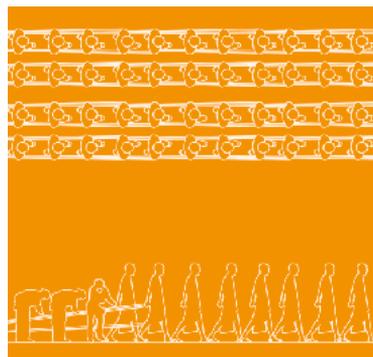


# Transporting false doors at the construction site of the Temple of Hatshepsut at Deir el-Bahari



**Abstract:** The article presents a probable way of transporting false doors to their location within the Temple of Hatshepsut during its construction. The issue does not seem to be of particular significance until one considers the value of the false doors as such and the impossibility of using heavy equipment in the chapels of the Complex of the Royal Mortuary Cult. The false doors had to be introduced into the construction site at the time that the walls of the chapel were being raised but before the building of the vaults. The options discussed in the article illustrate the logistical problems of the undertaking and the construction opportunities that might have been taken advantage of. The discussion provides a closer look at the construction processes taking place in the Temple of Hatshepsut during the separate stages of expansion and the changes in its functional and spatial design. In consequence, it reopens the debate on the building chronology of the temple.

**Keywords:** Deir el-Bahari, Hatshepsut, temple of Hatshepsut, Complex of the Royal Mortuary Cult, false door

False doors constituted a regular element of the furnishings of Egyptian tombs and mortuary temples. In the temple of Queen Hatshepsut in Deir el-Bahari in West Thebes they were included in the Complex of the Royal Mortuary Cult, in the chapel of her cult as well as in a smaller chapel of Tuthmosis I. Both doors were of granite and were installed in the west walls of the chapels. The granite probably originated from the region of Aswan, where rich deposits of this raw material were exploited in the region of the first cataract from ancient times (Klemm and Klemm 2008: 233). The installation of

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these false doors must have coincided with the raising of the chapel walls and preceded the introduction of the vaults. Planning the construction of the temple required a detailed schedule of actions and deliveries of building materials and furnishings that were to be installed. In the case of the Complex of the Royal Mortuary Cult, it was necessary to schedule the extraction of granite blocks for making the false doors in the Aswan quarries and plan for their transportation to Deir el-Bahari. The architectural complex as such was built of

limestone supplied regularly from a local quarry. The nearness of the deposit and the relatively manageable size of the blocks did not call for extraordinary means and supply logistics to ensure the continuity of the construction work. However, with regard to the false doors components, the dimensions and weight of which were substantial, one should take into consideration the capacity of ancient construction workers, as well as the requirements for preparing a construction area for such a big undertaking as the transport of these objects.

## DIMENSIONS AND WEIGHT OF THE FALSE DOORS

The false doors in the Chapel of Hatshepsut consist of a granite base and an ornamental slab. The base was 2.25 m wide, about 0.58 m high and approximately 0.82 cm deep (Rajmund Gazda, *Journal of archeological and conservation works, season 2014/2015* [in Polish]). Its role was to facilitate the installation of the false door slab and ensure that the heavy slab did not crush the lower part of the wall made of limestone blocks. The slab, which was 3.60 m high, matched the base in width and depth (measurements taken from a 3D scan, see Kościuk et al. 2009 for the method). Aswan granite has a phaneritic and fine-grained structure (Klemm and Klemm 2008: 233), and weighs 2.60–3.20 kg/

dm<sup>3</sup> (kg/l) (Arnold 1991: 28). Based on the provided dimensions, it is possible to calculate the volume and weight of each element. The volume of the base is 1.07 m<sup>3</sup> and assuming the volume weight of this particular granite as 3.20 kg/l, its total weight is about 3.50 tons. The false door slab has a volume of 6.642 m<sup>3</sup> and with the same volume weight, it weighs 21.25 tons.

The false doors from the chapel of Tuthmosis I are much smaller than those from the chapel of Hatshepsut and their dimensions are: width 1.50 m, height 2.70 m and depth 0.19 m. The total slab volume is 0.77 m<sup>3</sup>, while the same volume weight as above results in the false doors weighing 2.50 tons.

