JSPW10/002

JOPPA SALT PAN WORKS

Archaeological Excavations

for Edinburgh City Council

May 2011

HEADLAND ARCHAEOLOGY (UK) Ltd

REGISTERED IFA ORGANISATION

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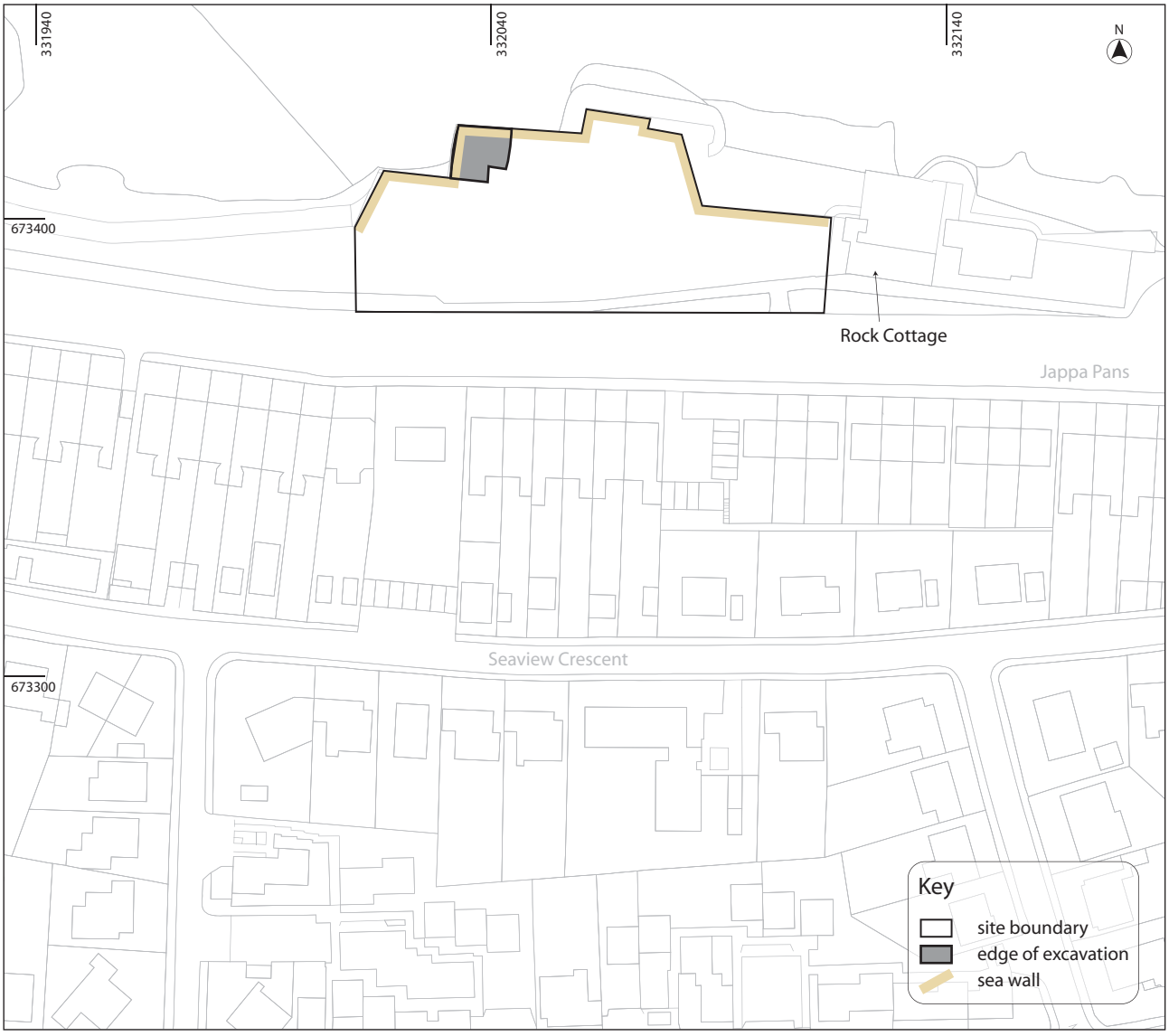


Illus 1
Site location

JOPPA SALT PANS

Archaeological Excavations

Headland Archaeology conducted a programme of archaeological works on the site of the former salt pan works at Joppa following the collapse of the north-western corner of the seawall. The programme of works comprised the excavation, recording and survey of the upstanding remains relating to the salt pan works within a specified area close to the damaged sea wall. The work was commissioned by Edinburgh City Council.

The excavations revealed features associated with at least three different phases of the salt pan works. These features included the remains of three upstanding stone walls, two of which formed two sides to a pan house. One of these stone walls incorporated two later inserted large brick arches that were connected to the remains of the two long brick constructed flues. These flues were the main focus of the excavation area and would have formed the main heating element to the salt pans. The arches had subsequently been blocked and the flues covered over. A smaller opening with a heavy cast-iron door had then been inserted into one of the arches and linked to smaller brick flue. All the features recorded are thought to be associated with the 19th century salt pan works with no earlier archaeological features or artefacts recorded.

1. INTRODUCTION

1.1 Project background

Headland Archaeology Ltd was commissioned by Edinburgh City Council to carry out a programme of archaeological works which included the excavation, recording and survey of a site previously occupied by Joppa salt pan works (NMRS: NT37SW 214).

The work was commissioned by the City of Edinburgh Council (City Development Flood Prevention & CECAS) in advance of repair of a collapsed section of Sea Wall caused by storm damage. The damaged section of Sea Wall was constructed from both original historic fabric associated with the salt works and later 20th century improvements. The work was conducted in accordance with a Written Scheme of Investigation prepared by Headland Archaeology Ltd and agreed with CECAS.

