



2010 On Site Review Report

3754.IND

by Kevin Low

Palmyra House

Alibag, India



Architect
Studio Mumbai / Bijoy Jain

Client
Jamshyd Sethna

Design
2005 - 2006

Completed
2007

Palmyra House

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I. Introduction

Palmyra House is an intimately detailed and constructed double-storey timber house in two blocks, with a centrally located lap pool. Built as a weekend retreat, the house lies in the shade of an extensive coconut tree grove on an agricultural parcel of coastal land facing the sea near the fishing town of Nandgaon, about two and half hours by boat and car from Mumbai.

II. Contextual Information

A. *Brief Historical Background*

The house is sited on the seaward portion of a rural agricultural lot measuring about 4,200 m², with a beach-fronting width of about 72 metres and a subdivided depth of about 195 metres. The original lot was not bought in its entirety, as the previous owner wanted to maintain ownership of the east, street facing portion of the site. Most plots of beachfront land in the area are subdivided and sold in this way, with urban dwellers buying beachfront property with seaward views and the original owners, engaged in agriculture, retaining the portions that offer the practicality and convenience of direct vehicular and animal-drawn access.

B. *Local Architectural Character*

The architecture of the area is typified by primary building masses of brick masonry, typically more finished on their street facades than on their sides (if finished at all) with hipped clay-tiled roofs of reasonable pitch (20° to 25°) and lime plaster and painted front elevations. The predominantly Muslim fishing village of Nandgaon, a five minute walk along a clean dirt track from the house, features architecture that is primarily two storeys in height, simple clay brick masonry in construction with timber extensions for porches, balconies and medium depth roof overhangs. There are bits of vivid colour throughout the architecture and the vernacular character has all the buildings facing the street.

The local architecture in the immediate neighbourhood and village is also oriented to the streets, with the formal frontage usually characterised by a colonnaded entry veranda covered overhead with an extended roof or a balcony above, which is itself shaded by an extension of the main building roof (roof overhangs are of medium depth). The sides of the buildings are generally left in a noticeably less finished state whereas the front, street-facing elevations are typically lime or cement plastered and painted, with the more elaborate embellishments provided through trim or colour.

The single-storey buildings, fewer in number and predominantly residential in function, are similarly finished, with heavy masonry colonnades supporting the reasonably deep shade of clay-tiled, roofed verandas.

C. *Climatic Conditions*

The climate in Nandgaon is described as tropical wet and dry, with just one strong monsoon season from the second week of June to the end of September, when between 1,800mm and 2,000mm of rainfall occurs. Climate is humid all year round, with the hot season from March till May and a dry, cooler spell between December and January.

D. *Immediate Surroundings of the Site*

Site access begins along the main street of the town of Nandgaon and down a branch dirt road, through the agricultural fringes that are within a short walking distance of the town. The site is entered from a short length of road edged by the basalt boundary wall of the property parallel to the coastline, with a single break at a timber gate.

The immediate surroundings have working groves of coconuts trees on basically flat land with brownish-grey, fertile sand underfoot (given the ancient geological history of volcanism in the area), punctuated with the wide mouths of brick-lined wells typical of the coastal beaches of the area. The neighbouring buildings are primarily one- or two-storey houses and single-storey brick storage sheds.

E. *Topography of the Project Site*

It is generally flat across the site, with a rise to gentle flat mounds on each side of about 750mm in height and 26 metres measured along their depth facing the sea, with a depression between them.

III. Programme

A. *History of the Inception of the Project*

The client, a resident of Mumbai, was in the market for a piece of coastal property for a weekend home, in order begin work on a book on travel (being in the travel business himself), with the later use of the house for weekend getaways. The land was found with the help of a broker, and its subsequent subdivision was formalised as part of the agreement.

B. *How were the Architects and Specialists chosen?*

The architect was recommended to the client by the architect's landlord who was a mutual acquaintance. The architect's office and premises are about 75 minutes away from the site; the specialists, cost surveyors, craftsmen and sub-builders, had previously worked directly under the architect or in collaboration with him on previous projects and simply became part of the overall engagement.

The structural engineer was selected by the architect for his willingness to experiment and push the limits of what was locally known: his work, however, concerned only the design of

the primary foundations and ground floor concrete slab - all responsibility for the structural timberwork was undertaken by the architect and his building studio of craftsmen.

C. *General Programme Objectives*

The program given to the architect was for a weekend refuge away from Mumbai, to serve initially as a place for the client to write his book and in the long term as a house for the client and his family. The main programmatic elements included a master bedroom and two bedrooms with en suite bathrooms, a study, an open-plan kitchen and dining area, a living room and a pool. The architect was left to configure the programmatic brief in any way he desired.

D. *Functional Requirements*

Aside from the general programmatic objectives, the specific functional requirements were left to the discretion of the architect, and as such, a formal brief did not exist. The architect decided on twin blocks as the means to differentiate the master bedroom wing and its study from that of the twin bedrooms as well as to provide a semblance of spatial identity to the basically anonymous site that had no previous construction or building on it.

IV. Description

A. *Building data*

- Number of main building masses: 2
- Number of ancillary masses: 3 (Asian kitchen, water tower/service quarters, pump room)
- Volumetry: per main building block: 525m³ excluding backfilled masonry foundations (1,050m³ for both blocks)
- Floor surface area:
 - master bedroom block - ground floor: 84m²
 - first floor: 49m²
 - guestroom block - ground floor: 84m²
 - first floor: 60m²
- Total main building floor area: 277 m²
- Surface area per north/south elevation: 132m² (excluding exposed masonry foundations).
- Surface area per east/west elevation: 23m² (excluding exposed masonry foundations).

B. *Evolution of Design Concepts*

Response to Physical Constraints

Located in an area zoned for agriculture, the site allowed for the construction of a single dwelling without need for a formal building submission (as is common to the British Form of

Contracts adopted by India). The site was also located under coconut trees (with the obvious dangers from falling coconuts and the heavy fronds) but it was decided at the outset that a minimal number of trees would be removed, since one of the main reasons for choosing the setting had been the trees that shaded it, providing lightly screened views to the sea, and passive cooling by way of shade throughout the day.

