



## Trend Analysis of Contextual Design in New York City's Historic District - Focusing on Remodeling, Extension, and New Buildings in Manhattan -

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### ABSTRACT

**Purpose:** There are many things to consider about the context when building new extensions or new construction in areas of historical significance. Accordingly, the purpose of this study was to identify the realistic trends being handled in the historical preservation district of New York City, which is in an advanced city, and to guide the concept of building planning that will occur in the future. **Method:** The process and trend of change can be a reference standard for designing buildings in our historical district which will be developed at a later point and provide guidance in the future. Among the historical preservation districts of New York City, 40 buildings that have been completed, renovated, or expanded since 2000 were surveyed and analyzed in Manhattan's residential area, where traditional residential villages are concentrated. **Result:** The primary phenomenon was that the main contrasting elements, characteristic of past materials, were actively reflected in the design. Among the various design methods and contexts, it was found that the application of a modern material, glass, occupies the majority. It is possible to identify the phenomenon rather than maintaining the existing flow; the expansion or renovation of buildings, reflecting contrasting effects, were mainly found in terms of modern treatment.

### KEYWORD

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## 1. Introduction

### 1.1. Background of the Study

The history of buildings represents the culture of a nation and becomes the symbolic face of that country and its development process. South Korea, with its long history, has been grappling with the inheritance and transformation of its traditional architectural culture with the changing times. Particularly, in contemporary times, the emerging interest in traditional villages and modern architectural heritage as historical backdrops has given rise to debates<sup>1)</sup> over whether to preserve such heritage when new urban development or redevelopment projects take place. Questions are always raised when making decisions regarding whether to preserve traditional buildings from the past as well as regarding the design of new structures erected near historic areas or landmarks. While there may not be precise answers in terms of context, the direction and design of such buildings may be assessed based on the surrounding landscape or the visual satisfaction of citizens. In the case of the United States, an advanced country, there are extensive research and logical guidelines intended to provide direction, and significant consideration is given to creating designs suitable for specific districts[1,2]. In South Korea, change has become necessary for

traditional modern buildings that had been preserved for 70 years after liberation in 1945 as they intermix with the newly constructed modern buildings that have been built around them due to rapid development, and context has become important. Therefore, examples of design from advanced countries must now be investigated and analyzed to understand modern trends and tendencies and establish our own direction accordingly. Through this survey and analysis, this study aims to provide preliminary design data necessary for initial planning in historic preservation areas in the future.

### 1.2. Purpose and Methodology

The main goal of this study is to examine modern trends and new directions in advanced countries when constructing new buildings or extensions to existing buildings in historic districts. Its research scope is a basic survey and review for the purpose of identifying practical trends in historic preservation districts in New York City to serve as guiding principles for concepts in architectural planning that can be applied to South Korea's future development. In addition, because the purpose of this study is not to set idealistic directions in the general sense or to pursue specific methodologies, it emphasizes the importance of presenting fundamental concepts to find suitable solutions that can be applied in design application methods.

The research findings from New York City, a city with a

relatively short history despite being the largest city in the world, may not perfectly align with the reality of South Korea, which has a long history. However, the process of the transformation of and trends for such large cities can still provide valuable standards for reference and suggest directions for designing buildings in South Korea's historic districts facing development in the future.

For investigation and analysis in this study, we selected New York City's historic preservation district,<sup>2)</sup> known for its sensitivity to history, as our sample. The surveyed buildings were those that were rebuilt, remodeled, or expanded after the year 2000 and mainly located in the downtown residential areas of Manhattan, where traditional residences were concentrated in the past. A total of 40 distinct buildings developed within this area were selected for this study, including 30 residential buildings and 10 buildings used for other purposes.

The analytical criteria for the survey data were based on theoretical literature related to the research topic, and data were collected and analyzed through on-site surveys to identify characteristics and trends for the purpose of providing foundational data that can be referenced for future designs.

## 2. Review of Theoretical Background and Legal Guidelines

We reviewed theoretical backgrounds in various literature that could serve as the basis for analyzing data and used it as a framework for this study. We also organized the forms and design techniques of development types for urban and architectural construction that must take context into account and identified their characteristics. Furthermore, we investigated legal guidelines to examine the relevant regulations administered by New York City within the logic of conservation and to determine the measures the subjects of this study have taken to consider context.

### 2.1. Types of Architecture That Consider Context

When there is a need for physical changes to existing buildings in historic downtown areas or districts, many considerations arise during the planning stage. Before implementing new additional construction activities, urban planners and architects take many things into account, but when considering harmony or flow with the surroundings during the design stage, situations arise in which they must maintain the context. Although there may be a variety of situations that arise, these types<sup>[3]</sup> can be broadly categorized into four phenomena, with each case prompting careful deliberation over the design decision. Table 1. shows the characteristics of the four types that have been summarized through various literature<sup>[4,5]</sup>.

Table 1. Types of architecture considering context

| No. | Type                | Characteristics   |
|-----|---------------------|---|
| 1   | Interior Renovation | <ul style="list-style-type: none"> <li>- Maintains the exterior shape or structure and is limited to the interior.</li> <li>- No considerations regarding the aspect of the scale of the macroscopic city.</li> <li>- Considering only the maintenance and context of the existing traditional building itself.</li> </ul>  |
| 2   | Alteration          | <ul style="list-style-type: none"> <li>- Maintaining the exterior features or landmark facade of existing traditional buildings.</li> <li>- Least change in flow in the urban context.</li> <li>- When there are many new designs, harmony between new and old is important.</li> </ul>   |
| 3   | Addition            | <ul style="list-style-type: none"> <li>- When adding or connecting a new space to an existing historical building.</li> <li>- The formation of visual harmony and unity between tradition and modernity is important.</li> <li>- A typical type that causes great concern because there are many specific and limited considerations.</li> </ul>                                    |
| 4   | In-Fill             | <ul style="list-style-type: none"> <li>- In the case of empty land or new construction, taking tradition into account after demolition.</li> <li>- Work on processing surrounding historical buildings and the space between them.</li> <li>- A complex process that requires addressing the surrounding contextual characteristics and analysis of a specific building.</li> </ul> |