## BUILDING STAGES OF THE SOUTHERN PART OF THE TEMPLE

The ultimate form of the temple was the outcome of extensions, redesigning and alterations of the plan. Construction work encompassing the extension of the Upper Terrace of the temple to the south took

place when the central part of the temple had already been built. According to Franciszek Pawlicki (1997: 46–47), there were three main stages of construction. The first was in the time of Tuthmosis II

when the ground was leveled under the central part of the temple with the Punt and Hunting Porticoes. The second took place in the time of Hatshepsut and involved a modification of the temple plan and changes to the visual form of the building. A colonnade was introduced in the main courtyard and the Coronation Portico was built as a means of closing off the space from the east. Additional work in the Sun Cult Complex and on the Middle Terrace called for building the Anubis chapel on the north and the Hathor chapel on the south. Further changes came in the third stage when the Sun Cult Complex was modified and the southern part of the Upper Terrace saw an extension of the Chapel of Hatshepsut and a reconstruction of the vestibule of the Royal Cult chapel to include recesses in the east wall. Moreover, the limestone portals in the central part of the terrace were replaced with granite ones, and an additional colonnade was added in the courtyard.

Zygmunt Wysocki was of the opinion that the Upper Courtyard was built first, followed by the Upper and Middle Porticoes, which were constructed east of it (Wysocki 1990: 325–327). He also suggested that the Upper Terrace must have been completed by the time that the Middle Terrace, i.e., the Punt Portico, was constructed (Wysocki 1985a: 37, 42). Wysocki emphasized that the construction of the main courtyard and the leveling of the entire area under the Upper Terrace took place already in the reign of Tuthmosis II (Wysocki 1992: 235). Neither did he have any doubt as to the secondary nature of rooms adjoining the courtyard on the south as attested, among others, by a Horus head painted in red and black

on the south wall of the courtyard, on the side of the Room with Window, on a wall separating this room from the Complex of the Royal Mortuary Cult. Wysocki noted that the area below the Upper Terrace was inclined to the east and south (1988, unpublished report). In order for any major construction work to take place in this area, an artificial platform was needed and the Upper Terrace walls had to be secured to maintain stability. He also opined that the construction process could have been stepped upwards instead of the other way round. Surveys conducted in the 1986/1987 season in the passage from the Upper Courtyard to the Room with the Window of Occurrences demonstrated that the foundations of the south wall of the courtyard were homogeneous (Wysocki 1988: 3–4).

Researchers currently agree that the Upper Terrace leading from the Amun Sanctuary and the Main Courtyard was built first and was subsequently closed by the Coronation Portico and the porticos of the Middle Terrace. The extension of the southern part of the Upper Terrace with the Complex of the Royal Mortuary Cult followed later. With this in mind one is faced with the question of how the huge granite false doors were transported inside the chapels of Hatshepsut and Tuthmosis I. Theoretical studies are needed in order to understand the process of delivering architectural elements of this size and importance, not the least, the location and direction of the transport ramps. Three options were considered with regard to the direction from which the stone material might have been brought in [1, 2 and 3 in *Fig. 1*]. The first option was a route from the south. The second route was alongside

the already constructed south wall closing the Punt Portico on the Middle Terrace and the Coronation Portico on the Upper Terrace. The third suggestion excludes the existence of the Punt and

Coronation Porticos at the time, putting into doubt the theory about the construction of the Complex of the Royal Mortuary Cult post-dating that of these two porticos.

## TRANSPORTING THE FALSE DOORS

Once extracted from the quarry, the slab of the false door had to be installed on wooden runners and transported to the construction site of the Hatshepsut temple. According to Reginald Engelbach (1923: 53), who studied the unfinished obelisk from the quarry in Aswan, problems may have occurred already at the block extraction stage, but this need not have concerned the false door slabs for the temple in Deir el-Bahari, which were of much smaller size. Neither does the transport of the blocks on a wooden sleigh pulled by men constitute an issue. Engelbach (1923: 52) refers to the transport of colossuses of Amenhotep III and Ramesses II to Thebes, as well as the planned transport of the Aswan obelisk weighing 1168 tons (Shaw and Nicholson 1995: 208). He also calculated (Engelbach 1923: 56) that 6000 men were needed in order to move the Aswan obelisk, meaning that one man could drag about 200 kg. Habachi (1984: 24) reasoned that several thousand people employed on this task would have gotten in each other's way. Referring to the presentation from the tomb of the governor named Djehutihotep (19th century BC), he estimated the weight of the statue shown transported there at about 60 tons and the number of men pulling

it at 172. However, he pointed out the absence of the wooden pads under the sleigh that were surely used in order to reduce the number of people required to move a block of stone.

