

Adaptive Reuse- A Case of Lal Baradari, Lucknow

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Abstract - Adaptation of existing buildings or old/heritage structures for a new function is not a new trend. The theoretical approach towards the adaptive reuse was established and theoretically formulated at the beginning of 19th century.

The research will explore an alternative strategy to a conservative adaptive reuse practices for different building typologies, considering the case of Lal Baradari, Lucknow (a summer house with twelve doors) .One of the heritage structure, located at a prime location. It is historically and administratively very important structure, Currently under State Lalit Kala Academy, Government of Uttar Pradesh. The paper will focus and explore adaptive reuse strategies that not only compliment's, but also challenges and reveals the history through the unique character and the original intent of the edifice by preserving the spirit of the place that is more than often lost in process of adaptation by conserving the meaning of the place conveyed through its architectural expression.

The adaptive reuse strategy will be formulated and tested through case studies and the live case of the Lal Baradari. The dissertation will focus on framing adaptive reuse guidelines for existing building or heritage building (either in use or abandoned).

Key Words: Adaptation, Old Heritage, Reuse, Lal Baradari, Guidelines

1. INTRODUCTION

How can adaptive reuse strategies be used to energize a currently underdeveloped building as an alternative to demolition and replacement?

Old buildings are the main features from which one can easily identify neighbourhoods their distinct character and at the same time also connects tangible to the past. Sometimes buildings start to outlive their original purpose for which it was built. This results in the implementation of adaptive reuse of such edifice in order to make the existing building and surroundings active once again.

When the original use of a building or complex changes or is no longer required, architects have the opportunity to bring or propose change the primary function of the structure, while keeping some of the existing architectural details and zoning that make the building unique.

The conservation and sustainable development in the urban area provide economic, social, and environmental benefits to a community and its stake holders. The conservation of the built structures is not only a contributor towards the economic and environmental composition of a

community, but also to the social and cultural identity, which helps to create dynamic places, and defines the 'spirit, character and sense of a place'.

2. LITERATURE

2.1 Introduction

Adaptive reuse is known as reuse of buildings or sites for purpose other than they were originally designed and built. After the change and renovation now new activity are featured in the renovated structure which can offer economic, social and cultural benefits to their user, stake holder and surrounding neighbourhood. Reuse is one of the best approach to sustainable development since it conserves original building materials and its values as well. Adaptive reuse deals with issues related to conservation and preservation of existing built form as well as strategies and policies. After use of a limited time period old structures deteriorates and become unsuitable for their requirements and functions or has remained unused for long time, adaptive reuse is a suitable option for reclamation of sites and its proper use. Adaptive reuse is defined as a revitalization strategy which employs a series of linked procedures to plan for, inventory, acquire, manage and reuse surplus or abandoned real estate. [1]

Adaptive reuse of spaces plays a vital in the sustainable development. When adaptive reuse involves heritage or very old buildings, benefits especially environmental are more significant, as these buildings offer a lot to the environment, landscape, identity and amenity to the belonging communities.

One of the main benefits of reusing buildings is the retention of the original building's "embodied energy". Reusing sites will retain embodied energy, making the project more environmentally sustainable as compared to entirely new construction. When done well, adaptive reuse helps to maintain and restore the historical significance of building and helps it to survival, rather than falling into disrepair through neglect or being rendered unrecognizable. Heritage buildings that are reused and renovated can continue to be used and appreciated.

2.2 Why Adaptive Reuse?

There are a number of reasons to this question. Here are a few:

- It offers a chance to encapsulate the past design ideas while moving forward with modern day ideas.
- It serves as a conduit between the established and the experimental.

• It bring up a dialogue between the age old design methods and current ideas in science, philosophy, architecture and technology.

“To provide meaningful architecture is not to parody history but to articulate it.”

