



3.2.6 Use Class Order

Use Class Order is the permitted activity for the use of land or building. It is categorised into classes where change from one class to the other shall be deemed to constitute development and therefore shall require planning approval. Change within the same class however shall not require planning approval under the provision of the Local Plan.

Limited Commercial refers to development comprising of office, retail and residential within the same plot. It is similar to mixed use but is only applicable

USE CLASS ORDER

- Development within the SCC shall conform to Use Class Order as specified in the Use Class Order Table within the Local Plan.
- Limited commercial developments within the SCC shall conform to the following requirements: -
 - i. The mix of commercial and residential on one plot shall be as follows: -
 - Commercial – 60%
 - Residential – 40%
 - ii. The total plot ratio of the proposed development shall not exceed the maximum as indicated in the above tables. This maximum plot ratio is the total for both commercial and residential components of the proposed development.
 - iii. Commercial uses especially retail are encouraged to be located on the ground floor fronting main streets whereas residential should be for upstairs levels and/or fronting secondary streets. Allowable activities within the plot shall conform to use class orders as specified in the Local Plan. Shop-office-home office (SOHO) concepts shall be considered as commercial use.
 - iv. Entries from the street to upper levels should be clearly identifiable. Entries for residential uses should also be separated from commercial uses to allow for privacy for residents.
 - v. Retail use should have appropriate delivery and garbage collection access, and related noise impacts on residents from early morning movements should be mitigated.

3.3 Urban Design

3.3.1 Streetscape

Streetscape is the urban character of the public realm which is made up of an assemblage of landscape, walks and curbs between the lot line and the vehicular lanes. Its physical character and ambiance is further defined by building frontages aligning the public right of way.

The streetscapes are of different characteristics and compositions. These can be perceived in the manner in which each detailed element that constitutes the streetscape is ordered to achieve the intended image in line with the urban identity and development focus.

Streetscape categories for the SCC are as the following: -

- Boulevard
- Avenue
- Drive
- Commercial Street

Boulevard is a long-distance, free movements thoroughfare traversing an urbanized area. A boulevard is flanked by wide parkway on both side of the thoroughfare with landscaped median in the centre. Buildings are setback from the lot line to accommodate for additional landscape strip, sidewalk or service lanes.

Avenue is a limited distance, free movement thoroughfare within an urbanized area. It is characterised by a median in the centre that may be wide enough to hold monuments or even buildings. Buildings or other structures to accentuate a focal point normally terminate its trajectory. An avenue may be conceived as an elongated square and access for vehicular traffic may be limited.

Drive is a thoroughfare along the boundary between an urbanized area and a natural condition, usually along a waterfront, a park, or a cape. One side of a drive has the urban character of a street or boulevard, with sidewalk and buildings, while the other has the qualities of a road parkway, with naturalistic planting and detailing.

Street is a local slow movement thoroughfare that provides frontages for higher density buildings such as offices and shops. The frontages are mostly green setbacks of buildings aligning it and sidewalks along the carriageway

The variables of a streetscape are its parkway, sidewalks, kerbs, planters, trees and streetlights.

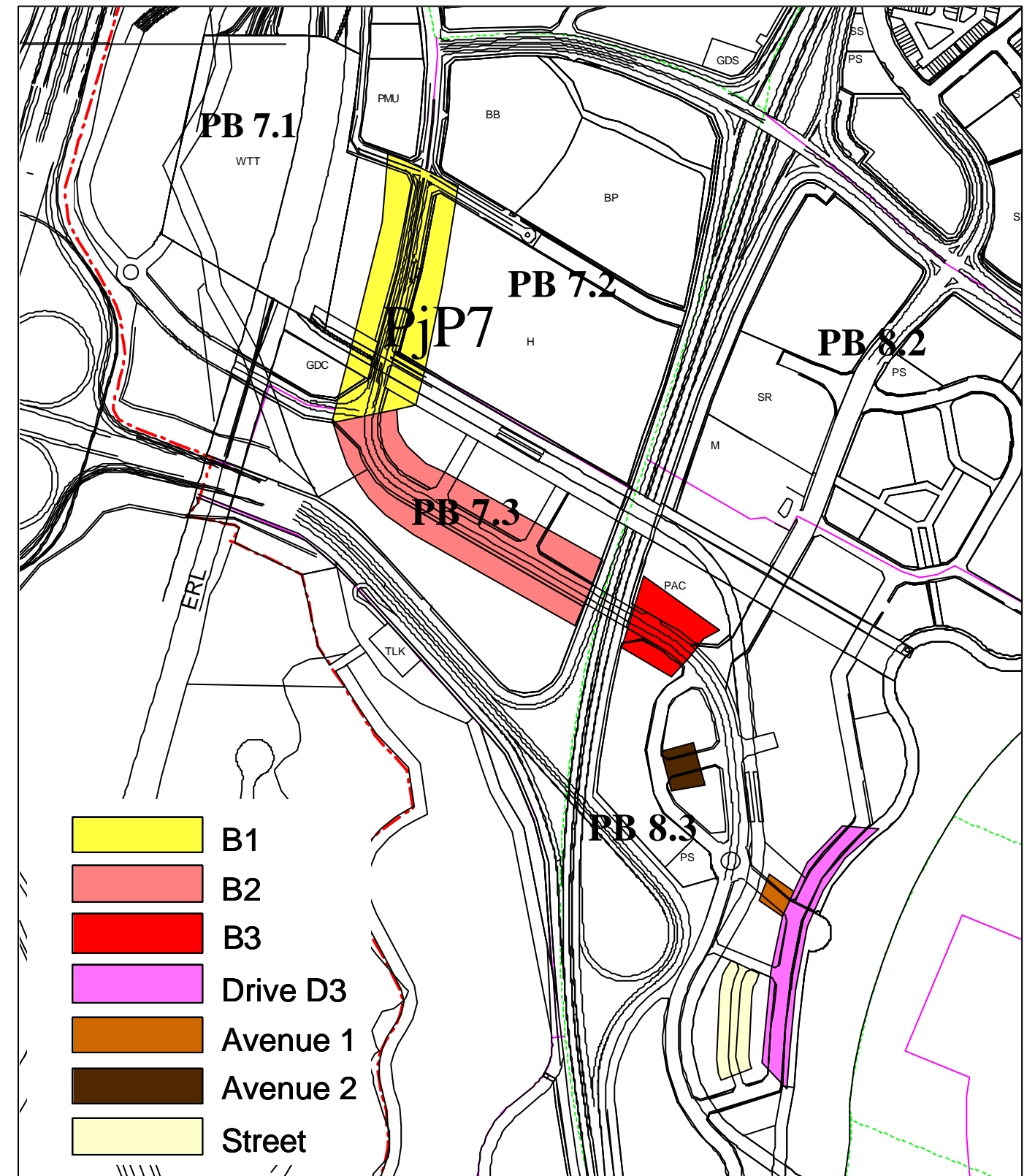


Figure 3.8
Streetscape Type

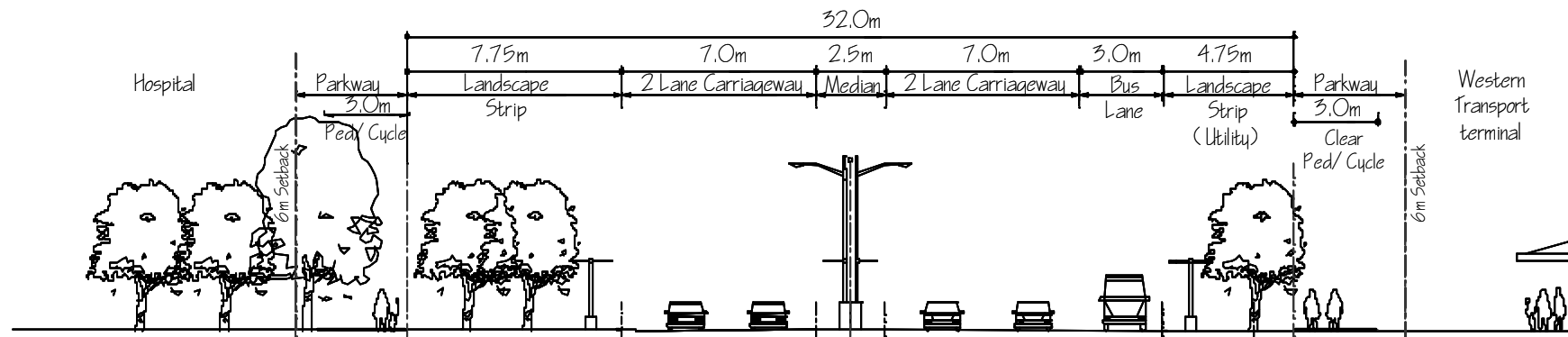


Figure 3.9
Typical Boulevard Type B1

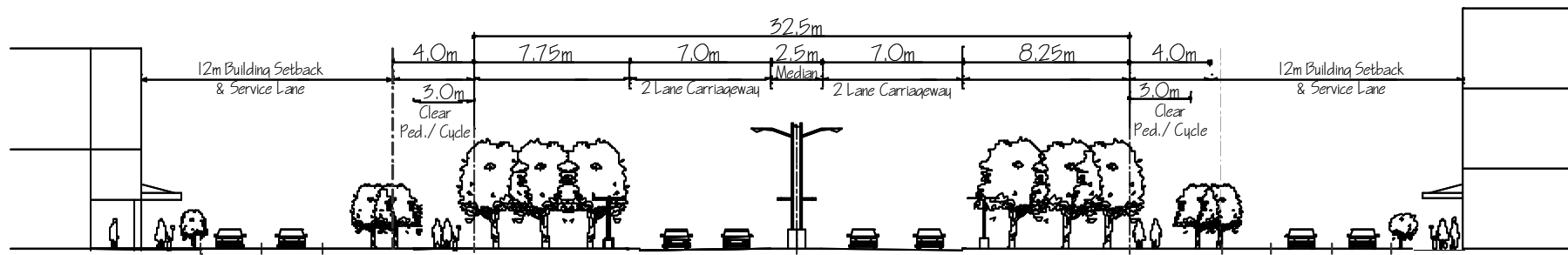


Figure 3.10
Typical Boulevard Type B2

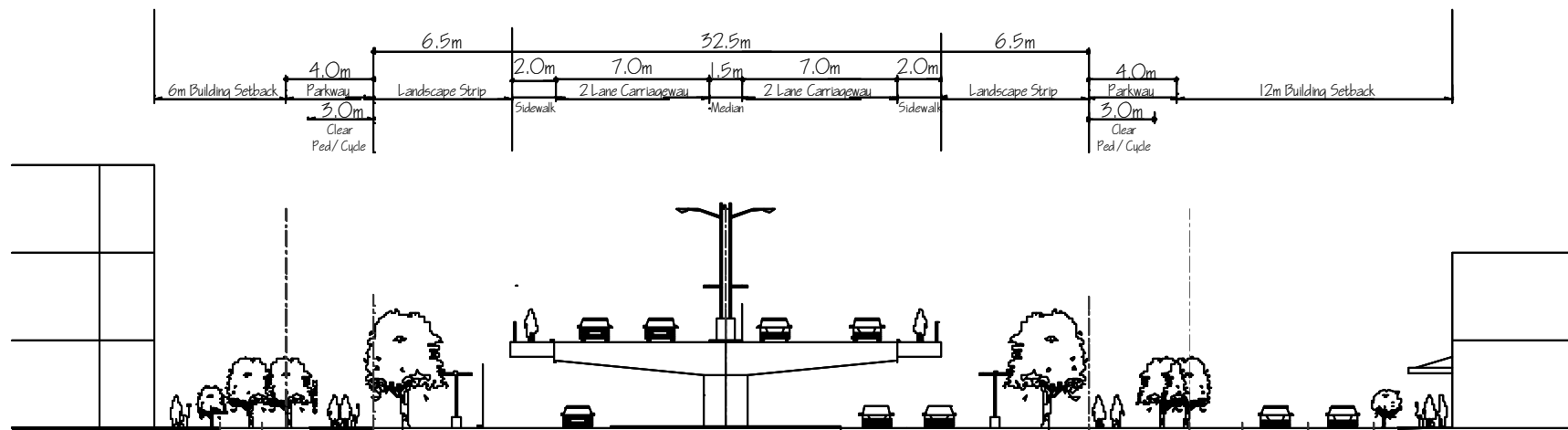


Figure 3.11
Boulevard B3

STREETSCAPE

- Streetscape within the SCC shall follow classification as indicated in **Table 3.5**.

Table 3.5 Streetscape Variables of Boulevard

	Boulevard Type		
	B1	B2	B3
R.O.W	32m	32.5m	32.5m
No. Of Lanes	4	4	4
Carriageway Width	7m	7m	7m
Median	2.5m	2.5m	1.5m
Sidewalk/ Landscape Strip/ Drain/ Utility	7.75m	7.75m	6.5m
Parkway	4m	4m	4m
Others	3.0m bus lane	Service Lane	Monorail Reserve
Frontage Type	Verandah way	Verandah way	Stoop
Setback	6m	12m	6m
Parking	Parallel		None

Note: * 32m and 32.5m ROW is inclusive of bridge and the ramps/steps on both sides of the bridge

