

**BEREC PUBLIC CONSULTATION****'ELECTRONIC COMMUNICATIONS SERVICES: ENSURING EQUIVALENCE IN ACCESS AND CHOICE FOR DISABLED END-USERS'****RESPONSE FROM SORENSON COMMUNICATIONS, INC.****NOVEMBER 2010****1. Introduction**

- 1.1 Sorenson Communications, Inc. (*Sorenson*) welcomes BEREC's attention to the important issue of access for disabled end-users to electronic communications and is grateful for the opportunity to respond to the consultation, 'Electronic communications services: Ensuring equivalence in access and choice for disabled end-users' (the *Consultation*).
- 1.2 Founded in 2000 and based in the United States, Sorenson is the leading developer and provider of telecommunications technology for Deaf people. Sorenson has particular expertise providing Video Relay Services (*VRS*), which enable Deaf callers to conduct video relay conversations through a qualified sign language interpreter. Our comments on the Consultation therefore focus on the Deaf sign language community.
- 1.3 We share BEREC's assertion in the Consultation '*that the provision of access to and choice of electronic communication services for consumers with disabilities is becoming increasingly important to ensure that all consumers can benefit from new communications services and fully participate in the Information Society.*'<sup>1</sup> Yet, for the Deaf and hard of hearing, access is severely restricted. The Consultation highlights the fact that only 7 Member States out of 27 provide relay services, and in most cases it is only text relay that is made widely available. This situation leaves hundreds of thousands of Deaf end-users in Europe without the functionally equivalent access to telecommunications mandated by the European legislation and required to allow them to participate fully in the workplace and in society. We will demonstrate how VRS is key to opening up telephony for those who cannot use voice and explain why sustainable funding models are crucial to facilitate the introduction of relay services more widely across the EU.
- 1.4 This submission reflects Sorenson's expertise as a provider of VRS. Below, we set out what VRS is and how it compares to text relay services and then go on to respond to those questions of the Consultation where we feel we can provide a constructive contribution to BEREC's work.

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<sup>1</sup> Consultation, page 5.

## 2. Functional Equivalence: how should it be interpreted?

2.1 In relation to telecommunications, one of the most adversely affected disability groups is Deaf people who rely on sign language as their primary means of communication. There are a variety of solutions available for Deaf and hard of hearing users to access telephone services but only one can be considered functionally equivalent, and that is VRS. We have set out below the evidence for this statement.

2.2 The primary characteristic of a conventional telephone conversation for end-users is that it takes place in real time and provides fast access to interactive and expressive communication. Awkward text-based relay services, whereby text typed by a Deaf person using a 'textphone' or computer is read out to a hearing person and the spoken word is relayed to the Deaf person as text, do not satisfy that requirement and are not functionally equivalent to normal voice telephony:

- (a) Text relay services require sign language users to communicate in their second language, say, English in the case of the United Kingdom. To understand the implications of that, it is critically important to understand the differences between written / spoken English and British Sign Language (*BSL*). Not only is meaning conveyed differently in sign language than in standard English; they are, in fact, different languages. A BSL user communicating via a text relay service is effectively having to communicate in a non-native, second language (written English). By contrast, when using VRS, sign language users are able to express themselves more fully and naturally: using the facial expressions, gestures, and body language that are integral components of sign language and that are impossible to use when communication is restricted to text. This is true for all sign language users across the EU. A MeAC report<sup>2</sup> recognises this point: *'people who rely on sign language as their first language may need or prefer signing with help of video telephony.'*
- (b) In a 2009 Ofcom consultation paper, 'Access and Inclusion', reference is made to the fact that many Deaf people in the United Kingdom find text relay awkward and time-consuming. As a result, Deaf users report getting other people to make and receive calls on their behalf, or otherwise restricting the calls they make;
- (c) Text relay services are much slower than voice communication and do not take place in real time. The time it takes a Deaf or hard of hearing text relay user to type and read messages causes a delay and makes communication cumbersome. It does not allow a fluid conversation in which the participants can interrupt one another, respond instantly to news and so on. Standard voice telephony allows communication at a speed of 170 words per minute (*wpm*), compared to 30 wpm for text relay. VRS however allows an impressive 150 wpm. In 2009, Plum Consulting prepared a study for the UK's Ofcom on voice telephony services for Deaf people (the *Plum Report*) and found that VRS is three to four times faster than basic text relay, and *'offer[s] substantial*

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<sup>2</sup> MeAC - *Measuring Progress of eAccessibility in Europe: Assessment of the Status of eAccessibility in Europe*, European Commission, October 2007.

*improvements in terms of natural, fluid conversation and nuanced expression that conveys emotions and helps clarify the intention behind words.'* This is recognised by the Consultation document which gives the example of the UK where *'because calls using the text relay service take longer than other calls, most providers [give] customers a rebate on these calls.'*<sup>3</sup>

2.3 For the reasons outlined above, many Deaf people who rely on sign language as their first language consider VRS to be the only electronic communications service that is functionally equivalent to voice telephony.

**Figure 1. Comparison between voice telephony, text relay services and video relay services**

| Feature                   | Voice telephony   | Text relay services   | Video relay services  |
|---------------------------|---|---|---|
| Language of communication | End-users are able to express a range of emotions in the spoken language of their choice    | Written language. As with email, SMS or instant messaging, it is difficult for sign language users to express feelings, emotions and humour. There are also significant language barriers for many Deaf individuals | End-users are able to converse in their first language, sign language, and express a range of emotions                      |
| Speed of communication    | Approximately 170 wpm <sup>4</sup>  | Approximately 30 wpm <sup>5</sup> (and dependent on typing skills of user)  | Approximately 150 wpm <sup>6</sup>  |
| Mobility                  | Choice of fixed line and mobile. The latter is fully portable to all areas within a network | Fixed to location of text equipment   | Currently fixed line only in the United States but mobile solutions are in production and will be brought to market shortly |

<sup>3</sup> Consultation, page 26.

<sup>4</sup> Plum Report, page 19, Figure 5.1.

<sup>5</sup> Ibid.

<sup>6</sup> Ibid.

- 2.4 VRS calls are placed in the home or at work. They are held over a standard broadband Internet connection through specially designed, easy-to-use, videophones connected to a TV monitor. During a video relay call, the Deaf user sees a sign language interpreter on the monitor and signs to the interpreter, who then calls the hearing user via a standard telephone line and relays the conversation in real-time. The act of interpretation in these two different media creates the functional equivalent of hearing-to-hearing communication. Please see Annex 1 for further information as to how VRS works.
3. **Consultation Question 2:** *Do you agree that the factors listed in sections 3.1.1 and 3.1.2 are important to consider when assessing equivalent access? Are there other factors which should be considered? Are some factors more important than others?*
- 3.1 The factors listed in 3.1.1 (availability of terminal equipment, price, number of additional suppliers and number of additional set-up) are crucial when assessing equivalent access to telecommunications services for Deaf end-users. The most important factors, of those listed, are price and the availability of terminal equipment. However, we believe that a fifth factor, the *availability of services* which provide equivalent access, is, along with the *price of such services*, crucial to assessing equivalent access.
- 3.2 Despite the life-changing benefits that real-time access to telecommunications for Deaf end-users would bring, VRS is not widely available in most EU Member States (we note from the Consultation that only 7 Member States currently provide any type of relay service)<sup>7</sup>. In addition, where private providers have sought to offer VRS, the lack of a sustainable funding mechanism has prevented widespread uptake. Deaf people are generally on disproportionately lower incomes and cannot be expected to pay for specialist services. As part of the functional equivalence test, they should pay no more than a hearing person pays for a telephone call. Indeed, the Consultation notes that '*In addition to the considerations regarding the price of specialist terminal equipment, it is important that end-users with disabilities should not have to pay additional charges to use the same electronic communications services as other end-users.*'<sup>8</sup> If Deaf end-users are to enjoy functionally equivalent access to telecommunications services then it is imperative that all Member States consider mandating VRS, supported by an appropriate funding mechanism which will allow Deaf end-users to access the service at no extra cost to a normal telephone call.
- 3.3 The availability of terminal equipment is interwoven with the availability of suitable services for Deaf end-users and the funding provided. In the case of VRS, terminal equipment is already available and well developed for fixed line users. However, in the majority of Member States, Deaf end-users are unable to obtain such equipment because of the two-fold problem of not being able to afford the equipment and either not having access to a VRS service or, where one is available but does not benefit from funding support, not being able to afford it.

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<sup>7</sup> Consultation, page 14.

<sup>8</sup> Consultation, page 26.

- 3.4 The simplification of the set-up process for Deaf end-users is also important to encouraging wide adoption of services which enable equivalent access. Measures that can facilitate this include:
- (a) a simple registration procedure for relay services such as VRS;
  - (b) ensuring that the necessary equipment is interoperable between providers;
  - (c) providing in-home set-up carried out by engineers skilled in the use of sign language; and
  - (d) providing a choice of relay services to Deaf end-users and making it easier for them to switch between providers without needing to alter other aspects of the telecommunications package such as their broadband provider.
4. **Consultation Question 3:** *Do you agree that the factors listed above (section 3.2.1 and 3.2.2) are important to consider when assessing equivalent choice? Are there other factors which should be considered? Are some factors more important than others?*
- 4.1 We agree that a 'range of service providers that provide accessible services' as well as the ability of Deaf end-users to exercise choice are important when assessing equivalence of choice. However, it is also important to ensure that there is genuine competition, and therefore a genuine choice, between undertakings providing accessible services and not just a choice between telecommunications companies who then all provide access to the same relay service. Moreover, provision of the service should not be restricted solely to incumbent telecommunications companies, but must also allow for entry of new specialist service providers.
- 4.2 In the UK for example, Deaf end-users can currently access text relay services from any provider of fixed line telephony, however, this does not allow them to make a choice based on the quality or type of service provided. In fact, British Deaf end-users are provided with access to only one service – Text Relay, from one provider – BT.
- 4.3 Competition among relay service providers benefits both end-users and providers of relay services. Users will receive a better service, lower prices and innovative products, while service providers will have the opportunity to make profits.
- 4.4 The competitive market for VRS established in the United States provides a ready precedent for the advantages of competition between providers of relay services. For example, the regulatory requirement for speed of answer is that 85% of calls must be answered within 2 minutes. As a result of competition, the average speed of answer is now 10 seconds. Competition has also resulted in the number of video phones available for Deaf people growing from 1 to as many as 8.
- 4.5 In light of the above, we believe that it is crucial for Member States to find a funding mechanism that provides the correct incentives for the proper provision of relay services, such as VRS, by multiple providers and at a cost no greater than that of a normal phone call.