– Daniel Libeskind

2.3 Principles of Adaptive Reuse

The challenge is in finding balance between 3 different components namely change, restoration and adaptation to appease all its stakeholders. In finding balance, adaptive reuse projects should have five basic principles in design as stated by:

- Redesign building should perform well as per the functional requirement.
- Should adapt changes and alterations done and should create connect to the new users.
- Respond well to the existing surroundings and enhance its context
- Should create a visual statement by providing visual coherence and please users and passers-by
- Be sustainable, least-polluting, energy efficient, easily accessible and have a minimum environmental impact.

2.4 Advantages of Adaptive Reuse

- It is believed that old buildings were made with better grade of construction materials as compared to the latest construction material that is why a longer life span have.
- Moreover, older building consists of generally strong building envelope which maintains proper heating and cooling, numerous windows helps to create proper ventilation and many other factors helps to achieve energy efficiency.
- The benefits of reuse projects also include social factors such as rejuvenating the historical and cultural values of a building.
- Older buildings have the ability to create urban character and ‘sense of a place’.

2.5 Impact of Adaptive Reuse on surrounding

The structure which can be adopted and reused should have a greater impact of the surrounding. These sites are known as brownfields instead of Greenfields due to the fact that they may contain chemical contamination; it is necessary to deal with this problem before the structures can be put to demolition or the most common residential or commercial use. A successful adaptive reuse project can offer growth and also bring historical tourism to its city and new life to its neighbourhood.

2.6 Guidelines for conservation and Restoration of monuments and site [2]

2.6.1 Venice Charter 1964

- Reaction to World War II architectural reconstruction practice
- Western concept (Fabric) disregards Social & Intangible Values
- Not only single architectural work but the urban & rural setting. (Setting)
- Safeguard as works of art & historical evidence

2.6.1.1 Conservation

- USE- socially useful purpose. (Social Use)
- No new construction, demolition or modification which would alter relations of (not alter) Mass & colour
- Moving of sculpture, painting or decoration allowed if it ensures its preservation (can be moved)

2.6.1.2 Restoration

- Preserve & reveal the aesthetic & historic value based on original documents.
- Indispensable extra work must be distinct, bears a contemporary stamp (for extra work).
- When traditional techniques prove inadequate, consolidation can use modern technique (traditional techniques unavailable) after it is proven experience & scientific data.
- Respect contributions of (Respect) all periods. Unity of style is not the aim. Removal of superimposed object is approved if it has little interest. (History)

2.6.2 Burra Charter

- Australia 1970-1999 finalized
- Key Ideas:
 1. Place
 2. Cultural landscape
 3. Cultural Heritage from Statement of Significance

2.6.2.1 Cultural Significance

AHSS value for past, present & future generation (Architectural, Historical, Social & Scientific)

2.6.2.2 Conservation

All processes to retain its cultural significance

2.6.3 PRRA

PRESERVATION>RESTORATION>RECONSTRUCTION>ADAPTIVE RE-USE

2.6.3.1 Preservation- maintaining the fabric of a place to its existing state & retarding deterioration

Restoration- Returning the existing fabric to a known earlier state by removing accretions or by reassembling components without introduction of new material

Reconstruction- Returning a place to a known earlier state by introduction of new material.

Adaptation- modifying a place to suit existing use

2.6.3.2 Conservation principles -Compatible USE

New use- Minimal change to Fabric & use, respect associations & meanings, continuation of practices contributes to cultural significance. Retain the visual setting & relationships. Visual setting. Siting, bulk, form, scale, character, colour, texture & materials.

New construction, demolition, intrusions & other changes that would affect the setting are not appropriate. Physical location is part of the cultural significance. Should remain in its historical location.

Relocation- Sole practical means of ensuring of its survival. Contents, fixtures, & and objects which contribute to the cultural significance should be retained at that place. Removal allowed if it's the assurance of its security & preservation. Amount of change should be guided by the cultural significance & appropriate interpretation When cultural significance is reduced reversible. Temporary & considers future conservation action.

