POWERFUEL

Portland energy recovery facility

Environmental statement
Addendum
Appendices

6.1

Framework heritage mitigation strategy

Framework heritage mitigation strategy

This framework document outlines the content and broad principles for the heritage mitigation strategy, which will be secured through a planning condition and / or section 106 agreement.

The strategy applies to the group of 19th and 20th century military structures at East Weare to the south of the main ERF site at Incline Road, in particular to E battery, which is a scheduled monument and is listed grade II, and is included on the national Heritage at Risk register.

- Appendix 1: A map of the structures at East Weare and The Verne, both designated and non-designated heritage assets
- Appendix 2: Relevant extracts from the National Heritage List for England for those structures that are designated
- Appendix 3: A map of the proposed permissive footpath extension
- Appendix 4: Report of the preliminary site inspection of E battery conducted by the Accredited Conservation Engineers from Mann Williams
- Appendix 5: Report of the preliminary ecological walkover conducted by FPCR Environment and Design Ltd

1 Introduction

General introduction, to include information on the context of the overall ERF scheme and the legal status of the strategy, land ownership, responsibilities, and the parties involved in producing and implementing the strategy (Powerfuel Portland Ltd, Portland Port, Dorset Council, Historic England and Natural England).

Explanation of the relationship of the heritage mitigation strategy to the other proposed strategies concerning (a) the management of the SSSI (b) the aspirations for enhanced leisure and tourism outcomes in relation to the potential coastal path extension.

Recognition of the potential for input from the public and other local bodies/interests, for example involvement of voluntary groups, in the later stages of the strategy

Surveys and data archive and information sharing.

2 Overall objectives

- E Battery East Weare (scheduled monument and listed building grade II) – vegetation clearance and agreed repairs and removal of risk factors to enable its removal from the Historic England Heritage at Risk Register and appropriate public presentation of the monument (curated visits only, not involving permanent unfettered public access to the monument).

- Enhanced public access through the extension of the footpath at East Weare (known as Cemetery Road) to allow an “around the island” circuit of the coastal path by creating a new section of permissive footpath through currently inaccessible parts of the secure port estate to connect to the existing public accessible land/rights of way. The path will be fenced and will be wide enough (circa 2.5m) to allow access for maintenance vehicles and access for ongoing management of the SSSI.

- Enhanced opportunities for public appreciation through the provision of interpretation for the group of related heritage assets at East Weare (the A-E batteries, the former detention camp and the undesignated WWII features). Information boards will be provided at designated viewing areas, one relating to E battery, and one allowing clear views of the wider group of assets (the probable location is at the recently created viewing platform to the south). The boards will be designed to integrate with the existing interpretation e.g. the Portland stone features at the Fancys Farm open space at the top of Incline Road near the engine house

3. Proposals

This section of the strategy will provide the detail of the stages of work required to achieve the improved conservation status of the scheduled monument and the enhanced public access and interpretation.

- *Heritage at Risk: E Battery, East Weare*

Ecological caveats:
Some seasonal restrictions apply for ecological surveys and works and relevant information on these will form part of the completed strategy
Defined process required for consultation etc. if surveys reveal unforeseen or overriding constraints, that could not be overcome by standard and proven mitigation measures.

Proposed stages of work:

1 Preliminary surveys
Site inspection of the presently accessible areas of the monument by a conservation accredited civil engineer to determine the vegetation clearance required to allow access for surveyors to the battery structures and to identify any other relevant issues.
Site walkover as far as feasible by a suitably qualified ecologist to provide initial assessment of habitats and species. (see the reports in appendices 4 and 5)

2 Enabling works and condition survey
Determination of vegetation clearance required to allow access (further ecological surveys required, definition of extent of survey area and licences to be determined)
Agree and obtain necessary ecological licences and complete 1st phase of vegetation clearance
Conduct full condition survey of the battery

3 Project development and consents
Develop and agree detail of the proposed works and produce documentation for scheduled monument consent application to Historic England[1]
Develop and agree detail of works and produce documentation for ecological consents and licences
Post-consent information requirements: SMC conditions and method statements

4 Main works stage

5 Monitoring, inspection and future maintenance

[1] When a scheduled monument is also a listed building, separate listed building consent is not required, though if the works would amount to development under the s55(i) of the TCP Act 1990, planning permission may also be required.

Agree programme of annual maintenance and quinquennial inspections of the battery
Identify opportunities for involvement by local voluntary groups and others

(Habitat enhancement, management and monitoring is the subject of the separate ecological strategy (outlined in the submitted statement of common ground)

- *Creation of a connecting path between footpaths S3/72 and S3/81, across East Weare using the existing route through the secure port estate. Widening and new surface suitable for off-road vehicles*

The existing footpaths, the new permissive path alignment and the locations and types of fencing as agreed with Portland Port are shown on the plan in appendix 3

Ecological caveats:
Some seasonal restrictions apply for ecological surveys and works (see calendar in appendix 4)
Define process required for consultation etc. if surveys reveal unforeseen or overriding constraints, that could not be overcome by standard and proven mitigation measures.

Planning stage
Confirm surveys required, produce documentation and obtain necessary consents and licences

Works
Vegetation clearance, installation/ repair of fences, installation/ repair of gates, path treatment and other works, including security.

Monitoring, inspection and future maintenance – see later points.
Identify opportunities for involvement by local voluntary groups and others

- *Design and installation of interpretation*

4 Future management and responsibilities

To be set out in the strategy with clear roles/responsibilities, inspection and works schedules, security between the parties defined.
Clarity on the limits on the contribution to ongoing management and/or cost from Powerfuel Portland and Portland Port.

5 Monitoring and review

A timeframe for initial enhancements will be set and monitored by the named parties endorsing the strategy.
Agreed reviews of the strategy should be periodic to take account of the long term nature of some of the envisaged works (more frequently at outset and then settling to a longer sequence (e.g. five, 10 or 15 years).

6 Health, Safety, Environment and Security

- All agreed actions to take full account of the landowner, Portland Port's commercial considerations, operations and security requirements, and landowner duties and responsibilities (health & safety, occupiers liability, trespass, etc).

- Requirements include: maintenance of the security of the port by appropriate measures, primarily a security fence to a specification agreed and at a location agreed with the port; that no permanent rights of way over port land are created by these measures (such that the path will be permissive only); that any work associated with the maintenance of the monuments and/or the SSSI is carried out under permissions from the port and that the port is notified of the works in advance; and that the port is not liable for any costs associated with the construction and maintenance of these works

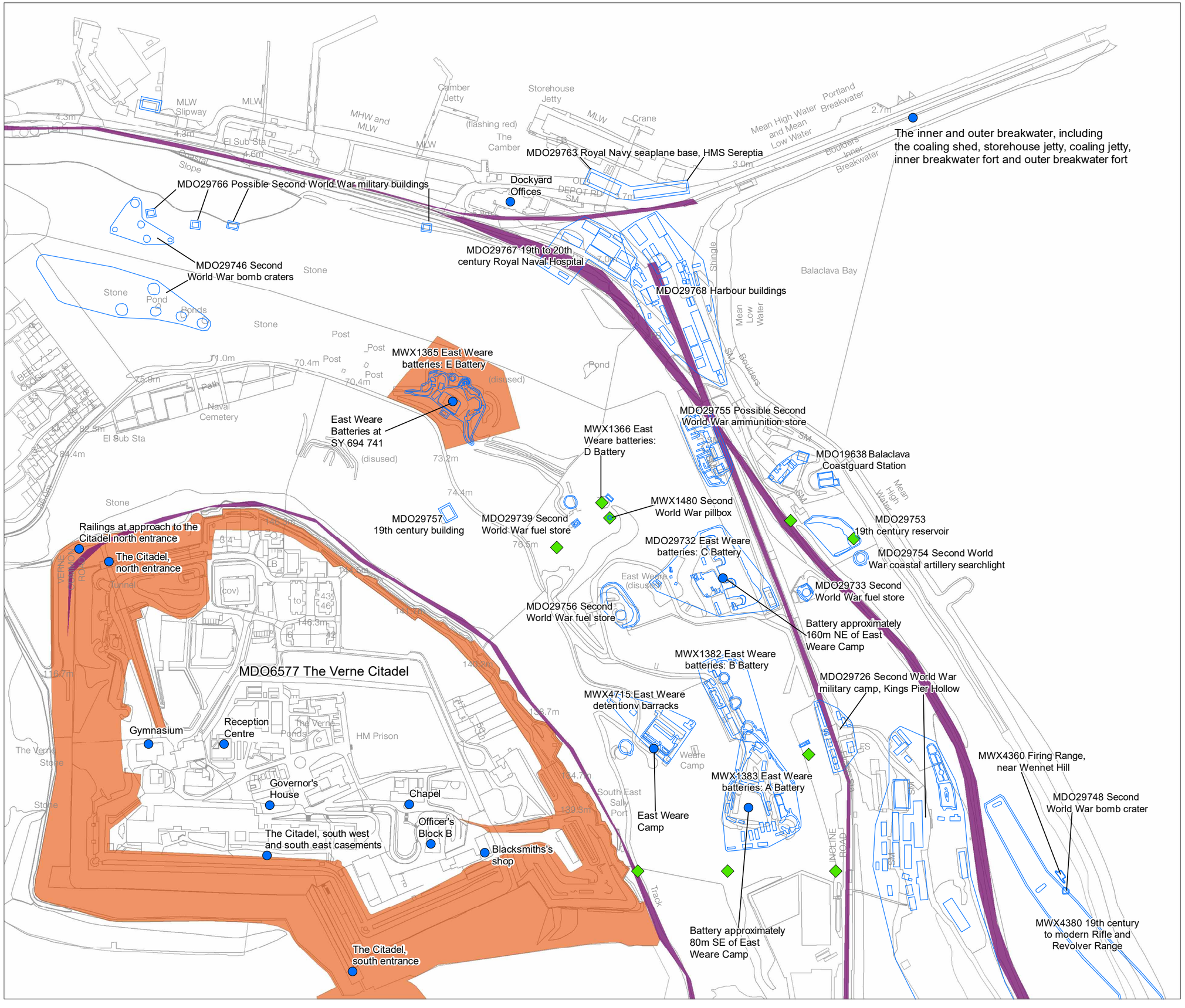
- All agreed actions to take account of the SSSI and potential for ecological co-benefits.

- All agreed works to be appropriately licensed (as required) and performed with due consideration to environmental and heritage law and policy with due consultation with regulators as required.

Portland energy recovery facility

Framework heritage mitigation strategy

Appendix 1



Portland ERF
Powerfuel Ltd

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Framework Heritage Mitigation Strategy: the assets at East Weare

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Portland energy recovery facility

Framework heritage mitigation strategy

Appendix 2

Appendix 2: Designation information

The inner and outer breakwater, including the coaling shed, storehouse jetty, coaling jetty, inner breakwater fort and outer breakwater fort, grade II

Summary
The inner and outer breakwater, including the coaling shed, storehouse jetty, coaling jetty, inner breakwater fort and outer breakwater fort. Constructed between 1849 and 1882. Designed by Chief Engineer, James Meadow Rendel, succeeded by John Coode in 1856, and carried out by civil engineer John Towlerton Leather. The outer breakwater fort was designed by Captain E H Steward. Late C19, C20 and C21 alterations and additions. All post-1945 buildings, structures and plant added to the structures are excluded from the listing.

Reasons for Designation
The inner and outer breakwater, including the coaling shed, storehouse jetty, coaling jetty, inner breakwater fort and outer breakwater fort are listed at Grade II for the following principal reasons:

Architectural interest:
* The huge and impressive engineering feat of constructing the breakwaters; * An innovative combination of Victorian architecture and hydraulic engineering in response to the problems of coaling the increasingly steam-driven navy of the time; * Association with nationally significant engineers, J M Rendel, J Coode and E H Seward; * The good degree of survival.
Historic interest:
* As the first safe anchorage specifically designed to create a harbour of refuge to replenish the navy's fleet of steam-driven warships; * The importance of the mid-C19 coaling shed in the history of the mechanised fuelling of ships; * Fortification of the breakwaters in response to the 1859 Royal Commission on the Defence of the United Kingdom, a nationally important period of England's military history; * Subsequent adaptation to the fortifications to keep pace with advancing military tactics and technology.
Group value:
* As part of a largely complete naval base of considerable importance; * With the Grade II listed late C19 Bincleaves Groyne and North- Eastern Breakwater to the north of the harbour.

History
The area around Portland Harbour has historically been recognised as an important military strategic location. The advent of a steam-driven naval fleet in the early to mid-C19 necessitated the storage of large quantities of coal, not only at the dockyards, but also at strategic locations determined by the likelihood of enemy attack and the limited range of the steamship when using its engines alone. Portland, conveniently situated equidistant between Portsmouth and Plymouth and facing the French naval dockyard at Cherbourg, was established as the first naval anchorage specifically designed for the navy's fleet of steam-driven warships, and the necessary breakwaters and coaling facilities were an integral part of the scheme. Suggestions for fortifying the anchorage here were first put forward in 1835. An 1844 survey map of Portland, by surveyor John Taperell, shows the proposed breakwater structures of the scheme designed by the Admiralty's Chief Engineer, James Meadow Rendel. Preliminary works for the breakwaters began in 1847 with the formal construction of the inner breakwater being marked by a ceremony in which HRH Prince Albert laid the foundation stone on 25 July 1849.
The inner and outer breakwater were intended to be straight, but a!er work began John Coode, Resident Engineer (who succeeded Rendel as the Admiralty's Chief Engineer in 1856) suggested that the outer arm be curved. This was considered as a great improvement by Rendel and the plan of the breakwaters drawn up in 1852 incorporates this amendment. Both

breakwaters were constructed from stone brought from the quarries on Portland via an inclined railway and using timber piers, railways and cranes, stone was dumped into the sea from a height and the action of the sea compacted the mass. The breakwaters were very successful, being cheap to construct and e"ective in providing a harbour of refuge for the ships using the coaling facility.

The coaling shed (1856-1860) at the western extent of the inner breakwater and the coaling jetty halfway along the breakwater's length operated to replenish the navy's steam fleet. Coal was li!ed from colliers berthed at the west end of the storehouse jetty, via hydraulic cranes, into wagons which ran on four sets of rails in the roof of the coaling shed. The coal was then either stored at first-floor level or transferred to the ground floor tunnels from where the wagons carried the coal, via the viaduct, onto the elevated section of the inner breakwater, the Prince Consort Walk, and the coal was transferred to the vessels by hydraulic chutes to ships at the coaling jetty. The coaling operation was regarded as a failure and adaptations were made. By 1869 coal was being unloaded in bags from the sides of the coaling shed by manually-operated winches and berthed at three, timber coaling stages which had been built on either side of the jetty. Lighters would carry the coal out to the ships. These have since been removed and the system was condemned in 1885. The west end of the storehouse jetty was rebuilt in 1906. In 1907 the viaduct, which had carried the rails from the coaling shed to the inner breakwater, was demolished and replaced with a new viaduct with concrete arches faced in ashlar. Four of these seven arches have now (2017) been demolished.

