

09/08/99
 26-JUL-2019 11:03
 S:\Contracts\Resurfacing Projects\Division 10\I-5904 Meck (DONT USE SHAREPOINT)\5904 Title sheet.dgn
 p:\port AT_CSD-292592

CONTRACT: C204364 **TIP PROJECT: I-5904**

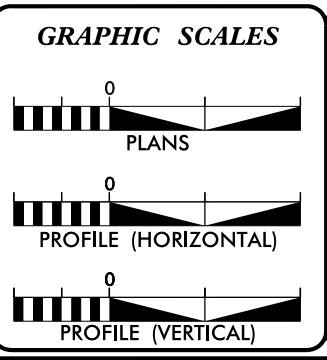
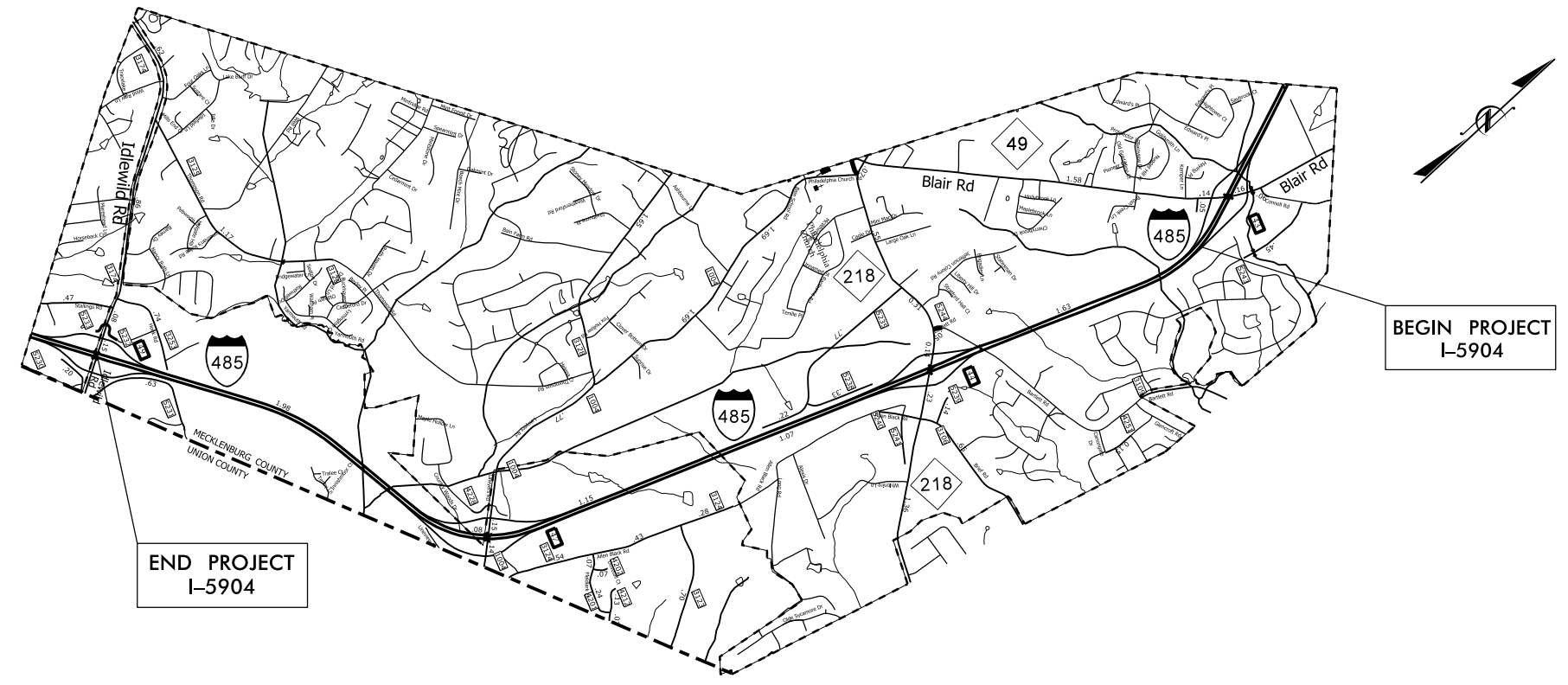
STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

MECKLENBURG COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5904	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45887.3.GV1	NHPIM-0485(051)	CONST.	

LOCATION: *I-485 FROM THE ASPHALT PAVEMENT JOINT SOUTH OF NC 51 BLAIR ROAD TO ASPHALT PAVEMENT JOINT AT IDLEWILD ROAD APPROXIMATELY MM 43.00 TO MM 49.00*

TYPE OF WORK: *MILLING, PAVING WITH HOT MIX ASPHALT PAVEMENT MARKINGS & SNOWPLOWABLE PAVEMENT MARKERS*



DESIGN DATA

ADT 2017	=	85,000
ADT	=	
K	=	%
D	=	%
T	=	% *
V	=	70 MPH
* TTST	=	DUAL

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT 45887.3.1 = 6.00 MILES
 TOTAL LENGTH OF STATE PROJECT 45887.3.1 = 6.00 MILES

Prepared in the Office of:
DIVISION OF HIGHWAYS
 DIVISION 10

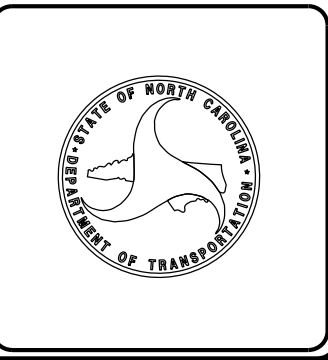
2018 STANDARD SPECIFICATIONS RIGHT OF WAY DATE: N/A LETTING DATE: OCTOBER 15, 2019	JOHN H. EDMONDS <small>PROJECT ENGINEER</small> JOHN H. EDMONDS <small>PROJECT DESIGN ENGINEER</small>
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HYDRAULICS ENGINEER

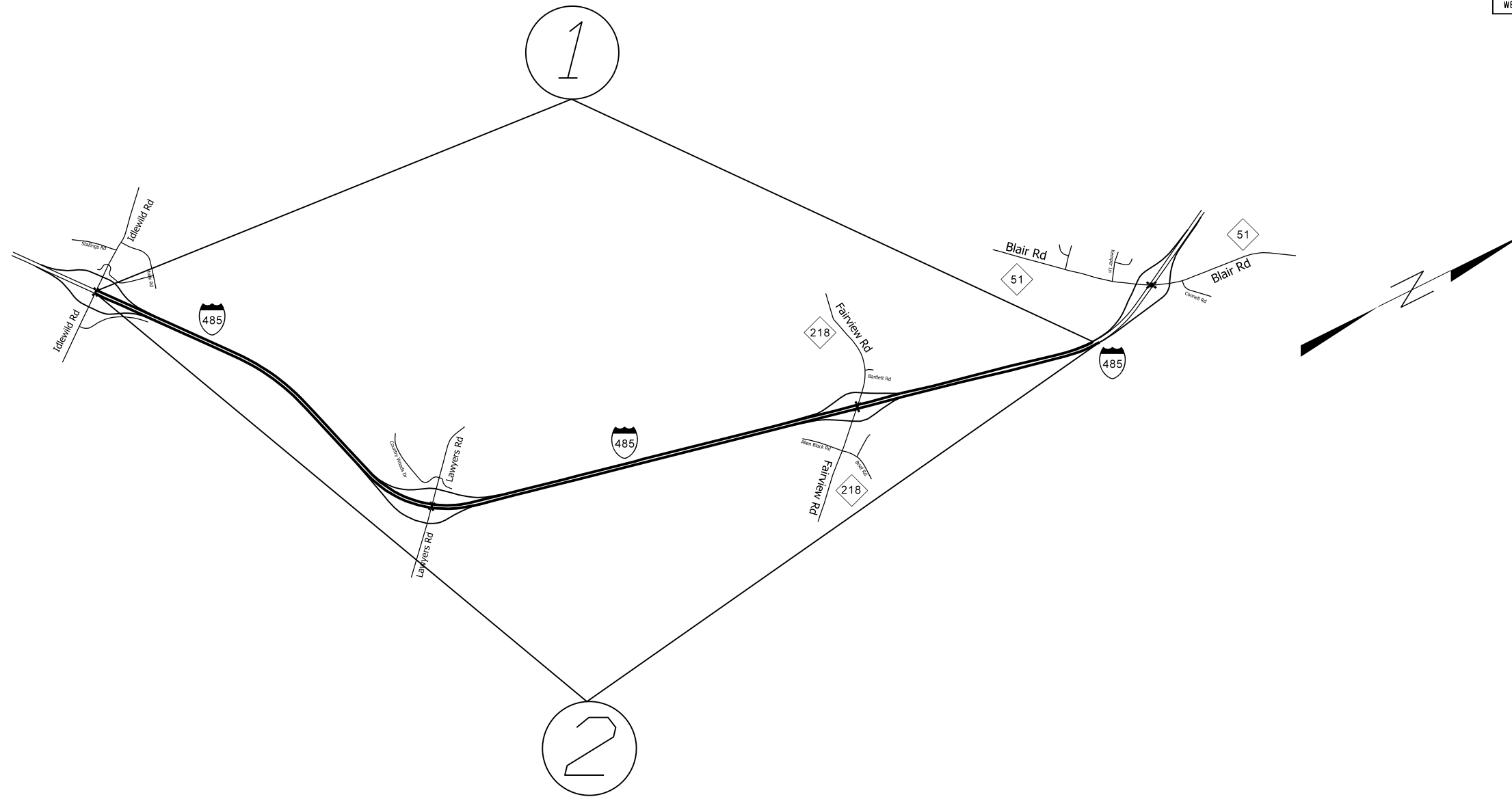
SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.



STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5904	2	
WBS NO. 45887.3.GV1			



MAPS

1 SB I-485 INNER BELT

2 NB I-485 OUTER BELT

DESCRIPTION

FROM PAVEMENT JOINT SOUTH OF
BLAIR ROAD TO PAVEMENT JOINT AT
IDLEWILD RD

FROM PAVEMENT JOINT AT IDLEWILD RD TO
PAVEMENT JOINT
SOUTH OF BLAIR RD

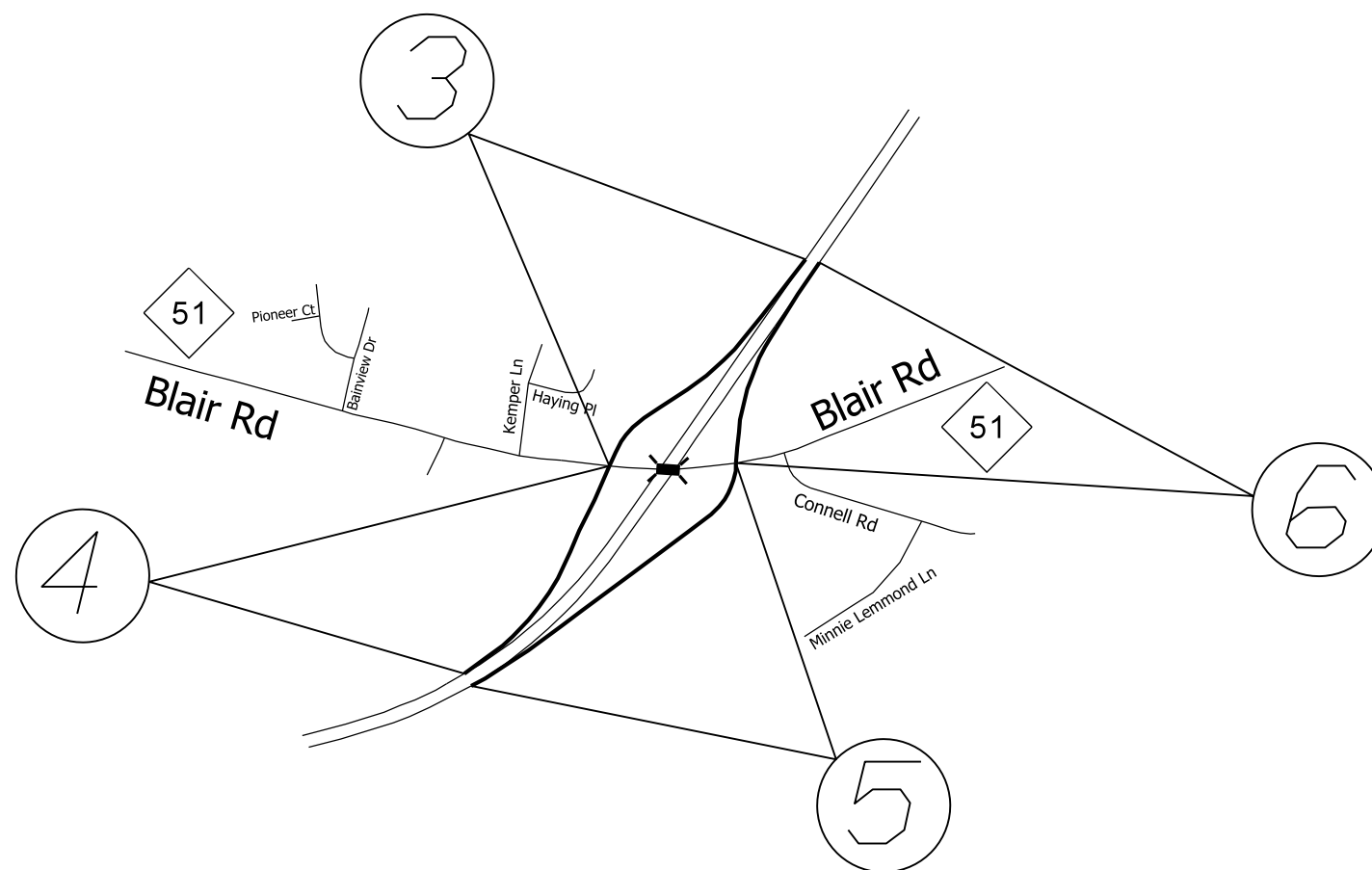
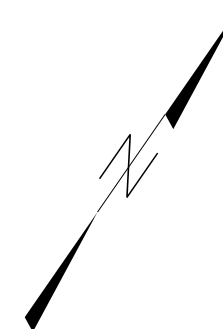
I-5904 INTERSTATE I-485
PAVEMENT REHABILITATION
MECKLENBURG COUNTY

SCALE	-NA-
DATE	12/18
DWG. BY	JHE
DESIGN BY	JHE
APPROVED	



REVISIONS	

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5904	3	
WBS NO. 45887.3.GV1			



MAPS

- # 3 SB OFF RAMP
- # 4 SB ON RAMP
- # 5 NB OFF RAMP
- # 6 NB ON RAMP

DESCRIPTION

- FROM PHYSICAL GORE TO BLAIR RD
- FROM BLAIR RD TO PHYSICAL GORE
- FROM PHYSICAL GORE TO BLAIR RD
- FROM BLAIR RD TO PHYSICAL GORE

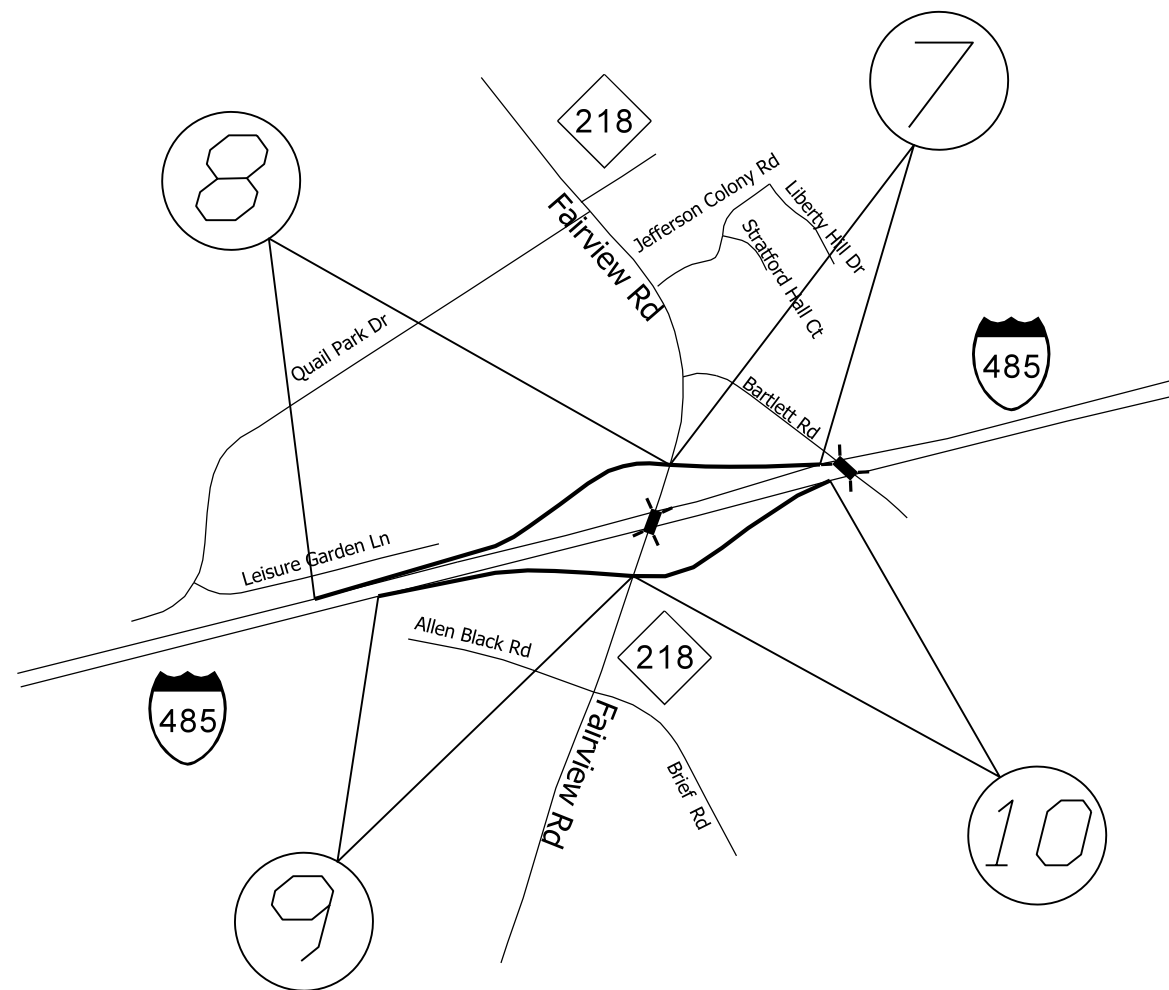
I-5904 INTERSTATE I-485
PAVEMENT REHABILITATION
MECKLENBURG COUNTY

SCALE	-NA-
DATE	12/18
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DESIGN BY	JHE
APPROVED	



REVISIONS	

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5904	4	
WBS NO. 45887.3.GV1			



MAPS

- #7 SB OFF RAMP
- #8 SB ON RAMP
- #9 NB OFF RAMP
- #10 NB ON RAMP

DESCRIPTION

- FROM PHYSICAL GORE TO FAIRVIEW RD
- FROM FAIRVIEW RD TO PHYSICAL GORE
- FROM PHYSICAL GORE TO FAIRVIEW RD
- FROM FAIRVIEW RD TO PHYSICAL GORE