Response to User Requirements, Spatial Organisation

The functions of the house were put into two oblong louvered masses, side by side, with the north block just ahead of the one to the south. The house lacks a strictly formal main door; entry is through the short ends of the two blocks, along the side of a rubble wall (which itself serves the purposes of an aqueduct, fed by the roof pond of a water pump room) and into the 'room' of the centrally-located pool, which is the uniting space of the house. The 'room' of the raised lap pool is slid midway between the two blocks and extended beyond the architecture to the sea and sunset westwards. A master bedroom suite sits in the north block, with the bedroom looking over the tall volume of a living room facing seaward west, and the bathroom facing the land-bound east, lies just past the fully glazed landing of an access staircase. The ground floor of the same block contains a study, an informal corridor/ lobby with storage cabinets, and a door to the powder room by the stairs, then out to the high ceilinged living room.

The south block contains the two guestrooms with en suite bathrooms, one stacked above the other, separated from the double-volume dining space to the west (with sea view) by stairs going up, and a western-style dry kitchen. On the upper floor, the access stairs separate the second guest suite with an informal loft for a lounge, the floor of which serves as the ceiling of the kitchen below, as the guest suite looks over the dining room.

Formal Aspects - Massing, Articulation of Facades, Decorative Features

The house proper takes on the massing of the two aforementioned blocks pointed to the seafront, one offset slightly with the other, with a gentle splay facing the west. The louvered blocks are raised off the sandy ground level by a recessed base, giving them a subtle and sensitive detachment in relation to the site. Ancillary support building masses include a small Asian kitchen touching the south boundary (added later), a single-storey pool pump room sited to the east of the main house, a three/four-storey stone water tower with servant's quarters located beneath, and smaller un-designed screened areas of timber and palm fronds for a diesel generator and water pumps by the existing wells.

The elevations of the two primary blocks of the house are predominantly characterised by louvers made from the trunks of the local Palmyra palm (*Borassus flabellifer*), an indigenous agricultural crop, with a trunk resembling that of the coconut tree, and rung with leaf scars.

The east facades facing the entry path are fully constructed of sliding/ folding 'accordion' doors with adjustable louvers in a substantially more finished teak wood. The east elevation, aside from being the most polished, is the only one that can be fully opened to reveal the spaces inside. The external facades looking north and south have a combination of protruding sections of various cantilevers for the master bath/ shower, bed head storage in the

guestrooms, or bay seating by the living area, all against a backdrop of the Palmyra louvers interspaced with fixed glass panes correlating to the functions of the interior spaces.

The west facing elevations feature the predominant Palmyra louvers, with a single tall, narrow pane of laminated glass for the northwest corner of the living room. The tall volumes of the living and dining areas employ similar ‘accordion’ doors as those facing east, to open entirely on their inner sides to the shared outdoor space of the pool ‘room’ between them. Each of their outward-facing walls, south and north, are blank-faced, sheer walls of local *aini* timber, rising to the first floor perimeter frame, above which are fully glazed, fixed glass panes that allow views up to the crowns of palm fronds above.

There is no decoration on the elevations of the blocks, only construction details which reveal (in part) the nature of their assembly, and contribute to the overall texture of the building. The elevations for the house can be described as delicate and austere, simple but warmly textured surfaces that make the house appear as twin filigree boxes lying amid coconut trunks.

Landscaping

The landscape design for the project was conceived around the existing coconut grove, both formally and functionally. At the main gate to the property, a forest of predominantly areca, or betel nut palms (*Areca catechu*) was added to the existing grove, as a buffer to the house beyond. The dirt driveway terminates almost immediately after the gate, giving way to a narrow foot path which meanders to the right and along the side of the north property wall, the top of which also serves as an aqueduct. Throughout the journey in, the palm forest on the left screens the service masses of the water tower, service quarters and other support structures for the house. The path broadens as it nears the house obliquely, the forest ending as the sparser trunks of the coconut grove take over, with the angled north face of the master bedroom wing coming to view first, the cantilevered box of the master bath hanging over the brown sand below. The gesture of the oblique entry, subtly directing one towards another low aqueduct wall to the left between the blocks, is touched on later in the report, in the reference that the building’s massing makes to the formal street frontage of the buildings of the villages in the area.

Functionally, the project landscape gathers inspiration from the patterns of agriculture in the region and the coconut grove. The architect, having received the client’s request for higher boundary walls for better perceived security, decided to soften the intention of the walls by topping them with aqueduct channels, in acknowledgement of the many lower masonry aqueducts in the region. He placed the formal aqueducts on top of the side boundary walls, with the less formal aqueduct channels carved into the sand from their feeder walls on either side. The concept was to have the moss and green ferns commonly found growing on the sides of these walls (which are constantly wet) to proliferate from the boundary walls themselves, and gradually grow in, towards the house. The channels carved into the sand run perpendicularly from the boundary aqueducts, ending in moats around each coconut tree (another nod to local agricultural practice), in order to saturate the sandy soil and roots at the base of each tree. The patterns cut into the bare, brown, sandy landscape around the house, either viewed from the rooms above or as playful depressions to avoid in a walk through the property, speak a language of the land.

The clearer part of the site where the main blocks of the house are located is, in selected areas around the house and along the aqueduct walls, planted with a variety of cycads, ferns, smaller palms and shrubs. It is obvious, even before close examination, that these have been planted recently (perhaps in readiness for the technical review?), as the fresh plantings appear predominantly next to the aqueduct and building walls, thinning out as they spread from the walls, which recalls the architect's statement about spontaneous growth on agricultural land originating most typically from the sides and bases of the aqueduct walls as they gradually spread from the primary source of water. The plantings range from small coconut trees (*cocos nucifera*), to screwpines (*pandanus utilis*) and spider lilies (*hymenocallis speciosa*), bird's nest ferns (*asplenium nidus*), banana plants (*musaceae*) and frangipani (*plumeria obtuse*).

C. **Structure, Materials, Technology**

Structural Systems

The structural system employs post and lintel timber construction for all vertical loading, with external stud walls of timber shiplap boarding and internal walls of masonry for sheer loads.

Materials

Structural members:

- Local *aini* hardwood timber (*Artocarpus hirsutus*) for entire structural frame
- Continuous reinforced concrete base footing and basalt rubble stone bearing walls
- Reinforced concrete ground floor for perimeter support of timber superstructure
- Brick masonry sheer walls
- Ship-lapped weatherboarding on structural timber frame for external sheer walls.