In 1859, due to concerns over a possible French invasion, Lord Palmerston, the Prime Minister, instigated the establishment of the Royal Commission on the Defence of the United Kingdom which recommended that vital points along the south coast, including the Royal Dockyards at Portsmouth, Chatham, Plymouth and Portland, be fortified. As a consequence the defences at the port were developed and large scale construction work took place in and around Portland Harbour from 1862, when the Admiralty handed over the site to the war o"ice. This included the advancement of the 1840s scheme to build defensive breakwaters.
The inner breakwater fort, a coastal artillery battery at the north-east end of the inner breakwater, was designed by the Admiralty in 1859 and constructed by local builders Jesty and Baker between 1859 and 1862. The war o"ice completed the fort in 1866. The armament rapidly became obsolete due to military advances and between 1897 and 1899 the fort was upgraded and the five north- eastern chambers of the inner breakwater were adapted to provide accommodation and a cookhouse, and latrines were added. In 1902 a concrete glacis, a sloping structure, was added to the seaward side of the fort incorporating positions for two 12-pounder quick-firers and a Maxim gun as part of its anti-torpedo defences. These were removed by 1919 and it was rearmed with 6" and 9.2" breech loading guns. During the Second World War it was equipped with a 40mm Bofors gun.
The outer breakwater fort was added to the north end of the outer breakwater in 1869-1882. It was originally designed by Captain E H Steward in 1857 as a casemented granite structure, but it was amended to a single-tier stone and iron fort armed with fourteen, 12.5 rifled muzzle-loading guns, installed between 1874 and 1875. To install the guns the L-shaped jetty was added to the breakwater, extending from the fort's entrance, and including rails to transfer the guns to the fort. The guns themselves were powered, supplied with ammunition, and operated, using a steam engine that was installed at the fort in 1884. In 1900 the gun floor was altered for the installation of two, 12-pounder quick-firer guns, which were also installed on the jetty. In 1907 the fort's armament was replaced and the remaining rifle muzzle-loading guns were broken up and discarded; some of the remains are evident on the seaward side of the outer breakwater.

There are a number of additional buildings added around the outer breakwater fort and to the jetty, as well as the northern end of the breakwater. The rendered brick buildings largely date from the First World War, and the breeze block, concrete and steel constructions from the breakwater's re-use during the Second World War. A plan of 1947 shows the function of each of these buildings. By 1956 the fort was abandoned as a coastal defence, and the breakwater as a coastal watch.
Details
The inner and outer breakwater, including the coaling shed, storehouse jetty, coaling jetty, inner breakwater fort and outer breakwater fort. Constructed between 1849 and 1882. Designed by Chief Engineer, James Meadow Rendel, succeeded by John Coode in 1856, and carried out by civil engineer John Towlerton Leather. The outer breakwater fort was designed by Captain E H Steward. Late C19, C20 and C21 alterations and additions. All post-1945 buildings, structures and plant added to the structures are excluded from the listing.
PLAN: the inner breakwater, inclusive of the storehouse jetty which forms the return to the west into The Camber, and the inner breakwater fort at the outer (north-east) end, is a total length of approximately 750m. Separated by the South Ship Channel, the outer breakwater forms a continuation of the inner breakwater and runs from south to north, curving towards the west at its southern end. At the northern end is the outer breakwater fort, and extending to the south-west is the L-shaped jetty. The outer breakwater has a total length of approximately 1820m.

DESCRIPTION
The STOREHOUSE JETTY at the western extent of the inner breakwater is constructed of large, bolstered roach stone blocks to a battered face. The west end has been rebuilt (1906). There are some of the timber stubs of the mid-C19 coaling stages to either side.
The COALING SHED is constructed of Portland rubble stone with ashlar dressings, and originally had a slate roof; it is now corrugated iron. It is a long 11-bay stone structure arranged in two parallel ranges with gabled west and east ends; the east gable has been rebuilt in brick above the eaves line. The roof is divided by two raised and coped 'party divisions' which do not correspond with the main bay articulation. The south elevation has eleven sunken panels, divided by a high band, and a series of segmental-headed openings near ground level, and four larger openings in bays 3, 4, 6 and 8. At the right-hand end is a single-storey, breeze-block addition. The north elevation is as the south, with the addition of two staircases to the upper doors. The west gable has a pair of large lunette windows, beneath which are the timber stubs of the platform used to transfer coal to the shed. Both the west and east end have three, ground- floor arched openings with keystones; the central arch is wider than the outer two and corresponds to the layout of the internal tunnels. The ground floor of the coaling shed has a main axial brick-vaulted tunnel with stone surrounds to segmental-arched openings leading into the narrower side tunnels. The upper floor of the coaling shed, originally a coal store, is divided longitudinally by raised baulks and heavy axial timbers with braces supporting a double king post roof with joists in iron shoes. The rails for the former coal wagons and other original parts of the coaling system also remain. The lube oil storage tanks to the eastern end of the coaling shed and the alterations to provide o"ice accommodation are not of special interest and excluded from the listing.

The INNER BREAKWATER continues towards the east, and its stone construction has large bolstered stone blocks to a battered seaward face. The upper, elevated section is the Prince Consort Walk and at its western end is a carved commemorative stone. On its west face is the Royal Coat of Arms and on the north face is the inscription:

FROM THIS SPOT / ON THE 25TH JULY 1849 / HIS ROYAL HIGHNESS PRINCE ALBERT, / CONSORT OF QUEEN VICTORIA / SUNK THE FIRST STONE OF THIS BREAKWATER. / UPON THE SAME SPOT / ALBERT EDWARD, PRINCE OF WALES, / ON THE 18TH AUGUST

1872 / LAID THIS LAST STONE / AND DECLARED THE WORK COMPLETE. / THESE ARE THE IMPERIAL WORKS / AND WORTHY (OF) KINGS.

The east face is inscribed:
JAMES MEADOW RENDEL / DESIGNED THIS WORK / AND DIRECTED ITS EXECUTION / TILL HIS DEATH IN 1856. / JOHN COODE, / THE RESIDENT ENGINEER FROM ITS COMMENCEMENT, / THEN SUCCEEDED TO ITS CHARGE / AND COMPLETED IT. / J.T. LEATHER WAS THE / CONTRACTOR FOR THE WORK.

The inner face of the breakwater has brick-vaulted, stone storage chambers with segmental arched openings with keystones. The chambers are divided by battered piers. Some of the openings have been walled across with brick or concrete, and some have had modern plant inserted, these later alterations are not of interest and excluded from the listing. Above is a stone cornice, and projecting from and beneath the cornice are the timber stubs of the staging that supported the hydraulic chute system to the COALING JETTY where coal was transferred to the ships. The inner walkway is paved with stone setts; although the inner section is now covered with tarmac.

The INNER BREAKWATER FORT is built of roach stone and granite. The circular fort has a diameter of 35m and is accessed from the breakwater via a stone staircase and wooden bridge, replacing an earlier sliding bridge. To either side of the drawbridge are flanking walls with granite cones projecting from the coping stones. A segmental arched opening, partially infilled with brick, gives access to the gun floor that retains the shell and cartridge hoists from 1897, the mountings for the quick-firers, and the concrete glacis, a sloping surface, to its southern side. A plaque has been added to the gun floor inscribed:
THIS STONE COMMEMORATES THE VISIT BY / HIS ROYAL HIGHNESS / THE PRINCE PHILIP DUKE OF EDINBURGH / ON 14TH JULY 1999 / TO CELEBRATE THE 150TH ANNIVERSARY OF / THE LAYING OF THE FIRST STONE OF / THE PORTLAND BREAKWATERS / BY / THE PRINCE ALBERT THE PRINCE CONSORT
To the centre of the gun floor is an iron cover which provides access to the magazine below. The magazine has a cross plan with a stone spiral staircase within a brick stairwell to its centre. The southern arm has been filled with concrete as has part of the eastern arm but it retains cartridge and shell stores.

The OUTER BREAKWATER similarly consists of an inner pier and an elevated section on the seaward side. It is built of large boulders, and the outer face is sloped towards the sea and is mortared in places. The inner face of the elevated section is largely of cut, and coursed stone, with some sections of strewn boulders. There is evidence of repair and rebuilding along its length. On the elevated section survive some of the timber piles for the original staging for the rails, and there are baulks of timbers. The circular pierhead at the south end is faced in granite and has a Second World War concrete searchlight, as well as the winches and bollards associated with working the boom that closes the South Ship Channel. Behind the pierhead is a small landing stage, and a ramp along the inner face of the breakwater. There are the ruins of an unroofed, ashlar building. Further towards the north are C20 searchlights and observation posts. And at the northern end, which terminates with the outer breakwater fort, are a series of C19 and C20 buildings of brick, stone and concrete which includes a single-storey, four-bay building of rusticated stone with ashlar to the openings, and internally, a fireplace and niches. To the inner face of the outer breakwater, at the northern end, is a triangular landing platform. The OUTER BREAKWATER FORT is constructed on a concrete substructure that is faced in granite. Above is the cast iron fort which comprises two rings of iron box-girders, supplied by Jeavons & Co. of Millwall, fanning from a central, octagonal well. The walls are three thicknesses of 15cm iron plates, supplied by Messrs Brown of She"ield. The iron roof is capped

with concrete, and on top of the roof is a Second World War pre-cast concrete coastal artillery searchlight.
Internally, the central well is faced with ashlar with rusticated Roach stone forming the quoins and keystones to the arched openings to the gun rooms and ports for fourteen guns. There is concave fluting to the sloping ceiling to the gunports, supported by pillars between the casements. The lower level has shell and cartridge stores and separate passages and li!s for both. To the centre is the former engine room. Both levels of the fort are connected by a spiral cast-iron staircase. The fort retains many fixtures and fittings including doors, slatted timber floors to guard against explosions, pegs for hanging clothes changed when ammunition was being handled, and an original lamp in the lamp passage, as well as shell hoists.
The buildings to either side of the ramp leading from the west entrance of the fort to the L-shaped jetty, are early-C20 garrison buildings. The ramp leads down to a two-tier structure. On the upper floor is a late C19 gun emplacement with associated magazine stores and a C20 concrete-rendered brick building added to the ground floor of an earlier stone building. To the lower floor are three segmental arched openings, behind which are stores and ablutions. The position of the capstan and winch which transferred the guns onto rails up the slow-rising staircase and ramp to the right, is evident in grooves to the side of the jetty. The jetty continues to the west over three segmental arches with quoins and keystones. Above is a flat-roofed, altered, brick building and a three-bay, flat-roofed stone building with rusticated quoins to the openings. To the rear wall of the jetty are the winches for the boom. The jetty continues to the south.
Pursuant to s1 (5A) of the Planning (Listed Buildings and Conservation Areas) Act 1990 ('the Act') it is declared that all post-1945 buildings, structures and plant added to the inner and outer breakwater, the coaling shed, storehouse jetty, coaling jetty, inner breakwater fort and outer breakwater fort are not of special architectural or historic interest. These include:
the small brick lean-to attached to the east end of the coaling shed; the oiling jetty, attached to the storehouse jetty; the detached late-C20 building with corrugated iron roof to the east of the coaling shed; the brick and concrete walling across the openings of some of the storage chambers and the inserted modern plant; the fuelling jetty and associated pipelines; the mid-C20 building, known as the salvage shed, attached to the inner face of the inner breakwater, at its eastern extent.

Dockyard Offices (Building 228, Portland Port Business Centre), Main Road, Castletown, Portland, grade II

Summary
Former dockyard engineer's offices of 1848 by John Coode, built to oversee the construction of the breakwaters at Portland Harbour. The building was extended and altered in 1890 and 1910, and later.

Reasons for Designation
Dockyard Offices, Castletown, Portland is listed at Grade II, for the following principal reasons:
Architectural interest: • As a dockyard Engineer's Office dating from the 1840s it is an early example of its type; • Including some architectural detailing and constructed using good quality Portland stone; * Despite considerable alteration it still retains its historic core and the changes to its layout are in line with a building that has been adapted regularly to its evolving use.
Historic interest: • As the focal point of the historic breakwater construction overseen by James Rendel and realised by John Coode, who designed this building for his own use and for the day-to-day running of the breakwater construction project over decades.
Group Value: • As part of a complete naval base of considerable importance, specifically designed as the first safe anchorage for the replenishment of the navy's fleet of steam-driven

warships; • Portland Harbour and the nearby coast of the Isle of Portland has a significant collection of designated assets associated with the military history of the area, including Portland Castle (Grade I and Scheduled Monument) and the East Weare Defences.

History

The area around Portland Harbour has historically been recognised as an important military strategic location. The advent of a steam- driven naval fleet in the early to mid-C19 necessitated the storage of large quantities of coal, not only at the Dockyards, but also at strategic locations determined by the likelihood of an enemy attack and the limited range of the steamship when using its engines alone. Portland, conveniently situated equidistant between Portsmouth and Plymouth and facing the French naval dockyard at Cherbourg, was established as the first naval anchorage specifically designed for the navy's fleet of steam-driven warships, and the necessary breakwaters and coaling facilities were an integral part of the scheme. Suggestions for fortifying the anchorage here were first put forward in 1835. An 1844 survey map of Portland, by surveyor John Taperell, shows the proposed breakwater structures of the scheme designed by the Admiralty's Chief Engineer, James Meadow Rendel. Preliminary works for the breakwaters began in 1847 with the formal construction of the inner breakwater being marked by a ceremony in which HRH Prince Albert laid the foundation stone on 25 July 1849.

In 1859, due to concerns over a possible French invasion, Lord Palmerston, the Prime Minister, instigated the establishment of the Royal Commission on the Defence of the United Kingdom which recommended that vital points along the south coast be fortified. As a consequence large scale construction work took place in and around Portland Harbour from the 1860s, including the continuation of the 1840s scheme to build defensive breakwaters. The inner pierhead fort designed by the Admiralty in 1859 was constructed between 1859 and 1862 and the breakwater fort added to the north end of the outer breakwater was built in 1868-1879.

The Dockyard Engineer's Office was a central focal point during this extended period of construction and the projecting bay at the east end of the building was designed to provide views of the breakwaters. The ground and first floors were an office and model room, and the basement was a waiting room for naval personnel consulting the engineers on construction issues. The Engineer's Office was noted as being "a very handsome suite" in the London Daily News of 27 July 1849. The office served its original use until 1890 when a new façade, in a sympathetic style, was added. In 1909/10 the building was extended to the west with an adjoining block, and there were further additions and modifications to its internal layout. There were later alterations in 1948 and a large new block and attached single-storey addition was built to the west in the later C20 when the building served as a naval centre. In the early C21 it is vacant and the fabric in the 1848 building and elsewhere has suffered from water ingress.

Details

Former dockyard engineer's offices of 1848 by John Coode, extended and altered in 1890 and 1910, and with later C20 extensions and alterations.

MATERIALS: the principal elevations are constructed of Portland ashlar with the range to the west rendered. The extensions are built using brick and concrete block. The roofs are covered in slate.

