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TRAI/FY22-23/006
Dated: 11.05.2022

To,
Shri Sanjeev Kumar Sharma,
Advisor (Broadband and Policy Analysis)
Telecom Regulatory Authority of India,
Mahanagar Door Sanchar Bhawan,
JawaharLal Nehru Marg,
New Delhi – 110 002.

Subject: Response to Consultation Paper on "Use of Street Furniture For Small Cell And Aerial Fiber Deployment."

Dear Sir,

This is in reference to TRAI's Consultation Paper on "Use of Street Furniture For Small Cell And Aerial Fiber Deployment" dated 23.03.2022.

In this regard, please find enclosed our response for your kind consideration.

Thanking You,

Yours' Sincerely,
For Bharti Airtel Limited

Rahul Vatts
Chief Regulatory Officer

Encl: a.a

Response on "*Use of Street Furniture for Small Cell and Aerial Fiber Deployment*"

Preamble

Highspeed Broadband (HSBB) Connectivity is the bedrock of the **Hon'ble Prime Minister's vision on Digital India**. The **Atmanirbhar Bharat (Self-reliant India)** vision means we leverage connectivity and digital technologies to support India's economic progress, resilience and cohesiveness.

Today, nations depend on the quality of their digital infrastructure to improve their productivity, international competitiveness, economic growth and improvements in the living standards of their citizens. The benefits that telecom connectivity bring to a nation are there for everyone to see. The direct and indirect impact of telecom has brought significant economic value add to India and is expected to bolster it further in the coming decades.

According to GSMA Intelligence[1], mobile networks in India are generating huge socio economic value which is forecast to only increase e.g. in 2021, it generated 4.7% of GDP in India or >$136bn value added, that is expected to reach ~$155 billion in 2025. On employment front too, the mobile ecosystem directly and indirectly supports nearly 4.6 million jobs.

Similar other studies (e.g. Nokia Mbit 2021 and Ericsson Mobility Report 2021) highlight the growing importance and centrality of mobile networks in lives of Indians. For example:

- Indians spend ~5 hours per on smartphones, one of the highest consumers of data per day, surpassing China.
- Since launch of 4G services in 2016, total data traffic has jumped by ~60times (2015-2020), one of the highest in the world.
- Industry 4.0 enabled by Private Networks with various IoT and Enterprise use cases would spur LTE, 5G growth and data usage.
- Data traffic / smartphone / month, forecast to reach 50GB by 2027 from 18.4GB in 2021
- Mobile subscription in India by technology by 2027: 39% 5G, 55% 4G and balance others.

[1] Mobile Economic Impact India, GSMA Intelligence, March 2022

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When we look at the impending 5G era, and the future use cases of connected devices (e.g., V2X), M2M/IoT, AR/VR, smart cities, waste disposal, smart metering, it becomes apparent that we will need more enhanced, capable and dense networks through an increasing number of base stations at shorter distances to provide street level coverage. This will necessitate coverage through poles and other available street furniture. The following excerpt from the TEC Committee Report sums up what we can rightfully expect over the coming times:

"The next generation of cellular technology i.e. 5G, represents a paradigm shift for cellular infrastructure. With the advent of 5G, there will be a requirement to deploy Low Power Base Stations (LPBTS) with 5G radios often called "small cells". These 5G Small Cells operate on higher frequency spectrum bands in the range, FR1 band (sub 6 GHz) and FR2 band (mm Wave) that necessitate denser network deployments to support larger traffic volumes per unit area. The number of 5G small cells will therefore be huge in number as compared to the previous generation of 4G base station towers. These 5G small cells have limited coverage of tens/hundreds of meters and are mostly marked by short ranges and may however vary significantly depending on their use cases. Considering the need for densification of the network, these small cells will be deployed on various types of street furniture such as poles, street lights, traffic lights, bus stop shelter, advertisement hoardings, billboards, etc. due to their low weight and small size."[2]

Small Cells can contribute to regulatory and policy objectives in several important ways as depicted in this chart from a report[3] brought out by Small Cell Forum.

Policy or initiative	Role of small cells
Smart city	Bring the ubiquitous coverage required for services like public safety, traffic management, etc. as they can be deployed in hard-to-reach locations such as underground car parks or even in pavements.
Smart digital community	A blanket of small cells can quickly and cost effectively bring broadband and cloud access to more (small) businesses, stimulating new economic activities.
Bridge digital divide	Provide a more affordable, flexible way to extend coverage to remote and rural areas, and to hard-to-reach urban areas, to enable universal broadband access.
Maximize use of spectrum	Increase the spectrum efficiency by reusing the existing mobile operator spectrum for indoor operation, both the currently unused frequencies and those already used by outdoor sites. They can make use of high frequency spectrum as well.
Stimulate new consumer services	The location- and presence-awareness inherent in small cells can support and accelerate new commercial applications such as mobile shopping and context aware marketing, enabling new services.
Emergency response	Small cells can play an important role in providing vital communications for emergency teams. Their localized and dynamic nature helps to meet regulatory requirements placed on national carriers in such circumstances.
Visual integration	Minimized impact on the environment, due to their relatively small and unobtrusive form factor. The visual integration in the surroundings can be further improved if mounted on existing structures such as lampposts, walls, etc.

Table 3-1 The ways in which small cells can support common policy objectives of governments and cities

[2] Roll Out of Small Cells for 5g Network by Leveraging Street Furniture - to Facilitate a Standard Approach for the Proliferation of Dense Small Cell Infrastructure, TEC Committee Report No TEC 81001:2022, March 2022

[3] Small cell siting: regulatory and deployment considerations, February 2017, 5gamericas.com and smallcellforum.org

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As evident, rollout of Small Cells in a timely, cost effective manner is need of the hour, to reap true benefits of 5G. Timely Rights of Way (RoW) permissions are a critical piece to enable this.

While RoW rules 2016 (and amendments) came to facilitate the establishment and maintenance of underground and over-ground telegraph infrastructure, considerable on ground challenges remain.

As per ITU[4], in some countries, regulation and local authority policy have slowed the development of small cells through excessive administrative and financial obligations on operators, thus blocking investment.

