7.3. Phase 3. The Late Renaissance Global Harbourside, 1630s-1680s

7.3.1. Summary

Phase 3 represents the Late Renaissance period in Denmark (and end of the Early Post-medieval period in NW Europe) on the Gammel Strand Metro Cityring project. It featured the construction of two large wooden harbour structures in the western area of the Main Excavation trench, maintenance and use of the harbour between the 1630s-1680s. The main activity for construction was located in the western part of the harbour in the Main Excavation trench. These posts and bulwarks (from G674 and G648) were revealed within Trench 1 of the Guide Wall trench and the area west of the baulk in the Main Excavation trench. As discussed in Phase 2, Phase 3 consists of the second part of the Renaissance harbour use and continues the Proto-globalisation period in Copenhagen where there is more evidence of a higher number of luxurious goods being imported from outside of Europe into Copenhagen via Gammel Strand. The phase ends at the end of 1680s which is shown by the removal of stone from the harbour wall to be reused elsewhere, and discarding large quantities of rubbish into the harbour for the beginning of land reclamation in Phase 4.

7.3.2. Introduction

In the western area there were two main periods of construction activity at the start of the phase, all within a short period of time, 5-10 years. First, a land reclamation fence comprising groups G406, G674 was constructed (Fig.84). The area behind was backfilled with urban waste, as seen from group G651. The use of the fence was short-lived but still long enough for the formation of alluvial/usage deposits created to the south, as seen with G682. This mini phase was short-lived as 4 metres south a proper harbour front was constructed, built into alluvial deposits and natural sand.

The next activity was seen in the creation of the harbour front G648, the wood used came from trees felled in the mid to late 1620s. This was seen in the Main Excavation trench on a NE-SW orientation, leading in from the western section of the 2012 Guide Wall trench, which joined into the earlier Phase 2 wall G532 at 18 m from the western end of the trench. When the bulwarks were completed, they were backfilled with rubbish from the city, represented by G640. Built in front and to the south of the new harbour front G648 and the harbour bulwarks G602 and wall G532 from Phase 2 were storm post groups G511, G646 and G649. These were added to protect the harbour and provide temporary mooring.

Usage phases of the harbourside from the 1640s were then represented by alluvial group G664 in the west, the lower deposits of G663 in the central area of the main trench, and the lower layers of group G666 in the eastern area of the trench. At the end of the phase, in the 1680s, the use of the Renaissance harbour ends. The upper levels of wall group G532 were removed or robbed, as seen in G682 although some of these stones were found dislodged south and north of the wall in various destruction deposits. To prepare it for the construction of the Phase 4 bulwark the area to the south of harbour wall G532 and bulwark G648 became a dumping area for urban waste. This was represented by G620 in the west, and the upper levels of G663 and G666 in the centre and east of the main trench and the Stairway trench. As expected, the end of the phase merges in with Phase 4, so the deconstruction deposits can also be viewed as construction deposits.

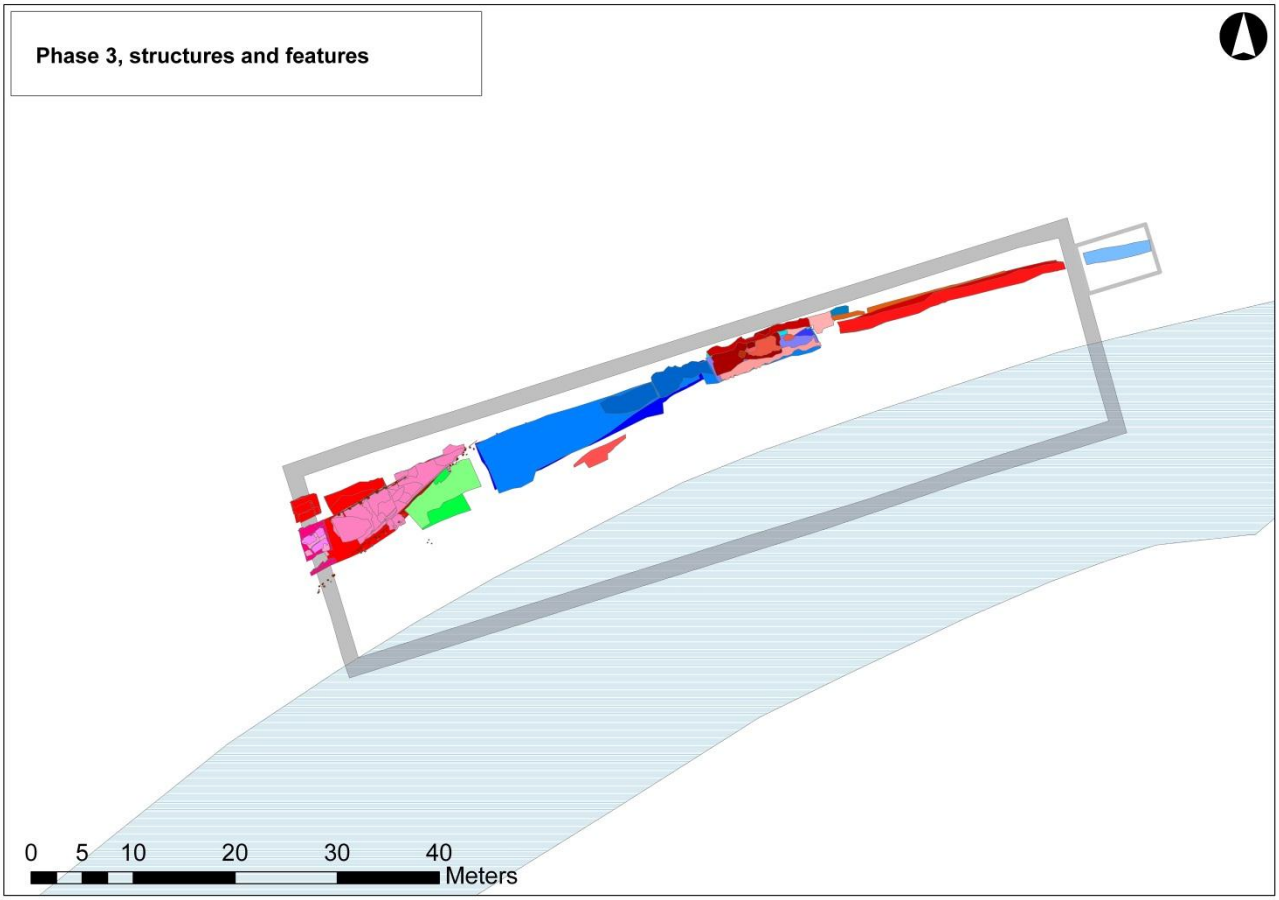

Fig. 84 Plan showing all Phase 3 structures and features (See also A3 plan in Appendix C)

7.3.3. Land reclamation from the 1620s

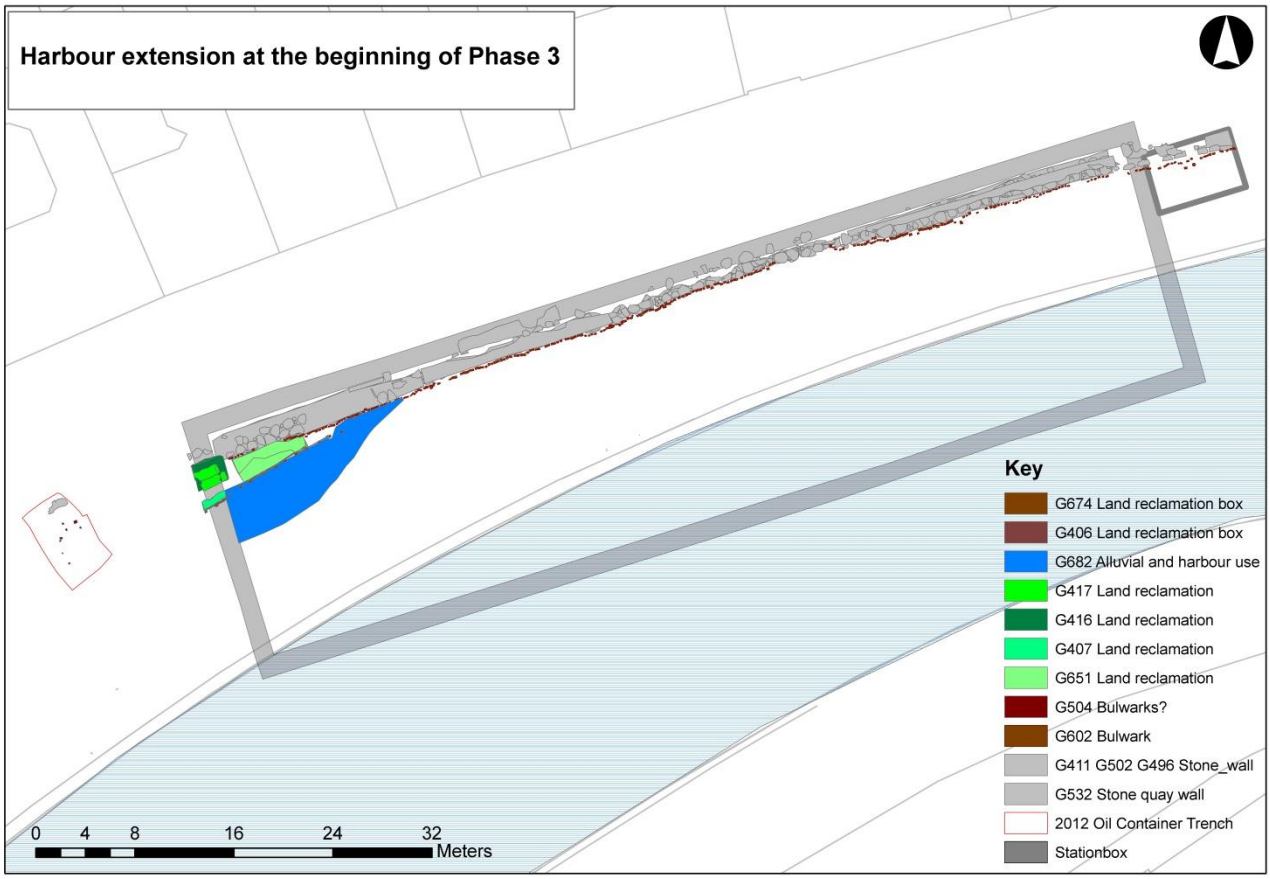

Fig. 85 Plan showing activity in Phase 3 in the mid 1620s.

7.3.3.1. Groups belonging to bulwark/land reclamation fence G406 & G674

The first action in Phase 3 was the gradual creation of a new harbourside. This began with the construction of a land reclamation bulwark or box to start the movement south. The land reclamation bulwark was found in two periods of fieldwork, roup G406 in the Guide Wall excavation, and G674 in the Main Excavation. The whole structure measured 12.37 m long by 0.4 m in width and up to 3 m in height. It functioned as the eastern part of either a short-lived *fiskegang* or a reclamation box/fence for the expansion of the area south in the western part of the excavation. It may have been a *fiskegang* located slightly above the waterline but the planking connecting the fence to the stone harbour wall has disappeared or has been re-used. This short- lived structure was covered over by deposits SD44602 of G651 and SD43061 of G682.

Fig. 86 Photo of reclamation fence G406, looking SW. Guide Wall excavation 2012. C03_20120725_5207

Group	Subgroups	Group name
406		Bulwark/land reclamation fence
674		Bulwark/land reclamation fence

Table 26 Groups related to bulwark/land reclamation fence

Fig. 87 Reclamation Fence G674, Looking N-W. Note, the bulwark was constructed in two different parts, and that bulwark G602 may have been removed to build this structure. C03_20140624_11187

7.3.3.1.1. Bulwark group G406

The top of the western section of the fence, G406, was uncovered at 0.8 m OD. It measured 2.72 m by 0.75 m and was exposed to the depth of 0.6 m. The group comprised 5 posts and a horizontal plank to form the fence. The posts were vertically set, and were registered as ST9194, ST9199, ST9203, ST10470 and ST12266. They were located on the south side of a horizontal plank wall, ST9334. The plank wall, ST9334, comprises 3 planks on top of each other. Only one vertical post, ST9199, was able to be removed, and measured 2.66 m long. It was rectangular in cross section, and tapered to a point. The post was curved, perhaps through construction or by driving it into the ground. The edges were bevelled and it was quite worn. Many samples were taken for dendrochronology from posts and planks in G406, but no dates were able to be obtained.

Fig. 88 Working photo of the excavation between G602 and G674 looking NE. Note the majority of the backfill has been removed. C03_20140624_11196.

The vertical posts were pushed beyond the limit of excavation. The structures went out of use by the late 17th Century, when they were covered over by levelling deposits from groups G405 and G407, when the harbour was expanded southwards in the Guide Wall trench.

7.3.3.1.2. Bulwark group G674

The top of the reclamation fence in the Main Excavation trench was located between 0.02 m and 0.72 m OD, and measured 9.65 m long by 0.35 m wide. It comprised of posts to 3 m long and 0.2 m wide. The structure in this area comprised ten vertical rectangular shaped posts (see appendix for individual post numbers and measurements), three horizontal planking systems belonging to ST55660 and eight support posts driven into deposit SD55010 of G642**.** The support posts were tangentially shaped and very thin at 0.04 m thick. They were attached to the posts and the support posts by nails. Planking structure ST55660 was given the same number and split into three areas (relating to the three separate bulwark sections) for registration, labelled as A, B and C (from west to east). The fence line was orientated NE-SW, nearly reaching wall G532 at the NE end.

All sections had been nailed through the rear support planks into the front support beams. This indicated that the back, the NW facing side of the bulwark, was exposed completely prior to backfilling. The top level of planking was thought to have been truncated during the demolition phase of G674 bulwark, presumably at the end of Phase 3. Surrounding these posts to its southern side was sub-group SG682 from the bulwark

group. The alluvial type deposit was formed by usage around the structure. The timber has since found to have been fashioned from spruce and imported from an unknown source.

