

PLANNING REGULATIONS IN THE USA AND THEIR IMPLICATIONS ON URBAN DESIGN IN THE CENTRAL CITY ZONE

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Abstract. *At the beginning of the 20th century, urban planning of the American cities was founded on the strong capitalist system and vast available land area. After a long period of planning, which was suited for the use of automobiles, nowadays the deficiencies both in the urban structure and social sphere are very obvious. Modern planning is striving to prescribe guidelines for urban design and thus create a continuity of cityscape and emphasize the pedestrian character of the area, particularly in central city zones. Town planning in the USA comprises local regulations which are suited to the needs of individual cities. Particularly important are the implications which certain town planning regulations have on the design of physical structures in the central city zone, which is the research goal of this paper.*

Key words: *planning regulations, urban design, FAR, incentive zoning.*

1. INTRODUCTION

One of the most prominent differences between European and American cities is vast available land area in the USA, in comparison to Europe where the space is scarce. The expanse of the American continent engendered car-wise oriented cities, and consequently, adverse environment for pedestrians and cyclists. Urban growth of the American cities reached an enormous scale. E. Fodor stated that in the circumstances of a strong capitalist system "local city planning services became a part of urban growth machine, whose primary task is to build roads and infrastructure, and provide public services for an endless mass of housing lots, industrial parks and shopping centers" [4].

Nowadays, large disparities between all sorts of densities in metropolitan cities of America are obvious (population densities, job densities, service densities etc.). On one hand, small towns and suburbia in large cities comprise "city sprawl", individual housing, blind alleys and low population density. Such developing pattern entails dependence on motor cars, weakly developed public transport and enormous, impossible pedestrian distances, which often results in obesity and many other health issues of the population. On the other hand, attractive downtown districts have immense, psychologically almost uncomfortable densities, with structures more than 50 stories high, which completely block the natural light at the street level.

Most of American cities have the prescribed **design guidelines**. The issue of design of physical structure and urban environment in general is very arguable, regarding the variety of tastes and changeable nature of trends in architecture. As J. Costonis stated in his book "Icons and aliens", mentioning the examples of Flatiron Building and Guggenheim Museum in New York, a structure which at the time of construction may appear as a completely inadequate structure in space, may in time become a landmark – icon of the city [2]. Even though design guidelines are not the most favorable solution because they imply danger of creating uniform, monotonous areas and restrain artistic expression, the Americans are of fast opinion that too much order is better than no order at all. Such position is the result of evident city planning failures from the beginning of the 20th century. Nowadays the guidelines for urban design in many cities include measures which not only define the building volume, but also the construction material, organization of elements on the façade, disposition and façade apertures and design of parking garages, even the roof design. The urban design guidelines are question of argument of planners and architects, because they leave too narrow space for certain spontaneity of urban forms and architectonic expression.

2. ZONING

Zoning is the most powerful instrument of land segregation. Zoning regulations in the USA date back to the beginning of the 20th century, with a goal to promote and protect human health, safety and general welfare. Control of land use was a way to separate new housing zones from industrial pollution, and a safety mechanism that new housing meets basic health and safety standards. Strict segregation of uses with allotted areas is particularly characteristic for the United States. Even though in Los Angeles a type of zoning was implemented as early as in 1909, it is considered that it was for the first time thoroughly implemented in 1916 in New York with a goal to relieve pressure on the central city core. The impulse for implementation of zoning was emergence of skyscrapers and the fear that physical structures would completely obscure the sunlight. The zoning regulations related to the building heights, alignment line and use segregation, so as to separate housing from industry and manufacturing. The purpose of zoning was to protect investments and the cost of land, but also to keep the poor in their inexpensive housing.

Until 1946, zoning was accepted in all American states. "Undesirable" uses were removed from the center, and zones with only one function were created in their place, which replaced the confusing mixture inherited from the 19th century industrial city. Segregation of incompatible uses represents a legitimate instrument of local authorities in the USA. Such policy resulted in the present day situation where zoning regulations neces-

sarily separate housing from commercial or catering uses, very often with detrimental effects on the built-up environment and human health. All these weaken the identity of community and lead to the suburban sprawl with low population density. In combination with the transport policy, the zoning regulations not only encourage the sprawl, but render impossible the more "sustainable" forms of development (moderate urban growth, pedestrian environments etc.). Such zoning was criticized in the last decades, with the recommendation to implement a mixed-use development whenever possible to the benefit of the city and its environment sustainability [3].

