



Euro NCAP
For Safer Cars

Version 1.2
July 2026

Verification conditions for robustness layers

Crash Avoidance

Technical Bulletin CA 002

Implementation 1st January 2026

PREFACE

DISCLAIMER: Euro NCAP has taken all reasonable care to ensure that the information published in this protocol is accurate and reflects the technical decisions taken by the organisation. In the unlikely event that this protocol contains a typographical error or any other inaccuracy, Euro NCAP reserves the right to make corrections and determine the assessment and subsequent result of the affected requirement(s).

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INTRODUCTION

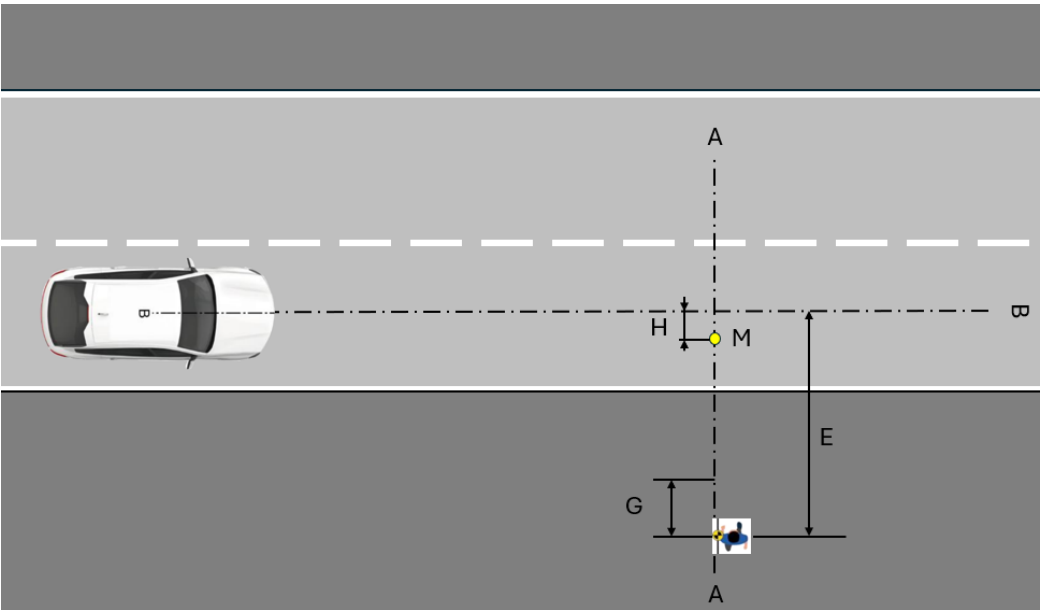
This document outlines the verification conditions that must be followed by the Test Laboratory at the time of verifying the claimed performance across the robustness layers contained in the Euro NCAP Crash Avoidance Frontal Collisions and Lane Departure Collisions assessment.

1 FRONTAL COLLISIONS

1.1Speed

1.1.1 CPNA – 25% with variation of target speed

Standard CPNA-25% with pedestrian speed of 8km/h.

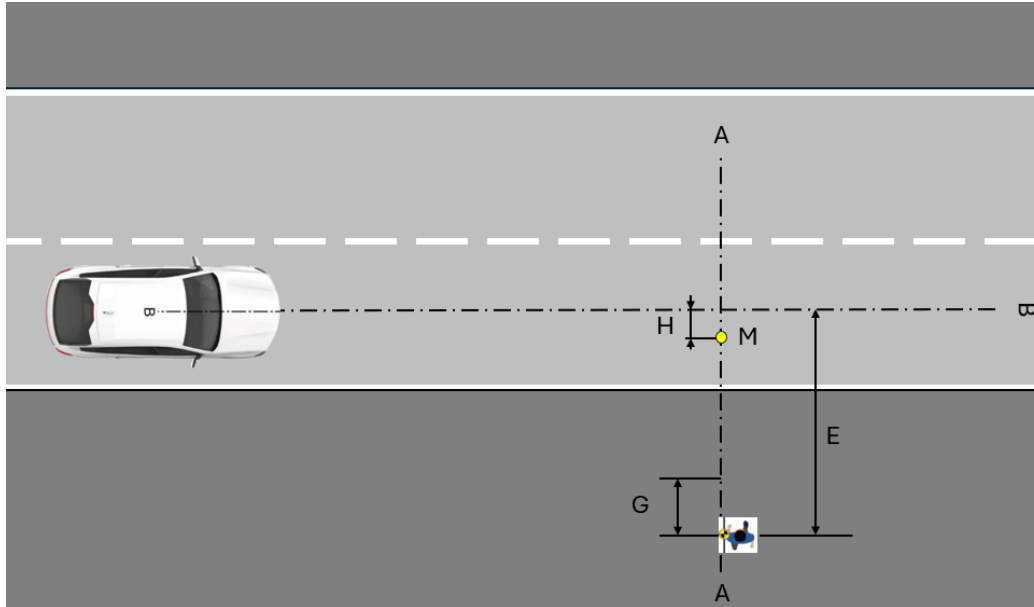


Axes		Values
AA	Trajectory of pedestrian dummy H-point	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.5m
H	Impact point offset for 25%	
Points		
M	Impact position for 25% nearside scenario	

1.2 Initial position offset

1.2.1 CPNA – 25% with variation of starting position

Standard CPNA-25% with variation of starting point E for the pedestrian.



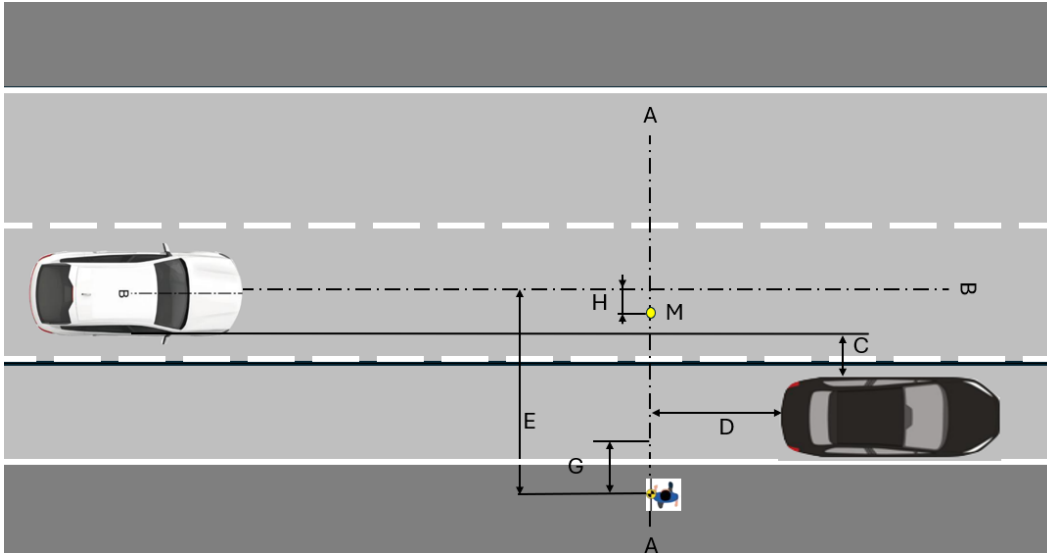
Axes		Values
AA	Trajectory of pedestrian dummy H-point	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m -25%
G	Dummy acceleration distance (walking)	1.0m
H	Impact point offset for 25%	
Points		
M	Impact position for 25% nearside scenario	

1.3 Infrastructure/Clutter

1.3.1 Car-to-Pedestrian

1.3.1.1 CPNA – 25% with parked vehicle after pedestrian path

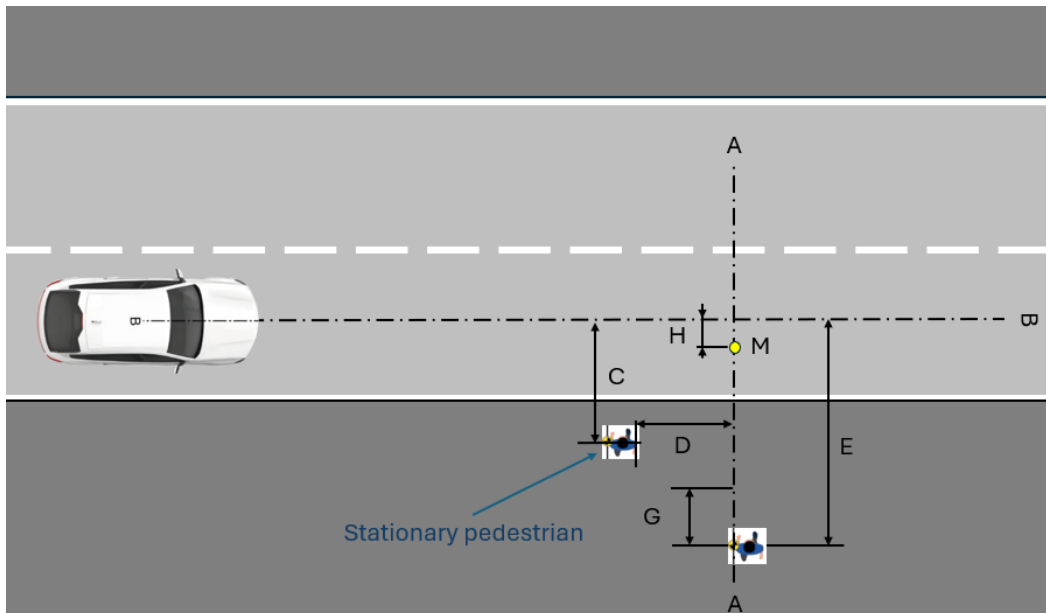
Standard CPNA-25% with dark SUV parked after pedestrian path AA.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.0m
C	Distance between Vehicle under test and the parked vehicle	1.0m
D	Mid rear of parked vehicle to pedestrian path	1.5 - 2.5m
H	Impact point offset for 25%	
Points		
M	Impact position for 25% nearside scenario	

