

REPAIRS TO THE OLD ENGLISH GARDEN AT ELVASTON CASTLE COUNTRY PARK:

DESIGN, ACCESS & HERITAGE STATEMENT



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Conservation, Heritage and Design Service

Place

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- 1.1 The 'Old English Garden' forms part of a Grade II listed building, comprising two large rectangular walled gardens within the grounds of Elvaston Castle County Park. The location of the 'Old English Garden' garden is shown on the accompanying plan (P06/F/01) and on the adjacent page. The condition of the north wall has deteriorated more significantly over recent years to a point where it has become dangerous and it is at the risk of collapse, following an assessment made by a structural engineer. Derbyshire County Council (DCC) has secured the funding necessary to undertake repairs to this section of wall. Subject to the obtaining listed building consent it is anticipated that the repairs will be undertaken by the end of 2022.
- 1.2 In order to fully understand the extent of the proposed repairs it is important that this document is read in conjunction with the following documentation, submitted as part of the Listed Building Consent application:
- P06/F/01 Site Location Plan
 - P06/F/02 Site Plan
 - P06/F/03 Existing Elevations
 - P06/F/04 Proposed Elevations
 - P06/F/05 General Arrangement Plan
 - P06/F/06 Proposed GA Elevations - Sheet 01
 - P06/F/07 Proposed GA Elevations - Sheet 02
 - P06/F/08 Existing Gated Opening
 - P06/F/09 Proposed Gated Opening
 - P06/F/10 Existing Wall Construction - Sheet 01
 - P06/F/11 Existing Wall Construction - Sheet 02
 - Archaeological Recording of the North Wall (July 2021)



Fig. 1 (top): Location plan to illustrate the existing access arrangement for the listed structure via foot from the from the north, via the principal Visitor Car Park, or from the west, via the Park Reception building.

Fig. 2 (bottom): Enlarged aerial view to indicate the location of the 'Old English Garden' (light blue dashed boundary) forming part of the listed building 'The Nursery Garden & Attached Outbuildings' (red dashed boundary).



- 2.1 The proposals for the repair of the historic structure are to be achieved, on the whole, on a like-for-like basis. Therefore, this means that all elements of the design, including materials, appearance, layout, scale and landscaping associated with the listed structure will not be altered. Similarly, any existing access points will not be impacted on following the repairs.
- 2.2 The plan below (Fig. 3) shows the general layout of the 'Old English Garden'. The principle pedestrian visitor access point to the garden is located through an existing gated opening on the north wall (position A). There are various other existing access points within the walled structure as indicated on the plan (B-E) although these are generally used for maintenance purposes only. General views of and around the site are illustrated through Figures 4-9 with position identified on the plan below.

Fig. 3: General layout of the Old English Garden

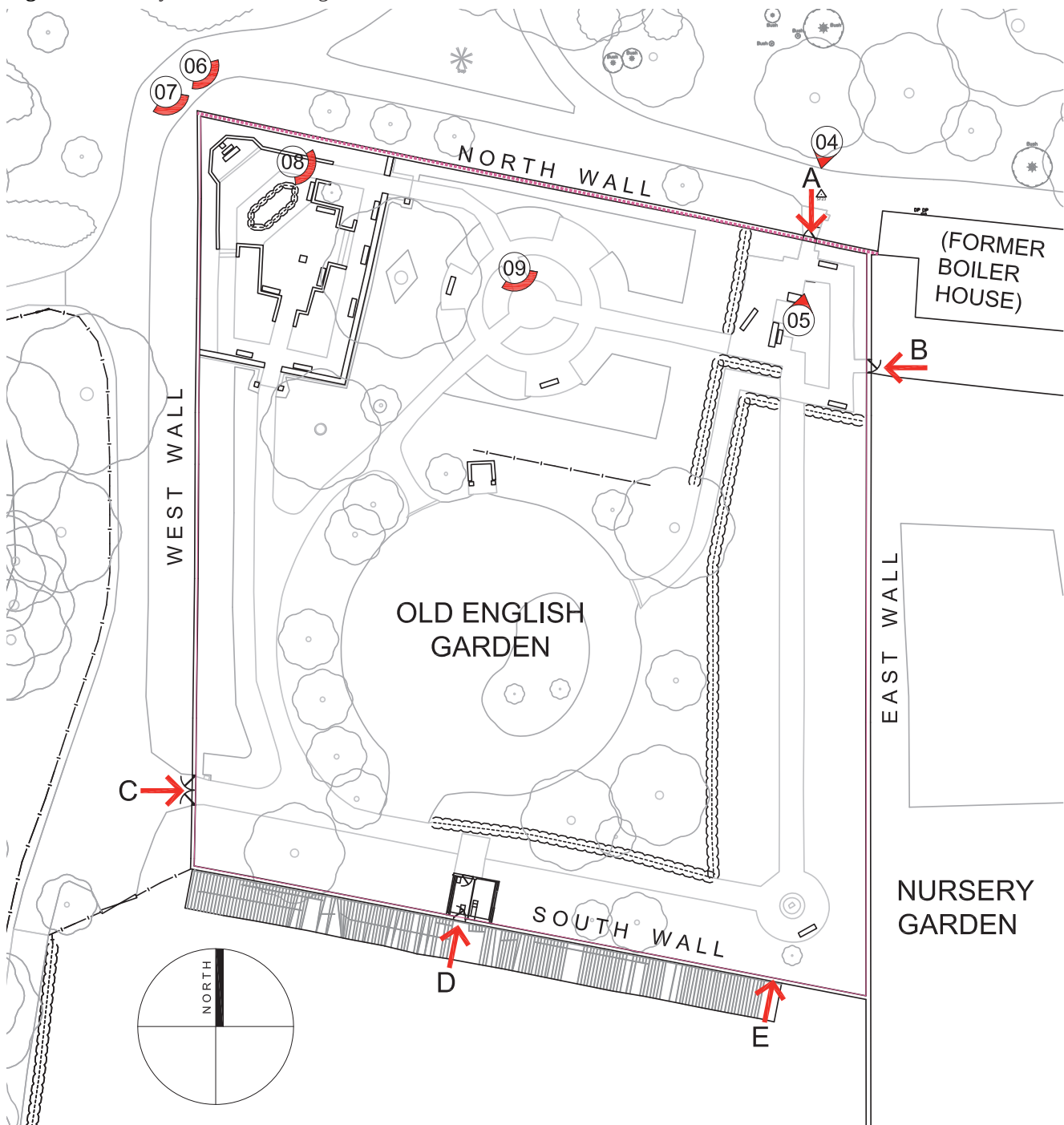




Fig. 4: Visitor entrance from north side (exterior) of the former heated garden wall; to be rebuilt to the same size.



Fig. 5: Entrance from south side (interior) of the wall; the double gate arrangement is to be replaced with a single gate.



Fig. 6 (above): Panoramic view of north elevation of the heated wall; note the large format bricks used in comparison to those shown on; **Fig. 7 (below):** Panoramic view of west elevation of the former heated garden wall





Fig. 7: Panoramic view of south elevation of the heated wall (facing east); note the poor condition of the wall with multiple missing areas of brickwork. The wall is to be rebuilt along its entire length to the same height, proportions & materials.



Fig. 8 (above): Panoramic view of south elevation of the heated wall (facing west); note the presence of further areas of missing and badly eroded bricks along its length.

Fig. 9 (below): Panoramic view of the interior of the 'Old English Garden' (facing south east); the garden was once a productive garden, growing produce for the house, but it was remodelled during the 1970's as a decorative garden.



- 3.1 This Heritage Statement (HS) has been prepared in accordance with the guidance set out by Historic England (HE) in their Advice Note 12 '*Statements of Significance*'¹. The purpose of this HS is to provide an understanding of the significance of the 'Nursery Garden Walls and Attached Outbuildings at Elvaston Castle', a Grade II listed building, in consideration towards the proposed works that are being applied for as part of a listed building consent application. It also is intended to help satisfy the requirement set out in paragraphs 189 & 190 of the National Planning Policy Framework (NPPF):

'189. In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes, or has the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.'

'190. Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this into account when considering the impact of a proposal on a heritage asset, to avoid or minimise any conflict between the heritage asset's conservation and any aspect of the proposal.'²

- 3.2 As further details in this report make it clear, the condition of the north wall to the Old English Garden is such that it needs to be taken down and rebuilt. This has been assessed by a suitably qualified structural engineer and is considered to be the only viable option to ensure its long term future but also to ensure that it does not pose a risk to visitors and staff. The intention is that the work will be carried out in a like-for-like way in so far as is practicably achievable.
- 3.3 Designation records show that the walled structure to be repaired is part of a Grade II listed building; HE LEN# 1096400 (refer to Listed Building Card; Appendix I). This listed building gardens fall within the curtilage of Elvaston Castle, the main house, which is Grade II* listed (HE LEN# 1334604).
- 3.4 Elvaston Castle Country Park, Derbyshire, is a Grade II* Registered Park and Garden which encompasses 321 (130 ha) acres of open parkland, woodland and more formal historical gardens which dates from the early 19th century. There are also numerous Grade II listed buildings and curtilage listed structures within the estate but given the

1 Anon. (HE, 2019), *Statements of Heritage Significance: Analysing Significance in Heritage Assets*, available to view at: <https://historicengland.org.uk/images-books/publications/statements-heritage-significance-advice-note-12/heag279-statements-heritage-significance>, URL accessed 21.06.21.

2 Anon. (DCLG, July 2018), *The National Planning Policy Framework*, available to view at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf, URL accessed 21.06.21, p55.

localised scope of the proposed work these have not been individually identified as the work will not impact on their setting.

- 3.5 A search of the Derbyshire Historic Environment Record (HER) was undertaken but the results did not include anything of relevance to the proposed works (see Appendix II). Neither was there any records to suggest that site is of potential archaeological interest.
- 3.6 Similar repairs were carried to the east walled garden, known as the ‘Nursery Garden’, in two phases during 2010 and then 2018. Ground investigation works carried out were recorded as part of the listed building consent submission and these did not reveal any archaeological evidence beyond what related to the construction of the wall. Further trial holes were undertaken to inform the structural report and recommendations as part of this application; the results of this exercise have been recoded in page 7 of the Structural Report prepared by Ward Cole (Appendix III) and also in the Archaeological Recording of the North Wall (submitted separately to this document). The work was undertaken under a suitable archaeological watching brief but once more this did not reveal any archaeological evidence. It is therefore anticipated that the archaeological potential in the area concerning the repairs is also likely to be limited.
- 3.7 Numerous planning and/or listed building consent applications have been made for other buildings and structures within the Elvaston Castle Country Park estate over recent years. However, there are no known extant applications which apply to the listed walled gardens. Preliminary advice was provided by SDDCs Conservation Officer, James Bate, on June 17th 2021 during a site visit. While the proposed works were supported in principle the officer advised that:
- Listed building consent would be required for the work due to the extent of demolition and rebuilding likely to be required,
 - A Heritage Statement should form part of the submission in conjunction with any relevant plans and photographs, and,
 - Prior to undertaking the works a clear methodology should be agreed.
- 3.8 The methodology for the assessment of the significance of the Grotto has generally been undertaken in accordance with the guidance set out in HE’s *Conservation Principles*³ in a manner proportionate to the scope of work to be undertaken. This has been important to sufficiently appreciate and articulate the potential impact of the works which has comprised of the following actions:
- Site visits and photographic survey of the heritage site (recorded separately in the Archaeological Recording of the North Wall),
 - Desk-based research of existing available literature,
 - Analysis of historic maps,
 - Historic books, newspaper articles, magazines & journals, and
 - Consultation/discussions with relevant historical societies & amenity groups; Elvaston Castle Gardens Trust, The Friends of Elvaston, etc.

3 Anon. (HE, 2008), *Conservation Principles, Policies and Guidance*, available to view at; <https://historicengland.org.uk/images-books/publications/conservation-principles-sustainable-management-historic-environment/>, URL accessed: 21.07.2021.

4.1 Form, History and Setting

- 4.1.1 The ‘Nursery Garden Walls and Attached Outbuildings at Elvaston Castle’ was listed on 11th March 1987. The list description for the walled gardens is as follows:

‘Kitchen garden walls and attached outbuildings. Late C18 and mid C19. Built for the Earl of Harrington. Red brick with brick and stone dressings, and slate roofs to outbuildings. Two large rectangles of walls, both approximately 12 feet high with late C18 walls to east plus outbuildings attached to north wall, and mid C19 walls to west. Mid C19 walls are partly of metric sized bricks and are hollow to allow hot air to be pumped through. West wall has a C20 opening with wrought iron gates. C18 walls have flat stone copings. The outbuildings to north have a two storey part to east, with central panelled door below plain stone lintel and a 2-light window below similar lintel to east, plus canted bay window to west. Above there are three 2-light horizontal sliding glazing bar sashes below segment heads. Central part is single storey with plank doors and lapped glass windows below plain stone lintels and to west there is a tall tower-like structure with single pitched roof, also with lapped glass window and plank door.’⁴

- 4.1.2 The listed building essentially comprises two adjoining walled structures which are believed to have been built during the late 18th and mid-19th centuries. A larger walled garden, known as the ‘Nursery Garden’, is located on the east side, whilst the smaller ‘Old English Garden’ (OEG) is located on the west. As the proposed repairs relate to the OEG, the location within the Elvaston Estate, it is shown on the accompanying site location plan; drawing reference P06/F/01.
- 4.1.3 The east and west walls of the OEG wall structure are a of a simple free-standing brick construction of approximately 3.5-4.0m in height with a thickness of one-and-a-half bricks or approximately 330mm. However, the north and south walls are more unusual in their construction and materials. On close inspection they are more distinct and unique in form and appearance.
- 4.1.4 This is because the walls are built using large format clay bricks, of several variations, to create walls of a greater thickness; measuring approximately 475mm. Further, the walls include a substantial cavity to allow them to once have functioned as heated walls. From the evidence available it appears that they were heated by means of cast iron pipes fed from two separate boiler houses.
- 4.1.5 The south wall features a smaller ‘boiler house’ and dilapidated glasshouses but as the repairs are beyond the scope of this report it is not known if the construction of the wall is identical. The former boiler house for the north wall

4 Anon. (HE), *Nursery Garden Walls and Attached Outbuildings at Elvaston Castle*, List entry number 1096400, available to view at: <https://www.historicengland.org.uk/listing/the-list/list-entry/1096400> , URL accessed 21.07.2021..

is a much taller structure (Fig. 12), and it is thought that this would also have supplied heat to the glasshouses in the adjacent walled garden. Evidence also survives to indicate that the north wall also featured glazed lean-to structures along its length which has long since been removed (Fig's 10 & 11).

- 4.1.6 Preliminary investigations were undertaken without damaging the listed wall by inspecting a number of existing holes present on the south side of the wall (Fig's 13-15). This allowed additional observations to be made, through the use of hand-held camera equipment, and measurements. Drawings P06/F/10 & 11 were subsequently produced to help illustrate the findings of this investigation. The results have also been included in the separate Archaeological Recording of The North Wall.

