Landscape Architecture

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Exposure-Sensitive Contextual Fragility of Urban Park Quality in Tenerife

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Abstract

The evaluation of park conditions provides a mean condition score in urban park-quality assessment, while the city authorities need to address a more practical question: which parks demonstrate contextual vulnerability along with low domain floors, poor balance between domains, and sufficient park-user exposure? This study elaborates a method called Exposure-Sensitive Contextual Fragility Profiling (ECFP), a straightforward approach to interpret compact park-audit results that prevents the dominance of spatial aspects in concealing safety support, cleanliness, physical order, sensory richness, proper illumination, and acoustic conditions problems. Data for analysis comprise twelve urban parks in Tenerife (Canary Islands, Spain), observed based on eleven subcategories of the Public Space Characteristics Observation Questionnaire along with user-count statistics obtained from 155 frequent park users. The calculation procedure uses four components: contextual vulnerability, the deficit in the weakest domain floor, spatial, functional, and contextual balance, and the percentage of contextual subcategories scoring below the half-point on the 0–10 audit scale. Logarithmic exposure adjustment uses user counts without permitting the domination of high-sample parks in assessing environmental conditions. Order produced by ECFP assigned Polideportivo El Casco and Parque El Quijote to the top two places followed by Parque Primero de Mayo, Parque Punta Larga, and Parque de Guadamojete. In terms of park fragility, Parque Primero de Mayo outranks all other parks since it ranks well above average due to low levels of lighting, safety support, acoustics, sensory stimuli alongside excellent physical order. The sensitivity tests revealed high Spearman rank correlations in the range of 0.923 to 1.000 depending on the omission of each component and critical value adjustments. The research findings suggest that urban park repairs should start with ensuring the contextual aspects underlying accessibility, visual appeal, legibility, and usability of a park.

Keywords: urban parks; public open space; contextual fragility; park audit; exposure-sensitive prioritisation; restorative environments; Tenerife

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1. Introduction

Urban parks are ordinary urban civic settings where vegetation, accessibility, encounters, play, walking, rest, and restoration coexist in one piece of urban land use. The public value of parks does not depend solely on their vegetative coverage. A park can be accessible, spacious, and aesthetically pleasing yet undesirable for use due to poor lighting, appearance, sensory presence, cleanliness, or acoustic context. The significance of these factors lies in the experiential character of public space. People will choose to walk through, linger in, or bring children to a space depending on its orderliness, safety support, amenity, atmosphere, and restorativeness.

The planning problem discussed below is how to use a small audit table to select parks that require repair despite scoring acceptably high in several domains. It is a relevant problem since mean park score can serve as a poor decision-making tool. Average scores assume that gains and losses can be exchanged: better views can compensate for poor lighting, more positive areas can compensate for poor cleanliness, good physical order can compensate for the lack of sensory elements, and so forth. Such statistical averaging does not capture reality since one severe negative attribute is sufficient to discourage park use if it concerns safety, perceived care, legibility, acoustic comfort, or sensory experience.

There is a theoretical framework that sees streets, squares, parks, waterfronts, playgrounds, and markets as settings for supporting public social life through the provision of access, invitation, visibility, comfort, and proper management [9]. This view of public space derives from classical research and theory of urban life and public space which emphasizes occupation, encounter, observation, and social performances [10, 13, 37]. Public parkland is a special case of the more general idea since urban parks are unique among public lands in combining natural and civic elements. Parks offer physical exercise, resting, encounters, shading, and relief from sensory overload of the city [11, 23, 32].

Research focused on health-related urban planning adds weight to the notion that parks must be evaluated according to quality. Accessible parks provide opportunities for physical exercise, reduce stress, promote restoration, and enhance mental health; however, all of these are conditional on park affordances and perceived conditions [8, 14, 36]. Biodiversity, vegetation type and structure, small urban green spaces, and restorative components demonstrate that naturalness, visible vegetation, trees, grass, water, size, and sensory richness can determine the restorativeness of parks [15, 27, 35, 39]. This evidence directly suggests that a park with good structural qualities yet poor perceived qualities is less likely to offer its restorative potential.

Park-use research also highlights that park attributes function collectively. Theory and empirical findings demonstrate the link between park use, physical activity, access, aesthetics, safety, maintenance, amenities, and perceptions of the social environment [4, 21, 25]. Audit scales provide data on those aspects of park experience, but the scores can be summarized into a single average value. A park with a variety of features can go unused if the respondent perceives it to be unsafe or untidy; however, a small park can be highly useful due to the design features promoting rest, shade, seating, enclosure, and legibility. This multidimensionality implies an alternative approach to interpreting the scores produced by the audit.

Finally, the equity component also calls for a repair-oriented approach to auditing. Research on the distribution of access and quality of parks within urban areas demonstrates that the benefits of green space must be considered in terms of social vulnerability and health disparities [18, 19, 30, 38]. A park with many frequent visitors but low contextual qualities suggests a bigger population exposed to inferior urban spaces. An audit approach ignoring exposure risks understating the importance of improving park conditions that affect the lives of many people. Conversely, exposure must not overshadow the issue of environmental quality, as a poorly measured frequency of visits cannot dominate park audits. A moderator variable is needed if frequency estimates are available.

This study explores whether the audit scores for Tenerife urban parks identify parks with critical contextual deficiency, low domain floor, imbalance between domains, exposure to a large audience, and other criteria for requiring repair. Calculations are designed to depart from weighted average scores and use the weakest domain score, threshold-defined context load, and score range per domain. Exposure score is adjusted with a log transformation. The objective is neither to provide a replacement for site visits, participatory urban planning, financial evaluation, nor design assessment. It is to develop a reproducible ranking reflecting specific park conditions.

The dataset consists of scores obtained from the park audit of Tenerife urban parks reported by Lorenzo et al. [16]. The material was selected using the inclusion criteria of urban location with at least 3000 inhabitants and at least five park frequent users visiting the site two times a week, including weekdays and weekends. The material comprised data from twelve parks with a total of 155 park frequent users. Parque Primero de Mayo had the lowest number of frequent users (five), and Parque de Guadamojete had the highest (twenty-eight).

The description of survey respondents is provided below as an informative baseline against which the audit results can be interpreted. The mean age was 41.7 with a minimum of 18 and maximum of 78 years. Women comprised 56.1% of respondents, men 43.9%. University degree completion was reported by 46.5% of participants, university education by 9.0%, secondary education by 33.5%, and primary education by 11.0%. Work was declared as the employment status by 65.8%, unemployment by 17.5%, studying by 14.1%, and retirement by 2.6%. These measures were not used as covariates since they referred to the aggregated population rather than park-specific frequencies.

2. Materials and methods

2.1. Study area and audited parks

The empirical record is represented by twelve Tenerife urban parks that were assessed using a park audit instrument and summarized by frequent visitors. The dataset is adequate for the research since it includes park-specific audit scores of multiple categories, as well as the frequency of visits. The analytical goal is to interpret scores and develop criteria indicating whether particular parks require repair. The practical objective is to produce an actionable ranking of parks showing why the park needs attention in the terms of lighting, safety, cleanliness, sensory enrichment, acoustics, signage, services, appearance, and preservation.

2.2. Data sources and processing

The raw dataset comprises the data on park characteristics presented in tabular form by Lorenzo et al. [16]. The material reflects a trained observer audit of twelve parks and the summary of user experiences with the same parks. Data collection included the evaluation of fourteen domains and six subdomains in the following way. Park features and attributes were observed at noon and after dark using an audit tool and scored by a trained park auditor. User summaries were collected by interviewing at least five frequent park users in each park.

Table 1. Park sample.

