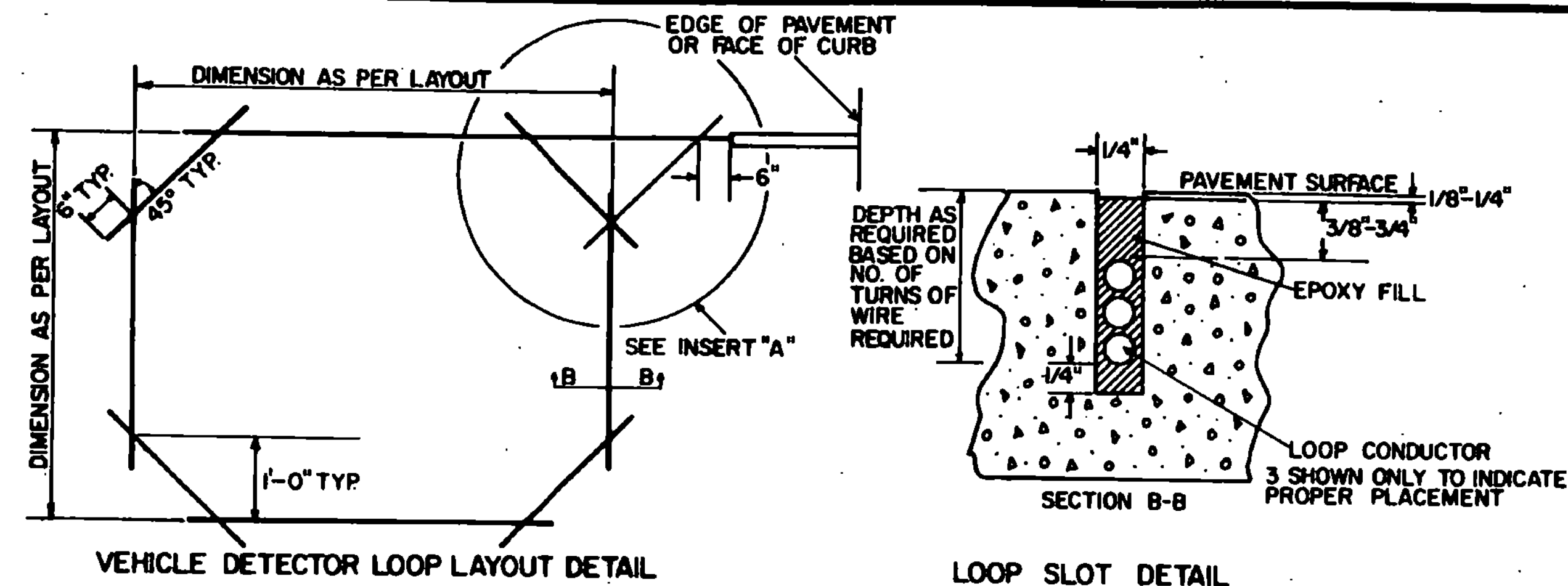




RECTANGULAR LOOPS VEHICLE DETECTOR LOOP INDUCTANCE DESIGN TABLE									
SHORTER DIMENSION OF LOOP									
6 FEET LARGER LOOP DIM. AREA (FT.) (SQ. FT.)	8 FEET LARGER LOOP DIM. AREA (FT.) (SQ. FT.)	10 FEET LARGER LOOP DIM. AREA (FT.) (SQ. FT.)	12 FEET LARGER LOOP DIM. AREA (FT.) (SQ. FT.)	LOOP PERIMETER (FT.)	LOOP INDUCTANCE (MICROHENRIES)				
					1 TURN	2 TURNS	3 TURNS	4 TURNS	
6	36	—	—	—	24	11	40	82	136
8	48	—	—	—	28	13	47	96	161
10	60	8	64	—	32	14	54	109	184
12	72	10	80	—	36	16	60	123	207
14	84	12	96	10	40	18	67	137	230
16	96	14	112	12	44	20	74	151	254
18	108	16	128	14	48	22	81	164	277
20	120	18	144	16	52	23	87	178	300
22	132	20	160	18	56	25	94	192	323
24	144	22	176	20	60	27	101	205	346
26	156	24	192	22	64	29	108	219	369
28	168	26	208	24	68	31	114	232	392
30	180	28	224	26	72	32	121	246	415
32	192	30	240	28	76	34	128	260	438
34	204	32	256	30	80	35	135	274	461
36	216	34	272	32	84	37	142	288	484
38	228	36	288	34	88	38	149	302	507
40	240	38	304	36	92	40	156	316	530
42	252	40	320	38	96	41	163	330	553
44	264	42	336	40	100	42	170	344	576
46	276	44	352	42	104	44	177	358	599
48	288	46	368	44	108	45	184	372	622
50	300	48	384	46	112	46	191	386	645
