



A public consultation document issued by the
Telecommunications Regulatory Authority of the
Kingdom of Bahrain

**Draft Position Paper on the Deployment of
Telecommunications Networks in New Property
Developments**

27 May 2009

Reference Number: TOD/0509/024

The address for responses to this document is:

General Director
Telecommunications Regulatory Authority (TRA)
PO Box 10353, Manama, Kingdom of Bahrain
Alternatively, e-mail responses may be sent to the
TRA's email address at consult@tra.org.bh
The deadline for responses is **4pm on 25 June 2009**

Purpose: To seek the views of interested parties on a Draft Position Paper on the TRA's regulatory policy in relation to the deployment of telecommunications networks in new property developments.

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Instructions for submitting a response

The Telecommunications Regulatory Authority (“**TRA**”) invites comments on this consultation document from all interested parties.

Comments should be submitted by **4pm on 25 June 2009**.

The address for responding to this document is:

General Director
Telecommunications Regulatory Authority
P.O. Box 10353, Manama, Kingdom of Bahrain

Alternatively, responses may be sent to TRA by email to consult@tra.org.bh.

Responses should include:

- brief statement explaining the interest of a party submitting comments in relation to the draft Position Paper;
- in the case of responses from corporate persons:
 - the name of the company/institution/association, etc;
 - the name of the principal contact person; and
 - full contact details (physical address, telephone number, fax number and email address);
- in the case of responses from individual consumers, name and contact details.

Stakeholders are welcome to comment on any issues related to the Position Paper. However TRA would in particular appreciate views on the:

- 1) **Specific Question 1:** definition of New Developments (Section 2);
- 2) **Specific Question 2:** estimates of cost proportions, used in the Position Paper, for different elements of deploying telecommunications infrastructure (Section 5);
- 3) **Specific Question 3:** role of developers suggested, in particular if such a role should extend beyond deploying a duct network (Section 5);
- 4) **Specific Question 4:** appropriate level of regulation/encouragement in ensuring open access to telecommunications infrastructure and services (Section 7);
- 5) **Specific Question 5:** impact, if any, that prevailing global economic and financial conditions could have on the implementation of the regulatory policy proposed (General).

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In the interests of transparency, TRA will make all submissions received available to the public, subject to the confidentiality of the information received. TRA will evaluate requests for confidentiality in line with relevant legal provisions and TRA's published guidance on the treatment of confidential and non-confidential information¹.

Respondents are required to clearly mark any information included in their submissions, which is considered confidential. Where such confidential information is included, respondents are required to provide both a **confidential** and a **non-confidential** version of their submission. If a submission is marked confidential in part or in its entirety, reasons for this should be provided. TRA may publish or refrain from publishing any document or submission at its sole discretion.

Once TRA has received and considered responses to this consultative document, TRA will issue a final version of the Position Paper, together with a report on the consultation.

¹ http://www.tra.org.bh/en/pdf/Confidentiality_Guidelines_Final.pdf

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Executive Summary

1. Based on the specific study, which took into account international experience and input from the relevant stakeholders in Bahrain, TRA is of the opinion that (1) a focused contribution of developers towards deployment of telecommunications infrastructure together with (2) an open access policy, ensuring competition and choice for consumers in New Developments, as well as (3) continued application of the existing regulatory framework are the main elements of an appropriate regulatory strategy in relation to New Developments.
2. Developers have a key stake in the success of their New Developments. Therefore it is expected that they facilitate the deployment of telecommunications infrastructure. Developers are expected to plan their projects in a way that would include appropriate utility corridors and other necessary plots of land for telecommunications purposes and invest into scalable passive infrastructure with at least:
 - 2.1. sufficient number of ducts (including necessary manholes and chambers). Duct infrastructure should ensure that sufficient spare capacity (supported by subducting, where necessary to facilitate sharing of ducts) is available;
 - 2.2. pre-cabled in-building "dark" fibre or, in the absence of a clear technological choice, combo-cabling supporting both copper and fibre, together with associated facilities in buildings (and, where appropriate, facilities ensuring internal coverage of wireless services).
3. Sharing of duct and in-building cable infrastructure will provide equal opportunities to a larger number of operators to provide services to occupants of New Developments. In some cases such sharing, based on the initial contribution of a developer, is crucial for such investment to occur at all.
4. Depending on the expected pattern of demand on a specific New Development as well as the importance of telecommunications for the success of such a development, developers may consider the possibility to include in their business plan deployment of "dark" fibre infrastructure throughout their development. Investment in the "lit" fibre would in most cases complicate the business model of developers without clear benefits.
5. Open access to bottleneck elements of telecommunications infrastructure and service provision has to be granted to allow competition at any level, where it is feasible. TRA aims to promote competition as far upstream into the value chain of telecommunications (as deep into the network) as possible.
6. Developers are also expected to enable wireless services to cover New Developments and provide appropriate rights of way, where necessary. This implies that wireless operators should be able to erect their facilities on an appropriate space within New Developments and connect them to their backbones. Developers may also chose to offer passive infrastructure upon which operators can place their aerials. This will ensure

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that users have at least the possibility to use wireless services from the very initial stages of occupancy at a certain New Development.

7. TRA is of the view that the existing regulatory framework is to a large extent appropriate to resolve issues related to New Developments. It provides TRA with the appropriate tools to enforce symmetrical open access supplemented, where necessary, by asymmetric market regulation (both *ex ante* and *ex post*). TRA however expects that market forces, guided by TRA's position, will in themselves lead to regulatory and policy objectives being met without specific intervention.
8. However to ensure this TRA plans to take additional actions to ensure sufficient clarity to stakeholders and effective implementation of the regulatory strategy, including:
 - 8.1. utilising the Telecommunications Technical Office of TRA in facilitating the interaction between developers and operators (some of the related functions are already being implemented; they will be further expanded by the end of 2010);
 - 8.2. amending licences to clearly enable symmetrical obligations related to New Developments (as part of the process to introduce unified licensing);
 - 8.3. preparing guidelines governing in-building telecommunications cabling, including appropriate telecommunications rooms (anticipated to be completed in 2010);
 - 8.4. facilitating adoption of requirements supporting the regulatory policy outlined in this Paper in the approval processes, administered by CPO and MOSS (anticipated to be completed in 2010).
9. Possible further actions TRA may take in the field may include:
 - 9.1. Preparing a regulation based on article 65 (h) of the Telecommunications Law clarifying the enforceability of the TRA's policy on New Developments;
 - 9.2. Preparing cost models to use as a reference in ensuring fair and non-discriminatory access to bottleneck elements of telecommunications infrastructure deployed in New Developments.
10. It is expected that the position, outlined in this Paper, will be reviewed as the environment of New Developments in Bahrain matures. TRA plans for such a review to happen after 5 years from publishing this Paper.

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1. Introduction

1. The Kingdom of Bahrain has been experiencing rapid development in terms of new properties. These properties range from individual houses to high-rise business and residential buildings on both existing land as well as new islands (based on reclaimed land)². These developments are usually managed by a developer who controls a master plan and makes decisions on the infrastructure to be deployed and the access regime to communal property.

Purpose of this Position Paper

2. This Position Paper (“**Paper**”) is intended to offer guidance to property developers, existing and potential telecommunication operators as well as other interested stakeholders. It outlines the regulatory treatment in relation to the deployment and provision of telecommunications services and infrastructure in new property developments (“**New Developments**”).
3. In terms of telecommunications regulation New Developments give rise to a wide range of regulatory issues. At the high level they raise one central question: What is the most appropriate regulatory approach with regard to New Developments? Two sets of considerations underpin this question: (a) the incentives to invest and to offer state-of-the-art telecommunications services in New Developments; and (b) the imperative to ensure consumer choice and availability of competitive telecommunications to residents and tenants.
4. This Paper is a TRA position paper only. It is not intended to provide an exhaustive list of practices which TRA will consider in relation to New Developments. It is not binding upon TRA and should not be considered as a legal advice.
5. It is expected that the position, outlined in this Paper, will be reviewed as the environment of New Developments in Bahrain matures. TRA plans for such a review to happen after 5 years from publishing this Paper.