J. Barnett stated that "while the lawyer, surveyor and municipal engineer consider their primary task to be not control over design but over more abstract considerations of public health and welfare, nonetheless they have (un)intentionally determined the basic design framework of the American city through a combination of local zoning regulations and the street pattern..." [1]. New York is certainly the best example of a physical embodiment of its own zoning. The law of 1916 on retraction of the alignment line of the upper stories meant that instead of the elegant and slender skyscrapers of the time, new pyramidal-cascading forms were being built, so as to permit the daylight to reach the streets by retracting the façade from the street.

Nowadays, when the city authorities adopt a plan, two basic instruments realizing this plan are the zoning plans and building lot regulations. The zoning regulations divide the city into areas or zones, and regulate the land use in each of them, by specifying the purpose of structures, density of services and volume of the structure.

3. SOME STANDARDS IN URBAN PLANNING

The standards in the USA planning defining maximum horizontal and vertical volume and position of the structure on a lot (within certain zoned area, in this case – downtown) are: the size of the lot, index of floor area, lot cover percentage, surface area of the yard, height of the building and alignment line position.

Alignment line position is extremely significant and in densely urbanized environments, it varies by the floors. **Setback** of the façade plane of the structure at higher stories most often means cascade retraction of one or several facade planes, which results in a terraced appearance of buildings.

Floor Area Ratio - FAR is a fundamental standard which controls the size of the structure, that is, its horizontal and vertical dimensions. Similarly to the built-up area coefficient in the Serbian regulations, FAR represents a ratio between total gross developed building surface area and the surface area of its lot (Figure 1). Each zoned area has its own prescribed FAR value. As an incentive for the investors "**FAR bonus**" can be acquired, in the form of additional floor area, which is a compensation for provision of a new service, public area (most often a pedestrian square – plaza) or prediction of a certain number of accessible, inexpensive residential units.

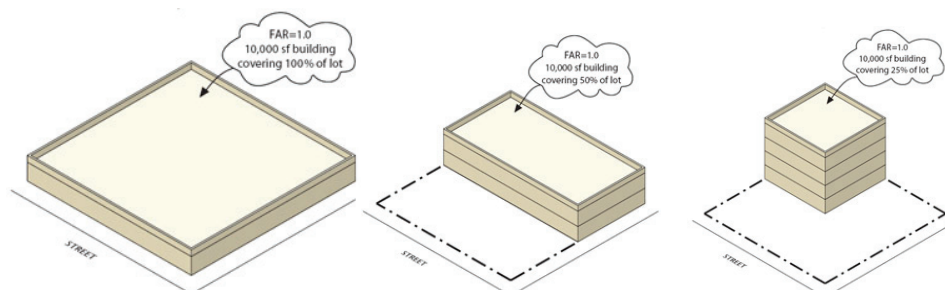


Fig. 1. Possibilities in horizontal and vertical formation of the structure on a lot of 10.000 square feet, in an area with maximum FAR amounting to 1. Source: <http://www.nyc.gov/html/dcp/html/zone/glossary.shtml>

Building/Zoning Envelope is the maximum volume on a lot within which a physical structure can be built in respect to the allowed parameters: height, alignment line and required yard area (Figure 2).

Height Factor is a gross developed area divided by the ground floor surface area.

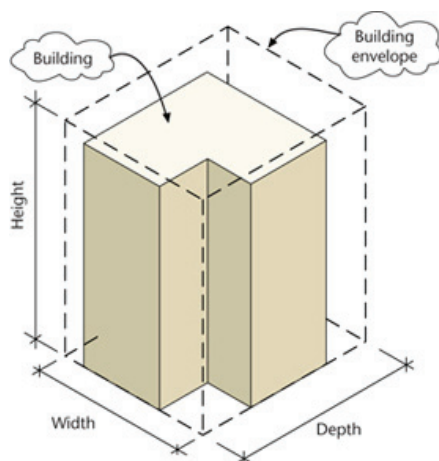


Fig. 2. Building envelope. Source: <http://www.nyc.gov/html/dcp/html/zone/glossary.shtml>

