# MASS HOUSING AND LIVEABILITY
## MAPPING OF THE GROUND REALITY

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# Contents

# WHY THIS STUDY?

The ongoing COVID-19 pandemic has brought to the surface many inadequacies of our urban built environment. In the month of April 2020, India witnessed a mass exodus of migrants who live and work in sub-optimal conditions in cities but have largely remained invisible. This crisis put a spotlight on them and the unsustainability of their houses and habitat. This has also underscored the point that the sustainable resource efficiency and sufficiency that cities are aiming for to decarbonize the economy and minimize environmental degradation cannot be achieved if solutions are not mainstreamed for all.

The World Bank has estimated that nearly 40 million migrant workers (inter and intra-state) were affected by the hard lockdown phases in India.[1] Other independent and indicative estimates take this number to 120–140 million.[2] According to Centre for Monitoring Indian Economy, unemployment rate shot up to 23.52 per cent from 8.75 per cent in March 2020.[3] As per Hunger Watch—a collection of social movements—the pandemic has left the urban poor poorer, hungrier and with less nutrition than their rural counterparts.[4] Some 45 per cent rural respondents had to skip a meal and nearly two-thirds of the urban respondents had to do so in October 2020. In the past year, many lost the means to live in the cities and moved to their rural stations.

This has serious implications as the migrants are an integral part of the informal economy in cities. Remaining in cities was also very important for the migrants themselves because it offered them a chance to educate their kids and achieve inter-generational mobility. Overall, COVID has forced many into poverty—nearly 230 million, according to an independent research by Azim Premji University. This is the population that lies below the national minimum wage threshold (Rs 375 per day). The pandemic has caused socio-economic demographic shifts as well. In general, households lost around 22 per cent of their cumulative income over eight months (March 2020 to October 2020). There was also a shift in workforce pattern due to the pandemic according to this study. It said that nearly half of formal salaried workers moved into informal work during the pandemic.[5]

Another analysis by Pew Research Center finds that the pandemic has undone the progress made by India to alleviate poverty from 2011 to 2019. The poverty rate in India likely rose to 9.7 per cent in 2020, up sharply from the January 2020 forecast of 4.3 per cent, according to the study. This has neutralized the efforts in the previous decade, during which the number of poor in India is estimated to have decreased from 340 million to 78 million.[6] The middle class in India is also

estimated to have shrunk by 32 million in 2020 due to the economic slowdown compared with the number it may have reached without the pandemic.

Urban poverty and pandemic induced distress are eroding all welfare gains and also compromising the access of vulnerable groups to liveable and habitable housing and surroundings. Post-pandemic economic recovery will have to keep the poor at the core of policies and initiatives to leave a lasting impact and start the recovery from the ground-up. The second wave of COVID-19 in India was much more intense. While its exact impact is yet to be analysed and established, it is clear that it has left a severe dent on India's economy.

It has therefore become necessary to understand the aspects of liveability of the new mass housing projects that are being constructed under central and state government policies. While rolling out this housing stock, the governments need to integrate the criteria and improved guidelines on serviceability of these settlements. Some factors which determine people's welfare and wellbeing are accessibility of these settlements to the economic hub and job centres in cities; adequate provisioning of essential services like schools, health centres and hospitals; and access to public transport infrastructure. This also has a bearing on the larger urban design and infrastructure that determines how much carbon, pollution, ill-health, energy intensity and economic distress will get locked in.

It has also become necessary to assess the redevelopment and resettlement of the informal settlements of the poor. If not addressed, these issues can seriously compromise health, wellbeing and economic opportunities of the poor.

Against this backdrop, India's housing programme requires reassessment to understand the gaps in delivery of services that have a bearing on quality of life in the housing settlements. So far, housing programmes are aiming to fill the gap in housing provisions to reduce the shortage. But focus on quality of life and access is not adequate.

Even the estimate of housing shortage is debatable. The erstwhile Ministry of Housing and Urban Poverty Alleviation set up a Technical Group on Urban housing Shortage (TG-12) in 2012, which estimated the housing shortage in India based on congestion, non-serviceability (katcha houses), obsolescence, and homelessness to come up with a national shortage of 18.78 million in their report.[7] Based on this estimate, India's ongoing housing programme—Pradhan Mantri Awas Yojana (PMAY)—was launched in 2015. Under this scheme, fresh demand surveys were conducted which revised the national housing demand to

11.2 million dwelling units. However, recently, Indian Council for Research on International Economic Relations (ICRIER) estimated the latest housing demand in the country (as of 2018) using the same methodology adopted by the TG-12.[8] This study has included the slums and thus shows a mean shortage of about 29 million units, while the upper bound may lie around 50 million houses. This is a staggering target.[9]

The plight of housing shortage falls disproportionately on the poorer households. In fact, available estimates show that about 95 per cent of housing shortage is in the economically weaker sections and in low-income group (LIG) category—56 per cent in economically weaker section, and 39.4 per cent in the LIG category. Shortfall in middle-income and higher-income group is less than 5 per cent according to the TG-12 report.

This is also the reason why housing is considered central to the sustainable development goal and planned urbanization for improving quality of life globally. The UN Habitat places housing at the centre of the New Urban Agenda to reinforce its significance in uplifting quality of life of people and creating better cities.[10] Housing construction also plays a crucial role in economic growth considering its forward and backward economic linkages—it accounts for 6.8 per cent of the employment in India, according to a study by National Council of Applied Economic Research.[11] The share of informal employment to total employment in residential construction alone is second highest among all sectors, next only to agriculture. For every Rs 1 lakh investment in the residential construction sector, 4.06 new jobs are created.

## Refocusing housing

In the post-pandemic scenario, housing has been placed at the centre of economic recovery not only to stimulate economic growth and jobs but also to improve health and well-being of the people. In fact, in response to the migrant crisis, the Government of India has introduced a new vertical under Pradhan Mantri Awas Yojana Urban (PMAY-U) on rental housing called Affordable Rental Housing Complex for ease of living of urban migrants and the poor. This policy amendment on the sub-scheme of PMAY has acknowledged COVID-19 and reverse migration of workers that is compromising living conditions in slums; it has also acknowledged how inaccessibility of housing has increased transport costs. This new PMAY vertical aims to provide 'dignified living' and address the equity concern. It seeks to leverage vacant housing and construct new rental building stock.

The original PMAY programme verticals included beneficiary led individual housing construction in which individual households in low-income group get incentives to build houses. This has seen quickest up take hogging 63 per cent of the incentives. These households with security of *pattas/tenure* can improve their houses. The 'Affordable Housing in Partnership' vertical, which involves construction by private industry, has garnered 32 per cent of the incentives, according to a CSE study—Beyond the four walls of PMAY.[12] The in-situ slum redevelopment and credit linked subsidy scheme are still very small parts of the programme—about 2–3 per cent of the incentives so far. It is still challenging for the EWS households to access housing loans. Rental housing has opened up new opportunities.

For rapid augmentation of housing stock through the PMAY programme, both central and state governments are providing a range of incentives. Accordingly, 'Infrastructure status' has been accorded to affordable housing; central public enterprises are to give priority to use of land for affordable housing; GST for the affordable housing sector has been reduced from 8 per cent to 1 per cent; and PMAY requires states to provide additional floor area ratio (FAR) and transfer of development rights (TDR), and relaxed density rules for slum redevelopment and low-cost housing.

Several state governments therefore have provided exemption from stamp duty, additional FAR and TDR, and relaxed density rules. Some states like Telangana are providing free sand, steel and cement at subsidized rates. Construction cost has been capped in several states to keep the housing stock affordable. For example, Telangana has capped construction cost at Rs 1294 per sqft against market rate of Rs 1800 per sqft. Rajasthan has capped at Rs 1200 per sqft and Karnataka at Rs. 1500 per sq ft. The market rate can be at least Rs 400 per sqft higher than the construction cost. It is therefore important that the incentives are linked with performance criteria related to liveability and accessibility.

Affordable mass housing is now synonymous with urban expansion, sprawl, and suburbanization as land availability within the city is shrinking. Sprawled distances have made access to jobs, economic hubs and city centre more expensive and difficult; poor delivery of urban services has compromised liveability of settlements; and inappropriate choice of material and architectural design for such housing has undermined thermal comfort of the buildings. As the policy focus is on speed of construction of houses, it leads to material choices that are pre-fabricated and adoption of uniform cookie cutter building design that is delinked from local climatic consideration.

As the profit margin of this housing stock is very thin, they often do not find space inside the city where there are locational advantages. Land value and the property market out-price such initiatives and push them to the periphery and marginal land. This may lower the cost of housing but it raises the cost of living for the lower income groups. This is leading to a paradoxical situation where families are abandoning new housing to move back to more centrally located slums and informal unplanned settlements in cities. The investment in housing therefore remains suboptimal.

Centrality of locations and access to public transport network, job centres and services matter more to the poor. Urban planning has to respond to that. Whether it is mass housing, self-constructed homes or rental housing, they all require efficient and affordable connectivity and transit services. If the new mass housing is coming up at a distance due to lack of appropriate land inside cities, this new urban expansion will have to be integrated with public transport network services that are efficient, reliable and affordable based on social pricing of commute. But such policies have not emerged yet. On the other hand, mass housing, unplanned settlements, and planned low-income settlements are extremely deficient in basic services like water, sanitation and health. The pandemic has only exposed this fact.

Experts have documented how the lockdown has crippled people living in informal settlements with issues like unavailability of water to wash hands and use for sanitation. Heaps of biomedical waste lying unattended and community water taps and toilets increase disease exposure risk. Cramped dwelling units and by-lanes disallow physical distancing. Congested dwelling units do not receive adequate sunshine and ventilation. The poorest were and will be the most vulnerable, according to a study analysing multidimensional vulnerability to COVID-19.[13] If they are excluded from urban planning, risk will increase for them and everybody else.

Settlements in peri-urban areas and peripheral locations are more constrained due to longer distances from essential services for daily needs and health care, and additional costs in the absence of public transport and intermedia public transport system (IPT) due to the lockdown. A random survey conducted in the informal settlements of Delhi revealed that 85 per cent of respondents stated they had lost their primary source of income due to lockdown while half (53 per cent) of those did not receive full salaries for the month of March 2020.[14]
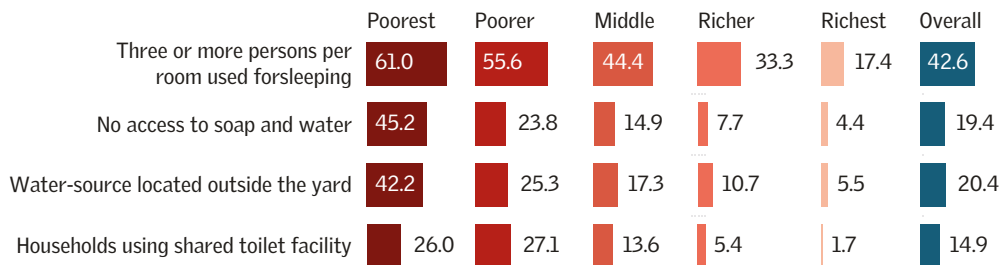
Another study shows that 55–61 per cent of the poorest and poor households live in congested condition with three or more persons sleeping in a room, 32–45 per

cent of the poorest and poor households do not have access to soap and water, 26 per cent of the poorest and 27 per cent of poorer have access to shared toilet.[15] Majority of these households therefore do not have space for physical distancing during pandemic or the ability to maintain proper hygiene. The study has analysed data from the National Family Health Survey (NFHS-4, 2015–16), which is a large-scale, multi-round survey conducted in a representative sample of households throughout India (see *Graph 1: Multidimensional vulnerability to COVID-19 infection in urban households*).

This points to the very critical nature of planning and design of mass housing that is now needed in the post-pandemic times keeping health and well-being of the most vulnerable at the core. Without addressing this, mass housing schemes are looking at enormous regressive social, economic and resource impacts.

## Graph 1: Multidimensional vulnerability to COVID-19 infection in urban households

| | Poorest | Poorer | Middle | Richer | Richest | Overall |
|---|---|---|---|---|---|---|
| Three or more persons per room used for sleeping | 61.0 | 55.6 | 44.4 | 33.3 | 17.4 | 42.6 |
| No access to soap and water | 45.2 | 23.8 | 14.9 | 7.7 | 4.4 | 19.4 |
| Water-source located outside the yard | 42.2 | 25.3 | 17.3 | 10.7 | 5.5 | 20.4 |
| Households using shared toilet facility | 26.0 | 27.1 | 13.6 | 5.4 | 1.7 | 14.9 |

Source: https://www.downtoearth.org.in/blog/urbanisation/what-covid-19-can-mean-for-sdg-11-sustainable-cities-and-communities-in-india-72987

There is global consensus on the fact that quality living requires much more than four walls and a roof. Liveability circumscribes affordability and sustainability. A liveable habitat maximizes access and minimizes expenditure of the inhabitants towards housing; basic services like water, sanitation and waste management; and infrastructure such as education, healthcare and transportation. This access is vital for upward social mobility of the poor and inclusive development.

India has adopted several housing programmes over the decades including Jawaharlal Nehru National Urban Renewal Mission (JNNURM), Basic Services for Urban Poor (BSUP) and Integrated Housing and Slum Development Programme (IHSDP). Experience shows that beneficiaries reject housing that compromises their liveability and raises operational expenditure. While these schemes were essentially aimed at improving the living conditions of the urban poor, these

schemes resettled beneficiaries at peripheral locations with limited access to basic services and infrastructure and resulted in job losses and rise in commute cost. For the same reason, housing schemes have not had takers for many years. For instance, Delhi Development Authority's 2019 housing scheme found no takers primarily due to its distant location and transportation and water problems.[16] These experiences must be internalized to guide the current and future schemes.

When urban poor move to formal housing provided under a housing scheme in unplanned locations, it threatens their job, education, access to health services and other needs and inhibits upward social mobility. Each avoidable trip costs much more than it would have costed in a central city location. Studies suggest this increment has gone up by 404 per cent for the commute cost in some locations.[17] Such settlement planning will have to be integrated with public transportation network.

The global push today is to strategically address housing at both national and local levels through the Sustainable Development Goal No. 11—Sustainable Cities and Communities—which aims to ensure adequate, safe and affordable housing for all, along with access to basic services, and to pull people living in slums to better habitats by 2030. This has to inform PMAY-U that was launched in 2015 to house every Indian in a pucca house connected with basic services by 2022. It has set a target of constructing 11.2 million housing units in urban areas, making it the largest affordable housing programme in the world. The spill over effect of the scheme is already immense as every state and union territory has adopted the national scheme and is actively constructing housing.

At the same time, several housing policies have unfolded at the city/state level as in Delhi, Ahmedabad, and Telangana, among others. These not only include formal mass housing but also schemes to redevelop and resettle informal settlements. These present another kind of challenge. This needs review to identify the ways to improve the quality of life of the beneficiaries.

While good mass housing can push cities towards becoming sustainable for all, inefficient housing and poorly designed habitats will lock in carbon intensity and disrupt the resource trajectory of the country. It can have long-lasting impacts on the quality of life of the beneficiaries as well.

## The investigation

In view of these challenges and the risks that the pandemic has exposed, the Centre for Science and Environment (CSE) has carried out an on-ground investigation of selected mass housing schemes and redevelopment schemes to assess locational disadvantages and gaps in services and infrastructure. This investigation covers a diverse set of programmes that include national housing schemes such as PMAY-U, private sector led state housing schemes, and slum rehabilitation and resettlement schemes.

Overall, several policies and master plans provide for reserving about 25 per cent of the dwelling units in any project for EWS and LIG. These stocks are used to rehabilitate slum dwellers as part of either the state housing scheme or a slum rehabilitation scheme. Similarly, master plans are required to earmark locations for affordable housing in order to receive the benefits of PMAY-U. Such provisions need to be linked with the criteria of liveability.

As the nature and scope of housing programmes vary across states and cities, this study has selected private sector-led mass housing projects in states (under different schemes) and the slum rehabilitation scheme in Delhi.

For this assessment, a simple matrix was created based on a few basic indicators related to availability of services and connectivity. These indictors have been derived from the urban planning guidelines and policies and wherever applicable from the Master Plan requirements. The first analysis is a rapid broad sweep of availability of basic services like schools, health centres and public transport nodes like bus and metro stations within 500m radius of new mass housing projects in seven selected cities spread across the National Capital Region (NCR), Punjab and Rajasthan. These include Noida, Gurugram, Faridabad, Mohali, Jaipur, Jodhpur and Kota.

Even though different policy guidelines exist on the distance criteria for provisioning of services in these formal mass housing projects, a best-case scenario of 500m distance criteria has been adopted for this assessment. The reason is to underscore that most of these settlements that are new have come up at the periphery and at significant distance from the city centre are particularly problematic for the lower income groups. They need special provision to have walkable neighbourhoods to reduce the need for motorized travel and cut down cost of travel while improving to basic services.

The second analysis includes deep dive assessment of the redevelopment of unplanned and informal settlement (Sultanpuri) and a planned resettlement (Baprola) in Delhi. This assessment has considered wider set of indicators that include availability of services like schools, health centres, public transport connectivity, water, and sanitation and waste management services. This brings out the constraints of older informal settlements that are fully and densely built up with very little scope of change and suffer from gross deficiency in basic service provisioning. The legacy burdens and limits the scope of improvement. But this still requires understanding of the opportunities for change especially as the COVID-19 pandemic has exposed the high health risks of living in a habitat with such resource constraints.

While doing this assessment, CSE has engaged with several actors in the housing sector in cities. Consultations were carried out with planning bodies such as Punjab Urban Development Authority, Jaipur Development Authority; special agencies like Delhi Urban Shelter Improvement Board (DUSIB), Rajasthan Housing Board, Telangana State Housing Corporation Ltd; urban local bodies such as Jaipur Municipal Corporation and Greater Hyderabad Municipal Corporation; regulatory authorities like RERA and industry associations such as CREDAI and its members among many others. CSE has also engaged academia, professional bodies (like Institute of Town Planners India, Indian Institute of Architects, Council of Architecture), architects and planners to sensitize them on the new approaches to habitat and bring in their insights and experiences to enrich the investigation in a two-way process. Think tanks and groups working with the poor were also consulted. Virtual meetings were convened.[18]

The lockdown affected the scope for one-on-one interviews and focussed group discussion with the habitants of the settlements. However, travel to sample cities for ground observations was possible. This report captures the findings based on this rapid and broad sweep analysis of two segments of settlements.

## Takeaways and way forward

The overall findings indicate that new housing stock is being planned without considering locational advantages and disadvantages, or implementing mitigation measures if location is not suitable. There is very poor planning of connectivity with the job centres and economic hubs. This creates huge risk of underutilisation of the new building stock even though there is housing shortage. This defeats the purpose of providing housing for all.

COVID-19 pandemic related humanitarian crisis and migrant distress has underscored that this agenda cannot be neglected anymore. More appropriate design and planning solutions are needed to ensure that policies and guidelines on the service level of the settlements are aligned for implementation to meet the objectives of inclusive planning.

**Need a balanced scorecard approach to measure and improve performance of the upcoming mass housing:** There is a need to create metrics or performance indices for approval, designing and planning of housing projects that cater to liveability, accessibility and affordability aspects of the poor. A balanced scorecard approach enables decision makers to take stock, plan and act in a comprehensive manner. This approach needs clear objectives, measures, and specific actions for results. More rigorous guidelines are needed in the master plan and zonal plans to earmark areas for new mass housing projects to minimize distances and also to integrate advanced planning of infrastructure and transportation for connectivity. This needs to be combined with indicators of energy savings, water and sanitation, and waste management. Such metrics need to be integrated with national housing guidelines (such as HFAPoA currently), PMAY, and state housing schemes.

**Adopt guidelines to integrate mobility needs and indicators for services and green performance of mass housing to inform implementation, incentives and financing:** National and state level housing policies including PMAY need to adopt detailed guidelines for mainstreaming locational characteristics, mobility related needs, and green performance of housing in new planning and redevelopment. Current green building frameworks do not include location and mobility from the perspective of the beneficiary as performance criteria of housing. Qualifiers that take into account the energy and carbon impact of the commute and the essential trips to be taken by beneficiaries in a new housing project need to be linked with performance. All incentives for housing schemes like extra FAR/FSI/TDR need to be linked with performance. Green financing must be extended only to those housing projects that holistically perform well on these criteria.

**Master plans to earmark locations for affordable housing along with mitigation strategies to integrate with public transport and improve service level:** Availability of cheap land is central to development of affordable housing. Land economics has always governed this decision. Mostly peripheral locations are identified for affordable housing both by the government and the private sector. Cities and state governments need to acknowledge the positive externalities of limiting sprawl and adoption of an efficient planning pathway and compact urban

form to reduce commute time and travel costs, improve access of the masses to efficient infrastructure and services, and ensure energy savings. Master plans are an important tool to strategically plan and regulate the location of affordable housing and manage mobility needs. Transport authorities need to work in tandem with the housing implementors to prevent temporal lag in providing access to public transport and other services and infrastructure to the allottees of affordable housing. Approvals for a new housing project should be sanctioned based on these criteria. Set of measures should be taken by the government/developer to offset the impact of the location on access to services and infrastructure for the beneficiaries. This has to be mainstreamed into PMAY-U, Smart Cities Mission, and Atal Mission for Rejuvenation and Urban Transformation, among others.

**Reform guidelines for redevelopment and resettlement of informal settlements to improve welfare, access and quality of life:** The deep dive comparative assessment of Delhi has revealed that the lower income households prefer to live in an informal settlement due to better access to jobs, education, healthcare, public transport, etc. even when the quality of basic services (water supply, sanitation, solid waste management, etc.) is inadequate. Poorly built, congested, under-lit and non-ventilated self-built housing is preferable over planned apartments that ensure safe water supply, sanitation, solid waste management and access to green spaces. This assessment builds evidence for the fact that relocating the poor to peripheral locations of the city is not only unfavourable to them in terms of access but also hinders their socio-economic mobility. This will have to be addressed to prevent sub-optimal and unproductive assets that fail to deliver on meeting housing requirements of all.

**Need city level policy and guidelines to inform interventions:** Every city is unique and therefore has specific housing and mobility requirements. Current regulatory mechanisms are inadequate to capture the idiosyncrasies of our cities. In order to facilitate this, city specific framework is needed for housing provision and should be backed by deep dive studies to understand the work-live-travel relationships and quality of life. A few indicators such as walkability/cyclability, number and types of recreation areas, number and types of public and semi-public spaces (markets, community centres, religious places, etc.), open spaces, local identity, social cohesion, social innovativeness, economic innovativeness, etc. will have to be considered to align the housing schemes with the need of beneficiaries.

**Need guidelines on rental housing that require different approaches to locational planning and operations:** Rental housing has been recognized for formal housing provisions. This has been integrated as a new vertical under PMAY

and state governments are also adopting this. MoHUA has launched affordable rental housing complexes (ARHC) as the fifth vertical under PMAY-U. The primary objective of ARHCs is to provide decent housing to the poor at affordable rents near their workplace. Most states and UTs have signed up for this national-level scheme by signing an MoA. Chandigarh, as of May 2021, leads at a national scale by already allotting 1,703 flats under the scheme so far. It is followed by Surat, Rajkot, Gwalior, Chittorgarh and Udaipur which have completed the first phase of procurement.  The COVID-19 pandemic and migrant distress has underscored its need. This enables integration of beneficiaries in-situ with better locational advantages. Rental housing has better economic feasibility in the long run for catering to the housing and mobility needs of the poor. Internalizing rental housing in urban planning and master plans therefore becomes important.

**Community engagement is key to address liveability**: Efforts to engage the community through campaigns, focussed discussions, and collaborative planning have led to positive results in settlement upgradation projects. Experts agree that the sense of ownership of habitat is instrumental in improving access to services and infrastructure. So much so that continuous engagement has even led the residents of a settlement to invest into upgradation efforts and actively operate and maintain the infrastructure. New housing must capture user perception and satisfaction frequently to improve the existing settlements and inform the future housing stock.

