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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Committee ME-064—Access for People with Disabilities

Design for access and mobility

Part 4.1: Tactile indicators

(Revision of AS 1428.4—2002)

(To be AS/NZS 1428.4.1)

PREFACE

This Standard was prepared by Standards Australia Committee ME-064, Access for People with Disabilities, to supersede AS 1428.4—1992, *Tactile ground surface indicators for the orientation of people with vision impairment* and AS/NZS 1428.4—2002*, Tactile indicators.*

The objective of this Standard is to assist in providing a safer built environment for persons who are blind or vision impaired, with particular reference to tactile indicators.

This revision addresses the needs of people with physical mobility impairment and those of people who are blind or vision impaired. It includes the following changes to the previous edition:

(a) Dimensioning of applications of tactile ground surface indicators (TGSIs) has been increased from 300 ±10 mm to 300 mm to 400 mm and 600 ±10 mm to 600 mm to 800 mm.

(b) The additional use of discrete TGSIs.

(c) Applications of TGSIs to kerb ramps and crossings.

(d) Applications of TGSIs to bus, tram and light rail stops.

(d) Removal of the spike from raised pavement markers.

(f) The addition of new appendices and diagrams on the design, installation, and luminance contrast criteria for TGSIs.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a standard, whereas an ‘informative’ appendix is only for information and guidance.

CONTENTS

FOREWORD

People with disabilities have the right to dignified, safe and independent access to the built environment.

Approximately 330 000 Australians are blind or vision-impaired and many more have some reduction in the effectiveness of their sight, the majority of whom are over the age of 65 years. The ageing of Australia's population is expected to see the number of people with vision impairment double in 25 years.

This Standard deals with the application of tactile ground surface indicators in the built environment.

Application of this Standard will enhance the safety, dignity and independence with which people who are blind or vision impaired have access to the built environment.

Tactile ground surface indicators (TGSIs)

TGSIs provide cues, which, when combined with other environmental information, assist people who are blind or vision impaired with their orientation. Orientation is a person's awareness of where they are, where they are going, and where they have been. For more information on wayfinding refer to Appendix A.

A person's orientation, through processing all available environmental cues, will make the information provided by the TGSI meaningful. Warning TGSIs indicate an approaching hazard but not what the nature of the hazard will be.

The application of TGSIs will not correct bad design or make an unsafe environment safe. Good design will minimise the need for the use of TGSIs.

TGSIs should be installed to provide guidance and/or warning of an obstruction or hazard in any location where insufficient alternative or 'natural' tactile cues exist.

Luminance-contrast

The majority of people who are blind or vision impaired have some vision. The provision of sufficient luminance-contrast in the design of signage and the choice of TGSIs will enhance access to information for people with vision impairment and for all pedestrians.

The use of luminance-contrasting strips on the nosing of stairs has been proven to improve safety for people who are vision impaired, as well as for all pedestrians.

Similarly, luminance-contrast principles applied to signage will be of benefit to all users. See Clause 1.4 for a definition of luminance-contrast.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Design for access and mobility

Part 4.1: Tactile indicators

SECTION 1 SCOPE AND APPLICATION

1.1 SCOPE

This Standard sets out requirements for new building work, for the design and application of tactile indicators, to ensure safe and dignified mobility of people who are blind or vision impaired.

1.2 APPLICATION

1.2.1 General

This Standard is applicable to the internal and external built environment, throughout Australia and New Zealand, in potentially hazardous situations such as stairs, ramps, kerb ramps, level transition between pedestrian areas where the motorist vision is limited.

1.2.2 New Zealand only

NZS 4121 is cited, in subsection 3 of Section 47A of the Building Act 1991, as a means of compliance with the building code. For those wishing to go beyond these minimum requirements, this Standard provides additional criteria.

The Local Government Act 1974, Section 331(2) states 'in forming or reforming any road or part thereof (not being a road in a rural area), the council shall ensure that reasonable and adequate provision is made for kerb and channel of any footpath or part thereof to be formed or reformed so as to permit safe and easy passage from kerb to kerb of any mechanical conveyance normally and lawfully used by a disabled person'.

NZS 4121 identifies a means of providing reasonable and adequate provision, while this Standard provides additional requirements.

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
1428	Design for access and mobility
1428.1	Part 1: General requirements for access—New building work
1428.2	Part 2: Enhanced and additional requirements—Buildings and facilities
2700	Colour Standards for general purposes
AS/NZS	
1580	Paints and related materials—Methods of test
1580.601.2	Method 601.2: Colour—Principles of colour measurement

NZS
4121 Design and access for mobility—Buildings and associated facilities

AUSTROADS Guide to Traffic Engineering Practice
Part 13: Pedestrians

1.4 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

1.4.1 Angle of approach

The angle of intersection between the centre-lines of two continuous accessible paths of travel.

1.4.2 Carriageway

The portion of a road or bridge assigned to the movement of vehicles, inclusive of any shoulders and auxiliary lanes. It is usually designated as that part of a public road (way) between kerbs.

1.4.3 Circulation space

The net unobstructed area for a minimum height of 2000 mm above the finished floor or ground surface (unless otherwise specified in this Standard), which is that space surrounding built elements, landscape elements, and fixtures and fittings required for movement into and within buildings.

1.4.4 Continuous accessible path of travel (accessway)

An uninterrupted path of travel to, into or within a building providing access to all required accessible facilities. A path of travel required to be accessible shall not include a step, stairway, turnstile, revolving door, escalator, moving walk or other impediment.

1.4.5 Depth

The distance measured along the direction of travel.

1.4.6 Directional indicator

An indicator used as a guide to a safe route indicating a direction of travel.

1.4.7 Direction of travel

The path a person travels along, which may include a footpath, passageway, walkway, ramp, stairs, landing or similar.

1.4.8 Discrete Tactile Ground Surface Indicators (Discrete TGSIs)

Tactile ground surface indicators that are individually installed.

1.4.9 Handrail

A rail used in circulation areas such as corridors, passageways, ramps and stairways, to assist in continuous movement.

1.4.10 Hazard

Any object in or immediately adjacent to a direction of travel, which may place people at risk of injury.

1.4.11 Integrated TGSIs

A series of TGSIs in a defined pattern of the same colour and material as the underlying surface.

1.4.12 Kerb

A side barrier to a trafficable surface including walkways and ramps.

1.4.13 Kerb ramp

An inclined section of an accessway with length not greater than 1520 mm and gradient not steeper than 1 in 8, provided instead of a kerb.

1.4.14 Height

The distance measured above the finished floor or ground surface.

1.4.15 Luminance-contrast

The amount of light reflected from one surface or component, compared to the amount of light reflected from the background or base surfaces.

1.4.16 Luminance factor

The ratio of luminance of a surface to that of a perfect reflector.

1.4.17 Orientation

A person's awareness of their position and relationship to significant objects in their environment.

1.4.18 Pedestrian push-button assembly

An enclosure incorporating a push-button switch that is designed for use in conjunction with a signalized intersection or foot crossing for the purpose of registering a pedestrian demand.

NOTE: It could also include, or have associated with it, facilities for the generation of audible signals.

1.4.19 Pedestrian operated signal (POS)

Pedestrian activated traffic signals operated through push-button assemblies.

1.4.20 Ramp

An inclined accessway with a gradient steeper than 1 in 20 but not steeper than 1 in 14.

1.4.21 Step ramp

An inclined accessway with a maximum rise of 190 mm and length not greater than 1900 mm and a gradient not steeper than 1 in 10, located instead of a step.

1.4.22 Tactile ground surface indicator (TGSI)

A raised unit installed on the ground or floor surface designed to provide pedestrians who are blind or vision-impaired with warning and/or directional orientation information.

1.4.23 Tactile indicators

Indicators designed to provide blind or vision-impaired pedestrians with orientation information by means of tactile perception.

1.4.24 Tactile perception

The process of feeling the shape, surface and size of an object.

1.4.25 Vision impairment

Any significant loss of sight.

1.4.26 Walkway

Any accessway with a gradient not steeper than 1 in 20.

1.4.27 Warning indicator

An indicator that is used as a warning of a hazard and the need to stop, consider, investigate and wait before proceeding.

1.4.28 Width

The distance measured at right angle to the direction of travel.

SECTION 2 CRITERIA AND APPLICATION FOR TACTILE INDICATORS

2.1 GENERAL

This Section provides details on the application of TGSI in various situations.

2.1.1

The following situations are covered:

(a) Stairways.

(b) Ramps (other than a threshold ramp, step ramp, kerb ramp or a swimming pool ramp).

(c) Escalators.

(d) Moving walks.

(e) Travelators.

(f) Overhead hazard.

(g) Vehicular ways.

2.1.2

The following applies to a tactile indicator:

(a) It shall be detectable by tactile means.

(b) It shall have luminance-contrast to the base surface as follows:

(i) Where the TGSIs are of the same colour as the underlying surface, of not less than 30% across its entire area

(ii) Where discrete TGSIs, of not less than 45%

(iii) Where discrete TGSIs are constructed using two colours or materials, the raised surface shall have a section that has 60% luminance contrast for a diameter of 24 mm to 25 mm tested as above.

Luminance contrast shall be tested in accordance with Appendix E.

2.2 WARNING TGSIs

2.2.1 General

In addition to the requirements of Clause 2.1, the following criteria apply:

(a) TGSIs shall be laid so that there is no likelihood of the edges lifting.

(b) Where TGSIs are placed across the direction of travel, to ensure they are detected, they shall be arranged as shown in Figure 1 and have a dimension of 600 mm to 800 mm.

(c) A TGSI shall be slip-resistant.

(d) TGSIs shall have the top surface no more than 4 mm to 5 mm above the base surface (see Figure 1).

(e) The base surface of an integrated TGSI shall not be more than 3 mm above the abutment surface of the surrounding floor or ground surface.

2.2.2 Placement

Warning indicators shall be installed—

(a) for the full width of the continuous accessible path of travel;

(b) perpendicular to the angle of approach to the hazard;

(c) set back 300 ±10 mm from the edge of the hazard; and

(d) on intermediate landings for stairs, stairways and ramps. Where handrails are provided on both sides of the stairs or ramp and are continuous around the landings (e.g., not broken by a doorway or the like), TGSIs are not required on intermediate landings.

(e) where integrated warning TGSIs are used, they shall be arranged according to Figure 1 over a distance of 300 mm to 400 mm in width.

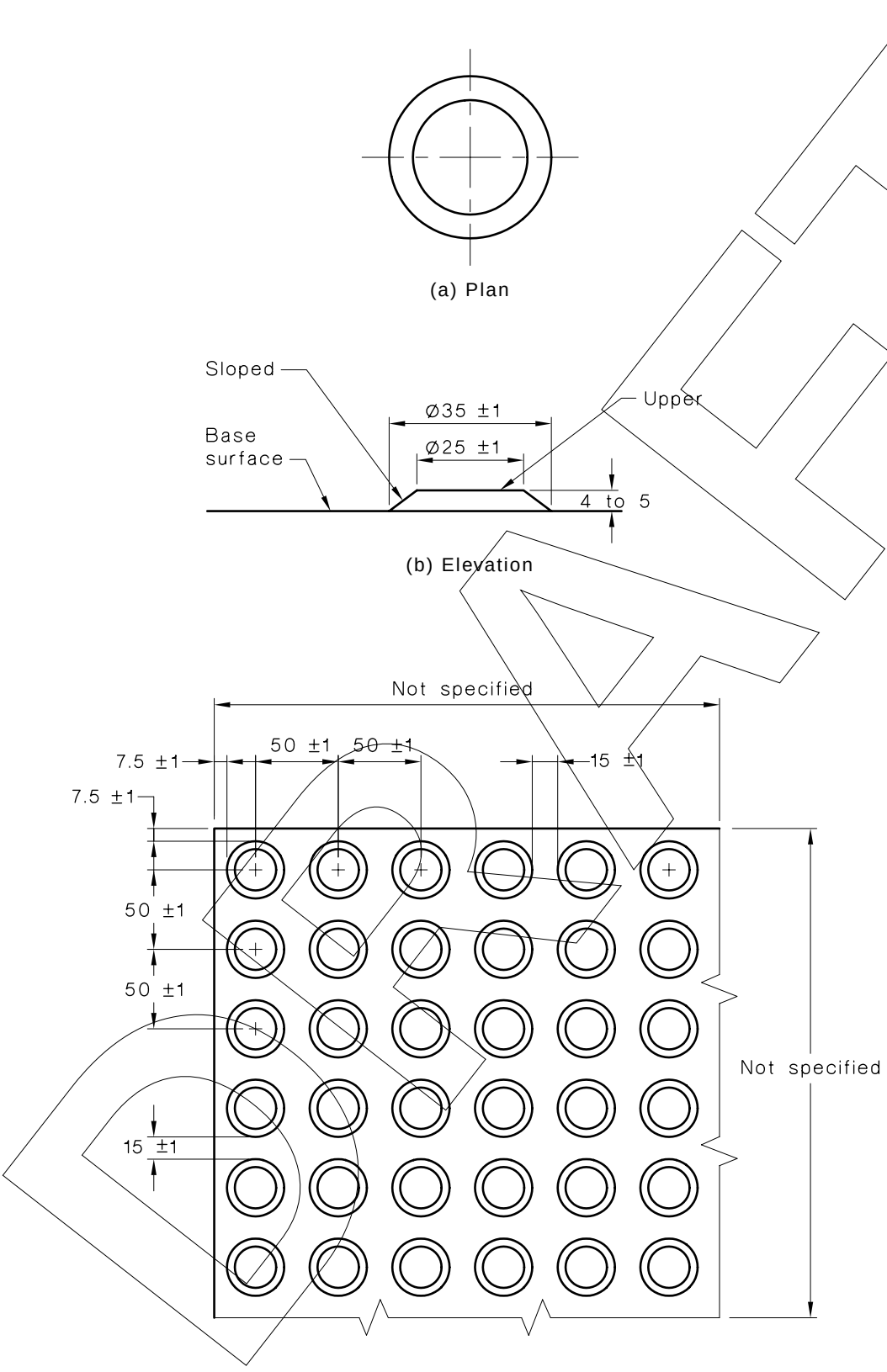
(f) where integrated warning TGSIs need to be detected by a person approaching at an angle to the continuous accessible path of travel, the TGSIs shall be arranged as shown in Figure 1 over a minimum distance of 600 mm to 800 mm in depth from the direction of approach.

(g) where discrete warning TGSIs are used, the arrangement shall be as shown in Figure 1 with a minimum of 6 discrete warning TGSIs.

(h) where discrete warning TGSIs need to be detected by a person approaching at an angle to the continuous accessible path of travel, the TGSIs shall be arranged as shown in Figure 1 with a minimum of 12 discrete warning TGSIs.

2.2.3 Design requirements

The design and arrangement of warning tactile ground surface indicators (TGSIs) shall comply with Figure 1.

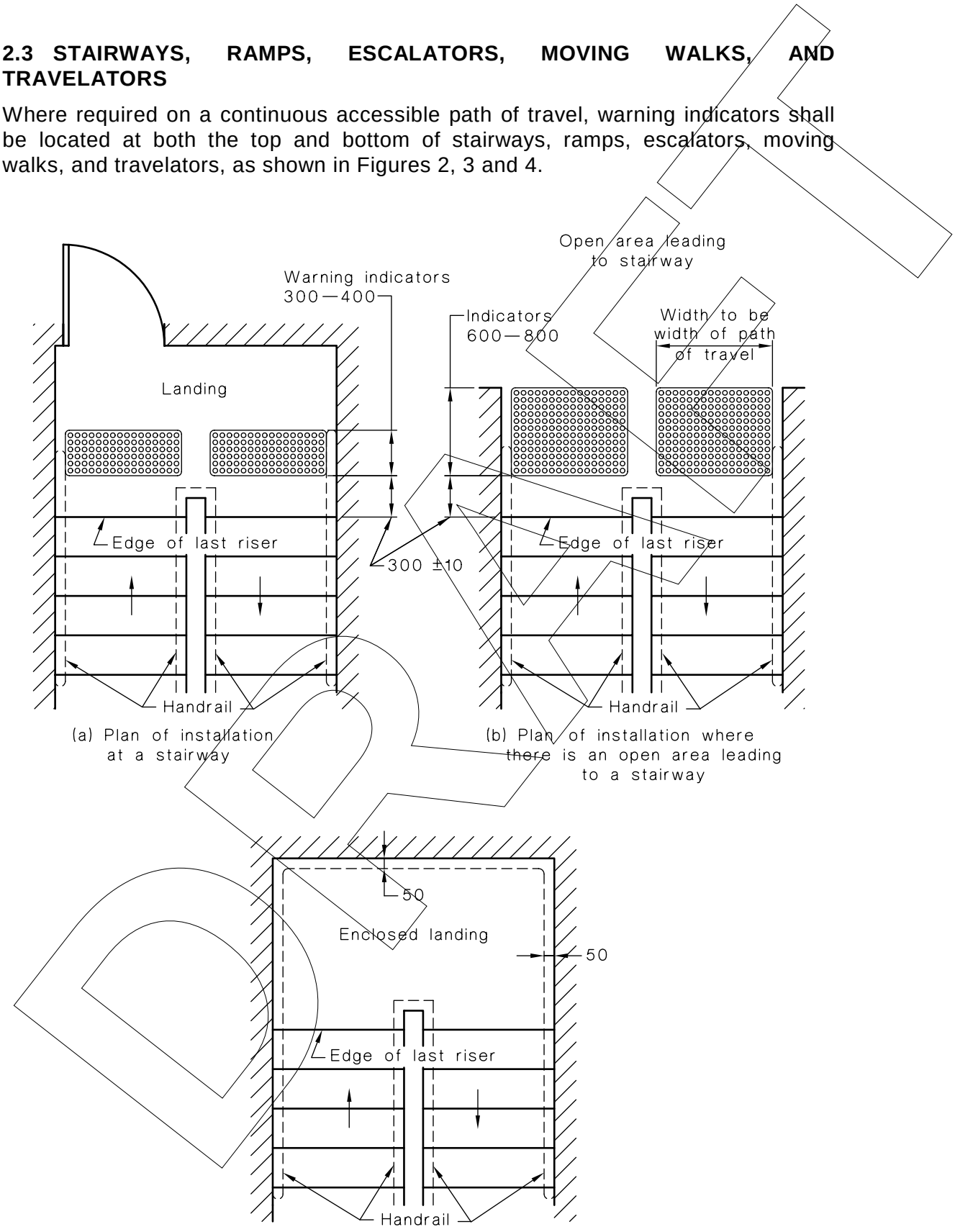


DIMENSIONS IN MILLIMETRES

FIGURE 1 DESIGN AND ARRANGEMENT OF TGSIs

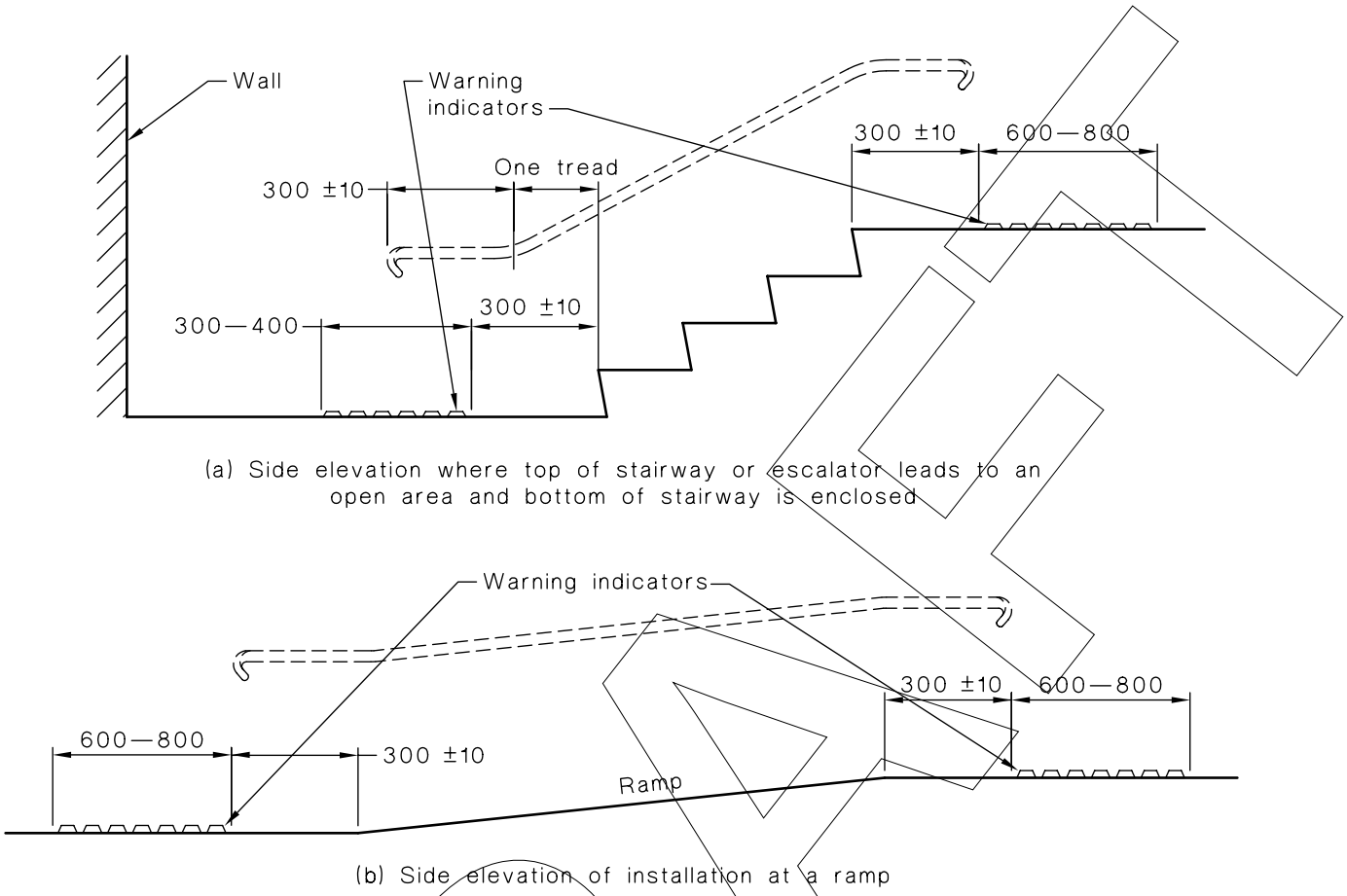
2.3 STAIRWAYS, RAMPS, ESCALATORS, MOVING WALKS, AND TRAVELATORS

Where required on a continuous accessible path of travel, warning indicators shall be located at both the top and bottom of stairways, ramps, escalators, moving walks, and travelators, as shown in Figures 2, 3 and 4.



DIMENSIONS IN MILLIMETRES

FIGURE 2 WARNING INDICATORS AT STAIRWAYS

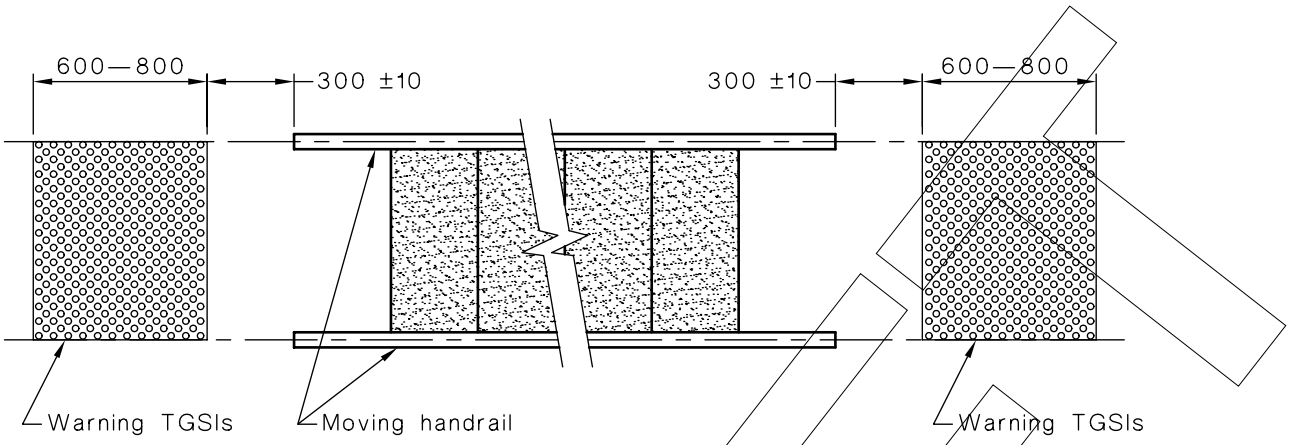


(a) Side elevation where top of stairway or escalator leads to an open area and bottom of stairway is enclosed

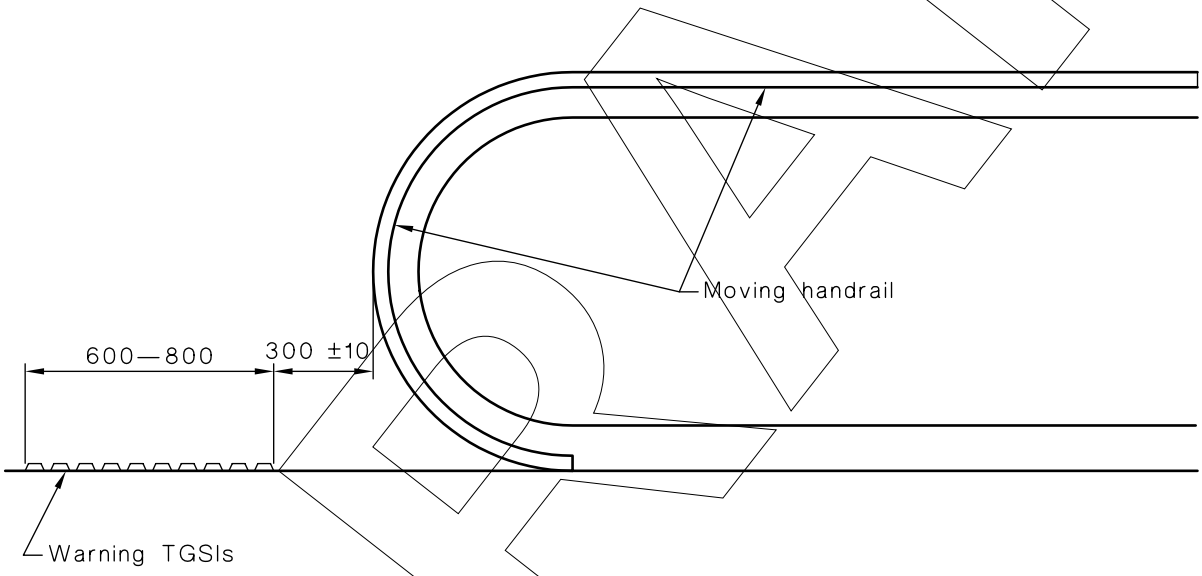
(b) Side elevation of installation at a ramp

