DIMENSI: Journal of Architecture and Built Environment, Vol. 53, No. 2, December 2026 DOI: https://doi.org/10.9744/dimensi.53.2.187-212
ISSN 0126-219X (print) / ISSN 2338-7858 (online)

Negotiated Space: Morphological Adaptations of Informal Market Stalls in Toril Public Market, Davao City, Philippines

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Article Info:
Submitted: July 16, 2026
Revised: August 21, 2026
Accepted: October 06, 2026
Available online: November 10, 2026

Keywords:
negotiated space;
architectural morphology;
informal market stalls;
spatial adaptation;
public markets.

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Abstract

Public markets are dynamic architectural spaces wherein informal vending practices continuously reshape formal spatial planning. The study investigated the negotiated spatial practices that led to the morphological transformations of informal market stalls at the Toril Public Market in Davao City. Specifically, this investigation focused on the material alterations to market stalls, the relationships between vendors and market officials, and the implications of these alterations for the circulation and accessibility of space. We used a convergent mixed-methods research design involving comparative spatial mapping, AutoCAD overlay technique, architectural measurement, photography, official market records, and semi-structured interviews with vendors, market officials, and long-time users of the market. Quantitative data were analyzed using descriptive statistics and a paired-samples t-test. Thematic analysis and triangulation were used to analyze qualitative data. The study revealed major morphological changes, including an increase in stall footprint, enclosure changes, spatial invasion, and blockage of circulation. The mean area of the 17 selected stalls increased from 5.19 m² to 10.03 m², representing a 93.26% increase and nearly doubling the original mean area. The size of the stalls differed significantly ($t=-9.36$, $p<0.001$) between the original and current sizes. The results emphasize the importance of negotiated spatial practices for the architectural organization and functional performance of the market. The study concludes that while informal spatial adaptations meet vendors' operational needs, they compromise efficient circulation, accessibility, and regulatory compliance. The research suggests the need for adaptive architectural planning, collaborative governance of markets, and flexible design approaches to meet user needs and ensure the functionality, safety, and sustainability of public markets.

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INTRODUCTION

Public markets play a vital role in the urban fabric, serving as trading centers for commercial, social, and civic activities. Public markets play an important role in promoting local economic development by providing small-scale business spaces (UN-Habitat, 2021). Given that the markets form part of public infrastructure, they are designed in a way that ensures efficiency in terms of circulation, zoning, accessibility, and environment through a well-organized spatial design (Carmona, 2021). The fast pace of urban development, population growth, and the rise of commerce are among the reasons that have turned public markets into places of change, where spatial organization is continually evolving, regardless of the initial design. Such changes have been observed more in developing countries due to the lack of space (Navapan & Charoenkit, 2019). Thus, the relationship between formal planning and spatial practices has become a significant issue for current architectural and urban studies (Lefebvre, 1991).

In public markets, vendors usually change their allocated spaces by extending stalls, altering enclosures, encroaching on circulation spaces, and installing temporary architectural structures to meet the needs of their evolving commercial activities (Remolino et al., 2023; Ekomadyo & Triwardhani, 2024). While such adjustments improve business performance and space utilization, they alter the originally intended architectural layout of the market, affecting its circulation performance, accessibility, environmental quality, and functionality (Ikhayere, Amhenya,

Louis, & Joseoph, 2025). According to Lefebvre's Theory of the Production of Space, built environments are socially constructed through constant negotiations between planned and lived spaces (Lefebvre, 1991). Rather than being static, spaces change through ongoing interactions between people and architecture. In public markets, this interaction occurs among vendors, market management, and customers, leading to ongoing morphological changes that affect the market's spatial structure and architecture (Kamalipour & Peimani, 2019).

Past studies have studied public markets using approaches that focused on urban informality, governance, sanitation, economic development, and market management (Carmen, Lima, Te, Toledo, & Hernando, 2020; Dulay, Eligue, Reyes Jr., & Tolentino, 2024). Similarly, researchers have addressed concerns regarding congestion, vendor encroachment, circulation problems, and informal spatial practices (Romero, Paulino, Tan, & Cortez, 2024; Remolino, et al., 2023). Nonetheless, past studies have mainly focused on economics and administration of public markets, but few have considered the architectural significance of negotiated spaces. In particular, there is limited empirical literature that explores the architectural implications of negotiated spaces as observable morphological changes like footprint enlargement of stalls, enclosure changes, reduction of circulation spaces, and spatial overlap in public market settings (Ikhayere, Amhenya, Louis, & Joseoph, 2025; Giddings, 2016). In sum, the architectural implications of negotiated spaces have not yet been adequately addressed, especially within Philippine public markets where commercial pressures lead to reconfiguration of built environments (Remolino, et al., 2023). Toril Public Market in Davao City is a good example of such scenarios. As one of the city's main public markets, it constantly transforms its spatial configuration through interventions by vendors themselves, driven by need and economic reasons. Although changes like these are readily visible, there has been little research on architecture that would explain how spatial negotiations altered the market's initial spatial configuration and operations (City Government of Davao, 2024).

Moreover, this paper is relevant to the UN Sustainable Development Goals, particularly Sustainable Cities and Communities, as it contributes to creating adaptable, inclusive, and resilient public spaces. In addition, Decent Work and Economic Growth are also supported through enhanced knowledge about the spatial dynamics that contribute to sustaining local livelihoods, as well as through Industry, Innovation and Infrastructure, as it provides evidence for designing the architecture of infrastructure adaptively (United Nations, 2015).

Based on Lefebvre's theory of the production of space (Lefebvre, 1991), this study attempts to examine the process by which negotiated space between the vendors and market administrators translates into morphological adaptation of the informal market stalls in Toril Public Market, Davao City. This study conducts morphological analysis, documents the spatial transformation, and conducts stakeholder interviews to understand the transformation and its impacts on circulation, accessibility, and functional architecture. Finally, this paper contributes to architectural knowledge by evidencing the relationship between negotiated spatial practices and morphological adaptation.

LITERATURE REVIEW

The Production of Space and Negotiated Boundaries in Urban Markets

Public markets reveal tensions between formally planned layouts and the ways vendors and customers use space in everyday life. Lefebvre's (1991) theory of the production of space provides a lens for examining how planned environments are reshaped through social practices. This perspective draws attention to the relationship between formal spatial planning and users' lived experiences (Zieleniec, 2018), while Pavo's (2019) study of Davao City's night market offers a local application of space as practiced. Together, these perspectives inform the analysis of how everyday activities and negotiations between vendors and market authorities shape stall boundaries and shared circulation spaces in Toril Public Market.

Lefebvre (1991) argues that space is not a neutral container but a social product, and that the "lived space" of users continuously contests the "conceived space" of architects as expressed in formal blueprints and regulations. This dialectical relationship yields what the researchers call "negotiated space", a condition where existing boundaries, such as stall lines and service alleys, are transformed into negotiable thresholds through constant bargaining between sellers and market authorities (Chu T. , 2010; Alya & Fuad, 2020). Vendors "claim" space beyond their legal boundaries with furniture, goods, and provisional constructions and rewrite the architectural program of the market hall on a daily basis. In urban markets, this negotiation is not only social, but has direct physical manifestations (Oriard Colin, 2015).

Lefebvre scholars have theorized extensively on spatial production, theorizing that every urban space is produced through three interrelated dimensions: representational spaces (lived space), spatial practice (perceived space), and representations of space (conceived space) (Schmid, Stanek, & Moravánszky, 2016). The representational spaces of market context concern the symbolic meanings and emotional attachments that users develop.

Representations of space concern municipal law and architecture. Spatial practice is the everyday practices of buyers and vendors. This triadic concept means that the physical form of markets is not static but is constantly produced through the interaction of these three dimensions (Zieleniec, 2018).

The recent literature highlights how this process creates a "boundary friction" where the rigid lines of the original design are softened by the constant overlap of store activity and public circulation (Giddings, 2016). Markets are inherently political because of struggles over access to, control over, and the right to use urban space. Contemporary research on urban informality shows that these kinds of negotiations are often motivated by economic survival (Romero, Paulino, Tan, & Cortez, 2024) and that the physical market structure directly reflects local livelihood strategies. The spatial practices of vendors produce a kind of "everyday urbanism" that contests the principles of top-down planning (Knierbein, 2023).

In various cultural settings, research on marketplaces across Southeast Asia and Latin America has shown how vendors make strategic use of spatial behaviors to increase economic visibility and claim their territorial space in the market. Such behaviors include displaying their goods to create visual and spatial boundaries, expanding the sales area by building temporary or makeshift structures, and negotiating with neighboring sellers about the common use of movement spaces (Karmilah, Surosohadi, & Puspitasari, 2017). As a result, the cumulative effect of such spatial behaviors may change the physical structure of the market, resulting in a different morphology than the one that was originally envisaged or planned (Ojeda & Pino, 2019).

To analyze the spatial dynamics of Toril Public Market, it is necessary to understand the concept of space as a phenomenon that is always being produced, appropriated, and negotiated (Dwisusanto & Juwita, 2022). The market space would not be conceived as a rigid physical place but as a relational one, where morphological alterations are the outcome of constant social and economic negotiations within the space by its users (Vargas Falla & Valencia, 2019). It means that the theoretical approach would enable understanding the alterations in stall sizes and modifications as not just physical actions, but an embodiment of vendors' spatial practices driven by economic factors and territorial claims (Schroeder, Pozo, & Medina, 2024). Thus, the Lefebvrian approach to the production of space would be useful for studying the dialectics of officially created market spaces and the spatial practices within them.

Typologies of Morphological Adaptations in Public Markets

Morphological adaptation refers to the physical transformation of built form, scale, configuration, and spatial organization over time (Ikhayere, Amhenya, Louis, & Joseoph, 2025; Stupar, Stanković, & Živanović, 2022). Within informal market settings, these adaptations may manifest as modifications to stalls, selling areas, circulation spaces, and other spatial components, as vendors respond to changing functional, social, and economic conditions (Navapan & Charoenkit, 2019; Ekomadyo & Triwardhani, 2024) . Identifying and classifying these transformations provides a systematic means of interpreting the varied and often incremental spatial changes that occur within public markets (Kamalipour & Iranmanesh, 2021). Through such typological classification, general observations of spatial change can be translated into specific and measurable morphological indicators, enabling changes in dimensions, spatial occupation, and circulation to be systematically documented and compared (Remolino, et al., 2023).

The morphological changes in the markets were identified as systematic responses to the constraints imposed by the formal stall designs (Ikhayere, Amhenya, Louis, & Joseoph, 2025). These changes are generally categorized into three types: horizontal expansion, vertical layering, and material improvisation (Ikhayere, Amhenya, Louis, & Joseoph, 2025; Navapan & Charoenkit, 2019). Horizontal adaptations to reconfigure circulation aisle width and create bottlenecks during peak trading hours include the outward expansion of booths into public walkways (Remolino G. , et al., 2023; Giddings, 2016). Vertical stacking uses the space above the stall for storage or signs, which often obstructs planned ventilation channels and creates visual clutter that obscures wayfinding (Navapan & Charoenkit, 2019; Ekomadyo & Triwardhani, 2024).