New work (Stabilization) - purpose is the physical protection of fabric. Interpretation cultural significance is not readily apparent explained in interpretation. For understanding, enjoyment & culturally apparent

2.7 Reuse Strategy

- Technical: To study and analyses the structural system of the existing structure.
- Strategically: The building along with its surroundings should be taken into context thus reusing the building while keeping in mind the 'character, sense and spirit' of the place.
- Typological: To understand the typology of the building of the existing and new use.

3. CASE STUDY

3.1 Adaptive reuse and restoration of a Chettinadu mansion, Pudukottai, Tamil Nadu, India



Fig. 1: Chittinadu Mansion

The reuse of a heritage or existing building becomes necessary for its social, economic and cultural sustainability. One such historic building, 'Chidambara Vilas' at Chettinadu region, Pudukottai, Tamil Nadu, India is a 110 year old palatial mansion once a residence of a Nattukottai Chettiars, today turned in to a heritage hotel.

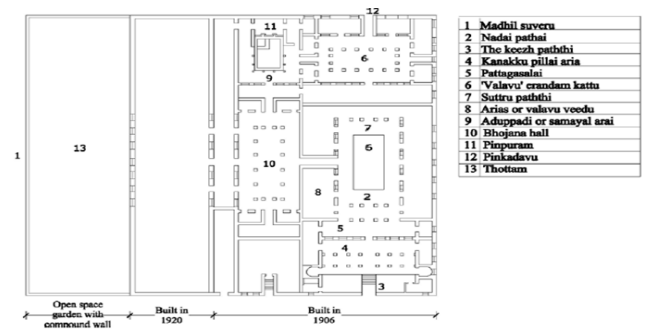


Figure 1: Ground Floor Plan – Original mansion.

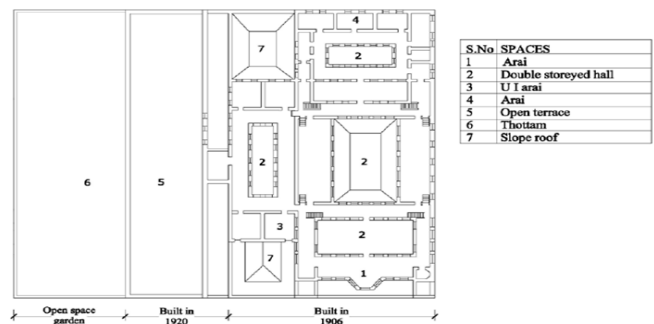


Fig. 2: Ground and First Floor Plan (Before)

Usage of space after adaptive reuse



Figure 9: Present Heritage Hotel: Ground Floor – After restoration and adaptive reuse.

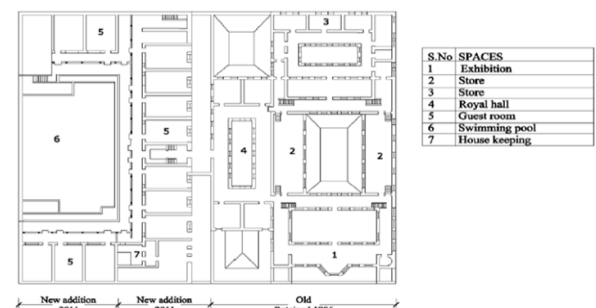


Fig. 3: Ground and First Floor Plan (After)

3.1.2 Conclusion

The restoration of this structure is done as per the guidelines with ethics of conservation. The character of the facade done in two different era blends its architectural identity as projecting one entity. A 5 year old extension uses finishes, materials and details similar to that of the century old mansion and the difference between the two cannot be seen with naked eyes or felt until scrutinized with very minute detail. The newly introduced functions for the old space gives due respect to the traditional usage of space. The newly introduced spaces with modern amenities are incorporated with respect to the old structure as well as to the historic fabric.

