Feedback on COPIF Consultation Paper

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Section 1: Future-ready mobile network infrastructure

A. Provision of Mobile Installation Space ("MIS") in new developments

Question (1)(i) Any views on the obligations to be imposed on BOs and MNOs to facilitate this process of pre-identifying a suitable location for mobile deployment?	This is a useful suggestion. A single appointed MNO point of contact (POC) should be asked to work with the BO's architect and QPs in order to identify the locations for mobile deployment and any related M&E provisions. The proposed approach to facilitate early coordination between BOs and MNOs to pre-identify suitable MIS locations is supported, as it can help enable more timely mobile network deployment and improve connectivity outcomes for tenants. MIS location planning (including internal warehouse / office units) must be integrated during the architectural design phase to ensure coordination with the structural grid, building envelope, and facade design. MIS equipment rooms should be positioned with primary building services risers. A dedicated MNO point of contact should engage with the project's Qualified Person (QP) and BO during the design development stage to identify rooftop and equipment room locations that accommodate the specific structural loading requirements of industrial ramp buildings without compromising the building's architectural intent or facade aesthetics. Pre-installation timeline should allow for building services coordination and integration with the mechanical, electrical, and plumbing (MEP) design (where feasible), ensuring MIS infrastructure is incorporated into construction documentations. MIS infrastructure (including all service providers deployments) should be ready prior to TOP to enable final commissioning alongside other building systems.
Question (1)(ii) Whether it is useful for MIS to be identified upfront during the development design phase, and if so, an appropriate engagement process between BOs and MNOs, such as leveraging on the Corenet, similar to the process where the Telecommunication Facility Co-ordination Committee engages the developers/BOs?	As BO, there is a vested interest to ensure the MNOs are engaged early. However, their responses are usually lukewarm, and on many occasions, frequent reminders are needed to expedite the planning and subsequent works. The timeline can be greatly reduced if their response is prompt. Currently SingTel, M1 and Starhub have a combined Common Antenna System (CAS) but not Simba. This means that BO would need to coordinate with 2 MNOs and would have 1 set of CAS (SingTel, M1 and Starhub) and 1 Antenna from Simba in the building. IMDA is requested to mandate all Telcos to use the CAS instead of installing individual equipment. In the same manner, a main POC for MNO to be responsible for providing inputs and installation of CAS should be identified to work with BO. It is very important for MNO to do a more accurate installation with sufficient coverage right from the start in order to reduce or prevent any disturbance later to Tenants/ BO. Agree to leverage on existing plans submission platform to identify Mobile Installation Space.

Question (1)(iii) The appropriate period/timeframe for MNOs to be granted access to carry out their installations without disrupting the TOP schedule (e.g., X months prior to TOP Date).	Generally, the entire timeline from getting MNO to carry out survey to signing the agreements to installing base stations and antenna internally and externally will take 1.5 years. Hence, we agree that the process of pre-identifying location(s) by BO's appointed Architect or Consultants should be carried out 1.5 to 2 years before the building TOP so that the Architect or Consultants could incorporate the cabling and antenna to their overall design and avoid wastage resulting from installing of the MNO's antenna internally. This will also minimize disruption to tenants fitting out and operations as compared to the current process where the MNO will only come in after TOP. This will also ensure that the telco network is in place for the tenants and users when the building TOP.

B. Provision of telecom infrastructure in basement carparks in new buildings

Question (2)(i) Whether it is sufficient for BOs to provision telecommunication risers, and cable trays alongside electrical cable trays in the B1 carpark, and if there are other types of ancillary infrastructure required to be provisioned upfront to facilitate MNOs' B1 carpark deployments?	BO will provide the telecom risers and MNOs should provide the other equipment similar to all other floors to ensure adequate coverage in B1 carparks. Potentially applicable to ramp-up logistics warehouse developments with basement(s), the design must incorporate telecommunications risers and cable tray infrastructure extending to all basement levels, as these areas serve as critical building service zones for infrastructure and vehicle circulation. Riser routing must be coordinated with the ramp structural design, particularly where basement levels transition to above-ground ramp levels, ensuring cable pathways do not conflict with the heavy structural members required to support elevated vehicle circulation decks. Cable tray installation should be designed alongside electrical and mechanical service distribution, with adequate clearances maintained for future maintenance access. Design provisions should include dedicated pathways for both MNO telecommunications equipment and building management systems, with adequate separation to prevent electromagnetic interference with building control systems and fire safety communications infrastructure.