Urban park	Users (n)	Share (%)	Exposure factor
Parque de Guadamojete	28	18.1	1.000
Parque Natural del Montillo	20	12.9	0.904
Parque San Benito	18	11.6	0.874
Polideportivo El Casco	16	10.3	0.841
Parque El Pinar	15	9.7	0.823
Parque El Quijote	10	6.5	0.712
Parque de la Granja	10	6.5	0.712
Parque Hoya Machado	10	6.5	0.712
Parque Punta Larga	9	5.8	0.684
Parque Los Dragos	7	4.5	0.618
Parque Garcia Sanabria	7	4.5	0.618
Parque Primero de Mayo	5	3.2	0.532

The sample composition in Table 1 shows why exposure can be included as a modest planning modifier. Parque de

Guadamojete represents the largest share of frequent-user responses, while Parque Primero de Mayo represents the smallest. These differences do not prove relative park demand across the whole island, yet they indicate that an intervention affecting Guadamojete may touch a larger observed user group than an intervention affecting a small-count park. The logarithmic exposure factor avoids a direct proportional weighting that would be too strong for a sample of twelve parks.

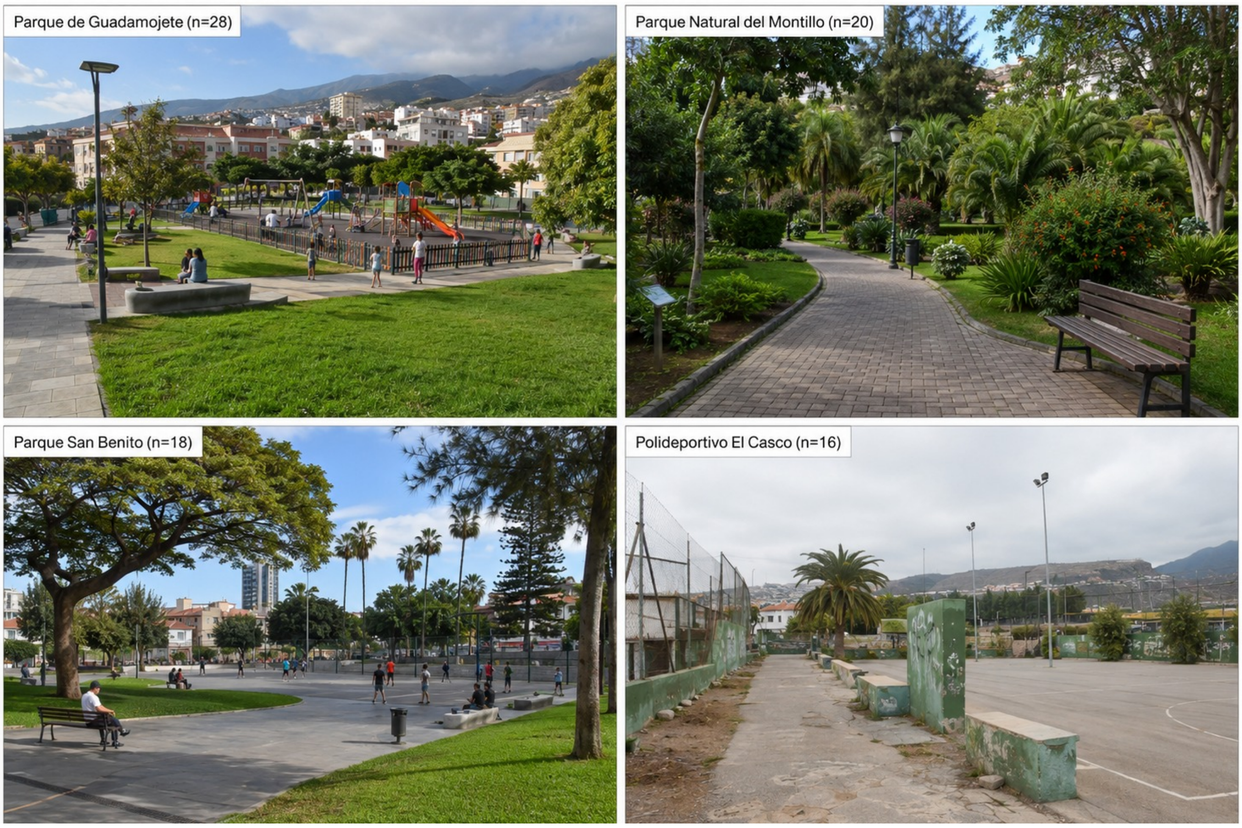

Figure 1. Tenerife park sample.

This visual representation in Figure 1 sorts the twelve parks by user count instead of considering the material to be an unsorted list. Guadamojete, Natural del Montillo, San Benito, and El Casco come first as they constitute the highest frequent-user counts in Table 1. The charts also help to understand a feature that will become apparent through the use of the scoring tables. Exposure does not equal condition, since high-use parks vary in their quality of vegetation and their contextual strengths.

The observational variables are gathered in the Public Space Characteristics Observation Questionnaire, where there are eleven sub-categories including accessibility, views, areas, services, signage, safety, cleanliness, physical order, sensorial elements, lighting, and absence of noise. This set of categories is divided into three distinct fields: spatial quality – accessibility, views, and areas; functional quality – services and signage; contextual quality – safety, cleanliness, physical order, sensorial elements, lighting, and absence of noise. The scores in all the tables are scaled 0 to 10, with higher values standing for better conditions.

It can easily be seen from the observer scores given in Table 2 that the park quality is highly uneven within the subcategory level. Parque Natural del Montillo receives the maximum possible scores on cleanliness, physical order, and sensorial elements. On the other hand, Polideportivo El Casco receives a score of 2.00 on physical order, a score of 0.00 on sensorial elements, and a score of 1.10 on lighting. Parque El Quijote receives the maximum view score in this set of scores, 10.00. However, this park receives a score of 0.00 on lighting and a score of 3.00 on physical order. Parque Punta Larga receives the maximum absence of noise score of 10.00. Yet, this park also receives a score of 0.00 on lighting and sensorial elements. These differences are exactly the kind of condition that make the average score potentially conceal the kind of weakness that influences the users' actual experiences.

