PRAYAGRAJ
SMART CITY

PRAYAGRAJ

SMART CITY, SMART FUTURE

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A bird's-eye view of the 30ft-tall
Maharshi Bhardwaj statue
outside Bhardwaj Park

PRAYAGRAJ
SMART CITY

Smart City
MISSION TRANSFORM-NATION

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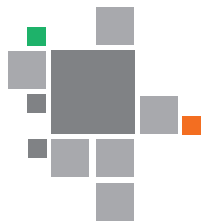
Kumbh Mela (the festival of the sacred Pitcher) is the largest peaceful congregation of pilgrims on earth, during which participants bathe or take a dip in a sacred river. Devotees believe that by bathing in the Ganges, one is freed from sins, liberating her/him from the cycle of birth and death. Millions of people reach the place without any invitation. The congregation includes ascetics, saints, sadhus, aspirants-*kalpavasis* and visitors. The festival is held at Allahabad, Haridwar, Ujjain and Nasik every four years by rotation and is attended by millions of people irrespective of caste, creed or gender. Its primary bearers, however, belong to akhadas and ashrams, religious organizations, or are individuals living on alms. Kumbh Mela plays a central spiritual role in the country, exerting a mesmeric influence on ordinary Indians. The event encapsulates the science of astronomy, astrology, spirituality, ritualistic traditions, and social and cultural customs and practices, making it extremely rich in knowledge. As it is held in four different cities in India, it involves different social and cultural activities, making this a culturally diverse festival. Knowledge and skills related to the tradition are transmitted through ancient religious manuscripts, oral traditions, historical travelogues and texts produced by eminent historians. However, the teacher-student relationship of the sadhus in the ashrams and akhadas remains the most important method of imparting and safeguarding knowledge and skills relating to Kumbh Mela.

Inscribed in 2017 (12.COM) on the Representative List
of the Intangible Cultural Heritage of Humanity

United Nation
Educational, Scientific and
Cultural Organization

Intangible
Cultural
Heritage

Hon'ble Prime Minister of India Shri Narendra Modi at 'Divya Kumbh–Bhavya Kumbh' selfie point during Kumbh 2019

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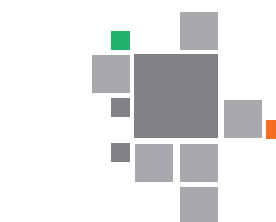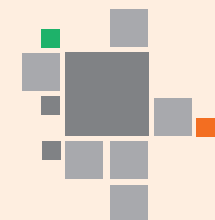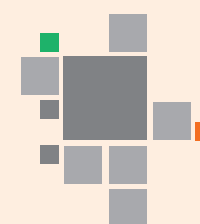In order to make this divine city more attractive and modern, projects worth over ₹4,000 crore have been launched, ranging from upgradation of railway stations and airport terminals to cleanliness of the city and River Ganges. I congratulate the people of Prayagraj for all these facilities.

The government has given special attention to connectivity and infrastructural development for Kumbh. Whether it is rail, road or air connectivity or improvement in roads, our endeavour has been to strengthen every mode of travel leading to Prayagraj. The Railway Ministry has scheduled many new trains. Long flyovers, railway overbridges (RoBs) and underpasses, besides several projects related to electricity and drinking water, will improve the city's infrastructure and connectivity. A new terminal in Prayagraj Airport has also been built in the record time of one year. It will connect this city to many others across India. I congratulate the people of Prayagraj for this new terminal as well.

Unlike earlier, the facilities are permanent and will exist even after Kumbh is over. The Integrated Command and Control Centre (ICCC), developed at the cost of ₹100 crore, is a symbol of the amalgamation of modernity and mythology in Prayagraj. It is to be an important centre since every facility, ranging from roads to electricity and water, will be operated from here.

We are making all efforts to ensure that people go back with memories and experiences of spiritualism, faith and modernity. Selfie points have been developed as centres of attraction. The government is also working at a fast pace to clean Ma Ganga. Of the several projects worth thousands of crores that have been inaugurated, many include cleaning of the Ganga and beautification of the ghats. Nearly a dozen drains will be prevented from being discharged directly into the Ganga with the help of sewerage treatment plants, set up at a cost of over ₹1,700 crore. Simultaneously, about 150 ghats are being beautified under the Namami Gange Mission, of which work on fifty ghats is already complete. Six out of these fifty ghats have also been opened for the public today. This is being done in every city situated on the banks of the Ganga. Under the Namami Gange project, so far, projects worth more than ₹24,000 crore have been sanctioned and about 75 projects with a cost of ₹5,000 crore have already been completed. Work on 150 other projects worth thousands of crores is under process.

– HON'BLE PRIME MINISTER SHRI NARENDRA MODI during the inauguration of
Kumbh Mela development projects on 16 December 2018

Hon'ble Prime Minister Shri Narendra Modi
inside Integrated Command and Control
Centre's Viewing Centre during Kumbh 2019

> Prayagraj has developed greatly and amenities have been augmented for an enhanced pilgrim experience – all under the guidance of the Hon'ble Prime Minister. The Kumbh in Prayagraj in 2019 will always be known for its magnificence. For the very first time, the Kumbh Mela's area has been expanded from 1,700 hectares to 3,200 hectares, infrastructure in Prayagraj has been developed and through the Paint My City campaign, the city is also wearing a new look.

– YOGI ADITYANATH, HON'BLE CHIEF MINISTER OF UTTAR PRADESH, during Hon'ble Prime Minister Shri Narendra Modi's visit to inaugurate Kumbh Mela development projects on 16 December 2018

Hon'ble Chief Minister of Uttar Pradesh Yogi Adityanath with members of Team Kumbh during an inspection at Prayagraj

Police personnel sitting in the war room inside ICCC

SMART CITY
SHOWCASING TOMORROW

The concept of a 'Smart City' varies from country to country and from city to city – there is no universally accepted definition for it. Everything relies upon the level of development, readiness to change and reform, and the resources and aspirations of the people developing it. Hence, a Smart City would have a different connotation in India from that in Africa, North America, Europe or any other place in the world. In fact, even in India, its definition varies as the resources, readiness and aspirations of those involved in its development varies.

Hence, urban planners target building the entire urban ecosystem to provide for the aspirations and needs of the society in a Smart City. The urban ecosystem is represented by the different pillars of comprehensive development and includes institutional, physical, social and economic infrastructural development. This 360-degree development is a long-term goal, and so cities work towards developing such comprehensive infrastructure gradually.

The target of the Smart City Mission is to promote urban communities that provide core infrastructure, a clean and sustainable environment and application of 'smart' solutions. The focus is on sustainable and inclusive development. The idea is to look at compact areas and create a replicable model that will act as a template for other aspiring cities. The Smart City concept integrates Information and Communication Technology (ICT) and is intended to set models that can be duplicated both inside and outside the Smart City, catalysing the creation of similar Smart Cities in various regions and parts of the country.

The purpose of the Smart Cities Mission is to drive economic growth

and improve the quality of citizens' lives by enabling local area development and utilizing technology for 'smart outcomes'. Area-based Development (ABD) will transform (retrofit and redevelop) existing areas, including slums, into better planned communities, thereby improving the liveability of the whole city. New areas (greenfield) will be developed around cities to accommodate the expanding population in urban areas.

The use of Smart Solutions will empower urban communities to utilize innovation, data and information to improve infrastructure and services. Comprehensive development in this way will improve the quality of life, create employment and upgrade earnings for all, particularly the poor and the deprived, leading to greater inclusivity in cities. Core infrastructural elements include adequate water supply, assured electricity supply, sanitation (including solid waste management), efficient urban mobility and public transport, affordable housing (especially for the poor), robust IT connectivity and digitalization, good governance (especially e-governance and citizen participation), sustainable environment, safety and security of citizens (particularly women, children and the elderly) and health and education.

To make all this happen, a number of Smart City solutions have been implemented. These include E-governance and Citizen Services (this will deal with public information and grievance redressal, electronic service delivery, citizen engagement and video crime monitoring), Waste Management (which will include generating energy in the form of electricity and/or heat from the primary treatment of waste, or the processing of waste into a fuel source, converting fuel waste to compost and recycling and reduction of C&D waste), Water Management (this will include

implementation of smart meters for water management, leakage identification, preventive maintenance and water quality monitoring), Energy Management (under which smart meters will be implemented, renewable sources of energy will be developed, energy efficiency will be improved and green buildings will be developed), Urban Mobility (under which smart parking, intelligent traffic management and integrated multi-module transportation system will be developed), and Telemedicine (with an emphasis on telemedicine and tele-education and development of incubation/trade facilitation centres and skill development centres).

A municipal crew carrying out camera installation in Prayagraj. A number of cameras were installed at various strategic locations to enhance security and surveillance in the city

Hon'ble Prime Minister Shri Narendra Modi, along with Hon'ble Governor of Uttar Pradesh Shri Ram Naik, Hon'ble Chief Minister of Uttar Pradesh Yogi Adityanath and Shri Mahendra Pandey, President, BJP Uttar Pradesh unit, inaugurating the Integrated Command and Control Centre
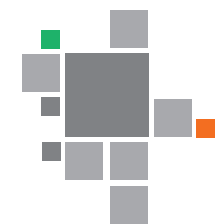
SMART CITY FEATURES

1 Promoting mixed land use in ABD – Planning for 'unplanned areas' containing a range of compatible activities and land uses close to one another to make land use more efficient. The state will enable some flexibility in land use and building by-laws to adapt to change.

2 Housing and inclusivity – Develop housing opportunities for all.

3 Creating walkable localities – Reduce congestion, air pollution and resource depletion, boost local economy, promote interactions and ensure security. The road network is created or refurbished not only for vehicles and public transport, but also for pedestrians and cyclists, and necessary administrative services are offered within walking or cycling distance.

4 Preserving and developing open spaces – Maintaining and creating parks, playgrounds and recreational spaces to enhance the quality of citizens' lives, reduce urban heat effects and generally promote eco-balance.

5 Promoting a variety of transport options – Transit Oriented Development (TOD), public transport and last mile para-transport connectivity.

6 Making governance citizen-friendly and cost-effective – Increasing availability and efficiency of online services to bring about accountability and transparency, especially using mobiles to reduce cost of services and providing services without necessitating visits to municipal offices; form e-groups to obtain citizens' feedback and use online monitoring of programmes and activities with the aid of cyber tours of worksites.

7 Giving an identity to the city – Based on its main economic activity, such as local cuisine, health, education, arts and crafts, culture, sports goods, furniture, hosiery, textile, dairy, etc.

8 Applying Smart Solutions to infrastructure and services in ABD – For example, making areas less vulnerable to disasters, using fewer resources, and providing cheaper services.

SMART SOLUTIONS

E-Governance and Citizen Services
- Public Information, Grievance Redressal
- Electronic Service Delivery
- Citizen Engagement
- Citizen – City's Eyes and Ears
- Video Crime Monitoring

Energy Management
- Smart Meters and Management
- Renewable Sources of Energy
- Energy Efficient and Green Buildings

Waste Management
- Waste to Energy and Fuel
- Waste to Compost
- Waste Water to be Treated
- Recycling and Reduction of C&D Waste

Urban Mobility
- Smart Parking
- Intelligent Traffic Management
- Integrated Multi-model Transport

Water Management
- Smart Meters and Management
- Leakage Identification and Maintenance
- Water Quality Monitoring

Others
- Telemedicine and Tele-education
- Incubation/Trade Facilitation Centres
- Skill Development Centres

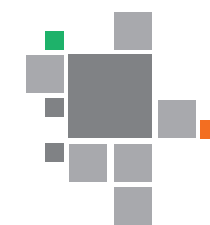In April 2017, the state government presented publicly its vision of transforming Kumbh 2019 into 'Divya Kumbh–Bhavya Kumbh', and the metamorphosis of Prayagraj began in earnest soon after that. Soon afterwards, the selection of Prayagraj under the Government of India's Smart City Mission – in its third round in June 2017 – served to further stoke the government's ambition. The administration decided that besides quantum improvement in the Mela works, it would prioritize permanent infrastructural development of the city and aim to meet all the Smart City parameters.

A number of ideas were proposed with enthusiasm, even though no one knew exactly what needed to be done at that stage to transform Prayagraj into a technologically advanced city that would also meet the administration's ambitions for the Kumbh Mela. Comprehensive, 360-

Hon'ble Chief Minister Yogi Adityanath presided over the first Kumbh meeting in April 2017 at Lucknow

PLANNING STEP-BY-STEP

degree development of the city was envisaged and the local administration was asked to prepare an action plan.

Among several other Smart City initiatives considered was the use of Information Communication Technology (ICT)-based solutions. This included setting up an Integrated Command and Control Centre (ICCC) not only for managing the city operations, but also for the Kumbh Mela. ICCC was envisaged as a one-stop solution for various challenges, including real-time monitoring and management of the city's security, traffic and other utilities.

There was strategic phase-wise selection of systems/components for ICCC, based on the immediate requirements of Kumbh Mela 2019 and Prayagraj Smart City (works under both these projects were being conducted simultaneously and October 2018 was set as the deadline for all the Kumbh Mela work). To expedite the work, the state government

formed three committees: one under the guidance of the Urban Development Minister for overall supervision, the second under the guidance of the Chief Secretary for review and sanction of all projects, and the third under the guidance of the Divisional Commissioner for execution and review of projects.

The Hon'ble Chief Minister of Uttar Pradesh Yogi Adityanath was of the firm opinion that the primary goal of the event would be to enhance the pilgrims' experience during the Kumbh Mela. Hence, technological solutions under the Smart City Mission were emphasized, besides permanent development of major roads connecting Prayagraj, and construction of road overbridges (RoBs) and road underbridges (RuBs). The initial list of projects underwent several changes before a final decision was taken on those roads and areas that required maximum intervention and where RoBs and RuBs needed to be built immediately. Blueprints were prepared of how and what needed to be done. Online Project Monitoring and Information System (PMIS) and Third Party Inspection Agency (TPIA) were introduced to ensure completion of projects within the stipulated time frame and ensure quality.

The Request for Proposal (RFP) for the Smart City project was released through a transparent competitive bidding process and the Master Service Agreement with the selected Master Systems Integrator (MSI) was signed in August 2018. With a total project cost of ₹246.62 crore, the entire ICCC project was divided into two phases, considering the impending Kumbh Mela 2019.

While Phase 1 of the ICCC project covered the Kumbh Mela area and the city area for monitoring and assisting the pilgrims, Phase 2 of the ICCC operations covered a wide range of citizen services. Phase 1 of the project was operational within 5 months to meet Kumbh Mela requirements.

Components for Phase 1 and Phase 2 included CCTV Surveillance System (to support police operations and maintain law and order while helping to deter, detect and thus deal with criminal activities), Intelligent Traffic Management System (to improve traffic efficiency and decrease the travel time by reducing vehicle congestion through optimized signalling), Solid Waste Management (with an aim to keep the Kumbh and Prayagraj city area clean and hygienic), Crowd Management

Divisional Commissioner, Prayagraj, Dr Ashish Kumar Goel in one of his inspection rounds

Hon'ble Chief Minister Yogi Adityanath along with Hon'ble Deputy Chief Minister Shri Keshav Prasad Maurya and Hon'ble Minister for Health Shri Siddharth Nath Singh during inspection visit

System (to analyse the crowd density during the Kumbh Mela), Transit Management System (for convenient public transportation services for the passengers and citizens of Prayagraj Smart City), Smart Urban Solutions (to cover city operations from a single-window monitoring perspective, like Smart Parking for MLCP), Advanced Video Analytics with the Artificial Intelligence System (for Solid Waste Management, Traffic Management and Citizens Safety – planned for Phase 2), and Data Centre (capable of recording and storing video feeds for 15 days during the Kumbh Mela and 30 days after the Kumbh Mela).

Former Chief Secretary of Uttar Pradesh Shri Rajiv Kumar inspecting Smart City works during his visit to Prayagraj

PRAYAGRAJ SMART CITY ABD AREA

COMPONENTS OF AREA-BASED DEVELOPMENT

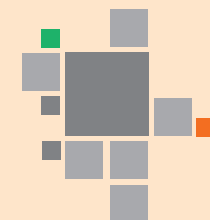The strategic components of Area-based Development (ABD) in the Smart Cities Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (greenfield development), plus a pan-city initiative in which Smart Solutions are applied, covering larger parts of the city.

Retrofitting will introduce planning in an existing built-up area to achieve Smart City and other objectives to make the area more liveable. An area of more than 500 acres will be identified by the city in consultation with citizens for retrofitting. Depending on the existing infrastructural services in the identified area and the vision of the residents, the city will prepare a strategy to make it 'smart'. Since existing structures are to remain largely intact in this model, it is expected that more intensive infrastructural service levels and a large number of smart applications will be packed into the retrofitted Smart City. This strategy may also be completed quickly, leading to its replication in another part of the city.

Redevelopment will effect a replacement of the existing built-up environment and enable co-creation of a new layout with enhanced infrastructure using mixed land use and increased density. Redevelopment envisages an area of more than 50 acres, identified by Urban Local Bodies (ULBs) in consultation with citizens. For instance, a new layout plan of the identified area will be prepared with mixed land use, higher FSI and high ground coverage.

Greenfield development will introduce most Smart Solutions in a vacant area (more than 250 acres) using innovative planning, planned financing and planned implementation tools (like land pooling and land reconstitution) with the provision of affordable housing, especially for the poor. Greenfield developments are required around cities to address the needs of the expanding population. Unlike retrofitting and redevelopment, greenfield developments could be located either within the limits of the ULB or within the limits of the local Urban Development Authority (UDA).

Pan-city development envisages application of select Smart Solutions to the existing city-wide infrastructure. Application of Smart Solutions will involve the use of technology, information and data to make infrastructure and services better. For example, applying Smart Solutions in the transport sector (like in an intelligent traffic management system) and reducing average commute time or cost to citizens will have positive effects on citizens' productivity and quality of life. Another example is waste water recycling and smart metering, which can make a substantial contribution to better water management in the city.

The Smart City proposal for each shortlisted city is expected to encapsulate either a retrofitting or a redevelopment or a greenfield development model, or a mix of all three, and a pan-city feature with Smart Solution(s). Pan-city is an additional feature – since the Smart City Mission takes a compact area approach, it is necessary that all the residents feel there is something in it for them too. Therefore, the scheme necessitates some (at least one) city-wide Smart Solution to make it inclusive.

LIST OF PARTICIPATING DEPARTMENTS

PRAYAGRAJ MELA AUTHORITY	PRAYAGRAJ DEVELOPMENT AUTHORITY	DISTRICT ADMINISTRATION	MUNICIPAL CORPORATION
UP STATE BRIDGE CORPORATION LTD.	UTTAR PRADESH POLICE	PUBLIC WORKS DEPARTMENT	UTTAR PRADESH POWER CORPORATION LTD.
UTTAR PRADESH HEALTH DEPARTMENT	UTTAR PRADESH IRRIGATION DEPARTMENT	UTTAR PRADESH STATE ROAD TRANSPORT CORPORATION	UTTAR PRADESH JAL NIGAM LTD.

GUIDING PRINCIPLES

STRAIGHTENING AND WIDENING OF ROADS	DEVELOPMENT OF ROBS AND RUBS	DEVELOPMENT OF TRAFFIC JUNCTIONS	DEVELOPMENT OF PARKS AND GREEN BELT
SOLID WASTE MANAGEMENT	COMMUNITY TOILETS	AMPLE WATER SUPPLY	INTEGRATED COMMAND AND CONTROL CENTRE
BEAUTIFICATION OF THE CITY	ELECTRIFICATION OF ROADS	TOURIST WALKS	UP WATER BOARD

A bird's-eye view of a crossing in Prayagraj after road widening work

FORMING SPECIAL PURPOSE VEHICLE

The implementation of the Mission at the city level will be done by a Special Purpose Vehicle (SPV), a subsidiary incorporated under the Companies Act, 2013, at the city level, in which the state and the Urban Local Bodies (ULB) will be the promoters, with 50:50 equity shareholding. The SPV will plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart City development projects. Each Smart City will have an SPV which will be headed by a full-time CEO and have nominees of the Central government, state government and ULBs on its board. The states/ULBs will be required to ensure that (a) a dedicated and substantial revenue stream is made available to the SPV to make it self-sustainable, so that it can evolve its own credit worthiness to raise additional resources from the market, and (b) government contribution to the Smart City is used only to create infrastructure that has public benefit outcomes. The execution of projects might be done through joint ventures, subsidiaries, Public Private Partnerships (PPP) and turnkey contracts, suitably dovetailed with revenue streams.

Funds provided by the Government of India in the Smart Cities Mission to the SPV will be in the form of tied grant and kept in a separate Grant Fund. These funds will be utilized only for the purposes for which the grants have been given and will be subject to the conditions laid down by the Ministry of Urban Development (MoUD). Complete flexibility is provided to the SPV to implement and manage the Smart City project. The SPV will appoint Project Management Consultants (PMC) for designing, developing, managing and implementing area-based projects.

