



DEPARTMENT OF TRANSPORTATION
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS

GUIDELINES ON THE DESIGN OF BICYCLE FACILITIES
ALONG NATIONAL ROADS



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A. DEFINITION OF TERMS – In line with the purpose of this Department Order, the following terms or words and phrases shall mean or be understood as follows:

1. **Active Transport** – Refers to physical activity undertaken as a means of transport, such as walking, cycling, or using other forms of light mobility for transportation.
2. **Bicycle** – A pedal-powered vehicle upon which the human operator sits. The term “bicycle” for this guidelines includes two-wheeled human-powered vehicles.
3. **Bicycle Facilities** – A general term denoting improvements and provisions to accommodate or encourage bicycling, including parking and storage facilities, and shared roadways.
4. **Bicycle Lane or Bike Lane** - A portion of roadway that has been designated for preferential or exclusive use by bicyclists or light mobility which is identified by pavement markings, physical separator and/or signs. It is intended for one-way travel, usually in the same direction as the adjacent traffic lane, unless designed as a contra-flow lane or two-directional.
5. **Bicycle Rack or Bike Rack** – A stationary fixture to which a bicycle can be securely attached.
6. **Bicycle Route or Bike Route** – A roadway or bikeway designated by the proper authority, either with a unique route designation or with Bike Route signs, along which bicycle guide signs may provide directional and distance information.
7. **Bicycle Wheel Channel** – A channel installed along the side of a stairway to facilitate walking a bicycle up or down the stairs.
8. **Bike Path** – A completely separate roadway designated for the exclusive use of bicycles; typically separated from motor-vehicle roadway by open space or barrier.
9. **Conflict Areas** – Refer to traffic zones involving the interaction of two or more road users and can be classified as merging, diverging, or crossing conflicts.
10. **Conflict Area Markings** – Refer to pavement markings designed to improve bicyclist visibility, alert all roadway users of expected behaviors, and to reduce conflicts with turning vehicles.
11. **Light Mobility** – refers to travel using electronic or non-motorized vehicles (two wheels attached to a frame, one behind the other) weighing not more than 100 kg.
12. **Pedestrian** – Refers to a person who is travelling on foot on a road, whether walking or running. The term pedestrian also includes a person with disability who is moving on a road in a wheelchair or similar conveyance.
13. **Road-User** – Anyone who uses a road, such as a pedestrian, cyclist or motorist.
14. **Roadway or Carriageway** – The portion of the highway, excluding shoulders, intended for vehicular use.
15. **Shared Roadway** – A roadway that is open to both bicycle and motor vehicle travel.
16. **Shared Roadway Marking** – A pavement marking symbol that indicates an appropriate bicycle positioning in a shared roadway.

17. **Shared Use Path** – A bikeway physically separated from motor vehicle traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users. Most shared use paths are designed for two-way travel.
18. **Sidewalk** – That portion of a street or highway right-of-way, beyond the curb or edge of roadway pavement, which is intended for use by pedestrians.
19. **Transit Stop** – Location where public transportation vehicles (i.e. bus, jeep or rail) will stop to allow passengers to board or alight the transit vehicle.

B. BICYCLE FACILITY CLASSIFICATIONS – Bicycle facilities shall be classified into three classes depending on the prevailing road and traffic conditions, to wit:

1. **Class I: Shared Use Path or Bike Path** – A designated path, completely separated from the roadway, designated for the exclusive use of bicycles or shared with pedestrians; typically separated from motor-vehicle roadway by open space such as on road sections with wide sidewalk (Figure 1).
2. **Class II: Separated Bike Lane using Pavement Markings or Physical Separation** - A portion of roadway which is designated for exclusive use by bicycle normally distinguished by a paint stripe, curb or barrier. Separated bike lanes can use a variety of separation methods, depending on cost, durability, safety and aesthetics. Separation types can be used in combination to realize the full benefits of several treatments at a lower overall cost (Figure 2).
3. **Class III: Shared Roadway** – A part of roadway that has been officially designated and marked as bicycle route but can also be used by motor vehicle where there is limited carriageway width (Figure 3).

C. GENERAL GUIDELINES FOR THE PROVISION OF BICYCLE FACILITIES ON EXISTING ROADS AND BRIDGES

It is intended to present sound guidelines for the provision of bicycle facilities that will meet the needs of bicyclists and other road users. These criteria and standards are subject to modifications in exceptional cases wherein adoption of minimum/desirable values along existing roads could increase potential risk to the safety of all road users.

1. **Bicycle Facility Selection** – The graph for the preferred bicycle facility/accommodation (Figure 4) shall be used in determining the appropriate facility choice, based on the available data of motor vehicle volume and operating speed. Generally, the higher the operating speed and volume of traffic on a road, the more protective bicycle facility is recommended. Shared roadway is recommended for a road with operating the lowest speed and traffic volume; separated bike lanes using pavement markings for low speed and low to moderate volume; and separated bike lane using physical separation or shared use paths for moderate to high speeds and high volumes. If enough space is not available to provide the preferred bicycle facility at the prescribed design values, it will be necessary to consider other bicycle facility classification and/or to provide a parallel facility per engineering judgement taking into consideration the overall impacts on ridership, comfort, safety, and overall network connectivity of all road users.

2. Bicycle Operating Space for Road

2.1 Establishing Width Criteria

- 2.1.1 The minimum paved width for a shared use path is 3.0 m. However, if there are physical constraints such as an environmental feature, bridge abutment, utility structure, fence, etc., a path width of 2.44 m may be used for a short distance. Typically, widths range from 3.0 to 4.3 m, with the wider values applicable to areas with high use and/or a wider variety of user groups. The preferred minimum roadway separation width to be divided into a travel-lane and shared use path is 2.0 m (Figure 5).
- 2.1.2 The minimum width of a one-directional separated bike lane or bike path is 2.44 m to allow for bicyclists to travel side-by-side or pass each other without leaving the lane. The bicyclists operating width is 1.22 m, which consist of 0.60 m width for physical dimension and 0.31 m for weaving space on each side. Gutter should not be included in the measurement as usable width; however, gutter may be used if the lane width cannot be achieved despite narrowing all other travel lanes to their minimum widths (Figure 6).
- 2.1.3 The desirable width for a two-directional separated bike lane is 3.0 m. In constrained condition, an absolute minimum width of 2.44 m may be allowed (Figure 6).
- 2.1.4 A minimum of 2.44 m of rideable surface along shoulder should be available for bicycle travel. An optional buffer space and application of rumble strip may be used to provide additional horizontal distance between moving vehicles and bicyclists (Figure 7).
- 2.1.5 Shared roadway type will be used along sections with roadway lane width between 3.35 m and 4.2 m. Beyond this width, Bike Lanes or Shoulders may be provided. Shared roadway is appropriate for low volume of traffic with operating speed of 40 kph and below. Sometimes it may be used as a temporary solution on constrained conditions, until additional right-of-way can be acquired, but should not be considered a permanent solution in this condition (Figure 8).
- 2.1.6 Existing sidewalk may be converted into a two-directional shared use path if its width is greater than or equal to 3.0 m taking into consideration the acceptable level of service for both pedestrians and cyclists; in constrained conditions, 2.44 m may be allowed (Figure 9).

2.2 Establishing Directional Criteria

- 2.2.2 The decision in the selection of one-way or two-way bike lanes shall be based on traffic lane configurations, bicycle demand, turning movement conflicts, parking requirements, and surrounding bicycle route network options and destinations, among others.
- 2.2.3 Selection of alignment decision for running the bike lane on the right-side, left side, or in the center of the road, include considerations on transit stop conflicts, intersection and driveway conflicts, locations of destinations, and parking placement. The designer shall use the existing conditions and surrounding network characteristics to evaluate the selection of directional characteristics, using engineering judgement.

2.3 Separated Bike Lane using Pavement Markings or Physical Separator

- 2.3.1 Along a continuous non-commercial section, pavement markings or combination of flexible bollards/delineator posts with curbs shall be used to designate an exclusive space for bicyclists (Figure 10).
- 2.3.2 In the event that physical separation is not feasible due to existing site condition, a movable physical separator (Figure 11) may be considered as an interim solution until such time, after adjustments and/or refinements, that a final layout is achieved and a more permanent bike lane facility scheme becomes feasible.
- 2.3.3 For areas where separated bike lanes are not feasible, more stringent guidelines and protocols such as strict enforcement of speed limit, provision of a dedicated traffic enforcer, etc., shall be defined and implemented to accommodate mixed traffic.

2.4 Cross-slope and Longitudinal Grade

- 2.1.7 The cross-slope for shared use path or bike path must not exceed 2%. The cross-slope of the separated bike lane must be the same as the slope of the adjoining carriageway (Figure 12).
- 2.1.8 The longitudinal grade on shared use path or bike path should be limited to 5% maximum. The grade for separated bike lane must follow the roadway grade (Figure 12).

2.5 Vertical Clearance

- 2.1.9 The vertical clearance to obstructions from signs, poles, trees or other fixed objects is 2.5 m, preferred is 3.0 m. Fixed objects shall not be permitted to protrude within the vertical or horizontal clearance of a shared use path or bike path (Figure 13).

3. Bicycle Operating Space for Bridge/Viaduct

3.1 Bridge/Viaduct

- 3.1.1 Sidewalks with a minimum width of 3.0m shall be converted into a shared use path (Figure 14).
- 3.1.2 Sidewalk with less than the required minimum width shall consider the following options:
 - Reduce travel lane to accommodate 1.22m bike path adjacent to the existing raised sidewalk (Figure 15).
 - Reduce travel lane to accommodate 2.44 shared use path by flushing raised sidewalk to the roadway. Provide raised barrier between bicycle and traffic lanes for low speed traffic (Figure 16) and combination railing for high speed traffic (Figure 17).
 - If 2.44m shared used path is not feasible, the existing travel lane shall be converted into shared roadway (Figure18).
- 3.1.3 Bicycle facility attached to existing bridges (Figures 19 to 23):
 - Where practicable to conform with the bike lane width provided on the road, widen existing bridge sidewalks from 0.76m to a minimum of 3.0m

to accommodate pedestrian and bicycle (shared-use) lanes by extending abutment/pier supports under the bridge. Ensure the structure could accommodate the additional loads (Figures 19 & 20);

- Dimensions of the attached bicycle bridge is the same as that of independent bicycle bridge (item 5.1. Pedestrian and Bicycle Bridge);
- Separation and clearances shall be considered if the attached bicycle bridge is suspended below the bridge;
- Lighting from the adjacent bridge can be used for the bicycle bridge lighting. If the bicycle bridge is suspended, special consideration shall be given to provide adequate visibility.
- If the bicycle bridge is adjacent to the roadway bridge, create a contiguous surface and install the barrier later. Concrete or asphalt surfaces are preferable to steel decking;
- Ensure attached bicycle structure can be safely added to the existing bridge.

3.2 Railings

3.2.1 To accommodate pedestrian and bicycle lanes on existing bridges, modify existing bridge railings to conform to the minimum height and clear opening requirements; see Figure 24 for sample modification of existing bridge barrier/railing.

4. **Conflict Areas** - Green pavement markings shall be used along the length of a corridor or in selected conflict locations where vehicles and bicycles are maneuvering at the same time thru merging, weaving and crossing (Figure 25). These shall be provided on conflict areas such as intersections, entrance/exit ramps, driveways, and transit stops per engineering judgement.

4.1 **Intersection** – To ensure the smooth transition and safety of both road users, intersection conflict areas shall be marked as follows:

4.1.1 Green-colored dashed pavement markings within a dashed bicycle lane indicate areas where merging and weaving maneuvers are permitted. This will decrease the chance of collisions as it allows motorists to merge when there is a gap in bicycle traffic up to the intersection. Said markings shall be dashed 15 to 70 meters in advance of intersection.

4.1.2 A colored conflict area (solid green road surface pavement markings) shall be used inside of queuing area at intersections and bicycle priority areas in front of driveways. Colored conflict area shall be placed/applied 4.5 to 9 meters before intersection or inside of queuing area.

4.1.3 Dotted line extensions to indicate continuity and transitions. This can be applied across intersections. Dotted lines shall be 150 mm (W) x 1000 mm (L) with 1 m gap spacing. Markings shall be white, skid resistance and retro-reflective.

4.1.4 The width of conflict area markings shall be as wide as the bike lanes, provided before and/or after intersection/ramp. Merge or diverge lanes such as ramp-style (entrance and exit lanes) or any other similar cases, typically have intrinsic visibility problem due to low approach intersection angles. Figure 26 shall be used as guide to highlight this potential conflict area.

4.1.5 A bike box is a designated area located at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible space to get in front of queuing motorized traffic during the red signal phase (Figure 27). Motor vehicles must queue behind the white stop line at the rear of the bike box.

- The bike box shall include a minimum length of 4.5 m and minimum combined width of the bike lane, buffer space, and adjacent travel lane.
- On multilane streets (two lanes per direction) where left turns are allowed, bike boxes may be extended across multiple travel lanes to facilitate bicyclist left turn positioning.
- Bike box shall have a setback/offset of 1.2 m from the pedestrian crossing to minimize encroachment by cyclists into the pedestrian crossing.
- Stop lines may be placed up to 2.0 m in advance of the bike box space to limit encroachment by motor vehicles. A "WAIT HERE" legend marking may be used to supplement the stop line sign in a bike box.
- A two-stage turn queue box may be an alternative approach to facilitating left turns where there are multiple vehicle through lanes (three or more lanes per direction). Two-stage turn queue box dimensions will vary based on the street operating conditions, the presence or absence of a parking lane, traffic volumes and speeds, and available street space. The turn box may be placed in a variety of locations including in front of the pedestrian crossing or at the tail end of a parking lane or a median island (Figure 28).

4.2 Driveway and Commercial Properties

4.2.1 Green pavement markings shall be used to identify the conflict area opposite the driveway to make it clear that the bicycle has priority over the entering and exiting vehicle/traffic. The length of colored conflict area shall be equal to the opening of the driveway (Figure 29).

4.2.2 Green-colored dashed markings with bollards and a gap of 6 m shall be provided to indicate conflict areas along a continuous establishments/commercial properties (Figure 30).

4.3 Transit Stops

4.3.1 A separated bike lane with conflict to loading/unloading areas shall be identified by green-colored pavement markings with crosswalks at the start and a sign indicating that the bicyclist shall yield to pedestrians (Figure 31). Buses must unload/load passengers without encroaching the Bicycle Lane.

4.3.2 If with a lay-by, the separated bike lane shall be routed behind the floating transit platform. The minimum width of the transit platform is 2.5m. Railings shall be installed along the edge of the island to restrict the pedestrians to cross only at the crosswalk (Figure 32).

5. Grade Separated Crossings

5.1 Pedestrian and Bicycle Bridge

5.1.1 For cyclists to safely use the bridge, minimum of 2.44m two-way cycling path (in between railings) shall be applied.

- 5.1.2 The expected number of cyclist using the bridge influences the deck width (Figures 33 to 36).
- 5.1.3 When traveling uphill, additional width/space shall be applied – from extra 0.25m at regular speed to 0.8m at low speed.
- 5.1.4 For curve at high speed add an extra 0.5m to the total width.
- 5.1.5 For curve bridges, curve radius shall be in between 10m to 20m. If space is limited, a minimum curve radius of 5m shall be used.
- 5.1.6 For ramps, avoid steep ramps and ramps that are too long.
- 5.1.7 The maximum grade for Bridge slope/ramp is 5%.
- 5.1.8 If space is limited and standard ramp is not possible the following alternatives shall be used (Figures 37 & 38):
 - Reduce the height difference
 - choose a more compact ramp design
 - Accept a steeper slope
 - Alternatives to a slope.
- 5.1.9 If ramps are not an option, less user-friendly alternatives shall be used:
 - a flight of steps with and adjacent bicycle stair access ramp (Figure 39)
 - a bicycle escalator
- 5.1.10 A landing is required for a height difference of 3m or more, over 5m height difference a landing of 25m in length is required before cyclist climb again.
- 5.1.11 If the bridge is accessible by maintenance vehicle, a semi-permanent access restriction such as removable bollard shall be used. The load caused by maintenance vehicle has to be taken into account.
- 5.1.12 For railings, the minimum height shall be 1100mm from the deck bridge surface and with clear openings of 150mm to the lower 685mm to 200mm in the upper portion of the railing.
- 5.1.13 Use local codes and regulations in computing the loads.

5.2 Pedestrian and Bicycle Tunnel/Underpass

- 5.2.1 The length of a tunnel must allow users to see from the entrance of the tunnel/underpass exit.
- 5.2.2 The recommended minimum height in tunnels is 2.5m (Figure 40).
- 5.2.3 The recommended width is 3.5m if the tunnel is used only by cyclist, and 5.0m for pedestrian and bicycle use.
- 5.2.4 Minimum width of 3m shall be used for short tunnels with a maximum length of 30m (Figure 41).
- 5.2.5 Maintenance vehicle shall be considered which will need a max height of 3m.
- 5.2.6 Make the approach to the tunnel straight from both sides. Make sure there are no dark corners obscured from view.
- 5.2.7 Smooth curves in the construction elements instead of the traditional straight angles can also increase the perception of social safety.
- 5.2.8 Lighting shall be provided in pathway tunnels and underpasses. Provide brighter lighting during the day than at night.
- 5.2.9 Tunnels require good drainage (often pumped) and shall be designed easy to clean.

6. **Batas Pambansa BLG. 344 (Accessibility Law)**

- 6.1 Bicycle facilities shall be adjusted/constructed to provide access for the physically impaired persons at the designated place in built-up areas along the project road, in accordance to Batas Pambansa Blg. 344.

7. **Road Signs and Pavement Markings**

- 7.1 Road signs and pavement markings shall conform with the DPWH, Highway Safety Design Standards Part 2: Road Signs and Pavement Markings Manual 2012, unless otherwise stated (Figure 42).
- 7.1.1 W6-5 sign with a supplementary word sign "AHEAD" shall be placed not less than 30m before the beginning of a bike lane.
- 7.1.2 W6-5 sign with a supplementary word sign "ENDS" shall be placed at the end of a bike lane.
- 7.1.3 W6-5 and the supplementary word sign "AHEAD" and "ENDS" shall be used only for Class I and Class II Bicycle Facilities.
- 7.1.4 R6-10 shall be used only in Class I and Class II Bicycle Facilities. It shall be placed at the beginning of bike lane, at intersection and at periodic intervals. Its periodic interval shall be determined by engineering judgement based on prevailing speed of bicycle and other traffic, block length, distances from adjacent intersections and other considerations. If there are multiple side roads/turns exist, it is not required to locate signs at every turn. However, sign spacing shall not exceed 500m.
- 7.1.5 A sign indicating the designated path of pedestrians and cyclist shall be placed at the start of a Class I-Shared Use Path and at periodic intervals same as described for R6-10 sign.
- 7.1.6 "SHARE THE ROAD" sign shall be placed at the start of a Class III-Shared Roadway.
- 7.1.7 "RIGHT TURNER YIELD TO BIKES" shall be placed not less than 30m before the intersection.
- 7.2 All overhead signs over a shared use path must have a vertical clearance of 2.5m and be installed 0.60m from edge of path to the post. All signages along a shared use path must be located at 0.60m from the edge of path to the edge of the signage with a minimum vertical clearance of 1.5m from the bottom of signage to the top surface of path (section 2.5.1).
- 7.3 Bicycle lane symbol and/or arrow markings (Figure 43) shall be placed in accordance to the following requirements to remind motorists and pedestrians of the potential presence of bicyclists, especially in areas where motorists are expected to cross bike lanes along the facility based on engineering judgement and shall be maintained periodically:
- 7.3.1 Bicycle lane symbol and/or arrow markings for shared use path and separated bike lane using physical separators shall be placed at the beginning of a cycle track, intersection and at periodic intervals of 100m minimum and not greater than 300m.
- 7.3.2 Bicycle lane symbol and/or arrow markings for separated bike lane using pavement markings shall be placed immediately after an intersection and spaced at intervals of 50m minimum. In areas where motorists make parking

maneuvers across bike lanes or where there is significant driveway density, it may be appropriate to space the symbols as often as every 30m.

7.3.3 Shared-lane markings shall be placed immediately after an intersection and spaced at intervals of 25m minimum and not greater than 76m. A "SHARE THE ROAD" symbols on the pavement may be considered to alert motorists and cyclists to share the road space.

7.4 The shared use path and bidirectional separated bike lane shall be separated with solid white line pavement markings with width of 100mm and consideration of appropriate informatory sign to guide and separate the cyclists from pedestrians and other users along the path.

7.5 Bike Route Sign shall be used to identify the facility as a designated bicycle route. It shall be placed at every 800 m on a major bike route and on the approach to major bike routes. It can be supplemented with "fingerboard" panels showing destinations, directions, and distances (Figure 44).

7.6 Roadside object or feature, with a diameter greater than 100mm that is located within the path must be painted with reflectorized white or marked in accordance to DPWH D.O. No. 73 Series of 2016 re: DPWH Standard For Object Markings, Markings on Curb And Island, and Approach Markings to Islands And Obstruction.

8. Bikeway Facility Maintenance

8.1 Regular bicycle facility maintenance includes sweeping, maintaining a smooth roadway surface, pavement markings, signages, and ensuring that the gutter-to-pavement transition remains relatively flat, and installing bicycle friendly drainage grates.

9. Bicycle Parking Facilities/Amenities

9.1 **Classification of Bicycle Parking Facilities** - The requirements for choosing a location for the site of the facility will be based on the use whether it is a short-term or long-term. Each of these parking types has unique site design requirements that will affect the kinds of fixtures to be installed in these facilities.

9.1.1 **Short-Term Bicycle Parking Facility** - This type of facility focuses on convenience, utility and the security for the basic bicycle rack. It usually defined a parking period of two hours or less, parking racks shall be convenient to the destination of the cyclist, must be within 15 meters of the main entrance to the building, or entrances that are frequently used by cyclists, visible to the cyclist, located in areas of high pedestrian activity and along the line adjacent the bikeways, well distributed, and sheltered or unsheltered. (see Figure 45)

- **Bicycle Rack Design**

- There are certain key features in designing a bicycle rack that will determine their quality and sustainability. One is the materials to be used; galvanized steel or industrial grade materials are prescribed. Wood, soft metals, untreated metals that will rust, brittle cast composite that may crack under impact and stainless steel that do

not weld strongly should be avoided. It shall also have a smooth outer surface that will not damage or scratch bicycle frames.

- Two point contact between the bicycle and the rack rather than one point contact to allow both frame and at least one wheel to be locked to the rack and supports the bicycle (Figure 46).
- It shall be space efficient to allow many bicycles to be parked in a small area and also provide adequate space to facilitate parking and locking.
- Sheltered racks or covered bicycle parking protects the bicycle from weather and provide protection from accidental damages.
- **Installation**
 - All bicycle racks shall be firmly secured to the ground or floor by bolting them to a hard surface or fixing them in concrete. Concrete is a preferred surface for maximum security although other surfaces may also be appropriate.

9.1.2 **Long-Term Bicycle Parking Facility** - This bicycle parking facility suggests an all day, overnight or longer duration parking period. The level of security and protection from the elements shall be high, but immediate convenience of the parking facility may not be as important. Bicycle racks are in an enclosed, secured area with controlled access or individual, secure enclosures or bicycle lockers. The facility may also include bike rentals and repairs, toilets, showers and lockers, easy link to transit and a variety of other services (Figure 47).

- **Bicycle cages** -Bicycles are locked to racks that are installed inside a cage. Through the use of an electronic key pad, security pass card or similar type of system restrict access to bicycle parking racks (Figure 48).
- **Toilet/Shower/Change Facilities** - The presence of toilet, shower and changing facilities in non-residential areas is good motivators for people to make use of bicycles as a form of transportation. People find these facilities of interest especially among commuters who experience long daily travels from home to their place of work or study especially if they are required to observe certain dress codes. In the design of such facilities, special consideration should be taken in terms of the proportion/ratio of long-term users of bicycle parking in the site as well as the number of shower stalls to be installed. Usually, the standard dictates one shower stall for every four or less bicycle parking spaces (Figure 49).

9.2 **Criteria For Good Quality Bicycle Parking** - Although there are wide variety of design strategies that can be used to implement good quality bicycle parking, there are three main criteria that must be satisfied.

9.2.1 Accessibility

- No obstacles like steep slopes
- Separate, dedicated bicycle ramps into parking areas are desirable
- Way - finding signage

9.2.2 Safety and Security

- Bike parking areas shall be reserved for use by bikes only. Regular monitoring is required for signs of damage to bicycles or racks and misuse such as storing items other than bicycles.
- Racks or lockers made from high quality materials firmly secured to the ground, floor or wall
- Regularly monitored by security personnel
- Keeping the area free from garbage
- Located in a well- lit area
- Short – term parking: located in a busy, public area to increase informal surveillance
- Long - term parking: Located in a separate, access controlled areas

9.2.3 Convenience

- Easy to locate and access
- Easy to use
- Wherever possible, situated close to bicycle friendly routes.

