JAPOTECH SOLUTIONS

White Paper: JTWP2026-01

Addressing the Fiber Deployment Impasse in Kampala, Uganda

Uganda's capital city Kampala's digital economy is heavily reliant on robust, high-capacity metropolitan fiber-optic networks. However, telecommunications operators and infrastructure providers consistently face severe structural, regulatory, and financial bottlenecks collectively termed "deployment impasses."

While underground trenching is ideal, Kampala's fiber network is predominantly **overhead (aerial)**, relying on utility poles. This structural reality introduces a different set of gridlocks, including visual pollution, regulatory ambiguity over pole ownership, vulnerability to environmental damage, and high lease costs.

This white paper analyzes the core challenges underlying Kampala's aerial and metro fiber gridlock and proposes a comprehensive framework to accelerate deployment, lower costs, and establish a scalable digital foundation for the city.

1. The Anatomy of Kampala's Fiber Deployment

Metro fiber deployment in Kampala is constrained by an intersection of legacy urban planning, high right-of-way (RoW) fees, and the physical limitations of an over-reliant aerial fiber grid. Because subterranean digging is expensive and disruptive, the vast majority of Kampala's internet service providers (ISPs) deploy fiber overhead. This has led to critical vulnerabilities:

Monopoly on Aerial Assets

For infrastructure sharing with a neutral player, operators can mainly depend on existing electricity distribution poles, primarily managed by Uganda Electricity Distribution Company (UEDCL). Negotiating pole-attach agreements is legally complex and commercially draining, as operators can face high monthly attachment fees per pole.

Structural Overload and Safety Risks

Kampala's utility poles are severely congested. Decades of legacy, unmapped, and often abandoned ("dark" or "deadweight") fiber cables hang loosely across streets. This creates significant public safety hazards, risks pole collapses, and leaves networks highly vulnerable to trucks, road accidents, and severe weather. Figure 1 shows the current messy aerial fiber deployment in Kampala.

Figure 1: Messy aerial fiber poles in Kyebando Kampala (Photo: New Vision 9th May 2025[1])

The "Clean-Up" Impasse

The Kampala Capital City Authority (KCCA) frequently threatens mass disconnections or enforcement campaigns to clear visual clutter, creating regulatory instability for ISPs who risk losing live fiber spans overnight.

High and Non-Standardized Right-of-Way (RoW) Fees

Even for aerial deployments, securing the legal right to string cables across public and private land is administratively chaotic. Telcos and Internet Service Providers (ISPs) face disparate pricing models and prolonged approval pipelines from KCCA, the Uganda National Roads Authority (UNRA), and private landowners, with no uniform tariff structure for aerial vs. underground infrastructure.

Accidental Cuts and Construction Friction

Kampala's rapid urbanization frequently outpaces utility coordination. Road widening, building construction, and tree trimming regularly snap overhead lines. Because there is a lack of centralized geographic information system (GIS) mapping for both underground and aerial utility corridors, fixing a single break often results in prolonged downtime for entire commercial sectors.

All stakeholders including the operators, property owners, customers or citizens, regulator and other government agencies; need to collaborate to streamline the fiber infrastructure deployment in Kampala.

[1] https://www.newvision.co.ug/category/news/city-of-poles-kampalas-quest-for-connectivity-NV_210483

2. Strategic Solutions Framework

To break the current deadlock, Kampala must transition from an unregulated, operator-centric aerial model to a coordinated, utility-based hybrid infrastructure framework as illustrated in figure 2. This model presents recommendations on Policy, Operational, and Technical Modernization aspects that provide clear ownership areas for regulators, tower companies, and ISPs.