Background to this Position Paper

6. TRA was formed pursuant to Legislative Decree No. 48 of 2002 promulgating the Telecommunications Law (the “**Telecommunications Law**”).

² These New Developments include large scale residential and/or business property developments (e.g., Amwaj Islands, Bahrain Bay, Riffa Views, Durrat Al Bahrain, Northern Bahrain New Town, Reef Island, Health Island (Dilmunia), Diar Al Muharraq, Bahrain Investment Wharf, Bahrain International Investment Park and Al Areen); major business and residential complexes featuring high-rise buildings (e.g., Bahrain World Trade Centre, Bahrain Financial Harbour, Marina West, Abraj Al Lulu). Construction of smaller scale residential developments (e.g., compounds) and single-building residential facilities also takes place.

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7. Through the telecommunications regulatory framework, TRA aims at fostering an environment of effective and fair competition where economic efficiencies and benefits to consumers³ are maximised in line with the TRA's core objectives to promote competition and to protect the interests of consumers as set in the Telecommunications Law.
8. New Developments represent a specific case where a clarification is needed on how the general strategy of TRA needs to be applied in order to achieve these objectives. TRA has indeed been approached on several occasions by various operators and developers on the topic of telecommunications networks in New Developments.
9. TRA's regulatory strategy regarding New Developments is based upon TRA's other work on this issue, which is overviewed below.
10. In December 2008 TRA published its Guidelines on Telecommunications Infrastructure Deployment⁴. Publication of this document together with the establishment of the Telecommunications Technical Office ("**TTO**") within TRA has enabled all suitably licensed operators to deploy their telecommunications infrastructure in public and private properties on equal grounds.
11. In 2008, TRA carried out a consultancy study on this subject with a view to scope the issues and assist in the definition of TRA's approach.
12. In the process of the consultancy project, TRA has received contributions from various market players: Nuetel, Zain, Mena telecom, 2Connect, LightSpeed, Etisalcom and Batelco; as well as developers and their consultants: Hisham Abdulrahman Jaffer, Bahrain Bay (together with Arcapita), Dar Al Handasah, Bahrain World Trade Center, Bahrain International Investment Park, Bahrain Financial Harbour and Bahrain Investment Wharf. Governmental contributors included the Central Planning Office ("**CPO**"), Municipal One Stop Shop ("**MOSS**") and the Economic Development Board. Members of the TRA's Consumer Advisory Group provided their views as well.
13. The outcome of the study and the related preliminary position of TRA were published in June 2008 and were at the same time presented by TRA and the consultant to the interested stakeholders during the Meeting on Regulatory Issues Related to the Deployment of Telecommunications Networks in New Property Developments⁵.
14. The main issues identified during the consultancy project related to the economic viability of investments into telecommunication infrastructure in New Developments. TRA's position on the best ways to address this is outlined in the following sections.

³ Here and elsewhere in this Paper the term "consumers" includes both residential and business customers.

⁴ <http://www.tra.org.bh/en/pdf/Guidelinesfortelecominfradeployment-Final.pdf>.

⁵ Relevant documents can be found at: <http://www.tra.org.bh/en/marketInfrastructure.asp>.

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2. Defining New Developments

15. For the purposes of this Paper, TRA defines New Developments as predominantly private newly built developments, where telecommunications services are yet to be provided. The approach outlined in this Paper will generally also apply to recent developments, where competition in telecommunications services has not yet developed.
16. The New Developments, covered by this Paper, will usually constitute an area of land, a single building with more than one accommodation unit or a cluster of buildings and will usually be built for the permanent use by their occupants (owners or tenants). New Developments include such facilities as high-rise buildings, new industrial zones and new cities. The application of the policy may, however, need some adaptation, depending on the specificities of a development in question.
17. This Paper does not intend to cover issues related to small single private (residential) houses, nor buildings that are not permanently used by the same tenants and where a temporary tenant does not normally enter into a contract for the provision of access to telecommunications networks and services. Hotels, for example, are therefore excluded from the scope of this Paper. However, there are elements of the proposed technical regulation that may apply to such properties. Furthermore, nothing in this Paper precludes TRA from applying similar principles to the ones outlined herein to any property, where considered appropriate by TRA.
18. New Developments also include some newly developed public initiatives whose purpose is for example to provide housing to the local population (e.g. Northern Bahrain New Town).

Specific Question 1: Do you agree with the definition of New Developments? Please elaborate.

3. Objective and General Considerations

Overarching Goals

19. The objective of this Paper is to define the regulatory strategy of TRA in relation to New Developments.
20. This regulatory strategy seeks to ensure long-term consumer choice and the competitive provision of telecommunications services throughout the country, including new residential, business and mixed areas. The formulation of the regulatory approach also recognises the need to provide adequate incentives to invest into state-of-the-art telecommunications networks and services in New Developments.
21. The regulatory strategy defined by TRA is pragmatic and takes into account resources constraints. It aims to achieve the most effective regulatory outcomes with the minimum required level of regulatory intervention and actions.

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22. TRA aims to regulate telecommunications networks deployed in Bahrain and telecommunication services made available to users in the Kingdom to the minimum extent necessary to allow for open competition and equal opportunities to all operators and provide the necessary incentives for efficient network investment.

New Developments: Investment Risks and Specificities

23. It is important to consider the investment risks associated with telecommunications infrastructure investment and the provision of state-of-the-art networks and services in New Developments due to high sunk costs (e.g. civil works) involved. It is estimated that deploying fibre-to-the-home (“**FTTH**”) network may need €500 – 2000 investment per household⁶.

24. In order to define a regulatory strategy that provides appropriate investment incentives it is important to understand factors that influence them. TRA has identified the following categories of risks that may impact the incentives to invest in telecommunications infrastructure in New Developments:

- 24.1. **Regulatory risk:** Regulatory risk refers to uncertainties with regard to the regulatory treatment of investments, including protective arrangements (e.g., exclusivity agreements), as well as regulatory obligations to be applied to facilitate infrastructure and/or service competition;
- 24.2. **Technology and cost risk:** Technology and cost risk refers to uncertainties related to the possibility of technology deployed becoming obsolete or at least appearing or turning out to be an inferior technology within a relatively short period (this is arguably a specific risk of the rapidly developing telecommunications sector in any event); and related uncertainties with regard to the best investment timing in relation to the cost of the technology chosen as equipment costs in the sector tend to decline rapidly when a technology matures;
- 24.3. **Demand risk:** Demand risk refers to uncertainties related to the demand of telecommunications services in New Developments.

Some operators expect only limited level of occupancy of apartments and houses. Figures as low as 40 per cent have been provided during the interviews conducted by TRA and its consultant. There is also uncertainty regarding the time it will take for New Developments to reach their peak occupancy rates, and hence the time it will take for a project to be in a steady state in terms of revenues. Some developments may attract only second-home or speculative buyers. These factors may result in reduced effective occupancy and uncertainty regarding what telecommunications services will be required, what penetration and revenues can be achieved as well as ultimately whether the investment is

⁶ Data collected by Juconomy.

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profitable. Demand risk is further exemplified in the current global economic and financial situation.

The magnitude and profile of demand risks depend on the nature of a particular New Development. Therefore the best approach to mitigate demand risks is, to certain extent, individual to each New Development.

24.4. **Uncertainty with regard to the accessibility of a specific New Development.** Telecommunications networks of New Developments need to be connected to the existing public networks. An economic and technical feasibility of this exercise may be an issue.

25. The risks identified above could be mitigated by:

25.1. **Defining a clear and predictable regulatory framework.** This Paper specifically aims to contribute to it;

25.2. **Lowering investment cost to operators.** This could take the form of a contribution of a third party leading to a reduction of entry and capital costs for an operator and hence an improvement in the investment equation;

25.3. **Guarantees of reduced competition.** As explained further below, TRA considers that mitigating investment risks by allowing some form of regulatory holidays or exclusive rights is not acceptable from a policy and legal stand point, in particular in light of the provisions of the Telecommunications Law. Obviously this does not apply to the possibility of certain natural first mover advantages, obtained because of economic unfeasibility to duplicate the investments (i.e., in some cases there may be economically unfeasible to replicate the infrastructure deployed by the first operator). Enjoyment of such advantages will, however, be subject to application of certain regulatory principles as outlined below. This will aim to ensure that competition is not foreclosed after infrastructure is deployed.