Table 2. Types of contextual design techniques

| No. | Type        | Application Cases and Features  | Application Examples  |
|-----|-------------|---|---|
| 1   | Hide        | <ul style="list-style-type: none"> <li>- Applicable when the existing building itself is very important or to avoid affecting the surrounding environment.</li> <li>- Using underground space as the most active expansion method.</li> <li>- Advantageous for energy conservation and effective when expanding landmark buildings.</li> </ul>  | Expansion of Harvard University's Pusey library, Columbia University's Avery Hall             |
| 2   | Imitation   | <ul style="list-style-type: none"> <li>- When the style has a strong visual character or a sense of unity, apply it by imitating the visual elements of old architecture.</li> <li>- Due to the effects of time, changes in materials, color, etc., are difficult to maintain, so there is a high possibility of failure and counterproductive results.</li> <li>- Detailed analysis and understanding of existing buildings are required.</li> </ul>   | Expansion of the Frick Collection, Hugh Jacobsen's Elliot House in New York                   |
| 3   | Abstraction | <ul style="list-style-type: none"> <li>- A type of imitation, favored by architects as it captures and emphasizes only the main elements of a building, maintains a harmonious relationship with them, and provides visual satisfaction.</li> <li>- Re-creation of new forms and details through modern interpretation by appropriately adjusting the height, mass, architectural elements, and scale of existing buildings. Problems that may cause disharmony in scale due to lack of awareness because of misinterpretation of existing architectural styles.</li> </ul> | Expansion of Washington D.C.'s Old Executive Building, Philip Johnson's Boston Public Library |

Table 2. Types of contextual design techniques (Continued)

| No. | Type       | Application Cases and Features  | Application Examples  |
|-----|------------|---|---|
| 4   | Contrast   | <ul style="list-style-type: none"> <li>- This is a technique that visually depicts the two styles of scenes and sections in a way that matches them, resulting in better results than immature imitation.</li> <li>- In areas with a strong sense of unity, there is a possibility of destroying continuity with the surrounding environment.</li> <li>- An expression that emphasizes material and technical contrast and creates harmony within contrast by sharing visual elements.</li> </ul> | Expansion of Boston Quincy Market Metropolitan Museum of Arts   |
| 5   | Background | <ul style="list-style-type: none"> <li>- A technique to simplify the addition of buildings to focus on existing historic buildings when new buildings are added around visually important landmark buildings.</li> <li>- Using a very strong contrast effect, visual continuity is fundamentally denied, and appropriate contrast and surrounding open space are secured to serve as a background.</li> </ul>   | John Hancock Tower behind the Trinity Church in Boston, the Met Life Building behind the Helmsley Building in New York. |
| 6   | Focus      | <ul style="list-style-type: none"> <li>- It is an opposite approach to the background building technique and can be a general solution, but there is a lack of success stories.</li> <li>- Brings vitality to the surrounding environment by providing visual direction in areas with clusters of featureless buildings or areas with strong uniformity and lack of change.</li> <li>- It is sometimes criticized in terms of contextual design, but it can also be welcomed.</li> </ul>          | Eiffel Tower, Pompidou Center in Paris, the Opera House in Sydney   |

## 2.2. Contextual Design Techniques

In all of the types summarized in 2.1, various contextual design methods are employed after careful deliberation before deciding on a new design based on the historical surroundings. By summarizing and synthesizing the theoretical backgrounds[4-6] that reflect the various conditions and circumstances of specific areas, we can categorize them into six methods[7], each with its own characteristics and examples, as shown in Table 2.

## 2.3. Legal Restrictions Within New York City's Historic Preservation Districts

### 1) Legal Provisions for Historic Preservation in New York State

To protect heritage through the preservation of historic buildings, sites, and districts, New York State enacted its first urban historic preservation law in the city of Schenectady<sup>3)</sup> in 1962. Since then, New York State has enacted local historic

preservation laws or ordinances in more than 175 municipalities [8]. Accordingly, Congress granted diverse powers to regulate historic resources, such as state historic preservation laws, historic landmark laws, and certified local government programs to regulate local governments and preserve historical and aesthetic resources. To this end, after listing buildings, structures, districts, objects, and places of historical, architectural, archaeological, and cultural significance to New York on lists of historical relics registered under the Historic Preservation Act of 1966, the New York State Legislature created the Register of Historic Places and passed the State Historic Conservation Act (L.1980, C.354) in 1980. Since the registered buildings are subject to strict regulations, their owners may express dissatisfaction when repairing or remodeling their properties. To address this issue, the legislation provides benefits, and proposals are examined by a committee to consider their legality through a statement and to enforce reasonable regulations.

For this purpose, the following powers are granted to municipalities:

First, municipalities are granted the authority to create their own historic preservation laws and protect historic resources through zoning laws for cities, towns, and villages.

Second, most municipalities that have enacted historic preservation laws or ordinances through zoning or separate preservation laws may establish a separate body (Design Review Board — Architectural Review Committee, Design Review Committee, or Historic Preservation Committee) to review proposed projects located in historic districts or affecting historic assets.

Third, the Act generally allows for the creation of local ordinance standards to protect historic resources that require new construction or modification to be compatible with existing structures that hold historic or architectural value.

Fourth, as part of site planning reviews, cities, towns, and villages may enact site planning review laws and ordinances as components of local laws or as separate enactments.

Fifth, the Landmarks Preservation Act provides additional authority for governments to protect historic resources through local laws or ordinances and supplements the zoning authority of local governments.

