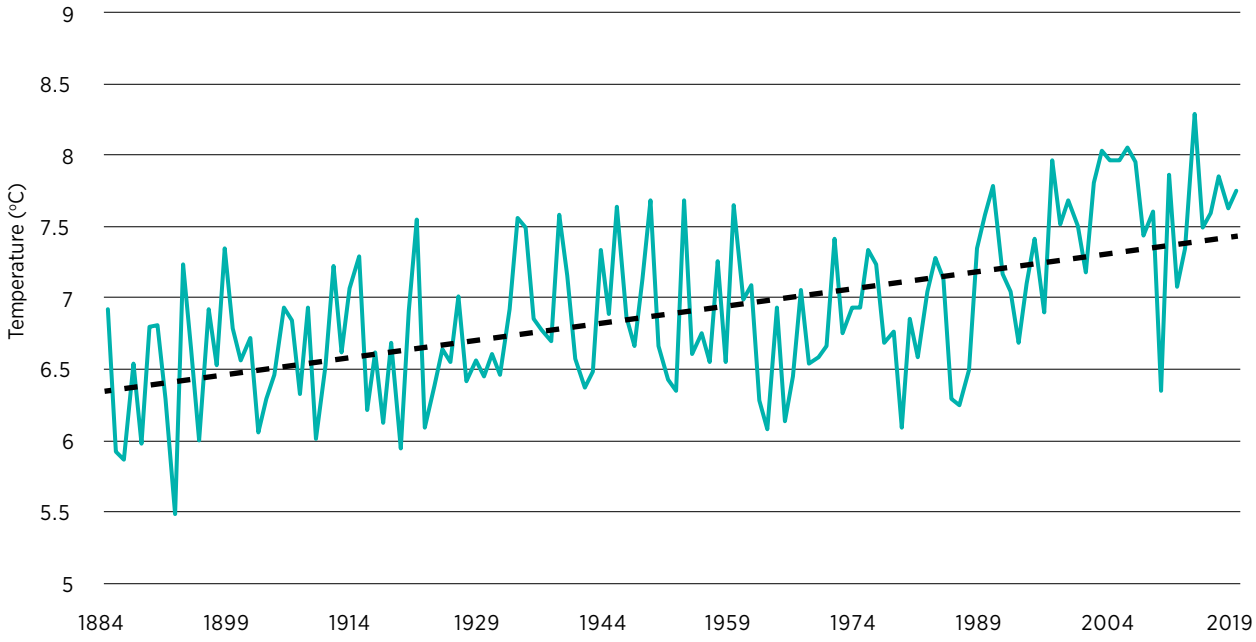


Figure 4.4 Average seasonal rainfall trends for East Scotland between 1862 to 2019 (Source – Met Office regional series).

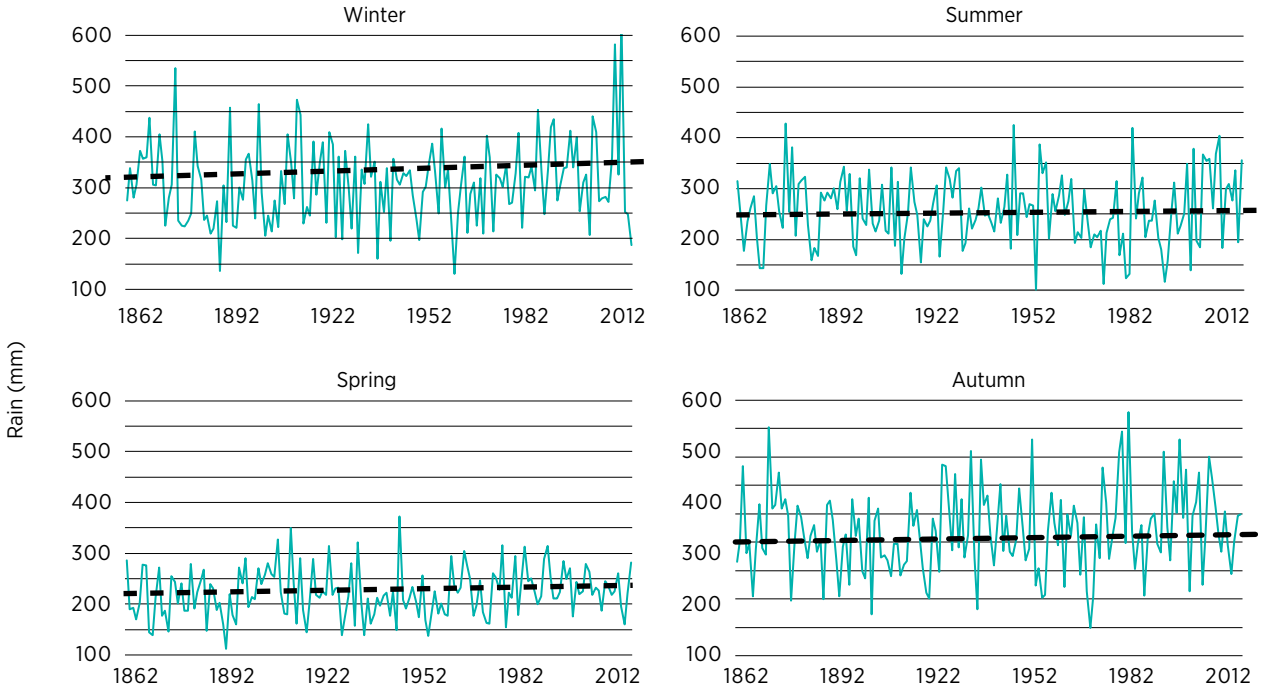


Figure 4.5 Heavy rain makes umbrellas a necessity for visitors

4.3 Future change

Edinburgh, like the rest of Scotland, will continue to see changes in climate in the decades ahead. The extent to which Edinburgh's climate will change will be controlled by the actions taken, or not taken, to reduce greenhouse gas emissions. If levels of greenhouse gas emissions continue to rise, more and more extreme climate impacts will occur than if levels of greenhouse gases are stabilised or significantly reduced. Across all future pathways, and certainly up until the middle of the 21st century, there are some generally agreed trends that describe how Scotland's climate will change:

- weather will remain variable and may become more variable
- average temperatures will increase across all seasons
- typical summers will be warmer and drier
- typical winters will be milder and wetter
- intense, heavy rainfall events will increase in both winter and summer (Figure 4.5)
- sea level will rise
- there will be reduced frost and snowfall

Model projections of key climate metrics for Edinburgh under a high-emissions scenario, in which greenhouse gas levels continue to rise rapidly, are consistent with these general statements (Table 4.4).

Cited references

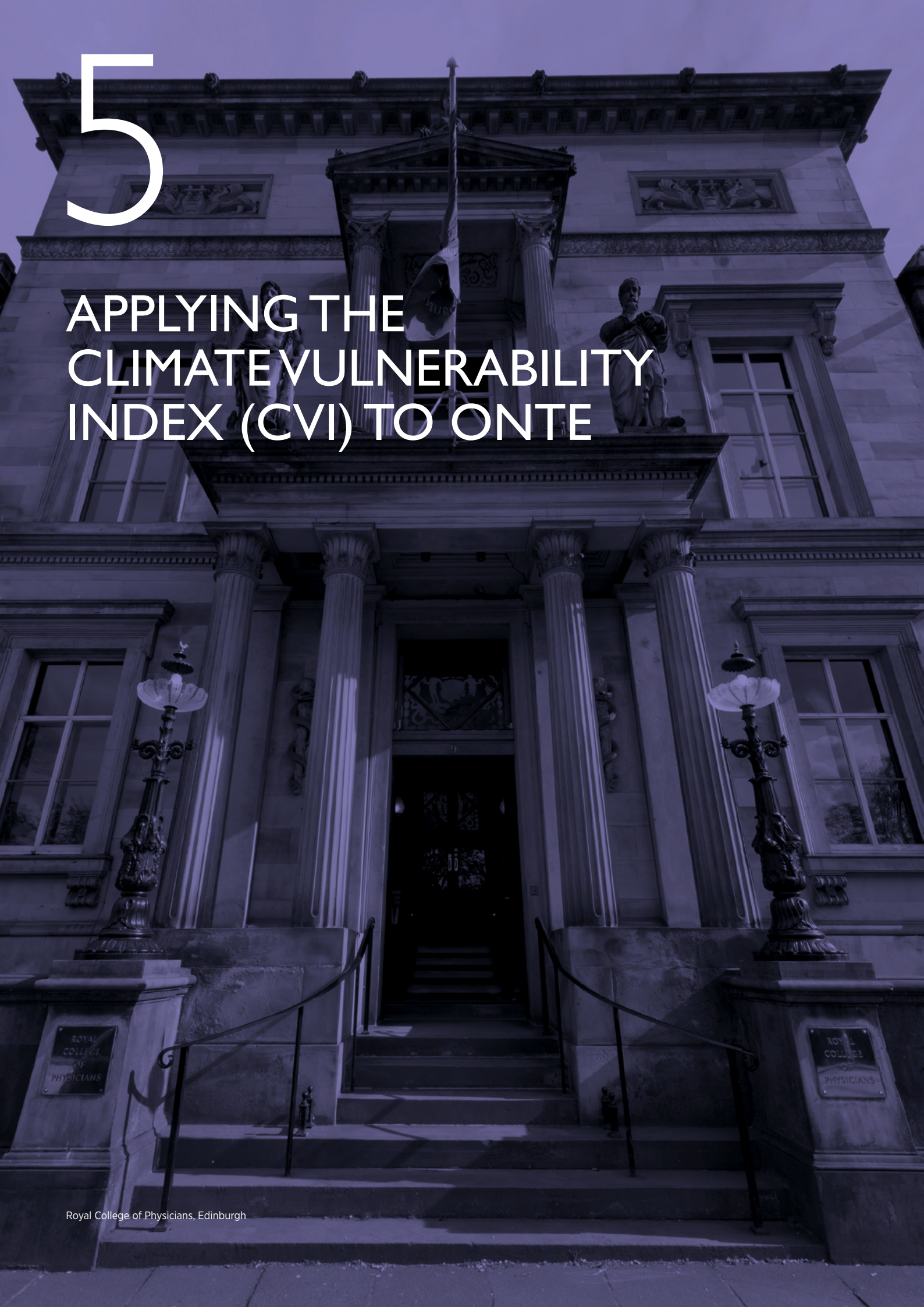
1 Met Office, Climate Change in the UK
2 See: Adaptation to climate change – Climate change (www.gov.scot)

Table 4.4 Projected changes in select climate metrics for the Forth River Basin Region under a high-emissions (RCP 8.5) scenario from a 1981-2000 baseline (summer = Jun/Jul/Aug and winter = Dec/Jan/Feb) (Source – UK Climate Projections).