26. Real estate investments in New Developments and investments in telecommunications infrastructure are mutually dependent. On the one hand, the economic feasibility of investments in telecommunications infrastructure depends on the expected take up, nature and pattern of effective occupancy in a specific New Development. On the other hand, it is difficult to expect that prospective occupants (either residents or businesses) would consider moving into a New Development in which no telecommunications services are offered.

27. This situation of mutual dependency creates the risk of a vicious circle where no timely investment in telecommunications infrastructure, caused by demand risk, could make such a risk a self-fulfilling prophecy as no occupants would move to such a New Development because of the lack of telecommunications services available. However, by breaking this deadlock, the availability of state-of-the-art telecommunications services could attract occupants to a New Development thereby generating demand for telecommunications services. In other words, the availability of telecommunications

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infrastructure may increase the attractiveness of New Developments and attractive New Developments may increase demand for telecommunications services.

TRA Regulatory Strategy: an Overview

28. TRA believes that the specific issues raised by New Developments do not override the duty of TRA to promote fair and effective competition. It is also essential to ensure that choice of telecommunications users in Bahrain is not restricted to one operator only because such users choose to live or work in a New Development.
29. TRA therefore believes that its regulatory strategy should:
- 29.1. **Protect competition at the point of deployment.** New Developments are a special case as they present new opportunities for any operator (not just the incumbent) to begin from the same starting point in investing in infrastructure. Hence New Developments provide for the potential of a genuine environment for contestable investments, although incumbency advantages may remain. It is therefore important not to undermine such an opportunity and to ensure that all operators have equal possibilities to make such investments. Competition at the entry level could also lead to emergence of multiple networks thereby setting the ground for infrastructure competition.
- 29.2. **Ensure continuous protection of competition in case of market failure.** Once a network is deployed, it may exhibit the characteristics of an enduring economic bottleneck. Appropriate regulatory treatment may therefore be required to ensure choice for consumers.
- 29.3. **Prevent the emergence of local monopolies.** In order to protect consumer choice, TRA will seek to prevent the emergence of local monopolies.
- 29.4. **Encourage developers to undertake specific actions.** In order to ensure the appropriate investment incentives without at the same time undermining the protection of effective and fair competition, TRA considers that the role of developers in the field of telecommunications infrastructure should be expanded as explained below.
30. In implementing its regulatory strategy for New Developments, TRA is prepared to take enforcement actions against breaches of the Telecommunication Law and other legal instruments, when appropriate, such as where an operator abuses its dominant position. However, TRA considers that its primary role is first of all to engage with the market regarding the proper application of the concepts of fair and effective competition and the initiative and measures to alleviate investment risks and improvement of the economic equation for investment in New Developments. TRA considers that developers have a major role to play in that regard.

4. Telecommunications Infrastructure in New Developments

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31. Technical solutions available to operators for the deployment of active equipment for their core and access infrastructure, are progressing at a fast pace. Existing technologies are being replaced by new solutions on a regular basis.
32. By contrast passive infrastructure has not experienced a similar level of technological innovations, especially regarding duct infrastructure.
33. In terms of the telecommunications local loop, historically the only commonly deployed solution worldwide (and Bahrain) was copper based networks.
34. Only recently has optical fibre been introduced as an alternative technology to copper lines. In many countries the process of investing into fibre to replace copper-based infrastructure and to phase out previous generation equipment with recent optical technology is ongoing. This process requires a significant amount of investment.
35. In the case of New Developments, which are by definition greenfield environment, investors have the opportunity to roll out fibre based infrastructure, including in the local loop, from the start. In virtually all cases a fibre solution is likely to be more beneficial to investors in relation to their business plans than deployment of copper. Figure 1 shows a comparison between basic technological features of copper and fibre based networks. Figure 2 shows a typical deployment of fibre optic infrastructure.

Characteristic	Copper	Fibre optics
Capacity	The capacity of copper depends on the modulation employed and the length of the line, typically the upper limit is between 8 and 24 Mbit/s, and more for sub-loops. It decreases as line length increases.	The capacity of fibre optics depends on the modulation and architecture employed but ranges from 10Mbit/s to virtually unlimited
Impact of distance	The bandwidth performance of copper decays significantly with distance	Fibre optics delivers consistent bandwidth up to 20km and potentially beyond
Line powering	Copper supports line powering easily	Line powering is generally considered impractical over fibre

Figure 1. Comparison: fibre optic v. copper⁷

⁷ Source: Ofcom.

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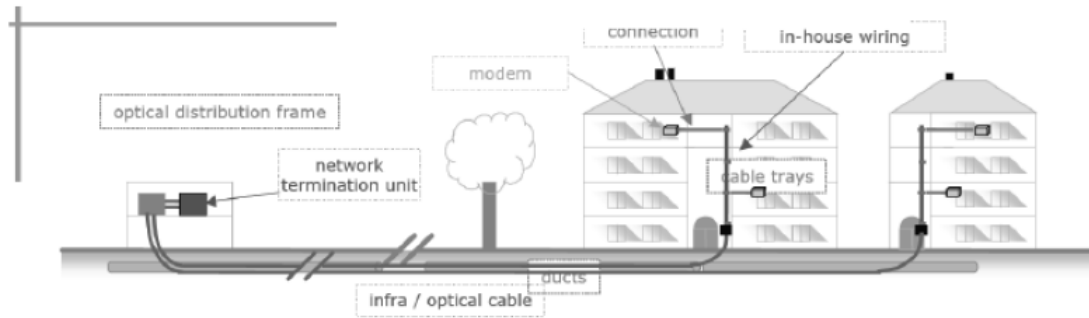


Figure 2. Typical fibre network deployment⁸

36. Nowadays it is commonly envisaged that a high quality living and/or working environment, being of either business or residential purposes, needs to be supported by the state-of-the-art telecommunications services. “Always on” broadband access to the Internet through wired and wireless points, possibility to place and receive high quality mobile calls and data irrespective of the location, access to a large number of value added services online including music, video, VoIP quality calls, and business applications etc., are becoming basic consumer expectations.
37. Telecommunications services will have (and, to a great extent, already need) to support an increasing number of interactive services, requiring an exponential amount of bandwidth to function smoothly. It is likely that only the state-of-the-art infrastructure based on optical fibre will be able to support the needed level of applications. Capabilities of fibre optics compared with other commonly used means to access broadband services are illustrated by Figure 3.

⁸ Source: ARCEP.