1.3.1.2 CPNA – 25% with stationary pedestrian in front of pedestrian path

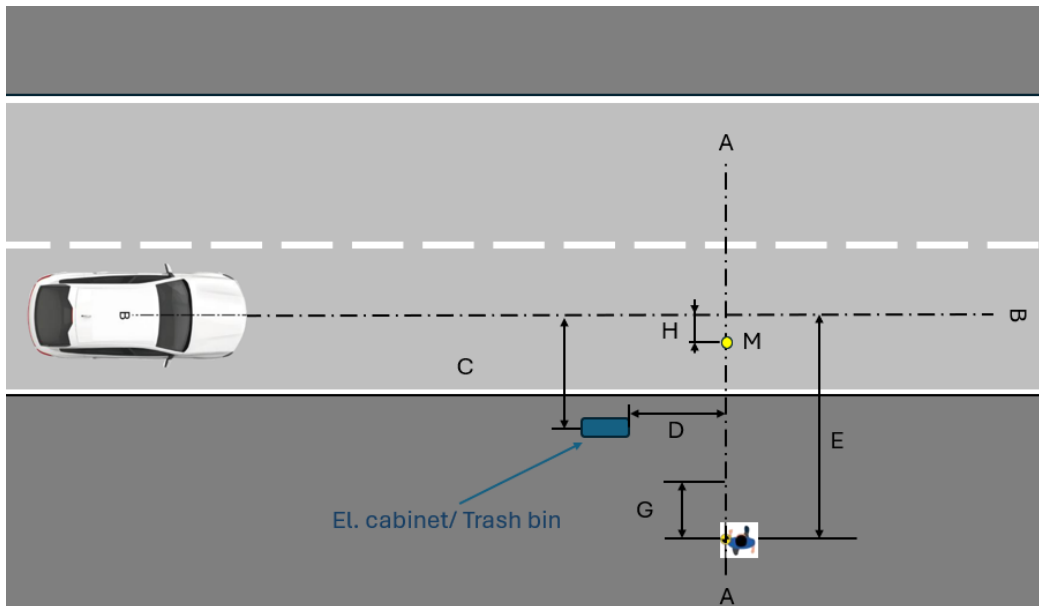
Standard CPNA-25% with stationary pedestrian standing before walking pedestrian path AA.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.0m
C	Stationary dummy H-point to VUT centreline BB	2.5m
D	Stationary dummy right shoulder to pedestrian path AA	1.0-1.5m
H	Impact point offset for 25%	
Points		
M	Impact position for 25% nearside scenario	

1.3.1.3 CPNA – 25% with Electrical cabinet / Trash bin in front of pedestrian path

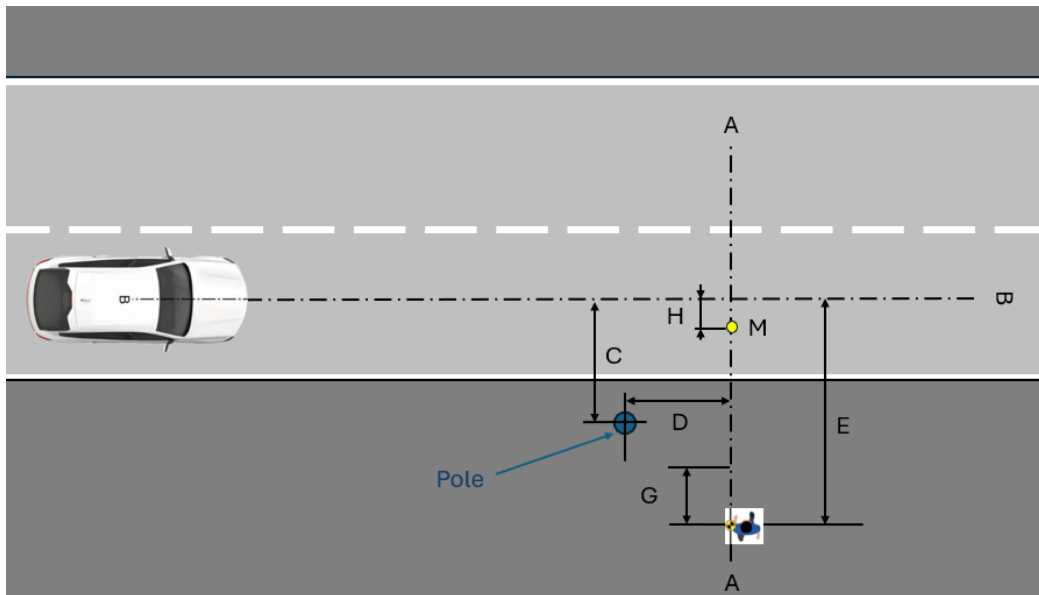
Standard CPNA-25% with Electrical cabinet/ trash bin before pedestrian path AA.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.0m
C	Mid Electrical Cabinet </Trash bin to VUT centreline BB	2.5m
D	Side Electrical Cabinet/Trash bin to pedestrian path AA	1.0-1.5m
H	Impact point offset for 25%	
Points		
M	Impact position for 25% nearside scenario	

1.3.1.4 CPNA – 25% with Street light pole in front of pedestrian path

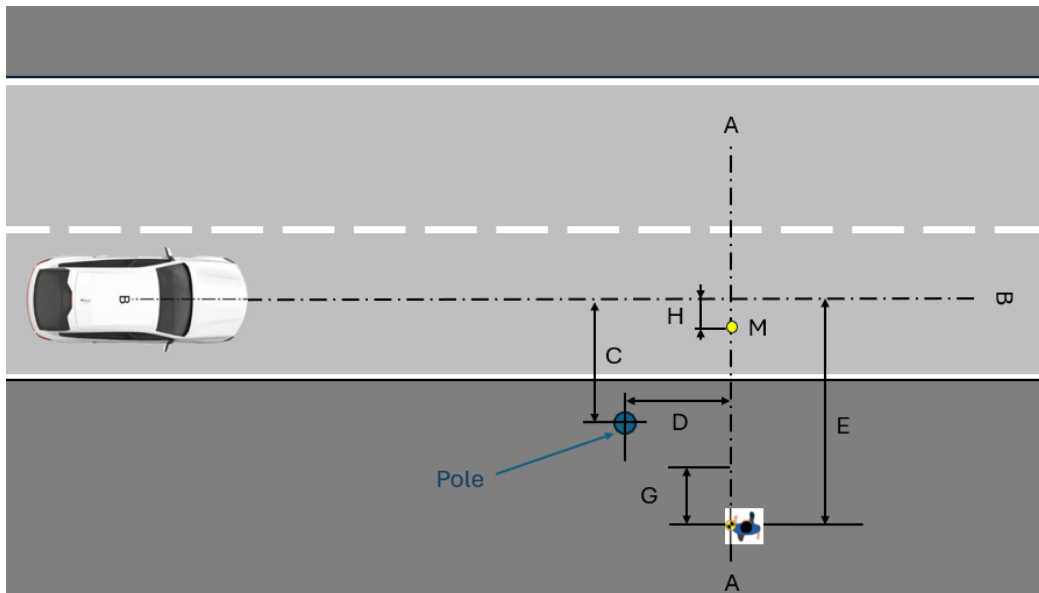
Standard CPNA-25% with Street light pole Ø 23 cm in front of pedestrian path AA.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.0m
C	Mid Pole to VUT centreline BB	2.5m
D	Mid Pole to pedestrian path AA	1.0 - 1.5m
H	Impact point offset for 25%	
Points		
M	Impact position for 25% nearside scenario	

1.3.1.5 CPNA – 25% with Traffic light pole in front of pedestrian path

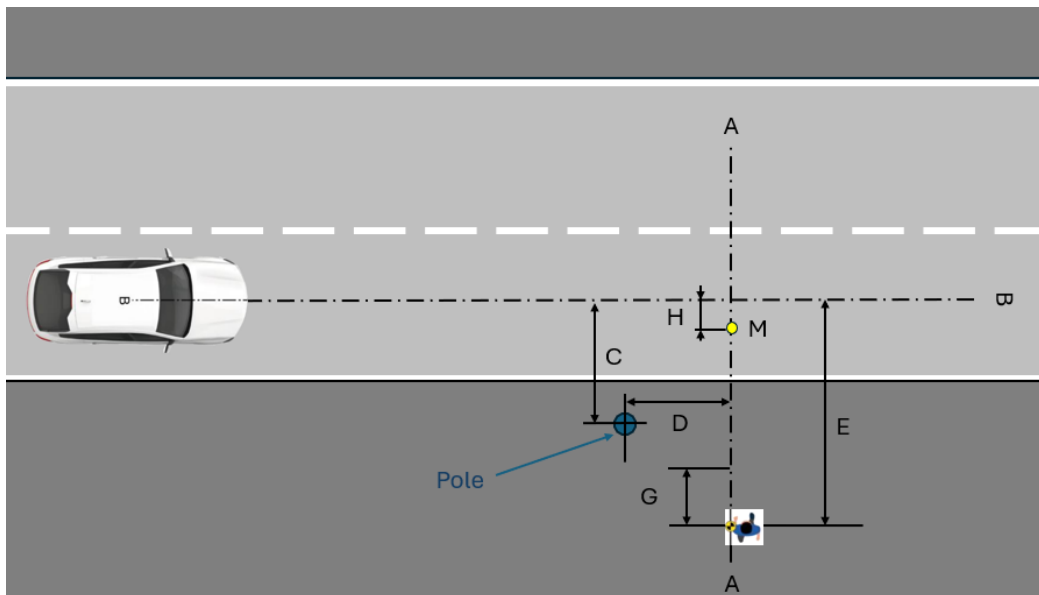
Standard CPNA-25% with Traffic light pole Ø 12 cm in front of pedestrian path AA.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.0m
C	Mid Pole to VUT centreline BB	2.5m
D	Mid Pole to pedestrian path AA	1.0 – 1.5m
H	Impact point offset for 25%	
Points		
M	Impact position for 25% nearside scenario	

1.3.1.6 CPNA – 25% with Traffic sign pole in front of pedestrian path

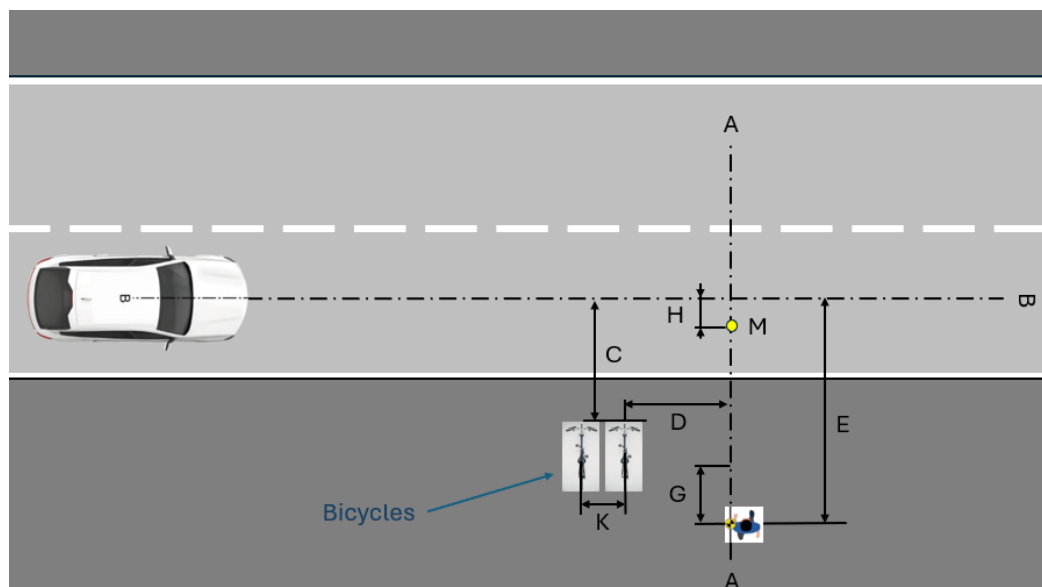
Standard CPNA-25% with Traffic sign pole Ø 7 cm in front of pedestrian path AA.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.0m
C	Mid Pole to VUT centreline BB	2.5m
D	Mid Pole to pedestrian path AA	1.0 – 1.5m
H	Impact point offset for 25%	
Points		
M	Impact position for 25% nearside scenario	

