

FEASIBILITY STUDY
DEVELOPING NEATH ABBEY IRONWORKS THROUGH HERITAGE-DRIVEN
REGENERATION AS AN ACCESSIBLE LIVING ASSET

The Friends of Neath Abbey Iron Company,
Wern Ddu Uchaf Farm,
Wernddu Rd,
Alltwen,
Pontardawe,
Swansea.
SA8 3JA
wernddu@tiscali.co.uk

July 2019

Executive Summary

Neath Abbey Ironworks is a unique site of world importance, being one of its kind in producing iron in its huge blast furnaces and at the same time being one of the greatest engineering concerns in Great Britain, making railway locomotives, marine engines, iron ships and stationary steam engines. These products powered the Industrial Revolution, and made Wales the first industrial society.

It is situated close to the Cistercian Neath Abbey, with close links to the M4 and Neath town centre, and covering an area of 0.6 hectares in the Cwmfelin valley. Due to safety reasons, it is presently closed to the general public with site access controlled by the Friends of Neath Abbey Iron Company (FNAIC) and Neath Port Talbot County Borough Council.

Supervised access is possible, but only at events coordinated by FNAIC, and these are limited by funding and the capacity of volunteers. There are on-going issues with unauthorised access and anti-social behaviour. The most significant risk to users at ground level is falling debris from elevated portions of the structure. Specifically, areas of loose stonework exist above the engine manufactory wall and the tops of the furnaces.

Despite these limitations, in the past two years the site has been completely transformed from a derelict dumping ground into a community space. Removal of trees and ivy has stopped the damage of archaeological remains, and herbicide spraying of vegetation such as Buddlieia and ivy has saved the monuments from further degradation. Clearing of illegal refuse tipped from the site has metamorphosed this forgotten valley into a useable community space. This work has been managed by FNAIC, a charitable incorporated organisation, formed from an enthusiastic group of committed local people.

Despite this transformation, unless safe access can be guaranteed, it is hard to see how the full potential of this site can be sustained. A recent CADW report (Dr Jessica Hughes, CADW, November 2016), stated that the monument at risk level was high. Further work will require external funding.

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Section One: Description of Issues:

- I. Neath Abbey Ironworks is a unique site of world importance which is presently closed to the general public due to safety reasons. A recent report stated the Ironworks' condition was, "*severe...Condition Current: unfavourable Monument at Risk Level: high*". Dr Jessica Hughes [CADW] (November 2016). This is primarily due to damage by vegetation. Unless safe access can be gained to the site, it is hard to see how the full potential of this site can be realised. Neath Abbey Ironworks must be part of a larger tourism strategy that includes Neath Abbey and other important sites, if it is to be preserved for posterity. In a recent survey carried out of stakeholders, the most important requirement named by all groups was site safety. This would involve fencing of dangerous areas and stabilization works to the monument (Please see Section Seven). The second requirement was information and interpretation of the site. This will involve information boards, a website, and a guide (Please see Section Nine).
- II. Supervised access is possible at events coordinated by the FNAIC group, but these are limited by funding and the capacity of volunteers. FNAIC is an enthusiastic group of committed local people who wish to see the site conserved for future generations because of its national importance, and were formed in 2004. Previously, a small group of dedicated local people, the Dyffryn Clydach Volunteers, had been voluntarily maintaining Cwmfelin (the valley in which the Ironworks is located) for more than 30 years, gaining a 10 year lease from Neath Port Talbot County Borough Council (NPTCBC) in 2009.
- III. Despite the limitations inherent in a small local voluntary group, in the past two years the site has been completely transformed from a derelict dumping ground into a community space. Removal of trees has stopped the damaging of the archaeological remains; herbicide spraying of vegetation such as Buddlieia has saved the monuments from further degradation and the clearing of refuse tipped on the site has converted this forgotten valley into a useable community space. This has been achieved by the several groups within the local community working in partnership, but has been led primarily by FNAIC.
- IV. In order to raise the profile of this forgotten site of heritage, FNAIC, funded by the Regenerate NPT Rural Development programme LEADER scheme and the National Lottery Heritage Fund, has run a series of events as part of its audience development plan. This culminated in a week long archaeological survey coordinated by the Glamorgan-Gwent Archaeological Trust (GGAT) in April 2019. This was one of many event held on the site over the past 2 years, allowing a large number of people to experience the site first hand. However, this is not the only way the site has been used to engage local people, information via social media and our extensive list of local talks and exhibitions has also helped to raise awareness of this endangered and forgotten site.
- V. However, as already stated, unless safe access can be guaranteed, it is hard to see how the full potential of this site can be sustained. The monument is at a high risk

level and needs urgent work to stabilize the monument in order to make it safe. **Further work will require external funding.**