Additionally as per a GSMA study[5] investments in the 5G era will be driven by need for large number of small and macro cells. The GSMA report highlights that cumbersome bureaucratic approval processes typically inhibit timely large-scale deployment of small cells.

Therefore, without regulatory intervention to streamline deployment, operators can face big delays and significant cost barriers.

Now, with the impending 5G launch, India must have a policy framework that removes administrative barriers to network rollouts at grassroot levels and where every organ of the State (Union and state government both) works seamlessly and horizontally to facilitate deployment of small cells infrastructure.

In addition to deployment in states and UTs, the Central government ministries' RoW policies should align approval and charging with DoT RoW Rules 2016 including Small Cells using street furniture. This includes Union ministries like the Railways, MoRTH, NHAI, MoPNG, MoEF, MoD, MoCA.

With this in mind, we answer the specific questions raised by Authority in the paper.

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[4] Setting the Scene for 5G: Opportunities & Challenges, 2018, ITU
[5] Realising 5g's Full Potential: Setting Policies for Success, March 2020

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ISSUES FOR CONSULTATION

Q.1: Is there a requirement for any modification in existing RoW Rules as notified by DoT to accommodate small cell deployment on street furniture? If yes, please provide the changes required.

Yes.

As explained in the Preamble, the network needs to be densified and these Small Cells can be deployed on various types of street furniture such as poles, street lights, traffic lights, bus stop shelters, advertisement hoardings, billboards, etc. because of their lower weight and small size.

As per a report[6], the "...Urban small cells deployed at street level are the next logical step to meet growing data traffic demand in city centres. Practical solutions need to be quick and easy to install, adapt seamlessly with tactical evolution and be resilient during outages..." It further states that "...Planning deployment of urban small cells involves trade-offs between three key capabilities – backhaul, power and site availability..."

If India is to leverage the most effective gains in the most seamless manner from the next generation of digital technologies, connectivity like 5G, it is imperative that a standardized policy for the roll out of Small Cells using street infrastructure is put in place. Further, this dense Small Cell Infrastructure should be available all across the country so that the potential of existing national assets like street furniture can be unlocked.

Therefore, yes, changes and modification to the present RoW Rules when it comes to the inclusion of small cell deployment on street furniture are necessary. In fact, all street furniture / public infrastructure, not just small cells, should be made standard infra under the RoW policies/ rules.

There should also be greater transparency when it comes to the availability of assets on which Small Cells could be deployed; processes should be streamlined so as to avoid all lengthy deployment delays; and pro-infrastructure citing and sharing policies should be put in place to ensure the wider deployment of Small Cells. The modifications and amendments should be quick, simple, affordable, effective and easy to implement with minimum timelines, and should be seen in the context of Small Cells rather than the existing macro telecom infra.

[6] SoftBank Japan - rapid small cell deployment in the urban jungle, CCS

"...We shouldn't apply burdensome rules designed for 100-foot towers to small cells the size of a pizza box. If America is to lead the world in 5G, we need to modernize our regulations so that infrastructure can be deployed promptly and at scale,..." FCC Chairman Ajit Pai[7].

Required changes:

The DoT's latest draft Policy Guidelines for Right of Way (RoW) for Establishment of Telecommunications Infrastructure already aims to prescribe general principles related to RoW calculation methodologies, pole deployments for small cells, etc. When it comes to Small Cells and usage of street furniture, in particular, it suggests the following:

"...Establishment of poles for deployment of Small Cells: -

(i) In case of establishment of poles (not mobile towers) for deployment of small cells, the application fee shall not exceed Rs. 1,000 per application. However, no application fee shall be levied by the Central Government Authority for establishment of poles on central government land for deployment of small cells and OFC required to connect small cells.

(ii) There shall be no compensation for establishment of poles for deployment of small cells.....

.... Usage of street furniture for deployment of Small Cells: -

(i) There shall be neither application fee nor compensation for using the street furniture, established by any person or entity over the immovable property of the Local/Government Authority, for installing small cells and OFC required to connect small cells. The applicant shall be required to submit to the Authority a self-declared intimation on online RoW portal for usage of street furniture for deployment of small cells. Along-with the written intimation, he shall also be required to submit the details of the street furniture, where installation of the small cells is proposed, and a copy of certification by a structural engineer authorised by appropriate authority. The details of authorised structural engineers shall be made available on online RoW portal] attesting to the structural safety of the street furniture, where the small cells are proposed to be deployed. The Telecom Engineering Centre (TEC) shall issue guidelines in respect of structural safety of the street furniture for installation of small cells.

(ii) The central government authorities shall permit deployment of small cells on government building and structures free of cost...."

[7] https://www.fiercewireless.com/wireless/trump-pledges-to-help-speed-up-small-cell-siting-processes

We believe, while the above are welcome however the application fee of 1000/- per application is very high and should be further rationalized. There are certain further aspects that should be looked into and incorporated into these draft RoW guidelines, and states and local bodies should be mandated to follow them.

These additional aspects include:

a. Amending the RoW Rules to include Small Cells (in a technology neutral way) along with mobile towers and telegraph line in opening paragraph of the DoT Rules.

b. Since telegraph is a Union subject, putting in a proviso in the Central RoW rules that any inclusion / amendment w.r.t a type of "telegraph" in Central Rules (of DoT) should automatically be deemed included in and aligned by the States in their RoW policies.

c. Expanding the term Central Government Authorities to include any central agency, department, ministry and their assets across India, e.g., forest ministry, MoUD, MoD, IT department, CSCs, etc.

d. Similarly, ensuring that the CPSEs, PSUs falling under the Union government (ministries/departments/ authorities) also fall under the ambit of the Central RoW rules issued by DoT, and are mandatorily aligned with it.

e. Mandating that any Smart City, municipality, state body getting financial support (in part or full) through Union Government funding must facilitate deployment of Small Cells and telecom infrastructure.

f. Suitably amending the Smart City policy of the Ministry of Housing and Urban Affairs to incorporate provisions for the utilisation of street furniture for small cells.

g. Extending by default all government infrastructure including but not limited to land / building / utility, street pole etc. for deployment of small cells.

h. Permitting applicants to enhance the capacities of street furniture at their own cost including street furniture installed by third parties on Govt.