Additionally, "spatial designs" that do not account for the actual number of commodities or the intensity of trading operations in metropolitan areas often lead to these physical alterations (Ikhayere, Amhenya, Louis, & Joseoph, 2025; Berndt, Peck, & Rantisi, 2020). These changes are considered to be gradual and enduring in Southeast Asia (Navapan & Charoenkit, 2019; Chu T. , 2010), which have completely transformed the market's original spatial logic. Vendors are frequently forced to adopt these adjustments as semi-permanent survival strategies due to "reconstruction delays" in local Philippine marketplaces (Jamito, 2025 ; Romero, Paulino, Tan, & Cortez, 2024).

Other typologies highlighted by scholars include the "colonization" of service corridors for retail use, the transformation of loading docks into permanent stalls, and the enclosure of initially open-air areas with makeshift coverings (Maciocco, 2008). Each of these changes reflects a distinct reaction to economic pressure and spatial scarcity (González , 2017; van Eck & van Melik, 2023). All these changes together form a market that is completely different from what was initially planned for architecture-wise (Morange, 2015).

The above categories of changes will enable the study to move from general observation to measuring specific architectural attributes of the Toril Public Market, like stalls' geometries and lengths of expansions (Remolino, et al., 2023). Such a systematic classification makes it possible to more fully understand the influence of each stall modification on the general transformation of the market hall (Ghulyan, 2024). The analysis reveals that the changes are not random but rather follow a logical pattern based on vendor specifications and geographic constraints. These typologies will eventually serve as the "morphological markers" this research will use to chart the status of Toril Public Market.

Architectural Performance: Impact on Circulation and Functional Flow

The most important indicator of the efficiency of market construction is the fluidity of movement (Remolino, et al., 2023). This section is about the morphological changes that cause degeneration of the primitive circulation system (Chu T. , 2010; Ikhayere, Amhenya, Louis, & Joseoph, 2025). It sees the market not as a collection of stands, but as an institution that helps to organize trade and may well be regarded as something "breaking down" because of the change in its components (Berndt, Peck, & Rantisi, 2020). This performance-oriented viewpoint is crucial in determining the market's long-term sustainability (Remolino, et al., 2023; Kurniawati, Faisal, & Prakasa, 2024).

The architectural performance of a building is measured in terms of its ability to support the activities it is intended to serve in the market (Remolino, et al., 2023; Ekomadyo & Triwardhani, 2024). The "circulation" indicator seriously deteriorates with morphological modifications such as expansion and encroachment of the stalls, increasing the pedestrian density, and slowing down the transit times (Remolino, et al., 2023; Giddings, 2016). The "functional performance" of the market is also hindered by the blurring of commodity sectioning; service alleys may be turned into selling spaces, or meat vendors may intrude on dry goods sections (Chu T. , 2010; Navapan & Charoenkit, 2019).

As a result, the "designed logic" of the market, which prioritizes the efficient flow of people and commodities over the maximal store occupancy, is lost (Ikhayere, Amhenya, Louis, & Joseoph, 2025). These functional shortcomings are often observed in the "surprising inspection" reports of the Davao City LGU, when informal stalls utilize areas for waste collection or disposal (City Government of Davao, 2024). A market that works below its intended capacity, with longer shopping times, more traffic, and lower consumer satisfaction, is the cumulative effect (Remolino, et al., 2023; Dulay, Eligue, Reyes Jr., & Tolentino, 2024).

Performance degradation also affects the market's ability to respond to changing retail trends and consumer preferences (Taylor & González, 2024; González , 2017). It is difficult for markets with poor circulation and functional zoning to accept new vendors, enhance hygiene, or incorporate contemporary retail technologies (Kurniawati, Faisal, & Prakasa, 2024; Karmilah, Surosohadi, & Puspitasari, 2017). As a result, there is a vicious cycle of deterioration whereby low performance results in lower investment, which makes spatial issues worse (Morange, 2015).

Spatial adaptations may support vendors' operational needs while creating constraints on circulation and shared-space use (Remolino, et al., 2023; Ekomadyo & Triwardhani, 2024). This study examines how these competing outcomes are manifested in the selected stalls of Toril Public Market.

METHODS

The study employed a convergent mixed-methods research design that integrates quantitative comparative spatial analysis and qualitative investigation to examine the manifestations of negotiated space through morphological adaptations of informal market stalls in the Toril Public Market, Davao City. The study operationalized the three dimensions of space as analytical variables based on Henri Lefebvre's Theory of the Production of Space: conceived space (original market layout), lived space (negotiated spatial practices), and spatial practice (observable morphological adaptations). A holistic understanding of the relation between social negotiation and architectural transformation was possible through the combination of quantitative and qualitative data (Lefebvre, 1991; Creswell & Plano Clark, 2018).

For the qualitative part, participants with direct knowledge and experience of the market's spatial use and transformation were selected through purposive sampling based on specific criteria. Nineteen participants were interviewed: 15 market vendors, 1 market official/administrator, and 3 long-time market users. Data were collected until data saturation was achieved. Saturation was achieved through ongoing review and comparison of interview responses as data were collected. As the interviews progressed, common responses and patterns emerged, particularly regarding stall modifications, spatial negotiation, circulation limitations, and the interactions between vendors and market authorities. The final interviews did not yield any new codes, themes, or substantive information relevant to the research objectives, indicating that further interviews were unlikely to reveal substantially new insights. Thus, 19

participants were deemed adequate to achieve data saturation and provide sufficient depth and credibility for the qualitative findings (Guest, Bunce, & Johnson, 2006; Creswell & Plano Clark, 2018; Yin, 2018).

Table 1. Distribution of qualitative interview participants

Stakeholder group	Number (*n*)	Basis for inclusion
Market vendors	**15**	Direct experience with stall use, modification, storage, display, and spatial negotiation
Market officials/administrators	1	Knowledge of stall allocation, market regulations, enforcement, and management practices
Long-time market users/customers	**3**	Long-term experience of circulation, accessibility, and changes in market configuration
Total	**19**	

Vendors were the everyday users who directly change and negotiate the stall spaces; market officials/administrators represented the institutional perspective on stall allocation, regulation, and management; and longtime market users observed changes in circulation, accessibility, and the spatial configuration over time. The quantitative component involved measuring 17 stalls selected through criterion-based purposive sampling within the defined study area of Toril Public Market, Davao City. Stalls were included based on clear morphological adjustments, such as stall-footprint extensions, enclosure modifications, vertical layering, and encroachments into circulation aisles. The sample comprised 11 stalls from the dry goods section and 6 stalls from the wet goods section. The final sample of 17 reflected adequate coverage of different commodity types and observable morphological adaptation typologies within the market. Of the 15 vendors interviewed, 15 operated stalls that were also included in the measurement sample. Stall measurements were used to compare original and current areas and document the extent of spatial expansion.

The semi-structured interview guide (See Table 2) was organized into six major domains aligned with the study's analytical lens. Conceived Space: The first domain studied the initial stall configuration. This domain studied the dimensions, materials, boundaries, management rules, and circulation conditions of the initial configuration to determine the formally planned spatial condition of the market. The second domain, Negotiated Space, examined how vendors altered their stalls, sought permission, negotiated with market authorities, and responded to informal agreements or tolerated practices that allowed them to use additional space.

The third domain was Spatial Practice, which concerned the physical expressions of morphological adaptation, such as horizontal and vertical extensions, changes in enclosures, encroachment of aisles, storage arrangements, and the slow evolution of stall modifications. The fourth domain, Power Dynamics and Enforcement, examined the roles of market authorities, vendors, and vendor associations in spatial decision-making, as well as experiences of conflict, compromise, enforcement, and participation in market policies.

The fifth domain, Architectural and Functional Implications, examined the impact of stall modifications on circulation, accessibility, congestion, commodity zoning, and overall market functionality, and sought suggestions to improve the market layout. The final domain, Reflection and Policy Recommendations, gathered participants' views on the most significant modifications affecting their business operations and their recommendations for future market spatial policies. Together, these domains allowed the interviews to capture both the social processes of spatial negotiation and their physical architectural outcomes, supporting the study's mixed-methods interpretation of morphological change in Toril Public Market.

The researchers used different research instruments to provide methodological triangulation. Qualitative data were collected through semi-structured interviews, respondent profile sheets, and systematic photo documentation and annotation sheets. The instruments probed vendors' spatial practices, their perceived constraints, negotiated arrangements with market authorities, and experiences regarding the evolution of stall configurations. During the as-built survey, quantitative data were collected using morphological measurement sheets, while baseline information was gathered using document analysis templates from original architectural plans, municipal ordinances, and market policy documents. Together, these instruments provided visual and measurable evidence for spatial transformation.

Data collection comprised three complementary components informed by Lefebvre's theory of the production of space (Lefebvre, 1991). First, archival plans, architectural drawings, and municipal documents were reviewed to establish the market's formally planned spatial configuration. The original plans were digitized in AutoCAD to identify baseline stall dimensions, designated aisle widths, enclosure configurations, and circulation routes. Second, spatial negotiation was investigated through interviews, observations, and document analysis to examine how interactions between vendors and market authorities shaped stall modifications and the use of shared spaces. Third, morphological adaptations were documented through systematic architectural measurements, photographic

documentation, and comparative CAD overlays. Laser measurements of current stall dimensions, extensions, and clear aisle widths were compared with the original architectural plans to identify changes in stall footprints and circulation spaces. Together, these components connected the planned spatial configuration with observed physical changes and participants' accounts of everyday spatial use (Lefebvre, 1991; Remolino, et al., 2023; Navapan & Charoenkit, 2019; Ekomadyo & Triwardhani, 2024).

Table 2. Summary of Semi-Structured Interview Guide

Interview Domain	Questions	Main Focus of Inquiry	Relation to the Study
Conceived Space: Original Market Layout	Q1	Original stall dimensions, materials, physical boundaries, management rules, original circulation and spatial arrangement	Establishes the formally conceived space against which later modifications are compared
Negotiated Space: Spatial Negotiations and Practices	Q2–Q4	Stall modifications, reasons for changes, permission processes, negotiation with market authorities, informal agreements, tolerance, and compromises	Examines how vendors and authorities negotiate the use and expansion of space
Spatial Practice: Morphological Adaptations	Q5–Q8	Horizontal and vertical extensions, enclosure changes, materials, aisle occupation, storage/display practices, evolution of modifications over time	Identifies the physical manifestations and processes of morphological adaptation
Power Dynamics and Enforcement	Q9–Q10	Influence over stall-space use, conflicts, regulatory enforcement, vendor participation, differences in enforcement, and decision-making	Explores the institutional and social relationships shaping spatial negotiation
Architectural and Functional Implications	Q11–Q13	Effects on circulation, congestion, accessibility, commodity zoning, market functionality, and suggested design improvements	Assesses the architectural consequences of stall adaptation
Reflection and Policy Recommendations	Q14–Q15	Most important modifications, perceived business benefits, recommendations for future spatial policies, control and flexibility	Identifies vendors' perceived benefits, priorities, and recommendations for market management

Quantitative data were analyzed descriptively, including stall dimensions, spatial expansion, enclosure changes, and circulation changes. Significant differences between the original and existing stall areas were determined using a paired-samples t-test. Qualitative interview data were transcribed, coded, and analyzed through (Braun & Clarke, 2006) thematic analysis to identify recurring themes relating to negotiated spatial practices. To strengthen the validity and reliability of the study, methodological triangulation was used to combine the results of the interviews, spatial measurements, CAD overlay analysis, photo documentation, and official market records (Creswell & Plano Clark, 2018).