DIMENSIONS IN MILLIMETRES

FIGURE 3 WARNING INDICATORS AT STAIRWAYS AND RAMPS



(a) Plan



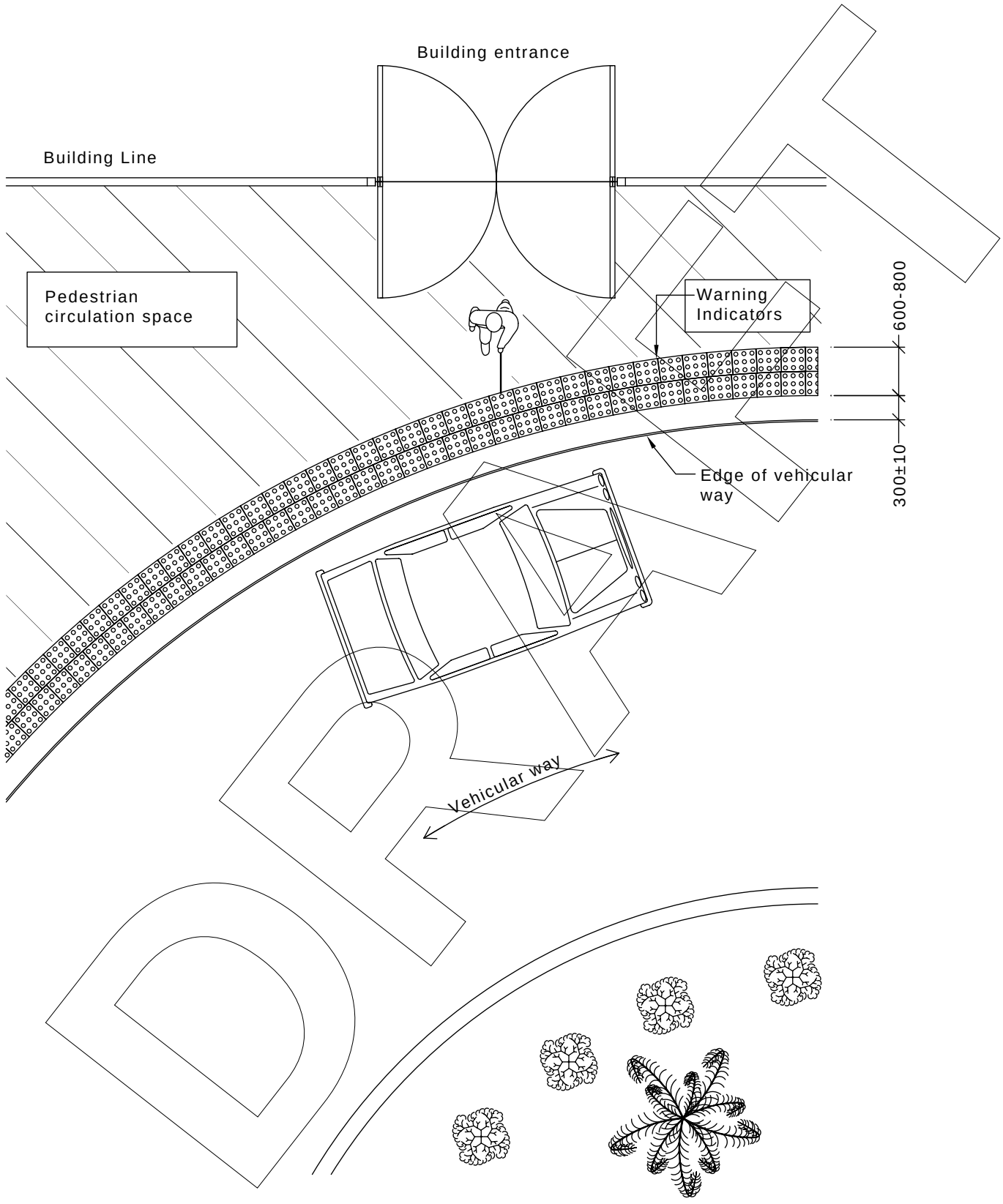
(b) Part elevation of escalators / travelators

DIMENSIONS IN MILLIMETRES

FIGURE 4 WARNING INDICATORS AT ESCALATORS, MOVING WALKS AND TRAVELATORS

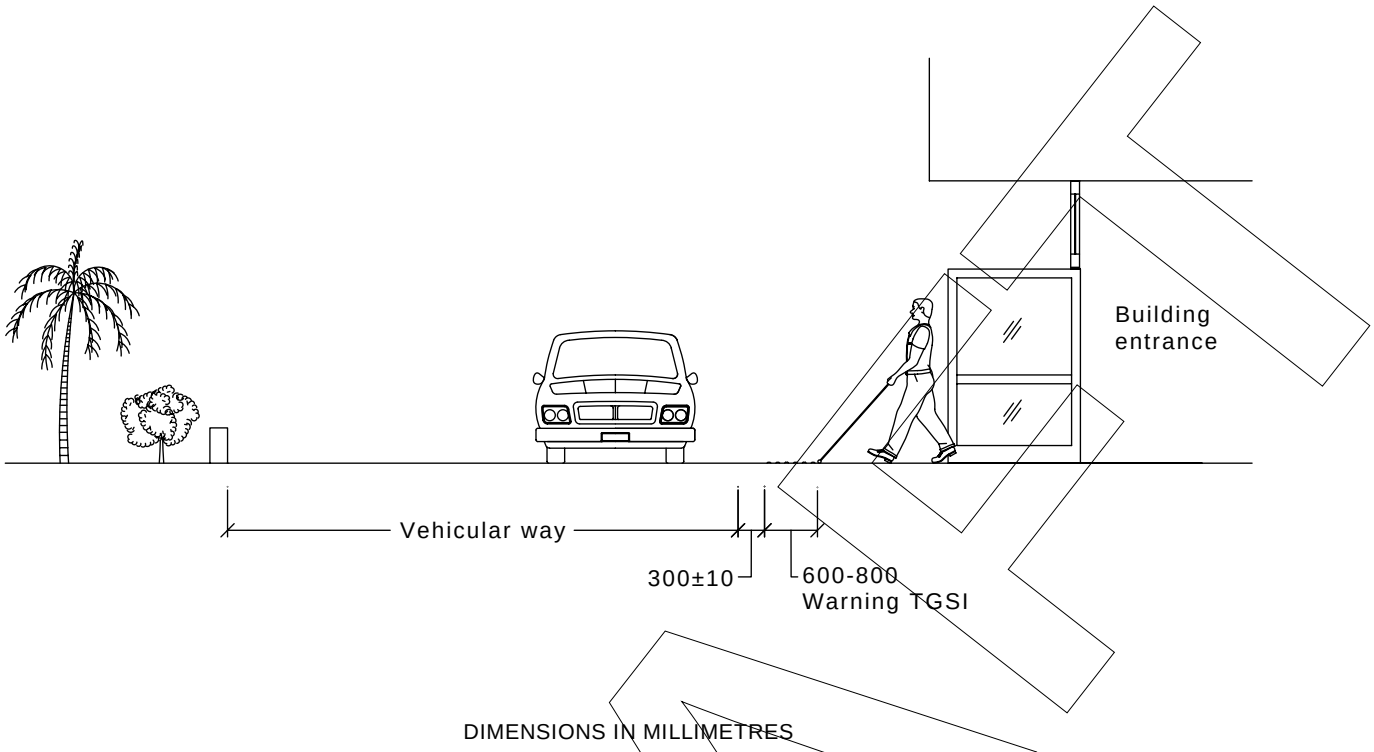
2.4 PEDESTRIANS AND VEHICULAR SHARED ZONE

Where required, tactile ground surface indicators are to be provided on a continuous accessible path of travel that meets a vehicular way in accordance with Figures 5 and 6.



DIMENSIONS IN MILLIMETRES

FIGURE 5 APPLICATION OF WARNING TGSIs TO DEFINE THE PEDESTRIAN WAY FROM A VEHICLE WAY AT THE SAME GRADE—PLAN



DIMENSIONS IN MILLIMETRES

FIGURE 6 APPLICATION OF WARNING TGSIs TO DEFINE THE PEDESTRIAN WAY FROM A VEHICLE WAY AT THE SAME GRADE—SECTIONAL ELEVATION

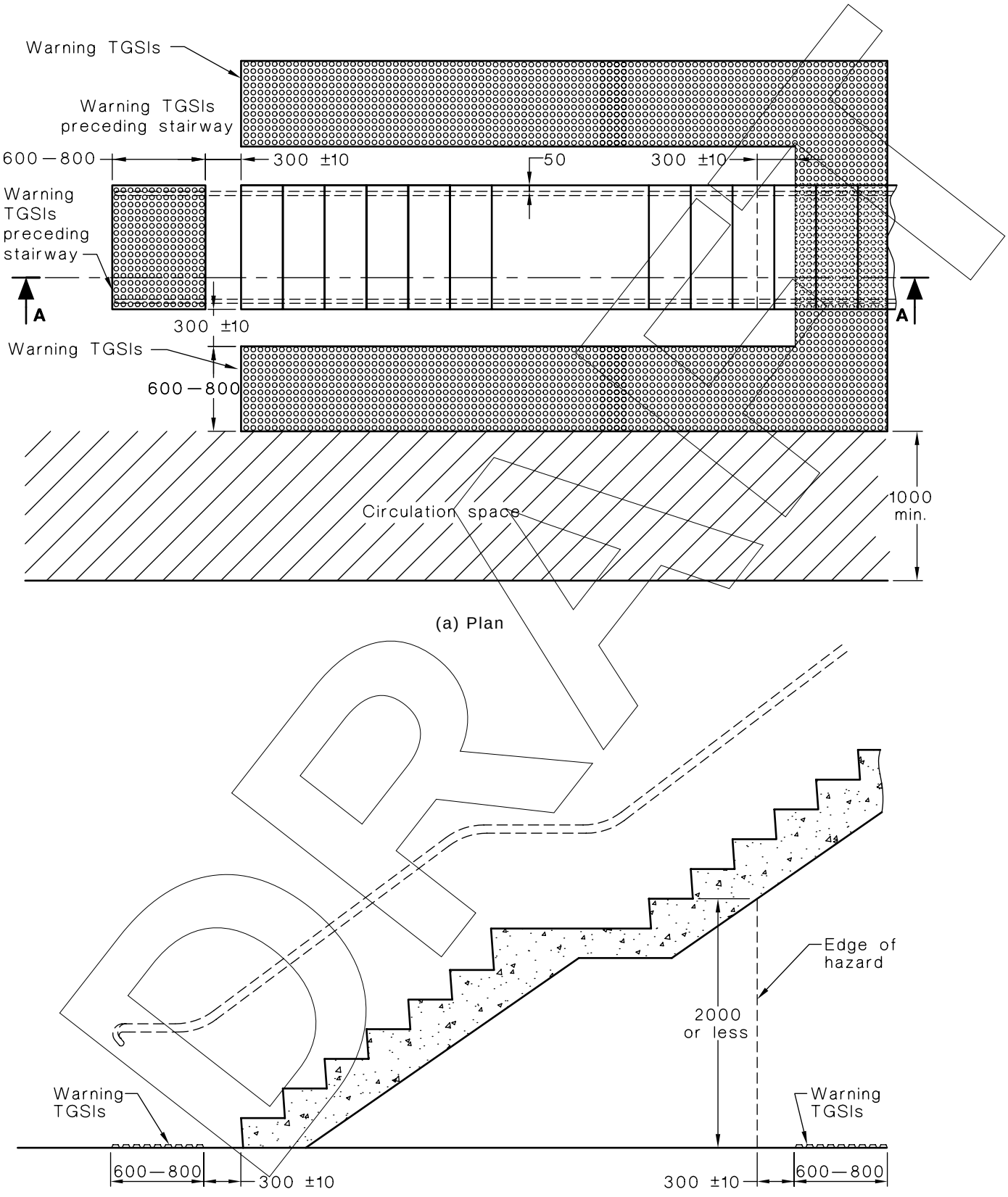
2.5 WARNING OF HAZARDS WITHIN THE CIRCULATION SPACE, OR ADJACENT TO A CONTINUOUS ACCESSIBLE PATH OF TRAVEL

Where there are impediments or hazards with less than 2000 mm clearance in an accessible open public space with no clearly defined continuous accessible path of travel, e.g., areas under a stairway, escalator or moving walkway, contact with overhead hazard shall be prevented by a suitable barrier including—

(a) enclosing the area;

(b) providing handrails with kerbs or kerb rails (see AS 1428.1).

In the absence of a suitable barrier, TGSIs shall be installed as shown in Figure 7.



DIMENSIONS IN MILLIMETRES

FIGURE 7 TACTILE INDICATORS WARNING OF HAZARD IN A CIRCULATION SPACE

SECTION 3 CRITERIA AND APPLICATION OF DIRECTIONAL TACTILE GROUND SURFACE INDICATORS

3.1 GENERAL

Where required to be installed by the regulatory authority, directional tactile ground surface indicators (directional TGSIs) shall be provided as applicable, in accordance with Clause 3.2—

(a) to give directional orientation in open spaces where there are insufficient tactile directional cues, e.g., handrails or walls;

NOTE: A person who is blind or vision impaired may need to negotiate a large internal/external public space, plaza or courtyard to have access to reception, a toilet, a public telephone or other facility for which there are no existing tactile directional cues.

(b) to designate the route to be taken to avoid a hazard in the absence of existing tactile cues; and

(c) to give directional orientation where a person must deviate from the regular continuous accessible path of travel to have access to—

(i) a mid-block kerb ramp or street crossing;

(ii) public transport access point, e.g., bus, tram or light rail stop, train or light rail station or passenger ferry wharf; or

(iii) point of entry to a significant public facility, e.g., railway station, public hospital, community health centre, sports or entertainment venue or public toilet.

(d) additional directional information may be provided by the use of raised pavement markers, refer to Appendix B.

3.2 DIRECTIONAL TGSIs

3.2.1 General

In addition to the requirements of Clause 3.1, the following criteria apply:

(a) Directional TGSIs shall be laid so that there is no likelihood of the edges lifting.

(b) Where directional TGSIs are placed across the direction of travel, to ensure they are detected, they shall have a dimension of 600 mm to 800 mm, as specified in Section 4.

(c) A directional TGSI shall be slip-resistant

(d) Directional TGSIs shall have the top surface no more than 4 mm to 5 mm above the base surface (see Figure 8).

(e) The base surface of an integrated directional TGSI shall not be more than 3 mm above the abutment surface of the surrounding floor or ground surface.

3.2.2 Placement

The following applies to the placement of directional indicators:

(a) Directional TGSIs shall be installed parallel with and along the centre-line of the required direction of travel.

(b) Where integrated directional TGSIs indicate the continuous accessible path of travel, they shall be arranged according to Figure 8 over a distance of 300 mm to 400 mm in width.

(c) Where integrated directional TGSIs need to be detected by a person approaching at an angle to the continuous accessible path of travel, the directional TGSIs shall be arranged as shown in Figure 8 over a minimum distance of 600 mm to 800 mm in depth from the direction of approach.

(d) Where discrete directional TGSIs are used, the arrangement shall be as shown in Figure 8 with a minimum of 4 discrete directional TGSIs to indicate a continuous accessible path of travel.

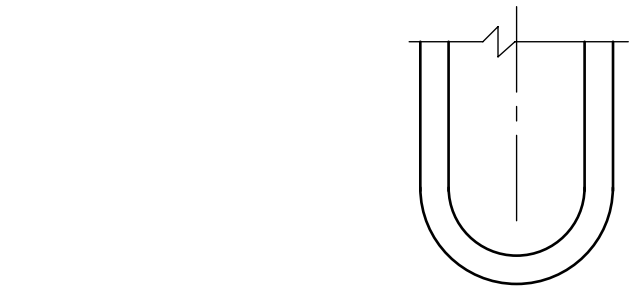
(e) Where discrete directional TGSIs need to be detected by a person approaching at an angle to the continuous accessible path of travel, the directional TGSIs shall be arranged as shown in Figure 8 with a minimum of 8 discrete directional TGSIs.

(f) Drainage gaps shall have a width of 10 ±2 mm and be located not more than 600 mm apart.

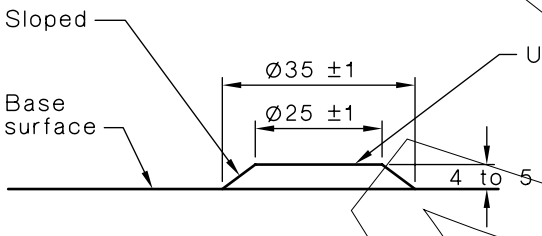
NOTE: For typical examples refer to Appendix C.

3.2.3 Design requirements

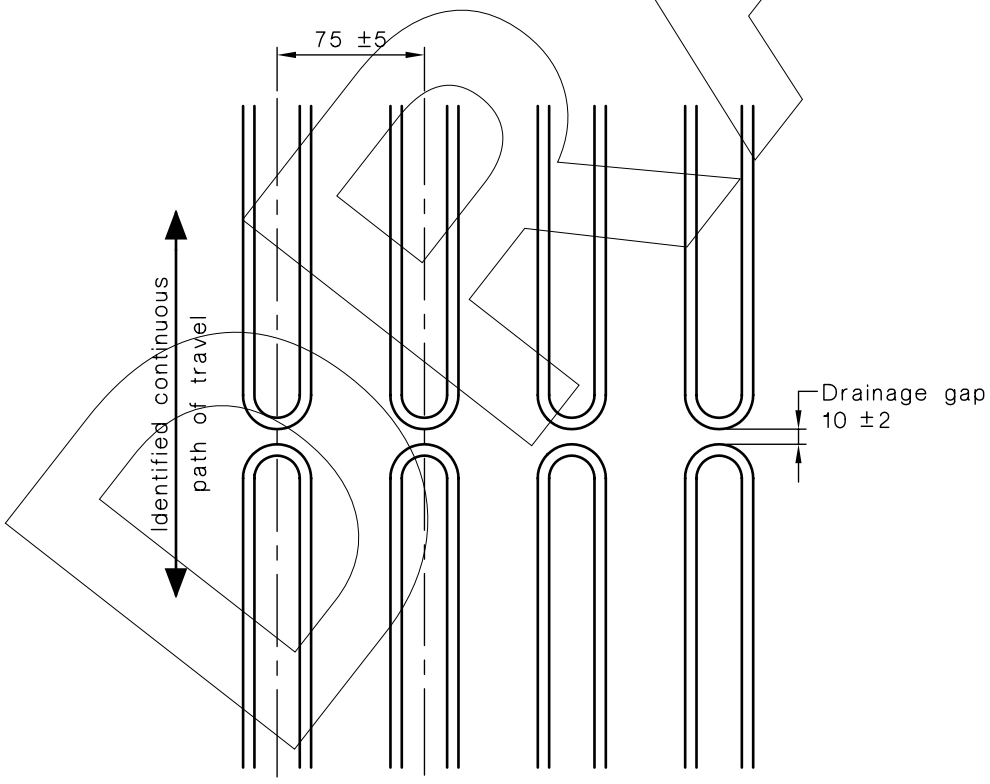
The design and arrangement of directional TGSIs shall comply with Figure 8.



(a) Plan



(b) Pattern detail



(c) Plan of arrangement of directional TGSIs

DIMENSIONS IN MILLIMETRES

FIGURE 8 DESIGN AND ARRANGEMENT OF DIRECTIONAL TGSIs

3.3 CHANGE OF DIRECTION

Where a continuous accessible path of travel denoted by directional tactile ground surface indicators reaches a point for a change in direction, this point shall be indicated by warning indicators as shown in Figure 9.

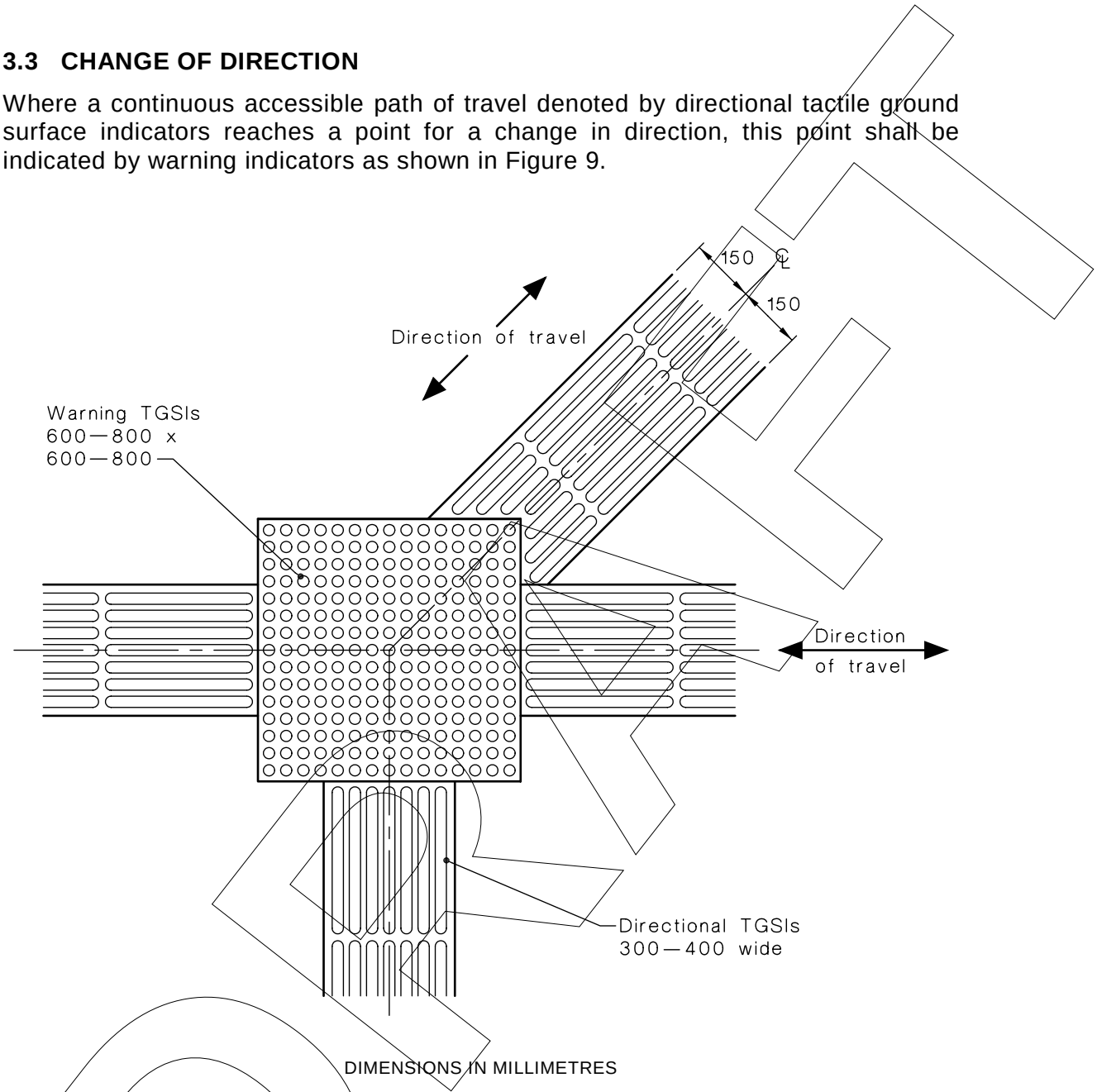
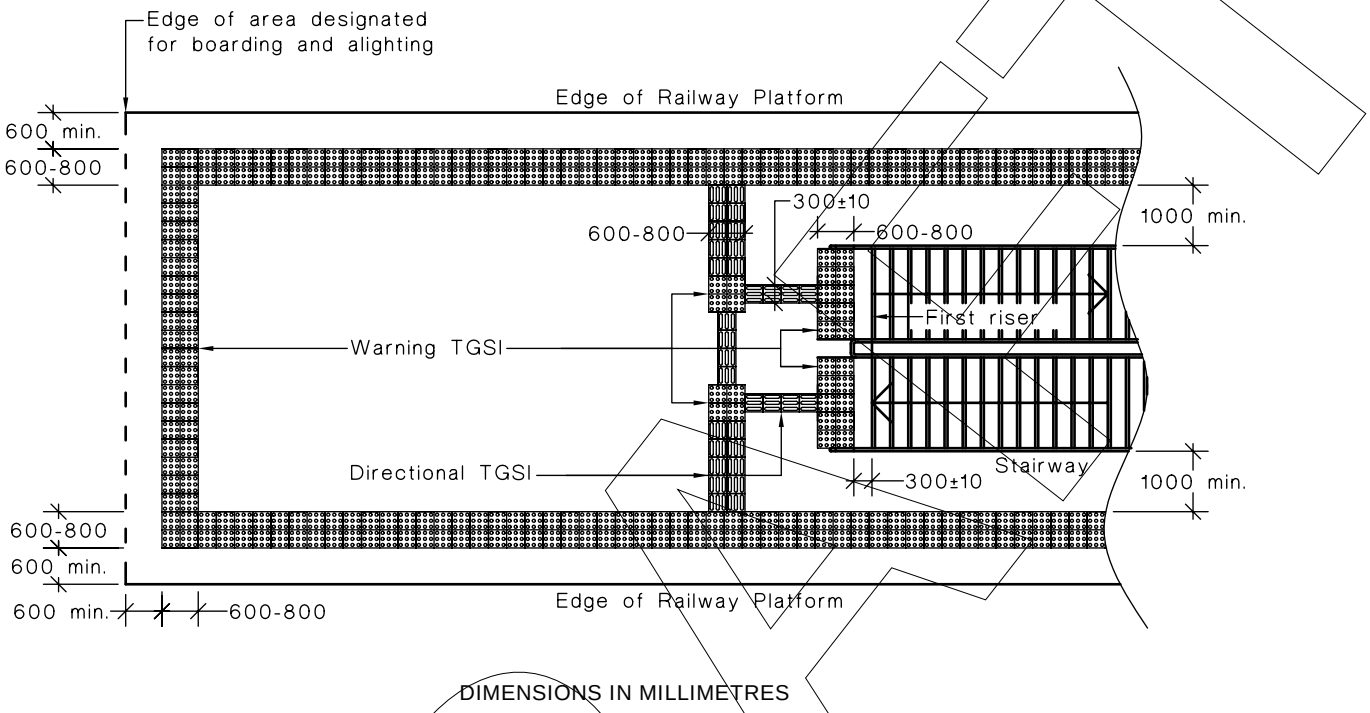


FIGURE 9 INSTALLATION OF TGSIs DENOTING A CHANGE OF DIRECTION

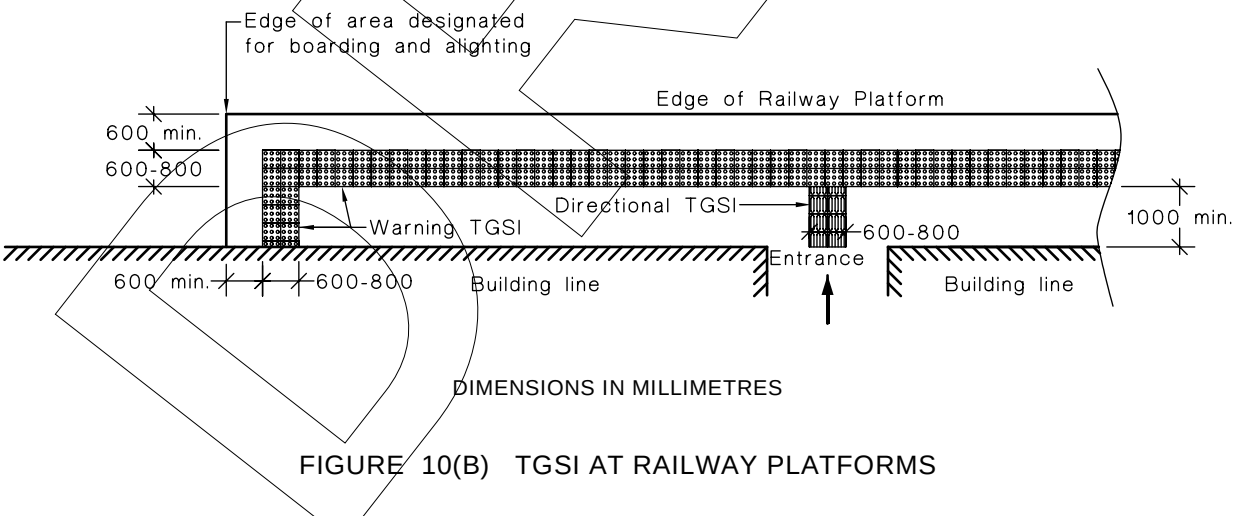
3.4 RAILWAY PLATFORMS

The edges of railway platforms shall have warning indicators as shown in Figure 10.



DIMENSIONS IN MILLIMETRES

FIGURE 10(A) TGSI AT RAILWAY PLATFORMS—TO/FROM STAIRFLIGHT



DIMENSIONS IN MILLIMETRES

FIGURE 10(B) TGSI AT RAILWAY PLATFORMS

On existing railway platforms the width of the continuous accessible path of travel that is parallel to the platform edge may include warning TGSIs where severe site constraints exist. This overlap of TGSIs should be kept to a minimum.