The false doors were transported to the temple of Hatshepsut on wooden sleighs pulled by laborers. Applying Engelbach's estimate of 200 kg being pulled by a single worker, 106 men would have been needed to transport a slab weighing 21.25 tons to the Chapel of Hatshepsut. When it comes to the much smaller false doors to the chapel of Tuthmosis I, 12–13 men would have sufficed. In order to reduce the number of people pulling the load to the temple, wooden pads may have been used to minimize runner friction on the ground. In any case, the task would have involved several dozen laborers. A schematic depiction of the arrangement of laborers pulling the false door slabs [Fig. 2] indicates the space needed to accommodate the approximately 100 people that this undertaking required to be carried out in proper order.

Ramps are another important issue to address when considering the way in which the slabs of the false doors were transported to the temple. Ramp construction and parameters were studied extensively by Mark Lehner

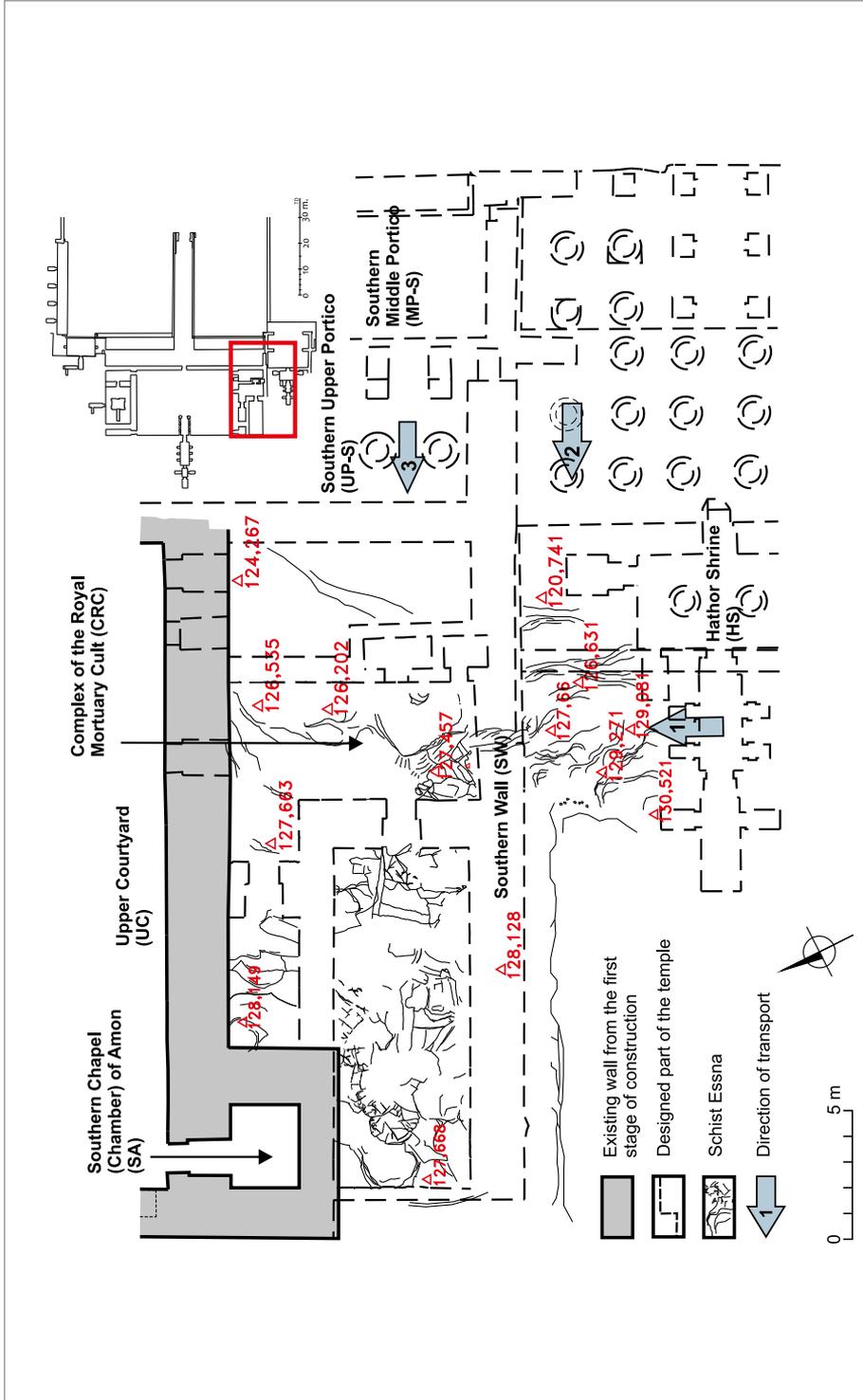


Fig. 1. Studied directions of transport of the false door slabs to the chapels of the Complex of the Royal Mortuary Cult (Drawing T. Dziedzic)