RESULTS AND DISCUSSION

This section presents the results of the comparative spatial analysis, CAD mapping overlay, photo annotation, and qualitative interviews conducted in Toril Public Market. The results are organized to show how negotiated spatial practices have changed the market's architectural morphology. Quantitative results are discussed in relation to Lefebvre's Theory of the Production of Space and interpreted with qualitative evidence.

Table 3. Descriptive statistics of stall geometry expansion

Indicator	Mean	Minimum	Maximum
Original stall area (m²)	5.19	2.50	9.00
Current stall area (m²)	10.03	4.94	16.00
Extension length (m)	0.69	0.00	1.50
Extension width (m)	1.01	0.40	1.50

Table 3 presents the descriptive statistics for stall expansion in Toril Public Market. The mean stall area increased from 5.19 m² to 10.03 m², representing a 93.26% increase relative to the original mean area. Expansion varied across the recorded stalls, with the largest increase documented at 189.80%. The mean extension width of 1.01 m indicates the extent of outward growth. Where these extensions occupied adjacent circulation areas, they reduced the space available for pedestrian movement and extended commercial activities into shared public space.

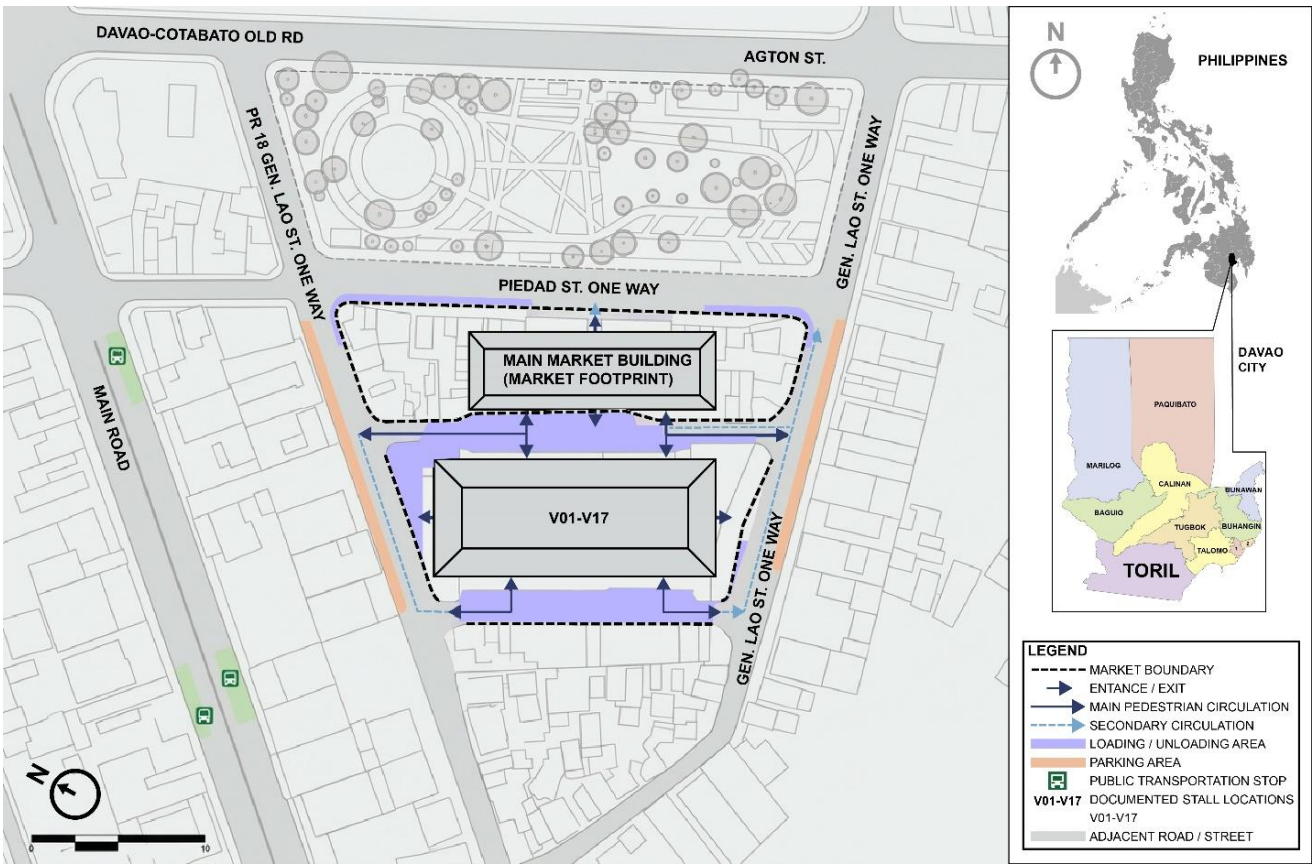


Fig 1. Spatial Context Plan of Toril Public Market

Before examining the individual morphological adaptations of the documented stalls, the broader spatial context of Toril Public Market was mapped to identify the market's relationship with its surrounding access, circulation, service, parking, and public transportation systems. Figure 1 presents the overall market boundary, major entrances and circulation routes, loading and unloading areas, parking spaces, public transportation interfaces, commodity zones, and the locations of the documented stalls. This spatial context provides a basis for interpreting how operational requirements, pedestrian movement, and access conditions may contribute to the observed patterns of stall expansion and spatial encroachment.

Figure 2 compares the original and existing spatial configuration of Toril Public Market and illustrates how incremental stall modifications have altered the intended relationship between commercial and circulation spaces. The overlay shows that several stall areas have extended beyond their original boundaries, resulting in additional protrusions and encroachments into adjacent circulation paths. These changes indicate that the existing market configuration no longer fully corresponds with the original planned layout, particularly in areas where stall extensions have progressively occupied portions of the designated pedestrian space.

The comparison further demonstrates that the transformation is not limited to isolated stalls but reflects a broader pattern of spatial appropriation across the market. The original layout was characterized by clearly defined stall footprints and circulation paths, whereas the existing condition shows increasing overlap between selling, storage, display, and pedestrian functions. This spatial overlap is consistent with the measured increase in stall areas and the documented reduction in aisle widths, suggesting that negotiated spatial practices have gradually reconfigured the market's formal organization into a more flexible yet increasingly constrained spatial arrangement.

From the perspective of Lefebvre's Theory of the Production of Space, the comparative overlay provides visual evidence of the interaction between conceived space, represented by the original market plan, and lived and practiced space, represented by the present-day modifications introduced through everyday vendor activities. The resulting morphology reflects an ongoing negotiation between formal spatial regulation and operational needs, where stall boundaries, circulation areas, and shared spaces are continuously redefined through use. In this sense, Figure 2 supports the interpretation of Toril Public Market as a negotiated spatial environment in which architectural form evolves through cumulative, user-driven adaptations rather than remaining fixed according to the original design.

Legend: *Original:* Original Area Circulation Paths
Existing: Original Area Stall Extension Constricted Circulation Paths Secondary Stall Protrusions

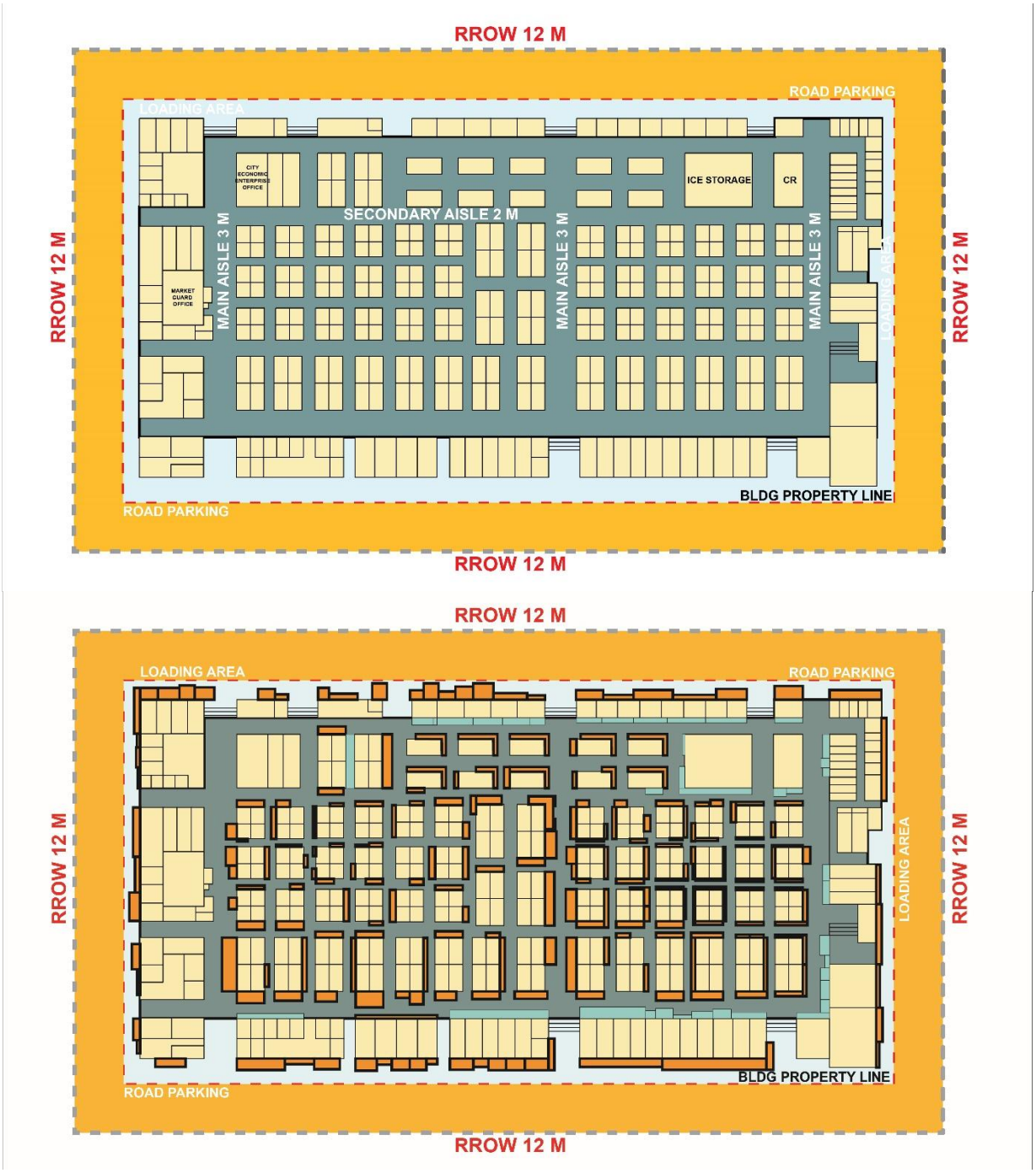


Fig 2. Comparative CAD overlay of original (above) and existing (below) market layout

Table 4. Paired-samples *t*-test comparing original and current stall areas

Measure 1		Measure 2	t	df	p	Cohen's d	SE Cohen's d	Lower	Upper
Original Area (m²)	-	Current Area (m²)	-9.36	16	< .001	-2.27	0.20	-3.17	-1.35

Note. Student's t-test.

