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THE SUITABILITY OF ACTIVITIES IN THE TRADE SUB-ZONE (THE CORRIDOR OF LETDA SUJONO ROAD, MEDAN TEMBUNG SUB-DISTRICT, MEDAN CITY)

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ABSTRACT

The development of population and infrastructure in cities can enhance the local economy, as seen in the Letda Sujono Road corridor. This area, located between Medan City and Deli Serdang Regency and near the Bandar Selamat Toll Gate, has seen significant growth in trade and service activities. This growth has spurred the development of housing, public services, commercial spaces, warehousing, and industry, increased land demand and causing potential land-use conflicts and traffic issues. Inappropriate space utilization can lead to urban sprawl, often due to inadequate spatial planning control. The Medan City Detailed Spatial Plan (DSP or *Rencana Detail Tata Ruang* (RDTR)) designates the Letda Sujono Road corridor as a Trade Sub-zone, with zoning regulations limiting some activities to 10% of the block area.

Aims: The objective of this study was to study the suitability of existing activities with the zoning plan which has been regulated in the Medan City Detailed Spatial Plan as a space control content in order to create safe, comfortable and sustainable spatial planning.

Methodology and results: This study uses a qualitative descriptive method with spatial analysis to assess the alignment of current activities with the DSP zoning plan.

Conclusion, significance and impact study: The findings reveal that 60.84% of the activities are suitable, while 39.16% are not. Some blocks, particularly Block 17-07-01 (Tembung), have exceeded the 10% activity limit, indicating that zoning plans have not been fully realized, with unauthorized activities such as integrated schools and vehicle-related services still present.

MANUSCRIPT HISTORY

Received
June 7, 2024
Revised
August 26, 2024
Accepted
August 26, 2024

KEYWORDS

- Suitability of Activities,
- Trade Zoning,
- Detailed Spatial Plan (DSP),
- Letda Sujono Road

1. INTRODUCTION

1.1 Background and problems

The growth of a city's population and infrastructure greatly affects its economy, which in turn drives more urbanization and population increase. This creates a cycle that impacts the demand for urban land. Urban development is most noticeable in the expansion of infrastructure to support various community activities. As cities grow, they often see higher population density, more buildings, and better facilities that support social and economic life. However, as [1] noted, urban growth can also harm the environment, making it important to maintain a healthy living environment for long-term sustainability.

The sub-districts of East Medan, Medan Perjuangan, Medan Tembung, and Medan Area are well-positioned to become Regional Service Centers in Medan City due to their strategic locations. These areas contribute to the overall development of Eastern Medan. The proposed service level system includes interconnected transport hubs, city-scale trade and services, and residential development. The area has strong connectivity, and a hexagonal spatial structure is recommended to optimize community services [2],[3].

The urban activity service centers describe the locations, hierarchy, scope, and functions of these centers [1],[2]. Medan Tembung is designated as part of the Sub-City Service Center in Medan's spatial plan. Located along Letda Sujono Road, it is a high-activity area influencing Medan City's border with Deli Serdang Regency. As the area grows, social and economic activities will increase, along with the need for utilities and facilities [4],[5]. The growth of trade and services boosts other sectors like housing and industry [6]. This sector influences the city's structure by increasing land use for housing and changing the city's physical layout [7],[8].

Medan Tembung has seen significant growth in trade and services, with land dedicated to these activities increasing from 87.17 hectares in 2003 to 103.13 hectares in 2018. However, there's a 236-hectare gap between current land use and Medan City's Spatial Pattern Plan, which could negatively impact the city's growth [9]. Urban areas often experience land use changes that don't align with spatial plans, driven primarily by trade, services, and access to infrastructure [10].

The misalignment between space utilization and the Regional Development and Town and Country Planning (DSP) laws is partly due to weak space regulation systems. Different uses of residential and business spaces require tailored spatial planning [11]. The implementation of

DSP policies faces challenges, including low public awareness of zoning rules, uneven policy socialization, inadequate supervision, and ongoing violations [12].

Traffic congestion in Medan City is caused by factors like poor public adherence to traffic rules, school traffic, illegal parking, and railroad crossings [13]. The average delay at key intersections is 46.80 seconds per vehicle, indicating unstable traffic flow [3]. Increased commercial activities along Letda Sujono Road have worsened traffic, especially near large warehouses. Letda Sujono Road, a main road at Medan City's border with Deli Serdang Regency, faces high traffic delays due to warehousing and logistics activities. Effective spatial control is needed to ensure that activities comply with conditions and are appropriately regulated in the trade sub-zone.

Medan City has two key spatial regulations: Perda No. 1 of 2022, covering the city's spatial plan from 2022 to 2042, and Perda No. 2 of 2015, detailing the city's zoning regulations from 2015 to 2035. These laws guide space use in Medan and the issuance of permits for building approval. Letda Sujono Road is designated as a Trade Sub-zone in the city's spatial plan, with certain activities allowed under conditions or limited to 10% of the planned block area. However, this 10% limit has not been mapped, which is important for future evaluations of space use. This study aims to map existing activities against the trade subzone regulations on Letda Sujono Road. The results will help develop spatial solutions to control space use and guide revisions of Medan City's DSP regulations.

1.2 Literature Review

The Medan City DSP Regional Regulation Number 5 of 2015 outlines the Detailed Spatial Plan and Zoning Regulations for Medan City from 2015 to 2035 [14][15]. This plan guides how land should be used in different zones. Medan Tembung Regional Planning Section aims to develop a trade and business center and a sports service area over 779.53 hectares. The trade zoning plan (K-1) for Medan Tembung covers 80.49 hectares in several areas, including Bandar Selamat and Tembung, mainly along Letda Sujono Road.

The 2020 Job Creation Law (UUCK) introduced new spatial planning rules, specifically for the Conformity of Space Utilization Activities, now regulated regionally. However, Medan City's current DSP still uses older land use rules that need updating to align with UUCK. Despite the DSP's success in managing land use permits and coordination among agencies, challenges

remain. These include a lack of public understanding of zoning rules, uneven outreach, inadequate land use supervision, and ongoing violations of DSP regulations [12].