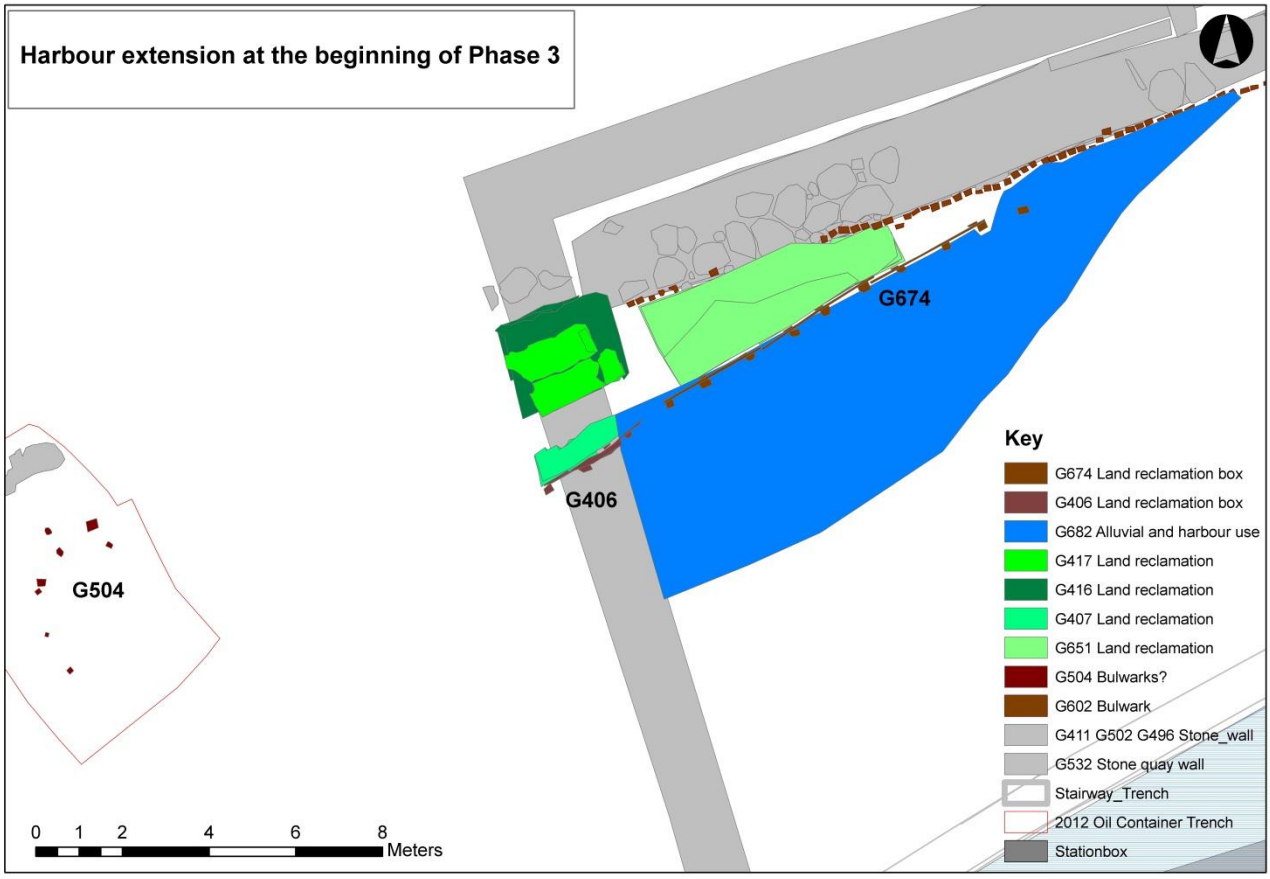

Fig. 89 Close up of the harbour extension at the western part the Main Excavation trench and the Oil Container trench at the beginning of Phase 3.

Dendrochronological analysis was undertaken on 18 posts and planks. Of the samples, only the spruce (used for planks and some posts) was able to be dated. None of the oak posts were successful. The oak timber probably came from southern Scandinavia, perhaps from Skåne, Hålland or Sjælland. The spruce was felled in the winter of 1625/6.

7.3.3.1.3. Bulwark/land reclamation fence G504

Group	Sub-groups	Group name
504		Bulwark/Land reclamation fence

Table 27 Groups related to Bulwark/land reclamation

Within the Oil Container watching brief trench, at the base of the trench, was a series of posts representing a bulwark. The group consisted of eight posts, vertically set, driven into the limit of excavation, SD102, in an area measuring 2.3 m by 0.9 m. The posts were located at heights of 0.3 m and 0.12 m OD in the SW, to 0.54 m and 1.3 m OD in the NE, portraying differential preservation of timbers. They were between 0.13 m and 0.2 m in thickness, rectangular in shape and were between 2 m and 3 m long. The posts were all overlain by soil deposit SD19372 from group G506 from Phase 4. As with all the posts from this group, post

ST19366 was found to be fashioned from pine. It measured 2.25 m long by 0.2 m wide. A dendrochronological sample, P203146, was taken from it but was found to be unusable for dating.

The bulwark perhaps represents land reclamation in the area. This probably occurred in the mid 17th Century going the stratigraphy and the location. It is believed to represent the movement of the land south from the Renaissance harbour wall, G532, as seen in the Guide Wall trench and the western area of the Main Excavation trench. How the posts were used is generally unknown as they were not linked to other structures in the Oil Container trench but it is believed they were either part of the bulwarks moving south or perhaps a base for a floor, such as a *fletværk* floor.

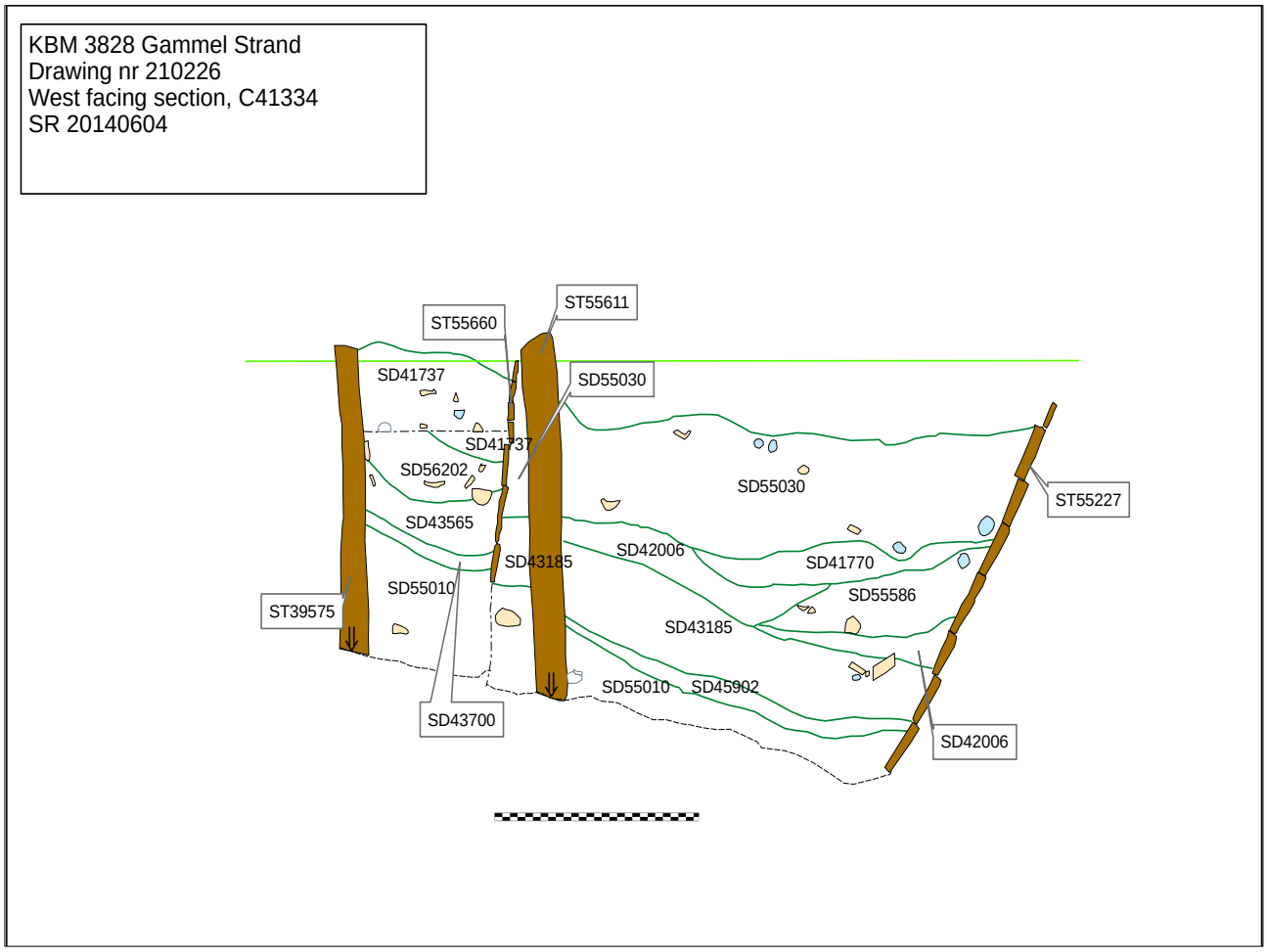

Fig. 90 West facing section of bulwark G674, represented by post ST55611 and bulwark G648, represented by planks and ST55227. Corresponding backfill deposits for those bulwarks in that area are shown. Drawing number 210226. Scale bar 1 metre.

7.3.3.2. Backfill/reclamation groups G651, G407

Group	Subgroups	Group name
651		Backfill of bulwark G674
407		Land reclamation

Table 28 Groups related to backfill/land reclamation

Sub-group SG651 and group G407, as portrayed partly in Fig. 90, represent a group of backfill deposits behind the bulwark groups G674 and G406 for the purpose of reclaiming land. The groups consisted of many different deposits comprising a mixture of urban rubbish, manure and the remains of the upper parts of harbour wall, G532, which had discontinued in use in this area. The remains of other buildings from the city had also been dumped amongst the waste reflecting many levels of society. Sub-group 651 comprised seven deposits spread over an area measuring 6.12 m long by 1.9 m wide and 1.7 m deep, and was located, at the top, at -0.25 m OD. Group 407 was located slightly higher up at 0.46 m OD and was observed viewed for another 0.2 m before the limit of excavation, SD102, was reached within the Guide Wall trench. The group measured 2.51 m by 0.73 m by 0.2 m.

7.3.3.2.1. Backfill Group G651

The earliest and first of these dumps in SG651 was deposit SD44602, an organic layer located between wall group G532 and bulwark G674, and physically overlying the bulwark. The deposit contained many sandy lenses. It also contained military and personal finds such as cannonballs, FO215179 and FO216622, and a ring, FO215349.

Fig. 91 Cannonball FO215179 from SD44602, G651. Exterior surface is missing. It is not known whether this is linked to corrosion or impact. Museum of Copenhagen

Overlying SD44602 was deposit SD44563, an organic layer with frequent inclusions of clay. In the layer's northwestern area it comprised more blue clay than organic material, this changed in the opposite area. The layer contained a few ceramics and imported *Römer* glass from Germany. Of note was a lead ring (Fig.92) containing a merchant's seal, FO211653, representing the merchant elite, although the owner of the ring could not be traced.

Overlying SD44563 was deposit SD45330, a manure rich layer full of rotten plants but void of finds. This differed entirely with the overlying SD43700, a dark organic layer with CBM and rubble mostly accumulated against bulwark G674 in the south. It was probably dumped shortly after SD43565 from a very different source. It comprised clay inclusions and various fragments of wood with a variety of urban waste. The layer was sloping towards the SE so it has probably been dumped from the W.

Fig. 92 Photo of a Lead merchant ring FO211653, SD44563, G651. Museum of Copenhagen

Within this assemblage were early clay pipes dating to the 1630s (FO215525 and FO215524) and ceramic stove tiles decorated with sea horse motifs (FO213859) and a lion head (FO213878). This layer was followed by another grey brown organic layer, SD43565, rich in organic waste, but poor in artefactual remains.

Above SD43565, was SD56202, a brown organic layer with a dark black lens located in the centre. The layer contained a large quantity of yellow bricks, hair, fur and a ceramic gaming piece fashioned from red glazed stoneware, FO213577. It was believed that some of the bricks were from the overlying deposit, SD41737, which have been pushed down into, and mixed with the organic material. The layer was truncated by SC42931, the cut for the pipe for the Phase 4 group 417, on the northern side.

7.3.3.2.2. Backfill group G407

Land reclamation/backfill group G407 comprised two rich organic deposits, SD9398 and SD12789, dumped behind bulwark G406. The earliest deposit was SD12789, a very a dark, black and brown organic rich deposit measuring 2.24 m by 0.84 m. The deposit comprised manure, shell and a variety of urban waste such as CBM, ceramics, a gaming piece (FO202637), window glass and a *Krautstrunk* forest type glass fragment, FO202685, dating to the 16th Century. Diet was represented by the bones of pig, cattle and sheep, normal urban consumption.

Overlying SD12789 was SD9398, which measured 2.6 m by 0.8 m. Within the dark brown sand and silt deposit was a selection of urban waste, such as slag, window glass, redwares and rope along with bones from cattle, sheep, hens, geese and pigs. Of particular interest were the discoveries of rat bones that rarely survive. The presence of goshawk bones, (FO208201, FO208203, FO208204 and FO208205) reveals that there were wealthy Copenhagen inhabitants who were able to own birds of prey and were also allowed to hunt.

7.3.3.3. Discussion

The majority of the backfilling and land reclamation occurred at the start of Phase 3 and is linked to the creation of new structures. The finds from these layers correspond with dendrochronological dates for the structures they backfill. The finds suggest that the deposits were created in a short period of time which is represented by the style and shape of the deposits which suggest quick deposition into the area, not just by carts from the landward side via various angles, but also from the sea. The deposits themselves represent a real mixture of soil and rubbish types, but it is noticeable that there was a fairly large assemblage of wealthy items, perhaps suggesting they came from the surrounding area.

The upper deposits from these groups are mixed with some later finds from the end of the 17th Century. This is probably due to the destruction at the area at the end of Phase 3 and the levelling process at the start of Phase 4.

7.3.4. Alluvial/harbour use

Alluvial Sub-group SG682 was located south of the bulwark, G674, and represents usage layers of that bulwark. It was located at the western end of the Main Excavation trench.

Group	Sub-groups	Group name
	682	Alluvial/ Harbour Use

Table 29 Sub-group SG682

7.3.4.1. Alluvial/harbour use SG682

The alluvial and usage sub-group, SG682, was located to the south of bulwark G674. The sub-group, SG682, comprised a single large usage layer, SD43061, formed by activity when the bulwark Group G674 was open to the elements and the sea. It was also affected by the building of the later bulwark G648. The deposit was a dark brown grey silt deposit with some sand; it measured 6.85 m by 4.44 m by 0.25 m thick at the greatest extent. It comprised pebbles, stones, bone and wood with medium amounts of CBM along with ceramics, iron, slag, bone, glass and leather dating from the late 16th to the early 17th Century. The deposit was found to be thicker next to the bulwark and thinner as it moved southwards. This was probably due to the process of fluvial activity and people throwing in rubbish from the bulwark. Physically the group overlies the lower parts of bulwark G674.

Sample PM212914 suggested that the deposit was slowly formed by natural accumulation. Ranheden, undertaking the macrofossil analysis (2016, 29) remarked that the remains from weeds and meadow species were quite sparsely represented in this sample but finds of hazelnut shells, wild strawberry and fruits from hops were more richly visible. This suggests that within the natural accumulation at the harbour base, there was some urban dumping, but not from areas of wasteland within the city.

Bangsgaard (2016, 65) writes in the animal bone report that the single deposit from the group comprised only 613 fragments of animal bone. The fish fauna was the most dominant but mammal and bird fauna were also identified. The mammal and bird fauna comprised domesticated or probable domesticated animals, with very few wild animals seen.

The fish material consisted of ten species, and mammals and birds together include just four identified species. The fish fauna was represented by salt water, fresh water and migratory species all of which could be for human consumption. The remaining collection consisted of mammals and birds including cattle, sheep/goat, pig and probably also domestic goose. This fact, along with the distribution of elements and cut-marks clearly indicate that the material from group G682 in its entirety represents the waste from household consumption.

7.3.5. The New Western harbour construction

The new western harbour construction section comprises both the new bulwark and the backfill deposits. It was seen in two excavations, the 2012 Guide Wall excavation and the 2014 Main Excavation, and is represented by groups G510 and G648. The backfill deposits G400, G401 and G405 relate to bulwark group G510 and backfill group G640 belong to bulwark G648.

