Report on the Development of

Regulations and Guidelines on Sharing Passive Communications Infrastructure in Botswana

Prepared by

ICT Consultants (Pty) Ltd

For The

The Botswana Telecommunications Authority

In the

Republic of Botswana

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1 Introduction

The Ministry of Transport and Communications (MTC) and the Botswana Telecommunications Authority (BTA) intend to develop a policy and regulatory framework for sharing of passive communications infrastructure in the country. BTA and MTC are of the view that sharing of infrastructure will enhance the provision of communications services by amongst others lowering the cost of communication services for consumers; and minimise the negative environmental impact caused by development of communications infrastructure in Botswana.

ICT Consultants (Pty) LTD (hereinafter "the Consultants" or "ICT") have been engaged to carry out a study to inform the development of the appropriate policy and regulatory framework.

1.1 Summary of the Terms of Reference

The key terms of reference are:

a. To review BTA's Draft Concept Paper on sharing of communications infrastructure.
b. To review the current regulations and legislation as they relate to sharing of communications infrastructure.
c. Develop Technical Guidelines and Regulations that will facilitate sharing of communications infrastructure.
d. To develop recommendations for policy and regulatory framework in respect of communication infrastructure sharing

This Report is the outcome of the consultancy study. It has three annexes which appear as separate documents. These are:

- The Draft Guidelines for Sharing of Passive Communications Infrastructure (Draft Guidelines) – Annex 1;
- The Consultative Response Document – Annex 2; and
- The BTA Concept Paper on Infrastructure Sharing – Annex 3.

1.2 Project implementation and consultation process

The implementation of this project consisted of the following activities:

a. Collection and review of existing policies, legislation and regulatory guidelines.
b. Collection and reviewing of existing licences for communications operators.
c. Interviewing key stakeholders.
d. Preparing a consultation document with preliminary findings, views and recommendations.

e. Circulating the consultation document to stakeholders and presenting same at a workshop.
f. Reviewing written submissions and feedback from the workshop and using this information to prepare the final project report.

The project cuts across many sectors. Accordingly, there are many stakeholders who had an input into it. The most difficult aspect of the whole project has been the scheduling of interviews with stakeholders. This difficulty, notwithstanding, the Consultants were able to interview the following stakeholders:

a. Botswana Telecommunications Corporation on the 20th July 2010.
b. Botswana Police Service – on the 25th August 2010.
c. Botswana Power Corporation – on 30th August 2010.
d. The Department of Environmental Affairs – on 2nd September 2010.
e. Water Utilities Corporation – on 8th September 2010.
f. Orange Botswana (Pty) Ltd – on 9th September 2010.
g. Kgatleng Land Board – on 14th September 2010.
h. Ministry of Transport and Communications – on 16th September 2010.
i. Tlokweng Land Board – on 20th September 2010.
j. Kweneng Land Board – on 23rd September 2010.
k. Kweneng District Council – on 23rd September 2010.
l. Department of Town and Regional Planning – on 18th October 2010.
m. Mascom Wireless (Pty) Ltd – on 22nd October 2010.
n. Office of the President – on 11th November 2010.

There were many stakeholders that could not be interviewed due to unavailability of key personnel, conflicting engagements, etc. Oral interviews were complemented by written submissions. However, only a few interviewees made written submissions. This limitation in the consultation process was, however, mitigated by the stakeholders' consultative workshop as well as the option given to stakeholders prior and posts the stakeholders' workshop to make written submissions.

1.3 Meaning of Communications infrastructure sharing

Communications infrastructure refers to facilities such as communications towers, equipment shelters, cable ducts, communications equipment and other similar facilities. Communications infrastructure sharing refers to the sharing of these facilities. In general, communications infrastructure is of two types. It is either passive or active infrastructure.

1.3.1 Passive communications infrastructure

Passive communications infrastructure refers to infrastructure that does not include electronic devices. Examples of passive infrastructure include communications towers, equipment shelters, communications cables, cable ducts, antennas and other similar communications facilities and devices.

1.3.2 Active Infrastructure

Active communications infrastructure refers to facilities with some electronic devices or equipment such as transceivers, transmitters, receivers, etc. As per the Terms of Reference, the focus of this project is on sharing of passive communications infrastructure. Thus henceforth reference to infrastructure shall mean passive infrastructure, unless stated otherwise.

1.4 General Benefits and Challenges for Infrastructure sharing

There are many benefits that could accrue to operators, consumers, local authorities, the environment and the general public on account of operators sharing their passive infrastructure. The following are just a few examples:

a. Operators can reduce their capital expenditures by sharing their infrastructure. Instead of each operator constructing its own infrastructure, operators could reduce their cost by either jointly constructing infrastructure or leasing their existing infrastructure to others so as to defray the sunk costs.

b. Higher projects costs lead to higher usage costs. Thus sharing infrastructure lowers the infrastructure development costs which should lead to lower usage charges for consumers.

c. The development of most communications infrastructure is generally preceded by seeking approvals from local authorities and regulatory bodies. Sharing infrastructure will thus reduce repeated requests for various approvals from these bodies. This will relieve these authorities from dealing with multiple requests for approvals in the same general area. This in turn will lead to quicker provision of services and thus accelerate the overall development of the country.

d. Shared use of communications infrastructure has the potential to reduce the negative impacts of infrastructure development on the environment that results from multiple constructions of similar facilities in the same area. In fact we gathered from the data collection and stakeholder interview exercises that some widely used infrastructure sharing practices such as mobile site sharing were designed to address environmental and local planning constraints.

Thus the shared use of communications infrastructure may have benefits for all stakeholders and the national economy. While we have summarized the general potential benefits of infrastructure sharing, it should be understood that our terms of reference do not require us to rationalize and or motivate the case for infrastructure sharing. The terms of reference clearly indicates that the policy to introduce passive communications infrastructure sharing has been taken. Overall, we are required to develop the regulatory and legal

framework for the implementation of infrastructure sharing in the country. It has therefore not been necessary, for example, to consider the general debate around infrastructure sharing versus infrastructure competition. It suffices to say that given the structure and nature of the Botswana economy in general and communications market in particularly it is unlikely that infrastructure competition would yield the required results. It is instructive in this regard to note that some Government initiatives such as Nteletsa II, through which Government provided subsidy to PTOs to expand into rural areas is a direct acceptance of the limitation of the infrastructure competition thesis in the context of Botswana.

A number of our findings and or recommendations would require cooperation of diverse agencies of Government for their implementation. In some cases the BTA and or the MTC may not have the competency in law to deal with an issue that we have made a specific recommendation on. The nature of the study itself was cross cutting. It was therefore inevitable that some of recommendations would require cooperation with other Government bodies for their implementation. Others may wholly fall outside the jurisdiction of the BTA. This fact did not escape the stakeholders as some of them raised the issue and felt that if BTA was to implement some of recommendations it would be intruding in the jurisdiction of other agencies of Government. It has been felt for example that environmental and planning issues by law fall within the jurisdiction of agencies other than the BTA.

Our approach to the project was that this is a Government Project. Accordingly, its implementation would require the cooperation of different agencies of Government. We believe that BTA would coordinate with other agencies when considering the implementation phase of this Report. We have nevertheless to the extent possible worded the proposed implementation tools (proposed guidelines) in a manner that would make inter agency cooperation possible. In some cases BTA may be minded to refer our recommendation to the appropriate and relevant agency for consideration. The proposed guidelines to the extent possible address issues falling directly under the jurisdiction of the BTA and or MTC.

1.5 General Overview of existing national communications infrastructure

The existing communications infrastructure in Botswana can be divided into that which is owned by licensed communications operators and that which is owned by private communications operators. Licensed operators are authorised either by the BTA or the National Broadcasting Board to provide communication services to the general public. The types of licences that the BTA may grant are discussed in Section 6 of this Report.

Private network operators do not need a Service Licence to operate their communications infrastructure for own use, if such systems “operate within a single area of their property and are independent of the public system” [see in this regard section 27(2) (a) of the Telecommunications Act,

[CAP.72:03].In all other cases, private telecommunications networks require a Service Licence and a System Licence. In addition, all operators that own radio systems require a Radio Licence. Some private network operators such as the Botswana Police Service and the Botswana Defence Force are exempted from licensing in terms of section 27(3) of the Telecommunications Act.

Private network operators own and operate communications infrastructure for purposed of their own internal communications systems. There are many private network operators. The ones that own large nationwide infrastructure include Botswana Power Corporation (BPC), Water Utilities Corporation (WUC) and the Botswana Police Service (BPS

Licensed operators include Botswana Telecommunication Corporation (BTC), Mascom Wireless Botswana (Pty) Ltd (Mascom), Orange Botswana (Orange), Value Added Network Operators, the Broadcasting Operators, etc.

1.5.1 Botswana Telecommunications Corporation's Infrastructure

BTC's infrastructure consists of practically all types of infrastructure associated with major telecommunications operators. Its infrastructure is found practically in all major villages, towns and centres. It consists of different combinations of:

a. Equipment Sites.
b. National and regional fibre optic cable rings.
c. National and regional cable ducts.
d. Telecommunications towers.

Figure 1 shows BTC's fibre optic cable network.

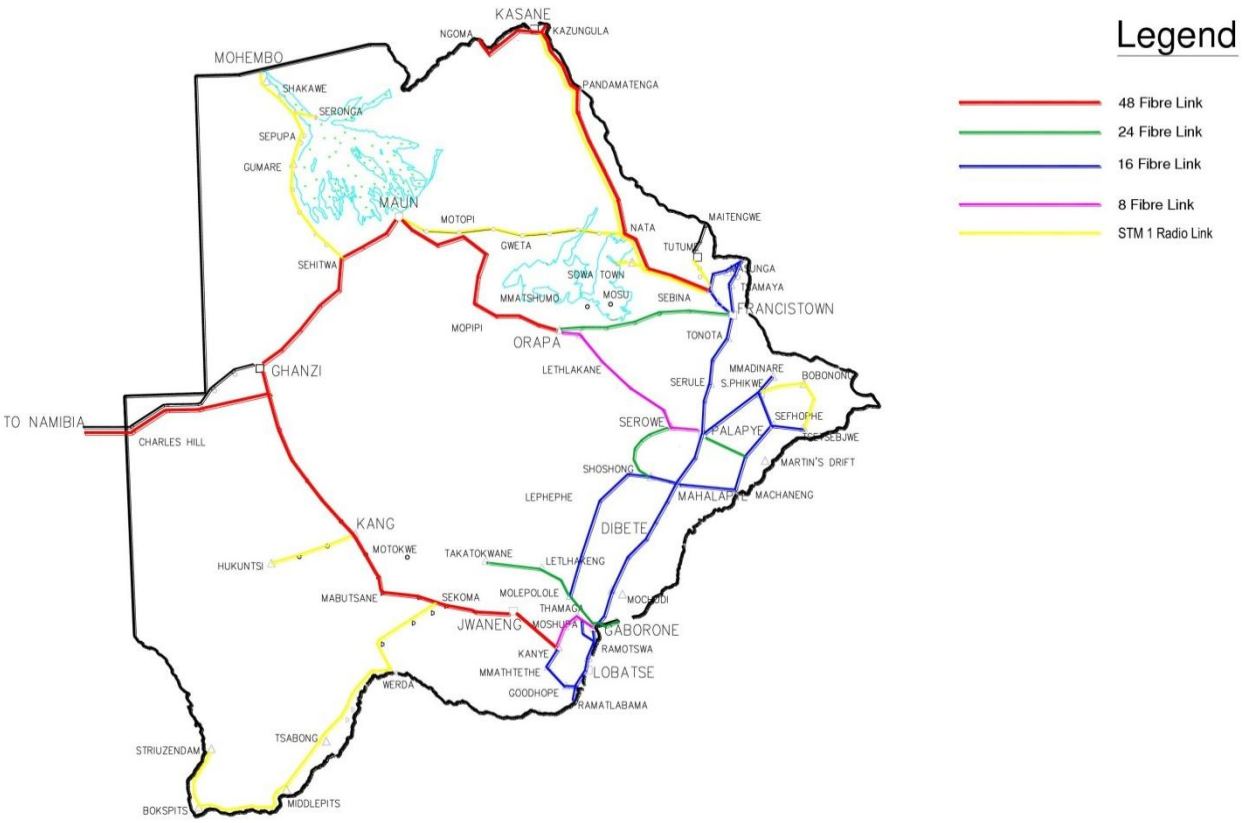

Figure 1: BTC's National Infrastructure (Source: "BTC")

1.5.2 Mascom Wireless' Infrastructure

Mascom has a national infrastructure which consists of base station sites and towers.

1.5.3 Orange's Infrastructure

Orange has a national infrastructure which consists of base station sites and towers.

1.5.4 The Department of Broadcasting Services' Infrastructure

The Department of Broadcasting Service (DBS) owns broadcasting towers that are located in or near most of the major villages, towns and centres. The towers are used for FM and television transmitters.

1.5.5 Botswana Power Corporation's infrastructure

Figure 2 shows BPC's fibre optic cable network. The network is currently used for transmitting supervisory control and data acquisition (SCADA) for BPC's power network and internal communications.

1.5.6 Water Utilities Corporation's Infrastructure

Water Utilities Corporation (WUC) operates a fibre optic cable which was jointly installed with BTC. The cable runs from Palapye to Letsibogo Dam near Mmadinare.

WUC and the Government plan to install a fibre optic cable between Gaborone and Dikgathong Dam. The cable will be used for transmitting SCADA for the water pumping system.

1.5.7 Botswana Police Service's Infrastructure

The Botswana Police Service owns a number of towers that are used for its private communications system. Many of these are shared with Public Telecommunications Operators (PTOs).

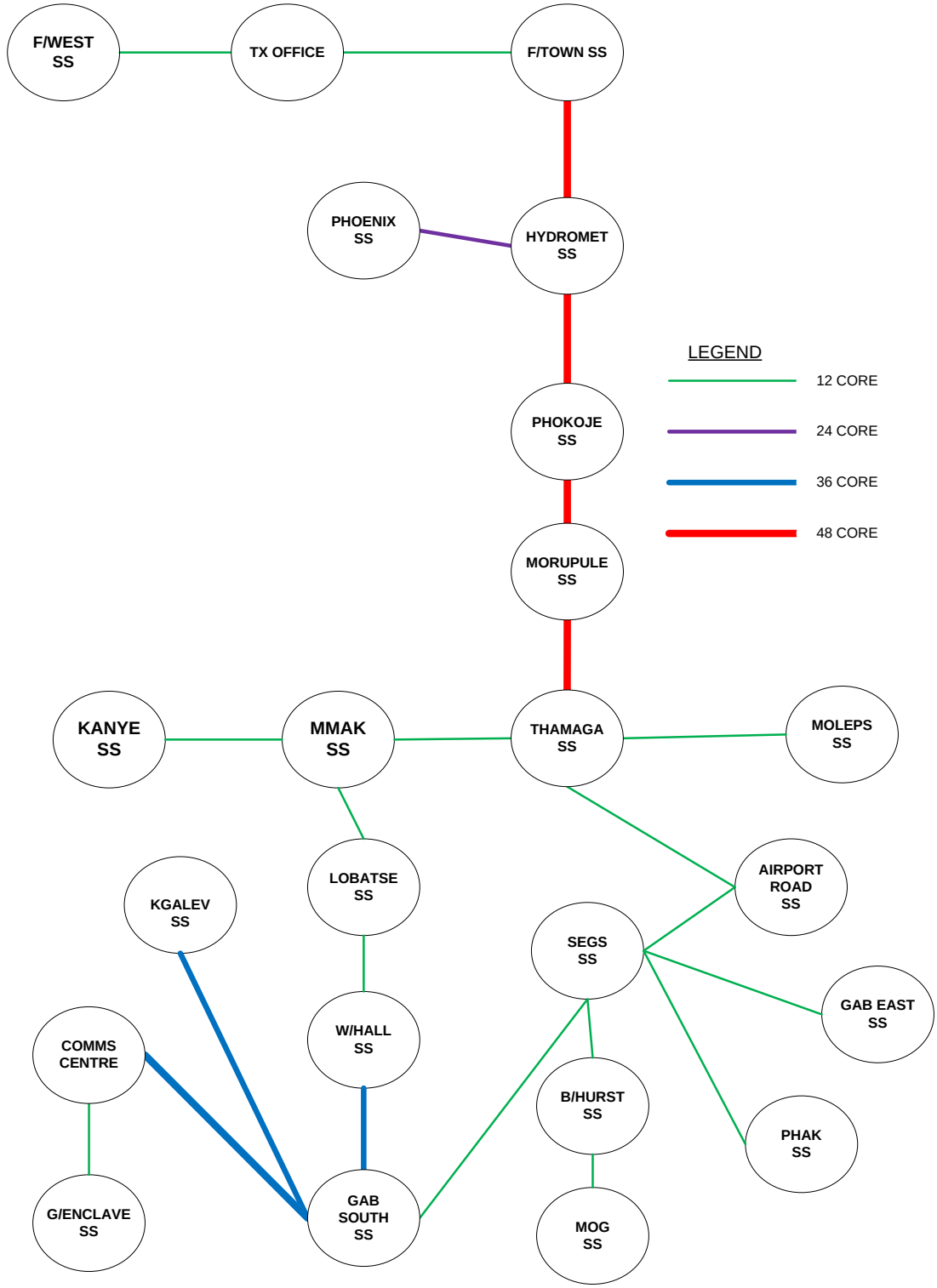

Figure 2: BPC's Fibre Network (Source: "BPC")

1.6 Current Regulatory Framework on infrastructure sharing in Botswana

There is currently no specific regulatory or policy framework related to infrastructure sharing in Botswana. However the following official documents encourage the shared use of communications infrastructure.