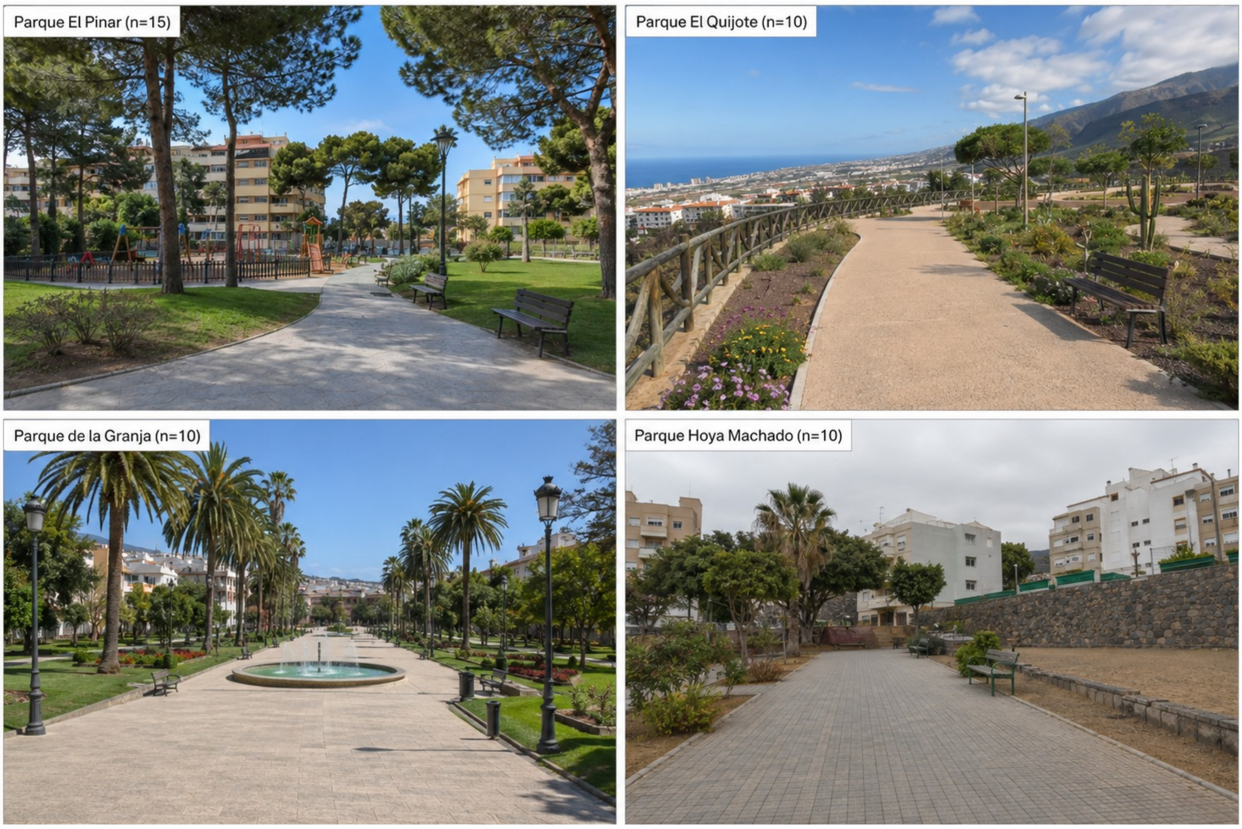

Figure 1. Tenerife park sample, continued.

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Table 2. Observer scores.

Park	Acc.	View	Areas	Serv.	Sign.	Safe	Clean	Order	Sens.	Light	Noise
Guadamojete	6.81	4.00	6.01	5.00	1.00	6.25	2.50	5.00	2.50	5.53	2.50
Montillo	7.12	4.00	9.09	8.41	6.00	5.00	10.00	10.00	10.00	5.53	5.00
San Benito	6.82	6.00	8.55	4.83	1.00	6.25	6.25	8.00	5.00	5.53	7.50
El Casco	5.90	4.00	6.51	6.00	1.00	3.75	2.50	2.00	0.00	1.10	7.50
El Pinar	6.51	4.00	6.62	5.50	4.00	5.00	8.75	6.00	0.00	5.53	5.00
El Quijote	5.45	10.00	7.11	3.50	4.00	5.00	2.50	3.00	2.50	0.00	5.00
La Granja	7.42	6.00	8.25	5.83	4.00	6.25	3.75	6.00	2.50	5.53	2.50
Hoya Machado	4.55	2.00	6.51	5.50	4.00	6.25	3.75	7.00	0.00	2.20	7.50
Punta Larga	5.00	2.00	5.49	3.00	2.00	2.50	2.50	5.00	0.00	0.00	10.00
Los Dragos	4.39	2.00	6.54	4.83	1.00	6.25	5.00	6.00	2.50	8.87	5.00
Garcia Sanabria	7.42	6.00	8.33	4.66	6.00	5.00	7.50	8.00	10.00	6.67	7.50
Primero de Mayo	5.45	8.00	7.26	5.00	2.00	1.25	5.00	10.00	2.50	0.00	2.50

Acc. = accessibility; Serv. = services; Sign. = signage; Safe = safety; Clean = cleanliness; Order = physical order; Sens. = presence of sensorial elements; Noise = absence of noise.

In the case of the scales provided in the Tenerife study, it is clear that emphasis was placed on the importance of contextual conditions. The scale for perceived environmental quality had a reliability coefficient of 0.86. The care-of-space subscale had a reliability coefficient of 0.84, the design-of-space subscale 0.69, the presence-of-sensorial-elements subscale 0.77, and the restorative capacity scale 0.78. Mean values on these dimensions were 3.57 for care of space, 4.13 for design of space, 3.81 for presence of sensorial elements, and 4.05 for restorative capacity. As can be seen, the strongest regression effect reported on these data concerns the predictive power of physical order in explaining care, design, and restoration.

2.3. Exposure-sensitive fragility calculation

The Exposure-Sensitive Contextual Fragility Profiling method was created for calculating scores in small parks audits that have as their purpose the determination of repair priorities. This method involves four condition components and one exposure modifier. It does not involve entropy-based subcategory weighting and does not need any individual-level information about parks users. This means that the calculation method is straightforward and understandable enough to be used in the municipal context, where planners will need to justify their reasons for placing a park higher or lower on a list.

Let x_{ij} stand for the 0–10 observation score on the subcategory j for the park i. First, we define the spatial quality of a park as follows:

$$A_i = \frac{x_{i1} + x_{i2} + x_{i3}}{3}. \tag{1}$$

In the same way, the functional quality of a park is defined as:

$$F_i = \frac{x_{i4} + x_{i5}}{2}. \tag{2}$$

Finally, the contextual quality of a park is defined as:

$$C_i = \frac{x_{i6} + x_{i7} + x_{i8} + x_{i9} + x_{i10} + x_{i11}}{6}. \tag{3}$$

With the help of these definitions, we obtain the balanced quality score:

$$B_i = \frac{A_i + F_i + C_i}{3}. \tag{4}$$

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While the balanced score gives some indication of quality, it cannot be used directly in prioritisation as it is based on equally weighted averages. This could mask a weak domain and thus lead to poor prioritisation decisions. We therefore proceed to define the four components of exposure-sensitive fragility profiling. The first component is the following:

$$K_i = \frac{10 - C_i}{10}. \tag{5}$$

As this measure grows larger, the gap between the user-facing domain and its best possible condition grows wider. This domain is highlighted as being crucial due to the fact that it encompasses important conditions such as those related to care, night-time legibility, sensory richness, cleanliness, and acoustic comfort. In other words, it would be misleading to imply that contextual conditions are not as important for the quality of the park as spatial or functional conditions.

The second component is the floor deficit in the weakest domain:

$$L_i = \frac{10 - \min(A_i, F_i, C_i)}{10}. \tag{6}$$

This measure is non-compensatory. As such, it reflects the importance of the weakest domain since it is this domain which imposes a real limitation on overall quality. Thus, even if the park has relatively high spatial quality but low contextual quality, the park should still be viewed as relatively fragile in terms of its utility for users.

The third component of the analysis is the following domain spread measure:

$$G_i = \frac{\max(A_i, F_i, C_i) - \min(A_i, F_i, C_i)}{10}. \tag{7}$$

As the spread grows larger, it means that the park in question has different development levels with respect to the considered domains. This is significant because in the case of a park with uneven development profile, the required interventions can be quite different.

The last component of our analysis refers to the number of failed contextual subcategories among six of them. Since each value less than 5.0 is seen as a failure, the critical share component can be defined as:

$$Q_i = \frac{1}{6} \sum_{j \in C} I(x_{ij} < 5.0), \tag{8}$$

where $I(\cdot)$ is an indicator function and C is the set of contextual subcategories.

We now calculate the exposure modifier of the model by considering the frequent user counts (n_i):

$$E_i = \frac{\ln(1 + n_i)}{\ln(1 + n_{\max})}, \tag{9}$$

where $n_{\max}$ is the largest user count in the sample. Finally, we combine all the components above with a light exposure multiplier:

$$P_i = \left(\frac{K_i + L_i + G_i + Q_i}{4}\right)(0.9 + 0.1E_i). \tag{10}$$

As can be seen, the multiplication by the exposure value has only a minor effect. This is because, in this study, environmental conditions should always take precedence over any number of visitors. The calculated score P_i stands for exposure-sensitive fragility of a park. A high score implies the combination of weak conditions, a weak floor, imbalance, many weak contextual subcategories, and a greater exposure to users.