3.2 Kasturbhai Lalbhai Museum, Ahmedabad (Rahul Mehrotra Architects)

The main building – the colonial home built in 1905, which was home to the Lalbhai family until the 1980's, typically a conglomeration of single storied rooms, has been restored to its past glory. It now houses the family's modest collection, eclectic in nature, showcases art and antiquities, perfectly balancing historical merit with personal favourites; all the while retaining the essence of the family home.



Fig. 4: Lalbhai Museum

3.3 Church into a Book Store

Location: Maastricht, Netherlands, Europe
 Architect (book installation): Merckx + Girod
 Area: 750 sq. m

Significance: Consecrated in 1294 the building was once part of a friary knocked about over the centuries by various invading armies. It was being used by the citizens of Maastricht as an indoor bike pound. Later, turned into a warehouse. [3]

Contained stone vaults and faded remains of ceiling paintings from around 1337; and others by the artist Jan Vessens, depicting saints and sinners and episodes from the Bible, dating from 1619.

1. Installation of a tall, three-storey black coloured steel book stack in the long, high nave.

2. Café is introduced in the choir area. The main feature of the cafe is a long, cruciform table lit by a lamp suspended from the stone vaults in the guise of a modern halo.

3. Popular books which are kept on lower shelves, while esoteric, academic and theological works are kept closer to heaven. These are reached by stairs which is located in sleek, well-made book stack, although there is also a lift.

Parameters covered:

3.1.1 Adaptive Reuse - the church is a monument, need to be kept as an open space as much as possible hence, introducing the two floors asymmetrically gave respect and emphasis to the structure. The new use blended well in the structure due to matching space requirements for both old and new uses.

3.1.2 Space - The large scale of the steel book stack was necessarily kept grand because a spread of shelves along and across the nave would have detracted from its character; and also café Selexyz needed 1,200 sq. m of selling space to increase the shop's finances add up. Changes planned in lighting was another intervention that it was integrated with the furniture or the volume to avoid pollution in the interiors.

3.1.3 Structural Systems- Original frame structure was untouched; addition of the book stack to two floors above was done in order to have more horizontal free space on ground level.

4. LAL BARADARI

The common name of this building, Kasrool Khakan or King's house, conveys no description of what it was used or intended for. Keeping religion out of the context, it may be considered the "WESTMINSTER ABBEY" of oudh. It was the Throne room, the coronation hall, and Grand Durbar, or hall of Assembly, of the monarchs of oudh. [4] It takes its name from the colour of the stone, with which it is covered, being red. From the time of Saadut-Ali Khan, all coronations took place in the great hall of this "Lal Baradari".

As will be seen from the view, the architects proposed the plan to be colossal; in keeping with the purpose for which it was intended, but although a fine structure, it lags far behind the Athenian or Roman Models.

From the History of Oudh, it will be remembered that a dispute to the succession took place between Moona Jan, the pretender, and Naseer-ood-dowlah; the people were in a state of intense excitement, the argument in the Lal Baradari was fast approaching a riot; the usurper attempted to coerce the British Resident into acknowledging his right to the succession; the resident, colonel Lowe, resolutely refused to present the accustomed nuzzur, or offering, to Moonna Jan, and finding a number of insurgents about the place, gave orders for cannon to be brought to bear on the building and would undoubtedly have reduced it to ruin had not Moonna Jan, with his mother, the Badsha Begun, and all their

followers, made their escape, leaving Nussurood-dowlah in undisputed possession of the throne.

The grandest Durbar ever known in Lucknow was held in the Lal Baradari; it took place on the triumphal entry of Lord Canning into the Capital; every noble in Oudh was present in his most beautiful costume; resplendent beautiful with jewellery, the staff of the Governor-General was extremely brilliant; probably neither before nor since has so picturesque a scene been witnessed in the Lal Baradari.

The result of that Durbar formed a new era in the history of Oudh; the nobles were clearly given to understand who their governors were, and what the policy of the British Government was.