Clockwise from top:

Fig. 10: Evidence of historic glasshouse structures is visible in the north east corner; note the diagonal line of whitewash depicts where this would have abutted the east wall. Further white wash is also visible on the internal facing elevation of the north wall.

Fig. 11 A number of truncated rafters are visible along the south side of the wall; these presumably formed the roof structure to the historic glasshouse structure.

Fig. 12: The tall boiler house, located close to the visitor entrance, is thought to have fed the heated wall on the north side of the walled garden. The south wall was fed by a separate boiler house.





Fig. 13 (top): A substantial existing hole, of approx half a metre in length and 1-2 courses in depth, within the wall at a low level was sufficient to permit a camera to be inserted by hand to inspect its internal construction. The cast-iron heating pipe, running horizontally, is just visible at the bottom of the opening.



Fig. 14: Longitudinal failures of the brick units, such as those pictured here, are unfortunately very common along the south wall. This type of failure is thought to have been caused by frost damage and possibly by the expanding corroded circular ‘ties’ which are also visible on the picture. This type of failure, however, has allowed the identification and measurement of a number of the brick types present in the wall.



Fig. 15: A further, existing, hole in the wall approximately 1.8m above ground level where the inner face of the cavity wall is visible. A double-frogged brick is clearly visible, a type which appear to have been used exclusively within the interior wall.



CCW from top: Fig. 16: The OEG dug over (08.02.1983) in preparation for planting. Although later than the 1970's restoration this shows that the garden has been remodelled substantially over recent years. **Fig. 17:** Aerial photo (c1989) of both walled gardens illustrating the established remodelled garden layout. **Fig. 18:** Elevated view of a raised walled enclosure within the OEG (11.06.1985) believed to have been created during the 1970's restoration scheme. **Fig. 19:** Detail of the modern wall and decorative steel railing panel (June 1985). **Fig. 20:** View of the decorative steel gate thought to have been installed as part of the 1970's restoration scheme (c1980's).



- 4.1.7 The listed building, or walled garden, is not necessarily considered to be a picturesque feature of the remnant gothic fantasy landscape; relative to the other and more decorative garden structures created by the hand of Barron. Notwithstanding the fact that it is an intrinsically important part of the overall significance of estate, its setting is fairly contained within the immediate vicinity. In a relatively secluded location, surrounded by mature trees and vegetation, this utilitarian structure was originally an area for plants under glass within which fruit, vegetables and exotic plants were grown for the Stanhope family. During the 1970's the OEG was redesigned⁵, and while no images could be found of this date others exist from a similar time to show that it has probably been redesigned a number of times over recent years (Fig's 16-20). While walled the garden has been re-purposed as a decorative garden, its historic character as a walled enclosure remains to this day.

4.2 Historic Context & Development of the Elvaston Estate

- 4.2.1 In order to appreciate the potential impact of the proposed repairs it is important to place the OEG in a wider historic context; given that it forms part of the historic Elvaston Castle Estate which is of great architectural and historic significance in its own right.
- 4.2.2 The Parish of Elvaston, Thulston and Ambaston were thought to have been a Viking settlement around 900AD. Elvaston was then mentioned in the Domesday Book as being in the possession of Geoffrey Alselin one of the Great Barons that held land for the King.
- 4.2.3 The land was passed through several families until it was acquired by the Stanhope Family in 1607. At this point in its history Elvaston may already have included significant gardens, partially walled with stone or terraced. It remained with this family for well over 400 years, until its sale in the late 1960's.
- 4.2.4 The estate was undoubtedly affected by many subsequent events and heirs, such as the Civil War in 1643, when Sir John Gell (Governor of Derby) ransacked the house for arms as the family supported King Charles I. Each successive Stanhope heir influenced the development of the estate – with William Stanhope being created the first Baron Harrington in 1730, rising in 1742, to become the first Earl. His elevation may have inspired him to make his estate and surrounding land more productive, as many changes took place following his rise.
- 4.2.5 Subsequent Earls continued to improve the estate – with perhaps the most well-known being the fourth Earl. He worked alongside William Barron, whom he had made head gardener, between 1830 until his death in 1851, to establish much of the character of the Park and Gardens as they can be seen today. Barron himself continued working, with a greatly reduced gardening staff, with the fifth and sixth Earls until he left Elvaston in 1865.

⁵ Anon. (DCC), *Old English Garden at Elvaston Castle*, available to view at: <https://www.derbyshire.gov.uk/leisure/countryside/countryside-sites/country-parks-and-visitor-centres/elvaston/facilities/old-english-garden/old-english-garden.aspx>, URL accessed 15.07.2021.

- 4.2.6 The Stanhope family and eleventh Earl finally left the estate in 1939 at the onset of the war. During the War, Elvaston housed a Teacher's Training College and in 1964 the estate was put up for sale. It was purchased by Needlers (subsequently part of Tarmac Roadstone UK), a mineral extraction company, with the central core of the estate subsequently being sold to Derbyshire County Council and Derby Borough Council in 1969, saving it from being exploited as a series of gravel pits.⁶
- 4.2.7 In 1970 the park was officially designated a country park and opened to the public. It has since continued to be managed by the County Council and enjoyed by a great deal of people where the gardens are presently the main attraction. Whilst the majority of the main castle building remains closed, the estate gardens are accessible by the public to most parts without restriction which are appreciated both for its historic significance and for use for leisure activities such as walking, picnicking, etc. The grounds are also host to a number of seasonal cultural events and activities.
- 4.2.8 Elvaston Castle Country Park is of national importance as a historic designed landscape, largely through the contribution of William Barron, as are many of the historic buildings within it, which reflect the late work of the 19th century English Gothic Revival architect James Wyatt. The history and character of both the buildings and landscape are intrinsically linked. Consequently, its significance is recognised through the designation of the grounds as a Grade II* RPG, and many of the buildings are either Grade II* and Grade II listed as being of special architectural or historical interest.

4.3 Architectural and Historic Significance

- 4.3.1 Most of the buildings visible within the Elvaston estate date from the late 19th century and the time of the Gothic Revival. It was Charles Stanhope, 3rd Earl of Harrington, who was responsible for commissioning James Wyatt to create a Gothic style seat, for the Earl and his family⁷. However, the extensive grounds that lie around Wyatts central architectural composition, comprising main castle building and ancillary buildings, is almost entirely the product of the hand of head gardener William Barron (1805-1891).
- 4.3.2 The 4th Earl (1780-1851) was a nineteenth century eccentric 'dandy' and after falling in love with Maria Foote, an American actress, the couple were married in 1831. Shunned from London's 'polite society' the couple retreated to Elvaston where the 4th Earl commissioned Barron to create their romantic pleasure grounds. It would take Barron the next 20 years, until the death of the 4th Earl in 1851, to create this romantic retreat which became referred to as 'a Gothic paradise'⁸. Testament to Barron's successful transformation perhaps lies in the rumoured refusal of 'Capability' Brown to take on Elvaston as it was

⁶ Anon. (DCC), *A Short History of Elvaston Castle Country Park*, available to view at: https://www.derbyshire.gov.uk/leisure/countryside/countryside_sites/country_parks/elvaston/heritage/short_history/default.asp, URL accessed 11.01.2021.

⁷ Anon. (DCC), *A Country Residence, Elvaston Castle*, available to view at: <https://www.derbyshire.gov.uk/site-elements/documents/pdf/leisure/countryside/countryside-sites/country-parks/elvaston/heritage/a-country-residence.pdf>, URL accessed 11.01.2021, p5.

⁸ Anon. (Elvaston Castle and Gardens Trust). *The History of Elvaston*, available to view at: <https://www.futureelvaston.co.uk/index.php/the-history-of-elvaston/>, URL accessed 13.01.2021

reported in a contemporary account by Barron that he declared the ‘place so flat that there was such a lack of capability in it that he would not meddle with it’⁹.

- 4.3.3 During this time ‘the Park and Gardens were the focus of much activity, with newly designed Gardens; thousands of new trees, intensely cultivated and only recently introduced; a new lake and associated rockwork; and new Garden structures, including kitchen gardens and lodges’¹⁰. The historic maps on the opposite page help to illustrate the dramatic transformation of the Elvaston landscape during the 19th century that took place under Barron’s watch. They also identify the location of the listed walled gardens within it.
- 4.3.4 The walled gardens would have been the functional and productive heart of estate. Originally an area for plants under glass within which fruit, vegetables and exotic plants were grown for the Stanhope family¹¹. This would have been no less true than during Barron’s time, as it is likely that they were used for the propagation the many species of plants and of numerous trees that we see today planted around the estate¹².
- 4.3.5 An early version of the walled gardens may be indicated on the earliest map of the estate produced in 1760 by George Grey (Fig. 21). Indeed, some historic graffiti exists on the brickwork the ‘Secret Garden’ to indicate an 18th century origin (Fig. 25).
- 4.3.6 After the fourth earl’s death in 1851, it is likely that any previous version of the walled gardens was substantially remodelled as Barron was instructed by Leicester Stanhope, the fifth earl of Harrington, to construct a commercial nursery in the garden¹³. The 1852 Tithe Plan corroborates with this as the walled gardens first appear in their overall current form (Fig. 22).
- 4.3.7 An exact date of the construction of the heated walls, as part of the alterations by Barron, cannot be fully determined. While it could be that the north and south walls are contemporary with the alterations shown on the 1852 map, they may also have been implemented later. Subsequent maps indicate that further alterations were made towards the end of the 19th century as further glasshouse ranges were added. It is possible to see these changes by means of comparison between the 1880 first edition OS map to the later 1901 2nd edition OS map (Fig’s 23 & 24). Some tangible evidence exists that may point towards the heated walls being inserted at this later stage; as there is a crude

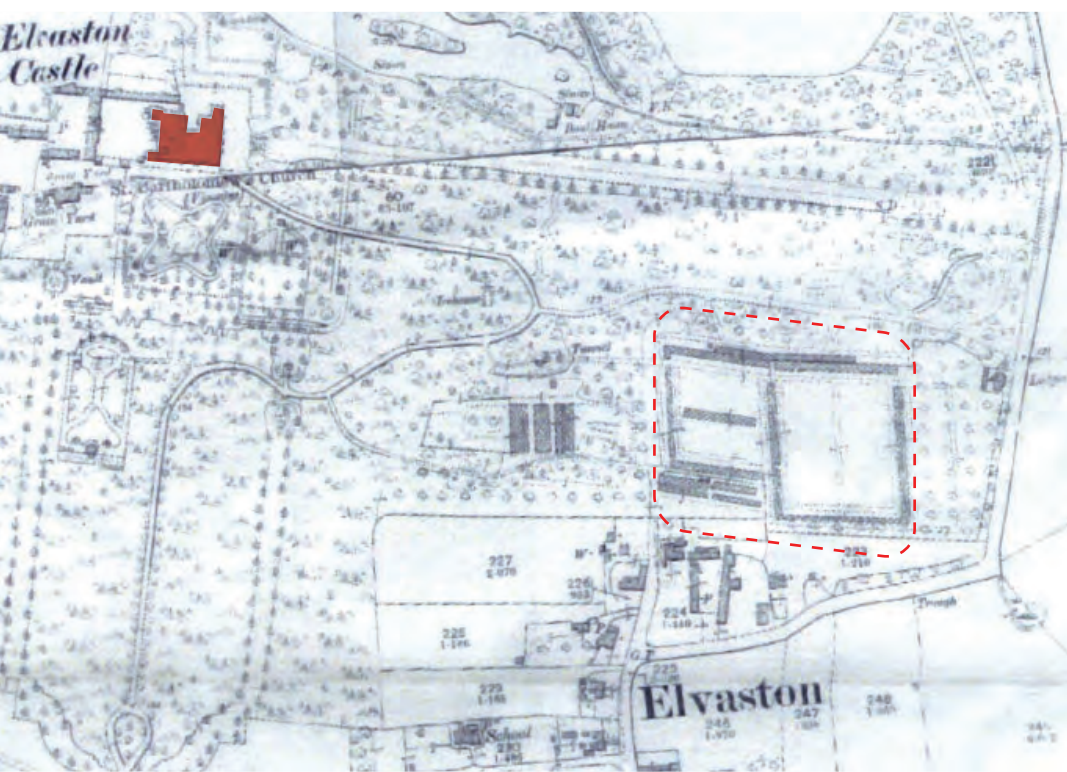
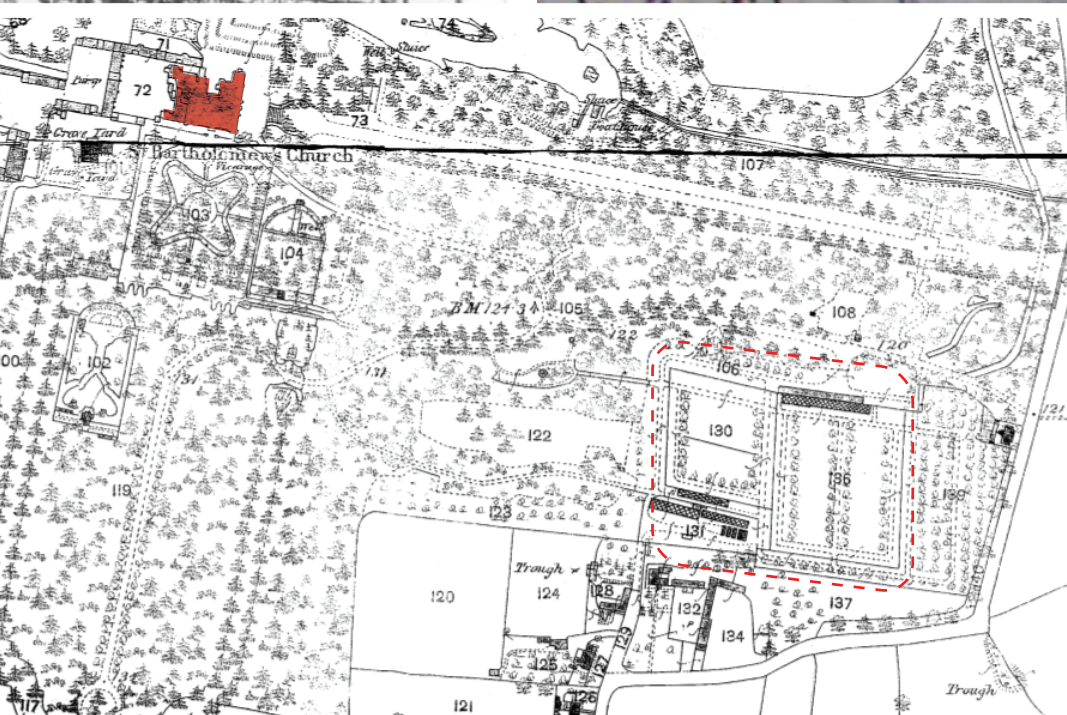
9 Barron, William (1852), *The British Winter Garden*, published by Bradbury and Evans, London. available to view at: https://www.google.co.uk/books/edition/The_British_Winter_Garden/FQs2AAAAMAAJ?hl=en&gbpv=1&printsec=frontcover, URL accessed 05.01.2021, p2.

