

# Assessment on Building Bylaws Implementation with Respect to Height and Setback, A Case of Lokanthali Madhyapur Thimi

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## Abstract

Building bylaws are control systems that prioritize society as a whole above an individual. In order to meet society's objectives for accessibility, safety, and health, building byelaws rules are essential tools. Such laws stop "overloading" in structures and on the land, maintaining an adequate supply of amenities and services. They are also increasingly considered as a means of achieving goals including sustainability and energy efficiency. Rapid urbanization has resulted in haphazard development that frequently violates setback, building height restriction rule and other building regulations. Significant social and environmental advantages for locals result from the setback and building height restriction. These include improved lighting, ventilation, landscaping, parking areas, the removal of encroachments, fire protection, etc. Setbacks contribute to the building's enhancement of qualities like quality space. The corridors of Lokanthali, Madhyapur Thimi have seen instances of violation of bylaws, despite the fact that laws and regulations were established for legitimate reasons. Additionally, this leads to worsening living conditions, narrowing of current road, and congestion. In order to draw implementation status to the setback and building height regulations that are now being violated by residential buildings. This paper has attempted field observation and measurement to know implementation status and engage questioner survey with the general public, municipal engineers, and consultants in the search for a solution from field. 53 dwellings were measured and field observations were made to determine the present setback and building height along with the questioner survey, which was carried out using the census technique. The statistics show that more than 85% of buildings violate setback requirements and more than 57% breach building height regulations. The results of this article will be beneficial to municipalities. The conclusion is that the majority of respondents think that awareness program and monitoring should be conducted.

## Keywords

building height, bylaws, setback, violation

## 1. Introduction

### 1.1 Background

Towns and settlements have city planning and building regulations in the very early times. The 16th century British municipal rules that outlined civic life and services in towns are where current construction standards got their start [?]. In order to preserve public health, these rules to create the principles for the spatial organization and construction of human settlements, primarily to stop the spread of diseases and fires that resulted from the industrial revolution [1]. Then zoning laws and the idea of land use segregation were created. Later, the scope was broadened to include exercising architectural control

over the type, pattern, and structural safety of development.

According to Pradhananga,[2] Kathmandu valley the typical house are generally in rectangle shape. The sizes ranged from four to eight meters. The average house has a height to width ratio of less than or equal to two. Structures must stay below the Taleju Temple as a height restriction. The necessity for extra space as families grew throughout the years caused the height to increase even further. This heightening was frequently accomplished by the building of a new floor [3]

In 1960, Nepal became democratic, and a free market economy emerged. Urbanization emerged as a result of the free market economy's increased emphasis on

advancing economic prospects. Buildings and land were considered as resources to be monetized in such urbanization, and private rights were given more weight than collective advantages [4]

The Kathmandu Valley's urban regions adopted the Building Bylaws of 2034 BS (1977), the first bylaws in the valley, to regulate master plan of 1969. It was created as a tool for development control, and its main goal was to slow down the fast urbanization of the Kathmandu Valley. Building Bylaws 2050 BS (1993) were created as a result to regulate uncontrolled development, especially building construction. In 2064 building bylaws was modified to regulate zoning requirement and significant in terms of functioning of future urban growth of city. Again after devastating earthquake 2072 building bylaws was shaped to regulate building construction and to develop disaster resilience community [5]. The latest building bylaws 2078 concerned with major modification on setback, building height, FAR and also introduce municipality transportation master plan [?].

