

= Tilbury Fort =

Tilbury Fort , also known historically as the Thernitage Bulwark and the West Tilbury Blockhouse , is an artillery fort on the north bank of the River Thames in England . The earliest version of the fort , comprising a small blockhouse with artillery covering the river , was constructed by King Henry VIII to protect London against attack from France as part of his Device programme . It was reinforced during the 1588 Spanish Armada invasion scare , after which it was reinforced with earthwork bastion , and Parliamentary forces used it to help secure the capital during the English Civil War of the 1640s . Following naval raids during the Anglo - Dutch Wars , the fort was enlarged by Sir Bernard de Gomme from 1670 onwards to form a star shaped defensive work , with angular bastions , water filled moats and two lines of guns facing onto the river .

In addition to protecting the Thames , in the 18th century Tilbury also began to be used a transit depot and for storing gunpowder . It continued to be essential for the defence of the capital and a new artillery battery was added in the south east corner during the Napoleonic Wars . The fort became increasingly less significant as a defensive structure , however , as military technology developed in the 19th century . It was redeveloped to hold heavy artillery after 1868 , providing a second line of defence along the river , but further changes in technology meant that it had become obsolete by the end of the century . Instead Tilbury became a strategic depot , forming a logistical hub for storing and moving troops and materiel throughout the First World War . The fort had only a limited role in the Second World War and was demobilised in 1950 .

Tilbury Fort is now operated by the heritage agency English Heritage as a tourist attraction , receiving 16 154 visitors in 2014 . Many of the more modern military features were demolished during the 1950s , with further restoration work taking place during the 1970s ahead of the site opening to the public in 1983 . The 17th century defences are considered by the historian Paul Pattison to be the " best surviving example of their kind in Britain " , and the fort includes the only surviving early 18th century gunpowder magazines in Britain .

= = History = =

= = = 16th century = = =

The first permanent fortification at Tilbury in Essex was built as a consequence of international tensions between England , France and the Holy Roman Empire in the final years of the reign of King Henry VIII . Traditionally the Crown had left coastal defences to the local lords and communities , only taking a modest role in building and maintaining fortifications , and while France and the Empire remained in conflict with one another , maritime raids were common but an actual invasion of England seemed unlikely . Basic defences , based around simple blockhouses and towers , existed in the south west and along the Sussex coast , with a few more impressive works in the north of England , but in general the fortifications were very limited in scale .

In 1533 , Henry broke with Pope Paul III in order to annul the long standing marriage to his wife , Catherine of Aragon , and remarry . Catherine was the aunt of Charles V , the Holy Roman Emperor , and he took the annulment as a personal insult . This resulted in France and the Empire declaring an alliance against Henry in 1538 , and the Pope encouraging the two countries to attack England . An invasion of England appeared certain . In response , Henry issued an order , called a " device " , in 1539 , giving instructions for the " defence of the realm in time of invasion " and the construction of forts along the English coastline .

The River Thames was strategically important , as the city of London and the newly constructed royal dockyards of Deptford and Woolwich were vulnerable to seaborne attacks arriving up the estuary , which was a major maritime route , carrying 80 percent of England 's exports . At the mouth of the estuary , the Thames narrowed considerably , forming a natural hub for communications : the " Long Ferry " took passengers into the capital , and the " Cross Ferry " moved traffic across the river . This was also the first point that an invasion force would be able to easily

disembark along the Thames , as before this point the mudflats along the sides of the estuary would have made landings difficult . Temporary defences had been constructed at Tilbury as early as the 14th and 15th centuries , although little is known about their design .