in his research on the transporting of stone blocks for the construction of the pyramids in Giza. Lehner found that the ramps leading from the quarry to the pyramids did not have a uniform angle of inclination. It amounted to approximately 6°–7° in the lowest parts

of the structure, then increased to 10° and ultimately reached 18° (Lehner 1997: 216). He referred to the reading of the papyrus of Anastasia I by Georges Goyon who read the ramp parameters as 55 ells (28.80 m) in width, 730 ells (383 m) in length, and 60 ells (31.50

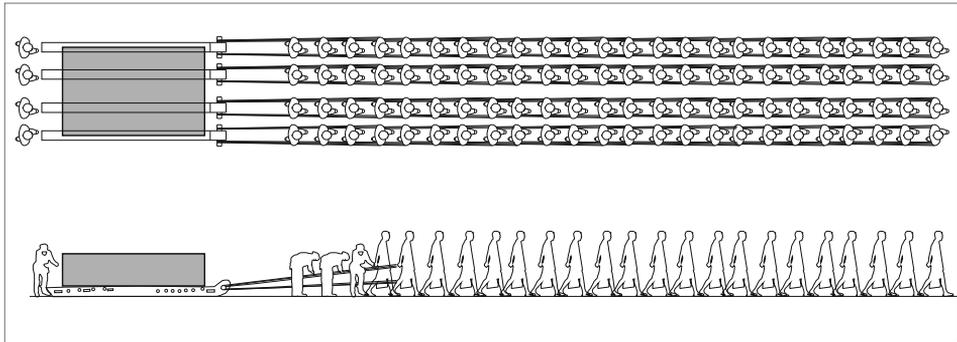


Fig. 2. Scheme presenting the arrangement of laborers pulling the false door slabs to the Chapel of Hatshepsut (Drawing T. Dziedzic)

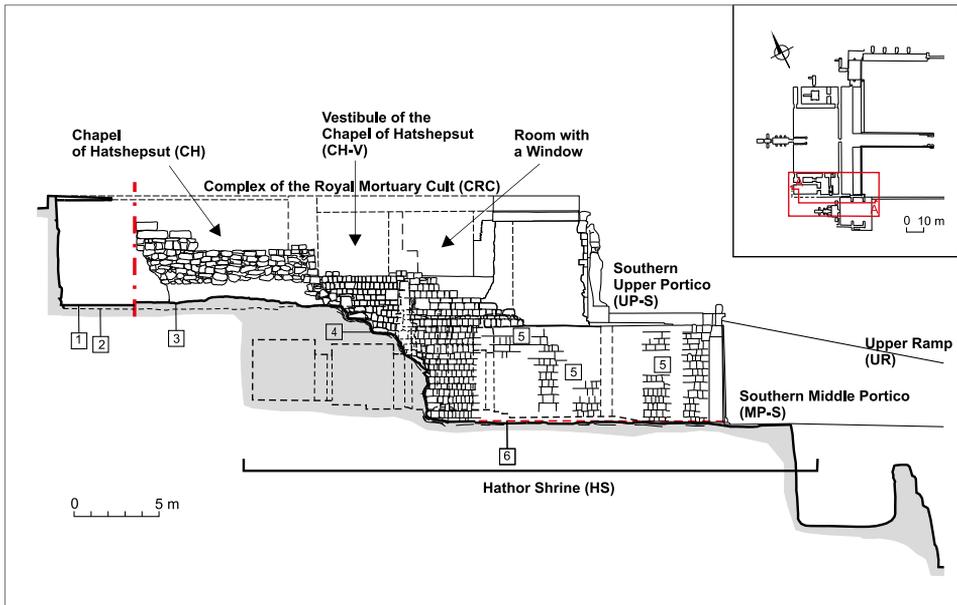


Fig. 3. Section through the south wall (SW), view from the south: 1 – ground level in the Hatshepsut chapel, 2 – leveled rock (Esna shale) in the Hatshepsut chapel, 3 – leveled rock (Esna shale) under the south wall of the temple, 4 – leveled rock (Esna shale) in the form of steps under the south wall of the temple, 5 – surface of the south wall (not studied), 6 – level of the south temple wall foundation corresponding to the level of the Middle Terrace (Drawing T. Dziedzic)

m) in height (Goyon 1977: 67–81). The suggestion of three ramp sections with different angles of inclination drew from the natural landform where the ramp was supposed to be located. In the case of the Hatshepsut temple, one should take into account the makeup of the terrain around the construction site. The location of the temple at the end of the Asasif valley determined the location of the construction site eastern or southeast of the building. Transport ramps, if any, would have been located there. The ground is relatively even here and would not have necessitated a ramp with multiple sections of different angles of inclination. It may be assumed that the ramp leading to the Upper Terrace had an angle of inclination of about 10°.

