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Spatial Manifestation of Planning Culture in Graz: Understanding Planning Processes and their Influence on Public Space Design

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1 ABSTRACT

The design of public space plays a central role in the fight against the climate crisis. The growing number of public space transformation projects in European cities reflects their potential to increase urban quality of life, drive forward the mobility transition and make the built environment climate-fit. These three aspects are interconnected through the notion of design quality. Considering the climate crisis, incorporating climate adaptation measures is no longer optional in good public space design. At the same time, such measures can enhance the user experience and improve the quality of stay. – two characteristics encouraging active forms of mobility.

However, public space transformation projects often undergo intensive, complex and long-lasting planning phases, that frequently involve substantial design changes. To prevent these changes from diminishing design quality, it is necessary to understand them precisely – particularly how and why they occur.

In this study, we further develop existing research on decision-making processes within the city administration of Graz by examining the design implications of these decisions. We approach an in-depth understanding of design changes during the planning phase by investigating the development of eight public space transformation projects in Graz – from competition to implementation. This investigation is based on students work from the elective course "Spaces of Mobility" in the Architecture program at Graz University of Technology. In this course, students analyzed planning documents (in particular competition entries) and the implementation of the corresponding projects.

By comparing the results of these analyses, we identified patterns in the changes to the designs that reveal key design-relevant elements of the local planning culture, such as priority setting and action routines in the planning process. Consequently, we were able to identify measures to prevent loss of design quality during the planning phase. Applying these measures can contribute to developing a planning culture that enables climate-resilient and adaptive design of public spaces, promoting the mobility transition.

Keywords: public space, design, urbanism, transformation, planning culture

2 INTRODUCTION

As the central field where climate-related challenges and urban transformation intersect, the design of public space holds huge potential in addressing the climate crisis.

Firstly, climate adaptation and mitigation can be integrated into public-space design in many ways. Combining technical solutions with thoughtful design enables reducing heat island effects through additional greening (Oláh 2012), decreasing risks from heavy rainfall events through permeable surfaces (Kron et al. 2019), and facilitating efficient rainwater utilization through sponge city elements (Arbeitskreis Schwammstadt 2024) – to name only a few. At the same time, all these measures are capable of improving microclimate and providing attractive meeting places. In this way, they can help to reduce the shortage of consumption-free recreational areas – a problem not exclusive to Austria (IBA Vienna 2022; Grün Stadt Zürich 2019). Yet there is an (international) tendency to cut back on green infrastructures when public spaces are redesigned (Mel 2017, Hansen and Pauleit 2014), and landscape architecture expertise is underrepresented in Austrian competition and planning procedures (IBA Vienna 2022).

Secondly, public space design strongly influences behaviors linked to environmental harm. It shapes the use of public spaces and thus has a direct impact on mobility behavior (Papagiannakis and Vitopoulou 2015; Banister 2007). Monofunctional road spaces designed solely for motorized private transport permit only this one – particularly environmentally harmful – form of mobility. Furthermore, they generate additional mobility flows, as everyday activities such as social contact, local recreation, leisure activities or sports

require a change of location to facilities built specifically for this purpose. By contrast, public spaces with high quality of stay offer a place for all these functions, thus reducing the number and length of daily journeys and promoting the use of active – and climate-friendly – forms of mobility such as cycling and walking. Once people are accustomed to using them, they are also more likely to maintain this habit in less inviting spaces (Blitz and Lanzendorf 2020). These spaces thus contribute to achieving the Austrian and European goal of a mobility transition (City of Vienna 2019; BMK 2021; European Commission 2020).

Thirdly, the design of public spaces influences consumer behavior. Public spaces with a high quality of stay contribute to a healthy local economy as they increase visitor frequency and length of stay (ZAM et al. 2025) and thus the use of local consumer services. In doing so, they strengthen local production, small-scale businesses and short supply chains (Bendiks and Degros 2019).

Given this multitude of advantages, it is hardly surprising that the number of public space transformation projects is increasing. However, many innovative (re)design concepts fail to be realized or lose much of their ambition during the planning process. As a result, the goal of changing the use of public spaces is not achieved to its full potential. At the same time, understanding what led to that particular outcome is difficult due to the complexity and length of these planning processes (Wolfram et al. 2019). It remains unclear where, why and how quality is lost in the process. This knowledge is nevertheless crucial to develop countermeasures.

