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01 INTRODUCTION

1. A Introduction
Dholavira, located on the island of Khadir in the Great Rann of Kachchh in Gujarat is ranked one amongst the five largest Harappan cities and second largest in India (Rakhigarhi being the largest), of the Harappan civilization. The site was discovered by Jagat Pati Joshi, former Director General of ASI in 1966, during his exploration in the Kachchh district.

Dholavira is managed by the Archaeological Survey of India (ASI) under AMASR Act, 1958 (Amendment and Validation, 2010). Conservation, maintenance and scientific preservation are the sole responsibility of ASI.

The excavated remains at Dholavira, a Harappan city, are one of the very few best preserved and in situ urban settlements in South Asia dating to 3rd to mid-2nd millennium BCE. Dholavira is one of the very few large Harappan settlements where an entire sequence which spans the history of Indus cities, from early Harappan town/ pre-urban phase to the height of the Harappan expansion and the Late Harappan is observed. The city demonstrates a meticulous urban planning system and execution in response to the local geography, geological settings, topography, climate and socio-economic systems of the Early and Mature Harappan phases and exercised a considerable influence on the contemporary urban settlements in the region and beyond. The configuration of the city of Dholavira, during its heydays, is an outstanding example responding to a stratified society having the principle qualities of planned and segregated urban residential areas based on differential occupational activities, technological advancements in water harnessing systems, water drainage systems as well architecturally and technologically developed in terms of design, execution, harnessing of local materials in an effective manner. Unlike other Harappan antecedent towns, the location of Dholavira in the island of Khadir, was strategic to harness the different mineral and raw material sources (copper, shell, agate-carnelian, steatite, lead, banded limestone, among others) to facilitate internal as well as external trade to the Magan (modern Oman peninsula) and Mesopotamian regions.

Dholavira’s outstanding universal value is based on its unique city planning and in situ finds of ingenious technology as well as art and architecture contributing to the large narrative and discourse of Harappan civilization.

1. B Aims and Objectives
- To safeguard and enhance the Outstanding Universal Values of Dholavira by managing, conserving and protecting the excavated remains through an effective plan.
• To outline a sustainable approach towards the conservation, preservation and maintenance of the site.
• To establish guidelines for the future management of the site, so that special character of the site is maintained and enhanced.
• To improve and enhance visitor experience.

The SMP aims to propose a holistic solution towards conservation and management of the excavated remains and work towards providing authentic and enhanced experience to the visitors.

1. C Vision of the Site Management Plan

“To protect, conserve and conserve the attributes of the property which includes its unique city planning and in situ finds of ingenious technology as well as art and architecture contributing to the large narrative and discourse of Harappan civilization, thus, ensuring to maintain its Outstanding Universal Value (OUV).”

1. D Scope of the Site Management Plan
The Site Management Plan (SMP) focuses on the:

i. Proposed World Heritage Nominated property area of 103 Ha, comprising citadel (fortification wall along with the gateways), the bailey, the water reservoirs, middle town, ceremonial ground, lower town and outer fortification wall remains and water channels

ii. Buffer area of 148 ha is the village boundary as per the District Collectorate, which includes the ancient lime stone quarry sites, the natural catchment area of the Manhar river and the archaeological port site of Saran to the North of the property.

The plan is limited only to highlight the issues emanating within the proposed property of Dholavira which are to be addressed by ASI and its defined buffer area which are to be addressed by the concerned stakeholders.

The SMP is a dynamic document, the actions plans and timelines are proposed for a period of 5 years based on the current conditions of the property. However, it may, as the ground situation may arise, be reviewed from time to time.

1. E Structure of the Site Management Plan

The Site Management Plan is structured as follows:
Property Description and Significance: A brief description of the site, its locations, its historical description and architectural description along with important attributes of the property and its significance has been presented.

Conservation Plan: A sub structure of the management plan, this section details out the excavation works along with the conservation works undertaken so far. Based on the present site conditions, an assessment of the state of conservation of the property area has been done based on which a conservation plans has been proposed.

Visitor Management Plan: Based on the current visitor footfall, their movement and amenities on site, a visitor management plan is proposed which encompasses provisions to be made for improving visitor experience and site interpretation.

Risk Preparedness Plan: The potential risk to which the site is exposed has been also taken into consideration and a plan has been devised accordingly to ensure a proper conservation of the site and attempt to safeguard its universal value.

Buffer Zone Management: The zone delimited for further protection to the site has another entity in itself with the presence of several stakeholders. After a detailed assessment of the buffer region a proper management mechanism for the buffer has been proposed to further ensure collaboration among stakeholders.

Implementation strategies and Action Plan: An action plan defining the time period to execute the identified works has been formulated for which an implementation mechanism has been defined. However, to implement the plan successfully, it needs to be followed closely and updated regularly.

Monitoring Plan: Monitoring Plan defines items of works to undertaken regularly, at different intervals depending upon the requirement.
02 PROPERTY DESCRIPTION AND SIGNIFICANCE

2. A Location
Dholavira (23°53’13.82”N; 70°12’48.95”E) is located on the isolated island of Khadir in the Great Rann of Kachchh in Gujarat. The archaeological remains within an overall fortification is located between two seasonal monsoon channels, known locally as Mansar (north) and Manhar (south). The archaeological remains encompassed within the outer fortification covers an area of around 70 ha and is ranked one among the five largest (may be six largest, if Lakhanjo-daro is taken into account and after Mohenjo-daro, Harappa, Rakhigarhi, Ganweriwala) Harappan cities and second largest in India (Rakhigarhi being the largest), of the Harappan civilization.

Image 2-1: Location of Dholavira in Khadir Island

2. B Description of Site
The city of Dholavira in its fullest form was a precisely proportionate whole and proportionality resolved configuration following a resolute set of principles of planning and architecture with mathematical precision and, perhaps, with astronomically established orientation.

The salient components of the full-grown cityscape consisted of a bipartite ‘citadel’, a ‘middle town’ and a ‘lower town’, two ‘stadia’, an ‘annexe’, a series of reservoirs all set within an enormous fortification running on all four sides. Interestingly, inside the
city, too, there was an intricate system of fortifications. The city was, perhaps, configured like a large parallelogram boldly outlined by massive walls with their longer axis being from the east to west. On the basis of their relative location, planning, defence and architecture, the three principal divisions are designed tentatively as 'citadel', 'middle town', and 'lower town'.

The citadel at Dholavira was laid out in the south of the city area. It had two conjoined subdivisions, tentatively christened at Dholavira as 'castle' and 'bailey', located on the east and west respectively, both are fortified ones. The former is the most zealously guarded by impregnable defence and aesthetically furnished with impressive gates, towers, 5alient and drainage. Seventeen gates, all built in the fortification walls with equally interesting add-on components, have been exposed so far. Their number-wise break up is: cattle 5, bailey 2, stadiums 4, middle town 1, annexe 2 and the remaining 3 belonging to the late Harappans of Stage VI. Being fairly much preserved, those bear immense archaeological and architectural significance.

Interestingly, each castle gate is designed differently. Four of them, constructed somewhat, if not precisely, in the centre of each arm of the fortification, were regular gates while the fifth as an additional one in the eastern wall served some specific purpose as the flight of its broad steps stopped just halfway down from the top and did not descend onto the ground outside. The south gate was a concealed passageway leading one through open stairs to an exquisite rock cut reservoir. The remaining three, one each on east, west and north, shared a few common features which comprised besides broad and deep passageway and stairs, a high front terrace and a connected pathway with outward gentle slope. All these were duly provided with in the west gate. There the similarity ended. The east gate was more elaborate with a built-in chamber, large and elevated above the sunken passageway which in turn was connected to stairs rising onto the interior of the castle. The north gate was however the most elaborate and the most elegant and imposing on a vantage location commanding over sprawling cityscape and enchanting landscape. It had two large and elevated chambers flanking the sunken passageway which in turn was connected to an L-shaped staircase ascending from the inner end. Its lofty front terrace, 6m high and 12m deep, was connected to an equally broad pathway with a slope towards the east where it terminated separately onto the little as well as great stadium. The north gate is also remarkable for yielding a spectacularly large inscription made up of 10 unusually big Harappan letters which were surely inlaid on a wooden board since decayed but fairly determinable for its size and shape which matched well with the width of the doorsill of the gate and suggesting thereby that it was originally sported on the façade, right above the door of the gate so as to be visible from afar for its white brilliance.

To the north of the citadel a broad and long ground, probably used for multiple purposes such as community gathering on festive or ceremonial occasions, a stadium and a marketing place for exchanging merchandise during trading seasons.
Further north, there was laid out the enwalled middle town while to its east was founded the lower town. The arterial street of the middle town passed through a gate in eastern fortification wall and then went on running across the lower town albeit with a few turns, each at the end of a residential sector. The street however remained uninterrupted. Other major and minor streets and lanes shot off from the axial street for making a defined network of housing sectors. The lower town did not have an appurtenant fortification though, it was set within the general circumvallation.

Besides to the south of the castle, across the adjoining reservoir, there was raised another built-up area running along the city wall, perhaps, designated as annexe or a warehouse meant for housing the retainers and menials.

The other significant area in which the Harappans of Dholavira excelled spectacularly pertained to water harvesting with the aid of dams, drain, reservoirs and storm water management which eloquently speak of tremendous engineering skill of the builders. Equally important is the fact that all those features were integrated part of city planning and were surely the beauty aids, too. The Harappans created about sixteen or more reservoir of varying sizes and designs and arranged them in a series practically on all four sides. A cursory estimate indicates that the water structures and relevant and related activities accounts for 10 hectares of area, in other words 10% of the total area that the city appropriated within its outer fortification. The 13 m of gradient between high and low areas from east to west within the walls was ideally suited for creating cascading reservoirs which were separated from each other by enormous and broad bunds and yet connected through feeding drains.

Six of the water tanks, one to east of castle and five of the series to south of it, have been fully or considerably exposed while a few others or other related features are testified in check digs.

The citadel has yielded an intricate network of storm water drains, all connected to an arterial one and furnished with slopes, steps, cascades, manholes (air ducts / water relief ducts), paved flooring and capstones. The main drains were high enough for a tall man to walk through easily. The rainwater collected through these drains was stored in yet another reservoir that was carved out in the western half of the bailey. Besides, the city has yielded toilets, sullage jars, or sanitary pits. Drains have shown a good variety even included cut-stone ones and pottery pipes.

Like many amazing elements that Dholavira has yielded in respect of Indus civilization, another aspect of sepulchral architecture. The cemetery lies to the west of the city and covers a very large area. There are found a variety of cenotaphs which include regular rectangular and circular structures. The most interesting are seven hemispherical constructions two of which were subjected to excavations. These were huge mud brick structures, having a circular plan and hemispherical elevation. While one was designed in the form of a spoked wheel, the other was without spokes. Both the structures were made over rock-cut chambers of large
dimensions. Primarily, all sepulchral structures are devoid of skeletons although in most cases, they are furnished with grave goods mainly in the form of pottery.

The various divisions of the city have gateways on cardinal directions. However, the gates of castle (fig. 2.030) are unique, and each one presents a different plan and architecture. The North Gate of the castle is the most elaborate among the gates and probably the only standing example of similar architecture in the entire Harappan civilization. Further, the East Gate of Castle (fig. 2.030 & 2.031), North Gate of Bailey (fig. 2.032), East Gate of Middle Town all represents different configurations of gateways that adorned the Harappan city of Dholavira. Even though evidence for gates are found from other Harappan settlements like Harappa, Mohenjo-daro, Lothal, Kalibangan, Banawali and others, the extraordinary preservation of architectural remains at Dholavira, has helped in the fuller understanding of the architectural features.

2. C Important Attributes of the Site

ii. Proto historic systems of Urban planning
iii. Water management systems
iv. Defence systems in planning
v. Art and technology
vi. Use of local materials for construction and dissemination of technology

i. Proto- historic Bronze Age urban settlement

Dholvira is an exceptional example of a proto- historic Bronze Age urban settlement pertaining to the Harappan civilization (Early, Mature and late Harappan phases) and bears evidences of a multicultural and stratified society during the third and second millennium BCE. The excavated remains clearly indicate the origin of the settlement, its growth, zenith and the subsequent downfall in the form of continuous changes in the configuration of the city, architectural elements and various other attributes. The evidence from Dholavira not only exhibits exceptional testimony to the Harappan culture, with its unique regional manifestations and variations of Gujarat region, representing this bygone civilization in all aspects, but also preserves evidence for the continuity, particularly in the areas of vernacular architecture, water management.

The settlement at Dholavira is the resultant of an excellent planning and located between two ephemeral streams, Mansar in north and Manhar in south effectively harnessed the available water during the rainy season. The evidence of quarrying of banded limestone to the northeast and northwest of the settlement, reservoirs in the upstream of Mansar and Manhar, indicates the strategic planning to exploit the local resources in an effective manner.

ii. Water management systems
Unlike other Harappan antecedent towns, the location of Dholavira in the island of Khadir, was strategic to harness seasonal water streams for water supply and management, sourcing of different mineral and raw material sources (copper, shell, agate-carnelian, steatite, lead, banded limestone, among others) to facilitate internal as well as external trade to the Magan (modern Oman peninsula) and Mesopotamian regions.

Dholavira: A Harappan City is an excelled example pertaining to water harvesting with the aid of dams, drain, reservoirs and storm water management which eloquently speak of tremendous engineering skill of the builders. Equally important is the fact that all those features were integrated as part of city planning. The Harappans created reservoirs of varying sizes and designs and arranged them in a series practically on all four sides. The 13 m of gradient between high and low areas from east to west within the walls was ideally suited for creating cascading reservoirs which were separated from each other by enormous and broad bunds and yet connected through feeding drains.

