

The Impacts of Liquor Outlets in Manukau City

Report No. 3
The spatial and other characteristics of
liquor outlets in Manukau City

Alcohol Advisory Council of New Zealand

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The views expressed in this report are those of the authors and do not reflect any official position on the part of the Centre or of the Alcohol Advisory Council of New Zealand.

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ABSTRACT

This report describes the spatial and other characteristics of liquor outlets in the Manukau City area in January 2009. These characteristics are important in terms of their effects on the availability of alcohol. Several key results were found relating to the characteristics of alcohol sales. First, on-licence outlets are most dense in areas with good transport links, such as town centres, and in areas with high amenity value. Second, off-licence outlet density is positively related to population density and to relative deprivation. Further, off-licence outlets are typically not gathered together in clusters. Rather they are distributed throughout the area in order to reduce local competition. Finally, areas with a higher density of off-licence outlets experience lower prices, longer operating hours and later weekend closing times. Further research into the relationship between liquor outlet density and alcohol-related harms should take account of these relationships.

Keywords: liquor outlets, density, alcohol, Manukau, New Zealand

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LINKS TO OTHER REPORTS

This is the third report in a series of five reports commissioned by ALAC in partnership with Manukau City. The research was undertaken by researchers from the University of Waikato between 2008 and 2011. The five reports in The Impacts of Liquor Outlets series are:

- Report 1 – A review of the international academic literature and New Zealand media reports
- Report 2 – Community stakeholder views on the impacts of liquor outlets in Manukau City
- Report 3 – The spatial and other characteristics of liquor outlets in Manukau City (this report)
- Report 4 – A spatial econometric analysis of selected impacts of liquor outlets in Manukau City
- Summary report – The impacts of liquor outlets in Manukau City (revised January 2012).

The summary report was initially released in March 2010. That report provided short summaries of the content of the main reports cited above. The summary provided for Report 4 contained a preliminary analysis of the impacts. Since the release of the summary report, the authors have presented the preliminary findings at a number of conferences and received additional peer review and feedback on the methodology. The summary report has been revised and re-released (January 2012) with updated information from Report 4.

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EXECUTIVE SUMMARY

There has been significant recent debate over the impact of liquor outlets on communities in New Zealand. This has arisen in part because of the liberalisation of the sale of alcohol following the Sale of Liquor Act 1989, which allowed the sale of wine in supermarkets and grocery outlets and generated a substantial increase in the number of outlets supplying alcohol. This report describes the spatial and other characteristics of liquor outlets in the Manukau City area in January 2009. These characteristics are important in terms of their effects on the availability of alcohol.

An initial database of liquor licensees was obtained from Manukau City Council, then updated and supplemented with additional data from telephone surveys of, and field visits to, off-licence outlets. Specifically, data on price and opening hours at off-licence outlets were collected, then converted to summary data at the Census Area Unit level for ease of comparison. Maps were used to demonstrate the key spatial and other characteristics of liquor outlets in the Manukau City area.

Several key results were found relating to the characteristics of alcohol sales in Manukau City in January 2009. First, on-licence outlets are most dense in areas with good transport links, such as town centres, and in areas with high amenity value. This is because these outlets cater to consumers who are looking for a destination at which to drink, or where drinking is incidental to some other activity such as a meal. Second, off-licence outlet density is related to population density, i.e. a higher population density is associated with a higher density of off-licence outlets, and to relative deprivation, i.e. higher relative deprivation is associated with a higher density of off-licence outlets. Further, off-licence outlets are typically not gathered together in clusters. Rather they are distributed throughout the area in order to reduce local competition. Finally, price and availability of alcohol at off-licence outlets are related to off-licence outlet density. Areas with a higher density of off-licence outlets have higher competition between those outlets, leading to lower prices, longer operating hours and later weekend closing times. Future research into the relationship between liquor outlet density and alcohol-related harms should take account of both the causes and consequences of liquor outlet density, as well as the association between liquor outlet density and other measures of availability such as opening hours.

1 INTRODUCTION

There has been significant recent debate over the impact of liquor outlets on communities in New Zealand. This has arisen in part because of the liberalisation of the sale of alcohol following the Sale of Liquor Act 1989, which allowed the sale of wine in supermarkets and grocery outlets and generated a substantial increase in the number of outlets supplying alcohol. For instance, in February 2008 there were 494 active liquor licences in Manukau City – compared with just 148 in 1990 (refer Table 1), putting Manukau into the top decile of liquor outlet density among territorial local authorities in New Zealand. However, given the large recent increase in the population of Manukau City, the number of liquor licences per 10,000 population has actually fallen from a peak of 14.5 licences per 10,000 population in 2002 to 13.7 in 2008.

Table 1: Number of active liquor licences in Manukau City 1990-2008

Year	1990	1995	2002	1 May 2007	12 Feb 2008
<u>Total licences</u>					
On-licence	53	131	204	248	247
Off-licence	40	128	168	183	181
Club licence	55	73	75	67	66
Total licences	148	332	447	498	494
<u>Licences per 10,000 population</u>					
On-licence	2.4	5.4	6.6	7.0	6.8
Off-licence	1.8	5.3	5.4	5.2	5.0
Club licence	2.5	3.0	2.4	1.9	1.8
Total licences	6.8	13.6	14.5	14.0	13.7

Source: Manukau City Council data.

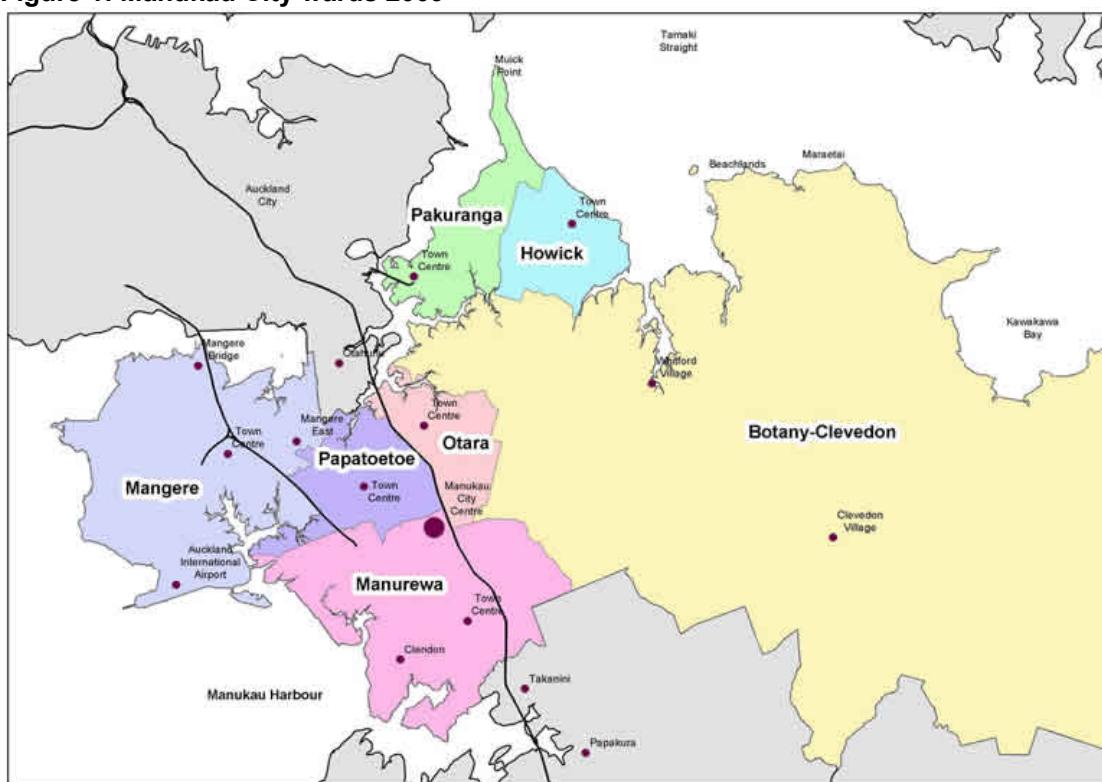
Increases in the number of both on- and off-licence liquor outlets have been matched with an escalation in the level of community unease about alcohol-related harm, culminating in a decision by Manukau City Council to review its alcohol strategy. Of particular concern are the more vulnerable communities of the City, in which the high density of liquor outlets is a notable feature.¹ Given community concerns regarding the impacts of liquor outlets (McNeill et al., 2012), and the lack of a consensus about the nature and extent of impacts in the academic literature (Cameron et al., 2012), the community is seeking strong empirical evidence that supports (or refutes) the need for changes to existing licensing laws.

¹ Density can refer to either the number of liquor outlets per unit of land area or the number of liquor outlets per unit of population. Either of these interpretations is valid, and in this report we make use of measures based on both definitions of density.

Manukau City covers a land area of 522 square kilometres and consists of seven electoral wards: Manurewa, Mangere, Otara, Howick, Papakura, Papatoetoe and Botany-Clevedon, as shown in Figure 1. The City is marked by contrasts, with areas of relative affluence, particularly in the north and east, and areas of relative deprivation, particularly in the west. It encompasses both rural and urban areas and a diverse ethnic composition, including the largest Māori and Pacific communities in New Zealand.

This report was developed at the request of the Alcohol Advisory Council of New Zealand (ALAC) in partnership with Manukau City Council. It describes the spatial and other characteristics of liquor outlets in the Manukau City area in January 2009. The overall aim of this project is the development of a policy tool that allows the impacts of liquor outlets to be modelled, with a view to informing future decision-making about the potential marginal impacts of an additional liquor licence in a given area.

Figure 1: Manukau City wards 2009



Source: Manukau City Council.

The spatial and other characteristics of liquor outlets in Manukau City are important in terms of their effects on the availability of alcohol. An understanding of these characteristics is a key input into the development of a quantitative model of the impacts of liquor outlets on the community in Manukau City, across a range of domains, in order to inform local body planning that minimises alcohol-related harm.

This remainder of this report is structured as follows:

- Section 2 outlines the method employed in the data collection and analysis.

- Section 3 presents the results, in terms of a series of maps.
- Section 4 discusses these results in the context of future quantitative research investigating the impacts of liquor outlets on Manukau City.
- Section 5 concludes the report.

2 METHOD

An initial database of liquor licensees was obtained from Manukau City Council in January 2009. This database contained basic geographical and contact information (address and contact telephone numbers), as well as a crude indicator of outlet type (on-licence, off-licence, and club). Additional fieldwork was undertaken in order to obtain fine details on the characteristics of off-licence outlets, which have significant variations that are not typically observed among clubs and on-licence outlets.

A pilot survey of off-licence outlets was conducted by the field research team, who visited several off-licence outlets and recorded data on price and opening hours, as well as the space within the stores devoted to alcohol sales and the extent of advertising both within and outside the stores. A simple analysis of this pilot survey demonstrated that there was little variation within different types of outlet in terms of space devoted to alcohol sales or the extent of advertising.

Given that price and opening hours data can be easily obtained by directly contacting each off-licence outlet, a telephone survey method, supplemented by additional field visits, was employed. Each off-licensee contacted was asked for:

1. their current operating hours each day
2. the prices of two indicator items, being a 15-pack of Lion Red bottles and a four-pack of Vodka Cruiser RTDs (ready to drinks).²

Those licensees who were unable to be contacted or who gave incomplete details over the telephone were visited by the field research team the week following the telephone survey. In all, 188 off-licence outlets were telephoned, and 72 off-licence outlets were subsequently visited. Ten outlets had closed either temporarily or permanently, or had ceased selling alcohol, and four outlets were essentially distributors only with minimal or no sales to the general public. Finally, a number of outlets that had been classified as off-licence outlets in the original database were re-classified as on-licence outlets when it became clear that off-licence sales were minimal or non-existent for those outlets.

This resulted in a final database of 476 outlets. The distribution of the database by type of outlet is summarised in Table 2. The largest number of licences was held by restaurants, cafes, function centres and other on-licence outlets (40.3 percent of the total), followed by liquor stores (18.9 percent). Dairies and superettes held only a small minority of the total number of liquor licences (4.4 percent).

² Respondents were asked about these two items as surveying a wider range of items would have increased both the time and cognitive costs to respondents, thereby increasing the number of refusals. The particular items were chosen as they are widely sold by off-licence outlets across Manukau City, and can be considered as indicative of the overall price level of beer and ready-to-drink (RTD) products at each outlet. Data on price were only collected from those stores that sold the appropriate indicator product(s) or the same product(s) but in a different packaged quantity(ies) (such as an 18-pack of beer rather than a 15-pack). Data on opening hours were only collected from liquor stores, dairies and superettes, supermarkets and specialty stores.

Table 2: Active liquor licenses in Manukau City by outlet type, 31 January 2009

Outlet type	Number of active licences on 31 January 2009
Restaurants/Cafes/Function centres/other on-licence	192
Pubs/Bars/Taverns/Night clubs	60
Clubs	69
Liquor stores	90
Dairies/Superettes	21
Supermarkets	22
Other off-licence ³	22
TOTAL	476

In order to compare prices at off-licence outlets across different spatial areas, a price index was created for each Census Area Unit (CAU) in Manukau City.⁴ First, the price of beer (indicated by the price of a 15-pack of Lion Red bottles as noted above) and the price of RTDs (indicated by the price of a four-pack of Vodka Cruisers) were normalised by converting each to a z-score of the per-unit price.⁵ The average z-score was used to represent the price level at each off-licence outlet, and these price levels were averaged across each CAU to obtain an estimate of the price level in each area.⁶ Descriptive statistics on the prices of beer and RTDs and the price index are shown in Table 3. At the 123 off-licence outlets that sold the beer indicator product, the mean unit price of beer was \$1.41, with a maximum unit price of \$1.67 and a minimum of \$1.11. At the 91 off-licence outlets that sold the RTD indicator product, the mean unit price of RTDs was \$2.19, with a maximum unit price of \$3.25 and a minimum of \$1.65. At the 124 off-licence outlets that sold either the beer indicator product or the RTD indicator product or both, the price index ranged from -2.54 (the least expensive outlet) to +2.41 (the most expensive outlet), with a mean of 0.01.