1.6.1 Telecommunications Policy, 1995

Section 8.4 of the policy states as follows:

> "*The existing telecommunications infrastructure has been developed by and is presently operated by BTC. In a free and open telecommunication market anyone who wants to make use of that infrastructure should be able to do so".*

In relation to BTC's infrastructure, the Telecommunications Policy supports the shared use of infrastructure. The Policy does not say much about communications infrastructure owned by other operators. This is understandable because at the time of the promulgation of the Policy, BTC was the sole provider (albeit publicly owned) of telecommunications services to the public. It therefore could potentially stifle the introduction of competition, which is one of the key goals of the Telecommunications Policy, 1995, by denying new market entrants access to its infrastructure. Be that as it may, the Telecommunications Policy, 1995 anticipated that BTC would be the only operator obligated to share its infrastructure with other operators.

1.6.2 Telecommunications Act [CAP. 72:03]

We review the Telecommunications Act in detail in section 6 of this Report. It suffices for now to state that the express provision in the Telecommunications Policy, 1995 regarding telecommunications infrastructure sharing did not find its way into the Telecommunications Act of 1996, at least in express terms.

1.6.3 National ICT Policy (Maitlamo)

Maitlamo envisages the development of high quality broadband infrastructure through public-private partnerships (PPP). While Maitlamo does not purport to revoke or replace the Telecommunications Policy of 1995, it certainly attempts to coordinate and integrate all initiatives related to information communications technologies into a common direction. To this extent, Maitlamo is thus a broader initiative that incorporates all aspects of ICTs beyond telecommunications. It has the following main policy goals.

- Creation of an enabling environment for the growth of ICT in the country.
- Provision of universal service and access to information and communication facilities in the country.

- Making Botswana a regional ICT Hub.

Maitlamo national goals include the need for Botswana to have an 'efficient and cost-effective ICT infrastructure." It outlines a series of initiatives aimed at developing and strengthening Botswana's communications infrastructure so that it can support the various programmes and projects that feature on it. Maitlamo does not, however, make any specific reference to communications infrastructure sharing. It is our considered opinion though that the Policy does anticipate that communications infrastructure sharing would be one of the strategies to achieve Government policy objectives on ICTs. In particular, it sets out the goal for universal access to information and communications facilities and infrastructure. Communications infrastructure sharing is one of the enablers for achieving universal service and access. That is, while there is no specific discussion as regards infrastructure sharing in Maitlamo, the Policy initiative, without doubt, anticipates the promotion of the shared use of communications infrastructure in the country.

1.6.4 Broadcasting Act 1998 and Draft Broadcasting Policy 2004

The Broadcasting Act of 1998 does not make any reference to infrastructure sharing. In contrast, Section 6.2 of the Draft Broadcasting Policy of 2004 states as follows:

> "*The transmission section of the Department of Broadcasting Services should either be privatised or turned into a parastatal independent from government and under public control. Such an enterprise could sustain itself by offering transmission services to public and private broadcasters as well as community radios (if they go beyond low power transmission).*
>
> *A signal distribution system will be put in place which is independent, efficient, cost effective and conducive to the development of broadcasting in Botswana, and one which gives universal access to all operators".*

The Draft Broadcasting Policy thus contemplates the establishment of a signal distributor that would provide shared infrastructure to distribute and transmit content from public, private and community broadcasters. In addition to the potential benefits of communications infrastructure sharing discussed in Section 1.4 of this Report, the shared use of broadcasting infrastructure would ensure that the whole country has access to the same broadcasting services. Currently only services delivered by the Department of Broadcasting Services reach most of the villages in the rural areas while service by private broadcasters are mainly limited to cities, towns and major villages.

It is not clear when and if the Draft Broadcasting Policy, 2004 would be adopted by Government. The Assistant Minister for Presidential Affairs and Public Administration recently told Parliament that the draft Broadcasting Policy of 2004 needs to be "revised and updated" but could not give timeframes for this exercise(refer to the Daily News of Wednesday 8th December 2010). Thus at the moment, there is neither a legal nor policy basis for infrastructure sharing with respect to broadcasting infrastructure.

In our opinion the approach taken by the Draft Broadcasting Policy, 2004 with regard to the proposal for the establishment of a signal distributor that would provide shared infrastructure to distribute and transmit content from public, private and community broadcasters is the preferred option. This approach is consistent with the emerging best practice particularly as part of the transition to digital broadcasting. A number of countries in Africa have already adopted this route. These include, but are not limited, to the following;

- Kenya
- Uganda
- Namibia
- South Africa

The details of the nature, operations and or licensing requirements for a signal distributor for digital terrestrial television broadcasting services differ from country to country. Such details are beyond the scope of this Project. It suffices to state that in general three possible options can be considered. These are:

(a) Option 1: In which one digital multiplexer (Multiplex 1) will be operated by the public broadcaster (say for example the Department of Broadcasting Services). This multiplex could also carry programmes for Community Television Broadcasters.

(b) Option 2: In which one digital multiplexer (Multiplex 2) will be jointly operated by commercial broadcasters to carry content from all commercial broadcasters.

(c) Option 3: Considering the high capital and operating cost of rolling out and operating the digital broadcasting infrastructure, it may not be feasible for the private sector to rollout the infrastructure for Multiplex 2 (Option 2). On the other hand, the Department of Broadcasting Service may not be able to use all capacity that will be available on its infrastructure following digitalization. Accordingly, the Department of Broadcasting Services and or the contemplated signal distributor in the Draft Broadcasting Policy, 2004 could be licensed to carry content for all broadcasters in the country. Some countries such have made it mandatory for all broadcasters to have their content transmitted by the designated signal distributor. As part of its digital migration strategy, Botswana would have to address this issue.

Whichever of the above option is adopted, it would be crucial for the BTA and or MTC to consider developing appropriate licensing framework as part of the transition to digital broadcasting. In particular, it is crucial to have appropriate licence conditions for the signal distributor.

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Recommendation 1:

1.1 *We recommend that Government finalize the process of, revising and/ or updating of the Draft Broadcasting Policy, 2004 so as to give a policy direction on the subject of infrastructure sharing in the broadcasting sector. In particular, we recommend that the principle contained in clause 6.2 of the Draft Broadcasting Policy, 2004 be adopted as a policy position going forward.*

1.2 *BTA and or the MTC should consider developing a licensing framework to encourage broadcasting infrastructure sharing under a digital environment.*

1.6.5 Initial Licences for Public Telecommunications Operators

The Telecommunications Act 1996 abolished BTC's monopoly in the provision of telecommunications services. It established the BTA as the regulator with the powers to license and regulates the provision of telecommunications services in the country.

BTA licensed BTC, Mascom Wireless Botswana (Mascom) and Orange (then VISTA) as PTOs in 1998. Initially Mascom and Orange were restricted to providing mobile services only and had to rely on BTC for transmission links for backhauling their traffic from base stations to their mobile switching centres. These could be lifted on a case-by-case basis subject to the two mobile operators demonstrating that BTC could not provide them with links.

Each operator's initial licence had a mandatory condition on infrastructure sharing subject to commercial agreement and technical capability of the specific infrastructure. All operators had a right to appeal a dispute with another operator on any matter, including infrastructure, to the BTA.

Mascom and Orange's licences had the following clauses that dealt with environmental impact, public safety and infrastructure sharing:

17.1 In the design, construction operation and maintenance of the Public Land Mobile Network (PLMN), the Licensee shall use its

best endeavours to minimise and limit any detrimental or negative impact of its activities on the environment.

17.2 The licensee shall not commence with the construction of any GSM site without submitting a comprehensive Environmental Impact Assessment Report in respect of such site at least 7 (seven) days prior to such commencement indicating the Licensee's compliance with clause 17.1 above, but excluding GSM sites based on existing infrastructure.

17.4 In the design, construction, operation and maintenance of the PLMN, the Licensee shall ensure that the safety of the public is given maximum priority.

19.3 The Licensee shall use its best endeavours to share infrastructure facilities of the PLMN with any other Operator, unless such sharing would interfere with or materially restrict the Licensee's ability to exploit the network capacity at its disposal in its own operation.

While BTC's licence did not have similar clauses, in practice the requirement for shared infrastructure was applied equally to BTC. Thus BTA took responsibility for imposing licence conditions in respect of:

a. Requirements for operators to share infrastructure.

b. Requirements for operators to undertake EIA studies. It should be noted that this was before the advent of the Environmental Impact Assessment Act of 2005 (EIA Act).

c. Requirements for operators to take public safety into account during the construction of their telecommunications infrastructure. Incidentally this licence provision anticipated issues such as alleged impact of radiation on the users of mobile phones and people in the vicinity of base stations.

1.7 Further liberalisation of the telecommunications sector

In 2006, the then Ministry of Communications Science and Technology (MCST), the predecessor ministry to the current MTC, embarked on a consultation process with BTA, telecommunications operators, internet service providers and other stakeholders with a view to introducing reforms in the communications sector. On the 21st June 2006, the Minister of Communications, Science and Technology issued a policy statement on further liberalisation of the telecommunications sector which had the schedule in Table 1 below:

Table 1: Summary of the Policy Statement on further liberalisation

No.	Activity	Time	Comment
1.	Lift the restriction on the provision of VoIP by value-added network service providers.	1 August 2006	*"Lift the restriction on the provision of VoIP by value-added network service providers" means allowing Voice over Internet Protocol to be provided by Internet Service Providers (ISP). This is equivalent to issuing voice licenses to ISPs at national and international level, the market currently serviced by BTC, Mascom and Orange only.*
2.	Mobile operators start self-providing (transmission links)	1 August 2006	*"Mobile operators start self-providing (transmission links)" means allowing Mascom and Orange to build their own backbone infrastructure to carry their traffic. Currently they are compelled to use the BTC infrastructure.*
3.	Current fixed line and cellular operators may apply for service-neutral licenses.	1 September 2006	*"Service Neutral Licenses" are those licenses that allow an operator to provide all telecommunications services including voice, data, and irrespective of whether the service is transmitted wirelessly or on a wire.*
4.	New entrants may tender for service-neutral rural/ district level licenses	1 September 2006	*See above*
5.	Liberalisation of the international voice gateway	1 October 2006	*"Liberalisation of the International voice gateway" means allowing other players to provide international switching and transmission of voice services, the market that is currently a monopoly to BTC.*
6.	BTC attains a satisfactory level of tariff rebalancing	December 2007	*"BTC attains a satisfactory level of tariff rebalancing" means allowing BTC to significantly complete their on-going exercise of adjustment of their tariffs to align them with costs.*
7.	New entrants may tender for service-neutral national licenses	December 2009	*See above explanation of "service-neutral licenses".*

Some people incorrectly interpreted item 2 as relieving BTC of the obligation to backhaul traffic from the two mobile operators. In fact Item 2 meant that the two mobile operators were no longer obligated to lease capacity from BTC. However, the obligation on all operators to share infrastructure and to carry each other's traffic, if requested, remained.

We note that the obligation on all major public telecommunications operators to interconnect their networks, carry each other's traffic and to share infrastructure subject to commercial and technical feasibility is a standard international practice.

1.7.1 Issuance of Service Neutral Licences

Subsequent to the issuance of the Policy Statement on Further Liberalisation, BTA issued Service Neutral Licences to BTC, Mascom and Orange in 2007. These licences removed all restriction in respect of the type of services that these operators could provide and the types of technologies that they could use to deliver services. BTC took advantage of the Service Neutral licence t to provide mobiles services using the be-Mobile trade name.

Obligations relating to requirements for infrastructure sharing, the requirements to undertake EIA studies and the need to ensure public safety during the construction and operation of networks were not included in the Service Neutral Licences. By then the Environmental Impact Assessment (EIA Act), 2005 was in force. Operators were thus required to undertake the EIA studies and submit their reports to the Department of Environmental Affairs (DEA) in the Ministry of Environment, Wildlife and Tourism under the said Act. The omission of the requirements for the EIAs in the service neutral licences did not, therefore, have any serious practical consequences with regard to the need to preserve the environment in the construction and operation of communications networks.

It is not clear why the requirement for infrastructure sharing was omitted in service neutral licences. In our opinion, the licence condition on infrastructure sharing ought to have been retained in service neutral licences for BTC, Mascom and Orange.

Consideration should be given to requiring operators to have regard to public health and safety in the construction of infrastructure and provision of service. This would in part address the growing public concern about the alleged negative impact of radiation emanating from towers and mobiles phones on the health of users of mobile phones and the public in general. It goes without saying that the enforcement of such a condition may entail the coordination and or cooperation between BTA and other Government agencies with specific mandate to deal with public health issues.

Recommendation 2:

2.1 *We recommend that BTA and the MTC should promulgate regulations that make infrastructure sharing, save for ducts, mandatory for all licensed operators, including BTC, Mascom and Orange.*

2.2 *With respect to ducts, the mandatory sharing should apply with respect to PTOs.*

Recommendation 3:

3.1 *We recommend that the BTA and the MTC should promulgate regulations that require all the operators to take public health, safety and the environment into account when constructing and or deploying infrastructure and generally in the conduct of their business.*

3.2 *The regulation contemplated in 3.1 should require BTA to coordinate its regulatory requirements and or enforcement on public health and environmental issues with other relevant and competent bodies.*

1.7.2 BTA's Concept Paper on Infrastructure Sharing

The BTA prepared and shared a concept paper on Infrastructure Sharing with stakeholders. The paper provides a broad discussion on the concept of infrastructure sharing and provides examples of various models of infrastructure sharing used in a number of countries.

The BTA Paper provides an excellent general reference material on infrastructure sharing and as such the Consultants have decided to attach the concept paper as an annex (Annex 3, as a separate document) to this report. Needless to say that the Consultants take no credit nor do they endorse the contents of the Concept Paper in whole. Reference will be made to relevant sections of Annex 3 as appropriate in this Report.

2 Overview of international practice on infrastructure sharing

There are many countries that either encourage or mandate some form of infrastructure sharing. Annex 3 provides some examples of countries that have some form of infrastructure sharing.

2.1 Examples of infrastructure sharing in other countries

This section supplements the examples of infrastructure sharing given in Annex 3.

2.1.1 Infrastructure sharing in Tanzania

In addition to the example of infrastructure sharing in the broadcasting sector as outlined in Annex 3, Tanzania also promulgated regulations in 2005 specifically on infrastructure sharing in the communications sector as a whole [1].The regulations require that infrastructure sharing be achieved through commercial negotiations between the parties based on fair and non-discriminatory principles. However, the regulatory authority has the power to mandate the sharing of facilities owned by dominant operators.

In terms of the Tanzanian's framework, a dominant operator with respect to which the regulator may mandate sharing of facilities is defined as "a network facilities operator who has at least thirty-five per centum of the network facilities in the relevant market in which it operates' and has the ability to materially affect 'the terms of participation (having regard to price and supply) in the network facilities market as a result of either the control over essential facilities or the use of its position in the relevant facilities market' and who has been declared by the regulator as a dominant operator. Essential facilities which is central to the definition of a dominant operator in the facilities market is then defined to mean a network facility owned by a licensee which 'cannot feasible, whether economically or technically be substituted' and is declared to be an essential facility by the regulator.

The Tanzanian experience provides us with an instructive question to which this project should provide the answer. It is whether the obligation to share infrastructure should be a general obligation applying to all licensed operators and or whether it should be mandated only with respect to a dominant operator or public telecommunications operators however defined. During the stakeholder interviews, some stakeholders took the view that the obligation should be of a general nature applying to all licensed operators while other stakeholders were of the view that only PTOs should be obligated to share their infrastructure.

We have carefully considered the different views of the stakeholders. Our view is that restricting the obligation to share infrastructure to PTOs in the context of Botswana may not achieve the designed result. As pointed out in

Section 1, the Ministry and BTA want a communications infrastructure sharing legal and regulatory framework that, inter alia, would facilitate the utilization of communications infrastructure owned by public utilities which are not PTOs. To achieve this objective, consideration should be given to imposing the obligation on the widest possible players who are subject to the jurisdiction of the BTA.

Recommendation 4:

4.1 *We recommend that the obligation to share infrastructure be applicable to all licensed operators provided that this recommendation shall not apply with respect to the sharing of cable duct.*

4.2 *The obligation to share and the right to demand access to cable ducts should be restricted to PTOs.*

2.1.2 Infrastructure sharing between mobile operators in Ireland

In 2007, the communications regulator of Ireland facilitated the signing of a Code of Practice on sharing of radio sites by all mobile operators in Ireland [2]. The code complements the site sharing commitments in the operators' licences. It deals with issues relating to transparent and non-discriminatory negotiated terms. It outlines the obligations of the parties to the infrastructure sharing agreement.

In our opinion the Irish approach shows an innovative combination of mandating infrastructure sharing through legal and enforceable licence conditions complemented by industry codes of practice. This approach would not be alien to Botswana. We have already indicated that before the advent of service neutral licences, PTOs were obligated to share infrastructure through their licence conditions.

