HOME ZONES: SHARED STREETS IN HALIFAX

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EXECUTIVE SUMMARY

This report explores the home zone concept, evaluating the potential for introducing the approach in Halifax, Nova Scotia. Streets have become places solely for moving vehicles quickly, to the detriment of residential life. Home zones represent an opportunity to restore the role of the street as public space, to be used by pedestrians and cyclists as well as motorists. Paving right-of-ways at a single grade creates shared space, while vertical features and winding vehicle paths encourage reduced vehicle speeds. Improved aesthetics increase activity on the street, leading to improved community involvement and ownership. Literature and English case examples show the success of home zones in other countries. Analyzing local policy and regulations identifies necessary changes before home zones can be introduced in Halifax Regional Municipality (HRM). Interviews with various professionals identify local challenges to address prior to implementing home zones.

The home zone concept originated in the Netherlands in the late 1960s before spreading to other countries in continental Europe. Nine pilot schemes starting in 1999 proved successful in England. Monitoring showed the approach improved safety within the schemes, as vehicle speeds and traffic flows decreased. Street aesthetics improved, while providing increased opportunity for community involvement and interaction. Success of the pilot schemes led to significant government funding for future schemes, along with traffic guidelines to encourage appropriate design.

Local policy documents discussing the future of HRM suggest the home zone approach is suitable for Halifax. Interviews with professionals identify potential obstacles to implementation, all of which can be addressed through careful consultation and design. Recommendations are included for moving forward with home zones in HRM, as research has shown the concept is suitable in the local context. Amendments to the Regional Subdivision Bylaw allow the designation and construction of home zone streets. Pilot projects increase exposure, while adding to public awareness of the concept. A guide to the design and implementation process and a checklist for evaluating the suitability of streets for retrofits are also included.

INTRODUCTION

Although the street was once a multi-purpose space the rise of the automobile has resulted in the street being regarded as a place for cars and trucks, with the primary purpose of moving vehicles quickly. According to Mackey (2008: 300), "the street has always been a learning area where children discover space and the community around them. The street is irreplaceable." This new focus on automobile traffic has resulted in road networks growing in complexity and extent, allowing a greater freedom of movement across the continent. Southworth and Ben-Joseph (1997: 58) note that "street layouts and road building became the essence of planning and development and a determining factor in shaping the pattern of the environment." Residential streets as shared spaces are becoming increasingly rare in the urban context, to the detriment of the quality of life of urban residents. This report focuses on the function of residential streets in urban areas, examining how the role of these streets has changed over time. In order to plan and develop liveable cities it is essential that residential streets are recognized as multi-use spaces, rather than simply as spaces for automobiles.

Prior to the emergence of the automobile as the dominant mode of transportation traffic moved significantly slower within cities. Pedestrians and horse-drawn carts were common users of the street, with only the wealthy having access to cars. Particularly in older European centres, cities tended to grow 'organically', meeting the immediate needs of local residents. However, with the growing prominence of the automobile street standards have tend to cater specifically to motorized transportation. For example, in the Halifax Regional Municipality (HRM) the minimum right-of-way for residential streets of 16 metres can be increased to facilitate traffic (HRM, 2009c). Although the right-of-way contains both the street and a strip of land on either side for sidewalks and services, Appleyard (1981: 252) writes that "in many communities streets are overdesigned for the traffic they have to carry." A review of such standards is necessary to restore the street as a multi-use space.

The rise of the automobile following World War II significantly impacted streets and urban form in Canada. Jill Grant (2008: 25) notes "Canadian cities began to develop their first modern suburbs in the 1950s, modelled loosely on the successful example of Don Mills." Five basic concepts informed the plans for Don Mills, one of which was a discontinuous road system to limit through traffic in residential areas (Sewell, 1993). Despite the success of Don Mills the discontinuous road system used

here and in similar developments is not supported in many newer approaches to urban development. New Urbanism advocates full connectivity within urban street networks. Steil, Salingros, and Mehaffy (2008: 271) recommend "connections should cut through all the scales of the street armature." While street connectivity in the urban environment is important, there are places where this should not be a primary concern. Treating residential streets solely as connections across cities reinforces the street as a place for automobiles, while ignoring their role as public space. Residential streets should serve the residents who live on them rather than simply facilitating movement for those passing through.

The 'woonerf', or 'residential yard', is a Dutch concept from the late 1960s that focuses on making residential streets safer for children (Fig. 1). Two basic principles inform the woonerf approach: legal right of way is given to pedestrians, and the street is designed as a shared space for pedestrians and vehicles (Appleyard, 1983). Implementation involves eliminating curbs, paving the entire road surface at a single grade, limiting parking, and narrowing automobile lanes. Benches, trees, and planters in the roadway act as obstacles for cars while improving the aesthetics of the street (Appleyard, 1981). Hamilton-Baillie (2000: 5) notes "removing certainty, consistency and clarity for traffic appeared to offer significant benefits." These changes, along with signage to announce the beginning and end of a woonerf area, make drivers more aware of their surroundings so that they drive more cautiously in these residential neighbourhoods.

Figure 1 - A typical Dutch woonerf

The woonerf concept has recently gained popularity in the United Kingdom (UK), where they are referred to as 'home zones' (Fig. 2). Home zones are residential streets in urbanized areas "in which the living environment clearly predominates over any provision for traffic. It is an environment where the design of the spaces between homes provides space for motor vehicles, but where the wider needs of residents are also fully accommodated" (Biddulph, 2001: 3). Home zones can include shops, schools, or other local services but should be primarily residential in nature (DfT, 2006b). The intent of home zones, as with the earlier versions of the concept, is to improve safety and restore the traditional multi-use character of residential streets in urbanized areas. Recent government funding in the UK has seen pilot home zone schemes implemented in various neighbourhoods in England, Scotland, and Wales. The Department for Transport (DfT) (2005: 9) notes that "Home Zones are equally applicable to any residential area, new or existing. Only the approach will vary."

This report examines the potential for introducing the woonerf or home zone approach in Halifax, Nova Scotia. An extensive literature review along with case examples provides necessary background information. Reviewing existing policy in HRM and Nova Scotia identifies opportunities and obstacles to implementing schemes in Halifax, such as street design standards. Interviews with various professionals identify further challenges while helping to establish the suitability of the concept in Halifax. Finally, the report concludes with recommendations for moving forward with home zones in Halifax, Nova Scotia.

Figure 2 - A typical Home Zone in the UK

EVOLUTION OF THE HOME ZONE APPROACH

Inspiration for the home zone approach grew out of a report prepared in England in the early 1960s. In 1959 the Ministry of Transport commissioned Colin Buchanan to investigate techniques for improving urban transport. Published in 1963, *Traffic in Towns* "recognized the importance of maintaining traffic movements but also the wider environmental consequences of traffic in residential areas" (Clayden et al, 2006: 56). Buchanan suggested creating specific zones known as 'environmental areas' or 'urban rooms', with appropriate levels of traffic in these areas depending on function. However, the Ministry of Housing and the Ministry of Transport supported traffic segregation and did not accept the approaches outlined in the report (Ben-Joseph, 2003; Clayden et al, 2006). More than three decades later these ideas became popular in England, although the concept caught on much earlier in continental Europe.

Buchanan's ideas inspired Nick De Boer, an Urban Design professor in the Netherlands, to begin exploring techniques for implementing these theories. De Boer attempted to create a shared space for automobiles and children through the physical design of streets (Ben-Joseph, 2003). The Municipality of Delft first implemented the approach, known as 'woonerf', in 1969 in inner-city areas. The intention was to improve safety for children, while providing urgently needed play spaces in these areas (Ben-Joseph, 1995). Following the success of initial retrofits the approach grew in popularity. The Dutch Government adopted woonerf traffic guidelines and regulations in 1976, and by the early 1980s these shared streets existed in over 220 cities in the Netherlands (Appleyard, 1983). By 2006 the Netherlands had implemented as many as 6,500 woonerf schemes (Appleyard and Cox, 2006).