PLAN: the principal historic structure is two adjoining buildings attached in-line. The site is split level so that the south front is of two storeys with basement and the north front is of three storeys.

EXTERIOR: the façade is spilt into two distinct sections. The five-bay eastern façade is a front of 1890 to the 1848 office. It is in the Vanbrughian style with a 2:1:2 window arrangement and the central bay is set back under a pediment. The first floor has 12-pane sashes, but the

ground floor has replaced C20 windows, all in raised eared plat-band surrounds with three projecting keystones and plain cills. There are central panelled doors in a slightly set forward plain pilaster portico. There is a small plain plinth, heavy pecked rusticated alternating quoins, a mid string course and a modillion cornice. The return to the right (east) has a plain wall with one replacement window to the ground floor, then, very slightly brought forward, a single-bay unit in rusticated quoins with a 12-pane sash in a surround matching the treatment of the façade above a semi-octagonal bay window with 12-pane sashes to the ground and basement floors. There is a cornice and blocking course, which continues to a basement level. Attached to the north east is a large C20 brick addition, of two storeys.*
The four-bay west section of the façade is rendered and has 12-pane sashes with a panelled door with transom light in the right bay. There is a mid string course, cornice, blocking course and parapet. The west end of the north front has a similar treatment. The three- bay gabled west front carries a small square clock tower of 1910 and has three 12-pane sashes at first floor under a single sash to the gable, and one at ground floor. The ground floor has a projecting bay to the centre and left and is partly concealed by a later addition. The clock turret has a string course, clocks to all faces, and a low pyramidal slate roof on moulded eaves. The openings across the north front have 12-pane sashes and those to the east have decorative architraves including some rustication. There are later C20 additions on the west front and north side.*
INTERIOR: many of the historic fittings have been removed or refurbished although some C19/early C20 joinery remains, but much modified. The few remaining fireplaces appear to be of the 1910 phase. Areas of removed render to the north wall indicate that it is the survival of the original 1848 construction.
SUBSIDIARY FEATURES: a two storey plus attic office addition of late-C20 date is attached to the south-west corner of the main block via a first-floor bridge.*

* Pursuant to s1 (5A) of the Planning (Listed Buildings and Conservation Areas) Act 1990 ('the Act') it is declared that these aforementioned features are not of special architectural or historic interest.

INCLINE ROAD, H.M. Naval Base (South side) East Weare Batteries at SY 694 741 GV grade II

Disused gun emplacement. c1870. Portland stone, some concrete and iron. Remains of 3 platforms plus magazine. A central magazine with earth-covered revetment has a platform on the axis to the NE, flanked by a platform to each side at 30 degrees; behind the magazine on the main axis is a small single-celled unroofed building. All is sunk into the slopes of The Verne on its N side and with a series of sunken passageways surrounding the central mound. The central platform has a semi-circular end in ashlar to a heavy rounded parapet at ground level; there are 4 vertical embrasures with segmental heads alternating with 5 mid-height square recesses with iron bolts and rings. To each side a straight run of rock-faced masonry wall runs approx 8m at approx 2.5m height to a bold weathered coping, and returns at an obtuse angle for approx 8m at same height, each with a central deep square recess at pavement level. The centre of the emplacement has a raised circular base in stone and concrete, with a central iron pivot or spigot, and a ramp towards the magazine mound. Each of the flanking platforms has a semi-octagonal termination. Each emplacement has a small stone plaque inscribed: LEVEL OF TOP OF RACER ABOVE HWM 216 FT. Axially to the SW is the mound over the magazine, with a small square vent in rock-faced stone. Retaining the mound on the SW side is an ashlar wall approx 20m long and 4.5m high, raked at either end above paired arched openings with bold rock-faced jambs and voussoirs; openings filled with concrete blockwork. Remains of a square-plan building approx 4m SW. The battery can be seen from the higher slopes of The Verne and commanded Portland Harbour to its SE.

SM DO 781, Battery 200 yards (180 metres) east of the Naval cemetery, Portland
(old county record, no detailed description)

Battery approximately 160m NE of East Weare Camp, grade II

Summary
A large battery and magazine store with four gun positions originally constructed in the 1860s, altered during the 1880s and again at the end of the C19.

Reasons for Designation
The 1860s battery approximately 160m north-east of East Weare Camp, formerly known as Battery C, is listed at Grade II for the following principal reasons:

Architectural interest: • As a good example of a battery dating from the 1860s, with some architectural detailing and use of good quality Portland stone; • For the good degree of survival of historic fabric, and the legibility of its layout.

Historic interest: • As part of the C19 and earlier defences at East Weare, which played an important role in British naval history.

Group value: • As part of a complete naval base of considerable importance, specifically designed as the first safe anchorage for the replenishment of the navy's fleet of steam-driven warships; • Portland Harbour and the nearby coast of the Isle of Portland has a significant collection of designated assets associated with the military history of the area.

History
The area around Portland Harbour has historically been recognised as an important military strategic location. The advent of a steam-driven naval fleet in the early to mid-C19 necessitated the storage of large quantities of coal, not only at the Dockyards, but also at strategic locations determined by the bases of a likely enemy attack and the limited range of the steamship when using its engines alone. Portland, conveniently situated equidistant between Portsmouth and Plymouth and facing the French naval dockyard at Cherbourg, was established as the first naval anchorage specifically designed for the navy's fleet of steam-driven warships, and the necessary breakwaters and coaling facilities were an integral part of the scheme. Suggestions for fortifying the anchorage here were first put forward in 1835. An 1844 survey map of Portland, by surveyor John Taperell, shows the proposed breakwater structures of the scheme designed by the Admiralty's Chief Engineer, James Meadow Rendell. Preliminary works for the breakwaters began in 1847 with the formal construction of the inner breakwater being marked by a ceremony in which HRH Prince Albert laid the foundation stone on the 25th July 1849.

The defences at East Weare, to the south of Portland Harbour, were also developed around this time and the Verne Citadel fort (1857-1881) and East Weare Battery (1862-1869) were constructed. East Weare Camp was established around 1880 and from 1889 the rifle range was built. The building of Verne High Angle Battery in 1892 and Upton Fort in 1902 demonstrate the continuing importance of Portland as a strategic location.

Five batteries were completed at East Weare between 1862 and 1869; these were armed with 9in and 10in rifled muzzle loading (RML) guns, and varied in size and plan. They were arranged on the north east slopes of Portland, overlooking the harbour. A series of photographs taken in 1877 show the completed batteries as originally built, with gun positions located and magazine stores behind them, concealed by angular earth mounds.

Due to continually advancing technology, the batteries quickly became outdated and had been updated by 1886 to take C pivot 9in RMLs. Towards the end of the C19 this battery, known as C Battery, was altered again so that the two centre gun positions took 10in RMLs.

Details
A large battery with magazine store and four gun positions originally constructed in the 1860s, altered during the 1880s and again at the end of the C19.
MATERIALS: the magazine stores and gun positions are constructed of stone, with some later alterations in concrete. The stores are concealed under a large earth mound.
PLAN: the magazine is roughly square on plan with a central corridor running north-south, accessed from the south. The four gun positions lie to the east of this.
EXTERIOR: the exterior of the magazine stores is mostly concealed by the earth mound. The gun positions to the east are aligned roughly north-south with roughly equal distances between them, and are connected by a substantial stone wall. This wall has square recesses along its length. The gun positions have sections of both stone and concrete, and some retain iron tethering rings and mounts.
INTERIOR: the magazine is entered through a door on its south side, which opens into a wide corridor with stone walls and brick vaulted ceilings. Off the corridor are smaller rooms which were used as a shell store and cartridge store. These rooms have their original doors surviving. There is a lamp passage to the rear.

East Weare Camp, Incline Road, grade II

Summary
A defensible barracks built in 1870-80 constructed of local stone and overlooking Portland Naval base.
Reasons for Designation
East Weare Camp, Portland is listed at Grade II, for the following principal reasons:

Architectural interest: • As a rare C19 defensible barracks adopting an original design in response to its required function overlooking Portland Naval Base; • Including some architectural detailing and constructed using good quality Portland stone; • Despite considerable dilapidation it still retains a legible layout and a substantial proportion of its principal structure.

Historic interest: • The C19 and earlier military defences at East Weare and the surrounding area have an important role in demonstrating British naval history as it developed, particularly in response to innovation brought about by the Industrial Reviolution.

Group Value: • As part of a complete naval base of considerable importance, specifically designed as the first safe anchorage for the replenishment of the navy's fleet of steam-driven warships; • Portland Harbour and the nearby coast of the Isle of Portland has a significant collection of designated assets associated with the military history of the area, including Portland Castle (Grade I and Scheduled Monument) and the Verne Citadel.

History
The area around Portland Harbour has historically been recognised as an important military strategic location. The mid-C19 was marked by a period of growing political and military concern over French foreign policy and an arms race developed between the two nations. In 1845 the Royal Navy established a base at Portland, constructing a new harbour where its fleet

of steam-driven warships could be replenished with coal. In 1859, due to concerns over a possible French invasion, Lord Palmerston, the Prime Minister, instigated the establishment of the Royal Commission on the Defence of the United Kingdom which recommended that vital points along the south coast, including the Royal Dockyards at Portsmouth, Chatham, Plymouth and Portland, be fortified. As a consequence the defences at East Weare, to the south of Portland Harbour, were developed and the Verne Citadel fort (1857-81) and East Weare Battery (1862-9) were constructed. In circa 1880 East Weare Camp was established and from 1889 the rifle range was being built. The building of Verne High Angle Battery in 1892 and Upton Fort in 1902 demonstrates Portland's continuing role as an important strategic location.

East Weare Camp, a self-defensible detention barracks, provided secure accommodation for the gunners and garrison of the East Weare Batteries, A-E. This is the only known example of this type of small defensible barracks. A range finding station and observation post were built near East Weare Camp in c.1901. Converted to coastguard use in 1914, East Weare Camp has had successive adaptations and alterations during the C20. By 1991 it had fallen out of use, was dilapidated and subject to vandalism. In 1995, a modern steel structure was erected over the south-west range in order to shield the failing original roofs. The site left Ministry of Defence ownership in 1995 and since that time minimal remedial works have been carried out to the barracks and the fabric of the buildings has continued to decline.

Details
A defensive barracks of c.1870-80, later converted for coastguard use, and with subsequent adaptations.
MATERIALS: constructed of snecked and dressed rubble, some slate roofs remain.
PLAN: two rectilinear buildings set at opposing positions on a levelled slope and adjoined by an enclosure wall to form a quadrangular camp of c.35m square. There are projecting corner units to the south and north and the remains of other structures within the courtyards. East Weare Camp is set well up on the slopes of The Verne, c.175m to west of Incline Road. It is approached by a climbing zigzag route.
DESCRIPTION: the principal south-west front is a broad single-storey elevation. The central entrance has a wide semi-circular arch in heavy pecked rusticated quoins, voussoirs and keystone under heavy roll-mould coping. The door is set slightly forward and rises above the enclosure wall, although partially covered by the apron of a modern steel structure that provides weather protection for the failing roofs. There are various blocked openings to all elevations, some with remains of timber window units. The lintels have been raised above inserted gun ports and iron plates cover the musket slits. The main elevations have chamfered cills and cast-iron vents at upper level between the openings. The wall is crowned in a heavy roll-mould cornice. The entrance is flanked within by hipped slate-roofed workshops, now in a state of collapse, and the entry arch is repeated on the courtyard side. The entrance to the north-west workshop has two cast-iron columns standing on pad stones and supporting the remains of a former roof structure. Each workshop has a stone division wall incorporating a chimneybreast for a fireplace on each side. There are other C19 iron fixings remaining such as door pintles and some floors are still covered in flag stones. A roofless brick addition is attached to the north west, extending along the enclosure wall to the edge of the lower section of courtyard, which is accessed by steps.

The enclosure walls to north-west and south-east sides are ramped down from the workshops to the barracks. The north-east building is a former barrack block, also with a heavy roll-mould cornice. To the left the lower openings are blocked and at upper level is a series of deep-set cast-iron windows. To the centre and right are various openings and a structure at upper level with external stairs probably relates to the later coastguard observation point. The outlook

tower in the east corner of the courtyard is also part of this later use of the site. The north-east barracks building could not be internally inspected due to unsafe structure. All of the buildings have suffered some degree of collapse and been subject to vandalism. The site is generally overgrown making complete external inspection impractical.
LB13 Battery approximately 80m SE of East Weare Camp, II

Summary
A large battery dating originally from the 1860s, altered during the 1880s and again during the C20. It is located on the NE side of the Isle of Portland.

Reasons for Designation
The 1860s battery approximately 80m south-east of East Weare Camp, formerly known at Battery A, is listed at Grade II for the following principal reasons:

Architectural interest: • As a good example of a battery dating from the 1860s, with some architectural detailing and use of good quality Portland stone; • For the good degree of survival of historic fabric, and the legibility of its layout.

Historic interest: • As part of the C19 and earlier defences at East Weare, which played an important role in British naval history.

Group value: • As part of a complete naval base of considerable importance, specifically designed as the first safe anchorage for the replenishment of the navy's fleet of steam-driven warships; • Portland Harbour and the nearby coast of the Isle of Portland has a significant collection of designated assets associated with the military history of the area.

History
The area around Portland Harbour has historically been recognised as an important military strategic location. During the mid-c19, a period of growing political and military concern over French foreign policy led to an arms race between the United Kingdom and France and in 1845 the Royal Navy established a base at Portland, constructing a new harbour where its fleet of steam-driven warships could be replenished with coal. In 1859, due to concerns over a possible French invasion the Prime Minister, Lord Palmerston, instigated the establishment of the Royal Commission of the Defence of the United Kingdom, which recommended that vital points along the south coast, including the Royal Dockyards at Portsmouth, Chatham, Plymouth and Portland, be fortified. As a consequence, the defences at East Weare, to the south of Portland Harbour, were developed and the Verne Citadel fort (1857-81) and East Weare Battery (1862-69) were constructed. East Weare Camp was established c.1880 and from 1889 the rifle range was built. The building of Verne High Angle Battery in 1892 and Upton Fort in 1902 demonstrate the continuing importance of Portland as a strategic location.

Five batteries were completed at East Weare between 1862 and 1869; these were armed with 9in and 10in rifled muzzle loading (RML) guns, and varied in size and plan. They were arranged on the NE slopes of Portland, overlooking the harbour. A series of photographs taken in 1877 show the batteries as originally built, with gun positions located with the magazine stores behind them, concealed by angular earth mounds.

Due to continually advancing technology, the batteries quickly became outdated and had been updated by 1886 to take C pivot 9in RMLs. The two batteries at the southern end of the site, which were at that time known as A Battery (the furthest south) and B Battery, were again updated c.1890; Battery B then having three10in RML guns and Battery A with two 10in RMLs.

A final upgrading took place between 1899 and 1901. A Battery was converted at this time to take two 9.2in breech loading (BL) guns, and three 6in BL guns were installed in B Battery. New magazine stores were constructed and the original magazine became the sergeant's mess and quarters. From this time on it seems that the two were collectively known as A Battery. A series of hand-drawn plans thought to date from the end of the C19 and the early C20 shows the batteries as altered at that time and much as they survive today.

