Report

Neighborhood Traffic Management Program

City of
Middleton, WI

October 2005
Rev. 11/3/15

Report for

City of Middleton, Wisconsin

Neighborhood Traffic Management Program

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SECTION 1
GENERAL

1.01 PURPOSE

The City of Middleton seeks to address neighborhood traffic concerns through a community-based program, the Neighborhood Traffic Management Program (NTMP). The Neighborhood Traffic Management Program implements a series of measures to direct and modify travel behavior through a neighborhood. These measures fall into the following three categories, commonly called the ”3Es”:

1. Education
2. Enforcement
3. Engineering

Education involves measures directed at informing neighborhood residents and drivers of speed limits and increasing pedestrian awareness. Enforcement takes another step and involves the use of police patrols, usually to issue speeding tickets. The final step, engineering, typically involves construction of traffic calming devices.

Figure 1.01-1 Typical Traffic Calming Measure
Source: Dan Burden

Most Neighborhood Traffic Management focuses on traffic calming to reduce the negative effects of automobile use, alter driver behavior, and improve conditions for residents, pedestrians, and bicyclists. Traffic calming uses physical measures to encourage people to drive more slowly. It creates physical and visual cues that induce drivers to travel at slower speeds. Traffic calming is self-enforcing (see Figure 1.01-1).

The design of a roadway itself can encourage slower speeds and reduce cut-through traffic without relying on compliance with traffic control devices such as signs and signals. While elements such as landscaping and lighting do not force a change in driver behavior, they can provide the visual cues that encourage people to drive more slowly.

Typically, traffic calming measures are targeted to reduce excessive travel speeds, too much traffic, and pedestrian/bicycle conflicts. Physical treatments are used, such as medians, roundabouts, road narrowing, speed tables, and diverters, to alter behavior of drivers as they travel through a neighborhood.

This NTMP policy documents the policies and procedures for implementing traffic management measures on existing neighborhood streets. The program only applies to neighborhood and collector streets directly under the City of Middleton's control and does not apply to arterials or to state or county roadways. Collectors can carry higher traffic volumes and, in some cases, operate at higher speeds than neighborhood streets which can limit the number of traffic calming devices which may be considered as solutions.

This program is consistent with the "3E" principals, initially focusing on education, which in some cases is combined with police enforcement and less restrictive measures such as signage (speed limit sign) and striping (bike lanes, parking lanes, and center line striping). If traffic concerns persist after these measures, a neighborhood may move on to more substantial measures such as speed tables, traffic circles, roadway narrowing, or other even more restrictive measures.

SECTION 2
NTM PROGRAM

2.01 OVERVIEW

A. Purpose

Neighborhood support is crucial to successfully implement and sustain traffic management strategies. Therefore, whenever practical, residents, businesses, community groups, and institutions should take the lead in initiating requests for traffic management projects.

B. Process

Figure 2.01-1 graphically shows the NTMP process which is described in Section 2.02.[1]

[1] Portions of this process are based on the City of Madison's Neighborhood Traffic Management Program.

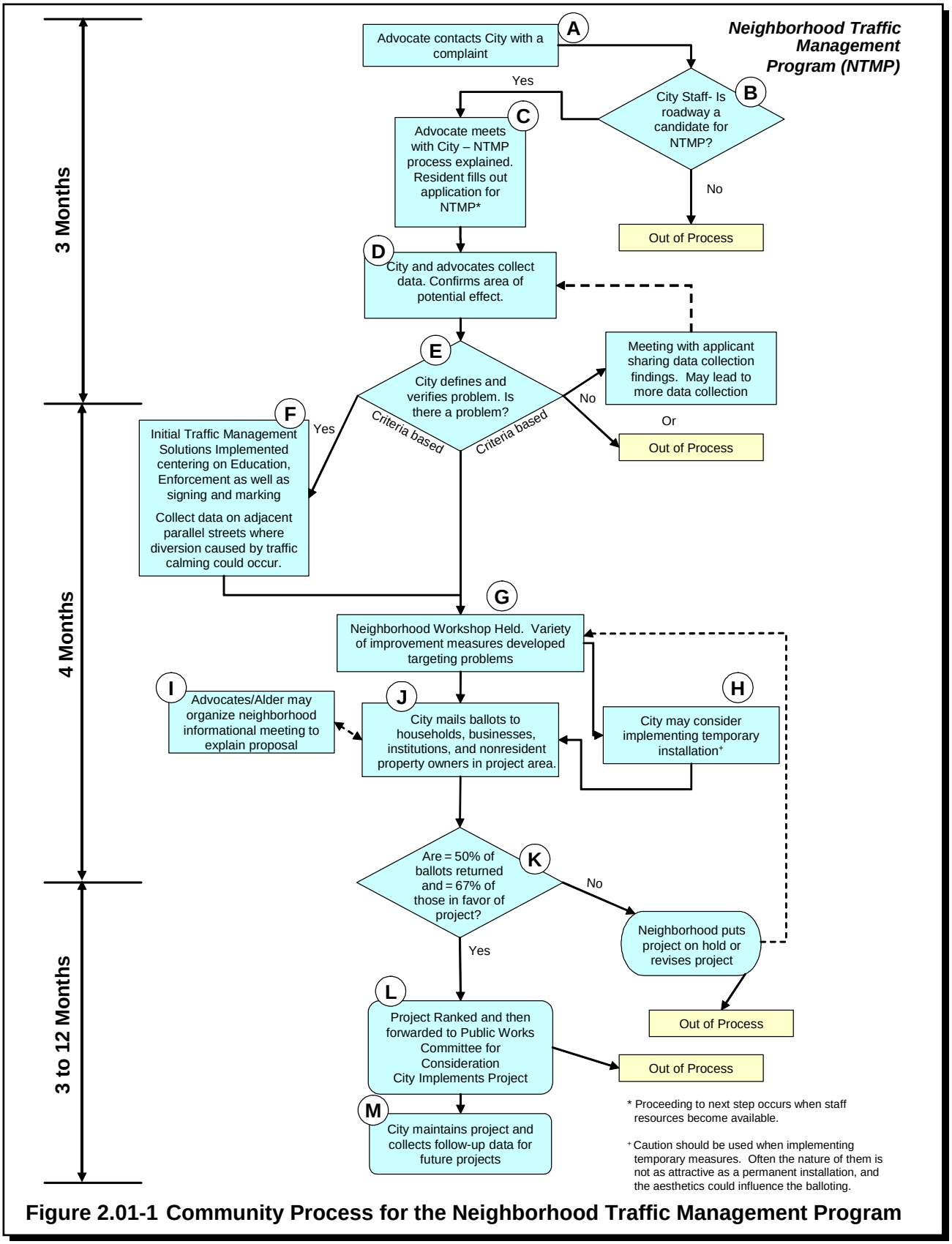


Figure 2.01-1 Community Process for the Neighborhood Traffic Management Program

2.02 PROCESS

The following paragraphs reference the action items in Figure 2.01-1.

A. Initial Complaint

The process starts when a resident, business leader, or community group identifies traffic concern to city engineering staff. This advocate concern can be made through a phone call, letter, personal contact, or through an alderperson.

B. Determination of Eligibility

City engineering staff will determine if the concern focuses on issues pertinent to neighborhood traffic management. Typically these concerns are:

- Motor vehicle speeds consistently above the posted limit.
- Higher than desired traffic volumes.
- Undesirable (unsafe) driver behavior.
- Pedestrian safety or accessibility.
- Bicyclist safety or accessibility.

The city engineering staff member also looks at the street context to see if it is an appropriate candidate for the neighborhood traffic management program. The full NTMP process may not be appropriate or necessary for some concerns. For example, the city may not be allowed to implement measures on roadways that it does not control, and other procedures should be used to address requests for stop signs, routine street maintenance, enforcement, or pavement marking.

To be eligible, the street must:

- Be a residential neighborhood or collector street under the City of Middleton's jurisdiction. (Appendix C contains the classifications for Middleton roadways).
- Have traffic volumes ranging from 800 to 6,000 vehicles per day.
- Have a speed limit of 30 mph or less.
- Not be a cul-de-sac[2].
- Be at least 1,000 feet long.

Additionally, extra consideration should be given to calming measures being proposed for roads that are on a Madison Metro Transit bus route or are a primary route used for emergency response services. Calming measures will be more limited for street that fall into these two categories and extra coordination with Madison Metro Transit and emergency services will be needed.

[2] While cul-de-sacs are not eligible for the NTM program, City Engineering can work with neighbors on cul-de-sacs to provide alternate solutions to concerns.

C. Initial Advocate/City Meeting

City engineering staff meets with the concerned advocate(s) and explains the Neighborhood Traffic Management Program. The staff member helps the advocate define the perceived problem, so that it is understood by all. Then, with the advocate, the staff member makes a preliminary determination if the neighborhood traffic management program applies based on type of concern and neighborhood or collector street eligibility. The staff member provides the advocate with an application and guidance on how to complete it if the concern qualifies for the NTMP

The advocate(s) then fill out an application for the NTM Program. The advocate may or may not have a traffic management measure in mind. Information conveyed in this application includes:

- Location(s) where the effects are experienced.
- The nature of the effect (speeding, high traffic volumes, other).
- The times during the year, week, and day when this effect is experienced.
- Other information. (Weather dependent? Is it a new occurrence? Has it been growing?).

The advocate completes the application. The advocate must obtain signatures from at least 50 percent of the households on the street segment of potential concern. Signatories affirm that the traffic concern described in the application exists and warrants further consideration in the NTMP process. The application does not endorse a particular measure. An example application is included in Appendix B of this report.

D. Data Collection

1. Data Collection

The city staff collects street and traffic data to assist in problem identification, formulation of solution alternatives, and implementation prioritization. These data may include vehicle speeds, volumes, pedestrian and bicycle routes, street geometry, crash history, and pedestrian and bicycle activity.

The advocate and other community members may assist in the data collection. For example, they might conduct a survey or assist in a walking audit of the project area. Walking audits are especially valuable information tools because they allow community members to experience their neighborhood as pedestrians.

2. Confirm Area of Potential Effect

After the city staff collects the data, they will confirm the area of potential effect discussed in the initial resident meeting. The area of effect is unique for each traffic concern; adjacent parallel streets can be affected by calming measures implemented on one specific street. Often the area of potential effect falls within 3 to 4 streets of the area being considered for calming measures. Spot-specific concerns will generally relate to a particular intersection

or street segment, whereas neighborhood-wide concerns will generally relate to conditions or behaviors across a larger geographic area. The potentially affected area for a neighborhood-wide concern should generally be a distinct area that is bounded or bisected by major roadways or geographic features. The city may elect to treat some spot-specific concerns as neighborhood-wide concerns if it decides that they could be better addressed in the context of the whole system.

The city staff also contacts other stakeholders, including emergency responders and nearby school principals. Emergency response vehicles, buses, snow plows and street sweepers generally require special consideration in the design of traffic management measures. These measures can also complement a Safe Routes to School program. If the influence *area* (but not the specific street being considered) includes state or county routes, the city staff will contact the County Highway Department or the Wisconsin Department of Transportation (WisDOT) to inform them of the perceived problem and traffic management alternatives being considered.

E. Determination of Problem

1. Once data is collected, city staff evaluate if the problem voiced by residents actually exists. The evaluation shall be based on specific, definable criteria. Because of limited resources, the city may not be able to implement every project proposed for the NTMP. The NTMP scoring system allows the city to prioritize projects. Table 2.02-1 summarizes the scoring criteria, which are explained in the following subsections. The proposed project's score is the sum of the point values for each of the criteria. Projects with a score of 20 or more are eligible for physical traffic calming measures.

    a. 85th Percentile Motor Vehicle Speed

    As motor vehicle speed increases, noise increases and pedestrian and bicyclist safety decreases. The point value for this criterion is equal to the 85th percentile motor vehicle speed (in miles per hour) measured on the subject street, minus the speed limit, plus five (e.g. 85th percentile speed–speed limit + 5). If possible, traffic volumes should be measured for at least 24 hours using Numetrics counters or multiple tubes capable of calculating speed. The 85th percentile speed should then be determined for the period of concern (rush hour, school hours, etc.)

    b. Excessive Motor Vehicle Speed

    Some of the most dangerous situations are the infrequent vehicles that are traveling substantially above the speed limit. The point value for this criteria is the percentage of traffic that is traveling at least 10 mph above the speed limit. Again, this value should be measured for at least 24 hours using Numetrics counters or multiple tubes capable of calculating speed.

c. Average Daily Motor Vehicle Volume

As motor vehicle volume increases, noise increases and pedestrian and bicyclist access decreases. The local function and feel of the street also diminish. Although the ideal motor vehicle volume on a local residential street is less than 300 vehicles per day (vpd), residents generally are able to accept volumes up to 800 vpd.

The point value for this criterion is equal to the average daily motor vehicle volume (in vpd) divided by 1,000, and rounded to the nearest whole number. If possible, the motor vehicle volume should be measured over a 24-hour period.

d. Distance from Park or School

Motor vehicle noise can have an adverse impact on parks and schools. In addition, these facilities typically attract pedestrians and bicyclists, especially children. Bicycle and pedestrian volumes (or demand) are typically the highest on streets adjacent to the facility and decrease as the distance from the facility increases.[3]

The point value for this criterion is equal to one one-hundredth of the difference of 1,000 and the linear street or sidewalk walking distance between the subject street and the nearest park or school. The minimum point value is 0. Other pedestrian-oriented facilities (such as the library or pool) may also be considered for this criterion. For example, if the problem area on the subject street is 400 feet away from a park, the point value associated to this distance will be (1,000-400) x 0.01 = 6.

e. Critical Location

Certain intersections or street segments have the potential for acute conflict between motorized and nonmotorized traffic. These “critical locations” may include:

- Multiuse trail crossings. (10 pts)
- Intersections where the minor street is marked as a bicycle route. (5 pts)
- Intersections staffed by a school crossing guard. (10 pts)
- Streets or intersections with high bicycle or pedestrian volumes (15 or more during a peak hour). (10 pts)
- Streets or intersections within a school zone (based on Safe Route to School Plan–generally 3 blocks surrounding a school area). (5 points.)

A project that improves conditions for bicyclists or pedestrians at a critical location may receive up to 10 points for this criterion, depending on the extent of both the need and the improvement.