### 2) The Role of the Landmarks Preservation Commission (LCP)

There are approximately 35,000 landmark buildings in New York City, most of which are located in 139 historic districts and extensions of historic districts in the five boroughs. Various approvals must be obtained from the commission to gain permission for alterations or remodeling of historic structures in

New York City. The purpose of the commission is to preserve historically significant and important buildings and sites for the purpose of protecting the locational and property value of landmarks, fostering civic pride and educational quality, vitalizing the local economy, and maintaining and preserving them as tourist attractions.

As the largest urban preservation organization in the United States, the New York City Landmarks Preservation Commission (LPC) has the authority to designate significant buildings within historic districts as landmarks and to designate historic districts, and it manages various organizations related to such work. The agency comprises 11 commissioners and, by law, must include at least three architects, a historian, an urban planner or landscape architect, a real estate broker, and at least one resident from each borough.

The LCP Permit Guidebook covers the requirements for various permits and approvals in great detail, and compliance with these legal elements is necessary to successfully complete the permit process. These requirements are covered in 14 chapters, which provide extremely detailed guidelines for topics ranging from windows and signage to HVAC,<sup>4)</sup> allowing us to discern the efforts made to preserve historic landmarks[9].

As outlined in these items, the most important consideration when creating historic districts is to protect exceptional areas as a whole; this is important because only the creation and regulation of historic districts can prevent the piecemeal destruction of such remarkable areas.

### 3) General Construction Regulations for Historic Buildings

Separate from the guidelines of various committees, Chapter 12 of the Building Code of New York State deals with various aspects of historic buildings in detail. An examination of its contents reveals that it covers considerations in a concrete and detailed manner. The important points can be summarized as follows[10]:

Section 1: This section explains general concepts and the scope of coverage.

Section 2: This section covers in detail everything from permissible materials when replacing or repairing the original to requirements that must be observed when replacing.

Section 3: This section comprehensively covers guidelines for fire safety and evacuation, from emergency exits to the fire resistance ratings of various fire-resistant materials as well as stairs and fire extinguishing devices. The types include lintels, interior finishes, staircase finishes, fire-resistant materials, handrails, guard rails, emergency exits, fire extinguishers, etc. It was found that special attention is paid to fire safety and disaster prevention.

Section 4: This section covers requirements that must be observed for changes in use, including details about everything from the allowable building area and fire-retardant roofing materials to fire prevention elements for materials and means of evacuation and escape. There is also content related to natural lighting, showing that careful consideration is being taken to prevent damage to the historical characteristics and materials of the building.

Section 5: This section deals with the structural details of existing buildings that must be adhered to at a level that ensures they remain undamaged, aiming to ensure the safety of older buildings to the fullest extent possible.

Section 6: This section addresses in detail regulatory requirements regarding exterior walls and openings for the case of buildings restructured through remodeling, etc.

## 3. Survey of the Current Status of Buildings in New York City's Historic Districts

For this study, 40 buildings completed, remodeled, or expanded after 2000 were selected, primarily from the residential area of Manhattan where there is a high concentration of traditional residences. Historic districts were mainly distributed in Southern Manhattan, Downtown, and Brooklyn. Of the 40 surveyed buildings, 30 were residential buildings, and 10 were general buildings for other purposes.

The surveyed buildings within historic districts in Manhattan are in areas that have long had their own traditions and historical backgrounds, and as outlined in Part 2, there are institutional regulations subjecting them to strict legal guidelines that prevent arbitrary remodeling or new construction of buildings. Moreover, because developers cannot carry out projects as they wish without the consent of the architectural committee or local residents, they were often completed amidst many constraints and controversies. We investigated and summarized the main characteristics of these two types of buildings.

### 3.1. The Current Status of Residential Buildings

Thirty of the surveyed buildings were residential buildings, and their current status and characteristics were investigated and organized as part of Table 3.

Newly constructed and reconstructed residential buildings in historic preservation areas were primarily low-rise structures of four floors or fewer in residential areas. However, in contrast to previous conditions, it was clear that new constructions, which were built to be seven to 12 stories high, aimed to maximize the floor area ratio and thereby secure the maximum number of





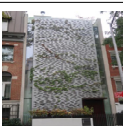
Table 3. Status of residential samples in historic areas

| Bldg.                            | Exterior  | Architect                                   | Com. | Characteristics  |
|----------------------------------|---|---|------|--|
| (1) 15 Renwick                   |    | ODA Newyork                                 | 2016 | Eleven-story, 31-unit residential building with three-story asymmetrical penthouse on top.   |
| (2) 22 Bond Street               |    | BKSK Architects                             | 2019 | Core-ten steel front wall and unique art garden.   |
| (3) 25 Bond Street               |    | BKSK Architects                             | 2007 | Eight-story. Asymmetrical facades with two different sizes of janda woodstone and bronze windows.  |
| (4) 39 East 13th Street Building |    | IO Architects                               | 2008 | An extension on a four-story warehouse with a new composed of three layers of translucent channel glass. Attempts to mix traditional and modern architecture by applying contrasting effects.  |
| (5) 40 Bond Street               |    | Herzog & de Meuron                          | 2007 | Eleven-story dwelling with a three-story townhouse (top: a penthouse) and eight-story apartments above it. Reinterpretation of traditional sculptural cast iron and introduction of laminated green glass.                                 |
| (6) 51 Astor Place               |   | Fumihiko Maki with Adamson Associates       | 2013 | A contrasting building that is far from historical structures in context but ironically treated. A simple but strong image designed in the shape of three sharp-angled cascading prisms.   |
| (7) 115 Norfolk Residences       |  | Grzywinski + Pons                           | 2011 | Eight-story, 24-unit residential building. Sloping horizontal window frame on the glass curtain wall contrasts with neighboring stone buildings.   |
| (8) 150 Charles Street           |  | Cookfox                                     | 2015 | Sixteen-story, 91-unit condo maintaining the continuity of brick and glass neighborhood buildings in the context. Large window between the bridge brick grid and the structural frame of the former warehouse.                             |
| (9) 166 Perry Street             |  | Asymptote Architecture                      | 2010 | Eight-story condo with a waterfall-shaped angled window displaying facades. A contrastive expression between avant-garde and modern architectural design.  |
| (10) 347 Bowery                  |  | Selldorf Architects                         | 2017 | Thirteen-story residential and commercial complex (four multi-story row houses and one three-story penthouse). Form a new urban context featuring a lower base consisting of custom-made bricks and a zinc-plate tower.                    |
| (11) 385 West 12th Street        |  | Flank Architecture                          | 2010 | Twelve-story condominium. Connected by an organic combination of vertical bays with different heights and shapes. The copper exterior material is designed to turn green in the future and become united with the surroundings with green. |
| (12) 408 Greenwich Street        |  | Morris Adjmi Architects                     | 2008 | Nine-story multi-family housing. The arched openings of the two floor modules reflect the surrounding context.   |
| (13) 497 Greenwich Building      |  | Archi-Tectonics with David Hotson Architect | 2004 | An 11-story glass building was added to the six-story brick building. Features new and old building harmonies, rippling glass surfaces, horizontal fin shapes, and curved glass.   |