Test of Normality (Shapiro-Wilk)				
			W	p
Original Area (m²)	-	Current Area (sqm)	0.94	.313

Note. Significant results suggest a deviation from normality.

The results of a paired-samples t-test comparing the original and current stall areas after morphological adaptation are reported in Table 4. The analysis showed a statistically significant increase in stall area, $t(16) = -9.36$, $p < .001$, Cohen's $dz = -2.27$, 95% CI [−3.17, −1.35]. The results indicate that vendors made many operational changes to greatly increase their original allotment of space by expanding their stalls, adding displays, spilling over

into storage areas, and other operational changes. The paired comparison demonstrates a substantial increase in area among the selected stalls. Interview accounts and spatial documentation help explain how operational demands and negotiated arrangements accompanied these changes.

The results show that informal spatial adaptation is not an independent phenomenon but a cumulative process that gradually transforms the market's spatial organization, and that this transformation is statistically significant. The expansion of stall footprints indicates the ongoing tension between formal planning and quotidian commercial practices and affirms Lefebvre's (1991) assertion that built environments are socially produced through successive spatial interventions. What was once an architectural hierarchy of designated stalls and circulation spaces has become a negotiated spatial configuration responsive to changing operational and economic needs.

Table 5. Descriptive statistics of aisle width reduction

Indicator	Mean	Minimum	Maximum
Original Aisle Width (m)	2.21	2.00	3.00
Current Aisle Width (m)	0.93	0.40	1.50
Aisle Reduction (m)	1.28	0.80	2.00

Table 5 presents descriptive data on the reduction in aisle width in the market circulation system. The results indicated a 57.92% reduction in clear aisle width, and the average aisle width decreased from 2.21 meters to 0.93 meters. The largest reduction reported was 2.00 m. This indicates very high levels of encroachment across various parts of the market. The results indicate that circulation lanes are increasingly occupied by tables, storage containers, goods displays, and temporary constructions, which greatly reduce pedestrian mobility, accessibility, and circulation efficiency in the market setting.

Table 6. Comparative analysis of original and existing aisle widths

Aisle ID	Original Width (m)	Current Width (m)	Reduction (m)	Reduction %	Cause
V03 Fruits	2.00	0.50	1.50	75.00%	Crates & Goods
V05 Vegetables	2.00	0.50	1.50	75.00%	Tables, Crates & Display
V10 Fish	2.00	0.40	1.60	80.00%	Storage Boxes & Equipment
V14 Chicken Meat	3.00	1.00	2.00	66.67%	Tables & Storage Boxes
V15 Live Chicken	2.00	0.60	1.40	70.00%	Tables & Cages
V17 Varieties	2.50	1.20	1.30	52.00%	Tables & Display Hangs

Table 6 compares the original and current aisle widths in certain market areas. Results indicated the greatest reductions in circulation occurred in high levels of storage goods, display tables, boxes, and operational equipment. The largest loss was 80 percent, with only 0.4 meters of usable circulation space left in the fish portion. Likewise, the fruit and vegetable and live poultry zones also suffered heavy circulation losses due to longer displays, cages, and piled goods. The results suggest that the growth of the outer stall and operational spillovers were important factors in the decline in circulation and loss of market access.

Table 7. Morphological adaptations of documented stalls

Morphological Adaptation	Number of Stalls	Percentage
Constricted Circulation Paths	17	100.00%
Horizontal Stall Extension	14	82.35%
Secondary Stall Protrusions	10	58.82%
Vertical Display Stall Extension	9	52.94%
Aisle Encroachment (Storage)	9	52.94%
Enclosure Patterns	5	29.41%

Table 7 summarizes the morphological adaptations documented among the 17 selected stalls. Constricted circulation paths were observed adjacent to all documented stalls (100%). Horizontal stall extensions were recorded in 14 stalls (82.35%), secondary protrusions in 10 (58.82%), vertical display extensions and aisle encroachment for storage in nine each (52.94%), and enclosure modifications in five (29.41%). Multiple adaptations could occur within a single stall; therefore, the categories are not mutually exclusive, and their percentages do not sum to 100%. These results describe the recorded adaptation categories, whereas Table 3 reports changes in measured stall areas.

Table 8. Summary indicators of stall morphological adaptations

Indicator	Value	Morphological Implication
Stall Expansion	93.26%	Increase in mean stall area
Aisle Reduction	1.28 m	Circulation constriction
Constricted Circulation Frequency	100%	Circulation constraints adjacent to sampled stalls
Horizontal Stall Extension Frequency	82.35%	Dominant adaptation pattern

Table 8 summarizes the documented morphological changes among the 17 selected stalls. Mean stall area increased by 93.26%, while mean aisle width decreased by 1.28 m. Constricted circulation paths were observed adjacent to all documented stalls, and horizontal extensions were recorded in 82.35%. Together, these indicators show how enlarged stall footprints and spatial obstructions altered the relationship between allocated commercial areas and shared circulation spaces.

(a) Eatery Section

Original Allocation **Existing / Modified**



Graphic Legend

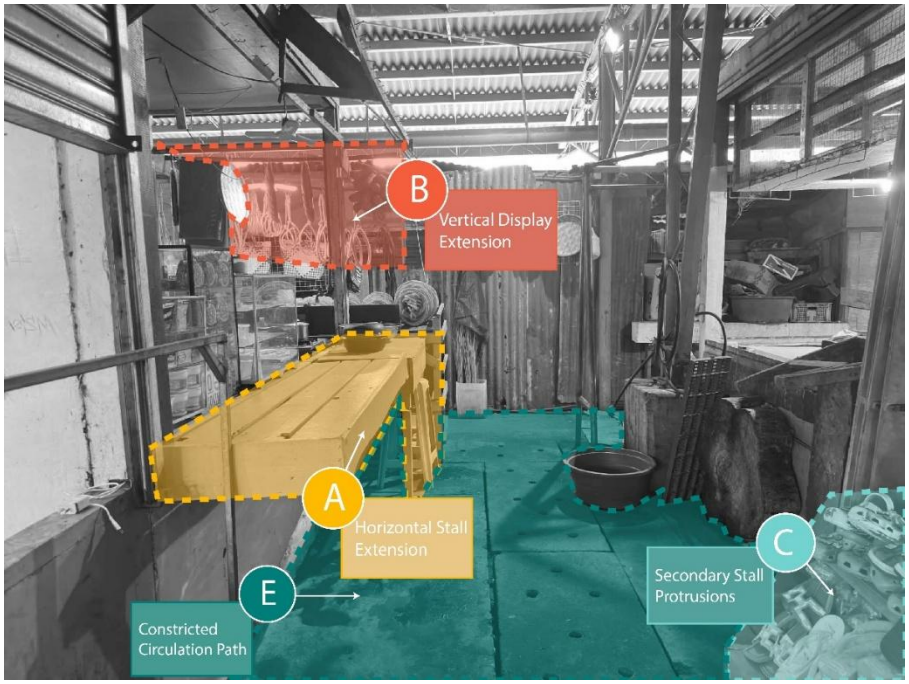
Original: Original Area Circulation Paths

Existing: Original Area Stall Extension Constricted Circulation Paths Secondary Stall Protrusions

Photo Annotation Key

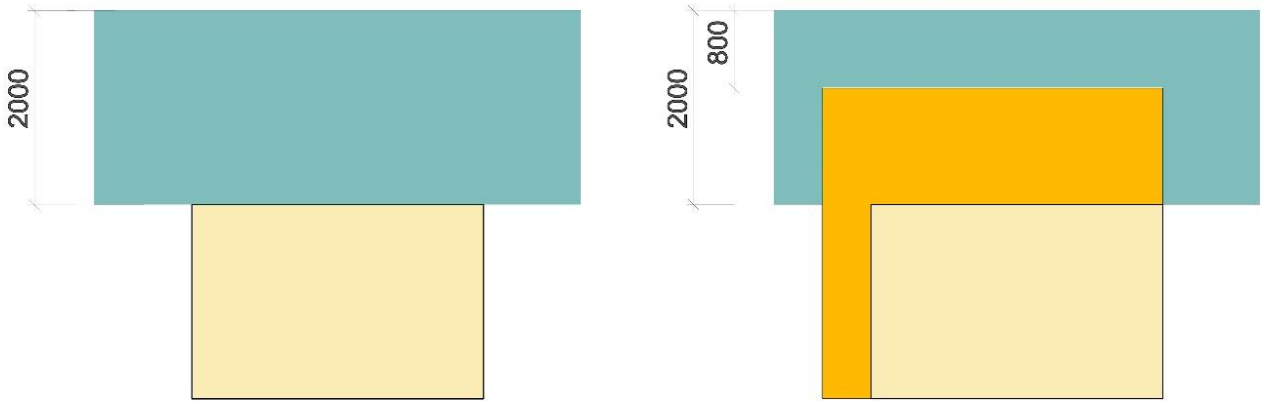
A. Horizontal Stall Extension B. Vertical Display Stall Extension C. Secondary Stall Protrusions

D. Aisle Encroachment (Storage) E. Constricted Circulation Paths F. Enclosure Patterns



(b) Dried Fish Section

Original Allocation **Existing / Modified**



Graphic Legend

Original: Original Area Circulation Paths

Existing: Original Area Stall Extension Constricted Circulation Paths Secondary Stall Protrusions

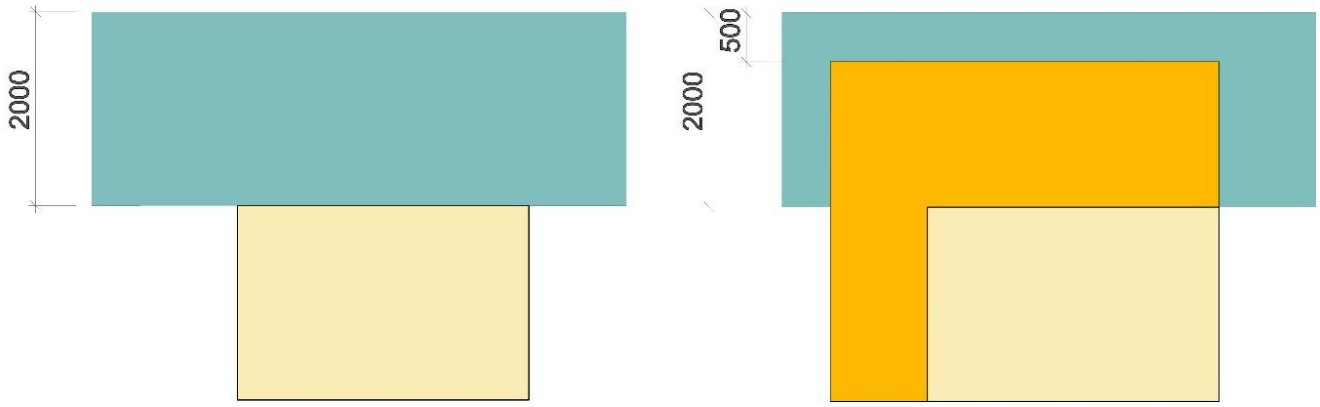
Photo Annotation Key

A. Horizontal Stall Extension
B. Vertical Display Stall Extension
C. Secondary Stall Protrusions
D. Aisle Encroachment (Storage)
E. Constricted Circulation Paths
F. Enclosure Patterns