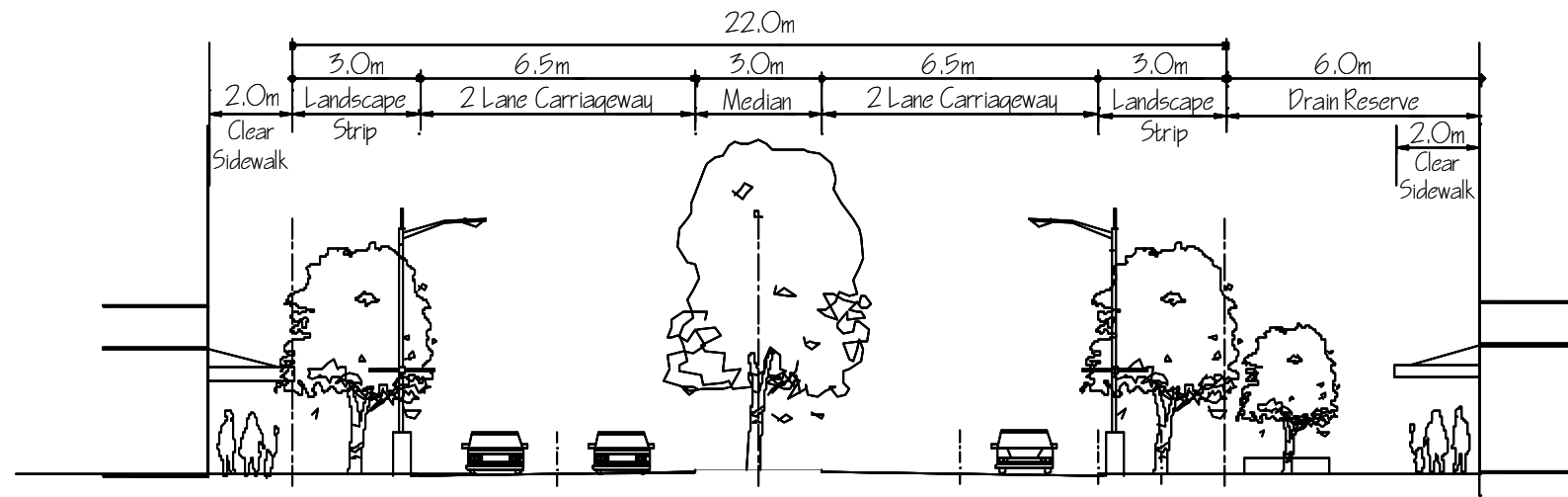


Figure 3.12
Avenue A1

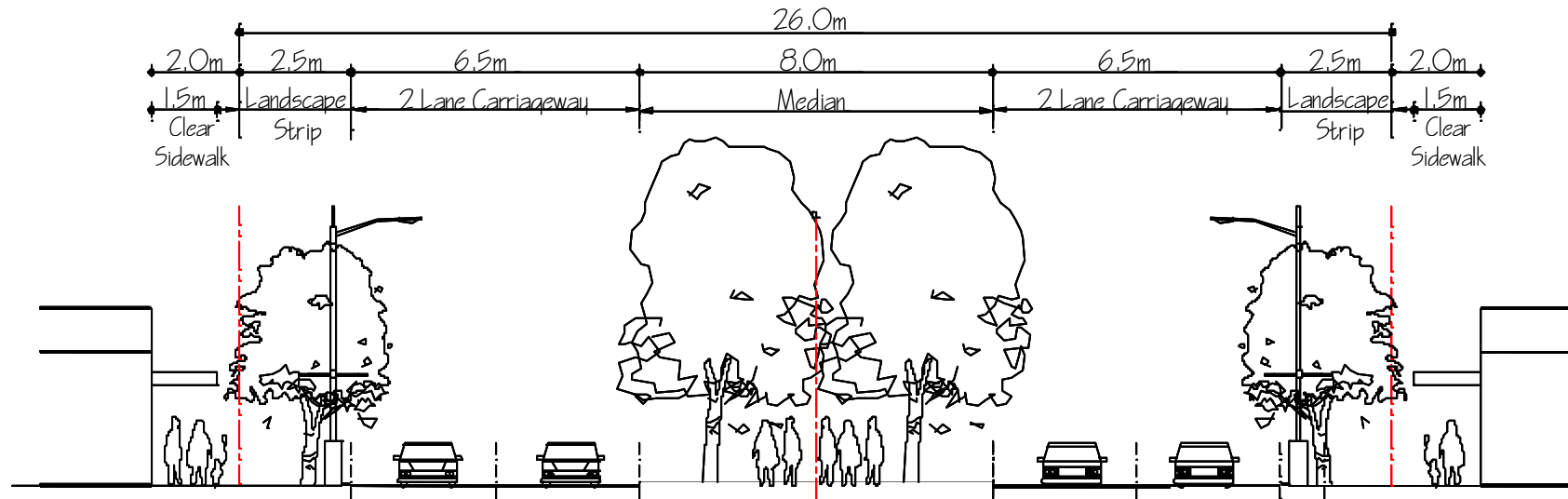


Figure 3.13
Avenue A2

STREETSCAPE

Table 3.6 Streetscape Variables Of A Drive, Avenue and Street

	Drive			
	D3	Avenue A1	Avenue A2	Street
R.O.W	22m	22m	26m	16m
No. Of Lanes	4	4	4	2
Carriageway Width	6.5m	6.5m	6.5m	6.5m
Median	-	3m	8m	-
Sidewalk/ Landscape Strip/ Drain/ Utility	4.5m	3m	2.5m	4.75m
Parkway	2.5m on promenade side	2m	2m	-
Frontage Type	-	-	-	-
Setback	4m	6m	6m	12m
Kerb Type	150mm raised kerb	150mm raised kerb	150mm raised kerb	150mm raised kerb
Parking	2.5m Parallel within ROW	-	-	-
Planter	Separate	-	-	-
Road Surface	Special	-	-	-

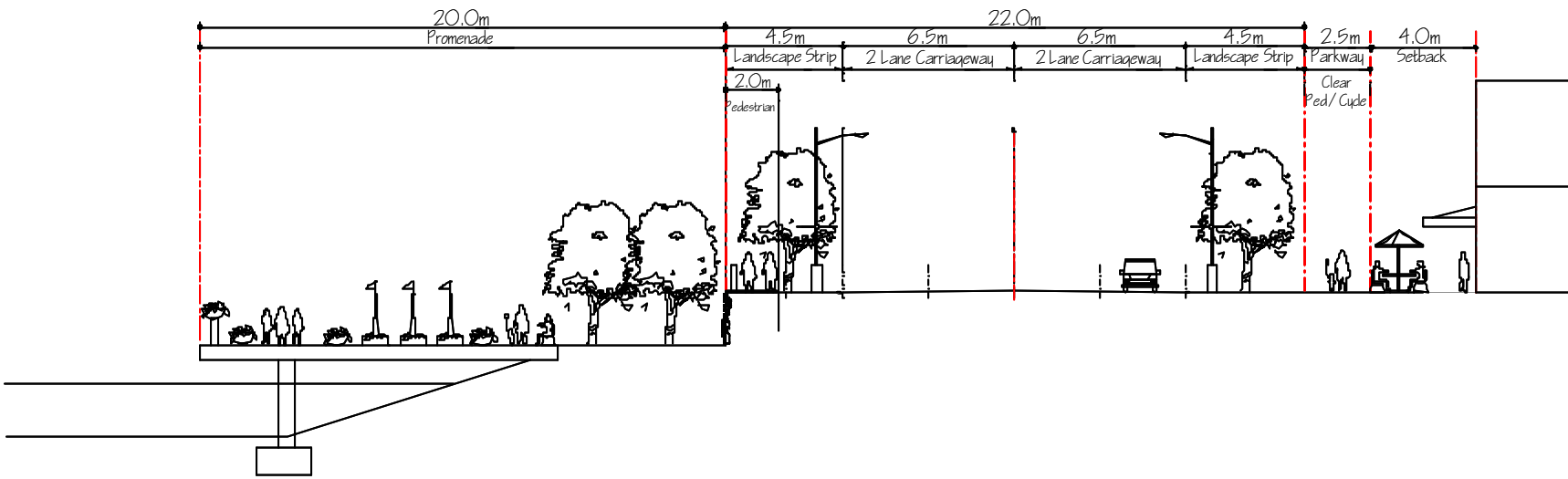


Figure 3.14
Drive D3

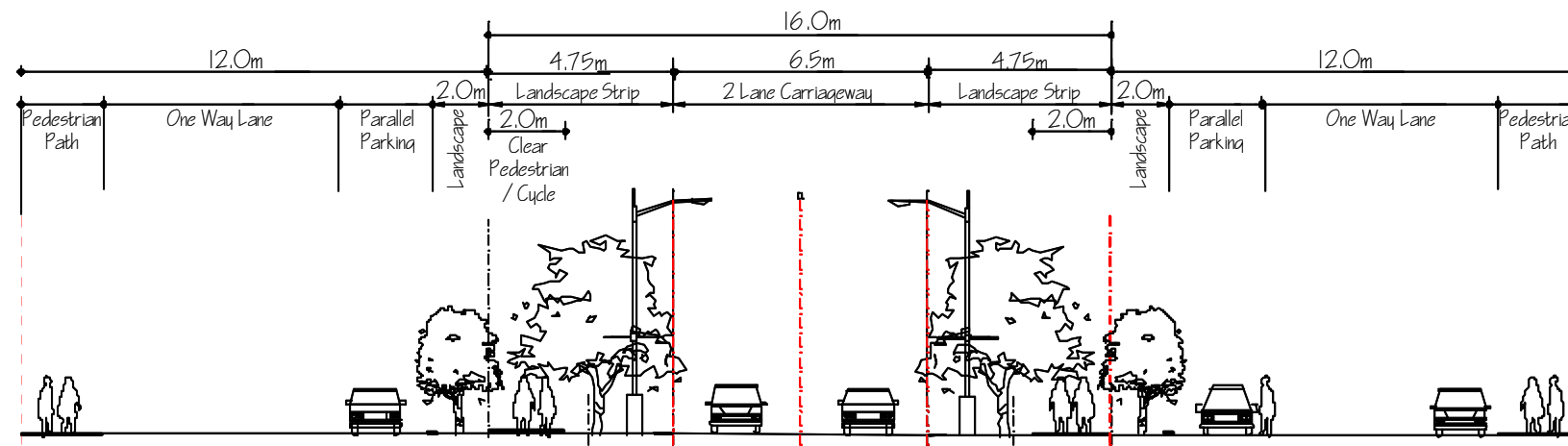
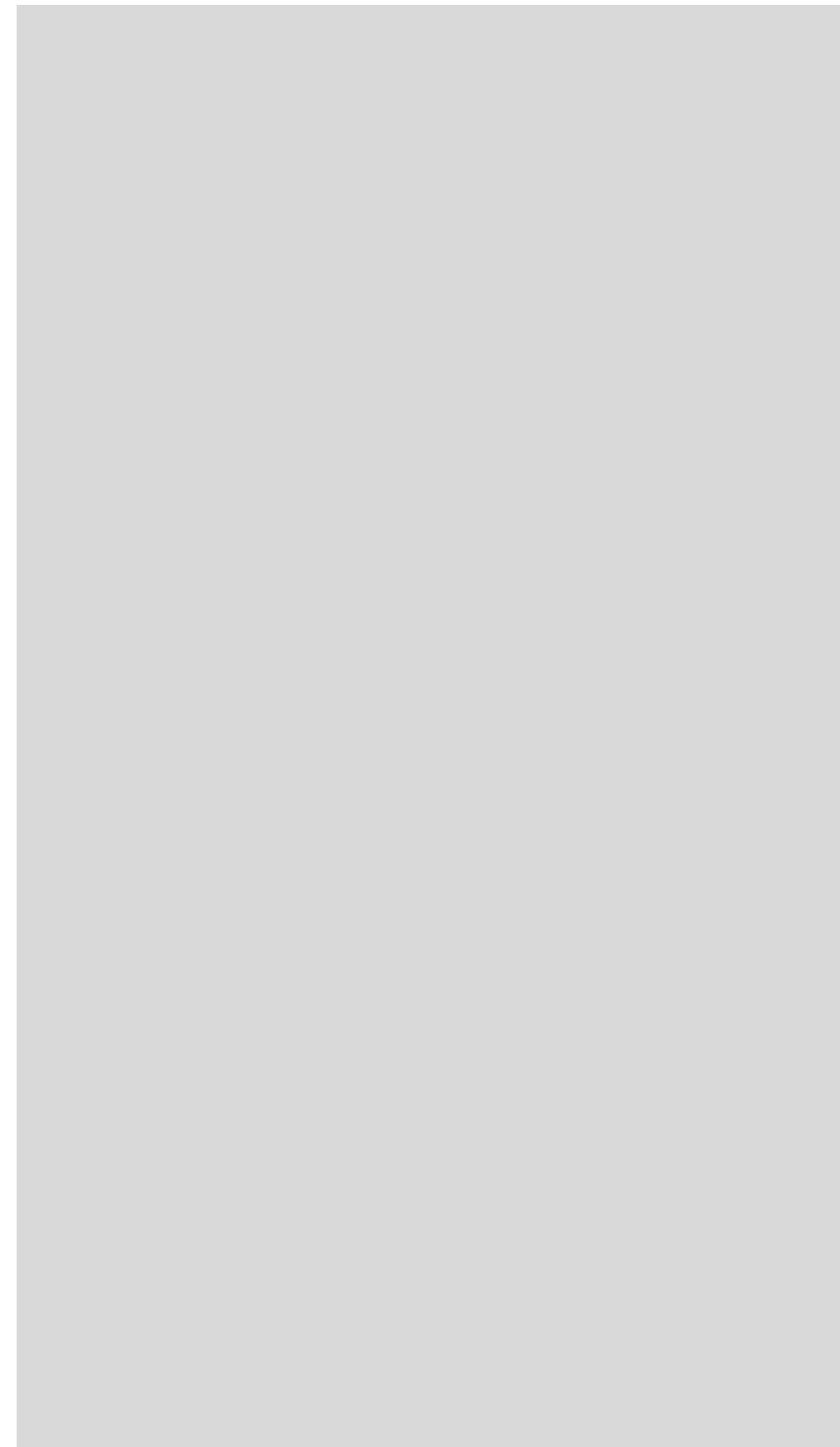


Figure 3.15
Street

STREETSCAPE



Sidewalk Layer of the streetscape dedicated exclusively to pedestrian activity and small-wheeled oriented vehicles. It is normally situated within the road reserve or within the setback area of a development plot.

Clear Sidewalk Zone is the zone within the streetscape where pedestrian flow is in continuity and uninterrupted by any structures such as columns or any landscape furniture such as trees, benches, kiosks and utility elements such as covers and gratings.

Kerb is the detailing of the edge of thoroughfare pavement separating the level of vehicular carriageway and sidewalk. There are several types as the following:-

- Raised kerb
- Flat bed kerb
- Flat kerb
- Drop kerb

Raised Kerb is a raised paving of the sidewalk where level is higher than the carriageway and is used to demarcate the limits of carriageway.

Flat Bed Kerb is the smooth transition paving differentiating two different materials of the sidewalk and the carriageway that is laid flush with the surface or shallow ramp. This type of kerb is typically used along kerb cut zones where provision of vehicular access or drop off is made.

Flat Kerb is the edge between sidewalk and carriageway where change of level is minimal and the domain between pedestrian and vehicular is normally demarcated by kerb barriers. Typically used at public spaces such as parks.

Drop Kerb is the area where kerb reduces in height at pedestrian crossings and kerb cut zones.

Kerb Barriers are low level traffic barriers employed to circumscribe vehicles on continuous paved surface and to ensure safety of pedestrians. Include bollards, landscaping and street furniture.

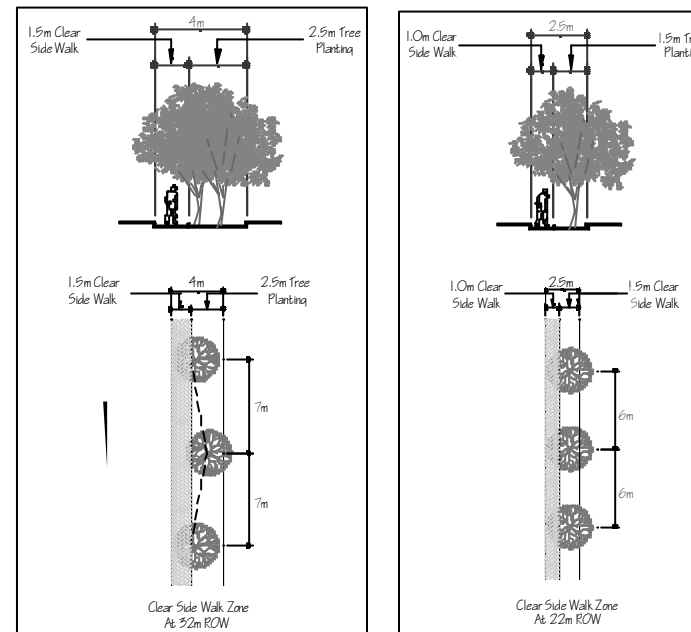


Figure 3.16
Clear Sidewalk Zone

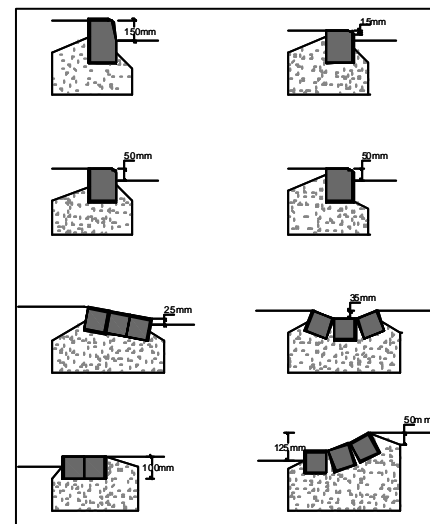


Figure 3.17
Kerb

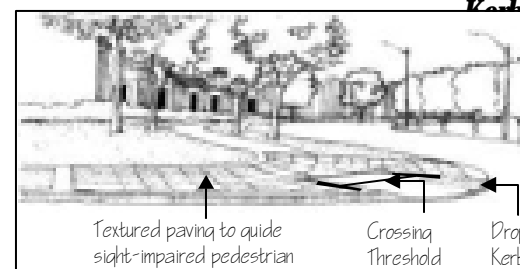


Figure 3.18
Drop Kerb

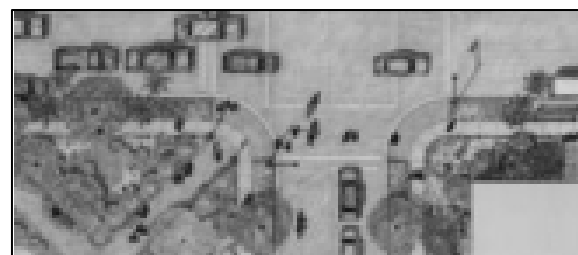


Figure 3.19
Continuous Sidewalk

KERB

- Clear sidewalk zone shall be ensured along all 32m and 22m roads according to the following minimum width (**Figure 3.16**). The clear sidewalk zone shall not be interrupted by any permanent or temporary structures including trees, utility covers and gratings.