Climate metric	2030 (2020 to 2039)	2050 (2040 to 2059)	2080 (2070 to 2089)
Mean annual temperature (°C)	0.3 to 1.8	0.6 to 2.9	1.5 to 5.2
Mean winter temperature (°C)	-0.1 to 1.9	0.1 to 3.2	0.7 to 5.5
Mean summer temperature (°C)	0 to 1.9	0.4 to 3.5	1.1 to 6.7
Mean winter precipitation (%)	-7 to 25	-3 to 40	-5 to 61
Mean summer precipitation (%)	-22 to 9	-31 to 4	-47 to 3
Sea-level rise (m)	0.03 to 0.13	0.05 to 0.28	0.07 to 0.62

5

APPLYING THE CLIMATE VULNERABILITY INDEX (CVI) TO ONTE



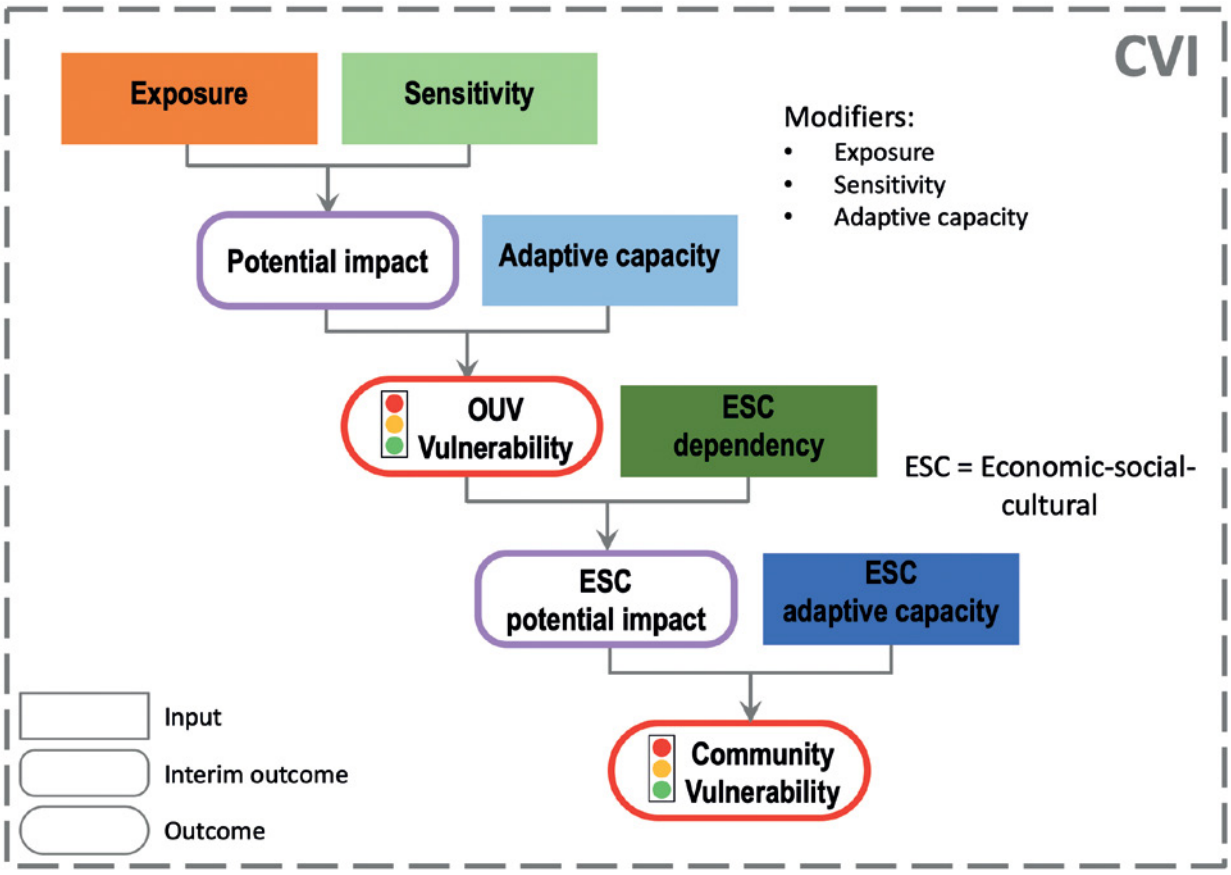
Royal College of Physicians, Edinburgh

5.1 Introduction

The Climate Vulnerability Index (CVI) is a rapid assessment tool originally developed for application to all types of WH properties, but which has applicability for other types of heritage areas. The CVI framework builds upon the vulnerability framework approach described in the 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC 2007)[1]. Vulnerability of OUV is determined by assessing the exposure, sensitivity, and adaptive capacity with respect to determined key climate stressors. The OUV Vulnerability becomes the exposure term to assess the vulnerability of the community associated with the property, combining with assessments of economic, social and cultural dependency (sensitivity) and adaptive capacity (Figure 5.1).
A customised spreadsheet-based worksheet is used to determine outcomes based on participant inputs. A more detailed outline of the CVI methodology is provided in the HONO CVI report (2019)[2]. The CVI process for Edinburgh was undertaken in an online workshop over five half-days: 25-27 May (OUV Vulnerability) and 1-2 June (Community Vulnerability) in 2021.

The CVI process employs plenary sessions and breakout groups. Plenary sessions were used for presentations, discussions and to compile information from the breakout groups. Breakout groups were conducted using the breakout feature within Zoom, the platform used for the online workshop. In all cases, outcomes from the groups were brought together in plenary to resolve any differences and reach the final conclusions.

Figure 5.1 The CVI framework used to undertake rapid assessment of climate change vulnerability of World Heritage properties and the associated community



Workshop participants from a range of expertise and interest areas related to ONTE worked through the following foundational steps:

+ confirmed the key values for ONTE (Table 2.1) derived from the Statement of OUV (Appendix 1)
+ expanded the list of other Significant Property Values (SPVs; Appendix 5)
+ identified the three key climate stressors that would be most impactful on the OUV of ONTE; and
+ identified the current condition and recent trend of the attributes of OUV (Table 2.1).

The following eight steps aligned with the CVI framework (Figure 5.1) were then conducted for ONTE:

+ undertake a high-level risk assessment (**exposure** and **sensitivity**) to OUV of the chosen three key climate stressors within the agreed time frame (i.e. by 2050). This process also considered the influence of important **modifiers** that may vary these assessments
+ use the spreadsheet-based worksheet to identify the **potential impacts** of the three key climate stressors on the attributes
+ consider the likely **adaptive capacity** of OUV in relation to the three key climate stressors
+ use the worksheet to determine the **OUV Vulnerability** to the three key climate stressors
+ consider, and assess separately, the relevant **economic, social,** and **cultural (ESC) dependencies** upon the WH property
+ use the worksheet to determine the **ESC potential impact** to the ESC dependencies upon the WH property
+ consider, and assess separately, the level of **ESC adaptive capacity** for the same ESC components considered above, and
+ use the worksheet to determine the **Community Vulnerability**.

5.2 Preparatory steps

i. Values of the property

The narrative within the Statement of OUV (SOUV) for ONTE describes the values and attributes of the property in broad terms. An initial list of key values for ONTE was derived by grouping excerpts from the SOUV, undertaken by the project Steering Committee in advance of the workshop (Table 2.1). Some of these key values reflect the landscape setting, others describe the planning layout or property elements within that, while others reflect the activity within the cityscape. Each of these key values are associated with attributes that can be tangible (and therefore manageable) or intangible. Attributes are derived from excerpts from the SOUV (or refer directly to excerpts from the SOUV) and express the key values in a more quantifiable way.

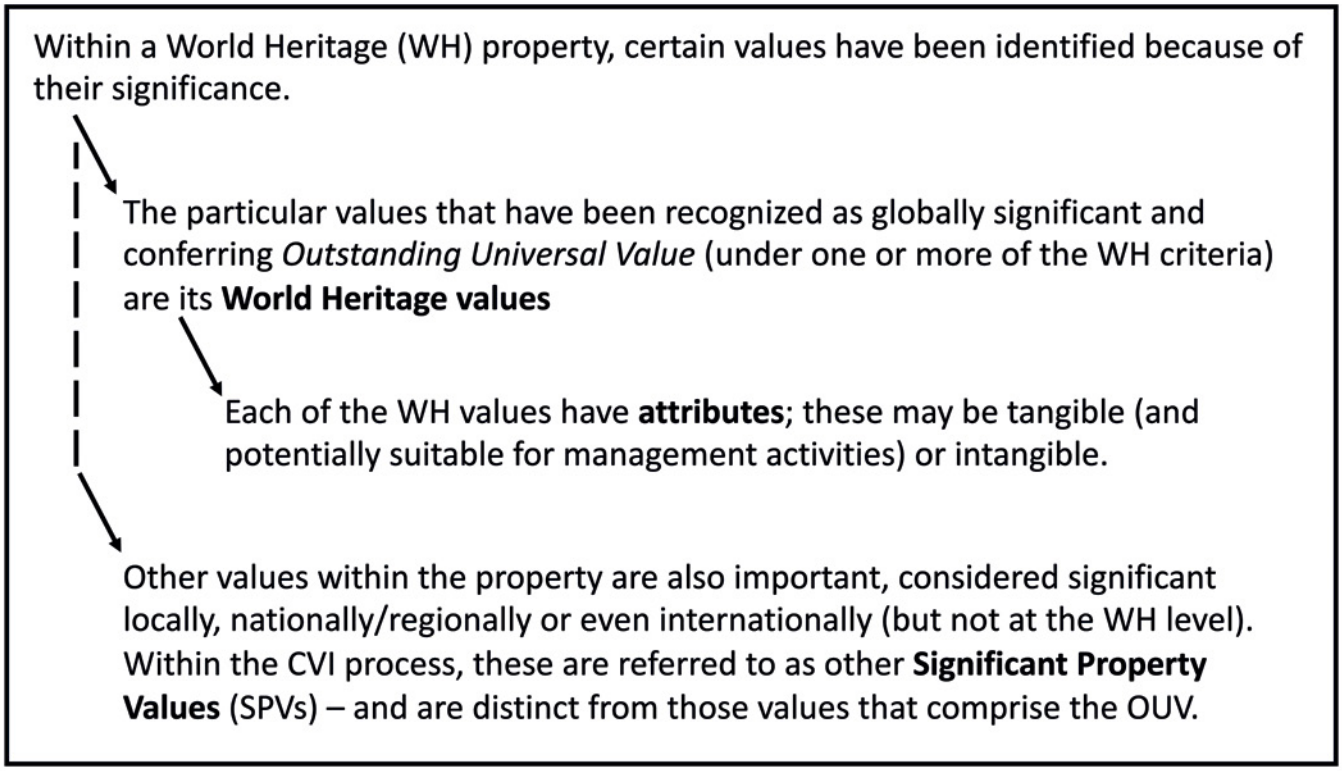
In addition to those values and attributes represented in the SOUV, there are typically other values that are not part of the Statement but have significance locally, at a national or regional scale, or even internationally, but not recognised as part of the UNESCO World Heritage values. Within the CVI methodology, these are referred to as other Significant Property Values (SPVs; Appendix 5). The key values, attributes and other SPVs can be considered to sit within a hierarchy of values (Figure 5.2).

ii Pre-workshop tasks

Prior to the workshop, participants were asked to:

+ read the Statement of Outstanding Universal Value (SOUV)
+ understand how the breakdown of key values and attributes was developed from the SOUV
+ watch a descriptive overview video of the CVI process
+ review various documents and videos regarding climate change effects relevant to ONTE, and
+ go through information provided regarding economic, social, and cultural connections with the WH property.