2.1.3 Infrastructure sharing between mobile operators in New Zealand

In terms of the New Zealand Telecommunications Act, 2001 (the Act), co-location of mobile facilities is a service which is not subject to price regulation. Initiallycolocation service was subject to commercial negotiation. However, the operators could request the intervention of the regulatory body in the event of a dispute.

The Act defines 'access provider' and 'access seeker' for the Mobile Co-location Service as follows:

Access provider: Every person who operates a cellular mobile telephone network.

Access seeker: Any person who:

- Operates or is likely to operate a cellular mobile telephone network;
- And seeks access to the service.

Following protracted negotiation between the operators, the Commerce Commission (regulatory body) intervened and issued a determination on 11 December 2008 which set conditions for the provision of colocation service, save for price [3]. Thus henceforth, the only item that the parties to any colocation arrangement had to negotiate was the price. All other conditions were specified in the determination.

The determination set conditions relating to issues such as:

- Which operators had the obligation to offer access to their infrastructure.
- Which operators had the right to demand access to other operators' infrastructure.
- How the interference management would be handled. That is, it set acceptable levels of interference degradation on the Access Provider's radios due to the Access Seeker's radios.
- What steps Access Providers may have to take to accommodate a request for space on their towers by Access Seekers.
- Service Level Targets that all parties had to abide by. These included targets within which collocation service should be delivered.

New Zealand has sought to balance the need for non-market regulation with respect to some aspects of the communications market with the need for market regulation. This was achieved by providing for collocation through a determination (where competition may not be efficient)and leaving price to be negotiated by the concerned operators.

Recommendation 5:

5.1 We recommend that subject to the requirement that the right to demand access and the obligation to share cable ducts apply only to PTOs, the proposed infrastructure sharing framework for Botswana should provide a general duty to share communications infrastructure on all licensed operators but leave commercial terms to be negotiated by the operators with the right to seek third party arbitration and or appeal to the regulator. However, the owner of infrastructure to be shared would be required to set the terms and conditions for sharing including pricing which are transparent, fair, competitive and non-discriminatory.

5.2	To facilitate and enhance an effective sharing regime the proposed regulations and or guidelines as the case may be should specify time-frames within which specific actions and or approvals need to be taken with regard to sharing of infrastructure. In addition, the agreement in relation infrastructure sharing should be filed with the BTA.

3 The development of Open Access Infrastructure for broadband networks

Many countries all over the world have realised the important role that broadband networks play in the development of economies. It is now accepted that broadband access is a prerequisite to the development of e-commerce. However, even in the most developed economies, the capital cost of developing truly national state of the art broadband networks is beyond the capability of the private sector. The heavy investments required to rollout national broadband networks rule out the possibility of operators rolling out competing multiple infrastructure. As a result, most governments have had to provide funding for national broadband networks, using different models.

Governments have come to accept that the motivation for the development of national broadband networks is the benefit to the overall economy of the country. The returns that accrue to the economy as a whole as a result of the multiplicities of services that such a network can provide outweigh the huge capital expenditures. Under these circumstances, most governments opt to make such infrastructure available to all service providers at the minimum cost of access and / or on fair and non-discriminatory conditions. These requirements are the basis for development of open access infrastructure as discussed in the sub-sections that follow hereunder.

3.1 Layered communications infrastructure

The International Organisation for Standards (ISO) developed a theoretical model which defines how dissimilar hosts on diverse networks should operate. This model is called the Open Systems Interconnection (OSI) reference model. The OSI model was designed to guide the development of open systems so that they can communicate with each other. Open systems are defined by the parameters of the interfaces between their functional blocks. The objective of the OSI model is to define rules at the interfaces such that equipment from one vendor that implements a function will work with equipment from another vendor that implements the next function. Figure 2 shows how data is transferred between layers of the OSI reference model.

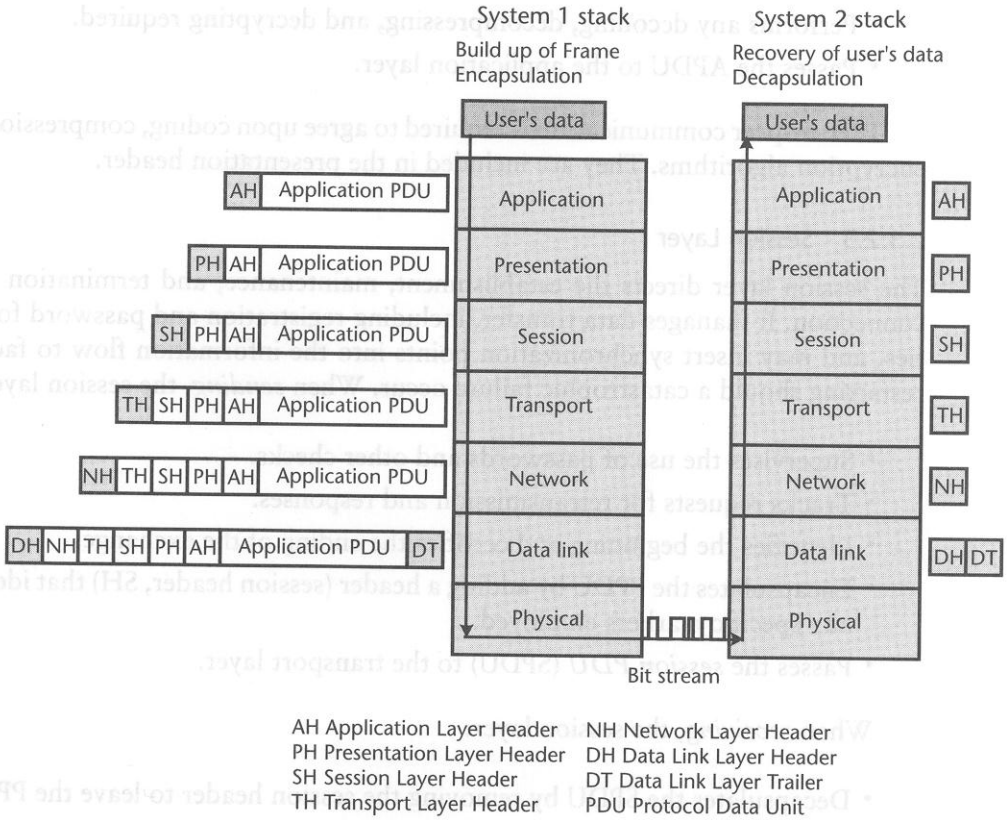

Figure 3: The transfer of data between layers of the OSI Model [4]

The model divides the actions of each host into seven independent activities that are performed in sequence. The seven layers contain protocols that implement the functions needed to ensure the satisfactory transfer of blocks of user's data between them. The internet is a four layered model that was developed to enable different networks and different computer systems to communicate. Figure 4 shows the comparison of the OSI and Internet protocol stacks.

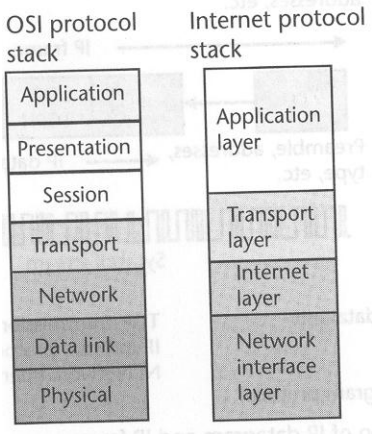

Figure 4: Comparison of the OSI and Internet Protocol stacks [4]

A telecommunication infrastructure can also be divided into three layers as shown in Figure 5 below. Services are offered to (wholesale and retail) customers at the Services layer. The traffic generated by customers is carried over the Service infrastructure (access networks such as traditional POTS, residential data networks (ADSL), mobile networks, ISP POPs, etc.). The Transport layer consists of transport network elements (optical terminal equipment) and fibre optic cables. The transport network elements aggregate the traffic from various elements in the Service infrastructure layer and provide the interface to the broadband optical transport network (OTN).

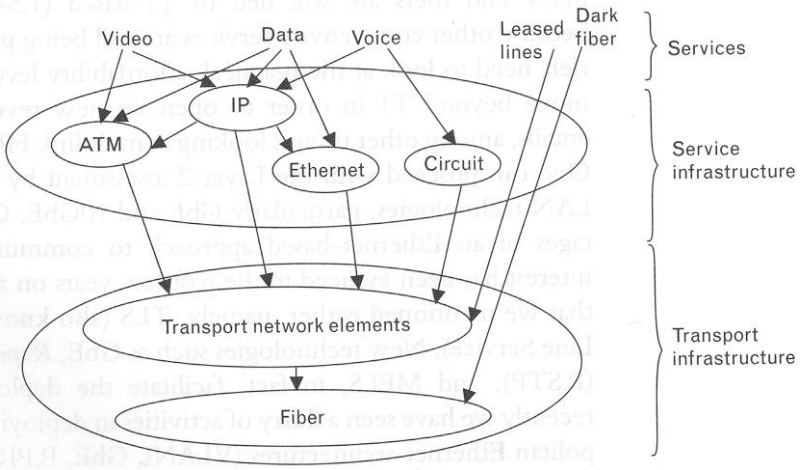

Figure 5: Layers applied to communications infrastructure [5]

Figure 6 represents the envisaged long term transformation of communications infrastructure in which all services will be carried over an IP based Service infrastructure [5]. Such an infrastructure is envisaged to lead to reduced operation, administration, maintenance and provisioning costs.

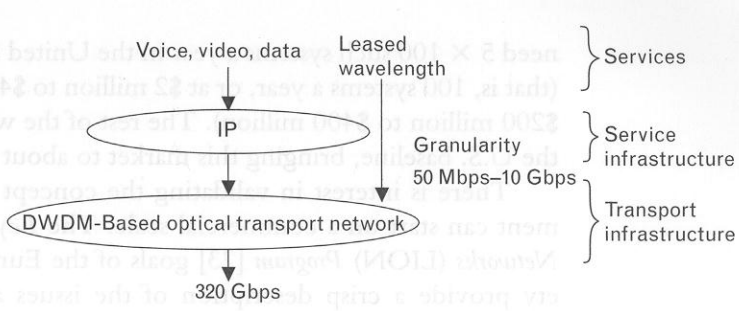

Figure 6: Future data-optimised multi-service optical transport network [5]

3.2 The definition of an "Open Access" Network

The generally accepted definition of an Open Access Network (OAN) is that it should have the following characteristics [6, 7, 8, 9, 10, and 11]:

1. Consumers must be free to choose any service provider on the OAN;
2. Any authorised service provider must be free to deliver services over the OAN;
3. Any authorised service provider should be allowed to add access points to the OAN, subject to technical feasibility and the service provider paying for the cost of establishing the access point;
4. Service providers should be offered Transport Layer services at various levels depending on their requirements;
5. All service providers must be offered services on fair and non-discriminatory terms and conditions;
6. The OAN operator should not compete with its customers (service providers) by offering retail services (directly to end users).

The fifth characteristic is related to the requirement for the OAN operator to be neutral by treating all its customers (Service Providers) in a fair and equitable manner. The last characteristic is required to ensure that the OAN operator does not become a barrier to market entry at the Service Layer by adopting anticompetitive behaviour in respect of service provision, pricing mechanisms, etc, towards other service providers. This last requirement is also intended to ensure that the OAN operator and Service Providers in the Service Infrastructure Layer develop trust and a sense of common purpose rather than behaving as competitors. Under these conditions, the OAN operator acts as a facilitator of competition in the Service Layer.

3.3 The application of Open Access Principles to Infrastructure Sharing

Figure 7 shows various models used in the application of Open Access principles to broadband infrastructure sharing. These models are generally adopted to address problems associated with the high capital cost of developing national broadband networks.

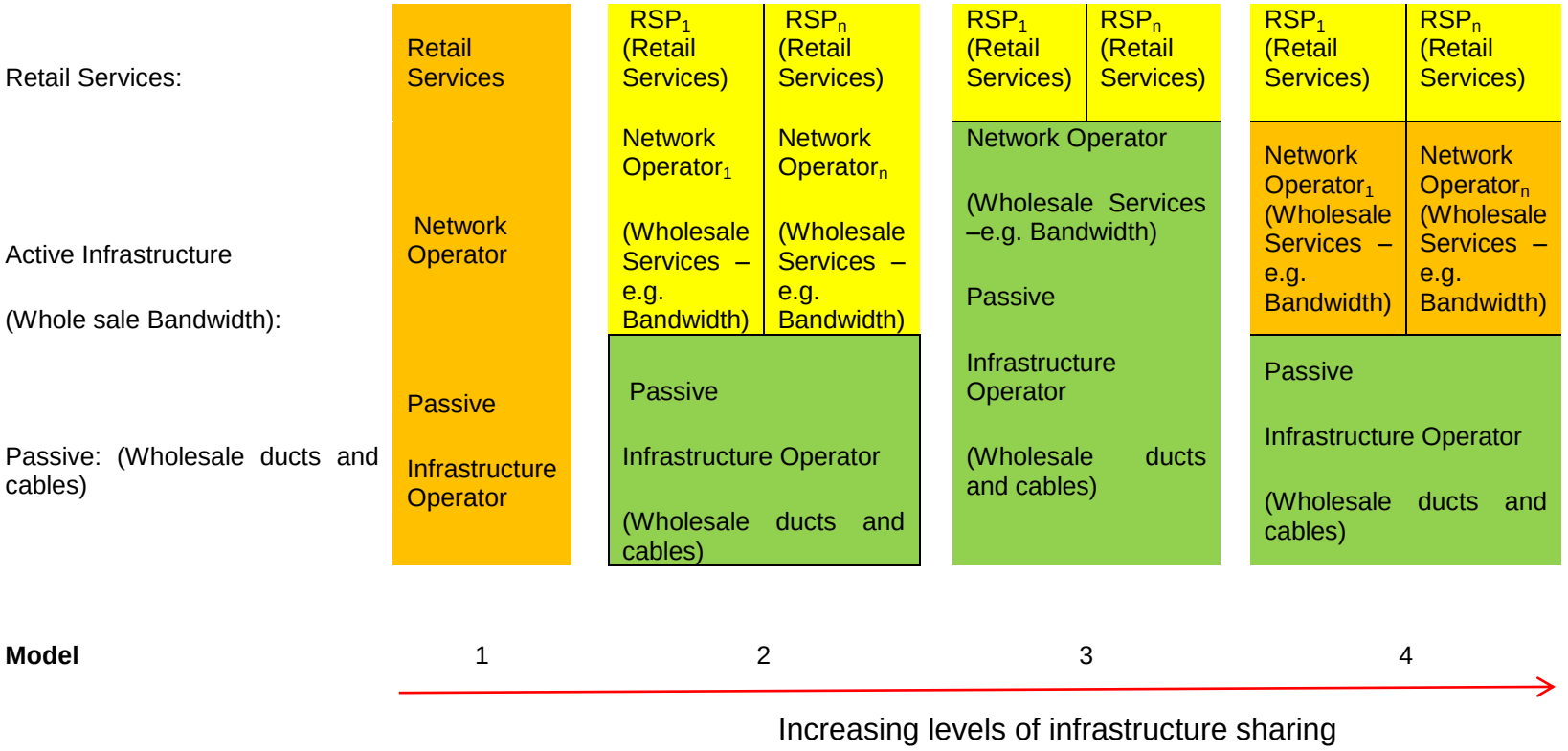

Figure 7: Open Access Models (adapted from [11])

Model 1 applies to the case where there is no infrastructure sharing and thus each operator builds its own infrastructure for own use only.

Model 2 applies to cases where there is a Passive Infrastructure operator that builds ducts and fibre optic cables to lease the passive infrastructure to Network Operators that provide both wholesale and retail services. Thus in this case the passive infrastructure is supplied by one operator.

Under Model 3, one operator builds both the passive infrastructure and the active infrastructure. This model has been adopted in the United Kingdom where British Telecom (BT) builds and operates both the passive and active elements of the broadband network. This model has the advantage of reducing the cost for Retail Service Providers since they do not have to build their own active networks. Thus operators share the capital costs associated with both the passive and active infrastructure.

One of the major criticisms against Model 3 is that the Network Operator is generally allowed to provide retail services (either directly or indirectly through subsidiaries) as well. It thus competes directly with the Retail Service Providers. Consequently, the Network Operator may not provide services to other retail service providers on fair and non-discriminatory manner. To address this problem, some governments (e.g. the United Kingdom) require that the Network Operator implement operational separation between its operations and those of its subsidiaries/affiliates (e.g. through accounts separation, management and staff separation, etc.). The regulatory authority is then required to enforce and monitor the Network Operator's compliance with these requirements. Model 3 is generally used in most countries in Europe. Some commentators argue that in practice, Model 3 is fraught with problems because:

a. It is very difficult for the regulator to come to grips with subtle anticompetitive behaviour that the Network Operator may employ.
b. In any case, the regulator can only react to reported incidents of anticompetitive behaviour after the fact.
c. It takes a very long time for the regulator to collect evidence about matters in dispute, analyse them and make a decision. For some operators, by the time the regulator makes a decision (which may or may not be in favour of the complainant), the damage may have already have been done.
d. Other operators do not even bother reporting to regulators out of frustration and belief that the time, effort and resources spent following up on issues in dispute could be better spent doing things that are under their control.

