

FUTURE IS URBAN

**Livability, Resilience and Resource
Conservation**

FUTURE IS URBAN

Livability, Resilience and Resource Conservation

Proceedings of the International Conference on
FUTURE IS URBAN: Livability, Resilience and Resource Conservation
(ICFU 2021), December 16–18, 2021

Edited by

Utpal Sharma

R. Parthasarathy

Aparna

First published 2023
by Routledge
4 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge
605 Third Avenue, New York, NY 10158

Routledge is an imprint of the Taylor & Francis Group, an informa business

© 2023 Nirma University

The right of Utpal Sharma, R. Parthasarathy and Aparna to be identified as the authors of the editorial material, and of the authors for their individual chapters, has been asserted in accordance with sections 77 and 78 of the Copyright, Designs and Patents Act 1988.

All rights reserved. No part of this book may be reprinted or reproduced or utilised in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any information storage or retrieval system, without permission in writing from the publishers.

Trademark notice: Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data
A catalog record has been requested for this book

ISBN: 978-1-032-37892-3 (pbk)
ISBN: 978-1-003-34244-1 (ebk)

DOI: 10.4324/9781003342441

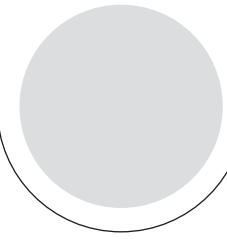
Cover page Credits

The coverpage and backpage design credits go to Parag Mistry and Mansi Kumar. The graphic is a juxtaposition of intelligent system networks in the upper half of a circle and street pattern from Ahmedabad old city in the lower half which was developed by Sujan Umaraniya for the brochure of ICFU'21. It was based on inspiration from Sweco, 2016, *A Smarter City*, <https://www.adsoftheworld.com/campaigns/a-smarter-city> retrieved on 1st June 2021.

Disclaimer

The views expressed and information presented in this compendium of papers are those of the authors are not necessarily endorsed by the editors.

Typeset in Times LT Std
by Aditiinfosystems



Contents

<i>List of Figures</i>	<i>ix</i>
<i>List of Tables</i>	<i>xxi</i>
<i>Preface</i>	<i>xxv</i>
<i>Acknowledgements</i>	<i>xxvii</i>
<i>Plenary Sessions</i>	<i>xxxi</i>

Part 1: Sub-theme 1—Space, Society and Culture

1. Beyond those Towering Walls: Architecture of Imprisonment and Human Well-being	3
<i>Chinar Bimal Shah and Sujan Umaraniya</i>	
2. Adoption of Prefabrication as a Construction System for Indian Contemporary Housing: A Survey of Gujarat Construction Professionals	15
<i>Himanshu Agrawal and Sujan Umaraniya</i>	
3. Multi-Dimensional Value Assessment of Architectural Heritage through Preference Selection Index Method	25
<i>Partha Sarathi Mishra and Soumi Muhuri</i>	
4. Topographic Urban Morphologies of Historic Towns in Western Maharashtra	34
<i>Hrishikesh Ashtekar</i>	
5. Investigating Neighborhood Effects and Local Embeddedness of a City and their Relevance on a Migrant's Life	47
<i>Hiranmayi Shankavaram and Alisha Sinha</i>	
6. Socio-Spatial Transformation in Traditional Residential Area: The Case of Ulsoor, Bengaluru	58
<i>Sruti R.</i>	
7. Impact of Changing Family Systems on Housing Typology: The Case of Pune City	68
<i>Priyanka Anand Chapekar and Parag Govardhan Narkhede</i>	
8. Assessment of Residential Satisfaction in Urban Neighbourhoods of Rasht, Iran	74
<i>Maryam Jafari Mehrabadi, Shamila Allahyari Asli Arde, Asgar Shokrgozar and Aurobindo Ogra</i>	
9. Conserving Heritage and Historical Legacy as a Tool for Enhancement of Liveability: The Case of Chowk, Lucknow	83
<i>Sameeksha Seth and Sourojee Dutta</i>	
10. What makes a Neighbourhood Livable? Exploring Strategies towards Sustainable Urbanism in Bakshi Nagar, Jammu	91
<i>Rakshit Gupta, Riddhimaa Gupta and Sourojee Dutta</i>	
11. Ascent in Architecture: Contribution of 'Means of Ascent' (Stairs, Steps, Ramps) in Synthesizing Spatial Experience	100
<i>Neha Surana and Jitesh Mewada</i>	
12. The "Movement-Image" of the City: Cinema as the Operative Image in the Lived Reality of a City	114
<i>Rupinder Singh and Sneha Singh</i>	

13. Films, Fictionalities and Realities: Image of the City	121
<i>Abhishek Bhardwaj</i>	
14. Public Art as a Generator of Placemaking	129
<i>Chintan Ahir and Digisha Mehta</i>	
15. Analysis of Thermal Comfort of Vernacular Ladakhi Dwellings of India	136
<i>Dinal Mehta and Vibha Gajjar</i>	
16. A Search for ‘My-Place’: User Centric Approach for Study of Common Social Spaces	146
<i>Digisha Mehta, Pratyosh Madhavi and Pahini Shah</i>	
17. Evaluating the Vitality of an Indian Market Street: The Case of Chandni Chowk, Delhi	157
<i>Payushi Goel and Foram Bhavsar</i>	
18. People, Place and Traditional Knowledge Systems	167
<i>Swapnil S.Bhole</i>	
19. Mediating Cultural Heritage Revival Through Urban Transformation in Ayodhya City	179
<i>Simran Purswani and Bhawna Bali</i>	
20. Architecture: An Object or an Experience?	188
<i>Kshitij Kumar Sinha, Avantika Dewangan, Manoj Mathur and Sushil Kumar Solanki</i>	
21. Heritage Tourism—A Tool for the Socio-economic and Cultural Development of a Region	193
<i>Mrinal G. Kashid and Parag Narkhede</i>	
22. Changing Urban Form of Historic Towns and its Impacts on Sustainable Urban Development	200
<i>Monica Kashkari and Tejwant Singh Brar</i>	
23. Post Occupancy Area Analysis of a Planned Urban Colony for Economic Affordability Parameters: A Case Study of Vaishali	209
<i>Mona Chandra, Ila Gupta and Mahendra Sethi</i>	
24. Liminal Spaces of Urban India	222
<i>Gautami B Menon and Dhaval Chauhan</i>	
25. Evaluating ‘Sense of Place’ Through the Characteristics of ‘Place Identity’	232
<i>Anshuka Asnani and Prof. Jaydeep Bhagat</i>	
26. Pedestrianization and Road Safety Improvement for Sector-3, MVP Colony, Visakhapatnam	243
<i>Jayeshkumar Maheshkumar Bhagwat, Haripriya Kesavan and Richa Rose Benson</i>	
27. Drivers of Social Interaction and Third Places: The Case of Bhopal, India	254
<i>Jyoti Yadav, Niruti Gupta, Amy Rachel Joseph and Bushra Saba</i>	
28. Transformation and Integration of Sindhi Refugee Settlements: The Case of Ulhasnagar, Thane	262
<i>Manmayee Sharma</i>	
29. Social Acceptability of High Rise Living in India: The Case of Ahmedabad City	269
<i>Purvi Jadav and Nishant Kansagra</i>	
30. Identifying the Urban Voids and Upliftment of Displaced Communities at Purana Loha Pul, Delhi	274
<i>Parama Mitra, Ananya Sharma and Sanmarga Mitra</i>	
31. Immersion Profundities with Absence of Metropolitan Flood Versatility in Hyderabad 2031: Towards Implications on SDGS 11	283
<i>Afreen Fatima and Asif Ali</i>	
32. Resilience of Historic Cities: A Case Study of Ahmedabad Walled City	292
<i>Pratima Singh</i>	
Part 2: Sub-theme 2—Green and Blue Infrastructure	
33. A Dialogue Between Green and Grey to Inquire into Open Space Strategy of an Indian Smart City, Bhubaneswar	301
<i>Karishma Rai and Amit Bhattacharya</i>	
34. Remediation of an Urban Landfill of Pirana, Ahmedabad Through Landscape Regeneration Approaches	310
<i>Monal Mistry</i>	

35. Impact of Passive Design Techniques on Building Performance in Improving Thermal Comfort in a Hot and Dry Climatic Zone	320
<i>Prachi Mashruwala and Purvi Jadav</i>	
36. Strategies for Stormwater Management in Kozhikode Corporation Area through Groundwater Recharge Technique	331
<i>Aminas and Smitha M. V.</i>	
37. A Systems Approach for the Future Master Planning of Punggol District, Singapore	354
<i>Madhvi Chulet, Sahil Fadia and Shweta Suhane</i>	
38. Evaluating ‘Place Identity’ Determinants Influencing Walkability at Urban Nodes of Ahmedabad	363
<i>Jaydeep Bhagat and Saloni Shah</i>	
39. Urban Public Space Management Outlook of Ahmedabad’s Parks and Gardens: Framework to Evaluate the Performance of the Public Park	375
<i>Tithi Soladhara, Mercy Samuel and Nishant Kansagra</i>	

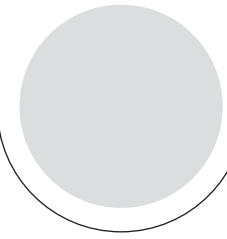
Part 3: Sub-theme 3—Ecology, Environment and Climate Change

40. Understanding Site Planning Approach Through Interpretive Study of Ancient Indian Buddhist Sites	383
<i>Amit Bhattacharya and Suchandra Bardhan</i>	
41. A Study on Endangered Ecosystems of Urban Area: The Case of Gavier Lake, Surat	396
<i>Manan Gandhi, Dhruv Surti, Vandana Masalawala, Unnati Khadawala and Rikta Desai</i>	
42. Microclimate: An Important Contributor to Climate Change	403
<i>Sumitra S. Kadam</i>	
43. Greening of Existing Small Scale Residential Buildings in Hot and Dry (Nagpur) Climatic Zone in Maharashtra	414
<i>Atul Shyamrao Ingale and Ritu B. Rai</i>	
44. Analysis of Urban Land Cover Composition Through Change Detection and Measures for Ecological Sustainability: The Case of Bamroli Wetland, Surat	429
<i>Dhruvin Dholariya, Sumit Khandelwal, Kunal Patel and Rikta Desai</i>	
45. The Impact of Industrial Development and Rapid Urbanization on the Yamuna River System: The Case of Delhi	442
<i>Asmita Yadav and Anju Mani Kalitha</i>	
46. Exploration of Indigenous Residential Settlements in Response to Disasters: The Case of Assam	448
<i>Diyalee Bhardwaj and Ankit Kumar</i>	
47. Correlating People, Governance and Climate Change Aspects through Urban Forests	462
<i>Shweta Suhane, Devanshi Gajjar and Utpal Sharma</i>	
48. Land Suitability Analysis for Encouraging and Locating New Urban Forests: A Case Study of Delhi, India	470
<i>Pooja Thareja, Pallavi Tiwari and Preeti Vajpeyi</i>	
49. Morphological Analysis of Medium Towns and Large Cities in India	478
<i>Siva Ram Edupuganti, Atul Kumar and Mahua Mukherjee</i>	
50. Environmental Impact Assessment of Development and Tourism Activity in Protected Areas of Panna National Park, Madhya Pradesh	485
<i>Sushmi Nimje, Abdul Razak Mohamed and Niruti Gupta</i>	

