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# Architectural Heritage Preservation: An Application of Historic Building Quality Assessment Criteria for World Heritage Sites in Ghana

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**ABSTRACT**

Ghana is home to several World Heritage Sites, including the Forts and Castles and the Asante Traditional Buildings (ATBs). The Forts and Castles were constructed in the 15th and 16th centuries and are situated along the coast from Keta to Beyin, whereas the ATBs were constructed in and around Kumasi in the 16th century. These historically noteworthy structures, which were built using a variety of materials, have withstood the test of time and constitute an important part of Ghana's architectural legacy. These heritage sites are currently evaluated using the opinions of experts. A standard for the efficient evaluation of the building fabric must be established in order to guarantee the timely and efficient preservation of these heritage assets. Using an interpretivist methodology, this study reviews the literature to theoretically investigate current standards for evaluating heritage structures. According to the literature research, there is little information available about the standards used to evaluate Ghanaian heritage sites in order to enhance the preservation of the country's architectural legacy. In order to properly evaluate the state of Ghana's World Heritage Sites, this study suggests using the Historic Building Quality Assessment Criteria (HBQAC). The required authority can create rules for the prompt restoration of historic structures and sites using the HBQAC grade values.

**Keywords:** Assessment criteria, Architectural heritage preservation, Ghana, Historic buildings, World Heritage sites.

## INTRODUCTION

Historic structures (buildings) and places are acknowledged worldwide as sources for the study of history and are frequently linked to specific meanings or values based on their antiquity, rarity, and uniqueness in relation to a famous person or historic event [1]. The World Heritage Convention explains that historic structures are a significant component of cultural heritage [2]. Architectural creations that are included in the tangible immovable assets are known as historic buildings [3]. Historic structures are architectural creations that have played significant historical roles and are frequently distinguished by their age, historical relevance, and comparatively high level of physical integrity [4]. When properly preserved, architectural legacy is a tangible culture that acts as a physical repository for memories and stimulates the development of an individual's consciousness and a place's identity [5].

Historic buildings are defined by the European Committee for Standardization [6] as structures that have heritage significance because of its architectural, historical, social, cultural, or symbolic qualities. Historic structures and locations in particular preserve people's ongoing sociocultural values [7], [8].

The 11th Sustainable Development Goal (SDG) of the United Nations (2015) outlines an objective under 11.4 to "strengthen efforts to protect and safeguard the world's cultural and natural heritage" [9]. The World Heritage List

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(WHL) was created by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in an effort to conserve the world's existing historic fabric. Out of the 1223 sites included on the UNESCO WHL [10], 108 are in Africa (Table 1). 2 out of 108, or 1.85% of Africa's heritage list, are in Ghana. These consist of Asante Traditional Buildings (ATBs) in Ghana's forested areas and coastal forts and castles [10].

**Table 1:** World Heritage List.

| Zone | Cultural | Natural | Mixed | Total | % of Total | State Party Represented |
|---|---|---|---|---|---|---|
| Africa | 61 | 42 | 5 | 108 | 8.83 | 36 |
| Arab States | 87 | 6 | 3 | 96 | 7.85 | 18 |
| Asia & the Pacific | 211 | 73 | 12 | 296* | 24.20 | 36 |
| Europe & North America (Including Israel, Russia) | 490 | 71 | 12 | 573* | 46.85 | 50 |
| Latin America & Caribbean | 103 | 39 | 8 | 150* | 12.26 | 28 |
| **TOTAL** | **952** | **231** | **40** | **1223** | **100** | **168** |

*(Source: UNESCO, 2024)*

A collection of traditional structures that reflect the height of 18th-century Asante civilization can be found in and around Kumasi. Situated in Abirim, Asawasi, Asenemaso, Adako Jachie, Bodwease, Ejisu Besease, Kentinkrono, Saaman, and Patakro, the Asante Traditional Buildings (ATBs) on the WHL comprise ten shrines [11]. Additionally, the coastal forts and castles from Keta in the Volta Region to Beyin in the Western Region are eligible to be recognized as World Heritage Sites. These ancient structures, which are a part of Ghana's architectural legacy, demonstrate how European settlers in the Gold Coast prepared for trade. These UNESCO World Heritage List items in Ghana are poorly maintained, and urgent action is required to prevent their destruction [12]. The "Year of Return" in 2019 saw a roughly 45% rise in the anticipated number of tourists in Ghana [13]. As a result, hotels, transportation, and other services saw significant patronage; the most popular destinations were the forts and castles, and Ghana made roughly $1.9 billion [14]. This suggests that the preservation of historic structures and sites is important for attaining sustainable development in all nations, serving as a catalyst for sustainable development with favorable effects on community development economics [15], [16].

Notwithstanding its significance, Ghana's implementation of Historic Building and Site Preservation (HBSP) has been disastrous because there are no set standards and insufficient laws and rules protecting historic structures. Without written laws and regulations, HBSP has been accomplished in traditional African civilizations such as Ghana using locally skilled labor and resources ([17], [18]. However, the majority of ancient structures in Africa, like the Forts and Castles and the ATBs in Ghana, are in decline and lack a set standard for effectively evaluating the building fabric. Ghana was the first nation in Sub-Saharan Africa to establish a National Committee of the International Council on Monuments and Sites (ICOMOS), which sparked the country's desire to conserve its architectural legacy in 1968. Following this, the 1972 World Heritage Convention of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) was ratified in 1975 [19]. Architectural heritage, including World Heritage Sites, are not adequately protected even after the National Museum Decree, 1969 (NLCD 387) was created to govern the National Museums' operations and maintenance [20], [21], and [22].

At the moment, expert opinions are used to evaluate these heritage sites, which frequently results in prejudice in the opinions of the experts. Thus, the goal of this project is to provide a standard for evaluating historic buildings, with a focus on Ghana's World Heritage Sites.

