

SHIFTING THE ISLAND SECTION LINE IN RECONSTRUCTION ISLANDS ACCORDING TO THE DEPTH CRITERIA WITH VECTOR TECHNIQUE

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Highlights

- The line showing that there are different building regulations on an island in zoning islands is expressed as the island division line.
- Zoning plans ensure that proper parcels are formed and that the facade and depth criteria required for building permits are formed on new parcels.
- The most preferred length addition method in vectorial technical direction length additions.

Article Info	Abstract
Article History: Received: June 8, 2022 Accepted: August 30, 2022	Zoning islands are referred to as areas surrounded by road networks with different features such as various residences, commercial, social facilities, official institutions in the implementation development plans. Some of these islands contain zoning parcels with different building regulations on the same island with the island division line. Sometimes, as a cadastral base, some parcels may coincide with a zoning island with more than one feature, separated by an island line. In the study, an examination was made about how the island division line will be given on the ground according to the planned areas type zoning regulation in Turkey, based on the side where the front and depth of the parcels formed in this way are excessive. This examination was created by the vectorial addition technique, which is called as longitudinal, the correlation between the lengths and the angles.
Keywords: Zoning Island; Island Division Line; Vectorial Insertion	

İMAR ADALARINDA ADA BÖLÜM ÇİZGİSİNİN VEKTÖREL TEKNİK İLE CEPHE DERİNLİK KRİTERLERİNE GÖRE KAYDIRILMASI

Makale Bilgileri	Öz
Makale Tarihçesi: Geliş: 8 Haziran 2022 Kabul: 30 Ağustos 2022	İmar adaları uygulama imar planlarında çeşitli konut, ticari, sosyal donatı, resmi kurum, gibi farklı özelliklere sahip etrafı yol ağları ile çevrili alanlar olarak adlandırılır. Bu kimi adalar ada bölüm çizgisi ile aynı ada üzerinde farklı yapı nizamlarına sahip imar parsellerini barındırırlar. Kimi zaman kadastral altlık olarak bazı parseller ada çizgisi ile ayrılan birden fazla özellikteki imar adasına denk gelebilirler. Çalışmada, bu şekilde oluşan parsellerin cephe ve derinliklerinin fazlaca olduğu taraftan baz alınarak ada bölüm çizgisini Türkiye'deki planlı alanlar tip imar yönetmeliğine göre nasıl zeminde verileceği hakkında irdeleme yapıldı. Bu inceleme uzunluk ve açların arasındaki korelasyon uzunlu adı verilen vektörel ekleme yani uç uca ekleme tekniği ile meydana getirildi.
Anahtar Kelimeler: İmar Adası; Ada Bölüm Çizgisi; Vektörel Ekleme	

1. Introduction

Planning systems around the world are grouped under two headings as plan-based systems where land use decisions are determined by means of legally binding plans, and project-based systems aimed at development equipped with wide discretion (Faludi, 1987; Alfasi, 2006; Nadin and Stead, 2008; Muñoz Gielen and Tasan- Kok, 2010, Berisha et al., 2020; Kılınç, 2021). The separation in planning systems is also known in the literature as the Continental European system - regulatory planning system and the British system - discretionary planning system (Willis, 1995; Cullingworth, 1997; Tang, Choy, & Wat, 2000; Kılınç, 2021). In the plan-based system used in the USA and many European countries, the hierarchy between plans was adopted (Steele and Ruming, 2012; Rivolin, 2008; Kılınç, 2021). In addition, the plans gain certainty after they are approved; In cases where the public interest requires, changes can be made in the plans by following some procedures (Alfasi, 2006; Kılınç, 2021). In this system, a regulatory role is attributed to the plans and it is aimed that the plan and implementation be a whole (Rivolin, 2008; Kılınç, 2021). In the plan-based system, the plan is legally binding, focused on physical developments, and has a feature that limits the use of discretion, while in the project-based planning system, the plan is a management tool of change, allowing wide use of discretion (Steele and Ruming, 2012; Muñoz Gielen and Tasan-Kok, 2010; Berisha et al., 2020; Kılınç, 2021). The existence of hierarchy between plans, precision, rigidity-immutability, regulatory role and plan-implementation integrity are the main features of the plan-based system. On the other hand, horizontal and vertical location, flexibility, discretion, application diversity, and strategic role are the main features of the project-based system (Steele and Ruming, 2012; Rivolin, 2008; Alfasi, 2006; Kılınç, 2021). The plan-based systems approach aims to shape the spatial environment by dividing the planning area into zones and determining what can and cannot be built in these zones (Booth, 2003; Faludi, 2002; Kılınç, 2021). The

main purpose of this approach is to create certainty by separating non-functional areas that may prevent inappropriate uses and investments in the land (Zakhour and Metzger, 2018; Alfasi, 2006; Kılınç, 2021). The rigid nature of the plan-based system has provided a powerful economic, social and environmental tool in controlling land uses and directing order and change (Berisha et al., 2020; Kılınç, 2021).

