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Engineering Management

A Systematic Evaluation of Barrier Free Adaptations in Historic Buildings - The Case of the Main Building at the TU Wien

A Master's Thesis submitted for the degree of
"Master of Science"

supervised by
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Affidavit

I, **Maria Teresa Dominguez**, hereby declare

1. that I am the sole author of the present Master's Thesis, "A Systematic Evaluation of Barrier Free Adaptations in Historic Buildings - The Case of the Main Building at the TU Wien",107 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and

2. that I have not prior to this date submitted this Master's Thesis as an examination paper in any form in Austria or abroad.

Vienna, March 31st 2017

Signature

Acknowledgements

I would like to thank my mother, who was my inspiration, motivation and constant support throughout this thesis. I am indebted to you forever; you are my role model and I thank you for believing in me and guiding me in every step of my life. This thesis is dedicated to you.

I extend my thanks to two of the people I love the most, my sister for her patient insights and moral support, and my partner for always encouraging me to achieve my goals.

Abstract

Individual access to the built environment is fundamental to the guarantee of equal opportunity for all. In this regard, barrier free provisions in buildings of historical significance play a major role. Specific adaptations may be necessary to ensure the usability of the structure for all variables in user needs, as well as sustainability for future generations. Such interventions are constrained by the building's existing structural conditions, spatial organization and preservation requirements.

The present research aims to demonstrate how to provide for accessibility needs in an historic building, while balancing preservation and intervention requirements. The investigation follows a systematic assessment of building samples from the main premises of the TU Wien (TUW), a structure with over 200 years of history. The author has developed a qualitative model to measure compliance with Austrian barrier free standards and regulations of different architectonic elements granting vertical and horizontal access.

Based on the assessment results, the author proposes several alternatives to the integration of accessibility provisions into the case study. The appraisal has unveiled good practices and challenges in achieving barrier free adaptations, demonstrating that solutions do not necessarily mean invasive interventions, but are rather a combination of strategic plans, managerial decisions and spatial alterations. A holistic analysis of possible solutions should follow a multidisciplinary plan involving end-users, designers, building managers and budget allocators.

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1. Introduction

1.1. Context of the Research

Accessibility encompasses a wide range of parameters that enable all individuals to fully participate in society, regardless of their age, physical or cognitive limitations and ethnic or national backgrounds. Accessibility can be defined as "*an umbrella term for all aspects which influence a person's ability to function within an environment*" (Iwarsson and Stahl 2003, p.59). By addressing many dimensions of human life, accessibility embraces education, employment, as well as technological, cultural, social and political participation (Bickenbach et al. 1999).

The concept of accessibility has its own relevance in physical terms. In this regard the built environment plays a crucial role in providing accessibility. The creation of products and infrastructure that can be successfully used by all within the total spectrum of human nature is understood as universal design (Iwarsson and Stahl 2003, p.62). The goal of universal design is to provide inclusive spaces that allow individuals to access the built environment and to eliminate access inhibitors, referred to as barriers (Steinfeld and Maisel 2012, p.3).

As it is common to encounter building designs from the past that are not accessible for all, a systematic approach is needed to deliver adaptable environments based on the barrier free requirements. The implementation of adaptations to existing buildings that do not provide universal access is constrained by their original structural conditions and spatial distributions (Douglas 2006). For historic buildings, preservation requirements add a layer of complexity to this process, as it obliges architects and engineers to find minimal intervention solutions (International Council on Monuments and Sites 2013).

The conservation principles for historic buildings entails establishing the correct balance between preservation and intervention. Buildings are dynamic and require to be adequate to modern times (Bachman 2004). Otherwise, an unused structure will lead ultimately to decay and loss of value (International Council on Monuments and Sites 1964). In this regard, caring for historic constructions involves managing alterations that enhance the use and sustainability of the building, while retaining its special characteristics (English Heritage 2015). Consequently, barrier free adaptations can be linked with conservation if such interventions ensure the usability of a building by a wider spectrum of users.

1.2. Understanding Disability

According to the World Health Organization (2001, p.18), disablement can be understood as variations in human functioning. Environmental factors make up the physical world where people conduct their lives, and have an impact on all components of functioning. In this regard, every person at some point will experience some form of disablement: whether it is children, the elderly, or the temporally or permanently impaired. Personal empowerment for independent living for every individual regardless of their functional limitations is pivotal in guaranteeing a fair and equal society.

The 2001 World Health Organization report on disabilities estimates that about 15% of the population lives with some form of disability. This occurrence is higher than in previous WHO reports from the 1970s that reported a figure of about 10%. The growth shown in this statistic is explained by the reduction in infant mortality, the control of infectious diseases and the development and treatment of chronic diseases (Christensen et al. 2009). Life expectancy rates have increased dramatically from the mid-twentieth century, and have had an impact on the aging population experiencing functional difficulties. Additionally, new and better methodologies are able to measure disability more accurately (World Health Organization 2011).

1.3. A Glimpse at Disability throughout History

The object of this study concerns historic buildings and barrier free adaptations. It is therefore essential to understand how the subject of disability has been approached throughout time. The history of disability has been one of segregation, coupled with prejudice toward the disabled. This has been a major barrier to access (Longmore 2003). People with disabilities have been stigmatized as frightening, inferior, and incompetent, and these prejudices have resulted in a marginalized, bullied, demeaned, and legally excluded population (Stiker 1999).

During the medieval era, the church controlled the discourse about illness and disability with little impact on the wellbeing of the people (Clapton and Fitzgerald 1997). Physical or cognitive limitations were explained based on biblical references as the result of sin, evil or the devil (Stiker 1999). The religious argument offered two aspects: God punished those spiritually ill, who in order to get miraculously cured, needed to surrender to the church's dogmas. On the other side, people with disabilities offered the able-bodied an opportunity to show their virtues through charities, benefitting religious institutions that cared for the disabled (Wheatley 2010).

In the 19th and 20th centuries, religious notions were replaced by science. After the industrial revolution, human worth was perceived as the individual value of labor and productivity (Clapton and Fitzgerald 1997). With advancements in medicine, the limitations associated with disability were seen as resident solely within the individual and his or her condition (Bickenbach et al. 1999). The lives of people with disabilities were merely a medical prognosis and their place in society was considered inferior to that of the able-bodied (Midgley and Livermore 2009). State funding of hospitals, asylums, and residential schools for the disabled, associated with a growing interest in eugenic, further contributed to isolation, marriage bans and forced sterilizations (Stiker 1999).

During WWI, approximately 21 million soldiers were wounded. Governments realized the importance of reintegrating troops into the labor force through rehabilitation and vocational training, since they represented a heavy financial burden on social welfare (Carden-Coyne 2007). Medical practitioners from Europe and the USA started orthopedic research, combining physiotherapy and the use of prosthetics (Bonfiglioli et al. 2015). In Vienna, Austria, an orthopedic study center was organized in January 1915 in the Lainz Hospital, sixty years later renamed Hitzinger Hospital (Tragl 2007). Since its inception, the orthopedic section consisted of a rehabilitation school, a workshop for the production of prostheses, and twenty one different occupational courses (Bonfiglioli et al. 2015). A year later the first college for training assistants in physiotherapy was established (Tragl 2007).

The United States, as well as non-Nazi Europe, continued with rehabilitation programs throughout WWII. This resulted in increased employment rates for people with disabilities, with only the able-bodied engaging in battle (Longmore 2003). On the other front, the Nazi purification project and the ideology of eugenics, however, resulted in the execution of around 200,000 of the disabled (Ford 2009).

Following the second world war, disability activists in the USA challenged segregation and discrimination based on mental and physical differences, They demanded deinstitutionalization and educational reforms (Longmore 2003). In the 1960's, human rights for the disabled became part of the civil rights movements in the USA, the UK and Scandinavia (Bickenbach et al. 1999). Disability began to be thought of as a consequence of societal and environmental limitations, meaning that the barriers the disabled faced in education, employment, housing and transportation were not merely a result of their medical condition, but were derived from social attitudes and stereotypical images about individual capacities and needs (Oliver and Sapey 2006). It is largely due to this social movement that scholars, governments and international organizations began to recognize the role of inadequately built environments that created disadvantages for people with disabilities.

1.4. Accessibility as a Human Right: The Global Scope

In 1975, The United Nations General Assembly adopted the Declaration on the Rights of Disabled Persons, which proclaims that the disabled have equal civil and political rights as those without disabilities. A year later, the General Assembly proclaimed 1981 as the International Year of the Disabled, and in 1982, the UN World Programme of Action was adopted. In order to provide a timeframe for governments and organizations to develop and implement the activities recommended in the Programme, the UN declared 1983 - 1992 as the Decade of Disabled Persons (United Nations General Assembly 1982). In 1994, after the 48th session of the General Assembly, the UN adopted the Standard Rules on the Equalization of Opportunities for Persons with Disabilities. This document provided guidance on access to the physical environment under Rule 5 on Accessibility (United Nations General Assembly 1993, p.14).:

> *"States should initiate measures to remove the obstacles to participation in the physical environment. Such measures should be to develop standards and guidelines and to consider enacting legislation to ensure accessibility to various areas in society, such as housing, buildings, public transport services and other means of transportation, streets and other outdoor environments.*
>
> *States should ensure that architects, construction engineers and others who are professionally involved in the design and construction of the physical environment have access to adequate information on disability policy and measures to achieve accessibility.*
>
> *Accessibility requirements should be included in the design and construction of the physical environment from the beginning of the designing process.*
>
> *Organizations of persons with disabilities should be consulted when standards and norms for accessibility are being developed. They should also be involved*

locally from the initial planning stage when public construction projects are being designed, thus ensuring maximum accessibility"

The 21st century strengthened the global commitment to the removal of barriers that hinder the integration of people with disabilities. The position of the UN was reinforced in 2007, through the Convention on the Rights of Persons with Disabilities. The convention was adopted during the sixty-first session of the General Assembly, compelling States to promote, protect and ensure the human rights of persons with disabilities. It has been signed by 160 countries and ratified by 168. Article 9 of the UNCRPD resolution states (United Nations General Assembly 2007, p.8):

"to enable persons with disabilities to live independently and participate fully in all aspects of life, States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications (…) These measures, which shall include the identification and elimination of obstacles and barriers to accessibility, shall apply to, inter alia: Buildings, roads, transportation and other indoor and outdoor facilities, including schools, housing, medical facilities and workplaces."

Similarly, in 2000, the European Council issued the 2000/78/EC Directive to ban all types of discrimination and to guarantee equal treatment in employment and occupations. A year later, with 2001/903/EC Decision, the Council marked 2003 as the European Year of People with Disabilities, to help the political agenda achieving full integration of disabled people. In 2003, The Disability Action Plan (2004-2010) was adopted in addition to the COM(2003)650. This plan covered accessibility to the built environment and promoted the development of standards to include the planning, design, construction and use of buildings.

In 2010, the European Union (EU) ratified the United Nations Convention on the Rights of Persons with Disabilities. With this Convention as the basis, the European Commission adopted the COM(2010)636 on the European Disability Strategy 2010-2020, which recommends a course of action for empowerment of the disabled, focusing on the abolition of barriers in eight different areas, including accessibility.

1.5. Actions Addressing Accessibility in Austria

According to the Austrian Health Interview Survey of 2006 - 2007, over 1.7 million people in Austria experience functional impairment, accounting for 20.7% of the population (Leitner 2008, p. 1141). The most frequent constraints for a 13% of the Austrian population are related to mobility.

Life expectancy in Austria has increased on average from 61 in 1947 to 81 in 2014 (Human Mortality Database 2015). These figures indicate that permanent impairment in Austria occurs most frequently at a more advanced age (Leitner 2008, p. 1141). The survey reveals that 50% of women over 75 experienced impairments while bending and kneeling, while 29% of men of advanced age suffered from the same conditions. Despite the use of walking aids, 14% of Austrians over 75 had problems walking, while 12% had difficulties climbing stairs.

In Austria, the Federal Disability Equality Act of 2005 is the legal framework for accessibility in the built environment. It acknowledges that architectonical barriers can be discriminatory, and it aims to protect people with disabilities from this type of discrimination. The Act states that if people with disabilities can access buildings and services without any difficulty and external assistance, then they are able to gain free access. A plan was developed to make all federal buildings accessible by the end of 2015; however, due to budgetary constraints, the plan has been delayed until 2019.

The Austrian Standards Institute issues standards that are often included in provincial building laws and regulations (Austrian Federal Government 2010). The main standard in the field is the ÖNORM B 1600 “Planning principles for barrier-free buildings”. Others include the ÖNORM B 1601 to B 1603 dealing with special buildings, such as schools and tourism facilities.

The Disability Equality Act deals with federal competencies of buildings. In addition to being responsible for federal buildings, regulating accessibility in other buildings is the responsibility of the jurisdiction of each of the nine provinces, which encompass various differences (Priestley 2013). The Act and its provincial ancillary legislation do not establish a mandate for accessibility.

Guidelines on accessibility for planning and building were agreed upon with all provinces in 2007 to mirror numerous laws and regulations related to construction (Priestley 2013).These guidelines were developed by the Austrian Institute for

Structural Engineering (OIB), partly based in the ÖNORMs. The OIB updated such guidelines in 2015.

1.6. Heritage Buildings: The Challenge

Historic buildings need to be protected for the benefit of future generations. The preservation of architectural heritage is fundamental to understanding the roots of a culture, since buildings and monuments are evidence of the human footprint in history, the arts and the sciences (UN Educational Scientific and Cultural Organisation 1972). Buildings throughout time have provided an urban space for socio-economic activities. Conservation has always enhanced the development, functionality and livability of a city (UN Educational Scientific and Cultural Organisation 2013).

International attempts formally acknowledging the importance of the conservation and restoration of historic buildings occurs on several relevant levels. 1931 marks a milestone with the First International Congress for the Preservation of Historic Monuments in Athens. In 1964, the same organization issued the International Charter on the Conservation and Restoration of Monuments and Sites, whose principles are still in use. In 1972, through the World Heritage Convention adopted at its 17th session in Paris, UNESCO expanded the scope of its conservation efforts, to protect both natural and cultural heritage sites.

In Austria, architectural conservation is under the Federal Monuments Authority dating from 1853, when Emperor Franz Joseph I established the Central Commission for the Exploration and Preservation of Monuments. Currently, this office is under the jurisdiction of the Federal Chancellery and is regulated by the Federal Act on the Protection of Historic, Artistic and other Cultural Significance Monuments (1923). In accordance with the first paragraph of the Act, the Monuments Authority evaluates the monuments to be preserved, compiling and updating the Austrian heritage list. The Monuments Authority may also grant permission for alterations, weighed against a request supported with valid argument, in support of preservation of the monument.

The standards of monument heritage preservation developed by the Austrian Monuments Authority are divided into three main topics: identifying, conserving and modifying buildings. The standards for altering buildings take into account the need for barrier free adaptations in the construction of the monument (Bundesdenkmalamt 2015). This document contains special considerations for providing accessibility to the main facilities of an historic building in accordance with the requirements established in the ÖNORMs and the OIB guidelines.

1.7. Problem Statement

The main building of the TU Wien is the oldest structure of the universities in Vienna that still serves its original academic purpose (Mikoletzky and Jiresch 1997). The building, located in the district of Wieden, is an amalgamate of several extension edifices or tracts, which differ in period of origin and spatial functions (Sequenz 1965).The uniform complex of more than 40.000 m^2 conforms in the present day approximately the 15% of the built area of the TUW (Technische Universität Wien 2010) .

In 2004 the Universities Act granted autonomy to the TUW, giving them the flexibility to adequate built spaces (Kasparovsky and Wadsack 2004). Having the authority based on this Act, the TUW leverages the pending renovations. Two years later, the Federal Act on the equalization of persons with disabilities came into force.

To guarantee opportunities for all in education, the TUW has made efforts to eradicate physical, technological and psychological barriers (Technische Universität Wien 2017). Among such initiatives, some adaptation works were made to meet barrier free requirements on its buildings under the scope of a general safety renovation, performed between 2007 and 2015 (Technische Universität Wien 2017).

Considering the usable area of the structure, its history of over 200 years, and the recently performed renovation project, the TUW's main building offers great opportunities to analyse accessibility provisions. A well-defined feedback process would allow the exploration of both good practices and challenges in performing barrier free adaptations.

This research aims to evaluate the current provision of barrier free facilities in selected tracts of the main historic building of the TUW, based on Austrian guidelines and regulations. The appraisal follows a systematic approach in assessing the different architectonic elements that provide horizontal and vertical access in the built environment. The main question of this study is *how adequate are selected tracts of the main historic buildings of the TU Wien guaranteeing accessibility for all?*

To address the research question, the following objectives have been established:

a. To identify the current provision of accessible facilities at the main building of the TUW.
b. To assess the compliance of the building in accordance with Austrian barrier-free standards.
c. To recommend measures to improve accessibility needs in accordance to the conservation principles of a building with historic significance.

2. Conceptual Framework

2.1. Barriers in the Physical Environment

The World Health Organization (2001, p.171) defines barriers as "*factors in a person's environment that through their absence or presence limit functioning and create disability*". These factors can be tangible or intangible such as negative attitudes or objects conforming the physical word. Barriers in the built environment deny people participation opportunities, making spaces unsafe and unreachable (Steinfeld and Maisel 2012, p.3).

Different national and international guidelines or standards reviewed for this study have similar requirements to eliminate barriers in the built environment. A comprehensive elaboration of the main barriers described in such documents have been assigned by the author to three main categories: mobility, approach and perception.

Mobility barriers limit the person's ability to gain access to spaces and to move within them. These include entering and exiting buildings, entering and maneuvering in facilities within buildings and overcoming level differences, either in vertical movement (up or down) or as isolated obstacles within a horizontal path.

Specific barriers to approach limit the possibilities of reaching and gripping objects, by having elements at unreachable heights or obstacles in the environment.

Perception barriers limit the ability for finding directions, following routing paths, and locating facilities inside and immediately outside of buildings. These barriers also limit the individual's capacity to recognize emergency situations.

Examples of such barriers are summarized in Table 2-1 below.

Table 2-1 Barrier types and examples

Barrier Type	Further Categorization	Examples
Mobility Barriers	Entering and exiting buildings.	- Narrow door openings and corridors - High thresholds - Heavy doors
	Gaining access in facilities inside buildings.	- Tight spaces in restrooms and elevators - No provision of accessible seating in auditoriums
	Overcoming level differences	- Inadequate provision or lack of handrails in staircases - Inadequate provision or lack of lifts and elevators - Inadequate provision or lack of ramps
Approach Barriers	Gripping and reaching objects.	- High button panels - High door knobs - Inadequate provision or lack of grab bars in restrooms
Perception Barriers	Locating exit doors, stairs and other facilities	- Inadequate provision or lack of clear signs - Lack of acoustic information
	Identifying the path of travel Recognizing emergency situations	- Lack of tactile surfaces - Lack of different sensorial warning systems (Optical alarm lightning)

2.2. Summary of the Austrian guidelines for Barrier Free Building

Austrian norms and standards for barrier-free buildings specify the ideal conditions and dimensions which ensure universal access.

The focus of this thesis is the analysis of building and architectural elements that provide basic vertical and horizontal access to public historic buildings. A summary of the requirements for the elements under study per the design principles of the ÖNORMs and the OIB Guidelines introduced in chapter 1.5 is outlined below.

2.2.1. Entrances and Doors

Main barrier-free entrances to all buildings are essential for accessibility. Where existing buildings cannot fulfil these basic requirements, other integral solutions must be provided. These include, but are not limited to, an alternative second gate or a barrier-free side entrance, appropriately signalized.

In order to provide access to those with reduced mobility, a horizontal approaching area of at least 150cm diameter shall be provided in front of the entrance. Door thresholds and level differences should be avoided; however, if these differences are unavoidable, there should be a maximum differential of 3cm. Greater deviations in height require the use of ramps, considering the needs of individuals in wheelchairs, using walking aids, or those pushing strollers. In this respect, door clearances must be at least 80cm wide and 200cm high. Doors are also to have a minimum approach area of 150cm in length and 120cm in width. Double doors are to be a minimum 200 cm wide. Entrances should be also easily identified with contrasting and tactile guide paths for those with visual impairments.

Doors must open and close without difficulty. Manual doors are not to exceed an operating force of more than 25N. Above this threshold, the door is to be automated. The height of the door handle is to be between 85 and 110cm, with lever handles preferable to rotary and knob-shaped handles.

Glass doors present significant risk of injury for the visually impaired and for children. Contrasting color markings at two levels (90-100cm and 150-160cm) are to identify glass doors with a frame width of less than 20cm.

2.2.2. Corridors

The minimum clearance of corridors shall be 120cm in width and 210cm in height. They must not be obstructed by built-in or protruding components, since these additions limit access for individuals with reduced mobility, those using wheelchair and strollers, or those walking in pairs. For full maneuverability, connecting corridor crossings are to be at least 150cm wide.

Differences in level, such as individual steps, are to be avoided. Failing this provision, ramps or platform lifts are to be provided. Strong color contrasts and tactile paving are also to be used in order to assist the visually impaired.

2.2.3. Stairs

Stairs or steps cannot be easily negotiated without assistance by individuals in wheelchairs or those carrying strollers, but must be accessible to people with walking difficulties, small-sized people, children, the elderly and the visually impaired. The main stairs of a building must be straight and have a usable width of at least 120cm. There should also be a landing after a maximum of 20 steps. For directional changes, the width of the landing is to be at least 150cm.

Handrails are to be installed uninterruptedly on both sides of the stairs, at least 30cm before both the first step and 30 cm after the last step. The maximum height of handrails is to be between 85 to 90 cm. Failing this stipulation, there is to be a second handrail at 75cm. All handrails must be designed for graspable secure support.