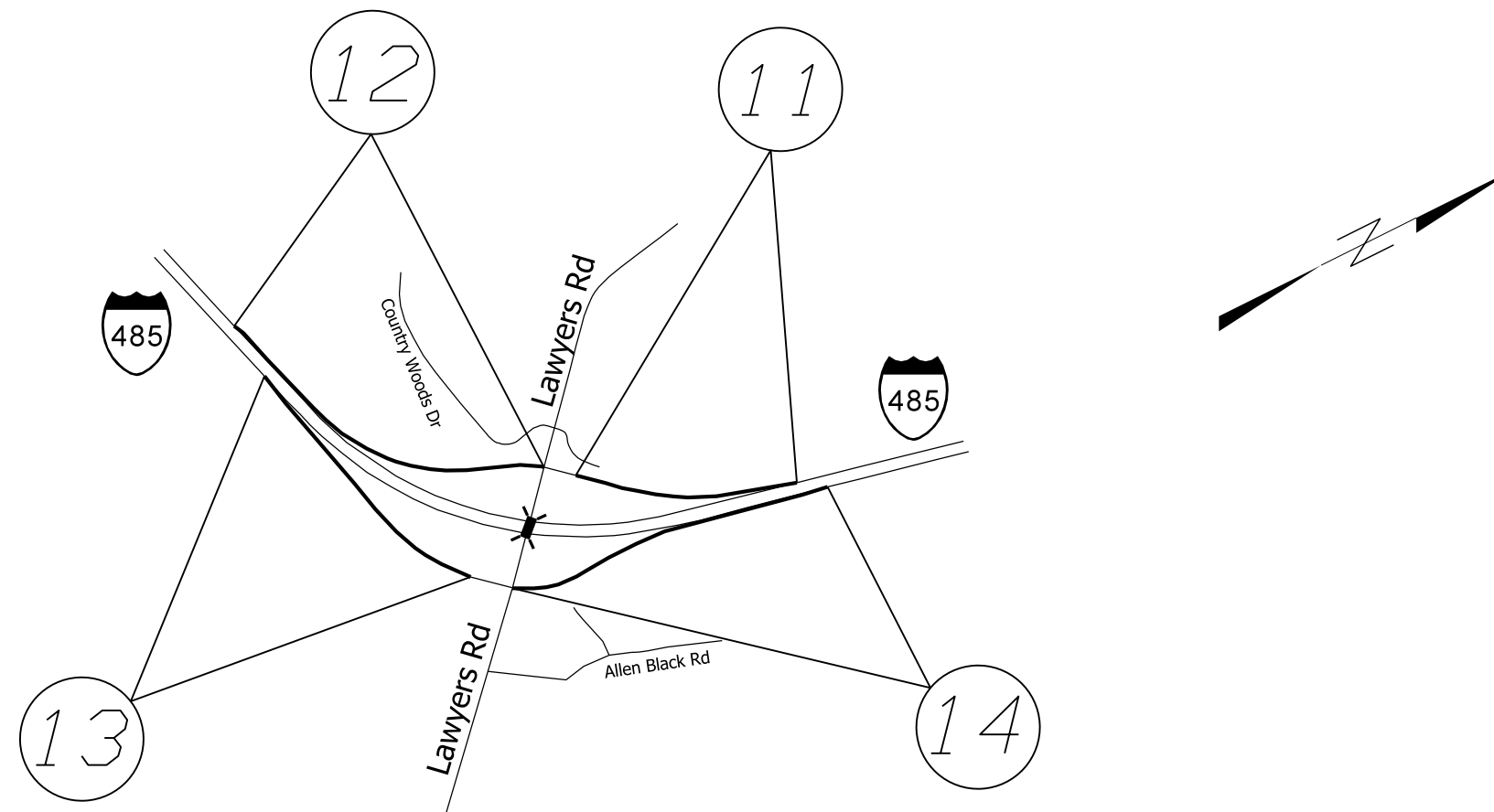
I-5904 INTERSTATE I-485
PAVEMENT REHABILITATION
MECKLENBURG COUNTY

SCALE	-NA-
DATE	12/18
DWG. BY	JHE
DESIGN BY	JHE
APPROVED	



REVISIONS	

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5904	5	
WBS NO. 45887.3.GV1			



MAPS

11 SB OFF RAMP

12 SB ON RAMP

13 NB OFF RAMP

14 NB ON RAMP

DESCRIPTION

FROM PHYSICAL GORE TO PAVEMENT JOINT
PRIOR TO LAWYERS RD

FROM LAWYERS RD TO PHYSICAL GORE

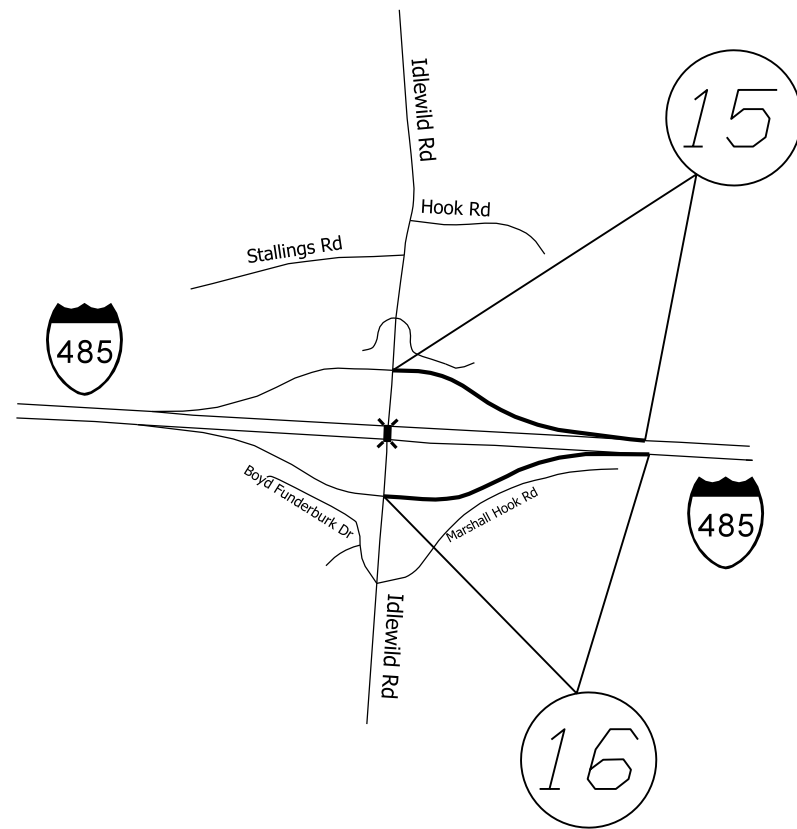
FROM PHYSICAL GORE TO PAVEMENT JOINT
PRIOR TO LAWYERS RD

FROM LAWYERS RD TO PHYSICAL GORE

I-5904 INTERSTATE I-485
PAVEMENT REHABILITATION
MECKLENBURG COUNTY

SCALE	-NA-		REVISIONS
DATE	12/18		
DWG. BY	JHE		
DESIGN BY	JHE		
APPROVED			

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5904	6	
WBS NO. 45887.3.GV1			



MAPS

15 SB OFF RAMP

16 NB ON RAMP

DESCRIPTION

FROM PHYSICAL GORE TO IDLEWILD RD

FROM IDLEWILD RD TO PHYSICAL GORE

I-5904 INTERSTATE I-485
PAVEMENT REHABILITATION
MECKLENBURG COUNTY

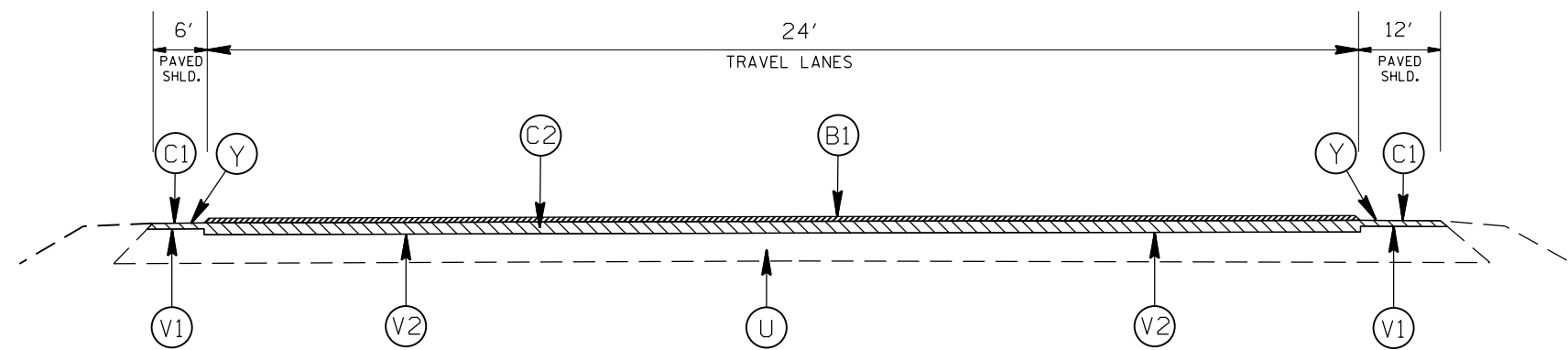
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DATE	12/18
DWG. BY	JHE
DESIGN BY	JHE
APPROVED	



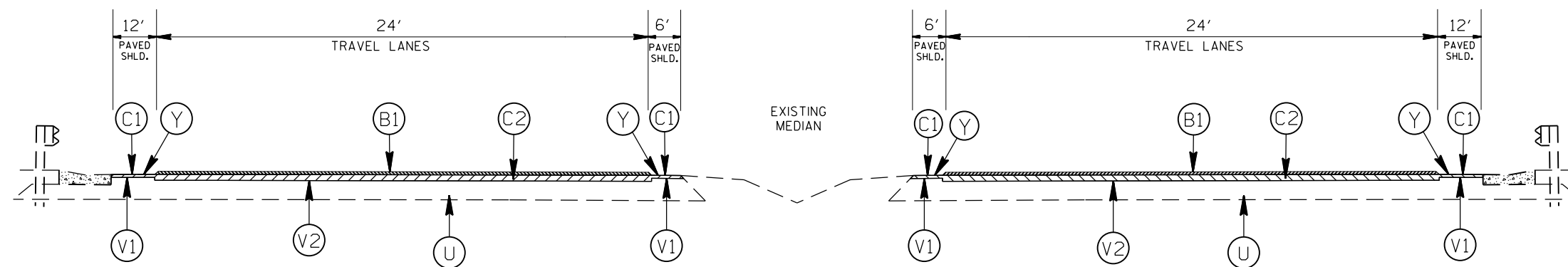
REVISIONS	

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5904	7	
WBS NO.	45887.3.GV1		

PAVEMENT SCHEDULE	
B1	PROP. APPROX. 5/8" ULTRA-THIN BONDED WEARING COURSE, AT AN AVERAGE RATE OF 70 LBS. PER SQ. YD.
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, IN 2 SEPARATE 1.5" LIFTS AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
U	EXISTING PAVEMENT
V1	MILLING, 1.5" DEPTH
V2	MILLING, 3.0" DEPTH
Y	MILLED RUMBLE STRIPS