Group	Subgroups	Group name
510		Bulwark
648		Bulwark

Table 30 Groups related to the new western harbour construction

The next major phase of activity in the western area of the Main Excavation was the creation of the new harbourside (Fig.93). South of bulwarks G406 and G674, a new harbour front supplanted the short-lived bulwark/reclamation fence. The total bulwark measured 21 m long by approximately 1.1 m wide by 1.4 m high. It was located, at the greatest extent, 4.5 m south from bulwarks G406 and G674 (and 7 m south from wall G532), and orientated on a NE-SW orientation, reaching harbour wall G532 at the NE terminus. The posts were mostly made from oak, the planking from pine, and the vertical planking from spruce and pine. The wood was mainly felled between the years 1618-1626 with the oak coming from *Sjælland*, *Skåne* or *Hålland* or Norway, the pine from the middle Baltic (*Gotland* or other areas of E. Sweden), but the source of the spruce is unknown. There was clear evidence of repair in certain areas, which would have occurred sometime between 1640 and 1690, when the bulwark was in use.

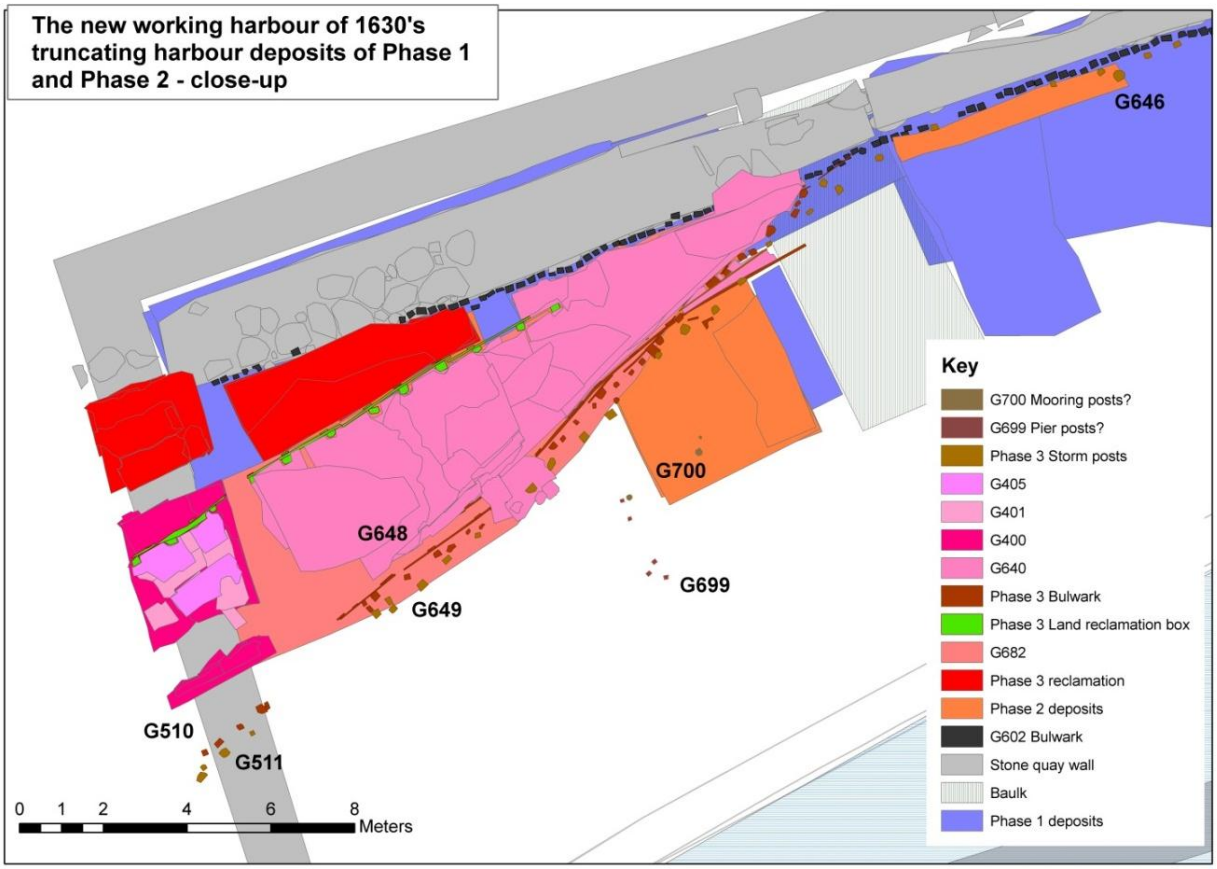

Fig. 93 Plan of the 1630s new working harbour G648, with associated deposits.

Fig. 94 Close up of harbour bulwark G648 next to the baulk. The photo is centered on an area of repair shown by horizontal plank ST41884 and three vertically set planks (ST39435, ST39413, ST55582) used as the plank's support. The photo is looking N. C03_20140613_10920

7.3.5.1. Groups belonging to the bulwarks

7.3.5.1.1. Bulwark group G648

Bulwark G648 comprised a total of thirty-six vertical posts, seven horizontal timber planking structures, and five planks and posts added later for repair. The dimensions of G648 were 16.67 m long by 1.1 m wide by 1.36 m high and it was located at the levels of 0.14 m to -0.3 m OD. The vertical posts averaged between 3.5 m long by 0.2 m by 0.2 m, whilst the vertical planks were, shorter at approximately 2 m, sharing the other dimensions . They were fashioned from oak, boxed heart style, fairly rectangular in shape with one flat and one pointed terminus. They were usually pushed into alluvial deposits from Group G642 rather than having a whole purposely dug for them. When uncovered most were still vertical, but some had warped or were now at an angle due to the weight of the harbour to the north.

The horizontal planking structures were fashioned from pine. They were between 1 m and 2 m long by 0.1 m thick and 0.2 m wide. They were set behind the vertical posts, attached by nails, and placed or added in layers. Leaning into these planks were support posts, positioned at an angle. The support posts were fashioned from oak and spruce, with oak being the dominant type.

Fig. 95 Harbour wall G532 to the far left of photo, Bulwarks G674 near left, backfill group G640 centre and bulwark G648 right of photo. Looking NW. C03_20140616_10952

The bulwark was orientated NE-SW. In the Main Excavation trench the new bulwark was at its greatest extent 7 m south of Group G532. The bulwark then continued 16 m, on an extreme angle towards the 1580s stone harbour wall, Group G532. The southern side was exposed to the water which was seen from the weathering and that it contained mussels and other saltwater shellfish. The pressure of the land against the harbour face can be seen by the way the upper reaches slanted outwards towards the south. This was confirmed by the repair evidence as the new support posts were angled inwards towards the north.

A total of 18 samples were taken for dendrochronological analysis. They comprise 17 pines, 8 oaks and two spruce/larch. The dendrochronological dates from the wood shows that the trees felled for planks were felled between 1623-25 and the trees felled for posts in 1623-4, 1625-26, and even some in the 1660s, but these must represent replacements. In general they were felled very shortly after bulwark G674, suggesting structure G648 was built shortly after G674. The harbour was in use until the new harbour was created at the start of Phase 4, directly south, in the 1690s.

From the excavation it was seen that the eastern part of the bulwark had to be replaced. This was attempted by adding a replacement section. This section comprised a new horizontal plank, and three support planks. The horizontal plank, ST41884, was fashioned from pine and measured 3.44 m long. It was kept in position by three new support planks, ST39435, ST39413, ST55582, different to the usual post type of support. These plank type posts measured 1.6 to 1 m long by 0.15 m to 0.2 m wide and 0.13 m thick. They were pushed into the ground and slanted northwards against plank ST41884. The tree, which was

used for the post ST34913, was felled in the spring/summer of 1662 suggesting the repair occurred in the latter stages of Phase 3. This dating fits in well with the dendrochronology of bulwark G648 and storm posts G646 as it was located in-between these two different structural groups. Plank ST55582 may be added to the support and repair planks, but it had collapsed just south of the bulwark, collapsing into the Phase 3 harbour area.

7.3.5.1.2. Bulwark group G510

Bulwark G510 comprised five wooden posts and one beam measuring 2.14 m long by 1.09 m wide by 0.3 m (exposed measurements only). The structure, at the top, was located at the height 0.25 m OD. The posts were between 0.13 m to 0.2 m in diametre and were driven into the edge of excavation SD102. Posts ST19244 and ST19220 were uncovered directly beneath machining layer SD103, so they are grouped with the other structures by function and form only. Posts ST18955, ST19236 and ST19328 were linked to overlying beam ST19216, which has been suggested as a land tie. The beam was only partially exposed as it continued into the eastern section.

Although G510 could not be fully excavated and the posts could not be dated, it was in line with and continued on the same orientation as G648, so they were added as the same.

7.3.5.2. Groups belonging to land reclamation/backfill

Group	Sub-groups	Group name
640		Land reclamation backfill group
400		Land reclamation
401		Land reclamation
405		Land reclamation

Table 31 Groups related to Land reclamation/backfill

To solidify the new harbour front, soil had to be placed behind the new harbour fronts which in turn lead to new land creation in the harbour region. Group G640 represents the dumping of waste behind the harbour front, G510 and G648. The deposits were mainly created by dumping backfill in the area between bulwarks G674 and G648, and in the eastern area between the Renaissance harbour wall G532 and bulwark G648. This occurred mainly in the 1630s and 1640s, when structure G648 was first built but the upper deposits were probably affected when creating the new harbour in Phase 4.

Land reclamation groups G400, G401 and G405 are a collection of groups that had their origins in Phase 3 in the 1630s, but were greatly affected and changed in Phase 4 in the early 1700s. They were originally land reclamation deposits formed by backfilling the area behind bulwarks G510 and G646 in Phase 3. When excavated it was obvious that they had been greatly affected by Phase 4 activity as they overlaid Phase 4 structures, and construction cuts within these deposits were invisible for a variety of reasons. It seemed appropriate that they should be mentioned in Phase 3, but a mixture of construction and levelling in Phase 4 means that the bulk of the activity and classification should be assigned to the groups being centred in Phase 4.

7.3.5.2.1. Land reclamation/backfill group G640

The group was located in an area measuring 14.97 m by 3.22 m by 1.5 m deep. The group consisted of a total of twenty five deposits of various sizes, rapidly dumped to backfill an area between the new harbour front and a land reclamation fence. Tip lines were visible in the profiles of the groups and it was evident that deposits were not able to slump and “even out”.

The majority of the layers were mid brown silt with some sand, comprising mixed urban waste with finds material such as clay pipes, leather, animal bone, ceramics glass and textiles. The deposits were also organic in places with the remains probably representing manure and other waste from the streets, which were seen in deposits SD55586, SD40743, and SD56082. These were a mixture of cess and horse manure representing everyday life from the city. Certain deposits, as in SD54972 and SD42941, contained primarily building waste/rubble probably from either the dismantling earlier stone harbour wall group G532, or from demolished buildings. Deposit SD55783 contained less building material, but comprised a large quantity of mortar representing excess materials from building structures. There were three highly organic deposits SD55586, SD40743, and SD56082.

Fig. 96 Well preserved stove tile depicting Judith with the head of Holofernes flanked by Adam (not preserved) and Eve and with a depiction of the Veil of Veronica, FO213816 and FO213811, SD55586 (G640). Museum of Copenhagen

Deposit SD55734 was a dark grey sand rich layer dumped in the process of backfilling. The layer was interesting for the rare remains of three charred seeds from oats (Avena sativa). Sample PM214740, from SD55734, also revealed that the deposit comprised remains from a brackish environment, showing it was open to the sea, perhaps via gaps or holes in the bulwark.

From SD56082, the results from Sample PM214696 reveal large quantities of meadow plants and weeds especially fat-hen (*Chenopodium album*). Among the wet/fresh meadow plants were fruits from sedges (*Carex* sp.) and dry/fresh meadow species like buttercups (*Ranunculus* spp.) and sheep sorrel (*Rumex acetosella*) which may represent traces from meadow and/or grazed areas. Fruits from these species were quite frequently noted. Among the grown or collected plant remains were seeds from hops, and a solitary seed from flax (*Linum*).

Fig. 97 Working photo of Section of G640, looking SW. The section reveals the mixture of the various types of urban waste. C03_20140625_11246.

Evidence of the repair of structure G648 was also seen by the purposeful depositing of soil SD55863. The deposit was composed of sand, broken red brick with lenses of light blue/grey clay with charcoal, and mortar. It was dumped between the early part and the repair of bulwark G648. This may represent a form of mortar used to fuse the repair bulwark to the older bulwark, or the backfilling of material to make the area more compact.

Fig. 98 Part of a Werra dish, c. 1580-1630, FO 217094, SD 55583, G640. Museum of Copenhagen

Group 640 comprised one of the prioritized groups for animal bone analysis in Phase 3. A total of 1578 animal bones were analysed as part of the process by the zoology museum. Bangsgaard (2016, 34) writes that the fish in group G640 is represented by at least fourteen species, eleven of which are saltwater fish, two are freshwater fish and the last one is a migratory species. Within this group it could be distinguished how some of the fish species were caught. Some of the larger gadids were normally caught by hook and line. Herring and the small gadids are traditionally caught by net fishing, where

the gadids are seen as a by-catch to the herring fishery. The flatfishes can be caught by stationary traps or hook and line.

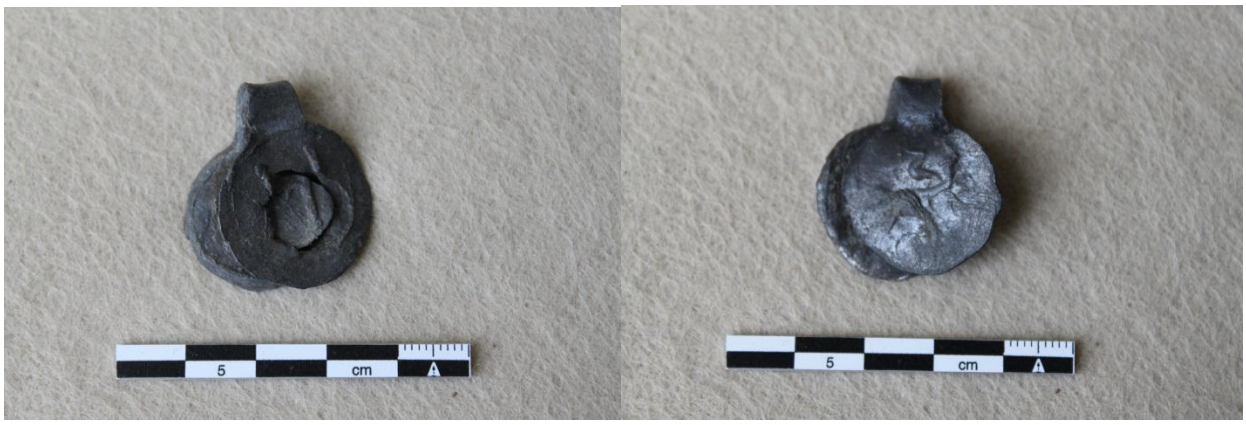

Fig. 99 17th Century lead cloth seal, FO212824 retrieved from SD56082, G640. Museum of Copenhagen

As in group G682, the mammalian and bird remains were dominated by the domesticated animals, cattle, pig and sheep/goat in a number of identified fragments. Unlike other animal bone groups registered within this phase, many wild species were found. The presence of cut marks within this assemblage suggests that most of these animal bones represent waste from household consumption. Of particular interest was the rare find of six phalanges from brown bear (Fig.100). Bangsgaard (2016, 34-35) writes that the elements along with the two cut-marks indicate that the brown bear remains made their way into the archaeological record as the remains of a bear skin and not as a food item, or a by-product of the skinning and butchering process.

