

# Disability considerations for Infrastructure Programmes



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# Acronyms

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AT	Assistive Technology
BRTS	Bus Rapid Transit System
CRPD	Convention on the Rights of Persons with Disabilities
DMRC	Delhi metro Rail Corporation
DPO	Disabled Persons Organisation
FCAS	Fragile & Conflict Affected States
G3ict	The Global Initiative for Inclusive ICTs
GDP	Gross Domestic Product
ICT	Information & Communications Technology
MRTS	Mass Rapid Transit System
NAP	National Accessibility Portal
NGO	Non-governmental Organisation
PIDA	Programme for Infrastructure Development in Africa
PRM	Person with Reduced Mobility
SARA	Safety, Accessibility, Reliability, Affordability
TRIPP	Transport Research and Injury Prevention Programme
UN	United Nations
UPE	Universal Primary Education
WASH	Water, Sanitation & Hygiene
WTO	World Trade Organisation
WHO	World Health Organisation

# Executive Summary

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DFID's aim is for its policies and programmes to be inclusive of and accessible to all people, including people with disabilities, vulnerable and those discriminated against and excluded due to gender, geography, income, age or other characteristics<sup>1</sup>. This rapid desk based study provides a reference document that identifies and summarises robust evidence of the impact of non-accessible infrastructure on people with disabilities. It makes recommendations on how to incorporate the principals of universal access into all infrastructure projects. This document should be read in combination with the DFID Disability Framework "Leaving No One behind" (2014), which sets out how DFID promotes inclusion of people living with disabilities in all its programmes.

Approximately 15% of the world's population, over a billion people, have some form of disability. Within the adult population (>15 years old) the *Global Burden of Disease* (GBD) estimates 975 million people with a disability, and 190 million with a severe disability, such as quadriplegia, severe depression or blindness. For children of 14 years or younger the GBD estimates 95 million have disabilities of which 13 million are severely disabled. Almost every person will be temporarily or permanently impaired at some point in life, and with an ageing population, the number affected will increase.

Disability can take many forms. The Washington Group Short Set of Questions, DFID's preferred method for programme data disaggregation by disability status, identifies 6 broad areas of disability including: difficulty seeing, hearing, walking or climbing steps, remembering or concentrating, difficulty (with self-care such as) washing all over or dressing, and difficulty communicating. For example, 285 million people across the world are visually impaired, 39 million of which are blind, while 90% of people who are visually impaired live in developing countries<sup>2</sup>. An estimated 38% of people over the age of 60 have an impairment or disability<sup>3</sup>.

Infrastructure is critical to social functioning with direct impact on social wellbeing, earnings, education and health. When infrastructure is inaccessible to any social group, that group is at risk of social exclusion, unable to participate in and contribute to society. Transport Infrastructure is critical, as it is the means by which other services are accessed, including health, education, employment, etc. Urban environments without a universally accessible transport system will exclude people living with disabilities, marginalising them and breaching their human rights.

When considering transport systems, it is important to look at the **whole journey from door to door**, including the provision of information, the pedestrian environment, the interchange within and between modes, including both hard (e.g. stations) and soft (e.g. information). Failure at any one point in the chain means the whole system fails, including the vehicles and the people who make the system work. This extends to the provision of information, including the information itself. Delivery in multiple modes helps to ensure that people can receive and understand the information they need, even if on their own, whereas any one

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<sup>1</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/382338/Disability-Framework-2014.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/382338/Disability-Framework-2014.pdf)

<sup>2</sup> World Health Organization (2014): Visual Impairment and Blindness, Fact Sheet No 282.

<sup>3</sup> <http://www.who.int/mediacentre/factsheets/fs282/en/>. xxxii World Health Organization/World Bank (2011).

model of delivery may not be sufficient for all users. The role of the person-to-person interface should not be ignored as people are more flexible than any technology.

Extensive work has been carried out concerning provision of WASH and energy access to people living with disabilities. This is not covered here, but further information on WASH can be found in the DFID internal reference document “*Disability inclusive WASH*”. Limited access to energy may have similar impacts on people living with disability, impacting on their independence, income potential, health and quality of life. It can shorten the working day, prevent the use of assistive technology and limit the maintenance of heat and light. The lack of accessibility in infrastructure can be attributed to several factors, including:

- **Inadequate knowledge or understanding** with decision makers not understanding the implications of design and failing to understand the challenges and risks;
- **Lack of user input**, with people with disabilities and reduced mobility not being brought in to the planning, design and implementation process; and
- **Missed Opportunities**, with the potential for added value for universal access to be missed.

It is essential to consult and involve people with disabilities, alongside other users and key stakeholders. Their perspectives, combined with an understanding of the technical issues can help ensure cost-effective and practical solutions. This requires decision makers to have a better understanding of the barriers faced by people with disabilities. To achieve this though, there needs to be greater social awareness and appreciation of the challenges; this goes hand-in-hand with accessible infrastructure, as the more society see people with disabilities living independently, the greater acceptance and support there will be from general society.

At the heart of addressing exclusion from infrastructure is the principal of **Universal Design**, the process of ensuring that systems are usable by all people of all ages and ability, to the greatest extent possible, without the need for adaptation or specialised design. It requires an engineering approach, developing a comprehensive understanding of the challenges to be addressed, establishing clear objectives to achieve and taking a systematic approach to dealing with them. This requires commitment to Universal Access at every level of the project planning, design, implementation and operation, with the concepts institutionalised in the same way as health & safety.

Legislation and regulation has a role to play, with the mandate of accessibility standards however, this alone will not solve the problem. There are many examples of good legislation which is undermined by poor compliance enforcement. Whilst this links to challenges in governance, the procurement process for internationally funded projects can support efforts by including key design approaches, specifications and supplier criteria in tender documents and evaluation criteria. Aspects that should be considered during procurement include: risk of corruption undermining aspirations; clarity of objectives with respect to universal access, performance criteria of completed infrastructure as opposed to dictated inputs (i.e. door size), competence of contractors and suppliers in providing services; capacity of procuring authority to monitor and enforce compliance and implications of operation and maintenance.

If an infrastructure project is to ensure universal access, including for users with disabilities, then it needs to incorporate appropriate disability sensitive indicators. Furthermore, these need to be harmonised with 1) Disability sensitive targets; namely the criteria by which the infrastructure performance will be assessed; and 2) Disability sensitive data sources, referring to the source of data that will be used to compare performance with criteria. There are existing resources that provide information on establishing appropriate indicators for

monitoring inputs, outputs, outcomes and impact from projects with specific relevance to people living with disabilities.

Consideration should be given to the potential entry points for mainstreaming disability issues into infrastructure policies and projects. Post-disaster reconstruction can present good opportunities to link wider infrastructure reconstruction with universal access. Similarly international sporting events provide opportunities to transform approaches to accessibility, not only in and around the event, but elsewhere within government policy and implementation.



# Definitions

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**Accessibility audit** is an important tool to identify barriers and can help to improve accessibility for people with disabilities, and “*provides the basis for an access improvement plan or strategy*” (NDA, 2014).

**Assistive Technology.** Broadly, **Assistive Technology (AT)** is defined as “*any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customised, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities*” (RESNA, 2014).

**Built and open spaces** are private and public buildings, including (but not limited to) homes, schools, health clinics, banks, post offices, police stations, courts, gardens, parks and recreational centres.

**Impairment** is a reduced physical or mental faculty. It becomes disabling when the individual is prevented from participating fully in society because of environmental and social barriers.

**Information and Communications Technology (ICT)** covers communications devices or applications, encompassing: radio, television, cellular phones, computers and network hardware and software, websites, satellite systems, and various services and applications associated with them, such as videoconferencing and distance learning.

**Infrastructure** is the basic physical and organisational structure needed for the operation of a society or enterprise (OD, 2015), or the services and facilities necessary for a society to function (Sullivan & Sheffrin, 2003, p474). The term typically refers to the technical, organisational and service structures that support a society, such as roads, bridges, tunnels, water supply, sewers, energy supply, telecommunications, transport systems, health, education and social support systems etc.

**Person with reduced mobility (PRM)** is a term to describe a person whose mobility when using transport is reduced due to any permanent or temporary impairment (physical, sensory or cognitive), (IATA, 2007).

**Reasonable accommodation** denotes adjustments in employment terms, conditions and the environment, including work design and facilities, with a view to accommodating the needs of people with disabilities, pregnant employees with disabilities, and employees with disabilities with family responsibilities without undue hardship to the employer.

**Social cohesion:** The concept of social cohesion accommodates multiculturalism and the coexistence of difference; this does not imply that social inclusion is the only solution to social exclusion (Beall & Piron, 2005).

**Social exclusion** is a process and state that prevents individuals or groups from full participation in social, economic and political life, and from asserting their rights. It derives from exclusionary relationships based on power. This may result from: their social identity (e.g. race, gender, ethnicity, caste or religion) or social location (e.g. in areas that are remote, stigmatised or suffering from war or conflict) (Beall & Piron, 2005).