[3] Current pedestrian and bicycle volumes can be a poor indicator of actual pedestrian and bicycle travel demand if roadway and traffic conditions discourage these modes.

f. Crash History

Residential NTMP areas with high crash frequency locations may indicate a safety concern that could be mitigated through the NTMP program. The point value assigned to this criteria is the number of reported crashes that have occurred at this location over the last three years. The point value for the crashes will be included if NTMP measures could mitigate future crashes (for example DUI crashes may be unrelated to roadway layout and geometry, and so would not garner any points.)

g. Pending Road Construction

Traffic calming measures can be easily implemented at little additional cost when roadway plans are prepared for reconstruction. When residential streets are planned for reconstruction within three years of passing the neighborhood balloting (see paragraph K below), the City will seek to capitalize on this opportunity and encourage the implementation of traffic calming measures as part of the reconstruction project. To acknowledge this criteria and opportunity, 15 points is awarded to the scoring.

h. Neighborhood Planning

Neighborhood-wide projects typically require extra effort and produce more comprehensive traffic management solutions. To acknowledge this effort, the city may award 5 points to a neighborhood-wide project for this criterion. This is a subjective measure.

The score for a neighborhood-wide project is the average of scores for individual project elements, and rounded up to the next whole number. The addition of 5 points also reduces the penalty incurred by project elements that score higher than the overall project average.

2. If the project scores a point value of 20 or above, city staff should define the problem to the extent possible and develop initial traffic management solutions with residents.

Criterion	Point Formula
85th Percentile vehicle speed	85th Percentile motor vehicle speed (in mph) – speed limit + 5
Excessive motor vehicle speed	Percent of traffic traveling at least 10 mph over speed limit
Motor vehicle volume	Average daily motor vehicle volume (in vpd) / 1000
Distance from school or park	(1,000 - linear distance to nearest school or park in ft)/100
Critical location	Up to 10 points
Crash history	Number of crashes in last 3 years
Pending road construction	15 points
Neighborhood planning	5 points

Table 2.02-1 Project Scoring Criteria

F. Initial Traffic Management Solutions

Generally it is desirable to address traffic problems with the least restrictive measures possible and implement geometric solutions only after other measures have proven ineffective. Therefore, city staff may initially choose to implement lower cost, less disruptive traffic management solutions before proceeding into more formative traffic calming measures. These solutions fall into three categories:

1. Education

The neighborhood can be educated concerning the traffic management problem. This education can include:

- Radar speed trailer
- Brochures/pamphlets describing the problem, including suggestions for what the neighborhood residents can do to improve the situation
- Speed watch programs, staffed by neighborhood volunteers

2. Enforcement

If police resources are available, regular and random patrol and enforcement activities can address speeding and other traffic control concerns. Enforcement is more effective when citations are issued, rather than warnings.

3. Engineering

The City may choose to install enhanced signing or pavement markings to address concerns. Examples of these measures can include:

- Roadway narrowing through pavement marking of medians, bike lanes, or parking lanes.
- Increased visibility of pedestrian crossing pavement markings.
- Additional warning signs.
- Additional speed limit signs.

At this time, City staff may want to collect traffic data on adjacent parallel streets that could be affected by traffic calming measures on the subject street. This data can later be used to determine what effect, if any, traffic calming had on adjacent streets.

G. Neighborhood Workshop

While the initial measures are being implemented, the project should move into the neighborhood workshop stage. City staff and the district alderperson should establish a date and location with residents for the workshop. The city should notify residents in the project area through mail of the workshop. Residents should also encourage their neighbors to attend.

1. Workshop

The workshop identifies issues and potential solutions. The city helps participants understand the full range of possible measures, their likely effectiveness, and their costs. Participants articulate their goals for their neighborhood and discuss how NTMP tools might help them realize those goals. Concepts or alternatives that should be considered at the workshop are described in:

- *Streets and Sidewalks, People and Cars: The Citizens' Guide to Traffic Calming* by Dan Burden (April 2000).
- TrafficCalming.org, http://www.trafficcalming.org
- Wisconsin Walks, http://www.wisconsinwalks.org
- ITE Traffic Calming State of the Practice, http://www.ite.org/traffic/tcstate.htm#tcsop

Chapter 3 of this report also lists several traffic calming measures, their appropriate application, their expected effectiveness, and their costs.

At the workshop, the participants also create a project committee of 3 to 10 residents that works with the City to develop a specific NTMP project proposal. The goals, available NTMP tools, and committee charter become the NTMP project action plan. A committee charter identifies the goals of the committee, the committee members, activities the

committee anticipates they will perform, responsibilities, and the length of time the committee intends to be active. An example committee charter is contained in Appendix D.

2. Assessment

The city reviews and refines the specific project proposal. Bicyclist, pedestrian, bus, emergency vehicle, and maintenance needs may influence the placement and design of specific measures. In addition, the project must be feasible and consistent with safety and engineering principles.

If the size of the project area has changed since the application, the city adjusts the project area and may require that the advocate obtain additional signatories to represent 50% of the residents and property owners in the larger study area. The city may also adjust the project area if it determines that the proposed measures are likely to cause substantial traffic diversion.

H. Temporary Measures

In general, temporary traffic calming devices should be used with caution. A number of agencies have adopted a policy of installing temporary traffic calming devices to test their effectiveness and the public's acceptance. There are a number of advantages and disadvantages to installing temporary traffic calming devices. Advantages include the cost and the opportunity to field test devices without committing to permanent installations. The disadvantages, however, can outweigh the advantages. Temporary devices such as traffic circles or curb extensions are generally not as effective as permanent installations as they do not have he same level of visual break created by landscaping. In addition, the installations are usually unattractive and reduce the acceptance and support by the general public or neighborhood residents. Most temporary installations also become attractions for road litter adding to the aesthetic problem. If, for example, a city has never installed traffic circles and the citizens are not familiar with circles, temporary installation using bumper blocks or barrels will be their first, and possibly only, exposure to a circle. It becomes difficult for them to imagine that such a device placed on a permanent basis could enhance their neighborhood. In general, programs and plans should be well thought out and caution is advised in the use of temporary installations. If temporary devices are used, care should be taken to address the issues of aesthetics and effectiveness.

For proposals that involve street continuity disruptions (diverters, cul-de-sacs, etc.), the city should implement trial temporary traffic calming measures that simulate the project being proposed by the neighborhood. The trial measures should be implemented during the nonwinter months for a duration of at least four months. Examples of trial implementations include:

- Using concrete barriers or barricades for diverters.
- Using barrels for cul-de-sacs.
- Using barrels or delineators for turn restrictions.

Trial installations help neighbors understand the potential effectiveness of the measures and their effect on area-wide traffic patterns.

I. Neighborhood Informational Meeting

Depending on the participation levels at the neighborhood workshop, neighbors or city staff may feel it is necessary to hold a neighborhood informational meeting to display the project plans and answer questions regarding the proposal. If this is necessary, it should be held prior to the balloting process (see paragraph J).

J. Balloting

If the project is feasible and meets criteria, the city mails one ballot to each household, business, and institution in the project area, and to each non-resident owner of property in the project area. A sample ballot is included in Appendix E. Each household receives one ballot per address.

K. Decision

To pass the balloting, at least 50 percent of the ballots must be returned to the city within four weeks of the mailing and at least 67 percent of the returned ballots must be marked in favor of the project. If the project passes, it moves to the implementation stage.

If the project does not pass, the process stops. An anonymous, typed record of comments received on the ballots is made available for review. At the city's discretion, the project committee may revise the proposed project for a second balloting without restarting the process. To avoid creating a nuisance to the neighborhood, if the revised project does not pass the second balloting, the NTM program will not consider the issue again for a period of at least three years.

L. Project Implementation

1. Scoring

The project's score from step E (Determination of Problem) is reviewed. This score is used to prioritize the projects under consideration for implementation. The project is placed on the NTMP project list, and its score is compared to other projects that have been proposed but not yet implemented. If the project receives a high score that places it near the top of proposed projects, the process continues. If an advocate group volunteers to pay for the project it automatically goes to the top of the city priority list. Unimplemented projects remain on the NTMP list for three years. Every three years city staff will attempt to notify the advocate, who may submit a new application to keep the project on the list for an additional three years.

2. Formal Review

The Public Works Committee reviews the project and makes a recommendation to the City Council. This review includes the project score, the project action plan, the proposed measures, the results of any temporary installations (if applicable), and the results of the balloting. A lower-scored project may proceed if higher-scored projects are implemented or rejected, funding becomes available, or an implementation opportunity (such as street reconstruction) arises.

During the annual budget process, the Council determines whether to fund and implement the project.

3. Implementation

City staff directs implementation of the permanent measures approved by the Council.

Many traffic management measures include landscaping. The city may add trees as part of the project. Other vegetation may be included if a volunteer or organization commits to its maintenance.

Potential project funding sources can include the City's annual capital budget, resident assessment districts, or neighborhood donations. After securing funding, the city Public Works Department has the project installed, either using city forces or by enlisting the services of consultants and contractors.

M. Maintenance and Evaluation

The city Public Works Department maintains the traffic management measure, and the City Public Lands Department maintains any trees in the right-of-way If other landscaping is not maintained by the volunteers, it may be removed at the discretion of the City.

The city will collect traffic data one year after implementation. The data should include motor vehicle speeds, motor vehicle volume, crash rates, and pedestrian and bicycle usage. This data can then be used in the study of potential future traffic calming projects.

2.03 CITY PROPOSALS

The city may also initiate traffic management projects. These projects typically promote specific community goals or enhance general community character. They might be located downtown, near parks or schools, at community gateways, or along important motor vehicle, bicycle, or pedestrian corridors. Collector streets are the most likely candidates for traffic management projects initiated by the city.

Specific traffic management projects are recommended in the city's planning documents. Others may be identified after a review of traffic issues such as crash history, motor vehicle speed, or bicycle and pedestrian safety and accessibility. Wherever practical, street and urban highway reconstruction projects should incorporate traffic management measures. For example, traffic circles and enhanced crosswalks are appropriate for many different street types and urban environments.

Community involvement is crucial to good design of traffic calming measures, and community support is crucial to successful implementation of the NTMP program. Therefore, although projects initiated by the City are not subject to the community proposal process, the City should make every effort to engage residents, businesses, institutions, and community groups.

2.04 REMOVAL OF TRAFFIC CALMING MEASURES

After traffic calming measures have been installed, the City may receive a request for their removal. The City will evaluate such requests in consideration of the following:

- The NTM Program involves significant time in documenting traffic problems (see Section 2.02.E).
- Initial steps of education, enforcement and minimally restrictive engineering measures such as signing and pavement markings have proven ineffective in addressing the problems (see Section 2.02.F).
- Neighbors in the affected area have voted in support of asking the City to address the traffic problems through installation of traffic calming measures (see Sections 2.02.I through K).
- To install a traffic calming measure, the City will have expended significant time and funding to study, plan, design and construct the traffic calming measure.

In recognition of the above, the City will not consider a request for removal of a traffic calming measure within five years of its installation. If a request to remove a traffic calming measure is received following at least five years of its use, the request must include a petition signed by an owner or adult tenant of at least 50% of the properties within the previously determined project affected area (see Sections 2.02.D and G).

Following staff verification that the petition represents at least one adult owner or tenant of at least 50% of the properties within the project affected area, staff will contact the Police Department for input on the proposed removal, and the Public Works Committee will decide whether to send out ballots for removal of the traffic calming feature(s). If balloting is directed by the Public Works Committee, the process will

be the same as for the initial balloting and decision as described in Sections 2.02.J and K. The Public Works Committee reserves the right not to send out ballots, and instead directly decide whether the traffic calming measures should remain in place or be removed. The City reserves the right to initiate removal of traffic calming features at its discretion.

If the balloting shows a neighborhood preference for removal of traffic calming measure(s), the Director of Public Works will schedule removal of the measure(s) as staff time and funding allow. Following removal of the traffic calming measure(s), the area will not be eligible for the Neighborhood Traffic Management Program for five years.

If the balloting shows a neighborhood preference for keeping the traffic calming measure(s), the City will not consider another request for removal within five years of the vote.

SECTION 3
TRAFFIC CALMING AND TRAFFIC MANAGEMENT

3.01 TRAFFIC CALMING AND TRAFFIC MANAGEMENT

There are two basic elements involved in neighborhood traffic management programs. They are classified into traffic calming and traffic management categories. Both categories use physical devices to change driver behavior. Traffic calming measures affect driver characteristics by slowing and/or discouraging through traffic on neighborhood streets. In comparison, traffic management measures change driver street system use patterns by attracting and/or diverting traffic to balance neighborhood street system use.

A. Traffic Calming

Many residents consider traffic calming to involve the installation of stop signs, traffic signals and signs such as Children at Play. Studies have shown that, in most cases, these devices actually have no effect, provide a false sense of safety or increase traffic speeds on residential streets. Traffic Calming measures use physical devices to change driver behavior. It typically involves the modification of streets and street networks that were originally designed in ways that now no longer fully meet the needs or interests of local residents. Different traffic calming measures target different characteristics of driver behavior. Traffic calming measures can be used to mitigate traffic safety problems or reduce speeding and cut-through traffic problems. Typically, one of these problems is identified and a set of calming measures is analyzed as a solution.

Traffic calming measures can be used to achieve the following goals:

- Increase safety for the neighborhood.
- Increase neighborhood amenities (atmosphere and landscaping).
- Decrease traffic intrusion (cut-through traffic).
- Increase internal and external connectivity of neighborhood street network.
- Increase diversity of street use (e.g., the street is used not only for motor vehicle travel, but also for pedestrians, bicyclists, residential gathering place, etc.).
- Increase Ped/Bike use of streets.
- Improve neighborhood identity (traffic circles, narrowings or gateway treatments)

The last four goals are not really directly related to addressing traffic problems, though they may be listed as additional benefits of traffic calming.

Objectives are *measurable targets* that are set to reach the desired goals. Traffic calming strategies directly address the objectives, which in turn foster achieving the goals. Example objectives include the following:

- Decrease vehicle-related crashes.
- Decrease through-traffic movement (cut-through traffic volumes).
- Decrease or increase local street network connectivity.
- Decrease conflict between vehicles and pedestrians and bicyclists.
- Decrease or simplify vehicle-to-motor vehicle conflict points.
- Decrease average and extreme vehicle speeds.
- Increase use of collectors and arterials by motor vehicles.
- Increase bike/ped (nonmotor vehicle) route continuity.
- Decrease traffic noise.
- Increase the quality of the streetscape (e.g., landscaped area in proportion to paved area).
- Increase the sense of a social space for neighborhood residents (e.g., increase the amount of right of way available for uses other than traffic movement.)
- Decrease the amount of street space (pavement width) devoted to motor vehicle traffic.