Three possible routes for the transport of the false doors inside the temple will be discussed [see *Fig. 1*]. Options 1 and 2 assume the existence of the Punt and Coronation porticos as well as the south wall bordering the Upper and Middle Terrace. The entire length of the wall is preserved, but not its full height. In the area of the Complex of the Royal Mortuary Cult, its height reaches about 2.50 m from the foundation in the Vestibule of the Hatshepsut Chapel (127.457 m ASL) and it next goes down several courses of stone blocks until the end of the Coronation Portico. Studies to date have demonstrated that the foundation of the wall reached the leveled Middle Terrace and went up in the form of stairs in order to reach the level of the stone platform of the Upper Terrace in the area of the Chapel of Hatshepsut [*Fig. 3*]. The ancient build-

ers seem to have actually cut steps in the rock to give the wall a sound foundation. The wall is quite homogenous; blocks were added apparently only in the section constituting the back of the wall in the Vestibule of the Hatshepsut Chapel where a recess was planned. Apart from this, there is no evidence of construction in stages. Documented building dipinti (Wieczorek 2010: 217–218) leave no doubt as to its uniform character. Hence it should be assumed that at the time of the construction of the Complex of the Royal Mortuary Cult, the south wall (SW) was at least as high as its current height.

**Option 1.** Assumed route of transport of the false doors from the south [*Fig. 4*]. The ground east of the Hatshepsut temple, empty at the time of the construction as the temple of Tuthmosis III had not been built as yet, was still not a good place for any kind of construction projects because of the proximity of the older temple of Mentuhotep II (Eleventh Dynasty). As shown in the section, the location of the third Deir temple excludes the possibility of forming a ramp in this area as any ramp embankment and its scarp reaching the level of the lowest terrace would have endangered the structure of the older temple.

**Option 2.** Assumed route of transport of the false doors along the southern face of the south wall (SW) and turning into the Complex of the Royal Mortuary Cult, passing above the unfinished wall [*Fig. 5*] and turning next toward the royal chapels. On the north, the ramp