9.3 Building Facility

9.3.1 Construction of building facility for bicycle shall conform with the Implementing Rules and regulations of the Philippine National Building Code and Local Government Ordinances.

9.4 Standard Bicycle Parking Dimensions

9.4.1 Parallel Parking to the road/street

- Orienting the bike racks parallel to the street requires less total area to park bicycles and allow to pedestrian walkways. For the design, begin by setting the bike rack back 600mm from the curb.
- Multiple bike racks shall be spaced 1.8 m. (min.1.20m) between the nearest legs, 900mm – 1.2 meters shall be allowed between walls obstruction and the nearest leg of the bike rack.
- The pedestrian walkway is then created by setting the racks 2.4 meters from the wall measured to the center of the rack (Figure 50).

9.4.2 Perpendicular Parking Layout to the road/street

- When orienting the bike racks perpendicular to the road/street, requires by installing the recommended distance of 1.2 meters (min. 900mm) from the curb. This is measured to the center of the bike rack. Distance to the near leg of the rack, the bike rack shall have an offset of 900mm (min. 600mm) from the curb.
- When the bicycle is properly secured, the frame and wheel locked to the rack, the distance from the curb will allow for enough space for the remainder of the bicycle without extending into the street.
- Bike racks shall be placed 1.2 meters (min. 900mm) from each other, measured from the center of the rack.

- A clearance of 900mm (min. 600mm) from walls or other obstructions will allow enough space to maneuver the bicycle into the rack, as well as an access from the side to lock/unlock the bike from the rack.
- A setback of 3.3 meters from buildings/walls to the bike racks. This will create a 1.8 meters walkway for pedestrian traffic (Figure 51).

9.4.3 Bike Parking Lot Layout (Figure 52)

- When designing a layout that will create a bike parking lot, consisting of multiple columns of bike racks, one key is to ensure there is a usable aisle between the rows of racks. This will let cyclists easily flow in and out of the bike parking area and racks specifically.
- You can start in a corner and place the first rack 900mm (min. 600mm) from a parallel wall. Then set it back 600mm – 900mm from the perpendicular wall, measured to the nearest leg. This distance is needed to allow space for the wheel and frame to align with the rack for proper locking. The parallel distance between the 2 racks is 1.2m (900mm min.) while the perpendicular distance between the 2 racks is 2.4m (1.8m).
- Setbacks to the perpendicular walls can also be measured at 900mm – 1200mm to the center of the rack.

10. Existing Utilities

10.1 Existing utility covers shall be adjusted flushed with the surface of the roadway pavement. Bike lanes should be provided with adequate drainage (bicycle-compatible drain grates) to prevent ponding of water, washouts, debris accumulation, and other potential concerns for bicyclists. All existing drainage gratings shall be adjusted perpendicular to the traffic (Figure 53).

11. Lane Width Reduction for Road and Bridge

11.1 Implementation of lane width reduction for road and bridge that is purposively for the provision of space for bicycle lanes will only be allowed to a minimum widths of 3.05 m and 3.35 m taking into consideration the design vehicle type, respectively, in exceptional situation applicable only for urban roads with high volume and low speed of traffic.

D. GENERAL GUIDELINES FOR THE PROVISION OF BICYCLE FACILITIES ON NEW CONSTRUCTION OF ROADS AND BRIDGES

All projects of DPWH that involve new road and bridge construction or future expansion to relieve traffic congestions such as road/bridge widening, diversion/bypass roads, among others, shall include in its design the provision of bicycle facility that meet the mandatory conditions stated above. Exemptions to the provisions of this Order may be allowed, subject to the evaluation by the Bureau of Design and approval of the Undersecretary for Technical Services.

- 1. Forms of Separation** - The selection of physical separation type(s) for bike lane in new road construction shall be based on the available right-of-way limit, cost, aesthetics,

maintenance, motorized traffic volumes, speeds and safety of road users, among others. The types of separation that may be used are shown in Figure 54. A combination of these treatments may be used along a corridor to achieve the full benefits of each separation type. The benefits of each type are compared in table under Figure 54.

2. Bicycle Operating Space for Road – For all road and bridge infrastructure projects to be implemented by DPWH, the minimum width to be adopted for a one-directional separated bike lane shall be 2.44m for all conditions.

3. Bicycle Operating Space for Bridge/Viaduct

2.1 Bike and Pedestrian Lanes shall be added to the standard plans of all bridge designs (Figure 55).

2.2 Dimension of bike and pedestrian lanes shall conform to the minimum required criteria of this guidelines.

2.3 Surface Conditions:

2.3.1 The decking shall be relatively smooth but non-skid.

2.3.2 Special attention shall be paid to expansion joints, longitudinal gaps, longitudinally grooved pavement, and honeycomb steel decking.

2.4 Railing:

2.4.1 The minimum height of bike and pedestrian railing shall be 1100mm measured from the top of walkway and riding surface.

2.4.2 It is recommended to use the 2018 DPWH Standard Bridge Railing.

2.4.3 For low speed traffic (speeds not exceeding 60kph), a combination traffic-pedestrian/bicycle railing shall be used with raised barrier as separator.

2.4.4 For high speed traffic (speeds in excess of 60kph), separated bike and pedestrian lane or shared use path shall be used. Traffic or combination railing shall be used as separator; combination or pedestrian railing shall be used on the outer edge of sidewalk (Figure 56).

2.4.5 For bike and pedestrian railings, 150mm clear opening shall apply to the lower 685mm of the railing, and the spacing in the upper portion shall be such that 200mm dia. sphere shall not pass through.

2.4.6 New traffic bridge parapet/railings shall satisfy crash testing requirements to confirm that they meet structural and geometric requirements of a specified railing test level using the test criteria specified in Article 18.3.2 of DPWH DGCS Vol.2 Bridge Design S. 2015.

E. APPLICABILITY OF GUIDELINES OTHER THAN NATIONAL ROAD

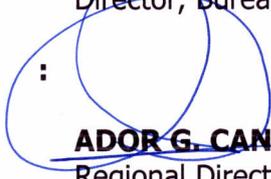
To achieve consistency in the functionality and quality of cycling infrastructure that will be used in active public transport across the Philippines, the design of all cycling infrastructure in the country which include both Government roads and private roads shall adhere to the above technical and performance standards.

F. OTHER CONSIDERATIONS IN THE PROVISION OF BICYCLE FACILITIES ALONG NATIONAL ROADS

1. Prior to implementation of Bicycle Facilities, a Feasibility Study (FS) shall be undertaken by the concerned implementing agency to evaluate its applicability both on new and existing roads, taking into consideration the following, among others:
 - 1.1 Evaluation of the geometric and operational conditions of the roads, given the traffic volume, operating speed, and the preferred bicycle facilities necessary to ensure the safety of cyclists.
 - 1.2 A study on the forecasted project utilization and mode choice (number of motorized users shifting to bicycle) to ensure that the implementation of bicycle facilities will not gravely affect the expected and existing capacity and level of service of the roads. Pursuing the said project without analyzing this consideration might result to severe unstable traffic conditions/operations of the roadway or the adjacent road network and may seriously compromise the safety of all road users.
2. A more stringent guidelines and protocols such as strict enforcement of speed limit, provision of a dedicated traffic enforcer, etc., to include monitoring and reporting of its compliance shall be established, fully defined and implemented to accommodate mixed traffic. Any road users who jeopardize the safety of other users shall be subject to sanctions/disciplinary actions defined and accepted by the proper authority; and
3. Appropriate advertisement and information dissemination of rules and regulations in the implementation and right usage for bicycle facilities shall be undertaken to increase understanding and awareness to all road users regarding the said facilities.

Prepared by DPWH Technical Workings Group:

Head : 
ARISTARCO M. DOROY,
Director, Bureau of Design

Members : 
ADOR G. CANLAS
Regional Director, National Capital Region


EDGARDO C. GARCES
OIC-Assistant Director, Bureau of Construction

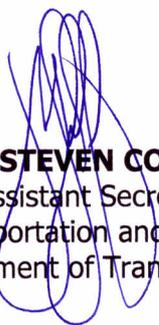

EDWIN C. MATANGUIHAN
OIC-Assistant Director, Bureau of Design


JONATHAN L. ARAULLO
OIC-Assistant Director, Bureau of Quality and Safety

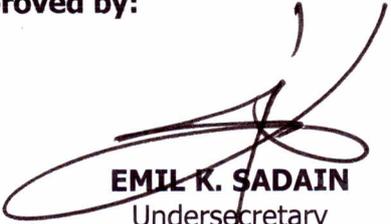

DANILO L. BALISI
Chief, Highways Division, Bureau of Design

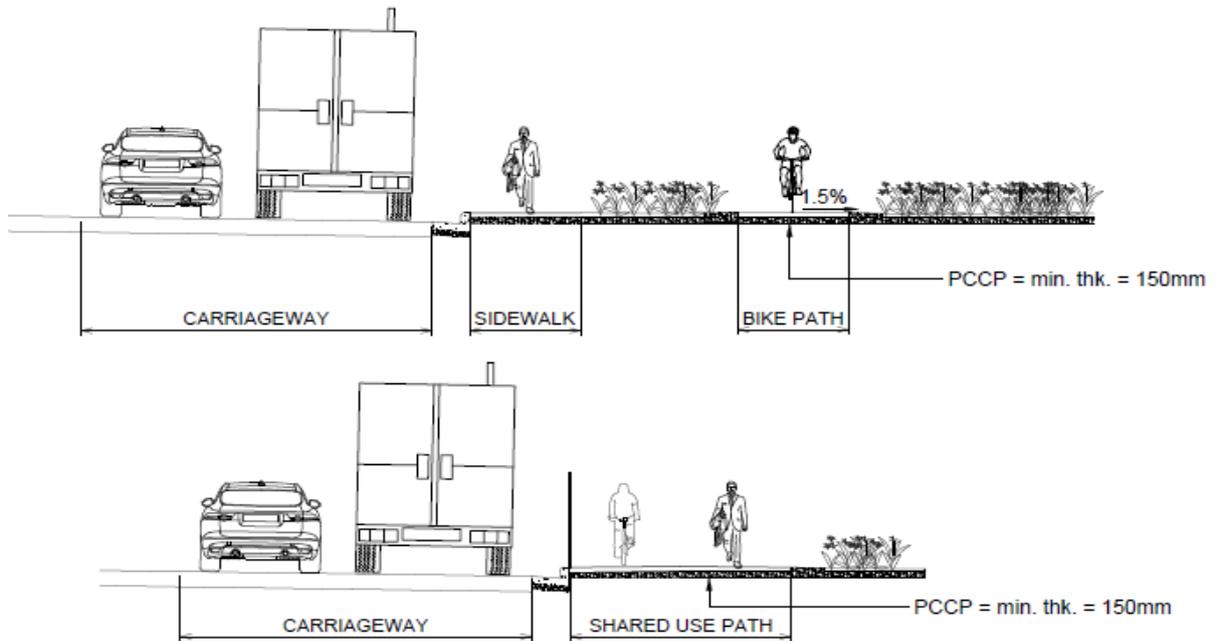

LYDIA CHUA
Chief, Planning and Design Division, DPWH-NCR

Concurred by:


MARK STEVEN CO PASTOR
Assistant Secretary
Road Transportation and Infrastructure
Department of Transportation

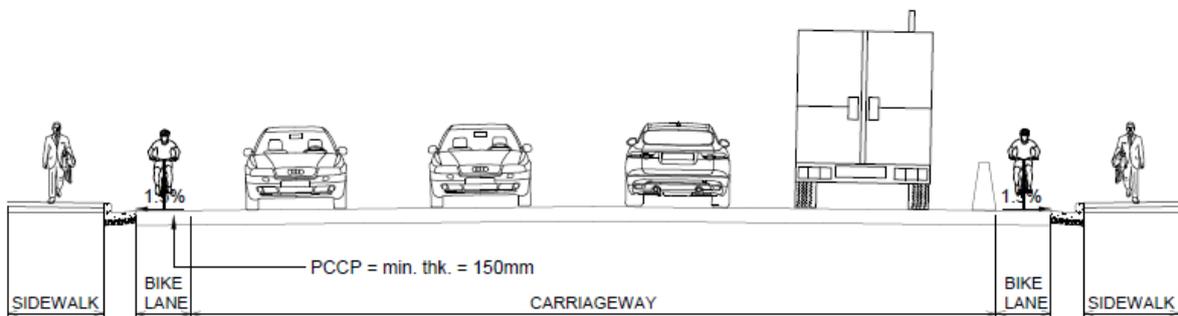
Approved by:


EMIL K. SADAIN
Undersecretary
UPMO Operations and Technical Services
Department of Public Works and Highways



Design of Pavement Thickness should be Based on AASHTO Guide for the Design of Pavement Structures 1993

Figure 1. CLASS I (Shared Use Path or Bike Path)



Design of Pavement Thickness should be Based on AASHTO Guide for the Design of Pavement Structures 1993

Figure 2. CLASS II (Separated Bike Lane)

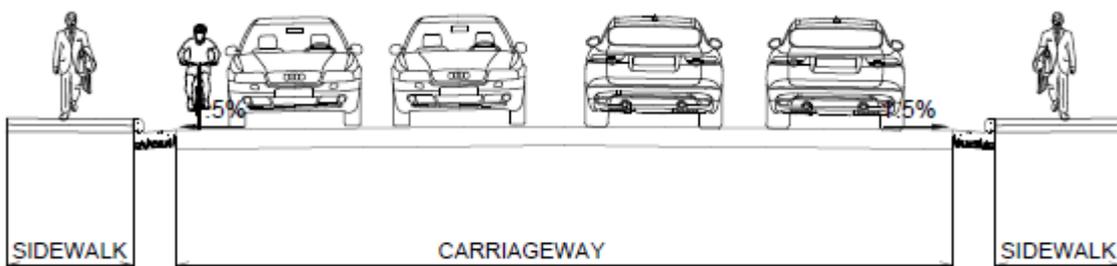
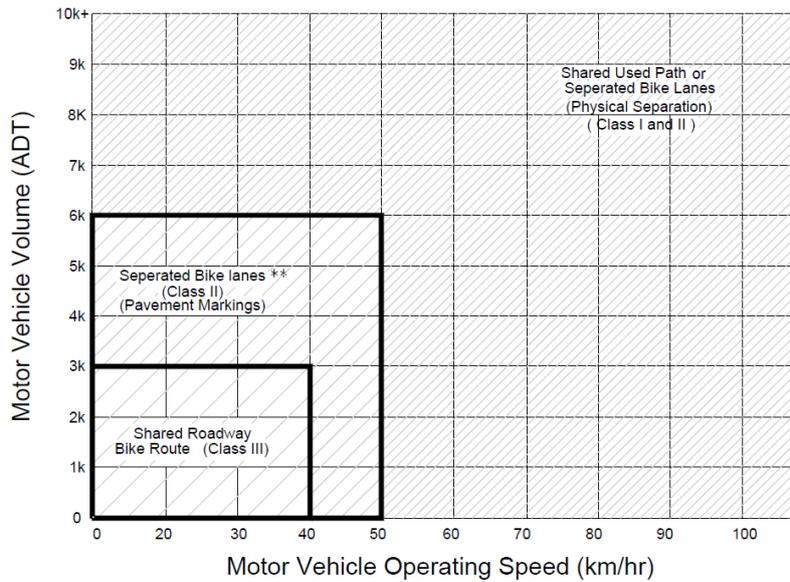


Figure 3. CLASS III (Shared Roadway)



Distribution Factor

- Directional distribution Factor (D_d) - A directional distribution factor expressed as a ratio, that accounts of ADT by direction, e.g. east-west, north-south, etc
- Lane distribution Factor (D_L) - A lane distribution factor, expressed as a ratio, that accounts fo distribution of traffic when two or more lanes are available in one direction; see Table below

Number of lanes in each direction	Percentage of ADT in design lane
1	100
2	80-100
3	60-80
≥4	50-75

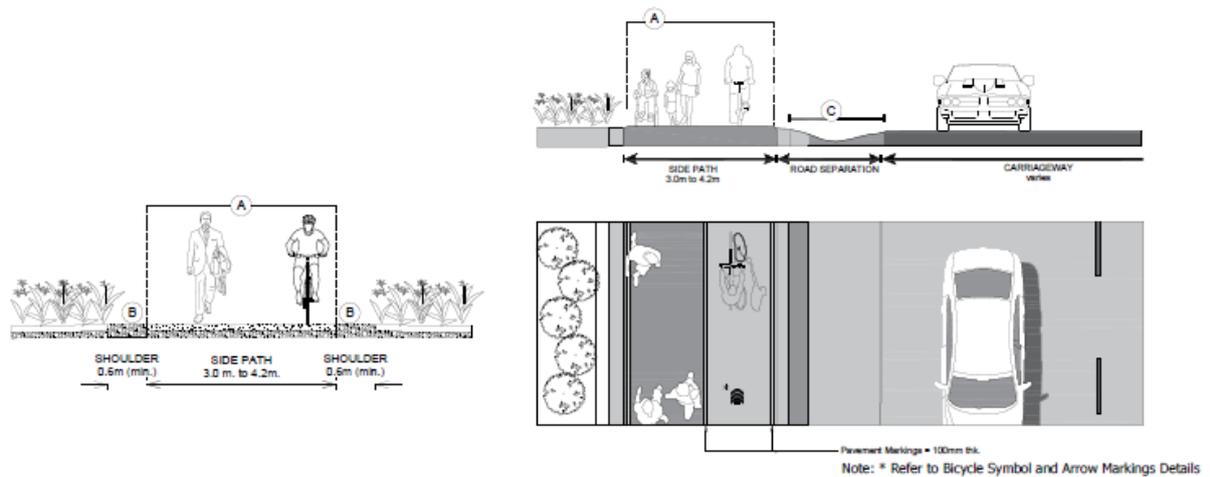
Vehicle Type		
No.	Description	PCEF
1	Motor-Tricycle	2.5
2	Passenger car	1.0
3-5	Passenger and goods utility and small bus	1.5
6	Large bus	2.0
7	Rigid Truck, 2 axles	2.0
8	Rigid Truck, 3 + axles	2.5
9	Truck semi- trailer, 3 and 4 axles	2.5
10	Truck semi- trailer, 5 + axles	2.5
11	Truck trailer, 4 axles	2.5
12	Truck trailer, 5 + axles	2.5

$PCU = \text{SUM} (ADT_VT1 * PCEF_VT1, ADT_VT2 * PCEF_VT2, \dots, ADT_VT12 * PCEF_VT12)$
 $ADT = (PCU / \text{lane}) = PCU * D_d * D_L$

Where:

- ADT = annual average daily traffic ;
- VPD = vehicles per day;
- PCEF = passenger car equivalent factors; and
- PCU = passenger car units

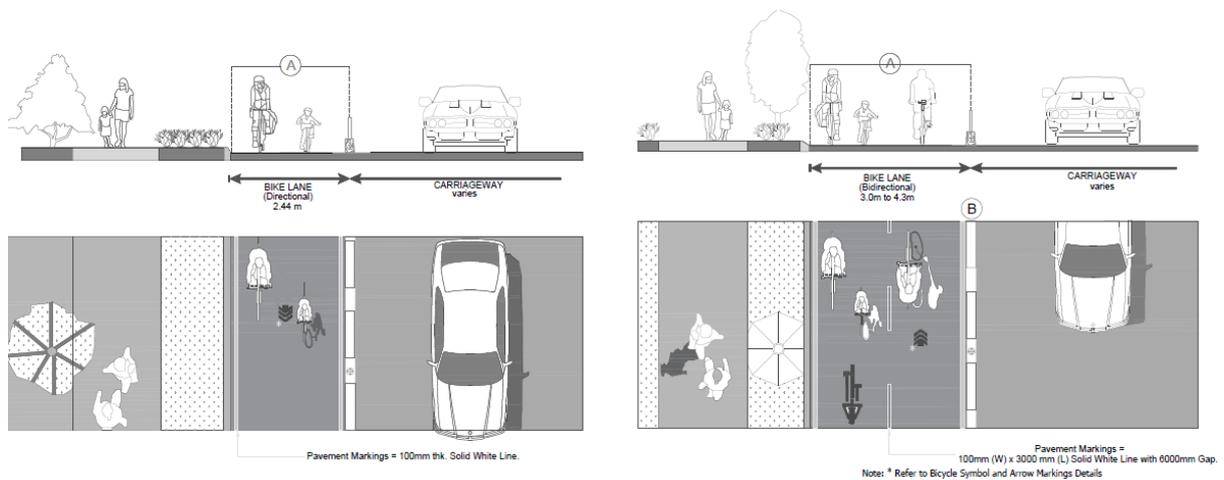
Figure 4. Bicycle Facility Selection



DESIGN FEATURES:

- A. The preferred side path widths at locations with the potential for mixed pedestrians and bicyclists range from 3.0m to 4.3m, with the wider values applicable to areas with high use and/or a wider variety of user groups; in constrained conditions, 2.44m may be used/allowed.
- B. A 0.6 m or greater shoulder on both sides of the path should be provided free of obstacles.
- C. The preferred minimum roadway separation width to be divided into a travel-lane and shared use path is 2.0m.

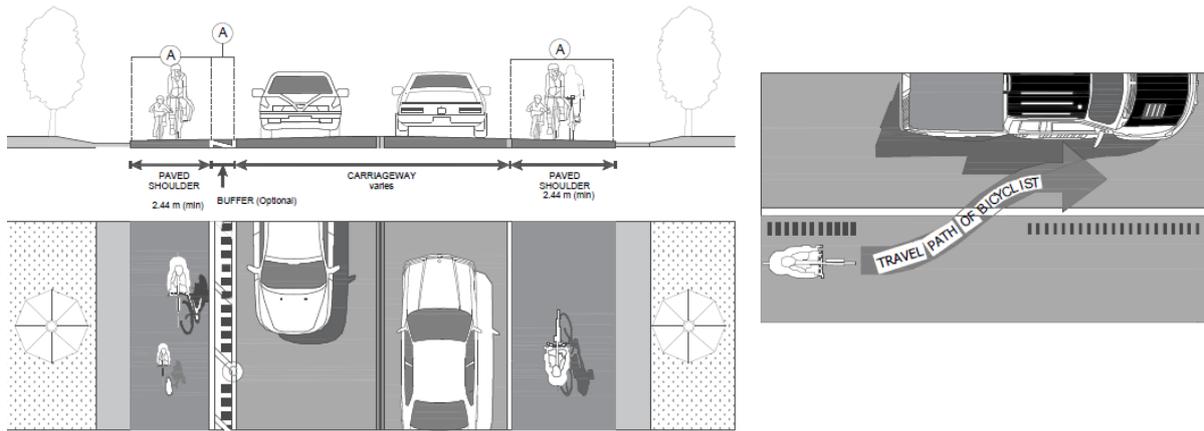
Figure 5. Establishing Width Criteria for Class I (Shared Use Path or Bike Path)



DESIGN FEATURES:

- A. The preferred width for one-directional separated bike lane is 2.44m to allow safe passing behavior and an absolute minimum width of 1.22m. The preferred operating width for a two-directional separated bike lane is 3.0m. In constrained condition, an absolute minimum width of 2.44m may be used.
- B. Separated bike lanes can use a variety of separation methods, depending on cost, durability and aesthetics. Low cost separation methods are often used for interim implementation to provide a functional facility prior to full capital construction with curbs and planted medians.

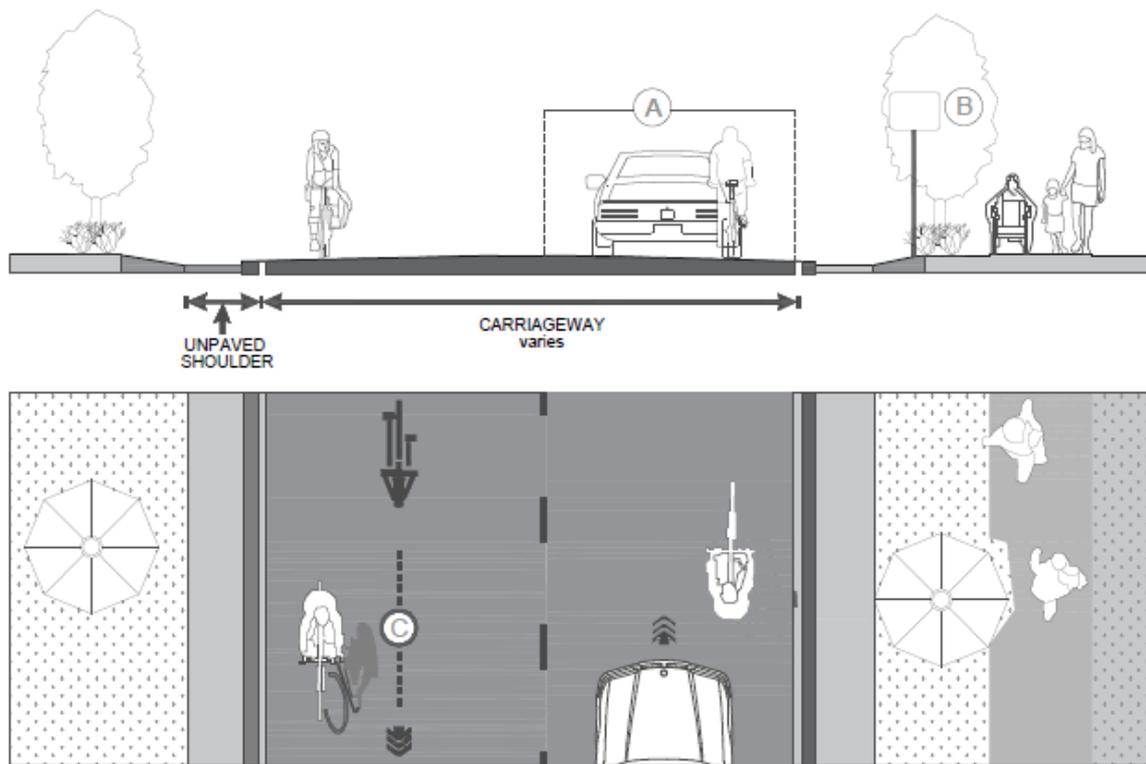
Figure 6. Establishing Width Criteria for Class II (Separated Bike Lane using Physical Separator)



DESIGN FEATURES:

- A. A minimum of 2.44 m of rideable surface should be available for bicycle travel.
- B. An optional buffer space may be used to provide additional horizontal distance between moving vehicles and bicyclists.
- C. To minimize negative impact to bicyclists, rumble strips may be used while maintaining the required width. Rumble strips should include a "bicycle gap" pattern of 3.3m gaps every 12.1m to 18.2m to allow access as needed. Bicycle-tolerant rumble strips can be designed as follows: Width: 127mm parallel to the traveled way, Depth: 10mm and Spacing: 280mm to 305mm center-to-center.