## 1.2 Introduction

Building bylaws are legal tools used to standardize coverage, height of building, setback, architecture design and different aspect of construction. Prescriptive construction laws are in place to govern and ensure systematic and regulated development in urban settlements throughout the Kathmandu Valley. But, nearly all of Nepal's metropolitan areas continue to experience problems with uncontrolled and inappropriate development, environmental degradation, pollution, high energy consumption, ineffective infrastructure, and decreasing living circumstances. Among these, setbacks requires that there must be space completely open to the sky at ground level from the edge of the building, and built-up areas are only allowed when specifically permitted [6]. According to Shojai, [6] the provision of setback has significant social and environmental benefits for residents. These includes better light, enhanced ventilation, landscape, parking space, encroachment elimination, fire protection etc. The extension of setback is quite common in modern buildings due to the functional and aesthetic requirements of these buildings. Providing setback in residential buildings improves their visual appearance and increase green patch in a city. Thus this is minimum open space required between two buildings which will not only benefits individual but whole city

[7]. According to Dahal and Shrestha [?] the rise of contemporary building style has caused the residential building designs to become more complicated and unsafe than ever. Even with the boom of Real Estate Development since the last decade, the residential buildings in the housing sector are being more and more vulnerable from environmental and construction (structural) viewpoint. There is no uniformity and harmony in newly emerging buildings which has brought individual characters incompatible with surrounding buildings and the environment. Consequently, the effectiveness of implementing current building bylaws is another major concern. At times, it is not only the violation of laws that is creating physical, social, and environmental problems in the city but it seems that the contents of bylaws are either not sufficient or not updated, thus resulting in haphazard developments.

## 1.3 Objective of research

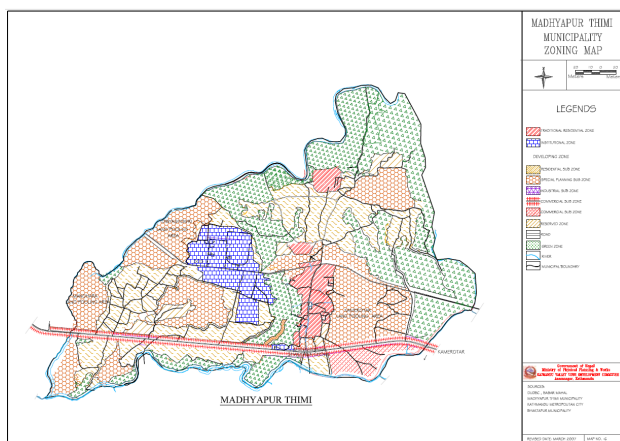
The paper focusses on analyzing the implementation status of building bylaws on setback and building height and also to know the reason behind violation in the area and recommend needful solution.

## 2. Study area

The majority of people in Nepal reside in the Kathmandu valley. Madhyapur Thimi is one of the nearest satellite cities to the densely populated Kathmandu city. Over the past decade years, the city has grown quickly as a result of overcrowding. According to the 2011 Census, Madhyapur Thimi is urbanizing at a rate of 4.09 %, but within ten years, this rate increased to an unprecedented rate of 5.8, enabling a population density of 7200 people per square kilometer, which necessitates high density and vertical development [8].

For the research, corridor from Lokanthali Chwok to Health Post Chwok from ward 1, was chosen as study area. The study area lies in residential sub-zone as per building bylaws 2064. The study area was selected as the development of urban activities and changes in social and economic communities that take place at a time it was followed by change in building form and constructions. The changing in the function of the building which is followed by violation of building bylaws, setback and building height, forms and amount of space. The lack of law enforcement and monitoring allowed people to violate the building

plans during the construction of their buildings and structure. Therefore, this paper attempts to assess the implementation of setback rules and building height in residential buildings. There are 53 houses between Lokanthali Chwok to Health Post Chwok on either side of the corridor. According to building bylaws 2064 the road width in the study area was 8 meters, but owing to setback and right-of-way regulations violations and other reasons, bylaws from 2072 from the municipality reformed to 6 meters.



**Figure 1:** Zoning map of Madhyapur Thimi municipality

### 3. Methodology

To identify and assess the current problems and shortcomings of the existing setback rules, a case study of the Lokanthali corridor area was conducted. Adopting census method where,  $N=53$ ,  $N$  is the number of household. Field measurement and observation, were done for setbacks, building height, floor to floor height of building, building projection on front setback. A household survey was accompanied to get the residents' opinions and suggestions. To ensure authenticity, the measured setback and building height is compared to the municipality's standardized setback and building height. Additionally, there were questionnaires for 40 consultants (engineers and architects) who are practicing in MTM and all 20 engineers and architects employed in municipality.