Traffic calming measures are used to try to achieve the desired objectives. They can be physical alterations to the roadway, or they can be policy changes. Examples of traffic calming measures include the following:

- Physical speed control devices.
- Intersection treatments.
- Alteration of the street form (e.g., narrowed width, curvilinear alignment, curb extensions).
- Zone-based speed control devices (e.g., lower speed limit, perimeter treatments).
- Nonphysical measures (e.g., enforcement, electronic enforcement).
- Dedicated bike/ped accommodations.

Table 3.01-1 shows goals, objectives, and traffic calming measures and how they relate to one another. It is derived and modified from information contained in Chapter 9 of Institute of Transportation Engineer's (ITE) *Traffic Engineering Handbook*.

GOALS								TRAFFIC CALMING MEASURE							
Increase Safety	Increase Amenities	Decrease Traffic Intrusion	Increase Connectivity	Increase Street Use Diversity	Increase Ped/Bike	Improve Local Identity	MEASURABLE OBJECTIVE	Speed Control Devices	Intersection Treatments	Alter Street Form	Zone Conditions	Nonphysical Measures	Reduce Connectivity	Ped/Bike Measures	Policy Measures
3							Decrease Vehicle Related Crashes	3	3	2	2	1	1	1	2
2	2	1			1		Decrease Total Traffic Movement	2		?			2		
1	1	3				2	Decrease Through Traffic Movement (Cut Through)	1		?	2		3		1
3	1	2	X			1	Decrease Network Connectivity		2	?			3		
X	?	X	3		1	2	Increase Network Connectivity						X		2
3							Decrease Intersection Hazards	1	3				2	1	
2					1		Decrease Vehicle/Bicycle Conflict Points	1	1	2	1			2	
2							Decrease Vehicle-Vehicle Conflict Points		3						
3	2			1	1		Decrease Speeds	3	2	2	2	2	1		
							Increase Transit/Emergency Access and Movement	X	X				X		
2	2	2	X			2	Increase Use of Collectors and Arterials	1		1	1		3		2
1					2		Increase Non-vehicle Route Continuity						1	3	
1	1	2					Decrease heavy Vehicle Through Movement	1		1		1	2		3
	2						Decrease Traffic Noise	?			1				
	2					1	Increase Quality of Streetscape			3					
?	2			3	1	2	Increase Sense of Social Space			2	2				
1	1			3	1	1	Decrease Streetscape Devoted to Traffic			2				1	

Note: Read Table *down* from "goals" and *right* to "objectives"; *right* from "objectives" and *up* to "measures."

KEY

3	Key Goal, Objective, or Traffic Calming Measure	1	Potentially Effective Link, Depending on Design and Conditions
2	Supportive Link	?	Uncertain on present knowledge
X	Goals or Measures in Conflict with Objective		

Table 3.01-1 Relating Goals, Objectives, and Measures

For this report, traffic calming measures are organized into the following categories:

1. Vertical deflection speed control devices
2. Horizontal deflection speed control devices
3. Roadway narrowings
4. Gateways/Intersection treatments
5. Reduced corner radii

B. Traffic Management

Traffic Management measures physically alter the street makeup so that traffic patterns cannot remain the same. These measures are quite extreme because they alter route patterns, often increase emergency vehicle response times, and can affect traffic in adjacent neighborhoods or street sections. The following are examples of traffic management measures:

- Restricting certain turn movements
- Installing intersection diverters
- Partial street closure
- Full street closure

These measures should be implemented only as a last resort. If they are implemented, residents of all streets and neighborhoods likely to be affected by rerouted traffic need to be part of the decision making process.

3.02 VERTICAL DEFLECTION SPEED CONTROL DEVICES

Speed Humps are elongated, parabolic humps constructed across a street, perpendicular to the direction of travel. They are typically 3 to 4 inches high and 12 to 14 feet long. Their elongated design allows travel speeds in the range of 15 to 20 miles per hour. Often their height tapers down toward the edge of the street to allow water to drain along the gutter and to permit bicycles to travel over them unimpeded. Speed humps should not be confused with the abrupt speed “bumps” that are often found in mall parking lots.

A **Speed Table** follows the same principles and similar design as the speed hump, yet has a flattened top that sometimes is easier to construct.

A **Speed Cushion** is similar to a speed hump and speed table, yet its width (measured perpendicular to the direction of travel) is only 8 feet. The cushion is positioned centrally in each travel lane. Passenger vehicles must travel over the cushion and therefore must reduce their speed. Vehicles with wide wheel bases (such as emergency response vehicles and buses) are able to straddle the cushion and therefore are able to maintain their travel speed.

A **Raised Pedestrian Crossing** is also essentially a speed table with the flattened portion serving as a sidewalk. The "table" portion of the crossing is typically 10 to 15 feet long (measured in the direction of travel). Studies have shown raised pedestrian crossings to be very effective in causing motorists to yield to pedestrians.

Figure 3.02-1 illustrates these vertical control measures.

There are some considerations with speed humps and other vertical control devices. Generally to be effective, they must be in a series and spaced not more than 100 yards apart. Speed hump spacing and width have been shown to reduce traffic speeds. For example, 12 -foot speed humps spaced at 200 to 250 feet have been shown to result in an 85th percentile speed of 20 mph, a 400 to 450 spacing has been shown to result in a 25 mph speed, whereas, an 800- to 850-foot spacing has been shown to result in a 30 mph speed.

Raised Pedestrian Crossing
Salt Lake Airport
Source: ITE Pedestrian Bicycle Council

Speed Cushion
Source: ITE Pedestrian Bicycle Council

Speed Hump
Source: Portland Office of Transportation

Speed Table
Source: Dan Burden

Figure 3.02-1 Vertical Speed Control Devices

Studies have also shown the following typical 85th percentile speed relationships to speed hump width:

12 ft. speed hump…….15 to 20 mph

14 ft. speed hump…….18 to 23 mph

22 ft. speed table……. 25 to 30 mph

Source: Victoria Transport Policy Institute, TDM Encyclopedia, May 27, 2003, www.vtpi.org

Speed humps or tables should not be used on sharp curves or steep grades. Curves should have a radius greater than 400 feet with a deflection angle of 60 degrees or less. Grades should generally be less than 6 percent. Speed humps should also be located at least 100 feet from the nearest intersection. Extra consideration must be given to roadway drainage, bus routes, emergency vehicle response times, increased vehicle noises (from braking and accelerating), increased exhaust fumes, street sweeper equipment limitations, and snow plowing operations with these measures. Also, speed humps and tables must be properly designed and constructed with tight profile tolerances to provide the correct “ride” and not create undue driver discomfort.

The design must be coordinated with buses and emergency services. Usually, vertical deflection devices, tight corner radii and roadway narrowing devices can be used selectively if coordinated with transit and drivers of emergency vehicles.

3.03 HORIZONTAL DEFLECTION SPEED CONTROL DEVICES

A horizontal deflection speed control device causes drivers to slow down by requiring the driver to drive around a roadway obstruction. They are similar to roadway narrowings discussed in the next section, yet narrowings do not necessarily require the driver to change his travel path.

A **Single-lane Slow Point**, sometimes called a choker, is a narrowing of the pavement between the curb lines that reduces the street width to one lane. This is typically accomplished by realigning the curb and widening the sidewalks and/or planting strips. They effectively create pinch points along the street. Slow points can be installed at midblock locations or used at intersections creating a gateway effect for an entering street.

Slow points require opposing motorists to yield to each other as they approach the slow point. In order to function effectively, the width of the traveled way cannot be wide enough for two cars to pass, generally 16 feet or less.

A **Chicane** horizontally diverts traffic through alternating roadside islands from the left to the right. A similar application to a chicane is an angled two-lane slow point. Chicanes can be subtle or quite restrictive depending on the design and angles (tapers) used. Shifting a travel lane will decrease speeds if the taper is not so gradual that motorists can comfortably maintain their speed. For traffic calming, the taper lengths may be as little as half of those typically used in a standard design.

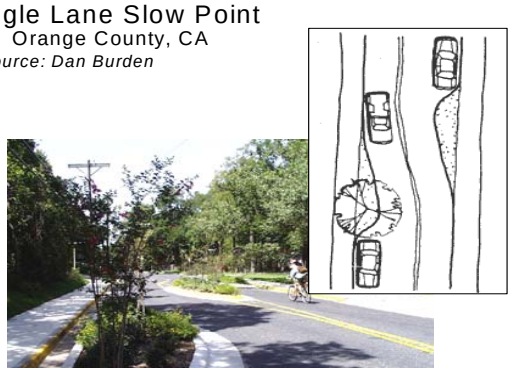
Similar to a chicane, traffic can also be horizontally diverted by shifting parking from one side to the other when there is only roadway width for parking on one side of a street or by building landscaped islands which shift traffic within the street, which also serve as a roadway narrowing.

Figure 3.03-1 illustrates these horizontal speed control measures.

There are several considerations for chicanes and slow points. They should be used only on low-volume, low-speed residential streets. Emergency response providers and sanitation collectors should be consulted before setting the widths. Chicanes and slow points will probably reduce the availability of on-street parking.

If islands are installed, good visibility should be maintained by planting only low shrubs or trees with high canopies. Also, design efforts should be made to ensure bicycle safety and mobility are not diminished.

Single Lane Slow Point
Orange County, CA
Source: Dan Burden



Chicane
Portland, OR

Drawing Source: WalkingInfo.org

Figure 3.03-1 Horizontal Speed Control Devices

3.04 ROADWAY NARROWINGS

Roadway narrowings reduce the width of the traveled way and, by doing so, increase the driver's desire to travel at a slower speed.

Narrow Street Width is the most obvious roadway narrowing measure. Neotraditional neighborhood development is returning to the narrower street widths that were used more than a half century ago, finding these narrow street widths help reduce speed. Roadway narrowing can be achieved in several ways. Lane widths can be reduced to 10 or 11 feet and excess asphalt marked to create a bicycle lane or shoulder. Travel lanes can be removed and on-street parking lanes added. Curbs can be moved to narrow the pavement cross section and expand the width of sidewalks and landscape terrace areas.

Bulb-outs create a roadway narrowing at a street intersection. In many ways, they are a gateway or threshold treatment. Bulb-outs often are coupled with a median island to further reduce the available width of the traveled way. One advantage of placing bulb-outs near intersections is that they reduce the crossing distance for pedestrians. Also, they prevent on-street parking near the intersection, which can increase the intersection sight distance if appropriate landscaping is used.

A **Two-Lane Slow Point** is similar to the single-lane slow point where the street is narrowed yet two lanes are maintained. It differs from the angled two-lane slow point in that there is no horizontal deflection introduced into the travel lane alignment. Sometimes a **Median** is used to further constrict the traveled way. If the travel lane widths are unchanged at the location of the slow point, it will have a minimal effect on speed.

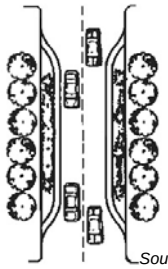
There are several considerations with road narrowing measures. If a parking lane is provided, and there are periods of the day when there are few parked cars, the visual effect of roadway narrowing will be minimized. For this reason, it is desirable to have several bulb-outs into the parking lane to physically reduce roadway width during times when there are no parked cars.

As with the other traffic calming measures, road narrowings must consider roadway drainage, bicycle, bus, emergency service and truck design vehicles.

Figure 3.04-1 illustrates some roadway narrowing examples.

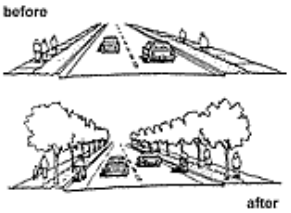
Median Crossing Islands

Source: Walkinginfo.org



Two Lane Slow Point

Source: "Making Streets That Work"



Roadway Narrowing

Source: Walkinginfo.org

Bulb-Outs
Eugene, OR

Source: Dan Burden

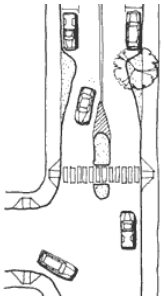
Figure 3.04-1 Roadway Narrowings

3.05 GATEWAYS/INTERSECTION TREATMENTS

A gateway is a geometric change in the roadway that signals a change in environment from a higher speed arterial or collector road to a lower speed residential area. Gateways often place a high emphasis on aesthetics and are frequently used in addition to distinctive signing to identify neighborhoods. Gateways may be a combination of roadway narrowings, bulb-outs, raised intersections, medians, signing, archways, roundabouts, or other treatments (see Figure 3.05-1). Gateways should send a clear message to drivers that their environment has

Raised Intersection - Portland

Source: Walkinginfo.org



Gateway Treatment

Source: Walkinginfo.org

Neighborhood Traffic Circle
Madison, WI

Gateway Treatment

Source: Dan Burdon

Figure 3.05-1 Gateway/Intersection Treatments

changed. Many gateway and intersection treatments have been discussed in the preceding paragraphs. Gateway treatments can also include the use of traffic circles, distinctive arches or public art at street entrances to neighborhoods.

A **Neighborhood Traffic Circle** is a circle placed directly in the center of an intersection. A neighborhood traffic circle differs from a modern roundabout in that its main purpose is not to keep traffic moving but to slow traffic. (Note: Roundabouts are an effective intersection treatment for collectors and arterials, but not for residential streets.) Much like horizontal deflection speed control devices, Neighborhood Traffic Circles reduce vehicle speeds by forcing motorists to maneuver around them. Drivers desiring to make a left turn are directed to go on the far side of the circle (three-quarters of the way around the circle) prior to making the turn. Signs should be installed directing motorists to proceed around the right side of the circle before making a right turn off of the circle. Neighborhood traffic circles are commonly landscaped with bushes, flowers, or grass, most often at locations where neighbors have agreed to maintain the plants. In locations where landscaping is not feasible, traffic circles can be enhanced through special pavement materials, such as stamped or colored concrete.

Reduced corner radii should complement this treatment to discourage high-speed right-turn maneuvers and to prevent left-turning vehicles from turning in front of the circle. The occasional large vehicle going through an intersection with a traffic circle (e.g., a fire truck or moving van) should be accommodated by creating a mountable curb (and perhaps a truck apron) in the outer portion of the circle. As with all other geometric traffic calming measures, close coordination with emergency response providers is needed before implementing a neighborhood traffic circle.

A **Raised Intersection** is essentially a speed table throughout an entire intersection. The raised intersection provides ramps on each vehicle approach and elevates the entire intersection to the level of the sidewalk. The crosswalks on each approach are also elevated as part of the treatment to enable pedestrians to cross the road at the same level as the sidewalk, eliminating the need for curb ramps.