1.3.1.7 CPNA – 25% with parked bicycles in front of pedestrian path

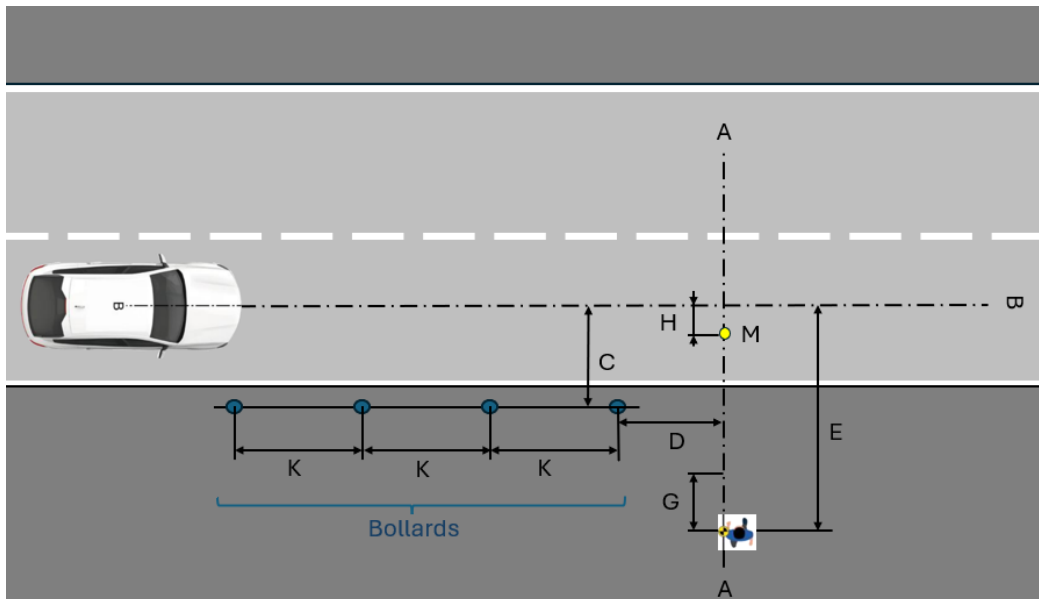
Standard CPNA-25% with two parked bicycles in front of pedestrian path AA.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.0m
C	Front bicycle wheel to VUT centreline BB	2.5m
D	Mid front wheel on bicycle to pedestrian path AA, for the bicycle closest to pedestrian path.	1.0 – 1.5m
K	Between the two parallel parked bicycles	1.0m
H	Impact point offset for 25%	
Points		
M	Impact position for 25% nearside scenario	

1.3.1.8 CPNA – 25% with multiple bollards in front of pedestrian path

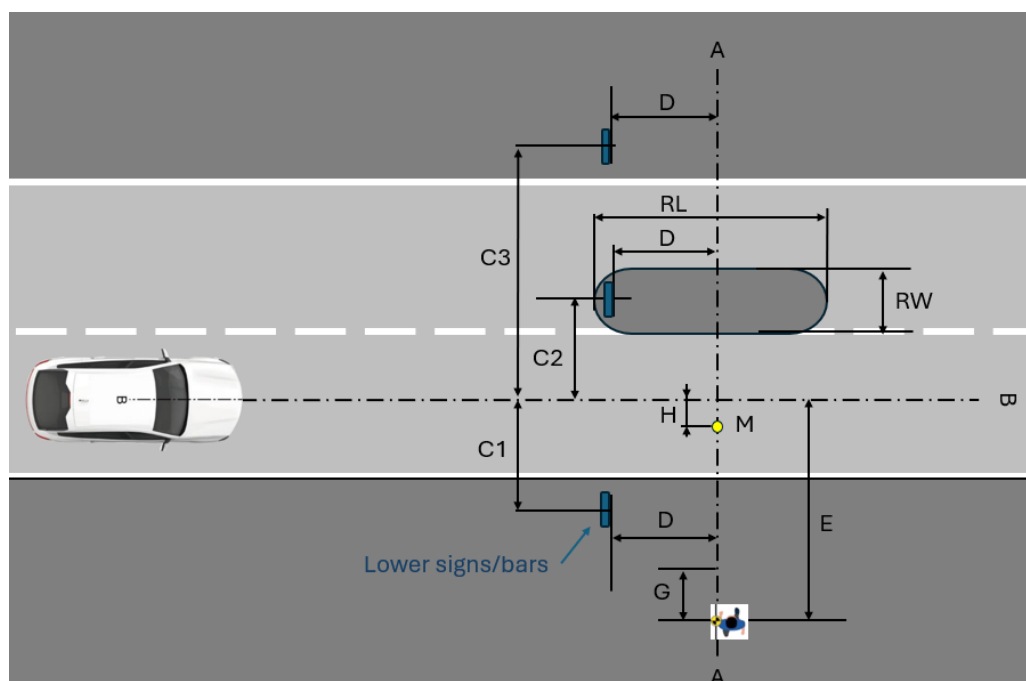
Standard CPNA-25% with four bollards in front of pedestrian path AA.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.0m
C	Mid of the bollards to the VUT centreline BB	2.25m
D	Mid of the last bollard to the pedestrian path	1.0 – 1.5m
K	Mid to mid of the closest bollards	1.0m
H	Impact point offset for 25%	
Points		
M	Impact position for 25% nearside scenario	

1.3.1.9 CPNA – 25% with lower sign bars/poles on both sides

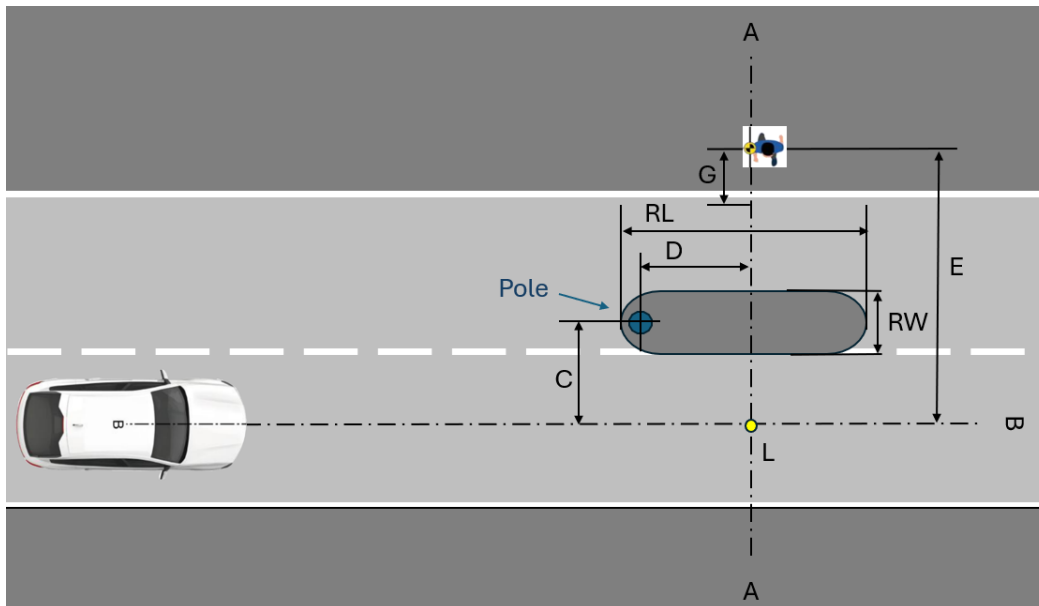
Standard CPNA-25% with lower sign bars/poles on both sides.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.0m
C1	Distance mid of the sign to the VUT centreline BB	
C2	Distance mid of the sign to the VUT centreline BB	
C3	Distance mid of the sign to the VUT centreline BB	
D	Distance backside of the sign to pedestrian path AA	1.0 – 1.5m
RL	Refuge length	
RW	Refuge width	1.2m
H	Impact point offset for 25%	
Points		
M	Impact position for 25% nearside scenario	

1.3.1.10 CPFA – 50% with traffic light pole on refuge

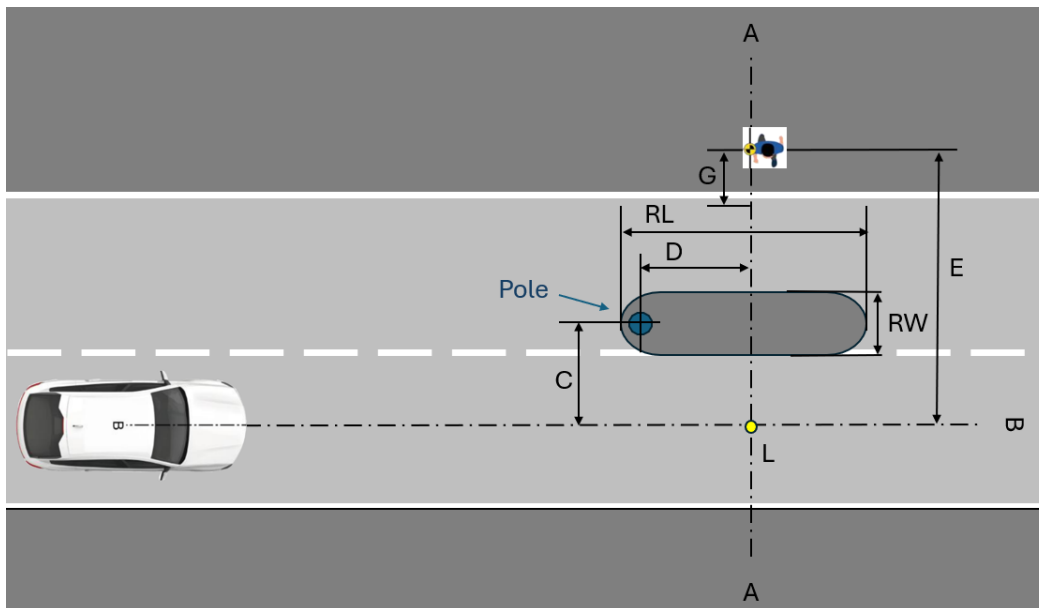
Standard CPFA-50% with traffic light pole Ø 12cm on refuge.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	6.0m
G	Dummy acceleration distance (walking)	1.5m
C	Mid pole to the VUT centreline BB	2.35m
D	Mid pole to pedestrian path AA.	1.0 – 1.5m
RL	Refuge length	
RW	Refuge width	1.2m
Points		
L	Impact position for 50% scenarios	

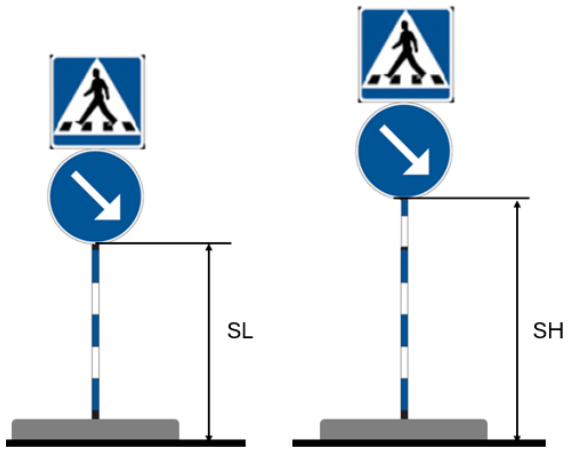
1.3.1.11 CPFA – 50% with traffic sign pole on refuge

Standard CPFA-50% with traffic sign pole Ø 7cm on refuge. Two traffic signs on the pole positioned in two variants (low mounted and high mounted).