**Transport infrastructure** is road and pedestrian environment, bus, bus shelters and terminuses, railway stations and rolling stock, rapid transit systems (bus, metro, monorail,

etc.), water ways and integrated public transport systems (cycle and auto rickshaws, feeder, non-motorised vehicles, tricycles, mobility scooters, etc.).

**Universal accessibility** provides for ease of independent approach, entry, evacuation and/or use of services and facilities by all potential users regardless of disability, age or gender with an assurance of individual health, safety and welfare during the course of those activities (International Standards Organisation, 2011). It emphasises an inclusive environment that accommodates the diverse needs of ‘all individuals’ and not just people with disabilities.

**Universal design** is the design of products and environments to be usable by all people to the greatest extent possible without the need for adaptation or specialised design (Mace, 2008). The intent of universal design is to simplify life for people of all ages and abilities by making products, communications, and the built environment more usable for as many people as possible at little or no extra cost.

**WASH** refers to Water, Sanitation and Hygiene.

**Women’s empowerment** is enabling women to participate fully in economic life across all sectors and recognising that this is essential to build stronger economies, achieve internationally agreed goals for development and sustainability, and improve the quality of life for women, men, families and communities. Further information can be found at <http://www.unwomen.org/en/partnerships/businesses-and-foundations/womens-empowerment-principles>

# SECTION 1

## Introduction

This rapid desk based study was undertaken to provide DFID infrastructure advisors with a reference document that identifies and summarises robust evidence and makes recommendations on how to incorporate disability considerations into all aspects of infrastructure projects. The study aims to help minimise barriers in infrastructure and improve access for people with disabilities, enabling them to participate fully in social and economic life. This is of particular importance in relation to the new Sustainable Development Goals (2015), which emphasise the need for inclusion of all people, including those who are disabled, people in all age groups and to take account of gender-specific needs.

*“a person has a disability if they have a physical or mental impairment that has a ‘substantial’ or ‘long-term’ negative effect on their ability to do normal daily activities”*  
Equality Act, 2010

### S U M M A R Y

## WORLD REPORT ON DISABILITY



World Health Organization



THE WORLD BANK

**Figure 1 The World Report on Disability, published in 2011 provides detailed information on the state of the world with respect to people living with disabilities**

indicating that between 76% and 85% of people living with serious mental disorders in developing nations do not receive treatment. The equivalent range for developed nations is 35-50%<sup>5</sup>. Further information and data on the number of people living with disabilities globally and in each nation can be found on the WHO website.<sup>6</sup>

The number or statistic is unimportant however; the key issue is that anyone with any disability should be included in infrastructure design. Infrastructure needs to be made accessible to all, with attention focused on what people with disabilities can achieve, rather than considering only what they might be unable to achieve.

The DFID guide, Disability Framework “Leaving No One Behind”, published in December 2014<sup>7</sup> sets out the contributions that DFID programmes should make towards making the world more accessible. It follows the UN Convention on the Rights of People with Disabilities (CRPD), including articles 11 and 32 which directly relate to international cooperation

<sup>4</sup> <http://www.who.int/mediacentre/factsheets/fs352/en/>

<sup>5</sup> <http://www.who.int/mediacentre/factsheets/fs352/en/>

<sup>6</sup> <http://www.who.int/mediacentre/factsheets/fs352/en/>

<sup>7</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/382338/Disability-Framework-2014.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/382338/Disability-Framework-2014.pdf)

(ratified by the UK in 2009). It is also in line with UK law, the Equality Act 2010 in its definition of a person living with a disability. The guide establishes DFID's core approach, requiring that policies and programmes are inclusive of people with disabilities and other vulnerable groups that may be marginalised on the basis of characteristics over which they have little or no control, including gender, geography, income, age, etc.

There are existing guidance documents on provision of services for people with disabilities within the infrastructure sector. Of note is the guide by Wiman & Sandhu (2004) *Integrating Appropriate Measures for People with Disabilities in the Infrastructure Sector*<sup>8</sup>. This GTZ sponsored guide provides a good introduction to the various issues and measures that can be used to support incorporating the 'disability lens' into infrastructure projects.

There is a risk in focusing on the negative impact of a disability, as it fails to understand the potential of people living with disabilities. A more appropriate model is, instead, to consider people's capabilities. Tyler (2006) suggests considering the problem as one of three factors: the Person, the Environment, and the Activity; a disability arises when the capabilities required by the environment and/or activity are greater than those provided by the person seeking to engage with them. The response is then to adjust the environment or activity, or to improve the capabilities, such that the problem is no longer a barrier. For infrastructure, this points to solutions that have usability requirements that are sufficiently low to enable everyone to use as they wish, and points to the need for a good understanding of the expected user population.

The study has been structured as follows:

- Rationale for considering disability in infrastructure:
  - Areas and impact of infrastructure on people with diverse disabilities in different sectoral settings.
- Best practices in project planning, engineering design and implementation for DFID implementation partners:
  - Examples of innovative partnership with the private sector to address the inclusion of people with disabilities.
- Examples of 'what works' in terms of both project implementation and output to increase inclusion and reduce negative impacts which 'locks' disabled people out and does more harm than good.
- Indicators for monitoring and evaluation processes to ensure projects are having the desired effects.
- Cost implications of inclusive design versus retrofitting.
- Examples of where international inclusive standards have been used as part of procurement policy.
- Mainstreaming disability considerations into infrastructure programmes and policy decisions.
- Disability considerations – gender issues.
- Disability considerations in fragile and conflicted affected states (FCAS) and regions.

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<sup>8</sup> <http://unipd-centrodirittiumani.it/public/docs/en-disability-infrastructure-2004.pdf>

# SECTION 2

## Rationale for Inclusive Infrastructure

Accessible infrastructure creates an inclusive environment for people with disabilities, allowing them to enjoy their civil, cultural, political, social, and economic rights and entitlements<sup>9</sup>. It is also a precondition for independent living and full and equal participation in society by children and adults with disabilities.

Infrastructure is designed to support society, with an impact on fundamental social concerns, including wellbeing, earnings, education and health. If it is inaccessible in any aspect, it can exclude individuals or groups from society, degrading quality of life and human rights, ultimately demeaning of society itself. This is true for all potential infrastructure users, but any inaccessibility issue that an un-impaired user may find will be that much more of a barrier for a person with a disability. This section considers particular features for key infrastructure sectors that may affect accessibility for disabled users.

### 2.1 Impact of Inaccessible Transport Infrastructure

Without accessible transportation, people with disabilities are more likely to be excluded from independent access to employment, education, and healthcare facilities, and to social contact and recreational activities (Roberts & Babinard, 2005; Venter et al, 2004).

Disability is not just an issue of a small minority within the general population; there is a much larger population affected, constrained or limited due to commitments to people living with a disability. As explanation, a study in China found that while 5% of the population had a disability, approximately 20% of people lived in a household where someone had a disability<sup>10</sup>. The implication is that mainstreaming accessibility promotes independence for both people with disabilities and those on which they rely to help them in daily life.



**Figure 2 Race the Tube: Accessibility of the London Underground**

<https://youtu.be/hF2O3pwegSU>

#### 2.1.1 The Travel Chain – Components and Continuity

The 'travel chain' refers to all elements that make up a journey, from starting point to destination, including pedestrian access, vehicles, and transfer points. If any link is inaccessible, the entire trip becomes difficult (Maynard, 2009). The accessibility goal is for people to have access to all vehicles and the full service area, as well as the pedestrian environment (Iwarsson et al, 2000). Table 1 presents key factors that contribute to inaccessible transport systems in low-income urban environments (WHO & WB, 2011).

<sup>9</sup> Economic rights and entitlements that persons with disabilities may find harder to access include social protection insurance, pension, allowance, reimbursement, assistive devices, etc.

<sup>10</sup> <http://go.worldbank.org/0E41ZJCE10>

**Table 2.1 Common accessibility issues in transport infrastructure**

Pedestrian access	Rail systems and ferries	Bus rapid transit systems
<ul style="list-style-type: none"> <li>• non-existent or poorly maintained pavements;</li> <li>• inaccessible overpasses or underpasses;</li> <li>• crowded pavements in the vicinity of stations and stops;</li> <li>• physical lack of traffic control;</li> <li>• lack of aids at street crossings for people with sensory impairments;</li> <li>• dangerous local traffic behaviours.</li> </ul>	<ul style="list-style-type: none"> <li>• size and height of the gaps between vehicle floors and the platforms, which may be different at every station (making boarding and alighting difficult);</li> <li>• space in vehicles for wheelchair access and anchoring;</li> <li>• access to tracks at different levels within stations;</li> <li>• inaccessible timetable information;</li> <li>• visual environments needed to accommodate people with visual impairments and the elderly (e.g. for example colour-contrasting railings and lighting).</li> </ul>	<ul style="list-style-type: none"> <li>• Gap between the bus floor and the ground at bus stops</li> <li>• Limited bus numbers on key routes</li> <li>• Limited number of accessible vehicles on key routes</li> <li>• Lack of information on accessible routes and timings for buses</li> <li>• Accessibility focused only on new lines</li> <li>• Distances to accessible bus routes</li> </ul>

### 2.1.2 Removing Barriers

Universal design is increasingly being adopted in bus and rail transit operations to address transport infrastructure barriers, as discussed later. The most important universal design innovation is the low-floor transit vehicle, adopted for heavy rail, light rail, trams, and buses, providing almost-level access from curbs and short-ramp access from street level. There is a growing global trend for the introduction of low-floor buses into bus rapid transit systems. Accessible bus rapid transit systems (BRT) have been constructed in Curitiba (Brazil); Bogota (Colombia); Quito (Ecuador); Ahmedabad, New Delhi, Pune, Indore and Jaipur, etc. (India); Dar es Salaam (Tanzania).