Part 4: Sub-theme 4—Urban Planning and Design

51. Circular Healthcare System Approaches to Managing Covid 19 and Preparing for Emerging and Future (Unknown) Pandemics: The Success Story of National Vaccines Strategy in Greece	493
<i>Ioulia Moraitou and John Kiousopoulos</i>	
52. Spatial Management Configuration to Revitalize an Indian Steel City: A Case Study of Durgapur	501
<i>Parikhit Biswas, Parikhit Biswas, Prof. Jayita Guha Niyogi and Prof. Arup Guha Niyogi</i>	

53. Impact of Hybrid Urban Spaces Influencing Human Behaviour in Public Place	506
<i>Jambavati Gouda</i>	
54. Pandemic and its Impact on Urban Planning from a Historical Context	514
<i>Rina Diwakar Salvi and Ashwini Pethe</i>	
55. Walking to Nowhere: The Futility of being a Pedestrian—Perspectives from a Small Town	521
<i>Rakesh K. S.</i>	
56. Conceptualization of Rural-Region: The Case of KwaZulu-Natal, South Africa	529
<i>Devashnee Naidoo and Aurobindo Ogra</i>	
57. Spatial Transformation and Nodal Planning in the City of Pietermaritzburg: The Case of Transit-Oriented Development (TOD) along Edendale/Northdale Corridor	540
<i>Devashnee Naidoo, Aurobindo Ogra and Zenzile Mbinza</i>	
58. Bus Rapid Transit and Transit Oriented Development: The Case of Ahmedabad	554
<i>Dhaval Chauhan, Jitesh Mewada and Utpal Sharma</i>	
59. Evaluating Slow Street Concept in Residential Neighbourhood: Pilot at Alexandria Street, Bengaluru	563
<i>Sonal Kulkarni, Monica Kashkari, Ann Jacob and V. Manjula</i>	
60. The Effectiveness of the Integrated Development Plan (IDP) on Service Delivery: The Case of Kagiso Township in Mogale City Local Municipality	572
<i>Vuyiswa Letsoko, Phathutshedzo Munwana and Aurobindo Ogra</i>	
61. Urban Design Guidelines for Optimum Urban Carrying Capacity	578
<i>Dona Santhosh</i>	
62. Military Settlements in India: A Case for Transformation into Smart and More Liveable Military Settlements	585
<i>Gaurav Singh Karki and Bhawna Bali</i>	
63. Access to Public Spaces in Indian Cities: An Opportunistic Model	595
<i>Archana Gaikwad and Utpal Sharma</i>	
64. Urban Water Management Through Design Intervention: A Review of Urban Design Cases from India	602
<i>Prerna Yadav, Siddh Doshi, Mona Iyer, Gargi Mishra and Sameer Kumar</i>	
Part 5: Sub-theme 5—Housing Policies and Form	
65. Housing in Kashmir Valley: Lost Opportunities and Future Prospects	613
<i>Bhavna Misri and Aurobindo Ogra</i>	
66. Innovations in Housing Finance Management	625
<i>Pavithra M. P.</i>	
67. Understanding Post Occupancy Modifications to Residential Building Designs: The Case Study of Government MIG Housing in Delhi NCR	630
<i>Anupama Chawla and Ila Gupta</i>	
68. Access to Housing Finance and Housing Affordability in India	641
<i>Prabhat Kumar Rao and Arindam Biswas</i>	
69. Informal Processes and New Dynamics of Housing in the Periphery: The Case of Vadodara	648
<i>Bhawana Vasudeva</i>	
Appendix: ICFU'21 Programme Summary	656



List of Figures

1.1	<i>Rehabilitation reduces habitual offending, thus reducing the recidivism rates</i>	4
1.2	<i>Well-being is the first primitive steps towards rehabilitation</i>	5
1.3	<i>Case study I - Prison built in 1895</i>	6
1.4	<i>Case study II - Prison built in 2019</i>	7
1.5	<i>Circulation to use : Prison built in 1895</i>	7
1.6	<i>Circulation to use : Prison built in 2019</i>	7
1.7	<i>Unit to whole : Prison built in 1895</i>	8
1.8	<i>Unit to whole : Prison built in 2019</i>	8
1.9	<i>Physical boundaries : Prison built in 1895</i>	8
1.10	<i>Physical boundaries : Prison built in 2019</i>	8
1.11	<i>Visual boundaries : Prison built in 1895</i>	9
1.12	<i>Visual boundaries : Prison built in 2019</i>	9
1.13	<i>Built to open relation : Prison built in 2019</i>	9
1.14	<i>Built to open relation : Prison built in 2019</i>	10
1.15	<i>Views from living space : Prison built in 1895</i>	10
1.16	<i>Views from living space : Prison built in 2019</i>	10
1.17	<i>Views while transition : Prison built in 1895</i>	11
1.18	<i>Views while transition : Prison built in 2019</i>	11
1.19	<i>Prospect while transition : Visitor room - Prison built in 2019 and 1985</i>	11
1.20	<i>Degree of permeability : Prison built in 1895</i>	12
1.21	<i>Degree of permeability : Prison built in 2019</i>	12
1.22	<i>Degree of flexibility : Prison built in 1985</i>	12
1.23	<i>Degree of flexibility : Prison built in 2019</i>	12
2.1	<i>Reasons Demanding Prefabrication</i>	19
2.2	<i>Reasons Demanding Prefabrication</i>	20
2.3	<i>Potentials of Prefabrication</i>	21
2.4	<i>Barriers in Adoption of Prefabrication</i>	22
3.1	<i>Only World Heritage Site in Odisha (Sun Temple at Konark)</i>	26
3.2	<i>18 selected Central-ASI Protected Odishan Temples</i>	27
3.3	<i>14 selected State-ASI Protected Odishan Temples</i>	27
3.4	<i>Six selected unlisted unprotected Odishan Temples</i>	28
3.5	<i>Hierarchical Model of Dimensions, Sub-Dimensions, and Parameters for the Value Assessment of Odishan Temple Architecture</i>	29
3.6	<i>Methodology for Selecting and Ranking of Odishan Temple Architecture through Preference Selection Index Method</i>	30

4.1	<i>Urban settlements with geomorphic associations in Western Maharashtra</i>	36
4.2	<i>Street pattern of Wai town – Major street network running north south perpendicular to slope, discharging surface water into river ‘Krishna’</i>	38
4.3	<i>The temple built form in Wai on river edge has thick non decorated stone masonry for walls and decorative ‘Shikharas’ above built in brick at roof level</i>	38
4.4	<i>Street pattern and urban blocks of ‘Sangli; old town show a linear pattern, perpendicular to contours and sloping towards river</i>	39
4.5	<i>Street pattern of Satara town – Major street network running north south which are perpendicular to slope and parallel to natural water streams</i>	40
4.6	<i>Narrow built form of Satara town on uphill ‘Peths’ with private wells in backyard located along edge of natural water streams (Ashtekar 2021)</i>	41
4.7	<i>Narrow built on uphill ‘Peths’ responding to contours (Ashtekar 2021)</i>	41
4.8	<i>Non responsive overlap of urban pattern on contours in newer parts of Satara town</i>	41
4.9	<i>The urban morphology of ‘Phutka Tala’ surrounded by built urban form and an edge acting as an active public space</i>	42
4.10	<i>Water cisterns or ‘Hauds’ located at street nodes in Satara (Ashtekar 2021)</i>	42
5.1	<i>Activity Frequency and Typology (Source: Authors)</i>	51
5.2	<i>Sample Dataset for Parametric Analysis of one respondent</i>	52
6.1	<i>Ulsoor Map</i>	60
6.2	<i>Heritage Map</i>	61
6.3	<i>Architectural Character</i>	63
6.4	<i>New Development</i>	63
6.5	<i>Socio-spatial Transformation Heat Map</i>	64
6.6	<i>Proposed Structure Plan</i>	66
7.1	<i>Relationship between Family Systems, Housing and Accommodation Type</i>	70
M8.1	<i>Location of Rasht in Guilan</i>	76
M8.2	<i>Location of residential neighborhoods studied in Rasht</i>	77
9.1	<i>Figure-Ground/Built-Open map</i>	87
9.2	<i>Land Use map of the area</i>	87
9.3	<i>Map presenting undeveloped river edge and their present condition</i>	88
9.4	<i>Map presenting heritage sites of the area</i>	88
9.5	<i>Map showing major nodes of the area with their present condition</i>	89
10.1	<i>Location of the selected area in the city of Jammu</i>	95
10.2	<i>Bakshi Nagar neighbourhood</i>	95
10.3	<i>Figure-Ground/Built-Open map of the neighbour-hood</i>	96
10.4	<i>Existing land-use map of the neighbourhood</i>	96
10.5	<i>SWOC Analysis of the area</i>	97
10.6	<i>The recommended neighborhood redevelopment plan</i>	98
11.1	<i>Flowchart summarizing the literature to achieve a Framework for analysis</i>	103
11.2	<i>Flowchart of Framework for analysis</i>	104
11.3	<i>The Second Floor Plan of ATMA building with the opted movement path, pause points and visual frames</i>	106
11.4	<i>Analysis Diagram of Pause point P1</i>	107
11.5	<i>Analysis Diagram of Pause point P2 (ATMA)</i>	108
11.6	<i>Analysis Diagrams of pause point P3</i>	110
11.7	<i>Comparative Discourse of External Means of Ascent (I)</i>	111
11.8	<i>Comparative Discourse of External Means of Ascent (II)</i>	111