Figure 5.2 Hierarchy of terminology describing World Heritage and other values and attributes as applied within the CVI process (after Heron *et al.* 2020)[3].



5.3 Climate scenario and timeframe

Two brief presentations were given during the workshop to introduce effects of climate change on ONTE. The first of these, by Yann Grandgirard, provided an overview of the Climate Change Risk Assessment project run by EWH that was culminating at the time of the workshop. This was complemented by a summary of climate projections relevant to the ONTE region, given by David Harkin. Information from these has been included in this report. These presentations also informed the selection of a future timeframe to use during the vulnerability assessments (as c. 2050) and of the climate projection scenario, which was for a high emissions trajectory given by model projections under Representative Concentration Pathway (RCP) 8.5. Workshop discussions noted that within the immediate future decades (to the selected c. 2050 timeframe) trajectories are similar, due to significant dependence upon historical emissions, but that the RCP 8.5 scenario, as the upper end of model projections, currently appears most likely.

A list of 15 climate stressors had been provided to participants before the workshop (Table 5.1). Definitions of these were clarified during the workshop and the likely magnitude and rate of change, as well as level of certainty in the predictions, were based on information provided in the climate projections presentation. The workshop determined that Wildfire Risk should also be considered as a 'context-specific' climate stressor.

In breakout groups, the participants analysed which climate stressors would be likely to have the most impact on each of the attributes of OUV (Table 5.1) within the c. 2050 timeframe. Results from the breakout groups were compiled and climate stressors within the top three selected for each value (including equal-third) were used to rank the stressors (Table 5.1, Figure 5.3). Implicit within the methodology used to determine the three key climate stressors is an equal weighting across all attributes of OUV. Participants discussed in plenary the comparative importance of key values and attributes, and the level of impact of climate stressors upon these. While the climate stressor Intense Precipitation Events was ranked equal-second, participants determined that these effects could be effectively represented within the consideration of Storm* Intensity and Frequency, which would also encapsulate windstorm events. As a result, the workshop participants determined the three key climate stressors to consider in the CVI analysis as:

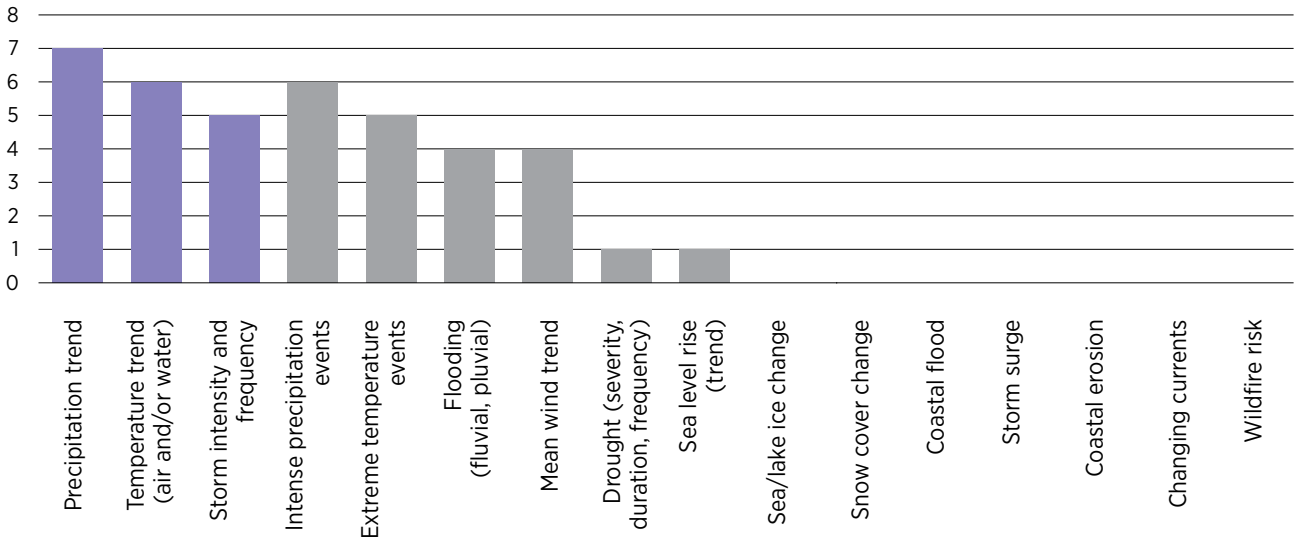
- Precipitation Trend
- Temperature Trend (air and/or water), and
- Storm Intensity and Frequency.

* A storm was defined as a deep and active area of low pressure with associated strong winds and precipitation.

Table 5.1 Climate stressors identified as likely to have the greatest impact for each of the eight key values of OUV for c. 2050. Marked cells indicate that the climate stressor was in the top three responses (including equal-third) for each key value.

	Temperature trend (air and/or water)	Extreme temperature events	Precipitation trend	Intense precipitation events	Flooding (fluvial, pluvial)	Drought (severity, duration, frequency)	Mean wind trend	Storm intensity and frequency	Sea/lake ice change	Snow cover change	Sea level rise (trend)	Coastal flood	Storm surge	Coastal erosion	Changing currents	Wildfire risk
Key values of OUV	**Climate stressors**															
Urban planning landscape	X	X	X	X	X			X								
Medieval Old Town	X		X	X			X									
Neo-classical New Town			X	X	X			X								
Gardens and Public Open Spaces	X					X		X								
Public and Commercial Monuments		X	X				X	X								
Topography and Iconic Skyline	X	X	X	X	X		X				X					
Scotland's Capital	X	X	X	X												
Conservation	X	X	X	X	X		X	X								
Total	6	5	7	6	4	1	4	5	0	0	1	0	0	0	0	0

Figure 5.3 Histogram of the number of key values assessed as having a high likelihood of impact from each of 16 assessed climate stressors by c. 2050.



5.4 OUV Vulnerability

For the identified three key climate stressors, assessments of **exposure** and **sensitivity** of the OUV system to each stressor were undertaken using a five-point categorical scale, adapted from categories used by IPCC and IUCN analyses (see Day *et al.* 2019 for details[2]). Modifiers were also assessed to include effects of temporal scale and trend (for exposure), and spatial scale and compounding factors (for sensitivity). These assessments were undertaken in breakout groups, which provided the potential for a range of responses that were then discussed in plenary to resolve the final assessments.

Exposure to Precipitation Trend and Temperature Trend were each determined as **Very likely** (>90%), whilst exposure to Storm Intensity and Frequency was **Likely** (67-90%). Sensitivity of OUV to Precipitation Trend was initially assessed as moderate but the consideration of the widespread spatial scale and high probability that compounding factors would increase impacts increased the final determination of this sensitivity assessment to be **High**, indicating potential for loss or significant alteration of many key WH values. The sensitivity to Temperature Trend and to Storm Intensity and Frequency were each determined as **Moderate**, indicating loss or alteration of some key WH values will occur, but not leading to a significant decline in OUV. Notably, the sensitivity of OUV with respect to Temperature Trend was increased from the initial assessment (of low) to the final assessment (**Moderate**) through application of the modifiers (Table 5.2). As a result, the **potential impact** (derived from exposure and sensitivity) was determined as **Extreme** (on a four-point scale, low to extreme) for Precipitation Trend and **High** (second highest) for Temperature Trend and Storm Intensity and Frequency.

The capacity of a system to adapt to stress can mitigate (i.e. reduce) the potential impacts of that stress. **Adaptive capacity** of the OUV system was assessed for each key climate stressor by considering the levels of local management response and scientific/ technical support (four-point scale), as well as the effectiveness of these to address impacts from each stressor (four-point scale). For Precipitation Trend, the adaptive capacity was determined to be **Very low** (four-point scale, very low to high), whilst for Temperature Trend and Storm Intensity and Frequency it was **Low**. Incorporating these assessments within the CVI framework, **OUV Vulnerability** (three-point scale, low to high) was determined to be **High** for Precipitation Trend and **Moderate** for Temperature Trend and Storm Intensity and Frequency. The combined OUV Vulnerability for ONTE was determined as **Moderate** (Table 5.2).

Table 5.2 Rapid assessment of OUV Vulnerability to identified three key climate stressors. Assessed values of exposure, sensitivity and adaptive capacity contribute to derived outcomes for potential impact and OUV Vulnerability. Colours refer to the elements of the CVI framework (Figure. 5.1).

Key Climate Stressors:	Precipitation trend	Temperature trend (air and/or water)	Storm intensity and frequency
Exposure	Very likely	Very likely	Likely
Temporal scale	On-going	On-going	Frequent
Trend	Moderate increase	Slow/Moderate increase	Slow increase
Exposure	**Very likely** ○○○○●	**Very likely** ○○○○●	**Likely** ○○○●○
Sensitivity	Moderate	Low	Moderate
Spatial scale	Widespread	Widespread	Extensive
Compounding factors	High probability	Medium probability	Medium/High probability
Sensitivity	**High** ○○○●○	**Moderate** ○○●○○	**Moderate** ○○●○○
Potential impact	**Extreme** ○○○●	**High** ○○●○	**High** ○○●○
Local management response	Low/Moderate	Low	Low/Moderate
Scientific/technical support	Moderate/High	Moderate	Moderate
Effectiveness	Low	Low	Low/Moderate
Adaptive capacity	**Very Low** ●○○○	**Low** ○●○○	**Low** ○●○○
OUV Vulnerability	**High** ○○●	**Moderate** ○●○	**Moderate** ○●○
Combined OUV Vulnerability	**Moderate** ○●○		

5.5 Community Vulnerability – complexity of urban context

Vulnerability of the community associated with the WH property was assessed through the consideration of economic, social and cultural (ESC) components of dependency (i.e. the sensitivity term) and adaptive capacity:

+ **Dependency** reflects the extent to which a decline in WH values due to the key climate stressors will affect economic, social, and cultural connections in the future, using the previously defined timeframe (i.e. c. 2050). Note that these effects may be positive or negative (four-point scale in each direction, high-negative to minimal-negative then minimal-positive to high-positive) in their nature (e.g. some business types may experience an increase in value under projected climate change).
+ **Adaptive capacity** reflects the current level of capacity within each component to adapt in the face of a decline in WH values due to the key climate stressors (four-point scale, minimal to high). Note that adaptive capacity only has a positive directionality.

Assessments were undertaken in small breakout groups and resolved in plenary.

