Appendix D: Structural and Geoarchaeological Evidence for the KVT as a Hydraulic Dock

This appendix consolidates the structural, geomorphological, and geoarchaeological evidence supporting the interpretation of the KVT as a hydraulic dock rather than a mortuary temple. It integrates data from CAD-based architectural analysis, sedimentological context, and comparative Old Kingdom infrastructure to evaluate the temple's functional design. Collectively, these observations demonstrate that the KVT's recessed U-shaped basin, scale anomalies, and hydrological setting are more consistent with harbour engineering than with ritual architecture.

D.1 Critique of Conventional Mortuary Interpretations

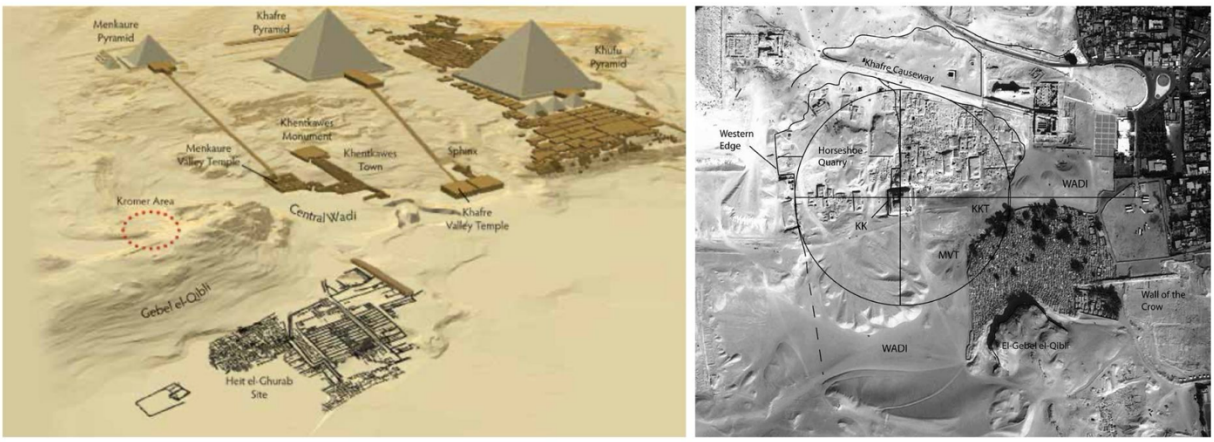
Traditional Egyptological perspectives view the KVT primarily as a mortuary or ceremonial site, attributed to its proximity to the Sphinx and adjacent funerary structures (1). Yet, these interpretations often overlook the engineering, hydrological, and logistical challenges of transporting 50-tonne granite blocks from Aswan (2). To date, no detailed structural analysis has systematically assessed the KVT's potential as a docking platform (3).

Despite its conventional label as a T-shaped ritual hall, the KVT's recessed U-shaped basin—characterised by flanking granite walls and a sunken courtyard—offers functional advantages for unloading large megaliths (4). This study's engineering simulations affirm stability for blocks up to 50 tonnes (5). In contrast to Old Kingdom ports like Wadi al-Jarf, which depended on inclined ramps for terrestrial access, the KVT's recessed design suggests a tailored hydraulic solution for direct fluvial unloading (6).

D.2 Topographical and Geomorphological Context

Nestled in the lowest eastern depression of the Giza Plateau, the KVT borders a palaeochannel identified through satellite imagery, digital elevation models (DEMs), and hydrological reconstructions (7). As illustrated in Fig. D1, the temple occupies the terminus of a continuous quarry–wadi–harbor system linking the central extraction zones to the ancient Nile margin. During the mid-Holocene highstand (~4400 BCE), this setting likely experienced sustained or seasonal inundation, creating an ideal locus for barge-based transport and unloading (8).

Figure D1. Quarry–Wadi–Harbor System at Eastern Giza: Plan and Perspective



Note: Oblique 3-D reconstruction (left) and aerial photomap (right) depict the spatial relationship between the Khufu, Khafre, and Menkaure complexes, the Central Wadi, and the Heit el-Ghurab settlement. This configuration illustrates a continuous quarry-to-wadi-to-harbor network terminating at the Khafre Valley Temple basin (~22 m a.s.l.), supporting its interpretation as a hydraulic dock during the mid-Holocene highstand (~4400 BCE). Source of figure reference: Giza Plateau Mapping Project (Mark Lehner, Ancient Egypt Research Associates, Season 2017: The Old and the New).

D.3 Structural Configuration and Load-Bearing Characteristics

The KVT's foundation comprises over 100 Aswan red granite blocks, each weighing up to 150 tonnes (1), anchored directly into bedrock. This layout delivers exceptional compressive strength and lateral stability—attributes more aligned with high-load unloading than a solely symbolic function (4).

D.4 Functional Transition and Adaptive Reuse

Archaeological evidence, including bread moulds and altar fragments found in the courtyard (9), points to a later ceremonial phase after the temple's hydraulic utility diminished post-3500 BCE due to Nile regression (10). Similar shifts to ritual use are observed at Dahshur and Lisht, where functional spaces were repurposed (4). Together, these archaeological and structural observations corroborate the hydraulic framework outlined in Appendix J, linking functional repurposing to the mid-Holocene decline of Nile connectivity.

D.5 Testable Predictions for Future Investigation

Geoarchaeological surveys of the KVT's eastern basin may reveal sediment layers from prolonged inundation, tool wear from megalith handling, or quay anchor points (11). Such discoveries would provide empirical backing for the docking hypothesis, linking predictive models with archaeological evidence (12).

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