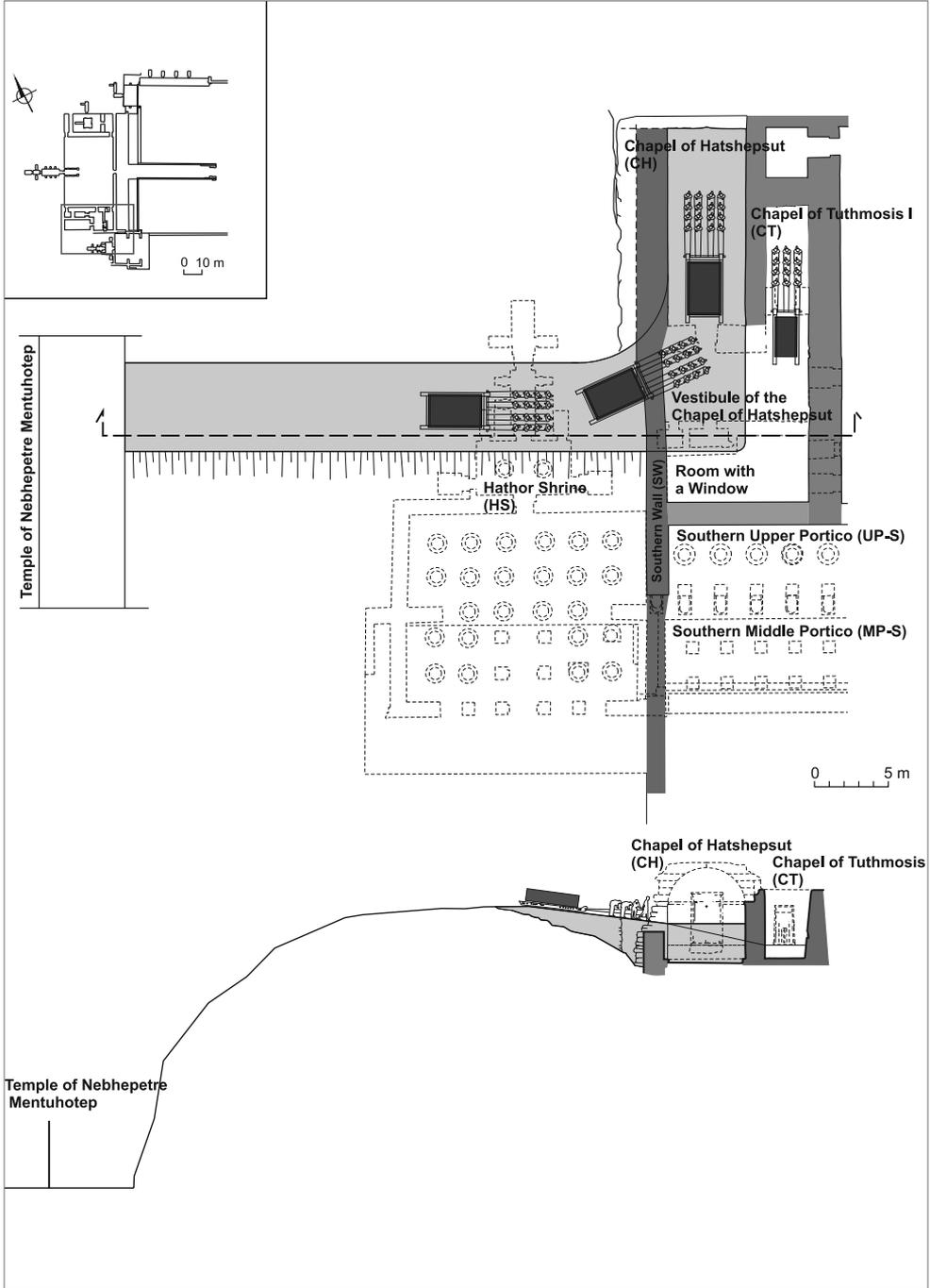


Fig. 4. Option 1. Plan and cross-section demonstrating the possibilities of transporting slabs from a southern direction (Drawing T. Dziedzic)

