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Practical challenges to increasing urban density[1]

Working paper

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In recent years, planning has made a policy commitment to compact development. Many Canadian cities have adopted policies that promote urban and suburban intensification. In this paper we reflect on the theory and practice of increasing densities in the Canadian context. We begin by reviewing the arguments for greater density, and then discuss some ways that Canadian cities have responded. We then analyse development practices in a mid-sized city to determine the effects of theoretical consensus on urban development densities. We conclude that although planners share a high degree of agreement about the importance of increasing density for efficient and sustainable development, many communities have yet to show significant success in meeting density targets.

A short history of density

Modern town planning takes as one of its core principles that sprawl is wasteful. Concern with controlling the endless growth of the city has a long lineage. As early as 1580, Queen Elizabeth sought to limit the spread of London into the countryside by establishing a three-mile green belt (Morris, 1994). Builders ignored the edict; London continued to grow. In the 1890s, Ebenezer Howard (1902) developed his garden city model to contain the sprawling industrial city: he proposed new satellite cities through the countryside to allow residents to enjoy the best of both town and country. Modern town planning continues to worry about the sprawling city (Duany et al., 2000).

Despite the popularity of garden city planning principles in the 20th century, rapid population growth, rising affluence, and industrial expansion facilitated urban sprawl. Wider access to home ownership and automobiles exacerbated the issue in North America as people rushed to the suburbs. The American dream meant a single house on a private lot, with room for the children to play, and a car in front (Hayden, 1984; Kunstler, 1993; Perin, 1977).

Jane Jacobs' (1961) critique of the modernist city initiated a process of reconsidering the American Dream as a premise for creating planning principles. Although lot sizes increased through the post-war period, planners continued to follow a rational planning model that argued for land use efficiency in infrastructure planning (Hodge, 2003; Kaiser et al., 1995). Jacobs drew planners' and politicians' attention to the inconsistencies between what they sought and what plans delivered (Breheny, 1996). She argued that compact form, as in the dense cores of older cities, offers vibrancy and vitality unavailable in the suburbs. Her book became a best seller and altered conventional planning wisdom.

By the 1970s, we see that Raymond Unwin's (1912) rallying maxim, 'nothing gained by

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overcrowding', gave way to new interest in the compact city. Decentralised solutions yielded to centrist views (Breheny, 1996). Planners began to recognise the costs of sprawl (RERC, 1974), and consider ways to increase suburban densities to levels that might reduce infrastructure costs, optimise service provision, and maintain transit viability. The energy crisis reinforced concern about sprawl in the age of the automobile and rapid growth (Meadows, 1974).

Canadian plans began to acknowledge an intensified interest in compact form during the 1980s, thus reflecting international trends in planning theory. For example, the Calgary *General Municipal Plan* of 1983 indicated its intent to ' raise the efficiency to which residential land is used. Essentially this means higher residential densities must be sought than have been normal in the past. ... [It will promote a] Standard design density of 22 persons per acre' (Calgary, 1983, Policy 2.1.11).[2]

> At the same time, however, planners recognised the challenge of increasing densities.
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> Average residential densities in new subdivisions built in recent years are between 15 and 18 p.p.a. The fact that this density falls short of the 22 p.p.a. guideline is due partly to steadily falling occupancy rates, because of the continuing trend towards smaller families, and partly to previous decisions relating to relatively low density development being permitted. (Calgary, 1983, 3.3.50)

While urban plans and land use bylaws continued to set minimum lot sizes and maximum densities (to avoid over-crowding and to reflect servicing limits), many Canadian municipalities also developed target densities for suburban areas. Some established development boundaries in the 1970s and 1980s to define servicing districts for urban growth.

The theory of density

Through the last two decades, interest in and commitment to, compact urban form has increased significantly within planning theory. The dominant paradigms of the late twentieth century affirm the importance of compact development for economic, environmental, and social reasons (Churchman, 1999; McLaren, 1992). First, compact forms facilitate walking, cycling, and transit use (Newman and Kenworthy, 1996). Second, by reducing land consumption, they render housing more affordable (Friedman, 1994). Third, they promote vibrant, mixed communities engaged in social interaction and economic growth (Glaeser, 2000; Van der Ryn and Calthorpe, 1986). Fourth, by building in smaller districts, they conserve more open space (Arendt, 1996; Gordon and Tamminga, 2002; Duany et al., 2000).