52	312	50	400	48	116	48	198	400	668
54	324	52	416	50	120	49	205	414	691
56	336	54	432	52	124	51	212	428	714
58	348	56	448	54	128	52	219	442	737
60	360	58	464	56	132	53	226	456	760
62	372	60	480	58	136	55	233	470	783
64	384	62	496	60	140	56	240	484	806
66	396	64	512	62	144	57	247	498	829
68	408	66	528	64	148	59	254	512	852
70	420	68	544	66	152	60	261	526	875
72	432	70	560	68	156	62	268	540	898
74	444	72	576	70	160	63	275	554	921
76	456	74	592	72	164	65	282	568	944
78	468	76	608	74	168	66	289	582	967
80	480	78	624	76	172	68	296	596	990
82	492	80	640	78	176	69	303	610	1013
84	504	82	656	80	180	71	310	624	1036
86	516	84	672	82	184	72	317	638	1059
88	528	86	688	84	188	74	324	652	1082
90	540	88	704	86	192	75	331	666	1105
92	552	90	720	88	196	77	338	680	1128
94	564	92	736	90	200	78	345	694	1151
96	576	94	752	92	204	80	352	708	1174
98	588	96	768	94	208	81	359	722	1197
100	600	98	784	96	212	83	366	736	1220

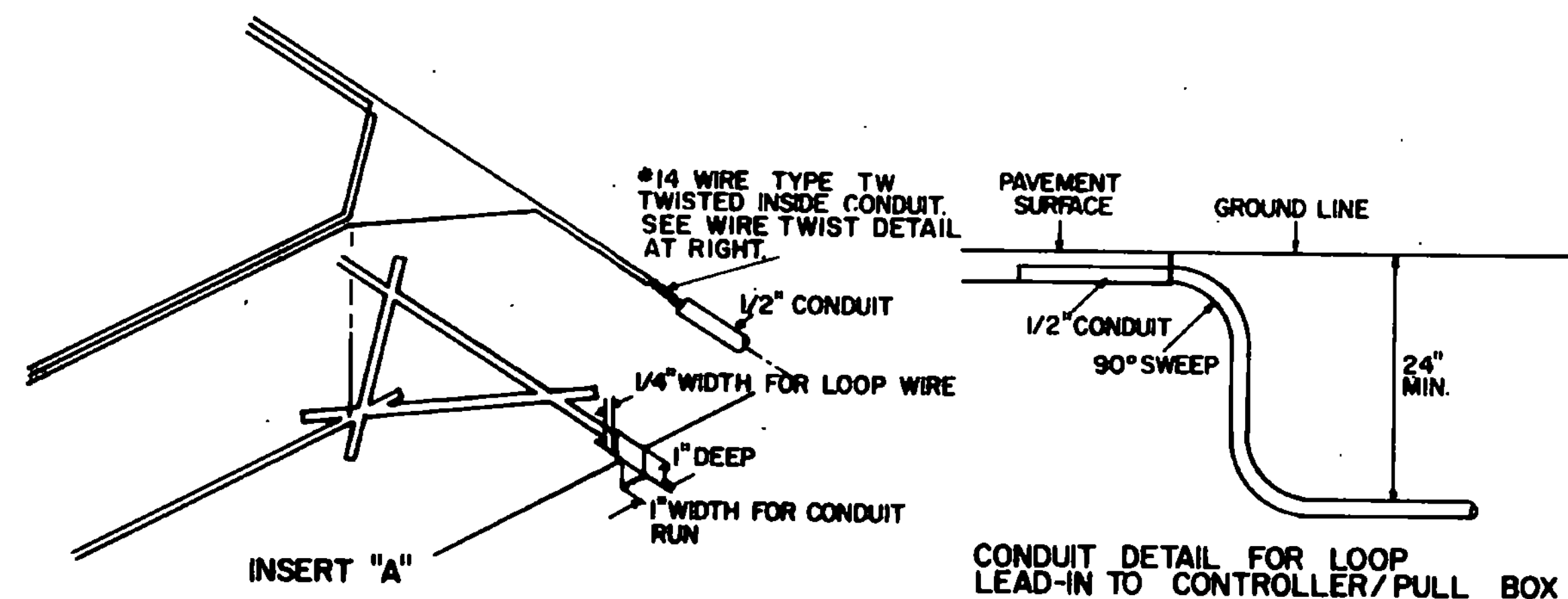
NOTE 1: TO THE ABOVE LOOP INDUCTANCES, ADD 25 MICROHENRIES FOR EACH 100 FEET OF LEAD-IN CABLE FROM THE PAVEMENT LOOP TO THE DETECTOR CABINET. LOOP FEEDER LENGTH SHALL NOT EXCEED 750 FEET FOR A SINGLE OR MULTIPLE LOOP SYSTEM.