FINANCING OF SMART CITIES

The Smart City Mission will operate as a Centrally Sponsored Scheme (CSS). The Central government has proposed to give financial support to the extent of ₹48,000 crore over 5 years (₹100 crore per city per year on an average) to the Mission. An equal amount, on a matching basis, would have to be contributed by the state/ULB; therefore, nearly ₹1 lakh crore of government/ULB funds will be available for Smart City's development. The project cost of each Smart City proposal will vary depending upon the level of ambition, model and capacity to execute and repay.
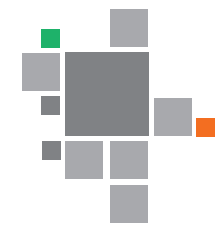
Hon'ble Chief Minister Yogi Adityanath along with Hon'ble Deputy Chief Minister Shri Keshav Prasad Maurya and Hon'ble Minister for Health Shri Siddharth Nath Singh during an inspection

Hon'ble Minister for Urban Development Shri Suresh Khanna taking a review meeting of Smart City works in Prayagraj

Divisional Commissioner, Prayagraj, Dr Ashish Kumar Goel inspecting Smart City works along with other officials
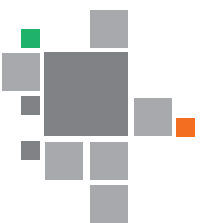
Former Chief Secretary Dr Anup Chandra Pandey and DGP Shri OP Singh during an inspection at Prayagraj

Hon'ble Minister for Urban Development Shri Suresh Khanna doing spot inspection along with other Cabinet ministers and officials
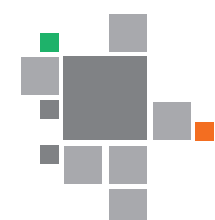
(Left) Hon'ble Chief Minister of Uttar Pradesh Yogi Adityanath performing an inspection of the city with Hon'ble Deputy Chief Minister of Uttar Pradesh Shri Keshav Prasad Maurya; Hon'ble Minister for Stamp, Court Fees and Civil Aviation Shri Nand Gopal Nandi; and other senior officials. The CM travelled to Prayagraj and performed late-night inspections often to ensure that all the infrastructural development work was completed on time. (Above) The CM accompanied by Shri Keshav Prasad Maurya

PROJECTS
UNDER PHASE 1

1. Smart Road 1: Lakshmi Talkies Junction to Mazar T-junction
2. Smart Road 2: Shivramdas Gulati Marg (Maharana Pratap Junction to Manmohan Park)
3. Smart Road 3: (Muir Road Part I, Manmohan Park Junction to Anand Hospital Junction)
4. Smart Road 4: Muir Road Part II (Anand Hospital Chauraha to Traffic Chauraha)
5. Smart Road 5: Kutchery Road (Maharana Pratap Junction to Anand Hospital Junction)
6. Smart Road 6: Elgin Road — GPO Chauraha to KN Road
7. Smart Road 7: Sardar Patel Road — Nawab Yusuf Road to Thornhill Road
8. Day Parking and Night Market (Maharana Pratap to Dhobi Ghat Jn.)
9. Construction of various bus shelters in Prayagraj
10. Night Market (Kamla Nehru Road, Phase 1)
11. Open-air Gym (Phase 1)
12. Development of Smart Public Toilets
13. Integrated Command and Control Centre (ICCC)
14. Pan-city Storm Water Drainage master plan (DPR preparation only)
15. Water Supply (24/7) for Zone II and Zone III (concept)

A view of SP Marg, the first road where uniform colour decoration was undertaken during Kumbh Mela 2019
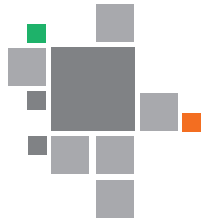
PROJECTS
UNDER PHASE 2

1. Smart Road 7: SP Road Extension — Vivekanand Chauraha to UPSRTC Workshop — Out of ABD — 500m
2. Smart Road 9: Sarojini Naidu Road — Nawab Yusuf Road Crossing to Muir Road Crossing — Partially out of ABD area — 2,040m
3. Smart Road 10: Dr Lohia Road — Nawab Yusuf Road Crossing to Muir Road Crossing — Partially out of ABD area — 2,000m
4. Smart Road 11: Clive Road — Nawab Yusuf Road Crossing to PD Tandon Road — 960m
5. Smart Road 12: Stretchy Road — Nawab Yusuf Road Crossing to PD Tandon Road Crossing — 1,100m
6. Smart Road 13: Cooper Road — Nawab Yusuf Road Crossing to Thornhill Road Crossing — 1,350m
7. Smart Road 15: Tashkent Road — Polo Ground Crossing to Kamla Nehru Road Crossing — Partially out of ABD area — 2,060m
8. Smart Road 16: Tez Bahadur Sapru Marg — PD Tandon Road Crossing to Kasturba Gandhi Road Crossing — 700m
9. Smart Road 18: Kamla Nehru Road Part 1 — Hindu Hostel Chauraha to Manmohan Park Crossing — 450m
10. Smart Road 21: Shobnath Singh Road — University Road Crossing to Lakshmi Talkies Crossing — 480m
11. Smart Road 22: Katra Road Part 1 — Kutchery Road to Jawaharlal Nehru Road — 780m
12. Smart Road 23: Kamla Nehru Road Part 2 — Manmohan Park Crossing to Lakshmi Talkies Junction — 780m
13. Smart Road 24: Katra Road Part 2 — University Road — Manmohan Park Crossing to Shobnath Singh Road Crossing — 900m
14. Smart Road 37: Hashimpur Road — Balson Chauraha to Church Lane Road Junction — 760m
15. Smart Road 31: Mumfordganj Road — Kutchery Road to Subhash Nagar Road — 1,300m
16A. Smart Road 33: Babu Bindeshwari Road — Stanley Road Crossing to Master Zehrul Hassan Road passing Fawara Chauraha — 950m
16B. Smart Road 32: Subhash Nagar Road — Stanley Road Crossing to Master Zehrul Hassan Road, passing from Abkari office — 980m
16C. Smart Road 25: Mission Road (Stanley Road Crossing to Kutchery Road Crossing adjacent to DM office) — 500m
17. Tagore Town Road — Balson Chauraha to Yashlok Hospital — out of ABD area
18. Underground parking at DM Office
19. Open-air Gym (Phase 2 — 200 units)
20. Development of parks (6 units)
21. Procurement of 300 CNG buses
22. 3D painting on walls and roads
23. Branding signage (Hollywood-style free-standing) near Boat Club/Naini Bridge
24. Plantation plan/green cover on smart roads entire ABD area — to be executed by PDA
25. Smart Parking for Civil Lines area
26. Signage on Smart Roads in ABD area
27. Upgradation of schools with digital education facilities

Apart from widening work, focus on improving aesthetics was also given in most of the recently restored roads. A wide view of a recently developed road

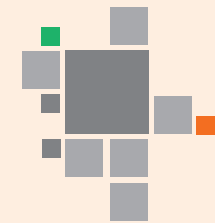To ensure that all the infrastructural development work was completed on time, meetings of officials from all departments, chaired by Divisional Commissioner, Prayagraj, Dr Ashish Goel were organized regularly

THE BEGINNING

DR ASHISH KUMAR GOEL, IAS, Divisional Commissioner, Prayagraj, and Chairman, Prayagraj Smart City Ltd.

Organizing Kumbh Mela is an arduous task because its sheer magnitude, complexity and sensitivity make it the most challenging assignment to deliver public management goals. In April 2017, when the government entrusted me with the task to conceptualize, plan and execute Kumbh 2019, by posting me as Divisional Commissioner, Prayagraj, and the nodal officer (in-charge), I was completely overwhelmed to be at the helm of such an important mission. At that juncture, Prayagraj was not shortlisted under the Government of India's Smart City Mission and the prime focus was to make the state government's vision of transforming Kumbh 2019 into 'Divya Kumbh–Bhavya Kumbh' a reality.

However, when the city was selected in the third round of Smart City selection process in June 2017, the news simply increased the state government's ambition. It reached a consensus that besides quantum improvement in the Mela works, permanent infrastructural development of the city, keeping all the Smart City parameters in mind, was vital. While everyone had a basic idea that Smart City primarily focuses on sustainable and inclusive development, there was not much clarity on what precisely was required to be done to make the city's infrastructure smart, which could also be beneficial for the Kumbh Mela.

Moreover, by that time, many of the Kumbh Mela projects were already identified. So we thought if we waited to get more clarity on Smart City work before commencing Kumbh Mela works, it would be too late. Back then, we were pressed for time as the state government had already set October 2018 as deadline for completing all Mela work. So we resolved not to wait for the Smart City details to unfold and proceeded with the infrastructural development work already identified. However, despite not having much clarity about Smart City projects, we endeavoured to ameliorate city infrastructure in a way that it reflected the philosophical congruence of Kumbh Mela and Smart City components. We took into account infrastructural development funds of Prayagraj Development Authority, Prayagraj Nagar Nigam, and the budget provided for the Kumbh Mela along with other departmental funds.

DETERMINING THE ROADMAP

The strategic components of Area-based Development (ABD) in the Smart City Mission are city improvement
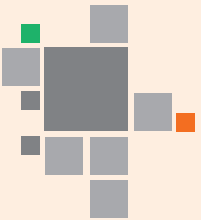
(retrofitting), city renewal (redevelopment) and city extension (greenfield development). Additionally, there is a Pan-city initiative in which Smart Solutions are applied covering larger parts of the city. Hence, the initial aim was to design a module for ABD and then replicate it.

After the shortlisting of Prayagraj under the Smart City Mission, Special Purpose Vehicle (SPV), a company to fulfil its objectives, was formed in August 2017 to execute all the work. The process of selecting the Project Management Consultant (PMC) commenced thereafter and a consortium of Aarvee Associates and PwC was selected as consultant in November 2017. Since an ICT-based solution to manage the city as well as Kumbh Mela operations was required to be developed, bids to take Master System Integrator (MSI) on board, which could develop an Integrated Command and Control Centre (ICCC), were invited in April 2018. Eventually, 5 companies qualified for technical presentation. As the timeline was very crucial, the entire selection process was completed in less than 45 days. On 1 June, a Letter of Intent (LOI) was issued following a transparent and competitive bidding process and Larsen & Tubro Limited came aboard as the MSI.

When the MSI was selected barely 6 months were left for the Kumbh Mela to commence. ICCC's conceptualization was the biggest challenge at that juncture as it was a totally new venture with no precedence. However, with focus on eliminating traffic jams, ease of mobility, effective parking management and other components of 360-degree development, 8 projects were made part of it after due deliberations. These included Surveillance, Integrated Traffic Management System (ITMS), Solid Waste Management (SWM), AI-based Crowd Management System, Data Centre, Network Infrastructure, Command and Control Centre, and Viewing Centre. Since all these projects were integrated into one command centre, it was called Integrated Command and Control Centre or ICCC.

At that time, there was also a need of a security and surveillance system from the Kumbh Mela perspective. Hence, developing a full-fledged ICCC just for the city area would have required the administration to hire additional infrastructure for the Mela – an added expenditure. Therefore, to save on the additional hardware and software cost, it was resolved that ICCC project should be divided into two parts: the first dedicated to the Kumbh Mela (where ICCC's hardware and Smart Solutions could be used in the Mela area) and the second to the city (after the Mela was over). Eventually, the projects were divided in two phases and with a total project cost of ₹246.62 crore, ICCC's work started.

In Phase 1, only those projects were resolved to be taken which could be completed before the Kumbh Mela. These included development of 8 Smart Roads (covered widening, straightening and beautification), parks, community toilets, and over 60 traffic junctions with aesthetically designed murals, expansion of green belt, SWM, augmentation of clean drinking water supply networks, lighting of roads, and overall beautification of the city, besides development of ICCC.

The 8 Smart Roads developed under Phase 1 included Lakshmi Talkies Junction to Mazar T-Junction, Shivramdas Gulati Marg (Maharana Pratap Junction to Manmohan Park), Muir Road Part I (Manmohan Park Junction to Anand Hospital Junction), Muir Road Part II (Anand Hospital Crossing to Traffic Crossing), Kutchery Road (Maharana Pratap Junction to Anand Hospital Junction), Elgin Road (GPO Crossing to KN Road), Sardar Patel Road (Nawab Yusuf Road to Thornhill Road) and Maharana Pratap Crossing to Dhobi Ghat Junction (day parking and night market).

In the second phase of development, over 20 roads are being developed and made pedestrian-friendly. More space for parking, vending zones and greenery will be created. Landscape design elements such as ground corner hedges and trees are being used to beautify road edges. The list includes: SP Road Extension–Vivekanand Crossing to UPSRTC Workshop; Sarojini Naidu Road–Nawab Yusuf Road Crossing to Muir Road Crossing; Dr Lohia Road–Nawab Yusuf Road Crossing to Muir Road Crossing; Clive Road–Nawab Yusuf

Road Crossing to PD Tandon Road; Stretchy Road–Nawab Yusuf Road Crossing to PD Tandon Road Crossing; Cooper Road–Nawab Yusuf Road Crossing to Thornhill Road Crossing; Tashkent Road–Polo Ground Crossing to Kamla Nehru Road Crossing; and Tez Bahadur Sapru Marg–PD Tandon Road Crossing to Kasturba Gandhi Road Crossing.

As many as 29 parks, including Chandra Shekhar Azad Park, Sumitranandan Pant Park, PD Tandon Park, Khusro Bagh, Triveni Pushp and Yamuna Bank Road have already been developed by the Prayagraj Development Authority and Nagar Nigam. Attractions at the Chandra Shekhar Azad Park, for instance, include a gym, a guava orchard and a Titli Park for children. A 2,000sq.m garden of seasonal flowers and a flower exhibition area spread across 3,600sq.m has also been set up. Flowerpots – 32,000 earthen and 2,500 cement ones – were placed along the roads. Besides, a lake forest around 150 acres at Kanihar is also being developed.

Altogether, more than 700 projects worth ₹4,300 crore (which comprised funds of Kumbh Mela, Smart City and other departments including Municipal Corporation and PDA) – entailing multi-stakeholder management and highest degree of project management skills – were executed during Kumbh Mela 2019. Prayagraj city witnessed a sweeping transformation. Substantial encroachments were removed, roads and traffic intersections were expanded, traffic was eliminated, and the city was given a facelift by following the model of Sustainable Development. Permanent infrastructural development included construction of 9 flyovers and railway overbridges, 6 railway underbridges, widening and strengthening of 140 roads, beautification of parks as well as the improvement of 60 traffic junctions along with aesthetically designed murals, upgradation of the public transport system, railway stations, foot overbridges, skywalks, and development of a new civil airport terminal. Prayagraj Development Authority roped in Urban Mass Transit Company (UMTC), a pioneer in the field of urban transport, which is under the Ministry of Urban Development, for redesigning traffic junctions.

EMPLOYING ICCC FOR SECURITY AND SURVEILLANCE

While Phase 1 of ICCC covered the Kumbh Mela area (along with the city area relevant from the Kumbh Mela's perspective) for monitoring and assisting the pilgrims, Phase 2 of ICCC operations is covering a wide range of citizen services. It is also providing technological solutions to a number of administrative departments. For surveillance and support system, over 1,100 CCTV cameras at strategic locations have been installed.

ICCC helps in managing Intelligent Traffic Signals, Variable Message Signboards and Adaptive Traffic Control System and during Kumbh 2019 it facilitated monitoring of the entire Mela area as well as the city. Two Viewing Centres, the Kumbh Mela Integrated Command and Control Centre (Kumbh Mela-ICCC), established in the Kumbh Mela area, and the Modern Control Room Command and Control Centre (MCR-CCC), established at Police Lines, Prayagraj, were used for that purpose.

Use of Video Analytics-based Crowd Management System to measure crowd density (that helped in averting stampede), was another big task which the experts sitting at these command and control centres were entrusted with. The experts of Motilal Nehru National Institute of Technology (MNNIT) were engaged to execute this video-analytics mechanism. Besides, an MOU was also signed between MNNIT and Kumbh Mela Police to generate crowd-density alerts periodically at different strategic locations and bathing ghats to flag emergency.

Three teams of 20 police personnel each were set up for each Viewing Centre. Hence, altogether 120 police personnel were trained (60 for each centre, with 20 working at a given time in 8-hour shifts). A corridor-wise segregation of the Mela area, which was linked to 13 Police Radio telecommunication grids, was also done. Each personnel entrusted with the task to sit in the control room was taken for a field visit first to understand the place he/she was
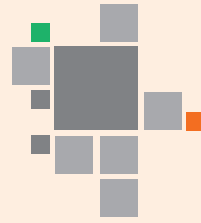
monitoring. Besides, a war room, which had representatives from each department and was linked to an emergency radio grid, was also developed to expedite the communication process. Continuous monitoring of the entire city and the Mela area was done using 4 extra Viewing Centres to make the whole area a foolproof security zone.

Geo-mapping of the entire Mela area was also done and coordinates of most places were available on Google Maps. This initiative also assisted police response vehicles (PRVs) during emergencies and turned out to be extremely advantageous. UP Dial 100 was integrated with the Mela Helpline No. 1920, to create alerts and a 30-seater 24x7 call centre was also run for the entire Mela period to assist the pilgrims in the best way possible. Over 30 people were trained for (8-hour shift each) for this purpose. This initiative particularly yielded considerable result as the call centre was successful in troubleshooting about 3 lakh queries during the entire Mela period.

SANITATION – WHEN AMBITION MET REALITY

The city witnessed the maximum number of floating population during the Kumbh Mela. The additional burden of this population posed major sanitation challenges during that period. Hence, the Nagar Nigam had prepared an extensive City Sanitation Plan to address these challenges with an objective to provide better pilgrim experience. Deployment of over 3,000 additional street sweepers and adequate Municipal Solid Waste (MSW) carrying vehicles for 80 wards of the city was the first initiative in that direction. Round-the-clock monitoring of street sweepers, GPS tracking of solid-waste vehicles, regulation and enforcement for bulk waste generators and ensuring that the garbage was collected, transported and treated at the Solid Waste Plant at Baswar were some other initiatives. Identification of OD hotspots and deployment of mobile community toilets, deployment of 20,000 dustbins and 100-plus *safai karmis* at hotspots were also done to keep the city clean. Apart from these, special focus was given to strategic locations such as temples, railway stations and bus stands for solid-waste collection and deployment of mobile toilets. A budget of ₹13 crore was apportioned for Information Education and Communication (IEC) and creating behavioural change activities around waste management.

Maintaining sanitation and hygiene in the entire 3,300 hectares of the Kumbh Mela area and the city of Prayagraj was another gigantic task. Hence, from the very beginning, the Kumbh Mela team was extremely cautious about the two challenges before us: making the Kumbh Mela open-defecation-free, and formulating a robust SWM plan. Hence, sanitation facilities were meticulously designed, using contemporary technological tools and with due consideration to all the distinct components of these challenges, which included discarding liquid waste from toilets to treatment facilities, solid waste to waste treatment plants at the disposal site, and drainage management to ensure river water quality.

New techniques regarding SWM procedures, which prevented the solid waste from contacting the ground during transportation, were adopted. Automated and manual street sweeping, garbage transfer from tipper to compactor and consequently to disposal and treatment site were done in a seamless way. Strong waste disposal chain started with trash bins, tailored for the Mela, installed at a distance of 50m all along the Mela roads, in vending areas, inside camps, near ghats, and in circulation areas of the Mela. Every trash bin had a liner bag, which ensured smooth collection of garbage and transfer to tipper vehicles, with least possibility of overflow or spillage.

A total of 1,22,500 toilets, including 20,000 urinals were deployed in Kumbh Mela with special focus on sludge management. Besides, nearly 20,000 garbage bins, 120 tipper vans, 40 compactors, 36 lakh liner bags and river trash skimmers were also deployed on-site for SWM. Supervision and monitoring of sanitation efforts was done by health department officials and 'Swachhagrahis' through a mobile app, linked to a control room, which made the entire task of toilet maintenance and cleanliness very transparent, effective and real-time, making this Kumbh open-defecation-free, garbage-free and odour-free.

PAINT MY CITY – CITY AS A CANVAS

The notion to enhance the splendour of this mystical city by aesthetically painting the city walls and showcasing the numinous significance of the Kumbh Mela through the hues of mythology, sprouted in September 2017. As the entire city was splattered with posters and different kinds of wall writings with a tilt towards negativity, all of which didn't quite give a positive impression, a 'Paint My City' campaign was conceived to crowd out defacement and unattractiveness from the city landscape.

Since a large number of travellers were anticipated during Kumbh 2019, an aesthetic ambience, featuring the mythological, cultural and historical significance of Prayagraj would have accentuated their experience. Also, since there was a general tendency of the crowd to defile the walls during their sojourn, running such a campaign would have served many purposes. Other than mirroring the soul of the Kumbh Mela, the campaign would have also precluded people from besmirching walls and would have motivated them to maintain cleanliness.
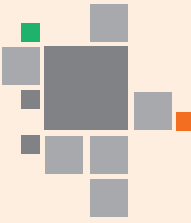
As the campaign was being run at Mela Administration's behest, it was extremely cautious about the subject that these canvases reflected. We had to ensure that the designs on the city canvases were not insensitive of people's sentiments and mirrored an ambience of celebration. Finally, themes highlighting India's intangible cultural heritage, mythology of Kumbh, architecture, eminent personalities, and modern art were approved for depiction. The canvases for these paintings included public building walls, railway underpasses, flyovers, water tankers, bus stops, railway stations and coaches, public transport vehicles, metal shutters and foot overbridges, to exemplify a few. A total of 20 lakh sq. ft of city area was painted under this campaign.

TESTIMONIALS

Kumbh 2019 also saw great participation of international and national political leaders. The Prime Minister of Mauritius, who visited along with his wife; the President of India; the Vice President of India; the Chief Justice of India; and scores of other senior political leaders all commented positively about its magnificence and management with special approbation for its robust sanitation and security architecture.

The Prime Minister of India visited Kumbh Mela twice. First on 16 December 2018 – a month before the formal inauguration of the Mela – to launch projects undertaken for Prayagraj's metamorphosis and oversee the Kumbh Mela preparations. During this visit, he also inaugurated the ICCC. His second visit was on 24 February 2019, for a special 'Swachh Kumbh' event in which he not only felicitated 'Swachhta Karmyogis' and 'Swachhagrahis', but also applauded the successful sanitation initiatives undertaken by the Kumbh Mela team. Notably, in many of his speeches in India as well as abroad, he referenced Kumbh Mela as a model of commendable public management, particularly with respect to sanitation, security, probity, and transparency.

None of this would have been possible without the continuous and inspirational support of the state government lead by the Hon'ble Chief Minister, who gave the Mela team liberty to identify and execute the best possible projects sans budget constraints. His review meetings, periodic inspection visits to Prayagraj, which often extended till late nights, and boundless energy kept the entire Mela team motivated. His guiding force turned out to be the biggest enabler in making Kumbh 2019 a commendable model of human endeavour.