(c) Fruits Section

Original Allocation **Existing / Modified**

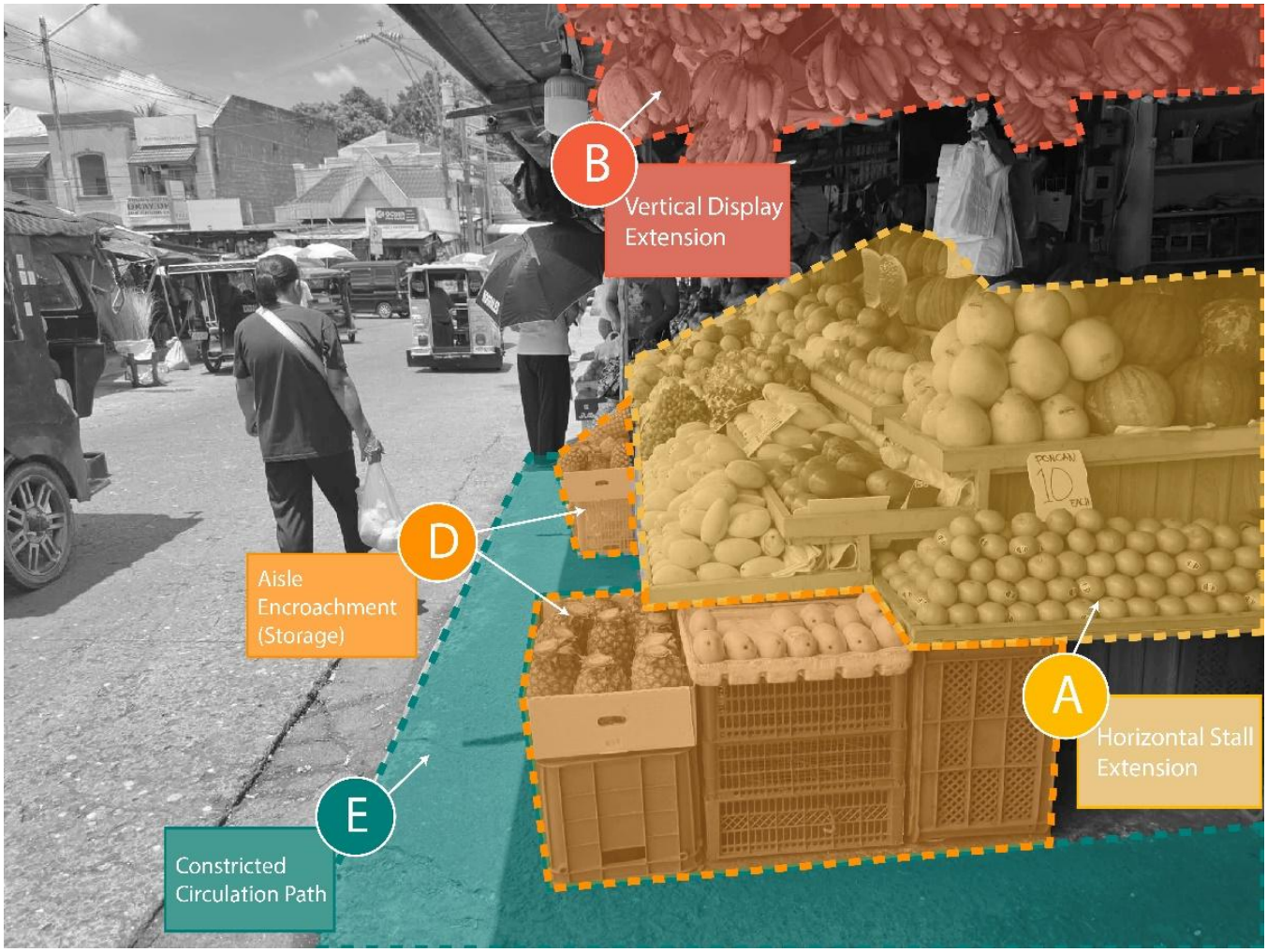


Graphic Legend

Original: Original Area Circulation Paths
Existing: Original Area Stall Extension Constricted Circulation Paths Secondary Stall Protrusions

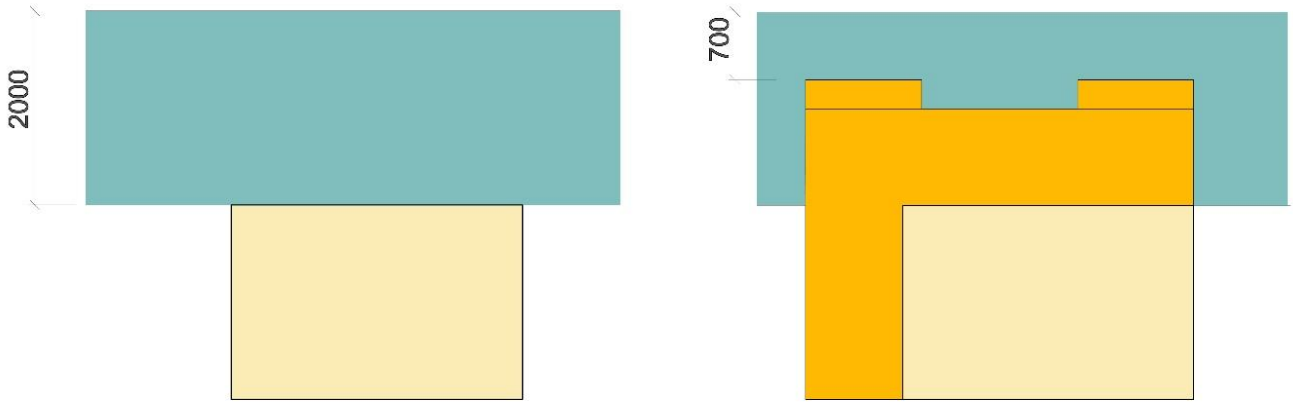
Photo Annotation Key

A. Horizontal Stall Extension
B. Vertical Display Stall Extension
C. Secondary Stall Protrusions
D. Aisle Encroachment (Storage)
E. Constricted Circulation Paths
F. Enclosure Patterns



(d) Vegetables Section

Original Allocation **Existing / Modified**



Graphic Legend

Original: Original Area, Circulation Paths

Existing: Original Area, Stall Extension, Constricted Circulation Paths, Secondary Stall Protrusions

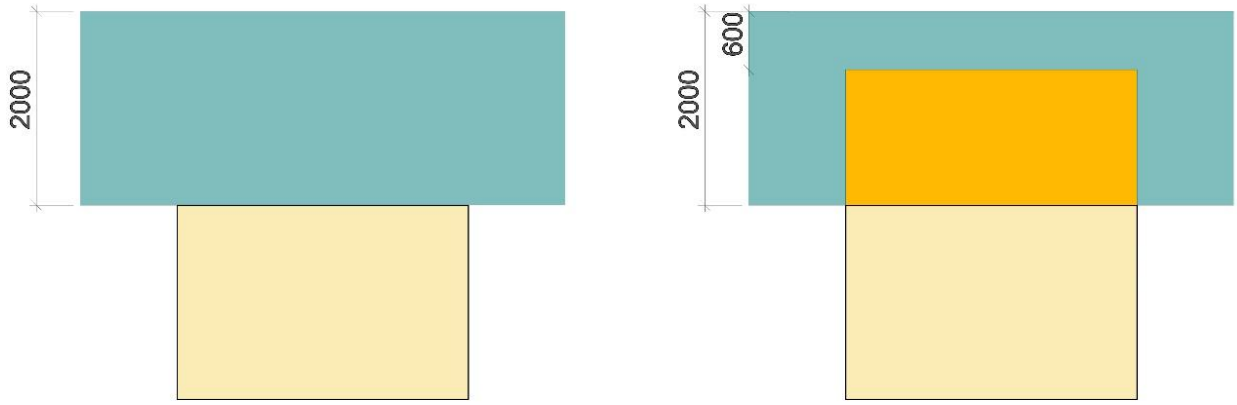
Photo Annotation Key

A. Horizontal Stall Extension
B. Vertical Display Stall Extension
C. Secondary Stall Protrusions
D. Aisle Encroachment (Storage)
E. Constricted Circulation Paths
F. Enclosure Patterns



(e) Rice and Grains Section

Original Allocation **Existing / Modified**



Graphic Legend

Original: Original Area Circulation Paths
Existing: Original Area Stall Extension Constricted Circulation Paths Secondary Stall Protrusions

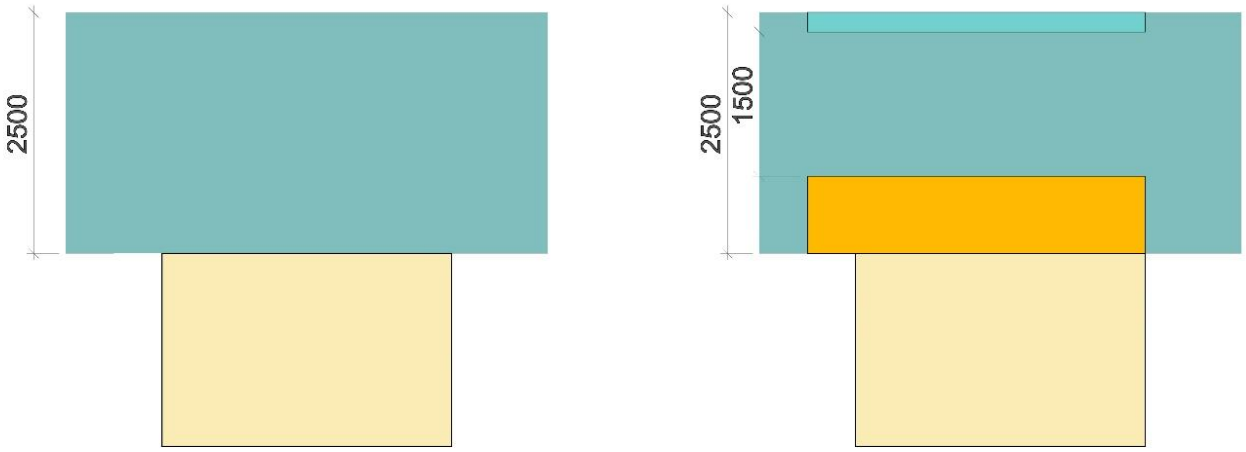
Photo Annotation Key

A. Horizontal Stall Extension
B. Vertical Display Stall Extension
C. Secondary Stall Protrusions
D. Aisle Encroachment (Storage)
E. Constricted Circulation Paths
F. Enclosure Patterns