Table 3. Status of residential samples in historic areas (Continued)

| Bldg.                       | Exterior  | Architect  | Com.      | Characteristics   |
|-----------------------------|---|--|-----------|---|
| (14) 512 Greenwich Street   |    | Archi-Tectonics  | 2018      | A townhouse with three floors added to the existing four floors. Features a perforated screen façade starting from above on the first floor (a cover that separates the scene and section and covers the outdoor terrace similar to a veil).  |
| (15) Astor Place            |    | Gwathmey Sigel & Associates                                | 2006      | Curved glass curtain wall housing. "Green monster" due to context problems with the surrounding historic area. Famous for the Alamo Cube sculpture in Alamo Square in front of the building.  |
| (16) Dumbo Townhouses       |    | Alloy  | 2015      | Five-story townhouse remodeled from an old warehouse. Lower floor height to reduce excavation costs and common space. Stainless steel, palette on the first floor and the arrangement of fiber cement vertical panels on the top emphasize facade.  |
| (17) Irving Place           |    | Audrey Matlock Architect                                   | 2011      | Eleven-story condominium. Dynamic representations of the protruding window are over one or two floors. Facade highlighted by connecting this to a horizontal white steel louver screen track. Contrasts with the surrounding buildings, which have brick and stone facades.   |
| (18) On Prospect Park       |    | Richard Meier & Partners Architects                        | 2009      | Fifteen-story all-glass condominium. The use of transparent glass curtain walls and slabs is concealed with white horizontal boxes due to contextual controversy with the surrounding environment. The guardrails of protruding balconies are treated with the same glass surface.  |
| (19) 1 Jackson Square       |   | Kohn Pederson Fox Associates with SLCE Architects          | 2009      | Thirty-five-unit condominium. The upper and lower parts freely maintain their own curves regardless of each other. The combined form of two masses (11-story & seven-story) under the building regulations of the other two regions. Case of applying a super-large cantilever foundation as a site above a subway tunnel.                                    |
| (20) 1 Kenmare Square       |  | Gluckman Mayner Architects                                 | 2006      | Eleven-story building. Designed with stone bands and different curves for each floor. Contrasting with minimalism's aesthetic characteristics   |
| (21) Scho lastic Building   |  | Aldo Rossi and Morris Adjmi Architects with Gensler Assoc. | 2001      | Ten-story building. Aldo Rossi's only work in New York built within the cast iron historic district. Introduction of beams, cornices, and pediment elements. Making an effort to maintain the context with the combination of decorative red and green cast iron beams.   |
| (22) State Street Townhouse |  | Rogers Marvel Architects                                   | 2006-2013 | Development completed in two stages in the preferred residential complex (nine units in 2006 and five units in 2013). The roof line matches the historic neighbors, and the harmony of grey and orange differs from the first. Contextual success with the idea of a change the level of entrances.   |
| (23) Superior Ink           |  | Robert A.M. Stern Architects                               | 2009      | Fifteen-story condominium redeveloped on the site of an old ink factory. The mass weight of the base formed by a 3-stage segment, the arch-shaped window, wide windows, and brick facades give a neoclassical image.  |
| (24) Switch Building        |  | Mini Hoang and Eric Bunge of Architects                    | 2006      | Seven-story apartment. Galvarum Panel (aluminum+zinc alloy coating) as an exterior material. The 1st floor is an art gallery, and the upper part is a two-story penthouse. The protruding bay windows serve as balconies for lighting and views.  |
| (25) The Pencil Factory     |  | Daniel Goldner Architects                                  | 2010      | Five-story residence. Redevelopment project in the former factory area. Panel composition with various brick colors alternately arranged in consideration of the context of surrounding brick warehouses. Protrusions of eight penthouses with upper white protruding frame windows. Repetitive elements to connect old and new factory buildings in context. |

Table 3. Status of residential samples in historic areas (Continued)

| Bldg.                       | Exterior  | Architect                           | Com. | Characteristics  |
|-----------------------------|---|-------------------------------------|------|--|
| (26) The Sterling Mason     |  | Morris Adjmi Architects             | 2016 | Seven-story, 33-unit condominium. Remodeling of the same building as the next warehouse building completed in 1905. The gray brick is glass fiber-reinforced concrete, and the stone part is transformed into aluminum paneling to be regenerated.   |
| (27) Townhouse              |  | Matthew Baird Architects            | 2005 | Four-story residential building. Emphasized with facade the steel plate made by corroding the 4.3m-wide and 10.4m-long cor-ten steel. Resolving natural light through vertical band windows on the side and rear skylights. Significant controversy in terms of context with the surrounding buildings in the historical district. |
| (28) Unhistorical Townhouse |  | Jeremy Edmiston of System Architect | 2018 | A facade like Gaudi's work. A residential remodeling that extends the existing three-story brick building to five-story on a site with 7.6m x 12m. Features a privacy-conscious balcony design.  |
| (29) Urban Glass House      |  | Philip Johnson & Annabelle Selldorf | 2006 | The last work by Philip Johnson. Twelve-story, 50-unit condominium. The historic district was evaluated as a symbolic building that was transformed into new urban architecture. The introduction of grid windows accounts for the surrounding context.  |
| (30) Urban Townhouse        |  | Peter Gluck and Partners            | 2009 | Five-story townhouse that is out of place with the surrounding context. Use of steel plate exterior with irregular perforation of standard brick size openings. Both vertical transparent windows highlight the steel plate and are internal.  |