### iii. Defense systems in planning

Ideally suited for a settlement, well provided with fortifications, built-up areas and artificial reservoirs, the site lies between the storm-channels and halfway down between the hills and the Rann, which provided proper defense to the site. The site has a few rocky protuberances and ridges, surrounded by a thick pile of naturally deposited sediments. The fortification walls, both inner and outer, were structures of proportionately molded mud-bricks, successive courses being laid in a recessed manner. As a result, both faces showed a marked taper with receding steps. While the outer faces were normally veneered with rubble and hammer-dressed stones, the inner ones were periodically plastered over with fine clays. The outer and inner walls acted and protected the site.

### iv. Art and technology

The development of art and technology is another hallmark of Dholavira that can be observed in various stages of its occupation. The introduction of articulated pillar elements used in the gateways during the mature Harappan period is a reflection of evolved artistic skills. Beside this, along with the construction of eastern and southern reservoirs, often cut into the bedrock speaks volumes about the technological innovations of Dholavira Harappans. The technological developments can be seen in other areas of artisanship also. However, the most stupendous and technological achievement of the Harappans happened at Dholavira in the form of invention of a specialised stone material, tentatively termed as ‘ernestite’ after Ernest Mackay, which was used for producing drill bits, that could perforate the much harder siliceous stone materials with more ease when compared to other materials. The ernestite stone material, still unknown of its geological provenance, is slightly harder than agate-carnelian and other siliceous stone materials, and hence could perforate them. Dholavira alone has in its record around 1586 numbers of ernestite drill bits of various sizes and configurations.
along with a very few chert drills, and the Scanning Electron Microscope (SEM) images of the drill hole impressions indicate a distinct and unique polish pattern, which is now used to identify beads perforated by earnestite drill bits.

v. Use of local materials for construction and dissemination of technology
The complete chaine opéraire in the processing of these pillar elements can be witnessed at Dholavira, which is unique to this settlement. Further, the export of such pillar elements to other urban settlements like Mohenjodaro and Harappa, well supported by scientific documentation is an illustration of the sophisticated technological innovation and also demands of such elements from elite of other settlements. The quarry site, located some 3 km northeast and northwest of Dholavira, demonstrates the processes involved in:

- selection of a suitable area to extract the required portion of limestone block,
- chipping the extracted stone block to achieve the required shape and size,
- transporting the roughly chipped and unfinished stone pillar member to the city for further processing, and; finally giving the lustrous and smooth surface finish, most probably on a lathe.

2.D Significance
Dholavira: A Harappan City, during its heydays, is an outstanding example responding to a stratified society having the principle qualities of planned and segregated urban residential areas based on differential occupational activities, water harnessing systems, water drainage systems as well architecturally and technologically developed in terms of design, execution, harnessing of local materials in an effective manner. Unlike other Harappan antecedent towns, the location of Dholavira in the island of Khadir, was strategic to harness the different mineral and raw material sources (copper, shell, agate-carnelian, steatite, lead, banded limestone, among others) to facilitate internal as well as external trade to the Magan (modern Oman peninsula) and Mesopotamian regions. Its scale of enclosures, the hierarchical street pattern and defined spatial utilization i.e. distinct areas for industrial activities, administration etc., as well as infrastructure like waste water disposal system, show the sophisticated urban life enjoyed in this metropolis.

Dholavira proves to be a protagonist in terms of art and technology which is evident from the materials culture viz. a flourishing bead industry, architectural elements of polished stone members and design of elements such as gateways to the city and fortification walls. Being one among the six largest urban settlements, catering to the hinterland of around 160,000 sq. km. covering the entire modern Gujarat state of India, the strategic location of Dholavira was at the crossroads of garnering resources and exchange of both raw materials and finished products to Sindh, Punjab regions in the north and Magan and Mesopotamia in the west, thereby also been a central point of fertile exchange of influences and generation of values.
The city demonstrates a meticulous urban planning system and execution in response to the local geography, geological settings, topography, climate and socio-economic systems of the Early and Mature Harappan phases and exercised a considerable influence on the contemporary urban settlements in the region and beyond. The cultural vestiges like distinct ceramics and artefacts along with the configuration in the cityscape of each of the phases are representative of the bygone ages and also indicative of the different manifestations (early, mature and late/post Harappan) of the Harappan culture.

The city had three distinct and prominent divisions named by the excavator as Citadel (consisting of a bipartite settlement, viz., Castle and a Bailey), Middle Town and Lower Town, all encompassed with an outer fortification, indicating adoption of specific ratio and proportion, considering the basic unit of measurement as 1 dhanus equivalent to 1.9 meters. The quadrangular shaped outer fortification measures 771 m (EW) and 617 m (NS).
03 CONSERVATION PLAN

3. A Introduction
Dholavira: A Harappan City, is owned and maintained by the Archaeological Survey of India (ASI) and is protected vide the Ancient Monument and Archaeological Sites and Remains Act (AMASR), 1958 (Amendment and Validation, 2010) (Refer Annexure A2 and A4).

ASI is responsible to carry out documentation, monitoring, maintenance, essential conservation works with an in-house team of archaeologists, engineers, architects, art conservators (scientists), surveyors and draftsmen. Under the purview of the National Policy for “Conservation of the Ancient Monuments, Archaeological Sites And Remains, 2014 (Refer Annexure A9), ASI ensures any intervention, in terms of conservation or provision of infrastructure, should respect the historic fabric of the excavated remains and not to compromise its authenticity and integrity.

ASI maintains monuments and sites of national importance on regular basis, depending upon their special needs, within the available manpower and financial resources by the way of taking structural repairs and chemical treatment and preservation. Maintenance and essential structural conservation of ancient monuments and archaeological sites of national importance is carried out by the Circle offices having experts in field of archaeology, engineering, architecture, museology, etc. The Superintending Archaeologist of the Circle remains the overall in-charge of conservation and maintenance of all protected monuments under her/his jurisdiction, while necessary conservation interventions within monuments are carried out by the concerned Conservation Assistant (CA In charge) of the sub-circle.

The proposed site, Dholavira: A Harappan City, comprising the fortification wall along with the Gates of the Castle, the bailey, the water reservoirs and water channels, middle town and lower town and outer fortification wall remains survive extant in situ. All its physical attributes are structurally stable and in a good state of preservation.

3. B Conservation Approach
The property is under the jurisdiction of Archaeological Survey of India and has been notified vide the Ancient Monument and Archaeological Sites and Remains Act (AMASR), 1958 (Amendment and Validation, 2010) (Refer Annexure A4) and one of the prime mandates of ASI is to ensure the conservation and maintenance of all protected monuments as per the AMASR Rules 1959 (Refer Annexure A3) and AMASR Rules 2011 (Refer Annexure A5).
ASI undertakes the conservation, preservation, environmental development and other maintenance works as per its own *National Policy for the Conservation of Monuments, Archaeological Sites and Remains, 2014*. (Refer Annexure A9) ASI follows the principle of minimum and reversible interventions, repairs (whenever necessary), with maximum retention of historic fabric. National Conservation Policy, 2014 provides comprehensive guidelines for conservation, preservation and maintenance of protected monuments, devising conservation principles for protected monuments and incorporating best international practices in conservation.

### 3. C Conservation History

ASI undertook thirteen field seasons of excavation from 1989-90 to 2004-05 and carried out scientific excavation and conservation works simultaneously. Systematic documentation of cultural materials and antiquities found during excavations, cataloguing, cleaning, conservation and restoration from excavations, classification and documentation, research and development has been performed by ASI’s Excavation and exploration section and Museum and antiquity section from time to time. *(Refer Appendix 1.2 for detail inventory of pottery and seals)*.

Since the first exploration exercise in 1968, various interventions in terms of excavations, findings and conservation of the archaeological site of Dholavira have been recorded in the *Indian Archaeology: A Review* and various Annual Reports.

The following is an account of the past conservation works carried out by ASI, during and after excavation and its current state of conservation and condition assessment.

#### 3. C.1 Summary of the conservation works undertaken at Dholavira: A Harappan city

The annual works programme of various conservation and development works is prepared by the CA at Dholavira (Bhuj sub-circle office). His responsibility encompasses site supervision and required interventions in terms of conservation, repairs, infrastructure development, and preparation of estimates, budget, annual work plan and phasing based on the inspection notes. The works are approved by the relevant competent authority (Director General, Regional Director, West or Superintending Archaeologist, Vadodara Circle of ASI. Conservation works and requisite budget is sanctioned for implementing by Director General, ASI headquarters, New Delhi every year as per the approved annual plan. It is ensured that the required expertise is acquired for the type of works and projects sanctioned and if required, external expertise is hired in consultation. The process of works, sanctioned budgets and estimates and execution of works is thoroughly documented and is published annually in the Annual report *(Indian Archaeology: A Review)*.

Following is the compiled list of conservation works carried out at the property during and after excavation process. Many of the conservation works carried out in the past are addressing similar issues which have been highlighted earlier in the conservation
assessment section above. The Vadodara circle has prepared a 3 year vision plan for the property to address the conservation and maintenance issues as well as upgradation of site from the point of view of tourist facilitation.

Brief summary of conservation works carried out in the past are as follows:

3. C.1.i Year 1997-98
- Careful documentation and dismantling of loose and sunken base portions of rubble masonry of the East gate of the Castle and walls of the middle and lower town. Consolidation and stabilization of the rubble masonry and levelling with lime-concrete and restored in lime mortar as per original

3. C.1.ii Year 1998-2000
- In continuation of the previous year's work, underpinning, pointing and water tightening of the rubble stone masonry structures of Castle structures in lime-cement-mortar matching the original.
- Careful documentation and dismantling and resetting of the loose and dislodged rubble stone masonry veneering of East wall of Castle in its original position and pointing in lime mortar mixed with stone dust to match the original and texture.

Image 3-1: Consolidation of broken and loose stone veneering at East corner of Castle fortification wall (L- on going conservation works; Year 2000-01; R- after completion of works)

3. C.1.iii Year 2000-01
- In continuation of previous year's works, repairs to the excavated remains, particularly the Castle wall from east gate to North corner, the East Reservoir and pointing of the walls of Larger Tank and Smaller Tank's located inside the Castle.
- Dismantling of the loose rubble stone masonry veneering after careful documentation and numbering of the stones. Re-setting and consolidation of veneer in their original position as per documentation in lime and sand mortar added with colour oxide.
- Weathered rubble masonry stones consolidated with stones of similar size, available at the site.
• Lime pointing of wide masonry joints in lime and stone dust mortar for water tightening purposes.
• Resetting of the dismantled veneering rubble stone masonry in its original position and pointing in lime-mortar mixed with stone dust, matching the original.

Image 3-2: Consolidation of broken and loose stone walls in Castle; Year 2000-01 (L- before conservation works; R- after completion of works)

Image 3-3: Consolidation of broken and loose stone veneering at East water reservoir; Year 2000-01 (L- ongoing conservation works; R- during execution of works)

3. C.1.iv Year 2001-02
• Detailed photographic documentation and numbering, disturbed, dislodged and bulged un-coursed rubble masonry wall and excavated structural remains of middle town and lower town area and dismantling and resetting in lime mortar as per original and water tightened.
• Reconstruction of damaged stone masonry latter additions (North gate) on account of earthquake
3. C.1.v Year 2002-03

- Dismantling of disturbed stone materials around excavated remains and reconstruction of the same in original and alignment in lime mortar including water tightening of the top layer.

Image 3-4: L- reported damage to stone pillars (Stage VII) during the Earthquake of 2001; R- Reconstruction of the pillars through salvaged material and lime/mud mortar.

Image 3-5 Consolidation of broken and loose stone veneering, restoration of broken steps at Larger Tank and Smaller Tank at Castle; Year 2002-03 (L- before conservation works; R- after completion of works)

Image 3-6 Consolidation and restoration of broken and loose stone veneering; Year 2002-03 (L- before conservation works; R- after completion of works)
3. C.1.vi Year 2003-05
- Dismantling and resetting of coursed rubble masonry wall and other structural remains after detailed photographic documentation
- Conservation of East Reservoir by consolidation of rubble stone masonry

Image 3-7: Consolidation and restoration of broken and loose stone veneering; Year 2003-04 (L- before conservation works; R- after completion of works)

Image 3-8 Consolidation and restoration of broken and loose stone veneering, staircase and edge stone of the well at East Reservoir; Year 2003-04 (L- before conservation works; R- after completion of works)

3. C.1.vii Year 2005-06
- Dismantling of uncoursed rubble stone masonry wall and structural remains of the southern reservoir and south east corner of the Castle before resetting.
- Photographic documentation of road leading to north gate and part of East Reservoir and dismantling and resetting in correct alignment

3. C.1.viii Year 2006-07
- Removal of earth debitage from south east corner of East Reservoir and between areas of other excavated remains.
- Construction of culvert over Manhar river for facilitation of access to the property
- Construction of vehicle parking area

3. C.1.ix Year 2007-09
- The work of dismantling & resetting of bulged rubble stone masonry wall
• Providing and laying of PCC pathway in front of the East gate
• Providing chain link fencing with dwarf masonry wall on the East & North side
• Removal of vegetation
• De-silting of reservoirs

Image 3-9: Consolidation and restoration of broken and loose stone rubble masonry; Year 2008-09 (L- before conservation works; R- after completion of works)

Image 3-10 Photos of Consolidation and restoration of broken and loose stone walls and creating pathway at East gate; Year 2007-08 (L- before conservation works; R- after completion of works)

Image 3-11 De-silting of south reservoir and consolidation of loose stone walls; Year 2007-08 (L- before conservation works; R- after completion of works)
3. C.1. X Year 2009-11
- Scientific clearance
- Prohibited and regulated area mapping

3. C.1. Xi Year 2011-13
- Dismantling and resetting of bulged-out random rubble masonry walls and structures, repairs to the excavated remains of bailey at North-West corner, such as bulged house walls, drains, streets and rooms which includes dismantling after proper documentation, numbering of the stones, photography of the repairs to be carried out, resetting the same alignment using lime mortar followed by the pointing work.
- De-silting of southern and East Reservoirs

3. C.1. Xii Year 2013-15
- Provision for removal heavy vegetation growth from the site
- Desilting of southern reservoirs
- Dismantling loose bulged rubble stone masonry wall and resetting the same as per original
- The work of dismantling and resetting of bulged out UCR masonry walls
- Repairs to structural remains of Bailey are in lime mortar
- The excavation for foundation and laying concrete at base and top of wall
- Construction of random rubble masonry dwarf wall and fixing chain link fencing fixed over dwarf wall on partly boundary of the protected area. Providing chain link fencing over dwarf wall

3. C.1. Xiii Year 2015-17
- Conservation and re-setting loose rubble masonry of walls at middle and lower town, main Castle portion
- De-silting of East and southern reservoir
- Jungle cutting, root extracting of all protected are of the site
- Construction of chain link fencing over dwarf wall; excavation for foundation; concrete coping over dwarf wall; random rubble stone masonry wall; pointing over wall and applying paint to chain link frames
- Provision of signage, pathways, tourist walk ways

3. C.1. Xiv Year 2017-19
- Removal of heavy vegetation growth and grass from wall and surface of the site, walls, structures, remains and protected area, earth filling (after dressing of the ground removing scrubs and grass) by good selected earth for levelling ground, rain cuts, depressed eroded places, gully, etc. and filling in patches at different places on the site
- De-silting reservoir by the way of scientific clearance after de-watering of reservoir, etc.
- Providing and constructing stone masonry wall in lime mortar wherever necessary damaged and missing
- Providing iron gate to property

Image 12: De-silting of east reservoir and consolidation of loose stone walls; Year 2017-18 (L-before conservation works; R- after completion of works)

Following is a consolidated list of major works carried out in the site in the past and also results of a detailed site inspection for condition assessment with respect to conservation and maintenance.