i. In the case of non-availability of street furniture, allowing TSPs/IPs to deploy poles for putting up Small Cells at defined charges for the states not exceeding Rs100/ as a one-time charge.

j. Keeping Small Cells out of the purview of building and construction rules. In some states tower installation and permission are governed under such rules but these should not apply to Small Cells.

k. **Registration of small cells:**

   a. Small Cell deployment should be on a permission exempt (or intimation) basis, i.e., Small Cell installations should be exempted from location registration requirements for certain categories.

   b. Small Cell installation on Street furniture should be allowed at no cost.

   c. In case any agency like a CPSE/private distribution company desires a fee (ideally this should not be the case since the pole has already been deployed), the fee charged should be nominal (not more than Rs. 100/annum) in line with SACFA clearances through the Saral Sanchar Portal.

   d. The SACFA related information can flow from the SACFA portal to the State and Central RoW portal[8]s.

   e. Seeking Bank Guarantees (BGs) should not be allowed for Small Cell deployment since this will result in blocking huge working capital, and impacting TSPs financially and operationally.

   f. Inventory of existing (and planned future) street furniture should be made available on the respective RoW Portal (of state/central agencies) by owner agencies which can be utilised for the deployment of aerial fibre.

   g. Structural engineering aspect should be applicable only in cases of Small Cells that are not in the permission exempt category

l. **Removal of small cells:**

   a. In case of any issue, the respective authority / agency / department may request for removal of the installed Small Cell by giving a 30-day notice and providing an alternative location for re-installation.

[8] The DoT, vide O.M. dated 09.05.2022 has simplified SACFA siting clearance guidelines for low power BTS, Small Cells i.e. Micro, Pico and Femto cells

b. Government agencies should pre-intimate TSPs and coordinate before starting work to avoid disruption and damage to Telecom infra. In the event of damage, compensation should be paid to TSPs.

m. **The portal** must have the following:

a. All authorities should give timely permissions under a single window clearance system with a concept of deemed approval.

b. In cases of permission exempt deployments, no permissions should be required.

c. The capability for bulk upload (in batches) preferably through excel templates should exist, for exempted and non-exempt categories.

d. Online payment modules that have no dependency on gateways should be enabled.

e. Payment should be accepted through corporate current accounts since the majority of activity is carried out by such organisations.

f. The portal should have reporting modules and features including status dashboard with query fetching which can be downloaded by DoT, State authorities and authorised and integrated service providers alike.

n. **Allied requirements (e.g., power, space) to use Street furniture:**

a. Provisions for electricity / power supply should be made.

b. Once installed, pay as you use for electricity/backup charges should be applicable.

c. Space for keeping small cell equipment and power-bank shall be provided.

d. Cost effective DC supply using battery banks or solar panels should be identified which states can subsidise or provide at subsidised rates by SEBs for Small Cells.

e. Backhaul should be made available wherever possible, whether via fiber and/or using E&V bands (provided LoS is available).

f. TEC should work with TSPs to identify broad recommendatory guidelines regarding specifications of Small Cells that can be deployed on various types of street furniture. No other specification by any other agency be entertained.

g. TEC may seek inputs from owners of such street furniture, information about types, ageing and other such specifications – the specifications should be broad based and not prescriptive so that it is possible to incorporate any future developments and innovations given nascence of development.

h. The ICNIRP Standards for EMF radiation for small cell power classes should be considered with regard to compliance with radiofrequency exposure limits.

Importantly, it is imperative to have a defined standard national policy if we are to successfully unlock the wider socio-economic gain for local communities through connectivity infrastructure.

Q.2: Have the amendments issued in 2021 to RoW rules 2016 been able to take care of the needs of aerial fiber deployment? If not, what further amendments can be suggested? Please provide exact text with justification.

Only to a limited extent.

The amendment has been helpful in defining aerial fiber deployment needs, but implementation on ground continues to be slow and challenging as different authorities approach it differently. Only a few states have included aerial fiber in their policies, e.g., Tamil Nadu in Jan, 2022.

Below comparison shows huge variance in EB pole charges for aerial fiber across states/UTs:

Response on "Use of Street Furniture for Small Cell and Aerial Fiber Deployment"

Charges for using EB Poles (Other Poles) for Deployment of Aerial Fibre				
S. No	State	Description	Rates/Annual Charges/Pole (INR)	Annual Increment
1	Andaman & Nicobar Island	Zone1 &2	200	NO
		Zone3 to 5	100	NO
2	Andhra Pradesh	Urban Area	600	NO
		Rural Area	420	NO
3	Arunachal Pradesh	No Rental Prescribed in RoW policy		
4	Assam	All Area	1,500	NO
5	Bihar	Municipal Corporation	120	NO
		Nagar Parishad	110	NO
		Nagar Panchayat	100	NO
		Rural	60	NO
6	Chandigarh	All Area	Rs. 10/- per Mtr for cables using poles	NO
7	Chhattisgarh	Urban	100	NO
		Rural	50	NO
		One Time permission Charges per route	5,000	NO
8	DNH & DD	No Provision for having Aerial Fibre		
9	Delhi	All Area	1,384	Yes
10	Goa	No Rental Prescribed in RoW policy		
11	Gujarat	No Provision for having Aerial Fibre		
12	Haryana	All Area (existing)	500	NO
13	Himachal Pradesh	All Area	695	NO
14	Jammu & Kashmir	All Area	500	NO
15	Jharkhand	No Policy Notified (Only Tower Policy notified)		
16	Karnataka	All Area	150	NO
17	Kerala	Metros		NO
		Other Areas		NO
18	Ladakh	Uncovered Area	250	NO
		Covered Area	500	NO
19	Lakshadweep	All Area	200 /pole/year INR 2000/ as one time charge	NO
20	Madhya Pradesh	All Areas	100	NO
21	Maharashtra	No Provision for having Aerial Fibre		
22	Manipur	Urban	200	NO
		Rural	100	NO
23	Meghalaya	Urban Area	200	NO
		Rural	50	NO
24	Mizoram	All Area	10 to 15	NO
25	Nagaland	Not allowed to use EB Poles for Aerial Fibre		
26	Odisha	Urban Area	100	NO
		Rural	50	NO
27	Puducherry	Urban (one time till license)	2,000	NO
		Panchayat (One Time till license)	1,500	NO
28	Punjab	All Area	500	NO
29	Rajasthan	All Area	1500/ (now INR 1000/ per pole per year for Street light poles and INR 1000/ per poles per year with escalation of 5% every year	Yes
30	Sikkim	All Area	1,000	NO
31	Tamil Nadu	No Provision for having Aerial Fibre		
32	Telangana	Urban Area	240	NO
		Rural	180	NO
		One Time permission Charges per route	5,000	NO
33	Tripura	No Provision for having Aerial Fibre		
34	UP	All Area	1,464	NO
35	Uttarakhand	Urban	100	NO
		Rural	50	NO
36	West Bengal	All Area	139	NO

The charges above are for using poles, and charges for Aerial Fibre may not be a part of these.

