Annexure-I

Concept note on Draft Standards for 'Sharable Telecom/Telecom + Power Duct'

1. Background:

Universal broadband connectivity is crucial for bridging the Digital divide, promoting e-Governance, transparency, financial inclusion and ease of doing business. This requires seamless Telecom connectivity through Mobile signals and Fiber to Home; which needs installation of underground and overground infrastructure like ducts/OFC for laying on intra-city and inter-city roads. Due to lack of synergy between the different Telecom operators on the one hand and Municipal/Road authorities on the other, laying of common ducts/OFC is very limited, thus, roads need to be dug multiple times for establishment and maintenance of telecom infrastructure and that lead to wastage of resources and operational challenges. As common duct is designed for all the utility services (electricity, water, telecom, sewage, domestic cooking gas etc.), but due to different policies/approach adopted by various utility agencies involved, it has been seen that it is not feasible to provide common duct in the existing infrastructure. Further, urban infrastructure needs to be evolved to support increasingly complex telecommunications and power systems, the integration and management of these utilities in shared conduits has become a critical area of focus as both faces similar type of problems. So, to address the common issue, concept note has been developed for 'Shareable Telecom /Telecom+Power Ducts' across the country at reasonable tariff.

2. Objectives:

This concept note proposes the nationwide adoption of 'Shareable Telecom/ Telecom+Power Ducts' to address these challenges. The key objectives are:

- **Cost-effectiveness:** Sharing infrastructure reduces overall costs for all stakeholders.
- **Reduced inconvenience:** Fewer trenches are needed, thus minimizing public disruption.
- **Simplified RoW:** Single approvals for sharable ducts will streamline the process.
    - **Optimized space utilization:** Efficient use of space will minimizes the need for additional infrastructure.
- **Improved aesthetics:** Reduction of aerial cables enhances urban landscapes.
- **Enhanced service:** Easier maintenance and accessibility improve service reliability.
    - **Future-Proofing:** Increased adaptability to emerging technologies and changing service needs.

3. Possible Types of design for 'Shareable Telecom/Telecom+Power Ducts':

There can be several types of designs of the common/shareable duct depending upon the utilities to be accommodated and the public pathway space available. Here we are focusing primarily on sharable Telecom ducts/Telecom+Power ducts. Broadly, such ducts can be divided into two parts which is as follows:

i. **RCC common Duct**: -

RCC common ducts can accommodate in HDPE pipes, both power Cable and OFC cable with a minimum separation of 0.3 mtr or only OFC Cables. RCC common duct can either be an RCC channel with cable hanger provision for placing HDPE pipe for LT/HT cables and multi-way HDPE pipes for OFC cable or soil buried circular/round RCC ducts with HDPE conduits for OFC cables to reduce cost.

In case of RCC channel with cable hangers, infrastructure-owning authority can have HDPE pipes laid and rent out to the Telecom Operators to lay their OFC cables or rent out space in the channel to lay both HDPE pipe & OFC cable at reasonable tariff. In case of soil-buried RCC ducts, infrastructure-owning authority shall also lay HDPE pipe and rent out to Telecom operators to lay their OFC cables. The cables are ploughed/pulled using rope in HDPE pipes.

Smart City Thiruvananthapuram

RCC Common Duct under construction with HDPE pipe containing provision for OFC Cable, electric cable

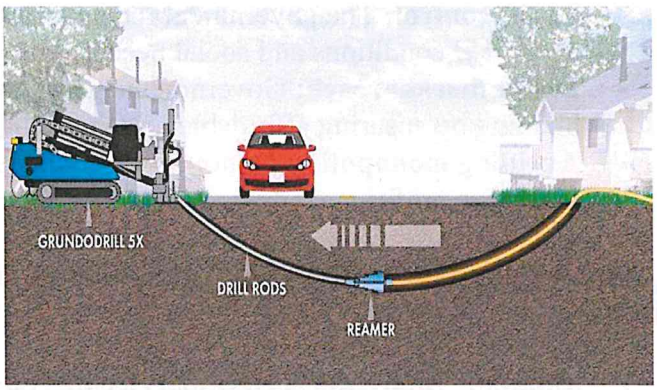
Smart City Kolkata

7-way prefabricated RCC common duct for OFC and Electric Cable

ii. **Soil buried Duct**: Soil Buried common duct may contain multi-way prefabricated duct with OFC HDPE pipe for Telecom Cable and HDPE pipe for Power Cable.