The batteries ceased active military service after 1945, and were for some time used for Royal Navy training exercises, including disaster relief and riot training.

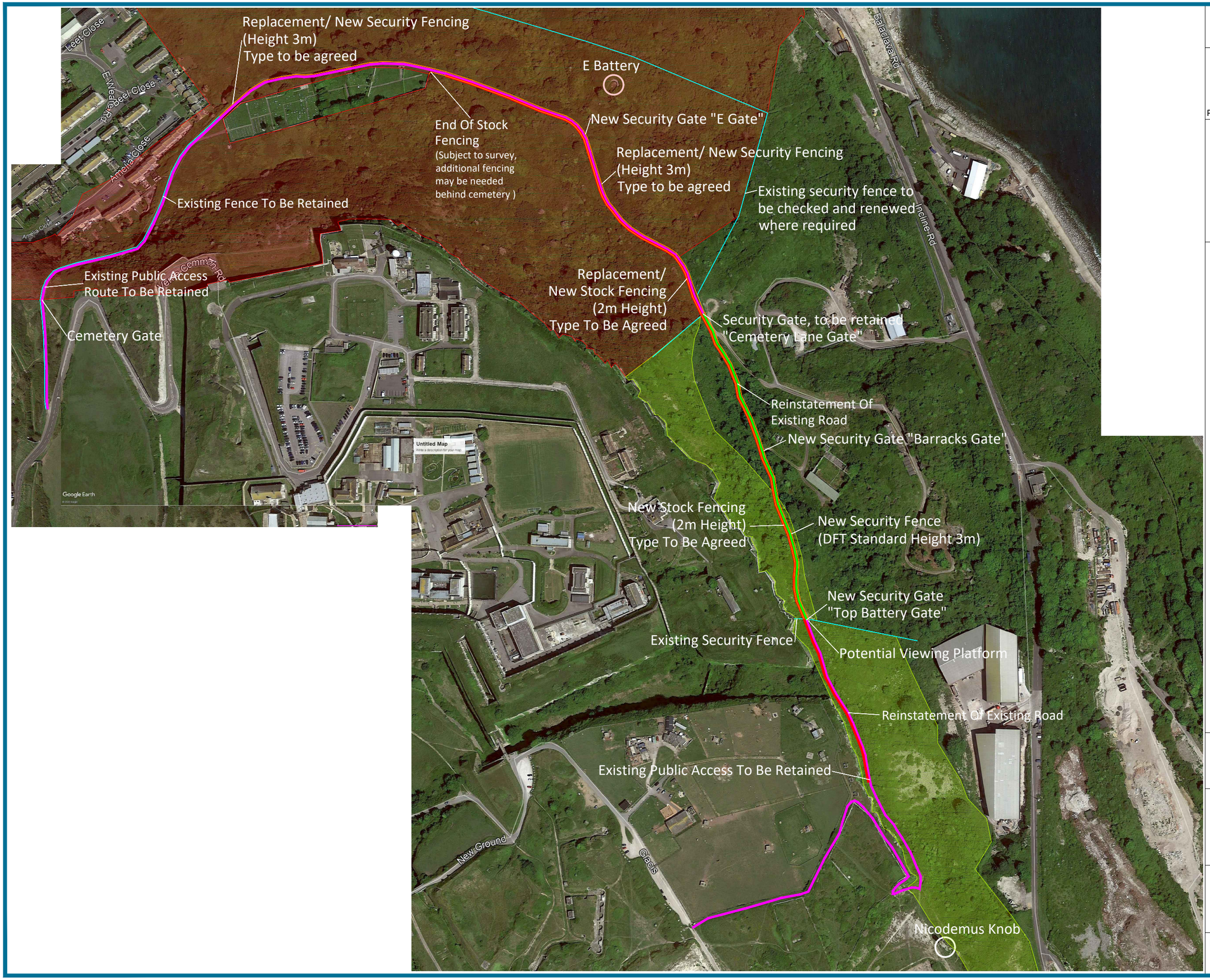
Details
A large battery dating originally from the 1860s, altered during the 1880s and again during the C20. It is located on the NE side of the Isle of Portland.

MATERIALS: the battery has magazine stores constructed primarily of stone under earth mounds, with gun positions of concrete and stone.
PLAN: the battery is entered from the north along a vehicle track which passes garrison buildings and the former Battery B (not listed); south of these is a freestanding, L-shaped building and the magazine stores which are housed within a large earth mound. This has an internal corridor running roughly north - south with the stores accessed off it. The two gun positions lie to the east.
EXTERIOR: there is a small, L-shaped building of coursed stone at the north-west corner of the magazine stores. This has a ramped parapet wall, individual door and window openings corresponding to the rooms within. This survives relatively intact from the original 1860s construction.
To the south, the large magazine store is housed underneath an earth mound. The western part of the magazine sections of stone elevations with arched openings which give access to the corridor within. The walls are of coursed ashlar stone with some later brick repairs.
To the east there are two gun positions from the rebuilding c.1900, mostly of concrete with some surviving ironwork and curving passages to the sides with sections of collapsed ceiling.
INTERIOR: The northern L-shaped building has four rooms, each with their own external access. Some of these rooms have later fireplaces inserted.
In the main magazine building there is a series of six barrel-vaulted rooms which are accessed from a long internal passage. These rooms were shell stores and cartridge stores, with a shelter for men at the southern end. The walls are mostly of stone, with brick vaulted ceilings, and some rooms retain timber doors, some with painted signs. At the end of each room is a small opening, with a lighting passage beyond. To the east there are believed to be further subterranean stores (not inspected).

Portland energy recovery facility

Framework heritage mitigation strategy

Appendix 3



Drawing not to scale,
For information purposes only.
Not for construction.

Notes:

Postcode: DT5 1EH W3W: nails.overpower.happy

Issue Log:

Issue:	Revision Details:	Date:
01	Initial Issue	11/05/2021
02	Route B added	17/05/2021
03	Details revised	18/05/2021
04	Details revised	08/06/2021
05	Details updated	09/06/2021
06	Details updated	10/06/2021
07	Details updated	14/06/2021
08	Details updated	21/07/2021
09	Details updated	22/07/2021
10	Details updated	23/07/2021

Key:

- Existing Public Access
- Existing Security Fence
- Proposed New Access Route
- Proposed Security Fence
- Existing Dual Pipeline Route
- Isle of Portland SSSI - Unit 33
- Isle of Portland SSSI - Unit 34

POWERFUEL

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Project Name:
Powerfuel Portland

Document Name:
Proposed Access Route

Document Reference #:
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RC	##	11/05/2021

Portland energy recovery facility

Framework heritage mitigation strategy

Appendix 4

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E Battery
East Weare
Portland
Dorset

Draft

Structural Inspection

Prepared for

Powerfuel Ltd
The Core, Gore Cross Business Park,
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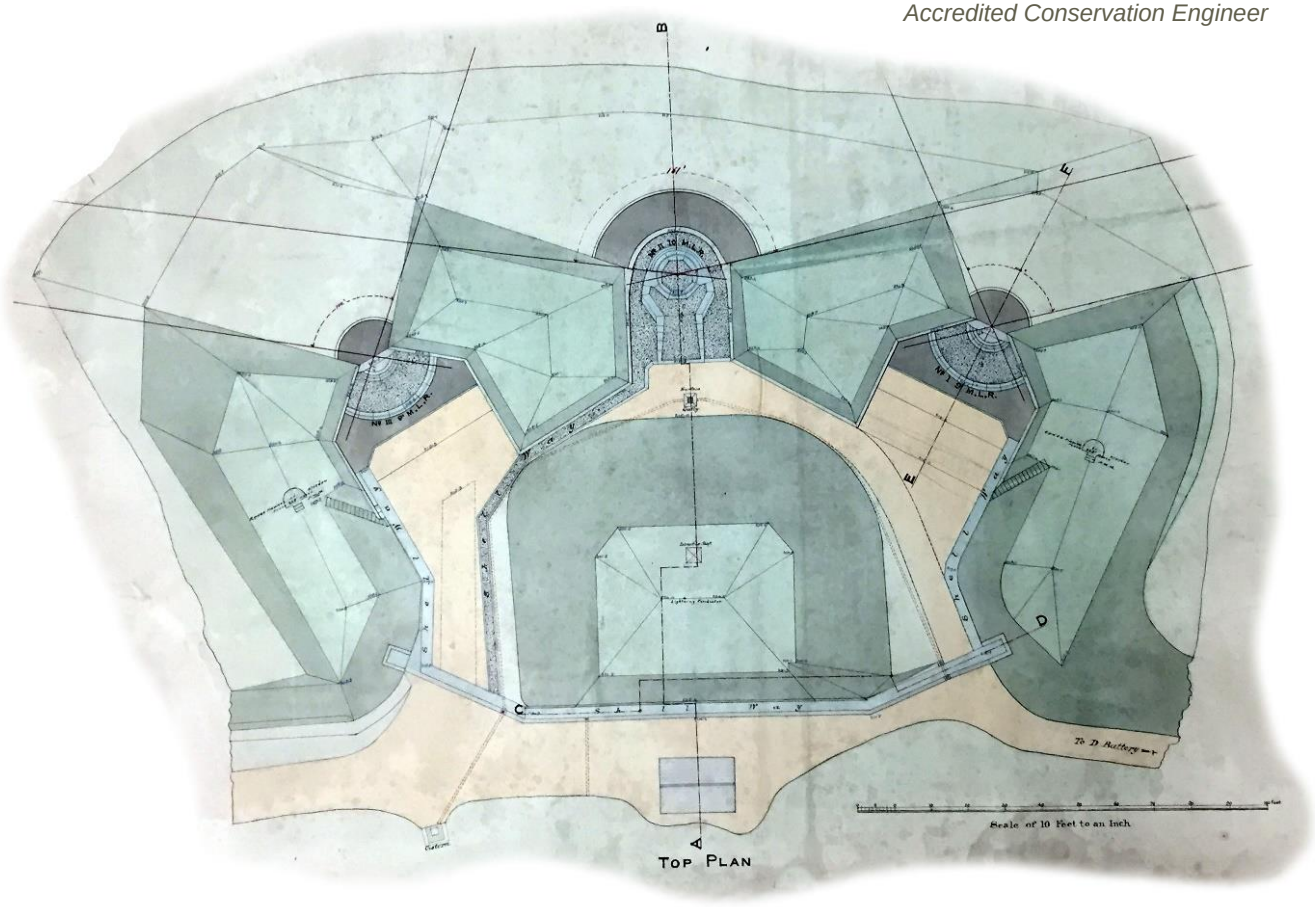
Project Number: 11166

Date: July 2021

Prepared by: Jon Avent
BSc(Hons) MIStructE, IHBC, CARE
Accredited Conservation Engineer



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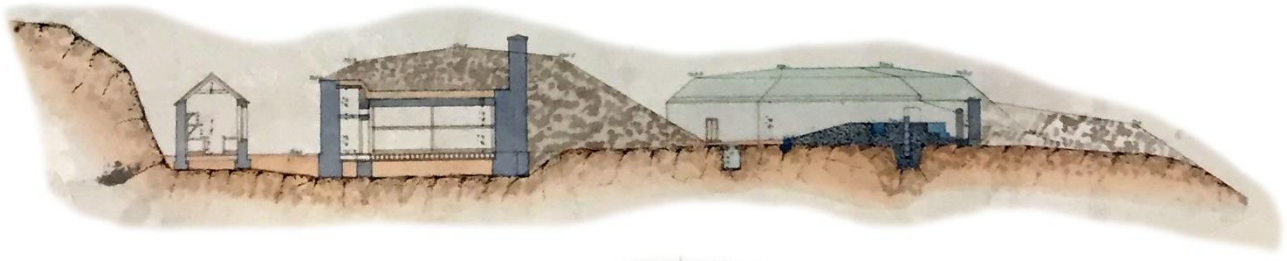
Content/Quality Assurance

Appendices



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MW Document Reference No: 11166Rja.01

Version Number	Issue Date	Issue Status	Distribution
01	28 July 2021	Draft	Client

[redacted]

Checked	Approved	Date
JWS	JA	28 July 2021

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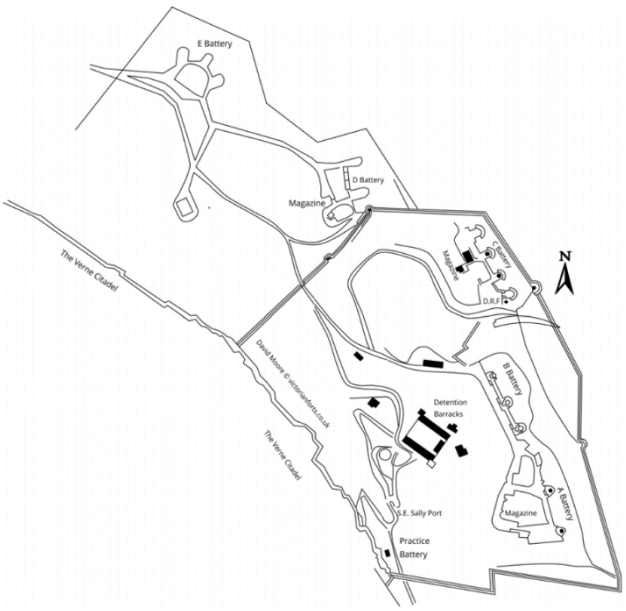
1.0 Introduction

1.01 Mann Williams were instructed by Giles Frampton of Powerfuel Ltd to carry out an initial structural review of E Battery at Weare on the Island of Portland, Dorset. The location of the Battery structure is identified on plan in appendix A.

1.02 The area around Portland Harbour has historically been recognised as an important military strategic location. The mid-C19 was marked by a period of growing political and military concern over French foreign policy and an arms race developed between the two nations. In 1845 the Royal Navy established a base at Portland, constructing a new harbour where its fleet of steam-driven warships could be replenished with coal. In 1859, due to concerns over a possible French invasion, Lord Palmerston, the Prime Minister, instigated the establishment of the Royal Commission on the Defence of the United Kingdom which recommended that vital points along the south coast, including the Royal Dockyards at Portsmouth, Chatham, Plymouth and Portland, be fortified. As a consequence the defences at East Weare, to the south of Portland Harbour, were developed and the Verne Citadel fort (1857-81) and East Weare Battery (1862-9) were constructed. In circa 1880 East Weare Camp was established and from 1889 the rifle range was being built. The building of Verne High Angle Battery in 1892 and Upton Fort in 1902 demonstrates Portland's continuing role as an important strategic location.

1.03 East Weare Camp, a self-defensible detention barracks, provided secure accommodation for the gunners and garrison of the East Weare Batteries, A-E. This is the only known example of this type of small defensible barracks. A range finding station and observation post were built near East Weare Camp in c.1901. Converted to coastguard use in 1914, East Weare Camp has had successive adaptations and alterations during the C20. By 1991 it had fallen out of use, was dilapidated and subject to vandalism.