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## METHODOLOGY

Through a thorough examination of the literature, we investigate historic building appraisal standards in this research. Architectural heritage studies have employed a literature review as a research method [23], [24], [25], [26], and [27]. The primary sources of data for this study are legacy studies journals, theses, and books as well as reliable internet databases like Academia, Google Scholar, African Journals Online, JSTOR, and Web of Science. Despite the impracticability of taking into account all descriptors in a single study, descriptors were employed to produce wider coverage findings in heritage evaluation criteria [28], [29The study's descriptors include "world heritage list," "historic buildings," "heritage buildings and sites," "architecture heritage," "heritage preservation," and "assessment criteria." The majority of the reviewed materials can be found in the following journals: "Journal of Buildings," "Journal of Building Engineering," "Journal of Cultural Heritage," "Elsevier," "Emerald," "Routledge," "Sage," and "Taylor and Francis," among others.

**Table 1:** 20 Relevant Document for Historic Building Assessment Criteria

| Authors | Year | Title | Assessment Criteria |
|---|---|---|---|
| V. Ferretti, M. Bottero, and G. Mondini | 2014 | Decision Making and Cultural Heritage: An Application of the Multi-attribute Value Theory for the Reuse of Historic Buildings | Multi-Criteria Decision Making |
| W. A. Hatem | 2014 | Comparing Design Quality For School Buildings in Iraq, Diyala | Design Quality Indicator |
| J.E. Reckermann, | 2014 | Pre-Occupancy Evaluation: Inhabitant Feedback Processes and Possibilities for a Regenerative Place | Pre-Occupancy Evaluation |
| O. Gocer, Y. Hua and K. Gocer | 2015 | Completing the missing link in building design process: Enhancing post-occupancy evaluation method for effective feedback for building performance | Design Quality Indicator |
| J Mundo-Hernández, MC Valerdi-Nochebuena, J Sosa-Olive | 2015 | Post-occupancy evaluation of a restored industrial building: Acontemporary art and design gallery in Mexico | Post-Occupancy Evaluation |
| A. Mardani, A. Jusoh, K.M.D. Nor, Z. Khalifah, N. Zakwan, A. Valipour | 2015 | Multiple criteria decision-making techniques and their applications - a review of the literature from 2000 to 2014 | Multi-Criteria Decision Making |
| S. Coleman | 2016 | Normalizing Sustainability in a Regenerative Building: The Social Practice of Being | Post-Occupancy Evaluation |
| D. Misirlisoy and K., Gunce | 2016 | Adaptive Reuse Strategies for Heritage Buildings: A Holistic Approach | Multi-Criteria Decision Making |
| Martínez-Molina et al. | 2018 | Assessing visitors' thermal comfort in historic museum buildings: Results from a Post Occupancy Evaluation on a case study. | Post-Occupancy Evaluation |
| Y. Cronhjort | 2018 | Criteria to Evaluate the Quality of Building Envelope Retrofits | SusRef / DQI |
| F. Ribera, A. Nestico, P. | 2019 | A multicriteria approach to identify the Highest and | Multi-Criteria |

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| Authors | Year | Title | Assessment Criteria |
|---|---|---|---|
| Cucco G. Maselli | | Best Use forhistorical buildings | Decision Making |
| Nadkarni and Puthuvayi | 2020 | A comprehensive literature review of Multi-Criteria Decision Making methods in heritage buildings | Multi-Criteria Decision Making |
| M.A. Hassanain, A. Alamoudi, and A. M. Al-Hammad, | 2020 | "Barriers to the implementation of POE practices in the Saudi Arabian building industry | Post-Occupancy Evaluation |
| Y. Li, L. Zhao, J. Huang and A. Law | 2021 | Research frameworks, methodologies, and assessment methods concerning the adaptive reuse of architectural heritage: a review | Multi-Criteria Decision Making |
| P. S. Mishra and S. Muhuri | 2021 | Value assessment of existing architectural heritage for future generation using criteria importance through inter-criteria correlation and grey relational analysis method: a case of Odisha temple architecture in India | Multi-dimensional values |
| K. Twumasi-Ampofo et al. | 2022 | Post Occupancy Audit: Assessing the Quality of GetTFund Buildings in Savannah Region, Ghana | Post-Occupancy Evaluation |
| M. S. Hidayata, and I. A. Wahab, | 2022 | "The Evaluation of Building Envelopes in Campus Buildings" | Design Quality Indicator |
| T. Das | 2022 | Architectural Design Quality Indicators for the Educational Built Environment in the Indian Context | Design Quality Indicator |
| Wang et al. S. Wang, W. Duan, and X. Zheng | 2023 | Post-Occupancy Evaluation of Brownfield Reuse Based on Sustainable Development: A Case of Beijing Shougang Park | Post-Occupancy Evaluation |
| Xiao and Yoon | 2024 | A Post Occupancy Evaluation of the Space Utilization of Cultural Heritage in Children's Education: A Case Study of Wuhan's Historical Districts, China | Post-Occupancy Evaluation |

According to Table 1, relevant papers from 2014 to 2024 were found using the aforementioned descriptors for the study, which was carried out between June and September of 2024 in order to determine the assessment criteria for historic structures. After an initial evaluation of 86 publications' abstracts, 20 were determined to be pertinent to the assessment criteria for historic buildings; the remaining documents were centered on linguistics, tourism, artifacts, and the performing arts. It would be nearly impossible to review every paper on the assessment criteria for heritage buildings in this study, much like A. Darko and A. P. C. Chan [29] argue. Following a semi-structured interview with the Ghana Museums and Monuments Board (GMMB) staff, who are responsible for the sites' care, the world heritage sites' conditions were evaluated using the Historic Building Quality Assessment Criteria as part of the study's validation.

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## RESULTS

### A. Post Occupancy Evaluation (POE)

Since its inception in the 1960s, Post Occupancy Evaluation (POE) has developed its theory, methodology, and practice, and is now utilized in the majority of Western nations ([30]).