**Affordable mass housing projects must be executed with a focus on natural systems:** Understanding the city's natural systems in terms of its green spaces, water cycles, air and the impact of sewage, solid waste and materials on the overall ecology is important. This has multiple co-benefits ranging from health to climate change adaptation and mitigation, among others. This includes addressing principles such as density, compactness, recycle and reuse of water and waste, and better building design and choice of materials to provide well-lit, ventilated, and thermally comfortable indoors as well as minimizing energy use. As housing accounts for 70 per cent of the land use in cities, it is imperative to integrate its development with the natural systems of the city to keep the overall growth of the city on a sustainable trajectory.

**Build capacity of ULBs and housing implementors:** ULBs and SLNAs play a crucial role in implementation of the current affordable housing schemes. They are responsible for determining housing demand, typologies, identification of location, and preparing implementation plans. With new typologies of affordable housing, like rental housing, taking root, it is imperative to enhance the capacity

of these actors to effectively conduct analysis and capture the nature of housing demand based on the socio-economic characteristics of the target groups. The interlinkages between affordable housing and mobility for affordability and liveability in the interest of beneficiaries also need to be disseminated widely.

**Need dedicated regulatory bodies for quality control**: For quality control and execution of mechanisms such as balanced scorecards for housing, a dedicated agency is required. Global experience has also shown that a dedicated agency that unifies different aspects of housing such as housing schemes, urban expansion projects, basic services, slum rehabilitation, national housing programmes, among others, delivers better performance. For instance, Hong Kong Housing Authority is the nodal authority for public housing provision and unifies the activities of the housing department, resettlement department and urban services department. Similarly, a dedicated executive housing body for quality control will be instrumental to address liveability in the mass housing sector.

# SECTION 1: Private sector led mass housing projects

As mass housing construction, especially that of affordable housing, is moving beyond the city centres and municipal limits, mapping of current level services and connectivity in these locations can provide an important insight into liveability and serviceability of these settlements. This can help to understand the constraints and the opportunities for improvement.

From this perspective, two typologies of housing settlements have been considered for assessment. One is the planned mass housing projects that meet the requirements of guidelines and regulations related to service provisioning. Second is the redevelopment and resettlement of informal settlements or slums that have enormous legacy issues in terms of densely built areas with poor service levels. Both the typologies need assessment to inform policies to improve the quality of life.

Typically, in cities, urban services and amenities are concentrated around the city centre which increases the value of that land. This land value decreases as one moves away from the centre and the commercially important nodes. This variability in land value has strong bearing on the choice of housing locations. Especially for affordable mass housing, land cost is the biggest deciding factor. According to National Housing Board, land value accounts for about 60 per cent of the dwelling unit cost.

This is outpricing the houses of the lower income groups inside the cities and limiting provisions. The only way to counter this is to mandate mixed income development, by earmarking land and a certain percentage of newly built spaces for housing of lower income groups. Policies have started to address this. Housing policies require 20–25 per cent of the housing to be set aside for the affordable component. Transit oriented development (TOD) policy recommends high density and mixed income development near the transit nodes. But the template of this provision is still very nebulous. Most of the new development is happening at the periphery and creating other sets of concerns.

To understand this phenomenon, two sets of housing settlements have been assessed: i) Private sector led planned mass housing projects, and ii) slum

redevelopment and resettlement projects. This section has focussed on the overview of the planned housing projects. A deep dive analysis has been carried out in targeted settlements of Delhi.

This review has been done based on a set of indicators derived from planning guidelines and polices on urban planning. It evaluates the service level of the settlements under review to draw lessons for policy making.

## Mapping of mass housing projects

CSE has done a quick diagnostic assessment of private sector led mass housing construction in selected states under different housing schemes. The settlements selected for this rapid assessment are located in Mohali (Punjab), Jaipur (Rajasthan), Noida (Uttar Pradesh), Gurugram (Haryana) and Faridabad (Haryana). CSE has used RERA databases of Punjab, Haryana, Rajasthan and Uttar Pradesh to collect data on the location, size and other parameters of housing projects. According to the Real Estate (Regulation and Development) Act 2016, new commercial and residential projects, including plotted development, measuring more than 500 sqm or 8 units are considered.

This is a good indicator to understand the scale and scope of construction. Since these housing projects vary in size, only the larger projects were sieved for the study. The size of these projects ranges from 22,000 sqm to 1,40,000 sqm of built-up area. A few are as large as 3.5 lakh sqm. Population in these projects ranges from 1300 to 3800 persons per project and is still low but is expected to increase. Currently, on an average, each project has a population of about 2200 persons. Clear guidelines on service level and connectivity need to be assessed and implemented at the early stages of growth.

Geospatial mapping of selected mass housing projects in all five cities has been carried out to check availability of some of the key services including schools, healthcare, etc. and connectivity with major roads and public transport nodes (see *Map 1: Housing projects in cities* and *Annexure 1: Location-wise mapping of services and connectivity*). This is a macro review and does not include neighbourhood level quality of accessibility and services. This is only indicative of access to services the reach and distance of which intensify mobility needs, cost of mobility and level of distress.

Technically, services and amenities provisioning is differentiated in city master plans according to population. For instance, according to MPD 2021 guidelines for intra-neighbourhood amenities, areas with populations up to 5000 persons

**Map 1: Housing projects in cities**
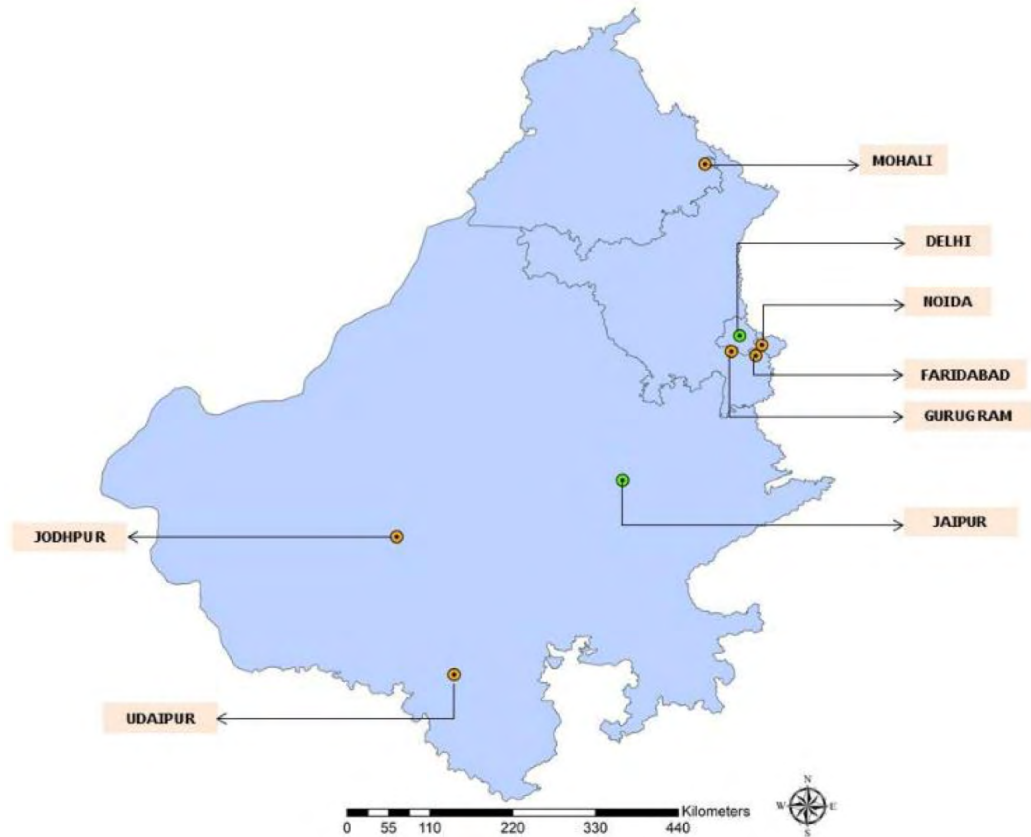


are required to have following facilities and utilities—convenience shopping, tot lot, park, playground, primary education, milk booth, etc. Areas with populations of up to 10,000 need primary school, secondary school, primary health care, local shopping, service market, informal market, auto stand, park, playground, amongst other things.

How are these housing projects planned today? As most of these new housing projects are coming up far from the city centres, their planning is largely governed by the broad URDPFI Guidelines. These broad norms expect schools, medical clinics and public transport nodes to be within a range of 1–2 km from the settlement. This is considered for the new mass housing that is otherwise not governed by specific requirements of master plans.

The provisions in URDPFI Guidelines for compact city or green city categorically state that urban sprawl is controlled by practicing high density development, green

cities should majorly use public transportation to reduce vehicular emissions, and basic transportation modes should be at walkable distances.[19] The guidelines further recommend that railway/metro stations should be located within 800m of housing projects and bus stops within 400m. Basic amenities like ATM, shopping, etc. should be within 600–800m and amenities like school, medical clinic, etc. should be within 1.6–2 km. At the same time, 25–35 per cent of the area should be open space.

In view of the fact that the overall objective of the current exercise is to promote walkable neighbourhoods, especially for the poorer section as accessing amenities and public transport can be onerous for this group, this assessment focuses on availability within a shorter distance radius and to make these locations more transit or public transport oriented. Only this will ensure that all planning related to housing is integrated with public transport service provisioning and dense amenity planning at the early planning stages.

Similar guidance is available from TOD policy that has established the accessibility criteria to make infrastructure and communities more transit oriented in the city. As all the housing projects studied are green field projects without the legacy burden of unplanned built environment, there is enormous opportunity in ensuring applications of the TOD rules and also take the extra step to make these walkable neighbourhoods better connected with the city centres. Delhi Master Plan 2021 has added a chapter on TOD to convert the principles into development control norms (see *Table 1: Accessibility criteria for social infrastructure and amenities within neighbourhood*). This specifies the walk and distance rule for housing, cluster, neighbourhood, community and district area. All facilities should be accessible within a 1–10 minute walk.

In view of these policy criteria and guidelines and particularly the compelling need of walkable neighbourhoods in low-income settlements—irrespective of population size—this assessment has considered a uniform 500m distance radius around new housing projects to assess their connectivity and access to amenities. This reiterates the principle that neighbourhoods must not require primary school kids to walk beyond 400m from the centre of the neighbourhood and it must not require residents to go further than 400m for basic supplies and public spaces. A pedestrian shed also needs to be developed. This thumb rule of a 5-minute

walk neighbourhood has to be the defining principle of new housing projects, particularly that of affordable housing.

**Table 1 Accessibility criteria for social infrastructure and amenities within neighbourhood**

| Hierarchy of facilities | Population per unit (Ref: Masterplan Ch 9) | Accessibility standards from place of residence |
|---|---|---|
| Cluster housing | 250 | Approx. 100m or 1 min walk |
| Housing area | 5000 | Approx. 250m or 3 min walk |
| Neighbourhood | 10,000 | Approx. 400m or 5 min walk |
| Community | 1 Lakh | Approx. 800m or 10 min walk |
| District | 5 Lakh | Approx. 2000m or 10 min cycling |

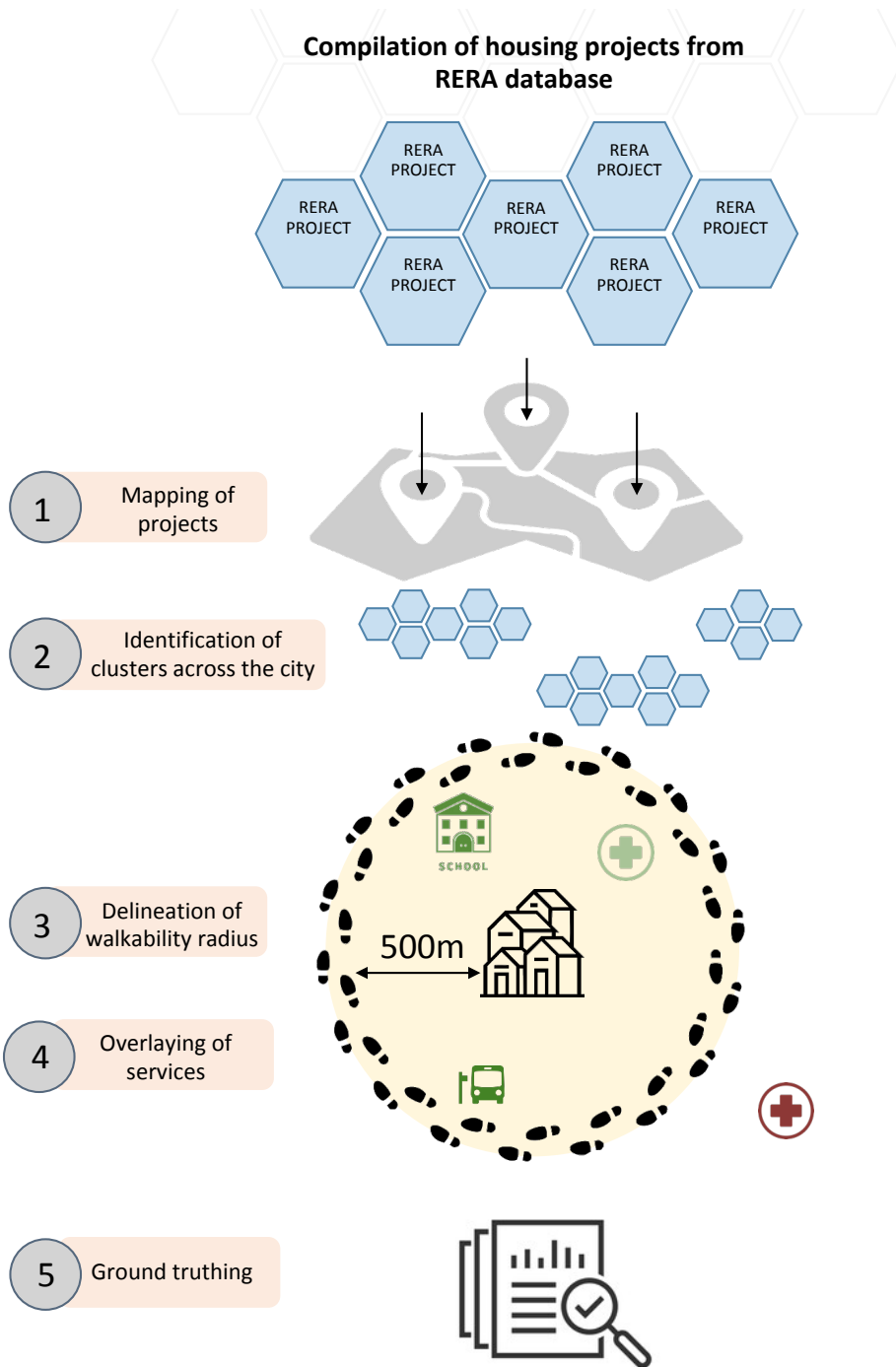Source: TOD Policy 2016; MPD TOD Chapter 12, 3C table 19.6

**Table 2 Accessibility to public transport stops from one's residence**

| Hierarchy of facilities | Desired frequency/availability at peak hr (non-peak hr can be based on requirement) | Accessibility standards from home/work |
|---|---|---|
| MRTS station | 2 min | Approx. 800m or 10 min walk |
| Metro feeder | 1 min or less | Approx. 400m or 5 min walk |
| Bus stop | 1 to 5 min | Approx. 400m or 5 min walk |
| IPT/ Auto stand | 24 hr availability | Approx. 250m or 3 min walk |
| Cycle rickshaw stand | Flexible | Approx. 250m or 3 min walk |
| Cycle rental stand | 24 hr availability | Approx. 250m or 3 min walk |

Source: TOD Policy, 3C table 19.5

With these criteria for the assessment of mass housing, the presence of schools, health clinics and bus/metro stops is calculated for each identified cluster in all the sample cities (see *Figure 1: Schematic diagram of the method*). Based on this assessment, the availability of services has been quantified (see *Table 3: Distribution of education, healthcare and public transport infrastructure in the vicinity of identified housing clusters*).

**Figure 1: Schematic diagram of the method**

Compilation of housing projects from RERA database

RERA PROJECT

RERA PROJECT

RERA PROJECT

RERA PROJECT

RERA PROJECT

RERA PROJECT

RERA PROJECT

RERA PROJECT

1  Mapping of projects

2  Identification of clusters across the city

3  Delineation of walkability radius

500m

SCHOOL

4  Overlaying of services

5  Ground truthing

**Table 3: Distribution of education, healthcare and public transport infrastructure in the vicinity of identified housing clusters**

| Sr. no. | City | Name of the cluster | No. of schools within 500m radius | No. of health clinics and hospitals within 500m radius | No. of bus or metro stops within 500m radius |
|---|---|---|---|---|---|
| | Mohali | Dera Bassi | 4 | 3 | 0 |
| | | Zirakpur | 3 | 4 | 2 |
| | | Kharar | 0 | 0 | 2 |
| | | Sunny Enclave | 0 | 2 | 0 |
| | Noida | Gaur City, Sector 4 | 0 | 0 | 5 |
| | | Sector 79 | 0 | 0 | 0 |
| | | Sector 119 | 1 | 2 | 4 |
| | Gurugram | Sector 85 | 0 | 1 | 0 |
| | | Sector 37C | 1 | 0 | 0 |
| | | Sector 102 | 2 | 0 | 2 |
| | | Sohna Road | 3 | 0 | 1 |
| | Faridabad | Sector 70 | 0 | 0 | 0 |
| | | Sector 82 & 85 | 4 | 0 | 9 |
| | | Sector 88 | 2 | 0 | 3 |
| | Jaipur | Harbanshpura | 1 | 1 | 0 |
| | | Nari ka Bas | 1 | 0 | 0 |
| | | Bagru Khurd | 0 | 1 | 0 |
| | | Lalpura 1 | 1 | 1 | 0 |
| | | Lalpura 2 | 1 | 2 | 0 |

Source: CSE

The housing projects assessed show high variability in service provisioning. Housing projects in Noida and Faridabad show comparatively more public transport access points including bus and metro stations. For example, Gaur City, Sector 4 and Sector 119 have five and four public transport stops within 500m respectively. Gaur city cluster in Noida is located along the Noida–Greater Noida link road and has closely spaced bus stops within 300–500m. Presence of a major junction near the projects makes public transport more accessible. Similarly, Sector 82 & 85 clusters in Faridabad have good access to public transport.
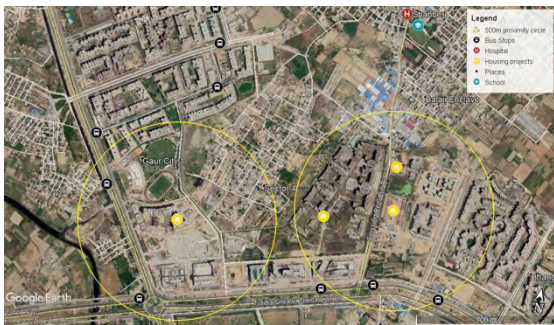
None of the housing settlements surveyed in Jaipur have a bus stop within 500m and are thus disadvantaged. The nearest bus stops were about 4 km away from the housing project. The inadequate access is the result of pro-sprawl urban form and neglect of connecting land-use with transportation planning.

With regard to other services including schools and health clinics, some of the housing projects in Mohali perform comparatively better—four schools and three health clinics in  Dera Bassi and three schools and four clinics in Zirakpur within 500m.
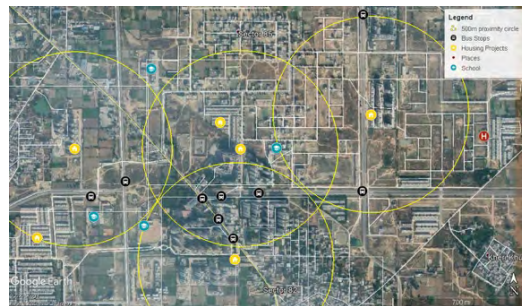
Some housing projects in Gurugram and Faridabad have better access to schools than health clinics. Sector 102 and Sohna Road in Gurugram have 2–3 schools respectively within 500m but no health clinic. Housing projects in Sector 82 & 85 have four schools within 500 meters but no health clinic. Such sparse availability of health centres within 500m from settlements is worrying to note during the pandemic (see *Map 2: Mapping of availability of schools, health centres and public transport stops within 500m*).

## Map 2: Mapping of availability of schools, health centres and public transport stops within 500m
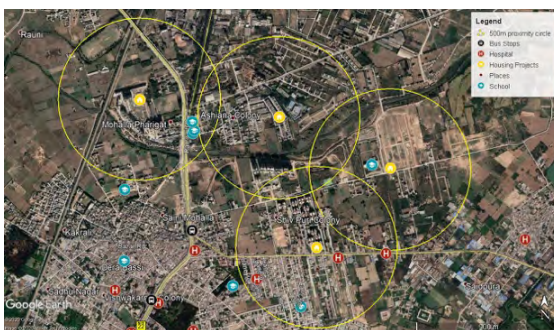
| | |
|---|---|
| *Gurugram: Gaur City 1 cluster has better access to public transport but inadequate schools and health centres* | *Faridabad: Sector 82 and 85 cluster has better access to public transport but average access to schools and weak access to health clinics/hospital centres* |
|  |  |
| *Mohali:  Dera Bassi cluster has a good presence of schools and health centres but needs better access to public transport* | *Jaipur: Harbanshpura locality has weak access to health care facility and primary school, the nearest bust stop at a 4.56 km distance* |
|  |  |
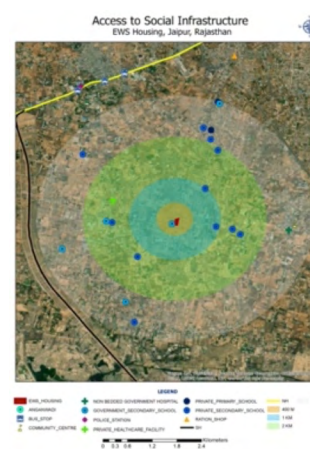
Source: CSE

Overall, it is also evident from this review that most of these housing projects have come up at a considerable distance from city centres. In most cities, new housing locations are located at least twice the average trip length of the city from the centre. Mohali has an average trip length of 5.49 km but the housing sites are located thrice the average of this trip length from the centre. Similarly, in Gurugram the sites are located 2.5 times the average trip length from the centre; in Noida twice, and in Jaipur, thrice the average trip length from the centre.[20] Only Faridabad has an average trip length of 9.67 km and the housing sites fall within this radius when considered from the city centre. Such distances are highly unfavourable for the poor.

This diagnostic mapping is a strong pointer towards developing guidelines and mandating for new development to ensure optimum service level and connectivity with clear benchmarks, especially for affordable housing clusters. This is needed now as India is implementing one of the largest housing projects and also innovating typologies like rental that are more appropriate for the poorer people.

The mandatory condition of PMAY-U to earmark land for affordable housing in respective master plans needs to be leveraged well. This reinforces the significance of master plans and zoning norms as key tools to strategically locate housing for the urban poor while optimizing mobility needs and costs for the beneficiary. This requirement, if applied properly, has the potential to address the mobility and liveability woes of the urban poor. However, there are several challenges faced by Indian cities regarding master plans.

The biggest challenge is the availability of master plans. According to the Town and Country Planning Organisation (2010), the apex planning body in India, around 76.2 per cent of the 7,953 census towns in India do not have a master plan. To fulfil the mandatory condition and to avail support under PMAY-U, most cities and towns are preparing or amending their master plans in an ad hoc manner. As a result, in 2020, the proportion of cities to have master plans rose to 35.84 per cent, according to the SDG National Indicator Framework, from 25.61 per cent in 2015.[21]

However, there are signs of change in some states. Telangana for instance has initiated a Telangana Municipal Development Project to target preparation of master plans and make a geospatial database for cities. Several other reforms are also taking place (see *Box: PMAY-U housing in Telangana: How accessible are they?*).

About 23 cities are preparing their master plans under this project. Such projects bring a great opportunity, especially in the small cities, to prepare or amend their master plans in a manner that limits mobility needs and costs. Master plans must strategically and scientifically strive to solve urban issues and upgrade well-being and quality of life of the people in the cities.