These premises underlay several theories that have influenced perceptions of good urban form in the last several decades. In the late 1980s, the 'healthy communities' movement promoted compact urban form and mixed use. Its proponents suggested that increased densities could improve health by making it possible for people to walk or cycle to activities in a safe community (Hancock, 1987; Hendler, 1989).

Sustainable development gained popularity in the early 1990s after the release of the Brundtland report (WCED, 1987). While the literature reflected a range of opinions on the role of urban form in promoting sustainable development (eg, Breheny, 1992; Calthorpe, 1993; Grant et al., 1996; Owens, 1991), by the late 1990s many planners saw compact form as preferable to

[2]We have given most information in the paper in imperial measures. Although Canada is officially metric, feet and acres are commonly used for discussing lot size and density. For purposes of conversion, one foot is equal to 0.3048 metres; one square foot equals 0.0929 square metres; one acre is 0.4047 hectares. Longer distances are more commonly measured in kilometres: one mile is 1.609 kilometres.

sprawl. Certainly, politicians and planners in Europe embraced the compact city as a means to sustainability (de Roo and Miller, 2000; Jenks et al., 1996).

As new urbanism became increasingly influential in North America, it reinforced a commitment to compact development. Both transit-oriented development (Calthorpe, 1993) and neo-traditional neighbourhood design advocate greater densities for land use efficiency and urban vitality (Duany and Plater-Zyberk, 1991; Duany et al., 2000; New Urban Publications 2001). Compact form became one of the key principles promoted in the Charter for the New Urbanism (CNU 2000).

By the late 1990s, smart growth created a significant political movement in the US. Designed as a strategy to respond to rapid growth and traffic congestion, smart growth built on the key principles of new urbanism and used the language of sustainability. Its proponents advocated greater densities, especially in association with transit-oriented development, for avoiding sprawl (Ewing, 1996; Gosling, 2001; O'Neil, 2000).

Some cities applied urban growth boundaries to force intensification within the urban envelope (Miller, 2000). As Lassar (2001) notes, the growth boundary increased the proportion of multifamily housing in Portland, Oregon, and expanded supply of apartments in Seattle, Washington. Bae (forthcoming) argues, however, that the growth boundary in Portland had the effect of shifting growth across the state border into neighbouring counties in Washington State; in some cases, then, efforts to increase densities may inadvertently stimulate greater sprawl.

The rhetoric of increasing densities in the American context reveals the challenge of intensification. Despite claims about the importance of compact form, many smart growth programs set modest targets. For instance, Maryland's density target for state programs is only 3.5 units per acre (Frece, 2001). By most calculations, that remains extraordinarily low. While Unwin (1912) considered 12 units per acre a viable upper range for the low density garden city, the 'smart city' suggests less than a third of that density.

The European Community has been a strong proponent of the compact city (CEC, 1990; Fulford, 1996; Jenks et al., 1996). Its vision of the future seeks to replicate densities of traditional European city centres, which are several times denser than their North American counterparts. Governments across Europe have adopted intensification in public policy (Blowers, 1993; Williams et al., 1996)

Those who write about the city see high urban densities associated with vibrant urban life and economic vitality, both in the west and in the east (Jacobs, 1961; Shelton, 1999). Certainly areas with high densities have lively reputations, and may attract tourists for their entertainment value. As Jenks et al. (1996, 5) note, however, 'the policies proposed have been based more in theory than in practice, and the arguments are contentious.' That is, while theorists idealise the compact centres of older cities, many urban residents resist high-density areas where they fear the effects of over-crowding, pollution, loss of sunlight, and noise. As Williams et al. (1996) and Tomalty (1997) argue, the benefits of compact form are felt globally (in less land consumed, energy used), but the impacts appear locally (in inconvenience and stress to residents).

