The Environmental Friendly Historic Urban Planning in Potohar Plateau, Pakistan: Lessons for modern architectural plans

Alia Jawad and Sadeed Arif

Abstract
The paper presents the nature and scope of environmental friendly urban/town planning and residential buildings of late 19th and early 20th century in Potohar Plateau. The study of urban/town planning includes a description of residential quarters of cities and towns, the rules for making streets, lighting them at night; the relationship of plants with residential quarters, water procurement, sewerage and drainage systems of the past. The study of residential buildings includes a description of the principles of layout of houses, i.e., their orientation, relationship of courtyards with verandahs and rooms; and their architectural features, i.e., the facades decorations, types of main doors, windows and ventilators, as well as pillars and pilasters. The paper highlights that the traditional urban planning, architectural features and materials corresponded successfully to the local environment, while modern architecture largely fails to do so. The paper concludes that we may take lessons from architecture of the past; try to apply them in modern constructions, and also to properly preserve the historic buildings for the sake of education of the common people.

Introduction
The characteristic features of late 19th-early 20th century urban/town planning and residential buildings of Potohar Plateau were recorded during a survey project titled ‘The Survey and Documentation of Archaeological Sites and Historic Monuments in Potohar Plateau’ conducted by the authors, in collaboration with Former Ministry of Culture, Islamabad. The project focused on four districts of Potohar

1 District in Pakistan is the basic unit of administration and the focal point of all social, cultural, economic and administrative activities. Districts are the second
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Plateau, viz. Attock, Rawalpindi, Chakwal and Jhelum. The present paper presents an essence of urban/town planning in ten cities, villages and towns; ten residential buildings; three bazaars (market places) and twenty water ponds. Special mentions are given to some cities and town, for instance, Rawalpindi, Islamabad, Kuri Shehr, Rawat, Fateh Jang, Qutbal, Chakwal and Daultala; and villages, i.e., Dhok Adrana, Ghaznabad, Barki Badhal, Pharwal and Nila (see table 1 & Map 1 for details). The study is significant as it focuses on architectural features and materials of ordinary houses as opposed to a general trend of highlighting large and affluent historic monuments and relates them with local climate. The results of the survey also highlighted that some thriving business towns in late 19th and early 20th century CE were presently shrunk to unpopular small towns and villages due to change in course of popular roads. However, this solitude was helpful in preserving historic monuments, that otherwise disappeared rapidly after introduction of new architectural styles and materials since 1970s.

The historic architecture, urban and town planning constitutes an important part of cultural heritage of any nation. Physical heritage includes buildings and historic places, or artifacts worthy of preservation for future reference. The concept of cultural heritage was traditionally limited to famous monuments and sites. However, presently it includes all types of buildings that are inherited from past. They are not only unique for their architectural styles but also bear imprints of the past communities. They are unique and irreplaceable, and their disappearance may cause impoverishment of the heritage of a nation or society.

The Potohar Plateau lies between River Indus on its west and River Jehlum on its east. Margalla hills and Kala Chitta Ranges from its northern boundary. Kala Chitta Range rises to an average height of 450-900 meters and extends about 72 km. Salt Range forms the southern boundary. Suleiman Ranges start from Murree hills and end near Kalabagh in River Indus (Encyclopedia Britannica 2007).

Potohar Plateau has a rich history and culture. However, there has been little research on its historic architecture or urban ordered administrative divisions of Pakistan; first being the ‘Provinces’.
planning. The urban planning provides clues to socio-psychological culture of its inhabitants. A large number of historic cities and towns in the plateau still preserve their original urban planning and architectural styles due to their location in remote areas. The historic cities and towns of Potohar Plateau represent a mature phase of architectural development, a deep understanding of architectural geometry, orientation of houses, the planning of spaces and volume and treatment of the facades. The architectural decoration was carried out to provide a visual impact. Furthermore, the historic architecture responded successfully to local environment by using locally appropriate constructional materials. A number of sophisticated ventilation systems were designed and the insulation properties of many natural materials were used (Rehman 1977).