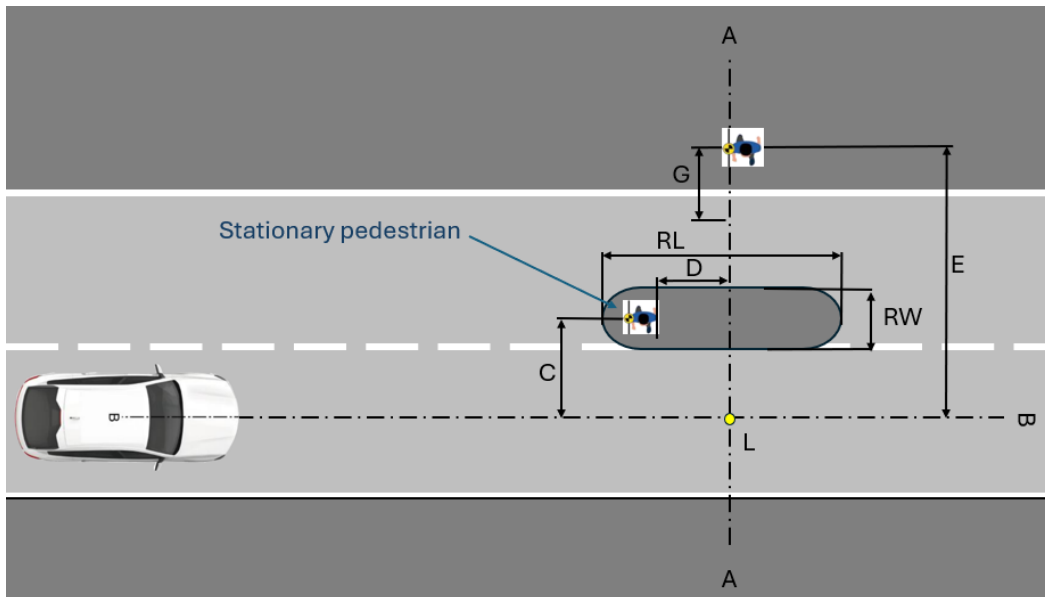
Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	6.0m
G	Dummy acceleration distance (walking)	1.5m
C	Mid pole to the VUT centreline BB	2.35m
D	Mid pole to pedestrian path AA.	1.0 – 1.5m
RL	Refuge length	
RW	Refuge width	1.2m
Points		
L	Impact position for 50% scenarios	
Heights		
SL	Lowest edge of lowest sign to ground	1.45m
SH	Lowest edge of lowest sign to ground	1.75m

Example of signs:



1.3.1.12 CPFA – 50% with stationary pedestrian on refuge before pedestrian path

Standard CPFA-50% with stationary pedestrian standing on refuge in front of pedestrian path AA.

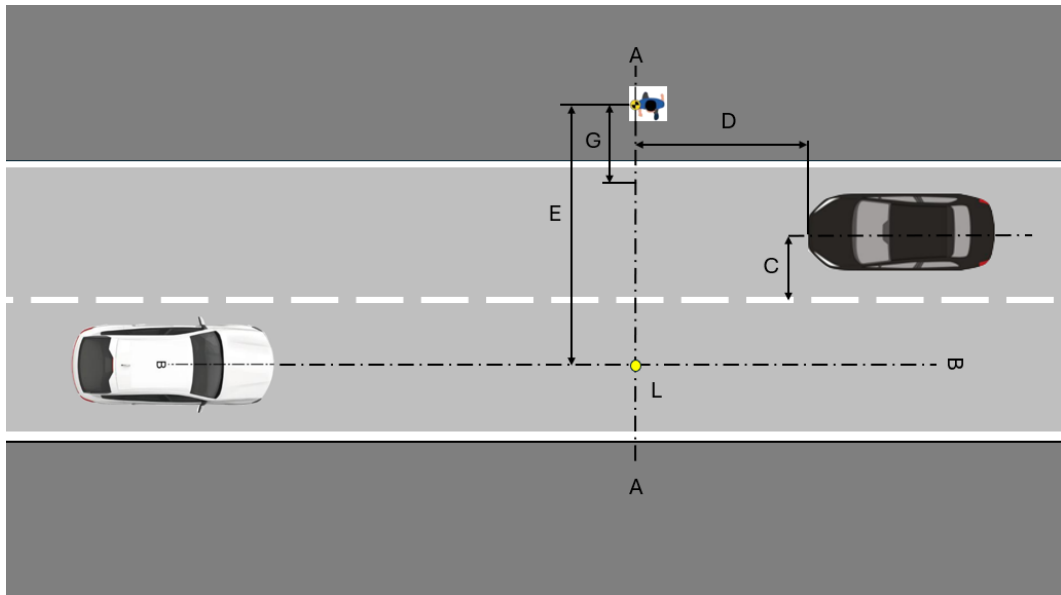


Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	6.0m
G	Dummy acceleration distance (walking)	1.5m
C	Stationary pedestrian H-point to VUT centreline BB	2.35m
D	Stationary pedestrian left shoulder to pedestrian path AA.	1.0 – 1.5m
RL	Refuge length	
RW	Refuge width	1.2m
Points		
L	Impact position for 50% scenarios	

1.3.1.13 CPFA – 50% with stopped oncoming vehicle in adjacent lane behind pedestrian path

Standard CPFA-50% with stopped oncoming vehicle in adjacent lane behind pedestrian path AA.

Oncoming vehicle positioned middle of adjacent lane.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	6.0m
G	Dummy acceleration distance (walking)	1.5m
C	Centre line stopped vehicle to centre of the centre dashed lane marking of the VUT lane.	1.75m
D	Mid front stopped vehicle to pedestrian path AA	1.5 – 2.5m
Points		
L	Impact position for 50% scenarios	

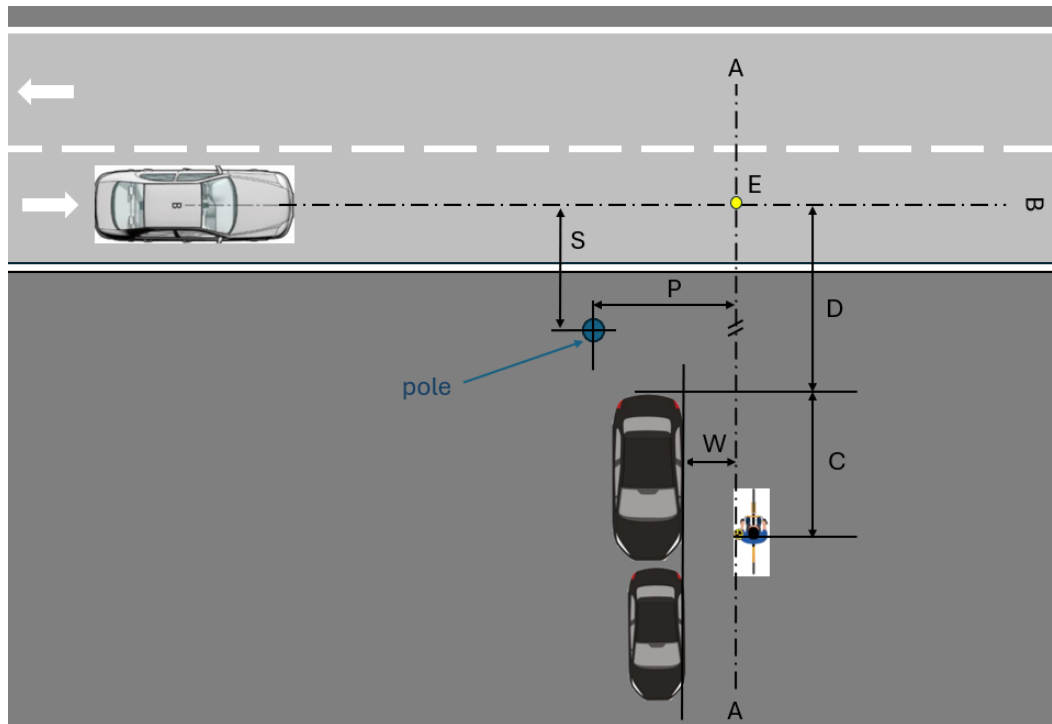
1.3.2 Car-to-bicyclist

1.3.2.1 CBNA – 50% with Street light pole or Traffic light pole in front of bicyclist path

Standard Euro NCAP CBNA with pole in front of path and VUT travelling at nominal distance from obscuration vehicles.

Pole I – Street light pole approx. Ø 23cm (steel) or Traffic light Ø 12cm

Note: no lane markings.