Figure 7. Establishing Width Criteria for Class II (Separated Bike Lane using Pavement Markings)



DESIGN FEATURES:

- A. Lane width varies depending on roadway configuration. It recommends wide curb lanes with widths between 3.35 m and 4.2 m. Beyond this width, Bike Lanes or Shoulders may be provided. Shared lane markings are appropriate for low volumes of traffic with speeds at or below 40 kph, sometimes used as a temporary solution on constrained conditions, until additional right-of-way can be acquired, but should not be considered a permanent solution in these contexts.
- B. Shared lane markings shall be placed in the center of the effective travel lane to reduce marking wear and should be placed immediately after an intersection and spaced at intervals of 25 m minimum and not greater than 76 m. A "SHARE THE ROAD" legend marking may be used to supplement the sign at the beginning of the said cycle track.
- C. Signs should be applied at intervals frequent enough to keep users informed of changes in route direction and to remind motorists of the presence of bicyclists.

Figure 8. Establishing Width Criteria for Class III (Shared Roadway)

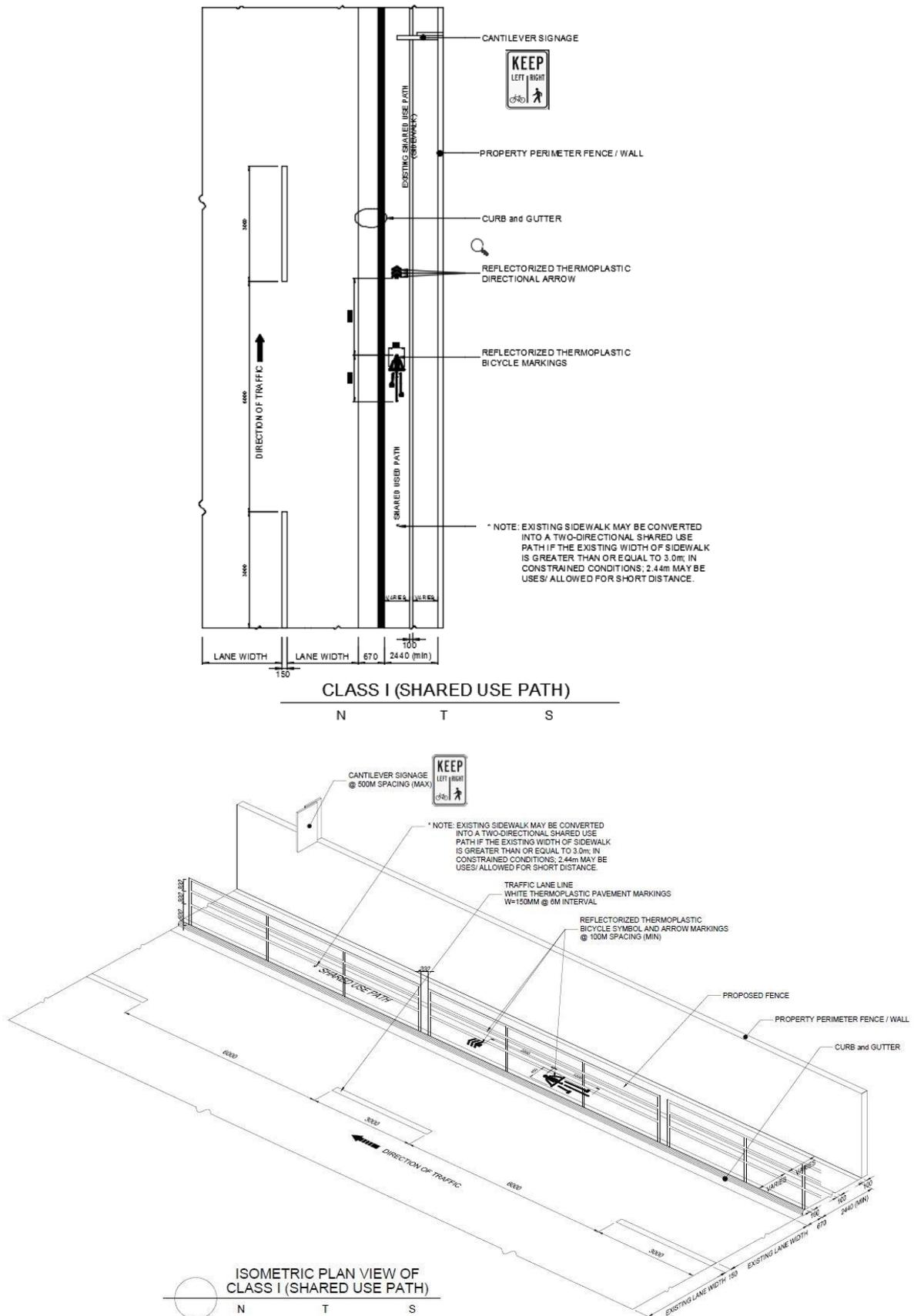


Figure 9. Existing Sidewalk (to be converted into shared use path)

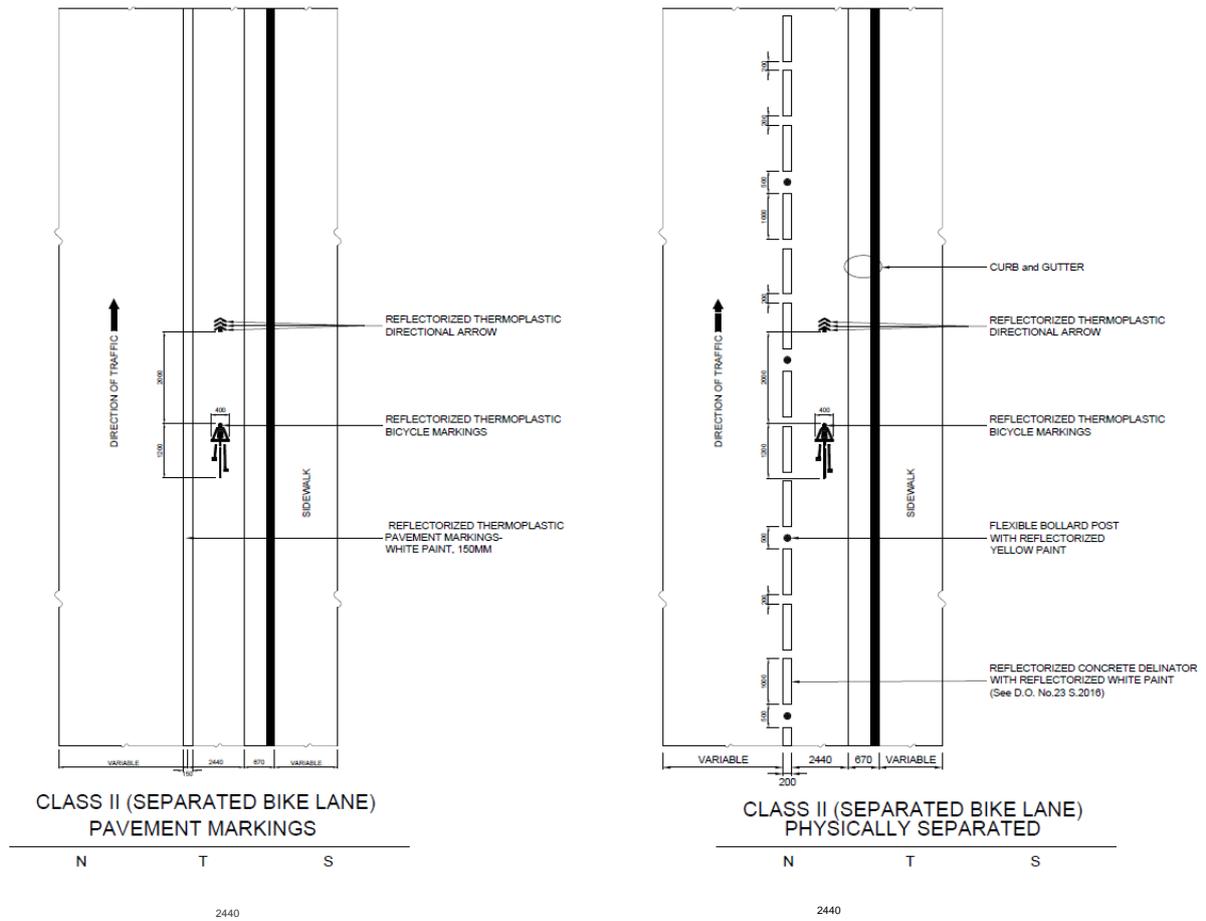


Figure 10. Separated Bike Lane Using Pavement Markings and Physical Separator (1 of 3)

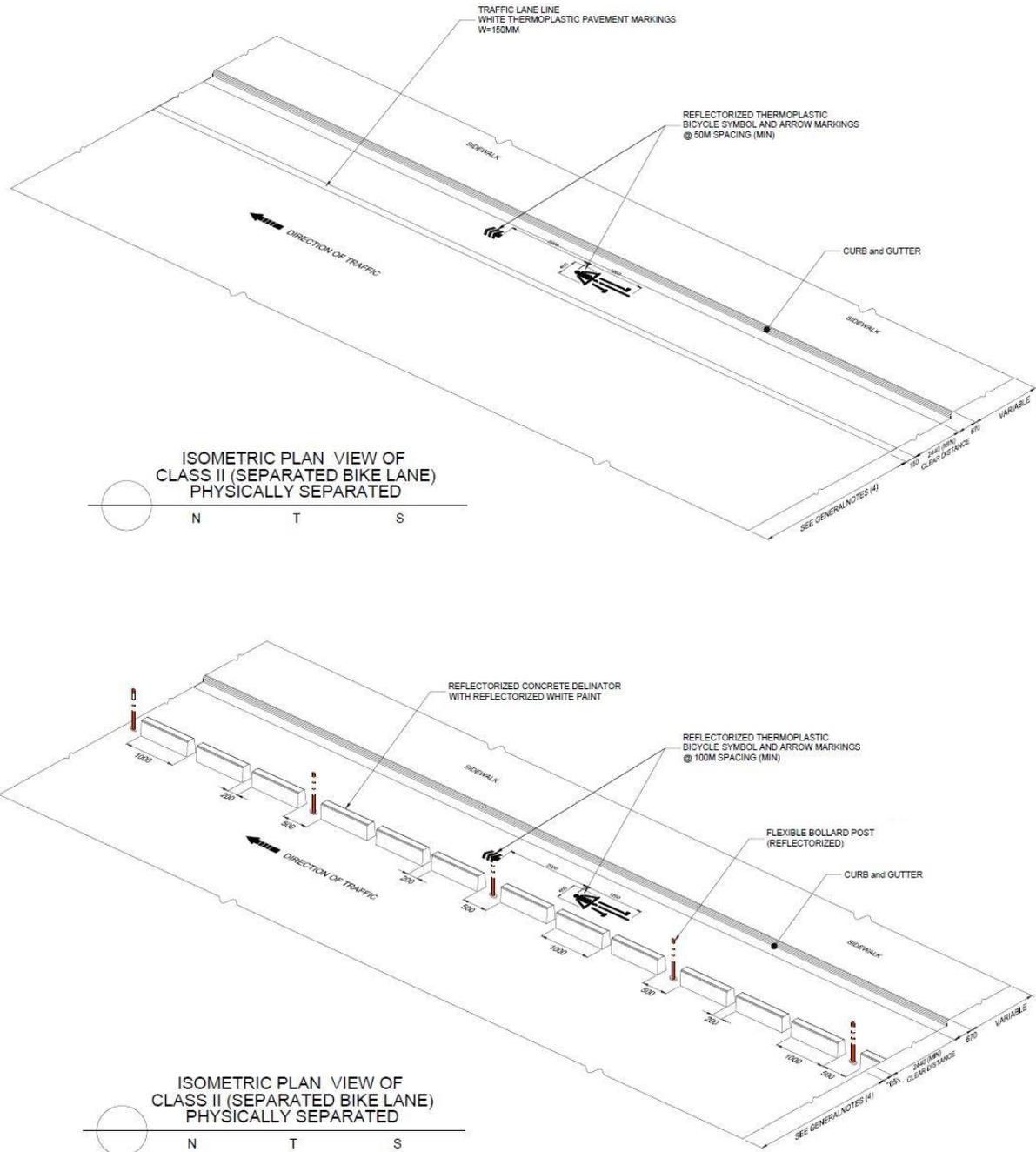
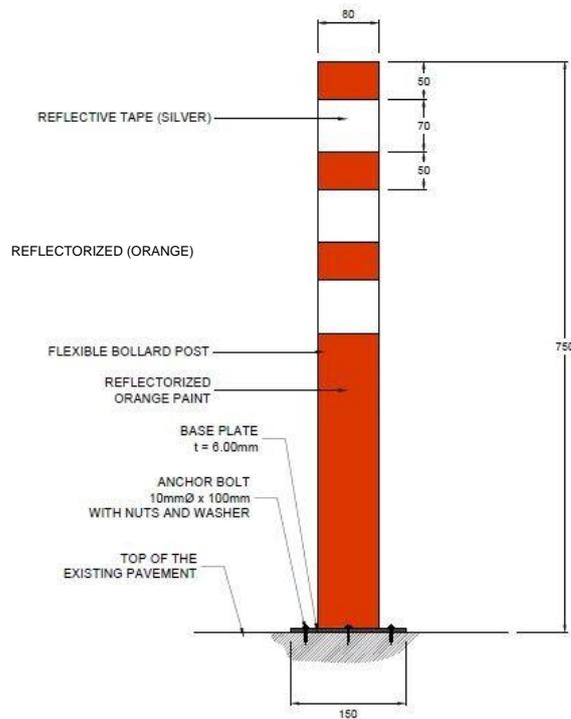
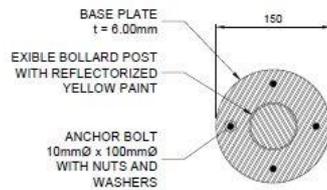


Figure 10. Separated Bike Lane Using Pavement Markings and Physical Separator (2 of 3)



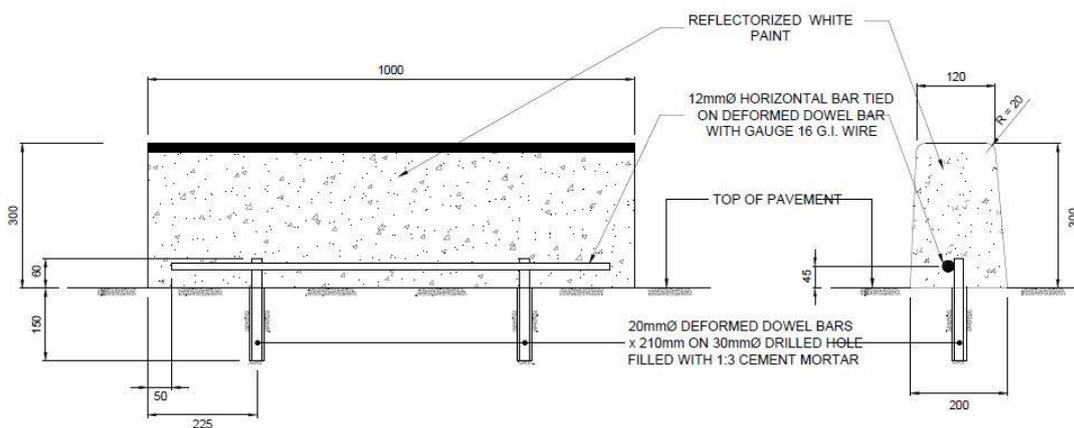
ELEVATION OF FLEXIBLE BOLLARD POST

SCALE : 1:6m



PLAN VIEW OF FLEXIBLE BOLLARD POST

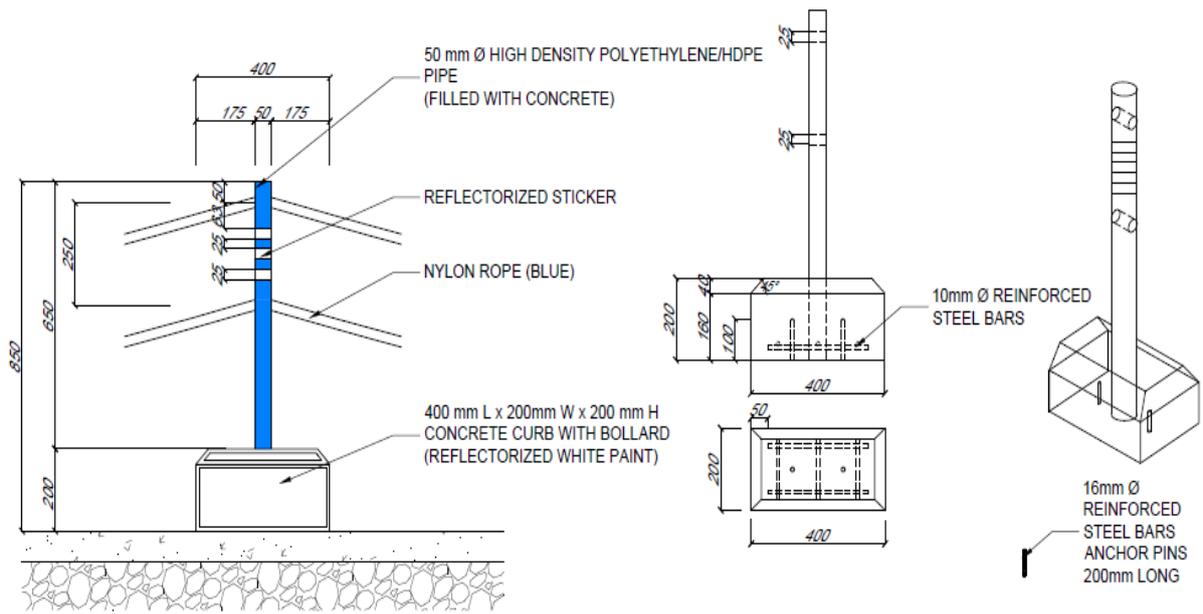
SCALE : 1:6m



REFLECTORIZED CONCRETE DELINEATOR

SCALE : 1:10m

Figure 10. Separated Bike Lane Using Pavement Markings and Physical Separator (3 of 3)

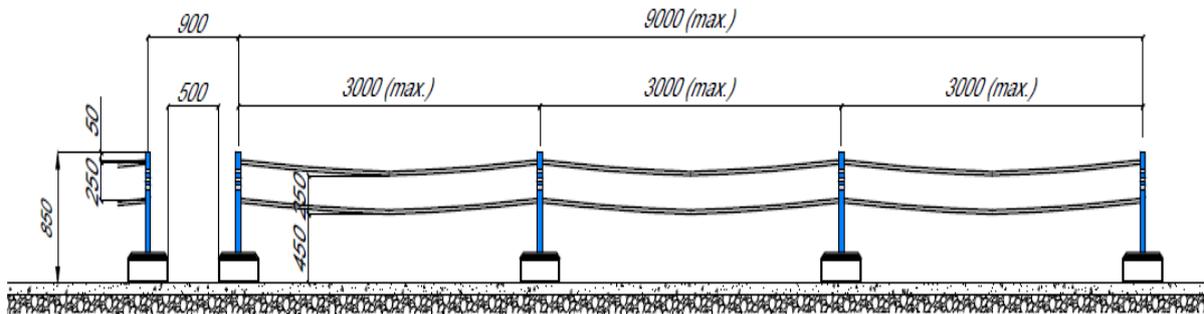


DETAILS OF CONCRETE CURB WITH BOLLARD
N T S



PERSPECTIVE VIEW OF CONCRETE CURB WITH BOLLARD
N T S

Figure 11. Temporary Physical Separator (1 of 2)



GENERAL NOTES

1. STANDARD SPECIFICATIONS

- ALL WORKS SHALL COMPLY WITH DPWH STANDARD SPECIFICATIONS FOR HIGHWAYS, BRIDGES AND AIRPORTS, 2013.

2. BICYCLE OPERATING SPACE

- THE MINIMUM WIDTH OF A ONE-DIRECTIONAL SEPARATED BIKE LANE IS 2.44 M TO ALLOW FOR BICYCLISTS TO TRAVEL SIDE-BY-SIDE OR PASS EACH OTHER WITHOUT LEAVING THE LANE.
- BIKE LANES SHOULD HAVE A SMOOTH RIDING SURFACE.
- OBSTRUCTIONS DUE TO ON-GOING ACTIVITIES WITHIN THE ROADWAY, IF NOT ILLUMINATED, SHALL BE MARKED WITH REFLECTORIZED HAZARD MARKERS (BLACK AND WHITE STRIPES) IN COMPLIANCE WITH THE DPWH DEPARTMENT ORDER NO. 73 SERIES OF 2016 RE: DPWH STANDARD FOR OBJECT MARKINGS, MARKINGS ON CURB AND ISLAND, AND APPROACH MARKINGS TO ISLANDS AND OBSTRUCTIONS.

3. CONCRETE CURB WITH BOLLARD

- ITEM SHALL BE CONSTRUCTED FOLLOWING THE DESIGN AND SPECIFICATION STATED IN THE DRAWINGS.
- ITEM SHALL BE INSTALLED IN THE POSITION AND AT THE SPACING INDICATED ON THE DRAWINGS.
- CONCRETE CURB WITH BOLLARD SHALL BE ANCHORED TO THE SURFACE OF PAVEMENT ALONG AREAS PRONE TO FLOODING, FREQUENT TURNING MOVEMENT OF VEHICLES, UNEVEN/IRREGULAR SURFACE, LOCATIONS WHERE PEDESTRIANS ARE NORMALLY CONCENTRATED SUCH AS CHURCHES, SCHOOLS, MARKETS, PARKS, AND OTHER AREAS FOR PUBLIC USE, HIGH VOLUME OF HEAVY VEHICLES, AMONG OTHERS.
- THE CEMENT CONCRETE SHALL BE CLASS A AS SPECIFIED IN THE ITEM 405, STRUCTURAL CONCRETE.
- SUPPLEMENTARY ROPE SHALL BE USED TO PREVENT ENTERING/ENCROACHMENT OF VEHICLES TO THE BIKE LANE AS NECESSARY BASED ON THE ACTUAL CONDITION.

4. EXISTING UTILITIES

- EXISTING UTILITY COVERS SHOULD BE ADJUSTED FLUSHED WITH THE SURFACE OF THE ROADWAY PAVEMENT. BIKE LANES SHOULD BE PROVIDED WITH ADEQUATE DRAINAGE (BICYCLE-COMPATIBLE DRAIN GRATES) TO PREVENT PONDING OF WATER, WASHOUTS, DEBRIS ACCUMULATION, AND OTHER POTENTIAL CONCERNS FOR BICYCLISTS. ALL EXISTING DRAINAGE GRATINGS SHOULD BE ADJUSTED PARALLEL WITH THE TRAFFIC.

5. REMOVAL OF EXISTING STRUCTURES AND OBSTRUCTION

- ALL WORKS SHALL COMPLY WITH ITEM 101 OF THE DPWH STANDARD SPECIFICATIONS VOLUME II, HIGHWAYS, BRIDGES AND AIRPORTS, 2013.