Qila (fortress) was an important architectural element of a historic city. It provided privacy and security to the inmates. Qila referred to a small number of mohallas (a small residential quarter consisted of a few houses), having one entrance. The houses of the external limits were knit together in such a way that their external walls fortified the Qila. When its one doorway was closed, the whole Qila was fortified. The streets of the Qila were made narrow and winding for security purposes. The interior streets of Old Qila in Rawalpindi city were extremely narrow (3 m wide). They seemed to be meeting at their top. The quarter belonged to the Bhabaras who were the wealthy Jain community. They built their residences in narrow lanes for protection against intruders.

Ahata (urdu word meaning an enclosure) was another important feature of urban planning. It was a walled living area, accessed through one gateway, which remained open during day and closed at night. An ahata was smaller than a Qila or a mohallah. A few houses (10-15) were built around a common courtyard. It provided security and intimacy to inmates of ahata. In Lal Kurti Bazar, Rawalpindi, the facades of front houses shared one long and continuous gallery, separated through thin concrete or wooden sheets (Pl. 1a).

Houses were the basic unit of construction. The orientation of the houses corresponded to local climate and sun path. Sunlight has influenced the building design since the beginning of architectural
history. Orientation was generally made to exclude the sun and maximize exposure to the cooling breeze in hot summer season. The houses were generally aligned facing north to receive direct sun light in winter when the sun was in the northern sky and allowing passive indoor heating through windows. However, it stopped the direct sun light in summer, when the sun was direct over head. The heavy eaves and shade windows further stopped the direct summer heat. Particular attention was given to day lighting for visual comfort. The windows and ventilators were placed in such a way that it permitted natural light for internal illumination (Pl. 1b).

The central courtyard, verandahs on one, two or more sides, and the rooms opening in the verandahs was a preferred plan of a historic house in Potohar Plateau for its practical usage. It not only provided privacy to inmates, but also a sharp contrast of massing between solids and voids, creating excellent conditions for continuous air movement in the house. The basic plan of the courtyard was rectangular or square. The courtyards and verandahs acted as the modifier of hot and dry climate. The courtyards presented contrast to narrow streets that remained in shade for most part of the day. The courtyards provided ventilation and light to each individual room. It served as light well during day and air well during night. The high walls of the courtyard saved it from early morning and noon sun. The sun reached the courtyard later in the day, when heated air rose and the convection currents caused an air flow that ventilated the interior court, as well as house. The arched entrances to the verandahs probably further enhanced smooth flow of air inside the living rooms.

A variety of pillars and pilasters were experimented in Potohar Plateau in late 19th-early 20th century CE. In Soojan Singh Haveli the triplicate pillars of the main verandah culminated into horse shoe arches. In Barki Badhal House 1 the tri-lobed arches of the verandahs were sunk in rectangular frames, supported by square pillars (Pl. 2a & b).

The walls of the houses were thick enough to absorb heat without transmitting it to interior. The traditional building materials

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2 Two historic houses were noted down in Barki Badhal, designated as Barki Badhal House 1 & Barki Badhal House 2 in present study.
such as earth, stone, brick and wood possessed a porous property, absorbing not only excessive heat, but also cold wind, thus making the house comfortable in hot as well as cold weather. They also possessed the capillary effect, absorbing water which could evaporate from their surface and thus hindered the interior air from being re-warmed by convection. The insulation properties of the earth were used by mud plaster in stone walls, or excavating underground basements in the houses. The basements were used for living, storing and also for defensive purposes (Michell 1995: 199). The main entrance of the house was followed by an entrance foyer or ‘deori’. It gave access to courtyard and also upper storey. On upper storey a balcony ran all around the courtyard to provide access to different rooms. The interior and exterior balconies were to create more space for upper storey rooms. Moreover interior balconies shaded the courtyards, while exterior balconies shaded the street and protected the passersby from sun and rain. The deep narrow streets were cooled. Facades were comparatively unexposed to sun rays, and cool air was collected at night. The multi-storeyed buildings shared parting walls, thus reducing the surface areas exposed to sun or air.

In Barki Badhal House 2, the windows and doorways were surmounted by large and wide ventilators, provided with decorative eaves. Sometimes whole length of the wall was pierced by windows and ventilators\(^3\), separated by a narrow piece of wall (Pl. 3a).