Therefore, we recommend certain amendments as follows:

- Automatic inclusion of Aerial Fiber into State RoW policies. Any inclusion in Central RoW Rules (of DoT) about any "telegraph" should automatically be deemed included in States' RoW policies
- Faster and time-bound permissions for Aerial Fiber.
- The framework for structured aerial cabling use of street furniture, small cell deployment, etc. should be defined with the objective of realistically facilitating implementation.
- When it comes to poles deployed by private distribution companies, clear direction should be given to the States/SERCs for allowing the usage of street poles, etc. at nominal charges.
- In cases of non-availability of such street furniture, TSPs/IPs should be allowed to deploy poles for putting up Small Cells at defined charges for the States and it should not exceed Rs100/ as a one-time charge.
- A list of existing and planned future street furniture should be made available on the respective State's RoW Portal/ Central Authority (Defence, NHAI, Ports, DoP, etc.) by the infrastructure-owning authorities which can be utilised for the deployment of Aerial fibre.

Q.3: What are the suggestions of stakeholders for aligning RoW policies issued by various other Central Government Bodies with existing DoT RoW policy?

Since Telegraph is a Union subject, and the DoT RoW Rules are issued by the Ministry of Communications, it is important that the RoW policies of various Central Government department/bodies/ ministries/agencies/authorities are both synchronized and consistent.

Unfortunately, the majority of Central Government Bodies like the Indian Railways, Ministry of Power, Airport Authority of India, Ministry of Defence, Ministry of Road Transport and Highways (MORTH) etc. have not aligned their policies as per DoT Rules 2016.

Similarly, Airport operators, whether under AAI or Association of Private Airport Operators (APAO), currently apply exorbitant RoW and IBS charges that are totally inconsistent with the GoI

RoW Rules. This prevents the creation of robust telecom infrastructure near Airports and adjoining areas.

TSPs **spend huge amounts annually as Bank Guarantees towards RoW**. This not only blocks important working capital but also adds to the cost. The situation is further exacerbated by the fact that on several occasions these BGs remain unreturned for months by local bodies, even after work has been completed/restored. They are not even adjusted against any new RoW work.

We suggest that RoW rules be applied on and followed by all Central bodies and agencies in a horizontal manner. For example, just like Housing and Building norms and codes issued by the Ministry of Housing / Urban Development are followed nationally, the Telegraph infrastructure norms and rules like RoW should be followed by all agencies.

We accordingly recommend the following:

a. All central government bodies, agencies, ministries, departments and the authorities under these should operate under DoT RoW Rules. Therefore, the Forest Ministry, MoUD, MoD, IT departments, etc. should follow one RoW guidelines.

b. Similarly, the CPSEs, PSUs falling under the Union ministries/departments should also fall under the ambit of Central RoW rules issued by DoT, and mandatorily align with it.

c. Airports (under AAI and Association of Private Airport Operators [APAO]) must all align their RoW charges and approval processes to reflect GoI (DoT) RoW Rules. Airports are part of public infrastructure and it is important that flyers have access to timely and quality Telecom services. The AAI Rules should be applicable on APAO for the purpose of RoW.

d. Any Smart City, municipality, state body getting financial support (in part or full) through Union Government funding must facilitate deployment of Small Cells and telecom infrastructure.

e. All Central bodies/agencies/departments should simplify their processes, i.e., in terms of charges and less paper, and avoid duplication. Railways, Forest departments and NHAI require a lot of extra paperwork and their lead time is huge – they should move processes online and reduce paperwork; thereby increasing lead-times for faster rollout of 5G in the country.

f. **Bank Guarantees:** The requirement of BGs needs to be reworked and significantly reduced.

    1. There **should not** be any BG requirement in case the restoration is done by the concerned Authority / agency.

2. Only in cases where restoration is done by the TSP should a BG be sought for a minimum amount which should not be more than 25% of the restoration cost.

3. The Authority / agency should return the BGs within 30 days of work completion. Such refund policy should be clearly defined in the RoW process and be strictly followed by all.

Q.4: Whether it should be mandated that certain public infrastructure (municipality buildings, post offices, bus, and railway stations, etc.) be earmarked to have dedicated spaces that allow service providers to deploy macro/small cells? If yes, what are the possibilities and under what legal framework this can be done? What should be the terms and conditions of use of such infrastructure? Please provide detailed inputs with justifications.

Yes.

All government buildings and public infrastructure with dedicated space should, wherever possible, be made available nationally for Small Cell and Macro Cell deployment without any exclusivity. Furthermore, they should be made available at nominal rentals. Airports, Railways (Central or Metro or High Speed), Ports, Stadiums and other such areas should be covered under this.

As per our assessment, the required space for pole and infra (SMPS & Battery Bank) is 1.5 meter*1.5 Meter. The space should be able to accommodate power, antenna and associated cabling equipment.

The requirements for getting access to public places and street furniture for installation of small cells are summarised below:

1. It may be prudent to have guiding norms related to the size and number of Small Cells that can be deployed on any single piece of street furniture infrastructure.

2. All street furniture require a power source for its wireless equipment to function. It should also be mandated that power requirements be specified so as to ensure that only authorized equipment is deployed over shared street furniture.

3. Wider reach at reasonable cost should be allowed across all government buildings/railway stations/metro rail stations/ airports/ stadiums, etc. as well as private buildings which are accessible to the public like malls/ shopping

complexes/multiplexes/theatres, etc. This would remove a significant hurdle in the deployment of Small Cells.