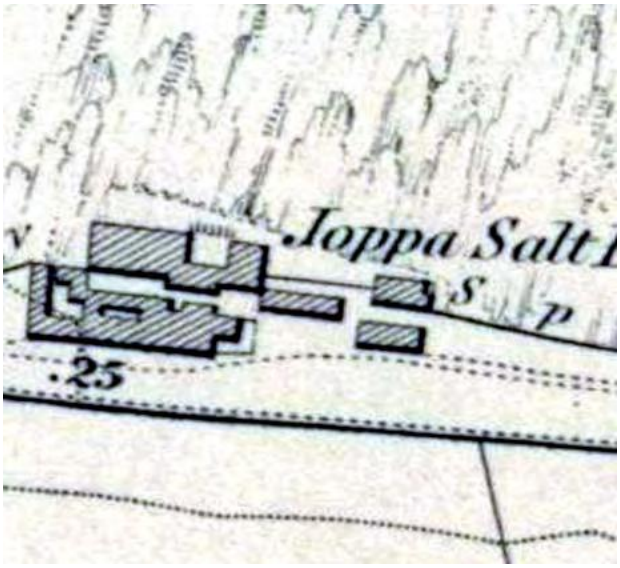
1.2 Site location and description

The site was located between Portobello, Midlothian to the west and Musselburgh, East Lothian to the east, centred on National Grid Reference: NT 3210 7340, approximately 7 miles to the east of Edinburgh. The site of the salt pans covers an area of *c.*0.3ha bounded to the north and west by the sea wall, to the south by Musselburgh Road and to the east by 1 Joppa Pans (Rock Cottage). Much of the area was grassed over and was being used as an open park area.

2. HISTORICAL & ARCHAEOLOGICAL BACKGROUND

2.1 History of Joppa

The settlement of Joppa was formed on the Marquess of Abercorn's land immediately to the east of Portobello (Gifford *et al.* 1991). The town was formed around the salt working and coal mining industry. The industries were closely related as the availability of abundant fuel supplies, such as coal, or peat, was required in order to fuel the evaporation process, as for every ton of salt produced about 16 tons of coal were



Illus 2
1853 OS map

consumed (Butt 1967). Therefore, the location of salt pans was often related to the presence of coal-bearing rocks. Joppa pans formed part of the Prestonpans group which consisted of a series of small manufacturing villages that formed along the coast of East and Midlothian, based on the coal supplies from the Lothian coalfield (Adams 1965).

2 2.2 Salt pans industry

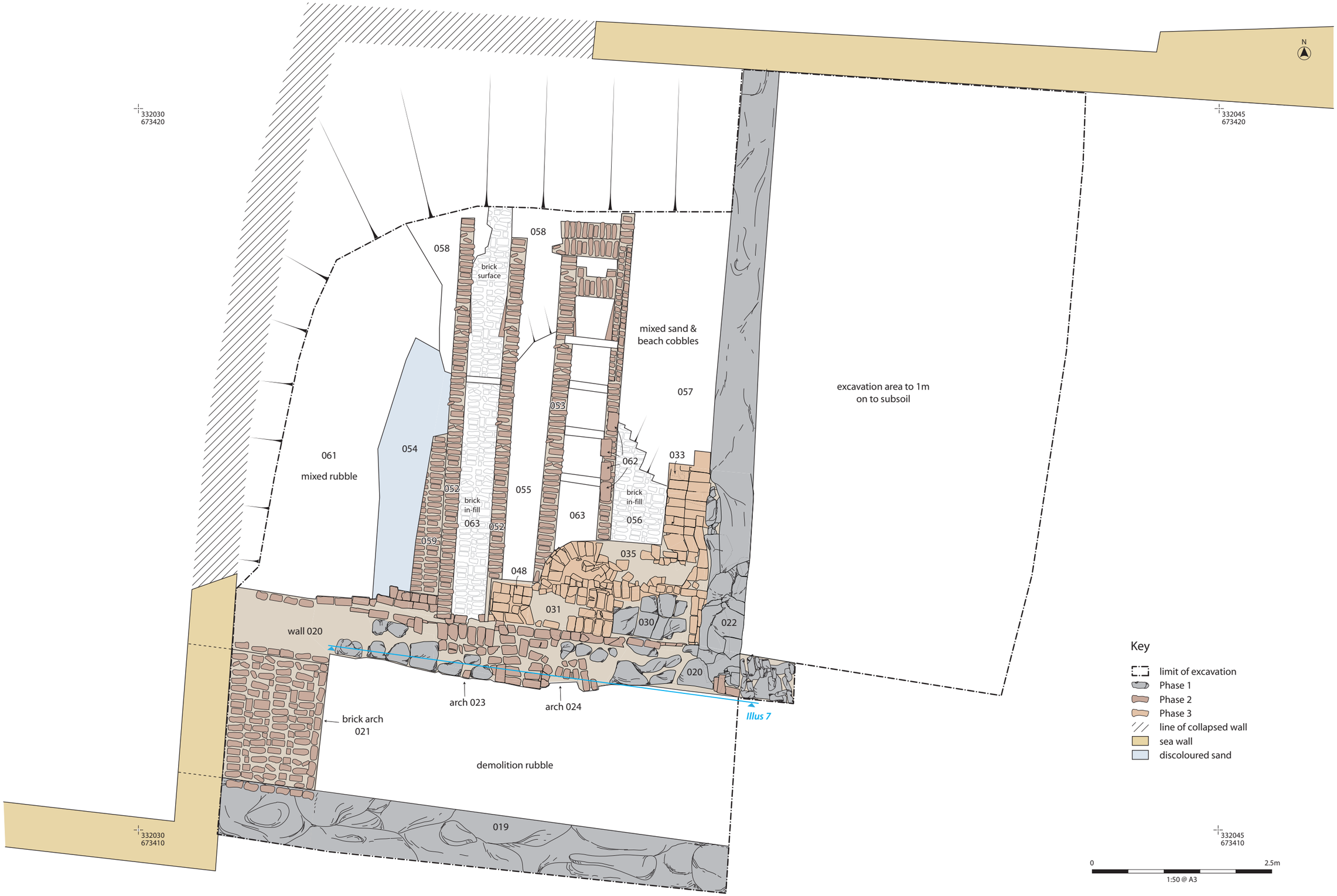
Salt boiling was a relatively simple but inefficient process. Seawater had to be collected and fed into a boiling pan. Bucket pots or reservoirs were built above the tide line to collect the seawater. The brine was then pumped or ladled into pans which were wide and shallow, and often heated from below by embers to evenly distribute heat and thus aid the evaporation process (Anderson 2000). When the correct concentration of salt was reached often a bucket of bullock's blood was thrown in to the pan to separate organic matter. A thick brown scum formed on the surface as further evaporation occurred. The scum was then skimmed off by hand to leave salt and various related products (Butt 1967).