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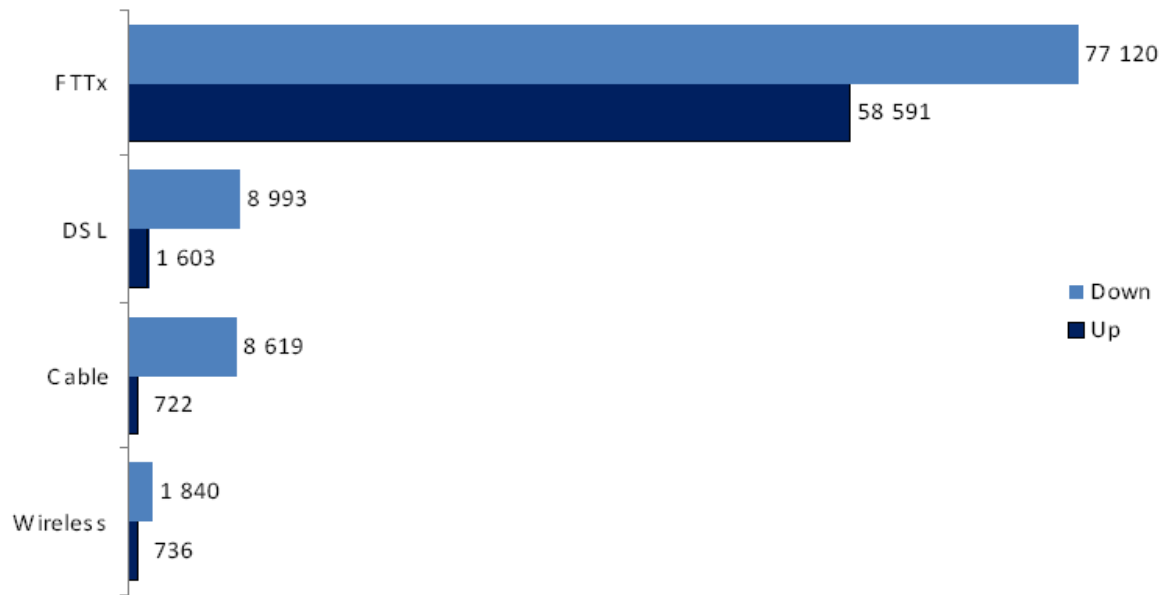


Figure 3. Average download and upload speeds by technology (October 2007)⁹

38. The study conducted by the consultant to TRA (referred above) concluded that:

“Wireless and mobile technology will play an important role in state-of-the-art telecommunications networks and services, but they will not suffice to satisfy the demand by themselves. Especially businesses but also residential customers will demand ever increasing bandwidths which can only be supplied by fibre based access networks...fibre-based infrastructure needs to be considered in new property developments in Bahrain”.

39. For the reasons above, TRA is of the opinion that existence of the fibre infrastructure is an important element in ensuring adequate choice for required telecommunications services for consumers located in New Developments.

40. However it is also important to recognise that not all New Developments will need the same level of technology and capabilities of the infrastructure deployed. Depending on the pattern of occupancy, needs of occupants of certain New Developments might be satisfied by wireless means. Such solutions may require significantly lower level of investment and better re-usability of the infrastructure deployed. TRA however considers that even in the cases where wired (fibre optic-based) infrastructure may initially be difficult to justify and it may need a considerable period to pay back, it is still appropriate

⁹ OECD Broadband Portal.

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to make necessary provisions (e.g., installation of ducts) enabling easy installation of wired telecommunications infrastructure when such demand arises. This is especially true where the cost of such preparation at the time of implementing a New Development project does not constitute a significant proportion of total investment into a specific New Development. Further if such investment is left to a later date there will also be the additional cost associated with disturbances caused by installation of the required infrastructure after the completion of a project.

41. Having regard to: the needs for mobility, which can be satisfied by wireless means only; the possibility that needs of certain classes of consumers can be sufficiently satisfied by wireless-only access; and coverage obligations common to licenses of providers of wireless telecommunications services, TRA considers it important to ensure the ability of wireless service providers to effectively provide their services to the consumers located in any of New Developments.

5. Role of Developers

42. In light of the investment risks involved in the deployment of telecommunications infrastructure and the expected benefits that developers may derive from the availability of telecommunications infrastructure in New Developments, TRA considers that developers have a major role to play in facilitating the deployment of networks. This section sets out the roles and actions TRA expects developers to follow where necessary.
43. The ability of residents and businesses located in a New Development to access services delivered over the state-of-the-art telecommunications infrastructure is very likely to increase the value of such a New Development. As can be seen from Figure 4, a €2,000 investment in FTTH can lead to nearly a five-fold increase in property value.

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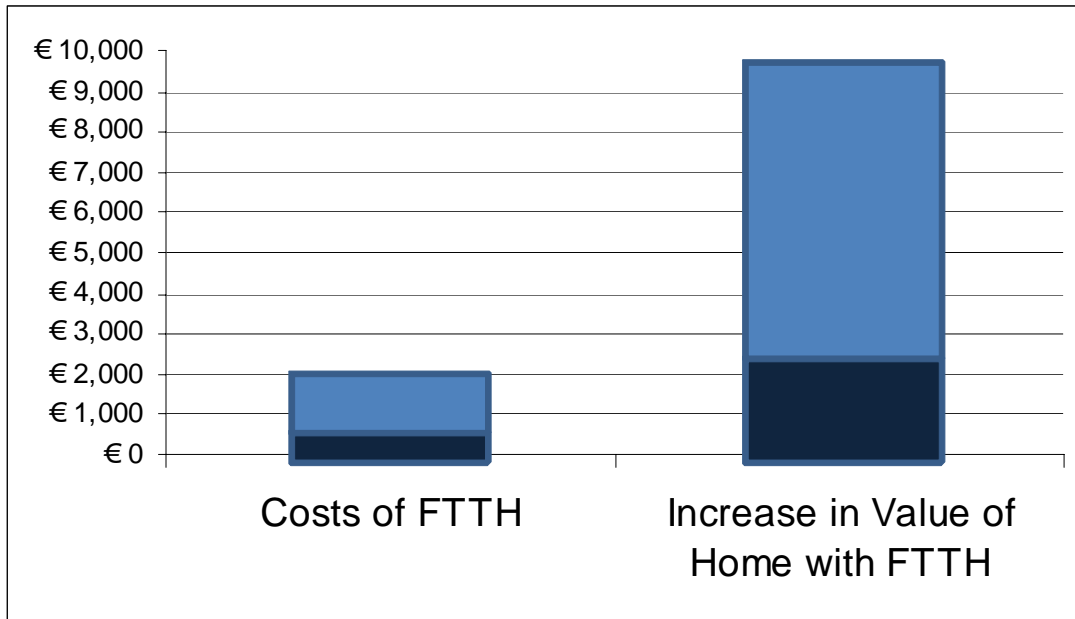


Figure 4. Increase in property value resulting from investment in FTTH¹⁰

44. Furthermore, it may be a risky decision for developers and their customers to invest in a property without the guarantee that modern telecommunications services will be available. If a developer is not able to achieve this, the business case for a New Development, as well as the value of a property, could be seriously detrimentally impacted.
45. Taking into account the existing competition in Bahrain and the pattern of the investment risks, it might be possible that sufficient incentives may not exist even for one private operator to deploy a telecommunication infrastructure in a New Development.
46. Furthermore, TRA recognises that a policy of open competition can have some (at least perceived) effect on incentives for operators to invest. TRA does not consider that competition and consumer choice should be sacrificed in order to provide some perceived investment incentives with unclear outcomes. This, however, may increase the need for developers to contribute in deploying telecommunications infrastructure.
47. The main factor that acts as a disincentive to investments is the very large sunk costs associated with the deployment of networks. Civil work related to deployment of ducts, manholes and associated infrastructure is estimated to constitute as much as 60 per cent of total investment costs¹¹ (see Figure 5 below). These costs per operator can be

¹⁰ Estimates from various studies (including Renda Vanderslice & Associated, "FTTH: The Third Network"). The darker colour of the columns shows lower range of the estimates and the lighter one shows the higher range of the estimates.

¹¹ European Commission states that civil works may represent up to 80 per cent of the total roll-out costs of next generation access networks (see:

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reduced, if sharing of works is adopted. However in the case of at least some New Developments this may not be enough.