5. **Consultation Question 4:** *In your view, should the obligations currently in place under USO, for end-users with disabilities, be placed on all service providers? If no, what types of service providers, considering factors such as financial impact (cost), should the obligations be placed on? What is your view in relation to alternative mechanisms for funding?*
- 5.1 Due to the costs of providing relay services and, in particular VRS, to Deaf end-users, we feel it would represent an unfair burden to impose such obligations on just one provider. Accordingly, a funding mechanism should be found that would involve all telecommunications providers in funding relay services while ensuring that end-users benefit from a choice of relay service providers.
- 5.2 The Universal Service Directive (the **USD**) and its accompanying recitals contemplate a number of possible funding models to facilitate the provision of universal service. Indeed, the USD provides specific authorisation for national regulators to impose charges to share 'the cost of universal service obligations' as set out in Chapter II of the USD (including, under Article 7, the obligation to provide equivalent services to disabled end-users).<sup>9</sup>
- 5.3 The recitals to the USD elaborate on the methods for funding Chapter II services. Recital 21, in particular, notes that, *'where a universal service obligation represents an unfair burden on an undertaking'*, it is *'reasonable for established net costs to be recovered from all users in a transparent fashion by means of levies on undertakings. Member States should be able to finance the net costs of different elements of universal service through different mechanisms, and / or to finance the net costs of some or all elements from either of the mechanisms or a combination of both.'*<sup>10</sup>
- 5.4 The funding mechanism is key in order to align the interests of providers with those of the users they serve and to deliver truly equivalent access for disabled end-users. Simply imposing a requirement on telecommunications companies to provide a loss-making service will not bring about the results that the revised USD seeks to secure.

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<sup>9</sup> USD, Article 13

*'1. Where, on the basis of the net cost calculation referred to in Article 12, national regulatory authorities find that an undertaking is subject to an unfair burden, Member States shall, upon request from a designated undertaking, decide:*

*(a) to introduce a mechanism to compensate that undertaking for the determined net costs under transparent conditions from public funds; and/or*

*(b) to share the net cost of universal service obligations between providers of electronic communications networks and services.*

*2. Where the net cost is shared under paragraph 1(b), Member States shall establish a sharing mechanism administered by the national regulatory authority or a body independent from the beneficiaries under the supervision of the national regulatory authority...'*

<sup>10</sup> USD, Recital 21.



6. **Consultation Question 6:** *Do you consider it appropriate that NRAs have a role in encouraging the availability of terminal equipment, in accordance with Article 23 (a) (ii)? If yes, what do you consider that NRAs could do to achieve this?*
- 6.1 We consider that NRAs do have a role in encouraging the availability of terminal equipment under Article 23(a)(ii). In addition, Member States are obliged to adopt specific measures to ensure access to, and affordability of<sup>11</sup> telecommunications services. The availability and affordability of terminal equipment is essential to enabling such access. Accordingly, NRAs should ensure that terminal equipment is subsidised.
7. **Consultation Question 7:** *In addition to the services, features and types of terminal equipment listed, are there any others which you consider necessary to ensure equivalent access?*
- 7.1 We welcome the inclusion of video relay in the list of services in 4.1.1 and underline again that, for Deaf sign language users, VRS is the only functionally equivalent service.
8. **Consultation Question 8:** *Where services, features or terminal equipment suitable for end-users with disabilities have been provided voluntarily, has there been encouragement from NRAs, Government or other parties, or does it appear that the market is delivering and will continue to deliver of its own accord?*
- 8.1 Unfortunately, as the data demonstrates, the market alone cannot be relied on to meet the demand for VRS from the EU's Deaf community. At present, according to the Consultation, only 7 countries (*i.e.* only a quarter of EU Member States) have any kind of relay service. The MeAC report found that the majority of user organisations (64%) reported 'no progress' having occurred in the availability of video telephones between 1997 and 2007.<sup>12</sup> This compares poorly with other economies such as the United States, where VRS has been widely available at no cost to users since 2003 on a 24 hours a day, 365 days a year basis.
- 8.2 Without some kind of market intervention and financial support, there is an insufficient business case for potential VRS providers to enter European markets and insufficient resources to provide an adequate service to Deaf users. We support the conclusions of the MeAC report that '*very few countries have the necessary set of measures in place to ensure anything close to real service equivalence for disabled users today...in terms of service quality, costs and choice*' and that '*sufficient progress is unlikely to be achieved without (further) EU-level intervention*'.<sup>13</sup>
- 8.3 We believe that establishing sustainable funding models for the provision of universal VRS will result in the creation of a market for these services, greatly enhancing the ability of Deaf end-users to access telecommunications services and all the benefits

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<sup>11</sup> USD, Article 7(1), 23(a).

<sup>12</sup> *MeAC Report*, October 2007, page 34.

<sup>13</sup> *MeAC Report*, October 2007, page 41.

that that would bring. The market has the potential to provide the service, provided sufficient funding is available to bring the service within the reach of Deaf end-users.

9. **Consultation Question 9:** *What consideration should be given to NRAs mandating undertakings to provide services, features or terminal equipment for end-users with disabilities as part of the standard services and packages they offer?*
  - 9.1 Once again, the key consideration is funding for these services, features and equipment. Simply mandating undertakings to provide loss-making services, however, is a dead-end. In a situation where an obligation to provide relay services is placed on all telecommunications companies, there will never be any incentive to encourage take-up of the service or to invest in R&D because the services will be loss-making (and indeed the more users utilising relay services, the more expensive its provision will become). Unless and until the entities paying the majority of the service and the entities providing it are separated, relay services will never be made widely available and Deaf users in the EU will continue to be short changed. Accordingly, any obligation to provide services, features or equipment as standard must be accompanied by a sustainable funding model that provides incentives for the provision of these services.
  - 9.2 As noted above, we believe that genuinely useful and innovative relay services can only be achieved by distinguishing between the providers of relay services and those who ultimately pay for them. It is equally crucial that multiple providers (incumbent telecommunications companies or new, specialist, service providers) compete with each other for the custom of Deaf end-users and, thus, a greater share of the monies made available for relay services (for the benefits of competition, see paragraph 4 above).
  - 9.3 Regarding the consideration of proportionality, we do not agree with the assertion in the Consultation that the low up-take of VRS in Germany means that providing a choice of providers would be disproportionate on grounds of cost. Firstly, up-take of VRS has been widespread in Sweden and the United States where it is suitably priced for Deaf end-users. Secondly, competition between VRS providers is likely to improve services and, in time, reduce costs. Finally, it should be noted that the provision of VRS does not have particularly high fixed costs and, indeed, providers in the United States are able to operate successfully on a relatively small scale. For these reasons, the assertion in the consultation on pages 55 and 56 that '*with regard to this situation [VRS in Germany] in practice the realisation of any choice of services and providers is limited*' should be reconsidered in light of evidence from other Member States and from the United States.
10. **Consultation Question 11:** *Where a subsidy is available for services, features or terminal equipment needed for disabled end-users is the up-take as expected and are there any barriers to take-up? If yes, what are the barriers?*
  - 10.1 In the case of the United Kingdom, the main budget for VRS currently comes from a Department for Work and Pensions programme entitled, 'Access to Work', which aims to overcome some of the practical obstacles of employing a disabled person. However, Access to Work can only fund VRS for use in the work place. Clearly, only having access to a telephone during working hours and for business calls is not



equivalent to the service enjoyed by the majority of users. Access to Work also does not provide a sustainable funding model for the long term.

- 10.2 Until the funding question is resolved, VRS will continue to be provided on a small scale or as pilot projects across the EU.
11. **Consultation Question 12:** *If funding is provided to facilitate equivalent access for disabled people, is it best targeted at purchase of equipment, discounts on tariffs, by subsidising special services such as relay services or by direct payment to the user?*
- 11.1 For Deaf sign language users, the key to accessing telecommunications services is having access to a service capable of relaying the spoken word into sign language and vice-versa. The first priority, therefore, should be to provide sustainable funding for VRS throughout Europe so that Deaf end-users are able to access these services and pay no more for equivalent access to telecommunications than the majority of users. The primary cost of VRS is the interpreting time required to relay from the spoken language into the relevant sign language.
- 11.2 Terminal equipment should be the second focus of a funding model.
- 11.3 We do not believe that a model based on direct funding to the end-user is suitable in relation to relay services.
12. **Consultation Question 13:** *Are there any details available on the cost per user of implementing any of the measures mentioned in the report?*
- 12.1 Sorenson Communications recently commissioned economic consultancy Europe Economics to conduct a detailed cost benefit analysis of introducing VRS in the United Kingdom. This may be of interest and we are pleased to attach a copy of this at Annex 2.
13. **Consultation Question 14:** *Are you in agreement that the steps, as proposed above, are appropriate for NRAs to consider when preparing to implement Article 23a? Are there any additional factors that should be considered?*
- 13.1 We agree with the approach set out, however, it should be recognised that some NRAs have already or are currently conducting similar analyses and any action by BEREC should aim to feed into those procedures so as to maximise its impact.

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## ANNEX 1

### HOW VRS WORKS

Video Relay Services (VRS) is a proven technology and has been universally available in the US for many years, provided by several operators.