NOTE 2: THE INDUCTANCE FORMULA USED FOR THE TABLE ABOVE IS $L = K \cdot N^2$ WHERE $K = 0.001$ THIS IS THE MARYLAND-ILLINOIS FORMULA FROM A REPORT ON VEHICLE DETECTION BY KLATT (1973).

NOTE 3: WHEN LOOPS ARE CONNECTED IN SERIES, THE TOTAL INDUCTANCE BECOMES THE SUM OF ALL INDUCTANCES. WHEN LOOPS ARE CONNECTED IN PARALLEL (PREFERRED DESIGN) THE COMBINED INDUCTANCE WILL EQUAL THE PRODUCT OF THE INDUCTANCES DIVIDED BY THE SUM, PLUS THE LOOP FEEDER INDUCTANCES.

VEHICLE DETECTOR LOOP NOTES

- 1) THE TERM "VEHICLE DETECTOR LOOP" SHALL REFER TO THE SENSOR ELEMENT IMBEDDED IN THE PAVEMENT WHICH SENSES VEHICLE PASSAGE OR PRESENCE. THE TERM "CABINET AMPLIFIER" SHALL REFER TO THE ELECTRICAL OR ELECTRONIC DEVICE LOCATED IN THE CONTROL CABINET WHICH RESPONDS DIRECTLY TO A VEHICLE ACTUATION AND INTERFACES WITH THE CONTROLLER.
- 2) WHEN THE DISTANCE FROM THE VEHICLE DETECTOR LOOP TO THE CONTROLLER EXCEEDS 250 FEET, 12 AWG WIRE SHALL BE USED FOR THE FEEDER WIRE. BELDEN SHIELDED CABLE SHALL BE USED TO EXTEND LOOP LEAD-INS TO THE CONTROLLER CABINET.
- 3) THE VEHICLE DETECTOR LOOPS SHALL BE INSTALLED IN SUCH A WAY AS TO MAXIMIZE SENSITIVITY AND SHALL BE CAPABLE OF DETECTING MOTORCYCLES AND BICYCLES. WHILE ELIMINATING FALSE CALLS FROM VEHICLES IN ADJACENT LANES. LOOPS ARE DESIGNED SO THAT THE LOOPS AND FEEDER LINES TOTAL INDUCTANCE THAT EXISTS AT THE AMPLIFIER IS AT THE CENTER OF RANGE WITH REGARD TO INDUCTANCE (DESIGN VALUE OF 350 MICROHENRIES, ASSUMED). INDUCTANCE AND CAPACITANCE MEASUREMENTS SHALL BE TAKEN AND RECORDED PRIOR TO AND AFTER THE SAW SLOTS ARE SEALED.
- 4) THE LOOPS ARE CENTERED IN THEIR RESPECTIVE LANE, UNLESS OTHERWISE NOTED.

