Side Setback Areas in Residential Zones in Japan –
A Socio-psychological Approach Towards Studying Setbacks,
Case Study of an Inner Osaka Neighborhood

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Abstract
This paper presents a study of utilization and perceptions towards side setback areas as an important but often overlooked urban space. Side setback areas, which are mutual distances between adjoining buildings in a high density, inner-urban, residential area of Osaka, Japan were selected for study. Volunteers were interviewed in the Kita Nakamichi area to investigate the physical attributes of their side setback areas and their frequency of usage. There was little impression of side setback areas or windows opening towards them. They are seen only as mere left out spaces between the building and boundaries; however, the respondents did not have concerns about security.

On the subject of utilization of the side setback areas, activities such as storage and gardening were noted, as these places were seen as abandoned spaces but subject to considerable maintenance, and were suggested by a significant number of the respondents as good places for parking places, storing items and drying clothes due to receiving good light and ventilation. When asked about their preference for making contact with fellow neighbours via their side facades, respondents unanimously reported that they prefer to undertake social interaction at their front door and those accidental contacts are not favoured.

Keywords: side setback; morphology; high density neighborhood; residential perception

1. Introduction
In a fully urban environment, a building and the street are closely tied: the façade forms part of the street wall, and an edge (Lynch, 1960) of a domestic territory. Territorial variation on the city block configurations vary from front gardens or arcades, to inner private or communal gardens, each resulting in different territorial hierarchies and boundaries. Examples vary from inner urban neighborhoods in Europe where houses are formed around city blocks to those in North American urban and suburban blocks, their difference further articulated by possible location of walls, fences or steps between houses and territorial boundaries which are the periphery line (Habraken, 2000). In the Japanese example, demarcation of territorial boundaries is essential to distinguish and preserve the periphery lines integrity. In many cases, the plot is open and unprotected, only subtly marked with occasional half walls or fences on some parts. This is in contrast to examples of urban blocks in Europe where the territorial boundaries are the buildings themselves.

This research studies the physical configurations of side setbacks as non-built territories and boundaries of residential buildings in a high density urban neighborhood in Japan. Side setback areas refer to the distance kept between two adjacent buildings formed by the distances which one or two buildings set back from their boundaries. The presence of side setbacks along with the changing location of the buildings inside their plots creates constant changes to the streetscape. The case study for this research is an Osaka inner-urban neighborhood. The aim is to identify whether there is an opportunity for providing socio-spatial relationships between neighbors. The focus of the present study is on (1) inspecting the physical properties of side setback areas and side facades; (2) investigating the likely utilization of side setback areas; and 3) studying the perception of having a view from a window or, if any, balconies or terraces towards side setback areas.

Under the current Building Standard Act of Japan, there are minimum side setback area requirements

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(Received October 3, 2016; accepted July 12, 2017)
DOI http://doi.org/10.3130/jaabe.16.589
in two categories of low-rise exclusive residential districts (nine universal categories for planning zoning in Japanese cities, seven of them include residential zonings). In other categories, there are respective setbacks from their boundaries practiced, mostly to provide ventilation, piping, and in some cases, access to the backyard. The street edges are therefore neither visually prominent nor impenetrable. The change in the landscaping indicates a boundary, and marks the territory. Boundary forms hardly include fences or short part masonry walls. As a result, visual connection and scope to and from the street as well as the neighboring plots are provided. The third section briefly reviews the general pattern of residential development in Japan from the Edo Period. The fourth section reviews the research framework that is to evaluate and compare in terms of the capability to provide opportunities for any desired activities. The fourth section introduces the case study for this study. The fifth section explains the research methodology; the questionnaire and interviews, followed by data collecting and analysis, and discussion. The conclusion follows in the seventh section.

2. Previous Studies on Neighborhood Physical Attribute

The physical features of neighborhoods such as the proximity of homes, placement of doors, and their relationship to crowdedness, privacy, control and comfort have been the subject of studies for their potential effects on social interactions between neighbors (Skjaeveland & Gärling, 1997, Kaplan, 2001). Satisfaction with fellow residents (Mohan & Twigg, 2007) has been found to be an important predictor of neighbourhood satisfaction among residents.