The Lal Baradari was kept, by the British government in a state of preservation, and is used up to the present day for the purpose of holding durbars, whenever such assemblies are necessary.

4.1 Location

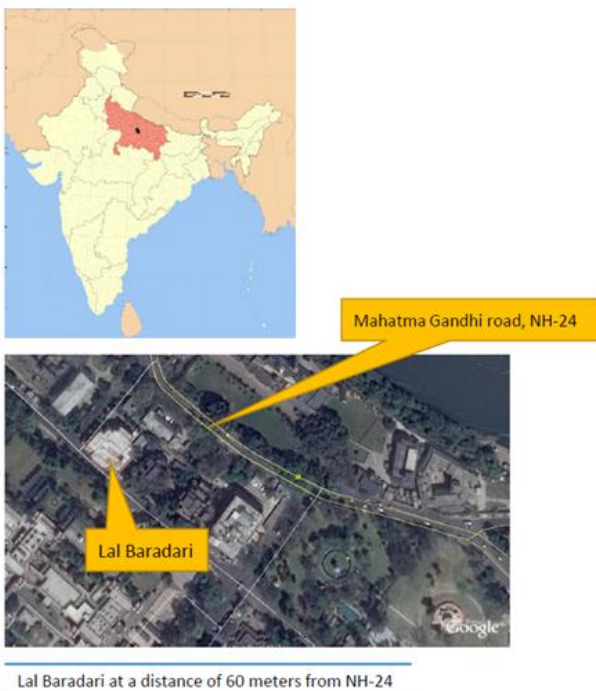


Fig 4: Location Plan, Lal Baradari

The heritage site of Lal Baradari is situated at Mahatma Gandhi road Qaiserbagh, Lucknow, at a distance of 60 meters from NH-24. The Lal Baradari is situated at a road adjacent to Mahatma Gandhi road.

There is one single building block on the site. The site of Lal Baradari measures 149 X 176 feet approximately. The placing of building block is such that its side set-back is of 5 feet's approximately and rear set-back is of 8.2 feet's approximately. Its front set-back is of 30 feet's approximately which is quite large as compared to the set-backs. The main approach to the building is from North-East and the orientation of the building is in North-East direction.

The openings in the building are decorated with foliated arches and ornamentation of fine stucco work can also be seen over the arches and pillars. The building is made up of Lakhauri bricks.

4.2 Plan of Lal Baradari

The site has a large building complex with a three small courtyard at the center which is presently covered with raised concrete platform and has ventilation system on all sides with glass and jaalis all around it. The site has got a single entrance and a building block has got two grand entrances at two adjacent corners facing north-east.

The walls of the building have got several openings with foliated arches and decorative works on them. Beautiful work of pillars can also be seen on the either side of the arch which is broad at the bottom and slightly tapered at the top.

As the structure dates back to 1870, materials such as Lakhauri bricks and lime mortar has been used which is important with respect to this region and establishes the construction techniques at that time in this region. Meanwhile renovations are being done by using cement concrete and modular bricks.

4.3 Existing Usage

Building was not responding to its original fabric. The building is enclosed with various other structures and the heritage importance and significance is getting lost. Unsympathetic alterations and additions were done just to run a department without maintaining the integrity and dignity of the original built fabric / built structure.