The zoning matrix (ITBX Matrix) defines how land can be used within Medan City's Detailed Spatial Plan (DSP). It categorizes activities into four types: "I" (Permitted), activities that can proceed directly unless restricted by other laws; "T" (Limited), activities allowed with certain limits, like distance, area, or building specifications; "B" (Conditional), activities allowed only if they meet specific requirements, such as environmental or traffic impact assessments and resident approvals; "X" (Not Allowed): activities that are not permitted at all. This matrix is used to ensure that any proposed space utilization aligns with the city's zoning rules.

The expansion of trade and service activities has increased built-up areas, including commercial land and public facilities, while reducing open spaces [6]. This growth impacts urban structure by increasing land use for housing and altering the layout of trade and service locations [7]. Industrial activities, involving large vehicles, contribute to road congestion due to high traffic volumes and limited road capacity. Areas dominated by trade and services often see additional industrial and warehousing activities, further impacting transportation [16]. With the rapid development of these areas, it's crucial to regulate activities by classifying them as permitted, restricted, conditional, or prohibited. Typically, permitted activities are smaller operations under 400 m², while restricted and conditional ones involve larger lots between 400-5,000 m² and may operate for 16-24 hours. Prohibited activities generally require lots over 5,000 m² [17].

The growing demand for space due to development is causing mismatches between how land is used and the original plans for its use. In urban areas, this often means more land is being used for trade and services [10]. For example, a 2022 study by Mas Pratono and Rahmad Dian Sembiring found that in Medan Tembung District, trade and service areas grew from 87.17 hectares to 103.13 hectares between 2003 and 2018, an 18% increase. This expansion, driven by Medan City's policies, has led to 69.61% of the area being used in ways not aligned with the city's Spatial Pattern Plan, which could cause disorganized growth and urban sprawl.

Land use mismatches are influenced by economic needs, housing demands, proximity to economic centers, road access, population density, and the availability of public facilities. Although tools like zoning regulations, licensing, and sanctions are in place to control land use, they are not always effectively enforced [18]. Urban development is mainly driven by human activity, business growth, and transportation, which increase space demands and alter land use

patterns. A lack of proper infrastructure is a significant challenge in managing trade and service areas [19]. Additionally, a 2019 study by Muhamad Iqbal Januadi Putra and team found that Serang City is experiencing the Urban Heat Island (UHI) effect, with temperatures reaching 32°C in the city center. This heat is spreading along road networks due to rapid development and increased human activity, posing risks to residents' well-being [20].

2. RESEARCH METHODOLOGY

In this research, the approach refers to the overall strategy used to collect and analyze data [21]. The study aims to achieve its objectives using a qualitative descriptive method with a spatial exploration approach. The main variables are the zoning regulation matrix and spatial data, used to analyze the suitability of activities based on their area in hectares. The spatial variables include: existing space utilization activities, Zoning Plan/Space Pattern Plan DSP Medan City, and Block Plan in DSP Medan City. Secondary data sources, including: the housing, settlement areas, human settlements, and Spatial Planning Agency of Medan City, providing the Medan City Detailed Spatial Plan (DSP) document and satellite images; the Land Office of Medan City providing spatial data of land parcels; books relevant to the research.

Data analysis is conducted using spatial analysis with the ArcGIS application. The analysis has two stages. First, satellite images are interpreted and digitized to identify current activities. Then, the digitized data is overlaid with the zoning map to check for mismatches between current activities and the zoning plan. The suitability of these activities is then assessed based on DSP regulations. The analysis also checks whether activities labeled as Limited (T) and Conditional (B) exceed the allowed 10% of the plan block area. This helps identify which plan blocks are within or beyond the limits. Finally, the analysis determines the suitability of activities in the trade sub-zone along Letda Sujono road.

3. RESULT AND DISCUSSION

3.1 Context

The study area is located in the eastern region of Medan City, which is detailed in Table 1 and Fig 1.

Table 1. Research Area

District	Sub-District	Block	Area (Ha)	%
Medan Tembung	Bandar Selamat	Block 17-06-01	77,22	45,96%
	Tembung	Block 17-07-01	44,70	26,60%
		Block 17-07-02	46,11	27,44%
Total			168,03	100,00%

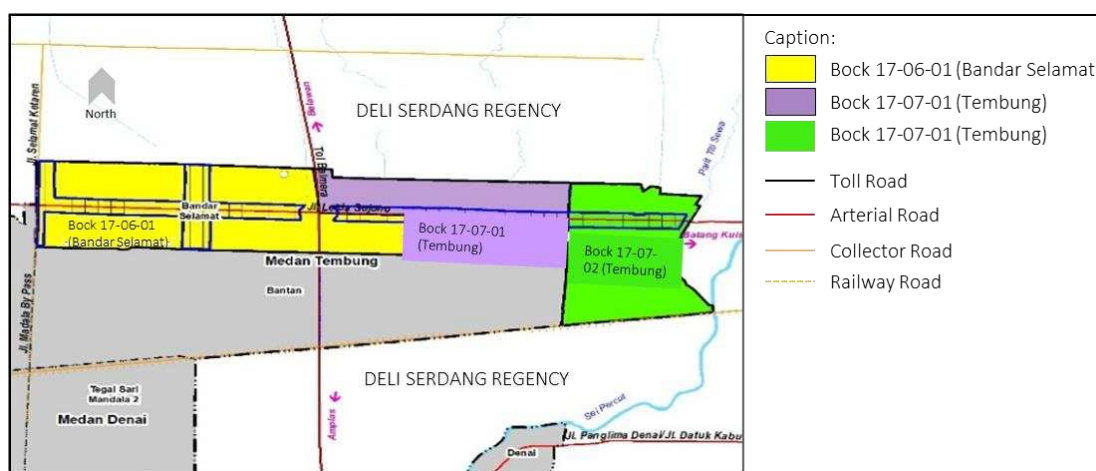


Fig 1. Research Area [22]

There are 1,250 instances where activities intersect with the spatial zoning plan in the Letda Sujono Street corridor, covering three block plans. In the protected area zoning plan, most activities are not allowed, while in the cultivation area zoning plan, most activities are permitted. There are 311 instances of permitted (I) activities, 127 instances of limited (T) activities, 131 instances of conditional (B) activities, and 681 instances of prohibited (X) activities. The zoning rule that limits activities to 10% of the planned block area applies only to Limited (T) and Conditional (B) activities, with 203 instances identified, making up 16.24% of all intersections in the study area. Zoning plans for high-density housing (R-1), public service facilities (PSF), offices (KT), trade (K-1), and commercial services (K-2) mostly involve activities within this 10% limit. Table 2 provides a detailed breakdown of these activities.