To avert problems associated with Model 3, some governments (e.g. Singapore, Australia, and New Zealand) have adopted variants of Model 4 in which there is a (structural or operational) separation between the Passive Infrastructure Operator, the Network Operator and Retail Operators. Under

this model, the government establishes a new Passive Infrastructure Operator and a Network Operator to construct and operate the passive infrastructure and active network elements, respectively on Open Access Principles outlined in Section 3.2. Most importantly, the Network Operator is not allowed to compete with service providers. The following subsections provide more information on the application of Model 4 in Singapore, Australia and New Zealand.

3.3.1 The development of a broadband infrastructure in Singapore

In 2006, the government of Singapore announced plans to development a Next Generation National Broadband Network (NGNBN). Subsequent to a number of consultations with industry and other stakeholders, the Minister for Information, Communications and Arts announced the following policy statement on 11th December 2007 as regards the structure of the NGNBN [12]:

> *…. As a policy, we have therefore decided to adopt separation between the different levels of the Next Gen NBN to achieve* ***effective open access****. The RFP to construct the network will therefore provide for structural separation of the passive network operator from the downstream operators. If necessary, the government is also prepared to consider legislation to achieve such* ***effective open access for downstream operators in the next generation broadband market.***

As shown in figure 8, the NGNBN consists of three layers:

a. The Passive Infrastructure Operator (NetCo) is responsible for the design, construction and operation of the passive infrastructure (ducts, fibre optic cables).
b. The Wholesale Operator (OpCo) that is responsible for the design, implementation and operation of the active network infrastructure (switching and transmission equipment).
c. Retail Service Providers that will purchase bandwidth from OpCo and compete against each other in the provision of services.

The government issued a Request For Proposals to develop the NGNBN on Public Private Partnership (PPP) basis. A consortium called OpenNet led by Singapore Telecom (Sing Tel) won the bid to establish NetCo while another consortium called Nucleus Connect led by the second mobile operator StarHub won the bid to establish OpCo. In principle there could be multiple OpCos, however, only Nucleus Connect was awarded the bid to form OpCo.

The capital cost associated with developing the passive infrastructure for NetCo is very high due to the high cost of civil works for fibre optic cable. In addition, the operating cost for running fibre optic cable infrastructure is also high because it tends to be labour intensive or reliant on outsourcing, both of which are very expensive. Thus the high cost of developing the passive infrastructure is a barrier to market entry in any country. As a result, policy makers and regulators are always concerned about a situation where an operator that owns the passive infrastructure competes with other operators and services providers that rely on it for access to the passive infrastructure. The reason being that such an operator may be inclined to frustrate its competitors by:

- Denying them access to the infrastructure;
- Employing delaying tactics in the provision of access;
- Providing them with poor quality of service;
- Charging them unreasonable rates for access to the infrastructure;
- Etc.

Regulators have developed many tools for dealing with such anticompetitive behaviour. For example:

- Making the right to access to the infrastructure mandatory for all operators;
- Implementing licence conditions and requiring service level agreements to ensure that all operators and service providers that require access to the infrastructure are treated in a fair and equitable manner.

However, the effectiveness of these measures is always a matter for debate.

To address this problem, some countries, including Singapore, have implemented a requirement for structural separation between the passive infrastructure operator and downstream operators (wholesale operators and retail service providers) that rely on the passive infrastructure operator. Thus NetCo is not allowed to own any of these operators or to compete directly with them. Neither are the downstream operators and service providers allowed to own any shareholding in NetCo. Thus NetCo operates in accordance with all the requirements for an Open Access network outlined in Section 3.2.

In February 2009, the Info-communications Development Authority (IDA) (regulatory authority) issued the NetCo Interconnection Code of Practice in respect of services that NetCo will offer [13]. For example:

- NetCo is obliged to offer services to all authorised operators that request for such services but it is not mandatory for operators to use NetCo’s infrastructure.

- NetCo is compelled to provide any information (including development plans), on request, to authorised operators that are authorised to obtain services from NetCo so as to assist them make informed decision about their own plans.
- NetCo is obliged to offer collocation services to qualifying operators.
- The Code stipulates how (structure) NetCo should charge for various services.
- Price changes for mandated services are subject to IDA's approval and IDA may subject the proposed changes to public consultation.
- The minimum period between price changes shall be three years.

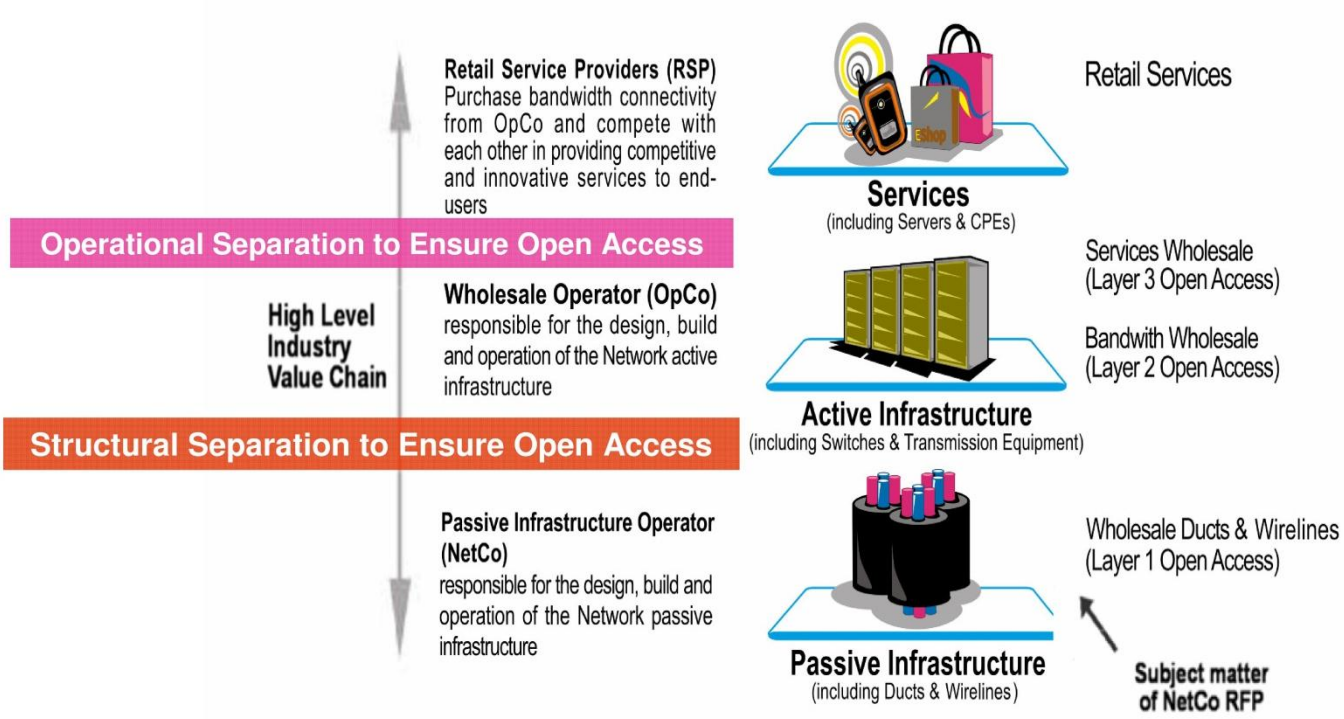

Figure 8: Singapore NGNBN Industry Structure [14]

In August 2009, the IDA issued the OpCo Interconnection Code of Practice in respect of services OpCo will offer [15]. The code specifies, amongst other things;

a. The pricing, terms and conditions offered by OpCo for connectivity to the active network.
b. The obligations and responsibilities of OpCo in relation to the services it offers.
c. The obligations of authorised operators and services providers in relation services offered by OpCo; and

d. The enforcement measures that IDA may take against OpCo, authorised operators and services providers for breach of the Code.

In the case of OpCo, IDA imposed Operational Separation (as a opposed to Structural Separation) between OpCo and Retail Service Providers to ensure compliance with Open Access principles. Thus OpCo is allowed to own subsidiaries that offer retail services on conditions that these entities operate independently and there are separate accounts, separate management and staff and OpCo offers such subsidiaries services on the same terms and conditions as other service providers. IDA left the option of instituting structural separation between OpCo and retail service providers open for future consideration, should the need arise.

3.3.2 The development of a broadband Infrastructure in Australia

The establishment of the National Broadband Network (NBN) in Australia has been very contentious. The government issued a Request For Proposals (RFP) on 11th April 2008 inviting companies to bid for the right to rollout and operate the NBN. The tender closed on 26th November 2008 and six pre-qualified companies, including the private incumbent operator, Telstra, submitted proposals. A panel of experts appointed by the government evaluated proposals and advised the government that none of the bidders would construct a network that would meet the government's policy objectives. They recommended that the government form a company that would construct and operate the NBN on Open Access principle [16].

Telstra Corporation Limited (Telstra), the incumbent private telecommunications operator, had submitted an incomplete proposal and was thus disqualified. Telstra had been engaged in a long dispute with the government about participation in the NBN project. The government was concerned about lack of competition and poor access to broadband services and was of the view that Telstra was the cause of these problems through alleged anticompetitive behaviour. To address these problems, the government's position was that Telstra should voluntarily separate (structural separation) into two independent companies (one wholesale and the other retail) and then the wholesale company should participate in the development of the NBN on Open Access principles. Telstra's position was that they were prepared to participate in the NBN on condition that there would be no requirement for any form of separation (structural or operational).

In view of the advice from the panel of experts and the stand-off with Telstra, in April 2009 the government decided to form NBN Co to construct and operate the NBN using Public Private Partnership (PPP). Unlike the Singapore case, NBN Co would operate both the passive and active components of the NBN and offer wholesale services to retail service

providers. However, there would be structural separation between NBN Co and retail service providers.

There were real concerns that there would be duplication of infrastructure because Telstra was threatening to go it alone while the government had also publicly stated that they would proceed with NBN Co with or without Telstra's participation. On the 20th June 2010 the government announced that they had reached an agreement with Telstra to buy the latter's existing passive infrastructure (ducts, copper and fibre optic cables, etc.). The following is an extract of the government's announcement [17]:

….The Agreement between NBN Co and Telstra, worth an expected value of $9 billion, provides for:

- The reuse of suitable Telstra infrastructure, including pits, ducts and backhaul fibre, by NBN Co as it starts to rollout its new network avoiding unnecessary infrastructure duplication; and

- The progressive migration of customers from Telstra's copper and pay-TV cable networks to the new wholesale-only fibre network to be built and operated by NBN Co.

The Agreement means that:

- Taxpayers benefit because it reduces the overall cost of building the network and will result in higher take-up rates and revenue for NBN Co.
- A greater proportion of the NBN rollout will be underground, with less overhead cabling.

Australia's largest telecommunications company, Telstra, will become a participant in the rollout of the NBN, and is likely to become NBN Co's largest customer….

Thus Telstra eventually agreed to government's demand for structural separation! Overtime Telstra will gradually transfer its broadband infrastructure to NBN Co and retain only its retail service infrastructure. Needless to say that this whole process has been very complicated and there are still a number of open issues. It could be argued that the establishment of NBN Co and subsequent purchase of Telstra's infrastructure by the Australian Government amounts to a reversal of the privatisation of Telstra. Considering that the Government of Botswana is in the process of privatising BTC, a study of the privatisation of Telstra, the process that led to the establishment of NBN Co and subsequent purchase of Telstra's infrastructure would be instructive.

3.3.3 The development of a broadband Infrastructure in New Zealand

The government of New Zealand divided the country into thirty three regions for purposes of developing the Ultra-Fast Broadband (UFB) infrastructure. As in the case of Australia and Singapore, the UFB will be constructed and operated on Open Access principles, with structural separation between UFB operators and retail service providers. However, local fibre companies (LFC) will bid for the right to develop the UFB jointly with the government on an area-by-area basis (for a total of thirty three areas) instead of the right to construct a single national UFB infrastructure. The government will only fund the passive part of the UFB. The government established Crown Fibre Holdings (CFH) in October 2009 with responsibility for managing the rollout and operation of the UFB. After ten years, investments by the government and LCFs into the development of UFB will be converted into ordinary shares in CFH.

Unlike Telstra, Telecom New Zealand agreed voluntarily to structural separation and undertook to complete the separation process in July 2011.

3.3.4 Open Access Networks operated by municipalities

There are no national open access broadband access networks in Europe and North America. However, some local authorities in some major urban areas and states in some developed countries have established open access networks that compete with incumbent national operators in the provision of cable ducts and dark fibre to service providers. Examples of countries that have municipal OAN include France, Netherlands, Finland, Sweden and the United States [18].

3.3.4.1 Utah Telecommunication Open Infrastructure Agency (UTOPIA)

The Utah Telecommunications Open Infrastructure Agency (UTOPIA) is an agency formed by local authorities of 16 cities in 2002 in the State of Utah in the United States to provide broadband telecommunications services to service providers on open access principles. UTOPIA sold municipal bonds to finance the construction of the fibre optic system. Its services include leasing of dark fibre, transport services at various capacities, hubs and head-ends to service providers.

The infrastructure is owned by the municipalities while the services to both residential and businesses are provided by private companies that lease capacity from UTOPIA [18].

3.3.4.2 Accessing Telecoms Links Across Scotland (ATLAS):

The Accessing Telecoms Links Across Scotland (ATLAS) is a broadband infrastructure owned by the Scottish Government to provide a broadband infrastructure that covers six business parks in major cities across Scotland. The infrastructure is operated and maintained by a managing company, ATLAS Connect Ltd.

The company leases capacity on open access principles to private service providers and does not provide services to end users [19].

3.3.4.3 Amsterdam Citynet:

In 2002 the Amsterdam City Council resolved to construct a broadband fibre optic infrastructure that would provide broadband services for businesses and fibre-to-the-home (FTTH). The municipality formed a company, Glasvezelnet Amsterdam BV (GNA) in which the municipality owns 1/3 of the shares, while 1/3 is owned by five housing corporations and the other 1/3 by private investors. GNA plans to provide services to about 450 000 customers, including deployment of 40 000 FTTH connections. GNA will lease capacity to service providers who will provide services to end user. GNA will not provide service to end users [20].

3.3.4.4 Stokab:

The Stokab system was founded in 1994 and is owned by StockholmsStadshus AB, which is in turn owned by the City of Stockholm, Sweden. Stokabwas established to fill the gap left by incumbent's refusal to provide fibre capacity after liberalization. Stokabdecided to offer dark fibre only on account of the fact that this is an asset that is most difficult to replicate on account of the high capital cost. Stokab left the provision of services to the new telecommunications companies that leased the dark fibre. Stokab's core business is to build, operate and maintain the fibre optic communication network in the Stockholm region and to lease out fibre optic connections to any service provider on open access principles. Stokab also helps facilitate the rollout of wireless infrastructure and drives broadband market growth in the Stockholm region.

The company expanded its network into 27 surrounding municipalities. It has also co-operated with Nordic and Baltic neighbours on fibre links, enabling Stockholm to become a regional ICT hub. The City of Stockholm sees Stokab as a provider of "public service on commercial terms." That is, its main objective is not to make profit but rather to provide service on a cost recovery basis. This allows service providers to use Stokab's infrastructure to provide services for profit on fair and equitable basis [21].

3.4 The need for a national broadband infrastructure strategy

As discussed in above, many countries are at various stages of developing and implementing their national broadband strategies. The consultants are aware that the Government is undertaking a number of initiatives aimed at providing connectivity to some international fibre optic cables. These initiatives are very important. Equally important and more difficult is the development of a national broadband access infrastructure. In fact, a requirement to deliver broadband services necessarily leads to the need to increase the communications infrastructure and thus infrastructure sharing becomes even more critical.

Recommendation 6: It is recommended that BTA and the Government should consider the development of a national broadband strategy in consultation with all stakeholders.

4 Current Practices of Infrastructure Sharing in Botswana

While there are no official guidelines as regards infrastructure sharing, operators do share some infrastructure in Botswana. Sharing arrangements are all based on commercially negotiated terms between concerned parties. Sharing of towers was given some impetus following a requirement by the Department of Environmental Affairs (DEA) that applicants for Environmental Impact Assessment (EIA) approvals for new (green field) sites should show what efforts they made to share existing sites owned by other operators in the vicinity of the site in question.

4.1 Challenges in respect of the development of communications infrastructure

This section highlights some of the challenges and possible options for resolving problems faced by stakeholders as regards infrastructure sharing.

4.1.1 Site acquisitions for telecommunications towers in rural areas

The site acquisition process differs between urban and rural areas. Application for telecommunications sites in rural areas are lodged with the respective land board authorities. Most land boards are concerned about telecommunications towers being too close to residential areas, as a result, they generally prefer that sites for telecommunications towers should be in open areas and some distance away from schools, residential areas and other public facilities.

Some land boards expressed concerns about land owners who do not consult the land boards when they decide to sublet sections of their land to

telecommunications operators to construct towers. Their view is that such arrangements amount to change of land use. It is the responsibility of the allocated land user (not the telecommunications operator) to seek approval from the concerned land board before subletting any part of his/her land. To avert problems and inconveniences, it is in the interest of the concerned operators to advise would-be landlords that they should seek approval from the respective land boards.

During the interviews with some land boards, it transpired that most of the concerns about subletting and location of towers stemmed mainly from perceived negative effects of telecommunications towers on human beings.

Land board fees for allocation of sites in most rural areas are as follows:

a. Application fee = P10.00;
b. Sketch plan (site visit) = P150.00;
c. Lease agreement = P60.00;
d. Annual fee = P0.25/m^2.

