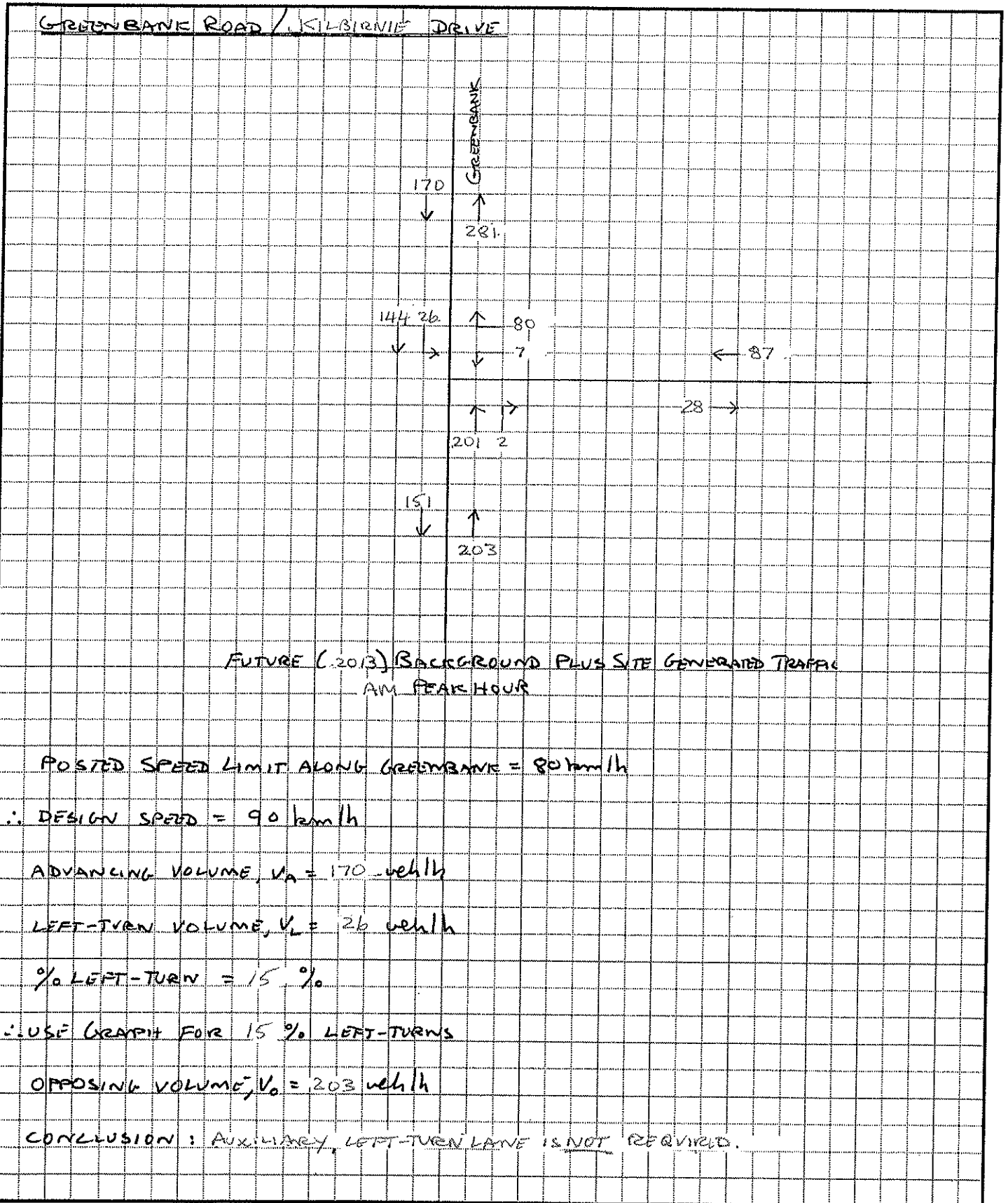


APPENDIX 7

AUXILIARY LANE ANALYSES

GREENBANK ROAD/ KILBIRNIE DRIVE



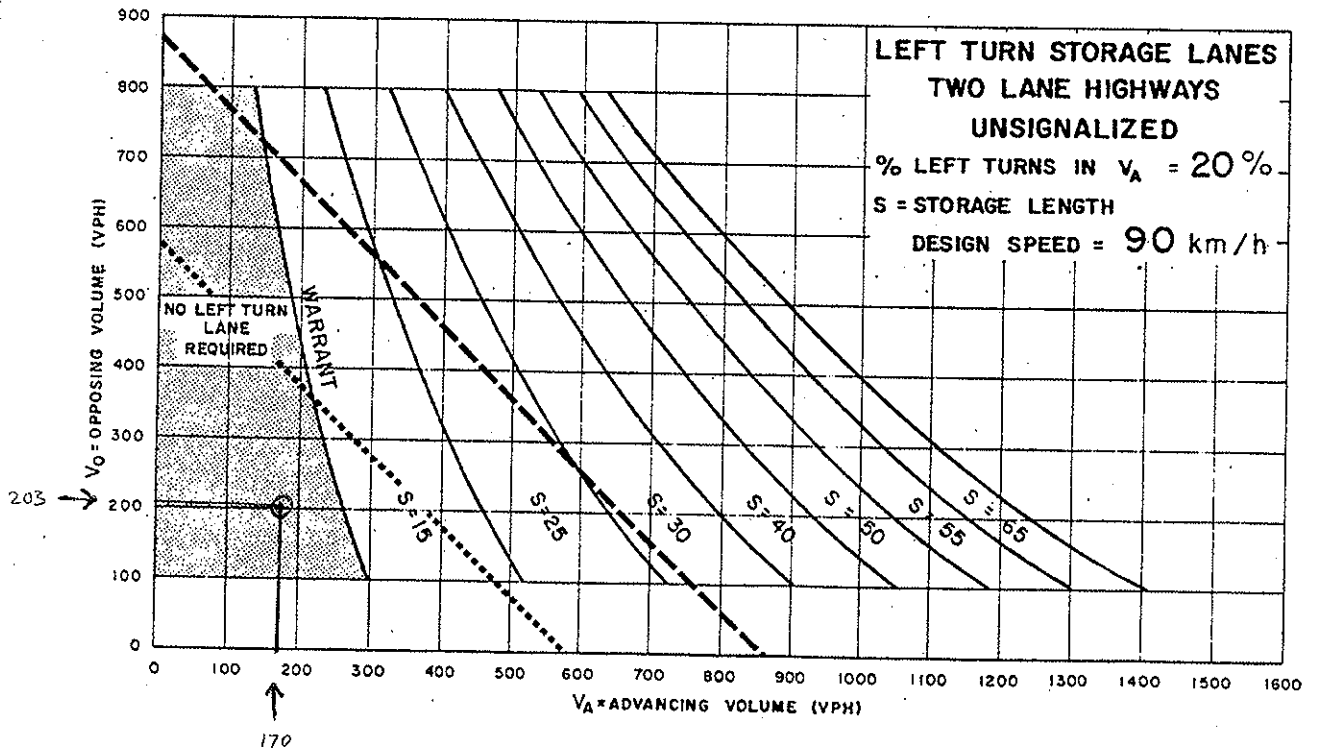
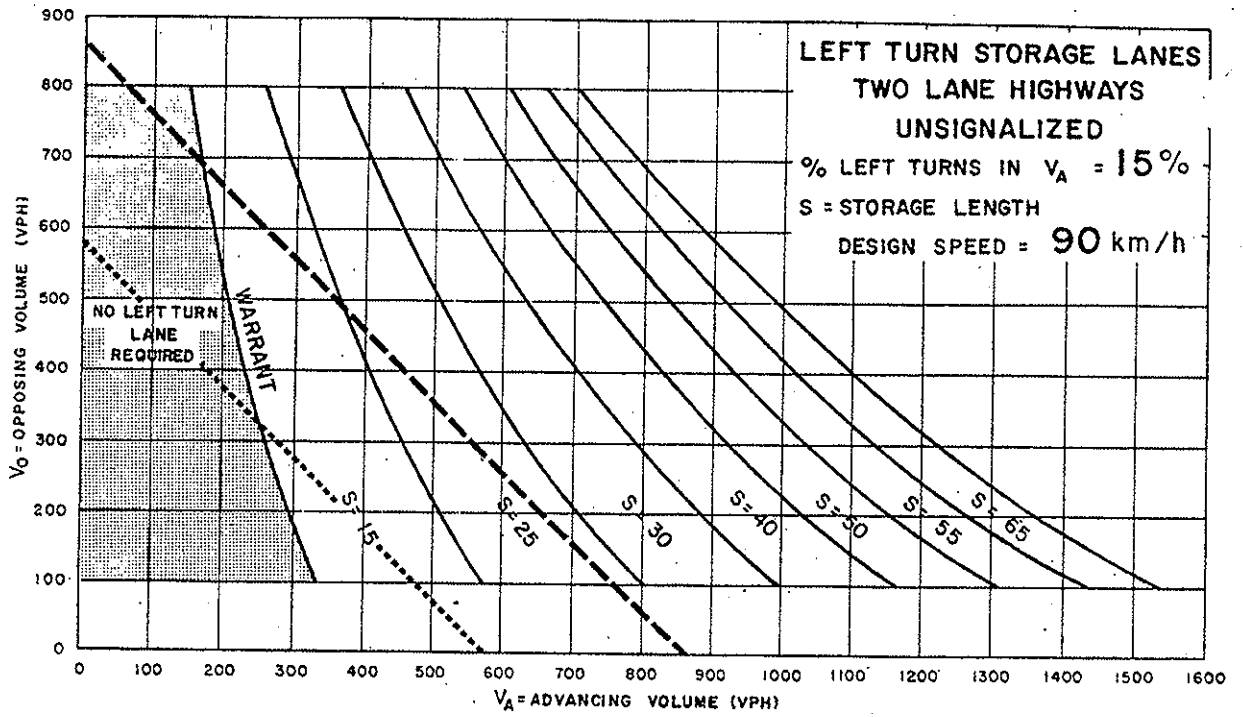
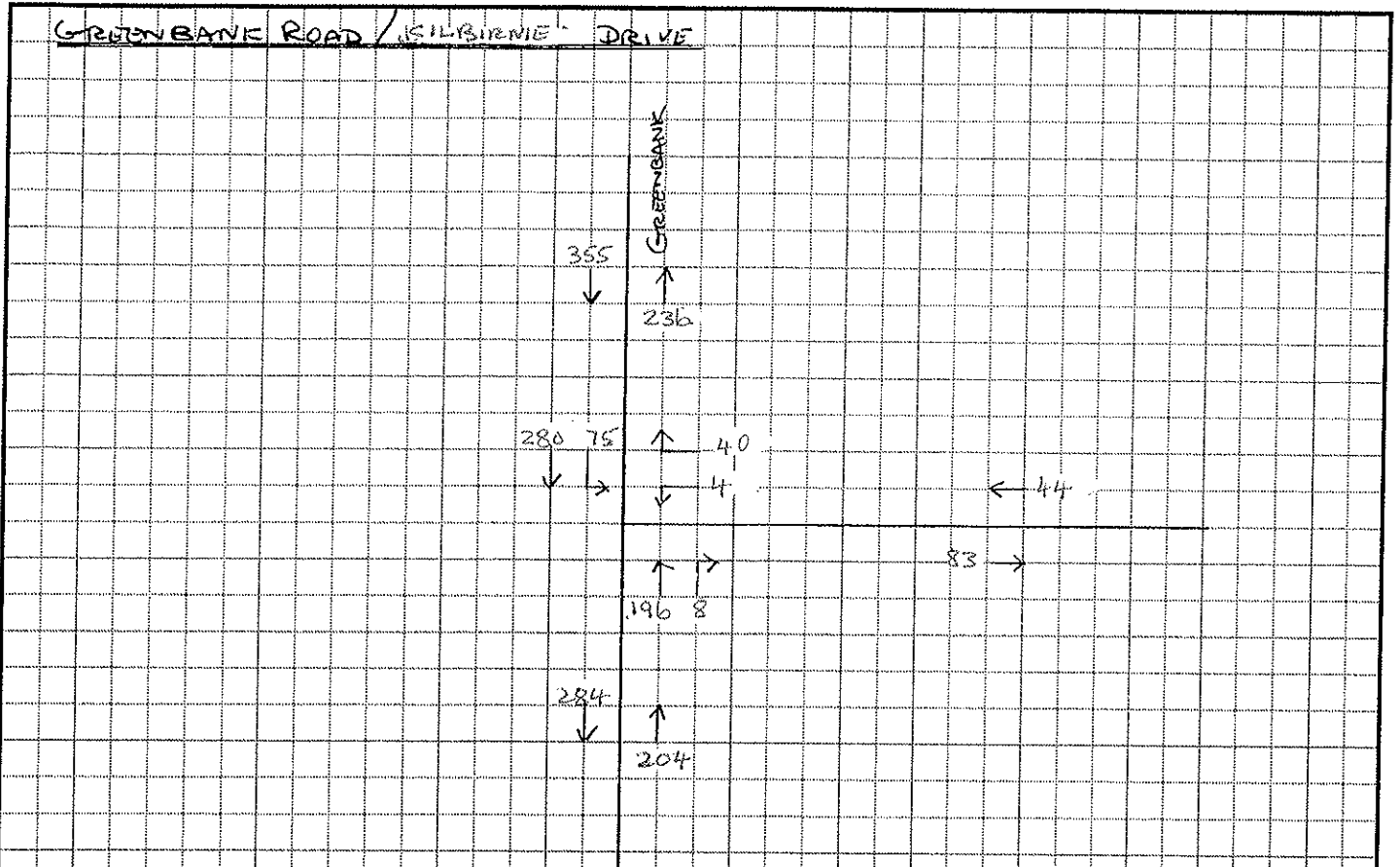