Under the King 's new programme of work , the Thames was protected with a mutually reinforcing network of blockhouses at Gravesend , Milton , and Higham on the south side of the river , and West and East Tilbury on the opposite bank . West Tilbury Blockhouse , part of the inner line , was initially called the " Thermitage Bulwark " , because it was on the site of a hermitage dissolved by the King in 1536 . It was designed by James Nedeham and Christopher Morice , supported by three overseers ; prior to the work , the estimated cost had been given as £ 211 , allowing for stone , timber , 150 @, @ 000 bricks and 200 tonnes (200 long tons ; 220 short tons) of chalk . The D @-@ shaped blockhouse was curved at the front , with two storeys of gun @-@ ports , and probably had additional gun platforms stretching along the river on either side of it ; ancillary buildings were placed at the rear and the whole site was protected by a rampart and a ditch , with extensive marshlands and creeks giving additional protection to the east . It was initially commanded by Captain Francis Grant and his deputy , and garrisoned with a porter , two soldiers and four gunners , equipped with up to five artillery pieces including a demi @-@ cannon and sakers .

The invasion threat passed and in 1553 all of the blockhouses were ordered to return their guns ; Milton and Higham were demolished . In the summer of 1588 , however , there was a fresh threat of invasion by the Spanish Armada . An army was mobilised to protect the mouth of the estuary and emergency improvements to the fortifications at Tilbury Blockhouse were made by Rober Dudley , the Earl of Leicester . Queen Elizabeth I visited the fort by barge on 8 August 1588 and rode in procession to the nearby army camp , where she gave a speech to the assembled forces . Fears of invasion continued even after the defeat of the Armada , and over the course of the next year the Italian engineer , Federigo Giambelli , reinforced the blockhouse with probably two concentric earthwork ramparts , with ditches and a palisade . A boom was stretched across the river to Gravesend at a cost of £ 305 .

= = = 17th century = = =

In the early 1600s , England was at peace with France and Spain and as a result the coastal defences received little attention ; surveys reported multiple problems with Tilbury Fort including flooding caused by the estuary tides , and ferry passengers and animals making their way uninvited into the fort . In 1642 civil war broke out between the supporters of King Charles I and those of Parliament . Tilbury was controlled by Parliament , who placed the Tilbury and Gravesend forts under the command of a military governor , using them to control traffic entering London and to search for spies ; it saw no military action during the war . Tilbury remained in use during the interregnum , having a garrison of three officers and sixty @-@ six men in 1651 .

After Charles II was restored to the throne in 1660 , he began a wide @-@ ranging programme of work on the coastal defences . The Dutch fleet then attacked up the Thames in June 1667 , but were deterred from going further for fear of the Tilbury and Gravesend fortifications . In reality , the forts were poorly prepared to resist a Dutch attack ; at Tilbury there were only two guns ready for action . The Dutch struck the English fleet at Medway instead , giving enough time for the government to improve the defences along the Thames and mount 80 guns on the forts . In the wake of the conflict , the King instructed his Chief Engineer , a Dutchman called Sir Bernard de Gomme , to develop Tilbury Fort 's defences further .

De Gomme prepared several plans for the King in 1665 ; a further iteration of the designs was submitted in 1670 and given royal approval . Work began the same year but it took until 1685 to complete the project . The work was carried out by skilled contractors , who were supplemented by large teams of pressed men brought in from across the region ; during 1671 , up to 256 workers were employed on the site . Around 3 @, @ 000 timber piles had to be brought from Norway for the project in 1671 to support the foundations in the marshy ground . The resources needed for the King 's multiple defence projects became stretched , and one of the planned bastions at Tilbury , originally planned to face the river , was cancelled in 1681 , in part to save money . The total cost of

the project is unknown , but was significantly more than the original estimate of £ 47 @, @ 000 .

The result was a large , five @-@ sided , star @-@ shaped fort with four angular bastions , revetted in brick , with an outer curtain of defences , including two moats and a redoubt ; two new gatehouses defended the entrance from the north . Two gun lines of gun platforms , facing the river , stretched alongside either the side of the fort . The Henrician blockhouse was incorporated into the defences , but the Elizabethan earthworks were destroyed . The interior of the fort was raised up above the level of the marshes to prevent flooding , and barracks and other buildings were constructed inside . The writer John Evelyn praised the new fort as " a Royal work indeede " . Further work after 1694 replaced the wooden gun platforms alongside the river with more durable stone equivalents .