In the case of sites in areas that have been designated as Development Planning Areas, the land boards consult physical planning officers at their respective councils for advice on the location of towers. As at the time of writing the report, one district had introduced the following fees which were applicable for towers anywhere in the District:

a. Plan perusal fee = P5000.00
b. Monthly fee = P3000.00.

They were also working on guidelines on the location of towers which were expected to be submitted to the Town and Country Planning Board for their consideration.

Interviewed telecommunications operators expressed concerns about these rates and guidelines on account of the following:

a. They argue that they were not consulted during the development of these rates and guidelines even though these new developments have a direct impact on their operations. In their view, rates, charges and procedures should be uniform across the country and all stakeholders, including telecommunications operators, the Ministry of Transport and Communications and BTA should be consulted before Districts implement any new rates, guidelines or procedures.

b. Their view is that the new rates are “excessive and prohibitive”.

c. They argue that the Government consulted them and urged them to increase their infrastructure in rural areas to facilitate development.

They said that they heeded the Government's call in good faith and on the basis of fees and procedures that were known to them. Thus in their view, if these new rates and procedures are to remain, then the Government should pay for these additional costs otherwise they will consider decommissioning some of their sites in all districts that will adopt these new rates.

It is important to note that the Nteletsa Project which is a Public Private Partnership (PPP) between the Government and PTOs brought telecommunications services to many rural villages that would otherwise not have such services without Government's intervention. Even with partial funding from the Government, all the operators still find their share of the capital costs and the operation and maintenance costs of the infrastructure too high relative to the income they derive from some villages covered by the Nteletsa Project. The imposition of the proposed new rates by some districts will simply make this situation worse and may force some of the operators to reconsider their participation in future rural telecommunications infrastructure development.

Recommendation 7: *We recommend that the Ministry of Local Government, Lands and Housing, the Ministry of Transport and Communications (MTC), the Botswana Telecommunication Authority and the concerned district councils should meet to review the impact of the new rates on the development of telecommunications infrastructure in the whole country.*

Recommendation 8: *In the event the meeting referred to in Recommendation 7 above decides that the rates should be retained, then, we recommend that MTC should consult the Public Telecommunications Operators (BTC, Mascom and Orange) on the implications of these rates on the rollout of telecommunications services in whole country.*

Recommendation 9:*We recommend that notwithstanding the resolution to the matter regarding the proposed rates, consideration should be given to coming up with either uniform rates that land boards and or councils should charge and or alternatively guidelines with respect to levying such fees after consultation with all stakeholders including the Ministry of Transport and Communications, the BTA, telecommunications operators, District Councils and respective land boards. BTA, through the MTC should take the lead in initiating the dialogue on this issue with a view to have the relevant ministry set the relevant uniform rates and or the principle to be applied in setting rates related thereto*

4.1.2 Site acquisitions for telecommunications towers in urban areas

The allocation of sites for telecommunications towers in urban areas is done by the respective councils. As in the case of rural areas, there are no locations designated for telecommunications towers as such. The Urban Development Standards, 1992 produced by the Ministry of Local Government, Lands and Housing make provision for laying of telecommunications cables at specified locations within the road reserves. There were no mobile networks in Botswana at that time and only Botswana Telecommunications Corporation had few telecommunications towers, which were allocated on a case-by-case basis.

Now there are three mobile operators (b-Mobile, Mascom and Orange) and each one of them is trying to keep pace with the demand for its services. This demand leads to a requirement for more base stations to increase capacity and improve quality of service. The result is an increase in the number of base stations and thus towers. This development has raised concern for land authorities, the DEA and members of the general public. Some authorities have responded by rejecting applications from service providers to construct towers in certain areas (e.g. residential areas) out of concern that the deployment of base stations in such areas could be detrimental to public health. All areas, including residential areas, require mobile services. While the concern about the multiplicity of towers in close proximity of each other is valid from an environmental point of view (e.g. physical aesthetics), rejecting requests to construct towers in some areas outright would be an impractical solution.

Recommendation 10: *All users of radio communications system should be required to adhere to the regulations and or guidelines on infrastructure sharing to be issued by BTA and or the MTC in order to reduce the number of towers that are built in close proximity of each other.*

Recommendation 11:

11.1 *The International Commission on Non-Ironizing Radiation Protection (ICNIRP) Guidelines on Non-Ionizing Radiation Protection for Limiting Exposure to Electromagnetic Field should be incorporated into the regulations on infrastructure sharing to be developed by the BTA and or the MTC*

11.2 *There should be no restriction on the location of towers on account of concerns about electromagnetic exposure, as long as operators*

can demonstrate on a case-by-case basis, to the satisfaction of the BTA and / or other relevant authorities , that the electromagnetic exposure that the general public will be subjected to will be below the permissible limits for public exposure as set out in the International Commission on Non-Ironizing Radiation Protection (ICNIRP) Guidelines on Non-Ionizing Radiation Protection for Limiting Exposure to Electromagnetic

Recommendation 12:

All operators with radio transmitters should train their staff that install and or maintain radio transmitters and landlords on whose buildings they have installed radio transmitters about the requirements of the ICNIRP Guidelines and other applicable regulations and guidelines).

4.1.3 Requirements, practice and procedures for EIA

The DEA a department under the Ministry of Environment, Wildlife and Tourism is responsible for coordinating all environmental issues in the country. Chief among them is the implementation of the EIA Act of 2005.

The EIA Act was promulgated:

- To provide for environmental impact assessment to be used to assess the potential effects of planned developmental activities.
- To determine and to provide mitigation measures for effects of such activities as may have significant adverse impact on the environment.
- To put in place a monitoring process and evaluation of the environmental impacts of implemented activities; and to provide for matters incidental to the foregoing.

The following is a summary of activities that should be undertaken during the Environmental Impact Assessment (EIA):

4.1.3.1 Screening

This stage involves identifying the overarching purpose of the plan or programme and deciding whether a Strategic Environmental Assessment (SEA) is required. This decision may be determined by legislation, policies, local requirements or an identified need. Context-specific screening criteria would assist in determining whether a SEA should be undertaken. For example, these criteria could include a checklist categorising plans and

programmes which could have a significant impact on the environment, a list of important ecological processes, or a spatial representation of environmentally sensitive areas.

4.1.3.2 Scoping

The aim of Scoping is to determine the nature and extent of the SEA. This involves formulation of a vision and identification of significant strategic issues to be addressed in the SEA. This stage should be informed by effective participation procedures that are applicable to the particular context of the plan or programme. In the case of SEA, a slight variation on what is stated in the Act may be taken as a preliminary step. It may be advisable that Scoping be initially undertaken by a group of key interested and affected parties that play a coordinating role, for example, through a steering committee. This committee could include authorities, specialists, non-governmental organisations, business and community organisations. This group should ensure that the Scoping process, which includes a wider range of interested and affected parties, focuses on strategic issues.

It is important that the public involvement process should enable and support interested and affected parties to engage in the process at different levels, in a way that is appropriate to their resources and needs. These levels of involvement could range from being informed of the SEA process, to providing inputs or to being actively involved in influencing the process. The public participation process should be designed in such a way that it enhances the entire SEA process.

The EIA Act provides for the establishment and strengthening of environmental impact assessment in the decision making process to ensure that the environmental implications of policies, programmers or development projects are evaluated before approval.

The Act makes it obligatory for relevant technical department or local authority to monitor development activities that are undertaken to ensure that they comply with the agreed mitigation measures provided. It also requires the developer to submit an evaluation report to the relevant technical department or local authority at such time that the authority shall determine. Section 20 of the EIA Act stipulates the need for monitoring the implementation of mitigation measures to ensure compliance with agreed mitigation measures during and after project implementation.

4.1.4 Requirements, practice and procedures for AIA

The Monuments and Relics Act (Cap 59:03) defines monuments to include any ancient or historic buildings, ruins, ancient workings, stone circle, graves, cave rock shelters, archaeological sites, midden, shell mounds, areas with distinctive scenery or geological formations or rare and distinctive flora, and waterfalls. Relics include: fossils, meteorites, stone tools, artefacts,

drawings or carvings on stone, petrology and ornaments of aesthetic value, archaeological, anthropological, scientific or historic value. They also include protected heritage areas, historic buildings and treasure troves.

Section 18 (1) of the Monuments and Relics Act prohibits the alteration, destruction, damaging or removal from its original site, and exportation of any national monument, relic, artefact and fossil, unless it is moved to the national museum and art gallery.

Under the Monuments and Relics Act of 2001, all natural, archaeological and historical monuments, and artefacts dating back to before 1902, as well as gazetted historic monuments postdating 1902, are protected.

It is illegal for any unauthorized person to alter, destroy or damage such remains or remove archaeological remains from their site of discovery. The act has provisions for salvage and/or rescue excavations or related activities to be undertaken by suitably qualified persons in order to mitigate the impact of any destruction of archaeological remains and deposits. Subsequent to such mitigation, the proposed extraction or construction can then proceed.

The National Monuments and Gallery Act (Cap 59:01) stipulates that the Minister of Labour and Home Affairs and the Board of the same ministry are to provide a comprehensive and efficient museum and art gallery services to all people.

The following is a summary of activities that should be undertaken during the Archaeological Impact Assessment (AIA) studies:

a. **Preliminary work:** This step consists of desktop studies of baseline data.
b. **Archaeological surveys:** Site visits and inspections are required to collect data.
c. **Oral interviews**: These interviews may be necessary to collect information on intangible heritage and significant historical or cultural information about the site.
d. **Detailed field work**: This work may be necessary to make onsite observations and to documentation in specified areas.
e. **Test pits** are necessary in areas deemed to have the potential to yield significant archaeological information (based on site observations and ranking).
f. **Reporting:** A formal report that documents the findings of the AIA should be submitted to the National Museum.

4.1.4.1 Steps in Chance-Find Procedure

With regard to sustainable archaeological and heritage impact management, the following steps should be undertaken:

- After induction training on possible archaeological and heritage finds, contract employees who encounter, or are informed of potential archaeological findings (e.g. potential artefacts etc.), should notify the Project Archaeologist and the National Museum.
- Step 2: Any earth moving activities must be temporarily suspended until the Project Archaeologist notified and a site visit and assessment have been conducted.
- Further archaeological mitigations must be undertaken by the archaeologist on site in case of new finds as contractually agreed between stakeholders, and/or as advised by the National Museum.
- Thereafter, discoveries of potential archaeological and heritage significance must be analysed by relevant specialists. Sites/artefacts should be assessed and documented and noted for records. If significant archaeological remains are found, recommendations may be made for further studies.
- The National Museum and/or relevant authority must be notified of any discovery of subsurface materials including burials. Site meetings should be held (involving the Project Archaeologist, National Museum, relevant operational staff and/or relevant authorities), to discuss the results of the assessment and the way forward on site.
- Recommendations based on the particular resource significance may include: site management, site conservation, mitigation (sampling/salvage excavations), and/or site destruction.
- Following the implementation of the agreed mitigation and management measures at the site, the Project Archaeologist, in consultation with other stakeholders, may allow development to legally proceed in the area, if authorized by the National Museum.
- Activities and aspects relating to the management and monitoring of archaeological and heritage sites/artefacts must be included in the feedback reports (as agreed by relevant authorities) and communicated to relevant parties.

4.1.4.2 Induction Course and Reporting

During the construction and post construction phases, it is important to recognize any significant archaeological materials being unearthed in order to make the correct judgment on which actions should be taken. To this end, an applicable induction training programme is essential for all employees (as mentioned under Step 1 above), as is the appointment of an accredited archaeologist, who shall inspect the site and any development regularly, with (daily/weekly) visits to the actual workface and operational areas.

4.1.5 Stakeholders' concerns about EIA studies

All stakeholders acknowledge and accept the EIA studies have to be done because they are required by law. That said, operators expressed concerns about the following issues:

a. Some operators complained that the requirement of the EIA Act is that consultations are supposed to be done with communities that live in the vicinity of the tower. However, there have been cases where the DEA imposed additional requires such as demanding consultations with more than one institutional body as regards the potential effects of radiation from the proposed base station. For example, in one case an operator was required to consult the Kgosi, land board, BTA and the Department of Radiation Protection on this matter. Operators are of the view that there should be one institutional body that can make a determination on all matters relating to electromagnetic radiation. Such determination should be based on agreed international standards.

b. The other major concern is that the EIA process takes far too long and causes major delays in the rollout of infrastructure and in some cases operators incur huge costs due to such delays.

c. While acknowledging that there are indeed delays in the EIA approval process due to manpower constraints, the DEA argues that operators also make the situation worse by:
    i. Submitting their applications late and in most cases when projects are already in progress. DEA argues that it has advised operators that EIA studies should be undertaken during project feasibility studies (planning phase) and not at implementation.
    ii. Submitting applications that do not include all the required documents. For example, in some cases, applications for EIA are submitted without letters of allocation of sites, clearance for towers from the Civil Aviation Authority, etc.
    iii. Submitting individual applications to erect base stations in the same general area. If operators shared infrastructure they would submit fewer applications thereby reducing the number of applications that DEA would have to deal with.

Some stakeholders suggested that DEA should consider outsourcing the EIA review process such that the outsourced EIA experts would do detailed reviews of EIA reports and submit recommendations (for either approvals or rejections) to DEA to enable them (DEA) to make final determination. The general view is that such outsourcing would relieve DEA burden of reviewing every EIA report, especially in view of their manpower constraints. Instead, they would only review recommendations from outsourced EIA experts. However, DEA would always retain the discretion to review any EIA report if necessary.

This matter was discussed during the interview with DEA and they were of the view that the Environmental Impact Assessment Act, 2005 does not allow them to outsource their functions relating to reviewing EIA studies. We review the Act and could not find any section/clause that bars DEA from seeking technical advice. Obviously the role of the outsourced experts would be to review the EIA reports and submit short reports to DEA with recommendations to either approve or reject proposed measures to address the requirements of the Act. The final decisions would be made by DEA and they would formally advise the applicants about the outcome of their reports. This approach would apply to the various stages of the EIA process (Scoping Report, Draft Report and Final Report).

Recommendation 13: *It is recommended that operators should share infrastructure in accordance with such regulations and or guidelines as shall be issued by BTA and or MTC.*

Recommendation 14: *EIA studies should be undertaken during the feasibility (planning) phase for all projects to ensure that by the time the project gets to implementation all approvals would have been granted.*

Recommendation 15: DEA should consider outsourcing the review of EIA Reports to speed up the process of EIA approvals and thus reduce delays in the rollout of infrastructure and services.

We note that recommendations 14 and 15 are strictly speaking outside the scope of the BTA and or MTC mandate. We suggest that BTA brings the issues raised by stakeholders and the recommendations to the DEA and other competent bodies.

4.1.6 Rights of Ways for towers

In addition to approvals by land and physical planning authorities (where applicable), the construction of towers must be approved by the Civil Aviation Authority of Botswana (CAAB). The main concern for CAAB is to ensure that proposed towers will not pose danger to aircrafts. This is achieved by detailed requirements spelt out in the Air Navigation Regulations.

One of the key requirements of CAAB relevant to this project deals with the lighting of en-route obstacles. For the purpose of this regulation, an “en-route obstacle”

means any building, structure or erection which is 150 meters or more above ground level. The person in charge of an en-route obstacle shall ensure that it is fitted with medium intensity red lights positioned as close as possible to the top of the obstacle and at intermediate levels spaced so far as practicable equally between the top lights and ground level with an interval not exceeding 52 meters. All towers are to be fitted with medium intensity steady red light as it acts as an en-route obstacle to aircraft.

CAAB also reviews the proposed location and height of towers to determine whether the construction should be allowed. CAAB further specifies how towers should be painted. The normal colour requirement is that a tower should be painted with red and white bands, each band being 1/7 of the total tower height and starting with the red colour at the bottom and thereafter alternating such that the top band is red. In some cases CAAB may also specify that a tower should have navigational warning lights.

From an environmental point of view, it is preferable that communications infrastructure should, to the extent possible, match the surrounding physical features (e.g. tree, buildings, etc.). Figure 9 shows a mobile base station tower that matches the surrounding vegetation.

Figure 9: A Base Station Tower that matches the surrounding environment

Operators should always seek permission from CAAB to paint towers to match the surrounding environment. It goes without saying that aircraft safety takes precedence over environmental/aesthetics concerns. Accordingly, CAAB will have the final say as regards whether a tower can be painted a different colour other that the red/white bands.

Recommendation 16: *It is recommended that operators should paint their infrastructure to match the surrounding environment. In the case of towers, operators should seek authorisation from CAAB to paint their towers in colours that match the environment.*

If accepted, the implementation of regulation 16 would involve a number of government agencies and or departments including BTA, CAAB and or the DEA.

4.1.7 Right of Ways for fibre optic cables

Most mobile base stations are linked to their respective mobile switching centres by backhaul microwave links. The use of microwave radio links in urban centres is increasingly getting difficult because:

a. Microwave links have to operate in a line-of-sight mode. In some cases this may not be possible due to obstructions from buildings. Even in cases where there is line-of-sight, there is always the danger that new multi-storey buildings could obstruct an existing link.
b. The high usage of microwave radios links leads to interference between microwave radios which results in poor quality of service.
c. The increased demand for mobile broadband services in urban areas means that in some cases microwave links may not provide the required capacities.