Building quality has been evaluated using a variety of instruments. In terms of standards for evaluating historic structures, hardly much has been accomplished in Africa. This is seen in countries like Libya, Mali, Nigeria, and Egypt, which has a civilization that dates back more than 4,000 years. The majority of these countries' historic structures are in risk ([31], [32]). Ghana, like the majority of African nations, lacks a set of standards for evaluating historic structures. The quality of the Ghana Education Trust, GETFund buildings in the Savannah Region of Ghana was evaluated by Twumasi-Ampofo et al. [33] using POEPost Occupancy Evaluation (POE) is a good way to gauge how excited and disappointed users are in comparison to what they expected. In order to evaluate the new use of a restored historic building in Puebla, Mexico from the viewpoint of the user, J. Mundo-Hernández, M. C. Valerdi-Nochebuena, and J. Sosa-Oliverb [34] employed POE with an emphasis on user happiness. Using POE, A. Martínez-Molina, P. Boarin, I. Tort-Ausina, and J. Vivancos [35] evaluated visitors' comfort levels in historic museum structures. This study focused on indoor environmental quality using a quantitative method and found that visitors were not always given enough thermal comfort in the microclimate. POE was utilized by S. Wang, W. Duan, and X. Zheng [36] to evaluate user behavior at Beijing's industrial heritage parks based on subjective human judgmentsYouths between the ages of 20 and 40 make up the majority of park visitors, and they expressed satisfaction with the park's natural heritage. In a related study, Xiao and Yoon [37] created a thorough system of evaluation index for the use of cultural heritage space in children's education in Wuhan's historic districts using POE. This study raised awareness of children's needs. Although it is not required for historic structures, this criterion also emphasizes the building's physical quality and user pleasure in new construction [38], [39], and [40].

### B. Design Quality Indicator (DQI)

The Construction Industry Council in the UK created a standard for evaluating the quality of buildings, both new and old. This criterion was introduced online in 2003 and was first known as the Design Quality Indicator (DQI) in 1990. Based on the Vitruvian triangle (Firmistas, Utilitas, and Vernustas), the DQI takes into account the building's strength, usefulness, and effects on the environment and community [41]. The United States of America adopted DQI in 2006, and by 2014, it was being used in over 1,400 projects [42]. This criterion encompasses stakeholder participation from design to life-cycle performance, going beyond a building's physical attributes. The usage of this criterion depends on the existence of occupants. Three key elements are highlighted by the DQI. These include (i) functionality, which includes access and space utilization; (ii) build quality, which includes engineering systems, construction, and performance; and (iii) effect, which includes environmental and urban and social integration. These fundamental demands are transcended by the element of "meaning," which takes "value" (OUV) into account. DQI is assessing both new building design and construction as well as existing building renovations. To satisfy the requirements for feedback on particular buildings and associated activities, DQI is used as an assessment criterion [43]. After analyzing the design quality of school buildings in Iraq, Hatem [44] came to the conclusion that the closed school building's design was better than the U-shaped building's in many ways.

In the evaluation of the educational built environment, indicators under the three main facets of the DQI have been emphasized [41]. Utilization, site selection, parking, access, space distribution, enough lighting, open areas, pedestrian pathways, natural ventilation, fire exits, acoustic comfort, and natural lighting (window placement) are the first signs under functionality. A maintenance plan, energy efficiency, a beautiful landscape, long-lasting finishes, structural stability and efficiency, road width, hygienic conditions, mechanical and electrical engineering systems, security systems, and a maintenance plan are the second set of indicators under build quality. Thirdly, the following measures fall under the impact category: unique character of the design, user comfort, internal and external environment, location, visually appealing effects, resilience to natural disasters, and integration into the settlement (city planning).

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### C. Sustainable Refurbishment of Building Façades and External Walls (SusRef).

Hakkinen [45] proposed a standard for assessing historic structures in Europe called Sustainable Refurbishment of Building Façades and External Walls (SusRef). Nordic research partners from Finland, Norway, Sweden, and Denmark collaborated in the European SusRef project under the direction of Tarja Hakkinen. For the best possible outcome for the current external wall renovation, the SusRef presents evaluation techniques and remodeling ideas [45]. The components of the façades are crucial to sustainable energy since they not only serve an aesthetic purpose but also affect the thermal comfort of the building's occupants. This criterion takes into account factors including cost, social impact, indoor air quality, energy efficiency, structural stability and safety, aesthetics, and environmental performance, primarily in residential structures [45]. Y. Cronhjort [42] assessed the quality of building envelope retrofits using the SusRef criteria and recommended future research to examine the assessment of more comprehensive building renovations. SusRef can be applied to heritage building façades, even though it was employed to retrofit an existing residential building.

### D. Multi/Multiple Criteria Decision Making (MCDM)

Projects must be evaluated thoroughly and in-depth in order to address the interdisciplinary character of adaptive reuse. Because so many elements need to be taken into account, choosing new reuse purposes for architectural heritage is a challenging subject that frequently involves a complicated and varied decision-making process [46], [47]. The MDCM criteria entail organizing and resolving decision-making issues using a variety of criteria. A crucial scientific technique that professionals utilize to quickly and effectively select the best option, categorize options, or rank options according to preference is Multi/Multiple Criteria Decision Making (MCDM) [48], [49]. It is important to take into account architectural, historical, economic, social, environmental, and/or cultural qualities when analyzing the adaptive reuse of heritage building functions. For such an approach to choose the optimal function, a multi-criteria decision model (MCDM) is necessary [50], [51]. With a multicriteria decision-making framework that accommodates certain viewpoints and offers a preference ranking organization approach for the enrichment of assessments, M. Bottero, C. D'Alpaos, and A. Oppio [52] place attention on the topic of adaptive reuse of heritage. But according to M. Pavlovskis, D. Migilinskas, J. Antucheviciene, and V. Kutut [53], the accuracy of conventional MCDMs needs to be increased. Instead, they suggest using Building Information Modelling (BIM) to create a 3D model as a data source.

An evaluation of the architectural legacy that currently exists for the next generation was carried out by P. S. Mishra and S. Muhuri [54]. This study ranked and prioritized important areas that need policymakers' attention using multi-dimensional values.

## DISCUSSION

Experiences were derived from aspects of the current criteria under study in order to construct an assessment criterion for Ghana's World Heritage Sites. A criterion for evaluating the status of Ghana's heritage buildings is crucial for determining how critical the building conditions are while researching the physical quality of these structures.

POE employs research as a methodical procedure to look into facilities management, building performance, and human needs. Additionally, it is a very useful tool for assessing if a building project satisfies the needs of the end user, including productivity, job performance, and occupant performance [38], [36]. Through feedback, POE is essential to a building's life cycle. It provides a range of benefits and activities, including assessing building performance and examining the connection between occupant behavior and building resource utilization [39], [34]. By optimizing the indoor environment for occupants, POE increases chances for communication between the design team and its stakeholders and helps make better informed decisions regarding future building design ([40], [37].