A specific scenario was presented to participants for discussion, the purpose of which was to guide assessment of likely climate change impacts on the economic, social, and cultural aspects. The selected scenario elements were

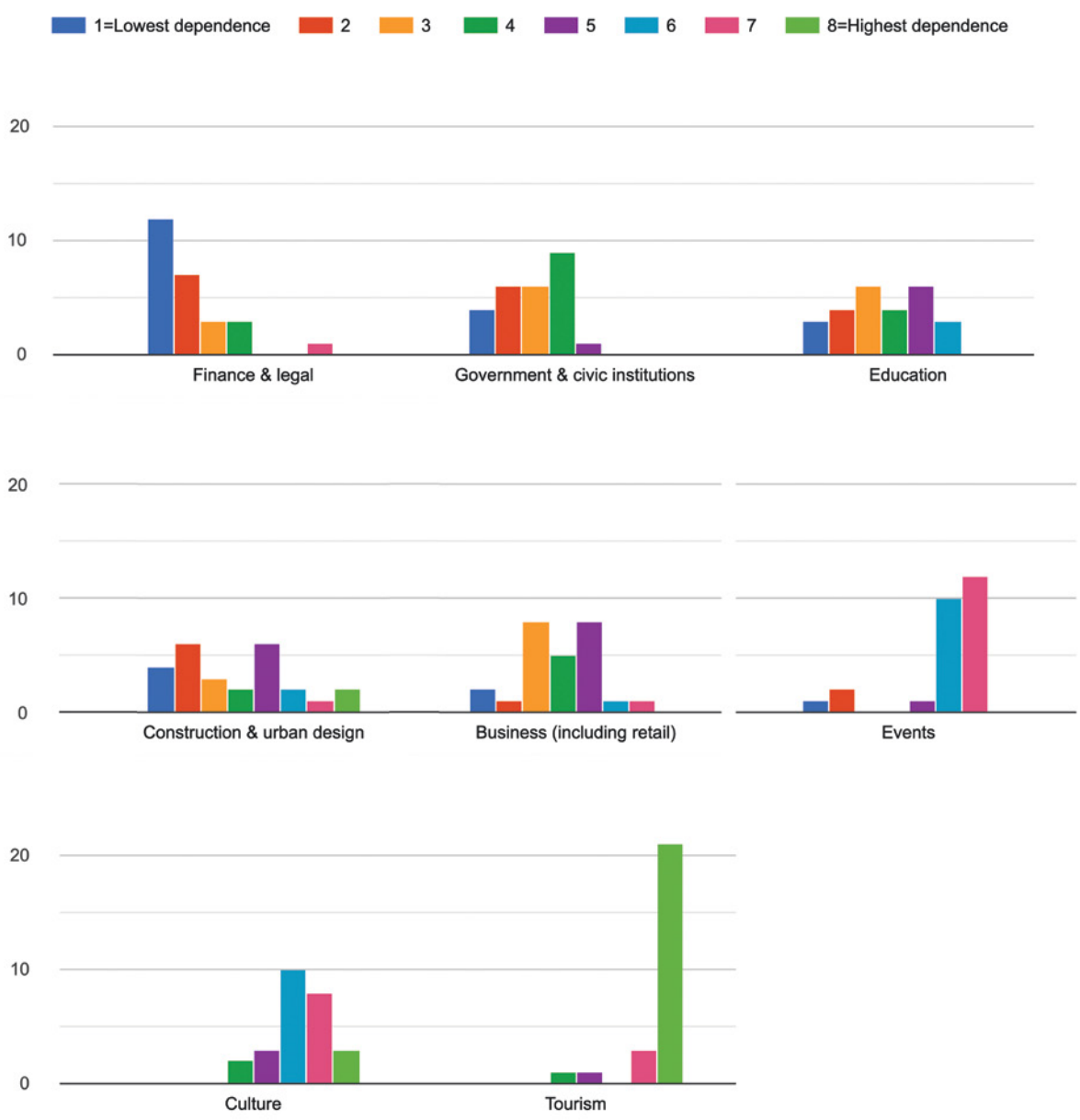
i Precipitation Trend: wetter winters and drier summers, trend towards torrential rain rather than Scottish drizzle.
ii Temperature Trend: warmer winters and hotter summers (+1.5°C above 1981-2000 baseline, c. 2050), with increased frequency and intensity of hot spells (50% chance of exceeding summer-2018).
iii Storm Intensity and Frequency: increased frequency and intensity of heavy (torrential) rainfall events (wettest days are 36% wetter) with an undetermined change in wind speeds/gusts.

The economic component includes only tangible (i.e. market or direct) economic effects on business types that are directly dependent upon the WH property. Eight groups of business types were considered: Business (incl. retail); Finance & legal; Construction & urban design; Government & civic institutions; Education; Culture; Events; and Tourism. Participant responses to an online poll, conducted on the days between the OUV and Community Vulnerability workshop sessions, ranked these business types by their dependence upon the WH values, revealing Tourism, Culture and Events as the most dependent and Finance & legal and Government & civic institutions as the least dependent (Figure 5.4).

Assessments of economic dependency and adaptive capacity were undertaken by each breakout group, drawing upon the economic information that had been presented to the workshop (summarised in Section 3.3). Economic dependency was assessed for each business type on an eight-point scale ranging from high-positive down to minimal-positive then minimal-negative down to high-negative; adaptive capacity was assessed only with a positive directionality with the four-point scale from high down to minimal. Participant rankings of relative dependency (Figure 5.4) were considered for the final assessment (in plenary). Overall, the economic dependency was assessed as low-negative (i.e. a negative impact at a low level), whilst the adaptive capacity was moderate (Table 5.3).

Intangible effects (e.g. social cohesion, aesthetics) were considered within the social and cultural components. An important distinction between these components is that social connections require a physical interaction with the property (i.e. visit), whereas cultural connections can exist without a physical interaction. For each component, three groupings of people were considered to assess dependency and adaptive capacity: local, domestic, and international.

Figure 5.4. Participant rankings of the eight business types by their dependence upon World Heritage values.



Social indicators used to inform the assessments can be considered within four categories: Human capital; Social capital; Natural capital; and Built capital (after Costanza *et al.* 2007)[4]. Social connections were considered by workshop participants to be predominated by local people, and this was taken into consideration for the final assessment. Social dependency (eight-point scale) was assessed as **Moderate-negative**, whilst the adaptive capacity (four-point scale) was **Moderate** (Table 5.3).

Cultural indicators can also be considered within four categories: Self-centric; People-centric; Environment-centric; and Pleasure-centric (after Marshall *et al.* 2019)[5]. Cultural dependency was considered by the workshop to be predominated by local people and this was taken into consideration for the final assessment. Cultural dependency (eight-point scale) was assessed as **Moderate-negative**, whilst the adaptive capacity (four-point scale) was **Low** (Table 5.3).

Combining the three components, the overall ESC dependency was determined as **Moderate-negative**, which, combined with the OUV Vulnerability (as the exposure term), resulted in the ESC potential impact being assessed as **Moderate** (three-point scale, low to high; Table 5.3). The combined ESC adaptive capacity was assessed as **Moderate** (three-point scale, low to high). These outcomes determined the Community Vulnerability as **Moderate** (three-point scale, low to high; Table 5.3).

Table 5.3 Rapid assessment of Community Vulnerability to identified three key climate stressors. Assessed values of economic, social, and cultural (ESC) dependency (sensitivity, ranging from negative to positive) and adaptive capacity contribute to derived outcomes for ESC potential impact and Community Vulnerability.

Economic	Low-negative
Social	Moderate-negative
Cultural	Moderate-negative
ESC dependency	**[-] ○ ● ○ ○ Moderate-negative ○ ○ ○ ○ [+]**
ESC potential impact	**Moderate ○ ● ○**
Economic	Moderate
Social	Moderate
Cultural	Low
ESC adaptive capacity	**Moderate ○ ● ○**
Community Vulnerability	**Moderate ○ ● ○**

It is of note that the CVI process focuses the analysis on the greatest level of impacts, such as through selecting the three climate stressors considered to be most impactful. This is appropriate as the loss of integrity and/or authenticity of one component of OUV is contrary to the tenets of WH – to preserve and maintain the site for the values described in the Statement of OUV. Furthermore, there will always be uncertainties in future impacts of projected climate change, and especially in how interactions between impacts may occur (synergistically, antagonistically, independently). Given both the high standard required within WH and the uncertainty of future impacts, the described bias within the CVI process is consistent with the precautionary principle (Kriebel *et al.* 2001)[6].

5.6 Summary

Precipitation Trend, Temperature Trend, and Storm Intensity and Frequency were identified as the three climate stressors likely to most impact the ONTE property. Potential impact from each of these key stressors was scored as **Extreme** or **High**. With adaptive capacity to mitigate impacts being assessed as **Very low** or **Low**, the OUV Vulnerability was determined to be **High** for the first and **Moderate** for the latter two key climate stressors, resulting in an overall **OUV Vulnerability** at the **Moderate** level. Impacts on WH values from the key climate stressors were judged as likely to lead to a **Negative** future impact on the economic (**Low** level), social (**Moderate**) and cultural (**Moderate**) aspects of the community associated with ONTE, resulting in a **Moderate** level of potential impact on the community. As the adaptive capacity of the community was determined to currently be at a **Moderate** level, the overall **Community Vulnerability** was assessed to be in the **Moderate** category.

Cited references

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4 Costanza R, Fisher B, Ali S, Beer C, Bond L, Boumans R, Danigelis NL, Dickinson J, Elliott C, Farley J, Elliott Gayer D, MacDonald Glenn L, Hudspeth T, Mahoney D, McCahill L, McIntosh B, Reed B, S Turab Rizvi A, Rizzo DM, Simpatico T and Snapp R (2007) 'Quality of life: An approach integrating opportunities, human needs, and subjective well-being', *Ecological Economics* 61: 267–276

5 Marshall NA, Thiault L, Beeden A, Beeden R, Benham C, Curnock MI, Diedrich A, Gurney G, Jones L, and Marshall PA (2019) 'Our Environmental Value Orientations Influence How We Respond to Climate Change', *Front. Psychol*. 18. DOI: 10.3389/fpsyg.2019.00938

6 Kriebel D, Tickner J, Epstein P, Lemons J, Levins R, Loechler EL, Quinn R, Rudel R, Schettler T and Stoto M (2001) 'The precautionary principle in environmental science', *Environmental Health Perspectives* 109, No. 9. https://doi.org/10.1289/ehp.01109871

Sharing the CVI outcomes with the community

Following the completion of the CVI workshop for ONTE, an online public event was held on 23 June 2021 to share the outcomes with members of the broader Edinburgh community. Hosted by Edinburgh World Heritage, the event 'Heritage Under Threat: climate change and the Old and New Towns of Edinburgh', consisted of a facilitated online discussion of five experts who had been involved in running the ONTE CVI workshop. A recording of the event is available online at https://www.youtube.com/watch?v=PVdgJ_HPQaY

6 NEXT STEPS

Launch event for 'Guide to Building Maintenance in a Changing Climate', Acheson House, Edinburgh.