Salt pans were often built on pillars and fired from beneath. Therefore clinkers and ashes are often found on the site of salt works (Butt 1965, for a comprehensive exposition of the salt making process see Anderson 2000).

2.3 Joppa Salt works

Joppa pans date from the beginning of the seventeenth century. Baird (1898) states that *'David Preston of Craigmillar gave his son George Preston that piece of land and rock let to him by Sir Thomas Thomson of Duddingston for building a salt pan, with the house etc., near the sea … within the bounds of Duddingston'.* However, Baird (*ibid.*) also states that *'we have reason to believe that the pans were built by David Preston before 1635'.* From 1788 till 1808, the salt works, which belonged to the Earl of Abercorn, were leased by Mr John Thomson of Priorlatham at a rental of '90 per annum. In 1825, John Baxter and Company were listed as the proprietors of the Joppa Saltworks in Pigot's Directory of Scotland (Pigot 1825). Baird (1898) states that *'the Joppa Salt Pans are carried on with continued success under the management of Messrs Alex. Nisbet & Son, who*

Illus 3
Postcard photo



Illus 4
Site plan

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Illus 5
View of excavation area facing NE

entered in occupation of the works after the late Mr John Grieve some thirty years ago, the works were enlarged and improved'. In 1889 the Joppa pans were bought over by the Scottish Salt Company by whom they were operated along with the salt pans of Pinkie, Prestonpans, and Charleston until closure (Baird 1898). The surviving pans were able to carve out a niche as the quality of salt had improved and demand for coarse cooking salt and salt related products increased. At this time Joppa pans diversified into pipeclay whiting (for doorsteps) (Anderson 2000). The demand for salt remained fairly steady, however the companies' other products were no longer selling. Salt was produced continuously on site until 1953 when the last salter retired (Adams 1965).

The earliest depiction of the salt pans is found on Roy's map of 1747 although at this time they are marked as the Magdelene pans. This name is continued on Laurie's maps of 1766 and 1786. Then by Knox's map of 1816 they are named as the Duddingston salt pans. Although the map is not very detailed it shows eight rectangular buildings in the area to the north of Musselburgh Road.

The first map to depict the pans as Joppa salt pans is the 1853 Ordnance Survey. This shows that the northernmost buildings to the east and west of the central corridor represent pans whilst the central, square depression represents a bucket pot. The large building to the south is labelled 'girnel', storehouse for the salt, and the L-shaped building to the west is a Salter's cottage. The westernmost of the three buildings to the east is labelled as an office.

Postcards from 1908 show two chimneys belonging to the salt works. This early photographic evidence of the site shows a complex series of buildings most of which seem to be constructed of rubble stone. A tramway ran east to west to the south of the salt works and Seaview terrace opposite the works was constructed between 1896 and 1908 suggesting that Joppa expanded during this time.

2.4 Archaeological background

The site was recorded during a coastal survey undertaken by GUARD in 1996. A rectangular rock cut feature measuring 15 m by 10m was recorded in the rocks in the foreshore below Joppa Pans House together with an associated channel, possibly rock cut, utilising a natural fissure leading straight to the sea (GUARD 1996).

Illus 6
View of N elevation of stone wall [019] facing SE

The collapse of the sea wall in 2010 led to a programme of archaeological works comprising a desk-based assessment, a geophysical survey, structural recording and trial trenching undertaken by Headland Archaeology in September 2010 (Wilson 2010).

The structural recording survey revealed sections of exposed archaeology that were fully recorded. The features recorded included several deposits and structures related to the former salt pans. The west-facing section through the collapsed sea wall showed that the modern sea wall was built on a concrete pad directly overlying an earlier stone, sea wall. Various structures backfilled with cinder, rubble, mortar and pantiles were seen behind this retaining wall, including the face of a north-south aligned, mortar bonded, rubble wall and although only partially exposed, a possible east-west aligned wall. In addition, two brick floors were noted at different levels.

The results of the trial trenching indicated that although much of the salt pan works were demolished a significant number of the foundation walls survived below the topsoil. Some of the walls exposed during the evaluation aligned closely to buildings depicted on the 1896 Ordnance Survey map. However, none of the trenches provided evidence of floor surfaces or old ground surfaces.

3. AIMS AND METHODS

3.1 Research aims

The objectives of the excavation were:

- to preserve by record archaeological remains threatened by the rebuilding of the seawall,
- to undertake an appropriate level of analysis and reporting.