Bangsgaard (31, 2016) further states that the six bones identified as coming from brown bear all belong to the extremities, specifically one of the paws. Although brown bear was naturally found in Denmark into the postglacial period, the latest confirmed finds of this species belong to around 2500 BC (Aaris-Sørensen, 1998). It is therefore highly probable that this bear was imported from elsewhere and, based on the distribution of bones; it is likely that it was imported as a skin and not as a complete and living animal.

Fig. 100 2 Phalanges III, 2 phalanges II and 2 phalanges I from brown bear animal remains. Photo: Zoologisk Museum

The group comprised a large collection of ceramics and glass from Germany and the Netherlands, with Rhine wares from Germany, and earthenware from Germany and the Netherlands. The glass was split between window glass, bottle glass and tableware in the form of *Römer* glass, forest glass and winged goblets. Clay pipes were also present with the fifty six fragments comprising some obvious Dutch imports.

7.3.5.2.2. Land reclamation group G400

Group 400 was a group of mixed deposits with various phases which span the period from1630 to 1700. The deposits were spread over an area measuring 5.5 m by 2 m by 0.3 m at an average height of 0.6 m OD with average depth of 0.2 m. They were deposited for the same purpose as G640, backfill and land reclamation, but were later affected by construction and levelling in Phase 4 where the construction of drains and land ties truncated these deposits and then used them to overlie the deposits. Not many finds were retrieved from these deposits.

7.3.5.2.3. Land reclamation group G401

Group 401 comprised five backfill/reclamation deposits and a single timber fragment linked to levelling in the mid to late 1600s. The group measured 2.7 m by 0.95 by 0.7 m and was located at 0.3 m OD with an average depth of 0.33 m. It was located in the Guide Wall excavation trench in Trench 1 and situated between bulwarks G406 and G510. Whilst excavating the group the archaeologists noticed that the deposits were affected by the later construction of a land tie G404. If the deposits were first formed in the harbour in the 1630s, then they were later affected by activity in levelling and construction of the Phase 4 harbour in the 1690s, and thus some late 1600s sherds were found within deposits dumped in the 1630s.

The deposits originally comprised urban waste. Animal bone remains comprised pig, sheep, goose, with finds of CBM, undecorated clay pipes and redwares. Of particular interest was a residual rim sherd of *Fadenrippenbecher* glass (FO202612) dating from 1300-1450 see Fig.101 This exquisite sherd was from a vessel fashioned in Bohemia, modern Czech Republic, imported to Copenhagen to be used by a wealthy household.

Fig. 101 Fadenrippenbecher glass sherd FO202612, from the High Medieval period, SD11091, G401. Museum of Copenhagen.

7.3.5.2.4. Land reclamation group G405

The group comprised two deposits SD11056 and SD11477 and measured 2.62 m by 2.56 m by 0.15 m. It was located at the average height of 0.14 m OD with an average depth of 0.15 m. Deposit SD11056 was an organic layer with urban waste such as a wooden stave, FO204871, glass fragments and animal bones of sheep and cattle. It was overlain by SD11477, a mid grey brown deposit mottled with patches of white mortar and light blue grey clay. It also exhibited brown organic patches containing wood chips. This deposit was not excavated due to rising ground water and so no finds could be retrieved. The minimum thickness of this deposit was 0.15 m.

7.3.6. Storm post groups for bulwarks and harbour wall

Group	Subgroups	Group name
511		Storm post group
646		Storm post group
649		Storm post group

Table 32 Groups related to stormpost for bulwarks and harbour wall

Placed in front and to the south of the bulwark groups, G510 and G646, the harbour wall, G532, and bulwark group G602 were storm post groups G511, G646 and G649. All three storm post groups fulfilled the same purpose but were assigned different numbers as they related to different parts of the harbour front. It is believed that they were all pushed into the underlying deposits and the harbour base around the same time in Phase 3, perhaps the early 1640s. The purpose of these posts may be varied. They may represent extra protection of the harbour wall, extra ties for ships or perhaps they represent harbour locations for docking. All three groups span an area 76 m long in the Guide Wall excavation and Main Excavation trench. It is suggested that these posts were in use until the end of Phase 3 in the late 1680s, and were then covered over with backfill for the construction of the harbour in Phase 4. They can be viewed in Fig. 93.

7.3.6.1. Groups belonging to storm posts

7.3.6.1.1. Storm post group G646

Storm post group G646 covered an area 59 m long by 0.2 m wide with the posts ranging from 2 m to 4 m high. They were found in the central and eastern area of the Main Excavation trench between the heights of 0.2 m OD to the west and -0.16 m OD to the east (measured from the top of the posts), which represents the gradual slope from east to west in the trench. They were recorded as a line of separate posts orientated E-W to the south of the bulwark posts G602, and were vertically set in the ground. They are pushed into various usage deposits and groups in the bottom of the harbour from Phase 1 and 2. The posts were all pine, cut in the winter of 1642/43, and probably transported from Norway, from the Oslo region.

The posts were mainly rectangular shaped with a pointed tip and in good condition due to the preservation conditions. Post ST34393 comprised a fish basket fashioned from wicker, F0219487, which was later attached to the post. It is believed that the basket represents storage of caught fish, rather than a fish trap.

Fig. 102 Storm Post ST34393 (G646) with wicker fish basket F0219487, G646. The upper part of the post had been recently removed to help excavation. Photo: K. K. Tayanin

Storm posts ST43696 and ST43687 may be structural evidence suggesting repair/reinforcement of the Valkendorf wall G532. The posts were probably inserted into the harbour in the same phase as post groups G511 from the Guide Wall excavation and post group G649.

7.3.6.1.2. Storm post group G649

Storm post group G649 was spread over an area measuring 15.34 m long by 0.49 m wide with an average length of post at 3.6 m long. The posts were uncovered in the ground at an average height of -0.21 m OD. The group consisted of eighteen storm posts and one horizontal plank. The group represents a collection of storm posts for bulwark G648. The posts were mainly fashioned from pine, rectangular shaped, in boxed heart style with one pointed terminus at the bottom and inserted into the harbour base, and one flattened terminus where they were hammered into the ground. The majority of the posts were pine, with some (ST37623, ST37269 and ST39399) confirmed to have been felled, mainly, in the winter between 1639 and 1640, and imported from Middle Baltic region, perhaps from Gotland/Eastern Sweden area. This differed to post group G646, which was imported from the Oslo area of Norway.

Not all the posts were able to be fully seen or sampled in the excavation due to health and safety reasons, but they generally appeared to be between 0.2 m wide and between 3 m to 3.63 m long. They were pushed into the harbour floor of that period, which consisted of deposit SD55010 of group G642 and deposit SD40361 of group G682. The top of the posts were damaged. These truncations probably occurred when the posts were no longer in use.

7.3.6.1.3. Storm post group G511

Storm post group G511 was located in Area 4 of the Guide Wall excavation and was located at the heights of 0.15 m and 0.3 m OD. The group was spread over an area 2 m long by 0.2 m wide by 2.4 m thick. Bulwark group 511 comprised four posts in a NE-SW line within Trench 4. The posts were all discovered beneath the machining layer SD103 and driven into deposit SD19095. The posts were exposed to the height of approximately 0.3 m at the limit of excavation SD102, and then removed and measured. Although

dendrochronology could not produce dates, their positioning and orientation has led to comparisons with the storm post groups G646 and G649.

7.3.7. Harbour base activity, 1620s-1650s

As mentioned in sub- chapters 7.1 for Phase 1 and 7.2 for Phase 2, a mixture of dredging and other harbour activity affected the soil deposits at the harbour base. It is not until the post 1650s that we can visibly distinguish new deposits at the harbour base in the central and eastern areas. What was largely seen in those areas is the continuance of Phase 1 deposits, but with Phase 2 and Phase 3 finds pushed into the deposit and added to the Phase 1 assemblage. This is viewed in Fig. 103 where the deposits in the harbour fromPhases 1 to 3 are shown. It would be wrong to remove the finds results from the Phase 1 assemblage, so they are kept in the Phase 1 deposits, with the knowledge that mixing of finds from Phases 1 to 3 has occurred.

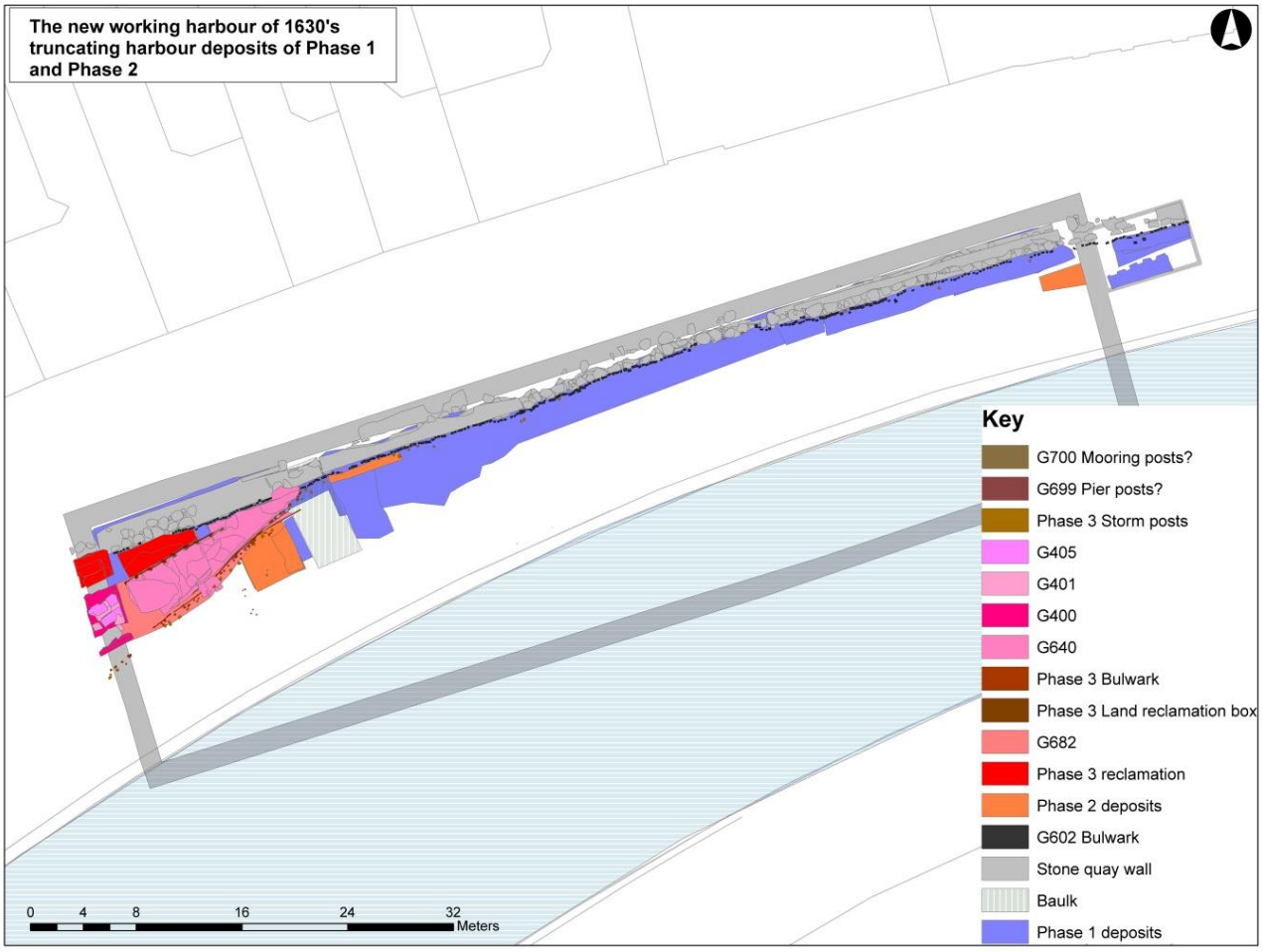

Fig. 103 Plan showing harbour activity from 1620s-1650s. Note the re-use of Phase 1 and Phase 2 deposits at the harbour base due to harbour dredging. Fig 103

7.3.8. The final phase of the Renaissance harbourside

Harbour use and deconstruction evidence at the end of Phase 3.

Groups	Sub-groups	Group name
663		Harbour use and deconstruction group
664		Harbour use and deconstruction group
666		Harbour use and deconstruction group
684		Demolition pit
701		Storm post repair
704		Bulwark repair group

Table 33 Groups related to the final phase of the Renaissance harbourside

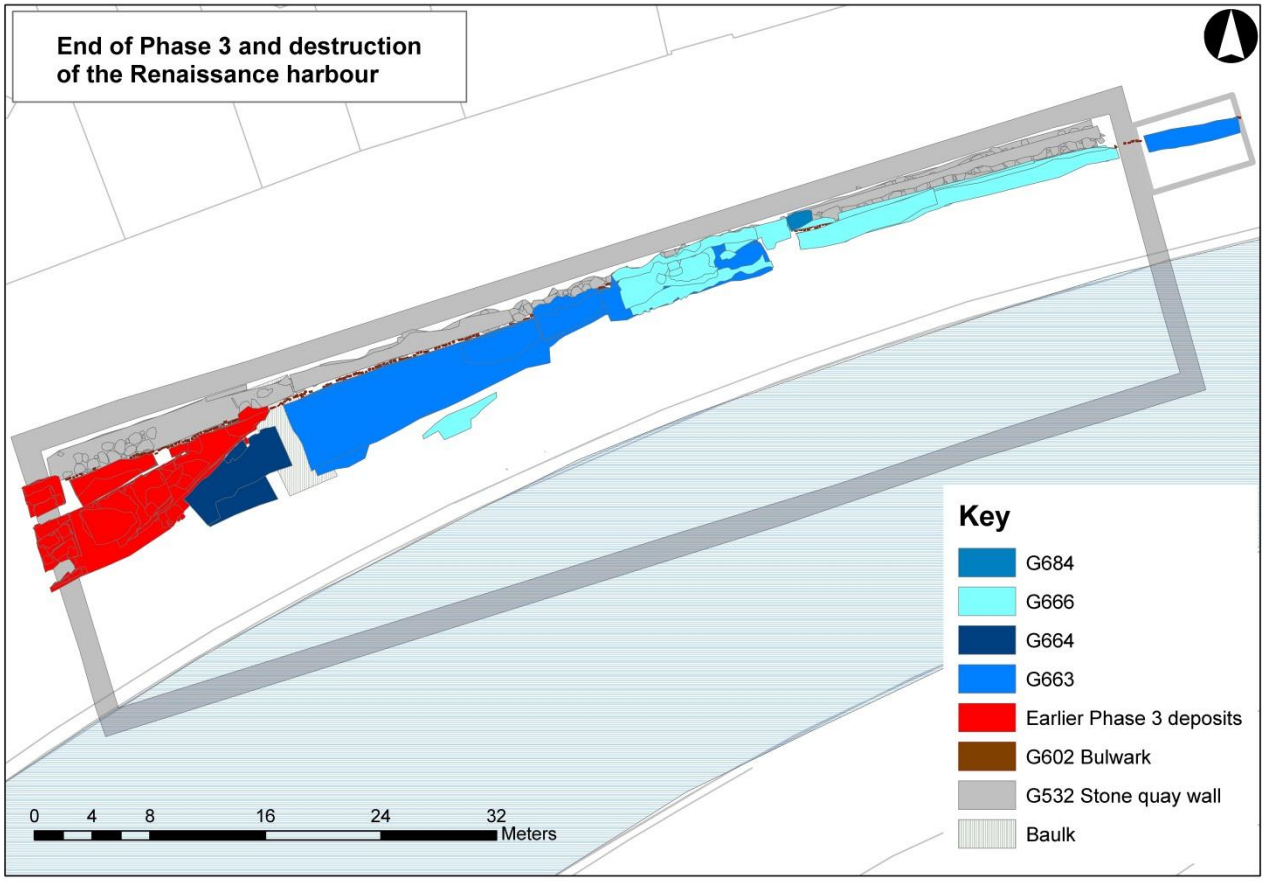

Fig. 104 Plan showing the end of Phase 3 and the destruction of the Renaissance harbour.