VRS calls are placed in the home or at work. They are held over a standard broadband Internet connection through specially designed, easy-to-use, videophones connected to a TV monitor. The Deaf user sees a sign language interpreter on the monitor and signs to the interpreter, who then calls the hearing user via a standard telephone line and relays the conversation.





ANNEX 2

EUROPE ECONOMICS – VIDEO RELAY SERVICES IN THE UK

## **Video Relay Services in the UK**

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## TABLE OF CONTENTS

|          |  |           |
|----------|--|-----------|
| <b>1</b> | <b>EXECUTIVE SUMMARY .....</b>                     | <b>3</b>  |
| <b>2</b> | <b>COST BENEFIT ANALYSIS OF VRS IN THE UK.....</b> | <b>6</b>  |
|          | <b>Costs .....</b>                                 | <b>7</b>  |
|          | <b>Economic Benefits.....</b>                      | <b>15</b> |
|          | <b>Benefits to HM Treasury .....</b>               | <b>22</b> |
|          | <b>Summary.....</b>                                | <b>27</b> |

## **1 EXECUTIVE SUMMARY**

- 1.1 A Video Relay Service (VRS) allows sign language users to communicate with hearing people, via a sign language interpreter, using videophones and similar technologies. At industry level, VRS has enabled an estimated 250,000 American Sign Language users to access US telecommunications in a way that is functionally equivalent to the access enjoyed by hearing individuals.
- 1.2 Sorenson considers that VRS could deliver significant benefits to British Sign Language (BSL) users in the UK and has commissioned Europe Economics to provide:
- (a) a quantitative analysis of the costs and benefits of introducing VRS; and
  - (b) a recommendation for a funding mechanism for VRS in the UK.

### *Costs and benefits of VRS*

- 1.3 Europe Economics conducted an independent analysis of the potential costs and benefits of VRS for the UK as a whole, not just the costs and benefits that would arise from Sorenson's participation in a UK market for VRS. The analysis is based in part on data provided by Sorenson and also on data uncovered during desk research undertaken by Europe Economics.
- 1.4 A conservative approach has been taken so as not to overstate the potential benefits of the service. For instance, we assume that 38,000 BSL users would access VRS in the UK, a figure that is below some estimates of the number of fluent users of BSL in the UK.<sup>1</sup>
- 1.5 The provision of VRS in the UK would not only benefit BSL users but also hearing individuals. VRS calls can be initiated by either a hearing individual or a BSL user so that the service would allow hearing individuals to contact a Deaf friend, relative or colleague with greater ease and at lower cost than is possible at present.
- 1.6 Specific benefits that are quantified in this report include improved productivity at work, increased employment and health benefits to BSL users. We also estimate the impact that the provision of VRS might have on transfers between individuals and the government, through taxes and welfare payments. Funded as we recommend, VRS could lead to savings for the taxpayer as a result of reduced unemployment and improved health of Deaf individuals.
- 1.7 A summary of the potential costs and benefits of VRS in the UK which it has been possible to express in monetary terms is presented in Table 1.1 below. It shows a significant net benefit.

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<sup>1</sup> For example, Plum Consulting, in a 2009 report to Ofcom, estimated that there are approximately 50,000 to 70,000 fluent BSL users in the UK.



**Table 1.1: Monetised Economic Costs and Benefits of VRS**

|                                | Present value over ten years |                              |
|--------------------------------|------------------------------|------------------------------|
|                                | Excluding multiplier effects | Including multiplier effects |
| <i>Costs</i>                   |                              |                              |
| Contact centre setup           | £6.3m                        | £6.3m                        |
| Head office setup              | £2.0m                        | £2.0m                        |
| Recruitment                    | £10.2m                       | £10.2m                       |
| Training                       | £4.9m                        | £4.9m                        |
| Videophone provision           | £60.6m                       | £60.6m                       |
| Contact centre ongoing (low)   | £487.9m                      | £487.9m                      |
| Contact centre ongoing (high)  | £575.6m                      | £575.6m                      |
| Head office ongoing (low)      | £162.6m                      | £162.6m                      |
| Head office ongoing (high)     | £191.9m                      | £191.9m                      |
| <b>Total cost (low)</b>        | <b>£734.5m</b>               | <b>£734.5m</b>               |
| <b>Total cost (high)</b>       | <b>£851.5m</b>               | <b>£851.5m</b>               |
| <i>Benefits</i>                |                              |                              |
| Productivity                   | £12.5m                       | £12.5m                       |
| Employment (direct)            | £551.2m                      | £551.2m                      |
| Employment (multipliers)       | -                            | £385.9m                      |
| Health benefits                | £898.5m                      | £898.5m                      |
| <b>Total benefits</b>          | <b>£1,462.3m</b>             | <b>£1,848.1m</b>             |
| <b>Net benefit (low cost)</b>  | <b>£727.7m</b>               | <b>£1,113.6m</b>             |
| <b>Net benefit (high cost)</b> | <b>£610.8m</b>               | <b>£996.6m</b>               |

*Note: Figures presented in the table may not sum to totals exactly because of rounding. Estimates are subject to a margin of uncertainty, as discussed in the text, but are presented to one decimal place for clarity.*

- 1.8 The table above demonstrates that VRS would have a significant net benefit taking into account only those benefits that it has been possible to quantify. There are, however, numerous other benefits of VRS on which we have not been able to place a monetary value, including:
- (a) benefits to hearing colleagues, friends and relatives of Deaf individuals that would be able to communicate with the Deaf more easily and effectively;
  - (b) increased ability for Deaf entrepreneurs to establish and run companies;
  - (c) improved ability for the Deaf to convey emotions and to be expressive in telecoms;
  - (d) ability for Deaf individuals to communicate directly with other Deaf people using videophones — approximately eight such calls are made for each VRS call in the US;

- (e) improved self-confidence and increased independence for BSL users; and
- (f) reduced public sector spending on sign language interpreters.

1.9 Accounting for these benefits would further reinforce the conclusion that VRS would deliver a substantial net benefit to the UK economy.

## 2 COST BENEFIT ANALYSIS OF VRS IN THE UK

- 2.1 A key purpose of this project is to provide a cost benefit analysis of VRS in the UK. Our approach to the cost benefit analysis has comprised desk research and the utilisation of information provided by Sorenson.
- 2.2 Before presenting cost and benefits estimates it is important to define two concepts that will be used throughout this section: present value and full time equivalence.

### *Present value*

- 2.3 We present costs and benefits in 'present value' terms over a forecast period of ten years. It is standard practice for policy decisions to be made on the basis of the net present value of the policy or initiative (i.e. present value of benefits minus present value of costs) where costs and benefits occur in different time periods.
- 2.4 Present values are calculated by 'discounting' future streams of costs and benefits. At the most basic level, the rationale for discounting is based on the principle that, in general, people would rather receive goods and services now rather than later. This is known as 'time preference'. The Treasury has recommended that a real (i.e. without inflation) discount rate of 3.5 per cent should be used when calculating present values and we use this value in our calculations.

### *Full time equivalence*

- 2.5 Full time equivalence is a measure of the number of hours that an individual is in employment relative to the number of hours worked by a full time employee. For example, if a full time employee works for 38 hours per week, an individual that works for 19 hours per week would have a full time equivalence of 0.5. Expressed differently, two workers employed for 19 hours each are equivalent to one full time employee.
- 2.6 Full time equivalence is important in the context of assessing the output gains arising from the provision of VRS in the UK. Indeed, the output gains of 10 full time employees would be twice that of 10 employees with a full time equivalent of 0.5. It is hence important to base some calculations on the rise in full time equivalent employment rather than the rise in the number of employees.
- 2.7 The Office of National Statistics has noted that there is "no agreed international definition as to the minimum number of hours in a week that constitute full-time or part-time work and the approach differs depending on the data source used".<sup>2</sup> In this work, we assume that a typical full-time employee works for 37.5 hours per week.

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<sup>2</sup> See <http://www.ons.gov.uk/about-statistics/user-guidance/lm-guide/concepts/employment/related-concepts/contract-status/index.html>

## Costs

2.8 Previous estimates of the costs of providing VRS in the UK, discussed below, have focussed on the per-minute (unit) cost. To some extent, this approach to cost measurement is useful as it permits a comparison of the costs of different relay services, but there are certain drawbacks. In this paper, we first present a review of VRS unit cost estimates and then attempt to quantify the costs of providing the service using an alternative approach.

### Unit cost estimates

2.9 Estimated unit costs per minute of providing different relay services in the UK are presented in Table 2.1 below.

**Table 2.1: Unit costs of relay services**

|                     | Cost per minute (£)                           |   |  |
|---------------------|---|---|--|
|                     | Estimate based on UK information <sup>3</sup> | Estimate based on US information <sup>4</sup> (\$1.4/£) | Estimate based on US information <sup>5</sup> (\$1.56/£) |
| Basic text relay    | 0.76  | 0.93  | 0.83   |
| Video relay         | 2.50 <sup>a</sup>                             | 2.85 <sup>b</sup>                                       | 2.56   |
| Captioned telephony | 2.00 <sup>c</sup>                             | 0.95  | 0.85   |

*a - Assuming large scale operation; b - FCC estimate rather than actual compensation; c - Teletec estimate for small scale operation*

2.10 It can be seen from the table above that the cost per minute of VRS is the greatest of the three relay services considered. However, this does not imply that the total cost of VRS would be greater than other relay methods because of differences in the number of words per minute that is possible with each relay service. Indeed, it has been reported that a conversation speed of 30 words per minute is possible with text-relay, compared with 150 words per minute with VRS and 170 words per minute with standard voice telephony.

2.11 The impact of conversation speed on service cost can be clearly illustrated by way of example, based on estimated costs for the UK. Consider a conversation of 300 words. Using text relay, this conversation would take ten minutes at a cost of £7.60 whereas the conversation would take two minutes at a cost of £5.00 using video relay.