The practice of density

While planning theory reflects a growing commitment to higher urban densities as a mark of successful cities, we might ask whether new development is changing to reflect the principle. Are suburban areas reducing lot sizes or increasing the proportion of multi-family housing in the mix? Is infill development sufficient to increase urban densities in central areas? These are important questions for practice. The evidence appears mixed.

In the development industry's journal, *Urban Land*, Fader (2000) argues that density is increasing. Without providing specific data, he identifies a trend to smaller lot sizes, with 25 to 40 foot widths becoming more common. He notes more mixing of lot sizes on the same block, and reduced front setbacks from the street. The proportion of multi-family units is increasing, and accessory units are appearing to offer new options. 'Although the housing industry is notably decentralised and slow to change, there is a clear movement toward increasing residential development densities' (Fader, 2000, 112). Dalby (2001) identifies similar trends in Australia.

Is intensification happening in Canada? Canadian cities have been described as denser than their American counterparts (Edmonston et al., 1985; Goldberg and Mercer, 1986), but they are far less dense than cities in Europe or Asia. Bourne (2001, 26) notes that the traditional definition of sprawl refers to suburban development that is 'haphazard, disorganised, poorly serviced, and largely unplanned.' By this rather strict standard, urban Canada has relatively little sprawl. A legacy of large municipal units, strong urban planning, and increasing monopolisation of suburban land by a few development interests have contributed to suburban development that is more compact than its American counterpart (Bunting et al., 2002; Hodge, 2003; Sewell, 1977).

In the late 1980s and early 1990s, interest in intensification increased in Canada (Isin and Tomalty, 1993; Tomalty, 1997). Reviewing policy developments, Isin and Tomalty (1993: iii) said that 'the breadth and depth of municipal projects undertaken indicate a significant planning policy shift in how urban land is used in Canada'. They noted that two-thirds of planning officials supported intensification. From 1993-1995, the Urban Institute offered a bi-monthly periodical, *The Intensification Report*, to report on and promote activities to achieve greater density. The compact city became a discussion topic at conferences, often linked to ideas related to healthy communities and sustainable development, and later to new urbanism and smart growth. By the early 1990s, over 40% of municipalities surveyed by Isin and Tomalty (1993) had adopted or were adopting intensification policies, primarily to reduce municipal servicing costs.

Several Canadian provinces cities supported an intensification agenda. The efforts of the largest cities – Toronto, Vancouver, and Montreal – are well-documented (Tomalty 1997). Tomalty argued that these cities have had limited success in achieving their growth management targets. Intensification within neighbourhoods has been more successful in Vancouver than in the other metropolises. Widespread antipathy to greater densities derailed efforts in Toronto to promote transit-oriented development in the early 1990s. Despite the difficulties, however, authorities remain committed to growing up instead of out: the 2003 official plan promotes urban intensification but does not set specific density targets (Toronto, 2003).

Medium-sized cities have also adopted intensification as an appropriate strategy. Isin and Tomalty (1993) discuss initiatives in several communities, including Halifax, Nova Scotia, and Kitchener, Ontario. The Province of Ontario sponsored a competition for a denser suburban project on surplus lands north of Toronto. The winning design for Cornell new town would

house 8.7 units per acre, an increase over 6.0 per acre in an earlier garden city new town, Don Mills (Dowler and Wood-Brunet, 1994). The noted Canadian architect, Avi Friedman (1994), developed narrow-front row housing models to provide affordable and flexible homes at 24 units per acre. Canada Mortgage and Housing Corporation actively promoted intensification through its programs (eg, Baird et al 1993; Kinnis, 1997; Moyes, 1997). By 1998, a suite of organisations, including the Transportation Association of Canada, Federation of Canadian Municipalities, Canadian Institute of Planners, Canadian Institute of Transportation Engineers, and the Canadian Urban Transit Association, had committed to compact form and mixed use as urban strategies (TAC, 1998). The literature on planning in Canada reveals the growing consensus on intensification as one of the first principles of development in the 1990s.