3.5 PASSENGER WHARVES

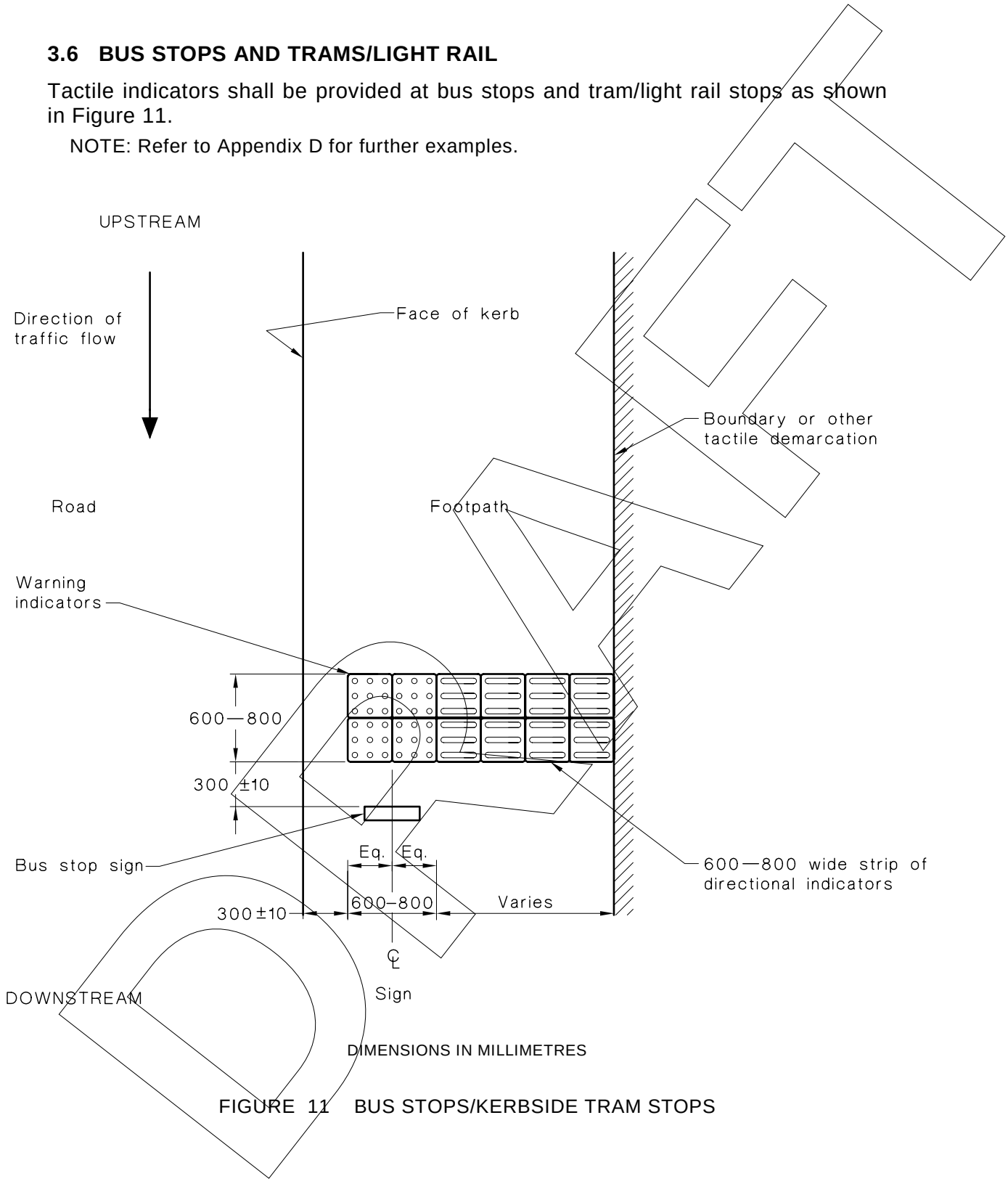
The edges of passenger wharves shall have warning indicators with a width of 600 mm to 800 mm commencing 600 mm to 900 mm from the edge of the wharf.

NOTE: The set-back from the edge of the wharf is normally specified by the transit authority.

3.6 BUS STOPS AND TRAMS/LIGHT RAIL

Tactile indicators shall be provided at bus stops and tram/light rail stops as shown in Figure 11.

NOTE: Refer to Appendix D for further examples.



DIMENSIONS IN MILLIMETRES

FIGURE 11 BUS STOPS/KERBSIDE TRAM STOPS

APPENDIX A

INFORMATION ON DESIGN AND INSTALLATION

(Informative)

A1 WAYFINDING

People who are blind or have a vision impairment are able to:

(a) Make use of aids and environmental indicators, available to them for way-finding in the community.

NOTE: Wayfinding aids and environmental indicators include personal assistants, guide dogs, orientation training, tactile ground surface indicators (TGSIs), sharp transitions to a change of plane, handrails along corridors, handrails on ramps, domed buttons on handrails, audible traffic signals, traffic noise, plus specialised items such as proximity devices, audible signs and Braille signs.

(b) Detect tactile ground surface indicators, either tactually through their feet or long cane and for those people with any residual vision via the luminance contrast criteria being applied to the TGSIs and the surrounding pavement/flooring.

(c) Distinguish between warning indicators and directional indicators.

(d) Determine a building line and follow this as an edge to a continuous accessible path of travel.

(e) Determine an abrupt change in grade such as the sharp transition between the grade of the footpath and a kerb ramp that is constructed to comply with AS 1428.1.

(f) Assume that in the absence of any indication or warning to the contrary, that there will be a clear, safe continuous accessible path of travel in front of them 2000 mm high, a minimum of 1200 mm in width and a depth of 900 mm.

(g) Stop walking with sufficient warning of any hazard within 300 mm to 900 mm constituted by a 600 mm to 800 mm deep application of warning indicators and a 300 ±10 mm set-back from any hazard.

(h) When reaching and having stopped at a set of warning indicators, locate the subject of the warning, in order to determine the correct response.

(i) Detect a change in the direction of a handrail to a corridor, stairway or ramp.

(j) Be oriented to make full use of the built environment.

(k) Benefit from a well-designed environment that presents a predictable set of physical circumstances.

(l) Become disoriented if presented with an unpredictable, incorrect, incomplete or over-supplied set of indicators.

Use of TGSIs should be minimized on kerb ramps.

NOTE: For factors that reduce the need for TGSIs, see Note to Item (a) above.

Having established the circumstances that assist safe wayfinding, the design industry should not over-use or over-prescribe the installation of tactile ground surface indicators, but rather should make full use of the range of environmental guidance features available so as to minimize inconvenience to other members of the community.

Alternative way-finding aids should be exploited to minimize the use of TGSIs. Proven aids include long canes and guide dogs. Very few people are able to use proximity devices.

To detect tactile ground surface indicators a depth of between 600 mm to 800 mm is required when being approached from a 90° angle.

A2 PEOPLE WITH MOBILITY IMPAIRMENT

People with a mobility impairment may find that tactile ground surface indicators affect their balance or interfere with the use of their mobility aid.

People who use wheelchairs may have difficulty manoeuvring on tactile ground surface indicators. Therefore, use of TGSIs should be minimized on areas where people in wheelchairs are likely to need to make fine adjustments in manoeuvring and turning their wheelchairs.

A3 DESIGN AND INSTALLATION

A3.1 General

It is imperative that the use of TGSIs be consistent to increase public understanding and to maximize their utility.

TGSIs should not be installed unnecessarily, as they will not compensate for poor design. Good design practice should minimize the need for TGSIs to be installed.

A3.2 Warning indicators

Warning TGSIs should be used to warn of hazards such as the following:

(a) Life threatening hazards where serious falls may occur, such as at railway platforms or wharves.

(b) Overhead hazards that protrude into the continuous accessible path of travel, such as the underside of a staircase that is unprotected. Wherever possible an architectural treatment should be used, e.g., the installation of a railing, seating or railing.

(c) Suspended hazards that protrude into a continuous accessible path of travel, such as a telephone booth, drinking fountain, fire hose reel or the like. Such hazards should be installed out of the continuous accessible path of travel.

(d) Vehicle hazards on roadways that are not separated from pedestrian accessways by a change of grade, such as vehicular driveways that intersect with clear continuous accessible paths of travel from large vehicular precincts, where a motorist's vision is limited, e.g., exits from car parks.

Warning tactile ground surface indicators should be used following directional indicators, to indicate that a point of importance has been reached, such as—

(i) the location of a bus sign or tram stop; or

(ii) the location of a change of direction on a pedestrian crossing island associated with a slip lane crossing.

Warning tactile ground surface indicators should be used at the top and bottom of stairways and ramps, but not at intermediate landings that have continuous handrails on both sides of the stairway or ramp.

Warning tactile ground surface indicators should be used at the top and bottom of stairways and ramps and intermediate landings that have entrances from that level to the landing.

A3.3 Directional indicators

Directional tactile ground surface indicators should be used—

(a) at mid-block crossings to indicate the position of crossings, bus or tram stops;

(b) at intersections that incorporate slip lane crossings to indicate the position of the crossing and the direction of travel across the island where the path of travel has not been cut through the island;

(c) at intersections where the point of entry to the road is more that 3000 mm from the property line (see Appendix C); and

(d) across an open space from point A to point B, where there are no other tactual cues.

APPENDIX B

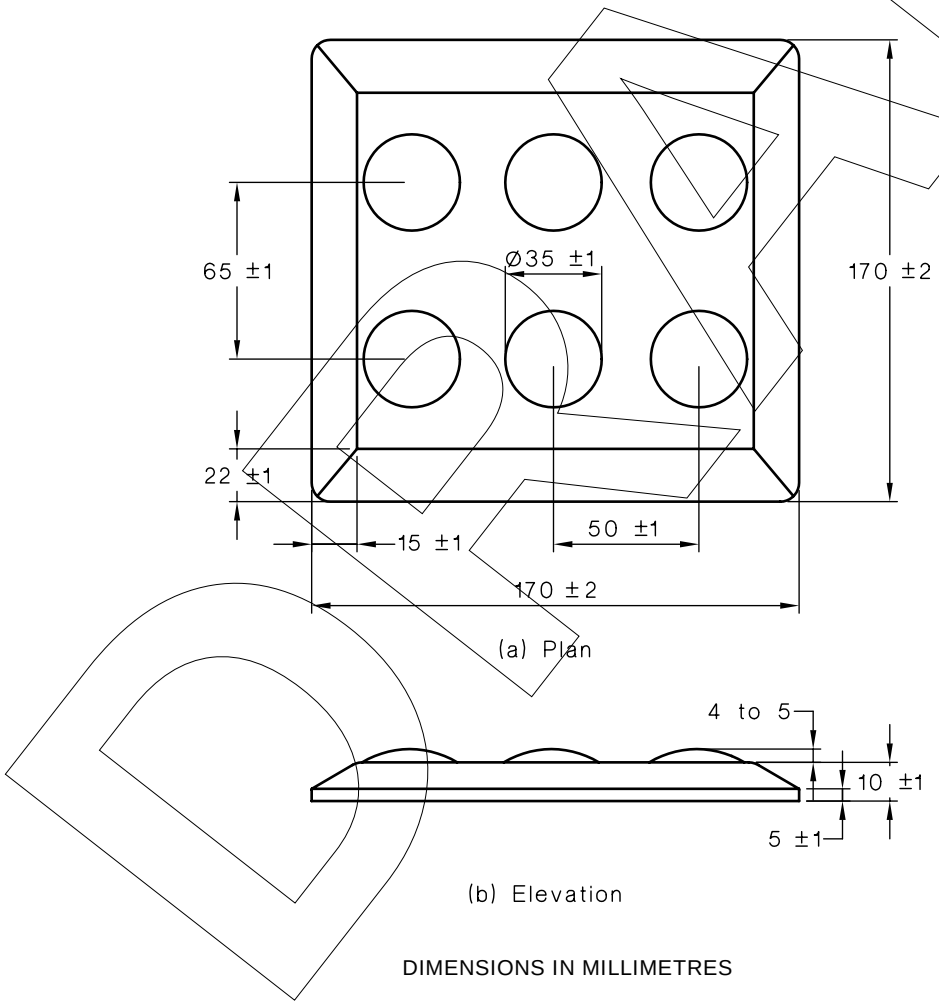
RAISED PAVEMENT MARKERS

(Informative)

Where pedestrian crossings are across roads of four lanes or greater, raised pavement markers to delineate the edges of the crossings are helpful to people who are blind or vision impaired.

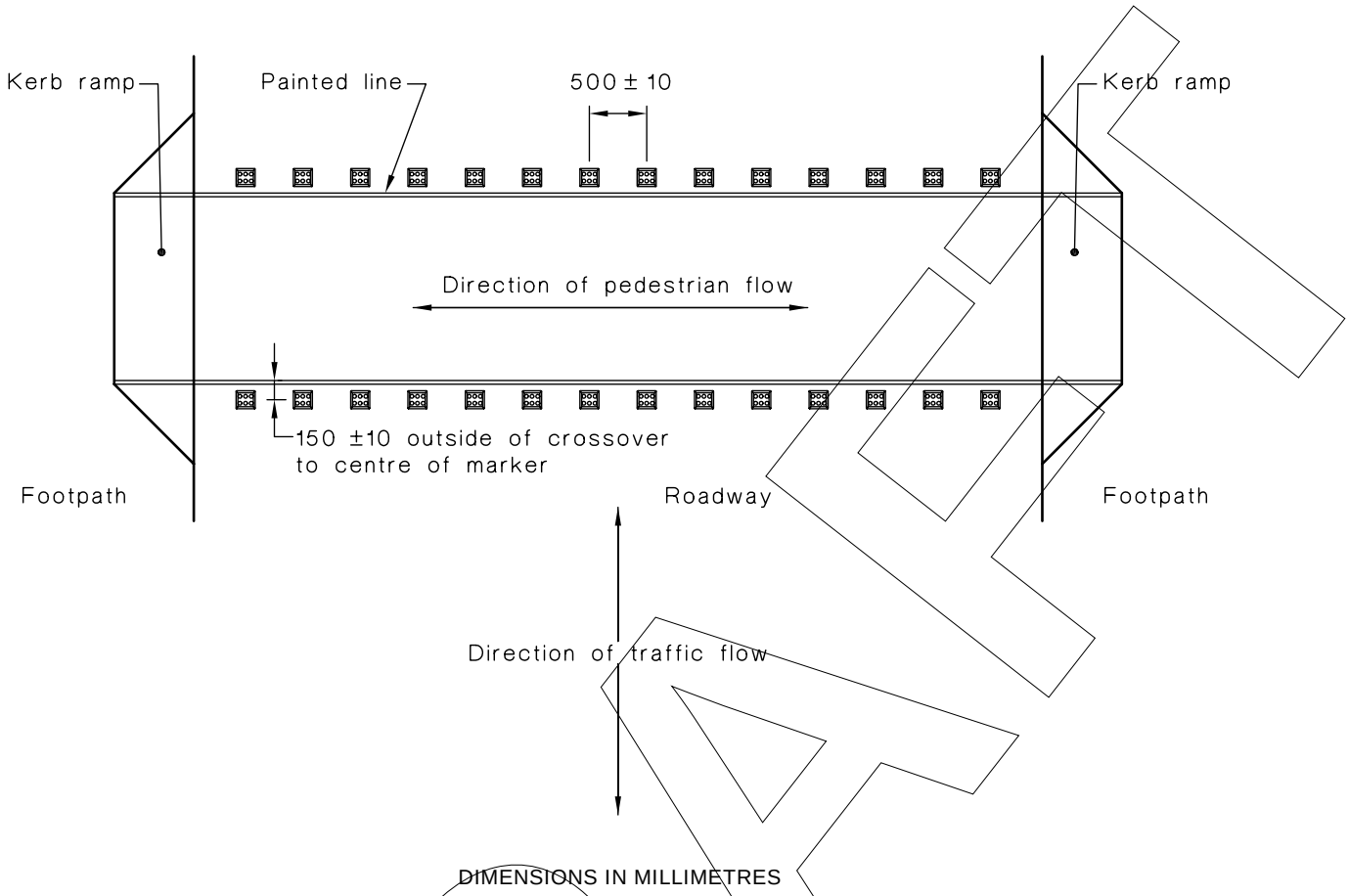
Raised pavement markers are not warning or directional TGSIs as defined in this Standard. The profile and dimensions specified for raised pavement markers are, therefore, markedly different from both warning and directional TGSIs (see Figure B1).

NOTE: For recommended installation format refer to Figure B2.



DIMENSIONS IN MILLIMETRES

FIGURE B1 RAISED PAVEMENT MARKERS



DIMENSIONS IN MILLIMETRES

FIGURE B2 RAISED PAVEMENT MARKERS AT PEDESTRIAN CROSSINGS

APPENDIX C

KERB RAMPS, MEDIANS AND MULTIPLE ENTRY POINTS

(Informative)

C1 GENERAL

This Appendix provides guidance on typical TGSI applications for kerb ramps and medians that meet the requirements of this Standard.

C2 MULTIPLE ENTRY POINTS

An alternative point of entry to the roadway should be established for blind and vision-impaired pedestrians at the kerb adjacent to a kerb ramp and within the confines of the path of travel on the road (see Figures C2 to C11 inclusive).

Warning TGSIs should be provided at right angles to the path of travel for a minimum of 900 mm and for 600 mm to 800 mm in the direction of travel. These indicators should be set back 300 ±10 mm at the closest point from the beginning of the roadway.

C3 KERB RAMPS

Where the upper entry point of a fully compliant ramp with a gradient of between 1:8 to 1:8.5 is within 3 m of the property line, TGSIs are not required.

Where the gradient is shallower than 1:8.5, warning TGSIs should be provided in accordance with Clause C2 and Figure C1.

Where the top of the AS 1428.1 compliant ramp is more than 3 m from the property line, directional indicators (600 mm to 800 mm wide) should be provided from the property line to the top of the ramp.

Tactile indicators should be located at crossing entry points and should be installed for the full width of the path of travel, where the following conditions apply and as shown in Figures C2 to C11 inclusive:

(a) At hazardous crossings.

(b) At kerb ramps that do not comply with the requirements of AS 1428.1.

Where a kerb ramp is not in the direct continuous accessible path of travel, oriented in terms of the normally available cues, such as a building frontage, directional indicators should lead to the warning indicators located at the crossing entry point. They should have a width of 600 mm to 800 mm.

NOTES:

1 See AS 1428.1 (NZS 4121) for ramp dimensions.

2 For footpaths, good design and construction practice is required to provide guidance for pedestrians, and the correct orientation of ramps can, in many cases, minimize the need for TGSIs.

3 Kerb ramps are sometimes installed without detailed plans and the layout of the ramp is left to the ‘on site’ personnel. It is essential that the ‘on site’ personnel and the designer understand the principles of good kerb ramp design to provide guidance for vision impaired pedestrians. The principles are as follows:

(a) The ramp grade should be oriented in the direction of travel.

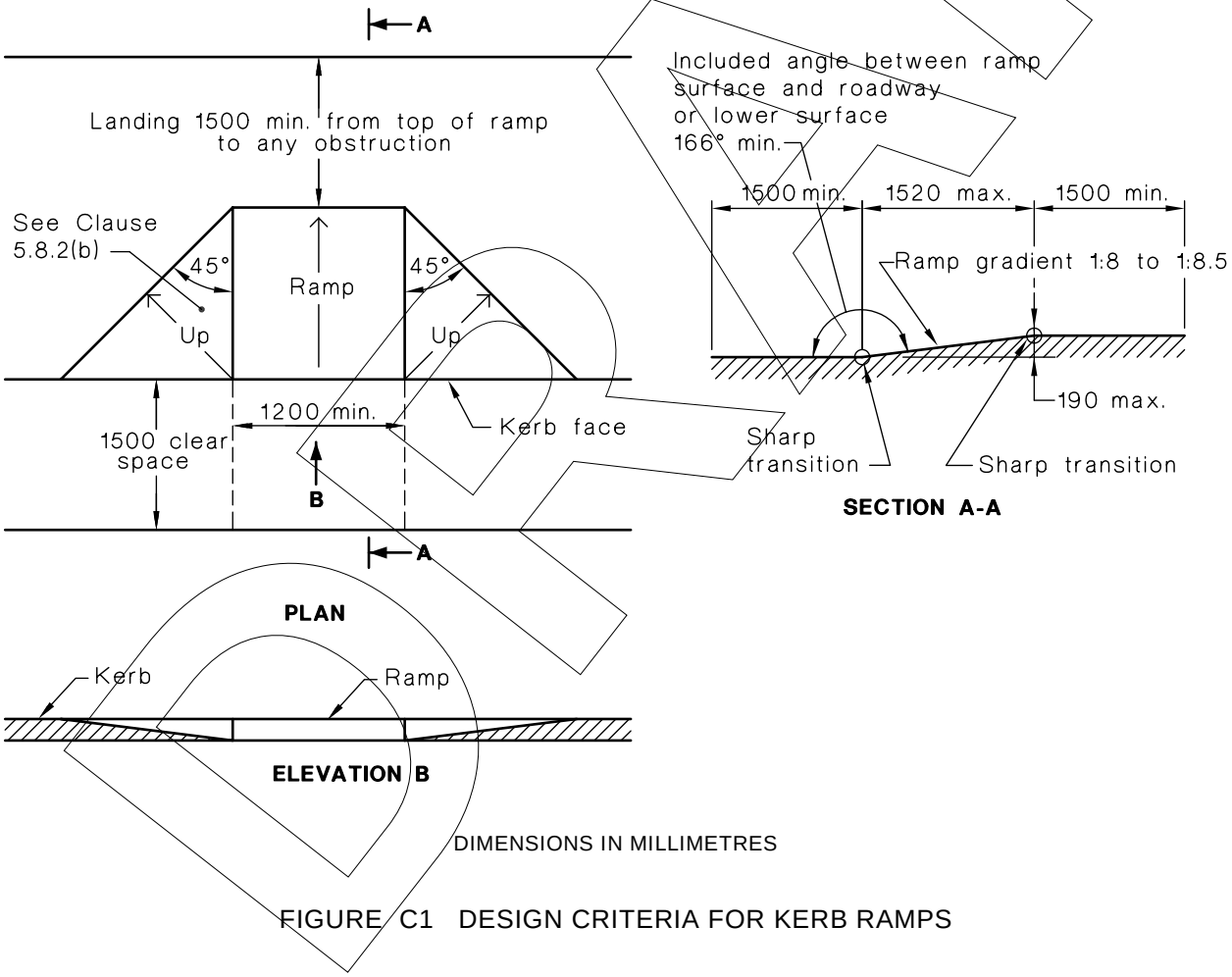
(b) Ramps on both sides of a carriageway have to be aligned with one another and the direction of travel.

(c) The transition between the footpath and the ramp should be sharp and at right angles to the direction of travel. If this requirement is not followed on angled roadways, the ramp grade will not be in line with the direction of travel. On angled roads and bellmouths, compromise is usually required on the set-out of the kerb ramp, as each side of the ramp will be of a different length causing different grades on each side of the ramp. Sloping terrain also causes problems.

(d) Warning indicators should be placed at right angles to the direction of travel, a minimum of 600 mm to 800 mm deep and 300 ±10 mm back from the roadway.

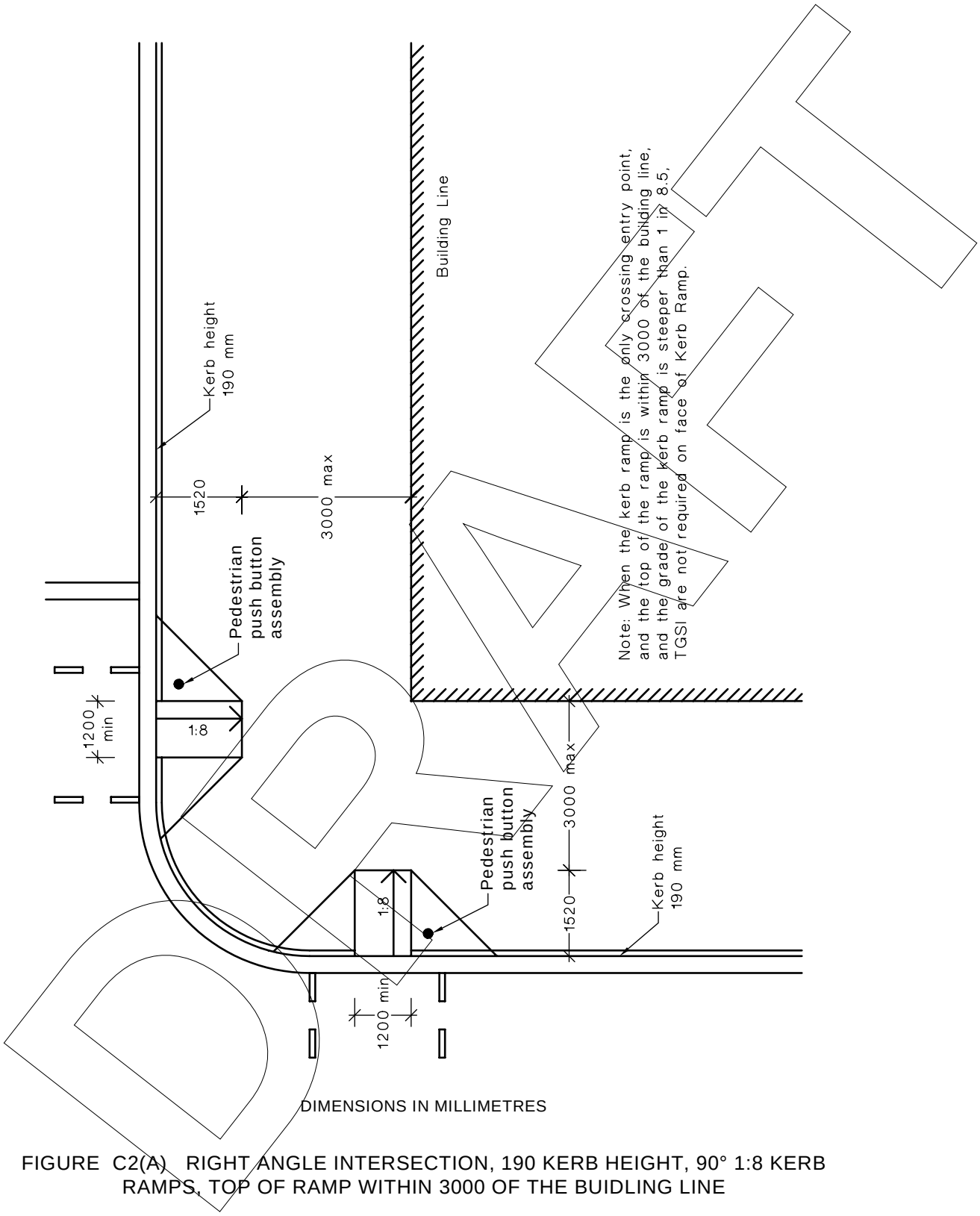
(e) The near side edge of the warning indicators should be, wherever possible, in line with the property boundary to allow vision-impaired pedestrians to locate the crossing point.

4 An important aspect in the design of footpaths for pedestrians with vision impairment is to provide a clear, continuous and accessible path of travel (see AUSTROADS *Guide to Traffic Engineering Practice*, Part 13: *Pedestrians*, Figure 2.4 for the dimensions of an obstruction-free envelope).