Infill materials:

- Local basalt stone for boundary and freestanding aqueduct walls
- Regionally local Palmyra wood (*Borassus flabellifer*) for all external fixed open louvers
- Primarily recycled *aini* timber for shiplap boarding on sheer walls
- Primarily recycled teakwood for all folding/sliding (or 'accordion') doors
- 12mm thick, locally produced laminated glass panes for all windows
- 600mm wide sheet aluminium roofing
- 18mm thick *aini* timber tongue and groove flooring on upper levels.

The main building enclosure material, the Palmyra louvers, warrants a greater discussion: Indigenous to India as an agricultural crop, it registers quick growth after a slow beginning. It is cultivated for its nutritious fruit and fleshy underground stems, its leaves are used for thatching and weaving hats, baskets and mats, and the wood from the trunks is highly valued for its durable nature.

Renderings and Finishes

- Cement render with oxide additive colouring for ground floor and all internal masonry walls.
- Stained selected plywood ceilings/wood-oil finished timber surfaces.
- 1mm thick copper flashings and trims.
- Unpolished brass tap ware and operating fittings, all locally sourced *Jaguar* tap ware.
- Ceramic sanitary ware - locally sourced *Hindware* basins, imported *Kohler* water closets.

Construction technology

Construction technology was primarily locally sourced, with mixed methods for the roofing and flashing details. However, a simple description fails to capture the nuance of the processes guiding the construction of the project, as the technology employed involved collaboration between architect and craftsman at every level and of the sort rarely seen in architectural practice.

The base foundations and ground floor level of the project are simple enough, with a typical continuous concrete slab footing and its basalt bearing wall to support a 175mm thick concrete slab ground floor, cantilevered about 300mm on all sides. The timber superstructure of the blocks was hung off the cantilevered edge by way of steel brackets welded to the slab reinforcement bars and was set in place before the concrete floor was cast. After the ground floor perimeter edge beams were mounted against the slab, the construction systemisation began. All timber framing, profiling and joinery was prefabricated in the design studio workshop about an hour from the site, in a close, collaborative process which involved about a dozen individuals from master carpenters, craftsmen and stone masons to a French roofing specialist, plumbers, electricians, a structural engineer and three architects.

The various parts of the building were brought to the site and assembled, with minimal variations in the course of assembly, as most of the unknowns had been sorted out already through discussion and with fully-scaled mock-ups prior to final fabrication. The master carpenter was vital, being the one who had deep experience in all the various trades. He was charged with everything from coordinating the physical junctions and intersections of the work, to bringing attention to areas and situations which warranted such coordination.

The development of the design and detail were achieved between architect and craftsmen, in a collaboration which often took on tested techniques, both local and foreign, and raised them to finer construction resolution. Some of the details regarding this heightened state of resolution included:

- Extensive copper flashing and coping details to most, if not all, of the timber joints expected to suffer the damaging effects of water intrusion.
- Rigorous structural timber jointing designed according to degree of strength and appropriateness of give required for each specific location.
- The detailing of local Palmyra wood to develop continuity for the louvering of the entire enclosure.

- The customisation and deep attention put to the design of cheap but sophisticated details and smaller touches that most architects commonly relegate as tasks secondary to the act of architectural design, examples of which include:
 - Light switch face panels, customised in recessed aluminium.
 - Cabinetry hinges which permit door leaves to meet without an exposed intermediary framing element.
 - Type of floor colouring oxide that would best age as well as recall the particular colour of lichen commonly found on local coconut trunks.
 - Overflow channels on pool edges and removable customised water inlets at the base of the pool to allow for ease of maintenance.
 - Customised hidden floor junction boxes for the provision of power outlets light fixtures.

The technology used in the construction of the project, simple though it might seem, was one which was constantly evolving and constantly informed by the architectural outcome.

Building Services, Site Utilities

The lighting for the house is functionally minimal, generally incandescent or fluorescent bulbs, the lumens of which are underprovided until the generator set is powered. After illumination, the lighting could be judged as still dim, but thoroughly appropriate and compatible with the given use of the house as a weekend retreat.

Water is supplied by any one of three large-mouthed wells that line the property between the service tower and the main blocks. Drawn by Grundfos pumps from the relatively high water table, the water is filtered and stored in a single large tank at the top of the tower, and then gravity fed to the house and its fixtures.

Waste water is piped to two septic tanks, one for each block, located immediately adjacent to each block next to the bathrooms, with the runoff drawn into separate filter pits of brick shards, loose gravel and coal filtering close to the north and south boundary aqueduct walls, for cleaning and percolation into the soil.

Each bathroom has a provision for the installation of floor mounted air conditioning, with electrical wiring and condensate piping already in place and elegant timber grilles designed as part of the interiors to conceal the machinery. The architecture will have to see the addition of an operable glazing enclosure to allow for ventilation and containment whenever required, as well as appropriate locations to house the air handling compressors.

D. *Origin of Technology, Materials, Labour, Professionals*

Technology

- | | |
|-----------------------------|---------------------|
| - Concrete and masonry work | Generally local |
| - Timber joinery | Predominantly local |
| - Carpentry | Local |
| - Roofing and flashing work | French |

Materials

- Primarily	Local
- Basalt rubble stone	Local
- Cement render with oxide colouring	Local
- 12mm thick laminated clear float glass panes	Local
- Sheet aluminium roofing	Local
- Hand-moulded copper trims/flashings	Local
- Ain timber	Local
- Reclaimed teak wood	Local
- Palmyra timber louvers	Local

Labour

- Predominantly	Local
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Professionals

- Architects	Indian, American
- Main contractor	Indian
- Subcontractors	Indian, French
- Consultants	Indian
- Craftsmen	Indian

V. Construction Schedule and Costs

A. *History of Project Design and Implementation, with Dates*

Commission	February 2005
Design and development	March 2005 - April 2006
Completion	June 2007
Occupation	October 2007

B. *Total Costs and Main Sources of Financing*

Initial budget	INR 15,000 000 (USD 300,000) excluding cost of land
Total final costs	INR 19,000,000 (USD 380,000) excluding cost of land

The house was privately funded by the client.