Master plans of two to three largest cities of the top 10 states with highest housing shortages were reviewed for any housing and transport related measures. In a quick analysis of about 28 master plans, it was revealed that most of the master plans do mention integrating land use with transport but lack any clear guidance or mandate regarding the same. The only mandate involves reservation for EWS and LIG houses to the tune of 5–25 per cent in any new development in the city.

Gujarat, slightly differently, has addressed the link between affordable housing and public transportation. For instance, Ahmedabad has notified a kilometre-wide buffer space along the outer ring road as the residential affordable housing zone (RAH) (see *Map 3: Ahmedabad Development Plan 2021*). Ahmedabad Bus Rapid Transit corridors are planned to intersect the RAH zone and provide frequent connectivity to the rest of the city. These corridors are zoned for TOD. To catalyse development in the RAH zone, incentives such as 50 per cent additional FSI, reservation of 10 per cent of FSI for commercial use elsewhere in the city and timed (two years) validity of these incentives, which shall lapse in absence of construction, have been offered. This strategy is expected to ensure that the beneficiaries who are going to dwell in the RAH zone have access to public transport or cheap mobility options.

However, research by Ahmedabad University suggests that this access will take time to be achieved as the RAH zone has been developed right at the periphery of the city. There is a temporal lag in the services to catch up as cities move towards 'peripheralization'. Qualitative surveys and observations in this study have revealed that the poor who are relocated from the city centre to this location have to face several constraints. These constraints include costs and inconveniences of travel, job constraints and economic stress (especially for the

**Map 3: Ahmedabad Development Plan 2021**
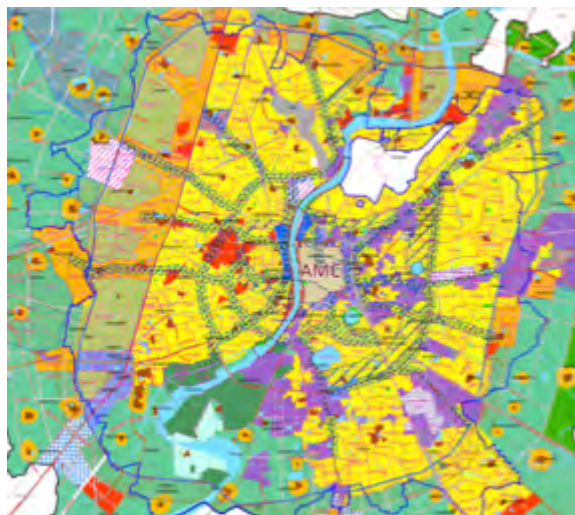
women), decline in schooling, absence and separation from families, lack of safety and crime, and loss of agency and potential for change, which overall affect the poor individual's mobility and freedom. Therefore, the current planning regime fails to address and rather worsens not only the physical mobility but also the socio-economic mobility of the poor.

## PMAY-U housing in Telangana: How accessible are they?

To understand accessibility to services in formal affordable housing, empirical analysis was conducted of the 2BHK scheme (state adaptation of PMAY-U) in Telangana. Telangana government is rehabilitating slums in-situ across the state under its 2BHK scheme. Out of about 124 slum sites spread in Greater Hyderabad Municipal area, 83 are being rehabilitated in-situ and 41 on vacant land due to site constraints according to the online geospatial database of the 2BHK scheme—Telangana State Remote Sensing Applications Centre

### Map: Affordable housing sites in Hyderabad



(see *Map: Affordable housing sites in Hyderabad*). About 25 per cent of the sites do not have access to public transport and other services due to their remote location.
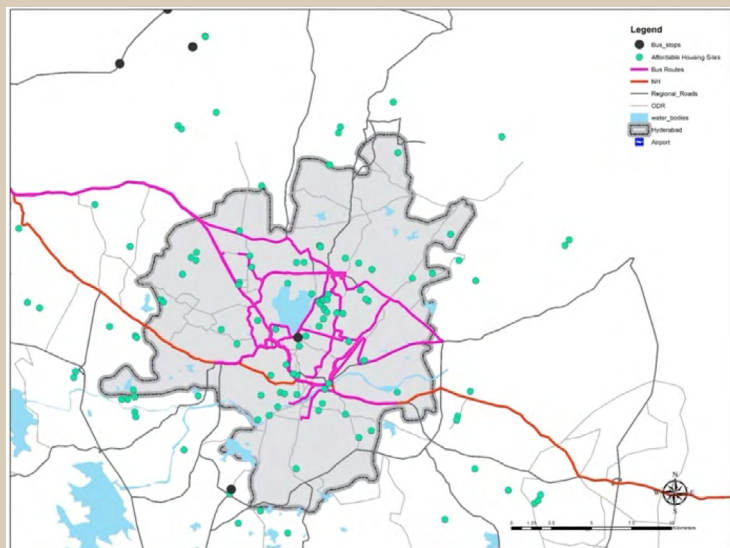
Telangana's 2BHK scheme comes with the provision of mixed-use development in some of the projects in Hyderabad. These projects promote the concept of self-sufficient neighbourhoods. For instance, the Kollur project is planned as a township that is equipped with commercial areas, health care facility, primary school, community centre, religious buildings and other social and physical infrastructure within the site. This helps in curbing mobility requirement and associated costs to a good extent.

However, it has not been possible to incorporate essential infrastructure within the sites in other areas. A sample survey of 25 2BHK scheme sites in Hyderabad reveals 50 per cent of the sites do not have any bus stop within a 400m distance (see *Table: Accessibility analysis of sample affordable housing sites in Hyderabad*). The status of proximity to primary schools is much worse. Only four sites have primary schools within 1 km radius. This indicates that mobility needs at these housing sites are going to swell and affect the liveability of the beneficiaries by increasing costs of living. In this context, self-sufficiency in affordable housing in terms of good access to services and infrastructure is an area of potential improvement for the government. The URDPFI Guidelines of 2016 suggest there must be a primary school within 600–800m distance from the neighbourhood, a health care
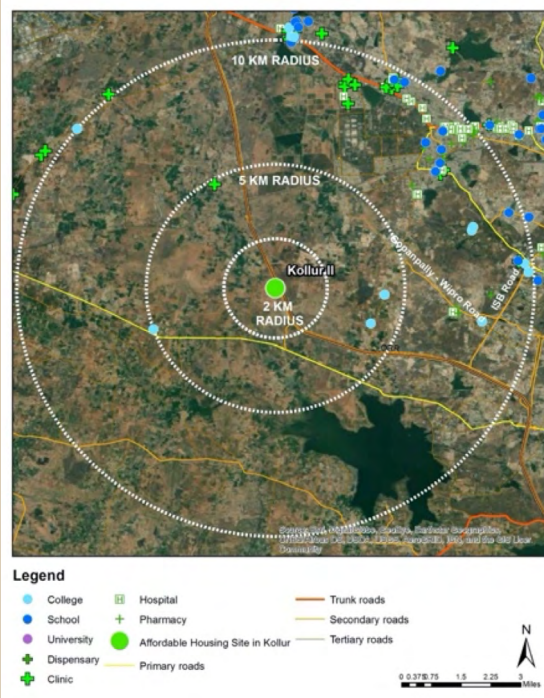
**Table: Accessibility analysis of sample affordable housing sites in Hyderabad**

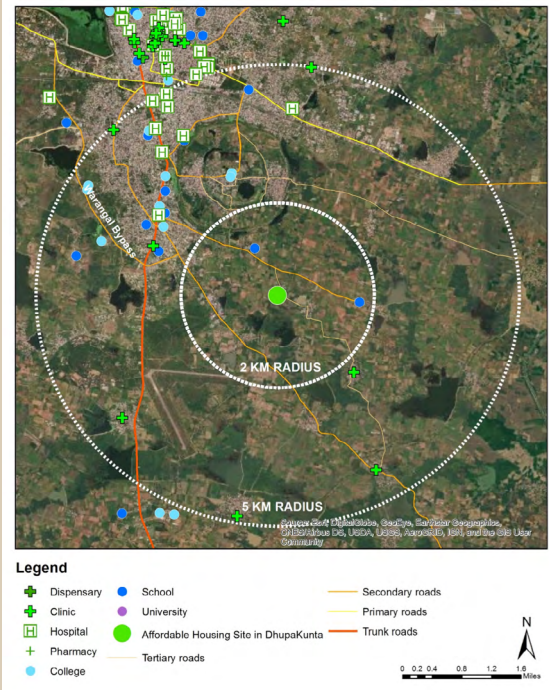| Site | No. of bus stops within 400m | No. of primary schools within 1 km | No. of healthcare facilities within 2 km | No. of secondary schools within 3 km |
|------|------|------|------|------|
| A | 1 | 0 | 6 | 0 |
| B | 0 | 0 | 19 | 10 |
| C | 2 | 1 | 4 | 1 |
| D | 0 | 0 | 0 | 0 |
| E | 1 | 0 | 1 | 0 |
| F | 0 | 0 | 3 | 7 |
| G | 0 | 0 | 0 | 2 |
| H | 0 | 0 | 1 | 0 |
| I | 0 | 0 | 1 | 1 |
| J | 4 | 1 | 4 | 5 |
| K | 2 | 0 | 1 | 0 |
| L | 0 | 0 | 3 | 0 |
| M | 2 | 0 | 0 | 0 |
| N | 10 | 0 | 6 | 2 |
| O | 0 | 0 | 0 | 0 |
| P | 0 | 0 | 0 | 0 |
| Q | 1 | 0 | 5 | 2 |
| R | 0 | 0 | 0 | 2 |
| S | 3 | 2 | 7 | 4 |
| T | 0 | 0 | 2 | 1 |
| U | 1 | 0 | 0 | 0 |
| V | 0 | 0 | 1 | 2 |
| W | 0 | 0 | 2 | 0 |
| X | 2 | 0 | 8 | 1 |
| Y | 1 | 1 | 2 | 1 |

facility within 2 km and a bus stop within 400m. Such guidelines need to be adhered to in our affordable housing schemes.

To expand the understanding on access to primary social and physical infrastructure and mobility needs, other sites in different districts were assessed. Almost all the sites reveal that the surrounding development will take some time to trigger availability of essential service infrastructure like market, health care facilities, primary schools, etc. within 2 km radius of these sites. This points to the need of making affordable housing scheme self-sufficient and improving accessibility of the beneficiaries to social and physical infrastructure.
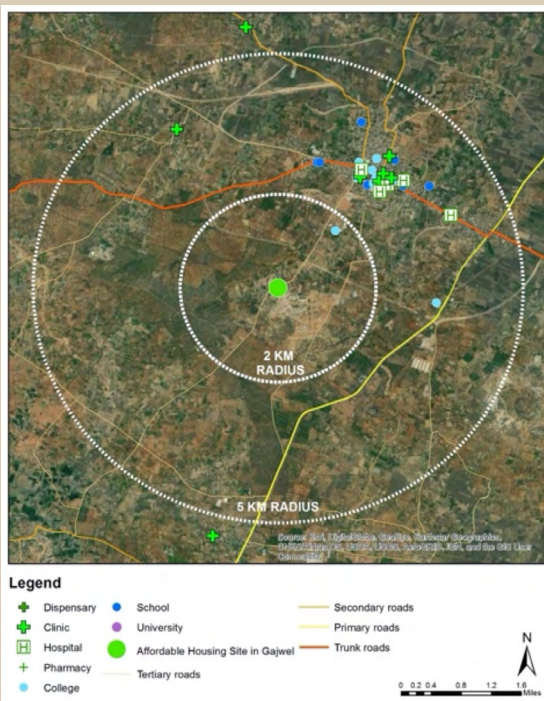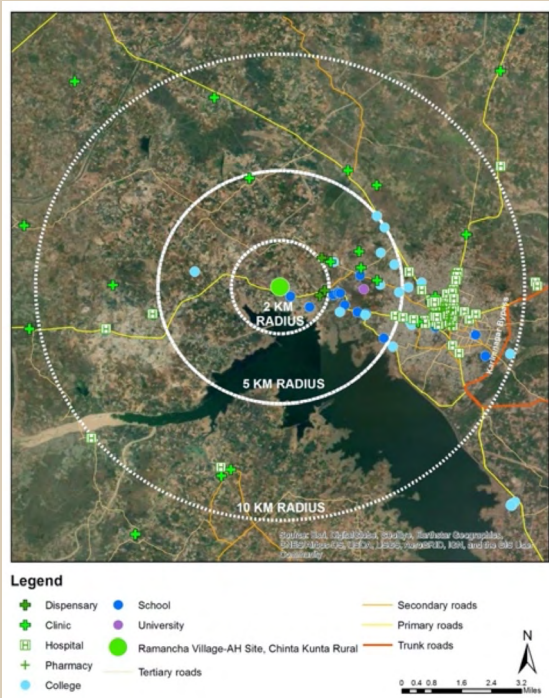
## Proximity analysis for Kollur II in Rangareddy district



**Legend**

- College
- School
- University
- Dispensary
- Clinic
- Hospital
- Pharmacy
- Affordable Housing Site in Kollur
- Trunk roads
- Secondary roads
- Tertiary roads
- Primary roads

## Proximity analysis for Dhupakunta in Khammam Urban district



**Legend**

- Dispensary
- Clinic
- Hospital
- Pharmacy
- College
- School
- University
- Affordable Housing Site in DhupaKunta
- Secondary roads
- Primary roads
- Trunk roads
- Tertiary roads

## Proximity analysis for Gajwel in Siddipet district



**Legend**

- Dispensary
- Clinic
- Hospital
- Pharmacy
- College
- School
- University
- Affordable Housing Site in Gajwel
- Secondary roads
- Primary roads
- Trunk roads
- Tertiary roads

## Proximity analysis for Ramancha in Karimnagar district



**Legend**

- Dispensary
- Clinic
- Hospital
- Pharmacy
- College
- School
- University
- Ramancha Village-AH Site, Chinta Kunta Rural
- Secondary roads
- Primary roads
- Trunk roads
- Tertiary roads

# SECTION 2: Redevelopment and resettlement projects

## Delhi deep dive

A deep dive analysis has also been carried out of informal settlements inside the city. These settlements have grown organically over time and are already fully built and are burdened with unplanned growth. Such urban settlements have become inevitable with continuous migration, iniquitous development and lack of planned intervention to improve service infrastructure.

Delhi has experienced more peripheral growth due to stringent density control in the central core the city and also because of the growth of National Capital Region of Delhi that was conceived to decongest the city. New economic hubs that include Gurugram, Noida and Faridabad have grown around Delhi and witnessed tremendous growth.[22] Delhi has not been able to keep up with the demand for housing which, according to the Master Plan exercise, requires 70,000 dwelling units a year to meet the housing shortfall.

Yet, a steady flow of migrants and a growing informal economy has created highly dense informal settlements. About 60 per cent of Delhi's population lives in sub-standard settlements with quasi-legal land tenures.[23] These informal settlements include squatter settlements, resettlement colonies, unauthorized colonies and urban villages.

As per DUSIB's Survey, there are 675 Juggi Jhopri (JJ) Bastis with about 3.06 lakh jhuggis in Delhi. As per the National Sample Survey, about 90 per cent of Delhi slums were built on public land, owned mostly by local bodies (46 per cent), railways (28 per cent) and state government (16 per cent), and only about two per cent of the slums are on private land.

In the 1960s, Delhi had 110 unauthorized colonies with a total population of 221,000. Today, there are 1,797 unauthorized colonies. According to the latest Economic Survey, about 5.5 million residents of Delhi live in sub-standard areas, of which three million live in slums.[24,25] Independent research suggests only 23.7 per cent of Delhi's population lives in planned colonies and the remaining lives in either unplanned or informal settlements (see *Table 4: Type of settlements in Delhi and their distribution*).[26]

## Table 4: Type of settlements in Delhi and their distribution

| Type of settlement | Population | Characteristics |
|---|---|---|
| Juggi Jhopri Clusters (JJC) | 17 lakh | Encroached on public land. State government: 30 per cent Central government: 70 per cent |
| Resettlement colonies | 2,67,859 plots (population unknown) | Incorporated within the expanded city with good shelter consolidation without adequate services |
| Unauthorized colonies | 40 lakh | Illegal colonies in violation of the master plan, no clear land title |
| Notified slum areas | 20 lakh | Notified under Slum Areas (Improvement and Clearance) Act, 1956. The residents are staying on perpetual lease basis. |
| Urban Village | 135 villages (population not specified) | Notified under Delhi Municipal Corporation Act 1957 |
| Homeless and pavement dwellers | 16,000 | |

Source: Delhi Urban Shelter Improvement Board

Delhi has multiple district centres. Some of the largest centres have spawned biggest informal settlements in their vicinity (see *Map 4: Livelihood centres in Delhi*).

For instance, Okhla industrial area in the South-east location of Delhi employs a high number of informal workers. These workers live in the squatter settlements in the vicinity of the industrial area itself or the largest unauthorized and extremely dense colony—Sangam Vihar—that houses more than 1 million persons. This colony came up because of its close proximity to Okhla and Tughlakabad industrial areas (see *Map 5: Proximity of Okhla Industrial Area to Sangam Vihar*). There are opportunities of livelihood, and individuals can walk or cycle to work, though in hostile conditions.

## Map 4: Livelihood centres in Delhi



Commercial

Industrial

Public & Semi-public
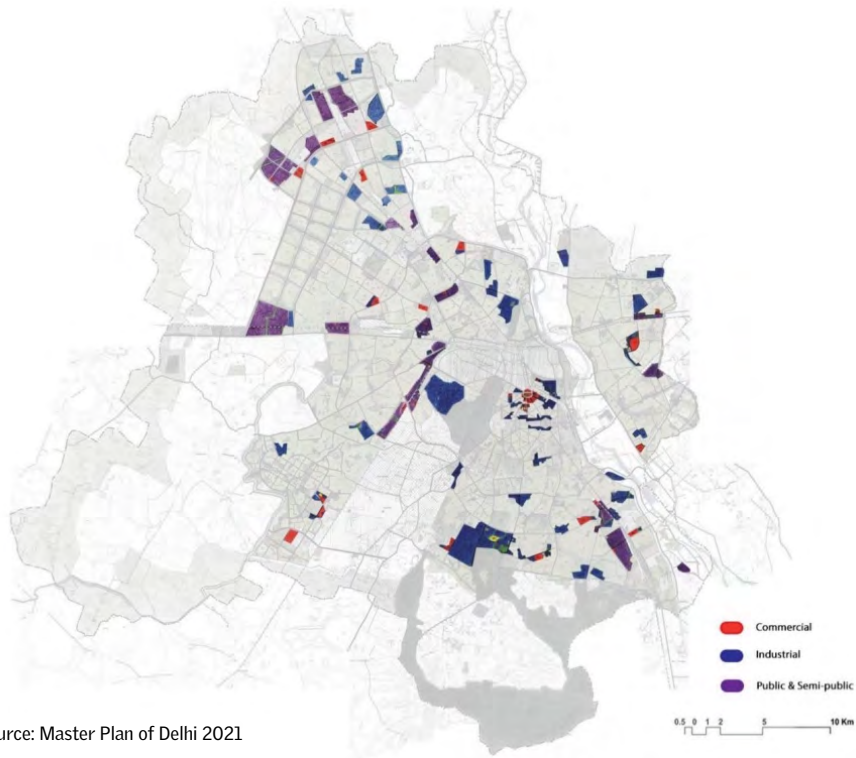
Source: Master Plan of Delhi 2021

## Map 5: Proximity of Okhla Industrial Area to Sangam Vihar

## Rehabilitation of informal settlements

DUSIB is the nodal agency tasked with the rehabilitation of informal settlements in Delhi as well as provision of night shelters for the homeless population in the city. DUSIB is governed by the government of National Capital Territory of Delhi (GNCTD) and was set up under the DUSIB Act 2010.

DUSIB adopted the Delhi Slum and JJ Rehabilitation and Relocation Policy, 2015—now renamed as Mukhya Mantri Awas Yojana (MMAY)—to promote the development and rehabilitation of the city's slums. It emphasizes that JJ bastis that came up till end of 2014 will not be removed without providing alternate housing.[27] DUSIB is currently engaged in issuing acknowledgement certificates to beneficiaries under MMAY.[28] Delhi is not actively implementing the national flagship housing scheme, PMAY-U, but has raised the need to provide housing for all under the scheme by notifying an in-situ slum redevelopment policy on PPA mode in May 2019.[29]

As per a survey conducted by DUSIB in 2017 as part of MMAY, there are 675 JJ bastis (informal settlement clusters) with about 3.06 lakh jhuggis (informal dwelling units) in Delhi. This survey was conducted to establish the housing demand for the poor.

Superimposition of JJ clusters (in red) over the land use plan of Delhi suggests majority of the clusters are either in the vicinity of railway lines or on industrial land (see *Map 6: Location of the 675 JJ Clusters in Delhi*).

**Map 6: Location of the 675 JJ Clusters in Delhi**
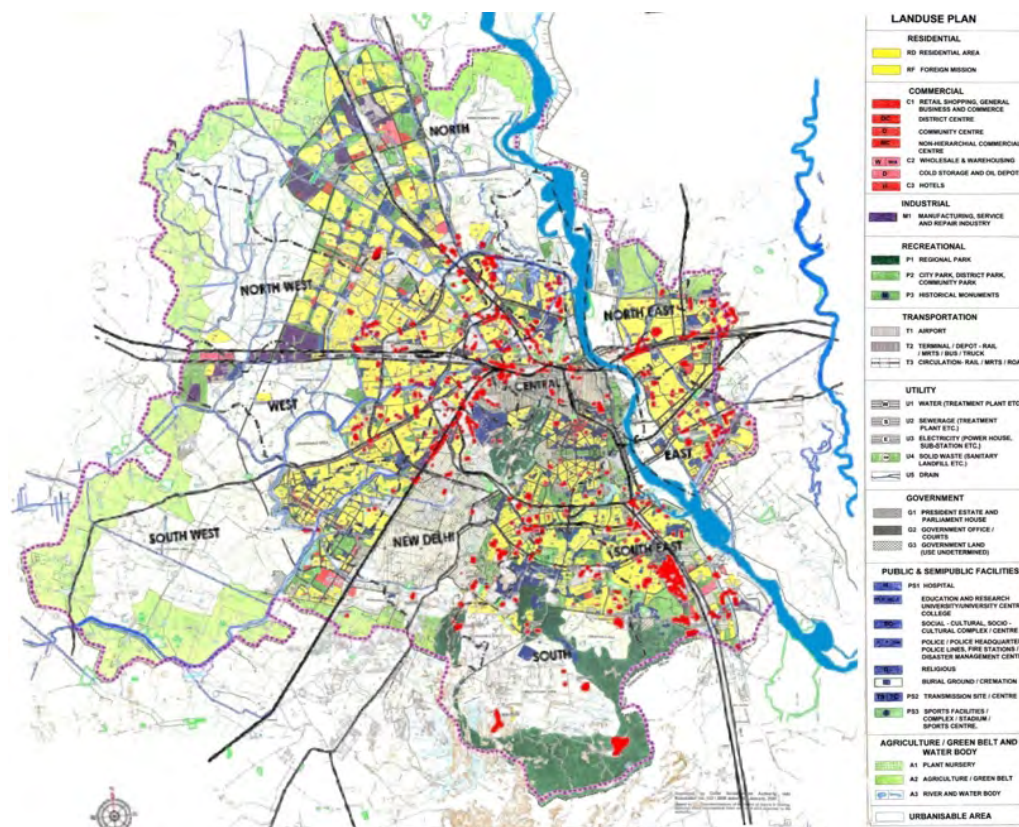


Source: DUSIB

## In-situ rehabilitation vs relocation

According to DUSIB, Government of India had approved 15 projects for construction of 52,584 dwelling units by Delhi State Industrial and Infrastructure Development Corporation (DSIIDC) and DUSIB under Sub Mission-II Basic Services for Urban Poor (BSUP) of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) during the last decade. However, the progress status of these projects was not satisfactory.