Table 2. Identification of Activities with 10% Proportion Requirement

Region	Zone	Sub Zona	Code	Number of Activities	Activities with 10% Proportion
Protected Area	Local Protection	Railroad Side-line	PS-8	125	10
	Green Open Space (RTH)	Sub-District Park Green Open Space	RTH-1	125	2

Region	Zone	Sub Zona	Code	Number of Activities	Activities with 10% Proportion
		City Park Green Open Space	RTH-2	125	9
		Green Open Space Public Cemetery	RTH-3	125	10
	Non-Green Open Space (NH)	Blue Open Space	NH-2	125	11
	Residential	High Density Housing	R-1	125	47
Cultivation Area	Commerce and Services	Trade	K-1	125	22
		Commercial Services	K-2	125	21
	Offices	Offices	KT	125	25
	Public Service Facilities	Public Service Facilities	PSF	125	46
Total				1.250	203

The utilization zoning plan is dominated by high density residential zoning covering 100.15 Ha (59.60%), road zoning covering 33.61 Ha (20%), and trade zoning covering 21.84 Ha (13%). The complete distribution of space utilization zoning plans in the study area can be seen in Table 3.

Table 3. Distribution of Zoning Plans

Sub-Zone	Block Plan (Ha)			Total (Ha)
	Block 17-06-01	Block 17-07-01	Block 17-07-02	
	Bandar Selamat	Tembung	Tembung	
Railroad Side-line (PS-8)	-	-	2,85	2,85
Sub-District Park Green Open Space (RTH-1)	-	-	0,27	0,27
City Park Green Open Space (RTH-2)	0,67	0,22	0,65	1,54
Green Open Space Public Cemetery (RTH-3)	1,33	-	-	1,33
Sub Total Protected Area	2,00	0,22	3,76	5,98
Blue Open Space (NH-2)	-	-	0,04	0,04
High Density Housing (R-1)	40,73	29,64	29,77	100,15
Trade (K-1)	13,46	5,32	3,06	21,84
Commercial Services (K-2)	0,49	0,05	-	0,54
Offices (KT)	0,54	-	-	0,54
Public Service Facilities (PSF)	2,69	0,78	1,86	5,33
Steet (BJ)	17,30	8,69	7,61	33,61
Sub Total Cultivation Area	75,22	44,48	42,34	162,04
Total	77,22	44,70	46,11	168,03

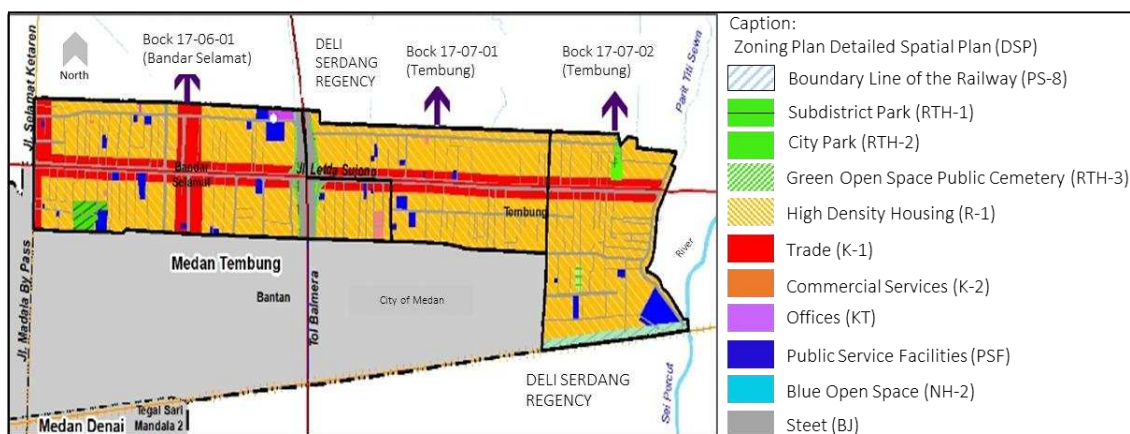
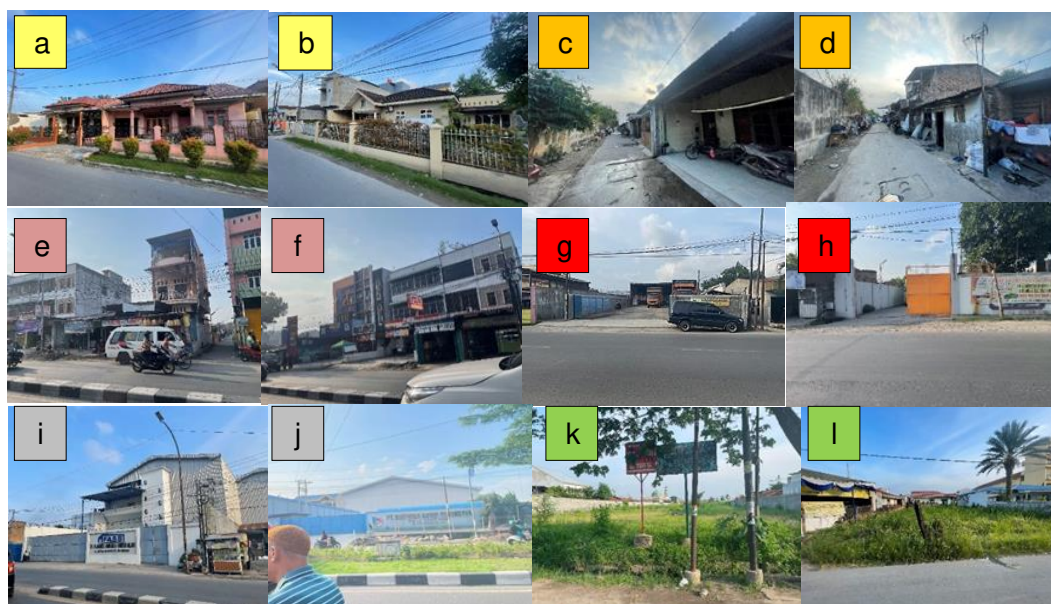