11.9	<i>Comparative Discourse of Internal Means of Ascent</i>	112
13.1	<i>Poster of Gali Guleiyan</i>	123
13.2	<i>Impact of film Gali Guleiyan on viewers</i>	124
13.3	<i>Streets studied at Gali Guleiyan</i>	125
13.4	<i>The overhanging wires in street of Chhipi wara</i>	126
13.5	<i>Garbage cluttered in streets of Chhipi Wara.</i>	126
13.6	<i>Lack of Natural light in Gali Guleiyan during day</i>	126
13.7	<i>Results of Questionnaires from SET-A, B, C</i>	127
14.1	<i>Stakeholders involved in the Heritage Week Festival</i>	131
15.1	<i>Site Plan and exterior view of Khirze House</i>	140
15.2	<i>Khirze House 3D</i>	141
15.3	<i>Thermal sensation (PMV and PPD%) and Indoor operative temperature Graph from Simulated analysis data</i>	141
16.1	<i>Social Sphere for an individual</i>	149
16.2	<i>Percentage distribution of Female (left) and Male (right) for location of 'My-Place'</i>	150
16.3	<i>Percentage Distribution of Age preference for location of 'My-Place'</i>	151
16.4	<i>Preferred Time of Visit based on Gender and Age</i>	151
16.5	<i>Preferred Frequency of Visit based on Gender and Age</i>	152
16.6	<i>Images capturing activities at few of the My-Places</i>	153
16.7	<i>Images showing different types of My-Places chosen by people</i>	154
16.8	<i>My-Place Activities and key factors</i>	155
17.1	<i>Structure of the Research Methodology</i>	159
17.2	<i>Chandni Chowk Study Area Representational Map</i>	161
17.3	<i>After Redevelopment Typical Street Section</i>	162
17.4	<i>Before Redevelopment Plan</i>	163
17.5	<i>After Redevelopment Plan</i>	164
17.6	<i>After Redevelopment Part Plan (People & Vehicles)</i>	164
17.7	<i>After Redevelopment Part Plan (Human Aspects)</i>	164
17.8	<i>Findings from Questionnaire Survey</i>	165
17.9	<i>Findings from Questionnaire Survey</i>	165
17.10	<i>Findings from Questionnaire Survey</i>	165
18.1	<i>Imposing snow capped Himalayas</i>	169
18.2	<i>Beautiful gradual trek leading towards Chehni Village</i>	170
18.3	<i>Traditional houses on way to Chehni village</i>	171
18.4	<i>Village Chehni showing the soaring Chehni Fort and the Thakurs Kothi over the village residential skyline</i>	171
18.5	<i>Chehni fort / temple with the temple bhandar in the front</i>	172
18.6	<i>1st floor level internal plan of Chehni fort</i>	173
18.7	<i>South and East (Front) Elevations of Chehni fort</i>	174
18.8	<i>The great tower temple of Chehni surrounded with the village structures</i>	174
18.9	<i>View of the village Chowk and the Bhandar</i>	175
18.10	<i>View of the Krishna temple</i>	175
18.11	<i>Sketches showing variations in Kath-Kunni system</i>	176
18.12	<i>Diagrams illustrating Kath-Kunni technology</i>	176
18.13	<i>Image depicting movement of structure during earthquake</i>	177

18.14	<i>Flowchart showing transfer of the technology</i>	177
18.15	<i>Chehni fort as it stands today</i>	178
19.1	<i>Total Tourists Visit in Ayodhya from 2014 to 2020</i>	181
19.2	<i>Land Use Land Cover Change of Ayodhya City (2001 and 2020)</i>	182
19.3	<i>Proposed Administrative Boundary of Ayodhya City</i>	185
19.4	<i>Transect Mapping around Shri Ram Janmbhoomi</i>	185
19.5	<i>Stakeholders Involved in City Development</i>	186
20.1	<i>Sunken Courtyards with a series of terraced gardens at Bharat Bhavan</i>	190
20.2	<i>Steps adding to the surprise element in Bharat Bhavan</i>	191
20.3	<i>Author's interpretation of what could have been a 'parti' for Bharat Bhavan, Bhopal</i>	191
20.4	<i>View of Upper Lake from Bharat Bhavan</i>	192
21.1	<i>Graph showing foreign and domestic visitors visited to various sites in Aurangabad in the year 2020</i>	194
21.2	<i>Location of Marathwada region</i>	195
21.3	<i>Map of Study area-Ambajogai town in a Beed District</i>	196
21.4	<i>Image showing the heritage sites on a route in study area</i>	196
21.5	<i>Yogeshwari Devi and Tandala</i>	197
21.6	<i>Hattikhana (Bhucharnath)</i>	197
21.7	<i>Barakhambi/Sakleshwar Temple</i>	197
21.8	<i>Mukundral Swami Samadhi</i>	197
21.9	<i>Pasodi</i>	198
21.10	<i>Dasopant Samadhi</i>	198
21.11	<i>Amruteshwar Mahadev temple</i>	198
23.1	<i>Percentage Distribution of Establishments by Major Economic Activity Groups in Delhi as per 5th Economic Census</i>	211
23.2	<i>Study Area Vaishali, Ghaziabad</i>	214
23.3	<i>Sector-4 Commercial Plot with Parking Space</i>	216
23.4	<i>Unauthorized Commercial Activity in Vaishali</i>	217
23.5	<i>Breakup of land use areas</i>	218
23.6	<i>Availability of property as per Vaishali Scheme 1989</i>	218
23.7	<i>Change in property size mix from 1989 to 2021</i>	219
24.1	<i>Location Map of Case Study 1</i>	225
24.2	<i>Figure Ground Map (top) and Zoning Map (bottom) of Part 1 and Part 2</i>	226
24.3	<i>Case Study marked in different parts</i>	226
24.4	<i>Case Study 1 - Shadow patterns of Part 1 and Part 2</i>	227
24.5	<i>Case Study 1 - Section AA' and Section BB' through part 1 and Part 2 – morning 9 a.m.</i>	227
24.6	<i>Case Study 1 - Part 2, footpath on the left. (left) Part 1, Public amenities & open spaces (right)</i>	227
24.7	<i>Case Study 1 - Section AA' and Section BB' through Part 1 and Part 2 - afternoon 12 p.m. to 4 p.m.</i>	228
24.8	<i>Case Study 1- Section AA' and Section BB' through Part 1 and Part 2 - evening 5 p.m. to 8 p.m.</i>	228
25.1	<i>Interpretations of Sense of Place by scholars</i>	233
25.2	<i>Interpretations of Place Identity by scholars</i>	234
25.3	<i>Components of Place Identity based on Relph's understanding (1976)</i>	234
25.4	<i>Constituents of Place Attachment based from literature review</i>	234
25.5	<i>Framework to study the case Study based on literature review</i>	235
25.6	<i>Relationship of place attributes with respect to setting based on site analysis</i>	236
25.7	<i>Site plan of precinct indicating different spaces</i>	237

25.8	<i>Site plan indicating spaces that attracted more people</i>	237
25.9	<i>Graph indicating average % of people observed in each space</i>	238
25.10	<i>Graph indicating average % of the different types of activities on site</i>	238
25.11	<i>Graph indicating responses from survey on Place Significance</i>	238
25.12	<i>Graph indicating responses from survey on Place Familiarity</i>	239
25.13	<i>Graph indicating responses from survey on Place Involvement</i>	239
25.14	<i>Graph indicating responses from survey on Place Belonging</i>	239
25.15	<i>Graph indicating responses from survey on Place Satisfaction</i>	240
25.16	<i>Diagram showing relation between Sense of place and Place Identity</i>	241
26.1	<i>Location of the study area</i>	244
26.2	<i>Framework of analysis</i>	245
26.3	<i>Location of survey points</i>	245
26.4	<i>Right of way of existing roads</i>	245
26.5	<i>Modal speed near school roads</i>	246
26.6	<i>Road B1-Cumulative frequency distribution</i>	246
26.7	<i>Road B1-frequency distribution</i>	246
26.8	<i>Road B2- Cumulative frequency distribution</i>	246
26.9	<i>Road B2- Frequency distribution</i>	247
26.10	<i>Road B3-Cumulative frequency distribution</i>	247
26.11	<i>Road B3-Frequency distribution</i>	247
26.12	<i>Road B4-Cumulative frequency distribution</i>	247
26.13	<i>Road B4-frequency distribution</i>	247
26.14	<i>Network Analysis- School Shortest Safe-Access Route</i>	247
26.15	<i>Absence of safety control devices</i>	248
26.16	<i>Encroachment alongside of the school boundary</i>	248
26.17	<i>Pedestrian Level of service</i>	248
26.18	<i>Land use map</i>	249
26.19	<i>Ratings for A1 road</i>	249
26.20	<i>Ratings for A2 road</i>	249
26.21	<i>Ratings for A3 road</i>	249
26.22	<i>Ratings for A4 road</i>	249
26.23	<i>Quality of service</i>	250
26.24	<i>Existing footpath network</i>	250
26.25	<i>Proposed footpath network</i>	250
26.26	<i>Rythu Bazar proposed Segment-1</i>	251
26.27	<i>Rythu Bazar proposed Segment-2</i>	251
26.28	<i>Rythu Bazar proposed Segment-3</i>	251
26.29	<i>Proposed school safe access network</i>	251
26.30	<i>School safety signage placement</i>	252
26.31	<i>Recommendation for Speed Breakers Potential Location</i>	252
27.1	<i>Components of Place</i>	255
27.2	<i>Place Framework</i>	255
M27.1	<i>Location Map</i>	257
27.3	<i>Parameter Rating of Taj-Ul-Masajd</i>	258
M27.2	<i>Taj-Ul-Masajid, Bhopal</i>	258