In December 2019, UNESCO recognized the Kumbh Mela as part of the 'intangible heritage of humanity'. This announcement boosted morale and further enthused the incumbent state government, which had already endeavoured to transform Prayagraj into a world-class city. Though work under the Smart City Mission and the Kumbh Mela project were being handled separately, Prayagraj witnessed enormous permanent infrastructural development and beautification. This included the construction of 9 RoBs and 6 RuBs, widening of 140 roads, beautification of several parks and placement of aesthetically designed murals at over 60 traffic junctions. The upgradation of the public transport system – railway stations, footbridges, skywalks, underpasses, development of a new civil airport terminal – were also part of this overall development. To enhance user experience and make this mega fair a memorable one, the

A view of a recently developed traffic junction in the heart of the city

THE GUIDING
PRINCIPLES

administration arranged 500 shuttle buses, 1,000 e-rickshaws, and 95 parking lots, including 18 lots developed as Satellite Towns (special parking zone) with a capacity for over 5 lakh vehicles.

Under the Paint My City campaign, over 20 lakh sq. ft of city and Mela area infrastructure was painted to enhance the aesthetic look of the city. Public accommodation for 20,000 pilgrims, dedicated vending zones (including night markets), 7 convention halls for thousands of cultural programmes, development of creative villages, installation of over 1,22,500 toilets (in Mela area) with ICT-based monitoring system for ensuring timely cleanliness, efficient on-site septage and odour management along with cesspool operations, digital lost and found centres integrated with social media and LED screens to reunite lost persons, were some of the other measures that played an important role in enhancing the

pilgrim experience this time and were an integral part of Kumbh Mela works.

Given the humongous challenge of managing over 200 million people, the administration took a number of other innovative technology initiatives, including Smart Solutions under the Smart City Mission, to cater to Kumbh Mela requirements. This included providing technological solutions to the various administrative departments, ensuring foolproof security, development of a state-of-the-art ICCC in a span of just 5 months for better surveillance and support (it included installation of 1,103 CCTV cameras at 268 strategic locations for real-time alerts). Video Analytics-based Crowd Management System to measure crowd density (used for the first time to prevent stampedes), Intelligent Traffic Signals, Variable Message Signboards and Adaptive Traffic Control System deployed for effective traffic management, were also part of this initiative.

A bird's-eye view of the recently constructed High Court Flyover

1 THE METAMORPHOSIS

In light of the fact that millions of pilgrims were expected to visit the city within a span of 49 days, elaborate preparations were done to enhance pilgrim experience. Since both Kumbh Mela works and Smart City works were being executed simultaneously, a large number of projects were completed. Over 700 projects involving over 25 departments were concluded. Since it would have been difficult to ensure manually that all these projects were completed in time, a PMIS portal was designed for the first time to prevent time and cost overruns and create a comprehensive database. Under PMIS, each project was divided into activities and sub-activities. The course of events and month-to-month targets were chosen and their advancement tracked against defined targets on a week-by-week basis. A Program Evaluation Review Technique (PERT) chart – a project management tool used to schedule, organize, and coordinate tasks – was used for real-time monitoring.

As a number of projects were running simultaneously, the administration performed post-audit of running bills and pre-audit of final bills to monitor and report on the quality of works executed. For this, a full-fledged dedicated laboratory for testing of various civil and mechanical materials was commissioned and an office was established. To facilitate adequate and timely monitoring of activities, a multi-layered hierarchy was formed so that quality checks could be conducted at regular intervals. Mobile testing vans were stationed at sites and, sometimes, experts even worked night shifts to meet project timelines.

Quality training was conducted regularly for all concerned stakeholders, including departments like PWD and contractors, in order to set out delivery expectations as per applicable IS codes and standards. To keep pace with deliverables, the bar was raised by conducting site visits late in the evening and at night. There were several implementing agencies and contractors executing hundreds of tasks simultaneously, and so it involved considerable planning and dedication to complete the task on time.
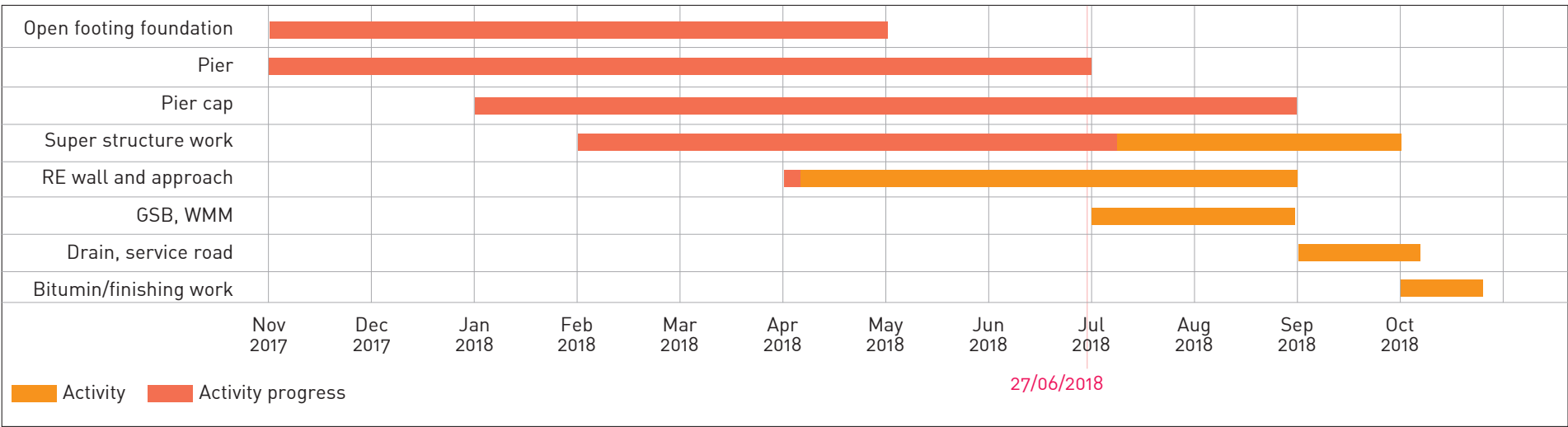
A bird's-eye view of Prayagraj city

Reports by Weekly Review — Smart City — ABC

S.No.	Work ID	Name of Work	Source of Funding	Approved Amount of Project Work	Available Amount Expended Amount	Estimated as per Pert chart for current month	Actual as on Date	Total No. Of Activities planned	Target Activities which should have been started	Actual Activities which are actually in progress or completed	Target Monthly Milestone which should have been completed	Actual Milestones Completed	Work CompletedALLNoYes	Last Update	Date of Last Third Party/Audit Inspection	Remarks
1	SCAB_001	Smart Road -1:Lakshmi Talkies Jn to Mazar T-Jn	Smart City	1575.00	1575.00 1575.00	100%	90%	21	21	17	21	17	No	25-11-2019	NA	Work Under Progress
2	SCAB_002	Smart Road2-Shivram Das Gulati Mark-Maharana Jn	Smart City	958.00	958.00 958.00	100%	100%	20	20	20	20	20	Yes	25-11-2019	NA	Work Completed
3	SCAB_003	Smart Road 3:Muir Road Part 1,Manmohan Park Jn	Smart City	290.00	290.00 290.00	100%	100%	8	8	8	8	8	Yes	25-11-2019	NA	Work Completed
4	SCAB_004	Smart Road4:Muir Road 2,Ananad Hopital Chauraraha	Smart City	621.00	518.00 454.00	100%	100%	21	21	20	21	20	Yes	25-11-2019	NA	Work Completed
5	SCAB_005	Smart Road 5 - (Kutchary Road, Maharana Pratap Jun	Smart City	903.00	903.00 903.00	100%	97%	21	21	21	21	21	Yes	25-11-2019	NA	Work In Progress
6	SCAB_006	Smart Road6:Elgin Road,GPO Chauraha to Amar Sahid	Smart City	2551.00	2551.00 2551.00	100%	90%	17	17	17	17	17	No	25-11-2019	NA	Work In Progress
7	SCAB_007	Smart Road 7:Sardar Patel Road	Smart City	2628.00	2628.00 2628.00	100%	98%	21	21	18	21	18	Yes	25-11-2019	NA	Work Completed

ROB — Pani ki Tanki

	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	Jun 2018	Jul 2018	Aug 2018	Sep 2018	Oct 2018
Open footing foundation												
Pier												
Pier cap												
Super structure work												
RE wall and approach												
GSB, WMM												
Drain, service road												
Bitumin/finishing work												

27/06/2018

Activity   Activity progress

2 GREENING THE ECOSYSTEM

Expanding the city's green belt was a significant initiative that would add to Prayagraj's beauty. In that direction, some of the major tasks were increasing greenery on MG Marg and Varanasi Marg, and planting 10,000 trees and 16,000 saplings in various parts of the city. Twenty-nine existing parks were also supplemented with amenities such as benches, lights, toilets, nurseries and gyms. While the Prayagraj Development Authority spent over ₹20 crore for development of 12 parks, Nagar Nigam spent over ₹4 crore for development of the remaining 17. Apart from this, 63 roads were beautified with 115 high mast lights and 5,000 LED lights.

A view of one of the parks in the city—a number of parks were beautified under the Smart City Mission

A bird's-eye view of roads widened under the Smart City project and how these looked after the completion of the development work

3 ENHANCING THE AESTHETICS

Taking inspiration from numerous international tourist destinations which are ranked high on the global tourism map, a campaign was undertaken to paint the entire city of Prayagraj in various hues that reflected the theme and spirit of Kumbh Mela. All the major roads leading to the Kumbh Mela and some of the city's prominent buildings were shortlisted as canvases of the Paint My City campaign. This ensured that the paintings on these public canvases reflected the festive mood and nothing negative was on display. Over 20 lakh sq. ft of infrastructure was painted under this campaign. Most of the art was related to the Kumbh Mela and was intended to educate pilgrims about the history and origin of this mega event.
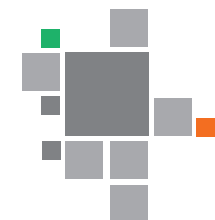

An artist painting one of the city walls under the Paint My City campaign

A recently developed traffic junction with artwork near CMP Degree College

4 SAFEGUARDING THE CITY

The scope of the ICCC included Intelligent Traffic Management System (ITMS), communication systems at bus shelters, environment sensors, Smart Parking systems and data centres, video analytics for crowd management and headcount mapping. ICCC was developed in two phases. While Phase 1 was dedicated primarily to the Kumbh Mela and intended to provide better surveillance and support, Phase 2 will cover a wide range of citizen services. About 1,103 CCTV cameras were deployed at 268 strategic locations for real-time alerts and a Video Analytics-based Crowd Management System was implemented to measure crowd density and prevent stampedes. Intelligent Traffic Signals, Variable Message Signboards and an Adaptive Traffic Control System, deployed for effective traffic management, are some other support functions that the ICCC provides.

(Left) Inside view of ICCC's Viewing Centre at Sangam;
(Below) Cameras installed at various crossings
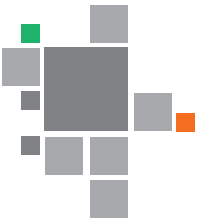
5 IMPROVING SANITATION

A campaign was launched to clean the city's chronically dirty pockets and spots, and compactors were used to remove dirt and garbage in the most effective and efficient manner. Eight hook loaders, 253 special bin lifters, 33 port stations, 75 compactors, 1,180 dustbins and 370 tippers were deployed to clean the Mela area as well as the city. Prayagraj was divided into 5 zones to ensure an efficient sewage system and in all these zones, sewer lines, sewage pumping stations and sewage treatment plants were established. Of the 5 zones, sewage work in Zones F, G and Jhunsi was conducted under the Public Private Partnership (PPP) model. Moreover, for work in all these 5 zones, 575 sewer lines, 32,530 home connections and 13 sewage pumping stations were installed at a cost of ₹2,400 crore.

A number of tippers and compactors were bought by Prayagraj Nagar Nigam to keep the entire city clean. A bird's-eye view of the place where these vehicles were parked

Photographs of the processing unit where solid waste is processed in Prayagraj

6 HEALTH AND RECREATION

By definition, recreational spaces are open spaces that provide opportunities for passive recreational activities such as walking, sitting and general relaxing. The main types of informal recreational spaces are botanical gardens, parklands, playgrounds and linear open spaces. Prayagraj Smart City Limited, under the Smart City Mission of the Government of India, has planned a number of recreational spaces which will take shape in the near future. The list includes development of nearly 200 open-air gyms, 8–10 parks and 2 amphitheatres. Time spent in recreational space offers a reprieve from the urban environment. These spaces generate social and economic benefit for the urban community.

An open-air gym in Bhardwaj Park. Open-air gyms have been developed in various parks under the Smart City Mission

A prototype of an aeroplane was installed in Chandra Shekhar Azad Park. It has become a centre of attraction and a popular selfie point

The decision to transform Prayagraj into a technologically advanced modern city was guided by the protocols of the Smart City Mission guidelines. However, the challenge then was to identify permanent infrastructure projects which would also be advantageous to Kumbh Mela 2019. Keeping all this in mind, recces and surveys were performed and projects shortlisted.

In the course of planning, it was also felt that since hundreds of projects, worth thousands of crores and involving over 25 government departments,

THE METAMORPHOSIS

would have to be executed simultaneously, there was a need for an advanced, computerized Project Monitoring and Information System (PMIS) to complete the work on time. An external agency was also required to perform unbiased inspection to guarantee proper execution of projects and prevent time and cost overruns. Hence, both PMIS and Third Party Inspection Agency (TPIA) were used in these projects.

These were some basic strategies the government was using. However, after the UNESCO recognized the Kumbh Mela as part of the 'intangible cultural heritage of humanity', the perspective and confidence of everyone associated with the mega project changed. Enthusiasm grew palpably, but the magnitude of the work also grew by leaps and bounds.

Once the master plan was finalized, several mammoth projects were launched and the city of Prayagraj began to witness a veritable metamorphosis. Substantial encroachments were removed, road and traffic intersections were expanded, traffic bottlenecks eliminated, and the city was given a facelift following the model of sustainable development.

Nine flyovers and 6 underbridges were developed in a period of less than a year (for which the usual time required is 3-4 years), including the broadening and beautification of all roads that led to the Sangam. Undoubtedly, the administration faced serious space constraints while developing RoBs, but with each stakeholder contributing in the best possible manner, most of the work was finished in less than a year. RuBs were developed within 1–3 months and in order to permanently solve traffic issues, most roads were broadened up to 30m.
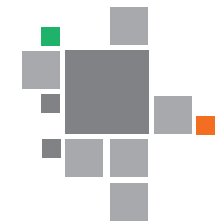
The estimated cost of 9 RoBs was ₹501.89 crore, while nearly ₹298.35 crore were spent on strengthening and widening 34 roads and redesigning, refurbishing and beautification work at over 60 traffic junctions. For this, the Prayagraj Development Authority took inputs from citizens and consulted the Urban Mass Transit Company (UMTC) report, a detailed document which defined the parameters around which development work was required to be done for transforming this holy city into a Smart City. The Development Authority played a major role in all the development work and approximately ₹150 crore were spent from its own kitty, besides the money allocated for Kumbh Mela 2019.

Other significant work included upgradation of 9 railway stations, construction of a new terminal at the Prayagraj Civil Airport,

One of the recently developed traffic junctions in Prayagraj that has been beautified with abstract art

construction and covering of drains, development of pathways and green belts, shifting of electric lines and services, installation of dividers and electrification of roads with LED lights – all completed in record time. Special care was also taken while constructing footpaths – these were made adequately broad, and attention was paid to every detail under the Smart Water Drainage System. Areas with rainwater drainage problems were first identified, after which measures were taken to permanently solve the concern. Capping of open drains was also undertaken. All drainage lines were constructed at the ends of roads, keeping in mind the possibility of future encroachment.

Some important buildings situated on prominent roads were identified and arrangements of facade lighting were made. Landscaping was also planned for Yamuna Bank, MG Road and Jhunsi and over 5,000 flowerpots with unique combinations of flowers and plants were used to beautify prominent locations for the Mela period and beyond.

Aesthetically designed artwork on various themes was placed in over 60 traffic roundabouts and major roads were developed in uniform

It took a lot of hard work to give the desired look and feel to the city roads. The photograph on the facing page shows the work in progress while the above photograph shows the result of that hard work in the form of a wonderfully restored road
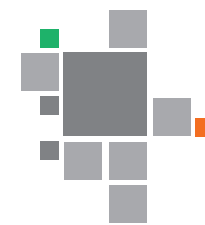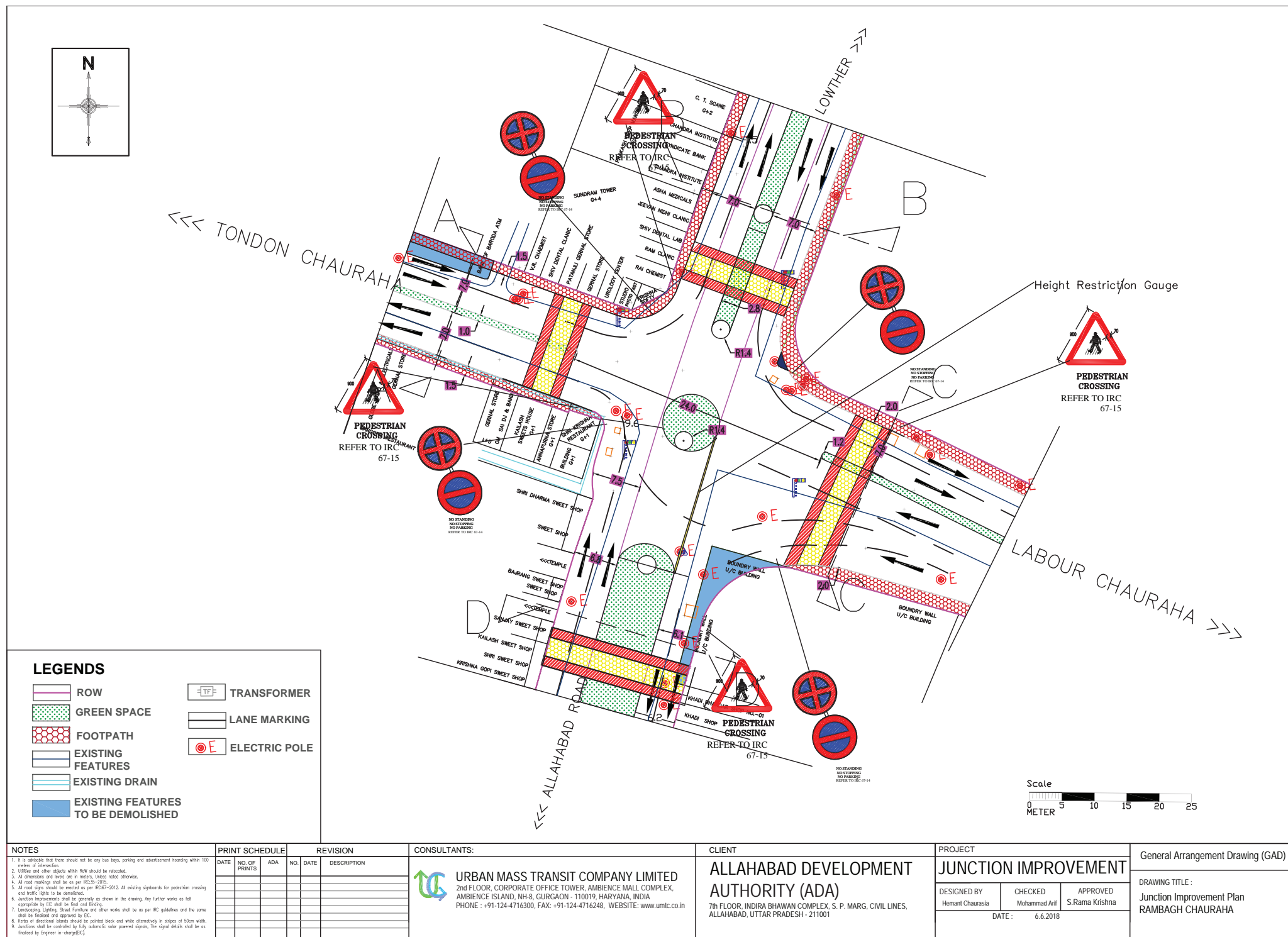
A blueprint prepared by the architect of one of the city crossings before the design was implemented
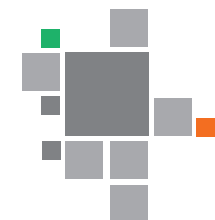
colours, taking inspiration from international cities. In a unique venture, 20 Shivalingas depicting various mudras of Lord Shiva were crafted from abandoned pontoons and were installed on MG Road. The Boat Club was beautified and water activities were arranged in it, besides renovating the Triveni Pushp at Arail. A 30ft statue of Maharshi Bhardwaj was installed at Balson Crossing.

Sanitation and anti-defacement drives were also integral parts of the beautification process.

Nagar Nigam was entrusted with the task of cleaning over 5,000 locations in the city under PDA's monitoring. During the anti-defacement drive, all billboards and banners were removed from road junctions and adjoining areas.