Summary measures were also derived for the average total operating hours per outlet in each CAU, and the average Friday/Saturday night closing time in each CAU. The descriptive statistics of these measures for the 138 off-licence outlets surveyed are summarised in Table 3. The average off-licence liquor outlet in Manukau City is open for 81.2 hours each week, with a maximum of 168 hours (i.e. 24 hours, seven days) and a minimum of 35 hours. The average closing time on Friday and Saturday

³ ‘Other off-licence’ includes gift shops, florists, specialty stores and vineyards. The characteristics of liquor sales from these off-licence outlets are quite different from those of other off-licence outlets, and as such they are excluded from the analysis of off-licence outlet density in the remainder of this report.

⁴ A Census Area Unit is a single geographic entity with a maximum population of approximately 5000, and in urban areas they generally coincide with suburbs or parts thereof.

⁵ The z-score indicates how many standard deviations a given value of a variable is from the mean of that variable. It is a dimensionless value derived by subtracting the population mean from an individual raw value, then dividing the difference by the population standard deviation. The use of z-scores is a usual method of normalising data with different means and standard deviations.

⁶ Note that a Laspeyres Index for price would be more theoretically valid, and would weight each observation based on the volume of alcohol sold, or by the relative population in a ‘catchment area’ of each outlet. However, since there is no data on alcohol sales for each outlet, an equal weighting was applied to each.

nights of off-licence liquor outlets in Manukau City is 9.30pm, with the earliest closing time being 4pm, and one outlet open 24 hours.

Table 3: Descriptive statistics on the price of alcohol in Manukau City and opening hours of off-licence liquor outlets, January 2009

	Mean	Median	Min.	Max.	Std. Dev.	n
Price of beer (per bottle)	\$1.41	\$1.40	\$1.11	\$1.67	0.12	123
Price of RTDs (per bottle)	\$2.19	\$2.23	\$1.65	\$3.25	0.26	91
Price index	0.01	0.03	-2.54	2.41	1.03	124
Total opening hours	81.2	79.5	35.0	168.0	17.6	138
Friday/Saturday closing	9.30pm	10pm	4pm	N/A	1.66	138

3 THE SPATIAL AND OTHER CHARACTERISTICS OF LIQUOR OUTLETS IN MANUKAU CITY

This section describes the features of the liquor trade in Manukau City, in terms of the spatial and other characteristics of liquor outlets located there. In particular, the location and type of liquor outlets, the average price of alcohol in each CAU, and the average operating hours in each CAU are considered.

3.1 THE SPATIAL DISTRIBUTION OF LIQUOR OUTLETS IN MANUKAU CITY

Figure 2 presents the spatial distribution of liquor outlets of all types and population density of each CAU (a larger version of this figure is available in Appendix I as Figure A1). As can be seen by comparing this figure with Figure 1, there are significant clusters of on-licence outlets (including restaurants/cafes/function centres and pubs/bars/taverns/night clubs) in the town centre areas, particularly around the Manukau City centre, Otara, Howick and Pakuranga. Off-licence outlets (including liquor stores, dairies/superettes and supermarkets) are more evenly spread throughout the City, probably reflecting a high level of local competition between outlets resulting in few off-licence outlets co-locating in close proximity to each other. These spatial features are also apparent from the spatial distribution of each type of outlet, included in Appendix I as Figures A2-A8. The figure also indicates that off-licence outlets are more likely to be located in highly populated areas, while the locations of on-licence outlets and clubs appear to have little relationship with population density.

Figure 2: Liquor outlets in Manukau City, 31 January 2009 and population density

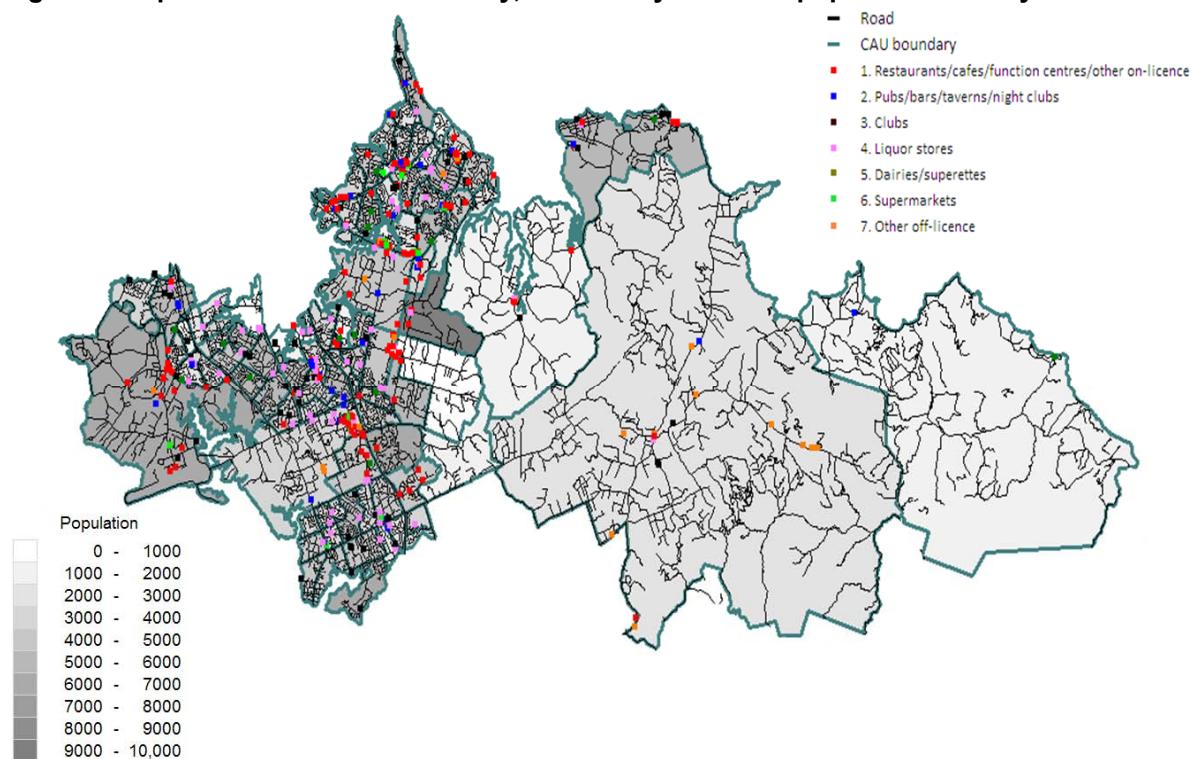


Figure 3 presents the spatial distribution of liquor outlets and the relative deprivation (as measured by NZDep2006⁷) of each CAU (a larger version of this figure is available in Appendix I as Figure A9). From this figure, a clear relationship between off-licence outlet location and relative deprivation is evident. Off-licence outlets appear to be more likely to locate in CAUs with high relative deprivation, while the locations of on-licence outlets and clubs appear to have little relationship with relative deprivation.

⁷ NZDep2006 is an index that uses census data to assess levels of socio-economic deprivation amongst groups of people within small areas. The index is weighted so that approximately the same numbers of people live in areas at each of the 10 (decile) levels of deprivation nationally. A decile score of 1 indicates least deprived, while a score of 10 indicates areas that experience the highest level of deprivation. Although the process of averaging can mask substantial variations in the level of deprivation experienced across small geographical areas (or CAUs), NZDep2006 provides a useful indication of where deprivation is likely to be most concentrated. Further details on NZDep2006 can be found in Salmond et al. (2007).

Figure 3: Liquor outlets in Manukau City, 31 January 2009 and deprivation

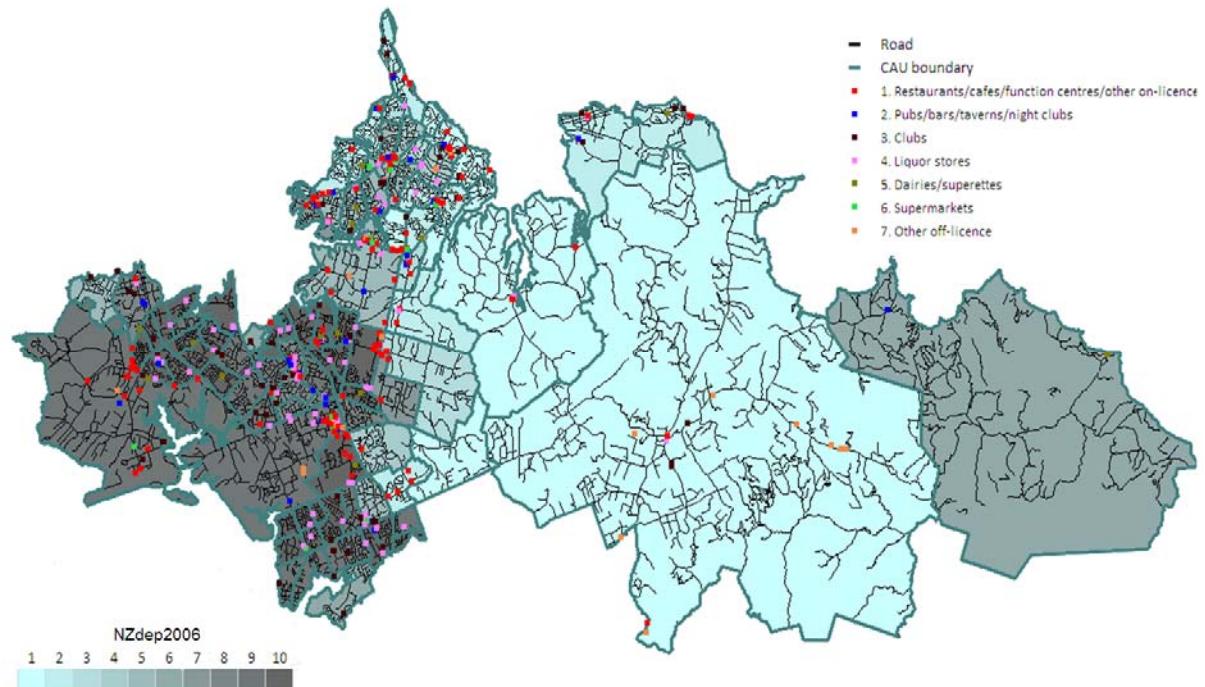


Figure 4 presents the CAU density of liquor outlets (of all types) in Manukau City, per 10,000 population (a larger version of this figure is available in Appendix I as Figure A10). The CAUs with the greatest density of liquor outlets per unit of population are Mangere Station, Manukau Central and Clevedon. Clevedon has a high density by this measure due to the small population and large number of vineyards in that area, while Mangere Station has a very small population (meaning that only a few outlets are required in order to generate a high density measure), and Manukau Central includes the Manukau City centre and the large number of on-licence outlets located there. Each of those three CAUs has more than 75 outlets per 10,000 population, while the average density for all of Manukau City is 14.5 outlets per 10,000 population.