10 Taylor, Hilary et. al (January 2003), *Elvaston Estate Conservation Plan Estate and Buildings*, Copy available on request from DCC’s Historic Environment Record, p40.

11 Op. Cit. Anon. (DCC), *Old English Garden at Elvaston Castle*

12 Elliott, Paul, et al. ‘William Barron (1805-91) and Nineteenth-Century British Arboriculture: Evergreens in Victorian Industrializing Society.’ *Garden History*, vol. 35, 2007, pp. 129–148, available to view at: JSTOR, www.jstor.org/stable/25472381. URL accessed 23.06.2021.

13 Anon. (Parks & Gardens), *William Barron*, available to view at: <https://www.parksandgardens.org/people/william-barron>, URL accessed 23.06.2021



Note: all historic maps presented: NTS

Fig. 21 (top left): 1760 Map of Elvaston (G. Grey) showing the estate prior to Barron's work. The former Tudor era H-plan house is shaded red and the approximate location of the walled gardens is loosely highlighted. Although it isn't possible to see a distinct outline of the walled gardens the plan appears to depict a number of walled enclosures within this area.

Fig. 22 (top right): 1852 Tithe Plan; a basic but familiar outline of both walled gardens is now present.

Fig. 23 (middle): 1st Edition OS (1880) showing Barron's remodelled Elvaston landscape surrounding the main house (shaded red) remodelled early 19th C. by James Wyatt. The walled gardens are clearly present with attached outbuildings.

Fig. 24: 2nd Edition OS (1901) appears to indicate further attached glasshouses. It is likely that these were present before the date of the map but hadn't been recorded.



Fig. 25: Historic graffiti on the east wall of the ‘Secret Garden’, which appears to be marked ‘T-S 1723’. The significance of the initials and date is unknown but it could relate to the date of construction of the wall.



Fig. 26: Historic lean-to glasshouses remain on the south side of the south wall to the OEG.



Fig. 27: A crude junction between the north heated wall and west wall of the OEG; notwithstanding the differing sizes in bricks these the adjoining structures simply abut each other rather than being toothed or properly tied together to ensure greater structural stability.

junction between the heated wall and adjoining garden wall structure (Fig. 27).

- 4.3.8 Nevertheless, by 1899 the walled gardens were at their most complete with extensive ranges of glasshouses¹⁴. Surviving tangible evidence of this is plainly visible on both walls; the south wall still retains these glasshouses (Fig. 26), although in a dilapidated state, and clear markings and remnant structural features still exist (Fig. 10).
- 4.3.9 In concluding this investigation, the significance of the north wall, as part of the listed building ‘Nursery Garden Walls and Attached Outbuildings at Elvaston Castle’, in reference to the three categories of ‘interest’, as defined in *PPG Historic Environment*¹⁵, can be described as follows:

Archaeological interest:

- 4.3.10 It is thought the archaeological potential for the site, beyond the construction of the wall itself, is very limited. As discussed in para 1.6, work to the adjoining walls of a similar nature, and early trial-pit investigations around the north wall did not reveal any archaeological potential beyond that of the wall itself. Furthermore, as the wall is built on ground previously disturbed during the construction of the wall, and, in particular, as there were two probable phases to this, it is thought that this also reduces any archaeological potential.

Architectural and artistic interest:

- 4.3.11 The walled gardens at Elvaston are a relatively plain and utilitarian feature in a historic parkland where there are many decorative architectural features and buildings to be found. While its artistic interest may be considered to be very limited, almost devoid of architectural ornament, this should not fool you into thinking it has no architectural interest.
- 4.3.12 Its architectural interest lies principally in its unusual construction. From the outside of the wall this is quite obvious as the wall has been constructed using a large format clay brick, which sets it aside from the more regularly sized imperial bricks used on the east and west walls. But this architectural interest arguably extends deeper into the inside of the wall to reveal what may be quite an unusual and possibly unique form of heated wall construction.
- 4.3.13 Heated walls of this period were common, but they typically took the form of a ‘heated flue’; an arrangement whereby heat from a fire was passed through a serpentine arrangement of chamber within the wall section¹⁶. However, at Elvaston the wall is of a single cavity construction, extending almost the full height of the wall, that would have been heated by the now redundant heating

¹⁴ Taylor, Hilary (June 2006), *Elvaston Castle Gardens and Park Conservation Management Plan*, Volume I, Section 3 (Historical Development), p78. Copy available on request from DCC.

¹⁵ Anon. (Ministry of Housing, Communities & Local Government, 10 April 2014), *PPG Historic Environment*; Paragraph: 006 Reference ID: 18a-006-20190723, available to view at: <https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment>, URL accessed 12.01.2021.

¹⁶ Anon. (Parks & Gardens, 8th March 2009), *The Walled Kitchen Garden*, available to view at: <https://www.parksandgardens.org/news-events/the-walled-kitchen-garden>. URL accessed 23.06.2021.

pipe near ground level.

- 4.3.14 From the outside the brick units follow a regular pattern, and one could be forgiven for thinking that just two types of brick are used in its construction. However, what adds more interest is the fact that several different variations of frogged or hollow bricks have been used. Previous structural reports (see Appendix III, IV & V) have identified the use of unusual arrangement of steel ties, or discs, but little can be deduced about this while the wall is in tact. The construction of the wall, particularly the bricks, could be of a design unique to Elvaston, but this would clearly needs more research to ascertain this.
- 4.3.15 The best kitchen garden walls are considered to be made of brick, due to their heat retaining qualities, as opposed to stone, but they were more expensive to build¹⁷. This was presumably due to the sheer number required and amount of labour. Building compartments within a cavity wall, as was more commonplace with other heated walls, would surely add to this cost. Perhaps this unusual construction adds further architectural interest to the wall as it could be telling of Barron's great ingenuity to increase productivity and resolve to reduce the cost of the construction of the wall.

Historic Interest:

- 4.3.16 On a national level, when considering the garden walls in the round, the historic interest of the garden walls is considered to be relatively limited. Very generally speaking, this is because walled gardens were once commonplace horticultural feature within the UK, typically associated with the grounds of most large country house. Elvaston was no exception to this, and the walled gardens would have been used to produce fruit and vegetables for the family, guests and staff.
- 4.3.17 As with many other examples across the county, the kitchen gardens at Elvaston would most likely have reached their most developed, architectural, technological and productive stages during the latter half of the 19th century¹⁸. Many, including those at Elvaston, fell into a state of disrepair and disuse during the 20th century. However, efforts made during the 1970's saved the walled gardens with the west wall enclosure revived as a decorative garden, known to those who visit the estate as the 'Old English Garden'.
- 4.3.18 During the 1600's so-called thermal fruit-walls became increasingly popular. Utilising no more than passive energy from the sun they enabled Mediterranean produce to be grown in cooler climes such as England¹⁹. More latterly, predominantly during the Victorian era, heated walls or 'hot walls'

¹⁷ Ibid.

¹⁸ Anon. (Wikipedia), *Walled Garden*, available to view at: https://en.wikipedia.org/wiki/Walled_garden. URL accessed 23.06.2021.

¹⁹ Kohlstedt, Kurl (2017), *Fruit Walls: Before Greenhouses, Walled Gardens Created Urban Micro-climates*, available to view at: <https://99percentinvisible.org/article/fruit-walls-before-greenhouses-walled-gardens-created-urban-micro-climates/>. URL accessed 23.06.2021.

became common²⁰. Their decline in popularity came as stand-alone glasshouse technology developed and materials, such as float glass, became cheaper. Artificially heated glass-houses could also produce similar or larger yields with much less labour involved²¹.

- 4.3.19 Heated walls with lean-to glasshouses, a sort of proto-greenhouse, like those at Elvaston, were probably less common and these mark a further evolution in the garden-wall typology. This adds greater historic significance to the wall as it is telling of the transition from walled enclosures to the dominance of heated glasshouses towards the end of the 19th century²². While the lean-to structures are no longer present, good tangible evidence remains which can quite easily be interpreted and assist in our understanding of the structure.
- 4.3.20 As we have seen Baron was considered to be an eminent figure in garden design as his work at Elvaston has been recorded in contemporary literature. Although the intervention made by Barron to form the heated walls are not considered of his most exuberant achievements, architecturally speaking at least, they are of historic interest because they underpin a great deal of his horticultural efforts and achievements made elsewhere on the estate. The heated wall is historically important as it demonstrates the great skill-set he possessed as an accomplished horticulturist, engineer and designer.

20 Op. Cit. Anon. (Parks & Gardens. 8th March 2009), *The Walled Kitchen Garden*.

21 De Decker, Kris (2015), *Fruit Walls: Urban Farming in the 1600s*, available to view at: <https://www.lowtechmagazine.com/2015/12/fruit-walls-urban-farming.html>. URL accessed 23.06.2021.

22 Ibid.

5.1 Description & Scope

- 5.1.1 In 2005 a preliminary survey, by Ward Cole Consulting, highlighted the need for remedial works to the north wall substantiated by further investigations. The Essential Repairs Report (ERR), commissioned by DCC (2010) and the Elvaston Castle & Gardens Trust, also describes the structural condition of the wall as ‘suspect’. The ERR also recommended further investigations and that work to stabilise the wall would be required²³.
- 5.1.2 Further to this, in 2014, DCC structural engineers prepared a 2-part structural report on the wall, with recommendations for remedial works (Appendix IV & V). In summary, the report found that the south side of the wall was suffering from serious structural problems; that this was probably related to the loss of the attached glasshouses, the deterioration of the metal ties and possible foundation rotation. The report recommended that stabilisation work would be required comprising localised removal and replacement of the bricks but also partial rebuilding of the wall where these effects were more advanced.
- 5.1.3 A further later report was commissioned by DCC with a view to progressing with this LBC application (Appendix III). As part of the 2014 report by Ward Cole Consulting Engineers, further measurements of the wall were undertaken to determine the extent of the lean. This found that the lean of the wall had advanced by a further 10mm, increasing from 125mm to 135mm. Trial pits, however, indicate that the foundations appeared to be in generally sound condition, with little movement or signs of significant deterioration evident.
- 5.1.4 As a result of further continual deterioration, and progressive leaning of the wall, the report concluded the wall to be unsafe and recommended the installation of temporary fencing to the south side. It also advised that the piecemeal repairs, previously considered, would no longer be practical or safe. Thus the principal and preferred recommendation (option 4.01a) as follows:
- 5.1.5 *‘Rebuild the wall plumb and square to the existing details in its entirety using reclaimed bricks and newly made special bricks. All existing corroding ferrous metal ties should be removed and the northern and southern skins of brickwork should be tied together with new stainless steel ties. The existing pipework, if in suitable condition, could be reinstated if it is so wished’.*
- 5.1.6 However, in the best possible interests of the significance of the wall it is proposed that the repairs are undertaken in two stages comprising of more extensive investigations followed by the full repairs;

Stage 1 - Investigation works:

- Take down a 4m length of wall as indicated on drawing P06/F/06 to facilitate a better understanding of the construction of the wall. This will be helpful to:

²³ Anon (Simpson & Brown Architects, 2010), *Elvaston Castle and Estate; Report on Essential Repairs & Associated Costs*, available to view at: <https://www.derbyshire.gov.uk/site-elements/documents/pdf/leisure/countryside/countryside-sites/country-parks/elvaston/elvaston-repairs-report-executive-summary.pdf>, URL access 10.08.2021, p58.

- Determine the precise number of bricks and brick types used to allow an accurate order to be placed with suppliers.
- Accurately record the construction of the wall to an agreed standard with the LPA. A copy of this information will be deposited within the Derbyshire HER.
- Allow a further visit by the structural engineer to undertake any further structural assessments required and formulate any additional interventions required to strengthen the wall. Should further structural interventions be required then these will need to be agreed with SDDC.
- Undertake a suitable mortar analysis to inform an appropriate mortar specification for the repairs.
- All bricks will be carefully sorted, cleaned and set aside for re-use where possible.
- The dismantled section of wall will be suitably fenced off from public access. A temporary timber stud wall will close off the dismantled section and faced with plywood shuttering; painted in a suitably dark and recessive colour; dark grey.

Stage 2 - Full repair works:

- The remaining length of the north wall is to be carefully dismantled
- All bricks and other masonry units to be sorted, cleaned and set aside for re-use where possible.
- Masonry from the dismantled existing gated entrance to be set aside for re-use if possible.
- The north wall is to be rebuilt using a mixture of old and new handmade specials, to exactly match the original bricks; sample to be agreed with SDDC and DCC historic building architect prior to commencement of rebuilding works.
- Stainless steel ties and other non-ferrous fixings to be used to replace the corroded steel ties.
- The redundant heating pipe is to remain in situ throughout.

5.2 Impact on the Significance

5.2.1 While the repairs are underway it is anticipated that there will be a very short-term temporary significant adverse impact on the significance on the heritage asset, and Grade II* RPG. The greatest visual impact during the course of the works is likely to come from any scaffolding platforms, temporary timber shoring and other site preliminaries; such as any fencing required. Although some vegetation will need to be clearer from around the rockwork it is not anticipated that there will be any requirement to remove any adjacent trees subject to any TPO restrictions.

5.2.1 The structure will be rebuilt as faithfully as possible and the two-stage approach to the repairs should ensure that this is achieved as closely as possible. However, the loss of some of the original building material will be inevitable; namely due to the replacement of a proportion of the original bricks and new mortar beds as the structure is rebuilt. This will have a very small negative impact on the authenticity of the structure but every effort will be made to ensure that new brick units are an exact match to the old units.

- 5.2.1 Modern building materials may also be incorporated within the structure to strengthen it. The extent of this type of work is likely to include some form of stainless steel bedding reinforcement and/or wall ties. Although these interventions are not reversible, they are required to ensure the stability of the structure. Any such interventions will be kept to a minimum to ensure this will result in a small to negligible amount of harm to the significance of the listed structure.
- 5.2.1 It is proposed that the existing gateway is rebuilt with a more regularly coursed masonry reveal complete with new bespoke cast iron gate (refer to drawing P06/F/09). This is considered to improve the appearance of the gateway whilst being an honest intervention. Although the exact date of the entrance is not known it is not thought to be a feature associated with the original heated wall by Barron. This is because the list description indicates that this is a ‘C20 opening’²⁴, but also, its position clashes with that of the redundant heating pipe within the wall. Neither is the gate itself an authentic feature as this is to the same pattern as the other ironwork within the OEG Wall thought to have been introduced during the 1970’s.