To provide accessible solutions requires understanding of the issues and then creativity in seeking a solution that is technically, culturally and financially appropriate (see case study 1 below).

#### Case Study 1 Pilot projects enhance access for persons with disabilities

The following case studies in South Africa, India, Mozambique, and Malawi demonstrate positive collaboration between DFID, TRL Limited (UK), CSIR Transportek (South Africa), Access Exchange International, India's Central Institute of Road Transport, and agencies in Malawi and Mozambique. The overall programme included demonstration projects aimed at implementing practical features and testing innovative low-cost access features. The results were incorporated into guidelines (Venter et al, 2004 – see link below).

- Pretoria, South Africa: a pilot project was planned to demonstrate bus access for wheelchair users at key sites, using ramped wayside platforms with bridges to span the floor-to-platform gap.
- Pune, India: bus-stop shelters along an entire six-kilometre route were upgraded to be more disabled person friendly. A spectrum of features for passengers with mobility, hearing, and vision disabilities were installed. In addition, bus drivers received disability awareness training and new buses incorporate wider entrances, improved hand rails, priority seating, colour contrast on handrails, and visual stop signs for passengers who are deaf or hard of hearing.

- Blantyre, Malawi: the focus was on safety and accessibility for both pedestrians and minibus passengers in the vicinity of a hospital entrance on a very busy road. New features included accessible walkways, a new bus shelter on one side of the road, and improvements to an existing shelter on the other side, curb ramps, and tactile features.
- Maputo, Mozambique: bus stands and pavements have been improved, as well as a pedestrian crossing upgraded at the city hospital. Pilot raised platforms, which are low cost, have been constructed at a major bus stop to assist ambulatory<sup>11</sup> passengers with disabilities.

While they served as testing grounds, these case studies clearly demonstrate that innovative low-cost access features can be easily provided.

Further information can be found at:

[http://www.transport-links.org/transport\\_links/filearea/publications/1\\_831\\_ORN%2021.pdf](http://www.transport-links.org/transport_links/filearea/publications/1_831_ORN%2021.pdf)

Recommended guiding principles to ensure the travel chain is complete for people with disabilities, include:

1. Planning and design approaches involving people with disabilities;
2. Adequate monitoring and enforcement of existing accessibility legislation;
3. Developing campaigns and educational programmes to improve policies, practices and the use of services. Such as posters informing passengers of priority seating;
4. Local knowledge contribution, such as locations for pedestrian crossings on busy/dangerous streets;
5. Provisions for alternative forms of transport, such as separate lanes and paths for tricycles, wheelchairs, bicycles, and scooters;
6. Affordable transport through subsidies for people with disabilities; and
7. Education and training of all parties involved in transportation, for instance:
  - Managers need to understand their responsibilities and front-line staff need to ensure customer care; and
  - Key equipment, such as portable lifts require properly trained attendants, as well as stopping vehicles in the right position to allow use.

## 2.2 Impact of Inaccessible Information and Communication Technology (ICT) Infrastructure

With the world going on line, ICT accessibility, or e-accessibility, has the potential to define social inclusion of the future. Accessible ICT has three distinct features: accessible design, availability and affordability.

The starting point is content; the information itself needs to be accessible, understandable and useful. If a person does not understand the system, or what they are being told, for whatever reason, it makes that service inaccessible, irrespective of their capabilities. However, the issue can be that much worse for people with disabilities. A survey commissioned by the Zimbabwe Parents of Handicapped Children's Association found that people with hearing and visual impairments were

*“Due to the explosive multiplication of ICT applications and innovations deployed in all aspects of society, the design of our technology will determine whether or not everyone will be able to participate fully in society. This is especially true for persons with disabilities who face barriers in the design of technology as well as other ICT accessibility barriers such as availability and affordability”*  
(Waddell, 1999)

<sup>11</sup> People able to walk

excluded from general HIV/AIDS services, as counselling and testing were not offered in sign language and educational and communication materials were not offered in Braille (Banda, 2006). Considering accessibility, availability and affordability, the guidelines for accessible ICT are:

1. Adopt policies on procurement which take into consideration accessibility criteria;
2. Support the development of telephone-relay<sup>12</sup>, sign-language, and Braille services;
3. Incorporate accessibility features to ensure that people with disabilities gain the same benefits as the wider population; and
4. Support the education and training of persons with disabilities to take advantage of ICT – including training to ensure digital literacy and skills (WHO & WB, 2011).

Just having the infrastructure will not fix the problem; many places, including the UK, provide the facilities to enable communication with disabled people, but it is unused as the core issue behind communication has not been addressed. Communication is not achieved unless the recipient has understood, which points to the delivery of the message and should be the basis for any decision when considering technological solutions to communication. In many cases, the most important component is the patience and empathy of the person providing the information.

The National Accessibility Portal (NAP) initiative of South Africa was a national project to address the needs of approximately 4 million persons with disabilities, where less than one percent are economically independent. It recognised that effective communication and access to information and services empower people with disabilities, using innovative, cost-effective and appropriate ICT based technologies to support people with disabilities. It aimed to empower them and to uplift them economically to enable them to play a full, participatory role in society. The portal served as a one-stop shop for information, services and communications for people with disabilities, caregivers, the medical profession, and others providing disability services. The research and development (R&D) phase of the portal was completed in March 2009, but was then closed down due to a lack of funding<sup>13</sup>.

## 2.3 Impact of Inaccessible Infrastructure: WASH and Energy

Extensive information resources already exist into the impacts of inaccessible WASH and energy infrastructure. It is not the purpose of this report to repeat key messages or research. Many of the accessibility issues that affect un-impaired people remain true for people with disabilities, however to a much greater extent. A lack of accessible WASH facilities is more likely to affect admissions, retention and dropout rates of girls with disabilities in schools and vocational training institutions, when compared to boys and non-disabled girls (ARTH ASTHA et al, 2013). A multi-state analysis in India has shown that in the state of Andhra Pradesh, school hostels have accommodated 1,009 male students, but only 290 female students with disabilities (UNDP, 2007).

DFID has a comprehensive internal guidance document on 'Disability Inclusive WASH' which sets out many of the issues relating to accessible WASH infrastructure. DFID also commissioned research through the R4D programme into inclusive WASH Programmes entitled 'Undoing Inequality: Inclusive WASH Programmes that deliver for All'. The output can be found on the R4D website under ref 197488<sup>14</sup>.

<sup>12</sup> Telecommunications relay service is an operator service that allows people who are deaf, hard of hearing, deafblind, or have a speech disorder to place calls to standard telephone users via a keyboard or assistive device.

<sup>13</sup> <http://www.napsa.org.za/>

<sup>14</sup> <http://r4d.dfid.gov.uk/Output/197488/>.



### 2.3.1 Access to Electricity

Electricity is an essential service. For people with disability its beneficial properties are not limited to light and heat; it also powers life-support equipment and devices that provide mobility, communication and independence. These include reading, writing, and speaking aids, hearing aids, mobile and cordless telephones, electronic door openers, motorised wheelchairs, mobility scooters, portable lifts, etc. (Hodge, 2008). People with disabilities are often more likely to have less income and therefore struggle to afford electricity costs, requiring greater support. Hodge (2008) outlines actions for ensuring that persons with disabilities stay connected:

*“To significantly reduce the risk of disadvantage, the safety net must offer assistance that has some relationship with current prices and be responsive to people’s disability-related electricity needs. This will require energy rebates with needs-based, rather than prescriptive, eligibility criteria.”*

Rebates are not sustainable, pointing to the need for further research and other innovative tariff structures. Though this issue falls within the remit of social protection, it has relevance here as interventions into affordable energy and electricity need to consider how to ensure universal access.

# SECTION 3

## Best practices in Project Planning, Engineering Design

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Including features to facilitate accessibility by persons living with disabilities from the outset increases the potential of satisfying the needs of all the users. It is also significantly more cost-effective than making retrospective adjustments during the construction or post-occupation phases. This section sets out key guidance to facilitate development of infrastructure, through best practice in project planning and design.

