

PALM JUMEIRAH AS PALM-TREE-SHAPED ARCHIPELAGO***Dr. Dhrubo Jyoti Sen**

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DOI: <https://doi.org/10.5281/zenodo.19087377>**How to cite this Article:** Dr. Dhrubo Jyoti Sen (2026). Palm Jumeirah As Palm-Tree-Shaped Archipelago. World Journal of Pharmaceutical and Medical Research, 12(3), 549–553.

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Article Received on 21/01/2026

Article Revised on 11/02/2026

Article Published on 01/03/2026

ABSTRACT

The Palm Jumeirah is an archipelago of artificial islands on the Persian Gulf in Jumeirah, Dubai, United Arab Emirates. It is part of a larger series of developments called the Palm Islands, including Palm Jebel Ali and the Dubai Islands, which, when completed, will together increase Dubai's shoreline by a total of 520 kilometres (320 mi). It has a population of over 25,000 as of 2022. Palm Jumeirah is a massive, man-made archipelago in Dubai shaped like a date palm tree, constructed between 2001 and 2009 using 94 million cubic meters of dredged sand and 5.5 million cubic meters of rock. The structure consists of a 2 km trunk, a crown with 17 fronds, and a surrounding 11 km crescent breakwater.

KEYWORDS: trunk, crescent, frond, Atlantis.**INTRODUCTION****Key Structural and Engineering Details**

The Trunk & Fronds: The main body features residential villas, apartments, and marinas, stabilized through vibro-compaction to prevent sinking.

The Crescent: A 11-km, 7-million-ton rock breakwater designed to protect the inner island from sea waves and erosion.

Infrastructure: A sub-sea tunnel connects the spine to the crescent, facilitating utilities like water and wastewater at 13-16m below the seabed.

Construction Technique: Sand was sprayed ("rain bowing") to create the shape, followed by deep-sea dredging and rock placement to form the island.

Transport: The Island is connected to the mainland by a bridge and features a monorail system. The project added over 78 km of coastline to Dubai.

**Figure-1: Palm Jumeirah & Persian Gulf.**

Atlantis, The Palm is a luxury hotel resort located at the apex of the Palm Jumeirah in the United Arab Emirates. It was the first resort to be built on the island and is themed on the myth of Atlanti but includes distinct

Arabian elements. The resort opened on September 24, 2008 as a joint venture between Kerzner International Holdings Limited and Istithmar World.



Figure-2: Atlantis, The Palm.

The islands were created using land reclamation. They were created to resemble a palm tree when seen from the air, and are roughly divided into three areas: **"trunk"**, **"fronds"**, and **"outer crescent"**. The trunk is a mixed commercial and residential area, the fronds are reserved for residential homes and villas, while the outer crescent is used for luxury and upscale resorts. The Trunk of Palm Jumeirah is a 2-kilometer-long, central hub connecting the island to the mainland, serving as the commercial heart with residential apartments, hotels, and retail. Developed by Nakheel, it features prominent residential projects like Shoreline Apartments, Golden Mile, and Marina Residences, along with the Palm Monorail.

Palm Jumeirah is a massive, man-made archipelago in Dubai shaped like a date palm tree, constructed between 2001 and 2009 using 94 million cubic meters of sand and 7 million tons of rock. It features a 2-km trunk, a crown with 17 fronds, and a 11-km crescent breakwater. Key infrastructure includes a sub-sea tunnel, a monorail, and soil stabilization via vibro-compaction.

Key Structural Components

- **The Trunk:** A 2-km long central spine connecting the mainland to the crown, featuring marinas, cafes, and residential areas.
- **The Crescent:** A 11-kilometer, 200-meter-wide breakwater that protects the island from Persian Gulf

waves. It was the first part built, constructed from over 7 million tons of rock.

- **The Fronds:** 17 fronds forming the crown, which house luxury villas, private beaches, and residential, leisure, and entertainment facilities.
- **Infrastructure:** The Island is connected by a bridge to the mainland and features a sub-sea vehicular tunnel connecting the spine to the crescent.

Construction & Engineering

- **Land Reclamation:** Built entirely from sand and rock, skipping traditional concrete foundations for the base to create land where there was only water.
- **Vibro-compaction:** To prevent sinking and stabilize the loose sand, engineers used specialized rigs to vibrate the sand into a denser configuration, a process that settled the ground by over a meter in some areas.
- **"Rain bowing":** The method used to spray dredged sand from ships to create the initial landform.