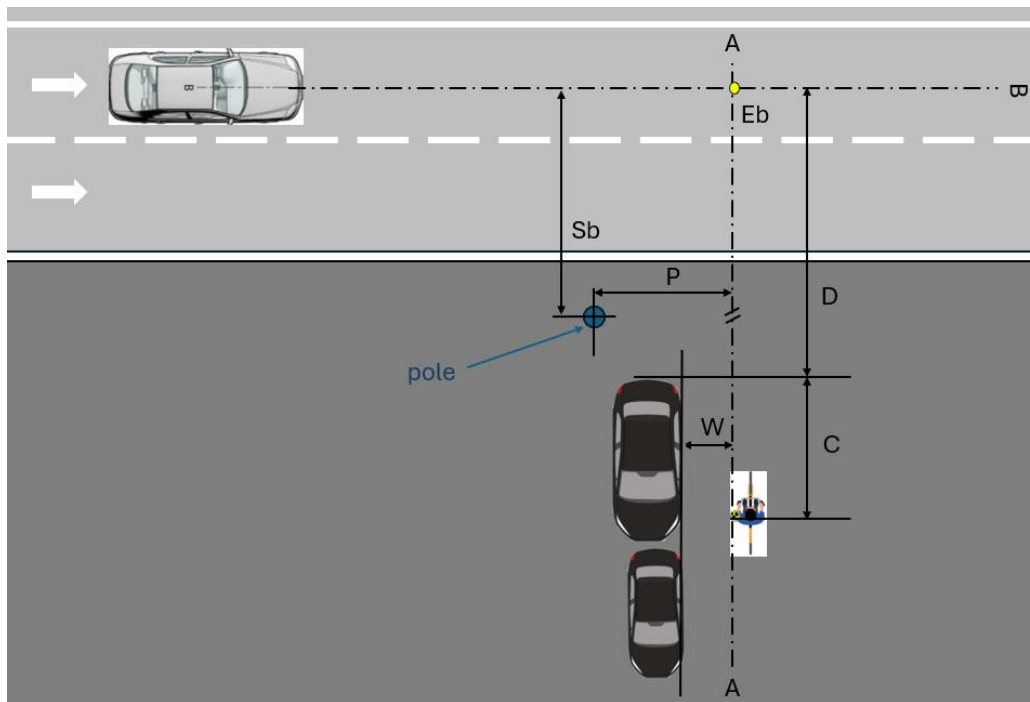
Axes & Angles		Values
AA	Trajectory of bicyclist target crank shaft.	
BB	Axis of centreline of Vehicle Under Test	
Distances		
C	Bicyclist target crank shaft, acceleration distance (not within field of view of VUT)	<8 m
D	Bicyclist target crank shaft, steady state distance to 50% impact location.	17.0 m
W	Distance between Bicyclist path to the side of the parked vehicles.	1.0 m
S	Mid Pole to VUT centreline BB	2.5 m
P	Mid Pole to bicyclist path AA	3.5-4.0 m
Points		
E	Impact location for 50% nearside scenarios	

1.3.2.2 CBNA – 50% with Street light pole or Traffic light pole in front of bicyclist path. VUT in 2nd lane.

Standard Euro NCAP CBNA with pole in front of path and VUT travelling farther away from the obscuration vehicles.

Pole I – Street light pole approx. Ø 23cm (steel) or Traffic light Ø 12cm

Note: no lane markings.



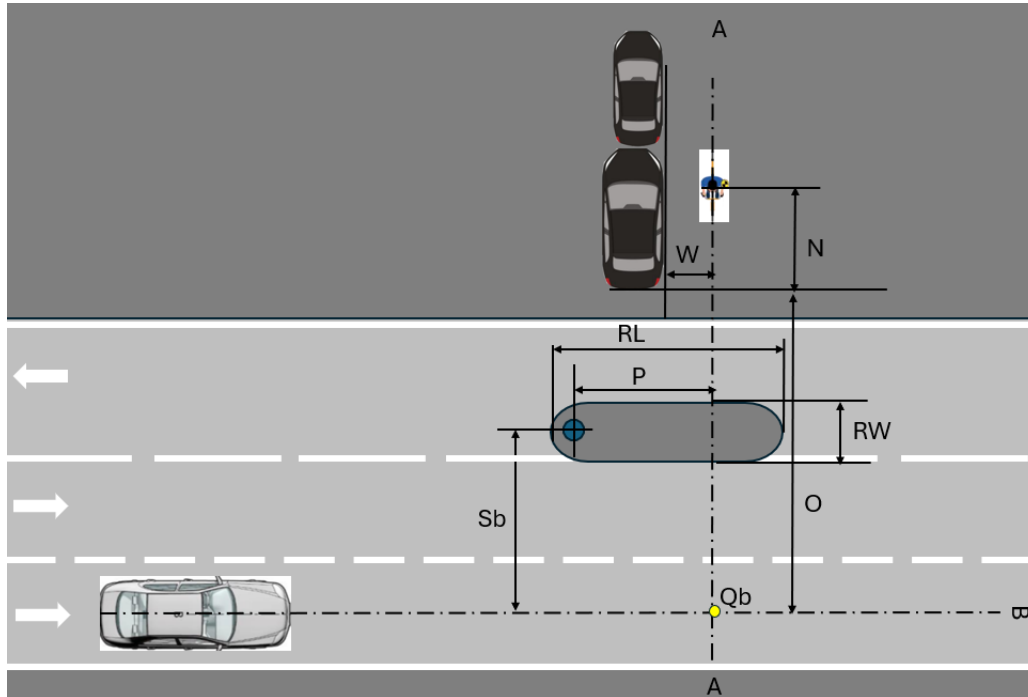
Axes & Angles		Values
AA	Trajectory of bicyclist target crank shaft.	
BB	Axis of centreline of Vehicle Under Test	
Distances		
C	Bicyclist target crank shaft, acceleration distance (not within field of view of VUT)	<8 m
D	Bicyclist target crank shaft, steady state distance to 50% impact location.	17.0 m
W	Distance between Bicyclist path to the side of the parked vehicles.	1.0 m
Sb	Mid Pole to VUT centreline BB	6.0 m
P	Mid Pole to bicyclist path AA	3.5-4.0 m
Points		
Eb	Impact location for 50% nearside scenarios	

1.3.2.3 CBFA – 50% with Street light pole or Traffic light pole in front of bicyclist path. VUT in right lane.

Standard Euro NCAP CBFA with pole in front of path and VUT travelling farther away from the obscuration vehicles.

Pole I – Street light pole approx. Ø 23cm (steel) or Traffic light Ø 12cm

Note: no lane markings, no refuge



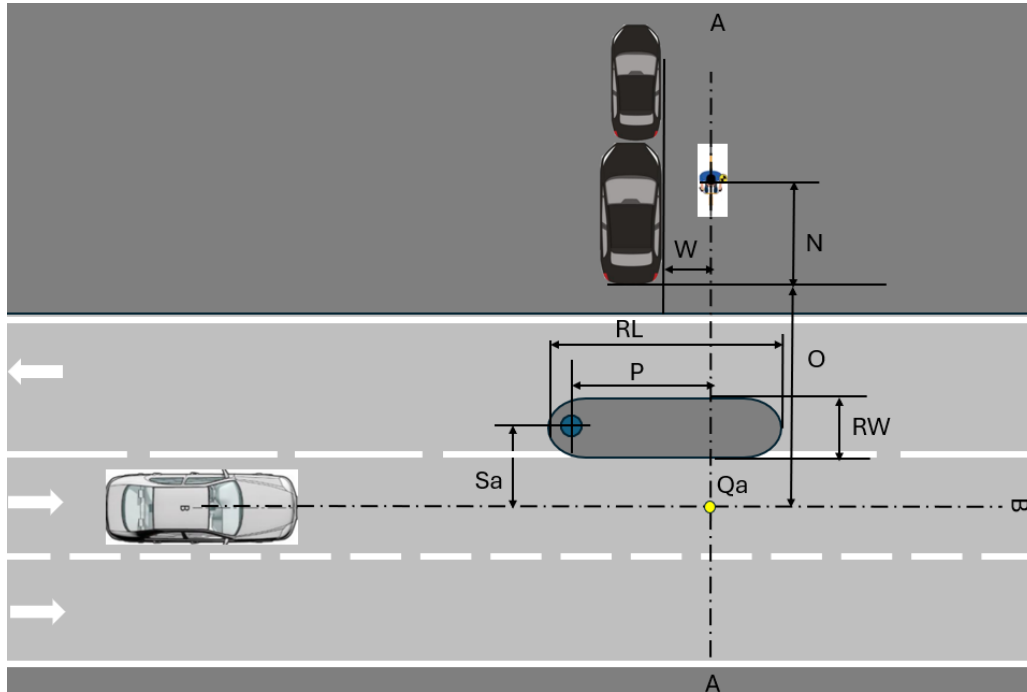
Axes		Values
AA	Trajectory of bicyclist target crank shaft.	
BB	Axis of centreline of Vehicle Under Test	
Distances		
N	Bicyclist target crank shaft, acceleration distance (not within field of view of VUT)	X m
O	Bicyclist target crank shaft, steady state distance to 50% impact location.	24.5 m
W	Distance between Bicyclist path to the side of the parked vehicles.	1.0 m
Sb	Distance mid of the traffic light pole to the VUT centreline BB	6 m
P	Distance mid of the traffic light pole to bicyclist path AA	3.5-4.0 m
RL	Refuge length	N/A
RW	Refuge width	N/A
Points		
Qb	Impact location for 50% farside scenarios	

1.3.2.4 CBFA – 50% with Street light pole or Traffic light pole in front of bicyclist path. VUT in left lane.

Standard Euro NCAP CBFA with pole in front of path and VUT travelling at nominal distance from obscuration vehicles.

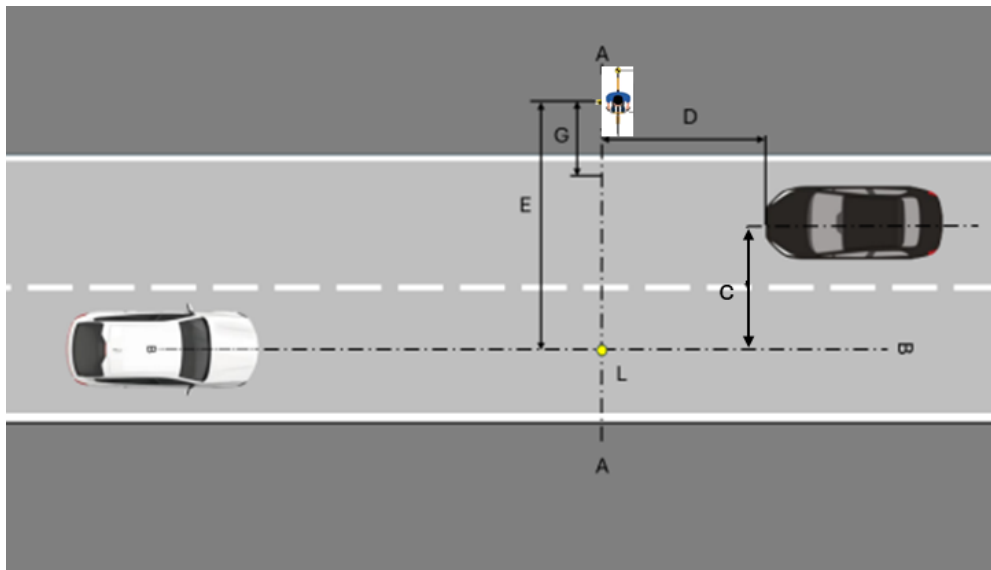
Pole I – Street light pole approx. Ø 23cm (steel) or Traffic light Ø 12cm

Note: no lane markings, no refuge



Axes		Values
AA	Trajectory of bicyclist target crank shaft.	
BB	Axis of centreline of Vehicle Under Test	
Distances		
N	Bicyclist target crank shaft, acceleration distance (not within field of view of VUT)	X m
O	Bicyclist target crank shaft, steady state distance to 50% impact location.	22.0 m
W	Distance between Bicyclist path to the side of the parked vehicles.	1.0 m
Sb	Distance mid of the traffic light pole to the VUT centreline BB	3.5 m
P	Distance mid of the traffic light pole to bicyclist path AA	3.5-4.0 m
RL	Refuge length	N/A
RW	Refuge width	N/A
Points		
Qb	Impact location for 50% farside scenarios	