= = = 18th ? 19th centuries = = =

By the start of the 18th century , Tilbury Fort was one of the most powerful in Britain . The number of artillery guns varied ; in 1715 there were 17 demi @-@ cannon and 26 culverins mounted on the west gun platform , and 31 demi @-@ cannons and one culverin on the east ; the following year there were reported to be 161 guns in total at the fort , although 92 of these were in poor repair and inoperable .

In addition to its role in protecting the Thames , the fort had various military uses during the 18th century . From 1716 onwards , the Board of Ordnance began to use it as a gunpowder depot ; there were safety restrictions on moving gunpowder in and out of the London docks , so Tilbury was used instead . Two large magazines were built , able to hold 3 @, @ 600 barrels of powder each , and the old blockhouse and other buildings were converted to act as further magazines . Eventually the fort could hold more than 19 @, @ 000 barrels of gunpowder . It was also used as a transit depot for soldiers and , after the Jacobite rising of 1745 , as a prison to hold 268 Highlander prisoners of war . The Jacobite prisoners were kept in the gunpowder magazines and 45 died from typhus before they were sent on to London for trial .

The living conditions at the fort were poor . It was surrounded by marshes , with a poor road network , and the garrison had to survive on collected rainwater . A trader called a sutler built a house inside the southern entrance , growing vegetables within the south @-@ west bastion and enjoying an effective monopoly on selling food to the soldiers . New barracks for the officers and enlisted men were rebuilt in 1772 , but the officers often preferred to live across the river in the more urban setting of Gravesend , near the military headquarters there . A cricket match in 1776 between men from the Kentish and Essex sides of the Thames reportedly ended in bloodshed when guns were seized from the guardroom ; newspapers recounted how an Essex man and a sergeant were shot dead , and a soldier was bayoneted , before both sides fled the scene . It is uncertain how accurate the newspaper account was , although the historians Andrew Saunders and Charles Kightly give it some credence .

During the American Revolutionary War there were fears of a French attack on London . In 1780 , the Army carried out a practice attack on the fort with 5 @, @ 000 soldiers , but there were less than 60 guns left at the fort and many of these were in poor condition . Thomas Hyde Page inspected Tilbury in 1788 and reported that the defences facing the Thames were seriously inadequate . As a consequence , a new battery was built in the south @-@ east corner of the defences , armed with 32 @-@ pounders (14 @. @ 5 kg) pointing down @-@ river , and a new battery , New Tavern Fort , was built along the river to the east . Fears continued during the French Revolutionary and Napoleonic Wars and smaller batteries were constructed further up the river in 1794 . Tilbury continued to be an essential part of the capital 's defences because of its control of the crossing point on the Thames , and the guns were upgraded with new traversing platforms ; the Gravesend Volunteer Artillery was formed to man the forts on both sides of the river . During the invasion scare of 1803 , the Royal Trinity House Volunteer Artillery manned ten armed hulks placed across the river as a barrier at Tilbury .

The size of the garrison varied during the first half of the century , but in 1830 the fort had space for 15 officers and 150 enlisted men . Despite the construction of a new range of facilities in 1809 , the

living conditions of the soldiers remained poor , with four men sharing each of the two @-@ bed rooms in the barracks , and no running water on the site . During the 19th century , a pump was installed to bring water up from a well 178 metres (584 ft) below the surface . Nationwide investigations into the standard of Army barracks during 1857 led to investment in better facilities at Tilbury ; piped water was run into the site in 1877 , and improved amenities and sanitation were installed after 1880 .

