on just as pedestrians are influenced by the design of the streets they try to cross. Most streets are designed to be conduits or channels—straight and as level as possible. But long straight runs of streets are precisely the conditions that encourage higher speeds and less observant drivers. Posting speed limits is not an effective means of controlling speeds, especially in residential areas where conflicts between vehicles and people can be anticipated.

Typical pedestrian streets are posted at 25 to 35 mi/h, but they are designed for speeds of 45 to 50 mi/h. Under such circumstances drivers will tend to drive faster than the posted speed. Research indicates that a person struck by an automobile traveling at 20 mi/h or less is usually not seriously injured. At 20 to 30 mi/h, the person's injuries are usually serious, and at vehicle speeds over 30 mi/h, the person is often killed. The reason streets are designed for higher speeds is to protect the driver. Higher design speeds result in a longer sight distance, which makes maneuvering easier and safer for the driver. But the higher design speeds also encourage speeding, which is dangerous to the residents of the neighborhood. Perhaps a better, safer alternative would be to design streets that require drivers to be more alert and to slow down.

Nontraditional street design

Streets can be designed in ways that will result in slower and safer vehicle speeds and that will enhance the quality of neighborhood life. Design elements that tend to slow down traffic include planted islands, changes in grade, changes in street width, meandering roads, cul-de-sacs, and rotaries. The Dutch use a traffic-slowing concept called a *woon erf* to integrate traffic and neighborhoods (see Table 5.15 and Fig. 5.20).

The woon erf is a distinctly European design that reflects the high density of development and the economy of design found in Europe. The woon erf concept could be applied equally well in the United States, and U.S. designers could tap the vast experience of the Europeans in this field. The woon erf street is more expensive to build and to maintain, but developers and cities have found that the experience of residents is so positive that the higher cost is worthwhile. One interesting aspect of the woon erf is that it calls for the use of pavers instead of poured paving. The paver is used for its esthetic value as well as its role in managing storm water runoff. In some cases the use of pavers to promote infiltration may reduce or eliminate the need for other storm water management facilities, which would be a cost saving that would offset the higher cost of the pavers.

Originally the woon erf was developed for use in low-income residential areas, but the street layout proved to be so desirable that its use spread to neighborhoods of all types. Many existing streets in European cities have been converted from traditional arrangements into woon erfs. Residents report that they find the environment very desirable because of the parklike atmosphere, the visual character of the neighborhood, and the availability of social opportunities for children and adults. While it may be unlikely that every aspect of the woon erf concept would apply equally well to all of the developing resi-