Multi-way prefabricated duct with OFC HDPE pipe can be soil buried only for OFC cables or together with HDPE Pipe for power cable to accommodate both Telecom OFC cable and electric Power cable with specified separation. In comparison to the RCC duct, these types of soil buried ducts will be economical for reducing the cost of construction. These soil-buried ducts are to be laid by infrastructure owning agencies and may be rented out to Telecom operators.

Manual Trenching



Horizontal directional drilling (HDD)

Recommended Common Features:

- RCC manholes can be placed at 500-meter intervals for branching/tapping of ducts/cables.
- State Govt/Agency can plan to lay ducts on both sides of Road within the city (intra-city) area and on one side for intercity.
- Utilize street furniture to provide connectivity across roads if the original duct/channel is on only one side.

Recommendation about selection of Type of a duct : Direct soil buried ducts are appropriate for Telecom OFC cable in urban and inter-city type of construction and are more cost effective. However, before finalizing any design and requirement it will be appropriate that State/Municipal bodies shall consult all the stakeholders involved like Telecommunications Service/Infrastructure providers(TSPs/IPs), DISCOMS, Electric Utility Companies, concern Industries associations, town planners etc.

4. Strategy to ensure overall benefits through reasonable tariff and long term viability: Building a sustainable 'Shareable Telecom/Telecom+Power Ducts' ecosystem involves construction, operation & maintenance (O&M), and monetization. Based on these, three options are presented for government agencies to consider:

a. **Option I:** A single party constructs, operates & maintains the ducts and sets tariffs based on Return on Investment (ROI).In this case, Govt agency may provide some Viability gap funding or may ask for some revenue based on demand or input cost. This may lead to monopolistic pricing and less flexibility.
b. **Option II:** A party is selected through a RFP for construction and O&M. And another party is selected for monetization and retail selling through another RFP.In this option also another party will try to earn maximum profit and Govt agency will have less control over tariffs.
c. **Option III:** A party is selected through an RFP for construction and O&M and Govt agency sets tariffs for direct retail selling to TSPs/IPs/DISCOM through online portal. In this case Govt agency will directly manages tariffs, allowing for flexibility and alignment with public interests.

So, Option III is recommended for the following reasons:

- **Tariff control:** The government retains control over tariffs, allowing flexibility based on market conditions and social needs.
- **Direct market reach:** Government agencies can directly contribute to nation-building by ensuring affordable lease rates based on market trends.
- **Avoiding monopolies:** Option III discourages bidders from acting as monopolies to maximize profits.

5. Action Required by State for Installation of 'Shareable Telecom & Telecom+Power Ducts'

- **Mandate 'Shareable Telecom/Telecom+Power Ducts'** in specified infrastructure projects, including those undertaken by central or state governments, UT administrations, or any other agency. Accordingly, GAIL, Metro, Railways, state highway, municipality etc. should also come up with a mechanism to lay ducts.
- **Include 'Shareable Telecom/Telecom+Power Ducts' installation plans** in project formulations and conduct prior consultations with relevant utility agencies (TSPs/IPs/DISCOM & relevant associations) alongwith finalization of specifications. .
- **Construct cable corridors and 'Shareable Telecom/Telecom+Power Ducts'** in existing infrastructure after gauging demand through Expressions of Interest and consultations with utility agencies(TSPs/IPs/DISCOM & relevant associations) . In such cases, 'Shareable Telecom/ Telecom+Power Ducts' shall be installed in a phased manner in consideration of financial conditions, installation priority etc.;
- **Cost-based charges:** Tariff on Duct shall be based on cost-recovery principles and Govt agency shall not consider it as a revenue generating activities. The payment of charges proposed to be spread over 25 years and should be arrived based on construction cost incurred on actual basis determined through competitive bidding process
- **Consider subsidies or financing** to facilitate smooth installations, particularly when shared cost models are employed.
- **Adopt model standards** for common ducts provided by the Telecommunication Engineering Centre (TEC), Central Government agency etc.
- **The management and operation of 'Shareable Telecom/Telecom+Power Ducts'** can be assigned to institutions designated by the Central Government, State Governments or UT Administration as needed for efficient operation and management.

6. Conclusion

'Shareable Telecom/Telecom+Power Ducts' offer a cost-effective and sustainable solution for expanding telecom infrastructure, improving aesthetics, and enhancing service quality. By implementing the recommendations outlined in this concept note, state governments can play a significant role in accelerating India's digital transformation