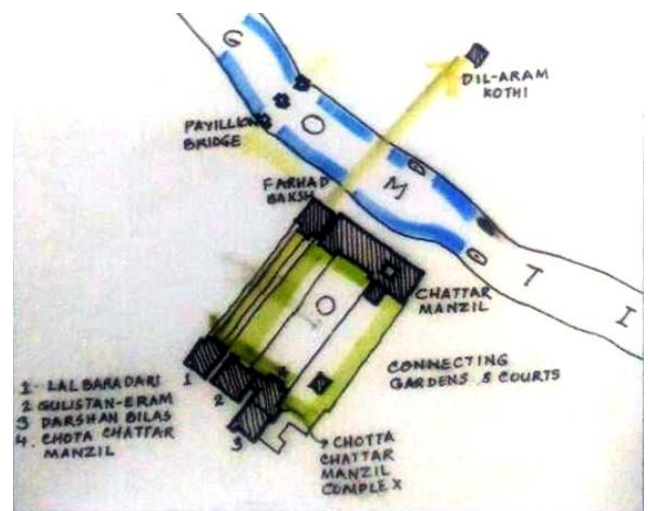


Fig 5: Site Plan, Lal Baradari

Both the Interior spaces and the external facades has been altered according to the need of the department. It includes the false ceiling which was added initially, the sanitary pipes, and electric wire conduit removal of vault and in place of the vault addition of slab. Present defects in the structure / alterations / additions were done for various purpose. The

heritage value was not recognizable. The changes was unplanned and done according to the need of the time.

Materials in the building is basically Lakhauri brick and lime mortar. At the time of alterations in the building it can be very clearly seen that instead of lime mortar and lakhauri brick use of modular brick and cement mortar has been done. Spatial Character of the building is lost in the baradari. The Structure is double heightened but the false ceiling was used by the department to make it single story finished. The initial vault has been removed with a rcc slab. Various kinds of boards are used to create internal partition. The alterations in the structure was somewhat permanent. At some places the floor glass was removed. The glass floor was also a source of light for the lower Ground floor. And because of the false ceiling in the interior spaces the carvings and the floral pattern of the arches were not visible. The beautiful double heightened space of the baradari was just used as a box for a purpose.

According to the need of the time there were introduction to modern Infrastructure and amenities in the building such as Electricity and plumbing.

Structure of the building is load bearing with arches carving out the opening to various places and helping in reducing the load as well as in equal transfer of load. The vaulted slab system with iron girders has been used in the ceiling to divide a large span into smaller parts and helping in distributing the load. Due to heavy load added to the structure by laying of concrete on the roof there might be some structural issues arise in the future.

4.4 Walls (Super Structure)

Building was not responding to its original fabric. The building is enclosed with various others structures and the heritage importance and significance is getting lost. Unsympathetic alterations and additions were done just to run a department without maintaining the integrity and dignity of the original built fabric / built structure.



Deterioration of wall due to weathering and water seepage



Vegetation and algae growth



Partial expose of brick work

Fig 6: Walls, Lal Baradari

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Present defects in the structure / alterations / additions were done for various purpose. The heritage value was not recognizable. The changes was unplanned and done according to the need of the time. The changes done in the building initially by the department are done without taking any permission from the nodal agencies. No grants and permissions were taken by the department for doing any kind of changes in the structure.

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4.5 Finishes and Plaster

At first glance it seems that due to the use of synthetic materials in the finishes the original plaster was not able to breath and therefore resulting in the flaking and leaving the masonry works.

Major chunks can be observed where the plaster has left the original masonry works due to insensitive and improper repairs and restoration works carried out in the past. At some walls, ornamentation done over the foliated arches are being damaged due to water seepage & flaking of the plaster. The carvings on the walls and below the projections are exposed to the weather conditions and are deteriorated and de-shaped at few places. Algae and bio growth over the external finishes can be seen at the rare parts of the building which is due to see page from the drains and rain pipes.



External wall are about to lose its lime plaster



Flaking & Peeling of plaster



Damage of Decorative work



Water leakage through pipes

Fig 7: Finishes, Lal Baradari

4.6 Roofs

In previous insensitive restoration works, the roof of the historic monument have been covered with a thick layer of

almost 100 to 150mm of concrete leading to structural issues such as increase in dead load on the building. Due to incompatible material the concrete and lime have not bonded well leaving the gaps between the two materials, which leads to seepage and dampness.



Fig 8: Roofs, Lal Baradari

The thick concrete acts as thick membrane not allowing the excessive moisture to evaporate leading to decay and deterioration of the original roof structure which is historically significant.