6.1 Findings from the CVI process

The ONTE WH property was determined to have **Moderate** overall vulnerability to the impacts of the three key climate stressors identified by the workshop participants. By 2050, there is the potential for loss or significant alteration of at least some and potentially many key WH values that comprise the OUV of the property. Each of the key climate stressors was considered in terms of how it would be expressed (acute or chronic) and the degree of confidence in the climate projections.

i OUV Vulnerability

The three key climate stressors identified to have the greatest potential impact on the heritage values of ONTE were:

+ Precipitation Trend: A high level of vulnerability of the WH values to increased rainfall, particularly in winter, that is projected to come in fewer, more-intense downpours. Increased rainfall has already impacted gardens and open spaces, with impacts compounded by footfall. The very likely probability of exposure combined with high sensitivity, led to the assessment of extreme potential impact on OUV from this stressor.
+ Temperature Trend: An increase of 1.5°C from 1981-2000 levels in 2050 has a high level of confidence in the projections. Potential impacts were considered to occur on both structures and landscapes within the property. Potential impact from this stressor was determined to be at a high level, derived from assessments of very likely exposure and moderate sensitivity of the property values.
+ Storm Intensity and Frequency: Projected increases in the frequency and intensity of heavy rainfall events underpinned the assessments for this key climate stressor. Combining the likely exposure to events with a moderate level of sensitivity of the property led to an assessment of potential impact at the second-highest level (high).

The capacity to adapt in the face of potential impacts from each of the stressors was considered to be very low or low, consideration of which led to the overall vulnerability of the OUV as **Moderate**.

ii Community Vulnerability

Economic, social, and cultural aspects were also determined to have a **Moderate** vulnerability, due to the economic dependence of key business types upon the property, the local population's connection with the property, and the assessed moderate level of adaptive capacity across the ESC components.

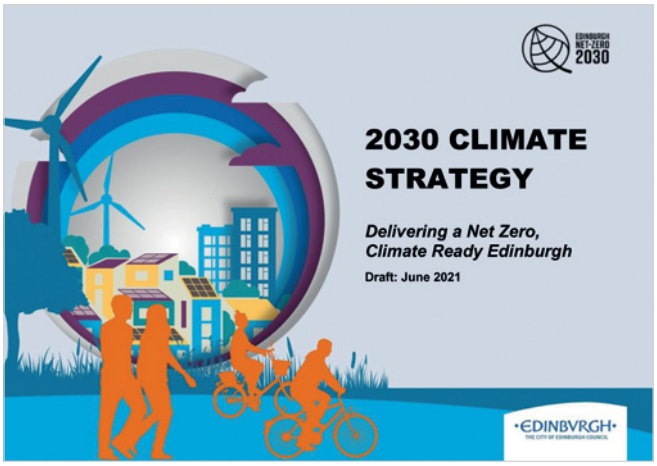
6.2 Integration into the management process

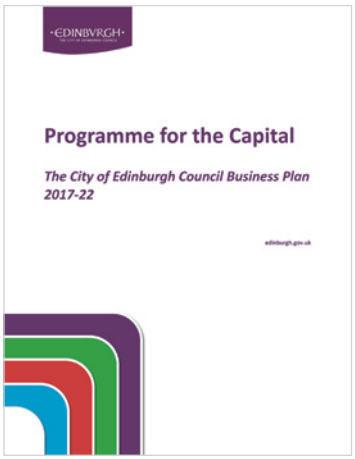
The results of the CVI workshop, and the qualitative data that the process provided, will support and enhance the ONTE management partners' efforts to understand the various threats posed by climate change to the property. Combined with identified gaps in research, policy and guidance, and management, they will help inform sensitive adaptation solutions to preserve the OUV for future generations.

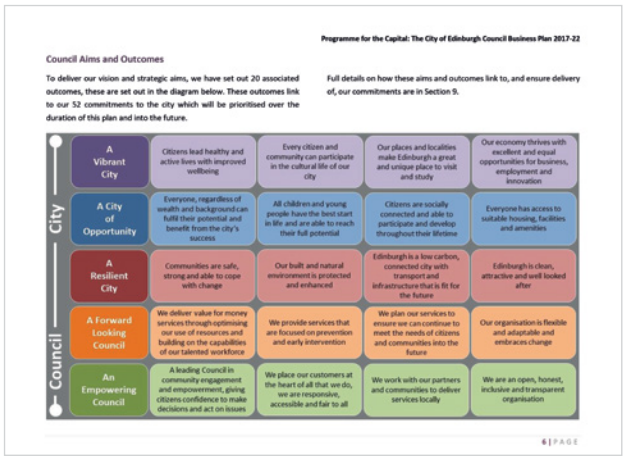
The CVI outcomes were incorporated into a dataset of evidence of future climate change impacts on and associated vulnerability of ONTE that was built as part of EWH's Climate Change Risk Assessment (CCRA) project (Figure 6.1 and Box on page 55). A draft ONTE Climate Action Plan covering the property was produced based on the evidence collected, and included actions related to ONTE management partners, residents and other organisations that share a link with the overall site.

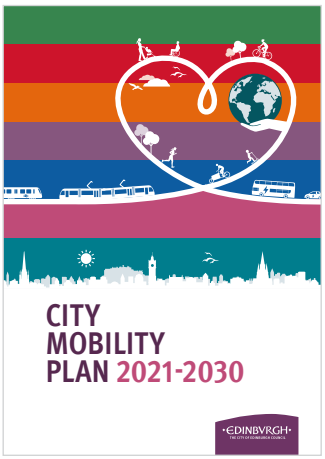
The next phase of the process will consist of integrating the draft ONTE Climate Action Plan into the Review of the ONTE Management Plan process and the new ONTE Management Plan 2023+ (Figure 6.2). The current WH Management Plan, 2017-22[1], already takes account of climate change and sustainability through a number of targeted actions. The challenge for the next plan is pulling these new threads together and articulating the extent to which the climate emergency is having an impact on OUV and what actions we can take: not only the impact on the built fabric of the city, but the intangible heritage as well, including the impacts on the resident population.

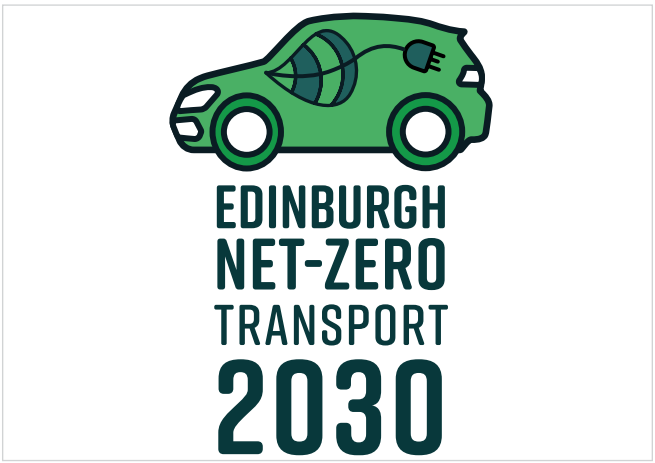
Figure 6.1 Integration with the City of Edinburgh Council and ONTE's key policies © City of Edinburgh Council











As part of the engagement and consultation programme for the ONTE Management Plan 2023+ the methodology has been adapted to consider 'climate' as its own entity, whilst recognising that this is a key thread through all the themes considered important for the effective management of the WH property.

Finally, the draft ONTE Climate Action Plan and the World Heritage Management Plan 2023+ will be used to inform key policies that are being developed by the City of Edinburgh Council. They include the city's 2030 Climate Strategy[2], 2030 City Plan (Edinburgh's new local development plan)[3], and also the city's Business Plan[4] and Mobility Plan 2021-2030[5], which proposes a Low Emission Zone for the city centre – covering a large part of ONTE. This is to ensure the OUV and other Signficant Property Values of ONTE are considered when developing these policies and that they should also contribute to the preservation of the ONTE OUV against the direct and indirect impacts of climate change.

Climate Change Risk Assessment (CCRA)

The CCRA project was supported by the Place-Based Climate Action Network (P-CAN) and the AtlaS World Heritage (AtlaS.WH) project. It aimed to understand and define the challenges posed by climate change to ONTE by extensively engaging with its communities to inform appropriate mitigation/adaption solutions relevant to its international and local values. An extensive bottom-up approach was tested to identify the impacts of climate change on ONTE and its communities, using two climate change risk and vulnerability assessment methodologies, including the application of the CVI process for the first time to a 'urban' WH property. The outcomes included a robust dataset of evidence that informed a draft ONTE Climate Action Plan, a replicable and integrated approach to climate change risk assessment, learnings dissemination and new research opportunities.

6.3 Gaps Identified

i. Research gaps

Whilst the quality of the climate data provided to the workshop participants was praised, it has been recognised that more data, in particular on the local microclimate, would be required to better understand, monitor, and manage the impact of climate change on the property. It has also been recognised that there is a lack of shared data across all sectors on past climate-related incidents in the WH property and their effects on the capacity for the city to thrive, e.g. impacts on outdoors events such as the Festivals, or on cultural venues.

Understanding the impacts of climate change on intangible heritage linked to the WH property OUV such as collective memory, stories, and traditional skills is complex and requires further work. This is because of the inherent complexity of this concept and the fact that the property's Statement of OUV focuses mainly on tangible heritage. As Statements of OUV are currently not subject to periodic review and update, alternative solutions must be found to improve this understanding to help better manage these particular impacts on the property.

Similarly, the assessment of the impact on economic, social, and cultural dependencies upon the WH property has proven to be the most difficult part of the workshop. The size and diversity of the WH property, the fact it is the central part of a capital city and the complexity of an urban environment mean that these dependencies are numerous and sometime difficult to fully comprehend. Research and more data are required to map and evaluate these dependencies so that the impacts of climate change on them can be reassessed in the future – leading to potentially revised results. This includes revisiting previous work to understand what the local community and visitors value about the WH property post Covid-19 pandemic.

Figure 6.2 Integration with the next ONTE Management Plan

Rainwater management is an important issue in the WH property and needs addressing. A surface water management plan is needed to understand surface water flooding risks, define underground drainage capacities, and propose adequate solutions.

Finally, the relationship between the WH property and its natural heritage has been recognised as critical. However, more knowledge is required to understand its value in helping combat and adapt to climate change and in contributing to biodiversity conservation. This knowledge will help better protect and enhance the property's natural heritage.

ii. Policy and guidance gaps

The ONTE WH property is a living, vibrant and constantly evolving capital city centre that fulfils different functions such as in residential, economic, administrative, touristic, and cultural realms.

Managing change and its incremental/cumulative effects over time on buildings, streets, skyline, and views while preserving the key attributes of the OUV within the property is critical but complex.