2. Theoretical Framework and Scope Introduction

In the plan-based system, it is aimed to keep urban development under control by keeping it away from speculation (Alterman, 2012; Kılınç, 2021) through legally binding plans approved by state powers (Tasan-Kok, 2008; Kılınç, 2021) (Valtonen et al., 2017; Rivolin 2008). ; Kılınç, 2021). Thus, state authorities aim to protect the public interest, not specific interest groups, by keeping spatial development under control and control (Alexander, 2012; Alfasi, 2006; Kılınç, 2021). In the plan-based system, the main goal of the realization of planning permission and control under public control is to ensure the public interest (Nadin et al., 2020; Alexander, 2012; Kılınç, 2021). In the plan-based system, plan and implementation are processes that follow each other (Booth, 2003; Kılınç, 2021) and after the plan approval stage, all zoning rights on the plan have been determined (Buitelaar et al., 2010; Rivolin, 2008; Kılınç, 2021). (Alexander, 2009; Kılınç, 2021). In the implementation phase, flexibility and discretion are prevented by not allowing the planning authorities or the investor to take initiative (Valtonen et al., 2017; Albrechts, 2004; Kılınç, 2021). Thus, it is aimed to transfer the decisions taken during the preparation of the plan to the city space, and to ensure that the plan and the application do not separate from each other (Steele and Ruming, 2012; Alexander, 2012; Moroni, 2007; Faludi, 1987; Kılınç, 2021). In our planning legislation, there is a base-superior relationship, which is expressed in the old language as 'sillsile-i meratip or series of ranks' (Günday, 2002; Kılınç, 2021). Planning hierarchy; In summary, it is that

the plans prepared at different scales direct each other. The main purpose of the plan hierarchy is to ensure coordination between the plans in reducing the plan decisions taken at the highest level to the space, and to make the decisions taken at the lower level in line with the plan decisions taken at the upper level, not pointwise. According to the hierarchy principle, the lower level plan decisions cannot be contrary to the higher plan decisions in the hierarchy. Thus, the hierarchical order between the plans also reveals a control mechanism (Gürsoy, 2015; Türk, 2016; Kılınc, 2021). One of the most important features of the project-based system is that a participatory approach has been adopted at almost every stage of planning. According to this approach, full success of the plans and public participation in the decision-making processes are possible with the joint effort and support of the parties and the authorities (Gürsoy, 2015; Kılınc, 2021). In plan-based systems, land use decisions, zoning rights and construction conditions are determined through plans approved by the public authority (Albrechts, 2004, Rivolin, 2008; Kılınc, 2021), while in project-based systems, land use decisions and zoning rights are equipped with wide discretion for each case. It is determined by negotiations between public authorities and private sector investors (Alfasi, 2006; Alterman 2012; Valtonen et al., 2017; Kılınc, 2021). In the plan-based system, the plan is legally binding, focused on physical developments, and has a feature that limits the use of discretion, while in the project-based planning system, the plan is a management tool of change, allowing wide use of discretion (Steele and Ruming, 2012; Muñoz). Gielen and Tasan-Kok, 2010; Berisha et al., 2020; Kılınc, 2021). The existence of hierarchy between plans, precision, rigidity-immutability, regulatory role and plan-implementation integrity are the main features of the plan-based system. On the other hand, horizontal and vertical location, flexibility, discretion, application 2 differences, and strategic role are the main features of

the project-based system (Steele and Ruming, 2012; Rivolin, 2008; Alfasi, 2006; Kılınc, 2021).

3. Material and Method

Let M be a differentiable manifold. on M manifold, $g : \chi(M) \times \chi(M) \rightarrow C^\infty(M, \mathbb{R})$, The M manifold defined as the symmetric, positive defined and bilinear g Riemann metric defined as, is called a Riemann manifold and is denoted by (M, g) (Kırık, 2016).

$\nabla : \chi(M) \times \chi(M) \rightarrow \chi(M)$, $(X, Y) \rightarrow \nabla_X Y$ (1). transformation, $\forall X, Y, Z \in \chi(M)$ ve $f \in C^\infty(M, \mathbb{R})$ için, $\nabla_X(Y + Z) = \nabla_X Y + \nabla_X Z$, $\nabla_{X+Y} Z = \nabla_X Z + \nabla_Y Z$, $\nabla f X = f \nabla X$, $\nabla_X(fY) = (X f)Y + f \nabla_X Y$ relations, the ∇ operator is called a linear connection (linear connection) on the M manifold (Kırık, 2016).