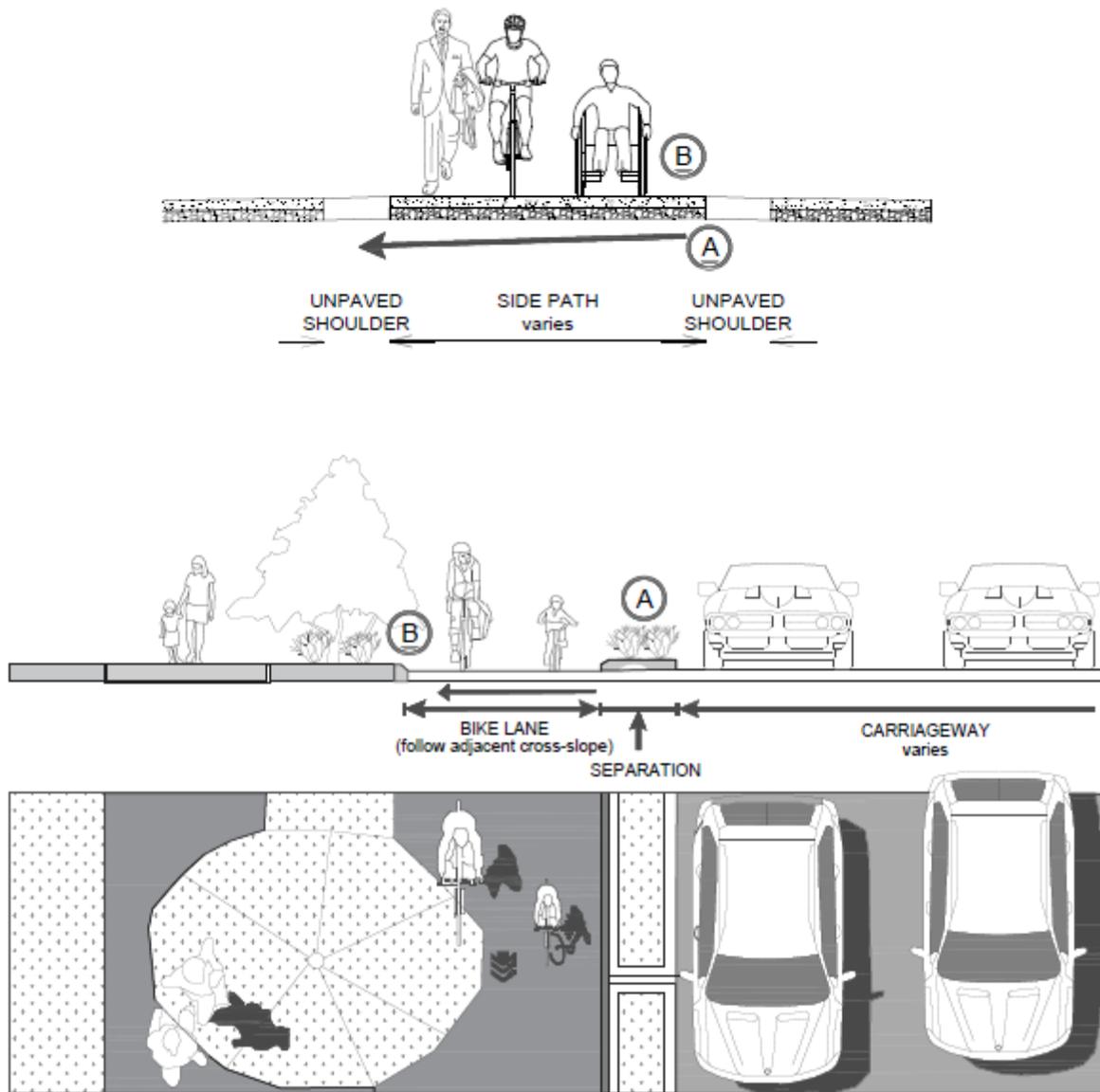
6. ROAD SIGNS AND PAVEMENT MARKINGS

- ROAD SIGNS AND PAVEMENT MARKINGS SHALL CONFORM WITH THE DPWH, HIGHWAY SAFETY DESIGN STANDARDS PART 2: ROAD SIGNS AND PAVEMENT MARKINGS MANUAL 2012, UNLESS OTHERWISE STATED.

7. BATAS PAMBANSA BLG. 344 (ACCESSIBILITY LAW)

- BICYCLE FACILITIES SHALL BE ADJUSTED/CONSTRUCTED TO PROVIDE ACCESS FOR THE PHYSICALLY IMPAIRED PERSONS AT THE DESIGNATED PLACE IN BUILT-UP AREAS ALONG THE PROJECT ROAD, IN ACCORDANCE TO BATAS PAMBANSA BLG. 344.

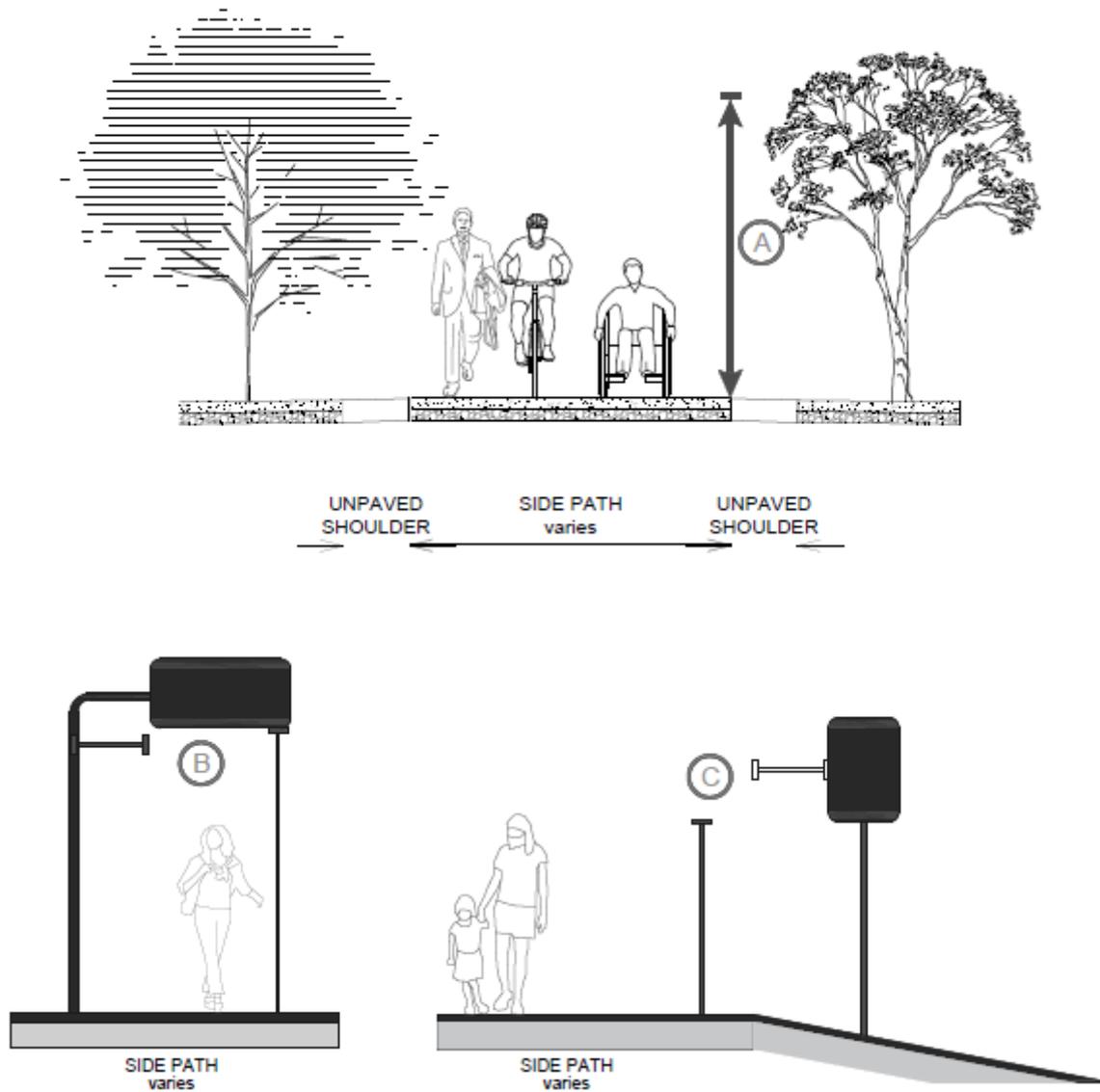
Figure 11. Temporary Physical Separator (2 of 2)



DESIGN FEATURES:

- A. The cross-slope for shared use path or bike path must not exceed 2%. The cross-slope of the separated bike lane must be the same as the slope of the adjoining carriageway.
- B. The longitudinal grade on shared use path or bike path should be limited to 5% maximum. The grade for separated bike lane must follow the roadway grade.

Figure 12. Cross-Slope and Longitudinal Grade



DESIGN FEATURES:

- A. Trees should be trimmed to provide a minimum of 2.5 m of vertical clearance, 3.0 m preferred.
- B. All overhead signs over a shared use path must have a vertical clearance of 2.5 m and be installed 0.60 m from edge of path to the post.
- C. All signages along a shared use path must be located at 0.60m from the edge of path to the edge of the signage with a minimum vertical clearance of 1.2 m from the bottom of signage to the top surface of path.

Figure 13. Vertical Clearance

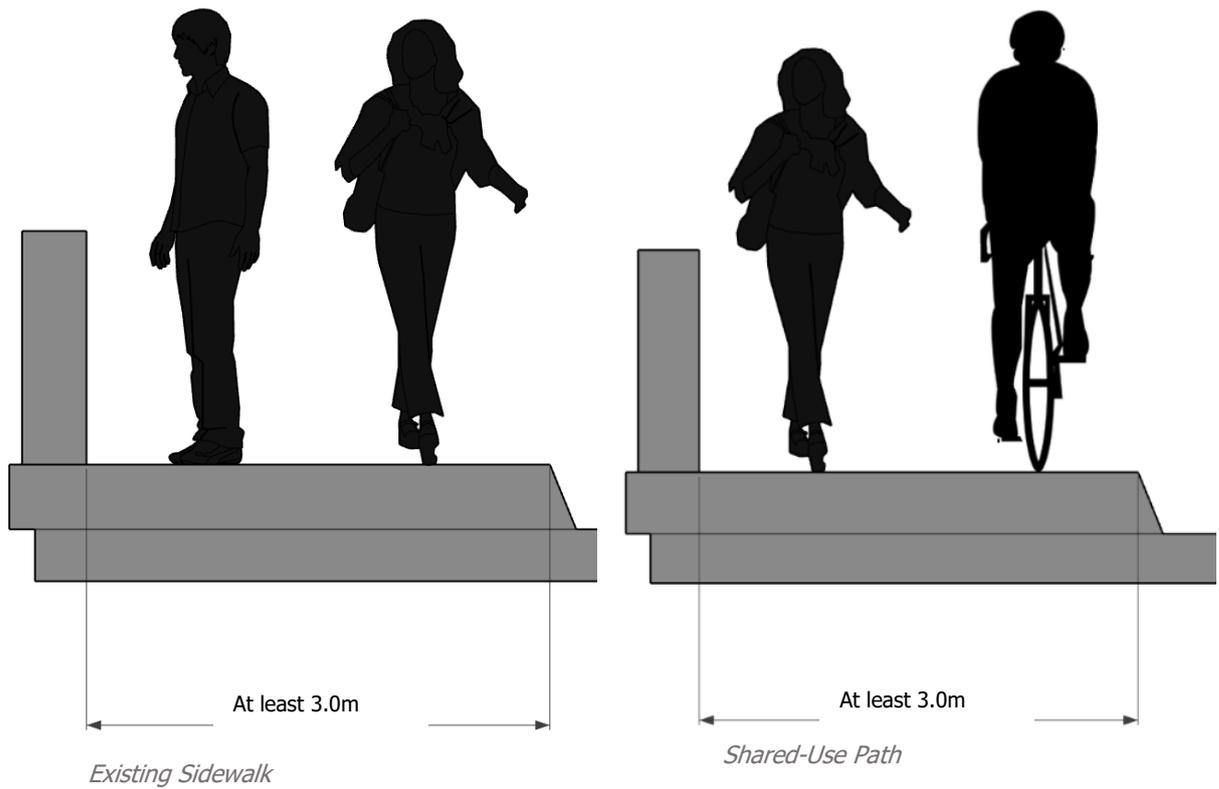


Figure 14. Existing Sidewalks Can Be Utilized as One-Directional Shared-Use Path

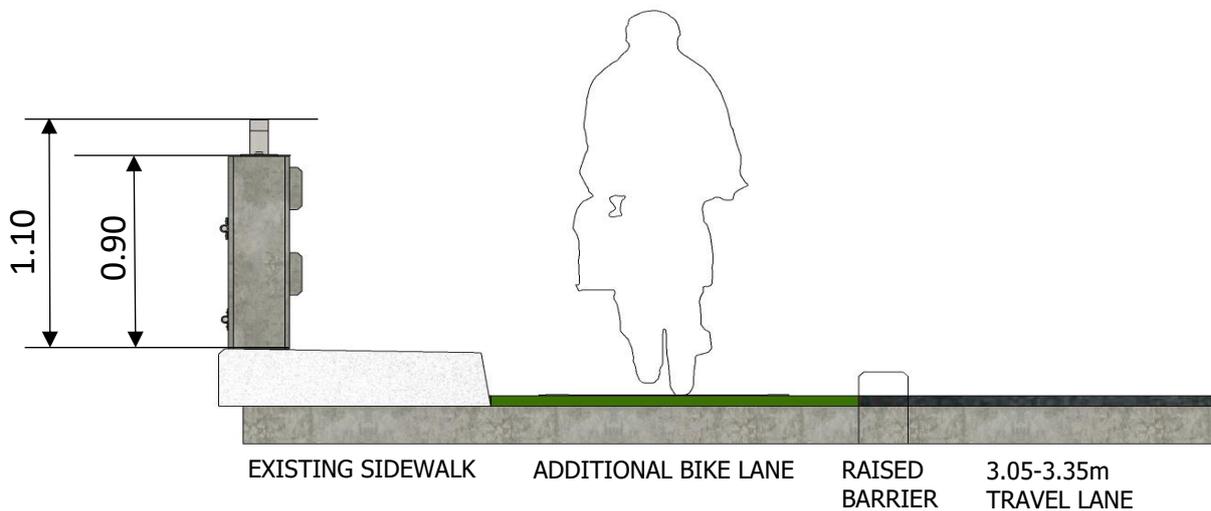


Figure 15. Separated Bike Lane applicable for low speed facilities

1. *Modify bridge railing height and clear openings to combination traffic-pedestrian railing.*
2. *Lane width reduction can be applied to multi-lane bridges to accommodate at least 1 bicycle lane facility of 1.22m on both sides provided that the minimum traffic lane width should not be less than 3.05m/3.35m.*

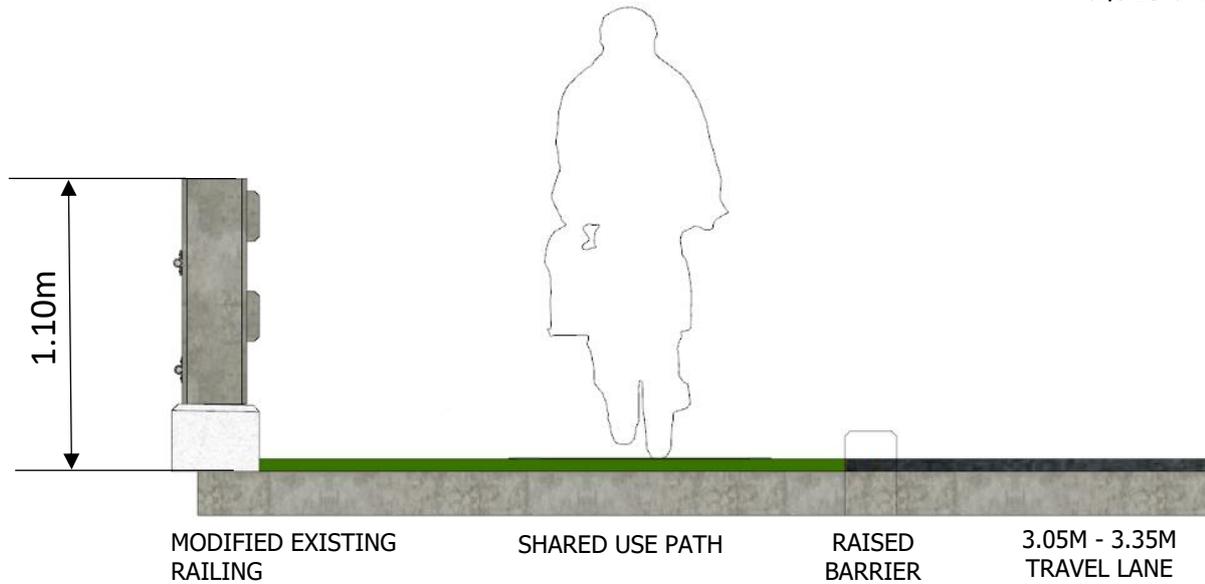


Figure 16. Shared Use Path applicable for low speed facilities

1. *Modify clear openings*
2. *Travel lane reduced to 3.05m/3.35m*
3. *Remove existing raised sidewalk*
4. *Additional bike lane with raised barrier between bike and travel lanes*