Question (2)(ii) Whether it is beneficial for telecommunication risers and telecommunication cable trays to be extended below B1 for future provisioning?	MNO's network should cover the entire building, including carparks, lift cars, M&E plant rooms, etc. and not restricted to where the traffic is high. Modern building operations and maintenance require telco coverage more and more, including the need to manage any emergencies in the carpark. In addition, users' experience transiting from good to poor network coverage in the building will be very poor if provisions are only to B1 carpark and not further down as necessary. We should strive to achieve zero functional blind spots.

C. Enable street-level mobile connectivity using street lampposts

Question (3)(i) The corresponding land take (i.e., space) required for each street lamppost deployment.	While BOs may provide the feasible spaces, MNOs should bear all cost related to the installation works. MNOs should also bear all costs to reinstate to as-built condition when the location is no longer needed. And in the event BO needs to remove or relocate the lampposts, MNOs shall remove or relocate at no cost to building owners. In addition, the use of the space(s) for MNO equipment related to lampposts shall be strictly subjected to BO's approvals. The land take shall be free only if the installation is meant to improve or enhance the network for the building. For logistics warehouse developments, lamppost deployment planning must be coordinated with the site layout design, including external vehicle circulation design, truck maneuvering areas, and site setback requirements. Ground-mounted equipment cabinets for lamppost installations must be positioned within designated equipment zones that do not conflict with landscape design, pedestrian walkways, or future building expansion areas defined in the master site plan. Installation locations require coordination with the project's civil engineer to ensure adequate foundation design for tall lampposts in exposed warehouse yard areas where wind loading is significantly higher than in urban settings. The site layout should designate equipment mounting locations that maintain required clearances from building services entry points, fire department access routes, and site drainage infrastructure. Aesthetic considerations should be integrated into the building's overall architectural design language, with equipment screening and finishes coordinated with the building's facade materials and landscaping design, all subject to BO's approvals.

Question (3)(ii) Feasible solution(s) to address safety and aesthetic concerns for such lamppost deployments.	BOs should have the right to approve or reject the MNO's submissions for safety and design. Particularly for design, an aesthetically incongruent design could do damage to the buildings ability to market its spaces. There will also be ground spaces where it will conflict with walkways, green areas and road widths that must be taken into consideration as part of the overall telco infrastructure design.

D. Enhance clarity on requirements under COPIF to facilitate faster mobile deployments into buildings

Question (4)(i) A reasonable lead time for a notice to be served by the BO to an MNO prior to any proposed temporary or permanent relocation.	3 months for works that require relocation of major equipment, i.e. base stations and 1 month for works that only requirement temporary relocation or relocation of minor equipment, e.g. for CAS antenna, repeater units For logistics warehouse buildings, the design phase should incorporate provisions for future flexibility of MIS locations, recognizing that warehouse facilities may undergo reconfiguration or expansion during their operational life. Initial building design should identify multiple technically viable locations for MIS equipment, with structural provisions including adequate roof load capacity distributed across alternative zones, and building services infrastructure designed with spare capacity to accommodate future relocations. Lead time for MIS equipment relocation requires minimum 4-6 months to coordinate with building modification permits, structural engineering reviews, and construction scheduling, particularly for multi-level ramp-up warehouses where access to rooftop areas may require temporary disruption to building services or coordination with building facade maintenance. The information provided to MNO should include the reason for relocation (e.g. redevelopment, operational optimization, or tenant requirements), together with relevant building plans, proposed timelines, and basic details of the alternative MIS location. MNOs shall also be responsible to ensure that the building design originally incorporated adequate structural provisions for the alternative locations.
Question (4)(ii) The information to be provided by a BO in order for MNOs to assess and facilitate any proposed temporary or permanent relocation.	Reasons for the relocation without sharing the exact details regarding any improvement or A&A works and the proposed new locations for MNOs equipment.
Question (4)(iii) The cost responsibility between a BO and an MNO for such temporary or permanent relocation.	Agree that MNOs should bear the cost for relocation.