Construction of about 24,504 dwelling units has been completed while 28,080 units are still under different stages of construction. Only 2147 units—8.76 per cent of the completed—were occupied by the end of December 2019 (see *Table 5: Progress of housing for urban poor in Delhi*). The low occupancy rate can be attributed, among other issues, to the non-availability of required infrastructure,

services and apprehension of allottees about losing livelihood after moving to the units. On the other hand, in-situ development of JJ clusters faces issues relating to lack of land for providing alternate accommodation to the JJ dwellers for development of the colony.

**Table 5: Progress of housing for urban poor in Delhi**

| Total housing Inventory for Urban poor (DUSIB +DSIIDC) | Construction completed | Under construction | Occupied (as of Dec 2019) | Targeted/ Proposed for 2025[30] |
|---|---|---|---|---|
| 52,584 units | 24,504 units | 28,080 units | 2,147 units | 89,400 units |

Source: DUSIB

**Map 7: Locations of major DUSIB and DSIIDC slum rehabilitation projects**



Legend

● DUSIB
● DSIIDC
— PRIMARY_ROAD
— SECONDARY_ROAD
▭ DELHI ADMINISTRATIVE BOUNDARY
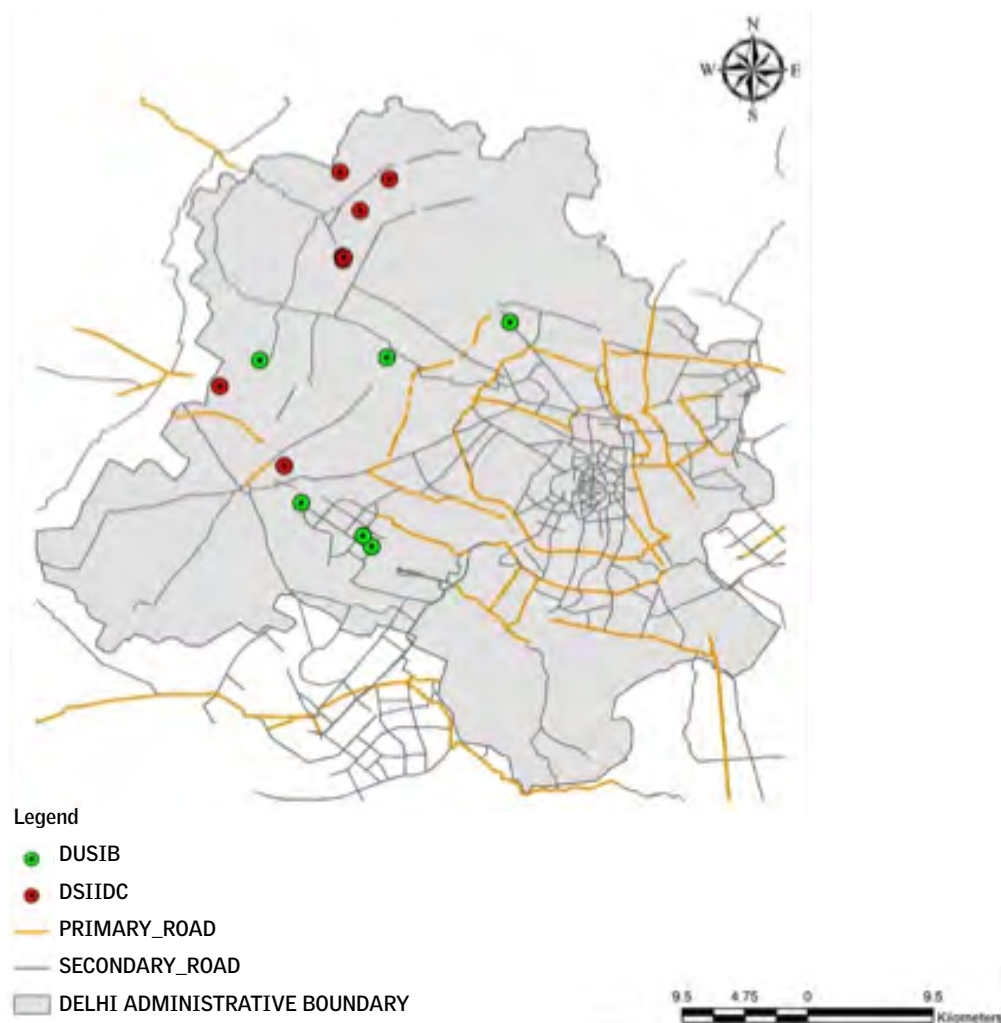
Source: CSE compilation

MPD 2021 envisages that for in-situ rehabilitation of JJ bastis, a maximum of 40 per cent land can be used as a resource and minimum of 60 per cent of land has to be used for in-situ redevelopment to rehabilitate JJ dwellers. In-situ development shall be the preferred option in order to ensure that development does not lead to a loss of job linkages or additional hours and income lost on commuting to work; where relocated, there will be an emphasis on active intervention to provide mobility or recreating livelihood linkages, according to the MPD 2021.

Under MMAY, more than 12,000 flats are proposed to be constructed as part of an in-situ rehabilitation plan. The existing housing stock of JNNURM is also proposed to be utilized for rehabilitation of some JJ clusters. A total of 45 JJ bastis with about 18,000 households are planned to be rehabilitated in the proposed 12,000 flats, which includes 7,400 flats at Bhalswa Jahangirpur and 1060 at Sultanpuri. Procurement of 582 EWS dwelling units at Sangam Park has also been initiated.

DUSIB has identified 15 sites for piloting in-situ slum rehabilitation. These are: i) Three sites at Sangam Park; ii) Three sites at Sultanpuri; iii) One site each at Sikri Bhatta/Shyam Nagar, F-block Raghubir Nagar, Lajpat Nagar, Bhalaswa Jahangirpur, Dev Nagar, Ambedkar Nagar and Jungpura, and
iv). Two sites at Mangolpuri.

Out of all these sites, Sultanpuri has undergone substantial work under this model recently. The allotment process started in 2019–20 and the units will be occupied soon. Since not many beneficiaries occupy the new units as of date, the informal settlements at Sultanpuri have been identified for assessment of their accessibility as the location and the surrounding infrastructure remain the same.

DUSIB's major ongoing relocation projects are located in Dwarka, Bawana and Bapraula. These projects have rehabilitated slum dwellers from the central parts of Delhi. Allotments started in these projects in 2019–20.

## Table 6: Relocation sites

| Sr. no. | Original slum location | Relocation site |
|---|---|---|
| 1 | Sunheri Bagh & Dhobi Ghat 7 & 9, Minto Road | Sector 16-B Dwarka |
| 2 | Kali Bari, Gole Market and Janpath | Bapraula, Phase II |
| 3 | JJ Basti Near Railway Crossing No.7 Std Booth Shalimar Bagh Gaon, Delhi-88 | DSIIDC, PKT-D, Sec-3, Bawana |
| 4 | Vishwas Nagar, 18 Quarters | Sector 16-B Dwarka, Site-3 |

**Map 8: Distances of relocation sites from original location of JJ clusters**
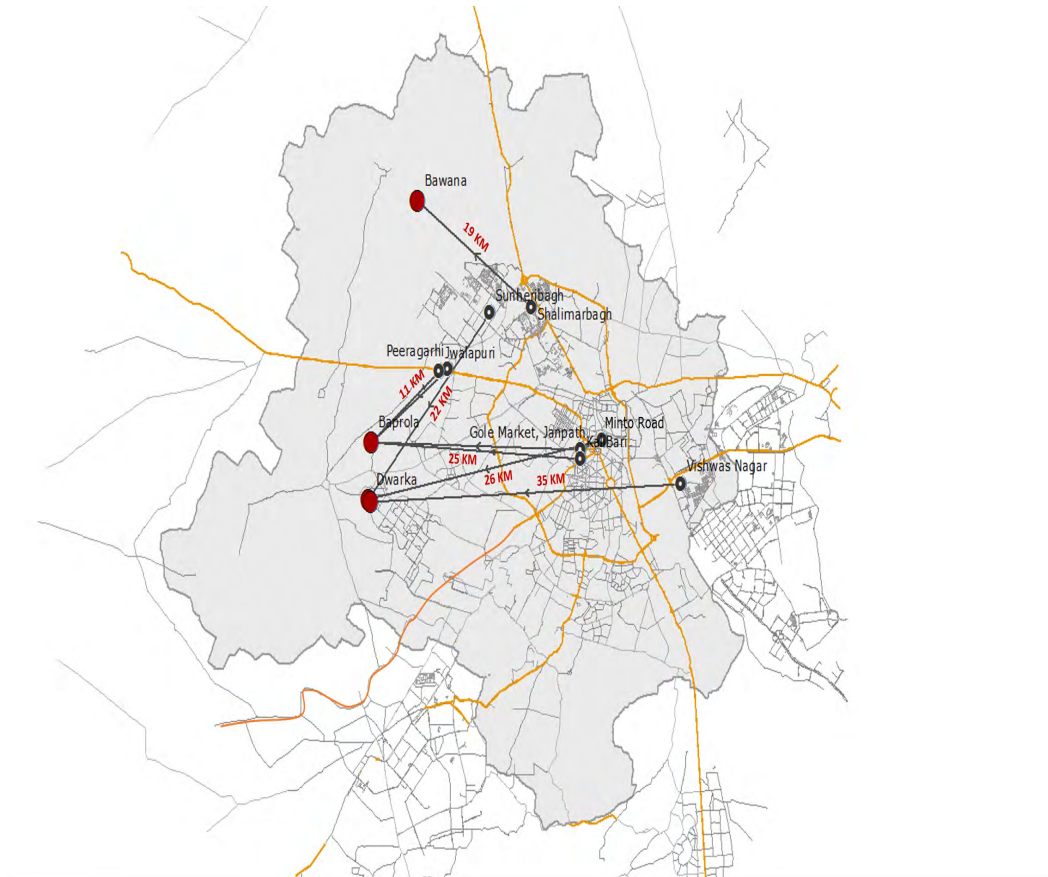


Source: CSE compilation

## Slum rehabilitation projects: Ground evidence on quality of access and services

Against this backdrop of policy and programmes on housing for the poor, a deep dive assessment of slum rehabilitation projects and resettlement projects has been carried out. Slum rehabilitation schemes in Sultanpuri and Baprola in Delhi have been assessed on liveability parameters. Both these housing locations are linked with Mukhya Mantri Awas Yojana and Rajiv Rattan Awas Yojana respectively.

This assessment has considered criteria derived from the existing policy guidelines—

**Access to school:** The Right of Children to Free and Compulsory Education Act 2009 asks for a minimum of one government primary school at the neighbourhood

level and URDPFI guidelines suggest a primary school in 1 km radius and one government secondary school in a 3 km radius.

**Access to healthcare**: Ayushman Bharat Guidelines 2018 provide for a non-bedded government healthcare facility at community level and URDPFI guidelines place it within 2 kms.
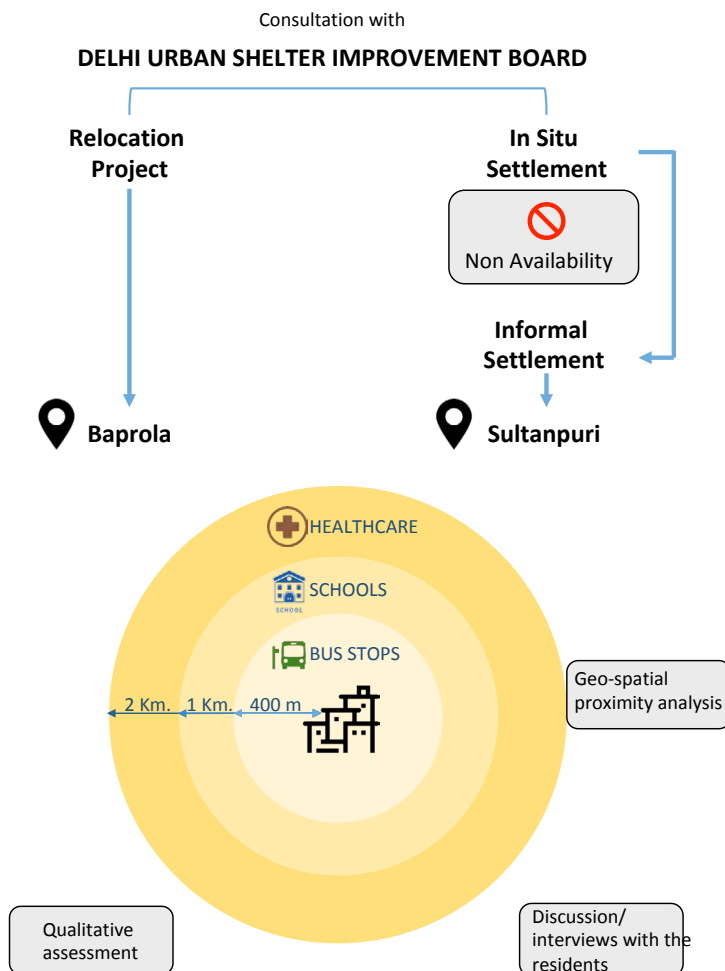
**Access to public transport**: Presence of metro stations or bus stops within a 400m distance from the centre of the settlement as per URDPFI guidelines.

**Access to safe water and sanitation:** At least 135 litres per capita per day of water must be supplied every day as per CPHEEO and every household should have an in-house toilet according to the Swachh Bharat Mission.

**Access to solid waste management:** Solid waste must be segregated into three streams—biodegradable, non-biodegradable and domestic hazardous—and handed over daily to the service provider appointed by the urban local body.

In the case of these settlements, assessment has been done based on the basic minimum requirements of the guidelines that ask for services with 1–2 km. This is in contrast to the earlier benchmark of 500m that has been adopted to assess the mass housing projects that are largely located at the periphery. This has been done on the premise that new development, especially of formal mass affordable housing, has the opportunity to plan well at the inception stage to address design and service level parameters in order to be walkable neighbourhoods and overcome service deficit, especially when they are far away from the city centres. But the redevelopment areas are already fully and densely built with the legacy of constraints imposed by unplanned built environment and scarce open spaces (see *Figure 2: Method of comparison*).

**Figure 2: Method of comparison**



Consultation with
**DELHI URBAN SHELTER IMPROVEMENT BOARD**

**Relocation Project**

**In Situ Settlement**

🚫

Non Availability

**Informal Settlement**

📍 **Baprola**

📍 **Sultanpuri**

HEALTHCARE

SCHOOLS

BUS STOPS

2 Km.  1 Km.  400 m

Geo-spatial proximity analysis

Qualitative assessment

Discussion/ interviews with the residents

## Sultanpuri settlement vs Baprola project: Key findings

The comparison of the two settlements at Sultanpuri and Baprola provides valuable insight. The detailed case study of the two settlements has been presented in Annexure 2. It presents the status of services in the two settlements based on the ground level information collected through survey and interviews with the local residents. While the detailed study is in the Annexure, some summary observations have been captured here.

## Access to social infrastructure

**Education:** The model Right of Children to Free and Compulsory Education Act 2009 asks for a minimum of one government primary school in the same neighbourhood where the child lives and URDPFI guidelines suggest it to be not more than 1 km away from a settlement. Sultanpuri informal settlement has two government primary schools in a 1 km radius, whereas, there is none at the Baprola project. Baprola has only one private primary school within 1 km radius. During the field visit, it was observed that the children of primary school going age were playing on the neighbourhood streets during school hours. While this could be due to the COVID-19 induced lockdown and no access to digital infrastructure, a qualitative assessment is needed to confirm the school drop-out rates after relocation.

With regard to secondary schools, Baprola has one government secondary school within 3 km radius as compared to seven in Sultanpuri. The school near Baprola has recently started operating and enrolling students. Its capacity is yet to be determined. For the time being, children at Baprola go to the government secondary schools located at Jwala Heri, Peera Garhi and Kirti Nagar where they were enrolled earlier. These locations are nearly 10–15 km away from Baprola.

**Healthcare:** Ayushman Bharat Guidelines 2018 advise for one non-bedded government healthcare facility at a community level and URDPFI Guidelines suggest it to be within a distance of 2 km from a settlement. A total of seven mohalla clinics are present in this radius at the Sultanpuri settlement. At Baprola, there is one mohalla clinic that operates from 8 am to 2 pm. The residents at Baprola reported that they face challenges in case of emergencies. The absence of a bedded facility in the vicinity forces the residents to travel to either Rao Tularam Memorial Hospital at Jaffarpur or Deen Dayal Hospital at Harinagar that are located about 10 km away from the project. At the same time, Sultanpuri settlement has three bedded government hospitals in a 2 km radius.

**Safety:** Safety is an element that can be assessed both quantitatively and qualitatively. Police records on incidents of crime give a quantitative outlook on frequency as well as severity of crime in an area. But it often happens that the crime is not reported. In this case, the perception of residents becomes key in understanding safety in a settlement. While Sultanpuri is generally perceived by the middle and upper classes as an unsafe area of Delhi, residents argued that they felt safe in the neighbourhood due to a strong sense of community. At Baprola project, residents, especially adolescent girls and women, reported safety as a major concern. They substantiated their remarks by the fact that due to job losses and

nearly zero livelihood opportunities, a part of the population has started engaging in unsocial activities. Overall, the sense of community is also weak in Baprola.

**Public transport:** URDPFI guidelines advise that there should be at least one bus-stop within 400m radius for a liveable habitat. Both Sultanpuri settlement and Baprola project do not have a bus stop within this proximity. Services have improved over time compared to what they used to be but they are still highly deficient. However, Sultanpuri has good access to IPT—both e-rickshaws and auto-rickshaws. It provides last mile connection to the bus stops that are located within 1 km from the settlement (at Jalebi Chowk and Sultanpuri bus terminal). Nangloi metro station is also within a walkable vicinity of 1 km. Expenditure for this last mile connection is Rs 10–15 per trip. Lengthy trips through buses also cost a maximum of Rs 15 for a trip. Residents shared that they prefer buses over metro due to its affordability. Average trip length, as understood from the residents, lies at around 3 km for Sultanpuri settlement, whereas it is 15 km for Baprola project. While people in Sultanpuri do not have need for lengthy trips, residents of the Baprola project travel for work to the locations of slums where they used to live previously.

**Water supply:** In a residential building, the level of water availability must be to the tune of 135 litres per capita per day (lpcd) according to Central Public Health and Environmental Engineering Organisation (CPHEEO). There is a tap connection in every dwelling unit as Baprola is a formal resettlement housing project and water is supplied for a total of 3 hours a day. DJB tankers refill the 3 community water tanks. Sulanpuri settlement has community taps that receive water for one hour daily. But in the summer months, water is primarily supplied by DJB tankers as the supply gets lean.

**Sanitation:** According to URDPFI guidelines, every household must have a private toilet. The ongoing Swachh Bharat Mission also aims to make India open-defecation free by improving access to toilets. Baprola project being a formal housing typology provides for a toilet in every house. Sultanpuri, on the other hand, has community toilet complexes.

**Solid waste:** Baprola project receives door-to-door solid waste collection service from South Delhi Municipal Corporation. The collection vehicle lifts the waste from the community collection points placed at every block. Whereas, Sultanpuri does not receive a regular door-to-door collection service. The residents of the

settlement are often required to dump their solid waste themselves in a community bin or *dhalao* nearly 0.66 km away from the settlement. At other times, the settlement faces the issue of littering, illegal dumping and unsanitary conditions.

**Green infrastructure:** Being a formal housing project, Baprola enjoys a good amount of dedicated greens. About 20 per cent of the site area is dedicated to organized green spaces. However, the access to these greens is an issue as the residents reported the green spaces to be occupied at all times by unemployed youth and anti-social elements. This hampers the utility of these green spaces for the entire community and raises questions about the quality of green spaces as well. Sultanpuri, on the other hand, being a congested informal settlement, does not have any green space except small patches of green at F-7 block and the community toilet.

# SECTION 3: Takeaways and way forward

Housing requires multiple functions to come together in a timely manner, but each function is assessed and enacted separately due to their hierarchical and sectoral diversity. As a result, multi-actor coordination or lack thereof affects the quality of services and infrastructure. In several cities, as in Jaipur, in the absence of a governance model for performance benchmark, slum dwellers are being rehabilitated as far as 30 km from the city centre in areas that are hugely deficient in services or infrastructure.

Different aspects of liveability are addressed and regulated at different levels of administrative hierarchy. Housing is a state subject and water supply and sanitation are also state subjects. Solid waste management falls under the purview of the urban local body, and electricity is administered both by central and state governments. Further, primary education is a local subject and health is a state subject with a role also played by the central government. A study by thinktank Praja finds that even after 29 years of 74th Constitutional Amendment Act, no state has managed to devolve the 18 municipal functions to urban local bodies.[31]

There are sectoral policies on resource management and urban planning at the national and state levels but their adoption and implementation in housing schemes is not actively aligned and implemented. Housing schemes at best lay out the provision for external development of infrastructure. However, there are a few good practices that were observed. For instance, Swachh Bharat Mission is being linked to housing programmes to fund construction of toilets in the Dignity Housing scheme of Telangana. The state's housing scheme projects are availing the benefits under Mission Bhagiratha to enable access to clean and safe drinking water to all residents of the state and to the beneficiaries. Overall, convergence of such national and state programmes with housing schemes was found to be weak in most states in absence of a unified housing governance structure.

Environmental Impact Assessment (EIA) is one procedure that mandatorily asks for several of these provisions. However, EIA itself has its limitations with lack of performance standards and relevant indicators. It has become mere paperwork. Further, there are no provisions for city level EIA or EIA in master plans in India. Amaravati capital city development project attempted such EIA and mitigation at city level but faced several non-compliances on environmental norms. This

emphasizes the fact that regulatory frameworks in India are mostly devoid of performance criteria. EIA is applied to buildings with built up area above 20,000 sqm. The rest of the stock that is the bulk of the built up area in our cities lack focus. Green rating systems comprise performance criteria but are voluntary.

The overall findings indicate that new housing stock is being planned without considering locational advantages and disadvantages, or implementing mitigation measures if location is not suitable. There is very poor planning of connectivity with the job centres and economic hubs. This creates huge risk of underutilisation of the new building stock even though there is housing shortage. This defeats the purpose of providing housing for all.

COVID-19 pandemic related humanitarian crisis and migrant distress has underscored that this agenda cannot be neglected anymore. More appropriate design and planning solutions are needed to ensure that policies and guidelines on the service level of the settlements are aligned for implementation to meet the objectives of inclusive planning.

**Need a balanced scorecard approach to measure and improve performance of the upcoming mass housing:** There is a need to create metrics or performance indices for approval, designing and planning of housing projects that cater to liveability, accessibility and affordability aspects of the poor. A balanced scorecard approach enables decision makers to take stock, plan and act in a comprehensive manner. This approach needs clear objectives, measures, and specific actions for results. More rigorous guidelines are needed in the master plan and zonal plans to earmark areas for new mass housing projects to minimize distances and also to integrate advanced planning of infrastructure and transportation for connectivity. This needs to be combined with indicators of energy savings, water and sanitation, and waste management. Such metrics need to be integrated with national housing guidelines (such as HFAPoA currently), PMAY, and state housing schemes.

**Adopt guidelines to integrate mobility needs and indicators for services and green performance of mass housing to inform implementation, incentives and financing:** National and state level housing policies including PMAY need to adopt detailed guidelines for mainstreaming locational characteristics, mobility related needs, and green performance of housing in new planning and redevelopment. Current green building frameworks do not include location and mobility from the perspective of the beneficiary as performance criteria of housing. Qualifiers that take into account the energy and carbon impact of the commute and the essential trips to be taken by beneficiaries in a new housing project need to be linked with

performance. All incentives for housing schemes like extra FAR/FSI/TDR need to be linked with performance. Green financing must be extended only to those housing projects that holistically perform well on these criteria.

