1.0 INTRODUCTION

Human spatial standards are derived from ergonomic and cultural data and vary widely across cultures and land-use settings. Standards are often established to provide:

1. Minimal safety clearances (ergonomic/legal)
2. Perceived user comfort (psychological/perceptual)
3. Ceremonial protocol (cultural/ritual)
4. Aesthetic choice (personal/cultural)

Most "normative" standards require cultural adjustment before being applied to a particular design setting. Cultural standards are often referred to as the "hidden dimension," and at times may contradict strictly

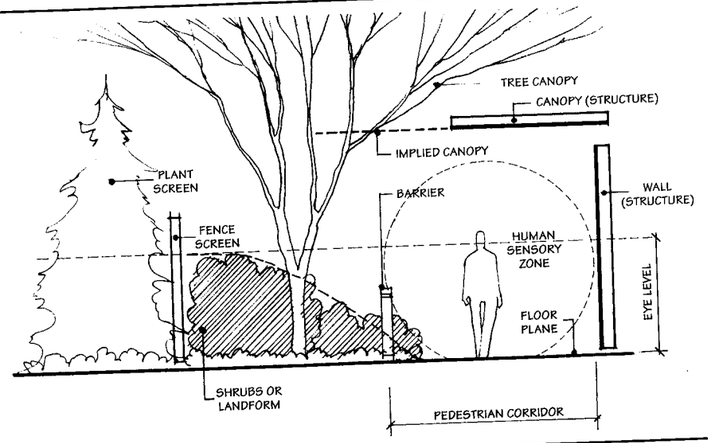


Figure 210-1. Elements of spatial enclosure: floor, wall, canopy, modified by time, light, climate, and intensity of activity.