Section Two: Historical Description: Transforming our world in numerous ways

- I. Neath Abbey Ironworks was established in 1792 by the Quaker Fox family of Cornwall and some friends. It possesses the two tallest masonry blast furnaces ever built at 65 and 53 feet which were in use until 1850. In the early nineteenth century, as well as a bulk producer of iron, it uniquely rose to become one of the greatest engineering concerns in Great Britain, making railway locomotives, marine engines, iron ships and stationary steam engines under the leadership of Peter Price and his sons, Joseph Tregelles Price and Henry Habberly Price. These products powered the Industrial Revolution, and made Wales the first industrial society. It exported this technology globally, and is a place that literally changed our world. It closed in 1886. Its plans are registered in the UNESCO Memory of the World Programme.
- II. Numerous stationary steam engines were made by the Ironworks to designs by famous engineers such as Richard Trevithick and Arthur Wolf. Neath Abbey engines developed the iron, copper and coal mining industries in Great Britain, especially south Wales, providing power for the Industrial Revolution.
- III. There are several notable surviving structures; these include two superb blast furnaces (NPRN 85098) dating from 1793 built against a rock face for ease of charging and the engine manufactory (NPRN 85097) on the site.
- IV. Nearby is Ty Mawr, the ironmaster's house dating from 1801. Some 450 metres due north up the Clydach valley is a former water-powered forge (NPRN 40458); the building was later used as a woollen mill (NPRN 96478) until it closed in 1974. The machinery is presently stored by the City and County of Swansea, Gower Heritage Centre and the National Wool Museum.
- V. After the success of Trevithick's first railway locomotive in Merthyr in 1804, the adoption of steam haulage in south Wales was slow, but in 1829, one of George Stephenson's engines was purchased by the Penydarren works in Merthyr, and in the same year, the Neath Abbey Ironworks was approached by Thomas Prothero to build locomotives. *Speedwell* was the first to be built by Neath Abbey, and in all 65 were built. Each locomotive was uniquely designed for a particular environment, and this shows the ingenuity of the engineers. The production of these steam engines enabled the hauling of bulk cargoes such as coal and iron to transport hubs such as docks, advancing the Industrial Revolution, and changing our world.
- VI. J.T. Price and H.H. Price started a new steamer service from Swansea to Bristol in 1822. The ships were powered by Neath Abbey's first marine engines, and introduced reliable timetabled steam navigation from Swansea for passengers and high value light goods. By 1829, lines of communication into the interior of the country existed providing reliable carriage of goods. The transport revolution outlined above

was a step change into a modern technological world. The Ironworks also made numerous paddle and screw steamers.

VII. In the 1840s, the Ironworks was a '*cradle of iron shipbuilding*' in launching some of the first examples of iron sailing vessels, beginning with *La Serena*, a barque built in 1848, and the first iron vessel to round Cape Horn. It built, as well, the first 1,000 tons iron sailing ship in the world, *Ellen Bates*, in 1853. Iron ships had a larger cargo carrying capacity over wooden vessels, were stronger, easier to repair, required less maintenance and were more economical. This enabled the cost-effective global transport of bulk cargoes such as copper ore, iron and Welsh coal. Cheaper world-wide transport was a major step towards further globalisation.

VIII. The Ironworks was at the cutting-edge of Victorian technology, and excelled in the training of apprentices. It produced many famous engineers such as David Thomas, founder of the Thomas Iron Company of Hokendauqua and father of the American iron industry, and Sir Benjamin Baker, designer of the London Underground and the Forth Bridge. The training of these engineers spread Welsh technology across the world.

Section Three: The Friends of Neath Abbey Iron Company's current position

I. FNAIC, an enthusiastic group of committed local people who wish to see the site conserved for future generations were formed in 2004. Despite the limitations of the site, the Friends, who are made up of the local community, have already done a great amount of work.

II. In 2017, FNAIC took over from NPTCBC vegetation management and other work, such as refuse removal, litter picking and looking after the structure of the site. This necessitated enhancing the practical skills of FNAIC and included training in the use of brushcutters, chainsaws (City and Guilds NPTC CS30 and 31), fencing and the use of herbicides for the spraying of Ivy and Buddleia (City and Guilds NPTC PA1 and PA6).

III. Joint working groups occur every Sunday afternoon from 1-4pm and on summer Wednesday evenings (7-9pm). In the past two years, the Ironworks has been cleansed of rubbish that has been tipped over decades and metamorphosed into a community space with much potential. Removal of trees and ivy has stopped the damaging of the archaeological remains; the herbicide spraying of ground vegetation such as Buddleia, detrimental to the structure of the archaeological remains, has started the conservation of the site. This has been achieved by the involvement of several groups within the local community.

IV. The latest work has been the spraying of the furnaces with herbicide to stop the damage done by vegetation. This was achieved by a qualified volunteer abseiling down the wall of the furnace.

V. On site community work is enhanced by off-site lectures being given to groups to highlight the heritage of the site, and illustrate its importance. Talks have been, or will be given to Skewen Historical Society, Cilybebyll Mothers Union, Swansea Valley History Society, Neath Rotary, Neath Library, Neath Port Talbot Heritage Forum, Bridgend Historical Society, Neath Library, Pontardawe Library, Skewen Library, Cefn Coed Colliery Museum, Oxford House Industrial History Society and Skewen Salvation Army. A travelling exhibition of the heritage and history of the Ironworks has been produced consisting of ten large panels. This has so far been taken to Neath Library, Pontardawe Heritage Centre, Skewen Church Community Centre, Neath Steam Fair, and will be taken to Neath Civic Centre and Swansea University Miners Library. Numerous tours of the site have been given, or will be given, to groups such as Cardiff Archaeological Society, Bridgend History Society, Oxford House Industrial History Society, the University of the Third Age, the Victorian Society, the Institute of Civil Engineers and the Society of Antiquaries of London, Neath Rotary, Abbey Primary School, Afan Nedd Photographic Club, Wealden Iron Research Group, the Gay Outdoor Club, Institute of Materials, Minerals and Mining and the Watford & District Industrial History Society.

Section Four: The Requirements of Stakeholders

- I. Data was gathered in community meetings, open days, guided tours, feedback from our facebook group, in discussion with a large variety of community groups, our volunteers and schools, including Abbey Primary School, and by surveying our local community. Data was separated into seven sub-groups and only the most important issue for each group is displayed:
- a) The local community: access to the site. This is a heritage site of world importance and has the potential to be used by the people of Dyffryn Clydach and its environs, but cannot be used without supervision. They would like, as well, to use the site as a leisure facility for walking and relaxation.
 - b) Disabled people: access to the site which is both easy and safe.
 - c) Tourists: be able to learn about its history and world importance.
 - d) College students and Trainees: want to learn heritage building skills.
 - e) School teachers: exploring Welsh businesses, and the links between these and international contexts and to use the site in relation to STEM subjects.
 - f) FNAIC and the DC Volunteers: want to want to work on the site and research its heritage.
 - g) Archaeologists and historians, such as those from GGAT: want access to the site for excavations because of the site's world importance.
- II. In conclusion, all groups highlighted the need to access the site safely. Most groups also recognised the need for information and interpretation of the site. Some educational and business groups also highlighted the need to encourage people to study STEM subjects and to use the site to teach heritage building skills.