M27.3 <i>Bharat Bhawan</i>	258
M27.4 <i>Vardhman Park</i>	259
27.4 <i>Parameter Rating of Bharat Bhawan</i>	259
27.5 <i>Parameter Rating of Vardhman Park</i>	259
M27.5 <i>Maulana Azad Central Library</i>	259
27.6 <i>Parameter Rating Maulana Azad Library</i>	260
27.7 <i>Parameter Rating of Maulana Azad Central Library</i>	260
27.8 <i>Comparison of third places</i>	260
29.1 <i>Status of public housing schemes - In-Situ Slum Redevelopment verticle of PMAY</i>	271
30.1 <i>Location of Purana Loha Pul</i>	275
30.2 <i>Site and Surrounding Context</i>	276
30.3 <i>Gaps and Overlaps in User and Site Study</i>	279
30.4 <i>Activities observed on site</i>	280
30.5 <i>Social interactions under the Loha Pul site</i>	281
30.6 <i>Varied nodes identified at the site and established social links and reference points</i>	282
31.1 <i>Distribution of fresh water on earth</i>	284
31.2 <i>Hyderabad city Map showing in red the hierarchy of boalis present in the plateau region, Telangana, India</i>	284
31.3 <i>1854 Pharoah Map or Plan of the City of Secunderabad, Telangana, India</i>	285
31.4 <i>View of Adalaj Stepwell, Gujarat (Gujarat Tourism 2008)</i>	286
31.5 <i>Hyderabad Master Plan Concept Plan</i>	287
31.6 <i>The Nagannah Step well in the Bansilalpet Neighbourhood after being recued by Rain water Project lead by Kalpana Ramesh</i>	288
31.7 <i>SDG11 Cities and Communities Sustainable</i>	288
31.8 <i>Main training needs identified so as to influence on the execution of a sustainable strategy</i>	288
31.9 <i>F1854 Pharoah Map or Plan of the City of Secunderabad, showing the location of Nagannahs Garden</i>	289
31.10 <i>Contextual plan showing the Nagannah Step well in the present-day context of Bansilalpet Neighbourhood</i>	290
31.11 <i>Stage 1 of well restoration by Rain Water Project</i>	290
31.12 <i>Ganeshha idol and dancing Hanuma idol were excavated at the second gallery level of the Bansilalpet well</i>	290
31.13 <i>Stage 2 of well restoration by Rain Water Project</i>	290
31.14 <i>Stage 3 of well restoration by Rain Water Project</i>	290
31.15 <i>Stage 4 of well restoration by Rain Water Project</i>	291
31.16 <i>Stage 5 of well restoration by Rain Water Project</i>	291
32.1 <i>Location of Walled City within Ahmedabad City</i>	293
32.2 <i>Urban Fabric in Walled City of Ahmedabad</i>	294
32.3 <i>Sun Light Hour Analysis for blocks consisting of houses sharing common walls (3 pm to 6 pm during the peak summer month - June)</i>	295
32.4 <i>Shaded streets flanked by houses with Otla's for interaction and serving as temporary resting/sitting spots for people</i>	295
32.5 <i>Light streaming in the Pol house courtyard during entire day and being sufficient to conduct home based economic activity (stitching)</i>	296
32.6 <i>Front façade of a Pol house using timber with embellishment for Structural and non-structural members</i>	296
32.7 <i>(Left) Pol residents sitting on Otla, (Right) A Black board in Pol</i>	297
33.1 <i>Existing Parks and Forest areas</i>	302
33.2 <i>Methodology approach</i>	302
33.3 <i>Child Population map</i>	304

33.4	<i>Need of Park acreage</i>	305
33.5	<i>Walkability Analysis for Parks</i>	306
34.1	<i>Landuse map of context of Pirana Landfill</i>	311
34.2	<i>Google Satellite image of Pirana Landfill</i>	312
34.3	<i>Impact intensity map of Pirana Landfill</i>	313
34.4	<i>Landfill gas capture process diagram</i>	314
34.5	<i>Capping layer system for landfill</i>	315
34.6	<i>Slope stabilisation and planting density diagrams</i>	316
34.7	<i>Surface layering system for retention pond on landfill diagram</i>	316
34.8	<i>Plant root depth over landfill diagram</i>	317
35.1	<i>Comparison graph of yearly comfort (1st Jan- 31st Dec)</i>	326
35.2	<i>Comparison graph of Air temperature (°C)</i>	326
35.3	<i>Comparison graph of Relative humidity (%)</i>	326
35.4	<i>Comparison graph of EPI (kWh/m²/year)</i>	326
35.5	<i>Comparison graph of yearly comfort (1st Jan- 31st Dec)</i>	326
35.6	<i>Comparison graph of Air temperature (°C)</i>	327
35.7	<i>Comparison graph of Relative humidity (%)</i>	327
35.8	<i>Comparison graph of EPI (kWh/m²/year)</i>	327
35.9	<i>Comparison graph of yearly comfort (1st Jan- 31st Dec)</i>	327
35.10	<i>Comparison graph of Air temperature (°C)</i>	327
35.11	<i>Comparison graph of Relative humidity (%)</i>	327
35.12	<i>Comparison graph of EPI (kWh/m²/year)</i>	327
35.13	<i>Heat gain charts of Sangath</i>	327
35.14	<i>Heat gain charts of Kakani Associates</i>	328
35.15	<i>Heat gain charts of Indigo Architects</i>	328
36.1	<i>Base map for Kozhikode Corporation Area</i>	334
36.2	<i>Elevation profile with stormwater drainage pattern of the Kozhikode Corporation Area</i>	335
36.3	<i>Low laying land converted to other land use during last 30 years in the study area</i>	336
36.4	<i>Zonal division of Kozhikode Corporation Area</i>	338
36.5	<i>Flood plains of the Kozhikode Corporation Area</i>	339
36.6	<i>Intensity of identified regions that face water scarcity</i>	340
36.7	<i>Lithology map of the Kozhikode Corporation</i>	342
36.8	<i>Geomorphology map of the Kozhikode Corporation</i>	343
36.9	<i>Geology map of the Kozhikode Corporation</i>	344
36.10	<i>Elevation map of the Kozhikode Corporation</i>	345
36.11	<i>Drainage Density map of the Kozhikode Corporation</i>	346
36.12	<i>LULC map of the Kozhikode Corporation</i>	347
36.13	<i>Groundwater Potential Zone (GWPZ) map of Kozhikode Corporation</i>	349
36.14	<i>Delineated Groundwater Potential Zones (GWPZ) in the Kozhikode Corporation</i>	350
36.15	<i>Wards with water scarcity in Drainage Zone B</i>	351
36.16	<i>Cross-section of the Infiltration Basin</i>	351
36.17	<i>Location of installing Infiltration Basins</i>	352
37.1	<i>Illustration demonstrates how highline is integrated into city fabric, providing access to the ground floor and neighboring buildings</i>	359

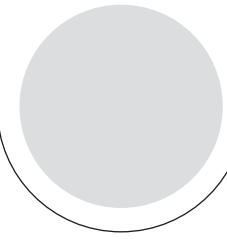
37.2	<i>Illustration shows the Nature Reserve, Sports Complex and Business Park linked by highline and PCN</i>	359
37.3	<i>Illustration showing various recreational spaces increasing the adaptability serving a valuable habitat for the wildlife</i>	360
37.4	<i>Illustration showing highline offering a great opportunity for gatherings and interactions</i>	360
37.5	<i>Illustration showing diverse typologies with multi-functional spaces enhancing living experiences of home</i>	361
38.1	<i>Components of Place Identity influencing walkability synthesized from the framework of Lynch (1960), Relph (1976), Gehl (2003) and Carmona (2010)</i>	367
38.2	<i>View of the Manek Chowk</i>	368
38.3	<i>View of the Girish crossroad</i>	369
38.4	<i>View of the Iscon crossroad</i>	369
38.5	<i>The degree of enclosure on the streets and the perceived safety of people</i>	369
38.6	<i>Number of shops and the degree of permeability</i>	370
38.7	<i>The degree of accessibility and the streetscape at Manek Chowk</i>	370
38.8	<i>The degree of accessibility and the streetscape at Girish crossroad</i>	370
38.9	<i>The degree of accessibility and the streetscape at Iscon crossroad</i>	370
38.10	<i>The perceived walkable length and the actual block length</i>	371
38.11	<i>Comparing the number of vehicles and pedestrians in morning, afternoon and evening</i>	371
38.12	<i>Relation of building edges and activities</i>	372
38.13	<i>Relation of building edges and activities</i>	372
38.14	<i>Legibility landmarks identified by the responders</i>	372
38.15	<i>Factors influencing walkability as stated by the responders</i>	373
38.16	<i>Direct and indirect influence of place identity components on walkability</i>	373
39.1	<i>Accessibility and linkage accross three categories of parks</i>	377
39.2	<i>Activeness accross three categories of parks</i>	378
39.3	<i>Sociability accross three categories of parks</i>	378
39.4	<i>Comfort and Image accross three categories of parks</i>	378
39.5	<i>Facilites Inorastructure</i>	379
40.1	<i>Conceptual Framework of the Research</i>	385
40.2	<i>Methods of Investigation</i>	385
40.3	<i>Location Map of Buddhist Monasteries in Floodplain of Bengal</i>	387
40.4	<i>Bharatpur Stupa in Riverine Landscape of Radha Region</i>	389
40.5	<i>Relationship between Monastic sites and Settlement</i>	391
41.1	<i>Location map of Haus khas lake, Delhi</i>	397
41.2	<i>Location map of Gavier lake, Surat district, Gujarat, India</i>	398
41.3	<i>Contour map of Gavier lake, Surat district, Gujarat</i>	399
41.4	<i>Year 2000 Map of Gavier area</i>	399
41.5	<i>Year 2005 Map of Gavier area</i>	399
41.6	<i>Year 2010 Map of Gavier area</i>	399
41.7	<i>Year 2020 Map of Gavier area</i>	399
41.8	<i>Evaluation of land use from 2000 to 2020</i>	399
41.9	<i>Existing TP plan of Gavier area</i>	400
41.10	<i>Proposed DP plan of Gavier area</i>	400
41.11	<i>Waterbody conservation proposal plan</i>	401
41.12	<i>Buffering and wind - breaking replanting</i>	401
41.13	<i>Buffering and remediation replanting</i>	401

42.1	<i>Location and proximity of Kalamboli site and Panvel site</i>	407
42.2	<i>Context of Kalamboli site (500 M radius surrounding area) with highlighted open spaces</i>	407
42.3	<i>Context of Panvel site (500 M radius surrounding area) with highlighted open spaces</i>	407
42.4	<i>Kalamboli site photos</i>	408
42.5	<i>Panvel site photos</i>	408
42.6	<i>Kalamboli Site – Percentage of Area of Built up and open spaces</i>	408
42.7	<i>Kalamboli Site – Percentage of Area under vegetation and open unpaved ground</i>	408
42.8	<i>Panvel Site – Percentage of Area of Built up and open spaces</i>	408
42.9	<i>Panvel Site – Percentage of Area under vegetation and open unpaved ground</i>	409
43.1	<i>Barriers and drivers for Greening of Existing structure (Mohamed 2014)</i>	415
43.4	<i>Architectural Plan of Residential Existing Structure at Nagpur _2333 sq. ft - plot area, 936.25 sq. ft – built-up</i>	416
43.5	<i>(a) Existing plantation, (b) West-facing main entrance, (c) East-facing, (d) South side shading, (e) From outside north facing</i>	417
43.6	<i>Energy consumption year from 12 months before November 2020</i>	418
43.7	<i>Monthly energy consumption (kWh) _eQUEST</i>	419
43.8	<i>Energy Consumption _eQUEST</i>	419
43.9	<i>Annual energy consumption by end-use _eQUEST</i>	420
43.10	<i>Solar rooftop calculation (MNRE)</i>	421
43.11	<i>Feasible plant size. (MNRE)</i>	421
43.12	<i>EMI calculation (MNRE)</i>	422
43.13	<i>Fixtures in WC-hindware- rimless with integrated jet - 2/4 Liters Flush (Hindware)</i>	422
43.14	<i>Kitchen - sink cock – hindware (6 to 7.5 l/m) (Hindware)</i>	423
43.15	<i>Eco365 Water Saving Faucets (Eco 365)</i>	423
43.16	<i>Hansgrohe Eco, Smart _basin taps, are reduced to around (5 liters per minute) (Hansgrohe Eco Smart)</i>	423
43.17	<i>Hansgrohe Eco Smart _ kitchen mixer 240, Eco, pull-out spray, two jets (flow rate limited to maximum 6l/min) (Hansgrohe Eco Smart)</i>	423
43.18	<i>Hansgrohe Eco Smart-shower Water consumption reduced to 9 l/min (Hansgrohe Eco Smart)</i>	423
43.19	<i>The pattern of soil wetting by a low-head bubbler (Nations, n.d.)</i>	424
43.20	<i>The pattern of wetting by a sand-filled plastic sleeve, perforated on one side and placed vertically in the root zone (Nations, n.d.)</i>	424
44.1	<i>Map showing location of Bamroli with the context of Surat</i>	431
44.2	<i>Contour map of selected site context</i>	432
44.3	<i>Map showing condition of land use in the year 2001</i>	432
44.4	<i>Map showing condition of land use in the year 2005</i>	433
44.5	<i>Map showing condition of land use in the year 2010</i>	433
44.6	<i>Map showing condition of land use in the year 2015</i>	433
44.7	<i>Map showing condition of land use in the year 2020</i>	434
44.8	<i>Comparative analysis of land use from the year 2000-2020</i>	434
44.9	<i>Map showing the change in land cover composition for the year - 2000</i>	435
44.10	<i>Map showing the change in land cover composition for the year - 2005</i>	435
44.11	<i>Map showing the change in land cover composition for the year - 2010</i>	436
44.12	<i>Map showing the change in land cover composition for the year - 2015</i>	436
44.13	<i>Map showing the change in land cover composition for the year - 2021</i>	437