A first step towards identifying the moments of and reasons for the quality loss in planning processes of public space transformation was taken by a previous study investigating the transformation of Kaiserfeldgasse in Graz (Bauer 2025). Building on research on planning culture in German-speaking countries (Helmholz 2023; Klammer 2022; Sondermann 2016), the study examined changes in actor constellations and the distribution of decision-making powers in the planning process, as well as the resulting changes in the design. The results showed that, in the process, a reduction in public space design quality occurred, and that barriers and obstacles in the planning process arose equally from technical, legal, and administrative side. In addition, the study revealed elements of planning culture (namely action routines and thought patterns – cf. ARL 2018) of the city administration that led to the identified quality-reducing design changes.

The present study builds on and further investigates the insights generated by this existing analysis. It examines the nature of design changes that occur in a larger set of public space (re)design projects in Graz, and thus deepens the understanding of planning processes and how planning culture influences public space design. It focuses on finding patterns in design changes, which enable the development of measures to prevent loss of design quality.

3 METHODOLOGY

The study results described below are based on a statistical and content analysis of data generated during a course at the Institute of Urbanism at Graz University of Technology in the winter semester of 2025/26, under the direction of Sabine Bauer. Together with 15 students from the Architecture program, we examined a total of eight public space transformation projects in Graz.

3.1 Project selection

All eight projects are located in the city of Graz. They were designed between 2011 and 2023 and implemented between 2012 and 2024.

The project selection was based on the following criteria: timeliness, relevance and visibility (e.g., recognizable by media presence), relation to mobility and availability of planning material. To depict the spatial effects of the negotiation process regarding the details and implementation of a (from designer's perspective) finalized design, we aimed to use material from an early yet well-developed design stage.

Half of the projects were conducted through public planning competitions.[1] For this group of projects, the competition-winning plans formed the dataset for the analysis. Only when the available competition material

[1] Annenstraße (Competition: Neugestaltung Annenstraße, 2011, Winner: Mettler Landschaftsarchitektur), Margarete Hoffer Platz (Wohnbebauung Graz Wiener Straße, Bebauung inkl. Platzgestaltung, 2015, Schwarz.Platzer.Architekten.ZT GmbH), Nikolaus-Harnoncourt-Platz (Smart City Graz Mitte – Baufeld Nord, 2018,

lacked detail, did we use planning documents from later planning stages. The other half of the projects were carried out without a competition process and were assigned directly.[2] The extent to which the project implementations differed from the competition results or planning documents varied by case, regardless of whether a competition had taken place or not.

3.2 Spatial Analysis

The analyses comprised several parts. First, the planning materials were examined using structured content analysis. Then, the built spaces were mapped and compared with the planning documents. The comparison enabled us to identify and visually represent the differences between planning and implementation. All visual representations followed strict graphical guidelines to facilitate comparison. The resulting plans show all elements of the public space design grouped into the three categories Green and Blue Infrastructure (represented in green), Mobility Infrastructure (blue), and Quality of Stay and Aesthetics (orange; including seating and leisure furniture, lighting, flooring, litter bins, etc.). The focus of each plan is to show the changes between the design in the analyzed planning document and the built (implemented) design.

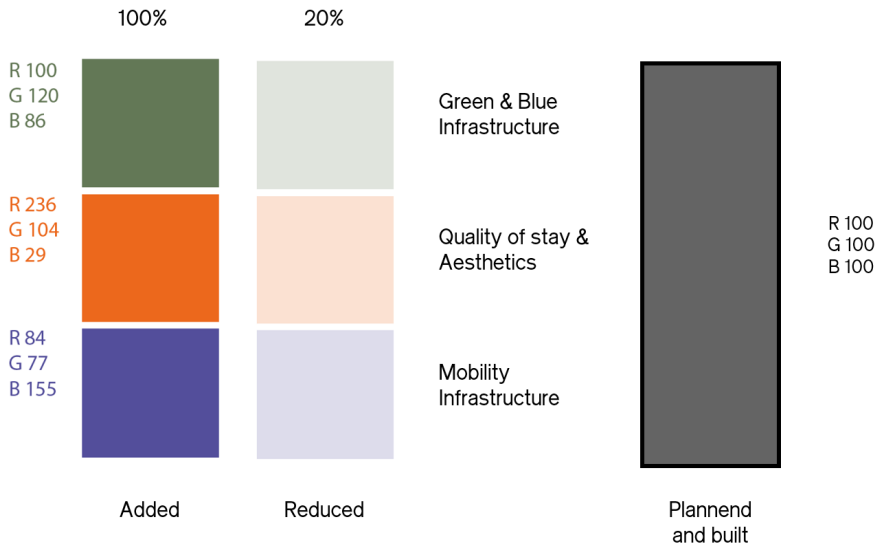

Fig. 1: Graphical guideline for the spatial analysis

To highlight these differences, a second graphical code was used in addition to the color scheme (green, blue, orange): elements added to the design stage captured on the analyzed planning documents were shown in dark colors (dark green indicates added green and blue infrastructure, dark blue added mobility infrastructure and dark orange added elements that increase quality of stay and/or aesthetics). Elements that were planned but not implemented were shown in light, transparent colors (light green, light blue and light orange). Elements that were included in the planning document and were also implemented were shown in dark gray (see Figs. 1 and 2).