The act of occupation defines the extent of a territorial claim and the territorial boundary is indicated not by the building but by parts and objects such as potted plants, door mats, and umbrella stands which create a margin which softens and articulates the demarcation offered by architecture (Habraken, 2000). Habraken (2000) mentions setback configurations in Japan as conveying strong meanings of privacy and territorial demarcation where placement of elements such as small trees or shrubs between the territorial wall of the boundary and the house only two or three feet behind it hides ground-floor windows.


3.1 History of Development

In a Japanese neighborhood, blocks show a unique pattern of divisions and sub-divisions, scales of buildings and their layouts due to the rather flexible arrangement of buildings and their associated open spaces including back yards and setbacks, resembling a 'kind of patchwork', as Shelton says (Shelton, 1999), of buildings and open spaces. In his book comparing urban scenery between France and Japan, Wada (2007) mentions that scholars in Japan do not necessarily think of the French example of having buildings set tight along the street as a historically aesthetic value. He mentions Japanese development as separate buildings slowly built on scattered rice fields one after another and eventually composing the townscape. Ashihara (1983) calls the Japanese city an Amoeba, referring to the freshwater organism which keeps changing its face. He refers to a Japanese city's continuously changing appearance due to replacement of buildings of various types and heights, which he discusses may look disorderly from an outside perspective, but has what he calls a 'hidden order' which corresponds to the Japanese way of living and thinking.

Japanese neighborhoods comprise of chonai or blocks, each block included several groups of houses as cores which translates three houses in front and two neighbors (向こう三軒両隣) which shows the level of community relations within each neighborhood, further enhanced by the presence of narrow lanes or roji which are also another important aspect of Japanese urban vocabulary.

The flammability of wooden buildings combined with the high density of dwellings produced a high risk of fire, exemplified by two big fires in Tokyo in 1872 and 1923, and also the 1932 earthquake, leading to the introduction of building laws in 1919 where nagaya (tenements) developments were required to continue with maximum numbers of 12, and after that on their side facades around 1 meter open spaces were to be provided (Nishiyama, 1975). In 1968, stipulations for side setback requirements, particularly for those low-rise residential areas composed mostly of wooden-frame residences, have persisted until the present.

During the Edo Period, houses and small shops called nagaya, were lined up next to the road without any space between the houses and road. Nagaya were accessible through the alleyways between the town houses. Another function for small alleyways between the nagaya was the traditional collection of night soil for use by farmers. Because farmers paid well for this fertilizer, management of human waste was a profitable act for slum landlords and there was little motivation to install expensive municipal sewage systems. The night soil collection system gradually declined in central Tokyo with the construction of the sewerage system (Hanley, 1997, Ishida, 1994).

After 1925 in Osaka, Nishiyama mentions semi-detached houses where walls were erected around the boundaries in order to protect the privacy of those rooms which had windows to the side areas, from the views and sounds of the neighboring buildings. This follows the housing ideal of the detached single-family home set in a garden with a perimeter wall and symbolic entrance gate. In Kyoto machiya houses, Nishiyama assumes that in order to make the construction cheaper, the inner side corridor on the
second floor providing access to the rooms would not be constructed, thus making the houses separate on the second floor (Nishiyama, 1975). However, he argues that this practice was not entirely to save construction costs but to introduce a new urban style to nagaya facades in Kyoto. In Kita Nakamichi, similar styles believed to follow this trend can be found. In his Collection of Essays, Kento Yoshida wrote: "A house should be built with the summer in mind... a badly made house is unbearable when it gets hot" (Tsurezuregusa essay no 55). This common sense seems to be present to date for providing ventilation to houses which would otherwise be hot and damp during warm seasons.

### 3.2 Recent Studies on Setbacks

In studies on setbacks in Japan, regulating building setbacks in relation to street lines to deal with lack of sunshine and ventilation in urban neighborhoods has been proposed (Japanese Institute of Architecture, 1996, Kuwata, 1998). Gao and Asami (2001) have measured attributes such as FAR, building quality, proximity to public green spaces, having a parking space and sunshine duration for evaluating detached residential neighborhood pricing in the Tokyo area using a hedonic pricing model. They used the 1993 national housing survey of Japan, which stated that 32 percent of detached housing residents complained about a lack of sunshine and ventilation, and 36 percent felt that the surrounding buildings were unfavorable. As for developing the pricing model, there was a strong positive effect of being in front of a green public space. Hidano et al. (1998) evaluated building setback regulations in terms of the increase in the number of trees, followed by net benefit and cost for the individual household. On the basis of a 2013 survey, Shojai et al. (2016) reported the average side setback area in Sapporo (Japan) is <2-m wide and its typical use is for storage. Their results indicated that side setback areas that were smaller than 1-m wide were perceived as abandoned and assumed to have no function. However, those wider than 1-m were seen as secondary storage areas. Regardless of this, respondents valued the light and ventilation provided by side setback areas.