3.06 REDUCED CORNER RADII

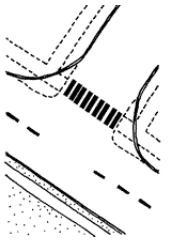
Reduced corner radii can be applied at gateways and neighborhood intersections, yet their application also is appropriate for intersections internal to a neighborhood or business district intersections. Their application may also be appropriate when no gateway effect is desired. Many street intersection curbs are designed to accommodate a large truck's turning movement. This results in larger pavement areas and longer crossing distances for pedestrians. A large curb radius also can result in high-speed turning movements by motorists driving passenger vehicles. Reconstructing the turning radius to a smaller curve will reduce turning speeds, shorten the crossing distance for pedestrians, and also improve sight distance between pedestrians and motorists. It will require some extra turning precautions (due to overtracking) by drivers of very large trucks as they turn around the corner. Smaller trucks and delivery vehicles have few problems with reduced corner radii. When large trucks are infrequent users of an intersection, generally the truck overtracking is a reasonable trade-off for the benefits obtained through reduced curb radii.

Where there is a parking and/or bicycle lane, curb radii can be even tighter, because the vehicles will have more room to negotiate the turn. Curb radii can, in fact, be tighter than many modern guides would advise. Some older cities in the Northeast and in Europe have radii of 2 to 5 feet. In new construction, curb radii should range from 15 to 25 feet for arterial streets with a substantial volume of turning buses and/or trucks. Tighter turning radii are particularly important where streets intersect at a skew angle.

As with all traffic calming measures, there are considerations that should be made before constructing reduced curb radii. In most neighborhood street situations, the design vehicle is not a 50-foot semi-trailer truck. The normal neighborhood design vehicle is a school bus, FedEx type delivery truck, or refuse collection truck. These vehicles do not require large corner radius to enter/exit a neighborhood street especially if opposing lane encroachment is considered acceptable on low volume residential streets. Consideration should be given to providing an easily maintainable surface to minimize damage created by encroaching truck wheels. Effective curb radii should also take into account parking and bicycle lanes.

Emergency response vehicles can also be accommodated with traffic calming measures without adversely reducing their critical response times or on-scene operation. Coordination with local emergency responders is important to the design and location of selected traffic calming and traffic management measures.

Figure 3.06-1 illustrates some applications of reduced corner radii.



Reduced Corner Radii
Source: Walkinginfo.org

Reduced Corner Radii
Source: Dan Burden

Reduced Corner Radii
Source: Dan Burden

Reduced Corner Radii
Source: Peter Lagerwey

Figure 3.06-1 Reduced Corner Radii

3.07 TRAFFIC MANAGEMENT MEASURES

As mentioned previously, traffic management measures physically alter the street so that traffic patterns cannot remain the same. They tend to have much more pronounced traffic effects than traffic calming measures, both positive and negative. Careful planning with all potentially affected neighborhoods should take place before implementing a measure that will alter traffic patterns.

A **Traffic Diverter** is an island built at an intersection that prevents certain through and/or turning movements. Diverters are a very severe traffic management measure because they change traffic patterns and the transportation system by restricting movements. Traffic diverters greatly affect people

living in the neighborhood and should be considered only when less restrictive measures are not appropriate.

There are several types of diverters: diagonal, forced turn, and star. A diagonal diverter breaks up cut-through movements and forces right or left turns in certain directions. A forced turn diverter mandates a certain traffic movement, typically through the placement of channelization islands or roadway closures. The most frequent applications of this are right-in/right-out islands and left-turn in only islands. A star diverter is a cross placed in the center of the intersection that forces right turns from every approach.

There are many implications that should be considered before constructing any type of diverter. Less restrictive measures should be considered first. Neighborhood traffic patterns must be evaluated to see how the diverter will affect other adjacent streets, and a diverter should have very strong neighborhood support before it is implemented. Diverters should be designed to allow full movements by bicycles and pedestrians. Finally, diverters disrupt the transportation system, which may affect emergency response times to portions of the neighborhood. For this reason, emergency response providers must be involved in the design process.

A **Partial Street Closure** uses a semi-diverter to physically prevent vehicles from entering a street at an intersection. A partial street closure could involve closing one direction of a two-way street. As mentioned, partial street closures at the entrance to a neighborhood must consider the traffic flow pattern of the surrounding streets, as these streets will probably experience increased traffic volumes. Partial street closure design should incorporate full (two-way) access for bicyclists and pedestrians. A partial street closure provides better emergency access than a full closure.

Figure 3.07-1 illustrates some of these traffic management treatments.

Right-in/Right-out Diverter
Source: Dan Burden

Left-in Only Diverter
Source: ITE Pedestrian Council

Partial Street Closure
Source: Dan Burden

Diagonal Diverter
Source: Dan Burden

Figure 3.07-1 Traffic Management Measures

3.08 COMPARISON OF DEVICES

Table 3.08-1 shows the approximate cost of some of the traffic calming treatments described in this manual.

As mentioned, various treatments accomplish different objectives. Table 3.08-2 illustrates the effectiveness of several traffic calming measures in reducing traffic volumes. Table 3.08-3 illustrates the effectiveness of several traffic calming measures in reducing traffic speeds. Table 3.08-4 illustrates the effectiveness of several traffic calming measures in reducing traffic crashes. All three tables are derived from the Victoria Transport Policy Institute TDM Encyclopedia, May 27, 2003. www.vtpi.org

Calming/Control Measure	Approx Cost
Speed Hump/Speed Table	$4-5,000
Raised Pedestrian Crossing	$5-6,000
Single Lane Slow Point	$32-45,000*
Chicane	$18-30,000*
Bulb-out	$20,000 (full int)
Two-lane Slow Point	$32-45,000*
Median Island	$8-10,000
Traffic Circle	$10-15,000
Reduced Corner Radii	$11-14,000
Right in/out Diverter	$8-10,000

*Large range because of drainage treatment

Table 3.08-1 Typical Costs

Average Volume Reduction	
Calming/Control Measure	**Percent Change**
12-ft humps	-18
14-ft humps	-22
22-ft table	-12
Neighborhood traffic circles	-5
Narrowings	-10
One-lane slow points	-20
Full closures	-44
Half closures	-42
Diagonal diverters	-35

Table 3.08-2 Average Volume Reduction

85th Percentile Speed Reduction	
Calming Measure	**Percent Change**
12-ft humps	-22
14-ft humps	-23
Raised intersections	-1
Neighborhood traffic circles	-11
Narrowings	-4
One-lane slow points	-14

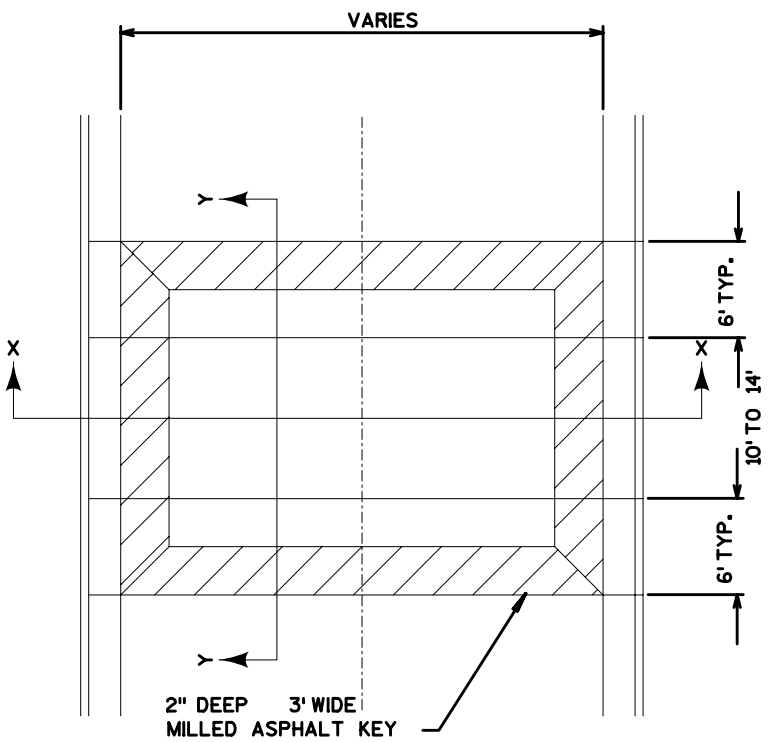
Table 3.08-3 85th Percential Speed Reduction

Safety Effects
Average Number of Crashes

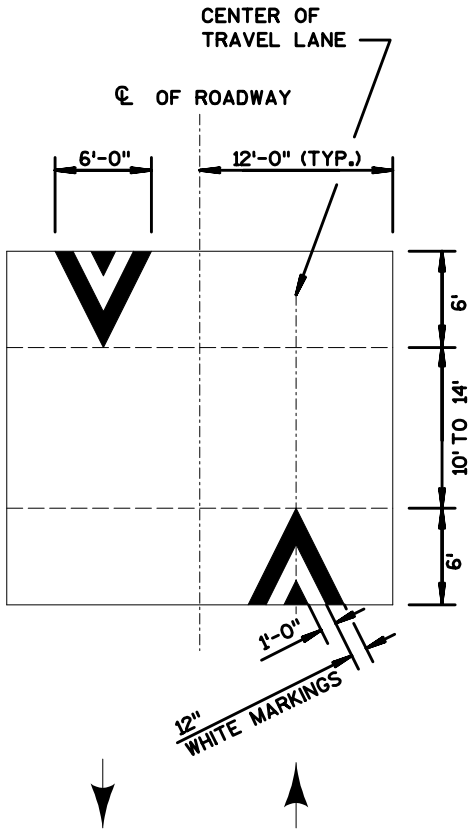
Calming Measure	Percent Change
12 ft. humps	-11%
14 ft. humps	-41%
22 ft. tables	-45%
Traffic circles	-73%
All Measures	-50%

Table 3.08-4 Safety Effects of Traffic Calming Measures

APPENDIX A
DRAWINGS OF TRAFFIC CALMING MEASURES



PLAN VIEW
NTS



PAVEMENT MARKING LAYOUT
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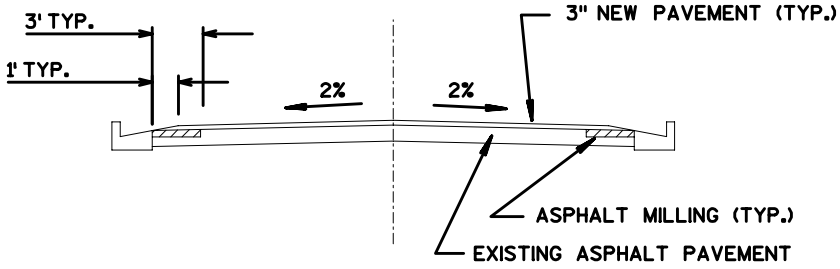

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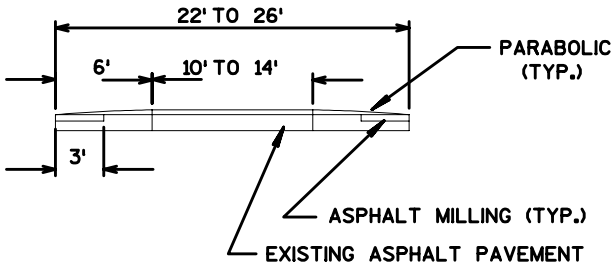

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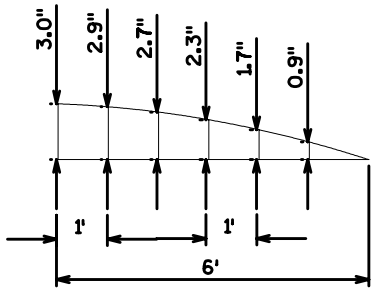


PARABOLIC DETAIL
NTS

ADAPTED FROM CANADIAN GUIDE TO NEIGHBORHOOD TRAFFIC CALMING

NOTE: CLEAN AND TACK COAT ALL SURFACES PRIOR TO PAVING

CITY OF MIDDLETON

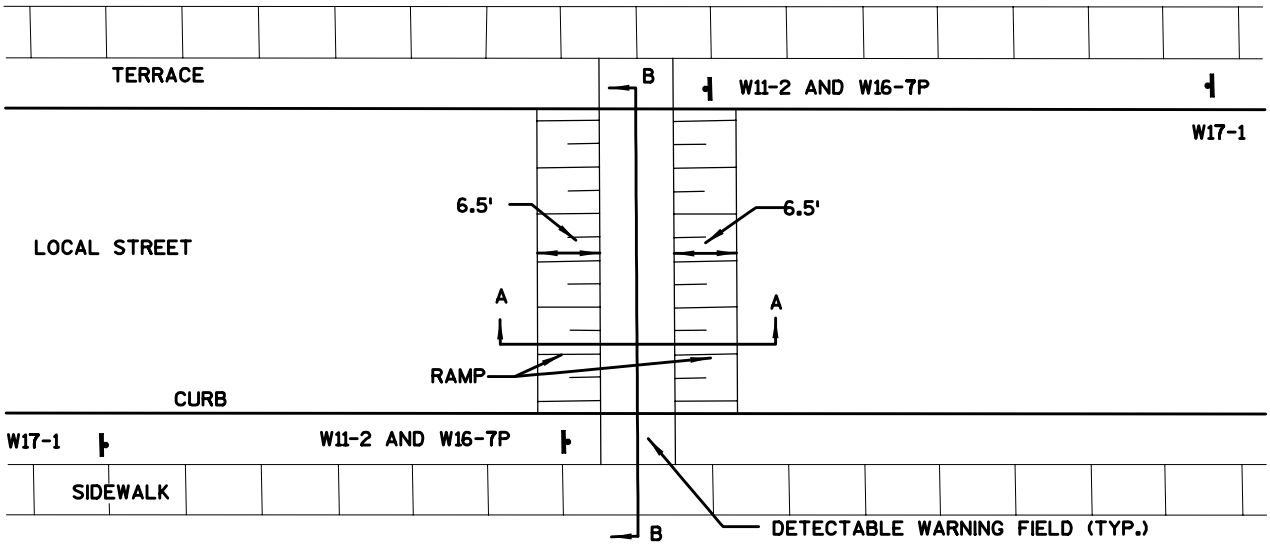
NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN

SPEED HUMP

STRAND ASSOCIATES, INC®
ENGINEERS

A1

1-024-005

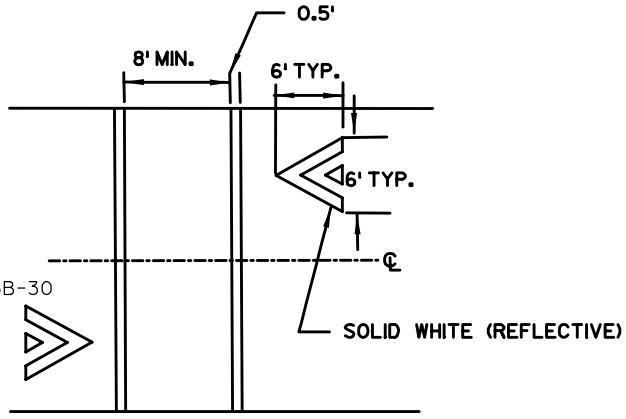


NOTES:
CATCHBASINS REQUIRED ON UPHILL SIDE OF A RAISED CROSSWALK

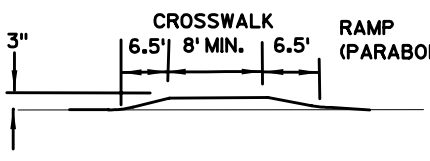
MAY REQUIRE SIDEWALK RECONSTRUCTION NEAR CURB

NOTES
W11-2 AND
W16-7P PEDESTRIAN CROSSWALK
W17-1 SPEED HUMP

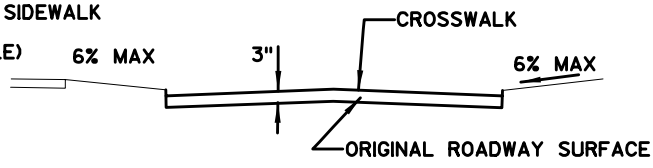
SEE MUTCD FIG 3B-30 FOR MARKINGS



PAVEMENT MARKINGS
(TWO-WAY STREET)



SECTION A-A



SECTION B-B

HANDICAP RAMP
PER CITY STANDARD

ADAPTED FROM CANADIAN GUIDE TO NEIGHBORHOOD TRAFFIC CALMING

CITY OF MIDDLETON

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN

RAISED CROSSWALK

STRAND ASSOCIATES, INC® ENGINEERS

A2

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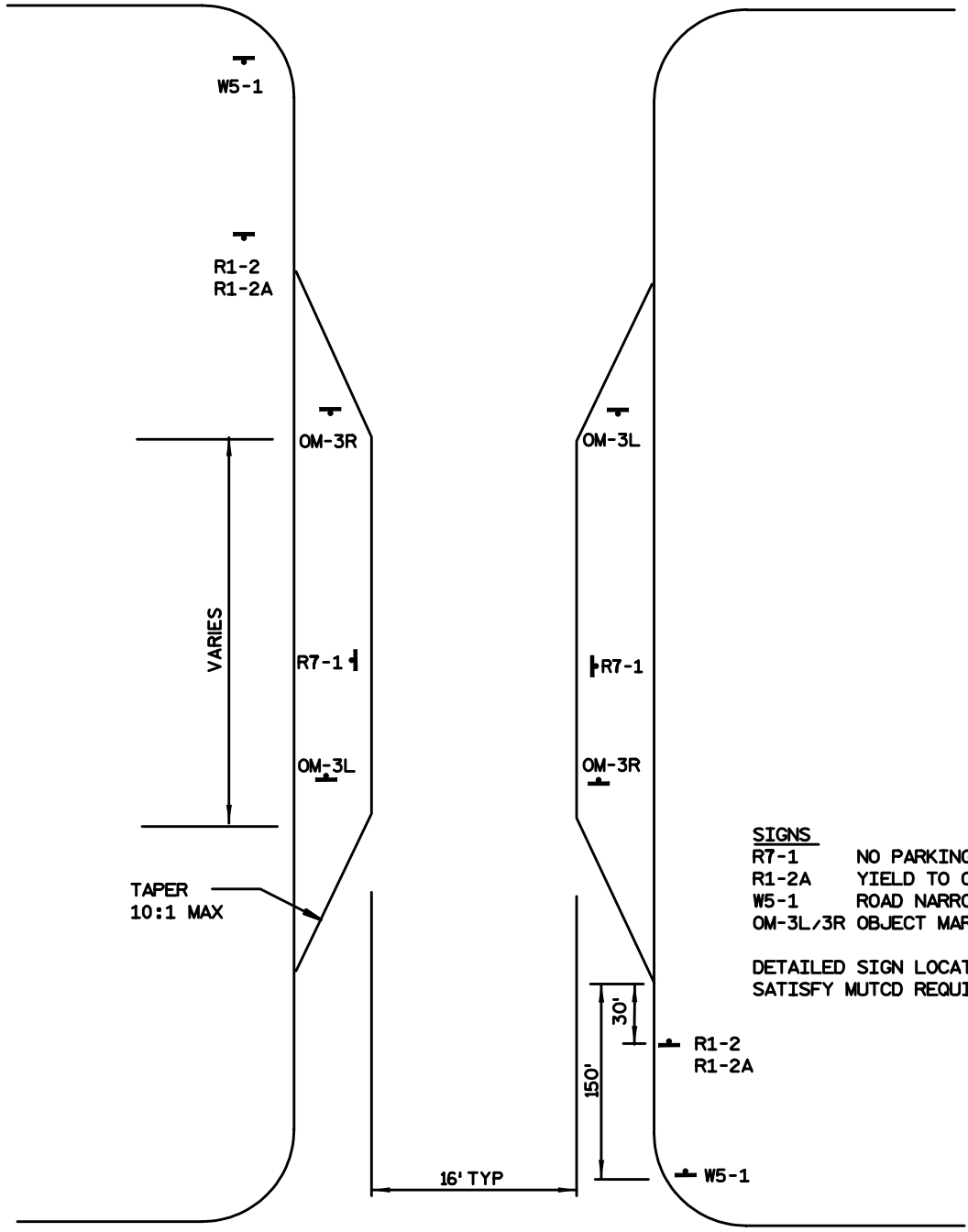


SIGNS

R7-1	NO PARKING ANYTIME
R1-2A	YIELD TO ONCOMING TRAFFIC
W5-1	ROAD NARROWS
OM-3L/3R	OBJECT MARKER

DETAILED SIGN LOCATIONS SHOULD SATISFY MUTCD REQUIREMENTS

CITY OF MIDDLETON

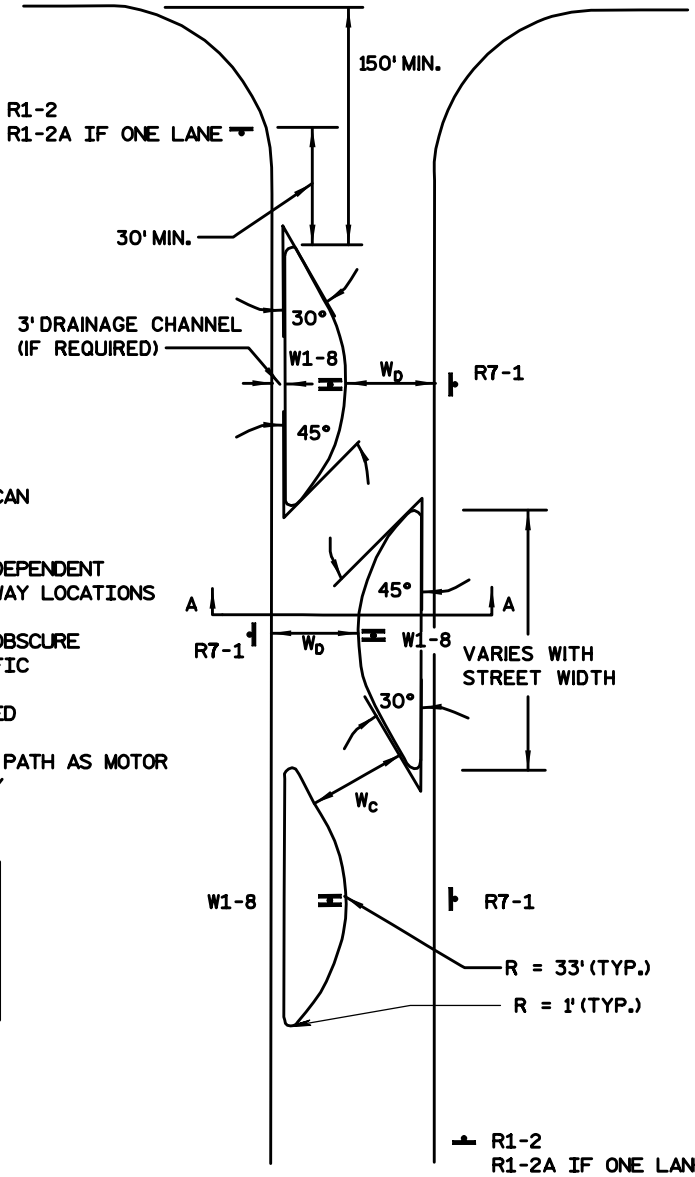
NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN

SINGLE LANE SLOW POINT

STRAND ASSOCIATES, INC® ENGINEERS

A3

1-024-005



NOTES:
TRAVEL PATH THROUGH CHICANE CAN BE ONE OR TWO LANES AS NOTED

SPACING OF CHICANE SEGMENTS DEPENDENT ON SITE CONDITIONS AND DRIVEWAY LOCATIONS

ISLAND PLANTINGS SHOULD NOT OBSCURE DRIVERS VIEW OF CHICANE TRAFFIC

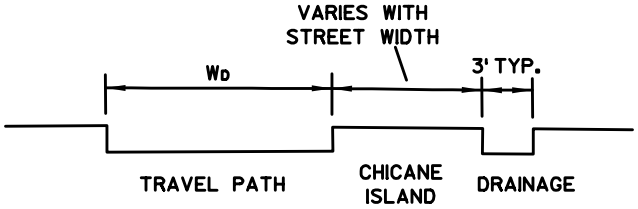
ADDITIONAL SIGNS MAY BE NEEDED

BICYCLES ARE TO USE THE SAME PATH AS MOTOR VEHICLE, NOT THE DRAINAGE WAY

RECOMMENDED WIDTHS		
	TWO LANES	ONE LANE
W_D	26'	15'
W_C	23'	12'

SIGNS
R1-2 YIELD
R1-2A YIELD TO ONCOMING TRAFFIC
R7-1 NO PARKING ANYTIME
W1-8 CHEVRON

DETAILED SIGN LOCATIONS SHOULD SATISFY MUTCD REQUIREMENTS



SECTION A-A

ADAPTED FROM CANADIAN GUIDE TO NEIGHBORHOOD TRAFFIC CALMING

CITY OF MIDDLETON

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN

CHICANE

STRAND ASSOCIATES, INC.® ENGINEERS

A4

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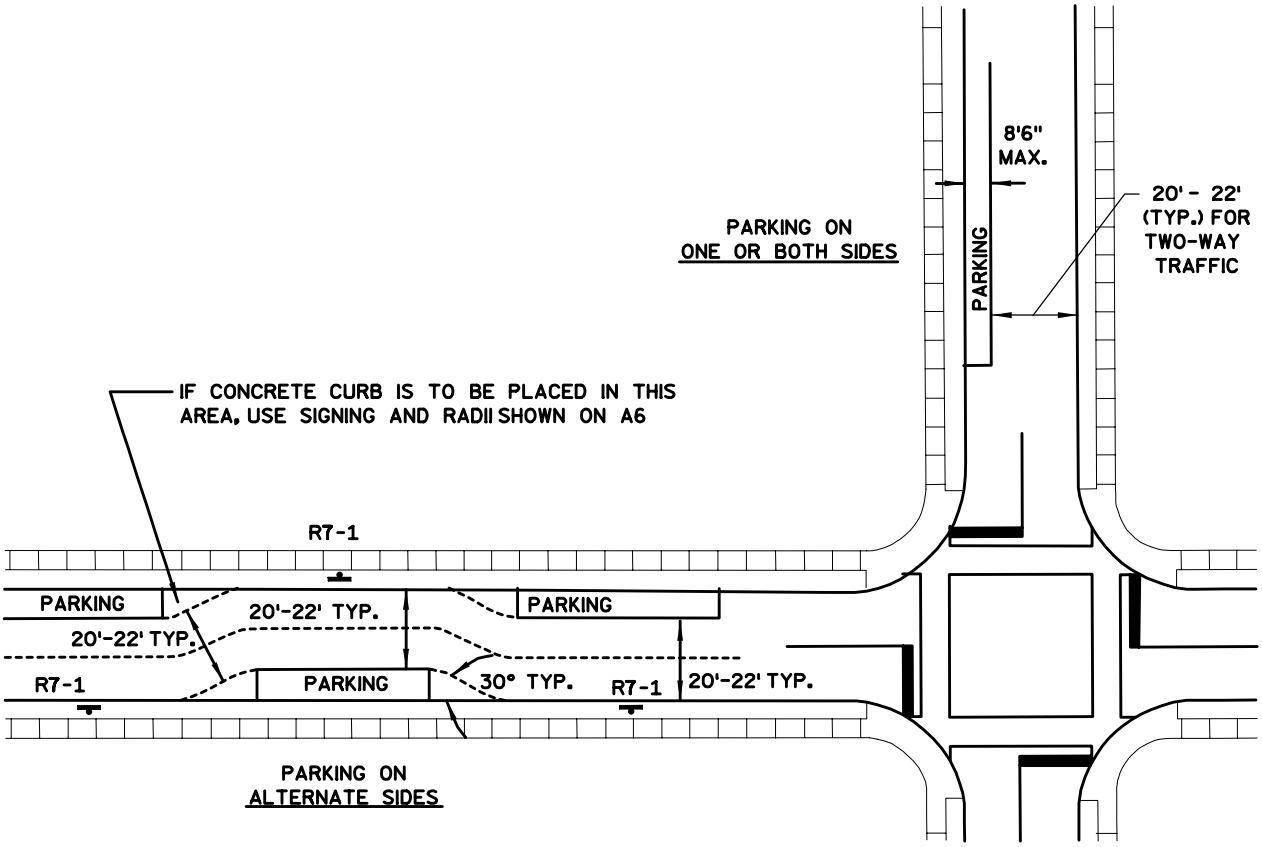