This score was translated into five planning bands, which provide a practical interpretation. Parks receiving scores of 0.60 and above are to be repaired immediately; those with scores from 0.50 to 0.60 should receive repair as soon as possible; those with scores from 0.35 to 0.50 require directed improvement; those with scores from 0.25 to 0.35 require routine improvement, and the remaining ones should receive condition stewardship.

2.4. Robustness assessment

To assess sensitivity of results, the ranking of the parks was recalculated by omitting each of the condition components at once. This was followed by calculating Spearman correlation coefficients between the ranking obtained without a particular component and the original ranking. In addition, robustness with respect to the critical contextual subcategory cut-off was checked in two additional ways. First, the cut-off of 5.0 was replaced with 6.0; then the cut-off of 4.0 was used.

3. Results

3.1. Domain quality and contextual vulnerability

Clearly, the twelve parks are differentiated with respect to spatial, functional, and contextual qualities. While spatial quality tends to dominate, the functional quality is frequently determined by weak signage scores. The contextual quality is particularly distinctive in this set of observations as it encompasses such criteria as physical order, cleanliness, sensory richness, lighting, safety support, and acoustic comfort.

Table 3. Domain profile.

Park	Spatial	Functional	Contextual	Balanced	Weakest domain	Critical count
Polideportivo El Casco	5.47	3.50	2.81	3.93	Contextual	5
Parque El Quijote	7.52	3.75	3.00	4.76	Contextual	4
Parque Primero de Mayo	6.90	3.50	3.54	4.65	Functional	4
Parque Punta Larga	4.16	2.50	3.33	3.33	Functional	4
Parque de Guadamojete	5.61	3.00	4.05	4.22	Functional	3
Parque de la Granja	7.22	4.92	4.42	5.52	Contextual	3
Parque Hoya Machado	4.35	4.75	4.45	4.52	Spatial	3
Parque Los Dragos	4.31	2.92	5.60	4.28	Functional	1
Parque San Benito	7.12	2.92	6.42	5.49	Functional	0
Parque El Pinar	5.71	4.75	5.05	5.17	Functional	1
Parque Garcia Sanabria	7.25	5.33	7.45	6.67	Functional	0
Parque Natural del Montillo	6.74	7.21	7.59	7.18	Spatial	0

The values in Table 3 show that Polideportivo El Casco and Parque El Quijote have the lowest contextual scores among the highest-fragility parks, while Parque Punta Larga has the lowest balanced quality. Parque Primero de Mayo is important because its balanced score is not the lowest, yet its contextual profile contains four subcategories below the critical midpoint. Parque San Benito illustrates a different problem: spatial and contextual scores are comparatively strong, but functional quality is low because signage and services are weak. These patterns indicate that repair need is not a single phenomenon. It can arise from general weakness, contextual collapse, functional underdevelopment, or imbalance among domains.

The domain environments in Figure 2 complement the numerical scores in Table 3. The highest-fragility cases show that spatial assets and contextual weakness can coexist, whereas the intermediate group illustrates parks where a narrower repair package is more appropriate than full redesign. The lower-fragility panels support the stewardship interpretation because stronger contextual and spatial conditions remain visible even where selected subcategories still need maintenance.

The observed park system also contains repeated contextual weak points. Sensorial elements fall below 5.0 in many parks, and lighting is absent or very weak in several. Cleanliness, physical order, and absence of noise vary widely.

Figure 2. Domain environments by repair band.

This distribution suggests that the dominant repair problem is not only facility provision. It is the experiential layer through which users judge whether a park is cared for, inviting, legible, and restorative.

The six contextual panels shown in Figure 3 convert the contextual score's variables to visual elements: safety support, cleanliness, physical orderliness, sensory stimulation, lighting, and acoustic amenity. The aforementioned conditions are precisely the ones that contribute to the creation of the contextual domain and the crucial contextual count Q_i. Each of El Casco, El Quijote, Primero de Mayo, and Punta Larga parks includes four or more contextual subcategories under 5.0, whereas none of Garcia Sanabria and Natural del Montillo is in the critical contextual count, favoring stewardship over urgent renovation.

3.2. Park ordering based on exposure adjustment

As opposed to a basic ranking of park quality, the ECFP score produces another repair order, where Polideportivo El Casco holds the first place with a score of 0.624 and is very close to Parque El Quijote with 0.612 points. Third place belongs to Parque Primero de Mayo with 0.549 points, while Parque Punta Larga and Parque de Guadamojete

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Figure 2. Domain environments by repair band, continued.

hold the fourth and fifth places, respectively.

Table 4. Fragility order.

Rank	Park	K_i	L_i	G_i	Q_i	E_i	P_i	Planning band
1	Polideportivo El Casco	0.719	0.719	0.266	0.833	0.841	0.624	Immediate contextual repair
2	Parque El Quijote	0.700	0.700	0.452	0.667	0.712	0.612	Immediate contextual repair
3	Parque Primero de Mayo	0.646	0.650	0.340	0.667	0.532	0.549	Early repair
4	Parque Punta Larga	0.667	0.750	0.166	0.667	0.684	0.545	Early repair
5	Parque de Guadamojete	0.595	0.700	0.261	0.500	1.000	0.514	Early repair
6	Parque de la Granja	0.558	0.558	0.280	0.500	0.712	0.460	Directed improvement
7	Parque Hoya Machado	0.555	0.565	0.040	0.500	0.712	0.403	Directed improvement
8	Parque Los Dragos	0.440	0.709	0.269	0.167	0.618	0.381	Directed improvement
9	Parque San Benito	0.358	0.709	0.421	0.000	0.874	0.367	Directed improvement
10	Parque El Pinar	0.495	0.525	0.096	0.167	0.823	0.315	Routine improvement
11	Parque Garcia Sanabria	0.255	0.467	0.211	0.000	0.618	0.225	Condition stewardship
12	Parque Natural del Montillo	0.241	0.326	0.085	0.000	0.904	0.162	Condition stewardship

The ranking in Table 4 changes the interpretation of several parks. El Casco and El Quijote remain the clearest immediate cases because both combine high contextual shortfall, high floor deficit, and multiple critical contextual weaknesses. Primero de Mayo moves above Punta Larga by the narrowest margin because its lighting, safety,