3.3 Public Space Quality Assessment

The students then conducted a design evaluation of the versions shown in the analyzed planning materials and of the implemented projects using a catalog of public space quality criteria. This catalog is based on the Public Space Quality Index developed at the Singapore-ETH Center[3] in 2020 (He et al. 2020; Herthogs 2025) and consists of the following 16 criteria: Aesthetics, Orientation, Human scale (and reference),

Nussmüller Architekten ZT GmbH) and Bertha von Suttner Platz (Graz City Gate, 2014, Scherr + Fürnschuss Architekten & Groszstadt Architekten with DI Waltraud Körndl)

[2] Lendplatz (plan author: verkehrplus, 2020), Obere Neutorgasse (Artgineering, 2023; integral, 2024), Leonhard Superblock (ZWOPK Landschaftsarchitektur Rode Schier Wagner OG, 2023/2024) and Zinzendorfgasse (bauchplan, 2023; bauchplan & verkehrplus 2022)

[3] Work done by P. He and P. Herthogs, (Future Cities Laboratory, Singapore ETH Centre, ETH Zürich, Singapore), M. Cinelli (Future Resilient Systems, Singapore ETH Centre, ETH Zürich, Singapore), L. Tomarchio and B. Tunçer at Future (Singapore University of Technology and design, Singapore), described in (He et al. 2020) and shared in personal correspondence with Pieter Herthogs in 2025 (Herthogs 2025)

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Light/lighting, Smell, Sound, Space for active use, Space for passive use, Space for social interaction, Flexibility (flexible use), Inclusivity, Pollution, (Traffic) Safety, Security, Thermal comfort and Ecology/metabolism (see Table 1). The assessment was carried out using an anonymous online questionnaire with a school grading scale of 1 to 5 (1 = very good, 2 = good, 3 = satisfactory, 4 = sufficient, 5 = insufficient). The results thus reflect the participating students' perceptions of how the projects' quality developed during the planning processes across all 16 criteria.