C. *Comparative Costs*

Costs of houses in the area range from	INR 500,000 to 30,000,000 (USD 10,000 to 600,000)
The average cost of a typical house in the area	INR 2,250,000 (USD 45,000)

D. *Qualitative Analysis of Costs*

Total building costs	INR 14,200,000 (USD 284,000)
Main building costs per square metre	INR 51,264 (USD 1,025)
Infrastructural costs	INR 2,500,000 (USD 50,000)
Landscaping costs	INR 800,000 (USD 16,000)
Professional fees	INR 1,500,000 (USD 30,000)
Cost for master bedroom block	INR 6,818,112 (USD 136,362)
Cost for guestroom block	INR 7,382,016 (USD 147,640)

E. *Maintenance Costs*

No information was available on the electrical costs as the building has not been sufficiently used in order to be able to estimate an average. There are no cooling/heating costs as the house is being passively cooled. There are no water costs since water is drawn from site wells.

F. *Ongoing Costs and 'Life Performance' of Building*

The materials of construction are typically hardy, with black basalt and reinforced concrete foundation, *aini* timber superstructure and teak with Palmyra wood enclosures.

VI. *Technical Assessment*

A. *Functional Assessment*

The building is well organised, with the spatial distinction made between the living area, master bedroom and study, which form one block, from the dining room, kitchen and two guestroom suites. The passage of entry, biased towards the living room block, guides the visitor to a perceived midpoint between the two blocks at the head of the pool, where two facing louvered doors on each block serve as the formal points of entry into the buildings proper, a subtle gesture achieved through a developed understanding of spatially perceived thresholds. Perceptually, passage through the spaces of the house and its overall spatial experience is refined and comfortable.

Functionally, the house has its weaknesses; to achieve the contiguous effect of the *Palmyra* louvers on the elevations of the buildings, the louvers were applied single-mindedly to most of the external faces, including the critical facades facing the sea to the west. While the effect works remarkably well within the interiors (especially the bathrooms) with respect to ambiance, it becomes considerably less satisfactorily at particular times of the day: the bedrooms and bathrooms, although ingeniously screened through the day by virtue of the visual contrast provided as the daylight is caught by the curved louver blades, are sufficiently exposed by internal lighting from dusk to late evening so as to deter the user from using any artificial lights in order to maintain privacy.

The operation of the large accordion doors at the living and dining areas was a touch tricky when I visited, as the doors tended to stick as they folded and slid, due to the lack of attention

given to the heights of the doors, and a subsequent decision to curve the bottom frames of each door where they butted against the floor timber rebate.

The master bedroom block, with its suite slung above the living room, over the powder room and study below, presents sightlines of the coast from the bedroom proper that are unavailable to the other parts of the house. However, the separation of the master bedroom from its bath area by the stair landing is an uncomfortable compromise, as passage between the two is interrupted by the somewhat less private landing, a fact that is compounded by fully glazed exterior walls which lay the landing bare to the opposite guestroom block and the neighbouring lot north.

The master bathroom proper is spacious, with subtle, ambient light filtering through the louvers by day. It includes the small light well of the cantilevered shower enclosure, open to both sky above and earth below, with the gaps of the slatted timber floor permitting the passage of water through the space. However, like the other bathrooms, this bathroom also suffers a loss of privacy during the hours of dusk and into the evening, as internal artificial lighting reveals the interior space between the open louvers to the outside.

B. Climatic Performance

With its minimal sense of enclosure, the house has been designed to put its occupants in intimate contact with their senses with respect to air flow and moisture, humidity, temperature, sound and smell. Apart from the adjustable teak louver doors on its main openings of the living, dining, study, guest bedrooms and bath areas, the entire enclosure is a permeable ‘skin’ of Palmyra wood louvers gently angled downwards from inside to outside. It means that the grace of permanent cross ventilation is experienced alongside the strong winds and driving rains of the monsoon months. The building, shaded by the crown of its coconut grove, is spared the absolute worst of inclement weather. The sheer transparency of the louvering prompted the design of framed plastic sheets to fit within the inner frame edges of all internal elevations, due to the lack of adjustment to the fixed open louvers. Mosquitoes and insects are generally only an issue at dusk, between the hours of six and eight in the evening, after which the lack of mechanical or sprayed insect control does not pose a problem.

The guest wing box, with its bedrooms located away from the seaward boundary and to the east, teaches an elegant lesson in passive cooling—by day, with the sea serving as a cooling mass of high pressure, winds breeze through the dining and kitchen areas; by night, when wind direction is reversed due to a faster cooling land mass with the sea as a latent heat sink, cool winds course through the bedrooms in the evenings and right through the night. The adjustable louvers that fill the entire east elevations of each block, behave like building-sized, natural air-handling diffusers.

C. Response to Treatment of Water and Rainfall

Rainfall on the roofs drains away from the facing elevations by way of hand-folded standing seam aluminium roofing sheets that lead into similarly moulded gutters that drain out to the sandy ground below through hand-moulded copper spouts (seven per roof). The gutter has been interestingly given seven corresponding divisions by means of internal gutter upstands,

each to a spout. The detailing of the actual spout and its fascia jacket is elegant, although the joint between the spout and gutter still relies on traditional French methods of water sealing. In a climate with significantly stronger rain and sun exposure, this might possibly create problems as time goes by.

The house benefits from having porous and quick draining soil on a healthy water table, so that surface water merely soaks away into each of three large masonry wells located on site. The well water is subsequently pumped to a tank in a masonry tower for use in the basalt stone aqueducts for landscape maintenance and, after filtering, for washing and general water use in the house. The attention given to sewage, with septic tanks and a coal filter soak-away pit seems to be reasonably effective, given the function of the building as a simple weekend house. The system should manage the cleaning of waste material well enough with proper treatment within the septic tank, so that treated overflow back into the soil should not pose a problem of contamination to the water table.

D. *Environmental Response*

The house adapts to its environment by allowing passage of its ambient microclimate through its internal volumes. Only two coconut trees were felled in the construction of the house, with all building materials brought to the site by hand to reduce the impact of the construction work. The basalt boundary walls on the north and south sides of the property serve as an elegant means to irrigate the groves of trees, while disguising their use as aqueduct channels.