7.3.8.1. Introduction

The final phase of the Renaissance harbourside dates from the late 1640s to the late 1680s when it was partially dismantled and a new harbour was created to the south. The deconstruction deposits then merge into the Phase 4 construction deposits for the construction of the new Phase 4 harbourside. This was not so apparent when excavating the areas, and near impossible to distinguish in the post excavation phase, but it is evident that these groups consist of harbour usage, deconstruction and construction with some deposits continuing into the early 1700s.

It appears from this phase that the harbour was not as frequently cleaned as in the earlier part of Phase 3 which is shown by the creation of large usage groups at the harbour base. This was apparent in the western area of the trench with G664, central area of the Main Excavation trench with G663, and in G666 at the eastern area.

7.3.8.2. Groups belonging to the final phase of the Renaissance harbourside

7.3.8.2.1. Harbour use and deconstruction Group 664

Group	Subgroups	Context types
664		Harbour use and deconstruction group

Table 34 Group G664 harbour use and deconstruction

Group G664 was evidence of the use of the harbour and later deconstruction of the harbourside at the end of Phase 3 in the western area of the Main Excavation trench. The group comprised two contexts SD38150 and SD40474 which were located in an area measuring 7.91 m by 4.9 m wide by 1.2 m deep. It can be seen in Fig.12.

Fig. 105 Plan of G664 and the deposits within the group

Context SD38150 represents a fairly large deposit, of almost pure sand, excavated immediately to the seaward side of the southernmost timber bulwark. The deposit was mottled in colour from light to mid yellowish grey. It also contained small patches of mid brown silt. This deposit was initially thought to be a land reclamation dump similar to overlying deposits. However, where SD38150 met the timbers of the wooden bulwark, clusters of mussel shells were found immediately around the posts. This strongly suggests

the area was open to the sea and that this deposit was washed in. The small patches of mid brown silt revealed evidence of many cultivated plants from the city, but little environmental evidence of the landscape according to sample PM214693. Within the sample were, presumed, locally grown prunes and cherries and particularly seeds from fig (*Ficus carica*). There were no weeds linked to the marine landscape so they most likely represent the urban rubbish (Ranheden 2016, 32).

Fig. 106 Deposit SD31850, from G664. Note the large quantity of shellfish from the usage deposit. Looking N. C02_20140526_9538.

The interface between SD38150 and overlying organic brown clay and silt deposit SD40474 was littered with animal bone, mainly mandibles from cattle, lying flat on top of this deposit, also suggesting that the area had been open for some time to the elements, with locals or butchers linked to slaughter houses in the area throwing waste animal products into the harbour.

The deposit was formed after bulwark G648 was constructed as it physically overlies many of the timbers. From samples PM214826 Ranheden found that there were not as many macrofossils from weeds and fresh/dry meadow species but a broader spectrum of finds from grown or collected plants. Examples include finds from black mustard, hemp, hazelnut, fig, wild strawberry, hops, flax, wild apple, cherries, cloudberry, raspberry, stone bramble and grape. The wide spectrum of types suggests household and urban waste. The sample contained fish scales/vertebra as well as some macrofossils from a brackish/marine environment, solitary fruits from *Ruppia maritima* and *Zannichellia palustris* were present in this sample. These represent the long timespan that the harbour base was open to the elements.

Fig. 107 a London lead cloth seal FO 211650, from SD 38150. Pre-conservation. Museum of Copenhagen

Overlying deposit SD38150 was deposit SD40474, physically and stratigraphically. Deposit SD40474 was very thick and the matrix was very organic. When first uncovered it was black but later turned brown after oxidization and comprised a lot of clay. It contained a large quantity of animal bones, especially jaw bones. The organic matrix was revealed in sample PM214696 to contain very few weeds and meadow type plants and instead a large quantity of cultivated plants and plants used in industry. The sample therefore reflected rubbish from an urban household. The remains comprised hazelnutshells along with wild strawberries. Seeds from hops were also present as were solitary fruits/seeds from walnut, juniper, flax (perhaps grown for textile production), cherries, plum and

raspberries (the latter occurring in large quantities (Ranheden 2016, 33). The figs were imported from the Mediterranean so reflect high status import.

Fig. 108 Tin metal dining plate FO 212785. G664. Pre-conservation. Museum of Copenhagen

By the bulwark or waterfront posts there were frequent shell inclusions within SD40474, nearly as frequent as in SD38150. They were clustered around posts ST39379 and ST39399. Finds included many examples of urban waste such as leather shoes, clay pipes, ceramics and ceramic building material. Of note was the cloth seal from London (Fig.107), a tin metal dining plate FO212785 (Fig.108), and a leather cavalry gun holster FO213540 (see arms and armour **Special Finds** report, Whatley 2016, 5). The clay pipe assemblage from the group comprised 214 fragments from the two deposits. Within the assemblage was one fragment from a Jonah pipe, 61 Dutch pipes and one English pipe. As with the other corresponding demolition and use groups, G663 and G666, the assemblage dates to the second half of the 17th Century (Pedersen 2016b, 6)

The animal bone assemblage comprised 664 fragments of bone, which were dominated by fish remains representing 93% of the collection. The remainder represent the normal household diet with species that were common in either Danish waters or on land.

Fig. 109 Leather gun holster from the 17th Century, F0 213540, SD40474, G664. Museum of Copenhagen

The Post-medieval pottery from group 664 is represented by 566 sherds weighing 31061.5g. The sherds mainly date to the late 17th Century with only one sherd predating the period, a Chinese Kraak sherd is the only sherd with a date that with certainty can be set to before 1650 (FO216855) (Fig.110). In general, the dates are within the 17th Century.

Fig. 110 Sherd from a Chinese Kraak porcelain bowl, c. 1580-1644, FO 216855, SD38150, G664. Museum of Copenhagen

The main ceramic imports were from the Netherlands, consisting of 37.41%. Lesser quantities were received from Jutland with *Jydepotte* and also from Germany with earthenwares and stoneware.

7.3.8.2.2. Harbour use and deconstruction group G663

Group	Sub-groups	Group name
663		Harbour use and deconstruction

Table 35 Group G663 harbour use and deconstruction

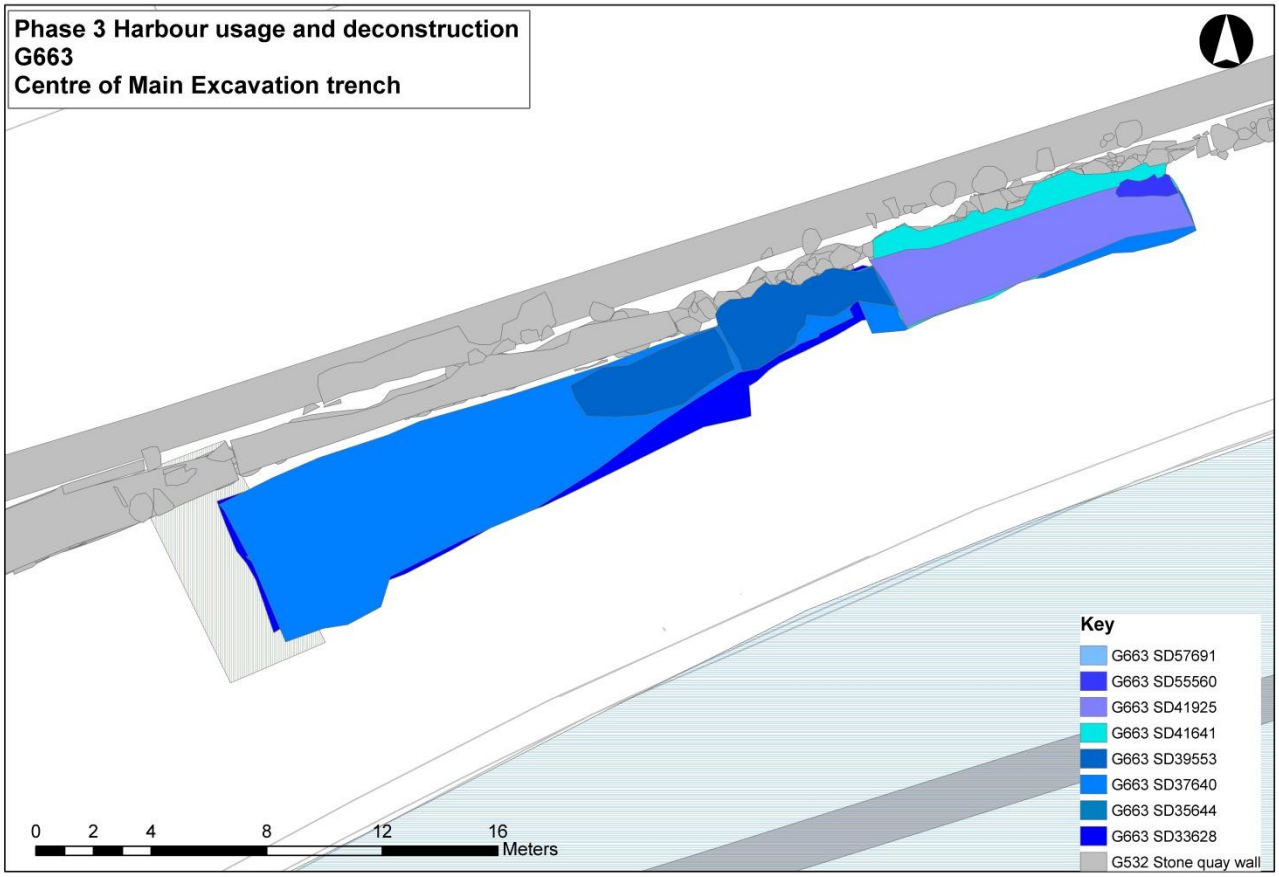

Fig. 111 Plan showing the contexts within G663, Main Excavation trench.

Group G663 was located in the central area of the Main 2014 excavation and within the Stairway trench of the 2014 Main Excavation. Within the main trench the group was spread over an area measuring 35 m by 5.65 m by an average thickness of 0.9 m. The location of the deposits varied in height; in the northern area from -0.24 to -0.8 m OD, and to -1.1 m to the south. In the Stairway trench one deposit is represented in this group, SD57691 measuring 6.5 m by 1.47 m by 1.47 m.

This group portrays usage of the harbourside from the early to late 1600s and is represented by six deposits which consist of a mixture of alluvial, slow accumulating layers and sporadic dumping of waste and demolition material at the end of the Renaissance harbour use. The deposits ranged in thickness between 0.3 m and 1 m and between 1.5 m and 4.5 m wide. They were rich in organic finds due to the anaerobic soil conditions and consist of assemblages full of ceramics, clay pipes, animal bones, organic and other special finds.

In the central area of the Main Excavation trench, the deposits from this group were located directly south of harbour wall G532 and post group G602. They overlay Phase 1 alluvial deposits and a few deposits from the Phase 2 alluvial group G642 which continued in use into the 1600s. Like Late Medieval and Early Renaissance deposits, the ones from this harbour group were formed in a similar style; natural accumulation at the harbour base in this particular time period, with some dumping of soil and rubbish, either by boat or from the harbour wall.

Fig. 112 FO 218778. Decorated Siegburg ware. SD33628, G663. From the eastern part of the central area. Museum of Copenhagen

Fig. 113 Leather book cover with imprinted floral decoration, after conservation. FO 213533, from SD37640, G663. Museum of Copenhagen

It was generally seen that these deposits were formed in the mid 1600s directly after storm post group G646 was inserted into the ground. The first deposit in this group, SD37640 extends over the whole central area at 34 m by 5.6 m by 1 m, shown in plan Fig.111 and section Fig.117. It consisted of dark brown silt and

clay and represents a long period of dumping over perhaps 40 years. Deposit SD37640 comprised many layers of mussels and fishbone that seem to have accumulated naturally in the organic layer. The mussels were whole so they were living in the harbour. The deposit comprised a large quantity of urban waste with finds from all over Northern Europe as seen in the glass, ceramics and stove tile assemblage. The large collection of clay pipes were found to have been imported from the Netherlands although some English pipes were registered (FO 212998 as an example). Special finds were represented by more coins, household materials and fishing artefacts.

Fig. 114 Base sherd, side sherd and narrow mount of a possible Spanish/Portuguese olive jar, c. 1550-1650, FO 216568, SD37640, G663. Museum of Copenhagen

Europe, as seen by the discovery of sherds from a Spanish/Portuguese olive jar, (Fig.114), and with many forms, uses and types of ceramics. This will be summed up in a group ceramic assemblage discussion in the conclusion of the group.

The ceramic assemblage was very large and varied; representing trade from all over

Fig. 115 FO 212520 Christian IV coin. Photo of Obverse with minting date of 1644, pre conservation. Museum of Copenhagen.

The deposit also contained remains of ships with an oak timber beam keel FO218893. The keel was in two fragments measuring 1.6 m long with 18 square iron nails still present. The keel was believed to be from either a small rowing boat or clinker built sailing vessel. 5-10 m in length (Dickinson 2016, 7).

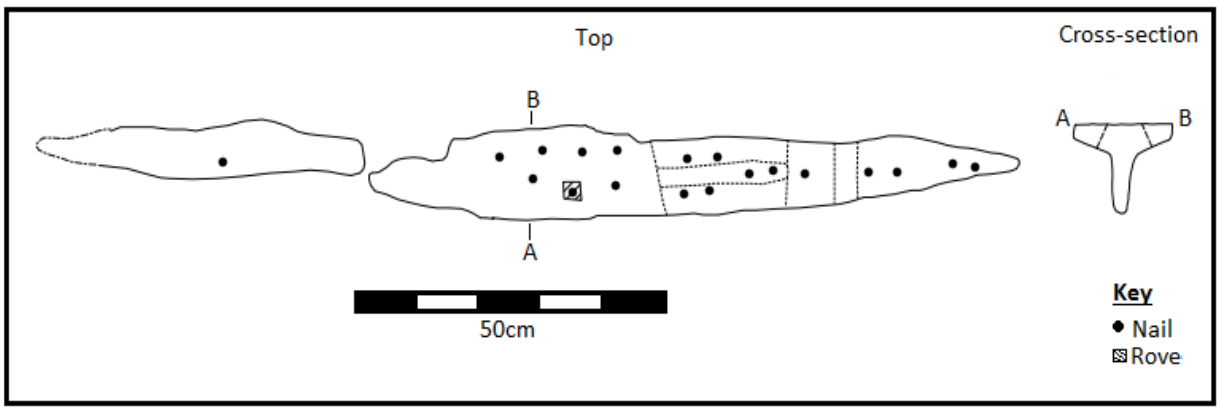

Fig. 116 FO218893 Reconstructed keel. Dashes on cross-section show angle of nails. SD37640, G663. Drawing by G. Dickinson.