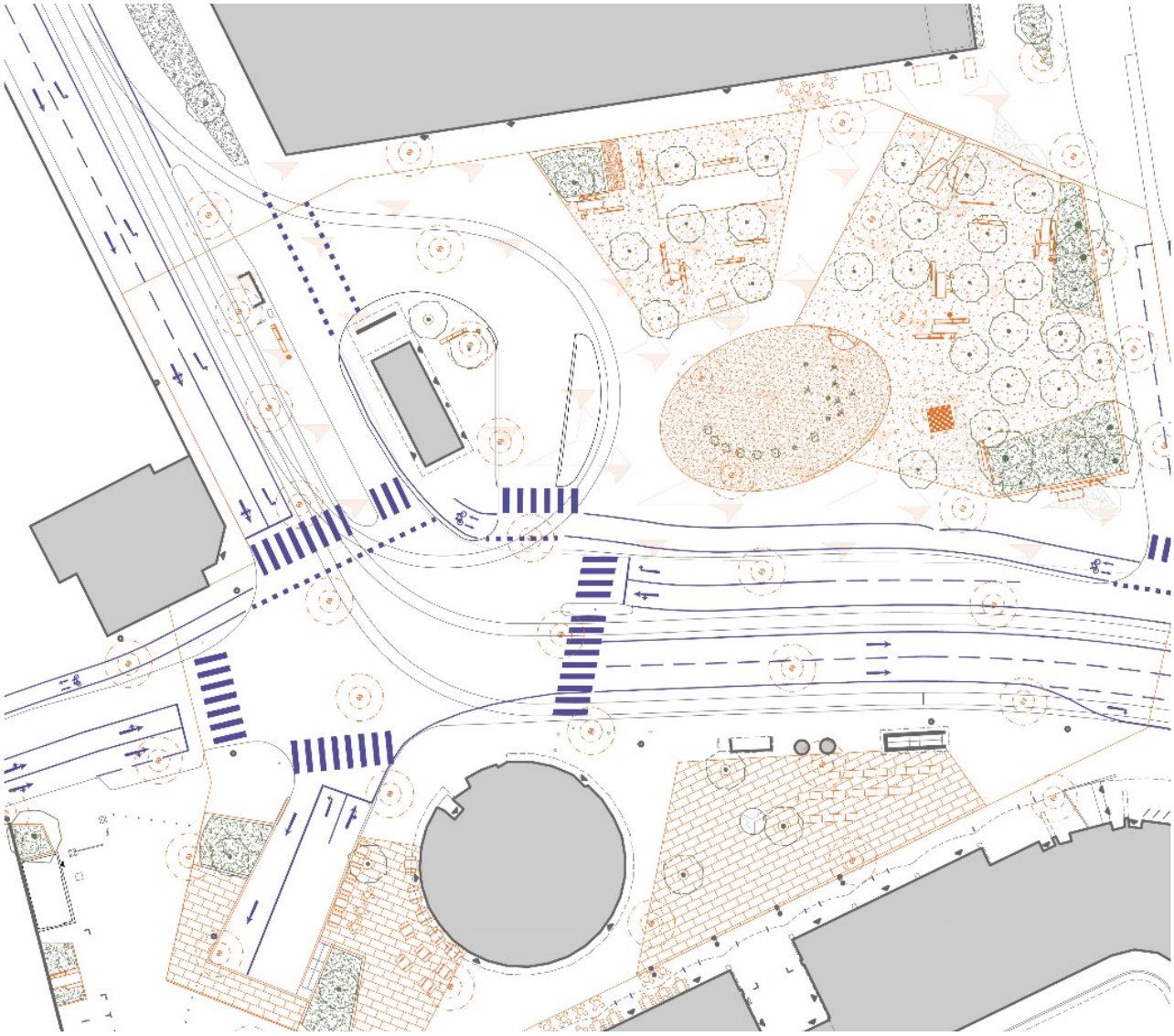

Fig. 2: Graphic example: Spatial analysis plan for Bertha von Suttner Square; The dark blue color of the ground markings indicate that they were added to the design in the process. The same applies to the surfaces structure, furniture, and overhead lights in dark orange and the green areas in dark green. The triangular pattern on the pavement of the square has not been implemented and is therefore shown in very light orange. Plan authors: Matija Pekic, Daniel Unterrainer

3.4 Identification and categorization of main changes

In the final step, main changes in the design of each project were distilled, listed, and categorized. The data provided an overview of all main changes in the analyzed projects during the planning phase grouped into the categories Greenery, Surface material, Mobility, Parking, Furniture, Form, and Accessibility (see Fig. 4). Cross-referencing these categories with the public space quality criteria (see Fig. 5) generated additional insights into the consequences of the identified changes. The resulting data allowed comparisons between individual projects and enabled us to draw conclusions about the full sample of public space transformation projects in Graz. On this basis, we were able to identify patterns in design changes. These patterns revealed four central issues, each indicative of key design-relevant elements of the local planning culture, such as priority setting and action routines in the planning process (see Fig. 5).