Figure EA-19



FUTURE (2013) BACKGROUND PLUS SITE GENERATED TRAFFIC
 PM PEAK HOUR

POSTED SPEED LIMIT ALONG GREENBANK = 80 km/h

∴ DESIGN SPEED = 90 km/h

ADVANCING VOLUME, $V_A = 355$ veh/h

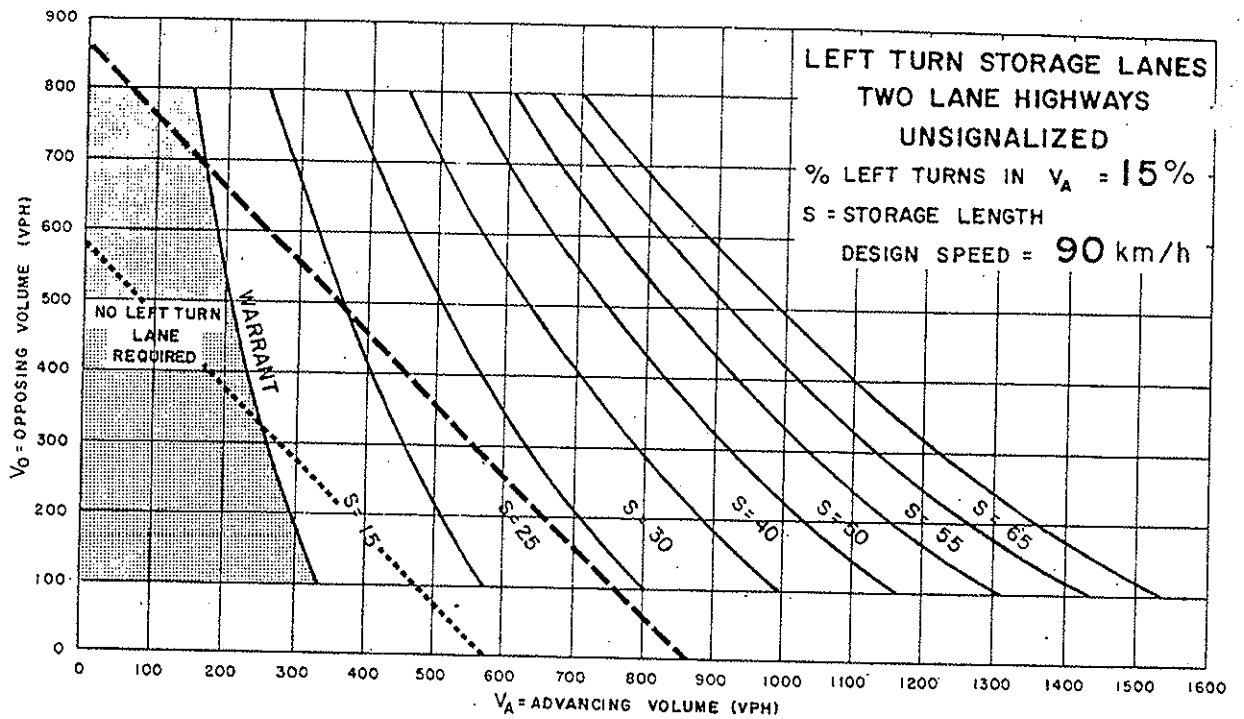
LEFT-TURN VOLUME, $V_L = 75$ veh/h

% LEFT-TURN = 21 %

∴ USE GRAPH FOR 20 % LEFT-TURNS

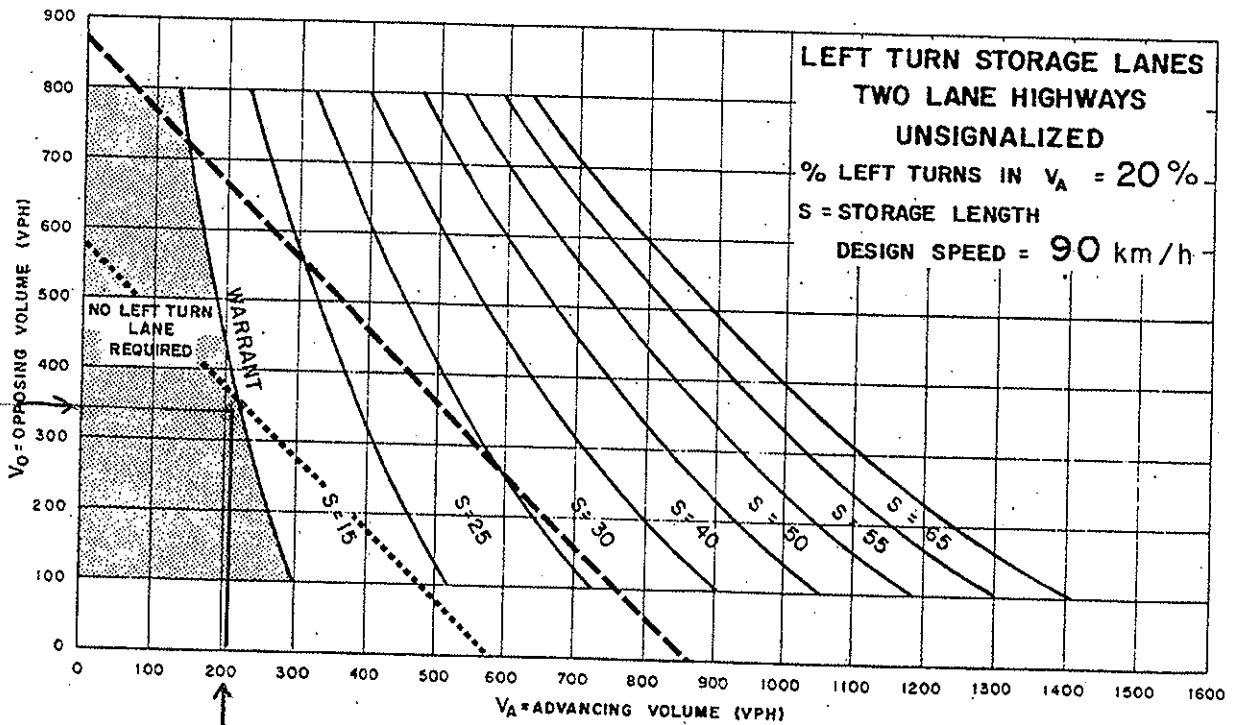
OPPOSING VOLUME, $V_O = 204$ veh/h

CONCLUSION : AUXILIARY LEFT-TURN LANE IS NOT REQUIRED



--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

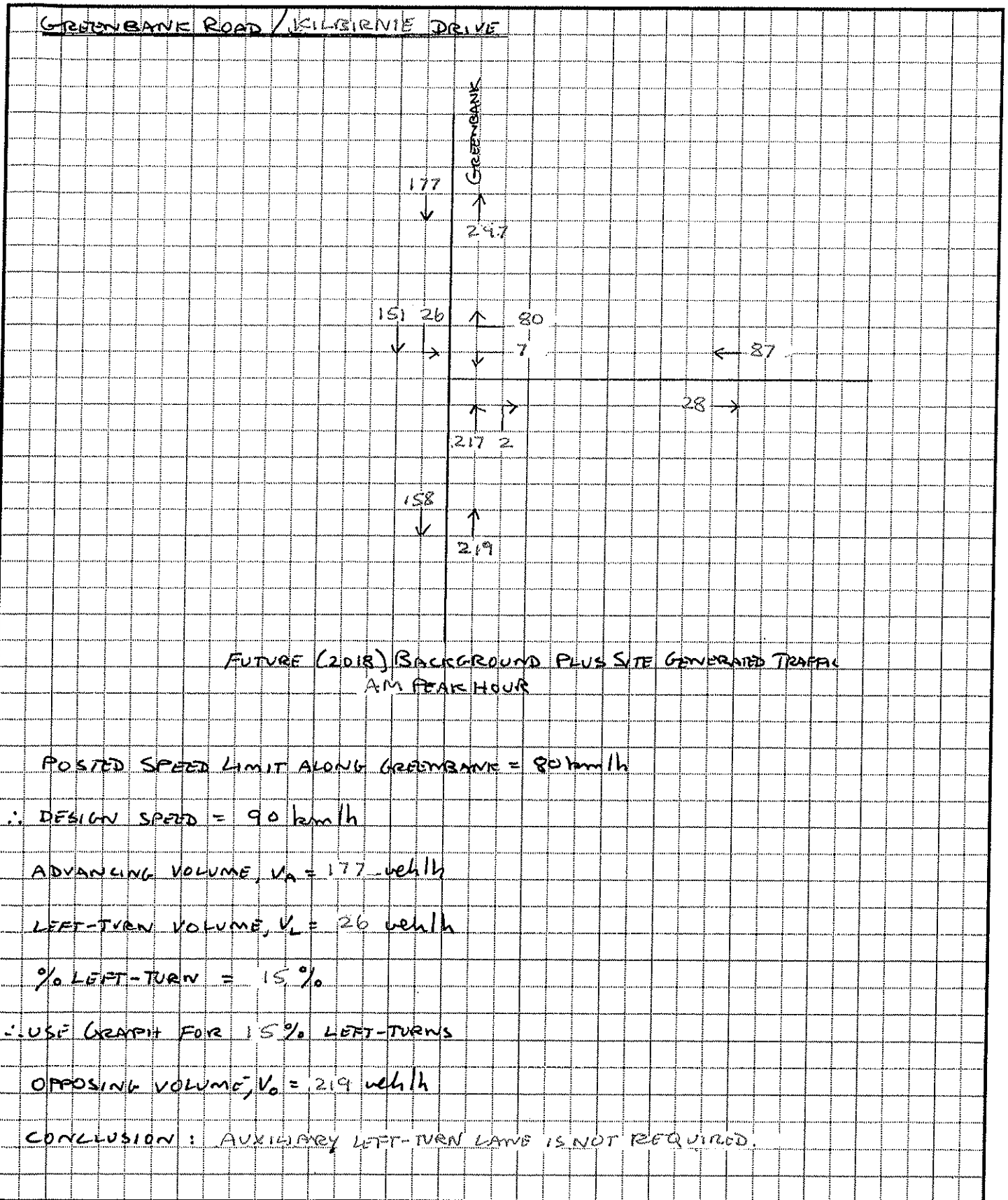
..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



355

204

Figure EA-19



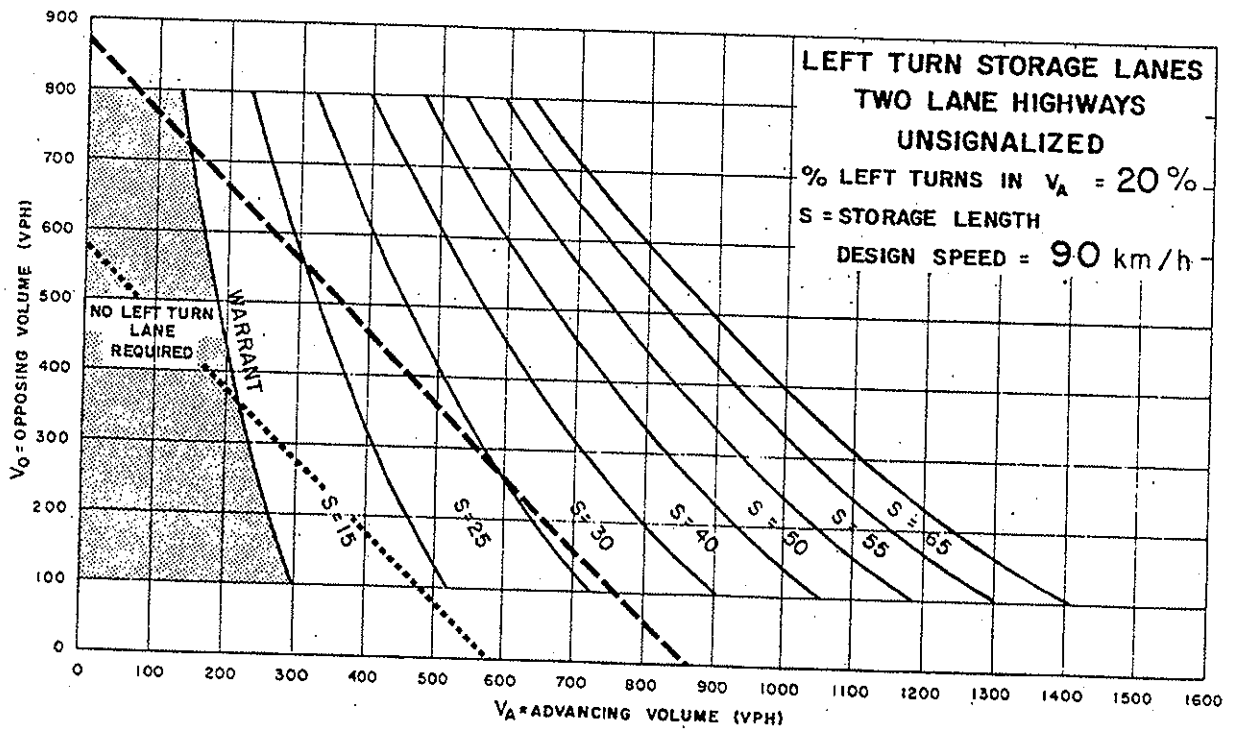
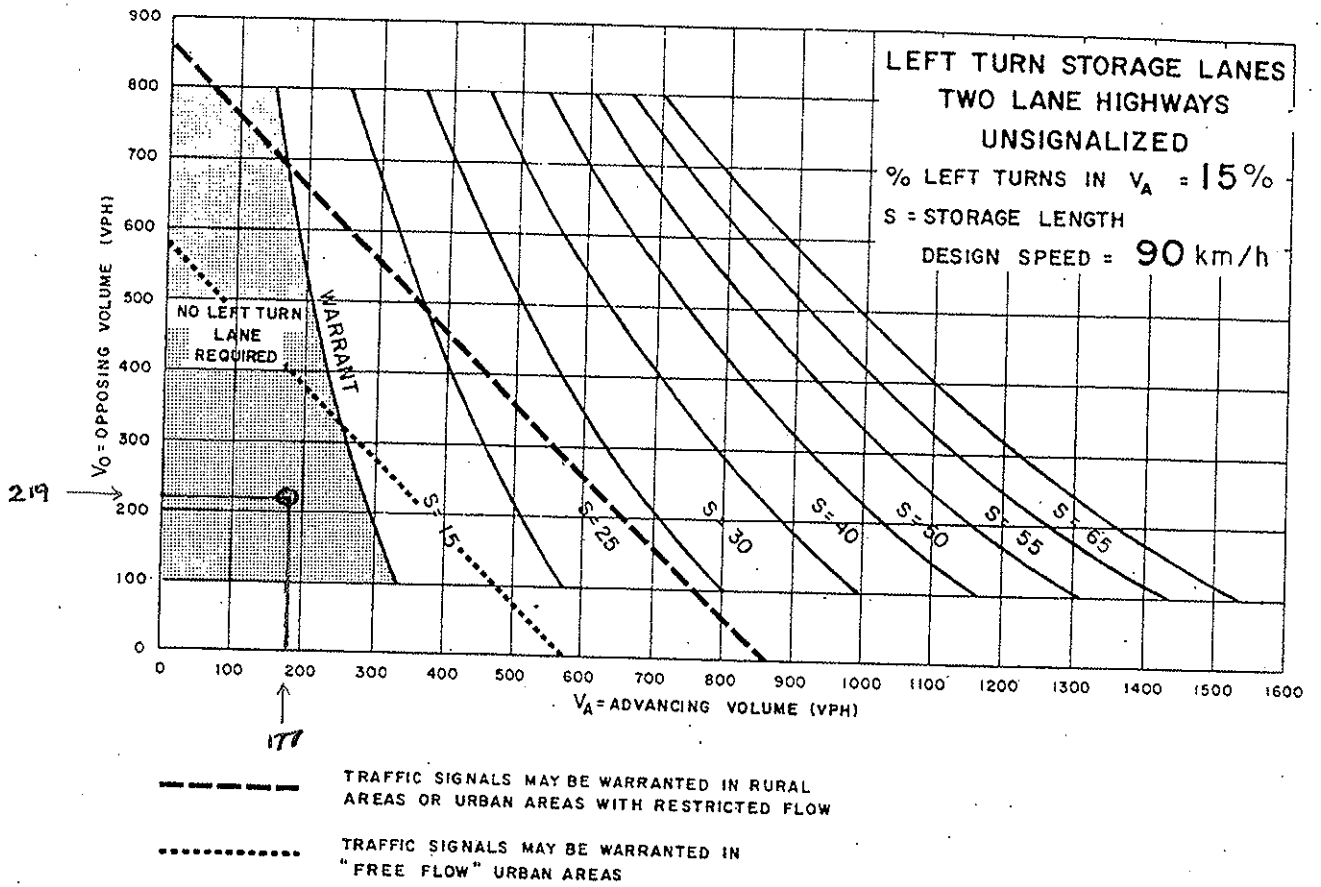
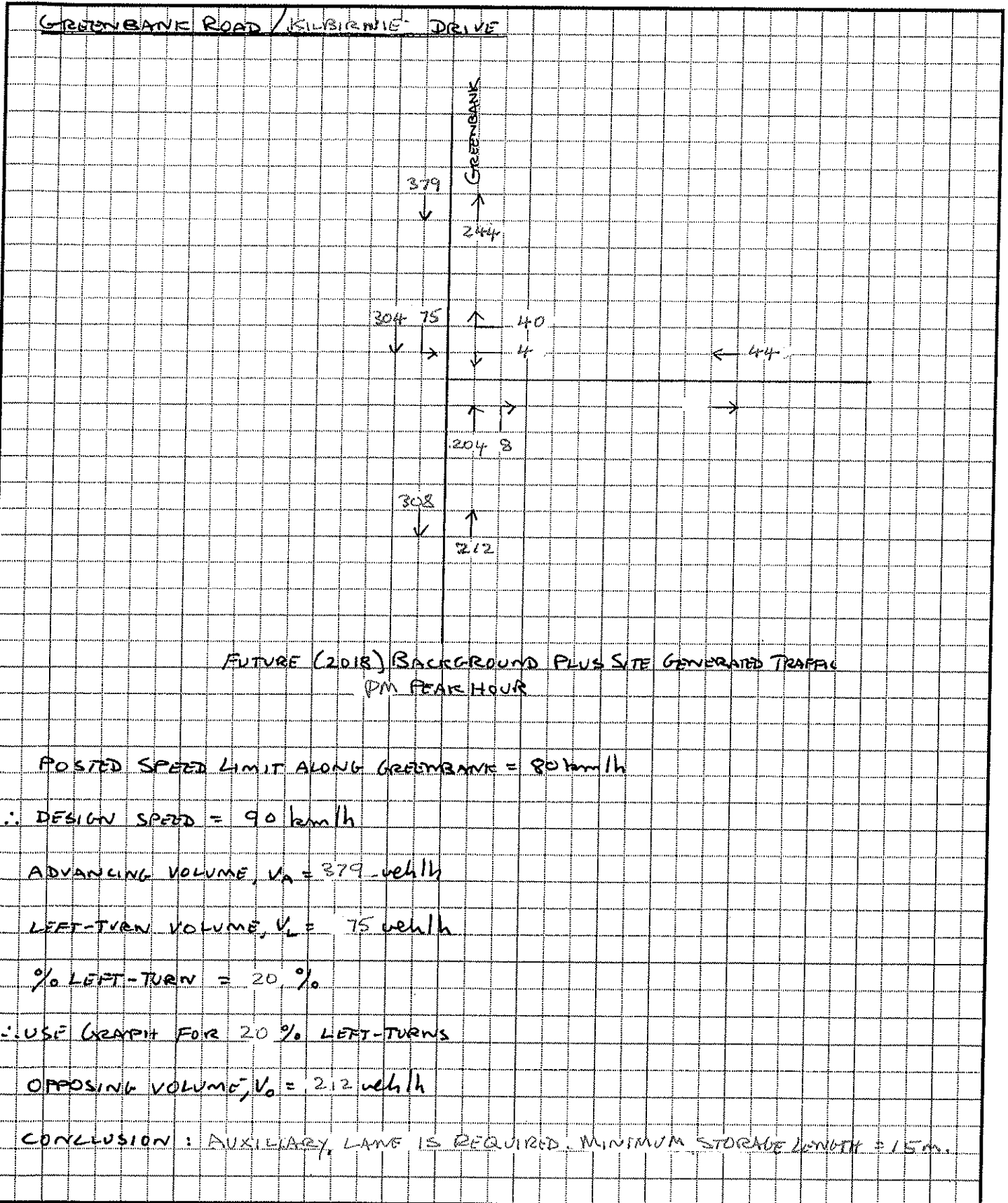
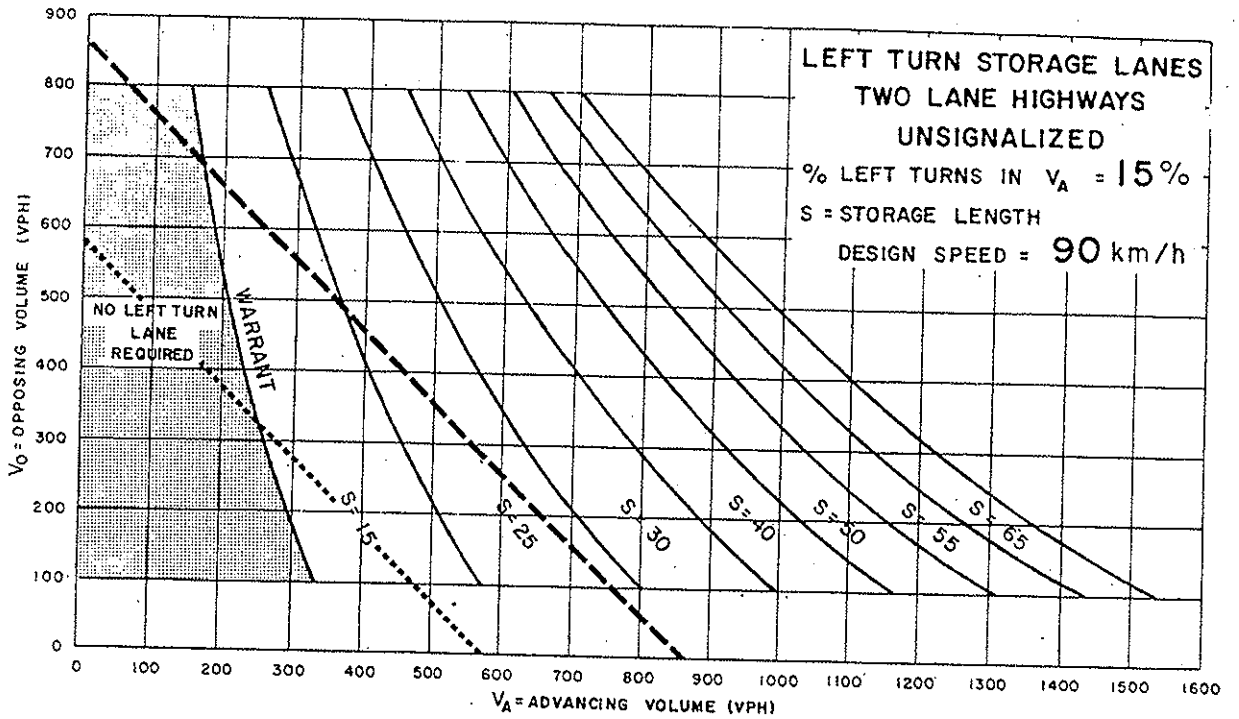