Fig 2. Zoning Plan Map [22]

3.2 Analysis of Existing Space Utilization Activities

The analysis identified nine activity groups and 45 specific types of activities within the study area, totaling 6,403 activities. The most common were single-house activities, making up 2,680 (41.86%), followed by row houses with 2,054 activities (32.08%). In the Trade group, shop and store activities were the most prevalent, with 442 activities (6.90%). In the Commercial Services group, shipping and freight services were the most common, accounting for 102 activities (1.59%). The Industrial group was dominated by warehouse activities, with 83 instances.



(a;b) residential, (c,d) row house, (e,f) shops, (g,h) delivery service, (i;j) warehousing, (k;l) vacant land.

Fig 3. Existing Facilities

The Suitability of Activities in The Trade Sub-zone (The Corridor of Letda Sujono Road, Medan Tembung Sub-District, Medan City)

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p-ISSN 2580-7552; e-ISSN 2548-7515, Volume 9, Number 2, pp 129 – 148, 2024

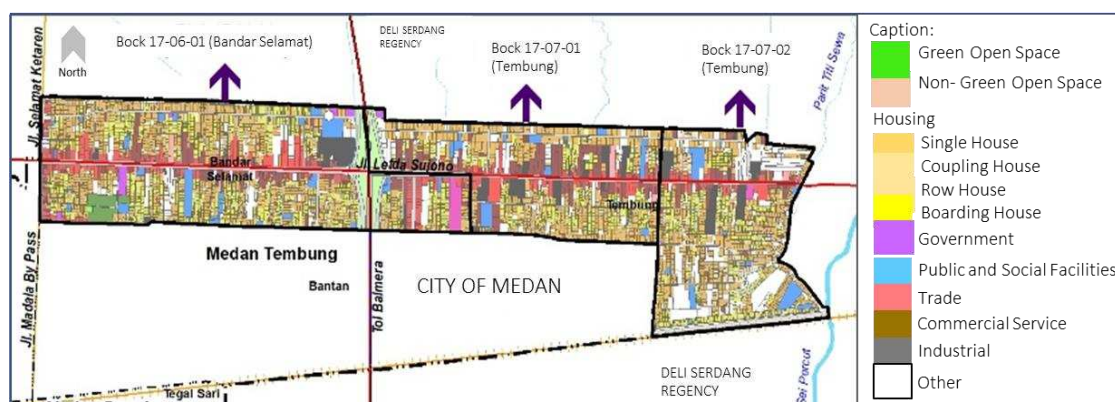


Fig 4. Existing Activity Map [22]

The most extensive activity group is the Housing group covering an area of 82.41 Ha (49.05%), the other group covering 42.12 Ha (25.07%), the Trade group covering 12.58 Ha (7.49%), and the Commercial Services group covering 11.42 Ha (6.80%) as seen in Table 4.

Table 4. Identification of Existing Activities

No	Existing Activity		Number of Activities	Area (Ha)
	Activity Group	Activity Type		
1	Green Open Space	Public Cemetery	3	1,40
2		Sports Ground	1	0,06
3		Green Lane Road	14	2,76
4	Non-green Open Space	Parking Lot	5	0,82
5		Integrated School	5	1,49
6	Public and Social Facilities	Senior High School	8	0,43
7		Secondary School	16	1,60
8		Elementary School	5	0,60
9		Kindergarten	4	0,27
10		Early Childhood Education (PAUD)	3	0,13
11		General Hospital	1	0,64
12		Public Health Centre	3	0,07
13		Sports Hall	2	0,36
14		Mosque	24	1,30
15		Mushola	3	0,04
16	Church	3	0,04	
17	Housing	Single House	2.680	51,37
18		Coupling House	153	1,93
19		Row House	2.054	28,81
20		Boarding House	13	0,31
21	Government	Provincial/Central Government Office	3	0,29
22		Sub-district Office	4	0,26
23		Police Station and the like	1	0,39
24	Trade	Kiosk/ Permanent Street Vendor	3	0,04

No	Existing Activity		Number of Activities	Area (Ha)
	Activity Group	Activity Type		
25		Traditional Market	20	0,31
26		Restaurant/Cafe	5	0,46
27		Shops/Stores	442	10,40
28		Self-service/ Mini Market/ Supermarket	3	0,60
29		SPBU / SPPBE / and the like	2	0,42
30		Showroom	3	0,35
31		Travel Bureau	11	0,32
32		Vehicle Pool	2	0,18
33		Shipping and Freight Services	102	7,96
34		Vehicle Washing Service	4	0,15
35	Commercial Services	Workshop	23	0,88
36		Parking Building	4	0,17
37		Beauty Services	5	0,08
38		Clinic / Joint practice	6	0,04
39		Doctor's Practice	13	0,45
40		Telecommunication Service Office	2	1,19
41	Industry	Warehousing	83	6,41
42		Medium/Household Industry	4	0,13
43		Vacant Land	547	21,99
44	Other	Road	110	20,12
45		River	1	0,01
Grand Total			6.403	168,03

3.3 Analysis of Conformity of Activity Requirements (see Fig 5 and 6)

A total of 60 areas allows permitted activities (I), 13 allow limited activities (T), 18 allow conditional activities (B), and 61 areas prohibit activities (X). There are also 20 areas not classified due to vacant land, roads, or water bodies. Specifically, permitted activities cover 88.36 hectares (52.59%), limited activities cover 2.97 hectares (1.77%), conditional activities cover 10.90 hectares (6.48%), prohibited activities cover 25.45 hectares (15.15%), and unidentified areas cover 40.35 hectares (24.01%). For the Railway Sidewalk (PS-8) plan, 77.69% (2.21 hectares) is designated for activities not allowed, such as housing and places of worship. Unidentified activities, like vacant land and roads, cover 22.31% (0.64 hectares). This plan has some incorrect labeling and areas not yet implemented.