Key Infrastructure:

- **Sub-sea Tunnel:** Located 13-16 meters below the seabed to connect the spine to the crescent.
- **Monorail:** Connects the Atlantis Hotel on the crescent to the mainland.
- **Breakwater Design:** The crescent-shaped breakwater utilizes large rocks to dissipate the energy of ocean waves.



Figure 3: The Palm Jumeirah Outer Crescent.

The Palm Jumeirah Outer Crescent is an 11-kilometre (6-mile) long, curved breakwater protecting the man-made island from the Arabian Gulf. It hosts ultra-luxury resorts like Atlantis the Palm, offers a popular 11.5 km, 2026-updated boardwalk for walking/jogging with skyline views, and is accessible via road or the Palm Monorail.

Key Features and Attractions

- **Structure:** Acting as a massive seawall, it provides crucial protection for the inner fronds.
- **Luxury Resorts:** The crescent is home to high-end, five-star hotels and resorts.
- **The Boardwalk:** A, 11-kilometre walkway running along the outer sea edge, popular for jogging, walking, and sightseeing.
- **Transportation:** Accessible via the Palm Monorail, which runs from the mainland to the Atlantis station.

- **Scenic Views:** Offers panoramic views of the Dubai skyline and the Arabian Gulf.

Activities on the Crescent:

- **Walking & Jogging:** The dedicated boardwalk offers a long, often quiet space for exercise.
- **Dining & Entertainment:** The area features various dining options, including those at The Pointe.
- **Photography:** Known for excellent photo opportunities of the Dubai skyline and the surrounding sea.
- **Beach Access:** Many of the resorts on the crescent provide private beach access.

The Crescent connects to the rest of the Palm Jumeirah (the spine and trunk) and is a central part of the overall, highly exclusive, artificial archipelago.



Figure-4: Atlantis, the Palm [outside & inside].

The Palm Jumeirah's outer crescent is an 11-kilometer (6-mile), massive rock breakwater built to protect the inner island from Gulf tides and storms. It uses 7 million tons of rock, features two, 100-meter openings to ensure water circulation, and hosts major luxury resorts like Atlantis, The Palm. Purpose: Engineered as a protective barrier (seawall) against sea erosion, rather than using traditional concrete foundations.

- **Composition:** Built using 7 million tons of rock, including large boulders (armor rock) to absorb wave energy and smaller core rocks for stability.
- **Design & Function:** A 11-km, 6-mile, crescent-shaped structure with strategic openings to allow for water circulation, preventing stagnation.
- **Development:** The crescent supports numerous luxury hotels, residential villas, and is connected to the main island via a subsea road tunnel.
- **Construction:** The structure was developed by placing layers of rock, including a filter layer to prevent sand erosion underneath.

Shah Rukh Khan's "**Jannat**" [**Heaven**] is a luxurious 14,000-square-foot beachfront villa on the prestigious K-Frond of Palm Jumeirah in Dubai. Gifted by Nakheel developers, the property is valued at over ₹100 crore and features a private pool, direct beach access, and custom interiors designed by Gauri Khan. Mannat, located at Bandstand, Bandra in Mumbai, is the iconic six-story sea-facing bungalow of superstar Shah Rukh Khan, worth an estimated ₹200–₹2000 crore. Originally named Villa Vienna, it was purchased in 2001 and redesigned by Gauri Khan with luxurious, modern-classical interiors, featuring a gym, library, and private theatre. Shah Rukh Khan owns a luxurious ~₹100 crore (\$12 million+) villa in Dubai named "Jannat" located on the prestigious K Frond of Palm Jumeirah. Gifted by Nakheel developers in 2007, this 14,000 sq ft beachfront property features six bedrooms, a private pool, and stunning skyline views, with interiors personally designed by Gauri Khan.

Key Details of SRK's Jannat

- **Location:** Palm Jumeirah, K Frond, Dubai.
- **Size:** 14,000 sq ft.
- **Features:** 6 bedrooms, private beach access, private pool, and 2 remote-controlled garages.
- **Value:** Estimated around INR 100 Crore.
- **Significance:** It serves as a holiday home for the family and was a gift from Nakheel.

The villa is known for its elegant design, incorporating Arabic-style architecture with modern, comfortable interiors. It is a premier example of the actor's luxury investments, reflecting his strong bond with Dubai, where he is also a brand ambassador and holds a Golden Visa.

Key details about SRK's Mannat [Vow]

- **Location:** Bandstand, Bandra (West), Mumbai - 400050.