Contrasting color marking strips are to be used to assist the visually impaired. All stairs exceeding 5 steps shall be clearly marked. For stairs exceeding 5 steps, only the first and last step are to be indicated. Additionally, tactile ground indicators shall be provided 30 to 40cm before a descending staircase.

2.2.4. Ramps

Ramps are not intended to replace elevators or platform lifts for large elevation differences, but are to be used to compensate for minor level variations. Ramps should be straight with a maximum slope of 6%. A maximum inclination of 10% is allowed, if an existing building cannot accommodate the lower slope. Those rising more than 4% must have their continuity interrupted after reaching a length of 10m, or a 45 or greater degree of change in direction.

The ramp is to be at least 150cm wide to ensure full mobility along its entire length for both pedestrians and those using wheelchairs. The beginning and the end of a ramp is to be marked in contrasting colors, with tactile strips, for the visually impaired.

In addition to handrails, wheel deflectors of 10-15 cm are to be installed to prevent wheelchairs from extending beyond the edge of the ramp, and to assist individuals with visual impairments to discern the ramp with a rod.

Ramps with a gradient over 4% are to have uninterrupted handrails on both sides with a height between 85 to 90cm. A second handrail should be available at a height of 75 cm, if the basic handrail exceeds 90cm. The handrail, located 30cm before and 30cm after the ramp, must have a secure graspable support.

2.2.5. Elevators

Elevators provide *stepless* access to all building floors and can be used independently. The inner measurements of the elevator car are to be at least 110cm wide and 140cm deep with the door located on the narrow side of the cabin. Automated doors must open to a width of at least 90cm. The area in front of the doors is to be at least 150cm deep, and are not to be placed directly opposite stair entrances. Failing this safety provision, the area between the elevator entrance and the stairs is to be increased to at least 200cm.

The elevator call button is to be located at a height between 90 to 110cm with appropriate tactile characteristics. The operating elements inside the cabin may be between 90 to 120cm high, and should be arranged horizontally on a slightly inclined dashboard. Additionally, mirrors enable wheelchair users to maneuver more easily.

For the visually impaired, elevator buttons are to be embossed with braille labels. A vocal announcement, with large high-contrast floor signals, should be used to indicate the floors. Large high-contrast floor signalization shall also be displayed in each floor.

2.3. Building Adaptations and Conservation

Adaptation works are defined as "*any intervention that changes a building's functional and physical attributes to suit new conditions or requirements*" (Douglas 2006, p.1). Buildings with historical significance require adaptation works to serve different needs of users that change over time. In addition, adaptations are necessary to safeguard the functionality and use of a facility (International Council on Monuments and Sites 2004, p.7). Necessary adaptations entail changes in use, modifications to the internal layout, introduction of new services, and other identifiable changes(International Council on Monuments and Sites 2013, p.7)

The scope of an adaptation will depend on the degree of intervention planned for the building. A hierarchical categorization of these levels varies in the literature specific to the concept. Feilden (1982, p.27) proposes seven ascending intervention levels relevant to building conservation: prevention of deterioration, preservation of the existing state, consolidation of the materials, restoration, rehabilitation, reproduction and reconstruction. These definitions are expanded in many of the international charters of heritage conservation (International Council on Monuments and Sites 2004).

Douglas (2006, p.15) interchanges some of these terminologies according to their etymology. He assigns a hierarchical categorization depending on the risk of deterioration of the structure. Based on this literature review, the author of this study proposes in Figure 2-1 an interpretation of the spectrum of building interventions as follows.

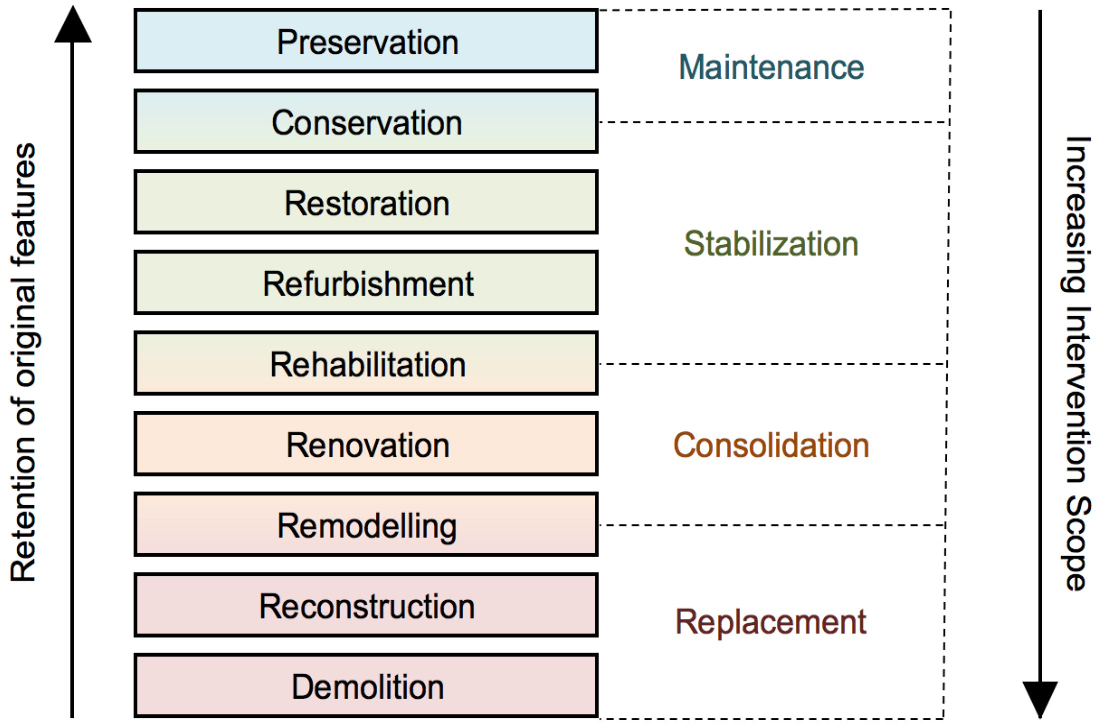

Figure 2-1 Spectrum of building Interventions adapted from Douglas (2006) and Feilden (1982)

General principles for the adaptation of historic buildings are embedded in international and national frameworks designed for heritage protection. The Austrian Standards of monument preservation comprise the criteria described by Feilden (1982), Douglas (2006) and common themes of the different ICOMOS charters, collected by Wells (2013). By combining criteria from these sources, this study identifies eight principles: documentation, minimum intervention, minimum loss of fabric, reversibility, compatibility, authenticity, distinguishability and sustainability. Table 2-2 below shows a definition of each one.

Table 2-2 Principles of adapting historic buildings adapted from Feilden (1982), Douglas (2006) and Wells (2013)

Principle	Description
Documentation	The collection, recording, keeping, and management of information of the building's main distinctive features and changes throughout time. Documentation should occur prior to, during, and after any intervention.
Minimum intervention	The restriction of the scale and form of the adaptation works, maintaining as much as possible the layout and arrangement of the building.
Minimum loss of fabric	The maximum retention of the original materials. This includes all the physical material, structures and surfaces.
Reversibility	The reversion of alterations to the previous condition. Changes should be capable of being removed and re-established or replaced with other measures without damaging the existing structure and fabric.
Compatibility	The consistency of the changes with the use of the facility.
Authenticity	The suitability of interventions on the original construction. The use of traditional materials and techniques is preferred in order to maintain the historical authenticity of the cultural heritage.
Distinguishability	The explicitness of the changes from the original state. Interventions should be conspicuous to preserve the integrity of the constructions, while avoiding forgery of their artistic or historic value.
Sustainability	The durability and functionality of the intervention for future generations, without compromising the environment.

2.4. The Systems Thinking Theory as Framework for Building Adaptations

A system is defined as a set of interrelated components forming a whole to fulfil a purpose (Blanchard and Fabrycky 2011, p.1). Per the systems thinking theory, information, energy and materials are transformed from inputs to outputs through processes, generating a flow of the systems components (Misra 2008, p.16). Using this approach, complex processes and the best use of resources can be improved to guarantee their successful implementation. This is done by a comprehensive needs assessment, requirement definitions, and the identification of dynamic solutions that can be further improved with appropriate feedback provisions (Blanchard and Fabrycky 2011).

Buildings are systems that suit different functionalities, enabling humans to control the physical environment, and supporting the internal flow of resources (Bachman 2004, p.17). From the renaissance to the WWI, the value of a building resided in its character and aesthetic worth, not its use (Steinfeld and Maisel 2012, p.30). After

WWI, these values evolved within the systems thinking theory to valuing architectural design as a viable approach to problem solving and planning (Misra 2008, p.18). Adaptation projects involve multiple requirements from different stakeholders, regulatory frameworks and local site conditions (Elliott 2009). The complexity of such adaptations increases later in the stage of the building's lifespan (Douglas 2006, p.3).

A systematic approach for barrier free adaptations facilitates the task of creating, integrating, verifying and implementing the best possible solution. Architects and engineers must understand the needs of *all* users to provide solutions suitable to conservation principles in historic buildings and also adaptable to budgetary constraints (English Heritage 2015, p.16).

The heritage authorities of the United Kingdom provide an example in their guidance texts and documents for the development of an accessibility strategy based in a systematic approach (English Heritage 2015). Figure 2-2 postulates a simplified approach from such documents of the process for delivering an ideally planned and coordinated access, adapted to the Austrian context.

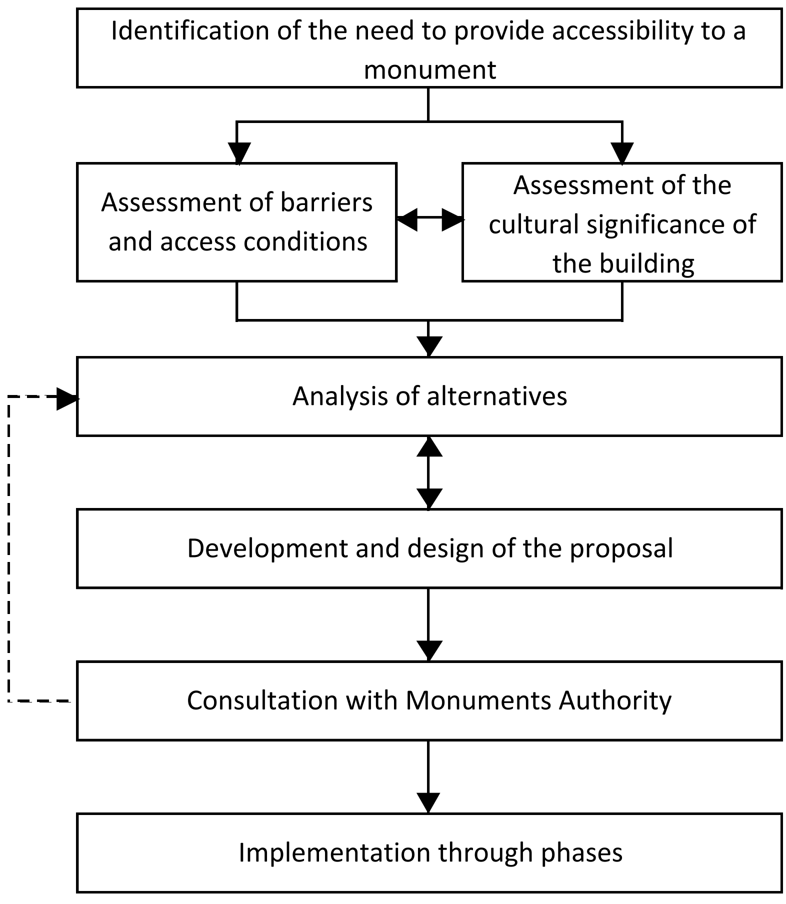

Figure 2-2 Main processes in providing accessibility to historic buildings adapted from English Heritage (2015)

3. Research Design and Methods

The research conducted is a qualitative analysis based on observations of samples of buildings of the TU Wien (TUW). The evaluation demonstrates a case study on how historic buildings can provide accessibility needs adequate for current times. The investigation has been organized in three main phases: delimitation of the study, collection of data and accessibility assessment.

3.1. Delimitation of the Study

Three different tracts of major relevance in the main building of the TUW were selected as samples for this study. To support the description and location of the samples, Figure 3-1 illustrates: 1) the position of the building with cardinal directions and 2) the differentiation of the selected tracts and the respective analysis areas, which are based on the nearest located staircase. The acronyms used for the tracts follow the characterization of the facility management office of the TUW.

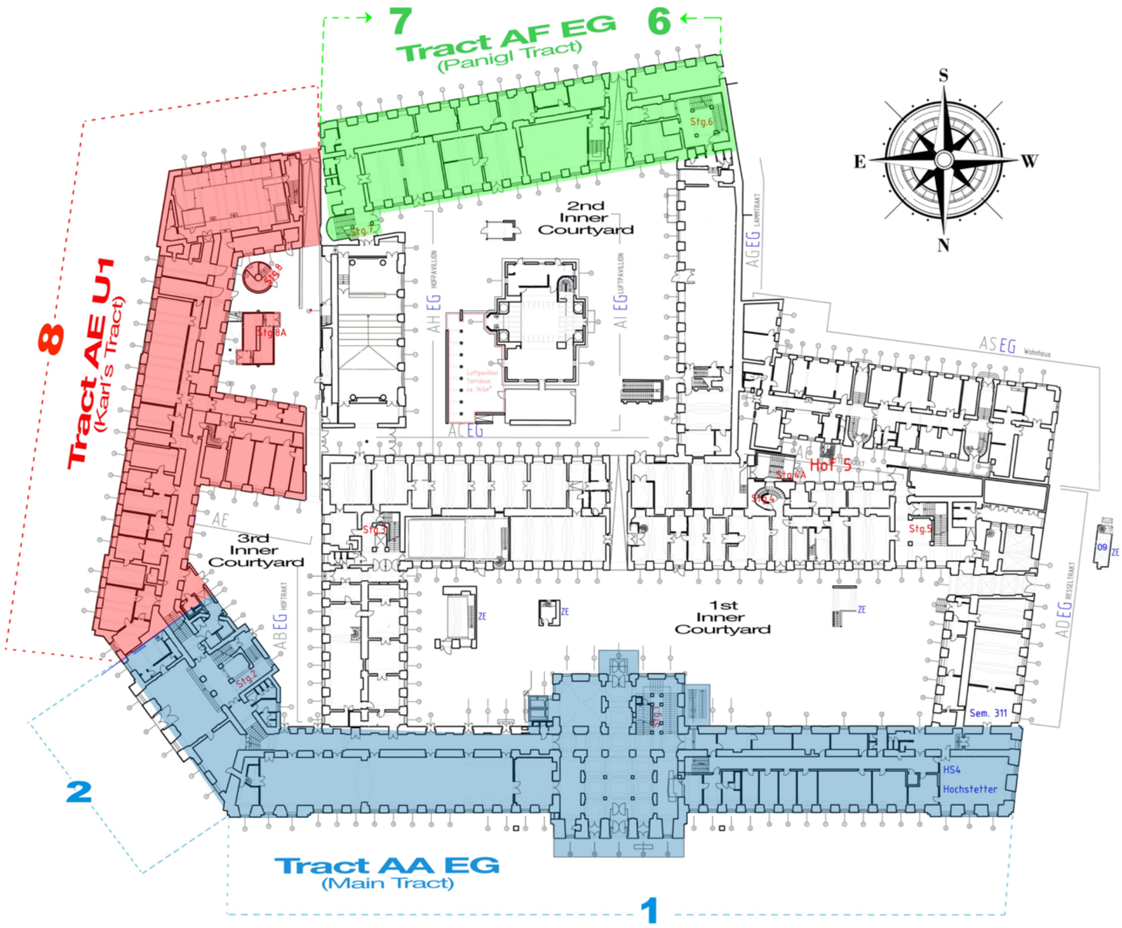

Figure 3-1 Selected tracts and staircase areas adapted plan from the facility management office of the TUW (2017)

The elements chosen for the analysis are the horizontal and vertical accesses for the public. The categorization of the different facilities and elements developed for a comprehensive comparison is presented as follows:

1. Entrances and doors
    a. Building entrances and exits
    b. Corridor doors and accesses
2. Corridors
3. Stairs
    a. Main staircases
    b. Other stairs and steps
4. Ramps
5. Elevators

Emergency routes, informal entrances, cellar or basement paths and other facilities, whose main purpose is not to provide circulation were not included in the model developed for evaluation. However, as the selected tracts and elements form part of an open system with other parts of the building, some of the elements out of the scope of the study might be described accordingly if necessary to provide holistic solutions and recommendations.

3.2. Methods and Tools for Data Collection

3.2.1. Collection of Secondary Data

Documentation review of sources establishing the background, historical significance and when possible, adaptations performed in selected buildings since their conception corresponds to the collection of secondary data. This data is used to assess the main historic elements of the building that require special conservation.

3.2.2. Collection of Primary Data

Observations on the access conditions were documented through accessibility checklists and a photographic record on site. The equipment consisted of a camera and measuring tape to corroborate the dimension requirements for each of the elements under study. The list was developed and adapted from barrier free Austrian national guidelines and standards summarized in chapter 2.2. Table 3-1 shows a generic template of the checklist created with the chosen variables used to collect the data from the observations.

Table 3-1 Template of the accessibility checklist

Category	Nomenclature	Level	Description	Checklist	Y/N	Comments
Building entrances and exits (1a)				Pathway free of steps and obstacles		
				Provision of ramp		
				Approaching area dimensions Ø>=1.5 m		
				Tactile orientation information		
				Door passage width >=1.00 m		
				Door passage height >=2.00 m		
				Movement area: w>=1.20 m-2.00m, d>=1.50 m		
				Door operating elements height between 0.80 - 1.10 m		
				Easy operability of the door		
				Glass doors with marking provided		
Corridor doors and accesses (1b)				Door passage width between 0.80-1.00 m		
				Door passage height >=2.00 m		
				Movement area: w>=1.20 m-2.00m, d>=1.50 m		
				Door operating elements height between 0.80 - 1.10 m		
				Easy operability of the door		
				Glass doors with marking provided		
Corridor (2)				Corridor movement area width>= 1.50 m		
				Clearance of corridor passage: w>=1.20 m,h>=2.10 m		
				Orientation information and signalization (Tactile and visual)		
				Distance to corners >=50 cm		
				Corridor pathway free of steps and obstacles		
Main staircases (3a)				Continuos and straight main stair, accessible to all floors		
				Width >=1.20 m		
				Step dimensions: h<=18 cm, w>=27 cm		
				Stair landings after max. 20 steps: d>=1.50 m		
				Optical markings on first and last step		
				Tactile stripes provided after last step		
				Handrails continuos in both sides		
				Handrail maximum height between 0.85-0.90 m		
				Handrail profile: grippable, preferably round		

Table 3-1 Template of the accessibility checklist *(continuation)*

Category	Nomenclature	Level	Description	Checklist	Y/N	Comments
Other stairs and steps (3b)				Width >=1.20 m		
				Step dimensions: h<=18 cm, w>=27 cm		
				Stair landings after max. 20 steps: d>=1.50 m		
				Optical markings on first and last step		
				Tactile stripes provided after last step		
				Handrails continuos in both sides		
				Handrail maximum height between 0.85-0.90 m		
				Handrail profile: grippable, preferably round		
Ramps (4)				Width >=1.20 m		
				Movement area before and after ramp Ø>=1.5 m		
				Optical markings before and after ramp		
				Inclination (Max 10%)		
				Handrails continuos in both sides		
				Handrail height between h=0.85-0.90m		
				Handrail profile: grippable, preferably round		
				Wheel deflectors		
Elevators (5)				Accessible without steps to all floors		
				Door width >=0.90 m		
				Cabine dimensions: w>=1.10m, d>=1.40m		
				Movement area outside elevator: Ø>=1.5 m		
				Level signalisation and voice announcement		
				Mirror on the backside		
				Operating elements height between 0.90-1.10 m (outside) 0.90-1.20 m (inside)		
				Operating elements in horizontal position		
				Tactile operating elements (Braille or other)		

3.3. Accessibility Assessment

The results of the evaluation are compiled in a matrix, where the overall accessibility compliance is assessed based on the percentage of requirements fulfilled by each of the elements presented in the evaluation. Besides the gauging and identification of critical requirements by category, this approach allows the comparison between the different tracts and staircase areas. Best practices and elements in dire need for adaptation have also been identified. The results of the extensive matrix analysis are visualized through radar and bar charts.

4. Case Study: The main building of the TUW

4.1. Building History Review

The Polytechnic Institute of Vienna that would later become the TUW was inaugurated on the sixth of November 1815 (Mikoletzky and Jiresch 1997). A year earlier, the founding director, Johan Joseph Prechtl, acquired a mansion in the district of Wieden, which today remains the main building of the TUW. The original building was built as a private mansion for Johann Christoph Rechberger von Rechcron, after the second Turkish siege from 1685 to 1701. The building was later owned by prominent families of the Viennese society, such as the Waldstein, Starhemberg, Dietrichstein, Losy and Palffy, who made expansions of the building on their own (Sequenz 1965).

Prechtl selected the building as the university's main structure because its location provided excellent possibilities for the expansion of the campus (Sequenz 1965). The standing buildings only formed a small section of the rooms of the Institute. A new building of three levels, planned by Andreas Fischer and Joseph Schemerl, was constructed between 1816-1818 for laboratories, auditoriums and collections (Czerny 1993). This construction constitutes the current area of the first staircase of the main tract (AA – S1).