The PWD had undertaken the humongous task of developing 116 roads on a budget of ₹1,388.28 crore. However, the task of developing 7 ghats along the riverfront as part of conservation work was undertaken by the Irrigation Department, on a budget of ₹47.61
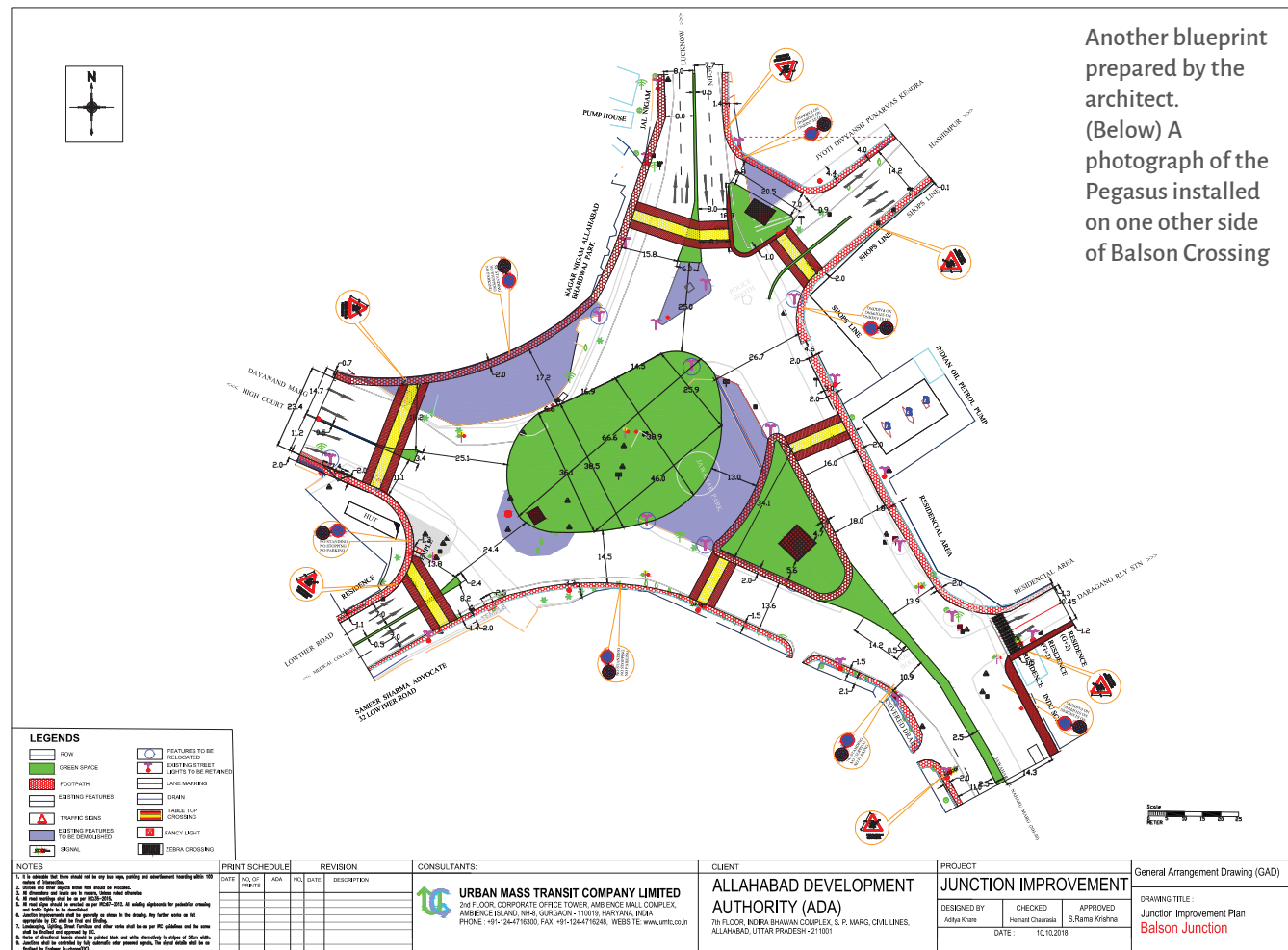
crore. The Uttar Pradesh Power Corporation (UPPCL) upgraded and strengthened the power infrastructure and electricity system on a budget of ₹81 crore. Measures were taken by the Uttar Pradesh Jal Nigam to augment the water supply system and improve drainage and sewerage on a budget of ₹136.10 crore. The Health Department renovated multiple hospitals, built new wards and upgraded medical equipment on a budget of ₹73 crore.

Extensive damage was caused to water and sewer pipelines in the city in the process of broadening and beautification of roads, installation of power/telephone cables and LPG pipelines. However, swift action by the Jal Sansthan helped in repairing all these lines within a mere 25–30 days. It was a mammoth task since the restoration had to be done without interrupting the water supply to citizens. But Jal Sansthan engineers worked in close coordination with different teams and fixed the problems quickly and efficiently. The department also installed 28 tube wells, besides renovating a pumping station at Daraganj.

Indian Railways also played an integral part in giving a makeover to the city by developing a number of railway stations. Construction of footbridges, skywalks, widening of underpasses and development of various flyovers over railway installations were some of the important works completed. A new terminal was also constructed at Prayag Ghat station. New platforms were developed at Chheoki Railway Station and Prayagraj Junction, besides permanent shelters within the station premises with amenities such as food, water, ticket counters and infotainment for pilgrims.

The Police Department spent around ₹84 crore in the construction, development and renovation of police stations and hostels. The Tourism and

Another blueprint prepared by the architect. (Below) A photograph of the Pegasus installed on one other side of Balson Crossing

FOOTPATH

Different footpaths were designed for different roads. On MG Road, for instance, footpaths have been made using stones and tiles. There are also gaps provided for grass and green belt expansion. Black and white zig-zag tiles have been used to enhance the aesthetics. It would have been very easy to use the usual interlocking tiles, but there was an emphasis on improving the look of the city's infrastructure. Even the contractors were initially puzzled about the kind of work they were being asked to do. There were used to working in their 'own style', and hence took time to understand the concept of the facelift and the new look.
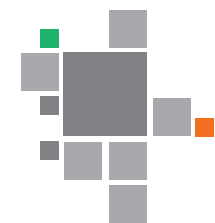
An aerial view of Hot Stuff Crossing on SP Marg

Culture Department built infrastructure and upgraded some key tourist sites. The National Highways Authority of India (NHAI) rebuilt and upgraded the Prayagraj–Pratapgarh Highway, the Rae Bareli–Prayagraj Highway and the Varanasi–Prayagraj Highway, while the Inland Waterways Authority of India (IWAI) built jetties at 5 locations and started point-to-point ferry services for pilgrims.

Monitoring and coordination between the various departments, which included Bridge Corporation, PWD, Nagar Nigam, Jal Nigam, Railway, Defence and Forest Departments, posed the greatest challenge. This cooperation was imperative because every task involved multiple stakeholders. For instance, coordination between PWD, PDA or Nagar Nigam and the Railways was important because most underbridges were constructed by the Railways. Hence, despite the budget allocation, a state government department could not play its part until the Railways gave the required clearance and completed its own work. Similarly, during the broadening and beautification process, removing trees from the roads was a Herculean task as some of them fell within Reserve Forest Area and Defence Department area, requiring permission from the Government of India and Ministry of Defence to remove them. However, the excellent coordination and cooperation helped in completing all work within the stipulated time.

LIST OF NEWLY CONSTRUCTED ROADS

1. Khusro Bagh to Johnston Ganj Crossing
2. Johnston Ganj Intersection to Rambagh Intersection
3. Rambagh Crossing to Behrana Crossing
4. Behrana Crossing to Harsh Vardhan Intersection
5. Nawab Yusuf Road – from Panch ki Tanki to the Fire Station
6. Johnston Ganj Crossing to Tulsi and Lohia Intersection, Civil Lines
7. Tulsi Crossing to CMP Underpass
8. CMP Underbridge to Behrana Intersection
9. Alopibagh to Daraganj Underpass
10. New Yamuna Bridge to Triveni Darshan, also did landscaping work here
11. Lohia Crossing Civil Lines (MG Marg) to Maharana Pratap Crossing
12. Maharana Pratap Crossing to Naya Purya, Stanley Road
13. Maharana Pratap Intersection to Dhobi Ghat Intersection
14. Prayag Crossing to Prayag Station – construction of approach road
15. Varanasi Road to Kanihar Lake
16. Daraganj Underbridge to Sagam Bangh Road
17. Construction of approach road to Jhansi Railway Station
18. Leader Road, Khusro Bagh to GT Road
19. Chaufatka Bridge to Khuldabad Intersection, GT Road
20. Chaufatka Bridge to Rajrooppur Police Chowki (Kaushambi Road)
21. Rajrooppur Police Chowki (Kaushambi Road) to Jhalwa Trisection
22. Khusro Bagh Intersection to Lukerganj Old GT Road
23. Construction of access road from Leprosri Crossing to Arail Road
24. Construction of four-lane approach road from Shantipuram Allahabad to Lucknow Road near Phaphamau for parking location
25. Shashi Bridge to Trivenipuram
26. Trivenipuram to Andawa Crossing
27. Balson Crossing to GT Jawahar Crossing
28. Near Khusro Bagh, road beneath flyover
29. CMP Underbridge to Harshvardhan Crossing
30. Nurulla Road Station Crossing to Khuldabad Police Station
31. For the parking of Kumbh Mela 2019, road expansion of Shantipuram Housing Scheme located area
32. Dhobi Ghat Crossing to Eklavya Crossing, GT Road

THEN AND NOW

These photographs depict the transformation process. Then and Now! How the places were before the Smart City work commenced and what they turned out to become after the completion of work

Railway stations also witnessed massive infrastructural development as about 240 million people were estimated to visit Kumbh Mela 2019. Therefore, an entirely new railway station at Prayag Ghat was also developed. Since the location of this railway station is part of the Mela area, a large number of pilgrims were able to benefit from Prayag Ghat Station, which worked as a terminal for a number of trains.
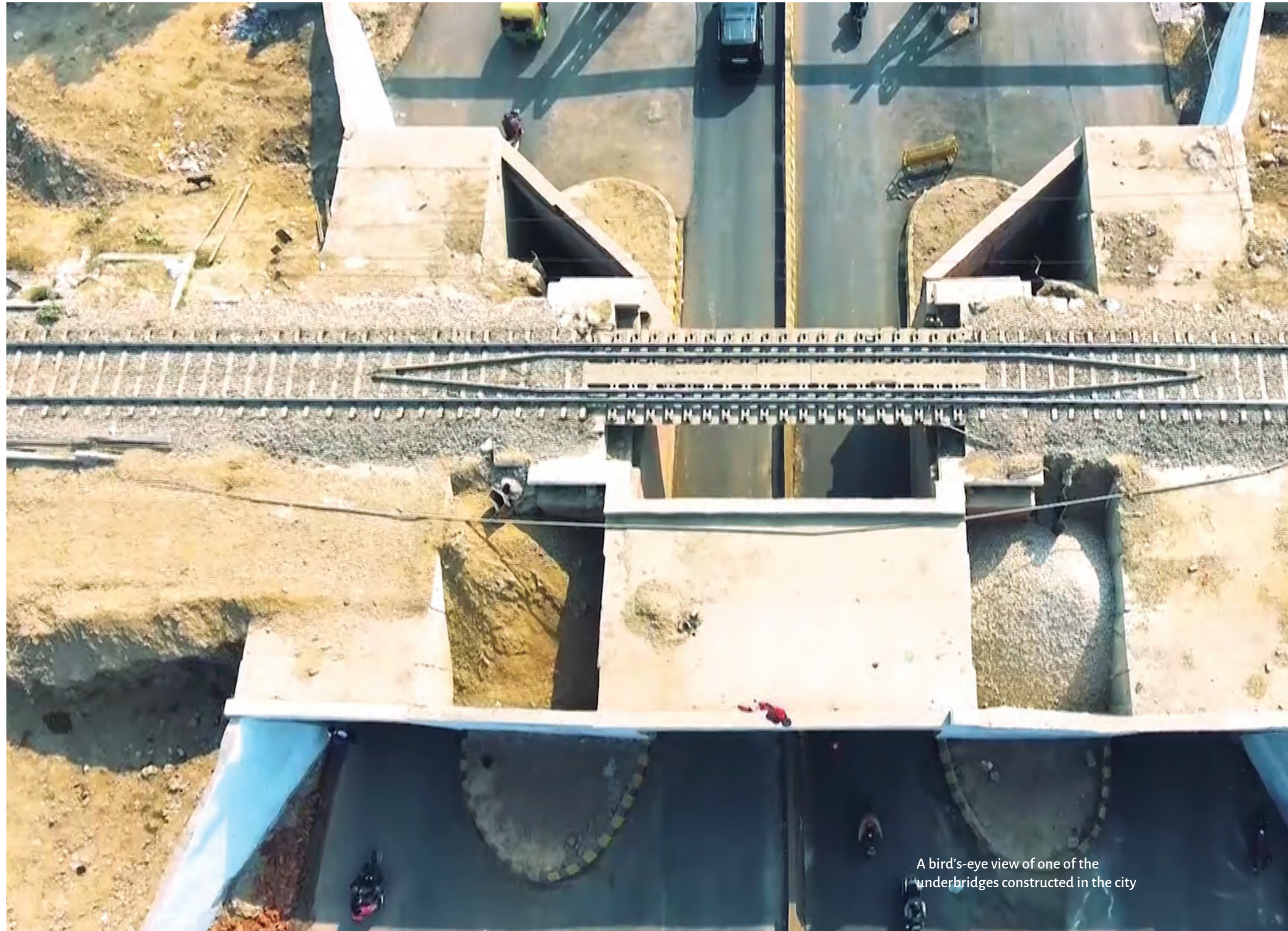
A bird's-eye view of one of the underbridges constructed in the city

A wide view of the recently developed road overbridge or flyover near Pani ki Tanki

Before Kumbh 2019 commenced, a new airport terminal was constructed in Prayagraj which was unveiled by Hon'ble Prime Minister Shri Narendra Modi in presence of Hon'ble Governor Shri Ram Naik and Hon'ble Chief Minister Yogi Adityanath

The new Prayagraj Airport Terminal on the day of its inauguration

As millions of people were expected to mark their presence in Kumbh Mela 2019, a new airport terminal was built in the city. It was inaugurated by Hon'ble Prime Minister Shri Narendra Modi. During the Kumbh Mela period, a number of special flights were operated from this terminal. This was a unique initiative that was undertaken for the first time to make Prayagraj more connected with the rest of the country. The Civil Aviation ministry at the Centre and the state government worked together to complete this project in record time.

DRAINAGE

All the permanent infrastructural development work has been done following the master plan and with a long-term perspective so that there is no need in the future to break anything that has been built in this project. The idea was to build infrastructure with a 20-year perspective. Meticulous planning and designing was used and everything, from green belt expansion to improving the drainage system, was given due attention. The work might seem easy at hindsight, but at that point, when the roads had encroachments and the officials didn't know where to make space for the drainage system, it was a Herculean task. Moreover, development needed to be done in such a way that there was no scope for encroachment in the future. With that in mind, the decision to develop the drainage system at the end of the roads (keeping the width of the road as per the 20-year master plan) was taken. It was determined that once the drainage system was built as per the 20-year master plan, no one would be able to encroach because of the clear demarcation. If somebody did try to encroach and made a temporary structure, it would be clearly identifiable.

Above & Below: Work under progress to improve civic amenities in the city

PROPOSED PROJECTS
UNDER PHASE 2

1. Underground Parking at AN Jha hostel, Holland Hall hostel, Hindu hostel
2. Anglo Bengali College — Underground Parking
3. Beside Bishop College and opposite the same (underground and multilevel parking) with FOB/skywalk to the triangle of the auto stand
4. Parking at Charcoal Restaurant in Katra area
5. Development of green spaces in front of Allahabad District Co-operative Bank (Kutchery Road)
6. Advertisement/signage on the constructed toilets by PNN
7. Cleaning and beautification of public places — concept to be submitted by PMC
8. Painting on existing steel plate (below High Court Flyover) — concept has been submitted
9. Signages (selfie point) in land between Eat On and Kamdhenu, MG Road
10. Advertisement rights of Bus Shelters by Smart City
11. Hoarding Planning and Design
12. Integration of SCADA System with ICCC for Water Supply & Sewerage
13. Integration of SCADA System with ICCC for Power system in association with UPPCL
14. Prepaid booths at various places, such as near railway station, bus stands, etc., for centralized ticketing system (5 in number)
15. Development of tempo and e-rickshaw stands in the city
16. Construction of bus depots at 4 corners of the city

ADDITIONAL PROPOSALS

1. Launching of Smart City Website and promoting Prayagraj Smart City on Social Media by preparing an app
2. Possibilities of houseboat services, upgradation, beautification and organization of stalls of priests and development of other tourist facilities at Sangam area should be explored
3. Tourist Information & Facility Centre at railway station, bus stands and airport (4 in number)
4. Possibilities of using recycled water for irrigating Chandra Shekhar Azad Park and proposed Green in ABD and surrounding area should be explored
5. Cast iron antique water tank situated in Chandra Shekhar Azad Park should be restored and made functional
6. ICT components — public address system, emergency call Box/panic buttons, CCTV surveillance, mobile charging points, display signboard, LED-based lighting for bus shelters
7. Solid waste (C&D) collection and disposal for city
8. Extension of day parking-cum-night market from Elgin Road Crossing to Hanuman Mandir on Kamla Nehru Road
9. Digitization of Nazul records, Municipal Corporation record
10. Automatic/astronomical time set up for all streetlights to be on automation mode

A scenic view of the green belt of the city

A massive beautification drive involving various government departments was put into motion to increase the ornamental value of the city. Apart from infrastructural development, the administration worked on facilities that would improve pilgrims' experience and enhance the city's visual appeal.

As many as 29 parks, including Chandra Shekhar Azad Park, Sumitranandan Pant Park, PD Tandon Park, Khusro Bagh, Triveni Pushp and Yamuna Bank Road were developed by the Allahabad Development Authority and Nagar Nigam. Attractions at the Chandra

GREENING
THE GREEN BELT

Shekhar Azad Park, for instance, included a gym and acupressure facilities, a guava orchard and a Titli Park for children.

A 2,000sq. m garden of seasonal flowers and a flower exhibition area spread across 3,600sq. m were also set up. Flowerpots – 32,000 earthen and 2,500 cement ones – were placed along the roads, and as many as 5,000sq. m in the Mela area were carpeted. A proposal to develop a lake around 65 acres in Kanihar was also mooted. In keeping with the 'social' reality of the times, 20 selfie points were also identified!

Wherever possible, trees were shifted to nearby places and greenery was removed only where it was absolutely necessary. However, in order to balance this, a green belt on MG Marg and Varanasi Marg was developed and around 10,000 trees and 16,000 saplings were planted in various areas. Moreover, for further green belt expansion on the side of the roads,
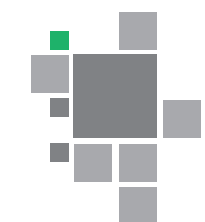
Preservation of green belt along with development work was carried out in the city

transformers were mounted on poles so that space could be created.

Besides, 4 plots of Nazul land were also identified to develop new parks. A number of departments were entrusted with development work. While the Allahabad Development Authority spent ₹20 crore for the development of 12 parks, Nagar Nigam spent around ₹4.61 crore for the development of the remaining 17. Apart from this, 63 roads were developed with 115 high mast lights and 5,000 LED lights at a cost of ₹15 crore.

Besides the remarkable Paint My City campaign, which has made the city artistic and attractive, over 25 temporary thematic gates were set up to mark approach roads and entrances to various sectors in the Mela area. Each gate was designed to express individual identity as well as display local culture and tradition. Also, to enhance the divinity of the event and create an awe-inspiring experience for pilgrims, patrons and domestic and international tourists, a sound and light laser show was held on the walls of the Allahabad Fort.

A land made holy by the confluence of the Ganga, the Yamuna, and the mythical Saraswati,

A view of the interiors of Chandra Shekhar Azad Park

Prayagraj is a treasure trove for pilgrims, history enthusiasts and those wanting to explore its ancient temples and monuments. Other than the Triveni Sangam, which is on top of the list of must-visit places, Prayagraj also boasts famous temples and a number of colonial-era buildings.

Attending the Kumbh Mela is an opportunity to see the city's various facets and the Tourism Department organized trails around 4 themes – historical buildings; places of religious and mythological significance around the main temples; food hubs in the city and adjoining areas; and the Sangam area along with important places in the Mela periphery. Of them, the most significant and germane, of course, was the Sangam Walk, which begins at Shankar Viman Mandapam and trails through Bade Hanumanji Temple, Patalpuri Mandir, Akshayvat, Allahabad Fort and Ram Ghat.

Facade lights adorn prominent buildings such as Allahabad University, the Collectorate, Mayo Hall, Senate Hall, Shastri Bridge and Naini Bridge. The beautification process also involved special electrification at 32 junctions, highlighting signboards, and the embellishment of 15 prominent junctions that lie on the approach to the Mela area with sculptures, murals and greenery.

Special emphasis was also placed on developing tourism around popular temples. The Prayag Panchkoshi Parikrama covers Dwadash Madhavs and other important temples, including Veni Madhav, Asi Madhav, Chakra Madhav, Gada Madhav, Manohar Madhav, Bindu Madhav, Anant Madhav, Akshayvat and Patalpuri. In an effort to revive the religious and mythological significance of these places, the Akhara Parishad, along with the Mela Development Authority, has even developed a roadmap for pilgrims.

Considering that Kumbh 2019 was the perfect platform to exhibit India's cultural heritage, the Mela featured 5 cultural pandals that hosted a series of daily cultural events, from musical performances to traditional and folk dances. While all major events were held in the megastructure of Ganga Pandal, the Pravachan Pandal and 4 convention centres equipped with state-of-the-art facilities hosted various spiritual events.

Spiral lighting and kiosks were used to decorate the 1,200 pillars on the approach road to the Mela area and an anti-defacement drive was launched to remove unwanted advertisements. Since tourist walks were planned around heritage, cuisine and shrines and over 200 cultural events featuring popular artists were on the cards, the Mela Authority engaged and mobilized volunteers to aid these activities. And, to ensure that the volunteers present the best image of Prayagraj and India, capacity-building workshops and training were conducted for all stakeholders, including tour operators, e-rickshaw drivers, boat operators and vendors.