Following success of the shared street approach in the Netherlands various other countries adopted traffic guidelines and regulations along the same lines. These countries included: Germany (1976), Sweden (1977), Denmark (1977), France (1979), Japan (1979), Israel (1981), and Switzerland (1982) (Ben-Joseph, 1995; 2003). In England the Department of Environment and the Department of Transport published *Design Bulletin 32* in 1977 (Clayden et al, 2006: 56). This marked the first step towards adopting the woonerf approach, although the concept did not became popular for several years.

In the mid 1990s governments in the UK, organizations such as the Children's Play Council, and residents groups recognized the need to improve safety on residential streets and encourage social interaction in residential areas (DfT, 2005). In England "half

of all road accidents with children under five occur within 100 metres of their homes" (Ben-Joseph, 1995: 507). Barrell and Whitehouse (2004: 57) note that "increasing use of cars was turning traditional residential streets into nothing more than car parks and people were becoming isolated within their homes, taking no part in, or responsibility for, the activities that historically had led to strong and close local communities." As a result of these trends children had become less active physically. Little interaction took place on most residential streets, between adults or children. Gill (1997: 269) notes that "kept indoors or escorted everywhere – usually in cars, ironically enough – very few children walk or cycle regularly, and their levels of physical activity are at an all-time low, thus storing up health problems for the future". The home zone approach represented an opportunity to alleviate these problems.

Construction began on nine pilot home zone schemes in England and Wales in 1999, with four more introduced in Scotland shortly afterwards. In 2001 the Prime Minister of England announced a £30 million Home Zone Challenge fund to encourage the development of home zones. The Scottish Executive later committed £11.85 million to help fund home zone related projects (Biddulph, 2001; DfT, 2005). The Transport Act 2000 in England and Wales and the 2001 Transport Act in Scotland established legal status for home zones in 2001 (Biddulph, 2003).

Popularity of home zones has increased in various countries since the concept appeared in the Netherlands 40 years ago. Studies in Europe, Japan, and Israel show accidents on retrofitted shared streets have declined by 20%, with severe accidents decreasing by more than 50% (Ben-Joseph, 1995). In England studies show a "typical 48-foot-wide street had a crash rate that was 18 times higher than that of a 24-foot-wide street" (Appleyard and Cox, 2006: 32). These statistics suggest that home zones and related approaches are successful in various countries, but a closer look is necessary to fully understand their effects.

Exploring the shared street experience in the Netherlands and England helps provide insight into strengths and weaknesses of the approach. Policies and design characteristics for each country are outlined to establish guidelines that can be adapted for use in HRM. Case examples and broader research gauge the effectiveness of the approach, in terms of safety and community involvement. Changes in traffic flows and vehicle speeds are used to measure the effectiveness of the approach in terms of safety, along with residents' perceptions. Community involvement is evaluated using residents' opinions of street activity, levels of social interaction, and the appearance of streets. Aesthetics are included as more pleasing residential environments can encourage outdoor activity.

THE EUROPEAN EXPERIENCE

Home zones have been implemented in a few instances within North America, particularly in the United States. Appleyard and Cox (2006) discuss two schemes introduced in Colorado in the 1980s, one within a condominium development and the other made up entirely of rental units. However, too few North American examples exist, with varying levels of implementation, to draw conclusions. Neither Canada nor the United States have adopted home zone design standards. Experiences from other countries offer the best opportunity for studying and evaluating the home zone concept. The Dutch experience has significantly influenced several other countries in their application of the approach. English examples are included due to the recent popularity of home zones and the availability of information.

Objectives of the Home Zone Approach

The Municipality of Delft in the Netherlands implemented the first woonerf in 1969, to make streets safer for children and to provide needed play areas (Ben-Joseph, 1995). Objectives and potential impacts of these schemes have evolved along with the concept. Most new schemes aim to improve safety for children and provide play areas, but in England "the key benefit of a home zone is that it turns a residential street into a valued public space, and not just a place for movement" (Jones and IHIE, 2002: 11). Specific goals vary between schemes, depending on local context and issues raised by residents and local authorities. Existing literature provides insight into common objectives in new schemes.

Most home zones aim to reduce vehicle speeds and traffic flows, to make streets safer for all road users. Other desired effects result from these reductions, apart from improving safety. Restricting automobiles encourages alternative modes of transportation, such as cycling and walking (Biddulph, 2001). Reducing vehicle speeds and traffic flows can promote more frequent and diverse activity on the street by all residents, not just children. Activity leads to increased community involvement and ownership of the street, especially if residents have participated in the implementation process (Jones and IHIE, 2002; Biddulph, 2001). Restricting traffic through home zones has several benefits beyond improving safety in the area.

Home zones often aim to improve street aesthetics, which in turn improves community involvement and ownership for residents. More pleasing residential environments encourage increased outdoor activity and interaction (Biddulph, 2001). Combined with higher levels of cycling and walking this can improve the health of residents in home zones. Several new home zone schemes in England have attempted to reduce criminal activity, primarily through improved lighting and increased 'natural surveillance' (DfT, 2005; Jones and IHIE, 2002). Identifying specific issues allows local authorities and residents to tailor objectives to address these concerns. With appropriate design home zones can significantly improve the quality of life in residential neighbourhoods.

Design Characteristics

Design characteristics of home zones vary from country to country, and even from street to street within a country. Local context, resident attitudes and values, and available funding determine the outcome of each different scheme. Despite these differences several similarities exist between neighbourhoods and between countries. Following sections outline characteristics common to the Netherlands and the UK. Information contained here is used in conjunction with case examples to inform and recommend design characteristics for Halifax.

Gateways

Gateways announce the entrance of a home zone, where motorists can expect more activity on the street. Standard home zone signs are included at all entrances, informing drivers that they must alter their habits and treat all road users as equal (Fig. 3). Back sides of gateway features include signs to notify motorists they are leaving a home zone (DfT, 2007). Carriageways are usually narrowed at entranceways, with ramps up to raised road surfaces located within 10 metres of the intersecting road (Jones and IHIE, 2002). Design of gateway features vary between home zones but often include planters, street furniture, sculptures, or other public art (Fig. 4). Allowing residents to participate in the design process produces unique gateways, potentially creating a greater sense of ownership of the street while adding to the character of the area (DfT, 2005).

A recent home zone initiative in the Kennington Road area, near Nottingham city centre, did not include a gateway as part of the scheme. Combined with vacant parking spaces near the entrance, the result has been an uninterrupted view into the area for motorists. Traffic speeds have not decreased on the street, as motorists are not forced to change their driving habits upon entering the home zone (Clayden et al, 2006). Gateways contribute to altering driver behaviour within home zones while adding to the aesthetics of an area.

Figure 3 - Home zone sign

Figure 4 - Gateway feature at Oxbridge home zone

Shared Surfaces

Paving the entire right-of-way at a single grade in home zones creates shared surfaces for all road users (Fig. 5). On traditional streets "A raised kerb gives a powerful message to all road users that the street is divided into vehicular and pedestrian areas" (Jones and IHIE, 2002: 29). Removing this barrier helps reinforce the idea that the street is a place for pedestrians and cyclists as well as motorists. Streets paved at a single grade allow activities other than movement while still permitting access for vehicles (DfT, 2005). According to the Department for Transport (2007) the key aims of shared surface streets are to encourage low vehicle speeds, make it easier for people to move around, promote social interaction, and create a space where pedestrians are not intimidated by motorists. Shared surfaces consequently play an important role in meeting the objectives of the home zone approach.

Vehicle paths on shared surfaces are designed differently than on traditional streets. Narrow lanes with horizontal shifts encourage motorists to drive slowly within home zones, creating a safer environment for pedestrians and cyclists. Traffic authorities in England and the Netherlands recommend a minimum carriageway width of 3 metres. Widened areas every 40 metres allow cars to pass each other if the carriageway is used for two-way traffic (CROW, 1998; Jones and IHIE, 2002). Blurring divisions between vehicle paths and pedestrian-only areas creates a sense of uncertainty for motorists, encouraging them to drive more cautiously (Barrell and Whitehouse, 2004). However, this technique can lead to poor parking behaviour and a sense of vulnerability for pedestrians if the space is poorly designed (DfT, 2007). Properly designed shared surfaces present an opportunity to create safer, more useable space within home zones.