TYPICAL SECTION NO.1
MAINLINE

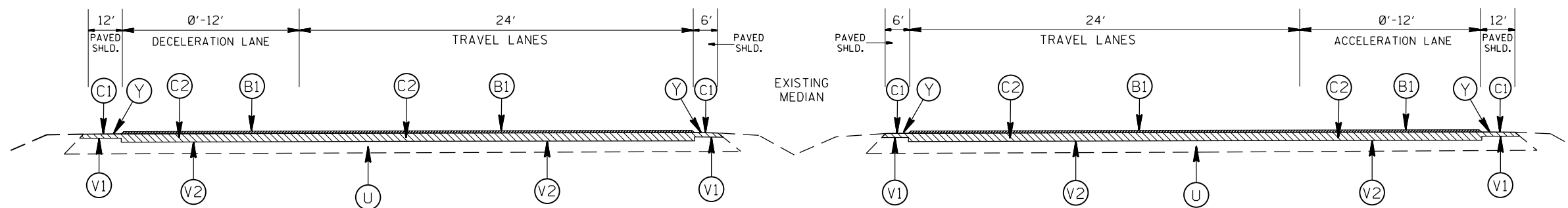


TYPICAL SECTION NO.2
MAINLINE

I-5904 INTERSTATE I-485
PAVEMENT REHABILITATION
MECKLENBURG COUNTY

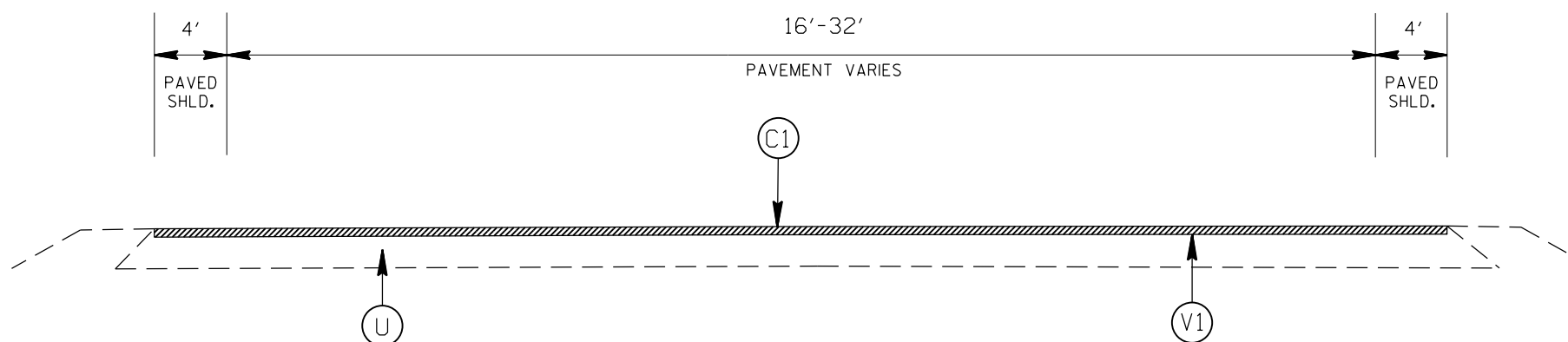
SCALE	-NA-		REVISIONS
DATE	3/19		
DWG. BY	JHE		
DESIGN BY	JHE		
APPROVED			

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5904	8	
WBS NO.	45887.3.GV1		



TYPICAL SECTION NO.3
FROM BEGINNING OF ACCEL/ DECEL LANES
TO END OF PHYSICAL GORE

PAVEMENT SCHEDULE	
B1	PROP. APPROX. 5/8" ULTRA-THIN BONDED WEARING COURSE, AT AN AVERAGE RATE OF 70 LBS. PER SQ. YD.
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, IN 2 SEPARATE 1.5" LIFTS AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
U	EXISTING PAVEMENT
V1	MILLING, 1.5" DEPTH
V2	MILLING, 3.0" DEPTH
Y	MILLED RUMBLE STRIPS



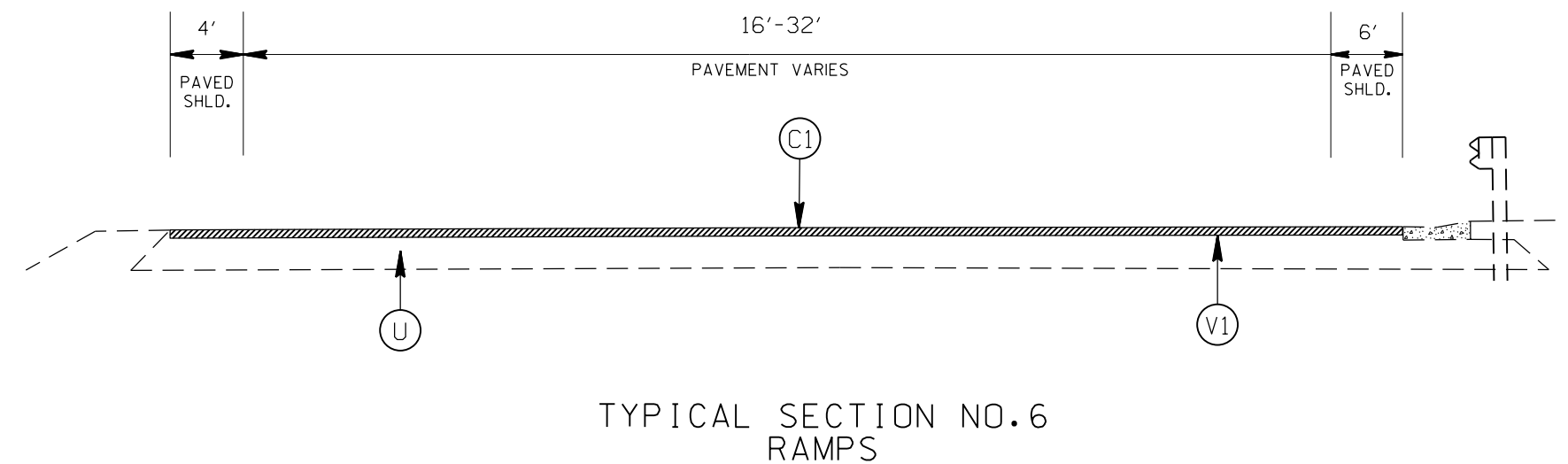
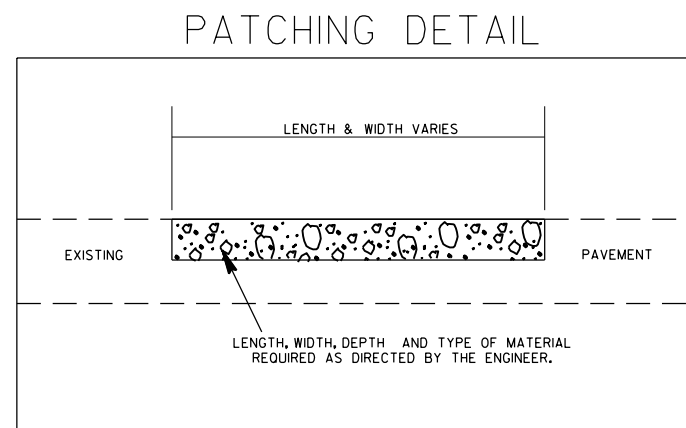
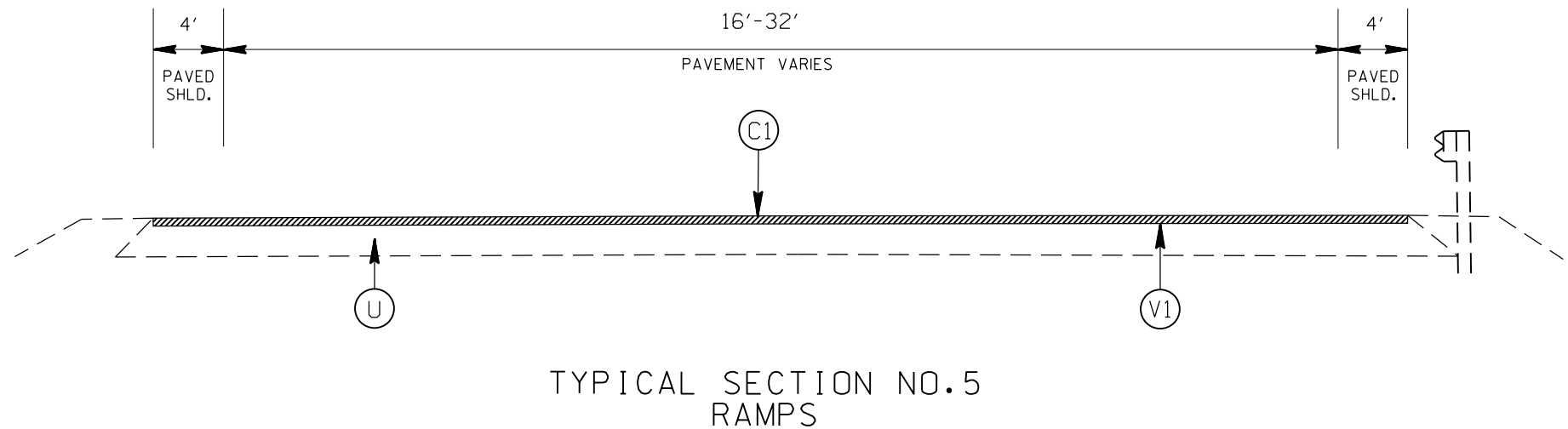
TYPICAL SECTION NO.4
RAMPS

I-5904 INTERSTATE I-485
PAVEMENT REHABILITATION
MECKLENBURG COUNTY

SCALE	-NA-		REVISIONS
DATE	3/19		
DWG. BY	JHE		
DESIGN BY	JHE		
APPROVED			

STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5904	9	
WBS NO.		45887.3.GV1	

PAVEMENT SCHEDULE	
B1	PROP. APPROX. 5/8" ULTRA-THIN BONDED WEARING COURSE, AT AN AVERAGE RATE OF 70 LBS. PER SQ. YD.
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, IN 2 SEPARATE 1.5" LIFTS AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
U	EXISTING PAVEMENT
V1	MILLING, 1.5" DEPTH
V2	MILLING, 3.0" DEPTH
Y	MILLED RUMBLE STRIPS