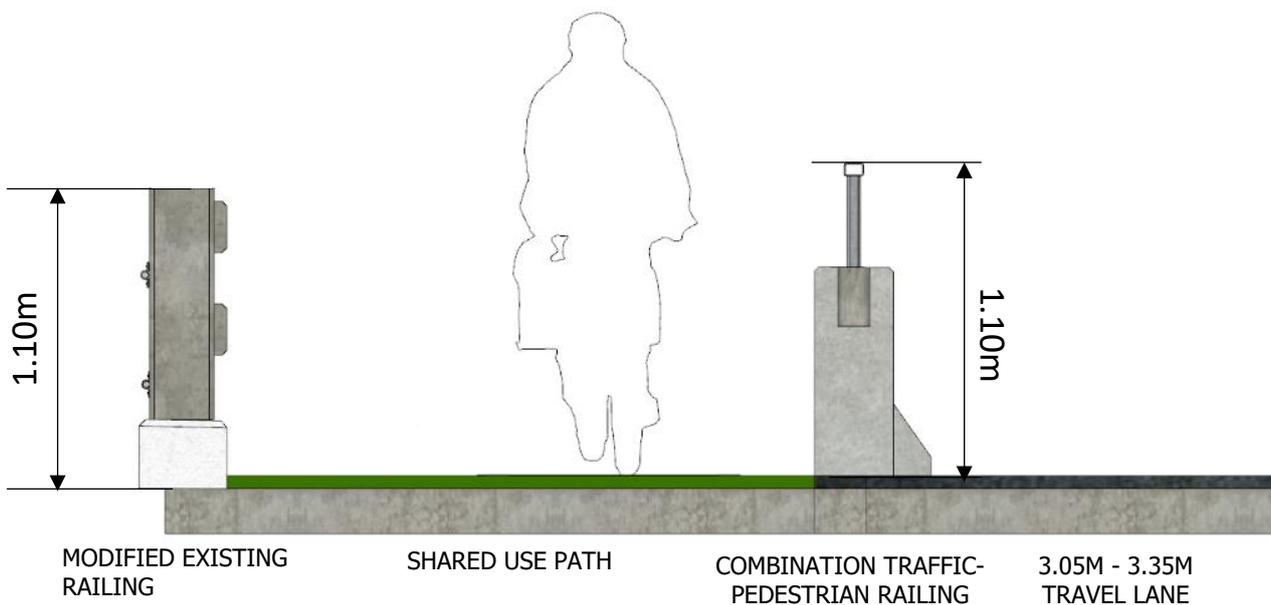


Figure 17. Shared Use Path applicable for high-speed facilities

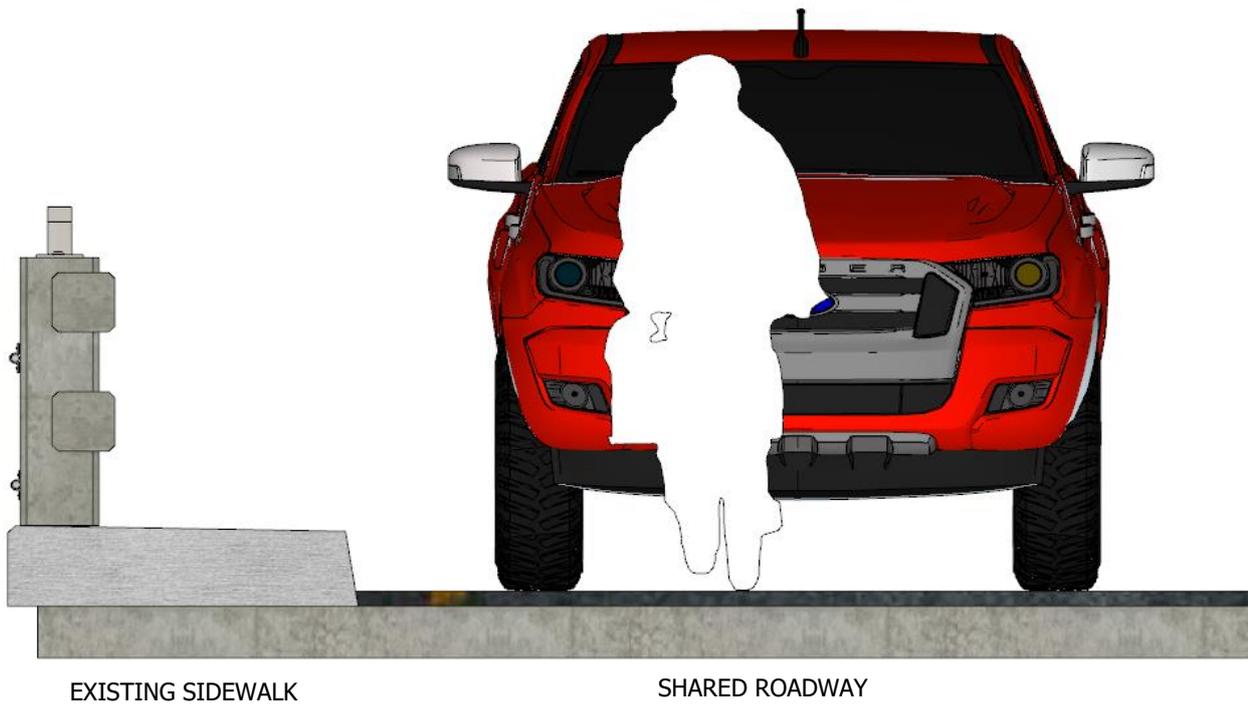


Figure 18. Shared Roadway on Existing Bridges

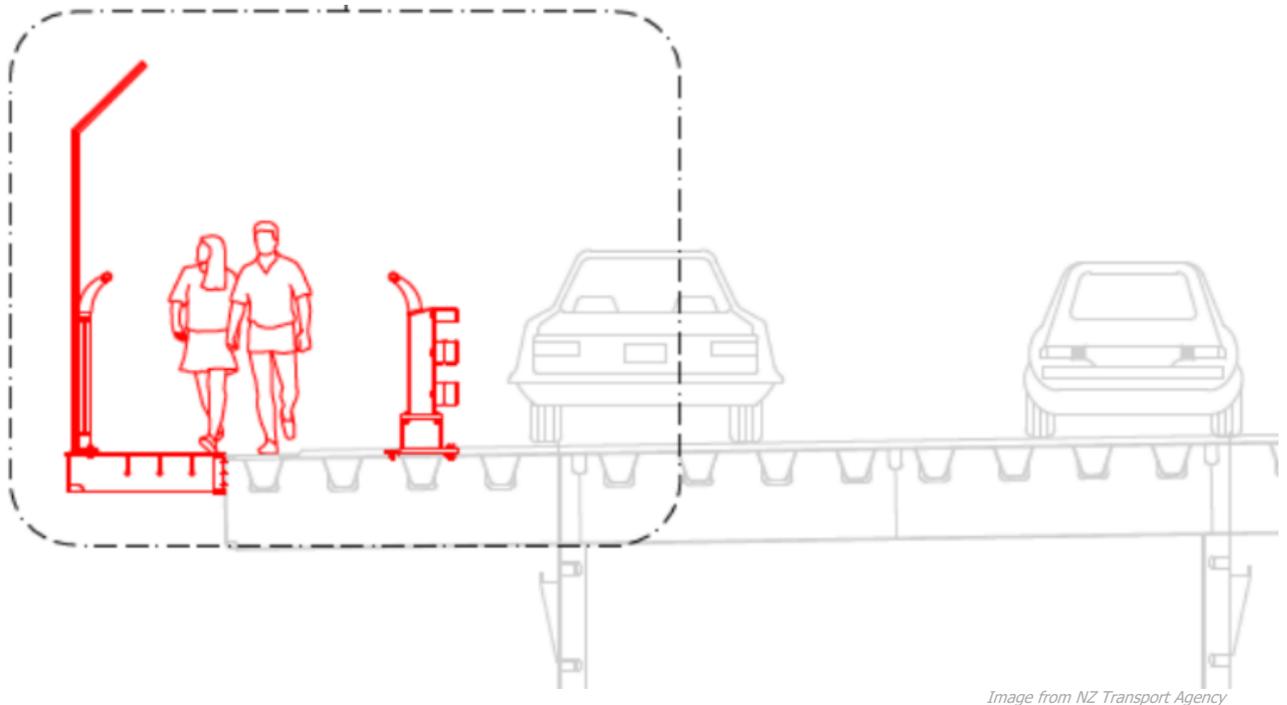


Image from NZ Transport Agency

Figure 19. Deck Level Shared-Use Path with Widening

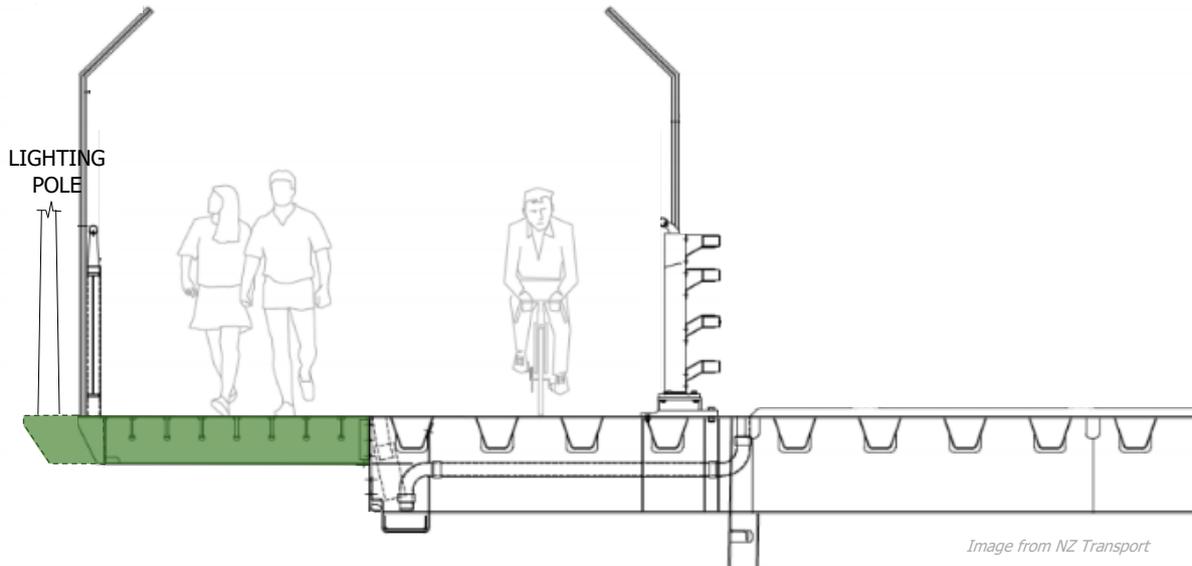


Figure 20. Deck Level Shared-Use Path with Widening

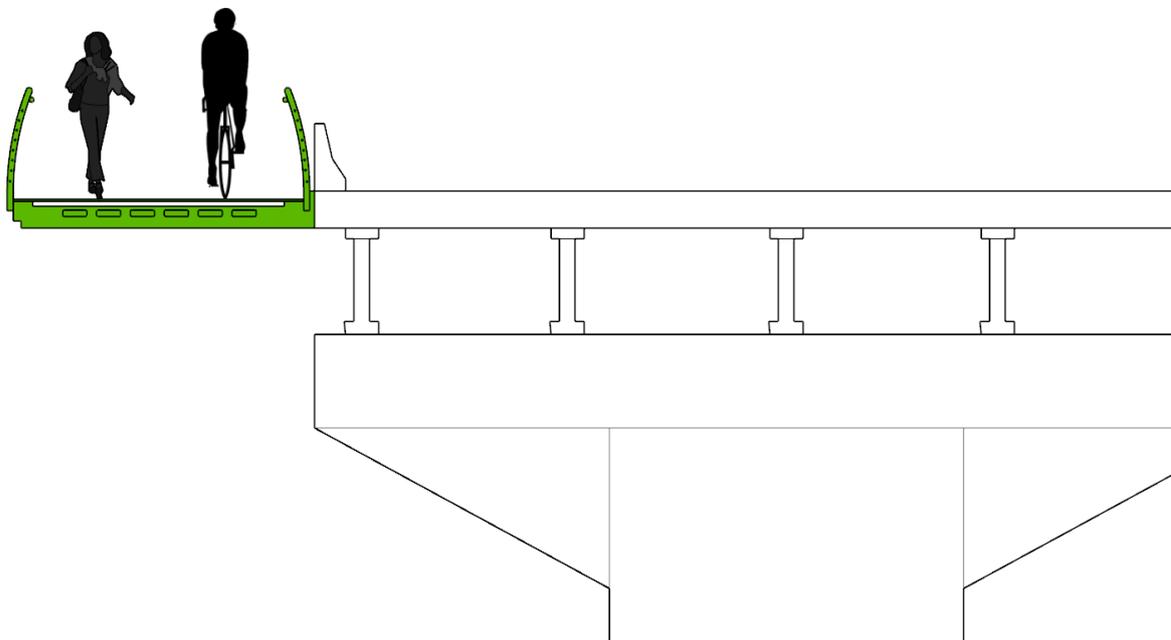


Figure 21. Attached Bike and Pedestrian Bridge to Existing Bridge - Deck

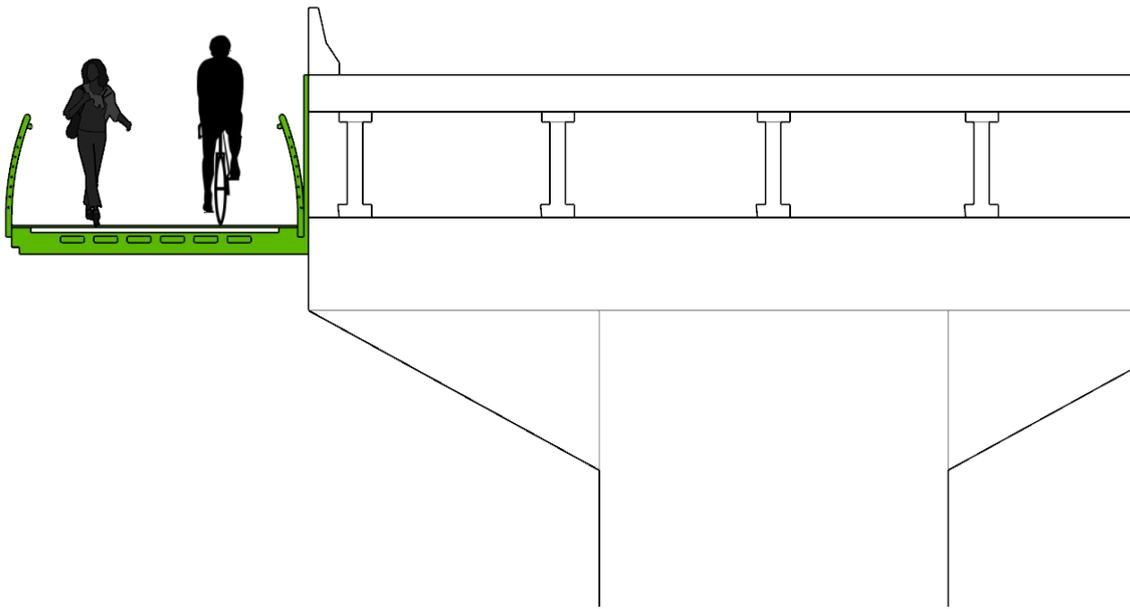


Figure 22. Attached Bike and Pedestrian Bridge to Existing Bridge - Pier Cap

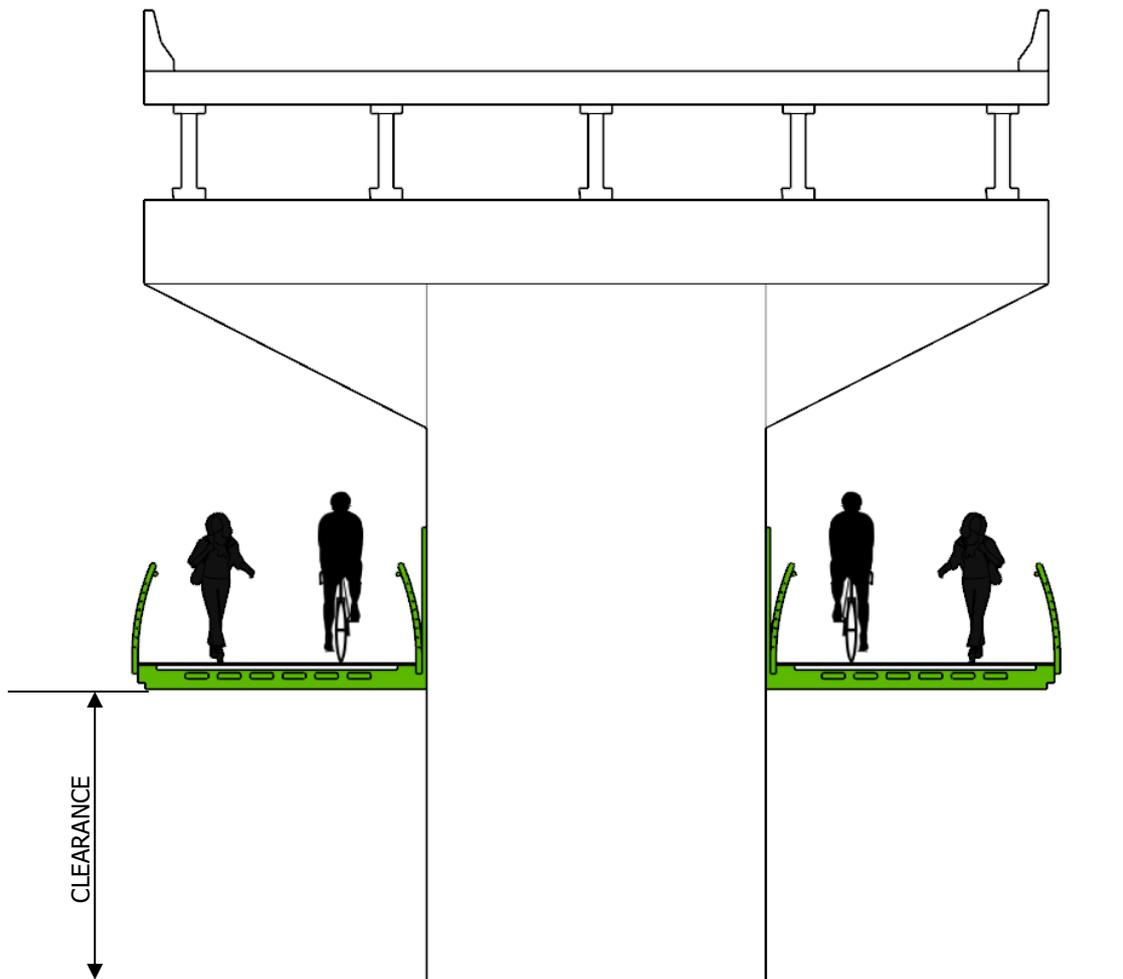


Figure 23. Attached Bike and Pedestrian Bridge to Existing Bridge - Pier

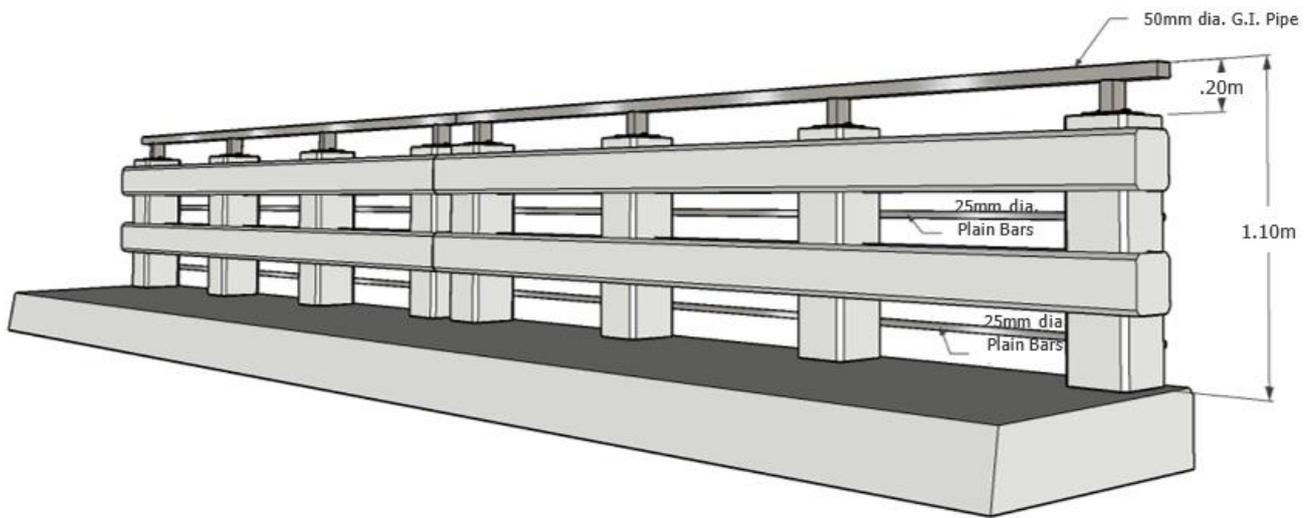


Figure 24. Existing Bridge Railing Modification

**from the existing 0.9m railing height, add steel rail mounted of top of concrete railing.
provide at least 25mm dia. plain bars to the existing clear openings.

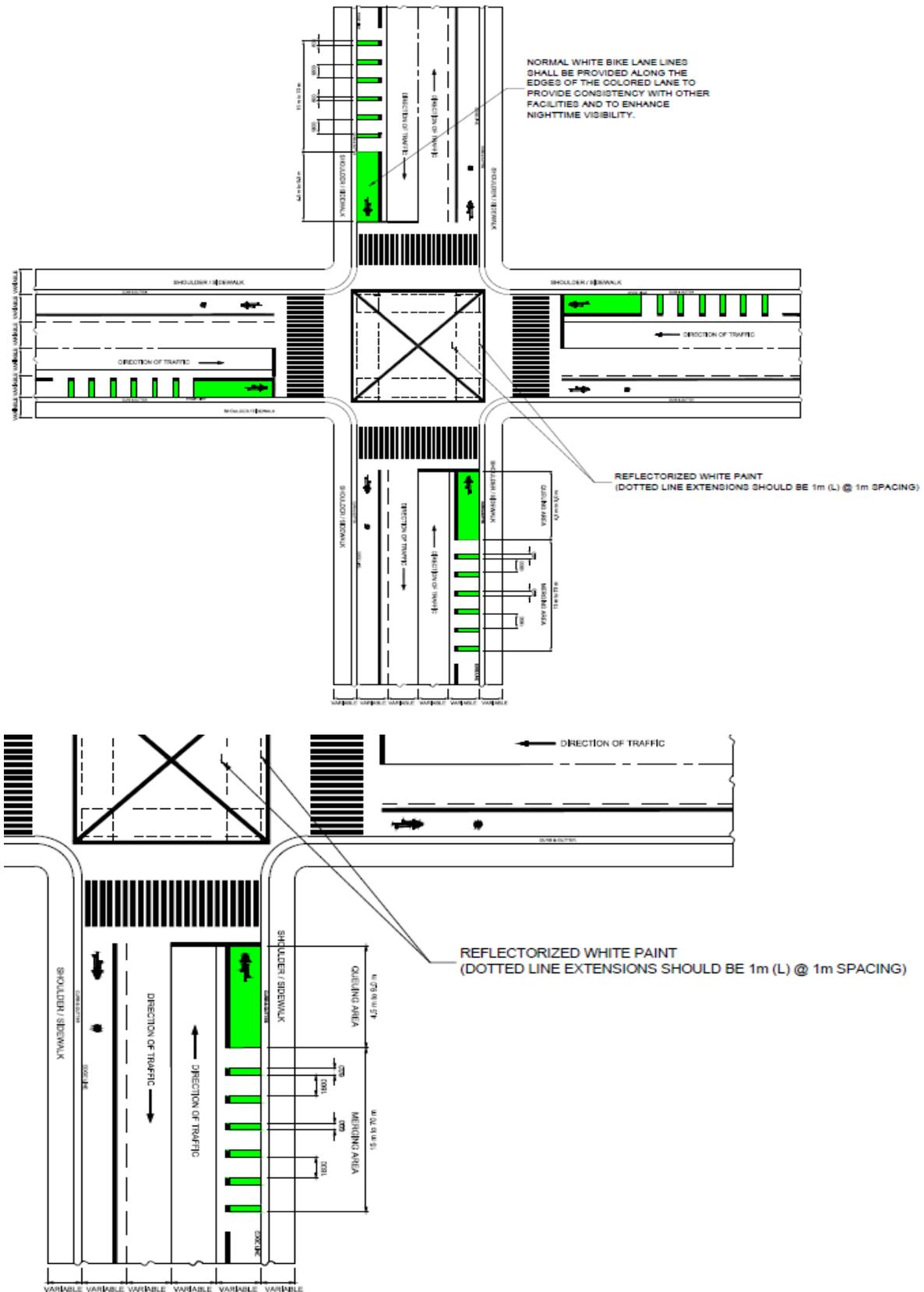


Figure 25. Minor Intersection Conflict Area Markings

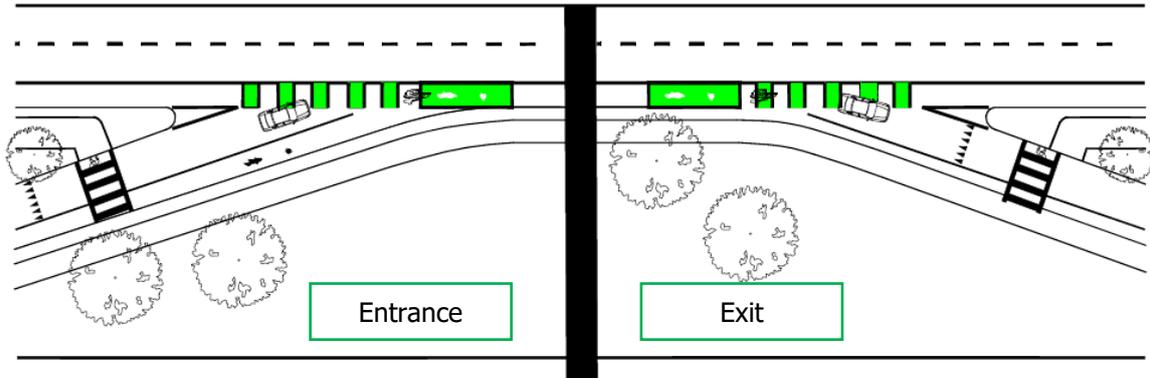


Figure 26. Merging and Diverging Conflict Area Markings

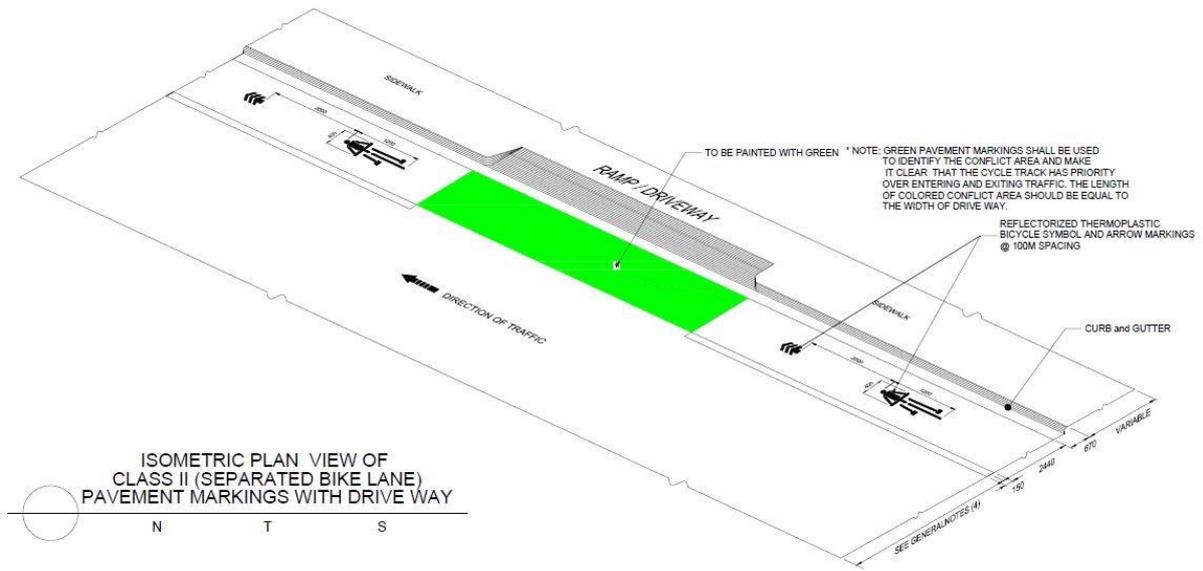


Figure 29. Conflict Area Markings along Driveway

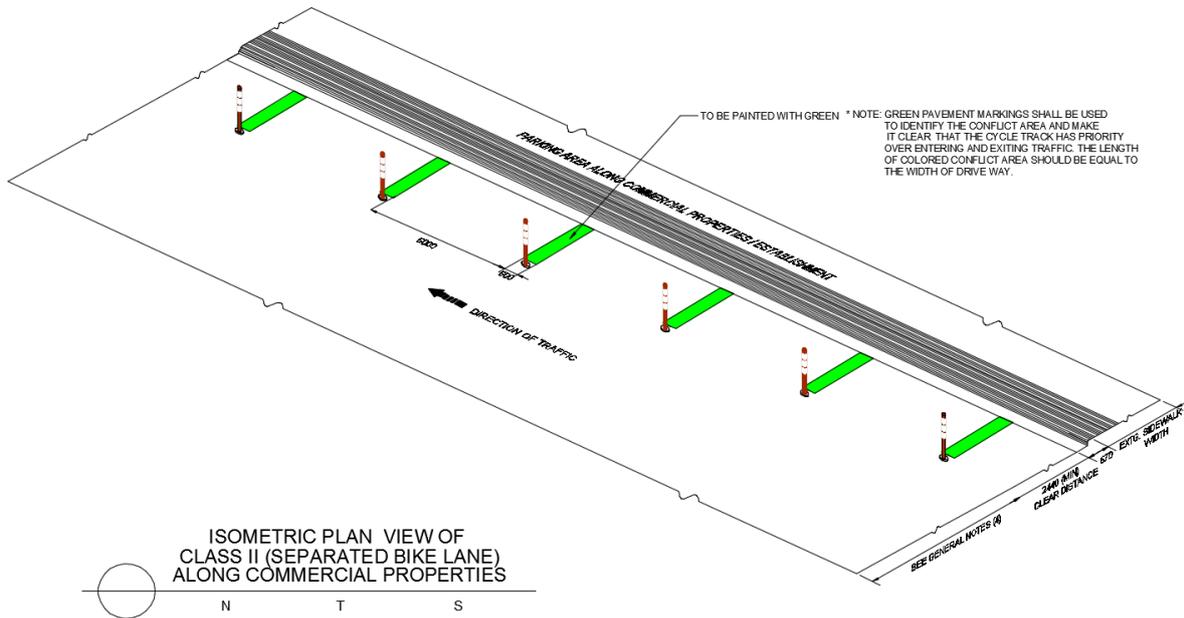


Figure 30. Conflict Area Markings along Continuous Commercial Properties/Establishments

