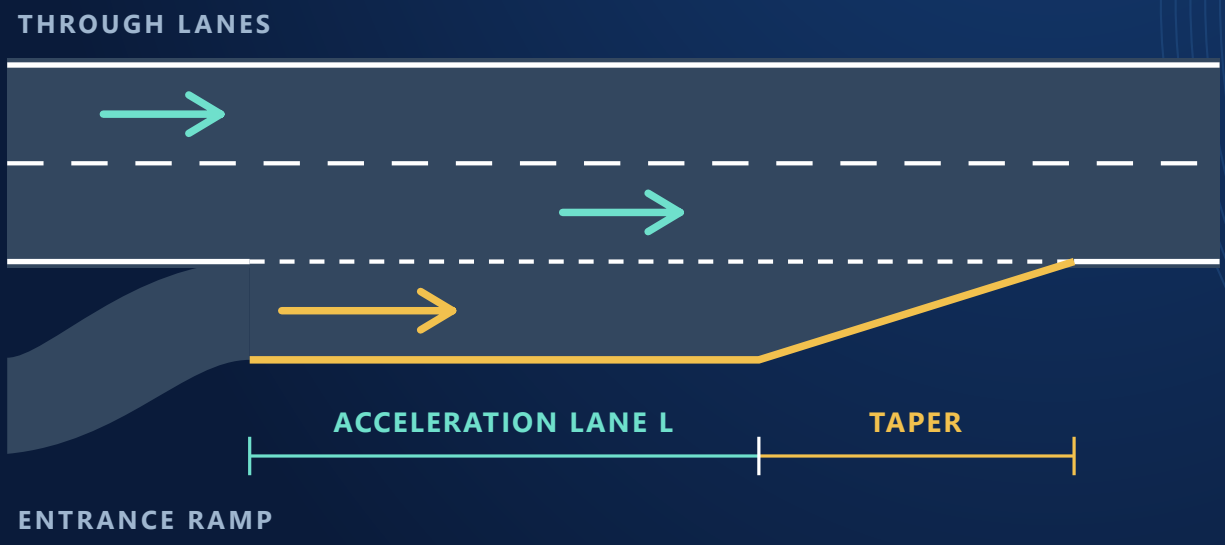
Speed Change Lane Report

Acceleration and deceleration lane lengths and tapers (AASHTO Green Book).



Sample Project

Client: Urban City

PREPARED & SUBMITTED BY

SP Consultant

in Joint Venture with USF Consultants

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Acceleration and Deceleration Lane Calculator

Design report · Reference: AASHTO 2001 Green Book §10.9.6 Tables: 10-4 (Acceleration) · 10-5 (Grade) · 10-6 (Deceleration) · Generated 11/5/2026 3:17:11 PM

1. Project

Project / road	Sample Project
Prepared by	SP Consultant
Date	11/5/2026

2. Deceleration Length — AASHTO 2001 · Table 10-6

HIGHWAY

Design Speed (kph)	100
Average Running Speed (kph)	85

EXIT CURVE

Design Speed (kph)	40
Average Running Speed (kph)	35

GRADE ADJUSTMENT — AASHTO TABLE 10-5

Highway Grade	0 % (Level)
Grade Adjustment Factor	1.00

RESULTS

Deceleration Length (m)	**145 m**
Grade-adjusted length (m)	**145 m**

COMPUTED VALUES

Highway ARS	85 kph
Exit ARS	35 kph
ARS Differential	50 kph
Base Length	145 m
Grade Factor	1.00
Adjusted Length	145 m

Based on AASHTO 2001 formula using **Average Running Speeds (ARS)**:
$L = (ARS_H^2 - ARS_E^2) / 41.47$ [a_{dec} = 1.6 m/s²], rounded to nearest 5 m.
Verified: V_H=100, V_{exit}=40 → ARS 85 vs 35 → **L = 145 m** ✓

CALCULATED DECELERATION LENGTHS — APPROXIMATION (M)

Highway Design Speed shown across top; Exit Curve Design Speed down left. `highlighted` = current selection.