### 3.1 Typical issues in Planning, Design and Implementation

The *2011 World Report on Disability* lays out prerequisites for progress, pointing to a culture that lacks accessibility, effective enforcement of laws and regulations and the need for better information on accessibility to different environments. Solutions need to take into account affordability, technology availability, knowledge, cultural differences and the level of development (WHO & WB, 2011). Too often, accessibility is designed around the unimpaired with concessions made for those with disabilities. The lack of accessibility in infrastructure can often be attributed to several factors, including:

- **Inadequate knowledge:** Decision makers often fail to understand the implications of decision making; attempts to prevent cycle access to pavements at kerb ramps also restricts wheelchair users;
- **Inadequate Understanding:** Decision makers are often removed from users and do not have an appreciation of challenges, risks or local context faced by people with disabilities, to develop an appropriate solution;
- **Lack of user input:** People with disabilities and reduced mobility are often not involved in the design, planning and implementation process;
- **Missed Opportunities:** Planners and designers often miss potential for added value to be gained by ensuring access for people with disabilities. Tactile floor indicators, such as tactile paving stones, can be used to enhance the visual impact, as well as improve access for persons with visual impairment.

### 3.2 Universal Design – Guiding Principles for Inclusion

The *2011 World Report on Disability* states that universal design is the key to inclusion, and that it is practical and affordable, even in developing countries. Put simply, universal design is design of products and environments to be usable by people of all ages and abilities to the greatest extent possible without the need for adaptation or specialised design (Mace, 2008). Use of universal design improves access to infrastructure and creates an enabling environment which benefits all, including people with reduced mobility; people with temporary and permanent mobility impairments due to age, medical conditions, and latent diseases; families with young children; unescorted children; persons with temporary ailments such as fractures; pregnant women; persons carrying heavy luggage; people with communication problems, such as different linguistic and ethnic groups like migrants and tourists (Agarwal & Chakravarti, 2014). It can be applied to anything that is designed, be it a

vehicle, building, website, playground, piece of furniture, toilet, or a consumer product such as a tap handle.

Universal design is increasingly being adopted in bus and rail transit operations to address transport infrastructure barriers. The most important innovation has been the low-floor transit vehicle, adopted for heavy rail, light rail, trams, and buses, providing almost-level access from curbs and short-ramp access from street level. There is growing global trend for the introduction of low-floor buses into bus rapid transit systems. Accessible bus rapid transit systems (BRT) have been constructed in Curitiba (Brazil); Bogota (Colombia); Quito (Ecuador); Ahmedabad, New Delhi, Pune, Indore and Jaipur, etc. (India); Dar es Salaam (Tanzania). Other examples of universal design include:

1. Portable lifts or manually folding ramps on all transit vehicles;
2. Automated lifts, bridge-plates, and ramps to deal with platform-level issues;
3. Raised pads at bus stops with ramp access, making it easier for someone with a mobility impairment to enter a bus, for visually impaired and cognitively impaired individuals to find the stop, and for improved safety of all those waiting for a bus (Rickert, 2010);
4. Real-time information on waiting times allowing planning of journeys;
5. Smart cards for fare collection, gates, and ticketing, facilitating access and reducing journey activities and time;
6. Visual and tactile warning systems at the edge of platforms – or full safety barriers along the entire platform;
7. Railings and posts painted in bright contrasting colours;
8. Audible signs to help people with visual impairments find gates and identify buses; and
9. Old single-level cars renovated to provide space by removing existing seats or replacing them with folding seats.

Access standards and universal design innovations implemented in developed countries are not always affordable or appropriate in low-income and middle-income countries. To provide accessible solutions requires understanding of the issues and then creativity in seeking a solution that is technically, culturally and financially appropriate. Simple examples which can be used in lower-income settings include:

1. A seating platform next to a communal hand pump to provide an opportunity for rest and enable small children to reach the pump;
2. Ramped access and a concrete apron at the pump post to help wheelchair users,
3. Making it possible to bring large, wheeled water containers to the village pump and reduce the number of trips; and
4. A bench fitted over a pit latrine, making the latrine use easier (WHO & WB, 2011).



**Figure 3 Ramped access to a tapstand in Mali (Source: WaterAid)**

### 3.3 Non-negotiable Elements in Planning and Engineering Design

There will be certain aspects of an infrastructure system that are essential to enable access and usability by all users. These will be non-negotiable criteria, based on the purpose to which the infrastructure is being designed and the expected users. It is important that such accessibility criteria is identified before the project, to influence design and monitored during implementation.

### 3.3.1 Commitment to Address Accessibility

Every project should outline its commitment to accessibility:

1. Assign a senior member of staff (e.g. project manager) responsibility for accessibility. It will be her/his role to ensure and advocate that accessibility is addressed at all stages of the project (e.g. design, construction and handover),
2. Prepare a brief statement on how accessibility is going to be addressed throughout the project, and
3. Put accessibility on the agenda throughout the project.

### 3.3.2 Accessibility Standards

Article 9 of the CRPD calls for the development of universal design and technical standards, but as yet these are not in existence. At the inception of every project it is important to identify local, regional, national or international regulations relevant to the project. These will ideally be mandated in the national disability laws and legislation and will have a tangible impact peoples' lives.

#### Case Study 2 Example of India's approach to Disability regulations

In India, separate accessibility standards and guidelines are available for roads, buildings, highways, buses, etc. Some ministries have mandated their incorporation, especially in new projects and retrofitting. To build a hospital, theatre, stadium or any other public building in Delhi, compliance with the National Building Code (BIS) is mandatory. For Delhi's city roads and street design, one must comply with the UTTIPEC (2010) Street Design Guidelines. Road-based public transport vehicles, such as buses, should comply with Urban Bus Specifications (UBS) I & II (IUT, undated). The accessibility of government websites in India should follow National Informatics Centre (NIC) guidelines. NIC's website is accessible to all users irrespective of the device used (computer, mobile phone, etc.), its technology or the ability of the user. For example, a user with a visual disability can access this website using assistive technologies, such as screen readers and magnifiers.

Further information can be found at:

[http://www.transport-links.org/transport\\_links/filearea/publications/1\\_831\\_ORN%2021.pdf](http://www.transport-links.org/transport_links/filearea/publications/1_831_ORN%2021.pdf)

Local or national codes, regulations or standards may not be available, and in these instances, reference can be made to international standards, such as the International Standards Organisation published 'ISO 21542 - Building construction - Accessibility and usability of the built environment' (ISO, 2011)<sup>15</sup>.

In some cases, basic standard designs may not comply with accessibility requirements. In such situations, efforts should be made to enhance designs to improve access, based on the nature of the facility and the population to which it is catering. For example, the Right to Education Act (MHRD) in India mandates the provision of at least one accessible unisex latrine in every school, or, where conventional society norms do not promote unisex latrines, provision of one accessible toilet cubicle each for boys and girls. It does not require design for use by disabled children, but relatively cost-effective changes can ensure that it does<sup>16</sup>.

<sup>15</sup> [http://www.iso.org/iso/catalogue\\_detail?csnumber=50498](http://www.iso.org/iso/catalogue_detail?csnumber=50498)

<sup>16</sup> WaterAid has carried out a detailed study into mainstreaming disability in WASH available at <http://www.wateraid.org/news/news/mainstreaming-disability-and-ageing-in-water-and-sanitation-programmes>

### 3.3.3 User Involvement and Technical Resource

It is essential to involve and consult people with disabilities (including women), as well as other potential users and stakeholders because:

1. Users' perspectives, combined with professional expertise and technical guidance, are essential to ensure that facilities and services are appropriate and provide value for money;
2. Better understanding of the barriers faced by people with disabilities helps mitigate against design-stage obstacles, thereby avoiding the costly modifications;
3. Consultation promotes disability awareness within the community, enhancing acceptance and integration (WHO & WB, 2011).

Safety, accessibility, reliability and affordability (SARA) are four interlinked factors that need to be assessed when considering infrastructure location (Venter et al, 2004).

1. **Safety** is the first and foremost concern of an individual regardless of age, sex, disability or gender (Agarwal, 2012). For example, locating a school near a busy market place or high traffic road is hazardous (Agarwal & Chakravarti, 2014), but remote locations can create issues with access to help if needed. Locating residential homes for persons with disabilities within hearing/visual distance of a community enables calls for assistance (WHO & WB, 2011);
2. **Accessibility** should enable individuals of all abilities to access and use all parts of the infrastructure system and facilities at all times (Agarwal & Chakravarti, 2014). This means considering environmental and usage features (lighting, weather, footfall numbers, transit times, floor services, signage, etc.) in addition to access features (ramps, lifts, tactile paving, etc.) that enables travel at all times (adverse weather, at night, during rush hour, etc.);
3. **Reliability** relates firstly to consistency across all the elements of a journey (Venter et al, 2004), meaning a person embarking on a trip must have confidence that all parts of the journey, including hard (i.e. infrastructure, vehicles) and soft (on-time performance, delays) will be accessible. This links closely to the whole trip chain;
4. **Affordability** is directly connected to safety and accessibility. Time, effort and convenience are as important as financial affordability. Persons with disabilities often have lower incomes, and in developing countries are often among the poorest. Therefore, high transport costs can be a barrier to use, especially if they are required to pay extra for transporting mobility aids (such as folded wheelchairs).