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In general, the adaptive reuse of historic structures has been the main focus of MCDM's extensive use in research. This demonstrates the need for decision-making, particularly when a heritage building's reuse and evolving purposes are taken into account [46].

Despite the fact that the quantitative features of using multi-dimensional values to rank and prioritize essential areas in heritage building evaluation [54] decrease bias, the established levels of the parameters based on their qualitative aspects are not integrated or taken into account.

Because it focuses on improving building design from the conceptual framework, client preferences during the design and construction stages, building element observation, and user expectations during the post-occupancy evaluation stage, the DQI is primarily qualitative. On the other hand, because it deals with experiments, SusRef is mostly quantitative. As part of the assessment of the quality of building envelope retrofits, it also entails the computation of façade element parameters like energy consumption, U-values, indoor air quality, light intensity (lux), etc. [42]. Over the past ten years, these two standards have undoubtedly been applied widely in construction evaluations. I contend that although POE and DQI appear to evaluate buildings across a broader spectrum, the SusRef criteria appear to concentrate on the rehabilitation of building façades and their effects on the environment and society. It is clear that none of the evaluation standards examined could be fully applied to Ghana's historic building assessment. As a result, this study suggests the Historic Building Quality Assessment Criterion (HBQAC), which incorporates elements of the DQI, POE, and SusRef criteria that were previously examined.

### A. Historic Building Quality Assessment Criteria (HBQAC)

This research makes use of a few SusRefs related to social and environmental effect, structural stability, build quality, and functionality from POE and DQI. Due to the fact that heritage buildings, particularly World Heritage sites, are already in existence, design factors like site selection, natural lighting and ventilation, and acoustic comfort in POE, DQI, and SusRef are not taken into account. We are also unable to take into account the functionality element, which deals with the use of space contrary to occupants' expectations, because the buildings in the research are not completely occupied for their intended architectural purpose. The "build quality" components of POE and DQI, as well as the "structural stability" and "impact" components of SusRef, are thus combined in this study to evaluate the condition of Ghana's world heritage sites. For heritage structures in Ghana, the combined assessment criteria for this study are thus known as the "Historic Building Quality Assessment Criteria (HBQAC)." In-person field observation is used by the HBQAC to evaluate buildings based on three primary overarching criteria: (i) architectural, (ii) structural, and (iii) functional impact. Table 2 lists all of the HBQAC's specific requirements and characteristics for this investigation.

**Table.2:** Historic Building Quality Assessment Criteria (HBQAC)

| CRITERION (i) | ATTRIBUTES | CRITERION (ii) | ATTRIBUTES | CRITERION (iii) | ATTRIBUTES |
|---|---|---|---|---|---|
| **Architectural** | Wall,<br>Wall Finish,<br>Floor,<br>Floor Finish,<br>Ceiling,<br>Roof covering,<br>Doors,<br>Windows. | Structural | Foundation,<br>Column,<br>Beam,<br>Truss,<br>Staircase. | Functional Impact | Electricity,<br>Plumbing,<br>Fire protection,<br>Vehicular Access, landscape,<br>Buffer zone,<br>Boundary,<br>Integration into urban planning. |

Source: Author's Construct

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The conditions of the walls, wall finishes, floors, ceilings, roof coverings, doors, and windows are among the eight features that are taken into consideration by the first overarching criterion (Architectural), which is based on Table 2. The foundation, column, beam, truss, and staircase conditions are among the five characteristics taken into account by the second criterion (structural). In order to determine the availability of services such power, plumbing, fire protection, vehicle access, landscape, buffer zone, and border, as well as how they have been incorporated into urban design, the third criterion (Functional Impact) takes into account a total of eight variables. These characteristics or elements are evaluated based on how well the architectural elements work, how exposed the structural elements are, and whether services are available to make it impactful and useful in the community.

**B. HBQAC value grading**

Using a graded scale of values ranging from 0 to 5, the features under each of the criteria included in Table 2 were rated according to the conditions seen on site in order to guarantee the efficient usage of HBQAC. Beyond the rubble, the state of the World Heritage Sites reveals the extent of degradation. The degree of degradation of the features under the several criteria (Architectural, Structural, and Functional Impact) is shown by the graded scale values listed in Table 3.

**Table 3:** Grading for the Attributes

| VALUE | GRADE | DESCRIPTION |
|---|---|---|
| **0** | Nonexistent | Nil |
| **1** | Very Poor | Non-functional, critically damaged, Hazard to health and safety |
| **2** | Poor | Non-functional, Damaged, Critical condition, |
| **3** | Fair | Not fully functional, Major defect, Moderate condition |
| **4** | Good | Functional, Minor defect, good condition |
| **5** | Very Good | Fully functional, No defect, very good condition |

Source: Author's Construct

From nonexistent (0) to very good (5) for qualities, the graded scale of values represents the degree of deterioration. Historic communities have managed their tourist and cultural heritage using a graded scale of values [55], [56]. To ascertain the degree of deterioration, or beyond the debris, the total graded values for the qualities under each historic building or site are employed in this research. In order to ascertain the state of Ghana's historic building fabric, the total graded values of the qualities have been given as percentages.

**Table 4:** Determining the historic building fabric conditions in Ghana

| Criteria | | | Range of total Attributes (%) | State of Historic Buildings and Sites |
|---|---|---|---|---|
| **Architectural (No.)** | **Structural (No.)** | **Functional Impact (No.)** | | |
| **0** | 0 | 0 | 0 | Inexistent (Beyond the debris) |
| **1-9** | 1-5 | 1-9 | 1-22 | Almost beyond the debris |
| **10-19** | 6-12 | 10-19 | 23-49 | Partially beyond the debris |
| **20-29** | 13-18 | 20-29 | 50-72 | Good |
| **30-40** | 19-25 | 30-40 | Above 73 | Very good |

Source: Author's Construct

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According to Table 4 above, each criterion's total qualities as shown in Table 2 and its graded value in Table 3 determine the condition of historic structures and places. For example, the lowest graded value (0) denotes a historic building and site that does not exist (beyond the debris) and is a function of the total attributes in each criterionHowever, the historic structure and site are in very good condition, as indicated by the highest graded score (5) and a function of the overall attribute in each category. In order to evaluate the World Heritage Sites, these functions are then represented as a range of total attributes in percentages. As stated in the sections below, the HBQAC was utilized to evaluate the state of Ghana's World Heritage Sites as part of the validation process.