Figure 5 - Shared surface in a home zone

Surface Treatments

Shared surfaces within home zones are often treated with materials other than asphalt, such as paving stones. Varying textures and colours on the street surface differentiates space within the street, such as pedestrian-only areas, parking spaces, and vehicle paths (Fig. 6) (Wheeler et al, 2005b). Using various colours and textures at intersections informs all road users they are approaching a potentially busier area. Signage can be removed to reduce visual clutter, as recommended by the Department for Transport (2007). Alternative paving materials enhance the aesthetics of a street while improving safety. Studies show paving stones reduce stopping distances and decrease vehicle speeds by between 4 and 7 kilometres per hour (km/h) when compared to asphalt surfaces (Ben-Joseph, 1995; DfT, 2005).

Paving stones are generally more expensive to install when compared to asphalt, although cheaper maintenance helps balance out higher initial costs over time. Pavers do not deform internally or crack from fatigue, resulting in a longer life span and a more sustainable street. Stones can be lifted out for street maintenance and reset afterwards, whereas asphalt must be dug up and patched (Ben-Joseph, 1995). Availability of replacement stones should be considered in the selection process, as pavers will need to be replaced eventually (DfT, 2007). Climate presents another barrier to using paving stones, particularly in the winter. Freeze-thaw cycles cause the ground to shift, potentially displacing paving stones on the surface.

Figure 6 - Parking spaces with coloured paving stones

Vertical Features

Planting boxes, street trees, bollards, and speed bumps are examples of common vertical features in home zones (Biddulph, 2001). These features have different functions depending on the context in which they are placed. Trees improve the aesthetics of the street while breaking up sight lines for motorists. Planting boxes deflect vehicular traffic while providing seating and places for informal play. Bollards can separate vehicle paths from footpaths or play areas. The function of most features will vary depending on the design of the street. Although vertical features are effective for traffic calming they should only be used for this purpose when necessary. Traffic calming through design is a preferable approach if possible, as some people find vertical features uncomfortable and confusing (Jones and IHIE, 2002). Features should be spaced no more than 30 to 50 metres apart when required for traffic calming (CROW, 1998; Jones and IHIE, 2002). This ensures motorists cannot speed up too quickly between features.

Play areas are important elements in home zone schemes, whether formal or informal. These areas provide space for children to play while generating "greater adult presence on the street, through informal supervision, leading to more social interaction between residents of all ages – a virtuous circle" (Jones and IHIE, 2002: 26). Vertical features help ensure these spaces are safe. Play areas should not be entirely fenced off, as this limits the mobility of children using the street. Bollards or planting boxes offer protection from vehicles without limiting children's mobility (Fig. 7). These features should be at least 1.5 metres from the vehicle path if placed near play areas, to ensure motorists can see children entering and exiting these spaces (Jones and IHIE, 2002).

Figure 7 - Bollards and a planter protecting a play area

Design Considerations

Home zones create safer streets while improving quality of life for residents. Creating streets and neighbourhoods that are accessible and functional for all requires special consideration of certain issues. Following sections outline specific issues that require extra attention in the design process.

Context and Connectivity

Resident support is the most important factor when choosing a location for a home zone. To be successful a scheme "must have the support of the existing community from the outset" (Jones and IHIE, 2002: 17). Home zones should not be constructed in isolation, but rather integrated into the surrounding area. Pedestrian and cycling routes within a home zone should extend outward, linking users to green spaces, services, and public transit (Biddulph, 2001; Jones and IHIE, 2002). Automobile connections are also important, but should focus on moving residents into and out of the home zone rather than moving traffic through the area. Traffic authorities in the Netherlands recommend home zones do not exceed 600 metres in length, whereas the English recommend a system of streets not exceeding a 400 metre radius (CROW, 1998; Jones and IHIE, 2002). Arranging a home zone as a network of streets presents a greater opportunity for integration into surrounding areas, as more connection points are possible for pedestrians, cyclists, and motorists.

Bus routes are discouraged within home zones, but can be integrated into schemes if necessary. The Nobel Road home zone in Nottingham retained an existing bus route following the retrofit, demonstrating the significance of residents' opinions when developing a home zone scheme (Tilly et al, 2005). Transit stops should be located at the periphery, providing residents with an alternative to the automobile. Streets with less than 100 vehicles per hour in the afternoon peak are the most suitable for conversion to home zones (Jones and IHIE, 2002). The London Borough of Ealing blocked off a street due to high levels of shortcutting, but this approach is only suitable in extreme cases (Webster et al, 2006). If possible home zones should reduce speeds within their boundaries and encourage motorists to choose other routes rather than severing access points.

Disabled and Elderly People

Needs of people living with a disability and the elderly must be considered when implementing a home zone. Removing curbs on shared surfaces improves mobility for those in wheelchairs, while eliminating trip hazards for the elderly and the less mobile (Jones and IHIE, 2002). However, the visually impaired rely on curbs as navigation tools. Alternative wayfinding techniques are necessary to facilitate movement for these individuals in the absence of curbs. Potential solutions include separating pedestrian-only areas from the vehicle path with bollards or varying textures at the borders of footpaths. Contrasting colours on surface treatments may also help those with limited vision (Jones and IHIE, 2002). While these techniques are helpful, the best solution is to involve people living with a disability and the elderly early in the design process (Biddulph, 2001). The home zone approach aims to improve the residential environment for all people, including the elderly and those living with a disability.

Access for Oversized Vehicles

Reducing vehicle speeds is a key objective in successful home zones. Narrowing vehicle paths and introducing obstacles are common strategies for achieving these goals. Retaining access for oversized vehicles is essential to ensure the safety of residents living on these streets. Authorities in England have created full scale mock-ups to identify issues, marking out proposed vehicle paths with pylons. Driving large vehicles through the mock-ups identified areas that require design changes (DfT, 2005). Swept path computer programs allow authorities to virtually manoeuvre oversized vehicles through proposed schemes, again identifying any potential problem areas (Jones and IHIE, 2002). Involving emergency and waste collection services early in the design process is the best approach, as it prevents any major issues emerging in later stages. Careful consideration and consultation ensures an effective design that slows traffic without compromising access for emergency and other oversized vehicles.

Parking

Parking is often the biggest concern for residents prior to implementing home zones in England. Potential reductions in the availability of parking led to a scheme in Dover being completely abandoned (DfT, 2005). Despite these concerns home zones tend to increase the efficiency of on-street parking, often leading to more spaces than were previously available (Jones and IHIE, 2002). On-street parking can contribute to the design of the street, through the use of echelon or angled parking spaces. Locating parking areas on alternating sides of the street creates a winding vehicle path, encouraging reduced vehicle speeds. Bordering these areas with planting boxes or street trees improves the aesthetics of the street while ensuring traffic calming effects remain when parked cars are absent (Biddulph, 2001; Jones and IHIE, 2002). Parking must be addressed in the design process, but should not be a determining factor.

Design Standards – The Netherlands and England

Forty years after its introduction the woonerf concept is the common approach to residential street and neighbourhood design in the Netherlands. The Dutch government introduced regulations governing design of these streets over thirty years ago, although the regulations are recommendations rather than rules (CROW, 1998). These standards have influenced the approach that many other countries have taken to shared streets. Dutch regulations include design characteristics for woonerf in higher traffic and commercial areas, but standards included here apply specifically to residential streets (Table 1). Special consideration has been given to allowing access for larger vehicles in creating these standards, such as fire trucks. Two excerpts from the Traffic Regulations for Woonerf, translated from Dutch, establish the rights of pedestrians and cyclists and responsibilities of motorists in a woonerf (Ben-Joseph, 1995: 506):

1. Article 88a RVV: Pedestrians may use the full width of the highway within an area defined as a 'Woonerf', playing on the roadway is also permitted.

2. Article 88b RVV: Drivers within a 'Woonerf' may not drive faster than at a walking pace. They must make allowance for the possible presence of pedestrians, including children at play, unmarked objects and irregularities in the road surface, and the alignment of the roadway.