SIGNS
R7-1 NO PARKING ANYTIME

ADAPTED FROM CANADIAN GUIDE TO NEIGHBORHOOD TRAFFIC CALMING

CITY OF MIDDLETON

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN

ON-STREET PARKING

STRAND ASSOCIATES, INC®
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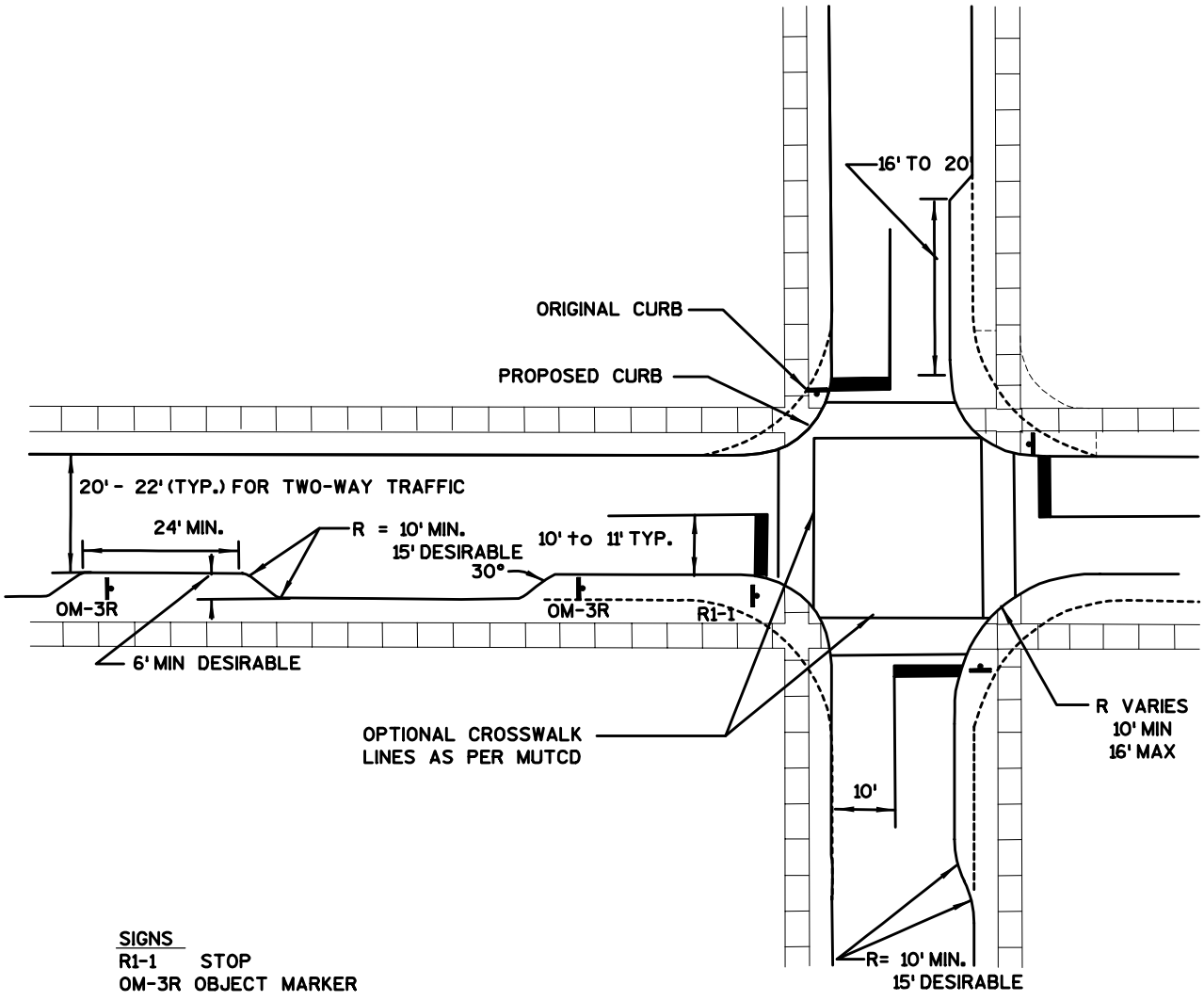

SIGNS
R1-1 STOP
OM-3R OBJECT MARKER

ADAPTED FROM CANADIAN GUIDE TO NEIGHBORHOOD TRAFFIC CALMING

CITY OF MIDDLETON

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN

CURB EXTENSION - BULB OUT

STRAND ASSOCIATES, INC.® ENGINEERS

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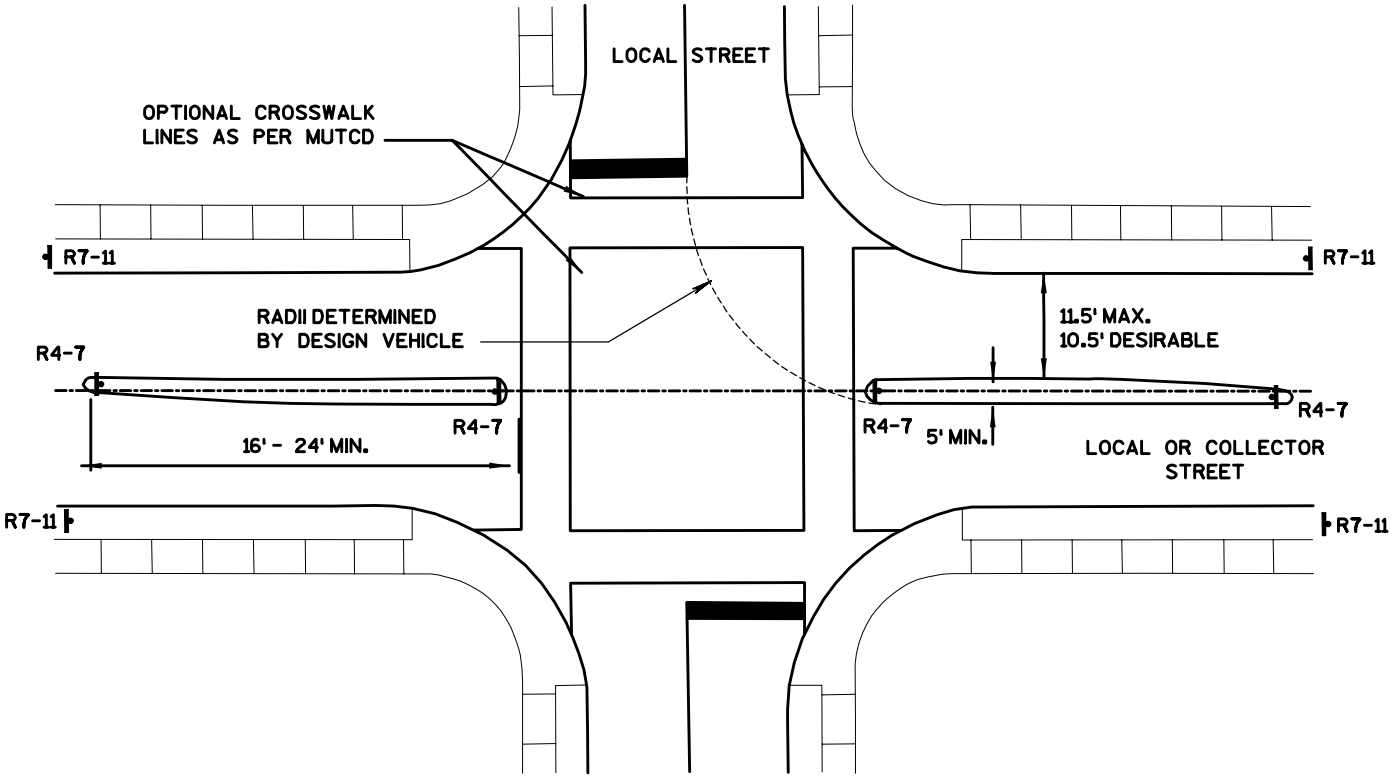
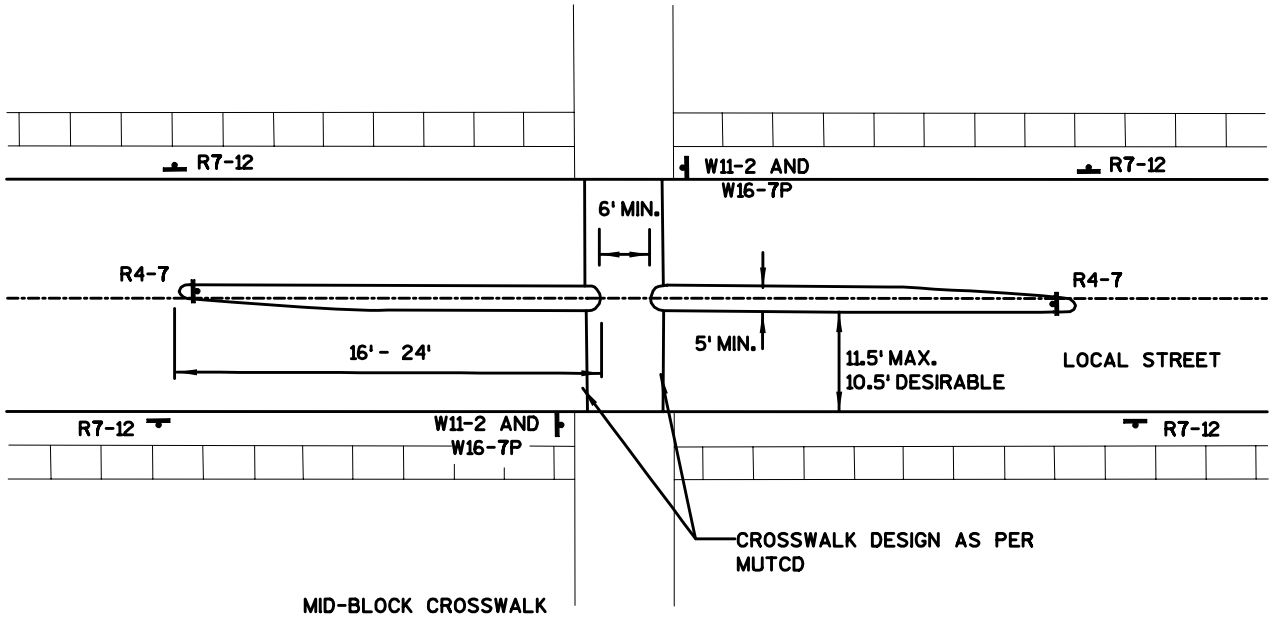


LOCAL STREET INTERSECTION

SIGNS
R7-11 NO PARKING HERE TO CORNER
R7-12 NO PARKING BETWEEN SIGNS
R4-7 KEEP RIGHT
W11-2 AND
W16-7P PEDESTRIAN CROSSWALK



MID-BLOCK CROSSWALK

ADAPTED FROM CANADIAN GUIDE TO NEIGHBORHOOD TRAFFIC CALMING

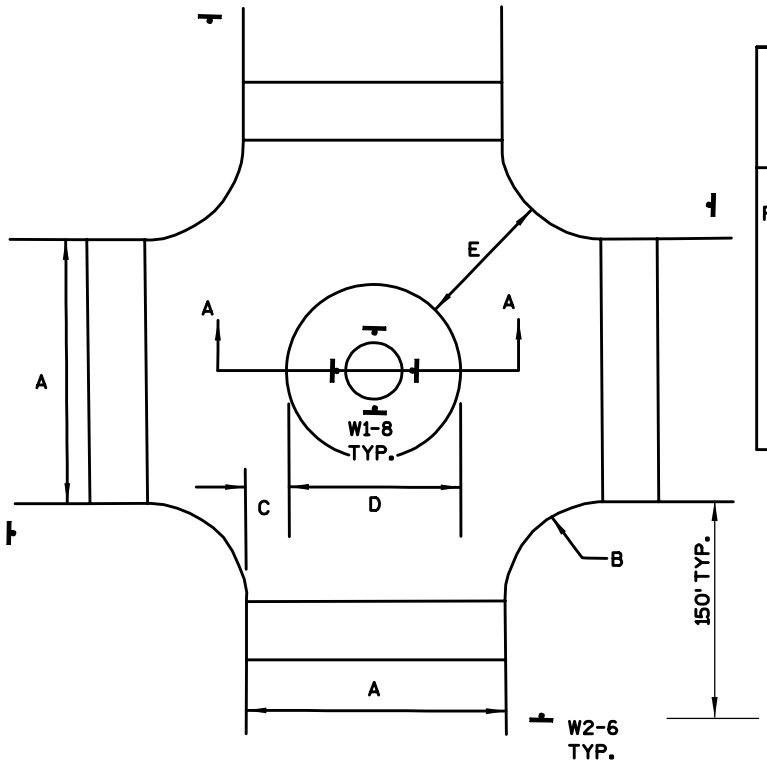
CITY OF MIDDLETON

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN

MEDIAN ISLAND

STRAND ASSOCIATES, INC®
ENGINEERS

A7
1-024-005

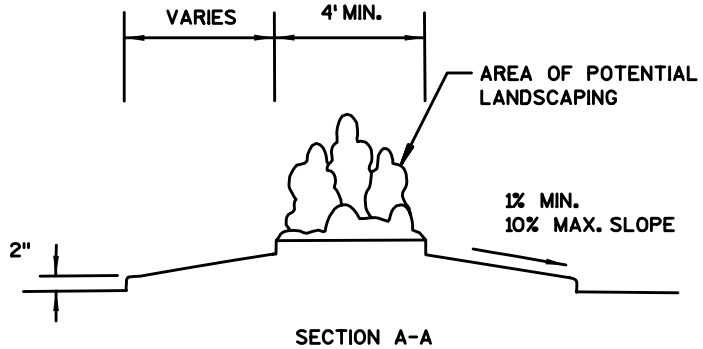


EXAMPLE DIMENSION CHART FOR VARYING ROADWAY WIDTHS (FROM FLAG)				
A ROADWAY WIDTH	B CURB RETURN RADIUS	C OFF-SET DISTANCE	D CIRCLE DIAMETER	E MINIMUM OPENING WIDTH
23'	21'	4.5'	14'	18'
26'	20'	4.5'	17'	18'
30'	18'	4.5'	20'	18'
33'	20'	4'	25'	19'
34'	20'	4.5'	25'	19'
36'	22'	3'	30'	19.5'

SIGNS
W2-6 CIRCULAR INTERSECTION
W1-8 CHEVRON

THE CENTRAL ISLAND IN THE TRAFFIC CIRCLE MUST BE LARGE ENOUGH SO THAT ALL VEHICLES ARE REQUIRED TO FOLLOW AN INDIRECT PATH EVEN TO PROCEED STRAIGHT THROUGH THE INTERSECTION. THE SIZE (D) AND POSITION OF THE CIRCLE IN RELATION TO THE ADJACENT ROADWAY WIDTH (A) SHOULD BE INDIVIDUALLY DESIGNED TO ACCOMODATE THE PATH OF A TYPICAL PASSENGER VEHICLE. THE TABLE ABOVE PROVIDES SOME EXAMPLE DIMENSIONS.

THE CENTRAL ISLAND SHOWN IS CIRCULAR, ALTHROUGH THIS IS NOT ESSENTIAL IF STREETS HAVE DIFFERENT WIDTHS.