3.D Excavation and studies undertaken

The property was first reported, explored and excavated in 1968. Since 1989, the site was subjected to archaeological excavations by Archaeological Survey of India for thirteen field seasons (as already mentioned in section 5.3). Following is the records of Excavation/ exploration works and scientific studies undertaken in the past

<table>
<thead>
<tr>
<th>Sr. no</th>
<th>Type of record</th>
<th>Date of record</th>
<th>Summary of record</th>
</tr>
</thead>
</table>
| 01     | Identification of site and mound | 1968-69 | • Eight Harappan sites including two major settlements were discovered in North Kutch  
• Identification of mound of city ruins |
<table>
<thead>
<tr>
<th>Year</th>
<th>Activity</th>
<th>Details</th>
</tr>
</thead>
</table>
| 1984-85 | Examination of site                              | • Re-examination of ruins of Dholavira  
• Three well-defined complexes, an acropolis, a middle town and a lower town: all set in a large fortification provided with multiple Gates at regular intervals were observed. |
| 1989-90 | Excavation, documentation, stratigraphy          | • Confirmation of otherwise some visible architectural features of the fortification system as well as of the layout of the Indus city by way of scientific surface digging to an average depth of 50 cm in long trenches across the site  
• Complete stratigraphic documentation of all the three principal divisions by way of deep probing at each |
| 1990-91 | Excavation, documentation, stratigraphy          | • Surface digging to an average depth of 50 cm in western half of the middle town and East half of the lower town, and  
• Deep digging at selected points, one each in the middle town and the lower town and to complete vertical digging at the castle and its bailey.  
• This season's work, besides confirming results of previous work, brought to light the earliest defensive wall belonging to pre-Harappan period in the Castle and has added several new details to Harappan town planning at the site. |
| 1991-92 | Excavation, documentation, stratigraphy          | • Besides imparting field training to the students of the Institute  
• Excavation aimed at reconfirming sequence at the castle and obtaining stratigraphic sequence of the Middle Town, the Lower Town and the Bailey of the Castle in addition to shallow digging in the E-W trench running across the Middle Town and the Lower Town |
| 1992-93 | Excavation, documentation, stratigraphy          | • To reconfirm the sequence at select places in each division of the Harappan city;  
• to excavate beside the north-western corner of Castle to find out whether there lay buried a Gate to Bailey:  
• to gather more details of the layout of the settlement as well as to make probing in the cemetery area which lies to the west of the city. |
| 1993- | Scientific                                        | • Radiocarbon measurements were made on |
Chapter 03: Conservation Plan

<table>
<thead>
<tr>
<th>Analysis and Investigations</th>
<th>Period</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>08 Excavation, documentation, stratigraphy</td>
<td>1996-97</td>
<td>• To gather further details of planning and architecture and make deep probing at selected places in the north-south oriented trenches in all the principal divisions and subdivisions of the city such as Castle, Bailey, Middle Town, Lower Town, both the Stadiums, Annexe and in the open fields believed to be concealing reservoirs.</td>
</tr>
<tr>
<td>09 Excavation, documentation, stratigraphy</td>
<td>1997-98</td>
<td>• Exposing the extent of the rock-cut reservoir, gathering more details of planning and architecture, determining precise architecture, date and nature of the tumulus in the cemetery and carrying out conservation of the principal structures of Castle</td>
</tr>
<tr>
<td>10 Excavation, documentation, stratigraphy</td>
<td>1998-99</td>
<td>• To ascertain the length of Stadium located in-between ‘Castle’ and ‘Middle-town’, to expose the possible gate at the south-western corner of Castle connecting Bailey with the area of the rock-cut reservoir, to expose the western end of the rock-cut reservoir, to open more area of both the water reservoirs: to open the possible entry to the smaller Stadium from southern side, and; to expose the East arm of the Stage VI fortification at its north-east corner. The present work, besides fulfilling the archaeological objective &amp; was also aimed at facilitating the requirement for the development plan of the site.</td>
</tr>
<tr>
<td>11 Excavation, documentation, stratigraphy</td>
<td>1999-2000</td>
<td>• To expose further the remains of structures such as reservoirs. To understand the features of the Castle and middle town areas.</td>
</tr>
</tbody>
</table>

3. E Condition assessment of the property

The Dholavira: A Harappan City, an excavated site, its remains are preserved in situ through regular maintenance and conservation works undertaken by ASI. The city is unique by way of its construction material, since use of limestone for structural members and stone veneering of the structures in the fortified city are prevalent in this property along with the use of mud bricks for fortification walls, whereas other
Harappan sites have use of burnt and sun dried brick as a material to build the core of the walls. There are no major structural conservation issues in the property. Major issues present in the property include consolidation of loose rubble masonry, wherever necessary, pointing of mortar wherever missing, underpinning to the rubble masonry at a few locations, disposal of storm water, disposal of excavated debitage and vegetation growth within the property.

ASI has been carrying out regular conservation, maintenance and other required works from time to time. However, necessary conservation works that need to be undertaken on immediate, mid-term and long term basis in the Action Plan (Refer Chapter number_07) based on the present condition assessment are as follows:

Following is the condition appraisal of the various components of the property:

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Condition assessment</th>
<th>Photograph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Related</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Location: Entrance complex</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Condition:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- No proper maintenance of Bunga Structures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Partially dilapidated round platforms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Chain link fencing missing at places.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Damages to the Entrance Causeway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Lighting poles and electric wires obstructing the view</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Cause:
General Lack of Maintenance

### Site Development Measures
- ASI complex require adequate landscaping.
- Repairing of the mud house, the two Bunga structures at the site complex
- Repair of platforms and sitting area wherever necessary.
- Removal of non-functional electrical poles / solar panels
- Chain link fencing should be restored, wherever required.
- De-vegetation from Site.

### CONSERVATION RELATED ISSUES

<table>
<thead>
<tr>
<th></th>
<th>Location:</th>
<th>East Gate, Castle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Condition:</td>
<td>Soil erosion due to the storm water flow</td>
</tr>
<tr>
<td></td>
<td>Cause:</td>
<td>Absence of drains/ channels and storm water treatment</td>
</tr>
<tr>
<td></td>
<td>Conservation measure:</td>
<td>Consolidation and pointing of rubble masonry. Providing of storm water drains and levelling of ground to prevent water percolation in the masonry structures</td>
</tr>
</tbody>
</table>
2. **Location:**
East Gate, Castle

**Condition:**
- Efflorescence deposits on masonry wall
- Weathering of steps

**Cause:**
- Water percolation within the walls
- Deterioration due to regular usage

**Conservation measure:**
- Providing of storm water drains / levelling of ground in the castle area
- Providing wooden casing over the steps to prevent further weathering of Stone blocks.

3. **Location:**
Stone blocks of pillars, East Gate, Castle

**Condition:**
Flaking of stone and crack development

**Cause:**
Weathering of Stone over time

**Conservation measure and Monitoring:**
- Consolidation of the flaked portion
- Monitoring of stone flaking and crack development using Tell Tale.

4. **Location:**
North Gate, Castle

**Condition:**
- Efflorescence deposits due to water percolation from above,
<table>
<thead>
<tr>
<th>Location</th>
<th>North gate, Castle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
<td>Masonry wall towards east out of plumb</td>
</tr>
<tr>
<td>Cause:</td>
<td>The masonry portion was affected due to the earthquake in 1800’s, however, does not have major implications on the structural condition of the Castle</td>
</tr>
<tr>
<td>Conservation measure and Monitoring measure:</td>
<td>Careful monitoring of Out of Plumb Wall</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Stone blocks of pillars, North Gate of Castle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
<td>Flaking of stone and crack development</td>
</tr>
<tr>
<td>Cause:</td>
<td>Weathering of Stone over time</td>
</tr>
<tr>
<td>Conservation measure and Monitoring measure:</td>
<td>Monitoring of stone flaking and crack development using Tell Tale</td>
</tr>
<tr>
<td></td>
<td>Location:</td>
</tr>
<tr>
<td>---</td>
<td>-----------</td>
</tr>
<tr>
<td>7.</td>
<td>North gate, Castle</td>
</tr>
<tr>
<td>8.</td>
<td>West gate, Castle</td>
</tr>
<tr>
<td>9.</td>
<td>Castle</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Location: Larger Tank and Smaller Tank, Castle | **Conservation measure:**  
- Periodic Desiltation, Consolidation of edges  
- Providing storm water drains and levelling of ground |
| Condition: Siltation at times due to excessive rains | **Cause:** Absence of drains/ channels and surface flow of storm water leading to soil erosion and siltation |
| Cause: Absence of drains/ channels and surface flow of storm water leading to soil erosion and siltation | |

| Location: Well at Southern–Western side, Castle | **Conservation measure:**  
Consolidation of edges, with additional masonry and providing storm water drains and levelling of ground |
| Condition: Undulating ground levels leading to soil erosion and silting of tanks and well | **Cause:** Absence of drains/ channels  
Absence of toe walls/ edges |
| Cause: Absence of drains/ channels  
Absence of toe walls/ edges | |
| 12. | **Location:** South western corner, Castle

**Condition:**
Loss and disintegration of mortar due to water percolation

**Cause:**
General Deterioration

**Conservation measure:**
Consolidation and pointing of rubble masonry |

| 13. | **Location:** Middle town

**Condition:**
Vegetation growth

**Cause:**
Water percolation in the mud brick

**Conservation measure:**
Removal of vegetation (only excess) |

| 14. | **Location:** Fortification wall of Castle towards Ceremonial Ground, north side.

**Condition:**
Loss of masonry of Stone steps in the North Side of Castle Fortification Wall towards Ceremonial Ground

**Cause:**
Gradual deterioration

**Conservation measure:**
Consolidation of Steps |

| 15. | **Location:** Fortification wall of Castle, north side.

**Condition:**
Erosion of Slope soil

**Cause:**
Surface run off

**Conservation measure:**
- Consolidation of soil slope
- Providing storm water drains and levelling of ground for proper drainage. |
### 16. Location: Mansar stream (South west edge)
#### Condition: Vegetation growth, erosion
#### Cause: General Deterioration
#### Conservation measure: Periodic removal of vegetation.

### 17. Location: South Reservoir- 1 and South Reservoir- 2
#### Condition: Silting of tank due to excessive rain
#### Cause: Absence of drains/ channels and surface flow of storm water leading to soil erosion and siltation
#### Conservation measure:
- De-siltation of Water Reservoir
- Necessary repairs to the reservoir walls to be carried out by filling up of the fallen portions, underpinning of lime stone walls wherever required.
- Reversible and temporary measures to be undertaken like dry pitching wall using local stones to prevent erosion of Earth Section into the Reservoir.

### 18. Location: South Reservoir 3
#### Condition: Silting of tank due to excessive rain
#### Cause: Absence of drains/ channels and surface flow of storm water leading to soil erosion and silt deposits
**Conservation measure:**
- De-siltation of Water Reservoir
- Necessary repairs to the reservoir walls to be carried out by filling up of the fallen portions, underpinning of lime stone walls wherever required.
- Reversible and temporary measures to be undertaken like dry pitching wall using local stones to prevent erosion of Earth Section into the Reservoir.

### 18. Location:
South Reservoir 4 and South Reservoir 5

**Condition:**
Development of Crack in the Stone block

**Cause:**
General Deterioration

**Conservation measures And Monitoring measure:**
Proper monitoring of stone flaking and crack development using Tell Tale.