As part of an investigation into the impact of new urbanism and sustainable development on Canadian planning practice, we conducted a study of several Canadian cities in the late 1990s and early 2000s. Our research included interviews with planners, developers, and realtors, visual analysis of new development projects, examination of development records, and content analysis of plans and policy documents. One of our research questions involved intensification. The study focussed on Calgary, Winnipeg, Kitchener-Waterloo, and Halifax Regional Municipality, but also involved some analysis of the Toronto northern fringe. Each of these communities revealed a policy commitment to the principle of compact urban form.

Calgary, Alberta, has experienced considerable growth because of its booming oil-based economy. In 1995, the city adopted a *Sustainable Suburbs Study* and a transportation plan both of which promoted compact development (Calgary, 1995a; 1995b). The 1998 plan targets 6-8 units per acre, essentially the same density promoted in the 1983 plan. With growth tightly controlled by a combination of municipal policy and land ownership patterns, new housing is relatively expensive. This has led lot sizes to decline in recent decades. Some narrow lot subdivisions have houses on 25-foot wide lots, both in the suburbs and in infill projects. As a developer we interviewed noted, the market is driving densities of 7 units per acre in new development.

> Traditional suburban design with a two car garage in front and on smaller lots is what is moving now. People are okay with having less grass to cut, but they like a big house. The smallest lots now are about 25 feet by 110. ... The largest lots in Calgary now are generally in the range of 40 to 48 foot wide by 110. So with those small lots you can get the density that the city wants, but in single-family detached. You don't have to produce multi-family housing to get density of 7 or 8 units per acre. (Calgary developer in interview in 2000)

The northern suburbs of the Toronto fringe demonstrate the pressures of a hot market on land use patterns. In areas like Richmond Hill, single detached houses sit on very small lots 20 to 25 feet wide (Figure 1). In Markham, where the municipality has committed itself to planning principles based on many of the ideas of new urbanism, 35 to 48 feet lots are common. Some streets, especially entry boulevards, have 'wide shallow' lots: these show conventional suburban widths of 50 or 60 feet, but have shallow back yards. The expense of land in a high growth area plays a major role in promoting suburban intensification: 'People are willing to drive a little longer if they can save money on buying a home. ... Price is the key to selling any house.' (Toronto suburban realtor in 2000)

Not all Canadian communities are growing as quickly or experiencing such intensification. Winnipeg, Manitoba, has included a commitment to increasing densities in its urban core since the 1970s. The city has been losing people from its older neighbourhoods for decades. Its population remains essentially stable while suburban areas still grow. Planning staff interviewed acknowledged the difficulty of translating intensification policy into action.

> It is hard to make the compact idea work in Winnipeg. You have to look at the regional context. It's a city that is easy to commute in. People can buy half to two acre lots outside the city and still be at work in 20 or 30 minutes. There is no public demand for small lots here. (Winnipeg planner in 2000)

The city of Kitchener, Ontario, has promoted intensification since the early 1990s (Kitchener, 1991; 1994). Isin and Tomalty (1993) noted that some large-scale projects have experienced success, but smaller initiatives less so. Planners and developers in Kitchener-Waterloo told us that lot sizes are decreasing, with narrow lots of 30 to 40 feet width becoming more common. However, an analysis of census data led Filion et al. (1999) to note that the trend in Kitchener-Waterloo is to car-dependent dispersion; they suggest that, despite growth, the region is unlikely to experience intensification. A local planner indicated the problems in trying to make greater densities happen: 'Council remains supportive of policies related to downtown, but they don't really push compact form. They believe in the principles, but their constituents don't want greater density. Political decisions reflect that.' (Kitchener planner in 2000)

Bunting et al. (2002) found that most Canadian cities are decentralising. They noted, however, that some cities show residual centralisation. In cities like Vancouver, Toronto, and Montreal, areas developed before the era of car domination grew in the central cores after 1971. Moreover, half of the suburban areas in census metropolitan areas over 250,000 people reveal some densification. Cities are growing out, but at slightly increased suburban densities.

