

## Digital Infrastructure

### 1.1 Economic Appraisal

#### 1.1.1 Summary of long list

A summary of the long list options, possible targets and success measures, costs and economic benefits<sup>1</sup> is presented in the following tables:

Rural	Targets/ Measures	Costs over 5 years (2020-25)	Estimated Economic Impact 15y	Key qualitative impacts and benefits
<b>1. Do nothing</b>	-	-	-	
<b>2: Do Minimum</b> <i>Supply Side Engagement</i>	<ul style="list-style-type: none"> <li>Increase commercial inward investment by £5m over 5y</li> <li>Obtain £5-10m from funding applications</li> </ul>	£0.5m	£15m	<ul style="list-style-type: none"> <li>Productivity enhanced</li> <li>Aids start ups</li> <li>Teleworking</li> <li>Household benefits</li> <li>Sustains communities</li> <li>Delivers public services</li> <li>Environmental</li> </ul>
<b>3: Do Something</b> <i>Demand stimulation Programme</i>	<ul style="list-style-type: none"> <li>Additional 5% uptake in NGA services over 5-year period i.e. approx. 17,000 premises in the region</li> </ul>	£5m	>£15 - 20m	<ul style="list-style-type: none"> <li>Productivity enhanced</li> <li>Aids start ups</li> <li>Teleworking</li> <li>Household benefits</li> <li>Sustains communities</li> <li>Delivers public services</li> <li>Environmental benefits</li> </ul>
<b>4: Do Something</b> <i>SBCD Procurement</i>	<ul style="list-style-type: none"> <li>100% premises connected</li> <li>4,500 outlying premises</li> </ul>	- £20m	- >£70m	<ul style="list-style-type: none"> <li>Productivity enhanced</li> <li>Aids start ups</li> <li>Teleworking</li> <li>Household benefits</li> <li>Sustains communities</li> <li>Facilitates mobile deployment</li> <li>Delivers public services</li> <li>Environmental benefits</li> </ul>
<b>5: Do Something</b>	<ul style="list-style-type: none"> <li>10 rural community schemes</li> </ul>	<£1m	<£3m	<ul style="list-style-type: none"> <li>Household benefits</li> <li>Sustains communities</li> <li>Delivers public services</li> </ul>

<sup>1</sup> See Annex 4 for economic analysis and impact multipliers

<b>Community Programmes</b>				
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**Table 1 - Rural Economic Summary**

<b>Connected Places</b>	<b>Targets/ measures</b>	<b>Costs over 5 years (2020-2025)</b>	<b>Estimated Economic Impact 15y</b>	<b>Key qualitative impacts and benefits</b>
<b>1. Do Nothing</b>	-	-	-	-
<b>2. Do Minimum</b> <i>Supply Side Engagement</i>	<ul style="list-style-type: none"> <li>Increase commercial inward investment by £10m over 5 years</li> <li>Obtain £5-10m from funding applications</li> </ul>	£0.75m	£20m	<ul style="list-style-type: none"> <li>Productivity enhanced</li> <li>Aids start ups</li> <li>Stimulates network build and inward investment</li> <li>Teleworking</li> <li>Household benefits</li> <li>Sustains communities</li> <li>Facilitates mobile deployment</li> <li>Industrial benefits</li> <li>Delivers public services</li> </ul>
<b>3. Do Something</b> <i>SBCD Asset Investment</i>	<ul style="list-style-type: none"> <li>Build and upgrade 150-200km of duct infrastructure</li> </ul>	£10m (see note below)	£60m	<ul style="list-style-type: none"> <li>Productivity enhanced</li> <li>Aids start ups</li> <li>Stimulates network build and inward investment</li> <li>Teleworking</li> <li>Household benefits</li> <li>Sustains communities</li> <li>Facilitates mobile deployment</li> <li>Industrial benefits</li> <li>Delivers public services</li> <li>Increase supply side competition</li> </ul>
<b>4: Do Something</b> <i>SBCD procurement</i>	<ul style="list-style-type: none"> <li>Minimum of 281 public sector sites connected</li> <li>184km of ducts and fibre infrastructure deployed</li> </ul>	£20m (see note below)	>200m (£133m in Swansea City alone)	<ul style="list-style-type: none"> <li>Productivity enhanced</li> <li>Aids start ups</li> <li>Stimulates network build and inward investment</li> <li>Teleworking</li> <li>Household benefits</li> <li>Sustains communities</li> <li>Facilitates mobile deployment</li> <li>Industrial benefits</li> <li>Delivers public services</li> <li>Increase supply side competition</li> </ul>

