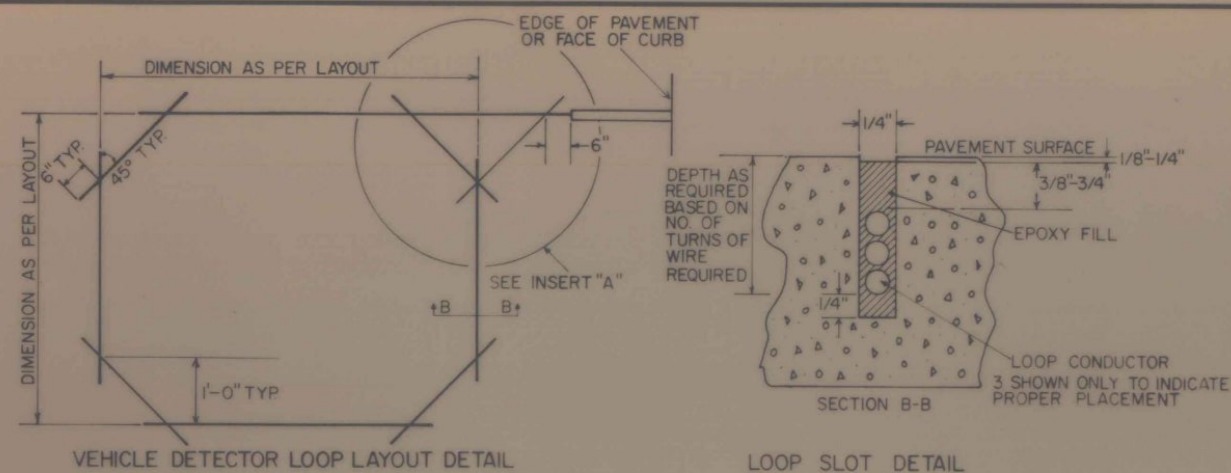




RECTANGULAR LOOPS											
VEHICLE DETECTOR LOOP INDUCTANCE DESIGN TABLE											
SHORTER DIMENSION OF LOOP						LOOP PERIMETER (FT.)	LOOP INDUCTANCE (MICROHENRIES)				TURNS
6 FEET LARGER LOOP DIM. (FT.)	8 FEET LARGER LOOP DIM. (FT.)	10 FEET LARGER LOOP DIM. (FT.)	12 FEET LARGER LOOP DIM. (FT.)	14 FEET LARGER LOOP DIM. (FT.)	16 FEET LARGER LOOP DIM. (FT.)		2	3	4	5	
AREA (SQ. FT.)	AREA (SQ. FT.)	AREA (SQ. FT.)	AREA (SQ. FT.)	AREA (SQ. FT.)	AREA (SQ. FT.)		K=45	K=42	K=38	K=36	
6	36	—	—	—	—	24	11	40	82	138	—
8	48	—	—	—	—	28	13	47	96	161	—
10	60	—	—	—	—	32	14	54	109	184	—
12	72	—	—	—	—	36	16	60	123	207	—
14	84	12	96	10	100	40	18	67	137	230	—
16	96	14	112	12	120	44	20	74	151	254	—
18	108	16	128	14	140	48	22	81	164	277	—
20	120	18	144	16	160	52	23	87	178	300	—
22	132	20	160	18	180	56	25	94	192	323	—
24	144	22	176	20	200	60	27	101	205	346	—
26	156	24	192	22	220	64	29	108	219	369	—
28	168	26	208	24	240	68	31	114	232	392	—
30	180	28	224	26	260	72	32	121	246	415	—
32	192	30	240	28	280	76	34	128	260	438	—
34	204	32	256	30	300	80	36	135	274	461	—
36	216	34	272	32	320	84	37	142	288	484	—
38	228	36	288	34	340	88	39	149	302	507	—
40	240	38	304	36	360	92	41	156	316	530	—
42	252	40	320	38	380	96	42	163	330	553	—
44	264	42	336	40	400	100	44	170	344	576	—
46	276	44	352	42	420	104	45	177	358	599	—
48	288	46	368	44	440	108	47	184	372	622	—
50	300	48	384	46	460	112	48	191	386	645	—
52	312	50	400	48	480	116	50	200	400	668	—
54	324	52	416	50	500	120	51	207	414	691	—
56	336	54	432	52	520	124	53	214	428	714	—
58	348	56	448	54	540	128	54	221	442	737	—
60	360	58	464	56	560	132	55	228	456	760	—
62	372	60	480	58	580	136	57	235	470	783	—
64	384	62	496	60	600	140	58	242	484	806	—
66	396	64	512	62	620	144	60	250	498	829	—
68	408	66	528	64	640	148	61	257	512	852	—
70	420	68	544	66	660	152	63	264	526	875	—
72	432	70	560	68	680	156	64	271	540	898	—
74	444	72	576	70	700	160	66	279	554	921	—
76	456	74	592	72	720	164	67	286	568	944	—
78	468	76	608	74	740	168	69	294	582	967	—
80	480	78	624	76	760	172	70	301	596	990	—
82	492	80	640	78	780	176	72	309	610	1013	—
84	504	82	656	80	800	180	73	316	624	1036	—
86	516	84	672	82	820	184	75	324	638	1059	—
88	528	86	688	84	840	188	76	331	652	1082	—
90	540	88	704	86	860	192	78	339	666	1105	—
92	552	90	720	88	880	196	79	346	680	1128	—
94	564	92	736	90	900	200	81	354	694	1151	—
96	576	94	752	92	920	204	82	361	708	1174	—
98	588	96	768	94	940	208	84	369	722	1197	—
100	600	98	784	96	960	212	85	376	736	1220	—