2.12 The quality of conversation is also enhanced through the use of VRS as it allows for nuanced expression and increased ability to convey emotion.

<sup>3</sup> Plum Consulting report for Ofcom (2009), "Voice telephony services for Deaf people", Page 23. Available at [http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/voice\\_telep.pdf](http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/voice_telep.pdf).

<sup>4</sup> Plum Consulting report for Ofcom (2009), "Voice telephony services for Deaf people", Page 23. Available at [http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/voice\\_telep.pdf](http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/voice_telep.pdf).

<sup>5</sup> Europe Economics calculation, based on US estimates from the Plum report but updated with the current (18/08/2010) \$/£ exchange rate

### Compensation rates

- 2.13 Compensation rates in the US lie somewhat above the estimated unit cost of providing VRS because of the need for providers to invest in new technologies so as to improve the service available to their customers and to fund Deaf-Deaf (or point to point) calls for which providers are not compensated. The same investment needs would apply in the UK and hence the reimbursement rate of providers would need to lie above £2.50 per minute. Based on the simple example above, it can be seen that it would be cheaper to provide VRS than text relay for any compensation rate for VRS below £3.80 per minute.
- 2.14 Hence, for compensation rates below £3.80 per minute, VRS could be justified on cost grounds alone, without even accounting for the many additional benefits of VRS (discussed below) as compared with text relay. Once the additional benefits of the service are taken into account, VRS could be justified for compensation rates of more than £3.80 and Sorenson's estimated funding requirement of £4 per minute is likely to be justified on this basis.
- 2.15 Based on an assumption that the compensation rate per minute of interpreting would be approximately £4 per minute in the first year and would decrease annually by 1 per cent in real terms, Sorenson have estimated the total funding requirement for the first five years in the UK to be as shown in Table 2.2 below.

**Table 2.2: Funding requirements for VRS in the UK**

|                    | Year 1      | Year 2      | Year 3      | Year 4      | Year 5       |
|--------------------|-------------|-------------|-------------|-------------|--------------|
| Installations      | 7,635       | 14,576      | 19,631      | 29,842      | 38,000       |
| Annual VRS Minutes | 6,251,528   | 11,933,517  | 17,403,625  | 23,628,516  | 30,790,152   |
| Total Funding      | £25,006,113 | £47,256,727 | £68,229,170 | £91,706,900 | £118,307,587 |

- 2.16 For the purposes of our work, we assume that the funding requirement remains fixed at around £118.3m per annum from year five onwards (i.e. we assume that an increase in minutes of use offsets the annual 1 per cent reduction in reimbursement rates).
- 2.17 On this basis, the present value of the funding requirement over ten years is approximately £785.7m. The USO currently costs BT between £57m and £74m per annum, or between £491m and £637m measured in present value terms over ten years.

### Alternative approach

- 2.18 As noted above, previous estimates of the cost of VRS provision in the UK have focussed on costs per minute without presenting a total cost estimate. We consider that it is attractive to estimate total costs in this paper, and to use a bottom-up methodology because it allows for a clear breakdown between one-off and ongoing costs, can account for the fact that investments are 'lumpy' and the fact that for any given infrastructure, the marginal cost of providing the service would be somewhat below the average cost.
- 2.19 There are four categories of costs that should be considered in this analysis:

- (a) one-off costs of setting up the infrastructure for VRS;
- (b) one-off recruitment and training costs;
- (c) ongoing costs of providing hardware such as videophones to VRS users; and
- (d) ongoing costs of operating the service.

2.20 Experience suggests that the costs of establishing VRS would be significant.

### **One-off set up costs**

2.21 Several different costs would be incurred by VRS providers before the service could begin operation, including property costs, infrastructure costs, recruitment costs and training costs.

#### *Property and infrastructure costs*

2.22 At present, there are approximately 140 VRS interpreting centres in the US for the industry as a whole. These centres are spread across the country, reflecting the fact that there is a limited supply of American Sign Language interpreters in any given locality. Whilst the UK is a fraction of the area of the US, and has a population of some 62 million as compared to 310 million in the US, it would nonetheless probably be necessary for VRS providers to establish a number of interpreting centres across the country. (In both countries there are minorities who do not speak fluent English, but that is an issue beyond the remit of this report.) Sorenson has estimated that an industry total of 30 contact centres would be required in the UK, with an average of 20 to 25 seats. Some centres would probably be smaller and some larger, depending largely upon the supply of interpreters in the local area.

2.23 At first sight, this may seem to be a surprisingly large number of contact centres given the geography of the UK, and it would appear to be more efficient to operate the service with fewer contact centres. There is, however, a limited supply of BSL interpreters and VRS providers would not wish to encourage interpreters to relocate, as this could risk leaving some regions of the country without access to face-to-face interpreting services.

2.24 A similar concern has driven the employment pattern of interpreters observed in the US — around 80 per cent of interpreters work part-time for VRS providers and devote the remainder of their time to providing non-VRS interpreting services, also known as community interpreting. To ensure that interpreters remain able to provide interpreting services for their local communities it would be necessary to establish around 30 contact centres in the UK. Initially, contact centres would likely be established in the main cities and regional contact centres would follow as usage of VRS increases.

2.25 Sorenson has estimated that a total of 2,053 interpreters would eventually be required to provide VRS in the UK, the vast majority of which would work part-time. This implies that approximately 68 interpreters would work at each contact centre, on average. Based on



these assumptions, the set-up cost for each contact centre is estimated to be between £200,000 and £250,000.<sup>6</sup> We use the average of these figures (£225,000) in subsequent analysis. These upfront costs would be paid for by VRS providers, and presumably recovered in the overall cost of the service once it is established.

- 2.26 We have assumed that six contact centres would be established in the first year of the service and that additional contact centres would be established as the minutes of usage increase. For simplicity, we have assumed that a further six contact centres would be established in each of the first five years of operation. On this basis, the present value cost of establishing contact centres is approximately £6.3m.
- 2.27 In addition to contact centres, VRS providers would need to establish a head office in the UK. The head office might be located in the same building as one of the contact centres and would contain several business functions, including the finance group, administrative services, HR and so on.
- 2.28 Sorenson has estimated that approximately 200 people would be required to fulfil these roles across all VRS providers. Assuming that there would be four main VRS providers in the UK, this implies that the average head office would have 50 employees, all of whom would work full time and hence 50 seats would be needed in the head office. Using the estimated cost of setting up a 20 seat contact centre (£200,000) and grossing it up to the number of seats required in head office, the cost of establishing each head office would be approximately £500,000. Therefore, the total cost of establishing UK head offices for VRS providers would be approximately £2.0m. It is assumed that this cost would be incurred in the first year of operation and hence the present value of this cost is £2.0m.

### *Recruitment*

- 2.29 At present, there are 519 interpreters on the UK Register of Sign Language Interpreters.<sup>7</sup> Sorenson envisage that 2,053 interpreters would eventually be required to operate VRS in the UK and hence it would seem that a significant recruitment and training programme would be required. However, based on its experience in the US, Sorenson estimates that more than 2,053 individuals already have the basic skills to work as VRS interpreters in the UK and hence the recruitment problem may not be as significant as it first appears. Many of these individuals are not registered as interpreters at present because of a lack of available jobs and hence some would be employed in alternative professions. VRS would create jobs for those with the skills to be interpreters.
- 2.30 The total number of jobs created as a direct result of the establishment of VRS in the UK would be greater than 2,053. Interpreters comprise 80 per cent of Sorenson's US workforce and the ratio is thought to be similar for other providers.

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<sup>6</sup> The estimates were provided by Sorenson in US dollars and converted at an exchange rate of \$1.5/£1

<sup>7</sup> The National Registers of Communication Professionals working with Deaf and Deafblind People Registration Update May 2010, available at [http://www.nrccd.org.uk/registration\\_updates.php](http://www.nrccd.org.uk/registration_updates.php)

- 2.31 The ratio of interpreters to total employees would probably be slightly higher in the UK as most technological development and testing would likely remain in the US for those providers that are already active in the US market. Approximately 1.8 per cent of Sorenson's North American workforce is in its development and testing department and, stripping these individuals out, the number of interpreters as a percentage of all staff is approximately 82 per cent. We assume that this figure would apply in the UK and hence it would be necessary to recruit around 2,504 people to operate the service in the UK.
- 2.32 Although many of these employees would be expected to work part-time, there is little reason to believe that recruitment costs would be significantly lower for part-time employees than for full time employees. Therefore, we bundle together part-time and full time employees for the purpose of estimating recruitment costs. The Chartered Institute of Personnel and Development (CIPD) has estimated that the median total cost of recruitment is £4,333 per employee.<sup>8</sup>
- 2.33 Sorenson has provided estimates of the number of interpreters that would be required in each of the first five years of operation. To estimate total recruitment costs and the present value of this cost, we have assumed that the number of staff recruited in each year is approximately 1.22 times the number of interpreters recruited. On this basis, the present value cost of recruitment is approximately £10.2m. The greatest annual cost (£3.5m) would be incurred in the first year of operation.<sup>9</sup>

### *Training*

- 2.34 As noted above, many individuals who would enter employment as VRS interpreters are currently likely to be employed in other professions. Whilst these individuals already possess many of the skills required to be a VRS interpreter they would need to undertake some training to polish these skills.
- 2.35 To estimate training costs, we have reviewed courses that are currently available in the UK for those with good BSL skills, defined as NVQ Level 3 BSL (or equivalent). Three qualifications are currently available that lead to full membership of the Register of Sign Language Interpreters:<sup>10</sup>
- (a) University of Central Lancashire/SLI Postgraduate Diploma in BSL/English Interpreting and Translation;
  - (b) University of Leeds Postgraduate Diploma/MA in Interpreting: BSL-English; and
  - (c) NVQ Level 4 in Interpreting (BSL/English).

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<sup>8</sup> CIPD, "Annual Survey Report 2007 Recruitment, retention and turnover".