32m roads	-	minimum 1.5m
22m roads	-	minimum 1.0m
- Raised kerb should be more than maximum height of 150mm.
- The inner edge of the flat bed kerb (next to the carriageway) shall be generally flush with the adjacent pavement. However, a 15mm chamfer is permissible where vehicular and pedestrian areas have to be differentiated. Gradient of flat bed kerb shall not exceed 1:10 (vertical: horizontal).
- Drop kerb shall be used at every pedestrian crossing. The width of drop kerb crossing threshold shall be equal to the width of crossing demarcated on the thoroughfare surface. Gradient of the drop kerb shall have a maximum grade of 1:12.
- Materials used shall of high durability, easily maintained and consistent with other kerb materials but may be selected to have a visual differentiation in terms of colour and design from the adjacent paving to clearly delineate a designated route. Kerb finish should blend with the urban floor pattern and shall not be painted.
- A band of 800mm tactile paving shall be positioned behind the crossing threshold and surface of crossing threshold shall be differentiated from the entire sidewalk pavement to facilitate sight-impaired pedestrians.
- Continuous sidewalk shall be maintained along kerb cut zone and level changes on footpath zone shall be avoided where possible to ensure smooth pedestrian movement. See Kerb Cut Zone

3.3.2 Frontages

Frontage is the privately held layer between the façade of a building and the lot line that fronts the public streetscape. It is characterised by the dimensional depth of the front yard and the combination of architectural elements such as fences, stoops, porches and colonnades and is correlated with the distance within which the building is setback from the boundary line. See also Setback Line.

There are three typical frontage types as the following: -

- Forecourt
- Verandahway
- Stoop

Forecourt is where the building façade is setback from the frontage line creating a forecourt suitable for vehicular drop-off, gardens and utility off-loading. This type is suitable for free-standing buildings.

Verandahway is where the ground level is setback from the lot line whilst the upper levels are aligned on the lot line. This accommodates pedestrian access along the frontage and more suitably applied to retail developments. Buildings are normally aligned on the boundary line. See also Build-to-line.

Stoop Frontage is where the façade is aligned build to line and the pedestrian way is elevated slightly from the street. Overhangs that extend into the public right of way are normally used to provide more coverage for pedestrians. See also Build-to-line.

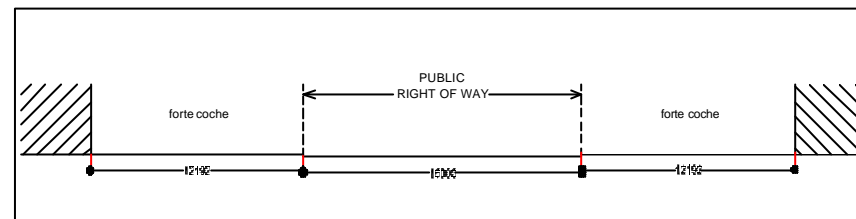


Figure 3.20
Forecourt Frontage

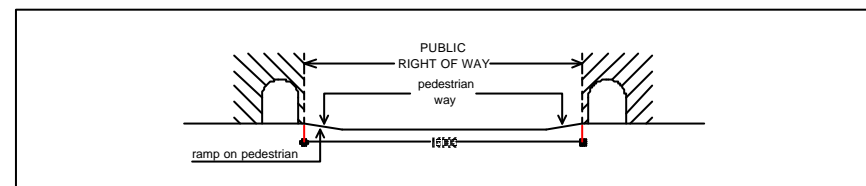


Figure 3.21
Verandahway Frontage

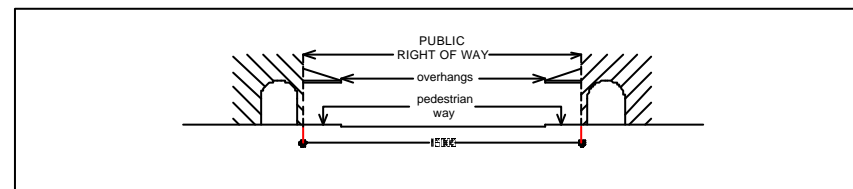


Figure 3.22
Stoop Frontage

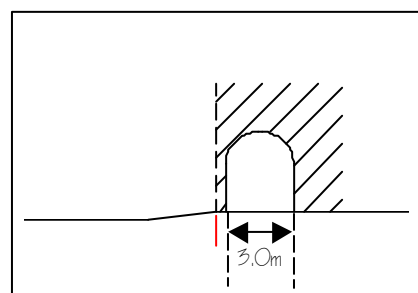


Figure 3.23
Width of Verandahway

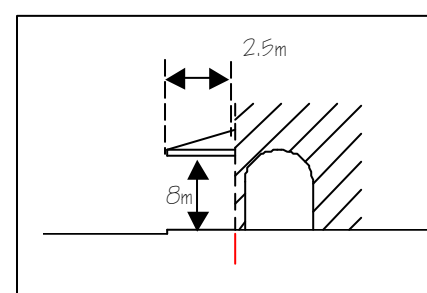


Figure 3.24
Overhang on Stoop Frontage

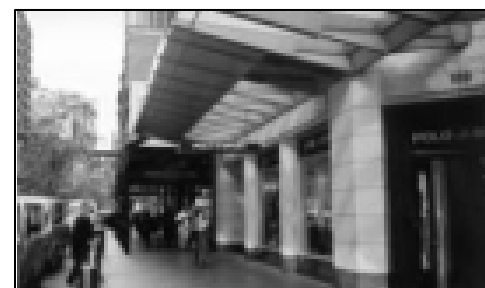


Figure 3.25
Examples of Treatment to Overhangs

FRONTAGE

- Buildings fronting a boulevard, a drive and the district park shall have either verandahway or stoop frontage.
- Building with 4m-setback line shall incorporate sidewalk within the setback line. The sidewalk shall be verandahway, covered walkway or uncovered walkway.
- The width of any verandahway shall not be less than 3.0m and height clearance of 8m. Where there is a change in levels along the verandahway between adjoining lots, steps with riser not exceeding 150mm and treads not less than 275mm or a pedestrian ramp of gradient of not exceeding one in ten (1:10).
- Columns defining front verandahway shall be between 400cm and 600cm in depth.
- Overhangs on buildings with stoop frontage shall not be more than 2.5m in width and the height measured from the surface shall not be less than 8m.



3.3.3 Urban Organisation and Character

Development of individual buildings within the SCC shall contribute towards achieving the overall urban design intentions of the Local Plan. Important urban elements such as axes, focal points, activity nodes and landmarks shall need to be emphasised.

Axis is an imaginary reference line linking two major points used for orientation and organization of urban elements along its trajectory.

Focal Point is primary areas or elements that act as visual or directional landmarks; e.g.: where activities or main movement networks converge, primary open spaces, and important structures.

Activity Nodes are created along axis line to break up monotonous of space and to create interesting gathering areas which enhance the urban identity and character of the development.

Landmark is a significant features or structure of superior or unique expression and form that adds interest to the urban fabric and language of the city.

Landmarks may incorporate: -

- Significant Buildings of unique architectural expression
- Public Buildings
- Important structures such as bridges
- Landscape features such as parks, halamans, urban plazas, etc
- Monuments or Sculpture

Gateway is an urban element which marks the entrance or the threshold of a sector or a district; one of the elements useful for orientation within the urban fabric.

URBAN ORGANISATION AND CHARACTER

- Building along axis lines shall be aligned build-to-line to frame the public spaces enfronting it and to frame view towards identified vista or focal point. They should be aligned to reinforce and define the path and spaces. Any form of structures shall not obstruct the axis and if unavoidable, they should be framed through view corridors. These axes shall also be terminated at both ends via a focal point or activity nodes.
- Buildings along the axis shall have a high degree of uniformity in its proportion, height, materials, repetitive elements etc to define a strong urban space and view.
- Plots or landscape element, which terminates axis or function as focal point, should have focal treatment or special building treatment that addresses the termination point. This can be in the form of its proportion, design and architectural details such as colour and materials.
- Where plots function as landmark or gateway to the SCC, buildings should be designed to accentuate this function.

3.3.4 Building Façade

Building Façade is the external vertical surfaces of buildings or structures. Façade shall respond to urban topological character and context to create a coherent urban environment and attractive streetscape. Elements such as verandahway, entrance and portals, window, vertical landscaping, exterior projections, expression lines, roof projections, utility such as gutters, drainpipes etc make up a harmonious entity of building façade.

Expression Line refers to a visual horizontal line that shall be expressed architecturally at defined heights between the base zone and the mid zone. It defines the façade proportionately to street level and human scale. It is expressed by a variation of material or by a limited projection such as a moulding or any protruding elements.

Maximum Roof Height refers to height of measured at top of roof cone of the building.

Corner Buildings are part of buildings located facing the chamfered section of a junction or public open space.



Figure 3.26
Example of Treatment to Corner Buildings



Figure 3.27
Corner Building Facing Landscaped Plaza

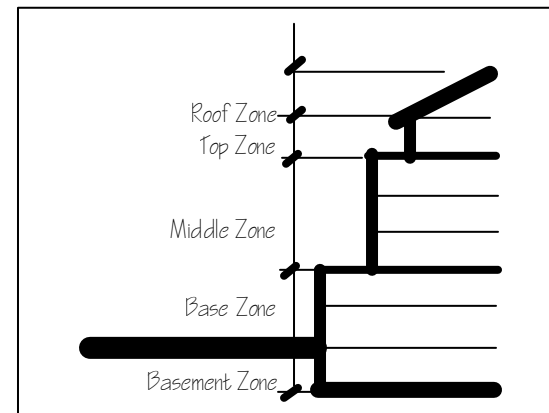


Figure 3.28
Building Layers

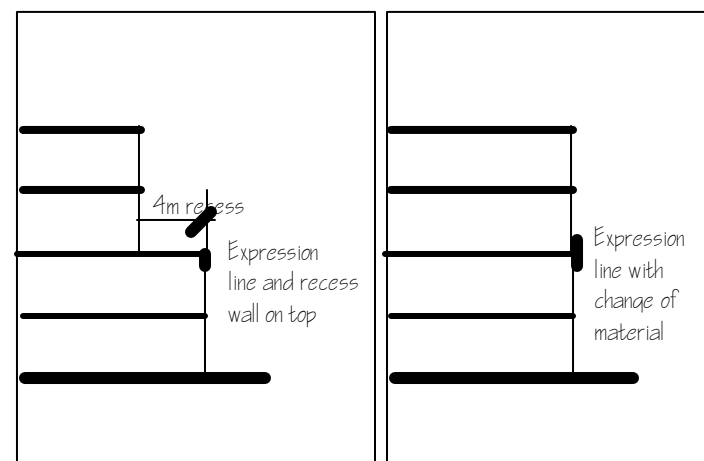


Figure 3.29
Expression Line

BUILDING FACADE

- Building façade shall be of similar in terms of character, scale and proportion to its adjoining neighbours.
- Façade on top of expression lines shall be setback to a minimum width of 4m. This is to ensure human scale at street level is maintained and proportionate spatial relationship with the street or open space is created.
- Expression line may or may not be continuous. Discontinued expression line shall be applied to accentuate rhythm and repetition of the façade. Variation of material, limited projection or protruding elements can be used.
- Break along the total length of built-to-line frontage shall be allowed and shall not exceed the 20% of the built-to-line, leaving wall frontage of 80%. Breaks shall be used to incorporate pedestrian and vehicular easements, change in façade alignment at corners of building and entrances.
- Maximum roof height shall not be more than 10m above the maximum height elevation of the building. The top zone shall accommodate for roof with roof cone of 30 degree measured from the maximum height elevation of the building.
- Corner buildings shall address the chamfered corner of the reference boundary line and be designed to accentuate and highlight the corner as a feature. Height at the chamfered corner can be higher than the rest of building elevation. Entrance into building shall be located at the chamfered corner to facilitate pedestrian movements into buildings.



3.3.5 Mechanical and Utility Appliances

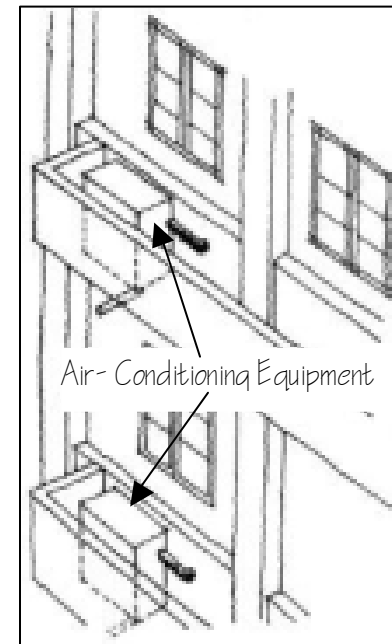


Figure 3.30
Compartment for Air Conditioning Equipment

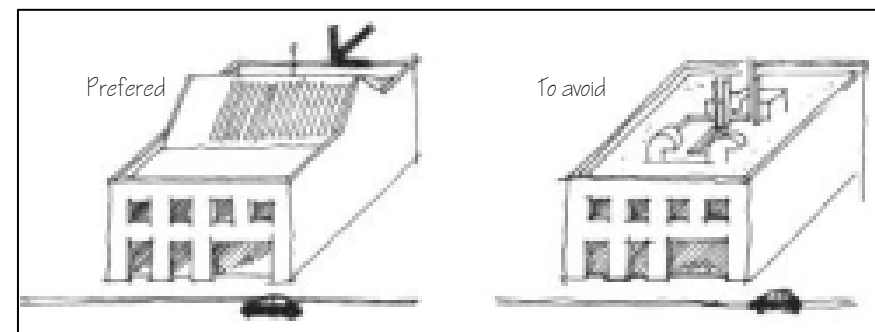


Figure 3.31
Service Equipment on Roof

MECHANICAL EQUIPMENTS & APPLIANCES

- Service and equipments on roof shall be located within the roof cone shall be positioned in such a way to minimise visual impact particularly from tall buildings and shall be housed in enclosures that are designed as a feature to effectively conceal any unsightly equipments.
- Air conditioning equipments should be contained in compartments that are designed as an integral component of the building to ensure they are hidden from view particularly from the public street. Air conditioning ducts shall not be exposed on the external surfaces of the buildings.
- Building design shall also take into consideration of placements of aerial and satellite dishes. For high-rise commercial buildings, a central reception system should be incorporated into building design. For other residential buildings, aerial and satellite dishes shall be located to avoid adverse impact on the amenity of adjoining buildings as well as character and appearance of the streetscape.
- All other service ducting shall not be exposed on the external surface of the buildings.

3.4 Access and Parking

Access refers to vehicular entrance and exit into development plot.

Kerb Cut Zone is the location where kerbs may be cut or discontinued for the purpose of incorporating vehicular and service access/drop off into the plots or easements without compromising the continuity of sidewalk.

Parking is the manner of storage and accommodation of vehicles when not in use. There are two types of parking categories, on-street parking and off street.

On-street parking is a single line of car parking bays located along the kerb line of thoroughfare accessible directly from a moving lane.

Off-street parking is a parking area located within a lot, away from the thoroughfare reserve. There are two types of off-street parking: surface parking and covered parking.

Surface parking is parking area at grade adjacent to building either as its rear, side or front. It provides convenient pedestrian access from the parking area to destination of the trip.