To address these challenges, some mobile operators want to deploy fibre optic rings to complement their microwave backhaul links. In urban areas, fibre optic cables have to be installed in cable ducts which run along road reserves. Figure 10 shows the location of telecommunications services (marked as BTC) on an access road reserve. Figure 10 was obtained from the Urban Development Standards, 1992. The document was prepared by the Urban Development Committee (UDC) which consisted representatives from the Ministry of Local Government, Lands and Housing, Road Department, Botswana Power Corporation, Botswana Telecommunications Corporation, Botswana Water Utilities and representatives of other ministries.

In 1992, BTC was the only telecommunications operator and thus all provisions for telecommunications services were reserved exclusively for BTC. The enactment of the Telecommunications Act of 1996 removed all privileges which BTC enjoyed hitherto. The licensing of Mascom and Orange (then Vista) in 1998 and subsequent issuing of service and technology neutral licences to BTC, Mascom and Orange in 2006 meant that these three operators henceforth had the same rights and obligations. Accordingly, anyone of them has the right to use the space allocated for telecommunications services to construct ducts to carry its fibre optic cables, if it so wishes.

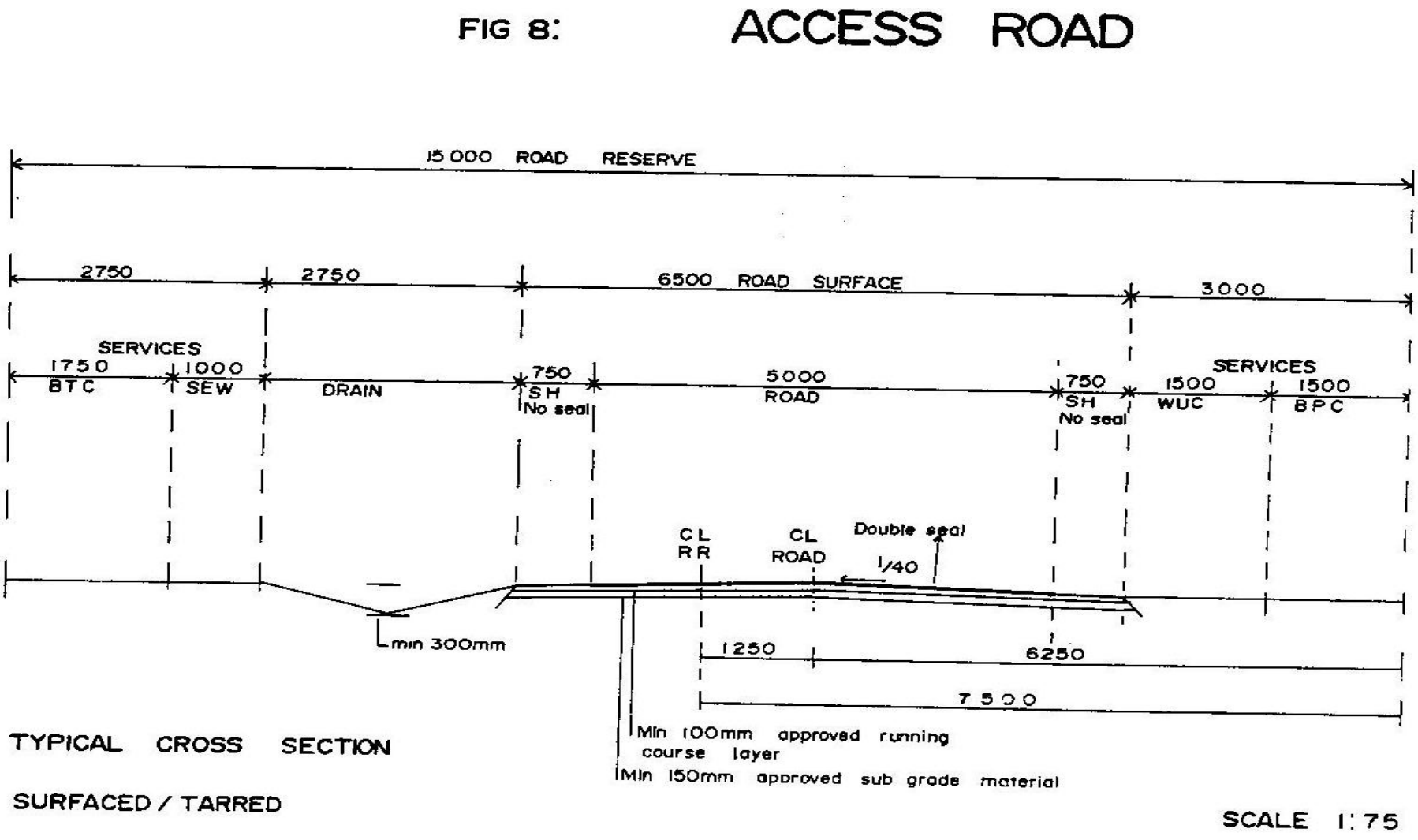

Figure 10: Location of services on a typical Access Road Reserve [22]

As one might expect, most of the space reserved for telecommunications services on the road reserve has been used up by BTC for its cable network (both fibre optic cables and copper cables). With only 1.75m available on the road reserve for telecommunication services, it is virtually impossible for three operators to lay their ducts side-by-side without damaging each other's cables and causing major disruptions to telecommunications services. In addition, the Roads Department, local authorities and DEA would not be amenable to having pavements and road network continuously demolished as each operator digs trenches for its cable ducts.

On the other hand each operator has a legitimate right to use the most efficient and technological advanced method to offer the best services to its customers. Thus Mascom, Orange and any future Public Telecommunications Operator have a right to use the space allocated for telecommunications services along the road reserves.

Sharing cable ducts is always a contentious matter because the incumbent operator will argue that they invested huge sums of money to develop such infrastructure and is therefore entitled to use it either exclusively for its own purposes only or is entitled to recover its investment. New entrants often argue that such infrastructure was developed during monopoly period during which the incumbent operator charged exorbitant rates using the same argument of cost recovery. Some would also argue that most investment made during the monopoly period was heavily subsidised through government funding and thus such infrastructure should be regarded as national asset rather than as belonging to the incumbent operator and should therefore be made available to all public telecommunications operators on equal terms since all operators serve the public and deliver services that contribute equally to national development.

In some cases, cable ducts could be full and there may be no space to cater for the requirements of the other operators. However, it is normal practice for full cable duct networks to be expanded to cater for increased demands. It is still much easier to expand an existing cable duct than to build a new one next to the old duct.

Recommendation 17: *It is recommended that, sharing of cable ducts should be mandatory between all the Public Telecommunications Operators.*

Recommendation 18: *Any Public Telecommunications Operator that constructs a cable duct system should make provision to share with other PTOs. PTOs should agree a procedure for implementing this requirement, failing which any PTO may appeal for BTA's intervention. The agreement should be lodged with BTA for information and filing.*

Recommendation 19: *Each Public Telecommunications Operator that has a fibre cable network should develop a standard agreement for leasing of spare fibres to other operators.* The standard agreement should be submitted to BTA for filing, save that BTA shall have the power to raise any issues it considers relevant.

Recommendation 20: *All infrastructure development forums such as the Urban Development Committee should be restructured to include all key stakeholders in the communications industry (e.g. all PTOs, representative of the Association of ISPs, etc.). The implementation of this regulation would involve consultation with other relevant and competent bodies such as the relevant urban local council, Ministry Local Government and the Ministry of lands.*

Recommendation 21: *Infrastructure planning should include consultations with key stakeholders in the communications sector (PTOs, the Association of ISPs, etc.) to ensure that their requirements are incorporated in land development plans. Just like recommendation 20, the implementation of this recommendation, if accepted would, involve stakeholders other than BTA and the MTC.*

4.1.8 Options for sharing cable ducts

While we recommend that sharing of cable ducts should be mandatory between Public Telecommunications Network Operators, we have decided to outline possible options that could be adopted to facilitate the sharing of ducts.

4.1.8.1 Option 1: BTC leases duct space to other PTOs

Under this option, BTC will lease duct space and dark fibres to other Public Telecommunications Operators. This is the model that is adopted by most countries when they open their telecommunications markets. In this case, BTC would develop a standard leasing framework for its ducts and dark fibres. The model agreement would include terms and conditions for leasing, including proposed charges. The model agreement would also include a Service Level Agreement with penalties for failure to meet service delivery targets, quality of services targets, etc.

The PTOs would negotiate the terms of the model agreement and try and reach an agreement. The agreed terms and conditions would be submitted to the BTA. BTA may request the parties to review any aspects of the model

agreement that it feels are not in the best interest of the public. However, BTA would not interfere to get a better deal for any operator, save in the case of a dispute. In the event the parties cannot reach an agreement, they would refer the matter to BTA for a determination.

Advantages and disadvantages of this Option 1:

The advantage of this option is that the parties could come up with a commercially agreed solution that meets their requirements without interference from the Government or regulator.

The major disadvantage of this option is that it invariably leads to protracted negotiations which generally end up with a declaration of a dispute. This is then followed by a lengthy determination process as the regulator tries to gather the facts in order to make what it considers to be a fair determination. The end result is generally that none of the parties is ever satisfied with the final outcome. However, the identified disadvantages can be mitigated by setting strict and enforceable frames lines in the applicable regulations.

4.1.8.2 Option 2: Establish an Open Access Network operator for cable duct infrastructure

Some of the problems often cited as regards Option 1 are:

1. It is in the interest of the incumbent operator to negotiate in bad faith because any delays in providing access to its ducts increases costs for its competitors and thus reduces the level of competition.

2. If, out of desperation, competitors accept exorbitant charges demanded by the incumbent operator then that constitutes a double win for the incumbent operator and a welfare reduction for consumers in the sense that:

    i. The incumbent operator will make a lot of money and;
    ii. Make life difficult for its competitors at the same time due to the fact that their operating costs will be much higher than those of the incumbent operator.

3. The regulator is often accused by policy makers and other industry stakeholders of failing to address what could be perceived as incumbent operator's anticompetitive behaviour as regards providing access to such essential infrastructure. The truth of the matter is that it is often difficult to determine with any level of confidence what constitutes fair and reasonable charges because often the parties to the dispute will bring complex and varied arguments and data to support their point of view.

It is on account of these problems that recently some middle income countries such as Singapore, Australia and New Zealand have insisted on structural separation. Thus under Option 2 the Government could make policy determination for a structural separation of BTC such that its backbone infrastructure would be run by a separate entity on open access principles.

Advantages and disadvantages of Option 2

The advantages of structural separation are that the Government could stipulate clear policy guidelines that the entity would have to adhere to. Structural separation ensures that the entity that operates the backbone network would treat all network operators in a fair and equitable manner since it would not have any direct relationship with any of the service providers. Its main objective would be to ensure the provision of critical infrastructure that is required by all service providers on non-discriminatory terms.

The disadvantage of Option 2 is that the implementation of structural separation could be lengthy and complex. It would also require some legislative changes and a detailed analysis of Government's long term plans as regards the privatisation or otherwise of BTC.

Almost all the stakeholders who commented during the stakeholder's workshop and those who made written inputs supported this option. It appears from the submission from the MTC and interventions during the stakeholder workshop that Government is in principle also inclined to option 2.

4.1.8.3 Option 3: Implement operational separation between BTC's backbone infrastructure and the rest of its operations

This option is a middle ground between Option 1 and Option 2. Under this option, the Government would require BTC to establish a separate unit (call it "BTC Infrastructure" or "BTCI") that would be responsible for operating the backbone infrastructure on open access principles. The Government would stipulate policy guidelines and targets that it (Government) would want in order to achieve its policy objectives at national level. Such policy objectives would be based on input and feedback received from all stakeholders as regards what BTCI should deliver in order to improve the availability of broadband services in Botswana. BTCI would not be allowed to compete with service providers.

Advantages and Disadvantages of Option 3:

This option is much easier and quicker to implement than Option 2. The Government could consult all stakeholders to receive input as regards what their requirements are and how BTCI could facilitate the achievement of

those requirements. The Government could use this input/feedback to prefer a performance contract that would guide BTCI's operations. This option would also give the Government an opportunity to assess its options as regards how it would handle BTCI during the privatisation of BTC.

The disadvantage of operational separation is that there is always the possibility of BTC and BTCI operating jointly to frustrate other service providers since they would still be essentially one company. However legal and regulatory measures could be put in place to address this potential problem.

4.1.8.4 Option 4: All PTOs jointly develop and maintain the fibre optic cable network

There are precedents in Botswana where two or all three PTOs shared the capital cost for the construction of a tower or for pulling BPC power to a shared site.

Thus under this option, PTOs could jointly develop and maintain the fibre optic cable infrastructure. Details such as:

a. Whether BTC is paid some amount (but not full cost recovery) for existing duct network. Or whether only future duct expansion costs will be shared and how.
b. Whether the parties would also jointly own the cable network or whether each party would install and maintain its own cables.
c. How the parties will share the cost of maintaining the duct network.

Such details could be worked out once the parties have agreed in principle to adopt this option.

Advantages and disadvantages of Option 4:

The advantages of this option are that it would require minimal intervention from the Government and BTA. There would be no need for structural separation of BTC which could take a long time due to the complexity of issues that would have to be addressed.

The disadvantage is that the parties would have to prepare a detailed agreement which addresses issues of how ownership of the various facilities would be handled. The agreement would also have to address how the maintenance of the duct network would be handled.

Recommendation 22:

22.1 *We recommend the adoption of option 2 with regards to the sharing of cable ducts. That is, structural separation of BTC.*

22.2. Government should stipulate clear open access guidelines and principles that the entity that would own the backbone (cable ducts) should adhere to in the instruments establishing such an entity.

22.3. In the development of open access guidelines and principles referred to in 22.2 above, Government should consult all the PTOs and other relevant stakeholders such as the BTA.

5 The case for BPC as a telecommunications operator

As shown in Section 1.5, the Botswana Power Corporation (BPC) owns 850 km of fibre optic cable that covers most of the major urban areas and large villages on the eastern side of the country.

BPC management undertook a feasibility study to assess the viability of establishing an entity that would use the excess fibre optic cable network to provide telecommunications services. The study reviewed various models and concluded that such an undertaking would be viable. Accordingly, BPC management made submissions to its Board, the Government and BTA requesting for authorisation to use the excess capacity in its fibre optic network to provide telecommunications services.

We have no mandate to validate BPC's feasibility study and its recommendations. However, we do in principle support and recommend that BPC's infrastructure be made available to other telecommunications operators. Some of the countries with the highest broadband access (e.g. South Korea, Japan) achieved this in part by making use of fibre optic cable infrastructure constructed by their power utilities. Closer to home, South Africa established Broadband Infrastructure Company (Infraco) in 2007 through a structural separation of Eskom whereby the fibre optic infrastructure and associated rights (e.g. rights of way) that had previously belonged to Eskom were transferred to Infraco.

We accordingly support BPC's request for authorisation to provide telecommunications services. This will increase the amount of telecommunications infrastructure in the country and thus lead to more competition in the market which will in turn benefit consumers.

We note that there are other public utilities such as Water Utilities Corporation that have fibre optic cable network although not necessarily to

the same extent as BPC. Our argument in favour of BPC applies with the same force to these entities. The challenge is to bring these entities within the purview of the Telecommunications Act. In our considered view, the current legal framework for the regulation of telecommunications is capable of accommodating the public utilities without any need for amendment. In Section 6 of this Report, we discuss the various categories of licences available under the Telecommunications Act.

Recommendation 23: *It is recommended that BPC's request for approval to use its extensive fibre optic cable network to provide telecommunications services be approved. BTA would determine the type and conditions of the licence that would be granted to BPC.*

Recommendation 24: *We recommend that as part of the implementation of infrastructure sharing BTA should consider taking steps to grant appropriate licences to utilities and other infrastructure owners so as to enable them to offer infrastructure sharing as a service.*

6 Legal Review

6.1 Introduction to Legal Review

In this section we seek to achieve two objectives. The first is to present a brief overview of fundamental documents and principles. For example, we always check to see whether any aspect of constitutional or administrative laws would hinder or prevent implementation of infrastructure sharing. Equally, the implementation of communications infrastructure sharing must necessarily be carried out within the parameters of the general competition law.

The second purpose is to present an analysis of the legislation which supports or constrains communications infrastructure sharing including those relating to deployment, licensing, and other related issues. We have looked at the existing legislation to ascertain to what extent it allows for a sound regulatory framework in so far as communications infrastructure sharing is concerned.

6.2 Foundation documents

No proposal for the creation of any legal framework with a bearing on property rights such as mandated sharing of communications infrastructure can be made without a detailed analysis of a number of basic legal documents. We, therefore, review these documents in some depth below.

6.2.1 The Constitution of Botswana

This is the fundamental law of the Republic. The reason for the examination of this document is that all laws and regulations find their validity from the constitution. Any Act of Parliament that contravenes the Constitution is invalid to the extent of the inconsistency. In some jurisdictions, some activities in the communications sector are or were constitutionally reserved for Government. The example usually cited occurred in the Federal Republic of Germany. Telecommunications activities were found to be constitutionally reserved to the Government. This was contrary to the telecommunications liberalization regime adopted by the Member States of the European Community, of which Germany is a significant member. The result was that the German Constitution had to undergo amendment.