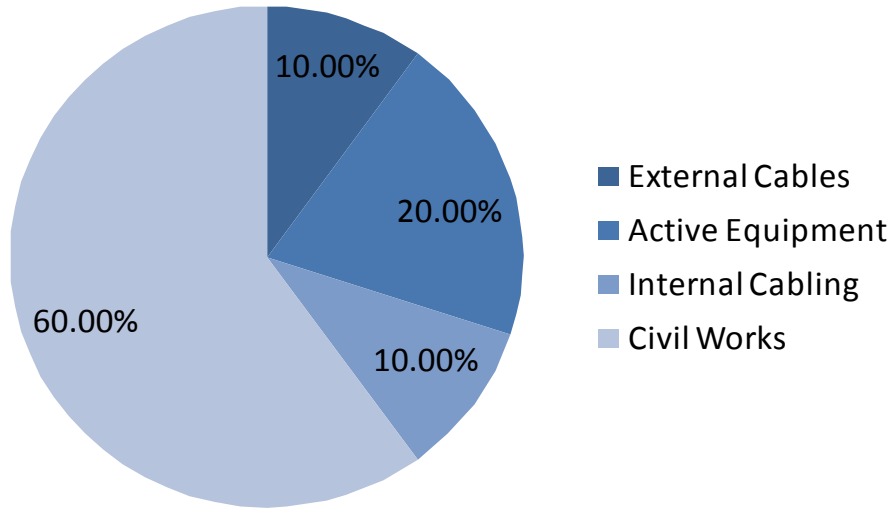


Figure 5. Breakdown of fibre network deployment costs¹²

48. Different elements of telecommunications infrastructure have different lifetimes. The useful economic life of such elements as ducts, manholes, as well as “dark” fibre, could be as long as 20-40 years. Whereas the useful economic life of active components (i.e. equipment needed to “light” the fibre) is estimated to be up to 8 years¹³. In the context of a greenfield operation such as a New Development, this means that it may make sense to invest into long-life assets (e.g. ducts) when a New Development is being constructed while investment in assets with short useful life can be deferred and made by operators as and when needed.

49. TRA does not recommend developers to substitute operators in deploying telecommunications networks. However TRA considers that there is a role for developers to contribute to the necessary telecommunications investments as part of their overall responsibility for the success of New Developments. Such contribution should be aimed at facilitating the initial deployment of telecommunications networks and lowering telecommunications operators’ investment risks. Proactive actions by developers in investing by themselves in certain elements of telecommunications infrastructure have a clear potential to contribute to the emergence of state-of-the-art

http://ec.europa.eu/information_society/policy/ecomm/doc/library/public_consult/nga/expl_note_nga.pdf). Office of Communications of the United Kingdom estimates that deploying passive infrastructure (ducts etc.) could represent 50-70 per cent of the costs of deploying next generation access infrastructure (see: http://www.ofcom.org.uk/consult/condocs/newbuild/statement/new_build_statement.pdf).

¹² Source: ARCEP.

¹³ Source: RGL Forensics (study for ComReg).

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telecommunications infrastructures, supporting competitive telecommunications networks. This can be achieved at marginal costs to developers compared to the total costs of New Developments.

50. Developers, investing in the provisioning of telecommunications infrastructure, are able to include the relevant costs in their business plans for such developments. They are also able to share the relevant costs of civil works with the works necessary to enable provision of other infrastructure and utilities (such as roads, water, electricity, gas, sewerage, district cooling etc.). The resulting costs can also (at least to some extent) be passed to the end customers, who will anyway benefit from more competitive telecommunications in such a New Development. The impact on the total cost (i.e., especially when evaluated on an incremental basis) should not be significant, taking into account estimates of the costs of FTTH solutions and opportunities to reduce such costs via sharing of works. On the other hand, any costs should be compared with the expected benefits that such investment will provide to a developer in terms of increasing the value of the property or at least maintaining it in the increasingly competitive market for such properties.
51. There are a wide range of options available to developers in terms of the contribution to the deployment and operation of telecommunications infrastructure. Figure 6 shows different elements of the value chain for investment in telecommunications infrastructure. This illustrates the various levels at which developers can be involved. The most suitable option is dependent on the nature of a New Development, however in the sections below TRA provides its views on how an appropriate option could be selected and what contribution from a developer is expected. In any case it is highly advisable that the decision on an appropriate option is made at a planning stage for a New Development. This would maximise synergies with other infrastructure works as much as possible and allow coordination of the relevant timelines.

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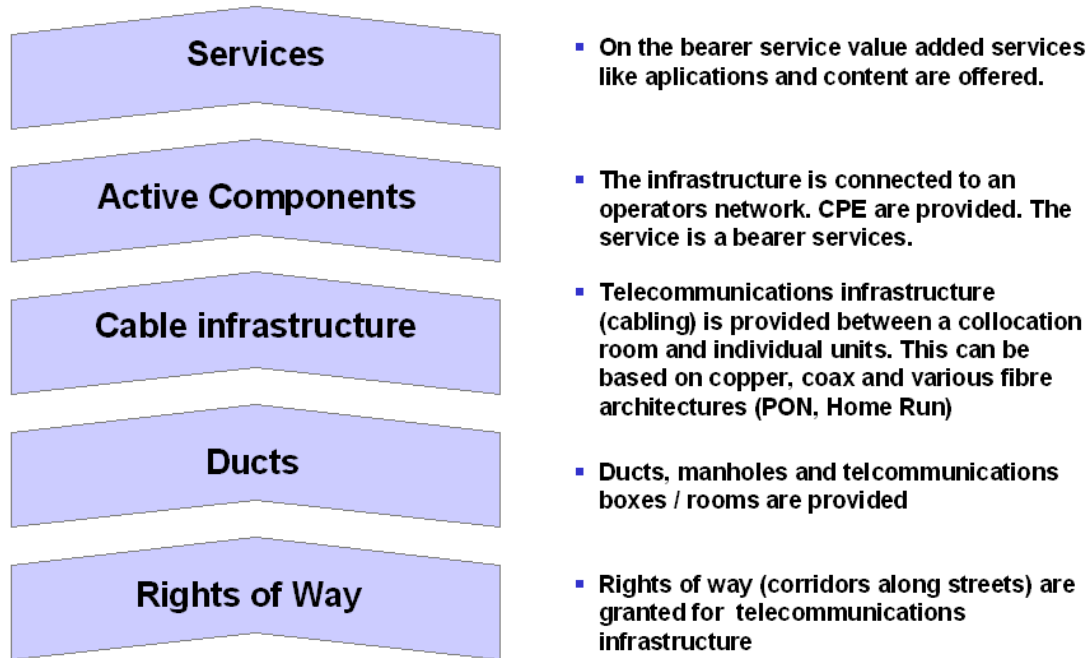


Figure 6. Value chain for investment in telecommunications infrastructure¹⁴

Specific Question 2: Do you agree with the estimates of cost proportions for different elements of deploying telecommunications infrastructures? Please elaborate. If available, please provide your own estimates.

5.1. Rights of Way

52. The minimum necessary involvement of any developer is providing appropriate rights of way for deployment of telecommunications infrastructure.
53. When implementing a New Development project, utility corridors are normally planned through such a development for all utilities and their providers. Such corridors are normally planned alongside the roads and usually accommodate water, electricity, gas, sewerage and other relevant services (e.g., district cooling may be included). Such corridors should be organised in accordance with the Standard Specifications for Building Works of the Ministry of Works and the current CPO Code of Practice. They should also accommodate the needs of telecommunications operators. Additional plots of land to accommodate necessary telecommunications infrastructure (such as exchanges as well as towers for wireless telecommunications) may also be needed¹⁵.

¹⁴ Source: Juconomy.

¹⁵ Developers may also chose to offer passive infrastructure upon which operators can place their aerials.

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Land corridors (or parts of them), together with additional plots of land allocated for telecommunications, represent the minimum possible involvement from a developer.

54. Developers should ensure that any licensed operator has equal access (right of way) to such allocated corridors and other plots of land for the purpose of deploying its infrastructure, e.g. ducts, sub-ducts, chambers, manholes as well as entry boxes to connect buildings as appropriate. Where necessary to connect specific buildings (or where dedicated corridors are not provided), access to land that has not been specifically allocated for telecommunications needs should also be provided.