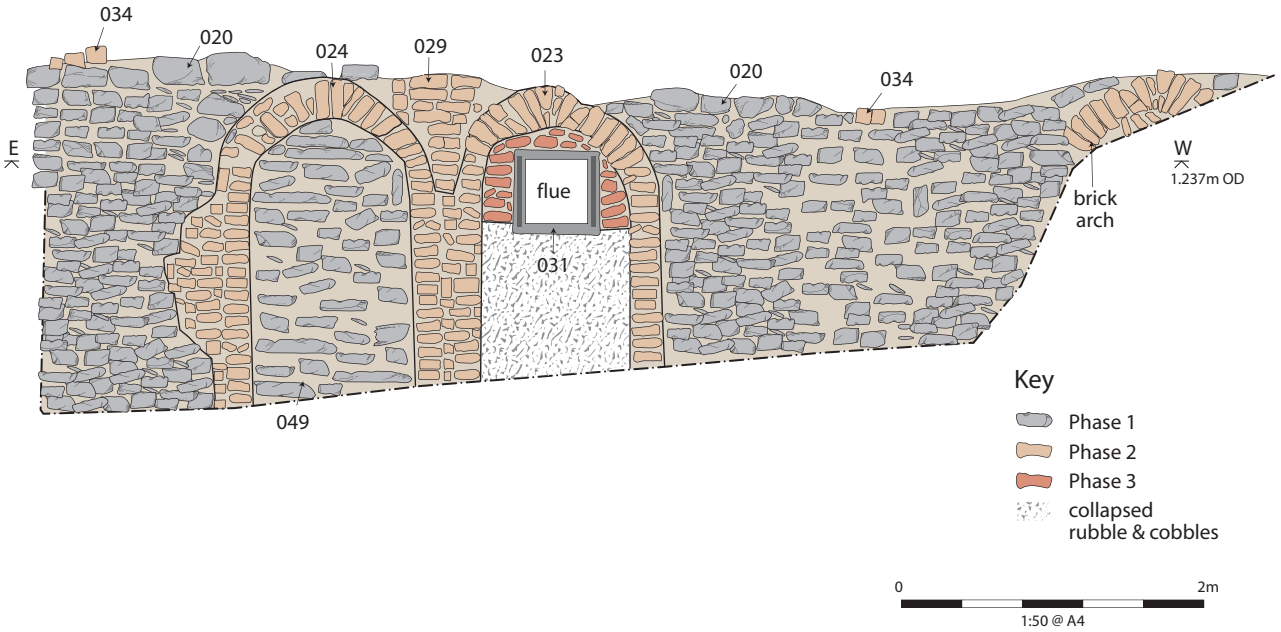
3.2 Excavation & research methodology

The area subject to targeted excavation was located on the north-west corner of the site where the sea wall had collapsed (*c.*3x5m, Illus 1 & 4). The exposed archaeology was found directly overlying the bedrock at a depth of approximately 3m below the present ground surface. Features such as brick floors and burnt deposits were recorded at varied depths on an uneven, sloping south-western facing section. Due to health and safety considerations the initial excavation comprised the opening of a wider area measuring approximately 10m x 10m to accommodate stepped excavations and allow subsequent archaeological excavation and recording down to the required level. Once the initial excavations had been carried out to a maximum depth of 1m a smaller area amounting to approximately 10m x 5.5m was excavated to the bedrock. The area of full excavation was bounded by stone walls to the south and east sides.

All recording followed Headland Archaeology Ltd standard procedures. All contexts and environmental samples were given unique numbers and all recording was undertaken on *pro forma* record cards that conform to accepted archaeological norms. A summary of the contexts can be found in Appendix 1. The context numbers in this report begin at [019] and follow on from the previous evaluation phase of the works (Wilson 2010).

Colour transparencies and print photographs were taken to record archaeological contexts and to illustrate the progress of the excavations. A graduated metric scale was clearly visible in record photographs of contexts. All photographs were recorded by individual print number and included information on the context and direction taken. A full list of the photographic record can be found in Appendix 1. The photograph numbers in this report begin at no. 072 and follow on from the previous evaluation phase of the works (Wilson 2010).

An overall site plan at an appropriate scale and relative to the National Grid and Ordnance Datum was recorded using a combination of digital survey and 1:20 plans of individual features, and sections/elevations as required. A list of the drawings can be found in Appendix 1.



Illus 7
S facing elevation of wall [020]

4. RESULTS

4.1 Geology

The underlying drift geology in the Joppa area is very complex with a series of bands of various limestone formations, passage formations and coal seams of the Lower Coal Measure formation. These all relate to the Arnsbergian and Langsettian age range (BGS 2011). The visible bedrock in this area was only exposed during low tide.

Illus 8
View of brick arches [023] and [024] facing NE

4.2 Salt pans

The area of the excavations was bounded by stone walls to the south and east and was exposed to the sea on the north and west sides due to the collapsed sea wall. This area, measuring approximately 10m x 5.5m, was excavated down to bedrock approximately 3m below the ground surface. A smaller adjacent area to the east measuring 4.5m x 8m was also excavated to a maximum depth of 1m below ground level in order to form a suitable platform for the tracked excavator to operate from. All the recorded features are thought to relate to the salt pan works. No features predating these works were identified with the lowest level of the upstanding remains sitting directly over the underlying bedrock.

Three main phase of activity were identified during the excavations:

Phase 1 – the construction of a series of stone walls;

Phase 2 – the insertion of the brick arches and construction of the associated pan flues;

Phase 3 – the blocking of the flues and the insertion of a smaller heating flue in the upper part of one of the Phase 2 arches.

It is not clear if the features assigned to Phase 3 were still in use up until the salt pan works finally closed or if further phases, that did not include

Illus 9
General view of pan house flues [052] and [053] facing SW

Illus 10
Detail of bricks [062] on flue wall

Illus 11
Detail showing the narrowing of flue [052]

Illus 12
View of brick arch [021] facing W

this area of the site, took place. It must be stated that these three phases relate to what was recorded within the small area excavated and do not relate to the salt pans as a whole.

Phase 1

Three lime mortar bonded rubble stone walls ([019], [020] & [022]) formed the earliest phase of activity within the excavation area. The southern edge of the excavation area was bounded by wall [019] that comprised an east-west aligned stone wall standing 1.8m tall. The wall was built upon on the underlying bedrock and it was topped with a course of red bricks [027] set at an angle in order to form the base of a brick arch. Wall [020] located 2.1m to the north and aligned parallel to [019] would have supported the opposing side of this arch creating a covered channel between the two walls. This second wall [020] was keyed into wall [022] at its eastern end (the wall actually continued eastwards beyond the limit of the excavation). Wall [022] was aligned north-south running between wall [020] to the south and the surviving sea wall to the north. Both these walls stood to a maximum height of 2.1m with the foundations again built on the bedrock.

Only a small section of north-south aligned rubble stone wall survived at the west end of wall [020], the majority having collapsed. It was not clear if this wall was keyed into wall [020]. The collapse of the sea wall had removed any evidence for walls to the north side.