There is a special vector that defines the beginning of the coordinate system and allows the use of position vectors, and this vector is the zero vector and can also be represented as $\vec{0} = (0, 0, 0, \dots, 0)$ in \mathbb{R}^n space. The zero vector has an infinite number of directions and directions, and its start and end points are coincident. A vector with a fixed origin is called a position vector or a ground vector. In the Cartesian system, the \vec{OA} vector connecting the initial point $\vec{0} = (0, 0, 0, \dots, 0)$ to a point A is called the position vector of the point A . In mathematics, points and spaces are considered as space, place, space \vec{OP} basic abstract concepts and a space model is created using a coordinate system. A three-dimensional coordinate system is simply an infinite set of ordered triples of real numbers (x, y, z) , and each point corresponds to one of these ordered triples, called the coordinates of the point. For each free vector or translation, a position vector associated with the origin corresponds under that translation. Thus the position vector is defined as points in space and corresponds to a unique(single) \vec{OP} vector to no position vector P (Güzel, 2021).

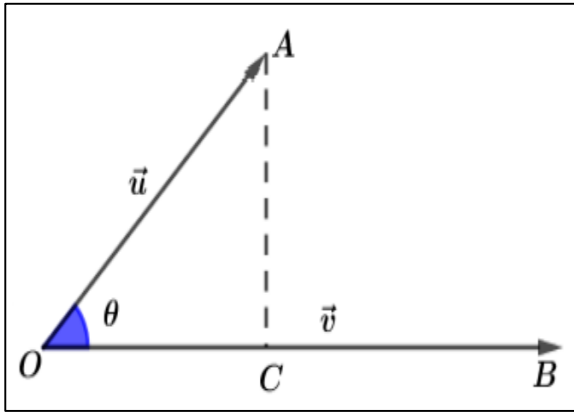


Figure 1. Geometric Meaning of Vectors (Güzel, 2021).

$$\vec{u} \cdot \vec{v} = \vec{OA} \cdot \vec{OB} = |\vec{OC}| \cdot |\vec{OB}| \quad (2).$$

The direction of any vector in the R^n space can be determined by giving the cosines of the angles made by the coordinate axes in the positive direction. The angles that a \vec{U} vector makes with the coordinate axes are called the direction angles, and the cosines of these angles are called the direction cosines (Güzel, 2021).

4. Findings and Discussion

Reconstruction islands are important parameters created by road networks within the boundaries determined in an urbanization planning. They are the main elements of the plan. Because, it is the order in which unclear parcels such as abandonment or creation from the road, which are in the nature of a field as a cadastral base or a zoning parcel, are transformed into zoning parcels with zoning procedures and are made to be taken for building permits. The island section line, on the other hand, is that it causes the zoning island to have different precedents, heights, or draw ground distances within itself, in the sense of issuing a building permit with that feature on the parcels corresponding to the part in which a zoning island is separated. In addition, the markers to be applied in a planning, especially to the main split, block or adjacent parcel, can be applied on a single zoning island as well as with the island division line in a zoning island. The problem of which building order will be based on, especially the

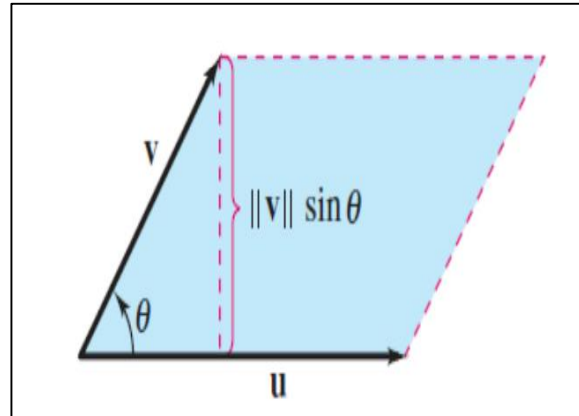


Figure 2. The Geometric Meaning of Multiplication of Vectors (Güzel, 2021).

facades and depths of the parcels on the island division line may arise. Therefore, in case a zoning permit is given to the parcels above the line, the planned areas on this island section line will be shifted until the façade and the appropriate depth and distance amount are provided according to the type zoning regulation. If we apply this shifting as a method of adding length by vectorial end-to-end addition, and we can explain it with examples as follows.

A zoning island is divided into three parts with two separations, with the island section line separated by the island division line, which is adjoining in the northeast direction up to eight floors, and the northwest side is divided into four floors, and the south side is a block structure with eight floors. has occurred. Especially the biggest problem here is the question of how to get zoning ground permission on the basis of the facades and depths of the parcels on the intersection sides that may be on the zoning island line. In this example, too, the minimum depth requirement for a parcel in the adjacent building order and the shifting of the island section line from the facade condition with vectorial addition in length. In this parcel, according to the planned type zoning regulation, the distances to the back and side gardens should be increased after four floors per floor in the planned type zoning regulation in places that will correspond to eight floors. After that,

since the front garden will not be allowed in the adjacent building regulations, which will increase by one meter per floor, the ground clearance is provided

by calculating the backyard plus depth distance without a garden.