44.14	<i>Comparative analysis of the change in land cover composition for the year 2000-2021</i>	437
44.15	<i>Proposed TP scheme for Bamroli, Surat, Gujarat, India</i>	439
44.16	<i>Proposed DP for Bamroli, Surat, Gujarat, India</i>	439
44.17	<i>Planning approach for the Bamroli area</i>	440
44.18	<i>Proposal for biodiversity park</i>	440
44.19	<i>Proposed Typical sectional detail illustrating creek development</i>	441
45.1	<i>Settlements on the river banks of Yamuna</i>	443
45.2	<i>Primary geographic characteristics of Delhi's National Capital Territory (NCT) are depicted on this map</i>	443
45.3	<i>Pollution loads in the Yamuna River as a result of several cities' contributions</i>	444
45.6	<i>A map depicting section of river Yamuna of the stretch of urban (Delhi)</i>	446
45.9	<i>Picture shows the Najafgarh drain spilling into the Yamuna at the Wazirabad Barrage</i>	447
46.1	<i>Images showing Chang & Assam type housing</i>	449
46.2	<i>Methodology adopted for research</i>	450
46.3	<i>Location of Case studies</i>	451
46.4	<i>Houses of Mising Housing Tribe</i>	451
46.5	<i>Measure drawing of house 2 Mising tribe</i>	452
46.6	<i>Houses of Deori Tribe</i>	453
46.7	<i>Exploded View of the House</i>	453
46.8	<i>Char Village</i>	454
46.9	<i>Mising Tribe cluster</i>	454
46.10	<i>Deori Tribe cluster</i>	454
46.11	<i>Flood water diagram</i>	455
46.12	<i>Topography of case studies</i>	455
46.13	<i>Orientation of the two typologies</i>	456
46.14	<i>Privacy Gradient of houses of the typologies</i>	456
46.15	<i>Spatial flowchart diagram</i>	457
46.16	<i>Layers of floor base</i>	457
46.17	<i>Layers of wall panel of second typology</i>	457
46.18	<i>Joinery details</i>	458
46.19	<i>Roofing members</i>	458
46.20	<i>Layers of floor base of Deori house (Chang House)</i>	459
46.21	<i>Layers of Roof members of old and new parts of the houses</i>	460
48.1	<i>Delhi - Indicator Maps</i>	475
48.2	<i>Land suitability map for locating new urban forests in Delhi</i>	476
48.3	<i>Highly suitable locations for urban forests overlapped with Delhi's land use map</i>	476
49.1	<i>Cumulative population of Indian Urban Settlements</i>	479
49.2	<i>Overall Accuracy of Aligarh LCZ map generated using the LCZ Generator tool</i>	481
49.3	<i>Local Climate zone Map of 3-5 lakh population Urban settlements Bilaspur, Karnal, Muzaffarpur</i>	481
49.4	<i>Local Climate zone Map of 5-7.5 lakh population Urban settlements Jhansi, Saharanpur, Ujjain</i>	482
49.5	<i>Local Climate zone Map of 7.5-10 lakh population Urban settlements Aligarh, Jalandhar, Moradabad</i>	482
49.6	<i>Local Climate zone Map of 10-15 lakh population Urban settlements Amritsar, Madurai, Raipur</i>	482
50.1	<i>Boundary of Panna National Park</i>	487
50.2	<i>Ranges of Panna National Park</i>	487
50.3	<i>Submerged area from project</i>	488

50.4	<i>Population of tigers in PNP</i>	489
50.5	<i>Biodiversity index for PNP</i>	490
56.1	<i>KZN locality Map</i>	534
56.2	<i>KZN District Municipalities</i>	534
56.3	<i>KZN local Municipalities</i>	535
56.4	<i>KZN Land Use Map</i>	535
56.5	<i>KZN Population Density</i>	536
56.6	<i>KZN Rural Settlement Areas</i>	536
56.7	<i>KZN Functional Town Typologies</i>	537
57.1	<i>Locality of Msunduzi Municipality in KZN</i>	543
57.2	<i>Edendale and Northdale Corridor and Node</i>	544
57.3	<i>Edendale area in 2009</i>	545
57.4	<i>Edendale area in 2019</i>	545
57.5	<i>Northdale area in 2009</i>	546
57.6	<i>Northdale area in 2019</i>	546
57.7	<i>Edendale Area Town Planning Scheme</i>	547
57.8	<i>Northdale Area Town Planning Scheme</i>	548
57.9	<i>2014 Urban Network Strategy</i>	548
57.10	<i>Edendale Town Centre</i>	549
57.11	<i>Northdale IRPTN Plan</i>	551
58.1	<i>Map of Ahmedabad BRT showing the route under study</i>	558
58.2	<i>Showing the different densities in each area of the buildings added after 2010 (Green for residential and red for commercial)</i>	559
58.3	<i>Showing the survey responses of residents living in Shivranjani and Akhbarnagar</i>	560
59.1	<i>Intervention sites in Alexandria Street</i>	565
59.2	<i>Intervention sites in Alexandria Street</i>	565
59.3	<i>Community participation in implementation of tactical interventions</i>	566
59.4	<i>Participant responses on their opinion on whether speeds have reduced post tactical interventions</i>	567
59.5	<i>Percentage of vehicular parking based on parking compliance/non-compliance/violations</i>	568
59.6	<i>Graphs showing participant profile</i>	569
59.7	<i>How people who drive/ride reacted to the tactical interventions</i>	570
61.1	<i>Character zones in Panampilly nagar</i>	581
61.2	<i>Aerial view of Panampilly nagar</i>	582
64.1	<i>Distribution of cases in each type of intervention</i>	604
64.2	<i>Summary of qualitative aspects of the reviewed case studies</i>	607
64.3	<i>Locating the case studies on the map of India</i>	608
64.4	<i>Case studies overlayed on a timeline to study the emerging trends</i>	608
67.1	<i>Vasant Kunj MIG Housing-3BHK and 2BHK Balcony extended on public land; Court covered</i>	634
67.2	<i>Original Ground Floor Plan Type 1 (3BHK Duplex and 2BHK) Vasant Kunj</i>	634
67.3	<i>Modified Ground Floor Plan Type 1 example 1 (3BHK Duplex and 2BHK) Vasant Kunj</i>	634
67.4	<i>Vasant Kunj MIG Housing-3BHK and 2BHK Extra Room Built Over Front Yard</i>	635
67.5	<i>Modified Ground Floor Plan Type 1 example 2 (3BHK Duplex and 2BHK) Vasant Kunj</i>	635
67.6	<i>Modified First Floor Plan Type 1 example 2 (3BHK Duplex and 2BHK) Vasant Kunj</i>	635
67.7	<i>Original GF layout 3BHK type 2 Vasant Kunj</i>	635
67.8	<i>Modified GF layout 3BHK type 2 Vasant Kunj</i>	636

67.9	<i>Vasant Kunj MIG Housing-3BHK and 2BHK Toilet, Extra Room on front Terrace</i>	636
67.10	<i>Modified Housing 3BHK type 2 Vasant Kunj Front Court Covered by Extra Room</i>	636
67.11	<i>Modified FF layout 3BHK type 2 Vasant Kunj</i>	636
67.12	<i>Modified SF layout 3BHK type 2 Vasant Kunj</i>	637
67.13	<i>Modified Elevation 3BHK type 2 Vasant Kunj Erection of Lift at Rear Entry</i>	637
67.14	<i>Modified Elevation 3BHK type 2 Vasant Kunj Front Courtyard Covered</i>	637
67.15	<i>Modified Elevation 2BHK type 1 Dwarka Lift Construction in Progress</i>	637
67.16	<i>Modified Elevation 2BHK type 1 Dwarka Front Court covered</i>	637
67.17	<i>Original GF layout 2BHK type 1 Dwarka</i>	638
67.18	<i>Modified GF layout 2BHK type 1 Dwarka</i>	638
67.19	<i>Modified Elevation 2BHK type 1 Dwarka Balcony included in Room, Extra room on Terrace</i>	638
67.20	<i>Survey Result 1</i>	638
67.21	<i>Survey Result 2</i>	639
68.1	<i>Urbanization trend in India</i>	642
68.2	<i>Urban Housing Shortage 2012</i>	643
68.3	<i>Housing demand and supply Mismatch</i>	643
68.4	<i>Factors affecting housing affordability</i>	644
68.5	<i>Disposable Surplus income as per income groups</i>	644
68.6	<i>Share of expenditure items in the poverty line basket as a percentage</i>	645
68.7	<i>Four verticals of PMAY (U)</i>	646
68.8	<i>Steps in Calculating Affordability Measure</i>	647
69.1	<i>The images of the housing pattern, farmhouse, and weekend home layout developed in the peripheral region of Vadodara</i>	652
69.2	<i>The image shows the arrangement of relative control and each stakeholder's interest in the peri-urbanization (Vasudeva, 2018)</i>	653