### 3.3.4 Fund Allocation

Resources are often not allocated separately for accessibility requirements during planning, creating issues for project design and implementation, leading to potential compromises in quality and quantity. It is essential that universal accessibility is not seen as an optional extra, but that costs to achieve it are included from the outset.

Issues can arise from contractual arrangements, with unintended consequences. Allocating budgets on a lump sum basis may lead to later cost-cutting efforts to reduce cost of providing a barrier-free environment (Samarthyam, 2013). Failing to understand actual demands for the site, terrain requirements, and any additional costs of labour and construction materials, can lead to budgets that are insufficient to deliver access. Examples can include apparently benign cost-cutting decisions, such as anti-skid tiles replaced with, cheaper but slippery glazed floor tiles or cheap towel rails to replace grab bars in toilets (Ahluwalia & Gupta, 2012).

### 3.3.5 Operations, Maintenance and Supervision

The creation and maintenance of accessible facilities go hand in hand with ensuring that projects are fully accessible and usable throughout their lifespan. For example, a facility should be under proper supervision, thereby also reducing risks of vandalism and non-functioning equipment, etc. (WHO & WB, 2011).

## 3.4 Examples of Innovative Partnership to Address Inclusion

There are benefits in both public and private partnerships for achieving inclusive infrastructure. Two case studies given below on a mass rapid transit system (MRTS) and on ICT clearly show how tangible results can be achieved.

### Case Study 3 Access Audits of Delhi Metro & Measuring ICT Dimensions of the CRPD

#### Delhi Metro Access Audits

Delhi Metro Rail Corporation (DMRC) covers 110 kilometres and 90 stations, and uses universal and inclusive design. DMRC actively promotes environmental benefits, such as less traffic congestion and lower pollution. Its reliability, affordability and comfort attract people away from using private modes of transportation. Inclusive and universal design have resulted in more passenger inflow, reduced travel time, and added revenue generation. Therefore, this increases education and employment opportunities, and better enables the integration of people with disabilities into mainstream society.

DMRC commissioned access audits of a sample station and future station designs for the Delhi Metro. These were conducted by Samarthyam, who were then also responsible for subsequent monitoring. Accessibility features provided as a result included: designated parking, guiding paths and warning strips, bright-coloured interiors, accessible automatic fare collection, escalators, lifts, and designated space for wheelchairs inside the coach. Further suggestions to improve signage, lower ticket counter heights, install distinct sound beepers for orienting vision-impaired persons, and establish transit ramps to bridge horizontal and vertical gaps between the coach and platform and toilets were accepted and are being followed up for new stations. The DMRC has become an example for the rest of India, with others now adopting the best practice learned in Delhi.

Samarthyam, the National Centre for Accessible Environments works to promote understanding and implementation of accessibility of the sustainable built, social and virtual environments. It continues to be associated with DMRC and to advise on all Metro Rail Corporation projects in India.

Further information is available at: [www.samarthyam.com](http://www.samarthyam.com)

#### Measuring ICT Dimensions of the CRPD

The Global Initiative for Inclusive ICTs (G3ict) is a public-private partnership and part of the United Nations Global Alliance for ICT and Development. Among other activities, G3ict assists policy makers around the world to implement the ICT accessibility dimension of the CRPD, with the help of a special 'e-accessibility toolkit'. In collaboration with ITU, G3ict is also developing the first digital accessibility and inclusion index for people with disabilities. This is a monitoring tool surveying countries that have ratified the CRPD to measure how far they have implemented the digital accessibility provisions defined in it (WHO & WB, 2011).

Further Information can be found at the following link:  
[http://www.who.int/disabilities/world\\_report/2011/report.pdf](http://www.who.int/disabilities/world_report/2011/report.pdf)

## 3.5 Project Implementation and Output

### 3.5.1 What Works

A project should have the following approaches to project design, planning and implementation:

1. **Building awareness and forming partnerships** with people with disabilities, designers, and planners is the foundation for effective action and implementation.
2. **Legal framework compliance** (see section 2.3.2) in contractual arrangements used with implementing partners and/or with service providers.
3. **Tender and award processes:** contract documents must include specific instructions to ensure that designs accommodate disabled users, by explicitly incorporating the principles of universal accessibility into the tender and contract documents.
4. **Quality assurance systems** are integrated with the requirements of universal accessibility to ensure existing systems and processes ensure supervision with respect to accessibility standards and requirements outlined in the contract.
5. **Training and capacity building of staff** to ensure disability-inclusive and accessibility-audit training is provided and there is the capacity to implement.
6. **Systematic Approach** through use of SARA and sensitised planning and implementation to integrate and institutionalise for universal access.

Case Study 4 illustrates an example of an approach to institutionalise and mainstream a disability lens within development programmes.

### 3.5.2 What Goes Wrong

Without sufficient technical and financial resources and user involvement in decision making, the best intentions can do more harm than good. In Kuala Lumpur, Malaysia, bollards were installed on curb ramps to prevent two-wheel vehicles from accessing the pedestrian pavements<sup>17</sup>. This also blocked access for other users including wheelchair and crutch users and people with prams. Similarly, Indian Railways have provided wheelchair-accessible 'Coaches for the Disabled'. These have adapted seats, maneuvering space and accessible toilets for people with mobility impairments. However, there is no accessible boarding device to bridge the vertical and horizontal gap between the coach and the platform, eliminating the value gained from having an accessible coach<sup>18</sup>. These are examples of how a lack of understanding can affect the lives of people with disabilities.



Figure 4 The gap between the platform and the train (source: Shivani Gupta <http://accessability-india.blogspot.co.nz/>)

<sup>17</sup> <http://www.thestar.com.my/news/community/2013/10/23/kuala-lumpur-not-disabledfriendly-faulty-aids-and-poor-facilities-in-the-city-poses-a-challenge-for/>

<sup>18</sup> <http://accessability-india.blogspot.co.nz/2012/02/indian-railways-for-disabled.html>

#### Case Study 4 An example of inclusive international cooperation

In November 2008 the Australian government launched its strategy 'Development for all: towards a disability inclusive Australian aid program'. The strategy marks a significant change in the way Australia's aid is designed and delivered. 'Development for all' is about improving the reach and effectiveness of development assistance by ensuring that people with disabilities are included, can contribute and benefit equally from development efforts. In preparing the strategy, DFAT, the Australian government's development aid agency, conducted consultations in most of the developing countries where DFAT works, involving people with disabilities, their families and caregivers, government representatives, NGOs, and service providers. Almost 500 written submissions were received in the process. During the consultations, overseas-based DFAT staff were supported to engage with local DPOs. The direct involvement of DFAT staff was an important step in commencing the process of building institutional understanding of the importance of disability-inclusive development, as they were better informed about disability issues. Some outcomes of the strategies have been:

- People with disabilities are more visible and are taking a central role in decision making, ensuring that Australia's development policies and programmes are shaped to better take account of their requirements.
- Australia's support is bolstering partner governments' efforts, such as in Papua New Guinea, Cambodia and Timor-Leste, towards more equitable national development that benefits all citizens, including people with disabilities.
- Investments in leadership by people with disabilities, together with international advocacy by Australian leaders, are helping to increase the priority and resources for inclusive development on the global level.
- DFAT's processes, systems and information about aid programmes are more accessible to people with disabilities.
- Key programme areas, such as scholarships, have revised guidelines, resulting in an increased number of scholars with disabilities.
- The strategy takes a rights-based approach, is sensitive to the diversity of people with disabilities and gender issues, and focuses on children with disabilities (WHO & WB, 2011).

Further Information can be found at the following  
link:[http://www.who.int/disabilities/world\\_report/2011/report.pdf](http://www.who.int/disabilities/world_report/2011/report.pdf)



# SECTION 4

## Monitoring and Evaluation Processes

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No single evaluation method can consider all accessibility factors, with different methods reflecting different impacts, scales and perspectives. For example, evaluation of pedestrian accessibility requires local-scale analysis, considering factors such as pavement and crossing quality, road traffic speed and volume, and access inclines, as well as surveys of users and potential users to identify perceived barriers and problems. This section explores options and methods for ensuring infrastructure projects deliver accessible services for all users.

### 4.1 Accessibility in Building and Transport Infrastructure: Indicators for the 'Disability Lens'

If an infrastructure project is to ensure universal access, including for users with disabilities, then it needs to incorporate appropriate disability sensitive indicators. Furthermore, these need to be harmonised with 1) Disability sensitive targets; namely the criteria by which the infrastructure performance will be assessed; and 2) Disability sensitive data sources, referring to the source of data that will be used to compare performance with criteria.