5.2. Ducts

55. Ducts are the first level where an active involvement of a developer in the form of financing, construction and coordinating access to ducts is strongly encouraged by TRA.
56. Such infrastructure should be established according to the Guidelines for Telecommunications Infrastructure Deployment issued by TRA¹⁶. It will normally consist of a network of polyvinyl chloride (PVC) ducts, sub-ducts made from High Density Polyethylene (HDPE), concrete chambers and manholes as defined and specified in the Guidelines. Duct infrastructure should normally be designed for a lifetime of 20 years and above.
57. To minimise costs and optimise initial investment, the deployment of duct infrastructure can be performed at the same time as the deployment of other utilities and general infrastructure works. TRA also expects that operators, willing to install their own duct infrastructure, will at the same time be offered to share works with a developer thereby allowing further reduction of unit costs.
58. TRA also encourages ensuring that the duct infrastructure is future proof by installing sufficient duct capacity at the implementation stage of a New Development project. This will avoid (or minimise) future additional civil works on roads, pathways, gardens and buildings. The associated inconvenience for residents, owners and users of properties and the risks related to quality of the work, disturbance of the pre-installed infrastructure and reinstatement of the relevant surface, will be avoided to the maximum possible extent.
59. Duct infrastructure, deployed by a developer, will normally be used by all interested operators for deployment of fixed network and aggregation of mobile and other wireless telecommunications traffic. It is therefore important that a sufficient amount of spare duct capacity (supported by sub-ducting, where necessary) is deployed in order to avoid bottlenecks in future and ensure that a New Development could fully benefit from developing competition and evolution of technology.
60. It is of utmost importance that all licensed operators requesting access to duct infrastructure deployed by a developer have equal and fair access to such infrastructure

¹⁶ See footnote 4.

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without any discrimination between operators in terms of pricing and any conditions of use. Developers could consider charging for such ducts at a price lower than costs of installing them. Facilities management charges could also be used to cover costs of the infrastructure, provided they are applied in a competitively neutral manner. Such a policy could contribute to facilitating deployment of competitive telecommunications networks and services, promoting value added services and increasing the overall value of a New Development. Such a policy should be applied in a non-discriminatory manner to any market player.

61. In order not to restrict competition, the fact that a developer has installed a duct network cannot be used to restrict abilities of operators to deploy their own duct networks in such a New Development, where reasonable. This is true in particular where there is no spare duct capacity available for such operators to use or terms and conditions of using them are not satisfactory to these operators.

5.3. Cable Infrastructure

62. Another option, which requires greater involvement by developers, is the deployment of a passive optical network infrastructure (“dark” fibre), namely fibre optic cables, optical distribution frames and optical couplers. This option could be considered in addition to deploying duct infrastructure.
63. Installing a passive optical network infrastructure represents an increased level of complexity compared to the deployment of a simple duct infrastructure. However it does provide more guarantees that residents and businesses located on a specific New Development will have services as soon as they move to the development.
64. A developer may consider this option, if it is expected that connectivity will be needed by early buyers of the properties, but demand for telecommunications services is not certain enough to encourage telecommunications operators to invest themselves. Availability of passive fibre infrastructure could facilitate faster deployment of telecommunications networks by operators as it would remove one more element where infrastructure investment is needed. However, investment required to deploy passive optical infrastructure is relatively not as significant as initial investment to deploy a duct network. Therefore in most of the cases deployment of a passive optical network by a developer is not as essential to ensuring provision of telecommunications networks and services in a New Development as deployment of duct infrastructure is.
65. In case a developer decides to invest in “dark” fibre, a point-to-point architecture is likely to be preferable to a Passive Optical Network (“**PON**”) architecture as a point-to-point network may prove to be more future proof and support competition better.
66. A developer, who has chosen to deploy “dark” fibre, should be prepared to commit to maintain a continuing interest with regard to maintenance and operation of such a network. A team and the expertise should be in place to ensure that maintenance arrangements guarantee prompt recovery of the relevant services upon failure.

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67. Installing “dark” fibre and providing it to licensed operators does not require a developer to obtain a telecommunication license.
68. Passive optical network infrastructure should be made available to all licensed operators in a similar manner as duct infrastructure (i.e., on fair and non-discriminatory terms).
69. Implementation of passive optical network infrastructure should not restrict abilities of operators to choose other options to deploy their networks, including via access to rights-of-way and ducts.

5.4. In-Building Cabling

70. Having regard to limited spaces for telecommunications networks within buildings and substantial efficiency gains in sharing in-building cabling among multiple telecommunications operators, TRA considers that relevant developers should establish such cabling and make it available for operators to use.
71. Internal cabling based on copper is likely to have a limited lifetime and to become obsolete soon. Therefore, it is advisable to use fibre for in-building cabling¹⁷. In the absence of a clear technology choice a combo-cabling supporting both copper and fibre should be the preferred option.
72. In order to guarantee the ability of tenants of buildings (in particular high-rise ones) to effectively use wireless telecommunications services, relevant developers should install in-building infrastructure supporting coverage of such services (at least the most popular ones) inside the buildings. This should be implemented without discrimination of any wireless operator, providing a certain type of services.
73. TRA plans to issue a specific document, providing guidelines on the implementation of internal cabling in accordance with best practices for such exercises. These guidelines will also cover issues related to providing sufficiently large risers for cable deployment (copper and/or fibre), ducts and sub-ducts running to buildings from central points and other related arrangements.

5.5. Active Components and Services

74. Developers may consider investing in active components (“lit” fibre) and provision of wholesale and/or retail telecommunications services to operators and/or end users. However this option requires a developer to obtain one or several telecommunication licenses and introduces a high level of complexity associated with running of a telecommunications business. The provision of telecommunications services by a developer is clearly outside developers’ core business and the expertise required to offer

¹⁷ Such a requirement is also confirmed by the practice of some jurisdictions – e.g. the French Law on Economic Development makes it compulsory to deploy internal optical fibre cables in new buildings from 2010. Source: www.modernisationeconomie.fr.

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reliable telecommunications services is very different and not necessarily complementary to the core expertise of developers. It will also require a developer to be continuously involved in operating the telecommunication network and services, including necessary upgrades to equipment. Such an investment however may have some benefits in that it can be used for other services which the developer may be involved in such as building security and services. TRA would however envisage that the operation of a network would in any case most likely be outsourced due to such issues as economies of scale and availability of scarce resources.

75. Developers, who choose to deliver telecommunications services (either wholesale or retail), will naturally fall under the Telecommunications Law, general framework governing the telecommunications activities, and, in particular, licensing requirements.
76. Where a developer decides nonetheless to invest in active components and services, TRA will in particular pay attention that fair and effective competition is not restricted by the adopted model. The vertical integration poses potential competition concerns, especially where retail telecommunications services are provided by a developer. All operators should be afforded fair, reasonable and non-discriminatory treatment in accessing upstream elements of service provision (such as rights of way, ducts, "dark" fibre, wholesale services etc.). Terms and conditions for provision of services to other operators should be at least the same as the ones applied to the arm of a developer, responsible for providing telecommunications services.

Specific Question 3: Do you agree with the role of developers suggested, in particular if such a role should extend beyond deploying a duct network? Please elaborate.

6. Open Competition, Exclusivities and Similar Arrangements

77. The Telecommunications Law and other legal instruments apply to all New Developments in the same way as they apply throughout the Kingdom of Bahrain. Therefore consumers, who choose to live or work in such developments, should have all the rights granted by the legal and regulatory framework governing telecommunications and competition in provision of services in Bahrain.
78. Occupants of New Developments should have the right to choose their telecommunications supplier. TRA shall promote effective and fair competition with regard to provision of telecommunications services in New Developments to the same extent as in relation to any other part of Bahrain (article 3 (b)(2) of the Telecommunications Law). TRA does not consider that any "regulatory holidays" or similar forbearance-based regulatory policies are warranted as such policies would threaten to undermine operation of effective and fair competition.
79. Any exclusivity granted to any telecommunications operator in relation to operation of telecommunications networks or services in a New Development will generally be considered as an anti-competitive practice (article 65 of the Telecommunications Law). The same approach is likely to be applied to any other arrangements preventing or restricting fair and non-discriminatory access to New Developments, including access to

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buildings as well as space and infrastructure, needed to provide telecommunications networks and/or services.