5.3 Avoiding Harmful Impacts

- 5.3.1 All temporary scaffolding and other contractors preliminary items are to be completely removed from site following the completion of the work. All earthwork will be restored to existing levels, using the same material removed, to ensure there are no long-term visual impacts on the walled gardens.
- 5.3.2 In order to mitigate the loss of any original mortar any new mortar will be to a specification to closely match the original as possible in colour, texture and composition. This will be informed by the results of an appropriate analysis of the composition of the existing mortar. Any replacement materials will be agreed with DCC’s Historic Buildings Architect and SDDC’s Conservation Officer prior to installation.
- 5.3.3 Where modern reinforcement materials are required they will be fully concealed within the structure in order to ensure that there are no adverse visual effects. Although these are irreversible the long-term benefit, in securing the stability of the structure, should outweigh any harm done.

- 4.1 A significant amount of harm to the significance of the Wall has been caused by the gradual deterioration of the wall. However, the rate of deterioration is now thought to be accelerating and it will result in more destruction to the wall if nothing is done in the immediate future.
- 4.2 The condition of the structure also presents a risk to health and safety. As we have seen, a temporary security fencing arrangement has been installed to keep people away from it. While the fencing is necessary it is nonetheless an unsightly temporary feature, detracting from the historic and architectural significance of the wall, and can only be removed once the repairs have been undertaken.
- 4.3 Therefore, as a responsible owner and custodian of the listed building, DCC would like to undertake the repairs necessary to restore its condition. It is considered that the repairs are well justified on the grounds that this will reverse the worst of the harm done, ensuring that the significance of the north wall, as part of the Grade II Listed Building, is maintained for future generations to enjoy.

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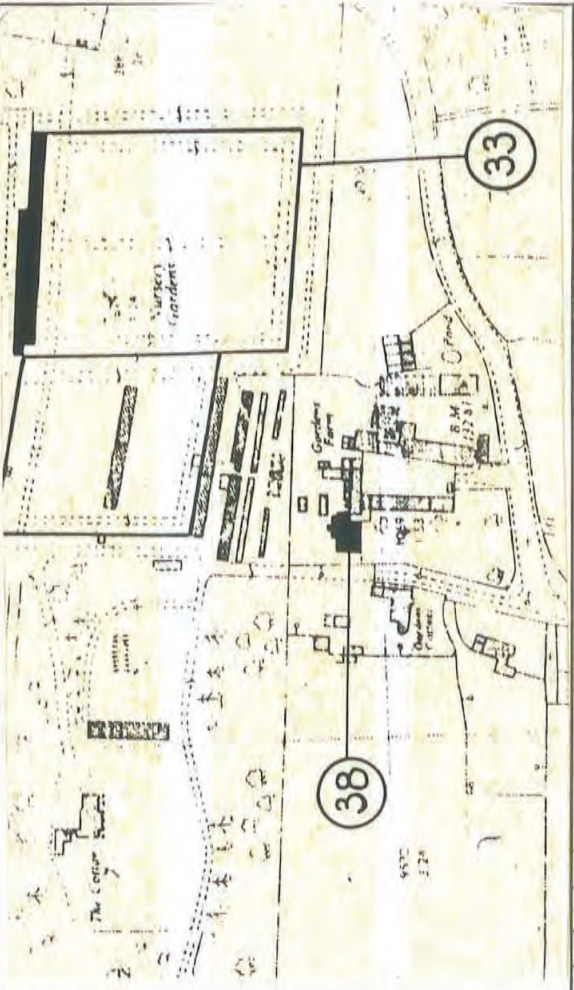
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1	Base aerial image of Elvaston from Google Earth; available to view at: https://www.google.com/maps/place/Elvaston,+Derby/@52.8923449,-1.3940255,550m/data=!3m1!1e3!4m5!3m4!1s0x-4879efdf0339091b:0x46415c9f14b9b71f!8m2!3d52.8881954!4d-1.3914301 , URL accessed 21.07.2021	Labels added by author
2	Base aerial image of Elvaston from Google Earth; available to view at: https://www.google.com/maps/place/Elvaston,+Derby/@52.8923449,-1.3940255,550m/data=!3m1!1e3!4m5!3m4!1s0x-4879efdf0339091b:0x46415c9f14b9b71f!8m2!3d52.8881954!4d-1.3914301 , URL accessed 21.07.2021	Labels added by author
16	Anon. (1983), ' <i>Eca1918: Photographic slide showing Old English Garden dug over in preparation for planting. Hand labelled: OEG replanting. Numbered and dated: 18 02 83. Slide reference number 1210</i> ', Elvaston Castle Estate Historic Images CD, Available to view on request; Conservation & Design Section, Derbyshire County Council (DCC).	
17	Anon. (1985), ' <i>Eca2532: 'Aerial photograph. Labelled 'CERTIFIED THAT THE PHOTOGRAPH TO WHICH THIS LABEL IS ATTACHED IS AN ENLARGEMENT OF ALL OF FRAME NO. 034 FROM FILM NUMBER 89-150. FLOWN ON 7.5.89 SIGNED S.A.PUGH CROWN COPYRIGHT RESERVED'</i> ', Elvaston Castle Estate Historic Images CD, Available to view on request; Conservation & DCC.	
18	Anon. (1985), ' <i>Eca2311: 'One of a series of slides showing plants and flowers from the Old English Garden" as shown on the "Gardeners World" TV programme. Date and reference embossed 11 JUN 85. Slide reference number 1418</i> ', Elvaston Castle Estate Historic Images CD, Available to view on request; Conservation & Design Section, DCC.	
19	Anon. (1985), ' <i>Eca2317: One of a series of slides showing plants and flowers from the Old English Garden" as shown on the "Gardeners World" TV programme. Date and reference printed 20 06 85'. Slide reference number 1412</i> ', Elvaston Castle Estate Historic Images CD, Available to view on request; Conservation & Design Section, DCC.	
8	Anon. (c.1859), ' <i>Eca2519: 'Photographic print of the gate of the Old English garden looking out to the lawn colour print 4x3.5</i> ', Elvaston Castle Estate Historic Images CD, Available to view on request; Conservation & Design Section, DCC.	
21	Taylor, Hilary (June 2006), ' <i>1760 Map of Elvaston</i> ', Elvaston Castle Gardens and Park Conservation Management Plan, Volume I, Section 3 (Historical Development), Fig.3/3, Copy available on request from DCC.	A Map of the Parish of Elvaston, George Grey, c.1760. Labels by author.
22	Taylor, Hilary (June 2006), ' <i>Plan of the Parish of Elvaston, 1852</i> ', Elvaston Castle Gardens and Park Conservation Management Plan, Volume I, Section 3 (Historical Development), Fig.3/38, Copy available on request DCC.	Plan of the Parish of Elvaston, 1852. Labels by author.
23	Taylor, Hilary (June 2006), ' <i>First edition, 25" OS, surveyed 1880, published 1881</i> ', Elvaston Castle Gardens and Park Conservation Management Plan, Volume I, Section 3 (Historical Development), Fig.3/20, Copy available on request from DCC.	First Edition 25" OS, surveyed 1880, published 1881. Labels by author.
24	Taylor, Hilary (June 2006), ' <i>Second edition OS, revised 1901</i> ', Elvaston Castle Gardens and Park Conservation Management Plan, Volume I, Section 3 (Historical Development), Fig.3/20, Copy available on request from DCC.	' <i>Second edition OS, revised 1901</i> '. Labels by author.

APPENDIX I

LISTED BUILDING CARD

Address NURSERY GARDEN WALLS AND ATTACHED		Reference Number	9	4132	33	File	
OUTBUILDINGS AT ELVASTON CASTLE		Civil Parish	ELVASTON			Related Files	
BORROWASH ROAD		District	SOUTH DERBYSHIRE				
(WEST SIDE)		(formerly S E DERBYS RD)					
Grade	II	Date first listed	11.3.87		Conservation Area	Group Value	YES
Kitchen garden walls and attached outbuildings. Late C18 and mid C19. Built for the Earl of Harrington. Red brick with brick and stone dressings, and slate roofs to outbuildings. Two large rectangles of walls, both approximately 12 feet high with late C18 walls to east plus outbuildings attached to north wall, and mid C19 walls to west. Mid C19 walls are partly of metric sized bricks and are hollow to allow hot air to be pumped through. West wall has a C20 opening with wrought iron gates. C18 walls have flat stone copings. The outbuildings to north have a two storey part to east, with central panelled door below plain stone lintel and a 2-light window below similar lintel to east, plus canted bay window to west. Above there are three 2-light horizontal sliding glazing bar sashes below segment heads. Central part is single storey with plank doors and lapped glass windows below plain stone lintels and to west there is a tall tower-like structure with single pitched roof, also with lapped glass window and plank door.							
							
Grid Reference (1 : 50,000)		North		Derbyshire County Planning Department Listed Building Record Card			
4119/3283							
Illustrations							
(6mm grid 300mm 1:50							
600mm 1:100							
Photograph ref. nos		B&W					
		Col.					

A black and white photograph of a long, two-story brick building, likely a school or institutional structure. The building features multiple windows and a prominent chimney. A large tree stands in the foreground on the right side of the frame.

HISTORIC ENVIRONMENT RECORD SEARCH RESULTS

HERITAGE GATEWAY

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results

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Statutory Data

[The National Heritage List for England](#) 2 results

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No records matched your search



Non-Statutory National Data

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No records matched your search

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Registered Park or Garden: Elvaston Castle (1368)

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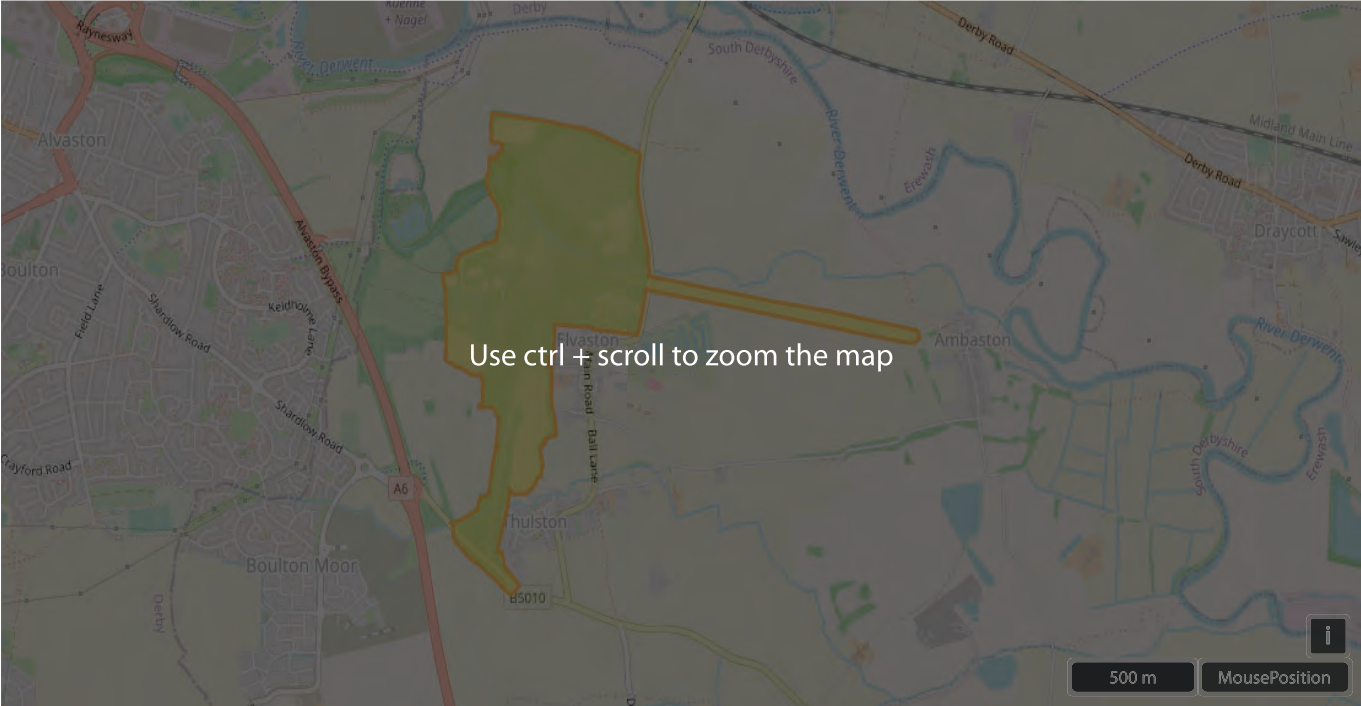
Grade	II*
Authority	Historic England
Date assigned	
Date last amended	

Description

External Links (0)

Sources (0)

Map



Location

Grid reference	Centred SK 4062 3262 (2248m by 1957m)
Map sheet	SK43SW
Civil Parish	ELVASTON, SOUTH DERBYSHIRE, DERBYSHIRE

Related Monuments/Buildings (11)

- [Cropmark features and ridge and furrow, south of Coronation Plantation, Elvaston \(Monument\) \(MDR5619\)](#)
- [Elvaston Castle, Elvaston \(Building\) \(MDR5559\)](#)
- [Gardens and Park, Elvaston Castle \(Monument\) \(MDR5630\)](#)
- [Icehouse, Elvaston Castle, Elvaston \(Monument\) \(MDR8381\)](#)
- [Moorish Temple, Elvaston Castle grounds, Elvaston \(Building\) \(MDR12343\)](#)
- [Pump House at Elvaston Castle \(Building\) \(MDR10017\)](#)
- [Ridge and furrow north of Thulston, Elvaston \(Monument\) \(MDR8269\)](#)
- [Ridge and furrow west of Ambaston, Elvaston \(Monument\) \(MDR8292\)](#)
- [Ridge and furrow, Elvaston Avenue, Elvaston \(Monument\) \(MDR5625\)](#)

Site record MDR5630 - Gardens and Park, Elvaston Castle

Type and Period (4)

[PARK](#) (Post Medieval to 21st Century - 1540 AD to 2050 AD)

[FORMAL GARDEN](#) (Post Medieval to 21st Century - 1540 AD to 2050 AD)

[RIDGE AND FURROW](#) (Medieval to Post Medieval - 1066 AD to 1900 AD)

[HOUSE PLATFORM](#) (Unknown date)

Protected Status/Designation

Registered Park or Garden (II*)

[Registered Park or Garden \(II*\) 1368: Elvaston Castle](#)

Images (0)

Documents (0)

Full Description

Formal gardens, pleasure grounds 1830-51 by William Barron for the Earl of Harrington. Now a country park. Site of medieval manor house, with a 14th century reference to gardens. Early 19th century reference to gardens in the antique style. Major remodelling 1830-51 by Barron survives only in part. Italian garden - elaborate topiary. Alhambra garden, grottoes beyond lake. Box pasture replaces Bower garden. Thuja tunnel collapsed 1970. Pinetrees, shrubberies, Moorish pavillion 1830-50. Golden gates 19th century. Remains of lime avenues to London lodges 800m long. To east, open lawns, formerly laid out with hedges, vista to Elvaston Avenue at least 900m long traceable for a further 400m. (1, 2)

Included in Register of Parks and Gardens. (3)

Field survey has identified a number of surface features within the grounds that are likely to be of medieval and post-medieval date. These include extensive areas of ridge and furrow, building platforms and routeways. While some ridge and furrow is probably medieval, some is different in form and appears to have obliterated any trace of buildings shown on a map of 1889. (4)

Areas of earthwork ridge and furrow were identified during a walkover survey in 1994. (5)

Golden gates erected at the south end of the formal gardens in 1819 brought from the Palace of Versailles by Charles Stanhope, Third Earl of Harrington. It is thought that these gates may have originated at the royal palace in Madrid. The formal gardens had been fully restored along with the castle itself. (6)

Sources/Archives (8)

--- [SDR22685](#) Bibliographic reference: Derbyshire County Council. Elvaston Castle Country Park, Near Derby.