Sample report: illustrative data, not for design use

Exit / Entry Speed → Highway Speed ↓	50	60	70	80	90	100	110	120	130
V = 20 kph ARS 20	45	60	85	110	135	165	190	215	240
V = 30 kph ARS 28	35	50	75	100	125	155	180	210	230
V = 40 kph ARS 35	25	40	65	90	115	**145**	170	195	220
V = 50 kph ARS 47	–	15	40	65	90	120	145	175	200
V = 60 kph ARS 54	–	–	20	50	75	105	130	155	180
V = 70 kph ARS 62	–	–	–	25	50	80	105	135	160
V = 80 kph ARS 70	–	–	–	–	25	55	80	110	135
V = 90 kph ARS 77	–	–	–	–	–	30	55	85	110
V = 100 kph ARS 85	–	–	–	–	–	–	25	55	75
V = 110 kph ARS 91	–	–	–	–	–	–	–	25	50
V = 120 kph ARS 97	–	–	–	–	–	–	–	–	25

3. Acceleration Length — AASHTO 2001 · Table 10-4

HIGHWAY

Design Speed (kph)	100
Average Running Speed (kph)	85

ENTRY CURVE

Design Speed (kph)	40
Average Running Speed (kph)	35

GRADE ADJUSTMENT — AASHTO TABLE 10-5

Highway Grade	0 % (Level)
Grade Adjustment Factor	1.00

RESULTS

Acceleration Length (m)	**290 m**
Grade-adjusted length (m)	**290 m**

COMPUTED VALUES

Highway ARS	85 kph
Entry ARS	35 kph
ARS Differential	50 kph

Sample report: illustrative data, not for design use

Base Length	290 m
Grade Factor	1.00
Adjusted Length	290 m

Based on AASHTO 2001 formula using **Average Running Speeds (ARS)**:
$L = (ARS_H^2 - ARS_E^2) / 20.74$ [a_{acc} = 0.80 m/s²], rounded to nearest 5 m.
Acceleration lanes are typically ~2× the deceleration length for the same speed differential.

CALCULATED ACCELERATION LENGTHS — APPROXIMATION (M)

Highway Design Speed shown across top; Entry Curve Design Speed down left. `highlighted` = current selection.

Exit / Entry Speed → Highway Speed ↓	50	60	70	80	90	100	110	120	130
V = 20 kph ARS 20	85	120	165	215	265	330	380	435	480
V = 30 kph ARS 28	70	105	150	200	250	310	360	415	465
V = 40 kph ARS 35	45	80	125	175	225	**290**	340	395	445
V = 50 kph ARS 47	–	35	80	130	180	240	295	345	395
V = 60 kph ARS 54	–	–	45	95	145	210	260	315	360
V = 70 kph ARS 62	–	–	–	50	100	165	215	270	315
V = 80 kph ARS 70	–	–	–	–	50	110	165	215	265
V = 90 kph ARS 77	–	–	–	–	–	65	115	170	215
V = 100 kph ARS 85	–	–	–	–	–	–	50	105	155
V = 110 kph ARS 91	–	–	–	–	–	–	–	55	100
V = 120 kph ARS 97	–	–	–	–	–	–	–	–	50

4. Reference tables

AVERAGE RUNNING SPEED REFERENCE — AASHTO 2001

Design Speed (kph)	20	30	40	50	60	70	80	90	100	110	120	130
Avg Running Speed (kph)	20	28	35	47	54	62	70	77	85	91	97	102

GRADE ADJUSTMENT FACTORS — AASHTO 2001 TABLE 10-5

Grade (%)	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	+6
Decel Factor	1.40	1.35	1.25	1.12	1.06	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Accel Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.08	1.17	1.27	1.40	1.55	1.70

Generated with the Acceleration and Deceleration Lane Calculator — https://shahidpervaiz.net/EngineeringDesignTools/speed_change_lane_calculator. Results should be checked by a qualified engineer before use.

Sample report: illustrative data, not for design use