	Public space qualities criteria	Description
1.	Aesthetic	• low effort maintenance • location specific design, fitting overall project appearance, materials, furniture and vegetation form a whole • simple design, spatial clarity, haptics
2.	Orientation	• signs and marking for different users and modes of transport • remarkable points of reference that help wayfinding and meeting
3.	Human scale (and reference)	• Proportions of the dimensions of the space, sense of enclosure • walkability and human centered street design • presence of heritage
4.	Light(ing)	• Balance between level of light and light design, light distribution • Appropriateness of the lighting for the function of the respective space and its function and users • Natural light: pleasant consideration of orientation and seasonal sun path • Artificial light: pleasant consideration of light color and temperature
5.	Smell	• Presence and balance of sources of pleasant smells (such as greenery, water features, natural materials) • Reduced unpleasant smells (e.g. organization and distribution of smelling and smell sensitive functions, vegetation as natural barriers, placement and design of garbage areas / pins, natural ventilation and air flow)
6.	Sound	• Distance to traffic • fountains that smother noises / conversations
7.	Space for active use	• Supports active engagement of people and invites to physical activities (areas and equipment for sports / play / exercise, interactive water features, interactive green features such as climbing trees, sand, gras, furniture for multifunctional use)
8.	Space for passive use	• Comfortable seating (not only benches, implies surfaces that are raised from the ground) • Opportunities for „people watching"/interesting views • Presence of trees, green, water • Shelter from the elements
9.	Space for social interaction	• Grouping of seating • Shelter from the elements • Opportunities for cummunal / group activities / play / eating or drinking together • Opportunities for exchange of goods / market
10.	Flexibility (flexible use)	• Space for different activities, not strictly predefined • users can improvise and uses or rearrange urban furniture
11.	Inclusivity	• opportunities for play and learning, places to rest and for social interaction, spaces without compulsion to consume, walkability • accessability; Tripping hazards, walkability of surfaces, with of walkways, quality and safety of paths and crossings
12.	Pollution	• Protection from (traffic) pollution – air quality, smells and noise
13.	(Traffic) Safety	• Prevention of accidents occuring • Enough space for different users of the space, no barriers or tripping hazards on cycling paths or walkways • Where different modes of transport meet: enough, safe crossings and clear orientation and guidance especially for fast modes of transport • Puffer between different modes next to each other (e.g. cycling path next to a parking strip)
14.	Security	• Knowledge or evidence of past crime, Knowledge or evidence of measures to protect security • Presence of fear spaces (dark, empty, poorly maintained, overly eclosed spaces)
15.	Thermal comfort	• Temperature, humidity, exposure of the space • Presence and balance of shading, greenery, water elements, infiltration surfaces, materials and colors
16.	Ecology / metabolism	• infiltration surfaces and systems, rain water management • Biodiversity – diverse plants and possible habitats for different kinds of animals • Use of low-ecological-footprint materials, Materials and systems that enable the circular economy

Table 1: Criteria used for the public space quality assessment.

4 FINDINGS

The results described below were distilled from all analyses described above and represent the main findings of the study.

4.1 Public Space Quality Assessment

Looking at the Public Space Quality Assessment for all eight projects analyzed, we found that some aspects were more likely to improve during the planning process, while others were more likely to worsen (see Fig. 3). The most frequent decline in quality between the analyzed planning material and implementation was observed in the aspects of Sound, Pollution, Spaces for passive use, Inclusivity and Aesthetics. In contrast, positive developments were more frequently diagnosed for the aspects of Spaces for active use, Flexibility, Traffic safety, Security, Light/Lighting and Ecology/Metabolism.

Fig. 3: Results of Public Space Quality Assessment.

As the two aspects Sound and Pollution are related to traffic volume and type, their poor rating suggests that the conditions for motorized traffic were frequently enhanced in the planning process. The decline in the quality for the aspects of Spaces for passive use and Inclusivity can be interpreted as a trend towards reducing non-consumer-oriented collective areas. The decline in Aesthetics scores is probably due to the reduced use of high-quality materials for furniture and flooring. Three out of the four projects that received negative Aesthetics ratings were found to have undergone main design changes related to material choices.

These noticeable trends can be classified as indicators regarding priority setting and action routines in the planning and implementation process. Also, the improvement of the three aspects of Traffic safety, Security and Light/Lighting likely reflect a prioritization of safety aspects in the planning and implementation process.

The positive assessment of the development of Ecology/Metabolism is surprising, as it contradicts the findings of the spatial analysis of main design changes within the same projects (see 4.2.1). This discrepancy may be attributed to the fact that this component of the study relies on subjective evaluations by individuals (the students participating in the course), which may be influenced by personal bias (see 5.1.2). It is also possible that the assessment of this aspect has been influenced by the fact that (looking at the built space) the

implementation of all projects resulted in an increase of green infrastructure compared to the situation before the redesign – even if the amount of implemented green infrastructure was less then originally planned. Disproportionately positive perception of (in fact minor) improvements to green infrastructure would also be in line with public-perception studies that indicate broad support for urban greenery at street level, even if the greenery is limited to small interventions (eg., Wolf 2005).

4.2 Main Design Changes

In total 37 design changes were identified across all projects, which were then categorized and examined in detail. The following findings were distilled:

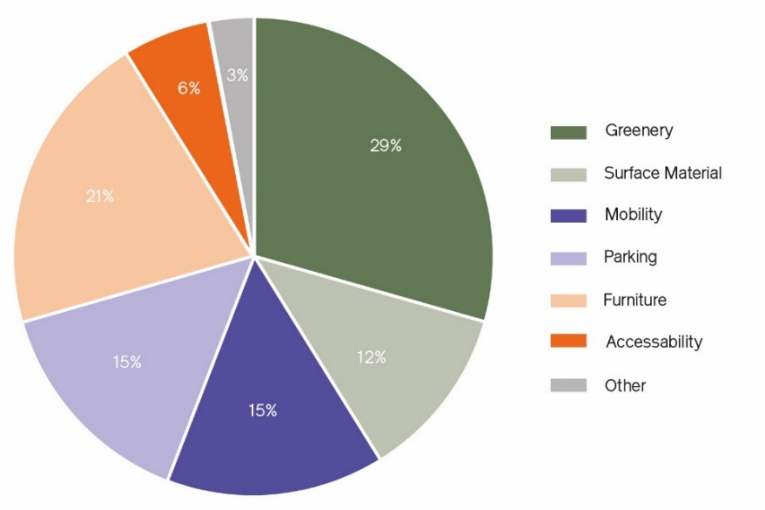

Fig. 4: Categorization of identified main changes.

4.2.1 Green infrastructures

It is significant that each project examined showed at least one main change relating to green infrastructures. Nearly one third of all identified design changes relates to the category of Greenery. The majority (almost three quarters) of these changes entailed reductions in green infrastructures such as trees, green/unsealed surfaces and biodiverse vegetation. One out of five changes in the planning process of the projects examined represent reductions in green infrastructures. The most frequently mentioned change was “fewer (grounded) trees”. A smaller share (8%) of all main changes increased green areas („more/bigger green areas“).

4.2.2 Mobility

15% of all identified changes related to Mobility concern mobility circulation (including prioritization of modes, routing, and route guidance). Half of these resulted in prioritization of motorized individual transport. All projects with circulation changes showed lower scores in Inclusivity suggesting that ambitions to invert the mobility pyramid were reduced during the planning process, with implications for perceived inclusivity.

One out of three projects examined showed circulation changes, indicating that this aspect is frequently adjusted during the planning process. Given that most public space redesign projects in Graz are led by the transport planning department (Bauer 2025), a focus on mobility during the planning phase and implementation is to be expected. At the same time, the evidence suggests that traffic planning – like open space planning – is often involved relatively late and not consistently integrated into conceptual design from the outset. This appears particularly common in competition based projects, as three quarters of the projects with circulation changes belong to this group.

4.2.3 Parking

As with mobility, results related to Parking show that a substantial share of design changes have reassigned space to motorized private transport. Although most changes in this section added bicycle parking spaces, more than one third increased the number of car parking spaces.

4.2.4 Surface material

Surface material changes accounted for 12% of all identified design modifications. In most cases, specified materials were replaced by less expensive alternatives (e.g., asphalt). In two out of three of such projects, the quality assessment indicated a reduction in Aesthetics, while one project showed no change. None of the identified modifications replaced a surface with a higher quality alternative. Overall, these findings indicate that surface related changes were predominantly used as a cost saving instrument and were generally associated with an aesthetic downgrade.

4.2.5 Furniture

Approximately 21% of all design changes concerned Furniture. Nearly half of these changes reduced seating elements. Smaller shares added seating elements, altered their design or reduced waste facilities. All projects with reduced seating recorded lower scores in Spaces for passive use and Spaces for social interaction, indicating a reduction in the quality of stay.

4.2.6 Accessibility

Less frequently mentioned changes concerned Accessibility. These changes were evenly split between decreases and increases in accessibility.

5 LIMITATIONS AND FURTHER RESEARCH

To contextualize the findings of this study and their transferability, we discuss its limitations and outline areas for future research.

5.1 Heterogeneity of the analyzed material

The empirical analysis drew on eight projects from Graz. While the sample size is adequate for an exploratory study within the 2010–2025 timeframe (see Section 3.1), the underlying planning materials varied across cases (e.g., competition entries vs. design development plans) and in their level of detail. These differences may reduce comparability between cases and introduced variation in the assessment of design quality, which may qualify the breadth of inference.

Future research could minimize heterogeneity by relying on planning documents from a single planning phase to ensure a consistent level of detail. For instance, a sample composed exclusively of open space competition submissions would reduce variability. Given that such competitions in Graz are relatively rare, broadening the geographic scope to include small and medium-sized towns across Austria (and potentially beyond) would support stronger comparative analysis.

5.2 Size and composition of the assessment panel

The quality assessment was conducted by a relatively small group of 15 architecture students (bachelor's and master's levels) at TU Graz (see Section 3). Although the participants were trained in architecture and spatial design, the modest sample size may limit the robustness of the results; individual rater bias cannot be ruled out, and the academic profile of the panel may not fully reflect professional practice perspectives. We partially addressed this by using a standardized instrument.