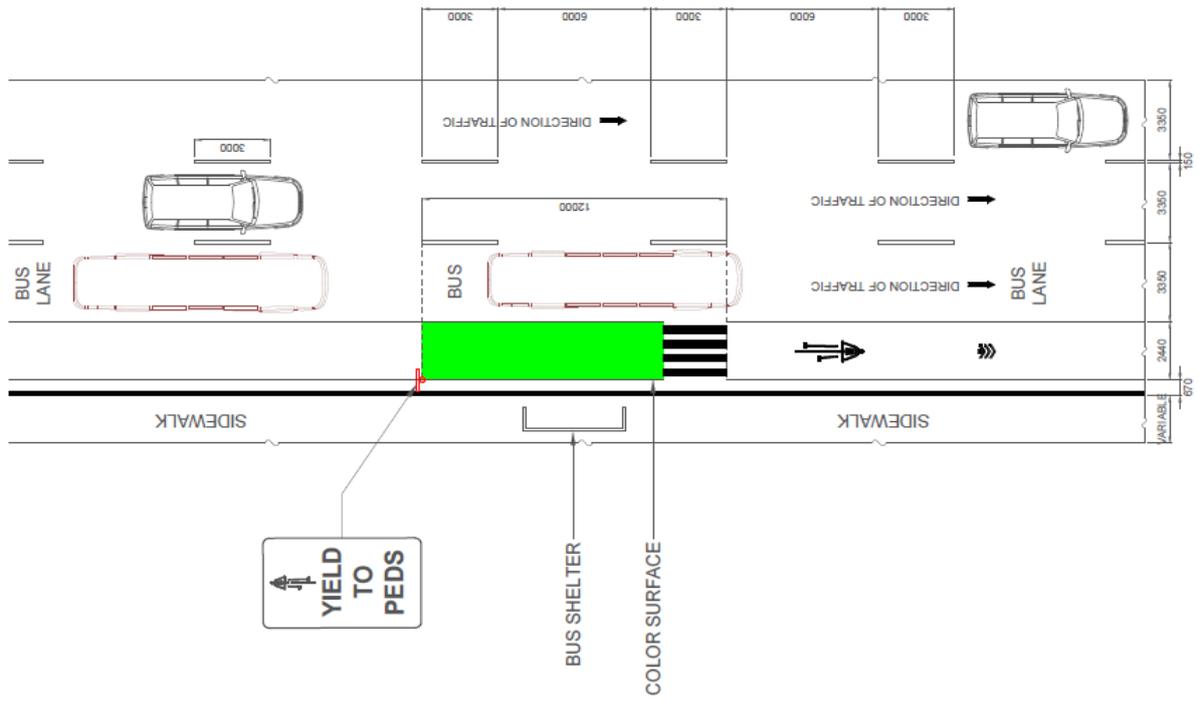


Figure 31. Transit Stop Loading and Unloading Bay

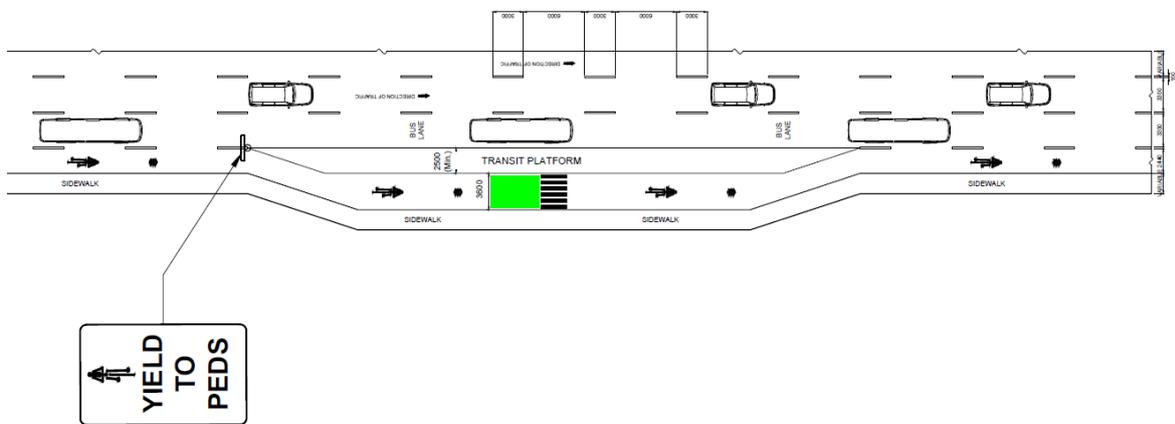


Figure 32. Transit Stop Loading and Unloading Bay (with Transit Platform)

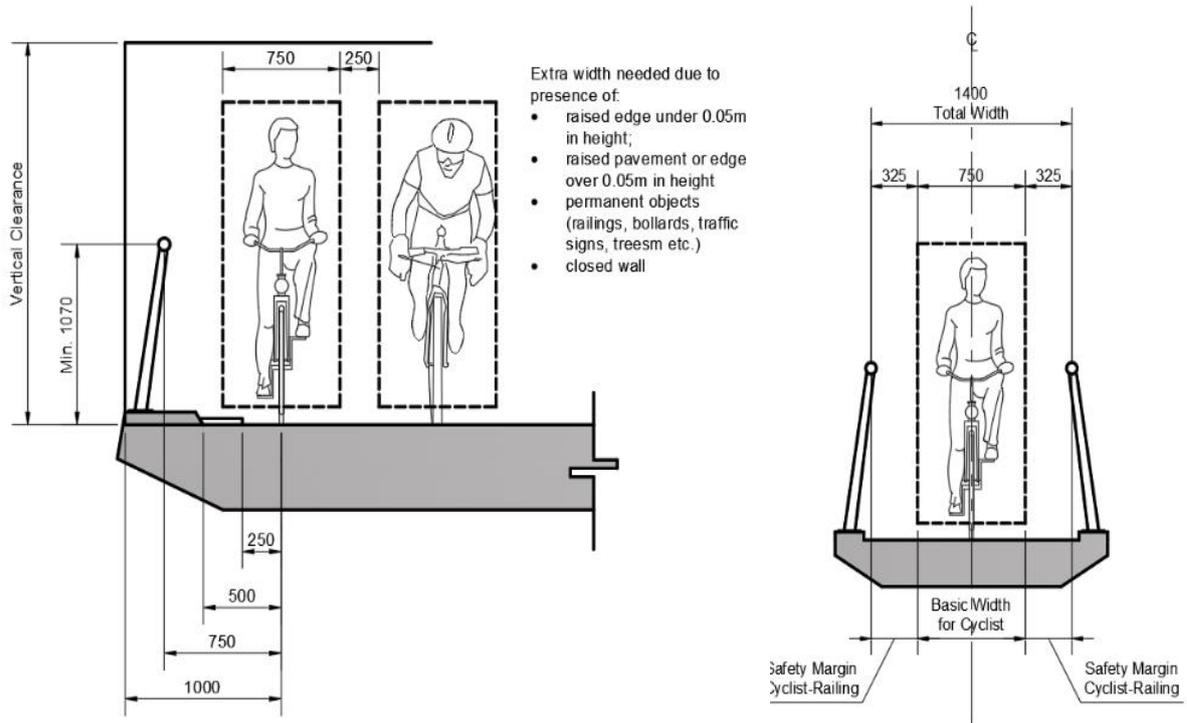


Figure 33. Minimal Width for Cyclist

Figure 34. One-Way Bicycle Path

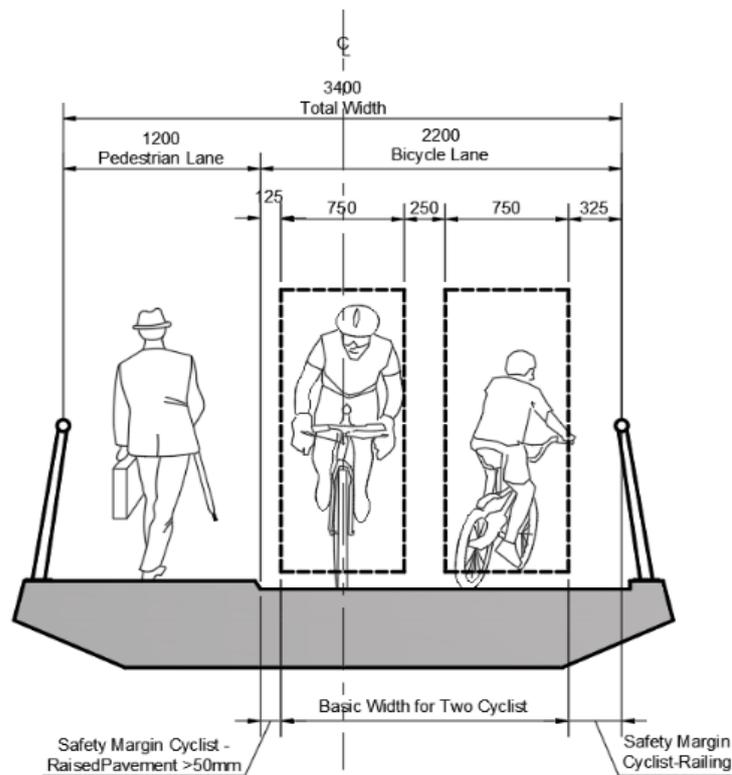


Figure 35. Two-Way Bicycle and Pedestrian Bridge

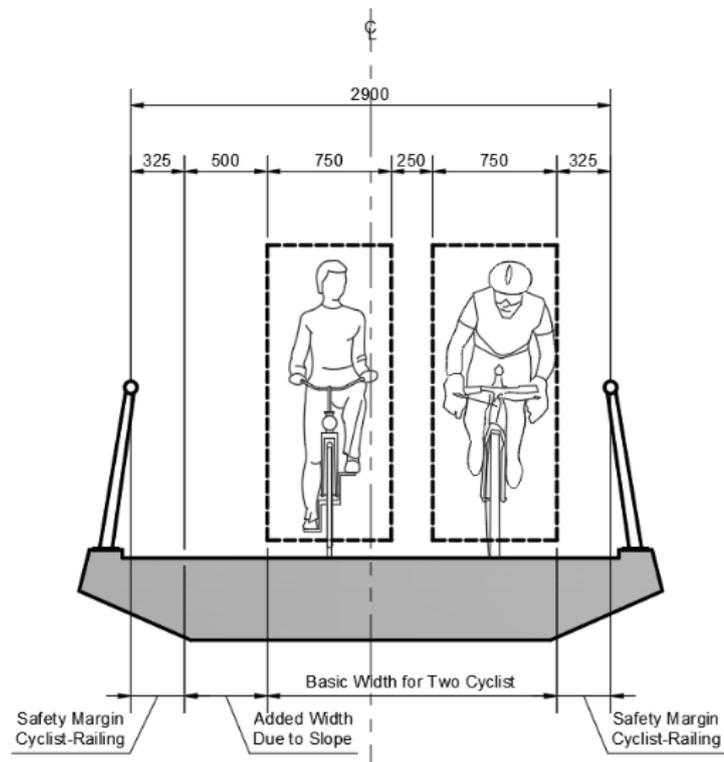


Figure 36. Two-Way Bicycle on Slope/Ramp

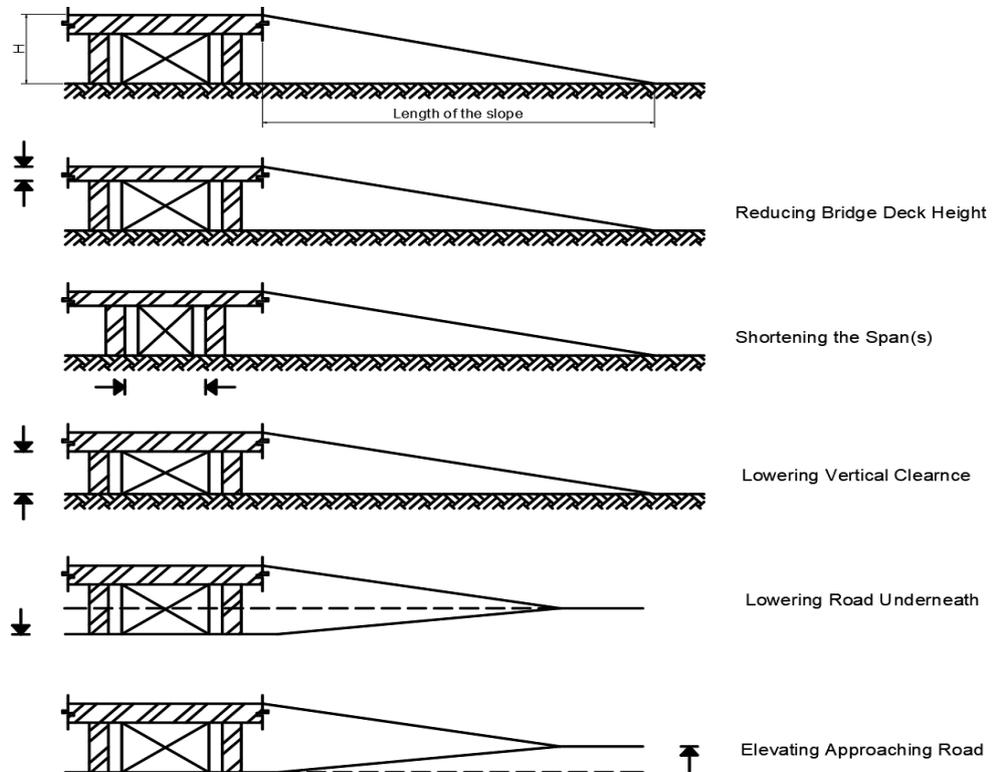


Figure 37. Height Difference Reduction

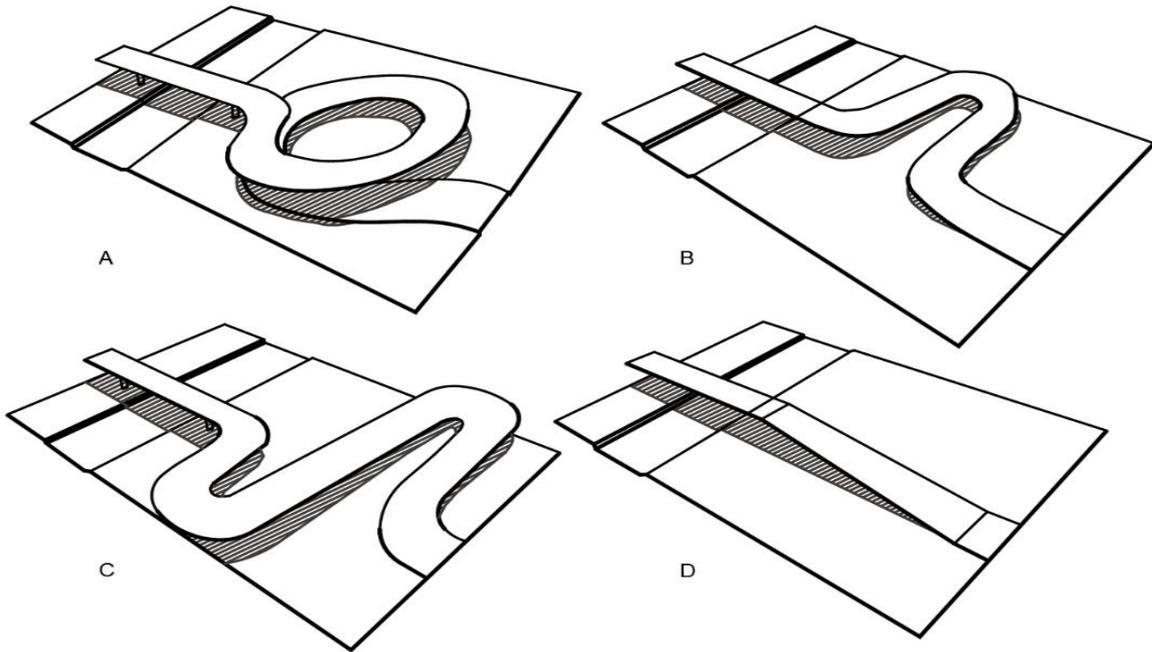
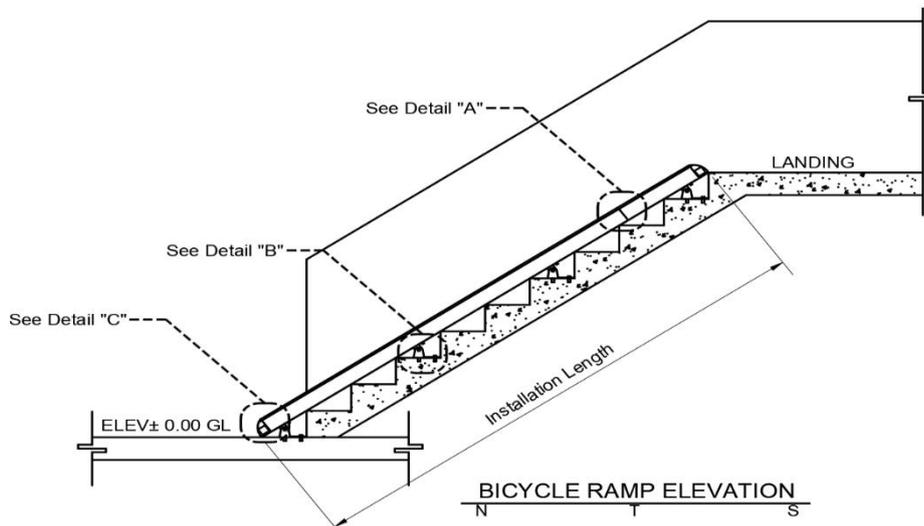


Figure 38. Compact and Steeper Ramp



Installation Length (ft)	Qty. of Ramp Modules	Qty. of Joining Biscuit Modules (A)	Qty. of Mounting Bracket Modules (B)	Qty. of End Cap Modules (C)
4 - 8	1	0	3	1
8 - 12	2	1	4	1
12 - 16	2	1	5	1
16 - 20	3	2	6	1
20 - 24	3	2	7	1
24 - 28	4	3	8	1
28 - 32	4	3	9	1

Note: End Cap Module includes 2 End Caps

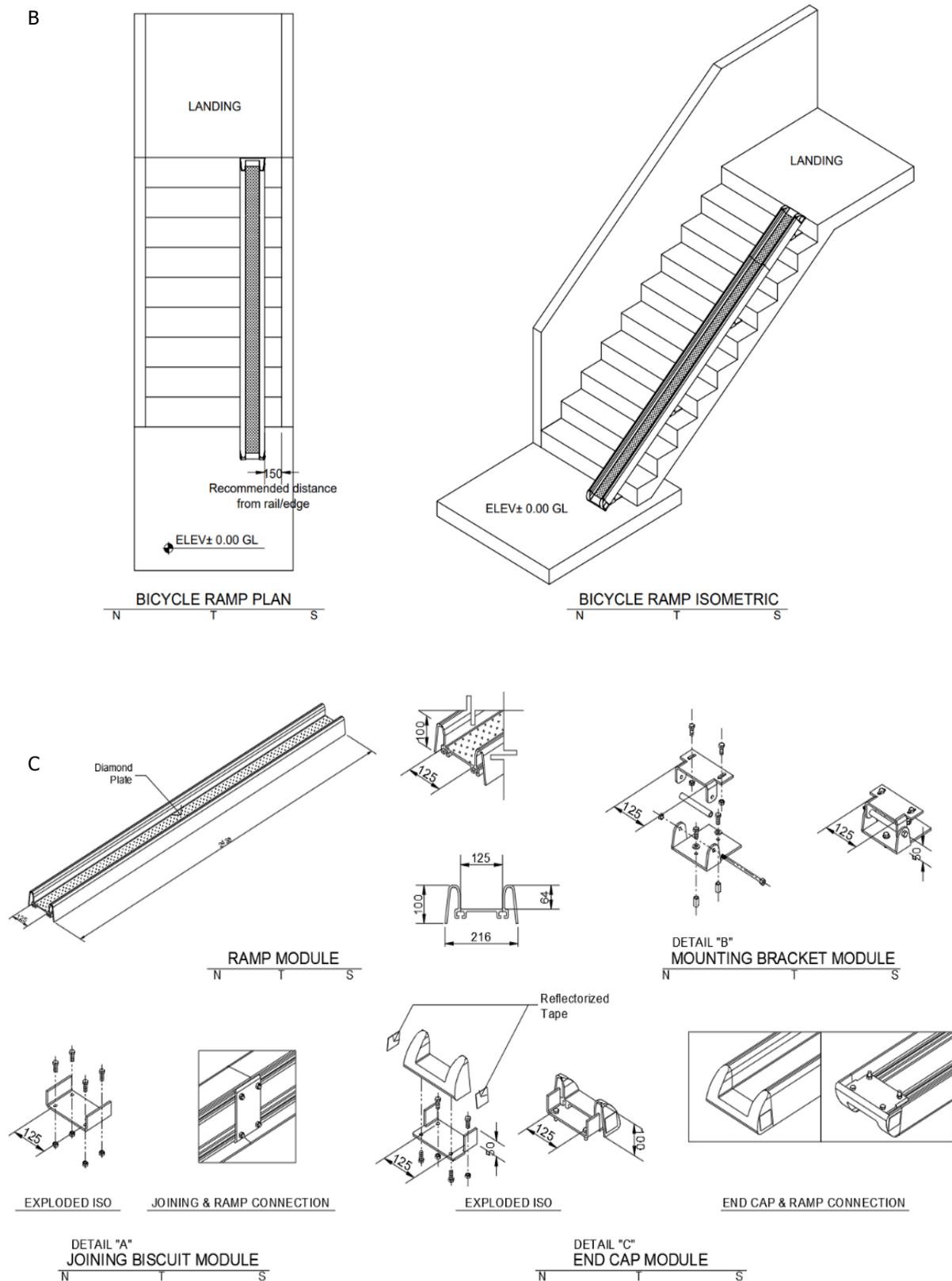


Figure 39. Bicycle Access Ramp Details

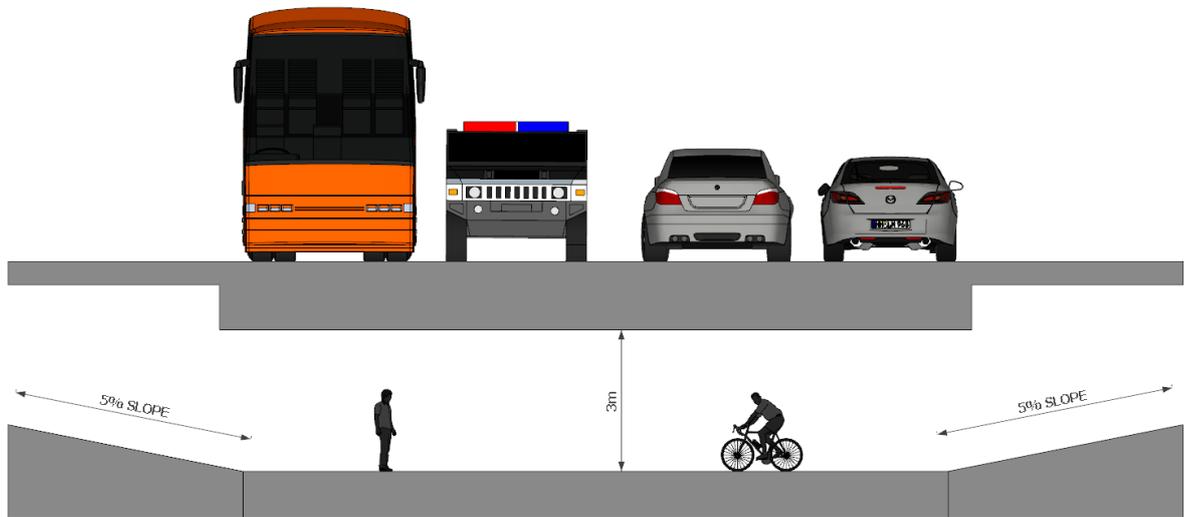


Figure 40. Tunnel/underpass for pedestrian and cyclist

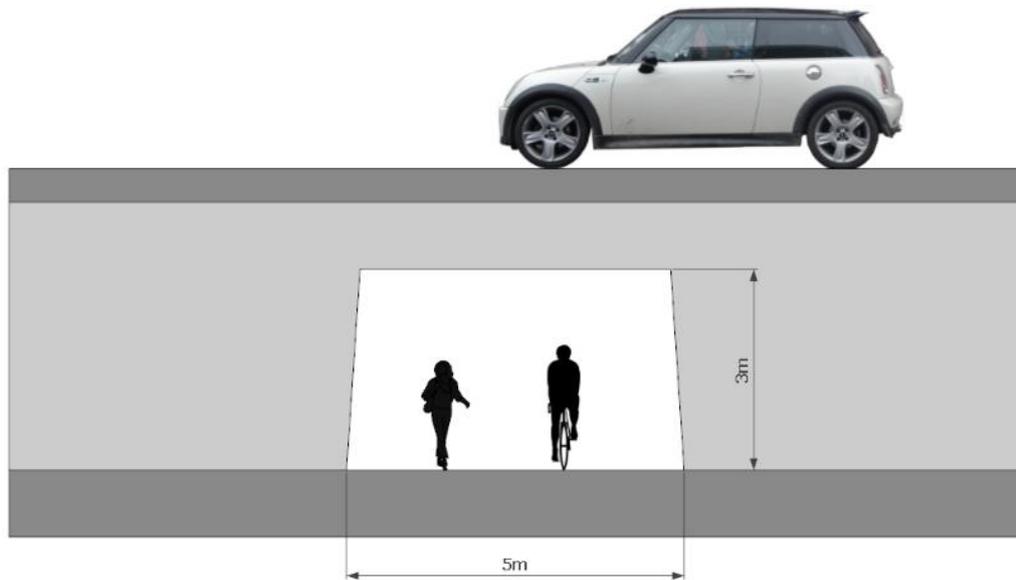


Figure 41. Minimum Section in Tunnels on Cycle Paths



GENERAL NOTES:

- W6-5 SIGN WITH A SUPPLEMENTARY WORD SIGN "AHEAD" SHOULD BE PLACED NOT LESS THAN 30 M BEFORE THE BEGINNING OF A BIKE LANE.
- W6-5 SIGN WITH A SUPPLEMENTARY WORD SIGN "ENDS" SHOULD BE PLACED AT THE END OF A BIKE LANE.
- R6-10 SHOULD BE PLACED AT THE BEGINNING OF BIKE LANE, AT SIGNALIZED INTERSECTION AND AT PERIODIC INTERVALS. ITS PERIODIC INTERVAL SHOULD BE DETERMINED BY ENGINEERING JUDGEMENT BASED ON PREVAILING SPEED OF BICYCLE AND OTHER TRAFFIC, BLOCK LENGTH, DISTANCES FROM ADJACENT INTERSECTIONS AND OTHER CONSIDERATIONS. IF THERE ARE MULTIPLE SIDE ROADS/TURNS EXIST, IT IS NOT REQUIRED TO LOCATE SIGNS AT EVERY TURN. HOWEVER, SIGN SPACING SHOULD NOT EXCEED 500M.