<sup>9</sup> These figures exclude any recruitment costs that would arise as a result of staff turnover.

<sup>10</sup> See <http://www.slilimited.co.uk/qualifications>

- 2.36 The cost of the university courses ranges from £3,000 to approximately £4,000 whilst the NVQ route is significantly more expensive. We assume that the cost of training provided by VRS providers would be no more costly than a university course and hence assume that training costs would be £3,500 per interpreter.
- 2.37 Not all interpreters would require training as some are already employed as interpreters. We assume that those currently on the UK Register of Sign Language Interpreters would not require training and that these individuals would be the first to secure jobs with VRS providers. Therefore, 1,534 individuals would require training.
- 2.38 On this basis, the present value of training costs is £4.9m. The annual cost is lowest in the first year (since the majority of those recruited are already employed as interpreters) and highest in the second year (as usage of VRS increases significantly).

### **Summary of one-off costs**

- 2.39 The main one-off costs that would be incurred by companies seeking to provide VRS in the UK would be associated with recruitment and training of staff and the establishment of contact centres. The total present value of one-off costs is estimated to be £23.0m.

### **Ongoing costs of providing hardware to VRS users**

- 2.40 Sorenson provides videophones free of charge to Deaf people in the US and would expect to do the same in the UK. The cost of videophone provision is, hence, borne by VRS providers.
- 2.41 In 2007, TAG, which works to raise awareness of Deaf issues, stated that videophones in the UK were available from £600, excluding installation costs.<sup>11</sup> If VRS were to operate in the UK, each service provider would employ Deaf individuals to install videophones and to provide training to recipients of the phones. Assuming that installers would work in their local area, it would be reasonable to assume that each installer could conduct four installations per day. This assumption is based on 90 minutes completing the installation and training and an average of 30 minutes travelling between appointments.
- 2.42 Assuming that each installer would earn a wage of £15 per hour and that no other materials are required, the cost of installing the videophone is £30 plus petrol costs of, say, £2.<sup>12</sup> We assume that videophones would need to be replaced every three years and hence installers would always be in gainful employment.
- 2.43 Sorenson has estimated the number of BSL users that would have access to VRS in each of the first five years, reaching the anticipated long-term usage rate of 38,000

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<sup>11</sup> <http://www.tagcomm.org.uk/Newslett/sequel07.htm>

<sup>12</sup> The petrol cost estimate assumes that the fuel cost is £5 per gallon, the distance travelled in 30 minutes is 20 miles and the vehicle has a fuel economy of 50 miles per gallon.

individuals by the fifth year. Based on these assumptions, the present value of the cost of videophone provision over ten years is approximately £60.6m.

### Ongoing costs of operating the service

- 2.44 Sorenson currently employs approximately 6,000 people in the US, around 80 per cent of whom are interpreters. Interpreters must be hearing individuals and fluent in sign language. In 2008, 80 per cent of interpreters worked part-time, typically for between 10 and 20 hours per week.<sup>13</sup> Taking the mid-point of this range and assuming that a full working week is 37.5 hours, the full time equivalent number of interpreters is 2,600.
- 2.45 It has been estimated that a pool of 2,053 interpreters would eventually be required in the UK. Assuming that working-time characteristics would be the same as in the US, the number of full time equivalent interpreters would be 1,068. Assuming, as above, that 30 contact centres would eventually be established in the UK, the number of full time equivalent interpreters per contact centre would be approximately 36.

### Efficiency

- 2.46 It is worth noting that on the basis of forecast VRS minutes and interpreter numbers, each full time equivalent interpreter would be engaged in interpreting activities for 29,000 minutes per year, or approximately 28 per cent of their working time.<sup>14</sup> At first sight, this statistic appears to indicate that the forecast efficiency of VRS is low and that there is significant room for increasing the proportion of working hours spent on interpreting activities.
- 2.47 We understand, however, that an interpreter efficiency rate of around 25 per cent is typical for VRS providers in the US. There are a number of reasons for this:
- (a) interpreting is an intensive activity and each interpreter is required to take a break of ten minutes per hour;
  - (b) VRS providers in the US are required to provide a functionally equivalent telecommunication service and hence must operate the service through the night. Night-time efficiency levels are significantly lower than those during the day due to smaller and more variable call volumes; and
  - (c) VRS providers in the US are reimbursed only for the time at which a conversation is taking place and not for the time it takes to set-up and end the call, or the time spent waiting for the next call to be allocated to the interpreter. The set-up time and waiting time, in particular, can be significant.

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<sup>13</sup> <http://www.sorenson.com/press/images/good/American%20Executive-PDF-logo.pdf>

<sup>14</sup> Calculation assumes a working day of 7.5 hours and 230 working days per annum

- 2.48 Taking these facts into account, a forecast efficiency rate of 28 per cent for VRS in the UK (assuming that the service operates for 24 hours per day) is plausible. Additional efficiency gains would be possible if the service were provided only for limited hours of operation.

#### Costs

- 2.49 The estimated cost of operating VRS contact centres in the UK is based on Table 2.3 below, which shows the typical split of running costs for a non-VRS contact centre in the UK during 2004. We assume that this cost breakdown has remained broadly accurate over time and is valid for VRS as well as telephone contact centres.

**Table 2.3: Operating budget expenditure for UK contact centres**

| Expenditure type                  | Percentage of operating expenditure |
|-----------------------------------|-------------------------------------|
| Staff salaries and employer costs | 63.7%                               |
| Rent                              | 6.2%                                |
| Utilities                         | 4.5%                                |
| IT                                | 9.5%                                |
| Telecoms                          | 7.5%                                |
| Management                        | 8.6%                                |

Source: DTI (2004), "The UK Contact Centre Industry: A Study", Page 118

- 2.50 To estimate the lower bound of contact centre running costs, we assume that each full time interpreter earns the median UK wage of £25,428 per annum. We assume that employers incur additional employment costs equal to 33 per cent of each employee's salary. On this basis, the total annual cost of running each contact centre would be approximately £1.9m. If it is assumed that interpreters are better paid than the median employee, earning a salary of £30,000 per annum, the annual operating cost for each contact centre would be £2.2m.
- 2.51 These estimates lie within the range of Sorenson's estimates, which are based on their US experience. Sorenson has estimated that annual ongoing costs of contact centres in the UK to serve a forecast 38,000 VRS users would be between £1.8m and £2.25m.<sup>15</sup> It is hence comforting that two separate methodologies have resulted in cost estimates within the same ball park, based on the same assumptions concerning scale of provision.
- 2.52 Using our estimates based on UK information, the total running cost of VRS contact centres would be between £56.7m and £66.9m per annum. The present value of this cost over ten years would be between £487.9m and £575.6m.

<sup>15</sup> The lower estimate assumes that there would be 20 seats per contact centre whilst the upper estimate assumes there would be 25 seats.

2.53 In addition to the cost of operating contact centres, further ongoing costs would be incurred at the head offices of VRS providers. It was assumed above that a typical head office would contain 2.5 times the number of seats as a typical contact centre. Assuming that per employee running costs are broadly similar to those of running the contact centre we can estimate that the annual running cost for each head office would be between £4.7m and £5.6m and hence total cost would be between £18.9m and £22.3m. The present value of this cost over ten years would be between £162.6m and £191.9m.

### **Summary of ongoing costs**

2.54 Based on the assumptions above, total ongoing costs for the provision of VRS in the UK would be between £711.1m and £828.1m, measured in present value terms over ten years.

### **Economic Benefits**

2.55 The provision of VRS in the UK would benefit not only BSL users but would also deliver significant benefits to hearing individuals. The service would allow hearing individuals to contact a Deaf friend, relative or colleague with greater ease and at lower cost than is possible at present. Indeed, VRS calls can be initiated by either a hearing individual or a BSL user.

2.56 Having noted that VRS delivers significant benefits to both hearing and Deaf individuals, a number of more specific benefits of the service can be identified. These include:

- (a) increased speed of telecoms communication, creating greater productivity at work and additional leisure time, primarily for the Deaf;
- (b) employment of Deaf people by VRS providers as equipment installers and trainers, leading to reduced welfare spending and increased tax and National Insurance revenues;
- (c) employment opportunities for hearing individuals as VRS interpreters;
- (d) improved employment possibilities and reduced unemployment, which could lead to better matching of skills to jobs and increased productivity, primarily for the Deaf;
- (e) second-round effects to the economy as a whole and benefits to deprived local areas through establishment of VRS interpreting centres;
- (f) increased ability for Deaf entrepreneurs to establish and run companies;
- (g) ability for Deaf individuals to communicate directly with other Deaf people using videophones (BSL interpreters are not required for this type of communication and approximately eight such calls are made for each VRS call in the US);



- (h) improved skills for BSL interpreters through training programmes provided by VRS providers;
- (i) benefits to colleagues, friends and relatives of Deaf individuals due to increased ability to communicate effectively;
- (j) ability for BSL users to use their first language, which allows them to convey emotions and to be expressive when communicating using the telecommunications network;
- (k) improved self-confidence and increased independence for BSL users; and
- (l) reduced cost of interpreting and text relay services and hence lower public sector spending and costs incurred by Universal Service providers.

2.57 There is no simple method of quantifying all of the benefits that VRS would deliver to Deaf users, hearing recipients of calls, businesses and society as a whole. However, we make use of innovative analytical techniques to quantify these benefits, as far as possible, in the remainder of this section.

### **Improved productivity at work**

2.58 It has been estimated that the UK text relay service currently has 11,000 regular users that generate a total of eight million minutes of use per annum.<sup>16</sup> This suggests that each text relay user engages the service for 727 minutes per annum, on average. Assuming that approximately 50 per cent of these minutes are made at work for each employed individual and given a Deaf employment rate of 68.4 per cent, the total number of text relay minutes at work is 2.74 million, or around 364 minutes per employed text relay user.