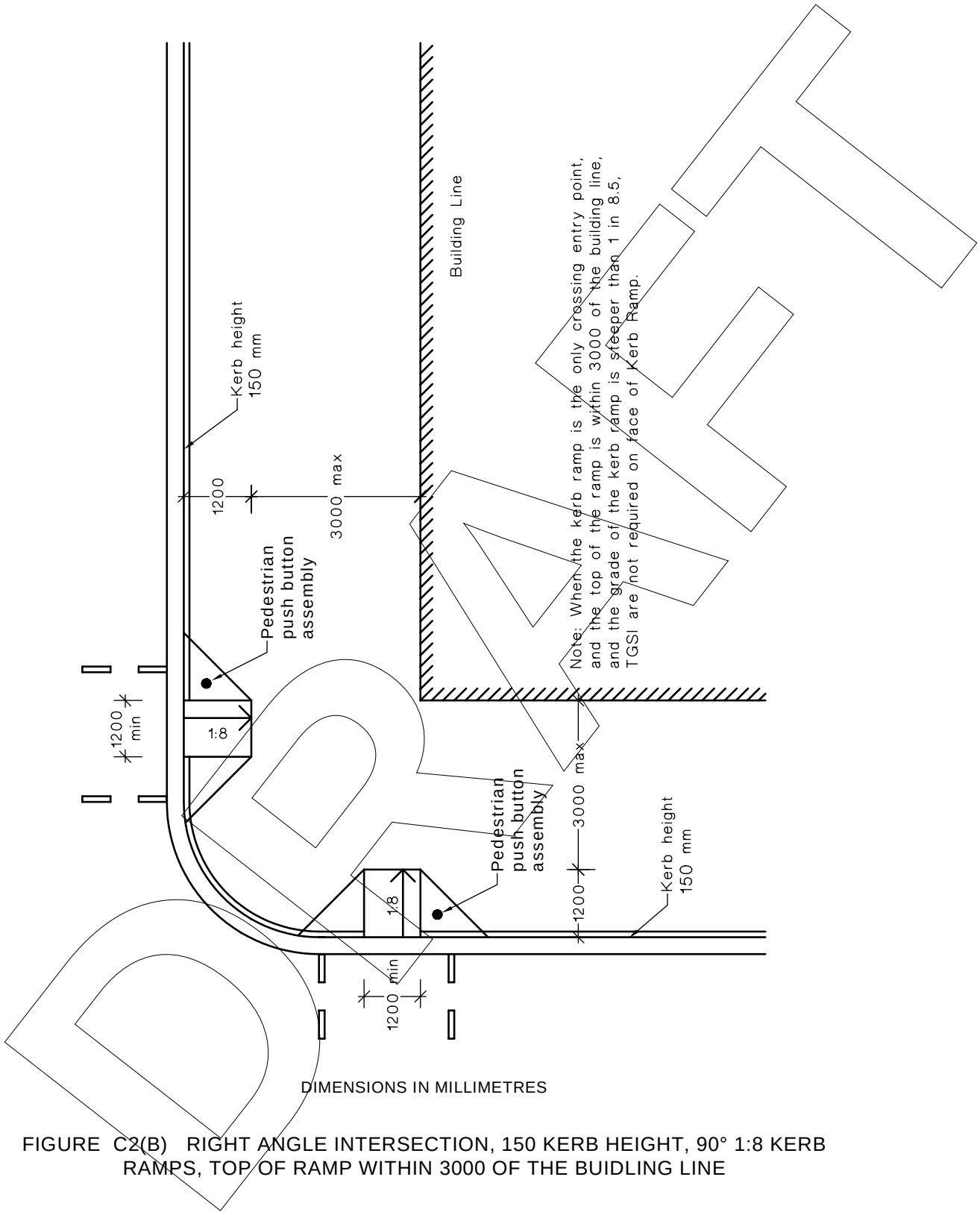
DIMENSIONS IN MILLIMETRES

FIGURE C1 DESIGN CRITERIA FOR KERB RAMPS



DIMENSIONS IN MILLIMETRES

FIGURE C2(A) RIGHT ANGLE INTERSECTION, 190 KERB HEIGHT, 90° 1:8 KERB RAMPS, TOP OF RAMP WITHIN 3000 OF THE BUIDLING LINE



DIMENSIONS IN MILLIMETRES

FIGURE C2(B) RIGHT ANGLE INTERSECTION, 150 KERB HEIGHT, 90° 1:8 KERB RAMPS, TOP OF RAMP WITHIN 3000 OF THE BUIDLING LINE

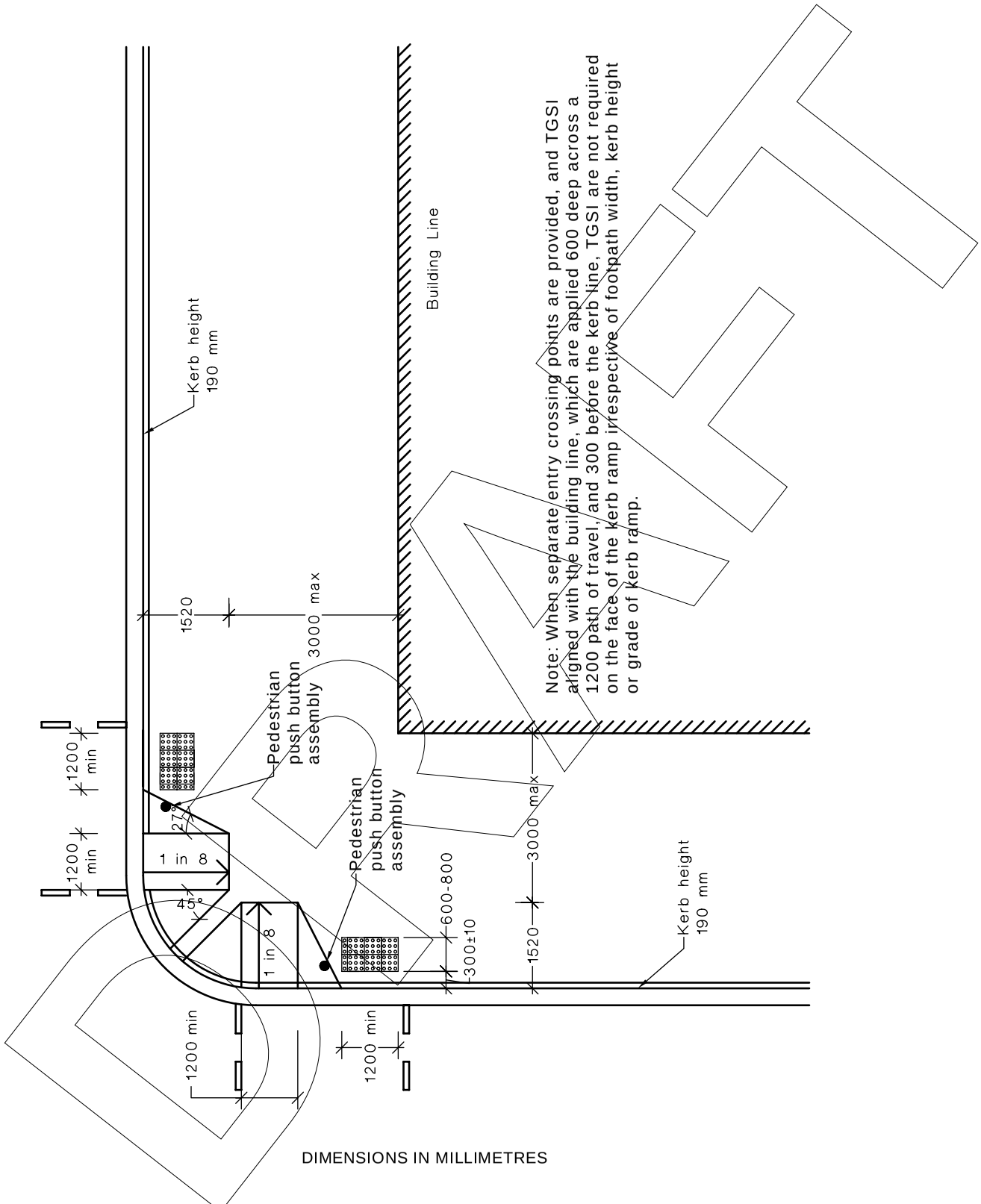
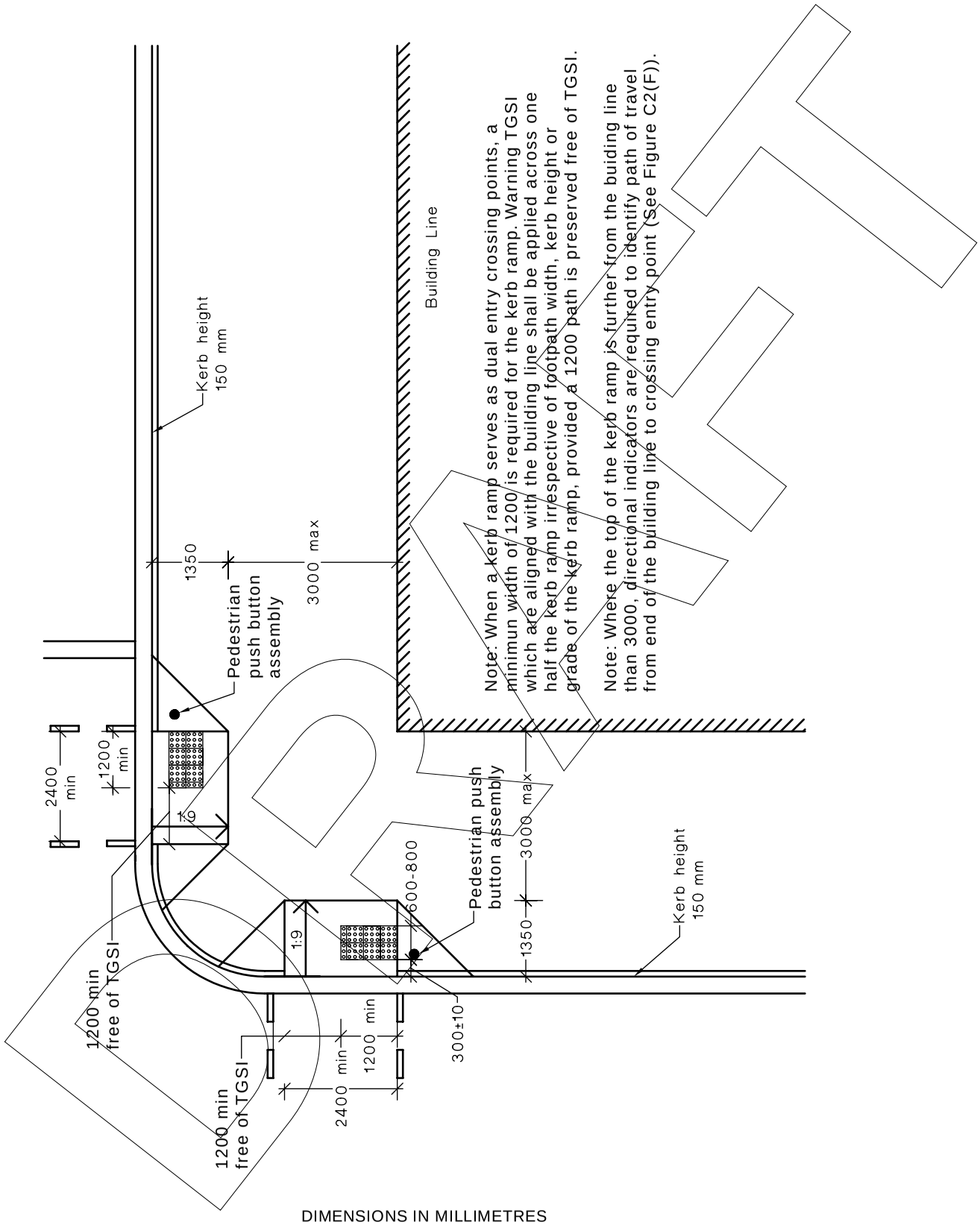
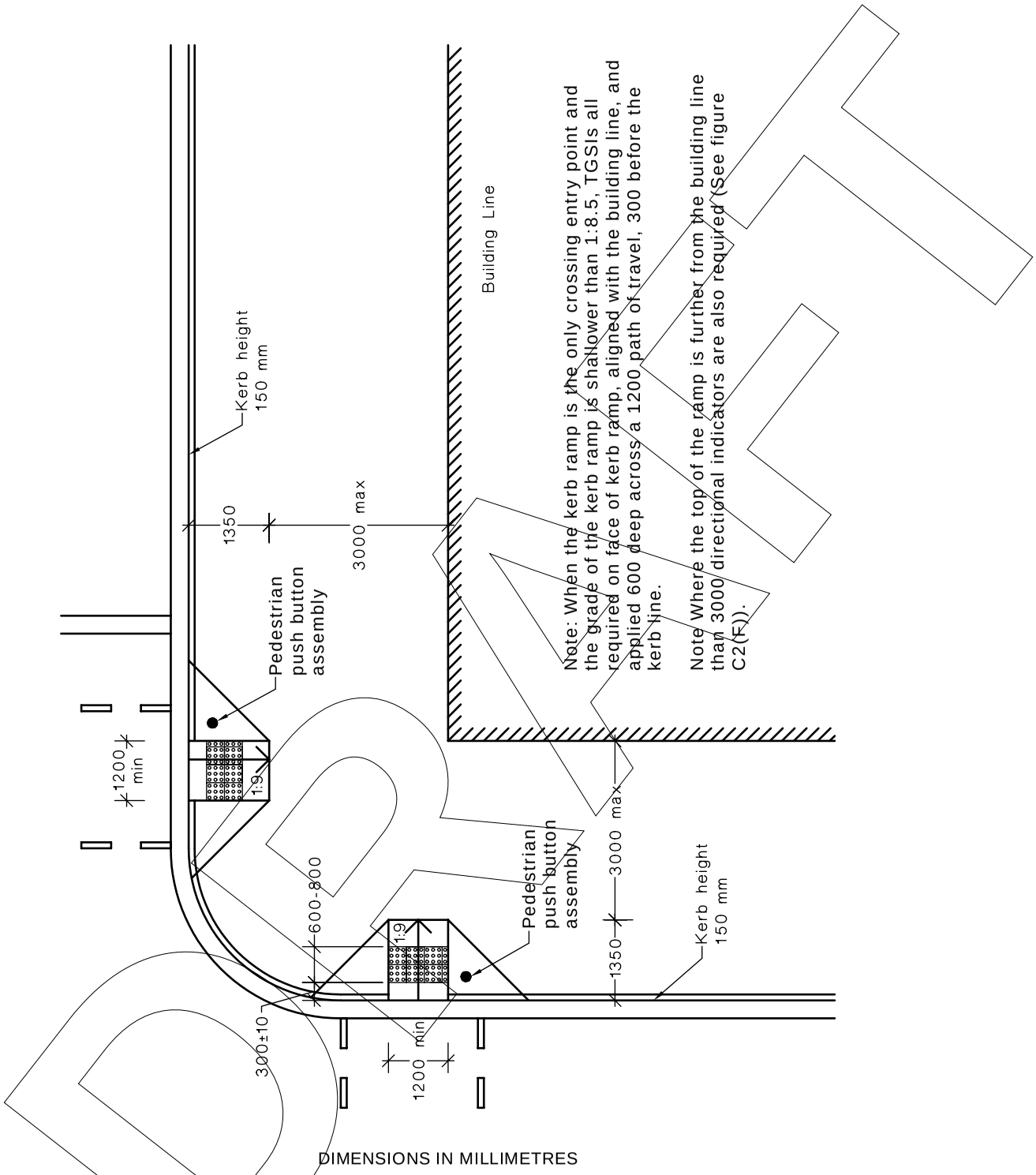


FIGURE C2(C) RIGHT ANGLE INTERSECTION, DUAL SEPARATE ENTRY CROSSING, 190 HIGH KERB, 90° 1:8 KERB RAMPS, TOP OF RAMP WITHIN 3000 OF BUIDLING LINE



DIMENSIONS IN MILLIMETRES

FIGURE C2(D) RIGHT ANGLE INTERSECTION, DUAL SEPARATE ENTRY CROSSING, 150 HIGH KERB, 90° 1:9 KERB RAMPS, TOP OF RAMP WITHIN 3000 OF BUIDLING LINE



DIMENSIONS IN MILLIMETRES

FIGURE C2(E) RIGHT ANGLE INTERSECTION, 150 KERB HEIGHT, 90° 1:9 KERB RAMPS, TOP OF RAMP WITHIN 3000 OF THE BUILDING LINE

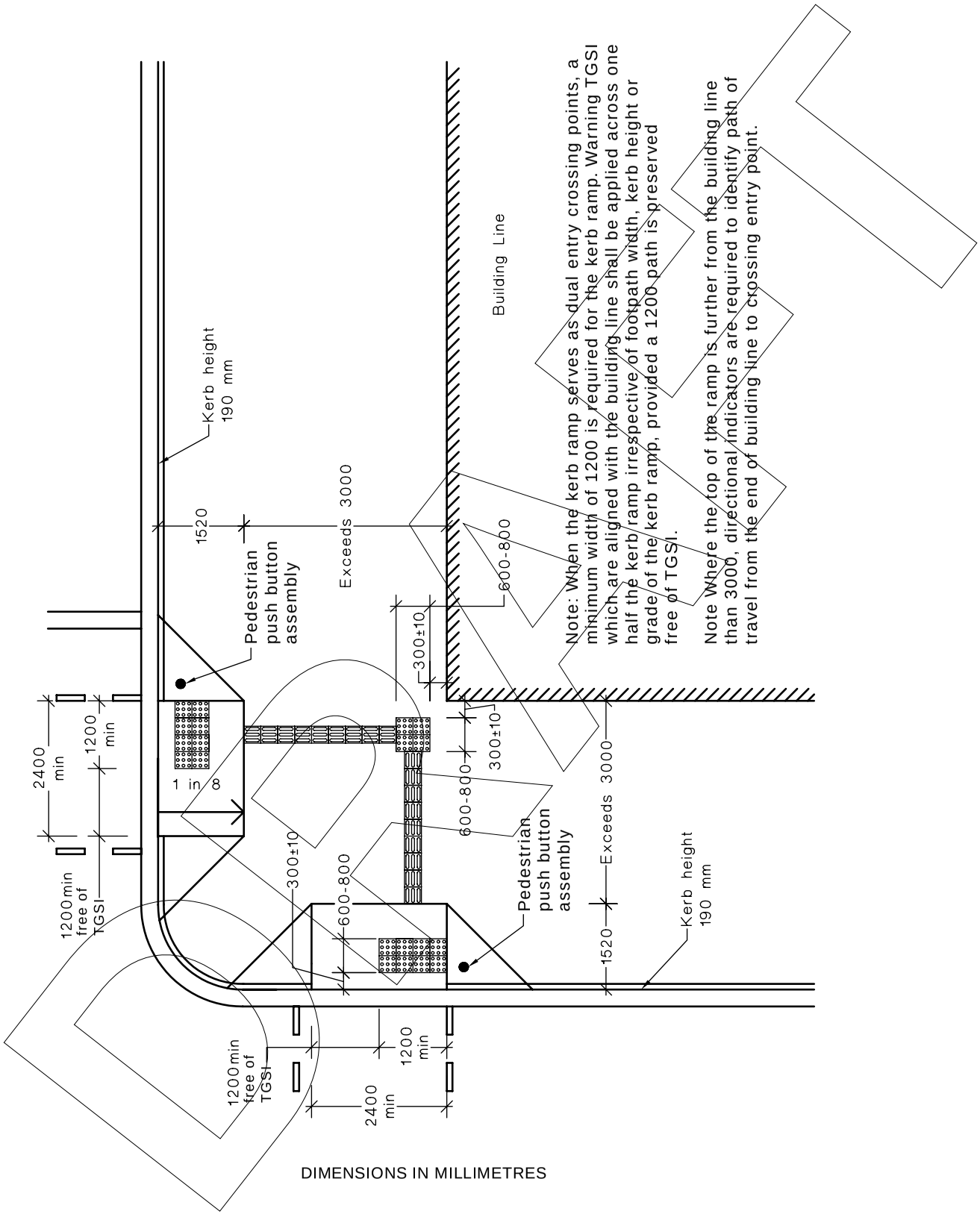
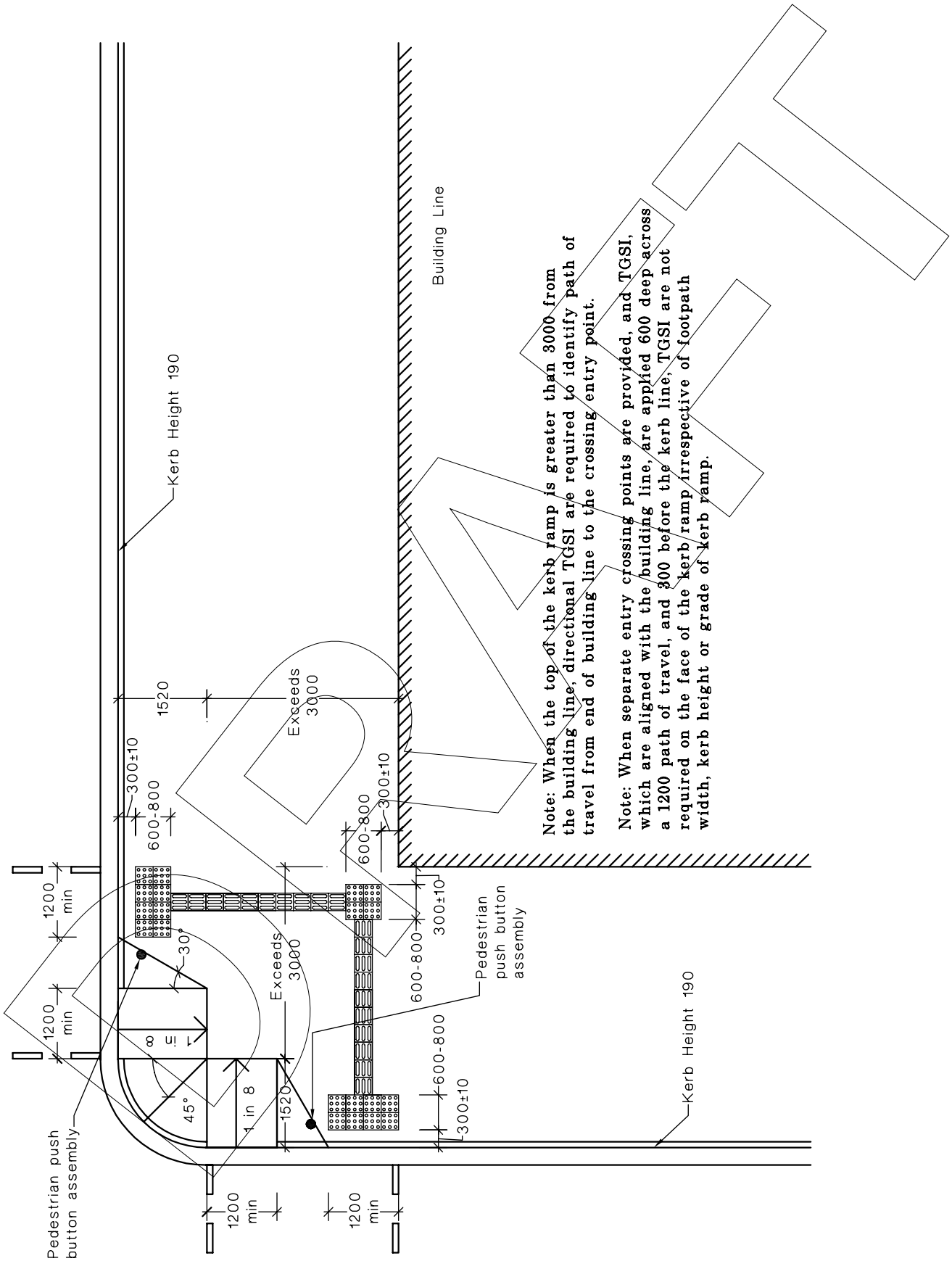
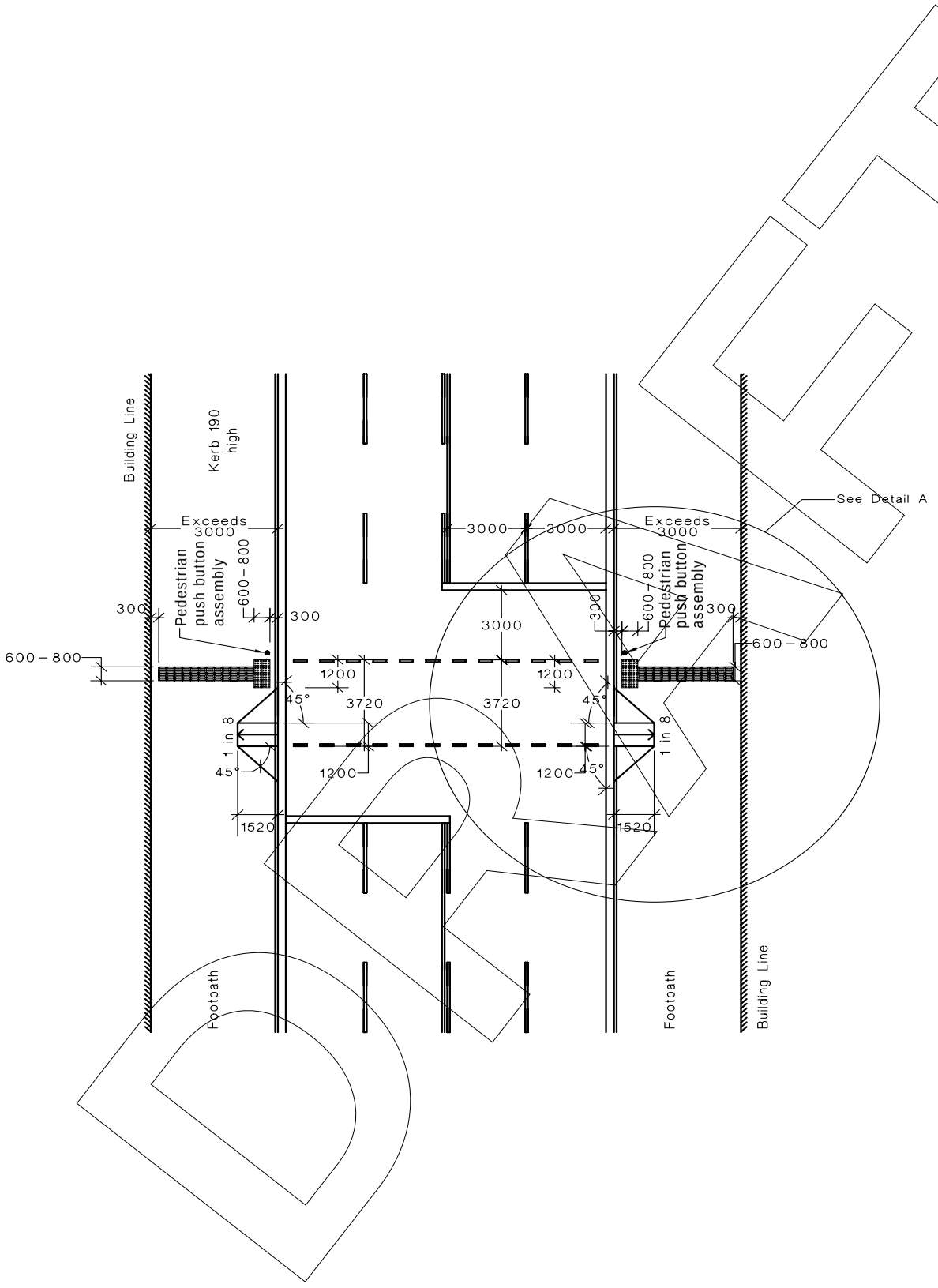


FIGURE C2(F) RIGHT ANGLE INTERSECTION, DUAL ENTRY CROSSING POINTS, 190 KERB HEIGHT, 90° 1:8 KERB RAMPS, TOP OF RAMP GREATER THAN 3000 FROM BUILDING LINE



DIMENSIONS IN MILLIMETRES

FIGURE C2(G) RIGHT ANGLE INTERSECTION, DUAL SEPARATE ENTRY CROSSING POINTS, 190 KERB HEIGHT, 90° 1:8 KERB RAMPS, TOP OF RAMP GREATER THAN 3000 FROM BUILDING LINE



DIMENSIONS IN MILLIMETRES

FIGURE C3 (in part) MID-BLOCK CROSSING, DUAL SEPARATE ENTRY CROSSING POINTS, 190 KERB HEIGHT, 90° 1:8 KERB RAMPS, FOOTPATH GREATER THAN 3000