Figure 42 Roads Signs for Bicycle Facilities

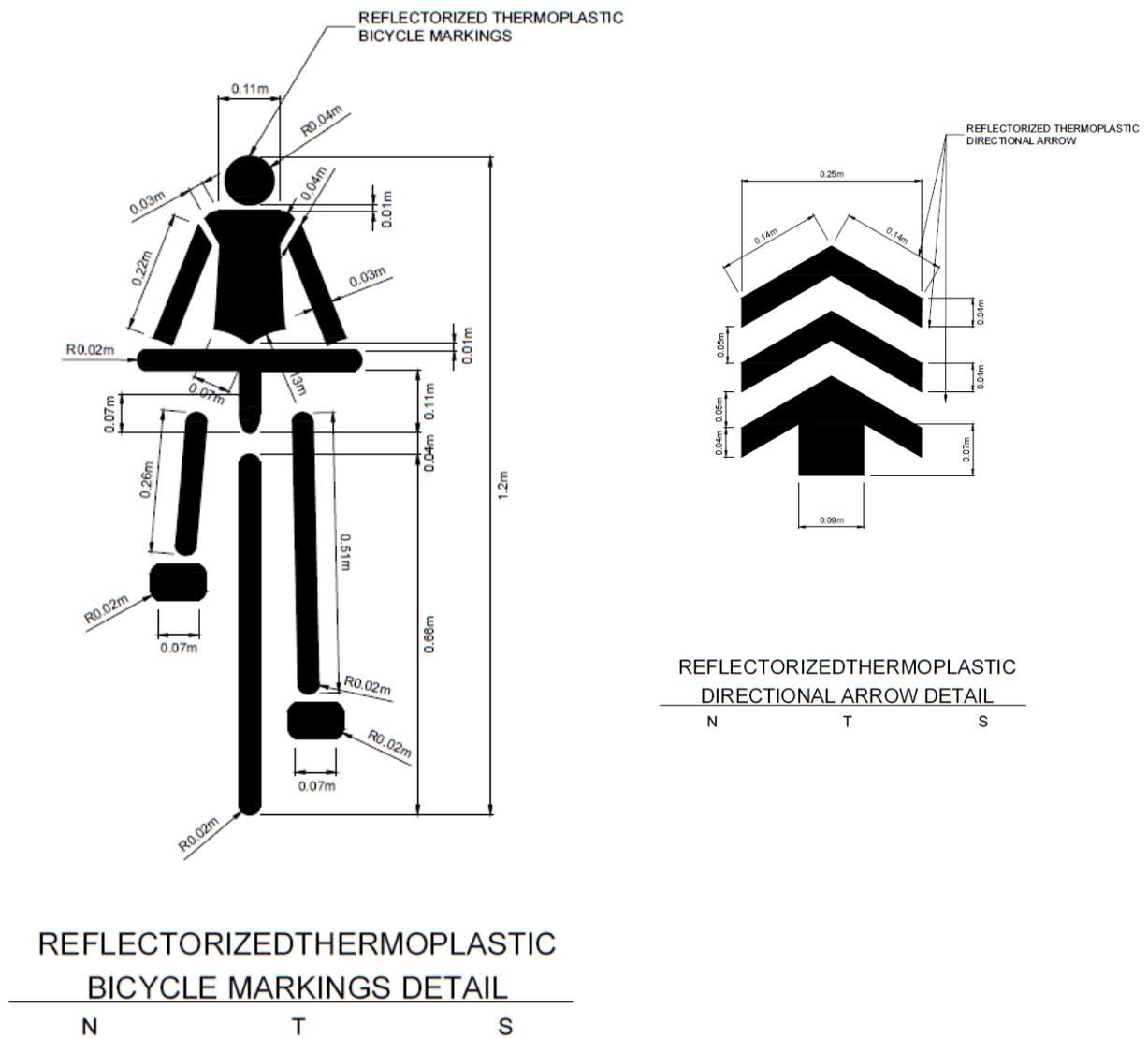
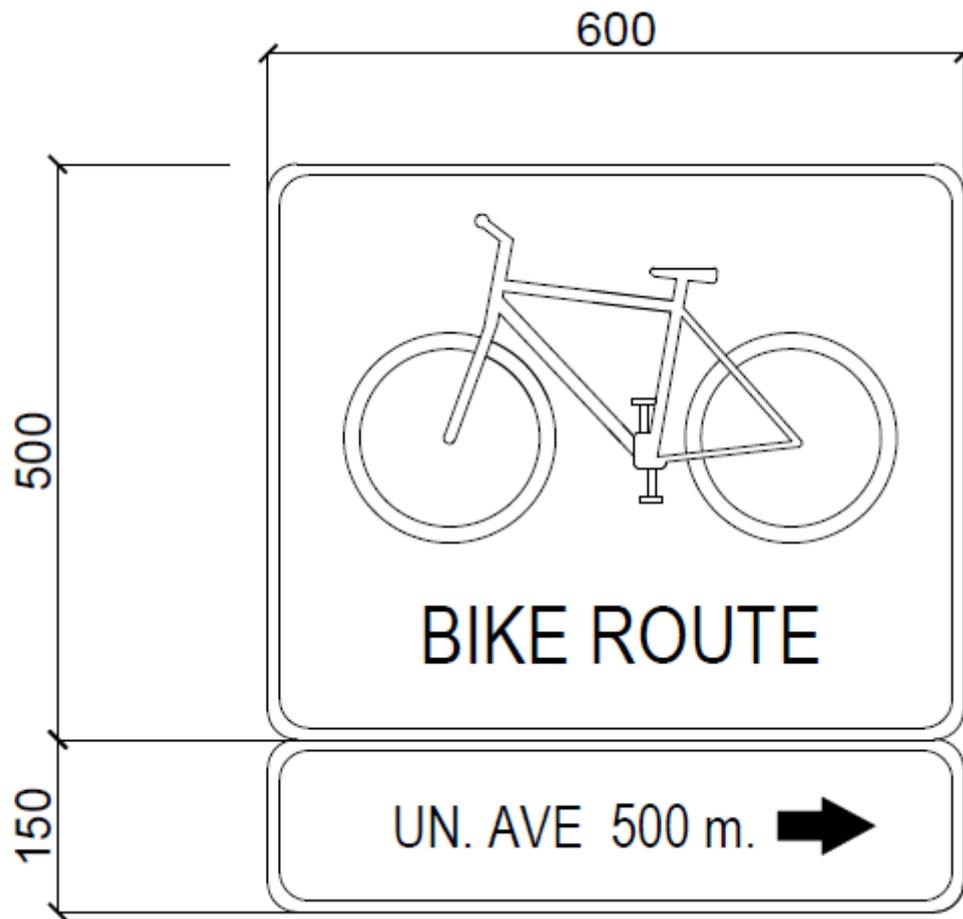


Figure 43. Bicycle lane symbol and/or arrow markings

**GUIDANCE:**

BICYCLE ROUTE GUIDE SIGNS SHOULD BE PROVIDED AT DECISION POINTS ALONG DESIGNATED BICYCLE ROUTES, INCLUDING SIGNS TO INFORM BICYCLISTS OF BICYCLE ROUTE DIRECTION CHANGES AND CONFIRMATION SIGNS FOR ROUTE DIRECTION, DISTANCE, AND DESTINATION.

DESTINATION SIGNS SHALL BE MOUNTED BELOW BICYCLE ROUTE GUIDE SIGNS TO FURNISH ADDITIONAL INFORMATION SUCH AS DIRECTIONAL CHANGES IN THE ROUTE, OR INTERMITTENT DISTANCE AND DESTINATION INFORMATION.

Figure 44. Bicycle lane symbol and/or arrow markings

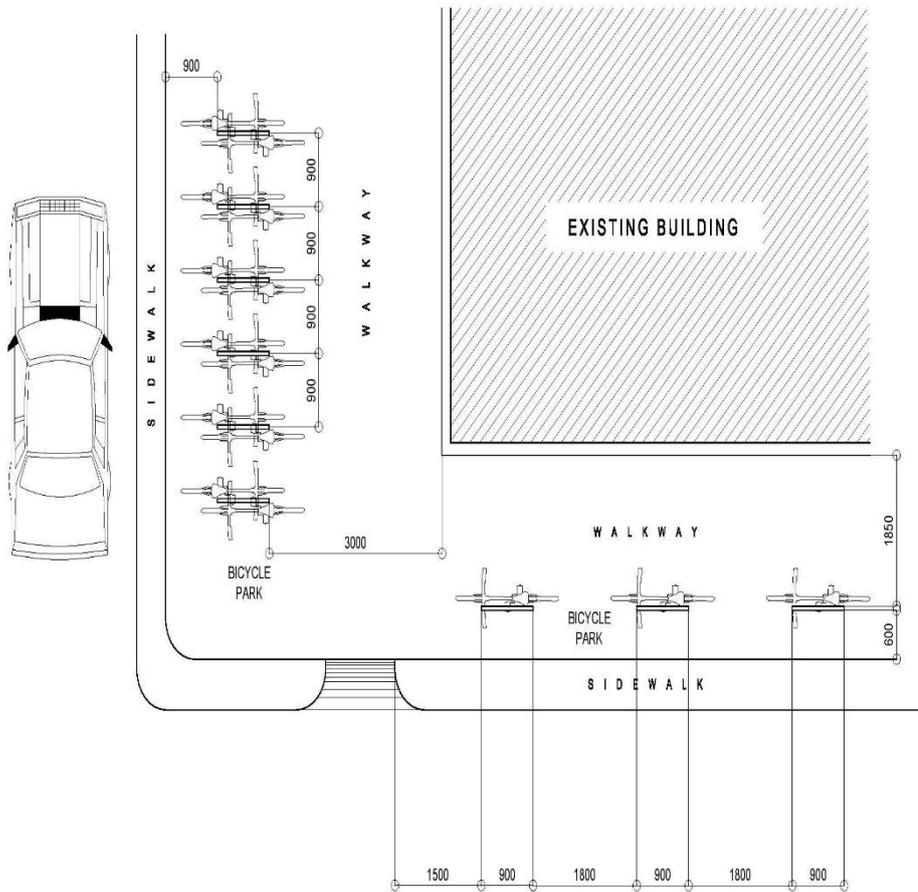
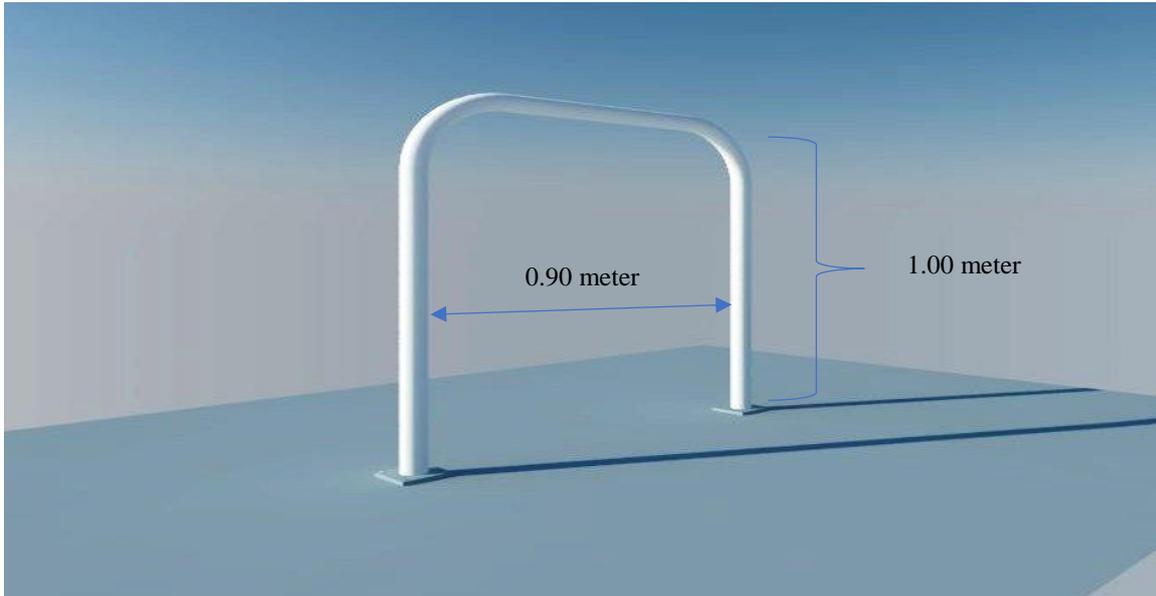


Figure 45. Short-term bicycle parking facility

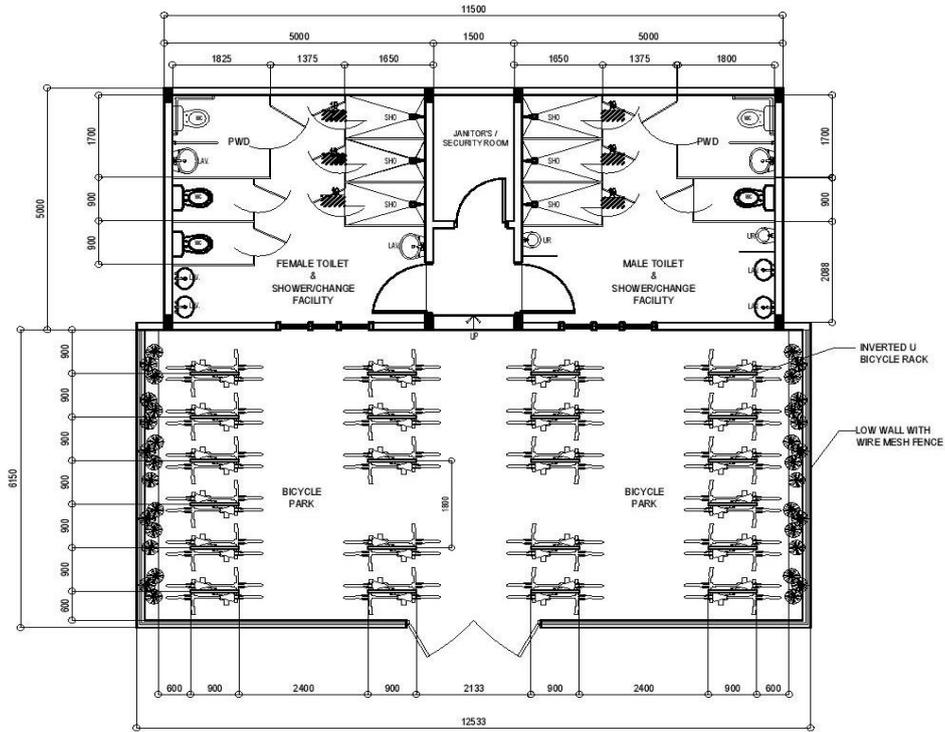
A



B



Figure 46. Bicycle Rack Design



FLOOR PLAN & LAYOUT OF LONG-TERM PARKING FACILITY

Figure 47. Long-Term Parking Layout

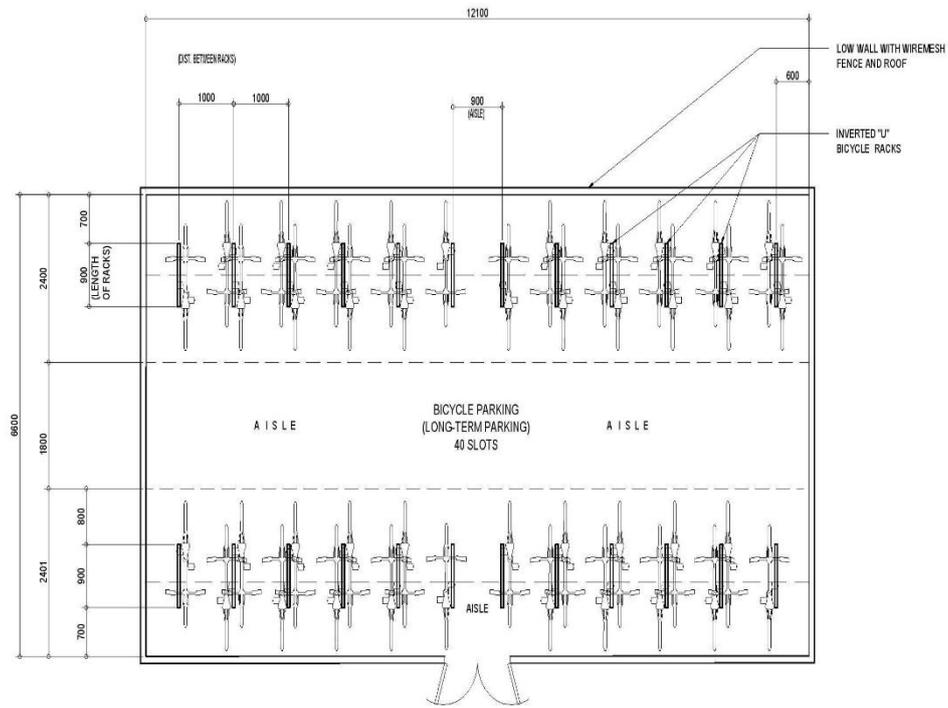


Table 48. Bicycle Cage

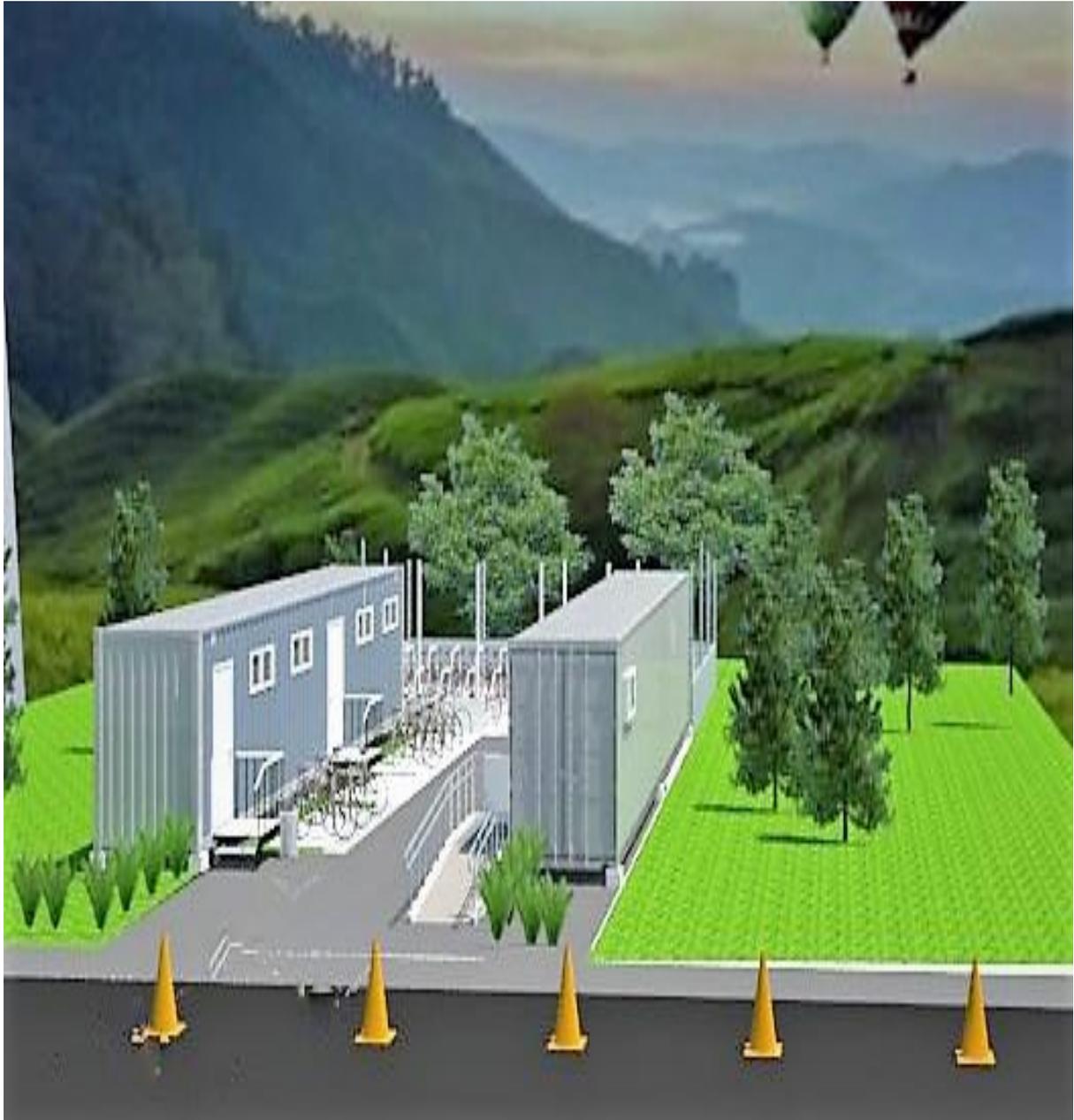


Figure 49. Toilet/Shower/Change Facilities (1 of 2)

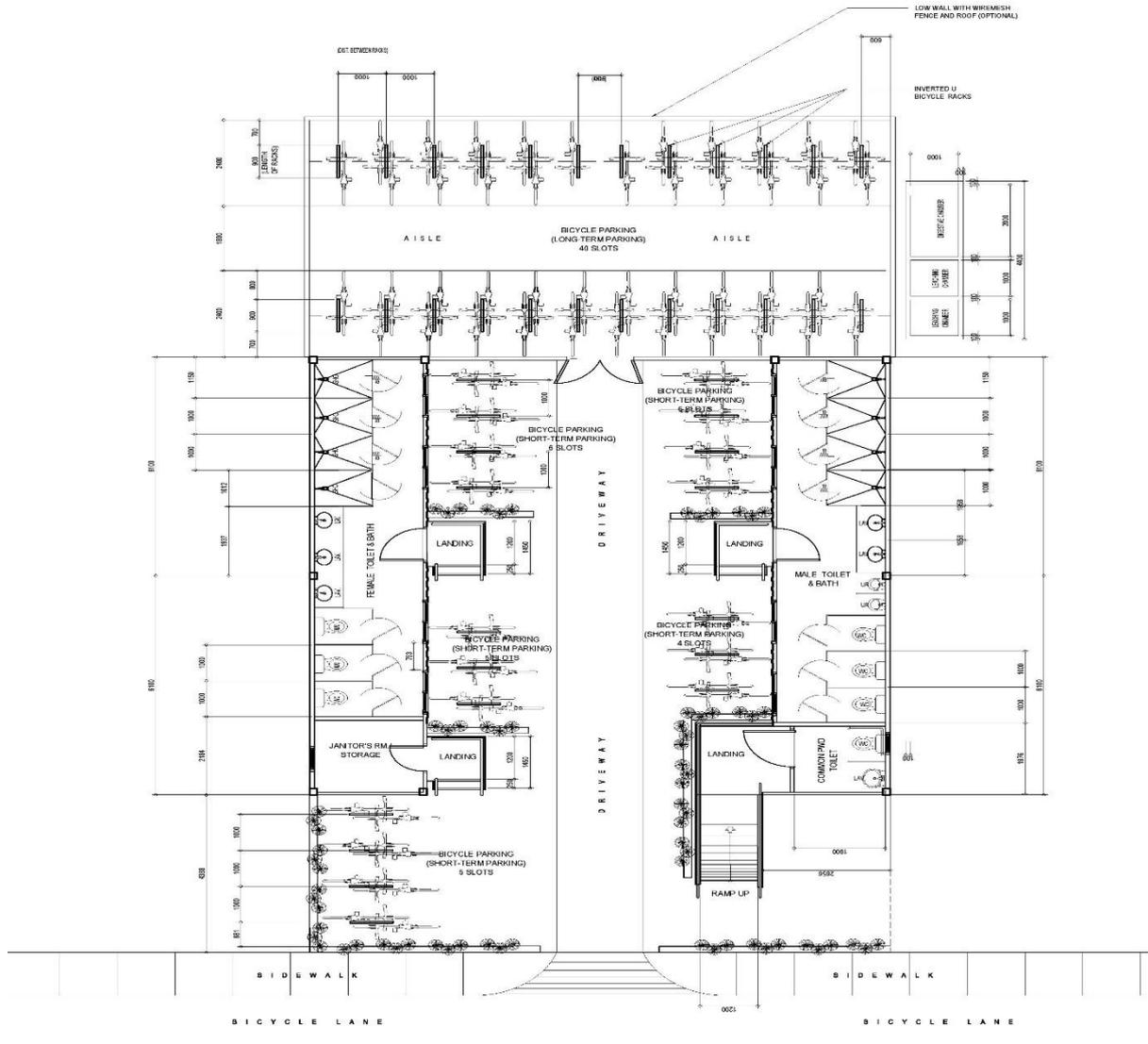


Figure 49. Toilet/Shower/Change Facilities (2 of 2)