### 19. Location:
Water Channel, South Reservoir

**Condition:**
Over vegetation and Loss of Masonry

**Cause:**
General Deterioration

**Conservation measure**
- De-vegetation of the water channel.
- Necessary repairs of the water channel walls to be carried out by filling up of the fallen portions, underpinning of lime stone walls wherever required.
### 20. Location: East Reservoir

**Condition:**
Silting of tank due to excessive rainfall

**Cause:**
Absence of drains/ channels and storm water treatment, absence of toe walls/ edges

**Conservation measure:**
- Consolidation of edges of structures, with additional masonry
- De-siltation of Reservoir
- Necessary repairs to the reservoir walls to be carried out by filling up of the fallen portions, underpinning of lime stone walls wherever required.
- Reversible and temporary measures to be undertaken like dry pitching wall using local stones to prevent erosion of Earth Section into the Reservoir.
- Providing of storm water drains and levelling of ground

### 21. Location: East Reservoir

**Condition:**
Development of Crack in the Masonry Wall

**Cause:**
Weathering over period of time
<table>
<thead>
<tr>
<th>Conservation measure and Monitoring measure:</th>
<th>Monitoring of crack on masonry wall using Tell Tale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>21.</strong> Location:</td>
<td>Bead Workshop, Bailey</td>
</tr>
<tr>
<td><strong>Location:</strong></td>
<td>Bead Workshop, Bailey</td>
</tr>
<tr>
<td><strong>Condition:</strong></td>
<td>Loss and disintegration of mortar</td>
</tr>
<tr>
<td><strong>Cause:</strong></td>
<td>Gradual deterioration</td>
</tr>
<tr>
<td><strong>Conservation measure:</strong></td>
<td>• Consolidation and pointing of rubble masonry</td>
</tr>
</tbody>
</table>

| **22.** Location:                          | Granary, Bailey                                  |
| **Condition:**                             | Silting of tank due to excessive rain            |
| **Cause:**                                 | Absence of drains/ channels and surface flow of storm water leading to soil erosion and siltation |
| **Conservation measure:**                  | • Reversible and temporary measures to be undertaken like dry pitching wall using local stones to prevent erosion of Earth Section into the Granary. |
|                                            | • Providing storm water drains and levelling of ground |

<p>| <strong>23.</strong> Location:                          | North Gate, Bailey                               |
| <strong>Condition:</strong>                             | • Loss and disintegration of wall mortar         |
|                                            | • Dilapidated steps                              |
| <strong>Cause:</strong>                                 | Gradual deterioration                            |</p>
<table>
<thead>
<tr>
<th>Conservation measure:</th>
<th>![Image of the North Gate, Middle Town]</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Consolidation and pointing of rubble masonry</td>
<td></td>
</tr>
<tr>
<td>• Consolidation of steps</td>
<td></td>
</tr>
</tbody>
</table>

24. **Location:**
North Gate, Middle Town

**Condition:**
Loss and disintegration of wall mortar / Undulations on ground surface

**Cause:**
Gradual deterioration

<table>
<thead>
<tr>
<th>Conservation measure:</th>
<th>![Image of Middle Town]</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Consolidation and pointing of rubble masonry,</td>
<td></td>
</tr>
<tr>
<td>• Consolidation of ground surface</td>
<td></td>
</tr>
</tbody>
</table>

25. **Location:**
Middle Town

**Condition:**
Loss and disintegration of wall mortar

**Cause:**
Gradual deterioration

<table>
<thead>
<tr>
<th>Conservation measure:</th>
<th>![Image of Middle Town]</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Consolidation and pointing of rubble masonry</td>
<td></td>
</tr>
<tr>
<td>• Consolidation of ground surface floor.</td>
<td></td>
</tr>
</tbody>
</table>

26. **Location:**
East Gate, Middle Town

**Condition:**
Loss and disintegration of wall mortar, Undulating Ground

**Cause:**
Gradual deterioration

<table>
<thead>
<tr>
<th>Conservation measure:</th>
<th>![Image of East Gate, Middle Town]</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Consolidation and pointing of rubble masonry</td>
<td></td>
</tr>
<tr>
<td>• Consolidation of ground</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>27.</strong> Location:</td>
<td>Lower Town</td>
</tr>
<tr>
<td><strong>Condition:</strong></td>
<td>Loss and disintegration wall mortar</td>
</tr>
<tr>
<td><strong>Cause:</strong></td>
<td>Gradual deterioration</td>
</tr>
<tr>
<td><strong>Conservation measure:</strong></td>
<td>Consolidation and pointing of rubble masonry, Consolidation of ground surface</td>
</tr>
<tr>
<td><strong>28.</strong> Location:</td>
<td>East Gate, Ceremonial Ground</td>
</tr>
<tr>
<td><strong>Condition:</strong></td>
<td>Loss and disintegration wall mortar</td>
</tr>
<tr>
<td><strong>Cause:</strong></td>
<td>Gradual deterioration</td>
</tr>
<tr>
<td><strong>Conservation measure:</strong></td>
<td>Consolidation, pointing of rubble masonry, Consolidation of ground surface</td>
</tr>
<tr>
<td><strong>29.</strong> Location:</td>
<td>Outer city Fortification Wall</td>
</tr>
<tr>
<td><strong>Condition:</strong></td>
<td>Vegetation, Loss and disintegration wall mortar</td>
</tr>
<tr>
<td><strong>Cause:</strong></td>
<td>Gradual deterioration</td>
</tr>
</tbody>
</table>
### Conservation Plan

**Conservation measure:**
- De-vegetation,
- Consolidation and pointing of rubble masonry,

### 3. F Recommendations

**New Conservation Works to be undertaken:**

#### 3. F.1 Site development
- ASI complex require adequate landscaping.
- Repairing of the mud house, the two Bunga structures at the site complex
- Repair of platforms and sitting area wherever necessary.
- Removal of non-functional electrical poles / solar panels
- Chain link fencing should be restored, wherever required.
- Excessive De-vegetation from Site.

#### 3. F.2 Conservation Related

#### 3. F.2.i Conservation of Reservoirs

##### a) East Reservoir
- Consolidation of edges of structures, with additional masonry
- De-siltation of Reservoir
- Necessary repairs to the reservoir walls to be carried out by filling up of the fallen portions, underpinning of lime stone walls wherever required.
- Reversible and temporary measures to be undertaken like dry pitching wall using local stones to prevent erosion of Earth Section into the Reservoir.
- Providing of storm water drains and levelling of ground

  **Monitoring measures**
  - Monitoring of crack on the Masonry Wall using Tell Tale

##### b) Southern Reservoir
- De-siltation of Water Reservoir
- Necessary repairs to the reservoir walls to be carried out by filling up of the fallen portions, underpinning of lime stone walls wherever required.
- Reversible and temporary measures to be undertaken like dry pitching wall using local stones to prevent erosion of Earth Section into the Reservoir.

##### c) Water Channel, Southern reservoir
- De-vegetation of the water channel.
• Necessary repairs of the water channel walls to be carried out by filling up of the fallen portions, underpinning of lime stone walls wherever required.

**Monitoring measures**
• Proper monitoring of stone flaking and monitoring of crack using Tell Tale in the stone blocks of Southern Reservoir and scientific investigation.

3. F.2.ii Conservation of Castle

a) **East Gate, Castle**
• Consolidation of edges.
• Providing of storm water drains and levelling of ground to prevent water percolation in the masonry structures
• Consolidation and pointing of rubble masonry.
• Providing wooden casing over the steps to prevent further weathering of Stone blocks.
• Consolidation of the flaked portion of stone pillar

**Monitoring measures**
• Monitoring of stone flaking.
• Monitoring Crack development on the stone pillars, using Tell Tale and scientific investigation.

b) **North Gate, Castle**
• Providing storm water drains and levelling of ground.
• Consolidation, pointing of rubble masonry providing wooden casing over the steps.
• To repair the wall carefully
• Providing wooden casing over the steps to prevent further weathering of Stone blocks.

**Monitoring measures**
• Careful monitoring of Out of Plumb Wall
• Proper monitoring of stone flaking and crack development using Tell Tale and scientific investigation.

c) **West Gate, Castle**
• Consolidation and pointing of rubble masonry

d) **Larger Tank and Smaller Tank And Wells, Castle**
• De-siltation
• Consolidation and pointing of rubble masonry
• Providing storm water drains and levelling of ground.

e) **Castle**
• De-vegetation
• Providing of storm water drains and levelling of ground
• Consolidation and pointing of rubble masonry
• Underpinning of lime stone walls wherever required

f) Fortification Wall, Castle
• Consolidation and pointing of rubble masonry.

3. F.2.iii Conservation of Bailey

a) Bead Workshop, Bailey
• Consolidation, pointing of rubble masonry

b) Granary, Bailey
• Reversible and temporary measures to be undertaken like dry pitching wall using local stones to prevent erosion of Earth Section into the Granary.

c) North Gate, Bailey
• Consolidation, pointing of rubble masonry
• Underpinning of lime stone walls

3. F.2.iv Conservation of Middle Town

a) North Gate, Middle Town
• Consolidation, pointing of rubble masonry
• Consolidation of ground surface floor.

b) East Gate, Middle Town
• Consolidation, pointing of rubble masonry
• Consolidation of ground surface floor.

c) Middle Town
• Consolidation and pointing of rubble masonry
• Consolidation of ground surface

3. F.2.v Conservation of Lower Town
• Consolidation and pointing of rubble masonry.
• Consolidation of ground surface soil.

3. F.2.vi Conservation of structures in Ceremonial ground
a) East Gate
• Consolidation and pointing of rubble masonry.
• Consolidation of ground surface soil.
3. F.2.vii Conservation of Outer city fortification Wall

- De vegetation,
- Consolidation and pointing of rubble masonry.
- Consolidation of ground surface soil
4. A. Introduction
Tourism has positive impact by virtue of providing employment and revenue generation and education for visitors as well as negative impact on account of wear and tear and deterioration due to excessive visitor pressure on the monument. Dholavira: A Harappan City, being a remotely located site has, as of now, lesser impact of tourism, as only few thousands of visitors manage to visit annually.

This chapter will discuss the issues related to visitor infrastructure and shall propose ways of improving visitor experience and management (as well as to ensure preservation of archaeological site). The visitor management plan takes into account the profile of visitors, the provision of facilities and amenities. This chapter will therefore focus upon strategies for improving visitor experience and interpretation at site.

4. B. Regional Tourism
Khadir Island is dotted with several places of tourist attraction, which are mentioned below:

![Figure 1: Map showing attraction places in Khadir Island](figure1.png)

4. B. 1 Dholavira: A Harappan City
The excavated remains at Dholavira, A Harappan City, are one of the very few best preserved and in situ urban settlements in South Asia dating to 3rd to mid-2nd millennium BCE. Dholavira is one of the very few large Harappan settlements where an entire sequence which spans the history of Indus cities, from early Harappan town/ pre-urban phase to the height of the Harappan expansion and the Late Harappan is observed. The city demonstrates a meticulous urban planning system
and execution in response to the local geography, geological settings, topography, climate and socio-economic systems of the Early and Mature Harappan phases and exercised a considerable influence on the contemporary urban settlements in the region and beyond.

Typically, as of today, the majority of visitors explore only the core monument (Castle and bailey. Tourist amenities are limited to rain shelters, drinking water dispensers, parking, toilets, benches, dustbins and signages, all located near the entrance.

4. B. 2 White Rann
Dholavira lies on the Khadir bet island, which is surrounded by the Rann from all sides. Dholavira offers the view of Rann from three directions, through Fossil Park to the north, Dattatreya temple to the west and north and Moon light point to the south and west. While Fossil Park and Dattatreya temple are famous tourism product due to their enhanced connectivity, only few tourists visit the moon light point. The Rann is filled with water during the rainy season, during which a lot of migratory birds visit the place, during the months of December to May the water dries up and a layer of salt covers the Rann. Since it lies near to the India-Pakistan border, tourist activity on the Rann is limited and monitored by the BSF, especially the foreign tourist according to BSF aren’t officially allowed to enter the Rann. The tourists, however, can obtain permission from the BSF to go to a nearby temple that is situated on a mountain called Bhanjadao hills, where the mountain itself is a potential tourism product. The Rann is whitish during the month of December just after the drying up of the water, after that dust starts settling upon and the color changes to wheatish/ brown. The color of the Rann is dependent upon the amount of rainfall the Rann receives during the post monsoon period since a lot of dust is washed away due to the same.
4. B. 3. Fossil park

The Wood Fossil Park is situated at the northern edge of the land and the Rann. It is the most famous tourism attraction and is visited frequently by the tourists. The locals call it ‘Laakda’. It was established and maintained by the forest department. In a significant discovery, the geologists had found gigantic plant fossils that belonged to the Jurassic times. There are numerous fossilized stones that age back to prehistoric times. (Times of India, 2007) As per the primary analysis, there are 12 fenced display areas around the ancient fossils that are developed by the forest department. There are points which offer excellent views of Sunrise and sunset, however the access to these vantage points are undefined and there aren’t any directional signages for the same, thus, to reach these locations one needs to hire a local tourist guide who has the knowledge about these locations. In addition to that, one gets to see various form of interesting rocks, geologically significant cliffs and fossils in this region.

4. B. 3. i. Migratory birds- Breeding ground for Flamingos

The white Rann at the Khadir bet area is area, where several migratory flamingos arrive after monsoons. The flamingos feed on the algae and small organisms in the Rann, which fills up after the monsoon. These migratory birds lay their eggs at the Rann ecosystem and go back once the eggs are hatched. Dholavira can be
promoted as the destination for bird watching and other ecotourism activities during the lean tourist months.

Image 4- 4: Migratory birds in Rann

4. B. 4. Ancient Quarry Site

The ancient site provided limestone which was utilized for construction of the limestone pillar elements, stone veneering and structures in the Dholavira, nominated Site. This site is rarely visited by tourists.

Image 4- 5: Ancient Quarry Site at Khadir

4. B. 5. Ancient Site at Saran

The Ancient Site of Saran is interpreted as an Ancient Port Site. The catchment area of Mansar seasonal stream was one of the major sources of water for the Dholavira: A Harappan city.

The rich and diverse creative traditions of Kachchh (often written as "Kutch") live at the intersection of cultures and communities. Kachchh has a rich tradition of sea trade from different regions across globe. A river system was shared between Kachchh, Sindh and Rajasthan. As a border state, Kachchh is constantly absorbing cultures from the north, west, and east. Kachchhi motifs can be traced to the ancient Harappan civilization, yet craft is developing and growing with the innovative and entrepreneurial drive of spirited artists.