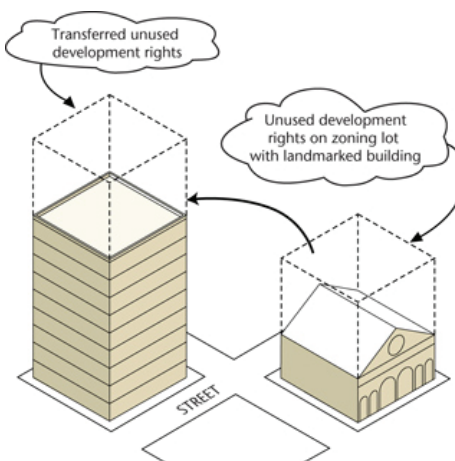


Fig. 3. Unused development rights on zoning lot with landmark building that can be transferred to the neighboring building. Source: <http://www.nyc.gov/html/dcp/html/zone/glossary.shtml>

Maximum gross developed area on a lot which can be used for building is called **Development Rights**. The difference between this value and a lower value representing actual structure is called **Unused Development Rights**, and under special circumstances they can be transferred from one lot to another. It is **Transfer of Development Rights – TDR**, and it is most frequently realized in order to preserve historically valuable buildings, open areas or cultural values (Figure 3). **As-of-Right Development** is such

development which observes all the zoning regulations and does not require any discretionary action by the City Planning Commission and similar bodies.

3.1. Application of environmental standards

In many downtown areas, buildings must observe regulations protecting environmental values – light penetration, limitation of shadows cast, wind gust reduction, protection of vistas. When it comes to the environmental effects of high buildings on the environment in terms of insolation, New York and San Francisco are the cities with most detailed regulations.

The New York law on zoning of 1916 actually introduced **Sky Exposure Plane**, with the intention to allow penetration of natural light through the windows and retaining the sight from the interior of the structure towards the sky. Sky Exposure Plane is a virtual sloped plane which tangentially touches all the façade planes which have been set back, and its role is to provide penetration of air and light at the level of the street in high density zones (Figure 4). Direct consequence of these regulations is cascade retracted planes at higher stories.

Position of façade planes at higher stories depends on the type of zoned area. In such districts where the structural height factor is implemented, the position of the alignment line is controlled via the sky exposure parameter. However, as in practice departure from the prescribed heights and the position of the alignment line in exchange for the public services was approved, contractors built atrium type buildings where these services were situated. In this way the sky exposure plane concept somewhat became senseless. In the districts where contextual zoning is applied (such standards are established where newly constructed buildings respect the context and are in agreement with the existing character of the neighborhood), the position of the structure is defined by the distance from the alignment line.

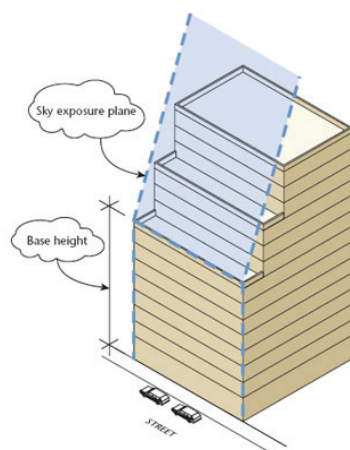


Fig. 4. Sky Exposure Plane.
Source: <http://www.nyc.gov/html/dcp/html/zone/glossary.shtml>

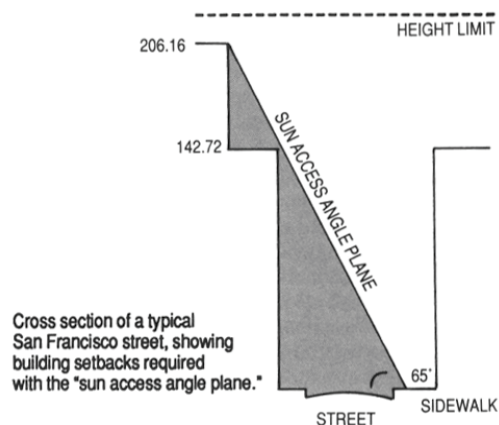


Fig. 5. Sun access angle plane.
Source: Lasser, TJ: Carrots and Sticks: New Zoning Downtown, str.91, Urban land Institute, 1989

In its downtown plan of 1985, San Francisco also prescribed the methods of insolation and preventing of newly constructed buildings to cast shadows on the streets and open areas during most intensive pedestrian activities. In a similar manner as in New York, this San Francisco plan defines **Sun Access Angle Plane**. This plane represents a limit to which a structure may be erected in height, by setting back the façade plane at higher stories (Figure 5). The stipulation known as Proposition K, which resulted in the civil initiative, prescribes all-day sunlight throughout the year for around 70 open areas and park, 14 of which are located in the downtown zone. In the Proposition K there was an exception for those shadows whose influence was of small importance. Even though in 1989 the city Planning Commission established the criteria for determining the shadows of small influence, until that date the ban of any shading of all open areas applied to all newly built structures.