Figure 4: Density of liquor outlets in Manukau City per 10,000 population

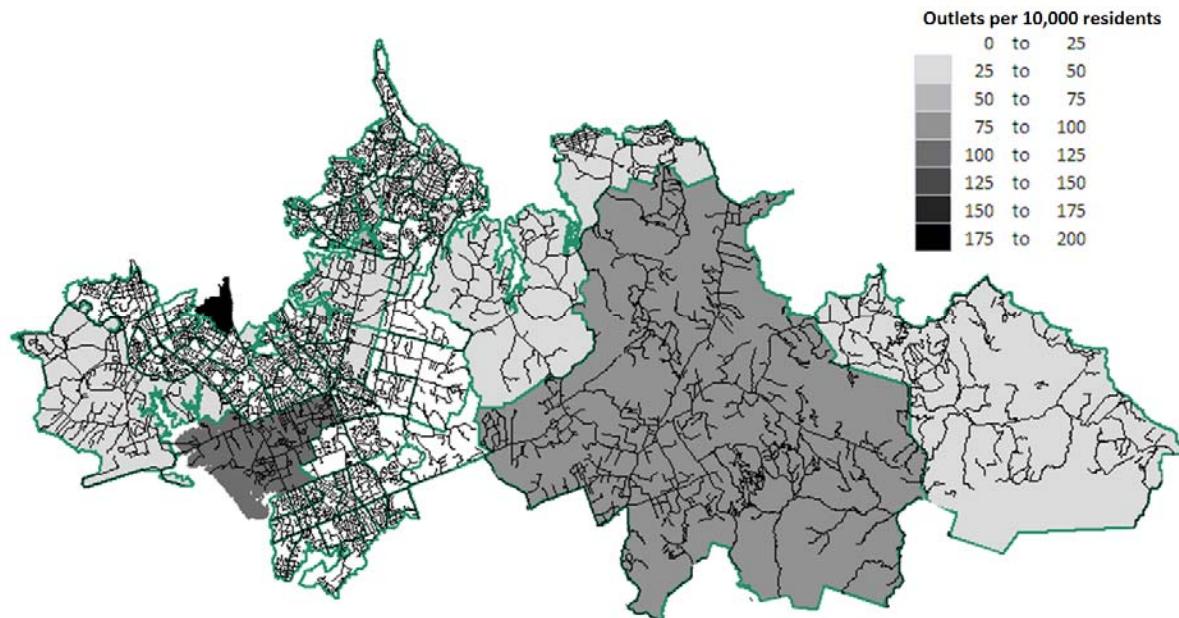
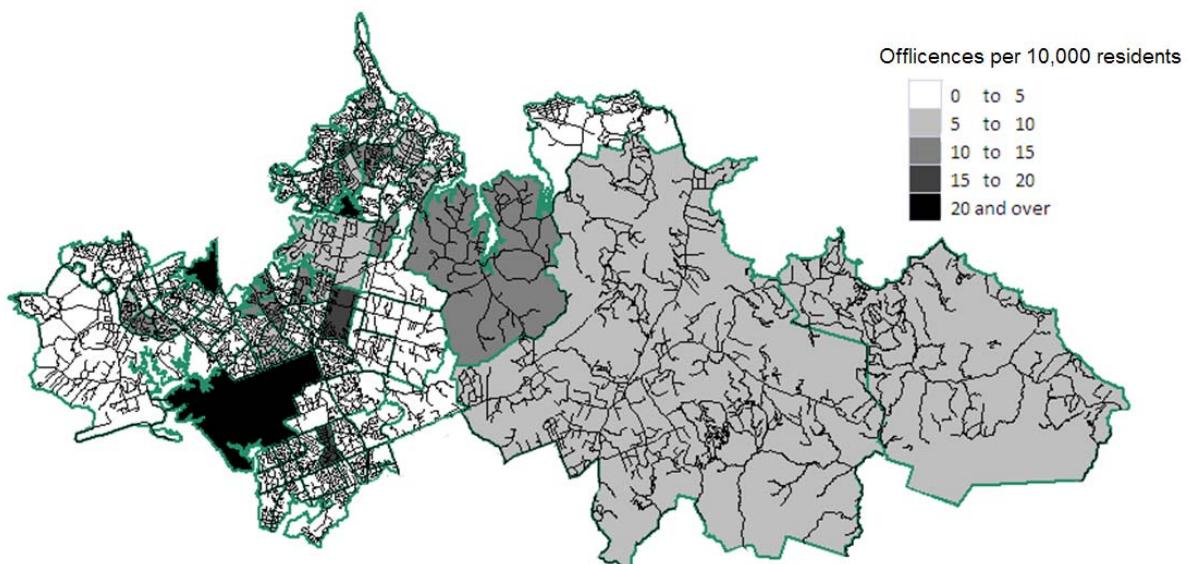


Figure 5 presents the CAU density of off-licence liquor outlets in Manukau City per 10,000 population (a larger version of this figure is available in Appendix I as Figure A11). While Mangere Station and Manukau Central still feature among the CAUs with the highest densities of outlet, several other areas such as Burswood, Pigeon Mountain South, Flat Bush and Manurewa Central also feature. Each of those seven CAUs has more than 15 off-licence outlets per 10,000 population, while the average density for all of Manukau City is 4 off-licence outlets per 10,000 population.

Figure 5: Density of off-licence liquor outlets in Manukau City per 10,000 population



An alternative measure of liquor outlet density is the number of outlets per unit of land area. Figure 6 presents the CAU density of liquor outlets (of all types) in Manukau City, per square kilometre (a larger version of this figure is available in Appendix I as Figure A12). The picture presented here is

somewhat different from that based on population. Areas of high spatial density of liquor outlets tend to be those with high population density, which provides additional support for the apparent relationship shown in Figure 2.

Figure 6: Density of liquor outlets in Manukau City per square kilometre

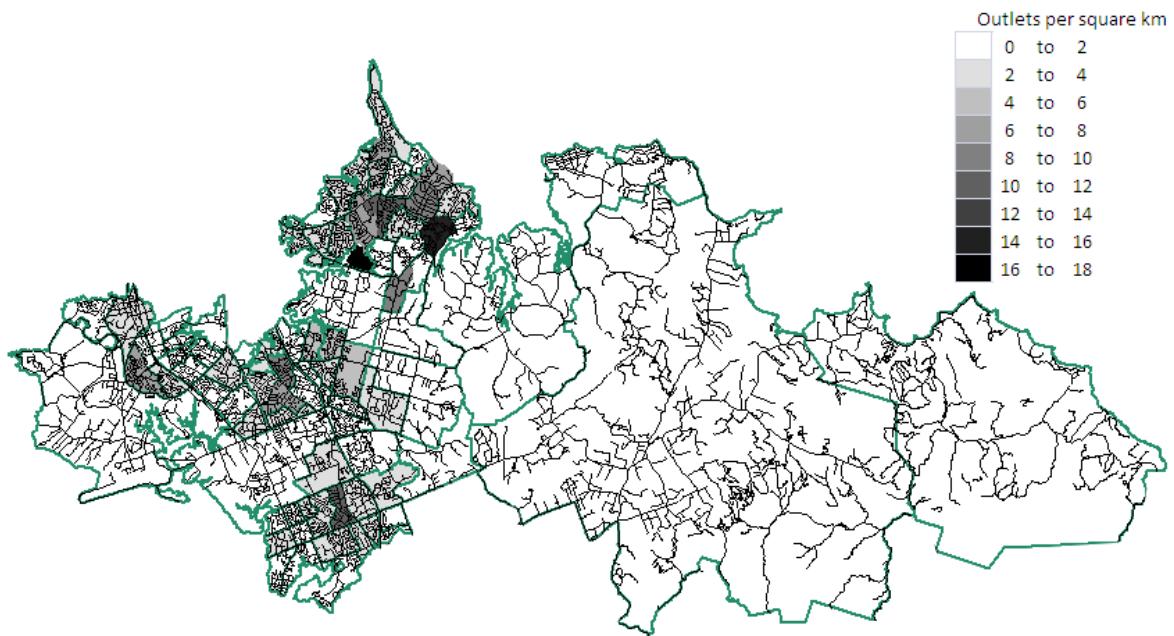
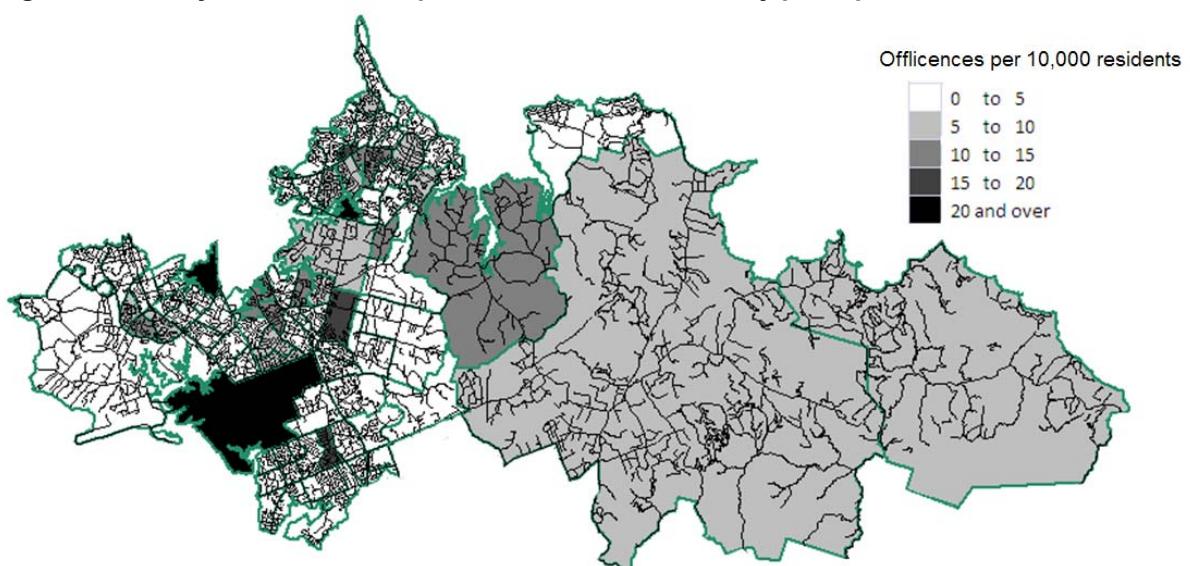


Figure 7 presents the CAU density of off-licence liquor outlets in Manukau City per square kilometre (a larger version of this figure is available in Appendix I as Figure A13). In addition to the relationship with population density, it is clear from this map that off-licence outlets are more densely located in areas of relative deprivation, such as the south and west of Manukau City.

Figure 7: Density of off-licence liquor outlets in Manukau City per square kilometre



3.2 THE SPATIAL CHARACTERISTICS OF LIQUOR OUTLETS IN MANUKAU CITY

Figure 8 presents the alcohol price index for each CAU. A number of spatial features relating to alcohol pricing are highlighted by this map (a larger version of this figure is available in Appendix I as Figure A14). First, rural areas and areas further from the Manukau City centre generally exhibit higher prices for alcohol. The Botany-Clevedon ward has the highest alcohol prices, followed by some areas of Howick and Pakuranga. The Otara ward and the area immediately around Auckland International Airport have the lowest alcohol prices. Second, comparing Figure 8 with both Figure 2 and Figure 4 it is clear that areas with a higher number of off-licence outlets have lower alcohol prices, presumably as increased competition drives the price downwards.

Figure 8: Alcohol price index, by CAU

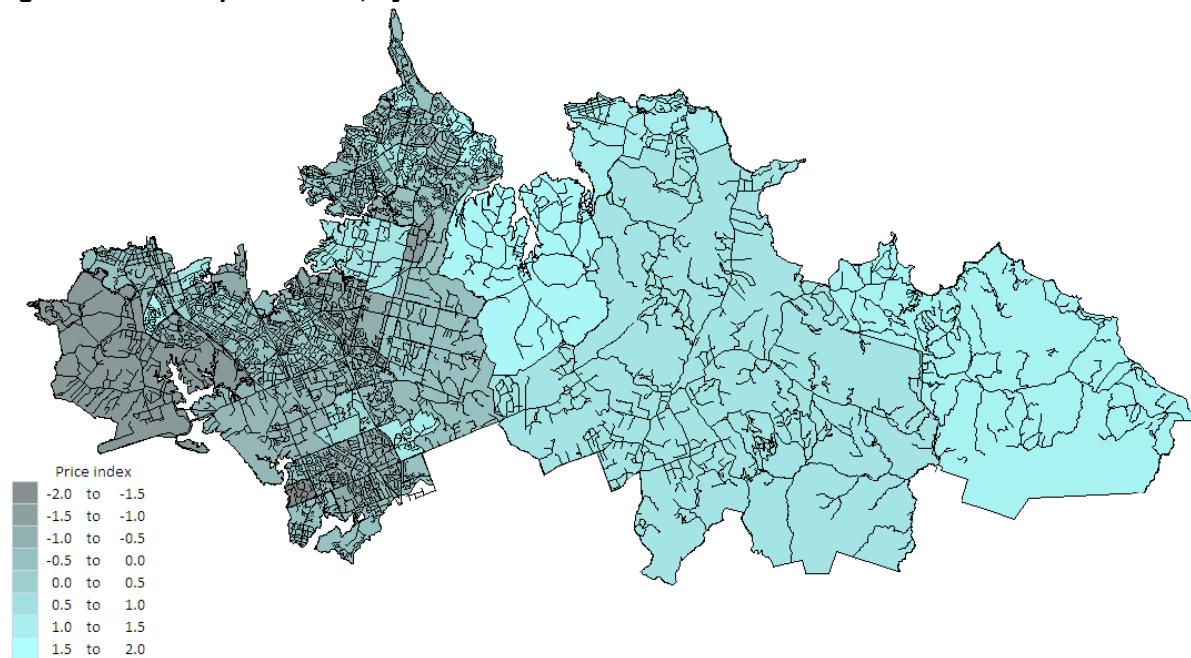


Figure 9 presents the average total opening hours per off-licence outlet per week for each CAU (a larger version of this figure is available in Appendix I as Figure A15). This is a measure of the availability of alcohol, and shows a similar pattern to the alcohol price index. Generally, the Howick and Pakuranga wards have the lowest alcohol availability in terms of opening hours of off-licence outlets, followed by Botany-Clevedon, while Mangere and to a lesser extent Otara tend to have the longest operating hours on average. Again this seems to be related to the number of off-licence outlets in each area as presented in Figure 2 and Figure 4, with areas of higher off-licence outlet density having longer opening hours.