Phase 2

Wall [020] was the only one of these stone walls that had been significantly altered. Two large brick arches ([023] & [024]) had been inserted into the wall. The bricks were all un-frogged hand made bricks bonded with soft sand. Some of these bricks had been stamped 'Hunter & Co Patent Portobello' indicating a local source for the bricks. It was clear that these arches had been inserted into an existing wall because on the south elevation of wall [020] the brickwork on the west side of arch [024] was irregular and clearly constructed to cover the damage caused from its insertion. Also the north elevation of this wall [020] was entirely faced with brickwork that butted up to the existing stone wall at the east and west ends. The two arches stood to a maximum height of 1.6m and were 0.95m wide on the southern elevation. The width of these arches reduced significantly as they ran through the wall being only 0.45m wide on the north elevation.

Illus 13
Detail of flue door [051] inserted in arch [023]

Two long brick flues ([052] & [053]) were attached to the arches on the north side of wall [020] and continued to the northern end of the excavation area. Both these flues were 0.42m wide and 3.15m long and were constructed of hand-made bricks. The flues ran parallel to each other with a 0.62m wide sand and brick in-fill [055] between them. The side walls of the flues stood to a maximum height of 0.9m although this reduced significantly at the north end, due to damage caused by the collapse of the sea wall. The tops of the walls had been significantly discoloured due to heat action. The eastern wall of flue [053] also included a single course of large heat affected bricks [062] that had chamfered inner faces. A large amount of corrosion was also recorded on the inner faces of these bricks. A series of heavily corroded iron supports approximately 1m apart and aligned east-west along the tops of the flue walls were also recorded. A section through the flues revealed a shallow 0.12m thick layer of coarse grey ash [063] at the base.

The brick sides of the flues gradually curved inwards close to the north end forming a slightly narrower channel. Only the base level of the flue survived at the far north end and this was formed by an irregular course of bricks set above a foundation layer of poorly sorted stones and sand [058]. The construction at the north end of the flues would originally have been much more substantial but was truncated by the sea wall construction and recent collapse.

To the west of flue [052] a layer of heat affected stones and sand [054] formed an insulation layer to the flue and lay over a backfill of dark brown silt with frequent stone inclusions. Unfortunately, due to the truncation caused by the construction of the later sea wall, the stratigraphy in this area was not clear.

Stone wall [022] provided a suitable eastern boundary to the excavation area and was left *in situ*. The area between this wall and the east side of flue [053] had been built up to the height of the flues with sand and poorly sorted cobble size stones [057] that formed a foundation layer above the bedrock. To the north side of this material a small area of a brick flooring [056] was revealed that seemed to sit above the cobbles [057]. This had been heavily truncated and no distinct pattern or purpose was recorded.

Excavation of the rubble demolition material found between walls [019] and [020] revealed the upper section of a further brick arch on the south elevation of wall [020]. This was located at the east end of the wall just beyond the limit of the excavation and was therefore left *in situ*.

Illus 14
Detail of later phase flue [032] facing S

The western ends of stone walls [019] and [020] were linked by a substantial brick arch [021]. This formed a large opening 2.15m wide and over 3m high at the west end of the channel created by walls [019] and [020]. This arch [021] had subsequently been brick-blocked with a large concrete slab placed over the top of the arch to support the construction of the modern sea wall.

Phase 3

After the flues ([052] & [053]) had gone out of use the western arch [024] had been blocked with stone [049]. The second arch [023] to the east had been in-filled with beach cobbles with a cast-iron double door [051] inserted close to the top of the south face of the arch. These doors formed an opening 0.4m^2 within the original arch and were held in place by a surround of 'ETNA' stamped fire bricks. The opening continued through wall [020] leading to a narrow brick-lined flue [035]. The flue was 0.25m wide and 0.5m high with brick sides and base. Immediately beyond the north elevation of the wall [020] the flue turned 90º to the east continuing 1.6m along the wall face until it reached the W face of wall [022]. At this point the flue turned north continuing along the west face of wall [022] for approximately 2.5m beyond which the flue had been truncated by modern activity. The flue was approximately 1m above original flue [053] on a deep red sand foundation that had been discoloured due to heat.

A number of features associated with the later phase flue [035] were also recorded. These included a series of flat concrete slabs [030] forming a platform on top of wall [020]. To the west side of the flue a square brick structure [048] was recorded. This abutted the north elevation of wall [020] and also partially sat over flue [052]. This small structure (0.62m x 0.58m in plan and 0.84m high) included a small shelf, the side walls of which had evidence of burning or soot. It was unclear what the feature [048] represented and whether it was related to the later phase flue, although it was clear that it was a later phase than the main pan flues below.

A small area to the east side of the main excavation area was also stripped of topsoil and underlying deposits to a maximum depth of 1m exposing the top of wall [022]. This revealed a significant number of deposits ([037]–[046]) that seemed to consist of layers of dumped material forming a made ground over which the topsoil was placed. No significant stratigraphy or upstanding features were recorded in the exposed section of this area.

5. DISCUSSION

5.1 Phase 1

The earliest features recorded were the three main stone walls ([019], [020] & [022]), although it was not entirely clear if wall [019] at the southern limit of the site belonged to the same phase as wall [020]. These two walls had at some point formed a channel leading to the beach and were linked by a brick arch. It may be that wall [019] was originally the north wall of a separate building that still survives to the south of the excavation area.

Walls [020] and [022] were definitely part of a single structure and probably formed two sides of an early building. It was unclear whether the short section of rubble stone wall at the western end of wall [020] represented the remains of the western wall of this building or whether it was a later phase sea defence wall. There was no remaining north wall of this building due to damage caused by the collapse of the sea wall. As these walls are considered to be earlier than the brick arches and pan flues it was unclear whether these walls originally enclosed an earlier version of a pan house or if the building had been used for a different purpose. Unfortunately no evidence for an earlier pan house phase or different use was recorded.