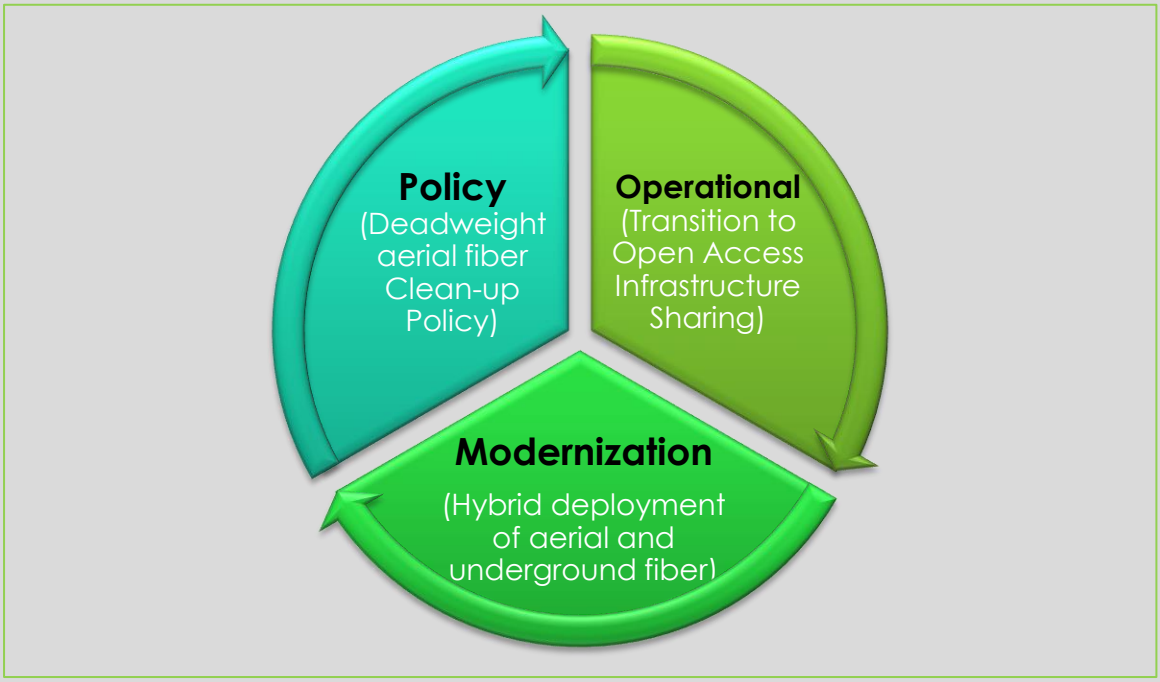

Figure 2: Proposed solutions to the Kampala aerial fiber impasse

Policy Intervention: A Unified Pole-Attachment and "Clean-Up" Policy

The Uganda Communications Commission (UCC), in coordination with the Electricity Regulatory Authority (ERA) and KCCA, must standardize how aerial assets are utilized:

> ***Capped Pole-Attachment Tariffs:*** Telecom operators should be encouraged to install aerial fiber cables on poles provided by utility companies such as electric poles. The Government bodies including UCC and ERA should regulate and standardize the fees utility companies can charge telecom operators for pole access, preventing monopolistic pricing.
>
> ***Mandatory Cable Auditing and Labelling*:** UCC should enforce a strict registration regime where operators must audit, label, and clean up their active lines. All dead or obsolete cables must be removed by law to free up structural capacity.
>
> ***Common-User Bundling:*** Instead of five different operators running five separate aerial cables down the same street, regulations should incentivize the use of high-count "figure-8" aerial cables or shared fiber bundles managed by an open-access provider.

In 2023, Uganda Communications Commission released guidelines on infrastructure deployment and sharing. The guidelines envisaged alignment with the National Broadband Policy 2008, highlighting the need to have a

comprehensive framework to facilitate coordination of all Government interventions in the development of broadband infrastructure; and to regulate the private sector to ensure sharing and complementarity of their broadband networks to avoid duplication in deployment of the infrastructure[2]. The UCC guidelines encourage operators to share infrastructure. However, the policy is not very clear on the scenario when operators are not willing to share infrastructure.

A good regulatory case study is the guidelines for fiber optic cables underground deployment by Rwanda Utilities Regulatory Authority in 2013[3], which prohibits duplicate infrastructure deployment and target avoiding damages to existing underground infrastructure such as existing fiber optic cable, sewage or water pipes, electrical cables or other telecommunications cables. They also intend to ensure that the installation of FOC is done in accordance with telecommunication standards.

Operational Model: Transition to Open-Access Infrastructure Sharing

Shifting the ownership of passive infrastructure to neutral, third-party Open-Access Providers (OAPs) or Tower Companies (TowerCos) eliminates the chaotic clutter of overhead wiring. A single neutral entity manages the aerial fiber backbone along main transit routes (like the Kampala-Jinja highway or Kira Road). Retail telcos and ISPs lease fibers within that bundle on an equitable, non-discriminatory basis, shifting their model from high-risk CapEx to predictable operational expenditure (OpEx). A comparative cost-benefit analysis is illustrated in table 1. From the table, it can be seen that the proposed open-access model provides a lower barrier to entry and accelerated network expansion for local ISPs. This is because the infrastructure provider shall cover the cost of deployment.