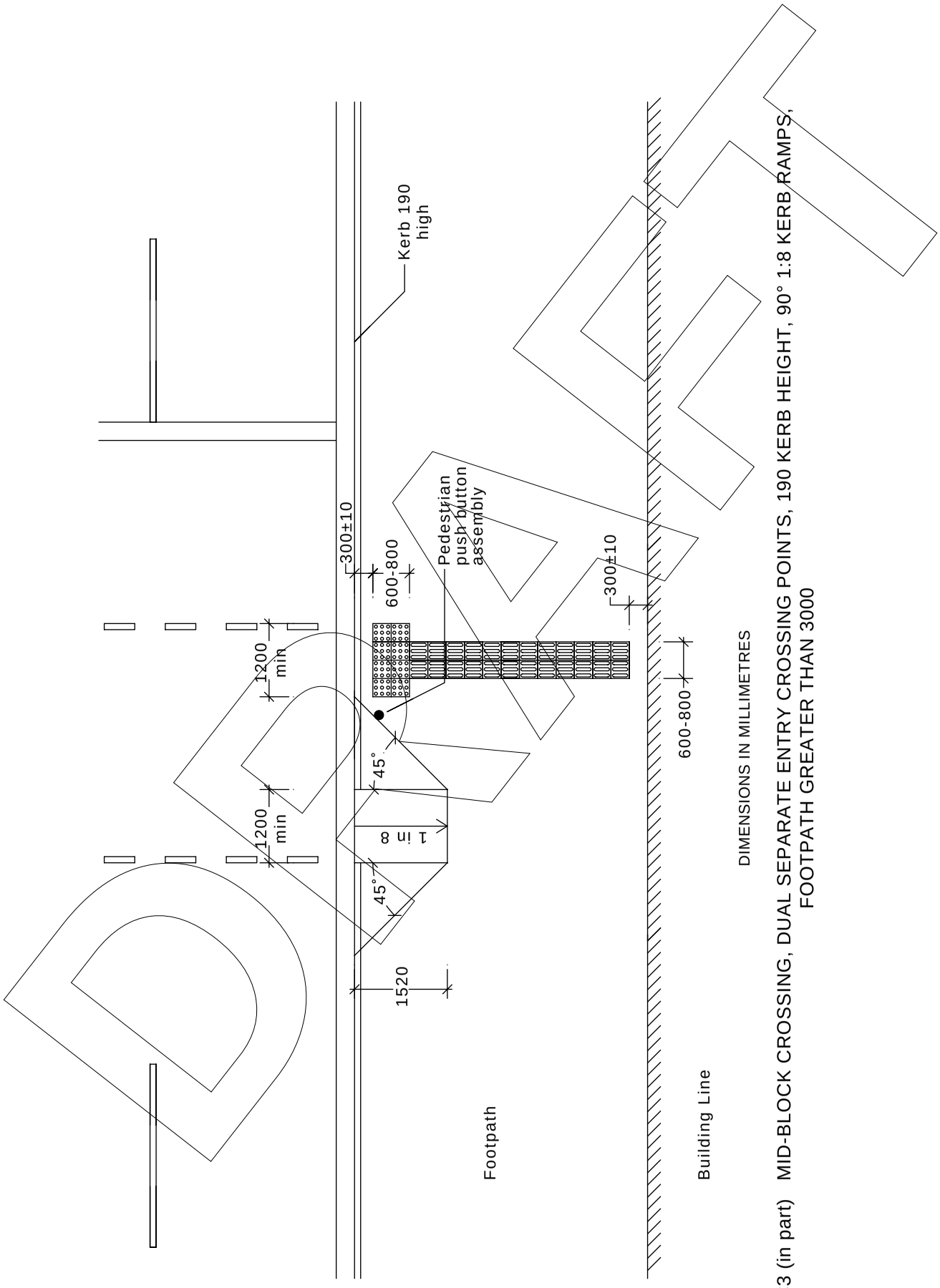
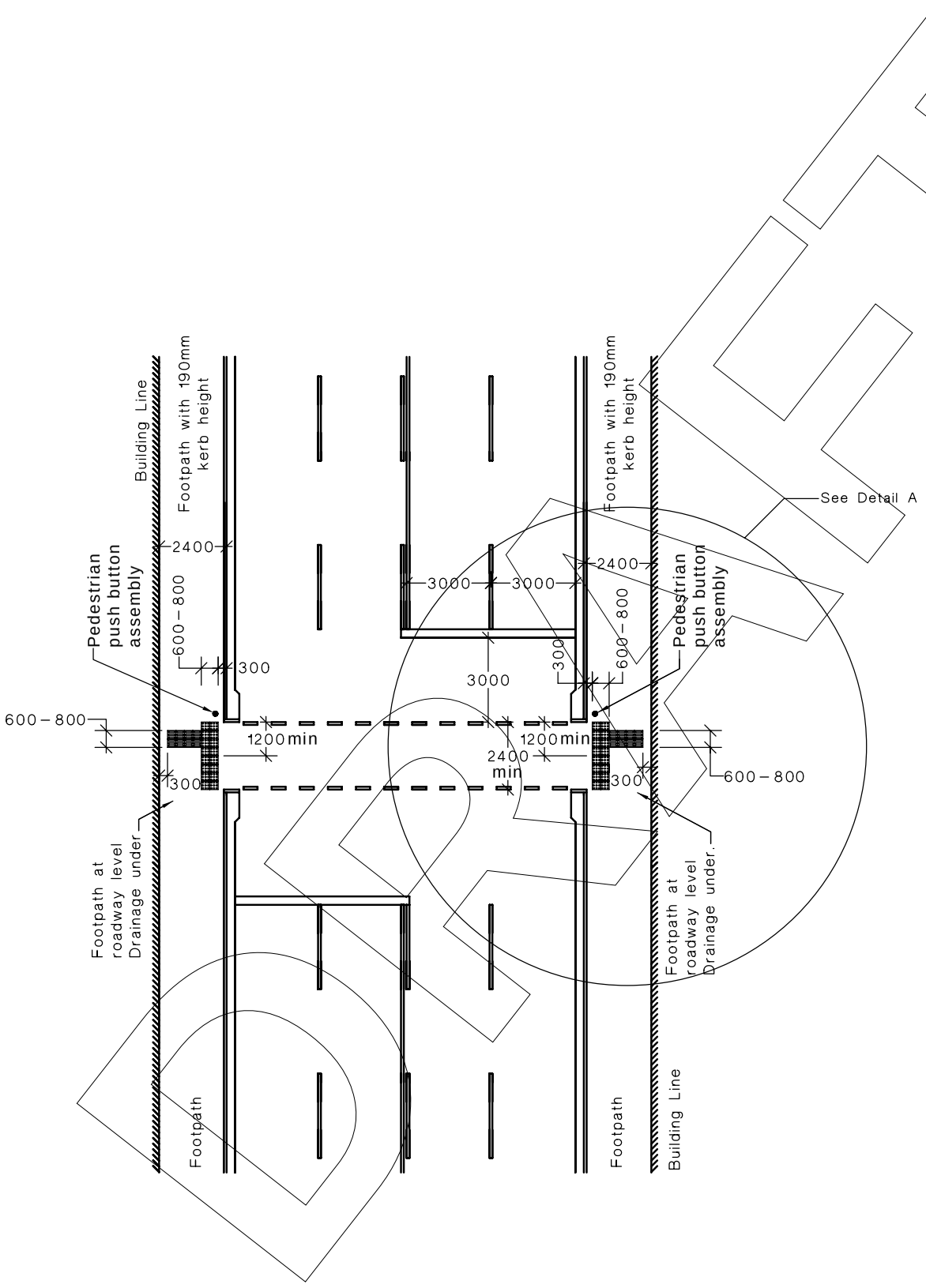


FIGURE C3 (in part) MID-BLOCK CROSSING, DUAL SEPARATE ENTRY CROSSING POINTS, 190 KERB HEIGHT, 90° 1:8 KERB RAMPS, FOOTPATH GREATER THAN 3000



DIMENSIONS IN MILLIMETRES

FIGURE C4 (in part) MID-BLOCK CROSSING, FOOTPATH 3000 OR LESS—PEDESTRIAN CROSSING AT GRADE—NO KERB RAMPS

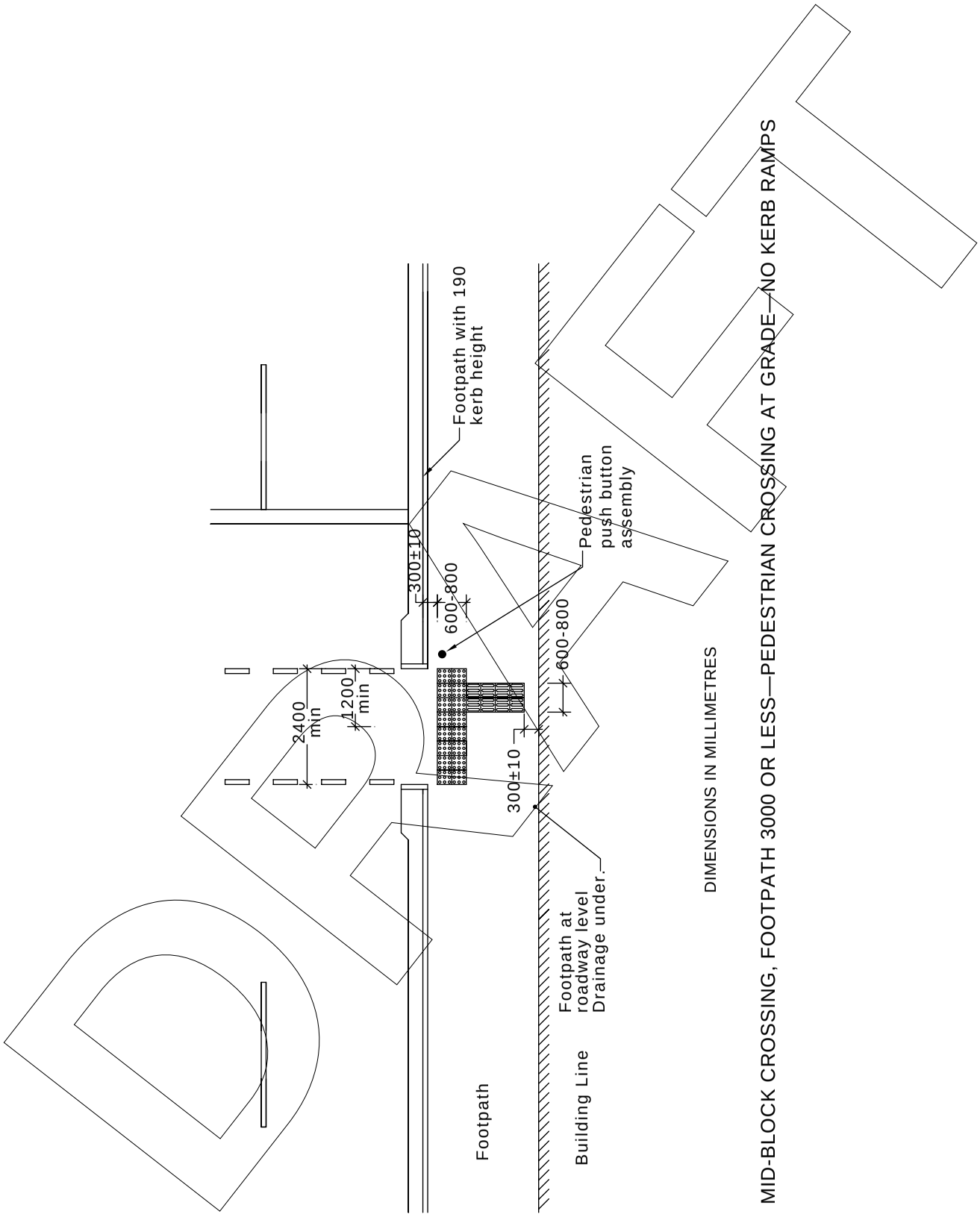
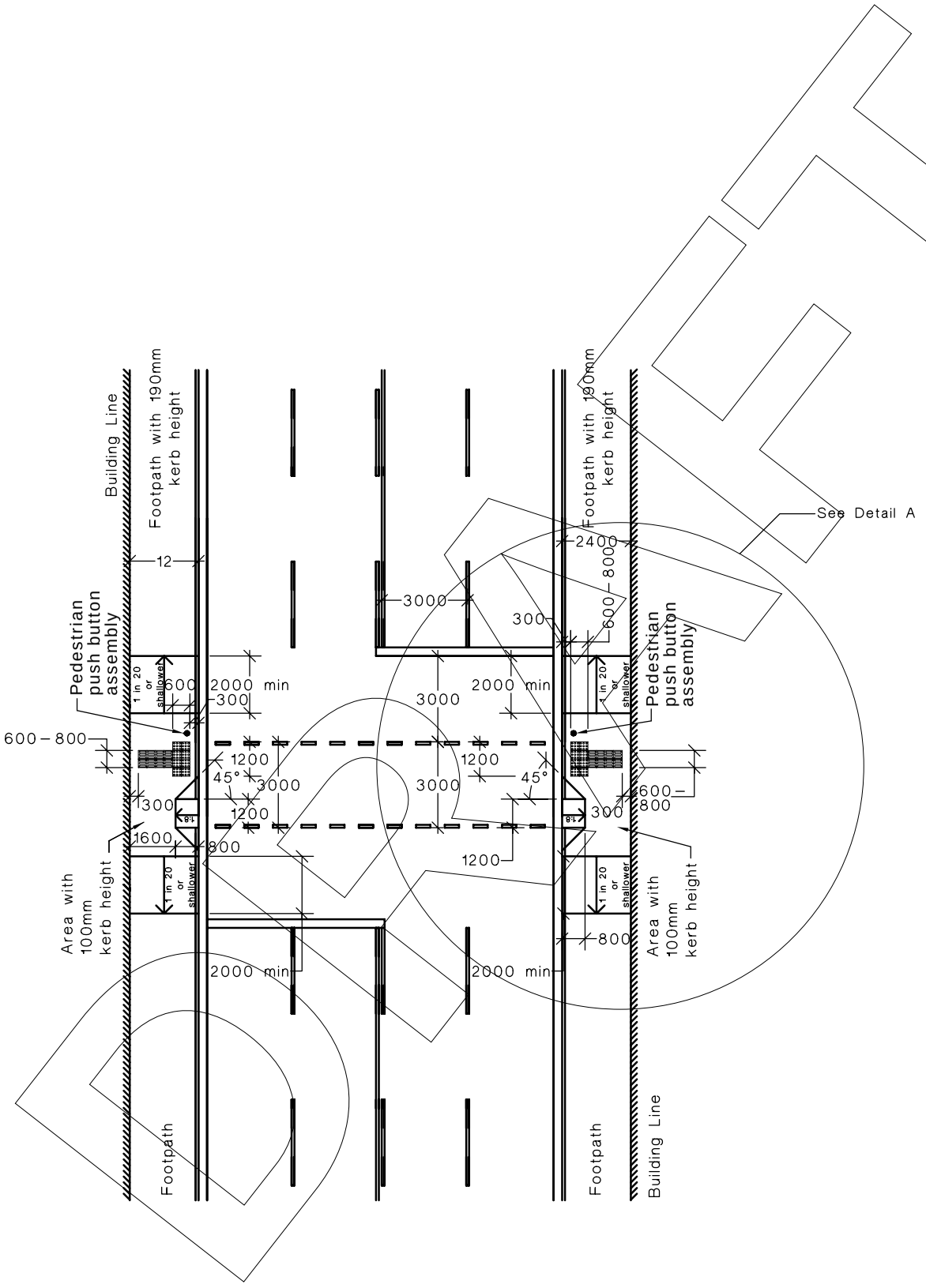


FIGURE C4 (in part) MID-BLOCK CROSSING, FOOTPATH 3000 OR LESS—PEDESTRIAN CROSSING AT GRADE—NO KERB RAMPS



DIMENSIONS IN MILLIMETRES

FIGURE C5 (in part) MID-BLOCK CROSSING, FOOTPATH LESS THAN 3000—LOWERED KERBS—DUAL SEPARATE ENTRY CROSSING POINTS, 90°KERB RAMPS

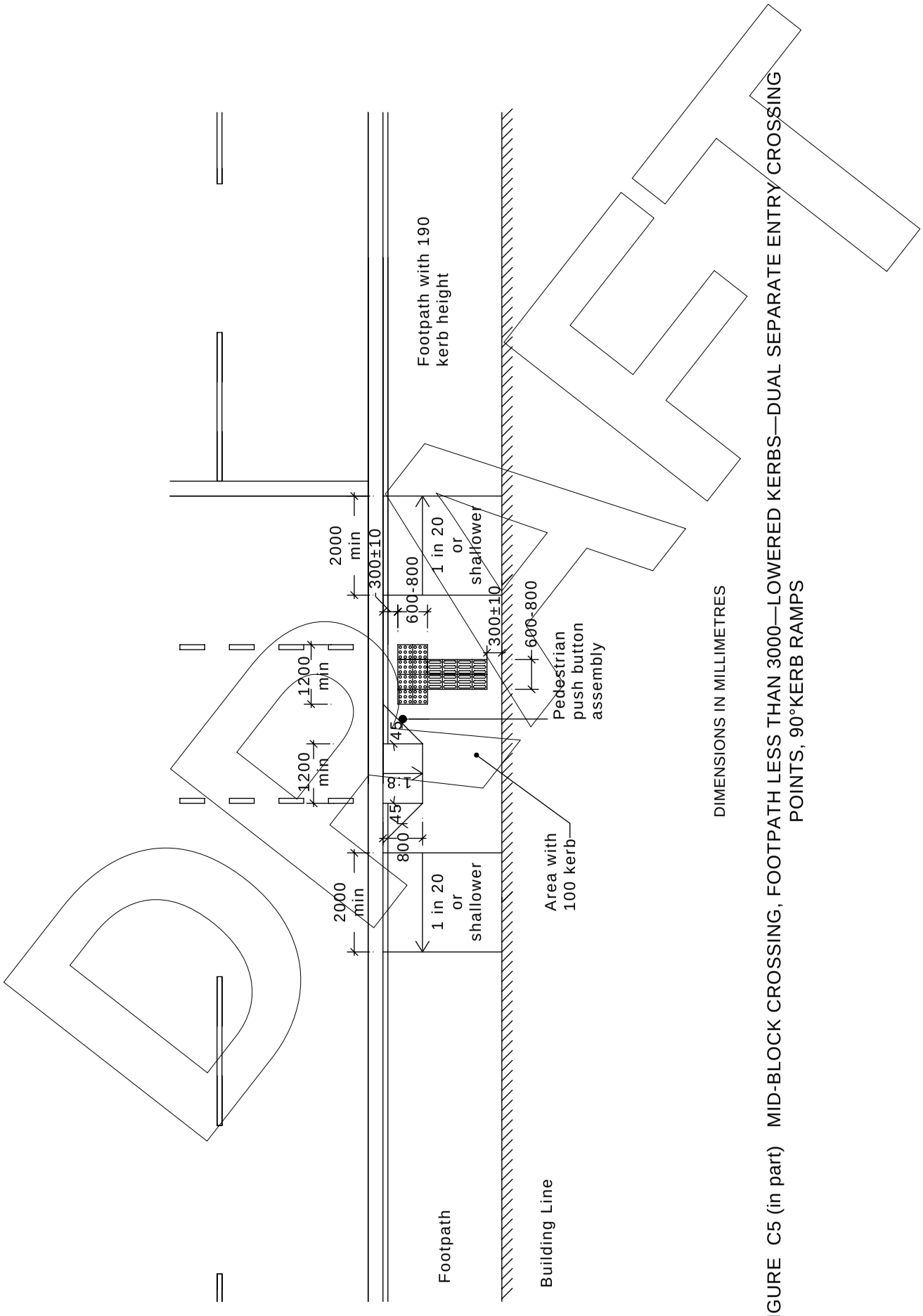
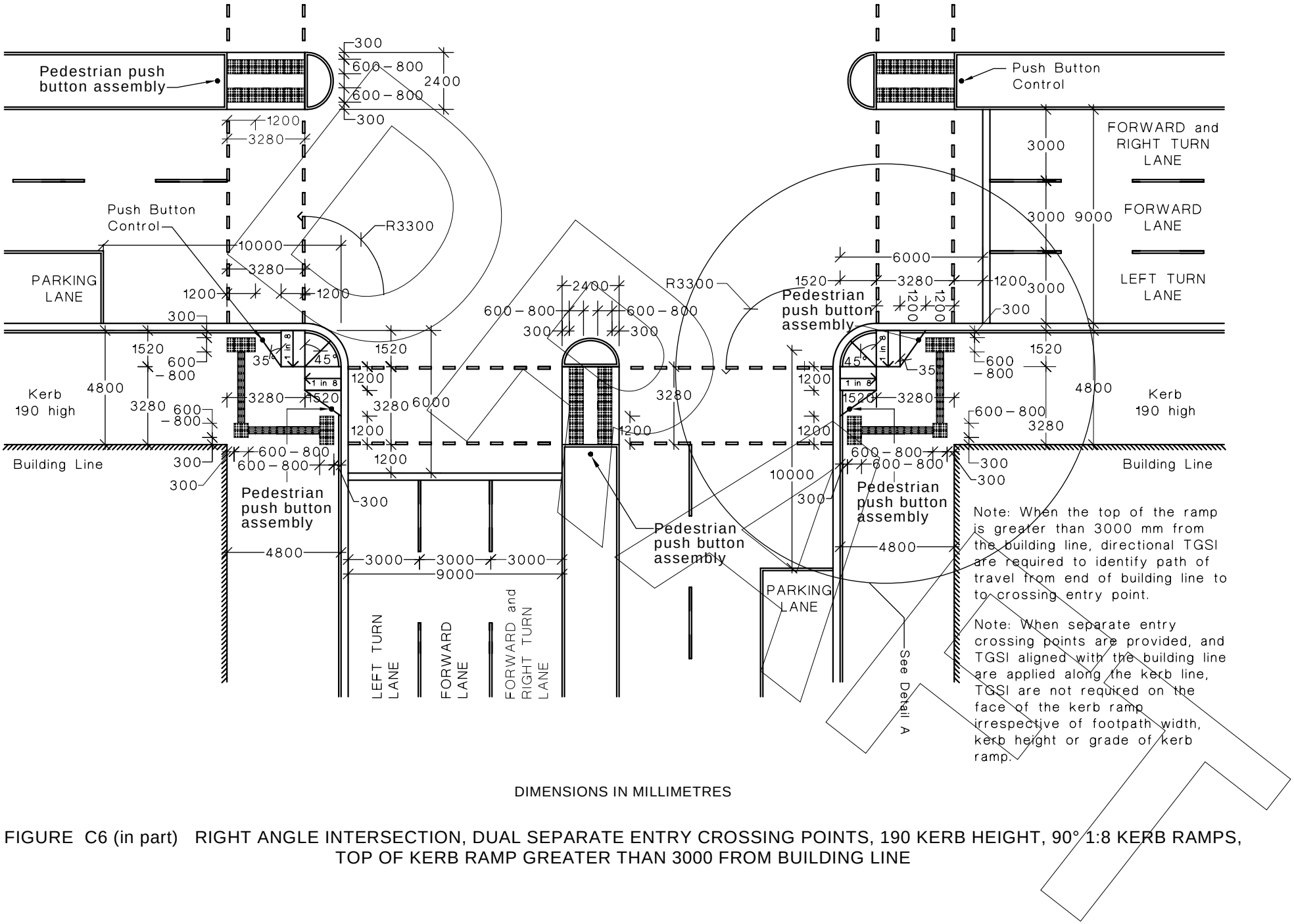
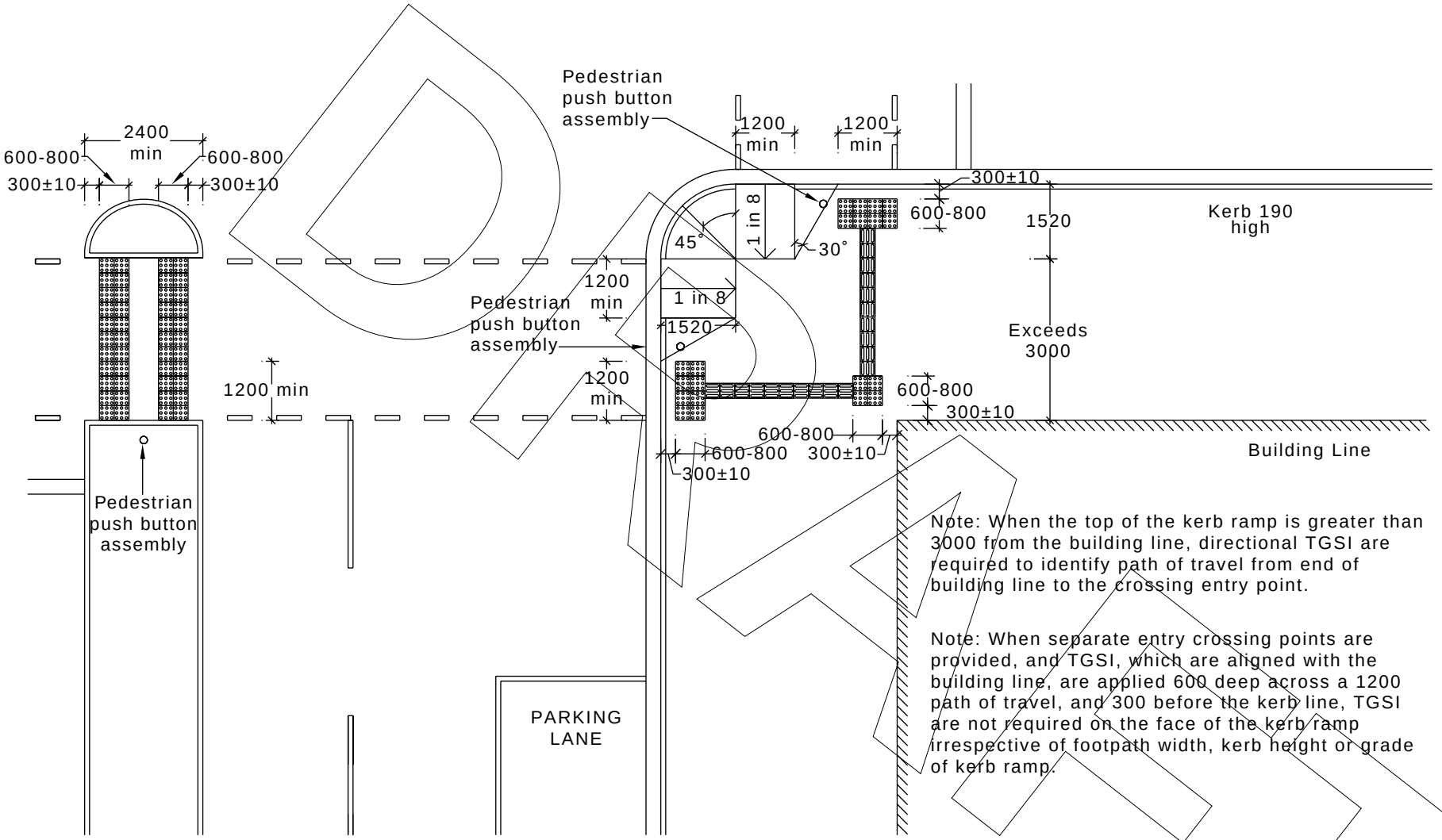


FIGURE C5 (in part) MID-BLOCK CROSSING, FOOTPATH LESS THAN 3000—LOWERED KERBS—DUAL SEPARATE ENTRY CROSSING POINTS, 90°KERB RAMPS



DIMENSIONS IN MILLIMETRES

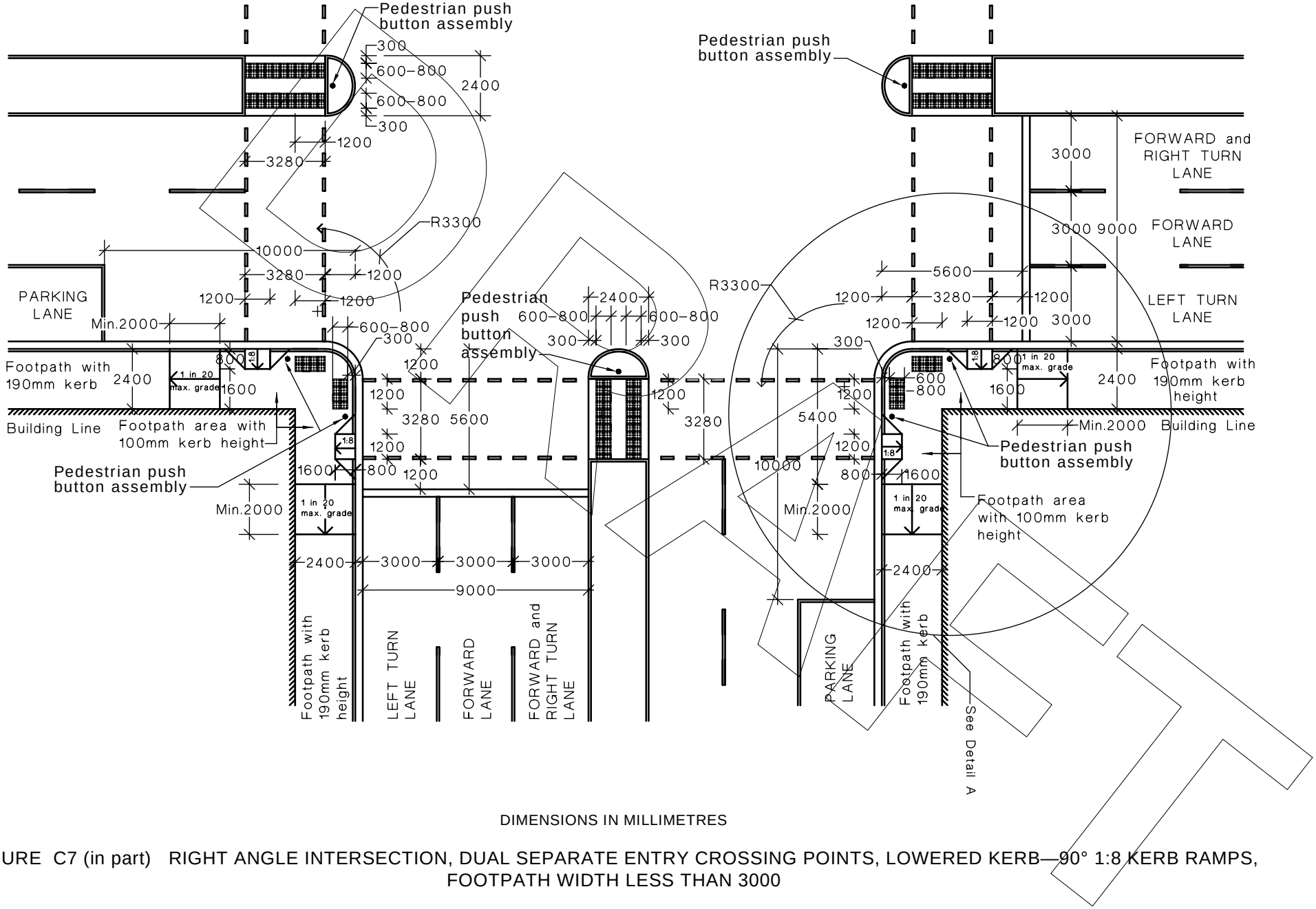
FIGURE C6 (in part) RIGHT ANGLE INTERSECTION, DUAL SEPARATE ENTRY CROSSING POINTS, 190 KERB HEIGHT, 90° 1:8 KERB RAMPS, TOP OF KERB RAMP GREATER THAN 3000 FROM BUILDING LINE