1.04 This initial inspection relates to objectives to remove the 'At-Risk' status of **E Battery** and the aim to progress conservation and repair works in due course.

1.05 With extensive vegetation surrounding the structure there is concern that removal may pose risks to the structure and this initial assessment and report will review and address those concerns.

1.06 It is noted that ecology considerations and surveys should be considered as part of overall strategy for conservation of E Battery structure. Separate advice on this aspect should be obtained.

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2.0 Initial Inspection

2.01 The image below is a view of the site of E Battery looking north west across Portland Harbour. The area of the site is heavily vegetated with the majority of the structure covered. An overlay of the approximate location and configuration of E Battery has been added for reference.

2.02 Within the undergrowth the masonry structure appears to remains in place and where the stonework can be reached it appears generally in reasonable condition. Access into the structures is not possible due to the presence of block infill to openings as illustrated in the image opposite.

2.03 It is noted that the Battery structure is formed with generally large Portland Stone blocks and is robustly built to withstand military service, however invasive vegetation still has potential to cause significant damage to the structure.

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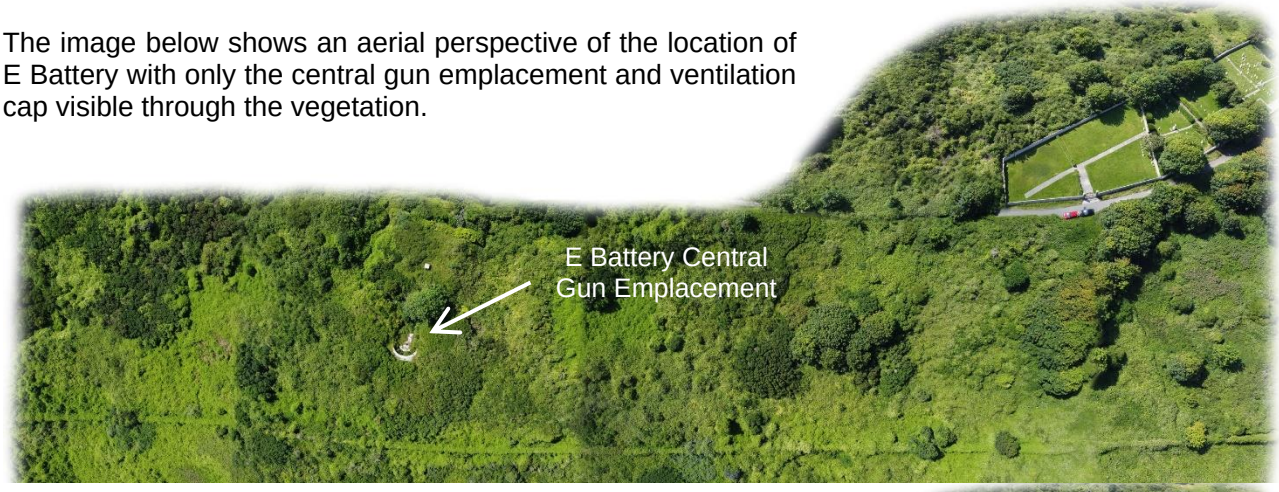
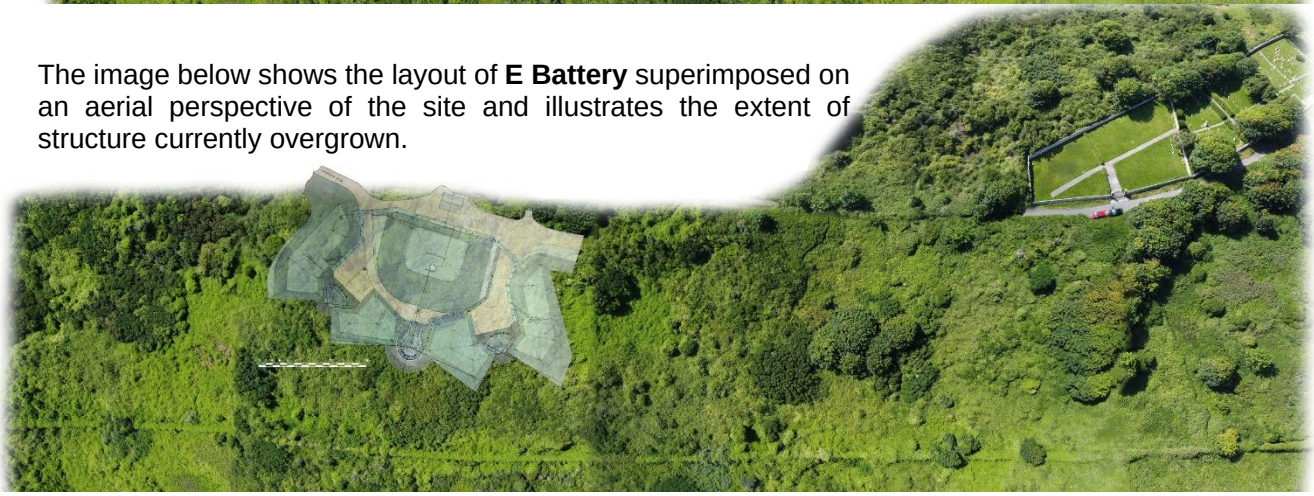
2.04 The image below shows an aerial perspective of the location of E Battery with only the central gun emplacement and ventilation cap visible through the vegetation.



2.05 The image below shows the layout of **E Battery** superimposed on an aerial perspective of the site and illustrates the extent of structure currently overgrown.



2.06 The image opposite illustrates the extent of vegetation that is present across the structure of E Battery. The vegetation in the image is concentrated around exposed wall heads and is a significant ongoing risk to the masonry, particularly where it is penetrating joints.

2.07 At this stage the majority of the structure is inaccessible for inspection but there are concerns that the high level areas are at an elevated risk of damage and vegetation should be removed at the earliest opportunity.

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3.0 Conclusion and Recommendations

3.01 The Battery Structures at Weare, Portland were robustly built military structures reflecting the purpose they were designed to provide. The ravages of time, neglect and the action of invasive vegetation is creating significant risk of decay to the principal fabric of the structures.

3.02 Vegetation is currently the most active and progressive risk to the monument and prompt action to control or preferably remove this risk is recommended as a matter of urgency.

3.03 The removal of vegetation can have adverse consequences for the structure if works fail to progress in a carefully defined and sequenced methodology.

3.04 Clearing a defined access route to the site is considered a logical and practical first stage of work in preparation for the treatment and removal of vegetation from the masonry structures. This work should progress at the earliest opportunity and for this to be followed by a further inspection to enable a vegetation treatment strategy and methodology to be developed.

3.05 A process of treatment, cutting, further treatment and removal would form the basis of vegetation removal and it would be considered essential that work progress sequentially in defined areas to ensure the structures can be regularly assessed to ensure the removal is not creating instability.

3.06 Removal of vegetation where it is attached or embedded into the masonry is considered essential, but must follow clearly defined methodologies to ensure no long-term damage is caused to the structure. Appendix B provides Historic England guidance and appendix C guidance from Environment and Heritage Services Northern Ireland on this and should be used as a key reference documents in the development of a vegetation control/removal strategy.

3.07 It is concluded that the removal of vegetation from the structure is beneficial to the long-term protection of E Battery and is considered an essential part of an evolving conservation strategy.

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Appendices

A Site Location Plan

B Historic England Vegetation Clearance Guidance

C Dealing With Vegetation on Historic Monuments: an EHS Guideline

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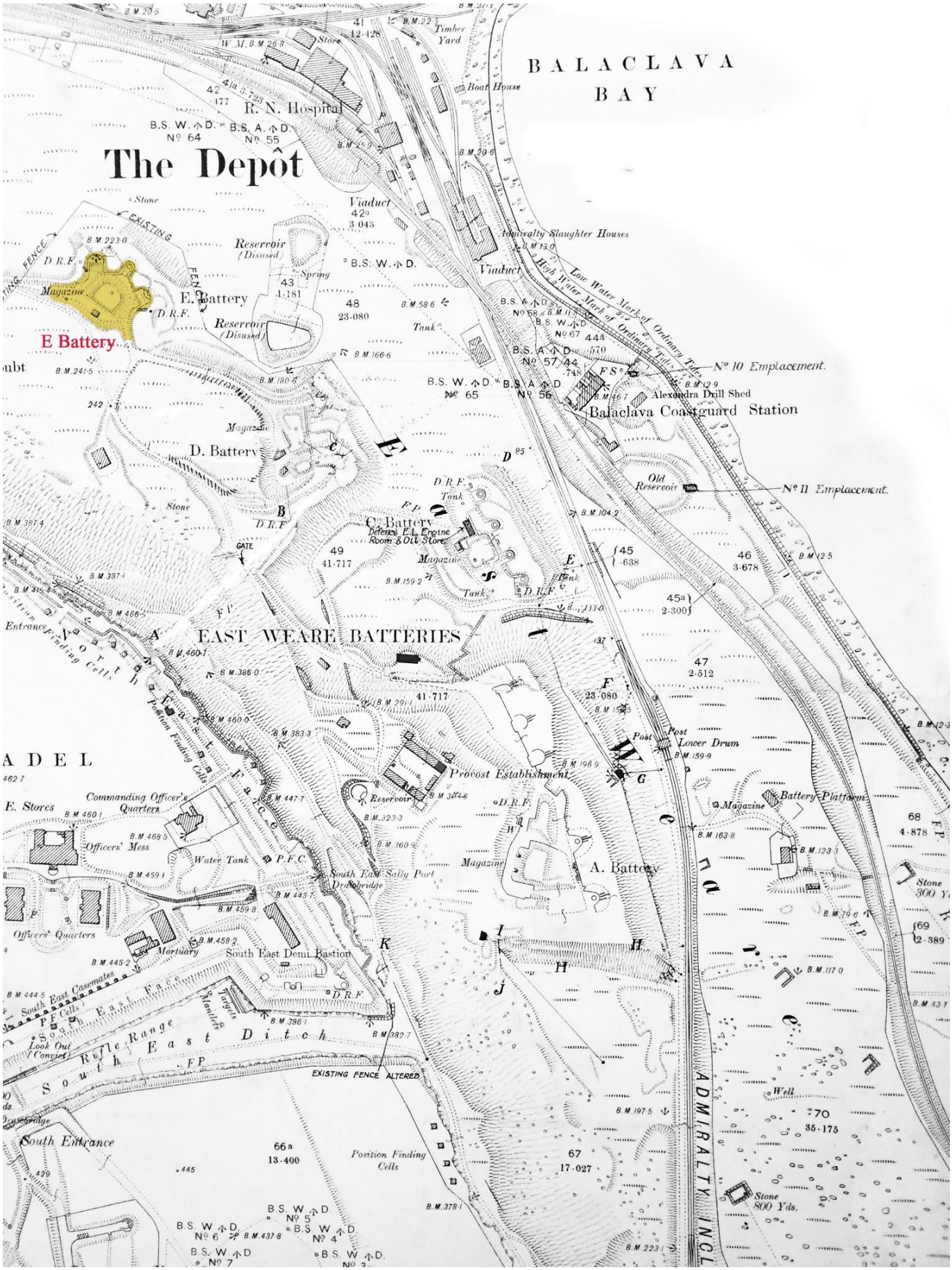
A. Site Location Plan



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B. Historic England Vegetation Clearance Guidance

Historic England

Clearing vegetation from monuments and memorials

Great care must be taken in the removal of vegetation from any monument. There is a balance to be struck between the vegetation posing a risk or causing damage to monuments and the wildlife habitats created by the vegetation cover.

The most likely vegetation problems you will encounter are:

- woody herbaceous perennials such as bramble
- invasive non-native species like Japanese Knotweed
- trees and shrubs such as sycamore, buddleia, and elder
- self- clinging climbers such as ivy

Any vegetation clearance work must not be carried out in the bird nesting season from March to August.

Cutting back adjacent vegetation

- If woody plants and climbers are growing adjacent to the monument, they can be cut back to ground level. Any cutting back should be done gradually by removing smaller growth and then larger branches.
- Care must be taken to ensure that branches do not fall onto monuments or fellow workers.
- Pull up any seedling trees and shrubs so that they do not grow big and cause damage.

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Clearing vegetation growing over the monument

- Start at the top and work slowly downwards.
- Do not attempt to remove all the vegetation right away but, using secateurs and/ or pruning saw, remove smaller branches so that the main stems can be revealed.
- Do not under any circumstances pull at the vegetation in the hope that it may become loose. There is a significant risk that the vegetation will have encapsulated some part of the monument (for example finials, carving, lead lettering) which would be vulnerable to any tugging. If monument parts fall off, they could be damaged, or they could hurt someone.
- Do not try to lever off larger clinging branches. Such action cannot easily be controlled and may cause damage to the monument.
- Do not cut ivy at the base in the hope that it will then die. It will tend to put out roots above the cut which can lead to further damage to the monument.
- Do not over-stretch to try and reach inaccessible areas. Always work within an easily and safely accessible zone.
- If absolutely necessary use a ladder or step-ladder to access vegetation above head height. The ladder must be set on secure ground and footed by another person. Finding a sound point to lean the top of the ladder against can be difficult as the stability of upper sections of the monument may not be clear. If that is the case, leave the higher areas of vegetation for professional removal.
- Clear all debris as it accumulates; arrange for disposal to an appropriate location. Leaving debris allows new seeds to take root.
- Once the 'trimming' process has been completed, further assessment should be carried out to understand the extent of the main stems and how and where they are rooted. Normally removal to this stage is sufficient to allow for the Monument and memorial condition survey form (available as a downloadable pdf on our website) to be completed.

<u>Further advice</u>

See our downloadable pdfs:

- Carrying out a memorial and monument condition survey
- Monument and memorial condition survey form

These and more information available at:

historicengland.org.uk/advice/caring-for-heritage/cemeteries-and-burial-grounds/

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C. Dealing With Vegetation on Historic Monuments

Dealing With Vegetation on Historic Monuments: an EHS Guideline

Problems Caused by Vegetation

A dense covering of vegetation, usually trees and ivy, is a common feature on many ruined, historic monuments. Established vegetation can cause irreparable damage to historic monuments, through root damage, displacement of wall fabric and abrasion against monuments due to wind action. In some cases, the extent of the damage caused by unchecked growth can eventually present safety problems for visitors and adjacent dwellers.

Natural Heritage Interests

In some cases plants growing against or on masonry may be of botanical or historical significance. If identified, such plants should be retained but their growth must be checked by appropriate pruning. If the plant is listed on Schedule 8 of the *Wildlife Order (Northern Ireland)* 1985 a licence must be obtained from EHS before the plant is pruned. Small flowering plants may be left without causing damage to the masonry, but all woody plants must be removed. Care should also be taken during the removal of vegetation that nesting birds or bats, which are all protected species, are not disturbed. Please see *Time of Treatment* section below.