In the eastern area of the group, SD41641 differed greatly from SD37640.The deposit was richer in sand with only patches of organic material. The 10 m long deposit featured very few finds with clay pipe and glass tableware retrieved alongside leather fragments. It was overlain by SD41925, a grey silt and sand layer with white lenses of sand from the harbour base.

Deposit SD41925 physically abutted the Renaissance wall G532 in the northwestern area, and deposit SD37640 at its western extent as well as part of SD41641. It is presumed to have represented a fluvial event being washed into the harbour. This is backed up by the analysis of sample PM213539 which revealed the remains of cultivated plants from the city, and few remains of meadow species and weeds. Cultivated plants were represented by *Cannabis sativum* (hemp), *Coriandrum sativum* (coriander), hazelnuts, buckwheat, fig, barley, hops (burnt) and cherry. Most of the evidence relates to the everyday life in the city although the figs represent imported goods for the people of higher status.

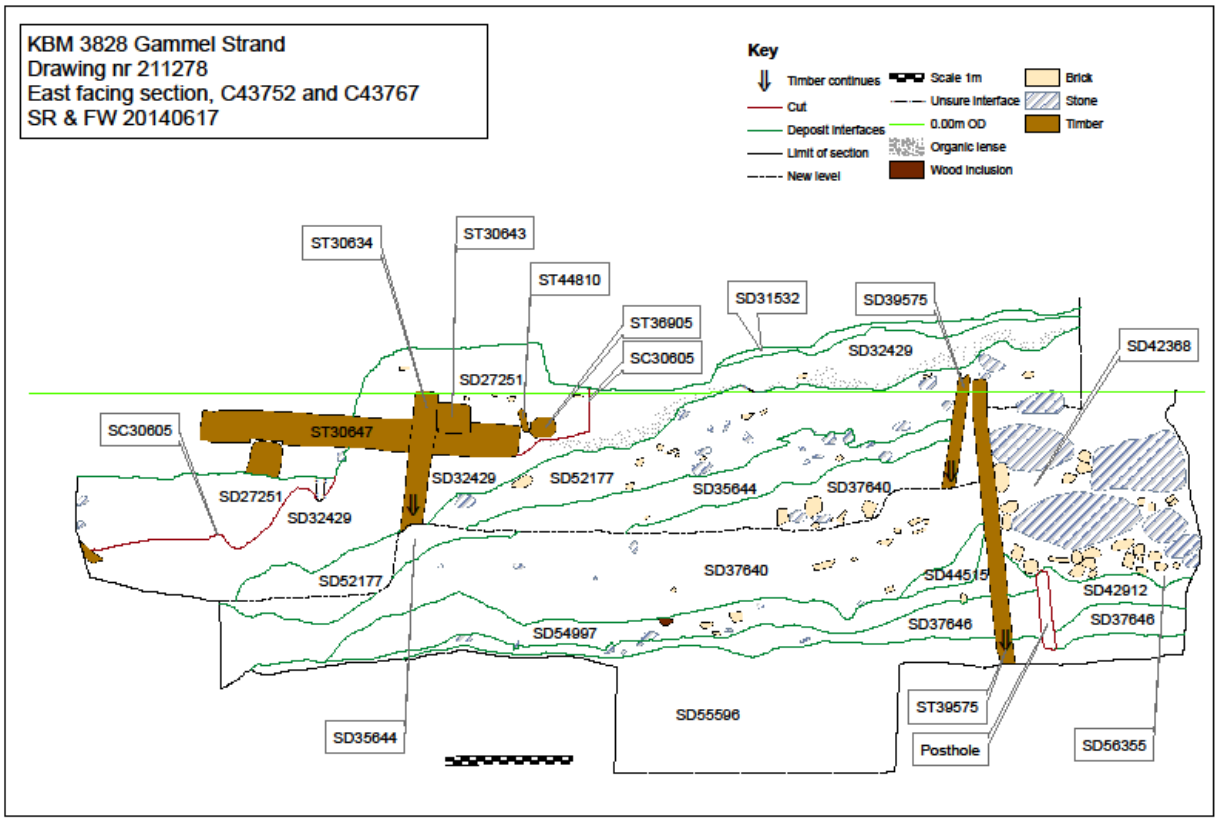

Fig. 117 East facing section of the baulk showing stratigraphy from phases 1-4. Group G663 is represented by deposits SD37640, SD35644 . Scale bar 1 metre.

Overlying SD41641 was a dumping event, represented as deposit 55560. The small organic dump deposit comprised a matrix of clay and silt and a large artefactual assemblage, especially animal bones. It may have been placed in the harbour or represent collapse and be linked with the construction of harbour posts G701 and harbour wall reconstruction group G704.

In the western area, above SD37640 and leading into the baulk was deposit SD35644. The deposit was a dump style deposit, perhaps formed in the final phases of Phase 3. The silt and organic rich deposit

contained a complete egg, FU 208929, amongst the waste as well as glass carafes and beakers and a decorated bone lid FO218208.

Fig. 118 FU 208929 Egg found within deposit 35644 of group G663. Dating from the 1600s deconstruction phase. Museum of Copenhagen

Deposit SD33628 represented a large dumping action in the central and western areas. The deposit was 24 m long by 6 m wide with an organic and silt matrix comprising material that may have come directly from a dumping site within the city. It comprised a large assemblage of clay pipes from the Netherlands with a few pipes from England. Glass was also well represented with various tablewares retrieved as well as window glass and medicine bottles. Unusually, the amount of ceramic vessels was low in the deposit. The average date pointed to the late 17th Century from these finds.

Overlying SD33628 was deposit SD39553. This was a thin accumulated deposit with some dumped material mixed throughout. It probably represented an 'open phase' of harbour accumulation. This is likely to be related to the deconstruction of the harbour wall and end of Phase 3 when it was partly backfilled in the 1680s as represented by SD37640, then left open but still underwater before the construction of the Phase 4 harbourside. This deposit comprised a few fragments of glass tableware and leather shoes but was again represented by clay pipes from the Netherlands.

Within this group a total of 2,462 clay pipe fragments have been analysed. Pedersen (2016b.4) writes that there were three fragments of Jonah pipes, with one rare example as it was green glazed. There were 508 fragments from the Netherlands and 10 pipes from England, an unusually high number for Copenhagen contexts. The assemblage dates to the late 17th Century which fits in with the other finds.

Fig. 119 Photo of SD33628 with the baulk at the central western part of the Main Excavation, Group 663. Looking NW. C03_20140521_10334

The group comprised the largest sub-collection of animal bones from Phase 3, with 3378 fragments. It had the most diverse in terms of species distribution with a minimum of thirty eight species represented, the majority being fish. Included in the collection was a large collection of mammalian, bird and crustacean remains with crab represented in large numbers. These were either present in the water or were part of diet.

Bangsgaard writes that the mammal and bird collection were mainly of domesticated or probable domesticated species with a small addition of wild and likely commensal species; sparrow, hare, mouse and rat. The overall impression is once again one of mainly waste from normal household consumption, in species selection, the element distribution, fragmentation and presence of cut-marks. Additionally to these are two species that were likely connected to these same household and everyday lives. Not as an addition to the diet but more likely serving functions such as mouse catcher, guarding, protecting or simply companionship. These include the few remains of dog and cat (2016, 46-7).

The fish assemblage was very diverse with twenty four species encountered amongst 1,474 identified fish bones. All of these fish would be part of the Copenhagener diet. Also within the fish remains were the differential styles of catching them, and then preparing them, suggesting their purpose.

Among the collection of mammal remains was a group of forty calvarium and thirty four mandible fragments from cattle. As they all contained similar cut marks they represent butchery on an industrial scale, possible from the local slaughter houses and they were discarded whilst the wall was in use and also when it was being destroyed, depending on the G663 deposit.

Medieval pottery was seen within deposits in the group. The thirty five sherds were all residual representing the mixed dumping of earlier deposits within the harbour. They were highly represented with German imports and local Medieval redwares. The most interesting fragment was the sherd of Pingsdorf ware, which although residual, represents earlier networks and trade.

Fig. 120 Pingsdorf fabric, dating from c. 900-1225. FO218772, SD33628. G663. Museum of Copenhagen

Group G663 comprised Post-medieval ceramics from three deposits, SD37640, SD33628 and SD55560. The assemblage contained 2,219 sherds, weighing 86441.5g. The harbour use deposit SD37640 comprised the most sherds at 2059, with deposit SD33628 containing only one Post-medieval sherd and SD55560 containing 159 sherds. Within the assemblage were 80 sherds datable to the early Post-medieval period and would be placed in the earliest phase of the general phase date (1630s-1680s) Kristensen (2016b, 2), as seen with the Chinese Kraak porcelain sherd (Fig. 121).

The majority of the assemblage dates to the later 17th Century with 41% of the assemblage was unsourced. A total percentage of 32% of the pottery was from Denmark with the majority imported from Jutland and parts of Fyn in the form of *Jydepotte*. The largest quantity of the imported ceramics comes from the Netherlands in the form of Majolica, faience, whiteware and late redware. German ceramics represent 10% of the assemblage from areas such as Raeren, Westerwald, Frechen and Waldenburg with earthenwares from Weser and Niedersachsen. With the few sherds from Spain and Portugal, in the form of an amphora, and Chinese porcelain, longer trade routes can be seen.

Fig. 121 Base sherd from a Chinese porcelain dish of Kraak type, c. 1580-1650. FO216366, SD37640, G663. Museum of Copenhagen.

As well as normal vessels, some special forms were seen in the form of ointment vessels and part of an oil lamp representing household goods. See Fig.122

Fig. 122 Part of oil lamp, produced locally, 1600-1800. FO214859, SD37640, G663. Museum of Copenhagen

7.3.8.2.3. Bulwark repair group G704 and storm post repair group SG701

Group	Sub-groups	Group name
701		Storm post repair
704		Bulwark repair group G532

Table 36 Groups related to bulwark repair and storm post repair

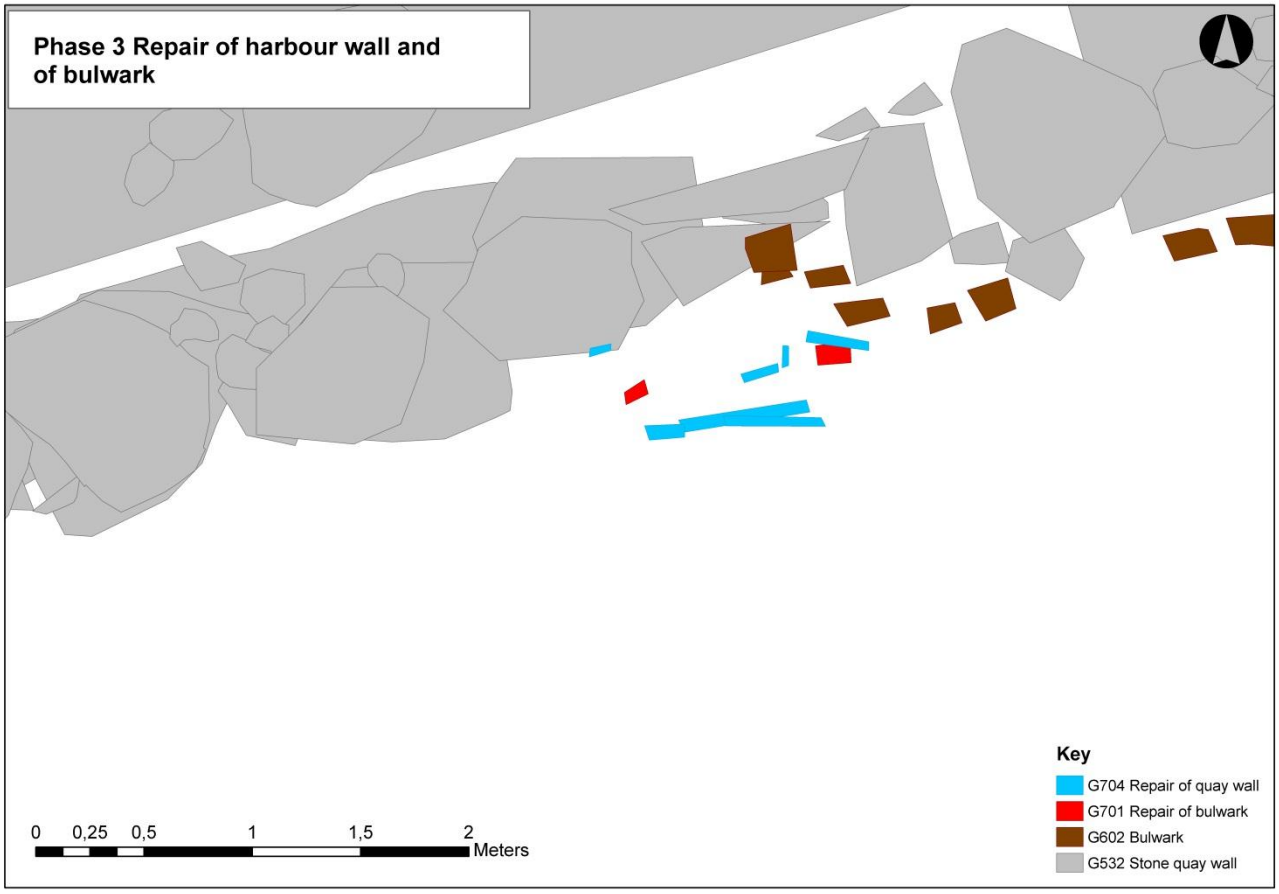

Fig. 123 Plan showing activity linked to groups G701, G704 which may suggest repair of wall G532 and bulwark G602.

Within the Main Excavation trench, evidence of repair of the harbourside was seen with groups G704 and G701. Post group G704 was a collection of planks functioning as a repair of Phase 2 wall group G532, whilst SG701 was the replacement of Phase 2 group G602.

Group G704 comprised six planks placed directly in front of the wall G532, which was highly truncated in this area. The dimensions of this area, where the group was located, measured 1.28 m long by 1 m wide by 1 m high with various truncated wooden planks at c.1 m long. It appears that the wall was damaged after G646, the storm post group, was inserted into the ground. From the dating of the finds and the overlying dump deposits, this would have occurred between the mid 1640s and the 1680s when the various deposits from G663 were inserted into the harbour area. The planks were up to 1 m long and 0.15 m wide, tangentially set, appeared much worn in comparison with the surrounding wood, and was suggested by the archaeologists to have been reused. The difference in quality of the stone wall and differential style suggests uncontrolled maintenance and lack of care of the facility.

Fig. 124 Collapsed remains of plank wall repair G704 with storm posts G701 either side. Original truncated wall G532 at rear of photo. C03_20140618_11043

The wall here comprised very few facing stones and was thus poorer in quality than other sections of G532. Damage in this area seems to have led to the original stones being removed and the plank wall being constructed. After the planks were inserted G701 was created. Group G701 comprised two posts, ST45220 and ST45216 pushed through usage deposit SD41925 of G663. This differed to the hundreds of posts from G602 which were pushed through Late Medieval deposits.