In the Sub-District Park (RTH-1) plan, 72.17% (0.19 hectares) is unidentified, including vacant land and roads. 27.83% (0.07 hectares) includes activities not permitted, like row houses. Some areas still need to be developed, and there are unapproved activities. The City Park (RTH-2) plan shows 56.21% (0.87 hectares) as vacant land and roads not listed in the plan.

27.00% (0.42 hectares) is for road green lanes with conditions. 16.33% (0.25 hectares) includes prohibited activities like warehouses and government offices. The plan hasn't been fully implemented, and some activities don't follow the rules. For the Public Cemetery (RTH-3) plan, 93.96% (1.25 hectares) is used for the cemetery, which is allowed. 4.64% (0.06 hectares) includes prohibited activities like sports areas and houses. 1.39% (0.02 hectares) is vacant land and roads. The plan isn't fully implemented, and some activities don't comply. In the Blue Open Space (NH-3) plan, 94.60% (0.04 hectares) is vacant land, roads, and water bodies not identified. 5.40% (0.002 hectares) is used for row houses, which are not allowed. This plan also isn't fully implemented, and there are unapproved activities.

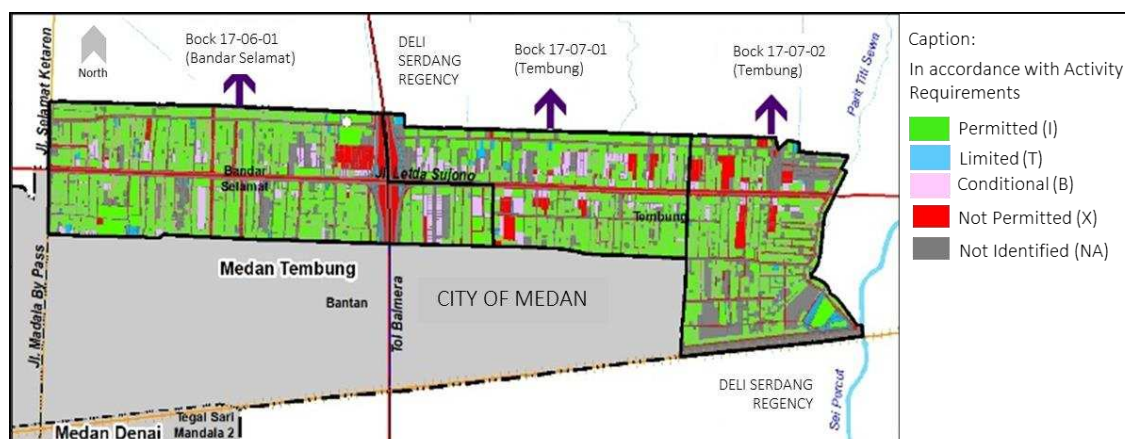


Fig 5. Activity Provision Conformance Map [22]

The High-Density Housing (R-1) zoning plan shows that most of the area, 65.54% (65.63 hectares), is used for permitted activities such as sports fields, green spaces, schools, hospitals, and various offices. About 19.06% (19.09 hectares) is occupied by vacant land and roads that are not clearly identified. Conditional activities, like cemeteries and markets, cover 8.89% (8.90 hectares). Activities not allowed by the zoning plan, including schools and warehouses, use 5.58% (5.59 hectares). Limited activities, such as high schools and government offices, take up 0.93% (0.93 hectares). The High-Density Housing plan is not fully implemented, with some areas not following the zoning rules.

In the Trade (K-1) zoning plan, 65% (17.49 hectares) is used for permitted activities like parking lots, schools, and various businesses. Another 46% of the area includes supermarkets, gas stations, and travel agencies. Vacant land and roads that are not clearly identified cover 10.50% (2.29 hectares). Conditional activities, such as vehicle pools and workshops, take up

8.98% (1.96 hectares). Activities not allowed by the plan, like integrated schools, occupy 0.46% (0.10 hectares). The Trade (K-1) plan is not fully realized, with some areas not fitting the plan or being conditional.

The Commercial Services (K-2) zoning plan is almost entirely used for permitted activities, covering 99.78% (0.54 hectares) with single and row houses, police offices, markets, and telecom offices. Only 0.22% (0.001 hectares) is used for road bodies. This plan is fully implemented and appropriate for the area. Similarly, the Office (KT) zoning plan is mostly used for permitted activities, covering 95.14% (0.51 hectares) with government offices and residential spaces. The remaining 4.86% (0.03 hectares) includes vacant land and road bodies. This plan is also largely realized and suitable for the area.

For the Public Service Facilities zoning plan, 55.19% (2.94 hectares) is used for permitted activities like schools and mosques. Limited activities, such as houses and supermarkets, cover 30.25% (1.61 hectares). Unidentified areas, mostly vacant land and roads, make up 9.61% (0.51 hectares). Activities not permitted by the plan, like warehouses, use 4.41% (0.23 hectares). Conditional activities, such as cemeteries, occupy 0.53% (0.03 hectares). The PSF plan is not fully implemented, with some areas used for unpermitted activities. The Road Body zoning plan does not have specific regulations in the Medan City DSP, and many of these plans have not been put into action.