Increasing both the number and diversity of assessors – and including practitioners with expertise in public space design (e.g., urban designers and landscape architects) – would allow testing and verification of the findings. Complementary approaches such as qualitative expert interviews or moderated workshops could further triangulate the results.

5.3 Spatial limitation and generalizability

The study focuses exclusively on cases from Graz, which suggests limits of the transferability of the findings to other urban contexts. Replicating the study in other medium-sized Austrian or European cities would build a comparative dataset to assess how local planning cultures and regulatory frameworks influence public space design outcomes.

Additional insights on national and international transferability could be obtained through qualitative expert interviews or moderated workshops that compare interpretations across contexts.

6 DISCUSSION

The analysis of design changes revealed the following central issues and related indicators of priority setting and action routines in the planning process of public space transformation projects in Graz. In general, all the projects examined improved the quality of the space relative to the situation before the redesign. However, the data also shows that most projects lost ambitious improvements that were originally planned during the planning process. The data clearly shows which categories are at particular risk of losing quality during the planning process and enables the following central issues to be identified that form the basis for developing countermeasures.

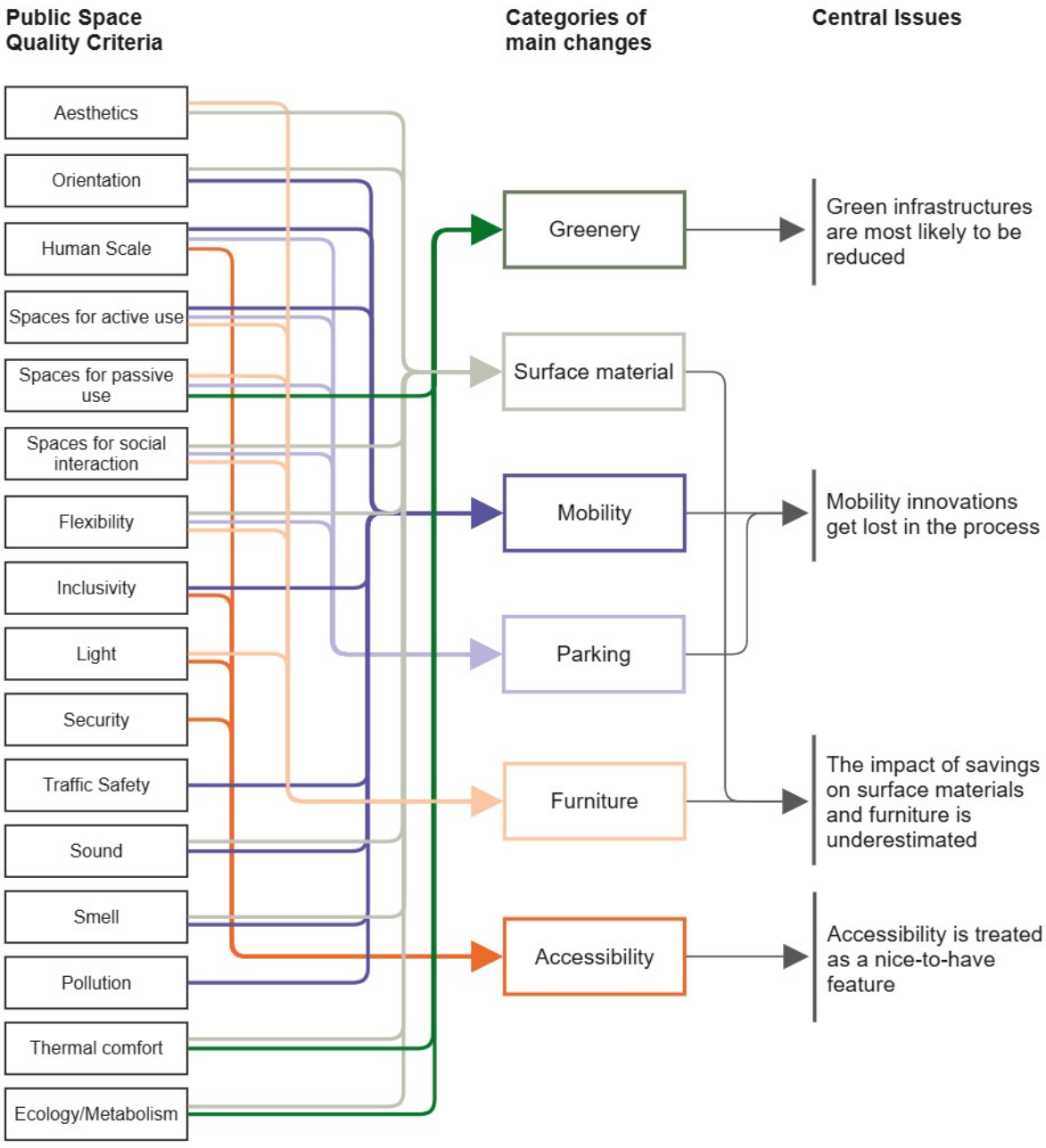

Fig. 5: Cross-referencing: Public Space Quality Criteria, Categories of changes and Central Issues.