### C. Assessing the Conditions of the World Heritage Sites (WHS) in Ghana Using HBQAC

The ATBs in and around Kumasi, as well as the forts and castles along the coast from Keta in the east to Beyin in the west, were physically inspected as World Heritage Sites. Architectural, structural, and functional effect were the three main topics used to evaluate the WHS's state in Ghana using the Historic Building Quality Assessment Criteria (HBQAC) described above. All 23 forts and castles as well as 8 ATBs were the subject of an in-person field observation; the grades are listed in Table 3. Details are shown in Tables 5 through 8 below.

**Table 5:** Assessing WHS based on the Architectural criteria in HBQAC

| Item | Name | Wall | Wall Finish | Floor | Floor Finish | Ceiling | Roof covering | Doors | Win-dows | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | Fort Apollonia | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 32 |
| **2** | Fort St. Anthony | 5 | 3 | 5 | | 3 | 3 | 3 | 3 | 29 |
| **3** | Fort Gross Friedricksburg | 5 | 4 | 5 | 4 | 4 | 4 | 3 | 3 | 32 |
| **4** | Fort Metal Cross | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 3 | 33 |
| **5** | Fort Batenstein | 4 | 1 | 4 | 1 | 1 | 2 | 1 | 1 | **15** |
| **6** | Fort Orange | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 34 |
| **7** | Fort St. Sabastian | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 35 |
| **8** | Fort British | 2 | 2 | 3 | 2 | 2 | 0 | 0 | 1 | **11** |
| **9** | Fort Vredenburg | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| **10** | Castle of St. George | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 35 |
| **11** | Fort St. Jago | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 31 |
| **12** | Cape Coast Castle | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 34 |
| **13** | Fort Victoria | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 33 |
| **14** | Fort William | 5 | 3 | 4 | 3 | 3 | 4 | 3 | 2 | 27 |
| **15** | Fort Amsterdam | 3 | 2 | 3 | 2 | 2 | 0 | 2 | 2 | **16** |
| **16** | Fort Patience | 5 | 3 | 5 | 4 | 3 | 4 | 4 | 3 | 31 |
| **17** | Fort Good Hope | 5 | 4 | 5 | 4 | 4 | 5 | 4 | 4 | 35 |
| **18** | James Fort | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 32 |
| **19** | Ussher Fort | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 34 |
| **20** | Christianborg | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 40 |

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| Item | Name | Wall | Wall Finish | Floor | Floor Finish | Ceiling | Roof covering | Doors | Win-dows | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | Castle | | | | | | | | | |
| **21** | Fort Vernon | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | **8** |
| **22** | Fort Frederiksborg | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| **23** | Fort Prinzenstein | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | **10** |
| | ATB | | | | | | | | | |
| **1** | Abirem | 5 | 4 | 5 | 4 | 0 | 5 | 4 | 4 | 31 |
| **2** | Adako Jachie | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | **5** |
| **3** | Asenemaso | 4 | 3 | 4 | 3 | 0 | 5 | 4 | 4 | 27 |
| **4** | Bodwease | 3 | 3 | 3 | 2 | 1 | 3 | 3 | 2 | 20 |
| **5** | Ejisu-Besease | 5 | 4 | 5 | 4 | 0 | 5 | 4 | 4 | 31 |
| **6** | Kentinkrono | 4 | 3 | 4 | 3 | 0 | 4 | 4 | 4 | 26 |
| **7** | Patakro | 3 | 2 | 3 | 2 | 0 | 3 | 2 | 2 | **19** |
| **8** | Saaman | 4 | 3 | 4 | 3 | 0 | 4 | 4 | 4 | 26 |

(Author's field Studies, October, 2024)

Based on Table 5, every World Heritage Site (WHS) in Ghana was examined using philology and in-person field observation. In addition to ATBs, the survey covered 23 forts and castles. Three of the 23 forts and castles were found to be nearly beyond the debris, four to be fairly beyond the debris, two to be in good condition, and the majority, 14, to be in very good condition, according to the HBQAC's architectural analysis. On the ATBs, according to the HBAQC, two were found to be in very good condition, four were in good condition, and one of the eight examined was almost beyond the threshold. Remarkably, none of the locations were outside the debris. Consequently, 4 out of 31 WHS, or 13% of the total, were in a dilapidated state that was nearly completely covered by rubbish. The graded values (40) were less than 22% (9) for all four of these sites. Forts Vredenburg at Komenda, Prampram, Adako Jachie ATB, and Old Ningo are among them. While Fort Vredenburg at Komenda (Dutch – 1682) and Fort Frederiksborg at Old Ningo (Danes – 1734) had the lowest graded value of 1, representing 2.5% each, the Christianborg Castle at Osu (Danes – 1661) had the highest score of 40, representing 100% of the graded values in attributes under architectural aspects. Beyond the debris, the WHS includes Fort Vredenburg and Fort Frederiksborg, as well as Adako Jachie ATB (5), Fort Vernon (British-1745) at Prampram (8), Fort Prinzenstein (Danes-1784) at Keta (10), Fort British (British-1687) at Komenda (11), Fort Batenstein (Dutch-1656) at Butre (15), Fort Amsterdam (British-1631) at Abanze (16), and Patakro ATB (19). According to Table 6 below, the HBQAC's structural component comprises five attributes, each of which is rated from zero (nonexistent) to five (excellent). This raises each site's maximum graded value to 25.