SECTION A-A

ADAPTED FROM CANADIAN GUIDE TO NEIGHBORHOOD TRAFFIC CALMING

CITY OF MIDDLETON

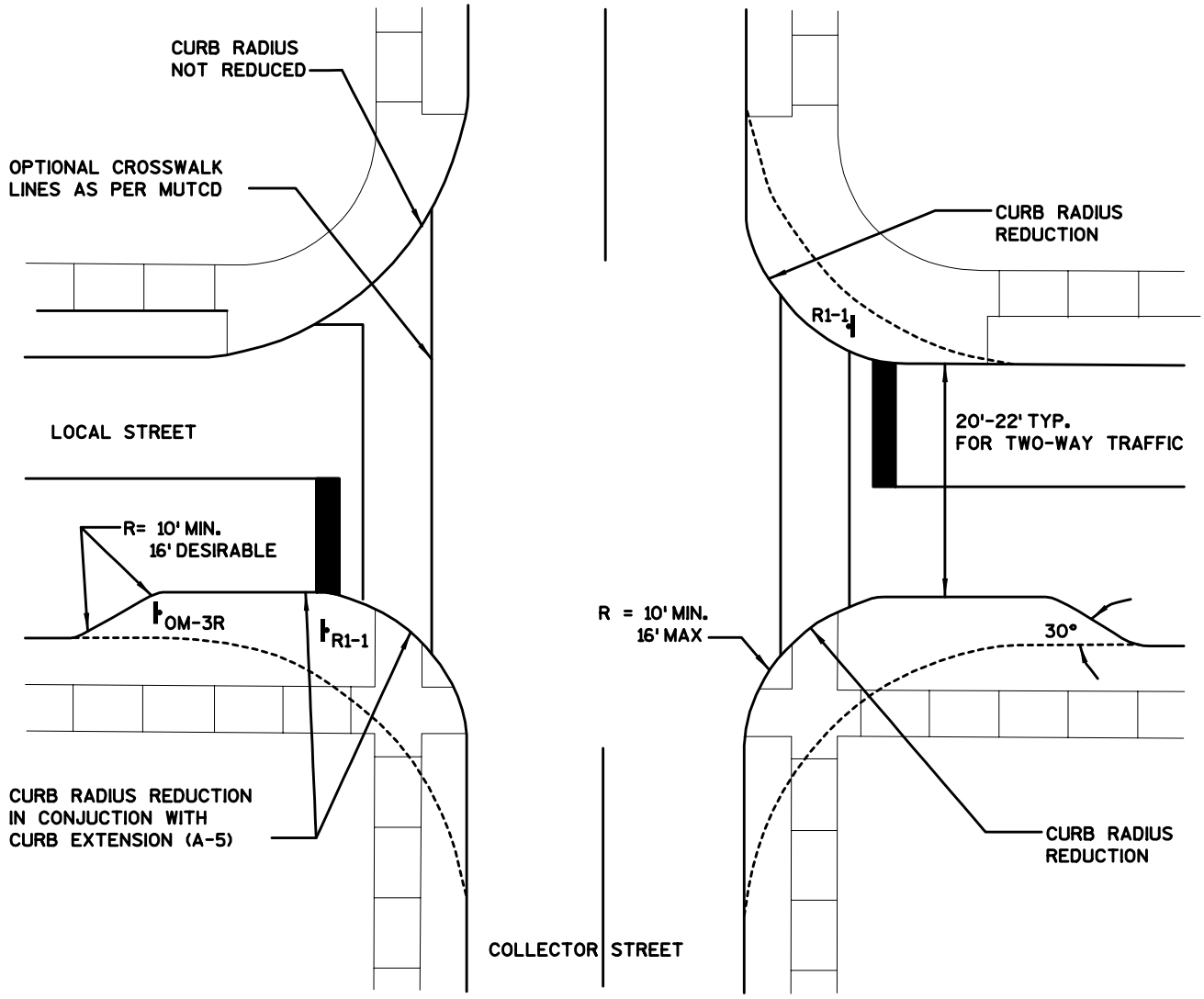
NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN

TRAFFIC CIRCLE

STRAND ASSOCIATES, INC® ENGINEERS

A8

1-024-005



SIGNS

R1-1	STOP
OM-3R	OBJECT MARKER

ADAPTED FROM CANADIAN GUIDE TO NEIGHBORHOOD TRAFFIC CALMING

CITY OF MIDDLETON

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN

CURB RADIUS REDUCTION

STRAND ASSOCIATES, INC.® ENGINEERS

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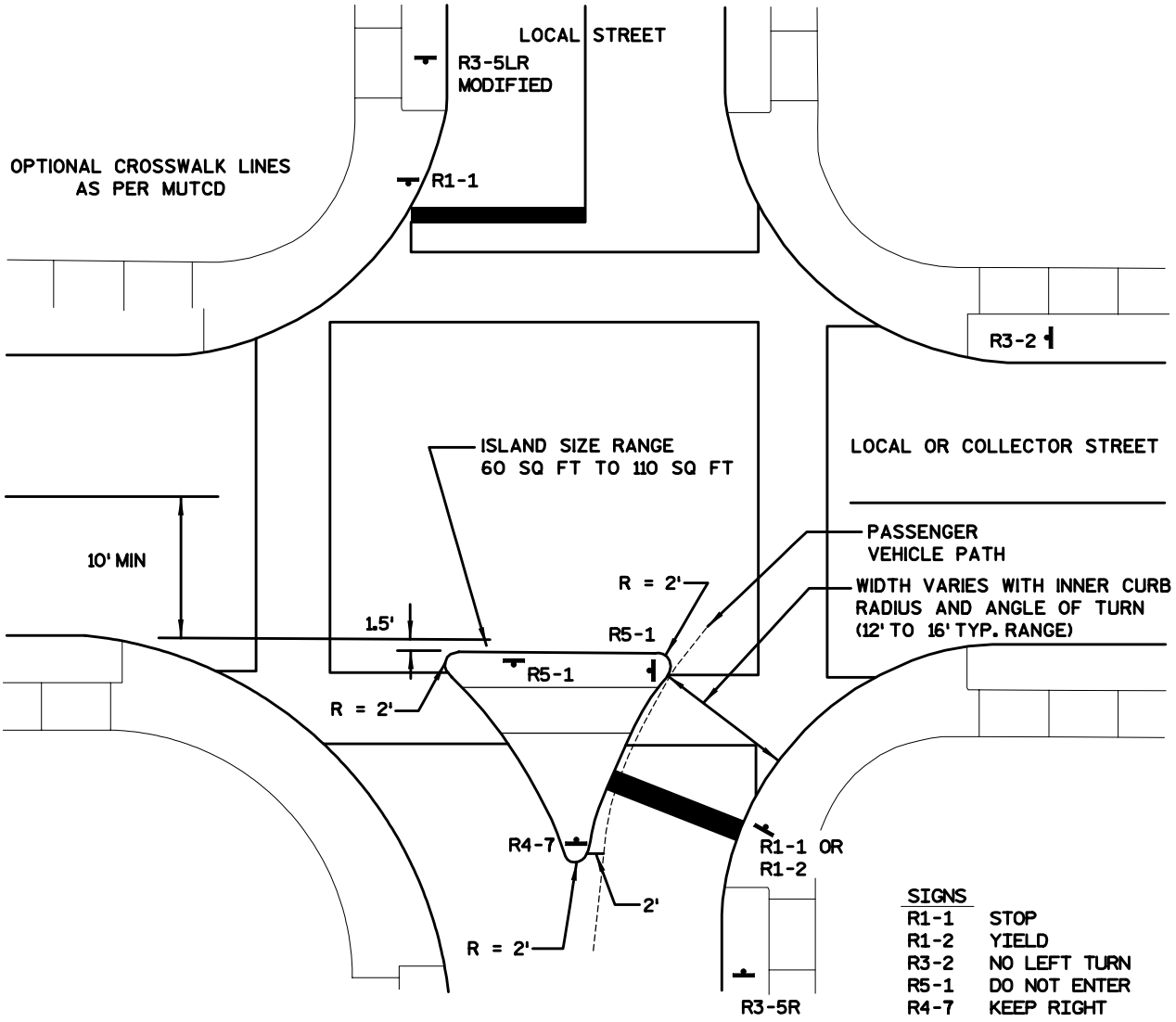
1-024-005



SIGNS	
R1-1	STOP
R1-2	YIELD
R3-2	NO LEFT TURN
R5-1	DO NOT ENTER
R4-7	KEEP RIGHT
R3-5R	RIGHT TURN ONLY
R3-5LR	MODIFIED RIGHT OR LEFT TURN

ADAPTED FROM CANADIAN GUIDE TO NEIGHBORHOOD TRAFFIC CALMING

CITY OF MIDDLETON

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN

RIGHT IN/ RIGHT OUT ISLAND

STRAND ASSOCIATES, INC® ENGINEERS

A10

1-024-005

APPENDIX B
NTMP APPLICATION

City of Middleton
Neighborhood Traffic Management Program Application

Contact Name: _____

Address: _____

Phone Number: _____

Email: _____

Date: _____

Location of Concern _____

Boundaries (from where to where) _____

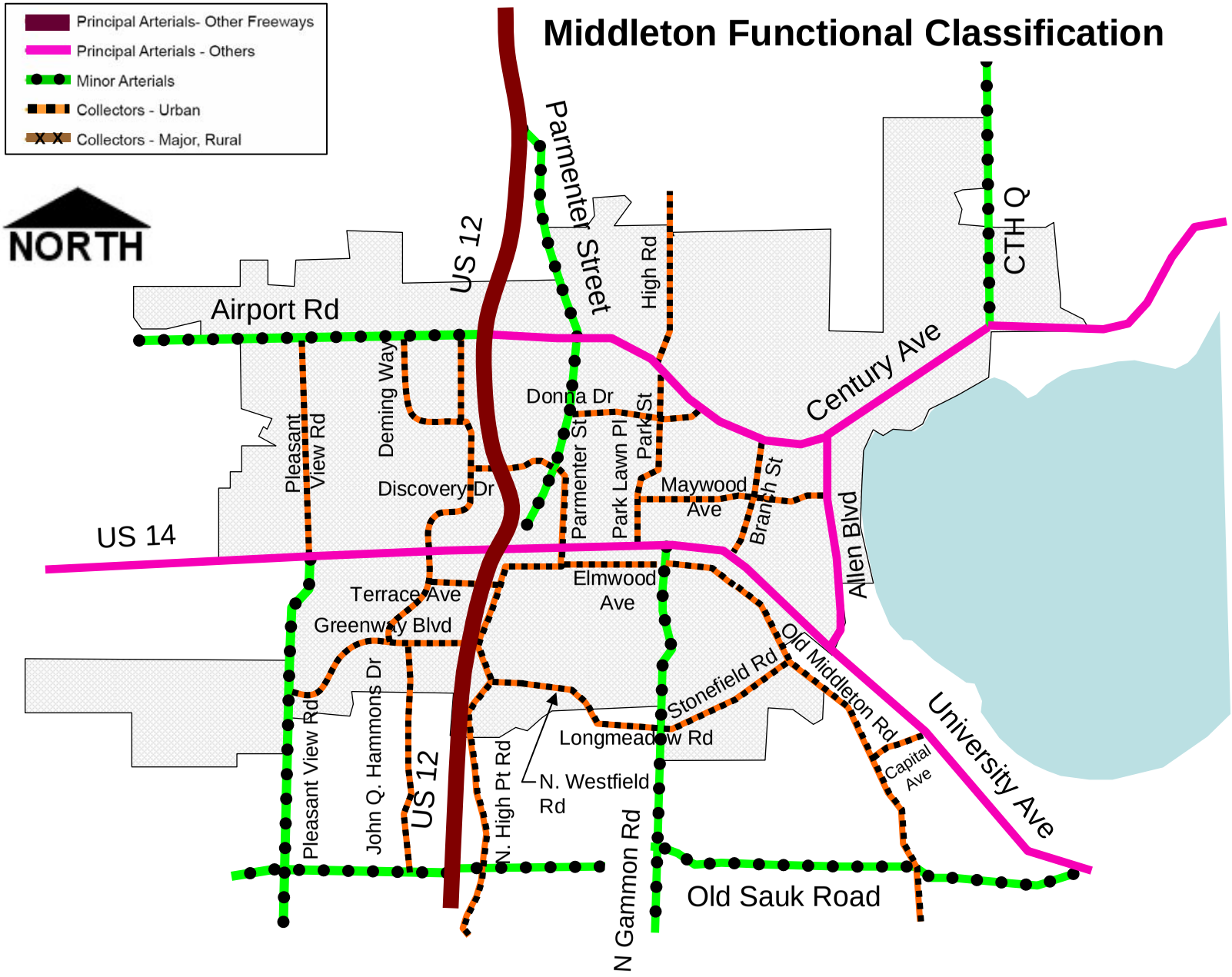
Description of Concern (please include the following):

- Specific location(s) where the effects are experienced.
- The nature of the effect (speeding, high traffic volumes, other).
- The times during the year, week, and day when this effect is experienced.
- Other information. (Weather dependent? Is it a new occurrence? Has it been growing?).