D. Enhance clarity on requirements under COPIF to facilitate faster mobile deployments into buildings

Question (5)(i) Should BO be allowed to recover such access charges from MNOs for each instance of rooftop access requested by an MNO?	Building Owner shall be allowed to recover reasonable access charges from MNOs, especially so when the request is due to urgency and require immediate access and after office hours. This is especially true of rooftop access which typically require dedicated resources for safety supervision, security escort, and administrative coordination. Rooftop access typically requires similar coordination, safety oversight, and operational planning subjected that the rooftop is not leased out, especially for logistics warehouses which may incorporate extensive rooftop solar systems. While IMDA may propose the recommended market charges taking into considerations of workforce wages, i.e. for the Security, In-house or Outsourced Technicians, access charges should be standardised across buildings, including for logistics warehouses. An appropriate benchmark could be based on typical industry costs for security escort, manpower, and administrative coordination.
Question (5)(ii) Should the access charges be different for buildings with and without security guards on site?	There should be no difference whether a building has security guards on site or not, as persons will have to be mobilized to provide the access, especially after hours.
Question (5)(iii) Should access charges be determined and set by IMDA? What would the appropriate benchmark for IMDA to adopt?	As indicated, IMDA may determine the charges based on the hourly work rates for security and/or technicians (whether insourced or outsourced), accounting for Year-on-Year inflation. However, that should not restrict BOs from imposing other manpower rates and any other administrative charges necessary to provide such access as individual building's contracted rates may be higher due to commercial reasons.

D. Enhance clarity on requirements under COPIF to facilitate faster mobile deployments into buildings

Question (6)(i) Whether it is useful for IMDA provide a sample agreement and if so, what terms and conditions should be included in the agreement?	It is useful for IMDA to set a base agreement for those Building Owners who can then adopt or amend from such base agreement. However, BOs should also not be prevented from adopting their own template agreement or be strictly bound by the terms and conditions set by IMDA. The sample agreement or template should include key terms such as scope of use, roles and responsibilities, access arrangements (including charges), cost allocation, relocation provisions, and safety requirements, while allowing flexibility for site-specific needs, which will help to reduce negotiation time and associated legal costs while giving BOs clearer guidance.

D. Enhance clarity on requirements under COPIF to facilitate faster mobile deployments into buildings

Question (7)(i) Whether there will be impact or prejudice to the (existing or new) BOs and MNOs in the two scenarios described above?	Clauses in license agreements can address issue of change in BO by requiring any licenses to be assigned / novated. However, BO should always have the right not to renew the agreements with MNOs to avoid entrenchment of MNOs which may not need the space but does not vacate since the license is not terminated, effectively in inefficient use of space. MNOs will also need to demonstrate ongoing technical necessity for the space. BOs shall also have the right to terminate the license agreements in event of AEIs / works. BO terminating license agreements may be a result of BO requiring the space, especially if MNOs are utilizing the space to provide services outside the building. For logistics warehouse properties, change of ownership scenarios are common as industrial assets are frequently transacted among REITs and institutional investors. Automatic designation of MIS upon ownership transfer is acceptable provided that incoming Building Owners retain rights to require MIS relocation when necessary for legitimate building modification projects such as warehouse expansion, structural upgrades to accommodate increased floor loading for modern high-density storage systems, or facade renovation projects. License agreements must include defined expiry dates (3-5 years) with renewal contingent on MNOs demonstrating continued technical necessity and compliance with current building structural and architectural standards. Building Owners must retain termination rights when undertaking building conversion projects requiring substantial structural modifications, such as adding mezzanine levels, modifying the building envelope for energy efficiency upgrades, or altering the roof structure for solar panel installations critical to achieving Green Mark certifications. Design documentation and as-built records of MIS installations must be maintained as part of the building's permanent record drawings, ensuring that incoming owners have complete information about structural provisions, loading capacities, and building services integration of existing MIS installations. The agreement should establish design liability and professional indemnity requirements, clarifying responsibilities for structural adequacy certifications and building code compliance documentation.

Question (7)(ii) Whether there is a need for an expiry date for the MIS Agreement?	License expiry is required as MNO can change or may not require so much area given changes in their deployment plans. In general, there should not be an auto-renewal clause without conditions in the License Agreement. An auto-renewal is feasible only if both BO and MNOs have no terms and conditions to be changed. A new license agreement will need to be formalized if both MNO and BO have proposed terms and conditions to be negotiated. LAs are generally 3-5 year in tenure and should be reviewed and renewed periodically especially in light of evolving technologies, market conditions and building needs. The reviews are thus necessary to ensure both parties have opportunities to adjust conditions periodically.