4. The present system of granting access to public spaces/ structures for installing Small Cells varies by state and the local body/agency, and this needs to be made uniform in its application with simple and efficient processes to award permits being put in place.

5. TSPs should have unrestricted access to utility poles. Another major cost component in building infrastructure is the cost paid to local bodies for using Government infrastructure. The Government should consider not levying any charges/fees on TSPs to use this infrastructure. This will help in faster and more cost-effective rollout of broadband networks.

Q.5: Can some of the street furniture like traffic lights, metro pillars etc be earmarked for mandatory sharing between controlling administrative authority and Telecom Service/Infrastructure providers for deployment of small cells and aerial fiber? Does existing legal framework support such mandating? What should be the terms and conditions of such sharing? Please provide details

Sharing should be allowed provided the street furniture in question has the necessary strength and space available to host more than one TSP.

Certain furniture like bus shelters, metro pillars can definitely be explored for such sharing since it has the necessary structural strength to carry the requisite Small Cell equipment.

Similarly, mandatory earmarking of public infrastructure such as municipality buildings, post offices, bus stations, and railway stations, etc., for dedicated spaces that allow service providers to deploy macro/small cells and aerial fiber should be considered.

As regards the legal framework, we believe that the controlling administrative authority can enable it by issuing the relevant administrative order/permission in discussion with DoT and TSPs/IP1s, **on a non-exclusive and non-discriminatory basis**. Also, all future tenders of such furniture (pillars, bus shelters) should include specifications to host telecom infrastructure on a sharable **and non-exclusive** basis with power and backhaul supply wherever possible.

The T&Cs for such sharing should be simple and on nominal charges. They should not be benchmarked to local area land rates/commercial rates (e.g., advertising hoardings). Rather the controlling authorities should look at enabling the telecom connectivity surrounding their infrastructure, while also making use of their assets.

The permissions should be simple, easy, online and integrated with the national RoW portal of DoT.

Q.6: How can infrastructure mutualization and infrastructure collaboration be ensured to avoid exclusive rights of way? What legal provisions can support mandating these? Provide full details.

Public authorities need to take care that anti-competitive phenomena (like exclusive access to small cell sites) don't accidentally or intentionally occur, so that consumers can reap the benefits of a healthy competitive environment[9].

We strongly recommend that **no exclusive rights of street furniture be given** to any TSP and a strict mandate be issued to allow sharing of such resources.

An infrastructure mutualisation[10] strategy will operate successfully when a common infrastructure is built, operated and maintained by an infrastructure provider, and jointly used by telecommunication service providers, with each leasing a portion of the mutualised infrastructure and paying for it at a wholesale price. Infrastructure mutualisation can be driven by markets or promoted by governments when the private sector does not have the incentives or resources. Public Private Partnership (PPP) approaches with different degrees of ownership and risk sharing can also be used to build the infrastructure under open access, non-discrimination and low-cost pricing principles.

Infrastructure cooperation occurs[11] when utility operators (railways, waterways, pipelines or electricity distribution) share rights of way with broadband operators, or when telecommunication operators that provide different services share the same physical infrastructure. Cooperation differs from mutualisation because agents are not competing in the same market and, as a result, are more willing to share.

CASE STUDY: Sweden's Municipal Fibre Network

Stockholm's Stokab municipal fibre network provides one example of backhaul over shared infrastructure. Net4Mobility, a joint-venture infrastructure company providing backhaul for the long-term evolution (LTE) network of two mobile operators (i.e. Tele2 and Telenor), is one of

[9] Global vision, Standardisation & stakeholder engagement in 5G, White Paper on Small Cells, June 2019
[10] https://thedocs.worldbank.org/en/doc/533261452529900341-0050022016/original/WDR16BPInfrastructureMutualisationGarcia.pdf
[11] ibid

Stokab's clients. The long-term commitment by Net4Mobility has allowed Stokab to extend its network into new areas of the city. At the same time, Net4Mobility stated that fibre network sharing has allowed the company to deploy its mobile network at a faster pace compared to regions where such shared infrastructure did not exist.

The Broadband Forum, which has a steering committee headed by the Ministry of Enterprise and Innovation, has served as an important form of co-operation contributing positively to fibre expansion in Sweden. Among other things, it has: i) contributed to increasing the collaboration between public and private players in mobile and fixed broadband expansion; ii) provided guidance to municipalities regarding robust fibre networks; iii) identified relevant barriers for infrastructure deployment; iv) provided solutions for establishing "fibre villages"; v) established measures to support for broadband deployment in rural areas; and vi) acted as a Secretariat for regional broadband co-ordinators.

Q.7: Should there be permission exemption for deploying certain categories of small cells at all places or all categories of small cells at certain places (Like apartments etc.)? What legal framework will support such exemptions?

Yes. We recommend deployment of Small Cells on a permission exempt basis for certain categories.

As already stated earlier, there should be minimal hindrances in the deployment of equipment on street furniture. The exemption should be provided for only a certain category of Small Cells at certain places such as wall mount out door small cells, residential buildings (RWA)/ Apartment's/ campuses, Hotspots and public gathering areas.

Available spaces in all these buildings need to be earmarked in consultation with the TSPs to identify their requirements. A mechanism needs to be developed to check and match the surveys conducted by different TSPs, so that the space identified/available serves the purpose of smooth rollout for every TSP.

International Best Practices Case Study – Egypt[12]: In Egypt, no building permits are required for Small Cell deployment. The only regulatory approval required after installation is the measurement of RF exposure. This occurs only once over the lifetime of a site, whereas for a macro cell, inspections are conducted at least every two years.

[12] https://www.gsma.com/asia-pacific/wp-content/uploads/2022/01/Small-Cell-Report.pdf

Q.8: What should be the criterion/ conditions (like power, height etc.) and administrative procedure for implementing such exemptions? Please provide exact text with detailed justifications

We would like to state at the outset that we believe that TEC, in conjunction with TRAI, should have a detailed discussion with TSPs (and OEMs) and that the outcome of that discussion should guide the criterion that it then sets.

Such specifications should be created for various categories of Small Cell equipment and their requirements and uniformly followed by all states/agencies. No other separate technical requirements / guidelines should be applied in addition to TEC norms. We highlight certain technical requirements that may be considered.