The research follow mixed method that is qualitative and quantitative approach. In this research qualitative data were collected through questioner and case studies. Whereas quantitative data were collected through field observation, measurement and analysis of related data were done. The epistemological position of this research is post positivist as the

finding are probably true or it may involve error and reality is imperfect and interpretivist as multiple subjective interpretation of social reality will be carried out. The research is limited to the study of regulation of setback and building height for residence building at corridor of Lokanthali. This study can be extended in other different part of Madhyapur thimi Municipality (MTM) which will help on strengthen the status within the city and gives field base solution.

### 4. Result and discussion

Nepal is one of the ten developing nations with the quickest growth rates [9]. bylaws 2050 were modified in accordance with the new standard and the needs of the time due to increased urbanization, a dense population, and haphazard development without any safeguards

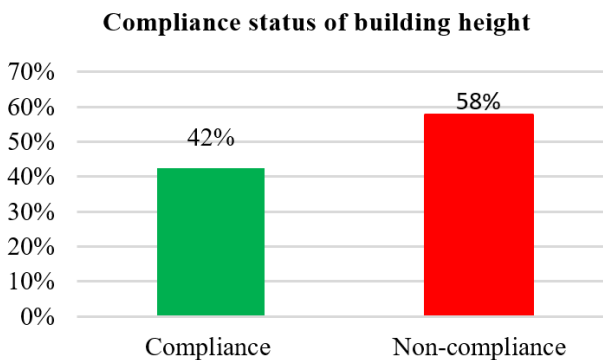
#### 4.1 Building Height Regulation

Height of building refers to the vertical distance between the highest point of the building and the top level of the adjacent drain for flat roofs and the halfway between the eaves level and the ridge for sloping roofs. The building height limit are the laws that restrict the height of building. There are various reasons for the height restriction for example in traditional town building height are limited according to height of temple Taleju. In Hong kong in order to safeguard the ridge line along Hong Kong Island and in Kowloon the height is limited accordingly [10]. Also in Indonesia the height of building is limited about 15m which is not taller than coconut tree [11]. Likewise the height of building is limited in different place according to land use and zoning.

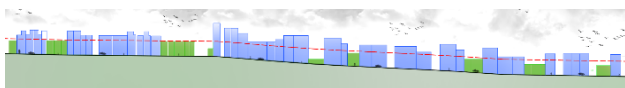
From the field observation it was found that only 42 % houses come under compliance status where 58 % houses are violating building height regulation. The houses are found up to seven story height which is maximum. One of the reason of increasing number of floors or building height is due to high land value in Lokanthali area.

The skyline is altered due to uncontrolled height, as seen in figure 3.2, where the red line marks the compliance limit and height over the red line denotes non-compliance.

Field measurements revealed that 94 % of buildings violated the floor-to-floor height restriction, with only 4 % of buildings below the specified height. Floor

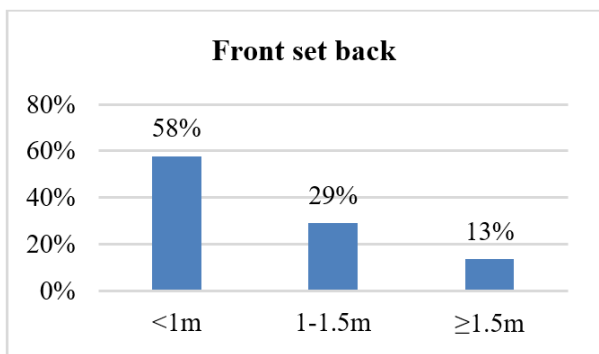


**Figure 2:** Compliance status of building height



**Figure 3:** Status of building height in existing site

to floor height is limited by municipal bylaws to 2.3 meters, yet it was observed that most buildings actually had floor to floor heights of 2.84 meters or higher [12].