We have reviewed the Constitution of Botswana and amendments thereto. There would appear to be no limitations which would adversely affect the creation of a legal and regulatory framework for the sharing of communication infrastructure. Section 8 of the constitution provides inter alia that no ‘property of any description shall be compulsorily taken possession of, and no interest in or right over property of any description shall be compulsorily acquired’ save under specified circumstances. It

seems to us that mandating communications infrastructure sharing cannot be said to be compulsory acquisition. The property to be shared would still be owned by the person who is required to share with others. In any case section 8(1)(a)(i) allows compulsory acquisition in the interest of public health and country planning purposes. That is, while sharing does not amount to compulsory acquisition of property as contemplated by the constitution; in some instances the constitution does provide for the possibility that infrastructure sharing could be mandated where doing so is required for town planning purposes.

6.2.2 International Treaties and Conventions

Botswana does not exist in a vacuum. It is part of an international community. To this extent, if the Republic of Botswana is a participant in international treaties and/or conventions, such international agreements may have limiting effect on what Botswana can do including on issues such as communications infrastructure sharing.

In Botswana, international treaties and agreements to which Botswana is a party do not automatically form part of national law unless and until expressly incorporated through the legislative process into Botswana law. However, the Courts would generally interpret national law so as to comply with the country's international obligations even in the absence of express incorporation. For purposes of this project, it would be necessary to ensure that whatever reforms are recommended are in line with international treaties signed by Botswana and incorporated into national law. Examples of international agreements bearing on the subject of this Project include the International Civil Aviation Association which the Civil Aviation Authority Act incorporates into domestic law. Botswana has also adopted the International Postal Convention and is a member of the Southern African Power Pool for electricity as well as the International Telecommunications Union. We have reviewed these documents and we see no aspect of which could hinder infrastructure sharing in Botswana.

6.2.3 Existing Policies

We have undertaken extensive review of the relevant policy documents under section 1.6 of this Report. As discussed at that section, the policy documents seem to be in favour of infrastructure sharing save for the broadcasting sector where the policy document is still in a draft form. There is thus no policy obstacle to infrastructure sharing particularly with respect to telecommunications infrastructure. We repeat in this regard, that there is no coherent policy position as regards, sharing of broadcasting infrastructure.

6.3 Review of Applicable Legislation

There are a number of pieces of primary and secondary legislation that bear on the subject of infrastructure sharing in the communications Sector. We identified such laws in the inception report and we discuss them in detail in this section.

6.3.1 The Telecommunications Act [CAP.72:03]

6.3.1.1 General

This Act is set out in eight Parts. Part I of the Act deals with preliminary issues of Title, Commencement and Interpretation, through a comprehensive definitions section; Part II refers to the Establishment, Constitution and membership of a regulatory body known as the Telecommunications Authority; Part III covers the meetings and Proceedings of the Board. Part IV applies itself to the Appointment of officers and employees and agents of the Authority; Part V consists of the functions, powers and duties of the Authority; Part VI relates to Licences; Part VII covers Radio Communications; Part VIII is Miscellaneous Provision part.

6.3.2 The Telecommunications Act and infrastructure sharing

The Functions, Powers and Duties of the regulatory Authority are set out in Part V. Generally, the Authority is required to supervise and promote the provision of efficient telecommunications services in Botswana. Specifically, the Authority is required to:

- Take reasonable steps to promote the provision, throughout Botswana of such telecommunications services as will satisfy all reasonable demands for these services, including emergency services, public call box services and directory information services.
- Promote the interests of consumers, purchasers and other users of telecommunications services in respect of the prices charged for and the quality and variety of such services and equipment or terminal equipment supplied for the purposes of such services.
- Promote and maintain competition among persons engaged commercial activities for or in connection with the provision of telecommunication services, and promote efficiency and economy on the part of persons so engaged.

In section 1.4 of this Report, we showed that, at least in theory an effective implementation of communications infrastructure sharing, may achieve a number of objects which could enhance overall consumer welfare. Such a discussion clearly showed that the theoretical case for infrastructure sharing is broadly in line with the objects of the regulatory authority as stipulated under section 17 of the Act and reproduced in the preceding paragraph. That is, while the Act does not expressly mandate or provide the legal basis

for infrastructure sharing, the Authority can, relying on its general powers and functions, take steps to promote infrastructure sharing. It is our considered opinion that provided that infrastructure sharing can contribute to the realization of section 17 objectives, the Authority is entitled to take necessary steps to promote and if need be to enforce or mandate infrastructure sharing.

Section 26 empowers the Minister to promulgate regulations for the better carrying into effect of purposes and provisions of the Act. The Minster is also given the right, after consultation with the Board, to give the Board specific or general directions regarding the exercise of the Board's powers and the performance of its functions (s. 17 (5). We note that both by law and by practice this is not an unfettered right. The statute provides that (a) the Minister has to consult with the Board, (b) any directions cannot be inconsistent with the Act (c) any directions cannot be inconsistent with any contractual or other obligations of the Authority. Be that as it may, the provision of section 17(5) further reinforces our opinion that there is currently sufficient legal basis for coming up with infrastructure sharing framework. The regulatory powers and functions of the Authority (BTA) are summarized in the following paragraphs:

(a) Tariffs – the Authority is required to publish in the Gazette, the principles established by it and to be applied in the setting of tariffs by operators and service providers. Operators make proposals for their tariffs, which are then submitted to the Authority for approval or counter proposal. If the counter proposal is not acceptable, an appeal lies to the Minister. Tariffs are to be made available to the public and failure to do so attracts a fine. Exceeding published tariffs also attracts a fine.

(b) Competition – under s.20 the regulator is required to monitor competition in the sector and report any contravention of the rules to the Attorney General. Section 48 gives illustrations of what amounts to anti-competitive conduct.

(c) Dispute settlement – s.19. It is normally considered a fundamental part of the regulatory remit for the regulator to assist in settling disputes. This section gives voice to this responsibility. Thus the BTA can be called upon to settle dispute on communications infrastructure sharing once such a framework is place.

(d) Terminal equipment approval – section 21 allows the Authority to regulate the terminal equipment market, by making regulations specifying the type of telecommunications equipment which may be used for providing a telecommunications service, for operating or connecting to a telecommunications system, or for terminal equipment.

(e) Numbering system – the authority is required to establish and maintain a non-discriminatory and efficient numbering system to be applied by all providers and operators of telecommunications services in order to ensure fair access to those services (s.25).

(f) Powers to grant licences – the relevant provisions are contained in Part VI. In summary the Act creates three categories of licences:
- Service Licence (per section 27(1)). Service Licence include the licence for the sale of radio equipment (section 27(2)(e)
- System Licence (per section 28)
- Radio Licence (section 43).

Generally, a comprehensive range of provisions is set out with respect to the licensing function. No person is allowed to provide a telecommunications service or operate a system without a licence save for designated bodies. In this regard we note that certain activities are exempt from licensing (s. 27 (3)).

Section 28 provides for the requirement of a system licence. No person may operate a system without a system licence. A comment on the meaning of a telecommunication system is in order for purposes of establishing the extent, if any to which the legal framework could regulate infrastructure sharing. The Act defines a system licence as:

> *"Telecommunication System means a network of telecommunications equipment which is used or capable of being used to provide a telecommunication service; and for the purposes of this Act, a communication system shall include a radio communication system"*

From the above we can draw the following conclusions:

- Telecommunications Infrastructure to the extent that it is used or capable of being used to provide a telecommunication service is part of a telecommunication system.
- The legal framework thus provides for the licensing of infrastructure in the form of a system licence. As part of encouraging infrastructure sharing the BTA should use its licensing powers to license infrastructure providers.

The current licensing practice is to combine both the service and system licences. However, the Act anticipates that in some cases a person may not be required to have a service licence (for example if he/she self provides telecommunication service in terms of section 27(2) (a) and yet be required to have a system licence. In this regard, it should be noted that while certain entities such as the Botswana Railways are exempt from the requirement of service licence, they are not exempt from the requirement of a system licence. Our reading of the Act is that any person who owns or uses a network or infrastructure for the provision of the telecommunication service

requires to have a system licence that authorizes him or her to own or use the infrastructure regardless of whether or not the system is being used to provide service to the public or not except where such person is exempted with prior written approval of the Minister in terms of section 28(2). It is, therefore clear that the current legal framework does require an infrastructure/network licence albeit in the form of a telecommunication system licence. This finding is very important for purposes of this project. It provides us with a ready tool for the enforcement of infrastructure sharing model that may be developed through licensing. Acting under section 35, which empowers the Authority to impose licence conditions and depending on the final outcome of this project, the conditions imposed pursuant to section 35 may make it mandatory for the licensee to participate in infrastructure sharing subject to the requisite service licence.

With respect to existing licences, the Authority may initiate licence amendment processes pursuant to section 35(1). We note that on its literally reading this section gives the power to initiate licence amendments to the licensee. However, it does not exclude the Authority to initiate licence amendments. Section 17 of the Interpretation Act, section 12 of the Public Authorities (Functions) Act and section 5 of Statutory Instrument Act all provide that the power to grant a licence includes the power to revoke and or amend such licence. However, we are of the view that the best way would be to invoke section 26 of the Act and have the Minister promulgate regulations mandating infrastructure sharing.

Applications for all types of licence have to be made to the Authority accompanied by a fee for a license (s. 29). The Authority, in deciding to award licences is bound to have regard to certain general principles (s.30). These include the following:

- Whether or not the grant of the licence will facilitate the performance of the general functions of the Authority specified in section 17.
- The grant or renewal of a licence will bring benefits to the national economy and to the consumers of the telecommunications services
- The applicant for a licence or renewal can provide the services in a safe and sustainable manner.

We have already pointed out that infrastructure sharing can arguably facilitate the realization of the objects of section 17. In this regard, section 30 entitles the Authority to consider potential benefits to be realized through licensing.

Radio communications – possession or operation of a radio communication network, or radio communication equipment, assembled or unassembled, and the erection of a radio communication network is forbidden without a licence from the Authority (s.42). Contravention results in an offence having been committed and financial penalties apply (s42 (7). Exemption is given for receipt of radio messages only. As stated earlier, exemption is also given

for the Botswana Defence Force, the Botswana Police Service, the Botswana Railways and the Civil Aviation Department, together with others who may be exempted on an ad hoc basis (s.42 (3). We were able to confirm that the Directorate on Economic Crime has been exempted through a regulation under section 42(3).

The authority's regulatory duties with respect to radio communications are set out in s.43. these include: establishing the radio frequency plan for the nation; ensuring that the needs for existing and new radio services are met; monitoring radio frequency use; establishing standards with respect to radio communications in accordance with international regulations; prescribing conditions and tariffs for the allocation of radio frequencies; negotiating with other countries and international organizations in connection with radio frequency spectrum management; establishing technical standards in relation to the radio frequency spectrum; allocating radio frequencies so as to avoid interference, particularly in relation to safety issues.

6.3.3 Compensation for loss or damage occasioned by Operators

The Act does not expressly give the telecommunications operators the right of access to publicly or privately owned property for purposes of infrastructure provision or telecommunications provision. Thus the right of access could be said to be regulated in terms of laws with a bearing on property. However, the Act requires that in the execution of works or interference with property, the telecommunications operators or service provider should cause as little detriment and inconvenience and do as little damage as possible. In addition, such operators are under an obligation to make full compensation to all local authorities and other authorities and other persons who have sustained any loss or damage owing to the works carried out by the telecommunications operators (s.50).

We have the following comments to make on the Telecommunications Act:

- The power of the Minister to give directions to the Board coupled with her/his regulation making powers could be deployment to facilitate the creation of a new framework dealing with infrastructure sharing without the need to amend the Act.
- The Telecommunications Act can accommodate the licensing of infrastructure providers. These operators could provide shared infrastructure to different operators on a shared basis.

- Section 48 is capable of addressing some of the challenges of infrastructure sharing. The concern that infrastructure sharing could encourage operators to collude at a retail level, can partly be addressed by para (a) and (e) criminalizing collusion on the part of operators. While para (j) does not strictly speak to competition, it can also be invoked where technical information exchanged for purposes of

facilitating infrastructure sharing is abused so as to constrain technical innovation.

Recommendation 25:

25.1 *To provide clarity to the licensing and regulatory framework BTA should consider developing a licensing framework*

25.2 *To further facilitate and encourage infrastructure sharing BTA should encourage the licensing of infrastructure providers whose business would mainly be the provision of communications infrastructur*e on a shared basis.

6.3.4 The Telecommunications Regulations, 1997

6.3.4.1 General

The Telecommunication Regulations were promulgated pursuant to section 26 of the Telecommunications Act. It provides details necessary for the implementation of the Act. It is divided into five parts being Part I (preliminary matters); Part II (Telecommunications Networks and Services); Part III (Radio Stations, Radio Communication equipment, Licences; Part IV (Equipment Type Approval) and Part V (Confidentiality, etc of messages).

Part II of the Telecommunications Regulations appears to us to be relevant to the project. It deals with critical issues on infrastructure deployment and thus is pertinent to infrastructure sharing: We restrict our comments to this Part.

6.3.4.2 Right to enter upon land and construct lines

The right to access land and other premises on the part of telecommunications operators is key to successful infrastructure deployment. We have already indicated that multiply applications for access to premises by operators is one of the drivers for increasing calls for infrastructure sharing.

Regulation 6 entitles licensees to enter upon any land, street, road, footpath, waterways or railway for purposes of providing a telecommunication service. This right is subject to the licensee giving not less than 14 days notice to the local authority or any person owning or having the care and management of any such land, street, footpath, waterway or railway of its intention to so enter the concerned property. Once the 14 days has been given, then the licensee may enter the property for purposes of constructing, maintaining and or removal of telecommunications line or pipe or conduct any other work on, under or upon such property as applicable. In addition, the licensee,

may, once on the property alter the position of any pipe under the ground other than a sewer, drain, or mains for the supply of water, electricity or gas. Where the licensee is changing the position of or removing an underground pipe, the owner thereof is entitled to supervisor the works in relation to the pipe and the licensee is to meet the costs associated therewith.

Regulation 7 for its part deals with access by licensees to fenced prosperities. In the event such fence renders access by the licensee impossible, the licensee may at its own expense erect and maintain gates on that fence and provide duplicate keys thereof to the owner or occupier. Where the licensee desires to erect a fence around its line, it must then give the owner or the occupier 21 days notice of his intention to do so.

We note that regulations 6 and 7 provide for the requirement of notice to property owners or occupiers without providing an objection procedure. This omission while unfortunate does not mean that the owner or occupier may not object. Similarly the right to access seems to be restricted to be for purposes of construction or maintenance of telecommunications lines or pipes only.

6.3.4.3 Telecommunications line over private property

In terms of regulation 11(2), where any telecommunications line passing over private property interferes with any building about to be constructed, the owner shall so notify the licensee and provide the necessary proof. The licensee is required within four weeks of receipt of the notification to cause the line to be altered in such a manner that it shall cause no interference with the building to be constructed. Where the owner of property desires that the telecommunication line be altered for any other reason, he/shall give the licensee notice to that effect. The licensee is then given 28 days within which to comply with request or in the event of non-compliance give reasons for the non-compliance to the owner of the property(reg.11(3).

6.4 Summary

- The Telecommunications Act gives licensed operators the right of access with respect to property owned by local authorities and or individuals for purposes of construction or maintenance of telecommunications lines or pipes.
- Both the Telecommunications Act and its regulations assume that the right of way would be requested by an individual operator. However, our contention is that this does not outlaw joint applications for right of access.

- The regulations give emphasis to access for lying of telecommunication lines but say almost nothing about other facilities such as sites and towers for base stations. This is because the application for sites is regulated by laws regulating leases and ownership of property.

- The framework for rights of way applications for purposes of construction and maintenance of telecommunications lines or pipes, under the current legal and regulatory framework established by the Telecommunications Acts and its regulations is applicable to infrastructure sharing arrangements. It can be applied even under the environment of telecommunications infrastructure sharing. However for certainty consideration should be given to:

    - Expressly providing for joint applications and right of access and sites in the infrastructure sharing guidelines or regulations.
    - Providing for objection procedures and timelines where the property owners seek to refuse the right of access.
    - Clear guidelines with respect to fees that may be levied for rights of access and or the method of calculating same particularly with respect to public property and or land etc.

6.5 The Botswana Telecommunications Corporation Act [CAP. 72: 02]

6.5.1 General

The Act is set out in seven Parts. Part I of the Act deals with Preliminary Issues of the Title, Commencement and Interpretation, through a comprehensive definitions section; Part II refers to the Establishment, Constitution and membership of the corporation known as the Botswana Telecommunications Corporation (BTC); Part III covers the meetings and Proceedings of the Board of the corporation. Part IV applies itself to the appointment of officers and employees and agents of the Corporation; Part V consists of the functions, powers and duties of the Corporation; Part VI deals with the financial provisions and accounting and Part VII deals general provisions.

6.5.2 Provisions relevant to infrastructure sharing

Parts five and seven are the ones speaking to infrastructure sharing. Part Five as already pointed out deals with powers, duties and functions of BTC. BTC is given the power and right to operate telecommunications networks and provide telecommunications services under licence or under contract from Government (s.12(1). Section 12(2) then provide functions and duties of the corporation. Other than specific functions relevant to the business of

telecommunications, the corporation is otherwise given all the powers which by law a body corporate may have. However, BTC cannot dispose of immovable property without the prior written approval from the Minister responsible for finance.

