

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NHU-1-981(101)111	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Support Size	Max Post Len	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF		LF	1st LF	2nd LF	3rd LF	4th LF								
<b>N Washington St</b>																						
25+57 Rt	SS18		3.0																		Mount on Light Standard	
26+40 Lt	SS7		14.6		8.7					10.7						1	4	3 x 3 7 ga		1	Mount with SS6, SS7(2)	
26+55 Lt	D11-1		7.0		7.2					14.7						1	4	2.25 x 2.25 12 ga			Mount with M4-4-12 and M4-14-12	
26+69 Rt	R1-1		20.6	5.2	9.2					11.7	1.6			2.25 x 2.25 12 ga	1	4	3 x 3 7 ga		1		Mount with SS6(2) and SS7 (2)	
27+01 Lt	R2-1	10		7.5	8.2					8.3					1	4	2.25 x 2.25 12 ga					
27+01 Rt	R2-1			12.5																	Mount on Light Standard with R8-3a-24	
28+44 Lt	R8-3a		5.0	3.0																	Mount on Light Standard with SS18	
29+53 Lt	W11-2				9.7					10.5						1	4	2.5 x 2.5 12 ga	1			
29+87 Lt	D11-1	29	3.0		6.7					13.6						1	4	2.25 x 2.25 12 ga				
29+96 Lt	R1-1		18.8	5.2	10.9					12.2	3.1			2.25 x 2.25 12 ga	1	4	3 x 3 7 ga			1	Mount with SS6(2), SS8(2)	
29+98 Rt	R8-3a		5.0	3.0																	Mount on Light Standard with SS18	
30+25 Rt	SS8		12.8		8.9					9.5						1	4	3 x 3 7 ga			Mount with SS6(1), SS8 (2)	
30+38 Lt	R2-1	10		7.5	10.0					10.6						1	4	2.5 x 2.5 12 ga				
30+47 Lt	D11-1	29	3.0		6.7					13.6						1	4	2.25 x 2.25 12 ga				
31+33 Lt	R8-3a	9		5.0																	Mount on Light Standard	
32+77 Rt	R8-3a	9		5.0																	Mount on Light Standard	
34+28 Lt	R8-3a	9		5.0																	Mount on Light Standard	
35+67 Rt	R8-3a	9		5.0																	Mount on Light Standard	
37+13 Lt	R8-3a	9		5.0																	Mount on Light Standard	
37+50 Lt	D11-1	29	3.0		6.7					13.6						1	4	2.25 x 2.25 12 ga				
37+59 Lt	R1-1		35.6	5.2	11.9	11.9				12.4	3.7	3.7		2 x 2 12 ga	2	4	3 x 3 7 ga			2	Mount with SS6(2), SS9(S), SS10 (N)	
38+03 Rt	R1-1		35.6	5.2	11.9	11.9				12.4	3.7	3.7		2 x 2 12 ga	2	4	3 x 3 7 ga			2	Mount with SS6(2), SS9(S), SS10(N)	
38+05 Lt	R2-1	10		7.5	8.2					8.3						1	4	2.25 x 2.25 12 ga				
38+12 Lt	D11-1	29	3.0		6.7					13.6						1	4	2.25 x 2.25 12 ga				
38+57 Rt	R8-3a	9		5.0																	Mount on Light Standard	
40+08 Lt	R8-3a	9		5.0																	Mount on Light Standard	
41+67 Rt	R8-3a	9		5.0																	Mount on Light Standard	
43+11 Lt	R8-3a	9		5.0																	Mount on Light Standard	
43+50 Rt	R8-3a	9		5.0	7.7					11.5						1	4	2.25 x 2.25 12 ga				
44+62 Rt	W6-1	20		9.0																	Mount on Light Standard	
44+94 Lt	D11-1	29	3.0		6.7					13.6						1	4	2.25 x 2.25 12 ga				
45+06 Lt	R1-1		30.4	5.2	11.9	11.9				12.6						2	4	3 x 3 7 ga		2	Mount with SS6(2), SS11(S), SS12(N)	
45+48 Lt	R2-1	10		7.5	10.0					10.6						1	4	2.5 x 2.5 12 ga				
45+52 Rt	R1-1		30.4	5.2	11.9	11.9				12.6						2	4	3 x 3 7 ga		2	Mount with SS6(2), SS11(S), SS12(N)	

Basis of Estimate  
Sign Support Lengths

The sign support lengths have been calculated using the following vertical clearances:

Areas where parking and/or pedestrian movement will occur - 84"  
Bike route - 60"

<p>This document was originally issued and sealed by Gabriel J. Schell, Registration Number 6876, on 8/25/2014 and the original document is stored at the City of Bismarck</p>	<p>Sign Summary Perforated Tube  N Washington St</p>
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NHU-1-981(101)111	110	2

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	XI SF	Sign Support Length 1st LF 2nd LF 3rd LF 4th LF				Support Size	Max Post Len LF	Sleeve Length 1st LF 2nd LF 3rd LF 4th LF				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments	
45+56 Lt	D11-1	29	3.0		6.7				2 x 2 12 ga	13.6						1	4	2.25 x 2.25 12 ga					
46+06 Lt	R8-3a	9		5.0																			Mount on Light Standard
46+75 Lt mdn	R4-7	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					
47+70 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					
47+95 Lt	W6-2	20		9.0	10.4				2.5 x 2.5 10 ga	12.9						1	4	3 x 3 7 ga			1		
50+00 Lt	R2-1			12.5	10.2				2.5 x 2.5 10 ga	11.4						1	4	3 x 3 7 ga			1		Mount with R8-3a-24
50+00 Rt	R2-1	10		7.5	8.2				2 x 2 12 ga	8.3						1	4	2.25 x 2.25 12 ga					
50+70 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					
51+75 Lt mdn	R1010			15.0																			Mount on Mast Arm (2 Signs)
52+01 Lt	SS2		39.8																				Mount on Mast Arm
52+53 Rt	SS3		22.5																				Mount on Mast Arm
52+71 Rt	R1010			15.0																			Mount on Mast Arm (2 Signs)
52+89 Lt	R1010			15.0																			Mount on Mast Arm (2 Signs)
53+30 Lt	SS3		22.5																				Mount on Mast Arm
53+47 Lt	D11-1	103	3.8		7.4				2 x 2 12 ga	14.8						1	4	2.25 x 2.25 12 ga					
53+55 Rt	SS1		39.8																				Mount on Mast Arm
53+89 Lt mdn	R1010			15.0																			Mount on Mast Arm (2 Signs)
54+60 Lt	D11-1	103	3.8		7.4				2 x 2 12 ga	14.8						1	4	2.25 x 2.25 12 ga					
55+00 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					
56+00 Lt	R2-1	10		7.5	8.2				2 x 2 12 ga	8.3						1	4	2.25 x 2.25 12 ga					
56+00 Rt	R2-1	10		7.5	8.2				2 x 2 12 ga	8.3						1	4	2.25 x 2.25 12 ga					
57+60 Lt	R8-3a		3.0	5.0	9.7				2.25 x 2.25 12 ga	10.8						1	4	2.5 x 2.5 12 ga					Mount with SS18
57+60 Rt	R8-3a		3.0	5.0	9.7				2.25 x 2.25 12 ga	10.8						1	4	2.5 x 2.5 12 ga					Mount with SS18
60+60 Lt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					
60+60 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					
63+60 Lt	R8-3a	9		5.0	9.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					
63+60 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					
64+61 Lt	D11-1	29	3.0		6.7				2 x 2 12 ga	13.6						1	4	2.25 x 2.25 12 ga					
64+67 Lt mdn	R4-7	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					
64+74 Lt	R1-1		32.1	5.2	12.4		12.4		2.25 x 2.25 12 ga	13.5	3.5	3.5		2 x 2 12 ga	2	4	3 x 3 7 ga			2		Mount with SS6(2), SS13(S), SS14(N)	
64+98 Rt mdn	R4-7	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					
64+99 Rt mdn	R4-7	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					
65+21 Rt	R1-1		32.1	5.2	12.4		12.4		2.25 x 2.25 12 ga	13.5	3.5	3.5		2 x 2 12 ga	2	4	3 x 3 7 ga			2		Mount with S6(2), SS13(S), SS14(N)	
65+29 Lt mdn	R4-7	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					
65+36 Lt	D11-1	29	3.0		6.7				2 x 2 12 ga	13.6						1	4	2.25 x 2.25 12 ga					
66+60 Lt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga					

Basis of Estimate  
Sign Support Lengths

The sign support lengths have been calculated using the following vertical clearances:

Areas where parking and/or pedestrian movement will occur - 84"  
Bike route - 60"

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Sign Summary  
Perforated Tube  
N Washington St

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NHU-1-981(101)111	110	3

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF			1st LF	2nd LF	3rd LF	4th LF								
66+60 Rt	R8-3a	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
69+60 Lt	R8-3a	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
69+60 Rt	R8-3a	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
72+60 Lt	R8-3a	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
72+60 Rt	R8-3a	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
74+50 Lt	R2-1	10		7.5		8.2			2 x 2 12 ga	8.3					1	4	2.25 x 2.25 12 ga					
74+50 Rt	R2-1	10		7.5		8.2			2 x 2 12 ga	8.3					1	4	2.25 x 2.25 12 ga					
75+60 Lt	R8-3a	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
75+60 Rt	R8-3a	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
76+00 Lt mdn	R4-7	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
76+05 Lt	D11-1	29	3.0			6.7			2 x 2 12 ga	13.6					1	4	2.25 x 2.25 12 ga					
76+18 Lt	R1-1		18.4	5.2	10.9				2.5 x 2.5 12 ga	12.3	3.1				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga		1	Mount with SS6(2), SS15(2)	
76+70 Lt	R2-1	10		7.5		8.2			2 x 2 12 ga	8.3					1	4	2.25 x 2.25 12 ga					
76+83 Rt	R1-1		18.4	5.2	10.9				2.5 x 2.5 12 ga	12.3	3.1				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga		1	Mount with SS6(2), SS15(2)	
76+90 Lt	D11-1	29	3.0			6.7			2 x 2 12 ga	13.6					1	4	2.25 x 2.25 12 ga					
76+91 Lt mdn	R4-7	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
78+60 Lt	R8-3a	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
78+60 Rt	R8-3a	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
79+50 Lt	S5-3	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
79+50 Lt mdn	S1-1	72		6.8		7.4			2 x 2 12 ga	7.8					1	4	2.25 x 2.25 12 ga					
79+50 Rt	S1-1	72		6.8		9.4			2.25 x 2.25 12 ga	10.3					1	4	2.5 x 2.5 12 ga					
81+29 Lt mdn	S5-1	23																			See Standard Drawing D772-7	
81+29 Rt	S5-1	23																			See Standard Drawing D772-7	
81+60 Lt	R8-3a	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
82+50 Rt	R8-3a	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
84+60 Lt	R8-3a		3.0	5.0		9.7			2.25 x 2.25 12 ga	10.8					1	4	2.5 x 2.5 12 ga				Mount with SS18	
84+60 Rt	R8-3a		3.0	5.0		9.7			2.25 x 2.25 12 ga	10.8					1	4	2.5 x 2.5 12 ga				Mount with SS18	
85+60 Lt	R8-3a	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
86+10 Lt mdn	SS17			10.5																	Mount on Mast Arm	
86+29 Lt	D11-1	29	3.0			6.7			2 x 2 12 ga	13.6					1	4	2.25 x 2.25 12 ga					
86+38 Lt mdn	R4-7	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
86+40 Rt	SS17		22.5	10.5																	Mount on Mast Arm with SS3	
86+45 Lt	SS4		15.3																		Mount on Mast Arm	
87+05 Lt	R2-1	10		7.5		8.2			2 x 2 12 ga	8.3					1	4	2.25 x 2.25 12 ga					
87+13 Lt	SS3		22.5	10.5																	Mount on Mast Arm with SS17	
87+21 Lt mdn	R4-7	9		5.0		7.7			2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					

Basis of Estimate  
Sign Support Lengths  
The sign support lengths have been calculated using the following vertical clearances:

Areas where parking and/or pedestrian movement will occur - 84"  
Bike route - 60"

<p>This document was originally issued and sealed by Gabriel J. Schell, Registration Number 6876, on 7/24/2015 and the original document is stored at the City of Bismarck</p>	<p>Sign Summary Perforated Tube  N Washington St</p>
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NHU-1-981(101)111	110	4

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF			1st LF	2nd LF	3rd LF	4th LF								
87+25 Lt	D11-1	29	3.0		6.7				2 x 2 12 ga	13.6					1	4	2.25 x 2.25 12 ga					
87+33 Rt	SS5		14.4																		Mount on Mast Arm	
87+48 Lt mdn	SS17			10.5																	Mount on Mast Arm	
88+00 Lt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
88+00 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
90+60 Lt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
90+60 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
92+28 Lt	S5-1	23																			See Standard Drawing D772-7	
92+28 Lt mdn	S5-1	23																			See Standard Drawing D772-7	
93+60 Lt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
93+60 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
94+35 Lt	S1-1	72		6.8	9.4				2.25 x 2.25 12 ga	10.3					1	4	2.5 x 2.5 12 ga					
94+35 Lt mdn	S1-1	72		6.8	7.4				2 x 2 12 ga	7.8					1	4	2.25 x 2.25 12 ga					
94+35 Rt	S5-3	9		5.0	7.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
96+60 Lt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
96+60 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
98+00 Lt	R2-1	10		7.5	8.2				2 x 2 12 ga	8.3					1	4	2.25 x 2.25 12 ga					
98+00 Rt	R2-1	10		7.5	8.2				2 x 2 12 ga	8.3					1	4	2.25 x 2.25 12 ga					
99+60 Lt	R8-3a		3.0	5.0	9.7				2.25 x 2.25 12 ga	10.8					1	4	2.5 x 2.5 12 ga				Mount with SS18	
99+60 Rt	R8-3a		3.0	5.0	9.7				2.25 x 2.25 12 ga	10.8					1	4	2.5 x 2.5 12 ga				Mount with SS18	
100+50 Rt	R3-7	16		9.0	9.9				2.5 x 2.5 12 ga	10.5					1	4	3 x 3 7 ga					
102+50 Rt	R3-7	16		9.0	9.9				2.5 x 2.5 12 ga	10.5					1	4	3 x 3 7 ga					
102+60 Lt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
103+60 Rt	W6-2	20		9.0	10.4				2.5 x 2.5 10 ga	12.9					1	4	3 x 3 7 ga			1		
104+56 Lt	D11-1	29	3.0		6.7				2 x 2 12 ga	13.6					1	4	2.25 x 2.25 12 ga					
104+66 Lt mdn	R4-7	9		5.0	7.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
104+82 Lt	R1-1		17.6	5.2	10.9				2.5 x 2.5 12 ga	12.6	2.9			2.25 x 2.25 12 ga	1	4	3 x 3 7 ga			1	Mount with SS6(2), SS16(2)	
105+42 Rt	R1-1		17.6	5.2	10.9				2.5 x 2.5 12 ga	12.6	2.9			2.25 x 2.25 12 ga	1	4	3 x 3 7 ga			1	Mount with SS6 (2), SS16 (2)	
105+50 Lt	R2-1	10		7.5	8.2				2 x 2 12 ga	8.3					1	4	2.25 x 2.25 12 ga					
105+81 Lt	D11-1	29	3.0		6.7				2 x 2 12 ga	13.6					1	4	2.25 x 2.25 12 ga					
106+34 Lt	R6-1	20		9.0																	Mount on Light Standard	
112+00 Lt	R2-1	10		7.5	8.2				2 x 2 12 ga	8.3					1	4	2.25 x 2.25 12 ga					
112+00 Rt	R2-1	10		7.5	8.2				2 x 2 12 ga	8.3					1	4	2.25 x 2.25 12 ga					
<b>Sub Total</b>			621.9	686.6		<b>Total</b>	952.1								<b>Total</b>	444			1	0	22	

Basis of Estimate  
Sign Support Lengths  
The sign support lengths have been calculated using the following vertical clearances:  
Areas where parking and/or pedestrian movement will occur - 84"  
Bike route - 60"

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NHU-1-981(101)111	110	5

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Support Size	Max Post Len	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF		LF	1st LF	2nd LF	3rd LF	4th LF								
<b>Ash Coulee Dr/43rd Ave</b>																						
504+80 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
506+18 Rt	W6-1	20		9.0																	Mount on Light Standard	
506+25 Lt	R3-7	16		9.0	7.9				2.25 x 2.25 12 ga	8.4						1	4	2.5 x 2.5 12 ga				
507+00 Lt	R2-1	10		7.5	8.2				2 x 2 12 ga	8.3						1	4	2.25 x 2.25 12 ga				
507+00 Rt	R2-1	10		7.5	8.2				2 x 2 12 ga	8.3						1	4	2.25 x 2.25 12 ga				
507+46 Rt	R4-7	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
509+05 Lt	R3-7			14.0	10.2				2.25 x 2.25 12 ga	11.3	2.5			2 x 2 12 ga		1	4	3 x 3 7 ga		1		
509+20 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
510+10 Lt	R6-2	20		9.0	8.9				2.5 x 2.5 12 ga	10.8						1	4	3 x 3 7 ga				
512+20 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
513+30 Lt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
513+69 Lt	D11-1	103	3.8		7.4				2 x 2 12 ga	14.8						1	4	2.25 x 2.25 12 ga			Mount with M6-4-12	
516+00 Rt	R3-7	16		9.0	9.9				2.5 x 2.5 12 ga	10.5						1	4	3 x 3 7 ga				
517+00 Rt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
518+20 Rt	W6-2	20		9.0	10.4				2.5 x 2.5 10 ga	12.9						1	4	3 x 3 7 ga		1		
519+05 Lt	R8-3a	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
519+55 Rt	R3-7R	16		9.0	9.9				2.5 x 2.5 12 ga	10.5						1	4	3 x 3 7 ga				
520+56 Lt mdn	R4-7	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
521+26 Rt	R1-1			0.0	12.4				2.5 x 2.5 12 ga	15.1	2.6			2.25 x 2.25 12 ga		1	4	3 x 3 7 ga	1		1	
522+10 Lt	W6-1	20		9.0	8.9				2.5 x 2.5 12 ga	10.8						1	4	3 x 3 7 ga				
525+60 Lt	R2-1	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
525+60 Rt	R2-1	9		5.0	7.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
<b>Sub Total</b>			3.8	142.0					<b>Total</b>	179.0						<b>Total</b>	84		1	0	3	
<b>Grand Total</b>			625.7	828.6					<b>Total</b>	1131.1						<b>Total</b>	528		2	0	25	

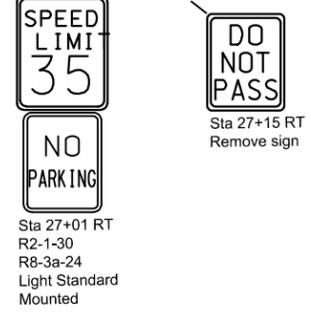
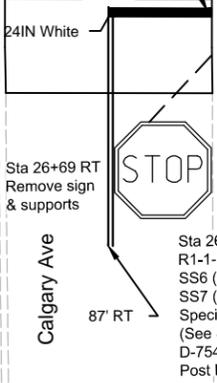
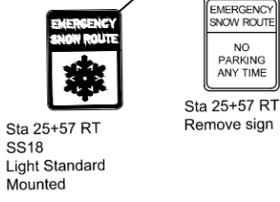
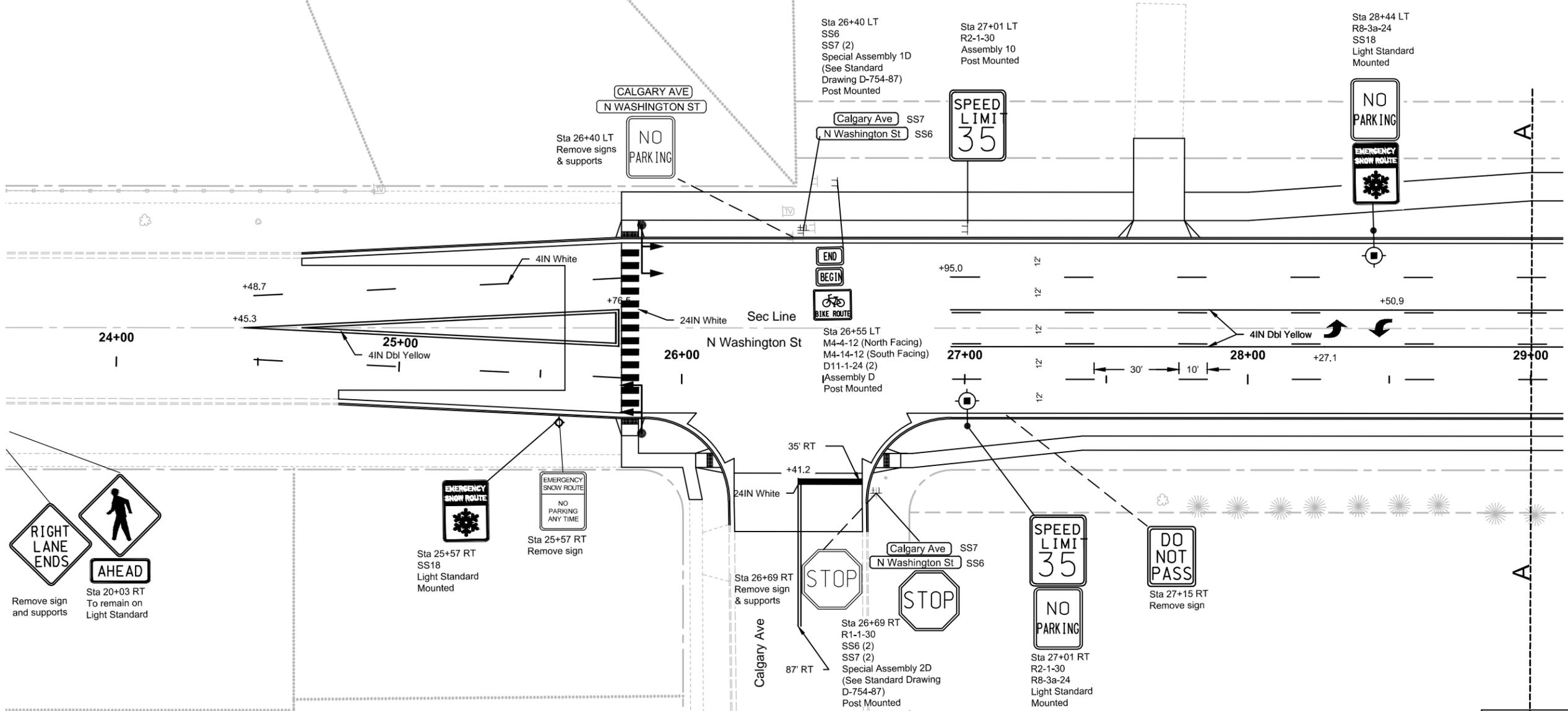
Basis of Estimate  
Sign Support Lengths

The sign support lengths have been calculated using the following vertical clearances:

Areas where parking and/or pedestrian movement will occur - 84"  
Bike route - 60"

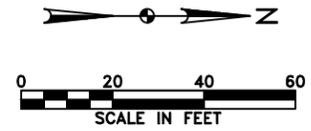
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Sign Summary  
Perforated Tube  
N Washington St

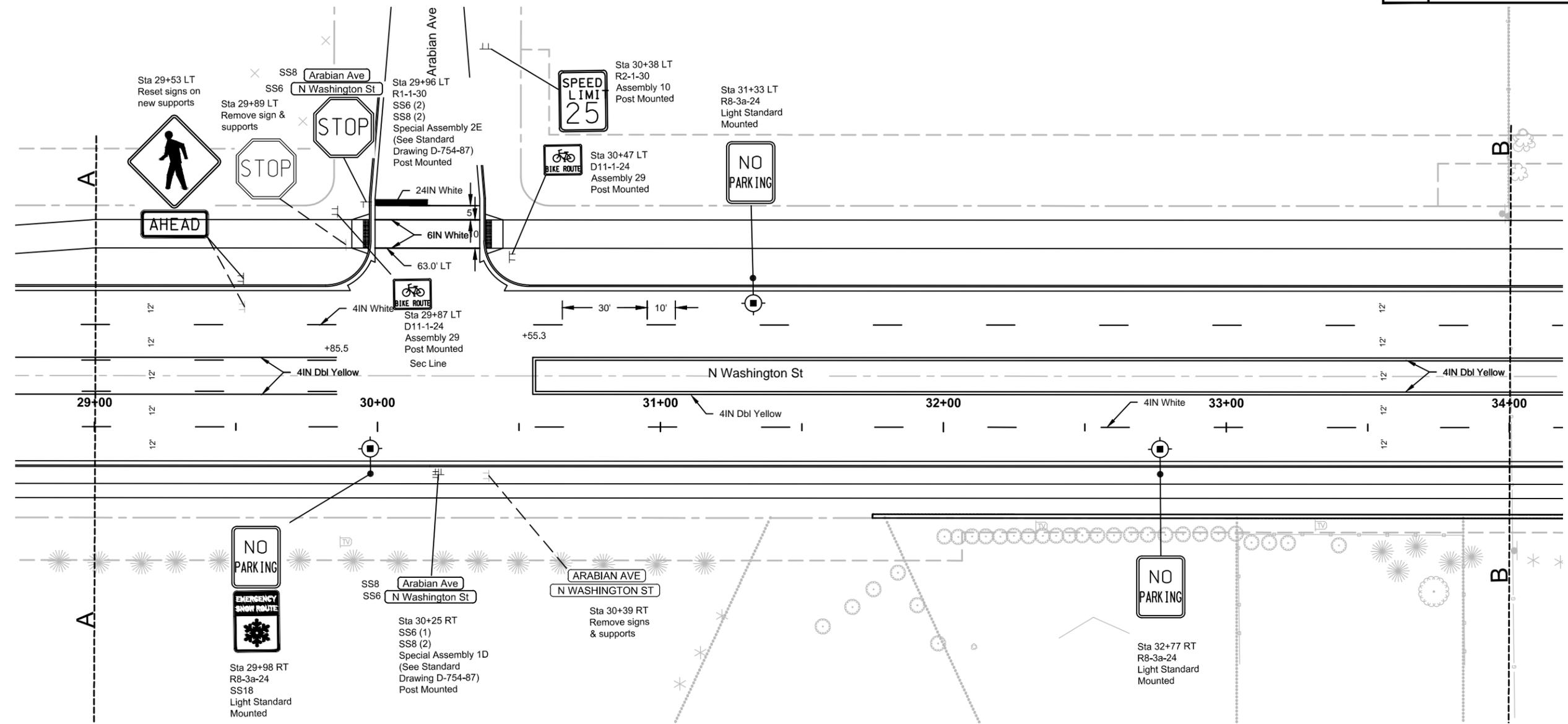


PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	
LT Arrow (2)	32 SF
PREFORMED THERMO PLASTIC PVMT MK 24IN LINE	
White Stop Bar	23 LF
Crosswalk	78 LF
Total	101 LF
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	
Yellow	1188 LF
White	200 LF
Total	1388 LF

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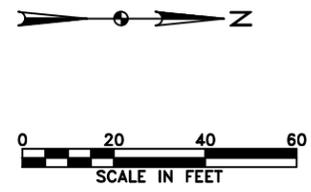


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NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
<b>KLJ</b>							
N Washington St Signing and Pavement Markings Sta 24+00-29+00							
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014	TJS	GJS	1412129	02/2014
C:\Users\gabeschell\appdata\local\temp\AcPublish_7332\110SN_005_LSign.dwg							
Kadmas, Lee & Jackson 2014							

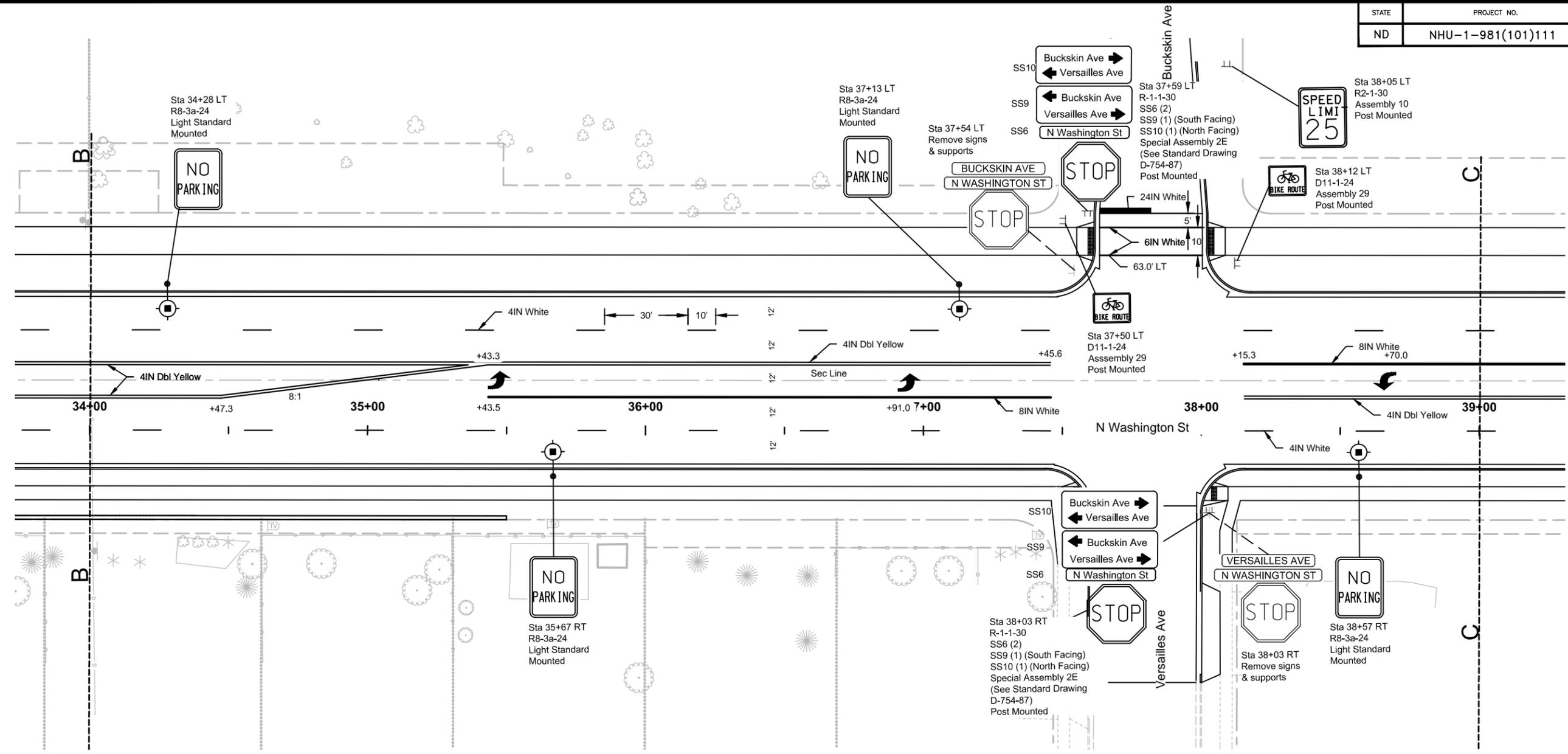


PREFORMED THERMO PLASTIC PVMT MK 6IN LINE	
Crosswalk	75 LF
PREFORMED THERMO PLASTIC PVMT MK 24IN LINE	
White Stop Bar	19 LF
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	
Yellow	1617 LF
White	220 LF
Total	1837 LF

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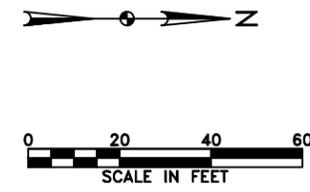


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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
<b>N Washington St</b> Signing and Pavement Markings Sta 29+00-34+00							
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014	TJS	GJS	1412129	02/2014
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PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED) LT Arrow (3)	48 SF
PREFORMED THERMO PLASTIC PVMT MK 6IN LINE Crosswalk	74 LF
PREFORMED THERMO PLASTIC PVMT MK 24IN LINE White Stop Bar	19 LF
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED Yellow	1150 LF
White	240 LF
Total	1390 LF
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED White Channel Line	287 LF

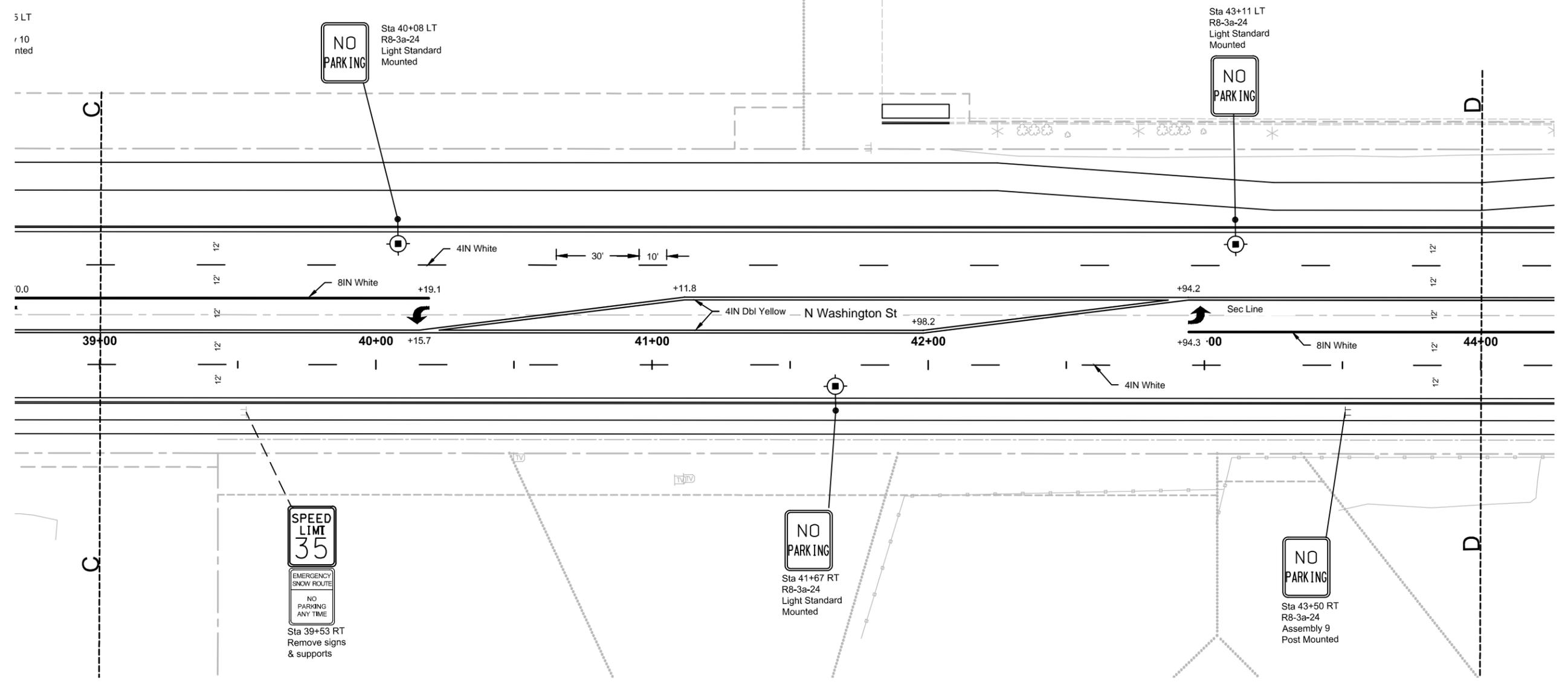
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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
<b>N Washington St</b> <b>Signing and</b> <b>Pavement Markings</b> <b>Sta 34+00-39+00</b>							
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS		02/2014	TJS	GJS		02/2014
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ND	NHU-1-981(101)111	110	9