FLOOR PLAN OF COMPLETE FACILITIES (TOILET, SHOWER / CHANGING CUBICLE AND LAYOUT FOR SHORT-TERM & LONG-TERM PARKING)

NOTE: THE SIZE OF THE FACILITIES BASED ON THE AVAILABLE SITE/LOCATION

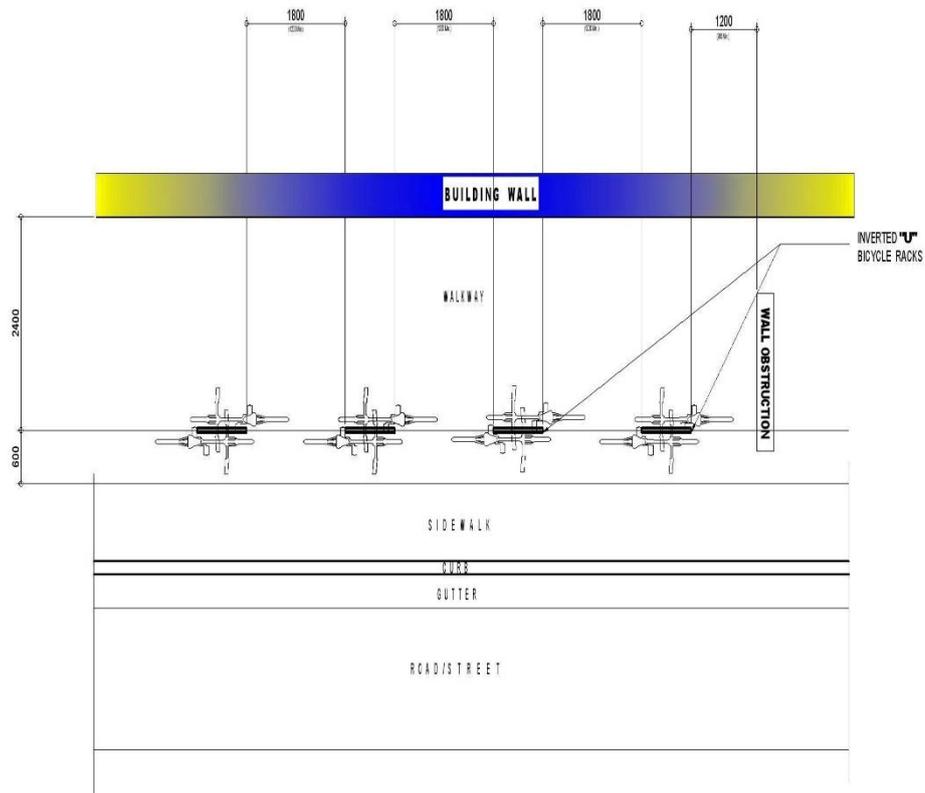


Figure 50. Parallel Parking Layout to the Road/Street

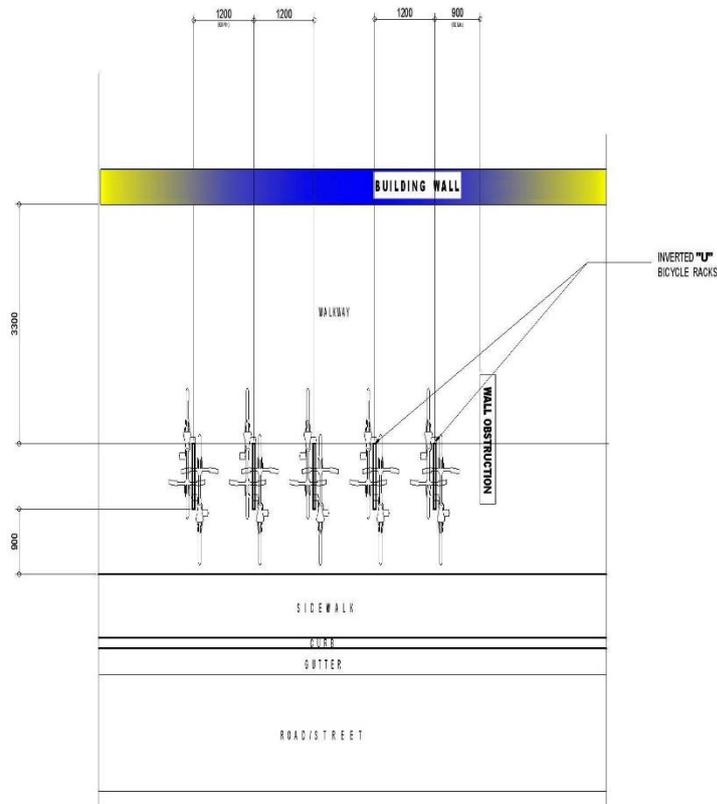


Figure 51. Perpendicular Parking Layout to the Road/Street

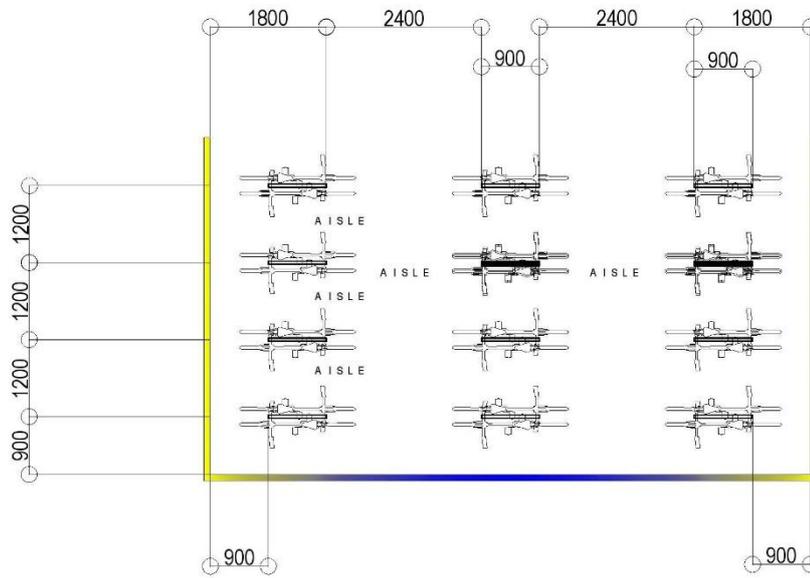
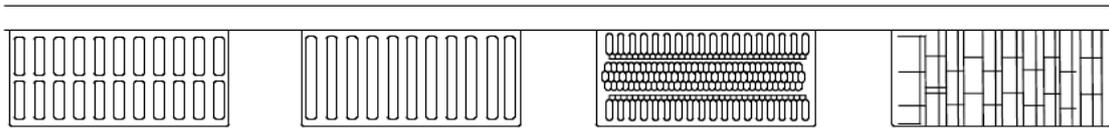
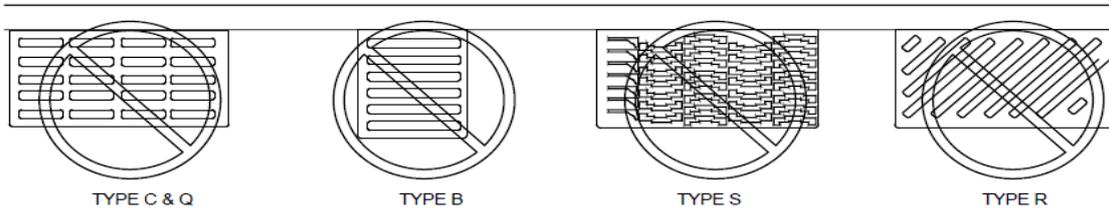


Figure 52. Bicycle Parking Lot Layout

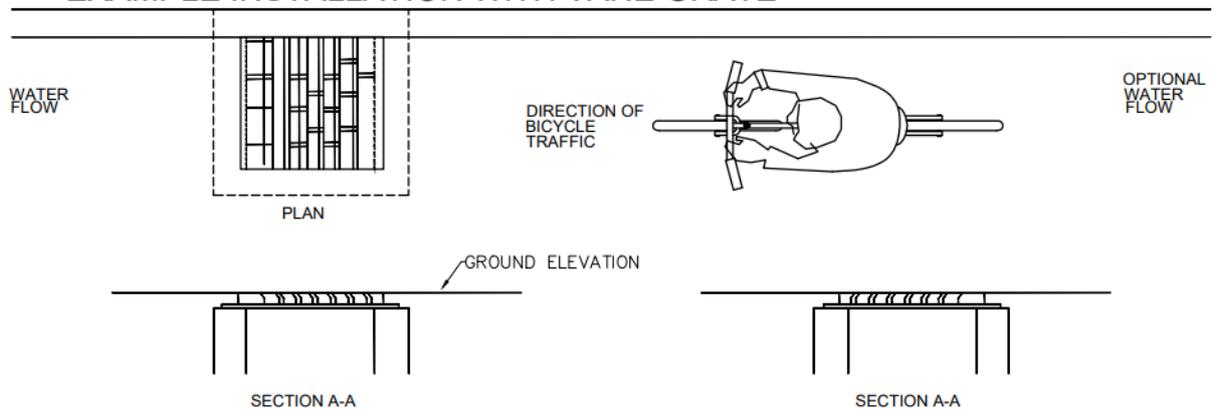
ACCEPTABLE GRATE DESIGNS



UNACCEPTABLE GRATE DESIGNS



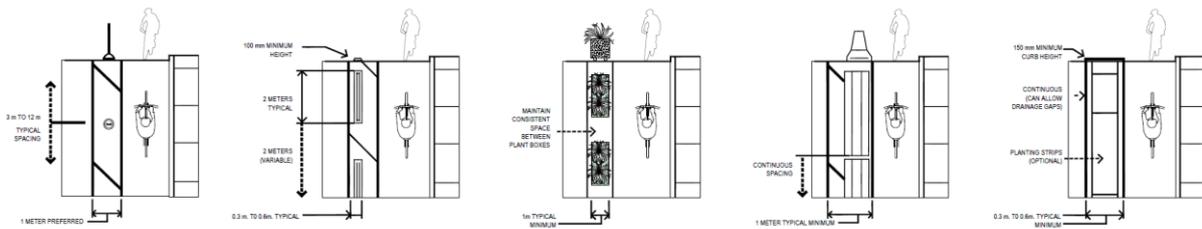
EXAMPLE INSTALLATION WITH VANE GRATE



NOTES:

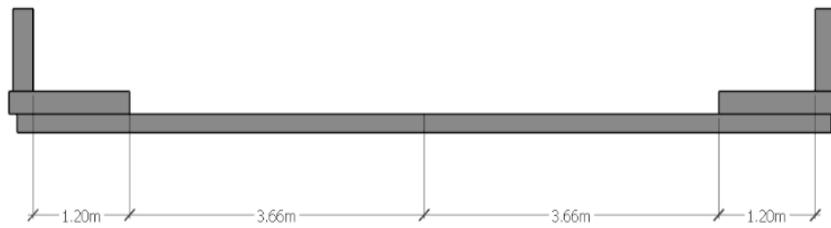
1. GRATE TYPES ARE ONLY CONSIDERED BICYCLE SAFE WITH THE CURB ORIENTATION AS SHOWN.
2. VANE GRATE OPENINGS ARE DESIRABLE IN LOCATIONS WHERE HIGHER HYDRAULIC CAPACITY IS NEEDED. THE GRATE MUST BE ORIENTED WITH THE DIRECTION OF FLOW AS SHOWN IN THE "EXAMPLE VANE GRATE OPENINGS" DETAIL.
3. EXISTING UTILITY COVERS SHOULD BE ADJUSTED FLUSHED WITH THE SURFACE OF THE ROADWAY PAVEMENT. BIKE LANES SHOULD BE PROVIDED WITH ADEQUATE DRAINAGE (BICYCLE-COMPATIBLE DRAIN GRATES) TO PREVENT PONDING OF WATER, WASHOUTS, DEBRIS ACCUMULATION, AND OTHER POTENTIAL CONCERNS FOR BICYCLISTS. ALL EXISTING DRAINAGE GRATINGS SHOULD BE ADJUSTED PARALLEL WITH THE TRAFFIC

Figure 53. Bicycle Safe Stormwater Grates

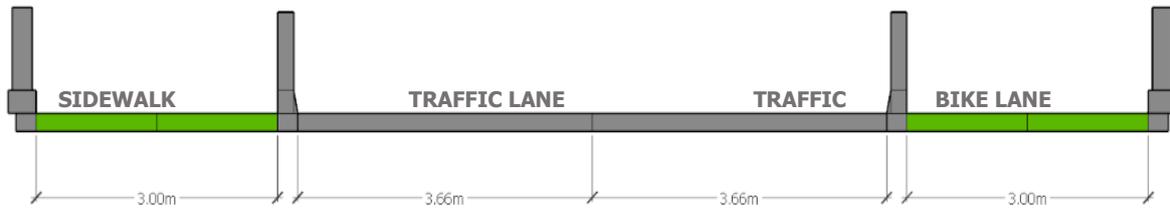


	FLEXIBLE BOLLARD POST	CURB	PLANT BOX	CONCRETE BARRIER	RAISED OR LANDSCAPED MEDIAN
1. Appropriate Context	<ul style="list-style-type: none"> Lower-speed environments; may not be appropriate for roads with posted speeds that exceed 50kph. Recommended treatment adjacent to motor vehicle parking to allow access. 	<ul style="list-style-type: none"> Lower-speed environments; may not be appropriate for roads with posted speeds that exceed 50kph. 	<ul style="list-style-type: none"> Lower-speed environments; planter boxes with periodic or intermittent spacing are not appropriate on roads with posted speeds of 50kph or greater. If planter boxes are used on roads with posted speeds of 50kph or greater, they should be constructed of a durable material and should not be periodic or intermittently spaced unless they are placed on top of a concrete median or adjacent to a median or curb to provide continuous physical protection. If they are used on roads where operating speeds are different from posted speeds, the design should be adjusted accordingly. 	<ul style="list-style-type: none"> Recommended for locations where more physical protection from motor vehicles is needed, such as bridges with high-speed traffic. Should not be used with on-street parking 	<ul style="list-style-type: none"> Recommended for locations where more physical protection from motor vehicles is needed; for example, on bridges with high-speed traffic.
2. Cost	<ul style="list-style-type: none"> Lowest initial capital cost but may need routine replacement, resulting in higher long-term costs 	<ul style="list-style-type: none"> Low cost 	<ul style="list-style-type: none"> High cost, including ongoing maintenance for re-positioning and possible seasonal removable. 	<ul style="list-style-type: none"> Relatively low initial capital cost compared to other types of separation 	<ul style="list-style-type: none"> Higher initial capital cost but requires less long-term maintenance than other types of separation
3. Design Flexibility	<ul style="list-style-type: none"> Easily removed and relocated 	<ul style="list-style-type: none"> Easily removed and relocated 	<ul style="list-style-type: none"> Easily removed and relocated If they are used on roads with posted speeds of 50kph or less, there is more flexibility in their design. 	<ul style="list-style-type: none"> Relatively low flexibility 	<ul style="list-style-type: none"> Relatively low flexibility
4. Design Notes	<ul style="list-style-type: none"> Small footprint compatible with a range of buffer designs. Should be combined with buffered bicycle lane pavement markings. Allows drainage and snow storage. Appearance is less 'permanent' than other forms and may be less aesthetically pleasing 	<ul style="list-style-type: none"> Can be used in narrower buffers than other types of separation. Must be pinned down. Consider use of end treatments such as mini-barrier noses. Must have vertical element at least at the start when adjacent to traffic; may need additional vertical elements to enhance visibility. 	<ul style="list-style-type: none"> Can add to the aesthetics and enjoyment of the facility Planters with intermittent spacing that are not separated from adjacent motor vehicle lanes should consider clear zone. Should have reflective markings or be signed. 	<ul style="list-style-type: none"> Intended to provide continuous vertical separation. On higher speed roads, crash cushions should be included at barrier ends. Less aesthetically pleasing than other types of separation 	<ul style="list-style-type: none"> Intended to provide continuous vertical separation. On higher speed roads, crash cushions should be included at barrier ends. Can add to the aesthetics and enjoyment of the facility
5. Durability	<ul style="list-style-type: none"> Low Durability 	<ul style="list-style-type: none"> High Durability 	<ul style="list-style-type: none"> Relatively high durability, depends on material used. 	<ul style="list-style-type: none"> High Durability 	<ul style="list-style-type: none"> High Durability
6. Protection	<ul style="list-style-type: none"> May increase user comfort but does not offer physical protection 	<ul style="list-style-type: none"> Can be used to provide continuous protection, but low height provides less protection than other types of separation. 	<ul style="list-style-type: none"> Moderate to high degree of protection, depending on spacing and material used. The face of the planter exposed to traffic may be rounded to better absorb the energy of an impact. The planter should not be anchored to the pavement and should have sufficient mass to absorb the energy of an impact without significant deflection. 	<ul style="list-style-type: none"> Provide a high degree of separation and physical protection from motor vehicles 	<ul style="list-style-type: none"> Can provide a continuous curb separation from motor vehicles, though may include gaps or inlets for channelizing stormwater towards existing catch basins in retrofit facilities.
7. Maintenance	<ul style="list-style-type: none"> Can be impacted if buffer space is used for snow storage. Susceptible to damage and may need to be frequently replaced. 	<ul style="list-style-type: none"> Low maintenance requirements 	<ul style="list-style-type: none"> High maintenance requirements; likely to require ongoing care and landscaping 	<ul style="list-style-type: none"> Low maintenance requirements 	<ul style="list-style-type: none"> Low maintenance requirements
8. Line of Sight	<ul style="list-style-type: none"> Minimal impacts 	<ul style="list-style-type: none"> Minimal impacts 	<ul style="list-style-type: none"> Need to ensure they do not restrict clear zone requirements and sightlines, particularly on roads with higher motor vehicle speeds 	<ul style="list-style-type: none"> Minimal impacts 	<ul style="list-style-type: none"> Need to ensure they do not restrict clear zone requirements and sightlines, particularly on roads with higher motor vehicle speeds.
9. Spacing	<ul style="list-style-type: none"> Spaced 3.0 to 6.0 meters apart. Spacing may be dependent on factors such as parking and loading encroachment. Generally placed in the middles of the buffer area but may be positioned to one side or the other as site conditions indicate 	<ul style="list-style-type: none"> May be spaced closer to create a continuous barrier. If spaced apart, spacing should be even along the corridor. Spaced 2.5m to 3.5m apart. 	<ul style="list-style-type: none"> May be spaced closer to create a continuous barrier. If spaced apart, spacing should be even along the corridor 	<ul style="list-style-type: none"> Continuous with breaks for emergency access as needed 	<ul style="list-style-type: none"> Continuous, with breaks for emergency access as needed

Figure 54. Bike Lane Physical Separator



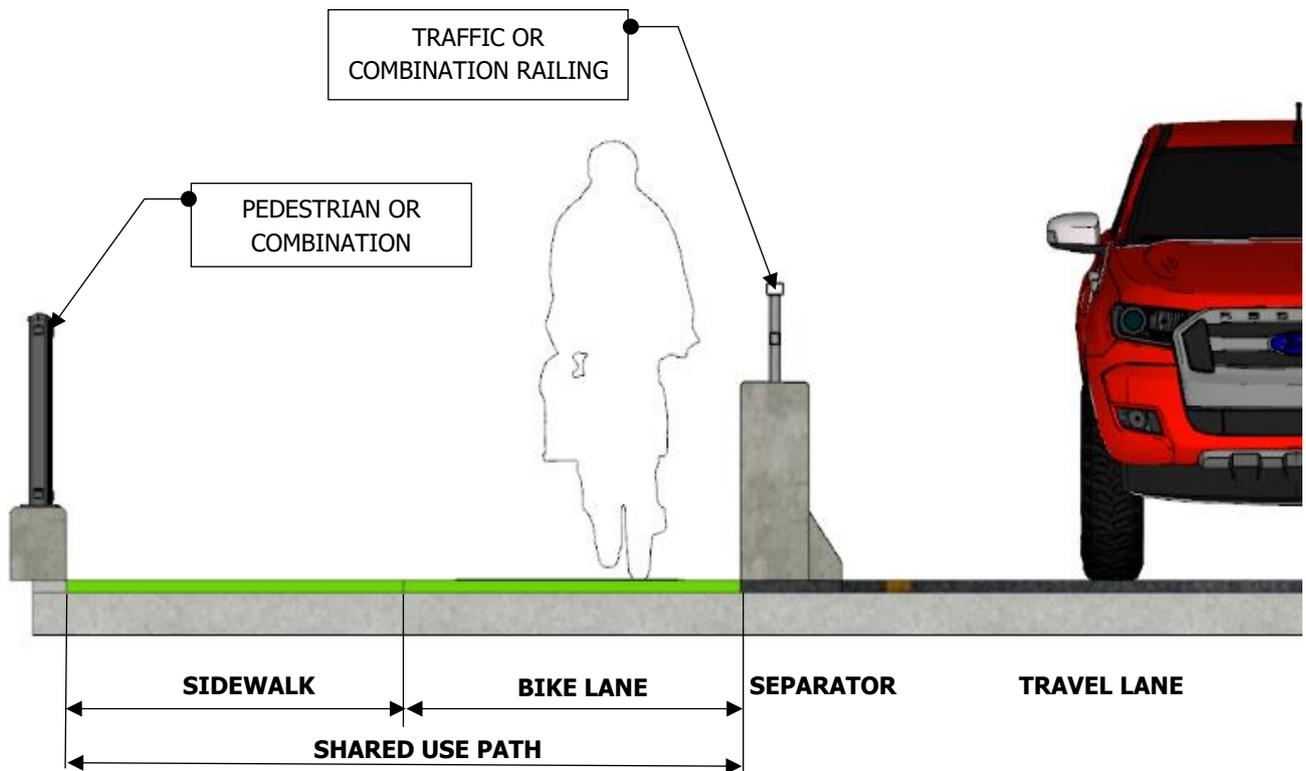
Standard Bridge Design



Standard Bridge Design with Shared Use Path

**an absolute minimum width of 2.44 may be used in constrained condition*

Figure 55. Proposed Standard Bridge Design



***separator:**
 -high speed traffic – traffic or combination railing
 -low speed traffic – raised barrier

Figure 56. Bridge Barrier/Railing

References:

- American Association Of State Highways And Transportation Officials. Guide For The Development Of Bicycle Facilities. 2012.
- American Association Of State Highways And Transportation Officials. Guide For The Planning, Design, And Operation Of Bicycle Facilities, February 2010
- Auckland Harbour Bridge Shared Path Single Stage Business Case January 2020, Version 4.0
- Bicycle Access Ramp By Fixation
- Bridge Rails And Barriers A Reference Guide For Transportation Projects In The Coastal Zone
- Brief Dutch For Bicycle And Pedestrian Bridges By Ipv Delft, June 2015
- Empire State Trail Design Guide, 2017.
- Federal Highway Administration. Implementing Bicycle Improvements At The Local Level, Publication NO. FHWA-98-105 1998
- Federal Highway Administration. Bikeway Selection Guide, 2019.
- Federal Highway Administration. Course On Bicycle And Pedestrian Transportation, Lesson 13, Walkways, Sidewalks, And Public Spaces
- Federal Highway Administration. Incorporating On-Road Bicycle Networks Into Resurfacing Projects
- Federal Highway Administration. Manual On Uniform Traffic Control Devices. 2009.
- Federal Highway Administration. Separated Bike Lane Guide, 2015.
- Massdot Separated Bike Lane Planning & Design Guide
- National Association Of City Transportation Officials. Urban Bikeway Design Guide. 2012.
- Toronto. Guide for the Design and Management of Bicycle Parking Facilities, 2008.

**REQUEST FORM FOR APPROVAL OF NON-IMPLEMENTATION OF BICYCLE FACILITIES FOR
NEW CONSTRUCTION ALONG NATIONAL ROADS**

Date: _____

FOR : UNDERSECRETARY FOR TECHNICAL SERVICES

THRU : DIRECTOR
Bureau of Design

1. Project Location :
2. Implementing Office :
3. Scope of Work of the Project :
(attach typical section)
4. Reason for Non-Implementation of Bicycle Facility :

_____ **4.1. Not adaptable to site condition**

- 4.1.1. Involving Road-Right-of-Way (RROW) constraints
 - Provide Vicinity Map showing the location and RROW limit of the project.
 - Details of the proposed roadway typical section
- 4.1.2. Affected by existing structures/obstructions
 - Photographs of existing structures i.e. trees, posts, etc.
- 4.1.3. Desirable bicycle facilities as per traffic volume and operating speed cannot be implemented
 - Provide latest traffic data and operating speed
 - Details of the proposed roadway typical section

_____ **4.2. Other reason(s) : _____**

Requested by:

Regional Director/District Engineer

The request was found to be meritorious, hence approval hereof is respectfully recommended.

Division Chief
Chief, Highways Division

Division Chief
Chief, Bridges Division

Recommending Approval:

Approved:

Director
DPWH Bureau of Design

Undersecretary for Technical Services