(f) Groceries Section

Original Allocation **Existing / Modified**



Graphic Legend

Original: Original Area Circulation Paths
Existing: Original Area Stall Extension Constricted Circulation Paths Secondary Stall Protrusions

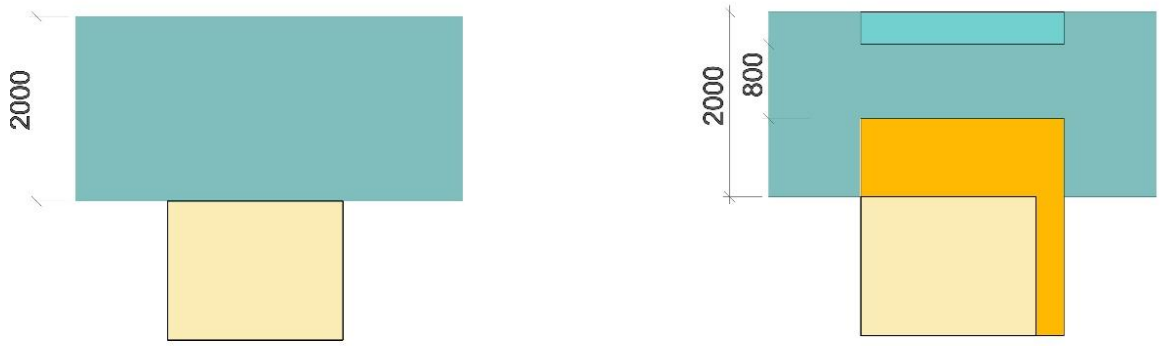
Photo Annotation Key

A. Horizontal Stall Extension
B. Vertical Display Stall Extension
C. Secondary Stall Protrusions
D. Aisle Encroachment (Storage)
E. Constricted Circulation Paths
F. Enclosure Patterns



(g) Fish Section

Original Allocation **Existing / Modified**

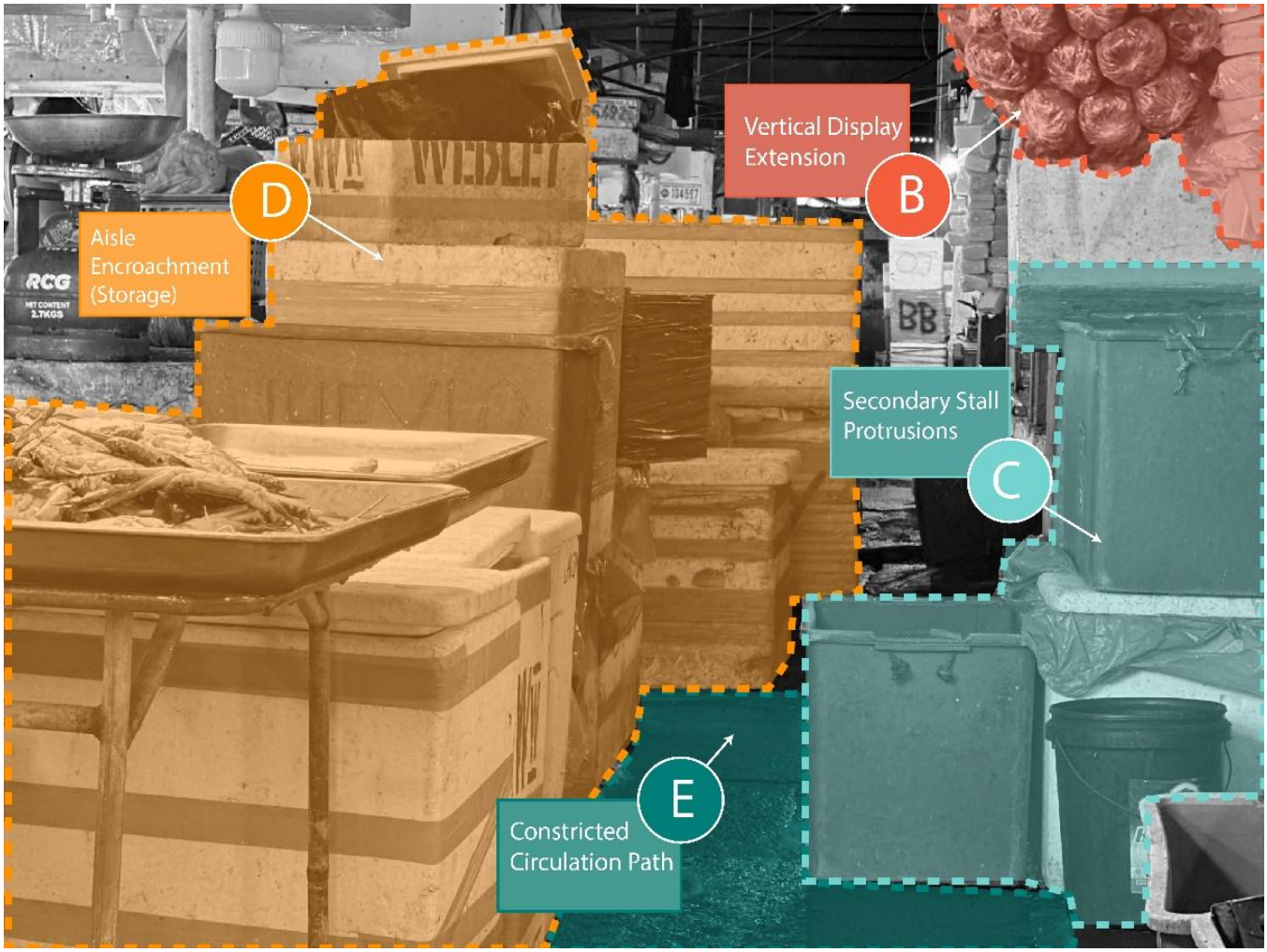


Graphic Legend

Original: Original Area Circulation Paths
Existing: Original Area Stall Extension Constricted Circulation Paths Secondary Stall Protrusions

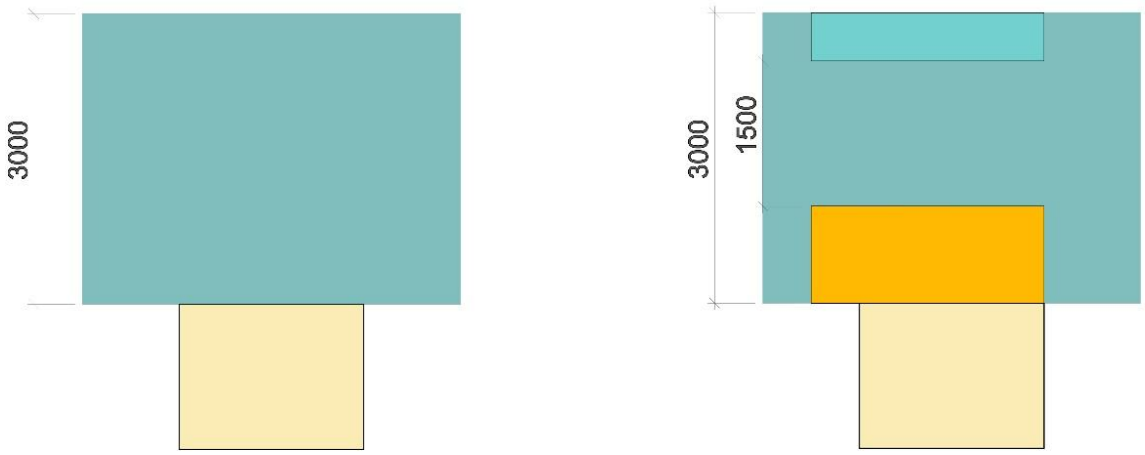
Photo Annotation Key

A. Horizontal Stall Extension
B. Vertical Display Stall Extension
C. Secondary Stall Protrusions
D. Aisle Encroachment (Storage)
E. Constricted Circulation Paths
F. Enclosure Patterns



(h) Meat Section

Original Allocation **Existing / Modified**



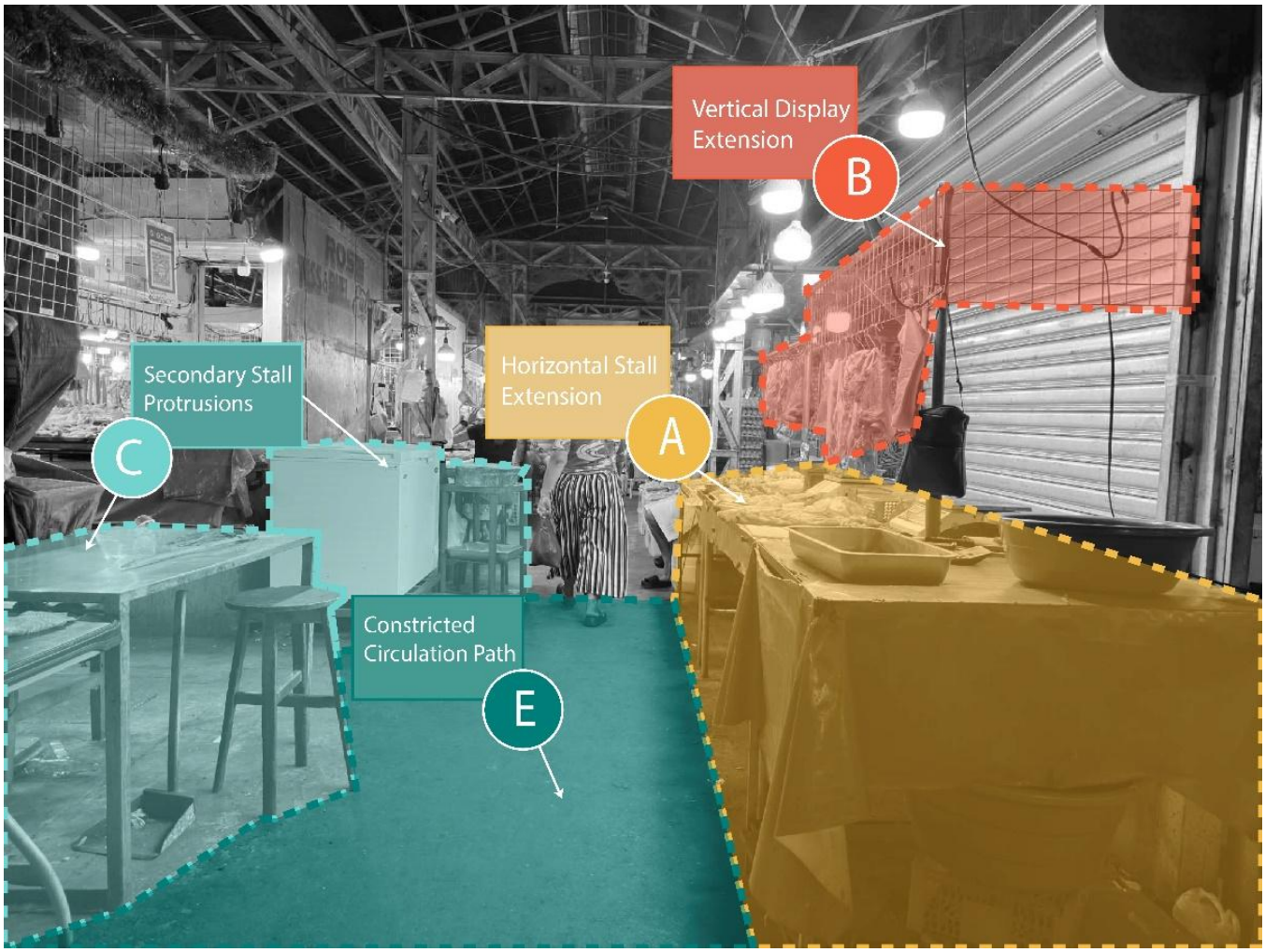
Graphic Legend

Original: Original Area, Circulation Paths

Existing: Original Area, Stall Extension, Constricted Circulation Paths, Secondary Stall Protrusions