Maximum Length of Woonerf Street	400-600 metres
Minimum Carriageway Width	3 metres (straight stretches) 6.15 metres (at intersections)
Minimum Sidewalk/Walkway Width	1 metre (over short distance) 1.5 metres (over longer distances)
Minimum Distance between Frontage and Carriageway	0.6 metres
Minimum Distance between Widened Areas	40 metres
Minimum Width of Widened Areas	4.5 metres
Maximum Length of Widened Areas	20 metres
Minimum Distance between Speed Reducing Provisions	50 metres
Appropriate Vehicle Speeds	Walking speed

Table 1 – Dutch Design Standards for a Woonerf Source: CROW, 1998

English home zone street design standards are based on the Dutch example (Jones and IHIE, 2002), resulting in similar standards (Table 2). Unlike the Netherlands, in England home zones have been restricted to residential neighbourhoods. Section 268 of the Transport Act 2000 permits the designation of streets or street networks as home zones. Rights of pedestrians and cyclists in home zones are also established in section 268, through use orders which can designate permitted uses other than passage of motor vehicles (DfT, 2006a). English standards are recommendations rather than rules, with dimensions of individual streets determined by the designer. A developer who proposes a carriageway less than 3.7 metres wide must consult a Fire Safety Officer. With approval carriageway width may decrease to 2.75 metres for fire access routes, or 2 metres for short distances if only to be used by small vehicles (Gereint Killa, personal communication, 2009-11-29).

Maximum Size of a Home Zone	400 metres (radius)
Minimum Carriageway Width	3 metres
Minimum Sidewalk/Walkway Width	1.8 metres 1 metre (over short distance)
Minimum Distance between Widened Areas	40 metres
Minimum Width of Widened Areas	4.5 metres
Maximum Forward Visibility	12 metres
Minimum Distance between Speed Reducing Provisions	30 metres
Appropriate Vehicle Speeds	16 kilometres per hour

Table 2 – English Home Zone Design Standards Source: Jones and IHIE, 2002

Three significant differences exist between the Dutch and English design standards for home zones. The English recommend speed reducing measures every 30 metres, whereas the Dutch recommend a maximum separation of 50 metres. Spacing between these measures has been reduced in England to ensure lower vehicle speeds, as motorists here are less familiar with the concept (Jones and IHIE, 2002). English standards introduced a minimum sight distance of 12 metres that is not present in Dutch standards, based on stopping distances at 16 km/h (Jones and IHIE, 2002). The biggest difference between Dutch and English standards relates to the actual layout of home zones. The English recommend developing networks of streets as home zones, whereas the Dutch focus on single streets. Networks of streets allow for greater connectivity for pedestrians and cyclists within these neighbourhoods, while encouraging greater community involvement and social interaction over larger areas.

CASE EXAMPLES

Evaluating individual home zones provides insight into how each scheme functions. General statistics are useful for evaluating the concept as a whole, but case examples offer more specific information. The Department for Transport in England thoroughly monitored the success of several schemes completed in the early 2000s, four of which are included in this report. Comprehensive studies of individual schemes in the Netherlands were not available. Evaluating chosen schemes provides information about the effectiveness of individual components within home zones. Information taken from the following case examples informs a list of recommended characteristics for home zone developments in Halifax.

Monitoring the Schemes

The Department for Transport commissioned Transport Research Laboratory (TRL) to monitor pilot home zone schemes in England and Wales in the early 2000s. TRL administered 'before' surveys in 2000 and 'after' surveys from 2002 to 2004 to gather information about residents' perceptions of the home zone schemes (Webster et al, 2006). Traffic data from before and after implementation along with video recording in some cases enabled TRL to evaluate the effectiveness of each scheme. Accident data suggests street safety has improved in all home zones, although more time is needed before full conclusions are possible (Webster et al, 2006). Residents, community groups, and local authorities devised objectives for each specific home zone. TRL used these objectives to measure the success of each home zone. Following sections describe experiences of four home zones in England: Morice Town in Plymouth, The Methleys in Leeds, Nobel Road in Nottingham, and the Five Roads Area in the London Borough of Ealing.

Morice Town

Morice Town home zone is situated 2.5 kilometres northwest of Plymouth City Centre. A naval dockyard and the River Tamar lie to the west, with a dockyard railway station to the northeast (Wheeler et al, 2005b). A 2.2 kilometre network of 12 streets makes up the home zone, with approximately 400 dwellings (Fig. 8). The site contains the Morice Town Primary School, a small frozen food business, and a Salvation Army

Hall. Several shops are located on Albert Street to the south, just outside the home zone. Surveys showed 63% of households had children under 17 years of age (Wheeler et al, 2005b).

Figure 8 - Morice Town home zone

Partners in the home zone project included the City of Plymouth, Morice Town Community Advisory Group, and the Keyham Business Group. Along with local residents, these groups developed a list of objectives for the pilot scheme, including (Wheeler et al, 2005b):

- Enhanced street environment
- Improved safety for all road users
- Improved community involvement and ownership
- Reduced vehicle speeds and through traffic
- Increased provision of play facilities

The scheme includes various home zone features to meet the objectives developed by the interest groups and local residents. Gateway features at each of nine entrance points narrow vehicle paths to between 2 and 5.5 metres. Raising carriageways to the height of the footpaths creates shared surfaces for all road users (Wheeler et al, 2005b). Intended use of space is differentiated by varying colours and textures of the surface. Grey surfaces indicate shared space, through routes, and intersections. Yellow surfaces are for pedestrian and community uses. Bright red surfaces must be kept clear to allow oversized vehicles such as fire trucks to make turns. Dark red surfaces with grey borders mark parking areas on shared surfaces (Wheeler et al, 2005b). Traffic calming measures include roundabouts, planters, low walls, and speed humps (Fig. 9). The design incorporates extensive planting, on-street play facilities, and new community space.

Resident surveys and traffic data show objectives for the home zone were met. The majority of adult residents in Morice Town (76%) support the home zone, with 93% stating the appearance of the streets improved (Table 3). Most children (80%) felt their general safety had improved, with 90% mentioning the streets looked nicer (Table 4). Traffic flows and vehicle speeds decreased significantly within the home zone, improving safety for all road users (Table 5, Table 6). Residents created shared gardens and local children helped design a new play area on an empty piece of grass (Wheeler et al, 2005b). The home zone improved safety while contributing to increased community involvement and ownership for all residents.

Figure 9 - Roundabout intersection in the Morice Town home zone

Home zone was a good idea	76% yes
Appearance of streets improved	93% yes, 3% same, 3% no
Streets safer from crime for adults	85% yes
Streets safer from crime for children	71% yes
Motorists more considerate towards children playing in/ near the street	68% yes, 21% no
Adult pedestrians and cyclists safer from traffic	54% yes
Child pedestrians and cyclists safer from traffic	51% yes
Friendliness on the streets	30% more friendly, 63% same, 4% less
Time spent outside	22% more, 75% same, 3% less

Table 3 – Adult Perceptions of Morice Town Home Zone Source: Wheeler et al, 2005b

Appearance of streets improved	90% yes
General safety improved	80% yes
Frequency of outdoor play	65% daily, 19% two to four days a week
Friendliness on the streets	43% more friendly, 50% same, 7% less
Slower vehicle speeds in the home zone	65% yes

Table 4 – Child Perceptions of Morice Town Home Zone Source: Wheeler et al, 2005b

STREET NAME	BEFORE	AFTER	CHANGE
Balfour Terrace	563	336	(- 40%)
Charlotte Street	1605	1096	(- 32%)
Cross Hill	534	398	(- 25%)
Herbert Street	893	653	(- 27%)

Table 5 – Mean Daily Traffic Flows in Morice Town Home Zone Source: Wheeler et al, 2005b

STREET NAME	BEFORE	AFTER	CHANGE
Balfour Terrace	34.6	25.6	- 9.0
Charlotte Street	36.7	24.3	- 12.4
Cross Hill	27.2	24.0	- 3.2
Herbert Street	36.9	20.6	- 16.3

Table 6 – Mean Vehicle Speeds in Morice Town Home Zone (km/h) Source: Wheeler et al, 2005b

The Methleys

The Methleys home zone is located just north of Leeds City Centre. Fourteen streets make up the home zone, which contains approximately 300 properties in a compact grid pattern (Fig. 10). The name of the scheme is derived from local street names, such as Methley Drive, Methley Grove, and Methley Terrace (Layfield et al, 2003). The site includes a printing shop on Blake Grove and the Chapel Allerton Primary School at the northern end of Methley Terrace. Approximately 30% of households have children under 17 years of age (Layfield et al, 2003). Prior to implementing the home zone most streets were relatively wide, with carriageway widths between 7 and 8.5 metres and sidewalks measuring 1.7 to 2 metres. Methley Drive (east/west) and Blake Grove (north/south) experienced the most through traffic.