The structure which underwent huge changes because of implementation of the Proposition K is the building in 343 Sansome Street in 1987. In the original design, this building had 25 stories and 350.000 square feet. However, Downtown plan reduced the FAR index from 14 to 9. In order to meet the proposition K, firstly 7 stories were eliminated, but as the structure still cast "significant" shade, another three floors had to drop off. All these resulted in large changes of the building architecture (Figure 6).

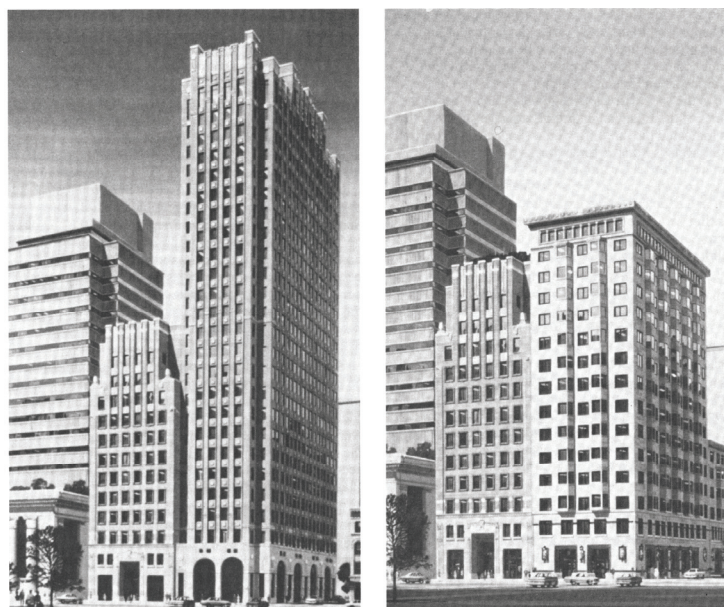


Fig. 6. 343 Sansome Street prior to (left) and after (right) meeting the Proposition K.

The building in the middle was integrated in the design as a historical building.

Source: Lasser, TJ: *Carrots and Sticks: New Zoning Downtown*, pg.94, Urban land Institute, 1989.

4. INCENTIVE ZONING

Incentive Zoning allows bonuses, most often in the form of additional floor area, in exchange for provision of public services or inexpensive housing. Many cities use incentive zoning to obtain necessary public services, which benefits both the developers and the city. In this way, the necessary services are provided with no city funds spending and without severe taxation of the developers. Incentive zoning must really contribute to the public interest. Each city defines which interventions are qualified for a bonus, and it is mainly a political decision reflecting the priorities of the community. In time, the list of items qualifying for a bonus largely expanded: improvement of the structure, improvement of pedestrian traffic and services, various types of inexpensive housing, public services, parking and public transport, culturally and historically valuable structures.

When implementing incentive zoning, developers and investors know in advance value of each item qualifying for a bonus, and the method used for calculation of a bonus. The calculation methodology, the so called "Bonus formula", differs from city to city. One of the possible ways to define the value of the bonus (most frequently in the form of an increased density) – for each square foot of additional public services, a certain amount of square feet of gross building area is obtained. For instance, in Seattle, the bonus coefficient for provision of a public park is 1:5, that is, for each square foot of the park, five square feet of additional area of commercial structure are approved.

The next variable is the quantity of bonus area each element can obtain within the design. For provision of public services, a certain value of additional area is obtained, but with limiting the FAR index (up to the value called FAR Caps). In Hartford, Connecticut, for each square foot of gallery space, four square feet of commercial space are obtained but only up to 1 FAR Caps. Above this limit, no bonus area is obtained for the gallery space. It is particularly complex to calculate the bonus in the cases where it is permitted to increase the density in exchange for financial payments to some funds (e.g. housing, employment or occupational training fund). The incentives must then be precisely calculated, so as to avoid charging the city authorities with selling bonuses.