The monumental façade of the main tract was built in avant-corps with a mansard roof and ionic columns. The arched gateway on the ground floor still possess the original wooden doors with imperial hardware (Czerny 1993). Above the entrance, a two-storey loggia was located with stone balustrade and ionic column arrangement. The plastic decoration made by Joseph Klieber in 1817 and 1818 show on the entablature, six allegorical figures with depictions of the disciplines taught at the university. On the roof, a medium-scale group of allegorical sculptures, represent the technical and commercial fields of study protected by the genius of Austria (Sequenz 1965). The main hall was set up as three aisles and three pillars each under a vaulted ceiling. The walls of the hall consist on Tuscan orders in front of a blind arcade (Czerny 1993).

The eastern inner transversal tract (AB), also designed by Schemerl, was built during 1820 and 1821 (Mikoletzky and Jiresch 1997).

Foreseeing for holding the Second Austrian Industrial Exhibition of 1839, several extension buildings were erected between 1836 and 1839 (Sequenz 1965). These included the central tract (AC), the Panigl tract (AF), the western transversal side tracts (Ressel Tract or AD and Lamm Tract or AG) and the pavilion (AH). The expansions were designed by Paul Sprenger and built under the supervision of Joseph Stummer, professor of land and water engineering. Story additions to the all the tracts were built between 1867 and 1898, due to the increasing need for space of the TUW (Mikoletzky and Jiresch 1997).

In 1903, busts of famous technicians were set up by Max Fabiani in front of the main facade of the AA Tract (Czerny 1993).

In the years 1907 to 1909, the tract located by the Karlsgasse, was built in front of the church of St Charles (AE and AA-S2). At the time, the plans designed by Professor Karl König, included the closure of the eastern side of building and the division of the inner courtyard through a cross-section which would be used for collections (Sequenz 1965).

Against the Karlskirche the representative façade is in avant corps and a large ionic column arrangement and balustrade in the attic. Allegorical figures of architecture, engineering, mathematics and natural sciences from were depicted on the entablature by Theodor Khuen in 1908 (Czerny 1993). On the inside, a rectangular hall was decorated with pilaster strips in the wall.

The aeromechanic institute (AI) was built between 1911 and 1912 by the initiative of Prof. R Knoller.

During the middle and late twentieth century, the fourth top floor of the central (AC), Panigl (AF) and Lamm (AG) tracts were built. The attic of the first one, between 1935 and 1956, with delays due to the WWII. The latter two tracts were expanded from 1985 to 1990 (Mikoletzky and Jiresch 1997). During this period an emergency staircase was also built from the outside of the Karlstract (AE) (Technische Universität Wien 2015).

There are minor alterations made to the building with no documentation. However, a main renovation was performed from 2007 until 2015 with the aim of comply with safety regulations, such fire protection systems (Technische Universität Wien 2017). These works envisaged attempts to eliminate barriers, including automation of doors, construction of new elevators, tactile flooring in the entrance hall and new information points.

Among the performed extensions of space in the fourth floor was built a domed hall, exposing the original wooden structure of the room with curved trusses and a mansard roof (Technische Universität Wien 2017). This space serves as a lecture hall for 240 people. The works were performed by Prof. DDI Winter, architects Nehrer, Medek und Partner ZT GmbH together with Neumayer.

Figure 4-1 illustrates a timeline of the different construction phases of the building and its different tracts.

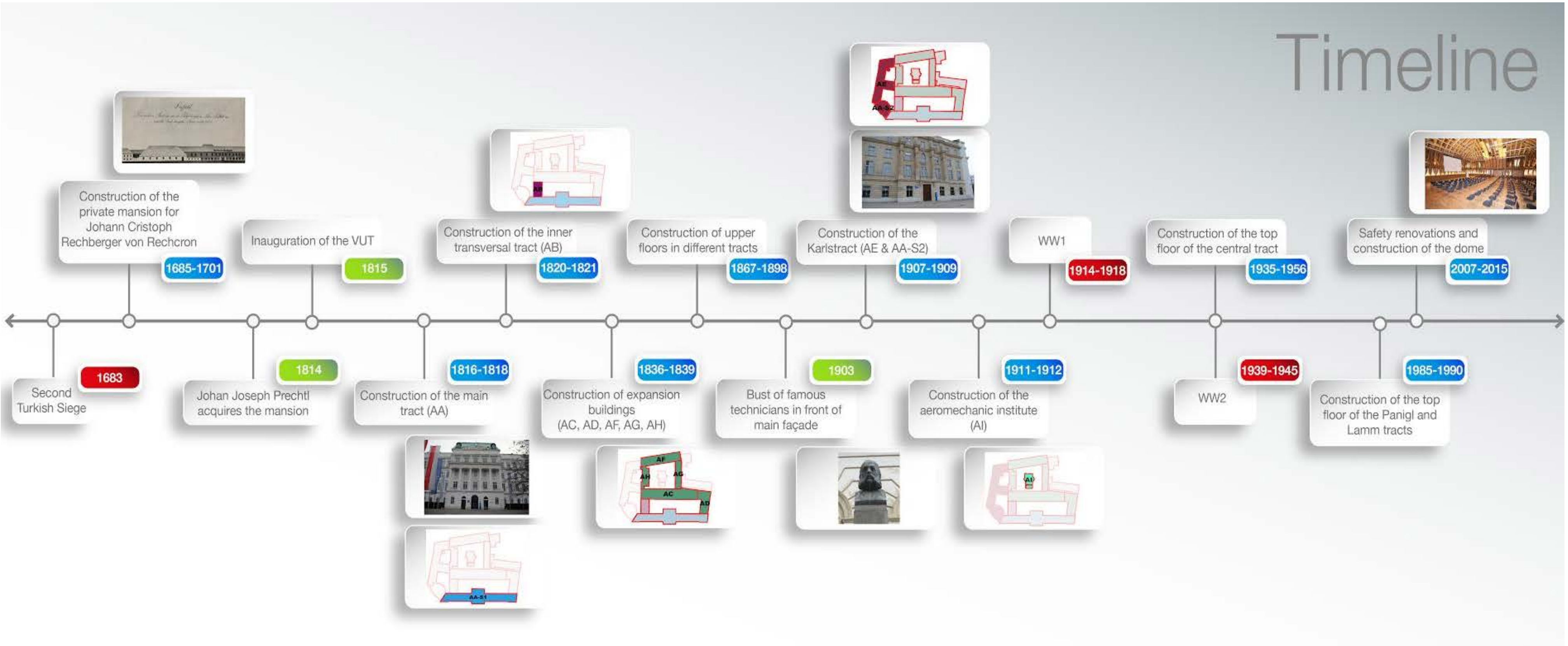

Figure 4-1 Timeline of the TUW's main building

4.2. Identifying Elements for Analysis

Table 4-1 below presents a list of the elements in analysis and the nomenclature used to describe them. The respective categorization is indicated, as well as the tract, staircase area and level in which they are located. Furthermore, floor plans of the building are made publicly available by the facility management office of the university. The author has edited these plans to show the exact location of the elements by level. These layouts are presented in Figure 4-2, Figure 4-3, Figure 4-4, Figure 4-5, and Figure 4-6. The categories of the elements have been color coded in both table and plans to facilitate their identification.

Table 4-1 List of elements by category and location

Nomenclature	Type	Category	Tract	Staircase	Level
EH1	1a	Building entrances and exits	AA	1	0
ES1	1a	Building entrances and exits	AA	1	0
D0S1a	1b	Corridor doors and accesses	AA	1	0
D1S1a	1b	Corridor doors and accesses	AA	1	1
D1S1b	1b	Corridor doors and accesses	AA	1	1
D1S1c	1b	Corridor doors and accesses	AA	1	1
D1S1d	1b	Corridor doors and accesses	AA	1	1
D1S1e	1b	Corridor doors and accesses	AA	1	1
D2S1a	1b	Corridor doors and accesses	AA	1	2
D2S1b	1b	Corridor doors and accesses	AA	1	2
D2S1c	1b	Corridor doors and accesses	AA	1	2
D3S1a	1b	Corridor doors and accesses	AA	1	3
D3S1b	1b	Corridor doors and accesses	AA	1	3
D3S1c	1b	Corridor doors and accesses	AA	1	3
D3S1d	1b	Corridor doors and accesses	AA	1	3
D3S1e	1b	Corridor doors and accesses	AA	1	3
D4S1a	1b	Corridor doors and accesses	AA	1	4
D4S1c	1b	Corridor doors and accesses	AA	1	4
C0S1a	2	Corridor	AA	1	0
C1S1	2	Corridor	AA	1	1
C1S1a	2	Corridor	AA	1	1
C1S1b	2	Corridor	AA	1	1
C2S1	2	Corridor	AA	1	2
C2S1a	2	Corridor	AA	1	2
C2S1b	2	Corridor	AA	1	2
C3S1	2	Corridor	AA	1	3
C3S1a	2	Corridor	AA	1	3
C3S1b	2	Corridor	AA	1	3
C4S1a	2	Corridor	AA	1	4
S1	3a	Main staircases	AA	1	0,1,2,3
S1a	3b	Other stairs and steps	AA	1	3,4
S1b	3b	Other stairs and steps	AA	1	3,4
S1c	3b	Other stairs and steps	AA	1	3,4
T10 *	3b	Other stairs and steps	AA	1,2	0
R3S1	4	Ramps	AA	1	3
R4S1	4	Ramps	AA	1	4
L1	5	Elevators	AA	1	-1,0,1,2,3,4
EH3a	1a	Building entrances and exits	AA	2	0
ES2	1a	Building entrances and exits	AA	2	0
D0S2a	1b	Corridor doors and accesses	AA	2	0
D0S2b	1b	Corridor doors and accesses	AA	2	0
D1S2a	1b	Corridor doors and accesses	AA	2	1
D1S2b	1b	Corridor doors and accesses	AA	2	1

Table 4-1 List of elements by category and location *(continuation)*

Nomenclature	Type	Category	Tract	Staircase	Level
D2S2a	1b	Corridor doors and accesses	AA	2	2
D2S2b	1b	Corridor doors and accesses	AA	2	2
D3S2a	1b	Corridor doors and accesses	AA	2	3
D3S2b	1b	Corridor doors and accesses	AA	2	3
D0S2c	1b	Corridor doors and accesses	AA	2	0
D1S2c	1b	Corridor doors and accesses	AA	2	1
D2S2c	1b	Corridor doors and accesses	AA	2	2
D3S2c	1b	Corridor doors and accesses	AA	2	3
C1S2	2	Corridor	AA	2	1
C2S2	2	Corridor	AA	2	2
C3S2	2	Corridor	AA	2	3
S2	3a	Main staircases	AA	2	0,1,2,3
TE2	3b	Other stairs and steps	AA, AE	2	0
T20 **	3b	Other stairs and steps	AA, AE	2	0
T21 **	3b	Other stairs and steps	AA, AE	2	1
T22 **	3b	Other stairs and steps	AA, AE	2	2
T23 **	3b	Other stairs and steps	AA, AE	2	3
L2a	5	Elevators	AA, AE	2	-1,0,1,2,3
L2b **	5	Elevators	AA, AE	2	-1,0,1,2,3
EH2	1a	Building entrances and exits	AF	6	0
ES6	1a	Building entrances and exits	AF	6	0
D1S6	1b	Corridor doors and accesses	AF	6	1
D4S6	1b	Corridor doors and accesses	AF	6	4
C1S67 *	2	Corridor	AF	6,7	1
C4S67 *	2	Corridor	AF	6,7	4
S6	3a	Main staircases	AF	6	-1,0,1,2,3,4
L6	5	Elevators	AF	6	-1,0,1,2,3,4
ES7	1a	Building entrances and exits	AF	7	0
D1S7	1b	Corridor doors and accesses	AF	7	1
D4S7	1b	Corridor doors and accesses	AF	7	4
S7	3a	Main staircases	AF	7	-1,0,1,2,3,4
R0S7	4	Ramps	AF	7	0
R1S7	4	Ramps	AF	7	1
RH2	4	Ramps	AF	7	0
L7 **	5	Elevators	AF, AE	7	-1,0,1,2,3,4
EH4	1a	Building entrances and exits	AE	8	-1
EH3b	1a	Building entrances and exits	AE	8	-1
D0S8a	1b	Corridor doors and accesses	AE	8	0
D0S8b	1b	Corridor doors and accesses	AE	8	0
D0S8c	1b	Corridor doors and accesses	AE	8	0
D1S8a	1b	Corridor doors and accesses	AE	8	1
D1S8b	1b	Corridor doors and accesses	AE	8	1
D1S8c	1b	Corridor doors and accesses	AE	8	1
D2S8a	1b	Corridor doors and accesses	AE	8	2
D2S8b	1b	Corridor doors and accesses	AE	8	2
D3S8a	1b	Corridor doors and accesses	AE	8	3
D3S8b	1b	Corridor doors and accesses	AE	8	3
C0S8	2	Corridor	AE	8	0
C0S8b	2	Corridor	AE	8	0
C0S8a	2	Corridor	AE	8	0
C1S8	2	Corridor	AE	8	1
C2S8	2	Corridor	AE	8	2
C3S8	2	Corridor	AE	8	3
T80a	3b	Other stairs and steps	AE	8	0
T80b	3b	Other stairs and steps	AE	8	0
R0S8a	4	Ramps	AE	8	0
R0S8b	4	Ramps	AE	8	0

* Element shared between two staircase area of the same tract

** Element shared between two tracts

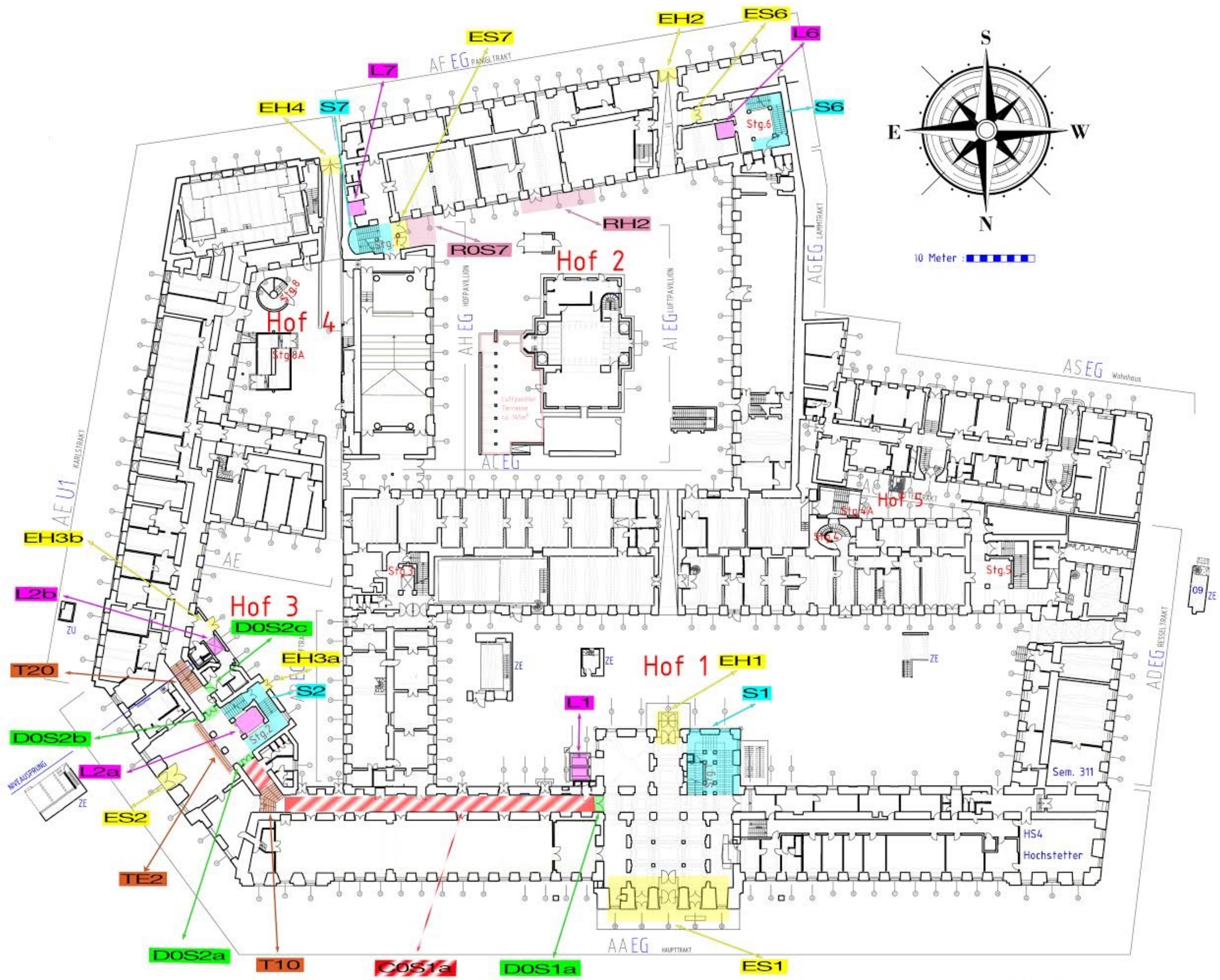

Figure 4-2 Elements in analysis in the ground floor for tracts AA and AF and the underground floor for tract AE adapted plan from the facility management office of the TUW (2017)

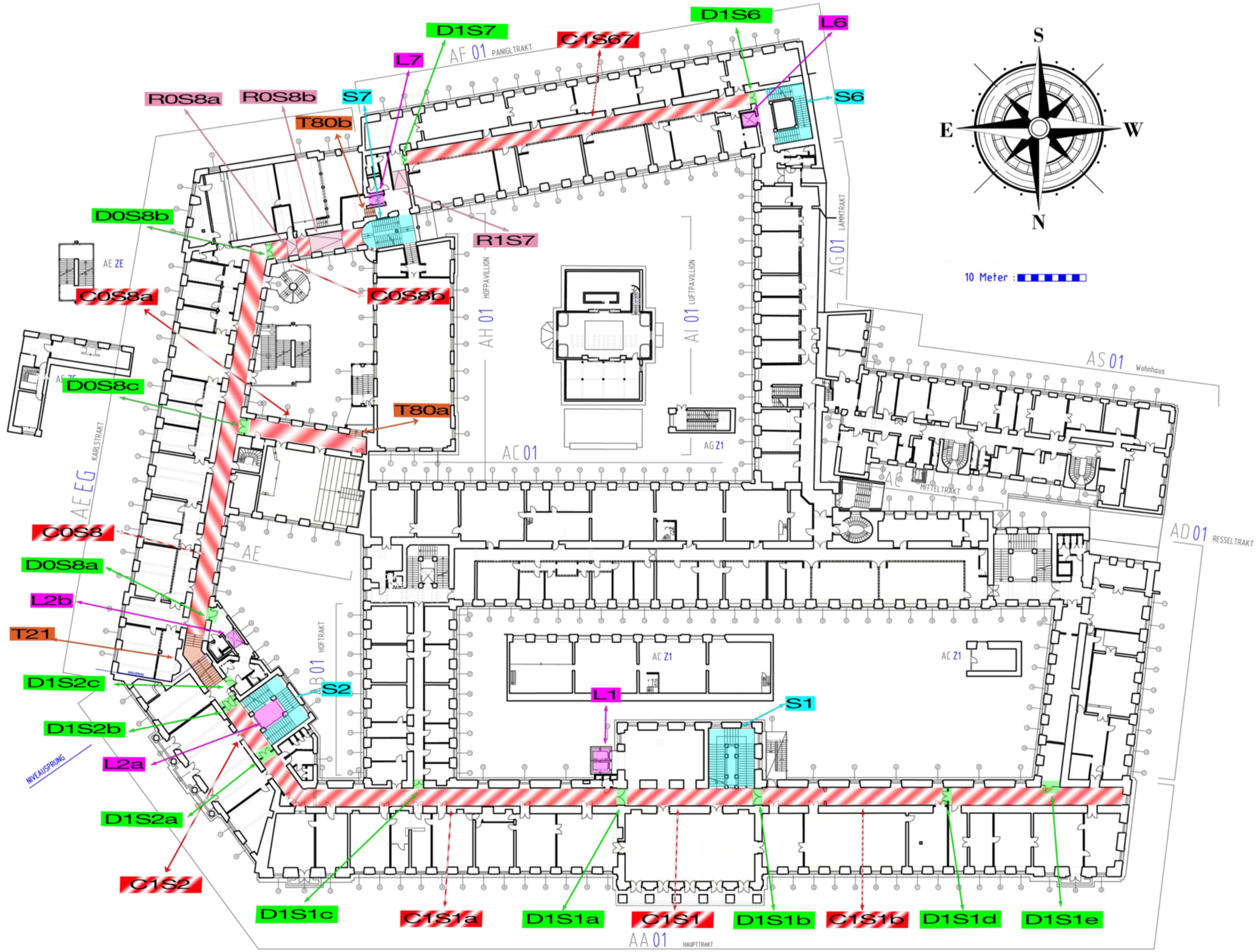

Figure 4-3 Elements in analysis in the first floor for tracts AA and AF and the ground floor for tract AE adapted plan from the facility management office of the TUW (2017)