--- [SDR977](#) Bibliographic reference: Anthony, J. 1979. The Gardens of Britain 6: The East Midlands.

<1> [SDR190](#) Bibliographic reference: Pevsner, N. 1953. The Buildings of England: Derbyshire, 1st edition. p133.

<2> [SDR4191](#) Article in serial: Country Life. 1899. Country Life, January 14th and 21st, 1899. 14/1/1899, p.48 & 21/1/1899 p80.

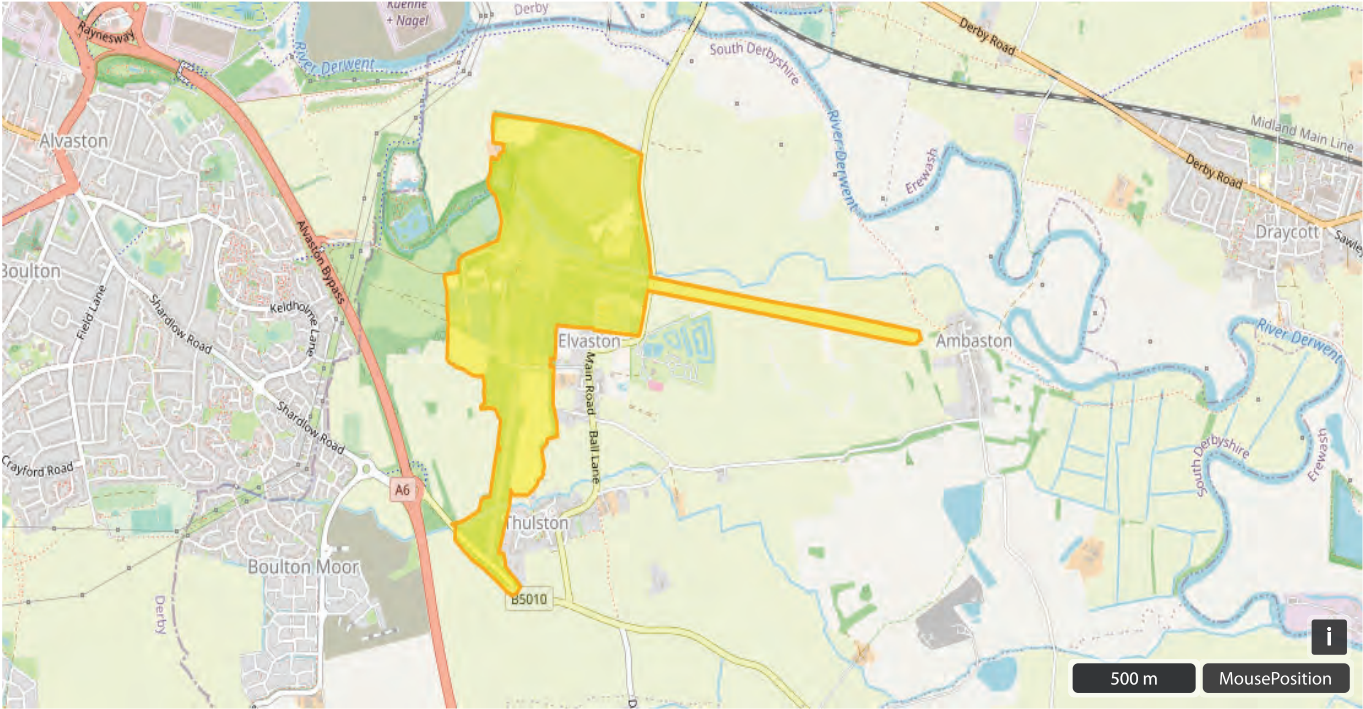
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<5> [SDR19031](#) Unpublished document: Challis, K. 1999. A6 Alvaston Bypass, Archaeological Assessment. Draft.

<6> [SDR22685](#) Bibliographic reference: Derbyshire County Council. Elvaston Castle Country Park, Near Derby.

Map



Location

Grid reference	Centred SK 40625 32624 (2248m by 1957m)
Civil Parish	ELVASTON, SOUTH DERBYSHIRE, DERBYSHIRE

Related Monuments/Buildings (0)

Related Events/Activities (3)

- EDR1724
- EDR3866
- EDR1680

Please contact the HER for details.

External Links (0)

Record last edited

Oct 20 2020 11:52AM

Comments and Feedback

Do you have any more information about this record? Please feel free to comment with information and photographs, or ask any questions, using the "Disqus" tool below. Comments are moderated, and we aim to respond/publish as soon as possible.

Listed Building record MDR22954 - Nursery Garden Wall, Elvaston Castle

Type and Period (1)

[WALLED GARDEN](#) (Georgian to 21st Century - 1775 AD? to 2050 AD)

Protected Status/Designation

[Listed Building \(II\) 1096400: NURSERY GARDEN WALLS AND ATTACHED OUTBUILDINGS AT ELVASTON CASTLE](#)

Images (0)

Documents (1)

☐ Show captions



Full Description

A wall garden to the west of Elvaston Castle, the easternmost of two walled gardens. Believed to have been designed by William Barron, who was appointed as head gardener by Charles Stanhope, 4th Earl Stanhope, in 1830, with a brief to redesign the gardens of the estate. Believed to have been designed for the growing of young plants for replanting into the main park and garden. An survey of the south wall suggests that some of the bricks in the wall date from the late 18th century which calls the idea that both walled gardens were designed by William Barron into question. (1)

From the National Heritage List for England:

'SK 43 SW 2/33

PARISH OF ELVASTON BORROWASH ROAD (West Side) Nursery Garden Walls and Attached Outbuildings at Elvaston Castle

GV II

Kitchen garden walls and attached outbuildings. Late C18 and mid C19. Built for the Earl of Harrington. Red brick with brick and stone dressings, and slate roofs to outbuildings. Two large rectangles of walls, both approximately 12 feet high with late C18 walls to east plus outbuildings attached to north wall, and mid C19 walls to west. Mid C19 walls are partly of metric sized bricks and are hollow to allow hot air to be pumped through. West wall has a C20 opening with wrought iron gates. C18 walls have flat stone copings. The outbuildings to north have a two storey part to east, with central panelled door below plain stone lintel and a 2-light window below similar lintel to east, plus canted bay window to west. Above there are three 2-light horizontal sliding glazing bar sashes below segment heads. Central part is single storey with plank doors and lapped glass windows below plain stone lintels and to west there is a tall tower-like structure with single pitched roof, also with lapped glass window and plank door.

Listing NGR: SK4114532791.'

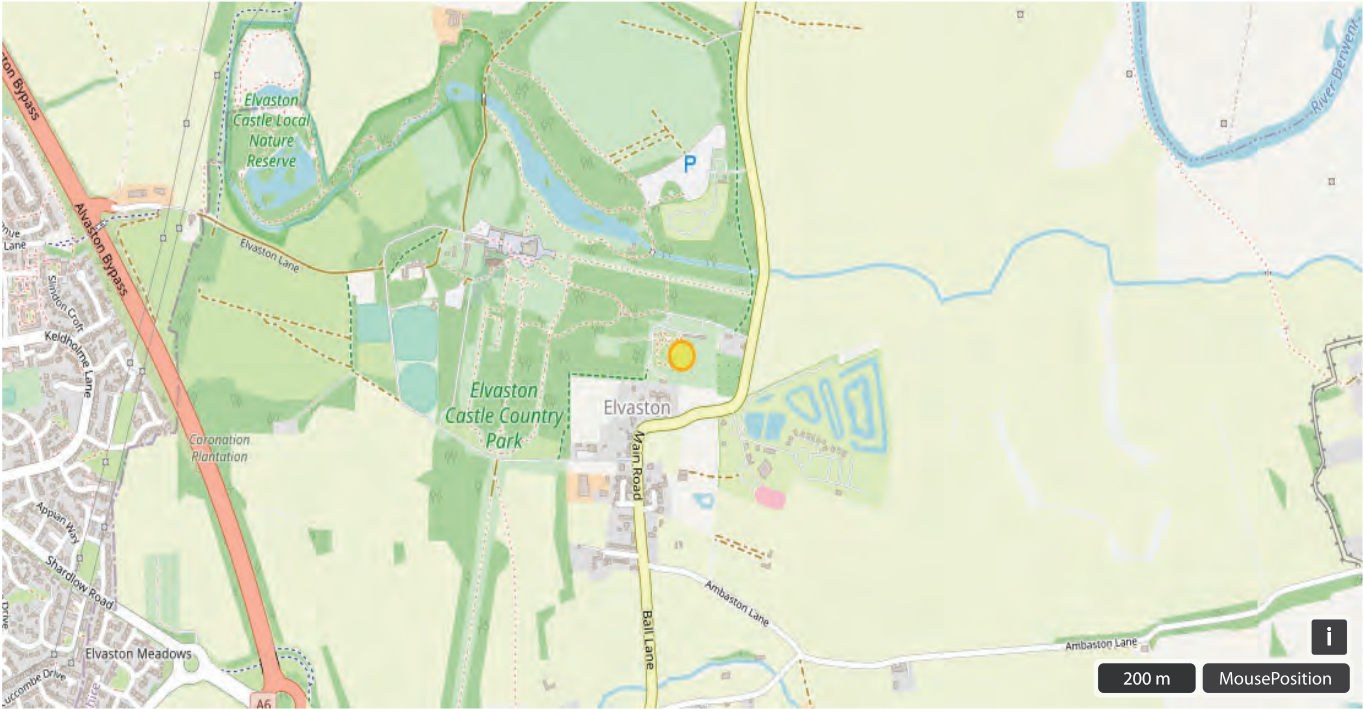
(2)

Sources/Archives (2)

<1> [SDR24188](#) Unpublished document: Gilbert, A. 2017. The Nursery Garden Wall, Elvaston Castle Country Park: an Archaeological Recording of the South Wall.

<2> [SDR19551](#) Listed Building File: Historic England. 2011. The National Heritage List for England. <https://historicengland.org.uk/listing/the-list/list-entry/1096400>.

Map



Location

Grid reference	SK 41145 32791 (point)
Civil Parish	ELVASTON, SOUTH DERBYSHIRE, DERBYSHIRE

Related Monuments/Buildings (0)

Related Events/Activities (1)

EDR4648

Please contact the HER for details.

External Links (0)

Record last edited

Mar 1 2020 8:16PM

Comments and Feedback

Do you have any more information about this record? Please feel free to comment with information and photographs, or ask any questions, using the "Disqus" tool below. Comments are moderated, and we aim to respond/publish as soon as possible.

Structural Report - Ward Cole Ltd (December 2020)



STRUCTURAL REPORT

Client: Derbyshire County Council

Project : Elvaston Country Park
Old English Garden: North Wall

Job No. : 24/1185

Date : 17th December 2020

Engineer : A DEMPSTER BSc CEng MStructE MICE

WARD ■■ COLE
consulting engineers

c/o Adrian Dempster
105 Nottingham Road
Selston
Nottingham
NG16 6BU
07971 142829

REPORT OF STRUCTURAL INSPECTIONS OF THE NORTH WALL TO THE OLD ENGLISH GARDEN AT ELVASTON COUNTRY PARK

1.00 INTRODUCTION:

1.01 On the instructions of Derbyshire County Council, the country park was visited in January and September 2020 for the purposes of carrying out structural inspections of the north wall to the Old English Garden. In January measurements were taken at regular intervals along both sides of the wall to determine the extent of the lean towards the north. In September four trial holes were excavated, two to the north side and two to the south side, to determine the depths and sizes of the wall foundations and the nature of the ground on which the foundations were built. A small section of the top of the wall was also carefully dismantled so that the construction of the copings and the brickwork courses below could be determined.

1.02 Details within this report are confined to the structural aspects as detailed in paragraph 1.01 above. The report does not constitute a full building survey and excludes certain items such as those listed below.

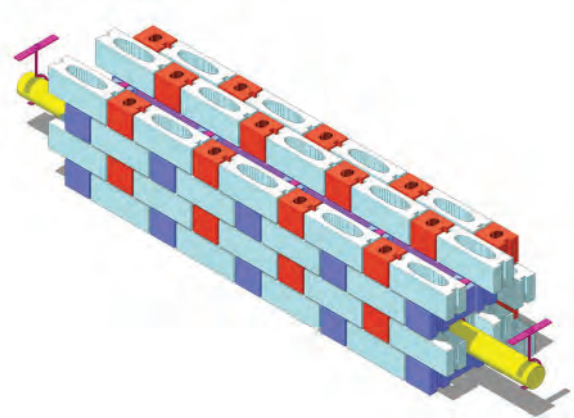
- a) The decorative condition of the wall.
- b) The condition of services.
- c) The location of the wall, its value and other aspects such as searches, boundaries etc.

1.03 No testing of materials, monitoring, or long-term investigation has been undertaken. We have not inspected parts of the wall which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the wall is free from defect.

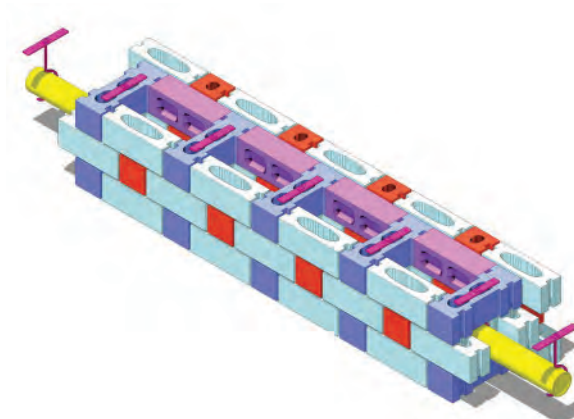
1.04 The wall, which is approximately 4m high above ground level, is of rather unusual hollow brickwork construction and contains redundant heating pipes which were originally designed to heat the greenhouse, now demolished, which was built as a lean-to on the south side of the wall. Typical details following an investigation by Alex Gilbert, of Derbyshire County Council, are shown below and in Appendix C to this

report. The cavities in many of the hollow bricks have been filled with mortar containing coarse aggregate.