5 LT  
10  
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**SPEED LIMIT 35**  
EMERGENCY SNOW ROUTE  
NO PARKING ANY TIME  
Sta 39+53 RT  
Remove signs & supports

**NO PARKING**  
Sta 40+08 LT  
R8-3a-24  
Light Standard Mounted

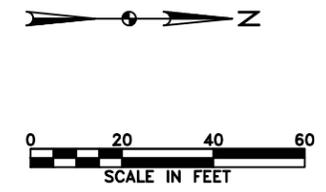
**NO PARKING**  
Sta 41+67 RT  
R8-3a-24  
Light Standard Mounted

**NO PARKING**  
Sta 43+11 LT  
R8-3a-24  
Light Standard Mounted

**NO PARKING**  
Sta 43+50 RT  
R8-3a-24  
Assembly 9  
Post Mounted

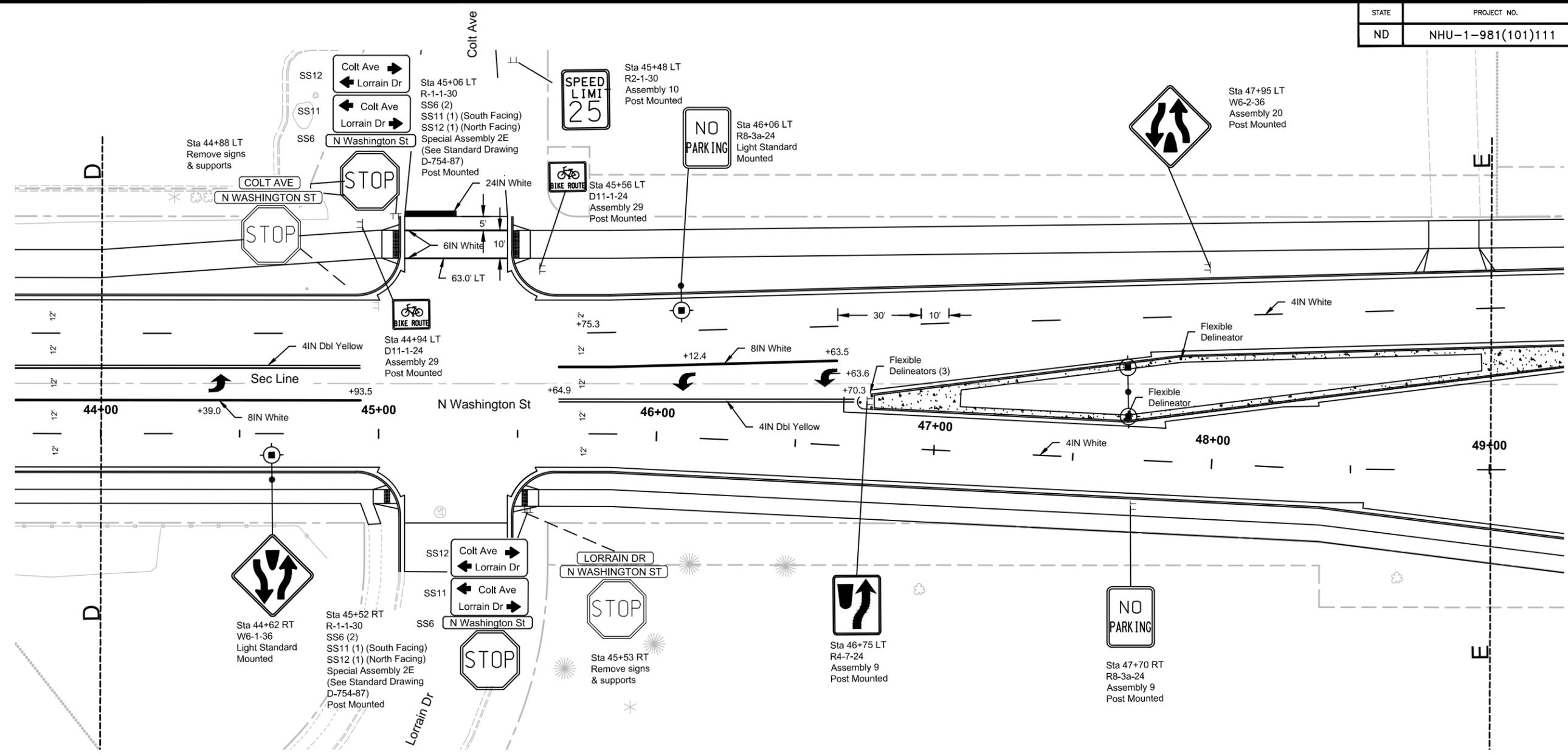
PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED) LT Arrow (2)	32 SF
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED Yellow	1560 LF
White	240 LF
Total	1800 LF
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED White Channel Line	226 LF

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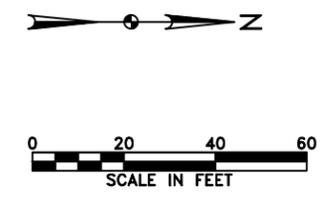
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NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
<b>KLJ</b>							
N Washington St Signing and Pavement Markings Sta 39+00-44+00							
DRWN. BY TJS	CHK'D BY GJS	PROJECT NO. 1412129	DATE 02/2014				
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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	110	10



FLEXIBLE DELINEATORS-TYPE D	Sta 44+00 to 49+00	5 EA
PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	LT Arrow (3)	48 SF
PREFORMED THERMO PLASTIC PVMT MK 6IN LINE	Crosswalk	75 LF
PREFORMED THERMO PLASTIC PVMT MK 24IN LINE	White Stop Bar	19 LF
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	Yellow	398 LF
	White	220 LF
	Total	618 LF
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	White Channel Line	193 LF

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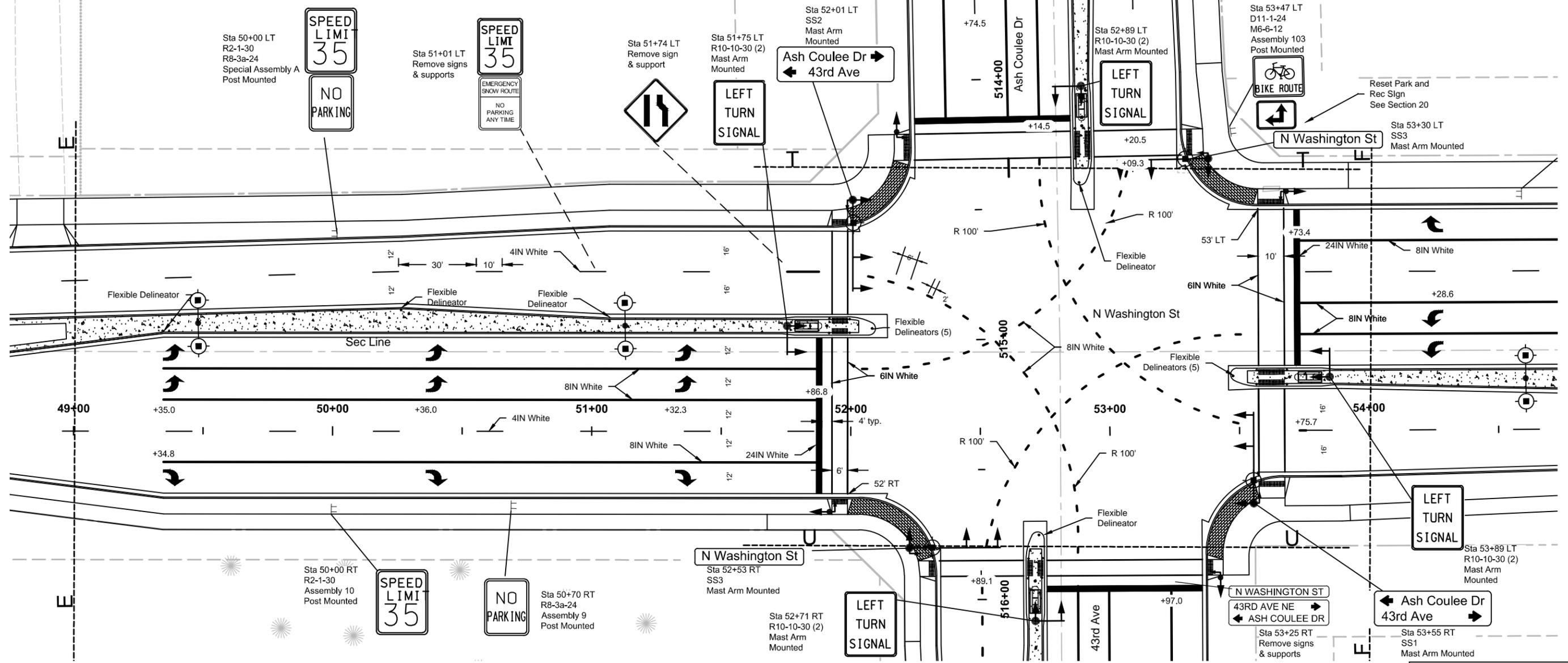
**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

**KLJ**

**N Washington St**  
Signing and  
Pavement Markings  
Sta 44+00-49+00

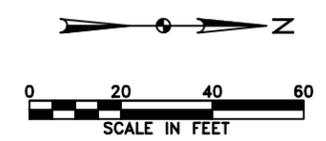
DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014

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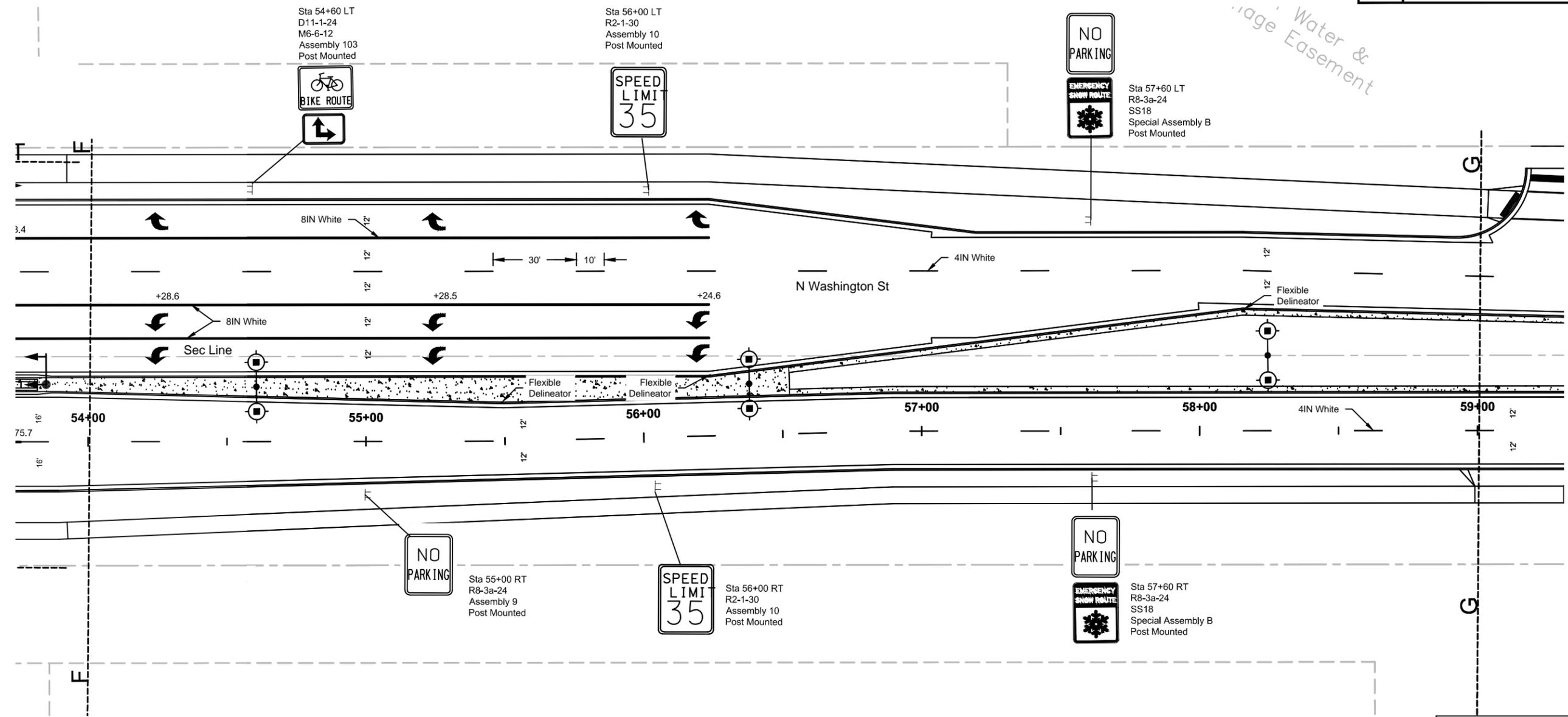
<b>FLEXIBLE DELINEATORS-TYPE D</b>	
Sta 49+00 to 54+00	15 EA
<b>PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)</b>	
LT Arrow (6)	96 SF
RT Arrow (3)	48 SF
Total	144 SF
<b>PREFORMED THERMO PLASTIC PVMT MK 6IN LINE</b>	
Crosswalk	368 LF
<b>PREFORMED THERMO PLASTIC PVMT MK 24IN LINE</b>	
White Stop Bar	120 LF
<b>PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED</b>	
White	160 LF
<b>PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED</b>	
White Channel Line	871 LF
White Dotted Extension	72 LF
Total	943 LF

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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
<b>N Washington St</b> Signing and Pavement Markings Sta 49+00-54+00							
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014	TJS	GJS	1412129	02/2014
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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	110	12



Water & Sewerage Easement

NO PARKING

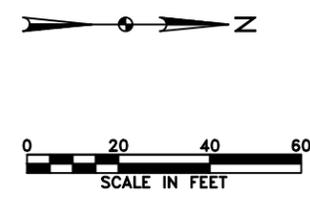
SPEED LIMIT 35

NO PARKING

EMERGENCY SNOW ROUTE

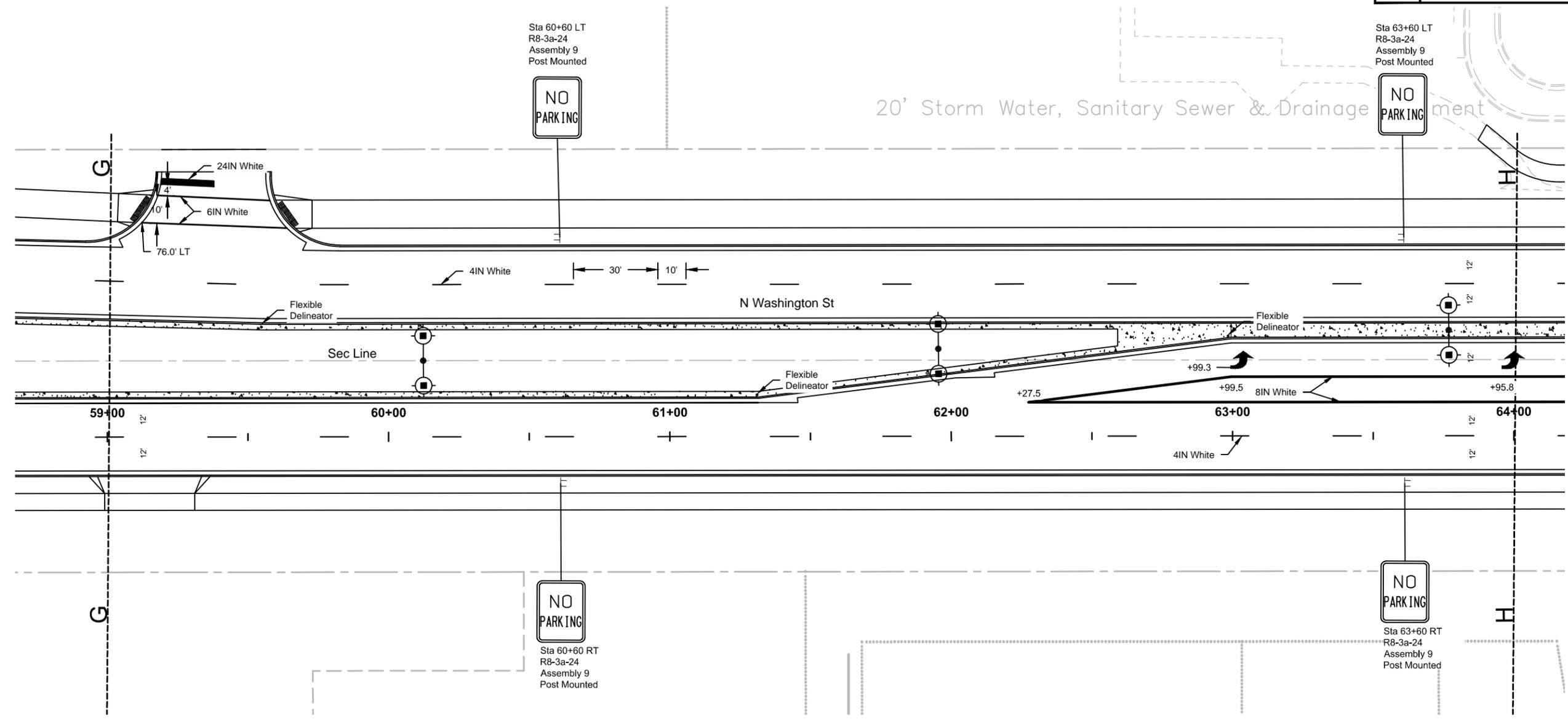
FLEXIBLE DELINEATORS-TYPE D	
Sta 54+00 to 59+00	3 EA
PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	
LT Arrow (6)	96 SF
RT Arrow (3)	48 SF
Total	144 SF
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	
White	260 LF
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	
White Channel Line	674 LF

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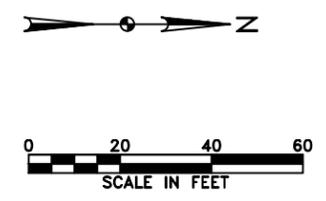
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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
<b>N Washington St</b> Signing and Pavement Markings Sta 54+00-59+00			
DRWN. BY	CHK'D BY	PROJECT NO.	DATE
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ND	NHU-1-981(101)111	110	13

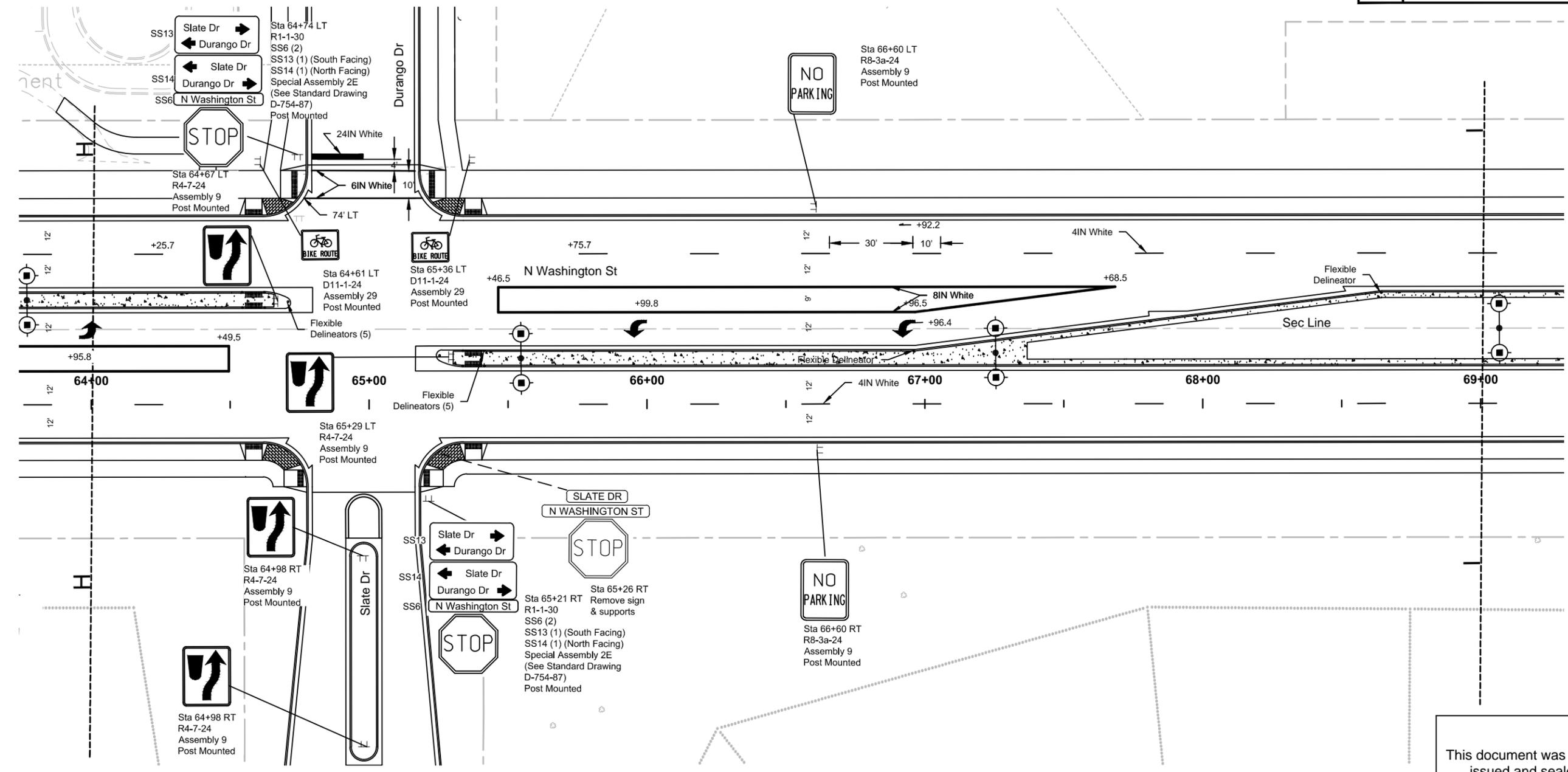


FLEXIBLE DELINEATORS-TYPE D	3 EA
Sta 59+00 to 64+00	
PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	32 SF
LT Arrow (2)	
PREFORMED THERMO PLASTIC PVMT MK 6IN LINE	104 LF
Crosswalk	
PREFORMED THERMO PLASTIC PVMT MK 24IN LINE	19 LF
Stop bar	
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	240 LF
White	
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	346 LF
White Channel Line	

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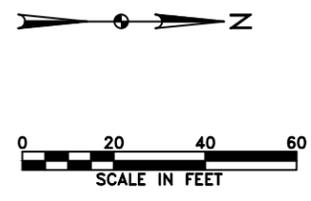


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NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
N Washington St Signing and Pavement Markings Sta 59+00-64+00			
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TJS	GJS	1412129	02/2014
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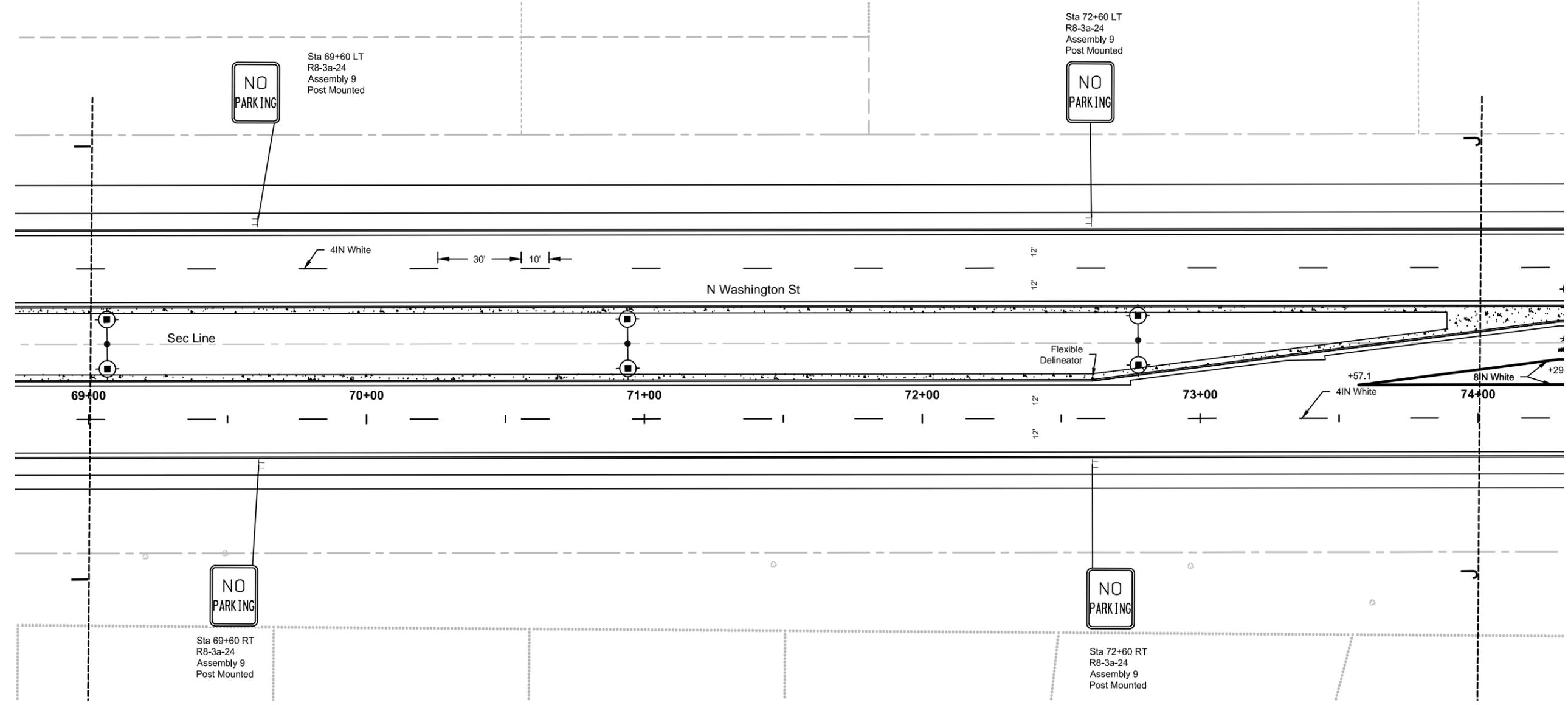
FLEXIBLE DELINEATORS-TYPE D	12 EA
Sta 64+00 to 69+00	
PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	32 SF
LT Arrow (2)	
PREFORMED THERMO PLASTIC PVMT MK 6IN LINE	86 LF
Crosswalk	
PREFORMED THERMO PLASTIC PVMT MK 24IN LINE	19 LF
White Stop Bar	
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	78 LF
Yellow	
White	200 LF
Total	278 LF
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	562 LF
White Channel Line	

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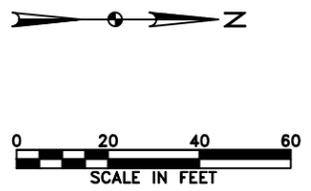
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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		<b>N Washington St</b> Signing and Pavement Markings Sta 64+00-69+00	
DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014
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ND	NHU-1-981(101)111	110	15

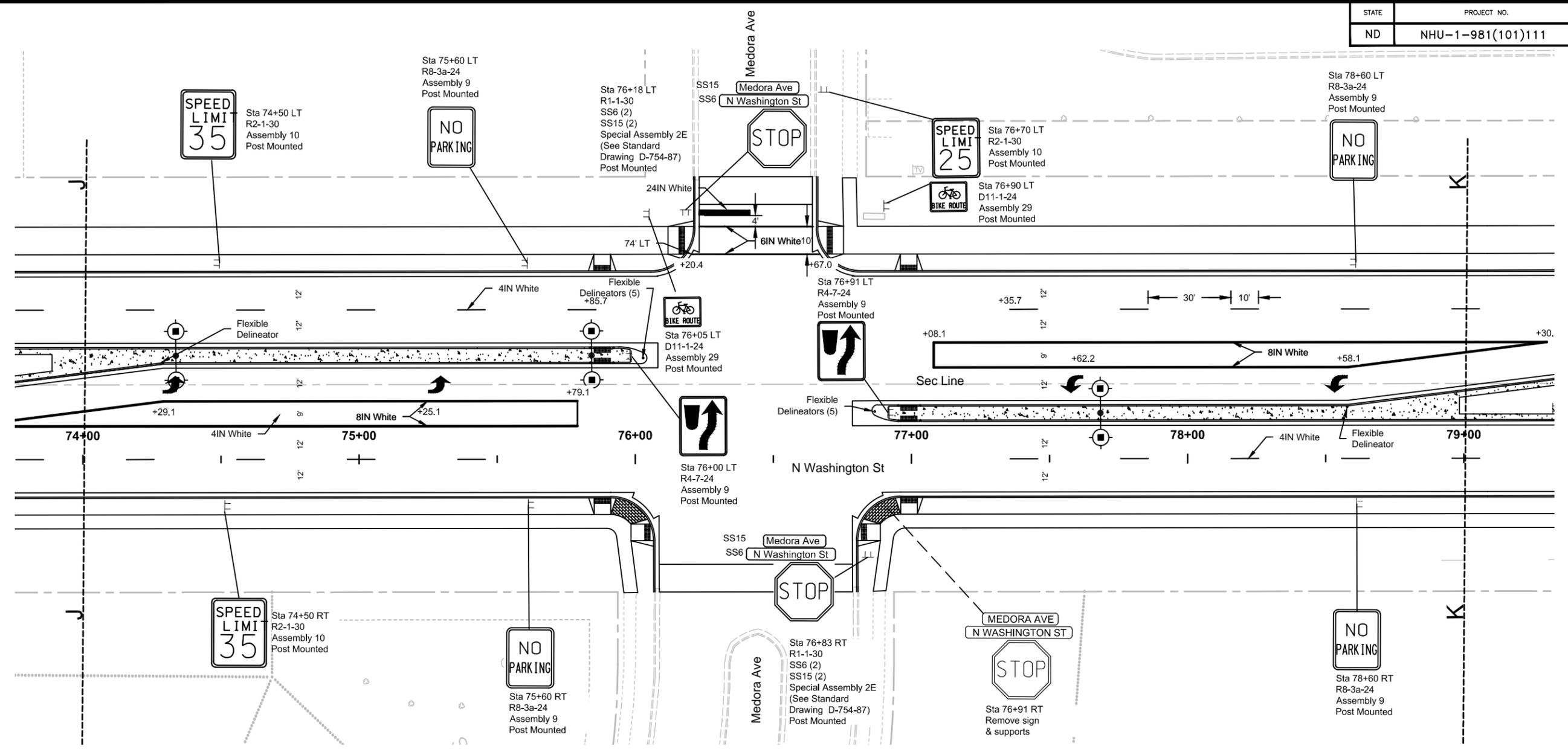


FLEXIBLE DELINEATORS-TYPE D	1 EA
Sta 69+00 to 74+00	
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	240 LF
White	
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	87 LF
White Channel Line	

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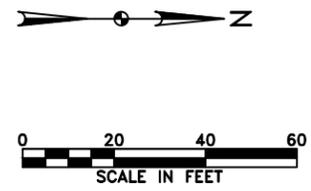