Both posts were set in the ground at angles, ST45216 with a ten degree angle towards the north east and ST45220 leaned towards the south, as seen in Fig.124. They were also fashioned from pine measuring over 2 m long and over 0.15 m wide with tapered points 0.22 m and 0.28 m long. This differed to the posts within G602 which were all vertically set posts and were fashioned from oak but with a similar length of tapered points.

It is believed that at some point in antiquity, perhaps in the mid-late 1600s, that the plank repair G704 collapsed and posts from G701 were pushed away, hence their discovery at different angles to other posts from the earlier G602. This area was then further backfilled and covered over at the end of Phase 3 and beginning of Phase 4. It is not known what caused the plank G704 and repair posts G701 to collapse, but within the soil deposit SD55560, cannonball or grenade FO212798 was found (as seen in Fig.125). This deposit overlay the planks, posts and lower soil deposit SD41925, and arguably the impact of the cannonball smashed the wall, posts and planks and led to the partial creation of SD55560, which then continued to be formed in the later 1600s.

Fig. 125 Iron cannonball FO 212798, from SD55590, G663. Pre-conservation photo. Museum of Copenhagen.

7.3.8.2.4. Harbour use and deconstruction group G666.

The group comprised harbour usage deposits and deconstruction deposits with some construction evidence behind the new Phase 4 bulwark.

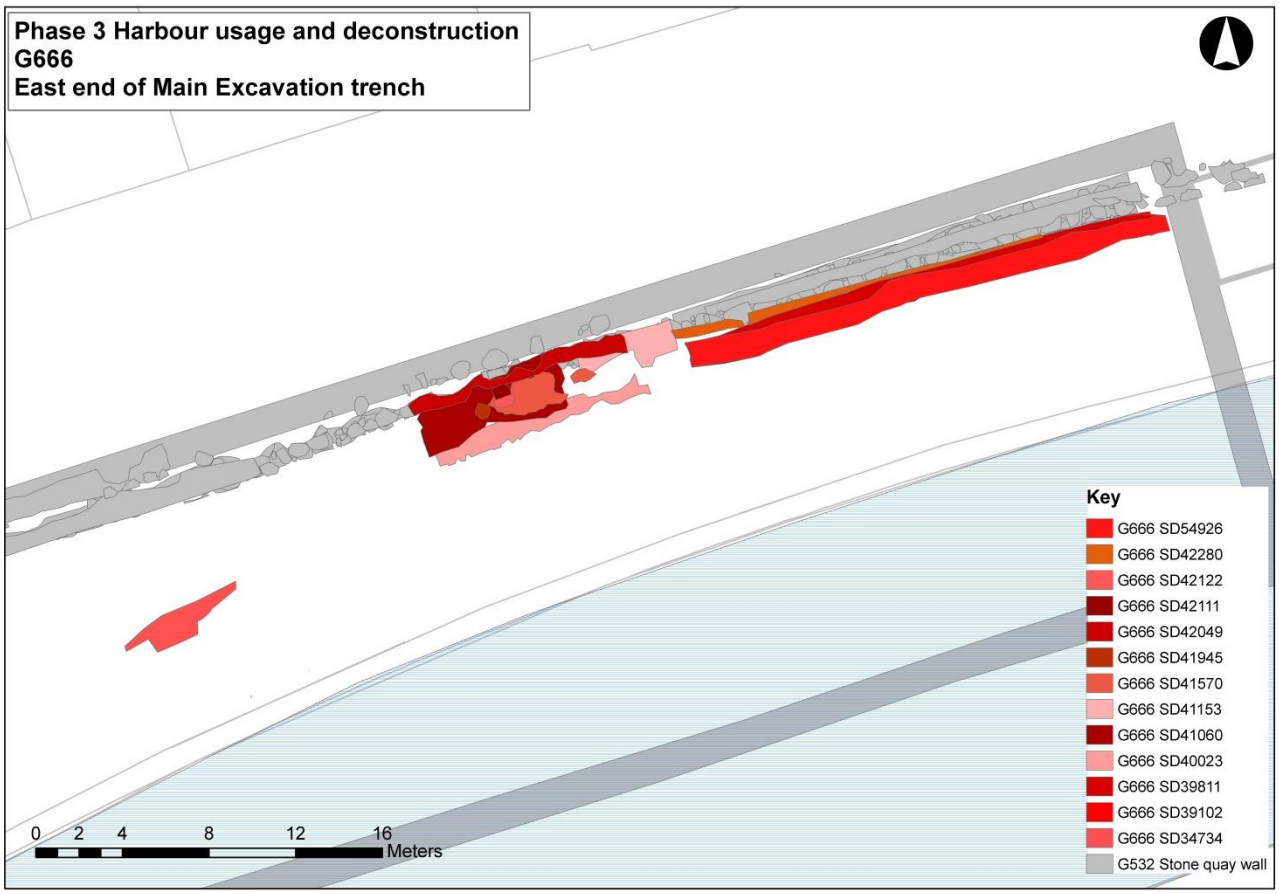

Fig. 126 Plan showing destruction group G666, and their contexts.

Group G666 comprised thirteen deposits. The group was a mixture of urban dump deposits within the harbour and the demolition of wall group G532 in the form of mortar dumps, brick dumps and foundation stones, merging with construction activity with reclamation layers for Phase 4. This phase dates from the mid 1600s until the late 1600s. The deposits were either found south of the wall G532 or physically above the remains of former wall G532. The group was located in the central and eastern areas of the Main Excavation trench and measured 59.85 m by 3.89 m by 1.5 m to 2 m deep, with highest points of the groups between c. 0.1 m OD to the north, to -1.2 m OD in the south, reflecting the slope of the landscape and tipping style of the dumping procedure.

The earliest deposit at the eastern end was SD54926, a long thin deposit overlying Phase 1 and Phase 2 alluvial deposits along the breadth and formed after the insertion of storm post group G646. The deposit measured 22 m long and was up to 0.5 m thick. General urban waste was seen in the form of glass, clay pipe and general earthenware and tableware from the Netherlands and Germany. The large quantity of sand in the deposit suggests extreme fluvial activity.

Fig. 127 Human molar, FO214734, SD39811, G666. Evidence of tooth decay in the late 17th Century. Museum of Copenhagen.

Deposit SD54926 was overlain by a rubble and sand rich layer, SD39811. The layer was again packed with finds of urban waste and measured 13 m by 1.3 m by 0.7 m thick. Amongst the finds was a human molar FO214734, most likely removed and then discarded due to the large cavity caused by decay (see Fig.127). Deposit SD39811 was overlain by a more organic deposit, SD39102, with roughly the same measurements.

Deposit SD39102 was a mixture of mid brown and grey clay; the brown silt represented the manure waste within the city. The finds assemblage was generally uniform as with other deposits in this group with a few extraordinary pieces representing the rise of globalism. This is showed at best with the cowrie shells assemblage FO 213583, which would have been imported from the Indian sea. The ceramics and glass were imported from areas to the north and North West of the Baltic in the form or redwares, Majolica, Faience and whiteware. Of particular interest was The Portuguese Faience sherd FO216631 representing the expanding trade network from Denmark.

Fig. 128 FO217959. Post-medieval lead buzz disc.SD39102, G666. Museum of Copenhagen

The glass featured window glass, a selection of tableware pieces such as beakers, carafes and *Römer* glass. Of the clay pipes, only a few of the clay pipes were from England with the Netherlands dominating the imported goods and the tobacco trade. The urban waste contained some anomalies with a discarded human molar FO214734, amongst the finds of everyday life.

Deposit SD39102 also overlay SD42280, and was found to comprisedmid grey brown sand and organic remains. The deposit was also full of urban waste consisting of *Röhmer* glass, stove tiles, clay pipes from the Netherlands and wall tiles. This deposit overlay wall group G532 and posts from bulwark post group G602 and so would have been formed at the very final point of Phase 3. Sample PM214692 revealed that the deposit, although containing urban waste such as shell fragments from hazelnut, hulls from buckwheat, seeds from wild strawberry, fruits of hops, seeds from juniper, cherry and raspberry, was open to the sea at various points so comprised remains from fluvial action such as sandy silt and fish remains.

Overlying G646 in the central area was dark brown silt, clayey and slightly organic deposit SD40023. The depth of the deposit varied, up to approximately up to 0.35 m to 0.40 m thick. Although very organic in nature, the deposit also comprised a small quantity of glass suggesting it was more likely a waste deposit.

At the far south of the central area was a long thin deposit, SD34734. Although mainly sandy, it comprised some urban waste relating to the same period as group G666. It overlay natural sand deposit G101 and was greatly truncated by timber structures from harbour front G604 and G606.

In the central area there were also many deposits linked to the demolition of wall group G532. Deposit SD 42049 was rich in urban waste finds, such as coin FO212547 amongst the normal late 1600s finds types. It was packed with remains of the former Renaissance wall group G532 with brick, mortar and stone. The deposit measured 10.39 m long and 1.25 m wide. The deposit followed the natural topography and sloped downwards from the wall, as it was thinner in the north, and thicker in the south. It was overlain by deposit SD41641 from group G663, a pure dump deposit from the late 1600s.

Further destruction of the wall was seen with demolition deposits, SS41945, SS42122 and SS42111. These deposits represent stone boulders which were dislodged and pushed into the harbour. All the stones were roughly the same size and shape at 0.9 m by 0.5 m by 0.5 m high. They were only roughly cut so were most likely from the wall foundations.

Fig. 129 Rapier/ Colichemarde handle FO 215169. SD41570, G666. Museum of Copenhagen

They were overlain by SD45170, a mixture of the former upper sections of the wall. The deposit measured 3.78 m long by 1.75 m wide by 0.1 m thick. It contained yellow mortar, bricks and stones and was located between the wall and the bulwark posts ST39175 from group G602. The deposit also contained urban waste, seen as lenses within the collapse. Of the few finds within the deposit, of note was FO215169, a small fragment of a rapier guard.

The final two deposits from G666 were deposits that were part

destruction and part levelling as they were truncated frequently by later Phase 4 activity, presumably in the early part of Phase 4. These deposits both overlay SD41570 and they were rich in destruction material from structures, most likely the remains from group G532. Deposit SD41060 was a dark brown and grey silt and sand deposit measuring 7 m by 2.75 m and 0.15 m thick. The deposit contained a few finds, consisting mainly of clay pipes and ceramics from the Netherlands, with *Röhmer* glass from Germany. Deposit SD41153 was very similar in make-up to SD41060, shallow at 0.15 m thick, and near the same length at 6 m by 1.8 m. It comprised a mixture of destruction waste, sand and a few artefacts from urban waste.

In general the artefactual assemblage in G666 was uniform in nature with 403 clay pipes mainly from the Netherlands, with a few from England. The glass was imported from mainly the Netherlands and the area that comprises modern Germany. The pottery was a collection of Danish redwares and *Jydepotte*, with lightwares and redwares from the Netherlands and Westerwald stonewares from Germany. Only a few fragments were represented from tableware, mostly in the form of faience and Majolica. The metal finds comprised a few corroded coins and unidentified corroded metal objects. The nature of the deposits, comprising of mostly of rubble and demolition material was represented by a standard late 17th Century urban assemblage. It is presumed that this urban waste was brought into the area and dumped as it would only represent household or storage ware from the prestigious structures in the area, not the exquisite tableware.

Fig. 130 Part of Portuguese faience vase or jug? Dates from 1575-1650. FO 216631, SD39811. G666. Museum of Copenhagen.

As with Group G663, residual Medieval sherds were also seen in these layers showing mixed dumping of deposits into the city harbourside. Medieval redwares and imported German greywares made up the group assemblage, in the forms of everyday vessels and some German drinking vessels.

In Group 666, the Post-medieval ceramics were found in the contexts SD39102, SD39811, SD41060, SD41153, SD42049, SD42280 and SD42926. They amounted to 1370 sherds weighing 48490g. Kristensen (2016b, 35) notes that the largest amount of sherds was seen in land reclamation layer SD39811 with 978 sherds of Post-medieval ceramic. The majority of the sherds date after 1650 with forms that continue in use after 1700s but it is believed that the sherds were deposited in the latter half of the 1600s. Some 18th Century sherds are found but as the area experienced activity in the form of land tie construction and harbour front replacements in Phase 4.

Kristensen further writes that the group assemblage was split with ceramics from the Netherlands, Faience, Majolica and redware and whiteware earthenware, providing 27.96% of the Post-medieval ceramic with German imports, mainly stoneware from various production areas with Niedersachsen and Weser earthenware, providing 10.88% of the total. Danish produced ceramics was the largest quantity with 30%, the majority consisting of *Jydepotte* and three sherds from lug-type bowls which according to ICP analysis is linked to a local Copenhagen production (FO 214875 ICP 195). Imports from further afield are represented by a fragment of Chinese porcelain and Portuguese Faience

Fig. 131 Palmette formed ear from a bowl produced locally, 17th Century. FO 214875, G666, SD 39811. Museum of Copenhagen

The clay pipe assemblage numbered 403 fragments. Pedersen (2016b, 5) noted in the clay pipe report that four fragments belong to different Jonah pipes, 66 fragments are from Dutch pipes, four fragments come from pipes produced in England, and one fragment comes from a pipe made in Copenhagen. This pipe would have been manufactured in the late 18th Century, so must be a later intrusion.

The amount of animal bone material from group G666 was very small so few conclusions could be drawn. As the group contained remains that were hand collected, sieved through large (5 mm) and fine (down to 1 mm) sieves, the species within the group was varied. The lack of fish remains may relate to the type of contexts within the group in comparison to other groups. Of particular interest from the group was the fact that all the cut marks represent household consumption and little activity in the harbour.

7.3.9. Demolition

Group	Sub-groups	Group name
684		Demolition pit

Table 37 Group G684 related to Demolition

Pit group G684 represents a demolition action of wall group G532. The cut is interpreted as the robber pit for the removal of the stones. The robber pit was then backfilled by surrounding soil as part of a levelling process to create a flat base for land ties for the construction of the new harbour in Phase 4. The group comprises a cut and backfill deposit measuring 1.89 m by 1.09 m by 0.46 m. Cut SC46309 was a large pit, irregularly shaped and orientated NE-SW. It was a robber cut removing part of wall group G532 and deposits SD39102 of group G666. The cut was filled by mid brown sand deposit SD46318 which contained no finds. The deposit acted as a levelling layer for the land ties parts ST25083 (G460) and ST46303 (G455) in the construction part of Phase 4.

7.3.10. Harbour related structures

Group	Sub-groups	Group name
699		Posts
700		Mooring posts

Table 38 Groups related to other harbour related structures

Located in the far west of the Main Excavation area and south of the harbour front G648 and storm post group G649 were two harbour related structures dating from the mid to late 1600s. In this area were two groups of posts that have been linked to Phase 3 due to stratigraphy and height. Groups G699 and G700 were sets of posts linked by orientation and possible use. Unfortunately no excavation could be undertaken on these posts nor could they be removed as they were along the line of access to the excavation trench. They could only be recorded in-situ. The location of these posts can be seen in Fig. 93.