DIMENSIONS IN MILLIMETRES

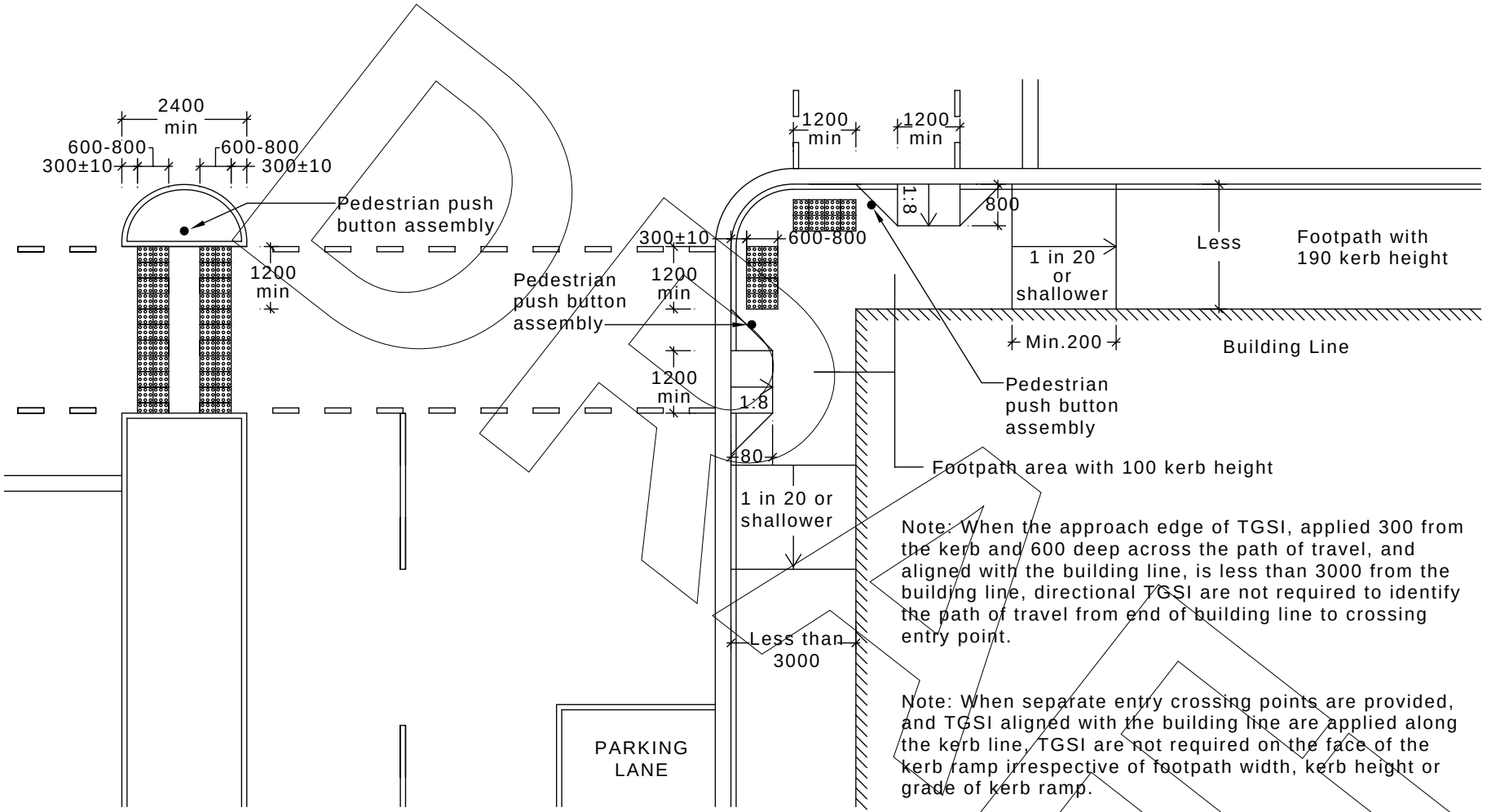
FIGURE C6 (in part) RIGHT ANGLE INTERSECTION, DUAL SEPARATE ENTRY CROSSING POINTS, 190 KERB HEIGHT, 90° 1:8 KERB RAMPS, TOP OF KERB RAMP GREATER THAN 3000 FROM BUILDING LINE

DRAFT ONLY



DIMENSIONS IN MILLIMETRES

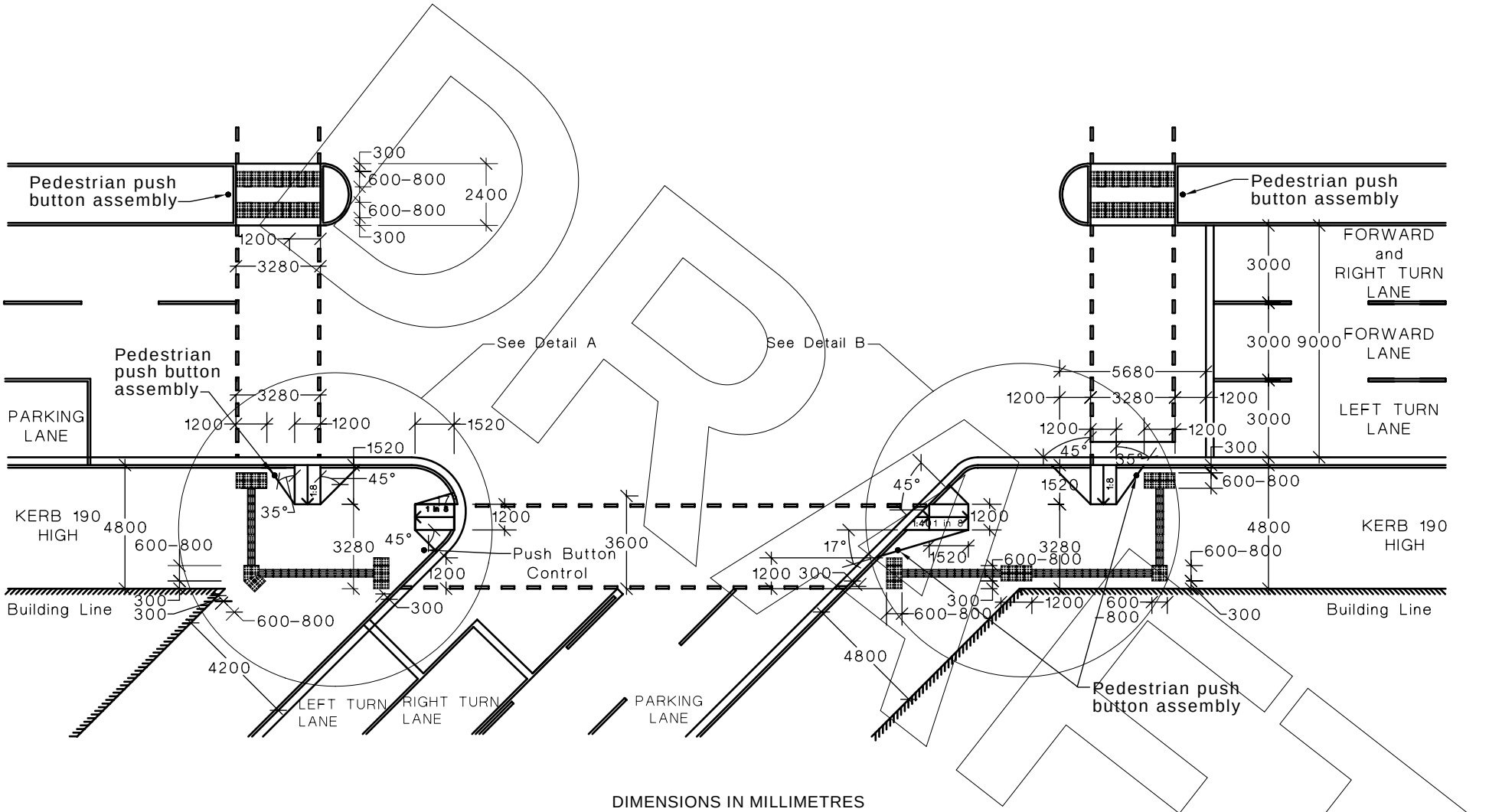
FIGURE C7 (in part) RIGHT ANGLE INTERSECTION, DUAL SEPARATE ENTRY CROSSING POINTS, LOWERED KERB—90° 1:8 KERB RAMPS, FOOTPATH WIDTH LESS THAN 3000



DIMENSIONS IN MILLIMETRES

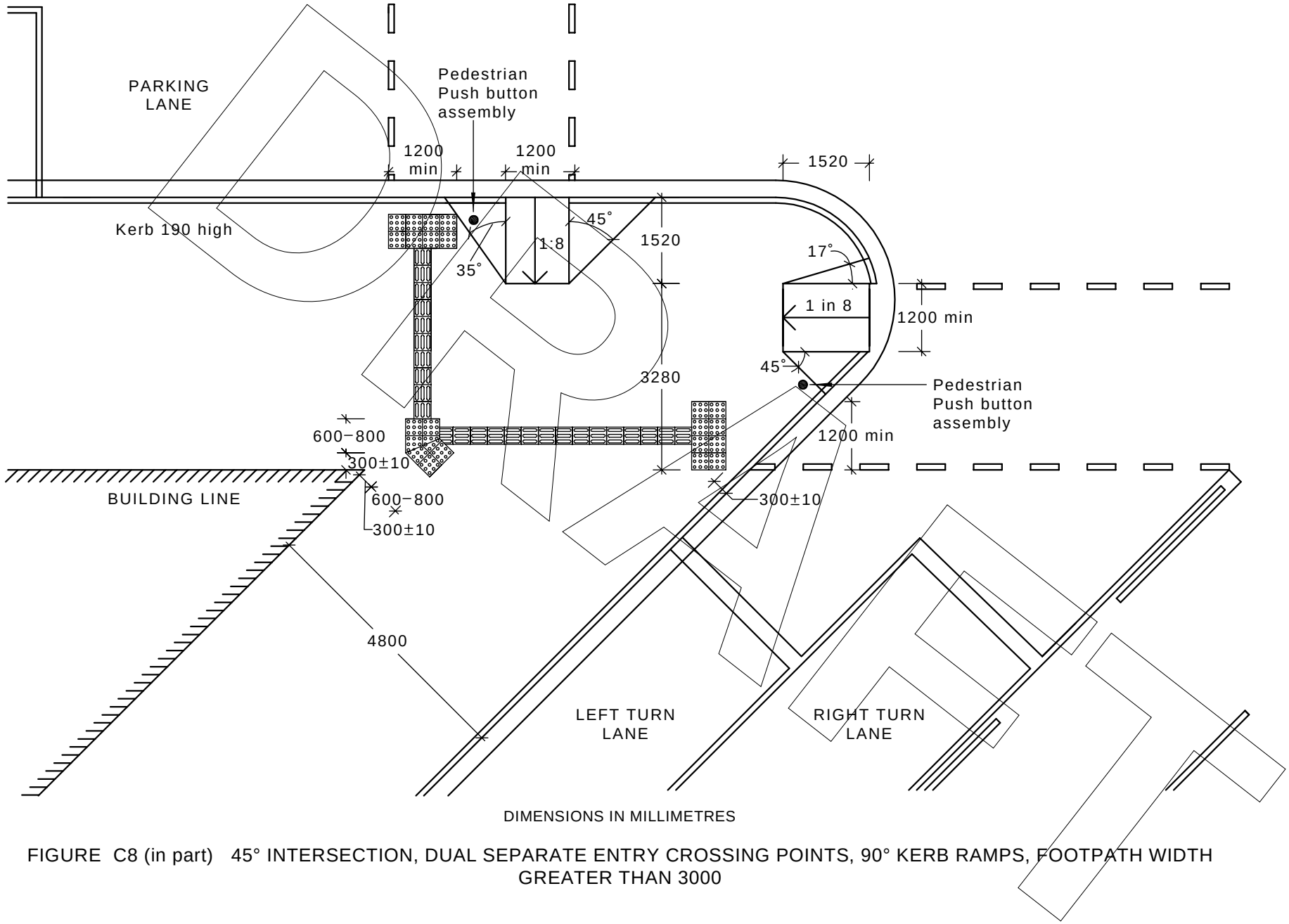
FIGURE C7 (in part) RIGHT ANGLE INTERSECTION, DUAL SEPARATE ENTRY CROSSING POINTS, LOWERED KERB—90° 1:8 KERB RAMPS, FOOTPATH WIDTH LESS THAN 3000

DRAFT ONLY



DIMENSIONS IN MILLIMETRES

FIGURE C8 (in part) 45° INTERSECTION, DUAL SEPARATE ENTRY CROSSING POINTS, 90° KERB RAMPS, FOOTPATH WIDTH GREATER THAN 3000



DIMENSIONS IN MILLIMETRES

FIGURE C8 (in part) 45° INTERSECTION, DUAL SEPARATE ENTRY CROSSING POINTS, 90° KERB RAMPS, FOOTPATH WIDTH GREATER THAN 3000

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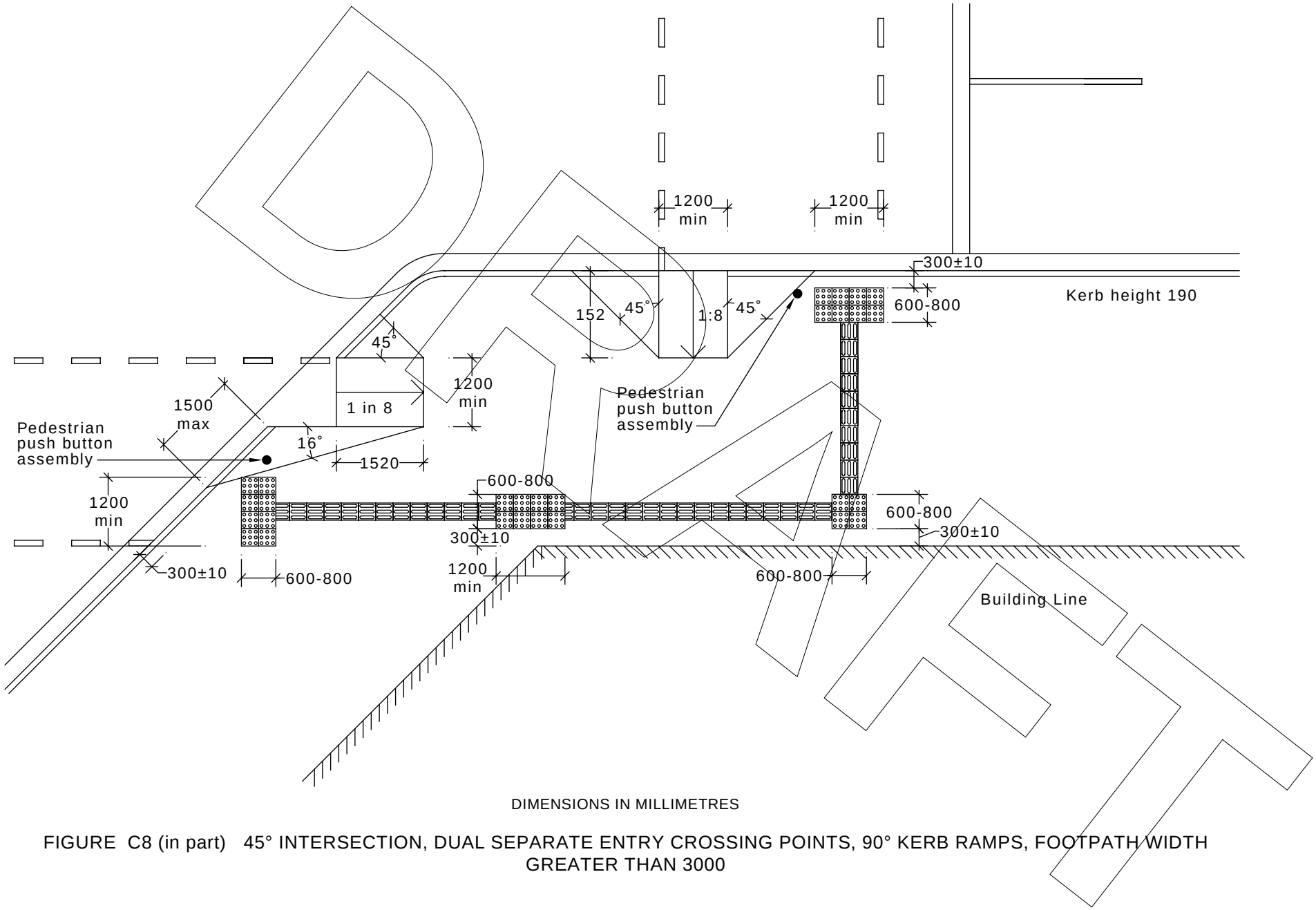
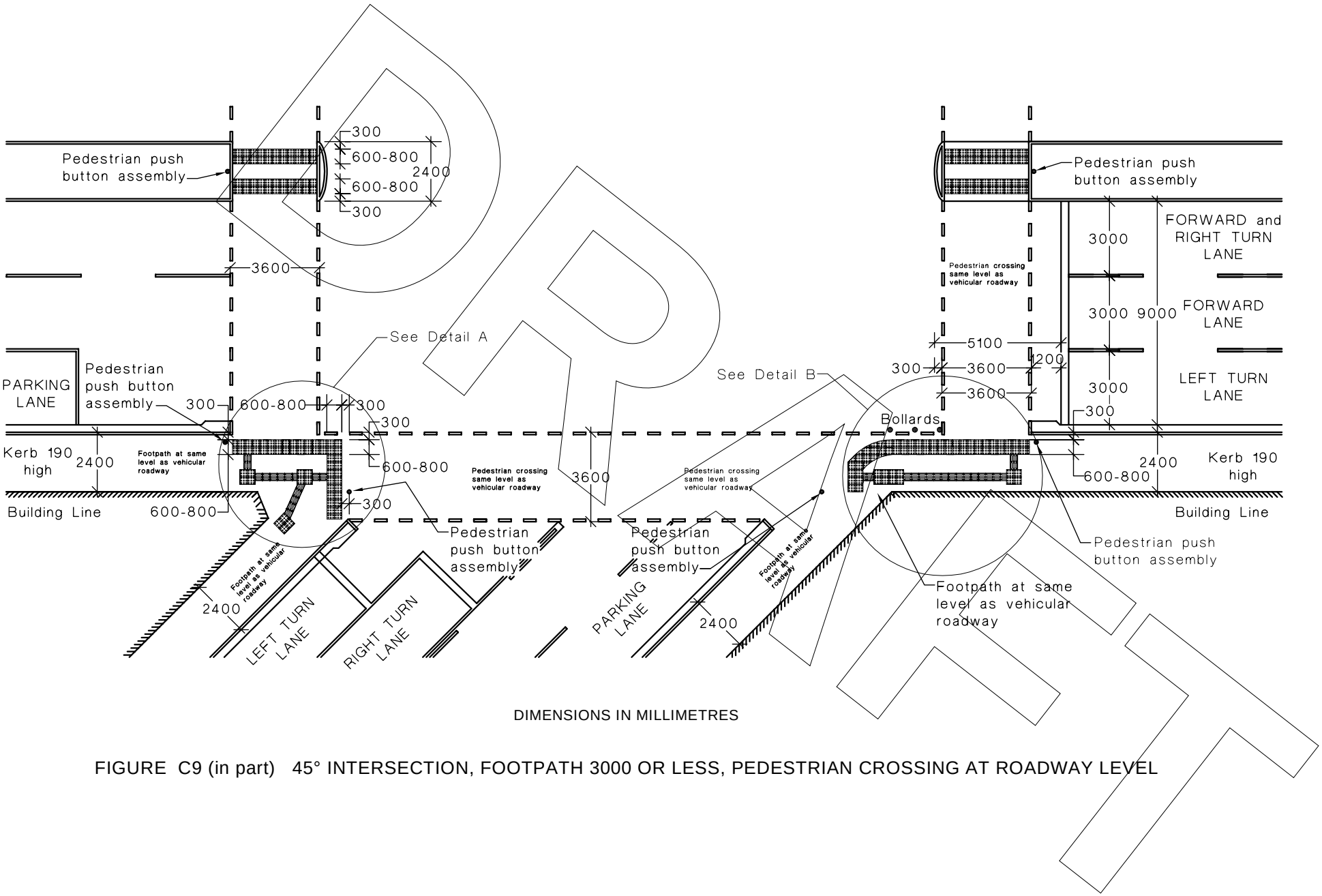


DIMENSIONS IN MILLIMETRES

FIGURE C8 (in part) 45° INTERSECTION, DUAL SEPARATE ENTRY CROSSING POINTS, 90° KERB RAMPS, FOOTPATH WIDTH GREATER THAN 3000

DRAFT ONLY



DIMENSIONS IN MILLIMETRES

FIGURE C9 (in part) 45° INTERSECTION, FOOTPATH 3000 OR LESS, PEDESTRIAN CROSSING AT ROADWAY LEVEL

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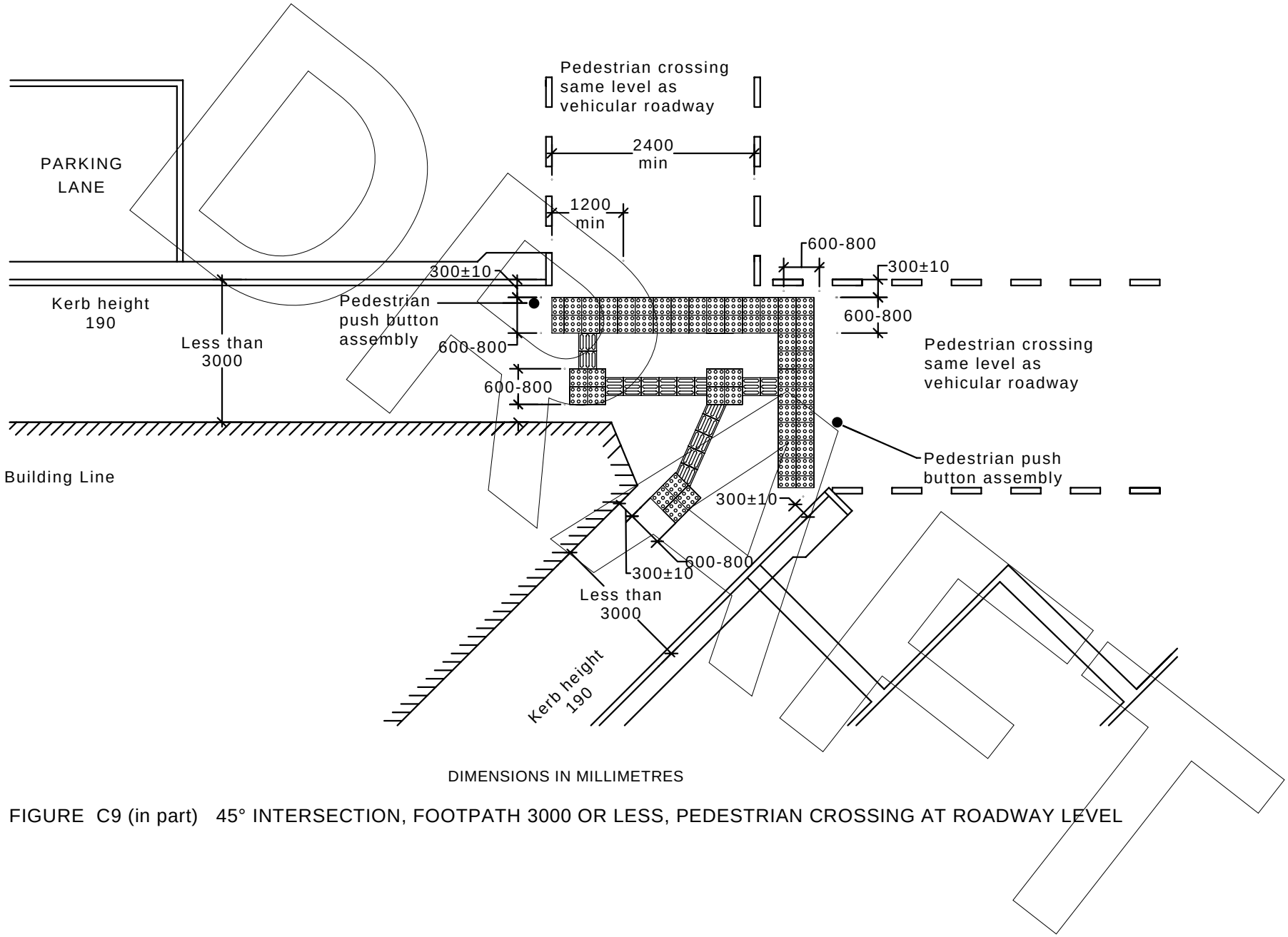


DIMENSIONS IN MILLIMETRES

FIGURE C9 (in part) 45° INTERSECTION, FOOTPATH 3000 OR LESS, PEDESTRIAN CROSSING AT ROADWAY LEVEL

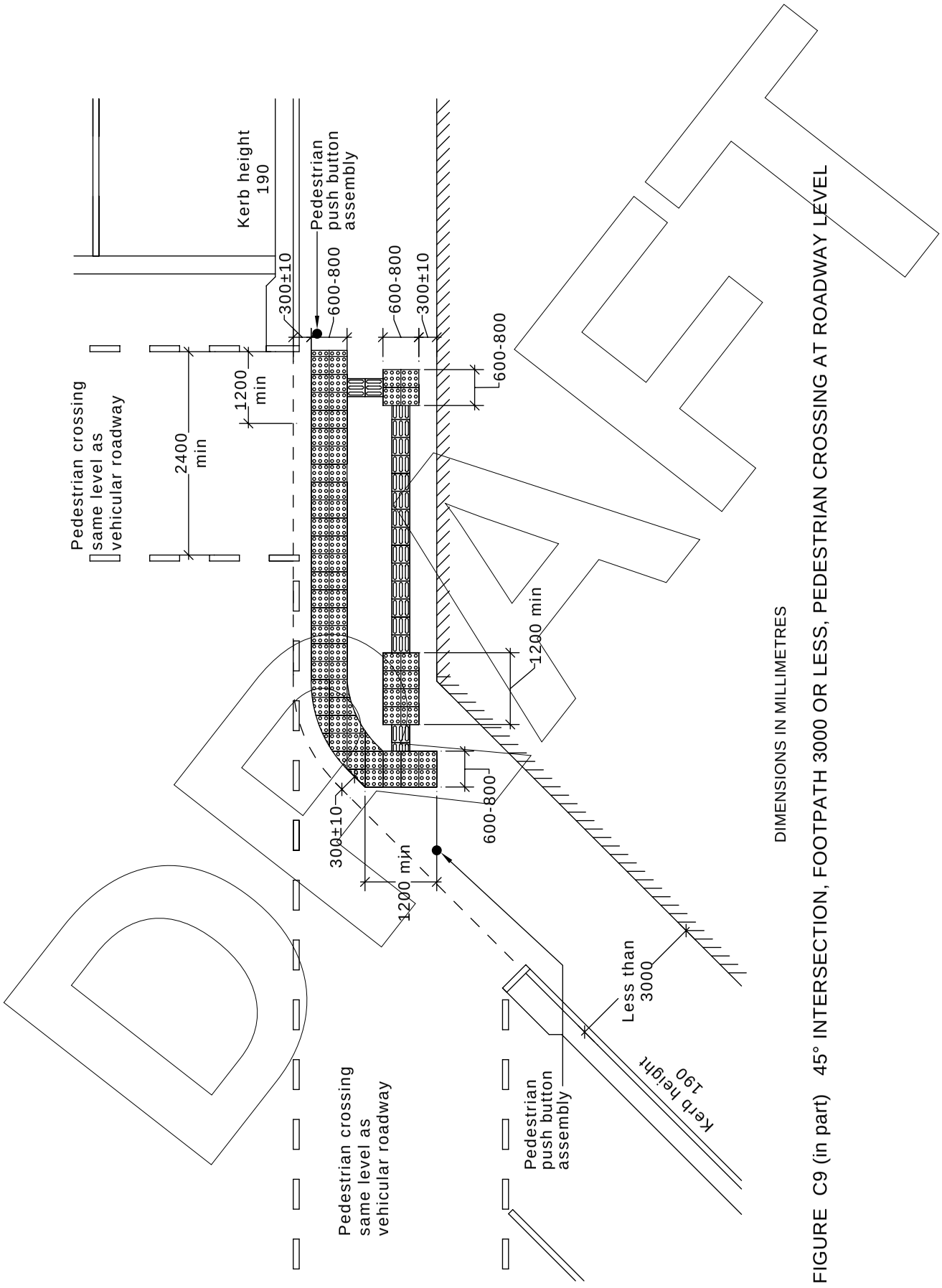


FIGURE C9 (in part) 45° INTERSECTION, FOOTPATH 3000 OR LESS, PEDESTRIAN CROSSING AT ROADWAY LEVEL

C4 MEDIANS

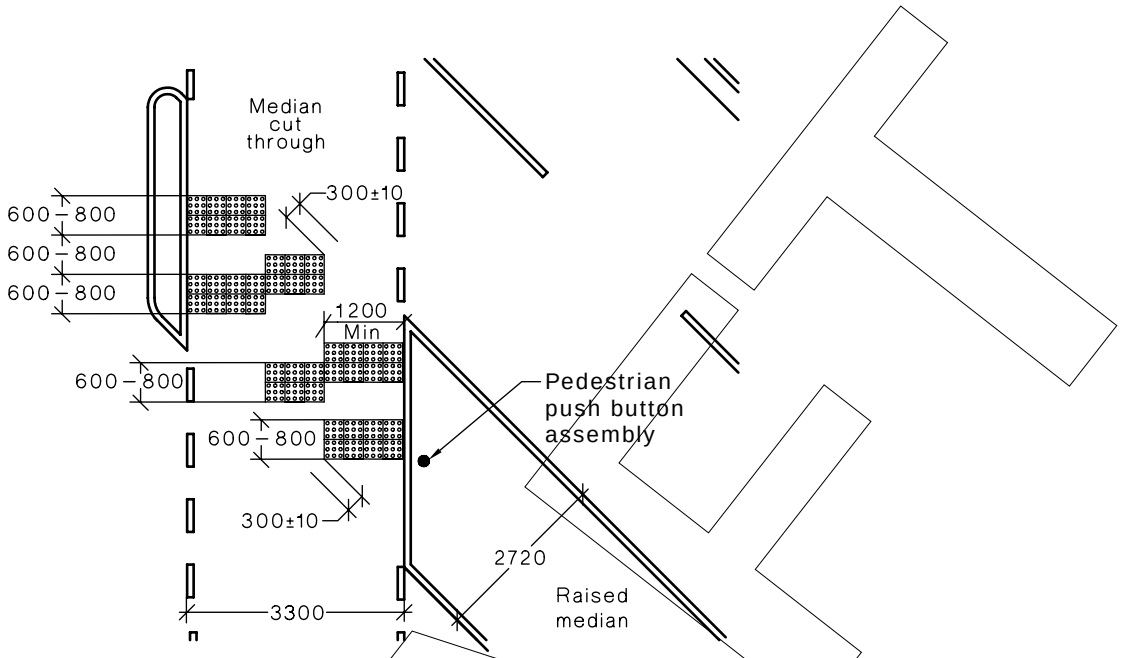
Raised islands in crossings should be cut through level with the street or have kerb ramps at both sides and a level area at least 1200 mm long in the part of the island intersected by the crossings (see Figures C10 and C11).