**Table 2 - Connected Places Summary**

NOTE; The blend of public sector owned ducts and commercial owned duct investment will be determined in procurement. In option 4 in the table above we estimated the total blended costs of these two options is £20m i.e. if a procurement takes place it will include costs of options 3.

Next Generation Wireless	Targets/ measures	Costs over 5 years (2020-25)	Estimated Economic Impact 15y	Key qualitative impacts and benefits
<b>1. Do Nothing</b>	-	-	-	
<b>2. Do Minimum: Supply side market engagement</b>	<ul style="list-style-type: none"> <li>Increase commercial inward investment by £3m over 3 years</li> </ul>	£0.75m	£3m	<ul style="list-style-type: none"> <li>Stimulates network build and inward investment</li> </ul>
<b>3. Do Something: Undertake Future Telecom Infrastructure Review guidance in full &amp; Driving SRN</b>	<ul style="list-style-type: none"> <li>Increase commercial inward investment by £7m over 3 years</li> </ul>	£2.0m	£7m	<ul style="list-style-type: none"> <li>Stimulates network build and inward investment</li> <li>Teleworking</li> <li>Household benefits</li> <li>Sustains communities</li> <li>Facilitates mobile deployment</li> </ul>
<b>4. Do Something Funded Intervention to extend 4G coverage to at least parity with other parts of</b>	<ul style="list-style-type: none"> <li>Increased investment by operators to improve coverage, £10m - £30m</li> </ul>	£9m	£10m - £30m	<ul style="list-style-type: none"> <li>Productivity enhanced</li> <li>Stimulates network build and inward investment</li> <li>Teleworking</li> <li>Sustains communities</li> <li>Facilitates mobile deployment</li> </ul>
<b>5. Do Something Funded intervention to deliver 5G and IoT connectivity in selected locations</b>	<ul style="list-style-type: none"> <li>Accelerated deployment by operators of 5G and IoT services over the first 5 years</li> </ul>	£7.5m	£13.5m	<ul style="list-style-type: none"> <li>Productivity enhanced</li> <li>Aids start ups</li> <li>Stimulates network build and inward investment</li> <li>Teleworking</li> <li>Household benefits</li> <li>Sustains communities</li> <li>Facilitates mobile deployment</li> <li>Industrial benefits</li> <li></li> </ul>

**Table 3 – Next Generation Wireless Summary**

It should be noted that many of these options are complementary and should be undertaken as part of a package of interventions for each of the three target market segments.

***In addition, options should not be evaluated on total economic impact alone as each option will have different economic and social implications and risks.***

In all cases there are significant benefits that are non-quantifiable. The challenge is that all options offer these benefits, other than the do-nothing option. The measure is to what degree the benefits can be achieved rather than there being a fixed differential of the different benefits available. The identification of non-quantifiable benefits is a well-trodden path when considering digital connectivity and services and includes;

- Avoiding isolation and loneliness
- Social inclusion
- Digital inclusion
- Empowering communities
- Access to information sources for social benefits
- Access to a wider market of suppliers and money saving
- Time savings in accessing goods and services
- Entertainment access
- Educational resource access
- Health resource access

## 1.1.2 Long list to short list criteria assessment

In order to derive a preferred short list of options, each of the long list options has been assessed against the critical success factors for the programme as summarised in Table 18 above.