Despite its religious focus, the Kumbh Mela is held in the spirit of all popular fairs, and vendors – chosen through an online stall allotment system – set up umpteen designated stalls for food, grocery, clothes, utensils and more. In the main city, 5 marketplaces – used as parking lots during the day – were identified as night-vending zones, including those near St Joseph's College and Boys High School.

To enhance pilgrims' experience and ease navigation for tourists and pilgrims, over 2,000 signboards were installed across the city at parking lots, bus stops, railway stations, prominent roads and crossings, and in the Mela area. With the safety of pilgrims and tourists being of utmost importance, and to prevent

A scenic view showing the recently broadened MG Road

accidents due to poor visibility during winter, 1,200 LED light poles and 115 high mast lights were installed on many of the city's main roads – MG Road, Hewitt Road, Leader Road, Stanley Road, PD Road, Nawab Yusuf Road, Jawaharlal Nehru Road, Chaufatka, Maharana Pratap Crossing, Eklavya Crossing, MNNIT Crossing, and Dhobi Ghat.

Beautifying the city to make the pilgrim experience memorable was yet another important task. There was facade lighting on all the trans-river bridges and all important buildings, plus uniform colour decoration on all prominent roads. Folk art in the form of specially designed murals, keeping the Kumbh's festive mood in mind and highlighting its cultural and spiritual aspects, was also showcased on railway underpasses, overbridges and flyovers. A big attraction in the city are the recently made 45 city crossings, where aesthetically designed murals and sculptures, based on different themes, have been installed to give these places an entirely new look. Some of these themes include Kumbh Urn (Kalash), Unicorn, a Trident with a fish head, Goddess of Justice (with a sword in one hand and a weighing scale in the other), Folk and Tribal Art, Conch, Samudra Manthan, and Krishna Leela (where Krishna is stealing butter from the earthen pot). Besides, an entire stretch of MG Road was decorated with multiple Shivalingas, made of half-cut pontoons, placed on either side of the roads, and painted with different mudras of Lord Shiva.
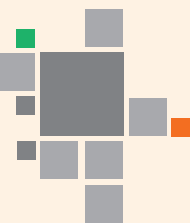
Photographs of greenery in the city

Thousands of flowerpots were placed on dividers to enhance the aesthetic look of the city roads

DIVIDERS

Planning and constructing dividers as per traffic norms was another challenging task. One of the big decisions to be taken was the height of these dividers. Earlier, dividers were short — people would lift their bikes (and other two-wheelers) over them and cross the road. This increased cross-movement and chances of accidents. Hence, there was a need to increase the height. Also, since the dividers were earlier made of concrete, people would get injured in accidents, sometimes fatally. Therefore, this time, we wanted to design dividers to reduce the impact of collision in an accident and prevent fatalities. For the first time, therefore, we reduced the strength of these dividers by making them hollow and by not using concrete. It was decided that it would be better if a divider breaks in case of an accident rather than resulting in an individual's death. Though there was some concern initially that the dividers were not strong enough and would break at the smallest impact, engineers knew that it would not happen because the hollow cavity was filled with mud to make it strong. It served two purposes — one, by not using concrete, we reduced fatal accidents and two, to a great extent, these dividers worked as shock absorbers. The process took almost 5 months, from taking a call on the curvature of the dividers to giving them such a shape.

THE FACELIFT

**BHANU CHANDRA GOSWAMI, IAS, District Majistrate, Prayagraj,
and Former Vice Chairman, Prayagraj Development Authority**

After Prayagraj was selected under the third phase of the Smart City Mission and UNESCO recognized the Kumbh Mela as part of the 'intangible cultural heritage of humanity', the zest to transform it into an advanced, modern city equipped with Smart City protocols increased.

However, at that point, the city was not in very good shape. City walls were defaced, drains were overflowing in many areas and there was not even continuous power supply. Since everyone coming to the Kumbh Mela would have travelled through the city to reach Sangam and it is a general tendency of the crowd to notice things which are either well above or well below average, a facelift of the city was imperative so that at least the negative aspects were not the only impression

of the city pilgrims took with them. The facelift was also essential because this time, the government had advertised Kumbh 2019 on a humongous scale and apart from the regular pilgrims (who primarily came from villages), it was also expecting people from across the globe to turn up in large numbers. Hence, world-class development, both in the Mela area as well as in the city, was vital.

This was a Herculean task, and so both the state government departments as well as the Central government came together to accomplish the task. Apart from permanent infrastructural development, a 360-degree beautification plan was also envisaged because the government wanted everything to look outstanding – for the first time, the focus was on user experience.

Since most people were expected to arrive by train, railway stations were developed by the Central government. Apart from capacity-building in many places, new stations at Subedarganj and Prayag Ghat were also developed (Subedarganj Railway Station existed earlier but trains did not stop there as there was no platform). A new civil terminus also commenced operations, connecting Prayagraj with a number of metropolitan cities.

In the light of these developments, the primary task of Prayagraj Development Authority (PDA) was to ensure proper connectivity to and from the city. With that intention, we identified places for RoBs and RuBs. Roads were also ascertained and depending upon the flow of traffic on a particular road, a call on its width and design was taken.

The city was very green at that time and since there were a number of trees on the roadsides, the foremost concern was how to widen roads without affecting the greenery. Moreover, keeping the long-term perspective in mind, the

administration was also required to follow the master plan so that once the infrastructure was created, there was no need to alter it in the near future. The idea was to build everything with a 20-year perspective. With all that in mind, it took months of hard work to design a layout in which everything, ranging from greenery to drainage, was given due attention. The drainage system was developed keeping the width of the road (as per the 20-year master plan) in mind, towards the end. By doing so, the scope for encroachment on both sides of the road in the future was also reduced.

Although the road widening work was being done as per the master plan, the city administration was working with a degree of uncertainty as the engineers were not sure about finishing the work on time; a lot of encroachment had to be removed. The process of design finalization was also delayed. Then there was a Third Party Inspection Agency (TPIA) to audit and cross-check the work of contractors, which both engineers and contractors were not able to accept.

For instance, when the engineers were asked to raise the height of dividers, they were totally baffled. They considered it extra work and were unable to understand its importance. The dividers in the city were very low, because of which people lifted their two-wheelers and crossed over them. This led to criss-cross movement and affected the traffic flow. It took us a lot of time to convince these engineers. It took almost a month to raise the height of the dividers from 8in to 1m on MG Road. The height of 1ft will still not deter people from jumping the dividers, but at least now people would not be able to carry their bikes and cycles on their shoulders and cross them.

Furthermore, we also wanted to plant shrubs on these dividers, so the height of 8in wouldn't have helped us. Even with grills or any other type of barricading on the dividers, its life is always limited. It would get rusted and become useless in a few years' time, so that was also not an option. Although plantation on dividers was expensive and tedious work, we resolved to do it. A committee was set up, with renowned horticulturists from Allahabad University as members. Keeping the city's climatic conditions in mind, they recommended the variety of plants that could be planted on these dividers.

After taking expert suggestions, when the planting commenced, we faced another challenge. Stray cattle on the roads would eat all our plants! They ate even those plants we thought they wouldn't eat. Due to this, we had to revise our work order and buy new kinds of plants. Hence, a decision to buy a number of cactuses, which absorbed less water and which these cattle did not eat, was also taken. Even while taking a call on cactuses, we kept in mind that they should complement the greenery and not give a desert look. On various crossings, we placed different plants to give the entire city a green look.

Even while designing the tabletops, both the strength factor as well as aesthetics were kept in mind. Although there was criticism initially regarding the use of rebars in these tabletops, once everyone understood the logic behind it, all criticism stopped. Initially, the administration was being accused of wasting resources, but people had missed a basic point. These tabletops were elevated, so whenever a heavy vehicle like a truck passed over them, it caused friction as the tyres generated more heat. Plus, heavy vehicles hit them really hard while coming in contact, so if the rebars were not used, the tabletops would have crumbled.

Moreover, it was not possible to make these tabletops on bitumen roads, because during the summers, the corner of the tabletops would have melted. Hence, a new approach was developed. A decision on the material to be used on their surfaces was also taken. Instead of using tiles (which would have crumbled under heavy vehicles), stamp concreting was used. Stamp concrete is concrete that is patterned and textured to resemble brick slate flagstone. Other chemicals are used to make them strong.

While designing and widening traffic junctions, we encountered another problem. The survey report being used for reference was based on the old layout and traffic junction design. So no one knew how much a particular road was required to be broadened, let alone taking a call on the circumference of these traffic junctions. This turned out to be another challenge because when the road would finally be broadened and traffic junctions enhanced, it would affect the current mobility plan. Eventually, everything was reworked
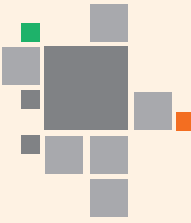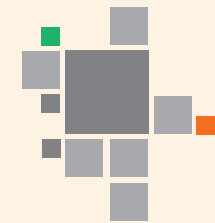
and UMTC was entrusted with the task of redesigning over 60 traffic junctions. It was also ensured that whatever was being shown on the design and presentation was implemented sans any compromise with the quality. The work on traffic junctions is never done at one go, but in a phased manner so that traffic is not impeded. Due to this, work on a traffic junction is completed in 10–12 phases. But we ensured that traffic wasn't obstructed for even a single day.

Inter-agency coordination was another daunting task. The drainage work was being done by Nagar Nigam and Ganga Pollution; the electricity department was digging roads to put electric cables; and the PDA was developing roads, which meant that every stage of the work demanded proper coordination. Besides, we were very strong in our documentation. There was a maintenance clause, so if the quality of the work deteriorated within the maintenance period, the contractor was supposed to refurbish or remake. Such clauses were included in earlier contracts as well, but the contractor never bothered. However, this time, we ensured that the clause was followed strictly.

To ensure that what JEs and others reported about the quality of work was true, every morning, I used to take a round of the city on my bike. In whichever place I found that the construction was not according to the designs finalized, I would talk directly to the concerned JEs and contractors. We had about 300 JEs and contractors working simultaneously, so it had become a routine to talk to these 300–350 people every morning and troubleshoot their problems. Then we would update everyone on the WhatsApp group about the development and changes, and finally in the evening, call all those who had major issues regarding the design and drawing of the work inspected on that particular day to solve their queries. This exercise continued for a good 7-8 months.

We were running against time and there was no margin for error. For instance, if an encroachment was supposed to be removed from a particular place before construction began, and the contractor started the work without doing it, he was taken to task. He was called in the evening and told that since the encroachment was not properly removed, he was supposed to break whatever was made and redo the work. Even if a section of the drainage line was not made as per the design given to the contractor, he was asked to break it and redo it. For the first time, small holes at the end of all the newly made roads were made and were connected to drainage lines, to evacuate rainwater. As a result, the administration was able to evacuate rainwater from the roads in much less time this year.

The service lanes at a couple of places were converted into night markets. It was resolved that during the day these lanes would be used as parking areas, but from 4pm onwards, the same place would be used for the night market. A big attraction in the city are the recently made 60 city crossings, where aesthetically designed murals are placed. Some of these themes include Kumbh Urn (Kalash), Unicorn, a Trident with a fish head, Goddess of Justice (with a sword in one hand and a weighing scale in the other), Folk and Tribal Art, Conch, Samudra Manthan and Krishna Leela (where Krishna is stealing butter from the earthen pot). While developing these traffic junctions, the biggest challenge that the city administration faced was explaining these concepts to the artists. Since these artists were creative people, it became very difficult to make them do what others wanted. But finally, everything went well and Prayagraj transformed into a city with world-class infrastructure.

One of the recently developed roads where widening and other work under Smart City parameters were done

USING AI FOR A SMART CITY

R SRINIVASAN, EVP & Head, L&T – Smart World & Communication Business Unit

L&T Smart World and Communication was entrusted with the responsibility of implementing the Smart City project in the holy city of Prayagraj. The first phase of the project was completed by our team in record time, as part of making the city Kumbh ready, with the cooperation and support of the Prayagraj Municipal Corporation officials. We have set a record in assisting the Police Department in crowd management through Artificial Intelligence interventions, preventing stampede situations and ensuring the safety of 23 crore pilgrims. Smart Solutions like Adaptive Traffic Management, Pollution Monitoring and city-wide Surveillance have enhanced pilgrims' experience and the quality of life of the citizens. We will continue to work with the various officials in maintaining the established solutions for the next 5 years and also to extend more Smart Solutions that are being offered by us in more than 20 Smart Cities across the country.
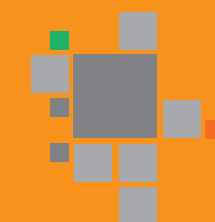
One of the many city walls painted under the Paint My City campaign, depicting a Prayagraj riverbank

Taking inspiration from Western countries, where city roads have become canvases for local art and culture, the Uttar Pradesh government decided to give the entire city of Prayagraj a festive look before Kumbh 2019. Besides, as the city was also being developed under the Smart City Mission, the campaign complemented the architectural elements and infrastructure of the city.

With the Kumbh Mela approaching, the content on these walls was expected to foster positivity, keeping the festive mood in mind. Subtle, beautiful and awe-inspiring pictorial messages that depicted religious, spiritual and scientific aspects of the Kumbh, besides the mythological background, cultural diversity, social awareness and the heritage of the

ENHANCING
THE AESTHETICS

city, were thought to be appropriate for this theme. Nothing provocative, obscene or negative was reflected anywhere across the city.

A decision was taken to paint the entire city in different hues that showcased the spirit of Kumbh Mela and call the campaign 'Paint My City'. A testing ground was set up in the form of a small pilot project during Magh Mela 2018 with the help of university students who were invited to share their designs. However, later, realizing the magnitude of the work, professionals were roped in. The initial funding came from Namami Gange (Government of India's ambitious National Mission to Clean Ganga, which became the main sponsor) and the UP Tourism Department.

The most important themes of this project were the depiction of India's and Uttar Pradesh's cultural heritage, historical legacy of the

city, and the story behind the genesis of the Kumbh. However, the Kumbh legend formed an integral theme. As described in the Vedic literature, the power of the devas was diminished because of a curse by Maharshi Durvasa. Hence, they lost to the asuras, led by Bali. In a bid to find a solution, they approached Lord Shiva, who directed them to Lord Vishnu. The latter asked them to churn the Ksheera Sagar (Primordial Ocean of Milk) in what is termed as 'Samudra Manthan', to produce nectar.

Since the devas possessed neither the powers nor the strength to do so, Lord Vishnu asked them to seek help from the asuras. Mandara Mountain became the axis, and Vasuki, the king of Serpents, became the rope for the churning. On Lord Vishnu's advice, the devas agreed to take the tail-end position of the serpent. The asuras, who were positioned on the head side, thus had to deal with the poisonous breath that emanated from Vasuki. During the churning, Mandara began to sink, and Lord Vishnu took the shape of Kurma, a giant turtle, to support it on his back.

Initially, the act produced the deadliest of poison, which was drunk by Lord Shiva. Since his neck became blue because of the poison, Lord Shiva came to be known as 'Neelkantha'. A few drops of poison fell on the ground, and were licked by animals like scorpions and snakes, which thereafter became venomous. Among other gifts that initially emerged from the churning were Kamdhenu (wish-fulfilling cow, which was taken by Lord Brahma and given to the sages), Airavata (an elephant that went to Lord Indra), and Uchhaishravas (a seven-headed horse which was given to Bali). The ever-flowering Parijat tree was taken by the devas to Indralok. After 1,000 years, Dhanvantri appeared with the pot of nectar, or amrit.

The huge wall of Naini Central Jail too became a canvas for Paint My City artists. This painting depicts a scene from Samudra Manthan

Paint My City reflected the spirit of Kumbh Mela everywhere. This painting depicts blessings from saints

However, when the Amrit Kumbh (the urn containing the nectar) emerged during the churning, Indra's son Jayant flew away with it. The asuras followed him and tried to overpower him, which resulted in a fierce battle that lasted 12 days. Ultimately, Mohini (Lord Vishnu in disguise) agreed to give the amrit or nectar to everyone, but decided to first serve it to the devas.

The plan was to finish the amrit before it reached the asuras. However, an asura dressed as a deva managed to drink some nectar. Lord Vishnu cut off his throat but some drops went down to his stomach, so he did not die. His head became Rahu, and his body Ketu.

The Paint My City campaign captured all these aspects as well as the religiosity of the

Lord Jayant with the Amrit Kumbh

Another visual from Samudra Manthan showing Vasuki being used as the rope to churn the ocean

Kumbh. Lord Shiva, given his crucial role in the Manthan, became a logical motif. The significance of Maha Shivratri, a day associated with Lord Shiva, when the Kumbh ends officially, encouraged painters to depict legends and myths related to the lord. Various avatars of Lord Vishnu, who proposed the ocean churning and saved the nectar for the devas, also received prominence.

Saints and ascetic orders were also painted at religious places. On the walls and the adjacent buildings of Bade Hanuman Mandir, near Sangam, the street art shows Lord Hanuman, a devotee of Lord Rama and Goddess Sita, for obvious reasons. The Manthan and its various elements, including the entire narrative, are visible in several sites – New Mela Office, Naini

Central Jail, GT Jawahar Flyover and others. There is the visual depiction of the churning, with Kurma, Mandara, Vasuki and Neelkantha. Various personalities and objects that came out of the sea, including Dhanvantri with the nectar pot, and Mohini, are there for pilgrims to see.

The campaign also depicted the Saptarishis, the mind-born sons of Lord Brahma, who attained semi-immortal status. Each sage, who is assigned to guide the human race during his lifetime, lives for a Manvantra, or 30,67,20,000 earth years. These include Rishi Atri (known for discoveries of great sacred mantras), Rishi Bhardwaj (author of Ayurveda, master of advanced military arts, father of Dronacharya, who was the guru of the Pandavas and Kauravas), Rishi Gautama (credited with authoring many hymns
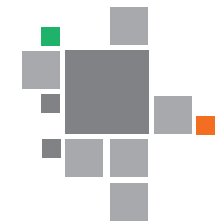

Painting showing harmony with nature

Under Phase 1 of the Smart City Mission, only those projects were taken which could be completed before the Kumbh Mela. This included the development of 8 Smart Roads. The first Smart Road, where the concept of uniform colour decoration was implemented, was SP Marg. The shops and showrooms on the entire road were given a black-and-red theme. The concept turned out to be a huge hit and today SP Marg has emerged as the most beautiful road of the city
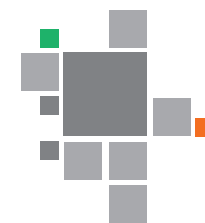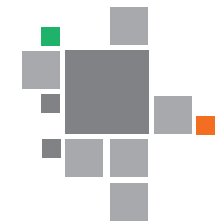
in Mandala 1), Rishi Jamdagni (father of Parashurama, the sixth avatar of Lord Vishnu), Rishi Kashyapa (author of *Kashyapa Samhita*, a classical reference book in the field of Ayurvedic paediatrics, gynaecology and obstetrics), Rishi Vasishtha (Rajguru of Surya Vansh, whose scripture, *Yoga Vasishtha*, provides content and context to the questions Lord Rama asked when he was disenchanted with the world), and Rishi Vishwamitra (only seer who rose to the position of a Brahmarishi through sheer merit).

Since the city has also been the intellectual and

Numerous traffic junctions were decorated with wonderful art. The first installation on this page has been dedicated to 'Astronaut', while the second to 'Butterfly'. These crossings are now locally known as the Butterfly and Astronaut crossings
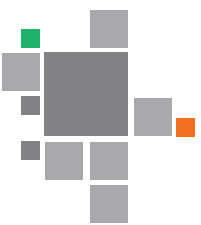
political hub of the country for over a century, political and literary personalities were also given space in this art campaign. The list covered Mahatma Gandhi, Subhash Chandra Bose, Atal Bihari Vajpayee and Madan Mohan Malaviya, to name a few. From e-rickshaws to flyovers and poles under the bridges to hostel buildings, all were used as canvases. Today, Prayagraj is a beautiful city, completely transformed and lively with artistic paintings, plants and flowers across its length and breadth. Each nook and corner seems to welcome one and all. And, much after Kumbh 2019 is over, Paint My City will continue to live in the minds of all who see and experience the amazing and wondrous art. It will leave behind an everlasting legacy of aesthetics on various city sites.