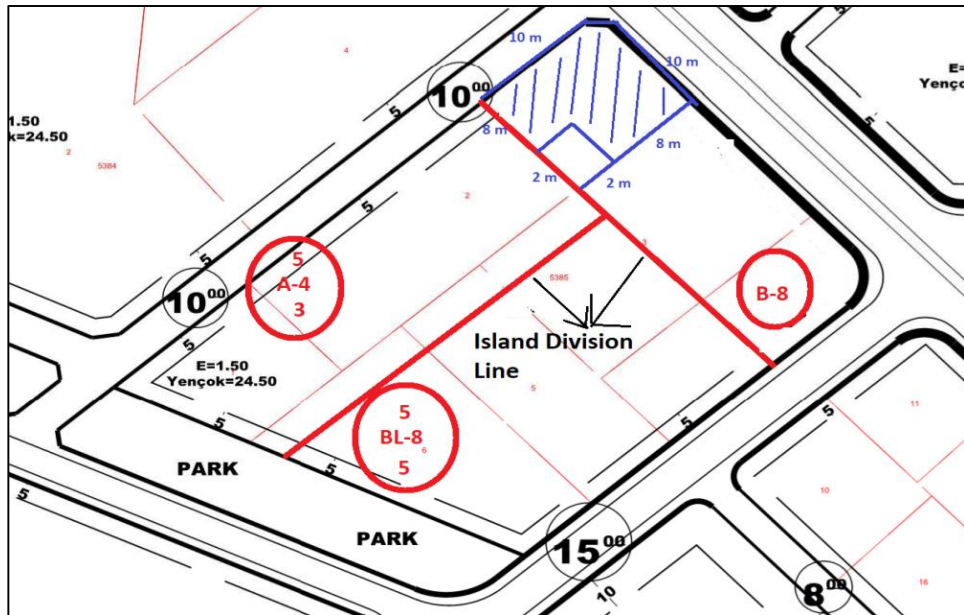


Figure 3. Scroll view to be made with two different island section lines (Url, 1).

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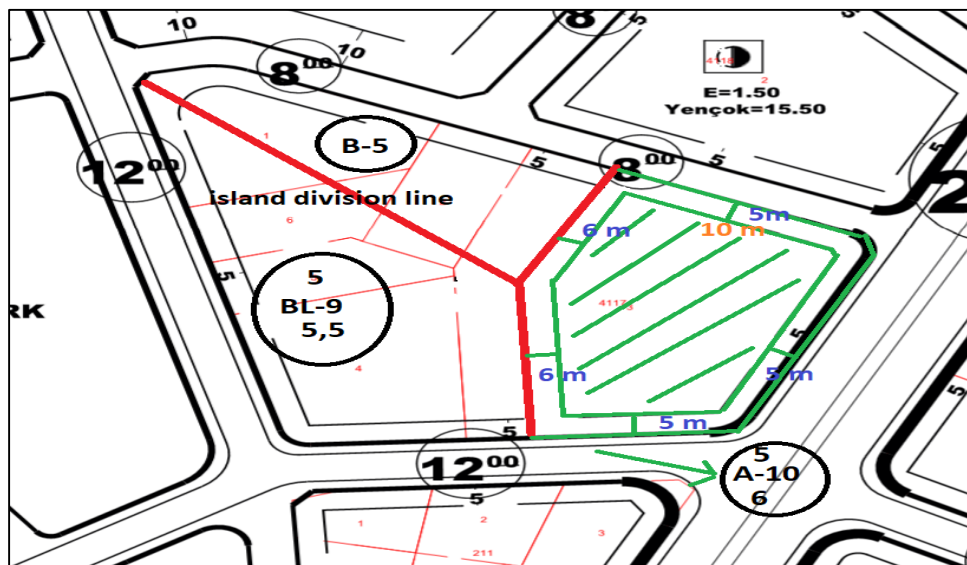


Figure 4. The shift view of the island section line (Url, 1).

The zoning island division line, which divides into three different building identities only in the block and adjacent building order, is given in green, and the ground seating area is given by drawing the ground session of the parcel up to 10 floors, which is separated

in the block and adjacent part of the other parcel. Here, the red colored island section line is vectorally shifted towards the green colored area. The aim is to coincide with the full depth and front of the parcel.