Partners in the project included the Leeds City Council, the Department of Highways and Transportation, and the Methleys Neighbourhood Action Group. Objectives for the home zone devised by these groups along with local residents included (Layfield et al, 2003):

- Improved safety for all road users
- Improved perception of road safety
- Reduced vehicle speeds
- Increased street based activity
- Increased community involvement
- Increased opportunity for outdoor play

Figure 10 - The Methleys home zone

The scheme incorporates various home zone features to address the objectives set out by the interest groups and local residents. Gateway features include coloured paving and ramps, with carriageways narrowed to 4 to 6 metres. Raising the vehicle path to the height of footpaths on the western section of Methley Drive encourages street based activity while altering driver behaviour (Layfield et al, 2003). Circular patterns of concrete block paving break up vehicle paths at intersections. Staggered planted areas create a winding vehicle path that narrows to 4 metres at some points (Fig. 11). Other traffic calming measures include speed bumps and chicanes. Local artwork has been introduced throughout the home zone (Fig. 12).

Objectives of The Methleys home zone scheme have been achieved, as shown by resident surveys and traffic data. Most adult respondents (74%) supported the home zone, with 99% stating the appearance of the streets had improved (Table 7).

Thirty-eight percent of children felt safer playing outdoors, with none responding they felt less safe (Table 8). Traffic flows on Methley Terrace increased, although they remain quite low (Table 9). Traffic likely shifted here from adjacent streets, as Methley Terrace has no home zone features. Vehicle speeds decreased throughout the area, contributing to a safer environment (Table 10). Many residents began planting and maintaining gardens, which was uncommon prior to implementing the home zone (Layfield et al, 2003). Home zone measures have improved safety while providing greater opportunities for street based activity and interaction.

Figure 11 - Staggered street trees

Figure 12 - Paving stone designed by a local child

Home zone was a good idea	74% yes, 11% no
Appearance of streets improved	99% yes (50% a lot, 49% a little)
Number of speeding vehicles	51% decreased, 40% same, 9% increased
Danger to children from traffic	46% decreased, 42% same, 13% increased
Motorists more considerate towards children playing in/near the street	49% yes, 47% no change
Friendliness on the streets	11% more friendly, 79% same, 5% less

Table 7 – Adult Perceptions of The Methleys Home Zone

Source: Layfield et al, 2003

Appearance of streets	90% nicer, 5% same, 5% uglier
How safe they feel outside	38% safer, 57% same, 5% no answer
Frequency of outdoor play	24% increased, 43% same, 5% decreased
Friendliness on the streets	24% more friendly, 76% same,
How people drive in the home zone	43% changed, 48% same, 9% don't know

Table 8 – Child Perceptions of The Methleys Home Zone Source: Layfield et al, 2003

STREET NAME	BEFORE	AFTER	CHANGE
Methley Drive (east)	1145	1033	(- 10%)
Methley Drive (west)[1]	N/A	723	N/A
Methley Terrace[2]	126	226	(+ 40%)
Blake Grove	1227	1133	(- 8%)

Table 9 – Mean Daily Traffic Flows in The Methleys Home Zone Source: Layfield et al, 2003

[1] Section with raised vehicle path to create a shared surface

[2] No home zone measures introduced

STREET NAME	BEFORE	AFTER	CHANGE
Methley Drive (east)	32.3	23.3	- 9.0
Methley Drive (west)[1]	N/A	22.2	N/A
Methley Terrace[2]	23.7	22.5	- 1.2
Blake Grove	35.1	26.9	- 8.2

Table 10 – Mean Vehicle Speeds in The Methleys Home Zone (km/h) Source: Layfield et al, 2003

[1] Section with raised vehicle path to create a shared surface

[2] No home zone measures introduced

Nobel Road

Nobel Road home zone is located in a suburban area 6 kilometres southwest of Nottingham City Centre. The site is bounded by Barton Lane to the northwest, Clifton Lane to the east, and agricultural land to the south (Fig. 13). Nobel Road, a 'D' shaped spine road running through the site, provides the only vehicular access at each end of Clifton Lane. Nineteen cul-de-sacs connect to Nobel Road (Tilly et al, 2005). Social housing makes up approximately two-thirds of the 600 dwellings within the neighbourhood. The site contains three seniors' complexes, the Park Gate Community Centre, and a shop at each end of Nobel Road. Seven bus routes run along Nobel Road, at a frequency of 12 buses per hour in each direction (Fig. 14). Approximately 30% of the population is under 16 years of age (Tilly et al, 2005).

Figure 13 - Nobel Road home zone

The Nobel Road home zone was implemented in two phases. Phase A included improvements to Nobel Road, with Phase B focusing on the 19 cul-de-sacs. At the time of monitoring only two cul-de-sacs were completed: Chamberlain Close and Richardson Close (Tilly et al, 2005). Key partners included Nottingham City Council, Nobel Road Tenants and Residents Association, and Barton Lane Community Association. Objectives developed by stakeholders and local residents included (Tilly et al, 2005):

- Improved safety for all road users
- Reduced vehicle speeds on Nobel Road
- Improved quality of life for residents
- Increased community involvement

Gateway features at each end of Nobel Road mark entrances into the home zone. Speed humps raise the carriageway to the height of the footpaths at seven localized points along the road (Fig. 15). Narrowing vehicle paths to a single lane at these points, along with newly planted trees, calms traffic while reinforcing pedestrian crossings (Tilly et al, 2005). Original plans to raise the entire carriageway to the height of footpaths were abandoned due to cost. More substantial home zone measures are present on Richardson Close and Chamberlain Close (Tilly et al, 2005). New surface treatments and 'pinch points' calm traffic while improving the aesthetics of the areas. Landscaped areas, gardens, and upgraded street furniture create spaces for activity while encouraging interaction. New pedestrian routes increase connectivity with Barton Lane.

Figure 14 - Bus moving along Nobel Road

Figure 15 - Speed hump on Nobel Road

Resident surveys and traffic data show objectives for the home zone were generally met, although community involvement has not changed significantly. Most adult respondents (60%) support the home zone, with 65% stating children are safe from traffic on the streets (Table 11). Children respondents believed "traffic speeds were better but other things were little changed" (Tilly et al, 2005: 19). Mean traffic speeds decreased by 6.3 kilometres per hour (km/h), from 36 km/h to 29.7 km/h. Daily traffic flows decreased only slightly (-7%), due largely to the function of the road as an access route for the cul-de-sacs (Tilly et al, 2005). Community involvement did not change significantly, as 90% of adult respondents stated they spent no more time outside than before.

Home zone was a good idea	60% yes
Appearance of streets improved	78% yes
Speed of traffic	37% decreased, 57% same, 5% increased
Danger to children from traffic	65% safe
Danger to adults from traffic	73% safe
How often they walk	97% unchanged
Time spent outdoors by adults	90% unchanged
Time spent outdoors by children	89% unchanged

Table 11 – Adult Perceptions of Nobel Road Home Zone Source: Tilly et al, 2005

The Five Roads Area

The Five Roads Area home zone is located in West Ealing, near Ealing Town Centre and a main shopping area (Fig. 16). Five roads make up the site, hence the name of the scheme. The area is bounded by St. Leonard's Road to the east, Drayton Green Road to the west, and a railway line to the north. The Southern boundary is marked by Uxbridge Road, a busy street with various offices and shops. West Ealing Train Station sits just west of the home zone on Drayton Green Road (Wheeler et al, 2005a). The site contains roughly 400 households, most of which are single family or semi-detached dwellings. Approximately 36% of households have children under 17 years of age (Wheeler et al, 2005a).