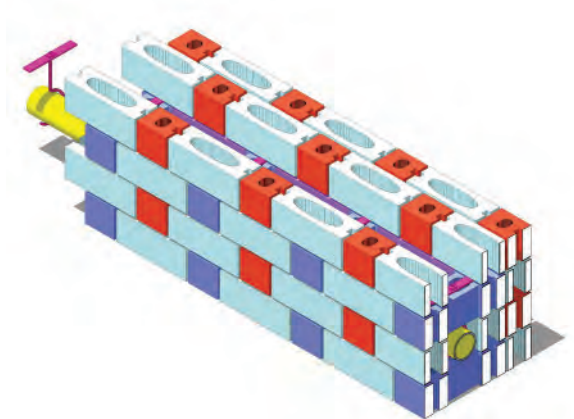
SK_01



SK_02



SK_03



2.00 PREVIOUS INVESTIGATIONS:

- 2.01 The writer carried out an inspection of the wall in November 2005. The observations and recommendations given following that inspection are given below.

“Old English Garden:

The north and south walls appear to be constructed in hollow terracotta units which are approximately 300 mm long, 150 mm high and 125 mm wide.

The south side of the north wall is in very poor condition with significant spalling being evident to the hollow terracotta units in places. It is clear that there is some cast iron pipework within the wall. This has been exposed in some places where terracotta units have completely spalled away. It appears that there was a greenhouse structure attached to this wall at some time in the past which would have protected the terracotta units from weathering.

It is clear that major remedial works are required to the north wall, particularly to its south side. Firstly, an investigation should be carried out to determine the exact construction of the wall and the nature of the hollow terracotta units. If the damaged units are to be replaced on a like for like basis, then it is clear that the manufacture of a considerable number of new units will be required. It is recommended that the wall is repaired by raking out and repointing the mortar joints and replacing all significantly damaged terracotta units with new units. If corroded ferrous metal ties are encountered then these should be removed and replaced with stainless steel. Similarly, the condition of the cast iron pipes buried within the wall should be checked for traces of corrosion and removed if these are causing damage to the masonry. Prior to any repairs being carried out to the wall a stability scaffold should be erected to provide temporary support to the wall while the repairs are being carried out.”

- 2.02 Keith Czertowicz of Derbyshire County Council carried out an inspection of the wall in September 2014. His observations and recommendations contained in the report he prepared are given below.

“Investigation Findings

Wall A

490mm thick, slightly thicker than 2 bricks wide with a hollow cavity.

The wall is in two leaves with a one brick thick backing wall on the north side, a

150mm wide cavity and a half brick skin to the south face. There are long headers which bridge the cavity and tie the two leaves together. There is a cast iron heating pipe (photo 1) at low level which runs along the length of the wall adjacent to where the former lean-to greenhouse used to be running within the cavity. Where visible the cast iron pipe does not appear to be badly corroded. The greenhouse would have been heated by a boiler, possibly on the north side of the wall providing hot water to the cast iron pipe and heating the greenhouse from inside the wall cavity. Old OS maps show that greenhouses used to run along part of the north face of wall A, adjacent to the lean-to bothy buildings which remain. Along the line of the pipe snapped headers are used and may be the reason for the grooves and iron ties since the bond pattern is weak along that course of bricks. Similar untied rows may occur elsewhere at intervals up the wall and this may be evidenced by the continuous rows of spalled bricks seen. The special side grooves seen in the bricks have corresponding metal disc ties on both vertical joints either side of the header in order to interlock the stretchers with the headers and snapped headers. Refer to detail SK1 for the assumed bond arrangement. These ties have corroded badly causing expansion of the metal and splitting and spalling of the bricks. This splitting is made easier by the presence of large voids within the bricks in particular the stretchers. This occurs in distinct horizontal bands at 3 or 4 levels and intermittently along the length of the wall.

The large format bricks used for this wall have a face width of 102mm on the south face but near the top of the north face where loose masonry had been removed, the faces were only 65mm wide.

Wall A was recorded as leaning by up 125mm in 1995. This was clearly visible when viewed from high level with a distinct outward curve toward the end nearest the entrance gate (photo 2) which was the position as recorded in 1995.

The rear of the wall (north face) was inspected at the end nearest wall B and where accessible was found to plumb and flat with mortar mostly present in joints except for some open joints towards the top. There is some efflorescence and moss present and some plants self-seeded into the copings. The north face of wall A does not have the distinct stepped movement seen on the south face associated with the metal ties as presumably these are not present. The wall appears to have had some protection from the ivy; however a section of masonry had been dislodged near the top. The opened up section showed solid masonry visible for the full width of the wall, i.e. no cavity present and no metal ties. The bonding of the internal bricks appeared to be less regular and it also contained what appeared to be weathered concrete or gravel infill."

This report refers to an inspection carried out in 1995. We have not had sight of the report associated with this inspection.

- 2.03 Following the inspection in September, further investigations were carried out and Keith Czer towicz prepared an additional report dated 9th December 2014. His observations and recommendations contained in that report are given below.

“Structural Report

Wall A

The walled gardens are most likely to be part of the original castle construction which is about 200 years old.

The large format bricks used for this wall are not commonly seen and were most likely hand made.

They are hollow and have special side grooves, which correspond to metal discs which interlock the bricks. These have corroded badly causing some bricks to split and spall.

Replacements of bricks of this size and type would have to be specially hand made.

Some of the damage to wall A may be longstanding as consequence of the heat applied in the past when it was a greenhouse via hot air ducts, which may occur within the wall. Heating pipes are also likely to have been hung off the wall as this occurs within the derelict greenhouses in the adjacent secret garden.

Comments regarding spalling of bricks in 1995 still apply although weathered and open pointing is also prevalent.

Leans in the wall of up 125mm measured in 1995 were re-measured to be about the same today. It was suggested in the 1995 report that rotation/ failure of the foundation could be the most likely cause. It was also stated that in order to confirm this there was a need to assess the ground by carrying out a trial pit investigation, however this has not progressed. There is a section of stepped displacements along horizontal beds creating a lean, which is not a rotation. Loss of support from the former greenhouse rafters was mentioned in the 1995 report. Whilst rafters may have helped restrain the wall, the lean is away from the garden. A design check shows that the wall if adequately bonded and in good repair should be adequate as constructed.

This wall is in a poor state of repair and the fencing should remain until its many defects are rectified. The wall needs further investigation to establish fully how unstable it is. Its construction needs to be fully understood including the purpose of the “metal disc” ties and how they might help bond the bricks to form flues or if

the wall is solid, however internal inspection is essential to confirm this by removing a brick to view inside the wall or flues if present. The back of this wall needs to be cleared of climbers so that that the back face can be inspected as this may or may not be fully tied to the inner wall face.

The wall leans away from the garden side, so should be fenced off both sides as the public have access to the rear of the wall.

It may be necessary to carry out some localised rebuilding and BRE Digest 475 suggests an ultimate limit of 1 in 50 for leaning walls. This limit is exceeded and whilst rebuilding would be preferable, buttressing on the rear of the wall was suggested in 1995. As an alternative solution, a temporary shoring scaffold was also recommended to prevent collapse. This had not been installed.”



The exact function of the “metal disc” ties noted in the report above is not clear. What is clear, though, is that they have corroded and expanded, thus causing or exacerbating some of the cracking and spalling which is evident to the wall.

3.00 OBSERVATIONS:

3.01 Measurements of Lean to the North:

A surveyor's staff, a spirit level and a measuring tape were used to measure the horizontal movement which has occurred at 3m intervals along the length of the wall to the north side and less frequently to the south side. The positions and measurements taken are given in Appendix A to this report. On the north side the measurement noted as "Bottom Measurement" indicates the movement at the top of the wall. On the south side, the measurement noted as "Top Measurement" indicates the movement at the top of the wall.

It can be seen that, at worst, the wall leans in a northerly direction by 135mm, indicating that some further movement of approximately 10mm appears to have occurred since the wall was inspected in 1995.

3.02 Trial Holes:



Four trial holes were excavated, two to the north side and two to the south side, to determine the sizes and depths of the foundations and the ground conditions at foundation formation level. In all cases, stepped brick footings founded on firm dry clay approximately 1.05m below ground level were revealed. Some, relatively minor, root activity from nearby trees and shrubs was noted in some of the trial holes.

The approximate locations and logs of the trial holes are given in Appendix B to this report.

3.03 Construction at the Top of the Wall:



It appears that, at some time in the relatively recent past, the coping bricks, the tile crease course on which they are laid and the course of bricks immediately below the tile course have been rebuilt. Hard cementitious mortar was used in the rebuilding and the careful dismantling of a small section of wall proved to be quite difficult. On removal of a small section of brickwork, it could be seen that the top section was constructed in solid brickwork infilled with cementitious mortar.

3.04 Deterioration of the Wall:

Photographs from November 2005 (South Side)



Photographs from September 2020

South Side



North Side



It is clear that significant deterioration has occurred since the writer carried out his original inspection of the wall in 2005. Significant further spalling has occurred to the brickwork and much more of the core of the wall has been exposed. As recommended in the report prepared by Derbyshire County Council in 2014, protective fencing has now been erected to each side of the wall to prevent pedestrian access and to keep personnel safe in the event of collapse.

4.00 DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS:

4.01 Since the significant deterioration which has occurred since the writer's inspection in 2005, it is considered that piecemeal repairs will no longer be practical or safe. In view of the risk of the wall becoming unstable and collapsing in the places where the northward lean is at its highest, or where significant loss of section has occurred to individual masonry units, it is recommended that, as soon as possible, the wall should be carefully dismantled down to a level where it is considered to be solid and stable enough to retain what remains. Safe working platforms will have to be erected to each side of the wall to achieve this. These should be designed to give the wall temporary support while it is being carefully taken down.

Any re-usable bricks should be stored in an environment where no further deterioration can occur. The top surface of the remaining wall should also be protected from the elements to prevent further weathering. It is considered that there at least three rebuilding options which could be considered. These include:

4.01a Rebuild the wall plumb and square to the existing details in its entirety using reclaimed bricks and newly made special bricks. All existing corroding ferrous metal ties should be removed and the northern and southern skins of brickwork should be tied together with new stainless steel ties. The existing pipework, if in suitable condition, could be reinstated if it is so wished.

4.01b Rebuild part of the wall plumb and square to the existing details using reclaimed bricks. All existing corroding ferrous metal ties should be removed and the northern and southern skins of brickwork should be tied together with new stainless steel ties. The existing pipework, if in suitable condition, could be reinstated in the partly rebuilt section if it is so wished. Rebuild the remainder of the wall using new solid brickwork to comply with current Codes of Practice, showing a clear, readable joint between the old and new brickwork.

4.01c Once the wall has been taken down to a level which is considered to be solid and safe, rebuild the wall in its entirety using new solid brickwork to comply with current Codes of Practice.

4.02 Of the options noted above, 4.01a would be the most desirable, followed by option 4.01b. Option 4.02c would be the least desirable and, in any event, is unlikely to be approved by the Heritage Bodies.

4.03 It should be noted that the foundations of the wall are considered to be adequate for any rebuilding and do not appear to need any strengthening works to be carried out.

FOR AND ON BEHALF OF WARD COLE

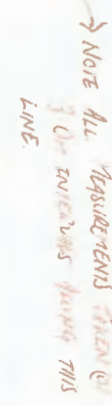
A handwritten signature in black ink, appearing to read 'A. V.' or similar, with a stylized flourish at the end.

A DEMPSTER, B.Sc., C.Eng., M.I.Struct.E., M.I.C.E.

APPENDIX A

Measurement Locations

Horizontal Measurements



OLD ENGLISH GARDEN WALL
MEASUREMENTS TAKEN ALONG THE SOUTH
ELEVATION OF THE NORTH WALL.

PLAN POS'N #	TOP MEASUREMENT	BOTTOM MEASUREMENT
1	25	0
2	67	30
3	85	0
4	105	0
5	92	0
6	80	0
7	45	0
8	35	0
9	15	20
10	15	25
11	0	35

OLD ENGLISH GARDEN WALL
MEASUREMENTS TAKEN ALONG THE NORTH
ELEVATION OF THE NORTH WALL (CONTINUED)

PLAN POS'N #	TOP MEASUREMENT	BOTTOM MEASUREMENT
17	45	0
18	30	0
19	27	0
20	23	0
21	0	0
22	0	10

OLD ENGLISH GARDEN WALL
MEASUREMENTS TAKEN ALONG THE NORTH
ELEVATION OF THE NORTH WALL.

PLAN POS'N #	TOP MEASUREMENT	BOTTOM MEASUREMENT
1	15 (mm)	30 (mm)
2	3	60
3	35	90
4	45	125
5	55	135
6	55	135
7	52	130
8	45	100
9	40	85
10	25	48
11	25	25
12	10	0
13	28	0
14	35	0
15	32	0
16	45	0

APPENDIX B

Trial Hole Location Plan

Trial Hole Logs

Job Title
ELVASTON COUNTRY PARK

Checked

Date

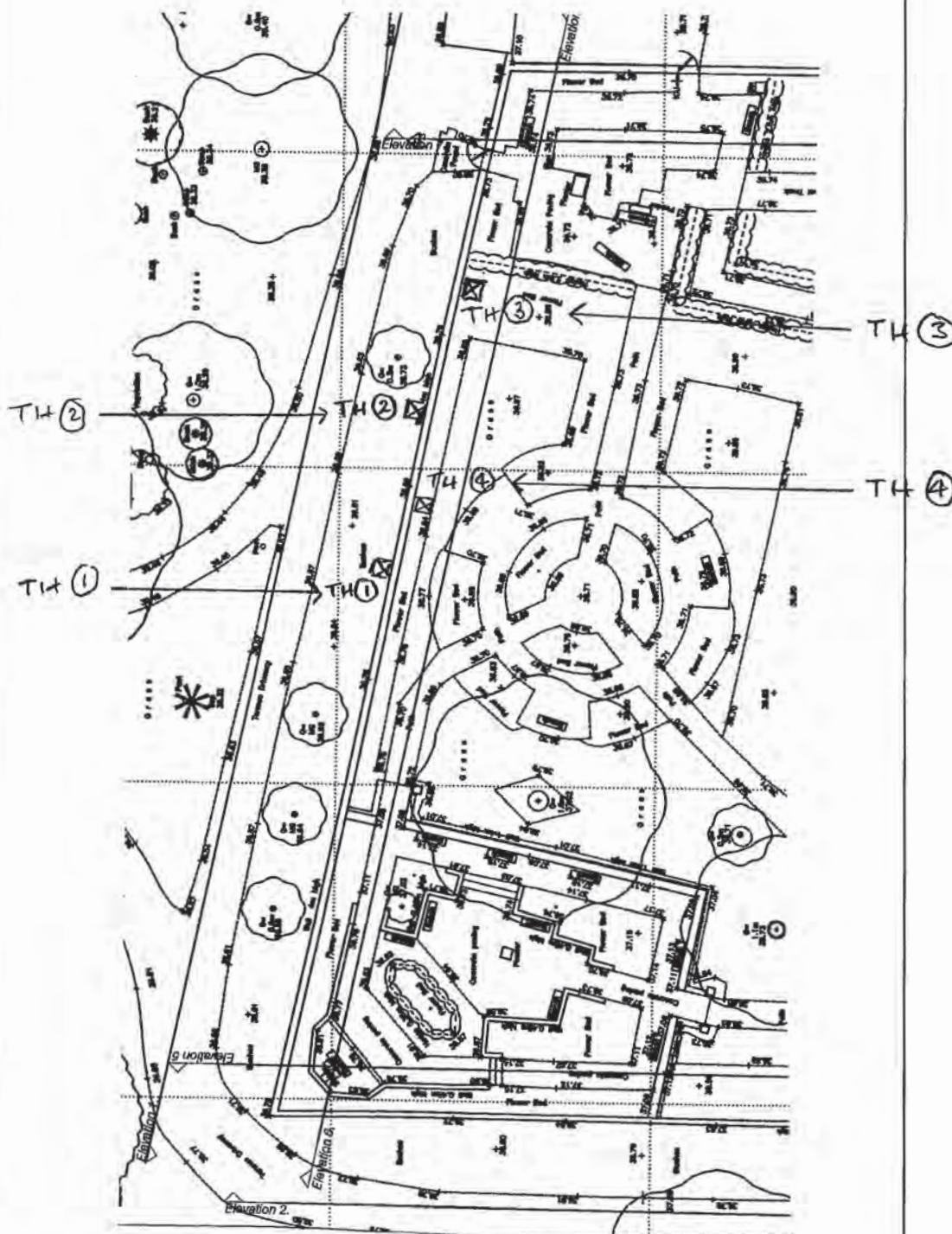
Calculation Title
OLD ENGLISH GARDEN WALL