1.3.2.5 CBFA – 50% Clutter: Dark stopped SUV behind the cyclist.



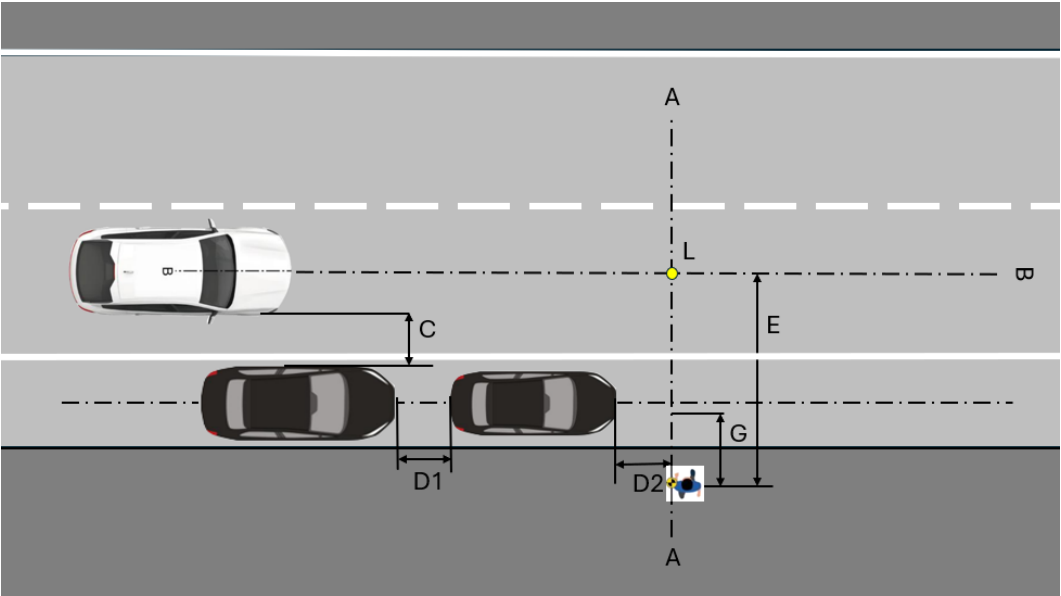
Axes		Values
AA	Trajectory of bicyclist target crank shaft.	
BB	Axis of centreline of Vehicle Under Test	
Distances		
C	Distance Dark SUV center to center line marking	3.5 m
D	Distance Dark SUV front to right side cyclist dummy	2.5 m
E	Cyclist dummy startpoint	22.0 + G m
G	Bicyclist target crank shaft, acceleration distance (not within field of view of VUT)	X m
P	Distance mid of the traffic light pole to bicyclist path AA	3.5-4.0 m
RL	Refuge length	
RW	Refuge width	1.2m
Points		
Qb	Impact location for 50% farside scenarios	

1.4Obstruction/Obscuration

1.4.1 Car-to-pedestrian

1.4.1.1 CPNCO – 50% with variation of starting position

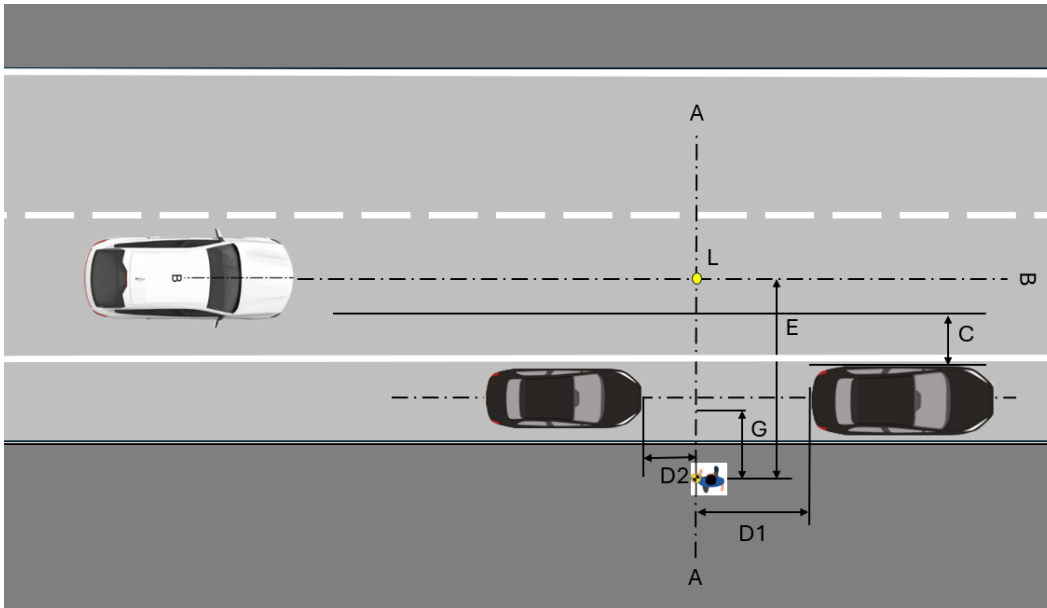
Standard CPNCO-50% with variation of starting point E for the pedestrian.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m -25%
G	Dummy acceleration distance (walking)	1.0m
C	Distance between Vehicle under test and larger obstruction vehicle	1.0m
D1	Distance front of first obstruction vehicle to rear of second obstruction vehicle	1.0m
D2	Dummy H-point to front of obstruction vehicle	1.0m
Points		
L	Impact position for 50% scenarios	

1.4.1.2 CPNCO – with pedestrian walking in between parked vehicles.

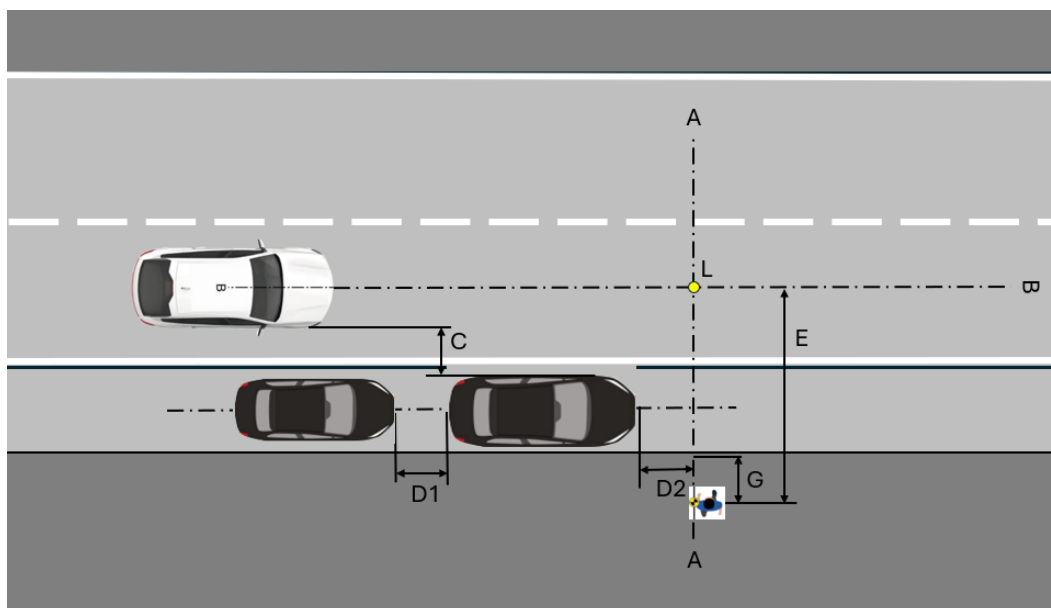
Standard CPNCO-50% with 1st parked vehicle moved to behind the pedestrian path. Allowing the pedestrian to walk in between the two vehicles.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.0m
C	Distance between Vehicle under test and larger obstruction vehicle	1.0m
D1	Distance front of first obstruction vehicle to rear of second obstruction vehicle	1.3m
D2	Dummy H-point to front of obstruction vehicle	1.0m
Points		
L	Impact position for 50% scenarios	

1.4.1.3 CPNCO – with reversed order of the parked vehicles before pedestrian path.

Standard CPNCO-50% with reversed order of the two parked vehicles, so the larger vehicle is in front of the smaller vehicle.

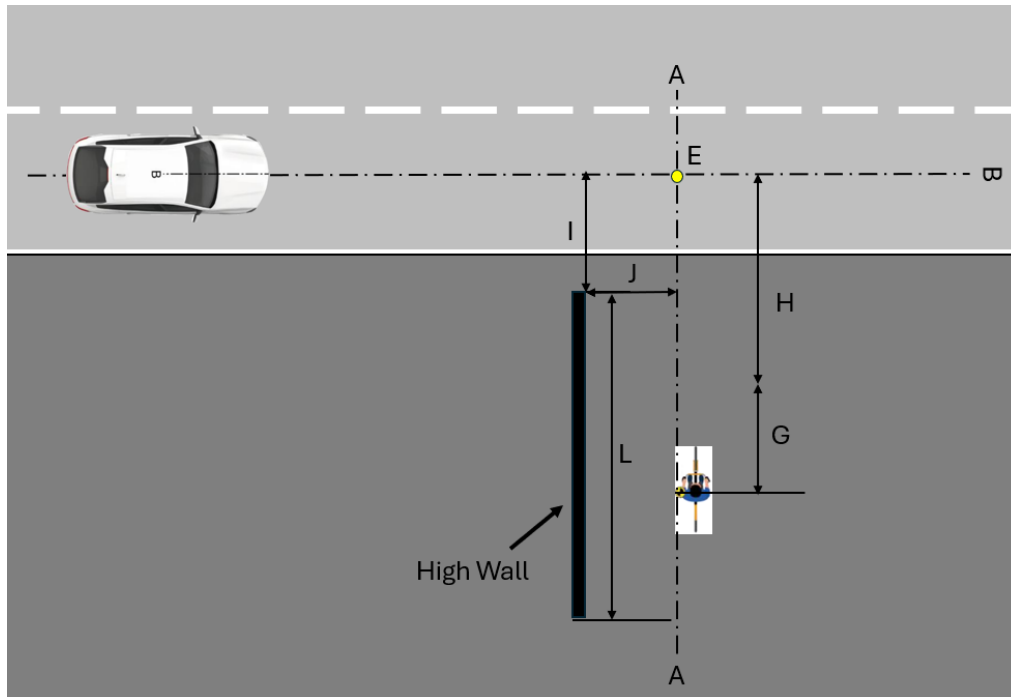


Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under Test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.0m
C	Distance between Vehicle Under Test and larger obstruction vehicle	1.0m
D1	Distance front of first obstruction vehicle to rear of second obstruction vehicle	1.0m
D2	Distance dummy H-point to front of obstruction vehicle	1.0m
Points		
L	Impact position for 50% scenarios	

1.4.2 Car-to-bicyclist

1.4.2.1 CBNAO – wall obstruction.

Standard CBNAO with adjusted distance from the VUT path to the obstruction, and adjusted distance from the bicyclist path to the obstruction. The obstruction must be a wall of sufficient height to fully cover the bicyclist target.