**Table 6:** Assessing the WHS based on the Structural criterion in HBQAC

| Item | Name | Foundation | Column | Beam | Truss | Stairs | Total |
|---|---|---|---|---|---|---|---|
| **1** | Fort Apollonia | 5 | 5 | 5 | 4 | 4 | 23 |
| **2** | Fort St. Anthony | 4 | 4 | 4 | 3 | 3 | 18 |
| **3** | Fort Gross Friedricksburg | 5 | 5 | 4 | 4 | 3 | 21 |
| **4** | Fort Metal Cross | 5 | 5 | 4 | 4 | 4 | 22 |
| **5** | Fort Batenstein | 5 | 4 | 4 | 0 | 3 | 16 |

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| Item | Name | Foundation | Column | Beam | Truss | Stairs | Total |
|---|---|---|---|---|---|---|---|
| **6** | Fort Orange | 5 | 5 | 4 | 4 | 4 | 22 |
| **7** | Fort St. Sabastian | 5 | 5 | 4 | 4 | 4 | 22 |
| **8** | Fort British | 1 | 1 | 1 | 0 | 1 | 4 |
| **9** | Fort Vredenburg | 1 | 0 | 0 | 0 | 0 | 1 |
| **10** | Castle of St. George | 5 | 5 | 5 | 4 | 4 | 23 |
| **11** | Fort St. Jago | 4 | 4 | 4 | 4 | 4 | 20 |
| **12** | Cape Coast Castle | 5 | 5 | 4 | 4 | 4 | 22 |
| **13** | Fort Victoria | 4 | 4 | 4 | 3 | 3 | 18 |
| **14** | Fort William | 5 | 5 | 5 | 4 | 4 | 23 |
| **15** | Fort Amsterdam | 2 | 2 | 1 | 0 | 1 | 6 |
| **16** | Fort Patience | 5 | 5 | 5 | 4 | 4 | 23 |
| **17** | Fort Good Hope | 5 | 5 | 5 | 4 | 4 | 23 |
| **18** | James Fort | 5 | 5 | 4 | 4 | 4 | 22 |
| **19** | Ussher Fort | 5 | 5 | 4 | 4 | 4 | 22 |
| **20** | Christianborg Castle | 5 | 5 | 5 | 5 | 5 | 25 |
| **21** | Fort Vernon | 1 | 1 | 1 | 1 | 1 | 5 |
| **22** | Fort Frederiksborg | 1 | 0 | 0 | 0 | 0 | 1 |
| **23** | Fort Prinzenstein | 2 | 2 | 1 | 1 | 1 | 7 |
| | **ATBs** | | | | | | |
| **1** | Abirem | 5 | 5 | 5 | 4 | 0 | 19 |
| **2** | Adako Jachie | 1 | 1 | 1 | 1 | 0 | 4 |
| **3** | Asenemaso | 5 | 5 | 5 | 4 | 0 | 19 |
| **4** | Bodwease | 3 | 4 | 3 | 3 | 0 | 13 |
| **5** | Ejisu-Besease | 5 | 5 | 5 | 5 | 0 | 20 |
| **6** | Kentinkrono | 5 | 5 | 4 | 4 | 0 | 18 |
| **7** | Patakro | 2 | 3 | 3 | 3 | 0 | 11 |
| **8** | Saaman | 5 | 5 | 5 | 5 | 0 | 20 |

(Author's field Studies, October, 2024)

Of the 31 WHS, three were substantially beyond the debris, five were in good condition, and the bulk, 18 in very good condition, while five were nearly beyond repair. The results of the structural observation showed that eight sites, or 26% of the WHS, were in a dilapidated state. With the exception of Fort Batenstein at Butre, which was in good structural condition and received a total grade of 16, these buildings are comparable to those identified under architectural aspect. However, Table 6 of the structural aspect of HBQAC on the WHS reveals that Christianborg Castle at Osu (Danes -1661) had the highest graded value of 25Fort Frederiksborg at Old Ningo (1), Fort Vredenburg at Komenda (1), Adako Jachie ATB (4), Fort British at Komenda (4), Fort Vernon at Prampram (5), Fort Amsterdam at Abandze (6), Fort Prinzenstein at Keta (7), and Patakro ATB (11) are the eight locations inside and outside the debris that are listed in order of dereliction.These were followed by the following: Ussher Fort

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(Dutch – 1649) in Accra, James Fort (British – 1673), Cape Coast Castle (Portuguese – 1555), Fort St. Sabastian (Portuguese – 1523), and Fort Metal Cross (English – 1693) in Dixcove (all with graded values of 22).

**Table 7:** Assessing the WHS Based on the Functional Impact criterion in HBQAC

| Item | Name | Electricity | Plumbing | Fire protection | Vehicular Access | Landscape | Buffer zone | Boundary | Integration into urban planning | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | Fort Apollonia | 5 | 5 | 0 | 5 | 1 | 0 | 0 | 0 | 16 |
| **2** | Fort St. Anthony | 3 | 3 | 0 | 5 | 3 | 0 | 0 | 0 | 14 |
| **3** | Fort Gross Friedrichsburg | 5 | 5 | 0 | 5 | 4 | 3 | 4 | 0 | 26 |
| **4** | Fort Metal Cross | 5 | 5 | 0 | 5 | 3 | 0 | 0 | 0 | 18 |
| **5** | Fort Batenstein | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | **2** |
| **6** | Fort Orange | 5 | 5 | 5 | 5 | 3 | 3 | 3 | 0 | 29 |
| **7** | Fort St. Sebastian | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 15 |
| **8** | Fort British | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | **5** |
| **9** | Fort Vredenburg | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | **5** |
| **10** | Castle of St. George | 5 | 5 | 3 | 5 | 4 | 3 | 3 | 0 | 28 |
| **11** | Fort St. Jago | 5 | 5 | 0 | 5 | 2 | 0 | 0 | 0 | 17 |
| **12** | Cape Coast Castle | 5 | 5 | 4 | 5 | 2 | 0 | 0 | 0 | 17 |
| **13** | Fort Victoria | 5 | 5 | 0 | 5 | 2 | 0 | 0 | 0 | 17 |
| **14** | Fort William | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 15 |
| **15** | Fort Amsterdam | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | **5** |
| **16** | Fort Patience | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 15 |
| **17** | Fort Good Hope | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 15 |
| **18** | James Fort | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 15 |
| **19** | Ussher Fort | 5 | 5 | 5 | 5 | 3 | 0 | 0 | 0 | 23 |
| **20** | Christiansborg Castle | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 40 |
| **21** | Fort Vernon | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | **5** |