The arid climate has pushed communities here to evolve an ingenious balance of meeting their needs by converting resources into products for daily living. While embroidery has become a craft synonymous with Kachchh, other textile crafts and hard materials crafts give this land color and identity. Craft is inextricable from the numerous communities, connected by trade, agriculture and pastoralism in Kachchh.

![Image 4-7: Locals running craft shops at home](image)

4. C Reaching Dholavira

Located on a remote Island Khadir, Dholavira is only well connected with a wide network of road from all over India. Regular buses only ply to and fro from Dholavira via buses made available by private as well as government companies like the Gujarat state road transport corporation. There is no availability of direct flight or railway connectivity to Dholavira. The nearest airport is located in Bhuj 220 km away and the closest railway station is also in Bhuj which is 219 km away.

**By Road** – This is one of the convenient ways of reaching the historic site of Dholavira. Bus services are available from Bhuj to Rapar which is the nearest big town to Dholavira and takes around 5 hours to reach. These buses run from early morning to late evening. Taxi services are also available from the station at Bhuj to Dholavira.

**By Train** – There is no direct rail connectivity to Dholavira which is situated 219 kms away from the town. Closest railway station for Rapar is located in Samakhiali junction and Bhachau. It caters to trains from all different parts of India making it very connected.
**By Flight** – There is no direct flight present for Dholavira on a direct basis with the closest airport being located in Bhuj at a distance of 87 km. Taxis and cab services are available.

![Map showing connectivity of Khadir Island with Bhuj](https://kachchh.nic.in/map-of-district)

**4. D Visitor statistics**
At present the site is a non-ticketed monument. The tourists footfall is calculated based on the visitor register maintained by Site museum, which is a part of the site campus.

On an average approximately twenty one thousand visitors visit the site every year, with maximum number of visitors visit the site during winters, i.e. from Nov- Feb.

**4. E Present Visitor movement in the monument**
At present, since the site is remotely located with very less influx of tourists is at the site. Consequently, at present there is no defined visitor movement pattern. Tourists coming to site don’t follow any prescribed pattern and often randomly visit its various components. However, tourists, after alighting at the parking near the museum, visit its various components such as the reservoirs, Castle and middle and lower towns, and on an average tend to spend 1 -2 hours at the site. Random movement within the site can have an adverse impact on the integrity of the site, and this ASI has developed the visitor movement plan (discussed later in the chapter) to control and guide the visitor movement.

**4. F Present Visitor amenities and facilities for interpretation**
At present, the archaeological site of Dholavira is under the protection of ASI. For the facilitation of the visitors as well as to promote awareness about the site and for regular upkeep and good interpretation of visitors, following infrastructure is present at the site:

- **Visitor Parking:**

Presently, the site has a proper parking space for around 50-60 cars inside the A.S.I Dhalovira Site Complex.

- **Site Museum:**

Dholavira Site Museum showcases several artefacts recovered from the site that have been displayed within two galleries. The site museum also has a small interpretation centre and an audio visual room. Entry to the site museum and interpretation centre is free.

- **Audio-visual room:**

The Audio-visual room has capacity of 50-70 visitors, where visitors are shown documentary on the history and excavation of Dholavira.
- **A.S.I Complex**

There is an A.S.I complex has around nine huts.

- **Cafeteria:**

The site has developed a proposed cafeteria in the premises which has been constructed near the entrance. It is expected to be operational shortly.

![Image 4-11: A.S.I complex and proposed Cafeteria inside the site complex](image)

- **Washrooms and water points**

The site has proper washroom, which require maintenance. The water point is located at the entrance which has a proper filtration plant with it. The water point not only caters to the visitor’s requirement but also serves the needs of the nearby villagers residing in the proximity of the site.

![Image 4-12 Visitor infrastructure like washrooms and water points provided at the site](image)

- **Signage and Benches**

Signages and benches are installed at the site. For proper interpretation additional signages shall be installed at site shortly.
4. F.i Visitor awareness programmes for better interpretation

After the excavation of the Harappan city of Dholavira, and after the site was notified as a protected monument by ASI, the site is being visited by number of tourists, school children, scholars and researchers.

For visitor facilitation, amenities are provided and site interpretation as well as a small museum has been set up to explain the cultural and archaeological significance of the site. Many scholarly research papers and articles have been written and published widely by in-house experts of ASI. To engage the local village residents, many annual events are held and international days are celebrated to develop a sense of community as well as to promote engagement with the site and the custodians and create awareness.

Image 14: Community engagement at site, Yoga day celebrated at site.
4. F .ii Current and Upcoming Schemes/ Policies at site

a) Ministry of Culture Schemes
For the facilitation of the visitors, facilities such as visitor centre, museum, convenience (toilets and drinking water) is provided on the site. The site is also declared an Adarsh Smarak, thus many new facilities and amenities such as publication counter, new toilet, benches, signage, dustbins, pathways, parking area etc. have been developed and execution is underway.

ASI is planning to construct a full-fledged site museum to display all artefacts excavated from the site and to provide interpretation; for this purpose acquisition of land is under process.

b) Ministry of Tourism Schemes
Ministry of Tourism, Government of India, under the Swadesh Darshan scheme in 2017-18 has launched 'Development of Iconic Tourism Sites in India' project. 17 tourism sites in 12 clusters of international acclaim have been identified for development as Iconic Tourist Sites with world class tourist infrastructure and service. The list includes the archaeological site of Dholavira, District Kutch. The project is envisioned to synergize with other line ministries, departments of Government of India and their various schemes/projects/grants etc. to bring harmony in efforts to develop these sites. The main objective of the project is:

- to enhance visitor experience, to promote tourism at the iconic sites
- overall development from the tourism point of view in and around these sites — which includes roads and infrastructure, hotels and lodges, connectivity and access
- Maintain international standards, interventions in and around the monuments will have elements of universal accessibility, green technology, and enhanced security for tourists.
In addition, Ministry of Tourism under its Swadesh Darshan and PRASHAD Schemes provides Central Financial Assistance to State Governments/Union Territory (UT) Administrations/Central Agencies for development of thematic tourist circuits in the country and for holistic development of identified pilgrimage and heritage destinations. The projects under these schemes are identified for development in consultation with the State Governments/UT Administrations and are sanctioned subject to availability of funds, submission of suitable detailed project reports, adherence to scheme guidelines and utilization of funds released earlier.

4. G Recommendations

4. G.i Provision for enhanced Visitor movement for better Interpretation according to different time schedules

For proper interpretation, proposed visitor movement is recommended at site. The proposed different visitor movement patterns are according to the different time schedule, depending on the amount of time the visitor wishes to spend at the site.

Different options are based on time schedule, visitor wishes to spend at site.

**Proposed Visitor movement Option 1: 2hrs**
- Entering from South Reservoir
  1. Bailey
  2. Castle
  3. Ceremonial ground
- Exit from East Reservoir

**Proposed Visitor movement Option 2: 4hrs**
- Entering from South Reservoir
  1. Bailey
  2. Castle
  3. Ceremonial ground
  4. Middle town
  5. Lower town
- Exit from East Reservoir

**Proposed Visitor movement Option 3: 6hrs**
- Entering from South Reservoir
  1. Bailey
  2. Castle
  3. Ceremonial ground
  4. Middle town
  5. Burial Ground
  6. Outer Fortification Wall
7. **Lower town**
   - Exit from East Reservoir

4. **G .ii Providing defined temporary Pathways/ ramps for visitors**
   The approach pathways, steps and ramps should be clearly discernible by virtue of lining the pathways with stones fixed on the ground. In order to have prescribed movement pattern, and to restrict visitors stepping over Archaeological remains, rope railing are proposed.

4. **G .iii Developing different viewpoints for enhanced visitor experience**
   According to the proposed visitor movement, different halting points and viewpoints are proposed in different areas.

4. **G .iv Providing improved Interpretative and directional Signage's**
   To enhance visitor experience, better interpretative signages are proposed within the monument by installing information and direction signages at appropriate locations such as the water reservoirs (East and South), different parts of the Castle area, bailey, bead workshop, arena, middle and lower towns, and the burial mound.

4. **G .v Providing better interpretation and awareness through interpretation Centre:**
   To propagate proper awareness among visitors, an interpretation centre and a museum to display all the antiquities is under consideration and ASI is taking efforts towards materializing this project.

   Beside this, steps are further taken of using better interpretative methods for better understanding and narrating the story of unearthing the site through documentaries and other digital mediums.

   Facilitation of intellectual access by devising an enhanced visitor movement within the site to cater to the widest range of visitor community including the local residents, domestic and international visitors. Intellectual access will consider special segments as per gender, age and abilities of visitors to explore and learn about the physical, archaeological and cultural aspects of the property

4. **G .vi Providing special training to guides.**
   Special training to guides will be given and special brochures that narrate authentic, historic information will be made available to the visitors.

4. **G .vii Promoting Research and propagation of awareness**
   The existing scholarship and research articles of the excavation and exploration of the Harappan city to be systematically compiled and made available to the visitors through ASI website.
   - Generating literature for awareness and research
• Promoting Capacity building and training for tourist guides, visitor facilitation, etc
PROPOSED VISITOR MOVEMENT PLAN
TIME PERIOD - 4 Hrs.
05 DISASTER MANAGEMENT PLAN

5. A Introduction
“Disaster management” means a continuous and integral process of planning, organizing, coordinating and implementing measure that are necessary or expedient for the basic approach that can be adopted for preventing and mitigating risks can be broadly dealt under:

a) Prevention of Hazards:
b) Reduction of risk of any disaster or its severity or consequences;
c) Capacity building
d) Preparedness to deal with any disaster;
e) Prompt response to any threatening disaster situation or disaster,
f) Assessing the severity or magnitude of effects of any disaster,
g) Evacuation, rescue and relief,
h) Rehabilitation and reconstruction;

Dholavira: A Harappan City, is located in the Island of Khadir, is prone to several Natural Hazards. Therefore, the Risk Assessment Process which should be adopted is broadly described below.

5. B Risk Assessment

| Natural Hazards affecting the property | Meteorological and hydrological (floods, high speed winds and storms) |
| Geological Hazards (earthquakes) | Progressive risks from erosion, water seepage and rising dampness |
| Human Induced Hazards affecting the property | Progressive risks improper implementation of planned activities |

Identifying heritage attributes, hazards and vulnerabilities

Risk of a Disaster

Risk from a Disaster

Stampede and Mass Panic

Inadequate Emergency Preparedness and Response

Causalities/ societal agony and huge economic loss
5. B. i  Natural Hazards affecting the property

The location of the archaeological site of Dholavira largely hinges on the multidisciplinary study of the Great Rann of Kachchh, which through history has witnessed extreme conditions of climate, sea level and landscape metamorphosis and recurrent episodes of earthquakes. The following is an account of the findings through excavation and scientific analysis of effects of natural external forces on the site of Dholavira.

a) Earthquake

Kachchh region is a highly sensitive seismic zone (zone V). Structurally, it is a weak area under tension and compression. The region has witnessed several earthquakes, specially, the earthquakes occurring in 1819, 1845, 1892, 1903, 1940, 1945, 1964 and 2001. Some of them are reported to have brought about drastic geomorphological and topographical changes. The estimated mean taluka earthquake peak ground acceleration (PGA) zonation for a 100-year return period is presented in the figure 2.1. All of Kachchh, almost the entire coastline of North Saurashtra that adjoins Kachchh and a small area in Patan district fall into the very sever intensity zone over a 100-year return period.

The 1819 earthquake, in particular, destroyed the major towns and villages in Kachchh and caused a series of changes in geomorphology. With respect to the property, expert archaeologists have inferred from the findings the history and effects of proto-historic earthquakes and its effects on the occupation and the structure of the Harappan city.

Figure 5-1Gujarat earthquake hazard risk zonation map; Source: Gujarat State Disaster Management Authority
A massive earthquake, with its epicentre about 9 km south-southwest of the village of Chobari in Bhachau Taluka of Kachch District of Gujarat, of magnitude 7.7 and 8.1 on the Richter scale, hit Gujarat on 26th January 2001. It claimed lives of around 20,000 people, leaving 167,000 injured and destroying nearly 400,000 houses. However, at the archaeological site of Dholavira, very minor damage was reported. The two gate pillars at the North gate of the Castle, which are built in stage VII, suffered damaged and partial collapse. These were restored with salvaged limestone members and lime/mud plaster.

However, no other major damage was observed to the structures in the property, owing to the fact that the fortifications walls of the Castle and bailey have stable foundations and thick mud brick masonry which makes it robust and resistant to seismic hazards.

b) Floods

Kachchh region is classified as desert as per the classification and does not witness heavy rainfall causing floods. The property is located at 70 feet above mean sea level. The region is characterized by a high aridity index of over 40%, which indicates a very high deficiency of soil moisture. The average annual rainfall is even less than 25 mm with dependability of less than 40%; total rainy days are less than 15 days.

The Rann is a dry bed of the remnant of an arm of the sea which once connected the Narmada rift with Sindh and separated Kachch from the mainland. From November to March the Rann is a barren tract of dry salt-encrusted mud, presenting aspects of almost inconceivable desolation.

During April to October, it is flooded by water of rivers upto 2-3 feet depth that are held back owing to the rise of the sea by the south west monsoon winds. The
following are Moderate Resolution Imaging Spectroradiometer (MODIS) images contrast the wet and the dry seasons in the Rann of Kachch, showing the Khadir island located roughly in the centre of it. As the depth of the water is shallow, the property is not subject to any potential hazard, owing to its elevation of 80ft from the mean sea level.

After heavy rainfall, the tanks and reservoirs have an issue of soil deposits and siltation. Although, the flood water recedes after some time.