Figure EA-19





--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

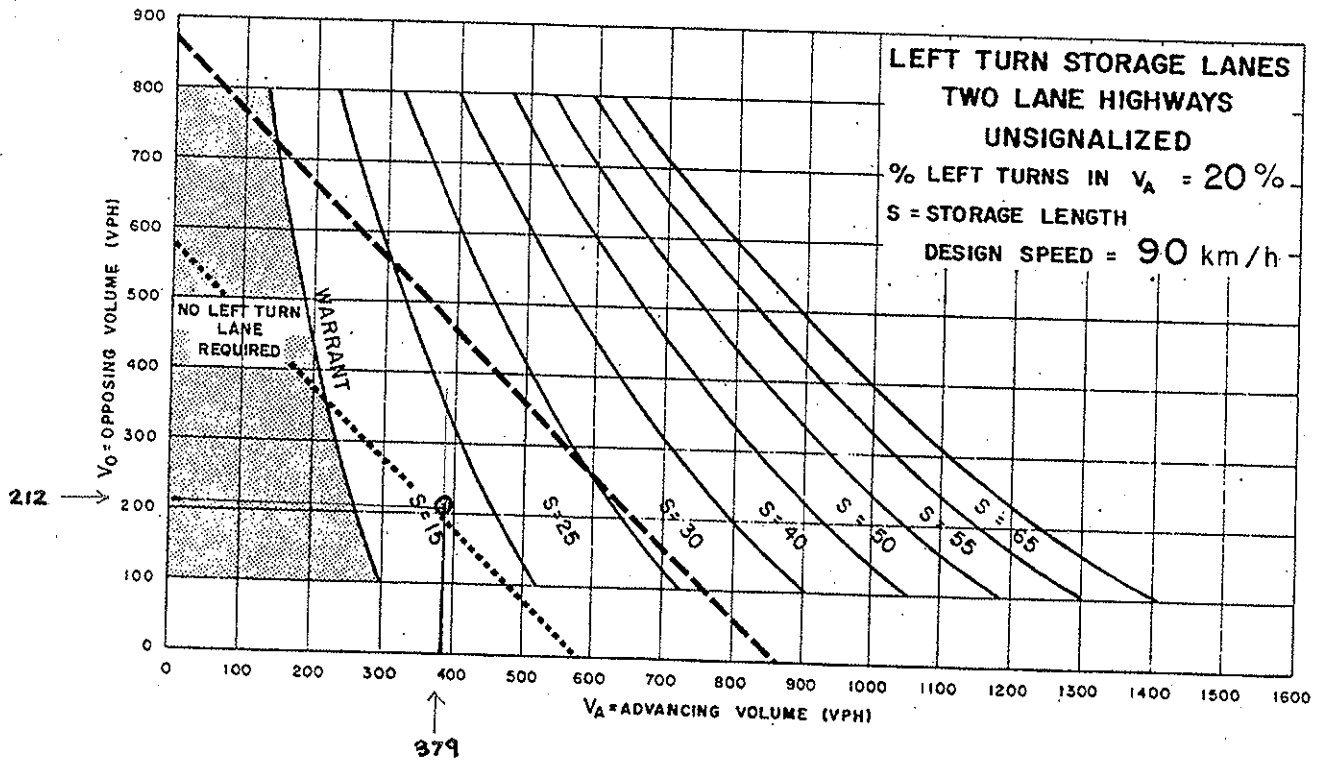
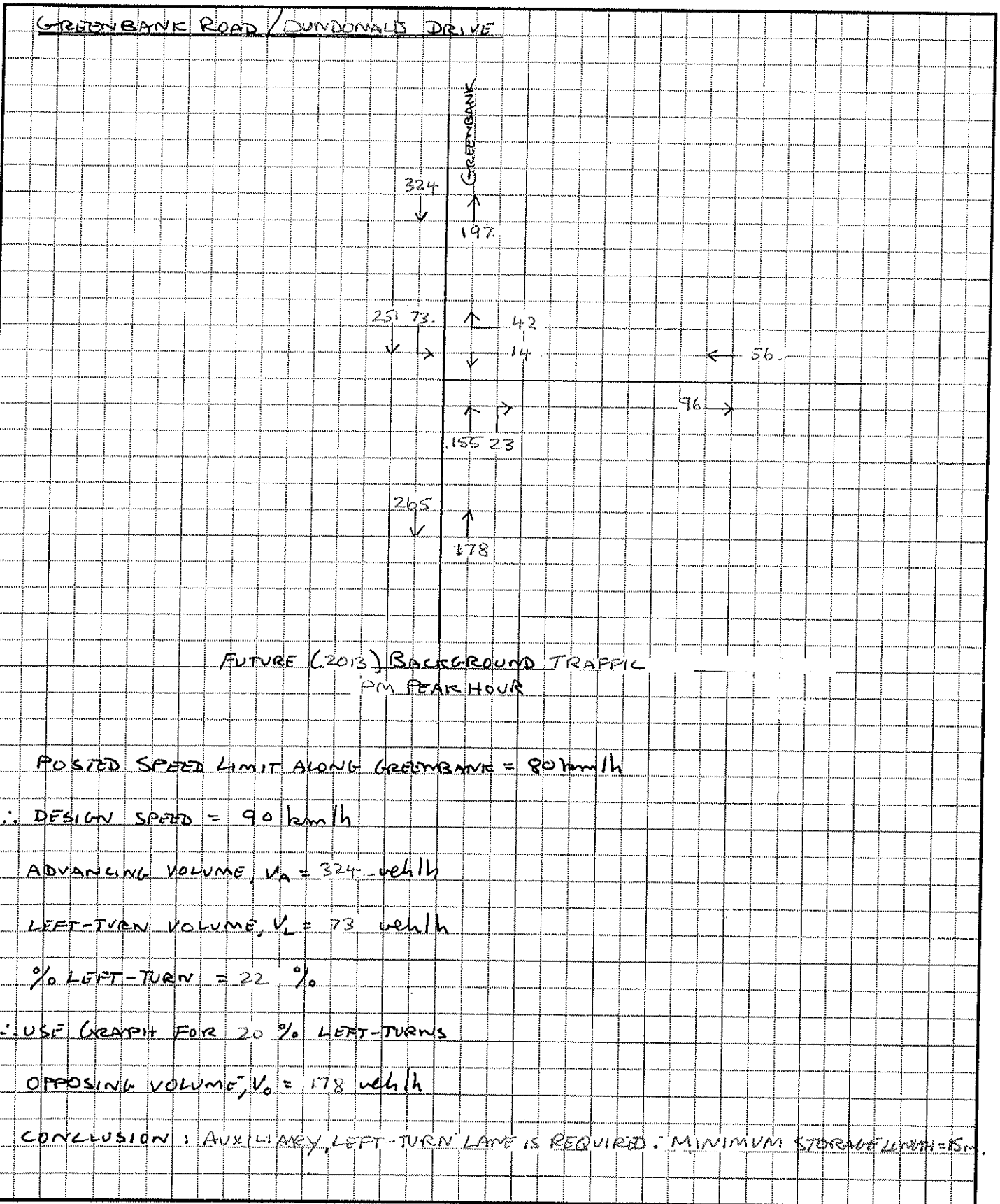
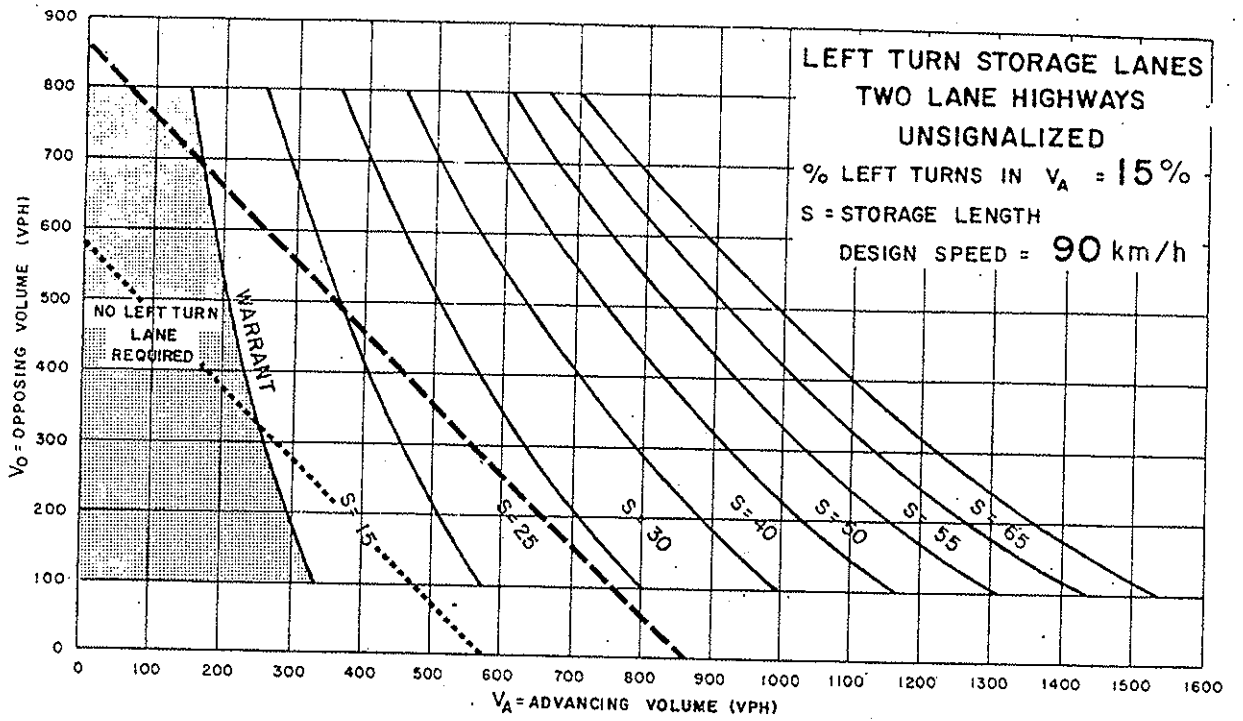


Figure EA-19

GREENBANK ROAD/ DUNDONALD DRIVE





--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

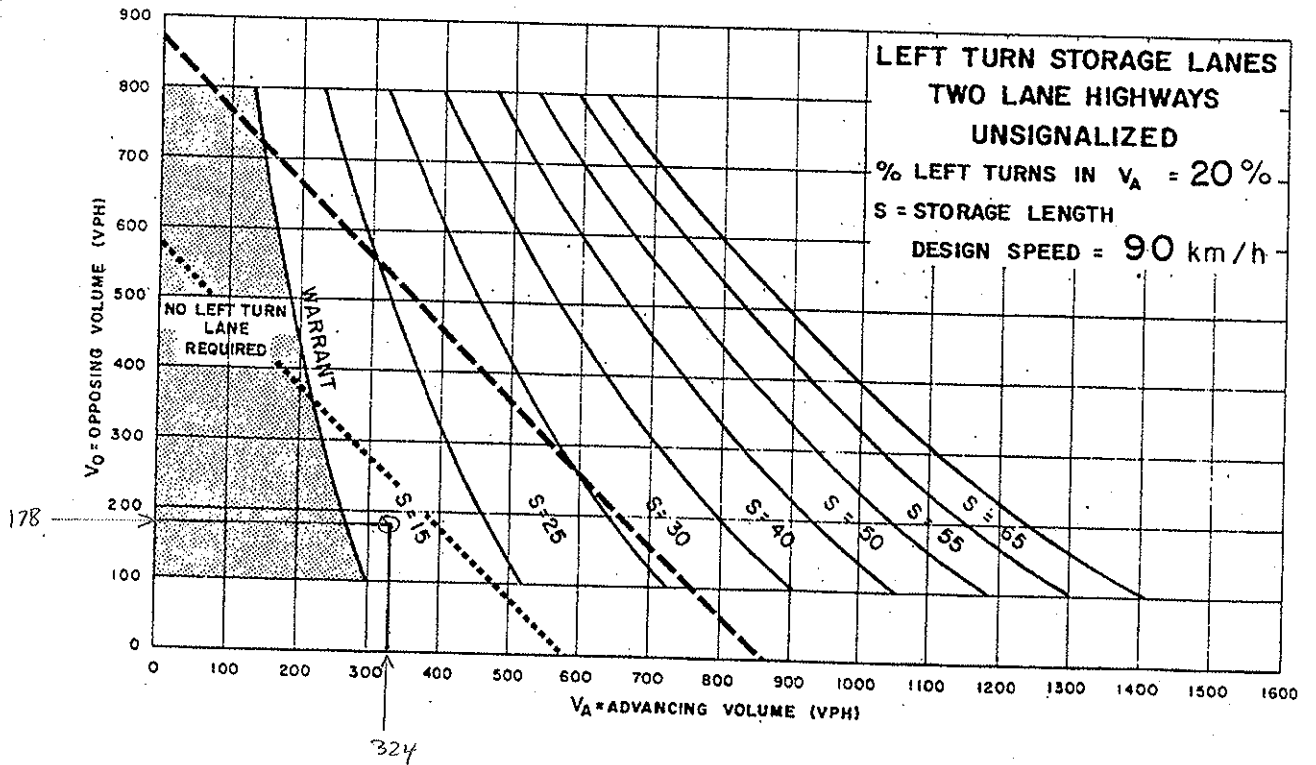
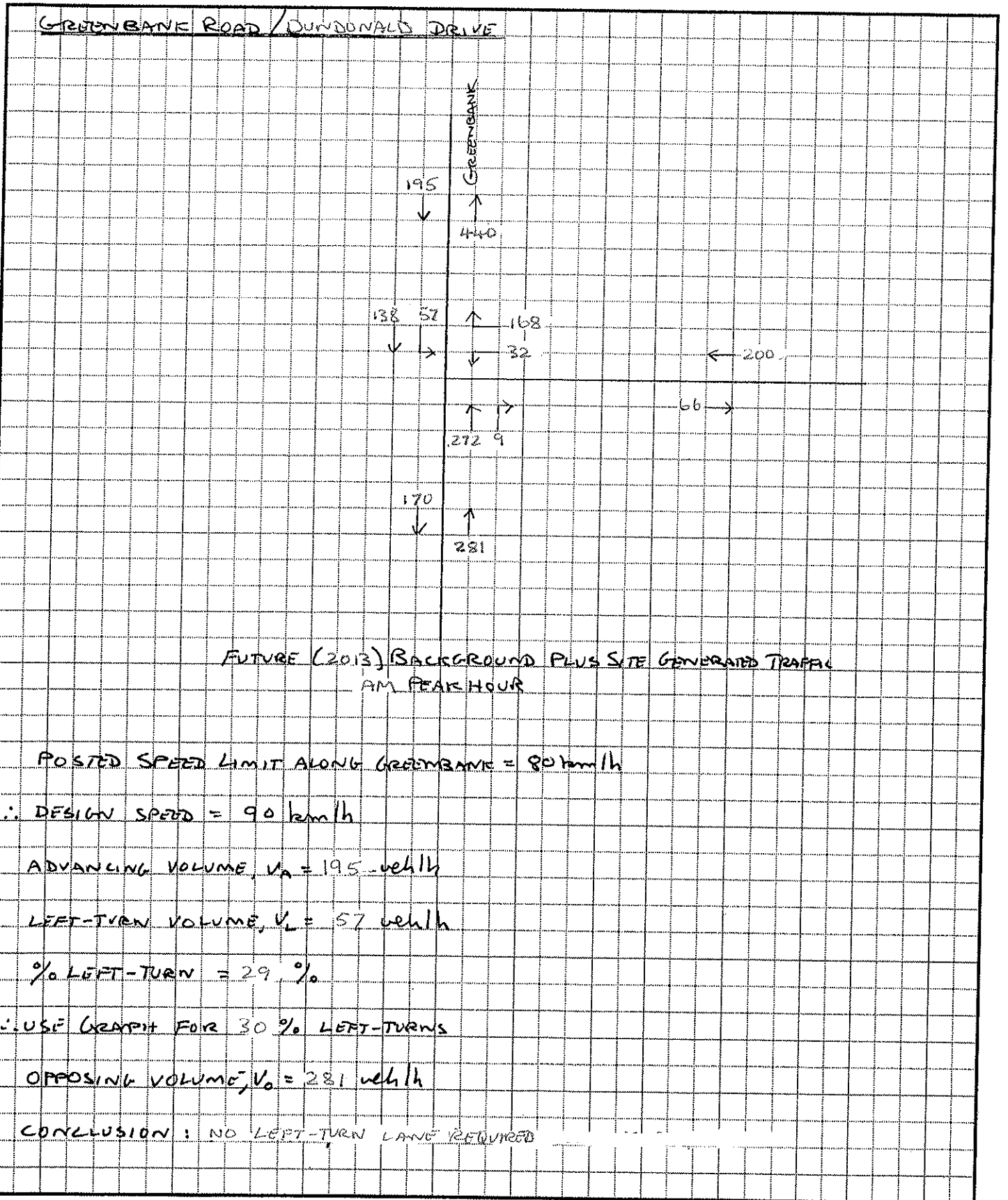
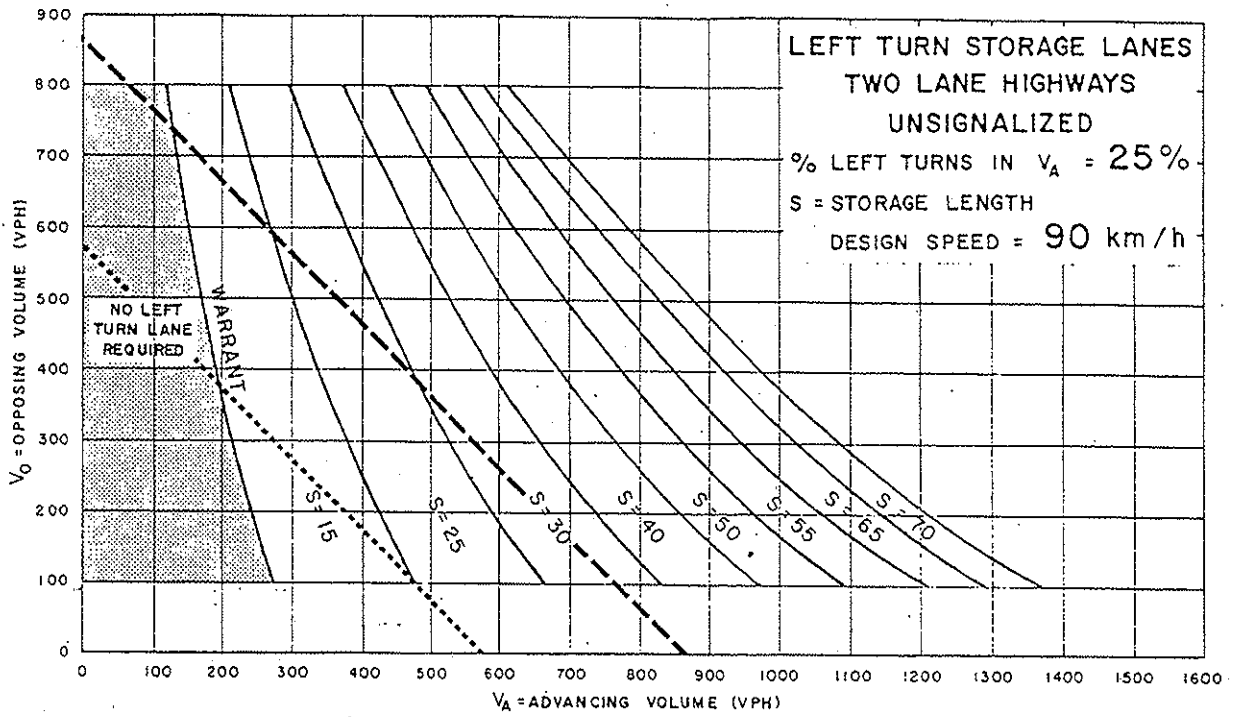