The unexpected recent plantings I found adjacent to aqueduct walls and exposed building foundations are a touch jarring, both in the freshness of their planting, their colours and the specifications. Some of the plants are the sort found in the landscapes of downtown commercial developments as hotels and apartments, with the whole effect of the secondary landscape unsympathetic to the existing site texture of coconuts trees, brown sand underfoot and austere louvered boxes.

The landscaping that I believe was designed during the inception of the project, the thick forest of areca nut palms, appears to be better appointed, serving its function of buffering the private aspects of the site well and blending in considerably better with the grove of coconut trees. The preservation of all but two of the coconut trees in the vicinity of the construction area is commendable, as would the whole effect of the house sitting on its shaded lawn of sand and towering trunks have been, had it not been encumbered by additional and extraneous planting.

E. *Choice of Material, Level of Technology*

The materials used in the house are all locally sourced and of considered selection. The reclaimed teak lumber, used for all main accordion doors and their operable louvers in the living, dining, study and bedroom areas suggest a concern for reuse rather than fresh consumption, as does the use of some structural elements of local *aini* hardwood, in both fresh and recycled forms of the timber. The trunks of the Palmyra (*Borassus flabellifer*) have been farmed for their use in the extensive louvers wrapping the elevations of the house, the robustness of the material boding well for the rigors of the coastal monsoon climate. The

processing of the Palmyra wood into louvers has been designed to maintain the external curvature of the truck for each louver blade, with the eccentricity of each gently undulating blade left uncorrected, and the assembly of the slats detailed to accentuate continuity.

The materials of copper and aluminium, although not quite a part of the architectural tradition of the region, are nonetheless available in sizes appropriate for roofing and weatherproofing timber joints. The attention given to additional detailing of typically French roofing methods by the team has resulted in constructs that have been tailored quite specifically to the project, with the exception of the spout/gutter detail. The cement finish with its oxide colouring found on the ground floor and on masonry walls within the enclosure of the house provide the subtlety of colour and texture ideal for the harsher light of a tropical climate. The sensitivity with which the finish has been taken into the face plates of the light switches, covers of floor junction boxes and bathroom walls brings a deep sense of narrative to the building.

From the task of constructing a custom pool overflow and its water inlets, to the copper bracketing required of a structural corner framing joint, the structured humanness of the uneven horizontal louvering, and the design research required for a concealed brass hinge for cabinetry, the technology used in the project was one of invention, from architect to craftsman, as well consideration of the three most valued issues in the pure construction of a building: ease, durability and elegance.

F. Response to, and Planning for, Emergency Situations

The site has not experienced flooding historically, its soil being of high porosity. However, the plinth of its main level slab has been raised off the sandy ground level by means of a recessed masonry foundation wall, cantilevered to receive its structural timber frame. As such, the blocks of the house sit between 350mm to 600mm off the ground level protecting against the intrusion of sand with the onset of stronger winds.

Being enclosed in most part by screens of angled Palmyra horizontal louvers in line with prevailing winds, the building responds to lateral wind loads favourably: as with its visual transparency, wind loads are accommodated by the open louvered screens with their uninterrupted passage through the interiors of the house.

Earthquake or exceptional wind loads that are experienced are absorbed by the nature of its structural construction - the building is allowed to sway and subtly give with heavy lateral loads, with its timber pin joints providing the necessary tolerance. Being predominantly constructed of timber, the building presents the unavoidable risk of fire, reduced in part by the precautionary measure of fire insulating all electrical conduits in the upper level timber floor construction.

As the primary enclosure for the house was in the form of open louvering, timber-framed thick plastic panels were designed for insertion into the framing of the Palmyra louvers during the monsoon period, in order to keep the driving rains from inundating the interiors. The storm panels are currently stored away in mediocre condition, given the relative difficulty of their application.

G. *Ageing and Maintenance Problems*

The client has moved from Mumbai to Delhi and the house has been occupied on a mere six occasions since completion. The accommodation kindly provided for this technical review for three full days marked the seventh occasion. As such, the house interiors do not exhibit the usual signs of wear due to regular occupancy.

The external parts of the house appear to be holding up well, due to the choice of materials used in construction that leave very little trace of the maintenance they require. It is difficult to say how well the joints of the unprotected structural timber and Palmyra louvering will take extended weathering, but thus far, the material and methods employed in construction show aesthetic resilience. Aside from the small cracks and splitting surfaces which commonly accompany structural timber construction (without compromising structural integrity) there appear to be no signs of running problems.

The house is expected to see a heavy degree of water intrusion over the monsoon season with strong winds if extensive precautions are not taken to prevent the rain from entering.

The decision to build directly beneath the shade of coconut trees brings with it the obvious issue of running damage from falling coconuts and the heavy fronds. Whereas most coconut plantations are only averagely maintained, the grove around the project requires diligent monitoring of the crown layer, ensuring that dead leaf and coconut removal occurs on a regular basis to prevent damage to the aluminium roof and copper accessories.

H. *Design Features*

The house, contextualised by two horizontally louvered blocks amid the vertical trunks of a coconut grove presents a contrast of form and a confluence of texture that is immediately gracious to its setting. The simple rectilinear form of the blocks cut a clean contrast to the more organic nature of the site, but its material and constructional textures help dissolve whatever division that might be felt between the two, resulting in a building that immediately sparks interest, being both distinguished and quiet. The blocks have been justified more to the south boundary, as a gesture to create more of a buffer between the master bedroom wing and the neighbouring lot, with more activity of a service nature occurring between the smaller space between the guestroom block and the property by the south boundary.

The location of the two blocks also followed from a depression on the site on either side of the raised area where it was generally felt the building would sit. With the house set on the gently raised mounds, the pool could rest comfortably in the depression with little or no excavation. Excavated soil for the foundations of the house was backfilled around the pool resulting in a net balance of cut and fill, an appropriate gesture given the tight passage to and from the construction area.

The gentle splay between the two louvered blocks as they face seaward presents both the subtle intimacy of arrival and the force of its revealed context. The architect had pointed out a particular street en route to the project, which had to an extent inspired the relationship between the two masses of the house).

The character of the street, generally two-storey blocks with eccentrically located timber balconies, with a separating dimension approximating less an actual street than a public *room*, can actually be found in a number of other locations through the main street of Nandgaon. It is around the concept of this 'room' that the design of the house was formed, and it provides the project with its appropriate sense of character for the chosen site.