Revised

Date

TRIAL HOLE POSITIONS (APPROXIMATE)

N ←



Job Title
ELVASTON COUNTRY PARK

Checked

Date

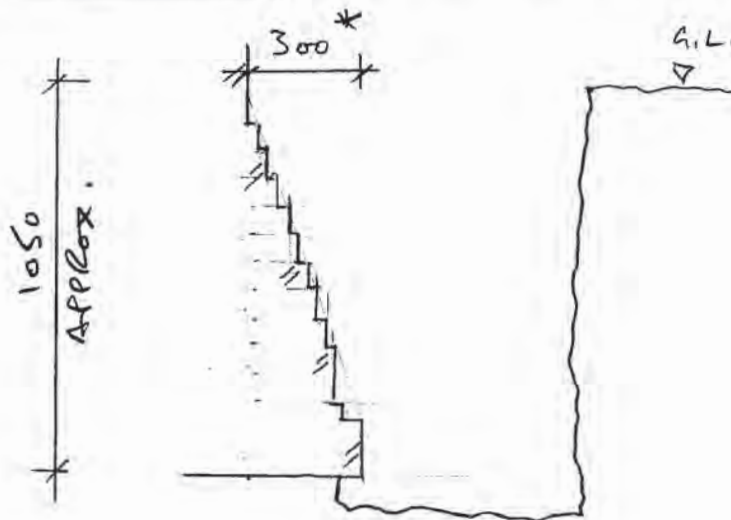
Calculation Title
OLD ENGLISH GARDENS WALL

Revised

Date

TRIAL HOLE LOGS

TH (1) AND TH (2) (TO NORTH SIDE)

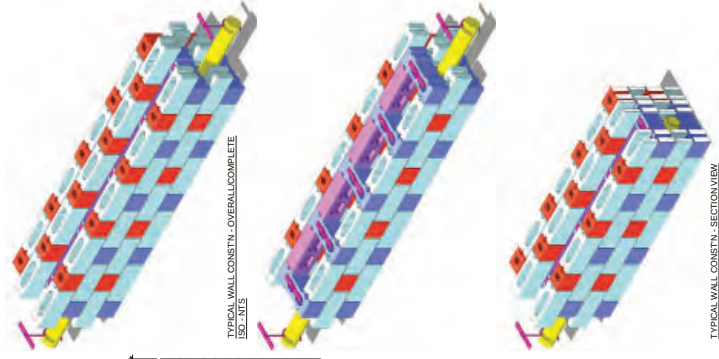
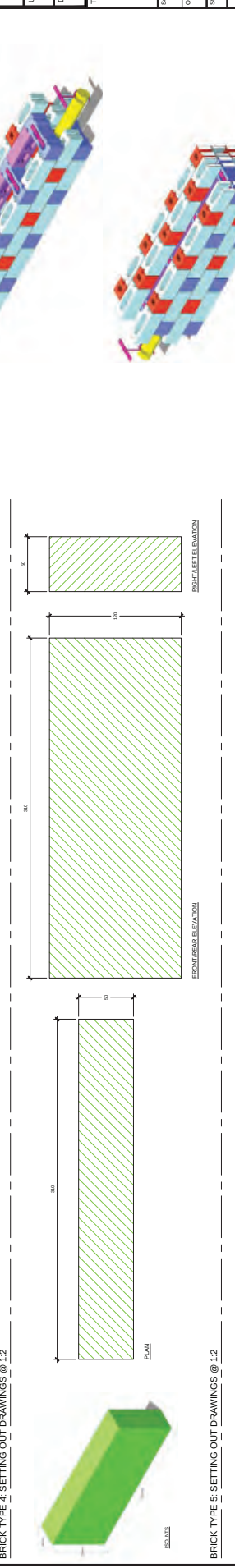
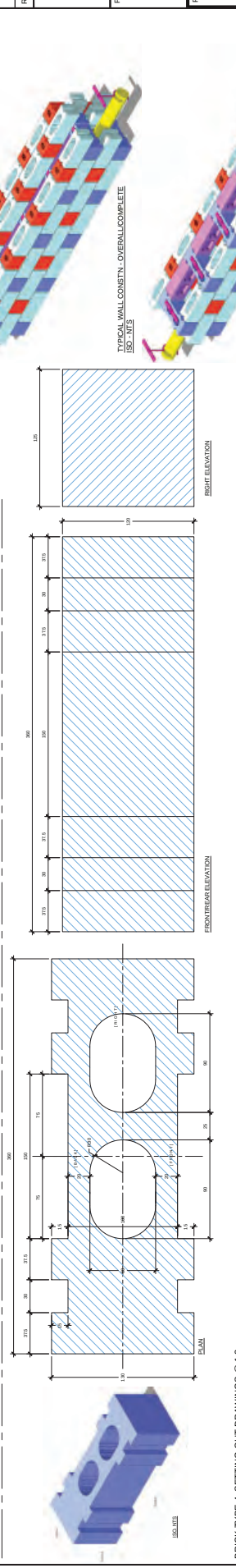
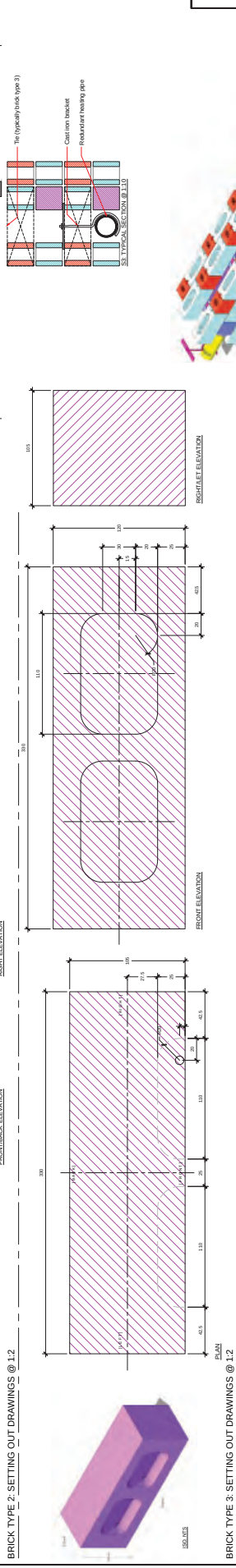
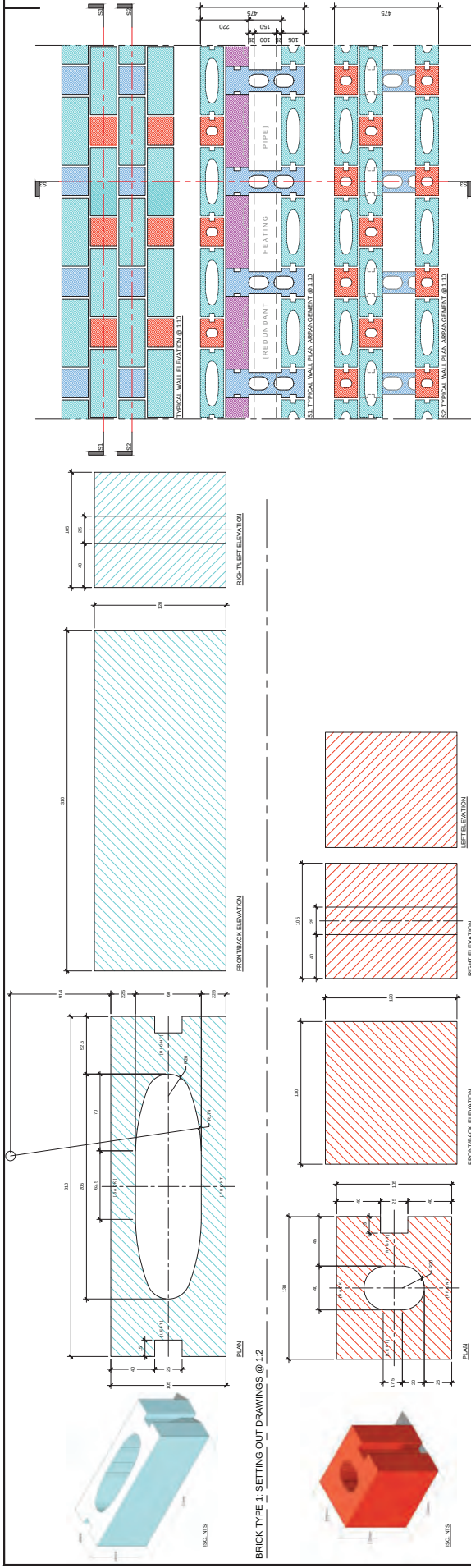


TH (3) AND TH (4) (TO SOUTH SIDE)

AS ABOVE EXCEPT * DIMENSIONS IS 200

APPENDIX C

Typical Wall Details



Rev	Details of Revision	Date	Initial
 Derbyshire County Council Corporate Property Planning Department Jeremy Goucher Chesham Hall, Chagford Road, Chagford, Devon PL30 2JF Tel: (01329) 150000 Fax: (01329) 330266			
Project Details Project ELVASTON CASTLE OLD ENGLISH GARDEN WALL REPAIRS			
UPRN Number		2853-01	
Drawing Number		P06-SK04	
Title TYPICAL EXISTING WALL CONSTRUCTION DETAILS			
Scale	Drawn	Checked	
VARIOUS	AG	AG	
Original Size	Date	Date	
A1	29/03/2018		
Status			
PRELIMINARY			
DO NOT SCALE			
Use only values for construction work unless otherwise stated. If the work being put into hand, any discrepancies reported to the originator.			
 INVESTOR IN PEOPLE			

Structural Report (Part 1) - Derbyshire County Council (Sept 2014)

CONTROLLED



**CORPORATE RESOURCES DEPARTMENT
CORPORATE PROPERTY**

Structural Report

On

**Defective free standing Walls to the Old English
Garden and Secret Garden.**

Part 1

At

**Elvaston Castle,
Elvaston, Derby.
DE72 3EP**

UPRN No: 2853-01

Report By: Keith Czertowicz

Checked by: D. Hart

Date: 10 September 2014

**Jeremy Goacher
Director of Property
Chatsworth Hall
Chesterfield Road
MATLOCK
DE4 3FW**

Brief

Further to an E-mail request of 01 September 2014, from Jamie Lancaster / DCC Area Surveyor / Building Surveyor for structural advice at the above property, K Czertowicz (DCC Senior Structural Engineer) visited the site 5 September 2014, to look initially at wall A (as referenced on attached plan (M1) with regard to removal of the unsightly Heras fence and to carry out further wall inspections and report on the condition of the defective freestanding walls which surround the gardens. These walls were reported on previously by Richard Lowe (Retired) DCC Structural Engineer on 25/05/1995 and this report is intended to update this and add further comment or highlight any changes and occurrences since that date and is as follows:-

Observations

See attached pages 1 to 23.

Structural Report

Wall A

The walled gardens are most likely to be part of the original castle construction which is about 200 years old.

The large format bricks used for this wall are not commonly seen and were most likely hand made.

They are hollow and have special side grooves, which correspond to metal discs which interlock the bricks. These have corroded badly causing some bricks to split and spall.

Replacements of bricks of this size and type would have to be specially hand made.

Some of the damage to wall A may be longstanding as consequence of the heat applied in the past when it was a greenhouse via hot air ducts, which may occur within the wall. Heating pipes are also likely to have been hung off the wall as this occurs within the derelict greenhouses in the adjacent secret garden.

Comments regarding spalling of bricks in 1995 still apply although weathered and open pointing is also prevalent.

Leans in the wall of up 125mm measured in 1995 were re-measured to be about the same today. It was suggested in the 1995 report that rotation/ failure of the foundation could be the most likely cause. It was also stated that in order to confirm this there was a need to assess the ground by carrying out a trial pit investigation, however this has not progressed. There is a section of stepped displacements along horizontal beds creating a lean, which is not a rotation. Loss of support from the former greenhouse rafters was mentioned in the 1995 report. Whilst rafters may have helped restrain the wall, the lean is away from the garden. A design check shows that the wall if adequately bonded and in good repair should be adequate as constructed.

This wall is in a poor state of repair and the fencing should remain until its many defects are rectified. The wall needs further investigation to establish fully how unstable it is. Its construction needs to be fully understood including the purpose of the “metal disc” ties and how they might help bond the bricks to form flues or if the wall is solid, however internal inspection is essential to confirm this by removing a brick to view inside the wall or flues if present. The back of this wall needs to be cleared of climbers so that the back face can be inspected as this may or may not be fully tied to the inner wall face.

The wall leans away from the garden side, so should be fenced off both sides as the public have access to the rear of the wall.

It may be necessary to carry out some localised rebuilding and BRE Digest 475 suggests an ultimate limit of 1 in 50 for leaning walls. This limit is exceeded and whilst rebuilding would be preferable, buttressing on the rear of the wall was suggested in 1995. As an alternative solution, a temporary shoring scaffold was also recommended to prevent collapse. This had not been installed.

Wall B

Further deterioration of this wall may have occurred. The section which adjoins wall A has several diagonal cracks up to 3mm (P14) occurring as a likely result of localised settlement. A trial hole would help clarify this. This may have occurred since 1995 as it was not recorded in the original report. There is a bricked up former entrance nearby which may have led to a tunnel as shown on old OS maps.

Whilst it was stated by RJJ that in 1995 this wall was more robust than wall A with no serious loss of pointing, it appears that continued lack of maintenance and subsequent weathering has continued to weaken this wall with further loss of mortar especially near the top of the wall, where many plants such as buddleia are starting to be established causing additional root damage.