I-5904 INTERSTATE I-485
PAVEMENT REHABILITATION
MECKLENBURG COUNTY

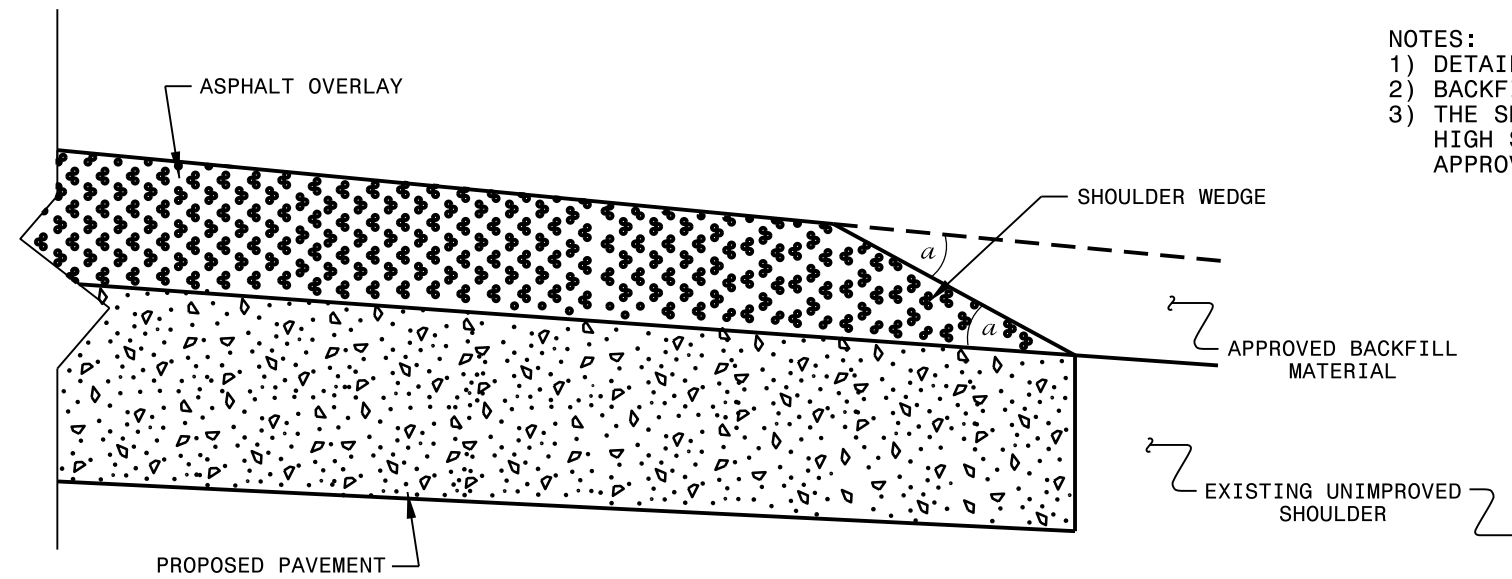
SCALE -NA-
DATE 3/19
DWG. BY JHE
DESIGN BY JHE
APPROVED



REVISIONS	

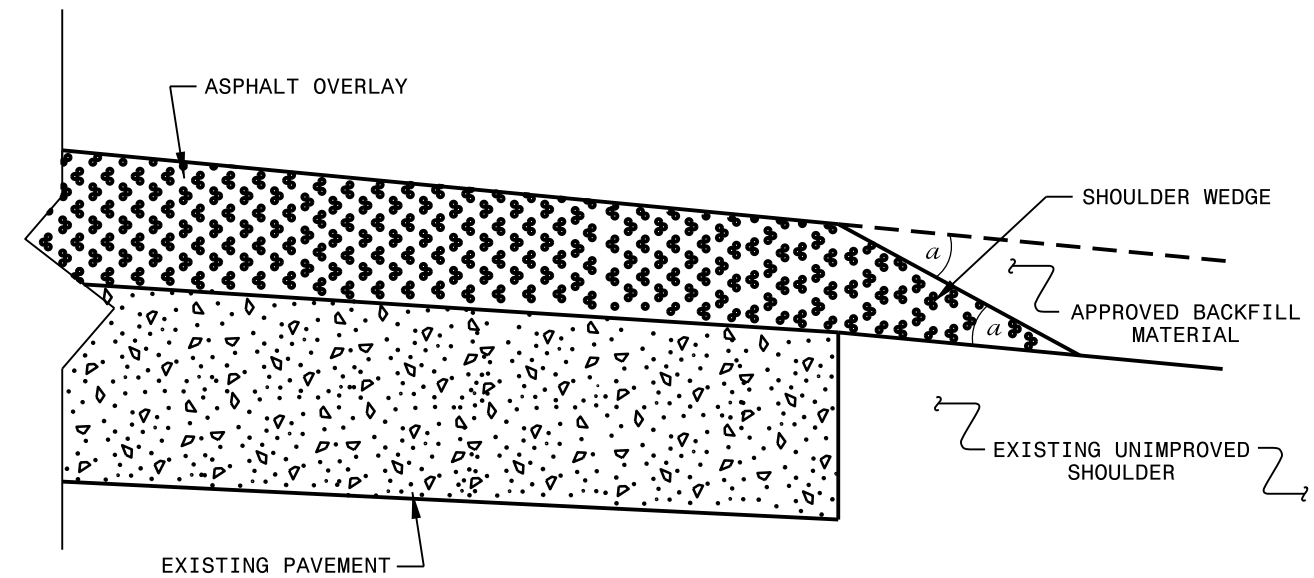
NOTES:

- 1) DETAIL DOES NOT APPLY TO OGAFB AND ULTRA-THIN BONDED WEARING COURSE.
- 2) BACKFILL SHOULDER WITH APPROVED MATERIAL.
- 3) THE SHOULDER WEDGE DEVICE MAY BE DISENGAGED AT PAVED DRIVEWAYS, SIDE STREETS, HIGH SHOULDERS, AND OTHER LOCATIONS NOT FEASIBLE TO CONSTRUCT AS APPROVED BY THE ENGINEER.



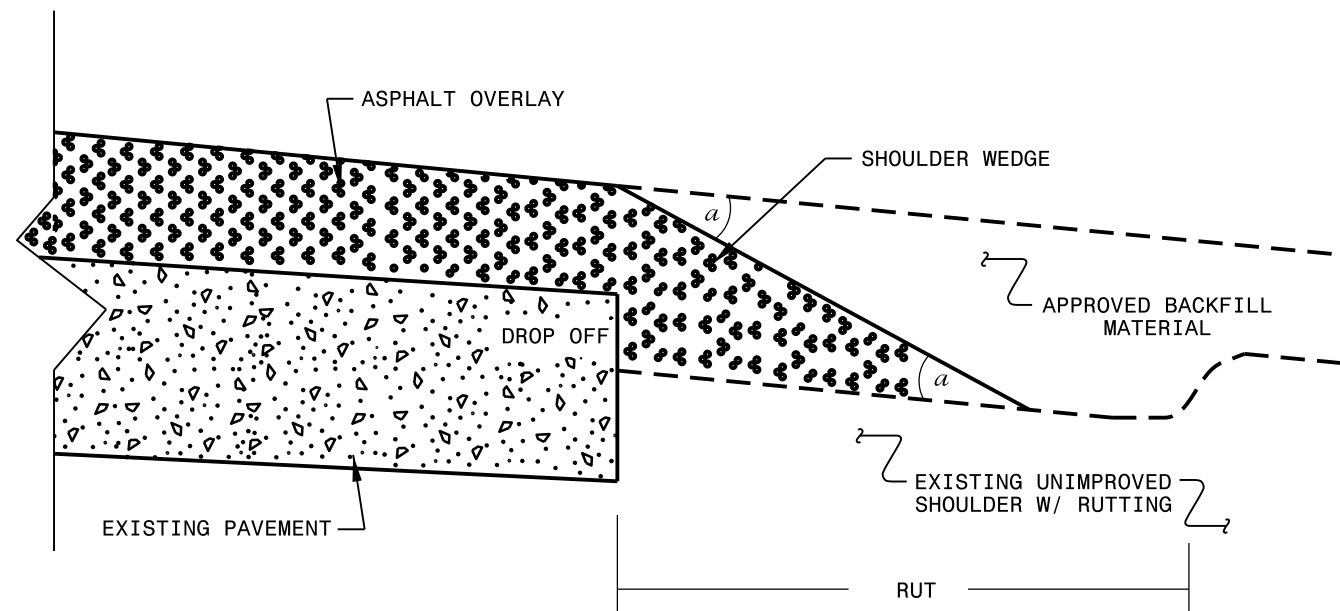
SHOULDER WEDGE DETAIL

(Resurfacing Projects w/ Widening or with Existing Paved Shoulder having no dropoffs)



SHOULDER WEDGE DETAIL

(Resurfacing Projects w/ NO Widening)



SHOULDER WEDGE DETAIL

(Resurfacing Adjacent to Rutted Shoulder)

- SHOULDER WEDGE ANGLE = 30°

CONTRACT STANDARDS AND DEVELOPMENT UNIT		
Office 919-707-6950 FAX 919-250-4119		
SHOULDER WEDGE DETAILS		
ORIGINAL BY: T.SPELL	DATE: 7-19-11	
MODIFIED BY:	DATE: 2/2/16	
CHECKED BY:	DATE:	
FILE SPEC.: szusr/details/stand/shoulderwedgedetail.dgn		