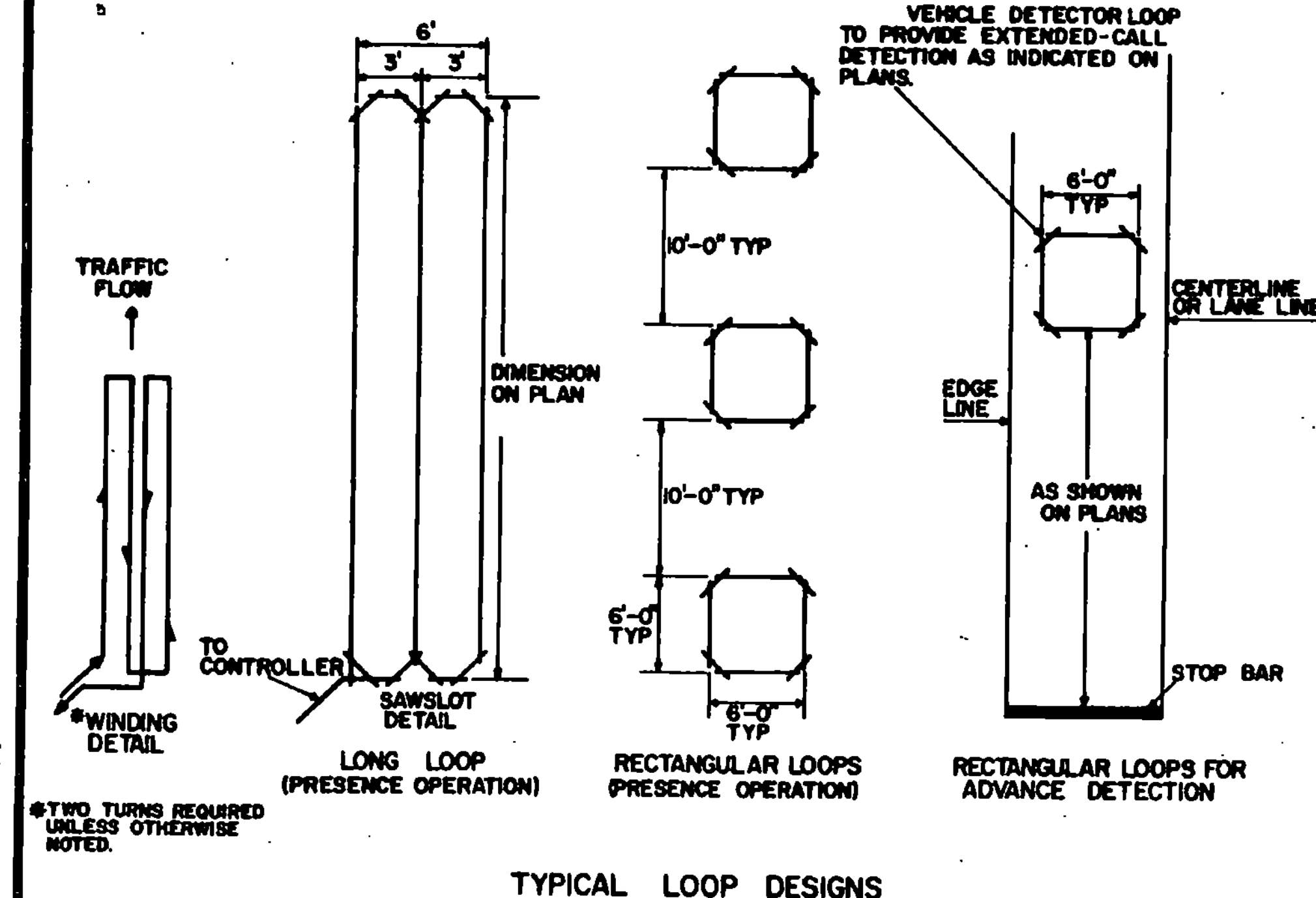


DESIGN VALUES	
AVAILABLE CONDUIT AREA	CONDUCTOR SIZE TABLE
SIZE	TYPE
1"	#14
1 1/4"	#12
1 1/2"	#10
2"	#8
2 1/2"	#6
3"	
3 1/2"	