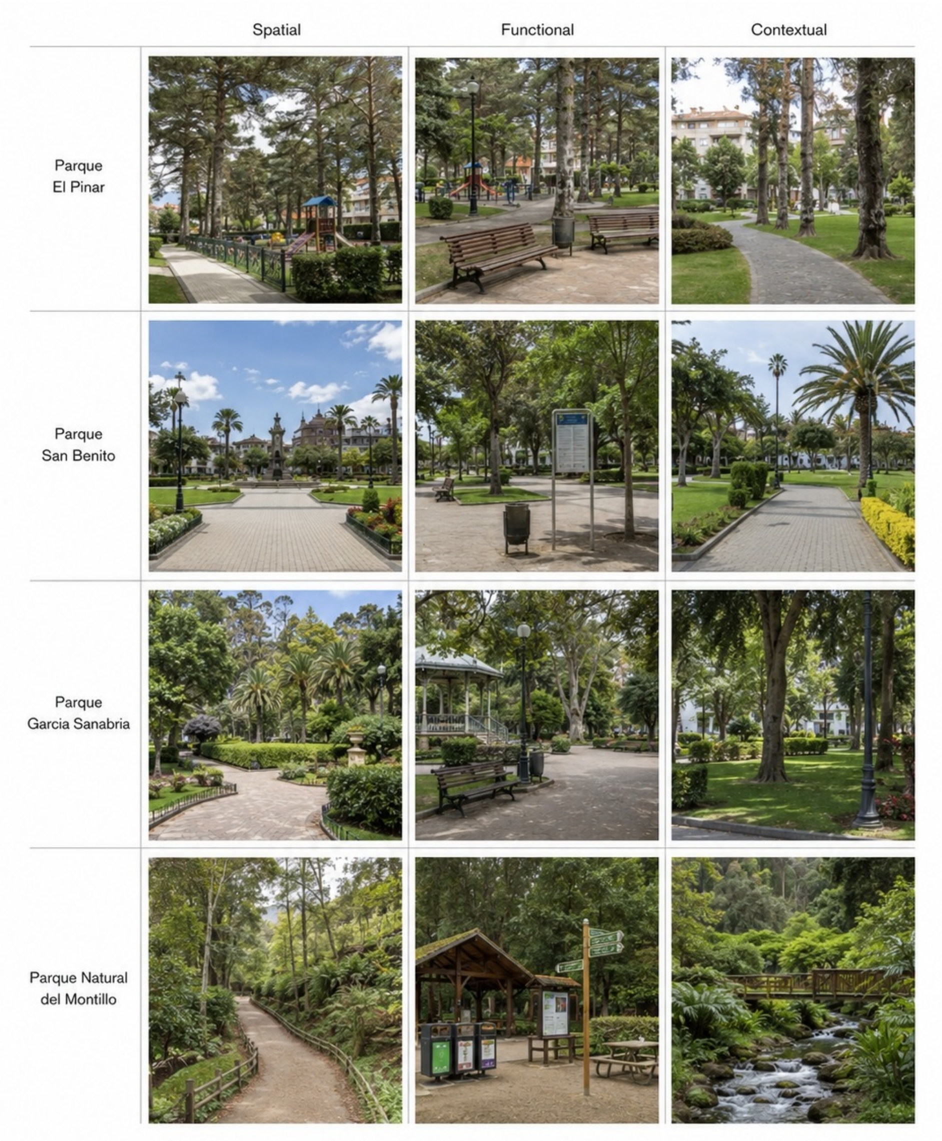


Figure 2. Domain environments by repair band, continued.

sensory, and acoustic scores are all problematic even though its physical order is excellent. Guadamojete reaches the early repair band because moderate contextual weakness is combined with the highest observed exposure and a weak functional floor. San Benito, despite a reasonable balanced quality value, does not become an early repair case because its main deficit is functional rather than contextual.

The component values in Figure 4 show why the final order is not reducible to any single column of Table 4. El Casco has the strongest combination of contextual shortfall and critical contextual share, Punta Larga has the largest weakest-domain floor deficit, El Quijote has the largest domain spread, and Guadamojete has the highest exposure factor. The final score therefore emerges from the joint reading of contextual weakness, floor condition, imbalance, threshold burden, and user exposure.

The divergence plot in Figure 5 confirms that the ECFP order is not a re-labelled mean-quality ranking. Punta Larga is fragile partly because its balanced quality is low, but El Quijote and Primero de Mayo remain high-fragility cases even though their balanced scores are not the lowest. Natural del Montillo occupies the opposite end of the field, combining the highest balanced quality with the lowest fragility score.

The repair spine in Figure 6 turns the numerical ranking into a staged intervention sequence. The visual separation between the first five parks and the lower bands supports an initial repair programme focused on El Casco, El Quijote, Primero de Mayo, Punta Larga, and Guadamojete. The lower end of the spine also clarifies why Garcia

(a) Safety

(b) Cleanliness

(c) Physical order

(d) Sensorial elements

(e) Lighting

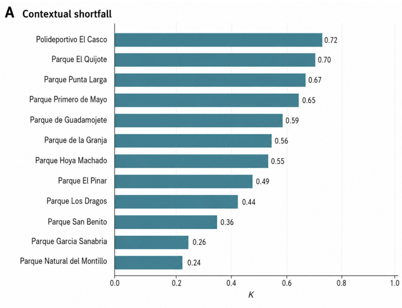
(f) Acoustic comfort

Figure 3. Contextual condition examples.

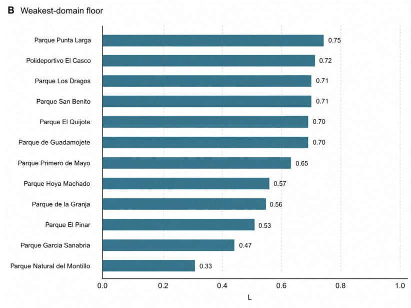
Sanabria and Natural del Montillo should be managed through selective stewardship rather than immediate repair.

3.3. Park-level repair priorities

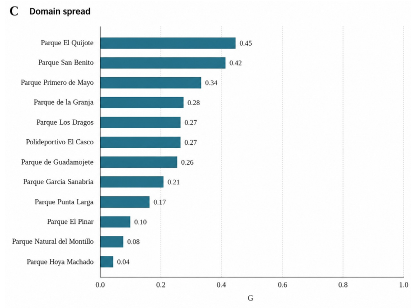
A repair order is useful only if it is connected to practical intervention content. The leading ECFP cases share contextual fragility, but they do not require the same design response. El Casco has severe lighting, sensory,



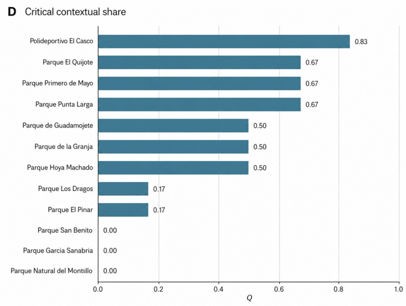
(a) Contextual shortfall



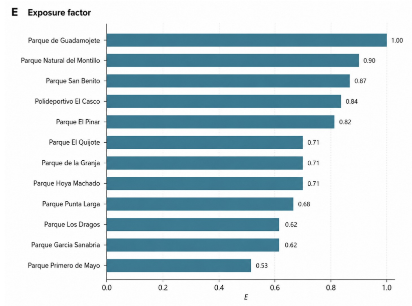
(b) Weakest-domain floor



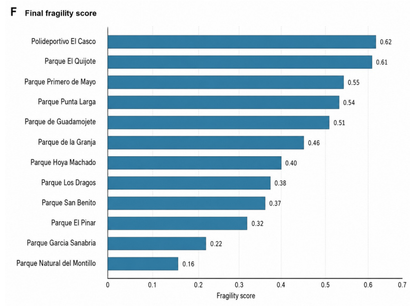
(c) Domain spread



(d) Critical contextual share



(e) Exposure factor



(f) Final fragility score

Figure 4. ECFP component values.

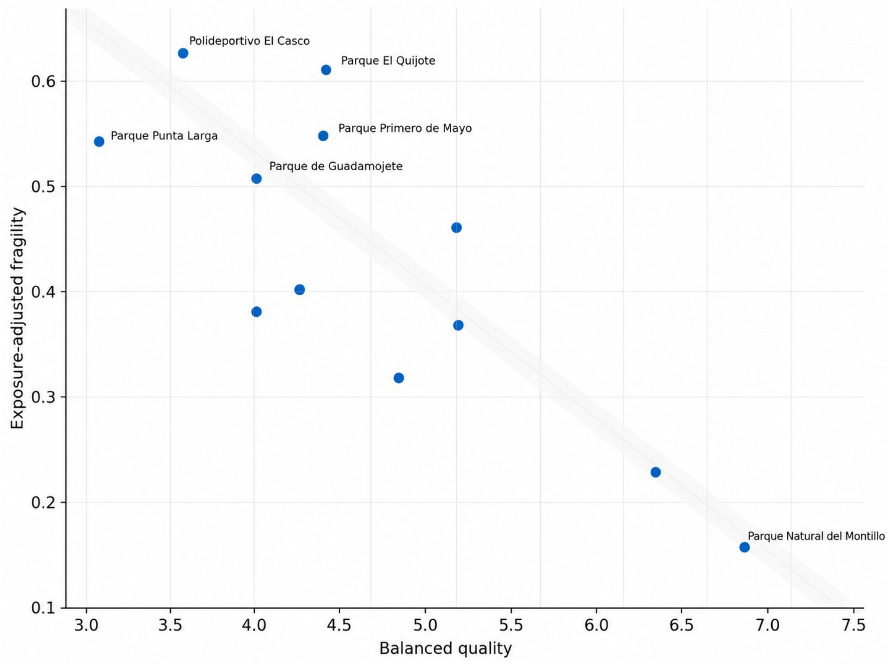


Figure 5. Quality-fragility divergence.

physical-order, and cleanliness weaknesses. El Quijote has excellent views, but contextual conditions prevent the park from fully converting its visual asset into a supportive everyday environment. Primero de Mayo has a distinctive split: very strong physical order and good views coexist with extremely weak lighting, low safety support, poor acoustic comfort, and limited sensory richness. Punta Larga has the lowest balanced quality and requires broad correction. Guadamojete combines heavy observed use with cleanliness, noise, signage, and sensory weaknesses.