Strong commercial interests to redevelop premium locations combined with the city's net zero agenda and the drive to upgrade existing buildings to be more energy efficient – the technical, economic, and visual implications of which are yet to be understood and managed – are putting the planning system under pressure. Reviewing existing policies and defining appropriate tools to monitor change in comparison to the situation in 1995, when the property was inscribed, will be critical in mitigating potential impacts across the entire WH property. The net zero agenda is an opportunity to fully recognise and protect the embodied carbon within buildings by informing policies to prevent the demolition of these historic assets.

The effect of the Covid-19 pandemic and its implications in terms of policy at a local and national level are already affecting how the ONTE WH property operates and is being used by residents, visitors, and businesses – particularly the tourism and hospitality sectors. This has led to planning relaxation and is already visible in the commercial areas of the city, and on mobility. Research is required to understand the full implications of the pandemic and its long-term effects on the WH property.

A more sustainable use of the city and its green spaces, as part of post Covid-19 green recovery, would benefit the WH property and its communities. Policies focusing on sustainable use of green spaces and sustainable tourism would support this process.

iii. Management gaps

Climate change is an overarching issue that is impacting a significant number of individuals and organisations across the WH property. To address it, working in partnership with all the property's stakeholders will be essential. Such a collaborative approach will allow the efficient combination of the multiple pieces of knowledge and datasets. For instance, this could inform monitoring of relationships between people and place, within the WH property, as they are being affected by climate change.

The WH property management partners will need to prioritise current and future actions to address the most problematic climate change issues. This process will be supported by the results provided by the CVI workshop and the ONTE CCRA project, and will consider current capacities amongst partners. However, it may be necessary to review the appropriateness of current resources and governance structures to successfully address these issues.

As a living WH property, support to the local communities and grass-roots groups across the property will be essential to ensure they can be fully involved in this process and better cope with future threats and challenges posed by climate change.

6.4 Lessons for other properties and recommendations for Scottish World Heritage properties

The CVI for ONTE was the second CVI workshop after the successful cultural pilot at the Heart of Neolithic Orkney in April 2019[6]. Thanks to a successful application to the Royal Society of Edinburgh for their Arts and Humanities Research Network grants, a project was set up by Historic Environment Scotland and James Cook University to further apply the Climate Vulnerability Index to WH properties in Scotland (2021-3).

The application of the CVI to Edinburgh was the first fully online CVI with two 'control rooms' established: in James Cook University in Townsville, Queensland; and in Historic Environment Scotland in Edinburgh. Due to the time zone differences, the workshops were held over five Scottish mornings across two weeks with the first week (three mornings) focusing on OUV Vulnerability and the second week (two mornings) on Community Vulnerability. Given the complexities of a major urban city, this was not sufficient time to adequately consider the Economic, Social, and Cultural issues and this section was expanded to three half-days for subsequent Scottish workshops (Antonine Wall and St Kilda in 2022).

Variations to the format of the CVI process through the CVI 'Snapshot' and other delivery modes within the CVI spectrum will aid in the management of a variety of sites. A CVI Snapshot application was completed for Scotland's Flow Country in March 2022 to aid with its WH nomination.

Flood mapping of the WH property

Since the CVI workshops in May-June 2021, the City of Edinburgh Council, with funding support from HES and EWH, has embarked on a project to analyse the flood risk for the WH property. This flood risk study aims to further understand the areas in ONTE at risk under current and future (2050) climate conditions in Scotland using hydrological modelling. This will inform management planning for the WH property including, in the long term, a rainwater management strategy, policies, and adaptation works.

In advance of future CVI applications, all available data (e.g. climate data, current impacts, ESC information) should be gathered in order to be presented in an accessible manner to workshop participants.

The values-based, science-driven, and community-focused approach of the CVI application works well within current Scottish Government agendas and is likely to fit well with the forthcoming new *Our Place in Time* Historic Environment Strategy for Scotland (due 2023). The CVI has a valuable role to play in the development of Management Plans for Scotland's WH, ensuring a consistent approach to the impacts of climate change.

6.5 Revisiting the CVI process

The CVI workshop was extremely timely, dovetailing with a review of the ONTE Management Plan and also the concurrent CCRA project. The CCRA project commenced in 2020 in recognition that the management of ONTE must address climate change mitigation and adaptation, and that a 'bottom-up' approach would be a powerful tool to:

+ understand what people value about ONTE
+ understand current issues (and to anticipate future ones)
+ provide robust evidence to support relevant policy proposals
+ engage the ONTE community so they can become part of the solution to climate change issues.

The rapid assessment approach of the CVI means that it can be periodically repeated to determine if changes have occurred to the condition of the values or attributes (and hence to the vulnerability of OUV) and to the community associated with ONTE. It is also recommended that the CVI process be undertaken to enable systematic input into WH Periodic Reports (approximately every six years).

A review of the current ONTE Management Plan is underway. In order to ensure that trends and results are easily comparable, it is recommended that the same or similar CVI methodology be applied in any follow-up climate-related workshops, and prior to the inception of the 2023+ Management Plan review process. Re-assessment may also occur if there is any updated release of climate change projections.

6.6 Future applications

The successful implementation of the CVI process in the context of the Old and New Towns of Edinburgh demonstrates the potential for this tool to be applied to a challenging typology of cultural heritage such as urban WH properties.

Looking at the wider picture and based on its flexible and systematic approach, the CVI process could potentially be applied to other types of designated urban heritage such as Conservation Areas to support adaptation policies and planning.

Due to similarities in climate, the results presented in this report may also be of interest to other WH properties and heritage sites in the UK and Ireland.

Finally, this report will benefit other WH properties worldwide that are considering undertaking a rapid climate change vulnerability assessment to provide evidence and support the management of their property.

Cited references

1 Managing a World Heritage Site (ewh.org.uk)

2 2030 Climate Strategy – The City of Edinburgh Council

3 https://www.edinburgh.gov.uk/downloads/file/29997/proposed-plan-written-statement

4 https://www.edinburgh.gov.uk/downloads/file/24691/council-business-plan-2017-22

5 https://www.edinburgh.gov.uk/downloads/file/29320/city-mobility-plan-2021-2030

6 Day JC, Heron SF, Markham A, Downes J, Gibson J, Hyslop E, Jones RH, Lyall A (2019) Climate risk assessment for Orkney World Heritage: An application of the Climate Vulnerability Index. Historic Environment Scotland, Edinburgh

ACKNOWLEDGEMENTS

Contractors from rope access firm GeoStructural carry out scaling works on Salisbury Crags, Holyrood Park

The organisation and implementation of the CVI workshop for the Old and New Towns of Edinburgh was only possible thanks to the Royal Society of Edinburgh for the award of a Research Network grant (2021-23) for a 'Climate Vulnerability Network to develop our understanding in relation to World Heritage in Scotland'. The applicants for the grant were Rebecca Jones and Ewan Hyslop from Historic Environment Scotland together with Scott Heron from James Cook University.

Many people contributed to the success of the CVI workshop for Edinburgh.

- A Steering Group was established:
  - Scott Heron and Jon Day – the CVI developers from James Cook University
  - Rebecca Jones, Ewan Hyslop, Mairi Davies and David Harkin from Historic Environment Scotland
  - Jenny Bruce, Old and New Towns of Edinburgh World Heritage Co-ordinator from the City of Edinburgh Council/ Historic Environment Scotland
  - Yann Grandgirard from Edinburgh World Heritage
- The four break-out group leaders: Jenny Bruce, Mairi Davies, David Harkin and Yann Grandgirard
- The five note-takers, without whose detailed notes this report would not have been possible: Chujun Yan, Diya Pavithran, Elizabeth Gallagher, Francesca Morri and Shane O'Neill
- Technical support for the Edinburgh control room was provided by Sarah Malikov and Scott Johnson from Mallard Productions
- Technical and logistical support in James Cook University, Townsville, was provided by Riccardo Losciale and Taruna Venkatachalam
- Laura Mackenzie from Historic Environment Scotland provided invaluable administrative support for the workshop, helped by Mike Elliot; she also provided huge support in the production of this report
- All the participants listed in Appendix 4 gave their time and expertise to the workshop, which greatly benefited from the diverse range of perspectives and views about Edinburgh
- Edinburgh World Heritage hosted an online evening event to disseminate the results of the workshop, organised and compered by Nick Hotham
- Kirstie Wright made additions to the climate text in Chapter 4
- The authors thank Michelle Moore from Historic Environment Scotland for copy editing the report.

APPENDICES

Streetlamp at Bute House, Charlotte Square, Official Residence of the First Minister of Scotland

APPENDIX 1

Old and New Towns of Edinburgh World Heritage property: Statement of Outstanding Universal Value
Adopted by UNESCO World Heritage Committee Thirty-seventh session, Phnom Penh, Cambodia, June 2013
http://whc.unesco.org/en/list/728

Date of inscription 1995
Text in **bold** was used to develop the Key Values document.

Brief synthesis

The **remarkable juxtaposition of two clearly articulated urban planning phenomena. The contrast between the organic medieval Old Town and the planned Georgian New Town** of Edinburgh, Scotland, **provides a clarity of urban structure unrivalled in Europe**. The **juxtaposition of these two distinctive townscapes, each of exceptional historic and architectural interest, which are linked across the landscape divide, the 'great arena' of Sir Walter Scott's Waverley Valley, by the urban viaduct, North Bridge, and by the Mound, creates the outstanding urban landscape**.

The Old Town stretches along a high ridge from the Castle on its dramatically situated rock down to the Palace of Holyrood. Its **form reflects the burgage plots of the Canongate, founded as an 'abbatial burgh' dependent on the Abbey of Holyrood, and the national tradition of building tall on the narrow 'tofts' or plots separated by lanes or 'closes', which created some of the world's tallest buildings of their age, the dramatic, robust, and distinctive tenement buildings**. It contains many **16th and 17th century merchants' and nobles' houses such as the early 17th century restored mansion house of Gladstone's Land which rises to six storeys, and important early public buildings such as the Canongate Tolbooth and St Giles' Cathedral.**

The Old Town is characterised by the **survival of the little-altered medieval 'fishbone' street pattern of narrow closes, wynds, and courts leading off the spine formed by the High Street, the broadest, longest street in the Old Town**, with a **sense of enclosed space derived from its width, the height of the buildings lining it, and the small scale of any breaks between them**.

The **New Town, constructed between 1767 and 1890 as a collection of seven new towns on the glacial plain to the north of the Old Town, is framed and articulated by an uncommonly high concentration of planned ensembles of world-class, ashlar-faced, neo-classical buildings, associated with renowned architects**, including John and Robert Adam (1728-92), Sir William Chambers (1723-96), and William Playfair (1790-1857). Contained and **integrated with the townscape are gardens, designed to take full advantage of the topography**, while forming an **extensive system of private and public open spaces**. The New Town is integrated with large green spaces. It covers a very large area of **3,288 ha, is consistent to an unrivalled degree, and survives virtually intact**.

Some of the **finest public and commercial monuments of the New-classical revival in Europe** survive in the city, reflecting its continuing status as the **capital of Scotland since 1437**, and a **major centre of thought and learning in the 18th century Age of Enlightenment**, with its **close cultural and political links with mainland Europe**.