The table presents each long list option against each of these success factors and colour codes accordingly with green strongly achieving the criteria through to red where there is limited benefit.

Rural Options	Aligned to Strategy	Economic Impact	Achievability	Affordability	Attraction to Supply Chain	Programme Compatibility	Risk	Rank
1. Do Nothing	Poor	Poor	Poor	Good	Poor	Good	Poor	5th
2. Supply Side Engagement	Good	Medium	Good	Good	Medium	Good	Good	2nd
3. Demand Stimulation	Good	Good	Good	Good	Good	Good	Good	1st
4. SBCD Procurement	Good	Good	Medium	Medium	Medium	Medium	Medium	3rd
5. Community Programmes	Good	Poor	Poor	Medium	Poor	Medium	Poor	4th

  

Connected Places	Aligned to Strategy	Economic Impact	Achievability	Affordability	Attraction to Supply Chain	Programme Compatibility	Risk	Rank
1. Do Nothing	Poor	Poor	Poor	Good	Poor	Good	Poor	4th
2. Supply Side Engagement	Good	Medium	Good	Good	Good	Good	Good	1st
3. SBCD Asset Investment	Good	Good	Good	Good	Medium	Good	Medium	2nd
4. SBCD Procurement	Good	Good	Medium	Good	Medium	Good	Medium	2nd

  

Next Generation Wireless	Aligned to Strategy	Economic Impact	Achievability	Affordability	Attraction to Supply Chain	Programme Compatibility	Risk	Rank
1. Do Nothing	Poor	Poor	Poor	Poor	Poor	Good	Poor	5th
2. Supply Side Engagement	Good	Poor	Good	Good	Good	Good	Good	1st
3. Undertake 'Future Telecom Infrastructure Review guidance	Good	Medium	Good	Good	Good	Medium	Good	2nd
4. Funded Extension of 4G Coverage	Good	Medium	Medium	Poor	Medium	Medium	Medium	4th
5. Funded Intervention for 5G and IoT deployment	Good	Poor	Good	Good	Good	Good	Medium	3rd

Table 4 - Success Factor Map<sup>2</sup>

<sup>2</sup> See Annex 5 for analysis framework

In order to derive these scores an economic case workshop was held attended by the digital leads from each of the authorities. The scores were discussed, captured and circulated for comment. The analysis in Table 24 presents the consolidated view.

There are a number of key external risks and challenges that could potentially impact the delivery of the proposed SBCD Digital Infrastructure Programme, these are:

- **State Aid:** It will be time consuming and costly for SBCD to undertake its own state aid application – typically 2 years and several man years of resources. In addition, the process remains uncertain given Brexit. If SBCD wishes to minimise risk in this field, it should:
  - Prioritise demand side measures (e.g. vouchers, demand stimulation) which do not attract state aid issues
  - Undertake rural in-fill procurements working in conjunction with national or regional programmes that have or are obtaining state aid clearance (e.g. Welsh Govt or DCMS Rural Gigabit Connectivity). This also applies to Community led schemes. However, SBCD should retain local control and direction of any intervention
- **Supplier appetite:** Industry is constrained in its capacity and the SBCD is competing with similar measures across the country, including in Wales. The key risks are:
  - Community schemes may attract smaller specialist operators, but there is a risk they do not attract sufficient industry appetite
  - Connected City/ Economic development full fibre projects may be viewed as less attractive outside central urban areas such as Swansea. In this case a blend of Full fibre procurement and public asset investment may be more appropriate
  - 5G Use Case projects are likely to overlap with those being undertaken within the UK and particularly across Wales. It will be necessary to harmonise efforts within Wales to maximise the opportunities of 5G and to benefit from the outcomes of other's Use Cases, particularly where this involves commercial models of intervention
- **UK and Welsh Government Programmes:** Such programmes will part fund and address the challenges the region faces. The key challenges are;
  - Funding and programmes do not materialise in a timely manner
  - Such funding does not fairly reflect the needs of the SBCD region
  - SBCD funding is used in-lieu of funding when other sources are available.
- **Ability to recruit and attract resources** to lead the digital programme and undertake all procurement, stimulation and co-ordination activities. Failure to have such resources would lead to a failure to deliver economic benefits
- **Stakeholder co-ordination** between authorities and other key stakeholders such as Welsh Govt and PSBA could result in delay and increased costs
- Under any heading, **Do-nothing will be in breach of UK and Welsh policy** objectives and commitments at the local authority level, but not SBCD level