I. Impact of the Project on the Site

There does not appear to be much impact of the project on its site to speak of, the site being rurally sited. The edge of the site that faces west, however, overlooking a tumbling man-made breakwater of loosely laid basalt stone to the beach, has become a default weekend promenade for the neighbourhood cricket matches among the Muslim youth of Nandgaon.

J. Durability and Long-term Viability of the Project

The project, lifted of the ground level on its basalt stone foundations and constantly cross ventilated through its robust Palmyra louvered boxes, appears to be well protected against ground moisture and damage, and should thus prove durable. The canopy of coconut trees has been maintained to good advantage as well, keeping the structures protected from the harsher rays of the equatorial sun. Aside from the effect that rains during the monsoon period will have on the house envelope and interiors, the project could easily be imagined to survive a significantly long time.

K. Ease and Appropriateness of Furnishings

The interiors of the house are a carefully detailed combination of stained cement floors, lightly grooved gridded plywood ceilings, timber tongue and groove flooring, and custom detailed unpolished brass light switches, door handles, tap ware and accessories. The fine attention paid to the design and the coordination of typical commercially specified items such as door hinges, floor reveals for electrical outlets, switch ware, thresholds and bathroom shower flooring, reveals the sort of depth one rarely finds in architecture anywhere.

The loose furnishings of chairs, tables and towel racks were selected by the architect, to make the accommodation during this technical review more comfortable; they blended into the copper green of the oxide coloured floors and walls, lending a sense of grace and comfort to an entirely unfamiliar experience.

VII. Users

A. Description of Those Who Use or Benefit from the Project

The client of the project runs a travel business and belongs to a high-income group. Thus far, the users have included the client and his family on five occasions, the architect and his wife for an overnight visit, and the review team of a videographer and technical reviewer for three nights. All users have had the privilege of university educations and degrees, of a higher economic profile, and are well-travelled and culturally conscious.

B. Response to Project by Clients, Users, Community

What do Architectural Professionals think about the Project?

Judging from the numerous internationally well-established architectural journals the project has been featured in, it is clear that the building is held in high regard among journalists, critics and architects generally; both as a model of architectural merit unto itself, and as an example with a deeper impact in the field. It appears to be well received locally, and has been published in journals and written about favourably in the country.

Popular reaction is glowing at the very least, with numerous architectural website blogs, both locally and internationally, featuring the project.

What do Neighbours and those in the Immediate Vicinity think about the Project?

Neighbourhood reaction is mostly positive, with the local name *lakde ka ghar*, the 'wooden house', given to the project. While not many understand its significance, apart from the fact that it belongs to a wealthy individual from Mumbai, most are generally warm, if somewhat perplexed by its transparency and form.

VIII. Persons Involved

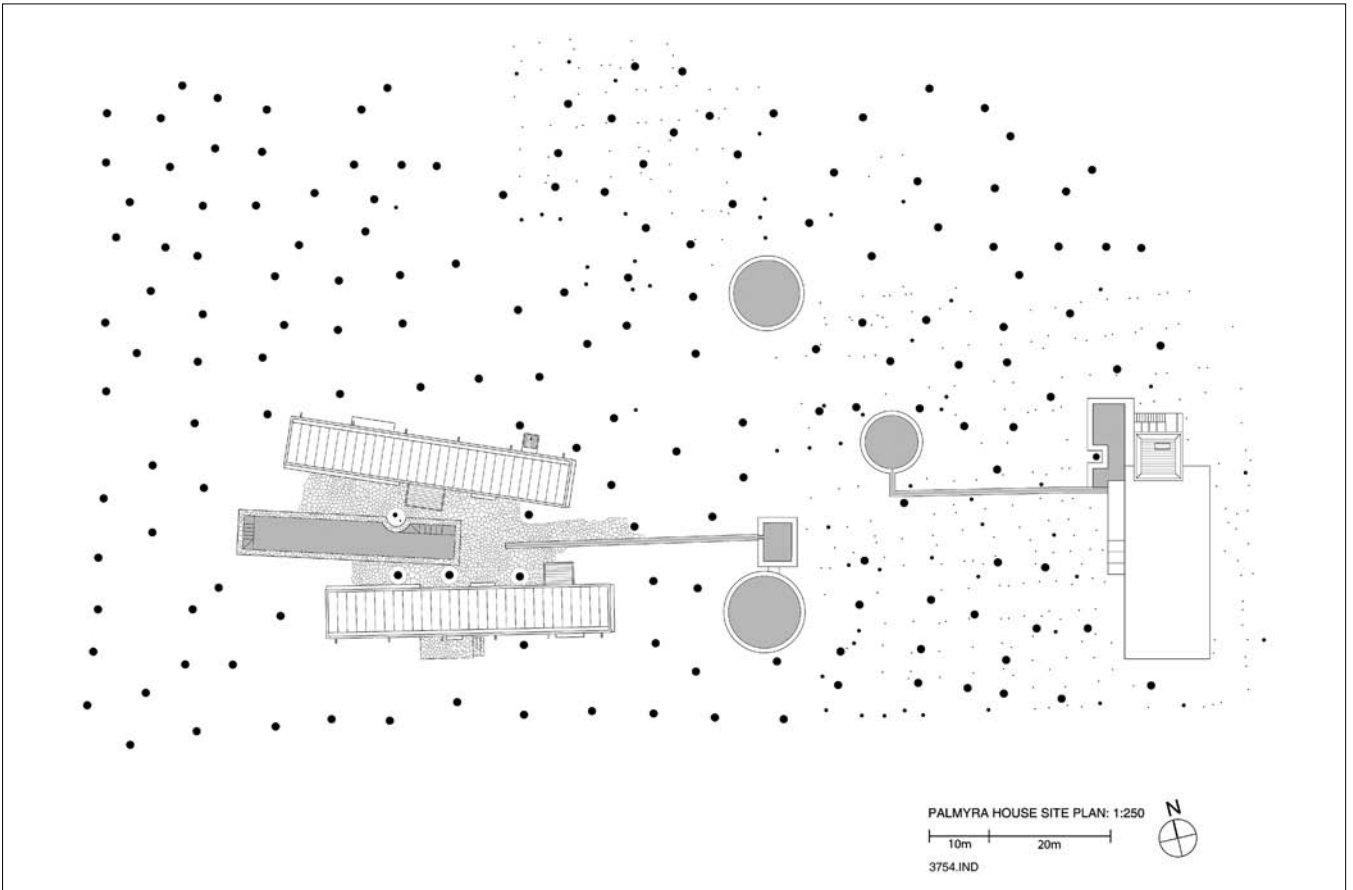
<i>Full name</i>	<i>Role in Project/Position</i>
Mr. Jamshyd Sethna	Client
Mr. Bijoy Jain	Principal Architect
Mr. Jeevaram Suthar	Master Carpenter/Coordinator
Mr. Punamchand Suthar	Head Carpenter
Mr. Pandurang Gharat	Master Mason
Mr. Bhaskar Raut	Master Craftsman
Mr. Dwijen Bhatt	Foundation and slab design/Engineer
Mr. Roy Katz	Assisting Architect
Mr. Samuel Barclay	Assisting Architect
Mr. Mangesh Mahatre	Site Architect
Mr. Jean-Marc Moreno	Metalwork and Roofing Specialist
Mr. Kishor Mhatre	Plasterer/Mason
Mr. Fahim Khan	Electrician
Mr. Imram Ali	Electrician
Mr. Nizam Mohammed	Plumber
Mr. Jayesh Gharat	Site Foreman
Mr. Dattatrey Shinde	Master Stone Mason