Names of Area Households that Agree with Concern:
(please print – At least 50% of the area households must sign, please copy page as necessary)

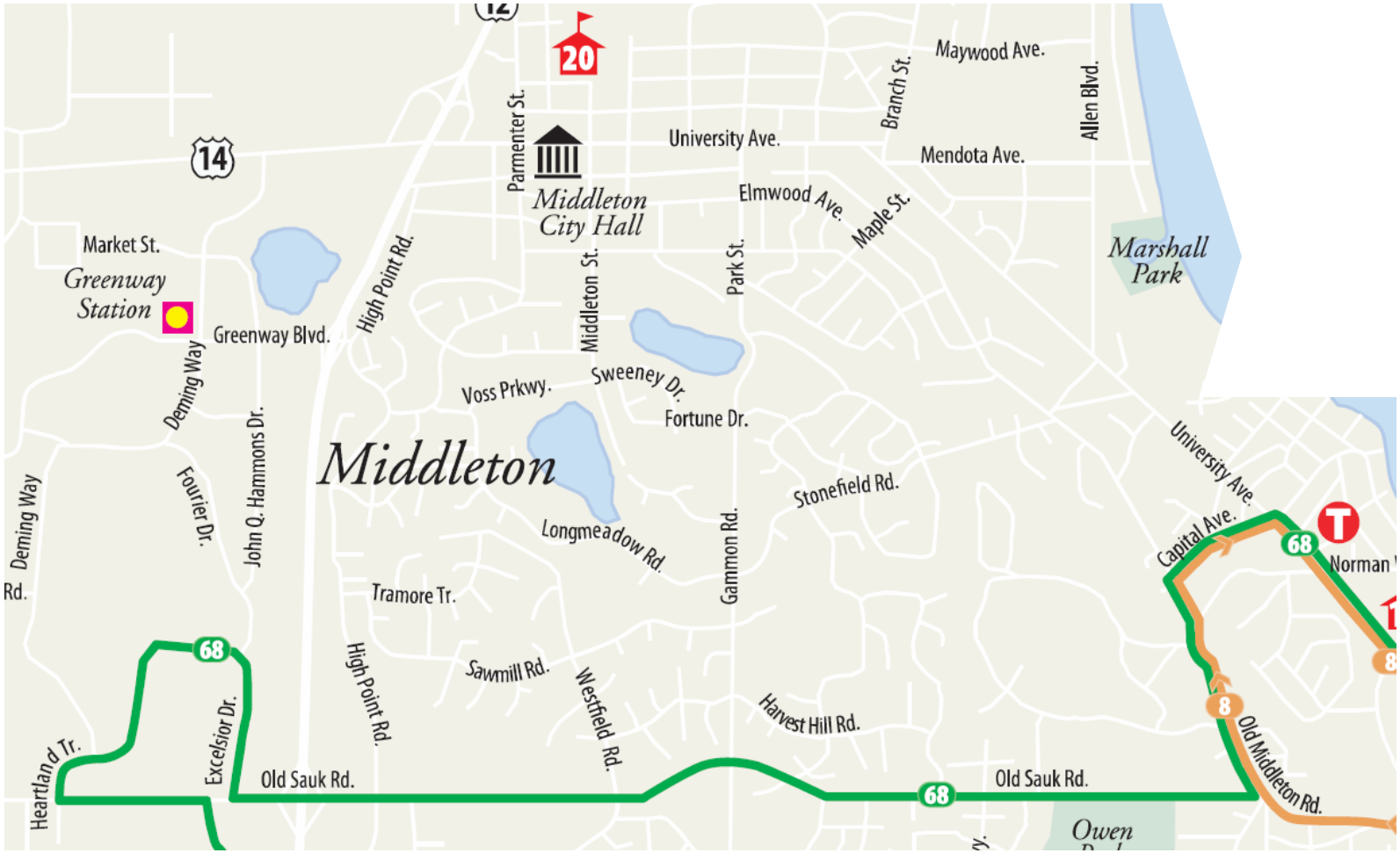
Name	Address/Phone
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	

APPENDIX C
MIDDLETON STREET CLASSIFICATION AND MADISON METRO TRANSIT BUS ROUTES


Middleton Functional Classification
Principal Arterials- Other Freeways
Principal Arterials - Others
Minor Arterials
Collectors - Urban
Collectors - Major, Rural
NORTH
Airport Rd
US 12
Parmenter Street
High Rd
CTH Q
Century Ave
Deming Way
Pleasant View Rd
Donna Dr
Parmenter St
Park Lawn Pl
Park St
Branch St
Maywood Ave
Allen Blvd
Discovery Dr
US 14
Terrace Ave
Greenway Blvd
Elmwood Ave
Old Middleton Rd
University Ave
Stonefield Rd
Longmeadow Rd
Capital Ave
John Q. Hammons Dr
Pleasant View Rd
US 12
N. High Pt Rd
N. Westfield Rd
N Gammon Rd
Old Sauk Road

Madison Metro Transit – Weekday Routes

Source: www.mymetrobus.com



Madison Metro Transit – Weekend Routes

Source: www.mymetrobus.com

APPENDIX D
COMMITTEE CHARTER

City of Middleton
Neighborhood Traffic Management Program
Committee Charter

Committee Name: _____

Area Committee Represents: _____

Goals of Committee:

Anticipated Activities to be Performed by the Committee:

Committee Members

Name	Address/Phone
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Date of Committee Formation _____

Anticipated Length of Service (in months) _____

Responsibilities:

Chair Person _____

Meeting Coordinator (if different) _____

City Liaison (if different) _____

Publicity _____

Meeting Minutes _____

Data Collection _____

Other _____ _____

APPENDIX E
BALLOT

City of Middleton
Neighborhood Traffic Management Program
BALLOT

Family or Business Name _____

Check One Renter ☐ Owner ☐

Address: _____

Phone Number: _____

Date: _____

(name and address will be kept confidential)

Description and drawing of measure being proposed. (Below, attached, or on back)

We <u>support</u> the proposed measure ☐

We <u>oppose</u> the proposed measure ☐

Comments:

_____

_____

_____

_____

_____

_____

Return to _____ **by** _____

APPENDIX F
WALKING CHECKLIST

Walkability Checklist

How walkable is your community?

Take a walk with a child and decide for yourselves.

Everyone benefits from walking. These benefits include: improved fitness, cleaner air, reduced risks of certain health problems, and a greater sense of community. But walking needs to be safe and easy. Take a walk with your child and use this checklist to decide if your neighborhood is a friendly place to walk. Take heart if you find problems, there are ways you can make things better.

Getting started:

First, you'll need to pick a place to walk, like the route to school, a friend's house or just somewhere fun to go.

The second step involves the checklist. Read over the checklist before you go, and as you walk, note the locations of things you would like to change. At the end of your walk, give each question a rating. Then add up the numbers to see how you rated your walk overall.

After you've rated your walk and identified any problem areas, the next step is to figure out what you can do to improve your community's score. You'll find both immediate answers and long-term solutions under "Improving Your Community's Score..." on the third page.

Partnership for a Walkable America

Pedestrian and Bicycle Information Center

U.S. Department of Transportation

Take a walk and use this checklist to rate your neighborhood's walkability.

How walkable is your community?

Location of walk _____

_____

Rating Scale:

1	2	3	4	5	6
awful	many problems	some problems	good	very good	excellent

1. Did you have room to walk?

☐ Yes ☐ Some problems:

- ☐ Sidewalks or paths started and stopped
- ☐ Sidewalks were broken or cracked
- ☐ Sidewalks were blocked with poles, signs, shrubbery, dumpsters, etc.
- ☐ No sidewalks, paths, or shoulders
- ☐ Too much traffic
- ☐ Something else _____

Locations of problems: _____

Rating: (circle one)
1 2 3 4 5 6

_____

_____

2. Was it easy to cross streets?

☐ Yes ☐ Some problems:

- ☐ Road was too wide
- ☐ Traffic signals made us wait too long or did not give us enough time to cross
- ☐ Needed striped crosswalks or traffic signals
- ☐ Parked cars blocked our view of traffic
- ☐ Trees or plants blocked our view of traffic
- ☐ Needed curb ramps or ramps needed repair
- ☐ Something else _____

Locations of problems: _____

Rating: (circle one)
1 2 3 4 5 6

_____

_____

3. Did drivers behave well?

☐ Yes ☐ Some problems: Drivers...

- ☐ Backed out of driveways without looking
- ☐ Did not yield to people crossing the street
- ☐ Turned into people crossing the street
- ☐ Drove too fast
- ☐ Sped up to make it through traffic lights or drove through traffic lights?
- ☐ Something else _____

Locations of problems: _____

Rating: (circle one)
1 2 3 4 5 6

_____

_____

4. Was it easy to follow safety rules? Could you and your child...

☐ Yes	☐ No	Cross at crosswalks or where you could see and be seen by drivers?
☐ Yes	☐ No	Stop and look left, right and then left again before crossing streets?
☐ Yes	☐ No	Walk on sidewalks or shoulders facing traffic where there were no sidewalks?
☐ Yes	☐ No	Cross with the light?

Locations of problems: _____

Rating: (circle one)
1 2 3 4 5 6

_____

_____

5. Was your walk pleasant?

☐ Yes ☐ Some unpleasant things:

- ☐ Needed more grass, flowers, or trees
- ☐ Scary dogs
- ☐ Scary people
- ☐ Not well lighted
- ☐ Dirty, lots of litter or trash
- ☐ Dirty air due to automobile exhaust
- ☐ Something else _____

Locations of problems: _____

Rating: (circle one)
1 2 3 4 5 6

_____

_____

How does your neighborhood stack up? Add up your ratings and decide.

1. _____
2. _____
3. _____
4. _____
5. _____

Total _____

26–30	Celebrate! You have a great neighborhood for walking.
21–25	Celebrate a little. Your neighborhood is pretty good.
16–20	Okay, but it needs work.
11–15	It needs lots of work. You deserve better than that.
5–10	It's a disaster for walking!

Now that you've identified the problems,
go to the next page to find out how to fix them.

Now that you know the problems,
you can find the answers.

Improving your community's score...

	What you and your child can do immediately	What you and your community can do with more time
1. Did you have room to walk? Sidewalks or paths started and stopped Sidewalks broken or cracked Sidewalks blocked No sidewalks, paths or shoulders Too much traffic	• pick another route for now • tell local traffic engineering or public works department about specific problems and provide a copy of the checklist	• speak up at board meetings • write or petition city for walkways and gather neighborhood signatures • make media aware of problem • work with a local transportation engineer to develop a plan for a safe walking route
2. Was it easy to cross streets? Road too wide Traffic signals made us wait too long or did not give us enough time to cross Crosswalks/traffic signals needed View of traffic blocked by parked cars, trees, or plants Needed curb ramps or ramps needed repair	• pick another route for now • share problems and checklist with local traffic engineering or public works department • trim your trees or bushes that block the street and ask your neighbors to do the same • leave nice notes on problem cars asking owners not to park there	• push for crosswalks/signals/ parking changes/curb ramps at city meetings • report to traffic engineer where parked cars are safety hazards • report illegally parked cars to the police • request that the public works department trim trees or plants • make media aware of problem
3. Did drivers behave well? Backed without looking Did not yield Turned into walkers Drove too fast Sped up to make traffic lights or drove through red lights	• pick another route for now • set an example: slow down and be considerate of others • encourage your neighbors to do the same • report unsafe driving to the police	• petition for more enforcement • request protected turns • ask city planners and traffic engineers for traffic calming ideas • ask schools about getting crossing guards at key locations • organize a neighborhood speed watch program
4. Could you follow safety rules? Cross at crosswalks or where you could see and be seen Stop and look left, right, left before crossing Walk on sidewalks or shoulders facing traffic Cross with the light	• educate yourself and your child about safe walking • organize parents in your neighborhood to walk children to school	• encourage schools to teach walking safely • help schools start safe walking programs • encourage corporate support for flex schedules so parents can walk children to school
5. Was your walk pleasant? Needs grass, flowers, trees Scary dogs Scary people Not well lit Dirty, litter Lots of traffic	• point out areas to avoid to your child; agree on safe routes • ask neighbors to keep dogs leashed or fenced • report scary dogs to the animal control department • report scary people to the police • report lighting needs to the police or appropriate public works department • take a walk wih a trash bag • plant trees, flowers in your yard • select alternative route with less traffic	• request increased police enforcement • start a crime watch program in your neighborhood • organize a community clean-up day • sponsor a neighborhood beautification or tree-planting day • begin an adopt-a-street program • initiate support to provide routes with less traffic to schools in your community (reduced traffic during am and pm school commute times)
A Quick Health Check Could not go as far or as fast as we wanted Were tired, short of breath or had sore feet or muscles Was the sun really hot? Was it hot and hazy?	• start with short walks and work up to 30 minutes of walking most days • invite a friend or child along • walk along shaded routes where possible • use sunscreen of SPF 15 or higher, wear a hat and sunglasses • try not to walk during the hottest time of day	• get media to do a story about the health benefits of walking • call parks and recreation department about community walks • encourage corporate support for employee walking programs • plant shade trees along routes • have a sun safety seminar for kids • have kids learn about unhealthy ozone days and the Air Quality Index (AQI)

Need some guidance?
These resources might help...

Great Resources

WALKING INFORMATION

Pedestrian and Bicycle Information Center (PBIC)
UNC Highway Safety Research Center
730 Airport Road , Suite 300
Campus Box 3430
Chapel Hill, NC
27599-3430
Phone: (919) 962-2202
www.pedbikeinfo.org
www.walkinginfo.org

National Center for
Bicycling and Walking
Campaign to Make
America Walkable
1506 21st Street, NW
Suite 200
Washington, DC 20036
Phone: (800) 760-NBPC
www.bikefed.org

WALK TO SCHOOL DAY WEB SITES

USA event: www.walktoschool-usa.org
International: www.iwalktoschool.org

STREET DESIGN AND TRAFFIC CALMING

Federal Highway Administration
Pedestrian and Bicycle Safety Research Program
HSR - 20
6300 Georgetown Pike
McLean,VA 22101
www.fhwa.dot.gov/environment/bikeped/index.htm

Institute of Transportation Engineers
www.ite.org

Surface Transportation Policy Project
www.transact.org

Transportation for Livable Communities
www.tlcnetwork.org

WALKING COALITIONS

America Walks
P.O. Box 29103
Portland, Oregon 97210
Phone: (503) 222-1077
www.americawalks.org

Partnership for a Walkable America
National Safety Council
1121 Spring Lake Drive
Itasca, IL 60143-3201
Phone: (603) 285-1121
www.nsc.org/walkable.htm

PEDESTRIAN SAFETY

National Highway Traffic Safety Administration
Traffic Safety Programs
400 Seventh Street, SW
Washington, DC 20590
Phone: (202) 662-0600
www.nhtsa.dot.gov/people/injury/pedbimot/ped

National SAFE KIDS Campaign
1301 Pennsylvania Ave. NW
Suite 1000
Washington, DC 20004
Phone: (202) 662-0600
Fax: (202) 393-2072
www.safekids.org

WALKING AND HEALTH

US Environmental Protection Agency
Office of Children's Health Protection (MC 1107A)
Washington, DC 20460
Phone: 202-564-2188
Fax: 202-564-2733
www.epa.gov/children/
www.epa.gov/airnow/
www.epa.gov/air/urbanair/ozone/what.html
www.epa.gov/sunwise/uvindex.html
www.epa.gov/otaq/transp/comchoic/ccweb.htm

President's Task Force on Environmental Health Risks and
Safety Risks to Children
www.childrenshealth.gov

Centers for Disease Control and Prevention
Division of Nutrition and Physical Activity
Phone: (888) 232-4674
www.cdc.gov/nccdphp/dnpa/readyset
www.cdc.gov/nccdphp/dnpa/kidswalk/index.htm

Prevention Magazine
33 East Minor Street
Emmaus, PA 18098
www.itsallaboutprevention.com

Shape Up America!
6707 Democracy Boulevard
Suite 306
Bethesda, MD 20817
www.shapeup.org

ACCESSIBLE SIDEWALKS

US Access Board
1331 F Street, NW
Suite 1000
Washington, DC 20004-1111
Phone: (800) 872-2253;
(800) 993-2822 (TTY)
www.access-board.gov