The authorities were quite circumspect while choosing the themes for traffic junctions. This one was dedicated to folk art. It features folk performers dancing on a traditional musical instrument
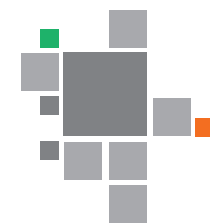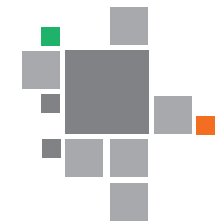
The most prominent crossing in the city, Subhash Crossing, is dedicated to Netaji Subhash Chandra Bose. At this crossing, apart from the statue of Netaji, one can also see statues of armymen in various fighting positions, reminding one of Netaji's vision and valour

Taking inspiration from two popular Hollywood movies, *The Ghost Rider* and *Pirates of the Caribbean*, the officials of the Smart City team developed two prominent places on SP Marg around that theme. Two sculptures, one of the Ghost Rider and the other of Captain Jack Sparrow, were installed on this road. They still attract hundreds of people every day and have become popular selfie points

Music and mythology have also been used as themes for these sculptures. While there are stringed instruments on either side of Dhobi Ghat Crossing, a Pegasus installation has pride of place on Balson Crossing

Captain Jack Sparrow, the protagonist of the famous Hollywood series, *Pirates of the Caribbean*, also got space in the artwork of the city. Outside one of the prominent malls of the city on SP Marg, the government installed a huge statue of Jack Sparrow
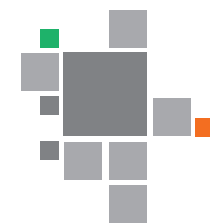
LIST OF A FEW PLACES WHERE JUNCTION IMPROVEMENT, SIGNALLING, AND MURAL INSTALLATION WAS DONE

1. Fire Brigade Crossing
2. Tulsidas Statue Crossing
3. Dhobi Ghat Crossing
4. GT Jawahar Crossing
5. Andawa Crossing
6. Pandit Madan Mohan Malaviya Crossing
7. Balson Intersection
8. Manmohan Crossing
9. Behrana Crossing
10. Medical Crossing
11. Bangar Crossing
12. Maharishi Balmiki Crossing
13. Rambagh Underbridge (both sides)
14. MNNIT Tri-junction
15. Telierganj Crossing
16. Phaphamau Tri-junction
17. Lakshmi Talkies Intersection
18. Maharana Pratap Crossing Baba Crossing
19. Traffic Crossing, Stanley Road
20. Salikram Jaiswal Statue Tri-junction (near railway station)
21. Rajrooppur Police Post Tri-junction
22. Jagat Taran Intersection
23. Bai ka Bagh Tri-junction
24. Chandralok Talkies
25. Samudhan Manthan Crossing ahead of Sambhatiyabag
26. Awas Vikas Colony Tri-junction, Jhunsi

27. Public Service Commission Crossing
28. Sobatiyabag Crossing
29. Kamdhenu Sweets Crossing, Elgin Road
30. Crossing near CMP Underbridge
31. Lukerganj Crossing
32. Hot Stuff Crossing, SP Marg
33. Dosa Plaza Crossing, Elgin Road
34. ICICI Crossing, SP Marg
35. Tanishq Crossing, SP Marg
36. Mishra Bhawan Crossing
37. Patrika Crossing
38. PVR Cinema Crossing, SP Marg
39. IOC Tri-junction
40. Old GT Road Tri-junction
41. Alopi Temple Crossing
42. Trivenipuram Crossing
43. Johnston Ganj Crossing
44. Petrol Pump Co. in front of Power House
45. GHS Crossing
46. Jhunsi Road and Old GT Road Crossing
47. Madhavadhur Crossing
48. Sangam Dam/Daraganj Crossing
49. Rajasv Parishad Crossing
50. Saligaram Statue Crossing
51. Kharbanda Tri-junction, Nawab Yusuf Road

LIST OF ROAD OVERBRIDGES MADE

1. Pani ki Tanki
2. Begum Bazar
3. Level Crossing Naini
4. Manauri
5. Rasulabad
6. Karchana
7. Prayagraj City Station
8. Phulpur Yard
9. MNNIT Prayagraj

Wildlife was also one of the themes for the sculptures. An installation of a giraffe eating leaves from a tree has been placed at one of the prominent crossings of the city

Most of the artwork has been dedicated to Hindu mythology. In one of the prominent crossings near CMP Degree College, one can see a scene from Krishna Leela. Lord Krishna was also known as 'Makhan Chor' because he used to steal butter from people's homes. One such episode has been captured by a sculptor and depicted at one of the crossings. One can see Lord Krishna, accompanied by *gwalas*, stealing butter from an earthen pot.

Indira Bhavan is one of the landmarks of the city and houses the office of the Prayagraj Development Authority (PDA). The officials of the authority gave the entire building a facelift and adorned it under the Paint My City campaign. The entire 12-floor building was painted in the hues of mythology following the Kumbh Mela theme. Multicoloured facade lighting was also arranged for the building, which enhanced its look. Anyone visiting the city makes it a point to visit this place and click a picture.

At another city crossing is an eye-catching installation of a dancer's feet in *ghungroos*, on a tabla. The *ghungroos* and the tabla depict the richness of classical performing arts in the country.
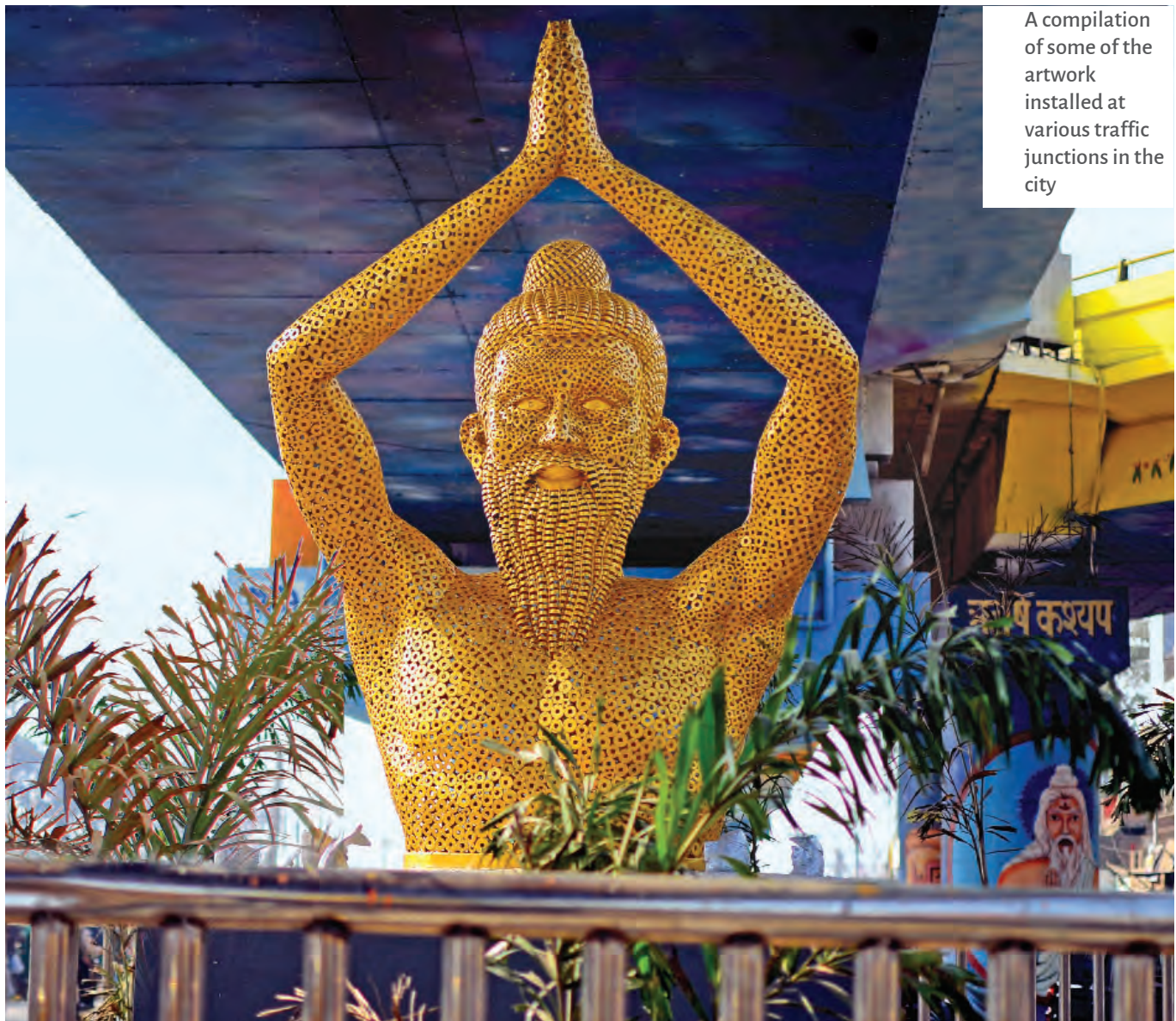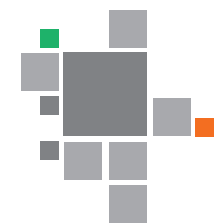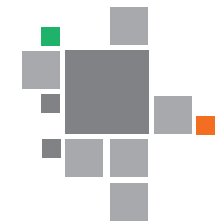
A compilation of some of the artwork installed at various traffic junctions in the city

This railway underbridge was recently renovated. Not only was it widened, its aesthetics were changed as well. The two urns placed on either side depict that the Kumbh Mela area begins from this place. Visitors and pilgrims can also consider it an entrance to the Mela area

The old railroad Yamuna Bridge, also known as Old Naini Bridge, was built during British rule. The Old Naini Bridge is one of the longest and oldest bridges in India. It is a double-decked steel truss bridge that runs across the Yamuna in the southern part of the city. The bridge runs north to south across the Yamuna, connecting the city of Prayagraj to the neighbouring area of Naini. Currently, the bridge is used by Indian Railways and the movement of heavy commercial vehicles on it has been stopped. In an attempt to enhance the beauty of the entire city, facade lighting was also undertaken on this bridge. Today, it has become a must-visit spot for the tourist. Although boat rides at night are not allowed in the Sangam, people usually visit the banks of the river to click pictures in the evening.

The New Yamuna Bridge (also known as Shyama Prasad Mukherjee Bridge) is a cable-stayed bridge in Prayagraj. The bridge was completed towards the end of 2004 with the aim of minimizing traffic on the Old Naini Bridge. After Prayagraj was shortlisted under the Smart City scheme of the Government of India, it was proposed that this bridge be adorned with multicoloured facade lighting. Later, with the help of the tourism department, facade lighting was arranged. The bridge today has become a picnic spot for the denizens of the city. During the evenings, youngsters visit the bridge in large numbers and spend quality time walking in the service lane. Even evening walkers often come to this place for fresh air.

Made of halved pontoons, these 8 Shivalingas depict various mudras of Lord Shiva. They have been strategically developed on MG Road, the most prominent approach road to the Kumbh Mela area. Anyone travelling through this road will get a sense of spirituality. These Shivalingas also became selfie points for youngsters during Kumbh 2019. Locally, the road is sometimes referred as 'Shivaling Road'

In order to make the riverbanks of Prayagraj beautiful, a lot of development work was also carried out at various ghats. This is a scenic view from one of the banks, where tourists regularly go for boat rides
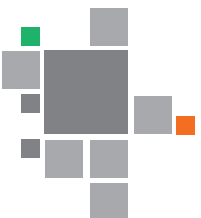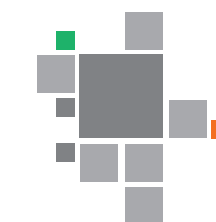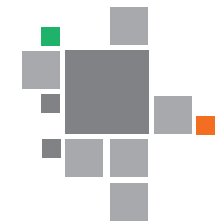
A view of the aesthetically developed Saraswati Ghat, which is a famous picnic spot for the youngsters of the city

The objective of the government was to transform Prayagraj into a city with modern infrastructure. Since the city is surrounded by rivers on three sides, the development of ghats was also imperative. Hence, from ghats to gardens, and from roads to traffic junctions, everything was developed in the best possible manner, keeping the 20-year master plan in mind.
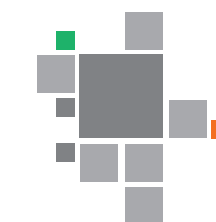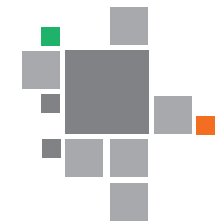
One of the other prominent ghats of the city is Saraswati Ghat. This ghat is generally used during VIP visits and movement of general public is restricted here. The ghat is under the Cantonment area. However, pedestrians are allowed in some parts of the ghat as it is adjacent to a prominent Shiva temple, Manakameshwar. The ghat has been aesthetically designed and artwork from various Indian states has been depicted on its walls. It is also a famous picnic spot for youngsters, who often come to this place in the evenings and spend time in the garden. The place is close to Shyama Prasad Mukherjee Bridge and hence, most morning and evening walkers come to this place. A couple of shops have also been allowed in this area, from where visitors can buy food.

Flyovers like this one in the city were beautifully decorated under the Paint My City campaign
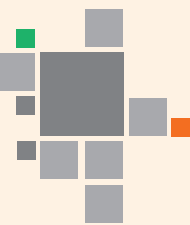
An aerial view of the newly developed Prayag Ghat Railway Station

Sixty-four traffic junctions were developed in the first phase of the Smart City project. On GT Jawahar Crossing, the last crossing before the Mela area, a sculpture resembling a sadhu has been placed

A COMPLETE MAKEOVER

TK SHIBU, IAS, VC, Prayagraj Development Authority

An aerial view of a newly developed city crossing where massive road widening work was also done

In the first phase of Smart City development, some of the important works conducted by Prayagraj Development Authority (PDA) included the widening and strengthening of numerous roads, beautification of parks and improvement of over 64 traffic junctions (including installation of aesthetically designed artwork on all these junctions). The Urban Mass Transit Company (UMTC), a pioneer in the field of urban transport, which is under the Ministry of Urban Development, was roped in for redesigning traffic junctions.

Besides, 7 Smart Roads, plus a night market, were also developed. This included Lakshmi Talkies Junction to Mazar T-Junction, Shivramdas Gulati Marg (Maharana Pratap Junction to Manmohan Park), Muir Road Part I, Manmohan Park Junction to Anand Hospital Junction, Muir Road Part II (Anand Hospital Crossing to Traffic Crossing), and Kutchery Road (Maharana Pratap Junction to Anand Hospital Junction).

In the second phase of development, over 20 roads will be developed and landscaping will be done to make them pedestrian-friendly. More space for parking, vending zones and greenery will be created and greening of roadsides will be achieved through ground corner hedges and trees. The focus will be on more jungle spaces and on parks and parking. The list of Smart Roads to be developed in Phase 2 includes SP Road Extension–Vivekanand Crossing to UPSRTC Workshop; Sarojini Naidu Road–Nawab Yusuf Road Crossing to Muir Road Crossing; Dr Lohia Road–Nawab Yusuf Road Crossing to Muir Road Crossing; Clive Road–Nawab Yusuf Road Crossing to PD Tandon Road; Stretchy Road–Nawab Yusuf Road Crossing to PD Tandon Road Crossing; Cooper Road–Nawab Yusuf Road Crossing to Thornhill Road Crossing; Tashkent Road–Polo Ground Crossing to Kamla Nehru Road Crossing; and Tez Bahadur Sapru Marg–PD Tandon Road Crossing to Kasturba Gandhi Road Crossing – 700m.
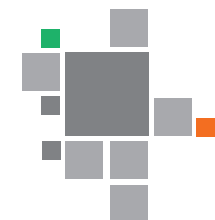
Besides, a multipurpose convention centre with a capacity of 2,000 is also being planned for cultural activities. The idea is to run it, without any government support, on the self-financed (revenue) model (for operations only). However, the construction would be done under the Smart City Mission fund provided by the Government of India.
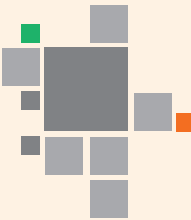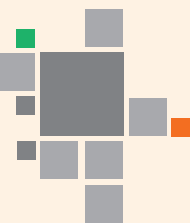
Night view of the recently developed SP Marg. Greenery on dividers was arranged by the administration to enhance the aesthetic look of the roads

OPTIMIZING QUALITY OF LIFE

RAVI RANJAN, IAS, Municipal Commissioner, Prayagraj

The aim of Prayagraj Smart City is to optimize citizens' quality of life by leveraging technology and integrating several essential services. In Phase 1, we had already completed a number of projects keeping Kumbh Mela in mind. This included setting up an Integrated Command and Control Centre (ICCC) for security, surveillance, crowd and traffic management. In Phase 2, the focus would be on the emerging areas which would cover the essential services that a city should provide to its citizens.

For this, we are aiming to enforce the concept of 'one city-one app' and are even in the process of developing a multipurpose app. Once this app is developed, it would allow users to access essential services. Not only would it allow its users to pay their house tax, water tax, and electricity bill, but it would also help in procuring birth and death certificates and gain relevant information related to traffic, city-specific cab services, and tourism. Even a centralized mechanism for grievance redressal is also being put in place which would be coordinating with all the other departments so that people do not have to go to different departments for grievance redressal.

A blueprint has already been prepared in that direction with the help of an analytics-based software. We are also trying to make the Municipal Corporation, the government organization responsible for delivering these services, smart. The focus is on Business Process Engineering to avoid delays, red-tapism and to enhance transparency.

There are also plans to manage the water supply system with the help of technology. Automatization will reduce manual management and streamline the entire delivery process with less margin for errors. Hence, data management and GIS mapping will also be done. Basically, convergence-driven things would be taken for which services of our Master System Integrator, L&T, will also be taken at a later stage.

Solid Waste Management (SWM) is another important area we will be focusing upon. Some important initiatives were already taken during Kumbh Mela 2019. New techniques regarding SWM procedures that prevented solid waste from contacting the ground during transportation were successfully demonstrated. Automated and manual street sweeping, garbage transfer from tipper to the compactor and consequently to disposal and treatment site was done in a seamless way. During that period, different types of equipment were also procured. So apart from employing those tried-and-tested techniques of SWM at a larger scale, we would now be focusing on processing the solid waste which gets generated. For instance, an initiative towards using the construction and demolition waste (rubble) has already been taken and now we are looking forward to setting up a plant to process this rubble so that it can be used for other civil works done within the city. Basically, we are looking for methods which could help in generating revenue from this kind of solid waste. We are also in the process of taking a decision towards setting up a plant for processing garbage with a special focus on recycling plastic waste. The team is also studying models of other cities which have been able to successfully process the plastic waste and use it. We are aiming to explore how to make roads, tiles and maybe fuel from plastic in the future.

For city sanitation, we are trying to streamline the process of utilizing the different types of equipment procured during Kumbh Mela 2019 in a more efficient way. There are also plans to identify littering and spillovers with the help of cameras integrated with the command and control centre. This will help us ascertain the garbage production load and the areas where spillover and littering are maximum. ICCC is also being used as a centralized monitoring system for all purposes and would enable us to work towards eradicating such problems with the existing infrastructure. It will also help us prepare a route chart to cut costs.

Parking is another area of focus and hence Smart Parking is being introduced in the entire city. The aim of Smart Parking would be to utilize the parking space in the most efficient manner, managing it on a real-time basis so that spaces are not left empty and maximum revenue can be generated. Places for multilevel parking are also being identified and we are planning to develop these parking lots in such a way that they are self-sustainable revenue-wise. For instance, we are mulling over setting up restaurants/commercial places near multilevel parking/parking lots so that they can help attract the crowd.

Besides, since urban mobility has become a big problem and there is a need to decongest roads, we are pushing for a public transportation system, especially the environment-friendly system. The administration is also exploring options in transportation and looking forward to introducing public bike-sharing systems. There are also plans to set up open-air gyms in about 200 locations, maintenance of which will be borne by both Nagar Nigam and Prayagraj Development Authority (PDA). Roughly, by March 2020, we are looking forward to wrapping up projects worth ₹1,000 crore under Phase 2 development.
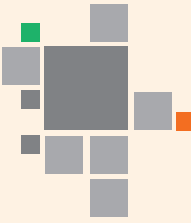
As a part of the ambitious Smart City Mission, Prayagraj was selected in the third round of the selection process. Among several other initiatives that were identified to transform this spiritual city into an advanced Information Communication Technology (ICT)-based centre, the establishment of Integrated Command and Control Centre (ICCC) was the foremost step. Not many know but the purpose of ICCC was not confined to managing the city operations during Kumbh Mela 2019. In fact, when functional at its full scale, ICCC was envisioned to provide a technological solution to the various facets of the city's management, including real-time monitoring of its security, traffic and other utilities.

Developed with the total project cost of over ₹246 crore, the entire

SAFEGUARDING
THE CITY

ICCC project was divided into two phases. Considering the management challenge that was before the administration in terms of managing Kumbh Mela 2019, Phase 1, which was supposed to cover the integration of Kumbh Mela work with the city area for monitoring and assisting pilgrims, was made operational within a record time frame of 5 months. However, Phase 2 and other ICCC operations covering a wide range of citizen services will be completed post-Kumbh Mela.

In Phase 1, the first and foremost CCTV Surveillance System to support police operations in maintaining law and order of the city was installed. This system produced real-time alert in case of an incident
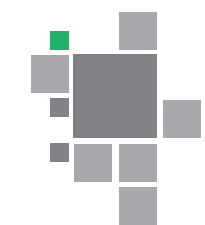
and informed the Radio Police team and first responders on the field. Real-time surveillance helped in improving the responsiveness through assistance to emergency services and fast turnaround time. Thereby addressing the threats from terrorist attacks and aiding investigation. For deterring, detecting and dealing with criminal activities, 1,103 CCTV cameras at 268 strategic (442 CCTV cameras in 127 locations in Kumbh Mela area and 141 locations Prayagraj Smart City area) were installed. However, post-Kumbh Mela, all the 442 CCTV cameras installed in the Mela area were relocated to the city.

During the Kumbh Mela, for monitoring camera feeds, 3 teams of 20 police personnel (for 8-hour shift at each Viewing Centre) at ICCC were set up for round-the-clock monitoring. Altogether, 120 people were trained for this purpose. A corridor-wise segregation of the Mela area, which was linked to 13 Police Radio telecommunication grids, was done and each personnel entrusted with the task to sit in the control room was taken for a field visit first to understand the place he/she was monitoring. Besides, a war room, which had representatives from each department and was linked to an emergency radio grid, was also developed to expedite the communication process.

Geo-mapping of the entire Mela area with coordinates plotted on Google Maps to assist police response vehicles (PRVs) during emergencies was another initiative taken with the help of ICCC, which turned out to be extremely advantageous. UP Dial 100 was integrated with the Mela Helpline No. 1920, to create alerts and a 30-seater 24x7 call centre was also run for the entire Mela period to assist pilgrims in the best way possible. All the monitoring and call management was done from ICCC. Over 90

people were trained for (8-hour shift each) this purpose. This initiative particularly yielded a lot of result as the call centre was able to troubleshoot about 3 lakh queries during the entire Mela period.

Besides, for improved Intelligent Traffic Management System that can help in traffic efficiency and decrease the travel time by reducing vehicle congestion on roads through optimized signalling and improving the safety of commuters, 23 traffic junctions were identified strategically to be installed with an Adaptive Traffic Control System (ATCS)-based Traffic Signals during Kumbh Mela in Phase 1. Placement of 40 Variable Message Signboards for dissemination of information related to traffic for Kumbh Mela was another big step in that direction. Post-Kumbh Mela, 24 additional such junctions were installed and thereafter centralized controlling in all 47 traffic junctions was ensured.