The signatures in Table 5 demonstrate why a single numerical order should not be read as a uniform design prescription. El Casco needs a maintenance-and-legibility package anchored in lighting, physical order, and cleanliness. El Quijote needs contextual reinforcement that protects its strong views while correcting the conditions

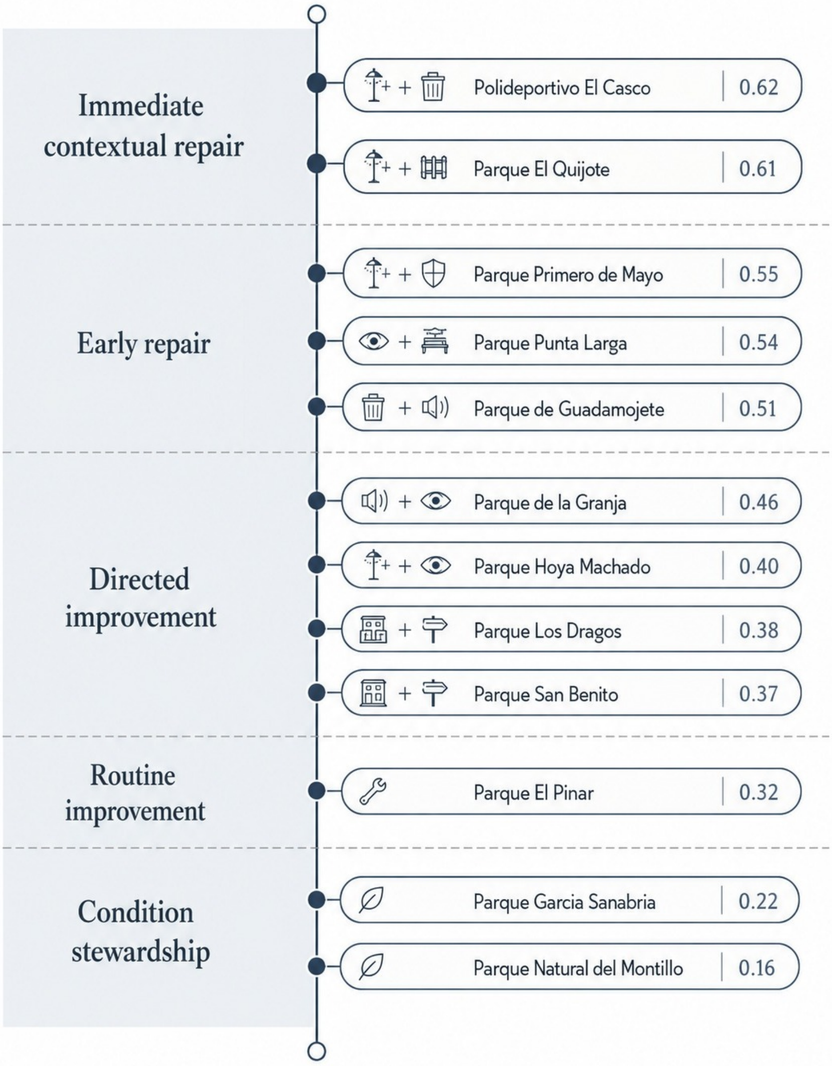


Figure 6. Repair priority spine.

Table 5. Repair signatures.

Park	Leading repair interpretation
Polideportivo El Casco	lighting, sensory elements, physical-order recovery, cleanliness
Parque El Quijote	lighting, physical order, cleanliness, sensory enrichment around strong views
Parque Primero de Mayo	lighting, safety, acoustic comfort, sensory enrichment
Parque Punta Larga	lighting, sensory elements, safety, visual quality, services
Parque de Guadamojete	cleanliness, sensory elements, acoustic buffering, signage
Parque de la Granja	acoustic buffering, sensory elements, cleanliness, physical-order monitoring
Parque Hoya Machado	visual quality, sensory elements, lighting, cleanliness
Parque Los Dragos	visual quality, signage, accessibility, service support
Parque San Benito	signage, service support, cleanliness, lighting
Parque El Pinar	sensory enrichment, view quality, signage, lighting retention
Parque Garcia Sanabria	selective view, service, safety, and lighting maintenance
Parque Natural del Montillo	selective view, lighting, safety, and noise maintenance

that weaken perceived care. Primero de Mayo should not be treated as neglected in the same way as El Casco because physical order is strong; its repair focus is evening legibility, safety support, sound moderation, and sensory enrichment. Punta Larga requires a wider intervention because multiple domains are weak. Guadamojete has a strong social-exposure argument for early repair because it has the largest observed user count.