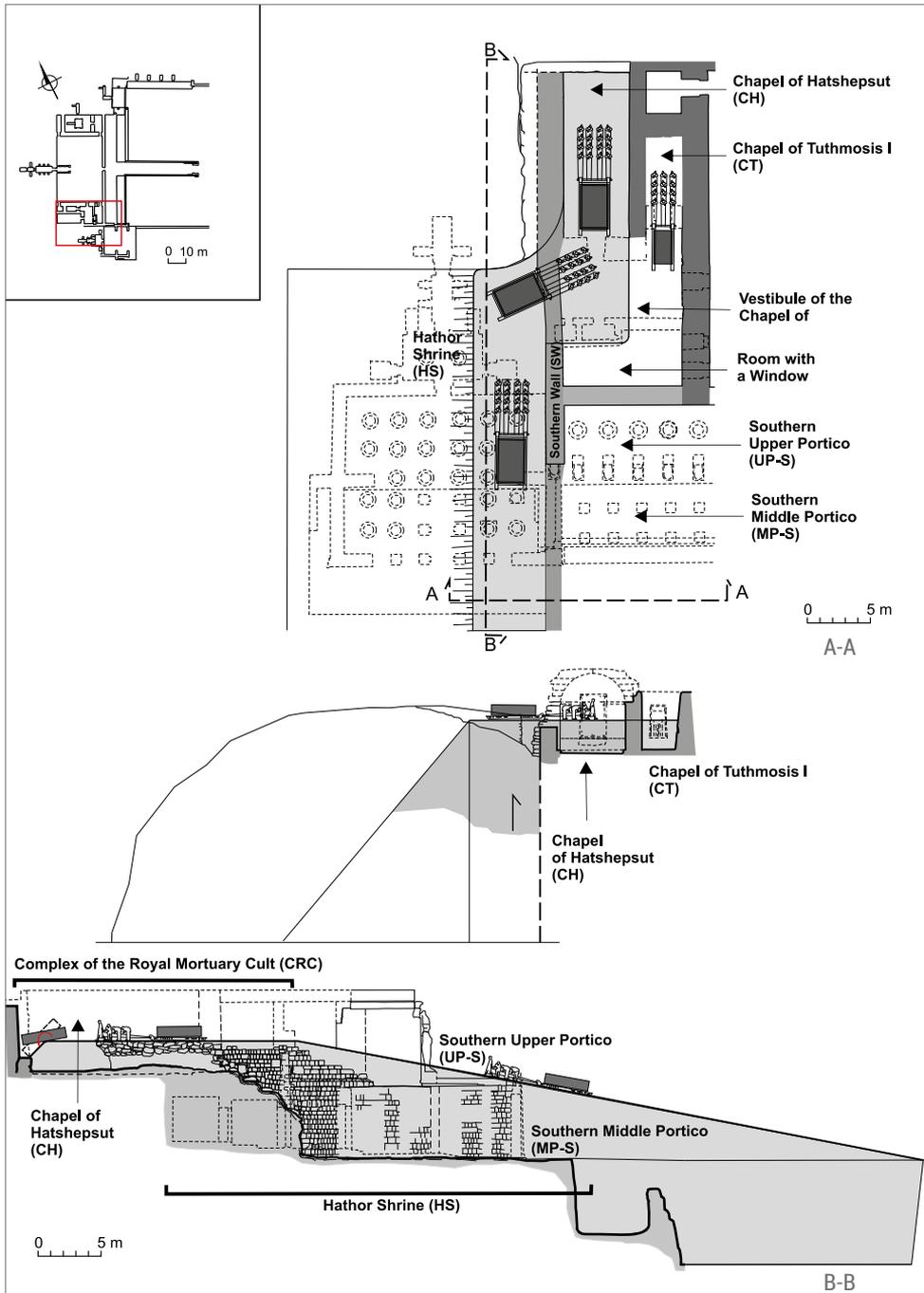


Fig. 5. Option 2. Plan and sections A and B demonstrating the possibilities of transporting slabs from a southeastern direction (Drawing T. Dziezic)