Image 5- 2L- Image showing vast regions of dry salt-encrusted mud in the Great Rann of Kachch (May 2003); R- Image showing vast regions of standing water in the Great Rann of Kachch; Source: Jacques Descloitres, MODIS Land Rapid Response Team at NASA GSFC

Figure 5-2 Elevation map of Rann of Kachch; Source: https://en-in.topographic-map.com/maps/djl9/Rann/

The highest rainfall is in the hilly regions of Western Ghats in Dangs recorded 2327 mm in 1967, whereas in North Gujarat it is 664 mm in Mehsana district; 544.11 mm in Sbarkantha (Himmatnagar); 377 mm, in Banaskantha district (Radhanpur); and
711 mm in Kachch (Bhuj) for the same year. The annual average for Bhuj is about 411 mm. This data clearly show that there is diversity in the total amount of rainfall in different parts of Gujarat.\(^1\) However, the site was not excavated during this period, hence no records are available.

The following map indicates the Tsunami hazard risk zonation for the state of Gujarat. The Khadir island is not projected for potential hazard by the indicative surge inundation.

![Gujarat Tsunami Hazard Risk Zonation](image)

**Figure 5-3**Gujarat tsunami hazard risk zonation map; Source: Gujarat State Disaster Management Authority

c) Cyclones

The Hazard Risk and Vulnerability Atlas prepared by GSDMA shows the Cyclone hazard zonation along with the basic wind speed at the taluka level. Over 120 cyclones originating in the Arabian Sea had passed through Gujarat over a period of 100 years. Figure below shows a maximum wind speed class of more than 55 m/sec along the Saurashtra coast, specifically in Porbandar, Jamnagar and Junagadh districts, which

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\(^1\) R.I. Patel (1971) ‘the forest flora of Gujarat state’
are exposed to high intensity cyclonic and storm impact. This is followed by the 40 to 44 m/sec class that gets its swathe from Kachchh through North Saurashtra all the way to the coast of Gulf of Khambhat and South Gujarat which has low impact of the cyclone hazard. In Gujarat, the Saurashtra-Kachchh region experiences a cyclone. The port towns of Veraval, Porbandar, Jamnagar, Dwarka, Okha, Kandla and Bhavnagar and other minor port towns suffer most.

5. B. ii Scale/Intensity of types of hazards and their effects on site

Based on the analysis of meteorological data:

<table>
<thead>
<tr>
<th>Name of District</th>
<th>Earthquake</th>
<th>Floods</th>
<th>Cyclones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhuj</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>

The major Risk in the area is of Earthquake. Following are the main attribute affected due to Earthquake in the past.

*Attributes at site affected majorly due to Natural hazards*
a) **Structural Impact on Components**

All structures that have been identified, which have been affected over due course of time. Structural issues are mainly because of Earthquakes or a result of progressive decays. Structures with identified structural issues should be monitored on a regular basis.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Site Component</th>
<th>Issues</th>
<th>Hazard Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>North Gate, Castle</td>
<td>Crack development / Flaking of stone pillar.</td>
<td>Earthquake, Progressive Decay</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Out of plumb wall affected all time back.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>East Gate, Castle</td>
<td>Crack development / Flaking of stone pillar</td>
<td>Earthquake, Progressive Decay</td>
</tr>
<tr>
<td></td>
<td>Reservoirs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>East Reservoir</td>
<td>Crack development in the Masonry Wall</td>
<td>Progressive Decay</td>
</tr>
<tr>
<td>4.</td>
<td>South Reservoir</td>
<td>Crack development over the rock bed</td>
<td>Weathering and Progressive Decay</td>
</tr>
</tbody>
</table>

b) **Non – structural Impact on Components**

Several areas are affected due to torrential rains, Winds and cyclones.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Site Component</th>
<th>Issues</th>
<th>Hazard Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Castle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Small water tanks,</td>
<td><strong>Siltation:</strong> Soil erosion from different areas around, resulting in silt deposition. This further leads to siltation of Tanks and running off of surface soil towards South Reservoirs</td>
<td>Torrential Rains, Winds</td>
</tr>
<tr>
<td></td>
<td>Castle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>North Reservoirs</td>
<td><strong>Siltation:</strong></td>
<td>Torrential Rains,</td>
</tr>
</tbody>
</table>
Soil erosion from different areas around North Reservoir. Winds

3. South Reservoir

Siltation: Soil erosion from different areas around South Reservoir. Torrential Rains, Winds

c) 5. B. iii Human Induced Disaster affecting the property

Although no major event of human vandalism has been reported from site till date, vandalism of the remains could be a concern considering that tourists tend to climb up on the archaeological / structural remains which in a long run can adversely impact the integrity of the property. Certain structures within the Castle area are showing signs of deterioration due to continuous movement of tourists through these areas.

![Image 5- 3 Visitors at site](image)

Attributes at site affected majorly due to human-induced Hazards

<table>
<thead>
<tr>
<th>S.No</th>
<th>Site Component</th>
<th>Issues</th>
<th>Hazard Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Castle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>East Gate, Castle</td>
<td>Weathering of steps</td>
<td>Continuous movement of visitors and stepping of visitors over steps.</td>
</tr>
<tr>
<td>2.</td>
<td>North Gate, Castle</td>
<td>Weathering of steps</td>
<td>Continuous movement of visitors and stepping of visitors over steps.</td>
</tr>
</tbody>
</table>
Site complex

<table>
<thead>
<tr>
<th>No.</th>
<th>Site complex</th>
<th>Shifting of Random rubble blocks</th>
<th>Continuous movement of visitors and stepping of visitors over steps.</th>
</tr>
</thead>
</table>

5. C Mitigation Measures and Recommended Actions

Within the property, three basic approaches have been undertaken for preventing and mitigating disaster risks.

- **Prevention of hazards**: Since, risks due to Natural Disaster are more prominent at the site, preventive measure like preventing access to more risk prone areas may be helpful.

- **Reducing vulnerability of cultural heritage**: The site can be supplemented with robust planning and interventions to reduce its vulnerability to certain kinds of hazards. For example, in the case of earthquakes, structural strengthening of different structures may be helpful like it has already been done in the North Gate of Castle.

- **Mitigation of impact of hazards**: In cases of unavoidable hazards, for instance, meteorological hazards that include heavy rainfall, dust storms etc. proactive measures may be undertaken to mitigate the impact of the risk.

*Key aspects of the intervention and proposals for Dholavira are as follows:*

- Integrating mitigation strategies within the management of the property
- Technical measures for protecting the site from the impact of specific disasters
- Monitoring systems for mitigating risks. Monitoring and early response are effective mechanisms not only to reduce risk but also help in emergency preparedness, which will be discussed in the next section
- Prioritisation of risk mitigation options based on hazards and vulnerabilities identified
5. C .i Recommendations
Certain preventive measures might be undertaken at site, which might be helpful to protect the site from any kind of further destruction.

a) Measures to be undertaken to mitigate Natural Hazards

- Floods
  In case of floods or torrential down pour:
  1) Providing proper drainage system
  2) Areas affected must be consolidated/ repaired immediately.
  3) Immediate evacuation measures must be undertaken at site.

- Earthquake
  In case earthquake hits the site, the following measure may be undertaken:
  1) Emergency evacuation to be undertaken to evacuate people from the monument.
  2) Injured people must be given first aid treatment and then should be taken to nearby hospitals.
  3) Documentation of damaged areas to be undertaken immediately.
  4) All site affected architectural components must be repaired immediately and movement to these areas must be restricted.

b) Measures to be undertaken to mitigate human induced Hazards

- Restricting movement at certain archaeological site:
  Structures or areas within the property which are sensitive should be completely safeguarded by restricting movement to these areas. These include:

  1) East Gate, Castle
  2) North Gate, Castle
  3) East Reservoir
  4) South Reservoir

5. C .ii Monitoring and Maintenance

Maintenance forms an essential component of the management of any heritage property. In Dholavira, some simple measures of monitoring can be linked with routine maintenance procedures where implementation can be undertaken at a neighbourhood level. Maintenance activities can be differentiated on basis of weekly, monthly, quarterly and annual activities and enforcing agency should be clearly identified.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Site Component</th>
<th>Interval</th>
<th>Hazard Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Structures with identified issues</td>
<td>Quarterly inspection and monitoring progression of any cracks or</td>
<td>Earthquake, heavy rainfall, progressive risks of decay</td>
</tr>
<tr>
<td></td>
<td>signs of movement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>------------------</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Structures in good physical condition</td>
<td>Earthquake, heavy rainfall, progressive risks of decay</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Annual inspection and routine maintenance and cleaning of surfaces and finishes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Drainage channels and water network</td>
<td>Rising Dampness and seepage, heavy rainfall, vegetation, siltation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quarterly inspection during the year and weekly inspection during Monsoon season</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. D  Action Plan Post Disaster

After a disaster has struck, the action and remedial measures which are to be taken are most crucial. For the same several agencies have to come together and work in coordination to recover from the disaster. In case of Dholavira also, though it is an ASI protected monument, there are multiple agencies responsible. The immediate, medium term and long term measures in case of a disaster would be as follows:

<table>
<thead>
<tr>
<th>Agencies</th>
<th>Immediate response</th>
<th>Medium term</th>
<th>Long term</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ministry of Culture</strong>&lt;br&gt;Archaeological Survey of India&lt;br&gt;National Monuments Authority</td>
<td>• Emergency Consolidation; • Salvaging debris; • Evacuation after; • Safety of visitors; • First aid to the injured, removing them to hospitals • Functioning Access routes</td>
<td>• Repair of Archaeological structures • Implementation of Site Management and Disaster Management Plan; • Provision of Signages</td>
<td>• Improvement of access; • Implementation of Mitigation and Preventive measures • Survey and documentation of the site</td>
</tr>
<tr>
<td><strong>District Administration</strong>&lt;br&gt;Bhuj Development Authority&lt;br&gt;Village Panchayat&lt;br&gt;Gujarat state disaster management authority&lt;br&gt;Narmada, Water Resources, Water Supply And Kalpsar - Communities/ NGOs</td>
<td>• Relief work; • Sending injured to nearby hospitals; • Relief camps for the displaced; • Restoration of Services and public infrastructure; • Removal of debris; • Monitoring and coordination between various agencies</td>
<td>• Approval of reconstructions ; • Grants to the affected people • Coordination with various agencies; • Reconstruction and upgradation of civic amenities and infrastructure</td>
<td>• Maintenance of infrastructure; • Access improvement; • Signages; • Hospitals to establish special emergency cells</td>
</tr>
</tbody>
</table>
5. E Implementation Mechanism

The implementation of Post Disaster Programme can be undertaken by following mechanism:

- **Archaeological Survey of India**
  - Director General
  - Superintending Archaeologist
  - Sr. CA (site in-charge)
  - Monument Attendants
  - Temporary Status Workers
  - Academic / Technical Institutions

- **Bhuj, Development Authority**
  - Gujarat State Disaster Management Authority
  - Flood Control Board
  - Hospitals – Government and Private

- **Community**
  - Village Panchayat
  - Local Community
06 BUFFER ZONE MANAGEMENT

6.A.i Introduction

6. A.1 Ownership of the Nominated property

6. A.1.i Nominated Property

The nominated property for nomination is a notified property and under the protection and ownership of the Archaeological Survey of India, Ministry of Culture, Government of India (Refer Annexure A1) ASI managed this site of national importance as per the provision of the Ancient Monuments and Archaeological Sites and Remains 1958, (Refer Annexure A2) amended as the Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010 (hereafter AMASR Act 2010) (Refer Annexure A4)

6. A.1.ii Buffer zone

The Buffer zone to the property covers an area of 148 ha. The defined boundary of Area is in accordance with AMASR Act (Amendment 2010). The Buffer zone around the core property is operated and owned by multiple stakeholders as listed below:

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Name of stakeholders</th>
<th>Detailed stake in the buffer zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Archaeological Survey of India</td>
<td>Buffer Zone of 300 meters (first 100 m as Prohibited Zone and further 200 m as Regulatory Zone) as per AMASR Act, 1958</td>
</tr>
<tr>
<td>3.</td>
<td>Forest &amp; Environment Department, Government of Gujarat</td>
<td>Parts of Buffer Area under Forest and Environment Department</td>
</tr>
<tr>
<td>4.</td>
<td>Ministry of Tourism</td>
<td>Development of Iconic site of Dholavira under the Swadesh Darshan scheme</td>
</tr>
<tr>
<td>5.</td>
<td>Tourism Corporation of Gujarat Ltd., Gandhinagar.</td>
<td>Tourism related Activities in the vicinity of Buffer Area</td>
</tr>
<tr>
<td>6.</td>
<td>Roads and Buildings Department, Government of Gujarat.</td>
<td>The R&amp;B Department is in charge of all activities pertaining to planning, construction and maintenance of all categories of roads and all Government owned buildings in the State of Gujarat.</td>
</tr>
</tbody>
</table>
7. District Collector, Kachchh  
   Regulatory functions under the leadership of the Collector and District Magistrate, such as law and order, land revenue/ reforms, excise, registration, treasury, civil supplies and social welfare

8. District Development Officer, Kachchh  
   Integration of activities of various development departments in the district and the provision of a common extension organisation

9. Village administration (Gram panchayat)  
   Village area development

10. Private agricultural land holdings  
    All land in a 100m radius from the prohibited and regulated zone from the boundary of core property, is an agricultural area, where cultivation is allowed as per the Section 19 of the AMASR Rules 1959. (*Refer Annexure A3*)

11. Gujarat water supply & sewerage board (GWSSB)  
    GWSSB is a statutory body set up by the State Government for Development, Regulation and Control of the Drinking water sector in the State. The jurisdiction of the GWSSB (Board) extends to the whole state. The Board largely works for putting in place rural water supply system as well as operational management of Rural Regional water supply schemes covering cluster of villages.

    To harness the valuable and limited water resources optimally, one has to resort to the internal and consolidated system such as large medium and small preservation, joint use of underground water, preservation and reuse of underground reservoir, salinity ingress, preservation and diversion of additional quota of water and utilize the same for public purpose in proper perspective.

13. Gujarat State Disaster Management Authority, Government of Gujarat  
    To implement the gigantic task of rehabilitation and reconstruction programme in the earthquake affected areas of the State and simultaneously act as a nodal agency to plan and implement pre-disaster preparedness and mitigation activities including training and capacity building of all the stakeholders involved in disaster management.