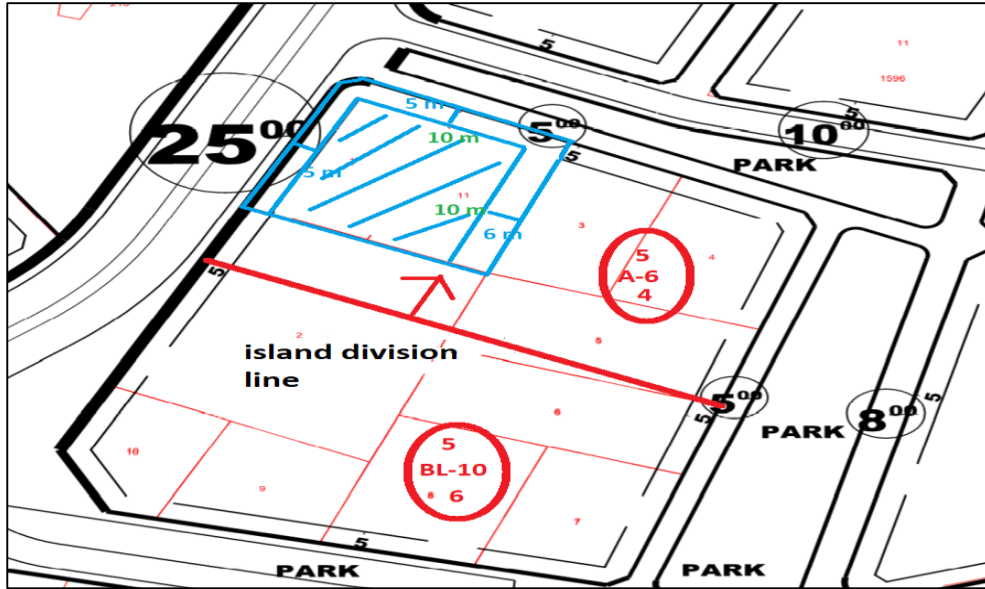


Figure 5. Indication of the dividing line in two different island features (Url, 1).

In the zoning island divided by a single dividing line, which has a block and separate building order, the parcel must be passed over the full border of the section line, since a part of the parcel enters the part of the parcel with the other building identity, as the parcel

alone is not sufficient for the construction permit. Here, too, since the depth plus the front garden distance must be at least 15 meters in block building regulations, it has been drawn in this way.

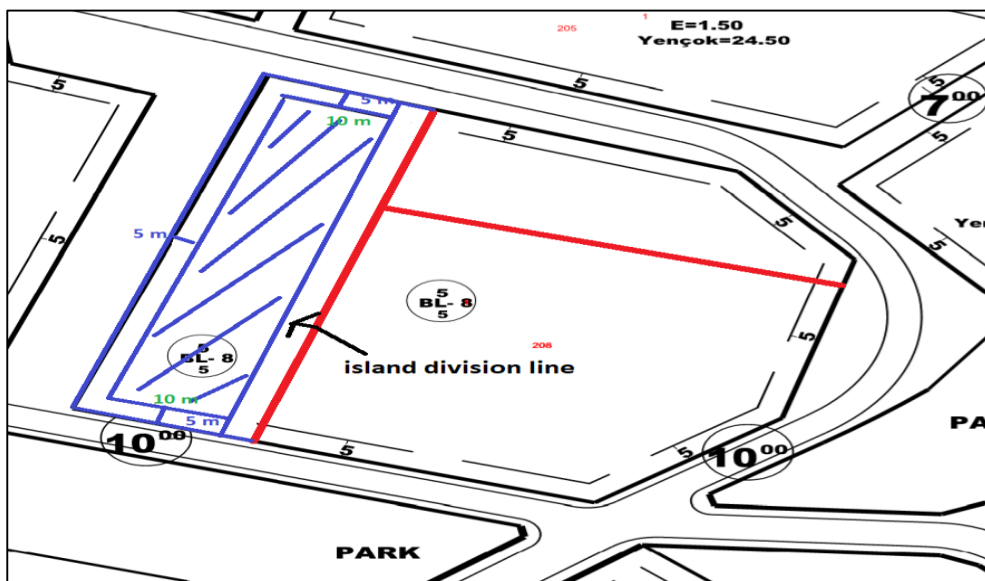


Figure 6. Separation line image of a single zoning island with the same structure (Url, 1).

The important thing that distinguishes the example from the others is that they have the same building identity. In other words, although the zoning island is separated by a different island division line, it is allowed up to eight floors in the identity of a block building. In other words, when viewed from here, the

important part is that if a part of the parcel falls within that line and a part of it falls within the other section line, it should be shifted in which direction by adding the vector in length and the parcel tries to provide the correct front and depth condition.