Covered parking is a specialised building or part of building dedicated for parking. The parking is at basement, sub-basement, multi-level or roof-top. This type is normally suitable for commercial or high-rise residential buildings.

Parking standard is a requirement for provision of parking space based on number of dwellings units for residential development and on gross floor area for commercial and other developments.

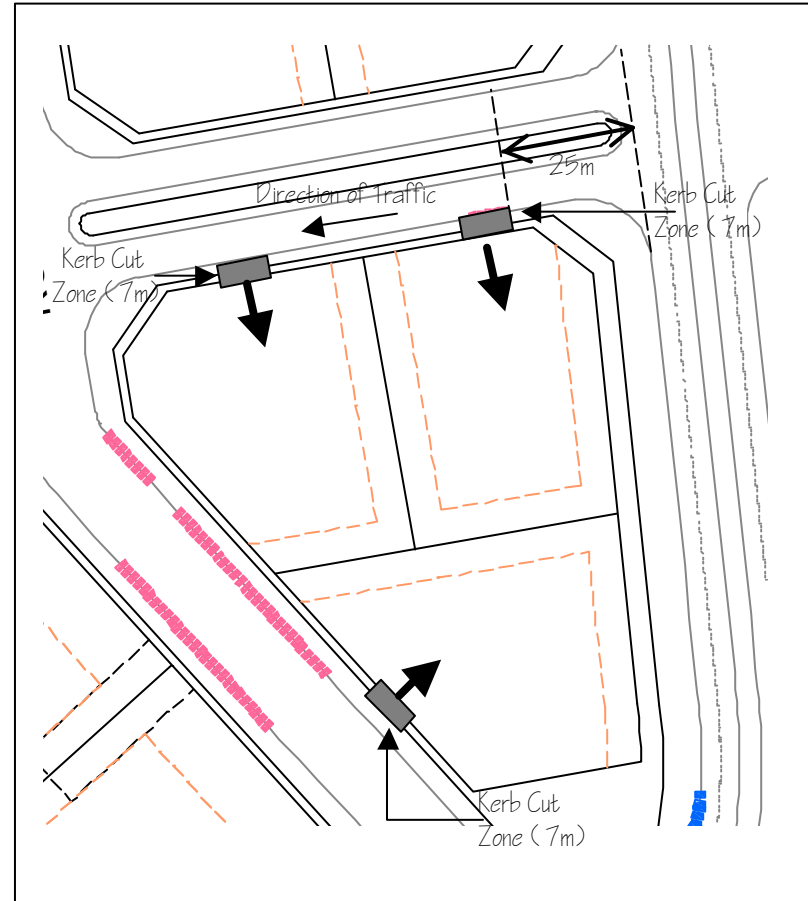


Figure 3.32
Kerb Cut Zone

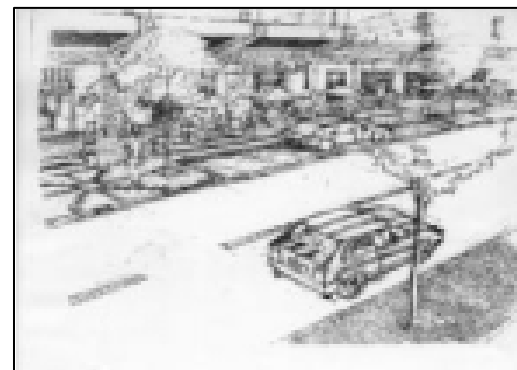


Figure 3.33
Indented Parallel Parking

ACCESS & PARKING

- Vehicular entrance and service access into development plot shall preferably incorporate 2 zones where kerb cuts (kerb cut zone) can occur to allow for main entry point and service entry point. Kerb cut zone should be incorporated on all roads.
- The kerb cut zone shall be setback to a minimum distance of 25m from the nearest junction from which traffic is approaching. The kerb cut should be of minimum width of 7m to allow for egress/ingress of vehicles into development plot (**Figure 3.32**). Drop kerb with gradient not more than 1:12 shall be used at all kerb cut zones.
- Commercial developments within the SCC shall provide parking in accordance to the requirements indicated in **Table 3.7**.

Table 3.7 Parking Requirement for SCC

Type of Development	Parking Requirements		
	Car Parking	Motorcycle	Others
Office	1CPS:70 GFA	1MPS:150 GFA	<ul style="list-style-type: none"> ▪ Handicapped parking – 1% on top of the required parking provision or minimum 2 parking spaces whichever is higher. ▪ Min. 2 coach bays for hotels with 100 rooms or more.
Office (within 200 meters of monorails stations)	1CPS:85 GFA	1MPS:200 GFA	
Hotel			
Bedrooms	CPS:5 bedroom + 10% visitor	1MPS:10 bedrooms	
Shopping arcade or mall	1CPS:60 GFA	1MPS:200 GFA	
Restaurant	1CPS:20 GFA	1MPS:160 GFA	
Conference Hall	1 CPS:8 seats	1 MPS:20 seats	
Superstores	1CPS:60sq.m	1MPS:160sq.m	
Retail	1CPS:70sq.m	1MPS:200sq.m	
Theatre/Cinemas	1CPS:5seats	1MPS:3seats	
Apartment	1 CPS : 1 unit + 10% for visitor	50% of total housing units	
Condominium	2 CPS : 1 unit + 10% for visitor	50% of total housing units	
Town House/ apartment	1 CPS : 1 unit + 10% for visitor	50% of total housing units	

Note: All GFA is in square meter
 CPS – Car parking Space
 MPS – Motorcycle parking Space



Figure 3.34
Use of Pervious Pavement at Parking Area

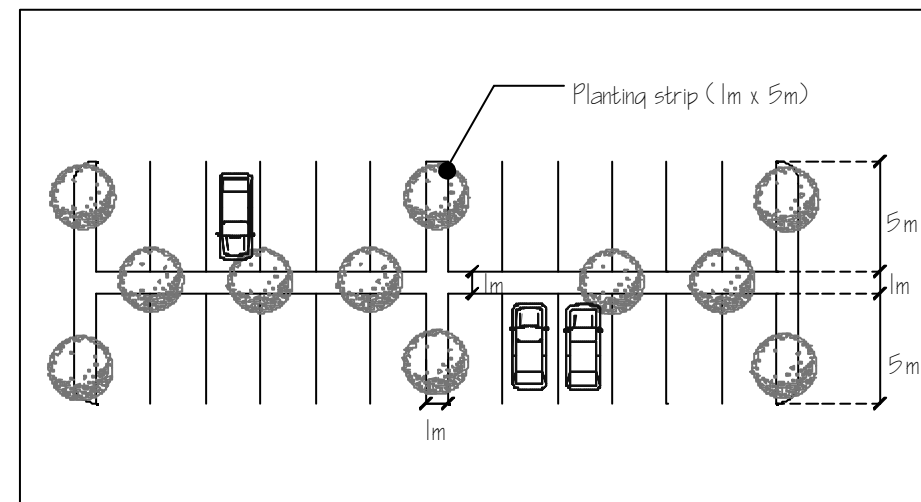


Figure 3.35
Planting Margin

PARKING

- All parking requirements shall be provided within buildings. Parking structures shall be designed as part of the overall building and shall incorporate landscaping elements to soften the impact on urban landscape.
- On-street parking shall only be allowed for developments fronting roads classified as Drive and Commercial Street. Car parking bays shall be of parallel parking. Desirably, the bays should be in a different surfacing to the moving lanes.
- Surface parking shall be located in pockets and as near to the pedestrian entry. Access for pedestrians via walkway and ramps where required shall be provided.
- Grasscrete surface shall be used for all surface parking spaces to allow for infiltration surface run-off (**Figure 3.34**). Landscape features shall be used to soften hard surface of parking courts. Linear rows of car parking bays shall be avoided and shades shall be provided. Planting island of 1m shall be incorporated for every 6 parking bays (**Figure 3.35**).

3.5 LANDSCAPE AND URBAN FURNITURE

Courtyard is privately owned and maintained outdoor spaces but open to public use. It normally introduced to ensure adequate provision of outdoor landscape areas in line with the Garden City concept.

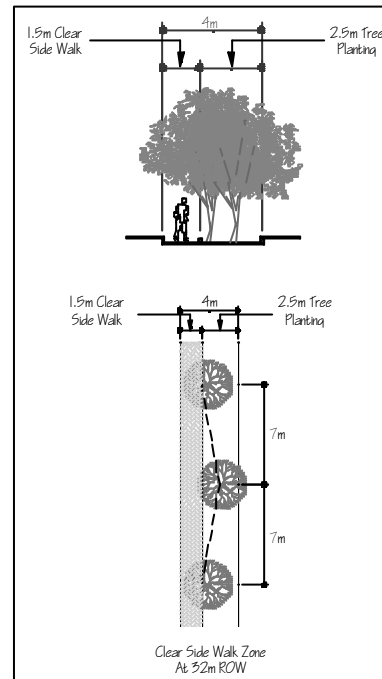


Figure 3.36
Tree planting at 32m ROW

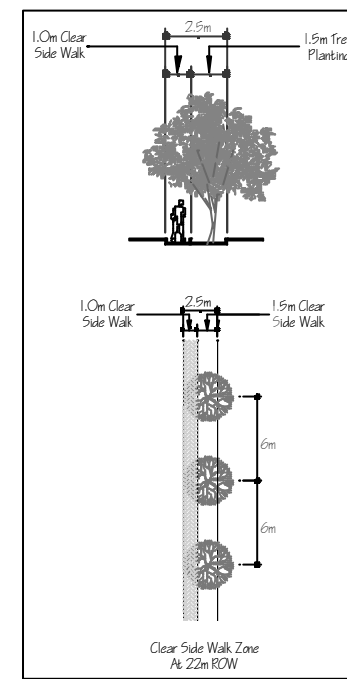


Figure 3.37
Tree planting at 22m ROW

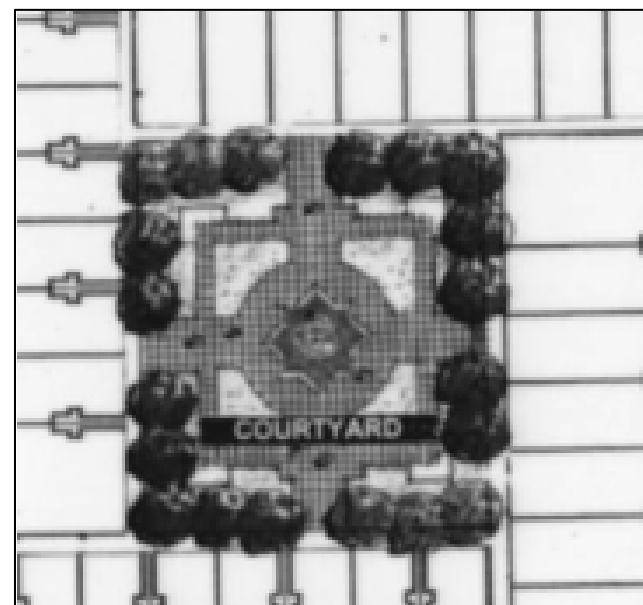


Figure 3.38
Typical Example of Enclosed Courtyard

LANDSCAPE

Road Reserves

- Tree planting along 32m-road reserve shall be as follows: -
 - Double row tree planting at 7m intervals with staggered arrangement.
 - Large size trees of flowering species.
 - Recommended tree pit size is 2m x 2m wide and 2m deep and provision for irrigation.
- Tree planting along 22m-road reserve shall be as follows: -
 - Single row tree planting in planter.
 - Medium size trees of flowering species.
 - Recommended planter size of 1.5m x 1.5m and provision for irrigation.

Courtyard Areas

- The courtyards shall allow direct access from a major green space or along pedestrian route. Buildings shall enclose these courtyards as complete space.
- Courtyards shall be at least 80% landscape either soft or hardscape and the balance can be part of retail kiosk, stage or exhibition pavilion.
- The courtyard shall be landscape to allow for a more effective cross ventilation and illumination of spaces within the buildings.
- The material and pattern used for the courtyard shall extend and complement the building enclosing the courtyard.
- Shading devices providing that it shall not exceed 50% of the total courtyard may cover courtyards.
- Flowery species shall be the major species planted for the parks. Colourful shrubs and seasonal flowers planted in pots are use sparingly to highlight entry or focal points.
- Where tree pits are used, recommended pit size is 2m x 2m wide and 2m deep.

Plaza is a public space at the intersection of important streets, set aside for civic purposes and commercial activity, including parking, circumscribed by building frontages, its landscape consisting of durable pavement and formally disposed trees, requiring limited maintenance.

Corner Plaza is Plaza located enfronting 'corner building' and usually happen at road junction or two designated path i.e. where the Peoples Parks meet the Drive, and intended to highlight the building frontage and to frame the view corridor. Introduced to ensure interesting variation to the streetscape and to highlight and emphasize frontage.

Softscape Zone refers to space within the urban fabric and open space network designated for soft landscape. The soft landscape zone may include all or a combination of trees, shrubs, ground cover planting and turfing.

Hardscape Zone refers to open space area dominated by paving, urban furniture. Parking and vehicular driveways can also be classified as hardscape.

Bollard short upright post usually found in multiple linear placements. Bollard is use to circumscribe vehicles on continuous paved surface, as in the design of plazas.

Sculpture can take the form of carvings, freezes, murals installations, pictures, lighting, earthworks or applied and integrated into structures and paving.



Figure 3.39

Examples of Treatment to Corner Buildings



Figure 3.40

Corner Building Facing Landscaped Plaza



Figure 3.41
Bollard

LANDSCAPE

Corner Plaza

- The plaza shall allow frontage and access to the corner building.
- The built form shall embrace the plaza and form a strong urban space.
- Corner plaza shall landscape to enhance the built form.
- The material and pattern used for the plaza shall extend and complement the corner building and the landscape of junction.
- The width varies according to the corner cut of the junction. The plaza however shall have a minimum of 10 feet from the corner cut.
- The plaza shall incorporate drop kerb for pedestrian crossing at junctions and intersection.
- Colourful shrubs and seasonal flowers planted in pots are recommended to highlight entry and to ensure clear splay zone for vehicle stopping at the junction.
- Where tree pits are used, recommended pit size is 2m x 2m wide and 2m deep.

Sculpture

- Should be located at points of visual focuses, gateways and where practicable, integrated into the nightscape concept.
- Ideally should be integrated into the public realm in the form of applied art in which the piece of sculpture also serves a functional as well as aesthetic purpose, for example the sculpture may also be a seat, a bin, a play structure, and bus-stop etc.

Tree Grilles is material used to protect the tree pit.

Tree Pit A cavity as deep as the height of the ball of earth of the tree stock with side somewhat larger and unfilled with topsoil.

Paving refers to stone, brick, block or homogenous surface treatment applied to pedestrian or vehicular routes (pavements) to provide a solid, well defined, safe and easily negotiated surface on which both pedestrian and vehicular traffic can travel and to encourage as well as facilitate pedestrian movement in the public realm.