Section Five: The conclusion of the project

- I. At the conclusion of this part of the project, FNAIC will continue to work on the Ironworks site with regards to vegetation control, day to day management and supervision of the site and the extensive outreach work.
- II. However, this work will not fully achievable unless full and safe access can be gained to the site. On site information needs to be produced if the site is to be interpreted in any meaningful way.

Section Six: Condition of the Ironworks

In a recent report the Ironworks' condition was stated as, "*severe...Condition Current: unfavourable Monument at Risk Level: high*". Dr Jessica Hughes [CADW] (November 2016). This is visible in the photographs below.



Illustration One and Two showing the precarious structure of Furnace No.1.

- I. Mann Williams were appointed by FNAIC to undertake a visual assessment of the standing structures on the site assisted by iBex Technical Access. This was undertaken over three days from the 16th to 18th of April 2019. This report is to be found in full in Appendix Three in the Appendices.

II. The report states:

III. *The general condition of the two blast furnaces and engine manufactory are reasonable. However, the conclusion of the visual assessment shows a number of key risks which we recommend are addressed. These have been split into three main categories:*

- a) *Risks relating to safety and welfare of people on and around the site.*
- b) *Immediate risks to the stability of the monument.*
- c) *Longer term risks to the stability of the monument.*

IV. *Access to the site is presently via a gate that is controlled by the FNAICO and Neath Port Talbot Council. However, it was clear during our visit it is used as a thoroughfare and has issues with antisocial behaviour. The most significant risk to these users at ground level is items falling from elevated portions of the structure. This includes but is not limited to loose stonework and mortar at high level. During the inspection a number of areas of loose stonework were observed at high level, including the engine manufactory wall heads and the tops of the furnaces.*

V. *The other potential risk is to users of the Longford Rd to the west of the site. The road level is some 12m above the site level supported by a cliff and stone retaining wall and separated from the drop by a blockwork wall. We suspect the blockwork wall is insufficient to act as a vehicle restraint barrier and there is no indication of the drop beyond. Furthermore, the stone retaining wall supports the highway and should be inspected on a regular basis as required for highways structures.*

VI. *There are two areas where the monument is at significant risk of local collapse or instability, the north west corner of furnace 1 and the south west corner of the engine manufactory.*

VII. *In the north west corner of furnace 1 a portion of the facing stone to the furnace and a portion of the adjacent boundary retaining wall have collapsed. The client informed us further material had been lost from this area during a minor earthquake in the area in 2018. There are substantial areas of stonework in poor condition, corroded metal lintels with poor bearing and exposed steep earth slopes. There is a substantial risk of further collapses in this area with the potential for relatively large sections of stonework facing to fall from a substantial height.*



Illustration Three showing the dangerous structure of Furnace No.1.

- VIII. *The south west corner of the engine manufactory appears to have been in significant distress during the works in 1995 with significant stabilisation works undertaken. This area is again in poor condition primarily due to root action from large shrubs inside and outside the building. A prop has been installed to support a failed iron and timber beam embedded in this wall. There is a risk of further loss of facing material from this area and a less significant risk of local collapses.*
- IX. *The longer term risks to stability of the monument are a combination of ongoing degradation mechanisms such as vegetation action and weathering causing loose masonry and degraded or missing pointing. Left unchecked these pose risks to site users, items falling from height, and a risk to the monument as portions deteriorate and collapse.*



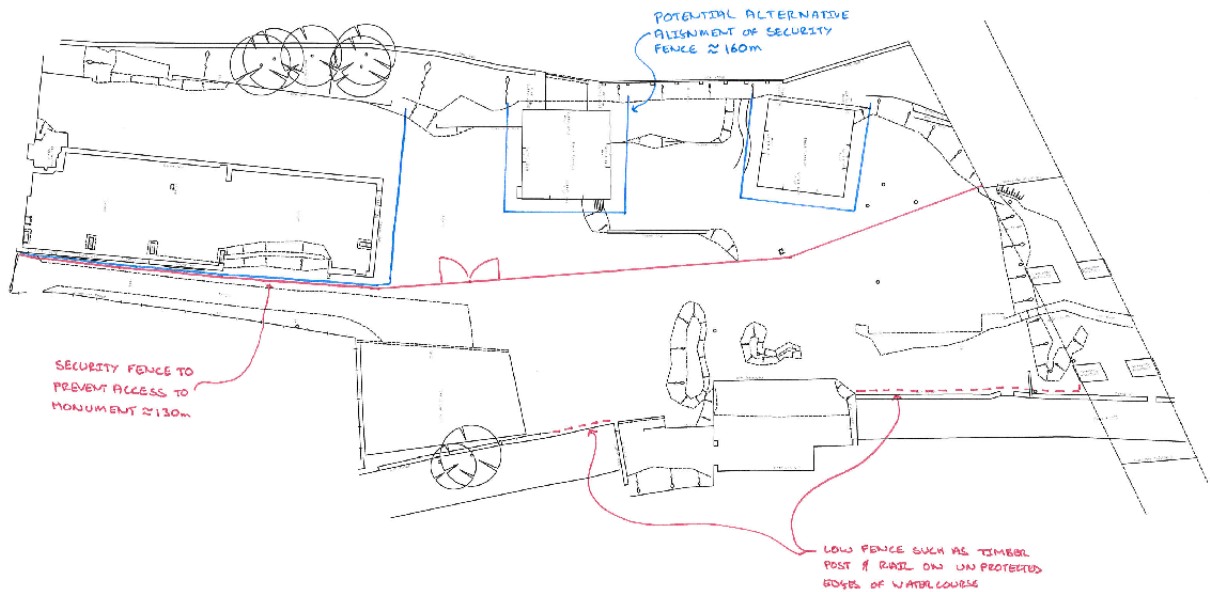
Illustration Four showing the poor condition of engine manufactory

VII. This means, at present Neath Abbey Ironworks (NAIW), is officially closed to the public and access should be available only under supervision by FNAIC or representatives of Neath Port Talbot County Borough Council. Due to the site being officially closed, there are no information boards yet, as, for legal reasons, this could be construed as an invitation to visit the site.