units. When remodeling or expanding an existing building, it could not be built high due to its structural limitations, so it would either remain the same height, or only two to three floors would be added. In the case of new construction, there were instances in which a small open space on the first floor served as an entrance area functioning as a shared lobby and allocated space for parking, and in cases in which proximity to a main street made a size increase legally permissible, high-rise development was made possible, resulting in mixed-use buildings with commercial facilities on the first floor, playing a significant role in transforming the area's streetscape and commercial districts[11].

Especially when located along main streets, even residential buildings often had glass curtain walls. Though this phenomenon has raised much criticism and concern from a contextual perspective, it has also been considered an inevitable aspect of the transitional phase in which historic districts evolve into new urban architecture. In addition, in cases in which a building is rebuilt or expanded to be higher than before, the uppermost floors are mostly designated as luxury penthouses, which has developed into a standard for forming a new high-end residential market within Manhattan's historic areas and continually sets records for considerably high sale prices[12].

As will be discussed in detail in the comprehensive analysis in Section 4, the majority of the surveyed buildings tended to create a markedly different atmosphere from the heritage areas by



incorporating contrasting elements rather than harmonizing with the architectural flow of its neighboring buildings. While this raises questions, it also serves as an opportunity to speculate on broader trends.

### 3.2. Status of General Buildings

The current status and characteristics of the 10 general buildings surveyed in addition to the 30 residential buildings out of the total 40 surveyed buildings are summarized in Table 4.

The surveyed buildings are primarily observed in historical industrial areas, a trend attributed to the fact that as the city gradually expanded, urban development spread to the quiet outskirts that had not been developed[13]. This is because as areas where warehouses and factories were located became derelict and turned into slums, citizens and planners wished to redevelop and modernize these areas while maintaining and preserving the area's distinct heritage. As industrial areas were transformed into commercial zones and as traditional educational and cultural facilities were modernized, effort was made to create guidelines to maintain the surrounding environment and historical context and to make connections to the historical trajectory of the areas. Notably, the predominant characteristic was the use of contextual designs that apply a contrasting effect by using modern glass against the main exterior material of brick, which was commonly used in industrial areas in the past.

Table 4. Status of general building samples in historic areas

| Bldg.  | Exterior  | Architect                                 | Com. | Characteristics   |
|--|---|---|------|---|
| (1) 10 Jay Street                            |    | ODA New York                              | 2018 | Office that was remodeled from the former sugar refinery and warehouse. The north facade overlooking the East River is designed similar to a crystal and seems to surround a stone building.  |
| (2) 837 Washington                           |    | Morris Adjmi of MA                        | 2014 | Renovation of the Art-Deco brick warehouse building. Composed of a diagonal steel frame, cantilever canopy, and curtain wall. A design featuring a combination of grid shapes on city streets.  |
| (3) Brooklyn Museum Entry Pavilion and Plaza |    | Polshek Partnership                       | 2004 | Renovation of the Beaux-Arts museum designed by McKim, Mead & White in 1897. A semicircular pavilion made of steel and glass. The entry stairs were demolished and reconstructed to create a modern entrance. Open and forward-looking design.  |
| (4) Empire Stores                            |    | Studio V Architecture & S9 Architecture   | 2017 | Redevelopment that transformed the former site of a coffee plant into a complex facility. A creative attempt to lead pedestrians both architecturally and in terms of accessibility by placing a square in the center of the block along with the elevation of a shutter-encrusted arch opening.  |
| (5) New Museum of Contemporary Art           |    | Sanaa                                     | 2007 | A 53m-tall museum in the form of seven boxes. To address the windowless aspect, the boxes are slightly brushed and stacked to provide skylights. Separate layer-specific functions for each box. An aluminum mesh front screen and white wall heighten the overall atmosphere   |
| (6) Pratt Institute Higgins Hall             |   | Steven Holl with Rogers Marvel Architects | 2005 | Remodeling after the fire at Pratt School of Architecture. The reconstruction of both wings and the missing center are newly inserted with white glass that suggests the slope of the level difference between the south and the north. The first case in which all glass was allowed in terms of the context of traditional areas.                     |
| (7) Sperone Westwater Gallery                |  | Foster+Partners with Adamson Associates   | 2010 | Nine-story gallery. Simple facade of glass curtain wall in rectangular black metal frame. Red space visible through the inside of the translucent glass is designed to be movable according to the exhibition plan.   |
| (8) St. Ann's Warehouse                      |  | Marvel Architects                         | 2015 | A remodeling of an old tobacco storage warehouse. It consists of a 700-seat theater and its attached space. A plywood and glass wall protruding at the top provides visual vitality day and night. The triangular courtyard is an attraction, providing a fine rest area for the audience and the public.   |
| (9) The Williamsburg Hotel                   |  | Michaelis Boyd Associates                 | 2017 | A hotel with a variety of architectural elements, including continuous balconies, cor-ten steel facades, embossed brick wall signs, and upper water tanks. Various auxiliary facilities and a view from the unique interior of the glass-bottom water tank-rooftop bar.   |
| (10) Wythe Hotel                             |  | Morris Adjmi Architects                   | 2012 | A hotel (72 rooms), a five-story historic textile factory with 4-story curtain wall extension, mixing old and new. Cut off the end of the plant within the legal limit and cover it with a new curtain wall. The entrance that extends well with the hotel sign utilized the corner space (in the past, the barrel was lifted), attractive rooftop bar. |

#### 4. Comprehensive Analysis of Surveyed Buildings

As a result of analyzing the selected 40 buildings by classifying them according to the various types and technical standards discussed in Section 2's theoretical review, it was found that the various buildings developed within the historic district of New

York City bore signs of a plethora of considerations regarding the continuity of their context and flow. This is likely because when discussing the redevelopment of existing buildings, the most important issue becomes the method by which to proceed with the redevelopment. Based on the results of the investigation, we comprehensively analyzed the status of each category and the characteristics of the elevation design.