Figure 9: Average total opening hours per off-licence outlet per week, by CAU

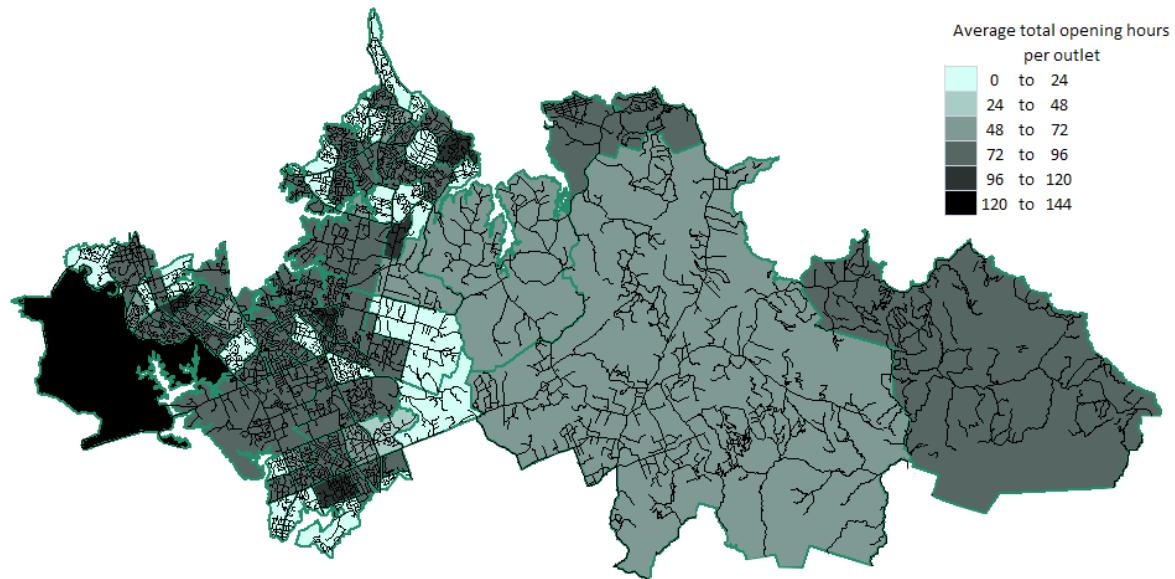
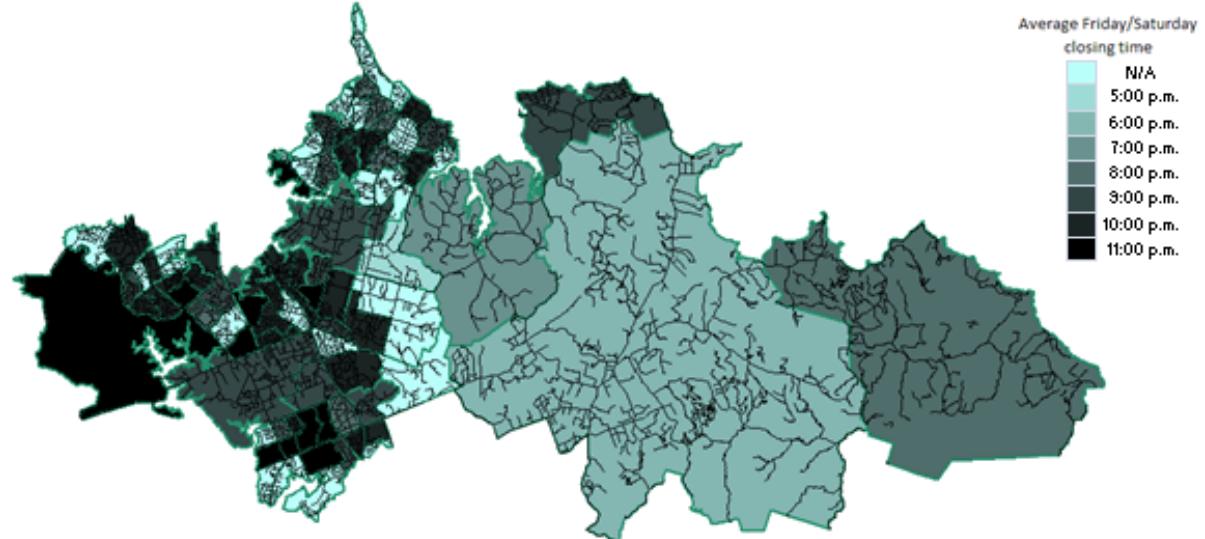


Figure 10 presents the average Friday and Saturday night closing time for off-licence outlets in each CAU, which is another measure of the availability of alcohol (a larger version of this figure is available in Appendix I as Figure A16). Again, the pattern is similar to the other measures. Consistent with the number of off-licence outlets in each area, as presented in Figure 2 and Figure 4, Botany-Clevedon ward has the earliest closing times and Mangere and Otara have the latest closing times.

Figure 10: Average Friday and Saturday night closing time for off-licence outlets, by CAU



4 DISCUSSION

Based on economic theory, we expect that liquor outlets will select their locations based on the extent of unmet local demand for alcohol, i.e. they will locate where there is sufficient unmet local demand to sustain a suitable profit for the owners.⁸ However, there are key differences in the location decisions of on-licence and off-licence outlets, which cater to consumers with different needs.

On-licence outlets are destination outlets, i.e. places where consumers go in order to drink (or where drinking is incidental to some other activity such as a meal). As such, on-licence outlets will locate in centralised areas with good transport links, such as along main roads or in retail cores such as town centres or shopping malls, or will locate in other areas with high amenity values, for instance along beachfronts or where there are good views (Pillsbury, 1987). These are areas to which it is easy to get or attractive to go, ensuring relatively higher demand for their services. Further, on-licence outlets might benefit from spillover effects, as consumers might choose to go to a destination (where they know there are restaurants, bars, etc.) then choose a retailer, or may move from outlet to outlet and purchase some services from several retailers (i.e. bar-hopping). On-licence outlets are able to effectively differentiate the goods and services they offer, so co-locating with competitors does not substantially reduce the demand for their own products and may in fact increase demand due to spillovers (Picone et al., 2009).

In contrast, off-licence outlets cater to home-based drinkers and therefore attract consumers by lowering the real total cost of alcohol.⁹ For this reason, off-licence outlets will tend to locate in areas with a high population density, where demand is consequently higher. Further, as they are unable to effectively differentiate the products they sell from those of their competitors, they differentiate themselves spatially by locating as far as possible away from the nearest competing liquor outlet. This reduces competition, increasing prices and profits (Netz and Taylor, 2002; Picone et al., 2009).

Furthermore, the international literature has found some evidence that there is little difference in alcohol consumption between the most deprived and least deprived sectors of the population (Ecob and Macintyre, 2000; Rice et al., 1998; Scribner et al., 2000) or that the incidence of heavy drinking (an indicator of alcohol demand) is highest among the least deprived (Pollack et al., 2005), although alcohol outlets tend to locate in areas of relative deprivation (Pollack et al., 2005; Bluthenthal et al., 2008; Pearce et al., 2008).¹⁰ This difference between the spatial density of off-licence liquor outlets and spatial demand for alcohol can be explained by differences in the price elasticity of demand between the least deprived and most deprived sectors of the population. Those who are least deprived are likely to have better access to transport, and are therefore more able to 'shop around' for alcohol and thereby have a relatively elastic demand for alcohol from any given outlet. Those who are relatively deprived may have poorer access to transport and so purchase from the nearest outlet, and

⁸ We exclude clubs and 'other off-licence outlets' (gift stores, florists, specialty stores and vineyards), which will tend to locate in certain areas in response to demand for their other activities rather than demand for alcohol per se.

⁹ The real total cost of alcohol includes not only the cost of the alcohol itself, but the cost of the travel and time involved to obtain the alcohol.

¹⁰ Also, Hay et al. (2007) found a significant relationship between higher on-licence outlet density and higher relative deprivation, which held for urban but not rural areas in New Zealand.

therefore have a relatively inelastic demand for alcohol from that outlet. Where there is little competition, relatively inelastic demand leads to higher prices and higher profits, thereby encouraging more outlets to sell alcohol in those areas. This would lead to more off-licence outlets locating in relatively deprived areas, despite alcohol consumption being highest amongst the relatively advantaged.

The relationships observed in this report generally confirm these initial expectations. There is a clear tendency amongst on-licence outlets to locate close to the main town centres in Manukau City. In particular there is a large cluster of on-licence outlets located in the Manukau City centre (refer Figure 2). Off-licence outlets are more dispersed throughout the City, consistent with a desire to avoid excess competition between outlets. Also, more off-licence outlets are located in the most densely populated areas of the City, where demand for alcohol is likely to be higher. Our findings (specifically Figure 3 and Figure 4) also demonstrate that off-licence outlets in Manukau City are more likely to be located in areas of relative deprivation, consistent with the explanation above.

Finally, areas that have a more competitive local market for alcohol (i.e. a higher density of liquor outlets) are likely to have lower prices, as liquor stores compete for customers (Clemenz and Gugler, 2006). Furthermore, stores may also employ non-price competition, such as increasing the intensity of their advertising or increasing operating hours, in order to attract customers. In Manukau City, lower prices were observed in areas with a higher density of liquor outlets, consistent with expectations. While this report does not include data on advertising intensity, qualitative reports suggest that advertising in Manukau City is intense in some areas, particularly in areas of high relative deprivation (McNeill et al., 2012). Longer opening hours and later closing times on Friday and Saturday also appeared to be observed in areas with a larger number of off-licence liquor outlets, consistent with expectations.

5 CONCLUSION

This report has described the spatial and other characteristics of liquor outlets in Manukau City in January 2009. Several key results were found relating to the characteristics of alcohol sales in Manukau City. First, on-licence outlets are most dense in areas with good transport links, such as town centres, and in areas with high amenity value. This is because these outlets cater to consumers who are looking for a destination at which to drink, or where drinking is incidental to some other activity such as a meal. Second, off-licence outlet density is related to population density, i.e. a higher population density is associated with a higher density of off-licence outlets, and to relative deprivation, i.e. higher relative deprivation is associated with a higher density of off-licence outlets. Further, off-licence outlets are not typically gathered together in clusters. Rather they are distributed throughout the area in order to reduce local competition. Finally, price and availability of alcohol at off-licence outlets are related to off-licence outlet density. Areas with a higher density of off-licence outlets have higher competition among those outlets, leading to lower prices, longer operating hours and later weekend closing times. Future research into the relationship between liquor outlet density and alcohol-related harms should take account of both the causes and consequences of liquor outlet density, as well as the association between liquor outlet density and other measures of availability, such as opening hours.

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APPENDIX 1: ADDITIONAL MAPS

Figure A1: Liquor outlets in Manukau City, 31 January 2009 and population density

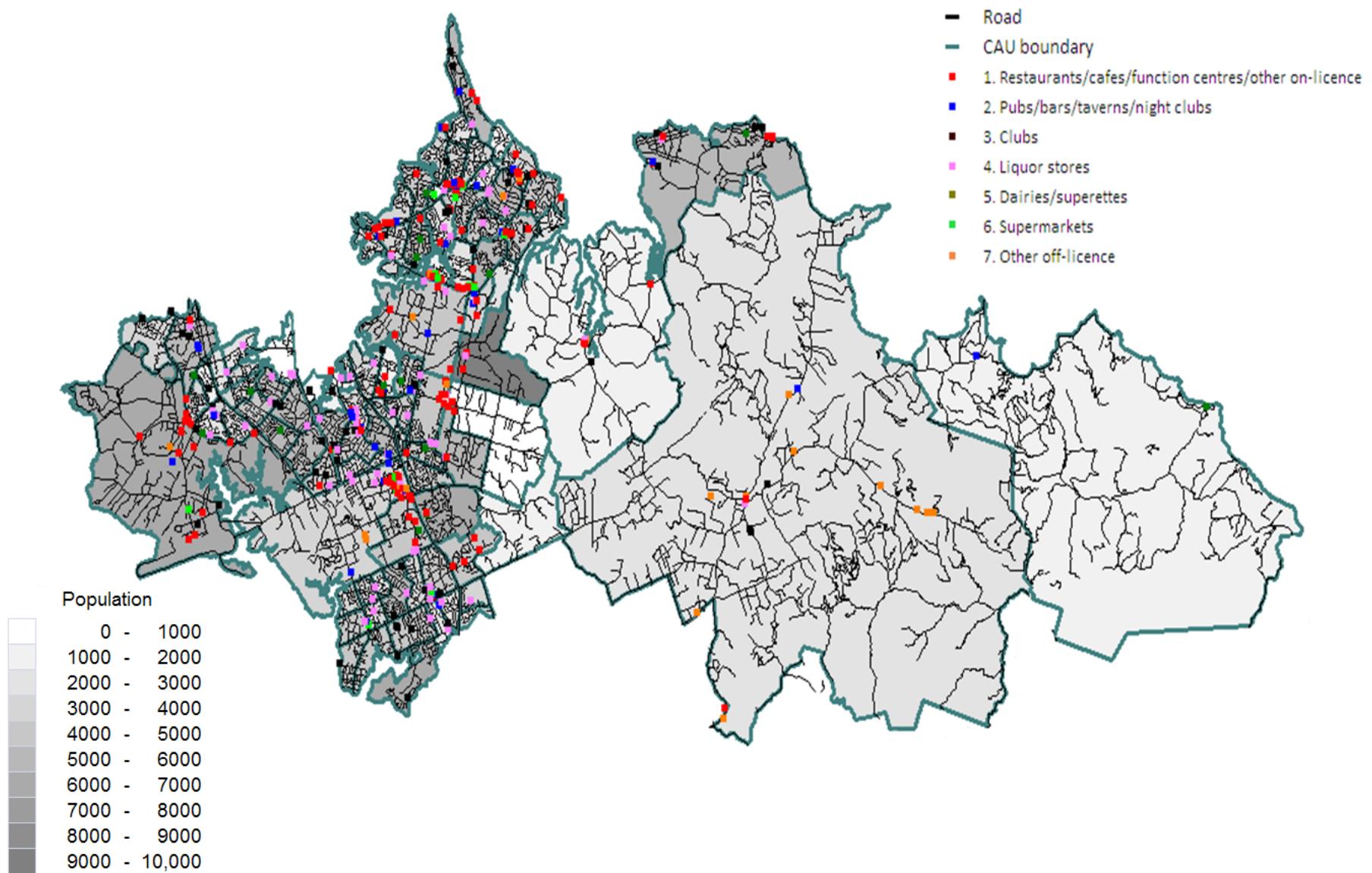


Figure A2: Licensed restaurants/cafes/function centres and other on-licence outlets in Manukau City, 31 January 2009