D. Enhance clarity on requirements under COPIF to facilitate faster mobile deployments into buildings

Question (8)(i) The proposal for a PE to be engaged for such mobile deployments.	This is strongly supported. In addition, MNOs must also carry out periodic inspection (once a year) of their equipment, i.e. that equipment are properly secured and functioning well etc., with reports submitted to the Building Owners. MNOs shall also maintain their equipment on a regular basis, including replacing/painting of those CAS antenna or equipment that are not functioning or the color has faded in order to maintain the overall aesthetic of the equipment within building. Especially for multi-level ramp-up logistics warehouse buildings, a structural engineer's certification will address the unique design considerations of industrial ramp buildings. PE certification must specifically analyze structural loading scenarios including the cumulative dead load and live load when MIS equipment is combined with other rooftop systems such as large HVAC units serving high-bay warehouse spaces, solar panel arrays increasingly required for Green Mark compliance, rainwater harvesting systems, and building maintenance equipment. Structural analysis must also verify that antenna support structures and equipment foundations do not compromise the primary structural members designed to support elevated ramp loads, particularly in areas where roof structural members also serve as part of the ramp structural system. Wind loading calculations must account for the large unobstructed rooftop areas typical of logistics warehouse buildings (often exceeding 10,000 square meters) and the increased wind exposure at the roof level of tall industrial buildings, requiring coordination with the building's structural engineer to ensure adequate anchorage and bracing design. PE certification should address seismic design requirements, foundation adequacy for point loads imposed by equipment supports, and structural coordination with existing or planned roof penetrations, waterproofing (and its warranty, if any) for building services. Certification documentation should be coordinated with the building's original structural design documents, with the PE verifying compatibility with the building's design load capacity and providing updated structural calculations that can be incorporated into the building's as-built documentation.

Section 2: Future-proof fixed line infrastructure

E. Upgrade of in-building cabling to support fixed-line broadband speed beyond 10Gbps

Question (9)(i) The appropriate cabling standard that has the capability to support broadband speed of 10Gbps and beyond and the reasons for the choice of the proposed cabling standard.	Cat 6A would be able to deliver up to 10Gbps for up to 100m of cable length. Cat 7 is up to 10Gbps and Cat 8 is from 25Gbps to 40Gbps. While Cat 7 cables may become commonplace in the next 2-3 years, Cat 8 may be too excessive and costly for residential use at this juncture. As in commercial properties, 4G/5G coverage should also be provided for residential carparks for seamless communication for amenities like EV charging and particularly for emergencies. Cabling design should be coordinated with the building's overall MEP design, with cable tray routing planned to maintain separation from high-voltage electrical distribution and mechanical systems to minimize electromagnetic interference.

F. Reduced telecommunication Space and Facilities to allow optimisation of space in single-user buildings

Question (10)(i) The proposal to remove and/or reduce the telecommunication Space and Facilities for small single-user non-residential development as described above.	For multi-level ramp-up logistics warehouse facilities, MDF room sizing and location must be coordinated with the building's core design and vertical circulation strategy. Large single-tenant warehouse facilities exceeding 20,000 square meters should be permitted reduced MDF room provisions relative to gross floor area, as telecommunications infrastructure requirements are concentrated in office and administrative zones rather than distributed across warehouse storage areas. However, adequate MDF room sizing remains important for buildings incorporating multiple tenants or specialized logistics functions requiring dense network infrastructure. IMDA should establish separate design guidelines for logistics and industrial buildings, recognizing that telecommunications load is driven by building management systems and administrative functions rather than warehouse floor area. MDF room location should be coordinated with the building's structural grid to avoid conflicts with ramp structural supports, positioned for efficient horizontal distribution to office areas while maintaining appropriate separation from high-vibration zones associated with heavy vehicle circulation on ramp levels.
Question (10)(ii) Any feedback on the current required telecommunication Space and Facilities, such as the MDF room sizes, for the different types of developments?	IMDA should review the space required as in most instances, the space can be grossly under-utilized by the Telco and especially so under the current COPIF whereby new development with more than 30 storeys need to provide two MDF rooms.