Section Seven: Making the site safe

I. Mann Williams, consulting engineers, make the following recommendations with regards to site safety:

II. Access to the site is presently via a gate that is controlled by the FNAICO and Neath Port Talbot Council. However, it was clear during our visit it is used as a thoroughfare and has issues with antisocial behaviour. The most significant risk to these users at ground level is items falling from elevated portions of the structure. This includes but is not limited to loose stonework and mortar at high level. During the inspection a number of areas of loose stonework were observed at high level, including the engine manufactory wall heads and the tops of the furnaces.



Plan One of Ironworks showing suggested fencing.

- III. *The other potential risk is to users of the Longford Rd to the west of the site. The road level is some 12m above the site level supported by a cliff and stone retaining wall and separated from the drop by a blockwork wall. We suspect the blockwork wall is insufficient to act a vehicle restraint barrier and there is no indication of the drop beyond. Furthermore the stone retaining wall supports the highway and should be inspected on a regular basis as required for highways structures.*
- IV. *There are two areas where the monument is at significant risk of local collapse or instability, the north west corner of furnace 1 and the south west corner of the engine manufactory.*
- V. *In the north west corner of furnace 1 a portion of the facing stone to the furnace and a portion of the adjacent boundary retaining wall have collapsed. The client informed us that further material had been lost from this area during a minor earthquake in the area in 2018. There are substantial areas of stonework in poor condition, corroded metal lintels with poor bearing and exposed steep earth slopes. There is a substantial risk of further collapses in this area with the potential for relatively large sections of stonework facing to fall from a substantial height. In the short term we recommend the area below should not be accessed by anyone unless absolutely necessary. In*

the longer term we recommend a programme of stabilisation works to the furnace and boundary wall.

- VI. The south west corner of the engine manufactory appears to have been in significant distress during the works in 1995 with significant stabilisation works undertaken. This area is again in poor condition primarily due to root action from large shrubs inside and outside the building. A prop has been installed to support a failed iron and timber beam embedded in this wall. There is a risk of further loss of facing material from this area and a less significant risk of local collapses.*
- VII. The longer term risks to stability of the monument are a combination of ongoing degradation mechanisms such as vegetation action and weathering causing loose masonry and degraded or missing pointing. Left unchecked these pose risks to site users, items falling from height, and a risk to the monument as portions deteriorate and collapse.*

Urgent Works

- I. The proposed urgent works are to minimise the existing potential risks to site users including unauthorised site users. The most significant risk to these users at ground level is items falling from elevated portions of the structure.
- II. Mann Williams (MW) recommend that this is mitigated in the short term by fencing the site to exclude unauthorised access and ensuring authorised site users wear suitable protective equipment (hard hats and steel toe capped boots). Furthermore, they recommend a fence is added to the section of the river channel with no edge protection.
- III. In the long term the proposed consolidation works together with an ongoing programme of inspection, vegetation clearance and consolidation could make the site suitable for public access.
- IV. In order to mitigate the risks to users of Longford Road, they recommend the local highways authority are made aware of the drop behind the blockwork wall, their reservations about this wall and the stone retaining wall supporting the highway.

Short Term Works

- I. A Biodiversity Survey, which has been completed, was vital in the identification of protected and unprotected species and their habitats before conservation work commenced. This has given a green light to conservation measures.
- II. The proposed short-term works are to minimise the immediate risks to the monument. There are two areas where the monument is at significant risk of local collapse or instability, the north west corner of furnace No.1 and the south west corner of the engine manufactory.

- III. MW recommend no one accesses these areas unless absolutely necessary and the existing Herras fencing in the engine manufactory remains in place. Consideration should be given to providing signage and or barriers to make people aware of the risks.
- IV. They also recommend a programme of repair works is undertaken to these two areas to consolidate the monument.
- V. MW have developed an initial scheme for consolidating the monument which includes allowances for various methods of stabilisation. These areas are complex with numerous defects in close proximity and their poor condition made inspection difficult. As a result of this, detailed repair proposals will need to be developed on site so they can be adapted to suit the effectiveness of repairs and interconnections of defects.
- VI. In addition to the complexity of the repair works safe access to these areas is also challenging and will need careful consideration. Scaffolding and propping proposals will need to be developed in conjunction with a contractor to ensure they understand the risks posed by the structure's current condition.

Long Term Works

- I. The long-term works are to stabilise and repair the various minor defects in the monument which have arisen as a result of vegetation action and weathering to enhance its resistance to these effects going forward.
- II. MW recommend a programme of repair works is undertaken to consolidate the monument as set out in the attached schedule of works in the report in Appendix Three.
- III. They have developed a schedule of repair works to be undertaken during this phase of works. This has been developed based on the findings of their visual inspection and are their recommendations for bringing the monument into a good state of repair. It is possible additional works may be required if further defects are found on site particularly if these works are delayed.
- IV. MW acknowledge these works may well be undertaken in a phased manner to reduce capital expenditure. These works include repointing, removal of vegetation (inc. large stumps), reconstruction of areas of loose stonework and consolidation of cracks.