Axes & Angles		Values
AA	Trajectory of bicyclist target crank shaft.	
BB	Axis of centreline of Vehicle Under Test	
Distances		
I	Distance between VUT side and edge of wall.	3.25 m
J	Distance between side of wall and bicyclist crank shaft.	3.75 m
L	Length of the obscuration wall	8.5m
H	Bicyclist target crank shaft, steady state distance	4.5 m
G	Bicyclist target crank shaft, acceleration distance	2.0 m
Points		
E	Impact position for 50% scenarios.	

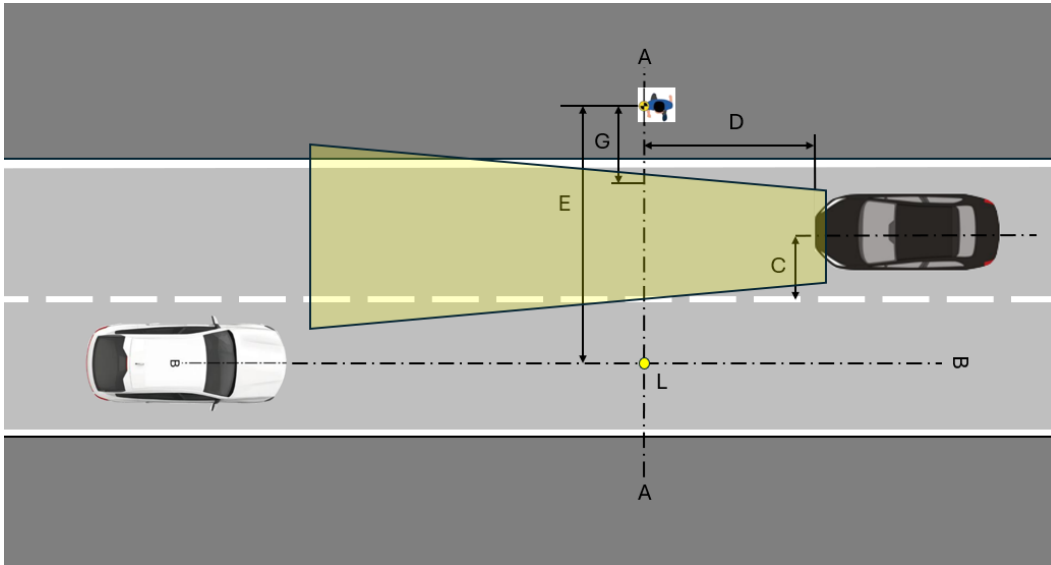
1.5 Illumination – Glare

1.5.1 Car-to-Pedestrian (Nighttime)

1.5.1.1 CPFA – 50% with stopped oncoming vehicle in adjacent lane behind pedestrian path, nighttime with streetlights and low beam.

Standard CPFA-50% with stopped oncoming vehicle in adjacent lane behind pedestrian path.

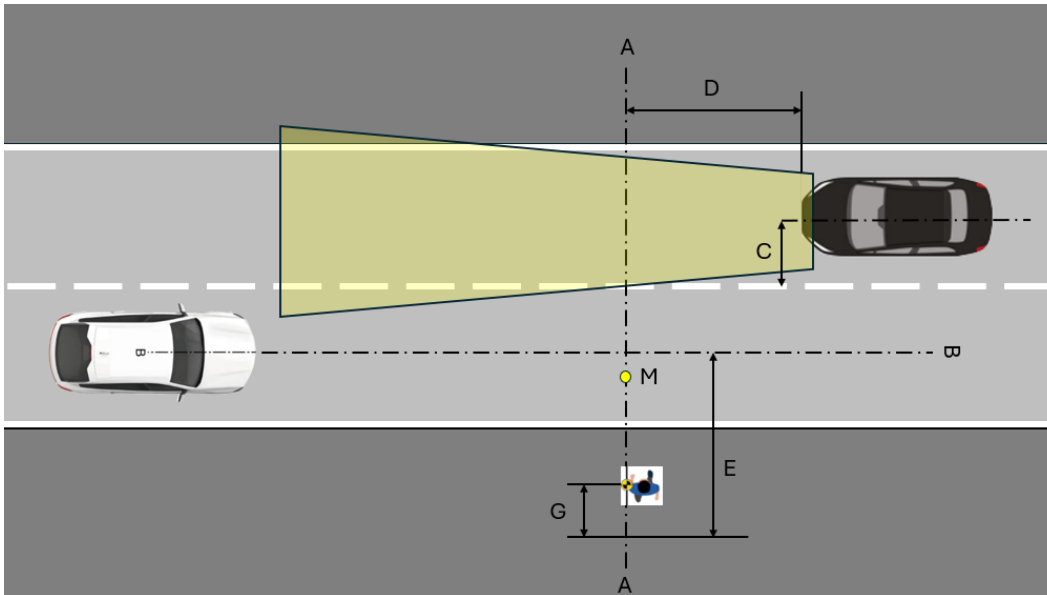
Oncoming vehicle positioned middle of adjacent lane with low beam. Streetlights according to Euro NCAP CPFA night test.



Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	6.0m
G	Dummy acceleration distance (walking)	1.5m
C	Centre line stopped vehicle to centre of the centre dashed lane marking of the VUT lane.	1.75m
D	Mid front stopped vehicle to pedestrian path AA	1.5 – 2.5m
Points		
L	Impact position for 50% scenarios	

1.5.1.2 CPNA – 25% with stopped oncoming vehicle in adjacent lane behind pedestrian path, nighttime with streetlights and low beam

Standard CPNA-25% with stopped oncoming vehicle in adjacent lane behind pedestrian path. Oncoming vehicle positioned middle of adjacent lane with low beam. Streetlights according to Euro NCAP CPNA night test.

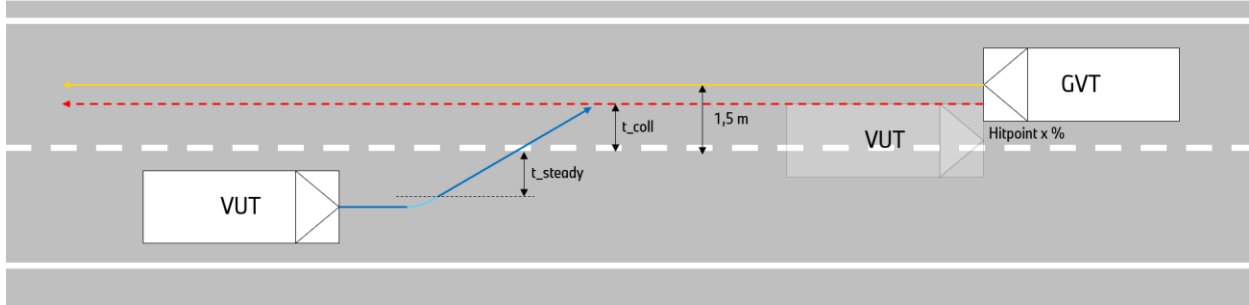


Axes		Values
AA	Trajectory of pedestrian dummy H-point in std CPNA	
BB	Axis of centreline of Vehicle under test	
Distances		
E	Dummy H-point, start to 50%-impact	4.0m
G	Dummy acceleration distance (walking)	1.0m
C	Centre line stopped vehicle to centre of the centre dashed lane marking of the VUT lane.	1.75m
D	Mid front stopped vehicle to pedestrian path AA	1.5 – 2.5m
Points		
M	Impact position for 25% nearside scenario	

2 LANE DEPARTURE COLLISIONS

2.1 Parameters for Oncoming & Overtaking scenarios

2.1.1 C2C Oncoming

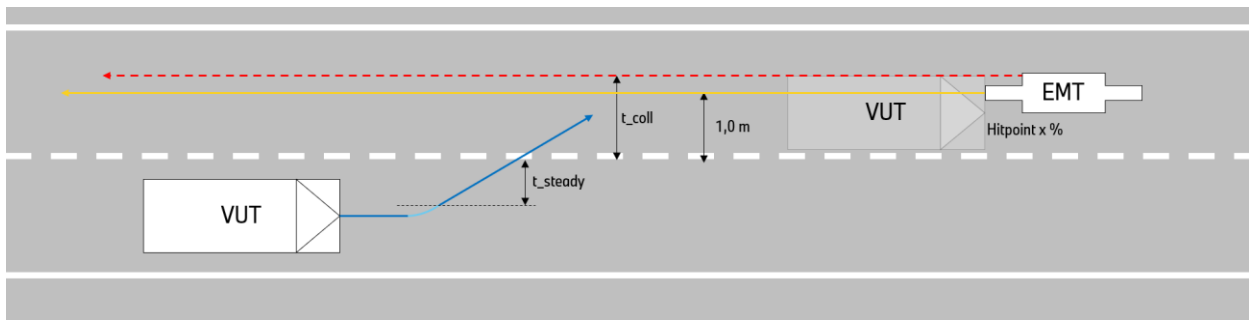


Standard Range											
Impact Location [%]	vLat [m/s]	d2 [m]	t_steady [s]	d_coll [m]	t_coll [s]	Distance to target @ crossing [m]					
						vdiff_long [km/h]					
						100	120	140	160	180	200
90	0,3	0,90	3,00	0,824	2,75	76	92	107	122	137	153
90	0,4	0,80	2,00	0,824	2,06	57	69	80	92	103	114
90	0,5	0,75	1,50	0,824	1,65	46	55	64	73	82	92
90	0,6	0,60	1,00	0,824	1,37	38	46	53	61	69	76

Robustness Layer (Impact location)											
Impact Location [%]	vLat [m/s]	d2 [m]	t_steady [s]	d_coll [m]	t_coll [s]	Distance to target @ crossing [m]					
						vdiff_long [km/h]					
						-	-	140	-	-	-
100	0,3	0,90	3,00	0,644	2,15	-	-	83	-	-	-
100	0,4	0,80	2,00	0,644	1,61	-	-	63	-	-	-
100	0,5	0,75	1,50	0,644	1,29	-	-	50	-	-	-
100	0,6	0,60	1,00	0,644	1,07	-	-	42	-	-	-
80	0,3	0,90	3,00	1,022	3,41	-	-	132	-	-	-
80	0,4	0,80	2,00	1,022	2,56	-	-	99	-	-	-
80	0,5	0,75	1,50	1,022	2,04	-	-	79	-	-	-
80	0,6	0,60	1,00	1,022	1,70	-	-	66	-	-	-