For Outdoor Small Cells, requirements are as follows:

- **Power** - 1.2- 1.5 KW.
- **Height** - 6 Mtr (antenna placement height).
- **Weight**- Pole can sustain up to 100 to 150 KG (3 Small Cells + power back up + FDB with fibre).
- Number of Small Cells to be defined per pole – up to 3.
- Clamps availability on street furniture (e.g., poles) for mounting small cell.
- The street furniture shall be able to withstand predefined applicable wind velocity in that area under maximum permissible loading.

Q.9: For Small Cells that do not fall under the exemption category, should there be a simplified administrative approval process (like bulk approvals etc.) for deployment? If yes, what should be the suggested process? If not, what should be the alternative approach?

Yes.

The process should be simple and online. Administratively, the following steps should be followed:

- As regards SACFA approval, all Small Cells should be reported via the Saral Sanchar portal[13].

[13] DoT O.M. dated 09.05.2022 has already simplified SACFA siting process for Small Cells for low power BTS, Femto, Pico and Micro cells

- As regards RoW approvals, the Central RoW portal Sugam Sanchar should be integrated with the RoW portals of states and all other agencies/departments.
- The RoW portal should have two categories for reporting Small Cells: (a) Exempted and (b) non-Exempted.
    - Exempted category uploads be considered immediately deemed approved.
    - Non-exempt categories - the approvals should be given within 30 days.
- A standardised, uniform format should be developed and integrated across all RoW portals, and be made available to TSPs / IPs to download and fill details.
    - TEC should consult all stakeholders and make appropriate recommendations.
- Simple bulk upload facility should be allowed for all TSPs/IPs in the pre-defined and agreed format.
- Number of entries per batch/upload should be left to TSP/IP.
- An online unique ID should be assigned to respective applicants for each upload.
- Provisions for uploading of common supporting documents like design, equipment, frequency, location, etc. should be made.
- The elements falling under SACFA should be dealt with by DoT/SACFA, while street furniture approvals should be dealt with by the owning agency/authority/department/company.
- The approving authority (Electricity Department, local municipality, etc.) should be able to give bulk approval on the application.

As per the Small Cell Forum report[14] of 2017,

"...Based on emerging best practice around the world, the checklist below indicates the main areas where regulatory and administrative authorities can work with operators to create a strong environment to deploy small cells at scale:

- *Simplified procedures to optimize administrative flows of documentation processing*
- *Generic declaration of equipment at national / regional/local level*
- *Generic certification of equipment: internationally standardised accepted classes of equipment with installation rules/manuals, aimed at avoiding additional documentation*
- *Exemptions based installation based on generic criteria (e.g.: antenna height, power levels, or a combination of power and height)*
- *Generic permits for installation and operation*
- *Generic per batch installation permissions (vs. site-by-site) and franchises for installation*
- *Eased access to the public domain: building permits & rights of ways – generic national authorisation form to access administration facilities, single applicable documentation form at national/state level...."*

[14] Small cell siting: regulatory and deployment considerations, February 2017, 5gamericas.com and smallcellforum.org

International example– United States of America: In 2018, the FCC issued guidelines that covered fees, aesthetics, and shot clocks requirements, etc. Under this, state/local fees were rationalised, and state and local governments had 60 days to decide on applications for existing infrastructure and 90 days for all other small cell wireless applications.

Q.10: What power related problems are envisaged in deploying small cells on street furniture? Please provide full details.

Power supply to Small Cells is a very important consideration. Getting enough and reliable power supply at affordable rates for thousands and lakhs of Small Cells to power 5G will be a critical determinant of 5G's success. If not looked at holistically and addressed within the framework, this could turn out to be a huge challenge for Small Cell densification across India.

As per Mr. Tom Craft, Director of engineering, MetroCell Solutions at CommScope[15] "*...Everything is focused on densification and getting services out to users, but when that densification increases by a factor of 10, so does the amount of power...*"

Further, "*CommScope estimated in 2018 that the total time to deploy small cells is 18 to 24 months, due mostly to power constraints. According to the company, this timeline is a result of prioritizing coverage when designing new network sites, leaving power as an afterthought. Once the infrastructure design is in place and it is discovered that no electrical power exists nearby, approval to tap nearby buildings for power must be sought—a process that can take several months...*"[16]

In India, 5G services would mean very low latency and 24x7 uptime which can only be achieved by ensuring 100% uninterrupted power supply. Uninterrupted power should be provided for street furniture as well.

Therefore, we see the following challenges that would need proactive support to overcome:

a. Some of the DISCOMs do not allow giving a separate connection for installing electricity meters on street furniture and also at each pole.

b. Since it is not always possible to have a meter at each pole, power connectivity will need to be got from the nearest pole that can cover a set of poles and this will be difficult to do.

[1515] https://www.rcrwireless.com/20211015/5g/is-powering-small-cells-the-greatest-densification-challenge

[16] *Ibid.*

c. Affordability of power: SERCs prescribe different rates for commercial, industrial, utility, billboard, etc. connections. Since significant densification is expected, the commercial electricity rates will make deployment unviable hence need an alternative solution

Q.11: What viable solutions are suggested to address these problems? Please provide full details.

TSPs can provide a maximum of a 2-hour backup.

To address the challenges highlighted in the previous section, some viable solutions could be:

a. Tab-in into power source should be made available.

b. Providing power connections on several poles which could each cater to a certain number of poles through the process of bulk approvals.

c. Providing uninterrupted stable AC/DC power since it will be required along with power supply on poles for deployment of communication equipment[17].
   d. For AC products: C products: On-Line UPS C products: is required with back up as per need of the TSP.
   e. For DC products: or DC products: Power or DC products: solutions with solutions rectifier and Li ON battery with back-up as per need of the TSP.
   f. Power back-up has to be considered depending upon EB availability and TSP requirements.

g. As individual meters at each Small Cell site won't be practical (will make it unviable for DISCOMs), a better option is to deploy meters on a sample basis e.g. 5%-10% of installed small cells base, and the metering be done on the basis of sample only. Charging of such sampled meters can be averaged and extrapolated to arrive at the bill.

h. For areas/poles where the electricity supply is disrupted or not available, installation of Solar Panels with battery backup should be provided as an option.

i. The Open access policies of all states should include providing Small Cells with the access to solar/renewable power without any restrictions or minimum load.