To capture traffic violators, 18 strategic traffic junctions were covered with Red Light Violation Detection (RLVD) systems. This empowered traffic police with 30 e-challan handheld devices for on-site challans of traffic violators. The second big step was taken in the direction of Solid Waste Management (SWM) to keep the city clean and for this around 500 GPS devices were installed in sanitation vehicles for real-time monitoring of their movement. Even 500 bulk generators were strategically identified and installed with Radio Frequency Identification (RFID) tags. To ensure the collection of waste from these bulk generators, about 20 sanitation vehicles were installed with RFID readers.

Moreover, to ensure the field attendance of sanitation workers, Prayagraj Municipal Corporation was provided with 100 Aadhar enabled Biometric Attendance devices in Phase 1

of the project. Post the Kumbh Mela, additional 500 bulk generators were installed with RFID tags along with the installation of cameras at 50 vulnerable garbage points in Phase 2 of the project.

Besides, installation of Crowd Management System to analyse the crowd density during Kumbh Mela on an experimental basis in Phase 1, Transit Management System for provisioning of convenient public transport services with proposed 500 CCTV cameras for 250 city transport buses, Passenger Information System (PIS) for 20 bus shelters and 3 bus terminals along with the installation of Automatic Fare Collection System (AFCS) for city bus transport services in Phase 2 were also envisioned.
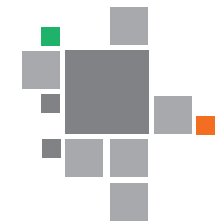
Smart Urban Solutions to cover the holistic city operations from a single-window monitoring perspective were initiated. A multitude of Smart Urban Solutions including Smart Parking for multilevel car parking and environmental sensors for 28 strategic locations are also to be integrated with the ICCC in Phase 2 of the project.

Advanced Video Analytics with supportive Artificial Intelligence System for SWM, Traffic Management and Citizens Safety, were also planned for Phase 2 of ICCC project. A few of the key analytics which would be run on the CCTV cameras are graffiti and vandalism detection, debris and garbage detection by keeping a track on the cleaning of streets and bins to litter detection, parking violation, speeding vehicle, accident detection, 'Vehicle of interest' tracking by colour, speed, number plate,
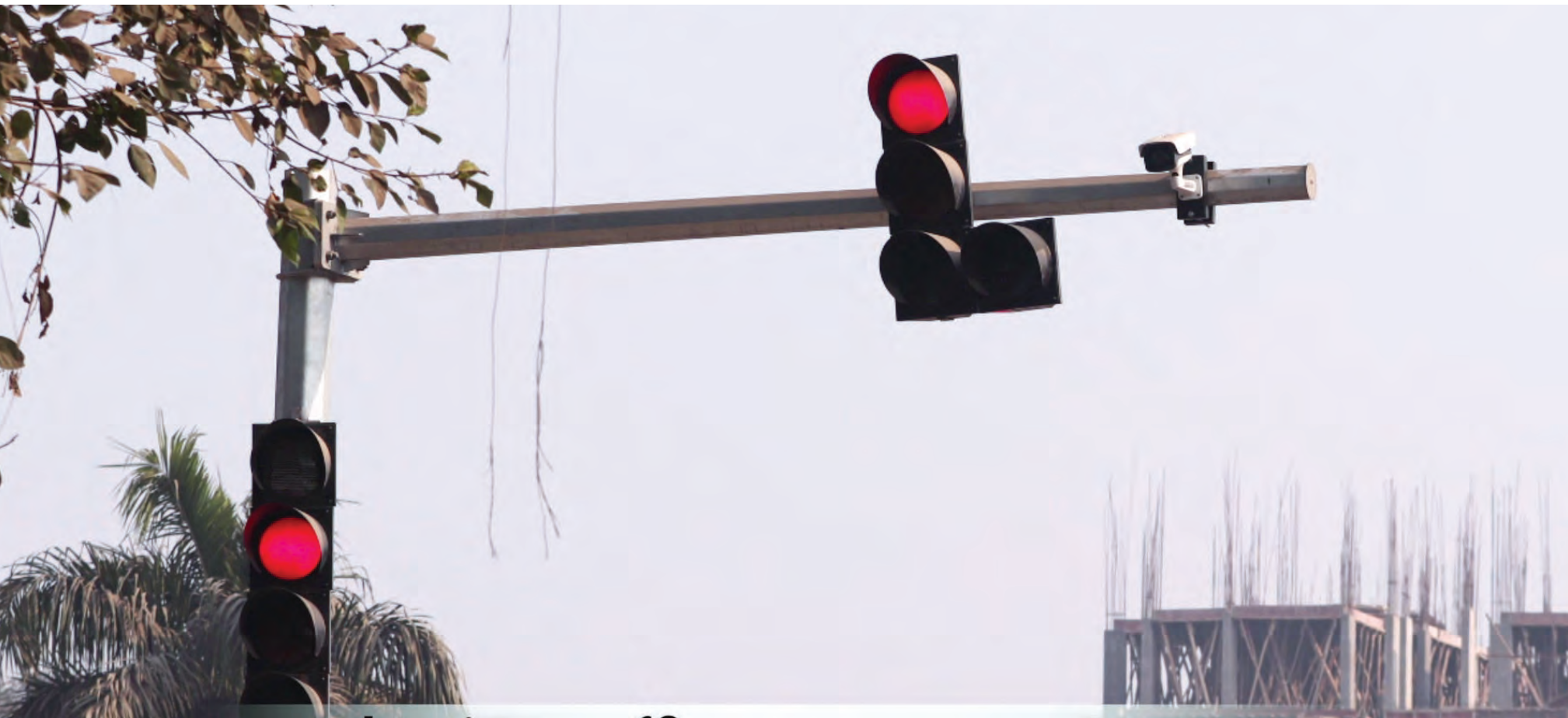
helmet detection on a two-wheeler, unwanted/banned vehicle detection, wrong-turn detection and human classification, like loitering detection, person collapsing, gesture recognition, and behavioural biometry.

Apart from these two Data Centres as a part of Phase 1 at Municipal Corporation Prayagraj (MCP) and Kumbh Command & Control Centre were also established along with Cloud-based Disaster Recovery Centre managing the operations of Kumbh and Prayagraj city areas. The Data Centre has the capability of recording and storing video feeds for 15 days during Kumbh Mela and 30 days post-Kumbh Mela. Ten per cent of the total CCTV camera feeds considered for flagged incidents will be stored for 90 days.

However, post-Kumbh Mela, one Data Centre at ICCC will be established along with Cloud-based Data Recovery for city operations which would include the migration of partial infrastructure of the Data Centre being established at Kumbh Command & Control Centre. Besides, 2 dedicated and interconnected command and control centres, manned by 20 operators each, have also been established for Kumbh Mela and Prayagraj city operations, out of which the ICCC will provide a platform with the ability to receive, intelligently correlate and share information to predict better outcomes. Additionally, a 30-operators call centre with the Kumbh Mela Helpline No. 1920 has also been set up at Kumbh ICCC for enriching pilgrims' experience during the Mela period. The call

centre, which is integrated with 'DIAL 100' for emergency response services, would operate in 3 shifts and would be operational 24x7. Apart from this, 4 Viewing Centres at strategic locations were also set up for localized monitoring of the Kumbh Mela activities.

With the help of ICCC, it was for the first time that a command and control mechanism was put in place in Kumbh Mela 2019. Making the best use of that as against the entry allowed to the ghats from several points, this time access points were controlled from ICCC which were fed with information from over 1,100 cameras tracking the movement of people and vehicles. This technological solution also empowered the authorities with a video management system and video analytics which could be used for automatic number plate recognition and red light traffic violation detection.

In fact, on the main bathing days, especially on the Mauni Amavasya which witnessed over 60 million people taking a holy dip at Sangam, over 450 Pan Tilt Zoom (PTZ) surveillance cameras helped the security forces manage the crowd by holding them up at separate spots for about 50–60 minutes, which was primarily done to prevent too many people gathering at a particular point. Whenever the density of crowd exceeded 3 people per square metre, a soft alert was triggered to commence evacuation. However, if the figure crossed 5 people or more per square metre, it signified emergency as the crowd density indicated conditions for a stampede.

Besides the dense crowd counting, the cameras

Cameras on the crossings were installed in a way that they gave a 360-degree view

were also capable of recognizing faces, which was a plus point and could be used to identify criminals. However, this technology was not put much to use. The success of a disaster-free Kumbh Mela can be attributed to the blend of contemporary technologies like Artificial Intelligence with the needs of millions of pilgrims and tourists in the form of Smart Solutions.

Post-Kumbh Mela, various services being provided to various departments including Police, Traffic, Electricity, Smart Street Lights, Water, Transport Services, e-Governance and Waste Management would be integrated and operated from the fully functional ICCC in Phase 2 of the project.
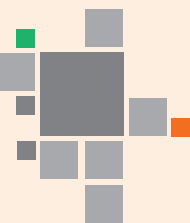
View inside the war room of ICCC where officials from different departments, including the Police Department, sit and monitor the city
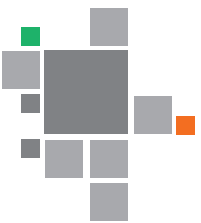
RAISING THE BAR

AMIT SINGH, Director-Advisory, PricewaterhouseCoopers

We, at PricewaterhouseCoopers (PwC), feel privileged to be part of this transformational journey of delivering Kumbh Mela 2019 by leveraging digital experience. During the inception stage, while Prayagraj Smart City Limited (PSCL) was preparing Prayagraj to be a world-class Smart City and was in the stage of conceptualizing various Information and Communication Technology (ICT) and infrastructure projects, another authority, i.e. Kumbh Mela Authority, was involved in making the city ready for hosting one of the world's largest religious gatherings on the planet, i.e. Kumbh Mela. The event was scheduled to be organized for 50 days starting from 5 January 2019 to 4 March 2019 and was expected to host more than 12 crore pilgrims and visitors not only from the country but from across the globe.

Interestingly, the Divisional Commissioner, Prayagraj, was not only the Chairman, PSCL, but was also the Chairman of Kumbh Mela Authority. Additionally, various senior IAS, IPS and state services officers were on the board of both the authorities. PSCL therefore played a very crucial role in making the city Kumbh ready not only by way of infrastructure but also from the ICT perspective.

The state government, especially Kumbh Mela Authority, wanted to ensure that management of the crowd should be done intelligently through ICT implementation and therefore the responsibility of making the city and Kumbh Mela area ready and safe from the security and surveillance perspective was provided to PSCL, which led to the requirement of a world-class Integrated Command & Control Centre (ICCC) for Kumbh Mela 2019.

PwC, being the ICT consultants, had to ensure that not only the city but the Kumbh Mela area would be provided with security and surveillance services. Implementation of ICCC was therefore envisaged in two phases: Phase 1 for the Kumbh Mela area and the city area during the event, and Phase 2 for the entire city with added services post-Kumbh Mela. While designing the project for Kumbh Mela 2019, we adopted a holistic approach to identify the potential and immediate requirements for Phase 1 of the ICCC implementation and services like CCTV Surveillance, Traffic Management, Solid Waste Management, Parking and Crowd Management using Artificial Intelligence were envisaged for the project.

Various tasks for the successful delivery would include stakeholder management from various domains like Municipal Corporation and Traffic Police to understand their vision and requirements from ICCC perspective. After various consultations with the stakeholders and considering the vastness of the Kumbh Mela area and the population it is going to cater to, it was decided that two separate Command & Control Centres (CCC) with 2 Data Centres with data redundancy facility and 4 Viewing Centres should be provided in the Kumbh Mela and city area.

Considering the importance of Kumbh 2019 and unlike other government projects, flexibility in the implementation timelines was nowhere an option and therefore the PwC team had ensured that each location for the installation of security services like CCTV cameras, traffic junctions should be thoroughly surveyed without any scope of error in the stringent timelines, and a detailed bill of quantities was prepared. After several rounds of discussions with the authority, the Request for Proposal (RFP) was prepared and through a transparent bid process management, the Master System Integrator (MSI) was onboard for the implementation.
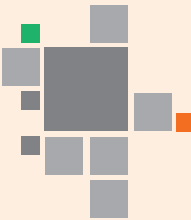
As soon as the MSI was onboard, the PwC team was immediately involved in project implementation at ground zero with the implementation team. With limited time in hand, the implementation of various services like preparing the foundations for the poles, installation of poles for CCTV cameras, laying of optic fibre cable for connectivity was done both during the day and at night. Since, various infrastructural project implementation was also under process by Prayagraj Development Authority (PDA) and Kumbh Mela Development Authority across the city, collation and overlapping of the work was rather challenging. Yet, through strict coordination with stakeholder via daily and weekly review meetings, the implementation works was commenced and completed successfully because of the holistic vision of the authority leadership. As the Kumbh Mela deadline was standing on our head, so did the proportionate pressure for the completion of the work within timelines. At the same time, the PwC team had to ensure that all the components get implementation under the committed timelines with no compromise in the quantity and quality of the services through strict on-site audits along with compliance on the delivery documents and timelines.

The ICCC was inaugurated by Hon'ble Prime Minister Shri Narendra Modi on 16 December 2018, and started functioning properly before commencement of Kumbh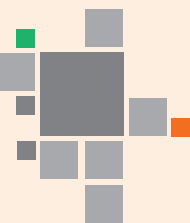 Mela. The two ICCCs in the city and the Kumbh Mela area were supported by data centres and 4 Viewing Centres, 30-operator call centres along with 1,100+ CCTV cameras at 250+ locations across the city, 30 junctions provided with Adaptive Traffic Control System, Variable Messaging Signboards for 40 locations, GPS tracking of 500+ sanitation vehicle under Solid Waste Management, Parking Management at 10+ locations. State-of-the-art Artificial Intelligent-based Crowd Management System was fully functional with analytics cameras installed at 35+ strategic locations across the city and Kumbh Mela area. Strict Standard Operating Procedures (SOPs) were formulated with relevant stakeholders to manage situation and flow of commands.

All the above components played a vital role for the management of the entire Kumbh Mela event. All operations for the management of the crowd's security and safety was controlled through ICCC. There have been various instances during the event, especially on the day of 'Mauni Amavasya' on 4 February where more than 5 crore pilgrims and visitors were in the city, when ICCC and Crowd Management System played a significant role in controlling stampede situations. With the inclusive and holistic approach adopted by the leadership and thorough understanding of the previous Kumbh Melas, the Kumbh Mela of 2019 was completed and ICCC project among others implemented by Prayagraj Smart City has been a crucial denominator in the security and safety of the over 24 crore pilgrims and visitors. The events have been registered as the world's largest gathering of humans on earth for any religious meet in *The Guinness Book of World Records.*

PwC, as consultants, has managed events previously too, but Kumbh Mela 2019 has been a feather in our cap and will always be the lighthouse for other mega events to be held across the country and the world. Whenever the massive impact of the ICT amalgamated with religion in any mega size event will be discussed, Kumbh Mela 2019 with ICCC-project amalgamated with security and surveillance services will be the torchbearer.

ENHANCING THE SERVICES

ALOK CHOUBEY, Team Leader, Aarvee Associates

I feel honoured to be engaged by Prayagraj Smart City as Team Leader for Project Management Consultant (PMC) for the overall redevelopment of Smart City, including planning and management of works. PSCL appointed M/s Aarvee Associates Architects Engineers & Consultants Private Limited to design, develop, manage and implement Smart City Projects in Prayagraj, Uttar Pradesh. PMC team is represented by a team leader and duly assisted by teams with varied experience in urban planning, designing of projects, construction supervision and ICT-based solutions apart from routine MIS works for all stakeholders as per their requirements.

The team leader is the interface between the Board of Directors to Planners of Works and the executing agency, including quality of work within the specified time and cost optimization for all identified projects. In compliance to Smart City Mission guidelines, I, being Team Leader, had to extensively coordinate and facilitate in the overall execution of planning, design of urban infrastructural works and project monitoring work, including construction supervision work. Working on prestigious projects in a limited time frame, optimal cost with correct procurement strategy, and getting projects cleared is always a big challenge in any government project. PSCL has excellent teams of well-experienced senior government officials who provided active support with clear vision and defined output to get the projects approved.

Apart from routine work, following are the major features provided in the current planning stage for improving the lifestyle of city residents.

- Redesigning individual road layout for full utilization of public space by remaking footpath with raised platform in all major roads for dedicated and unhindered space available for walking.
- Provisioning of demarcated auto/taxi stands which help in organizing the spaces within city and make better use of available space.
- Finalizing specification and procurement for Tourist Information Centre and prepaid booths for ease of the public and organizing the various scattered facilities at designated locations.
- Public bus route finalization across the city; finalizing the number of buses required and providing locations for bus shelter; and prepaid booths at various locations for better utilization of public space.
- Redeployment of parks in ABD area to make them people-friendly.
- Creating space at multiple locations for optimal usage of land and bio-diversity of the area for people-friendly facilities.
- Identifying various public places for installing open-air gyms and toilets for full utilization of resources.
- Integrating all projects in Project Monitoring Software for quick response and monitoring progress review by all senior officials.
- Updating the projects in Smart City Mission portal for viewing by Central and state government agencies.
- Geo tagging of all the projects for public viewing in compliance to GoI data.
- Interacting with various stakeholders for getting their views.
- Overall supervision for ICCC in Prayagraj town.
- Finalizing locations for Public Address System, Variable Message Signboards and CCTV camera locations with various stakeholders like Police, Nagar Nigam and Prayagraj Development Authority.
- Overall monitoring and contract administration for ICCC project and Smart City project.
- Planning for the overall development of Nazul land for public use at various places in Prayagraj, including sport facility, auditorium, amphitheatre, sport complex, etc.
- Overall planning for heritage building restoration and tourism facility along with improvement and facade lighting.
- Finalization of location of public toilets within city limits for various suitable locations.
- Construction supervision, for all the ongoing works.
- Measurement certification for all Smart City projects and overall compliance checking of all components of works as per Board directive.
- Planning and engineering detailing of the sports facility in various government schools for students and other citizens after school hours.
- Planning of Smart Classroom beautification for the selected classes.
- Planning and overall design of proposed workshop-cum-office complex for Prayagraj Nagar Nigam.
- Planning and detailing of day parking-cum-night market at 2 locations to make this place as parking during daytime and as night market for foods and other recreation facility so that the family can utilize their quality time in the open.
- Involved in engagement of operator for night market at various locations for utilizing the place as per intended purpose.
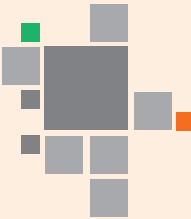
Hon'ble Chief Minister Yogi Adityanath flagging off a sanitation vehicle

For the disposal of solid waste, Prayagraj Nagar Nigam had set up a solid waste plant in Baswar in 2012. Developed in an area spanning 62 acres, this plant processes the solid waste generated by the entire city. Altogether, 100 metric tonnes of solid waste gets processed in this plant per day, scientifically. On 4 July 2015, the Nagar Nigam contracted Hari Bhari Allahabad Waste Management Private Limited to dispose of solid waste in a scientific way. The responsibility of Hari Bhari ranges from door-to-door garbage collection to transportation, to processing and disposal of the waste generated from

IMPROVING
SANITATION

the city. Hari Bhari Allahabad Waste Management Private Limited was incorporated on 19 April 2012. It is classified as a non-government company and is registered at Registrar of Companies, Kanpur.

Currently, around 3,300 *safai karmis* and 90 *safai nayaks* have been appointed to keep various roads and lanes of all the 80 wards of the city clean. Around 27 port stations have been developed by Prayagraj Nagar Nigam from where solid waste is collected and taken to the plant for processing. Besides, under the plastic management rules of 2016, Hari Bhari is also required to dispose of plastic waste by making plastic granules using plastic granular machines.