In the next section, we examine lot sizes and densities in an area of Halifax Regional Municipality (HRM), Nova Scotia. HRM resulted from the 1996 amalgamation of the cities of Halifax and Dartmouth, the town of Bedford, and the county of Halifax. Several of the constituent municipalities had earlier adopted development boundaries to demarcate areas for suburban development to ensure infrastructure provision and limit sprawl. In 1997, HRM published a report on small lot housing. Interviews and policy analysis we conducted in the municipality revealed a commitment to intensification. Planners saw a trend to smaller lot sizes, but recognised some problems with small lots. One explained:

> The public has found some of the small lot projects pretty tacky. If you build on larger lots, you can leave some trees and people say, 'that looks nice'. If you build on small lots then developers clear everything and people say it's ugly. (Halifax Regional Municipality planner in 2001)

To what extent do recent developments in Halifax Regional Municipality reflect the planners' commitment to a compact urban form?

The lowdown on lot size

With considerable anecdotal information to suggest that lot sizes are decreasing and that smaller lot projects have become more common, we decided to look at data from Halifax Regional Municipality to test the hypothesis that densities are increasing. Churchman (1999) describes the many problems of defining density. Ernest Alexander (1993) noted that lot size is related to density in a complex way. Nonetheless, since population density reflects population dynamics as well as urban form, and planners are only able to manage land use regulations, we felt that examining lot size trends would give us a useful indication of the impact of planning policy on development patterns.

We decided to conduct the test on Dartmouth. Its boundaries are well defined, as it was previously an independent city. It remains an administrative unit for data collection within the region. The area has seen a fair bit of growth in the last decade (Millward, 2002). We believed that data collection would prove feasible and manageable for looking at trends over the past ten years. In 2002, we obtained lot size data from staff at the municipal office, and processed them through a data base program.

Before a bridge linked Dartmouth to Halifax in the 1950s, the community grew slowly. During the 1960s through 1980s, however, the city expanded quickly, becoming an affordable option for commuters. The 1978 Dartmouth plan required a minimum of 50 foot frontage and 5000 square feet for new lots within regions defined by a development boundary. Amendments to the plan in 1987 allowed smaller lots through development agreement. Other changes in 1991 provided a new R1-M (modified) zone to permit small lots of 2800 square feet with 30 foot frontage. Comprehensive development districts allow planners to reduce lot size minima to 40 feet frontage and 4000 square feet area.

The regional report (HRM, 1997) on small lot housing describes 17 small lot developments. The municipality reported approving 2540 small lots over the previous seven years.

> Small lot single-family housing is becoming increasingly popular in the local and national market, replacing both multiple and conventional single family housing types. Market analysts predict that this trend will continue in response to a demand for smaller, more affordable housing. (HRM, 1997, 2)

Since policy provisions were in place by 1991 to enable smaller lots, we took the period from 1991 to 2001 as our study frame. First we looked at data from the census years (1991, 1996, and 2001) to ensure access to population and other statistics for a comparable period. The year 1991 would serve as the ‘base line‘, reflecting lots approved before most of the policies took effect. Data for 1996 and 2001 would show the impact of the policies. Once we discovered that relatively few lots were approved in 1996, we expanded our sample to include data from all the years from 1997 to 2000. In the seven years examined, 1143 new units were approved.

Table 1: Population and number of dwellings in Dartmouth

	Halifax CMA population	**Dartmouth population**	**Density (persons per acre)**	**Dartmouth dwellings**	**Density (units per acre**
2001	359,100	65,741	4.54	28,060	1.94
1996	342,966	65,629	4.53	26,385	1.82
1991	320,501	67,798	4.68	26,045	1.80

Source: Statistics Canada (2003)

Table 1 reveals that the population of Dartmouth declined from 1991 to 1996, and then remained stable until 2001. From 1991 to 2002, it lost 3% of its residents, while the larger metropolitan area grew 12%. The number of dwellings in Dartmouth continued to expand, up 7.7% over the ten years. Thus we see the number of units in the urban area increasing (one measure of density), while population per given area is decreasing (another measure). Declining household size is the major reason for the discrepancy: the average household fell from 2.60 persons in 1991 to 2.34 in 2001.