Lal Kurti (meaning the red shirt) Bazaar is located in the southern quarter of Rawalpindi Cantonment. It contained a number of houses of Late 19\(^{th}\) and early 20\(^{th}\) century CE, reflecting a middle class business society. The lower storey comprised shops or store houses, while upper storey had residential quarters. The houses in the main bazaar streets did not have a courtyard. Rather, the projected wooden balconies were used as women quarters. The balconies were covered with wooden screens in front pierced by one, two or three windows. The daily house chores could easily be carried out in balconies, keeping privacy, as well as maintaining sun and

\(^{3}\) Ventilators were the small windows pierced above the regular windows, closer to roof. They were meant for ventilation and light.
ventilation for inmates. The entrances to houses were provided in rear streets. These houses revealed a closely knit business and family life. The male members could set their business close to their houses, keeping in touch with their families even during business hours. Similar examples were also noted down in the main street buildings of *Raja Bazaar*, Rawalpindi (Pl. 3b & 4a). The houses in back streets of the same *bazaar* represented small *bangalows*\(^4\) with spacious courtyards and airy rooms.

Daultala was a historic town, with high concentration of well preserved historic buildings. A total number of eight houses of historic character were recorded, among which four were noteworthy. About six wooden balconies were present, among which four were in fair state of preservation. The houses of the wealthy possessed heavily decorated facades in front of houses of modest dimensions. The facades exhibited a wide variety of wooden doors, wooden balconies, wooden *jharoka* (eaves) and pilasters. A variety of pilasters were experimented, ranging from Ionic\(^5\), Corinthian\(^6\) to purely local character. The winding narrow streets were sometimes covered by projecting balconies on either sides of the street. The main doors were made monumental by raising them to a height of three storeys. The whole being enclosed in single, double or triple brick frames (Pl. 4b). The doorway of one house was surmounted by a tracery window, flanked by slender brick pilaster, above it was a polygon bay window\(^7\) of Victorian style\(^8\) (Pl. 5a); finally surmounted by rectangular name plate bounded by two small turrets. The wooden

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\(^4\) A bungalow refers to small detached house, meant for a single family unit, as opposed to apartment houses. Generally it had wide verandah across its structure.

\(^5\) The ionic pillars were remnants of ancient Greek order, comprising volute capitals.

\(^6\) Corinthian pillars, representative of ancient Greek and Roman architecture, were introduced in 1\(^{st}\) century CE in Gandhara art. The abacus upon the capital had concave sides to conform to the out-scrolling corners of the capital, which may have a rosette at the center of each side.

\(^7\) A bay window is a window space projecting outwards from the main walls of a building, either square or polygonal in plan.

\(^8\) The term Victoria style refers to a number of architectural styles employed during middle and late 19\(^{th}\) century in United Kingdom.
door jambs of another house were sunk in multi-lobed rectangular frame. The doorway was surmounted by triple windows, sitting on a slightly projected frame. Another doorway was flanked by globular seats on its both sides. The brick or stone seats flanking main doors were regular feature of the houses of Potohar Plateau. They served as temporary resting place for older people or children playing in the streets (Pl. 5b).

There was an elaborate system of street lighting at night. Kerosene lamps\(^9\) were placed in lighting niches at the corner of every street. The streets of the entire city were illuminated in this way. The external corners of the houses were chamfered for easy flow of human and mechanical traffic (Pl. 6a).

Qutbal was a medium sized town of Tehsil Fateh Jang in Attock. The old quarter of town, locally called as bazaar, built in late 19\(^{th}\) century CE, represented better urban planning than modern parts of the same town (Pl. 6b). The deep drains represented an effective sewerage system. The houses were built of dressed stones. The front faces of the stones were additionally chiseled with deep cuts to present an even finer look. The facades of the houses presented artistic, wealthy and pleasant look. They were elaborately decorated with door portals, windows and ventilators. The wooden doors (1.5 x 1.20 m) were sunk into rectangular portals flanked by Corinthian pilasters on both sides (Pl. 7a). The doors were surmounted by a molding and ended in a multi-cusped arch, typical of 19\(^{th}/20\(^{th}\) century architecture in Potohar Plateau. The main entrance was flanked by three windows (1 x 2 m) on each side. The windows were surmounted by pointed arched eaves, and further above were the rectangular ventilators, sunk in shallow curved eaves (Pl. 7b).