7.3.10.1. Post Group G699

Posts G699 were a selection of five posts, near identical in measurement at 0.12 m in diametre. They were in a line orientated NW-SE following the general orientation of the harbour from Phase 2, as following the orientation of harbour front G648 would have decreased spatial usage in the area. The two northern posts were located at -0.39 m OD, with the three southern posts at -0.15 m OD.

7.3.10.2. Mooring posts G700

Posts group G700 comprised three posts on a NE-SW orientation located at -0.4 m OD. These posts ranged between 0.12 m to 0.2 m in diametre and in cross section they were a mixture, with ST52243 and ST52249 being semi- circular and ST52221 circular in cross section. They were located between 1.5 m and 2.5 m from harbour front G648, with the difference portraying the orientation of the harbour front and the turn to meet wall G532.

7.3.11. Phase 3 structures from the 2010 excavation

It has been decided in this phase that various structures from the 2010 report that are linked to Phase 3 will not be discussed in detail. These structures were not seen on the 1674 Resen plan but are possibly displayed on an unsourced plan dating from 1683. The 1683 plan may either be denoting future construction or recent construction of the structures at the very end of Phase 3.

From these three groups, G225 denotes the eastern courtyard of the *Vejerhus*/western part of the *Vragerbro,* and dates to Phase 4. Group G300 represents the western part of the *Vejerhus* courtyard, and possibly a 1700s Phase 4 period extension. Group G297 comprises a large foundation stone or wall, G329, overlying crushed bricks. No finds were seen within G297, and the stratigraphy cannot assist with dating.

Group	Sub-group	Type of structure
225		East *Vejerhus* courtyard
297		*Slagterboden*, 17th Century???
300		West *Vejerhus* courtyard

Table 39 Groups related to Phase 3 structures from the 2010 excavation

These structures are presumed to link with the *Vejerhus* and are not on plan until Gedde's plans in the 1760s. They were either constructed at the end of Phase 3 or early Phase 4, but dating evidence is not accurate enough to pinpoint the exact date. The role of these groups have not changed from the 2012 report (Olesen & Bork Petersen, 2012) so they will not be discussed more in the main report.

7.3.12. The end of the Phase 3 harbour

The final act within the phase is shown by the demolition and robbing of the harbour wall. Very little of the wall was dumped into the harbour as the stone was of high standard and would have been robbed and reused, as seen in the foundations of structures in the next site phase. Large quantities of brick and mortar from the upper reaches of the wall were mainly thrown into the harbour, as they were not deemed so important to keep. It is expected that complete bricks were reused elsewhere.

7.3.13. Phase 3 conclusion

It is in Phase 3 that Gammel Strand continues increasing its role as global harbour, as suggested from the artefactual remains. The harbour in this period continues as a working harbour as well as an administrative centre for maritime trade. With the supposed increase in imports brought in via the sea in Copenhagen, more space would have been needed for storage on the harbourside before weighing and taxing. This is probably the reason for the western harbour expansion as shown by reclamation fence G674 and then new harbour front G648. The harbour base in the western area of the main trench was shallower and due to fluvial activity, sand and silt appear to have built-up in the western part of the main trench. Alluvial deposits that had been created in this area in Phase 2 were overlain and buried providing secure stratigraphy.

7.3.13.1. The western harbour extension and continuance of the Phase 2 harbour wall

The new harbourside and reclamation fence was a mixture of oak and pine imported from areas within Denmark, Norway and Sweden, with most posts and planks newly felled. The whole construction project seemed to have occurred around the same time in the mid 1620s according to dendrochronological dates. The main harbourside was also refurbished with the addition of storm posts which were pushed into earlier alluvial deposits of Phases 1 and 2. The storm posts were imported oak felled in 1637 and 1638 with the

new western harbour comprising oak from Norway and the central and eastern areas comprising oak from Öland. The different provenance of the storm posts is interesting and may be represented by many factors, without a confirmed answer by historical documentation. They may represent different shipments; different companies furbishing the harbour or simply using the next two shiploads to furnish the harbourside.

In the western area, south of the new harbourside, were sets of posts that may represent piers or mooring posts (G699 and G700). The area surrounding the groups could not be excavated due to health and safety reasons and use of the entrance to the excavation, but they provide a glimpse of harbour use in the 17th Century.

The main harbour wall, G532, continued in use until the end of the 17th Century when it was replaced by a new wooden harbour front at the start of Phase 4. Although it is expected that was under constant maintenance, very little evidence is found of harbour wall repair due to later robbing or truncation and, as argued in Chapter 7.2, the original harbour wall may have been constructed using different materials and techniques. There is an exception to the wall maintenance evidence as seen with repair groups G701 and G704. It is believed that in the mid-17th Century that the wall collapsed and the bulwarks and storm posts needed replacing. Repair work was identified from the use of vertical planks to rebuild the gap in the wall and new storm posts were added to the south to protect the new area. With the presumed new wealth flowing into Copenhagen and Gammel Strand it appears strange that the wall was not properly rebuilt here and instead the planks stayed in use for the next 40 years.

7.3.13.2. Maintenance of the harbour wall, and cleaning of the harbour base

Historical records relating to Gammel Strand in Phase 3 relate to two main topics; cleaning of the harbour or preventing the harbour being filled and the maintenance of the harbour. Unless a specific building on Gammel Strand area is mentioned in these records, they may not actually relate to the Gammel Strand area but at least they provide an insight into activity. Records from 1633 (Nielsen 1877a, nr. 142, 115f), 1635 (Nielsen 1877a, nr. 193, 156), 1637 (Nielsen 1879a, nr. 586 or 1882 nr. 136), 1639 (Nielsen 1877a, nr. 280, 207) and 1642, running for five years (Nielsen 1877a, nr. 338, 234) state the continuance of the *accise* tax, in total fourteen years of work, to be used on maintenance and repair of the harbour. This obviously links well in the time period for the construction of harbour extension G674, harbour front G648 and G510 and storm posts G511, G646 and SG649 from the Main Excavation area. In 1680 people living next to the new canal were told to fix the harbour when maintenance was needed (Nielsen 1884, nr. 1122, 739), which implies that all areas had a responsibility to provide upkeep of the harbour next to their properties.

Regarding the cleaning of the harbour, in 1658 (Nielsen 1872, nr. 487, 689), due to moving of the stream at *Løngangen*, the citizens asked for it to be cleaned up. This, amongst other issues led to the king appointing *Henrich Bielcke* in 1663 to keep an eye on the harbours and make sure they were equipped with bulwarks and not filled up with dirt and sand as had happened (Nielsen 1884, nr. 345, 381). A harbour tax is used in 1665 for five years to support the harbour (Nielsen 1884, nr. 703, 531). In 1671 a regulation was placed forbidding the loading and off-loading of ballast or throwing dirt out into the harbours or canals (Nielsen 1884, nr. 793, 568).

The mid to late 17th Century in this phase is mainly represented by the build-up of rubbish next to the harbour front and to the south of the harbour front. Many of the lower deposits of groups, G664 to the

west, G663 to the centre and G666 to the east of the main trench were sand rich layers coupled with what appears to be short bouts of dumping of urban rubbish over the harbour wall. This process of dumping changes at the end of the phase with thick deposits of manure, waste, building material and food remains created by throwing rubbish into the harbour showing the end of the harbour use. The anaerobic soil conditions created from this activity led to the preservation of organic artefacts revealing knowledge of the Copenhageners in the period.

7.3.13.3. Conclusions from finds and natural sciences

Within these deposits and groups was an assemblage mainly of Renaissance finds with some Medieval artefacts. Unlike in Phase 2, the assemblage was not so representative of the presumed rich surrounding inhabitants of Gammel Strand. With the creation of the *Brofoged*, "paving inspector", position in 1624 (Nielsen 1874, nr. 790, 754), rubbish and the discarding process of waste may have been different in Phase 3. The lower deposits of G664, G663 and G666 may still represent the dumping of waste in the harbour, hence the various laws passed in the 17th Century. It is probable that waste may have come from anywhere in the city as seen in the upper layers of G664, G663 and G666. These deposits were thrown into the harbour in the 1680s over a short period of time, and the soil could have arrived from rubbish dumps, excess soil from a nearby construction within the inner Medieval boundaries or from the road surface. This would explain the diverse status of finds, residual Medieval finds and evidence of everyday life as seen from the Phase 3 assemblage. The importance of these finds do not decrease, the same trading routes continue and new global trading routes appear. The assemblage instead is more representative of the average Copenhagener, and less of the elites.

The residual Medieval sherds

Of the 63 Medieval sherds retrieved from Phase 3, 12 dated to the High Medieval period, three dated to Late Medieval period and the final 47 belong to the broader Medieval period (1050-1550). The assemblage was mainly composed of Scandinavian redwares with a few imports from Germany in the form of early stoneware. Of particular interest was the Pingsdorf ware sherd, which although residual, the rarity of this sherd seen in Copenhagen provides a glimpse of earlier trade routes and networks.

Post-medieval sherds

The Post-medieval ceramic assemblage comprised 4616 sherds. The majority of them dated from 1650-1700, with smaller amounts predating 1650 and a small amount post-dating 1700 representing later truncation of earlier deposits. The majority of sherds were of Danish origin in the form of *Jydepotte*, revealing regional trade from Jylland. Local wares are present but few in number, they are redwares and provenanced by ICP analysis. Many redwares could not be provenanced but it is very probable that they have some local origin; however this cannot be proven until local kiln sites are discovered.

The largest amount of imported ceramics to the region was from the Netherlands. Dutch influence is also seen in other forms of material culture such as art and architecture. Kristensen (2016b) notes that the phase coincides with the increase of the Delft faience import, although whiteware and especially redware utensils are well represented in this assemblage. German ceramics in the form of stonewares, and to a lesser degree earthenware, make up the next biggest ceramic imports to Copenhagen. Although not as dominating as in Phases 1 and 2, the German ceramic industry represented c. 10% of the Phase 3 ceramic assemblage.

In smaller quantities but also very important to the knowledge of trade patterns and consumption was the presence of Portuguese and Italian faience and Majolica, Spanish olive jars and amphorae and Chinese Kraak porcelain from the Ming Dynasty. It is presumed that many of these artefacts could only be afforded by the elite, hence the small quantity; they represent a part of the trading process seen in historical sources and part of the networking and gift giving process undertaken by the elites throughout Europe.

Kristensen (2016b, 35-6) found that the types/forms of the pottery was varied but mainly consisted of pots, frying pans, jugs, mugs, bowls, and dishes. Many were worn, representing clear signs of use and thus representing urban rubbish rather than dumping of trade goods from ships at Gammel Strand.

Phase 3 clay pipes

Even with using prioritization of contexts for registration, the phase contained the largest collection of clay pipes with 3135 fragments analysed. The assemblage comprised a date range of c. 1650-1690 (Pedersen.2016,5) which fits into the period date range providing an increased knowledge of trade and networks for this period. As with the majority of clay pipes from Phases 2 and 3, the Netherlands provided the largest quantity with smaller amounts from England and Scotland.

Phase 3 animal bones & fish bones

The animal bone assemblage comprised a total of 6,989 prioritized fragments representing a minimum of 44 different species. The majority of both NISP and identified number of species belong to the fish fauna, but mammals, birds, crustaceans and amphibians are also represented. The animal bone phase report by Bangsgaard et al (2016, 65-69) is summarized here in this section of the conclusion.

The fish fauna had the highest representation within Phase 3, mainly representing finds from Danish saltwater or freshwaters, and also representing diet from the city. Bangsgaard suggests that the few remains from crustacean and amphibians, along with three species of mammals and birds (rat, mouse and sparrow) are likely to be evidence of the general environment in or around the harbour or of the city. The two groups of crustaceans and amphibians most likely found their habitat in or near the harbour. Whereas the species of mammal and birds have found a habitat niche in or near human habitation, as such all the mentioned species likely testify not to the pattern of human consumption, but to the general conditions of the area (Bangsgaard et al 2016, 65).

The majority of the fish were from saltwater areas (94%) and represent the fishing industry within the city and later consumption, as seen from urban waste. The main species were Atlantic herring, gadids (including cod, haddock, whiting and ling) and flatfishes (Including turbot, brill, plaice, flounder and dab). The freshwater species were in the form of pike, salmon and bream, with pike and salmon high status types for the elite (Bangsgaard et al 2016, 64).

Bangsgaard (2016, 67) further writes that the mammal species were primarily domesticated species, which were part of the human diet, cattle, sheep/goat and pig. Unlike in Phase 2, game was not a frequent find and the only identified species in Phase 3 was hare. As with the mammal species, the bird assemblage mainly comprised domesticated goose and duck remains with wild species in small quantities. They portray urban waste.

Lack of status evidence was also seen in the age distribution from sheep and goat as well as cattle. Bangsgaard writes in the Phase 3 animal bone report that the limited evidence from sheep and goat

suggest a main age of death up to 2 years of age with most evidence in the upper age category. Thus the evidence indicates that butchering primarily happened around the time of optimal weight gain or slightly before, perhaps in accordance with fodder availability (Payne 1973 and Vretemark 1997).

The evidence from cattle is more substantial and suggests a much more consistent and substantially higher age as the overwhelming majority of the mandibles are over the age of 2 years. Additionally, all three main domesticated species are generally represented by elements from the entire body and a number of cut marks clearly testify to all parts of the butchering process, dismembering, carving and filleting. The collection of cattle mandibles does, however, stand out by its uniformity expressed by a very narrow kill-off pattern and uniform chop-mark and fracturing. Although it is not possible to ascribe a specific function to this pattern it suggests an industrial or productive process and not simply household consumption (Bangsgaard et al 2016, 66).

Representing mammals that were not killed for food were domesticated species such as cats and dogs, used to keep pests at bay and guard properties. The discovery of brown bear claw bones, the phalanges, represents industry in the form of skinning for fur. Brown bear has not been a native species in Denmark for thousands of years so the one found at Gammel Strand was skinned elsewhere and imported as bear skin with the claws still attached (Bangsgaard et al 2016, 67).

Phase 3 macrofossil remains

The macrofossil remains provide a lot of information regarding the harbour, the surrounding urban landscape, crafting, production and diet. It is within this period that differential status in diet can be seen, as the higher status population has imported figs from the Mediterranean. Crafting and production can be viewed from flax seeds for clothing, hops for brewing and hemp for rope manufacture.

Sample PM214696 from SD56082 revealed that seeds from meadow plants could have been transported into the city along with crops or they could have become attached to clothing of people or the fur of animals coming into the city from the surrounding countryside, along with evidence of industry with flax for cloth making and hops for beer production. Sample PM214693 from SD38150 shows the mixture of the brackish marine environment along with high status diet from the surrounding areas with fig seeds. Sample PM213539 from SD41925 represented fluvial activity in the harbour, the drainage of excess used water from the harbourside area with additions of plant remains from the city. It revealed mainly cultivated plants and imported plants such as hazelnut, fig, barley, cherry and coriander representing diet and hemp and hops representing the brewing of beer and the production of rope. This was again seen in sample PM214693 from the then harbour base deposit SD40474. The sample comprised hazelnut-shells along with wild strawberries. Seeds from hops were also present as were solitary fruits/seeds from walnut, juniper, flax (perhaps grown for textile production), cherries, plum and raspberries (the latter occurring in large quantities, (Ranheden 2016, 32), The figs were imported from the Mediterranean so reflect high status diet.

Fig. 132 Photo displaying section within SD41925, C02_20140626_10083 (cropped)