Figure EA-19





--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

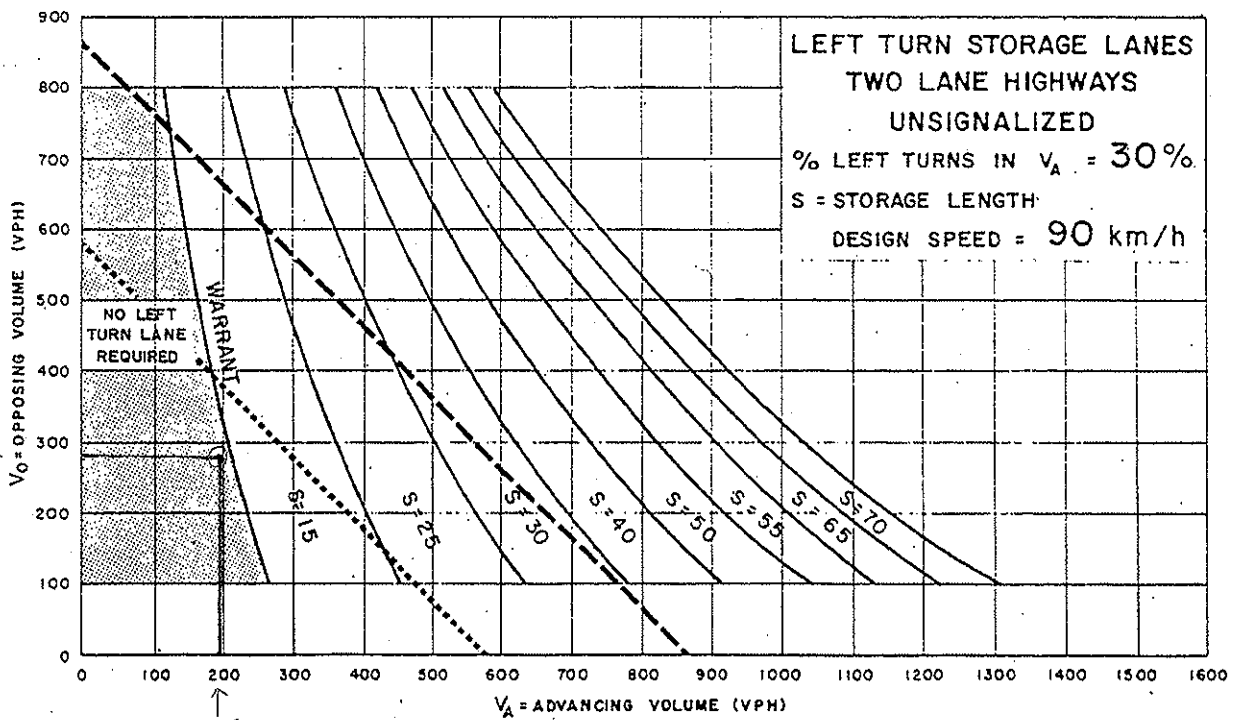
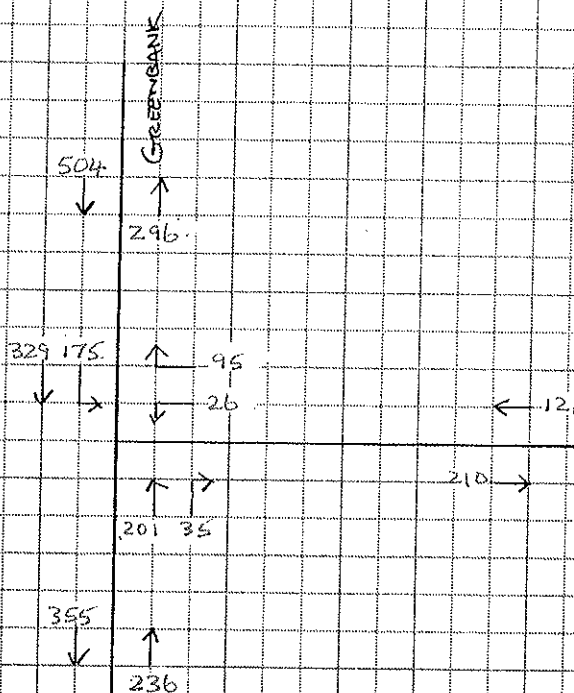


Figure EA-20

GREENBANK ROAD / LUNDONALD DRIVE



FUTURE (2013) BACKGROUND PLUS SITE GENERATED TRAFFIC
PM PEAK HOUR

POSTED SPEED LIMIT ALONG GREENBANK = 80 km/h

∴ DESIGN SPEED = 90 km/h

ADVANCING VOLUME, $V_A = 504$ veh/h

LEFT-TURN VOLUME, $V_L = 175$ veh/h

% LEFT-TURN = 35 %

∴ USE GRAPH FOR 35 % LEFT-TURNS

OPPOSING VOLUME, $V_O = 236$ veh/h

CONCLUSION : AUXILIARY LEFT-TURN LANE IS REQUIRED. MINIMUM STORAGE LENGTH = 25 m.

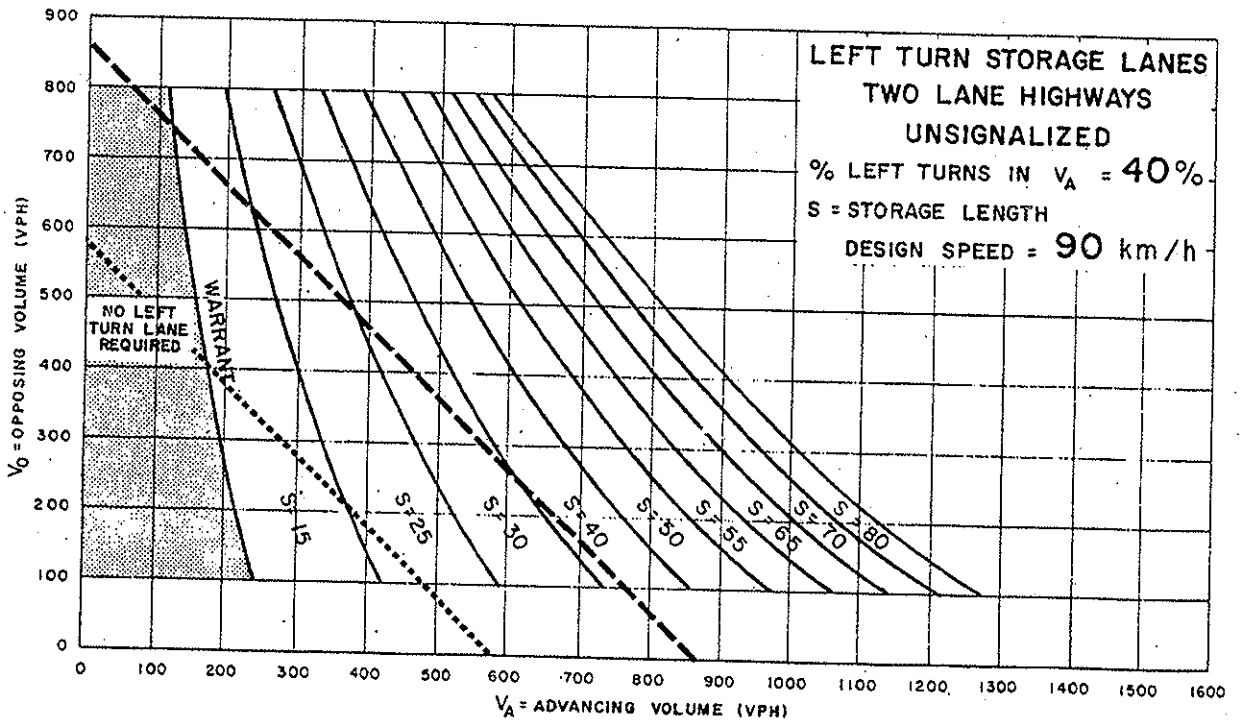
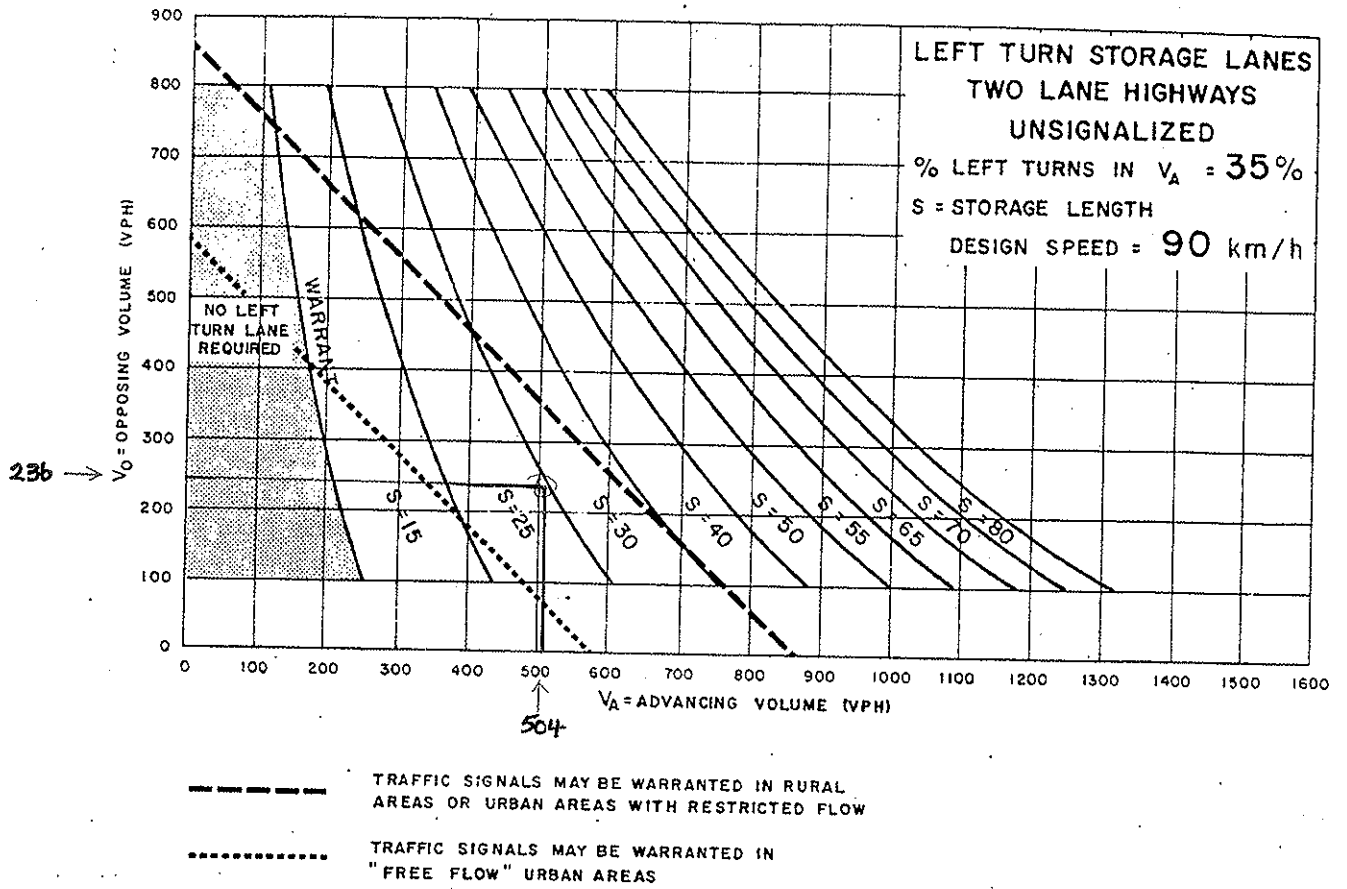
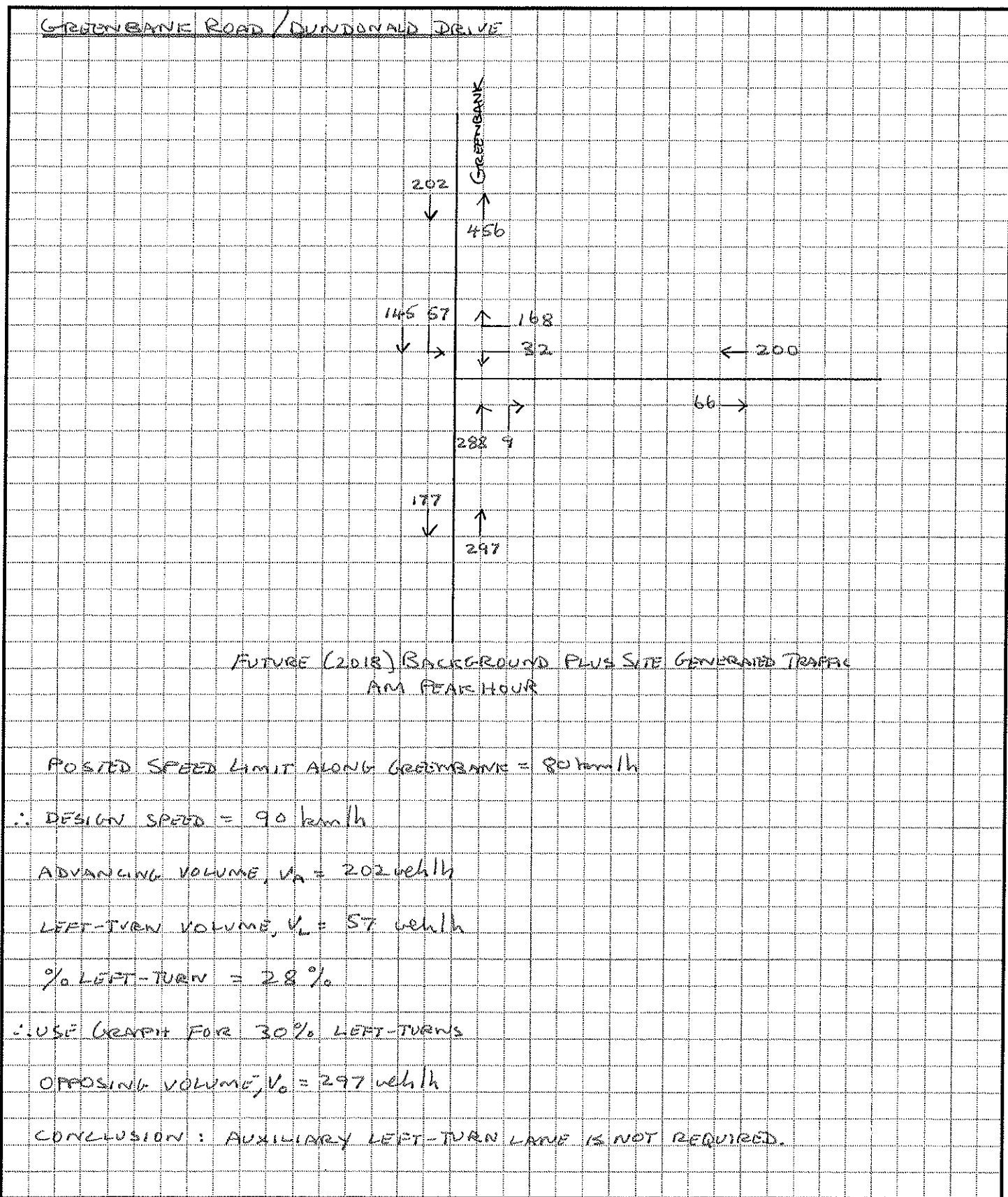