The earth and wood was the favored architectural material in Potohar Plateau. Wood is a fibrous material with a porous network structure. The strength of wood both from tension and compression arises from its organic nature, which gives it an internal structure of longitudinal and radial fibers that is not impaired by cutting or long

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\(^9\) Kerosene oil is a combustible hydrocarbon liquid. Kerosene lamps were widely used for lighting at night before modern electrical supply to each and every house in cities, towns and villages of Potohar Plateau in 1970s.
exposure (The New Encyclopedia Britannica 1995: 881). Moreover, it could be profusely painted and lacquered. Wood was used for screens, balconies, doors, ceilings and for the cupboards. The wood carving revealed a perfect craftsmanship. Moreover, small pieces of wood were fitted together in complicated designs. Ceilings were also made of carved wood, often painted. Sometimes pieces of mirror were used in mosaic inlays. The thick and bulky stone and wooden architecture yielded best insulation and acoustic properties. The stone architecture absorbs harmful short wave sun radiations and radiates long wave radiations, useful for human health. The solid wooden structures were acoustic materials that absorbed incident sound and reduced sound pressure in the buildings/rooms (Bucur 2006: 2). It provided a quieter and serene environment to the living rooms of the houses.

The wooden works of extra-ordinary workmanship of late 19th-early 20th century CE, were recorded in old city buildings, as well as in far off towns of Potohar Plateau. The wooden balconies in historic cities and towns were built with technical proficiency and structural durability. The wooden frames were made and duly nailed down for strength and durability. The parapets, in the form of eaves, were supported by a row of brackets. The doors were adorned with geometric and floral patterns, showing the proficiency and absolute precision that was transferred for centuries. The paints of good quality, e.g., yellow, vermillion, azure, blue and green were used for painting wood. The wooden ceilings were worked in geometrical and floral patterns. A few other examples could be cited as the main door of Soojan Singh Haveli (mansion) in Rawalpindi city, two doors in a small town called as Pharwal, two doors and two painted ceilings in Nila Village, one door in Kuri Sher, Islamabad, and two doors and one ceiling in Dhok Adrana.

The jambs of the main door of Soojan Singh10 Haveli were sunk in rectangular panels with exceptionally delicate floral and animal motifs. They were divided into six smaller rectangular panels,

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10 Locally called as Soojan Singh Haveli, Haveli is Urdu word meaning ‘Mansion’. Rai Bahadur Sardar Soojan Singh was related to Maharaja Ranjit Singh. Ranjit Singh ruled Punjab in early decades of 19th century CE.
three in each door jamb, bounded by floral carving. The central panel was carved with a male and a female in traditional dresses. The four panels above and below these central ones were carved with bird motifs sitting along potted bunches of flowers (Pl. 8a & b). The door jamb was surmounted by carved, curvilinear canopy, flanked by two kiosks on either side. The second storey of the mansion had double flooring, the concrete one covered by wooden paneling. The wooden paneling must have had absorbed the excessive heat and noise of the second storey. The wooden ceiling, although crumbling and disappearing, still represented an exquisite carving and painting in delightful brown and golden colors.

A desolate house in the far off village of Pharwal exhibited two extensively carved doors, one painted cupboard, some pillars, lintels supporting the roof, and carved supports for these lintels. A Pharwal wooden door of outstanding dimensions (wooden frame: 8 x 12 ft; door jambs; 4 x 6 ft) with its detailed floral and geometric carving, was reported to be executed in late 19th century CE. The door jambs were sunk in a wide wooden frame, with three panels. A carved wooden screen surmounted the door jambs. The screen was meant to provide light and air to the interior of the room. However, sadly speaking, the house was uninhabited for eight years. One door was standing in the door way, while other was lying in open courtyard, exposing it to harsh cold and hot weathers. Inner wooden structures were in a fair state of preservation due to the excellent quality of wood, and its paint. However, the wooden structures were likely to be rotten due to non-interest of the owners of the house.

The carpenter’s family in Nila village reported that the craftsmanship existed in their family for several centuries. Their house still possessed two wooden doors, exquisitely carved and worked out by their late grandfather (Pl. 9a & b). However, the demand for wooden architecture diminished after 1960s. Consequently, some heirs of the traditional carpenters entered into formal education system and totally left traditionally transmitted craftsmanship; while others moved to unskilled labor market. Two other doors in the same village were reported to be 150-200 years old. One singularly painted wooden ceiling was marked by the name of the painter and date of its execution, i.e., ‘Noor Mohammad, April
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1917'. The painted ceiling exhibited the stars filled with floral patterns in different colors and geometric designs within continuous circles. The wooden frame not only covered the ceiling, but also upper part of the inner walls of the room. The upper borders of the frame were painted with floral stripes, backgrounds being filled by blue and off white paint. The painted wooden structures still revealed an amazingly fresh look. No termite was reported in the wooden structures (Pl. 10a & b).