5.2 Phase 2

The brick arches ([023] & [024]) and associated flues ([052] & [053]) had been inserted into an already existing stone wall [020]. At least one and probably two further arches had been inserted into wall [020] to the east side of wall [022]. This suggests the existence of a second pan house immediately to the east. Whether this second pan house ran in conjunction with the excavated pan house or was an earlier or later replacement is conjecture. Given that the section of the third flue revealed in wall [020] seemed to be part of a continuous series of arches, it was probably contemporary with those recorded to the west. The bricks stamped 'W. Hunter & Co' used in the arches were made at Westbank Brick and Tile Works in Portobello between 1873 and 1881 (Douglas *et al.* 1985).

The brick arches and flues formed the main heating element of the salt pans although it was not fully clear how this operated. The heat was created either close to the arches and drawn through the flues or within the flues themselves, with the fuel possibly sat on a grate below the pans. The iron supports across the top of the flue walls are thought to have supported a grate. Ash at the base of the flues may represent the burnt remains of the fuel placed on these grates that were used to heat the pans. The heated iron salt pan would have been placed over these flues with the intense heat causing corrosion and heat damage to the bricks. The narrowing of the flues at the north end may have been in order to create a stronger draft through the flue as well as possibly causing the heat to re-circulate through the flue instead of escaping out the end. Although much of the structure at the north end was truncated, it is thought that the heat and fumes would have been regulated by apparatus at this end of the flues before the fumes were carried through to a chimney. This chimney, as depicted on the early photographs (see Illus 3), seems to be located slightly further to the east beyond what is thought to be the second pan house. As the site is known to have had two chimneys, the second one being located to the east side of a central water capture tank, it is possible that another series of pans also existed on the east side of the salt pan works.

The brick arch [021] at the west end of the stone walls ([019] & [020]) was clearly a later phase feature than the walls themselves and was probably associated with the phase that included the insertion of the arches and flues. The opening led through to the beach and may have been used as an entrance for the delivery of locally sourced coal which was known to exist in seams along the beach. The angled bricks capping on top of wall [019] suggested the whole channel would originally have been covered with a brick arched roof, although this would have been set at a slightly higher level than the arch recorded at the west end.

5.3 Phase 3

Once the pan flues had gone out of use Phase 3 saw a much smaller flue inserted in one of the existing arches. The metal doors inserted in the archway leading from the south side of wall [020] formed the opening for a small firebox or oven, suggesting that fuel was introduced from this side. The 'ETNA' fireclay bricks surrounding the firebox were made at Armadale in West Lothian and were produced from 1890–1947 (Douglas *et al.* 1985). The slabbed stone surface above the later flue may have been constructed for a small pump or similar piece of equipment that required more stability than a brick surface could provide. Although the later flue had been badly truncated by modern disturbance its smaller scale indicated that it was not being directly used in the production of salt and was more likely to have been a heating duct or utilised for some other purpose that involved the transfer of heat.

6. CONCLUSION

Although no direct dating evidence was recorded during this programme of works for the earliest stone walls, the east-west wall at the southern edge of the area corresponds to a wall on the 1st edition Ordnance Survey map of the site (1853; Illus 2). The parallel wall to the north is likely to have been internal and is not shown on the map. The north-south wall may be depicted on a later map (1896), however it is likely there is not enough detail on these

maps to be able to say this with any certainty. The walls were clearly built by the mid-19th century and may be of earlier date.

The remodelling of one of these walls by the insertion of the brick arches and flues is closely dated to 1873–1881 by the stamped bricks in the arches. At this time the works were operated by Messrs Alex Nisbet & Son, who enlarged and improved the works around 1868 (Baird 1898), which broadly coincides with the building of the new brick arches and flues. The salt pan works were bought by the Scottish Salt Company in 1889 (Anderson 2000), when the company began to also manufacture pipeclay whiting. It is tempting to link the blocking of the arches and the building of a smaller flue to the diversification in production and change in ownership around this time.

Although only a small area of the entire salt pan works was excavated the results provided a good insight into the complexity of these works. They also indicated that a significant part of the salt pan works may still remain below the modern ground surface. This is particularly so across the northern half of the site.

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8. APPENDICES

8.1 Appendix 1 – Site registers

Context register

Context	*Description*	*Length (m)*	*Width (m)*	*Depth (m)*
019	E-W running wall of south side of area (group no.)	5.9	2.1	1.85
020	E-W running wall of north side of area (group no.)	–	–	–
021	N-S section of wall w/arch to sea (group no.)	2.1	2.15	*c.*3
022	N-S running wall that abuts seal wall (northern)	c.10	0.58	–
023	Red brick arch (east most) within [020]	–	0.95	1.6
024	Red brick arch (west most) within [020]	–	0.98	1.6
025	Red brick arch (west facing) within [021]	*c.*1.1	–	–
026	Stones of wall [019]	–	–	–
027	Red brick topping [026]	5.9	–	–
028	Stones of group [020]	–	–	1.8
029	Red brick of [020]	–	–	–
030	Paving on north side of wall of [020]	–	–	–
031	Brick surfaces to the west of [030]	1	0.64	*c.*0.3
032	White fired bricks of kiln/flue	–	0.4	0.4
033	Horizontal red brick under [032] abutting west of [022]	–	0.52	–
034	Red brick topping of [020]	–	–	–
035	Brick flue of [032]	–	0.53	>0.5
036	Wall abutting N side of [024]	1	–	*c.*0.25
037	Sand layer (seen in east of limit of excavation, west facing section)	–	–	–
038	Rubble layer (seen in east of limit of excavation, west facing section)	–	–	–
039	Black/burnt layer (seen in east of limit of excavation, west facing section)	–	–	–
040	Sand layer (seen in east of limit of excavation, west facing section)	–	–	–
041	Yellowish clay (seen in east of limit of excavation, west facing section)	–	0.7	–
042	Possible burnt layer (seen in east of limit of excavation, west facing section)	–	–	–
043	Brick rubble with ash/cinders (seen in east of limit of excavation, west facing section)	–	–	–
044	Burnt layer (seen in east of limit of excavation, west facing section)	–	–	–
045	Grey clay with mortar/brick (seen in east of limit of excavation, west facing section)	–	–	–
046	Charcoal/coal layer (seen in east of limit of excavation, west facing section)	–	–	–
047	Possible flag stones on wall [019]	–	–	–
048	Bricks on north side of wall [020]	0.62	0.56	0.84
049	Blocking of brick arch [024]	–	1	1.03
050	Rubble infill of brick arch [023]	–	0.88	1.06
051	Cast Iron frame and doors of flue [036]	–	0.4	0.4
052	Brick flue	3.15	0.42	1.9