These risks will be captured, monitored and reported. A summary of the risks under each of the intervention areas has been described in sections 1.3.6 (Connected Places), 1.4.6 (Rural) and 1.5.6 (Next Generation Wireless)



### ***De-Selected Options***

- Do-Nothing is negative in all cases and is therefore not considered further
  - ***Rural***
- Option 5 is negative on nearly all measures and is therefore rejected
  - ***Next Generation Wireless***
- Option 2 offers very limited economic impact and is therefore rejected
- Option 4 offers a neutral position and will be provided through SRN

### **1.1.3 The Preferred Option(s)**

Given the above analysis a recommended strategy will consist of the following blend of activities

#### **Rural**

- Option 2: Supply side engagement
- Option 3: Demand stimulation programme
- Option 4: SCCD led in-fill procurement BUT only if;
  - State aid compliant
  - Utilising national state aid and procurement programmes but under SBCD financial and operational control

#### **Connected Places/Economic Development**

- Blend of Options 3- an investment in public sector owned duct infrastructure and 4, a procurement of commercial owned full fibre infrastructure should be undertaken. The blend of these two options will depend on supplier appetite to be defined in market testing with a total budget of ceiling of £20m

#### **Next Generation Wireless**

- Option 3, namely compliance with the guidance provided in the Future Telecoms Review should be executed under a central SBCD mandate and management, but would require the agreement and cooperation of all member authorities. In addition, the provisions of SRN should be a key focus with the aim of ensuring Wales receives the right level of additional coverage and that it is first in the queue for action with at least two mobile operators
- Option 5, selected funded interventions to deliver 5G and IoT connectivity in key locations should be executed under a central SBCD mandate and management

## 1.1.4 Sensitivity Analysis

### **Rural**

The following sensitivity analysis has been considered

- ***Demand stimulation activities deliver a lower take up of next generation services***

In this analysis an industry standard benchmark has been used, demand stimulation delivers a 5% uptake in next generation services over 5 years equating to approximately 17,000 properties delivering an economic benefit of >£100m over 15 years. Hence a failure to deliver each 1% rise in take up results in a reduction in connectivity of 3400 premises and >£20 of economic benefit.

- ***Lack of state aid compatible procurement channels restricts ability of SBCD to undertake in-fill procurement***

This would result in an estimated 3-5000 outlying premises being without access to broadband services and an economic loss of approx. £50m over 15 years as well as social and environmental consequences. This cannot be replaced by demand stimulation activities.

### **Connected Places**

The following sensitivity analysis has been considered

- ***Industry unwilling to utilise public sector assets***

If there is an unwillingness of industry to use public sector duct assets as a result of commercial or state aid concerns there will be an estimated economic loss of £60m to the region, notably in the development zones outside of central Swansea (e.g. Milford Haven/Pembroke Dock)

- ***Industry only wishing to respond to procurement addressing central Swansea rather than region as a whole***

A detailed cost model has been produced showing the costs of required infrastructure investment in each of the connected cities/ development zones areas. This is presented below:

	Length of network	Cost (£)
<b>Carmarthenshire</b>	63.2Km	£5.7m
<b>Neath Port Talbot</b>	42.7Km	£4.1m
<b>Pembrokeshire</b>	17.9Km	£2.1m
<b>Swansea</b>	60.7Km	£5.7m

**Table 5 – Fibre Network length & cost**

However, it should be noted that Carmarthenshire build is focused on Carmarthen and Cross Hands which are now subject to a BT build programme. This is likely to restrict supplier appetite.