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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
				<b>N Washington St</b> <b>Signing and</b> <b>Pavement Markings</b> <b>Sta 69+00-74+00</b>			
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014	TJS	GJS	1412129	02/2014
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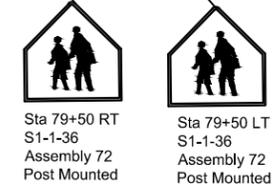
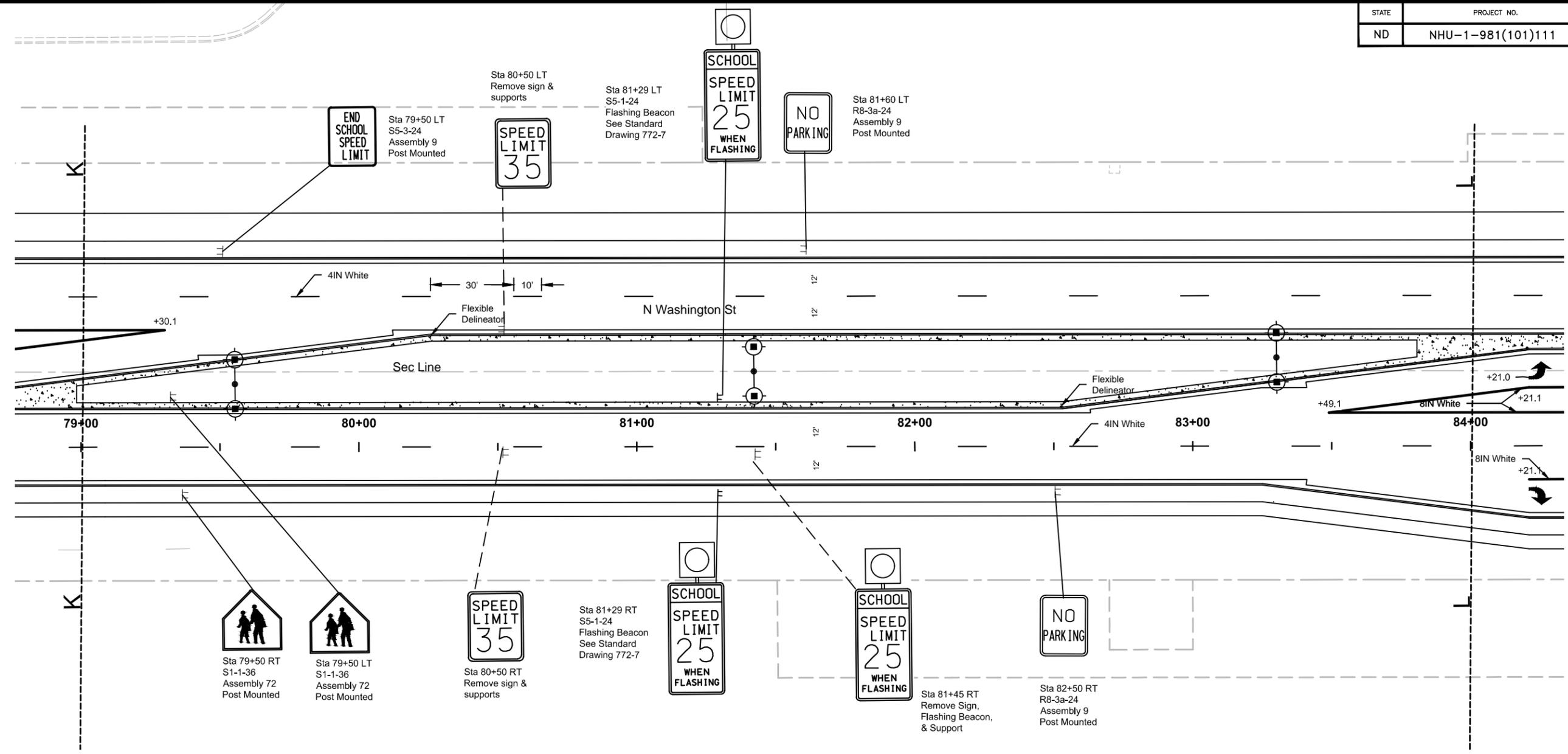
FLEXIBLE DELINEATORS-TYPE D	12 EA
Sta 74+00 to 79+00	
PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	64 SF
LT Arrow (4)	
PREFORMED THERMO PLASTIC PVMT MK 6IN LINE	94 LF
Crosswalk	
PREFORMED THERMO PLASTIC PVMT MK 24IN LINE	19 LF
White Stop Bar	
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	190 LF
White	
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	761 LF
White Channel Line	

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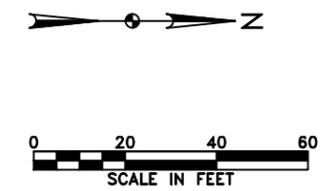
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<b>N Washington St</b> Signing and Pavement Markings Sta 74+00-79+00			
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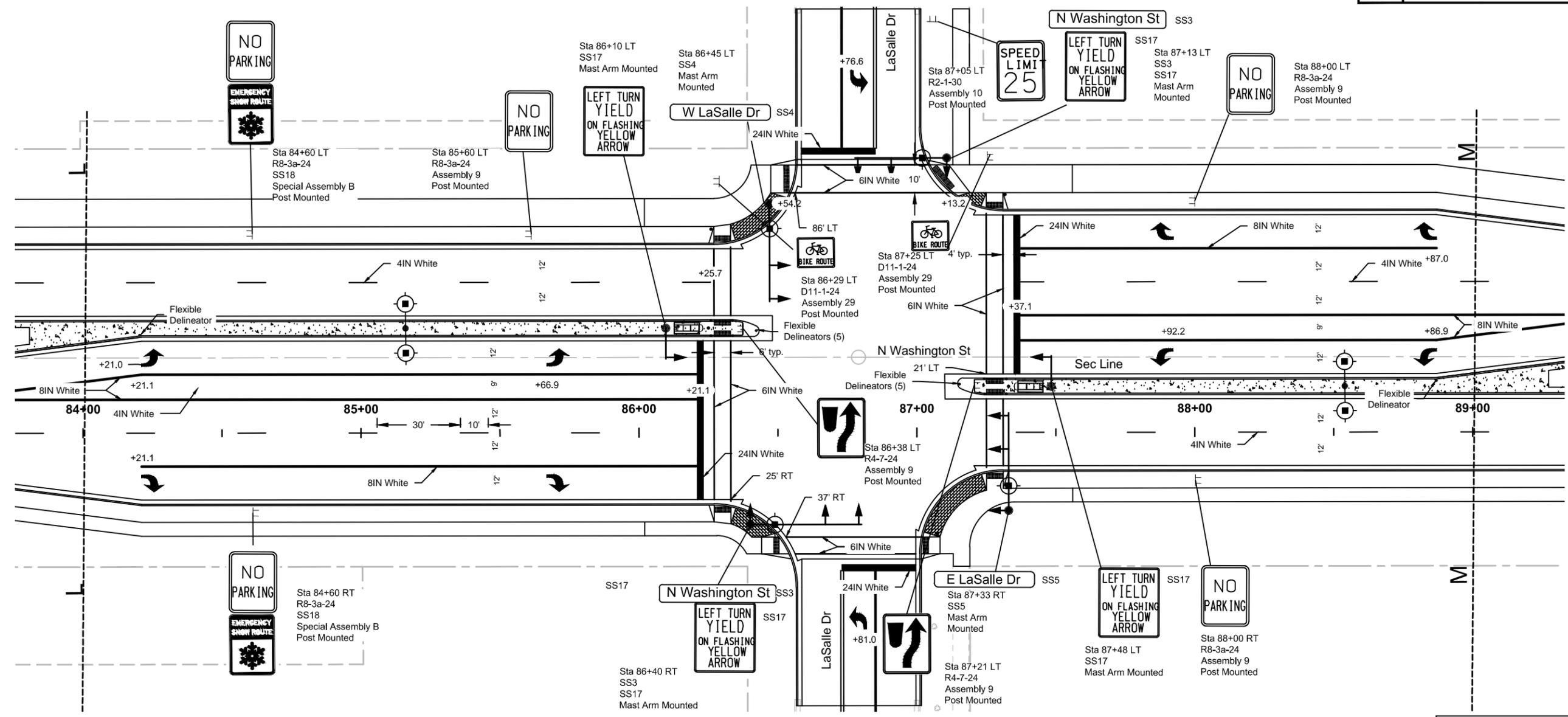


FLEXIBLE DELINEATORS-TYPE D	Sta 79+00 to 84+00	2 EA
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	White	240 LF
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	White Channel Line	164 LF

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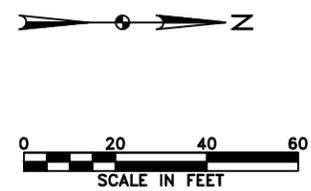


Rev'd.				Scale: 1:40 Hor, 1:10 Ver			
<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
<b>N Washington St</b> Signing and Pavement Markings Sta 79+00-84+00							
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	07/2015	TJS	GJS	1412129	07/2015
C:\Users\gabeschell\appdata\local\temp\AcPublish_7332\110SN_005_LSign.dwg							
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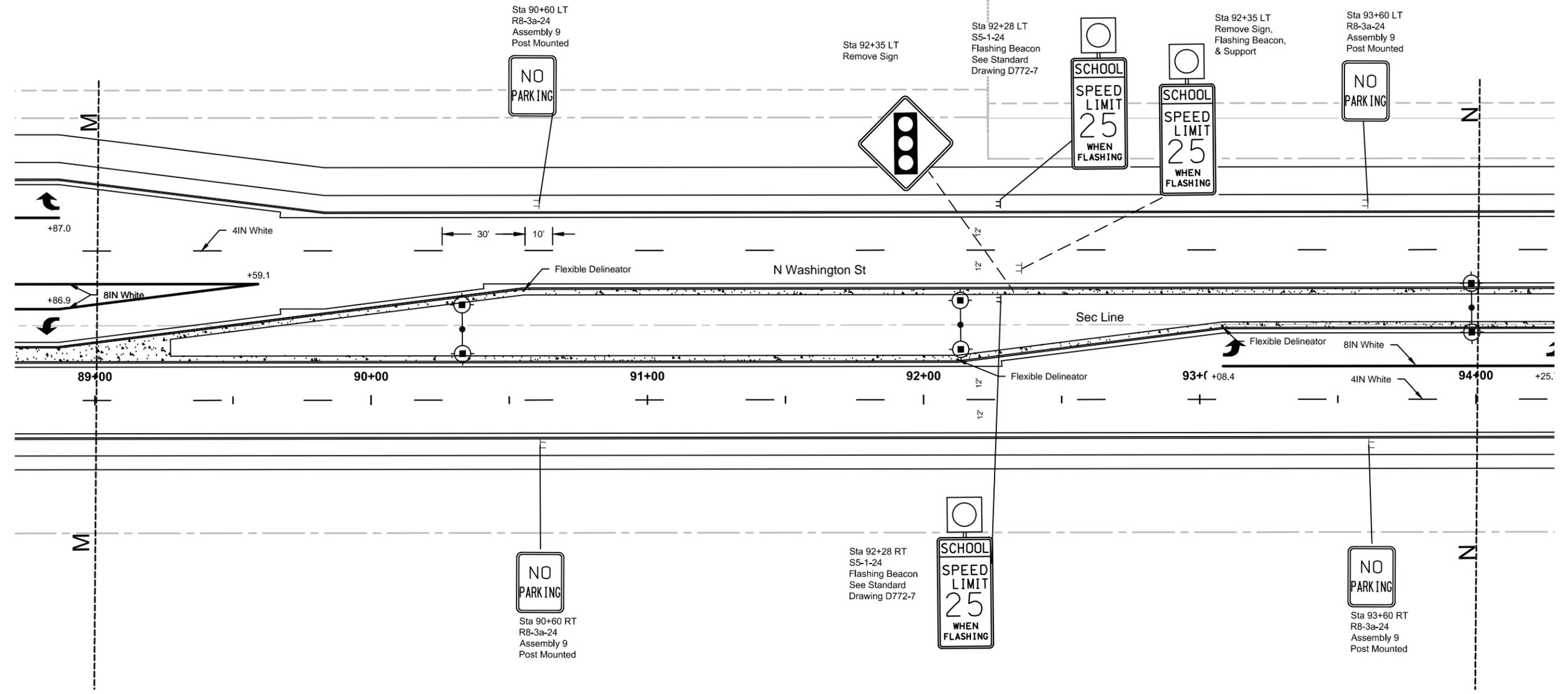
FLEXIBLE DELINEATORS-TYPE D	
Sta 84+00 to 89+00	12 EA
PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	
LT Arrow (6)	96 SF
RT Arrow (4)	64 SF
Total	160 SF
PREFORMED THERMO PLASTIC PVMT MK 6IN LINE	
Crosswalk	544 LF
PREFORMED THERMO PLASTIC PVMT MK 24IN LINE	
White Stop Bar	169 LF
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	
Yellow	204 LF
White	210 LF
Total	414 LF
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	
White Channel Line	1221 LF

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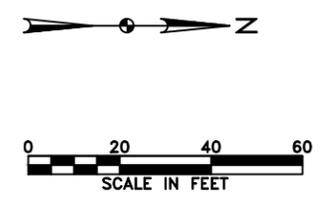
Rev'd.				Scale: 1:40 Hor, 1:10 Ver			
<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
<b>N Washington St</b> <b>Signing and Pavement Markings</b> <b>Sta 84+00-89+00</b>							
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014	TJS	GJS	1412129	02/2014
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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	110	19

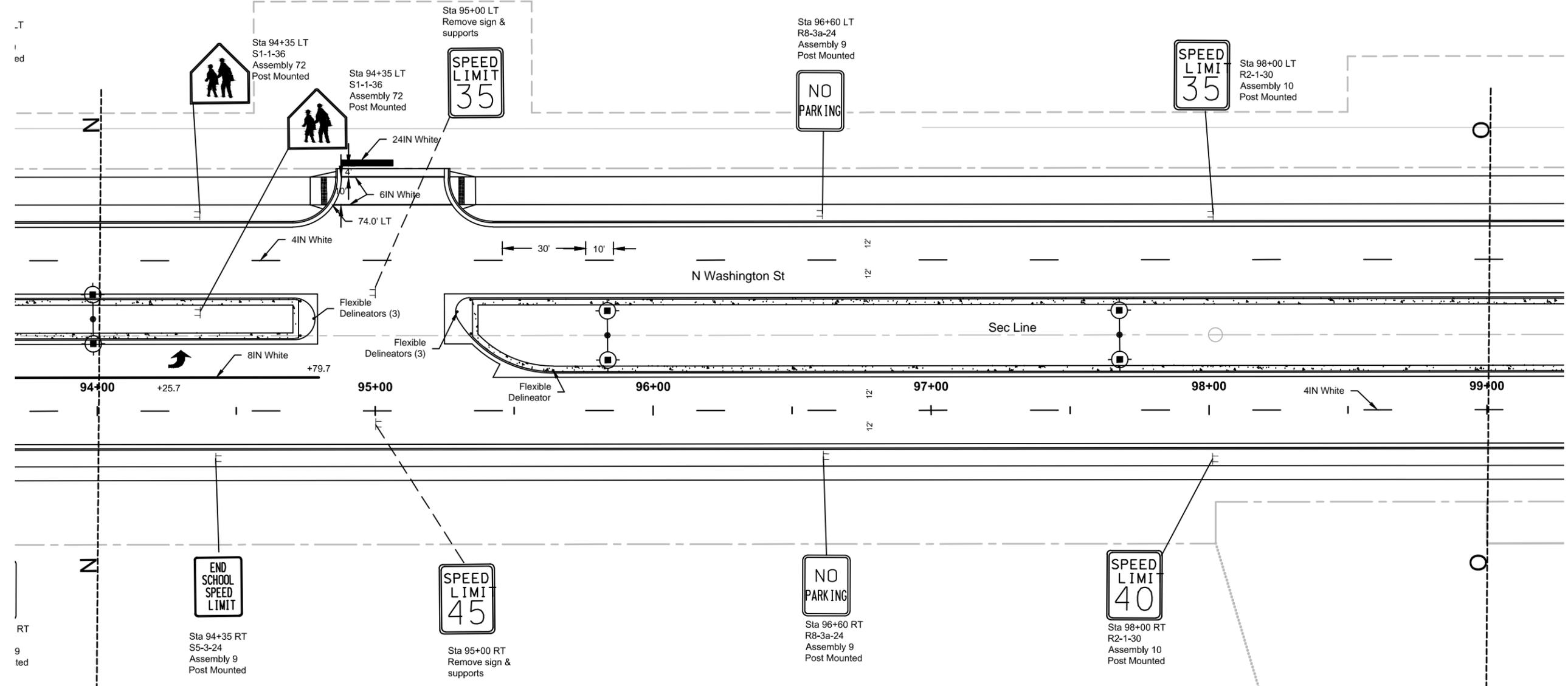


FLEXIBLE DELINEATORS-TYPE D	3 EA
Sta 89+00 to 94+00	
PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	16 SF
LT Arrow (1)	
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	240 LF
White	
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	210 LF
White Channel Line	

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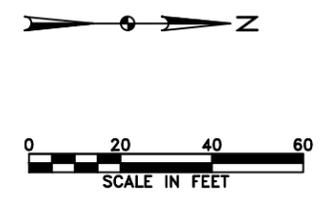


Rev'd.				Scale: 1:40 Hor, 1:10 Ver			
NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
N Washington St Signing and Pavement Markings Sta 89+00-94+00							
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	07/2015	TJS	GJS	1412129	07/2015
C:\Users\gabeschell\appdata\local\temp\AcPublish_7332\1105N_005_LSign.dwg							
Kadmas, Lee & Jackson 2015							

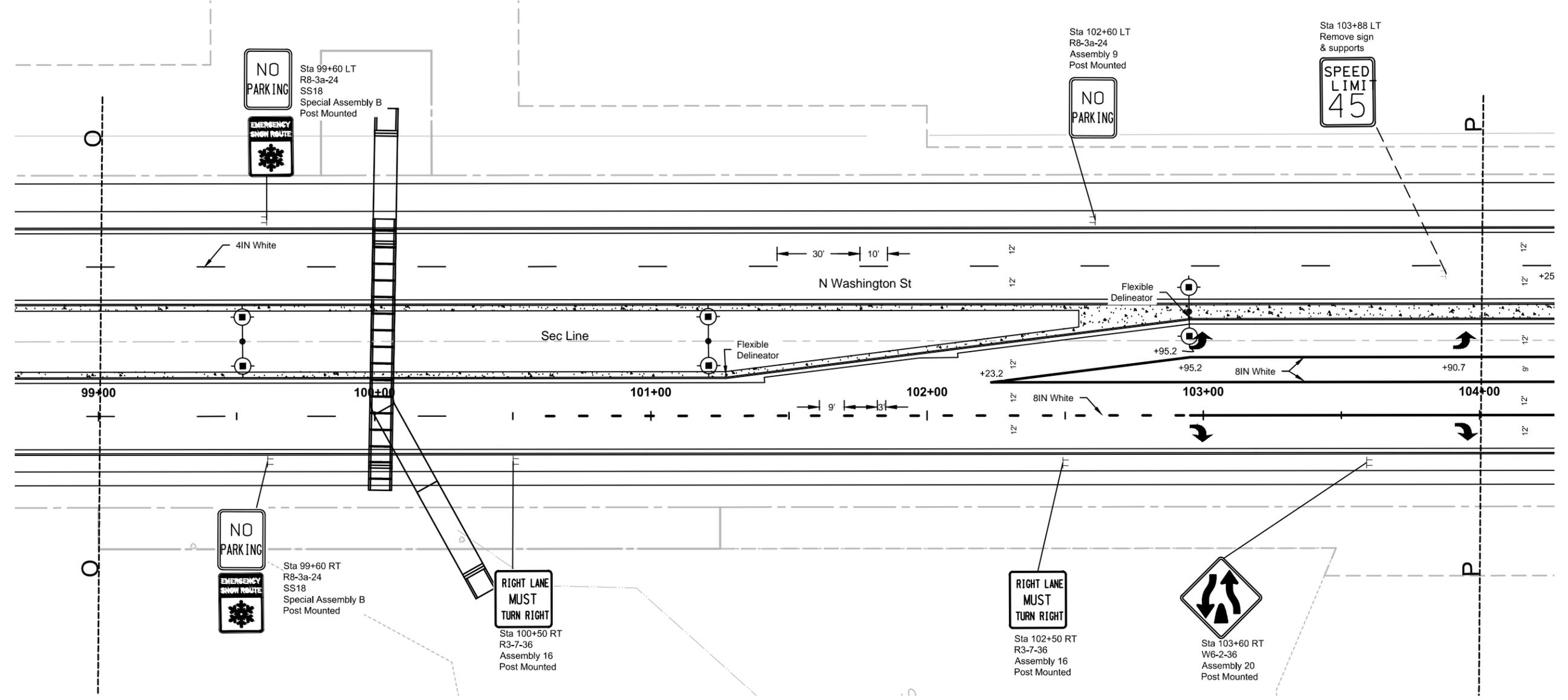


FLEXIBLE DELINEATORS - TYPE D	7 EA
Sta 94+00 to 99+00	
PREFORMED PATTERNED PVMT MK-MESSAGE (GROOVED)	16 SF
LT Arrow (1)	
PREFORMED THERMO PLASTIC PVMT MK 6IN LINE	84 LF
Crosswalk	
PREFORMED THERMO PLASTIC PVMT MK 24IN LINE	19 LF
Stop bar	
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	260 LF
White	
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	80 LF
White Channel Line	

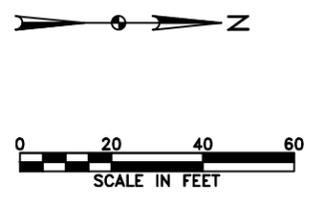
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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
<b>N Washington St</b> <b>Signing and</b> <b>Pavement Markings</b> <b>Sta 94+00-99+00</b>							
DRWN. BY	TJS	CHK'D BY	GJS	PROJECT NO.	1412129	DATE	07/2015
C:\Users\gabeschell\appdata\local\temp\AcPublish_7332\1105N_005_LSign.dwg							
© Kadmas, Lee & Jackson 2015							

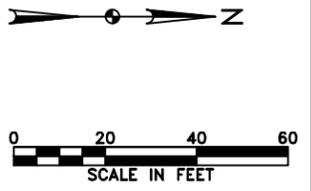
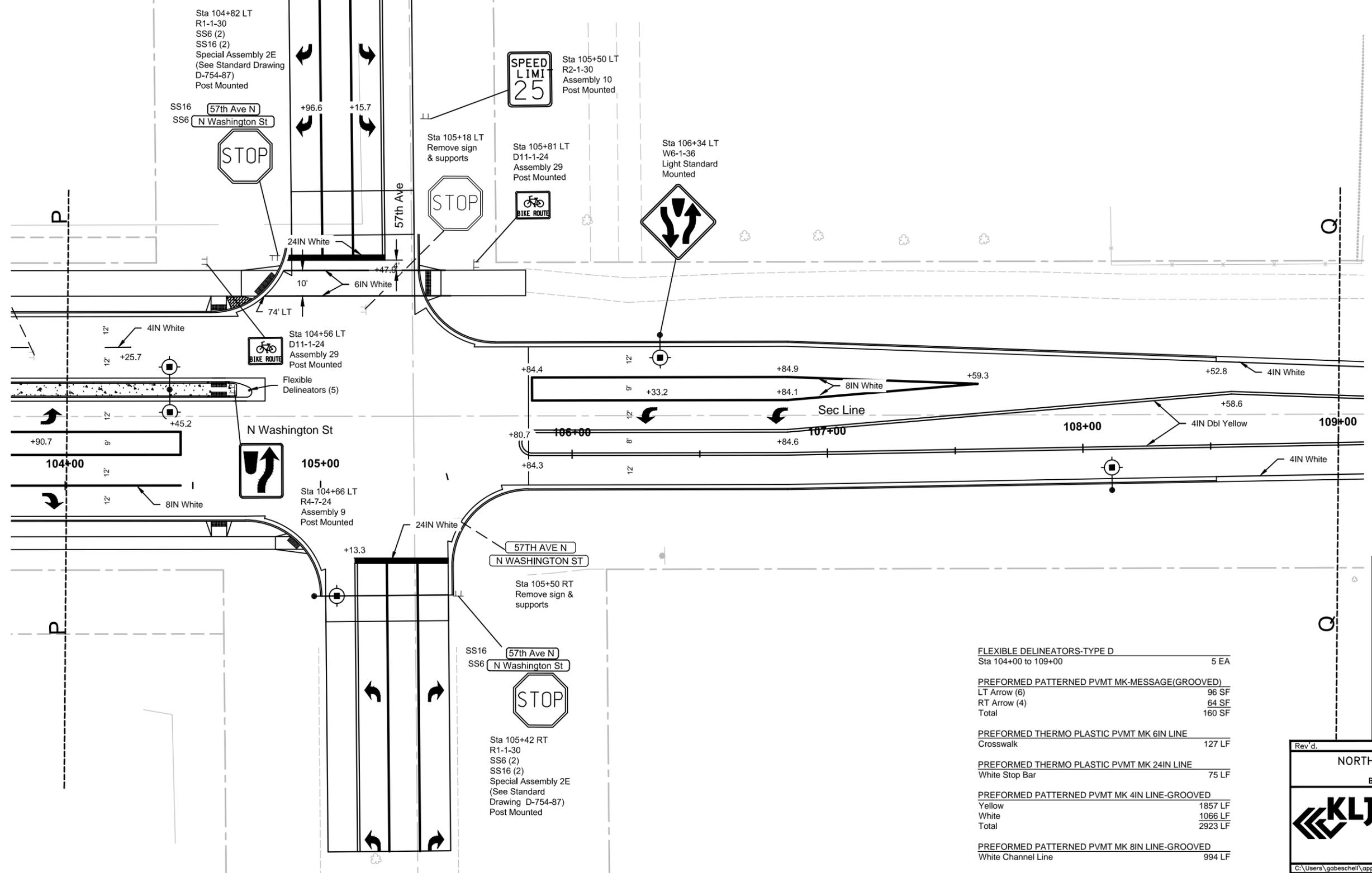


FLEXIBLE DELINEATORS-TYPE D	
Sta 99+00 to 104+00	2 EA
PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	
LT Arrow (2)	32 SF
RT Arrow (2)	32 SF
Total	64 SF
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	
White	150 LF
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	
White Channel Line	460 LF
White Lane Drop	60 LF
Total	520 LF



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N Washington St Signing and Pavement Markings Sta 99+00-104+00							
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014	TJS	GJS	1412129	02/2014
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Kadmas, Lee & Jackson 2014							

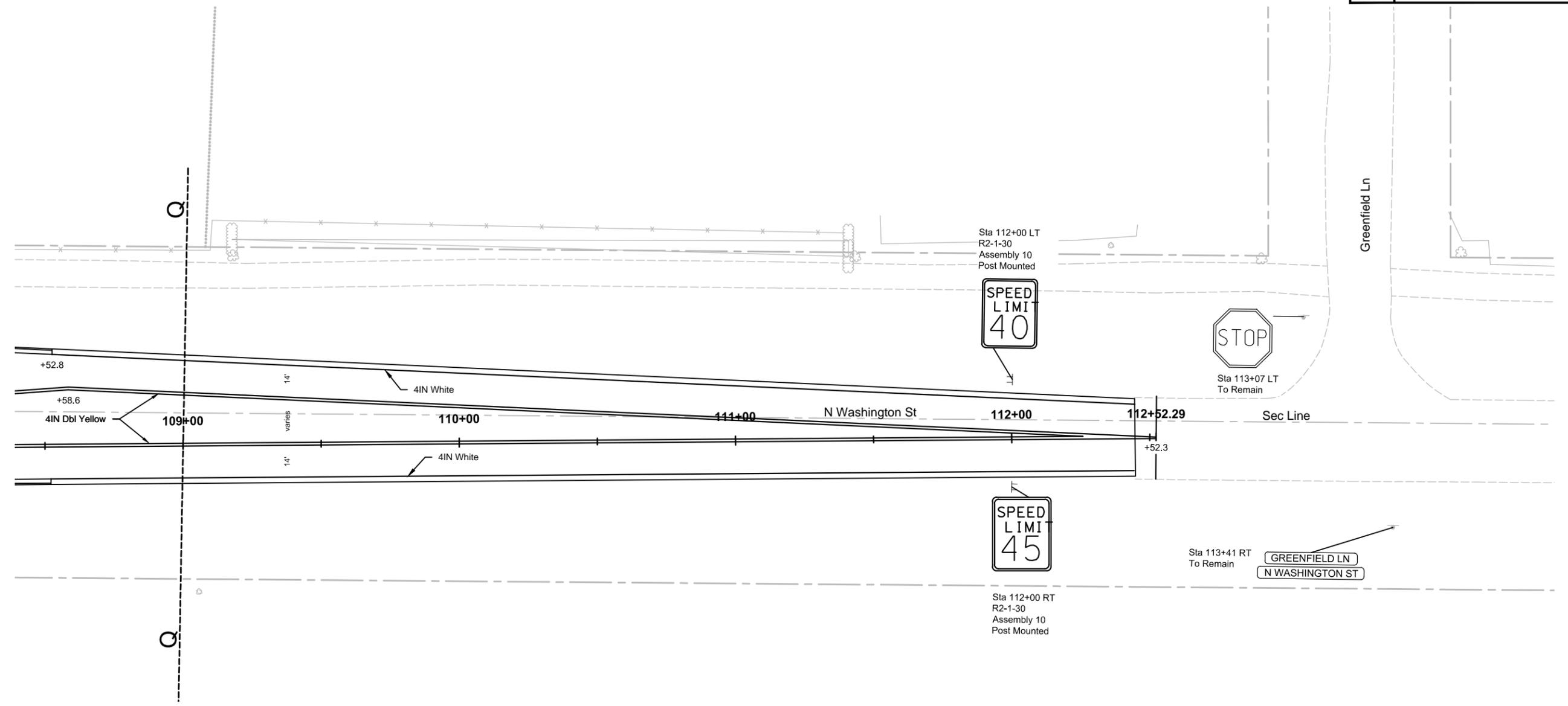


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FLEXIBLE DELINEATORS-TYPE D Sta 104+00 to 109+00	5 EA
PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED) LT Arrow (6) RT Arrow (4) Total	96 SF 64 SF 160 SF
PREFORMED THERMO PLASTIC PVMT MK 6IN LINE Crosswalk	127 LF
PREFORMED THERMO PLASTIC PVMT MK 24IN LINE White Stop Bar	75 LF
PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED Yellow White Total	1857 LF 1066 LF 2923 LF
PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED White Channel Line	994 LF

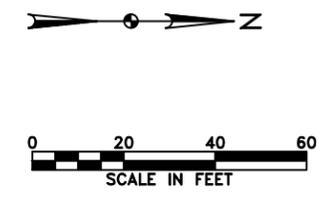
Rev'd.		Scale: 1:40 Hor, 1:10 Ver	
<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		<b>N Washington St</b> Signing and Pavement Markings Sta 104+00-109+00	
		DRWN. BY TJS	CHK'D BY GJS
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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	110	23

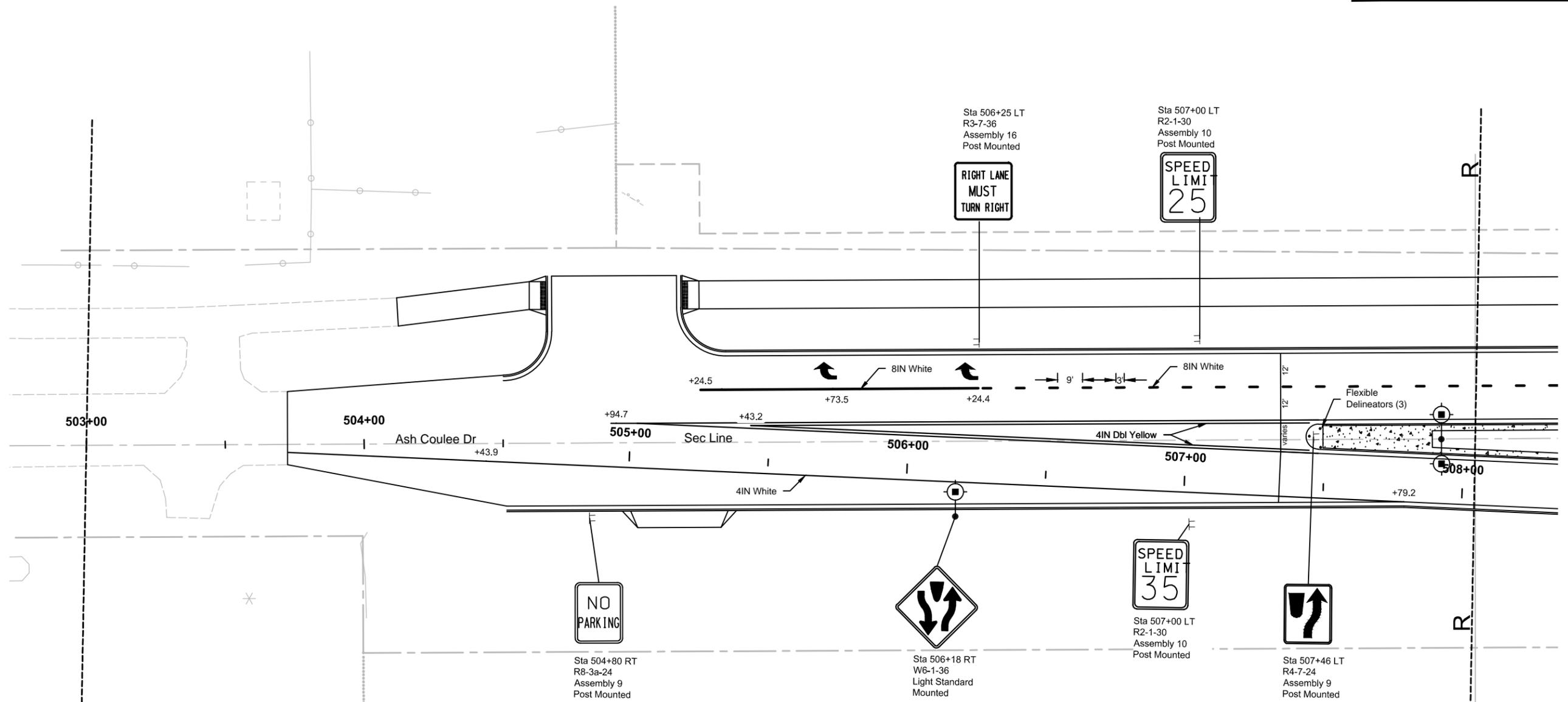


PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	
Yellow	1411 LF
White	705 LF
Total	2116 LF

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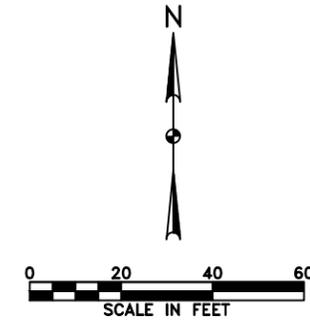