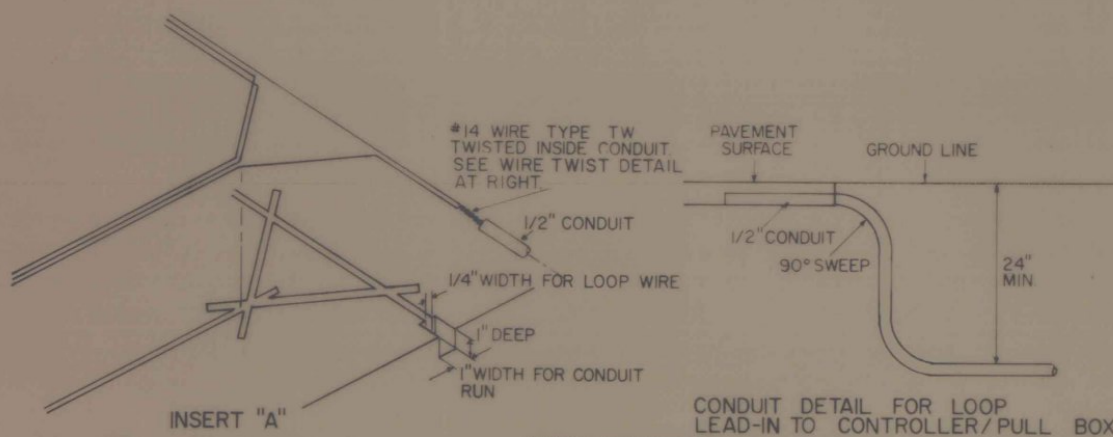
NOTE 1: TO THE ABOVE LOOP INDUCTANCES, ADD 25 MICROHENRIES FOR EACH 100 FEET OF LEAD-IN CABLE FROM THE PAVEMENT LOOP TO THE DETECTOR CABINET LOOP FEEDER LENGTH SHALL NOT EXCEED 750 FEET FOR A SINGLE OR MULTIPLE LOOP SYSTEM.

2. THE INDUCTANCE FORMULA USED FOR THE TABLE ABOVE IS $L = KPN^2$, WHERE $K = \frac{5}{10N}$. THIS IS THE MARYLAND-ILLINOIS FORMULA FROM A REPORT ON VEHICLE DETECTORS, BY KLATT (1973).

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.