**Figure 4:** Peoples opinion on building height

According to a survey conducted to ascertain the general public’s view on building height, 63 % of respondents believe that buildings should be three to four stories tall. 37 % of people believe that floor height restrictions should not be implemented. They believe that a building’s height should be determined by its coverage and open space.

In MTM there is no FAR regulation, only building height restriction is tools to control height of building in residential sub zone i.e.11.4m and additional 2.4m can be added for add of stair cover (i.e. four and stair cover for all zone and five and stair cover for both side of Araniko high way) [12]. The municipality also seems to avoid the concept of light plane to regulate the building height. In an interview with MTM building permit chief, it was learned that because the town is historically significant and the plot size inside the

historical town have huge variation and it is simple to check the state of compliance with building height regulations due to which the FAR regulation is not applicable. The height of buildings is restricted in order to get the same skylight.

In contrast, consultants suggest FAR is tools to control density it should be included as per zoning. The height of building regulation should be applied only for heritage zone. The height of building should not be same for all land use zoning. Municipality should plan on new building bylaws with respect to building height and setback for newly developed and plan area like Kamerotar planning, Dibyashwori planning, Sintitar planning etc. where land plot size are more over similar.

#### 4.2 Setback Regulation

Setback is minimum distance that need to be leave from edge of building to road, river and adjacent building or any bodies that need protection. It can be measured from edge or center line. The master plan or zonal plan typically regulates the setback requirements for the specific city or region [13]. A substantial amount of land may be conserved if structures are built in accordance with the planning standard, which may then bring a host of advantages in residential areas [14]. All vertical construction must comply with setback requirements, setback serve as a tool to manage population density. For example, in a densely populated city like Manhattan in New York, building walls that touch the street line may be restricted to a certain height or number of floors [15]. In contrast, a building with a maximum setback and a height limit will have a low population density. Setbacks are important for safety reasons, to promote area openness and aesthetic appeal, to heighten spatial sense, to maintain adequate road width in future extension and to create buffer space between private plot and the road, river and any other bodies. Every city and region has a different set of setback bylaws. It may have a variety of construction setback regulations. The size of the plot, whether it is an open plot with one or more sides, the neighborhood or locality where the plot is located, the width of the road on which the plot is located, and the maximum authorized covering area in the locality are the criteria that will affect setback.

To know the status of building compliance, on setback field survey was done. From field observation and measurement, buildings were found to be



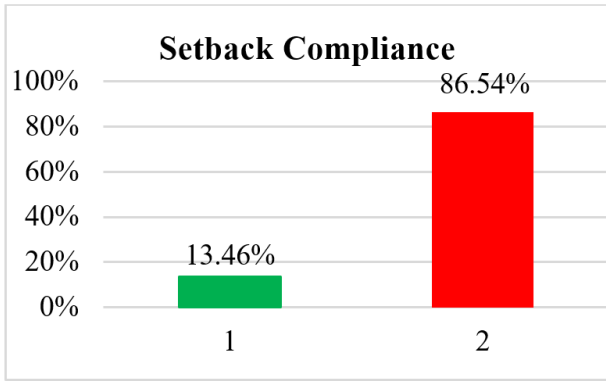


Figure 5: Compliance status of set back

non-compliance of 86.54 % in setback bylaws and only 13.46 % comes under compliance. The existing scenario represented in fig 3.5 with green dots depicts the setback line as per bylaws.