**Master plans to earmark locations for affordable housing along with mitigation strategies to integrate with public transport and improve service level:** Availability of cheap land is central to development of affordable housing. Land economics has always governed this decision. Mostly peripheral locations are identified for affordable housing both by the government and the private sector. Cities and state governments need to acknowledge the positive externalities of limiting sprawl and adoption of an efficient planning pathway and compact urban form to reduce commute time and travel costs, improve access of the masses to efficient infrastructure and services, and ensure energy savings. Master plans are an important tool to strategically plan and regulate the location of affordable housing and manage mobility needs. Transport authorities need to work in tandem with the housing implementors to prevent temporal lag in providing access to public transport and other services and infrastructure to the allottees of affordable housing. Approvals for a new housing project should be sanctioned based on these criteria. Set of measures should be taken by the government/developer to offset the impact of the location on access to services and infrastructure for the beneficiaries. This has to be mainstreamed into PMAY-U, Smart Cities Mission, and Atal Mission for Rejuvenation and Urban Transformation, among others.

**Reform guidelines for redevelopment and resettlement of informal settlements to improve welfare, access and quality of life:** The deep dive comparative assessment of Delhi has revealed that the lower income households prefer to live in an informal settlement due to better access to jobs, education, healthcare, public transport, etc. even when the quality of basic services (water supply, sanitation, solid waste management, etc.) is inadequate. Poorly built, congested, under-lit and non-ventilated self-built housing is preferable over planned apartments that ensure safe water supply, sanitation, solid waste management and access to green spaces. This assessment builds evidence for the fact that relocating the poor to peripheral locations of the city is not only unfavourable to them in terms of access but also hinders their socio-economic mobility. This will have to be addressed to prevent sub-optimal and unproductive assets that fail to deliver on meeting housing requirements of all.

**Need city level policy and guidelines to inform interventions:** Every city is unique and therefore has specific housing and mobility requirements. Current regulatory mechanisms are inadequate to capture the idiosyncrasies of our cities.

In order to facilitate this, city specific framework is needed for housing provision and should be backed by deep dive studies to understand the work-live-travel relationships and quality of life. A few indicators such as walkability/cyclability, number and types of recreation areas, number and types of public and semi-public spaces (markets, community centres, religious places, etc.), open spaces, local identity, social cohesion, social innovativeness, economic innovativeness, etc. will have to be considered to align the housing schemes with the need of beneficiaries.

**Need guidelines on rental housing that require different approaches to locational planning and operations:** Rental housing has been recognized for formal housing provisions. This has been integrated as a new vertical under PMAY and state governments are also adopting this. MoHUA has launched affordable rental housing complexes (ARHC) as the fifth vertical under PMAY-U. The primary objective of ARHCs is to provide decent housing to the poor at affordable rents near their workplace. Most states and UTs have signed up for this national-level scheme by signing an MoA. Chandigarh, as of May 2021, leads at a national scale by already allotting 1,703 flats under the scheme so far. It is followed by Surat, Rajkot, Gwalior, Chittorgarh and Udaipur which have completed the first phase of procurement.  The COVID-19 pandemic and migrant distress has underscored its need. This enables integration of beneficiaries in-situ with better locational advantages. Rental housing has better economic feasibility in the long run for catering to the housing and mobility needs of the poor. Internalizing rental housing in urban planning and master plans therefore becomes important.

**Community engagement is key to address liveability**: Efforts to engage the community through campaigns, focussed discussions, and collaborative planning have led to positive results in settlement upgradation projects. Experts agree that the sense of ownership of habitat is instrumental in improving access to services and infrastructure. So much so that continuous engagement has even led the residents of a settlement to invest into upgradation efforts and actively operate and maintain the infrastructure. New housing must capture user perception and satisfaction frequently to improve the existing settlements and inform the future housing stock.

**Affordable mass housing projects must be executed with a focus on natural systems:** Understanding the city's natural systems in terms of its green spaces, water cycles, air and the impact of sewage, solid waste and materials on the overall ecology is important. This has multiple co-benefits ranging from health to climate change adaptation and mitigation, among others. This includes addressing principles such as density, compactness, recycle and reuse of water and waste,

and better building design and choice of materials to provide well-lit, ventilated, and thermally comfortable indoors as well as minimizing energy use. As housing accounts for 70 per cent of the land use in cities, it is imperative to integrate its development with the natural systems of the city to keep the overall growth of the city on a sustainable trajectory.

**Build capacity of ULBs and housing implementors:** ULBs and SLNAs play a crucial role in implementation of the current affordable housing schemes. They are responsible for determining housing demand, typologies, identification of location, and preparing implementation plans. With new typologies of affordable housing, like rental housing, taking root, it is imperative to enhance the capacity of these actors to effectively conduct analysis and capture the nature of housing demand based on the socio-economic characteristics of the target groups. The interlinkages between affordable housing and mobility for affordability and liveability in the interest of beneficiaries also need to be disseminated widely.

**Need dedicated regulatory bodies for quality control**: For quality control and execution of mechanisms such as balanced scorecards for housing, a dedicated agency is required. Global experience has also shown that a dedicated agency that unifies different aspects of housing such as housing schemes, urban expansion projects, basic services, slum rehabilitation, national housing programmes, among others, delivers better performance. For instance, Hong Kong Housing Authority is the nodal authority for public housing provision and unifies the activities of the housing department, resettlement department and urban services department. Similarly, a dedicated executive housing body for quality control will be instrumental to address liveability in the mass housing sector.

# Annexure 1

## Mapping of basic services in selected housing projects in cities

This is a compendium of maps that depicts the provisioning of basic services and connectivity of the housing projects selected in Gurugram, Noida, Faridabad, Mohali, Jaipur, Jodhpur and Kota. These projects have been identified from the RERA database. A rapid survey of these projects has been carried out based on three simple parameters—availability of schools, health centres and public transport stations within 500m of the project. This criteria has been adopted to emphasize the importance of developing guidelines for walkable neighbourhoods, especially for the affordable housing projects. This, however, does not include assessment of intra-settlement mobility and last mile connectivity. Only mapping of macro evidence is presented here.

### 1. Mohali

According to Punjab RERA database, nearly all projects in Mohali are ongoing and their completion year falls between 2020 and 2022. Housing projects in Dera Bassi (in south), Zirakpur (in south) and two clusters near Kharar have been reviewed.

**Dera Bassi:** Dera Bassi is a satellite area located to the southeast of the city of Mohali. It is dotted with a number of small housing projects and a few large-scale projects. This location has comparatively better access to schools and health care facilities within walkable 500m radius. The adjoining highway provides bus connectivity. A bus stop is present within a proximity of 1 km.

**Map 9: Housing projects in the Dera Bassi cluster**
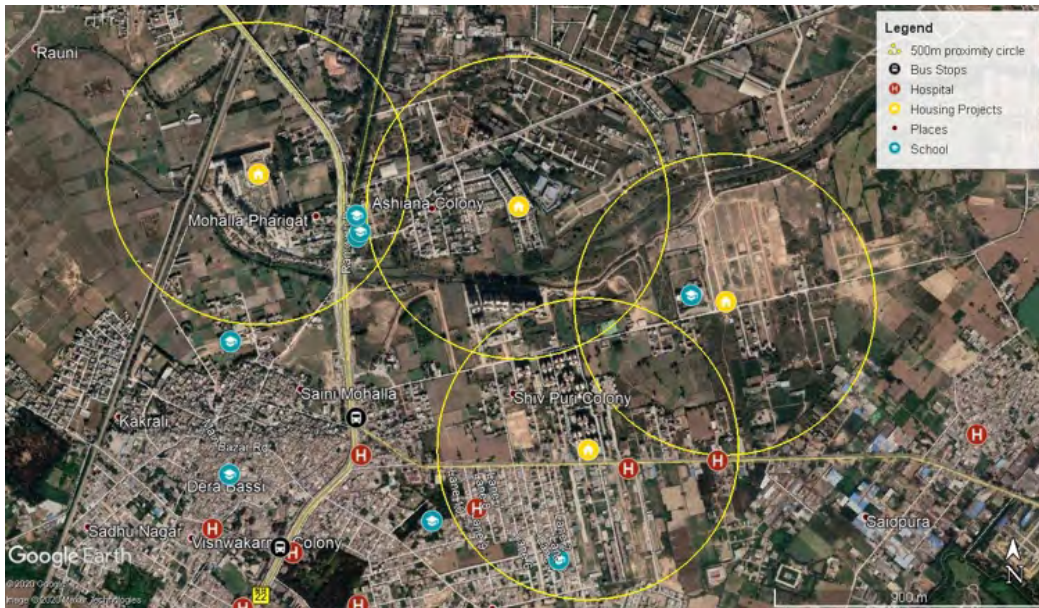


Source: CSE compilation

**Zirakpur:** Zirakpur is a satellite area in Mohali adjoining the Chandigarh airport. The national highway provides access to the city bus service. Medical facilities and schools are present within walking distance.

**Map 10: Housing projects in the Zirakpur cluster**



Source: CSE compilation

**Kharar:** Kharar is a Municipal Council in the Sahibzada Ajit Singh district of Punjab. It is located to the west of Mohali. Due to lesser intensity of developmental activities, services such as schools and healthcare facilities are not well distributed in this cluster. Bus connects the cluster to Mohali.

## Map 11 Housing projects in the Kharar cluster



Source: CSE compilation

**Sunny Enclave:** Sunny enclave is a planned neighbourhood in Mohali. While it is dominated with plotted housing, a number of medium-rise projects are coming up in the neighbourhood. Schools and healthcare facilities are not within 500m but within 1 km.

**Map 12: Housing projects in the Sunny Enclave cluster**
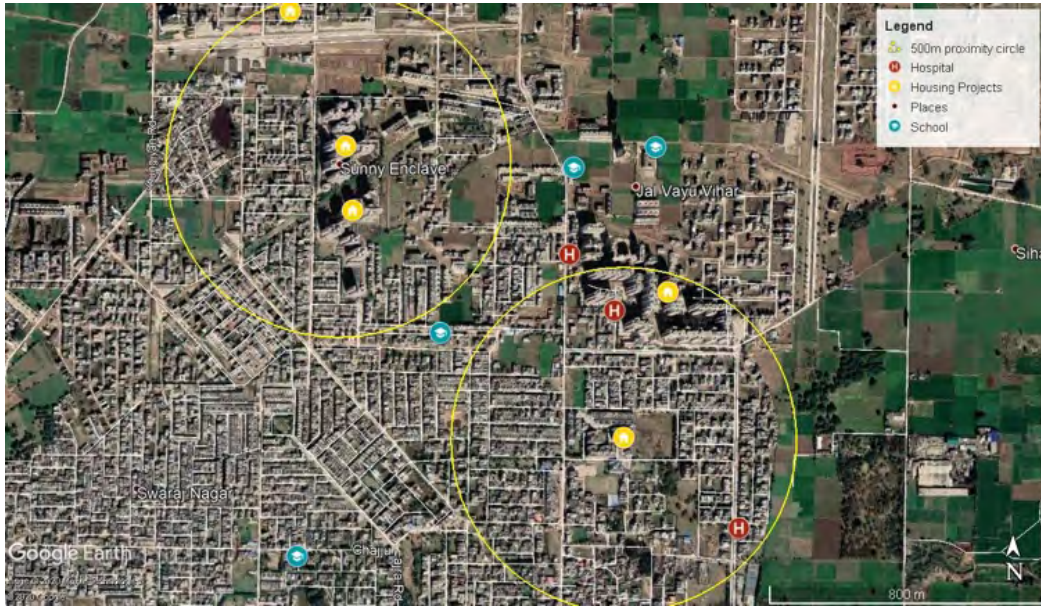


Source: CSE compilation

**Table 7: Summary of the infrastructure that falls within 500m radius in the Mohali clusters**

| Sr. no. | Name/Location of clusters | No. of projects in the cluster | No. of schools within the radius | No. of hospitals within the radius | No. of bus stops within the radius |
|---|---|---|---|---|---|
| 1 | Dera Bassi | 4 | 4 | 3 | - |
| 2 | Zirakpur | 5 | 3 | 4 | 2 |
| 3 | Kharar | 3 | - | - | 2 |
| 4 | Sunny Enclave | 5 | - | 2 | - |

## 2. Noida

Noida is part of Delhi-NCR and is experiencing enormous development. Projects are spilled across the city heterogeneously. Three housing clusters have been identified for locational analysis—Gaur City, Sector 79 and Sector 119.

**Gaur City 1:**  Four housing projects in Gaur City 1 cluster have been identified for analysis according to the RERA database. These projects are located along the Noida-Greater Noida link road. They have access to bus stops at an interval of 300 to 500 metres. Presence of a major junction near the projects make them accessible in terms of services.

**Map 13: Housing projects in Gaur City 1**



Source: CSE compilation

**Sector 79:** The sector 79 cluster has four projects. There are metro stations in the vicinity (about 1.5 km) as well as bus stops. Schools and healthcare facilities are not within a walkable distance.

**Map 14: Housing projects in Sector 79**



Source: CSE compilation

**Sector 119:** The sector 119 cluster is located adjacent to the Faridabad-Noida-Ghaziabad expressway. Schools and health care facilities are available in walking distance from the housing sites.

**Map 15: Housing projects in Sector 119**



Source: CSE compilation

**Table 8: Summary of the infrastructure that falls within 500m radius in the Noida clusters**

| Sr. no. | Name/Location of clusters | No. of projects in the cluster | No. of schools within the radius | No. of hospitals within the radius | No. of bus stops within the radius |
|---|---|---|---|---|---|
| 1 | Gaur City, Sector 4 | 4 | - | - | 5 |
| 2 | Sector 79 | 4 | - | - | - |
| 3 | Sector 119 | 3 | 1 | 2 | 4 |

# 3. Gurugram

Mass housing projects are located in the periphery of Gurugram. National highway and state highway routes pass through the city connecting the housing clusters. As the project sites are on the periphery, major medical facilities are far from the vicinity yet accessible. Four housing clusters have been identified, namely in sector 85, 37C, 102 and near Sohna Road where housing projects are closely located to each other.

**Sector 85: *This cluster*** is located in the southwest periphery of Gurugram. Two of the four housing projects are under construction. While there is a hospital present within 500m radius, there are no schools or public transport options within that distance.

**Map 16: Housing projects in Sector 85**



Source: CSE compilation

**Sector 37C:** Of the four clusters in this study, the sector 37C cluster is closest to the built urban form of the city. Several hospitals and schools are located in close proximity. The cluster is also well connected to the public transport system.
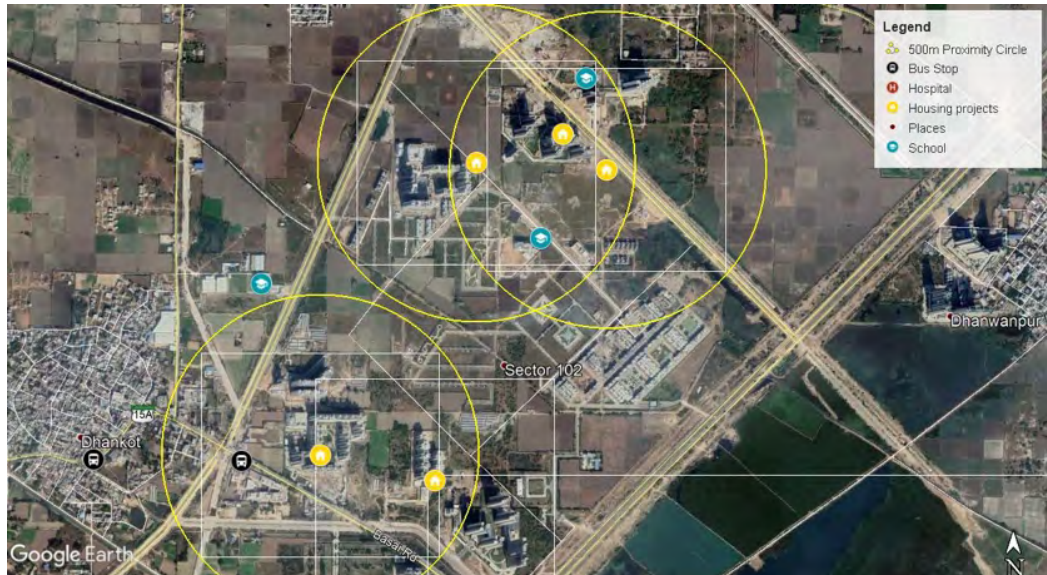
**Map 17: Housing projects in Sector 37C**



Source: CSE compilation

**Sector 102:** The cluster is located in the north-eastern side of the city. It has frequent bus stops in the vicinity on the state highway road. Medical institutions are not within walkable distance.

**Map 18: Housing projects in Sector 102**



Source: CSE compilation

**Sohna Road:** The cluster is located in the outskirt of Gurugram and is almost 2 km away from the town of Sohna. Schools are located within the vicinity with proper public bus route connecting on the either side via Sohna–Gurgaon road. As the location is in the outskirt, bus stops are not frequent.

**Map 19: Housing projects in Sohna Road**
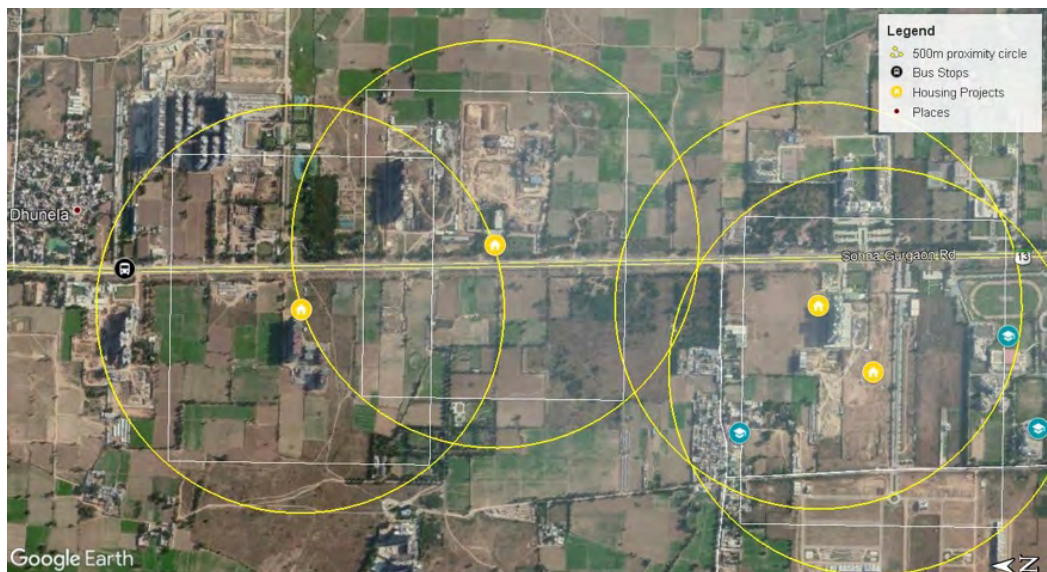


Source: CSE compilation

**Table 9: Summary of the infrastructure that falls within 500m radius in the Gurugram clusters**

| Sr. no. | Name/Location of clusters | No. of projects in the cluster | No. of schools within the radius | No. of hospitals within the radius | No. of bus stops within the radius |
|---|---|---|---|---|---|
| 1 | Sector 85 | 4 | - | 1 | - |
| 2 | Sector 37C | 6 | 1 | - | - |
| 3 | Sector 102 | 5 | 2 | - | 2 |
| 4 | Sohna Road | 4 | 3 | - | 1 |

# 4. Faridabad

The housing projects in Faridabad are located on the east of the Agra canal. Three housing clusters have been identified, in sector 70 (in south), sector 82, and sector 88 (in central), where housing projects are closely located to each other.

**Sector 70:** The two housing projects in the south are far away from the centre of the city. One project is under construction. The nearest bus stop is 1–2 km away from the sites. Medical and educational institutions are not close either.
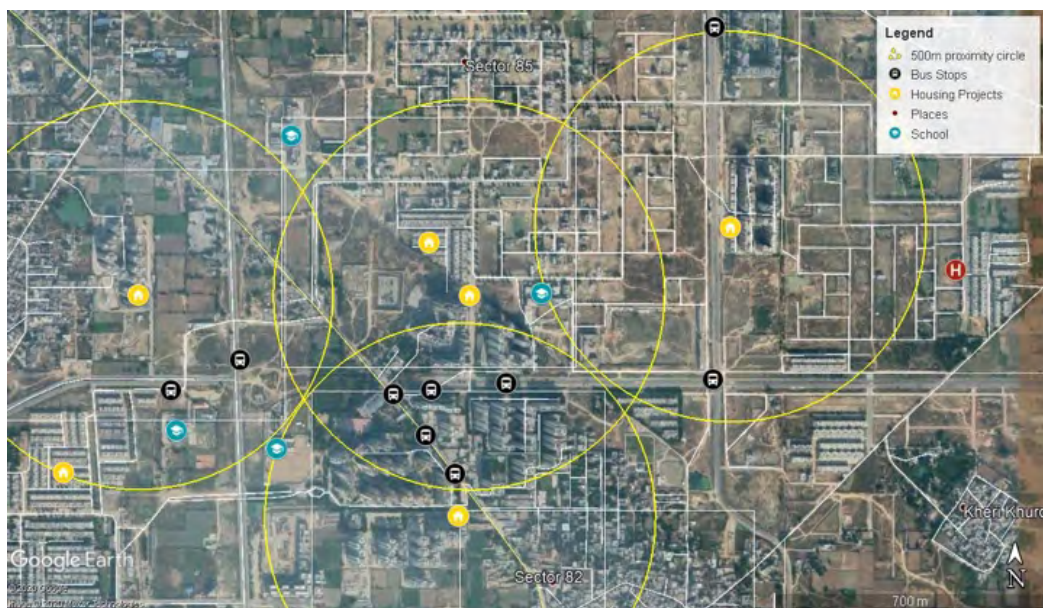
**Map 20: Housing projects in Sector 70**



Source: CSE compilation

**Sector 82:** The cluster consists of sector 82 and some areas of sector 81, 86 and 85. Area is well connected with bus routes.

**Map 21: Housing projects in Sector 82**



Source: CSE compilation

**Sector 88:** The cluster is connected on the other side of the canal to Faridabad bypass road through the bus route in Swami Vivekananda Marg.

**Map 22: Housing projects in Sector 88**



Source: CSE compilation

**Table 10: Summary of the infrastructure that falls within 500m radius in the Faridabad clusters**

| Sr. no. | Name/Location of clusters | No. of projects in the cluster | No. of schools within the radius | No. of hospitals within the radius | No. of bus stops within the radius |
|---|---|---|---|---|---|
| 1 | Sector 70 | 2 | - | - | - |
| 2 | Sector 82 & 85 | 6 | 4 | - | 9 |
| 3 | Sector 88 | 3 | 2 | - | 3 |

## 5. Jaipur

Rajasthan RERA database was used to map the ongoing construction of housing in Jaipur (see *Map 23: Location of affordable housing in Jaipur*). According to Rajasthan's Chief Minister Jan Awas Yojana (CMJAY), different actors (government and private) have to develop and earmark 5 to 50 per cent of any housing project's land or dwelling units for EWS/LIG households in order to avail the benefits of the scheme. Jaipur Development Authority (JDA) is rehabilitating inhabitants of the informal settlements in these reserved houses primarily constructed by the private sector. Therefore, for a deep-dive analysis in Jaipur, four such projects were identified with JDA and visited. Instead of a cluster analysis approach like in the other cities, neighbourhood level analysis based on specific guidelines for schools, health units and public transport was conducted.