2.59 Using VRS, it is possible to communicate at a speed of 150 words per minute (wpm), compared with 30 wpm for text relay and 170 wpm for standard voice telephony.<sup>17</sup> Given this, the equivalent of 364 text relay minutes for an employee using VRS would be 73 minutes.

2.60 One measure of productivity is value added per employee, which is estimated to be £68,782 on average in the UK.<sup>18</sup> Assuming that the individual works for 7.5 hours per day, 230 days per annum this productivity saving is worth £194 per Deaf employee, per annum. The total saving to UK businesses is, hence, nearly £1.5m per annum or £12.5m measured in present value terms over ten years.

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<sup>16</sup> Plum Consulting (2009), "Voice telephony services for Deaf people", Page 9.

<sup>17</sup> Plum Consulting (2009), "Voice telephony services for Deaf people", Page 19, Figure 5.1.

<sup>18</sup> See [http://www.innovation.gov.uk/value\\_added/default.asp?page=76](http://www.innovation.gov.uk/value_added/default.asp?page=76)

## Improved employment possibilities

2.61 According to the RNID, in 2002 the unemployment rate of the severely and profoundly Deaf was four times the national average.<sup>19</sup> Assuming that this relationship still holds, the current unemployment rate of the severely and profoundly Deaf would be 31.6 per cent.<sup>20</sup> Given that the unemployment rate appears to increase with severity of disability, it is reasonable to assume that the unemployment rate of those whose first language is BSL is somewhat above that estimated for all severely and profoundly Deaf. However, as we wish to be conservative in our estimates, we will use the figure of 31.6 per cent in this work.

### *Employment opportunities with VRS providers for Deaf and hearing individuals*

2.62 We estimated above that 1,068 full time equivalent interpreters would be required to operate VRS in the UK. We estimated above that approximately 18 per cent of the UK VRS workforce would be employed in non-interpreting roles and hence the total number of full time equivalent employees of VRS providers would be 1,302.

2.63 It should be noted that some of those that would enter employment with a VRS provider may leave an existing job to take up their new role. However, some of these vacated roles will be filled by other individuals whilst in other cases the individual would simply increase the number of hours they work and hence there would be no 'displacement effect'. Nonetheless, there may be some individuals that reduce or end their working hours in an existing job in order to become employed by a VRS provider and this job is not filled by another individual. This would be a 'displacement effect' of VRS.

2.64 The size of any such displacement effect is unknown, but likely to apply only to currently registered interpreters, who may reduce the number of hours they spend on face-to-face interpreting, especially if demand for this service falls. Newly qualified interpreters and those entering non-interpreting roles are likely to be unemployed at present or to have their existing roles filled by another individual (for example, a vacated secretarial job would probably be filled by someone else). For the purposes of this analysis we have assumed that displacement effects would apply for 10 per cent of FTE jobs created by VRS providers and hence net direct job creation as a result of VRS would be 1,172.<sup>21</sup>

2.65 Some of these jobs would be taken by Deaf people. As of April 2010, 42 per cent of Sorenson's US workforce (excluding interpreters) are Deaf, the majority of whom are videophone installers and provide training of how to operate the videophone and use

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<sup>19</sup> <http://www.cabinetoffice.gov.uk/media/cabinetoffice/strategy/assets/mid3.pdf>

<sup>20</sup> Based on National Statistics estimate of 7.9 per cent unemployment rate in the three months to April 2010.

<sup>21</sup> It should be noted that a somewhat greater displacement effect (also known as a re-absorption factor) is used in some standard analyses of UK employment impact. We consider that a lower factor is appropriate in this case because of the high unemployment rate of the Deaf (and hence the vast majority are likely to enter employment, rather than switch jobs), because of the specific skill attributes required of interpreters, and because there will remain a need for community interpreting services in many situations.

VRS.<sup>22</sup> Assuming that this characteristic would apply in the UK, 89 Deaf people (full time equivalent) would find employment with VRS providers.

*Employment opportunities facilitated by VRS*

- 2.66 VRS would certainly allow Deaf individuals greater access to a range of jobs than they enjoy at present. Apart from the jobs created by VRS providers, the primary effect is most likely to be one of intensifying competition for jobs between Deaf and hearing individuals.
- 2.67 The fact that there is intensified competition for jobs is, in itself, a benefit to the economy. If VRS enables a Deaf individual to compete for, and secure, a job that would not have been available to them otherwise, it must be that they are better qualified for the job than the hearing individual. In this case, VRS has led to an increase in the average skill level and productivity of the workforce, as it has allowed the employer to select the best candidate for the job whereas this candidate would not have been available in the absence of VRS.
- 2.68 Quantifying this impact is, unfortunately, extremely difficult and it has not been possible to identify a feasible and robust approach. As we wish to be conservative in our estimates we do not wish to speculate on what the magnitude potential benefits might be and hence treat this as a non-quantified benefit of VRS in subsequent analysis.

*Multiplier benefits*

- 2.69 If a new business is established, there will be an increase in the employment rate because workers are required to produce the output of the company. This is the direct effect. This business requires inputs and hence there is a trickle-down effect on their suppliers and so on down the supply chain. This is the indirect effect. As a result of the direct and indirect effects, household incomes will increase and some of this increased income will be re-spent on final goods and services: this is the induced effect. An employment multiplier is the ratio of direct plus indirect (and possibly induced) employment changes to the direct employment change. These effects generate employment in a range of industries and it is important to allow for this employment effect in the context of VRS for the UK.
- 2.70 There is debate amongst economists about the magnitude and validity of multiplier effects that arise from an increase in government spending or the creation of jobs through the establishment of a new business. Indeed, on the magnitude of multiplier effects the Treasury Green Book states:

“The effect on net employment and net output is likely to be much smaller than the direct employment and output effects of the project. Evidence should support the assessment of the scale and importance of any net employment and net output benefits, taking account

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<sup>22</sup> <http://inmylingo.blogspot.com/2010/04/exclusive-interview-with-sorensonvrs.html>

of multiplier effects. A multiplier measures the further economic activity, (whether output or jobs), resulting from the creation of additional local economic activity.”

- 2.71 On validity of multiplier effects, some argue that the creation of jobs leads to additional jobs being created in the supply chain and as a result of increased incomes and expenditure by those with new jobs. Opponents suggest that other effects are at work and that the level of employment is determined by the level of inflation and money supply, or of aggregate demand.
- 2.72 These views can, to some extent, be reconciled with reference to the timeframe over which the effects operate. It is natural to assume that following a period of job-creation, there would be some knock-on multiplier effects in the short run and that there would be a subsequent adjustment such that the view of employment being determined by the money supply and inflation rate holds, at least to some extent, in the long-run.
- 2.73 In this paper, we present an analysis based on multiplier effects both because the effects appear to be justifiable in the short run from an economic perspective and because it is a standard technique used in assessments of policies of this sort. Indeed, the fact that VRS would help Deaf people (who are disadvantaged in the labour market) into employment can be seen as akin to a policy that is designed to help a depressed economic region. Multiplier effects are a standard part of analyses of depressed regions and, given that VRS providers will invest in a range of regions in the UK and would create employment opportunities for those disadvantaged in the labour market, we consider the inclusion of multiplier effects to be justified. The estimates should, however, be treated with a certain degree of caution and we calculate the overall net benefit of VRS both including and excluding multiplier benefits.
- 2.74 It is possible to calculate multiplier effects from Input-Output tables, published by the Office for National Statistics (ONS) and other national statistics authorities. These tables illustrate interdependencies between industries and capture how changes in demand in one industry affect other industries that depend on it. The most recent version of ONS analytical input-output tables was published in 1995 and hence the applicability of these estimates to today's economy is questionable.
- 2.75 The Treasury Green Book notes that “where it is considered appropriate to calculate multipliers, guidance is available from English Partnerships and the Regional Development Agencies”.
- 2.76 English Partnerships have produced an estimate of typical regional multiplier effects that flow from investments in the UK and we have used this estimate in our analysis.<sup>23</sup> The rationale for this is that VRS providers would invest in numerous regions and hence there could be numerous regional multiplier effects. Assuming that there are average linkages

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<sup>23</sup> English Partnerships (2004), “Additionality Guide”, Page 24.

within the local supply chain and that there would be average income and induced effects in each of the regions that received VRS investment, the relevant multiplier is 1.7. This suggests that for each job created by VRS providers, an additional 0.7 jobs would be created as a result of multiplier effects.

- 2.77 To be conservative in our estimate of multiplier effects, we take as the base for analysis the net total of 1,172 full time equivalent jobs created as a direct result of the provision of VRS, rather than the gross figure of 1,302 full time equivalent jobs created. On this basis, approximately 820 additional full time jobs would be created as a result of indirect and induced effects. Deaf people would have access to these additional jobs, and based on an estimate that approximately 0.28 per cent of people of working age are severely or profoundly Deaf, the number of full time equivalent jobs that would be filled by Deaf individuals would be 2.<sup>24</sup>

#### *Value of additional jobs to the economy*

- 2.78 The Department for Business, Innovation and Skills (BIS) has estimated that the average value added by each UK employee was £68,782 in 2008.<sup>25</sup>
- 2.79 Based on this estimate, the value of full time equivalent jobs created as a direct result of the provision of VRS in the UK would be £551.2m, measured in present value terms over ten years. The value of jobs created as a result of multiplier effects would be more than £385.9m, also measured in present value terms over ten years.

#### **Health benefits**

- 2.80 A limited amount of research has been conducted to measure the health impact of Deafness in quantitative terms of health-related quality of life. One of the most relevant studies in the context of VRS is that of Fellinger et al (2007) who applied three different health-related quality of life (HRQoL) measures on a sample of 236 Deaf people who use sign language.<sup>26</sup> It was found that Deaf people have a greater risk of mental illness and mental distress, whilst they also provided lower self-ratings of their quality of life compared with the hearing population. Furthermore, the Deaf appeared to have higher levels of emotional distress but no difference was found in relation to social functioning.
- 2.81 The healthcare literature has paid much attention to designing numeric measures of quality of life and to valuing quality of life. In the UK, the Quality Adjusted Life Year (QALY) measure is now accepted as standard and each QALY is valued at £30,000. A similar concept known as the Activities of Daily Living Adjusted Year (ADLAY) has been developed in the field of social care, to which a value of £20,000 per ADLAY is attached.