The buffer zone map with all land ownerships is marked and attached herewith.
Figure 6-1: Nominated property and buffer zone

6. B Site and its setting and surroundings

The physical features, historical setting form a crucial aspect in understanding the Property area and the Buffer Zone.

6. B. i Physical features

Dholavira (23°53'13.82"N; 70°12'48.95"E) is located on the isolated island of Khadir in the Great Rann of Kachchh in Gujarat. The archaeological remains within an overall fortification are located between two seasonal monsoon channels, known locally as Mansar (north) and Manhar (south). The archaeological remains encompassed within the outer fortification covers an area of around 70 ha and is ranked one among the five largest (may be six largest, if Lakanjo-daro, Harappa, Rakhigarhi, Ganweriwal) Harappan cities and second largest in India (Rakhigarhi being the largest), of the Harappan civilization.

6. C Protective designation

6. C. i Nominated Property

The core property, consisting of the archaeological remains of Dholavira is a centrally protected monument since 27th August 2003, New Delhi; Vide Gazette Notification no. 776 of 2003-04, Regd. No. D.L- 33004/99, according to the Department of culture, Archaeological survey of India notification S. O. 982 (E)-giving notice as per the powers conferred by the Sub-Section (1) of Section 4 of the Ancient Monuments and Archaeological Sites and Remains Act, 1958 (24 of 1958), the Central Government gave notice of its declaring the said ancient monument to be of national importance. (Refer Annexure A1) Being designated as an ‘ancient monument’ of national importance, the ancient site of Dholavira is protected by a prohibited area measuring 100m in all directions, an beyond it, a Regulated area of 300 m in all directions, from the limits of the protected monument. All activities in the areas adjacent to the ancient site of Dholavira remain subject to prohibition and regulation in the respect prohibited and regulated areas as per provisions of the Ancient Monuments and Archaeological Sites and Remains Rules, 2011 (Refer Annexure A5). The area of the core property is 103 Ha. Any construction with in the regulated zone are subject to approval by the Competent Authority of the National Monument Authority, formed and notified as per the AMASR Act, 2010, and rules made thereto. The development bye-laws are under process.

6. C. ii Buffer zone

The Buffer zone to the property covers an area of 148 Ha. The defined boundary of Area is in accordance with the provisions of the AMASR Act 1958 and Rules 1959 (Amendment therein in 2010).
The following are the existing protective legislations, acts and policies applicable at various levels, applicable at Central Government level and State Government level.

### Nominated property level

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Name of the act</th>
<th>Mandate</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Ancient Monuments and Archaeological Sites and Remains 1958, amended as the Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010 (AMASR Act 2010)</td>
<td>The is an act of parliament of the Government of India that provides for the preservation of ancient and historical monuments and archaeological sites and remains of national importance, for the regulation of archaeological excavations and for the protection of sculptures, carvings and other like objects. The Archaeological Survey of India functions under the provisions of this act. This act protects the monuments of national importance in India. The act and rules have provision in terms of protection, ownership, land acquisition, matters of conservation and buffer zone management outlines roles and responsibilities of the authorities. The acts and rules also govern all matters pertaining to research and dissemination of credible information as a part of outreach.</td>
</tr>
<tr>
<td>2</td>
<td>Ancient Monuments and Archaeological Sites and Remains Rules, 1959</td>
<td>Same as above</td>
</tr>
<tr>
<td>3</td>
<td>27th August 2003, New Delhi; Vide Gazette Notification no. 776 of 2003-04, Regd. No. D.L- 33004/99, according to the Department of culture, Archaeological survey of India notification S. O. 982 (E)</td>
<td>Gazette notification vide which the Property was awarded protected status</td>
</tr>
<tr>
<td>4</td>
<td>National Conservation Policy, Ministry of culture, 2014</td>
<td>The Policy aims to not only draw lessons and inspirations from the ASI’s</td>
</tr>
</tbody>
</table>
rich legacy for conservation but also acknowledges the adoption of contemporary approaches to conservation, management and protection of monuments and archaeological sites, and proposes various principles of interventions within and around them. The Policy also acclaims available traditional craftsmanship in the country and the use of traditional building materials, practices and skills as an integral part of the conservation process.

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Name of the act</th>
<th>Mandate</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>The Antiquities and Art Treasures Act, 1972</td>
<td>An Act to regulate the export trade in antiquities and art treasures, to provide for the prevention of smuggling of, and fraudulent dealings in, antiquities, to provide for the compulsory acquisition of antiquities and art treasures for preservation in public places and to provide for certain other matters connected therewith or incidental or ancillary thereto.</td>
</tr>
<tr>
<td>6</td>
<td>Antiquities and Art Treasure Rules, 1973</td>
<td>Rules to regulate licensing, maintenance of schedule of antiquities and roles of responsibilities of officers in accordance with the Antiquities and Art Treasures Act, 1972</td>
</tr>
</tbody>
</table>

### Buffer Zone level

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ancient Monuments and Archaeological Sites and Remains 1958, amended as the Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010 (AMASR Act 2010)</td>
</tr>
</tbody>
</table>
Chapter 06: Buffer Zone Management

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Ancient Monuments and Archaeological Sites and Remains Rules 1959</td>
</tr>
<tr>
<td>3</td>
<td>National Monuments Authority (Appointment, Functions and Conduct of business) Rule, 2011</td>
</tr>
<tr>
<td>4</td>
<td>Ancient monuments and Archaeological sites and Remains (Framing of Heritage Bye-laws and other functions of the Competent Authority) Rules, 2011</td>
</tr>
<tr>
<td>5</td>
<td>The Wildlife (Protection) Act 1972</td>
</tr>
<tr>
<td>6</td>
<td>28th February, 1986 (No. GH-AVN-41/86-WLP-1386-207-V2)</td>
</tr>
</tbody>
</table>

State level
6.D Present condition of Buffer Zone

Since the notification of Dholavira archaeological site in 2003 (Refer Annexure A1) as a protected property of national importance by the Archaeological Survey of India, strict vigilance and controls are being exercised to control any form of encroachment in the protected area, as per the regulations of the Ancient Monuments and Archaeological Sites and remains Act, 1958, (Refer Annexure A2) amended as the Ancient Monuments and Archaeological sites and Remains (Amendment and Validation) Act, 2010. (Refer Annexure A4). As per this act, the prohibited and regulated area limits are up to 100 meters and 300 meters from the protected area respectively and no permission for construction, including Government/public work is to be permitted in the prohibited area of centrally protected monuments and protected areas. At present, there is no new construction within the prohibited and regulated zones of this property and the site does not face any development pressures.

The island of Khadir falls under the Biosphere reserve zone of Rann of Kutch and portion of the archaeological site and the island are within the buffer zone. (Refer Annexure A13) As the archaeological site of Dholavira on the Khadir Island is remotely located from the mainland and within the buffer of the Biosphere reserve of Kutch, it is observed that the site has not seen any development pressures due to strict adherence of the environmental regulations and is not prone to any grave effects of development.

Dholavira is under the village panchayat (rural level village council) jurisdiction of Dholavira village, Bhachau taluka. There are no specific guidelines for new construction. However, the cluster of Dholavira village is located at a distance of 1

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1 As per the provisions of this act, the NMA is the competent authority to issue the recommendation for carrying out any repair/renovation in any property located in the prohibited area (upto 100 meter in all directions from any centrally protected monument/site), whereas the Competent Authority declared by the Central Government in consultation with the respective State Government after issuing the notification, is empowered to issue NOC for carrying out any repair/renovation in any property located in the regulated area (from 100 meters to 300 meters in all directions from any centrally protected monument/site). However, the NMA is empowered to recommend the construction/reconstruction proposals received through the concerned Competent Authorities for the properties located in the regulated area (from 100 meters to 300 meters in all directions from any centrally protected monument/site) and subsequently, the respective Competent Authority has to issue NOC. No permission of construction/reconstruction is allowed in the prohibited area of any centrally protected monument/site.
km. approximately and beyond the prohibited and regulated areas, hence any construction is not direct threat to the environs of the property. Presently, there is no major issue in the Buffer Zone, as there is no major development in the vicinity of the site except the upcoming projects like development of infrastructure by the Tourism Department but they are in consonance with the provisions of the AMASR Act, 1958.

6. D.i. Insensitive/ Incongruous Tourism development Project in the area
Several insensitive tourism Development projects are coming up in the vicinity of the Property, which might have detrimental effect on the archaeological site in the long term. These kinds of developments must be regulated. Like the development of water body near to the site.

Image 6- 1: Upcoming Water Tank in the vicinity of the Archaeological Site developed under Tourism Department

6. D.ii No proper master/ Village development Plan for Dholavira Town which gives Khadir Island a special status.

At present, it is felt that there is lack of proper Master Plan/ Village Development Plan, for the Dholavira Village and its Surrounding which give the area special status and according to which the future developments must be regulated.
6.E Recommendations

6. E.i Congruous Activities which do not have detrimental effect on the environment of the archaeological site must be promoted. Activities which are congruous to the site should be promoted in the region and should affect the setting of the site and also should not affect the archaeological evidences of the site.

6. E. ii Development of Heritage bye-laws (in accordance with AMASR Act) to be prepared by Archaeological Survey of India
Development guidelines need to be prepared for Khadir Island which regulates future development in the buffer area.
07 IMPLEMENTATION STRATEGIES

7. A Introduction
The Site Management Plan of the World Heritage property of Dholavira is proposed to be implemented with the coordination and participatory approach of all stakeholders within the monument, i.e., ASI and in the buffer, i.e., ASI, Kutch District Administration, District Development Officer, Kachchh, Village administration (Gram panchayat) landholdings, Irrigation Department, Gujarat State Tourism Department, District Collector, Kachchh, private agricultural land holdings stakeholders. All activities proposed within the framework of the management plan will be carried out primarily keeping in mind that the OUV of the property is safeguarded, there is effective conservation of the site and the visitor experience is enhanced.

7. B Mechanism for implementing the Plan
7. B.i Proposed Management Framework
For effective implementation and for regular monitoring and management following management framework is proposed. The implementation of the Management Plan requires the support and participation of many government agencies and local communities. The Plan itself can provide the direction for coordinating this effort, but this requires a significant level of continued commitment and resources if it is to succeed in protecting and improving the WHS for present and future generations. To ensure proper management, implementation and monitoring of the Management Plan a Two tier Management Framework has been proposed as given below:

<table>
<thead>
<tr>
<th>PRPOSED MANAGEMENT FRAMEWORK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REGIONAL LEVEL APEX COMMITTEE</strong></td>
</tr>
<tr>
<td>Chaired by Chief Secretary, State Government of Gujarat</td>
</tr>
<tr>
<td>Meets twice a year</td>
</tr>
<tr>
<td><strong>LOCAL LEVEL COMMITTEE</strong></td>
</tr>
<tr>
<td>Chaired by District Collector, Archaeological Survey of India</td>
</tr>
<tr>
<td>Meets once a month</td>
</tr>
</tbody>
</table>
7. B .ii Regional Level Apex Committee

The prime function of this committee is to monitor and review/critical management issues & policies of the Property Area and of the Buffer area. The committee shall be constituted and chaired by Chief Secretary, Government of Gujarat, with representations from various stakeholders/ owners of the Buffer Zone. This committee shall meet twice a year. The objectives of this committee would be to address the following:

- Augmentation of tourist infrastructure in the buffer area;
- Repairs to existing roads connecting villages to the Khadir islands:
  - Rapar- Dholavira road
  - Bachau- Rapar road
  - Rapar- Adesar road
- Development of new roads to increased connectivity:
  - Khadir-Khavda road
  - Khadir-Bachau road
  - Santalpur-Khadir-Khavda Road
- Developments of basic facilities like water, electricity, sanitation in the village Dholavira;
- Developing micro level water shed management programme for water conservation water shed programs and projects on the island;

The Key members of the committee are:

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chief Secretary, Government of Gujarat</td>
<td>Chairperson</td>
</tr>
<tr>
<td>2</td>
<td>Regional Director(west), ASI</td>
<td>Member Secretary</td>
</tr>
<tr>
<td>3</td>
<td>Director General, Archaeological Survey of India, Ministry of Culture, Government of India</td>
<td>Member</td>
</tr>
<tr>
<td>4</td>
<td>Principal Secretary, Forest &amp; Environment Department, Government of Gujarat</td>
<td>Member</td>
</tr>
<tr>
<td>5</td>
<td>Principal Secretary, Ministry of Tourism, Government of Gujarat.</td>
<td>Member</td>
</tr>
<tr>
<td>6</td>
<td>Director of Archaeology, Gujarat State</td>
<td>Member</td>
</tr>
<tr>
<td>7</td>
<td>Managing Director, Tourism Corporation of Gujarat Ltd. Gandhinagar.</td>
<td>Member</td>
</tr>
<tr>
<td>8</td>
<td>Secretary, Roads &amp; Buildings Department, Government of Gujarat.</td>
<td>Member</td>
</tr>
<tr>
<td>9</td>
<td>Institutional expert(s)</td>
<td>Member</td>
</tr>
<tr>
<td>10</td>
<td>Managing Director,</td>
<td>Member</td>
</tr>
</tbody>
</table>
### Local Level Committee

The Local Level Committee is charged with the responsibility of the Regional Level Committee. The Committee is responsible for ensuring proper management of Dholavira: A Harrapan City. The Committee is chaired by Regional Director (Archaeological Survey of India, West Zone). The Committee also provides an important forum for deciding the key issues and management priorities to be addressed. This committee shall meet once every month.