The successive planned **extensions from the first New Town**, and the **high quality of the architecture, set standards for Scotland and beyond**, and **exerted a major influence on the development of urban architecture and town planning throughout Europe**.

The **dramatic topography of the Old Town** combined with the **planned alignments of key buildings in both the Old and the New Town**, results in **spectacular views and panoramas** and an **iconic skyline**.

The **renewal and revival of the Old Town in the late 19th century**, and the **adaptation of the distinctive Baronial style of building for use in an urban environment, influenced the development of conservation policies for urban environments**.

Criterion (ii): The s**uccessive planned extensions of the New Town**, and the **high quality of its architecture, set standards for Scotland and beyond**, and **exerted a major influence on the development of urban architecture and town planning throughout Europe, in the 18th and 19th centuries**.

Criterion (iv): The Old and New Towns together form a **dramatic reflection of significant changes in European urban planning, from the inward looking, defensive walled medieval city of royal palaces, abbeys, and organically developed burgage plots in the Old Town, through the expansive formal Enlightenment planning of the 18th and 19th centuries in the New Town, to the 19th century rediscovery and revival of the Old Town with its adaptation of a distinctive Baronial style of architecture in an urban setting**.

Integrity

The property encompasses **significant town-planning components, including layout, buildings, open spaces, and views, that demonstrate the distinctiveness between the organic growth of the Old Town and the planned terraces and squares of the New Town with the wide landscaped valley between**. Overall, the property forms a **remarkably consistent and coherent entity** which has **developed and adapted over time**. It has largely **preserved its skyline and extensive views** in and out of the property, although **as with any modern, living city these have altered and developed over time**, while **preserving the key attributes of Outstanding Universal Value** within the property. The vulnerability of the skyline and the views in and out of the property has been addressed by the introduction of a **Skyline Policy**.

Authenticity

The level of authenticity in Edinburgh is high. Individually the **high-quality buildings** of all dates have been **conserved to a high standard** and the **layout of streets and squares maintain their intactness**. The property also continues to retain its **historic role as the administrative and cultural capital of Scotland**, while remaining a v**ibrant economic centre**.

Protection and management requirements

World Heritage properties in Scotland are protected through the following legislation: The Town and Country Planning (Scotland) Act 1997 and The Planning etc. (Scotland) Act 2006 provide a framework for local and regional planning policy and act as the principal primary legislation guiding planning and development in Scotland. Additionally, individual buildings, monuments, and areas of special archaeological or historic interest are designated and protected under The Planning (Listed Building and Conservation Areas) (Scotland) Act 1997 and the 1979 Ancient Monuments and Archaeological Areas Act. The **Old Town, New Town, Dean Village, and West End Conservation Areas** provide adequate protection by covering the majority of the World Heritage property, whilst around **75% of buildings within the property are category A, B or C listed buildings**.

The Scottish Historic Environment Policy (SHEP) is the primary policy guidance on the protection and management of the historic environment in Scotland. Scottish Planning Policy (SPP) sits alongside the SHEP and includes the Government's national planning policy on the historic environment. It provides for the protection of World Heritage properties by considering the impact of development on the Outstanding Universal Value, authenticity, and integrity. Local policies specifically protecting the property are contained within The **City of Edinburgh Local Plan** and cite the Management Plan as a material consideration for decisions on planning matters. The immediate setting of the property is protected by a **Skyline Policy** that has been adopted by City of Edinburgh Council. This defines key views across the city with the aim of providing planning control that will safeguard them. This control of tall buildings that might impact on the city centre provides appropriate protection to the setting of the property, safeguarding its **world-renowned silhouette** and views from the property outwards to such **crucial topographic features as Arthur's Seat and the Firth of Forth**. The Skyline policy, combined with existing listed buildings and conservation area designations, provides a

comprehensive and sophisticated tool to protect the Outstanding Universal Value of the property. This method of protection is being monitored on an ongoing basis.

Management of the property is indirectly influenced by a large number of organisations, communities, and interest groups. The Management Plan was the subject of detailed stakeholder engagement, the results of which informed its vision, objectives, and actions.

The property is a **living capital city centre**. It has a rich cultural and intellectual life, which is part of its Outstanding Universal Value, and which is vital to sustain. This rich cultural life, in such a magnificent setting, attracts tourists in great numbers. An **Edinburgh Tourism Strategy** acknowledges the value of World Heritage status in its **strategic priorities for managing a world class city**.

Historic Environment Scotland and the City of Edinburgh Council work closely on the management of the property. Edinburgh World Heritage was established by the City of Edinburgh Council and Historic Environment Scotland through a merger between the Edinburgh New Town Conservation Committee and the Edinburgh Old Town Renewal Trust. Its role includes promoting the property, grant dispersal, and community engagement across the property. It is also a key partner in the execution of the Management Plan. The World Heritage Site Co-ordinator is responsible for coordinating the implementation of the Management Plan.

APPENDIX 2

The Climate Vulnerability Index (CVI) process for the Old and New Towns of Edinburgh

The CVI Workshop for the Old and New Towns of Edinburgh was the first time that the full process, as outlined in the CVI reports for Orkney and the Wadden Sea (Day *et al.* 2019[1], Heron *et al*. 2020[2]), was undertaken as an online workshop, due to travel restrictions related to the Covid-19 pandemic. The workshop was conducted over five sessions, spread across two consecutive weeks, with each session approximately four hours in duration. As had been undertaken for the second phase of the Wadden Sea CVI application (assessing the Community Vulnerability), the workshop was conducted using the Zoom platform. This platform enabled plenary and breakout sessions to be conducted within a single video-conference event (Figure A2.1). Inputs from breakout groups were collected via Google Sheets. Workshop registration prior to, surveys conducted as part of the process during, and participant feedback following the workshop were undertaken using Google Forms. Whilst not able to undertake a familiarisation tour of the ONTE property prior to the workshop, the CVI developers were able to subsequently visit the property to get a first-hand understanding of the property values and potential impacts of climate change (Figure A2.2).

Cited references

1 Day JC, Heron SF, Markham A, Downes J, Gibson J, Hyslop E, Jones RH, Lyall A (2019) Climate risk assessment for Orkney World Heritage: An application of the Climate Vulnerability Index. Historic Environment Scotland, Edinburgh

2 Heron SF, Day JC, Zijlstra R, Engels B, Weber A, Marencic H and Busch JA (2020) Workshop report: Climate Risk Assessment for Wadden Sea World Heritage property. Application of the Climate Vulnerability Index – Outstanding Universal Value (OUV) Vulnerability. Common Wadden Sea Secretariat, Wilhelmshaven, Germany

Figure A2.1 Some of the participants in the online ONTE workshop

Figure A2.2 Jon Day and Scott Heron, together with Cathy Day (left) visiting Edinburgh Castle in April 2022 © Rebecca Jones

APPENDIX 3

Outline of the CVI workshop schedule, 25-27 May and 1-2 June 2021

Tuesday 25 May
08:30-12:30

1 Overview of workshop aims, introductions, use of plenary and small-group sessions, logistics, Zoom workshop etiquette
2 Introduction to the Climate Change Risk Assessment (CCRA) project

AIM 1: Understand the Climate Vulnerability Index (CVI) framework and its application in the Old and New Towns of Edinburgh

3 Overview of the CVI process

AIM 2: Understand the significant values that comprise the OUV for ONTE; and assess condition and trend. Discuss other significant values (i.e. Significant Property Values, SPVs / attributes)

4 Ensure all participants are aware of the Statement of OUV for Edinburgh and how the table of key values was derived
5 High level assessment current condition and recent trends
6 Other values (Significant Property Values – SPVs)

Wednesday 26 May
08:30-12:30
AIM 3: Understand future climate change scenarios facing ONTE

7 Overview of climate change projections for ONTE; Timeframe for the assessment

AIM 4: Assess the climate stressors impacting the values of ONTE and select key climate stressors

8 Presentation of climate stressors and discussion of top three impacting the key values of the OUV of Edinburgh

Thursday 27 May
08:30-12:30
AIM 5: Evaluate vulnerability of OUV to key climate stressors, considering exposure, sensitivity and adaptive capacity for a selected climate scenario (e.g. 'Business as Usual' or 'Paris Agreement').

9 Discuss processes for exposure and consider the term and modifiers for each of the three key climate stressors
10 Discuss sensitivity and review potential impact matrix combining sensitivity with exposure; Discuss adaptive capacity and review OUV Vulnerability matrix combining this with potential impact
11 Discuss OUV vulnerability

Tuesday 1 June
08:30-12:30
AIM 6: Consider economic, social, and cultural dependencies (sensitivity) and adaptive capacity, to determine Community Vulnerability

12 Present analysis of economic, social, and cultural (ESC) dependency
13 Discuss economic dependency and adaptive capacity
14 Discuss social and cultural dependency and adaptive capacity
15 Discuss community vulnerability

Wednesday 2 June
08:30-12:30
AIM 7: Summary, feedback, and next steps

16 Summarise outcomes from the workshop, following final analysis worksheet
17 Recap on those items that had been 'parked' during the workshop
18 Conduct workshop evaluations; other feedback from participants

APPENDIX 4

List of participants in the CVI workshop (not all were able to attend all five online sessions)

Name	Role	Organisation
Ailsa Macfarlane	Director	Built Environment Forum Scotland (BEFS)
Alda Bessa		Município do Porto Departamento Municipal de Gestão Cultural
Alena Katushkina	Climate Change Officer	Edinburgh World Heritage
Alice Lyall	Heart of Neolithic Orkney World Heritage Coordinator	Historic Environment Scotland
Andrea Nicholas	Chief Executive, Green Tourism	Edinburgh Tourism Action Group
Benjamin Carey	Managing Director	Carey Tourism
Bob Hodgart	Representative	Southside Community Council
Caroline Peacock	Biodiversity Officer	City of Edinburgh Council
Caroline Stenhouse	Edinburgh Castle Admissions Operations Manager	Historic Environment Scotland
Carsten Hermann	Tier 1 Compliance Manager, Conservation, Technical Research	Historic Environment Scotland
Catriona Patterson	Programme Lead, Transformation of Culture	Creative Carbon Scotland
Christina McCallum	Green Spaces Project Development Officer	City of Edinburgh Council
Christina Sinclair	Director	Edinburgh World Heritage
Chujun Yan	Architectural Conservation Master Student	University of Edinburgh
David Harkin*	Climate Change Scientist	Historic Environment Scotland
Diya Pavithran	Architectural Conservation Master Student	University of Edinburgh
Elizabeth Gallagher	Carbon Management Master Student	University of Edinburgh
Elizabeth Vander Meer	Research & Policy Manager (Climate Change and Biodiversity)	University of Edinburgh
Ellie Murtagh	Climate Adaptation Services Specialist	Sniffer
Ewan Hyslop*	Head of Technical Research and Science	Historic Environment Scotland
Fiona MacDonald	Conservation Architect and Grants Manager	Edinburgh World Heritage
Fiona MacLeod	Senior Policy and Insight Officer	City of Edinburgh Council and Edinburgh Adapts
Fiona Rankin	World Heritage Site Project Manager	Edinburgh World Heritage
Francesca Morri	Heritage Graduate Trainee Officer	Historic Environment Scotland
Hazel Johnson	Policy & Strategy Manager	Built Environment Forum Scotland (BEFS)