Figure 16 - The Five Roads Area home zone

Partners in the project included the London Borough of Ealing, Five Roads Forum (residents' association), and engineering consultants and landscape architects appointed by the Borough Council. Objectives devised by these stakeholders included (Wheeler et al, 2005a):

- Improved perception of road safety
- Increased opportunity for children's play
- Increased neighbourhood involvement
- Decreased vehicle speeds

Gateway features at each of six entrances include raised tables with narrowed vehicle paths, as well as planters with mosaics incorporating street names (Fig. 17). Raising carriageways to the height of footpaths creates shared surfaces at several locations (Wheeler et al, 2005a). Echelon parking on alternating sides of streets creates a winding vehicle path, thus slowing traffic while making parking more efficient. Additional tree planting and improved lighting creates a more pedestrian friendly environment. A point closure on Hastings Road near Broughton Road prevents cars cutting through the home zone to avoid traffic on Uxbridge Road to the south, although emergency services hold a key to the gate (Fig. 18) (Wheeler et al, 2005a). Red block paving on vehicle paths inform drivers of layout changes throughout the home zone.

Figure 17 - Gateway feature with mosaic

Figure 18 - Hastings Road before the home zone

Objectives of the Five Roads Area home zone were met, as shown by resident surveys and traffic data. The majority of adults (75%) supported the scheme, with 74% stating children were safer from traffic (Table 12). Most children (83%) believed the appearance of streets had improved, with all children stating it was 'more fun' or 'the same' playing outside (Table 13). Over two-fifths of children (42%) thought people were friendlier in the streets, with none saying people were less friendly (Wheeler et al, 2005a). Vehicle speeds and traffic flows decreased significantly, creating a safer environment for residents. Vehicle speeds on Denmark Road did not change, although they were already low (Table 14). Traffic flows increased on Denmark Road, likely as a result of the point closure on Hastings Road (Table 15). Some residents complained that parking is more of a problem in the home zone, although the number of available spaces has not changed (Wheeler et al, 2005a). Home zone measures have created a safer residential environment in the Five Roads Area, while providing greater opportunity for outdoor activity and interaction.

Home zone was a good idea	75% yes
Appearance of streets improved	76% yes, 11% no, 13% undecided
Danger to children from traffic	74% safer
Danger to adults from traffic	73% safer
Time spent outside	21% more, 79% same
Time their children spent outside	30% more, 53% no change

Table 12 – Adult Perceptions of the Five Roads Area Home Zone Source: Wheeler et al, 2005a

Appearance of streets	83% nicer, 11% worse, 6% don't know
Number of cars on the streets	86% less, 5% more, 9% don't know
Speed of cars	90% slower, 5% not slower, 5% don't know
Friendliness on the streets	42% more friendly, 58% same,
Drivers changed the way they drove	68% yes, 18% no, 14% don't know

Table 13 – Child Perceptions of the Five Roads Area Home Zone Source: Wheeler et al, 2005a

STREET NAME	BEFORE	AFTER	CHANGE
Broughton Road	1532	1049	(- 32%)
Denmark Road	656	802	(+ 22%)
Hartington Road	1536	381	(- 75%)
Hastings Road[1]	902	674	(- 25%)
Hastings Road[2]	2377	435	(- 82%)

Table 14 – Mean Daily Traffic Flows in the Five Roads Area Home Zone Source: Wheeler et al, 2005a

[1] East of point closure near Broughton Road

[2] West of point closure near Broughton Road

STREET NAME	BEFORE	AFTER	CHANGE
Broughton Road	32.8	23.0	- 9.8
Denmark Road	23.8	23.8	0
Hartington Road	33.5	23.3	- 10.2
Hastings Road[1]	32.3	29.5	- 2.8
Hastings Road[2]	31.4	25.7	- 5.7

Table 15 – Mean Vehicle Speeds in the Five Roads Area Home Zone (km/h) Source: Wheeler et al, 2005a

[1] East of point closure near Broughton Road

[2] West of point closure near Broughton Road

Summary of the Pilot Schemes

Transport Research Laboratory (TRL) monitored seven pilot home zone schemes in England and Wales in the early 2000s, including the four schemes discussed previously. Results have been positive: pedestrian safety and general aesthetics have improved (Webster et al, 2006). Mean vehicle speeds decreased by an average of 24% (7.6 km/h), with the number of vehicles exceeding 32 km/h falling by 30%. Traffic flows decreased by 24% on average (Webster et al, 2006). The schemes created more pedestrian friendly environments, although residents spent only slightly more time outside (Webster et al, 2006). Improving the street environment has created the opportunity for greater community involvement and interaction should the residents choose to take advantage of it. Home zones in England have improved residential neighbourhoods for all road users.

POLICY AND PLANNING DOCUMENTS IN HRM

Two levels of authority must be addressed before implementing home zones in Halifax: provincial and regional. The Municipal Government Act (MGA) is provincial enabling legislation which applies to all parts of Nova Scotia. It describes what municipalities can regulate, and how they can go about regulating it. The Motor Vehicle Act is another relevant piece of provincial legislation, primarily in establishing liability amongst street users. The Regional Municipal Planning Strategy (RMPS) is an overarching policy document that guides development in HRM. Regulations related to the subdivision of land are contained in the Regional Subdivision Bylaw (RSBL), with specific sections dealing with streets. HRM Municipal Service Systems (Design Guidelines) contains street standards. Reviewing these documents identifies several statements in line with goals of the home zone approach, as well as regulations that present challenges.

Supportive Policy

Section 190(b) of the MGA enables municipalities to "assume the primary authority for planning within their respective jurisdictions, consistent with their urban or rural character, through the adoption of municipal planning strategies and land-use by-laws consistent with interests and regulations of the Province" (MGA, 1998). The RMPS predicts the population of HRM will increase by 84,400 between 2001 and 2026, with 58,750 new dwelling units created over the same period (HRM, 2009a). This presents an opportunity for HRM to promote "walkable, mixed-use communities where people can be more active in their daily lives" (HRM, 2009a: 14). In dealing with increased demand for housing "the approach is to shape settlement in such a way that transit and other alternatives to commuting will become more viable" (HRM, 2009a: 36). Objectives articulated here show an interest in changing the way communities are designed in HRM.

The RMPS mentions the approach in HRM has traditionally been to think of roads simply as a means of moving automobiles. However, as HRM evolves in the future "the function of the roads will change to accommodate and encourage alternative modes of transportation" (HRM, 2009a: 71). The RMPS states "streets should be considered part of the public space. They should include not only the road itself, but also the sidewalks, landscaping and other public spaces" (HRM, 2009a: 71).

These statements show the vision of the future for HRM includes a desire to make communities more vibrant and liveable, with streets playing an important role. HRM is currently developing a 'Road and Road Network Functional Plan' that will help address these changes. This section of the RMPS acknowledges (HRM, 2009a: 77):

> "land use planning can help decrease traffic speeds and volumes through neighbourhoods by reducing front yard setbacks, increasing planting along boulevards, and narrowing lane widths (while maintaining an acceptable minimum width to accommodate emergency vehicles). All can give the illusion of a narrow street and make motorists feel uncomfortable driving at higher speeds or cutting through such neighbourhoods"

This shows home zones are an appropriate approach to meet HRM's goals for the future.