- **Architecture & Design:** A 27,000+ sq ft, Grade III heritage bungalow featuring a Neo-classical, all-white façade.
- **Interiors:** Designed by Gauri Khan with a mix of Italian and contemporary styles, including five bedrooms, a personal office, and a terrace.
- **Value:** Purchased for roughly ₹13–₹18 crore in 2001, it is now one of India's most expensive celebrity homes, valued between ₹200 crore to ₹2000+ crore.
- **Landmark Status:** A major tourist attraction where SRK frequently greets fans on Eid and his birthday.



Figure-5: Jannat (Dubai) & Mannat (Bandra) [Shahrukh Khan's Bungalow].

CONCLUSION

Palm Jumeirah was constructed between 2001 and 2007, with land reclamation starting in June/August 2001 and the first residents moving in by 2007. Developed by Nakheel, this man-made archipelago used sand dredged from the Persian Gulf, with infrastructure in place by 2004 and major building construction beginning in 2006. **Palm** is an unbranched evergreen tree of tropical and warm regions, with a crown of very long feathered or fan-shaped leaves, and typically having old leaf scars forming a regular pattern on the trunk. **Jumeirah** translates to "beautiful" or "glowing," often associated with paradise. It is a prestigious, coastal residential area in Dubai known for its beaches, luxury, and iconic landmarks. The name reflects both the area's scenic beauty and its reputation as an exclusive community.

- Construction Start: June–August 2001.
- Infrastructure Completion: 2004.
- Residential Handover: Began in 2006, with 75% of properties ready by October 2007.
- First Residents: Moved in during 2007.
- Major Hotel Openings: The Atlantis hotel opened in 2008, with 28 hotels operating by 2009.

Palm Jumeirah in Dubai is a massive man-made island built from over 3 billion cubic feet of sand dredged from the Persian Gulf, shaped into a palm tree and protected by an 11-kilometer crescent breakwater. Completed between 2001-2006, it uses no concrete foundation, relying instead on vibro-compaction to solidify the sand.

- **Materials:** Built entirely from sand and rock; no concrete was used for the foundation.

- **Technique:** Vibro-compaction was used to solidify the dredged sand, allowing it to support infrastructure.
- **Protection:** An 11 km crescent-shaped breakwater acts as a barrier against waves, storms, and tides.
- **Infrastructure:** A 6-lane sea tunnel, built using 200,000 cubic meters of concrete, connects the trunk to the crescent.
- **Layout:** Consists of a trunk, 17 fronds, and a surrounding crescent.
- **Residential:** Roughly 1,500 beachfront villas on the fronds and 6,000 apartments on the trunk.
- **Resorts:** Luxury hotels including Atlantis the Palm, Waldorf Astoria, and The Royal Atlantis.
- **Transportation:** A bridge connects the mainland to the trunk, and a subsea tunnel connects the trunk to the crescent.

Atlantis, The Palm is a luxurious, ocean-themed resort in Dubai featuring 1,544 rooms, the massive Lost Chambers Aquarium with 65,000+ marine animals, and Aquaventure Waterpark. The interior boasts high-end dining from celebrity chefs like Gordon Ramsay, extensive, family-friendly activities, and opulent, marine-inspired decor throughout.

- **Accommodations:** Rooms feature blue, water-themed carpets, gold accents, and dark wood, with many offering balconies overlooking the Palm Island. Specialized, high-end "underwater" suites are also available.
- **Dining & Entertainment:** The resort houses 36 restaurants, including Nobu, Gordon Ramsay's Bread Street Kitchen, and Ossiano, alongside Wavehouse, which features bowling and arcade games.
- **Marine Life & Attractions:** The Lost Chambers Aquarium is a major feature, offering interactive experiences with rays and sharks.
- **Amenities:** The resort includes luxury spas, high-end shopping boutiques, and extensive facilities for children, including a kids' club offering crafts, cooking sessions, and educational play.

The interior design is described as lavish, with noticeable, high-quality maintenance, featuring decorative elements like seashell and sand motifs in the hallways. Palm Jumeirah is a modern, man-made, artificial island in Dubai, constructed between 2001 and the late 2000s rather than a historical heritage site. Known as an "eighth wonder of the world," it is a marvel of engineering, reclamation, and luxury real estate, representing Dubai's modern, forward-thinking ambition.

Construction: Built by Nakheel using 50 million cubic meters of sand, designed in a palm tree shape.

Completion: The project was announced in 2001, and by 2008, it was fully inhabited.

Features: Features over 305-star hotels (including Atlantis), luxury residences, and a monorail.

Status: While not "heritage" in the traditional historical sense, it is considered a modern, iconic "blue-chip asset" and landmark for Dubai.

It is not to be confused with traditional heritage areas, as it represents modern architectural innovation.

REFERENCE

1. https://en.wikipedia.org/wiki/Palm_Jumeirah