4.7 Slabs

It is pertinent to take suitable conservation measures where historic structures are concerned. The vaulted slab system, resting on the I-section which acts as a beam, transferring the load on the walls, has been used in the buildings. In ground floor additional columns along with cross I sectional girders have been introduced to bear extra load of the building.



Vaulted slab resting on an I-Section



Suspended cables to the ceiling



Development of crazing in the slab

Fig 9: Slabs, Lal Baradari

In some part of the monument, electric cables have been suspended to the ceiling which might damage the ceiling.

Crazing can also be seen in the slab which is a cosmetic defect and not a structural concern the defect needs to be evaluated.

4.8 Flooring

a) Exterior

The flooring work of the exterior portion has been done with the hand chiselled red sand stone blocks. Several damages are in the flooring. It seems as if the level is raised above the original level as the building ground floor is below the external level.

b) Interior

The flooring in the ground floor has been redone using cement mortar. The flooring on the upper floors has also been done in cement whereas in several parts we can also find the original flooring. The stairs are paved with red sand stone. On the first floor several cut-outs have been made with a fixture of translucent glass to provide the penetration of natural light. Deterioration & Damages in the interior flooring can also be seen.



Damage in the exterior flooring

Fig 10: Flooring, Lal Baradari

4.9 Openings

The two major openings lead to the high platform over which the main complex is placed.

The foliated arched opening at the ground floor leads to several chambers with arches over which the upper floor is based.

There are no ornamental/decorative patterns over the arches and pillars at ground floor whereas, decorative pillars with vertical grooves can be witnessed at the upper floor and so may be the case in the lower arches which in due course of time and in previous insensitive repairs had been covered while the restoration process. There are signs of insensitive repairs with the cement based mortar over the arches and pillars.

Except the two major openings leading to the upper floors have been covered with iron grills and jallies and partially or completely closed with brick work behind them. Not allowing the building to breathe naturally resulting in the dampness inside the building.

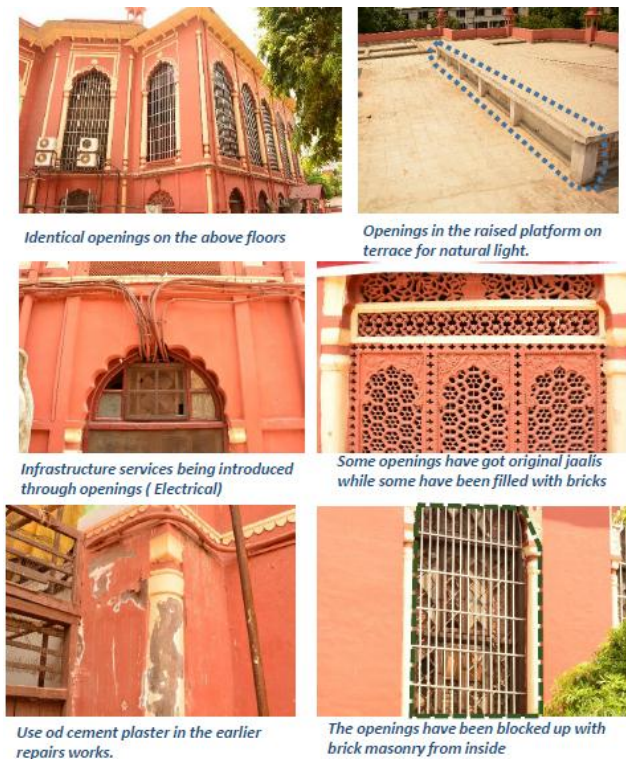


Fig 11: Openings, Lal Baradari

In Above floor arches, each openings has got foliated arches with decorative work of stucco done on it and with the specialty of non-repetitive patterns over them. The original doors and windows are deteriorating and decaying due to negligence and lack of maintenance. Openings on the roof have now been covered with the RCC Structure on a raised platform with ventilators at its side for light and air (which are generally closed).