### 4. Kita Nakamichi Area Planning: A Morphological Study

The Kita Nakamichi Area is part of the Higashinari District of Osaka, located on the eastern side of the Central Osaka Loop line. With an estimated area of 57 hectares, once leaving the highway it can be characterized as a mixture of small meandering roads and houses, stores and small to medium scale factories (Fig.1.). The Higashinari district of Osaka was a place for arms and ammunition manufacturing in 1879. In 1890, the Higashinari Parade Ground was built here. During this period, areas in Higashinari – including Kita Nakamichi – were influenced by developments in Osaka and started accommodating housing and household industries in the areas adjacent to neighboring Tsuruhashi, and gradually continued developing eastwards. After 1925, a lot of small to medium sized enterprises were formed in the Higashinari District during war time, focusing on ironwork and textiles developing at a groundbreaking rate. In 1945, air raids began and the central part of the district suffered destruction. In June 1945, 6,363 houses were destroyed by fire as a result of the air raids, resulting in 20,699 casualties. The areas most destroyed by the bombings were concentrated in the western parts of Higashinari District. In 1946, Osaka war-damaged areas revival projects started. In 1970, residential manifestation was implemented.

Kita Nakamichi is one of the districts in Japan called High Density Residential District (密集住宅市街地 in Japanese), a term used for those mainly undeveloped areas targeted by municipalities for improvement in access and disaster prevention (Osaka High Density Residential District Maintenance Project Report).

### 5. Research Framework and Methodology

The focus of this paper is on the socio-psychological aspects of having side setback areas in a dense neighborhood, as a case study representative of similar developments all over Japan. There is a hypothesis that similar to roji where close distance between neighbors creates neighborly ties; narrow distances between two adjacent buildings create the same sense of communication. If they do, are there meaningful relations between the physical layout of side setback areas or side facades and the perception of the residents? The connection between placement of physical features of the neighboring building side façades, such as the location of windows in relation to those on the adjacent side façade, have been investigated for the perceptions of residents as well as the interaction with their immediate neighboring building through these spaces as possible indicators of neighborhood perception.

After having meetings with the Kita Nakamichi community center and obtaining permission, residents were selected for interviews at their doorsteps from November 2014 to January 2015. There were two sections in the interview questionnaire: first, activity, and second, perceptions towards side setback areas of the respondents' residential buildings. The first part of the questionnaire, regarding activity, included items requesting demographics and data on the respondents’ residential building, such as daily occupation hours and overall length of residence, and time spent on daily routines with a focus on different room usage. Forty-five residences were included in the interview, and residents were asked to choose the rooms and overall length of residence, and time spent on daily routines with a focus on different room usage. Forty-five residences were included in the interview, and residents were asked to choose the rooms and overall length of residence, and time spent on daily routines with a focus on different room usage.
this is to associate respondents' perception with the side setback which they are most likely to have visual connection or access with, as the results from the less visible side setback would be predictable. After selecting the side setback visible from the most used room, objective measurements of the rooms regarding the windows in the side façades were documented as mediums of interaction with side setback areas, in order to draw possible connections between their types (i.e. glass types) and the respondents' behavior and perceptions towards these spaces. These included the type of window frames and window glass; window guards; two items including inside and outside the window including shutters, blinds, curtains or lace curtains; and, laundry poles, air conditioners, plants and decorations. The second part of the questionnaire included 27 items. This focused on the respondents' perceptions towards side setback area maintenance, neighbors, doors and windows to side setback areas and the side setback areas themselves using a Likert 5-point scale.