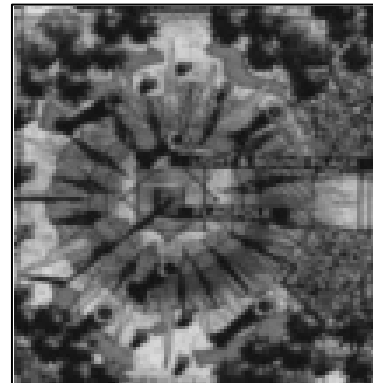


Figure 3.42
Decorative Paving

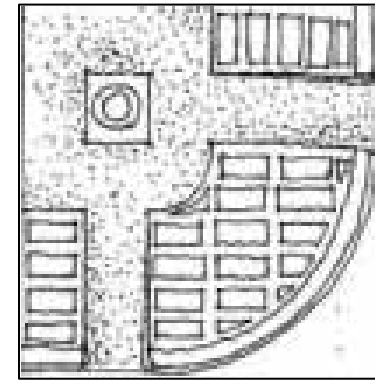


Figure 3.43
Paving at Pedestrian Crossing

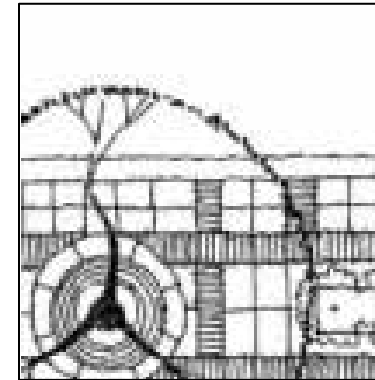
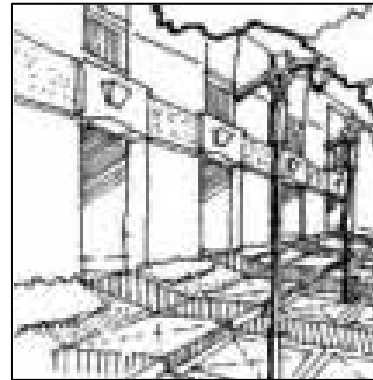


Figure 3.44
Paving for Safety

OPEN SPACE & LANDSCAPE

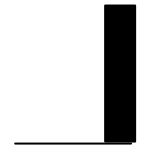
Tree Grilles

- The design should respond to surrounding landscape context and adjacent architecture.
- Design should consider surface water to be drain out through grating.
- The design should have proper opening at min. 300mm radius.
- Grating can be incorporated as part of the total floor pattern in urban spaces.
- Selection of material should be easy to maintenance durable and easy resemble.
- The design should cover a surface at least 1600m X 1600m minimum.
- High ornamental decoration prefers to be avoided.
- Grating design pattern should consider cyclist and disable people especially at recreational area
- Design pattern shall be perpendicular to road, footpath or cycle path.

Paving

- Paving design shall include textured paving for the partially sighted and visually impaired. Where practicable all surfaces should be non-slip.
- Paving shall be appropriate to the intended associated user.
- All paving shall be provided with cross-falls and a positive drainage system.
- Kerbs to paved areas shall be treated as an integral part of the pavement design.

FINAL DRAFT



- The surface finish of paving shall be even and consistent. Irregular and un-even surface finishes should be avoided.

Landscape lighting is ornamental and atmospheric lighting to compound areas and public open space that is not governed by statutory regulations.

Function of landscape lighting is as follows: -

- i. To provide appropriate and safe lighting levels to areas the public can access that at night.
- ii. To enhance the nighttime ambience and atmosphere within the public realm.
- iii. To highlight and emphasise selected features within the landscape.
- iv. To provision of a safe nighttime environment shall encourage greater nighttime activity.
- v. To provide an opportunity for signage and banners within the public realm.

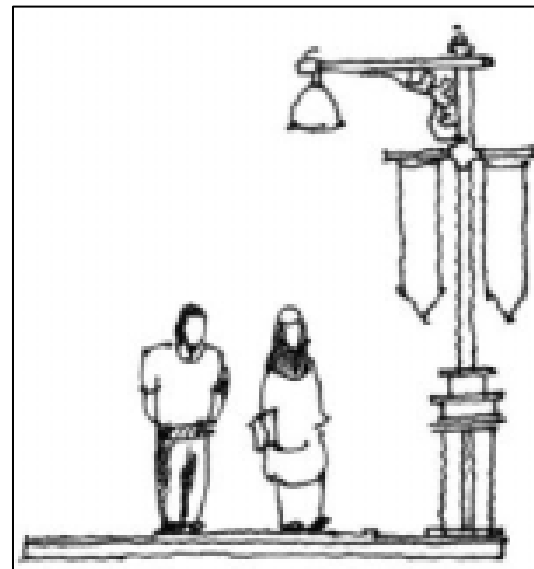


Figure 3.45
Typical Street Lighting
Combined With Banners

OPEN SPACE & LANDSCAPE

- Paving colours shall reflect the spatial ambience and large areas of dark coloured paving should be avoided to reduce microclimatic radiant heat.
- Unless creating special patterns at specific locations, paving patterns should be simple and uncluttered using a limited palette of materials, colours and finishes.
- Paving patterns should sympathetically integrate walls, ramps, steps, street furniture, drainage and other utilities elements to create a unified effect to the hardscape. Paving materials should complement finishes associated with the adjacent built form.
- At selected locations, feature paving may be introduced to convey specific concepts. However, this should be nodal and unique to the location and should not compete with the general paving but contrast at that particular nodal point.

Landscape Lighting

- All types of lighting fixings shall be able to withstand any form of vandalism by using durable and easily maintained materials.
- All lighting fixings and junction boxes should be well concealed or hidden from view where applicable.
- For pole lighting consideration should be given for banner fixing.
- Lighting design should be sympathetic with the adjacent landscape treatment.
- Where tree canopies interfere with lighting, trees will need to be clipped back.
- Materials, finishes and colours should be durable and easy to maintain and replace. The lighting should effectively integrate with pedestrian paving wall finishes, ramps, steps, street furniture, drainage and other utilities elements to create a unified effect to the hardscape where lightings are used.

Kiosk is a lightweight open-fronted booth or structure selling food, newspapers and other small consumer items.

Functions of kiosks are as the following: -

- i. To protect against inclement weather.
- ii. As a focal point or nodes for street activity.
- iii. To provide comfortable and user-friendly environment for pedestrian user.
- iv. As an information or selling outlet to promote street activity.
- v. To provide small non-permanent retail opportunities within the public realm.

Benches are long seats for sitting on. This can be in the form of a freestanding structure or a low wall, and can include arms and back rests as well as integrating other street furniture and lighting elements depending on designers preference.



Figure 3.46
Kiosk

OPEN SPACE & LANDSCAPE

Kiosk

- The design should reflect surrounding context and represent main function and activity of the area.
- Kiosk should be located at major pedestrian routes. Kiosk should be readily visible from street. This is to ensure security upon pedestrian user and public facility.
- Kiosk design shall incorporate some space for advertisement or information. Information board and lighting fixing shall be able to withstand vandalism.
- Kiosk design should look good from every angle. The interior space should provide sufficient space for retailer to do business. Kiosk design shall have flexibility in term of display items or selling items. Construction method should be fast and easy to assemble on site.
- Selection of material should allow for easy maintenance and should also be designed in sympathy with the adjacent street furniture.
- Consideration should be given to how the kiosk is serviced and whether vehicular access is necessary right to the structure.

Benches

- Benches shall be designed within standard ergonomic parameters.
- Benches shall be designed to allow comfortable sitting for reasonable periods but shall discourage 'lounging' or 'sleeping'. The design of benches shall be coordinated with other street furniture and reflect the Precinct's character.
- A flat platform shall be provided around freestanding benches. Space shall be allocated adjacent to benches for wheelchair parking.
- Fabrication materials shall be durable, easy to assemble and easy to replace/maintain.



3.6 PUBLIC UTILITIES

Public Utilities defined under the provision of this guideline refer to utilities that need to be provided within development plot for the use of the commercial buildings. It includes utilities such as electric substations and feeder pillars, fibre distribution house (FDH) and solid waste storage and collection facilities.

PUBLIC UTILITIES

Electric Substation

- Location of electric substations for commercial developments should be fully integrated within the development and shall be determined at design stage. The building should be 12.2m x 5.5m. The provision shall be on the ratio 1 : 30 shops for commercial developments. This however, will depend on final decision by TNB after total demand load of the proposed development have been studied in detail.
- Stand-by facilities, for mains-power supply for public buildings, are advisable. Sub-stations should be sited along the rear or side elevations of commercial buildings, so as to avoid intruding upon commercial and retail frontages.
- Design of substations shall integrate together with the overall theme of the development and shall use the same construction materials colour schemes as adjacent buildings.
- Direct access from local road shall be provided for maintenance and services for the substation.

3.7 Environmental Consideration

Environmental aspects required considerations by any developments within the Sub-commercial Centre are related to water quality, air quality, noise and waste. In order to minimize the impact of the environment it is important that the Environmental Management Plan (EMP) be complied throughout every phase of the development project.

EMP contains detail description of practices to be followed and activities to be undertaken for the environmental management of the development area.

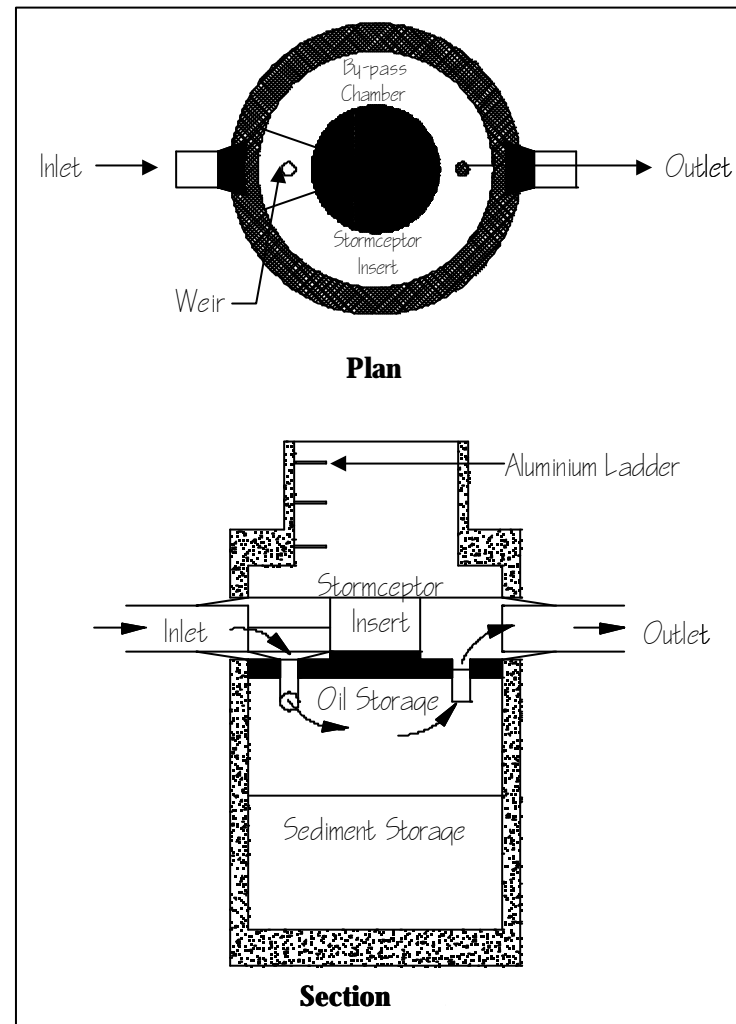


Figure 3.47
Typical Oil, Grease and Grit Trap(OGGT)

ENVIRONMENTAL CONSIDERATION

Water Quality and Drainage

- All effluents generated within the project area shall be treated to Standard A of the Environment Quality Act 1974 and should only comprise of sewage and sullage.
- There shall be no discharges of any substance such as organic or inorganic solvents, refuse, garbage, human or animal waste or solid matters into any inland waters within the project area especially the lake.
- There shall be no discharge to the storm drain system other than surface runoff. This includes wash water from equipment and vehicles used in the area.
- Gross Pollutant Trap (GPT) shall be install at the outlets into the proposed lake to minimise contamination of the lake water. The GPTs shall be periodically cleared to minimise blockage and odour.
- Water conservation shall be practiced as much as possible by all personnel during the life span of the project. This includes measures such as using rainwater for irrigation purposes and installing water conservation fixtures such as low flow toilets.
- Sedimentation ponds, silt traps and drainage systems to control surface run-off must be provided before the commencement of any earthworks. Discharges from sediment basins or any other discharge point from the site shall be collected, and removed via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause either pollution nor nuisance.
- Surface run-offs shall be designed in accordance to **Putrajaya Stormwater Management Design Guidelines** and the **Manual Saliran Mesra Alam (MaSMA, 2000)**, see also Chapter 9.0 Infrastructure and Utilities.
- Solid waste material shall not be disposed to any watercourse or drainage facility.

ENVIRONMENTAL CONSIDERATION

- Sewage, wastewater or effluent containing sand, cement, silt or any other suspended or dissolved material is not permitted to be discharged without the prior consent of the relevant Authority (DOE). Any such discharged are shall comply with the **Environment Quality (Perbadanan Putrajaya)(Lake Pollution Control) Regulations 1998. Table 3.8.**

Table 3.8 Putrajaya Ambient Lake Water Quality Standards and Standard for Discharge into Lake Area and Sewer

Parameters	Unit	Putrajaya Ambient Lake Water Quality Standards	Standard for discharge into the lake area or onto land	Standard for discharge into sewer
Temperature	°C		38	45
pH		6.5-9.0	6.0-9.0	5.0-9.0
BOD	mg/l	3	10	400
COD	mg/l	25	30	1000
Suspended solids	mg/l	50	50	400
Mercury	mg/l	0.001	0.001	0.10
Cadmium	mg/l	0.005	0.01	1.0
Hexa-Chromium	mg/l	0.05	0.05	2.0
Arsenic	mg/l	0.05	0.05	2.0
Cyanide	mg/l	0.02	0.02	2.0
Lead	mg/l	0.05	0.05	2.0
Tri-Chromium	mg/l	-	0.20	10
Copper	mg/l	1.0	0.10	10
Manganese	mg/l	0.1	0.20	10
Nickel	mg/l	0.02	0.20	10
Tin	mg/l	0.05	0.20	10
Zinc	mg/l	5	1.0	10
Boron	mg/l	1	1.0	50
Iron	mg/l	0.3	1.0	2.0
Phenol	mg/l	0.01	0.001	2.0
Free Chlorine	mg/l	-	1.0	-
Sulphide	mg/l	-	0.5	2.0

- Temporary drainage works and all other precautions shall be taken to ensure the avoidance of damage by flooding and silt washed down from the site.

ENVIRONMENTAL CONSIDERATION

- All domestic wastewater are to be connected to the central wastewater sewerage system. No discharges into the storm water drainage system are allowed. This is to ensure that the ambient water quality of all inland waters and Putrajaya Lake are preserved at their high standard.
- No discharge of any wastewater into the drainage system is allowed. All wastewater are to be connected to the central sewerage system. The drainage system is only to be used for removal of surface runoff from rainfall.
- All toilets, domestic and commercial wastewater is to be connected to the central sewerage system. No individual sewerage system shall be allowed..
- All eating outlets and parking spaces in the local and neighbourhood commercial centres shall be equipped with oil, grease and grit trap (OGGT) to trap effluents before being discharged into drainage outlets and lake.

Air Quality

- There shall be no burning of refuse, produce and waste except when permission has been obtained from the Department of Environment.
- Development activities shall be carried out by phase. Mitigation measures such as water spraying, wheel washing through and turfing should be provided and implemented during constriction phase to control and minimize dust desperation. Air quality should not exceed the recommended Malaysian Guidelines during earthwork and construction phase as in **Table 3.11**

ENVIRONMENTAL CONSIDERATION

Table 3.9 Air Quality Standard

Parameter	Specification	
	Averaging Time	Malaysian Guidelines
Total Suspended Solid	24 hours	260µg/m ³
Lead	3 months	1.5µg/m ³
Sulphur dioxide	24 hours	0.04 ppm
Nitrogen Dioxide	1 hour	0.17 ppm
Carbon Monoxide	8 hours	9 ppm

- Regular inspection of vehicles and machinery are to be made to ensure optimal performance and minimal pollution.
- The use of public transport systems to the project site shall be encouraged and promoted in order to reduce the reliance of private vehicles especially for visitors and routine travellers. Car-pooling shall also be encouraged to reduce traffic flow during peak periods.
- Public areas within the project shall be designated as a 'non smoking zone'.
- The project areas shall incorporate as much open spaces as possible in order to increase filtering of air by vegetation.