**Map 23: Location of affordable housing in Jaipur**
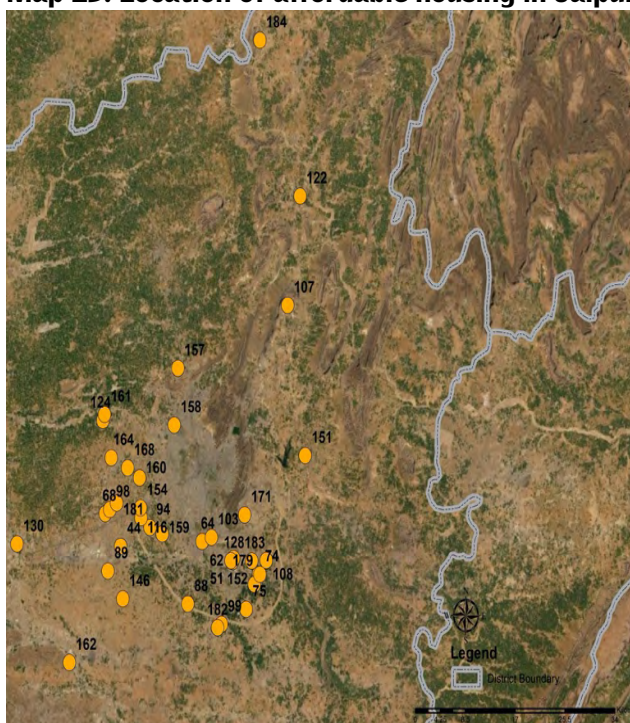


Source: Rajasthan RERA 2020

**Harbanshpura:** This housing project has 12 private schools within a radius of 3 km, out of which 10 are secondary and two are primary schools. There is one government secondary school at a distance of 190m from the site. There is a private bedded healthcare facility about 2 km from the site. A government non-bedded healthcare centre is present at 2.96 km from the site. The nearest bus stop is 4.56 km from the site.
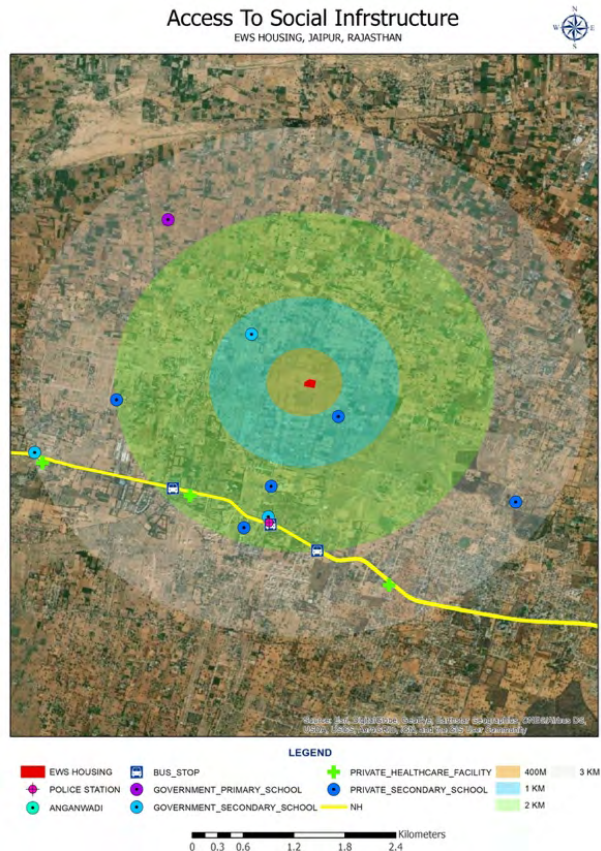
## Map 24: Access to social infrastructure in Harbanshpura
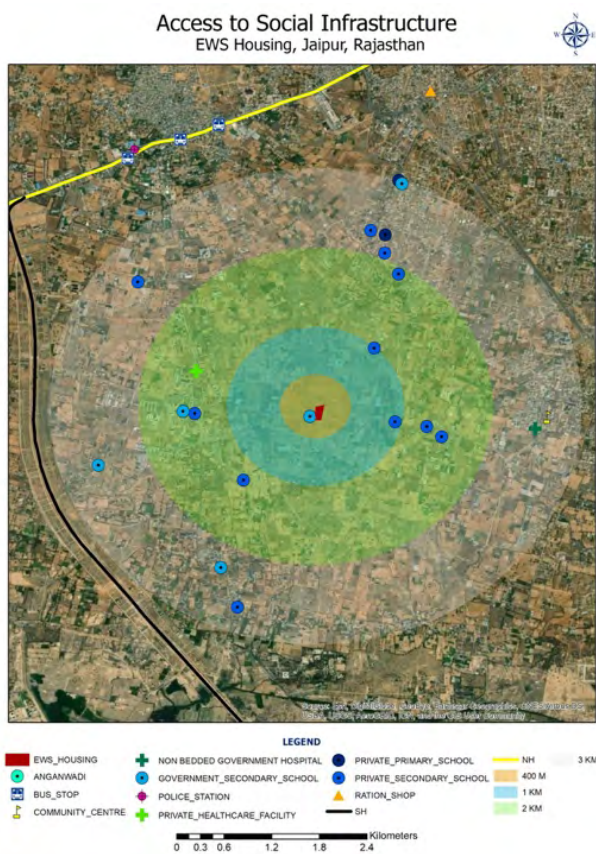


Source: CSE compilation

**Nari ka Bas:** There is one private secondary school at a distance of 800m from the site. The nearest government secondary school is 1.18 km away. There is no healthcare facility within a 2 km radius, the nearest is a bedded private health care facility 2.64 km from the site. There are no bus stops within a 400m radius.

**Map 25: Access to social infrastructure in Nari ka Bas**



Source: CSE compilation

**Bagru Khurd:** This housing project has 20 schools within a radius of 3 km. There is one government primary school 2.37 km from the site and one government secondary school at a distance of 1.55 km. There is one bedded hospital at a distance of 1.92 km from the site. There are five bus stops in the vicinity of the site ranging from 1.39 to 4 km away but none of them falls within the 400m radius.

## Map 26: Access to social infrastructure in Bagru Khurd
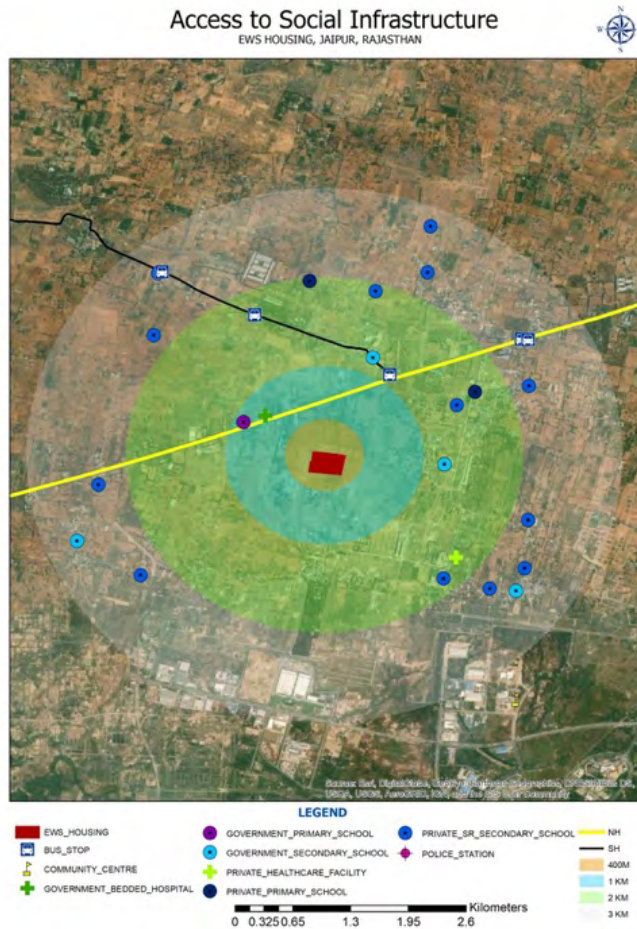


Source: CSE compilation

**Lalpura 1:** There are 14 schools within 3 km radius of the site, the nearest one is a private primary school 170m away. There is one government non-bedded healthcare facility at a distance of 1.32 km from the site. Nearest bus stop is the Kalwar bus stop which is 4.16 km away.
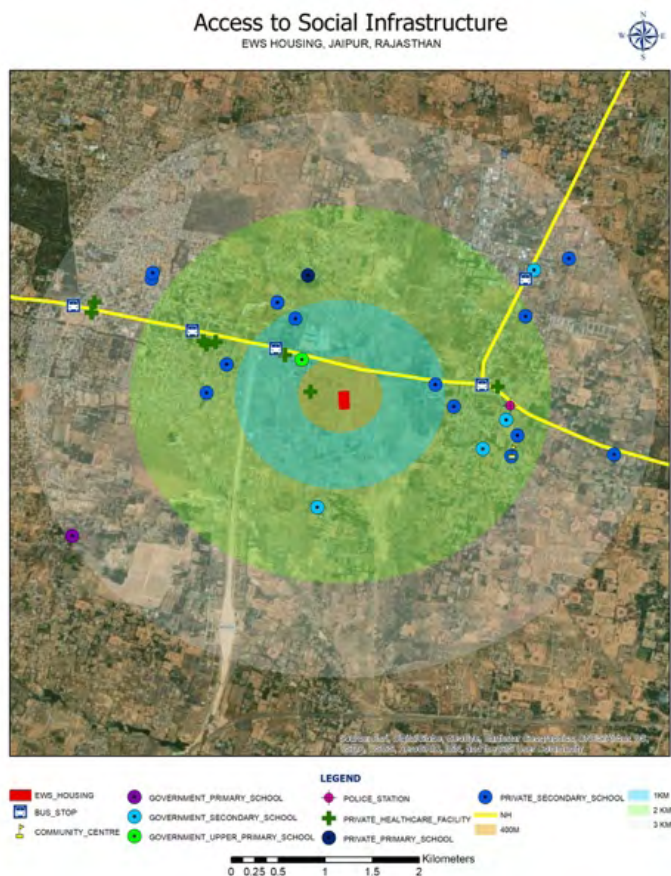
## Map 27: Access to social infrastructure in Lalpura 1
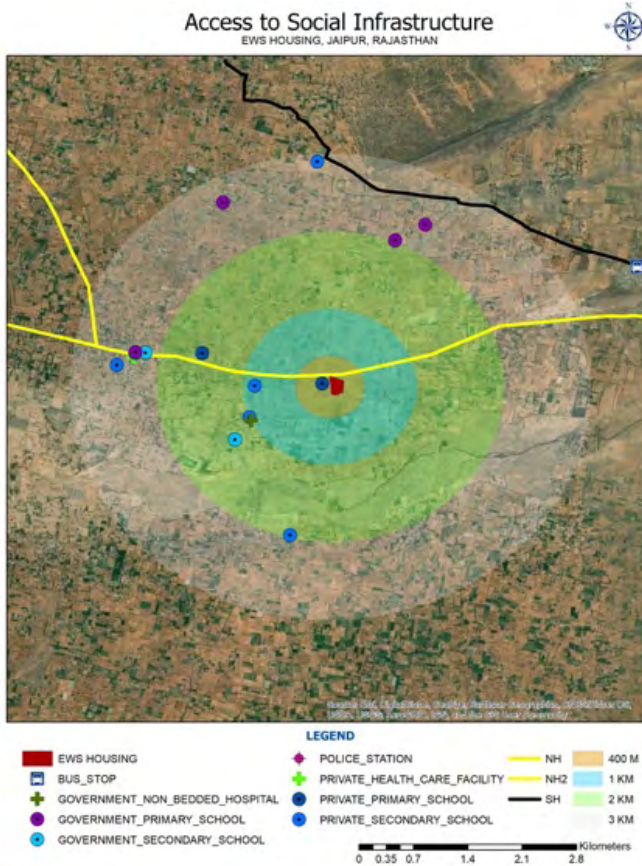


Source: CSE compilation

**Lalpura 2:** There is a government primary school 710m away from the site and two healthcare facilities in a 1 km radius of the site. There is no bus stop within 400m radius. The nearest bus stop is 1.1 km from the site.

**Map 28: Access to social infrastructure in Lalpura 2**



Source: CSE compilation

**Table 11: Summary of the infrastructure that falls within 500m radius in the Jaipur clusters**

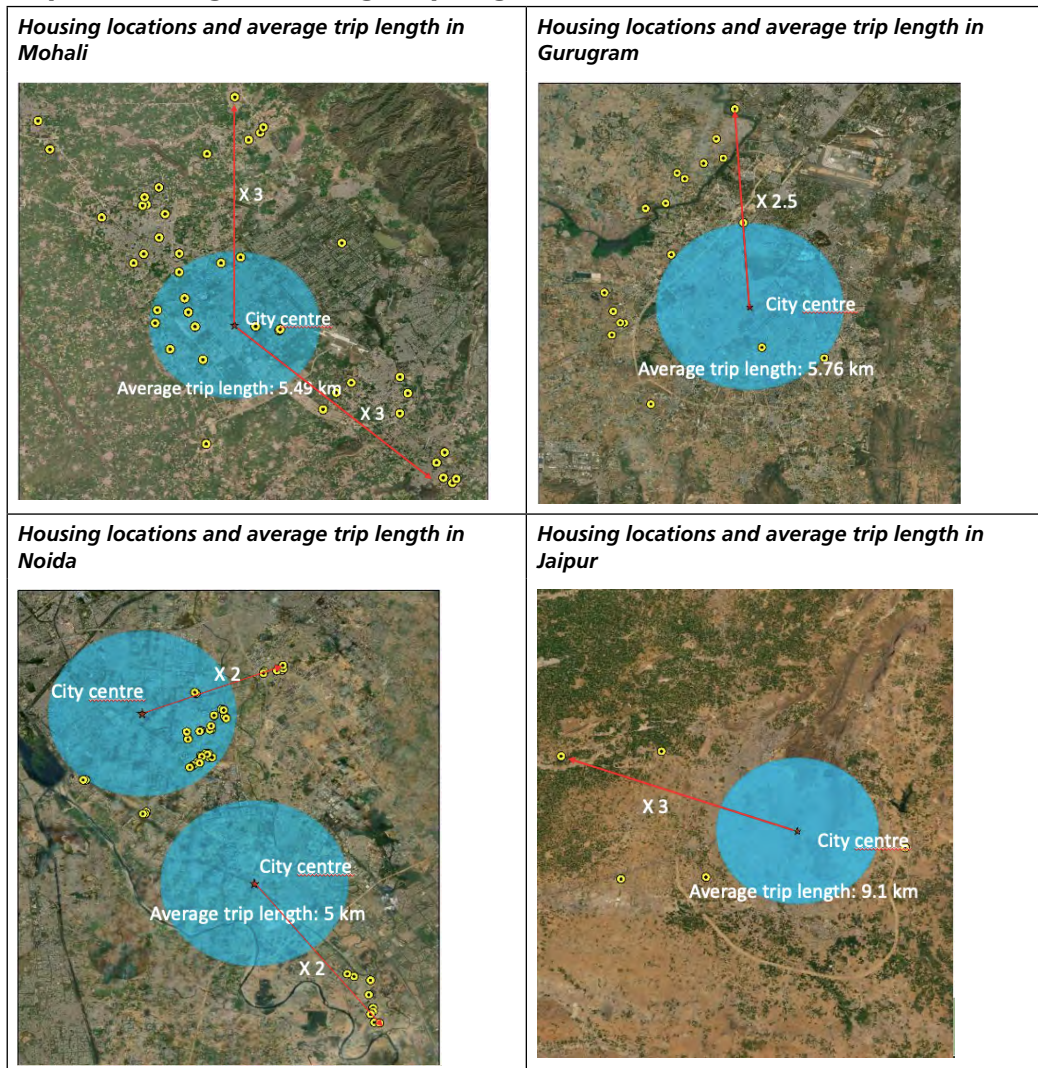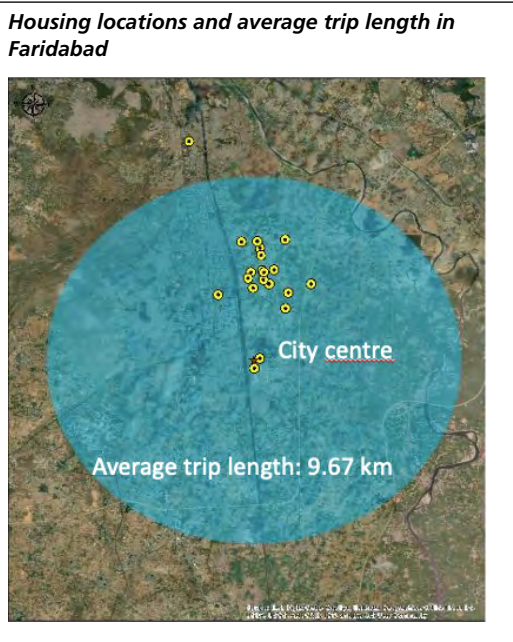| Sr. no. | Name/Location of the project | No. of schools within the 1 km radius | No. of hospitals within the 2 km radius | No. of bus stops within the 400m radius |
|---|---|---|---|---|
| 1 | Harbanshpura | 1 | 1 | - |
| 2 | Nari ka Bas | 1 | - | - |
| 3 | Bagru Khurd | - | 1 | - |
| 4 | Lalpura 1 | 1 | 1 | - |
| 5 | Lalpura 2 | 1 | 2 | - |

# Connectivity of housing projects

In another analysis, the average trip length of the cities has been assessed. In most cities, new housing locations are located at least twice the average trip length of the city from the centre. Such lengthy distances to the city centre are highly unfavourable for the poor.

Mohali has an average trip length of 5.49km and the housing sites are located thrice the average trip length from the centre. Similarly, in Gurugram the sites are located 2.5 times the average trip length from the centre; in Noida, twice; and in Jaipur, thrice the average trip length from the centre. Only Faridabad has an average trip length of 9.67 km and the housing sites fall within this radius when considered from the city centre. Transit oriented development of the city certainly adds to accessibility.

## Map 29: Housing and average trip lengths in different cities



*Housing locations and average trip length in Mohali*

*Housing locations and average trip length in Gurugram*

*Housing locations and average trip length in Noida*

*Housing locations and average trip length in Jaipur*

*Housing locations and average trip length in Faridabad*

Source: CSE compilation

# Annexure 2: Case study

## Redevelopment and resettlement colonies in Delhi

This case study presents the ground level evidence from two selected settlements—Baprola, which is a planned resettlement colony, and Sultanpuri, which is a redevelopment area. Both are low-income neighbourhoods.
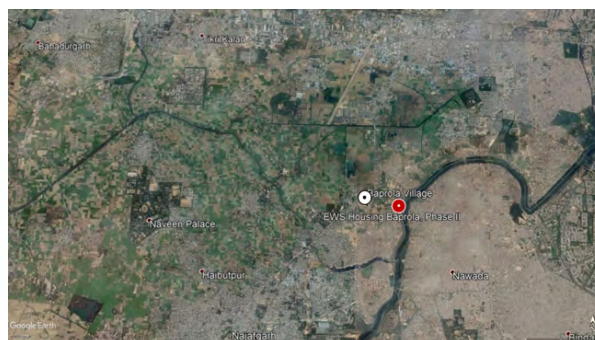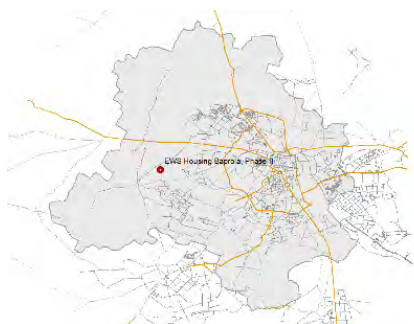
### 1. Baprola

*Relocation—Rajiv Ratan Awas Yojana (RRAY) Resettlement Colony, Phase II in Baprola*

The resettlement colony in Baprola, located along the Najafgarh drain in the outskirts of south-west Delhi, was constructed under the RRAY by DSIIDC. There are two phases of RRAY, containing 5,568 flats. Phase I includes over 2,000 flats in 58,071 sqm and Phase II includes nearly 3,500 flats spread over nearly 91,412 sqm. The Delhi government plans to relocate families from 17 areas across Delhi to the site.

As on 22 January 2021, families had not been moved to Phase I. Therefore, this assessment focuses on residents and facilities in Phase II. Out of a total 958 flats allotted by DUSIB since 2015, over 870 families were reported to be residing in Phase II currently. More are expected to be relocated from Gole Market and Janpath as per the recent allotment list of October 2020. In addition, a part of this project has been barricaded (nearly occupying an area of 33,000 sqm) and has been handed over to Central Industrial Security Force (CISF), indicating the challenges DUSIB probably faces in relocating slum dwellers to this particular location.
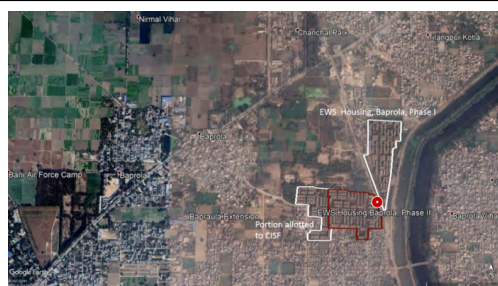
The project offers ownership-based low-cost housing for slum dwellers who are considered eligible. However, a family must pay Rs 1,12,000 to obtain a flat. Families belonging to scheduled castes must pay Rs 1,000. All families must also pay an additional Rs 30,000 one-time maintenance fee, as per DUSIB's 2015 rehabilitation and relocation policy. While most families living in these flats owned the flats, few also reported to be living there on rent (of Rs 2000/month) in spite of belonging to the same slums which have been relocated to this site.

**Map 30: EWS Housing, Baprola**



Source: CSE

| **Map 31: Phase I and II of EWS Housing, Baprola** | **Figure 3: EWS Housing at Baprola, Phase I** |
|---|---|
|  |  |
| Source: CSE | |

DUSIB has been responsible for the maintenance and management of the complex for a period of 5 years starting from 2015. However, as the contract ended in 2020, the maintenance cost of the high-rise apartments in these resettlement colonies has placed an extra burden on already poverty-stricken families, severely impacted by the job losses during and post the pandemic-induced lockdowns. In the absence of ability to pay for maintenance costs, the relatively new housing complex has begun to suffer from issues such as dampness, leakages and choked sewer lines.

| Figure 4: Bathrooms and toilets in need of repair at Baprola | Figure 5: Clogged storm-water drains lead to water logging |
|---|---|
|  |  |

**Settlement and community profile:** Families from Jwalapuri, Peergarhi, Kali Bari, Gole Market and Janpath have been relocated in the outskirts of Delhi. With an average household size of six members, as estimated from the survey, the settlement approximately has a population of over 5,220 (or more owing to larger family sizes with a high number of dependents). As per these estimates, the current population density is roughly around 231 persons per acre or 383 DUs per hectare. Families in RRAY settlement are largely migrants from Bihar, Haryana, Madhya Pradesh, Rajasthan, Uttarakhand, and Uttar Pradesh.

## Access to social and physical infrastructure

**Primary schools and secondary schools:** A new Government Senior Secondary School has recently started functioning within 1 km radius which should benefit the community in the near future. However, residents reported that currently many primary school students go to a private school (Shri Lal Convent School) that also lies within 1 km radius. The colony has an Anganwadi, functioning from two flats, in the block right opposite to the Mohalla Clinic. Most of the secondary school students cannot afford to go to the two private schools that lie within the 1–3 km radius. Hence, they travel to the far-off government schools in Jwalapuri, Peeragarhi and Kirtinagar, where they were earlier enrolled owing to their proximity to the slums. No vocational institutes/ITIs were reported to exist close to the settlement. However, few families also reported that they sent their wards to private schools in the vicinity as they could avail fee-waiver benefits under the EWS category.

| Map 32: Access to schools, health care facilities and other social infrastructure at Baprola in a walkable radius of 400m | Map 33: Access to schools, health care facilities and other social infrastructure in a larger span of 3 km around Baprola |
|---|---|
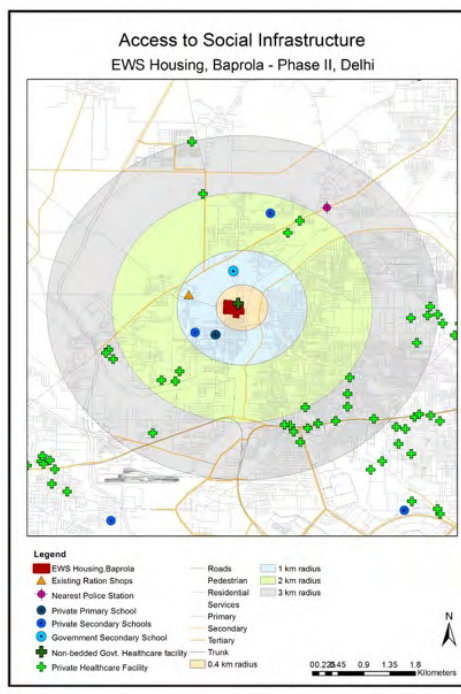


Source: CSE

**Hospitals and dispensaries:** With respect to access to healthcare infrastructure, community members reported that though there is a mohalla clinic within RRAY which is functional from 8:00 am to 2:00 pm, they face severe challenges in case of emergencies and have to travel far for a dispensary or government hospital. While a few residents choose to travel all the way to these public health facilities, others spend large portions of their already meagre income paying for health services at private health facilities in the vicinity. The two government hospitals that the mohalla clinic reported its common referrals to were Deen Dayal Hospital, Harinagar, which is 9 km away and Rao Tularam Memorial Hospital, Jaffarpur, located at a distance of nearly 12 km. The on-ground reports were cross-verified by conducting a mapping exercise, according to which six hospitals were located within a radius of 2 kms, but all of them were private facilities.