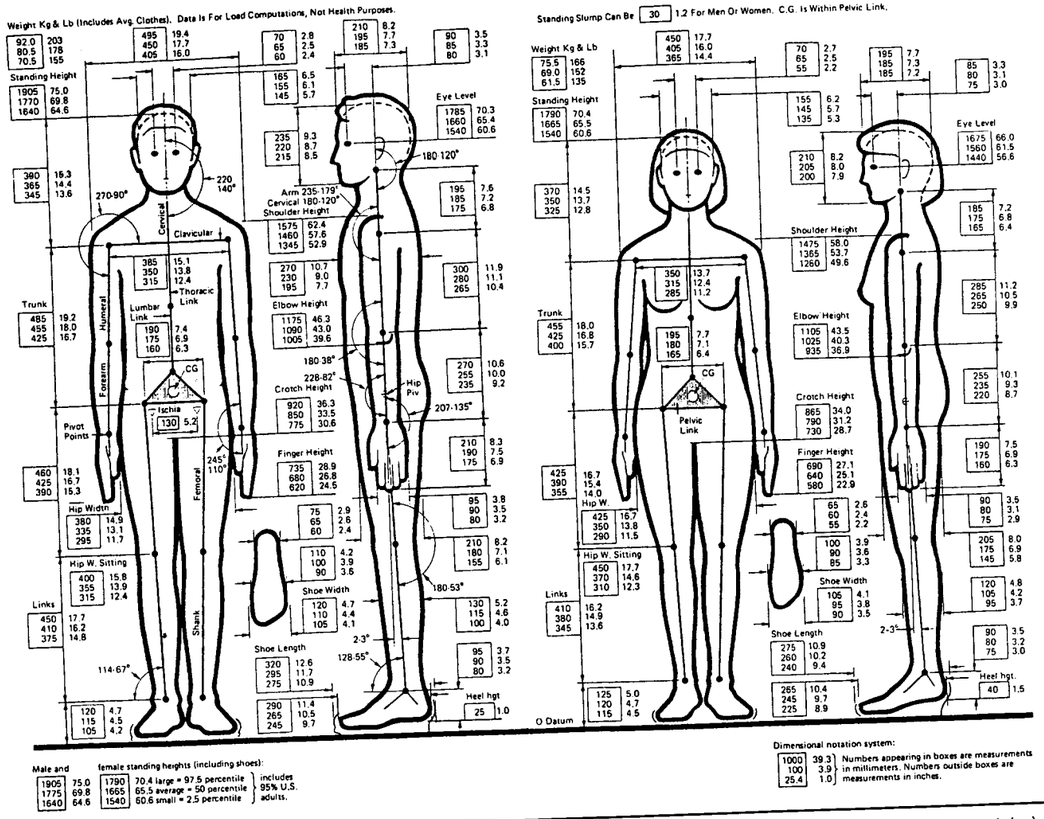


Figure 210-2. Standing adult male and female dimensions. *(Anthropometric data provided by Henry Dreyfuss Associates).*

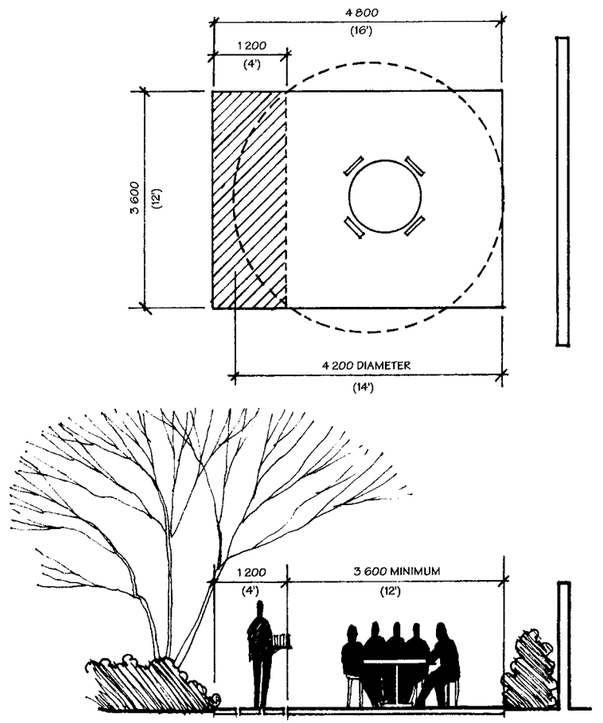


Figure 210-3. Patio dining requirements. *Circulation space should be factored into spatial design.*

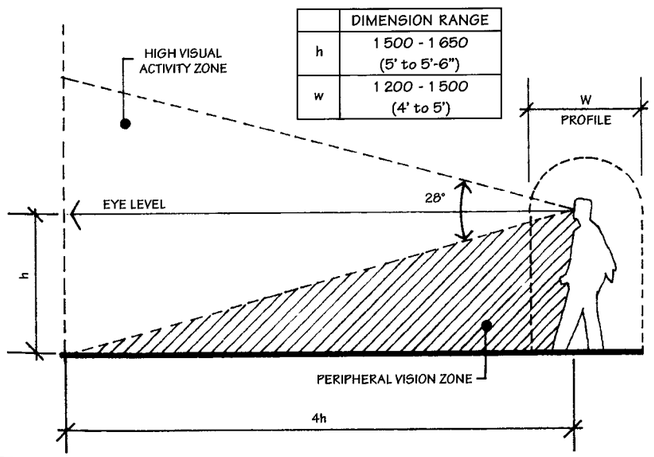


Figure 210-4. Pedestrian peripheral vision zone. *The vertical cone of vision results in a peripheral floor distance of 6 000-6 600 mm (20-22 ft).*

physical or ergonomic requirements. Dimensions indicated in this section are primarily North American and may not apply in all circumstances.