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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
 <b>N Washington St</b> <b>Signing and</b> <b>Pavement Markings</b> <b>Sta 109+00-112+50.89</b>							
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014	TJS	GJS	1412129	02/2014
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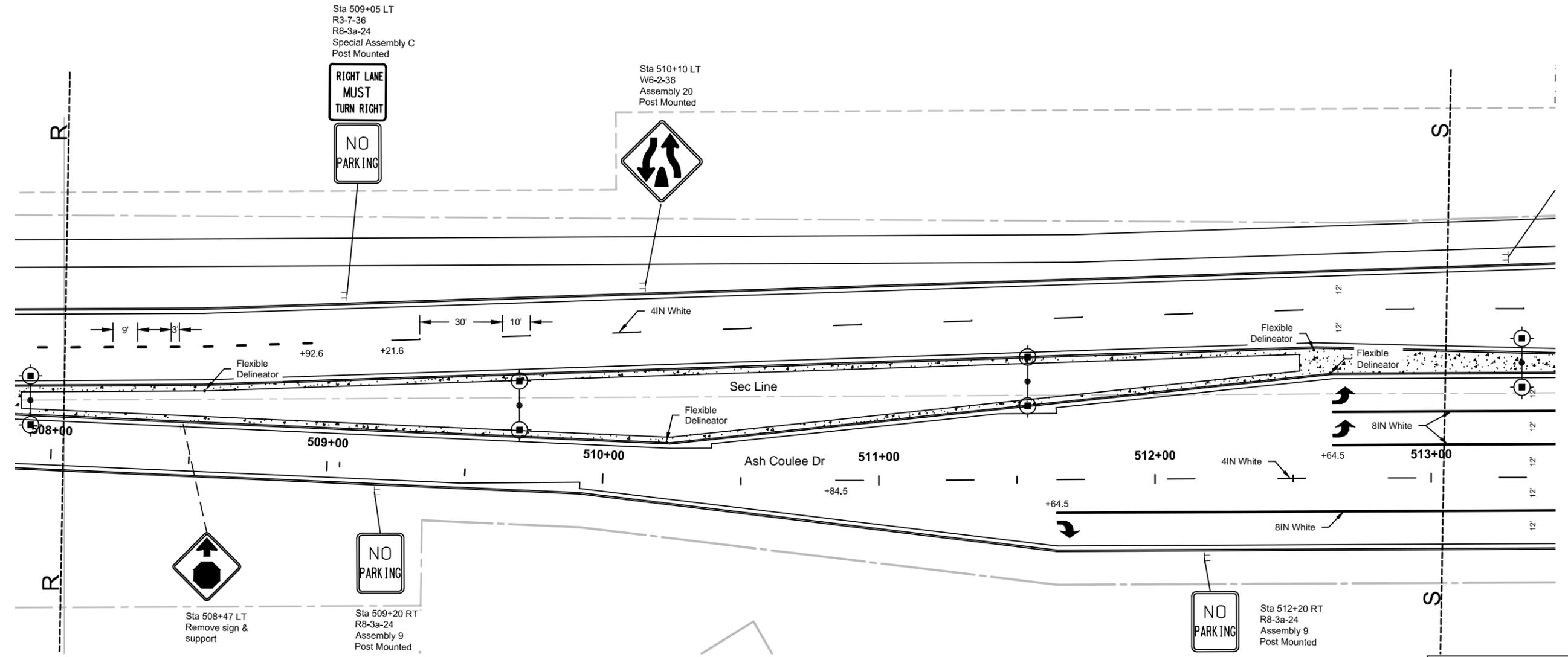


<b>FLEXIBLE DELINEATORS-TYPE D</b>	
Sta 503+00 to 508+00	3 EA
<b>PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)</b>	
RT Arrow (2)	32 SF
<b>PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED</b>	
Yellow	1012 LF
White	402 LF
Total	1414 LF
<b>PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED</b>	
White Channel Line	100 LF
White Lane Drop	45 LF
Total	145 LF

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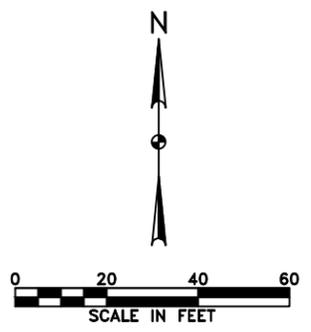


Rev'd.				Scale: 1:40 Hor, 1:10 Ver			
<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
Ash Coulee Dr/43rd Ave Signing and Pavement Markings Sta 503+00-508+00							
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014	TJS	GJS	1412129	02/2014
C:\Users\gabeschell\appdata\local\temp\AcPublish_7332\1105N_005_LSign.dwg							
© Kadmas, Lee & Jackson 2014							

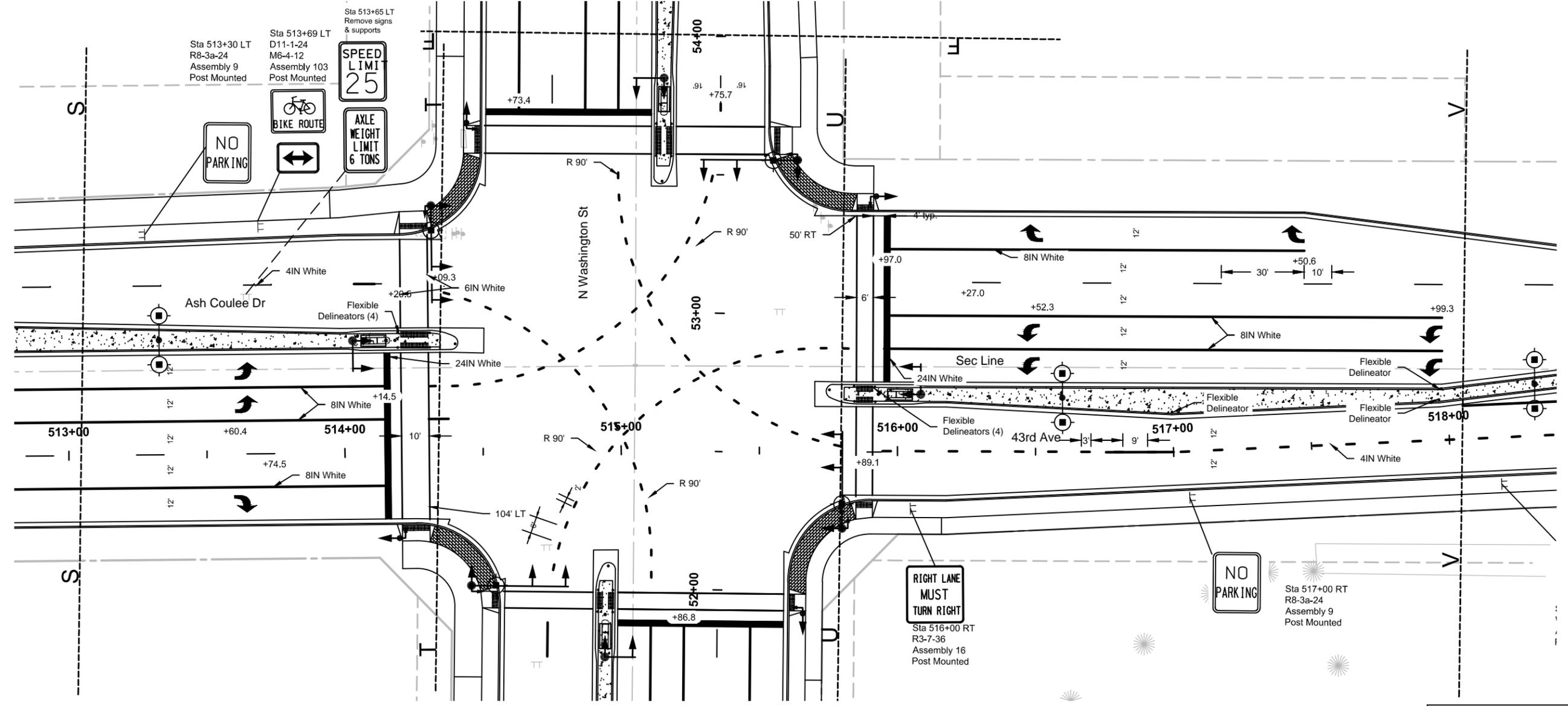


<b>FLEXIBLE DELINEATORS-TYPE D</b>	
Sta 508+00 to 513+00	4 EA
<b>PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)</b>	
LT Arrow (2)	32 SF
RT Arrow (1)	16 SF
Total	48 SF
<b>PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED</b>	
White	160 LF
<b>PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED</b>	
White Channel Line	237 LF
White Lane Drop	24 LF
Total	261 LF

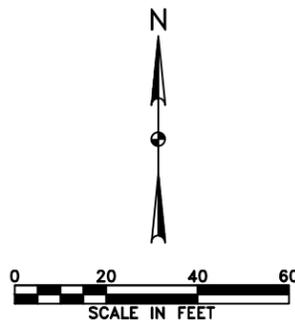
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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
<b>Ash Coulee Dr/43rd Ave</b> <b>Signing and</b> <b>Pavement Markings</b> <b>Sta 508+00-513+00</b>							
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014	TJS	GJS	1412129	02/2014
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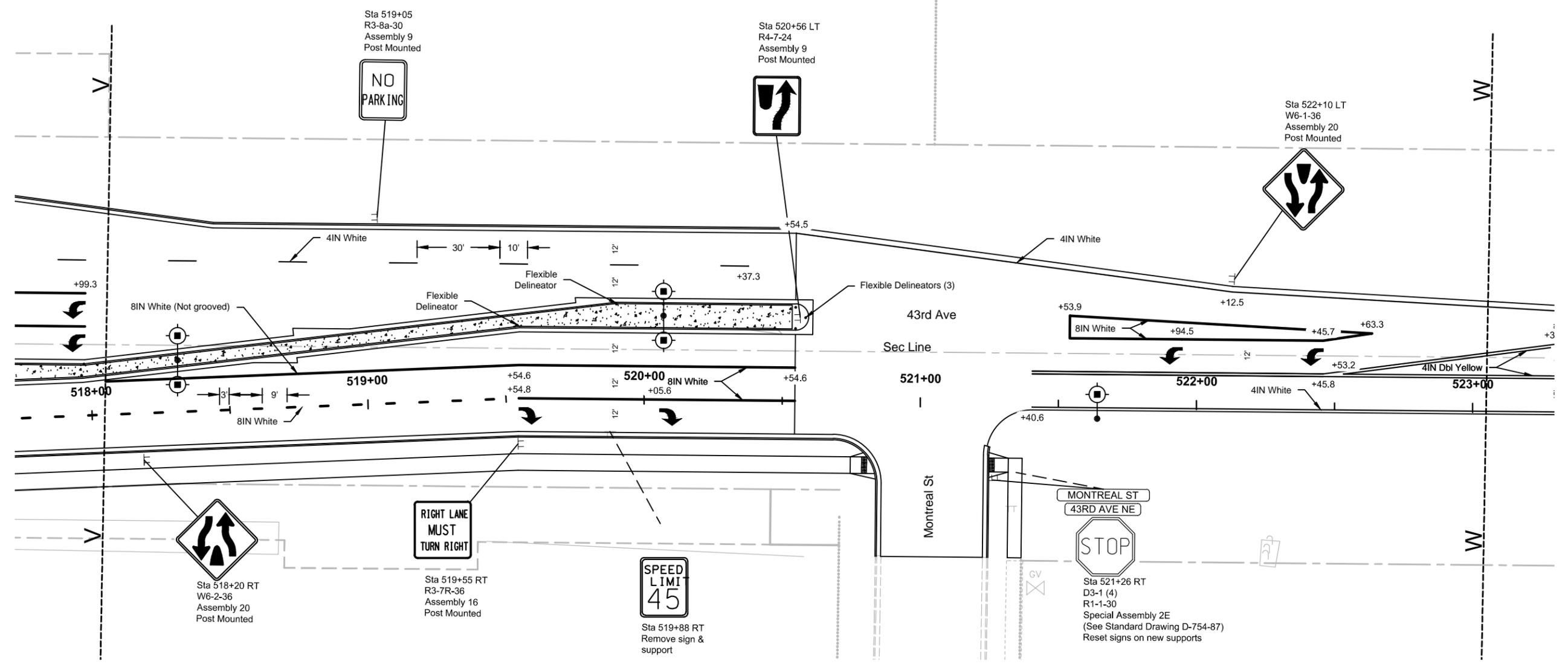


<b>FLEXIBLE DELINEATORS-TYPE D</b>	
Sta 513+00 to 518+00	11 EA
<b>PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)</b>	
LT Arrow (6)	96 SF
RT Arrow (3)	48 SF
Total	144 SF
<b>PREFORMED THERMO PLASTIC PVMT MK 6IN LINE</b>	
Crosswalk	368 LF
<b>PREFORMED THERMO PLASTIC PVMT MK 24IN LINE</b>	
White Stop Bar	120 LF
<b>PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED</b>	
White	100 LF
<b>PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED</b>	
White Channel Line	602 LF
White Dotted Extension	4 LF
White Lane Drop	54 LF
Total	660 LF



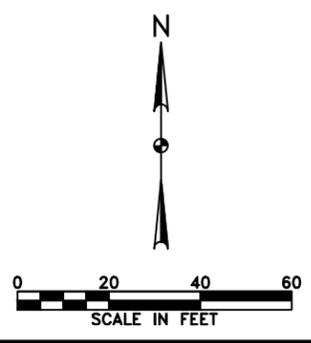
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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
<b>Ash Coulee Dr/43rd Ave</b> Signing and Pavement Markings Sta 513+00-518+00			
DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014
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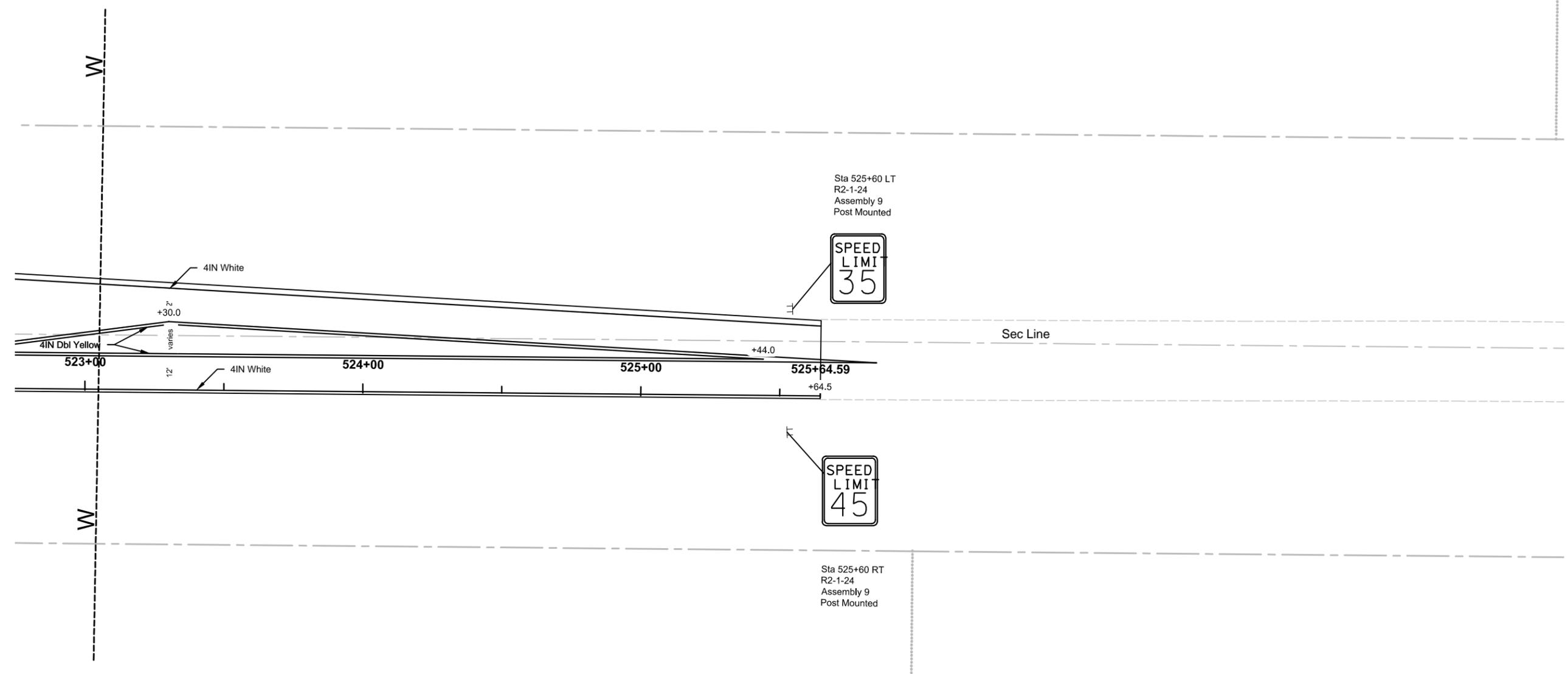
<b>FLEXIBLE DELINEATORS-TYPE D</b>	
Sta 518+00 to 523+00	5 EA
<b>PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)</b>	
LT Arrow (2)	32 SF
RT Arrow (2)	32 SF
Total	64 SF
<b>PVMT MK PAINTED 8IN LINE</b>	
Sta 518+00 to 519+55	150 LF
<b>PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED</b>	
Yellow	439 LF
White	472 LF
Total	911 LF
<b>PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED</b>	
White Channel Line	578 LF
White Lane Drop	36 LF
Total	614 LF

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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		Ash Coulee Dr/43rd Ave Signing and Pavement Markings Sta 518+00-523+00	
DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014
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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	110	28



Sta 525+60 LT  
R2-1-24  
Assembly 9  
Post Mounted

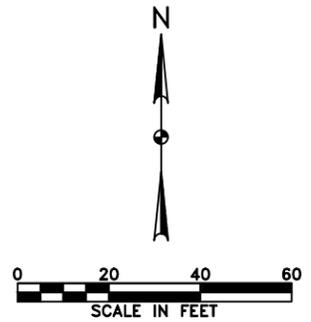


Sta 525+60 RT  
R2-1-24  
Assembly 9  
Post Mounted

PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED

Yellow	1092 LF
White	530 LF
Total	1622 LF

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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
Ash Coulee Dr/43rd Ave Signing and Pavement Markings Sta 523+00-528+00							
DRWN. BY	CHK'D BY	PROJECT NO.	DATE	DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014	TJS	GJS	1412129	02/2014
<small>C:\Users\gabeschell\appdata\local\temp\AcPublish_7332\1105N_005_LSign.dwg          © Kadmas, Lee &amp; Jackson 2014</small>							

**SIGN DETAIL**

Station: 53+55 Rt  
Area: 39.8 SF

SIGN NUMBER	SS1
WIDTH x HGHT.	12'-3" x 3'-3"
BORDER WIDTH	1"
CORNER RADIUS	2.25"
MOUNTING	Overhead
BACKGROUND	TYPE: IV Reflective COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective COLOR: White/White

SYMBOL	ROT	X	Y	WID	HT
AR_Type D	90	4.3	22.5	12	18
AR_Type D	270	124.5	4.5	12	18

Panel Style: ND\_Street\_Name\_Overhead\_Border.ssi  
Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)														LENGTH	SERIES/SIZE				
A	s	h		C	o	u	l	e	e		D	r					ClearviewHwy-2-W		
34.3	44.3	52.8	59.3	68.3	77.7	88	97.7	102.9	112.5	119.4	128.4	138.6					108.5	12/9.8	
4	3	r	d		A	v	e											ClearviewHwy-2-W	
4.3	13.5	22.6	29	35.7	44.2	54.1	63.1											65.8	12/9.8

**SIGN DETAIL**

Station: 52+01 Lt  
Area: 39.8 SF

SIGN NUMBER	SS2
WIDTH x HGHT.	12'-3" x 3'-3"
BORDER WIDTH	1"
CORNER RADIUS	2.25"
MOUNTING	Overhead
BACKGROUND	TYPE: IV Reflective COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective COLOR: White/White

SYMBOL	ROT	X	Y	WID	HT
AR_Type D	270	124.7	22.5	12	18
AR_Type D	90	4.7	4.5	12	18

Panel Style: ND\_Street\_Name\_Overhead\_Border.ssi  
Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)														LENGTH	SERIES/SIZE					
A	s	h		C	o	u	l	e	e		D	r						ClearviewHwy-2-W		
4.3	14.3	22.8	29.2	38.2	47.7	57.9	67.7	72.9	82.4	89.4	98.4	108.6						108.5	12/9.8	
4	3	r	d		A	v	e												ClearviewHwy-2-W	
34.8	44	53.1	59.4	66.2	74.7	84.6	93.6												65.8	12/9.8

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Rev'd. Scale: 1:40 Hor, 1:10 Ver

NORTH WASHINGTON STREET  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

Permanent Signing & Markings Sign Details

DRWN BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014

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SIGN DETAIL

Station:  
52+53 Rt  
53+30 Lt  
86+40 Rt  
87+13 Lt  
  
Area: 22.5 SF

SIGN NUMBER	SS3
WIDTH x HGHT.	11'-3" x 2'-0"
BORDER WIDTH	1"
CORNER RADIUS	2.25"
MOUNTING	Overhead
BACKGROUND	TYPE: IV Reflective COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective COLOR: White/White



SYMBOL	ROT	X	Y	WID	HT

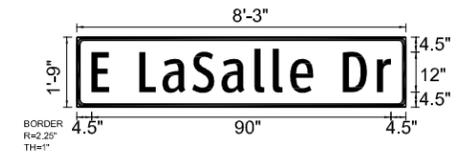
Panel Style: ND\_Street\_Name\_Overhead\_Border.ssi  
Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIES/SIZE			
N	W	a	s	h	i	n	g	t	o	n	S	t				ClearviewHwy-2-W	
4.4	12	20.7	35	44.1	52.6	62.2	67.5	77	86.3	92.8	103.1	109.5	117.9	126.3		126.1	12/9.8

SIGN DETAIL  
1:40

Station:  
87+33 Rt  
  
Area: 14.4 SF

SIGN NUMBER	SS5
WIDTH x HGHT.	8'-3" x 1'-9"
BORDER WIDTH	1"
CORNER RADIUS	2.25"
MOUNTING	Overhead
BACKGROUND	TYPE: Reflective COLOR: Green
LEGEND/BORDER	TYPE: Reflective COLOR: White/White



SYMBOL	ROT	X	Y	WID	HT

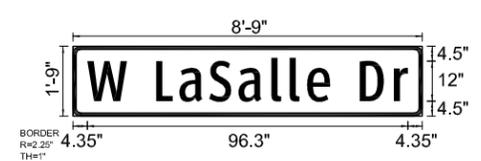
Panel Style: ND\_Street\_Name\_Overhead\_Border.ssi  
Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIES/SIZE			
E	L	a	S	a	l	l	e		D	r						ClearviewHwy-2-W	
4.5	9.8	18.8	25.8	34.8	43.5	53.5	59	64.2	71.1	80.1	90.3					90	12/9.8

SIGN DETAIL

Station:  
86+45 Lt  
  
Area: 15.3 SF

SIGN NUMBER	SS4
WIDTH x HGHT.	8'-9" x 1'-9"
BORDER WIDTH	1"
CORNER RADIUS	2.25"
MOUNTING	Overhead
BACKGROUND	TYPE: IV Reflective COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective COLOR: White/White



SYMBOL	ROT	X	Y	WID	HT

Panel Style: ND\_Street\_Name\_Overhead\_Border.ssi  
Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIES/SIZE			
W	L	a	S	a	l	l	e		D	r						ClearviewHwy-2-W	
4.3	16.3	25	32	41	49.7	59.7	65.2	70.4	77.3	86.3	96.5					96.3	12/9.8

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Rev'd. Scale: 1:40 Hor, 1:10 Ver

NORTH WASHINGTON STREET  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

Permanent Signing & Markings Sign Details

DRWN BY TJS	CHK'D BY GJS	PROJECT NO. 1412129	DATE 02/2014
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J:\trans\1412129\CADD\110SN\_020\_LSign\_Detail.dwg  
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SIGN DETAIL

Station:  
37+59 Lt  
38+03 Rt  
Area: 11.8 SF



SIGN NUMBER	SS9
WIDTH x HGHT.	6'-9" x 1'-9"
BORDER WIDTH	0"
CORNER RADIUS	0"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective COLOR: White/Green

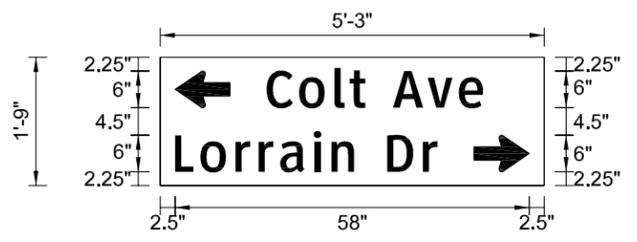
SYMBOL	ROT	X	Y	WID	HT
AR_Type D	90	2.4	12.8	6	9
AR_Type D	270	69.6	2.2	6	9

Panel Style: ND\_Street\_Name\_Conv.ssi  
Dimensions are in inches.tenths  
Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIES/SIZE			
B	u	c	k	s	k	i	n		A	v	e					ClearviewHwy-3-W	
17.4	22.9	28.1	33.1	37.6	42.5	47.4	50.3	54.1	58.9	64.6	69.7					56.3	6/4.9
V	e	r	s	a	i	l	l	e	s		A	v	e				ClearviewHwy-3-W
2.4	8	13.5	16.9	21.6	27	29.9	33	35.8	40.9	44.4	48.9	54.6	59.7			61.3	6/4.9

SIGN DETAIL

Station:  
45+06 Lt  
45+52 Rt  
Area: 9.2 SF



SIGN NUMBER	SS11
WIDTH x HGHT.	5'-3" x 1'-9"
BORDER WIDTH	0"
CORNER RADIUS	0"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective COLOR: White/Green

SYMBOL	ROT	X	Y	WID	HT
AR_Type D	90	2.5	12.7	6	9
AR_Type D	270	51.5	2.2	6	9

Panel Style: ND\_Street\_Name\_Conv.ssi  
Dimensions are in inches.tenths  
Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIES/SIZE			
C	o	l	t		A	v	e									ClearviewHwy-3-W	
17.5	22.8	28.6	31.1	33.7	38.2	43.9	49									35.5	6/4.9
L	o	r	r	a	i	n		D	r								ClearviewHwy-3-W
2.5	6.6	12.3	16.2	19.7	25.2	28.1	31.8	37.2	43.1							43	6/4.9

SIGN DETAIL

Station:  
37+59 Lt  
38+03 Rt  
Area: 11.8 SF



SIGN NUMBER	SS10
WIDTH x HGHT.	6'-9" x 1'-9"
BORDER WIDTH	0"
CORNER RADIUS	0"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective COLOR: White/Green

SYMBOL	ROT	X	Y	WID	HT
AR_Type D	270	64.7	12.7	6	9
AR_Type D	90	2.4	2.2	6	9

Panel Style: ND\_Street\_Name\_Conv.ssi  
Dimensions are in inches.tenths  
Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIES/SIZE			
B	u	c	k	s	k	i	n		A	v	e					ClearviewHwy-3-W	
2.4	7.9	13.1	18.1	22.6	27.5	32.4	35.3	39.1	43.9	49.6	54.7					56.3	6/4.9
V	e	r	s	a	i	l	l	e	s		A	v	e				ClearviewHwy-3-W
17.4	23	28.5	31.9	36.6	42	44.9	48	50.8	55.9	59.4	63.9	69.6	74.7			61.3	6/4.9

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Rev'd. Scale: 1:40 Hor, 1:10 Ver

NORTH WASHINGTON STREET  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

Permanent Signing & Markings Sign Details

DRWN BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014

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**SIGN DETAIL**

Station:  
45+06 Lt  
45+52 Rt  
Area: 9.2 SF

SIGN NUMBER	SS12
WIDTH x HGHT.	5'-3" x 1'-9"
BORDER WIDTH	0"
CORNER RADIUS	0"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective COLOR: White/Green

SYMBOL	ROT	X	Y	WID	HT
AR_Type D	270	44	12.7	6	9
AR_Type D	90	2.5	2.2	6	9

Panel Style: ND\_Street\_Name\_Conv.ssi  
Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIES/SIZE				
C	o	l	t		A	v	e										ClearviewHwy-3-W	
2.5	7.8	13.6	16.1	18.7	23.2	28.9	34										35.5	6/4.9
L	o	r	r	a	i	n		D	r									ClearviewHwy-3-W
17.5	21.6	27.3	31.2	34.7	40.2	43.1	46.8	52.2	58.1								43	6/4.9

**SIGN DETAIL**

Station:  
64+74 Lt  
65+21 Rt  
Area: 10.1 SF

SIGN NUMBER	SS14
WIDTH x HGHT.	5'-9" x 1'-9"
BORDER WIDTH	0"
CORNER RADIUS	0"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective COLOR: White/Green

SYMBOL	ROT	X	Y	WID	HT
AR_Type D	90	2.6	12.8	6	9
AR_Type D	270	57.4	2.2	6	9

Panel Style: ND\_Street\_Name\_Conv.ssi  
Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIES/SIZE					
S	l	a	t	e		D	r											ClearviewHwy-3-W	
17.6	22.8	25.7	30.7	34.5	38.5	43.7	49.5											34.4	6/4.9
D	u	r	a	n	g	o		D	r										ClearviewHwy-3-W
2.6	8.4	13.9	17.5	23	28.3	33.8	38	43.2	49									48.9	6/4.9

**SIGN DETAIL**

Station:  
64+74 Lt  
65+21 Rt  
Area: 10.1 SF

SIGN NUMBER	SS13
WIDTH x HGHT.	5'-9" x 1'-9"
BORDER WIDTH	0"
CORNER RADIUS	0"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective COLOR: White/Green

SYMBOL	ROT	X	Y	WID	HT
AR_Type D	270	42.9	12.7	6	9
AR_Type D	90	2.6	2.2	6	9

Panel Style: ND\_Street\_Name\_Conv.ssi  
Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)													LENGTH	SERIES/SIZE					
S	l	a	t	e		D	r											ClearviewHwy-3-W	
2.6	7.8	10.7	15.7	19.5	23.5	28.7	34.5											34.4	6/4.9
D	u	r	a	n	g	o		D	r										ClearviewHwy-3-W
17.6	23.4	28.9	32.5	38	43.3	48.8	53	58.2	64									48.9	6/4.9

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**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

Permanent Signing & Markings Sign Details

DRWN BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014

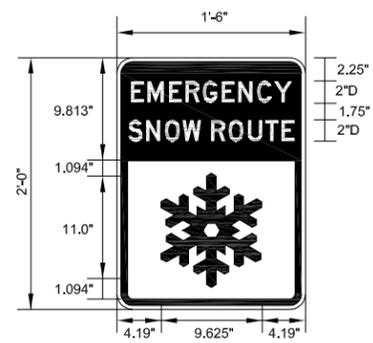
J:\trans\1412129\CADD\110SN\_020\_LSign\_Detail.dwg  
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SIGN DETAIL

Upper Section:  
White Legend with Red Background  
Lower Section:  
Red Legend/Border with White Background

BORDER  
R=1.5"  
TH=0.38"  
IN=0.63"



Station:  
28+44 LT  
29+98 RT  
57+60 LT  
57+60 RT  
84+60 LT  
84+60 RT  
99+60 LT  
99+60 RT  
Area: 3.0 SF

SIGN NUMBER	SS18
WIDTH x HGHT.	1'-6" x 2'-0"
BORDER WIDTH	0.38"
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: White/White
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White,Red/Red

SYMBOL	ROT	X	Y	WID	HT

Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

LETTER POSITIONS (X)										LENGTH	SERIES/SIZE
E	M	E	R	G	E	N	C	Y			D 2000
1.3	2.9	4.9	6.5	8.2	10.0	11.6	13.3	15.0		15.4	2
S	N	O	W		R	O	U	T	E		D 2000
1.1	2.8	4.6	6.2	8.1	9.0	10.6	12.5	14.2	15.7	16.9	2

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NORTH WASHINGTON STREET  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

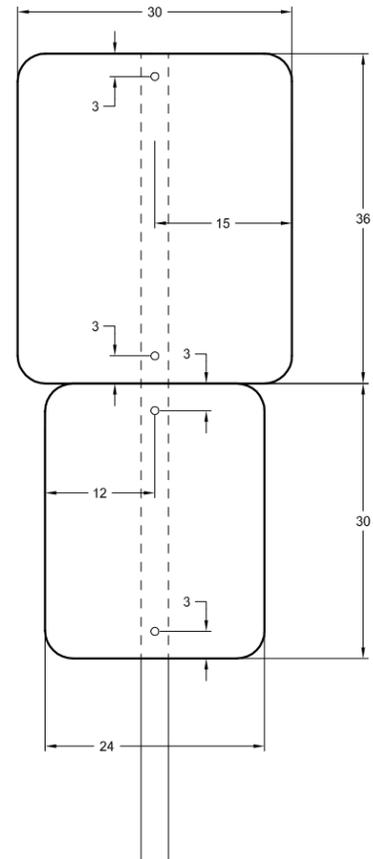


Permanent Signing & Markings Sign Details

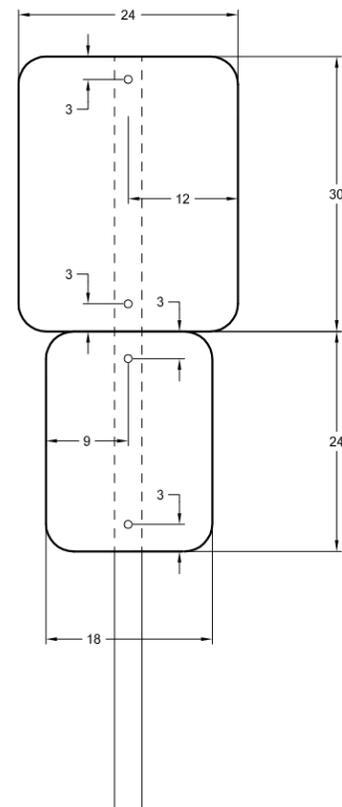
DRWN. BY	CHK'D BY	PROJECT NO.	DATE
TJS	GJS	1412129	02/2014

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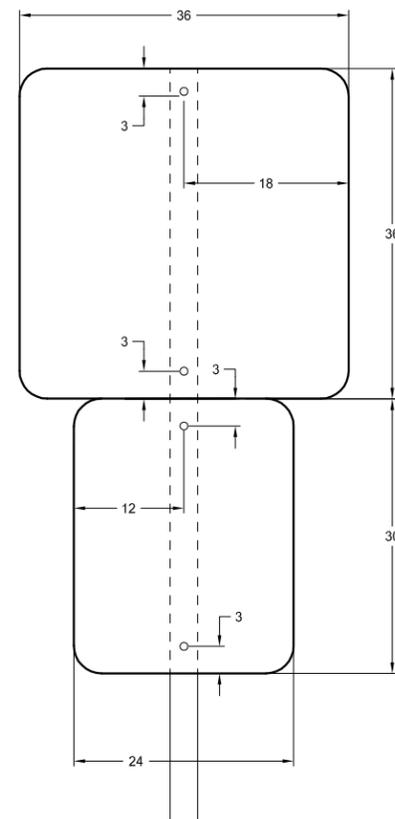
STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	110	36