Recent plans in Dartmouth have called for increased densities. The 2000 Dartmouth downtown plan enables dense housing development (HRM, 2000). It allows townhouse units on 1800 square foot lots with 18 foot frontage minimum; in the Downtown Business Zone it permits 100 units per net acre. The Downtown Neighbourhood Zone allows 35 units per net acre, with a minimum lot area of 2500 sq ft on 25 ft frontage. These minima may be reduced by development agreement. The regional planning exercise, initiated in 2001, also advocated compact form and 'healthy growth' in appropriate urban nodes (like central Dartmouth).

Table 2: Number of units approved in study period by type

Year	**Singles**	**Semis**	**Townhouses**	**Apartments**	**Total**
1991	169	98	–	–	267
1996	84	30	20	12	146
1997	20	–	–	–	20
1998	39	–	–	–	39
1999	43	–	43	–	86
2000	106	–	28	62	196
2001	279	38	72	–	389
Total	**740**	**166**	**163**	**74**	**1143**

Table 2 shows that single-detached units were more common than multi-family units in every year of the study period: singles constituted almost 65% of the total. While a substantial

number of semi-detached units were approved in 1991, none appeared in four of the years. Only two groupings of apartments were approved. A major townhouse project was built downtown late in the study period. Generally speaking, the years 1997-99 were lean for development in Dartmouth.

The number of units approved per acre was higher in 1996 and 2000 than in 1991, but then decreased in 2001 (Table 3). Approval of affluent subdivisions with large lots in 2001 reduced density for that year (Figure 2). The density of semi-detached units approved in 1996 and 2001 was up over 1991 levels. Since no apartment or townhouse projects were approved in 1996, we cannot establish any trends for them. We can see, however, that the townhouse project approved in central Dartmouth in 2000 was almost twice the density of any other project during the period: this reflects the ambitions of intensification in the downtown plan (HRM 2000).

Table 3: Average number of units per acre approved during the study period

Year	**Singles**	**Semis**	**Townhouses**	**Apartments**	**Overall**
1991	5.60	11.49	–	–	6.90
1996	5.99	16.27	10.28	36.66	8.04
1997	4.78	–	–	–	4.78
1998	5.00	–	–	–	5.00
1999	5.58	–	11.01	–	7.41
2000	6.46	–	23.88	29.59	9.97
2001	4.56	15.37	12.65	–	5.61

The highest overall density was approved in 2000, with 9.97 units per acre; the next year, however, approved units declined to 5.61 per acre. The data do not offer evidence that lot sizes are decreasing enough to make a difference in the density or compactness of the city. While Alexander (1993) notes that it is possible to achieve densities of 10 units per acre in singles, 59 units per acre in townhouses, 46 in garden apartments, 60-170 per acre in high rise apartments, the densities seen in Dartmouth come nowhere near those numbers.

Table 4: Average unit lot areas approved (in square feet)

Year	Singles	Semis	Townhouses	Apartments	Overall
1991	7779.82	3791.11	–	–	6315.80
1996	7277.84	2676.83	4237.51	1188.17	5415.42
1997	9110.99	–	–	–	9110.99
1998	8705.54	–	–	–	8705.54
1999	7804.32	–	3957.09	–	5880.71
2000	6739.89	–	1823.88	1471.92	4371.20
2001	9547.67	2833.84	3443.71	–	7762.04

As Table 4 illustrates, lot sizes for single detached lots decreased slightly in 1996 from the 1991 average, and by 1000 square feet in the year 2000. In all the other years, however, single lots got larger on average than they were in 1991. Single lot sizes took a big jump between 2000 and 2001. The average lot size in 2001 was more than 4000 square feet greater than that required for a minimum suburban lot size (5000 square feet), some 80% over the requirement.

Lot sizes for semi-detached houses were lower in the later period than in 1991. Townhouse lots decreased in size between 1996 and 2000, but increased again in 2001. The smallest lots approved were in comprehensive development districts where developer and planning staff negotiate specifications which then require Council approval (Figure 3). Infill projects in central Dartmouth are generally on small lots. The smallest lot approved for a single detached house in the period measured 2582 sq ft (on Starr Lane in 2001).