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| Item | Name | Electricity | Plumbing | Fire protection | Vehicular Access | Landscape | Buffer zone | Boundary | Integration into urban planning | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **22** | Fort Frederiksborg | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | **5** |
| **23** | Fort Prinzenstein | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | **5** |
| | | | | | **ATB** | | | | | |
| **1** | Abirem | 5 | 5 | 0 | 5 | 0 | 0 | 0 | 0 | 15 |
| **2** | Adako Jachie | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | **5** |
| **3** | Asenemaso | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | **5** |
| **4** | Bodwease | 5 | 4 | 0 | 5 | 0 | 0 | 0 | 0 | 14 |
| **5** | Ejisu-Besease | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 10 |
| **6** | Kentinkrono | 5 | 5 | 0 | 5 | 0 | 0 | 2 | 0 | 17 |
| **7** | Patakro | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | **5** |
| **8** | Saaman | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | **2** |

(Author's field Studies, September, 2020)

The HBQAC's functional impact (performance) aspect is displayed in Table 7. It comprises eight attributes, from the availability of electricity to integration into urban planning, and each attribute is graded on a scale from zero (nonexistent) to five (very good). In this instance, the total graded value for each building or site is 40, which represents 100%. Of the 31 WHS, the majority (26) are almost or fairly beyond the debris in terms of functional impact, as they obtained total values less than 20 (50%) of the total attributes. Of the 26, 11 are almost beyond the debris, with recorded values of five or less. Adako Jachie (5), Asenemaso (5), Patakro (5), and Saaman (2) are the locations of four of these ATBs. Fort Batenstein at Butre (2), Fort British at Komenda (5), Fort Vredenburg at Komenda (5), Fort Amsterdam at Abandze (5), Fort Vernon at Prampram (5), Fort Frederiksborg at Old Ningo (5), and Fort Prinzenstein at Keta (5) are further examples. Without affecting or providing functional services, these 11 sites received a score of just one attribute (vehicular access). Because cars could only go so far before visitors had to continue on foot for the evaluation and general tours, Fort Amsterdam at Abandze (2), Fort Batenstein at Butre (2), and ATB at Saaman (2) all received low marks despite having automobile access.

### E. Combined HBQAC for World Heritage Sites in Ghana

For ease of comparison for identifying the World Heritage Sites beyond the debris, all three criteria have been included in a combined HBQAC Table 8, which includes all elements and their overall grades given in percentages (%). Figure 1 provides a graphic representation of this.

**Table 8:** Combined HBQAC for World Heritage Sites in Ghana

| World Heritage Sites | Architectural Grade | | Structural Grade | | Functional Impact | |
|---|---|---|---|---|---|---|
| **Forts and Castles** | **Total Grade** | **%** | **Total Grade** | **%** | **Total Grade** | **%** |
| **Fort Apollonia** | 32 | 80 | 23 | 92 | 16 | 43 |
| **Fort St. Anthony** | 29 | 73 | 18 | 72 | 14 | 35 |

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| World Heritage Sites | Architectural Grade | | Structural Grade | | Functional Impact | |
|---|---|---|---|---|---|---|
| **Fort Gross Friedricksburg** | 32 | 80 | 21 | 84 | 26 | 65 |
| **Fort Metal Cross** | 33 | 83 | 22 | 88 | 18 | 45 |
| **Fort Batenstein** | **15** | 38 | 8 | 32 | **2** | 5 |
| **Fort Orange** | 34 | 85 | 22 | 88 | 29 | 73 |
| **Fort St. Sabastian** | 35 | 88 | 22 | 88 | 15 | 38 |
| **Fort British** | **11** | 28 | 4 | 16 | **5** | 13 |
| **Fort Vredenburg** | **1** | 3 | 1 | 4 | **5** | 13 |
| **Castle of St. George** | 35 | 88 | 23 | 92 | 28 | 70 |
| **Fort St. Jago** | 31 | 76 | 20 | 80 | 17 | 43 |
| **Cape Coast Castle** | 34 | 85 | 22 | 88 | 17 | 43 |
| **Fort Victoria** | 33 | 83 | 18 | 72 | 17 | 43 |
| **Fort William** | 27 | 68 | 23 | 92 | 15 | 38 |
| **Fort Amsterdam** | **16** | 43 | 6 | 24 | **5** | 13 |
| **Fort Patience** | 31 | 76 | 23 | 92 | 15 | 38 |
| **Fort Good Hope** | 35 | 88 | 23 | 92 | 15 | 38 |
| **James Fort** | 32 | 80 | 22 | 88 | 15 | 38 |
| **Ussher Fort** | 34 | 85 | 22 | 88 | 23 | 58 |
| **Christianborg Castle** | 40 | 100 | 25 | 100 | 40 | 100 |
| **Fort Vernon** | **8** | 20 | 5 | 20 | **5** | 13 |
| **Fort Frederiksborg** | **1** | 3 | 1 | 4 | **5** | 13 |
| **Fort Prinzenstein** | **10** | 25 | 7 | 28 | **5** | 13 |
| **ATBs** | | | | | | |
| **Abirem** | 31 | 76 | 19 | 48 | 15 | 38 |
| **Adako Jachie** | **5** | 13 | 4 | 16 | **5** | 13 |
| **Asenemaso** | 27 | 68 | 19 | 76 | **5** | 13 |
| **Bodwease** | 20 | 50 | 13 | 52 | 14 | 35 |
| **Ejisu-Besease** | 31 | 76 | 20 | 80 | 10 | 25 |

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| World Heritage Sites | Architectural Grade | | Structural Grade | | Functional Impact | |
|---|---|---|---|---|---|---|
| **Kentinkrono** | 26 | 65 | 18 | 72 | 17 | 43 |
| **Patakro** | **19** | 48 | 11 | 44 | **5** | 13 |
| **Saaman** | 26 | 65 | 20 | 80 | **2** | 5 |

(Author's field Studies, September, 2020)