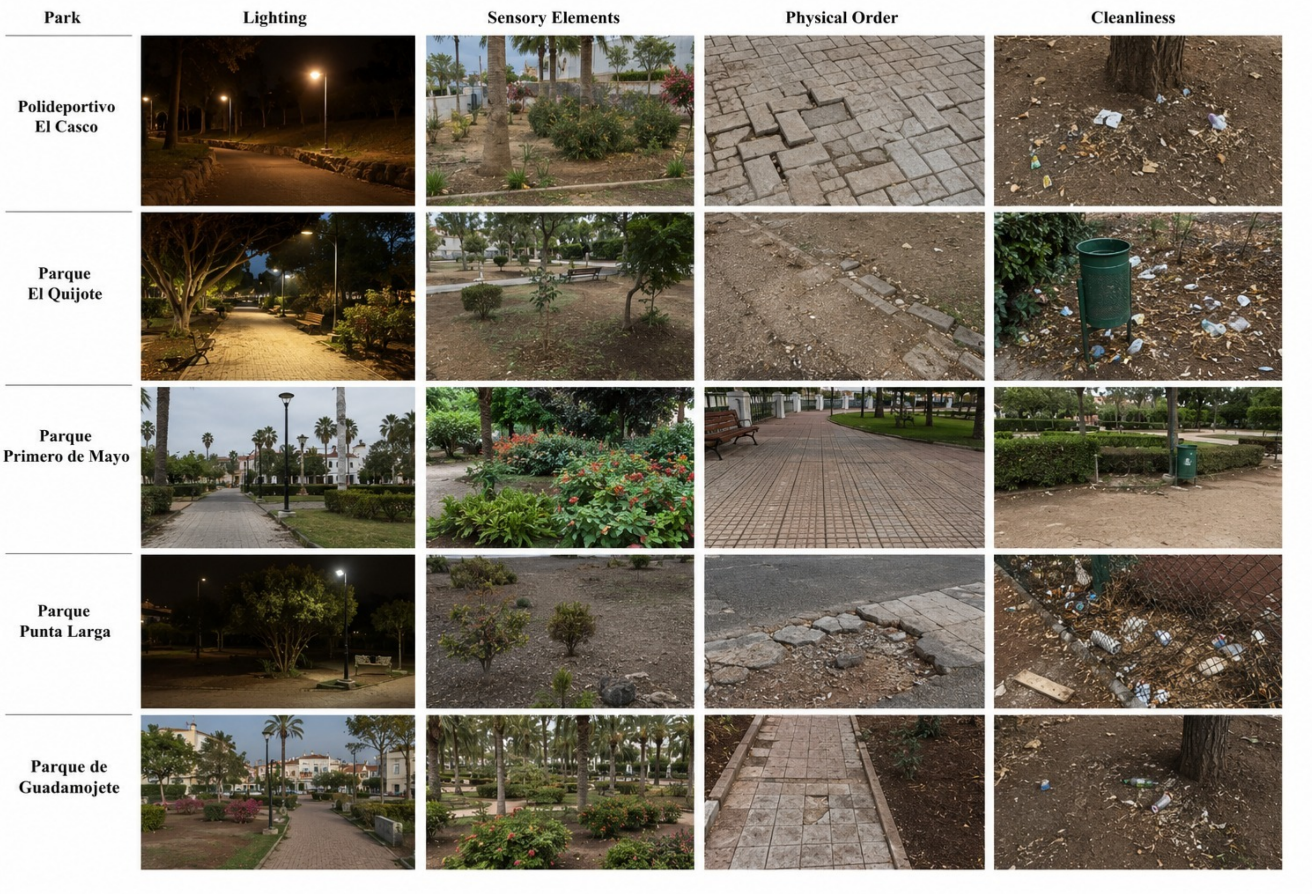


Figure 7. Repair fingerprints.

The repair fingerprints in Figure 7 illustrate which high priority parks should receive what kind of interventions. The figure highlights the fact that El Casco, El Quijote, Primero de Mayo, Punta Larga, and Guadamojete are all identified as early candidates but are unique in terms of the nature of their repair needs, namely lighting and order in El Casco, contextual reinforcement in El Quijote, safety-lighting in Primero de Mayo, recovery across the board in Punta Larga, and exposure- and acoustics-sensitive cleaning in Guadamojete.

The middle segment of the order features parks with somewhat more directed issues. Acoustic buffering and sensory enrichment are necessary for La Granja alongside cleanup, monitoring, and restoration of order. View-related and sensory issues, and lighting need to be taken into account in Hoya Machado. Los Dragos lacks both good views and good lighting but has decent access, signage, and facilities; it is a fairly functional and spatial issue. San Benito has a poor functional score, due to issues with signage and facilities. Sensory enrichment is needed in El Pinar despite contextual adequacy in other respects.

The stewardship category comprises strong parks that require some attention regardless. Garcia Sanabria and Natural del Montillo have reasonably low fragility scores but suffer from inadequate views, lighting, safety, facilities, and acoustics. Stewardship implies preventive maintenance, not neglect, and the practical relevance of the ECFP lies in the separation of strong and weak parks when it comes to prioritization.

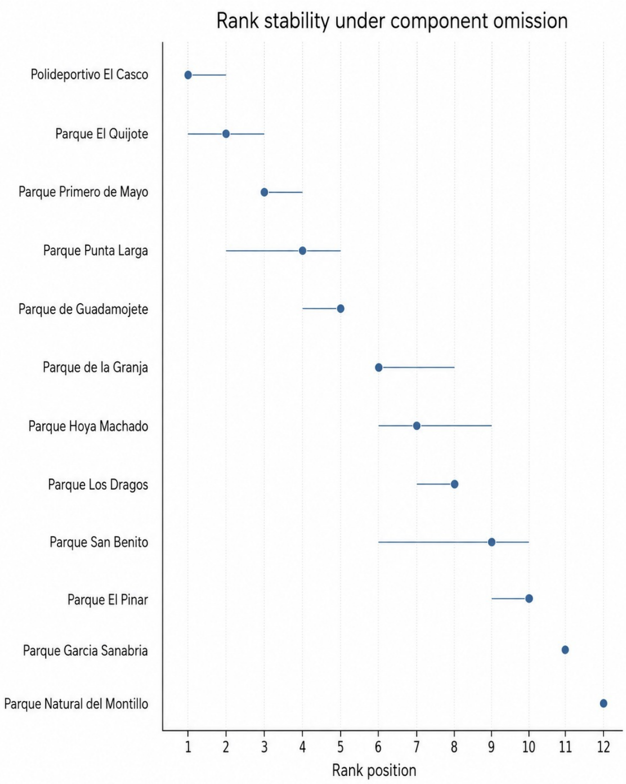
3.4. Robustness of the park order

Based on the sensitivity checks performed, the ECFP order is robust enough for planning considerations. Exclusion of contextual shortfall results in a Spearman correlation of 0.972 compared to the full order; exclusion of the floor deficit has no effect on it at all. Excluding domain spread reduces the correlation to 0.965, while excluding the critical contextual share gives the minimum correlation of 0.923. The critical threshold test shows consistency with a stricter threshold of 4.0, and acceptable consistency with a loose threshold of 6.0.

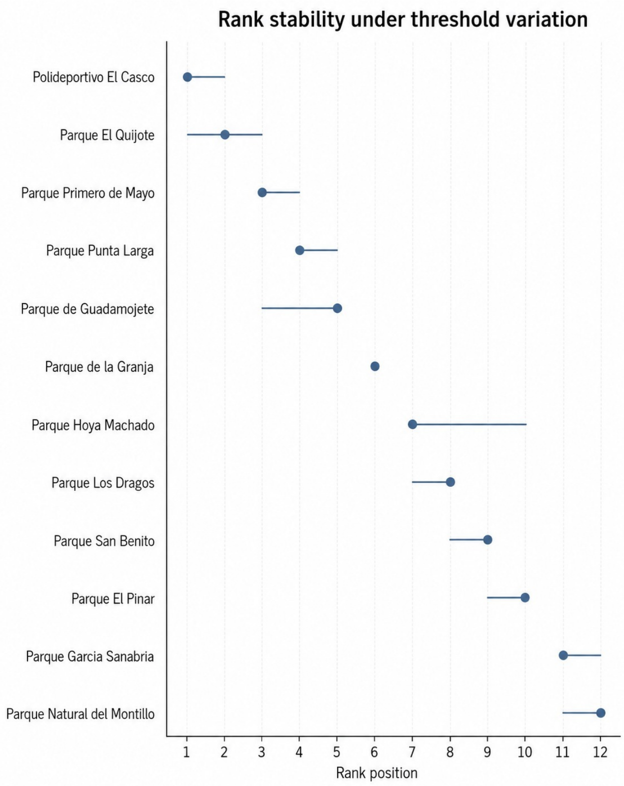
Table 6. Sensitivity checks.

Recalculation	Spearman correlation	Maximum rank shift
Omit contextual shortfall	0.972	2
Omit floor deficit	1.000	0
Omit domain spread	0.965	2
Omit critical contextual share	0.923	3
Critical threshold set at 4.0	1.000	0
Critical threshold set at 6.0	0.923	3

As seen from Table 6, the evidence of stability implies that there is no undue dependence on any particular parameter setting. The topmost group remains consistent in vulnerability, and the lower group consistent in stability. Critical contextual share has the highest influence of all components since it involves recording a number of threshold violations, not just mean conditions. It is useful in prioritizing repair since multiple moderate-severe contextual deficiencies might outweigh the average in each domain.



(**a**) Component omission



(**b**) Threshold variation

Figure 8. Rank stability.

The rank stability shown in Figure 8 suggests that the top and bottom segments of the order have considerable consistency. Component omission leads to a mere exchange of top positions or minor adjustments in the middle. Threshold variation has an effect on Guadamojete and Hoya Machado but does not dissolve the top repair group.

4. Discussion

The results confirm that park quality interpretation changes when the analysis starts from contextual fragility rather than general park quality. General average scoring is helpful for rapid assessment, but it is not sufficient for prioritizing repair where high spatial attributes co-exist with poor conditions of care. El Quijote represents the most prominent case. Although it has the best views rating and the highest spatial domain, this park has zero lighting, very low physical order, cleanliness, and sensory elements. A user can enjoy viewing and still feel a park is badly maintained and lacks conditions for safe, effective, comfortable stay during evenings. Therefore, the proposed procedure of ECFP addresses contextual weakness as a planning challenge in its own right.