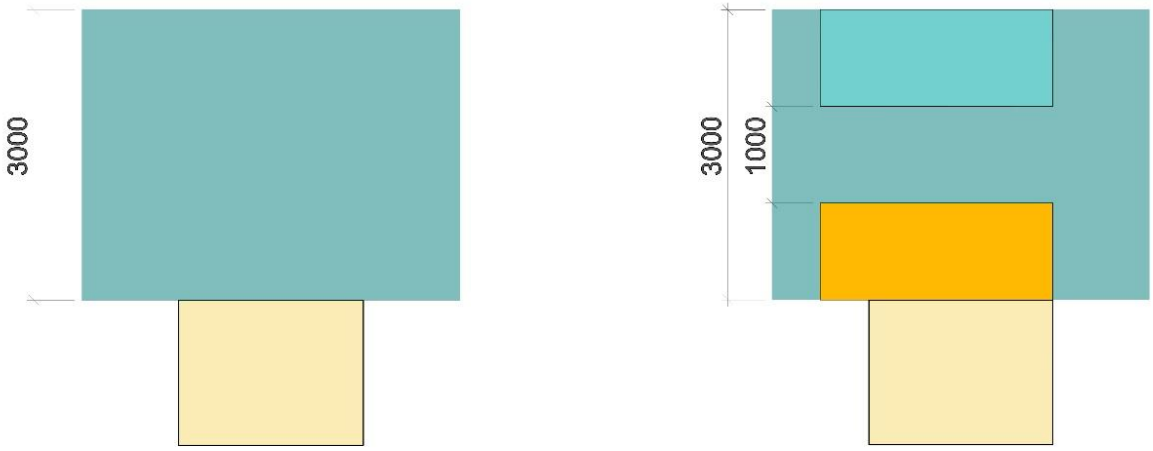
Photo Annotation Key

A. Horizontal Stall Extension
B. Vertical Display Stall Extension
C. Secondary Stall Protrusions
D. Aisle Encroachment (Storage)
E. Constricted Circulation Paths
F. Enclosure Patterns



(i) Chicken Meat Section

Original Allocation **Existing / Modified**



Graphic Legend

Original: Original Area Circulation Paths
Existing: Original Area Stall Extension Constricted Circulation Paths Secondary Stall Protrusions

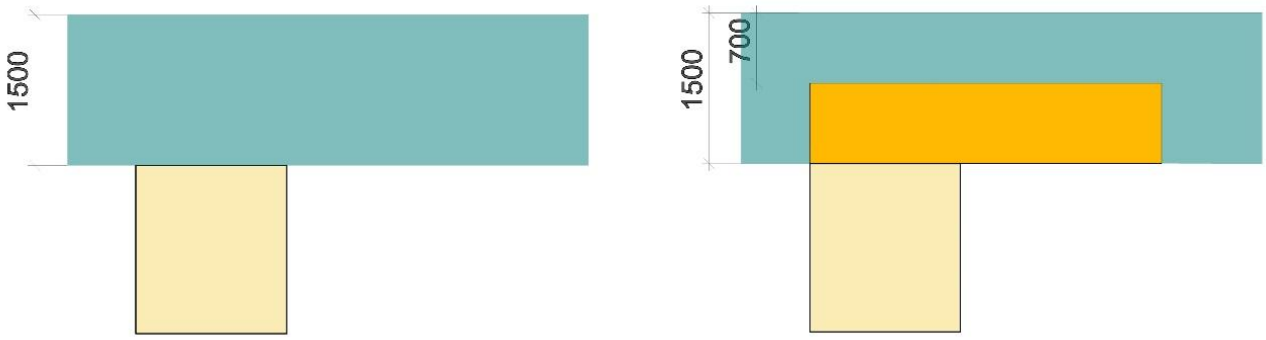
Photo Annotation Key

A. Horizontal Stall Extension
B. Vertical Display Stall Extension
C. Secondary Stall Protrusions
D. Aisle Encroachment (Storage)
E. Constricted Circulation Paths
F. Enclosure Patterns



(j) Live Chicken Section

Original Allocation **Existing / Modified**



Graphic Legend

Original: Original Area Circulation Paths

Existing: Original Area Stall Extension Constricted Circulation Paths Secondary Stall Protrusions

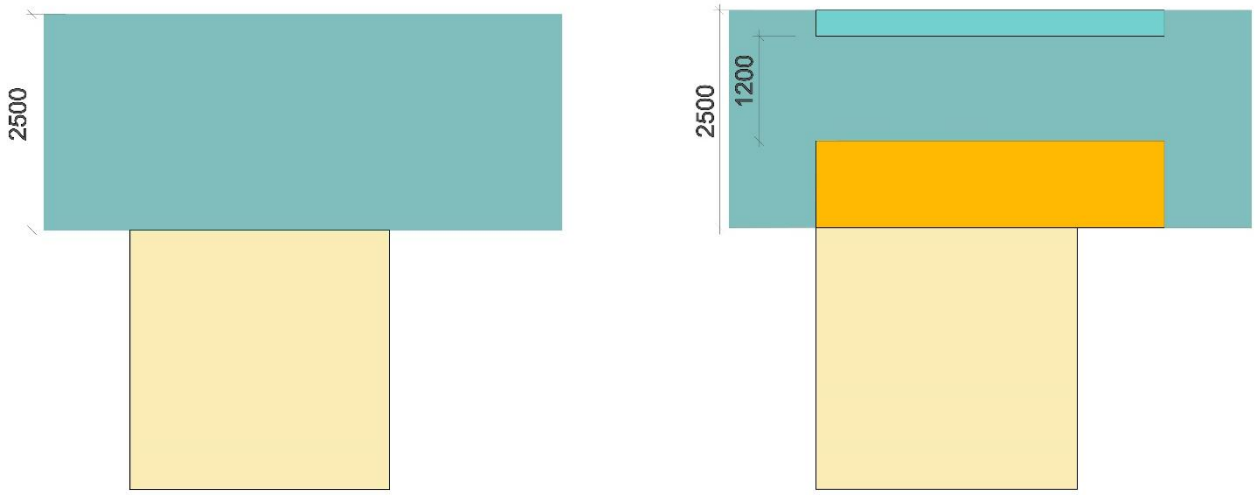
Photo Annotation Key

A. Horizontal Stall Extension
B. Vertical Display Stall Extension
C. Secondary Stall Protrusions
D. Aisle Encroachment (Storage)
E. Constricted Circulation Paths
F. Enclosure Patterns



(k) Varieties

Original Allocation **Existing / Modified**



Graphic Legend

Original: Original Area Circulation Paths
Existing: Original Area Stall Extension Constricted Circulation Paths Secondary Stall Protrusions

Photo Annotation Key

A. Horizontal Stall Extension
B. Vertical Display Stall Extension
C. Secondary Stall Protrusions
D. Aisle Encroachment (Storage)
E. Constricted Circulation Paths
F. Enclosure Patterns



Fig 3. Comparative CAD overlays and photographic documentation of morphological adaptations in Toril Public Market by commodity section: (a) Eatery Section; (b) Dried Fish Section; (c) Fruits Section; (d) Vegetables Section; (e) Rice and Grains Section; (f) Groceries Section; (g) Fish Section; (h) Meat Section; (i) Chicken Meat Section; (j) Live Chicken Section; and (k) Varieties Section.

Figure 3 (a–k) presents the spatial and morphological adaptations of selected commodity stalls in Toril Public Market through comparative AutoCAD mapping overlays and corresponding photographic annotations. The

comparison between the original and current configurations shows how vendor-induced spatial adaptations have gradually altered the market's original architectural layout. The adaptations made by the documented stalls are horizontal extensions of the stalls, vertical extensions of the display, secondary protrusions of the stalls, encroachment of the aisles for storage, constriction of the circulation paths, and modifications of the enclosure. The CAD overlays and photographic evidence reveal that these modifications often breach the original stall boundaries and intrude upon the circulation spaces, leading to reduced aisle widths and increasingly irregular stall geometries.

The form and intensity of these adaptations vary according to commodity-specific operational requirements. Horizontal extensions, storage encroachments, and operational spillovers are particularly evident in the fruit, vegetable, rice and grains, fish, and live chicken stalls [Figure 3(c–e), (g), and (j)] where crates, tables, storage containers, equipment, cages, and merchandise extend the floor area beyond the formally delineated stall boundaries. These spatial conditions are consistent with the circulation reduction observed in Tables 5 and 6, particularly in the fruit, vegetable, fish, and live chicken sections, where aisle widths were considerably narrower than their original dimensions.

However, the grocery and variety stalls [Figure 3(f) and (k)] have more vertical display extensions and hanging merchandise arrangements. Adaptations are made to optimize the display and storage capacity of the product, not only through horizontal expansion of the floor, but this can contribute to visual congestion and go beyond the original spatial envelope of the stalls. Likewise, the eatery stalls, dried fish, meat, and chicken meat [Figure 3(a), (b), (h) and (i)] show combinations of stall extensions, secondary protrusions, storage occupation, and circulation constriction, showing that morphological adaptation is not limited to one section of the market but is common to different commodity types.

Collectively, Figure 3(a–k) shows the emergence of negotiated spatial adaptation as a recurring morphological condition in the market. This observation was in line with the quantitative results in Table 7, where constricted circulation paths were recorded in all 17 stalls (100.00%), horizontal stall extensions in 82.35%, secondary stall protrusions in 58.82%, vertical display extensions and aisle encroachment in 52.94%, and enclosure modifications in 29.41%. The repetition of these adaptations in the recorded commodity types suggests that negotiated space is physically manifested in incremental changes to the boundaries of stalls, display and storage spaces, enclosures, and circulation spaces.