Figure EA-21



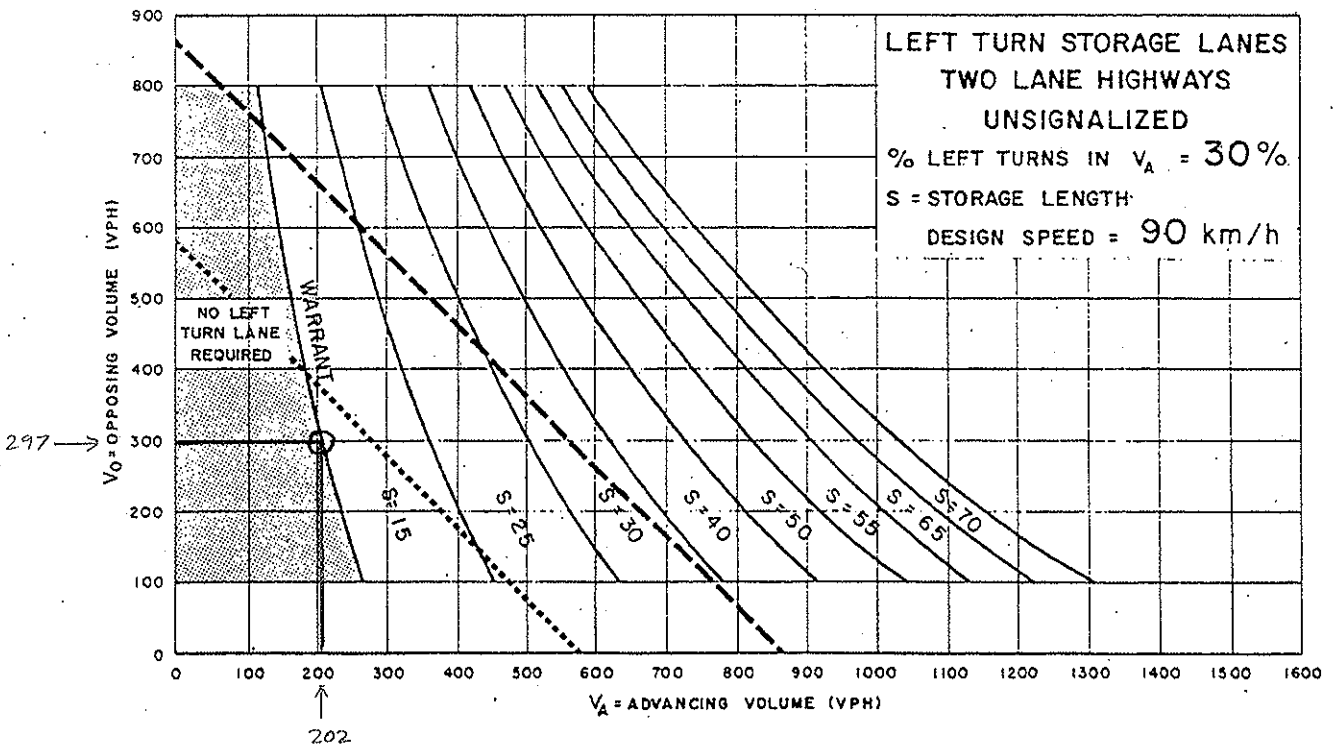
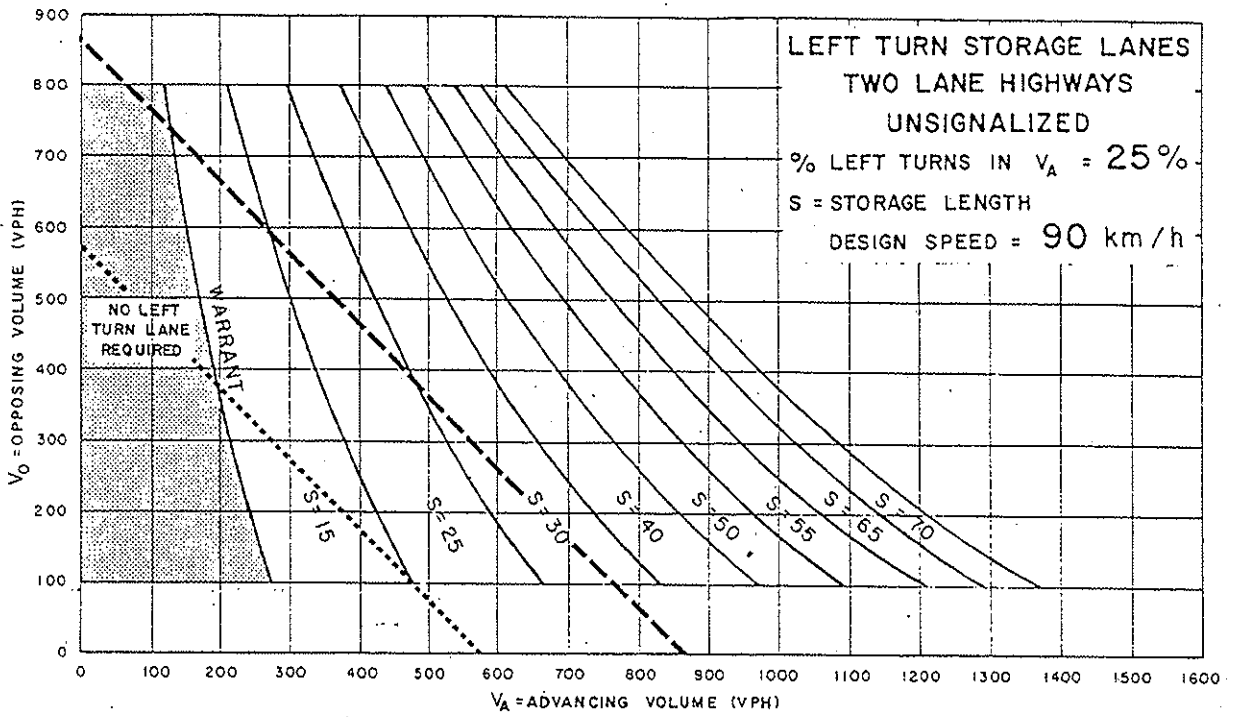
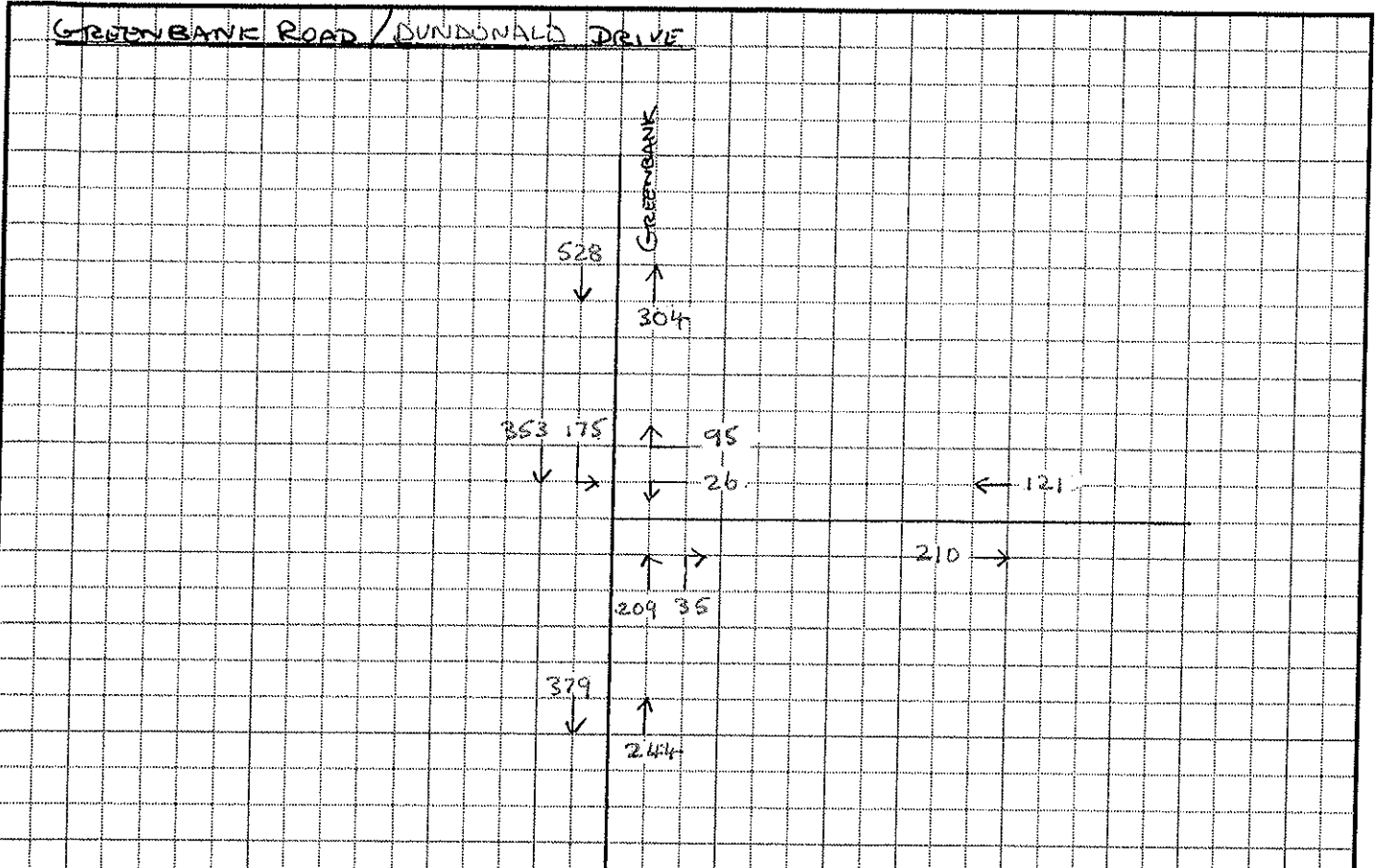


Figure EA-20



FUTURE (2018) BACKGROUND PLUS SITE GENERATED TRAFFIC
PM PEAK HOUR

POSTED SPEED LIMIT ALONG GREENBANK = 80 km/h

∴ DESIGN SPEED = 90 km/h

ADVANCING VOLUME, $V_A = 528$ veh/h

LEFT-TURN VOLUME, $V_L = 175$ veh/h

% LEFT-TURN = 33, %

∴ USE GRAPH FOR 35% LEFT-TURNS

OPPOSING VOLUME, $V_o = 244$ veh/h

CONCLUSION : AUXILIARY, LEFT-TURN LANE IS REQUIRED. MINIMUM STORAGE LENGTH = 30m

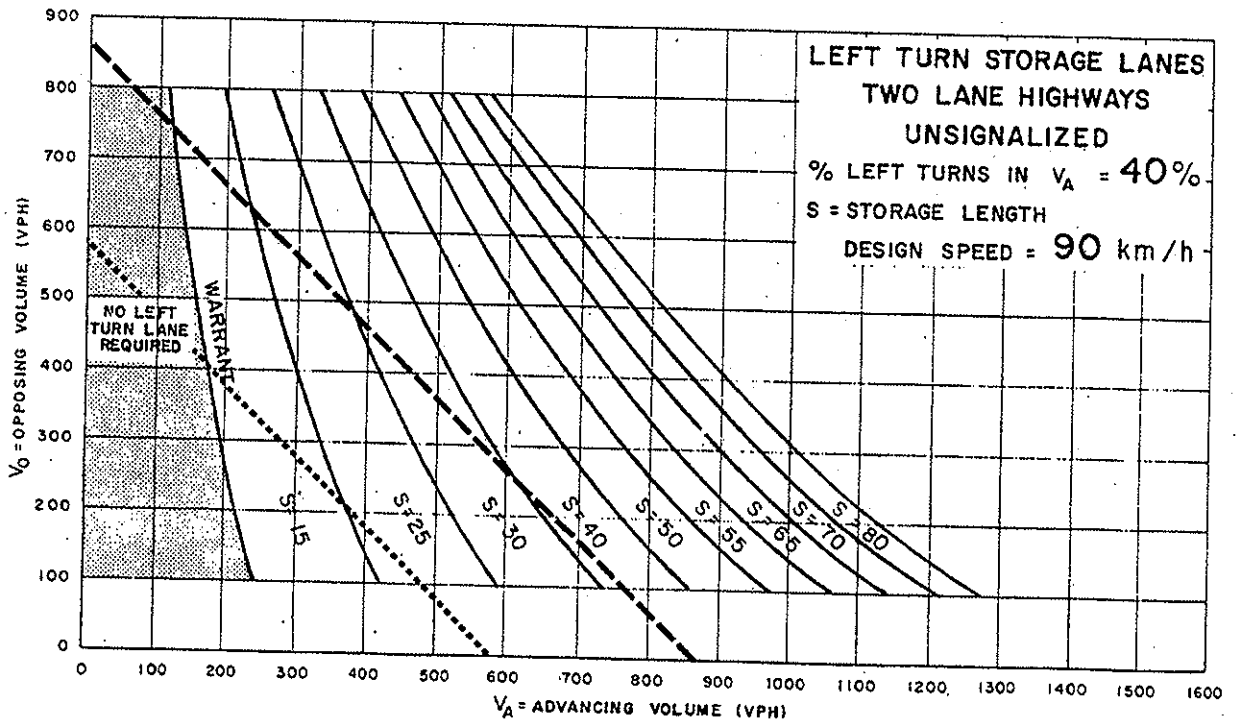
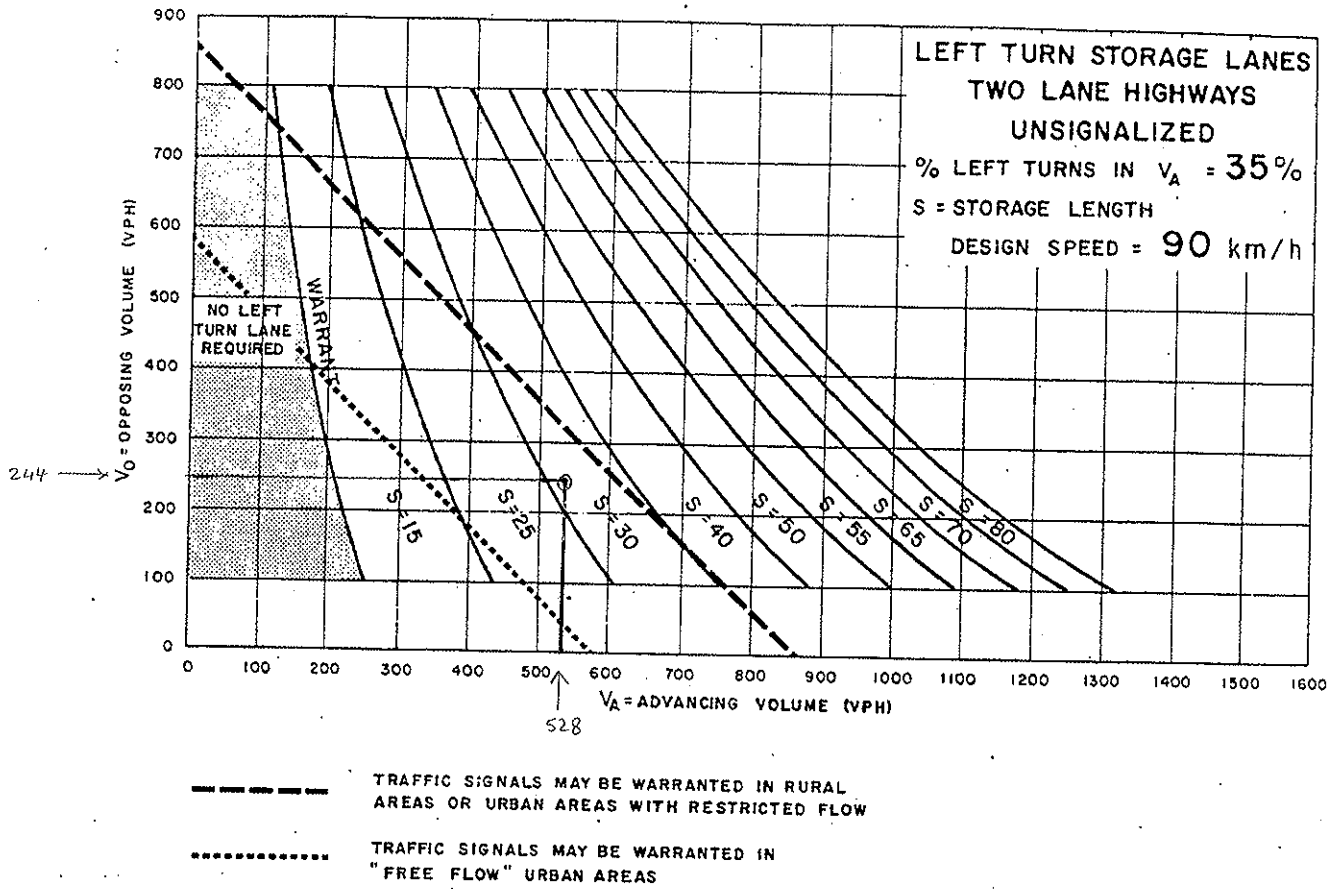
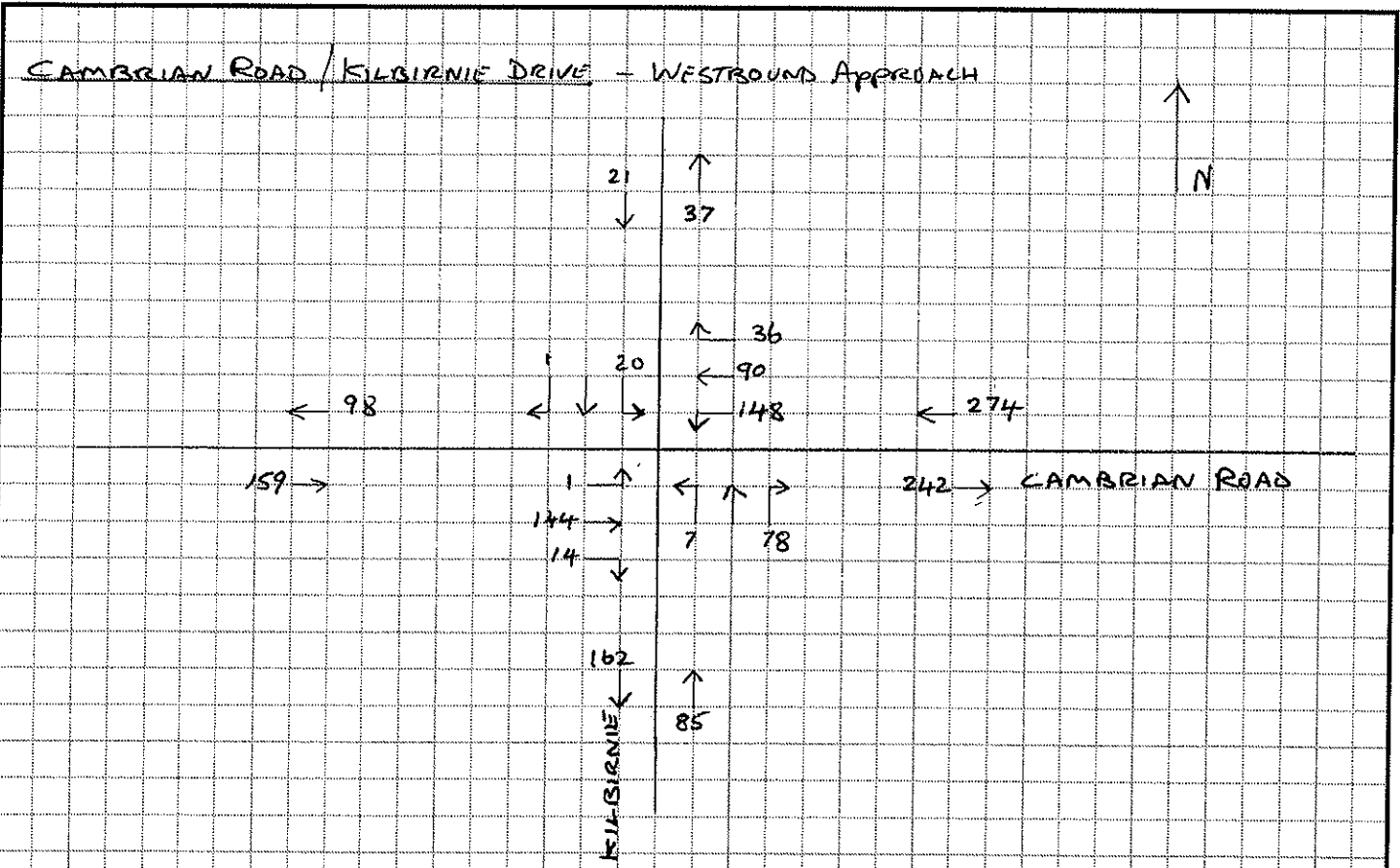


Figure EA-21

CAMBRIAN ROAD/ KILBIRNIE DRIVE



FUTURE (2013) BACKGROUND TRAFFIC
PM PEAK HOUR

SPEED LIMIT ALONG CAMBRIAN ROAD = 50 km/h

DESIGN SPEED = 60 km/h

APPROACHING VOLUME, $V_A = 274$ veh/h

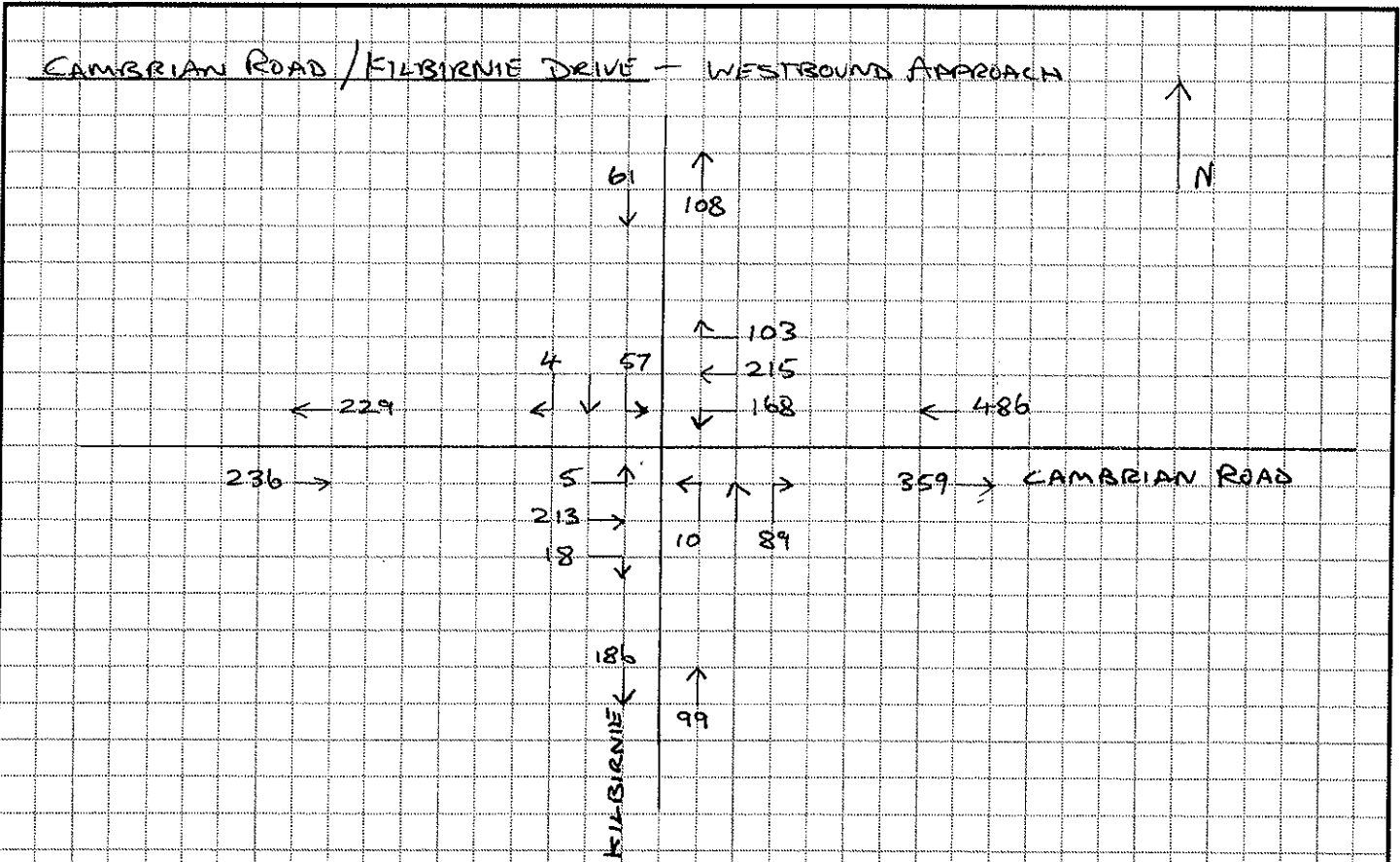
LEFT-TURN VOLUME, $V_L = 148$ veh/h

% LEFT TURNS = 54%

USE GRAPH FOR 40% LEFT-TURNS

OPPOSING VOLUME = 159 veh/h

CONCLUSION: AN AUXILIARY LEFT-TURN LANE IS NOT REQUIRED.