The process of selecting key performance indicators can be used to improve project design and outcomes, by raising awareness and developing stakeholder commitment to outcomes. As such indicators and objectives should be selected in consultation with stakeholders, so that they are relevant and collectively 'owned'. Many of the performance indicators that would be used on an infrastructure programme would continue to apply. However, the key is to use a disability lens, which ensures the monitoring of meeting indicators are relevant to people living with disabilities. As an example, accessibility indicators for transport infrastructure may consider:

1. Measuring accessibility by considering the entire journey chain, including travel links, information provision, and all the processes involved (e.g. buying tickets), rather than just mobility. If all users cannot complete a journey within the design time, then the design has not met the performance indicator;
2. Accessibility to all services by all users, including people with disabilities at all times of the day, considering specific accessibility constraints, such as traffic congestion or financial costs;
3. Affordability, as defined by people with disabilities and low incomes;
4. Qualitative factors such as user convenience, comfort, affordability, security and consumer preferences; and
5. Safety of users, for instance road safety of people with disabilities, especially when crossing roads at busy intersections, where timings for traffic lights may be insufficient for a person with reduced mobility to cross in time.

The specific indicators can be used to measure performance by i) resource input, ii) output, iii) outcome and iv) impact<sup>19</sup>. Table 4.1 is adapted from indicators appropriate for urban development projects, developed by CBM:

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<sup>19</sup> While different classifications for indicators exist, this typology is suggested by the European Commission Guideline for the use of indicators in country performance assessment, December 2002

**Table 4.1 – Disability Indicators for urban development<sup>20</sup>**

Level	Definition	Indicator
Input	The financial, administrative and regulatory resources provided by government and donors	<ul style="list-style-type: none"> <li>• Participation of people with disabilities in decision-making and implementation process</li> <li>• Evaluation and data collection on people with disabilities living in the concerned area</li> <li>• Development of Urban Sector Profile Study including people with disabilities</li> <li>• Expenditure on development of policy/ project/ program on inclusion of people with disabilities in urban development (such as infrastructure, transport, housing, services etc.)</li> <li>• Training of officials, service providers etc; on disability inclusion</li> </ul>
Output	Measure the immediate and concrete consequences of the measures taken and the resources used	<ul style="list-style-type: none"> <li>• Number of people with disabilities included in decision-making process</li> <li>• Number of accessible: <ul style="list-style-type: none"> <li>○ infrastructure (ex. Roads, footpaths, public building)</li> <li>○ transport (buses, trains etc;)</li> <li>○ Services and facilities (water, sanitation, electricity, health, education etc.)</li> <li>○ Housing schemes</li> <li>○ Economic centres (markets, shopping centres)</li> <li>○ Recreation places (parks, sport facilities.)</li> </ul> </li> </ul>
Outcome	Measures the results at the level of beneficiaries	Number of people with disabilities having access to infrastructure, transport, services provision, housing schemes, economic centres, recreation places etc.
Impact	The consequences of the outcomes, or the measurement of key dimensions of well-being	<ul style="list-style-type: none"> <li>• Increased quality of life for people with disabilities (health, nutrition, hygiene etc.)</li> <li>• Reduced physical and attitudinal barriers for integration and thus more opportunities for participating in social and economic life of community</li> <li>• Less dependence from outside world</li> <li>• Improved access in urban environment benefits community as a whole</li> </ul>

Further useful information on selecting key indicators for inclusive infrastructure can be found in the GAATES Toolkit: Key Indicators of Accessibility (2015), which provides an overview of accessibility/universal design indicators and measures as reported by signatories to the CRPD<sup>21</sup>.

#### 4.1.1 Disability Indicators for the Sustainable Development Goals

On the 6<sup>th</sup> of January 2016, the UN Statistical Division released the Report of the Inter-agency and Expert Group on Sustainable Development Goal Indicators (IAEG-SDGs), which defined the global indicators intended to measure the implementation of the SDGs<sup>22</sup>. This included 9 indicators with explicit reference to persons with disabilities and declared a core

<sup>20</sup> [http://www.addc.org.au/documents/resources/20120417-part-3-disability-inclusive-management-of-the-project-cycle\\_toolbox\\_471.pdf](http://www.addc.org.au/documents/resources/20120417-part-3-disability-inclusive-management-of-the-project-cycle_toolbox_471.pdf)

<sup>21</sup> [http://gaates.org/wp-content/uploads/2014/07/FINAL-Toolkit\\_-UN-CRPD-KEY-INDICATORS-OF-ACCESSIBILITY-2015-06-29.pdf](http://gaates.org/wp-content/uploads/2014/07/FINAL-Toolkit_-UN-CRPD-KEY-INDICATORS-OF-ACCESSIBILITY-2015-06-29.pdf)

<sup>22</sup> <http://unstats.un.org/unsd/statcom/47th-session/documents/2016-2-IAEG-SDGs-E.pdf>

principle to be the disaggregation of data by disability. Data is to be collected by national statistical systems and made available by a UN managed data series for international access.

Of all the targets that refer to persons with disabilities, only Target 17.18 on data, monitoring and accountability does not have an associated indicator. Similarly, there are two indicators that are associated with targets that do not specifically refer to people with disabilities, including:

- Indicator 1.3.1: social protection systems under Target 1.3 to eradicate poverty, and
- Indicator 16.7.1: representative decision making under Target 16.7 for peaceful societies.

2 summarises the remaining relevant targets and indicators. It should be noted that 80 of the indicators are noted as requiring further consultation and refinement.

**Table 4.2 – 2030 Global Agenda inclusion of people with disabilities<sup>23</sup>**

*“SDG indicators should be disaggregated where relevant by income, sex, age, race, ethnicity, migratory status, disability and geographic location, or other characteristics, in accordance with the Fundamental Principles of Official Statistics”*  
(IAEG-SDGs, 2016)

## Goal 1. End poverty in all its forms everywhere

1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable

1.3.1 Percentage of the population covered by social protection floors/systems disaggregated by sex, and distinguishing children, unemployed, old age, “persons with disabilities,” pregnant women/newborns, work injury victims, poor and vulnerable

## Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with “disabilities,” indigenous peoples and children in vulnerable situations

4.5.1 Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as “disability” status, indigenous people and conflict-affected as data become available) for all indicators on this list that can be disaggregated

4.a Build and upgrade education facilities that are child, “disability” and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all

4.a.1 Percentage of schools with access to (i) electricity; (ii) Internet for pedagogical purposes; (iii) computers for pedagogical purposes; (iv) “adapted infrastructure and materials for students with disabilities;” (v) single-sex basic sanitation facilities; (vi) basic handwashing facilities (as per the WASH indicator definitions)

## Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

8.5 By 2030, achieve full and productive employment and decent work for all women and

8.5.1 Average hourly earnings of female and male employees by occupation, by age group and “persons

<sup>23</sup> <http://blog.cbm.org/global-indicators-and-inclusion-of-persons-with-disabilities/> and a advocacy tool kit designed to support can be found at [http://www.iddconsortium.net/sites/default/files/resources-tools/files/disability\\_indicators\\_advocacy\\_toolkit.pdf](http://www.iddconsortium.net/sites/default/files/resources-tools/files/disability_indicators_advocacy_toolkit.pdf)

men, including for young people and “persons with disabilities,” and equal pay for work of equal value

with disabilities”

8.5.2 Unemployment rate, by sex, age group and “persons with disabilities”

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## Goal 10. Reduce inequality within and among countries

10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, “disability,” race, ethnicity, origin, religion or economic or other status

10.2.1 Proportion of people living below 50 per cent of median income, disaggregated by age group, sex and “persons with disabilities”

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## Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, “persons with disabilities” and older persons

11.2.1 Proportion of the population that has convenient access to public transport, disaggregated by age group, sex and “persons with disabilities”

11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and “persons with disabilities”

11.7.1 The average share of the built-up area of cities that is open space for public use for all, disaggregated by age group, sex and “persons with disabilities”

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## Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels

16.7.1 Proportions of positions (by age group, sex, “persons with disabilities” and population groups) in public institutions (national and local legislatures, public service, and judiciary) compared to national distributions

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### 4.2 Performing an Accessibility Audit

Specialist companies provide Access Audit services, evaluating the accessibility of a building, an environment or a service. It is a service that is typically offered in the UK, but may be less common in developing world countries. An example of an access audit checklist can be found here: [www.hfs.scot.nhs.uk/publications/access-audit-checklist-feb-2000.pdf](http://www.hfs.scot.nhs.uk/publications/access-audit-checklist-feb-2000.pdf)<sup>24</sup>.

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<sup>24</sup>

While this document pre-dates the UK’s Equality Act 2010 and the correlating building regulations BS 8300:2009+A1:2010 on accessibility of buildings in the UK it reflects the requirements of the predecessor act (Disability Rights Act 1995), which saw relatively few changes as it was consolidated into the EA2010.