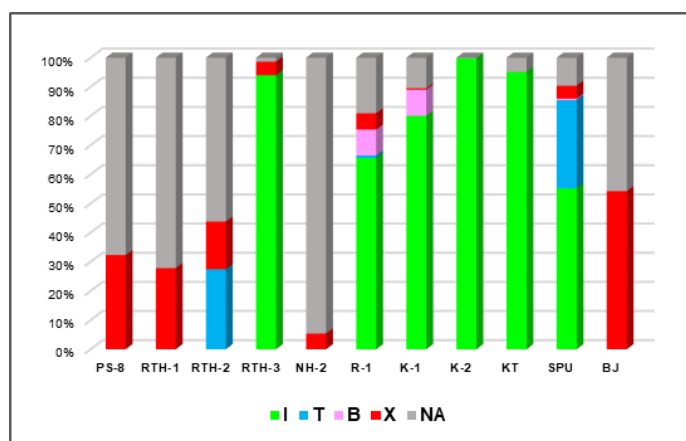


Fig 6. Proportion of Activity Provisions in the Zoning Plan

The distribution of the analysis of the suitability of activity provisions (see Fig.7)

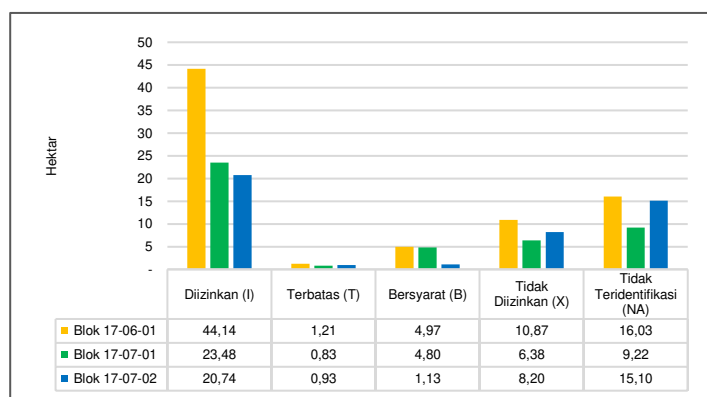


Fig 7. Distribution of Activity Requirements in the Plan Block

in Block 17-06-01 (Bandar Selamat) is dominated by those activities classified as Permitted (I) (57.17%), Unidentified (NA) (20.76%), Not Permitted (X) (14.08%), Conditional (B) (6.44%), and Limited (T) (1.56%). The distribution of the analysis of conformity to the provisions of activities in Block 17-07-01 (Tembung) is dominated by Permitted activities (I), which account for 52.53% of the total. In Block 17-07-01 (Tembung), the sequential distribution of activities is dominated by Permitted activities (I), which account for 52.53% of the total, followed by Unidentified activities (NA), which account for 20.62%. Activities that are not permitted account for 14.26% of the total, while those that are conditional account for 10.73%. Limited activities account for 1.86% of the total. The distribution of the analysis of the suitability of activity provisions in Block 17-07-02 (Tembung) is dominated by Permitted activities (I), which account for 44.98% of the total, followed by Unidentified activities (NA), which account for 32.76%. The remaining 17.79% of the total is accounted for by unpermitted activities (X), while 2.45% is accounted for by conditional activities (B). The remaining 2.02% is accounted for by limited activities (T).

3.4 Activity Suitability Analysis at 10% Proportion Exceedance

In the aforementioned study area, 10% of the activities in question fall under the limited and conditional provisions. The aforementioned activities are distributed across three distinct zones.

The area designated for High Density Residential (R-1) is 9.84 hectares, while the area designated for Trade (K-1) is 1.96 hectares and the area designated for Public Service Facilities is 1.64 hectares. In total, these zones encompass 13.44 hectares, which constitutes 8% of the study area. The restricted activities (T) occupy 2.55 hectares, representing 18.95% of the total

area, while the conditional activities (B) encompass 10.90 hectares, or 81.05% of the study area.

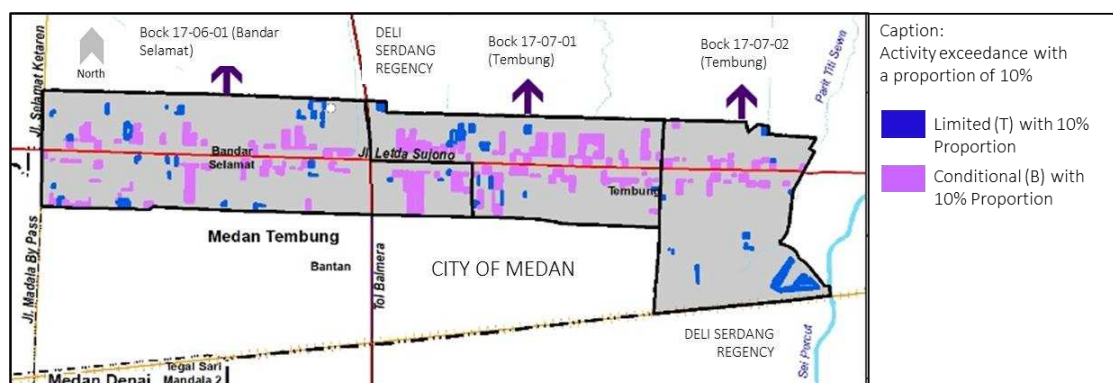


Fig 8. Activity Occurrence Map with 10% Proportion [22]

The high-density residential zone (R-1) is composed of: Restricted Activities (T): The aforementioned zones encompass a variety of land uses, including single-family residences, multi-family dwellings, government offices, commercial establishments, transportation services, recreational facilities, personal care services, and medical practices. The Conditional Activities (B) zone encompasses a range of facilities, including public cemeteries, hospitals, sports halls, markets, restaurants, shops, supermarkets, gas stations, travel bureaus, vehicle pools, shipping services, vehicle washing, repair shops, telecommunications offices, warehouses, and medium-scale industries. For a comprehensive list, please refer to Fig. 8 and Table 5.