Section 13 enjoins the corporation to co-operate with local or other public authorities, including departments of Government in the discharge of its functions. BTC is specifically required to consult with local authorities and other public bodies in relation to matters of concern to BTC. It is strange that the duty to cooperate is restricted to public bodies and other local authorities. One would have assumed that BTC should be obliged to take interest of consumers and cooperate with such consumers.

6.5.3 BTC Act versus infrastructure sharing

The Act as already pointed out subjects BTC to the prevailing legal and regulatory framework (s.12 (1). Thus BTC is subject to the jurisdiction of the BTA as well as the general legal and regulatory framework established by the Telecommunications Act discussed earlier. BTC is as well required to cooperate with other local and public bodies (s.13) in the conduct of its business. This would include public bodies dealing with issues of say land allocation, environmental protection etc.

6.5.4 Compulsory acquisition of land

The functions of the BTC are deemed to be public functions for purposes of compulsory acquisition of land (s.22). This means that if BTC for example, needs a piece of land for purposes of providing or facilitating the provision of telecommunications service, it may with the necessary modifications invoke the provisions of say the Acquisition of Property Act and Tribal Land Act dealing with compulsory acquisition of property for public purposes. In essence, if BTC needs a piece of land, and the owner is not willing to sell and or lease, BTC may through the legal process compulsorily acquire such land, in which case the owner would be obliged to sell his/her property to BTC.

We note that no other telecommunications operator has the same privileges as those conferred by BTC by section 22. With respect to the promotion of competitive provision of telecommunications service, BTC has been given a legislative advantage. BTC can always invoke section 22 or a threat thereof to obtain sites and rights of ways. The ability to have sites on which to deploy infrastructure or rights of ways directly bears on the speedy infrastructure deployment and thereby the ability to compete. On this point alone, the provisions of this section must be reviewed.

With respect to the possibility of infrastructure sharing framework that provides or requires operators to make consolidated or joint applications, for sites and or rights of access, there could be complications when the owner

of the property is not willing to grant the right, in that amongst the joint applicants only BTC would have the right to compulsorily acquire the property. In order to facilitate infrastructure sharing, this section would either have to be amended such that all operators' activities related to provision of service are deemed to be for public purposes or better still to be repealed.

6.5.5 Resettlement measures

In addition to the power to compulsorily acquire property, section 23 gives BTC further privileges, which are not available to other operators. It provides that if the operations of BTC lead to the resettlement of any person dwelling upon any communally owned land, then terms of the resettlement have to be determined by agreement between Government and the local authority of the concerned area. This section, just like section 22 treats BTC as a Government department. For our purposes it suffices to say that it gives BTC an advantage over other operators and deserves to be reviewed as the country moves to an infrastructure sharing regime and equal treatment of all PTOs by the Government.

6.5.6 Compensation for loss or damage

This is dealt with under section 24. If in the execution of works or interference with property as part of the exercise of its powers, BTC causes damage or loss to any person or local authority, BTC is required to pay full compensation. In the event of failure to reach agreement with respect to whether or not compensation is payable or the quantum thereof, the last portion of the section provides that the issue should be referred to arbitration in accordance with the provisions of the Arbitration Act. This section thus takes the matter of compensation outside the Telecommunications Authority and or the courts. In this way, the procedure for BTC is by law different from that of other operators in respect to which there is no statutorily mandated arbitration.

6.5.7 Comments

- BTC is given more privileges and rights with respect to issues with a bearing on infrastructure deployment than other operators. It would be necessary to have a level playing field as part of infrastructure sharing.

- As discussed below BTC may be converted into a corporation under the Companies Act. If and when that happens the BTC Act would fall away.

6.6 Botswana Telecommunications Corporation (Transition Act) [72:05]

The purpose of this Act is to provide for the transition of BTC from a statutory corporation into a company established under the Companies Act. This BTC would do by applying to the registrar of companies under the provisions of section 355 of the Companies Act. While the Transition Act does not expressly repeal the BTC Act, it is clear that from the conversion date, BTC would cease to be a statutory corporation, and would thus lose the privileges we discussed above.

6.7 Competition Act

This Act is of limited application to the issue of infrastructure sharing. It applies to the extent that infrastructure sharing may raise competition issues. In our technical proposal we pointed out thus:

> *"Coordinating future development plans has the potential of disclosing operators' development strategies to their competitors. Operators do not often want to disclose their future plans to competitors. From a regulatory point of view, such coordinated development may lead to collusions at the retail level thus depriving customers of the benefits of competition."*

Collusion is outlawed by both the Telecommunications Act (section 48(2) (a) and the Competition Act (s.25). In theory, if the operators collude with each other, they would be caught either under the Telecommunications Act and or the Competition Act. This potential jurisdictional conflict has however been addressed by section 73 of the Competition Act which provides for cooperation and coordination on the part of the Competition Commission with other sector specific regulators including the BTA on issues that are subject to the jurisdiction of sector specific regulators.

6.8 The Broadcasting Act [CAP. 72:04].

6.8.1 General

This Act provides for the establishment of the National Broadcasting Board and generally the regulation of the broadcasting sector. It is divided into four parts viz, Part I (Preliminaries), Part II (National Broadcasting Board), Part III (Broadcasting Licences) and Part IV (miscellaneous provisions).

The Act established the National Broadcasting Board consisting of 11 members (ss 3-4). The Board is then in terms of section 10 charged with the following functions:

- To issue broadcasting licences.

- Supervise broadcasting activities including the relaying of radio and television programmes in and out of Botswana to places in and outside Botswana.
- To allocate available spectrum resources so as to ensure the widest possible diversity of programming and optimal utilization of the resources.

The Act expressly establishes two types of licences. These are the broadcasting and re-broadcasting licences (s.12). It seems to us that the Board was established to issue broadcasting service licences only. However, it is also arguable that the Board is empowered to issue what under the Telecommunications Act is referred to as radio licences. This appears from section 10(1) (c) which empowers the Board to allocate available spectrum resources. On face of it, this creates overlapping jurisdiction in respect of spectrum management with BTA since BTA's authority over spectrum does not exclude broadcasting spectrum**.** However, in practice this possible conflict is mitigated by the fact that the BTA is the secretariat and technical advisors to the National Broadcasting Board (s.9).

Save for definition of the word broadcasting, the Act is silent with respect to infrastructure (broadcasting is defined by section 2 to mean the distribution of television or radio signals, as defined herein by means of terrestrial, satellite, cable or optical fibre capable of being received on suitable apparatus by members of the public). Unlike the Telecommunications Act, it does not have any provisions dealing with rights of ways, compensation in respect of loss or damage caused by broadcasters in the process of execution of works or interference with property. There is thus no express provision dealing with infrastructure deployment. However, it is arguable that section 10(1)(c) to the extent that it requires the National Broadcasting Board to allocate available spectrum resources so as to ensure diversity of programmes and optimal utilization of the spectrum can be relied upon as a basis by the National Broadcasting Board to promote infrastructure sharing. The National Broadcasting Board can also rely on the following provisions to encourage or mandate infrastructure sharing:

- Imposition of Licensing conditions in terms of section 13(2). Although the Act does not expressly give the Board the power to amend licences at its own motion or at the instant of a licensee, it is entitled in terms of Interpretation Act, the Public Authority (Functions) Act and the Statutory Instrument Act as the guarantor of the licence to amend the licences it issues.

- Through the Code of Practice prescribed in terms of section 21. Such code of practice has a binding effect on all licensees.

- Through regulations prescribed by the Minister in terms of section 23.

6.8.2 Comment

There is an implementation problem that arises due to the fact that telecommunications operators and broadcasters are currently regulated by two different Acts and two different regulatory bodies. This may lead to inconsistencies in the application of whatever framework comes out of this project. However, such a problem may be short-lived. We have been advised that preparations are advanced for the enactment of a converged communications legislation which would subject the whole spectrum of communications to one legislation and one regulatory body.

The other challenge is the scanty or lack of provisions on infrastructure deployment in the Act.

6.9 Civil Aviation Authority Act [CAP.71:03]

The Civil Aviation Authority Act establishes an autonomous regulatory body known as the Civil Aviation Authority for the aviation and air transport sectors. It has a limited bearing on infrastructure deployment which we discuss below.

The Act is divided into eleven parts. Part I deals with definition and interpretations of words and or phrases. Part II established the Authority as a body corporate. Part III provides for the jurisdiction, objectives, functions and powers of the Authority. The objective of the Authority is to promote safe, regular and efficient use of civil aviation in Botswana (s.6). Its functions are stated as being to implement and enforce regulations made by the Minister (s.7). Such regulations deal inter alia with 'the minimizing or preventing of interference with the use of, or the effectiveness of apparatus used in connection with air navigation or communication, and the prohibition of, such signs and lights as may endanger aircraft' (s.49(2)(a)(xxvii). Thus the Authority is implicated in infrastructure deployment in that it has the power for example to determine the height of towers. Operators are therefore required to comply with the requirements of the Civil Aviation Authority with respect to height and colours of towers for example. The procedures and process of the Authority would therefore have to be aligned with the infrastructure sharing framework to be developed particularly with respect to joint applications. This should not be of a major concern and would not require any legislative amendment.

The Act has a welcome provision, which is not for example found in the laws establishing other regulatory bodies such as the Telecommunications Act. Section 11 thereof mandates the Authority to establish consultation mechanisms to secure the views of the users of the Authority's facilities and services and to consult with Government, consumers and other relevant bodies in the performance of its functions.

6.10 Town and Country Planning Act [CAP. 32:09]

The preamble to this Act states its purpose as being to make provision:

- For the orderly and progressive development of land in both urban and rural areas.
- To preserve and improve the amenities of land.
- For the grant of permission to develop land.
- And for purposes ancillary to the development of land.

The Act is divided into six Parts. Part I deals with preliminary issues. Part II deals with the administration of the Act. The Minister is empowered through an order published in the Gazette to declare any area a planning area (s.4). The Act applies only to areas so gazetted (s.4). Section 5 establishes and constitutes the Town and Country Planning Board. The Board's functions are to determine applications for permission to develop land submitted to it and to advise the Minister on matters within its knowledge or on which the Minister may seek its advice (s.5 (3)).

Part III deals with the preparations of development plans. A development plan may, inter alia, define sites for proposed roads, public roads and other works and allocate land for use 'for agricultural, forestry, mining, and other purposes of any class specified in the plan. It is possible therefore that the development plan can specify land specifically for purposes of construction or deployment of telecommunications infrastructure.

Part IV deals with the control and Development of Land and Permission for Development. It gives the Minister the power, through publication in the Gazette for the grant of a development order (s.10). The Board may refuse the application for permission to develop land or grant such permission unconditionally or conditionally (s.11). The development order may make provisions for regulating applications for applying for development permission.

In our opinion, the framework under the Town and Country Planning Act is flexible enough to accommodate applications for permission under a sharing environment. Through the order, the Board may be required with respect to planning areas, to insist that applications from operators should be joined and or show that no other operators is interested in the area in respect of which application is sought. In addition, to the extent that permission may be granted conditionally, the Board may include infrastructure sharing as a condition.

6.11 Tribal Land Act [CAP. 32:02]

6.11.1 General

The Tribal Land Act provides for the establishment of tribal land boards and vests tribal land in such boards. Accordingly, the telecommunications operators seek and obtain right of ways and sites from tribal land boards for purposes of providing services to customers in the concerned tribal territories. The Act is divided into Seven Parts. Part I deals with preliminary issues such as definition of terms. Part II establishes and empowers land boards and subordinate land boards.

Part III deals with the grant of customary land rights. This Part is not applicable to the subject of this study since no customary land rights may be granted for trading, manufacturing, or other business or commercial purposes.

Part IV deals with Grant of Land Rights under common law through leases (s.23). Ownership in tribal land may only be transferred to the state under this Part (s.24). It should be noted that a grant under Part IV may be made to non-citizens only with the prior written permission of the Minister. This means that with respect to corporate bodies such as telecommunications companies, they could be only granted leases under this Part where such companies are wholly owned by citizens or the majority shareholding thereof is in the hands of citizens and or where the Minister has given written consent. Otherwise the grant of such leases for say sites would be invalid.

Part V deals with the compulsory acquisition by the state of tribal land required for public purposes. If the President determines that tribal land which ownership vests in the Tribal Land Board should be acquired by the State the Minister shall serve notice on the land board in question and the district council (s.32). We have already noted that only BTC has been given the power to compulsorily acquire tribal land to pursue its purposes.

Part VI deals with financial and planning provisions with respect to land boards. Part VII deals with general issues such as the power of the Minister to make regulations.

6.12 State Land Act [CAP. 32:01]

This Act regulates the grant of land that is vested in the state. It is a very short Act with only eleven sections. The power to make and execute any grants or disposition of any state land or of any interest in state land is vested in the President (s.3). These presidential powers may be exercised on behalf of the President by any person authorized by the President by publication in the Gazette (s.4). No contract for the sale or other disposition

of state land or any interest therein shall be of any force or effect unless executed under the hand of the President or any person authorized by him/her through publication in the Gazette (s.10).

The person authorized to exercise the President's powers with respect to State land may through publication in the Gazette raise a levy on the occupier of state land for purposes of defraying any expenditure incurred, or to be incurred for the grant of such land and the provision of services and amenities in connection with the use of the land (s.5). That is, the fees for rental of state land must be those set through publication in the Gazette.

For purposes of infrastructure deployment on state land, there is an element of transparency with respect to charges for the land lease as such charges are gazetted.

6.13 The Building Control Act [CAP. 65:02]

The Act's purpose is to authorize the making of building regulations. To give effect to its provisions, the Minister is given the power to establish the Building Regulations Board (s.3). Section 4 then empower the Minister by statutory instrument to make regulations for dealing with the control of buildings. The prescribed regulations deal with the general buildings and are not specific to regulations for purposes of housing telecommunications equipment.

6.14 The Environmental Impact Assessment Act of 2005

6.14.1 General

The Act provides for environmental impact assessment to be used to assess the potential effects of planned developmental activities. It also provides for the requirement for mitigating factors for planned developmental activities with potential adverse effect on the environment as well as the monitoring process and evaluation of the impact of the planned activities on the environment.

6.14.2 Scope of the Act

The Act applies to activities in respect of which the Minister may, after screening them, by regulation prescribe (s.3 (1). The Minister is required by section 3(2) to prescribe:

- A list of activities which are likely to cause significant adverse effects on the environment or the locations which are environmentally

sensitive and thus require environmental impact assessments before implementing prescribed activities.
- Thresholds determination of environmental assessment with respect to the prescribed activities.
- Criteria which shall be used to determine the likely effects of a proposed activity.

No person is allowed to implement and or undertake a prescribed activity unless the environmental impact of the proposed activity is fully taken into account (s.4). It is a criminal offence so to do.

Section 5 is particularly relevant to the communications infrastructure deployment. It enjoins any authority that issues licences, permits, consents or approvals in relation to prescribed activities, to ensure that the requirement of the Act in relation to the carrying out of the environmental impact assessment has been complied with. Accordingly permits for rights of ways and or applications for development of sites are generally subjected to the requirement of environmental impact assessment.

Part II – V deals in detail with respect to the stages, processes and procedures for environmental impact assessment, which developers including communications operators in the process of deploying communications infrastructure must comply with. We have discussed this in detail in section 4.1.3 of this Report. No purpose will be served by repeating same here. It suffices to state that the Act does not have any provision that would outlaw joint applications for environmental impact assessment related authorization under a mandated infrastructure sharing regime. In any case, we have already indicated that the current sharing arrangements amongst PTOs have in part resulted from the requirement of the EIA's agencies encouraging sharing.

7. Regulations and Guidelines on Communications Infrastructure Sharing

As pointed out in the introduction, the terms of reference require the preparation of regulations and or guidelines for infrastructure sharing. The proposed regulations and or guidelines would be intended to implement our recommendations which have been accepted.

One of the issues we had to deal with is with regards to the distinction between regulations and guidelines. Related to this is what issues should be addressed in regulations and which ones should be addressed in guidelines.

Regulations are statutory instruments. They are thus legal instruments and have legal force. In terms of issuance, regulations are issued by the Minister, in our case in accordance with the provisions of the Telecommunications Act (section 26). The regulations take their validity from the Act under which they are issued. In the event of any inconsistency

between the Act under which such regulations are issued and the regulations, the Act prevails to the extent of the inconsistency.

Guidelines on the other hand have less binding force. They do not create any substantive rights. They often deal with procedural issues with the intent to assist the regulated entities meet the requirements of the Act and or the regulations. Guidelines would be issued by BTA. Guidelines thereby introduce an element of flexibility into the regulatory framework.

Our considered opinion is that the BTA should not rush to have regulations on infrastructure sharing. Given the lack of experience with regard to statutorily mandated infrastructure sharing, we recommend an evolutionary approach. This approach would entail at the initial stage the promulgation of guidelines as opposed to regulations. Whether or not regulations would be required would depend on the experience gained from the implementation of the guidelines. Based on such experience, the guidelines may in future be converted into regulations in whole or in part. We are also of the view that guidelines would provide a learning curve in terms of coordination and cooperation with other agencies which work has a bearing on infrastructure sharing as discussed in this Report.

The draft guidelines are accompanied by an explanatory note. The explanatory note provides the rationale for each regulation. This would be achieved, *inter alia*, by referring to the relevant provision of the report that the concerned guideline intends to implement where appropriate.

8. References:

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