NOTES:

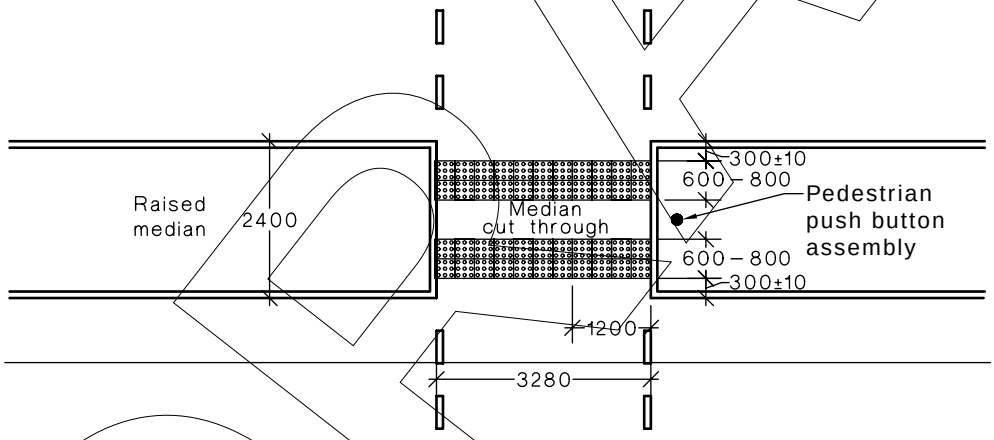
1 Pedestrian push button assemblies should be positioned within the zone of common reach (see AS 1428.2)

2 Where pedestrian push button assemblies are installed, auditory signals and tactile directional indicator buttons should be provided.

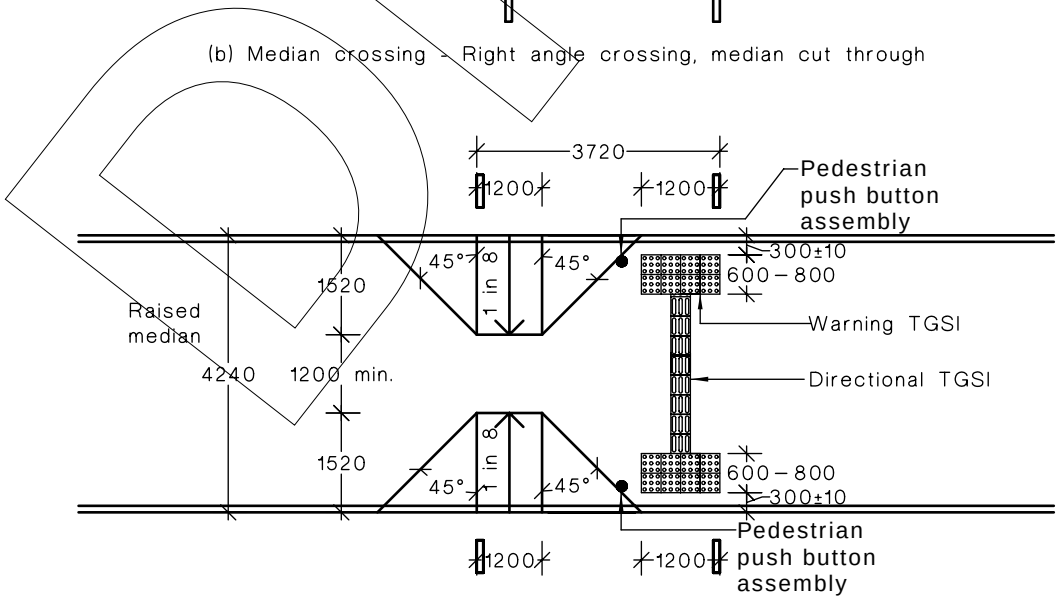
TGSIs should be provided at medians as shown in Figures C10 and C11.



(a) Median crossing - Oblique crossing, median cut through



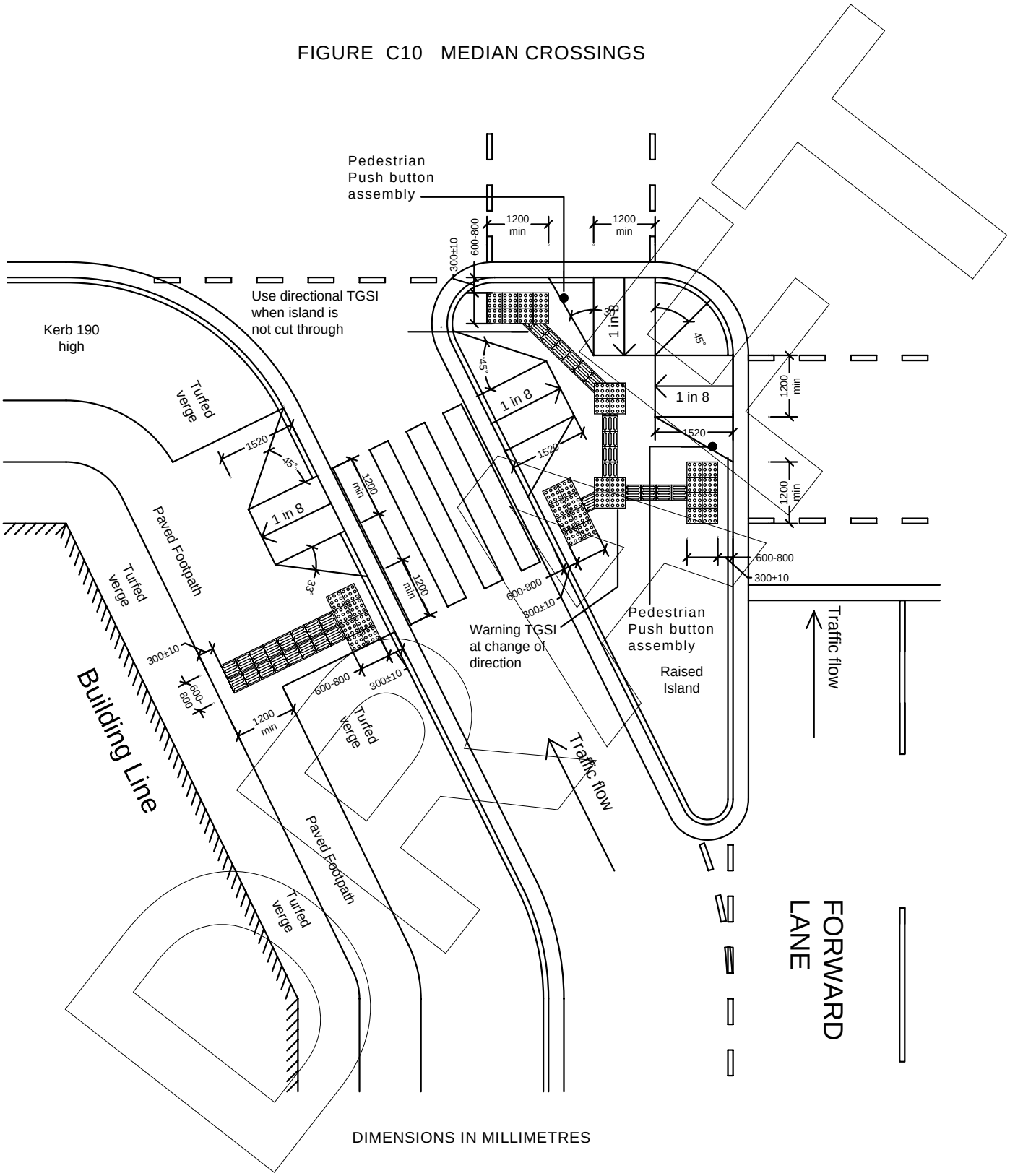
(b) Median crossing - Right angle crossing, median cut through



(c) Median crossing - Right angle crossing, 90 degree kerb ramps

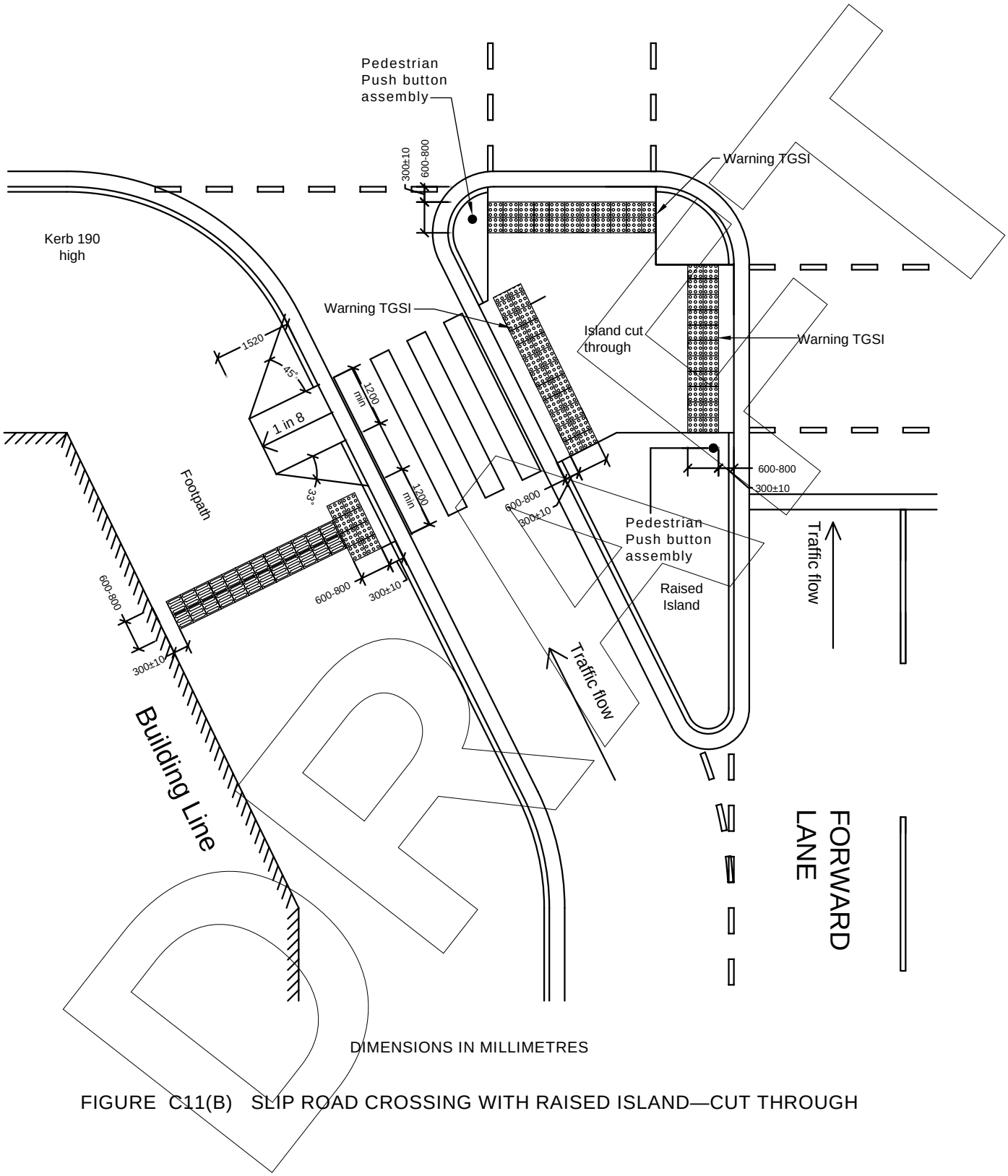
DIMENSIONS IN MILLIMETRES

FIGURE C10 MEDIAN CROSSINGS



DIMENSIONS IN MILLIMETRES

FIGURE C11(A) SLIP ROAD CROSSING WITH RAISED ISLAND—KERB RAMP



DIMENSIONS IN MILLIMETRES

FIGURE C11(B) SLIP ROAD CROSSING WITH RAISED ISLAND—CUT THROUGH

C5 At grade vehicular crossing adjacent to pedestrian entry to building or walkway where motorists vision is limited

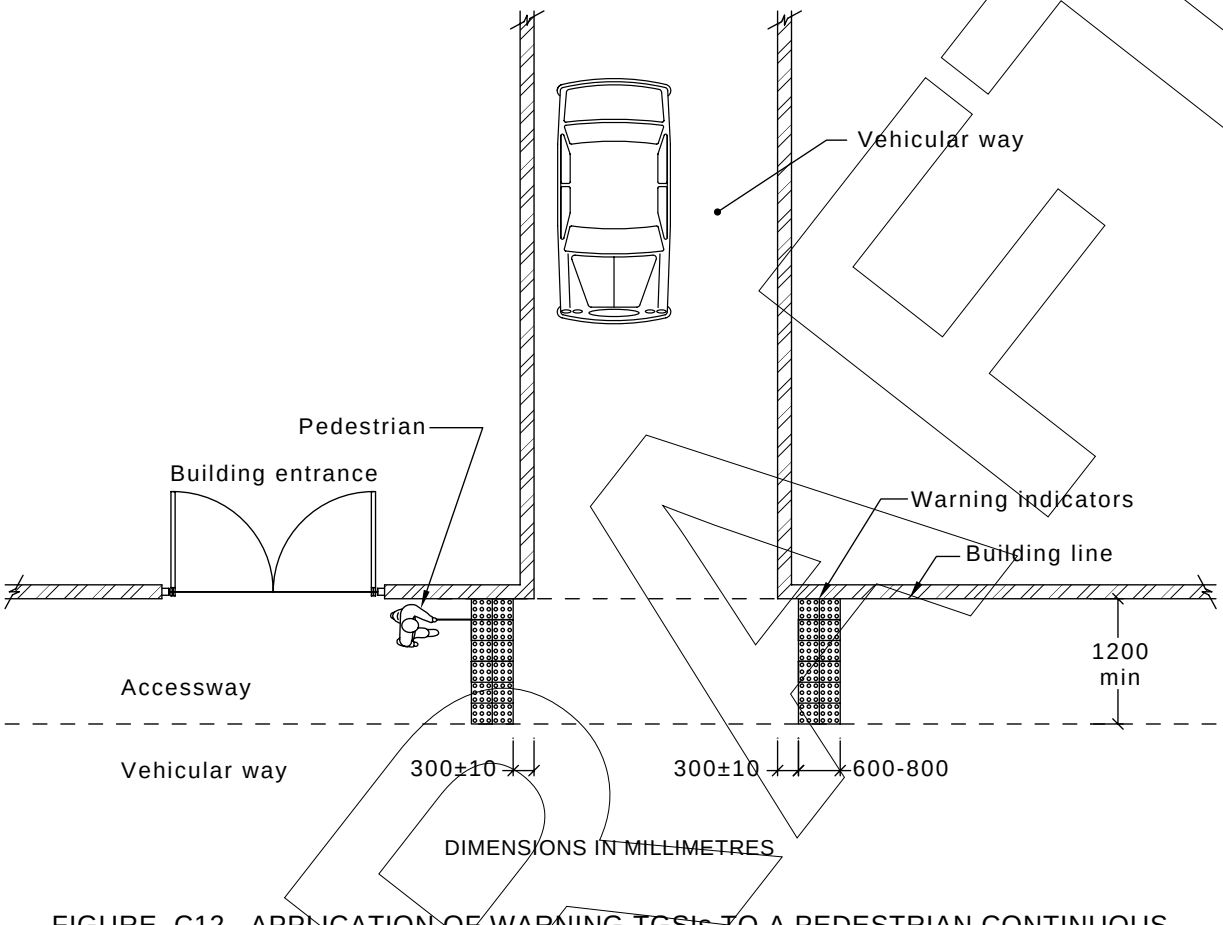


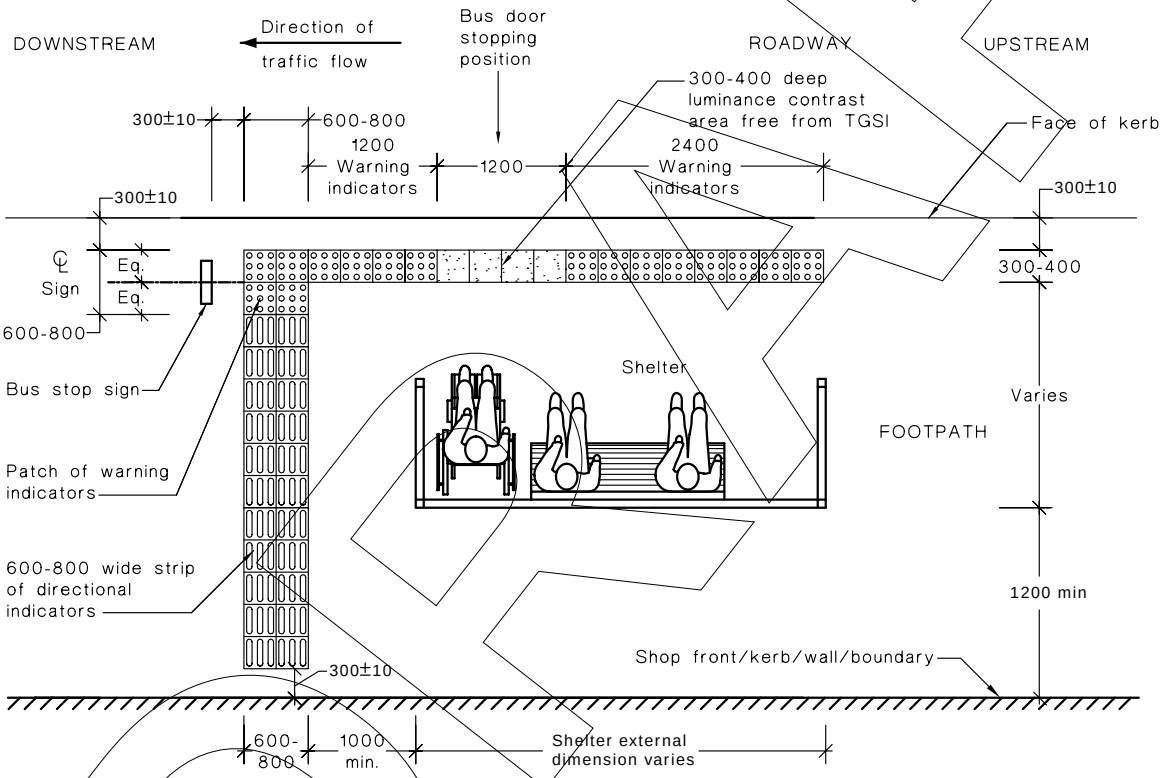
FIGURE C12 APPLICATION OF WARNING TGSIs TO A PEDESTRIAN CONTINUOUS ACCESSIBLE PATH OF TRAVEL TO WARN OF A VEHICULAR CROSSING WHERE A MOTORIST'S VISION IS LIMITED

APPENDIX D

TYPICAL EXAMPLES OF TACTILE GROUND SURFACE INDICATORS FOR BUS STOPS AND TRAM/LIGHT RAIL STOPS

(Informative)

This Appendix provides examples of preferred treatments for a fully accessible bus stop and tram/light rail stops. These treatments should be used as the basis for determining new bus and tram/light rail stop treatments, as well as treatments required as part of the retrofit program on all declared roads. Refer to figures D1 to D3.



NOTES:

1 Where there is a flush junction between pedestrian and vehicular areas adjacent to a bus/light rail stop, the use of TGSIs should be in accordance with Clause 3.6.

2 The circulation space in front of a shelter should be a minimum of 1 m in width. If there is insufficient clear circulation space at the end of the shelter, the upstream end should be open.

3 Included in the layout drawing is the option to extend the application of hazard tactile pavers along the kerb. Discussions with the bus operators, local user groups, disability advocacy groups and users with special needs should be undertaken to determine particular needs.

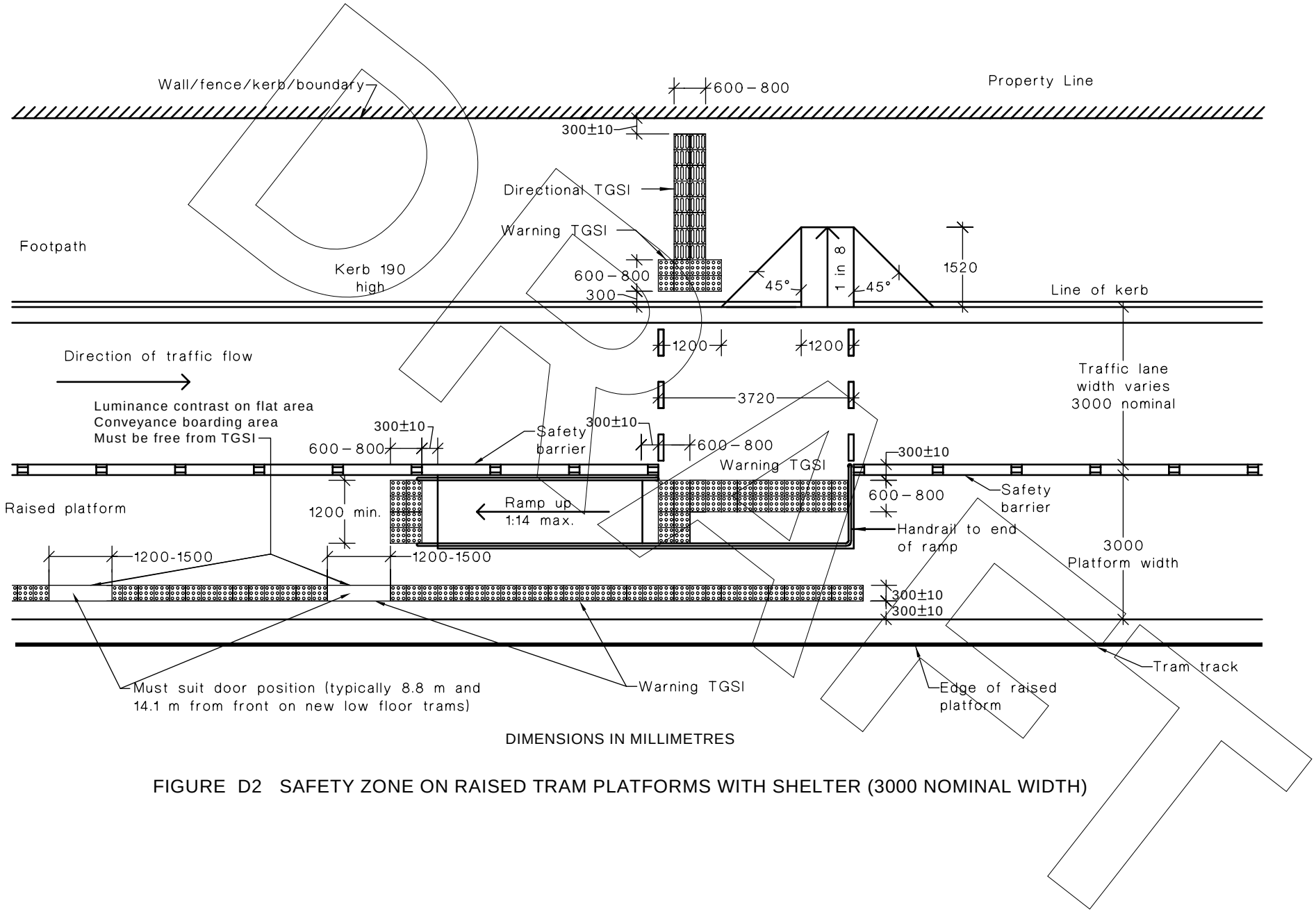
4 The 1200 mm free from warning pavers at the bus door stopping position provide the minimum space for wheelchair manoeuvrability.

5 Where tactile indicators are used along the kerb, they shall be warning indicators set back 300 ±10 mm from kerb edge.

6 Bus door access point may be indicated by the use of luminance contrasting flat pavers to assist wheelchair manoeuvrability.