*1976 NATIONAL ELECTRICAL CODES INDICATES 40% FILL

INSTALLATION NOTES

- 1) NO WIRE SPLICING EXCEPT IN PULL BOXES. SPLICES SHALL BE SOLDERED (ROBIN CORE) AND WRAPPED WITH PLASTIC TAPE AND COATED WITH A SEALANT USED FOR SUCH PURPOSES.
- 2) BEFORE LAYING IN THE LOOP WIRE, A ONE-QUARTER INCH OF SEALANT SHALL BE PLACED IN THE SAW SLOT AND ALLOWED TO SET UP SUFFICIENTLY TO GIVE THE WIRE SOME SUPPORT. EACH WIRE SHALL BE PLACED IN THE SAW SLOT WITH A BLUNT WOODEN STICK AND SEALED BEFORE PLACING THE NEXT WIRE ON TOP UNTIL THE REQUIRED NUMBER OF TURNS IS COMPLETE.
- 3) VEHICLE DETECTOR LOOPS SHALL NOT BE PLACED ON THE BASE COURSE AND PAVED OVER. SAW-CUTS SHALL BE MADE IN THE FINAL PAVEMENT COURSE AND THE LOOPS INSTALLED IN THEM.
- 4) LOOP LEAD-INS FROM ADJACENT LOOPS SHALL BE IN SEPARATE SAW-SLOTS TO THE CURB PULL BOX.
- 5) LOOP FEEDERS SHALL BE AT LEAST ONE FOOT AWAY FROM POWER WIRING.



LONG LOOPS VEHICLE DETECTOR LOOP INDUCTANCE DESIGN TABLE									
LOOP INDUCTANCE (MICROHENRIES)									
LARGER LOOP DIMENSION	SHORTER LOOP DIMENSION								
	4 FEET	6 FEET	8 FEET	1 TURN	2 TURNS	3 TURNS	4 TURNS	5 TURNS	6 TURNS
10	29	92	31	96	33	104	—	—	—
20	41	132	43	136	45	144	—	—	—
30	54	172	56	176	58	184	—	—	—
40	67	212	69	216	71	224	—	—	—
50	80	252	82	256	84	264	—	—	—
60	93	292	95	296	97	304	—	—	—
70	106	332	108	336	110	344	—	—	—
80	119	372	121	376	123	384	—	—	—
90	132	412	134	416	136	424	—	—	—
100	145	452	147	456	149	464	—	—	—
110	158	492	160	496	162	504	—	—	—
120	171	532	173	536	175	544	—	—	—
130	184	572	186	576	188	584	—	—	—
140	197	612	199	616	201	624	—	—	—
150	210	652	212	656	214	664	—	—	—
160	223	692	225	696	227	704	—	—	—
170	236	732	238	736	240	744	—	—	—
180	249	772	251	776	253	784	—	—	—
190	262	812	264	816	266	824	—	—	—
200	275	852	277	856	279	864	—	—	—