* member of Steering Committee

Name	Role	Organisation
Ian Baxter	Professor of Historic Environment Management	Heriot-Watt University
Isabel Thom	Representative	West End Community Council
James Paterson	Programme Director for Carbon Management, School of GeoSciences	University of Edinburgh
Jenny Bruce*	ONTE World Heritage Coordinator	City of Edinburgh Council and Historic Environment Scotland
Jocelyn Cunliffe	Vice President	The Architectural Heritage Society of Scotland (AHSS)
John Lawson	Curator of Archaeology	City of Edinburgh Council
Jon Day*	CVI Developer; Adjunct Senior Research Fellow; a former Director with the Great Barrier Reef Marine Park Authority (now retired)	James Cook University, Australia
Julie Waldron	Senior Landscape Planner	City of Edinburgh Council
Kate Crowley	Co-Director of Edinburgh Climate Change Institute; Lecturer in Climate Risk and Resilience; Deputy Programme Director for MSc in Carbon Management, School of GeoSciences	University of Edinburgh
Mairi Davies*	Climate Policy Manager	Historic Environment Scotland
Patricia Weeks	Antonine Wall World Heritage Coordinator	Historic Environment Scotland
Paula Ward	Regional Leadership Director	VisitScotland
Paula Whitelaw	Senior Heritage Planner	The National Trust for Scotland
Rebecca Burnett	Business Growth Talent Development and Lead	City of Edinburgh Council
Rebecca Jones*	Head of Archaeology and World Heritage	Historic Environment Scotland
Scott Heron*	CVI Developer; Associate Professor	James Cook University, Australia
Shane O'Neill	Carbon Management Master Student	University of Edinburgh
Simon Holledge	Representative	New Town and Broughton Community Council
Terry Levinthal	Director	Cockburn Association
Tony Crouch	World Heritage Manager for the City of Bath	Bath and North East Somerset Council
Yann Grandgirard*	Climate Change Manager	Edinburgh World Heritage

* member of Steering Committee

APPENDIX 5

List of other Significant Property Values (SPVs) that are locally, regionally, or nationally significant for ONTE

Broad groupings of values	Key values	Additional justification – Why is the value significant? Nationally, regionally, or locally?
Intangible	Histories & Stories	History – what came before and how it influences today The embodiment of national history and local stories – *Nationally, regionally, and locally*
	Legends	*Nationally, regionally, and locally*
	Local Folklore	*Locally*
	Local Culture	*Locally*
	Old Reekie	Old nickname for Edinburgh – *Nationally, regionally, and locally*
	Pride and Patriotic feelings	*Nationally, regionally, and locally*
	Smell and sounds	The typical smell when you arrive in Edinburgh, the smell of the breweries – *locally*
	Continuity of town planning expertise and management of conservation	*Nationally, regionally, and locally*
	Individual memories and experiences	*Nationally, regionally, and locally*
	Art	Art in the public realm Street art and culture – *Nationally, regionally, and locally*
	Literature tradition	UNESCO City of Literature *Nationally, regionally, and locally*
	Symbol of Scotland	*Nationally, regionally, and locally*
	Church of Scotland	Site of the Disruption of the Church of Scotland in 1843 – *Nationally, regionally, and locally*
	Sense of identity	*Locally*
	Sense(s) of Scottish, British, and European identity	The OT and NT are inseparably linked to one's or our understanding and engagement with Scottish history, culture, literature, politics, and our sense(s) of Scottish, British, and European identity, which are diverse – *Nationally, regionally, and locally*
Social	Quality of life	*Locally*
	Wellbeing	*Locally*
	Public services	Schools, living, jobs, shops – *locally*
	Multicultural nature of the city	*Nationally, regionally, and locally*
	Welcoming and friendly city	*Nationally, regionally, and locally*
	Safe city	*Locally*
	Social link between the place and residents	Linked to memory (childhood, family, and friends) – *Locally*

Broad groupings of values	Key values	Additional justification – Why is the value significant? Nationally, regionally, or locally?
Social	Social link between the place and visitors; visitor experience	*Nationally, regionally, and locally*
	Stronger emphasis on 'living city'	*Locally*
	20min neighbourhoods (reality and potential)	*Locally*
	Quality of public realm	Referring to active travel of all kinds. – *Locally*
	Many religions	*Nationally, regionally, and locally*
	Health and wellbeing value of gardens/green spaces	Demonstrated by the inception of the festivals which continues today to demonstrate Edinburgh's outward facing profile – *Nationally, regionally, and locally*
	Good places/Placemaking	Spaces important for culture, accessibility and inclusiveness, community, living, wellbeing, history, and education – *Locally*
	Neighbourhood design	Individual neighbourhoods that connect well together – *Locally*
	Social inclusion and diversity support	*Locally*
	Locality vs 'national agenda' / Local focus vs Central Place	Economic driver for Scotland vs localised neighbourhood support (challenge in integration and emphasis) – *Nationally, regionally, and locally*
	Community space	*Locally*
	Experience of nature in the city	Edinburgh: the city with birdsong and greenery; connection to nature in every district – *Locally*
Heritage Practice (Conservation/ Skills/ Social / Wellbeing/ Tourism)	Traditional skills and trade	The historic built environment reflects and is the reason for the perpetuation of traditional skills and trades (stonemasons, joiners, plasters, etc)
	Urban planning and building construction	20th century urban planning and building construction in the World Heritage site
	Maintenance	Considered as a strategic objective of the management of the values of the site
	Multicultural nature of the city	New people and students living in the city – *Nationally, regionally, and locally*
	Many religions	*Nationally, regionally, and locally*
	'Communal heritage value' definition	The meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory
	Streetscape	Management by public authorities on interventions (temporary and permanent)

Broad groupings of values	Key values	Additional justification – Why is the value significant? Nationally, regionally, or locally?
Heritage Practice (Conservation/ Skills/ Social / Wellbeing/ Tourism)	Stronger emphasis on 'living city'	
	Intellectual/ Engagement with past	Stimulates discussion and engages us with our past e.g. Black History Matters (to some extent associated with OUV e.g. monuments)
	Role in addressing climate emergency	Biodiversity, local level adaptation
	Making environmental change tangible	Experience of climate impacts and resulting narratives
	Investment potential	as property owner within WH area
	Education and Academia	*Nationally, regionally, and locally* Academic centres of excellence World leading status in a range of fields University city – with people from around the world studying and living here
	Victorian city development	
	Meritocracy	City of meritocracy in the 19th century
	Links between culture and heritage	
	Design elegance in New Town	
	Community space	
	Neighbourhood design	Individual neighbourhoods that connect well together
	Valley of the Water of Leith	The buildings that are now the Galleries of Modern Art 1 & 2 and the whole Dean Village Conservation Area plus Donaldson Hospital site (not just OT and NT)
	Hospitality / tourism	(Better support / involvement / education of businesses in carbon reduction and impacts of climate change); (Over-tourism / need to limit numbers / seasonality balance)
Archaeological	History and hidden histories	Importance of excavation in advance of any developments – *Nationally, regionally, and locally* Over 8,000 years of evidence for human settlement
Economic	Financial/business and economic opportunities	Centre for financial industries – *Nationally, regionally, and locally* International business and conference destination
	20min neighbourhoods (reality and potential)	*Locally*
	Commercial and employment opportunities	Commercial and employment opportunities make Edinburgh a thriving living city – *Nationally, regionally, and locally*
	Investment potential	For property owner within WH area – *Locally*
	Local businesses	Neighbourhood diversity of local businesses including history and heritage and eclectic) – *Locally*

Broad groupings of values	Key values	Additional justification – Why is the value significant? Nationally, regionally, or locally?
Scenery/ Landscape and Seascape (Aesthetics and Experience)	Aesthetic and sense of calm of gardens	*Locally*
	Aesthetic value of places	Feelings evoked by historic sites (awe, etc) – *Nationally, regionally, and locally*
	Atmosphere	How specific areas make us feel e.g. a sense of calm through quiet/ beautiful places
	Emotional response to aesthetic	
	Beauty	
	Topography of the seven hills	
	Design elegance in New Town	
	Continuous change of views	The continuous change of view distance from short to long views to the coast, always changing unlike a flat landscape/townscape
Natural systems	Biodiversity	Value of gardens and green spaces Quality of life
	Role in addressing climate emergency	Biodiversity, local level adaptation
	Making environmental change tangible	Experience of climate impacts and resulting narratives
	GeoHeritage	
	Natural capital	Supports health and wellbeing – quality of life Connection between green spaces and off-road options for walking
Recreational	Festival City – Festivals and events	*Nationally, regionally, and locally*
	Experience of nature in the city	Edinburgh: the city with birdsong and greenery
	Outdoor and Play	Promotion of outdoor activities, play landscapes, mental wellbeing – *Locally*

APPENDIX 6

Acronyms

AtlaS.WH	Heritage in the Atlantic Area: Sustainability of the Urban World Heritage Sites
CCRA	Climate Change Risk Assessment
CEC	City of Edinburgh Council
CVI	Climate Vulnerability Index
ESC	Economic, Social and Cultural
EWH	Edinburgh World Heritage
Fintec	Financial technology
HES	Historic Environment Scotland
HONO	Heart of Neolithic Orkney
NHS	National Health Service
ICOMOS	International Council on Monuments and Sites
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
JCU	James Cook University
ONTE	Old and New Towns of Edinburgh
OUV	Outstanding Universal Value
P-CAN	Place-based Climate Action Network
RCP	Representative Concentration Pathway
RSE	Royal Society of Edinburgh
SOUV	Statement of Outstanding Universal Value
SPV	Significant Property Values
UNESCO	United Nations Educational, Scientific & Cultural Organization
WH	World Heritage

Glossary

Burgh	A town with special privileges conferred by charter and with a town council to run its affairs
Close	An alleyway leading off a main thoroughfare and usually private or a dead end
Tenement	A large building containing a number of rooms or flats, access to which is usually gained via a common stairway
Tolbooth	A building serving as a centre of local burgh administration, justice, and ceremony
Wynd	A narrow strip of land between houses leading off a main thoroughfare

CVI

HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA

JAMES COOK UNIVERSITY AUSTRALIA

EDINBVRGH THE CITY OF EDINBURGH COUNCIL

EDINBURGH WORLD HERITAGE

RSE The Royal Society of Edinburgh KNOWLEDGE MADE USEFUL

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Old and New Towns of Edinburgh Inscribed on the World Heritage List in 1995

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Longmore House
Salisbury Place
Edinburgh EH9 1SH

0131 668 8600

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