By the 1850s , the advent of steam ships meant that enemy vessels could sail up the Thames far more quickly than before , reducing the time available for forts to intercept them . Rifled guns and turret @-@ mounted weapons and new armour @-@ plating meant that enemy warships could fire on forts such as Tilbury from downstream more easily while being protected from their guns . Fears of an potential invasion by Napoleon III of France led to the establishment Royal Commission on the Defence of the United Kingdom in 1859 . The Commission reported the following year and recommended that new , more powerful forts be built further downstream , with defences such as Tilbury Fort forming a second @-@ line of defence . Work began on strengthening Tilbury in 1868 , under the direction of the then Captain Charles Gordon , focusing on adding heavier gun positions able to fire upstream to support the new forts . The west , north @-@ east and east bastions and the south @-@ east curtain wall were altered to house thirteen rifled muzzle @-@ loading guns , protected by brick walls , earthworks and iron shields . Initially 7 @-@ ton , 7 @-@ inch (7 @,@ 112 kg , 17 cm) guns were deployed but these were upgraded to 9 @-@ inch ((22 cm) weapons by 1888 , supported by a heavier 25 @-@ ton , 11 @-@ inch (25 @,@ 401 kg , 27 cm) gun . The old Tudor block @-@ house was destroyed to make way for the new guns .

Naval and defensive technology continued to improve over the next few decades , rendering Tilbury Fort 's bastion design out @-@ moded . The government considered the defences further down the Thames to be sufficient and Tilbury was not therefore not improved ; it was largely redundant as a defensive fortification by the end of the century , although still in use as a strategic depot . From 1889 onwards it formed a mobilisation centre to support a mobile strike force in the event of an invasion , part of the wider London Defence Scheme , and large storage buildings were built across the site to store materiel .

= = = 20th ? 21st centuries = = =

Fresh concerns grew that the Thames might be vulnerable to attack from torpedo boats and armoured cruisers , and in 1903 four quick @-@ firing 12 @-@ pounder , 12 cwt (5 @.@ 4 kg , 50 @.@ 8 kg) guns were positioned on Tilbury 's south @-@ east curtain wall , supplemented in 1904 by two 6 @-@ inch (15 cm) breech loading guns . In 1905 , however , the government decided that the Royal Navy and the forts downstream gave sufficient protection for the capital and removed the artillery , leaving only machine @-@ guns in place .

Tilbury continued to function as a mobilisation store and , after the outbreak of the First World War , it was used to house up to 300 transit soldiers and to supply the new army camps established at Purfleet and Belhus Mansion . It was initially manned by the 2nd Battalion of the Royal Dublin Fusiliers until 1916 , and by various reserve units for the rest of the war . The fort itself was used to store munitions while a depot for remounts was built just to the west ; a pontoon bridge was built across the Thames for troop movements , guarded by the fort 's guns . Until 1917 , also used to house the headquarters of several infantry battalions . Electric lighting was installed , and a narrow @-@ gauge railway and a steam crane on the quay were added to help to move material in and out of the fort . After the Zeppelin raids of June 1915 , anti @-@ aircraft guns and searchlights mounted at the fort and they played a role in the shooting down of the German Navy Zeppelin , L15 , although it is disputed as to which site in the area fired the shell that brought down the airship .

During the inter @-@ war years , the government concluded that the fort was no longer militarily useful and there were unsuccessful attempts to sell it off for development . During the Second World War , the fort initially housed an improvised anti @-@ aircraft operations room , controlling the defences of the Thames and Medway (North) Gun Zone between 1939 and 1940 . Trenches were dug across the surrounding area to prevent an airborne attack . The enlisted barracks and the

facilities block , as well as probably the sutler 's house , were bombed and damaged , being demolished after the war . The fort was transferred out of military use relatively early in the post @-@ war period , and in 1950 the Ministry of Works took over the site . Restoration work took place in the 1970 , including the construction of replica wooden bridges . It was opened to the public in 1982 .

In the 21st century , the fort is controlled by English Heritage and operated as a tourist attraction , receiving 16 @, @ 154 visitors in 2014 . The site is protected under UK law as a scheduled ancient monument , with the officers ' barracks a grade II * listed building .

= = Architecture = =

Tilbury Fort remains largely unaltered from its reconstruction in the late 17th century under the direction of Sir Bernard de Gomme , with some 19th century additions . It was designed in a predominantly Dutch style , with a ring of outer and inner defences intended to allow the fort to attack hostile warships , while being protected from attack from the land . The heritage agency Historic England describes it as " England 's most spectacular " example of a late 17th century fort , and the historian Paul Pattison considers the defences the " best surviving example of their kind in Britain " .