FUTURE (2013) BACKGROUND PLUS SITE GENERATED TRAFFIC
PM PEAK HOUR

SPEED LIMIT ALONG CAMBRIAN ROAD = 50 km/h

DESIGN SPEED = 60 km/h

APPROACHING VOLUME, $V_A = 486$ veh/h

LEFT-TURN VOLUME, $V_L = 168$ veh/h

% LEFT TURNS = 35%

USE GRAPH FOR 35% LEFT-TURNS

OPPOSING VOLUME = 236 veh/h.

CONCLUSION: AN AUXILIARY LEFT-TURN LANE IS REQUIRED. MINIMUM STORAGE LENGTH = 25m.

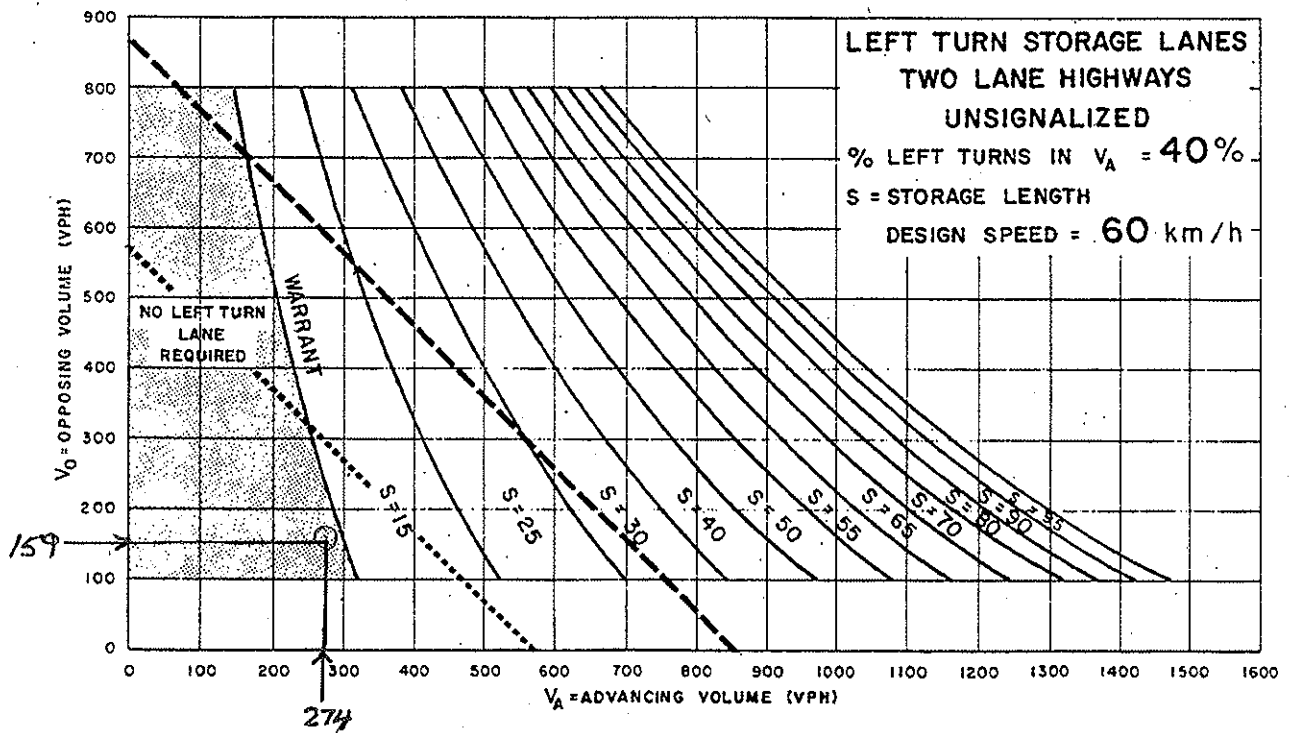
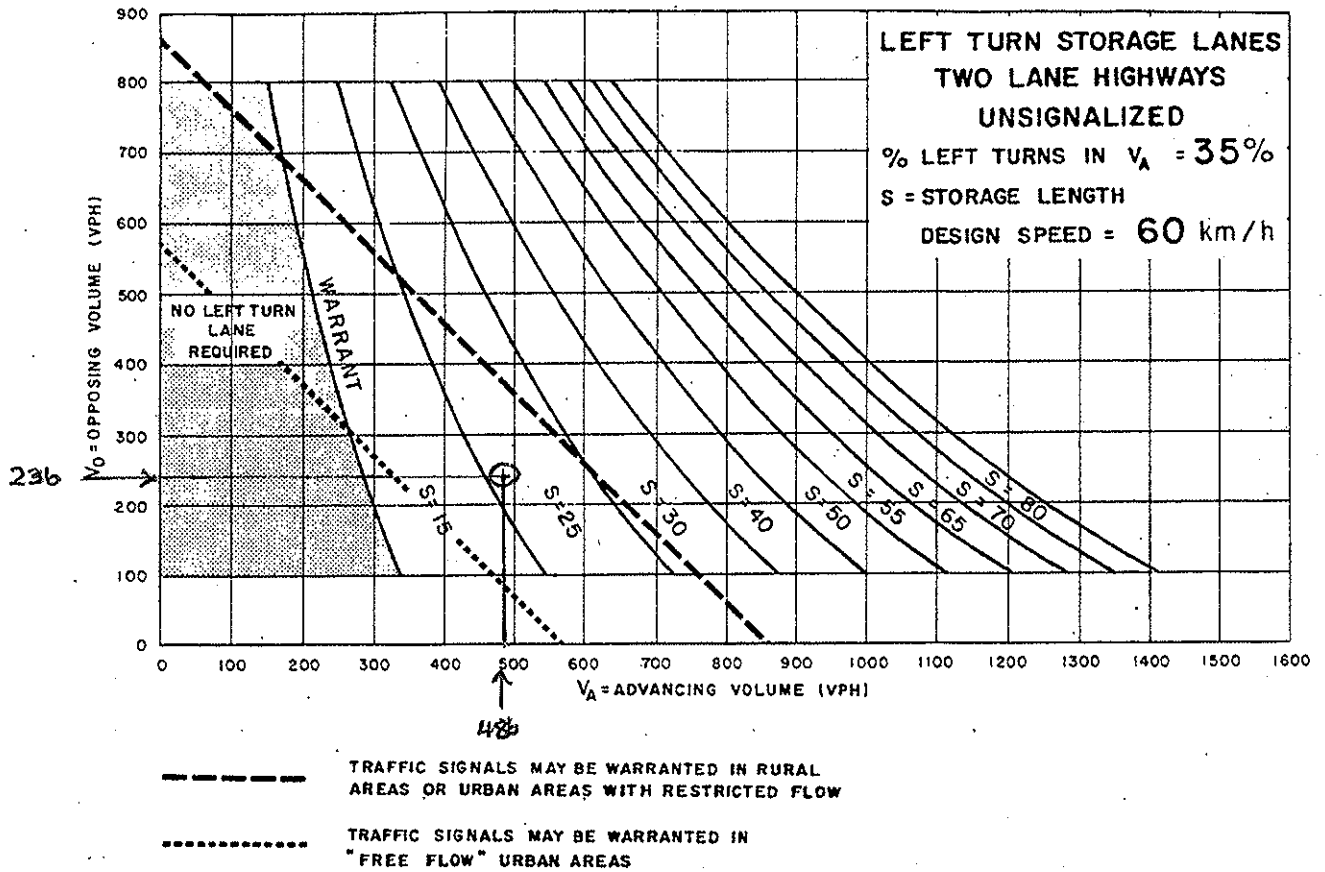
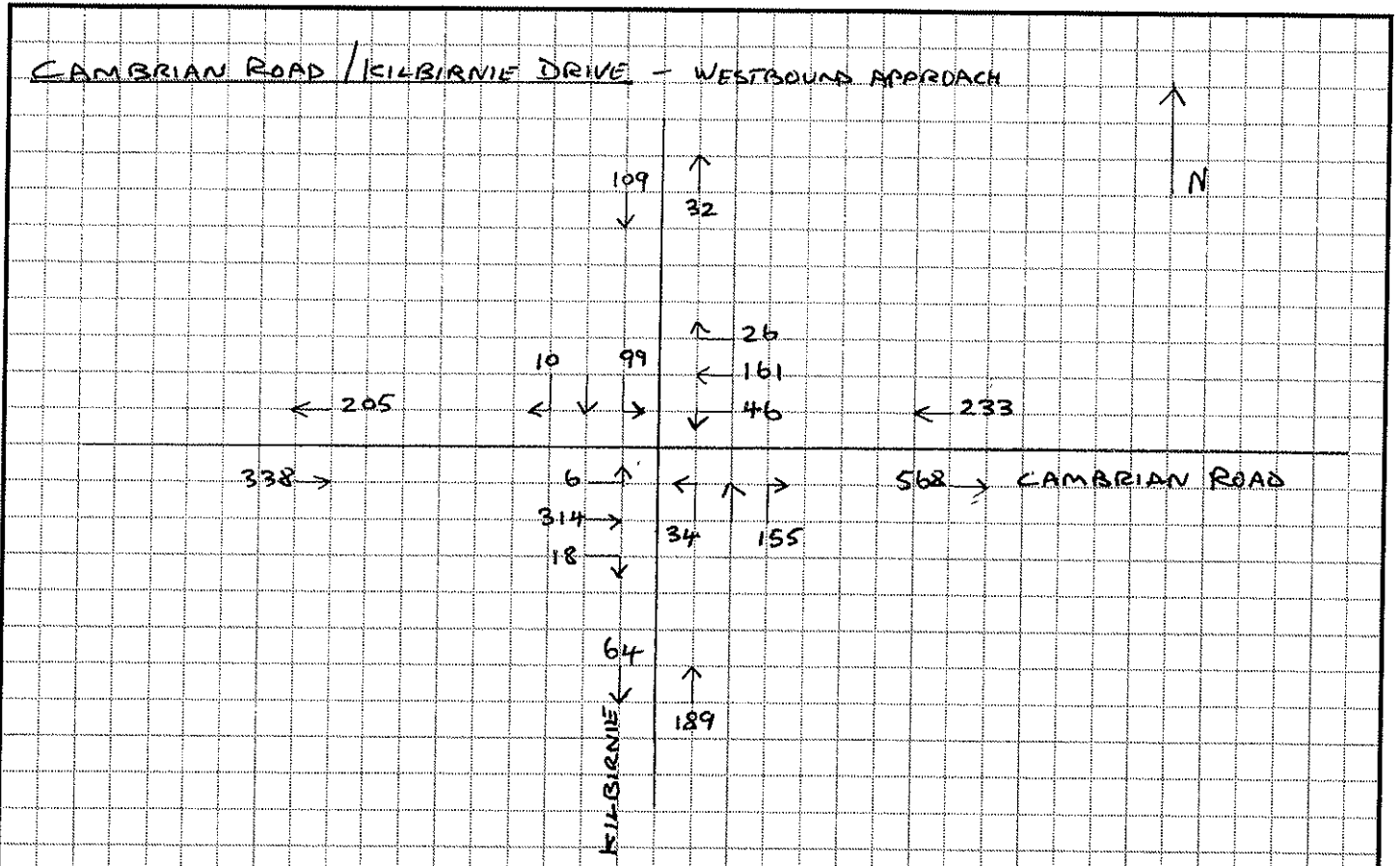


Figure EA-9



FUTURE (2018) BACKGROUND PLUS SITE GENERATED TRAFFIC
 AM PEAK HOUR

SPEED LIMIT ALONG CAMBRIAN ROAD = 50km/h

DESIGN SPEED = 60km/h

APPROACHING VOLUME, $V_A = 233$ veh/h

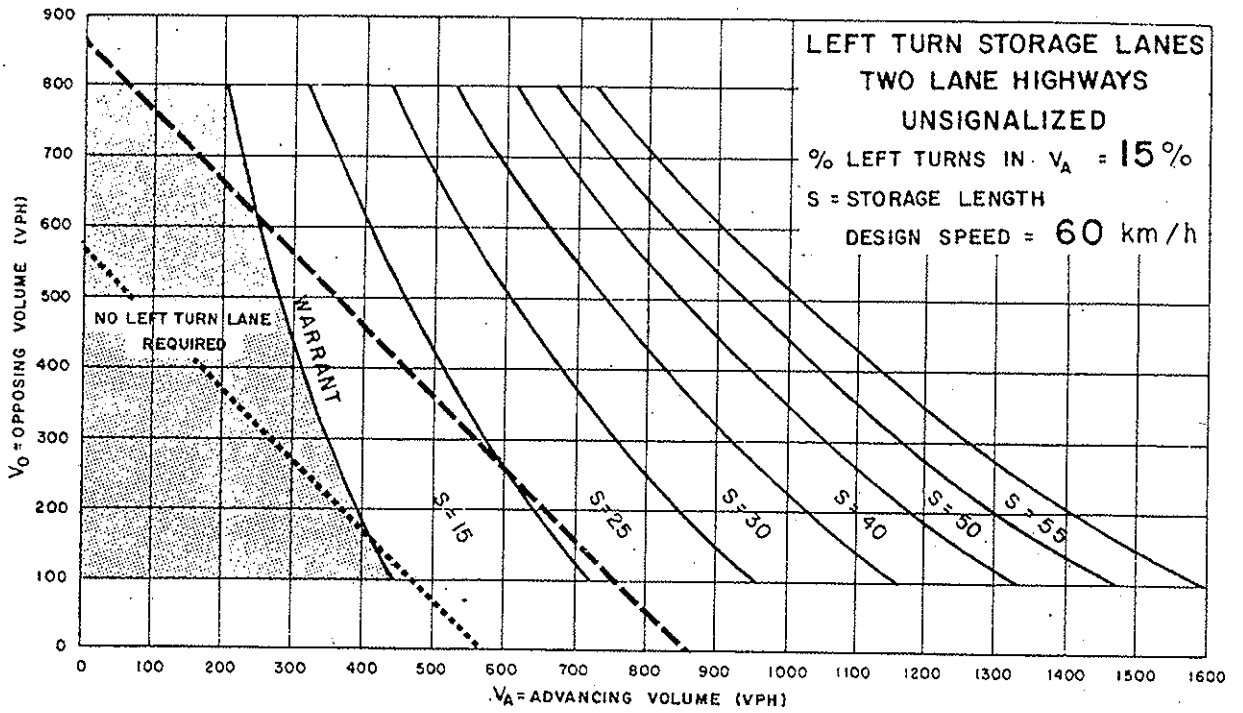
LEFT-TURN VOLUME, $V_L = 46$ veh/h

% LEFT TURNS = 20%

USE GRAPH FOR 20% LEFT-TURNS

OPPOSING VOLUME = 338 veh/h.

CONCLUSION: AUXILIARY LEFT-TURN LANE IS NOT REQUIRED.