In the event that industry only had the commercial appetite to invest in Swansea the cost would fall to £5.7m, delivering an economic benefit of over £133m over 15 years. This high cost benefit ratio derives from the concentration and density of business in Swansea compared with the other proposed build areas of Pembroke, Milford Haven, Llanelli and Neath/Port Talbot.

- ***Failure of Welsh Govt to deliver trunk road infrastructure***

The Welsh Government has developed its own business case for the development of a Trunk Road Network across the SBCD region. This network (if built) would deliver significant economic benefit for the SBCD region as it will enhance inward investment opportunities and facilitate enhanced backhaul for mobile deployment. It would also be complementary to the proposed asset upgrade and full fibre procurement programme.

### ***Next Generation Wireless***

The following sensitivity analysis has been considered

- ***Limited industry appetite to deliver 5G and IoT in region***

This would result in a loss of investment of between £5-£10m in the region by the operators. It could also impact the deployment by operators of extended 4G and lead to a wireless infrastructure being of lower capacity and speed than that deployed elsewhere in the UK.

### ***SRN allowed to evolve without support or attention from Wales/SBCD region***

If SRN is allowed to develop without monitoring or proactively driving an SBCD agenda then it will in every likelihood reach the required Ofcom levels of coverage, but localised issues will be left in the margin. The measure is a percentage for the whole of Wales and there is significant variation in how this might be achieved. This sensitivity is really a lost opportunity

### **1.1.5 Conclusions**

The economic analysis for the Digital Infrastructure Programme has concluded that the most economically viable and beneficial interventions of the three areas of the Digital Infrastructure Programme are:

- ***Rural Project***

- A blend of rural options 2 (Supplier engagement) ,3 (Demand stimulation) and 4 (In-fill Procurement) should be undertaken.
- Options 2 and 3 offer a low risk, economic beneficial approach in a deliverable manner.
- In-fill procurement will be dependent on an appropriate procurement channel and state aid but does offer a strong economic impact along with significant qualitative benefits.

- ***Connected Places Project***

- Should be undertaken with a blend of Options 3 (asset investment) and 4 (full fibre procurement) depending on supplier appetite to be defined in market testing.

- ***Next Generation Wireless Project***

- Option 3 should be executed under a central SBCD mandate and management but will require the agreement and cooperation of all member authorities.
- Option 5 should be executed under a central SBCD mandate and management.

A summary of the economic appraisal for each of the three streams within this digital programme is presented in the following table:

	Portfolio	Rural	Connected Places	Next Generation Wireless
A. Economic Impact		£87.5m	£220m	£11.7m
B. Public sector cost (or appropriate value for cost). Note Cost includes total public sector expenditure by SBCD, DCMS and Welsh Government	<b>Note:</b> Additional commercial investment in leveraged by public sector investment	£21.5m	£12.5m	£4.5m
C. Appropriate BCR		3.5	11	1.5
D. Significant unmonetizable costs/benefits		<ul style="list-style-type: none"> <li>• Productivity enhanced</li> <li>• Aids start ups</li> <li>• Teleworking</li> <li>• Household benefits</li> <li>• Sustains communities</li> <li>• Facilitates mobile deployment</li> <li>• Delivers public services</li> <li>• Environmental benefits</li> </ul>	<ul style="list-style-type: none"> <li>• Productivity enhanced</li> <li>• Aids start ups</li> <li>• Stimulates network build and inward investment</li> <li>• Teleworking</li> <li>• Household benefits</li> <li>• Sustains communities</li> <li>• Facilitates mobile deployment</li> <li>• Industrial benefits</li> <li>• Delivers public services</li> </ul>	<ul style="list-style-type: none"> <li>• Stimulates network build and inward investment</li> <li>• Teleworking</li> <li>• Household benefits</li> <li>• Sustains communities</li> <li>• Facilitates mobile deployment</li> <li>• Productivity enhanced</li> <li>• Environmental impacts ( e.g. reduced Co2)</li> <li>•</li> </ul>
E. Significant unquantifiable factors		<ul style="list-style-type: none"> <li>• Central and Welsh Govt Funding</li> </ul>	<ul style="list-style-type: none"> <li>• Commercial appetite to invest</li> </ul>	<ul style="list-style-type: none"> <li>• Commercial appetite to invest in region</li> </ul>