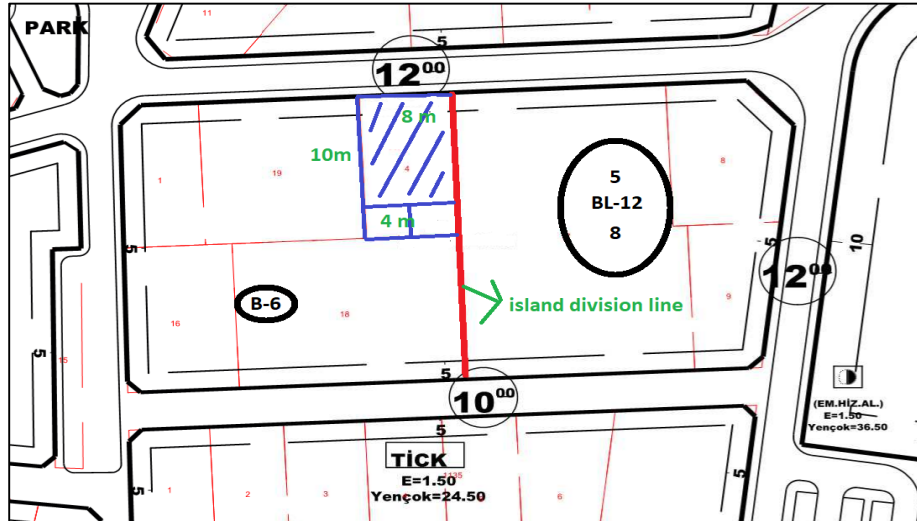


Figure 7. Representation of the division line in two different building orders (Url, 1).

In the example, it is an attempt to give the correct amount of frontage and depth to the parcels located at this point of the zoning island, which is shown in red, based on the representation of a zoning island, the west of which is allowed up to six adjacent floors and the east is up to twelve floors. While the building residence permit is given on the ground for the parcel located in the adjacent building order in the north, it is necessary to give the parcel by taking the direction from the

building order display, wherever the area or frontage of the parcel is greater. In a six-storey point, the condition of being an adjacent building is given from the adjacent part, with the front increasing by one meter after four floors and eight meters, and the backyard as a side garden at a minimum of ten meters in depth. That is, the island division line is vectorally shifted in the west or east direction.

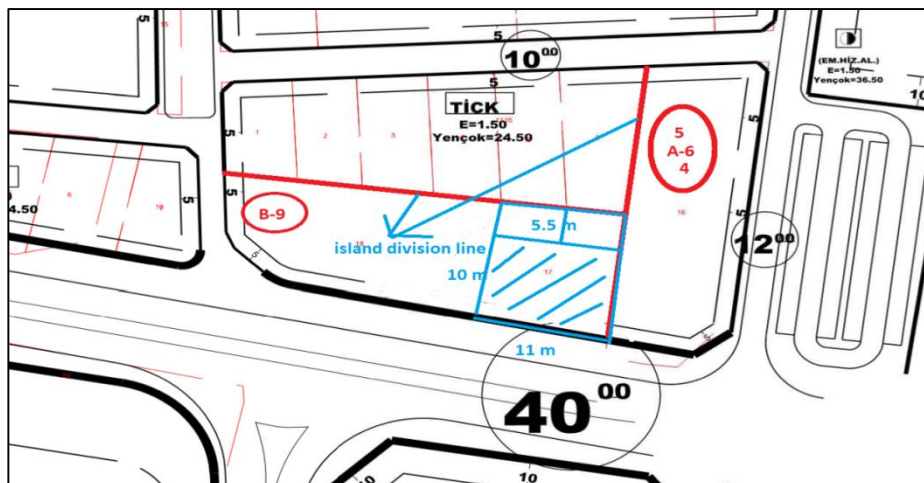


Figure 8. Island section line view (Url, 1).

The two lines shown in red on the zoning island include the building precedents and heights of three different properties, and are included in the plans so that the parcels can get the building residence permit in that way. In other words, according to the topographic situation, it has been determined on the land that a better situation can be achieved in this way. For example, when a zoning building residence permit is requested for the parcel marked in blue in the south, it

must be given by providing the façade and depth conditions as it has the adjacent building order. Here, if the island division line of the parcel is given in a different part of a part from another different place, a shift will be made to the place where the area or length is more by shifting it as a vector length.

$IAI+ IBI+ICI+IDI+....=IA+B+C+DI....$ There is a vector description in the form.