2.0 APPLICATIONS

2.1 Human Spatial Settings

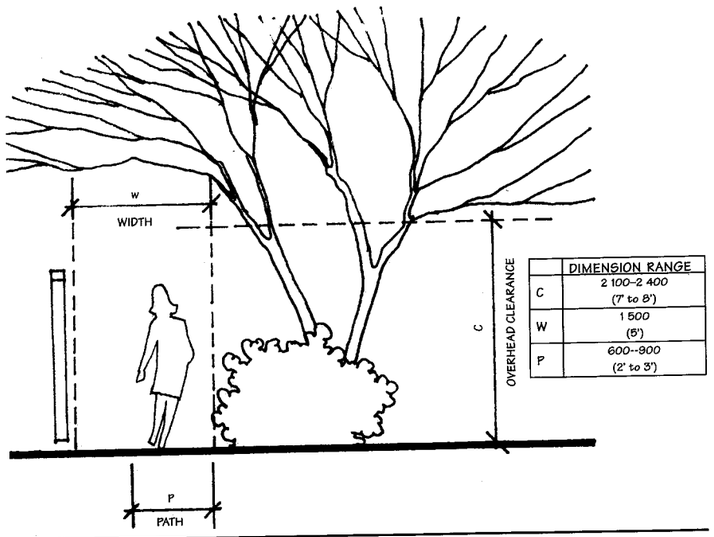
Human spatial and dimensional requirements, derived from land-use intensity and cultural setting, may be conceptualized as "space-time environments." Such environments are structured by enclosing floor, wall, and canopy elements, and are modified by time, light, climate, and intensity of activity. Figure 210-1 illustrates the elements of spatial enclosure in the outdoor environment as they relate to human perception (Refer to Section 340: Pedestrian Circulation for more detailed coverage of perceptual factors).

Ergonomic Measurements:

Typically ergonomic data accounts for age, sex, and size as indicated by percentile ranking. Figure 210-2, derived from data provided by Henry Dreyfuss Associates, indicates critical male and female standing position dimensions required for the design of human environments and artifacts. Minimum dimensions developed for architectural interior environments require modification when applied to exterior space. Generally, more exterior space is needed to accommodate most human activities commonly associated with interior applications, such as dining, walking in a hallway, and sitting in a group, because behavior and scale perception are altered by the context of sky and vista. Minimum patio or deck space required for exterior dining may be 40 to 60% greater than that which is minimally required for interior dining. As illustrated in Figure 210-3, a 3 000 x 3 000 mm (10 x 10 ft) dining room when placed on a patio setting typically requires a 3 600 x 3 600 mm or 3 600 x 4 500 mm (12 x 12 ft or 12 x 15 ft) exterior floor area to avoid feeling "cramped" by the lesser dimensions while in the openness of the outdoors.

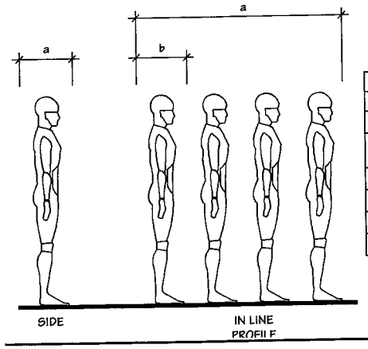
Peripheral Vision:

Figure 210-4 illustrates the typical relationship between the human eye level height and the perceived floor plane. Commonly, the floor plane is below the vertical cone-of-vision (28°) for a distance of 4 times the average eye level height of 1 500-1 650 mm (5 to 5 ft-6 in). In other words, a floor plane distance of 6 000-6 600 mm (20-22 ft) is typically within a pedestrian's peripheral vision zone. The vertical cone-of-vision