G. Minimise public disruption with advance laying of Lead-In Pipes (“LIPs”)

Question (11)(i) The approach for construction and interim ownership of LIPs, and the transfer arrangements of the LIPs from Licensee(s) to developer or BO once the latter has been identified.	Preference is to stick to current arrangement whereby Building Owners construct LIPs where the pipes are extended outwards from the boundary of the development. To illustrate, any changes by an appointed Licensee might affect or restrict the building's overall design which may then result in additional cost for Building Owner to relocate internal services to match the LIPs. Where there is such a need, the cost for such changes resulting in building design changes should be borne by the Licensee. Alternatively, Building Owners can engage utility operators during their building design stage to facilitate the planning to eradicate the need to relocate the LIP subsequently. With such coordination, the LIP can be constructed concurrently with the building construction. For logistics warehouse developments in industrial estates and logistics parks, advance Lead-In Pipe (LIP) installation by Licensees could provide coordination benefits for infrastructure planning across multiple development plots. However, LIP locations must be carefully coordinated during the building design phase with warehouse-specific foundation systems including deep pile foundations designed for heavy floor loading, extensive stormwater drainage systems required for large impermeable roof areas, fire protection water supply mains with substantial diameter requirements, and site circulation areas that cannot accommodate underground obstructions within truck maneuvering zones. Pre-installed LIPs must accommodate multiple diverse entry points required in large warehouse facilities for telecommunications redundancy, with entry locations coordinated with the building's structural design to avoid conflicts with ramp foundation piling, basement retaining wall systems, and structural columns supporting elevated vehicle circulation decks. The preferred approach for logistics warehouse projects is for developers to retain control of LIP construction during the building design phase, enabling optimal integration with foundation design, basement construction sequencing, and civil engineering site works. Advance coordination with Licensees during design development ensures LIP routing is compatible with the building's structural and civil engineering requirements while avoiding costly conflicts during construction. For multi-level ramp-up warehouses, LIP routing must be carefully coordinated with the complex foundation systems required to support elevated ramp loads, with entry points positioned to facilitate connection to the building's telecommunications riser system without requiring extensive horizontal distribution through structural zones.

H. Enhance resilience and diversity of buildings providing critical services

Question (12)(i) The proposal for the same Telecommunication Space and Facilities obligations imposed on buildings providing vital services to be extended to those buildings designated as SD/SI.	Agreeable but the additional cost to do so shall not be imposed on the Building Owners. For logistic warehouse facilities, the enhanced telecommunications infrastructure resilience requirements serving critical supply chain functions, including pharmaceutical cold storage facilities, food distribution centers, medical supplies warehouses, and distribution centers supporting essential retail operations is supported. These facilities should incorporate redundant telecommunications infrastructure designed with geographically diverse building entry points, duplicate cable distribution systems following separate riser pathways, and backup power provisions for telecommunications equipment integrated into the building's emergency power design. However, the substantial additional design and construction costs for redundant infrastructure should not be imposed by BO's or be offset substantially through government grants or tax incentives, recognizing that logistics facilities operate with tight cost constraints while providing essential services. For warehouse facilities designated as Special Development (SD) or Special Infrastructure (SI), redundancy requirements should address both building telecommunications and private network systems, as these integrated building systems are critical for facility operations. Design guidelines should recognize that large warehouse building footprints facilitate diverse-route telecommunications entry more readily than vertical residential towers, enabling cost-effective resilience through strategically positioned entry points on opposite building facades coordinated during architectural design. Redundant riser design should be integrated with the building's fire safety and life safety systems design, ensuring that telecommunications infrastructure maintains functionality during emergency scenarios. Building design should include dedicated equipment rooms for redundant systems with appropriate separation and fire-rated construction to prevent common-mode failures.

I. Others

Question (13)(i) Other potential changes to enable our telecommunications infrastructure to be future-ready to support Singapore’s digital economy	1) Support to be provided for Building Owner to upgrade current infrastructure for older buildings to move to high-speed fiber cabling and 5G services. 2) GFA exemption for MDF room especially for those buildings (with no basements) that are required to provide 2 MDF rooms. 3) As with new developments, request for IMDA to mandate a Common CAS for existing buildings. The installation of multiple infrastructure is disruptive and further consumes the already limited utility or engineering spaces. Currently, Singtel, M1, and StarHub share a CAS in many older buildings, while Simba operates a separate system. This duplicity of infrastructure also requires BOs to coordinate with multiple MNOs, leading to inefficient space usage and increased complexity. This is particularly important for existing buildings, where retrofitting is often constrained by space, structure, and lack of pre-planned provisions, resulting in ad hoc and visually intrusive installations. 4) As with development projects, a single MNO point-of-contact is also critical for BOs, as we often face difficulties reaching the appropriate MNO representatives due to changes arising from license renewals, novation, or divestments. This leads to outdated contact details and unclear ownership of responsibilities. It is therefore suggested that IMDA centralize or mandate a single, accountable POC (via IMDA or designated by MNOs) for coordination, planning, and deployment matters, with contact details kept current and accessible to BOs. 5) We recommend that IMDA mandate clear Service Level Agreements (SLAs) requiring Mobile Network Operators (MNOs) to respond promptly to feedback from members of the public and tenants regarding mobile connectivity. Our experience has shown that responses are often slow, leaving Building Owners to bear the brunt of complaints despite the matter being outside their control. Establishing defined response timelines will ensure accountability and improve stakeholder confidence in network services.