[17] https://www.tec.gov.in/pdf/Studypaper/TEC%20Committee%20Report%20on%20Rollout%20of%20small%20cells.pdf

j. DISCOMs should issue a single bill per DISCOM circle for one TSP which includes all the charges for all the meters installed on the poles on which the equipment resides.

k. Telecom sites should be provided with an electricity connection at industrial or utility rates. SERCs (State Electricity Regulatory Commissions) can be requested to incorporate the same in their tariff orders. For the purpose of Small Cells on stret furniture, the charges should be the same across all states for telecom services.

Q.12: Is there a need for standardizing the equipment or installation practices for next generation small cell deployment on street furniture? If yes, what are the suggested standards and what should be the institutional mechanisms for defining, and complying to them?

Yes.

Traditionally, street furniture such as an electricity pole is designed to cater to the overhead cables for electricity distribution and is comparatively light weight. Additionally, the poles used to install traffic lights are relatively weak, too, especially when compared with the load required to handle 5G equipment including batteries to power the equipment. Therefore, to use the available resources effectively, there is a need to recommend broad guidelines for street furniture that take into account the load of this telecom equipment. Sharing this infrastructure could be an option but only if it is sustainable when taking into account the weight of approx. 100 to 150+ KG weight (3 Small Cell+ Infra+ Fiber). Alternatively, different poles can be used by different TSPs.

Installation Practices

- Up to 3 Small Cells per piece of street furniture (structure stability).
- Pole diameter – 15'' to 18''.
- Distance from building face – Maintain a minimum of ten feet (10') from any above grade building face, including projecting windows.
- Clamp mounting permission after approval.
- Steel Conduit should be clamped with pole for safety from theft and damage.
- Deployment of Small Cells and Infra and Aerial fiber permission.
- 2-hr power backup on each piece of street furniture
- The street furniture as used for the placement of Small Cell shall be able to withstand a predefined applicable wind velocity in that area under maximum permissible loading.
- EMF exposure related issues also to be considered.

We suggest that the Telecom Engineering Centre (TEC) should issue broad guidelines with respect to the structural safety of the street furniture for installation of Small Cells. The TSPs should be consulted and have a say in the design specifications of the street furniture for future installations.

The specifications, once agreed, should also be extended to street furniture installed by third parties on Government land.

Q.13: Is there a need for a specific mechanism for collaboration among local bodies /agencies for deployment of small cells and ariel fiber using street furniture? If yes, what mechanisms should be put in place for collaboration among various local bodies/agencies involved in the process of permissions with TSPs/IP1s and to deal with other aspects of Small Cell deployment?

Unfortunately, the existing framework does not support systematic coordination between the controlling authorities towards sharing of such street furniture. And we believe that it is critical to have a mechanism of collaboration, especially since the issue that we are highlighting here is related to the installation of telecom and telegraph infrastructure.

A whole of government (WGA) approach is critical if such collaboration is to be expedited. Given digital infrastructure today, a seamless, online integration of portals with common specifications / fields across agencies / local bodies / states should be facilitated for the purpose of Small Cells, Aerial Fiber and all other RoW permissions.

The central and state governments should work with local municipal authorities to ensure reasonable fees are charged to deploy Small Cell onto street furniture.

The current National Building Code (NBC) makes mention of the DAS/ IBS and wireless system. However, in order for uniform growth, a provision should be made in the Building Rules / bye-laws to ensure compliance of this and include Small Cells, Aerial fiber as a condition precedent for the granting of a Building Completion certificate on a mandatory basis. This should also be provisional on a visit from the Department of Telecom (DoT) / TRAI officials along-with joint inspection with TSPs who may suggest any relevant modification in the plan.[18]

On the lines of the State broadband committees (SBCs), a central agencies/departments joint committee can also be created that could include representatives from IPs, TSPs, central agencies/ministries like Metros, Railways, Forests, NHAI, Defense among others.

[18] https://www.tec.gov.in/pdf/Studypaper/TEC%20Committee%20Report%20on%20Rollout%20of%20small%20cells.pdf

The sole purpose of this/these committee/s should be to expedite RoW permissions that facilitate the furthering of the digital connectivity infrastructure that will help with the growth of the country.

The local authorities must inform the relevant TSPs before removing any cables/ Small Cells failing which no cutting/removal permission should be granted by a body/an authority. To streamline this, contact details of NODAL officers of Local bodies, and the TSPs/IPs should be mandatorily available on the Portals.

The SBCs can also have districts/ towns specific representatives like DMs, Mayors to discuss and facilitate Small Cells /aerial fiber.

Q.14: Kindly suggest an enabling Framework that shall include suggestions about the role of various authorities, rules of coordination among them, compliance rules and responsibilities, approval process, levies of fees/penalties, access rules etc.

We believe that the first step should be a simple, online, integrated RoW portal across all possible agencies, departments, authorities, ministries and institutions; under which the role of each participant should be defined, i.e., either to give permission or deny permission. The denial should be evidence based (proofs like actual photographs), and must come within deemed approval timelines of say 30 days.

There should not be any scope for a "no response". On the 30th day, the portal should auto generate deemed approval.

The above should not be applicable in the case of exempted categories of permissions.

We do not believe that any complex, cumbersome compliance rules are required if the process and portal can be kept fairly simple, clear and straight.

We believe that in cases where the money of a TSP is blocked beyond the required time, e.g., if a BG is kept beyond the approval timeline and not released, the TSP should be compensated for such delay and any interest on BG should be recoverable from the agency /authority.

Similarly, if any agency digs up or damages telegraph infrastructure/Small Cell /Aerial fiber, without duly and priorly intimating the TSP/IP of its civil / repair work, compensation should be paid to TSP/IP by approving Authority. All such prior intimations should be available and updated online, at least a few days in advance, to enable the TSP/IP to make appropriate / alternate arrangements without disrupting connectivity.

Q.15: How can sharing street furniture for small cell deployment be mandated or incentivized? What operational, regulatory, and licensing related issues are expected to be involved in sharing of small cells through various techniques in the Indian context and what are the suggested measures to deal with the same?