Further, as many as 23 health centres/clinic/hospitals were identified within a 3 km radius, all of which were also private facilities. Though ASHA workers were reported to be working in the community, women expressed dearth of required assistance from them. The lack of accessible health facilities was found to put an

emotional and financial strain on colony residents and had particularly severe effect on pregnant women, young children, and the elderly. The COVID-19 pandemic has further exposed the vulnerability of these communities in terms of access to quality healthcare.

**Figure 6: A mohalla clinic is functional from 8 am to 2 pm at the settlement**



**Ration shops:** Majority of the residents have ration cards and their names were listed in the ration shop located in Baprola village. However, names of many families have now been shifted to the ration shop in Das Garden. The ration shops in both the locations are over a kilometre from the site. Moreover, there are no proper shops in the vicinity to cater to their daily needs, as the ones proposed in the community centre remain vacant. As a result, many residents have set-up small informal shops either in temporary sheds or within their flats.

**Figure 7: A number of residents have opened up informal daily-needs shops either in temporary sheds or at their flats**
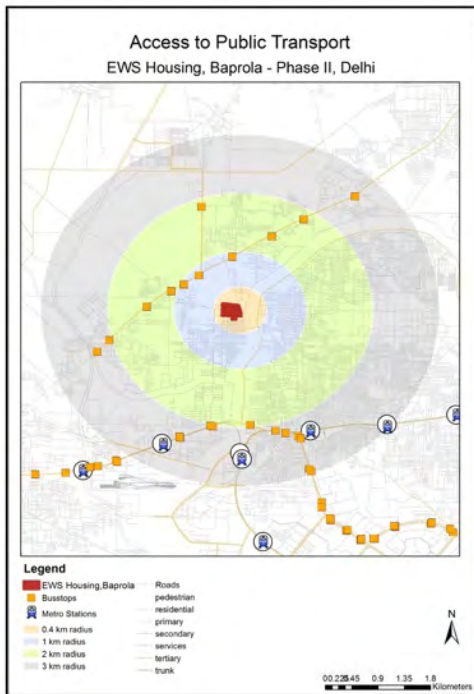
**Public transport:** To put in perspective the extent of difficulties faced by RRAY residents in accessing services, it is important to know that RRAY is located about 35 kilometres from central Delhi. A bus stand was initially constructed at the entrance of the settlement but it continues to remain non-functional and dilapidated. Until early 2017, only two early morning buses provided public transport to and from the site. However, the site is now connected with the nearest bus-stop (Chanchal Park), which is 1 km away, and enjoys frequency of over 40 buses per day plying on the Narela Terminal to Najafgarh Terminal Route of DTC. Most residents travel to Nangloi bus stop from Chanchal Park stop, from where they access buses to other parts of Delhi by paying a maximum of Rs 15 for a one-sided trip.

People depend largely on electronic rickshaws, which charge Rs 10–15 to the bus-stop and Rs 25 to the nearest metro station and are mostly owned by RRAY residents. People generally walk for a kilometre up to the main road, from where they access buses, autos or Gramin Sewa. There is no metro station within walking distance, the nearest being Dwarka Mor on the Blue Line of Delhi metro, 2.7 km away. Residents also reported that they do not use the metro services owing to the high fares.

It was noted during the field survey that traveling outside of RRAY to access basic services was earlier a challenge, while the situation has gradually improved over the years. However, the lack of access to transport is still challenging, especially for women.

**Map 34: Access to public transport at Baprola project**



Access to Public Transport
EWS Housing, Baprola - Phase II, Delhi

Legend
- EWS Housing, Baprola
- Busstops
- Metro Stations
- 0.4 km radius
- 1 km radius
- 2 km radius
- 3 km radius

Roads
- pedestrian
- residential
- primary
- secondary
- services
- tertiary
- trunk

N

Source: CSE

**Figure 8: Satyam Vihar (Chanchal Park) bus stop at a distance of about 1 km from Baprola**



**Water supply:** Though one is greeted by an old tube well at the very entrance, drinking water supply is limited to three water tanks in the settlement, as observed during the field study. Drinking water is being provided to the families

through DJB water tankers on DUSIB cost as an interim arrangement. DUSIB was incurring an amount of Rs 1.56 lakh per month, which is only increasing as the occupancy increases. Earlier, a water ATM was also installed by DJB in the complex, for supplying potable water on chargeable basis, i.e. 20 paise per litre. But the residents were not ready to take water from the water ATM and therefore, the water supply through water tankers had to be continued.

No proper arrangement of regular supply of potable water exists even today, though DSIIDC has laid the water supply network including an UGR, which still needs to be connected to the peripheral waterline of DJB. Presently, bore water is being supplied to individual flats for bathing and other purposes through overhead water tanks placed on the terrace.[32,33] As a result, residents reported piped water supply and taps in the kitchen and toilets of individual households. Water is supplied thrice a day, for a total of three hours. The community reported that fights were common over access to drinking water during the summer months.

**Figure 9: Piped water connection in each dwelling unit at Baprola; community water tanks are filled by DJB water tankers**



**Solid waste management**: Though segregation is not practiced, waste collection is done by South Delhi Municipal Corporation on a daily basis. Waste is collected by the collection vehicle from individual blocks. However, waste is also thrown into

streets and drains by several households, posing a public health concern. These are the families who have not yet adapted to the formal system of waste disposal and add to litter in community spaces. However, the settlement was noted to be largely clean.

**Figure 10: SDMC solid waste vehicles collect the waste from Baprola everyday from a secondary collection point**



**Sanitation**: Each household has access to individual toilets. However, there is no proper system of sewage disposal, though DSIIDC had laid sewer lines. The discharge/effluent from the flats is collected in a sump-well and then pumped into a septic tank and then effluent from the septic tank runs through open drain to nearby Najafgarh drain, thus resulting in a foul smell in the area. Broken drains, leakage, mould problems in the bathrooms and/or kitchens and choked sewer lines were noted as common issues during the observation study, hampering the sanitation and hygiene across the settlement.

There is no sewage-treatment plant within the settlement. However, there was a provision of STP with an estimated cost of construction of Rs 8 crores approximately in the approved DPR, but DSIIDC provided a septic tank instead. Ideally, the capacity of the treatment system should be 2268 KLD, based on CSE estimations.

**Figure 11: There is a toilet in each dwelling unit at Baprola which is connected to septic tank**



**Community centre:** The complex has a community centre with a civil court (allotment completed; not functional) on the first floor and a Baraatghar on the second floor, while a few rooms with shutters have been carved out on the ground floor of the community centre for shops, but they are currently unused, and it is unclear how they will be used. Only one room on the ground floor is currently occupied by DUSIB as a makeshift office for residents to bring complaints. As per the survey, in spite of a rent of Rs 2700 per day for the Baraatghar, along with a refundable security deposit of Rs 3,000, the facility remains largely unused by the community with only two functions hosted there since 2015.

Four large parks and two small parks serve as spaces for leisure, while children largely play on the streets. However, these parks are reportedly unsafe in the evenings, owing to their misuse for gambling and alcohol abuse.

**Figure 12: A complaint centre (left) established at the Baprola project; a *Baraatghar (right)* is developed at Baprola which can be availed by the residents at a rent of Rs 2700 per day.**



**Self-help groups:** Nazdeek, an NGO based in Lajpat Nagar, New Delhi, has been working closely with the community since 2016 and has been extending remarkable assistance to the community, especially during the lockdown. It has created a group of six to seven paralegals and volunteers who work with the community, and act as the voices to raise concerns and seek help on behalf of the community.

**Safety:** Safety is a major concern in the settlement. Adolescent girls and women reported that in absence of job opportunities, a large proportion of men engage in consumption of alcohol, gambling and drug abuse, creating an unsafe environment for women and children. Several liquor stores were reported to be operating within the flats. This contributes to one of the reasons for fights within the community, which when intensified, are handled either by the elected Pradhan of the community or by the Ranhola Police station.

**Housing typology**: Each building in RRAY, Phase II has four floors with four flats on every floor. Flats consist of a small living room, a bedroom, a kitchen, a toilet, and a balcony. The construction typology uses exposed brick and RCC-framed structure. Thermal comfort was reported as average, since most of the households were seen resorting to coolers or air-conditioners. The layout offers privacy, natural light and ventilation to all the flats. Daylight ingress and ventilation

were reported to be good during the observation study, with sufficient windows/ventilators in each room. As per a 2017 study, the window opening area is 14 per cent of the floor area.[33]

**Livelihood and jobs:** A knowledge-based Industrial Park was planned at Baprola around the same time when the RRAY project was conceived, back in 2010. The project with an estimated project cost of about Rs 2575 crore, spread in an area of approximately 55 acres adjacent to the RRAY settlement, was expected to provide direct employment to about 1 lakh persons and indirect employment to about 1.70 lakh persons. However, the project has remained stuck over the years.[34]

As a result, access to livelihood has become an issue, owing to the location of the project. Most residents reported that they need to travel long distances to reach their old jobs. Many have been forced to look for new jobs in surrounding areas and others complain of not being able to find work at all. Many families reported that they have been struggling to survive on income from casual labour, domestic work, factory work, contract labour, or home-based occupations such as tailoring, reselling scraps, or selling consumer goods. Average monthly income of households in the settlement was ascertained to be around Rs 10,000 per month, as per the survey. However, most households owned assets like cooler, fridge and mobile phones.

**Green infrastructure:** The cluster planning is such that the blocks are linked together with a central green belt. Four large parks and two small parks serve as organized green spaces within the settlement to cater to nearly 5,220 people. This organized green area contributes to 20 per cent of the total site area. This accounts for nearly 3.5 sqm of green area per capita with the current population and 0.87 sqm of green area per capita when the settlement is fully occupied.

A good distribution of green spaces within the settlement has been achieved. These green areas are mostly used for recreation and get-together purposes during the day. However, they also serve as hide-out areas for anti-social elements post-evening.

**Map 35: Baprola is planned with 20 per cent of the site area as dedicated green space**
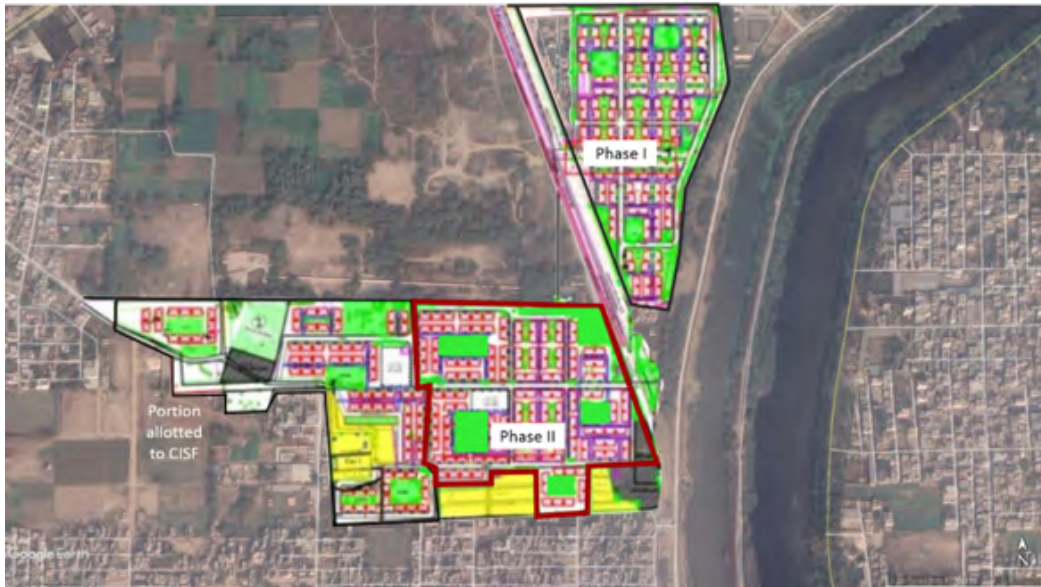


Source: CSE

**Figure 13: Green infrastructure in EWS Housing, Baprola**



**Environmental services:** Environmental services such as on-site waste management system, rainwater harvesting, wastewater treatment or use of solar panels were found to be completely missing on the site.

Overall, lack of decent job opportunities and access to healthcare facilities, including maternal health, in the proximity of the settlement were raised as the biggest challenges for the people residing in this settlement. Other complaints were received regarding access to schools, food and nutrition, and quality of construction.

## 2. Sultanpuri

Approached through a maze of narrow lanes, the informal settlement in Sultanpuri is located in a densely populated sprawling residential area in the northwest corner of Delhi. It originated around 1978, not long after Sultanpuri was developed, an instance of the 'slums within slums' trend in Delhi's resettlement colonies. The settlement, choked with garbage and lined with open sewers, presents a classic case of compromise with liveability standards as residents prioritize accessibility, proximity to job opportunities, and access to social infrastructure.

### Map 36: Location of the informal settlement in Sultanpuri—city level



Source: CSE

The Sultanpuri rehabilitation plan is among the 15 initially proposed pilot projects by DUSIB and involves moving residents of nearby slum clusters into the 1,060 EWS flats constructed under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM). The process aims to free the land they currently occupy for the construction of more such flats. It is, effectively, a pilot case of the in-situ rehabilitation model, where the JJ dwellers are rehabilitated at the same location or a site within a 5 kilometre radius of the slum by allotting a flat on leasehold basis, initially for 15 years which may be extended. Earlier experiments with resettling jhuggi residents on the outskirts of the city have failed to a large extent and therefore, the Delhi government expects in-situ rehabilitation to be a more practical option.

The JJ cluster, opposite F-7 block, is a notified JJ cluster on tenable land owned by DUSIB. It comprises a total of 278 households, spread over an area of 5911.75 sqm. Out of these 278 households, 200 households have been listed in the allotment process so far. These families reported that they have submitted their documents and paid a sum of Rs 32,000, against which they have received an allotment letter from DUSIB. They have raised loans for paying the remaining amount through monthly instalments.

| Map 37a: Location Map - Neighbourhood level | Map 37b: Location Map for informal settlement - Neighbourhood level | Map 37c: Location Map for rehabilitation site - Neighbourhood level |
|---|---|---|
|  |  |  |

Source: CSE

The residents, however, presented a mixed opinion in terms of choices to move to the resettlement site, just two kilometres away in salmon pink mid-rise structures, where over a thousand others await their arrival. On the one hand, a large fraction of residents expressed a strong willingness and have been anxiously waiting to move to the identified rehabilitation project at the earliest, as the process has faced a year's delay due to the pandemic. These residents reported the location of the identified project as the biggest advantage, since not only does it have good access to physical and social infrastructure, it is also within 2 kilometres of their current residence. However, they were extremely worried about the huge sum of money they have to pay for the new house and their financial instability, owing to the pandemic. General category beneficiaries need to pay Rs 1.12 lakh for a 25 sqm flat at the rehabilitation site, while the scheduled caste beneficiaries need to pay Rs 1000. Over and above this, Rs 30,000 needs to be paid in both categories, as maintenance cost for five years. They expressly demanded that the government should ensure proper sanitization and cleaning, along with retrofitting of the premises before handover, owing to its current state and usage as a quarantine facility for COVID-19 patients.

On the other hand, there were those who were more anxious than the others, for they had no allotment letters to show. Many of them had bought a jhuggi but they do not have the mandatory proof of residence. Such families are in a state of confusion about their future, in case the existing jhuggi is cleared. As per the policy, if a jhuggi has come up after 01 January 2015 and a jhuggi dweller does not have sufficient proof/documents of eligibility, it does not qualify as per the eligibility norms for allotment. Many also see the multi-storey flats as limiting, owing to their large family sizes. They raised concerns about the additional Rs 30,000 that they are required to pay for maintenance. Such concerns are valid considering who will bear such costs once the five-year maintenance period runs out. The upkeep of the new complexes will certainly become problematic thereafter, given the large families and the high cost of maintenance of lifts and common areas.

In spite of the above concerns, the households in this JJ cluster seemed prepared for moving to the new site. Apart from the JJ cluster opposite F-7 block, there are 10 more clusters in Sultanpuri, comprising nearly 1,510 households, spread over an area of 76,955 sqm. The ongoing process involves inclusion of these clusters in the upcoming allotment list.

**Map 38: Slums in Sultanpuri covered under the in-situ rehabilitation plan and their corresponding distances to the rehabilitation site**
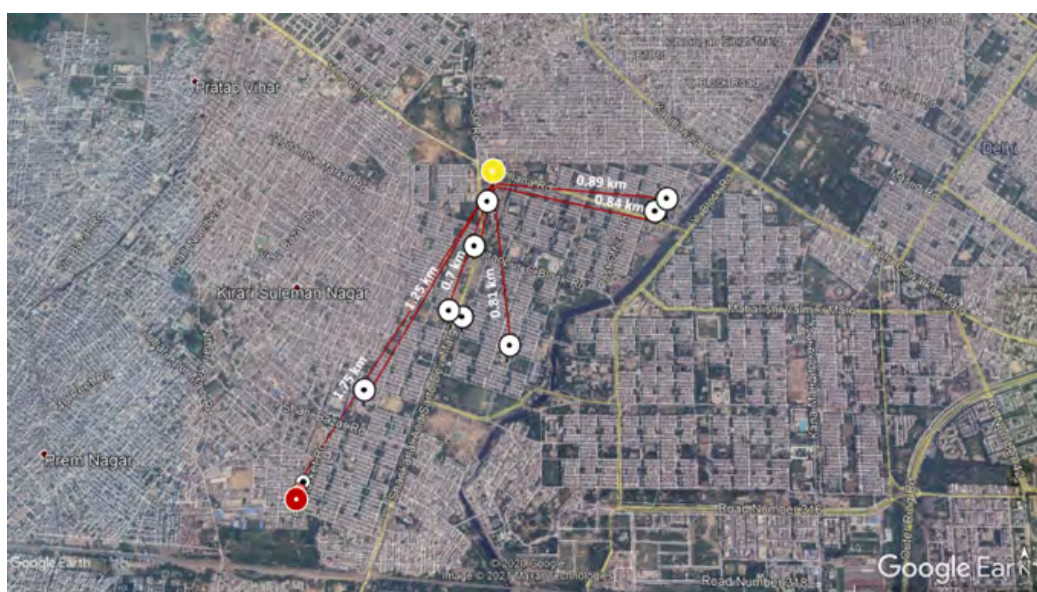


Source: CSE

Several other efforts have been taken by DUSIB, as part of this rehabilitation initiative. Five rooms, comprising an area of 642 sqft in the B-block at Sultanpuri, were planned to be allotted to an NGO/charitable trust to operate a Basti-Vikas Kendra in December 2019, subject to payment of Rs 2 per sqft per month license fees, provisionally for a period of one year. The Basti Vikas Kendra intends to carry out community development activities (on no profit and loss basis by the NGO). However, owing to the pandemic, all such proposed uses for community welfare stand stalled, as the premises are being used as a dedicated quarantine facility.

**Settlement and community profile:** The JJ cluster has an organic layout with densely-packed houses intersected by narrow galis (about 3 to 6 feet wide). Plot sizes are irregular, with most plots being about one-quarter to one-half the size of the standard 25 sq. yd. properties in the planned blocks of Sultanpuri's resettlement colonies.
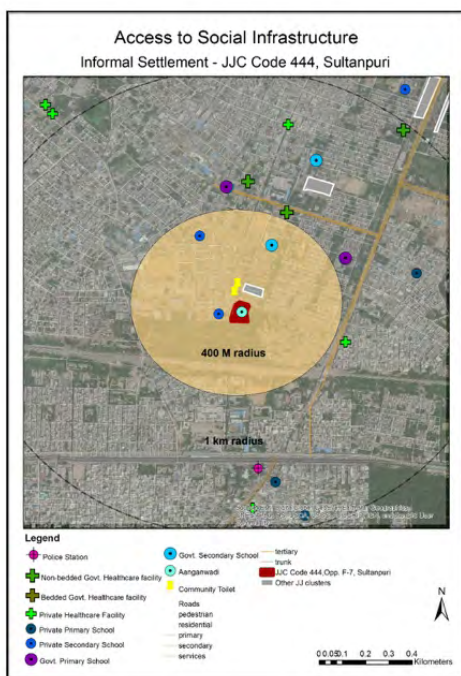
The settlement is predominantly home to a community of sewage and sanitary workers; there are also street vendors, people working at a recycling factory, mattress makers, and those engaged in sundry professions which are paid very low remunerations and thus are unable to find space in the non-slum areas. A large proportion of the residents are migrants from neighbouring states like Haryana, Uttar Pradesh and Bihar, while others claimed to be original inhabitants of Delhi.

With an average household size of six members, as estimated from the survey, the settlement approximately hosts a population of over 1,668 (or more owing to larger family sizes). As per these estimates, the current population density is roughly around 1142 PPA or 471 DUs per hectare. Though the community is situated amidst middle class urban settlements, it exists and operates as a segregated ghetto from the Sultanpuri main habitation.

## Access to social and physical infrastructure

**Primary schools and secondary schools:** Educational facilities include an Anganwadi within the settlement, government schools up to the secondary level (class 10), as well as private schools. There are four government schools within 1 km radius (two primary and two secondary) and as many as seven government secondary schools within a 3 kilometre radius. Apart from this, there is one private school that lies within the 3 kilometre radius. Such numbers indicate that the residents enjoy good access to educational infrastructure.

| **Map 39: Access to social infrastructure in a walkable vicinity around the Sultanpuri informal settlement** | **Map 40: Access to social infrastructure in a larger 3 km radius around the Sultanpuri settlement** |
| --- | --- |
| <br>Source: CSE | <br>Source: CSE |
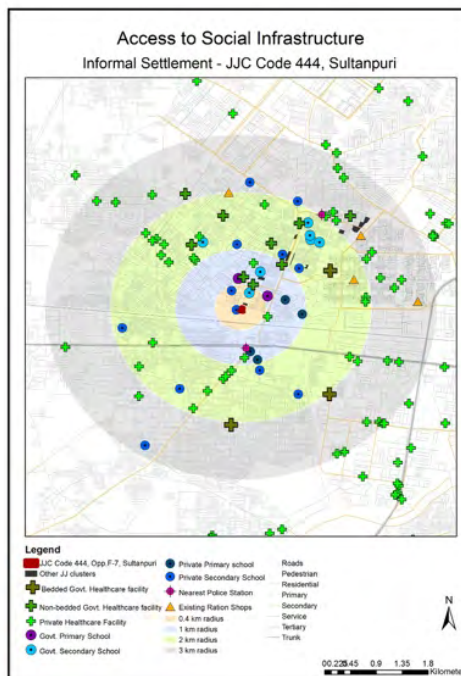
**Hospitals and dispensaries:** Health facilities in Sultanpuri consist of mohalla clinics, dispensaries, government hospitals, as well as private clinics. With respect to access to healthcare infrastructure, the community members reported that they depended primarily on Sanjay Gandhi Memorial Hospital and faced no issues in terms of access to healthcare facilities. This was further validated with the mapping exercise, which found that there were 7 mohalla clinics, 3 government hospitals and 23 private healthcare facilities within a radius of 2 kilometres. Apart from this, ASHA workers were also reported to be working in the community.