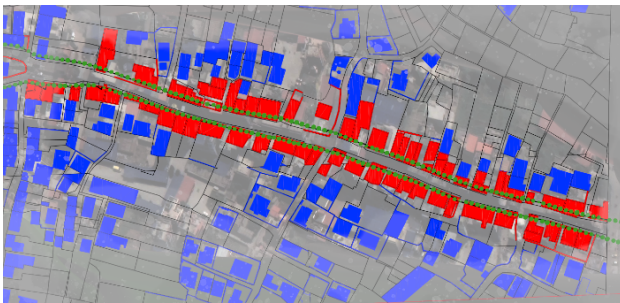


Figure 6: Implementation status of building setback

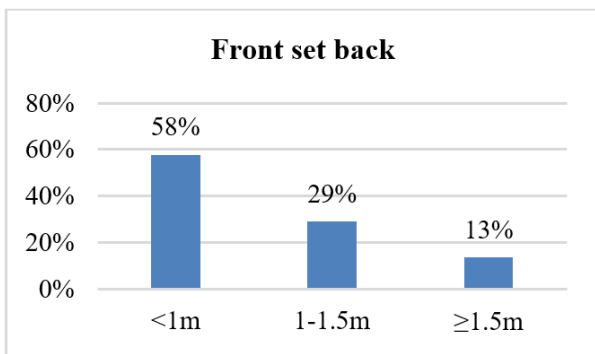


Figure 7: Front setback measured

From field measurement it was found that more than 58 % house hold have less than 1m setback, 29 % of building have setback in between 1-1.5m and 13 % building have setback more than or equal to 1.5m.

During questionnaire survey to know the opinion of public about setback, 53 % of respondents who have knowledge of setback rules suggest for 2-3m. They also give opinion that large setback on frontage can be used for parking and future road extension if required.

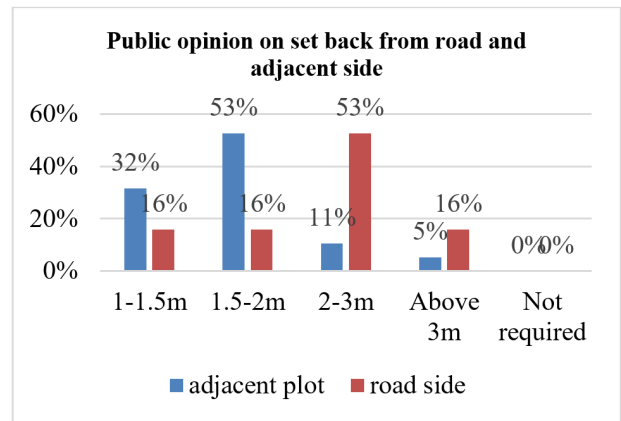


Figure 8: Public opinion on setback

The respondent suggested for 1-1.5m, 1.5-2m and above 3m setback were 16 % each.

Respondents who are knowledgeable about setback regulations were questioned about the minimum setback to neighboring plots, and 53 % of them recommended a minimum 1.5–2 m set back from the adjacent side. While only 32 % and 16 %, respectively, respond to setbacks of less than 1.5 and more than 3 meters on all sides. A variety of open areas, such as rear yards and setbacks on neighboring buildings, may be present, but this mostly relies on the neighbors’ development plans.

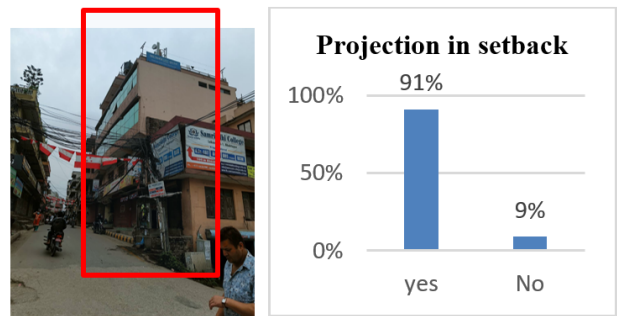
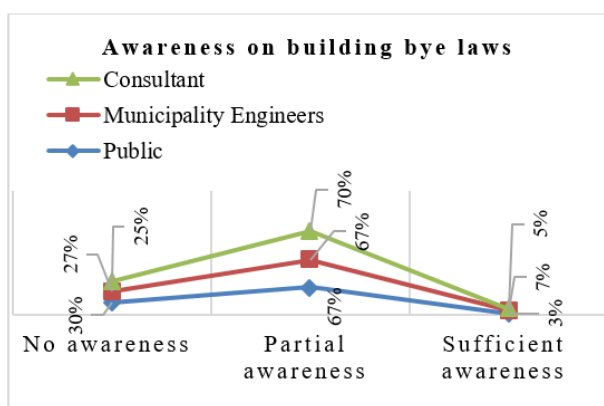