--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

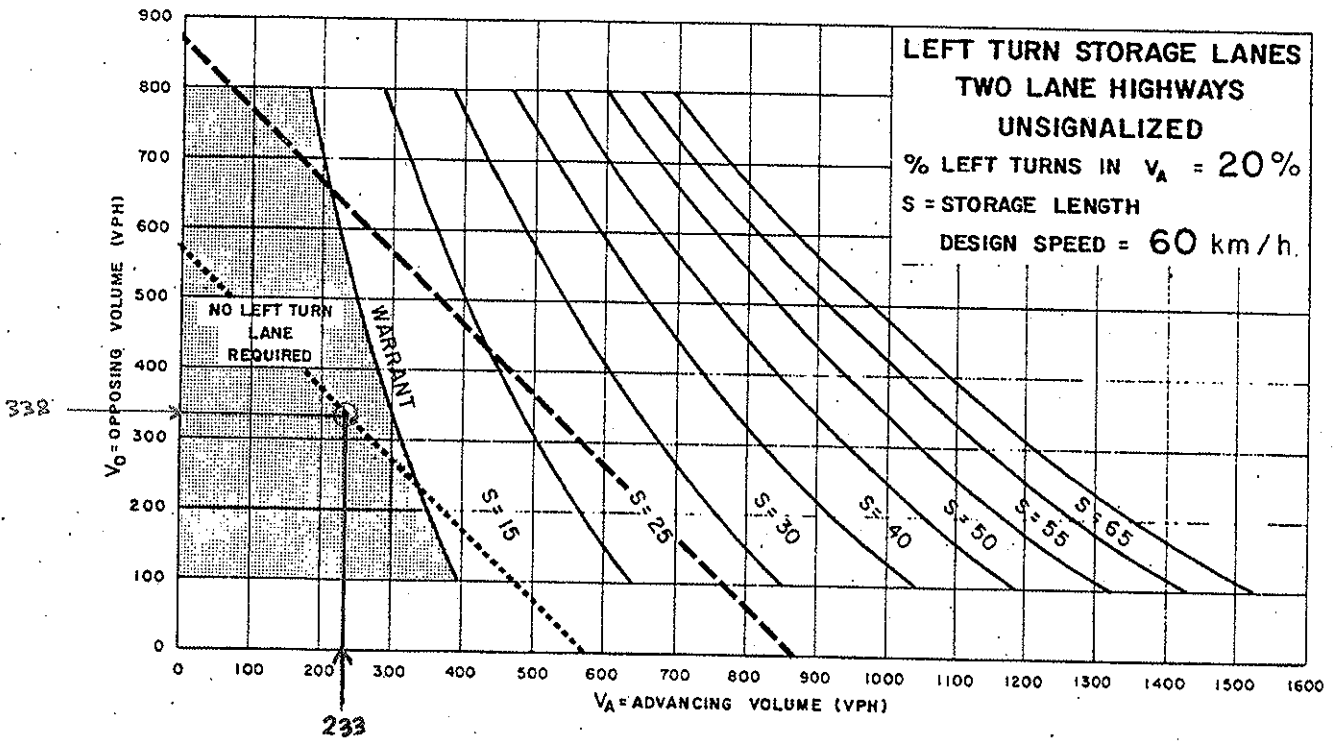
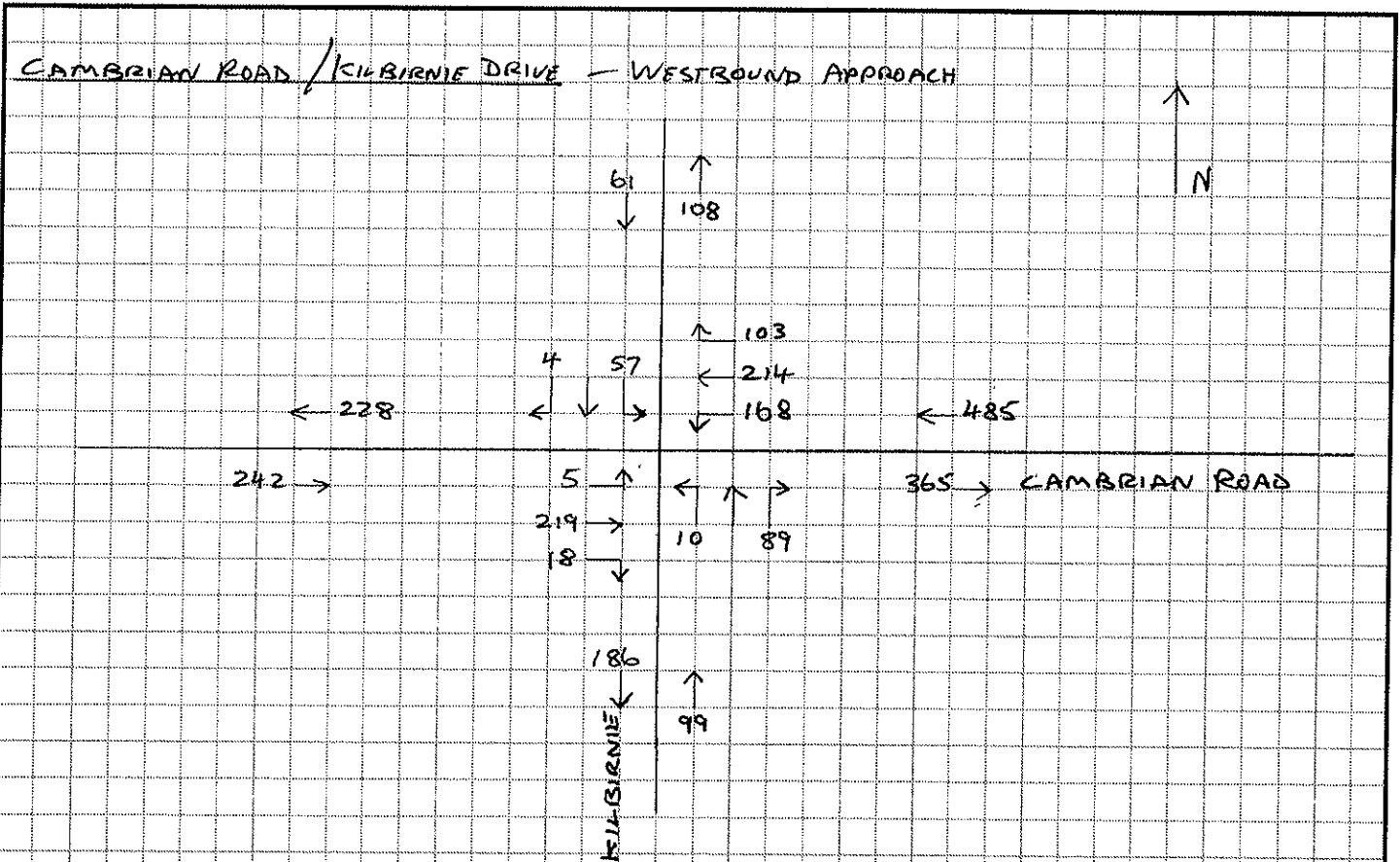


Figure EA-7



FUTURE (2018) BACKGROUND PLUS SITE GENERATED TRAFFIC
PM PEAK HOUR

SPEED LIMIT ALONG CAMBRIAN ROAD = 50 km/h

DESIGN SPEED = 60 km/h

APPROACHING VOLUME, $V_A = 485 \text{ veh/h}$

LEFT-TURN VOLUME, $V_L = 168 \text{ veh/h}$

% LEFT TURNS = 35%

USE GRAPH FOR 35% LEFT-TURNS

OPPOSING VOLUME = 242 veh/h

CONCLUSION: AN AUXILIARY LEFT-TURN LANE IS REQUIRED. MINIMUM STORAGE LENGTH = 25m.

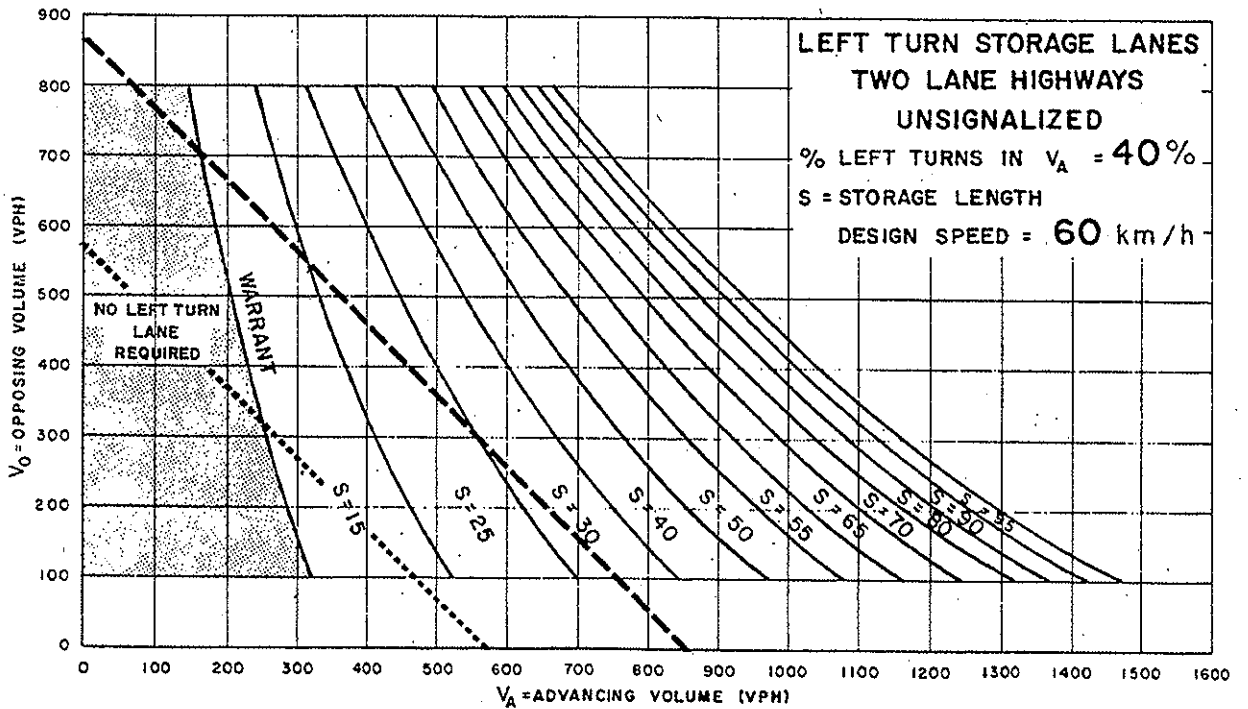
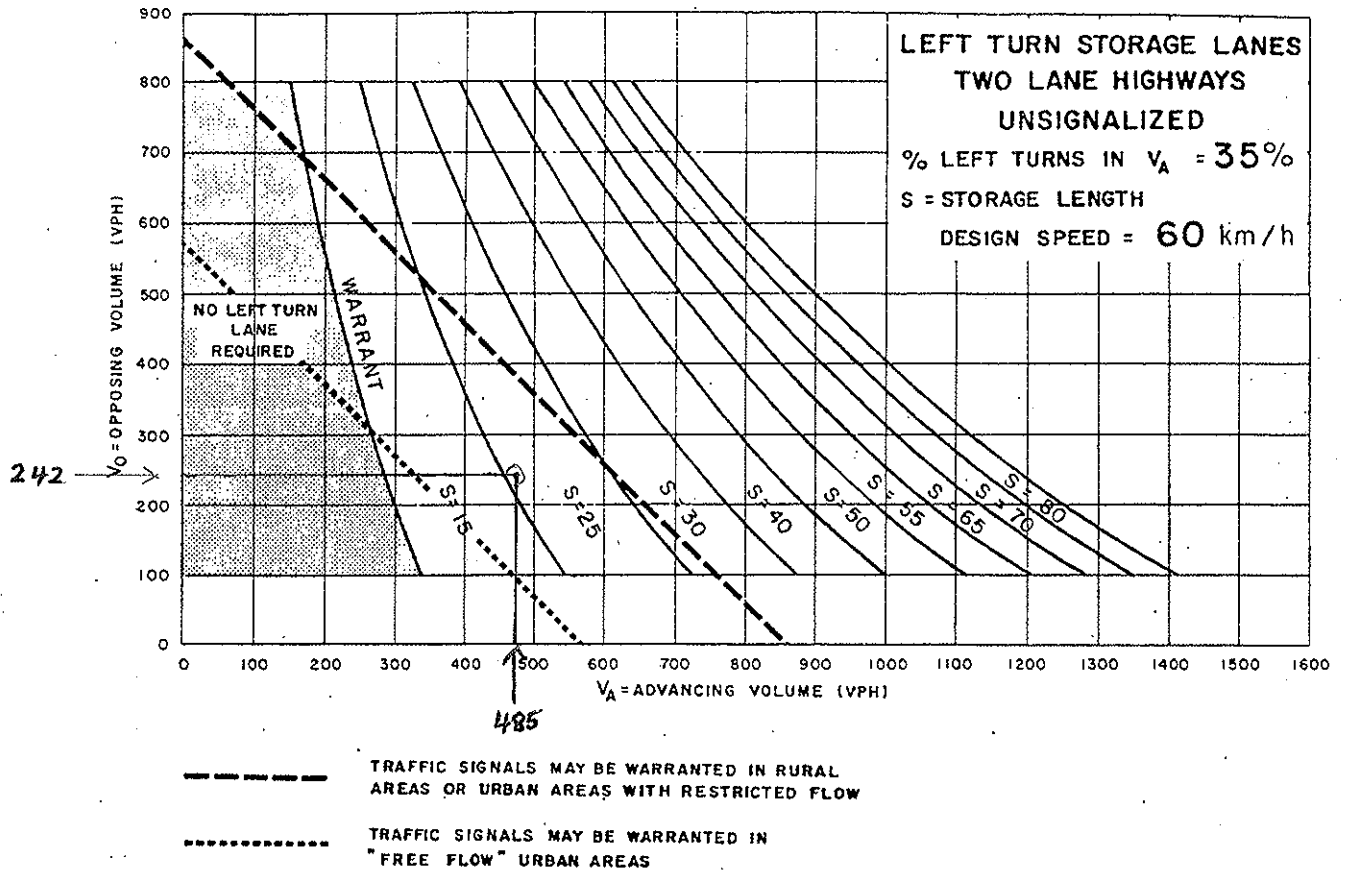
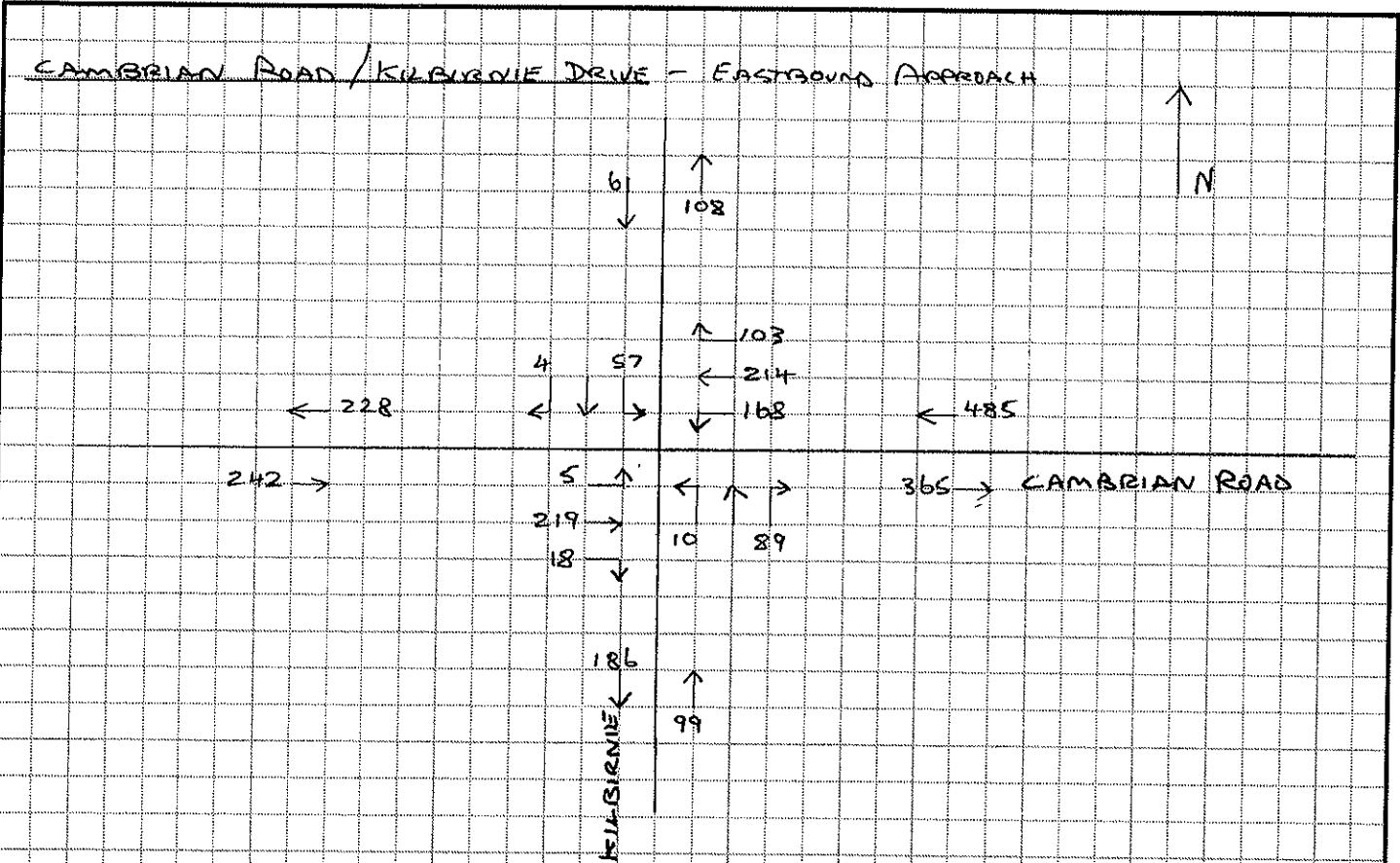


Figure EA-9



FUTURE (2018) BACKGROUND PLUS SITE GENERATED TRAFFIC
P.M. PEAK HOUR

SPEED LIMIT ALONG CAMBRIAN ROAD = 50 km/h

DESIGN SPEED = 60 km/h

APPROACHING VOLUME, $V_A = 242$ veh/h

LEFT-TURN VOLUME, $V_L = 5$ veh/h

% LEFT TURNS = 2%

USE GRAPH FOR 5% LEFT-TURNS

OPPOSING VOLUME = 485 veh/h.

CONCLUSION: AN AUXILIARY LEFT-TURN LANE IS NOT REQUIRED.