# SECTION 5

## Inclusive Design in Planning and Policy

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### 5.1 Cost Implications of Inclusive Design from Inception vs Retrofitting

The built, transport and other infrastructure will represent one of the largest investments in any country; the African Development Bank (2011) estimates that sub-Saharan Africa spends approximately \$45 billion, or close to 8 percent of GDP per year, on infrastructure. By comparison, the additional cost of ensuring that new infrastructure is universally accessible is small. The WHO and World Bank (2011) estimate that for new construction, full compliance with accessibility standards requires approximately 1% of total cost.

By contrast, the cost of retrofitting can be expensive. Ratzka (1994) consistently showed that renovation of existing infrastructure is significantly more expensive than adopting a universal design approach from the beginning. This is to be expected, given that retrofitting older buildings requires flexibility and management of technical constraints, especially where buildings have historic value (WHO & WB, 2011). Nevertheless, retrofitting will be necessary, and savings can be made when innovative solutions are found. Mehndiratta (2014) points to Paris as a good example; rather than make the transport system accessible by retrofitting the metro system, the bus system was adapted ensuring that this offered an adequate level of mobility. Such decision making can lead to added benefit, as seen in Delhi, after DMRC started requiring tactile paving, the majority of floor-tile manufacturers also began to manufacture tactile paving, significantly reducing the cost.

### 5.2 Procurement Policy Governed by the Need for Inclusion

An inclusive procurement policy should mandate that all procured products (hardware and software), goods and services must conform to accessibility requirements. Furthermore it should require that universal access is written into the contract documents. There are examples of proactive initiatives to mainstream disability awareness and universal access, as seen below.

#### Case Study 5 Mainstreaming people living with disabilities in procurement

In 2013, President Uhuru Kenyatta announced that Kenya would amend public procurement regulations to reserve 30% of government contracts for women, youth and persons with disabilities. Consistent with the President's directive, the Government of Kenya amended its public procurement regulations on 18th June 2013, allocating 30% of its procurement spend for the purposes of *"procuring goods, works and services from micro and small enterprises owned by youth, women and persons with disability"*.

Source: (Gathira, 2013)

## 5.2.1 Inclusive Development is a Critical Agenda at the World Bank

Other procurement initiatives include:

- The World Bank finances the construction of public infrastructure and encourages its clients to apply universal design using the most cost-effective methods of application (Snider & Takeda, 2008).
- Delhi Metro Rail Corporation has used international inclusive standards as part of procurement processes. A pre-condition to partial funding provided by Japan Bank of International Cooperation (JICA) was that the entire system should be inclusive from inception. Hence, every stage covered diverse access needs of persons with disabilities and reduced mobility;
- Inclusive BRT, Delhi, India: demand from disability rights groups and the National Urban Transport Policy in 2006, with its focus on 'moving people and not vehicles', led to the introduction of accessible BRT systems. Prototypes buses were provided by TATA Motors, after discussion with persons living with reduced mobility and disabilities. Options included telescopic, hydraulic, and foldable hinged ramps and alignment with raised bus-station platforms to eliminate vertical/horizontal gaps. These were audited, by access auditors and people with diverse disabilities, and field tested on Delhi's network (Gandhi & Tiwari, 2013). Since the Government of Delhi mandated accessibility features in low-floor buses, more than 11,000 accessible buses operated Delhi's roads. Bus stops were also made fully accessible to match low-floor buses, though reaching the bus stops was still a challenge. The programme has now been cancelled due to opposition from car drivers and is no longer in operation.

## 5.3 Procurement process

The procurement process is the method for delivering accessible infrastructure, and is fundamental to realising inclusive policy. Key attributes of procurement necessary to achieve this include:

1. Corruption free: if systems are not transparent and are susceptible to corruption, then it will be difficult to deliver any inclusive accessibility features;
2. Clear concise project brief: Accessibility requirements should be clearly identified, not as inputs, but in terms of performance of the end facility as universal accessibility;
3. Competent contractors: Contractors employed – whether as primary, secondary or subsequent contractors – should be demonstrably competent in providing accessible infrastructure. A Pre-Qualification Questionnaire process can be used to ensure that only appropriately qualified contractors are included in the full procurement;
4. Monitoring: the procuring authority needs to ensure that the contract requirements are being met, that problems arising are discovered and dealt with in proper time before they become too difficult to modify and that appropriate solutions are agreed as they arise;
5. Operation and maintenance costs: these must be considered in the bidding process, as many projects fail after completion, when appropriate maintenance has not been considered, or is too expensive, time consuming or complicated.

DFID has a robust procurement process, which if viewed through a disability lens can be an effective means of delivering appropriate infrastructure systems. The DFID procurement process can be found here: <https://www.gov.uk/government/organisations/department-for-international-development/about/procurement>

# SECTION 6

## Mainstreaming Disability Considerations into Infrastructure Programmes and Policy Decisions

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Interventions in other aspects of development can provide opportunities for mainstreaming disability considerations; accelerating urbanisation, international events, natural and man-made disasters, etc., all provide an opportunity to prompt growth in infrastructure. This in turn provides opportunities to integrate accessibility as an essential project component. Examples can include:

- **Disasters:** in the aftermath of a natural disaster or conflict, there are often reconstruction programmes focused on re-establishing or improving pre-event systems. This can create an opportunity to mainstream universal access, especially as finance for such programmes may come from international donors with policy on accessibility and support for people with disabilities;
- **High level policy changes:** high level decrees or policy statements by funding organisations can present opportunities to promote universal accessibility, such as the African Union (AU) Policy on Post-Conflict Reconstruction and Development, which identifies disabilities as a benchmark and standard;
- **Updating standard designs:** national standards for infrastructure, and standard detailed drawings, are updated on a cyclical basis. This can be an effective means of ensuring all future infrastructure provides enhanced accessibility, if the state has the technical capacity to be able to apply, inspect and maintain;
- **Empowering people with disabilities:** after the tsunami in 2005, disability rights groups in Port Blair (Andaman & Nicobar Islands, India), in conjunction with Samarthyam and Handicap International, organised a series of capacity-building training sessions for Public Works Department engineers and architects. Training enabled professionals and government officers to lobby and advocate for universal accessibility, thereby resulting in universal design features in upgrades to/renovation of public spaces such as Haddo jetty, schools, hospitals, and rehabilitation centres.
- **International Events:** when cities host important international events, new transit lines are often added to accommodate the expected large numbers of people attending (Steinfeld, 2001). Examples include:
  - **Olympic and Paralympic Games 2012 London, UK:** a study assessing the accessibility of London before and after the games indicated that the wider perceptions of disability improved dramatically, creating a legacy and an expectation of what London can deliver in the future;
  - **Commonwealth Games 2010 New Delhi, India:** for the XIX Commonwealth Games (CWG), huge investments were made to enhance the city's infrastructure. Samarthyam and the National Centre for Accessible Environments took this opportunity to collaborate with CWG delivery partners to promote an 'inclusive city'. The 'Accessible Delhi' project aimed to develop a replicable model for barrier free sites and services in the city, upgrading 23 public spaces, buildings, stadiums and transportation systems in a time-bound manner (Agarwal, 2010).

# SECTION 7

## Linking Disabilities with Cross Cutting Agendas

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### 7.1 Gender

Gender issues can exacerbate the impact of disability with regards to infrastructure accessibility.

#### 7.1.1 Health and Rehabilitation

If disabled, women are less likely to receive the health and rehabilitative care they need to be economically or socially independent. The World Bank (2013) estimates that more than 30 women every minute are seriously injured or disabled during labour. They are particularly vulnerable to forced sterilisation and abortion (Centre for Reproductive Rights, 2013). They are often far less likely than disabled men to receive rehabilitative care or assistive devices (such as wheelchairs and hearing aids) (WHO & WB, 2011).

#### 7.1.2 Employment

Studies on women with disabilities in rural areas of many countries in the Asia-Pacific region have found that more than 80% have no independent means of livelihood, and are totally dependent on others (UN ESCAP, 2003). *“A lack of access to funding is a major obstacle for anyone wanting to set up a business. For a person with a disability, particularly a disabled woman, it is usually more difficult, given the frequent lack of collateral”* (WHO & WB, 2011).

#### 7.1.3 ICT

The capability of women to effectively use information obtained through ICT is clearly dependent on many social factors, including literacy and education, geographic location, mobility and social class (Primo, 2003) (see case study 6).