Ongoing Inspection and Maintenance Regime

- I. The most significant factors causing ongoing degradation of the monument is vegetation growth and weathering. As it is not possible to halt these processes, MW recommend a programme of ongoing inspection and maintenance.

- II. The most critical activity to protect the monument is control of vegetation growing in the masonry structures. MW recommend a programme of spraying, cutting back and poisoning is developed over a number of years to find an effective method of keeping the structures free of damaging vegetation.
- III. As a large masonry structure, the potential for risks of items falling from height developing over time is substantial. In order to mitigate this, MW recommend the structure is inspected on a regular basis. Similar to bridges and other highways structures they suggest a system of principal and general inspections. General inspections could be carried out annually by a member of FNAIC from ground level with binoculars, this would be to assess vegetation growth, identify any loose material at high level and any developing defects.
- IV. Principal inspections could be every five to ten years or as required following general inspections and would be similar in nature to the inspection MW have recently carried out. This will make the site suitable for public access.
- V. This work will be done by volunteers, advised and facilitated by NPTCBC, CADW, GGAT, contractors and professional advisors such as structural engineers and architects.
- VI. **Grant funding will be sought for this work.**
- VII. Vegetation management is ongoing at the moment with ivy being sprayed on the furnaces by FNAIC. This is being done by volunteers with professional advice and guidance provided by CADW's vegetation plan.

Section Eight: Archaeological position

- I. FNAIC together with staff from the Glamorgan-Gwent Archaeological Trust and local volunteers excavated two evaluation trenches in April 2019. The Ironworks had never been previously archaeologically investigated. (Please see full report in Appendix One for details).

Excavation objectives:

- 1. To hold a community archaeological excavation of two integral areas within the Ironworks complex in order to investigate through observation and recording the buried archaeology associated with the Neath Abbey Ironworks.
- 2. To train local volunteers in archaeological methodology including excavation and recording.

Objective 1:

- I. FNAIC, funded by the European RDP LEADER scheme, commissioned GGAT to assist in the preparation and implementation of a programme of archaeological works

to excavate two integral areas within the Ironworks complex in order to investigate through observation and recording the buried archaeology associated with the Neath Abbey Ironworks, thus gaining knowledge of the site.

II. Following removal of vegetation and clearance of modern rubble, and prior to excavation, a photogrammetric and topographical survey took place. The photogrammetric survey obtained spatial information from photographic images of the site. This resulted in the production of 3-D images and elevations of the structures available for use by other professionals such as archaeologists and engineers.

III. The 3-D image is available at: <https://sketchfab.com/3d-models/neath-abbey-iw-26a1e605df1d445aa54b5953072c77bd>

IV. Elevations are available at: <https://www.dropbox.com/sh/gkmm5vhtffyh8e1/AADjgMv6YhcoLHNriM7xQXeVa?dl=0>

V. Unfortunately, the memory requirements of the data (100GB), preclude the placing of it in this report. The topographical survey is in Appendix Two.

VI. Volunteers from FNAIC and the community over the course of five days (from the 22nd to the 26th April 2019) of inclement weather excavated two trenches. Twenty five volunteers participated in the field work in some capacity. An additional 29 interested individuals attended, but did not participate in the dig. Ages ranged from 13 to 80, and most of the people were from the local community. During the course of the excavation, Trench 1 located the remains of the north wall (1010) of the casting house; the remains were relatively shallow and appear to have been demolished to ground level.¹ A question arose as to whether the north wall represented the base for an open sided building, but it remains unclear. The function of structure 1011 abutting wall 1010 is also unclear, but may be a base/support for roofing or other internal structure. Feature 1013 is possibly part of a crane base. The floor of the casting house, in the area examined, was made up of thick layers of sand, presumably casting sand.

VII. The upper courses of masonry in Trench 2, those over the wheel pit, were missing, but the general level of preservation otherwise was good. It was also found that the wheel pit, at least its northern part, had been cut into solid bedrock. The east and west walls, incorporating the mounting pins, and possibly the south wall (206) were then constructed. The northern wall 205 with its sloping face appeared to have been built abutting the west wall and probably the east wall; although the east and north wall junction was not excavated. Two protruding iron pins located between the wheel pit and the manufactory building uncovered during clearance likely belong to a gear wheel mounting as shown on contemporary drawings.

VIII. The wheel pit appears to have been re-used in the second half of the 20th century with the insertion of a blockwork wall along its east side and the addition of a

¹ For details of numbers see GGAT's Report in Appendix One.

concrete floor. The purpose of this later structure is unclear, although suggestions include a vehicle inspection pit. The later structures within the wheel pit may suggest the wheel pit was at least partially open and visible when they were inserted. The excavation proved the existence and good preservation of the targeted features at a shallow depth below the existing ground. A similar situation may pertain for other buried structures on the site. It is hoped that in the future more extensive investigations can be carried out at this historic site, exposing more of its unique features, constructed during the birth of what was to become one of the most important historical periods in the history of south Wales - the Industrial Revolution.

IX. However, grant funding will be needed for this.

Objective 2:

- I. Prior to the photogrammetric survey, a day school was arranged by FNAIC on the 3rd November, 2018, at which thirty people attended. Led by Adam Stanford of Aerial Cam, the day school was fascinating, and it explained how numerous photographs (some thousands in the Ironwork's case) were taken by either a drone or an SLR camera on a long pole. The software then compared the pixels on the photos, and joined them together to obtain 3-D images.
- II. A week before the excavation started, two trench areas were pegged by GGAT. With regards to the wheel pit, research by FNAIC on the plans of the water wheel meant that the archaeologists could accurately measure the position of the Trench 2 wheel pit. The project archaeologists located the corners of trenches and cord lines were strung out to mark the edges. Trench 1 measured 6m by 3m and consisted of a single slot trench orientated southwest/northeast to establish the extent and nature of any archaeological remains located to the east of the southernmost blast furnace. This trench was then extended at the northeast end to capture the casting house wall. Both trench positions had been chosen by FNAIC after discussion with GGAT and studying OS maps and plans.
- III. The area was then cleared of grass and other foliage by the volunteers. Once the archaeological clean had taken place GGAT project archaeologists provided instruction in preparation for the opening of the trenches. An important part of the first day was the tour of the site, headed by Sophie Lewis-Jones, Project Archaeologist. Volunteers were introduced to the history and topography of the site by a member of FNAIC, and to excavation methodology and theory by the archaeologists. Volunteers then began to cut the precisely aligned scarps that created the vertical boundaries of the digging area trenches. Gazebos, tea and coffee and a toilet were provided by FNAIC funded by the National Lottery Heritage Fund (NLHF).
- IV. Tools for the excavation included trowels, shovels, measuring tapes, wheelbarrow, picks, plumb bobs, and rubber buckets. These were hired from GGAT and FNAIC provided gloves and PPE. The process of excavation was achieved mostly by picks and shovels. For the most part, deposits were lifted by trowel and taken away by

buckets. The project archaeologists determined the speed of debris removal and the careful removal of remains from the trench. They then further recorded the trenches with photography, drawings, diagrams and descriptions, which included information on stonework, strata and finds. Finds discovered were kept for expert analysis by Jennifer Protheroe-Jones, Principal Curator - Industry at the National Waterfront Museum.

- V. The excavation would not have been possible without the support and assistance of the volunteers over the 5 days. Feedback taken after the dig showed clearly that the insight gained into archaeology had been given all the participants a much greater understanding of their local industrial past.

Section Nine: Archaeological and historical action

- I. In the future more extensive investigations need to be carried out at this historic site, exposing more of its unique features. This will be done by volunteers with professional advice, input and guidance. **Grant funding will be needed for this.**
- II. Historical investigations of local archives, such as the West Glamorgan Archives, containing historical evidence pertaining to the Ironworks, can be done by volunteers.
- III. Knowledge gained through archaeological and historical investigation will lead to:
- a) Bi-lingual information boards at strategic points at the monument and a bi-lingual guide.
 - b) Bi-lingual information boards at Neath Abbey to signpost people to the Ironworks
 - c) A bi-lingual community website with 3D reconstructions of the site.

IV. Grant funding will be needed for this.

Section Ten: Benefits of the Ironworks proposal, particularly in the long-term

- I. Heritage is a huge resource which cannot be replaced once it is lost. Use of the historic environment as an asset, and giving it new life, should be the cornerstones of the economic and social revival of our towns and cities.²
- II. The benefits of heritage engagement cannot be understated, especially in an area where 11 per cent of working age adults have no qualifications and is ranked as amongst the most deprived areas in Wales.³ This engagement can improve employment skills; ranging from technical and business management to conservation and information management.⁴ FNAIC already provide skills training for its volunteers and this could be greatly expanded if the site was stabilised and access made available to the community.

² Deloitte, *Heritage Works: A toolkit of best practice in heritage regeneration*, London, 2017.

³ Welsh Index Multiple Deprivation 2014.

⁴ BOP consulting for HLF, 2011.

- III. Volunteering opportunities provide a way to actively improve one's mental and physical health. The wellbeing benefits of participating in and engaging with heritage are being increasingly recognised in the public health sector. In 2017, the first Cultural Manifesto was published by Halton Clinical Commissioning Group, who deliver local NHS services. This advocated for a new approach to healthcare that focuses on 'wellness not illness' and addresses 'root causes and not just symptoms'. It argues that *'it is the context in which people live their lives that is the most important determinant of life expectancy and this requires a more than medicine approach'*.⁵
- IV. By giving people meaningful roles and physical work, FNAIC offers a real opportunity to add value to the community in a worthwhile way and at the same time it provides a context in which people can live a healthy life.
- V. By providing safe open access to the site, many more people could be encouraged to use the site for walks and exercise. Pathways could connect with trails that already exist in Cwmfelin, allowing people to enjoy the beauty of the valley; its woods, wildlife, wild flowers and waterfall. The site is presently unconnected to Neath town centre, Aberdulais Falls, Neath Abbey and other local historical attractions. A comprehensive tourist strategy is needed if the Ironworks is to be seen as an attraction within the context of its local area.

Business

- I. In a recent report, one in four businesses stated that heritage investment lead to an increase in business turnover, with every £1 invested in the historic environment leading to an additional £1.60 to the local economy over a ten year period. Indeed, half of the jobs created by historic visitor attractions are not on the site, but in the wider economy.⁶
- II. The site has the potential to attract visitors from beyond the local community and this would be an important contributor to economic regeneration of the local community. The clustering of mediaeval Neath Abbey, the gatehouse, other local attractions within a tourism strategy could be used to attract inward investment.

Business need

- I. The brief history and site description of the Ironworks noted above illustrates how extremely important the Ironwork's heritage is to the local community, nationally and internationally, and how vital it is that the site is conserved, so that future generations can enjoy learning about the tremendous impact it had on our world and society.

⁵ Heritage England, *Heritage and Society*, London, 2018.

⁶ English Heritage, *Heritage Counts*, London, 2010.

Sharing learning

- I. Shared learning is vital to sustaining the historic environment; it raises awareness and understanding of heritage, including the varied ways in which our past is perceived by different generations and communities. It encourages informed and active participation in the historic environment. Knowledge and expertise are vital in encouraging and enabling others to learn about, value and care for our heritage. The Ironwork's site is vital to the community, and it is important that the site is conserved, so that future generations can benefit from its legacy.
- II. Local interest in the site can be demonstrated by the sheer number of people who attend volunteer work days and events. On average our bi-weekly work days attract between 12-25 people and events 300-400 people. FNAIC has a facebook site, attracting 374 followers. On Twitter, Tweet impressions amounted to over 12,000 in the last month.
- III. NAIW is a unifying force, which brings together communities across generations, ethnic and socio-economic divides. It promotes 'sense of place' where the environment evokes positive feelings such as belonging, identity and pride; many people have told us how proud they are that their ancestors worked at the Ironworks. It engenders interaction between local people and promotes social cohesion. By enabling social networks to be formed it and sustained around our local heritage it helps tackle feelings of isolation which many people suffer from.