80. Furthermore, a sole service provider operating under an exclusive arrangement with a developer may still face investment risks, including uncertainties in demand.
81. Further there are no real incentives for an exclusive operator to provide consumers with the latest telecommunications services at an optimised level of quality and at competitive pricing. By granting exclusivity, a developer implicitly accepts responsibility for the services provided by a single operator and faces risks that dissatisfaction with such services could lead to the general disappointment of occupants with such a development.
82. Developers might be tempted to think that the drawbacks of exclusivity may be remedied by agreements between developers and selected operators. However the nature of telecommunications markets (i.e., rapid technological and business development) makes it extremely difficult or impossible to draft complete agreements that could ensure continuous development of telecommunications infrastructure and services so that they constantly meet modern requirements of consumers. This is true even for comparably short periods of time.
83. TRA reserves a right to take actions against practices, agreements or other arrangements, which restrict competition, including contracts between developers and operators granting exclusivity.

7. Open Access

84. TRA recognises that the ability for any operator to invest in telecommunications infrastructure does not necessarily mean that multiple infrastructures will actually emerge. This is especially true in the initial stages of implementation of a specific New Development. Indeed the feasibility of investment even in one telecommunications infrastructure may be of concern. This is the reason why TRA has suggested the specific involvement of developers.
85. TRA believes that competition and consumer choice have to be ensured at the level, where alternative investments are feasible. TRA recognises the fact that this may depend on the nature of a specific New Development, on the stage of implementation of a New Development project as well as on other factors. TRA will support competition as far into the upstream level (as close to the full infrastructure competition) as possible.
86. In order to achieve the objective of promoting competition, TRA believes that it is important to provide open access to the bottleneck elements of telecommunications infrastructure and/or services in New Developments. Open access enables at least service based competition based on a single infrastructure. Moreover, it also provides flexibility to realise infrastructure competition, when appropriate conditions are established.

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87. Open access requirements mean that (please see Figure 7 for illustration of the expectations for investments in infrastructure and openness thereof):

- 87.1. utility corridors, sufficiently satisfying the telecommunications needs, as well as additional plots of land needed for telecommunications purposes should be made available in the land of New Developments;
- 87.2. rights of way should be granted in a fair and non discriminatory manner to any licensed operator to deploy ducts, cables, towers, masts and any other required infrastructure to provide telecommunications services;
- 87.3. when ducts are available (irrespective of who has deployed them, either a developer or a telecommunications operator), access should be made available to any licensed operator. This requirement is of utmost importance whenever a duct network is a bottleneck facility;
- 87.4. whenever ducts are deployed (regardless who deploys them), it should be ensured that sufficient duct space is installed with sufficient spare capacity for future competitive use¹⁸ (it is expected that, where necessary, this would be further supported by sub-ducting to facilitate sharing of ducts). This would mean that more than one operator can deploy its passive infrastructure. This would minimise the need for later opening of the roads and other finished surfaces;
- 87.5. when “dark” or “lit” fibre (or, indeed, other similar technologies) is available, appropriate wholesale services (rights of use, in case of “dark” fibre) should be made available to operators requesting such a service to deploy their overlay network. Whenever technically feasible, access to the “dark” fibre should be made available even if wholesale services over the “lit” fibre are offered. These requirements are of utmost importance whenever there is no competition on a particular level. TRA also expects that in-building cabling and associated facilities will always be available for shared use, irrespective of the technology used.

¹⁸ Currently TRA Guidelines for Telecommunications Infrastructure Deployment require that when deploying new ducts at least 20 per cent of the usable internal area in each duct section is reserved for the future use of other licensed operators than the one deploying the ducts.

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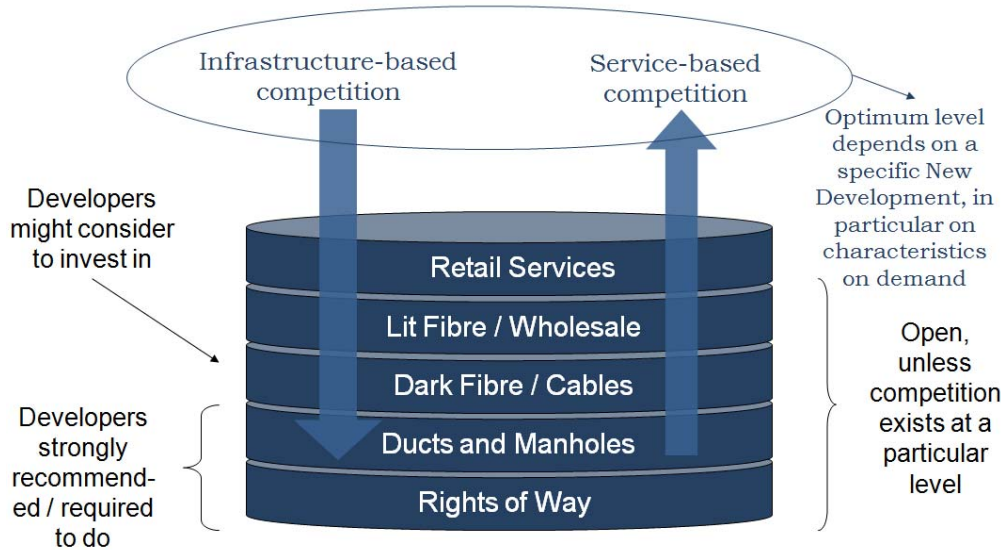


Figure 7. Levels of investment and openness of networks in New Developments

88. If required, TRA will intervene to ensure that no restriction applies at any of the identified layers, whenever such a layer constitutes a bottleneck, and that non discriminatory and fair access is granted to operators in accordance with the Telecommunications Law. Where needed, TRA will take appropriate measures to remove entry restrictions and/or strengthen competition.

Specific Question 4: What do you think is an appropriate level of regulation/encouragement in ensuring open access to telecommunications infrastructure and services in New Developments? Please elaborate.

8. Economic Regulation

89. One of the main elements of the implementation of the regulatory strategy outlined above is an appropriate economic regulation. Promoting competition in New Developments requires a pragmatic strategy to achieve regulatory objectives (i.e., open, effective and fair competition) in a cost and resource effective way.

90. Application of the general process for remedying market failures on a development by development basis (via the process of a case by case market analysis) is unlikely to be appropriate. Many New Developments for a considerable period of time may not present a market, which is mature enough to analyse or even to decide whether it constitutes a separate market. Furthermore many New Developments will represent a comparably small user base and territory and analysis of every one of them may result in a very inefficient use of TRA’s resources without any tangible benefits.

91. TRA does not consider that the general exclusion of New Developments from existing obligations, related to dominance and/or significant market power on a national basis, is

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reasonable. Such obligations should generally apply to infrastructure and services deployed and provided in New Developments to the same extent and on the same conditions as elsewhere. This does not mean, however, that dominance and/or significant market power based regulation could be automatically expanded to new services and/or markets, which are not provided and/or not regulated in relation to other parts of the Kingdom.

92. In some New Developments infrastructure may be operated by market players, which are not recognised as having dominance or significant market power on the national basis. In such cases appropriate measures will need to be taken to ensure that policy objectives, outlined in this Paper, are met by such players. TRA considers that the most appropriate measure is application of appropriate symmetrical regulation, based on the requirements of open access.
93. Based on the above TRA considers that developers and telecommunications operators should adhere to the symmetric open access requirements (i.e., requirements, which do not depend on finding dominance or significant market power). Such open access requirements are described above. For the sake of clarity TRA expects that everyone, who has network infrastructure and/or provides services in a New Development, would provide open access to such infrastructure, including ducts and “dark” fibre, and services, where:
- 93.1. there is only one such infrastructure; or
- 93.2. there is more than one infrastructure, but the owner of such infrastructure and/or possible provider of services is dominant in a relevant market. TRA considers that this should apply even without a specific determination or declaration from TRA on dominance, provided such dominance could reasonably be understood by a relevant party.
94. TRA also expects that the implementation of open access requirements will include the publication of non-discriminatory and fair terms and conditions so that all the interest parties could access such information. In case open access is provided by an integrated operator (i.e., the one which provides both – less competitive upstream elements and more competitive downstream ones), conditions of access should ensure that price-squeeze and any discrimination is avoided.
95. In all circumstances (i.e., irrespective of the number of infrastructures or existence of dominance) the ability to access (connect) to New Developments, including buildings, as well as to use roofs, telecommunications rooms and internal cabling in the buildings should be granted in a non-discriminatory, fair and reasonable manner.
96. Notwithstanding the above, TRA may, where appropriate, decide to evaluate whether a specific New Development constitutes a separate market and, if so, analyse it

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according to the Telecommunications Law and relevant instruments of TRA¹⁹. Such an analysis may lead to the imposition of *ex ante* obligations upon an operator, if considered required to remedy specific market failures. It could also result in exempting an operator, enjoying a position of dominance or significant market power elsewhere, from the implementation of such obligations in relation to a specific New Development. Thus the regulatory strategy outlined in this Paper should be considered to complement rather than substitute general *ex ante* pro-competitive regulation.