Bonuses in the floor area can be assigned for maintenance of certain parts of the project, most often of open areas and public art.

On the other hand, incentive zoning is not an ideal planning instrument and receives a lot of criticism in practice. Incentive zoning is often condemned for being a mask for potential manipulations. Namely, when regular zoning regulations are strict and narrow, which is accomplished by intentional lowering of FAR index below its market and real value, it is then that the contractors are compelled to solicit bonuses and incentive zoning. The critics of incentive zoning state that this is the excellent planning instrument that allows buying off the right to build outside limits sanctioned by the law, and where the city is cheaply selling its public resources. T.J. Lasser mentioned the report of a state audit of 1988 which is based on the study of 15 designs with special permits built on Manhattan in New York in the '80s: the total value of realized bonus was 5 million dollars, while the market value of realized additional area was as high as 108 million dollars [6].

4.1. Implementation of incentive zoning in some cities in the USA

New York. New York passed the Zoning resolution in 1961, which strongly shaped the cityscape. Instead of structure height factor, the sky exposure plane was introduced

and a set of standards defining the volume of the buildings [5]. Zoning revision of 1961 also launched a new method for control of the density – application of FAR index. Owing to the bonus of 20% in additional floor area which is obtained for creation of open areas, there was enormous increase of the number of plazas in New York. In order to obtain the maximum area approved by the law, the contractors built on the outside edge of zoning envelope. In such circumstances of market calculations, investment economy and politics, an architecture of cascade block cast skyscrapers emerged, modeled by the zoning law and building regulations (Figure 7).

Washington, DC. Zoning regulations, assisted by economic factors, formed the architecture in the capital of the States. Washington, DC suffered from the strict regulations on height limit of constructions. The principle that "no building is taller than the Capitol dome" resulted in numerous big-box formats of a mediocre architecture, of mostly the commercial buildings (Figure 8). And while the contractors and investors are justifying their actions of building on every available square meter of the ground level, instead of upwards, by being bound by strict zoning regulations, there are those who credit this height limit for creation of such loveliness and charm of certain districts, such as Georgetown.

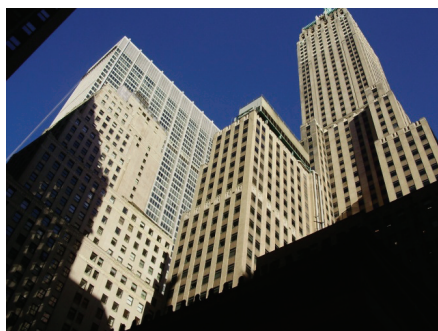


Fig. 7. New York: Silhouette of Lower Manhattan from the street level, cast shadows and cascade facade planes.
Source: photo-documentation of the authors.



Fig. 8. Washington, DC: Plain principle - "No building is taller than the Capitol dome".
Source: http://fr.wikipedia.org/wiki/Fichier:Washington,_D.C._-2007_aerial_view.jpg

San Francisco. Zoning regulations in many cities stimulate variety in designing roof planes, even though only San Francisco demands in that high commercial buildings in its downtown have the so called "hats", that is conical roofs (Figure 9). Downtown plan of 1985 defines not only the appearance of individual structures, but also their cumulative effects on the silhouette of the city. At some point in the second half of 20th century, the bulky and monotonous rows of box-like high commercial buildings disrupted the fine pre-war silhouette of San Francisco, so there were demands that the new construction must be of slender formats and more complex forms. The development regulations in the downtown zone not only encouraged the pointed form of the roof, but in the districts with height limitation allowed departure from it - up to 10% of permitted height can be added

to the building if the volume at the higher stories is reduced [5]. This created a more elegant, sculpture profiled silhouette, but also allowed penetration of daylight and reduction of wind at the street level.