Training

- I. **Several organisations would use the Ironworks for training apprentices if they were able to access the site:**
 - a) The Cyfle Shared Apprenticeship Scheme, is planning to make the Ironworks a training centre where apprentices, can work on a real world placement.
 - b) The Welsh Traditional Buildings Forum, NPTC Group Director of Construction and The Heritage Construction in Wales project have shown similar interest.
 - c) FNAIC undergo training in the use of brushcutters, mowers, leaf blowers, chainsaws, fencing and the use of herbicides. This training is undertaken to the Skills Academy Wales standard.

Tourism

- I. This project will increase the potential to attract visitors to the Ironworks from beyond the local community and this could be an important contribution to economic regeneration in the neighbourhood. As previously stated a tourism strategy needs to be formulated by NPTCBC's Tourism department. This would include the clustering of the mediaeval abbey and the Ironworks within a comprehensively funded programme.

Section Eleven: A three-year forward cash flow projection for the proposal, showing how it will be implemented and funded

Cash Flow Projection

Income for last financial year and estimated income				
	Last financial year y/e 2019 £	Year One £	Year Two £	Year Three £
Grants, HLF and Leader	13792	21800	61800	61900
Donations	665.83	700	700	700
Fund Raising	1055	1100	1100	1100
Total	15512.83	23600	63600	63700
Expenditure for last financial year and estimated expenditure				
	Last financial year y/e 2019 £	Year One £	Year Two £	Year Three £
GGAT	3722			
Mann Williams, structural engineers	1920			
Arborum- work on furnace	780			
HLF spending on container, info materials etc	7800.02	8000	8000	8000
Bat survey	450			
Contractors costs		15000	55000	55000
Sundries	594.01	600	600	700
Total	15266.03	23600	63600	63700
Surplus for Year:		0	0	0
	£246.80			

Business Plan

- I. Over the past two years, FNAIC has successfully invested grant money into the Ironworks. Leader EU funding has paid for a structural survey, an archaeological dig and a biodiversity survey. National lottery Heritage Fund has provided for an accessible toilet, shipping container and generator to facilitate open days and tours, amongst other things.
- II. Visitor numbers, as well as appreciation and knowledge of the site, have again increased due to the work of FNAIC. These tours and open days will be unsustainable unless the site is made safe and accessible. Capital programme money is necessary to undertake the urgent site conservation work needed to make the site safe, and open to the public.

Organisational overview

- II. FNAIC are an incorporated charitable organisation, and have four trustees. The objects are:
 - a) To preserve, restore and maintain for the benefit of the public the historic structure and environs known as Neath Abbey Ironworks, Neath Abbey, south Wales.
 - b) To advance the public's education with regard to the heritage and culture, especially that pertaining to engineering and science, of Neath Abbey Ironworks and its environs.

Scope:

- I. To safe guard the monument for future generations

Constraints

- I. Some of the constraints will be:
 - a) Lack of funding available for the conservation of industrial sites especially with the loss of EU funding.
 - b) Lack of capacity within FNAIC to apply for funding.
 - c) Lack of capacity within FNAIC to manage a successful funding bid of considerable size.
 - d) Location of the site, close to several high profile industrial heritage sites.

Dependencies

- I. The existence of other high profile sites within 20 mile radius.

Strategic benefits- Outlined below.

Strategic risks

- a) Availability of funds for a project of this size
- b) Lack of capacity within FNAIC
- c) The need for the owners of the site, NPTCBC, to agree with the project proposal

Options appraisal

Opportunities for collaboration with others

- I. This project does offer opportunities for FNAIC to collaborate with other voluntary organisations; this is ongoing at the present time with bodies such as the Dyffryn Clydach Volunteers, Port Talbot YMCA, and various historical societies amongst others. Collaboration occurs with bodies such as NPTCBC, CADW, GGAT, and the Swansea University heritage team.

Service delivery and contract management

- I. This project will be delivered by a partnership between the stakeholders, namely, FNAIC, NPTCBC and a private sector contractor. This will provide an amalgam of expertise between private heritage conservation contractors and the expertise of heritage officers in NPTCBC and Swansea University.

Implementation options

- I. As laid out in Section Seven work will be carried out in stages and will be governed by the timescale as outlined in the grant funding application.

Risk quantification, sensitivity analysis and risk management strategy

- I. Risk will be minimised by FNAIC's use of professional advice provided by NPTCBC, CADW, GGAT, Swansea University and contracted professional advisors such as structural engineers who will act as facilitators.

Commercial aspects

Sourcing options

- I. As outlined above, sourcing will involve private sector contractors submitting tenders. This will normally go to the lowest bidder, but only if NPTCBC and FNAIC are satisfied that the tenderers are fully qualified and competent to complete the work.

Contract length and payment mechanisms

- I. Contract length and payment will be linked to completion of the job by a specified time and in a specified manner, as this will be a stipulation of the grant funders and the professional advisers.

Risk allocation and transfer

- I. This will be allocated and transferred to the private contractors, as they are best placed to manage them to achieve best value for money, and are indemnified.

Achievability

- I. The project is achievable as similar projects have been undertaken elsewhere. Possibly the most famous example is Coalbrookdale, although this is on a vastly larger scale as compared to the Ironworks. Funding has been obtained locally, over many years, for the restoration of St Matthew's church, Dyffryn, Neath.