Plants were important part of historic urban planning (Pl. 11a). Almost every house contained plants. When houses were located in dense interior parts of the city, where sun could not reach; or their courtyards were too small to contain plants, the parapets of the roofs contained special platforms for flower pots. Sometimes external corner pilasters culminated in a flat platform for the same purpose. The Barki Badhal House 1 exhibited a polygonal pilaster ending in a huge polygonal capital, creating a spacious platform, possibly meant for decorative flower pots. The projecting platform was supported on large and curved petal shaped brackets (Pl. 11b).

The trees were also planted around the houses to provide shade and serenity, and also to purify the outer environment. Plants are indispensible component for cleaning air, preserving ground water, preventing soil erosion, and maintaining healthy eco-system (Appfel-Marglin & Pramod 2000:300; Charnyuler 2007:22). Clean air forms a blanket of friendly gases around the Earth, saving it from hostile cosmic radiations. The historic buildings played a fundamental role in preserving and sustaining clean bio-diverse environment, which needs to be yet explored by ecologists.

Large water ponds/tanks were integral part of historic towns and cities in Potohar Plateau, since immemorial times. They enjoyed not only a utilitarian but also a religious significance in the area. They were equally revered by Buddhist, Hindu, Sikh and Muslim communities, and were repeatedly mentioned in religious lore. They were considered holy till 1960s. Some local festivals are still held on banks of these ponds. Shaded and fruit trees of different kinds were planted around the water tanks. Huan Tsang, the Chinese Buddhist pilgrim to Gandhara and other parts of India in 7th century CE, mentioned gigantic water tanks in Hasan Abdal, District Rawalpindi.
He mentioned lotus flowers in water tanks and ‘fruit trees of hundred kinds’ all around the tanks. Same tanks were noted down by Jahangir in his *Tuzk-i-Jahangiri* (cf. Jawad & Sadeed 2009: 146, Rashid 2005: 63, Pl. 12a). Although extensive washing activities were carried out along the banks of these water ponds, no one directly washed or bathed in water ponds. Muslims took water for ablution from these ponds. No one directly bathed in water ponds. Rather bathrooms were constructed along their banks. The surveyors noted down foundations of several bath rooms at Kot Fateh Khan and Sagari town. At Ghaznabad, a row of four modern shops was standing over sturdy foundations of old bathrooms (Pl. 12b).

The cool banks of the ponds also served as community center where women did their washing during day and men folk sat and chatted during evening. They also provided ideal play and gaming center for children and youth. Sometimes ponds were walled to keep women away from gaze of the passersby. They were cool picturesque landscape in otherwise semi-arid, hot surroundings. The construction of water ponds was largely a community work. People of all walks and different religious communities voluntarily took part in construction of these water ponds. Their architecture was planned, elaborate and sometimes even monumental. They were constructed closer to water streams. An elaborate system of paved and covered water channels brought clean water from water streams to the ponds. They replenished community water supply and also maintained ground water table. Furthermore, they absorbed the solar energy and provided hot water in cold winters. They gave a sense of repose and coolness. The evaporation of water and presence of plants helped to keep air cool (water ponds). The water ponds once held a respectable position in town planning. They were the integral part of daily life activities. They provided easy, affordable access to clean and pure water. Although wells were commonly used in Pre-Partition Potohar, the water tanks supplemented the water supply. The sun rays not only warmed the water but also cleaned it, making the lives of the common folk easier. In far off towns of Potohar, where water fetching is extremely difficult due to uneven terrain, the wells had once provided easy access to healthy water supply. However, the Government water supply in 1970s caused misuse of wells as well as
the water ponds.

A few towns, hamlets or residential quarters of the old cities were named after water ponds, for instance Banni Saran (meaning a motel situated along the water pond) in Rawat town\textsuperscript{11}, or Banni mohalla (meaning water pond) in Rawalpindi city.