The largest lots are generally in 'rural' areas of the city, outside the old development boundary. Many of these new lots were created by subdividing old lots after sewer and water services moved into an area. New 'executive' home projects on lakes or golf courses also have large lots, many in the 15,000 to 20,000 square feet range. The largest lot approved during the period was 37,700 sq ft. Both the smallest and the largest single-detached lots were approved in the last year of the study period (2001). The averages shown in Table 4 clearly indicate that larger lots dominated the approvals. Hence we may conclude that Dartmouth is not making progress towards greater densities in as much as lot sizes are not decreasing.

Table 5: Average frontage of lots approved (in feet)

Year	Singles	Semis	Townhouses
1991	63.05	30.11	–
1996	49.94	24.39	14.10
1997	56.51	–	–
1998	56.17	–	–
1999	63.34	–	26.87
2000	48.34	–	19.74
2001	64.66	25.79	25.19

While the average lot frontages for singles dropped below the suburban standard (50 feet) in two of the study years (1996, 2000), we cannot see that as an indication that frontages are declining (Table 5). In all the other years, the average frontage dimensions exceeded the minimum standard. Moreover, radial lots (on culs de sac) are allowed on reduced frontages, bringing down the average for approved lots. The same is true for other building forms, including townhouses. Although regulations provide options, narrower lot frontages were not used often enough to create a trend to reduced dimensions.

Several projects approved during the period show mixing of lot sizes and types on streets. This practice proves fairly common in Lancaster Ridge, a subdivision developed by the Nova Scotia Department of Housing. Under a provincial land-banking system (now expired), Department staff designed moderate and low cost lots to achieve provincial housing objectives, including social mix and increased density.

Table 6: Major development projects in study period, showing dimensions and distance from town centre (measured from Ferry Terminal)

Major Projects	**Total units**	**Number of single lots**	**Average size of single lots (sqft)**	**Minimum size of single lots (sqft)**	**Distance from town centre (km)**	**Total acres developed**
Lancaster Ridge	250	136	6621	3773	2.91	30.79
Beechwood	31	11	5515	5001	4.20	2.61
Cheltonham	24	–	–	–	0.32	0.90
Craigwood Estates	79	79	9820	7501	6.84	17.81
Evergreen Village	84	2	5538	5466	2.62	6.09
Keystone Village	147	147	9974	5111	5.49	33.66
Lake Charles	20	20	7931	5781	5.09	3.64
Portland Hills	154	132	8889	5001	4.89	28.94
Portland Lakes	148	101	8831	5204	4.18	24.66
South Ridge	42	42	4011	3088	3.33	3.87
Starr Lane	11	11	3783	2582	0.84	0.96

Table 6 shows the size, number of units, and distance of the major projects developed in the study period. Development parcels varied from under one acre to over 30 acres in size. We found a significant correlation between singled detached lot size and distance from town centre: lots away from the centre tended to be larger[3]. This confirms what we would expect: that smaller lots characterize infill development where land values are higher and commuting more convenient.

[3] The correlation was r (955) = .32 with p <.001. Since r^2= .10, distance accounts for 10% of the variance in lot size.

The fate of density targets

The data appear do not support our hypothesis that lot size is decreasing in Dartmouth. How can we explain why the development data in Dartmouth did not reflect the decline policy might lead us to expect? Perhaps the small size of our sample has shaded the results. We looked at a relatively brief period in only part of the larger metropolitan area. Our assumption that beginning with 1991 would be appropriate may have been flawed: an earlier base year may have yielded different results. Alternatively, a ten year period may not be sufficient to see the full impact of the changed regulations. Perhaps intensification is happening in other parts of Halifax Regional Municipality, but not in Dartmouth. Dartmouth is largely built out, while other fringe areas of HRM may be rapidly urbanising. Had we selected another area within the region, we may have found more evidence of declining lot sizes. If Dartmouth had more central locations for infill development, average lot sizes may have shown a different trend, since small lots clearly clustered near downtown.

Dartmouth may attract a greater proportion of large lot housing because it features lower land prices than some other areas in the city. With the small amount of development in the period, a few large projects can skew the results quite dramatically. Developers' decisions about what market to target with their projects also play a major role in lot size. Several of the projects during the period featured attractive locations where buyers may pay a premium for amenity value. Large suburban projects in 2001 certainly increased the average lot dimensions significantly.