PROJECT NO.	SHEET NO.	TOTAL NO.
I-5904	11	

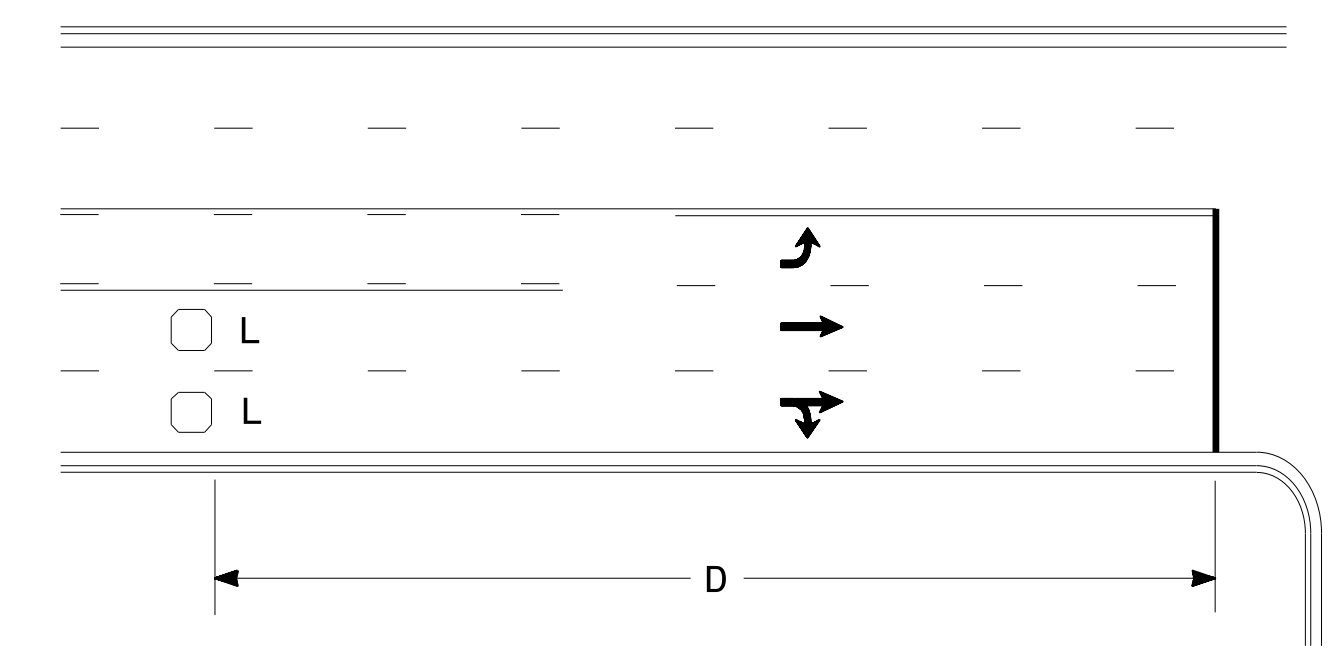
SUMMARY OF QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	LANES	LANE TYPE	FINAL SURFACE TESTING REQUIRED	WARM MIX ASPHALT REQUIRED	LENGTH	WIDTH	INCID. STONE BASE	1.5" MILLING	3" MILLING	INCID. MILLING	SURFACE COURSE, S9.5D	POLYMER MODIFIED ASPHALT BINDER FOR PLANT MIX	PATCHING EXISTING PAVEMENT	ULTRA-THIN BONDED WEARING COURSE	MILLED RUMBLE STRIPS (ASPHALT CEMENT CONCRETE)	LANE CLOSURE	RAMP/ LOOP CLOSURE	PORTABLE LIGHTING	INDUCTIVE LOOP SAWCUT	
																									MI
										GRAND TOTAL FOR PROJ NO. I-5904															
WBS 45887.3.GV1	Mecklenburg	1	I-485 (INNER)	NC 51 TO IDLEWILD ROAD	1,2&3	2		YES	NO	5.37	40		51,066	81,547	1,951	19,969	1,301	50	3,140	58,502	88				
		2	I-485 (OUTER)	NC 51 TO IDLEWILD RD.	1,2,&3	2	MD	YES	NO	5.53	40		52,991	84,025	1,811	20,592	1,342	50	3,235	58,502	88				
		3	SB OFF RAMP NC51	GORE TO BLAIR ROAD (NC 51)	4,5,6	1		NO	NO	0.23	24			3,502		137	337	19						3	
		4	SB ON RAMP NC 51	FROM (NC 51) BLAIR RD TO GORE	4,5,6	1		NO	NO	0.225	24	10		3,203		100	306	17						3	
		5	NB OFF RAMP NC 51	GORE TO BLAIR RD (NC 51)	4,5,6	1		NO	NO	0.328	24	10		4,983		24	463	26						3	
		6	NB ON RAMP NC 51	BLAIR RD (NC 51) TO GORE	4,5,6	1		NO	NO	0.128	24			2,025		41	191	11						3	
		7	SB OFF RAMP NC 218	GORE TO NC 218 (FAIRVIEW RD.)	4,5,6	1		NO	NO	0.161	24	10		2,525		43	238	14						3	198
		8	SB ON RAMP TO NC 218	NC 218 (FAIRVIEW RD) TO GORE	4,5,6	1		NO	NO	0.251	24	10		3,474		64	327	19						3	
		9	NB OFF RAMP NC 218	GORE TO NC 218 (FAIRVIEW RD)	4,5,6	1		NO	NO	0.16	24	10		2,436		78	233	13						3	198
		10	NB ON RAMP NC 218	NC 218 (FAIRVIEW RD) TO GORE	4,5,6	1		NO	NO	0.23	24	10		3,343		92	318	18						3	
		11	SB OFF RAMP SR 1004	GORE TO LAWYERS RD (SR1004)	4,5,6	1		NO	NO	0.25	24			4,146		76	390	22						3	204
		12	SB ON RAMP SR 1004	LAWYERS (SR 1004) TO GORE	4,5,6	1		NO	NO	0.258	24	10		3,676		79	347	20						3	
		13	NB OFF RAMP SR 1004	GORE TO SR 1004 (LAWYERS RD.)	4,5,6	1		NO	NO	0.355	24			5,440		70	510	29						3	198
		14	NB ON RAMP SR 1004	FROM SR 1004 (LAWYERS RD) TO GORE	4,5,6	1		NO	NO	0.213	24	10		3,038		76	288	16						3	
		15	SB OFF RAMP SR 3174	GORE TO IDLEWILD RD. SR 3174	4,5,6	1		NO	NO	0.211	24	10		3,706		107	353	20						3	204
		16	NB ON RAMP SR 3174	IDLEWILD RD (SR 3174) TO GORE	4,5,6	1		NO	NO	0.246	24	10		3,510		63	330	19						3	

THERMOPLASTIC AND PAINT QUANTITIES

PROJECT NO	COUNTY	MAP NO	ROUTE	DESCRIPTION	TYP NO	LANES	LANE TYPE	LENGTH	WIDTH	44000000	44230000	44240000	4434000000-1	451000000	4725000000-E				4815000000-E				48250000	48350000	4845000000-N				4890000000-E		48900000	48900000	4905..
										STATIONARY WORK ZONE SIGN	WORK ZONE DIGITAL SPEED LIMIT SIGNS	WORK ZONE PRESENCE LIGHTING	SEQUENTIAL FLASHING WARNING LIGHTS	LAW ENFORCEMENT	THERMO PM SYMBOL (90 MILS)	THERMO RT ARROW 90 M	THERMO STR & LT ARROW 90 M	THERMO LT ARROW 90 M	6" YELLOW PAINT	6" WHITE PAINT	12" WHITE PAINT	24" WHITE PAINT	PAINT STR ARROW	PAINT RT ARROW	PAINT STR & LT ARROW	PAINT LT ARROW	6"X 90M WHITE THERMO	6"X 90M YELLOW THERMO	12"X 90M WHITE THERMO	24"X 90M WHITE THERMO	SNOW PLOW-ABLE MARKERS		
										EA	EA	EA	EA	HR	EA	EA	EA	EA	LF	LF	LF	LF	EA	EA	EA	EA	LF	LF	LF	LF	EA	EA	EA
WBS 45887.3.GV1	Mecklenburg	1	I-485 (INNER)	NC 51 TO IDLEWILD ROAD	1,2&3	2		5.37	40	72	3	7	12	352	6				88,050	111,912	10,881		24				37,304	29,350	3,627		682		
		2	I-485 (OUTER)	NC 51 TO IDLEWILD RD.	1,2,&3	2	MD	5.53	40	72	3	7	12	352	9				88,050	111,912	11,289		36				37,304	29,350	3,763		765		
		3	SB OFF RAMP NC51	GORE TO BLAIR ROAD (NC 51)	4,5,6	1		0.23	24	8					12			2	2	1,192	1,304	430	54		4	4		1,304	1,192	430	54	28	
		4	SB ON RAMP NC 51	FROM (NC 51) BLAIR RD TO GORE	4,5,6	1		0.225	24	32					12					1,195	1,176	332					1,176	1,195	332		18		
		5	NB OFF RAMP NC 51	GORE TO BLAIR RD (NC 51)	4,5,6	1		0.328	24	8					12			2	2	1,698	2,290	382	38		4	4		2,290	1,698	382	38	26	
		6	NB ON RAMP NC 51	BLAIR RD (NC 51) TO GORE	4,5,6	1		0.128	24	32					12					674	906	238					906	674	238		12		
		7	SB OFF RAMP NC 218	GORE TO NC 218 (FAIRVIEW RD.)	4,5,6	1		0.161	24	8					12			2		863	924		55				2	924	863		55	9	
		8	SB ON RAMP TO NC 218	NC 218 (FAIRVIEW RD) TO GORE	4,5,6	1		0.251	24	32					12					1,335	1,224							1,224	1,335				
		9	NB OFF RAMP NC 218	GORE TO NC 218 (FAIRVIEW RD)	4,5,6	1		0.16	24	8					12			2		849	993		45				2	993	849		45	8	
		10	NB ON RAMP NC 218	NC 218 (FAIRVIEW RD) TO GORE	4,5,6	1		0.23	24	32					12					1,232	1,240							1,240	1,232		20		
		11	SB OFF RAMP SR 1004	GORE TO LAWYERS RD (SR1004)	4,5,6	1		0.25	24	8					12			3	3	1,318	1,648		66				3	1,648	1,318		66	15	
		12	SB ON RAMP SR 1004	LAWYERS (SR 1004) TO GORE	4,5,6	1		0.258	24	32					12					1,368	1,395							1,395	1,368				
		13	NB OFF RAMP SR 1004	GORE TO SR 1004 (LAWYERS RD.)	4,5,6	1		0.355	24	8					12			3		1,883	2,091		79				3	2,091	1,883		79	13	
		14	NB ON RAMP SR 1004	FROM SR 1004 (LAWYERS RD) TO GORE	4,5,6	1		0.213	24	32					12					1,136	1,088							1,088	1,136				
		15	SB OFF RAMP SR 3174	GORE TO IDLEWILD RD. SR 3174	4,5,6	1		0.211	24	8					12			3	3	1,114	1,528		65				3	1,528	1,114		65	20	
		16	NB ON RAMP SR 3174	IDLEWILD RD (SR 3174) TO GORE	4,5,6	1		0.246	24	32					12					1,271	1,314							1,314	1,271				
GRAND TOTAL FOR PROJ NO. I-5904									14.146		424	6	14	24	872	15	17	10	7	193,228	242,945	23,552	402	60	21	14	7	93,729	75,828	8,772	422	1,596	
														49				436,173				102				169,557							