6. Data Analysis
The area of the houses was generally less than 60 m$^2$ (n=34). Five houses were larger than 100 m$^2$.

The majority of the respondents were elderly (n=28), female (n=31) and stay at home most of the day (n=23). The majority of the respondents spend most of their time in their living room, followed by their kitchen, except three cases, all located on the ground floor. This gave assumption of that the respondents have a better understanding and utilization of their side setbacks (Table 1.).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Male</th>
<th>Female</th>
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<tr>
<td>Gender</td>
<td></td>
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<table>
<thead>
<tr>
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<th>Apartment</th>
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<td>No. of floors</td>
<td>2 (n=34)</td>
<td>4 (n=1)</td>
</tr>
<tr>
<td></td>
<td>3 (n=9)</td>
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<thead>
<tr>
<th>Work outside</th>
<th>Mostly work at home</th>
<th>Retired/stay at home</th>
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</thead>
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<tr>
<td></td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>5</td>
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<tr>
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<th>Stay at home between 5-10 hours</th>
<th>Stay at home more than 10 hours</th>
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<td>14</td>
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<th>Weekdays</th>
<th>Weekend</th>
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<tr>
<td>Living/Dining room</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>Kitchen</td>
<td>5</td>
<td>Kitchen</td>
</tr>
<tr>
<td>Talking with the family</td>
<td>32</td>
<td>6</td>
</tr>
<tr>
<td>Talking with friends</td>
<td>26</td>
<td>3</td>
</tr>
<tr>
<td>Study, working etc.</td>
<td>32</td>
<td>3</td>
</tr>
<tr>
<td>Watching TV</td>
<td>36</td>
<td>4</td>
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<th>Opposite the window</th>
<th>House</th>
<th>Apartment</th>
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<tr>
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<td>2</td>
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<table>
<thead>
<tr>
<th>Window glass type</th>
<th>Matte glass</th>
<th>Clear glass</th>
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</thead>
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<td>28</td>
<td>5</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Outside the window</th>
<th>Clothes hanging</th>
<th>Air con</th>
<th>Decoration</th>
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</thead>
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<td>1</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
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<th>What is opposite the window</th>
<th>Neighboring House</th>
<th>35</th>
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</table>

<table>
<thead>
<tr>
<th>What is on the neighboring building side facade</th>
<th>Matte glass</th>
<th>Glass</th>
<th>Wall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11</td>
<td>2</td>
<td>9</td>
</tr>
</tbody>
</table>
6.1 Physical Properties of Side Facades and Setbacks

Twenty-five of the side setbacks were wide enough for a person to pass through, all of them less than 1.5 meters. Twenty-three windows had matte glass, whereas only two had clear glass. In terms of utilization, small items such as trash bins and tools account for most. Occasional flowerpots were noticed too. There is no change in the façade material of street façades and side façades, which indicates the attention to their appearance and maintenance. Sixteen of the respondents had their living room windows towards the side setback areas. Eight respondents had their kitchen windows opening towards side setback areas, followed by 3 who had their bedroom windows facing towards side setbacks. Only two of the sample residences had doors to their side setbacks. A majority of side façades had pipes and electrical insulation attached to them, including 7 cases where air conditioners were placed there (Fig.2.).

6.2 Subjective Meaning of Side Setback Areas

When asked about the need for maintaining side setbacks, the majority agreed without further comments and replied that these distances are required by law and they are as they are. There was a general satisfaction with the ventilation coming from the windows to side setbacks. For light, most stated their dissatisfaction with the light received from their side façade windows, due to the narrow nature of these spaces regardless of the direction of the side façade, and also the fact that almost all of the windows on side façades have matte glass (Fig.3.). The only exception was one residence with a large window on the side façade, which faced a...
A Person cannot pass (n=25)

- Prefer to have clothes-drying place to side setbacks
- Prefer to have terrace/balcony to side setbacks
- Prefer to have living/dining room window
- Prefer to have bedroom window to side setbacks
- Prefer to look at neighbor’s clothes-drying place
- Prefer to look at neighbor’s terrace/balcony
- Prefer to look at neighbor’s large window
- Prefer to look at neighbor’s small window
- Prefer to look at green wall
- Keep curtains to side setbacks closed

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- Prefer to look at neighbor’s terrace/balcony
- Prefer to look at neighbor’s large window
- Prefer to look at neighbor’s small window
- Prefer to look at green wall
- Keep curtains to side setbacks closed

Living and Bedroom (n=31)