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<sup>24</sup> The percentage of people of working age with severe or profound Deafness has been calculated by dividing the number of people aged 16-60 that are profoundly Deaf (108,000, RNID) by the total number of people of working age (approx. 38.3m in mid 2009, National Statistics).

<sup>25</sup> See [http://www.innovation.gov.uk/value\\_added/default.asp?page=76](http://www.innovation.gov.uk/value_added/default.asp?page=76)

<sup>26</sup> Fellinger J. et al (2007), "Mental distress and quality of life in hard of hearing", *Acta Psychiatr Scand*;115:243-5

- 2.82 There have been some attempts to measure the impact of Deafness in terms of QALYs and associated measurement instruments. Indeed, one Australian paper compares the health status scores of four different instruments, each of which has a maximum score of 1 for perfect health.<sup>27</sup> The study found that “hearing loss is routinely associated with a loss of HRQoL of 0.24 QALYs per year”. The primary interest of the paper is in acquired hearing loss, but the work of Fellingner et al. (2007) showed that WHO-Quality of Life scores were similar for those with acquired hearing loss and the signing Deaf. It would therefore be reasonable to assume that profound Deafness is associated with a loss of 0.24 QALYs per year.
- 2.83 Given a baseline of QALYs lost through profound Deafness, the next step is to assess the impact that VRS could have. This is a rather tricky exercise for which there is little published evidence. Whilst there is some evidence on the health benefits of hearing aids, we have been able to identify few studies that have quantified the health status impact of other assistive technologies. Hearing aids have been estimated to increase HRQoL by 0.12 using the Health Utilities Index (HUI) 3 measure and 0.07 on the HUI 2 measure.<sup>28</sup> The EQ-5D measure, on which QALY estimates are typically based, was unable to detect an impact of hearing aids. The study recommends that the HUI 3 measure should be used for evaluating HRQoL in a population with hearing complaints.

*Götherström et al*

- 2.84 Given that the EQ-5D measure is considered insufficiently flexible to identify the impact of assistive technologies for hearing, it is unfortunate that the only study that has undertaken a quantitative comparative study of text and video relay services used EQ-5D as the device to measure health improvements. Nonetheless, the study does have several points of interest in the context of our work.
- 2.85 Götherström et al. undertook a comparative study of text and video relay services for Swedish people that had been born Deaf.<sup>29</sup> All study participants had access to text relay services but only a subset had access to VRS, which was available from 8am to 8pm each day. The authors considered qualitative aspects of the service, estimated the socioeconomic cost of the services, the distribution of costs, the impact on quality of life and communicative effects.
- 2.86 It was found that users rated the quality of the VRS significantly higher than the text relay service and that the incremental cost of providing VRS was approximately SEK 40,000 per user, per annum (approximately £3,450 at current exchange rates).

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<sup>27</sup> Australian Communications Exchange (2009) submission to the Department of Broadband, Communications and the Digital Economy Feasibility Study into an Independent Disability Equipment Program

<sup>28</sup> Grutters et al. (2007), “Choosing between measures: comparison of EQ-5D, HUI2 and HUI3 in persons with hearing complaints”, *Qual Life Res.* 16(8): 1439–1449.

<sup>29</sup> Götherström, U., Jan Persson, J. and Jonsson, D. (2004), “A comparative study of text telephone and videophone relay services”, *Technology and Disability*, 16:2:101-109

- 2.87 Having access to VRS led to a significant improvement in the communicative abilities of Deaf individuals. Indeed, having access to VRS led to a 33 per cent increase in general communicative ability (from 0.61 to 0.81 on a zero-one scale), whilst the increase in communicative ability at work was approximately 62 per cent. The study could not identify health effects measured through the EQ-5D tool but this should not be taken as evidence that VRS has no health effects. As discussed above, there is some consensus that EQ-5D is too inflexible to pick up changes arising from assistive technologies.
- 2.88 However, it is interesting to note that the 0.01 change in EQ-5D score observed in the study is identical to the change observed in the study of different measures of the impact of hearing aids on HRQoL. That paper showed that a change in EQ-5D score of 0.01 corresponded to a change of 0.12 on their preferred HUI3 measure. If this holds also for other assistive technologies, VRS would lead to an increase in HRQoL of 0.12. This would be worth £3,600 per year if we apply NICE's recommended valuation of £30,000 per QALY.
- 2.89 Based on these assumptions, the total health benefit arising from VRS would reach £136.8m per annum once the technology has been fully rolled out to 38,000 potential users. The present value of these health benefits over ten years is approximately £898.5m.

## **Benefits to HM Treasury**

- 2.90 In addition to the economic benefits identified above, there would also be benefits to the Treasury as a result of the provision of VRS in the UK and the jobs that it would create. These benefits would come from two sources: reduced welfare payments and increased tax revenues.

### **Reduced welfare payments**

- 2.91 It was noted above that 1,302 full time equivalent jobs would be created as a direct result of introducing VRS in the UK and that a total of 2,504 individuals would secure either part time or full time employment with VRS providers.
- 2.92 Some of these individuals would take on a role with the VRS provider whilst continuing with their existing employment (this might be especially true for interpreters) whilst others might simply move from a non-VRS job to employment with VRS providers. Still others would move from unemployment to employment as a result of securing a job with VRS providers and it is these individuals that we are particularly concerned with in estimating the benefit to the taxpayer as a result of reduced spending on welfare payments.
- 2.93 It is rather difficult to estimate this benefit to the taxpayer as we do not know the number of people that would move from unemployment to employment with VRS providers. However, noting that the unemployment rate of severely and profoundly Deaf people is four times the national average, it is probably reasonable to assume that Deaf individuals that find a job with VRS providers would have been unemployed in the absence of the

service. It is also likely that some hearing people would enter employment as a result of the service.

- 2.94 To be conservative in our estimates, we have chosen to estimate the lower bound of saved welfare payments by focussing on Deaf individuals that would enter employment with VRS providers. This approach also enables us to estimate the welfare payments that unemployed individuals would receive in the absence of VRS though it should be noted that we do not attempt to provide a complete inventory of benefits that may be received by Deaf individuals. Rather, we include in the analysis only the primary welfare payments that are affected by employment status.
- 2.95 It should be noted, however, that there may be additional welfare payment savings if hearing individuals were to enter employment as a result of VRS.

*Increased Deaf employment rate*

- 2.96 Deaf people may be entitled to several different welfare payments in the UK. Some of these payments are available irrespective of employment status whilst others are available only if the individual is unable to work because of their Deafness. In-work payments are also available and the Deaf may use state-funded schemes designed to help them enter employment such as the Pathways to Work Scheme and the New Deal for Disabled People (available in certain areas only).
- 2.97 It is possible that the introduction of VRS could lead to a reduction in welfare payments to Deaf people. This would be the case if the Deaf unemployment rate were to fall as a result of VRS and this cost saving is greater than the in-work benefits to which employed individuals are entitled. The key employment-status dependent benefits to which Deaf individuals may be entitled are as follows:
- (a) Employment and Support Allowance (ESA) — if the Deaf person is unable to work (or working <16 hours per week) because of their disability. Payments may be up to £96.85 per week, or £5,036.20 per year. The average ESA claimant receives approximately £4,800 per year.<sup>30</sup>
  - (b) Access to Work — provides help for the Deaf person to get necessary equipment and communication support for work. The scheme covers up to 100 per cent of costs, though larger employers must make a significant contribution. We assume that the average award is £500 for the purposes of this paper, based on the idea that the majority of Deaf individuals would require a text-phone at work, at a cost of approximately £250, and that a minority of individuals would require additional assistance at greater cost.

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<sup>30</sup> Average payment calculated from figures available at <http://news.bbc.co.uk/1/hi/uk/10431024.stm>



- (c) Working Tax Credit — this is for employed individuals on low incomes and, whilst there are complex rules, the average payment is approximately £1,600 per year.<sup>31</sup> Entitlement depends on income, marital status and whether or not the individual has dependent children.
- (d) Job Grant — a one-off payment of £100 or £250 if the individual enters employment and stops claiming benefits.
- (e) Return to Work Credit — a tax-free payment of £40 per week which can be paid for up to 52 weeks.

#### *Employment of less than 16 hours per week*

- 2.98 It is possible that some Deaf people would be able to enter employment as a result of VRS but would choose to work for less than 16 hours per week. This could lead to an increased welfare expenditure on these individuals in the first year because they would still be entitled to claim ESA, but would also become eligible for the Access to Work Scheme. Individuals receiving ESA are generally allowed to continue to claim the benefit for only 52 weeks whilst undertaking ‘permitted work’ of less than 16 hours per week for which a wage of no more than £93 may be received.
- 2.99 Based on the assumptions above, welfare expenditure could increase by £500 in the first year as the individual enters employment, continues to receive ESA and receives an Access to Work payment.
- 2.100 The impact in subsequent years would depend upon the individual’s response. If they chose to stop work so as to remain eligible for the ESA then there would be no change in welfare spending. If they continued to work for less than 16 hours per week, or entered a high paid job, they would not be entitled to receive the Working Tax Credit and hence there would be a saving of £4,800 per year. If they chose to work sufficient hours in a low paid job to become eligible for the Working Tax Credit, the welfare payment saving would be £3,200 per year.