Ivy

Ivy can be very destructive to historic monuments. At first, it will not generally harm upstanding masonry where walls are intact, showing no cavities. In these situations, ivy mattes growing up the masonry faces act as protective barriers from the elements and pollutants. The feeding roots of ivy are anchored into the ground, and the plant uses the monument for support.

However, progressively, on ruined masonry where the wall bonding is weakened and failing, ivy can grow through the wall fabric. In such cases, ivy stems grow and expand within the wall, displacing areas of masonry and causing collapse. Subsequent open joints permit water to penetrate the fabric of the wall, causing further damage. In these cases conservation repair work needs to be carried out to remove the ivy growth and to waterproof the walls by capping and pointing in an appropriate manner.

Masonry on historic monuments can be loose and unstable. In some cases ivy may actually be holding the existing wall fabric in place. Ivy and other vegetation must be in a decayed state before removal, and should not be removed at all unless conservation of the monument is already in progress. Depending on the extent of the ivy growth on the monument, it can take up to two years for ivy to be successfully and appropriately treated, prior to the start of conservation work. Below are the steps that should be followed to treat vegetation in such cases in a safe and responsible manner.

Steps for Treating Ivy:

1. Cut away or trim any vegetation that can be easily removed from, and around, the monument, including trees, shrubs etc. Ivy should be cut back as close to the face of the monument as possible, without endangering the integrity of the historical remains or creating a health and safety risk to the personnel undertaking the work.

2. This trimmed face should then be sprayed ***immediately*** with an appropriate herbicide, (see details below). Ivy roots and shoots can seal themselves within an hour once damaged, and so must be sprayed as soon as possible.

3. The main ivy stem(s) should be cut at the base of the root, removing a piece at least 300mm in length. This effectively cuts off the water supply to the plant. The size and unpredictability of chain saws, even when used by trained personnel, make them unsuitable for this task. A hand saw is appropriate, taking care not to let the saw strike the vulnerable masonry. If the root is small, it should then be painted or sprayed immediately after cutting with the chosen herbicide. If the root is of reasonable size, up to 200mm in diameter, drill a hole into the stump 80mm long and fill with the herbicide solution, then plug. Should the root be wider than 200mm, a series of holes can be drilled into the stump, making sure the holes are at least 30mm in from the cambium (the formative layer of cellular tissue that lies between the young wood and the

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outer surface layer). The herbicide solution should then be poured in and the holes plugged. Once the main root has been cut, secondary roots may attempt to burrow invasively into the weaker areas of wall fabric to access moisture naturally present in the walls. Immediate spraying will prevent this damage occurring.

4. The vegetation should then be left to die away naturally. It can take up to two years before it has decayed sufficiently to ensure safe removal. The state of the vegetation should be periodically checked as it may require a second treatment during this time, and perhaps again a few weeks prior to removal.

5. The plant must never be removed from walls while still alive. Once the stems have died, they should be removed with the utmost care by hand, and not with a rope or any other means, in order to avoid damage to the monument or possible collapse of loose masonry. On areas of loose masonry, ivy mattes are often keeping masonry sections in place. Therefore it is best to leave the withered ivy on the wall until the conservation work on that respective wall section is being undertaken.

Displaced masonry

Large ivy roots can penetrate through to the heart of masonry walls, displacing stones. In such cases it is not advised to bury them within newly repointed masonry. Decayed roots will leave voids providing areas where moisture can penetrate and cause further damage possibly affecting the setting of new mortar. Even small pockets of roots can re-establish themselves causing future damage. It is therefore important to make sure that all root material has been removed before repointing takes place.

Dismantling of masonry around large roots may be required involving the removal of the root and resetting of the original stonework. If stonework does need to be removed in order to get to roots deep within the masonry fabric, the original position of stones must be recorded by photographs and scale drawings as necessary. Individual stones should be numbered using a water-based paint, and the numbers annotated on the photographs and/or drawings to facilitate accurate resetting. The stonework can then be carefully removed. All removed stonework must be stored on a flat surface, away from other work activities, in order to protect the masonry. In such cases, archaeological supervision is necessary. In complex situations, this work may need to be undertaken in stages, perhaps months apart, giving large roots time to decay and new adjacent mortar to set.

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Herbicide

Only approved herbicides (pesticides used to control unwanted plants) may be sold or used. Approved pesticides are given either a MAFF number (up to 09999) or a MAPP number (10000 and over). Pesticides are approved for specific fields of use, and should not be used outside the locations for which they are specifically developed.

Products suitable for vegetation removal on and around masonry monuments will contain the active ingredients either **glyphosate** or **triclopyr**.

Glyphosate is non-selective; therefore it will target all vegetation with which it is in contact. Triclopyr controls woody and broad-leafed species (such as ivy) but will have minimal effect on surrounding grass, for example.

Recommended strengths of glyphosate:
For cut back vegetation [foliar application]: 200ml of concentrate to 10 litres of water (2%)
For root / stump application: 1.5 litres of concentrate to 10 litres of water (15%)

Recommended strengths of triclopyr:
For cut back vegetation: 70-150ml of concentrate to 10 litres of water (0.7-1.5%)
For root / stump application: 2 litres of concentrate to 10 litres of water (20%)

These herbicides can be used in conjunction with an approved **adjuvant**, which reduces surface tension and assists in the absorption of the herbicide into the plant, increasing the effectiveness of the herbicide. Adjuvants are often referred to as “wetting agents”.

Approved herbicides and adjuvants can be obtained from garden centres or DIY stores. Advice should be sought from the supplier. Many outlets will have a BASIS registered member of staff, who is trained to advise on the use of pesticides. These individuals can assist with any particular queries regarding products, strength of solutions and mixture of herbicide and adjuvant required for each specific task.

Health and Safety

All products must be used in accordance with the product label statutory conditions, including maximum dose rate, time of year for latest application, maximum number of treatments and application in the correct fields of use. It is an offence to use a product in any way other than that as stated on the label, or to use a product that has not been approved.

Before commencing any work on historic monuments, it is essential to ensure that there are no areas of loose or dangerous stonework, soil or debris that may cause injury to those undertaking the vegetation treatment.

The Health & Safety at Work Order (NI) 1978 and the Control of Substances Hazardous to Health Regulations (NI) 2002 requires employers to:

- Conduct a suitable risk assessment in relation to the use and method of specific pesticide products,
- Implement control measures to minimise risk to operators and others who may be affected,
- Provide suitable instruction and training, for example to the National Proficiencies Test Council standards.

All operators must have received adequate training, information and instruction in the storage and use of approved pesticides. Necessary certifications are:
PA1 (Foundation Module), concerning the handling of pesticides, and one other, dealing with the method of application. In the case of historic masonry monuments, the one to be most likely required is the **PA6 (Hand Held Applicator)**.

Those exempt from certification are:

1. Those spraying on the land / monument directly owned by them. They are personally liable therefore for their own health and safety.
2. Those under the direct and personal supervision of a certificate holder.
3. Those under “Grandfather rights” i.e. born on or before 31st December 1964.

It is advised that products with the lowest COSHH hazard rating should always be used. Therefore glyphosate products with no hazard rating should be preferred to triclopyr based products which are rated as Irritant or

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Harmful. However each case must be assessed on its own merits, and for very thick ivy growths, triclopyr based products may be more appropriate. Advice from the supplier is therefore recommended.

Time of Treatment

Frost and drought limit the effectiveness of glyphosate, while products containing triclopyr are most effective during summer months. However, other issues must also be taken into consideration before vegetation is treated. Nesting birds and roosting or hibernating bats will often use dense ivy. It is an offence under the *Wildlife (Northern Ireland) Order* 1985 to intentionally damage or destroy a wild bird's nest, whether in use, or under construction. The same Order protects bat roosts, and the *Conservation (Natural Habitats etc.) Regulations (Northern Ireland)* 1995 make it an offence to damage or destroy a breeding or resting place of any bat, and it does not require the offence to be intentional or deliberate. Each situation must therefore be assessed on its botanical and wildlife impacts. In general therefore, the best time for ivy treatment is late summer / early autumn, when the vegetation will still be active, but the possibility of adversely affecting wildlife is reduced.

Maintenance

Ivy is a perennial plant, and will always return. Regular annual maintenance work to deal with ivy growth on masonry monuments is recommended. This will ensure that minimal damage to the masonry monument is caused by vegetative growth, and attention can be brought to any other maintenance issues that emerge from time to time.

Wall Tops

EHS often recommends hard capping of wall tops using an appropriate lime mortar mix. However, work specifications are drafted uniquely for each site, and in certain circumstances soft cappings (grass, sod) can be deployed. This method should be used on sites with a delicate ecology, where the introduction of lime mortar capping may change the ecological balance of the site. It will also be employed on monuments constructed with very soft, porous stone, such as lias or mudstone. Hard capping on top of such walls will increase water run-off down the masonry, which would result in increased erosion of the upstanding remains.

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Trees

Occasionally trees root themselves onto wall tops. These need to be cut at their base, and treated with herbicide in the same manner as ivy stems. Trees growing adjacent to masonry monuments can also cause disturbance to the walls, by root action or by abrasion, as well as posing a threat of falling during very windy weather. In such cases, tree removal or cutting of some branches may be necessary. Regular monitoring is advisable as certain species, such as sycamore and ash, grow extremely quickly.

Ground Vegetation

Conservation work often necessitates the removal or trimming of vegetation from around the base of masonry buildings. This usually reveals a large number of loose, fallen stones. Because of this, ground vegetation should be removed using a strimmer, which will ensure that any loose masonry on the ground surface remains visible but undamaged.

Any fallen stonework should be recorded in its exact location, as it may be important in the understanding and conservation of the masonry fabric. Sometimes the original position of fallen stones can be deduced, and they can then be reset during the conservation works. Carved and worked stones are precious and require careful handling. Modern material, such as decorative wrought-iron railings, may also come to light, particularly on church sites. They are an important part of the historical record of the site, and must be carefully treated.

On some sites certain areas may be known to contain fragile buried archaeological remains, or visitor access to particular areas may be detrimental to site preservation. In such cases the “hostile planting” method can be used. This involves the dense planting of nettles or brambles. These species do not have deep invasive root systems that can damage below ground surface remains, but will act as an effective deterrent to climbers or metal detectorists. When dealing with scheduled monuments, Scheduled Monument Consent with the relevant conditions must be granted by EHS for this work to be undertaken.

Lichen

It is generally believed that lichen is not detrimental to undecorated masonry or headstones. Lichen forms part of the natural appearance of many stones and some lichens are rare and should be recorded and preserved. Lichen should never be removed by any crude method of cleaning using wire brushes and detergents or bleach that can cause irreparable damage to the stone face. However the living processes of lichen can attack the stone surface and can lead to subsequent deterioration. Therefore lichen can be cleared off decorated stonework by the selected application of an approved biocide, which is recommended in particular cases. This is not an instantaneous process and it can be many months before treatment will be fully effective. Further advice can be obtained from EHS when necessary.

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Further Information

Environment and Heritage Service www.ehsni.gov.uk
The Northern Ireland Health and Safety Executive www.hseni.gov.uk
Pesticides (Non Agricultural) Safety Pays Information Sheet (available from HSENI).
Control of Substances Hazardous to Health Regulations (NI) 1995, Approved Codes of Practice (available from HSENI ISBN 0-7176-0819-0).
Pesticides – Use Them Safely, a free leaflet available from HSE Books (www.hsebooks.co.uk)
The Biocides and Pesticides Assessment Unit, HSE, Bootle, Merseyside.
Building Research Establishment (BRE) Digest 418 *"Bird, Bee and Plant Damage to Buildings"*, September 1996.

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Andrew Cowan, Tree Craft Ltd.,
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Conservation compendium

Part 11: A career in ruins (the challenges presented by derelict structures)

This article forms part of the Conservation compendium, which aims to improve the way engineers handle historic fabric through the study of historic materials, conservation philosophy, forms of construction and project examples. Articles in the series are written by Conservation Accredited Engineers. The series editor is James Miller.

Jon Avent BSc(Hons), CEng, MIStructE, IHBC, Accredited Conservation Engineer and Chair of the Conservation Accreditation Register for Engineers (CARE)

Synopsis

Our built heritage is a finite resource stretching back thousands of years. Protecting and conserving this heritage is a challenge requiring knowledge, skills and experience, together with an ability to bring practical engineering judgement and often creative and imaginative solutions. This paper sets out the challenges faced by engineers and some of the approaches taken in the appraisal and protection of ruins.

Introduction

Our built heritage stretches back thousands of years and provides a finite physical record of civilisations and societies over those periods. The inevitable evolution of society renders buildings and structures obsolete; however, this evolution leaves historical relics stretching back to the Stone Age, with examples such as Stonehenge in Wiltshire, England requiring protection.

The Middle Ages witnessed a period of massive social change, burgeoning nationalism, international conflict, terrible natural disaster, climate change, rebellion, resistance and renaissance. Built heritage from this time does exist, but is often in a ruinous state, such as the grand castles located around the UK.

Changes in industrial working practices, discovery of new materials and development of new technologies have all also contributed to the dereliction and obsolescence of relatively recent examples of the UK's built heritage.

The consequence of obsolescence and dereliction is that ruins are generally encountered in configurations that they were never intended to be in and lacking their original use. They may have been exposed to the effects of nature over many years, or may have suffered more sudden action such as fire or flood. In the latter case, the decision to repair and reinstate lost fabric may be more clearly defined, whereas in the case of the gradual historical decay of a building or structure the philosophical arguments for the various options can be challenges in themselves. There is little doubt that a range of opinions will exist on the most appropriate solution.

It is important to recognise the distinction between historic structures with listed or scheduled monument status that are in a ruinous condition, and general buildings and structures without such statutory protection.

In a profession where health and safety is rightly given high priority, the challenges to be faced are significant. A building with no statutory protection which is in a ruinous state may be considered too dangerous to survey or repair and demolition becomes the 'simple' solution. With protected structures this approach can only be the very last resort. The consequence is that, as engineers, we need to think creatively to ensure that appropriate solutions and

Figure 1 Phasing plan for Astley Castle

Figure 2
Astley Castle prior to conservation and restoration

Figure 3
Mobile elevating work platform used to survey Astley Castle

Figure 4
Mobile elevating work platform passing through doorway

Figure 5
Aerial view of Gibside Hall taken by drone

options are developed.

The need to plan ahead is of paramount importance and the need for historical research in advance of any physical survey is essential. From the outset there should be an expectation for the unexpected and recognition that that each ruin will have potential for unique challenges. Understanding the history and evolution of a building or structure will assist in a number of areas, including significance of elements and potential alterations during the life of the structure. Figure 1 illustrates the phasing plan for Astley Castle, Warwickshire. Such information can assist the engineer in recognising potential changes in materials or discontinuities in the structural remains.

With the change from the Construction (Design and Management) (CDM) Regulations 2007 to CDM 2015, there is an inevitable review of procedures and processes for all construction professionals. This article does not propose to review the changes; however, underpinning all works is a need for competency, experience and planning. The CDM regulations have always stipulated a requirement for adequate time for planning of works, and this is particularly important when dealing with ruins.