**Ration shops:** Most households reported that their names are listed in the ration shop near Jalebi Chowk, which is located approximately at a distance of 1.5 km. However, most of them rely on local kirana stores on the main road along the settlement.

**Community centre:** A total of seven Basti Vikas Kendras (community centres) are located in Sultanpuri; one being located within the proposed rehabilitation site.

Awareness camps, vocational trainings, and government programs, such as the Integrated Child Development Scheme (ICDS), operate out of these community centres and target welfare activities for the JJ dwellers. These centres are operated and run by different agencies such as NGOs, Rotary Clubs and MCD.

**Leisure and religious activities:** The settlement lacks a formally dedicated space for religious activities. However, some people have built a small shrine under a transformer on the main road at the entrance of the settlement. Streets within and around the settlement, open spaces around the community toilet facility called the 'Jan-Suvidha Parisar' and Shishu Vatika, adjacent to it, acted as spaces for leisure and recreation for most residents even though there is a park in Block F-7.

| Figure 14: Religious space in the informal settlement | Figure 15: a children's park at Sultanpuri | Figure 16: neighbourhood streets being used for recreational activities |
|---|---|---|
|  |  |  |

**Self-help groups:** Two NGOs work in the community—Saahasee and Sewa Bharati. These NGOs provide vocational training, day care programmes, and awareness campaigns to address issues of health, hunger and education in these communities. However, no self-help groups were reported in the settlement.

**Safety:** Even though there is a perception in the middle and upper classes that Sultanpuri is an unsafe area, the residents of the informal settlement reported the neighbourhood to be safe and exhibited a strong sense of community, in spite of religious and regional diversity. However, petty fights over water supply were reported to be common.

**Public transport:** Sultanpuri is in close proximity to main transportation routes, including Rohtak Road and the Northern Railway line. It is well-connected to public transport, as both the nearest bus stop and metro station are within a walking distance of less than 1 kilometre. However, the benchmark of access to PT stops within 400m remains unsatisfied.

The residents reported that they could conveniently access public transport through either the bus stop at Jalebi Chowk or the Sultanpuri bus terminal. Those headed to Jalebi Chowk to access buses for specific routes preferred to walk, while residents mostly choose to board from the Sultanpuri bus terminal, which is roughly 2 km away from the settlement, from where they can access buses to any part of Delhi by paying a maximum of Rs 15. The site has good last-mile connectivity and people depend on electronic rickshaws or auto-rickshaws which charge Rs 10–15 to the Sultanpuri bus-terminal.

Nangloi metro station, which is the nearest metro station, is also located within walking distance of less than 1 kilometre. Residents, however, reported that they do not use the metro services, owing to the high fares.

Overall, owing to good access to social infrastructure and job opportunities in close proximity, the JJ dwellers did not report much expenditure on travel.

**Map 41: Access to public transport at Sultanpuri settlement**
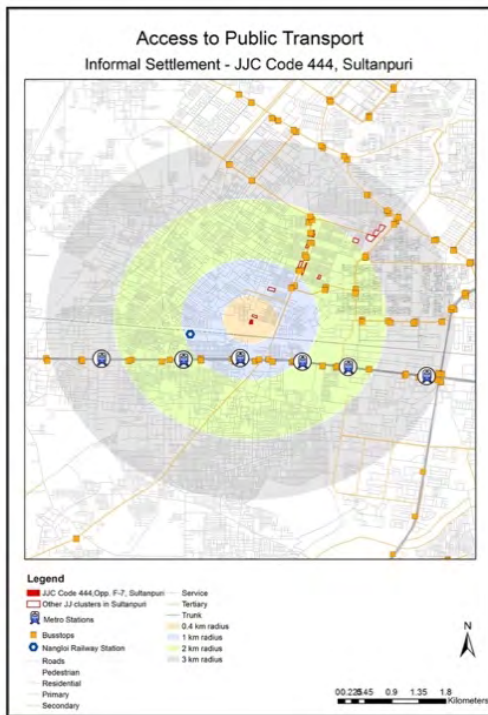


Source: CSE

**Water supply:** No households in the informal settlement have private connections. These households depend on three to four community stand-posts with municipal water supply spaced throughout the settlement. Neighbouring households use flexible PVC pipes to draw water from these posts, while the distant ones fill their storage containers bucket by bucket. As per a 2008 study, the frequency of water supply is once per day, which usually lasts up to one hour.[35] In the random survey, numerous respondents commented that the current access was not sufficient for their needs, and they face difficulties as they are required to store water in large containers on a daily basis. Furthermore, access to water supply throws harsher challenges during the summer months as they experience frequent water shortages, owing to low municipal water levels in the entire Sultanpuri area. The water supply requirements are then met through the tanker supply from Delhi Jal Board. This leads to long queues; often leading to fights within the community.

Further, as per the 2008 study, more than 90 per cent of the residents reported that the quality of water had adverse effects on health in their families and cited examples of water-related diseases such as diarrhoea, typhoid and cholera.

**Figure 17: Use of community stand-posts and flexible PVC pipes for access to water supply**

**Solid waste management**: Though waste collection is done by North Delhi Municipal Corporation on a daily basis from the adjacent blocks of Sultanpuri, collection from this settlement happens only from the point of entrance to the settlement, since door-to-door collection is not feasible owing to lack of vehicular access in the narrow lanes. The residents reported that the they faced a bias while dumping waste in the collection vehicle, as the safai karamcharis (government sanitation workers) were usually unwilling to collect waste from their settlement.

On delving deeper into the issue, it was found that such a bias stemmed from the lack of willingness to pay for the waste-collection service. Ideally, North Delhi Municipal Corporation levies a user charge for door-to-door collection of municipal solid waste, as part of the Solid Waste Management Rules, 2016, that ranges between Rs 50 to Rs 150 per month. As a result, waste being thrown onto streets and dumped in drains by several households was a common sight, contributing to insanitary living conditions and posing a public health concern. With such a poor situation of waste collection, segregation of waste remains out of the question.

Apart from paying for the collection of waste from the settlement, the residents have the option to carry their waste themselves to dhalaos, as the MCD's Cleaning and Sanitation Department (CSD) collects garbage from these dhalaos. The nearest dhalao for the settlement is located at a walking distance of 0.66 km in Block F-5, Sultanpuri.

| Figure 18: Residents use neighbourhood streets for washing clothes | Figure 19: Open drainage at Sultanpuri | Figure 20: Community toilet used frequently by the residents of Sultanpuri |
|---|---|---|
|  |  |  |

**Sanitation:** People in the informal settlement do not have household toilets. The community depends on a 'Jan-Suvidha Parisar', which is a community toilet complex, located near the entrance of the settlement, across the road. DUSIB has waived off the user charges w.e.f. 01.01.2018 and these toilets remain open 24x7 for public use.[36] The residents reported that the facility had continuous water supply and was sufficient to meet the requirements of the community during the day. However, access to the facility is difficult in the night hours, especially for the women, children and elderly.

MCD and DUSIB are the two nodal agencies mandated to provide sanitation facilities in Delhi's slums. MCD implements a plan scheme called 'Grants-in-Aid to MCD for Sanitation in JJ Clusters' under its plan budget whereby resources are allocated for sanitation facilities in JJ colonies. Similarly, DUSIB also implements a scheme since the Seventh Plan called 'Grants-in-Aid to MCD (Slum) for the Construction of Pay and Use Jan Suvidha Complexes', or Community Toilet Complexes (CTCs). This particular Jan Suvidha Complex has been constructed by DUSIB. The toilets in these complexes were proposed to have chemical technology to recycle the water for flushing and collection and discharge of sludge in nearby sewerage system after 70/80 uses.

As there are no toilets at individual HH level, the settlement does not have sewer lines, but has paved storm-water drains, which are also used for disposing grey-water from cooking and washing activities, apart from draining away rain-water. Existence of drains in the settlement represents a significant improvement for local residents, considering that permanent drainage infrastructure is unusual in squatter colonies. The residents, however, reported that these drains regularly overflowed and they faced difficulty getting these drains cleaned. As per the observation study also, overall, the community drainage system functions poorly since all naali sections had stagnant water and is commonly used as garbage dump and open toilet, after sunset.

**Housing typology:** Housing consists of mostly G or G+1 structures and a mix of small semi-pucca and pucca (permanent) structures. While both pucca and semi-pucca structures have brick and mortar walls, pucca structures have concrete roofs on GI frame while the semi-pucca ones have sheet metal roofs. Constrained by plot size, residents have expanded their housing vertically over the years. Most houses in the study community are double-storey, the rest being one-storey. Generally, each storey has one room (with or without a partition for kitchen). The *galis* between rows of houses are a salient feature serving as an extension of domestic space and a zone of social interaction. Thermal comfort was reported to

be 'average', while daylighting and ventilation were observed to be 'bad', owing to absence of adequate windows as well as overall congestion. Although the settlement is illegal and thus the government could, in theory, demolish it at any time, the structures nevertheless exhibit a sense of belonging, which can be interpreted in several features such as the choice of bright and lively colours and 'torans' on the entrance. From the observation survey carried out in the settlement, it was evident that families have invested substantial resources in building these homes over a period of time.

Such a pattern of housing investment is more commonly convenient for the poor in slums. The informal arrangement provides them the opportunity for incremental growth and expansion, slowly over a period of time. However, this incremental building process gets curtailed when the residents of such settlements are moved to a formal multi-storey rehabilitation site.

**Figure 21: Bright and lively spaces in the community reflecting the affinity and investments made by the residents**

**Cost of living:** Most people in the slum work primarily as sanitation workers or daily wage laborers in Nangloi, Jwalapuri and Mangolpuri industrial areas. The average total monthly income per household, as reported, hovers around Rs 12,000. The expenditure of these families was reported to be more than their incomes. In the JJ cluster, the actual expenditure pattern could not be analysed due to the lack of responses from the community. From the general discussions, it was gathered that food and medical expense covered a major share of the expenditure. However, nothing definitive about expenses on education, electricity and transport was reported.

**Green infrastructure:** The squatter settlement has very few small open spaces and the living conditions are extremely congested. However, the park of F-7 block is merely 100m away. Apart from this the Jan-Suvidha Parisar also has open green spaces.

**Environmental services:** Environmental services such as on-site waste management system, rainwater harvesting, waste-water treatment or use of solar panels were found to be completely missing in the informal settlement site.

**Table 12: Detailed comparative understanding of accessibility and liveability of the two locations—Baprola and Sultanpuri**

| Sr. no. | Indicator | RRAY settlement, Phase II at Baprola (relocation site) | Informal settlement opposite F-7 Block, Sultanpuri (proposed for in-situ rehabilitation) | Benchmark as per standards/ guidelines | Remarks |
|---|---|---|---|---|---|
| AREA AND POPULATION PROFILE | | | | | |
| 1. | Area of the settlement | 91,412 sqm | 5911.75 sqm | Minimum plot size of 2000 sqm for relocation/ rehabilitation | - |
| 2. | Total number of DUs | 3,500 | 278 | - | Baprola: 5,568 in Ph – I & II together |
| 3. | Total number of HHs residing currently | 870 | 278 | | Baprola: 958 flats allotted by DUSIB since 2015 |
| 4. | Average HH size | 6 | 6 | National average HH size is 4.7 | Large family sizes are common in both areas |
| 5. | Population density | 231 PPA | 1142 PPA | | Baprola: Density is well-planned and distributed over the site.<br><br>Sultanpuri: Maximum of 900 pph equals 364 PPA for group housing |
| 6. | DU density | 383 DUs/Ha | 471 DUs/Ha | Maximum of 900 DUs/ Ha for EWS housing schemes, 500 DUs/Ha for group housing or 125–150 DUs/ Ha for plotted development | Baprola: Large population accommodated in mid-rise G+3 structures, spread out on a large plot.<br><br>Sultanpuri: Large population in extremely congested living condition, owing to low-rise settlement |
| 7. | Per capita habitable space | 4.16 sqm | 3.5 sqm | Minimum of 5.32 sqm considering national average HH size as 4.7 and minimum DU size of 25 sqm | Baprola: Considering average DU size of 25 sqm<br><br>Sultanpuri: Considering average DU size of 21 sqm |
| EDUCATIONAL INFRASTRUCTURE | | | | | |
| 8. | Number of government primary schools in 1 km radius | 0 | 2 | Minimum 1 | Baprola: Currently, in the absence of a govt. primary school, the very few primary school students go to the only private school in the neighbourhood.<br><br>Sultanpuri: Most children in the settlement go to the nearby government primary schools. |

| Sr. no. | Indicator | RRAY settlement, Phase II at Baprola (relocation site) | Informal settlement opposite F-7 Block, Sultanpuri (proposed for in-situ rehabilitation) | Benchmark as per standards/ guidelines | Remarks |
|---|---|---|---|---|---|
| 9. | Number of private primary schools in 1 km radius | 1 | 4 | - | Sultanpuri: Private primary schools in the neighbourhood were reported to be unaffordable for the JJ residents. |
| 10. | Number of government secondary schools in 3 km radius | 1 | 7 | Minimum 1 | Baprola: A new government senior secondary school has recently started; enrolment is in process and should benefit the community in the near future.<br><br>Sultanpuri: Most children in the settlement go to the nearby government secondary schools. |
| 11. | Number of private secondary schools in 3 km radius | 2 | 12 | - | Baprola: Most of the secondary school students cannot afford to go to these private schools. Hence, they travel to the far-off government schools in Jwalapuri, Peeragarhi, Kirtinagar, where they were earlier enrolled.<br><br>Sultanpuri: Private secondary schools in the neighbourhood were reported to be unaffordable for the JJ residents. |
| 12. | School drop-out trends | High | Low | - | Baprola: Children, of all age groups were reportedly playing on the community streets on a working day, indicating the possibility of high school drop-out rates post relocation, in the absence of adequate educational infrastructure<br><br>Sultanpuri: Drop-out rates were reported to be much lesser as compared to that in Baprola. Even the few children who were found at home on a working day reported that they go to a nearby government school. |

| Sr. no. | Indicator | RRAY settlement, Phase II at Baprola (relocation site) | Informal settlement opposite F-7 Block, Sultanpuri (proposed for in-situ rehabilitation) | Benchmark as per standards/ guidelines | Remarks |
|---|---|---|---|---|---|
| HEALTH INFRASTRUCTURE | | | | | |
| 13. | No. of non-bedded government healthcare facilities in 2 km radius | 1 | 7 | Minimum 1 | Baprola: A mohalla clinic is located within RRAY settlement which is functional from 8:00 am to 2:00 pm.<br><br>Sultanpuri: A total of 7 mohalla clinics are within a walking distance of 2 km. |
| 14. | No. of bedded government healthcare facilities in 2 km radius | 0 | 3 | - | Baprola: The absence of bedded facilities forces the residents to travel to either Rao Tularam Memorial Hospital, Jaffarpur or Deen Dayal Hospital, Harinagar. The residents reported severe challenges faced by them, in case of emergency.<br><br>Sultanpuri: Among the 3 bedded government hospitals within 2 km, Sanjay Gandhi Memorial Hospital is the biggest. |
| 15. | Beds per capita in government healthcare facilities within 2 km radius | 0 | 5.5 | 2 beds per 1000 population | Sultanpuri: A total of 323 hospital beds are available for a population of 1,668.[45] |
| 16. | Distance to nearest bedded government healthcare facility | 9 km | 2 km | - | Baprola: Rao Tularam Memorial Hospital, Jaffarpur is the nearest bedded government healthcare facility, referred to by the mohalla clinic.<br><br>Sultanpuri: Sanjay Gandhi Memorial Hospital is the nearest bedded government healthcare facility, and was also reported as the one most residents visit. |

| Sr. no. | Indicator | RRAY settlement, Phase II at Baprola (relocation site) | Informal settlement opposite F-7 Block, Sultanpuri (proposed for in-situ rehabilitation) | Benchmark as per standards/ guidelines | Remarks |
|---|---|---|---|---|---|
| SAFETY | | | | | |
| 17. | Frequency and nature of criminal incidents | High | Moderate | - | Baprola: Adolescent girls and women reported safety as a major concern. They expressed that in the absence of job opportunities, a large proportion of men engage in consumption of alcohol, gambling and drug abuse, creating an unsafe environment for women and children. Several liquor stores were reported to be operating within the flats.<br><br>Sultanpuri: Owing to its location in the north-east district of Delhi, Sultanpuri is considered among one of the unsafe areas, prone to more frequent incidents of crime. At the community level though, the residents reported the neighbourhood to be safe and exhibited a strong sense of community. |
| PUBLIC TRANSPORT | | | | | |
| 18. | Average trip length | 15 km | 3 km | - | Baprola: Both men and children travel to area of their original slum locations daily, owing to absence of job opportunities and educational infrastructure in Baprola.<br><br>Sultanpuri: People mostly travel within Sultanpuri or to close-by areas such as Mangolpuri and Nangloi, owing to their workplaces, schools and hospitals being in close proximity. |

| Sr. no. | Indicator | RRAY settlement, Phase II at Baprola (relocation site) | Informal settlement opposite F-7 Block, Sultanpuri (proposed for in-situ rehabilitation) | Benchmark as per standards/ guidelines | Remarks |
|---------|-----------|--------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------|---------|
| 19. | Daily commute expense of a household | Rs 120 | Rs 40 | - | Baprola: Their daily commute cost has tripled after relocation.[46]<br><br>Sultanpuri: Share of total expenditure on transport was reported to be low. |
| 20. | Access to IPT | Bad | Good | - | Baprola: The site does not have good last-mile connectivity within 400m. People depend largely on electronic rickshaws, which charge Rs 10–15 to the bus stop and Rs 25 to the nearest metro station. People generally walk for a kilometre up to the main road, from where they access buses, autos or Gramin Sewa. However, there is no dedicated IPT stop<br><br>Sultanpuri: The site enjoys good last-mile connectivity within 400m and people depend on electronic rickshaws or auto-rickshaws which charge Rs. 10–15/ to the Sultanpuri bus terminal. |
| WATER SUPPLY | | | | | |
| 21. | Total daily water requirement | 704.7 KLD with current occupancy, 2835 KLD in case of full occupancy | 225.18 KLD | 135 lpcd | - |
| 22. | Type of WS connection | Tap connections in individual HH, Piped water supply | Community stand-posts in the absence of tap connections in individual HH | - | - |
| 23. | Source of water supply | Non-potable water—borewell<br><br>Potable water—DJB water tankers which refill the 3 water tanks in the settlement | Potable water – Municipal water supply, together with DJB water tankers, especially in summer months<br>* This needs to be discussed with NGOs or groups working with the urban poor. | - | - |

| Sr. no. | Indicator | RRAY settlement, Phase II at Baprola (relocation site) | Informal settlement opposite F-7 Block, Sultanpuri (proposed for in-situ rehabilitation) | Benchmark as per standards/ guidelines | Remarks |
|---|---|---|---|---|---|
| 24. | Daily duration of water supply | 3 hours (thrice daily for one hour); controlled by DJB | 1 hour (once daily), controlled by a community-based water committee[47] | 24 x 7 | - |
| SOLID WASTE MANAGEMENT | | | | | |
| 25. | Availability of door-to-door collection | Yes | No | 100% HH level coverage of door-to-door SWM service | Baprola: Waste collection is done by South Delhi Municipal Corporation on a daily basis. Waste is collected by the collection vehicle from individual blocks. However, waste is also thrown into streets and drains by several households, posing a public health concern.<br><br>Sultanpuri: With challenges in waste collection, segregation remains out of question. |
| SANITATION | | | | | |
| 26. | Access to toilets in individual HH | Yes | No | 100% coverage of toilets in individual HH | Sultanpuri: The community relies on a community toilet complexes(CTCs)/Jan Suvidha Parisar, located near the entrance of the settlement, across the road. |
| 26. | Estimated wastewater generated | 563.76 KLD with current occupancy, 2268 KLD in case of full occupancy | 2268 KLD | 80% of water supplied | - |
| 27. | Availability of decentralized wastewater treatment system | No | No | - | Baprola: Though an STP was proposed in the DPR, currently discharge from the flats is collected in a sump-well and then pumped into a septic tank. The effluent from the septic tank runs through open drain to nearby Najafgarh drain.<br><br>Sultanpuri: As per Economic Survey of Delhi, 2017-18, the community toilet complexes were proposed to have chemical technology to recycle the water for flushing and collection and discharge of sludge in nearby sewerage system after 70/80 uses. |

| Sr. no. | Indicator | RRAY settlement, Phase II at Baprola (relocation site) | Informal settlement opposite F-7 Block, Sultanpuri (proposed for in-situ rehabilitation) | Benchmark as per standards/ guidelines | Remarks |
|---|---|---|---|---|---|
| HOUSING TYPOLOGY | | | | | |
| 28. | Average number of floors | G+3 | G to G+1 | Height - no restriction; Maximum FAR 200 for group housing | Baprola: Mid-rise structures without scope for incremental expansion.<br><br>Sultanpuri: Low-rise structures with scope for incremental expansion. |
| 29. | Material of construction | Exposed brick and RCC-framed structure | Pucca and semi-pucca structures have brick and mortar walls; pucca structures have concrete roofs on GI frame while the semi-pucca ones have sheet metal roofs. | - | - |
| 30. | Average number of rooms per HH | 2 | 2 | - | Baprola: Along with a kitchen, toilet and balcony.<br><br>Sultanpuri: Each storey has one room (with or without a partition for kitchen). The galis between rows of houses are a salient feature serving as an extension of domestic space and a zone of social interaction. |
| 31. | Thermal comfort | Average | Average | - | Based on how people perceived thermal comfort in the settlement. |
| 32. | Daylight ingress and ventilation | Good | Bad | - | Sultanpuri: Owing to absence of adequate wall openings and their size as well as overall congestion. |
| ECONOMICS | | | | | |
| 33. | Jobs and employment | Predominantly reported as daily wagers. However, the community had a mix of those engaged in casual labour, domestic work, factory work, contract labour, or home-based occupations such as tailoring, | Predominantly sanitation workers or daily wage laborers in Nangloi, Jwalapuri and Mangolpuri industrial areas, which are in close proximity to the JJ cluster. Unemployment concerns were not reported during the field study. Women also contributed to the workforce by working mostly as domestic help. | | |

| Sr. no. | Indicator | RRAY settlement, Phase II at Baprola (relocation site) | Informal settlement opposite F-7 Block, Sultanpuri (proposed for in-situ rehabilitation) | Benchmark as per standards/ guidelines | Remarks |
|---|---|---|---|---|---|
|  |  | reselling scraps, or selling consumer goods. Unemployment was reported as a major concern, due to loss of jobs after relocation and lack of job opportunities in the proximity to the site. |  | - | - |
| 34. | Average monthly income | Rs 10,000 per month | Rs 12,000 per month | - | This needs to be discussed with NGOs or groups working with the urban poor. |
| GREEN INFRASTRUCTURE | | | | | |
| 35. | Percentage area of open spaces | 20% | Nearly absent, the narrow lanes were the only open spaces without greens; exact percentage could not be deciphered, due to the congested layout. | - | Baprola: With 4 large parks and 2 small parks as organized green spaces within the settlement catering to nearly 5,220 people.<br><br>Sultanpuri: The squatter settlement has very few small open spaces and the living conditions are extremely congested. However, the park of F-7 block is merely 100 m away. Apart from this the Jan-Suvidha Parisar also has open green spaces. |
| ENVIRONMENTAL SERVICES | | | | | |
| 36. | Solar energy tapped | No | No | - | - |
| 37. | On-site waste management system | No | No | - | - |
| 38. | Rainwater harvesting | No | No | - | - |
| 39. | Wastewater treatment system | No | No | - | - |

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In view of the challenges and risks that the pandemic has exposed, the Centre for Science and Environment (CSE) has carried out an on-ground investigation of selected mass housing schemes and redevelopment schemes to assess locational disadvantages and gaps in services and infrastructure. This investigation covers a diverse set of programmes that include national housing schemes such as PMAY-U, private sector led state housing schemes, and slum rehabilitation and resettlement schemes.