It is fully consistent with the park use literature indicating that park use depends on interrelated safety, aesthetics, amenities, maintenance, and social perceptions [4, 21, 25]. It is also consistent with studies suggesting that poor park conditions can undermine security and park use [24, 34]. While there is no novelty in stating maintenance is important, the value of the current analysis is showing how maintenance-related conditions can be integrated in a transparent way into a larger analysis that takes domain floors, thresholds and exposure into account.

Physical order becomes more important than ever, but it is not the sole organising concept anymore. Physical order receives a new interpretive context in the present framework, where it interacts with lighting, safety, cleanliness, sensoriality, and noise. Such an analysis is essential because some parks cannot be explained solely based on disorder. For instance, Primero de Mayo has outstanding physical order, but it receives a high repair ranking due to poor lighting, acoustic comfort, safety support, and lack of sensorial richness. Natural del Montillo is well-finished regarding cleanliness, physical order, and sensory richness, but its low values in views, lighting, safety, and noise require improvements. The example proves the irreducibility of contextual quality to physical order.

Sensorial elements become highly relevant as part of the park fragility score. They tend to receive very low ratings in many parks and play a crucial role in the interpretation of fragility of almost every park with a high fragility score. This finding fits perfectly the restorative environment literature pointing out that vegetation, nature, water features, fascination, extent, and biodiversity can promote healing and preferences [15, 27, 35, 39]. Sensorial richness should not be regarded as an aesthetic embellishment after a park is physically restored. Instead, it may contribute to the healing mission of parks and ensure that a park offers opportunities for rest, walks, social contacts, and healing.

Lighting turns out to be another key component of a park fragility score. It does not matter merely because it concerns night-time use. On the contrary, lighting is also about legibility, safety, care perception, and park usability regardless of daily rhythms. For instance, El Casco, El Quijote, Primero de Mayo, Punta Larga, and Hoya Machado provide illustrative cases of how lighting combines with other contextual weaknesses. The importance of the light-score rating of 0.00 and safety-score of 1.25 in the case of Primero de Mayo deserves particular attention since they compensate for its otherwise good physical order and great views. The case confirms the need for the use of non-compensatory criteria: good physical order cannot compensate for lack of night legibility.

Exposure plays an important role in park planning interpretation, although it cannot overshadow other dimensions. Guadamojete is not the park with the highest contextual fragility score, but it is the most frequently visited park in the empirical data. As a result, the logarithmic modification gives it increased relevance but does not push it above the parks with the highest environmental fragility scores. This balanced approach is especially relevant for small samples, where the intervention impact should be broader in areas of greater usage but not substituted by pure environmental diagnosis. It is consistent with equity-based green-space planning which indicates that parks' benefits depend on both access and quality [18, 19, 30, 38].

The presented prioritization allows to suggest an efficient planning strategy for municipalities. Parks in the immediate contextual repair band should get urgent assistance. El Casco needs direct intervention: restoration of lighting, physical order, cleanliness, and sensoriality. El Quijote, although also facing many contextual weaknesses, has its strengths in physical order and visual qualities, so it requires protection of its strength combined with addressing weaknesses. Early repair group consists of Primero de Mayo, Punta Larga, and Guadamojete. Different interventions will be required for those parks. Primero de Mayo requires safety-lighting-sensory intervention; Punta Larga needs a comprehensive quality improvement. Guadamojete is an exposure-sensitive case with the greatest needs for cleanliness, noise, signposting, and sensoriality improvement.

Directed improvement group will need more focused interventions than the previous two groups. La Granja is a well-balanced park but needs further intervention concerning noise, sensory richness, cleanliness, and physical order surveillance. Hoya Machado has quite a balanced profile, but several subcategories like views, sensorial elements, and lighting require improvements. Finally, Los Dragos is a well-lit park that needs improvements regarding spatial and functional aspects. San Benito is a park with a well-organised spatial context and poor functional floor that should be addressed via signposting and service improvement. Those distinctions are useful when the funds for municipal repair are limited. It is better to know the exact nature of a deficiency in order to avoid excessive redesign.

Stewardship group implies an entirely different intervention approach. Garcia Sanabria and Natural del Montillo are far from perfect, but the fragility score suggests preserving them as high-quality parks and implementing targeted maintenance. Such a decision ensures sustainability of park quality because deterioration can occur in a high-quality park due to deteriorated lighting, view, acoustic comfort, or safety. Periodical use of the ECFP methodology will help city managers spot when parks start to deteriorate and switch from stewardship stage to routine/directed improvement stage.

Another important advantage of the present methodology is transparency and simplicity of calculations. Due to four easily interpretable components of the park quality audit table, any ECFP result can be explained to municipal planners. It is suitable for audit score sets of small size where automated modelling is not necessary and where there is not sufficient data at the individual level. It also does not overfit the data because 12 parks cannot generate much overfitting in their small sample. Finally, it is important to stress that equal treatment of condition subcategories does not mean causally identical processes. It is merely a conservative way to integrate different repair signals into a score.

It is important to understand the differences between systemic and individual parks' problems. If one subcategory score is poor throughout the system, then a programme for improving this score will be needed. However, if the problem occurs just in a few parks and is associated with other contextual deficits, it becomes a basis for prioritized park repair. Tenerife parks suffer from lack of signage and sensorial elements equally, but poor lighting becomes a factor in some high-fragmentation parks. A municipality can design a system-wide programme concerning signposting and a special repair plan for the selected parks.

There are a few limitations worth noting. The methodology involves the use of aggregate park-level scores instead of individual user responses. Thus, it cannot provide insight into whether users' age, gender, education, socioeconomic status, employment, or frequency of use affects park perceptions differently. However, park-user counts help in exposure correction and indicate that user exposure requires more urgent interventions. User counts do not measure annual visitations, duration, proximity demand, alternative park availability. Thus, the exposure modifier helps but cannot substitute precise measures of demand. Scores represent assessed conditions for a certain moment. Park quality changes due to maintenance, season, time of day, weather, and events.

The next development step will include additional parameters like neighbourhood population, accessibility, deprivation index, heat exposure, maintenance cost, and repeated park assessment in the calculation. The same approach can be applied to another space type if subcategories are made comparable. However, adding extra variables can obscure the main result: contextual deficits can fragment a park even if it has a good spatial and/or functional floor. Priority of repair should preserve the visibility of such deficits.

5. Conclusion

The initial question was what Tenerife parks combine contextual weakness, low domain floor, cross-domain imbalance, critical contextual deficits, and user exposure sufficiently to require earlier repair, and what intervention approach follows for them. The answer is straightforward. Polideportivo El Casco and Parque El Quijote should be treated as a case of immediate contextual repair. While El Casco will require lighting, physical order, cleanliness, and sensoriality improvement, El Quijote requires contextual enhancement that will complement its excellent visual qualities. Early repair group comprises Parque Primero de Mayo, Parque Punta Larga, and Parque Guadamojete. Primero de Mayo ranks higher because of lack of lighting and safety support, poor acoustic comfort, and sensorial richness. Punta Larga requires comprehensive quality improvement, while Guadamojete needs early repair because of poor lighting and poor safety in combination with high exposure.

The general conclusion is that park quality renewal should not rely on a single average score. The lowest domain, number of critical contextual deficiencies, imbalance between domains, and user exposure modify the priority list dramatically. There are parks with a high spatial/functional floor, but poor contextual floor; with good physical order, but poor lighting and safety perception; with high acoustic comfort, but poor overall contextual quality. ECFP allows to make those distinctions transparently and identify the specific repair logic for each park efficiently.

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