Leans of up to 125mm were recorded in 1995. This lean was not visibly obvious or worse, although this was not measured at the time of my visit. Surveyor's measurements and locations from 1995 that go with RJJ's report were not found.

Wall C

The Secret Garden formerly known as the nursery garden in the 1995 report was only briefly seen and the walls were not inspected in detail during my visit due to limited access. Wall C was described in 1995 as being in the worst condition of all the walls with leans twice those of walls A and B. Heras fencing is in place along this wall and whilst it has survived since 1995 the adjoining wall F has not and has been rebuilt. The opposite wall G which continues after the lean-to buildings has been repaired in the past with substantial piers added on the outside of the garden, see P18. The wall leans approximately 280mm and is clearly visible.

Walls D and E were not commented on in 1995.

Wall D

This wall is the back of another greenhouse heated wall very similar to wall A; however it is cloaked in ivy (P16). Weathering of mortar and loose copings were seen. The wall was not looked at on the opposite (south) side but may exhibit similar defects to wall A. Removal of all the Ivy is essential prior to a detailed inspection. A small lean-to shed is currently fenced off.

Wall E

This is the dividing wall between the Old English and Secret Gardens. A brief inspection (P17) shows the extensive weathering to the top section of wall affecting about 17 courses. Rebuilding the top section of this wall is recommended.

Conclusions

Generally the original report still applies fully with the current deteriorating condition reflecting the timescale between then and now. All the walls require some repair urgently to re-establish the strength in the masonry through many years of weathering and little maintenance. These walls have been in this poor state for some considerable time and will continue to deteriorate without maintenance potentially leading to collapse. This has occurred where other sections of wall have collapsed. The weathering of mortar is now increasing leading to reduced strength instability and potential collapse under high wind conditions. The current policy of fencing off and waiting for walls to collapse should be reviewed with regard public access and consideration given to partial demolition and rebuilding. Further enabling work are required to fully explore these defects. It may be possible to improve the walls considerably and extend their life by localised brick and mortar repair and partial rebuilding for minimal cost, reusing existing materials where possible. As a grade 2 listed structure, advice should be sought again from DCC historic buildings advisors.

Recommendations

In order to progress this investigation prior to detailed repair recommendations the following enabling works and precautions are required.

- Wall A provide Heras fencing to rear of wall (north side).
- Wall A remove all climbers to rear of wall (north side).
- Wall A remove spalled bricks to establish masonry bonding, extent of metal ties and presence of any voids or ducts.
- Wall B carry out trial pit to rear of wall, to establish foundation, depth and ground conditions.
- Wall C to be further inspected by Structural Engineer. Surveyors records on recorded lean measurements 1995 or subsequent if available would assist.

- Wall D remove ivy and other climbers on garden side (North face) to allow inspection.

Attachments

- Observations
- Plans / maps M1 to M4
- RJL Structural report: freestanding walls at Elvaston Castle.
- Photographs

Structural Report (Part 1) - Derbyshire County Council (Sept 2014)

CONTROLLED



**CORPORATE RESOURCES DEPARTMENT
CORPORATE PROPERTY**

Structural Report

On

**Defective free standing Walls to the Old English
Garden and Secret Garden**

**Part 2: Additional investigations supplementary
to report dated 10 09 2014.**

At

**Elvaston Castle,
Elvaston, Derby.
DE72 3EP**

UPRN No: 2853-01

Report By: Keith Czertowicz

Checked by: RJ Moss

Date: 09 December 2014

**Jeremy Goacher
Director of Property
Chatsworth Hall
Chesterfield Road
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Brief

Further to our previous site inspection on 5 September 2014 and our initial report dated 10 September 2014, a further partial inspection was made 25 November 2014 by Keith Czertowicz (Senior Structural Engineer). This investigation was required to establish the construction of wall A and investigate the north side of the wall which was previously covered in ivy.

Wall D was also cleared of climbing vegetation to allow an initial inspection with regard to immediate safety and protective fencing. Subsequent to the first report the head gardener had reported that wall E could be rocked when accessed at high level using a cherry picker. This was also investigated with regard to immediate safety and requirements for protective fencing.

A cherry picker was provided by Pete Hogg (Head Gardener) and was used to view the top of walls A, B, D and E. Jamie Lancaster (Area Surveyor) attended and provided a bricklayer to take out loose or damaged bricks at key locations to establish the construction of walls A and D which are visually similar. Since the previous report the locations for the original 1995 alignment survey have been found which gives the locations of each measurement along the wall.

Investigation Findings

Wall A

490mm thick, slightly thicker than 2 bricks wide with a hollow cavity.

The wall is in two leafs with a one brick thick backing wall on the north side, a 150mm wide cavity and a half brick skin to the south face. There are long headers which bridge the cavity and tie the two leaves together. There is a cast iron heating pipe (photo 1) at low level which runs along the length of the wall adjacent to where the former lean-to greenhouse used to be running within the cavity. Where visible the cast iron pipe does not appear to be badly corroded. The greenhouse would have been heated by a boiler, possibly on the north side of the wall providing hot water to the cast iron pipe and heating the greenhouse from inside the wall cavity. Old OS maps show that greenhouses used to run along part of the north face of wall A, adjacent to the lean-to bothy buildings which remain. Along the line of the pipe snapped headers are used and may be the reason for the grooves and iron ties since the bond pattern is weak along that course of bricks. Similar untied rows may occur elsewhere at intervals up the wall and this may be evidenced by the continuous rows of spalled bricks seen.

The special side grooves seen in the bricks have corresponding metal disc ties on both vertical joints either side of the header in order to interlock the stretchers with the headers and snapped headers. Refer to detail SK1 for the assumed bond arrangement. These ties have corroded badly causing expansion of the metal and splitting and spalling of the bricks. This splitting is made easier by the presence of large voids within the bricks in particular the stretchers. This occurs in distinct horizontal bands at 3 or 4 levels and intermittently along the length of the wall.

The large format bricks used for this wall have a face width of 102mm on the south face but near the top of the north face where loose masonry had been removed, the faces were only 65mm wide.

Wall A was recorded as leaning by up 125mm in 1995. This was clearly visible when viewed from high level with a distinct outward curve toward the end nearest the entrance gate (photo 2) which was the position as recorded in 1995.

The rear of the wall (north face) was inspected at the end nearest wall B and where accessible was found to plumb and flat with mortar mostly present in joints except for some open joints towards the top. There is some efflorescence and moss present and some plants self-seeded into the copings. The north face of wall A does not have the distinct stepped movement seen on the south face associated with the metal ties as presumably these are not present. The wall appears to have had some protection from the ivy; however a section of masonry had been dislodged near the top. The opened up section showed solid masonry visible for the full width of the wall, i.e. no cavity present and no metal ties. The bonding of the internal bricks appeared to be less regular and it also contained what appeared to be weathered concrete or gravel infill.

Wall B

This wall is 1 ½ brick thick wall built in Flemish bond.

Leans of up to 125mm were recorded in 1995. This lean was not visibly obvious, from ground level however when viewed from above from the cherry picker the wall clearly snakes at the top (photo 3) in a shape consistent to those measurements taken in 1995. The 1995 survey points should be re-measured to verify if movement is continuing.

Whilst walking along the back of the wall (west face) there are a number of holes caused by missing bricks behind shrubs and near the base of the wall (photo 4).

Wall C

This wall is 1 ½ brick thick wall built in 1/3 running stretcher bond with occasional headers.

This wall was not inspected although when viewed at the corner with wall E there is a lean clearly visible at the top which is considered excessive. In 1995 it was recorded as 195mm. This would appear to be close to collapsing under its own weight.

Wall D

Approximately 490mm thick, slightly thicker than 2 bricks wide with a rubble filled cavity.

This wall at the back (south side) has a dilapidated lean too greenhouse which is overrun by vegetation. After removal of 2 brick stretchers by the bricklayer, the wall appears to be of solid construction with no cavity or internal heating system as found in wall A. A heating pipe is visible externally at high level fixed directly to the wall. Whilst access was limited, from photographs taken at the time of my visit, there would not appear to be the degree of spalling of bricks which has

occurred on wall A. It is therefore unlikely that the metal ties found on wall A were used in wall D.

The north face of wall D was previously cloaked in ivy and, some of it had been removed prior to this inspection. From the limited access available and a brief inspection, wall D would appear to be plumb and in relatively good condition. Weathering of mortar and loose bricks and copings were seen in specific locations at the top of the wall and in particular near to the small lean-to shed which is currently fenced off. When viewed from above the wall appears straight (photo 5).

Wall E

This wall is 1 ½ brick thick wall built in 1/3 running stretcher bond with occasional headers.

This is the dividing wall between the Old English and Secret/Nursery Gardens but also continues beyond the intersection with wall D to the intersection with wall C. This continued section was in the worst condition and when held at the top in the middle of the run the wall could be made to rock. This is probably made worse by the presence of an almost full height crack (photo 6), through which daylight is clearly visible. The crack steps slightly but increases from hairline at the bottom of the wall to about 30mm at the top.

There are visible gaps between stone coping and brick face and mortar erosion is very extensive and not just towards the top as seen previously within the Old English Garden section. When viewed from above the wall appears straight along the line of coping stones. Approximate measurements taken at 3 locations suggest leans at the wall top of 25 and 50mm and bowing in the middle of 25mm. There is also evidence of sloping coursing suggesting settlement along the length from the position of the vertical crack progressively towards the junction with wall C.

Wall F

This wall is 1 ½ brick thick wall built in 1/3 running stretcher bond with occasional headers. This wall was not required to be inspected at this time.

Wall G

There has been no request to inspect this wall at present. Visually there are excessive leans outward on this wall which appear to have been stabilised by a long standing arrangement of raking buttresses. We have no record for this work on our files.

Conclusions

Generally all the structural reports carried out so far describe the ongoing deteriorating condition of the garden walls. This follow on report investigates why wall A was failing and provides possible repair solutions subject to agreement with historical advisors, so that the existing fencing could be removed to improve public viewing. However since the issue of the first part of this report the

continuing investigation, in conjunction with the gardening team, has highlighted further problems. This has led to additional structural defects being identified in this report. Separate advice on immediate safety has already been given by E mail to J. Lancaster 28/11/2014, with regard to further fencing off to the worst areas seen, a summary of which follows. Where the gardeners still wish to work behind these fences it will be necessary to provide shoring to the wall for further protection.

Whilst all of the walls require some repair, in view of the likely costs only the worst affected areas requiring immediate attention are covered so far in the following recommendations and investigations will continue as necessary. This report should not be regarded as complete.

As a general item all vegetation growing out of walls should be removed and whilst repointing and repair of weathered brickwork is a widespread problem it is essential to re-establish the strength of some of the walls which are in the worst condition.

Some small holes evident within the soft bricks and mortar of these walls generally were thought to be due to masonry bees as seen in an earlier external report (Simpson and Brown Architects, Edinburgh), although there were no signs of these bees at this time of year.

It is a possibility that the leaning of the walls generally could be partly a result of rotation of the foundations due to soft ground. The trial pit record on file (attached) carried out by Ward Cole in 2010, indicates that whilst the foundations are presently 1m deep (the location is unknown) for wall F, the two lower tiled levels recorded suggest that the soil has been built up over the years. There is no soil description with the trial hole, however geological maps show the site is within a sediment filled channel with soft silts overlaying sands and gravels associated with the river Derwent which occurs nearby. This aspect should be clarified by further ground investigation by trial holes on each of the remaining walls.

Recommendations

Wall A

Currently wall A is fenced off fully to the rear and for about half its length within the garden.

Refer to drawings 2853/SK2 and SK3, for repair details for stabilising the south facing skin of brickwork. This work will stabilise the inner skin by localised removal and replacement of spalled bricks caused by the expansion of metal ties. In addition SK3 shows in addition the requirement for the removing and rebuilding the "stepped" sections which appear to have been pushed out by the expanding metal ties.

Some of the ivy pulled off the wall still remains heaped at ground level limiting full access to the north side of the wall. This should be removed fully to allow inspection and repairs.

Wall B

Repair the holes as seen in photo 2. Carry out further accurate alignment checks to confirm whether movements recorded in 1995 are increasing. Arrangements for this are to be agreed with J. Lancaster. The original survey was conducted by the building surveyor's team. Continue to monitor diagonal cracking near to seated area in herb garden and consider carrying out a trial pit to rear of wall, to establish foundation, depth and ground conditions.

Wall C

Not yet fully inspected by a Structural Engineer and currently fenced off (since 1995) for the full length within the nursery garden. This wall is in immediate danger of collapse. Further fencing has been instructed for south side full length. This wall should be safely taken down prior to an uncontrolled collapse.

Wall D

Fencing off of the area close to the lean too building and the corner with wall B has been instructed, opposite areas of loose masonry at high level, which could fall and should be taken down. Some fencing was already in place previously.

Further removal of the Russian vine (south side) which has grown through and damaged the wall is required.

Continue to remove ivy and other climbers on garden side (North face) to allow further inspection and repairs, to be arranged by the Surveyor.

Wall E

Fencing off of the wall both sides from the junction with wall C up to a point just before the access door has been instructed. Shoring has also been proposed to allow access behind the fencing by the gardeners. Initial details and loadings have been issued to J. Lancaster 01/10/2014, for design of the raking shores by a specialist sub-contractor. Subject to budget estimates, calculations and construction details will need to be submitted to the Structural Engineer for checking prior to carrying out these works. Rebuilding is required for the section from the intersection with wall D up to the corner at wall C. The central portion should be carefully taken down to mid-height and raked back to the return walls to prevent collapse.

Wall F

This wall was not inspected at this time but a trial pit investigation was carried out in 2010 by Ward Cole Consulting Engineers, Nottingham for wall F and shows a corbelled masonry footing at 1m depth. Repair details were found on file which show stainless steel reinforcing bars were installed in the collapsed and rebuilt

section of wall which adjoins the corner with wall C. It was considered by the Engineer that the original wall thickness was insufficient for the height and wind loads for the site and rather than add piers on the outside as occurs on wall G, steel bars were added in concrete pockets formed by leaving voids in a rat trap bond pattern. This method would also be appropriate for the rebuilding of other walls such as C and E, as and when funding allows.

Wall G

This wall has not been identified as defective.

Attachments

- Photographs 1 to 6.
- A4 Sketch detail SK1 showing the construction of wall A.
- A3 Sketch detail SK2 showing proposed localised repairs to wall A south face.
- A1 drawing SK3 showing wall A, south elevation, sections and location plan and stepped repairs.
- Trial Pit investigation dated 2010, by Ward Cole Engineers.



Photograph 1 - Wall A - cast iron heating pipe within cavity



Photograph 2 - Wall A -bowing towards entrance.



Photograph 3 - Wall B - showing distinct S shaped movement.



Photograph 4 - Wall B - west side- missing bricks in wall.



Photograph 5 - Wall D – view along top of wall.



Photograph 6 – Wall E mid-way between junctions with walls D and C – vertical crack and point at which wall can be rocked.