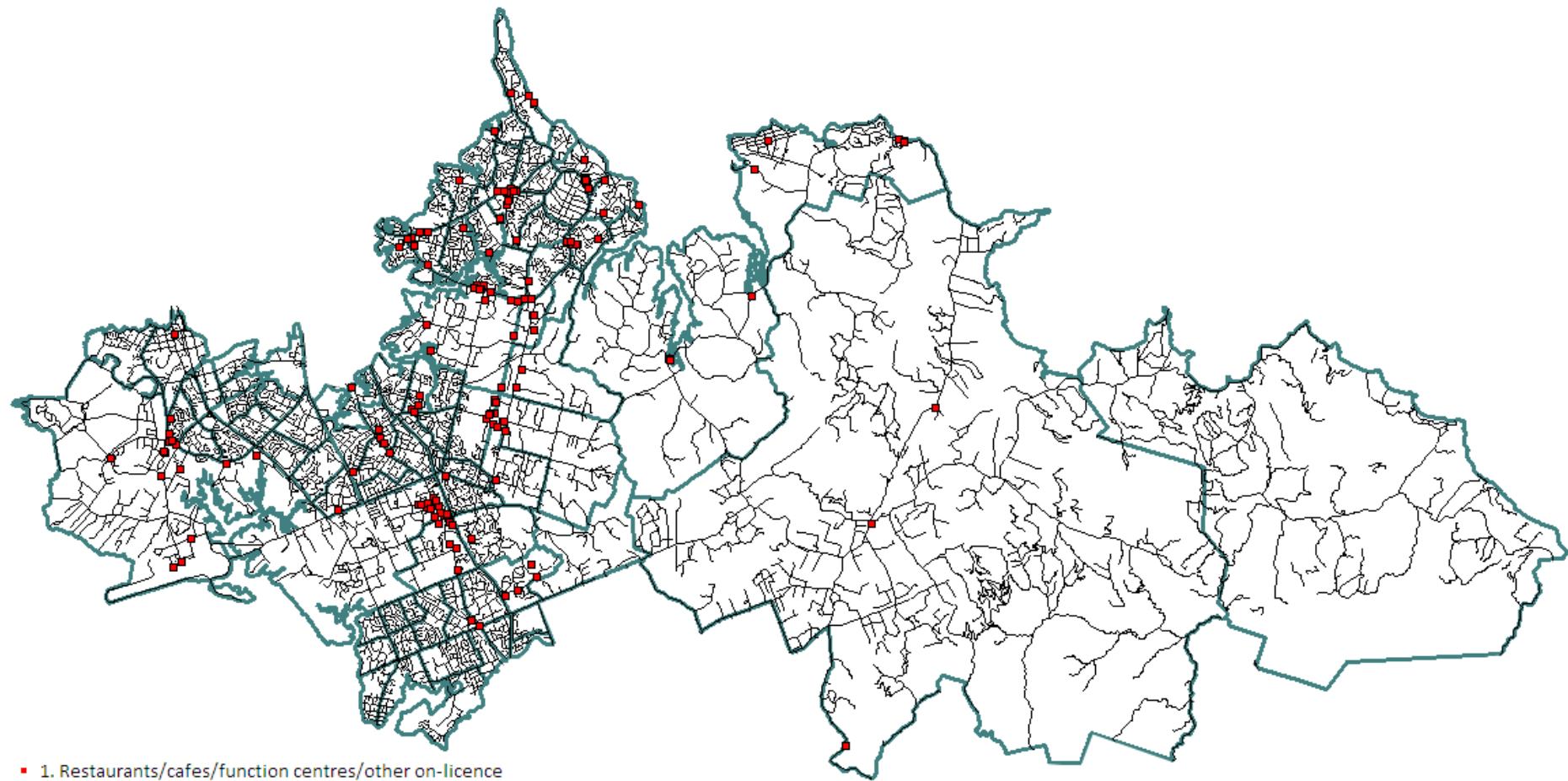


Figure A3: Pubs/Bars/Taverns/Night clubs in Manukau City, 31 January 2009

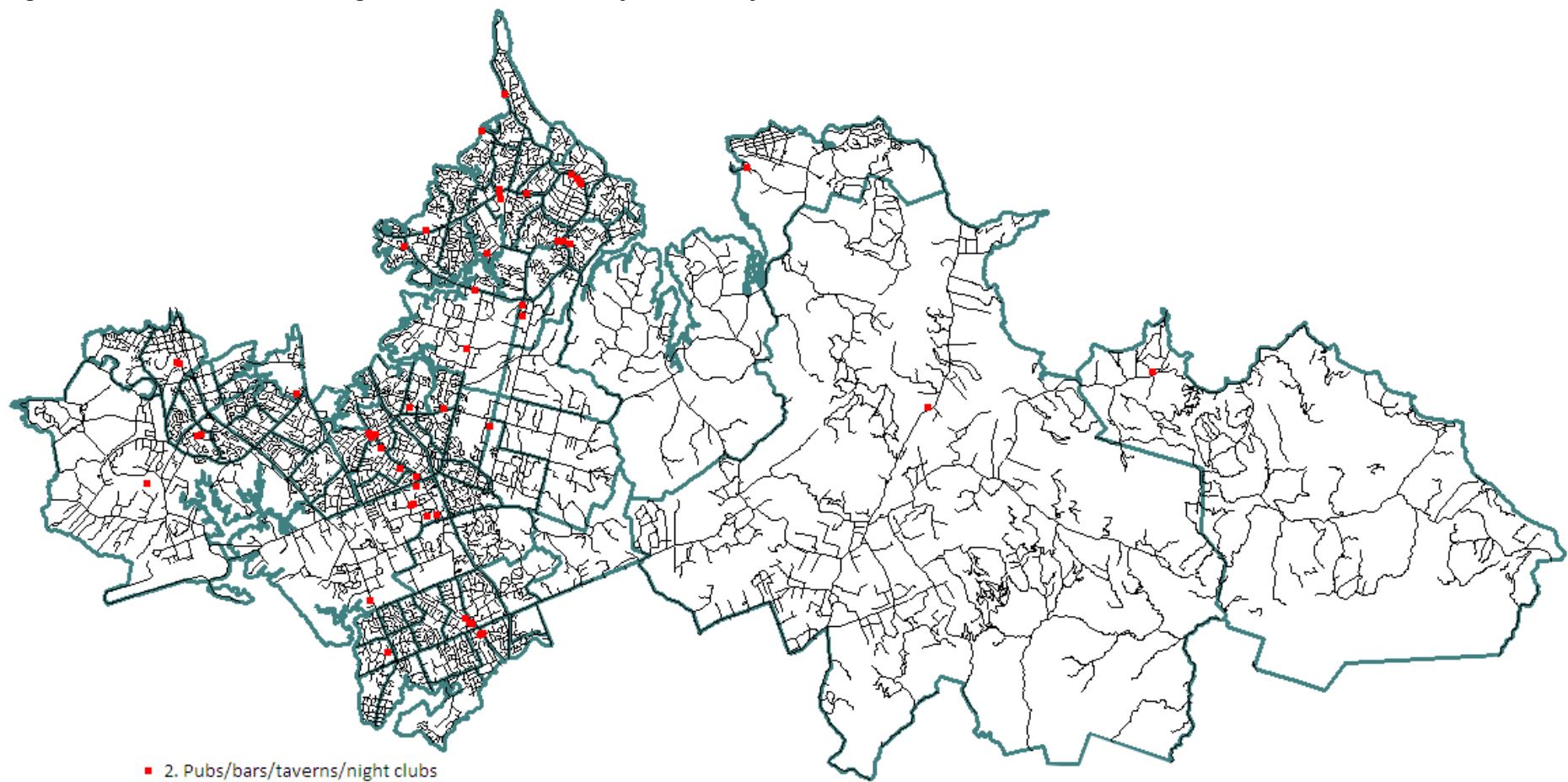


Figure A4: Licensed clubs in Manukau City, 31 January 2009

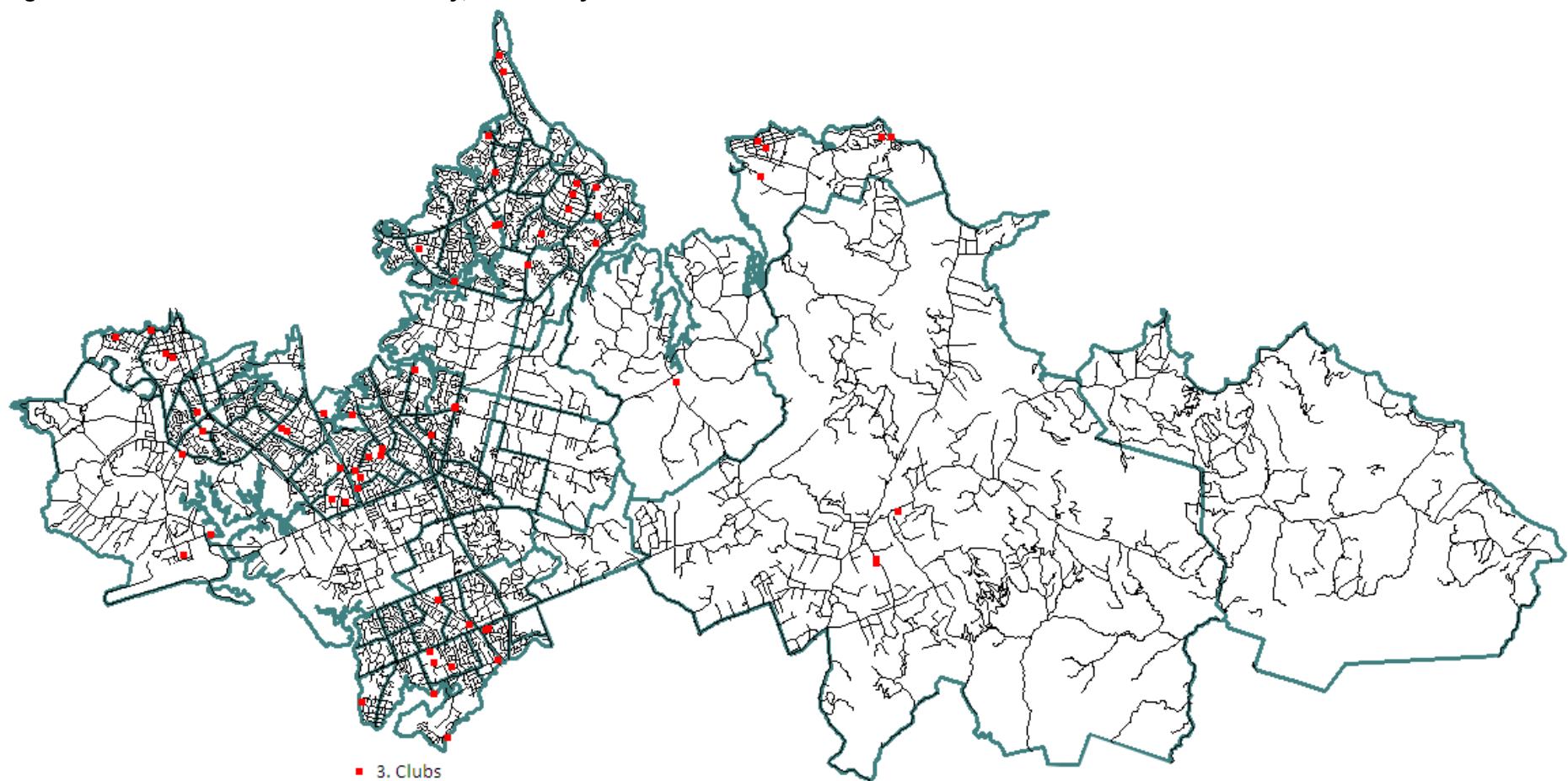


Figure A5: Liquor stores in Manukau City, 31 January 2009

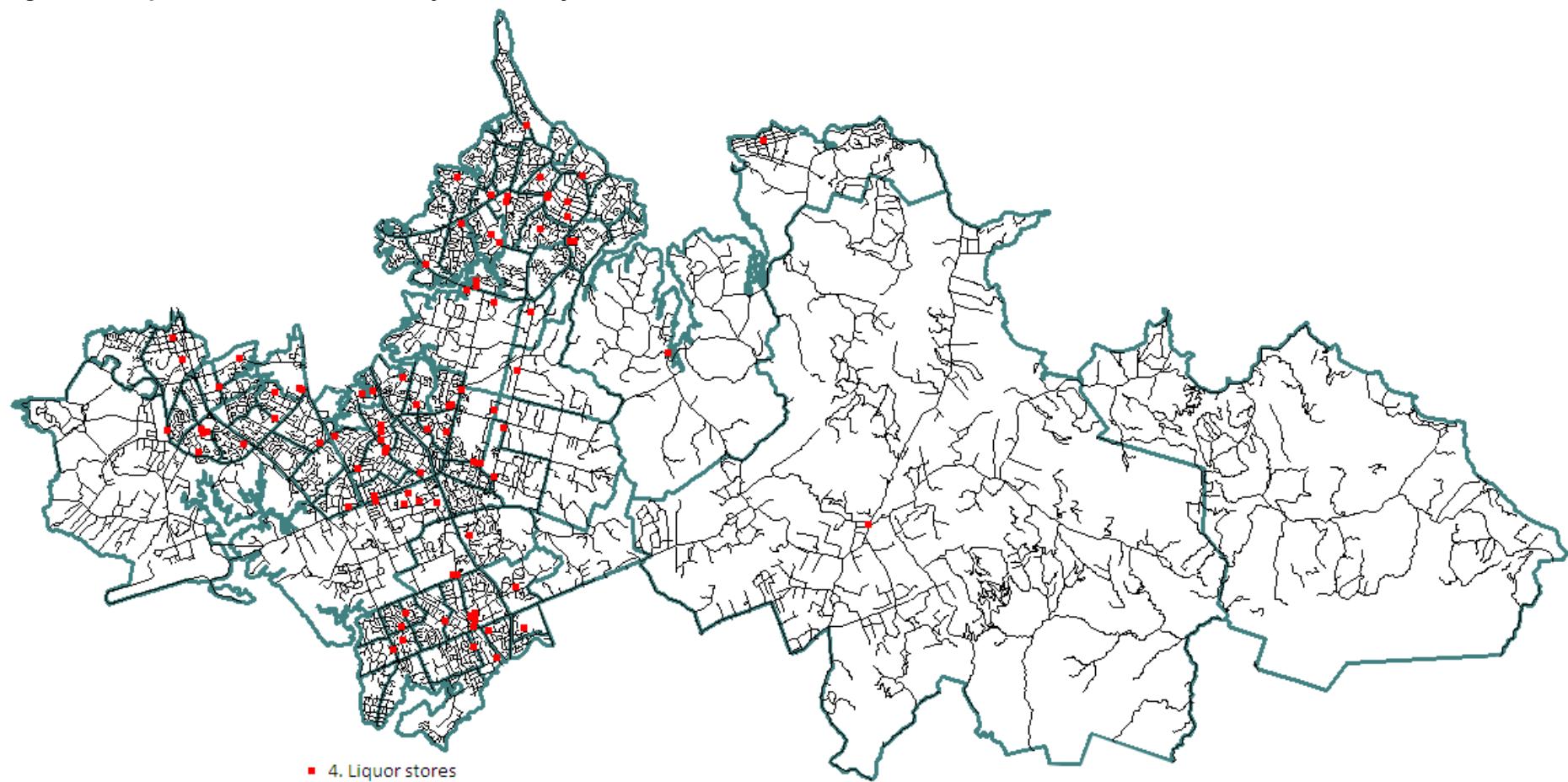


Figure A6: Licensed dairies and superettes in Manukau City, 31 January 2009