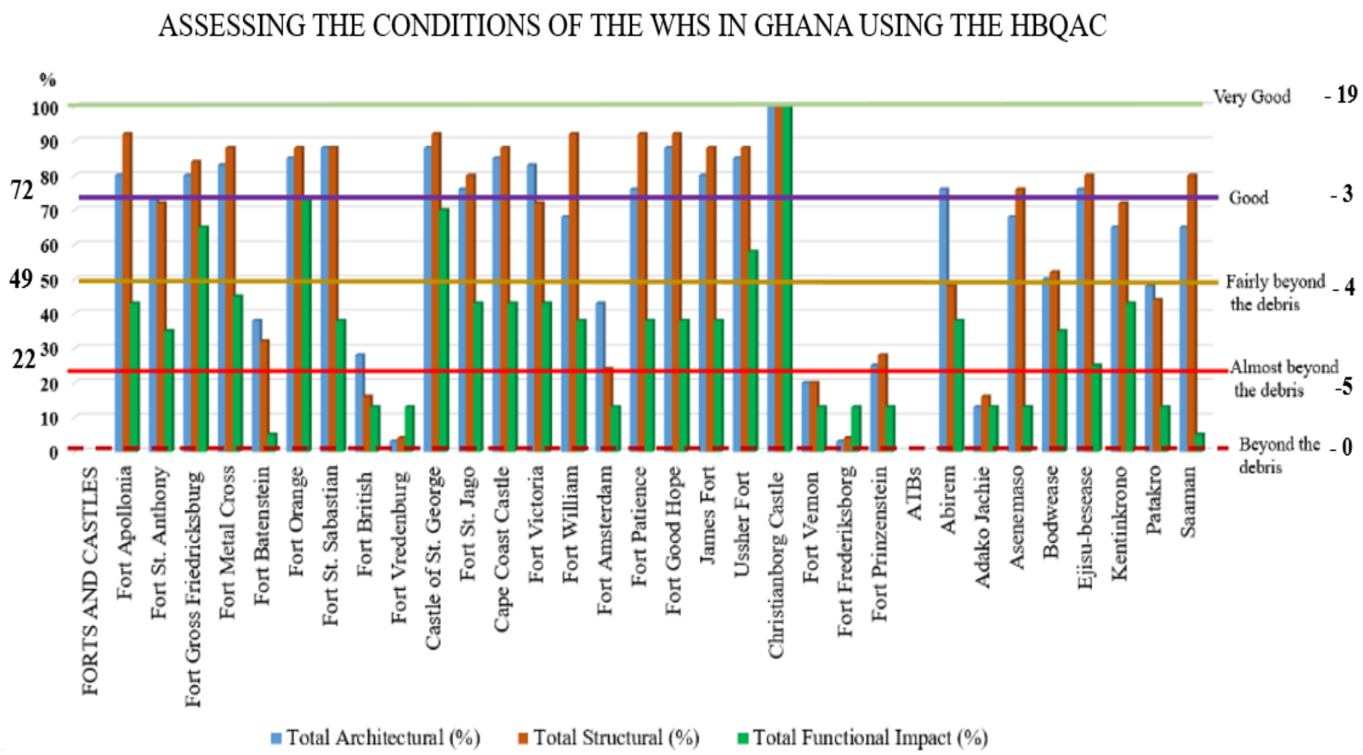


**Figure 1:** Determining the Conditions of the WHS in Ghana Using HBQAC[1] (Author's construction)

1 The HBQAC's architectural, structural, and functional impact aspects as a percentage of the total attribute: 0% denotes non-existent beyond the rubble, 1% to 22% nearly beyond the debris, 23% to 49% fairly beyond the debris, 50% to 72% good condition, and 73% to 100% extremely good condition (structure or site is well preserved).

From Figure 1, the Historic Building Quality Assessment Criteria (HBQAC) were used to establish the WHS's conditions. The total graded values for each attribute under the several aspects were then reported as percentages. By these standards, 0% indicates that the building is not beyond the debris (nonexistent), 1% to 22% indicates that it is almost beyond the debris, 23% to 49% indicates that it is pretty beyond the debris, 50% to 72% indicates that it is in good shape, and 73% to 100% indicates that it is in very good condition (the structure is well maintained).

The remaining nine sites, with the exception of the ATBs at Saaman and Asenemaso, are all categorized as WHS and are nearly and fairly beyond the debris in terms of the HBQAC's structural and architectural elements. There are nine WHS altogether, including two of the eight ATBs and seven of the twenty-three forts and castlesTheir structural integrity, architectural integrity, and functional impact are all in terrible condition. These include Fort British and Fort Vreedenburg (Dutch) at Komenda, Fort Batenstein at Butre, Fort Amsterdam at Abandzi, Fort Vernon at Prampram, Fort Frederiksborg at Old Ningo, and Fort Prenzenstein at Keta. Adako Jachie and Patakro are the ATBs. These all range from 1 to 49%. Furthermore, the provision of plumbing and electrical utilities in these locations is extremely subpar. Notably, Fort Batenstein's success in the areas of architectural and functional impact led to its classification as fairly beyond the rubble. Curiously, all of the locations appear to have very inadequate fire protection, with the exception of the Christianborg Castle in Osu. The in-person field observation revealed that all of the locations lacked landscape features, buffer zones, and limits, with the exception of the three castles in Princess Town: Osu Christianborg, Cape Coast, St. George, Elmina, and Fort Gross Friedricksburg. Despite being recognized as WHS in Ghana, none of the buildings are incorporated into the individual towns' municipal plans. According to interviews conducted at the locations, the WHS is owned by GMMB and is not under the MMDAs' jurisdiction. With the exception of the Christianborg Castle in Osu, which is being repurposed by government officials, the sites appear isolated in their respective settings.

Nine WHS are in a state of dereliction (nearly and fairly beyond the debris), while 22 WHS (16 Forts and Castles and 6 ATBs) are in comparatively good and very good condition.

## CONCLUSION

With the assistance of the City Authority, the GMMB will document historic properties using the Historic Building Quality Assessment Criteria (HBQAC) created in this study to identify those that urgently need restoration and preservation. This criterion provides a solid foundation for valuation. This study gives heritage workers and GMMB employees a well-defined HBQAC evaluation criterion to recognize a historic building's condition for preservation. In order to obtain the necessary attention and prompt intervention for the protection of architectural historic properties, it should be possible to apply the HBQAC assessment criteria created in this study not only in Ghana but also in other African cities where world heritage monuments are in danger.

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