		policy and subsidies • State Aid • Levels and locations of commercial investment • Ofcom regulatory policy	• Role of PSBA • State Aid	•
<b>F.</b> Risk costs by type and residual optimism bias		See Note Below	See Note Below	See Note Below
<b>G.</b> Switching values (for the preferred option only)		See Note Below	See Note Below	See Note Below
<b>H.</b> Time horizon and reason		2021 - 2025	2021- 2023	2021 – 2025

**Table 6 - Economic Appraisal Summary**

It is not appropriate to develop a Risk Cost and Switching Value at this stage. This is because:

- This is a broad Programme and each of the Projects potentially has numerous sub-projects within the chosen options
- The chosen options are based on a number of agreed selection criteria. Whilst some of these are quantitative, many are policy related. In addition the appetite of industry to address the chosen options is critical and this is as yet unknown
- There are a range of external variables that shape risk and whether an option should be undertaken. These include UK and Welsh Government policy, availability of funding, State Aid, user requirements, technological developments and supplier attitude. These are interdependent and cannot be measured as a quantifiable value of threshold

Only when the full scope, sources of funds, costs and commercial approach required for the specific Projects are more fully defined can the risk costs and switching costs be determined.

A summary of the proposed expenditure under each of these three streams is presented in the table below. The table splits out to what potentially is provided by SBCD along with commercial investment and assumed central government grant funding. It should be noted that commercial investment is likely to emerge in two waves. An initial direct contribution to the proposed programme plan. Then in addition, there will be secondary pull through investment by the commercial sector as subsequent investment will be made to enhance and expand the digital infrastructure facilitated by SBCD. This has been presented in the table below. The key assumptions are as follows:

- In the rural Project the Operator is likely to make an initial contribution of up to 20% of project costs. A subsequent second wave of commercial investment will arise as unserved premises are connected and SBCD demand stimulation activities increase take up and demand. There are currently 20,500 white premises. If the SBCD and DCMS programmes establish FFIB in most of these locations and there is a 30% adoption rate, we can expect around 7000 new FTTP customers. In addition, demand stimulation programmes will increase demand for Connectivity products and services across the region. A 5% increase in adoption would lead to around 15-20k new connections.

- In Connected Places experience in cities such as Aberdeen has shown, a multiplier between public and commercial sector investment of >6:1. Hence based on £12m of SBCD investment, commercial contribution of at least >£70m can be expected.

Stream	Proposed Budget	SBCD	Central Funding	Commercial Contribution to Initial Budget	Additional Commercial Pull Through Investment 15 Years
<b>Rural</b>	£25.5m	£8m	£13.5m	£5.0m	>£48m
<b>Connected Places</b>	£20.0m	£12.5m		£9.5m	> £70m
<b>Next Generation Wireless</b>	£9.5m	£4.5m		£6m	>3m
<b>TOTAL</b>	£55.0m	£25.0m	£10.0m	£12.0m	>£120m

**Table 7 - Budget & Source outline**



A split of this expenditure between revenue and capital for the Projects is shown below

<b>Stream</b>	<b>Proposed Budget</b>	<b>Capital</b>	<b>Revenue over 5 years</b>
<b>Rural</b>	£25.5m	£20.0m	£5.5m
<b>Connected Places</b>	£20.0m	£19.5m	£0.5m
<b>Next Generation Wireless</b>	£9.5m	£7.5m	£2.0m
<b>TOTAL</b>	£55.0m	£47.0m	£8.0m

Table 8 - Re