Table 5. Activities with 10% Proportion Limitation of Block Plan

Activity Requirements	Type of Activity	Space Zoning Plan			Total (Ha)
		Cultivation Area			
		R-1	K-1	PSF	
Limited (T) at 10% Proportion of Plan Block	High School Equivalent	0,25	-	-	0,25
	Single House	-	-	0,94	0,94
	Coupled House	-	-	0,03	0,03
	Row House	-	-	0,48	0,48
	Provincial/Central Government Office	0,22	-	-	0,22
	Shops/Stores	-	-	0,07	0,07
	Supermarket/Mini Market/Supermarket	-	-	0,03	0,03
	Travel Bureau	-	-	0,05	0,05
	Vehicle Pool	0,06	-	-	0,06
	Beauty Service	0,04	-	-	0,04
Doctor's Practice	0,37	-	0,01	0,38	

Activity Requirements	Type of Activity	Space Zoning Plan			Total (Ha)
		Cultivation Area			
		R-1	K-1	PSF	
Conditional (B) on a 10% Proportion of Plan Blocks	Public Cemetery	0,02	-	0,01	0,03
	Public Hospital	0,54	-	-	0,54
	Sports Hall	0,28	-	-	0,28
	Traditional Market	0,21	-	-	0,21
	Restaurant/Cafe	0,25	-	-	0,25
	Shops/Stores	2,24	-	-	2,24
	Supermarket/Mini Market/Supermarket	0,28	-	-	0,28
	SPBU / SPPBE / and the like	0,12	-	-	0,12
	Travel Bureau	0,02	-	-	0,02
	Vehicle Pool	-	0,11	-	0,11
	Shipping and Freight Services	4,43	-	-	4,43
	Vehicle Washing Service	0,09	-	-	0,09
	Workshop	-	0,44	0,02	0,46
	Telecommunication Service Office	0,36	-	-	0,36
	Warehousing	-	1,42	-	1,42
	Medium/Household Industry	0,07	-	-	0,07
	Grand Total		9,84	1,96	1,64

Activities that are limited to a maximum proportion of 10% of the planned block area are distributed in Block 17-06-01 (Bandar Selamat) covering 5.90 Ha, in Block 17-07-01 (Tembung) covering 5.49 Ha, and in Block 17-07-02 (Tembung) covering 2.06 Ha. So when compared to the area of the planned block, it is known that the exceedance in Block 17-06-01 (Bandar Selamat) has not been exceeded, in Block 17-07-01 (Tembung) it has been exceeded and in Block 17-07-02 (Tembung) it has not been exceeded.

Table 6. Exceedance of 10% Activity Proportion in the Plan Block

No	Block Plan	Area(Ha)		Proportion (%)	Exceed ability
		Block	Activity Proportion 10%		
1	17-06-01 (Bandar Selamat)	77,22	5,90	7,64%	Not Exceeded
2	17-07-01 (Tembung)	44,70	5,49	12,27%	Already Exceeded
3	17-07-02 (Tembung)	46,11	2,06	4,47%	Not Exceeded
	Grand Total	168,03	13,44	8,00%	-

3.5 Analysis of the Conformity of Activity Provisions in the Trade Sub-Zone in the Letda Sujono Road Corridor

The Trade Sub-Zone along Letda Sujono Road Corridor currently hosts 32 activities. Of these, 26 are permitted, including facilities like parking lots, schools, hospitals, housing, police stations, markets, restaurants, shops, and various service-oriented businesses. Three activities,

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such as vehicle pools, workshops, and warehouses, are conditional. One activity, an integrated school, is not permitted. The suitability of activities is mainly driven by the permitted ones, covering 17.49 hectares (65.54%). Other activities include those not specifically identified (2.90 hectares or 10.50%), conditional activities (1.96 hectares or 8.98%), and non-permitted activities (0.10 hectares or 0.46%).

However, the Trade Sub-Zone is not fully compliant with zoning regulations. This is evident from the presence of non-permitted activities, like integrated schools, and conditional activities, such as vehicle pools, workshops, and warehouses. The overall data analysis indicates that the zone is still not fully realized (see Fig.9).

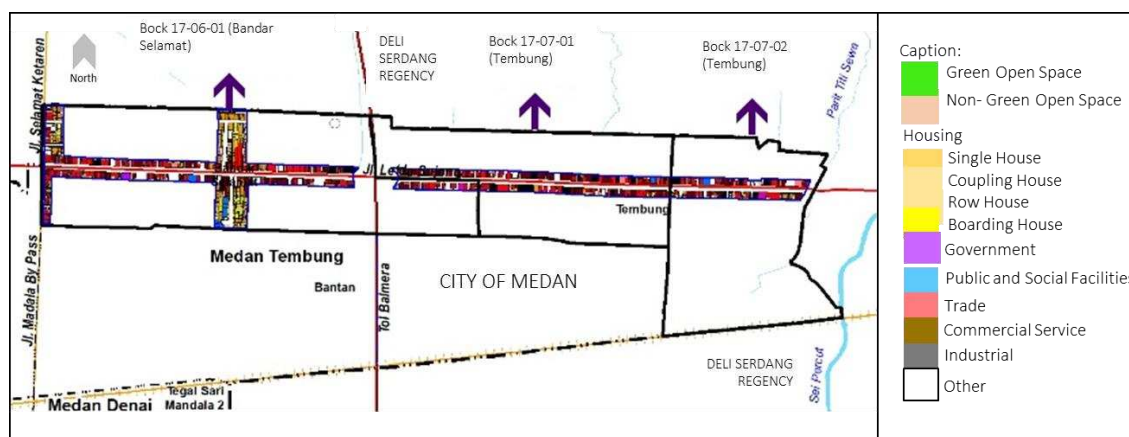


Fig 9. Map of Existing Activities in the Trade Sub-zone [22]



Fig 10. Map of Conformity of Activity Provisions in the Trade Sub-zone [22]

In the Trade Sub-zone on Letda Sujono Road, all activities designated as conditional (B) are those with a proportion of 10% of the planned block area. In order to achieve the desired outcome, it is essential to ascertain the extent of existing activities that exceed the prescribed

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limits. As evidenced in the preceding analysis, Block 17-07-01 (Tembung) has exceeded its permitted limits by 12.27%. Consequently, Block 17-07-01 (Tembung) in the Letda Sujono Road Corridor is no longer permitted for Conditional (B) and Limited (T) activities, with a proportion of 10%.