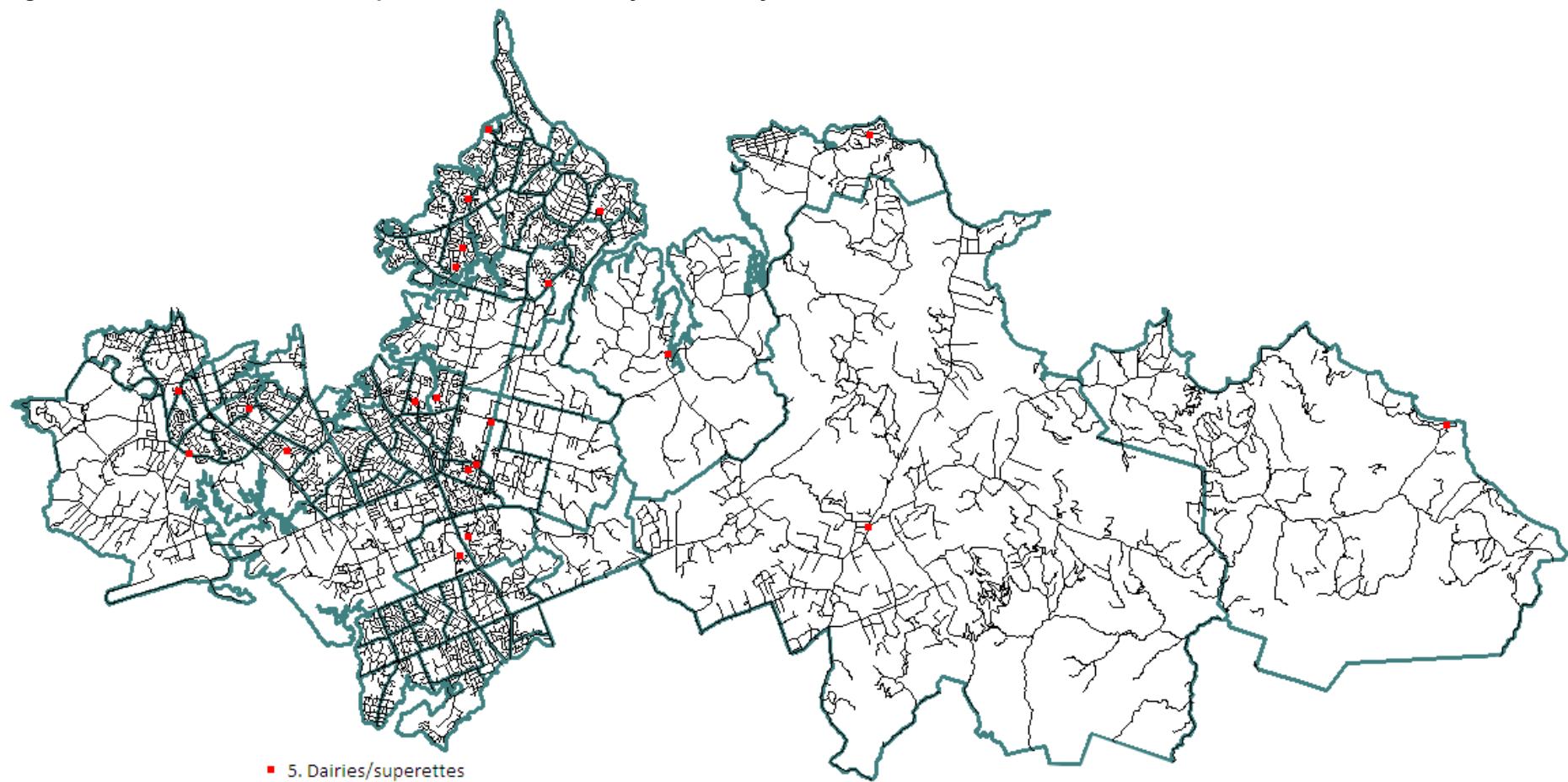


Figure A7: Licensed supermarkets in Manukau City, 31 January 2009

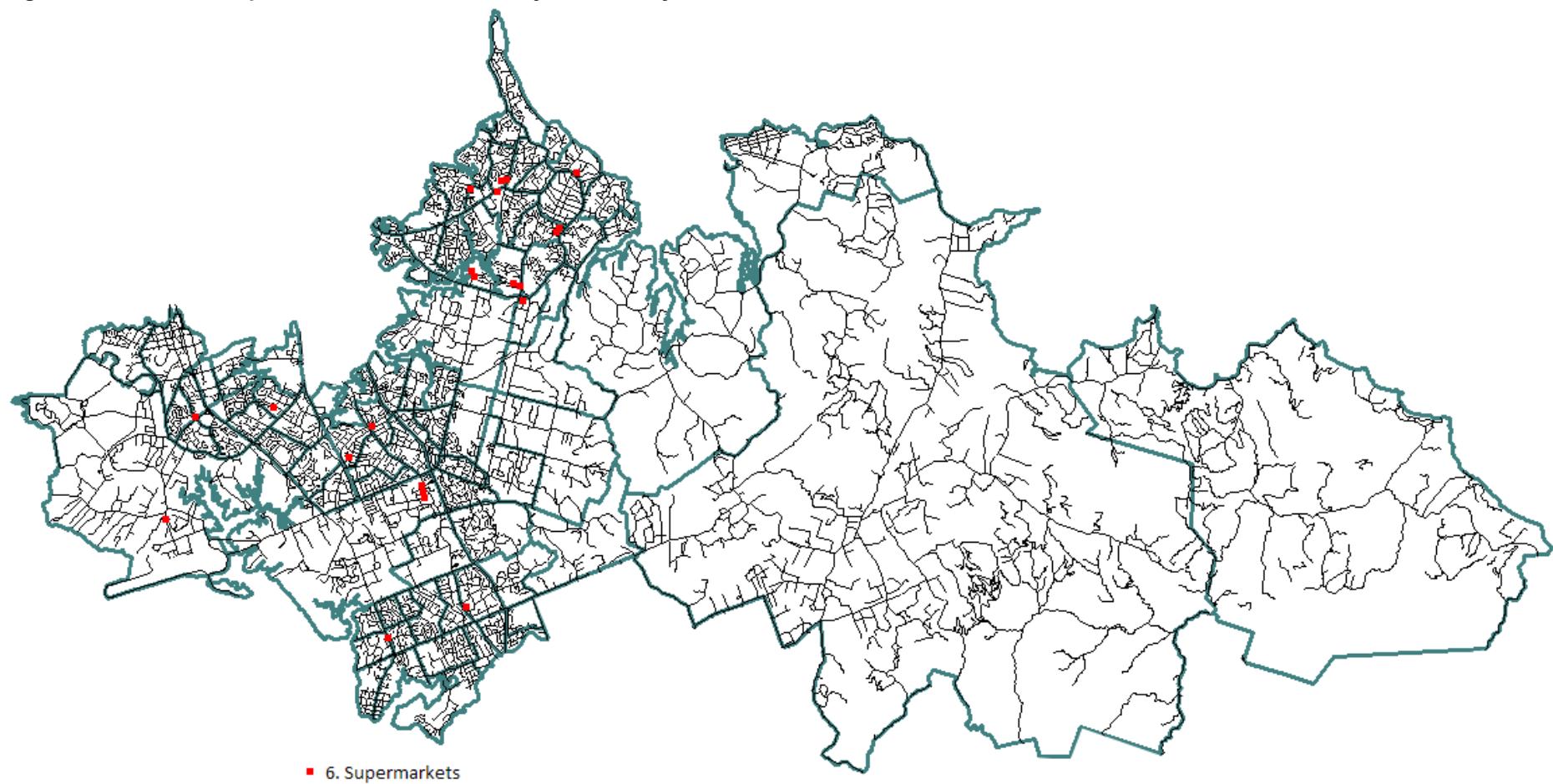


Figure A8: Other off-licence outlets in Manukau City, 31 January 2009

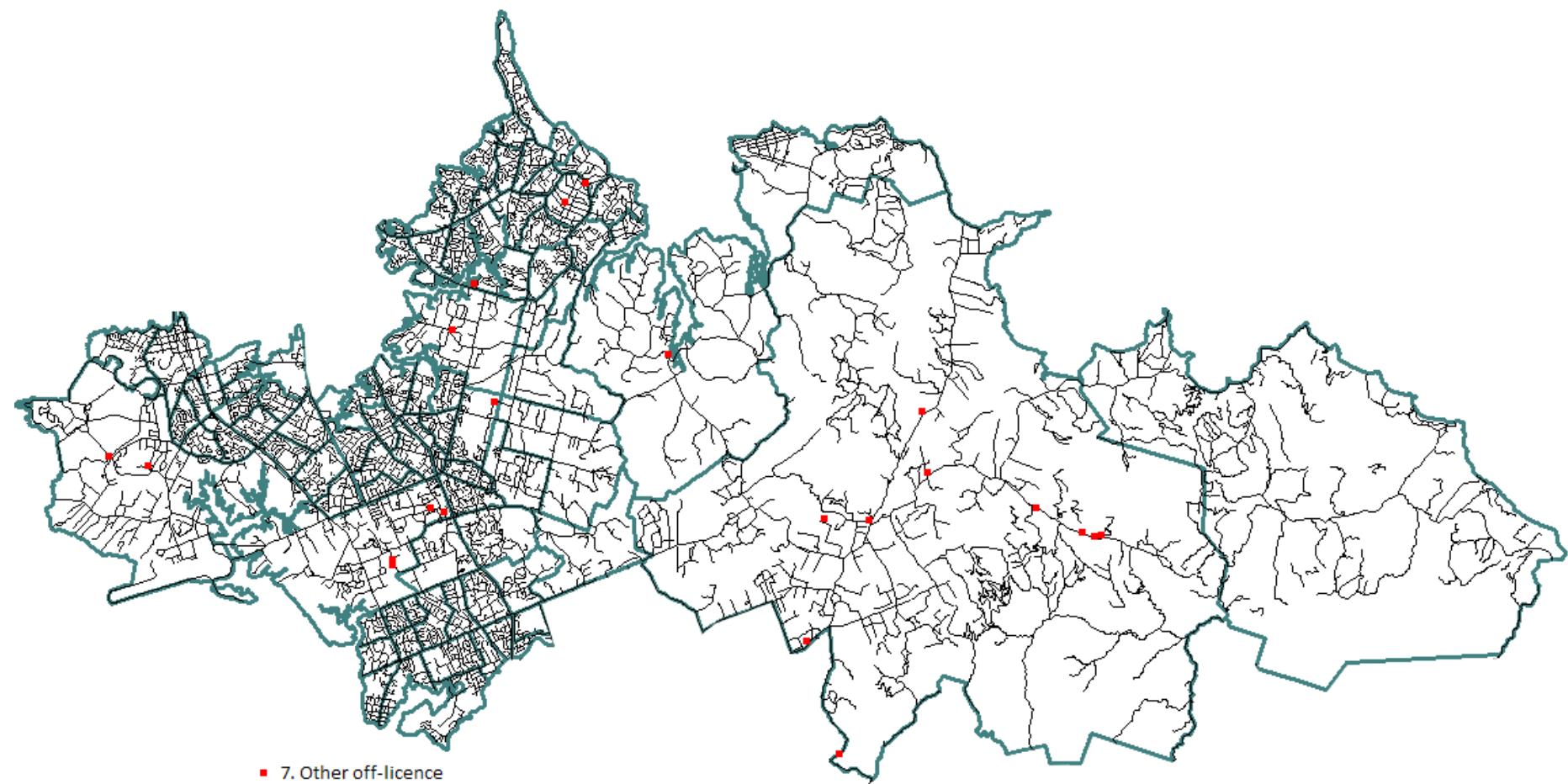


Figure A9: Liquor outlets in Manukau City, 31 January 2009 and deprivation

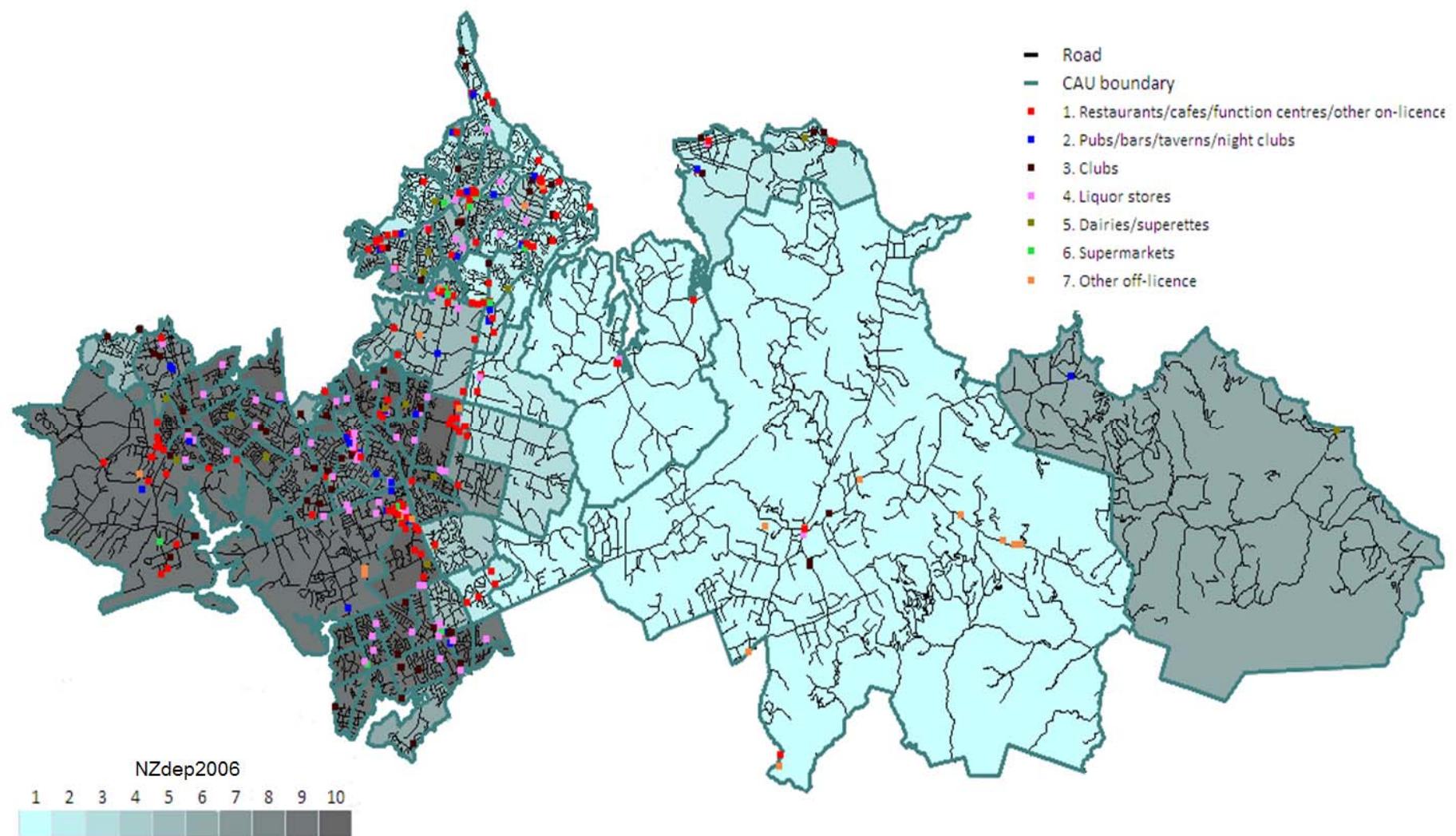