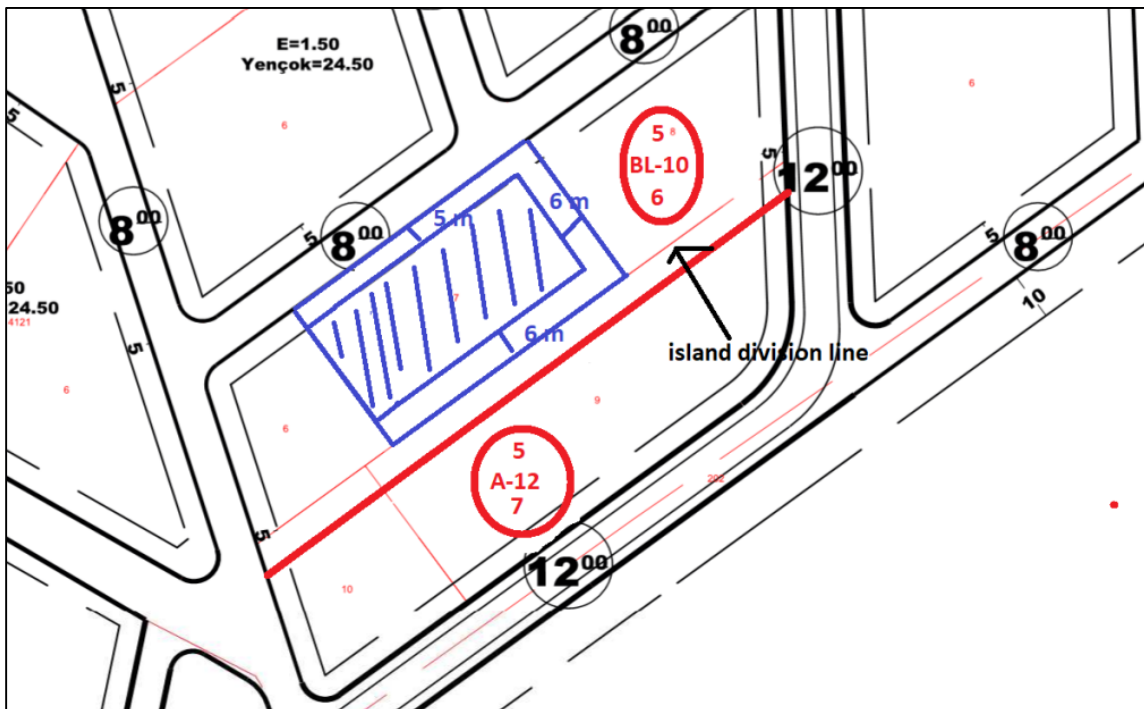


Figure 9. Island section line representation (Url, 1).

When looking at the island division line that divides the zoning island into two different blocks and separate structures in the north and south directions, the place it comes across is the southern points of the parcel, which is indicated by the thin red in the north, and it separates it in two different ways. From this point of view, it is necessary to move the parcel to the side with the building identity at the right point, with the vector process with the shift in the blue color that will enter the block building order with a shift upwards to the north, and the ground settlement process should be performed under the correct façade and depth conditions.

In the table, a summary of the parcels corresponding to the island division lines shown with examples has been summarized by summarizing the planned areas according to the zoning regulation, how and according to which façade depth conditions will be distanced to the parcels that will have a building permit in which building regulations and how many floors in Turkey.

Table 1. Front and depth conditions (Planned type zoning regulation, 2017).

	front garden (m)	Side garden (m)	backyard (m)	Front	Depth
split 4 floors	5	3	3	6	10
5 floors	5	3,5	3,5	7	10
6 floors	5	4	4	8	10
7 floors	5	4,5	4,5	9	10
8 floors	5	5	5	10	10
9 floors	5	5,5	5,5	11	10
10 floors	5	6	6	12	10
11 floors	5	6,5	6,5	13	10
12 floors	5	7	7	14	10
block 4 floors	5	3	3	6	10
5 floors	5	3,5	3,5	7	10
6 floors	5	4	4	8	10
7 floors	5	4,5	4,5	9	10
8 floors	5	5	5	10	10
9 floors	5	5,5	5,5	11	10
10 floors	5	6	6	12	10
11 floors	5	6,5	6,5	13	10
12 floors	5	7	7	14	10
adjacent 4 floors	-	-	3	6	7
5 floors	-	-	3,5	7	7
6 floors	-	-	4	8	7
7 floors	-	-	4,5	9	7
8 floors	-	-	5	10	7
9 floors	-	-	5,5	11	7
10 floors	-	-	6	12	7
11 floors	-	-	6,5	13	7
12 floors	-	-	7	14	7

5. Conclusion and Recommendation

In Turkey, zoning practices are carried out in the form of zoning practices on the basis of cities, districts or towns. Whether the parceling is on a holistic basis within the framework of the regulation or with a partial approach such as subdivision or unification, all transactions are made within the zoning island within the determined zoning boundaries. In some zoning islands, the topographic situation, aspect, slope, etc. Due to the circumstances, they may have a different structural identity within themselves with the island division line. The situation that may arise as a problem here is the situation of the parcels on the axis of the island division line. How to give zoning permission to

these parcels. From this point of view, it is to give the living area completely from that part where there is more depth or facades in these parcels. In this way, it is the process of shifting the island section line left or right or up and down as if it were an elastic line. Since these lines are measured in length, if we make a method by adding or subtracting vectorally, we will reach a healthy result. Especially if a proper urban planning is to be carried out, the cadastral status of the parcels must be up-to-date, whether in the revised zoning plan or in the areas to be opened for new settlement, and the island section lines should be processed according to the plan by following the borders of these parcels.

Conflict of Interest

No conflict of interest was declared by the authors.