The cut out in the slabs made for the light to enter from above and lighten up has gone meaningless as there is no sufficient light in the above floors as the openings have either being closed or covered.

4.10 Structural System

The building is construction on load bearing structure with arches carving out the opening to various places and helping in reducing the load as well as in equal transfer of load.

The vaulted slab system with iron girders has been used in the ceiling to divide a large span into smaller parts and helping in distributing the load.

An I-Section has been used which runs through the each end of the vault acting as a tension member & the load of vaulted slab is then transferred to the columns which is a compression member.

New columns with I section girders have been added to provide the extra support to the structure in the basement. As the structure dates back to 1870 materials such as Lakhauri bricks and lime mortar has been used which is important with respect to this region and establishes the construction techniques at that time in this region.

Meanwhile renovations are being done by using cement concrete and modular bricks.



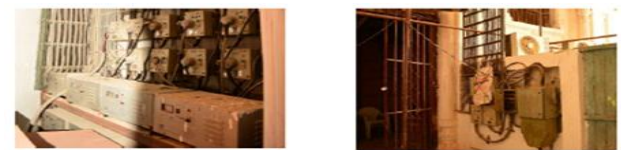
I-section running through each end of vaults finally transferring the load to the columns



Arches and columns transferring the load to the ground at the ends.

Fig 12: Structural Systems, Lal Baradari

4.10 Infrastructure Addition



Electrical supply services made in open and may lead to any accidents.



Various electrical services have been inserted into the building in an appropriate manner disturbing the visual aesthetics of the building.

Fig 13: Infrastructure Addition, Lal Baradari

The infrastructural facilities such as electrical and plumbing have been added to the structure in the most inadequate

manner, disturbing the visual as well as functional spaces of the building.

The electrical cables and wires are running haphazardly in the building. There is no separate electrical room outside the building as main supply room is being made inside the building only which is not appropriate seeing the historic significance of the building & may lead to any accidents, mainly in case of any short-circuit, which may lead to fire and thus damaging the building.

The drain pipes are choked as result all the water is seeped through the walls on the roof.

The water supply pipes are also leaking leading to seepage of water in the foundations leading to the dampness in walls. At the time of changes and alterations in the building there were no rules, guidelines and charters were considered.

5. GUIDELINES

5.1 Reuse Strategy

Typological: Before the reuse of the building, Literature study is a must about the original and new use to be incorporated.

Technical: Structural study and analysis with dimensions should be known and noted of the building.

Strategical: The building along with its surroundings should be taken into context thus reusing the building while keeping in mind the 'character, sense and spirit' of the place.

5.2 Use and function

Function and use of depends on building typology, location, environmental factors, social factors, and economic factors. Environmental factors should include site features, climatic conditions and embodied energy of existing building.

Social factors draws attention towards the needs and wants of the society and preservation of the character, sense and spirit of the place. Economic factors include the budget for sustainable construction, reuse, and durability [5].

5.3 Quality of Design

It should be suitable to the surroundings and the society, innovative designs, preservation of the historical and heritage elements should be carried out. It should also be structurally sound and strong to be durable.

5.4 Materials and Technology

Use of old and new techniques can be merged resulting in innovative techniques. The materials of the original structure should be ideally maintained and used unless it is in a very dilapidated structure. The new additions and preservation that are proposed can be a combination of old and new techniques and materials in the construction.

5.5. Flexibility and reversibility

The building should be able to undergo dynamic changes and adapt to other reusability options in case change of use

needs to be done due to society demands or economic demands in future.

6. CONCLUSIONS

This research is to study possible strategies for the successful adaptive reuse of buildings. It demonstrates that it is not only important to retain and restore but also to adapt them so as to give them new uses that are similar to their original intents.

Adaptations for contemporary use have resulted in new forms based on old forms but adapted for contemporary use. The research also focuses on preserving the spirit of existing form and space; it introduces additional spaces that are necessary for modern use.

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