Sharing of Street Furniture (i.e. passive infra):

i. Local authorities, state governments, central agencies, departments, authorities must provide details of readily available street furniture on the RoW Portal under one roof.

ii. Depending upon structural strength, in line with TEC specifications, owners of street furniture can categorise/indicate the list of street furniture (or in an area/locality) as sharable and up to what weight category.

iii. Wherever sharing is possible (based on strength of furniture), it must be mandated to be shared, and no exclusivity should be granted on such furniture.

Small Cells sharing:

- The sharing of Small Cell should be on mutually agreed basis among the TSPs, and no mandate is required.

- We do not see any issue in case Small Cells sharing since it does not entail spectrum sharing. Hence no licensing or regulatory intervention is required for a telecom licensee.

Q.16: a) Whether there should be any specific regulatory and legal framework to enable Small Cell and Aerial Cable deployment on

(i) Bus Shelters (ii) Billboards (iii) Electric/Smart Poles (iv) Traffic lights

Bus shelters, billboards, smart poles, traffic lights should be made available for the deployment of Small Cells and Aerial cable. Specifically, the following should be considered:

- Access to Street furniture must be provided on a non-discriminatory and non-exclusive basis. No Location based restrictions.

- SEBs/DISCOMs should be instructed to permit usage of electricity poles.
- Municipal agencies/authorities should be instructed to permit use of Smart poles, street lights and billboards.
- State road transport authorities/agencies should be instructed to allow the use of Bus Shelters.
- Access to street furniture should be granted on a 24x7 basis.
- Annual compensation for using existing Poles of any authority should not exceed Rs. 100 per pole in areas of jurisdiction of Urban Local Bodies and Rs. 50 per pole in areas of jurisdiction of non-Urban local bodies for which the telecom line is proposed to be established.
- Charges for using billboard, bus shelters, too should be annual and limited.
- No application fee should be levied by the Central Government Authority for the establishment of poles on central government land for the deployment of small cells and OFC required to connect small cells.

A. Bus Shelters[19]:

Bus shelters offer many ways to match Small Cells aesthetically or hide them within a shelter. Some examples include on the sides or top of advertisement boards, within a box on top of the shelter, within signs depicting the stops that the buses make, etc. They are abundant in cities and areas of higher population density and are also situated in a place where people tend to linger, causing many people to connect to that cell for a fair stretch of time. These locations are a bit shorter than other options, which could potentially hinder cell signal ranges. This option would be best used in combination with other applications, such as light poles and monopoles.[20]

International Best Practices Case Study [21]– Hong Kong: As facilitating measures for 5G deployment, the Office of the Communications Authority, Hong Kong, issued guidelines on the use of street furniture such as sheltered bus stops, public payphone kiosks and smart lampposts for installation of 5G Radio Base Stations in 2019-2020.

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[19] https://www.tec.gov.in/pdf/Studypaper/TEC%20Committee%20Report%20on%20Rollout%20of%20small%20cells.pdf
[20] https://apps.ict.illinois.edu/projects/getfile.asp?id=9079
[21] https://www.tec.gov.in/pdf/Studypaper/TEC%20Committee%20Report%20on%20Rollout%20of%20small%20cells.pdf

B. Billboards[22]:

Billboards are less frequently situated and much taller than many other options. Their height allows them to reach over many buildings and obstacles that lower cells may be hindered by, allowing them to fill gaps in signal along with other small-cell applications such as close light poles or monopoles. However, they are less effective when not used in combination with other methods.

Their height makes installation more difficult, and they are not prevalent in areas of dense population. Billboards within cities may be a better example of a place to install a small cell than a billboard on a highway with few surrounding structures and lower population density. They can be easy to match aesthetically if the small cells are hidden on the side of the board. However, if the location hinders the signal, then the small cells would need to stick out of the sides or top. This option is harder to make look nice and cohesive with the billboard structure. A few complications include the longevity of the lease and rent costs associated with billboards.

C. Traffic lights:

Traffic lights are a less abundant location but offer a good option when one needs to reinforce coverage at an intersection where other cells do not sufficiently reach. They are at an optimal height for the cells. Installation is relatively simple and, for safety reasons, would typically occur on the portion of the pole that does not hang over the road. Traffic signals are easy to make aesthetically pleasing when made flush with the pole and the boxes on the pole, or at the base—if the equipment installed does not get too bulky or invasive on the ROW. The conduits can run either inside or outside of the pole, depending on the interior configuration.

International Best Practices Case Study – Japan: Operators are permitted to install 5G base stations on 208,000 traffic lights across the country. Moreover, the Japanese government has proposed that the costs of using the traffic lights for 5G deployments be shared between operators and local administrations.

Q.17: What should be the commercial arrangements between the TSP's/Infrastructure Providers and street furniture owners for the same?

[22] https://apps.ict.illinois.edu/projects/getfile.asp?id=9079

airtel

Response on "*Use of Street Furniture for Small Cell and Aerial Fiber Deployment*"

We are not in favour of having commercial arrangements for the purpose of installation of Small cells, Aerial fiber using street furniture on a profit or high rental basis. The rentals should not be benchmarked to land/area rates or what a TSP would have spent otherwise.

The RoW permissions act as enablers to the local economy. Improved and enhanced connectivity enhances local opportunities. Hence local authorities, agencies, and owners of street furniture should not look at it as a revenue source, rather look at it as wider indirect socio-economic benefits.

We would like to caution that any linkage of rentals, charges with revenue generation/ profit will simply make the entire proposition unviable. Therefore,

- The commercial arrangement should be on a no-profit no-loss basis, through a national rate card for all types of street furniture.
- The rate card should be designed on the lines of a classification of circles, i.e., A/B/C circles.
- The categories of street furniture should also be broad and limited to accommodate variety within them.
- The rental charges/rates should be nominal, and on an annual basis. Monthly rentals should not be applied.
- Since street furniture will fall under various authorities, the nominal fees be publically disclosed by all based on certain principles like transparency, non-discrimination

The above approach is also appropriate since currently the street furniture available in the country cannot be used for any other purpose. Thus, creating a rate card will help partial recovery of this infrastructure. Over and above, access to electricity and/or backhaul on a pay as you use basis will further add to commercials.