= = = Outer defences = = =

The outer defences comprise outer and inner water @-@ filled moats , fed by the Thames and separated by a ring of defensive ramparts . The inner moat is 50 metres (160 ft) wide but relatively shallow and the banks have been repeatedly strengthened with piles to protect them from erosion . The fort is entered from the north through a triangular defensive work known as a redan , with a redoubt to defend the entrance . A causeway links the redan to the outer defences , which form a complex pattern of ramparts , protecting a covered way stretching around the defensive line . There are bastions on the north @-@ west and north @-@ east corners , and two triangular spurs , originally equipped with cannons , project from the defences on the west and east sides , with assembly points for infantry soldiers on the inside .

A replica wooden bridge runs from the outer defences over the water to an island called a ravelin , which is in turn linked to the inner defences by another replica bridge , protected with two drawbridges . The ravelin formed a physical barrier to incoming artillery fire aimed at the entrance to the inner defences and could also have directed fire against enemy forces that breached the outer defensive line .

On the south side of the outer defences , facing the river , are the West and East Lines of gun positions . These were built in the 18th century and have been subject to considerable erosion and silting ; 12 of the original 14 gun positions on the West Line remain but only one of the East Line has survived . In between the lines is a quay , designed to allow the delivery of supplies from the Thames , and the remains of the tracks from the narrow gauge railway built during the First World War . A sluice gate in the south @-@ west corner managed the water in the moats , and allowed them to be drained completely should the surfaces begin to freeze over in winter and provide an advantage to any attackers . To the west of the outer defences is the World 's End pub , originally the local ferry house , dating from 1788 .

= = = Inner defences = = =

The inner defences largely follow a pentagonal design , with four defensive bastions positioned around a central parade ground . From the south , the fort is entered through the Water Gate . This two @-@ storeyed gatehouse dates from the late 17th century with a monumental stone facade featuring carved displays of classical and 17th @-@ century weapons ; when first built , the now @-@ empty niche at the front probably held a statue of King Charles II . The building originally acted a house for the master gunner . Most of the inside of the fort is taken up by the parade ground , an

area covering 2 @. @ 5 acres (1 @. @ 0 ha) . The central parade ground was raised to its current height in the 17th and 19th centuries using chalk and dirt , and by the early 20th century much of it was occupied by four large warehouses , since destroyed .

Moving east from the Water Gate , the south @-@ eastern curtain defences and the south @-@ east bastion were rebuilt at the start of the 20th century to hold emplacements for four quick @-@ firing guns and two 6 @-@ inch (15 cm) guns , with underground tunnels linking to an underground magazine . Four artillery pieces , dating from 1898 to 1942 , are on display . Facing the parade ground are the officers ' quarters , a terrace of houses probably dating in its current form to the late 18th century , with a stables at the northern end , originally used to hold the commandant 's horses . It now holds the Bernard Truss collection of military memorabilia . The north @-@ east bastion was redesigned after 1868 and contains an earth @-@ covered magazine , as well as emplacements for 9 @-@ inch (22 cm) rifled muzzle loading guns .

On the north side of the parade are two early 18th century magazines , altered in the 19th century . These were specially designed to avoid the use of iron , which might have generated sparks and set off an explosion , instead being built using wood and copper ; they are the only remaining examples of their type in Britain . The Landport Gate lies behind the magazines , and has a gatehouse , called the Dead House , above the passageway leading into the interior of the fort . Past the north @-@ west bastion , the soldiers ' barracks would have stood opposite those of the officers ' , but was destroyed after the war and only the foundations of the building remain . The south @-@ west magazine also holds a covered magazine , similar to that in the north @-@ east bastion . Just to the west of the Water Gate is the fort 's guardhouse and chapel , dating from the late 17th century and one of the oldest surviving places of worship within a British artillery fortress .