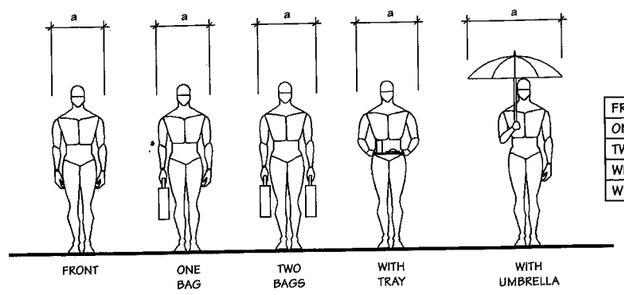
	DIMENSION RANGE
C	2 100–2 400 (7' to 8')
W	1 500 (5')
P	600–900 (2' to 3')

Figure 210-5. Typical vertical and horizontal garden clearances. *Branches and hanging vines are usually pruned to allow about 2 100 mm (7 ft) vertical clearance and about 1 500 mm (5 ft) horizontal clearance on a 600-900 mm (2-3 ft) wide path.*



	a	b
SINGLE SIDE	330 (13")	PER PERSON
PACKED NORMAL	1 880 (74")	470 (18")
WAITING LINE (WITH GEAR)	3 050 (120")	763 (30")
NORMAL LINE	2 135 (84")	534 (21")
CHOIR	2 030 (80")	508 (20")
WALKING	2 540 (100")	635 (25")
STRIDING	3 505 (138")	876 (35")

Figure 210-6. Minimum queuing distances.



FRONT	535 (21")
ONE BAG	800 (32")
TWO BAGS	1 015 (40")
WITH TRAY	965 (38")
WITH UMBRELLA	1 120 (44")

Figure 210-7. Width requirements for selected pedestrian activities.

narrows considerably as velocity increases (Refer to Section 342: Vehicular Circulation and Section 340: Pedestrian Circulation for additional information).

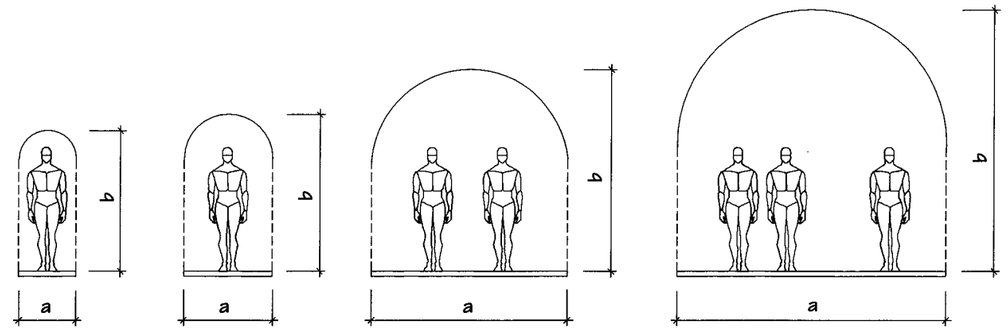
Intimate Garden Scale:

Figure 210-5 illustrates typical vertical and horizontal clearances found in small garden settings. Although these dimensions vary widely due to local practices and personal taste, the table shows general clearances required for mobility, safety, and maintenance considerations (Refer to Section 240: Outdoor Accessibility for more specific data on universal design considerations).

Figures 210-6 through 210-11 illustrate spatial dimensions required for various common human activities.

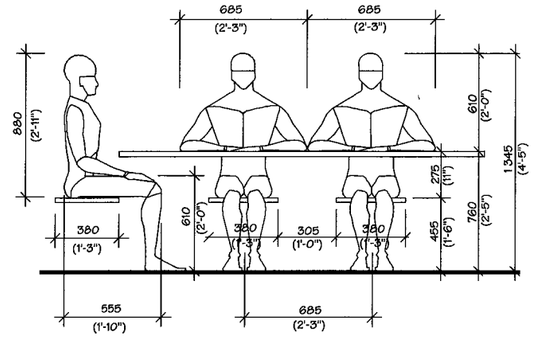
2.2 Vehicular Dimensions and Spatial Requirements

Vehicular spatial and dimensional requirements vary by vehicle type, land-use setting, and movement pattern (Refer to Section 342: Vehicular Circulation for information on road width and right of way). These spatial standards rely more heavily on physical data, but also include allowances for cultural settings and psychological expectations. Figure 210-12 illustrates the contextual elements that give scale to the pedestrian and vehicular landscape. Spatial standards must accommodate the intermingling of both large vehicles and pedestrians. Safe setbacks and clearances must be provided to protect pedestrians, plantings, structures, lights and other elements of the designed environment, while providing adequate maneuvering room for various types of vehicles.