#### 4.1. Classification of Contextual Design Types and Techniques

##### 1) Status of Classification by Type

When classified based on type, of the 40 surveyed buildings, new constructions were the most common with 25 such buildings, accounting for 62.5% of the total, followed by nine remodeled buildings and six expanded buildings. The breakdown is shown in Table 5.

The main reason for the high number of new constructions in historic areas is rooted in the fact that as the city develops, there are limits to how existing land plots can accommodate the growing city, prompting developers to create plans to construct commercial buildings of a certain scale by merging adjacent plots, driven by considerations of business feasibility. Manhattan’s areas of historical significance are located in secluded areas and are old and run down; thus, they may be considered to have low preservation value, prompting the demolition of low-rise structures in favor of economically viable options such as apartment buildings or commercial developments. Even buildings considered for preservation are often remodeled to align with modern sensibilities through renovation or expansion, thereby making changes in accordance with the trends of the times.

One notable point is that the transformation of Manhattan’s historic districts is likely to continue increasing due to regeneration, which raises the concern that traces of historic buildings will gradually decline and diminish due to the very nature of downtown areas. Though effort will be made to preserve the historical context through the framework of legal regulations and guidelines, there are limitations to imposing restrictions on or preventing change to private property; therefore, it is anticipated that new buildings even larger than the existing ones will continue to proliferate.

##### 2) Classification by Design Technique

Contextual design techniques have been analyzed and classified as summarized in Table 6. The main feature revealed by the analysis is that there were 20 sites that used techniques with contrast effects, accounting for 50% of the total. This is a technique that uses contrasting effects to make the building

distinct from the traditional buildings neighboring it. Additionally, 13 sites, constituting 32.5%, employed abstraction techniques, appearing to be the result of an effort to preserve context by incorporating similar design elements to the surrounding buildings, including colors, materials, shapes, and proportions. The five sites classified under the imitation technique do not precisely replicate existing structures but mimic certain aspects of the original forms, representing a somewhat modified imitation approach.

Two sites used the focus technique, though not as prominently as a powerful landmark such as the Eiffel Tower; rather, these sites were classified under this technique due to the significant differences and variations it introduced in relation to the height and design elements of neighboring buildings. While these could

Table 5. Classification by contextual type

| Type                  | Interior Renovation | Alteration | Addition | In-Fill |
|-----------------------|---------------------|------------|----------|---------|
| Residential Samples   | 0                   | 4          | 4        | 22      |
| General Bldg. Samples | 0                   | 5          | 2        | 3       |
| Sum                   | 0                   | 9          | 6        | 25      |

Table 6. Classification by contextual design technique

| Samples                  | Hide | Imitation | Abstraction | Contrast | Background | Focus |
|--------------------------|------|-----------|-------------|----------|------------|-------|
| Residential Samples      | 1    |           | •           |          |            |       |
|                          | 2    |           |             | •        |            |       |
|                          | 3    |           |             | •        |            |       |
|                          | 4    |           | •           |          |            |       |
|                          | 5    |           |             | •        |            |       |
|                          | 6    |           |             |          | •          |       |
|                          | 7    |           |             |          | •          |       |
|                          | 8    |           |             | •        |            |       |
|                          | 9    |           |             |          | •          |       |
|                          | 10   |           |             |          |            | •     |
|                          | 11   |           |             | •        |            |       |
|                          | 12   |           | •           |          |            |       |
|                          | 13   |           |             |          | •          |       |
|                          | 14   |           |             | •        |            |       |
|                          | 15   |           |             |          | •          |       |
|                          | 16   |           |             | •        |            |       |
|                          | 17   |           |             |          | •          |       |
|                          | 18   |           |             |          | •          |       |
|                          | 19   |           |             |          | •          |       |
|                          | 20   |           |             |          | •          |       |
|                          | 21   |           |             | •        |            |       |
|                          | 22   |           |             | •        |            |       |
|                          | 23   |           | •           |          |            |       |
|                          | 24   |           |             | •        |            |       |
|                          | 25   |           |             | •        |            |       |
|                          | 26   |           | •           |          |            |       |
|                          | 27   |           |             |          | •          |       |
|                          | 28   |           |             |          | •          |       |
|                          | 29   |           |             |          | •          |       |
|                          | 30   |           |             |          | •          |       |
| General Building Samples | 1    |           |             | •        |            |       |
|                          | 2    |           | •           |          |            |       |
|                          | 3    |           |             |          | •          |       |
|                          | 4    |           |             | •        |            |       |
|                          | 5    |           |             |          | •          |       |
|                          | 6    |           |             |          | •          |       |
|                          | 7    |           |             |          | •          |       |
|                          | 8    |           | •           |          |            |       |
|                          | 9    |           |             |          |            | •     |
|                          | 10   |           |             |          | •          |       |
| Sum                      | 0    | 5         | 13          | 20       | 0          | 2     |

also be seen as contrast techniques, these buildings were classified under the focus technique due to their potential to act as new landmark elements in the areas where they are located.

The analysis results suggested that the contrast and abstraction techniques are predominant. These methods are the easiest ways to design, with one technique involving applying contrasting effects to clearly distinguish between new and old and the other considering the key elements of surrounding buildings to create a visually similar flow by reflecting their feel and rhythm. It was found that these two methods are the most popular.