Conclusions

The above discussion highlighted that traditional urban/town planning and architectural styles were environmental friendly in nature. The natural thermal and acoustic properties of a number of architectural materials were successfully exploited during Late 19\textsuperscript{th} and early 20\textsuperscript{th} century CE in Potohar Plateau. The porous properties of several natural materials, i.e., stone, brick, earth and wood were used for a balanced thermal effect in extremely hot and cold weathers. The thick walls absorbed heat; a variety of ventilators and high ceilings provided better cooling effect than modern houses. The modern research reveals that stone absorbs the harmful sun radiations. Traditionally lime plaster was used to white wash houses. The lime plaster absorbs excessive carbon dioxide, thus cleaning environment from impurities. The thick wooden planks absorb the incident sound and reduce sound pressure in the buildings (cf. Bucur 2006: 2). Furthermore, the historic monuments revealed high aesthetic value on account of best wooden carving and painting, and decorated facades of the houses. On other hand, the modern buildings made up of cement and concrete, mainly built for the high rate of return, sometimes cause immense environmental pollution. The cement industry is the second largest carbon dioxide emitting industry after the power generating industry. Its high temperature calcinations processes also release toxic heavy metals in atmosphere, e.g., thallium, cadmium and mercury. The modern paints contain toxic materials that are harmful for human health.

The results of the present survey revealed that a number of historic buildings were standing in a derelict state of preservation (Pl. 13a & b). They were standing in a utter state of neglect and non-

\textsuperscript{11} The historic town of Rawat is situated about 18 km east of Rawalpindi on main Grand trunk road from Rawalpindi to Lahore or vice versa.
appreciation. Some of them were locked and people hesitated to walk closer to them as they could fall any time. The large mansions, once most affluent and notable in cities, could crumble to dust soon. The thick roots and shoots of old Pipal trees were growing in old and dried drains in external walls of the monuments. At instances, their precious scrupulously carved and painted doors were stolen, leaving only door frames behind. Some buildings were razed to ground to give way to modern business and residential plazas. Some were still used for residential or commercial purposes, but no attempt was made to preserve the notably beautiful architectural elements of the buildings. The wide cracks were apparent in the external walls. The buildings were liable to fall down any time. They needed urgent preservation and restoration.

The study also highlighted that traditional craftsmanship disappeared or veiled due to modern mechanical and electrical technologies. The heirs of the craftsmen largely turned to unskilled labor12 on daily wages.

The historic urban/town planning suffered badly on account of modern architectural trends. The proper orientation of the houses is largely forgotten, resulting in dark and climatically incompatible residential constructions. The water procurement and sewerage system deteriorated in face of ever increasing population and unplanned extension of the cities and towns. The water ponds were filled to procure land for houses; their stone or brick was taken away for modern constructions, or leveling the agricultural fields in rural areas. Those that escaped the human agencies were in bad state of preservation due to natural ravages. A number of water ponds were filled with filthy water and became a source of disease and environmental pollution. However, a few water ponds were preserved and maintained by the local government, making these vast resources still useful for washing purposes and quenching the cattle.

At a time when incompatibility of modern architecture has widely been recognized, we need to take lessons from rich cultural repository of traditional architectural styles and materials. The

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12 Unskilled labour is one of the lowest paid jobs in Pakistan.
traditional buildings, although standing in a state of neglect, they still provide significant clues to designing contemporary environmental friendly architecture.

Recommendations
On the basis of above discussion, we recommend that:
- Some of the important traditional buildings in Potohar Plateau, belonging to late 19\textsuperscript{th}-early 20\textsuperscript{th} century CE, may be included in National heritage inventory of Pakistan.
- These may be conserved/renovated and preserved for the education of future generations.
- The local traditional monuments may be included in the courses of syllabi for primary and secondary school social sciences.
- Lessons may be taken for modern constructions by adding chapters on traditional architectural styles and materials in the courses of syllabi of architectural planning and residential engineering.
- The common masses may be taught significance of traditional architectural styles through reports and documentaries on mass media.
Bibliographical References