It must be understood and accepted that all risks cannot be removed, but they do need to be identified and managed. Weather conditions during the time leading up to a survey and during a survey can have a significant influence on risk. High winds, heavy rain and frost can all influence the stability of a structure that may already be in a precarious condition.

Ruins are inherently dangerous and unpredictable structures which often involve areas of instability, collapse and near collapse. Early-stage surveys should seek to use remote access techniques to gain a greater understanding of the structure while avoiding unnecessary personal risk.

Surveying

Figures 2 and 3 show the 2013 RIBA Stirling Prize-winning Astley Castle in 2008 prior to conservation and restoration, when the building was a burnt-out and collapsing shell. The use of mobile elevating work platforms (MEWPs) enabled the condition of the building to be accessed from a number of safe perimeter locations, from which a strategy for progressing further surveys and any urgent stabilisation work was developed.

Once the high-level masonry and other precarious structures have been assessed, the need for closer inspection options can be considered. Following simple, practical and logical procedures will reduce risk. Continuing with a remote approach to inspections wherever possible will increase the understanding of the structure and associated risks before any close-up inspection is considered.

When it is considered sufficiently safe to enter the building, the use of MEWPs can continue to aid inspections. Tracked machines that can pass through single doorways are available (Figure 4). It should

Figure 6
Laser scan of Kirkistown Castle

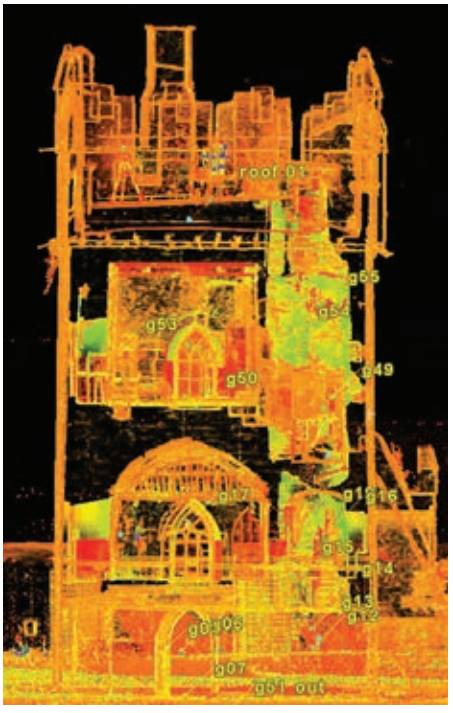
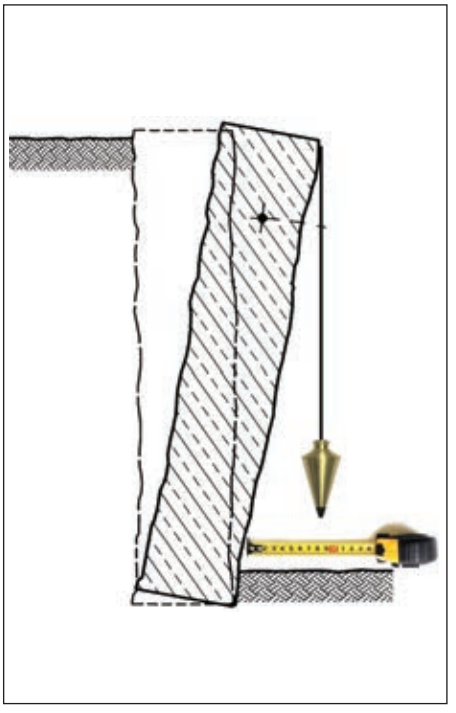


Figure 7
Rope access techniques used to survey Neath Abbey

Figure 8
Tape measure and plumb-bob provide understanding of wall stability



be noted that while these machines are highly compact and manoeuvrable, they are often very heavy and consideration should always be given to access routes and basements that may exist.

Drones

Drone technology is becoming increasingly useful in the survey of ruins. The ability to safely view high-level masonry and to identify areas of instability is a key benefit. Figure 5 shows an aerial view of Gibside Hall, Gateshead, taken using a drone. A number of companies offer Civil Aviation Authority certified services that can be tailored to individual site constraints.

Laser scanning

Laser scanning has the ability to remotely obtain geometric data that can be used to identify discontinuities and structural movement. Line of sight is required and site configurations and topography may not be suitable in all cases. Where data can be collected, there is scope for taking very accurate sections through structures in any plane, enabling wall profiles and structural thicknesses to be established with ease. Figure 6 illustrates the output from a laser scan of Kirkistown Castle, Northern Ireland.

Rope access

Rope access can provide a cost-effective solution to the inspection of high-level structures where remote platforms are unable to reach the area to be surveyed. The challenge for using this technique is the need to have a safe and secure anchorage for climbing ropes. Pre-assessment of anchor points and routes for access is essential; where there is any doubt the techniques should not be used. Figure 7 shows the use of rope access techniques to survey the ruins of Neath Abbey, Wales.

Simple techniques

With the development of technology there can be a tendency to feel a requirement to use every 'tool' available. However, the engineer should not ignore the very simple tools that can yield a wealth of information. Time taken to observe and understand a structure, how it was built and how it might fall down is an essential first stage. Understanding the building or structure three-dimensionally will ensure that defects and potential instability are not misinterpreted.

A simple tape measure and plumb-bob will provide great understanding of wall stability (Figure 8). A digital camera and dimensional key will allow approximate scaling of images when reviewing survey data. A good notebook together with a set of key building plans and a methodical referencing system will all aid an efficient inspection.

Vegetation

The encroachment of nature can contribute to the aesthetic attraction of ruins and can create natural habitats for rare flora and fauna. However, for many ruins vegetation can be a significant problem. Ivy may be a picturesque adornment for ruined walls but its lime-loving tendency and root systems can result in opening up of mortar joints, resulting in significant and rapid damage. Tree roots can penetrate deep into the core of historic masonry, thrusting apart face from core and requiring extensive remediation. Wind action on established trees and vegetation can exert significant forces on walls, and if growth remains unchecked, collapses may result.

The presence of vegetation can seriously restrict the ability to effectively survey a ruin, but without knowledge of the underlying structure there are risks presented by any decision to remove or cut back. A carefully considered and phased approach is always necessary to ensure operatives are not exposed to risks themselves and also that they do not inadvertently cause further

damage or destabilisation of the structure. It is usual to carry out a light 'cut-back' of surface vegetation, avoiding any extraction of roots or pulling action on underlying masonry. This process will enable further inspection and assessment of masonry to occur and appropriate methodologies to be developed for extraction of intrusive vegetation, while maintaining a safe working environment and retaining as much historic fabric as possible.

Such intrusive vegetation will require careful pruning to reduce wind resistance, taking care not to damage historic fabric or cause collapse during the process. Figure 9 shows the curtain walls at Ruthin Castle, Wales, affected by intrusive vegetation.

Repairs and stabilisation

When progressing any survey, it is useful to have knowledge of the intended objectives. With heritage ruins the primary objective is often to protect and stabilise, although occasionally there is an intention to carry out new works to provide the site with a sustainable future. Knowing the objectives will assist in defining appropriate repair strategies and enable critical areas to be given closer consideration at survey stage.

Wall heads

Exposed wall heads are a key feature in ruins and an area where water ingress can lead to significant and rapid deterioration. In the past it was common for many ruined wall heads to be treated by 'rough racking' or 'coring', forming a coping of recreated masonry corework on top of the historic wall. Both these approaches tend to crack and direct water into the walls at specific locations. They also have the effect of concentrating water flow down the wall faces, accelerating stone erosion.

In recent years there has been a move towards 'soft capping' ruined walls, using turf sourced local to the ruin. Figure 10 shows recently completed soft capping works to masonry remains at Kilpeck Castle, Herefordshire. The turf capping absorbs water and insulates the wall head, and can also 'breathe' and dry out. The grass overlapping the edges also provides a natural 'drip', protecting wall faces. The technique also has the advantage of retaining a soft and natural appearance to the ruin.

Stabilisation

Ruins which exhibit structural problems may require remedial works, although the engineer should always question the necessity of intervention. Unless the structure presents an imminent danger, it may be more appropriate to monitor over at least a year to determine whether the movement is progressive and not simply seasonal and cyclical.

Trial pits or cores may be beneficial to establish subsoil conditions that may be contributing to movement. While some fractures can be easily stabilised using

Figure 9
Intrusive vegetation at Ruthin Castle

Figure 10
Soft capping works at Kilpeck Castle

Figure 11
Stitching of fractures

Figure 12 Ruins of Piercefield House showing wide array of openings

Figure 13 Timber and ply braced frame in door openings at Piercefield House

Figure 14 Astley Castle – example of ruin being protected through modern insertion

ALAMY

stainless steel ties or other forms of stitching (Figure 11), other defects may require greater consideration. It is essential that any defect is fully understood before the solution is proposed.

Door and window heads

These pose a range of challenges and have the added risk of potentially significant collapse if failure occurs. Figure 12 shows the ruins of Piercefield House in south Wales and illustrates a vast array of window openings all potentially contributing to instability of the elevations. Where timber lintels or heads have rotted away, it may occasionally be appropriate to reinstate them if they can be protected from decay. Often the natural arching effect of historic masonry can be considered, and in some instances the failure of a door or window head does not lead to further instability in the short term. Where concerns do exist, it may be appropriate to implement urgent support to prevent progression of movement, pending a more permanent solution. Figure 13 shows a simple timber and ply braced frame inserted in a pair of door openings at Piercefield House.

Protecting ruins

The most effective method of ensuring that a ruin is effectively maintained is to ensure it has a use. Any proposed future use needs to be balanced with the level of intrusion required to generate the future use. Figure 14 shows the completed Astley Castle project, where contemporary accommodation was placed within the consolidated ruin. The project secured the RIBA Stirling Prize in 2013, and was an example of a bold modern insertion into a historic ruin to create a sustainable future.

However, it is essential to treat each structure on its own merits, and in some instances a degree of 'managed decay' may be more appropriate than inappropriate restoration.

The surveying, repair and conservation of ruins is a rewarding occupation, which continually presents new challenges to the engineer. In the words of John Ashurst[1]:

"Ruins are very special places – they are fragmentary remains of an earlier culture, civilisation or way of life that, in most cases, no longer exists. They provide a window for the visitor to look through and to visualise how things had once been."

Reference

1) Ashurst J. (2007) *Conservation of ruins*, Oxford, UK: Butterworth-Heinemann

The Institution of Structural Engineers **StructuralAwards2016**
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Mount Stewart House, NI

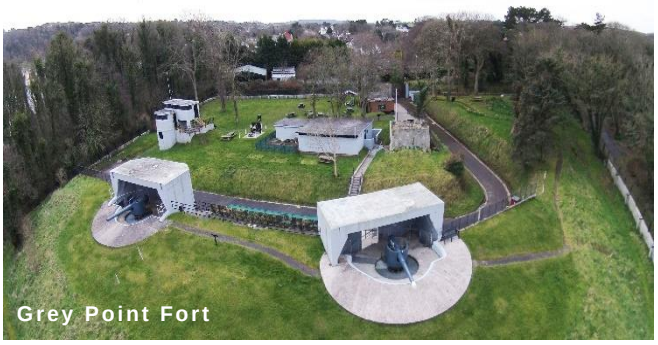

Corfe Castle


Charterhouse, London


Grand Redoubt, Hythe


Astley Castle


Blackpool Wintergardens


Grey Point Fort

Jon joined **Mann Williams, Bath** in 1989 gaining extensive experience across a wide range of construction techniques; progressing to Director level in 1996.

He has worked on a wide range of projects across the UK, including many Grade 1 properties, Scheduled Monuments, and Landscape projects for clients including Historic England, National Trust, Cadw, DfC-HED, local authorities, Building Preservation Trusts & private clients.

In 2004 Jon was one of the first UK engineers to achieve Accreditation under the Institute of Civil and Structural engineers scheme ('CARE') which recognises competence and experience in the field of Building Conservation. He was Chair of the CARE Panel from 2011 to 2017 and sits on the RICS Conservation forum boards and the Edinburgh Group. Jon currently provides structural engineering input to the Northern Ireland heritage department HED (former NIEA) as part of a framework commission. He also provides structural engineering advice to the National Trust as a representative on their specialist advice panel.

Other experience includes expert witness input where Jon has advised clients, including local authorities, on heritage protection matters and buildings at-risk.

At Mount Stewart House in Northern Ireland Jon provided conservation engineering input for the National Trust on the multi award winning £8m project enabling the house and gardens to be more widely opened to the public.

Jon's pragmatic approach, intuitive design and practical nature ensure that projects are easily executed, with problem solving and buildability high on the list of key objectives.

A selection of recent projects include:-

- **Astley Castle – RIBA Stirling Prize Winner 2013**
Conservation repairs and stabilization of ruined fortified manor house for refurbishment
- **Mount Stewart House, NI - IStructE & RICS Awards**
Award winning £7m conservation and repairs project for National Trust on Grade A, winning National IStructE and RICS Building Conservation Awards in 2016
- **Grand Redoubt, Hythe**
Urgent conservation stabilization works and repairs to the military fortification built between 1798 and 1809 to support a chain of 21 Martello Towers
- **Darwin Tower**
Conservation repairs for local authority of one of the most viewed & well known monuments in Lancashire
- **Corfe Castle**
Stabilisation works and conservation repairs to historic masonry structures for National Trust
- **Grey Point Fort**
Structural repairs and conservation management advice on this battery located at Helen's Bay on the south side of Belfast Lough and part of the defenses of Belfast.

Portland energy recovery facility

Framework heritage mitigation strategy

Appendix 5

Our ref: 10256 Portland ERF, East Weare / APD

masterplanning
environmental assessment
landscape design
urban design
ecology
architecture
arboriculture
graphic design

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Kevin McGhee
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30th July 2021

Dear Kevin

Phase 1 walkover of East Weare heritage features for proposed remedial vegetation clearance works.

Introduction

This letter report details a Phase 1 walkover survey of proposed works to clear vegetation, to aid in the repair of heritage features, including the East Weare battery above Portland Port. The aim of the walkover survey was to establish any ecological constraints that may be present within the footprint of the proposed works, and to make recommendations to enable the works whilst protecting ecological features of interest. The site is within the Isle of Portland Site of Special Scientific Interest and Isle of Portland to Studland Special Area of Conservation (SAC) and therefore, an assessment of the habitats was also requested by Dorset Natural Environment Team as part of the consultation process. The aim of the vegetation clearance works is to create access to the heritage features for repair and removal of risk factors and eventual curated public access and improved interpretation. This includes the clearance of pathways and the heritage feature itself, which has become overgrown.

Methods

The Phase 1 walkover survey was conducted on 13th July 2021, by experienced FPCR Ecologist Dale Cooper. Dale is a FISC level 4 botanist and has over 10 years' experience in surveying for protected species.