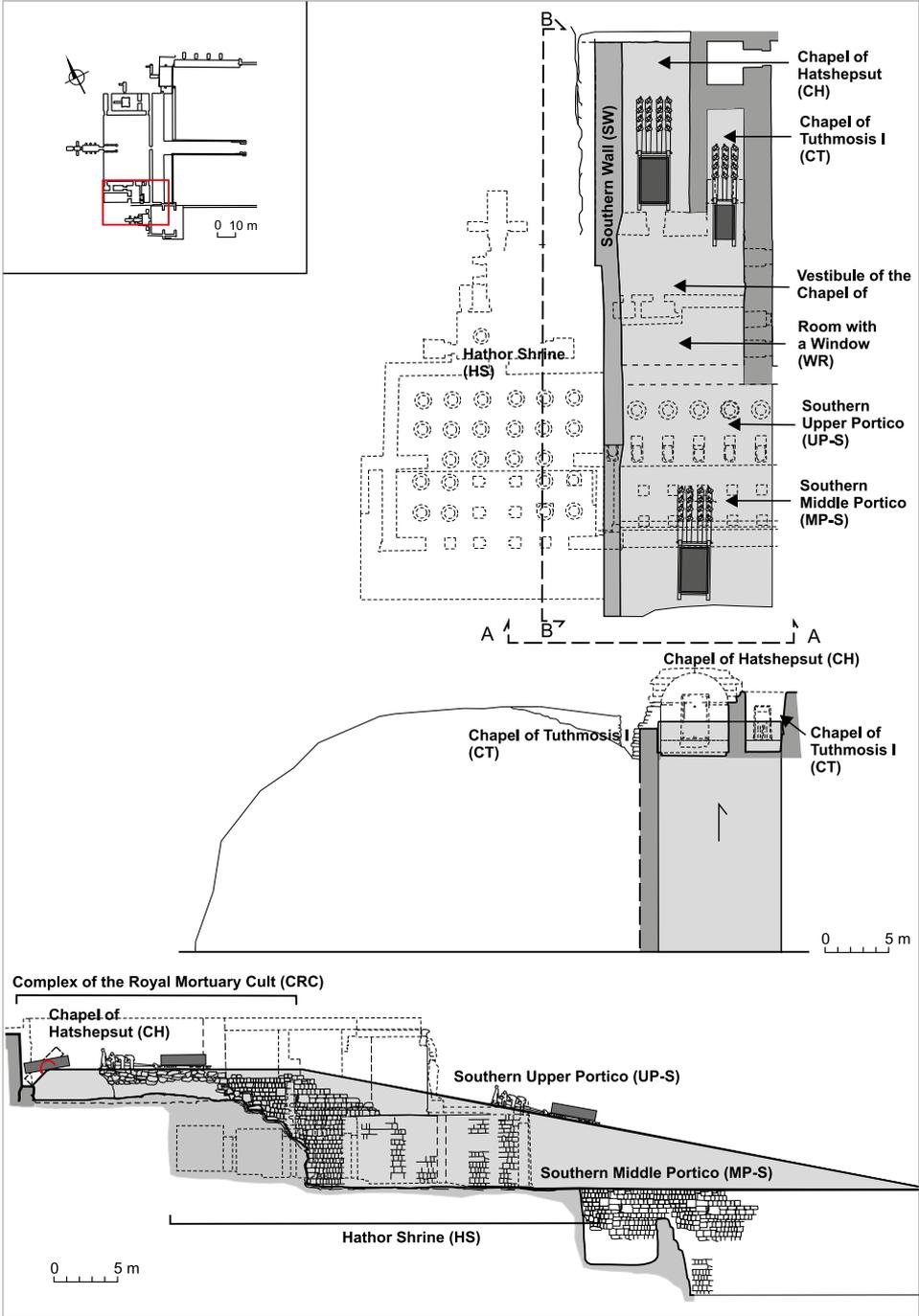


Fig. 6. Option 3. Plan and sections A and B demonstrating the possibilities of transporting slabs from a southeastern direction (Drawing T. Dziedzic)

leaning on the wall would have been about 6 m wide and its scarp with an angle of inclination of  $45^\circ$  would have been an estimated 20 m wide. The angle of inclination of the scarp means that every one meter of the ramp lets it grow by one meter in height. Polish Building Standards give  $45^\circ$  as a safe inclination of a scarp in cracked rock and waste rubble. To protect such an embankment from being washed out by rainwater requires paving it with stones (Kühn 2004: 109–110). In order to obtain the desired height of the embankment to make it suitable for transporting material above the south wall (SW), a ramp sloping  $10^\circ$  would have reached above the lower Obelisk Portico, which had not been constructed yet, and its length must have amounted to 120 m. The height of the ramp after inserting the load into the area of the Hatshepsut Chapel could not have gone down as the same height would have been necessary for the works consisting in arranging false doors slabs already in their target position, but this issue will be treated in a separate study.

**Option 3.** The third option assumes that neither the Punt Portico on the Middle Terrace nor the Coronation Portico on the Upper Terrace were standing at this time. The south wall (SW), which was already built, may have also acted as a retaining wall, protecting and encasing the ramp embankment from the south. From the north, the already existing ramp (UR) leading to the Upper Terrace might have closed off this temporary structure. The ramp with an angle of inclination of  $10^\circ$  may have started from the Middle Terrace which could have been already appropriately prepared considering that the central part of the temple was being used. This ramp would not have needed any scarps, which require a great deal of material and securing. The ground in the southern part of the Upper Terrace falls away naturally to the east and south, as noted by Wysocki (1988: 3). The embankment could have been performed with a limited workload and quantity of material, so that it would be possible to transport construction material and equipment into the designed and realized area of the temple.

## CONCLUSION

Summing up the question of how the false door slabs were transported inside the cult chapels of the Temple of Hatshepsut in Deir el-Bahari under construction, one needs to note the difficulties of design, logistics and actual building encountered by the builders. Transporting the slabs from the south, that is, from the direction of the already existing temple of Mentuhotep II (Option 1) is not

really an option as it would have interfered substantially with the standing temple and in any case, the ground here is rising.

Option 2 shows that the slabs may have been transported along the south wall (SW) of the Upper Terrace, but since there are no breaches in the wall, the embankment would have had to follow it and would have had to be very high, and

so very long, to pass over it (although in truth there is no proof that the wall then looked like it does today). Indeed, for the Punt Portico and the Coronation Portico to be built, the south wall must have been not only planned, but already standing. This is motivation to take a closer look at the chronology of temple construction in terms of the successive complexes and chapels.

Option 3 is the most probable route for transporting the false doors. The slabs were too heavy for any other form of transportation than by pulling them up an appropriately prepared ramp. The

making of a ramp constituted one of the stages of the building process, simultaneous with the transport of construction materials and masonry work. Its design and use must have been optimal and its location the most favorable for the transport of particularly precious and heavy materials. Hence the conviction that the delivery of false doors to the royal chapels in the Complex of the Royal Mortuary Cult was an extremely important undertaking, determining the preparation of an appropriate logistical plan to complete the extension of the Hatshepsut temple.

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