#### *Employment of more than 16 hours per week*

- 2.101 For the purposes of this analysis, we have assumed that where Deaf individuals enter employment, they do so for more than 16 hours per week. The impact of employment on welfare spending is then dependent on the salary that the individual earns in their employment and whether or not the individual has dependent children. The threshold income above which the Working Tax Credit will not be paid is significantly greater for

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<sup>31</sup> Direct statistics on the average Working Tax Credit payment are not available. However, the average amount of Credit that is unclaimed by entitled individuals is £1,600 per year. Assuming that the characteristics of claimants and non-claimants are identical, it is reasonable to use this figure in our analysis. The source for this statistic is HMRC, available at <http://www.taxationweb.co.uk/tax-articles/general/working-tax-credit-are-you-missing-out-on-extra-cash.html>

those with dependent children and for the purposes of this work we assume that those with children would be entitled to receive the Working Tax Credit upon entering employment whilst those without children would not.

- 2.102 For those that would be eligible for the Working Tax Credit upon entering employment, we assume that they would be entitled to the average Working Tax Credit payment, Return to Work Credit and higher Job Grant payment. For those that would not be eligible for the Working Tax Credit we assume that they would be entitled to receive the lower Job Grant payment and return to work credit in the first year but would not be eligible for welfare payments thereafter.
- 2.103 Based on the cost assumptions outlined above, welfare payment savings for individuals entering employment in which they receive the Working Tax Credit would be £370 in the first year and £3,200 each subsequent year. For individuals that would not be entitled to the Working Tax Credit or the return to work credit, the saving would be £4,200 in the first year and £4,800 in subsequent years.

#### *Total savings*

- 2.104 We estimated above that a full time equivalent of 89 Deaf people would eventually enter employment with VRS providers and that a full time equivalent of 2 Deaf people would enter employment as a result of indirect and induced effects.
- 2.105 For the purposes of calculating the impact of employment on welfare payments, however, it is appropriate to focus on the absolute number of Deaf people that would secure jobs rather than full time equivalence. The impact on welfare spending of an individual working full time would not be equivalent to the impact of three individuals working for a third of a normal working week.
- 2.106 To implement this calculation, it is therefore necessary to make an assumption concerning the number of hours that would be worked by a typical Deaf employee of a VRS provider. In this work, we assume that each employee would typically work for 30 hours per week, and would earn the corresponding proportion of the median full time wage in the UK. This means that each employee is assumed to earn a salary of £20,342.<sup>32</sup> Based on this assumption, we can estimate that 111 Deaf individuals would enter employment with VRS providers and 3 individuals would enter employment as a result of multiplier effects.<sup>33</sup>
- 2.107 As noted above, the threshold income above which the Working Tax Credit will not be paid is significantly greater for those with dependent children and hence we assume that those with children would receive the credit upon entering employment. We further assume that 50 per cent of Deaf individuals who secure a new job have dependent

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<sup>32</sup> The median UK wage is £25,428. The wage of a typical part time employee is calculated as:  $Wage = (30/37.5) * £25,428 = £20,342$

<sup>33</sup> The figures are calculated as follows: Direct effect =  $(37.5/30) * 89 = 111$ . Multiplier effect =  $(37.5/30) * 2 = 3$

children. On this basis, 50 per cent of new employees would be entitled to the Working Tax Credit, Return to Work Credit and Job Grant and 50 per cent would be entitled to the Job Grant alone. All employees would benefit from the Access to Work scheme.

- 2.108 Based on these assumptions, the annual welfare payment saving rises from £82,000 in the first year to £396,000 in the fifth year of operation for jobs created by VRS providers. Measured in present value terms over a ten-year period, the total saving is £3.0m. The present value saving for jobs created through multiplier effects is £77,000.

#### *Savings from intensified competition for jobs*

- 2.109 We identified above that VRS would lead to intensified competition for jobs between hearing and Deaf individuals. Where a Deaf individual successfully competes for a job that would otherwise have been filled by a hearing person, there are two opposing impacts on welfare payments:

- (a) there are savings for Deaf individuals that move into employment; but
- (b) welfare payments would be made to hearing individuals who would have been in employment in the absence of VRS.

- 2.110 It was noted above that quantifying the impact of VRS on increased employment of the Deaf as a result of intensified competition for jobs has not been possible and, as a result, we cannot estimate the impact on welfare payments.

#### **Increased tax revenues**

- 2.111 When an individual moves into employment, the Treasury benefits both from reduced welfare spending and from increased tax receipts.

- 2.112 We estimated above that a net figure of 1,172 full time equivalent jobs would be created as a direct result of the provision of VRS and that an additional 820 full time equivalent jobs would be created as a result of direct and induced effects. The impact of these jobs on tax revenue is somewhat difficult to calculate because it is heavily dependent on the earnings of each individual and cannot simply be estimated by multiplying average income by the total number of jobs created. The calculation is further complicated by the fact that some of the individuals who would find employment with VRS providers would already be paying taxation whilst those that would be employed for a small number of hours per week may be exempt from income tax.

- 2.113 As a result of these difficulties, and so as to be conservative in our calculations, we have chosen to estimate the lower bound of increased tax revenues by focussing on Deaf individuals who enter employment with VRS providers. As for the calculation of welfare payments, it is appropriate to focus on the total number of individuals who enter employment rather than full time equivalence. We again assume that each employee would typically work for 30 hours per week, would earn a salary of £20,342 and would have been unemployed in the absence of VRS and hence would not have paid any

income tax. We also continue to assume that 111 Deaf individuals would enter employment with VRS providers and 3 individuals would enter employment as a result of multiplier effects.

2.114 Applying an income of £20,342 to the Prudential Income Tax and National Insurance Calculator, the median individual would incur a tax and National Insurance bill of £4,382.

2.115 On this basis, the total increase in tax revenue as a result of employment with VRS providers would be £157,000 in the first year, rising to £423,000 once VRS has been fully rolled out. This has a present value of £3.3m over ten years. The present value of increased tax revenue for jobs created through multiplier effects is £86,000.

## **Summary**

2.116 Table 2.4 below summarises the costs and benefits of providing VRS in the UK. Given some uncertainty concerning the cost of establishing VRS in the UK, a range of potential net benefits is given in the table. We present an estimate based on the unit cost approach discussed in paragraphs 2.9 to 2.17. We also present upper and lower bound estimates based on the bottom-up approach which was used as the primary costing methodology in this paper.

**Table 2.4: Monetised Economic Costs and Benefits of VRS**

|   | Present value over ten years |                              |
|---|------------------------------|------------------------------|
|   | Excluding multiplier effects | Including multiplier effects |
| <i>Costs – unit cost approach</i>         |                              |                              |
| <b>Total cost</b>                         | <b>£785.7m</b>               | <b>£785.7m</b>               |
| <i>Costs – bottom-up approach</i>         |                              |                              |
| Contact centre setup                      | £6.3m                        | £6.3m                        |
| Head office setup                         | £2.0m                        | £2.0m                        |
| Recruitment                               | £10.2m                       | £10.2m                       |
| Training                                  | £4.9m                        | £4.9m                        |
| Videophone provision                      | £60.6m                       | £60.6m                       |
| Contact centre ongoing (low)              | £487.9m                      | £487.9m                      |
| Contact centre ongoing (high)             | £575.6m                      | £575.6m                      |
| Head office ongoing (low)                 | £162.6m                      | £162.6m                      |
| Head office ongoing (high)                | £191.9m                      | £191.9m                      |
| <b>Total cost (low)</b>                   | <b>£734.5m</b>               | <b>£734.5m</b>               |
| <b>Total cost (high)</b>                  | <b>£851.5m</b>               | <b>£851.5m</b>               |
| <i>Benefits</i>                           |                              |                              |
| Productivity                              | £12.5m                       | £12.5m                       |
| Employment (direct)                       | £551.2m                      | £551.2m                      |
| Employment (multipliers)                  | -                            | £385.9m                      |
| Health benefits                           | £898.5m                      | £898.5m                      |
| <b>Total benefits</b>                     | <b>£1,462.3m</b>             | <b>£1,848.1m</b>             |
| <b>Net benefit (unit cost)</b>            | <b>£676.6m</b>               | <b>£1,062.5m</b>             |
| <b>Net benefit (bottom-up, low cost)</b>  | <b>£727.7m</b>               | <b>£1,113.6m</b>             |
| <b>Net benefit (bottom-up, high cost)</b> | <b>£610.8m</b>               | <b>£996.6m</b>               |

Note: Figures presented in the table may not sum to totals exactly because of rounding.

2.117 In addition to the economic benefits presented above, there would also be benefits to the Treasury arising from reduced welfare spending and increased tax revenues. These benefits are presented in Table 2.5 below.

**Table 2.5: Benefits of VRS to the Treasury**

|  | <b>Present value over ten years</b> |                                     |
|--|-------------------------------------|-------------------------------------|
|  | <i>Excluding multiplier effects</i> | <i>Including multiplier effects</i> |
| Welfare payment savings (direct)                 | £3.0m                               | £3.0m                               |
| Welfare payment savings (multipliers)            | -                                   | £0.1m                               |
| Tax and National Insurance revenue (direct)      | £3.3m                               | £3.3m                               |
| Tax and National Insurance revenue (multipliers) | -                                   | £0.1m                               |
| <b>Total benefits</b>                            | <b>£6.4m</b>                        | <b>£6.5m</b>                        |

2.118 On the basis of the tables presented above, it can be seen that VRS would have a significant net benefit taking into account only those benefits that it has been possible to quantify. As noted above, there are numerous other benefits of VRS which we have not been able to place a monetary value on, including:

- (a) benefits to hearing colleagues, friends and relatives of Deaf individuals that would be able to communicate with the Deaf more easily and effectively;
- (b) increased ability for Deaf entrepreneurs to establish and run companies;
- (c) ability for the Deaf to convey emotions and to be expressive in telecoms;
- (d) ability for Deaf individuals to communicate directly with other Deaf people using videophones — approximately eight such calls are made for each VRS call in the US;
- (e) improved self-confidence and increased independence for BSL users; and
- (f) reduced public sector spending on sign language interpreters.

2.119 Accounting for these benefits would further reinforce the conclusion that VRS would deliver a substantial net benefit to the UK economy.