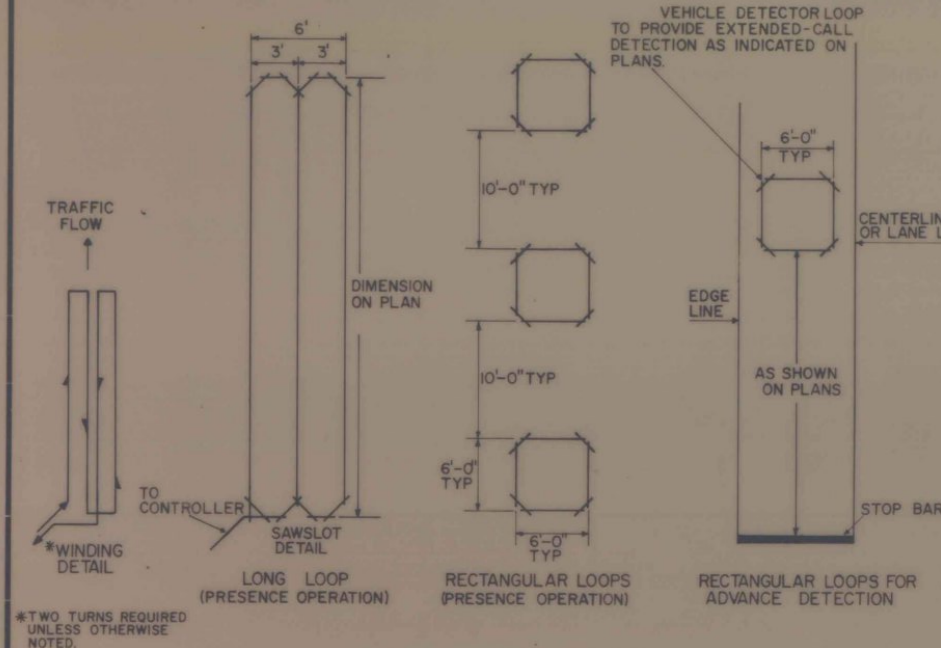
VEHICLE DETECTOR LOOP NOTES

- 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	* 26% FILL (IN ²)
1"	0.23
1 1/4"	0.39
1 1/2"	0.53
2"	0.87
2 1/2"	1.24
3"	1.92
3 1/2"	2.57

*1978 NATIONAL ELECTRICAL CODES INDICATES 40% FILL



LONG LOOPS				
VEHICLE DETECTOR LOOP INDUCTANCE DESIGN TABLE				
LARGER LOOP DIMENSION	SHORTER LOOP DIMENSION			
	4 FEET	6 FEET	8 FEET	10 FEET
10	29	92	31	98
15	41	132	43	138
20	54	172	56	178
22	59	188	61	194
24	64	204	66	210
26	69	220	71	226
28	74	236	76	242
30	79	252	81	258
32	84	268	86	274
34	89	284	91	290
36	94	300	96	306
40	104	332	106	338
45	116	372	118	378
50	129	412	131	418
55	141	452	143	458
60	154	492	156	498
65	166	532	168	538
70	179	572	181	578
80	204	—	206	—
90	229	—	231	—
100	254	—	256	—

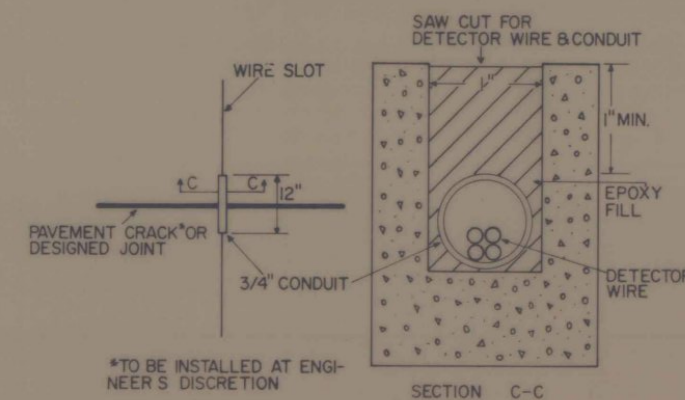
NOTE: 1. SAME AS #1 FOR RECTANGULAR LOOPS.

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

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

2 TURN = (PERIMETER X 1.5) + (LARGER DIMENSION X 5.0)

3. SAME AS #3 FOR RECTANGULAR LOOPS.



INSTALLATION NOTES

- 1) NO WIRE SPLICING EXCEPT IN PULL BOXES. SPLICES SHALL BE SOLDERED (ROSIN 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.

REVISIONS AND CORRECTIONS

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

8/23/82 NOTES 485 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