6.1 Green infrastructures are most likely to be reduced

The large share of design changes affecting green infrastructure suggests either a lack of planning in the early design stage (as when the examined planning documents were drawn, many aspects of the green infrastructures had not yet been decided or specified) or that green infrastructures are particularly often subject to cutbacks during the planning process.

Both possibilities can be seen as indicators of priority setting in the planning process that disadvantages green infrastructures and thus conflicts with climate protection goals. This is consistent with international studies, that identify the same trend towards the reduction of green infrastructure in international transformation processes and highlight the risk of a resulting loss of quality. (Mel 2017, Hansen und Pauleit 2014).

Another possible reason for this is a lack of awareness of the need to plan open spaces and particularly green infrastructures. This is reflected in the fact that competitions were held for only half of the projects considered for this study. In three out of four of these, buildings and open spaces were included in the competition. However, in none of these cases public space was designed to the same level of detail as the architecture. In one case, there was hardly any identifiable design for it. In only one of the analyzed projects the competition focused on the public space, reflecting the underrepresentation of landscape architecture expertise in Austrian competition and planning procedures, and the late or lack of involvement, even in tasks relevant to open space throughout Austria (IBA Vienna 2022).

6.1.1 Recommendation

A greater focus on open space competitions and greater involvement of landscape architects in the process would be desirable to address the above mentioned imbalance. However, greater involvement must be backed up by an appropriate budget for planning and implementation of green infrastructures. These adjustments to the planning process align with the recognition of the importance of squares and streets as places for living, rather than “just” spaces of mobility (Bauer 2025; Bendiks and Degros 2019).

6.2 Mobility innovations get lost in the process

In the context of the general commitment to the mobility transition (City of Vienna 2019; BMK 2021; European Commission 2020), design changes towards more motorized individual traffic are no longer justifiable. Every opportunity to reduce climate-damaging forms of mobility and promote active ones must be used. Nevertheless, the data shows that a considerable proportion of projects undergo such changes that are often justified by technical and legal norms. However, the case of Kaiserfeldgasse shows that those responsible within administrative processes have the power to break long-established action routines within the applicable guidelines (Bauer 2025).

6.2.1 Recommendation

In „Try it out... Transformation! Learning from experiments and temporary interventions” (Degros et al. 2025), Barbara Russo and Eva Schwab emphasize the potential of temporary trials, pop-ups, and in-depth participation to empower administrative staff to change outdated planning routines. Following this idea, we recommend to introduce an administrative procedure that enables the simple and fast temporary testing of innovative mobility solutions (with structured stakeholder involvement) in order to enable their long-term implementation.

6.3 The importance of surface materials, furniture and accessibility is underestimated

We also found that seemingly minor changes and savings, such as the number of seating elements or surface materials used, can be decisive for the quality of the design, particularly with regard to the quality of stay. The results of the quality assessment for the criteria Spaces for passive use and Spaces for social interaction for projects with reduced material quality and/or furniture highlight their influence on this issue, which is closely related to the lack of high-quality, consumption-free areas in Austria and beyond (IBA Vienna 2022; Grün Stadt Zürich 2019). The data also shows that the issue of accessibility is not currently receiving sufficient priority or attention to create livable spaces for all. To make public spaces attractive and usable for as many people as possible, accessibility and quality of stay must be prioritized.

6.3.1 Recommendation

To achieve this, it is recommended that experts in design, inclusivity, and participation are involved throughout the entire planning process. In the long term, establishing an independent supervisory body to evaluate the designs with regard to specific issues such as accessibility, quality of stay and climate resilience would be a way to ensure quality.

The „Stadt Grün" Department of the City of Zürich can be used as a role model for such a quality assurance institution. Within the city of Zürich "Stadt Grün" reviews public space designs and must be consulted on all transformation projects. Before a design for a public space in Zurich is implemented, it must be approved by "Stadt Grün" to ensure that it aligns with the "Zürich Grüner" vision (Stadt Zürich 2026).

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