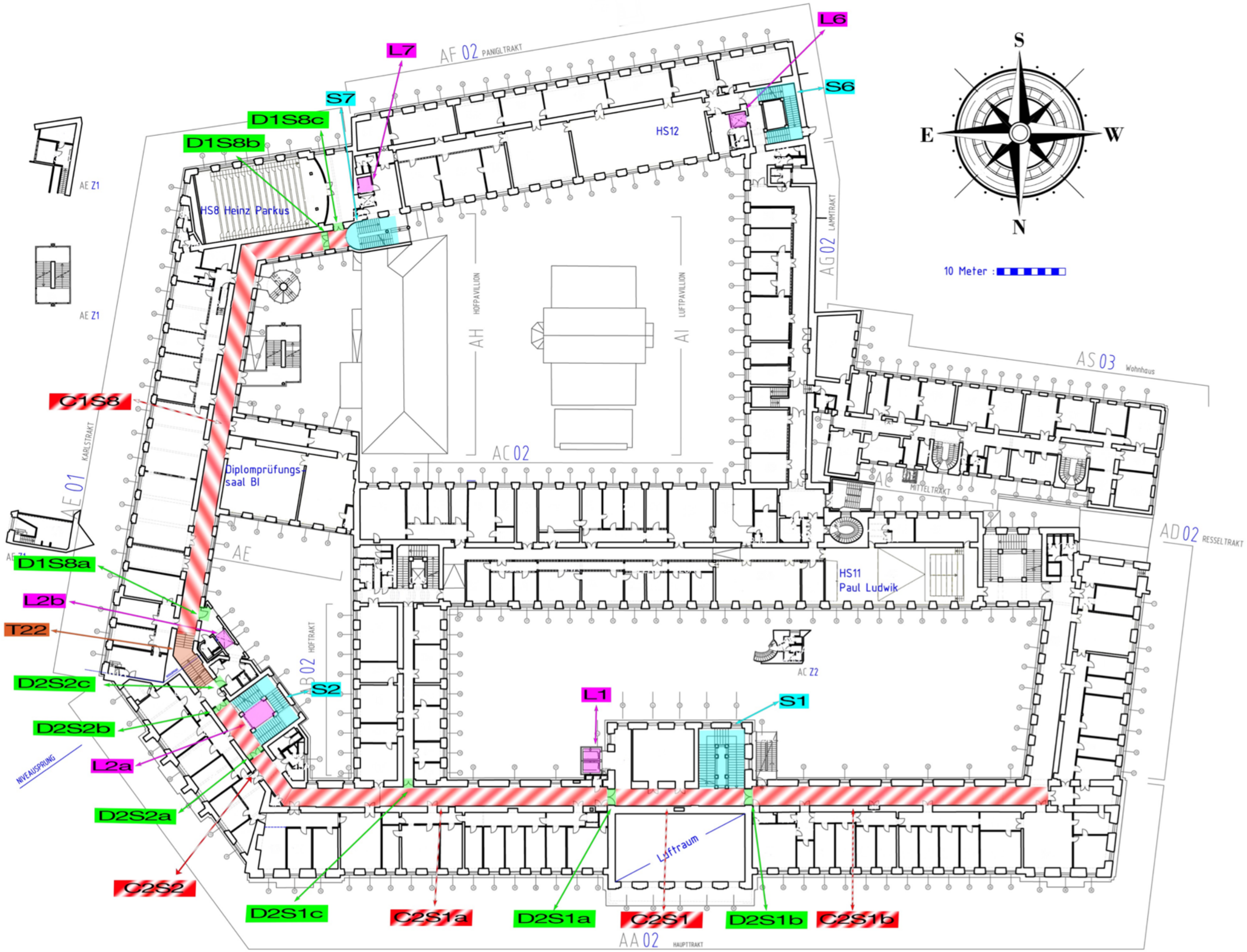

Figure 4-4 Elements in analysis in the second floor for tracts AA and AF and the first floor for tract AE adapted plan from the facility management office of the TUW (2017)

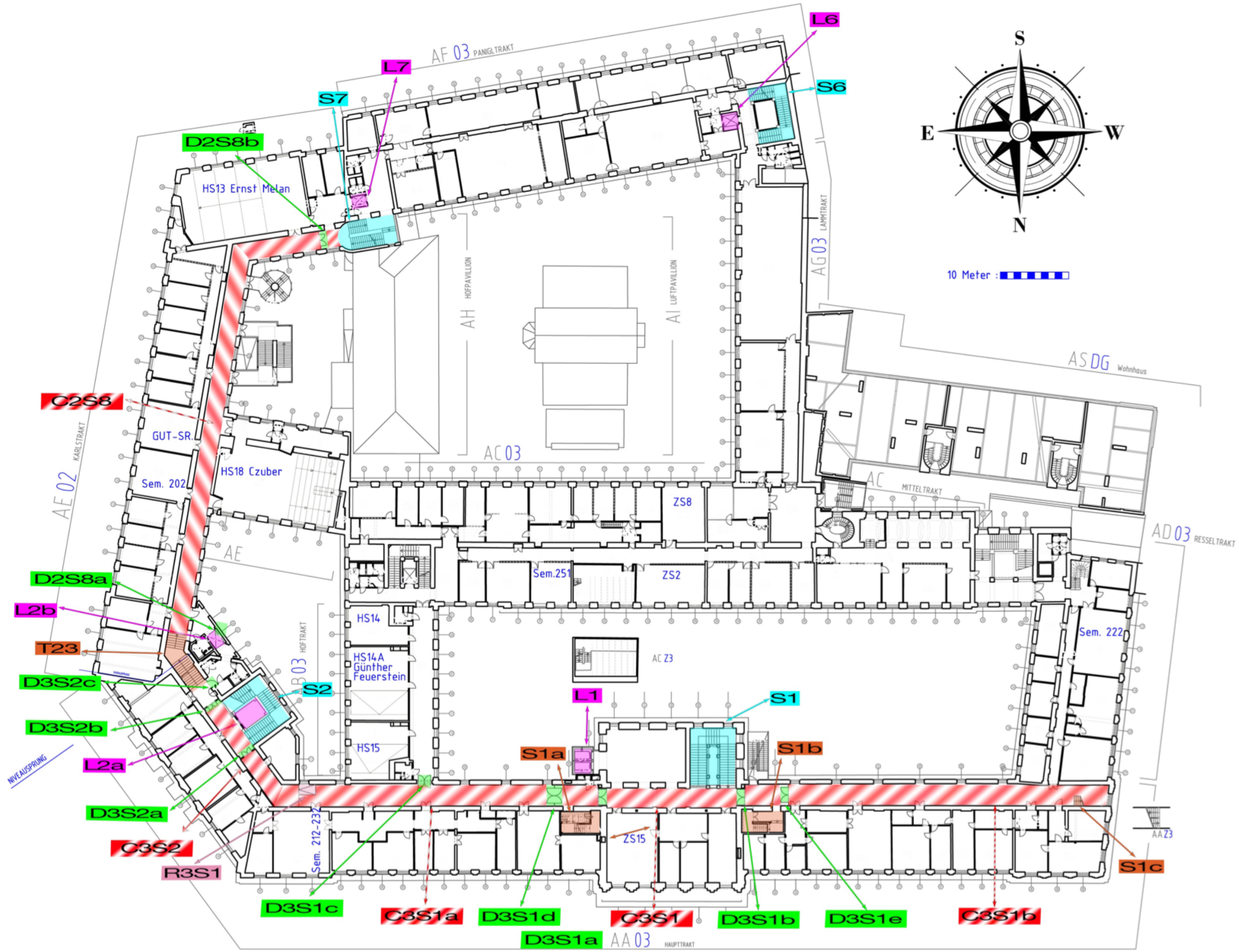

Figure 4-5 Elements in analysis in the third floor for tracts AA and AF and the second floor for tract AE adapted plan from the facility management office of the TUW (2017)

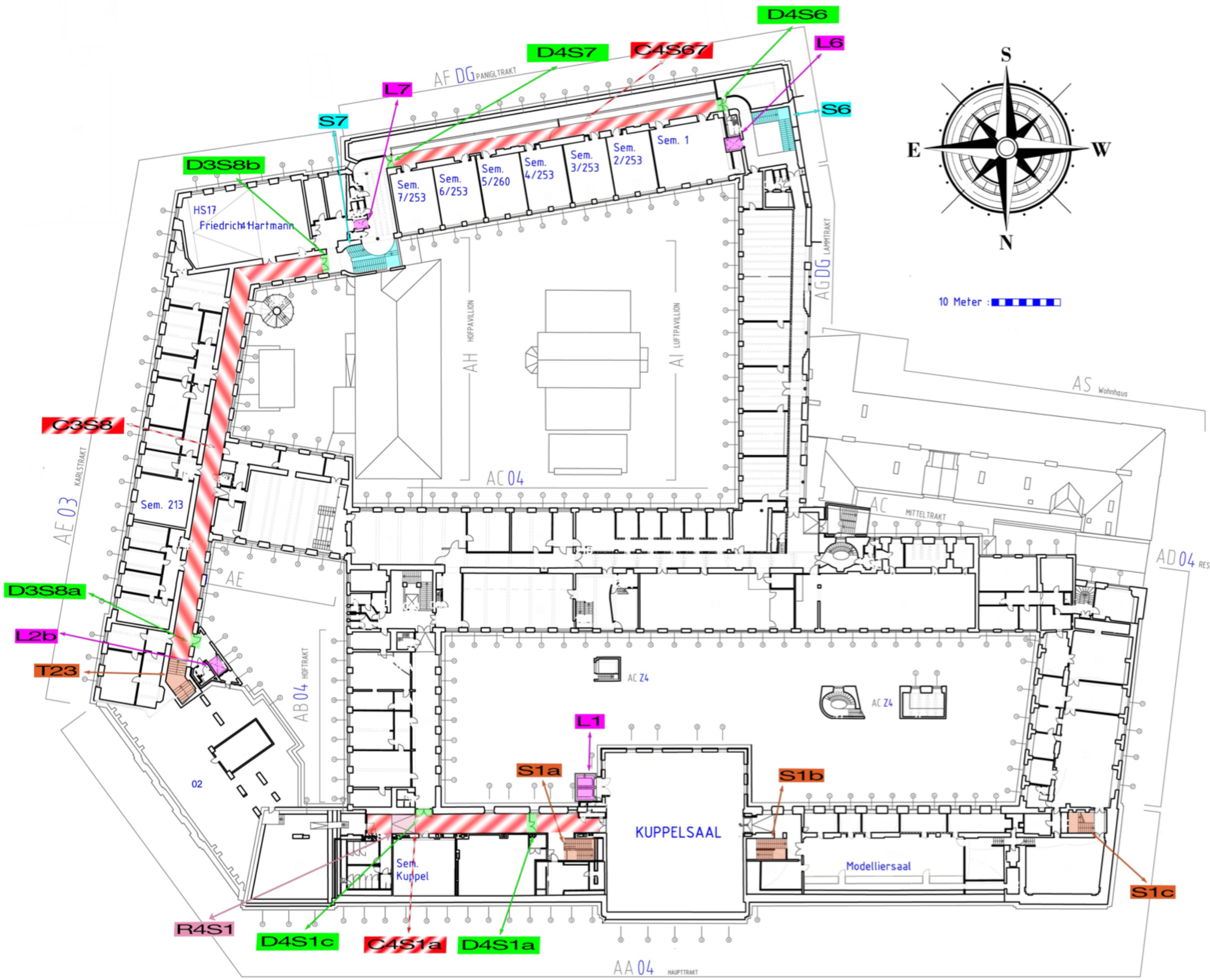

Figure 4-6 Elements in analysis in the forth floor for tracts AA and AF and the third floor for tract AE adapted plan from the facility management office of the TUW (2017)

5. Results and Discussion

5.1. Tract AA: Description and Photographic Record

5.1.1. Entrances and Doors: Building Entrances and Exits

Three wooden double gates constitute the principal entrance (ES1) of the TUW's main building located in Karlsplatz 13 (see Figure 5-1). To provide access to all visitors of the university, two of these doors remain open during all times of operation. An additional set of doors is positioned immediately beyond the exterior entryways. The central doors are double leaf glass. On the west side, these are automated wooden double doors for disability use only.

Figure 5-1 Main entrance of the TUW - ES1

The entrance grants access to a three-aisle main hall on the ground floor divided by Tuscan columns. This hall serves as a transitional space, leading to a main staircase, an elevator, the eastern corridor on the ground floor and the first inner courtyard. The main hall is equipped with benches, a cloakroom, an information point with personnel assistance and a computer information station. From the automated doors, there are tactile ground surface indicators, providing guidance to the aforementioned facilities. Figure 5-2 shows the view from the main hall.

Opposite the main entrance, two sets of frameless double glass doors provide a second point of entry (EH1) to the main hall from the first inner courtyard, as shown in Figure 5-3. This first inner courtyard also connects to the other sections of the building.

Figure 5-2 View of the main hall

Figure 5-3 Entrance from the first courtyard – EH1

The second main entrance of the building is on the Karlsgasse, facing the St. Charles's Church on the northeast side of the building (ES2). The entry is a massive historic wooden double door of six panels and a single-step rise, as can be seen in Figure 5-4. A second additional set of wooden doors with glass panels is inside the building, immediately beyond the main external gate (see Figure 5-5).

Figure 5-4 Second main entrance on the Karlsgasse – ES2

Figure 5-5 Second set of wooden double doors on second main entrance –ES2

This entrance grants access to a second hall on the ground floor leading to an additional staircase and elevator. Both facilities can be accessed from a flight of three steps at the center of the hall. The second hall also serves as a transitional space between the eastern corridor of the building's first staircase and the AE edifice via stairs and a second elevator. Figure 5-6 shows the second hall from the entrance.

Figure 5-6 Second main hall

There is an entrance (EH3a) of wooden double doors with glass panels and narrow leaves from the third inner courtyard in the area behind the second main staircase and the elevator (see Figure 5-7). From the outside, a step rises to the door, whereas on the inside, five steps are provided past the building's entrance.

Figure 5-7 Entrance from the third inner courtyard - EH3a

5.1.2. Entrances and Doors: Corridor Doors and Accesses

Identical wooden double doors with arched fanlights (D1S1a, D1S1b, D2S1a, D2S1b) are located opposite each other providing a passageway to corridors on the first and second levels (see Figure 5-8). These approaches function as entrances from the middle corridor to the eastern and western corridors, circumscribing the area in front of main staircase 1. During operating times, one section of the doors remains open to facilitate access.

Figure 5-8 Corridor doors as on the first and second levels, open during operating time.

On the third level, in both corridors, a similar configuration is provided with two consecutive sets of glass double doors. The outer set of doors (D3S1a, D3S1b) encloses the middle corridor at the base of the main staircase, and the inner doors (D3S1d, D3S1e) separate the eastern and western corridors from auxiliary staircases 1a and 1b, respectively. An example of the door arrangement for the corridors on the third level is presented in Figure 5-9.

Figure 5-9 Corridor doors as on the third level

Access to the eastern corridor from the main hall on the ground floor, is through glass doors (D0S1a) which remain open during operating times. (see Figure 5-10). Similarly, on the top floor, a glass pane provides passage between the auditorium in the dome and the eastern corridor (D4S1a).

Figure 5-10 Glass door granting access to the eastern corridor on the ground level - D0S1a

The eastern corridors from the first to the fourth story, connect with the AB section of the building through a set of glass double doors on each floor (D1S1c, D2S1c, D3S1c, D4S1c), as shown in Figure 5-11 and Figure 5-12. In the western corridor of the first floor, two additional wooden double doors (D1S1d, D1S1e), divide the corridor centrally, leading to the sanitary facilities in the AD section of the building.

Figure 5-11 Doors connecting the eastern corridor to the AB section on the first two levels.

Figure 5-12 Doors connecting the eastern corridor to the AB section on the third level

In the area of the second staircase, from the ground floor to the third level, identical wooden double doors with an arched fanlight and narrow openings (D0S2a, D0S2b, D1S2a, D1S2b, D2S2a, D2S2b, D3S2a, D3S2b) serve as entrance to two corridors. One of the doors leads to the eastern corridor of staircase 1 of the same area while the other one goes towards section AE. On the ground floor, both doors remain open during operating times. In the upper levels, only one narrow section of the door remains open, while the other part must be opened manually. Figure 5-13 and Figure 5-14 show the door configurations on the different levels.

Figure 5-13 Corridor doors on the ground floor in the area of staircase 2

Figure 5-14 Corridor doors from the first to the third level in the area of staircase 2

Beyond the corridor doors leading to the AE section, there is an area shared with the AA tract. Automated swing glass doors marked for disability use provide access on every floor to an elevator and sanitary facilities (D0S2c, D1S2c, D2S2c, D3S2c), as can be shown in and Figure 5-16.

Figure 5-15 Location of doors in the area shared with the AE Tract

Figure 5-16 Automated doors that provide access for all

5.1.3. Corridors

There are eastern corridors on all floors of the main section that belong to the staircase 1 area (C0S1a, C1S1a, C2S1a, C3S1a, C4S1a). At the end of each of these corridors, the path turns south, allowing transition to staircase 2 of the same section. Several floors have level differences at this junction. Equalization of levels is achieved through stairs on the ground floor, two steps on the first floor, and a single step plus a ramp on the third floor. The facilities located along these passageways include different administrative offices, lecture halls, auditoriums and sanitary facilities. A crossing hall leading to the AB section can also be reached from the eastern corridors on all levels except the ground floor. An example of an eastern corridor is shown in Figure 5-17.

Figure 5-17 Eastern corridors in the area of staircase 1

On the opposite side, the western corridors (C1S1b, C2S1b, C3S1b) are located on levels one to three. These corridors provide passage mostly to administrative and office facilities, as can be seen in Figure 5-18.The AD tract is accessible from the western corridors located on the first and second stories. Three auxiliary staircases are positioned in the third-floor corridors to grant access to the fourth level.

Figure 5-18 Western corridor in the area of staircase 1

The middle tract of the corridors (C1S1, C2S1, C3S1) serve as a transitional space between horizontal and vertical access points (see Figure 5-19). These corridors allow the circulation between the staircase, elevator, eastern and western corridors, as well as other facilities such as foyers, offices and ceremonial halls, including the renowned “Festsaal” located on the first level.

Figure 5-19 Middle corridor in the area of staircase 1

The corridors in front of staircase 2 and between the AA and the AE tracts of the building offer access to offices and administrative facilities on the first to the third floors (C1S2, C2S2, C3S2). A view of the corridors from the second staircase is represented in Figure 5-20.

Figure 5-20 Corridors in the area of staircase 2

5.1.4. Stairs: Main Staircases

A u-shaped straight staircase with double landings (S1) constitutes one of the main staircases of the edifice and the principal staircase of the entire building (see Figure 5-21). Two rows of four pillars each with massive urn finials and allegorical figures, support the outstanding neoclassical structure, as shown in Figure 5-22. The staircase provides continuous access from the ground floor to the third floor. It has been enhanced with a continuous handrail that follows the total length of the stairs and with optical marking stripes in a contrasting color on all first and last steps.

Figure 5-21 Main staircase 1 - S1

Figure 5-22 Urn finials decorating the staircase

The second main staircase of the section (S2), grants access from the ground floor to the third floor. The staircase has a u-shape with double landings and a massive stone balustrade with original features. A handrail has been added along selected parts of the staircase. Optical marking stripes, on the first and last steps have been included, some of which have faded with time. A depiction of the second main stairs is presented in Figure 5-23.

Figure 5-23 Main staircase 2 – S2

5.1.5. Stairs: Other Stairs and Steps

Stairs consisting of nine steps (T10) are located in the eastern corridor to equalize the ground floor area between the first and second staircase of the AA section, as shown in Figure 5-24. A bifurcation in the stairs leads to a door at the end of the corridor. Handrails attached to the wall have been installed in different sections of each side of the stairs.

Figure 5-24 Stairs at the end of the eastern corridor - T10

Auxiliary staircases located on the third level grant access to the fourth and top floor. Staircase 1a (S1a) in the eastern corridor facilitates access to the dome auditorium and top eastern corridor. In the western corridor, staircases 1b (S1b) and 1c (S1c) lead to the dome from the west side and laboratories respectively. Figure 5-25, Figure 5-26 and Figure 5-27 show a section of each of the auxiliary staircases leading to the top floor.

Figure 5-25 Auxiliary staircase leading to the top floor - S1a

Figure 5-26 Auxiliary staircase leading to the top floor –S1b

Figure 5-27 Auxiliary staircase leading to the top floor –S1c

Stairs of about twenty steps and one landing (T20, T21, T22, T23) equalize the level between the AA and the AE sections on all floors, from the ground level to the third level in the area of staircase 2. Wall mounted handrails have been installed in separate sections of the stairs, as shown in Figure 5-28.

Figure 5-28 Stairs between the AA and AE tracts

Located inside the second main entrance on the ground floor, is a flight of three steps (TE2) which must be used to reach the main stairs, the elevator and the corridors of the AE and AA sections. Handrails are not available across the whole width of these stairs. Figure 5-29 illustrates a detail of this configuration.

Figure 5-29 Flight of steps located on the ground floor – TE2

5.1.6. Ramps

There are two ramps in the section of staircase 1. On the third floor, a 6% gradient ramp (R3S1) is used to compensate for a single step at the end of eastern corridor (see Figure 5-30). On the fourth-floor, a ramp with an inclination of 4% (R4S1) is used as a transition from the eastern corridor to sanitary facilities (see Figure 5-31).

Figure 5-30 Step and ramp the end of the eastern corridor - R3S1

Figure 5-31 Ramp leading to sanitary facilities - R4S1

5.1.7. Elevators

An elevator with two passenger cars and a capacity for thirteen people each, is located opposite the main staircase (L1). The elevator was built externally in 2009, and offers a view of the first courtyard through a glass structure. Figure 5-32 presents a frontal view of the elevator. Cars are accessible without steps on all floors and include automated doors, handrails, braille signalization, audio announcements, as well as reachable vertical and horizontal operating elements. Details of the operating elements are shown in Figure 5-33.