Figure 9: Projection on setback

About 91 % of the houses have cantilever on setback, only 9 % have no projection on setback are found through field observation. Set back regulations are being violated because the fact that people tends to copy the existing building that leads to violation and lack of monitoring. Usually it has been observed that due to DPC checking people are aware of setback in the ground floor but due to no monitoring till completion of building, the violation of cantilever was seen maximum in super structure. It is challenging to implement setback regulation due to the time needed to inspect and the fact that they cannot be easily

measured from the street.

During survey from public, they are not aware about bylaws, so they have less setback. In survey they have kept their view for importance on setback in front of road such as it can be used for parking, pedestrian purpose and for future road extension. Almost all houses have shops and they are also using setback as part of shop and steps to plinth so pedestrian have difficulties on use. Due to less set back it is also creating problem with good ventilation and light. In a municipality the setback rules from road is 2m for shutter and 1.5m for no shutter which is same for building height up to 13.4 and 15.4 which should be changed according to land use and zoning [12].

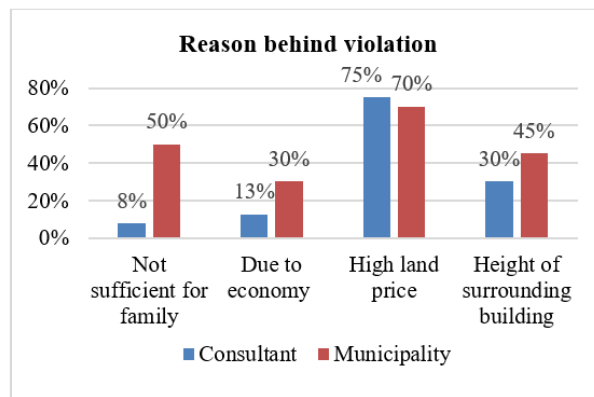


**Figure 10:** Awareness of building bylaws

From survey it was found that according to public, Municipality engineers and consultant’s 67-70 % house owners were partially aware about building bylaws. There were 25-30 % people not aware about building bylaws and only 3-7 % were fully aware. During questioner survey with house owners, most of respondent who have built house before 2060 B.S were not aware about building bylaws. Based on survey data, there is no relation between education level and violation of building bylaws. In general most of the respondent think authorized body should provide awareness program for newly constructed building before construction. The views of consultants and municipality personnel’s are not in contradiction to public.

**4.3 Reason behind violation of building bylaws**

In a survey to determine consultant and municipality personnel perceptions on reason behind violation of building bylaws. Most violation arise mostly due to cost factor of the land which is beyond capacity in



**Figure 11:** Consultant and municipality view for violation

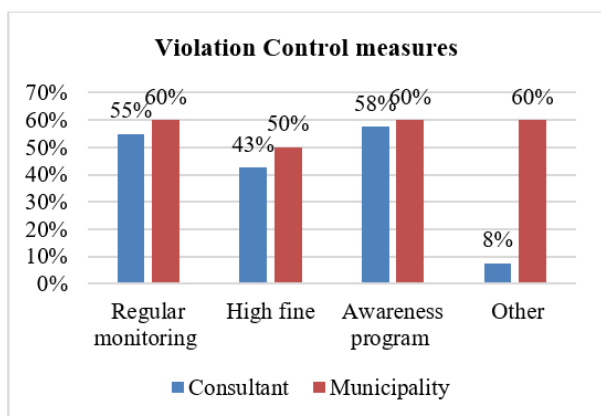
which 75 % from consultant and 70 % from municipality respond. At the same time 30 % and 45 % respondent believes that the height of surrounding building are the reason behind violation , 8 % and 50 % respondent says not sufficient for family and 13 % and 30 % respectively believes that economic reason is reason for violation.