Table 1: CAPEX and OPEX Comparison

Expense Category	Traditional Aerial Deployment Model	Proposed Open-Access Hybrid Model	Financial Impact & Strategic Benefit
Capital Expenditure (CapEx)	**High Initial CapEx per Operator** • Dedicated pole procurement & installation • Full cable span purchases per operator • Custom aerial anchor fittings & hardware	**Low Initial CapEx for Retail ISPs** • Infrastructure CapEx shifted to Open-Access Providers (OAPs) / TowerCos • Reduced cable inventory via high-count shared bundles	• **70%–80% CapEx Reduction** for retail operators • Lowers barrier to entry for local ISPs • Accelerates network expansion into new coverage zones
Civil Works & Trenching (CapEx)	**Low Initial / High Incremental** • Minimal digging, but frequent re-stringing and manual fixes when lines snap	**Upfront Core CapEx (Micro-Trenching)** • Targeted micro-trenching for core CBD routes (Nakasero, Kololo)	• High initial civil work cost, but amortized across multiple operators via neutral OAP ownership

[2] https://www.ucc.co.ug/wp-content/uploads/2023/10/THE-UGANDA-COMMUNICATIONS-COMMISSION-GUIDELINES-ON-INFRASTRUCTURE-DEPLOYMENT-AND-SHARING.pdf
[3] https://www.ictpolicyafrica.org/es/document/uqsrjml1gw8

		• Shared duct bank construction	
Right-of-Way (RoW) & Licensing (OpEx)	**Predictable but Disparate Costs** • Unstandardized RoW fees to KCCA, UNRA, and private landlords • Duplicated fees paid by each individual operator	**Standardized & Pooled RoW Costs** • Single unified RoW license fee negotiated by the OAP • Regulated, capped pole-attachment tariffs via UCC/ERA	• **30%–50% OpEx Savings** on regulatory fees through pooled multi-tenant sharing
Maintenance & Repairs (OpEx)	**High & Volatile OpEx** • Frequent repair dispatch for weather, fallen trees, and vehicle knocks • Total loss of cable spans from KCCA "clean-up" campaigns	**Predictable, Lower OpEx** • Underground micro-trenched core is immune to surface/weather damage • Shared SLA-backed maintenance by OAP	• Substantial drop in emergency repair expenses • Eliminates risk of overnight capital loss from unannounced regulatory cable cuts
Asset Lifespan & Depreciation	**Short Lifespan (3–5 Years)** • High degradation from UV exposure, wind stress, and physical cuts	**Long Lifespan (15–25 Years)** • Underground ducts and structured aerial bundles have superior durability	• Slower asset depreciation and higher return on invested capital (ROIC) over time

In the aspect of civil works, there shall be high initial civil work cost, but amortized across multiple operators via neutral OAP ownership. RoW and licensing costs shall be reduced by 30-50% due to pooled multi-tenant sharing. Maintenance costs shall reduce significantly because of unified infrastructure that can only be repaired by one provider. The asset lifespan shall be longer with a higher return on invested capital (ROIC) over time.

Technical Modernization: The Hybrid Deployment Approach

While aerial deployment is fast, Kampala must strategically migrate core transport routes underground while optimizing aerial loops for the "last mile" to homes and businesses.

Table 2: Proposed Hybrid Fiber Deployment Model

PROPOSED HYBRID FIBER DEPLOYMENT		
Feature	**Predominant Aerial Model**	**Proposed Hybrid Model**
Core Backbone	Overhead (Vulnerable)	Underground Micro-Trenching
Last-Mile Access	Chaotic / Cluttered	Regulated Common-User Aerial Bundles
Risk of Disruption	High (Accidents/Weather)	Low
Aesthetic Impact	High Visual Pollution	Clean / Minimal

The hybrid deployment model is important to address the challenges of aerial deployment which include wind vibration, ultraviolet exposure, falling trees, storm damage and vehicle knocks. The underground deployments also pose several risks including excavation accidents, rodent damage, flooding and water ingress. To benefit from each model while mitigating demerits of the other, the hybrid model must be deployed. Figure 3 shows the differences between aerial and underground fiber deployments.