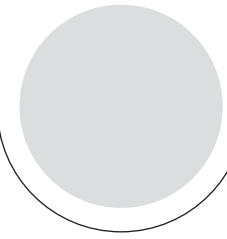
List of Tables

2.1	<i>Barriers faced in using Prefab Systems</i>	19
2.2	<i>Scope of Prefabrication in Future</i>	19
2.3	<i>Onus of Adoption of Prefabrication</i>	20
2.4	<i>Significance of Potentials as per individual Professions</i>	21
2.5	<i>Severity of Barriers as per individual Professions</i>	22
3.1	<i>Dimensional Values, Dimensional Values, Final Score and Final Rank of the Odishan Temples through the PSI Method</i>	31
4.1	<i>Relation between natural elements and built form</i>	44
5.1	<i>Template for Parametric Analysis with examples</i>	51
5.2	<i>Qualitative Analysis of Daily & Weekly Activities for Influence Assessment based on chronological frequencies</i>	52
5.3	<i>Qualitative Analysis of Monthly, Annual & Seasonal Activities for Influence Assessment based on chronological frequencies</i>	52
5.4	<i>Qualitative Analysis of Activities for Influence Assessment based on activity genre – LIVE</i>	53
5.5	<i>Qualitative Analysis of Activities for Influence Assessment based on activity genre – WORK</i>	53
5.6	<i>Qualitative Analysis of Activities for Influence Assessment based on activity genre – PLAY</i>	53
6.1	<i>Urban Transformation</i>	64
6.2	<i>Responsibility Matrix</i>	66
7.1	<i>Relationship between housing typology and family systems</i>	72
7.2	<i>Comparison between Apartments and Plot Housing as a Housing Typology</i>	73
8.1	<i>Percentage distribution of respondents by age groups</i>	78
8.2	<i>Percentage distribution of respondents by sex</i>	78
8.3	<i>Percentage distribution of respondents by marital status</i>	78
8.4	<i>Percentage distribution of respondents by education</i>	78
8.5	<i>Items related to Access indicators</i>	78
8.6	<i>Items related to social environmental features</i>	79
8.7	<i>Items related to physical environmental features</i>	79
8.8	<i>Items related to housing quality</i>	79
8.9	<i>Items related to public services</i>	79
8.10	<i>One-Sample Statistics</i>	80
8.11	<i>One-Sample Test</i>	80
8.12	<i>Model Summary</i>	80
8.13	<i>Coefficients</i>	81
8.14	<i>Correlations</i>	82
14.1	<i>Research Conduct</i>	130
14.2	<i>Parameters of the Study</i>	131

15.1	<i>Factors of thermal comfort and Architectural Parameters affecting thermal comfort</i>	138
15.2	<i>Input Values of Parameters and Output of the Simulation</i>	139
15.3	<i>Thermal Comfort Standards used as Framework for analysis</i>	140
15.4	<i>Comparative Analysis table of case studies of Vernacular Ladakhi Dwellings</i>	143
15.5	<i>Matrix of Constants and Variables to attain thermal comfort in dwelling of Cold desert of India</i>	144
17.1	<i>Parameters for Analysis</i>	160
17.2	<i>Parameters for Survey</i>	163
17.3	<i>Classification of Activities</i>	163
19.1	<i>Sources of Data</i>	180
19.2	<i>Land Use Change in Ayodhya City 2001 & 2020</i>	181
19.3	<i>Area Allocation for Planned Land Uses in Ayodhya City</i>	183
19.4	<i>Fund Allocation for Planned Facilities and Amenities</i>	186
23.1	<i>Number of Rooms in Homes for India & Delhi</i>	211
23.2	<i>Types of Settlements in Delhi, 2000</i>	212
23.3	<i>Land Use Distribution In Plotted Development Ghaziabad</i>	212
23.4	<i>Income Range per Month for India Across Ecoomic Classes</i>	215
23.5	<i>Maximum Home Loan per income group</i>	216
23.6	<i>Change in Land Value Over Thirty Years</i>	219
23.7	<i>Changing Percentage of Accommodation of Different Categories Over The Past Thirty Years</i>	219
24.1	<i>Characteristics of Incidental Spaces and their Significances based on Theoretical Analysis</i>	225
24.2	<i>Case Study 1 - Critical Characteristic Analysis</i>	228
24.3	<i>Case Study 1 - Activity Analysis throughout the day</i>	228
24.4	<i>Case Study 2 - Critical Characteristic Analysis</i>	229
24.5	<i>Case Study 2 - Activity Analysis throughout the day</i>	229
24.6	<i>Characteristics of Incidental Spaces and their Significances based on Case Study Analysis</i>	231
26.1	<i>PLOS for Footpaths</i>	248
26.2	<i>QOS for Footpaths</i>	250
26.3	<i>Symbol Specifications</i>	252
29.1	<i>Different housing programs</i>	270
30.1	<i>Parameters, Sub-parameters and their rating scale</i>	278
30.2	<i>Rating of Sites based on User Ratings</i>	278
30.3	<i>Ranking of Sub-parameters</i>	281
33.1	<i>URDPFI guidelines showing park categories</i>	309
35.1	<i>Reduction in temperature by using a passive technique</i>	322
35.2	<i>Inputs and Data value</i>	326
36.1	<i>Drainage Categorization in Corporation area</i>	337
38.1	<i>Framework for analyzing the case study</i>	368
39.1	<i>Attributes impacting performance of urban green spaces</i>	377
39.2	<i>Categories of the Parks based on an area in Ha</i>	377
40.1	<i>Buddhist Monastic Sites in Bengal</i>	386
40.2	<i>Categories of settlement patterns in Radha region</i>	390
41.1	<i>Impact Analysis of Proposed TP & DP-2035 plan</i>	400
42.1	<i>Climatic data (temperature in Celsius) of Kalamboli site and Panvel Site of April month, 2021</i>	409
42.2	<i>Climatic data (temperature in Celsius) of Kalamboli site and Panvel Site of May month, 2021</i>	410
42.3	<i>Comparative Analysis of Kalamboli site and Panvel Site</i>	411

43.1	<i>EPI calculation</i>	420
43.2	<i>Flow rate for Fixtures and fittings (GRIHA EB)</i>	422
43.3	<i>Water Efficiency Labelling Scheme (WELS)</i>	423
43.4	<i>Reusing water for various uses</i>	424
43.5	<i>Thermal performance of wall SP.41</i>	425
43.6	<i>Thermal performance of flat roof SP.41</i>	426
43.7	<i>Thermal Heat Gain according to the direction SP.41</i>	426
43.8	<i>Thermal Properties of Building _NBC</i>	427
43.9	<i>Heat Gain Factor Through Glass_SP.41</i>	427
43.10	<i>N.B.C._ Illumination level SP.41</i>	428
44.1	<i>Strength of selected site context</i>	438
44.2	<i>Weakness of selected site context</i>	438
44.3	<i>Opportunities for selected site context</i>	438
44.4	<i>Threats for selected site context</i>	438
44.5	<i>Impact analysis of government proposal of future development</i>	438
45.1	<i>Segments of Yamuna River (YAP II)</i>	444
46.1	<i>Inference for Settlement Pattern, Water Level & Topography</i>	454
46.2	<i>Inference for Orientation, Privacy Gradient, Spatial consideration, floor base, walls, joineries and roofing</i>	456
48.1	<i>Classification of Land use in Delhi</i>	474
48.2	<i>Delhi - Total Forest Cover</i>	474
48.3	<i>Weightage and Suitability Rank</i>	474
49.1	<i>Classification of Urban Settlements as per URDPFI guidelines</i>	479
49.2	<i>The built and land cover types as per the Local Climate Zone classification system proposed by Stewart and Oke</i>	480
49.3	<i>Selected Cities in Different Population Bands</i>	481
49.4	<i>Percentages of Built-up Area of 3-5 Lakh Population</i>	483
49.5	<i>Percentages of Built-up Area of 5-7.5 Lakh Population</i>	483
49.6	<i>Percentages of Built-up Area of 7.5-10 Lakh Population</i>	483
49.7	<i>Percentages of Built-up Area of 10-15 Lakh Population</i>	483
50.1	<i>Details of PNP</i>	486
50.2	<i>History of PNP</i>	487
50.3	<i>Infrastructure status of PNP</i>	488
52.1	<i>Phase wise job distribution</i>	503
52.2	<i>Project phases and their resources consumption</i>	504
52.3	<i>Typologies of revitalization related project and their involvement at each project phase</i>	505
52.4	<i>Models showing relation cost with project phase</i>	505
53.1	<i>Hybrid Urban Space Concepts</i>	508
53.2	<i>Urban Space Framework</i>	510
53.3	<i>Urban Space Framework</i>	510
53.4	<i>Urban Space Framework</i>	511
53.5	<i>Urban Space Framework</i>	511
55.1	<i>Evaluation of the Urban Environment characteristics</i>	525
55.2	<i>Rating of Overall Urban Environment characteristics</i>	526
55.3	<i>Ranking of Streets</i>	526
55.4	<i>Recommendations and Long-term strategies for planning</i>	527

57.1	<i>Differences in Land Use zones of the Edendale and Northdale Study Area</i>	547
57.2	<i>Proposed and Existing Projects: Edendale</i>	550
57.3	<i>Proposed and Existing Projects: Northdale</i>	551
59.1	<i>Spot speeds at six (6) stretches along Alexandria Street</i>	567
61.1	<i>Urban carrying capacity parameters</i>	579
61.2	<i>Ecological footprint analysis of Vancouver</i>	580
61.3	<i>Ecological footprint calculation</i>	582
61.4	<i>Shelter footprint analysis</i>	583
61.5	<i>Mobility footprint analysis</i>	583
61.6	<i>Food footprint analysis</i>	584
62.1	<i>Available Data on Military Settlements (2018)</i>	588
62.2	<i>Works Grant for the Military Engineering Services for Army</i>	591
62.3	<i>Expenditure on Maintenance and Operation of Services Installations in the Army</i>	592
64.1	<i>List of Case Studies Reviewed</i>	605
65.1	<i>Snapshot –JnNURM</i>	615
65.2	<i>Snapshot –BUSP; IHSDP</i>	615
65.3	<i>Roshni Act – Implementation</i>	620
65.4	<i>Roshni Act –Fiscal Snapshot</i>	620
68.1	<i>Methods of measuring housing affordability</i>	642
68.2	<i>Affordable Housing Initiatives in India</i>	643
68.3	<i>Housing Finance types</i>	646
68.4	<i>CLSS provisions for different income groups</i>	646



Preface

In the year 2008, the human population in the world became 50% urbanised (UNFPA, 2007). While there are global deviations in defining 'urban', the world is rapidly increasing in terms of the number of people living in cities as well as the overall number of cities. Urban areas have been the centres of power, religion, trade, art, and culture across human civilisations. Though scientific advancement and innovations have arguably led to improvements in the living standards of people, there still exist asymmetries in access to basic services and infrastructure. Owing to their size and density, cities are spaces where the current set of challenges get expressed in the most complex ways. Access to affordable housing and efficient transportation, clean water, healthy environment, safe public spaces are still out of reach for many, thereby posing a big challenge to the livability of cities. Further, this century also marked a shift in the now widely recognised impacts of global environmental change in enhancing threats to people and assets. Questions of resilience, ecological sustainability and resource efficiency have been brought to the core of the principles by which we design, develop and inhabit our planet. Cities are spaces where the current set of challenges get expressed in the most complex ways. Therefore, there is a need for academics and professionals from the field of planning, architecture and design to share emerging research and ideas for an informed discourse and decision making.