## Case Study 6 Gender equality and empowerment of women through ICT (UN, 2005)

### ICT in support of women's health in Uganda

The United Nations Population Fund (UNFPA), in collaboration with Uganda's Ministry of Health and Population Secretariat and Ugandan district authorities, initiated the 'RESCUER' project, with the objective to reduce Uganda's high maternal mortality rate (506 per 100,000) by improving local care and referral systems. The project combined communications, transport and quality health services. High frequency (VHF) radios were installed at base stations, health units, referral hospital ambulances and in District Medical Officer's vehicles. Birth attendants were equipped with walkie-talkies, which improved the image of the birth attendants and built confidence in their patients, allowing them to help more women. Rural health personnel are now able to call and give practical advice even when there is no transport available. The RESCUER project is being replicated in three districts and there are plans to extend it to 30 more.

Further information can be found at:

<http://www.un.org/womenwatch/daw/public/w2000-09.05-ict-e.pdf>

## 7.2 Disability Considerations in Fragile and Conflict Affected Environments (FCAS)

Conflicts tend to adversely affect human rights, as well as infrastructure. Millions of displaced people living in FCAS are among the most vulnerable and often live in poor conditions. Infrastructure damage restricts access to transport, energy, telecommunications, public buildings, and housing, compounding the problem. Data on people with disabilities in FCAS and their issues is practically non-existent. The few pieces of literature on this include:

- a) Deborah Stienstra (2013), Professor in Disability Studies at the University of Manitoba outlines that, as a result of landmines, conflict, malnutrition, gender-based violence, poverty and lack of access to necessary health services (among other things), people may face barriers to their mobility, emotional security, learning, ability to work or care for themselves and their children, and many other parts of life.

Implicit in many existing policies and practices in FCAS is the assumption that people with disabilities cannot contribute to their communities. Stienstra (ibid) argues that, when we fail to remove barriers to inclusion in education, reconstruction and participation, we perpetuate the belief that people with disabilities are only victims of conflict or poverty. She believes it is time to recognise persons with disabilities as persons with unique abilities to contribute to reconstruction, and indeed to social transformation.

- b) The Sphere Project Handbook (2011), developed by more than 400 organisations around the world, sets out minimum standards in disaster response and includes approaches for meeting the needs of people with disabilities. Disability is addressed as an issue cutting across all the main sectors, including water supply, sanitation, nutrition, food aid, shelter, and health services.

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## Annotated bibliography of key studies

Study	Focus	Synopsis
Greater London Authority. (2013) <i>Games Changer? An evaluation of London as an accessible visitor destination</i> . London. Available at: <a href="https://www.london.gov.uk/sites/default/files/Games%20changer%20report_1.pdf">https://www.london.gov.uk/sites/default/files/Games%20changer%20report_1.pdf</a>	Using opportunities such as international games to make London accessible and lucrative to tourists	A best practice initiative that can be replicated in other countries by development authorities and civic agencies
ARTH ASTHA, AAINA, & SPARC-India. (2013) <i>Third Annual report on the Status of Children with Disabilities under the Right to Education Act</i> . New Delhi: AARTH-ASTHA. Available at: <a href="http://www.asthaindia.in/download7/download.php">www.asthaindia.in/download7/download.php</a>	Inclusive education for children with disabilities and accessibility criteria for elementary and higher education in India	A study from three states of India highlighting the dropout rate, gender parity and inaccessibility of school infrastructure
AU. (2006) <i>Policy on Post-Conflict Reconstruction and Development</i> . Banjul. Available at: <a href="http://www.peaceau.org/uploads/pcrd-policy-framwowork-eng.pdf">http://www.peaceau.org/uploads/pcrd-policy-framwowork-eng.pdf</a>	Post-conflict reconstruction and development from Africa	
Agarwal, A. (2012) <i>WalkAbility audit reports: Assess seamless accessible travel chains in pedestrian infrasture and create awareness</i> . New Delhi: Samarthyam.	Accessibility and safety audits of street infrastructure	Promoting walking, non-motorised vehicles and public transportation usage by people with disabilities and other transport disadvantage groups such as seniors, women and children. Comprehensive detailing of use of standards, identification of barriers and inclusion of people with disabilities
Agarwal, A. & Chakravarti, D. (2014) <i>Universal Accessibility Guidelines for Pedestrian, Non-motorised Vehicles and Public Transport Infrastructure</i> . New Delhi: SSEF. Available at: <a href="http://shaktifoundation.in/wp-content/uploads/2014/02/Universal-accessibility-guidelines1.pdf">http://shaktifoundation.in/wp-content/uploads/2014/02/Universal-accessibility-guidelines1.pdf</a>	Promotion and implementation of universal accessibility to enhance usage of non-motorised transport and public transportation systems	India's first guidelines with detailed planning, design and implementation of universal accessibility elements, and enforcement, maintenance and operations mechanisms to make urban infrastructure universally accessible
Agarwal, A. & Madan, N. (2013) <i>Anthropometrics of persons with disabilities: Users of Mobility &amp; Other Aids</i> . New Delhi: VSO and Samarthyam.	Space standards in the local context and setting for mobility aid users in India	Analysis of existing usage of assistive devices in both rural and urban contexts and the impact of mobility aids on the lives of people with disabilities
Ratzka, D. (1994) <i>A brief survey of studies on costs and benefits of non-handicapping environments</i> . Brazil: Independent Living Institute	Cost of retrofitting vs inclusion of barrier-free environment in planning and design	The report highlights survey details for the benefits of accessible and inclusive environments and a cost analysis of why access features should be included at the design stage rather than retrofitting afterwards
World Health Organisation (WHO) & World Bank (WB). (2011) <i>World Disability Report</i> .	Mainstreaming disability, inclusion and non-discrimination of	Comprehensive world report on status of people with disabilities. Planning, design and implementation with people

Study	Focus	Synopsis
Malta. Available at: <a href="http://www.who.int/disabilities/world_report/2011/report.pdf">http://www.who.int/disabilities/world_report/2011/report.pdf</a>	people with disabilities	with disabilities as key stake holders; conclusion and recommendations for empowering and mainstreaming them in all walks of life
UN Enable. (2006) <i>Convention on the Rights of Persons with Disabilities</i> . Available at: <a href="http://www.un.org/disabilities/default.asp?id=259">http://www.un.org/disabilities/default.asp?id=259</a>	Convention on the Rights of people with disabilities	Mandating accessibility as a human rights' issue and changing lives of people with disabilities through several articles that call for states to make public and private infrastructure accessible for people with disabilities
UTTIPEC. (2010) <i>Street Design Guidelines</i> . New Delhi: Delhi Development Authority.	Street design with a 'people-first' approach, covering mobility, safety and user-friendly designs to reduce congestion of traffic and mandate sustainable development of cities	City guidelines with standards and best practices on street design for pedestrians and public transport users; these can be replicated with some adaptations in any city of developing countries
Venter, C., Sentinella, J., Rickert, T., Maunder, D. & Venkatesh, A. (2004) <i>Enhancing the mobility of disabled people: Guidelines for practitioners</i> . Berkshire: TRL Limited.	Enhancing mobility of people with disabilities in low-and middle-income countries	Pilot projects with universal design features in Asia, Africa and Latin America to demonstrate adaptations in transport infrastructure to meet the diverse access and mobility needs of people with disabilities



## Annex 1 Examples of Mainstream Disabilities within Legal Frameworks

In **Malawi**, the rights of all individuals are firstly enshrined in the Malawi Constitution. The Constitution prohibits discrimination on any grounds, including disability. The National Disability Policy and Transport Policy of Malawi identify people with disabilities as vulnerable groups alongside women, children, and the elderly.

In **Mozambique**, disability issues are addressed, either directly or indirectly, in a variety of laws, including the Mozambican Constitution (1990). Act 20 of 1999 established the Policy for People with Disabilities. The Policy is based on the constitutional principle of non-discrimination. The Mozambican Automobile Transport Regulation, 1989 (Act 24 of 89), establishes exemption from paying any tariff in urban and inter-urban transport, and reserved seats for people with disabilities. The *Responsibilities of the State of Mozambique with Regard to Disabled People* document brings together relevant policies, laws and strategies affecting and/or concerning disabled people.

In **South Africa**, the 2000 Promotion of Equality and Prevention of Unfair Discrimination Act defines unfair discrimination on the grounds of disability, as (Section 9):

*“(b) contravening the code of practice or regulations of the South African Bureau of Standards that govern environmental accessibility;*  
*(c) failing to eliminate obstacles that unfairly limit or restrict persons with disabilities from enjoying equal opportunities or failing to take steps to reasonably accommodate the needs of such persons”* (Government of South Africa, 2000).

Although no cases are known where these laws have been used in non-compliance litigation, they do present fairly strong mechanisms for promoting the inclusion of people with disabilities in both government and civil society policies and programmes. The South African Government’s official policy framework for disability equity adopted a socio-political approach to disability, whereby disability is located in the social environment. Its policy objective with regard to transport is to develop an accessible, affordable multi-modal public transport system that will meet the needs of the largest number of people at the lowest cost, while at the same time planning for those higher cost features which are essential to disabled people with greater mobility needs. National building regulations set requirements for an accessible built environment and are also applicable for transport interchanges (South African Bureau of Standards, 1990).