Figure A10: Density of liquor outlets in Manukau City per 10,000 population

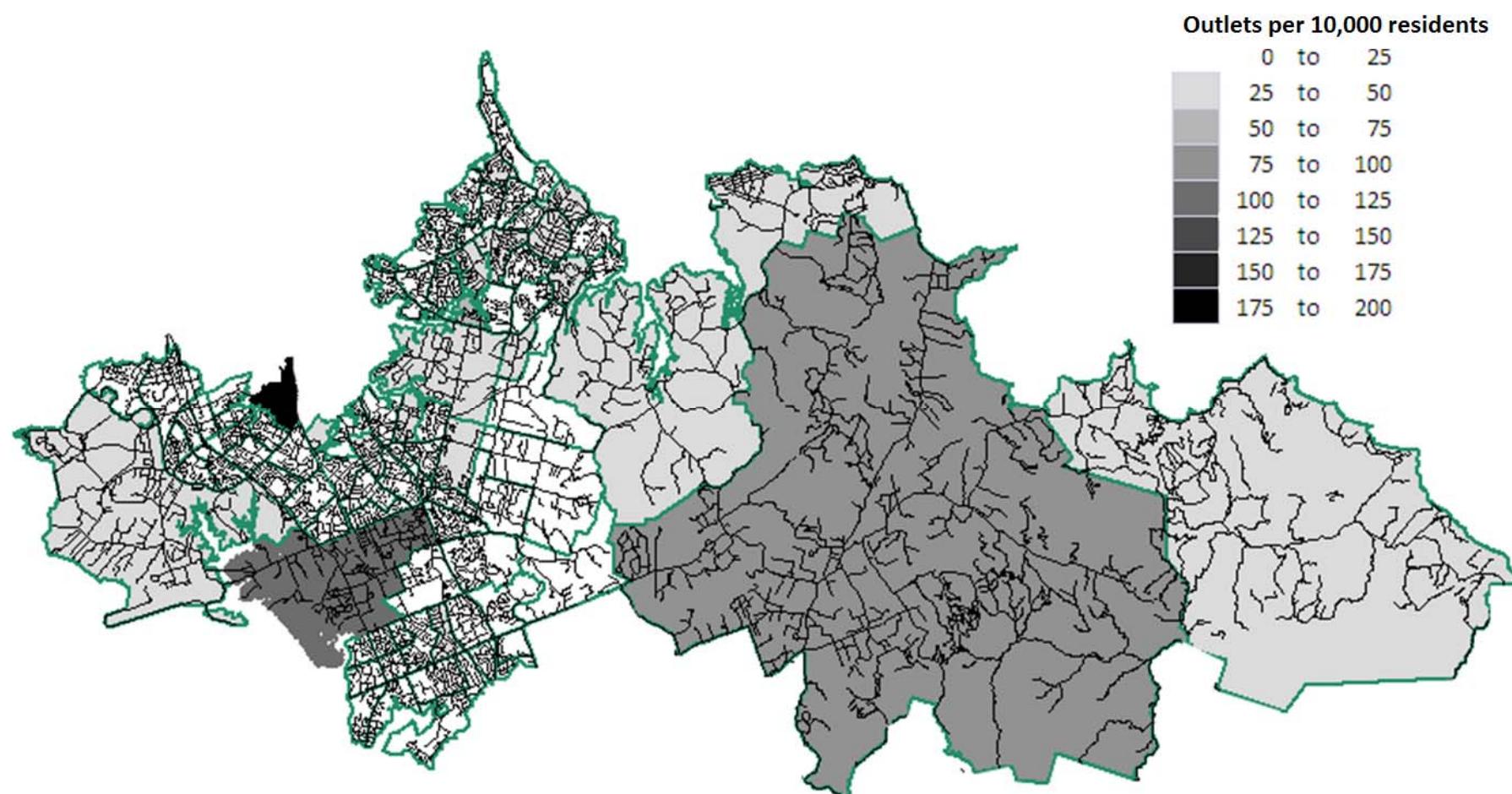


Figure A11: Density of off-licence liquor outlets in Manukau City per 10,000 population

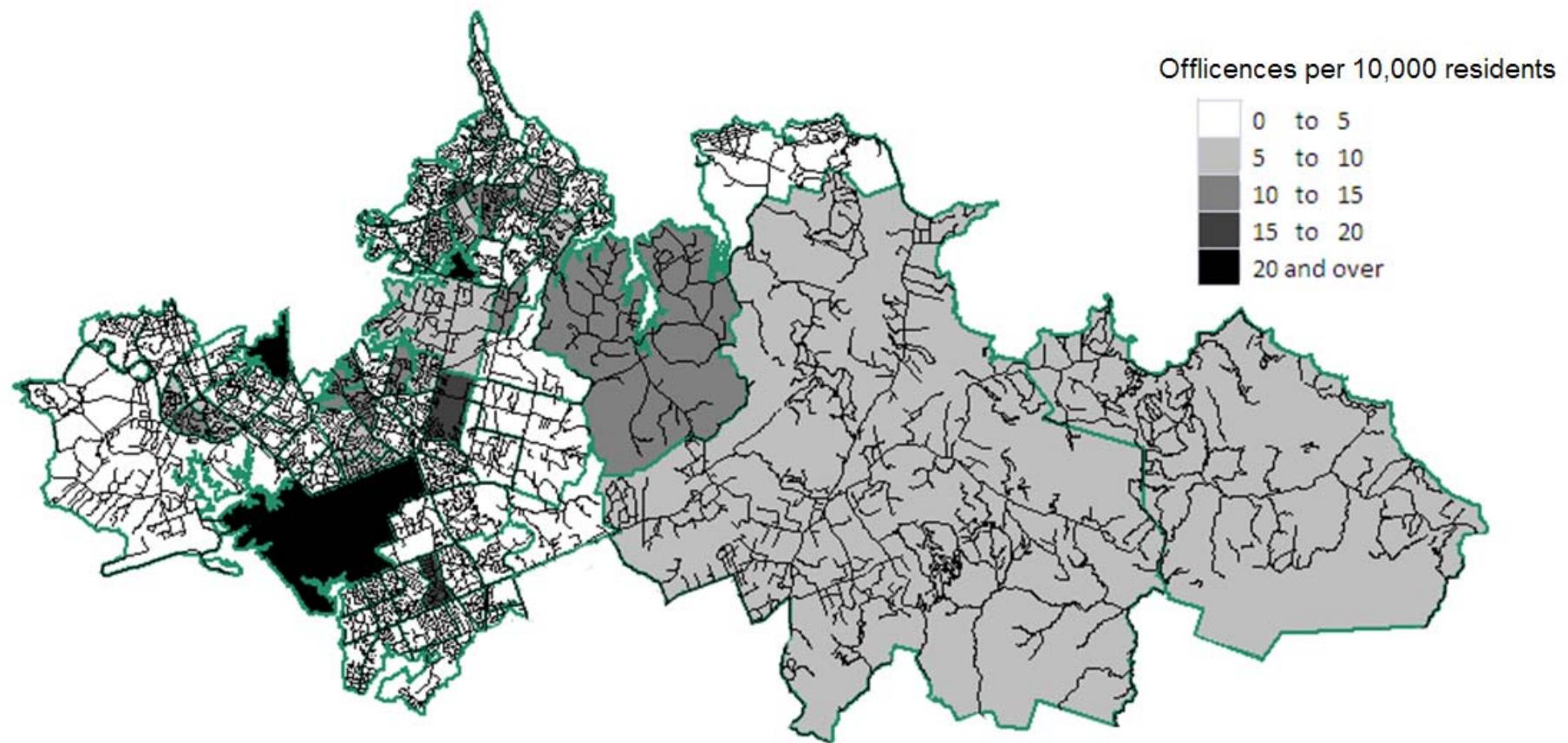


Figure A12: Density of liquor outlets in Manukau City per square kilometre

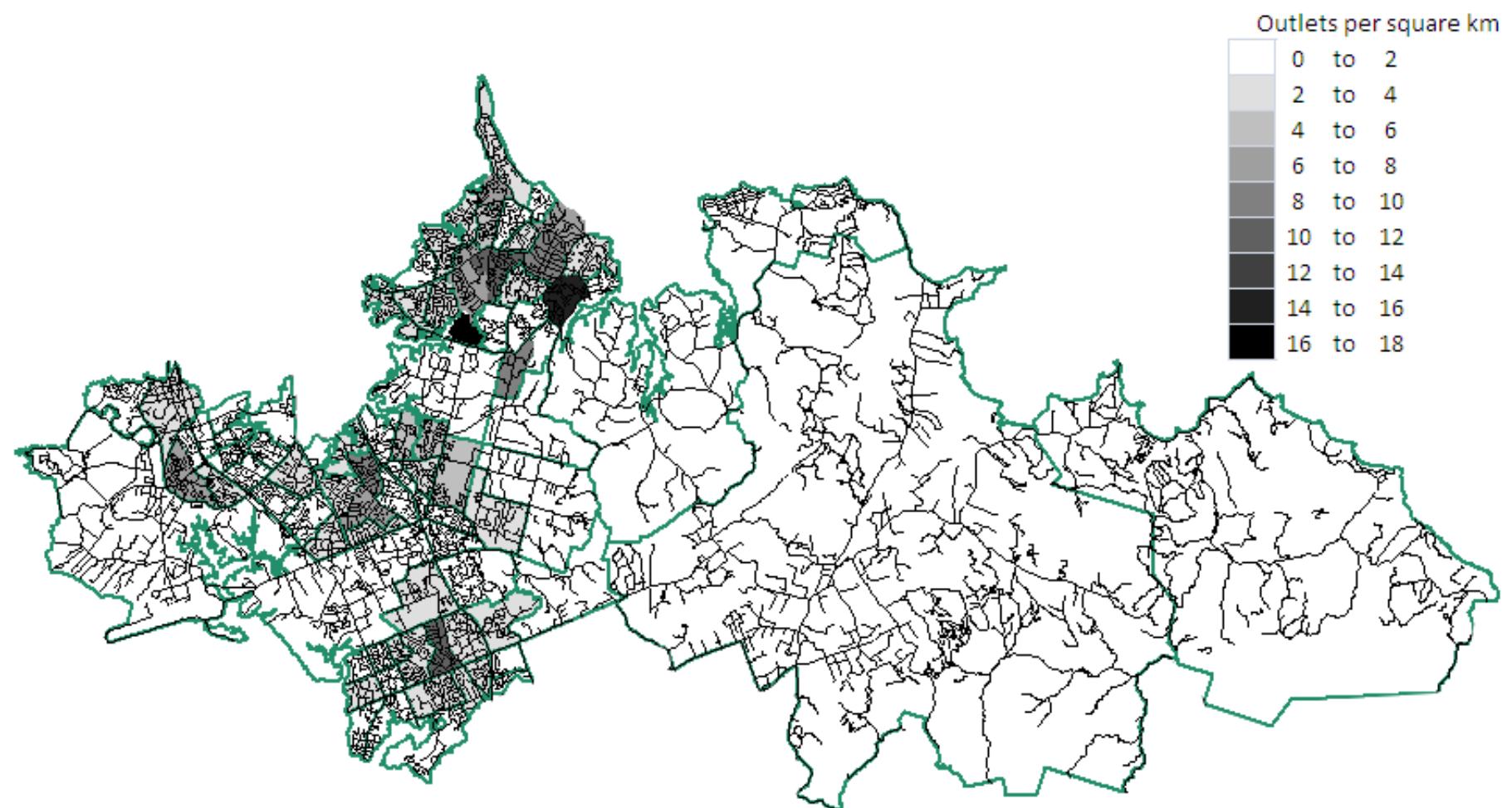


Figure A13: Density of off-licence liquor outlets in Manukau City per square kilometre