This plan also encourages Transfer of Development Rights from historically valuable buildings. The buildings significant in historical or cultural terms can be demolished only due to economic reasons or public safety reasons, and all alterations and interventions on them must have approval of the competent protection agency. Maintenance of such buildings is the owners' obligation. Before transferring the development rights to a new proprietor, the valuable structures must be rehabilitated. In case of San Francisco, TDR is the most reliable planning mechanism for realization of maximum densities. By buying off the TDR, developers can increase the FAR in the commercial zone from standard 6-9 up to even 18. The other way to achieve higher densities is provision of housing. There is no doubt that San Francisco planners are insisting on the valuable building protection program, and their law is one of the strictest in the USA.

San Francisco also demands that the buildings with more than 25.000 square feet, and which are situated in the commercial districts, provide a form of public art, whose value is no less than 1% of the construction costs, i.e. 2% in the case of the projects sponsored by the city. These works of art can be sculptures, murals, mosaics, decorative water areas etc. and must provide comfort to all the users of the space.

Seattle. The zoning law of Seattle of 1985 posed the limitations in terms of setting the alignment lines for the structures on individual street segments, in order to preserve the vista towards the Elliott Bay in West Seattle. This regulation has been criticized since its inception, firstly because it produced stereotyped architectonic designs, and then because the protection of vista as-it-was was absurd because certain structures had already disrupted the view.

Sculptural forms of roofs are considered public interest in Seattle, too, because of which the developer obtains a bonus, in the form of an increased density and/or height of the structure. The additional floor area which can be obtained represents a total of all the reductions in the surface area of higher floors plus 10.000 feet, and the maximum limit of

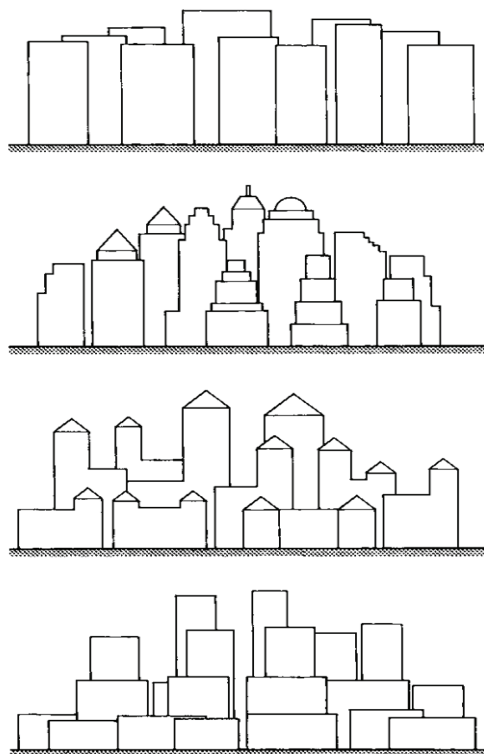


Fig. 9. Typical silhouettes in American cities.
Source: documentation of the author.

area available for bonus is 30.000 feet. The first building exploiting the FAR bonus because of the pointed roof was Washington Mutual Tower (Figure 10).

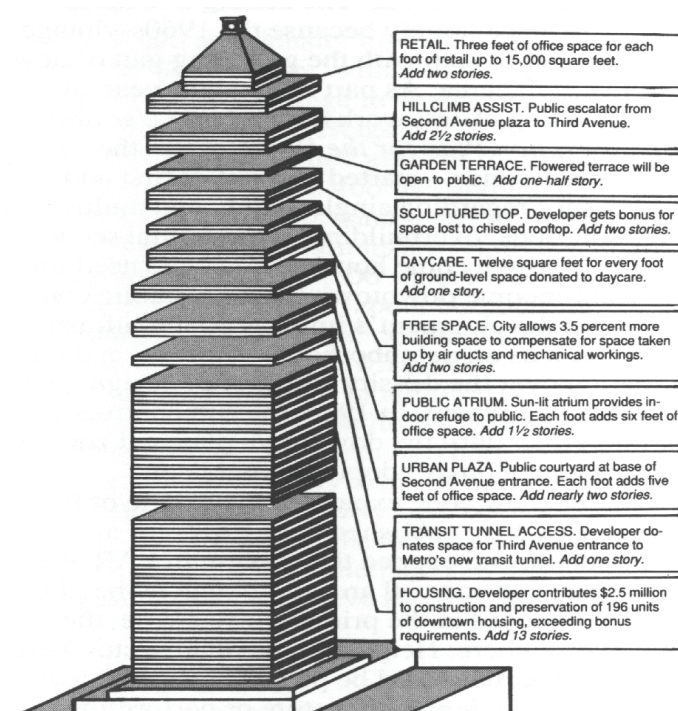


Fig. 10. Realization of FAR bonus of Washington Mutual Tower in Seattle: The structure was originally entitled to 27 floors, but this number increased to as much as 55 owing to the bonus points realized through incentive zoning system.