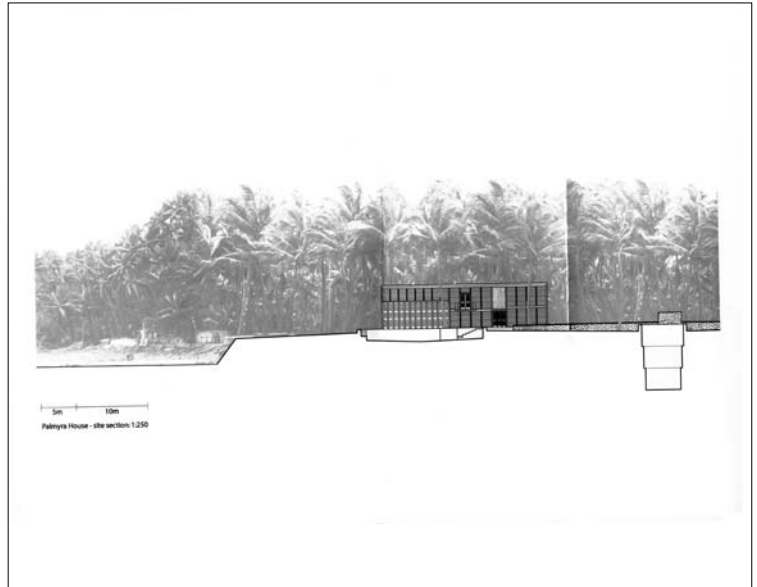
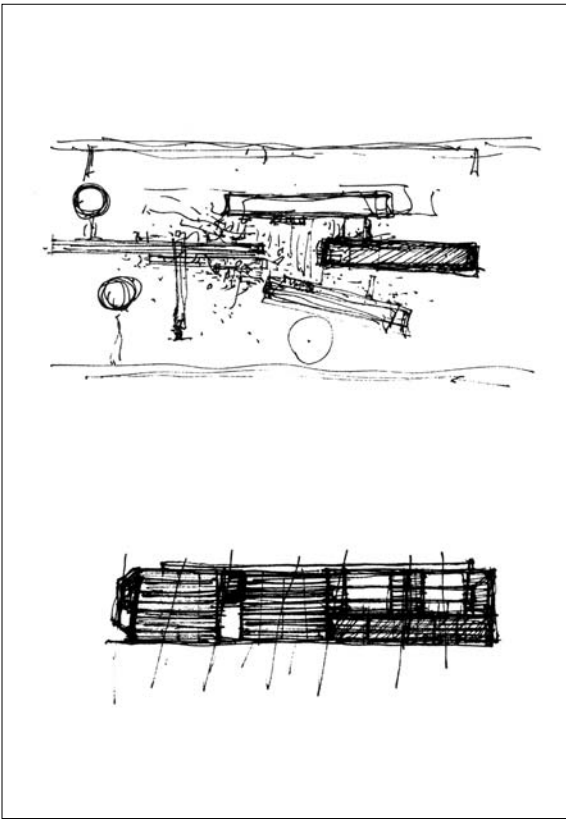
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Kevin Low

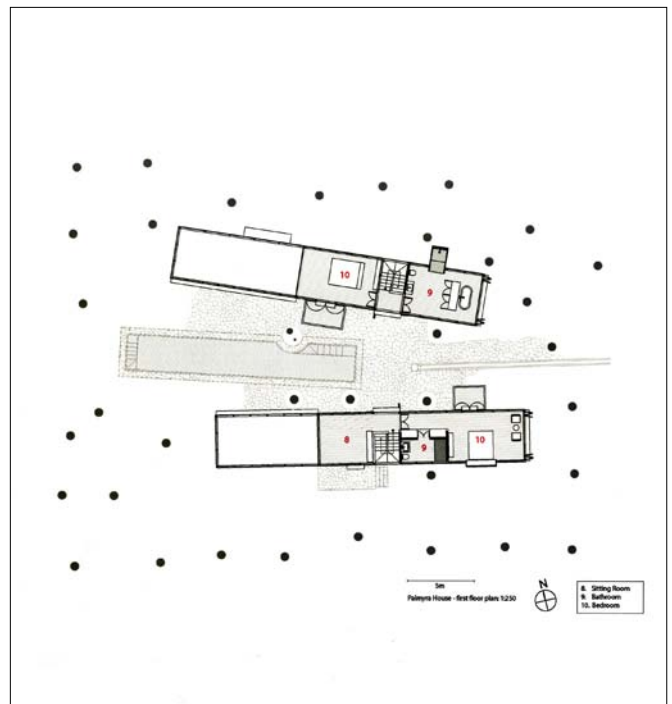
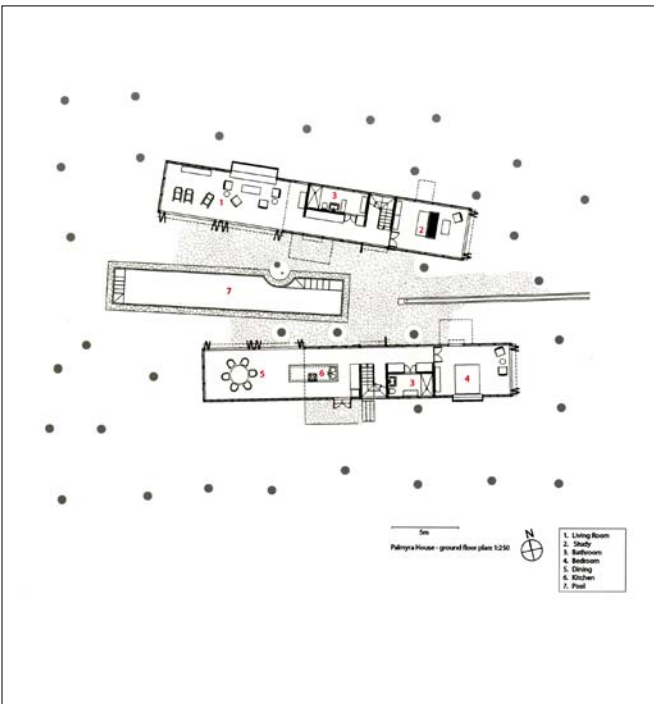
April 2010