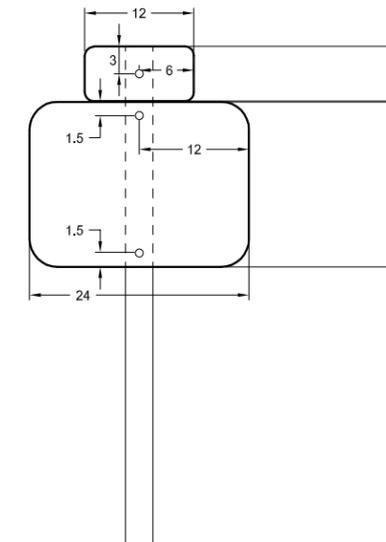
SPECIAL ASSEMBLY A  
AREA= 12.5 SF (DESIGN)  
(PERFORATED STEEL TUBE)



SPECIAL ASSEMBLY B  
AREA= 8.0 SF (DESIGN)  
(PERFORATED STEEL TUBE)



SPECIAL ASSEMBLY C  
AREA= 14.0 SF (DESIGN)  
(PERFORATED STEEL TUBE)



SPECIAL ASSEMBLY D  
AREA= 3.5 SF (DESIGN)  
(PERFORATED STEEL TUBE)

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Rev'd.		Scale: 1:40 Hor, 1:10 Ver	
NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		Permanent Signing & Markings Special Assemblies	
DRWN. BY ANG	CHK'D BY GJS	PROJECT NO. 1412129	DATE 07/2014
J:\trans\1412129\CADD\110SN_020_LSign_Detail.dwg © Kadmas, Lee & Jackson 2014			

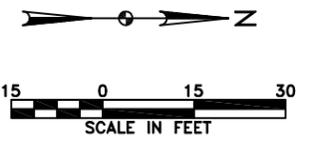
STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	130	1

**ATTENUATING CRASH CUSHION TL-2**

STA 51+83 40.5' LT	1 EA
STA 52+71 65.6' RT	1 EA
STA 52+90 125.1' LT	1 EA
STA 53+77 20.5' LT	1 EA
<b>TOTAL</b>	<b>4 EA</b>

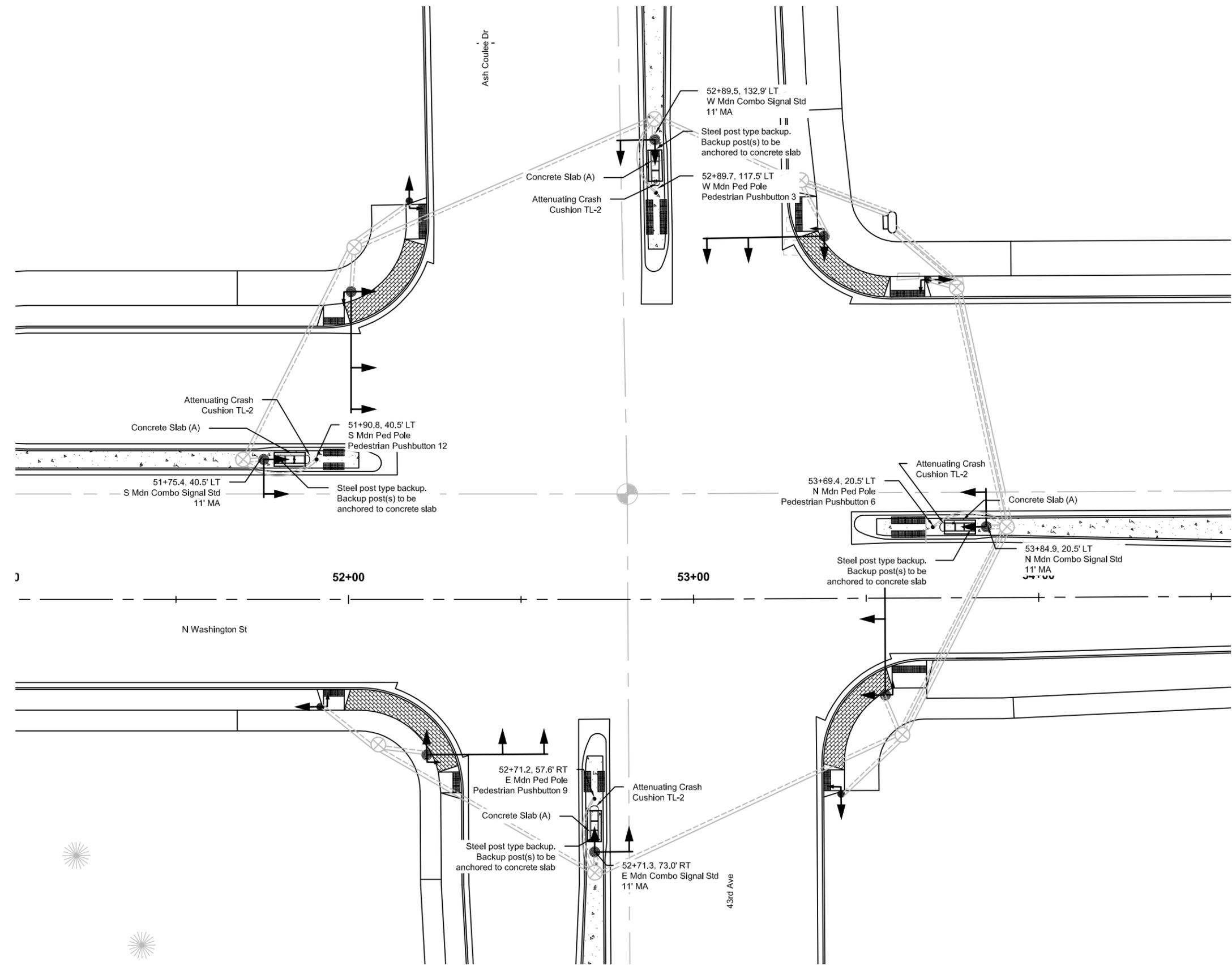
(A) The concrete slab shall be installed in accordance with the crash cushion manufacturer's recommendations.

All costs for installing the concrete slab shall be included in the price bid for the item "Attenuating Crash Cushion TL-2"



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Rev'd.	Scale: 1:30 Hor, 1:10 Ver		
<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
<b>Crash Cushion Layout</b>			
DRWN. BY ANG	CHK'D BY GJS	PROJECT NO. 1412129	DATE 07/2014
<small>C:\Users\gabeschell\appdata\local\temp\AcPublish_7396\130CC_001_CCushion.dwg          © Kadmas, Lee &amp; Jackson 2014</small>			

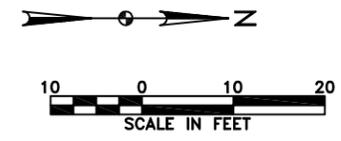


STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	130	2

<b>ATTENUATING CRASH CUSHION TL-2</b>	
STA 86+17, 37.5' LT	1 EA
STA 87+41, 16.5' LT	1 EA
<b>TOTAL</b>	<b>2 EA</b>

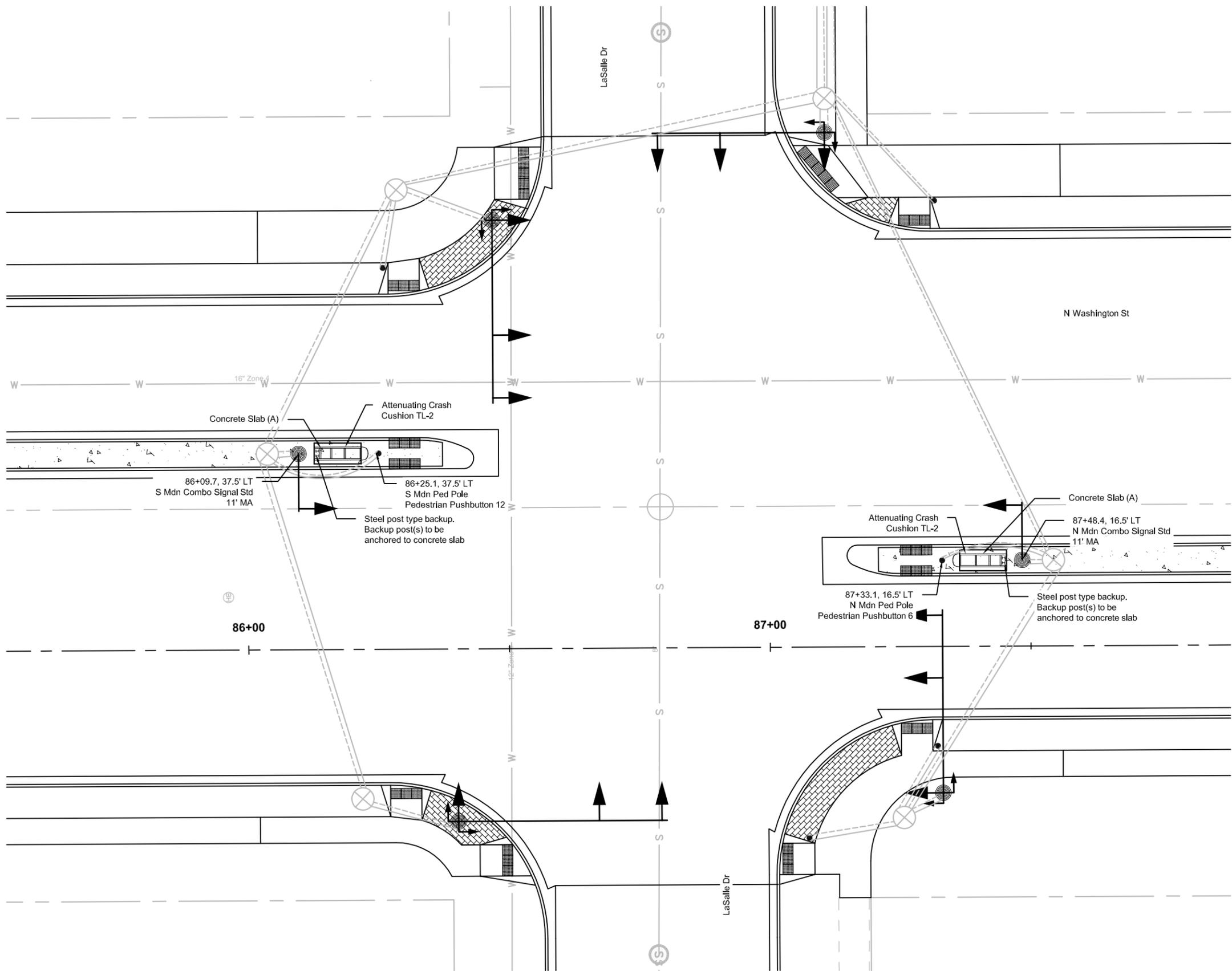
(A) The concrete slab shall be installed in accordance with the crash cushion manufacturer's recommendations.

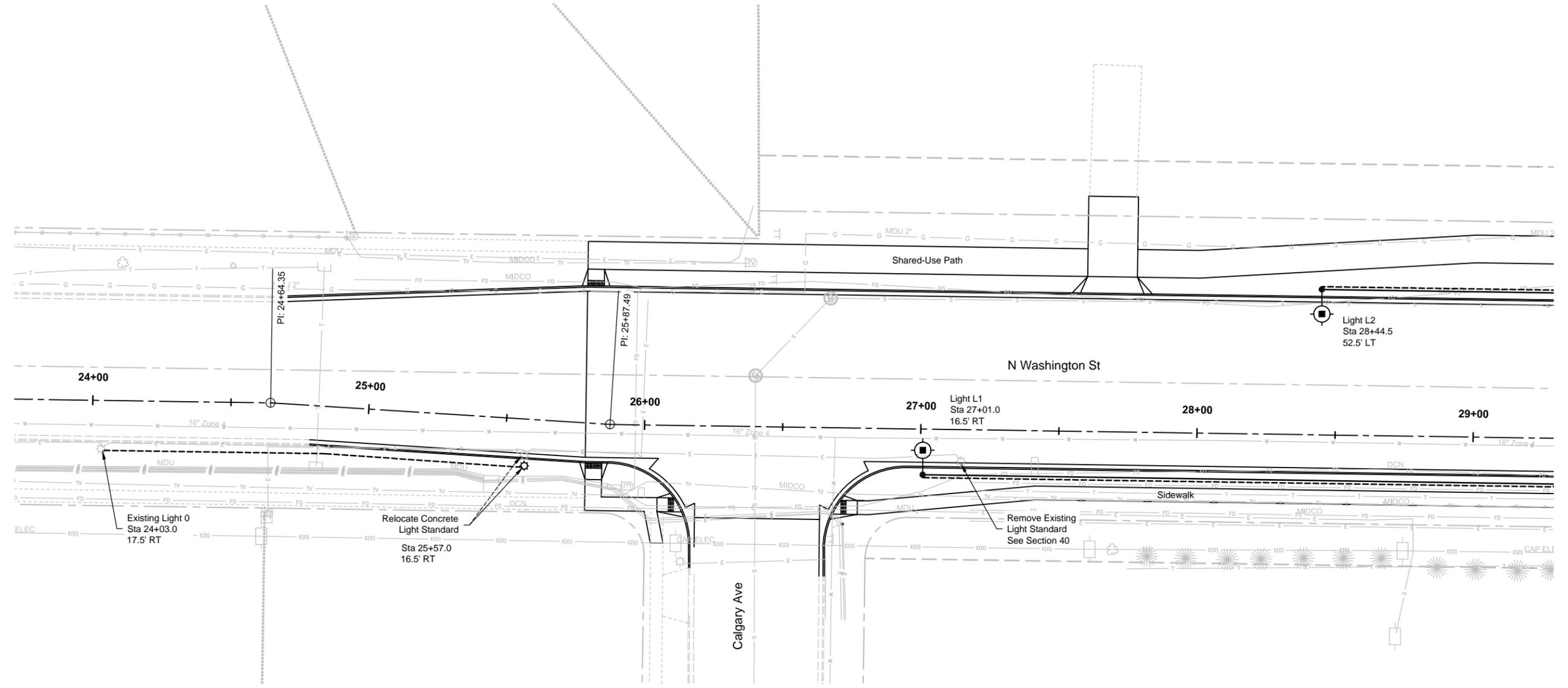
All costs for installing the concrete slab shall be included in the price bid for the item "Attenuating Crash Cushion TL-2"



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Rev'd.		Scale: 1:20 Hor, 1:10 Ver	
<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		Crash Cushion Layout	
DRWN. BY	CHK'D BY	PROJECT NO.	DATE
ANG	GJS	1412129	08/2014
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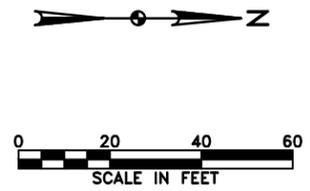




LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Existing Light 0 to Relocated Light 1	24+03.0, 17.5' RT to 25+57.0, 16.5' RT			318	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L1 to Light L3	27+01.0, 16.5' RT to 29+97.6, 16.5' RT	297	2"	610	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L2 to Light L4	28+44.5, 52.5' RT to 31+32.7, 52.5' LT	292	2"	600	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

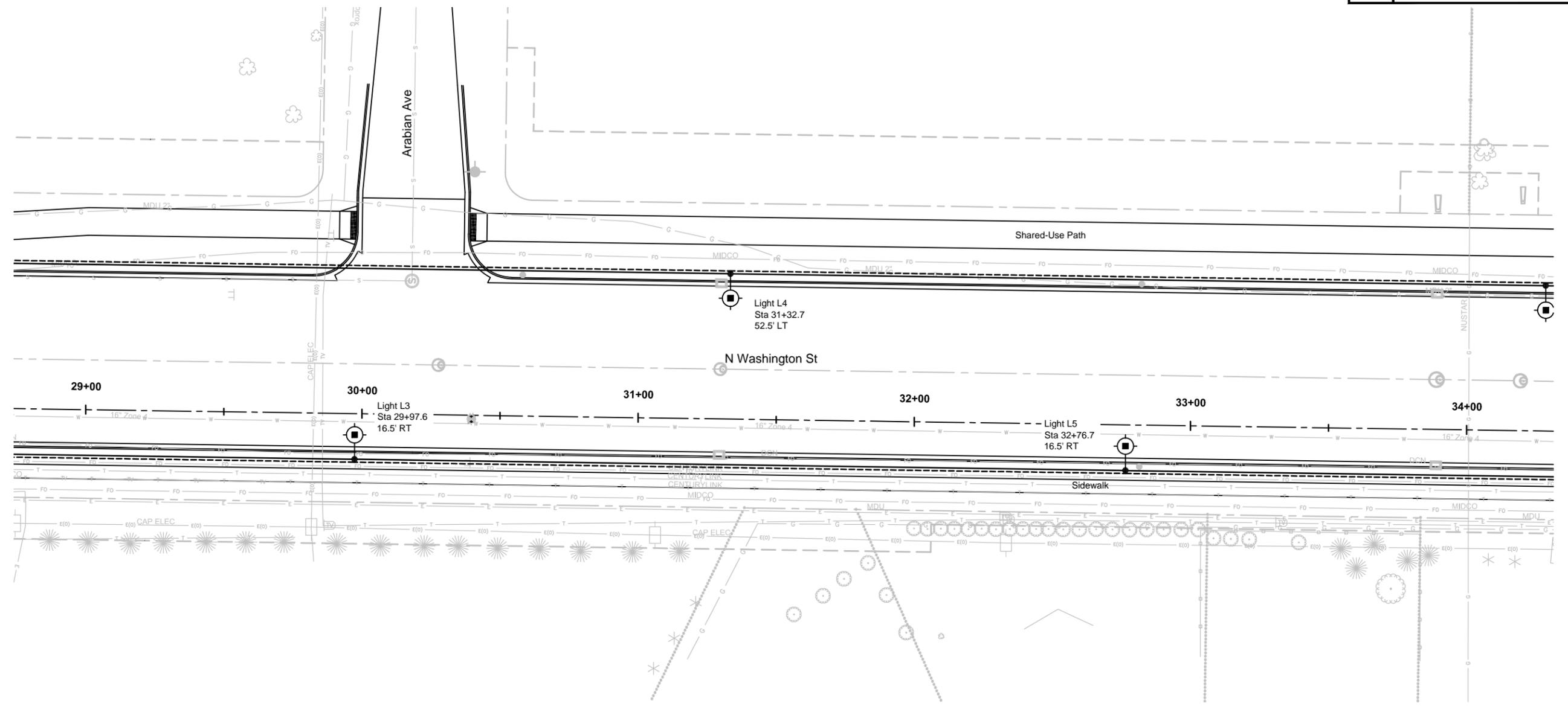
LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L1, L2	LED	III	Round Tapered Steel	40'	6'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

- CONCRETE FOUNDATION - HIGHWAY LIGHTING  
Sta 24+00 to 29+00 2 EA
- CABLE TRENCH-TYPE I  
Sta 24+03 to 25+57 151 LF
- 2IN DIAMETER RIGID CONDUIT  
Sta 24+03 to 31+33 589 LF
- UNDERGROUND CONDUCTOR NO2-TYPE RHW  
Sta 24+03 to 31+33 1528 LF
- UNDERGROUND CONDUCTOR NO4-TYPE THW  
Sta 24+03 to 31+33 764 LF
- LT STD 6FT MA 40FT MT HT BREAKAWAY  
Sta 24+00 to 29+00 2 EA
- LED LUMINAIRE - 150 WATT  
Sta 24+00 to 29+00 2 EA
- RELOCATE CONCRETE LIGHT STANDARD  
Sta 25+57, RT 1 EA



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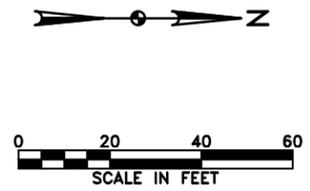
<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA  <b>N Washington St Lighting Layout</b> Sta 24+00-29+00	
DRAWN BY: JE CH'D BY: CH PROJECT NO: 1412129 DATE: 03/2014	J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg © Kadmas, Lee & Jackson 2014	



LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPER
Light L3 to Light L5	29+97.6, 16.5' RT to 32+76.7, 16.5' RT	279	2"	574	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L5 to Light L7	32+76.7, 16.5' RT to 35+66.9, 16.5' RT	290	2"	596	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L4 to Light L6	31+32.7, 52.5' LT to 34+27.9, 52.5' LT	295	2"	606	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

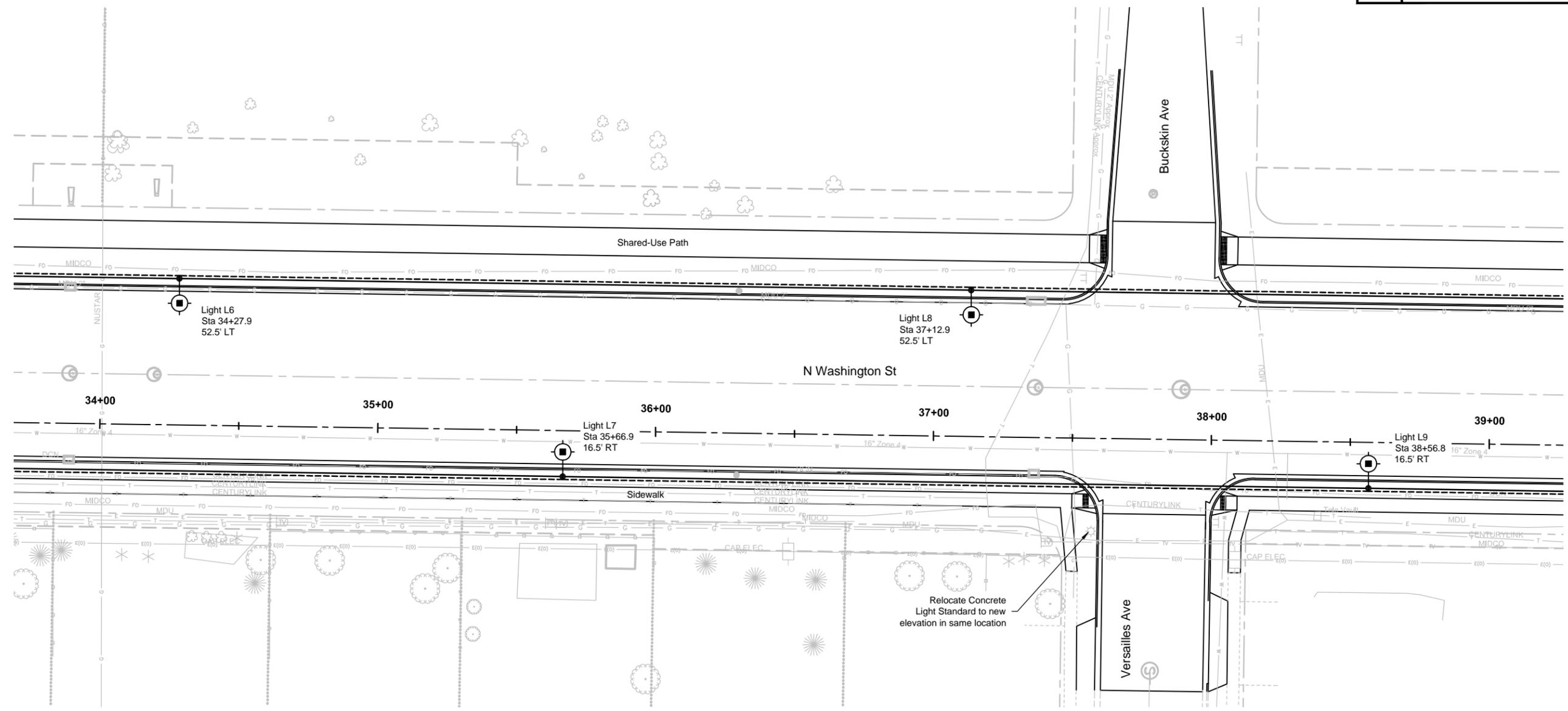
LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPER	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L3, L4, L5	LED	III	Round Tapered Steel	40'	6'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

- CONCRETE FOUNDATION - HIGHWAY LIGHTING  
Sta 29+00 to 34+00 3 EA
- 2IN DIAMETER RIGID CONDUIT  
Sta 29+98 to 35+67 864 LF
- UNDERGROUND CONDUCTOR NO2-TYPE RHW  
Sta 29+98 to 35+67 1776 LF
- UNDERGROUND CONDUCTOR NO4-TYPE THW  
Sta 29+98 to 35+67 888 LF
- LT STD 6FT MA 40FT MT HT BREAKAWAY  
Sta 29+00 to 34+00 3 EA
- LED LUMINAIRE - 150 WATT  
Sta 29+00 to 34+00 3 EA



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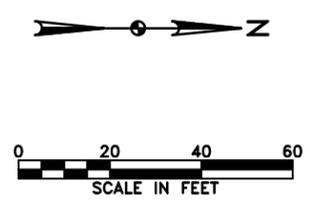
<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA 	
<b>N Washington St Lighting Layout</b> Sta 29+00-34+00		
DRWN. BY JE	CH'D BY CH	PROJECT NO. 1412129
		DATE 03/2014
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LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Light L6 to Light L8	34+27.9, 52.5' LT to 37+12.9, 52.5' LT	286	2"	588 294	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L8 to Light L10	37+12.9, 52.5' LT to 40+07.9, 52.5' LT	294	2"	604 302	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L7 to Light L9	35+66.9, 16.5' RT to 38+56.8, 16.5' RT	290	2"	596 298	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L9 to Light L11	38+56.8, 16.5' RT to 41+66.5, 16.5' RT	310	2"	636 318	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L6, L7, L8, L9	LED	III	Round Tapered Steel	40'	6'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

- CONCRETE FOUNDATION - HIGHWAY LIGHTING  
Sta 34+00 to 39+00 4 EA
- 2IN DIAMETER RIGID CONDUIT  
Sta 34+28 to 41+67 1180 LF
- UNDERGROUND CONDUCTOR NO2-TYPE RHW  
Sta 34+28 to 41+67 2424 LF
- UNDERGROUND CONDUCTOR NO4-TYPE THW  
Sta 34+28 to 41+67 1212 LF
- LT STD 6FT MA 40FT MT HT BREAKAWAY  
Sta 34+00 to 39+00 4 EA
- LED LUMINAIRE - 150 WATT  
Sta 34+00 to 39+00 4 EA
- RELOCATE CONCRETE LIGHT STANDARD  
Sta 37+57 RT 1 EA



**Legend**

LED Luminaire

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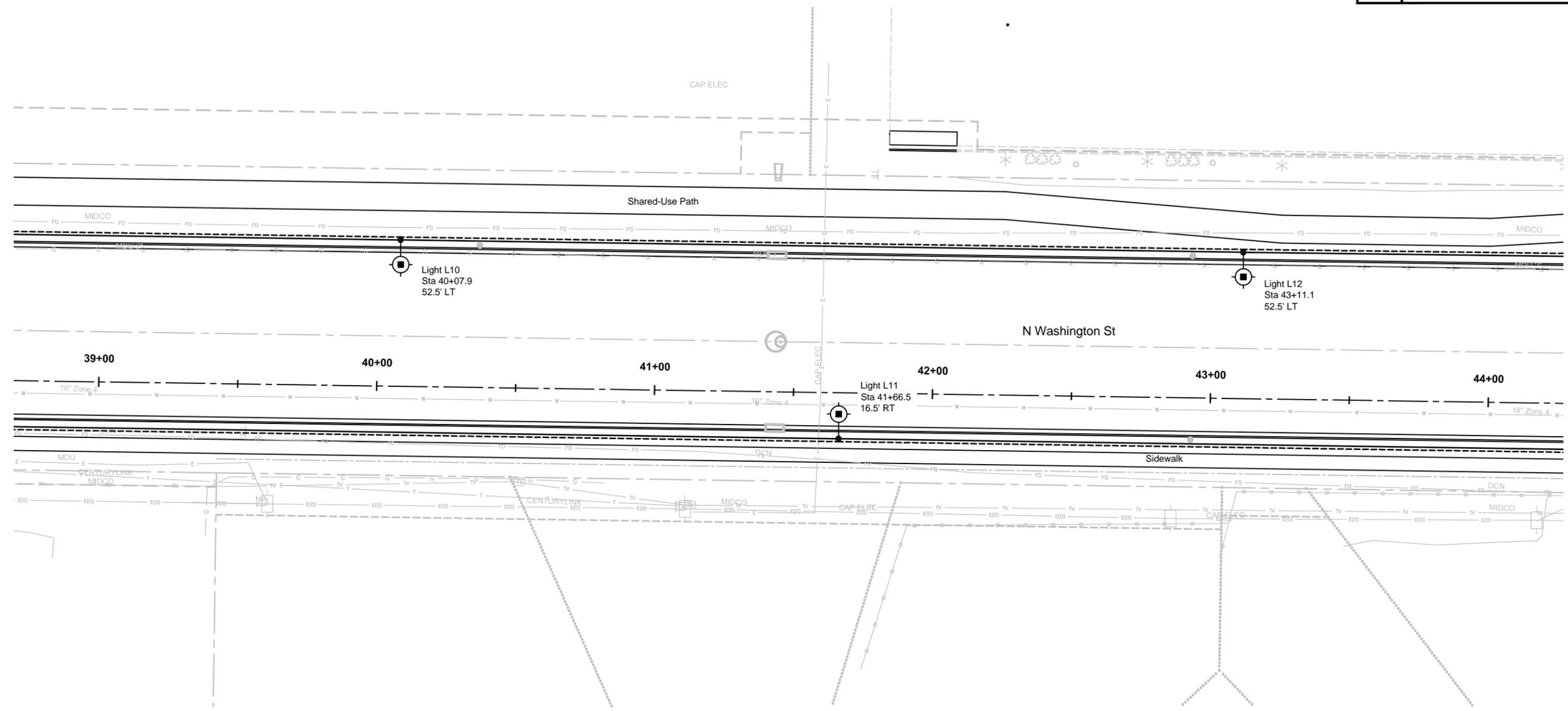
Rev'd. Scale: 1:40 Hor, 1:10 Ver

**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

**N Washington St**  
Lighting Layout  
Sta 34+00-39+00

DRWN. BY	CHK'D BY	PROJECT NO.	DATE
JE	CH	1412129	03/2014

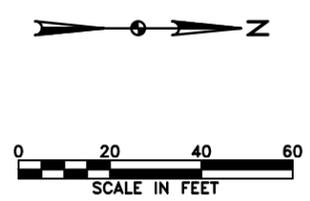
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LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Light L10 to Light L12	40+07.9, 52.5' LT to 43+11.1, 52.5' LT	303	2"	622	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L12 to Light L14	43+11.1, 52.5' LT to 46+06.2, 54.3' LT	302	2"	620	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L11 to Light L13	41+66.5, 16.5' RT to 44+61.7, 16.5' RT	295	2"	606	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

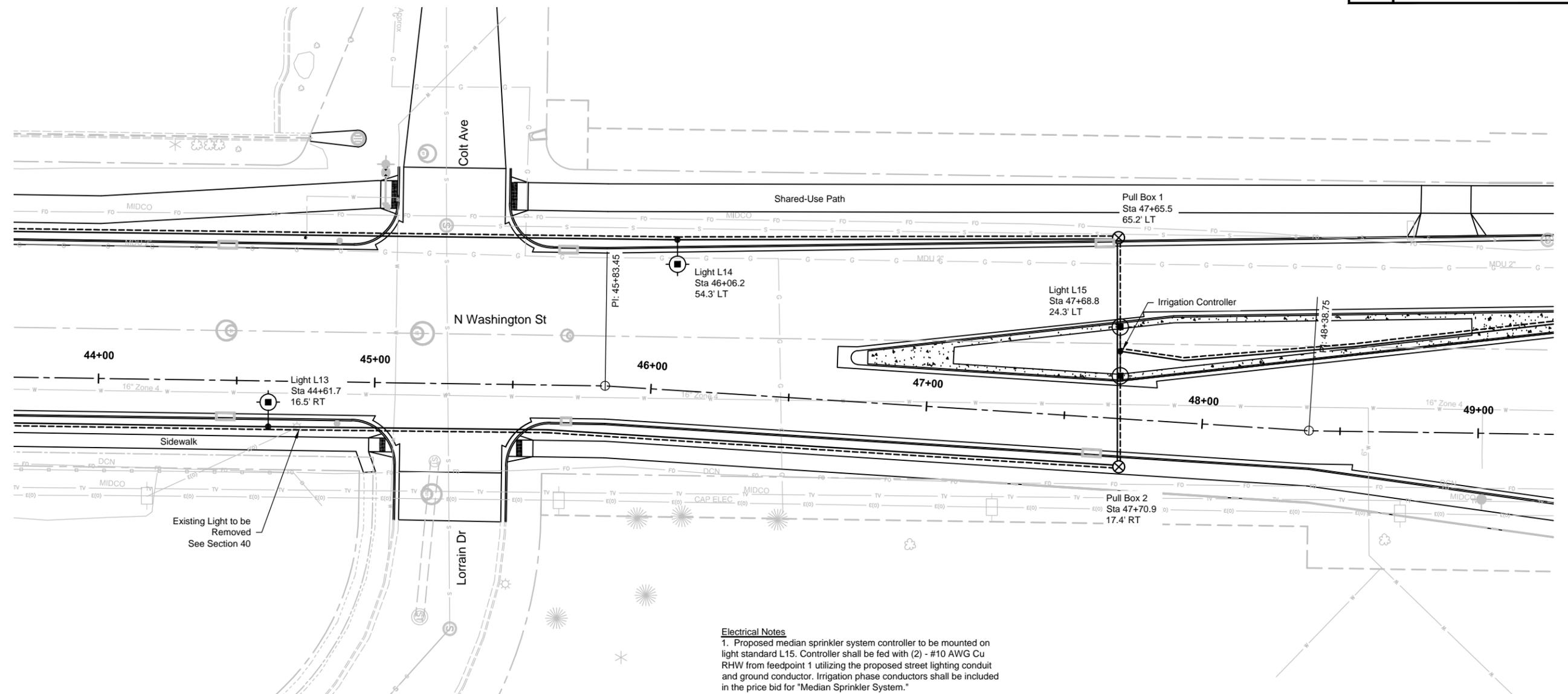
LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L10, L11, L12	LED	III	Round Tapered Steel	40'	6'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

- CONCRETE FOUNDATION - HIGHWAY LIGHTING  
Sta 39+00 to 44+00 3 EA
- 2IN DIAMETER RIGID CONDUIT  
Sta 40+08 to 44+62 900 LF
- UNDERGROUND CONDUCTOR NO2-TYPE RHW  
Sta 40+08 to 44+62 1848 LF
- UNDERGROUND CONDUCTOR NO4-TYPE THW  
Sta 40+08 to 44+62 924 LF
- LT STD 6FT MA 40FT MT HT BREAKAWAY  
Sta 39+00 to 44+00 3 EA
- LED LUMINAIRE - 150 WATT  
Sta 39+00 to 44+00 3 EA



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<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA  <b>N Washington St Lighting Layout</b> Sta 39+00-44+00	
DRWN. BY JE CHKD BY CH	PROJECT NO. 1412129 DATE 03/2014	J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg © Kadmas, Lee & Jackson 2014



**Electrical Notes**  
 1. Proposed median sprinkler system controller to be mounted on light standard L15. Controller shall be fed with (2) - #10 AWG Cu RHW from feedpoint 1 utilizing the proposed street lighting conduit and ground conductor. Irrigation phase conductors shall be included in the price bid for "Median Sprinkler System."

ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Light L13 to Pull Box 2	44+61.7, 16.5' RT to 47+70.9, 17.4' RT	309	2"	632	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Pull Box 2 to Light L15	47+70.9, 17.4' RT to 47+68.8, 24.3' LT	42	2"	98	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L14 to Pull Box 1	46+06.2, 54.3' LT to 47+65.5, 65.2' LT	160	2"	334	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Pull Box 1 to Light L15	47+65.5, 65.2' LT to 47+68.8, 24.3' LT	41	2"	96	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L15 to Light L16	47+68.8, 24.3' LT to 49+48.1, 41.4' LT	178	2"	744	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 4 THW

CONCRETE FOUNDATION - HIGHWAY LIGHTING		
Sta 44+00 to 49+00	3	EA
PULL BOX		
Sta 47+65, LT	1	EA
Sta 47+71, RT	1	EA
Total	2	EA

2IN DIAMETER RIGID CONDUIT		
Sta 44+62 to 49+48	730	LF

UNDERGROUND CONDUCTOR NO2-TYPE RHW		
Sta 44+62 to 49+48	1904	LF

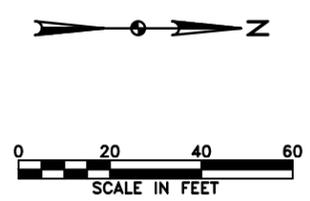
UNDERGROUND CONDUCTOR NO4-TYPE THW		
Sta 44+62 to 49+48	766	LF

LT STD 6FT MA 40FT MT HT BREAKAWAY		
Sta 44+00 to 49+00	2	EA

LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY		
Sta 44+00 to 49+00	1	EA

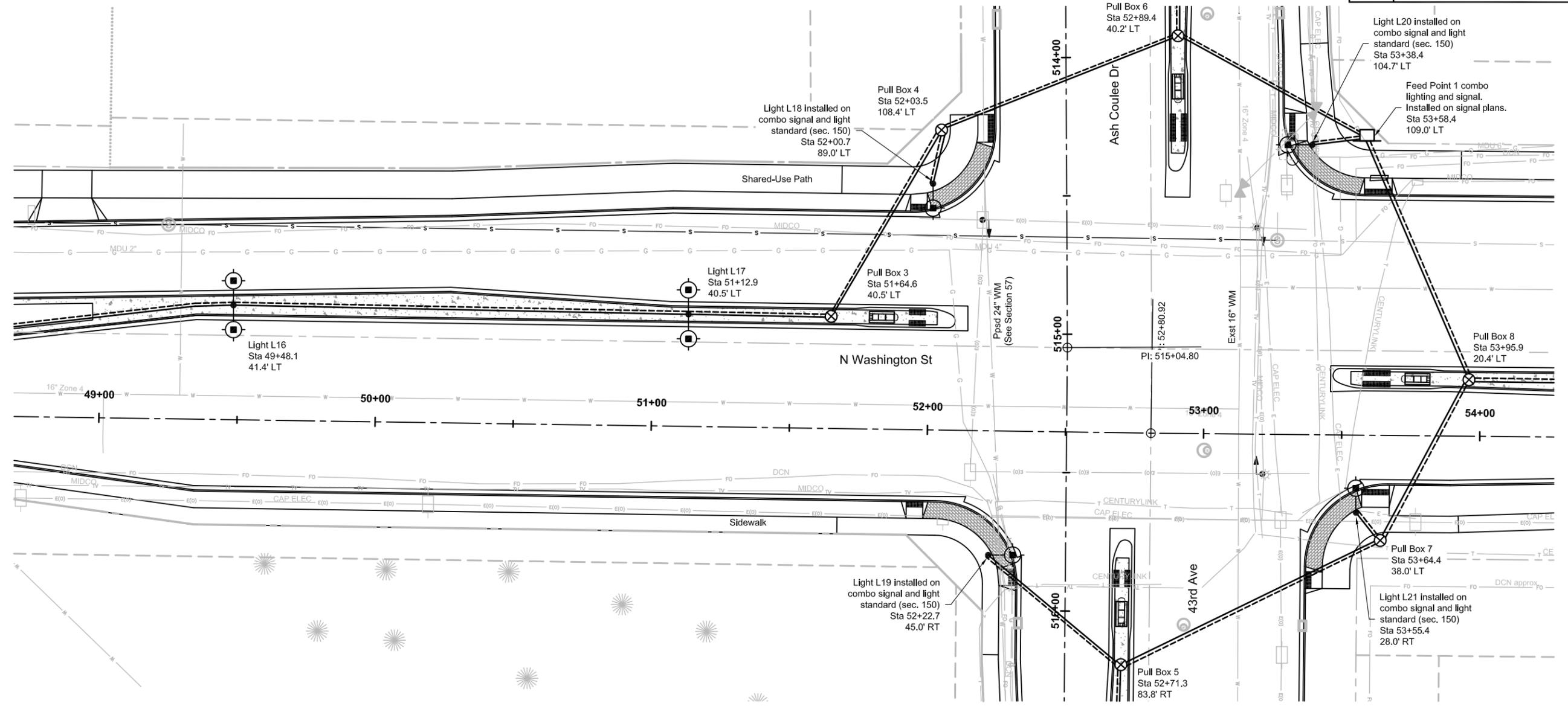
LED LUMINAIRE - 150 WATT		
Sta 44+00 to 49+00	4	EA

LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L13, L14	LED	III	Round Tapered Steel	40'	6'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.
L15	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.



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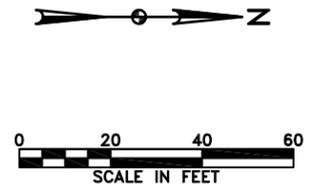
<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA  <b>N Washington St Lighting Layout</b> Sta 44+00-49+00	
DRAWN BY: JE CHKD BY: CH PROJECT NO.: 1412129 DATE: 03/2014	J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg © Kadmas, Lee & Jackson 2014	



See Sheet 7 for Cable/Conduit Schedule

LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L16, L17	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.
L18, L19, L20, L21	LED	III	Signal Std Extension	40'	6'	Install luminaire on combination signal standard light standard extension. Luminaire operated at 240V.

<u>CONCRETE FOUNDATION - HIGHWAY LIGHTING</u> Sta 49+00 to 54+00	2	EA	<u>UNDERGROUND CONDUCTOR NO6-TYPE THW</u> Sta 49+48 to 54+61	210	LF
<u>CONCRETE FOUNDATION - FEED POINT - TYPE B</u> Sta 53+58.4, LT	1	EA	<u>FEED POINT - TYPE V - PAD MOUNTED</u> Sta 53+58.4, LT	1	EA
<u>Pull Box</u> Sta 51+64.6, LT	1	EA	<u>LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY</u> Sta 49+00 to 54+00	2	EA
Sta 52+03.5, LT	1	EA	<u>LED LUMINAIRE - 150 WATT</u> Sta 49+00 to 54+00	8	EA
Sta 52+71.3, RT	1	EA			
Sta 52+89.4, LT	1	EA			
Sta 53+64.4, RT	1	EA			
Sta 53+95.9, LT	1	EA			
Total	6	EA			
<u>2IN DIAMETER RIGID CONDUIT</u> Sta 49+48 to 54+61	1095	LF	<u>Electrical Notes</u> 1. Irrigation phase conductors shall be included in the price bid for "Median Sprinkler System."		
<u>UNDERGROUND CONDUCTOR NO2-TYPE RHW</u> Sta 49+48 to 54+61	3314	LF			
<u>UNDERGROUND CONDUCTOR NO4-TYPE RHW</u> Sta 49+48 to 54+61	716	LF			
<u>UNDERGROUND CONDUCTOR NO4-TYPE THW</u> Sta 49+48 to 54+61	1137	LF			



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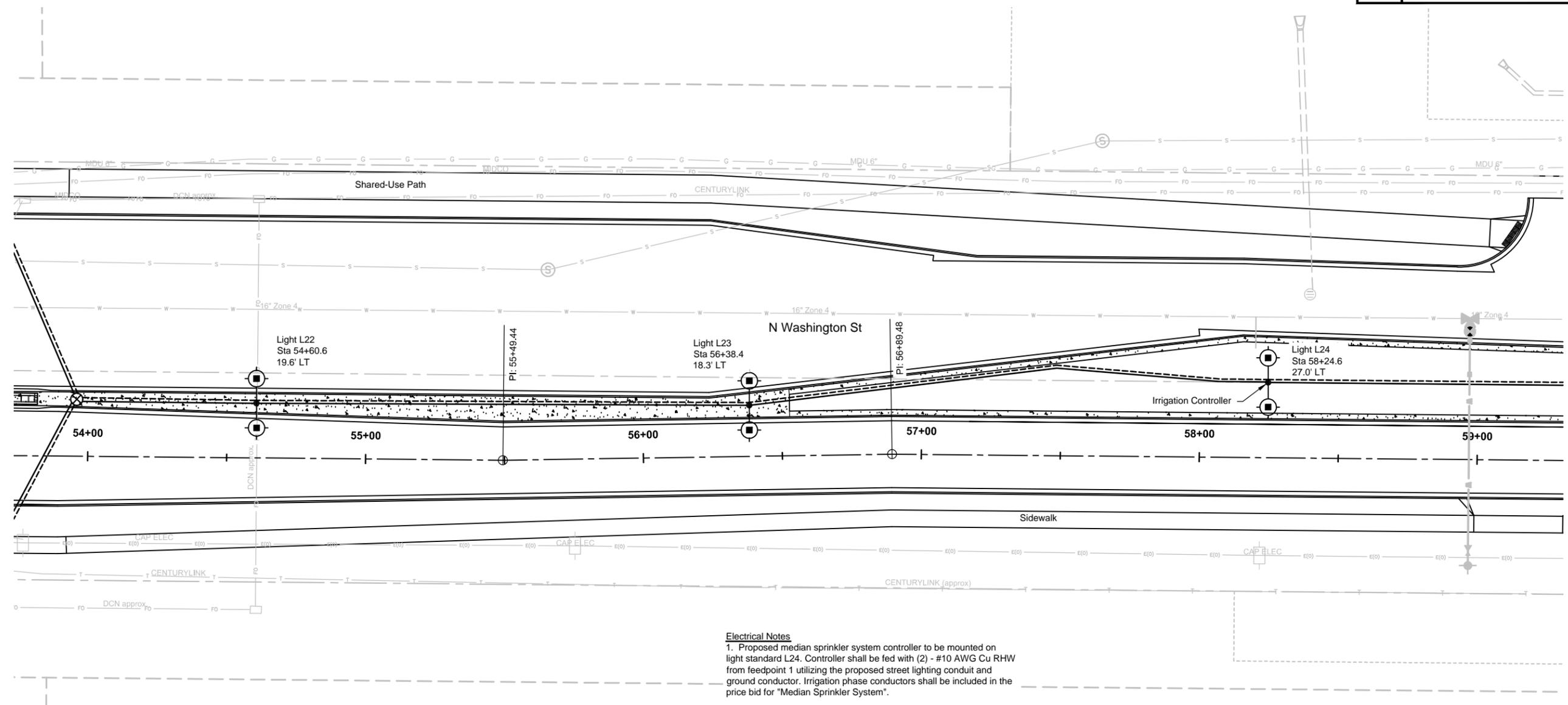
<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
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DRWN. BY JE	CHK'D BY CH	PROJECT NO. 1412129
		DATE 03/2014
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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	140	7

LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Light L16 to Light L17	49+48.1, 41.4' LT to 51+12.9, 40.5' LT	165	2"	692 346 173	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 4 THW
Light L17 to Pull Box 3	51+12.9, 40.5' LT to 51+64.6, 40.5' LT	75	2"	328 164 82	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 4 THW
Pull Box 3 to Pull Box 4	51+64.6, 40.5' LT to 52+03.5, 108.4' LT	79	2"	340 170 85	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 4 THW
Pull Box 4 to Light L18	52+03.5, 108.4' LT to 52+00.7, 89.0' LT	19	2"	104 52	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 4 THW
Pull Box 4 to Pull Box 6	52+03.5, 108.4' LT to 52+89.4, 40.2' LT	86	2"	368 184 92	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 4 THW
Pull Box 6 to Feed Point 1	52+89.4, 40.2' LT to 53+58.4, 109.0' LT	150	(2) - 2"	528 352 176	(6) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (4) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (IRRIGATION) (2) UNDERGROUND CONDUCTOR NO. 4 THW
Feed Point 1 to Light L20	53+58.4, 109.0' LT to 53+38.4, 104.47' LT	18	2"	62 31	(2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Feed Point 1 to Pull Box 8	53+58.4, 109.0' LT to 53+95.9, 20.4' LT	188	(2) - 2"	214 428 214 107 107	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 4 THW UNDERGROUND CONDUCTOR NO. 6 THW
Pull Box 8 to Pull Box 7	53+95.9, 20.4' LT to 53+64.4, 38.0' RT	66	2"	144 72	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Pull Box 7 to Light L21	53+64.4, 38.0' RT to 53+55.4, 28.0' RT	14	2"	84 42	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 4 THW
Pull Box 7 to Pull Box 5	53+64.4, 38.0' RT to 52+71.3, 83.8' RT	104	2"	220 110	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Pull Box 5 to Light L19	52+71.3, 83.8' RT to 52+22.7, 45.0' RT	66	2"	292 146	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 4 THW
Pull Box 8 to Light L22	53+95.9, 20.4' LT to 54+60.6, 19.6' LT	65	2"	288 144 72	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 6 THW

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NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		N Washington St Lighting Layout	
Sta 49+00-54+00			
DRWN. BY	CHK'D BY	PROJECT NO.	DATE
JE	CH	1412129	03/2014
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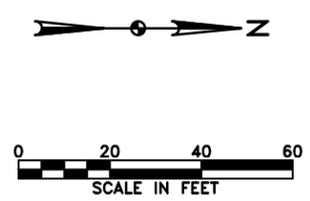


**Electrical Notes**  
 1. Proposed median sprinkler system controller to be mounted on light standard L24. Controller shall be fed with (2) - #10 AWG Cu RHW from feedpoint 1 utilizing the proposed street lighting conduit and ground conductor. Irrigation phase conductors shall be included in the price bid for "Median Sprinkler System".

ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Light L22 to Light L23	54+60.6, 19.6' LT to 56+38.4, 18.3' LT	177	2"	740	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 6 THW
Light L23 to Light L24	56+38.4, 18.3' LT to 58+24.6, 27.0' LT	190	2"	792	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 6 THW
Light L24 to Light L25	58+24.6, 27.0' LT to 60+12.4, 27.0' LT	187	2"	780	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW

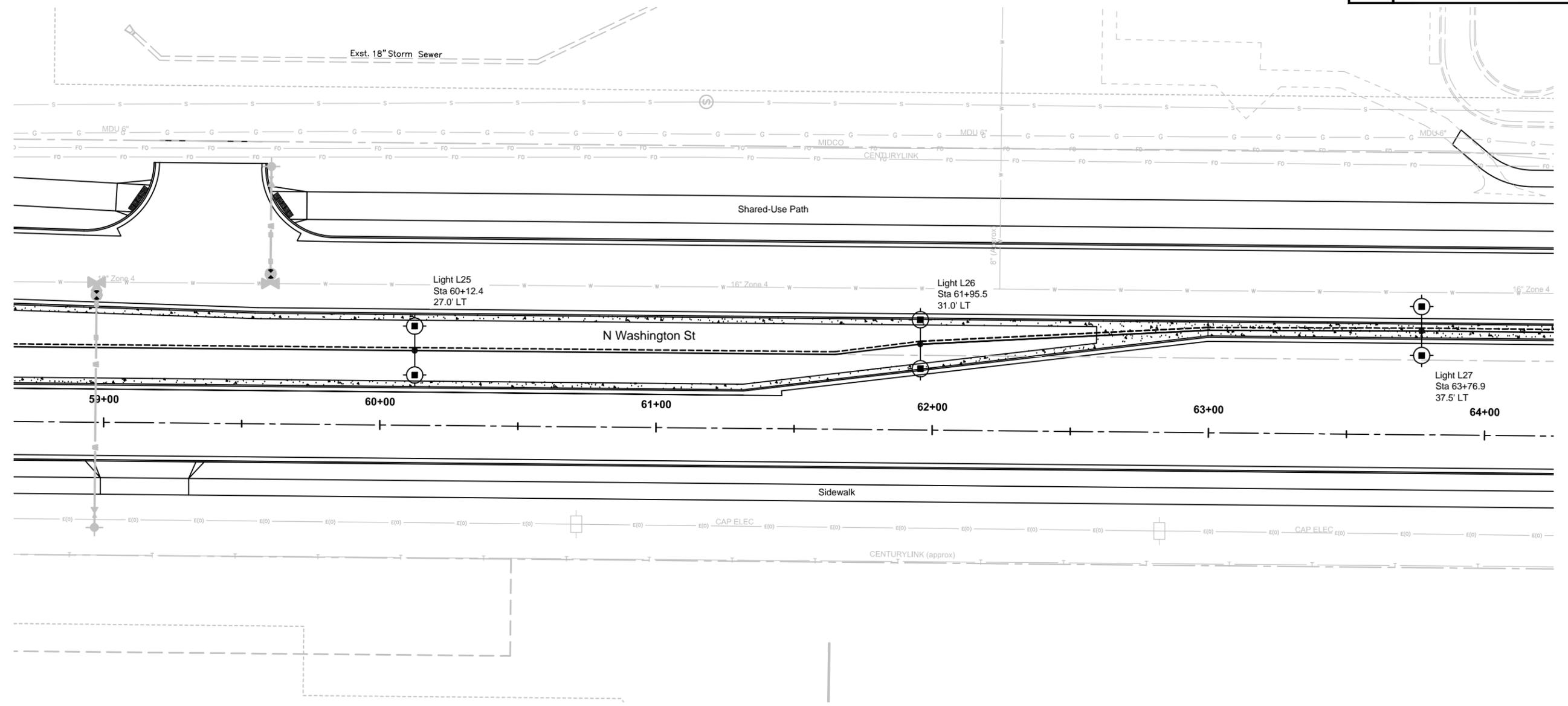
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L22, L23, L24	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

<b>CONCRETE FOUNDATION - HIGHWAY LIGHTING</b> Sta 54+00 to 59+00	3	EA
<b>2IN DIAMETER RIGID CONDUIT</b> Sta 54+61 to 60+12	554	LF
<b>UNDERGROUND CONDUCTOR NO4-TYPE RHW</b> Sta 54+61 to 60+12	2312	LF
<b>UNDERGROUND CONDUCTOR NO6-TYPE THW</b> Sta 54+61 to 60+12	578	LF
<b>LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY</b> Sta 54+00 to 59+00	3	EA
<b>LED LUMINAIRE - 150 WATT</b> Sta 54+00 to 59+00	6	EA



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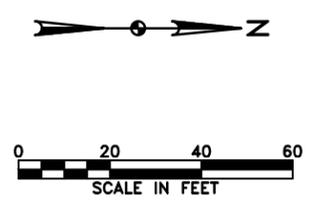
<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA	
	<b>N Washington St Lighting Layout</b> Sta 54+00-59+00	
DRAWN BY: JE CHKD BY: CH PROJECT NO: 1412129 DATE: 03/2014	J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg © Kadmas, Lee & Jackson 2014	



LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPER
Light L25 to Light L26	60+12.4, 27.0' LT to 61+95.5, 31.0' LT	182	2"	760 190	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L26 to Light L27	61+95.5, 31.0' LT to 63+76.9, 37.5' LT	182	2"	760 190	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L27 to Light L28	63+76.9, 37.5' LT to 65+54.7, 16.5' LT	181	2"	756 189	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW

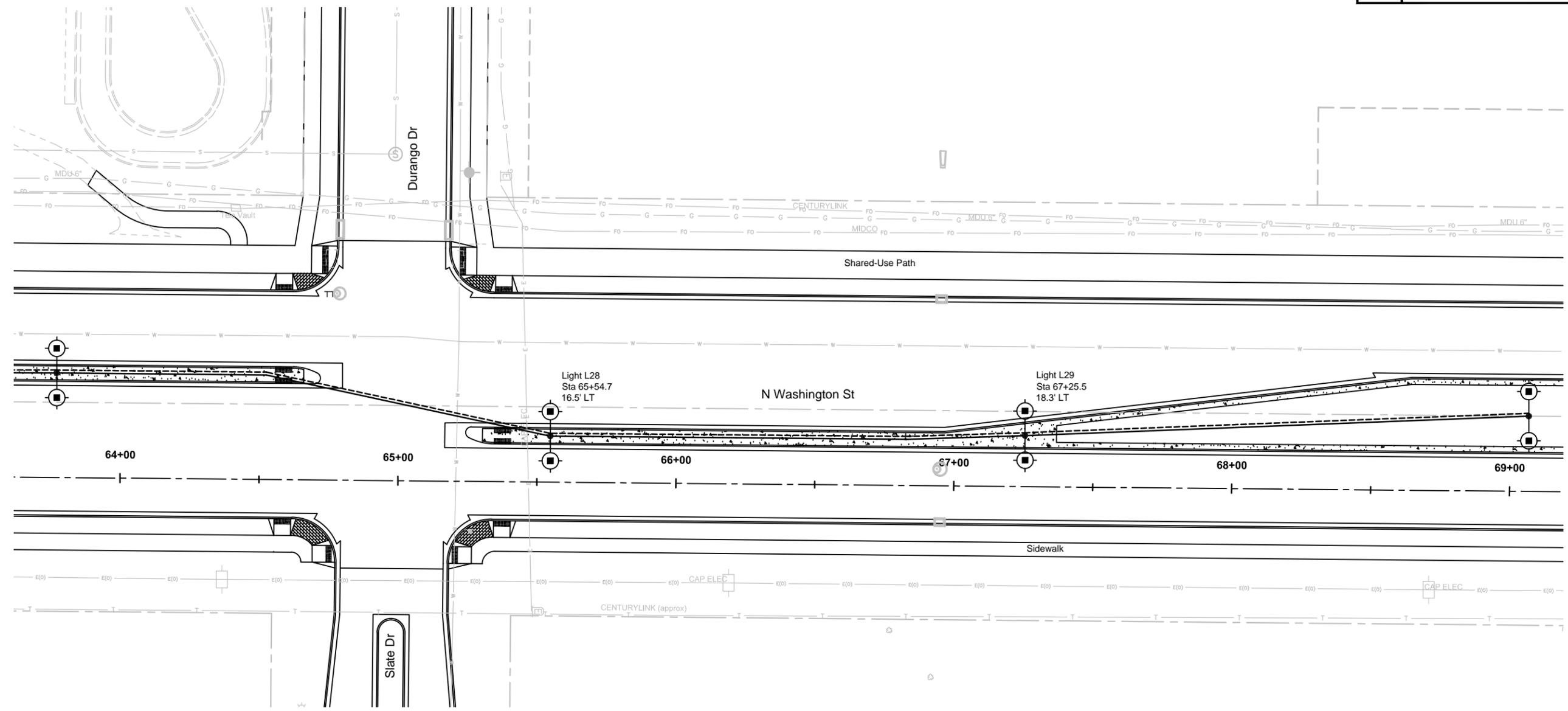
LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPER	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L25, L26, L27	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

- CONCRETE FOUNDATION - HIGHWAY LIGHTING  
Sta 59+00 to 64+00      3 EA
- 2IN DIAMETER RIGID CONDUIT  
Sta 60+12 to 65+55      545 LF
- UNDERGROUND CONDUCTOR NO4-TYPE RHW  
Sta 60+12 to 65+55      2276 LF
- UNDERGROUND CONDUCTOR NO6-TYPE THW  
Sta 60+12 to 65+55      569 LF
- LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY  
Sta 59+00 to 64+00      3 EA
- LED LUMINAIRE - 150 WATT  
Sta 59+00 to 64+00      6 EA



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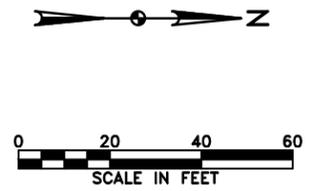
<b>Legend</b> LED Luminaire	Rev'd. Scale: 1:40 Hor, 1:10 Ver <b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA  <b>N Washington St Lighting Layout</b> Sta 59+00-64+00							
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DRWN. BY	CHK'D BY	PROJECT NO.	DATE					
JE	CH	1412129	03/2014					



LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPER
Light L28 to Light L29	65+54.7, 16.5' LT to 67+25.5, 18.3' LT	171	2"	716 to 179	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L29 to Light L30	67+25.5, 18.3' LT to 69+06.7, 27.0' LT	183	2"	382 to 191	(2) UNDERGROUND CONDUCTOR NO. 4 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW

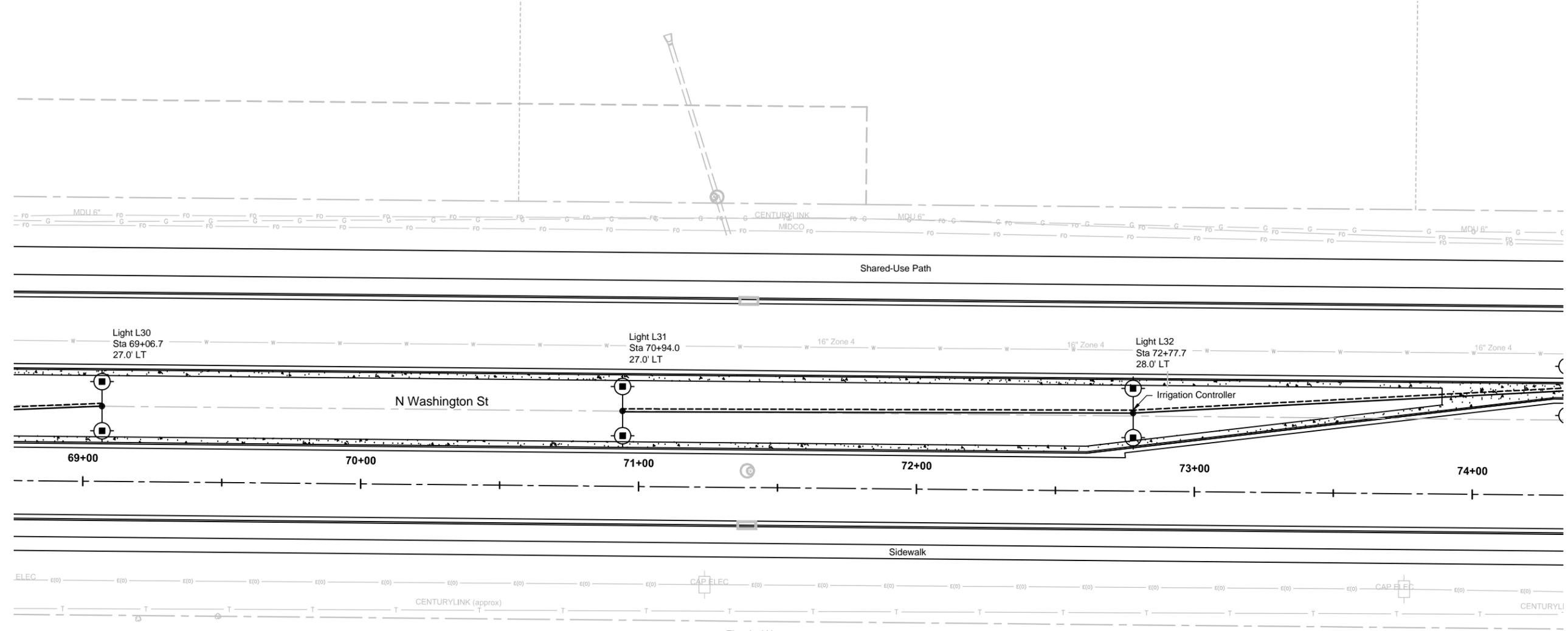
LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPER	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L28, L29	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

- CONCRETE FOUNDATION - HIGHWAY LIGHTING  
Sta 64+00 to 69+00 2 EA
- 2IN DIAMETER RIGID CONDUIT  
Sta 65+55 to 69+07 354 LF
- UNDERGROUND CONDUCTOR NO4-TYPE RHW  
Sta 65+55 to 69+07 1098 LF
- UNDERGROUND CONDUCTOR NO6-TYPE THW  
Sta 65+55 to 69+07 370 LF
- LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY  
Sta 64+00 to 69+00 2 EA
- LED LUMINAIRE - 150 WATT  
Sta 64+00 to 69+00 4 EA



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<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor., 1:10 Ver.
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA  <b>N Washington St Lighting Layout</b> Sta 64+00-69+00	
DRWN. BY JE	CHK'D BY CH	PROJECT NO. 1412129
		DATE 03/2014

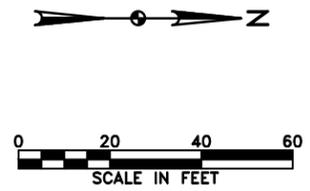


**Electrical Notes**  
 1. Proposed median sprinkler system controller to be mounted on light standard L32. Controller shall be fed with (2) - #6 AWG Cu RHW from Feedpoint 2 via Light L38 irrigation controller (same circuit) utilizing the proposed street lighting conduit and ground conductor. Irrigation phase conductors shall be included in the price bid for "Median Sprinkler System".

LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Light L31 to Light L32	70+94.0, 27.0' LT to 72+77.7, 28.0' LT	183	2"	382	(2) UNDERGROUND CONDUCTOR NO. 4 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L32 to Light L33	72+77.7, 28.0' LT to 74+33.8, 37.5' LT	156	2"	656	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 6 THW

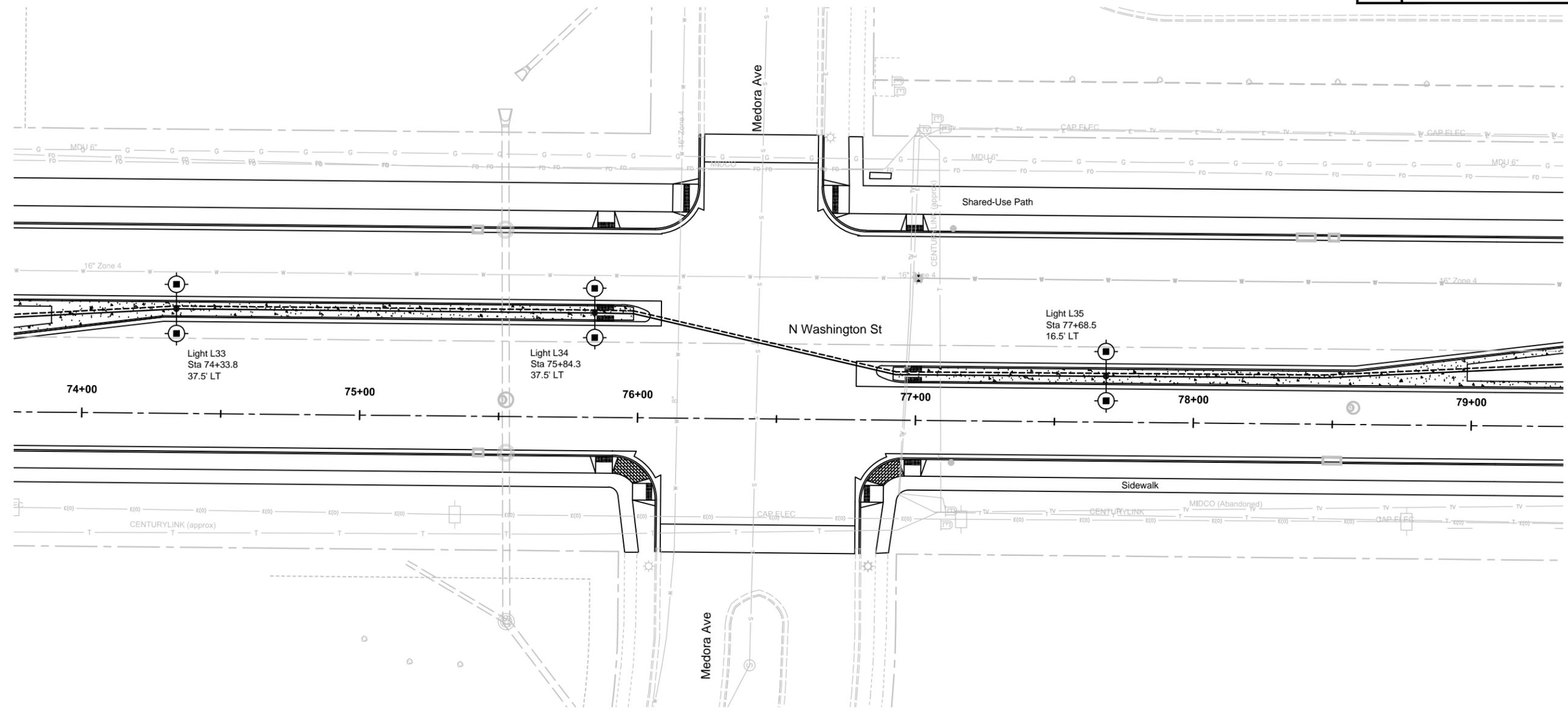
LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L30, L31, L32	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

<b>CONCRETE FOUNDATION - HIGHWAY LIGHTING</b> Sta 69+00 to 74+00	3	EA
<b>2IN DIAMETER RIGID CONDUIT</b> Sta 70+94 to 74+34	339	LF
<b>UNDERGROUND CONDUCTOR NO4-TYPE RHW</b> Sta 70+94 to 74+34	1038	LF
<b>UNDERGROUND CONDUCTOR NO6-TYPE THW</b> Sta 70+94 to 74+34	355	LF
<b>LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY</b> Sta 69+00 to 74+00	3	EA
<b>LED LUMINAIRE - 150 WATT</b> Sta 69+00 to 74+00	6	EA



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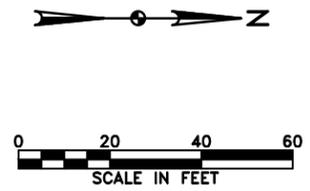
<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor., 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA  <b>N Washington St Lighting Layout</b> Sta 69+00-74+00	
DRWN. BY JE	CHKD BY CH	PROJECT NO. 1412129
		DATE 03/2014
J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg © Kadmas, Lee & Jackson 2014		



LIGHTING CABLE & CONDUIT SCHEDULE						
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN		
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE	
Light L33 to Light L34	74+33.8, 37.5' LT to 75+84.3, 37.5' LT	151	2"	636	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 6 THW	
Light L34 to Light L35	75+84.3, 37.5' LT to 77+68.5, 16.5' LT	176	2"	736	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 6 THW	
Light L35 to Light L36	77+68.5, 16.5' LT to 79+55.4, 22.6' LT	187	2"	780	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 6 THW	

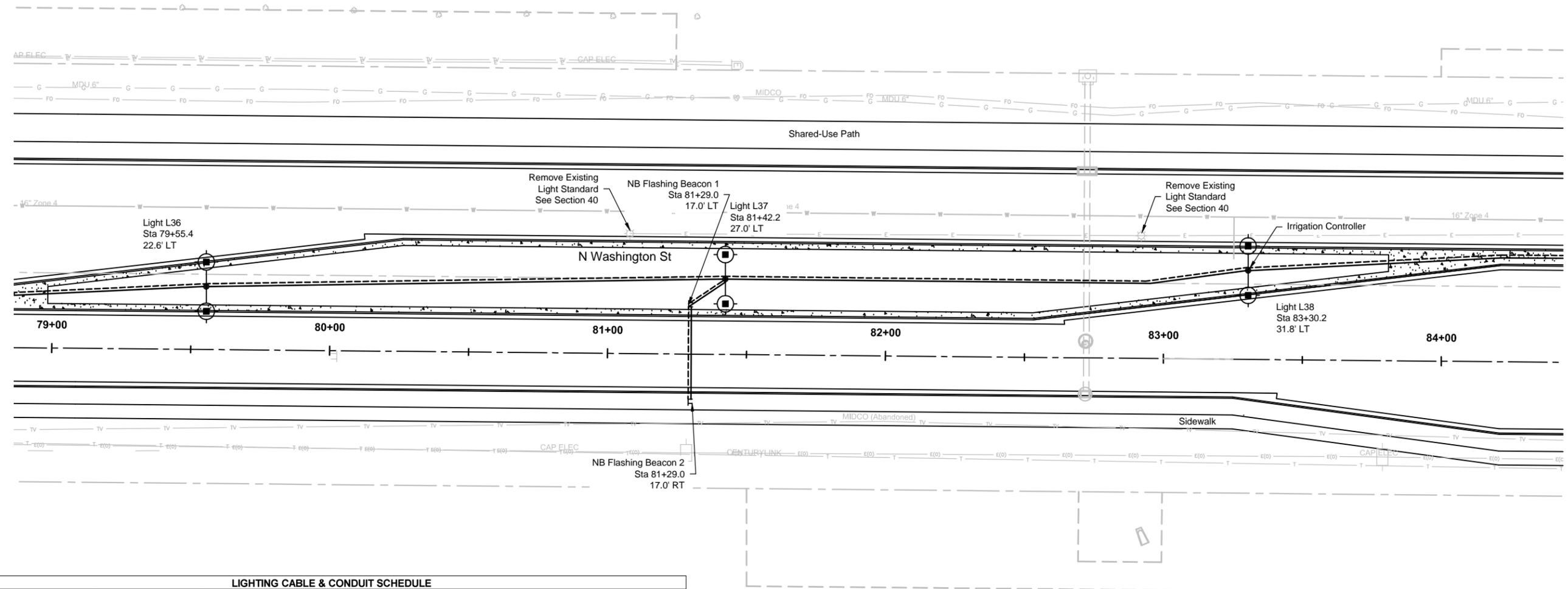
LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L33, L34, L35	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

- CONCRETE FOUNDATION - HIGHWAY LIGHTING  
Sta 74+00 to 79+00 3 EA
- 2IN DIAMETER RIGID CONDUIT  
Sta 74+34 to 79+55 514 LF
- UNDERGROUND CONDUCTOR NO4-TYPE RHW  
Sta 74+34 to 79+55 2152 LF
- UNDERGROUND CONDUCTOR NO6-TYPE THW  
Sta 74+34 to 79+55 538 LF
- LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY  
Sta 74+00 to 79+00 3 EA
- LED LUMINAIRE - 150 WATT  
Sta 74+00 to 79+00 6 EA



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<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA  <b>N Washington St Lighting Layout</b> Sta 74+00-79+00	
DRWN. BY JE	CHKD BY CH	PROJECT NO. 1412129
		DATE 03/2014
J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg © Kadmas, Lee & Jackson 2014		



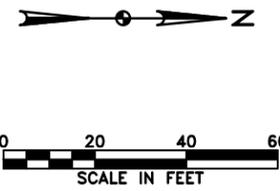
LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPER
Light L36 to Light L37	79+55.4, 22.6' LT to 81+42.2, 27.0' LT	187	2"	780 390	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 6 THW
Light L37 to NB Flashing Beacon 1	81+42.2, 27.0' LT to 81+29.0, 17.0' LT	16	2"	24	NO14 AWG 4 CONDUCTOR CABLE
NB Flashing Beacon 1 to NB Flashing Beacon 2	81+29.0, 17.0' LT to 81+29.0, 17.0' RT	35	2"	39	NO14 AWG 4 CONDUCTOR CABLE
Light L37 to Light L38	81+42.2, 27.0' LT to 83+30.2, 31.8' LT	189	2"	788 394	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 6 THW
Light L38 to Light L39	83+30.2, 31.8' LT to 85+16.1, 16.1' LT	186	2"	776 388	(4) UNDERGROUND CONDUCTOR NO. 4 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 6 THW
				194	NO14 AWG 4 CONDUCTOR CABLE

LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPER	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L36, L37, L38	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

**Electrical Notes**

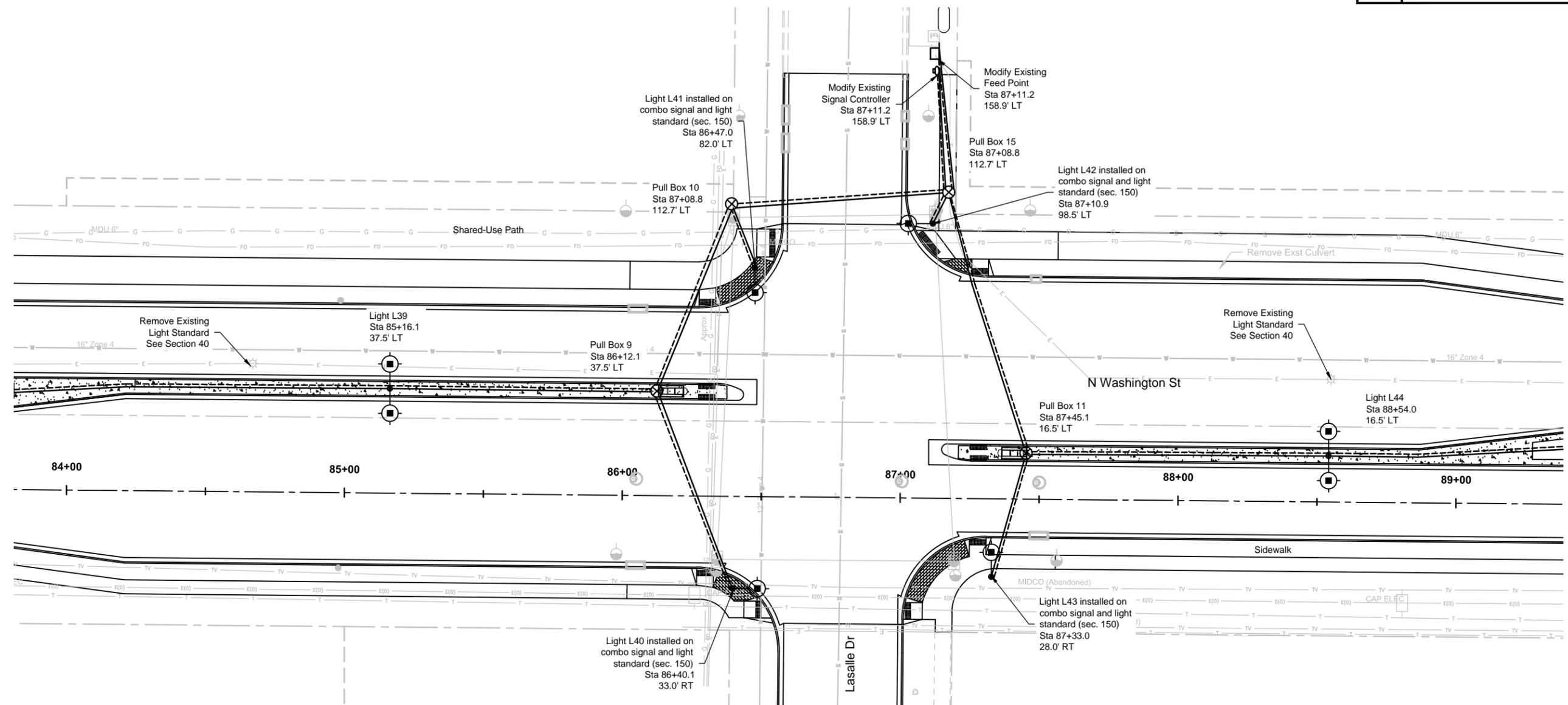
- Proposed median sprinkler system controller to be mounted on light standard L38. Controller shall be fed with (2) - #6 AWG Cu RHW from Feedpoint 2 utilizing the proposed street lighting conduit and ground conductor. Irrigation phase conductors shall be included in the price bid for "Median Sprinkler System."
- Flashing Beacon shall be fed with No 14 AWG 4 Conductor Cable from Traffic Signal Controller utilizing the proposed street lighting conduit. Cable shall be included in the price bid for "Flashing Beacon - Post Mounted."

<b>CONCRETE FOUNDATION - HIGHWAY LIGHTING</b> Sta 79+00 to 84+00	3	EA
<b>2IN DIAMETER RIGID CONDUIT</b> Sta 79+55 to 85+16	613	LF
<b>UNDERGROUND CONDUCTOR NO4-TYPE RHW</b> Sta 79+55 to 85+16	2344	LF
<b>UNDERGROUND CONDUCTOR NO6-TYPE THW</b> Sta 79+55 to 85+16	586	LF
<b>LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY</b> Sta 79+00 to 84+00	3	EA
<b>LED LUMINAIRE - 150 WATT</b> Sta 79+00 to 84+00	6	EA
<b>FLASHING BEACON - POST MOUNTED</b> Sta 81+29	2	EA



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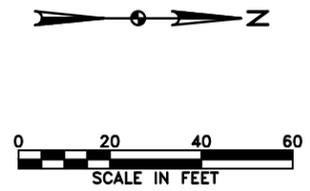
<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA  <b>N Washington St Lighting Layout</b> Sta 79+00-84+00	
DRWN. BY: JE CHKD BY: CH PROJECT NO.: 1412129 DATE: 03/2014	J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg © Kadmas, Lee & Jackson 2014	



See Sheet 15 for Cable/Conduit Schedule

LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L16, L17	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.
L18, L19, L20, L21	LED	III	Signal Std Extension	40'	6'	Install luminaire on combination signal standard light standard extension. Luminaire operated at 240V.

<b>CONCRETE FOUNDATION - HIGHWAY LIGHTING</b> Sta 84+00 to 89+00	2	EA	<b>MODIFY EXISTING FEED POINT</b> Sta 87+11.2, LT	1	EA
<b>CONCRETE FOUNDATION - FEED POINT - TYPE B</b> Sta 86+52.0, LT	1	EA	<b>LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY</b> Sta 84+00 to 89+00	2	EA
<b>PULL BOX</b> Sta 86+12.1, LT	1	EA	<b>LED LUMINAIRE - 150 WATT</b> Sta 84+00 to 89+00	8	EA
Sta 87+08.8, LT	1	EA			
Sta 87+45.1, LT	1	EA			
Total	3	EA			
<b>2IN DIAMETER RIGID CONDUIT</b> Sta 85+16 to 90+33	1266	LF			
<b>UNDERGROUND CONDUCTOR NO2-TYPE RHW</b> Sta 85+16 to 90+33	3556	LF	<b>Electrical Notes</b>		
<b>UNDERGROUND CONDUCTOR NO10-TYPE RHW</b> Sta 85+16 to 90+33	1252	LF	1. Irrigation phase conductors shall be included in the price bid for "Median Sprinkler System."		
<b>UNDERGROUND CONDUCTOR NO4-TYPE THW</b> Sta 85+16 to 90+33	889	LF	2. Flashing Beacons shall be fed with No 14 AWG 4 Conductor Cable from the traffic signal controller utilizing the proposed street lighting conduit. Cable shall be included in the price bid for "Flashing Beacon - Post Mounted."		
<b>UNDERGROUND CONDUCTOR NO6-TYPE THW</b> Sta 85+16 to 90+33	626	LF			



**Legend**

LED Luminaire

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**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

**N Washington St**  
Lighting Layout  
Sta 84+00-89+00

DRWN. BY	CHK'D BY	PROJECT NO.	DATE
JE	CH	1412129	03/2014

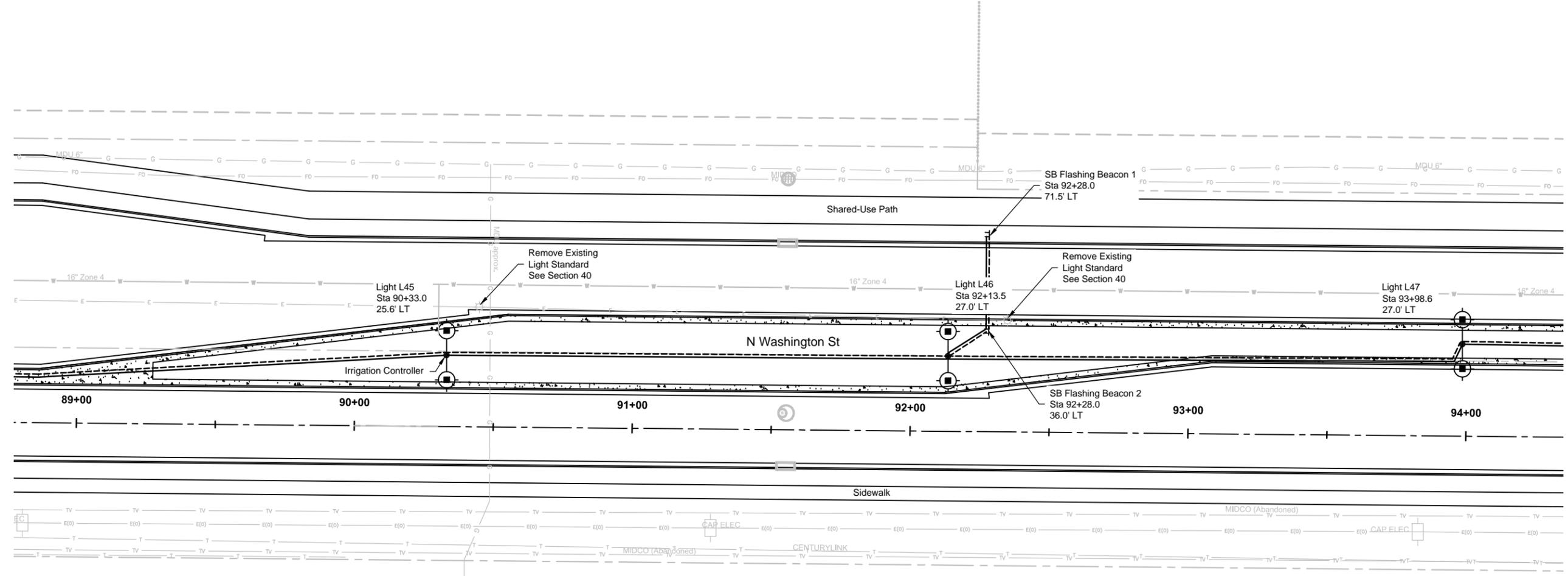
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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	140	15

LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Light L39 to Pull Box 9	85+16.1, 16.1' LT to 86+12.1, 37.5' LT	94	2"	202 404 101 101	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) (4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW NO14 AWG 4 CONDUCTOR CABLE
Pull Box 9 to Light L40	86+12.1, 37.5' LT to 86+40.1, 33.0' RT	69	2"	152 76	(2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Pull Box 9 to Pull Box 10	86+12.1, 37.5' LT to 87+08.8, 112.7' LT	144	(2) - 2"	156 156 312 78 78 78	(2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) (4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW UNDERGROUND CONDUCTOR NO. 4 THW NO14 AWG 4 CONDUCTOR CABLE
Pull Box 10 to Light L41	87+08.8, 112.7' LT to 86+47.0, 82.0' LT	25	2"	128 64	(4) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 THW
Pull Box 10 to Pull Box 15	87+08.8, 112.7' LT to 520+06.6, 17.1' RT	158	(2) - 2"	170 170 340 85 85 85	(2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) (4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW UNDERGROUND CONDUCTOR NO. 4 THW NO14 AWG 4 CONDUCTOR CABLE
Feed Point 2 to Pull Box 15	86+52.0, 118.0' LT to 520+06.6, 17.1' RT	192	(2) - 2"	218 436 872 109 218	(2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (4) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) (8) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (1) UNDERGROUND CONDUCTOR NO. 6 THW (2) UNDERGROUND CONDUCTOR NO. 4 THW
Signal Controller to Pull Box 15	86+52.0, 118.0' LT to 520+06.6, 17.1' RT	42	2"	108	(2) NO14 AWG 4 CONDUCTOR CABLE
Pull Box 15 to Light L42	520+06.6, 17.1' RT to 87+10.9, 98.5' LT	12	2"	114 57	(6) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (3) UNDERGROUND CONDUCTOR NO. 6 THW
Pull Box 15 to Pull Box 11	520+06.6, 17.1' RT to 87+45.1, 16.5' LT	196	(2) - 2"	208 208 416 104 104 104	(2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) (4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW UNDERGROUND CONDUCTOR NO. 4 THW NO14 AWG 4 CONDUCTOR CABLE
Pull Box 11 to Light L43	87+45.1, 16.5' LT to 87+33.0, 28.0' RT	46	2"	106 53	(2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Pull Box 11 to Light L44	87+45.1, 16.5' LT to 88+54.0, 16.5' LT	109	2"	464 232 116 116	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 4 THW NO14 AWG 4 CONDUCTOR CABLE
Light L44 to Light L45	88+54.0, 16.5' LT to 90+33.0, 25.6' LT	179	2"	748 374 187 187	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE (2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION) UNDERGROUND CONDUCTOR NO. 4 THW NO14 AWG 4 CONDUCTOR CABLE

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NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		N Washington St Lighting Layout	
		Sta 84+00-89+00	
DRWN. BY	CHK'D BY	PROJECT NO.	DATE
JE	CH	1412129	03/2014
J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg			
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LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Light L45	90+33.0, 25.6' LT	180	2"	752	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE
to Light L46	92+13.5, 27.0' LT			376	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION)
Light L46	92+13.5, 27.0' LT	17	2"	188	UNDERGROUND CONDUCTOR NO. 4 THW
to SB Flashing Beacon 2	92+28.0, 36.0' LT			25	NO14 AWG 4 CONDUCTOR CABLE
SB Flashing Beacon 2	92+28.0, 36.0' LT	35	2"	43	NO14 AWG 4 CONDUCTOR CABLE
to SB Flashing Beacon 1	92+28.0, 71.5' LT				
Light L46	92+13.5, 27.0' LT	188	2"	784	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE
to Light L47	93+98.6, 27.0' LT			392	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION)
Light L47	93+98.6, 27.0' LT	186	2"	196	UNDERGROUND CONDUCTOR NO. 4 THW
to Light L48	95+83.7, 27.0' LT			776	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE
				388	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE (IRRIGATION)
				194	UNDERGROUND CONDUCTOR NO. 4 THW

LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L45, L46, L47	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

**Electrical Notes**  
1. Proposed median sprinkler system controller to be mounted on light standard L45. Controller shall be fed with (2) - #6 AWG Cu RHW from Feedpoint 2 utilizing the proposed street lighting conduit and ground conductor. Irrigation phase conductors shall be included in the price bid for "Median Sprinkler System."

2. Flashing Beacon shall be fed with No 14 AWG 4 Conductor Cable from the traffic signal controller utilizing the proposed street lighting conduit. Cable shall be included in the price bid for "Flashing Beacon - Post Mounted."

**CONCRETE FOUNDATION - HIGHWAY LIGHTING**  
Sta 89+00 to 94+00 3 EA

**2IN DIAMETER RIGID CONDUIT**  
Sta 90+33 to 95+84 605 LF

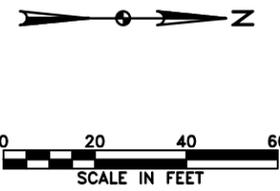
**UNDERGROUND CONDUCTOR NO2-TYPE RHW**  
Sta 90+33 to 95+84 2308 LF

**UNDERGROUND CONDUCTOR NO4-TYPE THW**  
Sta 90+33 to 95+84 577 LF

**LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY**  
Sta 89+00 to 94+00 3 EA

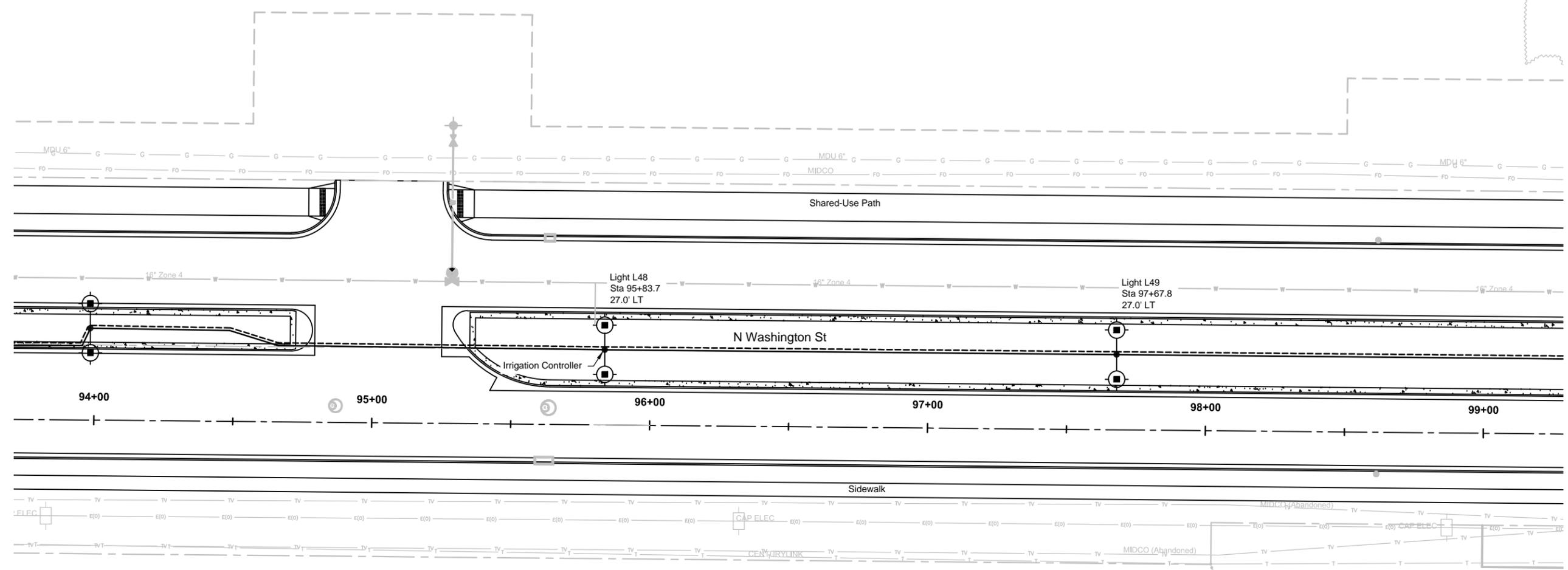
**LED LUMINAIRE - 150 WATT**  
Sta 89+00 to 94+00 6 EA

**FLASHING BEACON - POST MOUNTED**  
Sta 92+28 2 EA



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<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor., 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA 	
<b>N Washington St</b> <b>Lighting Layout</b> <b>Sta 89+00-94+00</b>		
<small>DRWN. BY</small> JE	<small>CHK'D BY</small> CH	<small>PROJECT NO.</small> 1412129
		<small>DATE</small> 03/2014
<small>J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg</small> <small>© Kadmas, Lee &amp; Jackson 2014</small>		



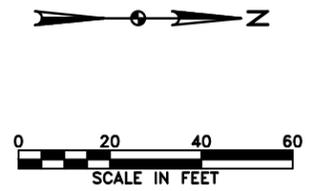
**Electrical Notes**

1. Proposed median sprinkler system controller to be mounted on light standard L48. Controller shall be fed with (2) - #6 AWG Cu RHW from Feedpoint 2 via L45 Irrigation controller (same circuit) utilizing the proposed street lighting conduit and ground conductor. Irrigation phase conductors shall be included in the price bid for "Median Sprinkler System."

LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Light L48 to Light L49	95+83.7, 27.0' LT to 97+67.8, 27.0' LT	184	2"	768	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L49 to Light L50	97+67.8, 27.0' LT to 99+52.2, 27.0' LT	185	2"	772	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

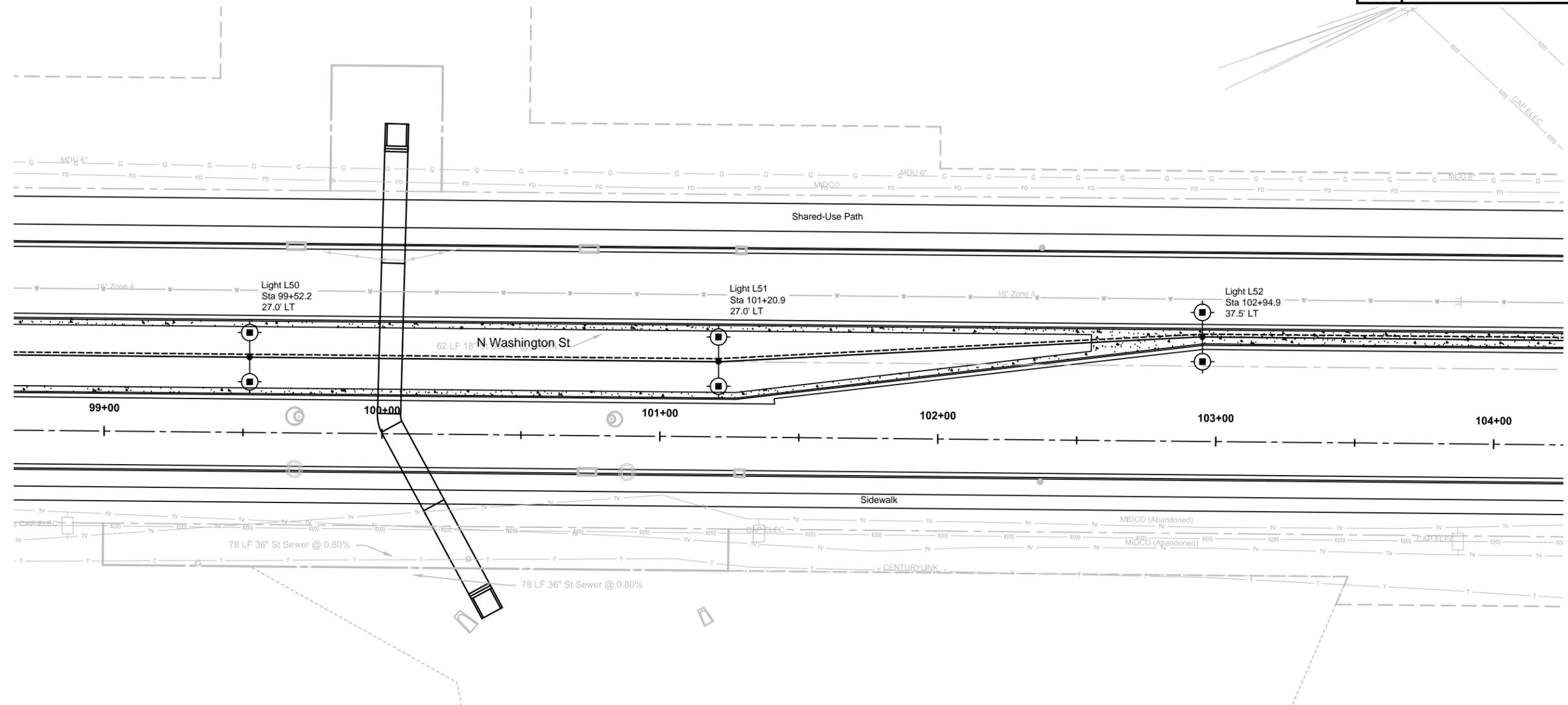
LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L48, L49	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

CONCRETE FOUNDATION - HIGHWAY LIGHTING Sta 94+00 to 99+00	2	EA
2IN DIAMETER RIGID CONDUIT Sta 95+84 to 99+52	369	LF
UNDERGROUND CONDUCTOR NO2-TYPE RHW Sta 95+84 to 99+52	1540	LF
UNDERGROUND CONDUCTOR NO4-TYPE THW Sta 95+84 to 99+52	385	LF
LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY Sta 94+00 to 99+00	2	EA
LED LUMINAIRE - 150 WATT Sta 94+00 to 99+00	4	EA



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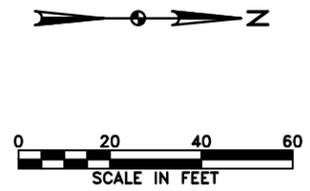
<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA  <b>N Washington St Lighting Layout</b> Sta 94+00-99+00	
DRWN. BY: JE CHKD BY: CH PROJECT NO.: 1412129 DATE: 03/2014	J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg © Kadmas, Lee & Jackson 2014	



LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPER
Light L50 to Light L51	99+52.2, 27.0' LT to 101+20.9, 27.0' LT	171	2"	716	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L51 to Light L52	101+20.9, 27.0' LT to 102+94.9, 37.5' LT	169	2"	708	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L52 to Light L53	102+94.9, 37.5' LT to 104+41.0, 37.5' LT	146	2"	616	(4) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

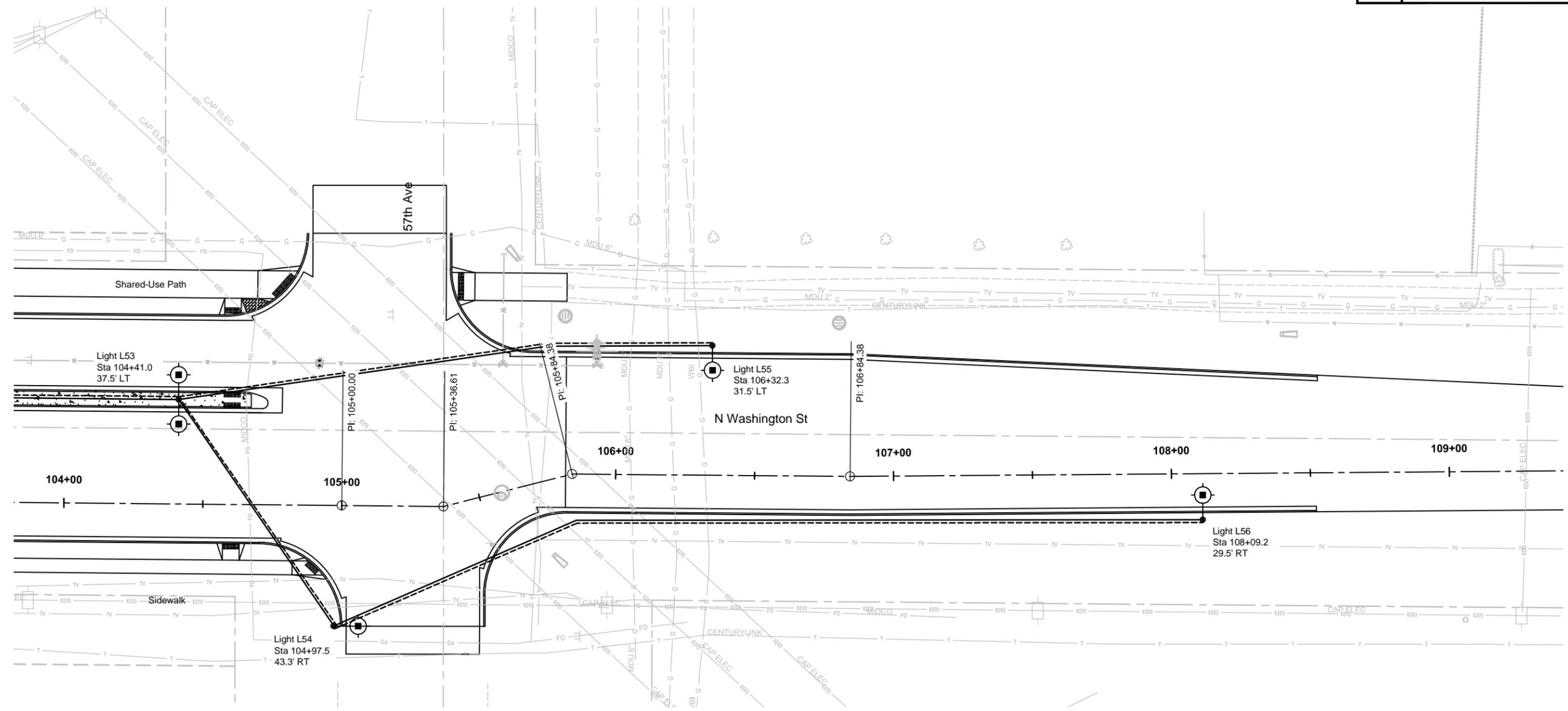
LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPER	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L50, L51, L52	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