### Annexure 1

#### Table 1:

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rawalpindi</td>
<td>District Rawalpindi lies between 32°6’ and 34°1’ north latitude and 72°47’ and 73°42’ east latitude. Rawalpindi city (33.600° N and 73.0500° east is a twin city of Islamabad. It is the fourth largest city of Pakistan after Karachi, Lahore and Faisalabad.</td>
</tr>
<tr>
<td>2</td>
<td>Islamabad</td>
<td>Capital of Pakistan, 33.43° North, 73.04° East at north edge of Potohar Plateau and at the foot of Margalla Hills.</td>
</tr>
<tr>
<td>3</td>
<td>Kuri Shehr</td>
<td>Kuri Shehr is a historical city, located in Islamabad, coordinates; 33°41’0” North, 73.11’0” East (33.681N, 73.178E).</td>
</tr>
<tr>
<td>4</td>
<td>Rawat</td>
<td>Coordinates; 33°30'00” North and 73°12'00” East; lies about 18 km east of Rawalpindi city on main grand trunk road running from Rawalpindi to Lahore or vice versa.</td>
</tr>
<tr>
<td>5</td>
<td>Fateh Jang</td>
<td>Fateh Jang located in District Attock, coordinates; 33.5689° North and 72.6378° East; lies 25 miles west of Islamabad on Rawalpindi-Kohat or Rawalpindi-Mianwali road.</td>
</tr>
<tr>
<td>6</td>
<td>Qutbal</td>
<td>Qutbal is a historic town in district Attock.</td>
</tr>
<tr>
<td>7</td>
<td>Dhok Adrana</td>
<td>A picturesque village of about 200 houses, lying at the bank of River Swan, about 40 km west of Rawalpindi, and 30 km from Rawat.</td>
</tr>
<tr>
<td>8</td>
<td>Ghaznabad</td>
<td>In Tehsil Kallar</td>
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<tr>
<td>9</td>
<td>Barki Badhal</td>
<td>Burki Badhal is a small town, situated about 1 km west of Gujar Khan city. Gujar Khan city is located in District Rawalpindi, coordinates; 3316°0.120” North, 7319°0.120” East. Barki Badhal town is located about 25 km on Sandal road, west of Barki interchange on Grand Trunk road, running from Rawalpindi to Lahore.</td>
</tr>
<tr>
<td>10</td>
<td>Pharwal</td>
<td>A small village of about 100 houses. The village belongs to Police station Chauntra, and lies about 6 km from the police station.</td>
</tr>
<tr>
<td>11</td>
<td>Chakwal</td>
<td>The historic city of Chakwal is located 90 km south east of the Federal Capital of Islamabad, with geographical coordinates; 32°56′0″ North and 72°52′0″ East.</td>
</tr>
<tr>
<td>12</td>
<td>Daultala</td>
<td>The historic town of Daultala is located in District Rawalpindi, situated about 60 km from Rawalpindi, with coordinates 33°12′0″ North and 73°9′0″ East.</td>
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<tr>
<td>13</td>
<td>Nila</td>
<td>The small village of Nila is situated about 50 km southwest of Chakwal</td>
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</table>
city, with coordinates 33°10’3” North 72°36’53”. It is one of the oldest and most beautiful village of district Chakwal.

Map 1: showing major surveyed sites
1a. Ahata in Lal Kurti

1b. Windows and ventilators of upper storey, Bhabra Bazaar, Rawalpindi
2a. Picture showing courtyard and arched verandahs of Soojan Singh Haveli
2b. Arched Verandahs, Barki Badhal House 2, Gujar Khan

3a. Doors and ventilators, Barki Badhal House 1, Gujar Khan
3b. Lal Kurti Balconies

4a. Wooden Balcony: Raja Bazaar, Rawalpindi
4b. Daultala Doorway

5a. Upper storey windows in Daultala town

5b. Seats besides doorways, Daultala
Pl. 6

6a. Abutted corners through rounded pilasters in Daultala town

6b. Narrow Street of Qutbal town
7a. Corinthian Capital in Qutbal

7b. Qutbal Windows
8a. Wooden Relief of Main Door of Soojan Singh Haveli

8b. Wood Relief Work: Main Door of Soojan Singh Haveli
Pl. 9

9a. Nila Village Door 1

9b. Nila Village Door 2

. Pencil Sketch. Nila Village Door 1

Pencil Sketch. Nila Village Door 2
10. Painted and lacquered ceiling, Nila Village, District Chakwal

11a. Plantation in the buildings: Rawalpindi
11b. Capital of the pillar, meant for flower pots

Pl. 12

2a. Hassan Abdal Water Pond
12b. Ghaznabad water pond, showing bastioned waterway and modern shops in background

Pl. 13

13b. State of preservation: Soojan Singh *Haveli*, Rawalpindi