#### 4.2. Analysis of Elevation Characteristics

To understand the facade characteristics and design trends of the surveyed buildings, the main features of the elevation elements were investigated and summarized by analyzing whether the main exterior materials of each building were in harmony with the surrounding structures and the degree of contrast. Whether the building was in harmony with the surrounding environment and the degree of contrast were classified into high, medium, and low, and a summary of the main elevation characteristics visible on the exterior was created to highlight the unique design identity of each building.

The analysis, classification, and summary of the elevation design characteristics of the 40 surveyed buildings are presented in Table 7.

##### 1) Analysis of Elevation Materials

Upon analyzing the elevation materials of the 40 surveyed buildings as presented in Table 7., as can be seen in Table 8., it was observed that buildings designed with glass curtain walls accounted for the highest number, with 13 buildings, and eight buildings used a combination of glass, brick, and stone. Thus, approximately 50% of the surveyed buildings used glass as their primary material. This can be considered a recent phenomenon in architecture that has inevitably surfaced even in historic districts, serving as evidence for assessing modern material usage trends.

The prevalent use of glass curtain walls can be attributed to the fact that it is a case of employing contrasting design techniques. When considering the context with the surroundings, such an approach creates an extremely separate relationship and distinct interpretation, creating a contrasting effect to more actively address the issue. This approach completely distinguishes between the new and the old, the traditional and the modern, emphasizing the originality of each building's elevation over specific contextual associations, thereby highlighting each individual building itself while applying and reflecting contrast effects.

Additionally, four buildings were found to have applied the method of maintaining the natural flow of the street by incorporating similar materials and colors to neighboring buildings by using brick or stone to achieve harmony with the surrounding environment. While this method should ideally be the fundamental approach that is applied the most when considering context, the results of this study unexpectedly revealed that completely different techniques were applied more frequently.

Attempts at extreme contrast using curtain walls sometimes encountered significant challenges during the construction process due to strong opposition from residents of heritage preservation areas and urban planning committee members, and some of these buildings have been considered by architectural critics as failures in terms of contextual design.

In particular, the sudden height discrepancies caused by high-rise buildings being built among low-rise housing complexes impeded the flow with the surroundings, and the glass structures often resulted in a soulless appearance, leading such buildings to sometimes be called monster buildings that were harshly criticized post-completion. This is a design technique that employs extreme contrasts and is regularly used by many modern architects when discussing context in historic heritage areas. While there is clearly a sharp division of opinions on this technique, it is undoubtedly an important issue requiring considerable deliberation and guidelines for suggesting future directions for architectural endeavors within heritage preservation zones.

##### 2) Analysis of Trends in Design Harmony and Contrast with Surroundings

The analysis of whether the 40 surveyed buildings are, in objective terms, in harmony with neighboring structures or exhibit contrast effects is summarized in Table 9.

While the analysis of whether there are contrast effects may entail some subjectivity, efforts were made to evaluate this based on objective criteria from a macroscopic perspective, and the criteria were analyzed and classified with an emphasis on the relationship with surrounding buildings, even if there was contrast from a contextual perspective.

In terms of harmony, around 50% demonstrated moderate harmony, 25% demonstrated good harmony, and the remaining 25% was judged to be non-harmonious. Ultimately, approximately 75% of the surveyed buildings were considered to be designed harmoniously from a contextual perspective. Although there may be differing opinions from a general perspective, it can be indirectly inferred that architects made an effort to consider the surrounding environment.

Viewed from a contextual standpoint, this is fortunate, as it indicates that architects have striven to implement ethical and logical designs out of a sense of responsibility within the urban and architectural spheres.

While designs that have applied contrastive effects would have

been completed after deliberation and approval by the historic preservation committee within historic districts, considerable differences may have existed when considering contextual harmony within existing areas. This is a reflection of scenarios where, when attempting new contextual designs, considering