Robustness Layer (Initial position)										
Initial position offset	vLat [m/s]	d2 [m]	t_steady [s]	d_coll [m]	t_coll [s]	Distance to target @ crossing [m]				
						vdiff_long [km/h]				
						-	-	144	-	-
0.25m away from VUT	0,3	0,90	3,00	1,083	3,61	-	-	140	-	-
	0,4	0,80	2,00	1,083	2,71	-	-	105	-	-
	0,5	0,75	1,50	1,083	2,17	-	-	84	-	-
	0,6	0,60	1,00	1,083	1,81	-	-	70	-	-
0.25m closer to VUT	0,3	0,90	3,00	0,583	1,94	-	-	76	-	-
	0,4	0,80	2,00	0,583	1,46	-	-	57	-	-
	0,5	0,75	1,50	0,583	1,17	-	-	45	-	-
	0,6	0,60	1,00	0,583	0,97	-	-	38	-	-

2.1.2 C2M Oncoming

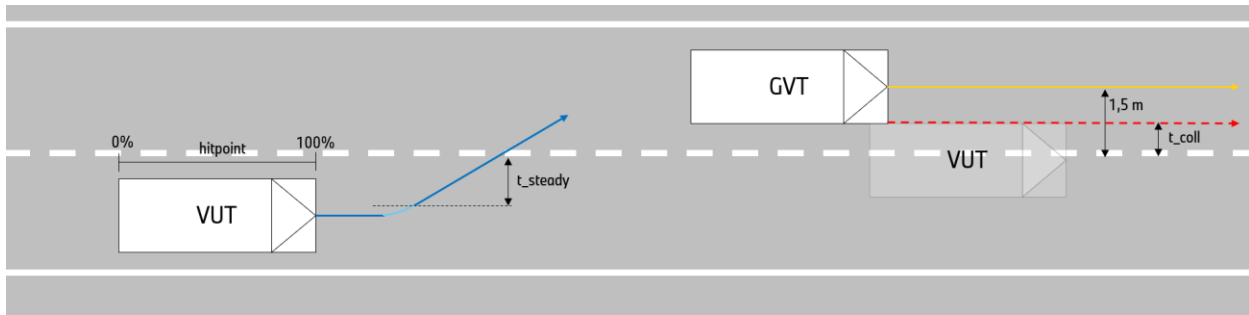


Standard Range											
Impact Location [%]	vLat [m/s]	d2 [m]	t_steady [s]	d_coll [m]	t_coll [s]	Distance to target @ crossing [m]					
						vdiff_long [km/h]					
						100	120	140	160	180	200
110	0,3	0,90	3,00	0,820	2,73	76	91	106	121	137	152
110	0,4	0,80	2,00	0,820	2,05	57	68	80	91	103	114
110	0,5	0,75	1,50	0,820	1,64	46	55	64	73	82	91
110	0,6	0,60	1,00	0,820	1,37	38	46	53	61	68	76

Robustness Layer (Impact location)											
Impact Location [%]	vLat [m/s]	d2 [m]	t_steady [s]	d_coll [m]	t_coll [s]	Distance to target @ crossing [m]					
						vdiff_long [km/h]					
						-	-	140	-	-	-
120	0,3	0,90	3,00	0,640	2,07	-	-	81	-	-	-
120	0,4	0,80	2,00	0,640	1,56	-	-	60	-	-	-
120	0,5	0,75	1,50	0,640	1,24	-	-	48	-	-	-
120	0,6	0,60	1,00	0,640	1,04	-	-	40	-	-	-
100	0,3	0,90	3,00	1,000	3,33	-	-	130	-	-	-
100	0,4	0,80	2,00	1,000	2,50	-	-	97	-	-	-
100	0,5	0,75	1,50	1,000	2,00	-	-	78	-	-	-
100	0,6	0,60	1,00	1,000	1,67	-	-	65	-	-	-

Robustness Layer (Initial position)											
Initial position offset	vLat [m/s]	d2 [m]	t_steady [s]	d_coll [m]	t_coll [s]	Distance to target @ crossing [m]					
						vdiff_long [km/h]					
						-	-	140	-	-	-
0.25m away from VUT	0,3	0,90	3,00	1,061	3,54	-	-	138	-	-	-
	0,4	0,80	2,00	1,061	2,65	-	-	103	-	-	-
	0,5	0,75	1,50	1,061	2,12	-	-	83	-	-	-
	0,6	0,60	1,00	1,061	1,77	-	-	69	-	-	-
0.25m closer to VUT	0,3	0,90	3,00	0,561	1,87	-	-	73	-	-	-
	0,4	0,80	2,00	0,561	1,40	-	-	55	-	-	-
	0,5	0,75	1,50	0,561	1,12	-	-	44	-	-	-
	0,6	0,60	1,00	0,561	0,94	-	-	36	-	-	-

2.1.3 C2C Overtaking

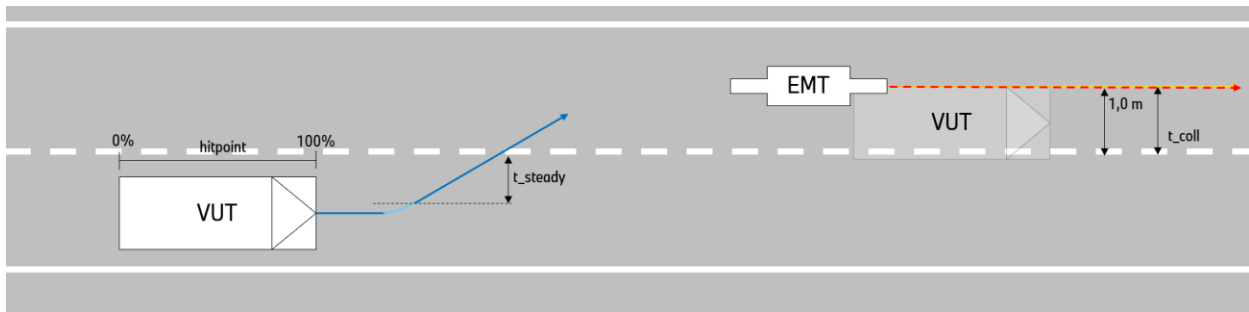


Standard Range							
Impact Location [%]	vLat [m/s]	d2 [m]	t_steady [s]	d_coll [m]	t_coll [s]	Distance to target @ crossing [m]	TTC: front target, rear ego
						vdifflong [km/h]	
						10	
25	0,2	0,70	3,50	0,644	3,22	7,71	2,78
25	0,3	0,90	3,00	0,644	2,15	4,73	1,70
25	0,4	0,80	2,00	0,644	1,61	3,24	1,17
25	0,5	0,75	1,50	0,644	1,29	2,35	0,85
25	0,6	0,60	1,00	0,644	1,07	1,75	0,63
25	0,7	0,53	0,76	0,644	0,92	1,33	0,48

Robustness Layer (Impact location)							
Impact Location [%]	vLat [m/s]	d2 [m]	t_steady [s]	d_coll [m]	t_coll [s]	Distance to target @ crossing [m]	TTC: front target, rear ego
						vdifflong [km/h]	
						10	
75	0,2	0,70	3,50	0,644	3,22	5,37	1,93
75	0,3	0,90	3,00	0,644	2,15	2,39	0,86
75	0,4	0,80	2,00	0,644	1,61	0,89	0,32
75	0,5	0,75	1,50	0,644	1,29	0,00	0,00
75	0,6	0,60	1,00	0,644	1,07	-0,60	-0,21
75	0,7	0,53	0,76	0,644	0,92	-1,02	-0,37

Robustness Layer (Initial position)							
Initial position offset	vLat [m/s]	d2 [m]	t_steady [s]	d_coll [m]	t_coll [s]	Distance to target @ crossing [m]	TTC: front target, rear ego
						vdifflong [km/h]	
						10	
0.25m away from VUT	0,2	0,70	3,50	0,894	4,47	11,22	4,04
	0,3	0,90	3,00	0,894	2,98	7,09	2,55
	0,4	0,80	2,00	0,894	2,24	5,02	1,81
	0,5	0,75	1,50	0,894	1,79	3,77	1,36
	0,6	0,60	1,00	0,894	1,49	2,95	1,06
	0,7	0,53	0,76	0,894	1,28	2,36	0,85
0.25m closer to VUT	0,2	0,70	3,50	0,394	1,97	4,28	1,54
	0,3	0,90	3,00	0,394	1,31	2,46	0,88
	0,4	0,80	2,00	0,394	0,99	1,54	0,56
	0,5	0,75	1,50	0,394	0,79	1,00	0,36
	0,6	0,60	1,00	0,394	0,66	0,63	0,23
	0,7	0,53	0,76	0,394	0,56	0,37	0,13

2.1.4 C2M Overtaking



Standard Range							
Impact Location [%]	vLat [m/s]	d2 [m]	t_steady [s]	d_coll [m]	t_coll [s]	Distance to target @ crossing [m]	TTC: front target, rear ego
						vdifflong [km/h]	
						10	
25	0,2	0,70	3,50	1,000	5,00	12,70	4,57
25	0,3	0,90	3,00	1,000	3,33	8,07	2,90
25	0,4	0,80	2,00	1,000	2,50	5,75	2,07
25	0,5	0,75	1,50	1,000	2,00	4,36	1,57
25	0,6	0,60	1,00	1,000	1,67	3,44	1,24
25	0,7	0,53	0,76	1,000	1,43	2,78	1,00

Robustness Layer (Impact location)							
Impact Location [%]	vLat [m/s]	d2 [m]	t_steady [s]	d_coll [m]	t_coll [s]	Distance to target @ crossing [m]	TTC: front target, rear ego
						vdifflong [km/h]	
						10	
75	0,2	0,70	3,50	1,0	5,00	10,31	3,71
75	0,3	0,90	3,00	1,0	3,33	5,68	2,05
75	0,4	0,80	2,00	1,0	2,50	3,37	1,21
75	0,5	0,75	1,50	1,0	2,00	1,98	0,71
75	0,6	0,60	1,00	1,0	1,67	1,05	0,38
75	0,7	0,53	0,76	1,0	1,43	0,39	0,14

Robustness Layer (Initial position)							
Initial position offset	vLat [m/s]	d2 [m]	t_steady [s]	d_coll [m]	t_coll [s]	Distance to target @ crossing [m]	TTC: front target, rear ego
						vdifflong [km/h]	
						10	
0.25m away from VUT	0,2	0,70	3,50	1,3	6,25	16,17	5,82
	0,3	0,90	3,00	1,3	4,17	10,38	3,74
	0,4	0,80	2,00	1,3	3,13	7,49	2,70
	0,5	0,75	1,50	1,3	2,50	5,75	2,07
	0,6	0,60	1,00	1,3	2,08	4,59	1,65
	0,7	0,53	0,76	1,3	1,79	3,77	1,36
0.25m closer to VUT	0,2	0,70	3,50	0,8	3,75	9,22	3,32
	0,3	0,90	3,00	0,8	2,50	5,75	2,07
	0,4	0,80	2,00	0,8	1,88	4,02	1,45
	0,5	0,75	1,50	0,8	1,50	2,97	1,07
	0,6	0,60	1,00	0,8	1,25	2,28	0,82
	0,7	0,53	0,76	0,8	1,07	1,78	0,64