Conditional Activities (B) in the Trade Sub-zone on Letda Sujono Road are activities with a high intensity of operational activities that have an impact on traffic and there is more effort to realize space in accordance with the provisions of space intensity and the need for more implementable zoning regulation techniques.

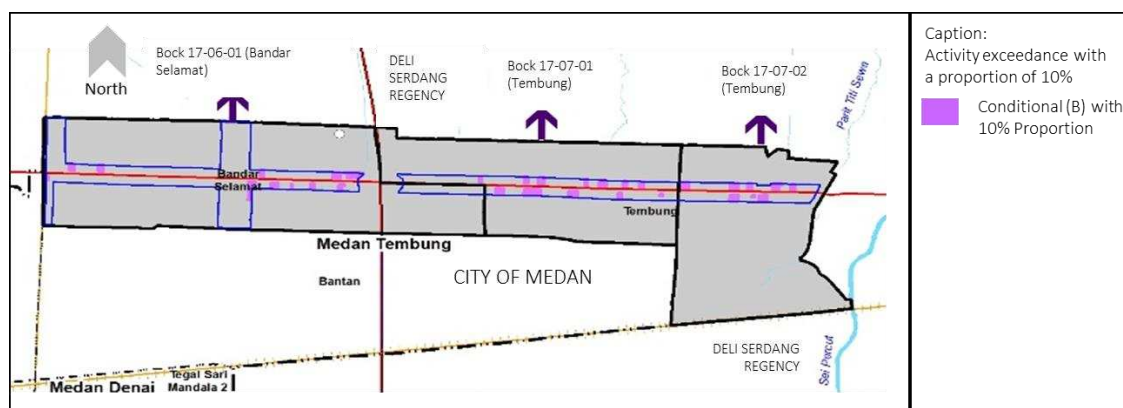


Fig 11. Activity Capability Map of the Trade Subzone [22]

Table 7. Activity Suitability Matrix for the Trade Sub-Zone

No	Activity Group	Activity Type	Activity Requirements	Area (Ha)
1	Non-green Open Space	Parking Lot	I	0,23
2	Public and Social Facilities	Integrated School	X	0,10
3		Secondary School	I	0,28
4		Early Childhood Education (PAUD)	I	0,00
5		General Hospital	I	0,10
6		Sports Hall	I	0,07
7		Mosque	I	0,08
8	Housing	Single House	I	3,83
9		Coupling House	I	0,22
10		Row House	I	2,00
11		Boarding House	I	0,04
12	Government	Police Station and the like	I	0,10
13	Trade	Kiosk/ Permanent Street Vendor	I	0,04
14		Traditional Market	I	0,01
15		Restaurant/Cafe	I	0,20
16		Shops/Stores	I	6,34

No	Activity Group	Activity Type	Activity Requirements	Area (Ha)
17		Self-service/ Mini Market/ Supermarket	I	0,24
18		SPBU / SPPBE / and the like	I	0,24
19		Showroom	I	0,33
20	Commercial Services	Travel Bureau	I	0,20
21		Vehicle Pool	B	0,11
22		Shipping and Freight Services	I	2,66
23		Vehicle Washing Service	I	0,01
24		Workshop	B	0,44
25		Beauty Services	I	0,02
26		Clinic / Joint practice	I	0,04
27		Doctor's Practice	I	0,01
28		Telecommunication Service Office	I	0,16
29		Industry	Warehousing	B
30	Medium/Household Industry		I	0,03
31	Other	Vacant Land	NA	1,57
32		Road	NA	0,72
Grand Total				21,84

4. CONCLUSION

The study looked at 1,250 interactions between 125 activities and 10 zoning plans. Out of these, 311 were allowed, 127 had some restrictions, 131 had specific conditions, and 682 were not permitted. Additionally, 203 of these interactions, which is 16.24%, exceeded the 10% limit set by the zoning rules, with the High Density Residential (R-1) zone showing the most violations, totaling 47 cases. The zoning plan shows that cultivated areas make up most of the land, covering 162.04 hectares, while protected areas are much smaller at 5.98 hectares. The largest protected area is in Block 17-07-02 Tembung, and the largest cultivated area is in Block 17-06-01 Bandar Selamat. High Density Residential (R-1) zoning is the most extensive, covering 100.15 hectares. Among the 45 types of activities found in the study area, Single Houses are the most common, followed by Row Houses. Shops and stores make up a smaller portion of the activities. When looking at how activities fit within zoning rules, there are 172 instances where activities cross into different zoning categories. Most of these are permitted activities, with a smaller number being limited, conditional, or not permitted. High Density Residential (R-2) zoning has the highest number of crossovers. Activities that fit within 10% zoning proportion cover 13.44 hectares, or 8% of the study area. Most of these are in R-1 zoning and Block 17-07-01 Tembung. In the trade subzone along Letda Sujono Road, 32 activities were found, with 26

being permitted. Most of the land in this area is suitable for these activities, but there is some non-conformity. Overall, zoning in the Letda Sujono Road Corridor still has issues, particularly with activities that are not allowed or conditional. To improve regional planning, the study suggests addressing these issues to ensure zoning regulations are better implemented and more effective.

To improve the zoning and planning in the study area, several actions are recommended: First, the Medan City Government should address the mismatches between current activities and zoning rules, particularly in the trade sub-zone along Letda Sujono Road. This will help ensure that land use complies with established regulations. Second, there should be a solution for handling the operations of shipping and freight services to prevent traffic problems, especially in areas near the borders of Medan City. Third, the findings from this study should be considered when updating Medan City's planning regulations. Finally, further research is needed to review other plan blocks beyond Letda Sujono Road to achieve a thorough understanding of spatial suitability across the city.

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