Figure 5-32 Elevator located in the area of the staircase 1 - L1

Figure 5-33 Operating elements of the elevator L1

An elevator with a capacity of twelve people was built in 1980 (L2a) in front of staircase 2, as shown in Figure 5-34. The car has sliding doors and a mirrorless wooden interior. The operating elements are not easily reached due to their height and shape. Embossed or braille signalization is not provided (see Figure 5-35). To access the elevator from the ground floor, several steps and stairs must be negotiated from every direction.

Figure 5-34 Elevator located in the area of the staircase 2 – L2a

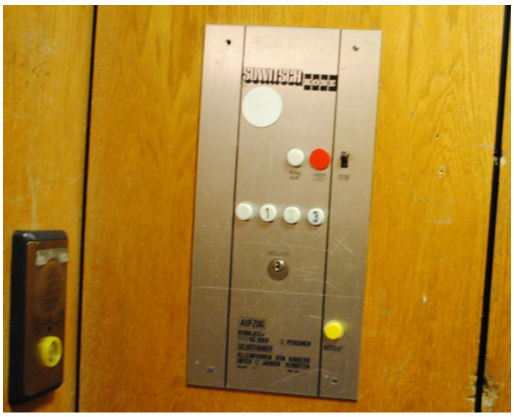

Figure 5-35 Operating elements of the elevator L2a

A second elevator (L2b) built in 2014 can be reached from all levels in the corridor leading to the AE section. Automated doors are located beyond the sanitary facilities and are especially installed for persons with disabilities. The elevator has double sided sliding doors and grants access to all floors of both sections AA and AE. The car includes a handrail, braille signalization, audio announcements and reachable vertical and horizontal operating elements. Figure 5-36 and Figure 5-37 present a view of the elevator and its operating elements respectively.

Figure 5-36 Elevator shared between AA and AE tracts– L2b

Figure 5-37 Operating elements of the elevator L2b

5.2. Tract AF: Description and Photographic Record

5.2.1. Entrances and doors: Building entrances and exits

The entrance to the building (EH2), consisting of massive wide wooden double doors with eight panels and an arched fanlight, is located on Paniglglasse. The gates open to a gallery facing the second inner courtyard which is aligned in the same north-south axis as the main entrance of the building towards staircase 1. A view of the entrance from the street is given in Figure 5-38.

Figure 5-38 Main entrance on Paniglgasse – EH2

On the west side of the gallery, automated glass double swing doors with an arched fanlight have replaced the original entranceway (ES6), as can be seen in Figure 5-39. The new doors allow access from the second courtyard to staircase 6 through a transitional space in front of the stairway and through an elevator (see Figure 5-40).

Figure 5-39 Entrance to staircase 6 – ES6

Figure 5-40 Transitional space after entrance ES6

A ramp with uneven paving and two sets of glass doors provides access beyond the gallery to staircase 7 of the section (ES7). This leads to a transitional space with an elevator, offices, sanitary facilities and vending machines. Figure 5-41 and Figure 5-42 offer a view from the described entrance and the common areas.

Figure 5-41 Entrance to staircase 7 – ES7

Figure 5-42 Area beyond entrance ES7

5.2.2. Entrances and Doors: Corridor Doors and Accesses

In the Panigl tract (AF) two corridors are open to the public, one on the first floor and another on the fourth floor. Entrances to these corridors are accessible from both staircases 6 and 7.

On the western side, glass doors are kept open during operating times (D1S6, D4S6), allowing the transition from staircase 6 and its respective elevator towards the corridor on both the first and fourth floors. Figure 5-43 and Figure 5-44 show the doors on both the first and fourth level, respectively.

Figure 5-43 Corridor door on the first floor - D1S6

Figure 5-44 Corridor door on the fourth floor - D4S6

On the east side, on the first floor, a wooden door with glass panels and narrow sections (D1S7) is situated in between the corridor and staircase 7 (see Figure 5-45). An elevator and a ramp are located near the door. On the fourth level, a glass double door with metal framing (D4S7) serves the same purpose as the door on the first floor, as can be seen in Figure 5-46.

Figure 5-45 Corridor door on the first floor - D1S7

Figure 5-46 Corridor door on the fourth floor - D4S7

5.2.3. Corridors

A corridor on the first and fourth floors connects both staircases 6 and 7. The corridor located on the first level (C1S67) allows access to offices, IT laboratories and architecture faculty training facilities (see Figure 5-47). Seminar rooms can be accessed from the corridor on the fourth floor (C4S67) (see Figure 5-48).

Figure 5-47 Corridor on the first level – C1S67

Figure 5-48 Corridor on the fourth level – C4S67

5.2.4. Stairs: Main Staircases

Staircase 6 (S6) is a principal staircase with double landings, providing access from the ground level to the fourth floor. Four columns with decorative vases on the third level support the u-shaped stone structure, which features continuous handrails on both sides of the wall and on the columns, parallel to a metal balustrade. In addition to providing access to the AF section, this staircase enables to reach the AG tract from the south. Figure 5-49 and Figure 5-50 present different views of staircase 6.

Figure 5-49 Main staircase 6 – S6

Figure 5-50 Decorative vases and handrails of staircase 6

Staircase 7 (S7) provides access from the ground level to the fourth floor. It features a metallic balustrade topped by a wooden handrail. There are semi-circular half landings at each level on its eastern side and two quarter straight landings on its western side. On the fourth floor, the steps begin to curve. Figure 5-51 and Figure 5-52 show two different views of the staircase. Sections AE and AH are accessible from this structure.

Figure 5-51 Main staircase 7 – S7

Figure 5-52 Half landing and steps on the fourth floor of staircase 7

5.2.5. Ramps

An L-shaped, 5% incline semi-permanent aluminium ramp (RH2) from the second inner courtyard allows access to the laboratories located on the ground floor, as shown in Figure 5-53.

Figure 5-53 Ramp in the second inner courtyard – RH2

A ramp (R0S7) with irregular pebble flooring and an inclination of 7,5% from the same courtyard, is located at the entrance to staircase 7 with a double handrail in the center (see Figure 5-54).

Figure 5-54 Ramp by the entrance of staircase 7– R0S7

On the first floor of staircase 7, a ramp (R1S7) leads to the corridor that transitions towards staircase 6 through the architecture faculty laboratories. This element separates the entrance of the corridor and an office door from the elevator, sanitary facilities and staircase (see Figure 5-55).

Figure 5-55 Ramp in the faculty of architecture – R1S7

5.2.6. Elevators

An elevator (L6) was built in 1985 near staircase 6 (see Figure 5-56). The 8-people capacity car has sliding doors and a mirrorless interior. Levels are not verbally announced. The embossed operating elements are not easily reached due to their height, and do not provide braille signalization, as can be seen in Figure 5-57.

Figure 5-56 Elevator located in the area of staircase 6 – L6

Figure 5-57 Operating elements of the elevator L6

On the opposite side, next to staircase 7, an elevator (L7) with automated double sliding doors grants access to all floors of sections AF and AE. The elevator was built in 1988 and is equipped with a mirror and handrail. Its operating elements are embossed, as in the elevator L6, but do not provide braille signalization. There are no voice announcements of levels to aid people who are visually impaired. Figure 5-58 and Figure 5-59 show a view of the car and its operating elements respectively.

Figure 5-58 Elevator located in the area of staircase 7 – L7

Figure 5-59 Operating elements of elevator L7

5.3. Tract AE: Description and Photographic Record

5.3.1. Entrances and Doors: Building Entrances and Exits

On the eastern side of the Paniglglasse 12, there is an informal entrance (EH4), used mainly for garage access (see Figure 5-60). The gates open to a ramp with an incline towards the fourth and third courtyards, from where an inner entrance grants barrier free access to the AE tract.

Figure 5-60 Informal entrance through garage - EH4

The entrance on the third inner courtyard (EH3b) allows barrier free admission through automated double glass doors to elevator L2a. This elevator, as previously described, allows access to all the floors of the AE section and is shared with the AA section.

The third inner courtyard can be reached from the first, second and fourth courtyards using the previously described entrances: ES1 and EH1, EH2 or EH4 respectively. Access is provided through the corridors and galleries located on the ground floor of the AB, AH and AE sections. There are no signs indicating this barrier free entrance, which complicates the path finding. A view from the entrance of the third inner courtyard is presented in Figure 5-61.

Figure 5-61 Entrance from the third inner courtyard to the AE tract – EH3b

The nearest formal outside entrance to the AE edifice is the second main entrance of section AA (ES2), located in front of staircase 2. The entrance from staircase 7 (ES7) provides access from the first to the fourth floors of the AE section, from the second inner courtyard through the stairs (S7) and elevator (L7). An emergency staircase 8 would admit entry to the different floors of the section. This staircase (S8) has not, however, been designed for this purpose. Considering that this staircase is to be used only in emergency situations, and not to provide access to the general public, it has not been included in this evaluation.

5.3.2. Entrances and Doors: Corridor Doors and Accesses

Automated glass swing doors grant access from elevator L2a to the main corridors on all floors of the AE section (D0S8a, D1S8a, D2S8a, D3S8a). These entries are located on the northern points of the corridors, where there is a transition area to the AA section towards staircase 2. Figure 5-62 shows a sample of the entries located on all floors.

Figure 5-62 Automated doors in the corridors of the AE tract

Metal-framed glass doors are located at the southern point of the section's corridors. On the first level, these doors (D0S8b) are positioned before the separation of the section to the west, and allow access with two ramps to staircase 7, elevator L7 and an auditorium through an extension of the main corridor (see Figure 5-63). From the first to the third levels, these doors (D1S8b, D2S8b, D3S8b) are located beyond the intersection leading towards the west. On the second and third floors, the doors offer direct access to staircase 7, elevator 7 and an auditorium. Figure 5-64 presents a sample of the doors at the end of the corridor on the upper levels.

Figure 5-63 Glass doors at the end of the corridor in the ground level – D0S8b

Figure 5-64 Glass doors at the end of the corridor in the upper levels

On the first floor, an additional set of wooden double doors with narrow leaves and high operating elements (D1S8e) is placed between the door at the end of the main corridor and the transitional space that allows passage to the auditorium and elevator (see Figure 5-65).

Figure 5-65 Doors providing access to elevator L7 in the first floor – D1S8e

A metal framed glass door (D0S8c) leads to an orthogonal corridor in the middle of the section. This corridor is only accessible from the main corridor of the ground floor, as shown in Figure 5-66.

Figure 5-66 Doors towards the orthogonal corridor leading to tract AH

5.3.3. Corridors

The main corridors of the AE tract are open to the public on all floors from the ground floor to the third level (C0S8, C1S8, C2S8, C3S8). The corridors provide access to offices and administrative facilities, emergency staircases, seminar rooms and auditoriums. It is noteworthy to mention that in the first-floor corridor, the office of students and examinations affairs is a high traffic area. A sample of the corridors of this section is shown in Figure 5-67.

Figure 5-67 Main corridors of the AE Tract

A door on the ground floor divides the corridor into another corridor section near the intersection of the west leading corridor (C0S8b), where two ramps are located (see Figure 5-68).

Figure 5-68 Corridor division in the ground floor of the AE Tract – C0S8b

On the ground floor of the central area corridor, a cross section of the structure can be entered through another corridor (C0S8a). This passage connects to an auditorium in the AH section of the building, as can be seen in Figure 5-69.

Figure 5-69 Orthogonal corridor in the AE Tract – C0S8a

5.3.4. Stairs: Other Stairs and Steps

Six steps (T80b) on the ground floor at the end of the corridor next to elevator L7 compensate for the level variations from the AE to the AF sections (see Figure 5-70). High handrails have been mounted on one side of the wall.

Figure 5-70 Stairs at the end of main corridor between sections AE and AF – T80b

Five-step stairs (T80a) located in the intersecting corridor of the ground floor serve as the transition from the AE to the AH tracts. No handrails or optical markings have been provided. Figure 5-71 shows a view of the stairs.

Figure 5-71 Stairs at the end of orthogonal corridor between tracts AE and AH – T80a

5.3.5. Ramps

This ground floor section features two consecutive ramps with a gradient of 12% and 13% (R0S8a, R0S8b). The ramps level the corridor located in the AE section with the corridor in the AF section, and the area leading to elevator L7 (see Figure 5-72).

Figure 5-72 Ramps at the end of the corridor of the ground floor.

5.4. Accessibility Assessment and Scoring

The results of the observations and measurements taken during the field assessment have been organized in matrixes to calculate the overall compliance of each element with barrier free requirements (variables). The original checklists with the raw data taken in-situ are attached as Annexes.

The average percentage of fulfilment of barrier free requirements in each category is presented in Figure 5-73. This chart shows that the most accessible facilities overall are corridors with a score of 77%, followed by corridor doors and accesses with 69%, building entrances and exits with 68%, main staircases with 61%, ramps with 55%, positioning elevators and other steps and stairs in last place with a score of 51% and 45%, respectively.

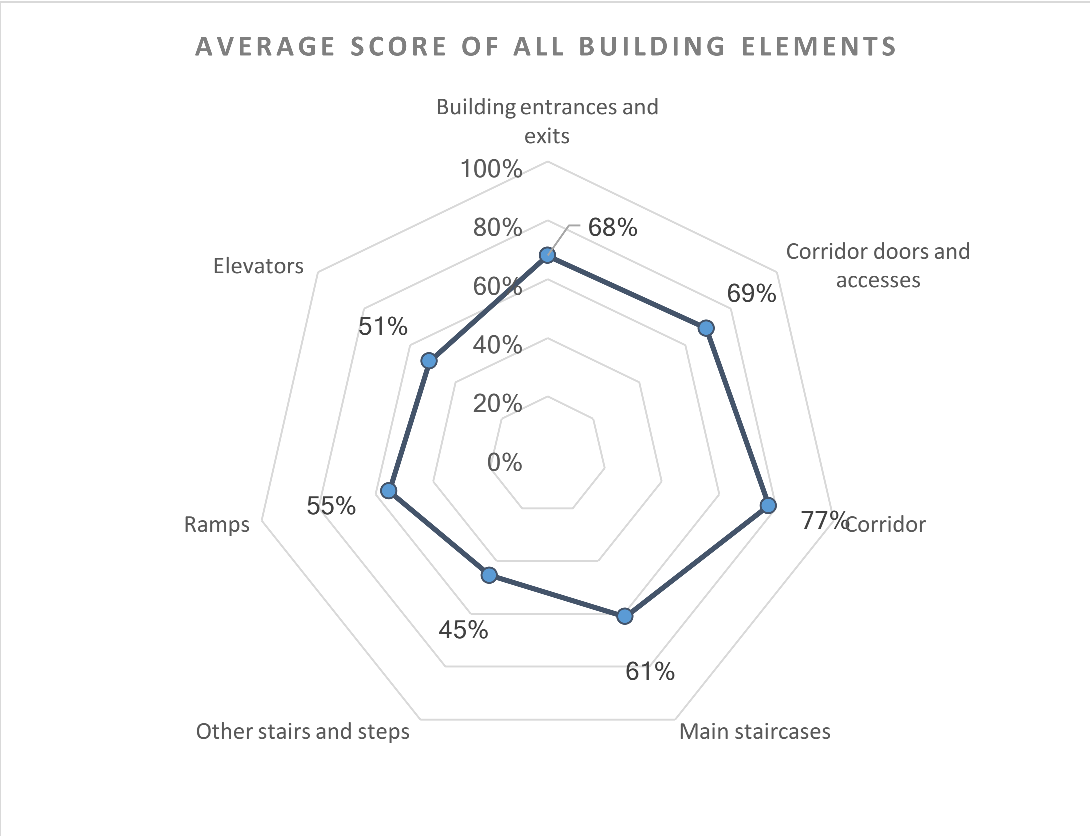

Figure 5-73 Overall average score of all building elements under study

These data must be interpreted with caution, as each category responds to different barrier free requirements. The detailed results according to the different tracts and staircase areas have been presented graphically in Figure 5-74.

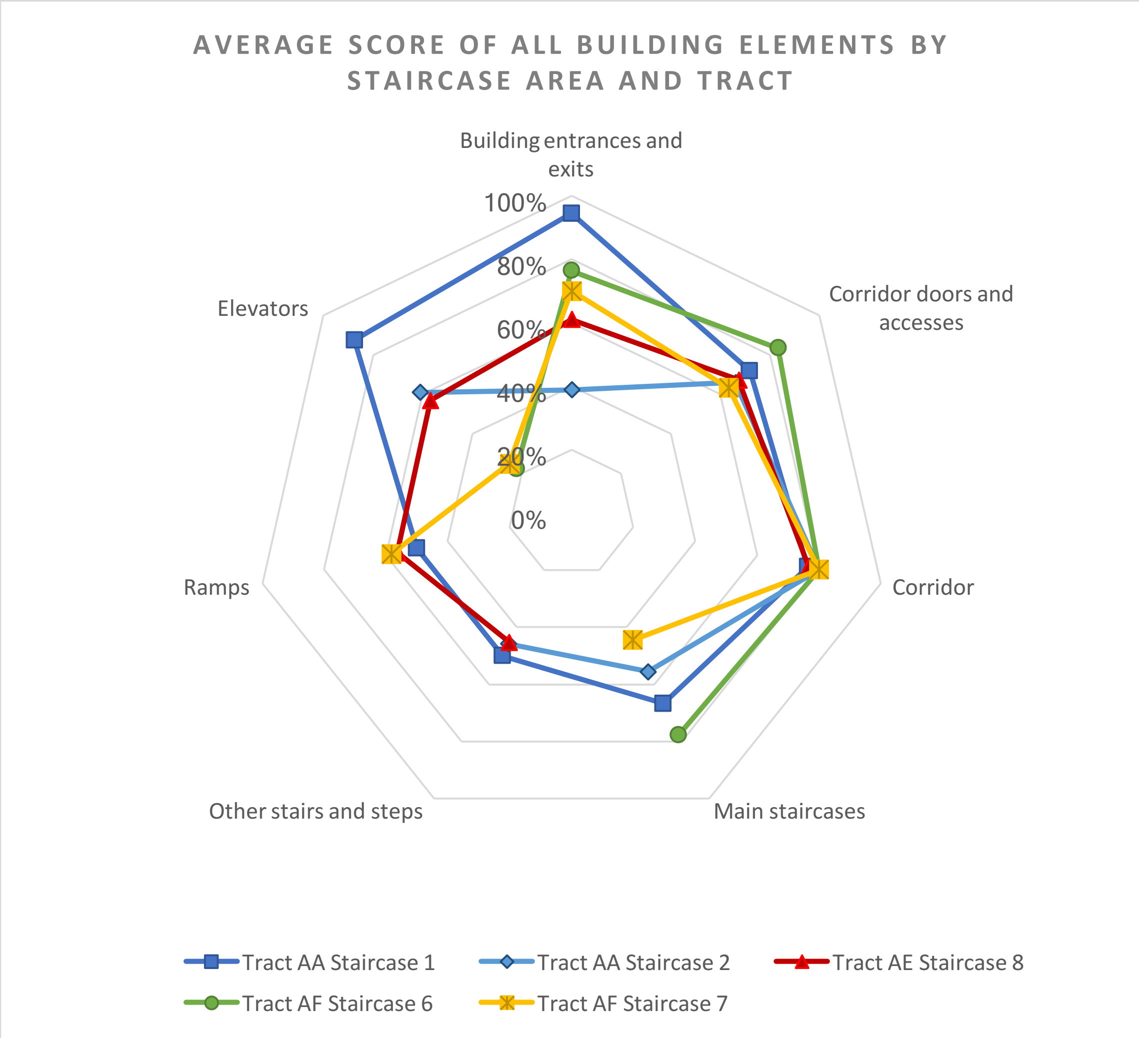

Figure 5-74 Overall average score of all building elements under study by staircase area and tract

This chart shows that in all staircase areas the categories that exhibit similar characteristics and scoring are corridors, ramps, other stairs and steps and corridor doors and accesses. The biggest differences encountered for the compliance with barrier free requirements can be observed in the elevators category, with the elevators by staircase 1 being superior in providing accessibility than the rest. Elevators in staircase 7 and 6 are at the bottom of the list, whereas the ones granting access to staircase 2 and 8 present an overall average scoring. The category building entrances and exits also shows considerable differences in compliance amongst the staircase areas with the most critical zone of this category located in staircase 2. The entrances by staircase 1 on the other hand provide an example of best practices in complying with accessibility requirements. From the main staircases analyzed, the scoring received from highest to lowest was given to staircases 6, 1, 2 and 7. A comprehensive assessment of each category under study is presented below.

5.4.1. Entrances and Doors: Building Entrances and Exits

Table 5-1 presents the checklist results and scoring of each element under the building entrances and exits category. Most of the entrances comply with the barrier free dimensions of doors, as well as the approaches and movement areas. The most critical variables that inhibit accessibility in most of the entrances are the lack of tactile ground indicators, lack of glass doors marking and the absence of required ramps, to overcome obstacles and guarantee *stepless* access.

About two thirds of the entrances analyzed allow doors to be easily operated either through automation or by leaving them open during operating times. Such measures should be considered for the one third of entrances that require adaptation. Additionally, only one half of the entrances have operating elements at a reachable height for all.