**4.4 Violation Control Measures**

According to a survey conducted between municipality staff and a consultant, violations of building bye rules can be prevented by educating the general public, contractors, and technical professionals about these laws. 58 % of respondents from the consultant and 60 % of respondents from the municipality, respectively, believe that awareness and ongoing monitoring are necessary. 43 % and 50 % of respondents believe that hefty fines should be levied, whereas 8 % and 60 % of respondents believe that structures that violate bylaws should be warned about and dismantled.

**5. Conclusion**

The implementation status of building bylaws are not satisfactory in regards to setback and building height. Most of building are found to be violating the rules. Urbanization is major issues in today’s context. High rate of urbanization expansion, violation of building bylaws are at its peak these days. The relevant authority falls short of ensuring planned growth and adequate oversight of building construction. The observation confirm that the illegally occupied space for setback is very large i.e. 91 %. Whereas building height is violated 86 %. The results of this research



**Figure 12:** Violation control measures in a view of municipality personnel’s and consultants

region also serve as a model for other metropolitan areas of expanding cities. As Setback requirements and building height restrictions can be used to improve both the urban environment and structural strength. In order to effectively implement bylaws, the government authority must improve the technical proficiency of the relevant workforce and implement public awareness campaigns. Setback regulations, FAR, zoning, and other development and growth management strategies must be properly maintained and implemented in order to protect the safety and aesthetics of municipal buildings.

## 6. Recommendations

Observing and knowing the present status and condition of building bylaws implementation on setback and building height following recommendation are drawn. Even though there exist bylaws and regulations, their enforcement is viewed as being very poor; hence, this aspect has to be addressed. Frequent monitoring is needed for which government will required additional staff. If the normal staff is insufficient, a consultant can be hired to be in charge of site supervision. Prior to the commencement of construction, municipalities should concentrate on implementing an awareness program for the general public and a technical training program to update knowledge for expertise. The regulation of building height and setback should be changed according to zone and land use. Setback, height, F.A.R., Ground Coverage, size, materials, color, the character of the buildings, and other factors all contribute to the streetscape’s excellence. Therefore, the regulations must be written to ensure

that new streetscape components are in scale, design, and stylistic harmony with the neighborhood. It is crucial to have a separate set of planning bylaws that include rules for land use zoning plan as well as rules for subdivisions, land development, and urban architecture. Laws pertaining to the aforementioned topics appear to be missing from the current bylaws. The document containing the building regulations must clearly include information about building use and occupancy standards/norms. Strict oversight is necessary to stop the change of use. Immediate action is essential to such activities. Municipality must check such acts and deal with the house owners appropriately. In addition to carefully examining the DPC authorization, further checks for the superstructure (perhaps the completion of each floor level) should be made to reduce violations of setback, building height, projection on setback, etc.

Practical solution for violation of existing building		
Categories	Condition	Punishment
Maximum Violation	Setback from road Not sufficient	Notice for self demolish for few time and Force Demolish
	Cantilever structure on setback from super structure	
	No. of Floor >6 storey	
Medium Violation	Setback from rear side less then 1.5m	Notice for self demolish with in allocated time frame and Force Demolish
	Cantilever structure on rear setback from super structure	
	No. of Floor >5 storey<6 storey	
Minimal Violation	Setback from rear side less then 1.5m >4storey No. of Floor <5 storey	High Tax/ Moderate Tax

**Figure 13:** Practical solution for violation control

## Further scope of study

Similar study should be conducted in other municipalities with consideration of other parameters of building bylaws. Studies should be carried out on floor area ratio (FAR) bonus and transfer development right (TDR).

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