TYPE	a WIDTH	b CLEARANCE
PATH		
SMALL GARDEN	450 (1'-6")	1 998 (6'-8")
TYPICAL	900 (3')	2 100 (7')
PREFERRED	1 200 (4')	2 100 (7')
WALK		
SINGLE	900 - 1 200 (3' to 4')	2 100 (7')
COUPLE MINIMUM	1 500 (5')	2 100 (7')
PREFERRED	1 800 (6')	2 100 (7')
FOUR ABREAST MINIMUM	2 400 (8')	2 100 (7')
PREFERRED	2 700 (9')	2 400 (8')
PUBLIC WAY		
MINIMUM	2 400 (8')	2 400 (8')
PREFERRED	3 000 (10')	3 000 (10')
METROPOLITAN/INSTITUTIONAL		
PEDESTRIAN WAY MINIMUM	3 000 (10')	3 000 (10')
MEDIUM	4 500 (15')	3 600 (12')
LARGE	6 000 (20')	4 500 (15')

Figure 210-8. Pedestrian walkway width and height requirements.



a Circle		a b Square		a b Rectangular		
Persons	a	Persons	a&b	Persons	a	b
2	600 - 900 (2 - 3')	2	600 - 900 (2 - 3')	---	---	---
4	900 - 1 200 (3 - 4')	4	900 - 1 200 (3 - 4')	4	750 (2'-6")	1 500 (5')
6	1 200 - 1 500 (4 - 5')	6	1 200 - 1 500 (4 - 5')	6-8	900 (3')	2 100 (7')
8	1 500 - 1 800 (5 - 6')	8	1 500 - 1 800 (5 - 6')	8-10	1 050 (3'-6")	2 400 (8')
10	1 800 - 2 100 (6 - 7')	10	1 800 - 2 100 (6 - 7')	10-12	1 200 (4')	3 000 (10')

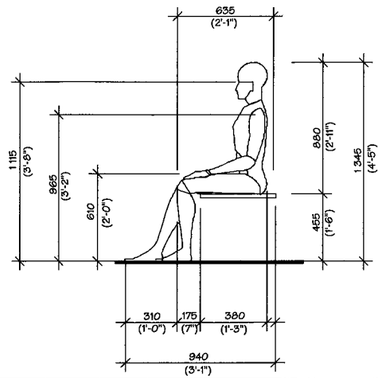
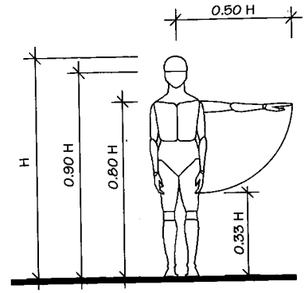
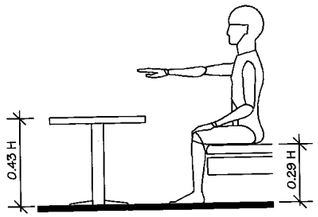
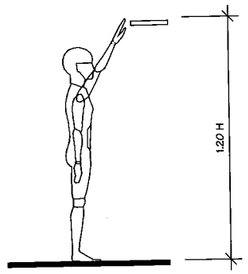


Figure 210-9. Seated figures.