Regulatory Barriers

The MGA (1998) allows municipalities to adopt a subdivision bylaw through sections 205 and 271. A subdivision bylaw may regulate street design and construction, as well as street widths (MGA, 1998: s. 271(3)(g), (k)). Section 24 of the RSBL explains that design standards and regulations for each classification are defined in the Design Guidelines (HRM, 2009b). These standards are guidelines rather than rules, which can be adjusted if approved by the HRM Engineer (HRM, 2009c). For example, HRM has reconstructed a few streets with 7.5 metre carriageways (Jeff Spares, personal communication, 2009-11-10). Residential streets in HRM fall under the 'Local Street' classification in the RSBL, which has the following characteristics (HRM, 2009c: A-32):

- Traffic movement is a secondary consideration, with land access as first consideration
- On-street parking is permitted
- Average daily vehicle flow of less than 3,000, characterized by an interrupted flow
- Average off-peak running speed of 15-30 km/h (average over entire trip, not speed limit)
- Access for passenger and service vehicles, large vehicles restricted
- Connects to local streets, minor collectors, and some major collectors

A well designed street system "can segregate through traffic from local traffic and assure that collector and higher classed roads as well as local-serving streets are designed and constructed to standards that reinforce their intended use" (HRM, 2009c: A-31). The Guidelines include general principles and objectives for effective street design consistent with the aims of home zones (Table 16). They promote safe and comfortable residential environments protected from traffic-related danger. One principle states street design and layout should reinforce the function of the street. Current standards reinforce residential streets as conduits for vehicles, while ignoring the function of streets as public space. While the intentions of the Design Guidelines mirror those of the RMPS, regulations concerning street design are inconsistent with these aims and present an impediment to introducing home zones in HRM.

PRINCIPLES FOR DESIGN OF STREETS
1) Street layout, design, and control should express and reinforce street function.
2) Local streets should be linked to higher classification streets in a way that provides good access to other parts of the community and region, and minimizes the chances of the local streets' use by through traffic.
OBJECTIVES FOR DESIGN OF RESIDENTIAL STREETS
1) To permit comfortable and safe pedestrian and bicycle movements, as well as motorized vehicular movements, and protect vulnerable users such as children, persons with disabilities, and elderly persons.
2) To enhance the overall aesthetics of the neighbourhood through well-designed street layout and street landscaping.
3) To protect local streets from through traffic: vehicles travelling on these streets should have a trip origin or destination in the area served by these streets.
4) To protect local streets from vehicles moving at excessive speeds.
5) To protect residential streets from parking unrelated to residential activities.
"A NEW VISION FOR URBAN TRANSPORTATION" PRINCIPLES (TRANSPORTATION ASSOCIATION OF CANADA)[1]
1) Promote walking as the preferred mode for person trips.
2) Increase opportunities for cycling as an optional mode of transport.
3) Create an environment in which automobiles can play a more balanced role.

Table 16 – Select Principles and Objectives for the Design of Streets Source: HRM, 2009c

[1]Document adopted by HRM Council in 1997

Despite apparent intentions of the various documents current residential street regulations cater to moving vehicles quickly (Table 17). None of these standards contribute to more liveable and walkable communities, or encourage the use of bicycles. They do nothing to promote the street as a public space. The RMPS mentions techniques for reducing vehicle speeds in residential neighbourhoods, and Section 101 of the Motor Vehicle Act (1989) states motorists shall not drive "at such a speed or in such a manner as to endanger the life, limb or property of any person". Despite this, the design speed of Local Streets remains at 60 km/h. Minimum carriageway widths are larger than necessary, encouraging higher vehicle speeds. Long sight distance requirements and high minimum centreline curve radii ensure roads remain straight with shallow curves, further encouraging high driving speeds. These regulations are impediments not only to implementing home zones, but to creating effective residential streets and neighbourhoods in HRM in general. Requiring that carriageways be centred in the right-of-way further limits design opportunities within home zones.

Design Speed	60 kilometres per hour
Minimum Centreline Curve Radius	100 metres
Minimum Sight Distance	65 metres
Minimum Width of Right-of-Way	16 metres
Minimum Width of Carriageway	9 metres
Location of Carriageway	Centred in Right-of-Way

Table 17 – Local Street Standards in HRM Source: HRM, 2009c

LOCAL CHALLENGES

Various local challenges must be addressed before implementing home zones in HRM, apart from current street design standards. Interviews with local professionals helped identified these potential issues. Interviewees included:

1. HRM Planner
2. HRM Design Engineer
3. HRM Traffic Engineer
4. HRM Fire Department Representative
5. HRM Public Works Representative
6. Halifax MLA
7. Private Planning Consultant
8. Private Planning Consultant

Feedback was generally positive, with seven interviewees stating the concept could work in Halifax if a few issues were addressed. Following sections outline the most common potential challenges identified through interviews.

Snow Removal and Storage

Dealing with snow was the most common issue raised, with seven interviewees identifying it as a challenge. Access for snow ploughs on narrowed or winding vehicle paths was the greatest concern. However, HRM owns a variety of ploughs and currently uses standard pickup trucks to plough some residential streets. Using smaller ploughs is less efficient, but it should not be a determining factor in designing residential streets. Introducing obstacles on the street was another issue for snow removal, but if vertical features are set back from the vehicle path they should not present a problem. Such features could help plough drivers identify the boundaries of the vehicle path in the absence of curbs. Appropriate design can address concerns about snow storage, by leaving periodic spaces along the carriageway. Widened areas, recommended by the Dutch and the English to allow cars to pass one another on narrowed stretches, present further opportunity for snow storage. Careful design with input from HRM Public Works can address potential challenges related to snow removal and storage.

Access for Emergency Vehicles

Half of the interviewees identified emergency vehicle access as a potential challenge, with narrow vehicle paths cited as the greatest concern. This should not be a problem, as fire trucks in HRM are approximately 2.4 metres wide requiring vehicle paths at least 3 metres wide for access (David Smith, personal communication, 2009-10-26). Winding vehicle paths can cause problems, as turning radii for fire trucks are greater than those of passenger cars. Swept path analysis using computer programs or full scale mock-ups can help identify issues. Some schemes in England include 'overrun areas', spaces at curves or intersections that must be kept clear to allow oversized vehicles to turn (Jones and IHIE, 2002). Including emergency services in the design process is the most effective means to create functional home zones that ensure access for all oversized vehicles.

Paving Stones

Half of the interviewees stated paving stones would not work in Halifax due to the climate. Concerns related to freeze-thaw cycles in the winter, causing the ground to heave and potentially displace pavers. This could result in trip hazards or snow ploughs damaging or pulling out the stones. Higher initial costs and the necessity of obtaining a supply of replacement pavers was also a concern. One interviewee stated stone pavers would be suitable in this climate, as long as they are set properly. Stamp-dyed asphalt could be a suitable alternative, which involves adding dye to the asphalt mixture and stamping in patterns while still warm. Various colours and textures are possible while eliminating the issues discussed above. Three interviewees stated stamp-dyed asphalt would be suitable in Halifax, while none stated it would not be suitable. Climate conditions and cost suggest paving stones may not be suitable in Halifax, although similar results are possible with stamp-dyed asphalt.

Reduced Sight Lines

Three interviewees identified reduced sight lines as a potential safety issue, with concerns relating to motorists not being able to see pedestrians entering the street. Recommended sight distances of no more than 12 metres in England are based on stopping distances at 16 km/h (Jones and IHIE, 2002). This is not suitable for Halifax,

as it is unlikely speeds would drop sufficiently in home zones upon introduction. However, current minimum sight distances in HRM of 65 metres are much longer than necessary. Sight distances should be addressed in the design process for each site, ensuring they are appropriate in the local context rather than setting a minimum standard. As the concept remains relatively unknown in HRM traffic calming should be achieved by other means, such as winding vehicle paths.

Cost

Three interviewees identified cost as a barrier to introducing home zones in Halifax. Retrofitting streets is expensive, as the costs of partially rebuilding a street can be high. However, additional costs of street construction in new developments built as home zones should be negligible (Gereint Killa, personal communication, 2009-11-29). Any additional construction costs would likely relate to materials used. Economic factors should not act as a barrier to introducing home zones in Halifax.

Utilities and Services

Two interviewees thought underground utilities and services could be problematic on home zone streets. This is not any more of an issue in home zones than on standard streets. Representatives from these companies can identify locations of existing pipes as well as other potential issues, which can be considered in designing the street. Input from these companies for new home zones identifies locations that are accessible for maintenance without limiting design potential (DfT, 2005). Addressing potential issues early in the process reduces the chances of larger problems later on.