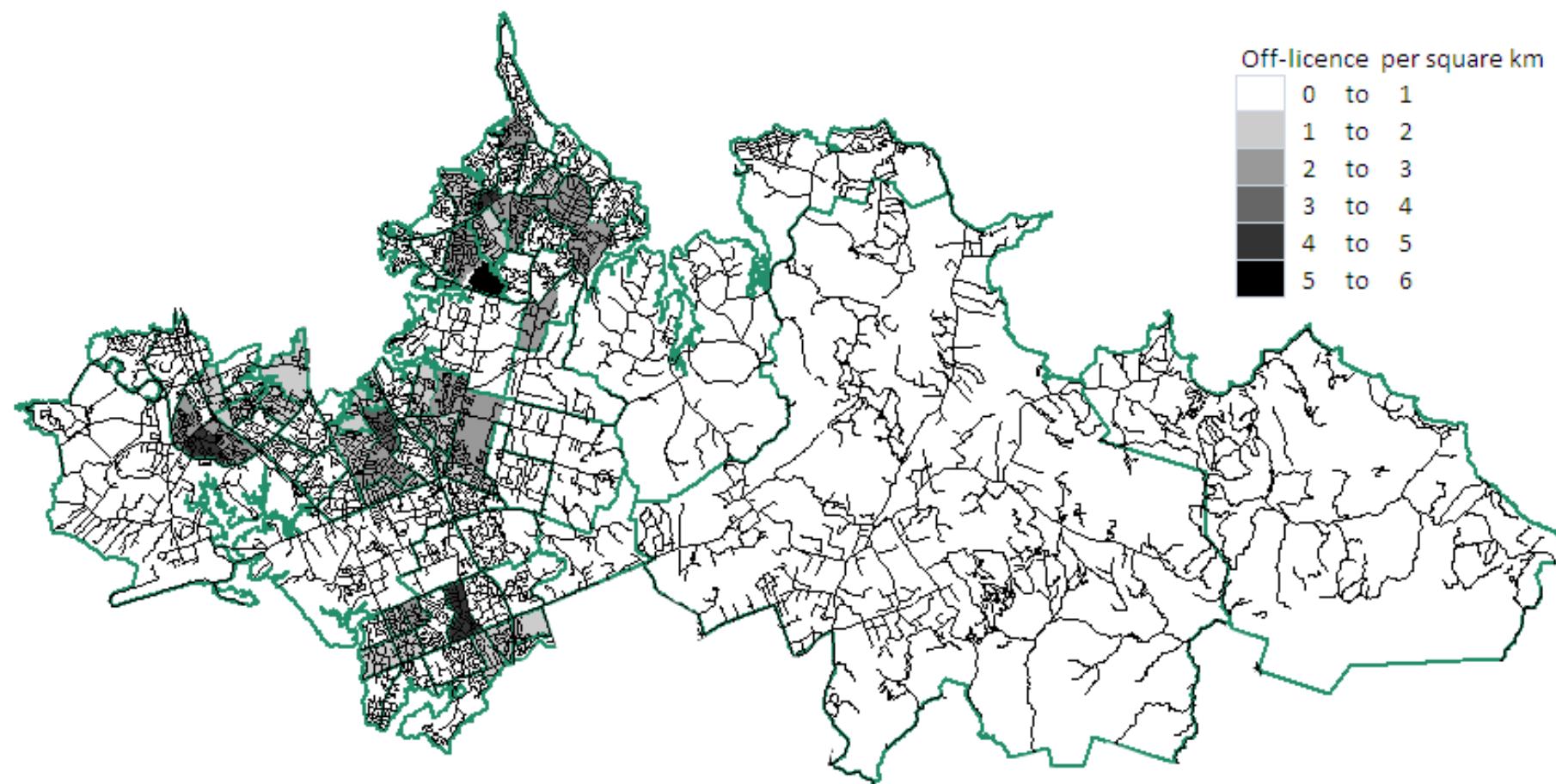


Figure A14: Alcohol price index, by CAU

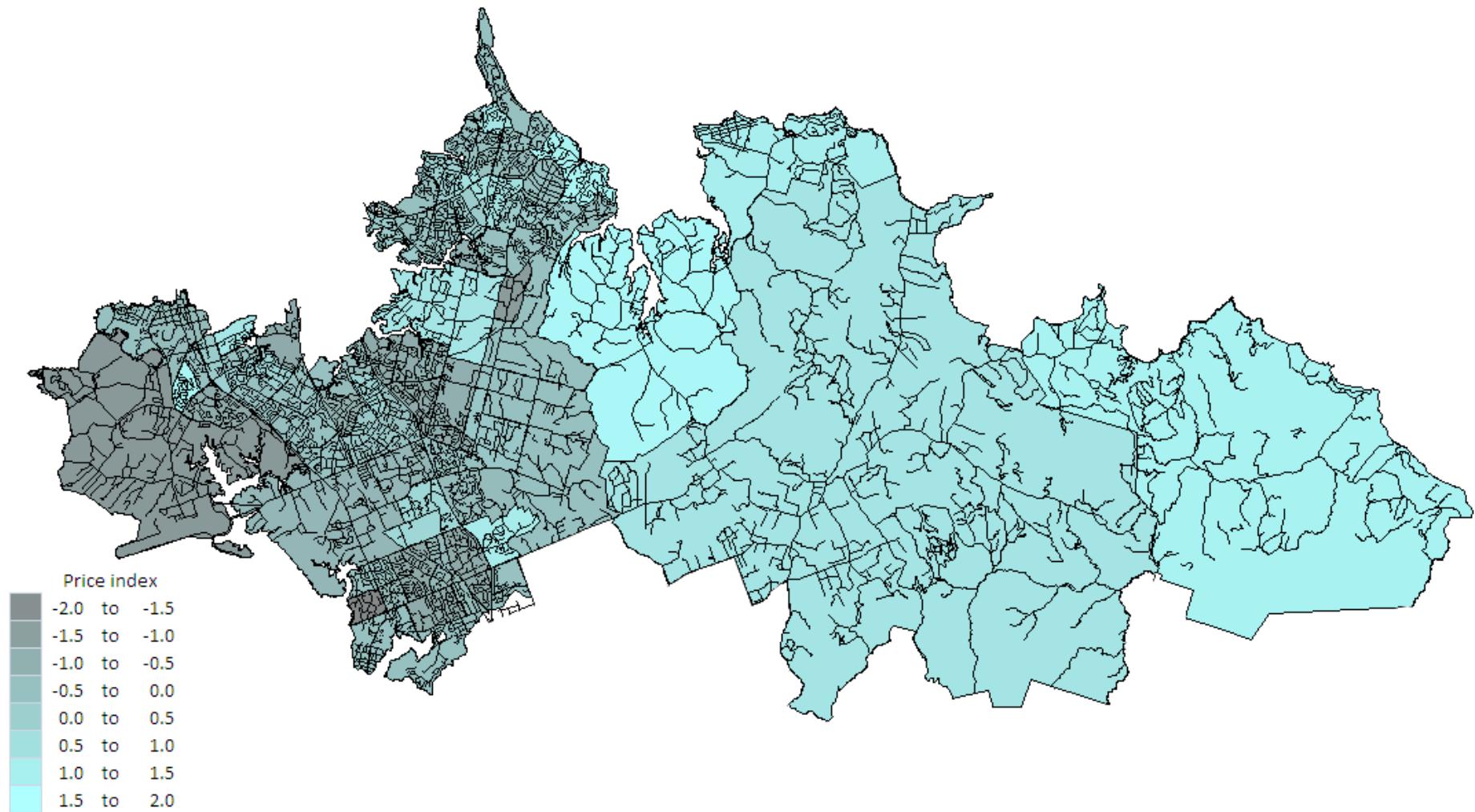


Figure A15: Average total opening hours per off-licence outlet per week, by CAU

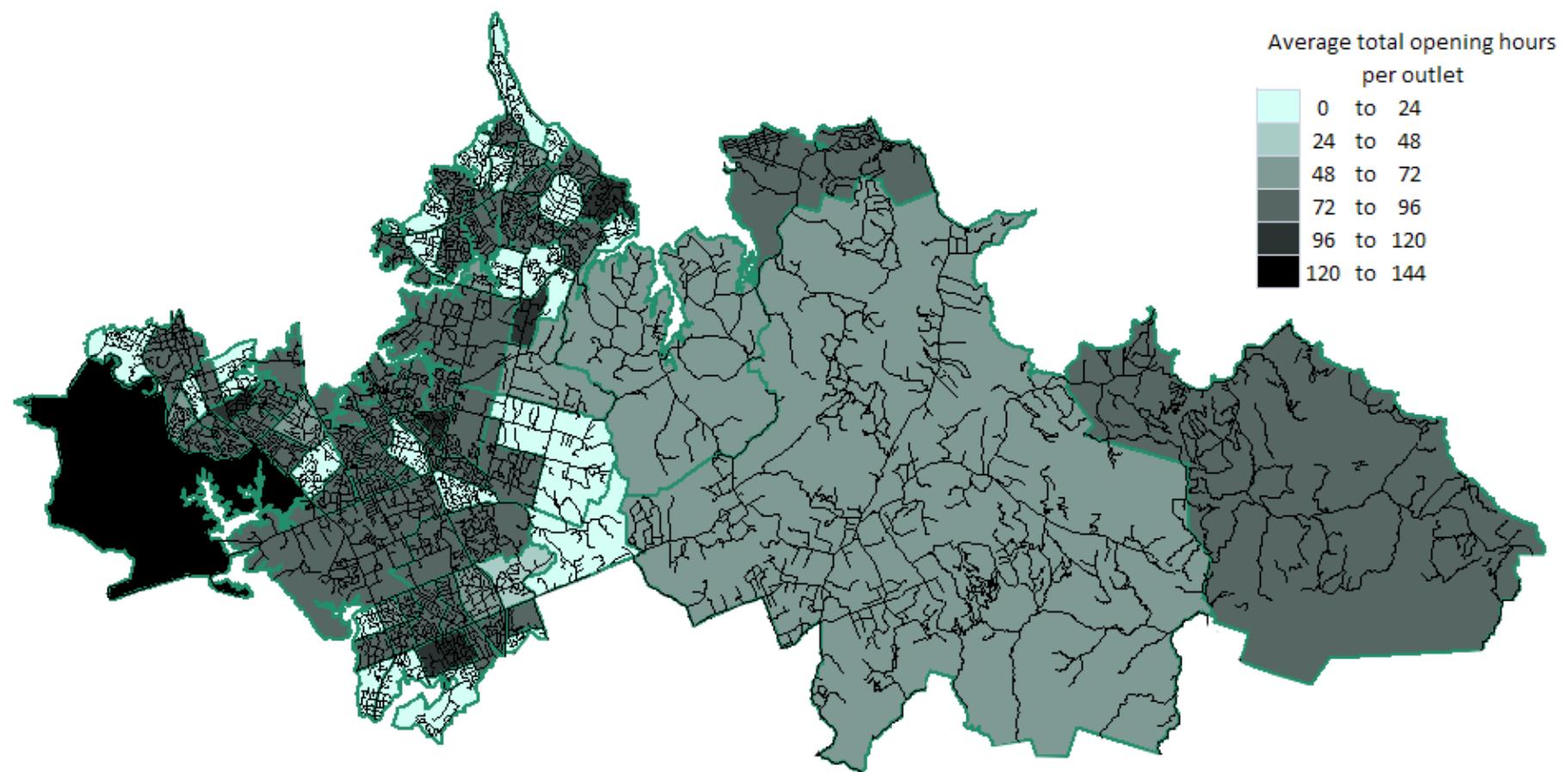


Figure A16: Average Friday and Saturday night closing time for off-licence outlets, by CAU