A fuller test of the hypothesis could involve expanding the sample to look at additional districts of the region over a longer period. A detailed study of other mid-sized Canadian communities may identify regional differences in density patterns. Perhaps fast growing areas experience greater density gains than do areas growing slowly.

It is also possible, of course, that trends happening elsewhere in Canada and the world may not affect Dartmouth. Land is relatively cheap and plentiful in Nova Scotia, creating little pressure for intensification. The volume of traffic in the region and the cost of commuting are not sufficient disincentives to promote low density living. Since developers pay the costs of infrastructure (and then recoup them from buyers), the municipality may not see a burden in approving low density projects. Moreover, planning law in many jurisdictions (including Nova Scotia) does not empower municipalities to require developers to propose smaller lots.

Achieving density is a challenge in western culture. As Grant (1999) notes, cultural factors such as preference for cars and large lots make intensification difficult. Like their American counterparts (Audirac, 1999; Talen, 2001), Canadians prefer low density living (Filion et al., 1999). Developers in Dartmouth, as in other parts of the world, respond to what they believe the market expects. The market for downtown units may be growing, but it remains a small segment of those purchasing homes. Cost keeps many households out of the high density urban infill projects that offer access to valued downtown amenities (Fulford, 1996; Tomalty, 1997; Skaburskis, 2000). The market proves slow to absorb small lots except where housing costs are extraordinarily high. Many smaller Canadian cities simply do not experience the conditions that drive higher densities. Policy alone is not sufficient to generate change.

In the aftermath of the terrorist attacks on New York, those who oppose increasing density have new arguments to offer. As Breheny (1996) noted, the decentrists remain a strong lobby. Now they draw on fears that congestion and congregation create vulnerability. While urban designers and planners advocate intensification, compact form, and efficiency, the masses

fear density, crowding, and town cramming. In this environment, it proves difficult for planners to make density gains.

Are we making progress towards the compact city? The data from Canada offer inconsistent evidence. In some cities, like Vancouver and Toronto, density gains are obvious. Other cities, like Sydney, Nova Scotia, or Sudbury, Ontario, are losing population, and thus declining in density. Many cities in the mid-sized range, like Halifax Regional Municipality, advocate intensification but have trouble achieving it. With household size still falling, we may find population holding stable or declining even as more units are built within urban boundaries. Population densities decrease even though unit density increases. Land use policy cannot compensate for the demographic shift to smaller households. Moreover, building footprints are increasing, with the potential that greater densities will increase environmental impact (CMHC, 1999; Paehlke, 1991; Thomas and Cousins, 1996). Planners keep talking about the compact city, but we are not there yet.

Is the compact city a sustainable form? Breheny (1992) and Breheny and Rookwood (1993) suggest that a compact city may not be a green city. Higher densities require environmental trade-offs: more impermeable surface coverage, drainage issues, urban habitat loss, and concentrated local effects like pollution (Paehlke, 1991). Compact form may also result in loss of quality of life as noise, privacy, odours, pets, pests, and infectious disease become issues. Crowding, loss of open space, and an increase in surveillance (social control) may accompany density. While 'eyes on the street' have positive connotations for crime reduction, 'eyes on me' may generate stress for those who prefer anonymity and privacy.

De Roo and Miller (2000) argue that we must adapt efforts at intensification to local conditions. Higher densities will not work everywhere. They may not be necessary everywhere. They require lifestyle or cultural adaptations that are not easily achieved except voluntarily. In rapidly growing cities, high land costs will continue to make higher density feasible. Declining central city land values make infill housing viable in the largest and most dynamic centres (Bunting et al., 2002). In most of Canada, however, there is little to drive compaction. In no growth regions, intensification policies cannot stimulate the changes that planning theorists advocate. When large lots in nice areas are eminently affordable, consumers seldom choose small urban lots. Practice inevitably responds first and foremost to local conditions. In the early 21st century, it appears that the time is not ripe for higher densities in some Canadian communities.

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