- Prefer to have clothes-drying place to side setbacks
- Prefer to have terrace/balcony to side setbacks
- Prefer to have living/dining room window
- Prefer to have bedroom window to side setbacks
- Prefer to look at neighbor’s clothes-drying place
- Prefer to look at neighbor’s terrace/balcony
- Prefer to look at neighbor’s large window
- Prefer to look at neighbor’s small window
- Prefer to look at green wall
- Keep curtains to side setbacks closed

Satisfied ✗ Dissatisfied

- No. of respondents agreed on the items
- No. of respondents disagreed on the items

Clothes-drying place refers to a small structure usually constructed of steel bars on top of the projecting first floor roofs, providing enough space only to step outside and hang clothes to dry under the sun.
high wall between the houses and most of the façade was lit due to the neighboring building setback from the street. When asked about feeling oppressed having neighboring buildings so close to the windows to side setbacks, a majority of respondents disagreed. The data in Table 3. suggests the general satisfaction with privacy, given that the windows to side setbacks are always kept closed and are equipped with matte glass.

When asked about preferences regarding the view to side setback areas, kitchen windows were the most desired choice. On the neighboring building side façade, if one were to have a view, a small window and clothes-drying places were the most desired options. This was due to the respondents’ concern over their privacy. The following are some notable comments the respondents mentioned about their impression of side setback areas:

Respondent #1: "There is a mere wall on the right side, but on the left there are windows and a staircase of the neighboring apartment. The residents are renters, not owners. They are always noisy. I would prefer if there was a wall on that side too!"

Respondent #2: "We know our side neighbors so we have no problem. Anyway, there are parking spaces on both sides. If there were rooms on the side façade maybe there would be problems such as privacy issues or sound. Generally we prefer to greet each other on our porches, not from our windows."

Respondent #3: "When I open the window sometimes a bad smell comes in from the neighbors’ house."
Respondent #4 (3rd and 4th floor were exposed to sunlight from the west): "Now I only have a toilet and corridor windows here, but I would like to have more windows to enjoy more light into my bedrooms, but the city wouldn't allow me. "Once there was an incident of theft from here, he went up and entered from the window".

Respondent #5: "Neighbor's kids can see my living room from the large window I have towards my side setback. Every time there is an interesting program on the TV, I can see them stretching their heads to watch my TV screen. I think it is adorable!"

Respondent #6 (the side setback was facing south and exposed to sunlight at the time of interview as the neighboring land was empty): "I have good sunlight here to my living room and enjoy it".

7. Discussion and Conclusion

Given that side setback areas are very narrow; their frequency of use was studied through storing items, drying clothes, or their maintenance. To most of the respondents, however, they were noted as dark and left-out spaces with very limited to no view and access. Once again, this study focused on the side setback which the most used room had a window onto. Except in three cases, the majority of most used rooms were located on the ground floor, which was favorable to the selection criteria as explained in the methodology. Consequently the result does not include all the room and higher floors which would clearly enjoy more sunlight. For those wider side setbacks, a handful of activities such as taking care of plants or taking the trash bin out were observed. In the two cases where the residents had plants outside their side façade windows, they stated that they keep them outside for a short while to get air and light and then put them back inside. The fact that almost all the windows towards the side setbacks had matte glass (n=23 out of 25) reassures the notion of privacy for the residents.

Despite the strong community bonds in the area and the fact that most of the respondents were staying at home, respondents unanimously reported that they prefer to undertake social interaction at their front door, and accidental contact via their side facades are not favoured.

The new houses built in the Kita Nakamichi area have kept side setbacks from the neighboring buildings and have windows with matte glass and downpipes running through them. The groundwork here is noticeable in contrast to the older houses where in many cases the ground was soil or occasionally wild plants. In newly developed neighborhoods, side setbacks can be designed wider in order to accommodate more activities. Improved natural ventilation performance can be achieved when the two openings are positioned in opposite directions or perpendicular to each other on side facades. Having terraces or clothes-drying places towards the side setback area can add extra space and enhance air circulation. For the purpose of improving the sunlight reception of side setback areas, the provision of short eave overhangs or flat roofs should be considered.

Finally, the majority of the respondents in this study were elderly and female therefore further studies on wider spectrum of the society are needed.

Acknowledgement

The authors are grateful to Katsuo Ayabe, chairman of Kita Nakamichi community center for his support in facilitating our research and recruiting respondents.

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