Figure 3: Aerial versus Underground Fiber Deployment[4]

Micro-Trenching for Core Routes

For high-density commercial zones such as Nakasero, Kololo, Kampala Central Business District, KCCA should mandate a shift to micro-trenching involving shallow, narrow cuts in asphalt that allow rapid underground fiber deployment without destroying roads or causing traffic gridlock.

Centralized GIS Asset Mapping

To address the possible infrastructure disruptions due to uncoordinated infrastructure works, it is important to implement a mandatory, real-time GIS mapping database for both underground ducts and aerial pole attachments ensures all infrastructure is visible to urban planners, preventing accidental disruptions during civil roadworks. The centralized mapping system can be hosted by UCC or by a regulated third-party provider. For example, working with one of ISPs, Japotech team established a missing blueprint of fiber infrastructure and initiated an independent GIS mapping routine of all infrastructure additions, illustrated in figure 4. This has added much value to the operator in their maintenance operations.

[4] (https://honelinks.com/aerial-vs-underground-fiber-optic-cable/

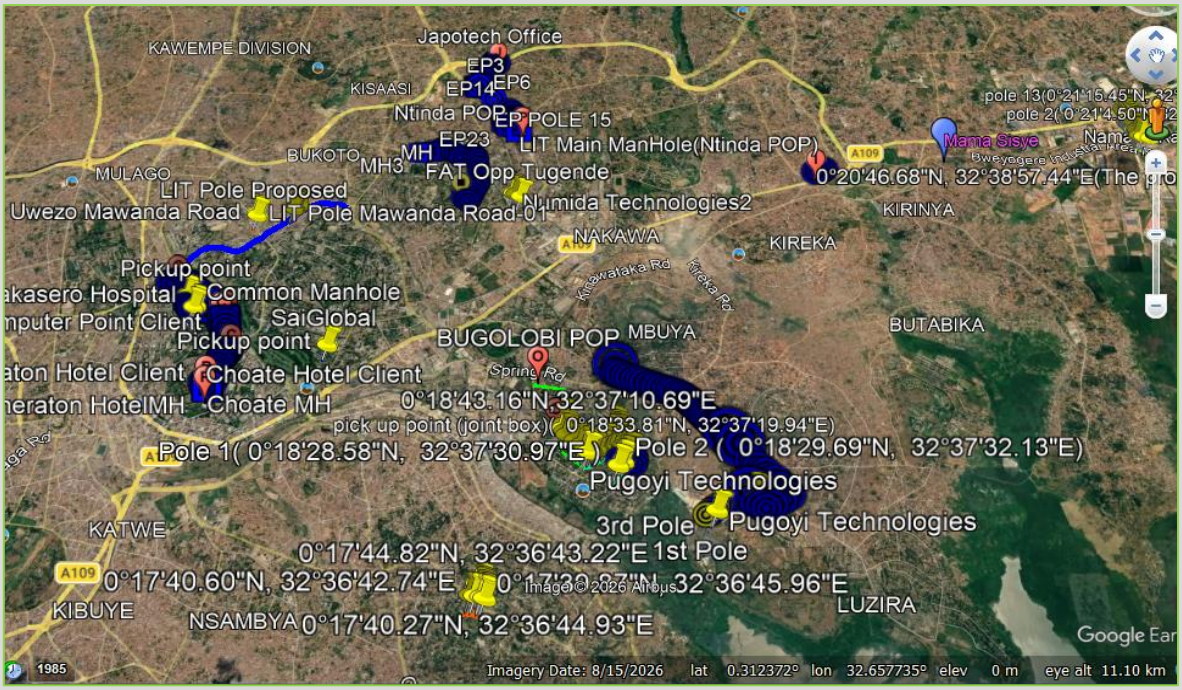

Figure 4: Japotech GIS Mapping of City Fiber Deployments in Kampala City

3. Conclusion and Next Steps

The metro fiber impasse in Kampala is heavily tied to the uncoordinated, cluttered nature of its predominant overhead network. By implementing a regulated pole-attachment policy, mandating the **clean-up of deadweight aerial assets**, **transition to open access infrastructure sharing** and introducing a **hybrid infrastructure model** that utilizes micro-trenching for core routes, Kampala can drastically lower the cost of broadband delivery. Unlocking this gridlock will clear the city's skyline, safeguard network uptime, and position Kampala as a modern, competitive hub for the East African digital economy.