Contingency plan

- I. FNAIC have an agreement with Neath Port Talbot County Borough Council, and this agreement with the authority will aid in the long term sustainability of the project. The authority, or its successors, will be on hand to ensure that should FNAIC cease to exist, than another body will be on hand to carry on the work undertaken. These factors are favourable for the long term sustainability of this project.

Section Twelve: Operational Plan

Year One

Objective	Milestone	Measure
Obtaining grant funding for urgent work outlined in conservation plan	Grant funding for conservation plan	Grant funding for conservation plan in place
Vegetation management by FNAIC	Vegetation management by FNAIC	Vegetation management by FNAIC completed. Site in better condition.
Ongoing programme of clearing and treating vegetation as well as inspecting and consolidating masonry.	Programme of clearing and treating vegetation as well as inspecting and consolidating masonry.	Vegetation treated, masonry inspected and consolidated. Site in better condition.
Obtaining grant funding for archaeology outlined by GGAT and FNAIC.	Grant funding for archaeology outlined by GGAT and FNAIC.	Grant funding for archaeology in place.
Archaeological investigation to enhance knowledge of site.	Archaeological investigation to enhance knowledge of site.	Archaeological investigation to enhance knowledge of site completed. Knowledge increased.
Historical investigation to enhance knowledge of site done by FNAIC.	Historical investigation to enhance knowledge of site done by FNAIC.	Historical investigation completed. Knowledge increased.

Year Two

Objective	Milestone	Measure
Obtaining grant funding for conservation plan	Grant funding for conservation plan	Grant funding for conservation plan in place
Vegetation management by FNAIC on site	Vegetation management by FNAIC	Vegetation management by FNAIC completed. Site in better condition.
Ongoing programme of clearing and treating vegetation as well as inspecting and consolidating masonry.	Programme of clearing and treating vegetation as well as inspecting and consolidating masonry.	Vegetation treated, masonry inspected and consolidated. Site in better condition.
Obtaining grant funding for archaeology outlined by GGAT and FNAIC.	Grant funding for archaeology outlined by GGAT and FNAIC.	Grant funding for archaeology in place.
Archaeological investigation to enhance knowledge of site.	Archaeological investigation to enhance knowledge of site.	Archaeological investigation to enhance knowledge of site completed. Knowledge increased.
Historical investigation to enhance knowledge of site done by FNAIC.	Historical investigation to enhance knowledge of site done by FNAIC.	Historical investigation completed. Knowledge increased.

Year Three

Objective	Milestone	Measure
Obtaining grant funding for conservation plan	Grant funding for conservation plan	Grant funding for conservation plan in place
Vegetation management by FNAIC on site	Vegetation management by FNAIC	Vegetation management by FNAIC completed. Site in better condition.
Ongoing programme of clearing and treating vegetation as well as inspecting and consolidating masonry.	Programme of clearing and treating vegetation as well as inspecting and consolidating masonry.	Vegetation treated, masonry inspected and consolidated. Site in better condition.
Obtaining grant funding for archaeology outlined by GGAT and FNAIC.	Grant funding for archaeology outlined by GGAT and FNAIC.	Grant funding for archaeology in place.
Archaeological investigation to enhance knowledge of site.	Archaeological investigation to enhance knowledge of site.	Archaeological investigation to enhance knowledge of site completed. Knowledge increased.
Historical investigation to enhance knowledge of site done by FNAIC.	Historical investigation to enhance knowledge of site done by FNAIC.	Historical investigation completed. Knowledge increased.

Section Thirteen: Conclusion

- I. Neath Abbey Ironworks is a unique site of world importance, being one of its kind in producing iron in its huge blast furnaces and at the same time being one of the greatest engineering concerns in Great Britain, making railway locomotives, marine engines, iron ships and stationary steam engines. These products powered the Industrial Revolution, and made Wales the first industrial society.
- II. A recent report stated the Ironworks' condition was, "*severe...Condition Current: unfavourable Monument at Risk Level: high*". Dr Jessica Hughes [CADW] (November 2016). This is primarily due to damage by vegetation.
- III. Unless safe access can be gained to the site, it is hard to see how the full potential of this site can be realised. NAIW must be part of a larger tourism strategy that includes Neath Abbey and other important sites, if it is to be preserved for posterity.
- IV. The most important requirement named by all stakeholder groups was site safety. This would involve fencing of dangerous areas and stabilization works to the monument. (See Section Seven). The second requirement was information and interpretation of the site. This will involve information boards, a website, and a guide. (See Section Nine).
- V. Supervised access is possible at events coordinated by the FNAIC group, but these are limited by funding and the capacity of volunteers.
- VI. Despite the limitations inherent in a small local voluntary group, in the past two years the site has been completely transformed from a derelict dumping ground into a community space. Removal of trees has stopped the damaging of the archaeological remains; herbicide spraying of vegetation such as Buddlieia has saved the monuments from further degradation and the clearing of refuse tipped on the site has converted this forgotten valley into a useable community space. This has been led primarily by FNAIC.
- VII. FNAIC, funded by the Regenerate NPT Rural Development programme LEADER scheme and the National Lottery heritage Fund has run a series of events as part of its audience development plan, and to raise the profile of this forgotten site of heritage. This culminated in a week long archaeological survey coordinated by GGAT in April 2019. This was one of many event held on the site over the past 2 years, allowing a large number of people to experience the site first hand. However, this is not the only way the site has been used to engage local people, information via social media and our extensive list of local talks and exhibitions has also helped to raise awareness of this endangered and forgotten site.
- VIII. However, as already stated, unless safe access can be guaranteed, it is hard to see how the full potential of this site can be sustained. The monument is at a high risk level and needs urgent work to stabilize the monument in order to make it safe. Further work will require external funding, but at present no funder has been found to

support this work. The difficulties in obtaining this funding have been highlighted above, and are not insignificant (See Section Eleven).