About 50 metric tonnes of C&D waste gets generated in Prayagraj daily. To manage this waste, Prayagraj Nagar Nigam is planning to set up a separate plant for C&D waste management for which RFP document has already been prepared. The plan will be set up soon. Besides, to manage and dispose of the hazardous waste, another plant by Arrow builders has already been established in Naini.
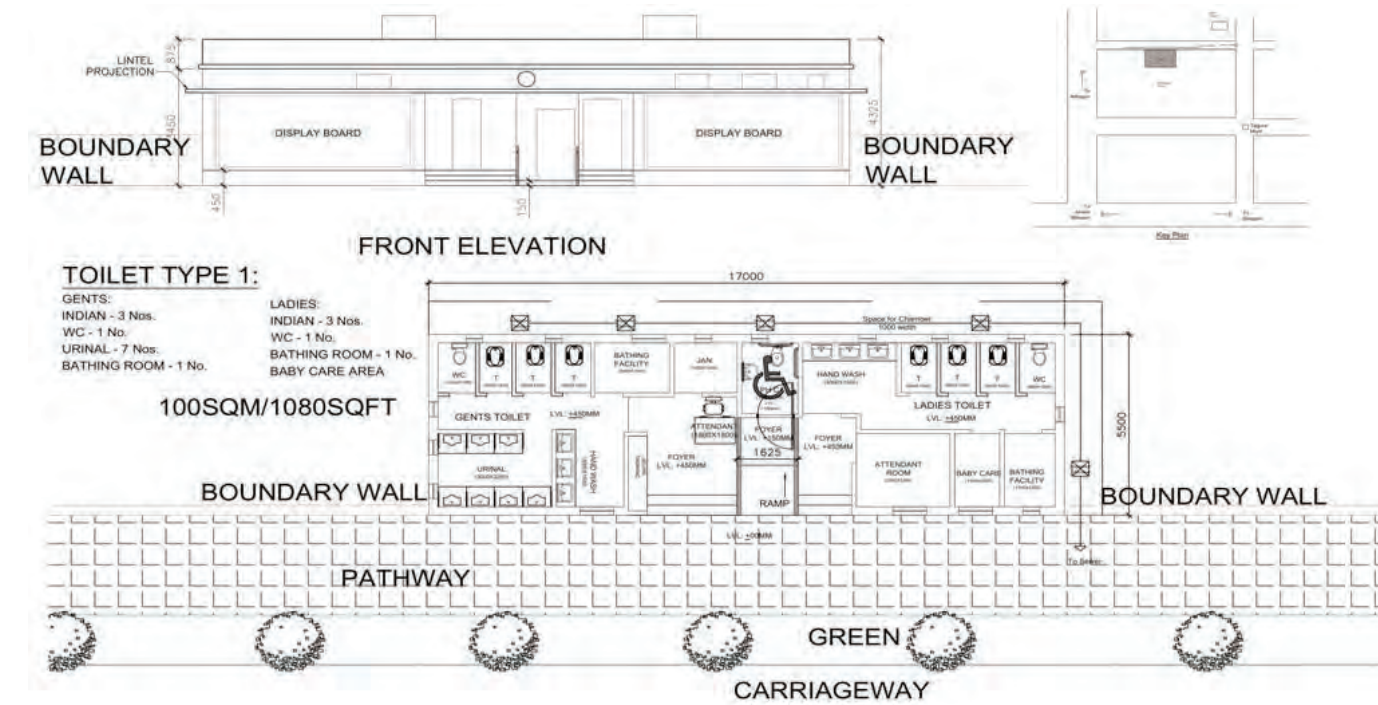
A blueprint of a sanitation complex along the roadside and photographs of the solid waste processing unit at Prayagraj where the entire solid waste was processed
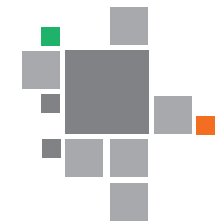
Acknowledged by UNESCO as an 'intangible cultural heritage of humanity', Kumbh 2019 offered a number of new things to tourists with a primary focus on user experience. To add to Kumbh 2019 magnificence and make the Mela more attractive, this time more than 25 theme gates were constructed with each one having its own identity. Strategically placed, mostly on the approach roads and at the beginning of each sector, these gates acted as landmarks and guided pilgrims in reaching their destinations. Some of the famous gates on different roads and sectors included Shankh Dwar, Dhanush Dwar, Nandi Dwar, and Airawat Dwar, to exemplify a few.

Construction of premium tents and Tent City for promoting tourism,

SUCCESS OF
KUMBH 2019
A GLIMPSE

an arrangement of heritage walks, tourist walks, facade lighting on bridges and noticeable structures, laser light and sound show and Virtual Reality (VR) experiences, water sports along with the decoration of city roads in uniform colour themes were some other attractions of Kumbh 2019. Moreover, public accommodation for 20,000 pilgrims, development of dedicated vending zones (including night markets), 7 convention halls for over 2,000 cultural programmes, Kala Gram and Sanskriti Gram were other integral parts of special arrangements done to enhance user experience. While Kala Gram was a creative village designed to showcase distinctive artwork with 13 dedicated pavilions developed under unique themes, Sanskriti Gram was a megastructure with 17 different galleries exhibiting structures from different Indian civilizations.

An aerial view of Sangam during Kumbh 2019. Millions of people thronged this place during the festival to take a holy dip
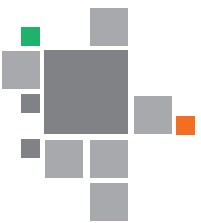
The special *aarti* at Sangam

Prayagraj has been constantly significant because of its river and waterways connectivity, hence the initiative taken up by the Inland Waterways Authority of India to run *CL Kasturba* (semi-cruise of IWAI) for explorers and sightseers to take a joyride in one of the most antiquated river routes of India that covered Sujawan Ghat, Old Naini Bridge, Saraswati Ghat and Quila Ghat ended up being extremely successful. It is noteworthy to mention that these experiential rides were planned to keep all safety aspects in mind and life jackets were provided to each visitor before boarding the cruise.

The Government of Uttar Pradesh had additionally mobilized the state cultural departments for exhibiting the rich and diverse cultural legacy that India possesses. Musical performances ranging from traditional to folk dances and *pravachans* (sermons) were organized on a daily basis for the visitors' entertainment. Some of the prominent musical performances included Ramlila of Indonesia, Ramlila of Trinidad, a dance performance by Hema Malini, flute by Padma Vibhushan Pandit Hariprasad Chaurasia, Mohan Veena by Padma Bhushan Vishwamohan Bhatt, Carnatic violin by Padma Bhushan Dr ML Subramaniyam, violin by Padma Bhushan N Rajam, Mohiniyattam by Padma Shri Bharti Shivaji, Dhrupad by Padma Shri Gundecha Brothers, and sitar by Padma Shri Ustad Shahid Parvez, to give some examples. Special arrangements for a laser light and sound show and some water sports were also made.

An important initiative to integrate technology with user experience was also taken wherein a whole new digital experience of 360-degree VR world during Kumbh 2019 was organized. Numerous VR kiosks – where visitors and pilgrims could watch the Kumbh 2019 videos of

A special cruise was organized during Kumbh Mela 2019. Almost all the VIPs who marked their presence in Kumbh 2019 made it a point to take that cruise

major events such as Peshwai (grand procession of *akhadas*), auspicious bathing days (*snaans*), Ganga *aarti* (worship) and other footages from this grand festival with the help of VR sets – were set up.

360-SECURITY ARCHITECTURE

The security architecture was formulated keeping the Kumbh Mela area as the core area and the adjoining areas as control areas. The entire Mela area was divided into 10 zones and 20 sectors and altogether 40 police stations and 58 police outposts were formed, with 1 outpost each on both sides of the 22 pontoon bridges. To cater to any kind of exigency/disaster during the Mela

period, a multi-tiered security strategy was implemented. Under this arrangement, river security was managed by 900 Jal Police and flood company of the Provincial Armed Constabulary (PAC), over 200 National Disaster Relief Force (NDRF) personnel and 70 State Disaster Relief Force (SDRF) personnel.

Water control room, floating jetties, rescue and speed boats, deep water barricading, reflective river line, diving suits for police and private divers, remote control lifebuoys, all-terrain vehicles, water scooters for patrolling and rescue operations, and life jackets were also arranged to make river security foolproof. Ten thousand life jackets were distributed to boatmen and it was made mandatory for all pilgrims to wear them during boat rides. Over 120 police motorboats and around 700 private boats were deployed on the 8km-long bathing ghats to prevent any drowning incident.

(Left) Crew installing cameras to enhance the surveillance system of the city

(Right) An aerial view of Swami Avdheshanandji's pandal during Kumbh 2019

(Below) Hon'ble Minister of State for External Affairs, Government of India, General (Retd.) VK Singh and Hon'ble Minister for Health, Government of UP, Shri Siddharth Nath Singh along with Heads of Nation from various countries

A glimpse of the Peshwai, the formal entry of *akhadas* in the Kumbh Mela area

Fire security was managed by 1,375 firefighting personnel along with the Jal Nigam which had installed over 4,000 hydrants at an average distance of 60m in the entire Mela area to meet any kind of fire contingency. Forty-three fire stations, 15 fire sub-stations and 13 static fire posts at each of the 13 *akhadas* were also established. For the first time, high-pressure trolley-mounted water mist fire extinguishers, 52 bikes with water and foam mist fire extinguishing systems, firefighting speed boat along with portable water pump, and air bags for lifting heavy objects during accidents were also used.

In light of the densely inhabited Mela area, various types of police and para-military forces were deployed for overall security. This included 21,000 civil police (inclusive of traffic police, radio, mounted police, motor transport department), 563 women police, 2 STF teams, 3 NSG commando teams, 26 Coys of PAC, 80 Coys of CAPF, 648 traffic police, 211 mounted police, 2 ATS commando teams, 7 sniper teams, 363 intelligence personnel, 30 anti-sabotage teams, 13 BDDS teams and 17 dog squad teams. About 50 four-wheelers, 200 bikes, 10,000 home guards, and 6,000 recruit constables were also deputed 24x7 to meet any kind of eventuality.
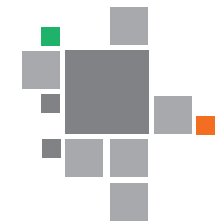
BLENDING TECHNOLOGY WITH TRADITION

In a unique initiative to blend technology with tradition, apart from the conventional announcement-based *khoya-paya* (lost and found) centres run by two NGOs, for the first time a

Hon'ble Minister for Health, Government of UP, Shri Siddharth Nath Singh during a cruise

Hon'ble Prime Minister Shri Narendra Modi visited the Kumbh Mela twice. During his second visit, he not only took a holy dip, but also felicitated sanitation workers by washing their feet
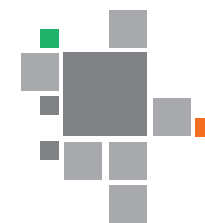
fully computerized lost and found system was installed. This meant instead of following the traditional approach, wherein the kith and kin of a lost person were supposed to approach the Public Address (PA) desk and rely heavily upon the announcement to find their lost family member, relatives of the lost person could now just give his picture and details to the digital lost and found desk, which in turn would display the details on the numerous digital screens installed across the entire Mela area, railway stations at Allahabad Junction and Jhunsi bus stop. Lost and found service was also linked to the Kumbh Mela and UP Police websites, so that anyone could upload the required details from anywhere. This not only enhanced the outreach but also significantly improved chances of finding the lost person. Altogether, 36,939 individuals were registered at the digital lost and found centres, out of which 36,908 were reunited with their family through this initiative. To make this happen, 15 centres in different sectors interconnected with state-of-the-art communication system and with facilities to hold the lost and found people were also established. Coordination with NGOs, roping of Police Mitras (volunteers), and creation of centralized digital lost and found system, were also some of the groundbreaking steps taken to augment the entire communication and security arrangement.
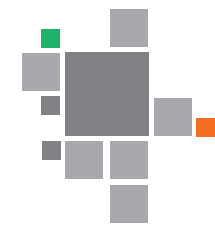
Hon'ble President of India Shri Ram Nath Kovind also visited Kumbh Mela 2019. During his visit, he also unveiled a 30ft-tall statue of Maharshi Bhardwaj

Hon'ble President of India Shri Ram Nath Kovind also did Ganga Pujan along with his family during his visit
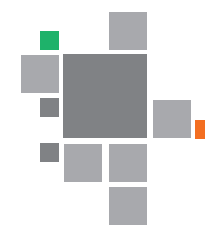
Hon'ble Vice President of India Shri Venkaiah Naidu also visited Kumbh 2019

Hon'ble Chief Minister Yogi Adityanath, along with Hon'ble Minister for Health Shri Siddharth Nath Singh and Hon'ble Minister for Stamp, Court Fees and Civil Aviation Shri Nand Gopal Nandi and Minister of Urban Development Shri Suresh Khanna, during an inspection visit

Besides, details of police stations/outposts, parking, traffic movement on peak and non-peak days, shuttle/railway/bus stand and senior officials deputed at the Kumbh Mela were also made available on the dedicated Mela website. A separate website to handle complaints ranging from lost and found, registration of e-FIR, identification of location of the nearest police station and parking lots was also developed. The idea was to ensure that pilgrims did not face any problem in procuring information. This website was linked with a separate mobile application for better and speedy services.
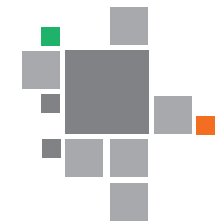
SURVEILLANCE WAS KEY TO SECURITY

Surveillance and communication were the two most important aspects of security and hence the monitoring of the entire Mela area as well as the

city was done from 2 Viewing Centres, the Kumbh Mela Integrated Command and Control Centre (Kumbh Mela-ICCC) established in the Kumbh Mela area and the Modern Control Room Command and Control Centre (MCR-CCC), established at Police Lines, Prayagraj. Both these centres were connected with 1,103 CCTV cameras at 268 strategic locations to manage real-time alerts, Intelligent Traffic Signals, Variable Message Signboards, ANPR cameras and Adaptive Traffic Control.

Use of Video Analytics-based Crowd Management System to measure crowd density (used for the first time to preclude and prevent stampede) was another big task which the experts sitting at these command and control centres were entrusted with. The Master System Integrator (MSI) for surveillance and security,

Hon'ble Minister of State for External Affairs, Government of India, General (Retd.) VK Singh accompanied the delegates from over 180 countries to Prayagraj during the Kumbh Mela

The delegates were welcomed by Indian folk dancers from various states

A number of renowned artists from across the country were invited to perform in Kumbh Mela. Politician and Bollywood actor Smt. Hema Malini was one of them
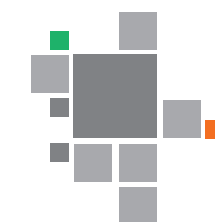
Larsen & Toubro, and the experts of Motilal Nehru National Institute of Technology (MNNIT) were roped in to execute this video-analytics mechanism. Besides, an MOU was also signed between MNNIT and Kumbh Mela Police to generate crowd-density alerts periodically at different strategic locations and bathing ghats to flag emergency. For monitoring camera feeds, 3 teams of 20 police personnel (for 8-hour shift at each Viewing Centre)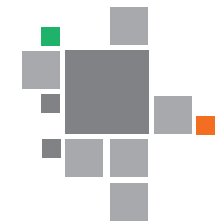 were set up for round-the-clock monitoring. A total of 120 people were trained for this purpose. A corridor-wise segregation of the Mela area, which was linked to 13 Police Radio telecommunication grids, was done and each personnel entrusted with the task to sit in the control room was taken for a field visit first to understand the place he/she was monitoring. Besides, a war room, which had representatives from each department and was linked to an emergency radio grid, was also developed to expedite the communication process.

The longest parade of buses was one of the three Guinness World Records that was created during Kumbh 2019. The other two were regarding sanitation and beautification

Geo-mapping of the entire Mela area with coordinates plotted on Google Maps to assist police response vehicles (PRVs) during emergencies was another initiative, which turned out to be extremely advantageous. UP Dial 100 was integrated with the Mela Helpline No. 1920, to create alerts and a 30-seater 24x7 call centre was also run for the entire Mela period to assist the pilgrims in the best way possible. Over 90 people were trained for (8-hour shift each) this purpose. This measure was particularly successful as the call centre was able to comfortably handle about 3 lakh queries during the entire Mela period.

A 60ft canvas was hand-impressed by 7,664 people, breaking the previous record held by South Korea with 4,675 handprints. This became a Guinness World Record for 'most contribution to a handprint painting in 8 hours'. This was a community engagement activity in which people from all walks of life and from around the world participated
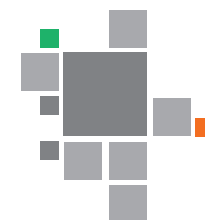
DEVELOPING A COMPREHENSIVE MOVEMENT PLAN

An elaborate traffic plan was drawn up not just for Prayagraj and the Kumbh Mela area, but even for the adjoining districts to manage the traffic inflow and outflow. To ensure that everything went according to the plan, several initiatives to ensure coordination between agencies engaged in Kumbh Mela work and traffic management were also put in place. Two types of traffic plans – one for normal days and the other for the main bathing days – were chalked out. Emergency traffic diversion plans for Mela and city areas were also prepared to avoid congestion at Sangam nose on the 6 main bathing days. Watchtowers for pedestrian traffic management at prominent junctions, e-rickshaw and shuttle bus facility, 1,176 signages to guide people to their destinations, Variable Message Signboards in over 100 places to update pilgrims, cranes for towing away illegally parked vehicles, barricading for *akhadas* and *Shahi snaans*, security of Akshayvat, Hanuman Mandir and uni-directional movement of pedestrian and vehicles were also put in place.

Besides chalking out private vehicle and bus routes to the Mela area from the airport, a separate movement plan for pedestrians in coordination with the Railways and Roadways was also made to prevent stampede or any other causality. A new concept of holding area for the pilgrims to control traffic inflow and outflow from Sangam was also introduced to preclude traffic congestion. Ninety-five parking areas were developed within the radius of 5km from the bathing areas, with 18 of them developed as satellite towns with all the basic amenities that included toilets, shelter and cloakrooms, ambulance, drinking water, electricity, police check posts and vending zones.

A total of 1,300 hectares of land was acquired to create these massive parking lots which had the capacity to accommodate 5.67 lakh vehicles. Several other traffic plans which included a National Highways traffic plan for diversion, route plan for *Shahi snaans*, barricading plans as well as a Mela emergency route plan were also prepared proactively to avert any kind of mishappening. Other strategies for effective crowd management included easy access to bathing ghats from the parking areas connected directly with different sectors. This sectorial movement plan turned out to be a great success as pilgrims were persuaded to take bath in the nearby ghats from the parking and settlement areas. Keeping Prayagraj vehicular traffic-free on peak days and as much as possible on non-peak days, separate movement plan for each of the four zones (Arail, North Jhunsi, South Jhunsi and city area), reducing average travel on foot to 2km on non-peak days and 3.2km on peak days and separate entry and exit routes were further keys to success. This was achieved by adequately deploying police personnel with proper communication gadgets and signage plans.

Unique plans for peak days (T-1 and T+1 days), which included flushing out vehicles from the Mela area and the city, clearing of holding areas and vending zones, activating farther parking lots and relocating bus depots to the outskirts of the city 2 days prior to peak days, particularly turned out to be very fruitful. During peak periods, the city area was made a No Vehicle Zone and extra manpower, including around 10,000 volunteers and civil society organizations, were deputed for this purpose.

Barricaded hold-ups to streamline crowd flow, mobile barricades and folding barricades at different junctions and roads for traffic regulation in Mela area were also planned. Proper

Pilgrims taking a holy dip in Sangam on the peak days were pleasantly surprised by the Pushp Varsha (flower rain) that was carried out by the authorities

Foreign delegates were warmly welcomed at Prayagraj Airport

communication channels to ensure coordination on a day-to-day basis between different police forces – Kumbh Mela Police, Prayagraj District Police, Railway Police, ATS, STF, Special Intelligence, NSG, IB, NTRO, NDRF and CAPF to facilitate swift action in times of need were also planned in advance to avert any type of last-minute commotion.

APPROBATION AND LAURELS

Kumbh 2019 got far-reaching approbation from individuals over the globe, including the ones featuring at the top in the hierarchy of accomplishment. Setting a matchless precedent, Heads of Mission of 70 countries, joined by Minister of State for External Affairs, GoI, General (Retd.) VK Singh and Uttar Pradesh Health Minister Shri Siddharth Nath Singh, visited Prayagraj and Kumbh Mela a month before the official commencement of the Mela.

Special arrangements were made for the dignitaries who arrived on a day-long visit to witness Kumbh 2019 arrangements. Many students lined the street leading to the Mela area, waving flags in the conventional gesture of welcome. At the event venue in the Mela region, the Mission Heads visited a unique exhibition on Kumbh Mela ventures, exhibiting the 'Making of Kumbh 2019'. This was followed by a cultural event and a documentary presentation, *Making of Kumbh*. The team of officials in charge of Kumbh Mela 2019 took the opportunity to

apprise the Mission Heads of the amenities that would be provided to visitors and pilgrims during the mega event. The diplomats were felicitated with shawls and were later taken for a boat ride in the Sangam. Thereon, the group headed to Arail Ghat, the venue for the flag-hoisting ceremony. Sending out a message of unity and peace, 70 diplomats hoisted flags of their respective nations – creating history on the banks of the Sangam.

Kumbh 2019 also witnessed the arrival of Pravasi Bhartiyas (Non-resident Indians) in the first-of-its-kind event. Special arrangements were made for their travel from Varanasi (where they had come to participate in Pravasi Bhartiya Diwas) to Prayagraj. Upon their arrival, they were welcomed with folk performances from various Indian states at the Tent City (developed at the heart of Kumbh Mela area), followed by a boat ride at Sangam and Akshayvat darshan. They were here for a day-long trip and were later sent to Delhi by special trains arranged by the Indian Railways to witness the 70th Republic Day event.
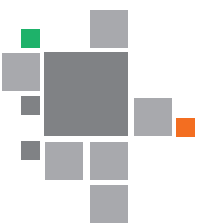
Lunch was organized in the Tent City (VIP residential accommodation) to welcome Non-resident Indians during Kumbh 2019
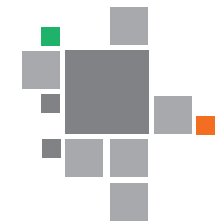
An aerial view of the city of tents in the Kumbh Mela area

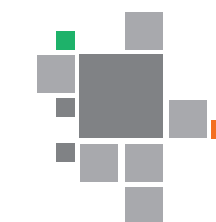The special *aarti* in the Mela area during Kumbh 2019 was a magnificent sight to behold
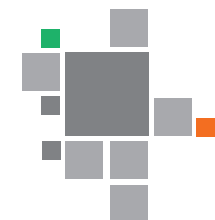
The third and other most important event was the visit of delegates from 180 countries. Accompanied by Minister of State for External Affairs, GoI, General (Retd.) VK Singh, they arrived at the Sangam city on two special flights to get a glimpse of Kumbh Mela's rich cultural legacy. Welcomed at the airport with garlands and folk musical performances, these ambassadors of peace from different nations were also given an opportunity to see the heritage of Prayagraj through the lens of modernity.

Kumbh 2019 also received immense support from international and national political leaders. The Prime Minister of Mauritius, who visited with his wife; the President of India; the Vice President; the Chief Justice; and several other political bigwigs all commented positively about its magnificence. The Prime Minister of India, who visited this sacred land twice, specifically referenced it as a model of commendable public management in his talks in India as well as abroad, particularly with respect to sanitation, security, probity, and transparency. It is noteworthy to mention that three Guinness World Records were also made during the course of the Mela: for the longest parade of buses; the most number of people sweeping the roads at a particular time; and the highest contribution to a handprint painting in hours, all of which further added to the glory of Kumbh Mela 2019.

The Kumbh Mela team along with Heads of Mission in Arail Ghat after the flag-hoisting ceremony