High Speed Detection (≥40 mph)

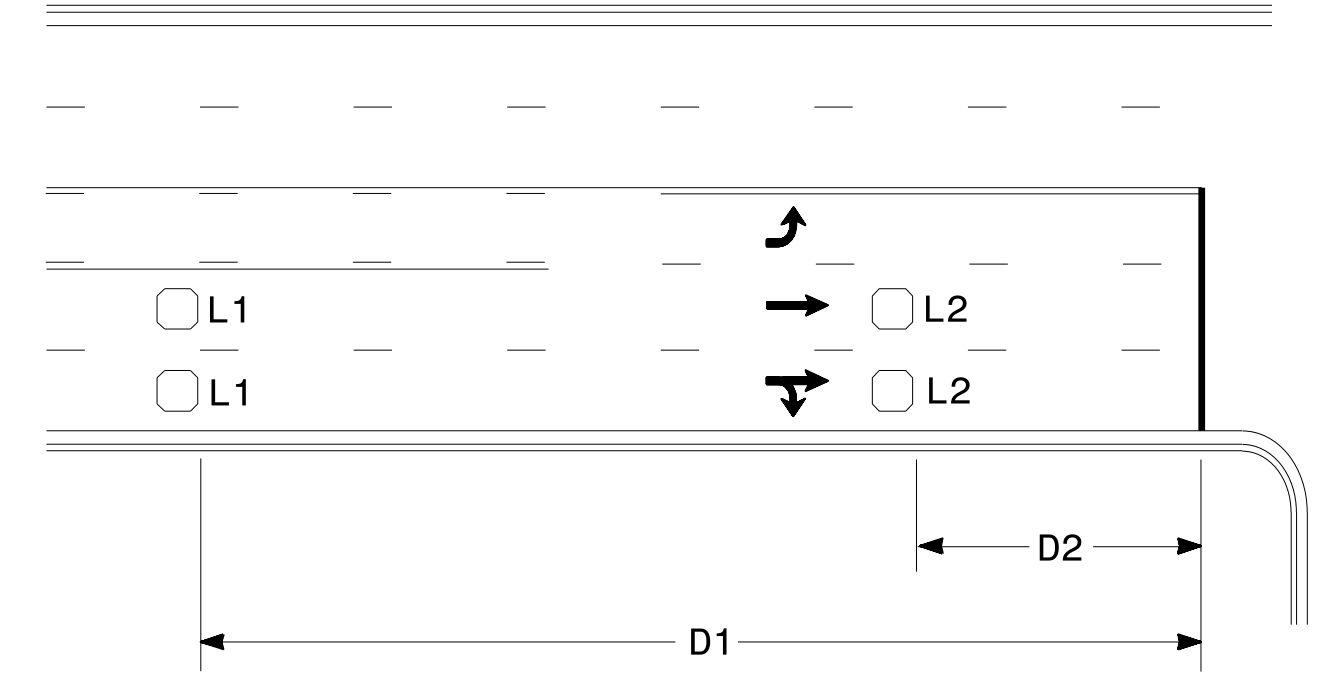


Speed Limit mph	D ft
40	250
45	300
50	355
55	420

L = 6ft X 6ft
Wired in series for TS1
Controllers
Wired separately for TS2,
170, and 2070L Controllers

Volume Density Operation

OR

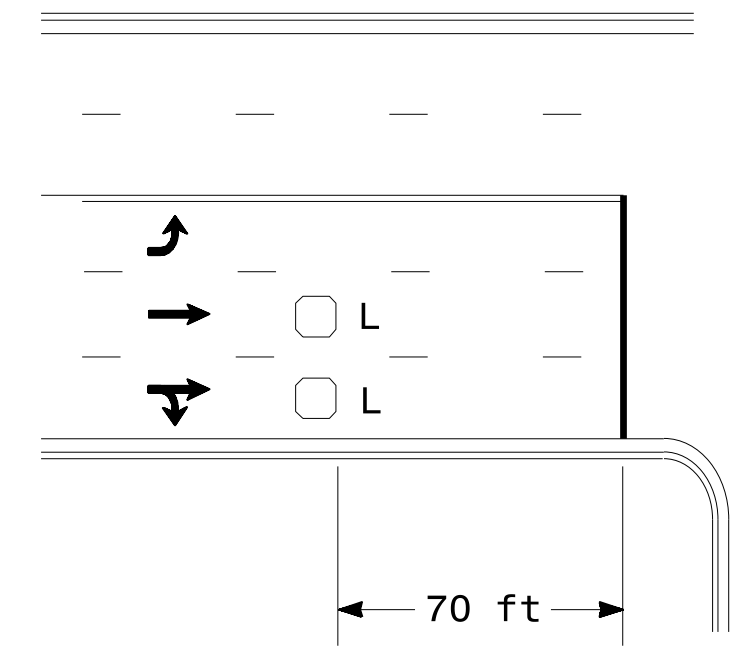


Speed Limit mph	D1 ft	D2 ft
40	250	80
45	300	90
50	355	100
55	420	110

L1 = 6ft X 6ft
Wired in series
L2 = 6ft X 6ft
Wired in series

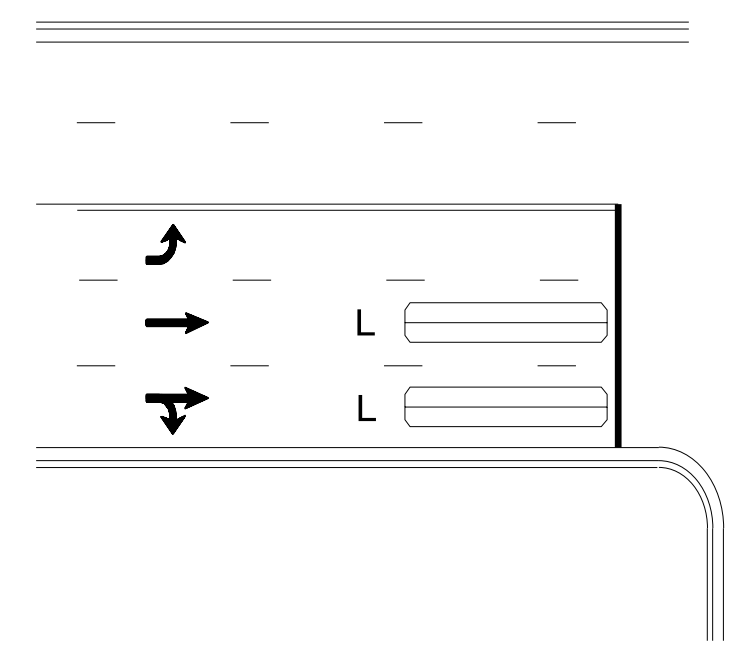
"Stretch" Operation

Low Speed Detection (≤35 mph)