The combined CAD overlays and photographic notations thus offer visual evidence of how everyday spatial negotiations become embedded in the physical morphology of Toril Public Market. Horizontal expansion, vertical appropriation, secondary protrusions, storage encroachment, enclosure changes, and circulation constriction are not isolated modifications, but together they change the relationship between formally designated commercial and circulation space. Thus, Figure 3(a–k) shows the change from the originally planned layout to a hybrid architectural setting in which stall, operational, storage, and pedestrian spaces increasingly overlap.

Negotiated Spatial Practices and Market Transformation

Negotiated spatial practices reconfigure the physical space in Toril Public Market. This is shown in the three emergent themes from the thematic analysis. These themes, far from being separate, explain the continuous transformation of the market from its originally planned layout into a negotiated architectural environment. Consistent with Lefebvre's (1991) Theory of the Production of Space, the results indicate that the market is continually reproduced through everyday interactions between vendors, market authorities, and users, with operational needs gradually altering the built environment.

1. Spatial Negotiation and Regulatory Compromise

The interview results suggest that spatial modification is generally negotiated rather than being a direct violation of market regulation. Vendors said repeatedly that any stall extensions have to be inspected, measured, and approved by the market authorities before they start charging additional rental fees.

One respondent explained:

"Mu adto ka sailahang office para mananghid, mag survey na sila una, bali sukaton na nila una bago ka maka add ug space, tapos add bayad nagyud na sa renta..." (Vendor Respondent)

Similarly, market authorities explained that extensions are conditionally permitted provided that circulation remains functional and public safety is not significantly compromised. Long-term market users likewise observed that conflicts over space are commonly resolved through discussion rather than strict enforcement.

From the above results, we can conclude that negotiated space is an adaptive governance framework, not a lack of regulation. Instead of maintaining a rigid spatial boundary, management is continually adjusting to meet needs and requirements, thereby enabling continuous development of the physical space. It confirms the theory proposed by Lefebvre (1991), who suggested that lived space constantly changes conceived space through practice. Similar

frameworks of negotiated governance have also been observed in public markets in Indonesia and Southeast Asia (Ekomadyo & Triwardhani, 2024; Pavo, Night Market from H. Lefebvre's Space as Practiced: The Case of Davao City, Philippines, 2019).

2. Incremental Stall Expansion and Architectural Transformation

Thematic analysis revealed that the expansion of stalls in Toril Public Market was gradual as vendors adjusted their space to meet changing operational needs. Rather than adhering to the original architectural layout, vendors gradually introduced additional display tables, storage areas, temporary roofing, shelves, and other structures to increase product visibility, increase sales capacity, and support daily business operations. These adaptations confirm the quantitative results, which indicate substantial growth in stall footprints and broad horizontal extensions across the market. The slow pace of these changes implies that market morphology results from continuous, small-scale interventions rather than a single building event.

One vendor explained:

"Dugay-dugay lang gyud namo giusab among pwesto. Nagdugang mi ug lamesa ug display kay gamay na kaayo ang original nga pwesto para sa among baligya." (Vendor Respondent)

This shows how stall expansion is largely a result of Operational needs that motivated the extensions, some of which encroached on designated circulation areas. The more commercial activity there is, the more vendors negotiate and reorganize to ensure efficiency and cater to their customers' needs. These results have been echoed in the study of (Remolino, et al., 2023) on spatial reconfigurations that are made by the vendors themselves as a means of adaptation in Philippine public markets and in (Ekomadyo & Triwardhani, 2024) study that claims the gradual transformation of traditional market morphology through incremental spatial intervention. From the perspective of (Lefebvre, The Production of Space, 1991), such spatial practices illustrate how conceived space constantly changes into lived space and hence brings about the transformation of the built environment.

3. Transformation of Circulation and Spatial Organization

The second important observation is the gradual expansion of the stalls, which leads to a constant decrease of circulation space. The vendors confessed that they had extended their stalls beyond the original boundary. The users perceived congestion as a usual condition in the market.

One respondent explained:

"Lisod na kaayo mulabang labi na kung daghan mamalit kay halos ang agianan gihimo na pud og display." (Long-term Market User)

These observations are consistent with the mapping and photo-annotation analysis results, where the authors recorded encroachment of aisles, secondary protruding stalls, additional roofing extensions, and enclosure alterations within the documented stall areas. All these strategies resulted in the conversion of circulation aisles into multi-use spaces that were not only used as circulation routes but also as commercial display spaces, storage, and places of socialization.

Architecturally, this means that the original hierarchy of spaces is considerably modified. Those spaces originally designed for circulation become part of commercial activities, thereby generating new forms of spatiality that differ from the market's original organization. This process has also been identified in tropical public markets (Carmona, 2021; Giddings, 2016).

Methodological Triangulation

To validate the research on the spatial negotiations and morphological adaptations of the Toril Public Market in Davao City, methodological triangulation was employed to integrate quantitative and qualitative findings. According to the comparative spatial analysis, AutoCAD superimposition, on-site measurements, and annotated photographs yielded quantitative results showing the considerable expansion of the stalls, a reduction in aisle width and circulation, and spatial incursion. It is possible to infer that the market's design is evolving as vendors continue to adapt their spatial arrangements.

However, the qualitative results supported the aforementioned findings by explaining the changes. The vendors justified the adaptations by citing the need for additional space to store and display goods and to optimize their processes. The market authorities argued that their extensions are permissible as long as circulation and access are not hindered, but they must be inspected and regulated.

The combination of the two findings revealed consistent patterns between the measured spatial conditions and the lived experiences of market users. Overall, the triangulated findings confirm that the transformation of Toril Public Market results from the interaction among formal regulations, vendors' operational demands, and informal adaptive spatial practices that continuously reshape the market environment.

The study examined 17 purposively selected stalls with observable morphological modifications in Toril Public Market. The findings therefore describe spatial adaptations within these selected stalls and do not establish their prevalence or average extent across the entire market. Their applicability to other public markets may also vary according to governance arrangements, spatial configurations, and socioeconomic conditions. Future research could include unmodified stalls and compare markets across different cities to assess the broader applicability of the findings and refine the proposed framework. Despite these limitations, the study offers practical insights for architects, planners, and local government units seeking to accommodate vendors' operational needs while protecting shared circulation spaces.

The results have practical implications for architects, planners, and local government units responsible for market redevelopment. Future public market design should not eliminate informal adaptations, but should include flexible stall modules, designated expansion areas, and protected circulation corridors to accommodate vendors' operational needs while preserving accessibility, safety, and environmental quality. Such adaptive strategies can help build economic resilience and sustainable market management.

CONCLUSION

The study shows that the negotiated spatial practices in Toril Public Market are not merely temporary or isolated changes but rather cumulative architectural transformations that significantly alter the market's intended spatial organization. The study employed comparative CAD mapping, architectural measurements, photographic documentation, and stakeholder interviews, and found that the average documented stall area increased by 93.26%, while the average aisle width decreased from 2.21 m to 0.93 m, representing a 57.92% reduction in clear aisle width. In sum, horizontal stall extensions, storage intrusions, secondary protrusions, vertical display systems, and enclosure alterations blurred their formally designated stall and circulation boundaries into overlapping commercial and pedestrian spaces.

The findings suggest that the management of public spaces should extend beyond the hard distinction between formally permitted and informal spatial use and develop a managed system for spatial adaptation. The study recommends that the local government of Davao City and public market administrators establish well-defined, demarcated stall boundaries and protected circulation zones based on periodic as-built spatial audits. The market may have stall limits permanently marked on floors or other appropriate surfaces, identifying areas that are leasable or vendor-controlled rather than circulation space. No extension beyond the designated boundary shall be allowed without the consent of the market management and shall not reduce the required clear pedestrian passage. The study revealed an average reduction in aisle width of 57.92%. Circulation protection should be a priority management and design concern, not just an enforcement issue.

The findings also support the development of market-specific circulation standards that specify minimum unobstructed pedestrian widths appropriate to the function, pedestrian volume, emergency access requirements, and applicable national and local accessibility, building, and fire-safety regulations. Rather than setting a one-size-fits-all numerical minimum based on the current dataset, the LGU should establish and enforce the necessary clear widths using the relevant regulatory standards and conditions of each market zone. These protected circulation corridors shall not be occupied by storage boxes, tables, cages, merchandise displays, equipment, and temporary structures. Special attention should be paid to commodity areas which have significant spatial spillover effects from operational equipment and storage needs.

Flexible and modular configurations at the stall scale need to be considered for future market rehabilitation and redevelopment. The documented average increase in stall area of 93.26% shows a big difference between the formally allocated stall dimensions and the actual space some vendors require to operate. Market design can instead offer designated expansion areas outside protected circulation corridors, adjustable display systems, vertical storage, shared storage zones, modular counters, and designated temporary expansion zones where conditions on the ground permit. Moreover, the stall configurations may be further classified according to commodity-specific operational requirements, as the forms and intensity of observed adaptation varied among fruit, vegetable, fish, rice and grain, poultry, grocery, and variety stalls.

The authors propose a periodic spatial monitoring system for market management. Market administrators may maintain a current as-built market plan showing approved stall lines, circulation widths, temporary-use areas, and recurring encroachment locations. Regular spatial audits can compare actual conditions to this reference plan and identify progressive encroachment before circulation becomes critically limited. Where informal adaptations already exist, corrective actions could be made incrementally through vendor consultation, boundary realignment, storage relocation, designation of shared operational areas, and restoration of priority pedestrian corridors rather than through indiscriminate removal of vendor adaptations.

At the policy level, the local government of Davao City may also consider incorporating a negotiated space management framework into the planning, rehabilitation, and administration of public markets. Such a framework

must acknowledge that vendor adaptations are often rooted in valid operational and economic reasons, and establish non-negotiable spatial requirements for pedestrian movement, access, safety, sanitation, and emergency circulation. A participatory consultation can be organized by bringing together market administrators, vendors, designers, and the appropriate city offices to identify where managed flexibility is possible and where circulation and access need to be safeguarded.

Therefore, the study suggests that the response to informal spatial adaptation should not be an unregulated expansion of vendors nor the strict enforcement of an architectural layout that may no longer fit contemporary market operations. Instead, public-market planning should establish a controlled and measurable balance between spatial flexibility and protected public circulation. By translating observed adaptations into measurable architectural indicators, the proposed approach provides LGU Davao and public-market administrators with an evidence-based basis for spatial auditing, stall management, circulation protection, and future market rehabilitation.

ACKNOWLEDGEMENT

The authors are thankful to the Toril Public Market Administration, City Government of Davao, and all the market vendors and key informants for their generous participation in the study. The authors also acknowledge the University of Mindanao for its support in conducting this study.

DECLARATIONS

Declaration of AI Use

The authors used Grammarly and QuillBot solely as assistive tools for English language enhancement and paraphrasing during manuscript preparation. The authors reviewed and edited all suggested revisions to preserve the intended meaning and assume full responsibility for the final published work.

Author Contributions

M.C.: Conceptualization, Methodology, Investigation, Data Curation, Formal Analysis, Writing – Original Draft. N.Z.B.: Supervision, Writing – Review & Editing. All authors have read and agreed to the published version of the manuscript.

Funding Statement

This research received no external funding.

Conflict of Interest

The authors declare no conflict of interest.

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