Noise Control

- All noise pollution within the project shall be addressed on a case-by-case basis in order to ensure sufficient and well-planned management measures are implemented.
- All facilities within the project shall be designed to act as noise barriers from outside influences.

ENVIRONMENTAL CONSIDERATION

Waste Management

- The 4R's of waste management will be emphasised with reduction being the predominant R and is listed below where the primary focus will be on the first 3R's.
Reduce-Reuse-Recycle-Recover
- Schedule waste generation within the project is expected to be at the bare minimum. Nevertheless, the management of Schedule Waste within the project should follow the existing regulations as stipulated under the **Environment Quality (Schedule Wastes) Regulation, 1989.**

4.0 LOCAL AND NEIGHBOURHOOD COMMERCIAL CENTRES

4.1 USE OF GUIDELINE

This guideline shall be used for all commercial developments located within the neighbourhood and local centres of Precincts 7, 8, 9 and 10, Putrajaya (**Figure 4.1**).

Local Centre is an area where commercial activities and spaces are provided to serve a local community. It is normally centrally located within one or several housing neighbourhoods. Commercial activities within the local centre usually include retail shops for convenient goods and the supply of basic services. Within the context of Precincts 7, 8, 9 and 10, Putrajaya, the local centres are located in PB9.1, PB9.3 and PB 10.3.

Neighbourhood Commercial Centre is a commercial area that serves a bigger catchments area than the local centre. It will serve several neighbourhoods and has the function and activities of higher order goods than a local centre. In the Local Plan area, the neighbourhood commercial centre can be found in PB7.5, PB 8.1 and PB 9.2.

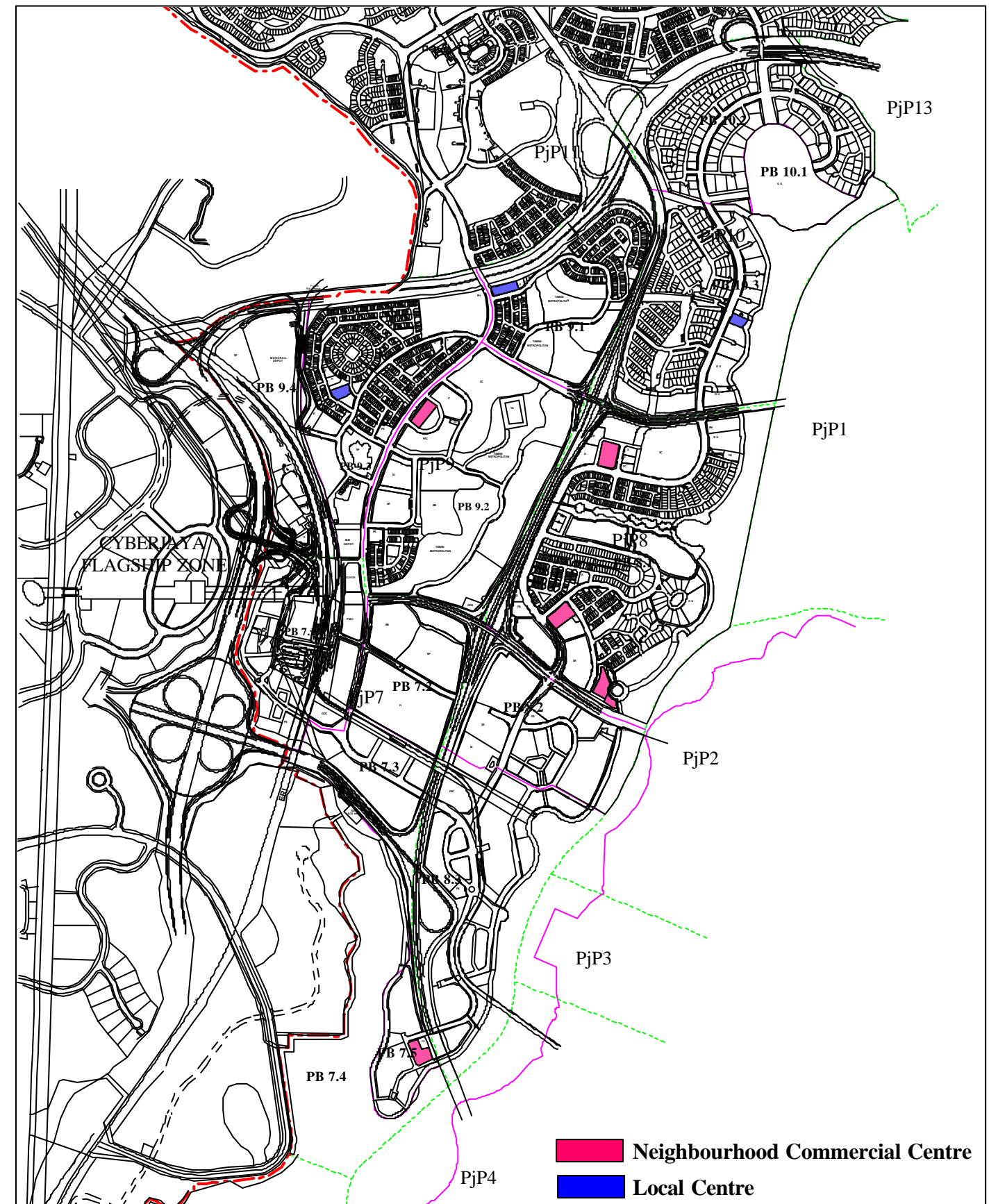


Figure 4.1
Location of Local And Neighbourhood Centre

4.2 DEVELOPMENT TYPE AND SIZE

Shophouse refers to a row of commercial buildings where the frontage is associated normally with verandahway that allows pedestrian access from one end to the other. Shophouse also refers to mixed use of commercial activities at the lower ground and residential use at the upper floors.

Shopoffice refers to a row of commercial buildings where frontage is associated normally with verandahway that allows pedestrian access from one end to the other, and all floors or levels are used for commercial activities only.

One-stop Centre refers to a block of commercial spaces located within one large plot where parking spaces are normally centralised and characterised by not more than two anchor tenants together with smaller retailers to support daily needs of the neighbouring residents.

Gross Floor Area is the sum of the planned areas of all floor levels (inclusive of the planned area of all walls, windows, column, elevator shaft) and the planned area of all internal and external stairs, landing, ramps, escalators, or other means of access between levels, or at each level in the building.

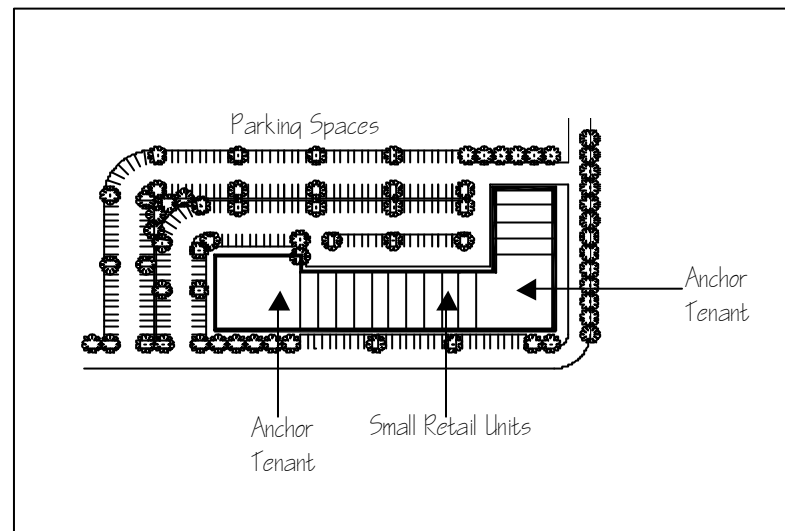


Figure 4.2
Typical Concept of One Stop Centre

DEVELOPMENT TYPE & SIZE

- Development type within the Neighbourhood and Local Centre shall desirably be of shophouses/shopoffice or one-stop commercial centre. These shall be provided based on indicative threshold ratio as shown in **Table 4.1**. This threshold shall be used as guidance in developing commercial areas to ensure that the commercial developments are not larger than required which may result in undesired influx of people and cars or marginal business that cannot provide proper services.

Table 4.1 Threshold Ratios for Local and Neighbourhood Commercial Centres

Development Type	Indicative Provision Threshold
Shop-house/shopoffice	1 shop : 40 residential units
One-stop centre	2600sq. ft. : 40 residential unit

- Local and neighbourhood commercial centre shall typically include 8 to 12 stores with an average gross floor area of about 36,000 sq. ft. The site will vary from 0.6 hectares to 1.6 hectares. (1.5 to 4.0 acres).

4.3 PHYSICAL PLANNING REQUIREMENTS

Plot Ratio as defined by The Town and Country Planning Act, 1976, is the ratio of the total floor area of a building to the area of the building plot as measured between the surveys boundary lines or, if there are no survey boundary lines, between the provisional boundary lines.

Plinth Area as defined by the Town and Country Planning Act 1972 is the proportion to be covered by building of the area of any lot.

Open Space Coverage is the portion of plot area outside plinth area. It may comprise of internal circulation, open space and both hard and soft landscape elements.

Building Height is the limit to the vertical extent of a building. It is measured as a number of storeys or floors from the ground level.

Setback refers to the minimum distance between a wall and a property boundary or a wall of another building.

Front Setback/Street Frontage refers to setback where lot/building frontage faces the following

- Park/public open spaces,
- Street frontage for main roads such as local or spine roads
- Street frontage roadside buffer
- Green corridors linking neighbourhood centres or open space
- Waterfront/Promenade

Side Setback refers to setback on the sides of the lot that adjoin another lot.

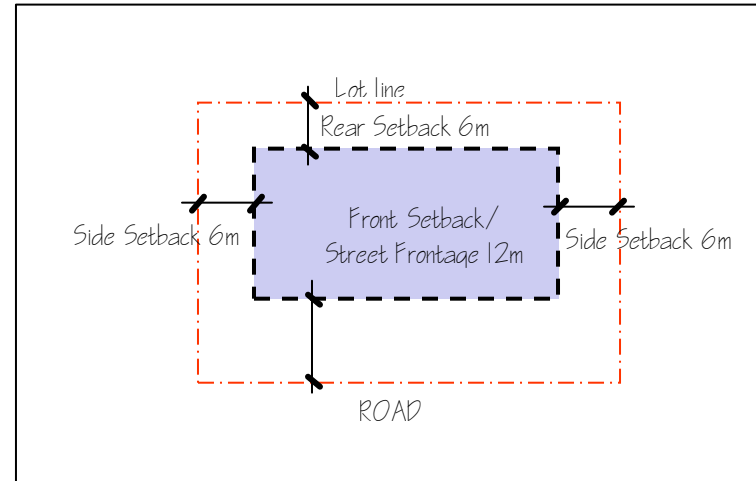


Figure 4.3
Building Setback for One-Stop Retail Centre

PHYSICAL PLANNING REQUIREMENTS

- Development of commercial buildings shall conform to the requirements as specified in **Table 4.2**.

Table 4.2 Planning Standards For Developments in Local and Neighbourhood Commercial Centre

Type	Min. Size	Plot Ratio	Max. Height	Max. Plinth
Shop-house/shop-office	20' x 70'	1 (on subdivided lot)	<ul style="list-style-type: none"> ▪ 4 storeys in Neighbourhood Commercial Centre ▪ 2 storeys in Local Centre 	100% over plot of commercial
One-stop centre	-	2	<ul style="list-style-type: none"> ▪ 4 storeys in Neighbourhood Commercial Centre ▪ 2 storeys in Local Centre 	60%

- Buildings shall be setback to the minimum dimensions as shown in the **Table 4.3**.

Table 4.3 Setback Requirements for Commercial Development.

Type	Setback		
	Front	Rear	Side
Shop-house/shop-office	-	-	-
One-stop Centre	12m	6m	6m

4.4 URBAN DESIGN

4.4.1 Streetscape

Streetscape is the urban character of the public realm that is made up of an assemblage of landscape, walks and curbs between the lot line and the vehicular lanes. Its physical character and ambiance is further defined by building frontages aligning the public right of way.

The streetscapes are of different characteristics and compositions. These can be perceived in the manner in which each detailed element that constitutes the streetscape is ordered to achieve the intended image in line with the urban identity and development focus.

For local and neighbourhood commercial centres, the streetscape character is less elaborated in its detailing as compared to those in the sub-commercial centre. The ambiance is more localised to reflect local character and function.

Raised Kerb is a raised paving of the sidewalk where level is higher than the carriageway and is used to demarcate the limits of carriageway.

Flat Bed Kerb is the smooth transition paving differentiating two different materials of the sidewalk and the carriageway that is laid flush with the surface or shallow ramp. This type of kerb is typically used along kerb cut zones where provision of vehicular access or drop off is made.

Flat Kerb is the edge between sidewalk and carriageway where change of level is minimal and the domain between pedestrian and vehicular is normally demarcated by kerb barriers. Typically used at public spaces such as parks.

Drop Kerb is the area where kerb reduces in height at pedestrian crossings and kerb cut zones.

Kerb Barriers are low level traffic barriers employed to circumscribe vehicles on continuous paved surface and to ensure safety of pedestrians. Include bollards, landscaping and street furniture.

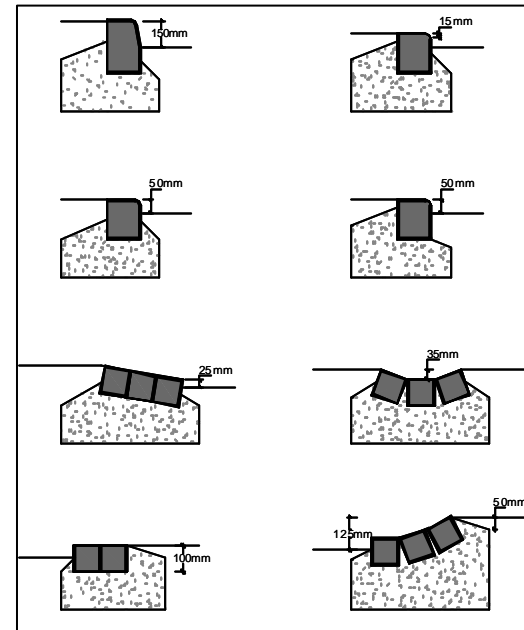


Figure 4.4
Kerb



Figure 4.5
Drop Kerb

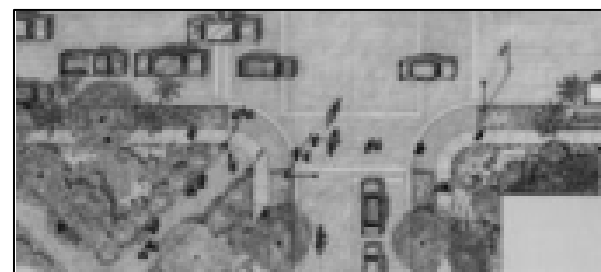


Figure 4.6
Continuous Sidewalk

STREETSCAPE

- The design of each street should convey to the user its primary function, character and identity, and encourage appropriate driver behaviour.
- Appropriate street trees should be provided in all streets except back lanes for pedestrian shelter, streetscape and amenity, and traffic management.
- Raised kerb should be of maximum height of 150mm. (Figure 4.4).
- The inner edge of the flat bed kerb (next to the carriageway) shall be generally flush with the adjacent pavement. However, a 15mm chamfer is permissible where vehicular and pedestrian areas have to be differentiated. Gradient of flat bed kerb shall not exceed 1:10 (vertical: horizontal).
- Drop kerb shall be used at every pedestrian crossing. The width of drop kerb crossing threshold shall be equal to the width of crossing demarcated on the road surface. Gradient of the drop kerb shall have a maximum grade of 1:12.
- A band of 800mm tactile paving shall be positioned behind the crossing threshold and surface of crossing threshold shall be differentiated from the entire sidewalk pavement to facilitate sight-impaired pedestrians.
- Continuous sidewalk shall be maintained along kerb cut zone and level changes on footpath zone shall be avoided where possible to ensure smooth pedestrian movement.
- Materials used shall of high durability, easily maintained and consistent with other kerb materials but may be selected to have a visual differentiation in terms of colour and design from the adjacent paving to clearly delineate a designated route.