In order to deliberate upon some of these issues, the International Conference on Future is Urban (ICFU) was organised by the Institute of Architecture and Planning, Nirma University, Ahmedabad in collaboration with national and international partners. In view of the continuing and emerging challenges of both urban living and provisioning for the same, "Livability, Resilience and Resource Conservation" was the theme for the Conference. It was held virtually from 16 to 18 December, 2021, with experts and participants joining across international time zones.

The call for papers for the Conference had received more than 250 abstracts which were closely reviewed. Based on double blind review of papers conducted by a panel of experts and academicians from across the world, around 110 papers were approved for presentation. The papers were on topics cutting across geographical boundaries, both from India and other countries. Looking at the relevance of the topics and the high-quality empirical research under the themes, a few of the papers were shortlisted to undergo a separate editorial process towards an edited book volume, while other submitted papers meeting the standards of publication are being presented here as a compilation of the Conference Proceedings. The papers in the Conference Proceedings are as per the five following sub-themes:

- Space, Society and Culture
- Green and Blue Infrastructure
- Ecology, Environment and Climate Change
- Urban Planning and Design
- Housing Policies and Form

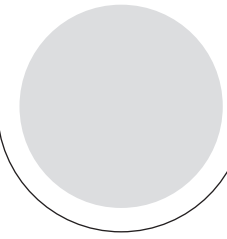
The **Space, Society and Culture** sub-thematic area included papers on topics as varied as vernacular architecture, regional identity of built form, public spaces, socio-cultural and ecological determinants of architecture, architectural and cultural heritage, urban morphology and neighbourhood, and studies on user perception of the built environment at various scales of the house, cluster, neighbourhood, and settlement. Under the sub-theme **Green and Blue Infrastructure**, the papers included subjects such as environmental management of urban areas, systems approach for infrastructure planning, landscape regeneration, public spaces and walkability, passive design techniques for thermal comfort, etc. The sub-thematic area **Ecology, Environment and Climate Change** also consisted of papers on wide ranging topics such as environmental impact assessment, development and tourism, impact of industrial development on ecology, land suitability analysis studies, urban morphological analysis, climate change adaptation and governance, microclimate studies, infrastructure and ecological sustainability, disaster

resilience, and urban green infrastructure. The sub-theme **Urban Planning and Design** contained papers on subjects such as urban metabolism and governance, resource planning in urban areas, pandemic and planning, circular healthcare, urban regeneration, urban morphology, urban-rural linkages, spatial transformation, public transport, mass transit, walkability and pedestrian-friendly streets, mixed use development, public spaces, and urban agriculture. The last thematic area **Housing Policies and Form** included papers on topics that ranged from new and old construction systems in the residential sector, post occupancy modifications in mass housing, peri-urban housing development, housing finance and affordability, building service life prediction model, and fire escape in the residential sector.

Due to the then prevailing pandemic situation, the conference was convened in the online mode; the details of the sessions may be referred to in the Programme Summary attached in the Appendix. The conference days commenced with a plenary session that included an inaugural address on the first day and keynote addresses on each of the subsequent days that highlighted the present and emerging discourse on design and planning of the urban spaces and urbanisation processes in different regions of the world. This compilation of papers also gives a brief account of these, apart from the papers presented. Selected papers are being brought out separately as an edited volume by the Routledge, Taylor and Francis group.

Reference:

UNFPA. State of World Population 2007: Unleashing the Potential of Urban Growth. United Nations Population Fund. 2007



Acknowledgements

With the emerging discourses on urbanisation, urban development, transformations taking place in the built environment, climate resilience and large urban programmes (such as Smart Cities Mission in the Indian context) have long been pointing towards creating a resilient urban future. The team at the Institute of Architecture and Planning at Nirma University (IAPNU) and the partner institutes had been discussing the possibility of hosting an international conference to bring together scholars from across the world. We are grateful to our sponsorship partners for facilitating this exchange of ideas, and the key ones among them are: Mr. Vijay Nehra, IAS, Secretary, Department of Science and Technology, Government of Gujarat and Mr. Narottam Sahoo, Advisor, Gujarat Council of Science and Technology (GUJCOST); Mr. Jayesh Hariyani, INI Design Studio; Mr. Umut Tuncer & Mr. Matthias Finger, Innovative Governance of Large Urban Systems (IGLUS) and Mr. Paresh Sharma, Institute of Town Planners India (ITPI). We are very grateful to Shri K. K. Patel, Vice President, Nirma University; Dr. Anup Singh, Director General, Nirma University and Shri G. R. Nair, Executive Registrar, for encouraging and supporting the Institute in this initiative. It is pertinent to also acknowledge publication partners of ICFU'21, the Routledge, Taylor and Francis group, for guiding the team from the very beginning to ensure rigour in the review process in order to have high quality proceedings as well as an edited volume of selected papers. Especially noteworthy are Shoma Chaudhury, Praveen Singh Dewal and Aafreen Ayub.

We would like to thank all our partners for their shared ownership and commitment towards making ICFU'21 a great success and also bringing on board their colleagues and friends. Especially notable among them are David Diamond, New York Institute of Technology (NYIT); Felipe de Noto and Eduardo Ferroni from Escola da Cidade; Laurent Lescop, ENSA Nantes; John Kiousopolous, University of West Attica; Shaleen Singhal, TERI University of Advanced Studies; Aurobindo Ogra, University of Johannesburg; Karl Zankl, University of Applied Sciences Wurzburg; Olivier Chamel, Florida Agricultural and Mechanical University; and Farah Al Altrash, German Jordanian University. The Conference has been enriched by the eloquent speeches and deliberations by leading scholars, academicians and experts from across the globe in the field of the built environment. We would like to express our deep appreciation for our keynote speakers: Julie Rudner, LaTrobe University; Thomas Verebes, NYIT; Meera Mehta, CEPT University; Chetan Vaidya, India; Jayesh Hariyani, INI Design Studio; Pablo Lorenzo-Eiroa, NYIT; Marta Moreira, Escola da Cidade; and Giovanni Santamaria, NYIT. In addition, we extend our heartfelt thanks to the esteemed paper reviewers and session chairs for raising the bar for the academic discourse and giving insightful comments during the review process and also during the presentations. Along with them, we would like to convey utmost gratitude to all the academicians and researchers who enthusiastically shared their research and ideas related to the built environment discourse by contributing papers and presentations in ICFU'21. Without them, we would not have witnessed such lively and relevant discussions on emerging areas in the associated discipline.

Further, we take this opportunity to thank our brilliant faculty, staff and student volunteers from the IAPNU especially Ankit, Jitendra, Prachi, Shweta, and Swati for taking the lead in organising the conference and Dhaval, Digisha, Foram, Jaydeep, Parag, Pratima, Purvi, Sneha, Vibha for coordinating and rapporteuring the panel discussions. We thank Jitesh and Sujan for fantastic visual communications, and Mansi for supporting extensively in coordination of the review process and database management. Also, we are grateful to the administrative staff of IAPNU: Bhadresh, Bharat, Dinesh, Gopal, Himani, Leena, Navin, Nisha, and Valji who assisted the ICFU'21 team. Special mention needs to be made of the assistance provided by the faculty and staff from the Institute of Technology, Nirma University. Our alumni and students were a great support during the preparatory stage and the various events. Noteworthy among them are Anoushka, Anushka, Devanshi, Nityashree, Rahul, and Vidushi.

Several people came forward and supported the endeavour and we sincerely apologise if we have inadvertently missed mentioning anyone. At the end, we would like to mention that having missed the real-time interaction with all our partners and participants during the ICFU'21, we look forward to the second round of ICFU which is hoped to be held in person.

The Advisory Committee

Mr. K K Patel - Vice President, Nirma University

Dr. Anup K Singh - Director General, Nirma University

Prof. Utpal Sharma - Director, Institute of Architecture and Planning, Nirma University

Dr. Laurent Lescop - Professor, Nantes' Superior School of Architecture (ENSA Nantes)

Prof. Matthias Finger - Emeritus Professor, Ecole Polytechnique Fédérale Lausanne (EPFL), Switzerland

Dr. John Kiousopoulos - Professor Emeritus, Development Works & Spatial Planning Division, School of Engineering, University of West Attica, Greece

Prof. David Diamond - Professor, Director of the Master of Architecture program, New York Institute of Technology

Dr. Kiran Shinde - Program Convener, Community Planning and Development, La Trobe University, Australia

Prof. Olivier Chamel - Assistant Professor, School of Architecture and Engineering Technology (SA+ET), Florida A&M University

Prof. Karl Zankl - Faculty of Architecture and Civil Engineering, University of Applied Sciences Würzburg-Schweinfurt, Germany

Mr. Jayesh Hariyani - Chairman & Managing Director, INI Design Studio

The Core Committee

Dr. Aparna - Associate Professor, Institute of Architecture and Planning, Nirma University

Jitendra Menghani - Associate Professor, Institute of Architecture and Planning, Nirma University

Prof. Ankit Kumar - Assistant Professor, Institute of Architecture and Planning, Nirma University

Dr. Swati Kothary - Assistant Professor, Institute of Architecture and Planning, Nirma University

Prof. Shweta Suhane - Assistant Professor, Institute of Architecture and Planning, Nirma University

Prof. Prachi Patel - Assistant Professor, Institute of Architecture and Planning, Nirma University

Prof. Sujan Umaraniya - Assistant Professor, Institute of Architecture and Planning, Nirma University

The Organizing Committee

Prof. Utpal Sharma - Director, Institute of Architecture and Planning, Nirma University

Dr. R. Parthasarathy - Director, Gujarat Institute of Development Research, Ahmedabad

Prof. Chetan Vaidya - Former Director, School of Planning and Architecture, New Delhi

Prof. Shaleen Singhal - Professor and Dean (Research and Partnerships), TERI School of Advanced Studies

Mr. Paresh Sharma - Former Chief Town Planner, Town Planning and Valuation Dept., Government of Gujarat

Dr. Meeta Goel - Head – Research and Publication, INI Design Studio, Ahmedabad, Gujarat, India