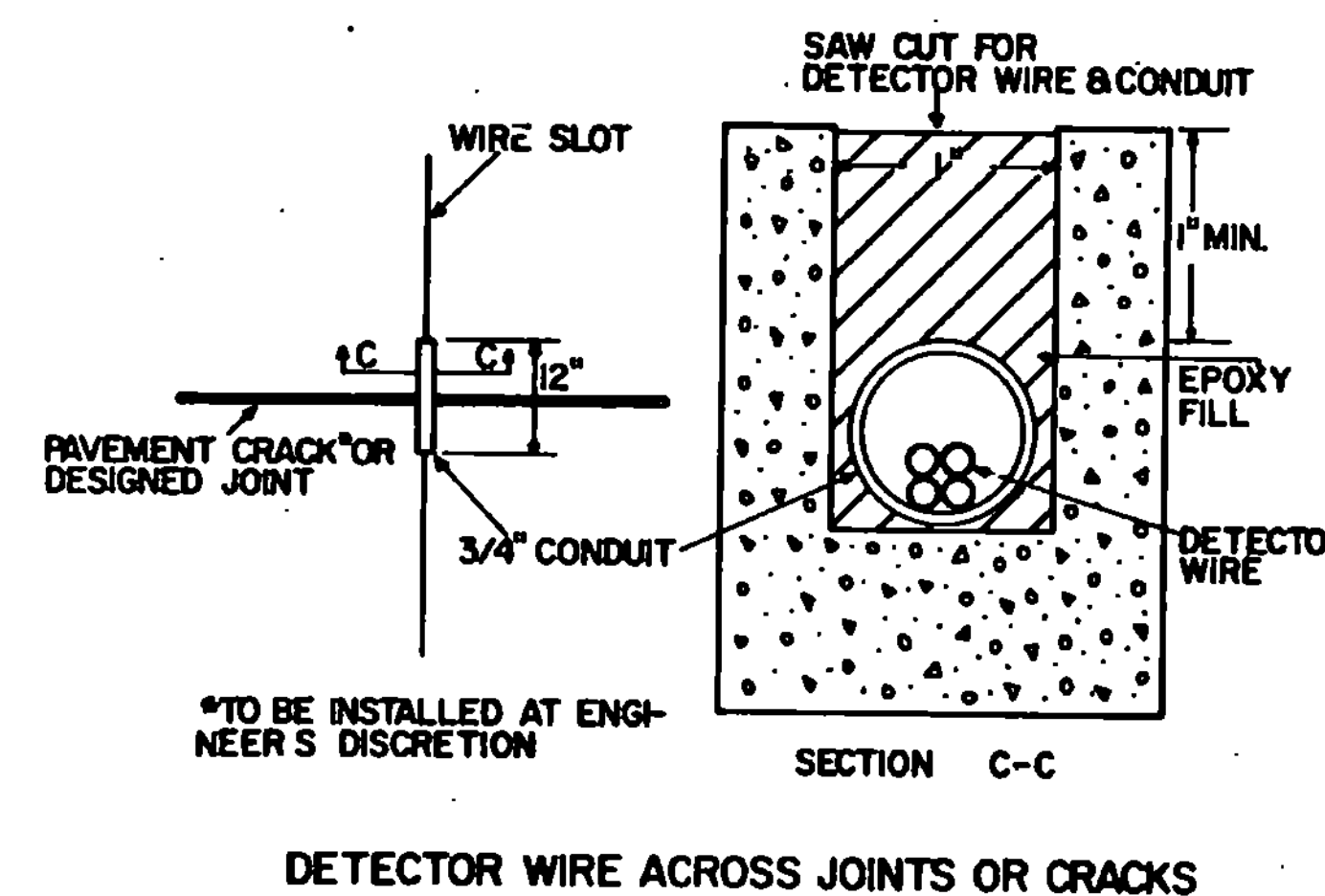
NOTE 1: SAME AS #1 FOR RECTANGULAR LOOPS.

NOTE 2: THE ABOVE INDUCTANCES ARE ESTIMATED QUANTITIES USING THE FOLLOWING EQUATIONS:

1 TURN = (PERIMETER X 0.5) + (LARGER DIMENSION X 1.5)

2 TURNS = (PERIMETER X 1.5) + (LARGER DIMENSION X 3.0)

NOTE 3: SAME AS #3 FOR RECTANGULAR LOOPS.



REVISIONS AND CORRECTIONS

DATE: 10/21/81 LONG LOOP INDUCTANCE TABLE ADDED.

8/23/82 NOTES 4 & 5 ADDED

FEB. 3, 1986 - UPDATED TO 1986 SPECIFICATIONS

APPROVED: JULY 28, 1981

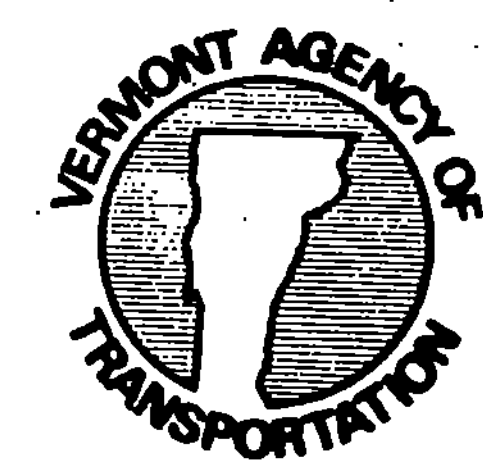
DATE

DIRECTOR OF ENGINEERING AND CONSTRUCTION

CHIEF OF DESIGN

TRANSPORTATION DESIGN ENGINEER

VEHICLE DETECTOR LOOP DETAILS



STANDARD

E-36