The survey was conducted using the methodology outlined in the Handbook for Phase 1 Habitat Survey (JNCC 2010)[1]. This involved a systematic walkover of the site to classify the habitat types

1 JNCC, (2010). Handbook for Phase 1 habitat survey – a technique for environmental audit, ISBN 0861396367.

present (using the standardised Phase 1 Habitat classification system) and mapping these onto an base map. Each habitat was described based on the botanical merits and target notes used to record features of habitats of particular interest, as well as any sightings, evidence of, or potential for protected or notable species. A full botanical species list (*Appendix A*) was compiled during the survey, and a Phase 1 plan of all major habitat types produced (*Figure 1*). Where necessary, the abundance of species was quantified using the DAFOR scale, ranging from Dominant (D) (>75%) to Abundant (A) (75-51%), through Frequent (F) (50-26%) and Occasional (O) (25-11%) to Rare (R) (10-1%).

In addition to recording the habitats present, a search for signs or evidence of protected species including, but not limited to badgers, dormice, nesting birds and reptiles was also undertaken. An assessment of the suitability of habitats present within the survey area to support protected species in the absence of obvious evidence was also made.

Results

Habitats

The habitats identified within the survey comprised almost entirely of scrub, with a small pocket of calcareous grassland and short perennial, as well as bare ground and a building (gun battery heritage feature).

Scrub

The majority of access paths and gun battery building are covered in and surrounded by dense scrub, typical of the East Weare cliffs. The scrub is dominated by blackthorn *Prunus spinosa* with abundant bramble species *Rubus fruticosus agg.* and ivy *Hedera helix ssp. Hibernica*. Dogwood *Cornus sanguinea* is frequent and wayfaring tree *Viburnum lantana*, sycamore *Acer pseudoplatanus*, clematis *Clematis vitalba* and dog rose *Rosa canina* are all occasional. The ditch in front of the gun battery building is dominated by dense ivy and bramble. Bramble scrub also dominates on the edges where scrub cannot grow into rockier areas. Nettle *Urtica dioica,* patches are found where nutrient rich slumps have formed. Where scrub growth is overhanging and leaves clearer patches beneath, some woodland specialists are established including occasional pignut *Conopodium majus* and hart's-tongue fern *Asplenium scolopendrium.*



Photographs 1: Section of photographs of the scrub along the current partially accessible paths

Calcareous grassland

Calcareous grassland within the survey area was limited to one area (front gun mount) where scrub growth is prevented by a lack of or very shallow soils. This includes exposed rock and exposed areas of concrete that form the old gun battery building. These areas are almost ephemeral/short perennial in nature; however, the plant communities present suggest that calcareous grassland has begun to establish. The calcareous nature of the grassland is indicated by the presence of frequent upright brome *Bromus erectus*, lady's bedstraw *Galium verum* and salad burnet *Sanguisorba minor*, whilst other indicators including common restharrow *Ononis repens* and hoary plantain *Plantago media* are also present.

N.B. – a small area of late successional, closed-sward, calcareous grassland is present atop of the northern hand gun mount. The area was viewed briefly, but access is difficult so did not return. Area will not be impacted by the scrub clearance.

Short perennial

Short perennial communities again have a limited distribution on rocky or shallow substrates within the survey area, including in shadier areas beneath scrub growth along established tracks. Yorkshire fog *Holcus lanatus,* false oat-grass *Arrhenatherum elatius*, yellow-oat grass *Trisetum flavescens* and meadow fescue *Festuca pratensis* are all occasional, whilst the herb communities include frequent ribwort plantain *Plantago lanceolata*, agrimony *Agrimonia eupatoria* and creeping cinquefoil *Potentilla reptans*, occasional marjoram *Origanum vulgare*, hop trefoil *Trifolium campestre*, bird's-foot trefoil *Lotus corniculatus* and wood sage *Teucrium scorodonia* and rare shining cranesbill *Geranium lucidum*.

Photograph 2: Eastern (front) gun mount showing calcareous grassland, short-perennial and diverse scrub edge habitat

Bare ground and building

Areas of bare ground within the survey area were typically rock or rocky substrate where no plant communities were established. This included historic paths to the gun battery. The gun battery building itself is of stone and concrete construction, with some climbing plant species growing on it including clematis and mature ivy *Hedera helix ssp. helix*.

Protected species

No evidence of protected species was found within the survey area. However, the suitability of the habitats recorded during the walkover to support protected species is listed below:

- The scrub has potential to provide habitat for badgers, dormice, nesting birds and reptiles where ground cover is a mosaic of dense and open areas.
- Grassland and short perennial habitats are suitable habitat for reptiles.

Discussion

Proposals

Figure 1 demarks the proposed scrub clearance in order to gain access to the heritage feature. The removal is a combination of widening existing routes, which are still just about accessible but require cutting back to approximately 2m width and removing overhanging vegetation, and the cutting of a 2.5m wide path though largely blackthorn scrub to link up the existing paths and allow access around the perimeter of the feature.

Currently the feature can be accessed through a narrow track through the scrub from the main path. There is evidence across the feature that this access is frequently used by groups of people as a private area for drinking and other activities.

Habitats

Scrub accounts for the highest area of habitat within the survey area. The scrub composition is typical for the cliffs of Portland and consistent with the SSSI description in areas away from the man-made building and made ground around it. Bramble and ivy dominate over areas of hardstanding and tracks and ruderal species including nettle dominate in features such as the gun battery ditch, where nutrients are washed down and concentrate. The proposed works will include the removal of small areas of scrub to provide access to the gun battery and where scrub has encroached or covered the building itself. The NVC scrub community W22 forms part of the suite of NVC communities that comprise the Annex 1 habitat vegetated sea cliffs of the Atlantic and Baltic coasts. The coastal scrub habitats are also mentioned in the SSSI citation. Small scale removal of above ground growth to facilitate inspection and repair of the monument will not have any significant effects on the interest features of the protected sites.

The limited areas of calcareous grassland and short perennial habitats have formed where scrub cannot grow. Calcareous grassland is a priority habitat and also forms part of the designation for the Isle of Portland SSSI. Whilst being important, it is unlikely that any of this habitat will be impacted to the proposed clearance works. This is because it is present in areas that do not require clearance to facilitate access to or restore the gun battery. In the long-term it is likely that scrub clearance at the site will increase the quality and extent of the calcareous grassland present, creating an overall enhancement for biodiversity. Short perennial habitats will also be retained and not impacted by the works.

Protected species

No evidence of protected species was recorded during the walkover survey, however, the habitats present are suitable to support species including dormice, nesting birds and reptiles, that are difficult to record without targeted surveys. Dormice records were not returned in a desktop search for the nearby Portland ERF proposals in 2020 and are thought to be absent from the Isle of Portland. Therefore, their presence is ruled out.

The scrub provides habitat for a wide range of nesting bird species. Whilst no nests were recorded during the walkover survey, birds can build nests any time between March and September. Nesting birds are protected by the Wildlife and Countryside Act 1981 (as amended). To protect nesting birds during the works, all scrub clearance should either be undertaken outside of the nesting bird season (between October and February), or should be preceded by a nesting bird check by an experienced Ecologist. In this instance it would be possible to identify nests by a search prior to clearance commencing. An Ecological Clerk of Works (ECoW) would supervise the scrub clearance in case any nests were found during the works. If a nest was found all work should stop to establish a five-metre buffer zone around the nest. Works could only commence again once all birds had fledged from the nest.

Scrub edges and areas of grassland and short perennial provide suitable habitat for reptile species. There are records of common lizard *Zootoca vivipara*, and slow worm *Anguis fragilis* within one kilometre of the survey area. The majority of vegetation clearance is within dense scrub and limited to areas not suitable for reptiles, however, small areas of reptile habitat may require clearance which can be identified on the ground with the ECoW during the supervision. Removal of these habitats, if

required, should be carried out under ECoW supervision and the “strim and push” method should be used. This method requires a search by the ECoW, and phased strimming of vegetation to ensure reptiles move away first through disturbance from a high cut and then a low cut is made at least 30 minutes later to make the habitat unsuitable prior to full clearance.

Summary

The proposed vegetation clearance works to enable permanent access and restoration of the East Wear gun battery heritage feature, will result in the loss of small amounts of scrub. Whilst there are no constraints to the removal of this habitat itself, there is potential for impacts on nesting birds and reptiles in the absence of suitable mitigation. An ECoW will be present during scrub removal to check for nesting birds and supervise a strim and push exercise for reptiles in sensitive areas. With these methods employed, the ecological impacts of the works will be negligible. In the long term, there is likely to be a small ecological benefit arising from the scrub clearance works in the form of increased calcareous grassland establishing in cleared sections, and the woodland ground flora along the paths will benefit from increased light.

Adam Day BSc (hons), MSc, ACIEEM
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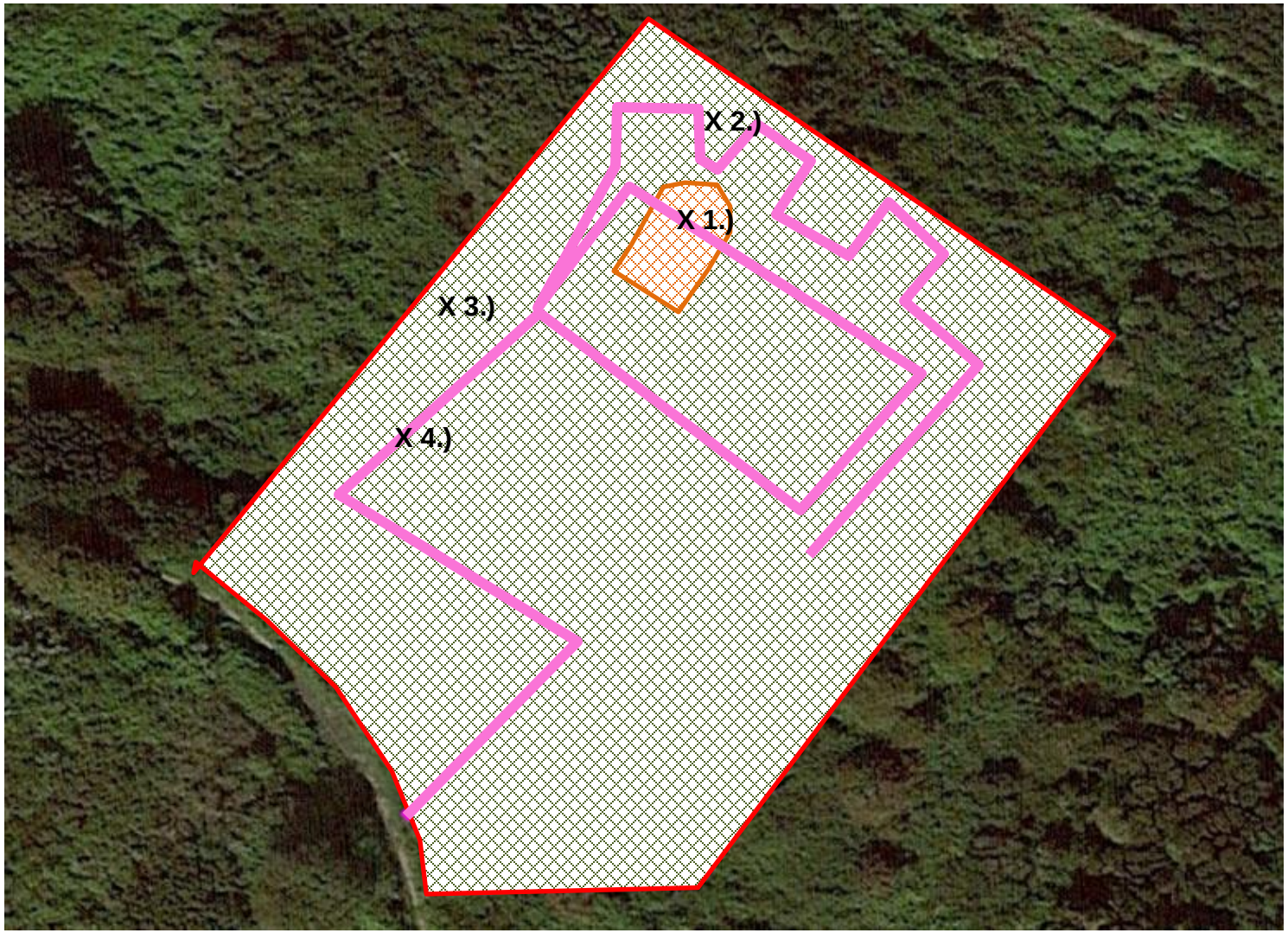
[redacted]

Appendix A: Botanical Species List

Common name	Scientific name
agrimony	*Agrimonia eupatoria*
bird's-foot trefoil	*Lotus corniculatus*
blackthorn	*Prunus spinosa*
bramble species	*Rubus fruticosus agg.*
burnet saxifrage	*Pimpinella saxifraga*
bush vetch	*Vicia sepium*
clematis	*Clematis vitalba*
cocksfoot	*Dactylis glomerata*
common restharrow	*Ononis repens*
common sorrel	*Rumex acetosa*
creeping bent	*Agrostis stolonifera*
creeping cinquefoil	*Potentilla reptans*
creeping thistle	*Rumex acetosa*
crested dog's tail	*Cynosurus cristatus*
dog rose	*Rosa canina*
dogwood	*Cornus sanguinea*
eyebright	*Euphrasia officinalis*
false oat-grass	*Arrhenatherum elatius*
germander speedwell	*Veronica chamaedrys*
great willowherb	*Epilobium hirsutum*
hart's-tongue fern	*Asplenium scolopendrium*
hawthorn	*Crataegus monogyna*
hedge bedstraw	*Galium mollugo*
hemp agrimony	*Eupatorium cannabinum*
herb robert	*Geranium robertianum*
hoary plantain	*Plantago media*
hoary plantain	*Plantago media*
hop trefoil	*Trifolium campestre*
ivy	*Hedera helix ssp. Hibernica*
lady's bedstraw	*Galium verum*
marjoram	*Origanum vulgare*
meadow fescue	*Festuca pratensis*
meadow vetchling	*Lathyrus pratensis*
nettle	*Urtica dioica*
pignut	*Conopodium majus*
prickly sow-thistle	*Sonchus asper*
ragwort	*Jacobaea vulgaris*
ribwort plantain	*Plantago lanceolata*
rough meadow grass	*Poa trivialis*
salad burnet	*Sanguisorba minor*
shining cranesbill	*Geranium lucidum*
sycamore	*Acer pseudoplatanus*
upright brome	*Bromus erectus*
wayfaring tree	*Viburnum lantana*
wild madder	*Rubia peregrina*
wood sage	*Teucrium scorodonia*

yellow-oat grass	*Trisetum flavescens*
Yorkshire fog	*Holcus lanatus*

Figure 1: Phase 1 plan with proposed clearance works overlay



Survey area

Calcareous grassland

X 4.) Target notes

Vegetation clearance areas

Dense scrub

Target notes:

1.) Calcareous grassland will not require removal here as on top of gun battery structure, only scrub will be cleared in this area

2.) Ditch with bramble scrub and dense ivy cover

3.) Small area of calcareous grassland away from scrub clearance path

4.) Short perennial habitats present under scrub, particularly on existing pathways

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