97. TRA expects that its regulatory objectives in relation to New Developments will, to a large extent, be achieved by voluntary market outcomes. In most cases if the position outlined by TRA in this Paper is followed then it should result in the promotion of an economically efficient competitive environment with consumer choice.
98. However it may be that in some cases individual regulatory/enforcement actions will be necessary. This will in particular be the case, where parties concerned are not able to agree on conditions of access to the relevant telecommunications infrastructure and services. Such actions of TRA could take a form of enforcement of licence conditions as well as *ex ante* and *ex post* measures.

Implementation of the Economic Regulation

99. In order to ensure legal clarity for telecommunications operators, TRA, as part of the process to introduce unified licensing, plans to amend telecommunications licences to explicitly include open access obligations.
100. If necessary (in particular until licences are amended or whenever their provisions need to be supplemented by additional actions) TRA may resort to enforcement of the Telecommunications Law in the light of the position outlined in this Paper using powers of articles 61 (symmetric powers) and/or 65 (*ex post* powers) of the Telecommunications Law as well as consider the possibility of imposing obligations under article 57 of the Telecommunications Law (*ex ante* powers).
101. Where parties involved are not licensed telecommunications operators, the Telecommunications Law in the light of this Paper could be enforced using the powers of articles 61 and 65 of the Telecommunications Law. Such enforcement may also include access to “dark” fibre and other facilities.

¹⁹ See TRA’s Determination 1 of 2003 on the Methodology for Definition of Telecommunications Markets at http://www.tra.org.bh/en/pdf/methodology_for_the_definition_of_telecommunications_markets_eru_de_003_v1.0_PDF.pdf; and TRA’s Determination 2 of 2003 on the Methodology for Determining Dominance and Significant Market Power at http://www.tra.org.bh/en/pdf/methodology_for_determining_market_power_eru_de_002_v1.0_23May2006.pdf.

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102. If decided appropriate, TRA may also issue a regulation under article 65 (h) of Telecommunications Law to further strengthen enforcement of the position outlined.

103. TRA also plans to impose and/or suggest imposing conditions, supporting the requirements of this Paper, through the system of approval of planning permissions and wayleaves, operated by CPO, and/or municipal approval process, operated by MOSS (anticipated to be completed in 2010).

104. Where required to provide more clarity to the parties as well as guide and facilitate their negotiations, TRA may consider establishing cost models for ducts, “dark” fibre, bitstream over the “lit” fibre and similar facilities.

9. Technical Regulation

105. TRA has established TTO as an internal unit responsible for validating the conditions stipulated by articles 59 and 61 of the Telecommunications Law and to enable public telecommunications network operators to construct, develop and maintain their networks in public and private properties.

106. TTO activities are governed by the TRA’s Guidelines for Telecommunications Infrastructure Deployment²⁰. These Guidelines are also applicable to telecommunications infrastructure deployed in New Developments. Rights of way, based on articles 59 and 61 of the Telecommunications Law, will be granted by TRA without any exclusivity.

107. As mentioned above, TRA’s Guidelines for Telecommunications Infrastructure Deployment include a requirement to ensure that sufficient amount of spare capacity in ducts is deployed. The Guidelines further require that whenever ducts are deployed, eligible telecommunications operators are offered to share the works and costs. These requirements will also be applied to New Developments.

108. TRA further plans to issue guidelines on in-building cabling and associated facilities that will be fed into the municipal approval system operated by MOSS and will also apply to buildings, constituting New Developments or built on them (anticipated to be completed in 2010).

109. TRA also plans to facilitate the introduction of specific approval requirements into the approval systems operated by MOSS and CPO to support the policy outlined in this Paper (anticipated to be completed in 2010). Such rules may include requirements to:

109.1. deploy adequate ducts and manholes when implementing a New Development project;

²⁰ See footnote 4.

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- 109.2. deploy adequate internal cabling and other facilities for internal telecommunications networks in buildings together with providing adequate telecommunications rooms. Such requirements may include rules necessary to support in-building coverage of wireless networks;
- 109.3. ensure access to New Developments, including buildings constituting such developments or built on them, on fair, reasonable and non-discriminatory basis.
110. As per the rules of the Guidelines for Telecommunications Infrastructure Deployment, TTO facilitates the coordination of telecommunications infrastructure deployment and sharing of related works among telecommunications operators. TRA considers that this function is relevant in the case of deployment of networks in New Developments as well and will apply the same procedures with regard to them.
111. It is planned that TTO will further support operators and developers in coordinating their relations (some of the related functions are already being implemented; they will be further expanded by the end of 2010), including by:
- 111.1. publishing information on New Developments and thereby providing operators with access to their plans. Such provision of information will facilitate better information and choice to developers in deciding on their options for telecommunications infrastructure as well as provide more opportunities to all the market players (not only those privileged to access such an information);
- 111.2. publishing and otherwise providing information on space on roofs, towers, telecommunications rooms and other common areas;
- 111.3. providing information to developers regarding technical requirements and processes for deploying telecommunications infrastructure;
- 111.4. facilitating consultations between developers and operators related to access facilities, internal cabling, telecommunications rooms specifications and similar issues.
112. TRA also considers it important that the possibility to deploy nation-wide wireless networks is not hindered with respect to New Developments. Operators of such networks should be able to install relevant facilities to provide coverage to New Developments. Where necessary, TRA may use powers of article 61 of the Telecommunications Law to enforce such a requirement.

10. Connecting New Developments

113. While it is important to ensure competition and choice of telecommunications services within New Developments, TRA also understands the need for operators to be able to connect their networks deployed in New Developments to their main backbone facilities.

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114. Depending on the location of a New Development, the investment required to build the connecting backbone/backhaul network can be significant.
115. TRA is however of the opinion that traditional regulatory policies and instruments in most cases are appropriate and sufficient to facilitate the connection of networks deployed in New Developments to operators' backbone. These traditional instruments include:
- 115.1. enabling alternative infrastructure deployment via rights of way to public property and facilitating it through joint works. This is achieved according to the rules set out in the TRA's Guidelines for Telecommunications Infrastructure Deployment, administered by TTO;
 - 115.2. duct sharing, both under the wholesale regulation (article 57 of the Telecommunications Law and the Reference Offer of Batelco²¹) and, where necessary, under article 61 of the Telecommunications Law;
 - 115.3. wholesale services available and regulated under article 57 of the Telecommunications Law and the Batelco's Reference Offer, such as local leased circuits.

²¹ <http://www.batelco.com.bh/reference.asp>.

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List of Acronyms

ARCEP	Autorité de Régulation des Communications Électroniques et des Postes (Electronic Communications and Posts Regulatory Authority of the Republic of France)
ComReg	Commission for Communications Regulation (of the Republic of Ireland)
CPO	Central Planning Office (of the Ministry of Works)
FTTH	Fibre-to-the-Home
MOSS	Municipal One Stop Shop
OECD	Organisation for Economic Co-operation and Development
Ofcom	Office of Communications (of the United Kingdom)
PON	Passive Optical Network
TRA	Telecommunications Regulatory Authority of the Kingdom of Bahrain
TTO	Telecommunications Technical Office (of TRA)