Context	Description	Length (m)	Width (m)	Depth (m)
053	Brick flue	–	0.46	–
054	Coloured, heat affected sand	3.65	0.45	–
055	Brick infill	–	–	–
056	Brick structure	–	–	–
057	Stone infill	–	–	–
058	Stone/mortar base/sea defence	–	–	–
059	Brick wall to west of flue [052]	2.65	–	0.4
060	3rd brick arch	–	–	–
061	Mixed infill behind modern sea wall, abutting [058]	*c.*9	*c.*2.5	*c.*2
062	Large brick edge to flue [053]	–	0.2	0.18
063	Basal fill of flue [052]	–	0.42	0.12

Photographic register

Digital	Colour Print	Colour Slide	Facing	Description
072	4\1	4\1	N	General view of area stripped for compound
073	4\2	4\2	SW	Working shot of excavation
074	–	–	–	Working shot of excavation
075	–	–	–	Working shot of excavation
076	4\3	4\3	S	Small tunnel as exposed after machining
077	4\4	4\4	N	South facing section of wall [020] after cleaning
078	4\5	4\5	W	East facing section of wall [021] after cleaning
079	4\6	4\6	W	East facing section of wall [021], frontal
080	4\7	4\7	S	View of wall [019]
081	4\8	4\8	S	View of brick flue base [033]
082	4\9	4\9	S	North facing elevation of flue structure [035]
083	4\10	4\10	S	North facing brick wall [020]
084	4\11	4\11	W	View of wall [020] showing inserted brick arch
085	4\12	4\12	N	Close up of arch [023] within group [020]
086	4\13	4\13	S	[030] paving on north side of wall [020]
087	4\14	4\14	S	[031] brick surface to west of [030]
088	4\15	4\15	S	Close up of fuel kiln, paving [030] in background
089	4\16	4\16	S	Close up of fuel kiln, paving [031] in background
090	4\17	4\17	S	Close up of flue/kiln opening
091	4\18	4\18	NW	Working shot
092	4\19	4\19	N	Wall [022]
093	4\20	4\20	S	Wall [022] and brick surface [033] to west
094	4\21	4\21	W	Working shot
095	4\22	4\22	E	West facing section of eastern limit of excavation
096	4\23	4\23	E	West facing section of eastern limit of excavation
097	4\24	4\24	E	West facing section of eastern limit of excavation
098	4\25	4\25	N	Working shot, partial demolition of wall [022]

Digital	Colour Print	Colour Slide	Facing	Description
099	4\26	4\26	NE	Working shot, digger moving rubble above western sea wall
100	4\27	4\27	E	West facing elevation of wall [021]
101	4\28	4\28	S	North facing elevation of archway [024]
102	4\29	4\29	S	North facing elevation of bricks [048], arch [024]
103	4\30	4\30	NW	Working shot
104	–	4\31	S	Bricks [048] close up
105	4\31	4\32	E	Bricks [048] from above showing burnt bricks
106	4\32	4\33	N	Arches [023] and [024] in wall [020]
107	4\33	4\34	N	Arches [023] and [024] in wall [020]
108	4\34	4\35	NW	Arches [023] and [024] in wall [020]
109	4\35	4\36	–	Arches [023] and [024] in wall [020]
110	5\1	4\37	–	Arches [023] and [024] in wall [020]
111	5\2	5\1	–	Film 5 ID shot
112	–	–	–	Working Shot
113	–	–	–	Working Shot
114	–	–	–	Working Shot
115	–	5\2	–	Working Shot
116	5\3	5\3	W	Views of arch [021]
117	5\4	5\4	W	Views of arch [021]
118	5\5	5\5	W	Views of arch [021]
119	5\6	5\6	W	Working shot of removal of wall [021]
120	5\7	5\7	W	Working shot of removal of wall [021]
121	5\8	5\8	SW	View of sea wall and wall [019] after removal of [021]
122	5\9	5\9	S	North facing section behind wall [019] after removal of [021]
123	5\10	5\10	SW	North facing section behind wall [019] after removal of [021]
124	5\11	5\11	NE	Working shot
125	–	–	–	Working shots at end of day
126	–	–	–	Working shots at end of day
127	–	–	–	Working shots at end of day
128	–	–	–	Working shots at end of day
129	–	–	–	Working shots at end of day
130	5\12	5\12	N	Detail of Cast Iron door [051]
131	5\13	5\13	NW	Detail of Cast Iron door [051]
132	5\14	5\14	S	View of flue [035]
133	–	–	–	Working shot
134	–	–	–	Working shot
135	5\15	5\15	N	Flues [052] and [053]
136	5\16	5\16	N	Flues [052] and [053]
137	5\17	5\17	S	Flues [052] and [053]
138	5\18	5\18	S	Flue [052]
139	5\19	5\19	SW	Flues [052] and [053]