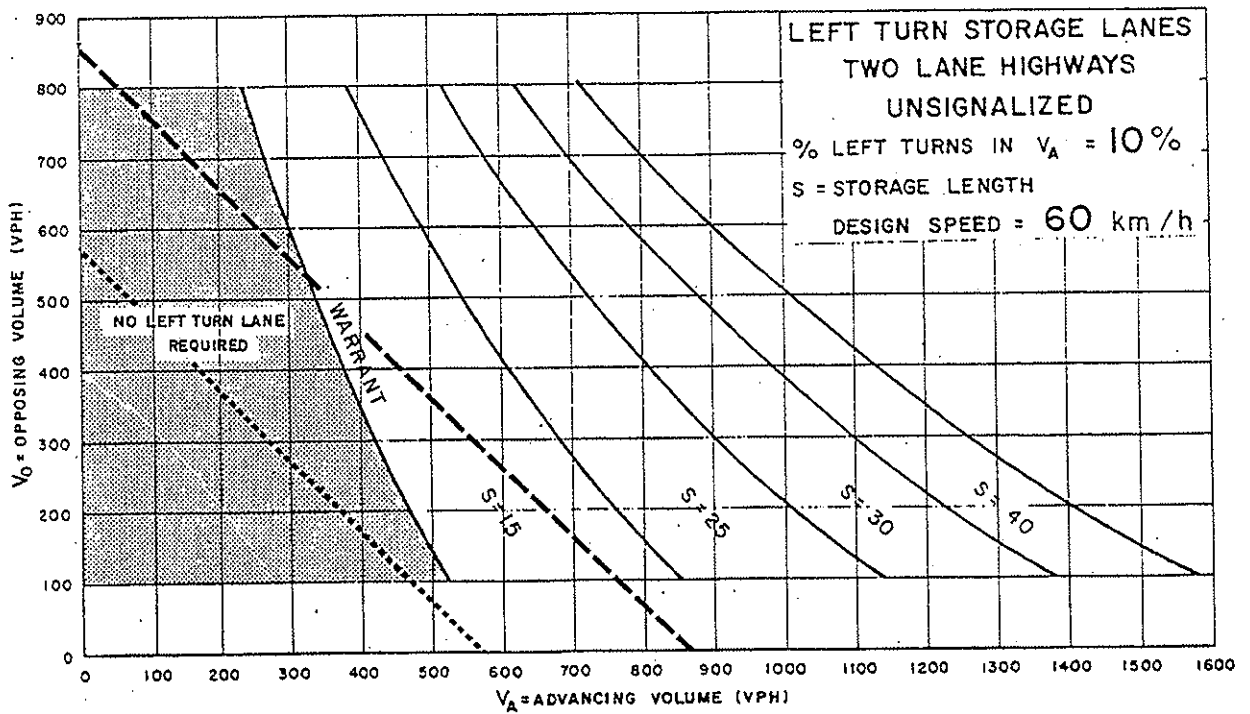
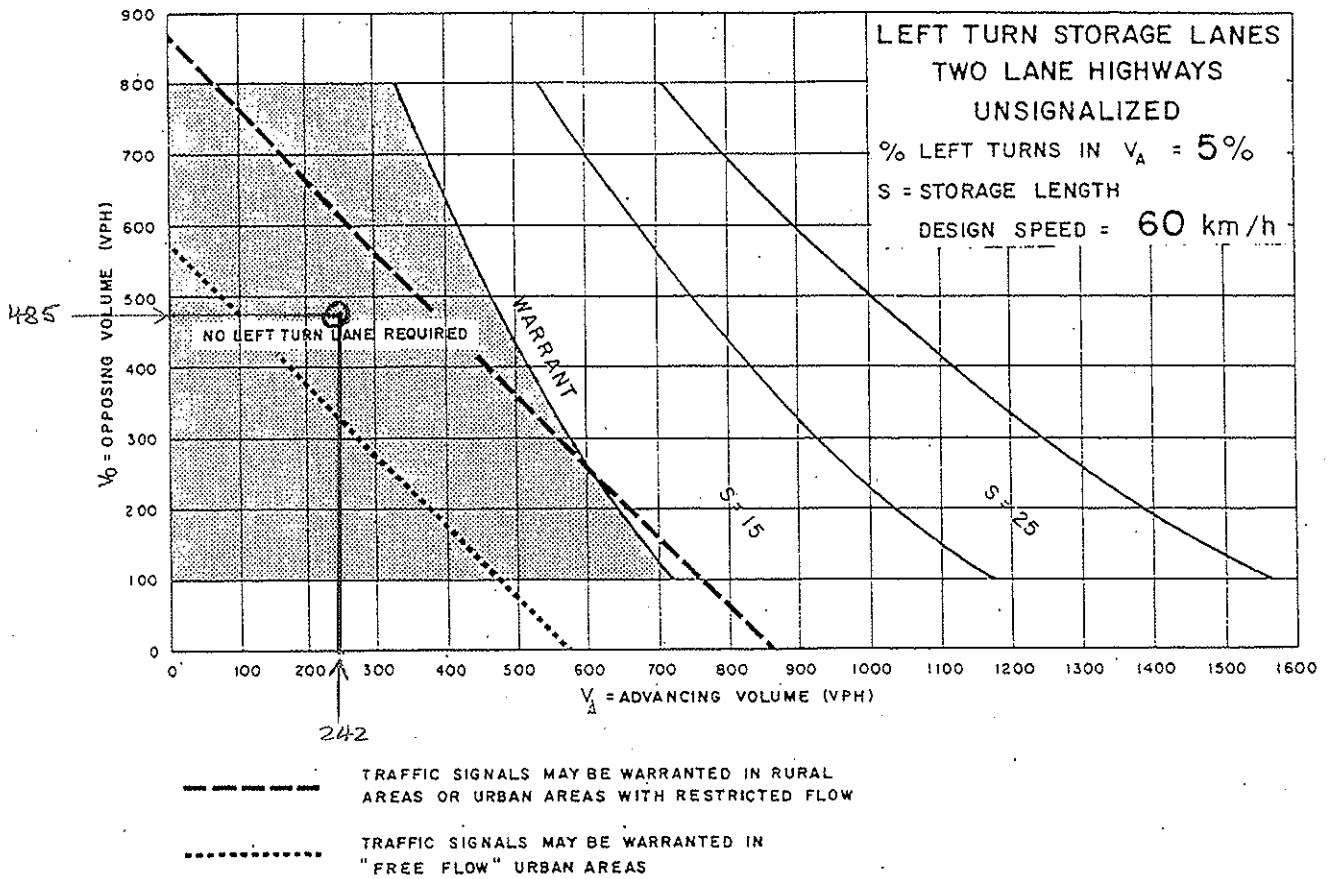
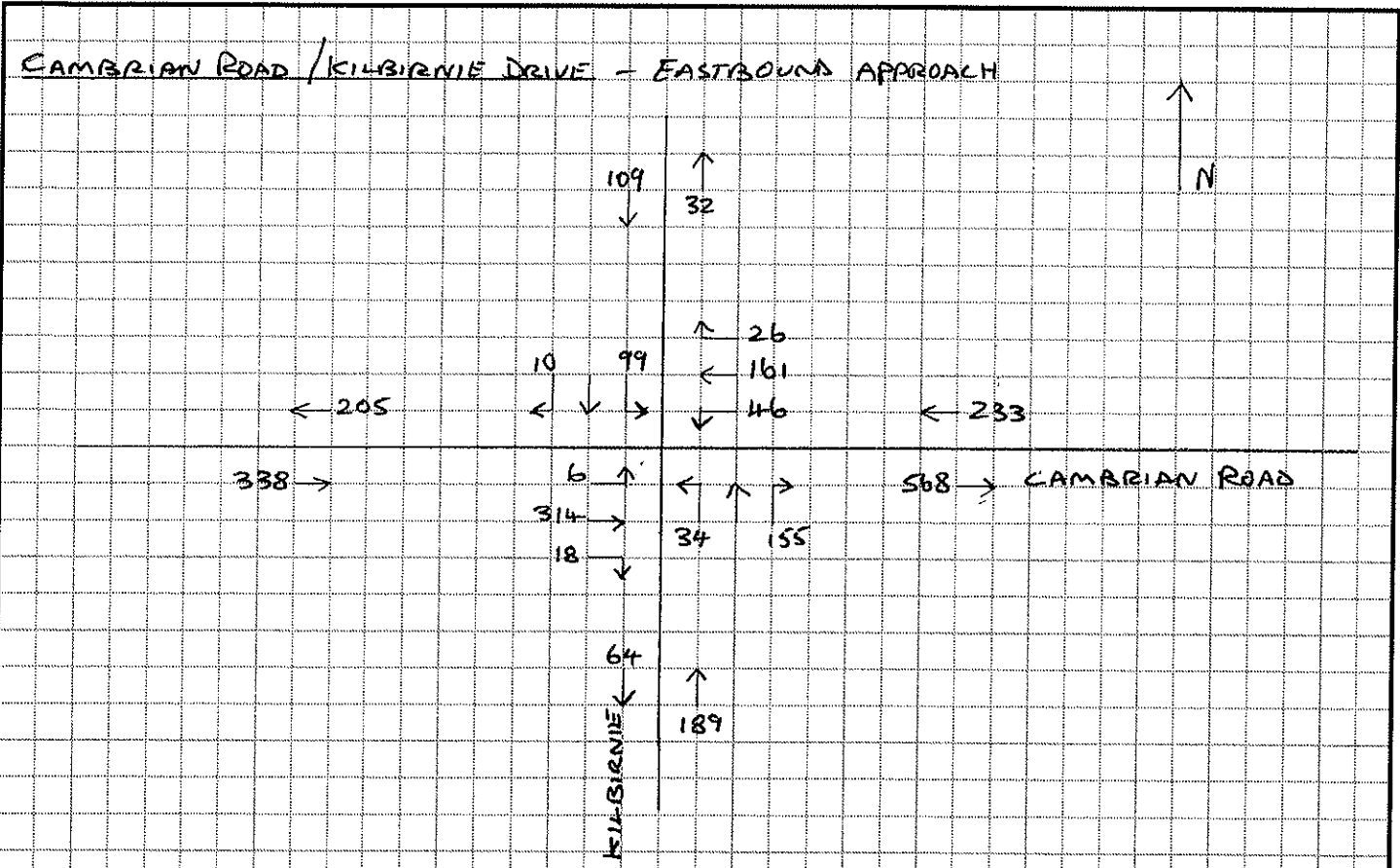


Figure EA-6



FUTURE (2018) BACKGROUND PLUS SITE GENERATED TRAFFIC
AM PEAK HOUR

SPEED LIMIT ALONG CAMBRIAN ROAD = 50 km/h

DESIGN SPEED = 60 km/h

APPROACHING VOLUME, $V_A = 338$ veh/h

LEFT-TURN VOLUME, $V_L = 6$ veh/h

% LEFT TURNS = 2%

USE GRAPH FOR 5% LEFT-TURNS

OPPOSING VOLUME = 233 veh/h

CONCLUSION: AN AUXILIARY LEFT-TURN LANE IS NOT REQUIRED

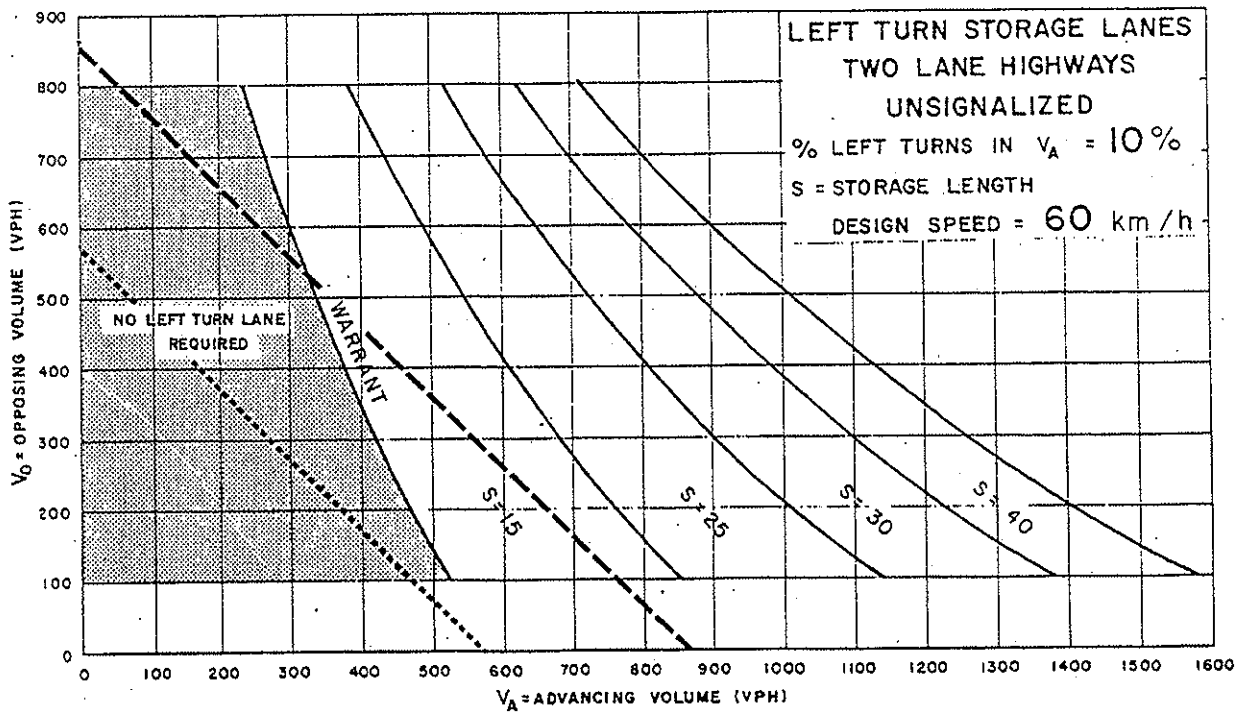
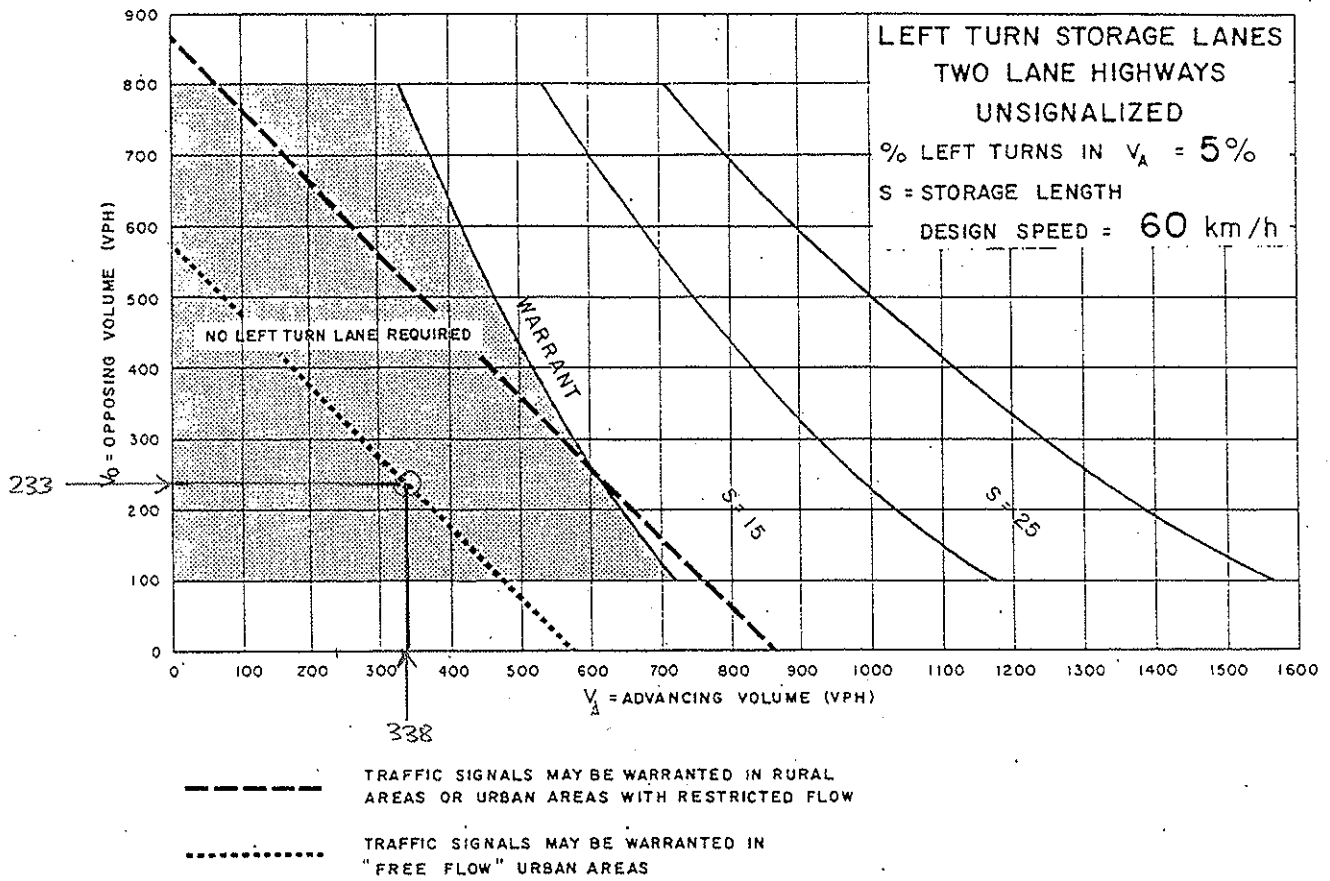


Figure EA-6

APPROACH TAPER LENGTHS

GRONBANK ROAD

*GEOMETRIC DESIGN GUIDELINES FOR CANADIAN ROADS, 1999 EDITION, TRANSPORTATION ASSOCIATION OF CANADA.

POSTED SPEED LIMIT = 80 km/h

DESIGN SPEED = 90 km/h

APPROACH TAPER LENGTH = 95m - 189m. (TABLE 2.3.8.1.)

∴ MINIMUM TAPER LENGTH = 95m.

CAMBRIAN ROAD

SPEED LIMIT = 50 km/h

DESIGN SPEED = 60 km/h

APPROACH TAPER LENGTH = 52.5m - 126m (TABLE 2.3.8.1.)

MINIMUM TAPER LENGTH = 55m.



Figure 2.3.8.1 Left-Turn Lane, Pictorial Description of Terms

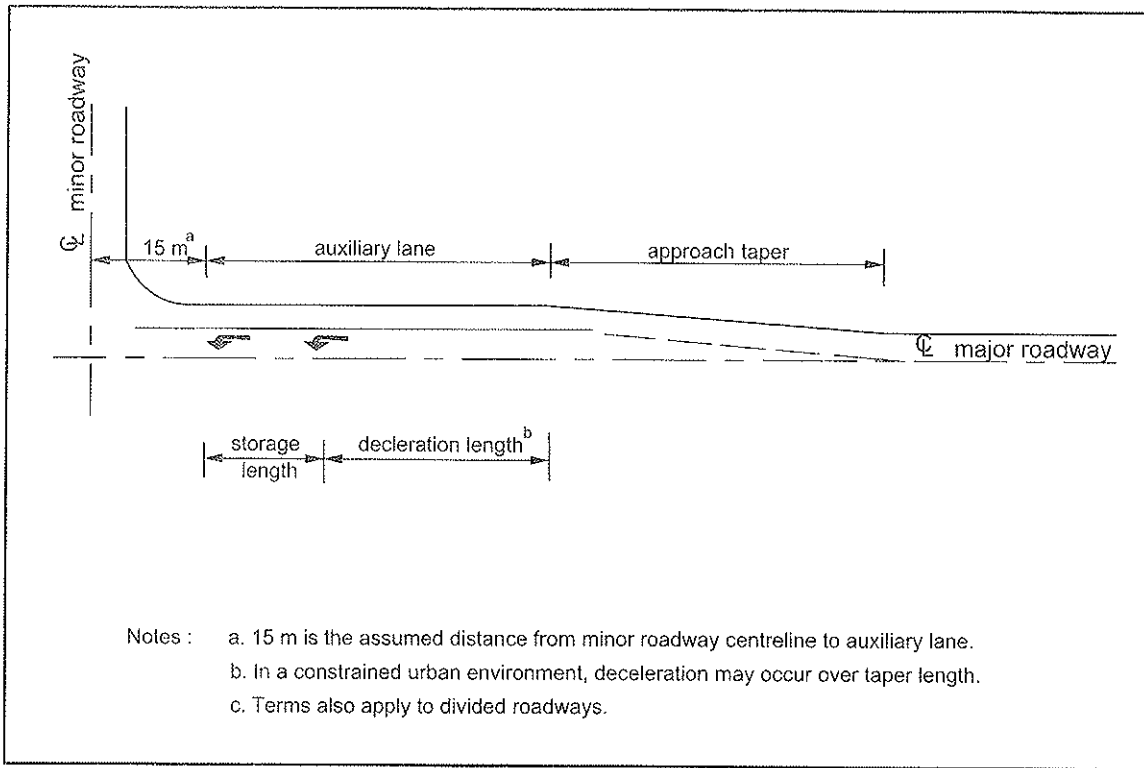


Table 2.3.8.1 Approach and Departure Taper Ratios and Lengths for Left Turns at Intersections

Design Speed (km/h)	Design Domain for Taper Ratio	Horizontal Curve to Smooth Taper R (m)
50	8:1 – 30:1	500
60	15:1 – 36:1	750
70	15:1 – 42:1	1000
80	15:1 – 48:1	1200
90	27:1 – 54:1	1500
100	30:1 – 60:1	2000
110	33:1 – 66:1	2500
120	36:1 – 72:1	3000