Source: Lasser, T.J. *Great Expectations: Limits of Incentive Zoning*, pg.13, Urban Land, May 1990.

Washington Mutual Tower was built in 1988. It has a total of 55 stories, out of which as much as 28 were the result of FAR bonus realization. 500.000 square feet more were constructed than the area allowed by standard zoning regulations, which in reality doubled the volume of the structure. T.J. Lasser states that the city bribed the contractor with such amount of additional construction area to provide various public services in return, so she calls the incentive zoning in Seattle "legalized bribery" [6], which becomes a national trend. Due to its final volume, with gross developed area of 1.000.000 square feet, the structure obtained many negative criticisms. To citizens' initiative, opposed to such high densities, in 1989 the law was changed so the heights and densities in the central zone were reduced.

5. CONCLUSION

Zoning is not a sufficient planning document which can answer to all the needs of a city for public services. The effects of incentive zoning, in terms of realization of inexpensive housing, are unfortunately very modest. For this reason, American cities are considering other forms of incentive to realize the desired goals, such as taxation exemptions, land consolidation programs, financing from the tax increase, financing of special service zones etc.

The specific of the USA cities is the local regulations which are tailored for each city. The regulations are prescribed by the planning commission with regard to the local characteristics and city needs. Thus, zoning differs from city to city and results in the concrete problems which occur in the cities having their concrete planning answers.

Recommendations for implementation of incentive zoning mainly concern the FAR bonus. This parameter should be based on the net surface of the lot intended for construction, and not the total area of the lot. The basic value of FAR should be set below the market level, so it becomes necessary to request bonus from the city. The cities must know in advance what public services they need, and prescribe bonuses on this basis, but must also leave sufficient space for maneuver and negotiations with contractors, in order to obtain the necessary services. The problem of uniform, monotonous areas can be solved by establishing of various values of FAR bonus for different city districts. The city planning services must revise these values in accordance with the market conditions, and constantly monitor which items are qualifying for bonus and attractive to investors at the same time.

REFERENCES

1. Barnett, J.: An Introduction to Urban Design, Harper&Row, New York, 1982.
2. Costonis, J.: Icons and Aliens: Law, Aesthetics and Environmental Change, Urbana and Chicago: University of Illinois Press, 1989.
3. Dinić, M. Mešovite funkcije u obnovi gradskog centra, Zadužbina Andrejević, Beograd, 2009.
4. Fodor, E.: Better not Bigger: How to Take Control of Urban Growth and Improve Your Community, Gabriola Island, BC: New Society Publishers, 1999.
5. Lasser, T.J.: Carrots and Sticks: New Zoning Downtown, Urban land Institute, 1989.
6. Lasser, T.J.: Great Expectations: Limits of Incentive Zoning, Urban Land, May 1990.
7. <http://www.nyc.gov/html/dcp/html/zone/glossary.shtml>

PLANSKI NORMATIVI U SAD I NJIHOVE IMPLIKACIJE NA URBANI DIZAJN U ZONI GRADSKOG CENTRA

Milena Dinić, Petar Mitković

Početak 20. veka urbanističko planiranje američkih gradova je svoje uporište nalazilo u snažnom kapitalističkom sistemu i ogromnim površinama raspoloživog zemljišta. Nakon dugog perioda planiranja gradova po meri automobila, nedostaci su danas očiti podjednako u urbanoj strukturi kao i u socijalnoj sferi. Savremeno planiranje čini ozbiljne napore da propisivanjem smernica za urbani dizajn ostvari kontinuitet ulične scenografije i pojača pešački karakter prostora, naročito u centralnim gradskim zonama. Urbanistička regulativa u SAD podrazumeva lokalne propise koji su prilagođeni potrebama svakog konkretnog grada. Posebno su značajne implikacije koje pojedini urbanistički normativi imaju na dizajn fizičkih struktura u zoni gradskog centra, što je predmet istraživanja ovog rada.

Ključne reči: *planski normativi, urbani dizajn, FAR, podsticajno zoniranje*