4.4.2 Frontages

Frontage is the privately held layer between the façade of a building and the lot line that fronts the public streetscape. It is characterised by the dimensional depth of the front yard and the combination of architectural elements such as fences, stoops, porches and colonnades and is correlated with the distance within which the building is setback from the boundary line.

There are two typical frontage types normally associated with streetscape character and activity pattern of the local and neighbourhood commercial centres as the following: -

- Verandahway
- Stoop

Verandahway is where the ground level is setback from the lot line whilst the upper levels are aligned on the lot line. This accommodates pedestrian access along the frontage and more suitably applied to retail developments. Buildings are normally aligned on the boundary line. See also Build-to-line.

Stoop Frontage is where the façade is aligned build to line and the pedestrian way is elevated slightly from the street. Overhangs that extend into the public right of way are normally used to provide more coverage for pedestrians. See also Build-to-line.

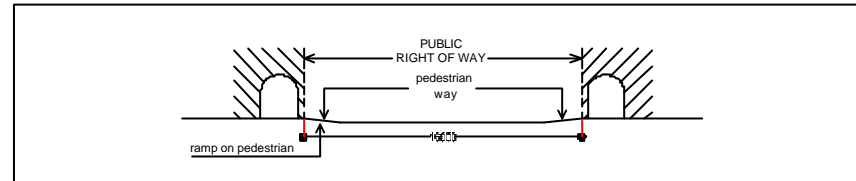


Figure 4.7
Verandahway Frontage

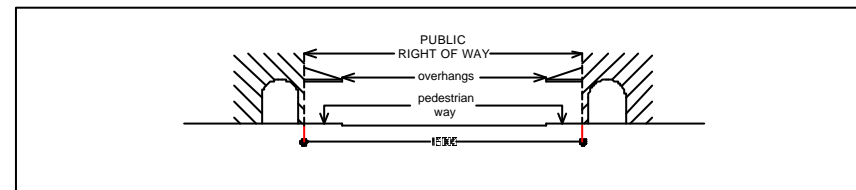


Figure 4.8
Stoop Frontage

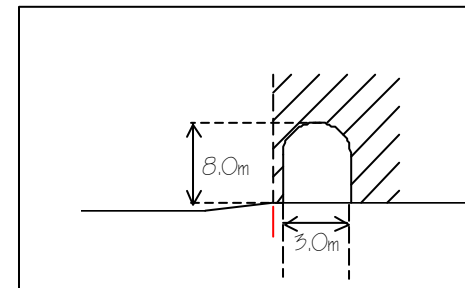


Figure 4.9
Width of Verandahway

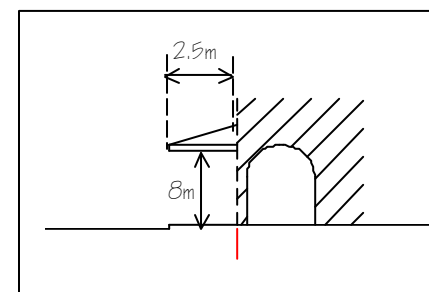


Figure 4.10
Overhang on Stoop Frontage

FRONTAGE

- The width of any verandahway shall not be less than 3.0m and height clearance of 8m. Where there is a change in levels along the verandahway between adjoining lots, steps with riser not exceeding 150mm and treads not less than 275mm or a pedestrian ramp of gradient of not exceeding one in ten (1:10).
- Columns defining front verandahway shall be between 400cm and 600cm in depth.
- Overhangs on buildings with stoop frontage shall not be more than 2.5m in width and the height measured from the surface shall not be less than 8m.

4.4.3 Building Façade and Elevation

Building Façade is the external vertical surfaces of buildings or structures. Façade shall respond to urban topological character and context to create a coherent urban environment and attractive streetscape. Elements such as verandahway, entrance and portals, window, vertical landscaping, exterior projections, expression lines, roof projections, utility such as gutters, drainpipes etc make up a harmonious entity of building facade.



Figure 4.11
Variation in Building Facade

BUILDING FAÇADE & ELEVATION

- The façade treatment should: -
 - Provide sun shading
 - Incorporate tropical vernacularism design character
 - Avoid continuous blank walls or continuous or monotonous elevation treatment
 - Incorporate screening devices for mechanical units
 - Incorporate lively character for street level facades
- Construction material and finishes should be selected to achieve a harmonious environments within the local or neighbourhood centre as well as the overall neighbourhood.
- Colour and tone of facades should blend with the environment and shall provide visual continuity with adjacent buildings and avoid extreme contrast.
- Roof design should incorporate traditional Malaysian roof and gable roof form that are responsive to local climatic conditions and shall be visually free of water tanks, ventilators, solar panels, etc.
- Commercial buildings in local centres adjacent to residential areas with predominantly gabled roofs shall have gabled roof to create a residential scale and character.
- Maximum roof height shall not be more than 10m above the maximum height elevation of the building. The top zone shall accommodate for roof with roof cone of 30 degree measured from the maximum height elevation of the building.

4.4.4 Mechanical and Utility Appliances

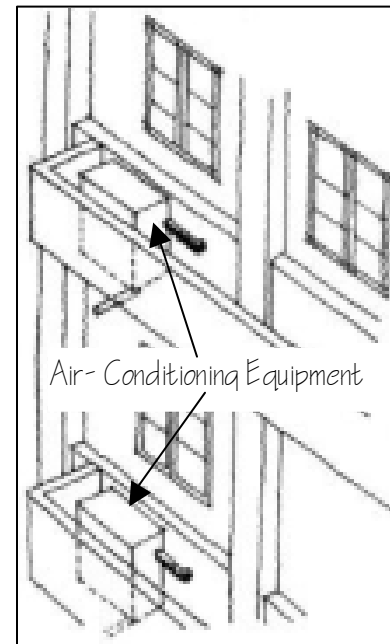


Figure 4.12
Compartment for Air Conditioning Equipment

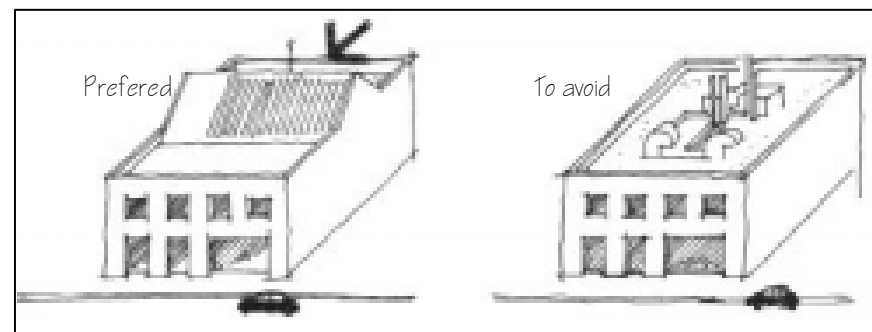


Figure 4.13
Service Equipment on Roof

FRONTAGE

- Service equipments on roof shall be located within the roof cone and shall not be visible at ground level for up to a lateral distance of 57m from the façade of the building. They shall be positioned in such a way to minimise visual impact particularly from tall buildings and shall be housed in enclosures that are designed as a feature to effectively conceal any unsightly equipments.
- Air conditioning equipments should be contained in compartments that are designed as an integral component of the building to ensure they are hidden from view particularly from the public street. Air conditioning ducts shall not be exposed on the external surfaces of the buildings.
- Building design shall also take into consideration of placements of aerial and satellite dishes. They should be located to avoid adverse impact on the amenity of adjoining buildings as well as character and appearance of the streetscape.
- All other service ducting shall not be exposed on the external surface of the buildings.

4.5 ACCESS AND PARKING

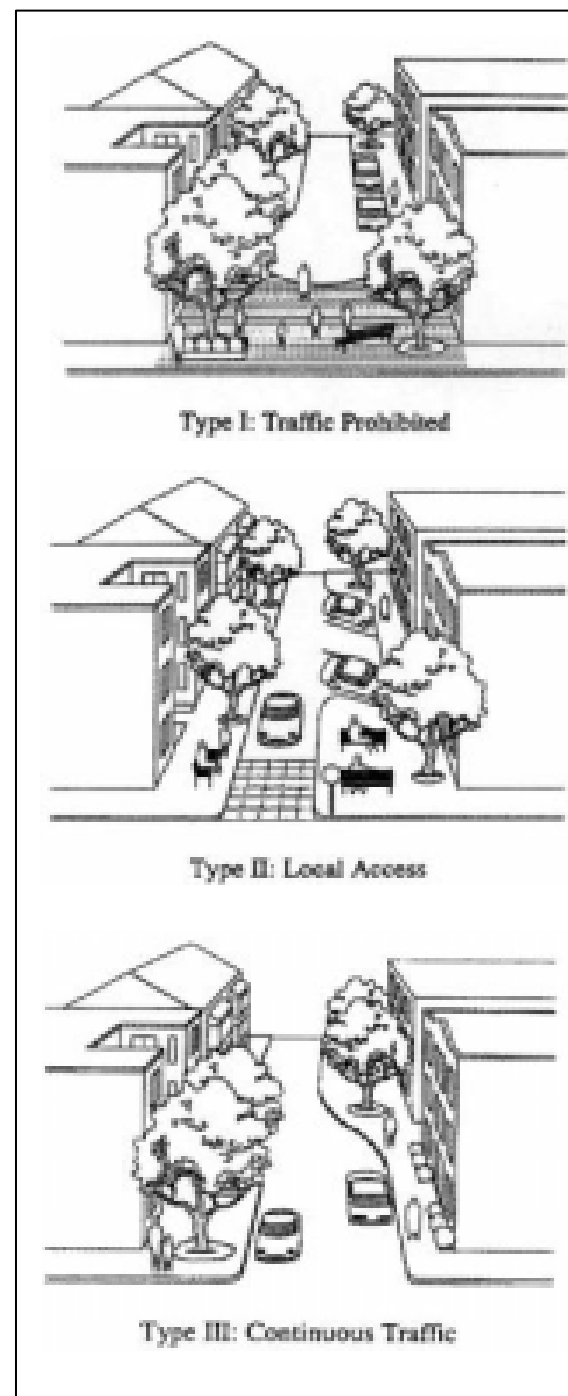


Figure 4.14
Traffic Calming Measures in Local and Neighbourhood Commercial Centre

VEHICULAR ACCESS

Vehicular Access

- A clearly identifiable road hierarchy should be established to provide safe circulation, with as few intersections as possible.
- Vehicular circulation should be segregated from pedestrian routes.
- Traffic calming devices should be introduced at strategic locations.
- Adequate provision should be provided for service and delivery vehicles.

Parking is the manner of storage and accommodation of vehicles when not in use. There are two types of parking categories, on street parking and off street.

Surface parking is parking area at grade adjacent to building either at its rear, side or front. It provides convenient pedestrian access from the parking area to destination of the trip.

Parking standard is a requirement for provision of parking space based on number of dwellings units for residential development and on gross floor area for commercial and other developments.

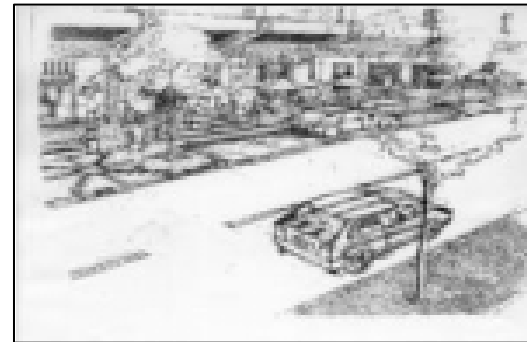


Figure 4.15
Indented Parking within Access Road in Local And Neighbourhood Commercial Centre



Figure 4.16
Pervious Surface for Parking Area

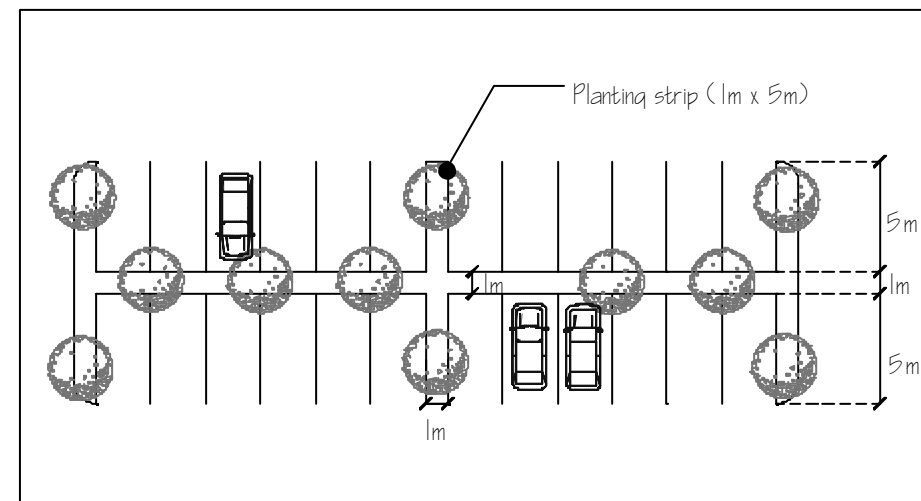


Figure 4.17
Planting Island

PARKING

Parking

- Provide spaces for disable/handicapped close to building entrance
- Adequate and convenience parking for all type of users.
- Parking for other types of vehicles such as bicycles and motorcycles should be provided
- Public parking and parking for servicing should be differentiate by using different material.
- Adequate lighting for security and safety reason
- Parking shall be provided in accordance to the requirements indicated in **Table 4.4**.

Table 4.4 Parking Standard for Neighbourhood and Local Centre

Type of Development	Number of Car Parking Spaces (CPS)	Number of Motorcycle Parking Spaces (MPS)	Others
Retail	1 CPS : 70 GFA	1 MPS : 200 GFA.	Handicapped parking – 1% on top of the requirement parking provision or minimum 2 parking spaces whichever is higher. Min. 1 Bicycle rack
Shop Office	1 CPS : 70 GFA	1 MPS : 150 GFA	
Restaurants	1 CPS : 20 GFA.	1 MPS : 160 GFA	
Food Court	1 CPS : 20 GFA	1 MPS : 70 GFA	

Note: GFA is in square meter
CPS – Car Parking Space
MPS – Motorcycle Parking Space
1 Rack Can Accommodate 10 Bicycle Parking Spaces

- Surface parking shall be located in pockets and as near to the pedestrian entry. Access for pedestrians via walkway and ramps where required shall be provided. Grasscrete surface shall be used for all surface parking to allow for infiltration of surface run-off. Landscape features shall be used to soften hard surface of surface parking.
- Linear rows of car parking bays shall be avoided and shades shall be provided. Planting island of 1m shall be incorporated for every 6 parking bays.

Clear Sidewalk Zone is the zone within the streetscape where pedestrian flow is in continuity and uninterrupted by any structures such as columns or any landscape furniture such as trees, benches, kiosks and utility elements such as covers and gratings.



Figure 4.18
Grille Shall Be Properly Positioned to Avoid Difficulty For Walking

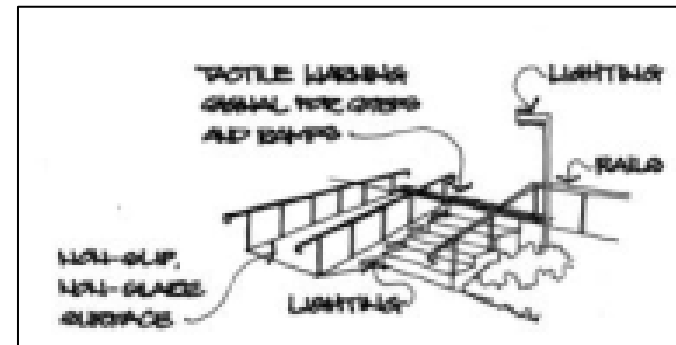


Figure 4.19
Ramps and Stairs Should Be Provided For Any Change in Grade

PEDESTRIAN ACCESS

Pedestrian

- Pedestrian routes should be segregated from vehicular circulation.
- Plaza or open spaces should be created along important pedestrian street.
- Shading devices such as awning, canopies etc should be incorporated along pedestrian routes.
- Level changes along pedestrian routes shall be avoided.
- Main pedestrian route shall not be disrupted either by improper positioning of landscaping elements or any other utility equipments. Continuous pedestrian route or clear sidewalk zone must be maintained along important pedestrian route.
- Provision for the handicapped along main pedestrian route shall be made.