Table 5-1 Evaluation matrix of building entrances and exits

Nomenclature	Checklist										Compliance (Elements)
	No steps/obstacles	Ramp provided	Ap. Area dimensions	Tactile guides	Door width	Door height	Mov. Area dimensions	Operating elem. height	Operability of door	Glass Marking	
ES1	Y	N/A	Y	Y	Y	Y	Y	N/A	Y	N/A	100%
EH1	Y	N/A	Y	Y	Y	Y	Y	Y	Y	N	89%
ES2	N	N	Y	N	Y	Y	Y	N	N	N/A	44%
EH3a	N	N	Y	N	N	Y	Y	N	N	N/A	33%
EH2	Y	N/A	Y	N	Y	Y	Y	N	Y	N/A	75%
ES6	Y	N/A	Y	N	Y	Y	Y	Y	Y	N	78%
ES7	Y	Y	Y	N	Y	Y	Y	Y	N	N	70%
EH4	N	N	Y	N	Y	Y	N	N	Y	N/A	44%
EH3b	Y	N/A	Y	N	Y	Y	Y	Y	Y	N	78%
Compliance (Requirements)	6/9 67%	1/4 25%	9/9 100%	2/9 22%	8/9 89%	9/9 100%	8/9 89%	4/8 50%	6/9 67%	0/4 0%	68%

Figure 5-75 illustrates the degree of entrance and exit requirements by tract and by staircase area. This chart shows that both the inner and outer entrances located in staircase 2 of the AA tract, namely EH3a and ES2, present the most barriers. The inner and outer entrances located in the first staircase's area of the same section (EH1 and ES1 respectively) have the highest scores, being the main entrance ES1 fully compliant with the analyzed variables.

In section AE, entrance EH4 presents significant barriers to access. This result was expected since this informal entrance is mostly used for parking purposes. The inner entrance by the courtyard (EH3b) complies with 78% of requirements.

The entrances located in tract AF (EH2, ES6, ES7) all have a compliance rate over 70%, while entrance ES7 in the area of staircase 7, has the most barriers within the section.

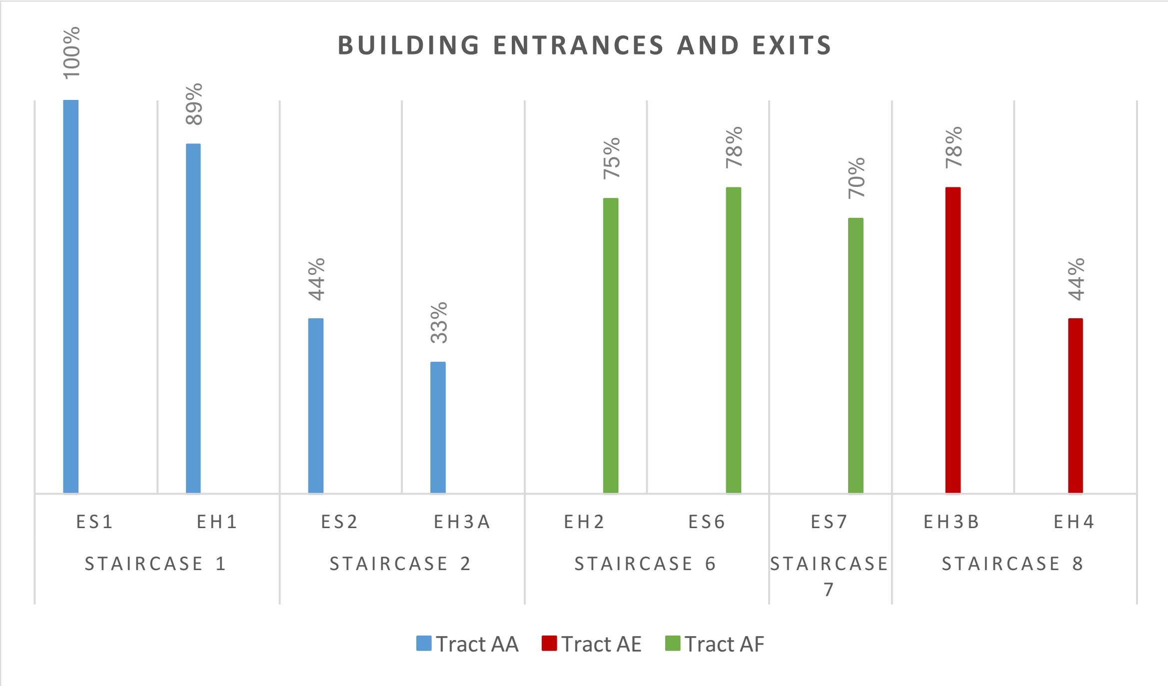

Figure 5-75 Compliance of building entrances and exits shown by staircase and tract

5.4.2. Entrances and Doors: Corridor doors and accesses

The most extensive list of elements analyzed are included in the corridor doors and accesses category. The results of the checklist and evaluation of each is presented in Table 5-2.

All the corridor doors under study comply with the requirements of movement area dimensions and door height, similar to the building entrances and exits category. Almost 30% of doors have either a narrow width that provides insufficient accessibility and/or have levers and handles located too high to be reached by all.

Approximately one half (47%) of the doors are either too heavy or feature ungraspable operating elements. Finally, none of the glazed doors in the building fulfil the requirement of optical markings in contrasting patterns.

Table 5-2 Evaluation matrix of corridor doors and accesses

Nomenclature	Checklist						Compliance (Elements)
	Door width	Door height	Mov. Area dimensions	Operating elem. height	Operability of door	Glass Marking	
D0S1a	Y	Y	Y	Y	Y	N	83%
D1S1a	Y	Y	Y	N	Y	N/A	80%
D1S1b	Y	Y	Y	N	Y	N/A	80%
D1S1c	Y	Y	Y	Y	N	N	67%
D1S1d	N	Y	Y	N	N	N/A	40%
D1S1e	Y	Y	Y	Y	Y	N/A	100%
D2S1a	Y	Y	Y	N	N	N/A	75%
D2S1b	Y	Y	Y	N	N	N/A	75%
D2S1c	Y	Y	Y	Y	N	N	67%
D3S1a	Y	Y	Y	Y	N	N	67%
D3S1b	Y	Y	Y	Y	N	N	67%
D3S1c	N	Y	Y	Y	N	N	50%
D3S1d	Y	Y	Y	Y	Y	N	83%
D3S1e	Y	Y	Y	Y	N	N	67%
D4S1a	Y	Y	Y	Y	Y	N	83%
D4S1c	Y	Y	Y	N	Y	N	67%
D0S2a	N	Y	Y	N	Y	N/A	50%
D0S2b	N	Y	Y	N	Y	N/A	50%
D1S2a	N	Y	Y	Y	N	N/A	60%
D1S2b	N	Y	Y	Y	N	N/A	60%
D2S2a	N	Y	Y	Y	N	N/A	60%
D2S2b	N	Y	Y	Y	N	N/A	60%
D3S2a	N	Y	Y	Y	N	N/A	60%
D3S2b	N	Y	Y	Y	N	N/A	60%
D0S2c	Y	Y	Y	Y	Y	N	83%
D1S2c	Y	Y	Y	Y	Y	N	83%
D2S2c	Y	Y	Y	Y	Y	N	83%
D3S2c	Y	Y	Y	Y	Y	N	83%

Table 5-2 Evaluation matrix of corridor doors and accesses *(continuation)*

Nomenclature	Checklist						Compliance (Elements)
	Door width	Door height	Mov. Area dimensions	Operating elem. height	Operability of door	Glass Marking	
D1S6	Y	Y	Y	Y	Y	N	83%
D1S7	N	Y	Y	Y	N	N/A	60%
D4S6	Y	Y	Y	Y	Y	N	83%
D4S7	Y	Y	Y	Y	N	N	67%
D0S8a	Y	Y	Y	Y	Y	N	83%
D1S8a	Y	Y	Y	Y	Y	N	83%
D2S8a	Y	Y	Y	Y	Y	N	83%
D3S8a	Y	Y	Y	Y	Y	N	83%
D0S8b	Y	Y	Y	Y	Y	N	83%
D0S8c	Y	Y	Y	Y	N	N	67%
D1S8b	Y	Y	Y	N	N	N	50%
D2S8b	Y	Y	Y	N	N	N	50%
D3S8b	Y	Y	Y	N	N	N	50%
D1S8c	N	Y	Y	N	N	N/A	40%
Compliance (Requirements)	30/41	41/41	41/41	30/41	18/37	0/26	**69%**
	71%	100%	100%	71%	47%	0%	

The comparison of the average scoring of corridor doors by tract and staircase area is shown in Figure 5-76. The overall highest score, with an average compliance of 83%, was given to the doors near staircase 6 in the AF section. The corridor doors located in the same tract on the opposite side, near staircase 7 have the lowest average grading of 63%.

The doors located in staircases 1, 8 and 2 scored 67%, 66% and 63%, respectively. These results indicate that for this category, access in all tracts can be improved by focusing on solutions by type of barrier.

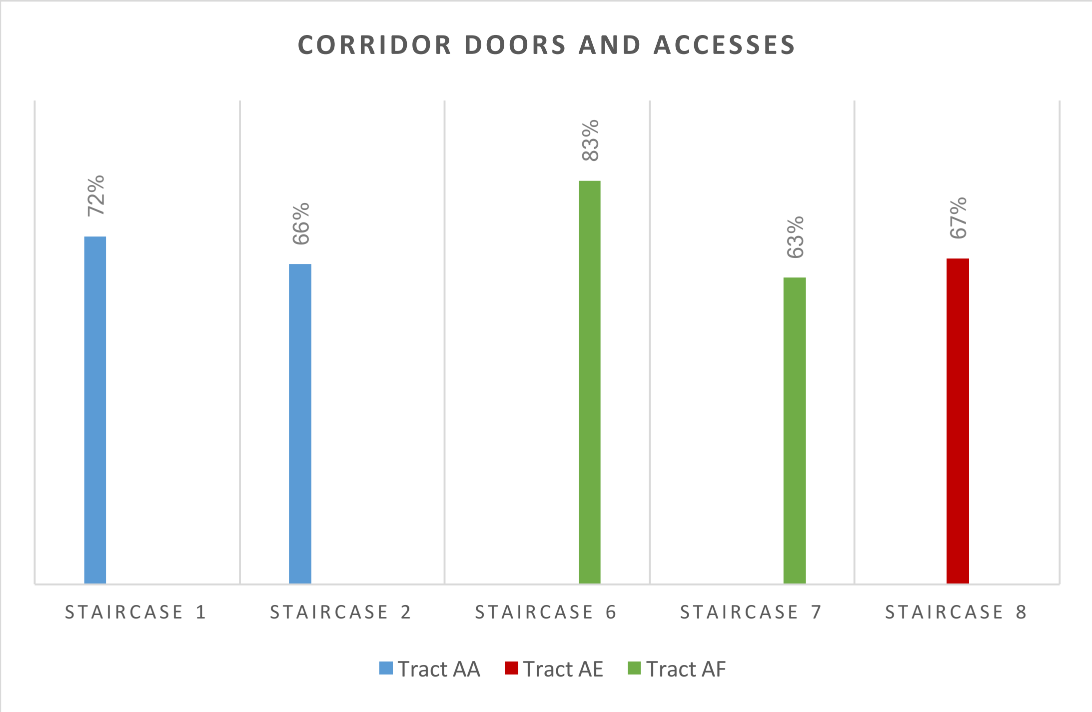

Figure 5-76 Average compliance of corridor doors and accesses by staircase and tract

5.4.3. Corridors

On average, corridors are the most accessible feature of the analyzed sections of the TUW building. This is due to the size of the monumental structure with spacious circulation areas. Table 5-3 shows the results of the evaluation checklist, indicating that all the area and width dimensions are, as expected, compliant with the barrier free requirements.

This table also shows that the textured surfaces and appropriate visual signs indicating directions are lacking. Although some corridors and areas provide directional indicators, most of these signs don't comply with size and color requirements. This makes it difficult to follow a path through the buildings, particularly for people with visual impairments.

It can be noted that obstacles and/or steps without the proper provision of ramps, lifts or platforms, occur in 27% of corridors

Table 5-3 Evaluation matrix of corridors

Nomenclature	Checklist: Mov. Area dimensions	Passage clearance	Signage (Tactile/Visual)	Corner distances	No steps/obstacles	Compliance (Elements)
C0S1a	Y	Y	N	Y	N	60%
C1S1	Y	Y	N	Y	Y	80%
C1S1a	Y	Y	N	Y	N	60%
C1S1b	Y	Y	N	Y	Y	80%
C2S1	Y	Y	N	Y	Y	80%
C2S1a	Y	Y	N	Y	Y	80%
C2S1b	Y	Y	N	Y	Y	80%
C3S1	Y	Y	N	Y	Y	80%
C3S1a	Y	Y	N	Y	Y	80%
C3S1b	Y	Y	N	Y	Y	80%
C4S1a	Y	Y	N	Y	Y	80%
C1S2	Y	Y	N	Y	Y	80%
C2S2	Y	Y	N	Y	Y	80%
C3S2	Y	Y	N	Y	Y	80%
C1S67	Y	Y	N	Y	Y	80%
C4S67	Y	Y	N	Y	Y	80%
C0S8	Y	Y	N	Y	Y	80%
C0S8a	Y	Y	N	Y	N	60%
C0S8b	Y	Y	N	Y	Y	80%
C1S8	Y	Y	N	Y	Y	80%
C2S8	Y	Y	N	Y	Y	80%
C3S8	Y	Y	N	Y	Y	80%
Compliance (Requirements)	22/22 100%	22/22 100%	0/22 0%	22/22 100%	19/22 86%	**77%**

Figure 5-77 shows the average compliance of all corridors by tract and by staircase area. It can be noted from this chart, that the corridors from the area of the first staircase of the AA tract present the most barriers with an average compliance of 76%. These are followed by the corridors located in the AE section with a score of 77%.

The corridors shared between staircase 6 and 7 in tract AF and the corridors located in the second staircase area of the AA tract are the most compliant elements with at least of 80% barrier free.

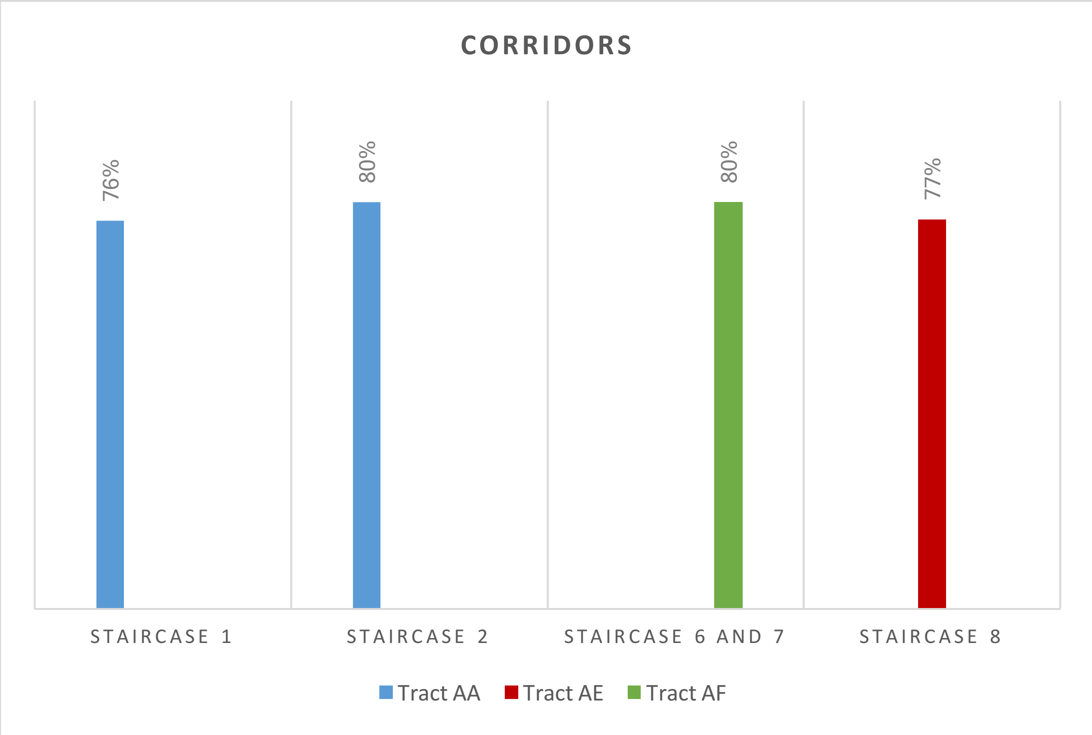

Figure 5-77 Average compliance of corridors by staircase and tract

5.4.4. Stairs: Main Staircases

Table 5-4 presents the checklist results and scoring of each main staircase. This table shows that all the main staircases comply with the barrier free requirements of width, handrail profile, steps and landing dimensions. However, none of them is provided with tactile ground indicators for descending the stairs.

This category has only four elements in analysis, allowing the discussion of the remaining requirements to be done by element and tract. The matrix results are presented graphically in Figure 5-78.

In the AA Tract, both staircases are straight and follow a continuous path along their length. Staircase 1 however, does not provide access to the top floor. This staircase has optical markings and fulfils the handrail requirements of height and profile, but presents discontinuities on the inner side handrail at every change of level. Therefore, the scoring of the first staircase is 67%. On the other hand, staircase 2 does not comply with the handrail requirements of height and continuity, with only one handrail in selected sections. It has optical markings on all first and last steps, but some of these have faded and need replacement. It therefore has received a scoring of only 56%.

In the AF tract, staircase 6 complies with all remaining requirements except for the provision of optical markings, giving it a score of 78%. Staircase 7 has an overall compliance of 44%, as it is not straight on all levels, doesn't provide optical markings and has handrails non-compliant with height and continuity requirements.

Table 5-4 Evaluation matrix of main staircases

Nomenclature	**Checklist**									**Compliance (Elements)**
	Cont. to all levels & straight	*Stair width*	*Step dimensions*	*Landings (max. 20 steps & dimensions)*	*Optical markings*	*Tactile stripes*	*Handrail cont. in two sides*	*Handrail height*	*Handrail profile*	
S1	N	Y	Y	Y	Y	N	N	Y	Y	67%
S2	Y	Y	Y	Y	N	N	N	N	Y	56%
S6	Y	Y	Y	Y	N	N	Y	Y	Y	78%
S7	N	Y	Y	Y	N	N	N	N	Y	44%
Compliance	2/4	4/4	4/4	4/4	1/4	0/4	1/4	2/4	4/4	**61%**
(Requirements)	50%	100%	100%	100%	25%	0%	25%	50%	100%	

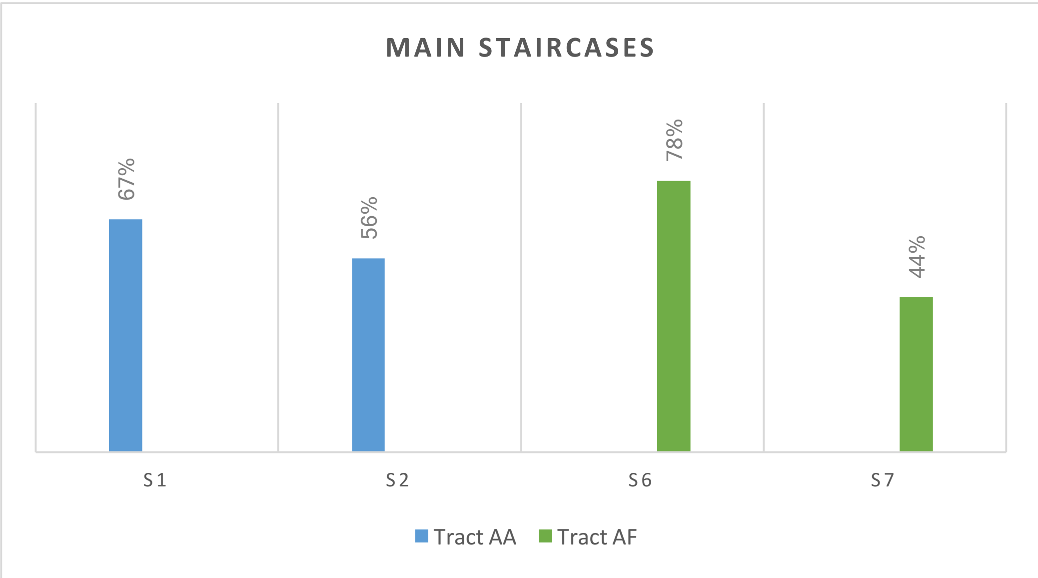

Figure 5-78 Compliance of staircases by tract

5.4.5. Stairs: Other Stairs and Steps

The checklist with results of the compliance of each element in the category other stairs and steps is presented in Table 5-5. This table shows that all the elements comply with the barrier free requirements of width, steps and landing dimensions. About two thirds of these stairs and steps are compliant with the profile requirement for the handrail. However, none of them have a reachable handrail height, nor tactile stripes before descending the stairs and only one out of eleven is provided with optical markings on its first and last steps.

Table 5-5 Evaluation matrix of other steps and stairs

Nomenclature	Checklist								Compliance (Elements)
	Stair width	*Step dimensions*	*Landings (max. 20 steps & dimensions)*	*Optical markings*	*Tactile stripes*	*Handrail cont. in two sides*	*Handrail height*	*Handrail profile*	
S1a	Y	Y	Y	Y	N	Y	N	Y	75%
S1b	Y	Y	Y	N	N	N	N	N	38%
S1c	Y	Y	Y	N	N	N	N	N	38%
T10	Y	Y	Y	N	N	N	N	Y	50%
TE2	Y	Y	N/A	N	N	N	N	N	29%
T20	Y	Y	Y	N	N	N	N	Y	50%
T21	Y	Y	Y	N	N	N	N	Y	50%
T22	Y	Y	Y	N	N	N	N	Y	50%
T23	Y	Y	Y	N	N	N	N	Y	50%
T80a	Y	Y	N/A	N	N	N	N	N	29%
T80b	Y	Y	N/A	N	N	N	N	Y	43%
Compliance (Requirements)	11/11 100%	11/11 100%	8/8 100%	1/11 9%	0/11 0%	1/11 9%	0/11 0%	7/11 64%	**45%**

The comparison of the scoring of other steps and stairs by tract and staircase area is shown in Figure 5-79. The overall highest score (75%) was given to the auxiliary staircase S1a, used to reach the fourth level in the area of the first staircase in the AA section. The other two auxiliary staircases that serve a similar purpose in the same tract (S1b and S1c) were given a score of 38%, due to their lack of compliance with all handrail requirements.