Prof. Jitendra Menghani - Associate Professor, Institute of Architecture and Planning, Nirma University

Prof. Shweta Suhane - Assistant Professor, Institute of Architecture and Planning, Nirma University

Prof. Prachi Patel - Assistant Professor, Institute of Architecture and Planning, Nirma University

The Technical Committee

Prof. Utpal Sharma - Director, Institute of Architecture and Planning, Nirma University

Dr. R. Parthasarathy - Director, Gujarat Institute of Development Research, Ahmedabad

Prof. Olivier Chamel - Assistant Professor, School of Architecture and Engineering Technology (SA+ET) , Florida A&M University

Prof. John Kiousopoulos - Director, Development Works & Spatial Planning Division, School of Engineering, University of West Attica, Greece

Dr. Kiran Shinde - Program Convener, Community Planning and Development, La Trobe University, Australia

Dr. Aparna - Associate Professor, Institute of Architecture and Planning, Nirma University

Dr. Laurent Lescop - Professor, Nantes' Superior School of Architecture (ENSA Nantes), France

Dr. Swati Kothary - Assistant Professor, Institute of Architecture and Planning, Nirma University

Prof. Aurobindo Ogra - Lecturer, Faculty of Engineering and the Built Environment, Department of Town and Regional Planning, University of Johannesburg

Dr. Felipe de Souza Noto - Coordinator, Conselho Técnico, Escola Da Cidade, Brazil

Prof. Roy F. Knight - Professor, School of Architecture and Engineering Technology, Florida A&M University

Dr. Mahsan Mohsenin - Assistant Professor, School of Architecture and Engineering Technology, Florida A&M University

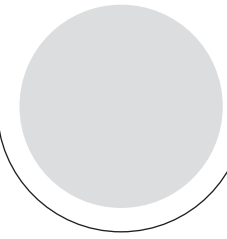
Dr. Meeta Goel - Head – Research and Publication, INI Design Studio, Ahmadabad, Gujarat, India

Dr.-Ing. Farah Al-Atrash - Head of the Architecture and Interior Architecture Department, School of Architecture and Built Environment, German Jordanian University

Prof. Luis Octavio de Faria e Silva - Professor, Faculty of Architecture and Urbanism, Escola da Cidade – São Paulo, Brazil

Prof. Marta Moreira - Professor, Design Department –School of Architecture, São Paulo, Brazil

Prof. Rita Bueno Buoro - Professor, School of Architecture, São Paulo, Brazil



Plenary Sessions

Inaugural Address

Anup K. Singh, Director-General, Nirma University

The theme of the conference is highly appropriate, considering that right after the hunter-gatherer days of humankind, cities such as Babylon, Alexandria, Athens, and Rome have evolved through civilisations. However, today, cities are getting overwhelmed with challenges of all kinds and need intervention on various fronts. With the current urban issues, as professionals, we must rise to the occasion to create cities that are socially responsible, environmentally conscious and digitally connected. Increased citizen participation and diligence is also desirable. Our cities must also provide sports, arts and cultural facilities to make them culturally prosperous. Best wishes are extended to the ICFU to address some of these challenges and deliberate upon future possibilities.

Welcome Address

Utpal Sharma, Dean & Director, Institute of Architecture and Planning, Nirma University

There is an urgent need to address various urban issues to plan and build better cities for the future. As the levels and nature of urbanisation vary across countries, the challenges of urbanisation and integration of the rural and the urban is to be handled differently as per the contextual requirement. If one observes closely, the ongoing pandemic of COVID-19 has been mostly an urban phenomenon, which highlights the need for better planning of appropriate densities to foster healthy cities. Compact city fabric has high density, reducing dependence on fossil fuels. A healthy balance between population density and provision of open spaces, amenities and utilities is required. Integrated planning is required to develop the unorganised urban areas and rural extensions of cities through attention to scales, identities and imageability, use of emerging technology and land suitability analysis for conservation spots and environmental planning.

Keynote Addresses

Planning, Pedagogy and Pandemics: A Plea for the Profession

Julie Rudner, Campus Director, La Trobe University - Bendigo

COVID-19 brought to the fore various issues related to human settlements such as food insecurity, inadequate housing, educational disadvantage, insecure employment, uneven access to nature, patch communication and the fracturing of the social structure. While key positions in pandemic management teams were held by those having a medical background, economists and others, a dearth of planners at the centre of the action was alarming, as many aspects of the pandemic had a spatial element. A comparison between planning education in Australia and India highlights that the former has higher per capita land and there is no limit in intake capacity for planning schools, unlike in India. Also, while Australia has more planners as compared to India, the latter has more registered planners. There is generally poor knowledge about the field, and therefore, there is a need to demystify planning by involving citizens and building local leadership.

Urban Complexity: Paradigms, Projects and Platforms

Tom Verebes, Professor, New York Institute of Technology (NYIT)

Since more than a century, thinkers have been bringing to our notice the rapidly changing means of human interaction and lifestyle, requiring each generation to review the way their living environment needs to evolve. Thus, there arrived and went by theories on different paradigms and urban-“isms”, parametric urbanism being one of them. Through this, the complexity of a city can be ordered logically with the help of different parameters that one can focus on, such as *Adaptive City*, *Customised City*, *Smart City* and *Intelligent Urbanism*. Parametric urbanism could use artificial intelligence to identify and model a city for desired planning outcomes. If one takes the example of the Hong Kong real estate model to understand the current and potential land values through parametric software, it shows that each parcel of land in the city is extruded to the maximum potential for economic gain; areas of land have been reclaimed and existing towers are being replaced by taller towers. A drone shot of the city shows the ways in which intelligence is already embedded in cities.

This is the Urban Century: Making Cities Inclusive, Climate Resilient & Sustainable

Meera Mehta, Professor Emeritus, CEPT University

By 2050, more Indians will live in cities than in villages. We are left with just nine years to achieve Sustainable Development Goals (SDGs) that cover issues such as climate resilience, gender transformation and inclusion, new forms of financing and the use of digital technologies. SDG 6.2 deals with the elimination of open defecation, and the programme Swachh Bharat Mission is working towards this goal in India. Sanitation should be treated as a public service as it generates widespread public benefits and needs performance evaluation systems for meeting targets. Toronto was the first city to apply Environmental, Social and Governance (ESG) assessment, creating a performance report and it is now in the process of raising green bonds. The Performance Assessment System (PAS) is an example of the application of ESG assessments to improve urban water supply and sanitation in India. There are successful models for sanitation systems such as in Sinnar, Maharashtra, and new forms of financing such as outcome-based funding and development impact bonds in India which attract impact investment.

Urban Ranking Indices as Means of Governance

Chetan Vaidya, Former Director, School of Planning and Architecture (SPA)

Urban ranking is now a global phenomenon and there are many urban indices in India, the first being Ease of Doing Business—a country-level index promoted by the World Bank as part of their Doing Business report. The Ease of Living Index (EoLI) measures the quality of life and has 13 categories ranging from education to city resilience. The citizen perception survey (CPS) accounts for 30% of the weightage. The Municipal Performance Index (MPI) assesses the performance of Indian municipalities across 20 varied sectors ranging from education to participation. The *Swachh Survekshan* in India assesses service level performance in the cities regarding cleanliness and sanitation. The Climate Smart City Assessment Framework (CSAF) assesses the climate situation and the roadmap for the cities for mitigation and adaptation. Such rankings foster healthy competition among cities to improve living conditions. Urban ranking indices may be used as tools of good governance and serve as a verified database on the status of infrastructure. However, there are too many ranking indices with overlapping parameters, while economic and inclusivity issues are insufficiently addressed.

Design & Planning Driven by Ethos of Sustainability & Spirituality

Jayesh Hariyani, Architect-Planner, INI Design Studio

A framework has been developed over decades of association at the INI Studio culminating in the ideals of spirituality and sustainability, making way for the process of seeking and bringing a deep sense of awareness, aliveness and interconnectedness. The INI studio has been able to use this framework across different scales of projects across geographical regions. One of the examples is the Rajkot Smart City Proposal prepared by the INI Design Studio which had greenfield development wherein apart from the conventional existing situation analysis for planning, there was citizen engagement too. Further, across different planning projects, there is an attempt to integrate blue and green infrastructure.

Urbanism of Information through AI Simulation

Pablo Lorenzo, Professor, New York Institute of Technology (NYIT)

The relationship between data and algorithms has changed wherein algorithms are less complex today except in the case of artificial intelligence. There is a need for the discipline to engage with forensic architecture and data science. As ecological crises arise, a way of understanding our environment is through systems of regulations. Big Data and other information-based systems allow manipulation of information flow in real time and provide various intervention solutions such as in the case of managing energy flows. This raises the question of whether we can look at space not as a shape but as a binary. The focus between urbanism and ecological systems brings about different types of agency and opportunity. Ecological systems are non-deterministic in themselves and simulation and site-based computation may help understand the complexity of relationships between environment and built environment. The example of the recently conducted academic studio project called “Morphology of the River” at NYIT showed the complex geometry and dynamic system of the river-basin model to create predictive models and optimisation of delivery systems of zoning for streets, social housing, traffic movement, etc. with latent ecological systems.

SESC 24 de Maio, MMBB Architects

Marta Moreira, Architect and Educator, University of Sao Paulo

Sao Paulo is a “modern city” that originated in the 20th century and is a major economic centre of Brazil at present. A majority of the buildings from the 20th century either no longer exist or are out of original use. The project SESC 24 de Maio done by MMBB Architects presented in the Conference is an example of urban heritage transformation. It was designed in collaboration with the architect Paulo Mendes da Rocha. It is now a modern “mixed use” building complex of recreational facilities and services for the public such as theatre, gallery, library, swimming pool, etc. An elevated road transforms into a public (pedestrian) node on weekends when it is closed for traffic. Different levels and functional spaces get appropriated by people in a different manner—an attribute that makes architecture. The process of urban transformation must take cues from the changing customs and ways of life observed in the city.

Mutating Landscapes and Integrated Design Strategies

Giovanni Santamaria, Architect & Educator, New York Institute of Technology (NYIT)

It is important that the natural environment be integrated with the cultural environment. There are different types of landscapes based on different aspects—spatial, biological, cultural, perceptual-aesthetic, historic-geographic, and ecological-natural. In a “landscape”, land equals form and scape depicts the image. Now, processes and dynamics are being re-defined and there are new ways to decode them. Comprehending the system of injustice, related dynamics and the process of experimentation and representation of such phenomena are generally not considered part of a designer’s work. However, there is a need to discuss the socio-political state in terms of indigenous territories and demographics and the anthropological landscape. Instead of the utopia of form, we need to explore heterotopic processes, interconnectedness of landscape urbanism and regional metabolism for resilience in the future.