4.6 Environmental Consideration

Environmental aspects requiring considerations by any developments within the local and neighbourhood commercial centres are related to water quality, air quality, noise and waste. In order to minimize the impact of the environment it is important that the Environmental Management Plan (EMP) be complied throughout every phase of the development project.

EMP contains detail description of practices to be followed and activities to be undertaken for the environmental management of the development area

ENVIRONMENTAL CONSIDERATION

Noise Pollution Control

- Noise at the boundary of the development should not exceed 65dB(A) during the day and 55dB(A) during the night.
- During construction times, that noise from the works shall not exceed 65dB(A) in terms of 30 min Leq at any noise sensitive receivers (NSR) at any time between 0600 to 2000 hours.
- All contractors will be require to submit lists of mechanical plants and methods statements for the control of noise level.

Air Quality

- Development activities shall be carried out by phase. Mitigation measures such as water spraying, wheel washing and turfing should be provided and implemented during construction phase to control and minimize dust desperation. Air quality should not exceed the recommended Malaysian Guidelines during earthwork and construction phase as in **Table 4.5**

Table 4.5 Air Quality Standard

Parameter	Specification	
	Averaging Time	Malaysian Guidelines
Total Suspended Solid	24 hours	260µg/m ³
Lead	3 months	1.5µg/m ³
Sulphur dioxide	24 hours	0.04 ppm
Nitrogen Dioxide	1 hour	0.17 ppm
Carbon Monoxide	8 hours	9 ppm

- All open spaces shall be landscaped to reduce air pollution.
- Buffer area between road and local and neighbourhood commercial centre shall also be planted with tall trees to minimize noise pollution.

ENVIRONMENTAL CONSIDERATION

Water Quality

- Sewage, wastewater or effluent containing sand, cement, silt or any other suspended or dissolved material is not permitted to be discharged without the prior consent of the relevant Authority (DOE). Any such discharged are shall comply with the Environment Quality (Perbadanan Putrajaya)(Lake Pollution Control) Regulations 1998. **Table 4.6.**

Table 4.6 Putrajaya Ambient Lake Water Quality Standards and Standard for Discharge into Lake Area and Sewer

Parameters	Unit	Putrajaya Ambient Lake Water Quality Standards	Standard for discharge into the lake area or onto land	Standard for discharge into sewer
Temperature	°C		38	45
pH		6.5-9.0	6.0-9.0	5.0-9.0
BOD	mg/l	3	10	400
COD	mg/l	25	30	1000
Suspended solids	mg/l	50	50	400
Mercury	mg/l	0.001	0.001	0.10
Cadmium	mg/l	0.005	0.01	1.0
Hexa-Chromium	mg/l	0.05	0.05	2.0
Arsenic	mg/l	0.05	0.05	2.0
Cyanide	mg/l	0.02	0.02	2.0
Lead	mg/l	0.05	0.05	2.0
Tri-Chromium	mg/l	-	0.20	10
Copper	mg/l	1.0	0.10	10
Manganese	mg/l	0.1	0.20	10
Nickel	mg/l	0.02	0.20	10
Tin	mg/l	0.05	0.20	10
Zinc	mg/l	5	1.0	10
Boron	mg/l	1	1.0	50
Iron	mg/l	0.3	1.0	2.0
Phenol	mg/l	0.01	0.001	2.0
Free Chlorine	mg/l	-	1.0	-
Sulphide	mg/l	-	0.5	2.0

ENVIRONMENTAL CONSIDERATION

- Sedimentation ponds, silt traps and drainage systems to control surface run-off must be provided before the commencement of any earthworks. Discharges from sediment basins or any other discharge point from the site shall be collected, and removed via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause either pollution or nuisance.
- Surface run-offs shall be designed in accordance to **Putrajaya Stormwater Management Design Guidelines** and the **Manual Saliran Mesra Alam (MaSMA, 2000)**, *see also Chapter 9.0 Infrastructure and Utilities*.
- Solid waste material shall not be disposed to any watercourse or drainage facility.
- Temporary drainage works and all other precautions shall be taken to ensure the avoidance of damage by flooding and silt washed down from the site.
- All domestic wastewater are to be connected to the central wastewater sewerage system. No discharges into the storm water drainage system are allowed. This is to ensure that the ambient water quality of all inland waters and Putrajaya Lake are preserved at their high standard.

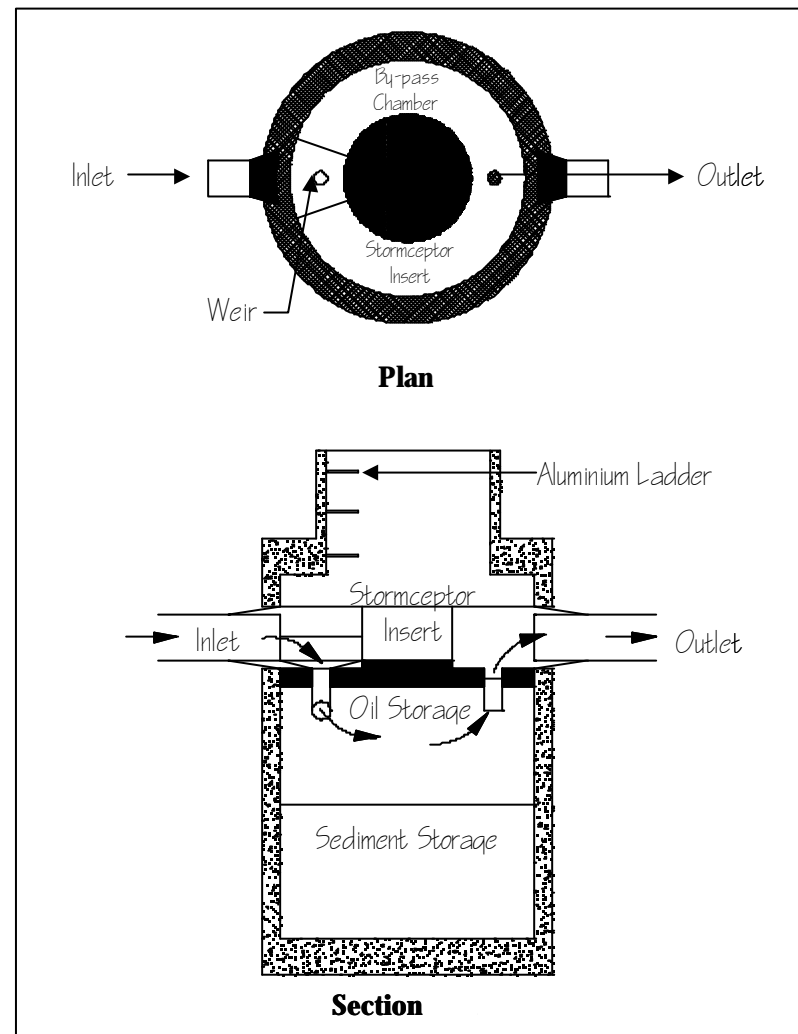


Figure 4.20
Typical Oil, Grease and Grit Trap(OGGT)

ENVIRONMENTAL CONSIDERATION

- All toilets, domestic and commercial wastewater is to be connected to the central sewerage system. No individual sewerage system shall be allowed.
- All eating outlets and parking spaces in the local and neighbourhood commercial centres shall be equipped with oil, grease and grit trap (OGGT) to trap effluents before being discharged into drainage outlets and lake.

Waste Management

- The 4R's of waste management should be emphasized with reduction being the predominant "R" and followed by "Reuse", "Recycle" and "Recover". Awareness campaign should be organized to promote the 3R's of waste management.
- Recycling depot should be included in the design of community centre to encourage people to make recycling a way of life.
- Biodegradable waste should be disposed at an approved dumping site as soon as possible.
- Where necessary, drainage control measures should be constructed around waste storage areas.
- No open burning of solid waste shall be allowed.
- All solid waste is recommended to be sorted on site into two types: - those that can be recycled and those that can be disposed.

5.0 PETROL STATION

5.1 USE

This guideline shall be used for all petrol station developments located in **PB7.1, PB8.1, PB8.2, PB8.3, PB9.2** and **PB9.3** as indicated in the Proposal Map (Figure 5.1).

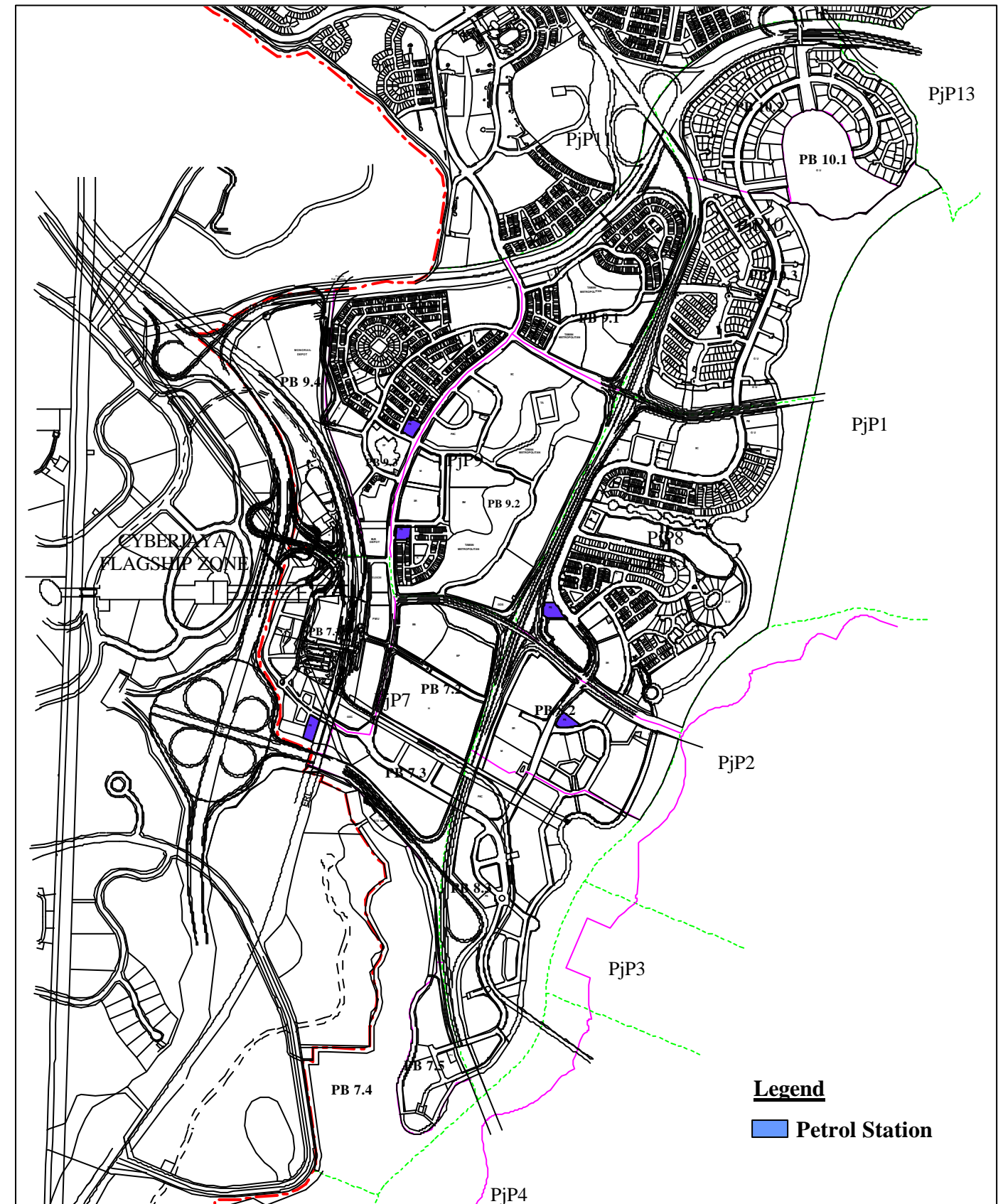


Figure 5.1
Location of Petrol Station in Local Plan Area

5.2 PLANNING REQUIREMENTS

Planning requirements for petrol station shall comprise the following aspects: -

- Lot size and building configuration
- Use
- Setback
- Parking provision

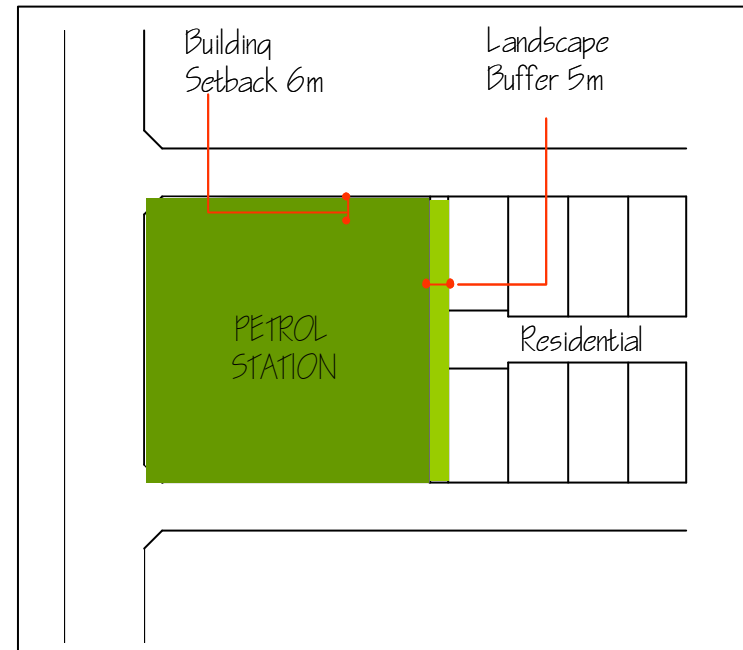


Figure 5.2
Setback and Buffer Requirements

PLANNING REQUIREMENTS

▪ Lot Size and Building Configuration

Size of each petrol station is subject to the following requirements:-

Min. lot size	-	0.4 hectare
Max. lot size	-	1.0 hectare
Min. frontage	-	60m except for petrol station in PB8.2 where allowable minimum frontage shall be 58m.
Height	-	1 storey (6.0m max)
Plot Ratio	-	0.5 (max)
Plinth Area	-	40% max

▪ Use

Sales of petrol, diesel, NGV will be the main use of petrol stations while convenience shop selling dry grocery goods and car wash/polish facility can be permitted for all petrol stations subject to approval by Perbadanan Putrajaya. Repair works and servicing of heavy vehicles shall not be permitted in all petrol stations.

▪ Setback

Setback for permanent structures within petrol station site shall be a minimum of 6m measured from the road reserve to the nearest permanent structure in the petrol station.

A minimum landscape buffer of 5m shall be provided for petrol station located next to a residential building (**Figure 5.2**).

▪ Parking Provision

Petrol stations with convenience shop shall provide parking in the ratio 1 cps: 150sq.m (gross floor area).

▪ Other Requirements

Oil/gas storage area shall be located at the farthest location from the nearest residential building. If a petrol station site is located next to residential building, a splash wall of 3m high shall be constructed on the boundary next to the residential building. This splash wall shall be landscaped to aesthetically improve the surrounding and to mitigate any noise or oil splash onto the residential building.