

Aqaba Low-Income Housing Design Competition

Welcome to the "VIVA Al-Beit" model home! A uniquely designed home, ideally suited for the different stages of a family's growing needs – from a cozy starter unit to a full-featured villa. The design combines aesthetics, functionality, and innovative energy efficiency while encouraging a sense of "community".

An overriding element in the design concept is the need for the home to respect the local culture of the community, while accommodating the individual needs of the owner. The essence of this concept is a modern house found under a traditional tent. The tent maintains a cultural link with the slowly fading lifestyle of the past and allows individual and communal expression of cultural heritage and weaving designs. Equally in harmony, is the use of an open courtyard offering an outdoor meeting area, while still providing appropriate privacy. The courtyard acts as the thread for weaving the fabric of the community.

The construction combines traditional, low cost housing building methods with simple technologies. This avoids potential bottlenecks, as high-skilled labor is not required. The design can easily be built by local contractors while still allowing the homeowner to contribute a significant portion of the labour - a cost-effective combination.

Energy efficiency is achieved by integrating various architectural elements. One visually powerful feature is a roof top tent that provides an entire upper floor of livable space for evening use. This 'outer skin' acts as a barrier to solar heat gain, providing a natural cooling effect for the home. The use of the tent design is also translated into the design of the block wall. The double-block cavity wall system provides the same conceptual design as a tent – an external layer with an air gap to reduce heat gain. This provides a low-cost solution to thermal insulation that is also simple for a homeowner to construct. Rockwool insulation is also encouraged to enhance energy efficiency, should sufficient funds be available. Recycled polystyrene can also be used in the cavity as a low cost alternative. In between the concrete structure of columns and floor slabs the cavity wall provides cross stability, essential in potential earthquake areas.

Cavity walls can be made of common concrete cement blocks finished with plaster using local sand mix, producing lighter colored cement to reflect the sun's rays. An innovative alternative to the regular block is the Compact Earth Block (CEB) - a mixture of cement and local sand pressed together into blocks. The production of these CEBs can be done as a community development project to generate income for local people and contribute to sustainable development. However, this proposal is beyond the scope of this competition and could be considered within a larger socio-economic initiative for the Aqaba economic zone.

Another innovative design to decrease heat loss is the use of horizontal tracks on the ceilings of the north-side walls. This provides the opportunity to fabricate

two-sided wool carpets filled with insulating material, such as animal hair, to be hung on tracks to cover the walls and provide thermal insulation.

A common bearing wall between properties optimizes the garden area for each home – a must for families with growing children! It also facilitates growth of crops, fruits or herbs. Local water-efficient plants or trees can be purchased with neighbors to reduce investment costs and provide shade and privacy. The use of a common bearing wall reduces the amount of construction material required at a communal level - an environmentally wise choice - and reduces sun exposure, especially on western facades.

Window placement provides the home with copious amounts of natural light and takes advantage of the prevailing northerly winds to provide cross-ventilation. The design is also innovative as windows are placed close to the inside wall to allow full opening, thus avoiding airflow obstruction. This deep sill also provides more shade - an added benefit for the summer. Cross-ventilation is also created by using ventilation holes at the top of the wall in the north and south facades. Regular cement blocks are placed on their sides to create openings to allow free airflow, which are easily closed in winter using a small panel. These simple solutions make the indoors both inviting and energy efficient.

Another architectural feature is the 'conservatory' or glass house verandah adjacent to the 'winter room' on the west side. Doors are left open during the summer for ventilation and banana leaf shades are used to block the sun. In winter, glass doors are closed and the shades are raised to capture solar energy, which can be circulated throughout the house.

Another way to increase heat gain is thermal mass on the roof using stabilized sand from foundation excavation and mixed with cement to become a solid mass. This element can only be introduced when there is no additional floor expansion. The two-storey house incorporates this feature to optimize solar heat absorption.

Energy management features include the use of solar panels to capture free and environmentally sustainable energy. The three-panel solar grid, for the fully expanded unit, can be tilted on a sliding rail to maintain a direct angle with the sun over the year. In addition, a flatter hot water tank reservoir provides more surface area to capture the sun's precious rays and heat the water naturally.

Simple, effective designs have been incorporated to increase water efficiency. Sink, shower and laundry gray water are routed via the shortest path using gravity to a small in-ground filter and reservoir. It provides the owner with the opportunity to irrigate plants, while ensuring minimal contact with people.

The "VIVA Al-Beit" is truly a one-of-a-kind design that proves environmentally sensitive home design doesn't have to be expensive!

Estimated Construction Costs

Basic starter unit (80 square meters):

- Substructure: 1,450 JD
 - Superstructure: 5,558 JD
 - Finishing: 738 JD
 - Landscaping: 250 JD
 - Total 7,996 JD
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- 99.95 JD per square meter

190 square meter extension:

- Vertical component - 120 sq. m @ 60 JD per sq. m = 7,200 JD
- Horizontal component - 60 sq. m @ 80 JD per sq. m = 4,800 JD

Total cost for fully expanded building: 19,996 JD