Also in the AA tract, all transitional stairs from one staircase area to another, were given a score of 50%. These are T10, which levels the area from staircase 1 to staircase 2, and T20, T21, T22 and T3 fulfilling the same purpose from the AA to the AE section.

The lowest level of compliance (29%) is found in the same section by the area of the second staircase. The element TE2 is the result of its configuration: a flight of three steps positioned in a main hall that has not been adapted nor provided with a handrail, becoming a very critical barrier in the tract.

In the area of staircase 8 of the AE tract, a second element with a score of 29% is located at the end of a corridor leading to the AH tract. The existing configuration of five steps has not been provided with a handrail. Finally, in the same section between the AE and the AF tract, an element equipped with only one handrail has received a score of 43%.

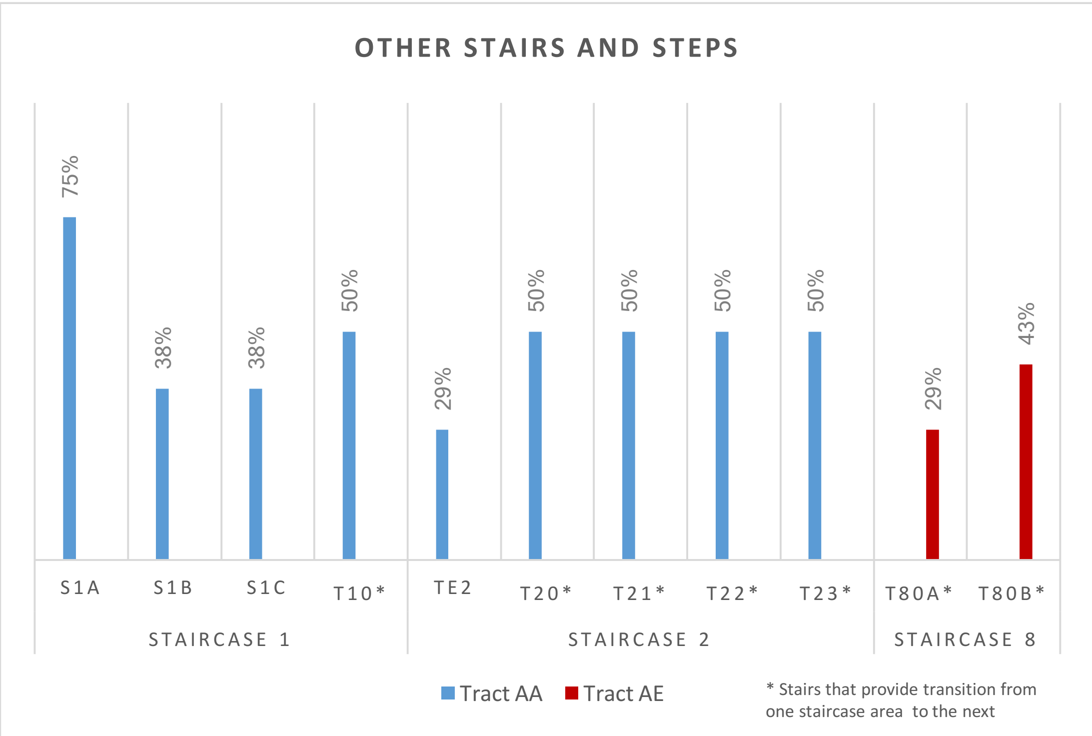

Figure 5-79 Compliance of other stairs and steps by staircase area and by tract

5.4.6. Ramps

The matrix developed for the ramp category is presented in Table 5-6. The results of this checklist show that all ramps evaluated fulfil the accessibility width requirement. Six out of seven ramps comply with the dimensions of the movement area and the provision of a proper handrail profile, and five out of seven satisfy the barrier free conditions of gradient and handrail height. None of the ramps provide optical markings and wheel deflectors and only two out of seven present a handrail on both of sides.

Table 5-6 Evaluation matrix of ramps

Nomenclature	Checklist								Compliance (Elements)
	Ramp width	Mov. Area dimensions	Optical markings	Inclination	Handrail cont. In two sides	Handrail height	Handrail profile	Wheel deflectors	
R3S1	Y	Y	N	Y	N	Y	Y	N	63%
R4S1	Y	Y	N	Y	N	N	N	N	38%
RH2	Y	Y	N	Y	Y	Y	Y	N	75%
R0S7	Y	N	N	Y	N	Y	Y	N	50%
R1S7	Y	Y	N	Y	N	N	Y	N	50%
R0S8a	Y	Y	N	N	N	Y	Y	N	50%
R0S8b	Y	Y	N	N	Y	Y	Y	N	63%
Compliance	7/7	6/7	0/7	5/7	2/7	5/7	6/7	0/7	**55%**
(Requirements)	100%	86%	0%	71%	29%	71%	86%	0%	

The compliance of ramps based on their tract and staircase area is presented in the Figure 5-80. The ramp located at the second inner courtyard of the AF section (RH2) received the highest score of 75%, whereas two other ramps of the same tract (R0S7 and R1S7) only comply with 50% of the requirements.

In the AA section of the first staircase area, a ramp located in the eastern corridor of the third level to compensate for a single step (R3S1) has a compliance of 63%. The ramp with the lowest score (38%) can be found on the way to sanitary facilities (R4S1) on the fourth level of the same tract. This ramp has not been provided with the minimal gradient required for handrails, estimated at 4%.

Finally, in the AE tract, two ramps located in sequence (R0S8a and R0S8b) present a compliance of 63% and 50% each. Neither of them meets the minimum gradient requirement, presenting a slope of 12% and 13%, respectively. Additionally, the ramp R0S8a is equipped with only one handrail.

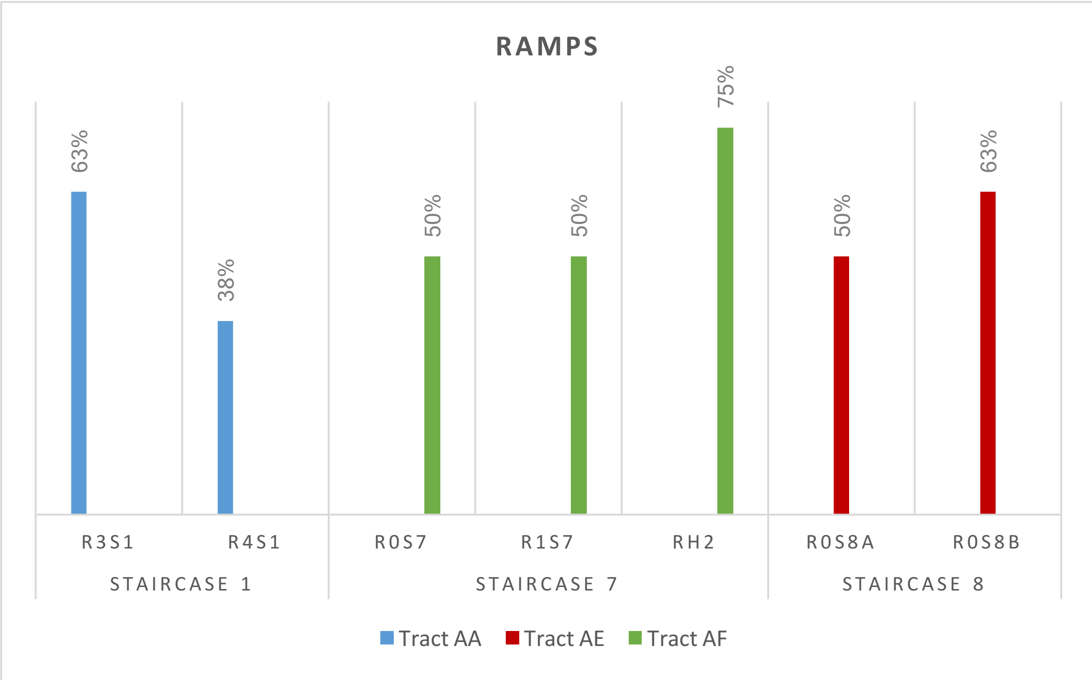

Figure 5-80 Compliance of ramps by staircase area and by tract

5.4.7. Elevators

Elevators have stringent requirements, since their main function is to provide vertical accessibility for all. Table 5-7 and

Figure **5-81** present the results of the assessment checklist and the differentiation of the score by section and staircase area.

Only two elevators comply with the major accessibility requirements. These elevators were most recently built in 2009 and 2014. The first corresponds to the AA tract near the first staircase and the latter is shared between the AA and AE sections in the area near the second staircase. The other three elevators, built in the 1980s are situated in each staircase of the AF tract and in the second staircase of the AA section. These elements achieve less than a third of the requirements, since they do not comply with the height and profile of the operating elements nor with having voice announcements of all levels.

Table 5-7 Evaluation matrix of elevators

Nomenclature	Stepless access	Door width	Car dimensions	Mov. Area dimensions	Level announcement	Provision of mirror	Operating elem. height	Operating elem. position	Operating elem. in braille	Compliance (Elements)
L1	Y	Y	N	Y	Y	N/A	Y	Y	Y	88%
L2a	N	Y	Y	Y	N	N	N	N	N	33%
L2b	Y	Y	N	Y	Y	Y	Y	Y	Y	89%
L6	Y	N	N	Y	N	N	N	N	N	22%
L7	Y	N	N	Y	N	N/A	N	N	N	25%
Compliance	4/5	3/5	1/5	5/5	2/5	1/3	2/5	2/5	2/5	**51%**
(Requirements)	80%	60%	20%	100%	40%	33%	40%	40%	40%	

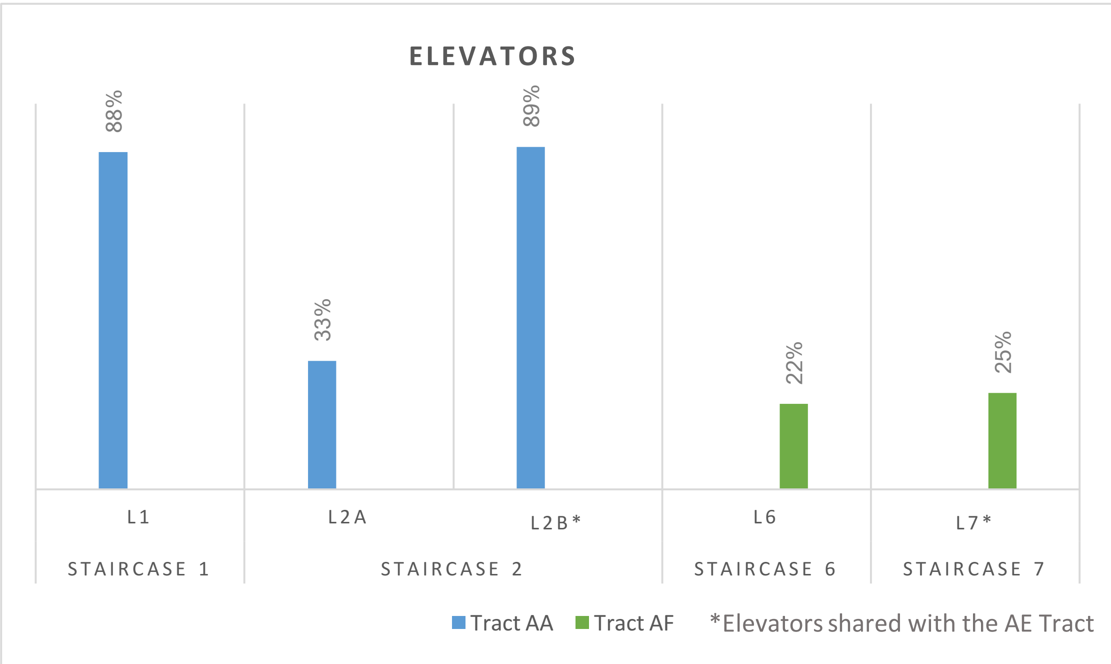

Figure 5-81 Compliance of elevators by staircase area and by tract

6. Conclusions and Recommendations

Specific efforts made by the TUW to guarantee accessibility in selected sections of its main historical building represent an important step in the provision of universal access. The installation of the newest elevators L1 and L2b is a remarkable milestone in a building dating to the XIX century.

Committed to the compliance with the entire body of regulations and the well-being of users with disabilities, the TUW installed automated doors at EH3b, ES6. The same improvement was made in sections AA and AE, providing access to sanitary facilities and elevator L2b.

Other noteworthy initiatives have been instituted in the main hall near the first entrance ES1. To improve the mobility of dwellers, an automated door and tactile paving leading to corridors, the first main staircase, elevators, information points and the first inner courtyard, have been introduced. The handrail mounted on the wall parallel to the balustrade of staircase 6, is another good example of a fully compliant barrier free installation.

All evaluated categories can profit from improvement. By emphasizing analogous solutions applicable to similar elements, some minor adaptations can be accomplished without incurring significant financial burdens.

Nevertheless, complex configurations or a combination of critical elements identified in any given area, may require an integrated analysis of the structure and surroundings to determine the best solutions.

Corridors are primarily accessible because of their ancient wide configuration. However, by lowering handles and operating elements to a level reachable for all, corridor doors can be upgraded. Heavy and narrow doors require automation. As an alternative, doors can remain open during building operating hours. Handles must be installed on both sides of narrow double doors. Otherwise, both doors are to remain open.

Proper signals for routing and path direction must be incorporated. In corridors with a small number of obstructing steps, such as in C1S1a, a ramp must be installed. In cases of significant height disparity, such as in T10, a foldable platform lift is required.

The barriers existing in stairs can be reduced through replacement, extension or new provision of handrails on both sides of the element. To aid the visually impaired to negotiate the stairs, the provision of reversible solutions is required, such as optical stripes and tactile markings before descending stairs.

The same kind of adaptation can apply to handrails on stairs and ramps. Ramps need to include wheel deflectors. In the case of ramp R0S7, the irregular tiles of the flooring must be replaced with a safer tiling option. For ramps R0S8a and R0S8b not compliant with the maximum slope requirements, additional evaluations should be made to consider a suitable solution for universal safety.

Two out of the five evaluated elevators are new and largely compliant with the barrier free criteria, giving access to the AA section near staircase 1, staircase 2 and the AE tract (L1 and L2b). The other three elevators assessed are located near staircase 2 (L2a), staircase 6 (L6) and staircase 7 (L7), with the latter also providing access to the AE section. Without a single accessible elevator in the AF area, adaptation of elevators in this tract is critical.

New cabin designs for elevators L6 and L7 can satisfy the dimensions required. Elevator L2a, on the other hand, complies with the dimension requirements of the doors and the car. Potential improvements can be achieved by installing audible signals, lowering call and operating buttons and installing embossed and braille inscriptions next to the buttons.

The area of the second main staircase has been identified as in critical need of improvement. Both entrances, the main (ES2) and inner courtyard (EH3a), have the lowest score within their category. A flight of steps located in the entrance hall (TE2), constitutes a barrier to both elevators (L2a and L2b) and the main staircase (S2). This is particularly critical, since elevator L2b is a barrier free element, providing access to both the AE and AA section. Additionally, elements L2a and S2 have very low scores within their categories.

Possible considerations include the automation of the inner courtyard entrance doors (EH3a) and the provision of ramps to negotiate the steps located at EH3a and ES2. The hall steps can be provided with four sets of handrails along their width and a ramp of at least four meters. Alternatively, a wheelchair lift can be installed. To safeguard the historical character of the main entrance (ES2), a similar configuration to the entry on the first staircase can be supplied, with the outer sets of door remaining open and an automated second set of internal doors provided

It is imperative to improve the already barrier free entrances EH2 and ES1/EH1, by providing visual signals from the inaccessible or informal entrances, such as EH4. To enhance safe access, tactile paving should also be provided towards and from all barrier free entrances.

Additionally, entrance EH3b that guarantees accessibility to the area of elevator L2b from the third inner courtyard to the AE tract, should be signalized from the entrances located in the first and second inner courtyard. An accessible path shall also be provided through the AB tract. This section provides a barrier free path from the second inner courtyard but not for the first. The door at the end of the gallery to the third courtyard should be automated and a ramp provided to compensate for three steps located beyond the door

This study reveals the possibilities of integrating accessibility provisions in the built environment conforming to conservation principles. It also demonstrates that adaptation alternatives do not necessarily result in invasive interventions. A combination of strategic plans, managerial decisions and physical solutions such as those presented for this case study, guarantee compliance with the eight conservation principles identified in chapter 2.3. Such solutions can also minimize costs. However, more sensitive cases could represent a major disbursement, such as the building or replacement of elevators. Ultimately, the best approach must follow a multidisciplinary plan involving end-users, designers, building managers and budget allotment holders.

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Annexes

Accessibility Checklist

Tract AA: Stiege 1

Category	Nom	Level	Checklist	Y/N	Observations
Building entrances and exits (1a)	ES1	EG	Pathway free of steps and obstacles	Y	
			Provision of ramp	N/A	
			Approaching area dimensions Ø>=1.5 m	Y	
			Tactile orientation information	Y	In the inside, providing access to main hall, staircase and courtyard
			Door passage width >=1.00 m	Y	
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	N/A	
			Easy operability of the door	Y	Automatic door marked for disability access only
			Glass doors with marking provided	N/A	
Building entrances and exits (1a)	EH1	EG	Pathway free of steps and obstacles	Y	
			Provision of ramp	N/A	
			Approaching area dimensions Ø>=1.5 m	Y	
			Tactile orientation information	Y	
			Door passage width >=1.00 m	Y	Measured w=1.00 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	
			Easy operability of the door	Y	
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D0S1a	EG	Door passage width between 0.80-1.00 m	Y	
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	
			Easy operability of the door	Y	Open during operational times (weekdays)
			Glass doors with marking provided	N	
Corridor (2)	C0S1a	EG	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	Poor visual signalization: small letters and non contrasting colors. Tactile information absent.
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	N	Nine step stairs at the end of the corridor, no ramp provided.
Corridor doors and accesses (1b)	D1S1a D1S1b	OG1	Door passage width between 0.80-1.00 m	Y	
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	N	Measured h=1.20 m
			Easy operability of the door	Y	Open during operational times (weekdays)
			Glass doors with marking provided	N/A	
Corridor doors and accesses (1b)	D1S1c	OG1	Door passage width between 0.80-1.00 m	Y	Measured w=0.90 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=1.05 m
			Easy operability of the door	N	
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D1S1d	OG1	Door passage width between 0.80-1.00 m	N	Measured w=0.70 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	N	Measured h=1.38 m
			Easy operability of the door	N	
			Glass doors with marking provided	N/A	
Corridor doors and accesses (1b)	D1S1e	OG1	Door passage width between 0.80-1.00 m	Y	Measured w=0.90 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=1.05 m
			Easy operability of the door	Y	Open
			Glass doors with marking provided	N/A	
Corridor (2)	C1S1 C1S1b	OG1	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	Poor visual signalization: small letters and non contrasting colors. Tactile information absent
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	

Category	Nom	Level	Checklist	Y/N	Observations
Corridor (2)	C1S1a	OG1	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	Poor visual signalization: small letters and non contrasting colors. Tactile information absent
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	N	Two single steps located at the end of the corridor C1S1a. No ramp. Optical markings provided.
Corridor doors and accesses (1b)	D2S1a D2S1b	OG2	Door passage width between 0.80-1.00 m	Y	
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	N	Measured h=1.20 m
			Easy operability of the door	N	Open during operational times (weekdays)
			Glass doors with marking provided	N/A	
Corridor doors and accesses (1b)	D2S1c	OG2	Door passage width between 0.80-1.00 m	Y	Measured w=0.90 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=1.05 m
			Easy operability of the door	N	
			Glass doors with marking provided	N	
Corridor (2)	C2S1 C2S1a C2S1b	OG2	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	Poor visual signalization: small letters and non contrasting colors. Tactile information absent
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	
Corridor doors and accesses (1b)	D3S1a D3S1b	OG3	Door passage width between 0.80-1.00 m	Y	Measured w=1.20 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=1.05 m
			Easy operability of the door	N	Heavy doors, not automated
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D3S1c	OG3	Door passage width between 0.80-1.00 m	N	Measured w=0.60 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=1.05 m
			Easy operability of the door	N	
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D3S1d	OG3	Door passage width between 0.80-1.00 m	Y	Measured w=1.00 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Gripping elements provided vertically, reachable at all heights
			Easy operability of the door	Y	
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D3S1e	OG3	Door passage width between 0.80-1.00 m	Y	Measured w=1.15 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=1.05 m
			Easy operability of the door	N	Heavy doors, not automated
			Glass doors with marking provided	N	
Corridor (2)	C3S1 C3S1a C3S1b	OG3	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	Poor visual signalization: small letters and non contrasting colors. Tactile information absent
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	A single step is located at the end of the corridor C3S1a. A ramp is provided. Optical markings provided, handrail is provided on one side.
Corridor doors and accesses (1b)	D4S1a	OG4	Door passage width between 0.80-1.00 m	Y	Measured w=0.90 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=1.05 m
			Easy operability of the door	Y	Open
			Glass doors with marking provided	N	