Sketches of the project and site section.

Ground and first floor plans.





View of the Palmyra House with its two blocks seen as you approach from the East side.

View of the two blocks from the east side showing aqueduct and pool in the centre. North block shows study and master bathroom while the South Block shows two guest bedrooms.





View of the two blocks from the east side showing aqueduct and pool in the centre. North block shows study and master bathroom while the South Block shows two guest bedrooms.



View of South Block looking East with its hanging balcony.



View from South of the two blocks with the pool in between.

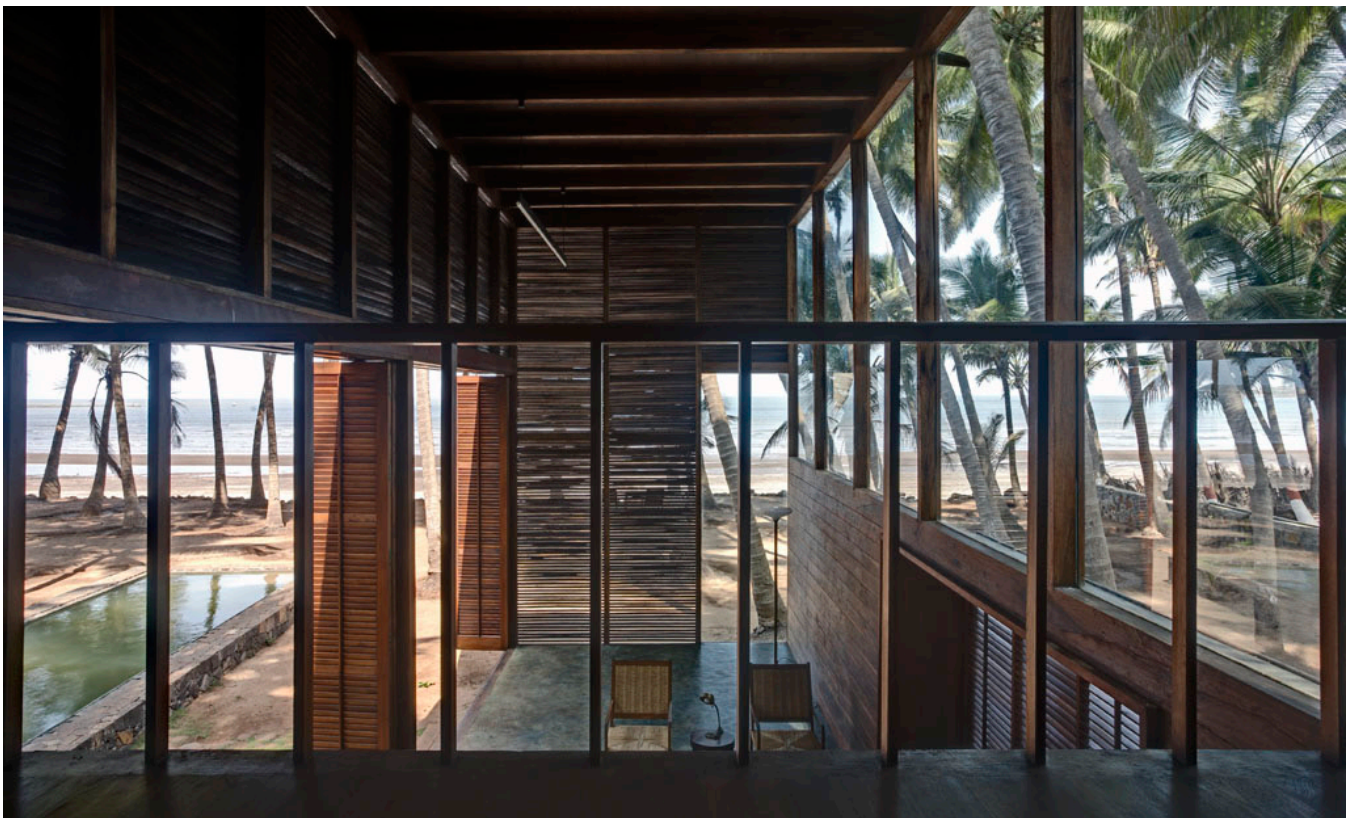
View from the Drawing Room in the North Block looking into the Dining Room in the South Block with the pool in the middle.





View of Drawing Room and Master Bedroom on the mezzanine floor with a long passage in the end leading to the Study Room. Through tall glasses you can see the swaying coconut trees.

View from the Master Bedroom on the Mezzanine floor of the North Block with the beach in the background and swaying coconut trees seen through the glass.





Master Bathroom with its open to sky hanging shower area.

Bathtub in the Master Bathroom with a view of the coconut plantation through the open shutters and the mirror reflecting the hanging shower area.





View from the West of the North and South Blocks with the pool in the middle lit in the evening.

View from the West of the North and South Blocks with the pool in the middle and coconut plantation in the background on the East side of the plot.





Top view of the hanging shower area of the Master Bathroom with copper plates used on its surface.



View of the camouflaged storage water tank raised on a stone structure.