Summary of Interviews

Challenges identified in interviews should not act as barriers to implementing home zones in HRM. Appropriate design can address all concerns voiced by interviewees. For example, two interviewees identified removing curbs as a safety issue. Bollards can provide greater protection on a shared surface while making the entire street more accessible for pedestrians. Six interviewees felt current traffic calming techniques were ineffective. Home zones represent an opportunity for HRM to make residential neighbourhoods safer from vehicle traffic, while improving community involvement and interaction.

RECOMMENDATIONS

This report illustrates the suitability of the home zone approach for Halifax, Nova Scotia. Current literature and case examples highlight the success of the approach in other countries, particularly England. Analyzing local policy shows the potential for home zones in Halifax, although some changes are necessary. Interviews with professionals identify local challenges, all of which are addressed. Home zones represent an opportunity to improve the quality of residential streets in Halifax, while reinforcing the function of streets as public spaces. Recommendations include amendments to the Regional Subdivision Bylaw (RSBL) to allow home zones in HRM, along with pilot projects to increase public awareness.

Suggested Policy Changes

Objectives for the future of neighbourhoods and streets in HRM planning documents suggest the home zone approach is suitable for residential areas in Halifax. Existing regulations concerning streets do not match the aspirations of the planning documents. Amendments to the RSBL allow these obstacles to be overcome, enabling introduction of home zones in HRM.

Section 23 of the RSBL classifies streets in HRM, with residential streets under the category of 'local streets'. Section 24 states "the characteristics of the street classification shall be as defined in the Design Guidelines" (HRM, 2009b: 9). The following amendments are recommended to enable the designation and construction of home zones:

1. Add the classification 'home zone street' to Section 23

2. Rename Section 24 as Section 24(1)

3. Section 24 (2): 'Notwithstanding section 24 (1), characteristics of home zone streets shall be defined in section 24 (3) of this document.'

4. Section 24 (3): 'Home zone streets are designed to meet the needs of all road users, including pedestrians, cyclists, and motorists. The entire right-of-way is a shared public space, which may be used for pedestrian activities as well as moving vehicles. The following standards apply to the home zone street classification:'

a) Networks of home zone streets shall not exceed a 400 metre radius.
b) Carriageway widths shall be at least 3 metres, widened to 6.15 metres at intersections.
c) Carriageways less than 4.5 metres wide require 'widened areas' every 40 metres or less.
d) Widened areas shall be at least 4.5 metres wide, extending a minimum of 20 metres.
e) Speed reducing provisions, such as vertical features or horizontal shifts, shall not be spaced more than 30 metres apart.
f) Footpath/sidewalk widths shall be at least 1.8 metres, or 1 metre over short distances.
g) Design speed shall be no greater than 25 kilometres per hour.
h) Carriageways may be located in any portion of the right-of-way.
i) Other design characteristics, such as right-of-way widths, centreline curve radii, and sight distances, shall be determined on a site-to-site basis and be approved by the Engineer.

Recommended design standards have been adapted from Dutch and British examples (CROW, 1998; Jones and IHIE, 2002), with additions suitable for Halifax. A design speed of 25 kilometres per hour ensures needs of pedestrians are taken into account along with those of motorists. Allowing carriageways to be located in any portion of the right-of-way creates necessary freedom for designing home zone streets. These design standards should be viewed as guidelines rather than strict rules, requiring final approval by the Engineer as stated in the Design Guidelines (HRM, 2009c). Appendix A includes a brief guide to designing and implementing home zones.

Pilot Projects

Halifax residents need to be educated about home zones, as the concept is relatively unknown in HRM. Pilot projects present the best opportunity to introduce the approach, as they allow people to experience home zones for themselves. If initial projects are successful demand will increase, legitimizing the approach. Two options exist for introducing the concept in Halifax: new build home zones and retrofitting existing streets.

New build home zones allow greater flexibility of design, with minimal extra costs. New home zones would likely be located outside the urban core, as more land is available for development off the Halifax Peninsula. Sites away from the Peninsula would experience less pedestrian and vehicular traffic, thus reducing exposure. Retrofitting existing streets allows introduction of home zones into existing neighbourhoods. Increased public awareness is the main benefit of this approach. Larger numbers of people experiencing home zones will increase awareness of the concept. Motorists moving through these neighbourhoods will eventually adapt to the idea of treating the street as a public space shared by all road users. Retrofitting existing streets is expensive, and further research is necessary to identify potential funding sources to cover costs for pilot projects. Despite higher capital costs the social return is invaluable. Appendix B includes a checklist for determining suitability of streets for conversion to home zones. Whether retrofitting existing streets or constructing new home zones, pilot projects provide examples residents can experience firsthand. Home zones represent an opportunity to change the role of streets in Halifax, addressing the needs of all road users.

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APPENDIX A – THE DESIGN AND IMPLEMENTATION PROCESS

Selecting and Organizing Schemes

1) Identify the characteristics of the area, such as traffic flows, accident figures, population, housing mix and density, and potential pedestrian connections with surrounding areas. This information can help inform the objectives of the scheme.

2) Define the area, taking natural boundaries into account. Home zones should not exceed a 400 metres radius, with easy access to public transportation. Larger schemes may need to be divided into smaller schemes to address the needs of residents.

3) Identify the community, as it is important to involve representatives from all groups. This includes children, teenagers, adults, the elderly, people with disabilities, and minorities.

4) Identify other resources that can be beneficial for the scheme. Schools or community centres can form focal points for the neighbourhood, and should be considered in the design. Community groups, non-profit organizations, and local politicians can contribute resources and provide input.

5) Identify concerns of residents as well as other stakeholders. Resident input can inform designs and contribute to developing objectives for the scheme. Input from stakeholders helps identify potential issues early, so they can be addressed in the design process. Stakeholders include: emergency services, utility companies, public works, and HRM planners and engineers.

6) Create time frames for the scheme. Larger projects may require several phases, which should be determined early. Funding sources and time frames should also be established.

7) Develop objectives for the scheme, including input from residents and other stakeholders.

Design Process

1) Consider the context in which the scheme is located. Address input from residents and stakeholders, as well as the objectives for the scheme. Connections with surrounding areas are of primary importance.

2) Translate the concept to fit the needs of the area. Every neighbourhood is different, and as a result every scheme is different. Techniques suitable for one scheme may not work in another, thus it is important to consider all potential options.

3) Select materials, involving contractors and HRM staff. Ensure chosen materials are suitable for the scheme and cost is not prohibitive. Future maintenance costs and issues should also be considered.

4) Develop a concept design and present it to residents and stakeholders. Identify areas of concern and revise original design.

5) Test revised design using computer programs or full scale mock-ups. Address any potential problem areas and revise design.

6) Develop a final design.

Implementation

1) Ensure predicted funding is available prior to commencing construction. Unrealistic budgets can force last minute design changes, to the detriment of the entire scheme.

2) Consult and cooperate with utility companies to ensure construction is efficient as possible. Delays can lead to extra costs, and potentially last minute changes to the design.

Monitoring

1) Specific monitoring tools depend on the objectives developed for the scheme. Use tools that will allow effectiveness of the scheme to be monitored, such as traffic counts or resident surveys. Information gathered can be used to improve later schemes.

Sources: (Biddulph, 2001; DfT, 2005; Jones and IHIE, 2002)

APPENDIX B – IDENTIFYING SUITABLE STREETS FOR RETROFITS

The following checklist is intended to identify sites in Halifax that are suitable for conversion to home zones. The more criteria a network of street meets the more suitable it is for a retrofit. Majority support from local residents is the only required characteristic.

- ☐ Majority of residents support the home zone
- ☐ Network of streets does not exceed a 400 metre radius
- ☐ All streets within the site are classified as 'Local Streets'
- ☐ Streets experience no more than 100 vehicles per hour during the afternoon peak
- ☐ Streets experience minimal through traffic
- ☐ Streets are not access routes for emergency services
- ☐ Transit stops located within approximately 400 metres of any spot within the site
- ☐ Schools or other community facilities located within or at the periphery of the site
- ☐ Homes oriented towards the street, providing natural surveillance
- ☐ Streets require maintenance (opportunity to reduce potential costs)

Sources: (Biddulph, 2001; DfT, 2007; Jones and IHIE, 2002)