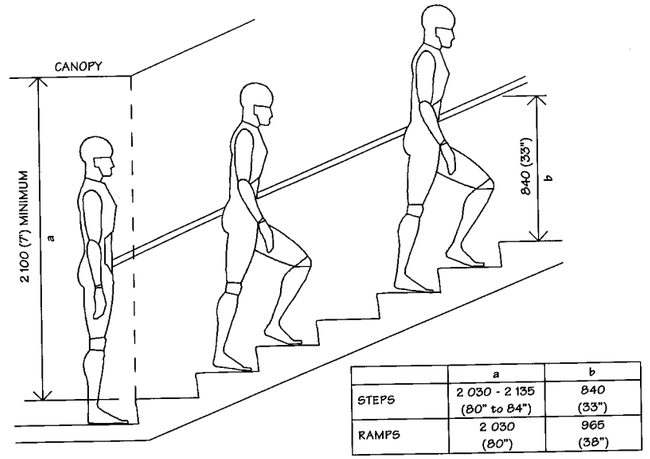






AGE	H
9	1 320 (52")
7	1 220 (48")
5	1 090 (43")

Figure 210-10. Child's dimensional proportions for ages 5, 7, and 9.



	a	b
STEPS	2 030 - 2 135 (80" to 84")	840 (33")
RAMPS	2 030 (80")	965 (38")

Figure 210-11. Covered stairway and ramp vertical clearances.

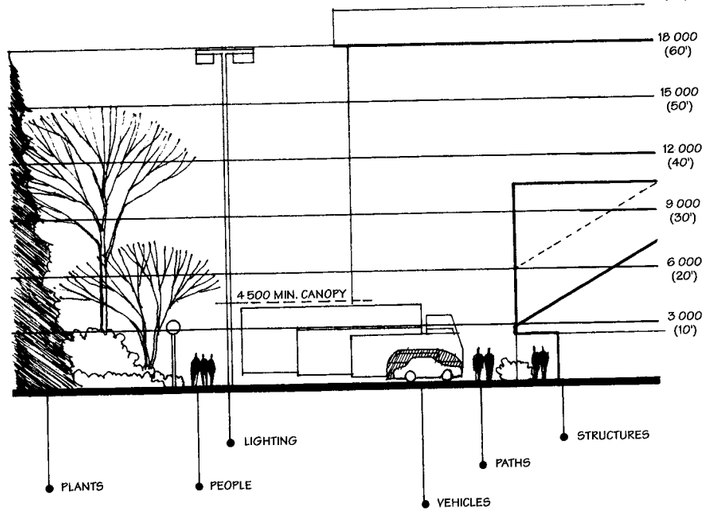


Figure 210-12. Elements of the pedestrian and vehicular landscape. *Scale variation in this landscape type is extreme. Tall commercial buildings, large trees, large trucks and transit vehicles, lights, and signs must co-exist with human scaled walks and corridors.*