Digital	Colour Print	Colour Slide	Facing	Description
140	5\20	5\20	W	N end of flues [052] and [053]
141	5\21	5\21	S	N end of flues [052] and [053]
142	5\22	5\22	NE	Flues [052] and [053]
143	5\23	5\23	S	Degraded/heat affected sandstone wall [054]
144	5\24	5\24	SE	Detail of top stones on east side of flue [053]
145	5\25	5\25	S	Detail of north end of flues [052] and [053] with rubble removed
146	5\26	5\26	E	Detail of north end of flue [052] with rubble removed
147	–	–	–	Working shot
148	–	–	–	Working shot
149	–	–	–	Working shot
150	–	–	–	Working shot
151	–	–	–	Working shot
152	–	–	–	Working shot
153	–	–	–	Working shot
154	5\27	5\27	S	View of north end of flues [052] and [053]
155	5\28	5\28	S	View of north end of flues [052] and [053]
156	5\29	5\29	S	View of north facing wall of blocked flue [052]
157	5\30	5\30	S	Section through flue [053]
158	5\31	5\31	W	View of brick wall [059]
159	5\32	5\32	S	Detail of wall [059] at south end
160	–	–	S	Detail of south end of wall [054]
161	–	–	S	Detail of south end of wall [054]
162	–	–	NE	Working shot
163	–	–	NE	Working shot
164	–	–	NE	Working shot
165	5\33	5\33	N	Arch [024] full extent
166	5\34	5\34	N	Arch [023]
167	5\35	5\35	NE	Arches [023] and [024]
168	5\36	5\36	N	Arch [024] full extent of south face
169	–	–	NE	Arch [024] full extent of south face
170	–	–	N	Arch [023] full extent of south face
171	–	–	NW	Arch [023] full extent of south face
172	6\36	6\36	–	Film 6 ID shot
173	6\35	6\35	SW	Back wall [019] to full extent
174	6\34	6\34	SE	Back wall [019] to full extent
175	6\33	6\33	NE	View of 3rd Arch
176	6\32	6\32	NE	View of 3rd Arch
177	–	–	–	Working shot
178	–	–	–	Working shot
179	–	–	–	Working shot
180	–	–	NE	View of site

Digital	*Colour Print*	*Colour Slide*	*Facing*	*Description*
181	–	–	NE	View of site
182	–	–	NE	View of site
183	6\31	6\31	W	View of area of [030] after removal of top stones
184	6\30	6\30	E	View of area of [030] after removal of top stones
185	6\29	6\29	S	Flue [052] following removal of infill
186	6\28	6\28	W	Detail of change between [057] brick and stone layer [058]
187	6\27	6\27	S	Detail of change between [057] brick and stone layer [058]
188	6\26	6\26	S	General shot of [061] abutting [058]
189	–	–	–	General site shot
190	–	–	–	General site shot
191	–	–	–	General site shot
192	6\25	6\25	SW	General site shot
193	6\24	6\24	S	General shot of flue [052]
194	6\23	6\23	–	General shots of flue [053]
195	6\22	6\22	S	General shot of flue [052]
196	6\21	6\21	–	General shots of flue [053]
197	6\20	6\20	S	Detail of base of flue [052] following section cut
198	6\19	6\19	S	General shot of flue [052] following section cut
199	6\18	6\18	SE	General shot of flue [052] following section cut
200	–	–	S	General working shot
201	–	–	S	General working shot
202	–	–	S	View of section through flues
203	6\17	6\17	SE	General view of section through flues
204	6\16	6\16	SE	General view of section through flues
205	6\15	6\15	SE	General view of section through flues
206	–	–	NE	Shot of removal of pans structures from above
207	–	–	NE	Shot of removal of pans structures from above
208	–	–	SE	General shot of wall following removal of salt pans structure
209	6\14	6\14	E	Detail of clay on wall following removal of structure
210	6\13	6\13	E	Detail of wall following removal of structure
211	–	–	E	Working Shot

Drawing register

Drawing	Section	Plan	Description
1	1:10	–	East facing elevation of wall [021]
2	–	1:20	Plan of walls [020]-[022]-[030] and features
3	1:10	–	[031]-[032]-[035]-[033]
4	1:20	–	South facing elevation of wall [020]
5	1:20	–	West facing elevation of section of limit of excavation on east
6	1:10	–	West facing elevation of wall [021]

Sample register

Sample	Context	Description
1	063	Basal fill of flue [052]

8.2 Appendix – Discovery and Excavation in Scotland Report

LOCAL AUTHORITY:	Edinburgh City Council
PROJECT TITLE/SITE NAME:	An excavation at Joppa Salt Pan Works, Portobello, Midlothian
PROJECT CODE:	JSPW10/002
PARISH:	Edinburgh City
NAME OF CONTRIBUTOR:	Donald Wilson
NAME OF ORGANISATION:	Headland Archaeology Ltd
TYPE(S) OF PROJECT:	Excavation
NMRS NO(S):	NT 37 SW 214
SITE/MONUMENT TYPE(S):	18th–19th century salt pan works
SIGNIFICANT FINDS:	None
NGR (2 letters, 8 or 10 figures)	NT 3210 7340
START DATE (this season)	February 2011
END DATE (this season)	March 2011
PREVIOUS WORK (incl. DES ref.)	DBA, evaluation and geophysical survey (September 2010)
MAIN (NARRATIVE) DESCRIPTION: (may include information from other fields)	Headland Archaeology conducted a programme of archaeological works on the site of the former salt pan works at Joppa following the collapse of the north-western corner of the seawall. The programme of works comprised the excavation, recording and survey of the upstanding remains relating to the salt pan works within a specified area close to the damaged sea wall. The work was commissioned by Edinburgh City Council. The excavations revealed the remains of a number of upstanding stone walls along with two brick flues and related features. In total, features associated with at least three different phases of the salt pans were recorded. The main features recorded included a stone wall that incorporated two later inserted large brick arches that were associated with the remains of two long brick flues. These flues were the main focus of the excavation area and would have formed the heating element to the salt pans. The arches had subsequently been blocked and the flues covered over. A smaller opening with a heavy cast-iron door had then been inserted into one of the arches that led to a smaller brick flue. No significant artefacts associated with the salt pan works were retrieved during these works.
PROPOSED FUTURE WORK:	None
CAPTION(S) FOR ILLUSTRS:	–
SPONSOR OR FUNDING BODY:	Edinburgh City Council
ADDRESS OF MAIN CONTRIBUTOR:	13 Jane Street Edinburgh EH6 5HE Scotland
EMAIL ADDRESS:	donald.wilson@headlandarchaeology.com
ARCHIVE LOCATION (intended/deposited)	RCAHMS

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