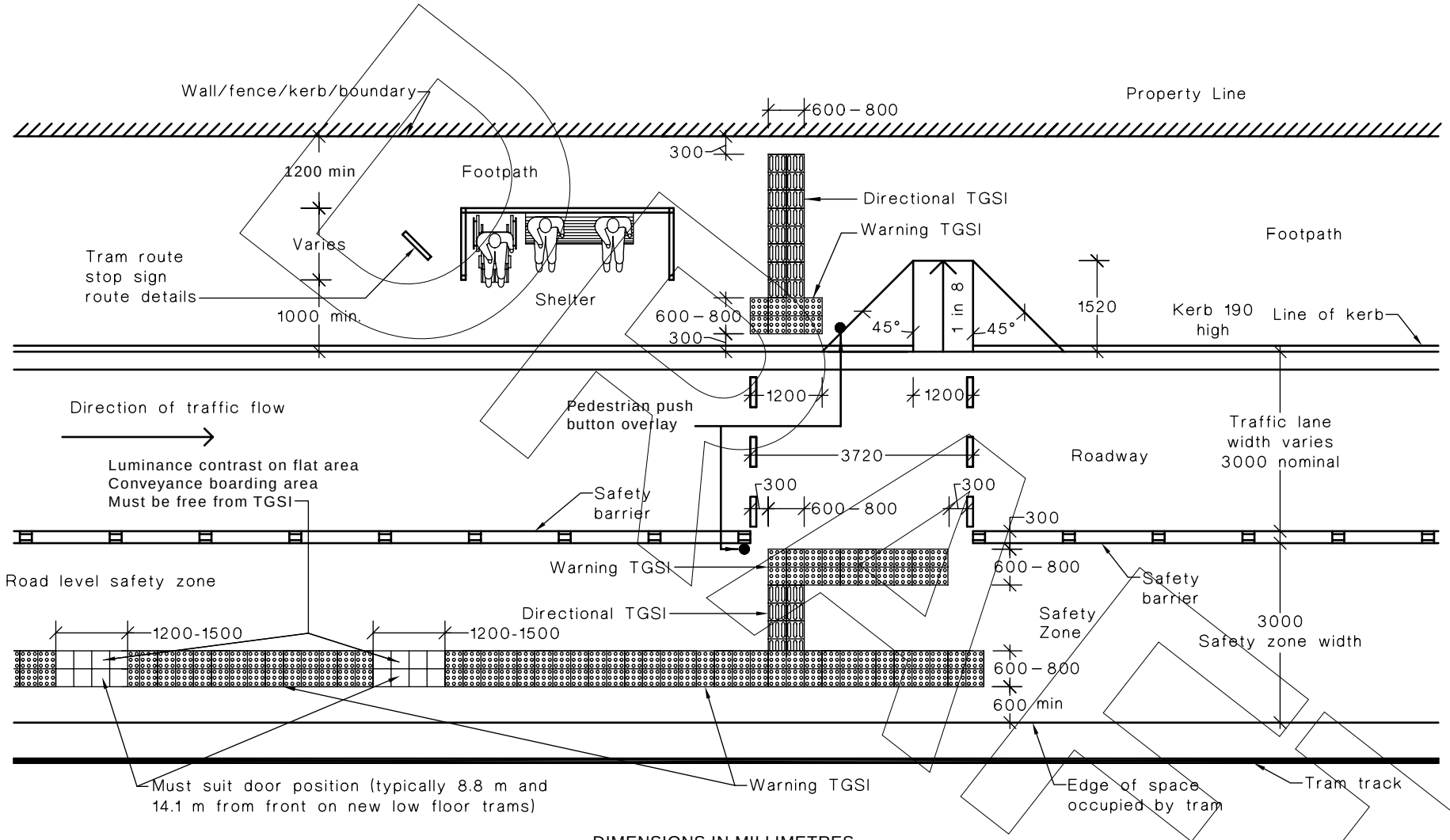
DIMENSIONS IN MILLIMETRES

FIGURE D1 TGSI AT BUS STOPS



DIMENSIONS IN MILLIMETRES

FIGURE D2 SAFETY ZONE ON RAISED TRAM PLATFORMS WITH SHELTER (3000 NOMINAL WIDTH)



DIMENSIONS IN MILLIMETRES

FIGURE D3 ROAD LEVEL TRAM/LIGHT RAIL SAFETY ZONE—ACCESS VIA DUAL ENTRY POINTS
(OPTIONAL PEDESTRIAN-OPERATED SIGNAL SHOWN)

DRAFT ONLY

APPENDIX E

LABORATORY AND ON-SITE MEASUREMENT OF LUMINANCE CONTRAST

(Normative)

E1 GENERAL

This Appendix sets out two methods for measuring the luminance contrast of integrated and discrete units.

Where manufacturers provide the mean luminance reflectance values (expressed as *Y-value*, see Clause E 3.3) of their TGSI products and mean luminance values of common surface materials, this simplifies product specification of both TGSIs and the adjacent surface. Where on-site testing is required, refer to Clause E5.

Where it is necessary to install TGSIs between different coloured surfaces, sufficient luminance contrast has to be achieved with all adjacent surfaces. This can usually be achieved by either using very dark or very light TGSIs. The luminance contrast is achieved by measuring the luminous reflectance of the TGSI and comparing it with the luminous reflectance of the surrounding pavement or floor surface. Alternatively, TGSIs of more than one colour may be used together and arranged in such a manner to achieve sufficient luminance contrast with all base surfaces.

E2 LUMINANCE CONTRAST REQUIREMENTS

Luminance contrast of TGSIs is the difference in the amount of light reflected from the TGSIs compared to the amount of light reflected from the background or adjacent path of travel.

Where the TGSI is an integrated unit, it shall have a minimum luminance contrast of 30% compared to the amount of light reflected from the surface of the adjacent path of travel.

Where the TGSIs are discrete units having the same luminance for the sloping sides and upper surface of the truncated cones, the units shall have a minimum luminance contrast of 45% compared to the amount of light reflected from the surface of the adjacent path of travel.

Where the TGSIs are discrete units having differing luminance for the sloping sides and upper surface of the truncated cones, the units shall have a minimum luminance contrast of 60% compared to the amount of light reflected from the surface of the adjacent path of travel.

E3 MEASUREMENT OF LUMINOUS REFLECTANCE

E3.1 General

This Clause sets out a method for measuring the luminous reflectance of tactile indicators and other surface materials. The method is carried out with reference to a standard light source, which is an inherent feature of suitable colorimeters and spectrophotometers. This enables the test to be conducted both in the laboratory and on-site, and for published results to then be compared.

NOTE: This test method is not suitable for measuring the luminous reflectance of translucent materials or illuminated objects. It is less applicable where the measured. The method specifies colorimeters and spectrophotometers that are widely available commercially and currently used by flooring and paving manufacturers.

E3.2 Instrumentation

A tristimulus colorimeter or spectrophotometer with a diffuse illumination/normal viewing (d/o) geometry, shall be used with CIE Standard Illuminant C. The instrument should be capable of measuring the absolute CIE which is then used to calculate Y_{xy}. The measured luminous reflectance is defined by the tristimulus value *Y*. The luminous reflectance '*Y*' value of the CIE 1964 colour system is recognized in AS/NZS 1580.601.2.

E3.3 Procedure

The procedure shall be as follows:

(a) Calibrate the equipment in accordance with the manufacturer's instructions.

(b) Locate the equipment on the surface to be measured.

(c) Make measurements in at least five locations (on one product) or on five units of the product (such as tiles, where five units are available). Where the surface does appear (visually) to be uniformly coloured, a minimum of 10 measurements shall be taken. Where the surface comprises discrete colours that are sufficiently large to be individually measured, a minimum of five measurements shall be made on each such colour. Record the luminous reflectance (*Y* value) for each individual dry measurement that is made.

NOTE: For standard colours, see AS 2700.

(d) Unless wet measurements are deemed to be inappropriate, wet the surface of the product and ensure that the surface remains wet (such that water ponds on the surface) for a minimum of 5 min. Make measurements as in Step C, as soon as possible after removing any unabsorbed water from the surface with a cloth or sponge that does not leave any solid residue. Record the luminous reflectance (*Y* value) for each individual wet measurement that is made.

(e) Determine the mean dry luminous reflectance Y_d and the mean wet luminous reflectance Y_w. Where measurements have been made on discrete colours and the individual mean luminous reflectances are within 20% of the composite mean luminous reflectance, calculate the dry and wet luminous reflectance as the mean of the colours measured. A more accurate calculation might be based on the relative proportions of each colour (where these proportions might be determined by image analysis techniques) such that $Y = aY_a + bY_b + cY_c$ where a, b and c are the relative proportions of each colour, (i.e., a + b + c = 1, where there are three principal colours). Where the mean luminous reflectances of individual colours vary markedly, it is necessary to either calculate the relative proportions or to determine the luminance of the product using the photometer method.

NOTE: The use of standardized illumination conditions when making photometer measurements could enable manufacturers to publish luminous reflectance values that are consistent with those obtained using this Appendix.

E3.4 Determination of luminous contrast

The luminous contrast (*C*), of two surfaces (such as a tactile indicator and its surround) shall be calculated using the following equation:

$$C = (Y_2 - Y_1) / 0.5\,(Y_1 + Y_2)$$

where Y_1 and Y_2 are the luminous reflectance values of the two surfaces.

In many cases it will be necessary to calculate the luminance contrast in both wet and dry conditions.

E3.5 Report

The following shall be reported:

(a) Full description of the surfaces tested with product details where known.

(b) The instrument geometry, the light source as being D65, the aperture and the observer angle.

(c) The locations of the measurements on the sample.

(d) The mean luminous reflectance of the tactile indicator (or other pedestrian surface) under the conditions set out in Paragraph E3.3.

(e) A reference to this test Method, i.e., AS/NZS 1428.4, Paragraph E3, Appendix E.

The corresponding data for other light sources and illuminant may also be reported.

E4 DETERMINATION OF LUMINANCE CONTRAST

This Clause sets out a method of using the luminous reflectance values to calculate the required luminance contrast of a TGSI between two adjacent or contiguous surfaces when the luminous reflectance of the products are known.

The necessary luminous reflectances (there may be two values corresponding to TGSIs that are lighter or darker than the base surfaces) are calculated based on the following equation:

$$C = (Y_2 - Y_1) / 0.5\,(Y_1 + Y_2) = 0.30$$

for integrated units, or

$$C = (Y_2 - Y_1) / 0.5\,(Y_1 + Y_2) = 0.45$$

for the elements of uniform discrete units, or

$$C = (Y_2 - Y_1) / 0.5\,(Y_1 + Y_2) = 0.6$$

for composite discrete units.

where

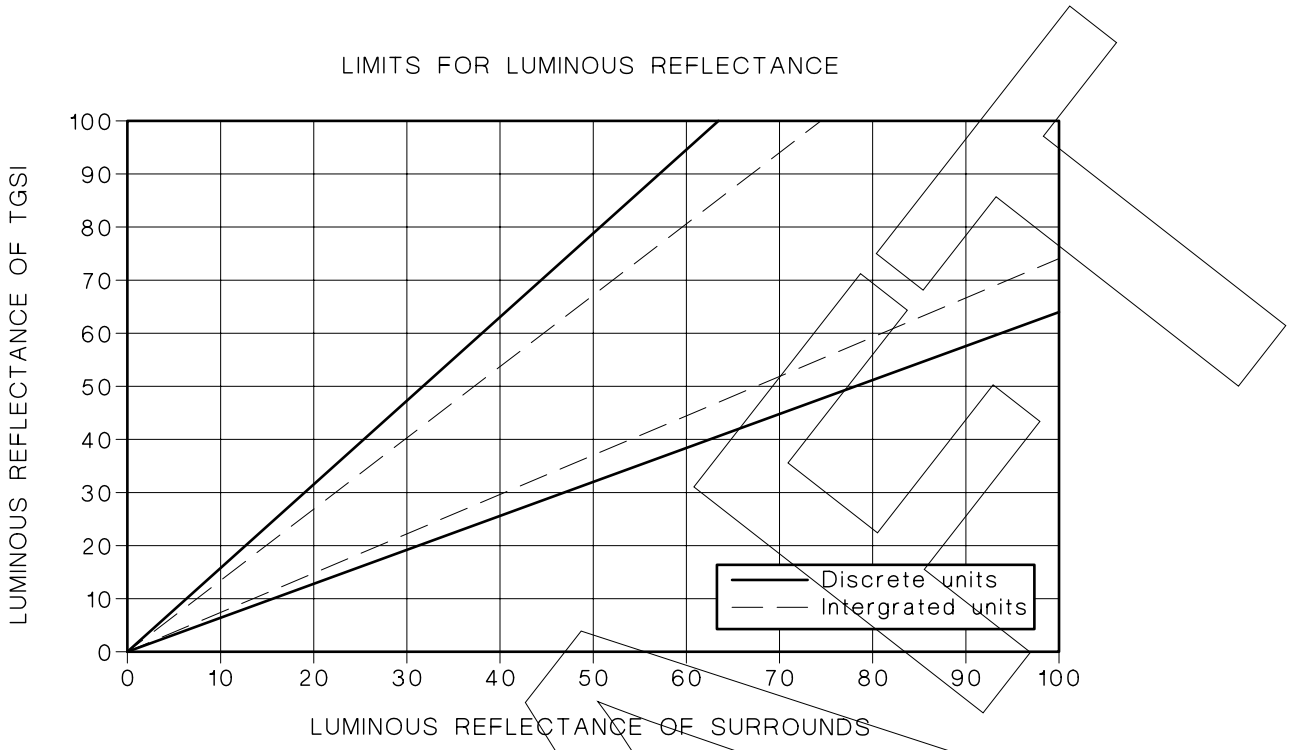
Y_2 is the lighter surface and Y_1 is the darker surface

The full set of limits is shown in Table E1. For adjacent paths of travel where the luminance of the adjacent surround, $Y_s > 60$, discrete units that are lighter than the surround can never provide sufficient contrast. Similarly, surrounds with $Y_s > 70$ cannot be adequately contrasted by integrated units.

Alternatively, this may be illustrated by Figure E1. The luminous reflectance of the TGSI shall lie above or below the lines illustrating the minimum and maximum luminous reflectance necessary.

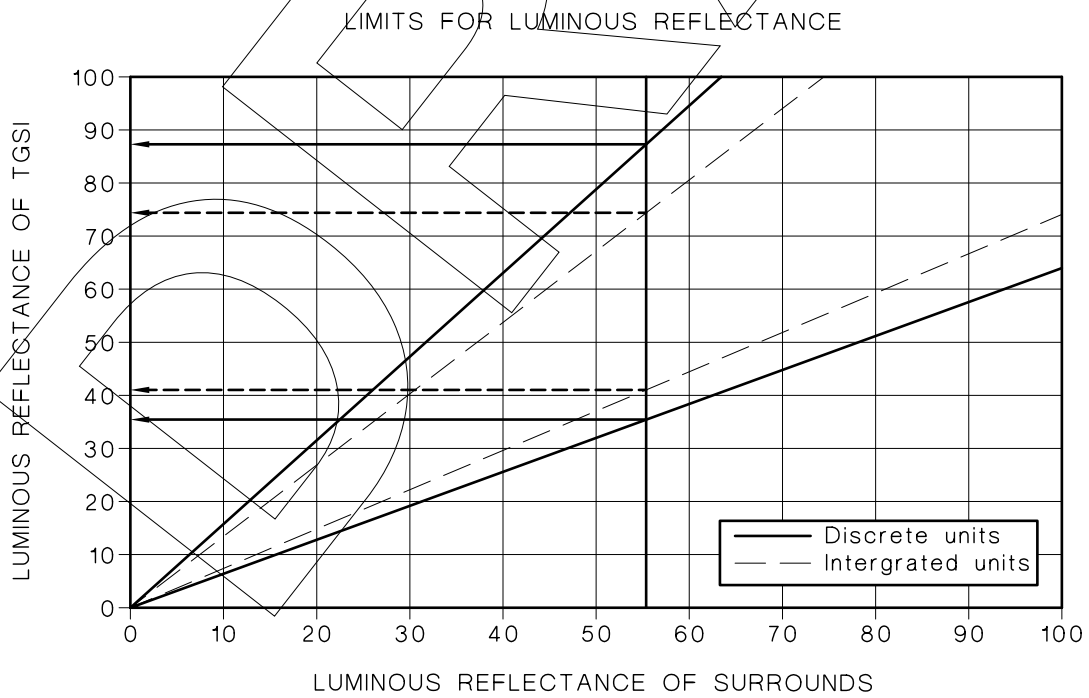
An example using this nomogram is illustrated in Figure E2. An assumed luminous reflectance for the surrounds of 55 is indicated by a vertical line from the x-axis. The intersections with the limiting luminous reflectance values are then reflected to the y-axis by arrows with solid lines to indicate the necessary luminous reflectance values for integrated TGSIs (≤41 or ≥74, dashed lines) or discrete TGSIs (≤35 or ≥87, solid lines).

Additionally, many products will have different dry and wet characteristics and separate measurements of luminance reflectance of the surrounds and TGSIs will need to be made. These may then be used to calculate the limits for the wet state in exactly the same way.



NOTE: Luminous reflectance of TGSI must lie above upper line or below lower line appropriate to the type of TGSI.

FIGURE E1 LIMITING VALUES OF LUMINOUS REFLECTANCE OF TGSI AS A FUNCTION OF LUMINOUS REFLECTANCE OF THE SURROUND.



NOTE: Example is a surround reflectance of 55 (X axis). The limits of ≤41 or ≥74 for an integrated TGSI of ≤35 or ≥87 for discrete TGSI can be read off on the Y axis.

FIGURE E2 WORKED EXAMPLE DEVELOPED FROM FIGURE E1.

E5 MEASUREMENT OF LUMINANCE CONTRAST

E5.1 General

This Paragraph sets out the method of on-site measurement of contrast of tactile indicators with their surroundings. This method is carried out under the prevailing lighting condition(s) and is also applicable where the tactile indicator or base surface is not uniformly coloured.

NOTE: The method specifies a luminance meter with a 1° measurement field. Such meters are widely available. While a wider field of view such as 3° may be preferable because it permits a shorter measurement distance, luminance meters with wider fields are less common and substantially more expensive.

E5.2 Instrumentation

A single lens reflex luminance meter with a 1° measurement field and a spectral responsivity approximating the CIE 1931 Standard Observer V (λ) function specified in ISO CIE 10527.

E5.3 Procedure

The procedure shall be as follows:

(a) Mount the photometer on a tripod so that the centre of the objective lens is at a height of 1.6 ±0.1 m (representative of the eye height of a standing person).

(b) Locate the tripod over the centre-line of the tactile marker array (extrapolated if necessary) and direct the luminance meter along the array to the point where the width of an indicator just fills the measurement field (see Figure E3). Choose an area that is visually uniformly lit. Record the luminance L_1.

(c) Direct the photometer to measure the area immediately alongside the previous location to the left of the tactile indicator. Record the luminance L_2.

(d) Repeat the measurement in Step (c) to the right of the tactile indicator. Record the luminance L_3.

(e) If the tactile indicator or the surrounds are highly coloured, correct any significant deviation from the CIE V(λ) function by measuring the luminance of a white plate (L_a) direct and then through a filter (L_b) with nominally the same chromaticity as the tactile indicator or surround, as appropriate, and known luminous transmittance (τ). Where the correction factor F is defined as follows:

$$F = \frac{L_a}{L_b} \cdot \tau$$

(f) If the surrounds on both sides of the indicator are nominally the same material and appearance, calculate the mean luminance of the surrounds

$$L_{2,3} = \frac{L_2 + L_3}{2}$$

and use this average in the calculations. If the materials either side of the tactile indicator are not the same, the calculations shall be carried out for each side independently.

(g) When averaging the surround, calculate the contrast of the tactile indicator with the surround as follows:

$$\text{If } L_{2,3} > L_1 \text{ then } C = \frac{L_{2,3} - L_1}{L_{2,3}}$$

(h) If $L_1 > L_{2,3}$ then $C = \dfrac{L_1 - L_{2,3}}{L_1}$

When dealing with different surrounds, calculate the contrast of the tactile indicator with the surround on each side.

If $L_{2 \text{ or } 3} > L_1$ then $C_{2 \text{ or } 3} = \dfrac{L_{2 \text{ or } 3} - L_4}{L_{2 \text{ or } 3}}$

If $L_1 > L_{2 \text{ or } 3}$ then $C_{2 \text{ or } 3} = \dfrac{L_{2 \text{ or } 3} - L_{2 \text{ or } 3}}{L_1}$

Compliance is established using C or $C_{2;}$ or C_2 and C_3, as appropriate.

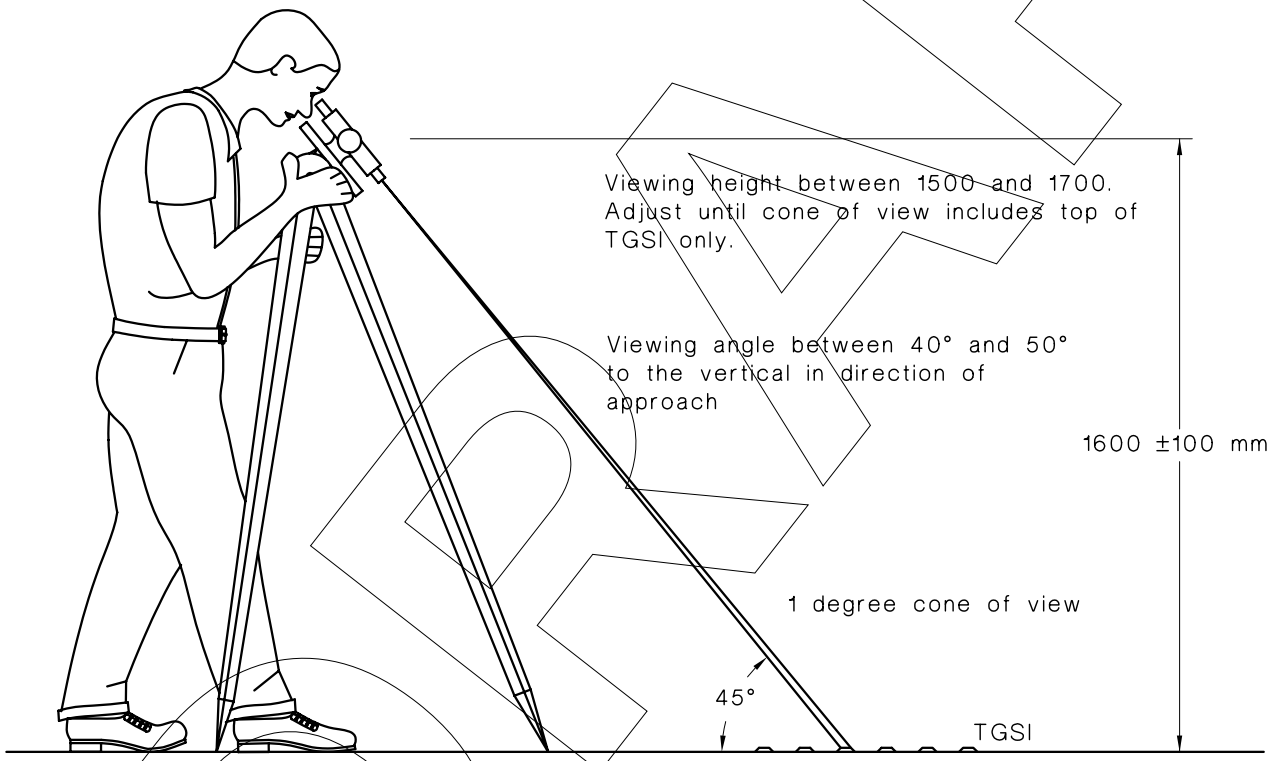


FIGURE E3(A) POSITION FOR MEASURING THE LUMINANCE OF THE TACTILE INDICATOR MEASURED BY THE LUMINANCE METER

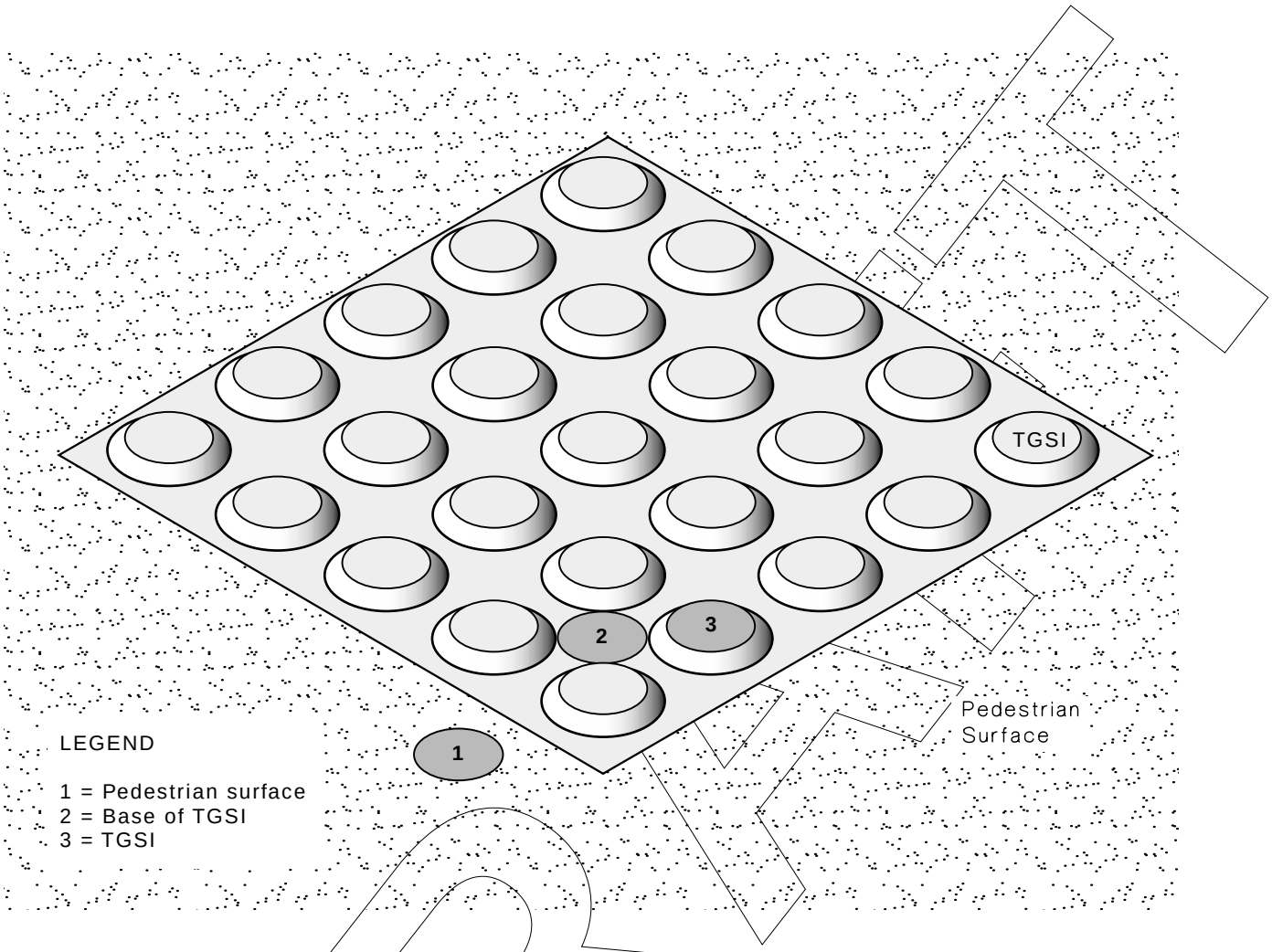


FIGURE E3(B) THROUGH THE EYEPIECE VIEW

E5.4 Report

The following shall be reported:

(a) Full description of the surfaces tested with product details where known.

(b) The instrument being a luminance meter with a 1° measurement area corrected to approximate the CIE 1931 Standard Observer.

(c) The location of the sample, if on-site.

(d) The location of the sample of the measurements on the TGSI.

(e) A description of the light source(s) illuminating the sample, including type, *e.g.,* fluorescent tube, incandescent, high pressure sodium discharge, metal halide, and colour (in general terms).

(f) The mean luminous reflectance of the adjacent surrounds to the tactile indicator under the conditions set out in Paragraph E5.3

(g) The mean luminous reflectance of the tactile indicator under the conditions set out in Paragraph E5.3

(h) The luminance contrast with the surrounds on both sides of the tactile indicator.

(i) A reference to this test method, i.e., AS/NZS 1428.4, Paragraph E5, Appendix E.

Where the lighting source varies, *e.g.,* by night and day, the corresponding data for other light sources may also be reported.

APPENDIX A

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*** END OF DRAFT ***

PREPARATION OF JOINT AUSTRALIAN/NEW ZEALAND STANDARDS

Joint Australian/New Zealand Standards are prepared by a consensus process involving representatives nominated by organizations in both countries drawn from all major interests associated with the subject. Australian/New Zealand Standards may be derived from existing industry Standards, from established international Standards and practices or may be developed within a Standards Australia, Standards New Zealand or joint technical committee.

During the development process, Australian/New Zealand Standards are made available in draft form at all sales offices and through affiliated overseas bodies in order that all interests concerned with the application of a proposed Standard are given the opportunity to submit views on the requirements to be included.

The following interests are represented on the committee responsible for this draft Australian/ New Zealand Standard:

AUSTROADS
Association of Consultants in Access Australia
Australian Association of Occupational Therapists
Australian Building Codes Board
Australian Industry Group
Australian Institute of Building
Australian Institute of Building Surveyors
Blind Citizens Australia
Commonwealth Department of Veterans Affairs
Consumers' Federation of Australia
Deafness Forum of Australia
Disabled Persons Assembly New Zealand Inc.
Housing Industry Association
Independent Living Centres Australia
Master Builders Australia
Mobility Research Centre New Zealand
Physical Disability Council of Australia
Property Council of Australia
The Royal Australian Institute of Architects

Additional interests participating in preparation of Standard:

Attorney General's Department
Human Rights and Equal Opportunity Commission