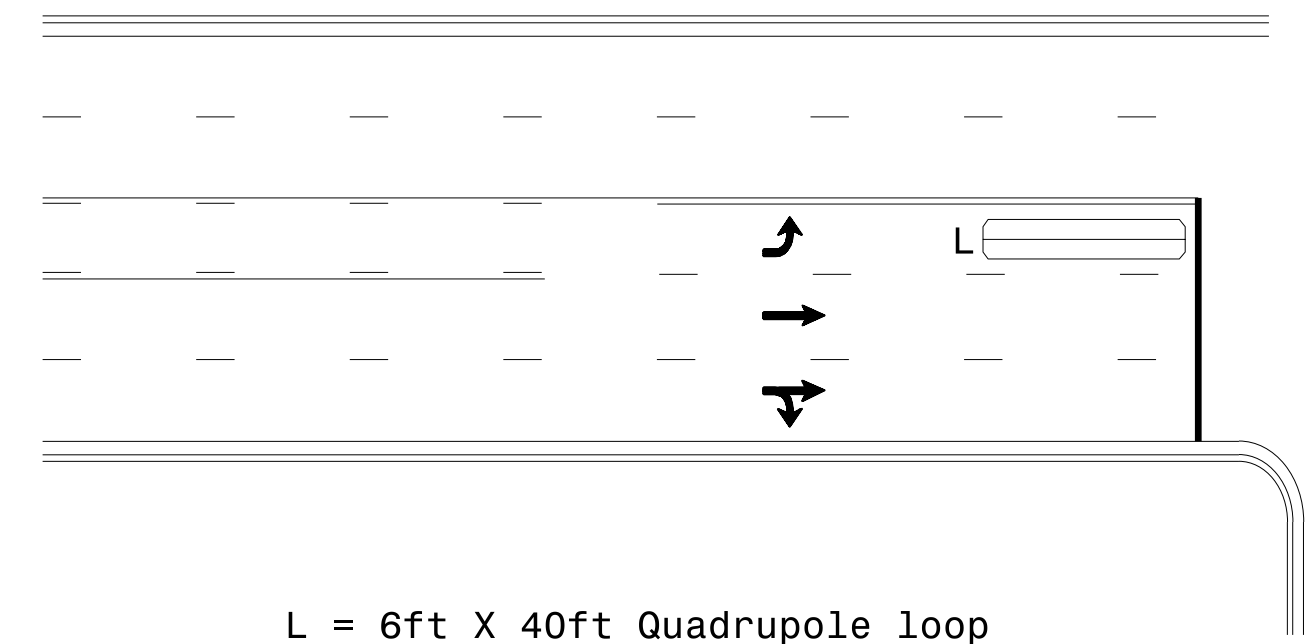
L = 6ft X 6ft
Wired in series

OR



L = 6ft X 40ft
Quadrupole loop, wired separately

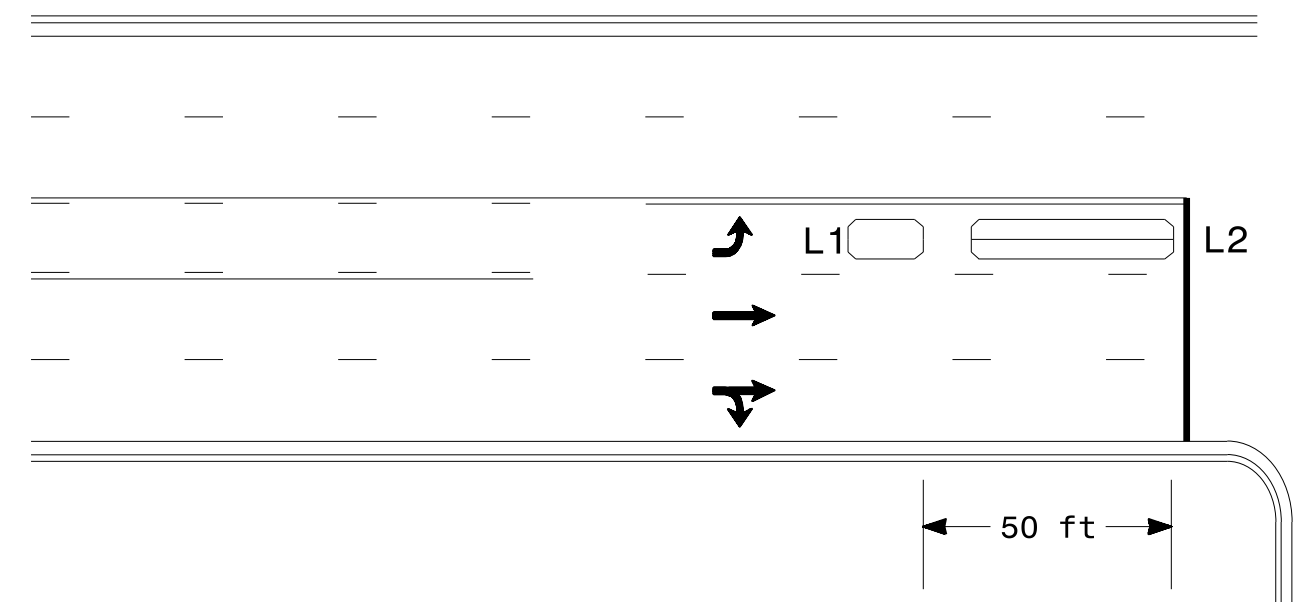
Left Turn Lane Detection



L = 6ft X 40ft Quadrupole loop

Presence Loop Detection

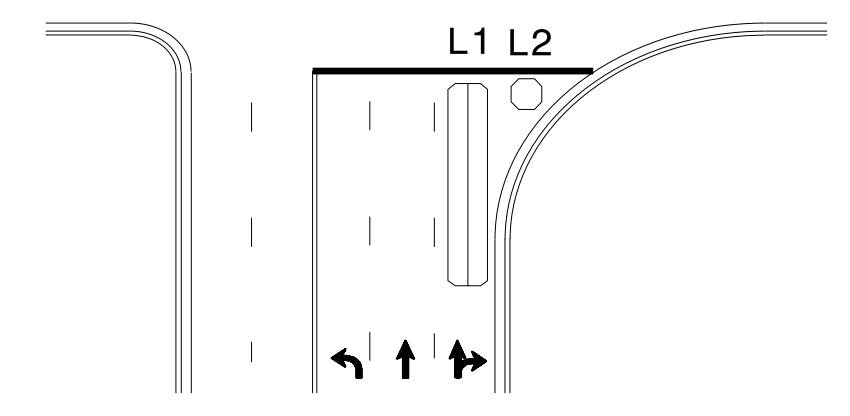
OR



L1 = 6ft X 15ft Queue detector
L2 = 6ft X 40ft Quadrupole loop

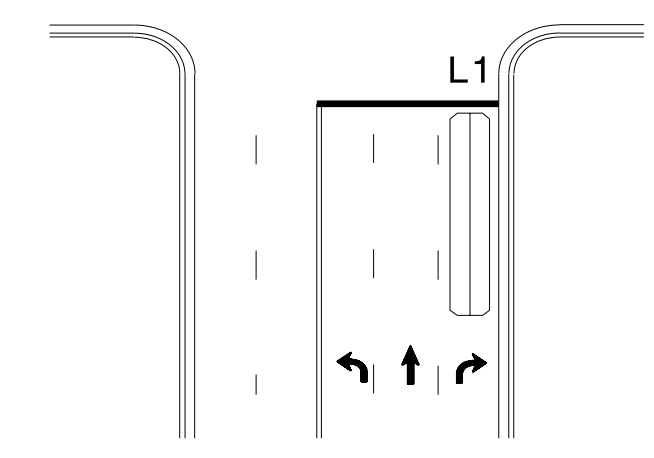
Queue Loop Detection

Right Turn Lane Detection

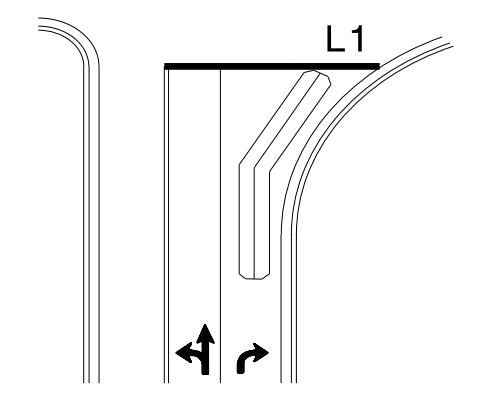


Shared Lane/
Wide Radius Turn

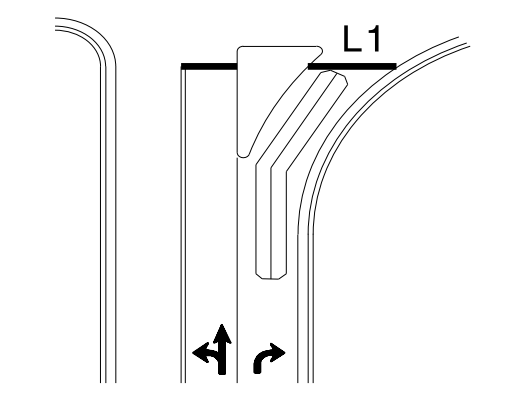
L1 = 6ft X 40ft Quadrupole loop
L2 = 6ft X 6ft [Minimum] Presence loop
Wired separately



Standard Turn

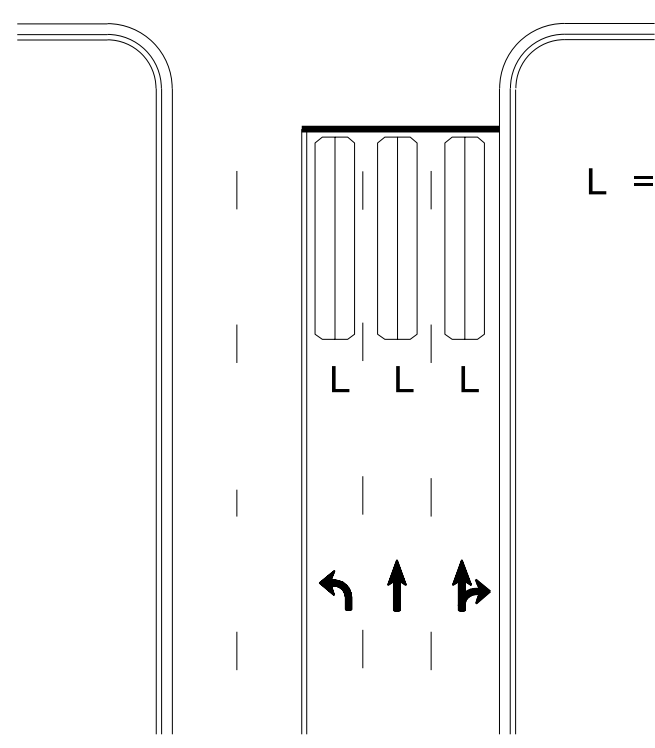


Wide Radius Turn



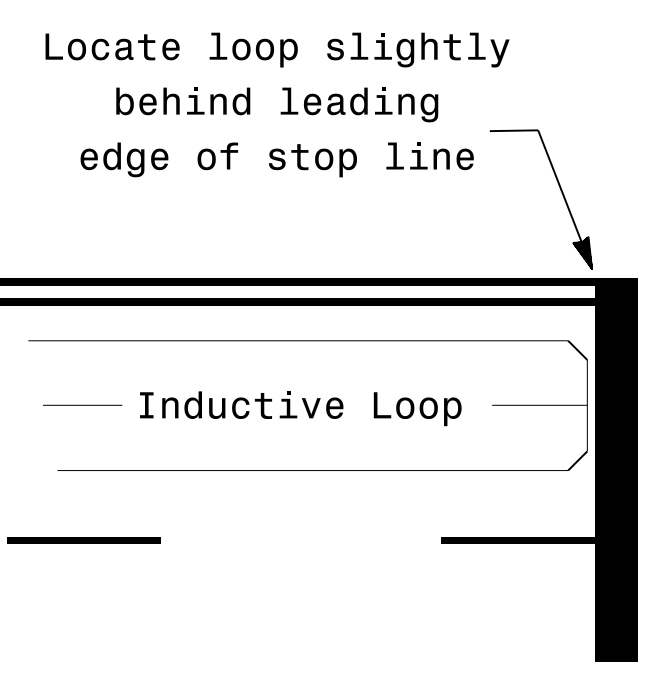
Channelized Turn

Side Street Detection



L = 6ft X 40ft
Quadrupole loop
Wired to separate
detectors/channels

Presence Loop Placement at Stop Lines



Note:
Loop may be located in advance
of stop line under any of the
following conditions:
1) stop line is greater than 15'
from edge of intersecting
roadway
2) loop detects a permissive or
protected/permissive left turn
3) for an exclusive right turn
lane

Recommended Number of Turns

Single 6' X 6' loop
(when wired separately):

Length of Lead-in ft	Number of Turns
< 250	3
250-375	4
375-525	5
> 525	6

Quadrupole loops: Use 2-4-2 turns
6' X 15' Loops:
Lead-in < 150', use 2 turns
Lead-in > 150', use 3 turns

750 N. Greenfield Pkwy, Garner, NC 27529

Prepared In the Offices of:

TRANSPORTATION MOBILITY AND SAFETY DIVISION
DEPARTMENT OF TRANSPORTATION
SIGNAL DESIGN SECTION

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PLAN DATE: January 2015		REVIEWED BY: JPG	
PREPARED BY: PLA		REVIEWED BY:	
SCALE	REVISIONS	INIT.	DATE
N/A			

DocuSigned by:
P. Alexander
1/30/2015 10:44:44 AM
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