Category	Nom	Level	Checklist	Y/N	Observations
Corridor doors and accesses (1b)	D4S1c	OG4	Door passage width between 0.80-1.00 m	Y	Measured w=1.15 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.00 m	N	Measured h=1.05 m
			Easy operability of the door	Y	Open during operational times (weekdays)
			Glass doors with marking provided	N	
Corridor (2)	C4S1a	OG4	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	Ramp provided
Main staircases (3a)	S1	EG, OG1, OG2, OG3	Continuos main stair/escape route stair	N	The staircase doesnt provide access to level OG4
			Width >=1.20 m	Y	Measured w=2.35 m
			Step dimensions: h<=18 cm, w>=27 cm	Y	
			Stair landings after max. 20 steps: d>=1.50 m	Y	Measured w=2.5 m
			Optical markings on first and last step	Y	
			Tactile stripes provided after last step	N	
			Handrails continuos in both sides	N	Discontinuity with the change of levels
			Handrail maximum height between 0.85-0.90 m	Y	Measured h=0.90 m
			Handrail profile: grippable, preferably round	Y	
Other stairs and steps (3b)	S1a	OG3, OG4	Width >=1.20 m	Y	
			Step dimensions: h<=18 cm, w>=27 cm	Y	Measured h=17, w=28 cm
			Stair landings after max. 20 steps: d>=1.50 m	Y	
			Optical markings on first and last step	Y	
			Tactile stripes provided after last step	N	
			Handrails continuos in both sides	Y	
			Handrail maximum height between 0.85-0.90 m	N	Measured h=1.05 m
			Handrail profile: grippable, preferably round	Y	
Other stairs and steps (3b)	S1b	OG3, OG4	Width >=1.20 m	Y	
			Step dimensions: h<=18 cm, w>=27 cm	Y	Measured h=17, w=29 cm
			Stair landings after max. 20 steps: d>=1.50 m	Y	
			Optical markings on first and last step	N	
			Tactile stripes provided after last step	N	
			Handrails continuos in both sides	N	
			Handrail maximum height between 0.85-0.90 m	N	Measured h=1.00 m
			Handrail profile: grippable, preferably round	N	
Other stairs and steps (3b)	S1c	OG3, OG4	Width >=1.20 m	Y	
			Step dimensions: h<=18 cm, w>=27 cm	Y	Measured h=17, w=29 cm
			Stair landings after max. 20 steps: d>=1.50 m	Y	
			Optical markings on first and last step	N	
			Tactile stripes provided after last step	N	
			Handrails continuos in both sides	N	
			Handrail maximum height between 0.85-0.90 m	N	Measured h=1.05 m
			Handrail profile: grippable, preferably round	N	
Other stairs and steps (3b)	T10	EG	Width >=1.20 m	Y	
			Step dimensions: h<=18 cm, w>=27 cm	Y	Measured h=14, w=37 cm
			Stair landings after max. 20 steps: d>=1.50 m	Y	
			Optical markings on first and last step	N	
			Tactile stripes provided after last step	N	
			Handrails continuos in both sides	N	
			Handrail maximum height between 0.85-0.90 m	N	Measured h=1.00-1.05 m
			Handrail profile: grippable, preferably round	Y	
Ramps (4)	R3S1	OG3	Width >=1.20 m	Y	Measured w=1.30 m
			Movement area before and after ramp Ø>=1.5 m	Y	
			Optical markings before and after ramp	N	
			Inclination (Max 10%)	Y	Measured 6%
			Handrails continuos in both sides	N	Provided only on one side
			Handrail height between h=0.85-0.90m	Y	
			Handrail profile: grippable, preferably round	Y	
			Wheel deflectors	N	
Ramps (4)	R4S1	OG4	Width >=1.20 m	Y	
			Movement area before and after ramp Ø>=1.5 m	Y	
			Optical markings before and after ramp	N	
			Inclination (Max 10%)	Y	4%
			Handrails continuos in both sides	N	
			Handrail height between h=0.85-0.90m	N	
			Handrail profile: grippable, preferably round	N	
			Wheel deflectors	N	

Elevators (5)	L1	UG, EG, OG1, OG2, OG3, OG4	Accessible without steps to all floors	Y	
			Door width >=0.90 m	Y	Measured w=0.90 m
			Cabine dimensions: w>=1.10m, d>=1.40m	N	Measured w=1.07 x d = 2.26 m
			Movement area outside elevator: Ø>=1.5 m	Y	
			Level signalisation and voice announcement	Y	
			Mirror on the backside	N/A	Glass cabine with view
			Operating elements height between 0.90-1.10 m (outside) 0.90-1.20 m (inside)	Y	Measured h=0.80-1.00 m
			Operating elements in horizontal position	Y	
			Tactile operating elements (Braille or other)	Y	

Tract AA: Stiege 2

Category	Nom	Level	Checklist	Y/N	Observations
Building entrances and exits (1a)	ES2	EG	Pathway free of steps and obstacles	N	One step provided
			Provision of ramp	N	
			Approaching area dimensions Ø>=1.5 m	Y	
			Tactile orientation information	N	
			Door passage width >=1.00 m	Y	
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	N	Measured w=1.50 m
			Easy operability of the door	N	Extremely heavy door
			Glass doors with marking provided	N/A	
Building entrances and exits (1a)	EH3a	EG	Pathway free of steps and obstacles	N	
			Provision of ramp	N	
			Approaching area dimensions Ø>=1.5 m	Y	
			Tactile orientation information	N	
			Door passage width >=1.00 m	N	Measured w=0.70 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	N	Measured h=1.15 m
			Easy operability of the door	N	
			Glass doors with marking provided	N/A	
Corridor doors and accesses (1b)	D0S2a	EG	Door passage width between 0.80-1.00 m	N	Double leaf door. Measured w=0.70 m
	D0S2b		Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	N	Measured h=1.15 m
			Easy operability of the door	Y	Open during operating time (week days)
			Glass doors with marking provided	N/A	
Corridor doors and accesses (1b)	D1S2a	OG1	Door passage width between 0.80-1.00 m	N	Double leaf door. Measured w=0.70 m
	D1S2b		Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=97 m
			Easy operability of the door	N	Open during operating time, but not wide enough. Person in wheelchair must open the other door too.
			Glass doors with marking provided	N/A	
Corridor (2)	C1S2	OG1	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	
Corridor doors and accesses (1b)	D2S2a	OG2	Door passage width between 0.80-1.00 m	N	Double leaf door. Measured w=0.70 m
	D2S2b		Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=1.00 m
			Easy operability of the door	N	Open during operating time, but not wide enough. Person in wheelchair must open the other door too.
			Glass doors with marking provided	N/A	
Corridor (2)	C2S2	OG2	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	

Category	Nom	Level	Checklist	Y/N	Observations
Corridor doors and accesses (1b)	D3S2a D3S2b	OG3	Door passage width between 0.80-1.00 m	N	Double leaf door. Measured w=0.70 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=1.00 m
			Easy operability of the door	N	Open during operating time, but not wide enough. Person in wheelchair must open the other door too.
			Glass doors with marking provided	N/A	
Corridor (2)	C3S2	OG3	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	
Corridor doors and accesses (1b)	D0S2c D1S2c D2S2c D3S2c	EG, OG1, OG2, OG3	Door passage width between 0.80-1.00 m	Y	Measured w=1.00 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=0.90 m
			Easy operability of the door	Y	Automated
			Glass doors with marking provided	N	
Main staircases (3a)	S2	UG, EG, OG1, OG2, OG3	Continuos main stair/escape route stair	Y	
			Width >=1.20 m	Y	Measured w=2.20 m
			Step dimensions: h<=18 cm, w>=27 cm	Y	Measured h=13, w=38 cm
			Stair landings after max. 20 steps: d>=1.50 m	Y	
			Optical markings on first and last step	N	Exist but are not distinguishable
			Tactile stripes provided after last step	N	
			Handrails continuos in both sides	N	
			Handrail maximum height between 0.85-0.90 m	N	Measured h=0.97-1.05 m
			Handrail profile: grippable, preferably round	Y	
Other stairs and steps (3b)	TE2	EG	Width >=1.20 m	Y	
			Step dimensions: h<=18 cm, w>=27 cm	Y	
			Stair landings after max. 20 steps: d>=1.50 m	N/A	
			Optical markings on first and last step	N	It should be provided in all of them
			Tactile stripes provided after last step	N	
			Handrails continuos in both sides	N	Not provided. Handrail should be included in different parts of the stairs, due to its width.
			Handrail maximum height between 0.85-0.90 m	N	
			Handrail profile: grippable, preferably round	N	
Other stairs and steps (3b)	T20 T21 T22 T23	EG, OG1, OG2, OG3	Width >=1.20 m	Y	Measured w=2.67 m
			Step dimensions: h<=18 cm, w>=27 cm	Y	Measured h=13, w=38 cm
			Stair landings after max. 20 steps: d>=1.50 m	Y	
			Optical markings on first and last step	N	
			Tactile stripes provided after last step	N	
			Handrails continuos in both sides	N	
			Handrail maximum height between 0.85-0.90 m	N	Measured h=0.9-1.00 m
			Handrail profile: grippable, preferably round	Y	
Elevators (5)	L2a	UG, EG, OG1, OG2, OG3, OG4	Accessible without steps to all floors	N	From the entrance in the EG there are three steps to overcome before being able to access the elevator. Also not accessible from the courtyard entrance.
			Door width >=0.90 m	Y	Measured w=0.90 m
			Cabine dimensions: w>=1.10m, d>=1.40m	Y	Measured w=140, d=160 m
			Movement area outside elevator: Ø>=1.5 m	Y	
			Level signalisation and voice announcement	N	
			Mirror on the backside	N	
			Operating elements height between 0.90-1.10 m (outside) 0.90-1.20 m (inside)	N	Measured h= 1.32-137 m
			Operating elements in horizontal position	N	Measured h=1.42 m
			Tactile operating elements (Braille or other)	N	
Elevators (5)	L2b	UG, EG, OG1, OG2, OG3, OG4	Accessible without steps to all floors	Y	
			Door width >=0.90 m	Y	Measured w=0.90 m
			Cabine dimensions: w>=1.10m, d>=1.40m	N	Measured w=1.05, d=2.20 m
			Movement area outside elevator: Ø>=1.5 m	Y	
			Level signalisation and voice announcement	Y	
			Mirror on the backside	Y	
			Operating elements height between 0.90-1.10 m (outside) 0.90-1.20 m (inside)	Y	Measured h=0.9-1.05 m (in) 1.00-1.10 m (out)
			Operating elements in horizontal position	Y	
			Tactile operating elements (Braille or other)	Y	

Tract AF: Stiege 6 and 7

Category	Nom	Level	Checklist	Y/N	Observations
Building entrances and exits (1a)	EH2	EG	Pathway free of steps and obstacles	Y	Obstacle by door threshold <3 cm
			Provision of ramp	N/A	
			Approaching area dimensions Ø>=1.5 m	Y	
			Tactile orientation information	N	
			Door passage width >=1.00 m	Y	Measured w=1.25 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	N	
			Easy operability of the door	Y	Open during operating time (week days)
			Glass doors with marking provided	N/A	
Building entrances and exits (1a)	ES6	EG	Pathway free of steps and obstacles	Y	
			Provision of ramp	N/A	
			Approaching area dimensions Ø>=1.5 m	Y	
			Tactile orientation information	N	
			Door passage width >=1.00 m	Y	Measured w=0.95 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Buttons for automatic door: inside and outside. Measured h=0.9-1.10 m
			Easy operability of the door	Y	Automated door
			Glass doors with marking provided	N	
Building entrances and exits (1a)	ES7	EG	Pathway free of steps and obstacles	Y	
			Provision of ramp	Y	
			Approaching area dimensions Ø>=1.5 m	Y	
			Tactile orientation information	N	
			Door passage width >=1.00 m	Y	Measured w=1.00 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=1.05 m
			Easy operability of the door	N	Automated door
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D1S6	OG1	Door passage width between 0.80-1.00 m	Y	Measured w=0.97 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=0.95
			Easy operability of the door	Y	Open during operating time (week days)
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D1S7	OG1	Door passage width between 0.80-1.00 m	N	Measured w=0.60 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=0.95-1.10 m
			Easy operability of the door	N	Heavy doors, not automated
			Glass doors with marking provided	N/A	
Corridor (2)	C1S67	OG1	Corridor movement area width>= 1.50 m	Y	Measured w= 2.00 m
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	Ramp at the end of the corridor
Corridor doors and accesses (1b)	D4S6	OG4	Door passage width between 0.80-1.00 m	Y	Measured w=0.97 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=0.95
			Easy operability of the door	Y	Open during operating time (week days)
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D4S7	OG4	Door passage width between 0.80-1.00 m	Y	Measured w=0.85 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=0.85-1.05 m
			Easy operability of the door	N	Heavy doors, not automated
			Glass doors with marking provided	N	
Corridor (2)	C4S67	OG4	Corridor movement area width>= 1.50 m	Y	Measured w= 1.75 m
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	

Category	Nom	Level	Checklist	Y/N	Observations
Main staircases (3a)	S6	UG, EG, OG1, OG2, OG3, OG4	Continuos main stair/escape route stair	Y	
			Width >=1.20 m	Y	Measured w=1.80 m
			Step dimensions: h<=18 cm, w>=27 cm	Y	Measured h=10 cm d=30 cm
			Stair landings after max. 20 steps: d>=1.50 m	Y	
			Optical markings on first and last step	N	
			Tactile stripes provided after last step	N	
			Handrails continuos in both sides	Y	
			Handrail maximum height between 0.85-0.90 m	Y	Measured h=0.85-0.90 m
			Handrail profile: grippable, preferably round	Y	
Main staircases (3a)	S7	UG, EG, OG1, OG2, OG3, OG4	Continuos and straight main stair, accessible to all floors	N	Curved steps in last floor
			Width >=1.20 m	Y	Measured w=1.80 m
			Step dimensions: h<=18 cm, w>=27 cm	Y	Measured h=17 cm d=30 cm
			Stair landings after max. 20 steps: d>=1.50 m	Y	
			Optical markings on first and last step	N	
			Tactile stripes provided after last step	N	
			Handrails continuos in both sides	N	
			Handrail maximum height between 0.85-0.90 m	N	Measured h=1.00-1.10
			Handrail profile: grippable, preferably round	Y	
Ramps (4)	RH2	EG	Width >=1.20 m	Y	w=1.20 m
			Movement area before and after ramp Ø>=1.5 m	Y	
			Optical markings before and after ramp	N	
			Inclination (Max 10%)	Y	h=0.25 l=4.70
			Handrails continuos in both sides	Y	
			Handrail height between h=0.85-0.90m	Y	h=0.75-1.00 m
			Handrail profile: grippable, preferably round	Y	
			Wheel deflectors	N	
Ramps (4)	R0S7	EG	Width >=1.20 m	Y	
			Movement area before and after ramp Ø>=1.5 m	N	Ø after ramp=1.3 m
			Optical markings before and after ramp	N	
			Inclination (Max 10%)	Y	Measured 7,4%
			Handrails continuos in both sides	N	
			Handrail height between h=0.85-0.90m	Y	Measured h=0.60-0.85 m
			Handrail profile: grippable, preferably round	Y	
			Wheel deflectors	N	
Ramps (4)	R1S7	OG1	Width >=1.20 m	Y	
			Movement area before and after ramp Ø>=1.5 m	Y	
			Optical markings before and after ramp	N	
			Inclination (Max 10%)	Y	Measured 9%
			Handrails continuos in both sides	N	Handrail provided only on one side
			Handrail height between h=0.85-0.90m	N	Measured h=1.10-1.15 m
			Handrail profile: grippable, preferably round	Y	
			Wheel deflectors	N	
Elevators (5)	L6	UG, EG, OG1, OG2, OG3, OG4	Accessible without steps to all floors	Y	
			Door width >=0.90 m	N	Measured w=0.80
			Cabine dimensions: w>=1.10m, d>=1.40m	N	Measured w=1.09 m d=1.40 m
			Movement area outside elevator: Ø>=1.5 m	Y	
			Level signalisation and voice announcement	N	
			Mirror on the backside	N	
			Operating elements height between 0.90-1.10 m (outside) 0.90-1.20 m (inside)	N	Measured 1.15-1.40 m (in) 1.35-138 m (out)
			Operating elements in horizontal position	N	
			Tactile operating elements (Braille or other)	N	Tactile relieve, non sufficient
Elevators (5)	L7	UG, EG, OG1, OG2, OG3, OG4	Accessible without steps to all floors	Y	
			Door width >=0.90 m	N	Measured w=0.80
			Cabine dimensions: w>=1.10m, d>=1.40m	N	Measured w=1.07 m d=1.55 m
			Movement area outside elevator: Ø>=1.5 m	Y	
			Level signalisation and voice announcement	N	
			Mirror on the backside	N/A	
			Operating elements height between 0.90-1.10 m (outside) 0.90-1.20 m (inside)	N	Measured 1.30-155 m (in) 1.15-1.20 m (out)
			Operating elements in horizontal position	N	
			Tactile operating elements (Braille or other)	N	Tactile relieve, non sufficient

Tract AE: Stiege 8

Category	Nom	Level	Checklist	Y/N	Observations
Building entrances and exits (1a)	EH4	UG	Pathway free of steps and obstacles	N	
			Provision of ramp	N	
			Approaching area dimensions Ø>=1.5 m	Y	
			Tactile orientation information	N	
			Door passage width >=1.00 m	Y	
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	N	Inclination present inmediatly after door. No safe passage way is provided
			Door operating elements height between 0.80 - 1.10 m	N	
			Easy operability of the door	Y	
			Glass doors with marking provided	N/A	
Building entrances and exits (1a)	EH3b	EG	Pathway free of steps and obstacles	Y	
			Provision of ramp	N/A	
			Approaching area dimensions Ø>=1.5 m	Y	
			Tactile orientation information	N	
			Door passage width >=1.00 m	Y	
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	
			Easy operability of the door	Y	Automated doors
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D0S8a D1S8a D2S8a D3S8a	EG, OG1, OG2, OG3, UG	Door passage width between 0.80-1.00 m	Y	Measured w=1.00 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=0.90 m
			Easy operability of the door	Y	Automated
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D0S8b	EG	Door passage width between 0.80-1.00 m	Y	Measured w=0.80 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=1.05 m
			Easy operability of the door	Y	
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D0S8c	EG	Door passage width between 0.80-1.00 m	Y	Measured w=0.90 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	Y	Measured h=1.05 m
			Easy operability of the door	N	Heavy door not automated
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D1S8b D2S8b D3S8b	OG1, OG2, OG3	Door passage width between 0.80-1.00 m	Y	Measured w=0.80 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	N	Measured h=1.05 m
			Easy operability of the door	N	
			Glass doors with marking provided	N	
Corridor doors and accesses (1b)	D1S8c	OG1	Door passage width between 0.80-1.00 m	N	Measured w=0.75 m
			Door passage height >=2.00 m	Y	
			Movement area: w>=1.20 m-2.00m, d>=1.50 m	Y	
			Door operating elements height between 0.80 - 1.10 m	N	Measured h=1.22 m
			Easy operability of the door	N	Heavy door not automated
			Glass doors with marking provided	N/A	
Corridor (2)	C0S8	EG	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	Poor signalisation, non contrasting colors
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	
Corridor (2)	C0S8a	EG	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	N	At the end of corridor steps provided to access tract AH
Corridor (2)	C0S8b	EG	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	Poor signalisation, non contrasting colors
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	Two consecutive ramps provided

Category	Nom	Level	Checklist	Y/N	Observations
Corridor (2)	C1S8	OG1	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	Poor signalisation, non contrasting colors
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	
Corridor (2)	C2S8	OG2	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	Poor signalisation, non contrasting colors
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	
Corridor (2)	C3S8	OG3	Corridor movement area width>= 1.50 m	Y	
			Clearance of corridor passage: w>=1.20 m,h>=2.10 m	Y	
			Orientation information and signalization (Tactile and visual)	N	Poor signalisation, non contrasting colors
			Distance to corners >=50 cm	Y	
			Corridor pathway free of steps and obstacles	Y	
Other stairs and steps (3b)	T80a	EG	Width >=1.20 m	Y	
			Step dimensions: h<=18 cm, w>=27 cm	Y	Measured h=17 w=28 cm
			Stair landings after max. 20 steps: d>=1.50 m	N/A	
			Optical markings on first and last step	N	All of them should be marked
			Tactile stripes provided after last step	N	
			Handrails continuos in both sides	N	
			Handrail maximum height between 0.85-0.90 m	N	
			Handrail profile: grippable, preferably round	N	
Other stairs and steps (3b)	T80b	EG	Width >=1.20 m	Y	
			Step dimensions: h<=18 cm, w>=27 cm	Y	Measured h=17 w=30 cm
			Stair landings after max. 20 steps: d>=1.50 m	N/A	
			Optical markings on first and last step	N	
			Tactile stripes provided after last step	N	
			Handrails continuos in both sides	N	Only on one side
			Handrail maximum height between 0.85-0.90 m	N	Measured h=1.10 m
			Handrail profile: grippable, preferably round	Y	
Ramps (4)	R0S8a	EG	Width >=1.20 m	Y	
			Movement area before and after ramp Ø>=1.5 m	Y	
			Optical markings before and after ramp	N	
			Inclination (Max 10%)	N	12.20%
			Handrails continuos in both sides	N	Only on one side
			Handrail height between h=0.85-0.90m	Y	
			Handrail profile: grippable, preferably round	Y	
			Wheel deflectors	N	
Ramps (4)	R0S8b	EG	Width >=1.20 m	Y	
			Movement area before and after ramp Ø>=1.5 m	Y	
			Optical markings before and after ramp	N	
			Inclination (Max 10%)	N	13.30%
			Handrails continuos in both sides	Y	
			Handrail height between h=0.85-0.90m	Y	
			Handrail profile: grippable, preferably round	Y	
			Wheel deflectors	N	