Resources

- Albrechts, L. 2004. Strategic (spatial) planning re-examination. *Environment and Planning B: Planning and Design*, 31 (5), 743-758.
- Alexander, E. R. 2012. Institutional design for value capture and a case: The TelAviv Metropolitan Park. *International Planning Studies*, 17 (2), 163–177.
- Alfasi, N., 2006. Planning policy? Between long-term planning and zoning amendments in the Israeli planning system. *Environment and Planning A*, Volume 38, pp.553-568.
- Alterman, R., 2012. Land use regulations and property values: The 'Windfalls Capture' Idea Revisited. *The Oxford Handbook on Urban Economics and Planning*, Chapter 3, pp.755-786, Oxford University Press.
- Berisha, E., Cotella, G., Rivolin, U.J., & Solly, A. 2020. Spatial governance and planning systems and the public control of spatial development: a *European typology*. *European Planning Studies*. 29 (1), p.181-200.
- Booth, P. 2003. *Planning by Consent. The Origins and Nature of British Development Control* London, Routledge.
- Buitelaar, E., & Sorel, N. 2010. Between the quest for control and the rule of law: legal certainty in the Dutch planning system. *Land Use Policy* 27, 983-989.
- Cullingworth, J. B. 1997. *Planning in the USA: Policies, Issues, and Processes*, Routledge, London.
- Faludi, A. 1987. *A Decision-Centered View of Environmental Planning*. Oxford: Pergamon Press.
- Gunday, M. 2002. *Administrative law*. Image Publications, Ankara.
- Gursoy, N. 2015. Integrating the Strategic Planning Approach into the Regulatory Plan System: Planning Studies in Fikirtepe Urban Transformation Area. (Master Thesis), Istanbul Technical University, Istanbul.
- Güzel, S. 2021. Examining the Field Knowledge of Elementary Mathematics Education Undergraduate Students on Vector and Mixed Product, Dokuz Eylul University Institute of Educational Sciences, Department of Mathematics and Science Education, Master's Thesis, Izmir.
- Kilinc, N. 2021. Examining the Development Plan Changes from the Perspective of Legal, Spatial and Urban Rent: The Case of Istanbul, Istanbul Technical University Graduate Education Institute, Department of City and Regional Planning, PhD Thesis, Istanbul.
- Kırık, B. 2016. Vector fields on some special manifolds, Istanbul Technical University, Institute of Science and Technology, Department of Mathematical Engineering, PhD Thesis, Istanbul.
- Moroni, S. 2007. Planning, liberty and the rule of law. *Planning Theory*, 6(2), 146–163.
- Muñoz Gielen. D., & Tasan-Kok, T. 2010. Flexibility in planning and the consequences for public-value capturing in UK, Spain and the Netherlands, *European Planning Studies*, 18 (7), 1097-1131.
- Nadin, V., & Stead, D. 2008. European spatial planning systems, social models and learning. *The Planning Review*, 44 (172), 35–47.

Nadin, V., Stead, D., Dąbrowski, M., & Fernandez-Maldonado, A. M. 2020. Integrated, adaptive and participatory spatial planning: *trends across Europe, Regional Studies, Vol, 55 (5), p,791-803.*

Back Again?): *The Role of Municipal Planning in the Urban Governance of Stockholm, disP - The Planning Review, 54, (4), 46-58.*

Planned areas zoning regulation, 2017. Official Gazette
Date: 03.07.2017 Number of Official Gazette:
30113.

Rivolin, U. J. 2008. Conforming and performing planning systems in Europe: *An unbearable cohabitation. Planning, Practice & Research, 23 (2), 167-186.*

Steele, W., & Ruming, K. J. 2012. Flexibility versus certainty: *Unsettling the land use planning shibboleth in Australia. planning. Practice and Research, 27 (2), 155-176.*

Tang, B., Choy, L. H., & Wat, J. K. F. 2000. Certainty and Discretion in Planning Control: A Case Study of Office Development in Hong Kong. *Urban Studies, Vol. 37, (13). 2465-2483.*

Taşan-Kok, T. 2008. Changing Interpretations of 'Flexibility' in the Planning Literature: From Opportunism to Creativity? *International Planning Studies, 13 (3), 183-195.*

Turk, S. S. 2016. Urban Law Practices Lecture Notes. Istanbul Technical University, Istanbul.

Url 1: <https://www.elazig.bel.tr/>, 2022.

Valtonen, E., Falkenbach, H., & Viitanen, K. (2017). Development-led planning practices in a plan-led planning system: empirical evidence from Finland. *European Planning Studies, 25 (6), 1053-1075.*

Willis, K.G. 1995. Judging development control decisions, *Urban Studies, 32, pp. 1065-1079.*

Zakhour S., & Metzger, J. 2018. From a "Planning-Led Regime" to a "Development-Led Regime" (and