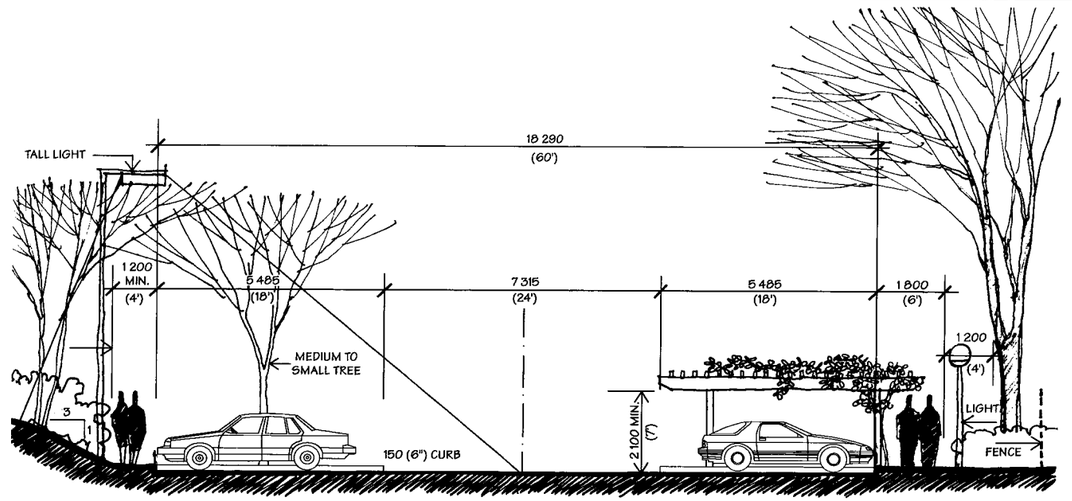


Figure 210-13. Auto parking elements and typical spatial dimensions. *Typically plantings, land form, screens, and structures are used to create a more hospitable transition from auto to pedestrian path.*

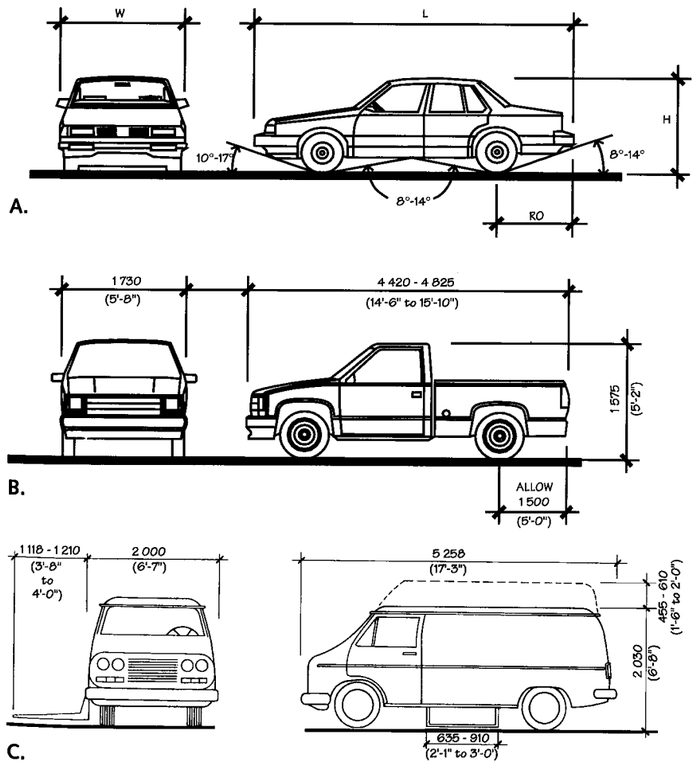


Figure 210-14. Vehicular dimensions by type. *a. Typical automobile, b. Small pick-up truck, c. Large van. (Refer to tables on vehicular dimensions.)*

Pedestrians move from vehicles to pathways within parking lot settings. Figure 210-13 illustrates the typical design elements and spatial standards which may be employed in parking area design. The data indicates minimum tolerances based on vehicle size and mechanics, and also points to recommended dimensions and configurations. Generally, parking pavement should be minimized, allowing storm water runoff to be interrupted by vegetative growth in order to slow velocities and allow cleansing and infiltration (Refer to Section 330: Stormwater Management for more detailed information). Drainage objectives may support visual objectives by breaking up the mass of hard surface area through the use of landform and planting.

Automobiles:

Figure 210-14 and the accompanying chart indicates key dimensional data by vehicle type. Rear overhang and bottom clearance angles are especially noted because they affect minimum distances of structures and plantings to parking lot curbs, and to maximum ramp differentials respectively. Figures 210-15 and 210-16 illustrate overhang and degree of slope relationships. Rear overhang is generally larger than front overhang, and for design purposes, rear overhang provides the more conservative dimension to determine minimum setbacks. It is common practice to allow for a 1 500 mm (5 ft) overhang. Parking lots designed to accommodate special vehicles such as larger trucks, recreational vehicles, and