Table 7. Elevation design characteristics of samples

| Samples                  | Main Materials | Harmony               | Contrast | Design Characteristics |  |
|--------------------------|----------------|-----------------------|----------|------------------------|--|
| Residential Samples      | 1              | Glass                 | △        | △                      | Asymmetric projection of the top three layers                                |
|                          | 2              | Cor-ten steel         | △        | ○                      | Creative highlights of corrosive steel facades                               |
|                          | 3              | Stone                 | △        | △                      | Asymmetric vertical stone of various sizes                                   |
|                          | 4              | Glass                 | ○        | ○                      | Contrasting effects of tradition and modernity                               |
|                          | 5              | Glass/<br>cast iron   | △        | ○                      | Reinterpretation and greening of traditional cast iron architecture          |
|                          | 6              | Glass                 | ×        | ○                      | Application of contrasting curtain wall of paradoxical expression            |
|                          | 7              | Glass                 | ×        | ○                      | Differentiation between curtain wall and sloping mullion                     |
|                          | 8              | Glass/<br>brick       | ○        | △                      | Maintaining material continuity with neighbors                               |
|                          | 9              | Glass                 | ×        | ○                      | Arrangement of pleated curtain walls is symbolic                             |
|                          | 10             | Zinc/<br>brick        | △        | ○                      | Height and material separated from the surrounding context                   |
|                          | 11             | Copper panel          | △        | △                      | A plan predicting the green change of copper                                 |
|                          | 12             | P.c.panel             | ○        | ×                      | Arched openings maintained in the surrounding context                        |
|                          | 13             | Glass/<br>brick       | △        | ○                      | Harmonized elevation representation of new and old buildings                 |
|                          | 14             | Steel screen          | ○        | △                      | Steel screen covering separates new and old                                  |
|                          | 15             | Glass                 | ×        | ○                      | Green curved curtain wall with contextual issues                             |
|                          | 16             | Cement panel          | △        | △                      | Alignment of fiber cement vertical panels                                    |
|                          | 17             | Glass                 | ×        | ○                      | Dynamic elevation representation of a protruding curtain wall                |
|                          | 18             | Glass                 | ×        | ○                      | Processing of transparent curtain walls controversially in context           |
|                          | 19             | Glass                 | ×        | ○                      | Contrast of free curved curtain walls  |
|                          | 20             | Glass/<br>stonework   | ×        | ○                      | Variability of stone bands and curved curtain walls                          |
|                          | 21             | Glass/cast iron beam  | ○        | △                      | Application of harmony between traditional elements and colors               |
|                          | 22             | Brick                 | ○        | ×                      | The change of entrance space to fit in with the surroundings                 |
|                          | 23             | Glass/<br>brick       | ○        | ×                      | Neoclassical image considering the surrounding context                       |
|                          | 24             | Galbanum panel        | △        | △                      | Application of an angled, protruding balcony of a bay window                 |
|                          | 25             | Color steel plate     | △        | △                      | Effort to maintain context by introducing ambient color and shape            |
|                          | 26             | Reinforced concrete   | ○        | ×                      | Application of materials that feel like surrounding warehouses               |
|                          | 27             | Steel plate Panel     | ×        | ○                      | Facade representation of heterogeneous corrosion steel plates                |
|                          | 28             | Brick                 | △        | ○                      | Attempt to differentiate with twisted brick configurations                   |
|                          | 29             | Glass                 | △        | ○                      | Symbolic change introducing grid window                                      |
|                          | 30             | Perforated iron plate | △        | ○                      | Application of punched steel plate with an abstraction of the brick shape    |
| General Building Samples | 1              | Glass/<br>brick       | △        | ○                      | Contrast between the existing brick and the crystal-shaped glass surface     |
|                          | 2              | Glass/<br>st'l frame  | △        | ○                      | Contrastive extensions of steel frame and curtain wall                       |
|                          | 3              | Glass                 | △        | ○                      | Open and forward-looking entrance remodeling plan                            |
|                          | 4              | Brick                 | ○        | ×                      | A creative expression that maintains the facade of an existing building      |
|                          | 5              | Aluminum mesh         | ×        | ○                      | Introduction of materials and forms differentiated from the surroundings     |
|                          | 6              | Glass                 | △        | ○                      | Reproduction of fire loss as a contrasting representation                    |
|                          | 7              | Glass                 | △        | ○                      | The simplicity of abstract and modern expression                             |
|                          | 8              | Glass/<br>brick       | ○        | △                      | Contrastive application of extension while maintaining the existing building |
|                          | 9              | Glass/<br>brick       | ○        | △                      | Complex traditional elements and glass diversity                             |
|                          | 10             | Glass/<br>brick       | △        | ○                      | Extensions reflecting traditional utilization and contrasting effects        |

\*Relevant Degree; ○: High △: Medium ×: Low

Table 8. Statistics of main materials of samples

| Glass curtain wall | Glass+ brick/ stone | Steel plate/ metal panel | Brick/ stone | Other panels | Other |
|--------------------|---------------------|--------------------------|--------------|--------------|-------|
| 13                 | 8                   | 7                        | 4            | 3            | 5     |

Table 9. Analysis of the degree of harmony and contrast effects

| Degree of application | Harmony | Contrast |
|-----------------------|---------|----------|
| High                  | 11      | 24       |
| Medium                | 19      | 11       |
| Low                   | 10      | 5        |

traditional materials or maintaining consistency in elevation proves challenging, and due to various economic factors affecting business feasibility, it is common to resort to contrasting elements that are most readily accessible as the primary solution and widely apply these.

Regardless of the verdict on whether the products of this contrasting design technique are right or wrong, perhaps it is worth considering whether such a technique is the new trend of modern urban change in the rapidly evolving historic districts of New York City unless the building in question is a special landmark building.

## 5. Conclusion

This study aimed to elucidate trends in contextual design that considers harmony with the surroundings when constructing new extensions or new buildings in the historic preservation districts of New York City, one of the world's largest and most future-oriented cities. The main focus of the study was traditional residential villages, and the investigation and analysis of 40 buildings that were completed, remodeled, or expanded after 2000 can be summarized as follows.

First, in terms of classification by type, over 62.5% of the buildings were reconstructed as new buildings after the demolition of existing ones. Despite considerable controversy over the fact that major changes permitted even under the stringent regulations of the historic preservation committee, this highlighted the inevitable nature of changes with the times and the limitations in regulating private property.

Second, in terms of classification by technique, over 50% of the buildings applied a harmonized contrasting technique, with 32.5% using abstraction techniques that reflected existing conditions. The main feature of this technique involves applying contextual design by considering the existing design elements of

neighboring structures, actively incorporating harmonized contrasting techniques into the design rather than preserving or imitating traditional styles.

Third, in terms of elevation characteristics, over 50% used glass as the main material, showing that the application of glass, a modern trend, was popular even in historic districts. Rather than applying traditional materials or maintaining continuity of elevation, entirely different materials were used not only to distinguish between past and present but also to express the relationship by completely separating them through contrasting visual effects.

Fourth, while the contrasting aspect was quite pronounced, it was evident that approximately 75% attempted to maintain a harmonious flow through the application of contextual design that considered the connection with the surrounding environment.

The emergence of such characteristics signals a trend in the transition toward new urban architecture in alignment with New York's future urban changes, even in historic districts, as well as a starting point for setting new directions in terms of context.

It is undoubtedly challenging to determine the right and wrong aspects of contextual design in terms of harmony within the historical background. Ultimately, it is crucial for designers in the planning stages to consider not only individual buildings but also the application of macroscopic aspects that take into consideration the visual environment of the entire city. In other words, it is clear that establishing the right concept for contextual, creative architecture within historic districts requires architects to have a sense of responsibility and insightful knowledge that allows them to see the whole at a glance.

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