The objectives of this committee would be to address the following:

- State of conservation of the archaeological site;
- Appointment of necessary staff for site maintenance;
- Development of visitor facilities and create awareness through site interpretation;
- Conducting workshops for capacity building.
- Providing assistance and conducting repairs after any kind of disaster at Site.
- Land ownership and management and acquisition, if any;

The Key stakeholders of the committee would be:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>District Magistrate,</td>
<td>Chairman</td>
</tr>
<tr>
<td></td>
<td>District Kachchh</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Regional Director (west). ASI</td>
<td>Member</td>
</tr>
<tr>
<td>3</td>
<td>District Development Officer,</td>
<td>Member</td>
</tr>
<tr>
<td></td>
<td>District Kutch</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Superintending Archaeologist,</td>
<td>Member Secretary</td>
</tr>
<tr>
<td></td>
<td>Vadodara Circle, Archaeological Survey of India,</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Field Expert (s)</td>
<td>Member</td>
</tr>
<tr>
<td>6</td>
<td>Local community representative</td>
<td>Member</td>
</tr>
</tbody>
</table>
7. C Action Plan
Based on the recommendations for different issues identified in the plan, action plan has been devised highlighting the priority and time period of the work to be taken up and identifying the relevant department to undertake the work. These are however variable and subject to change depending on the ground situations.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Action Plan</th>
<th>Branch</th>
<th>Time Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Immediate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Year 1</td>
</tr>
<tr>
<td>1)</td>
<td>Proposals for Site Development and Conservation Related</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Site Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>ASI complex requires adequate landscaping.</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Repairing of the mud house, the two Bunga structures at the site complex.</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Repair of plinths in the round sitting area wherever necessary.</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Removal non-functional electrical poles / solar panels to be removed.</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Wire gauge fencing should be restored, wherever required.</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Providing proper drainage at Site.</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Conservation Related</td>
<td></td>
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</tr>
<tr>
<td>B.1</td>
<td>Conservation of Reservoir</td>
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</table>
### Chapter 07: Implementation strategies and Action Plan

**Archaeological Survey of India**

<table>
<thead>
<tr>
<th>B.1.1</th>
<th><strong>East Reservoir</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>De-siltation of Water reservoir</td>
</tr>
<tr>
<td>2</td>
<td>Necessary repairs to the reservoir walls to be carried out by filling up of the fallen portions, underpinning of lime stone walls wherever required</td>
</tr>
<tr>
<td>3</td>
<td>Reversible and temporary measures to be undertaken like dry pitching wall using local stones to prevent erosion of Earth Section into the Reservoir.</td>
</tr>
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<table>
<thead>
<tr>
<th>B.1.2</th>
<th><strong>South Reservoir</strong></th>
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<tbody>
<tr>
<td>1</td>
<td>De-siltation of Water reservoir</td>
</tr>
<tr>
<td>2</td>
<td>Necessary repairs to the reservoir walls to be carried out by filling up of the fallen portions, underpinning of lime stone walls wherever required.</td>
</tr>
<tr>
<td>3</td>
<td>Reversible and temporary measures to be undertaken like dry pitching wall using local stones to prevent erosion of Earth Section into the Reservoir.</td>
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</tbody>
</table>

| B.1.3 | **Water Channel, South Reservoir** |
### Chapter 07: Implementation strategies and Action Plan

<table>
<thead>
<tr>
<th></th>
<th>De-vegetation of the water channel.</th>
<th>Vadodara Circle, A.S.I</th>
</tr>
</thead>
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<tr>
<td>2</td>
<td>Necessary repairs of the water channel walls to be carried out by filling up of the fallen portions, underpinning.</td>
<td>Vadodara Circle, A.S.I</td>
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#### B.2

**Conservation of Castle**

#### B.2.1 East Gate, Castle

<table>
<thead>
<tr>
<th></th>
<th>Consolidation of edges.</th>
<th>Vadodara Circle, A.S.I</th>
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<tbody>
<tr>
<td>2</td>
<td>Providing storm water drains and levelling of ground to prevent water percolation in the masonry structures</td>
<td>Vadodara Circle, A.S.I and A.S.I Headquarters</td>
</tr>
<tr>
<td>3</td>
<td>Consolidation and pointing of rubble masonry.</td>
<td>Vadodara Circle, A.S.I</td>
</tr>
<tr>
<td>4</td>
<td>Providing wooden casing over the steps to prevent further weathering of Stone blocks.</td>
<td>Vadodara Circle, A.S.I</td>
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</table>

#### B.2.2 North Gate, Castle

<table>
<thead>
<tr>
<th></th>
<th>Providing storm water drains and levelling of ground.</th>
<th>Vadodara Circle, A.S.I and A.S.I Headquarters</th>
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<tbody>
<tr>
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<tr>
<td>---</td>
<td>--------------------------</td>
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<tr>
<td>2</td>
<td>Consolidation and pointing of rubble masonry.</td>
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<tr>
<td>3</td>
<td>Providing wooden casing over the steps to prevent further weathering of Stone blocks.</td>
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</table>

**B.2.3 West Gate, Castle**

<table>
<thead>
<tr>
<th></th>
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<td>Consolidation and pointing of rubble masonry</td>
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**B.2.4 Water tanks And Wells, Castle**

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<td>De-siltation</td>
<td>Vadodara Circle, A.S.I</td>
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<tr>
<td>2</td>
<td>Consolidation of edges with additional masonry</td>
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<tr>
<td>3</td>
<td>Providing storm water drains and levelling of ground.</td>
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**B.2.5 Castle**

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<tr>
<td>2</td>
<td>Providing of storm water drains and levelling of ground</td>
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**B.2.6 Fortification Wall, Castle**
### Chapter 07: Implementation strategies and Action Plan

#### 1. Consolidation and pointing of rubble masonry.

<table>
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<tr>
<th>Number</th>
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</table>

#### B.3 Conservation of Bailey

##### B.3.1 Bailey

1. Consolidation and pointing of rubble masonry

<table>
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<th>Description</th>
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<tbody>
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<td>consolidation and pointing of rubble masonry</td>
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2. Underpinning of lime stone walls

<table>
<thead>
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<th>Description</th>
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<tr>
<td>2</td>
<td>underpinning of lime stone walls</td>
<td>Vadodara Circle, A.S.I</td>
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</table>

#### B.3.2 Granary, Bailey

1. Reversible and temporary measures to be undertaken like dry pitching wall using local stones to prevent erosion of Earth Section into the Granary.

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<th>Number</th>
<th>Description</th>
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<tbody>
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<td>1</td>
<td>reversible and temporary measures to be undertaken like dry pitching wall using local stones to prevent erosion of Earth Section into the Granary</td>
<td>Vadodara Circle, A.S.I</td>
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#### B.3.3 Bead Workshop, Bailey

1. Consolidation and pointing of rubble masonry

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<th>Description</th>
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<tbody>
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<td>consolidation and pointing of rubble masonry</td>
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#### B.4 Conservation of Middle Town

##### B.4.1 North Gate, Middle Town

1. Consolidation and pointing of rubble masonry

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Location</th>
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<tbody>
<tr>
<td>1</td>
<td>consolidation and pointing of rubble masonry</td>
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2. Consolidation of ground surface

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<tr>
<td>2</td>
<td>consolidation of ground surface</td>
<td>Vadodara Circle, A.S.I</td>
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</table>
### B.4.2 East Gate, Middle Town

<table>
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<th>Location</th>
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<tbody>
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<td>Consolidation and pointing of rubble masonry</td>
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<td></td>
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<tr>
<td>2</td>
<td>Consolidation of ground surface floor</td>
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### B.4.3 Middle Town

<table>
<thead>
<tr>
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<tbody>
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<td>1</td>
<td>Consolidation and pointing of rubble masonry</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Consolidation of ground surface floor</td>
<td>Vadodara Circle, A.S.I</td>
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### Conservation of Lower Town

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<tr>
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<tbody>
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<td>1</td>
<td>Consolidation and pointing of rubble masonry</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Consolidation of ground surface soil</td>
<td>Vadodara Circle, A.S.I</td>
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### B.5 Conservation of structures in Ceremonial ground

#### B.5.1 East Gate

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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<td>Consolidation and pointing of rubble masonry</td>
<td>Vadodara Circle, A.S.I</td>
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</tr>
<tr>
<td>2</td>
<td>Consolidation of ground surface soil</td>
<td>Vadodara Circle, A.S.I</td>
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### B.6

<table>
<thead>
<tr>
<th></th>
<th>Conservation of Outer city fortification Wall</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>De vegetation, Vadodara Circle, A.S.I</td>
</tr>
<tr>
<td>2</td>
<td>Consolidation and pointing of rubble masonry. Vadodara Circle, A.S.I</td>
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#### 2) Proposals for Enhanced Visitor Management And Site Interpretation

<table>
<thead>
<tr>
<th></th>
<th>Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Provision for enhanced Visitor movement for better Interpretation according to different time schedules A.S.I Headquarters</td>
</tr>
<tr>
<td>B</td>
<td>Providing defined temporary Pathways/ ramps for visitors at appropriate location, where ever feasible Vadodara Circle, A.S.I and A.S.I Headquarters</td>
</tr>
<tr>
<td>C</td>
<td>Developing different viewpoints for enhanced visitor experience Vadodara Circle, A.S.I and A.S.I Headquarters</td>
</tr>
<tr>
<td>D</td>
<td>Providing improved Interpretative and directional Signage’s Vadodara Circle, A.S.I and A.S.I Headquarters</td>
</tr>
<tr>
<td>E</td>
<td>Providing better interpretation and awareness through interpretation Centre</td>
</tr>
</tbody>
</table>

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**Archaeological Survey of India**

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### Implementation strategies and Action Plan

<table>
<thead>
<tr>
<th></th>
<th>Proposal Description</th>
<th>Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Providing special training programmes to guides.</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Promoting Research and propagation of awareness</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
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</tbody>
</table>

#### 3) Proposals for Disaster Management

<table>
<thead>
<tr>
<th></th>
<th>Proposal Description</th>
<th>Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Restricting movement at certain archaeological areas for Safety and Security of structures</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) East Gate, Castle</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) North Gate, Castle</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3) East Reservoir</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4) South Reservoir</td>
<td>Vadodara Circle, A.S.I</td>
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#### 4) Proposals for Buffer Zone

<table>
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<tr>
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<th>Proposal Description</th>
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<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Development of Heritage byelaws (in accordance with AMASR Act) to be prepared by Archaeological Survey of India in order to have congruous developments in the near future</td>
<td>A.S.I Headquarters</td>
<td></td>
</tr>
</tbody>
</table>
8. Monitoring and Maintenance plan

Based on the recommendations for different issues identified in the plan, monitoring and Management Plan has been devised highlighting the time period of the work to be taken up and identifying the relevant department to undertake the work. These are variable and subject to change depending on the ground situations.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Item</th>
<th>Agency</th>
<th>As Necessary</th>
<th>Daily</th>
<th>Every Three Months</th>
<th>Before Monsoon</th>
<th>After Monsoon</th>
<th>Annual</th>
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<tbody>
<tr>
<td>1.</td>
<td>De-silting of water reservoirs</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Checking surface water routes and storm water drainage system</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Erosion of the mortar caused by human factors (vandalism, walking on the edges of walls, abrasion)</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>5.</td>
<td>Dismantling and resetting of bulged-out random rubble masonry walls and structures</td>
<td>Vadodara Circle, A.S.I</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6.</td>
<td>Effects due to damage/vandalism/natural hazard</td>
<td>Gujarat State Disaster Management</td>
<td></td>
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### Monitoring Plan

<table>
<thead>
<tr>
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<th>Activity Description</th>
<th>Authority, Vadodara Circle, A.S.I</th>
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<tbody>
<tr>
<td>7.</td>
<td>Recording of structures distresses on various attributes after Natural Hazards like Earthquakes and Floods</td>
<td>Vadodara Circle, A.S.I</td>
</tr>
<tr>
<td></td>
<td>Careful monitoring of Out of Plumb Wall at Northern Gate, Castle</td>
<td>Vadodara Circle, A.S.I</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>12</td>
<td>Proper monitoring of stone flaking and crack development using Tell Tale and scientific investigation of stone pillar blocks showing sign of deteriorations as well as flaking at Northern Gate, Castle</td>
<td>Vadodara Circle, A.S.I</td>
</tr>
<tr>
<td>13</td>
<td>Site inspection by Engineer to oversee on-going conservation works</td>
<td>Vadodara Circle, A.S.I and Bhuj Sub- Circle Office</td>
</tr>
<tr>
<td>14</td>
<td>Inspecting condition of Excavated trenches</td>
<td>Vadodara Circle, A.S.I and Bhuj Sub- Circle Office</td>
</tr>
<tr>
<td>15</td>
<td>Site inspection by SA to observe the state of built structures</td>
<td>Vadodara Circle, A.S.I</td>
</tr>
<tr>
<td>16</td>
<td>Before and after photographs of the site and instruments to record changes after the conservation works are carried out on site</td>
<td>Vadodara Circle, A.S.I</td>
</tr>
<tr>
<td></td>
<td>Monitoring Plan</td>
<td></td>
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<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>18</td>
<td>Managing Visitor movement</td>
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<td></td>
<td>Vadodara Circle, A.S.I and Bhuj Sub- Circle Office</td>
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<tr>
<td>19</td>
<td>Monitoring tourist infrastructure</td>
<td></td>
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<td></td>
<td>Vadodara Circle, A.S.I and Bhuj Sub- Circle Office</td>
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<tr>
<td>20</td>
<td>Cleanliness of Site</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vadodara Circle, A.S.I and Bhuj Sub- Circle Office</td>
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<tr>
<td>21</td>
<td>Monitoring Buffer Zone as per AMASR Act 1958 (Amendment 2010)</td>
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<td>Vadodara Circle, A.S.I and Bhuj Sub- Circle Office</td>
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<td>22</td>
<td>Monitoring of Buffer zone with respect to:</td>
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<td></td>
<td>Unplanned development</td>
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<tr>
<td></td>
<td>Provision of tourist activities</td>
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<td></td>
<td>Vadodara Circle, A.S.I and Bhuj Sub- Circle Office</td>
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