- CONCRETE FOUNDATION - HIGHWAY LIGHTING  
Sta 99+00 to 104+00 3 EA
- 2IN DIAMETER RIGID CONDUIT  
Sta 99+52 to 104+41 486 LF
- UNDERGROUND CONDUCTOR NO2-TYPE RHW  
Sta 99+52 to 104+41 2040 LF
- UNDERGROUND CONDUCTOR NO4-TYPE THW  
Sta 99+52 to 104+41 510 LF
- LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY  
Sta 99+00 to 104+00 3 EA
- LED LUMINAIRE - 150 WATT  
Sta 99+00 to 104+00 6 EA



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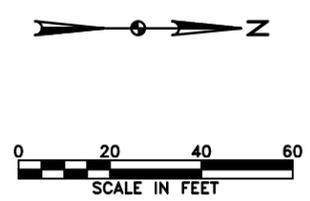
<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA	
	<b>N Washington St Lighting Layout</b> Sta 99+00-104+00	
DRWN. BY JE	CH'D BY CH	PROJECT NO. 1412129
		DATE 03/2014
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LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Light L53 to Light L55	104+41.0, 37.5' LT to 106+32.3, 31.5' LT	194	2"	404	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L53 to Light L54	104+41.0, 37.5' LT to 104+97.5, 43.3' RT	98	2"	212	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L54 to Light L56	104+97.5, 43.3' RT to 108+09.2, 29.5' RT	321	2"	658	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L53	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.
L54, L55, L56	LED	III	Round Tapered Steel	40'	6'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

- CONCRETE FOUNDATION - HIGHWAY LIGHTING  
Sta 104+00 to 109+00 4 EA
- 2IN DIAMETER RIGID CONDUIT  
Sta 104+41 to 108+09 613 LF
- UNDERGROUND CONDUCTOR NO2-TYPE RHW  
Sta 104+41 to 108+09 1274 LF
- UNDERGROUND CONDUCTOR NO4-TYPE THW  
Sta 104+41 to 108+09 637 LF
- LT STD 6FT MA 40FT MT HT BREAKAWAY  
Sta 104+00 to 109+00 3 EA
- LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY  
Sta 104+00 to 109+00 1 EA
- LED LUMINAIRE - 150 WATT  
Sta 104+00 to 109+00 5 EA



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**Legend**

LED Luminaire

Rev'd. Scale: 1:40 Hor, 1:10 Ver

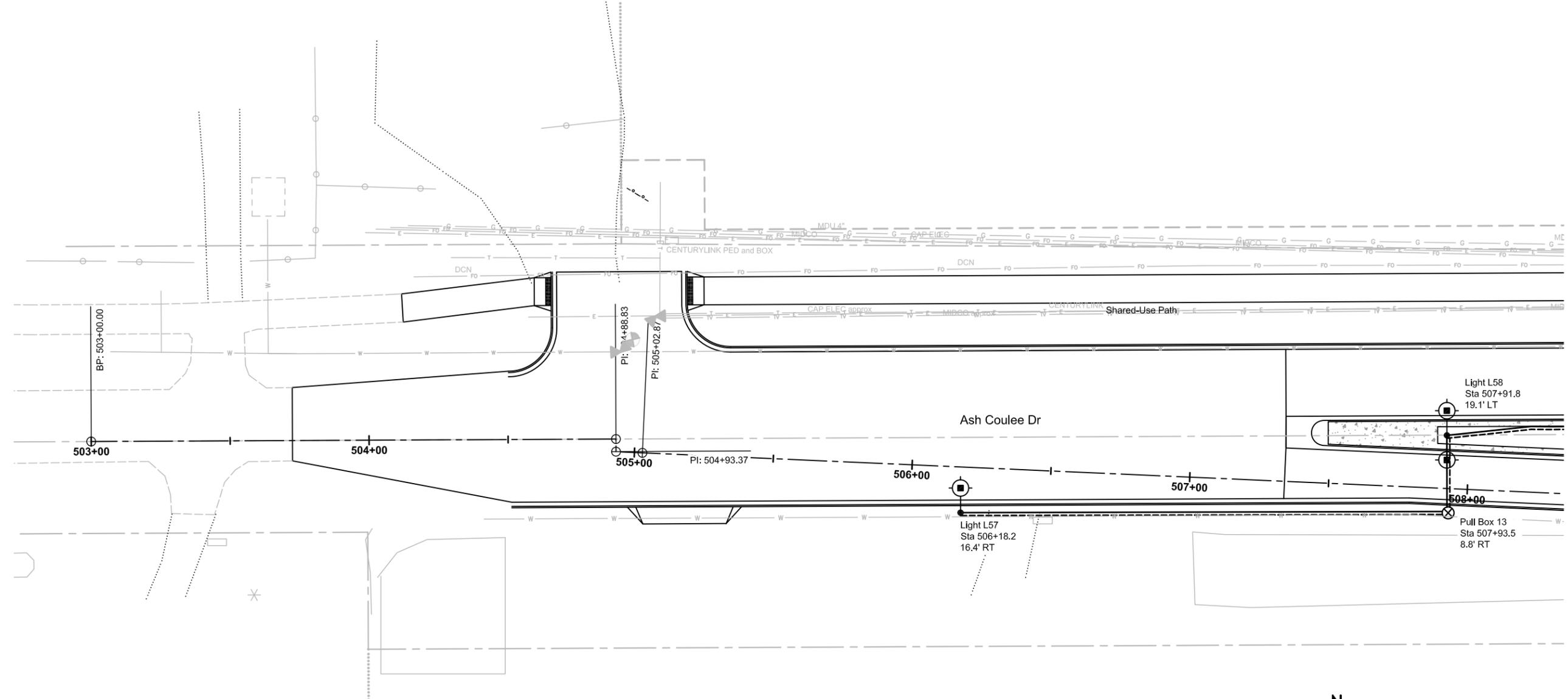
**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

**N Washington St**  
Lighting Layout

Sta 104+00-109+00

DRWN. BY	CHK'D BY	PROJECT NO.	DATE
JE	CH	1412129	03/2014

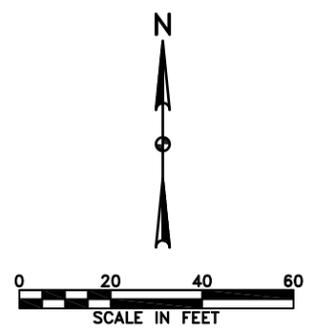
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LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPER
Light L57 to Pull Box 13	506+18.2, 16.4' RT to 507+93.5, 8.8' RT	182	2"	378	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Pull Box 13 to Light L58	507+93.5, 8.8' RT to 507+91.8, 19.1' LT	28	2"	70	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L58 to Light L59	507+91.8, 19.1' LT to 509+68.7, 25.0' LT	179	2"	374	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

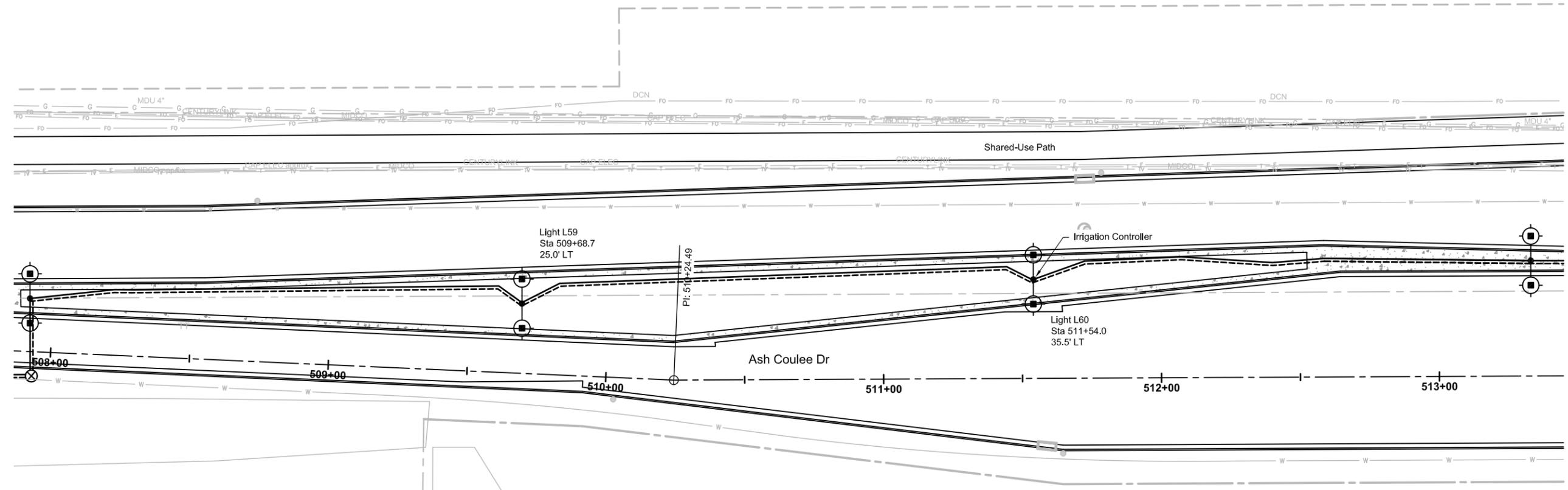
LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPER	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L57	LED	III	Round Tapered Steel	40'	6'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.
L58	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

- CONCRETE FOUNDATION - HIGHWAY LIGHTING  
Sta 503+00 to 508+00 2 EA
- PULL BOX  
Sta 507+93.5, RT 1 EA
- 2IN DIAMETER RIGID CONDUIT  
Sta 506+18 to 509+69 389 LF
- UNDERGROUND CONDUCTOR NO2-TYPE RHW  
Sta 506+18 to 509+69 822 LF
- UNDERGROUND CONDUCTOR NO4-TYPE THW  
Sta 506+18 to 509+69 411 LF
- LT STD 6FT MA 40FT MT HT BREAKAWAY  
Sta 503+00 to 508+00 1 EA
- LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY  
Sta 503+00 to 508+00 1 EA
- LED LUMINAIRE - 150 WATT  
Sta 503+00 to 508+00 3 EA



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<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA 	
<b>Ash Coulee Dr/43rd Ave Lighting Layout</b> Sta 503+00-508+00		
DRWN. BY JE	CHK'D BY CH	PROJECT NO. 1412129
		DATE 03/2014
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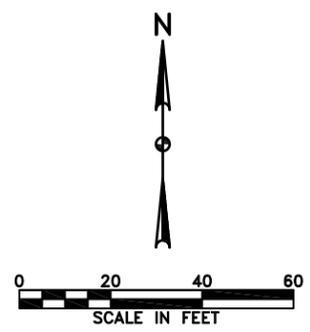


**Electrical Notes**  
 1. Proposed median sprinkler system controller to be mounted on light standard L60. Controller shall be fed with (2) - #10 AWG Cu RHW from Feedpoint 1 utilizing the proposed street lighting conduit and ground conductor. Irrigation phase conductors shall be included in the price bid for "Median Sprinkler System."

LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPER
Light L59 to Light L60	509+68.7, 25.0' LT to 511+54.0, 35.5' LT	187	2"	390	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L60 to Light L61	511+54.0, 35.5' LT to 513+33.0, 41.4' LT	180	2"	376	(2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (IRRIGATION) (2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

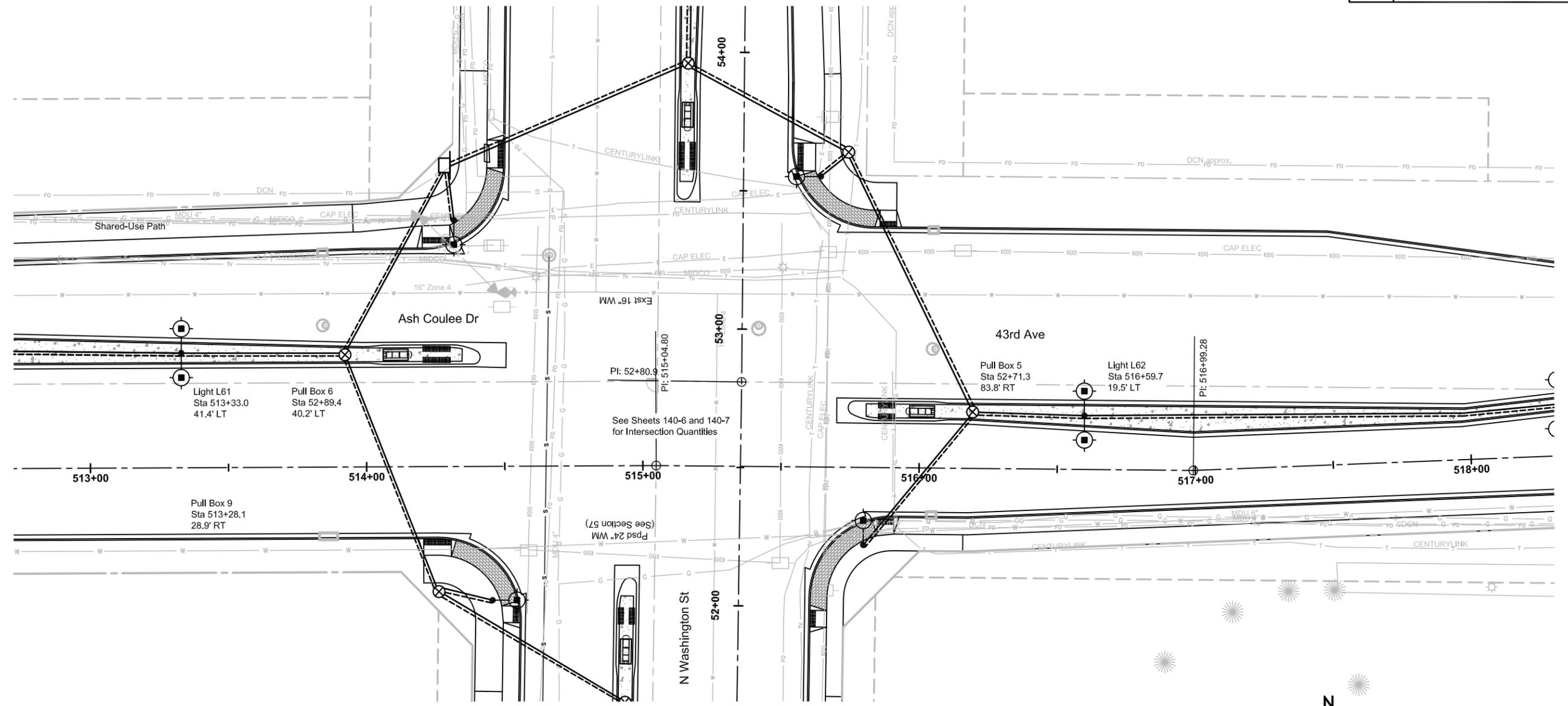
LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPER	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L59, L60	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

<b>CONCRETE FOUNDATION - HIGHWAY LIGHTING</b> Sta 508+00 to 513+00	2	EA
<b>2IN DIAMETER RIGID CONDUIT</b> Sta 509+69 to 513+33	367	LF
<b>UNDERGROUND CONDUCTOR NO2-TYPE RHW</b> Sta 509+69 to 513+33	766	LF
<b>UNDERGROUND CONDUCTOR NO4-TYPE THW</b> Sta 509+69 to 513+33	383	LF
<b>LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY</b> Sta 508+00 to 513+00	2	EA
<b>LED LUMINAIRE - 150 WATT</b> Sta 508+00 to 513+00	4	EA



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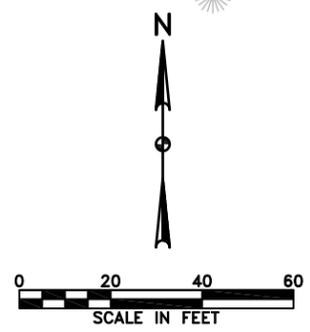
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DRWN. BY: JE CHK'D BY: CH	PROJECT NO.: 1412129 DATE: 03/2014	J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg © Kadmas, Lee & Jackson 2014



LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPER
Light L61 to Pull Box 6	513+33.0, 41.4' LT to 52+89.4, 40.2' LT	59	2"	132	(2) UNDERGROUND CONDUCTOR NO. 10 RHW/USE (IRRIGATION)
Pull Box 5 to Light L62	52+71.3, 83.8' RT to 516+59.7, 19.5' LT	40	2"	94	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L62 to Light L63	516+59.7, 19.5' LT to 518+31.7, 18.7' LT	171	2"	358	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

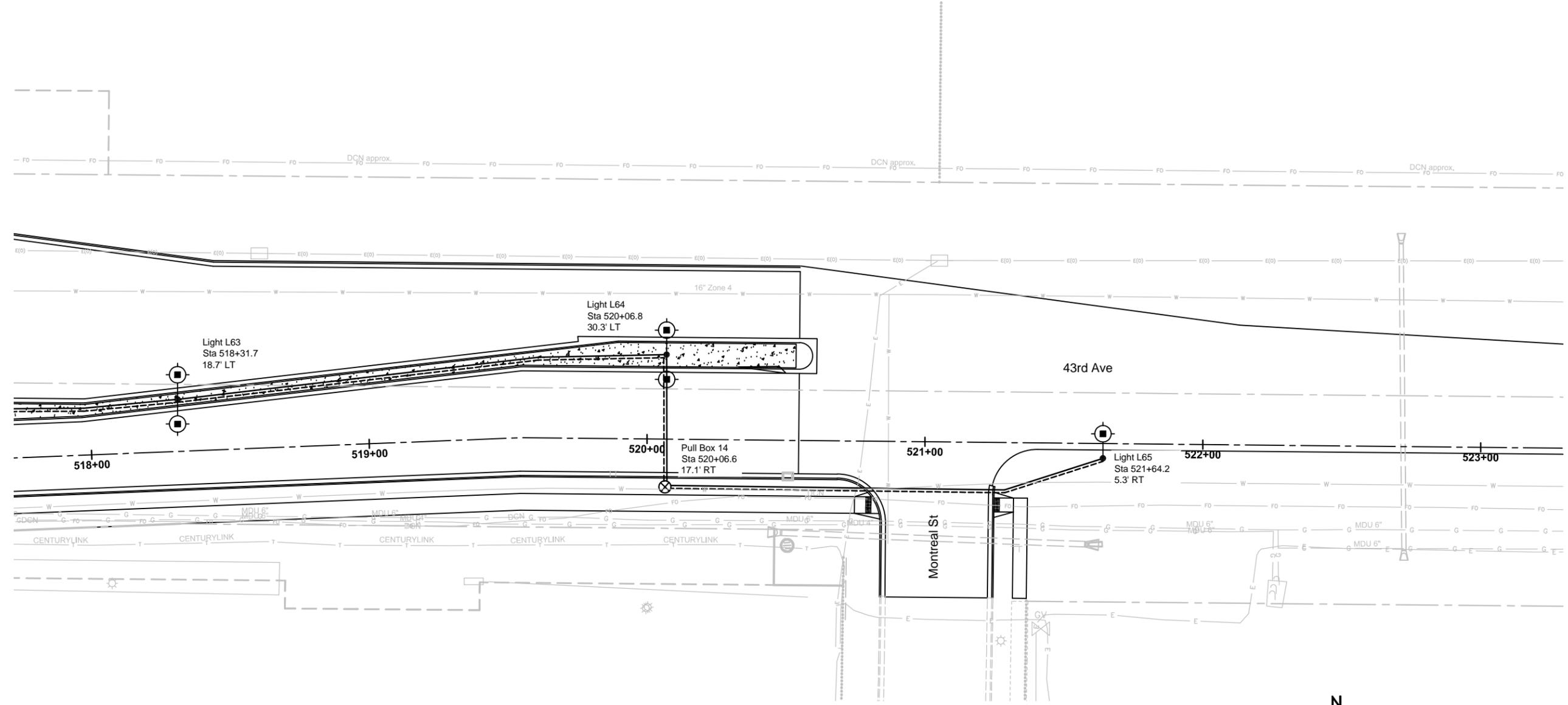
LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPER	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L61, L62	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

- CONCRETE FOUNDATION - HIGHWAY LIGHTING  
Sta 513+00 to 518+00 2 EA
- 2IN DIAMETER RIGID CONDUIT  
Sta 513+33 to 518+32 270 LF
- UNDERGROUND CONDUCTOR NO2-TYPE RHW  
Sta 513+33 to 518+32 584 LF
- UNDERGROUND CONDUCTOR NO4-TYPE THW  
Sta 513+33 to 518+32 292 LF
- LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY  
Sta 513+00 to 518+00 2 EA
- LED LUMINAIRE - 150 WATT  
Sta 513+00 to 518+00 4 EA



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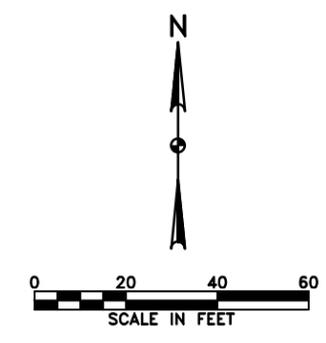
<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA  <b>Ash Coulee Dr/43rd Ave Lighting Layout</b> Sta 513+00-518+00	
DRWN BY: JE CHK'D BY: CH	PROJECT NO.: 1412129 DATE: 03/2014	J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg © Kadmas, Lee & Jackson 2014



LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPER
Light L63 to Light L64	518+31.7, 18.7' LT to 520+06.8, 30.3' LT	177	2"	370	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L64 to Pull Box 14	520+06.8, 30.3' LT to 520+06.6, 17.1' RT	47	2"	108	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Pull Box 14 to Light L65	520+06.6, 17.1' RT to 521+64.2, 5.3' RT	158	2"	330	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPER	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L63, L64	LED	III	Round Tapered Steel	40'	6' Twin	Install twin mast arm light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.
L64	LED	III	Round Tapered Steel	40'	6'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

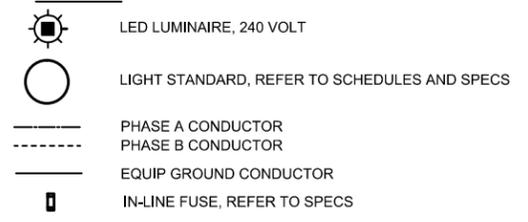
- CONCRETE FOUNDATION - HIGHWAY LIGHTING  
Sta 518+00 to 523+00 3 EA
- PULL BOX  
Sta 520+06.6, RT 1 EA
- 2IN DIAMETER RIGID CONDUIT  
Sta 518+32 to 521+64 382 LF
- UNDERGROUND CONDUCTOR NO2-TYPE RHW  
Sta 518+32 to 521+64 808 LF
- UNDERGROUND CONDUCTOR NO4-TYPE THW  
Sta 518+32 to 521+64 404 LF
- LT STD 6FT MA 40FT MT HT BREAKAWAY  
Sta 518+00 to 523+00 1 EA
- LT STD TWIN 6FT MA 40FT MT HT BREAKAWAY  
Sta 518+00 to 523+00 2 EA
- LED LUMINAIRE - 150 WATT  
Sta 518+00 to 523+00 5 EA



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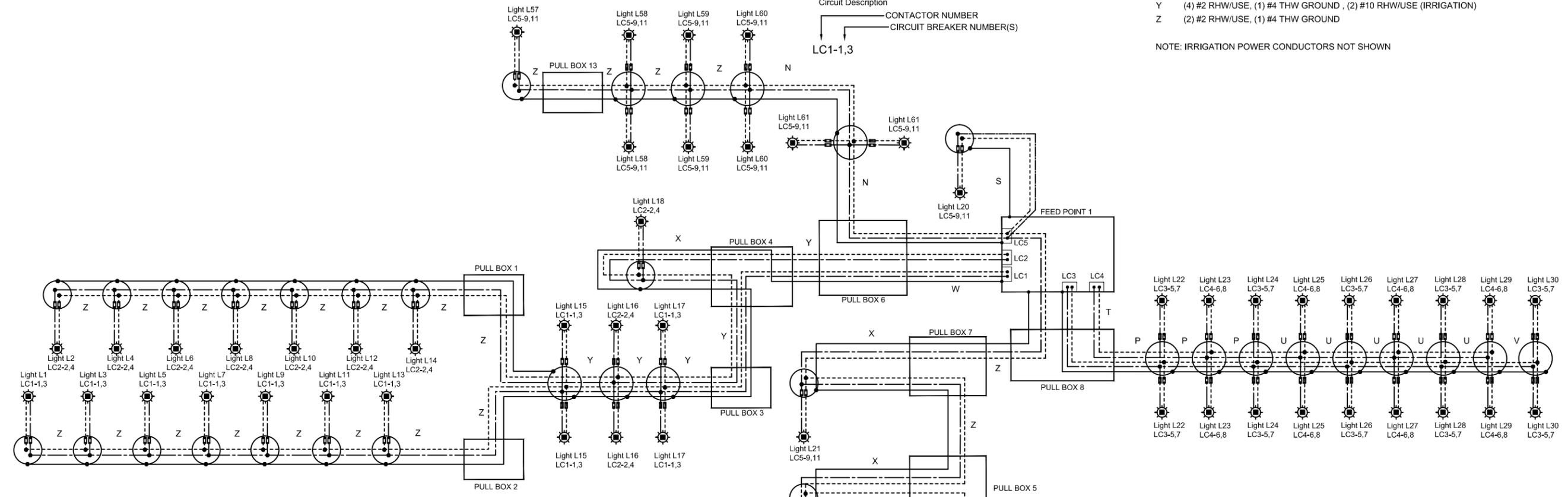
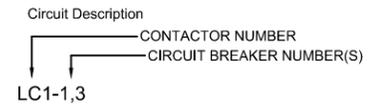
<b>Legend</b> LED Luminaire	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA <b>Ash Coulee Dr/43rd Ave Lighting Layout</b> <b>Sta 518+00-523+00</b>	
DRWN. BY: JE CHKD BY: CH	PROJECT NO.: 1412129 DATE: 03/2014	J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg © Kadmas, Lee & Jackson 2014

**LEGEND**



- N (2) #2 RHW/USE, (1) #4 THW GROUND, (2) #10 RHW/USE (IRRIGATION)  
 P (4) #4 RHW/USE, (1) #6 THW GROUND, (2) #10 RHW/USE (IRRIGATION)  
 S (2) #10 RHW/USE, (1) #6 THW GROUND  
 T (2) #2 RHW/USE, (4) #4 RHW/USE, (1) #4 THW & (1) #6 THW GROUND, (2) #10 RHW/USE (IRRIGATION)  
 U (4) #4 RHW/USE, (1) #6 THW GROUND  
 V (2) #4 RHW/USE, (1) #6 THW GROUND  
 W (6) #2 RHW/USE, (2) #4 THW GROUND, (4) #10 RHW/USE (IRRIGATION)  
 X (4) #2 RHW/USE, (2) #4 THW GROUND  
 Y (4) #2 RHW/USE, (1) #4 THW GROUND, (2) #10 RHW/USE (IRRIGATION)  
 Z (2) #2 RHW/USE, (1) #4 THW GROUND

NOTE: IRRIGATION POWER CONDUCTORS NOT SHOWN



**FEED POINT 1 PANEL SCHEDULE**

200 Amp Main Breaker, 120/240 Volt, 1Ø, All breakers 22 KAIC minimum.  
 NEMA 1 enclosure. 20 space minimum loadcenter. Fed from Utility Metersocket. UL SUSE Rated.  
 (3) - #3/0 AWG Cu RHW/USE in flex conduit from metersocket to loadcenter, in conduit for service.  
 Provide Typed Identifications according to NEC 408.  
 Per NEC provide and bond #6 AWG ground electrodes to ground rods and cabinet.

CKT	DESCRIPTION	BRK	V-A	AMPS	Φ	AMPS	V-A	BRK	DESCRIPTION	CKT
1	LC1			14.52	A	12.90			LC2	2
3	Washington St - to the South	50	3,485	14.52	B	12.90	3,096	50	Washington St - to the South	4
5	LC3			13.20	A	10.56			LC4	6
7	Washington St - to the North	50	3,168	13.20	B	10.56	2,534	50	Washington St - to the North	8
9	LC5			22.44	A	1.5	180	20	South Irrigation L15	10
11	43rd Ave & Ash Coulee Dr	50	5,386	22.44	B	1.5	180	20	North Irrigation L24	12
13	GFCI Receptacle (Feedpoint Internal)	20	600	5.0	A	1.5	180	20	West Irrigation L60	14
15	Photo cell control	15	12	0.1	B				(Space)	16
17	(Space)				A				(Space)	18
19	(Space)				B				(Space)	20
<b>Total Connected VA and Amps</b>			18,821	81.6		75.2				

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**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

**Lighting Schematic**

DRAWN BY: JE  
 CH'D BY: CH  
 PROJECT NO.: 1412129  
 DATE: 03/2014

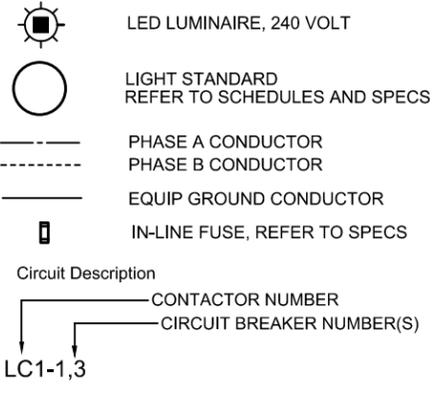
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EXISTING FEED POINT 2 PANEL SCHEDULE

Provide Typed Identifications according to NEC 408.

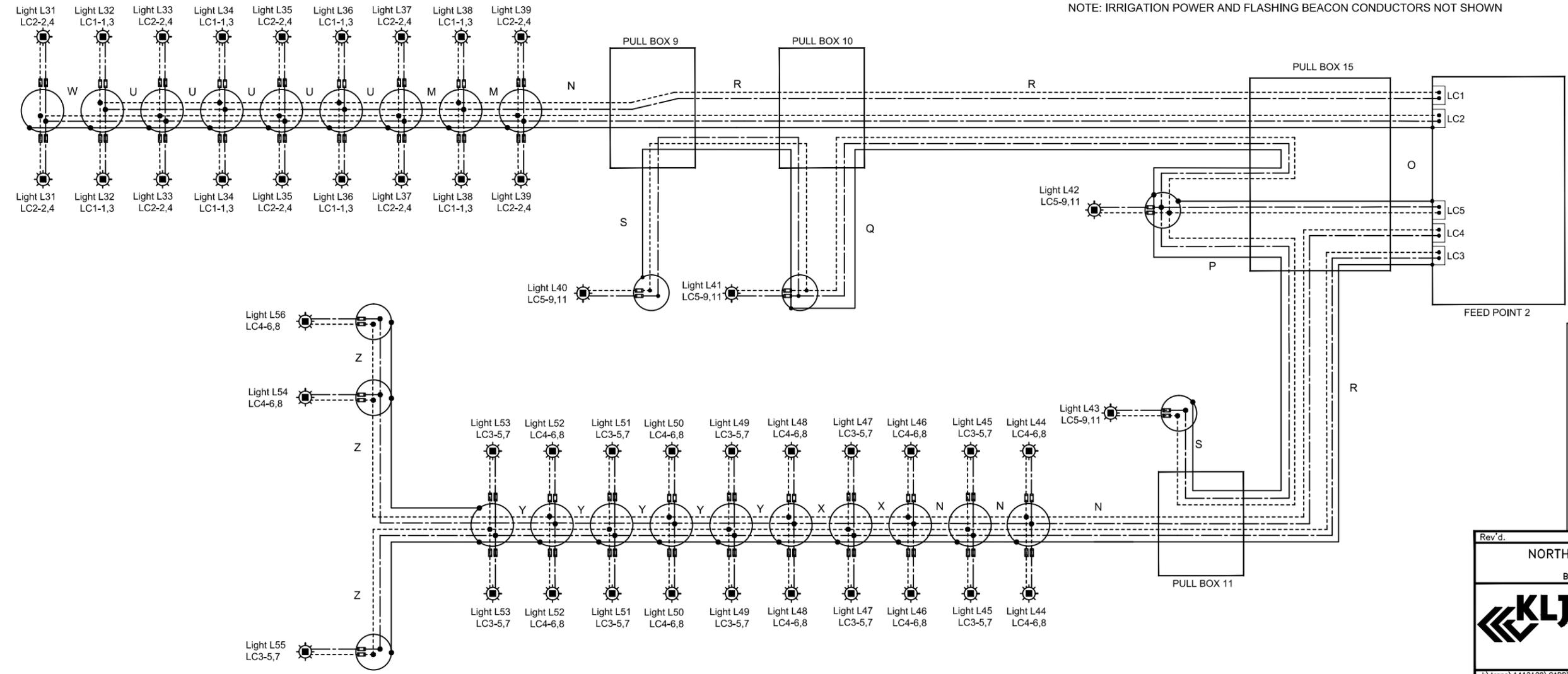
CKT	DESCRIPTION	BRK	V-A	AMPS	Φ	AMPS	V-A	BRK	DESCRIPTION	CKT
1	LC1	50	2,851	11.88	A	14.52	3,485	50	LC2	2
3	Washington St - to the South			11.88	B	14.52			Washington St - to the South	4
5	LC3	50	3,485	14.52	A	15.84	3,802	50	LC4	6
7	Washington St - to the North			14.52	B	15.84			Washington St - to the North	8
9	LC5	50	1,272	5.30	A	3.0	360	20	South Irrigation L32 & L38	10
11	Signal Lighting			5.30	B	3.0	360	20	North Irrigation L45 & 48	12
13	GFCI Receptacle (Feedpoint Internal)	20	600	5.0	A				(Space)	14
15	Photo cell control	15	12	0.1	B				(Space)	16
17	(Space)				A				(Space)	18
19	(Space)				B				(Space)	20
<b>Total Connected VA and Amps</b>			16,226	70.1						
				65.2						

LEGEND



- M (4) #4 RHW/USE, (1) #6 THW GROUND, (2) #6 RHW/USE (IRRIGATION), (1) NO14 AWG 4/C CABLE
- N (4) #2 RHW/USE, (1) #4 THW GROUND, (2) #6 RHW/USE (IRRIGATION), (1) NO14 AWG 4/C CABLE
- O (8) #2 RHW/USE, (2) #10 RHW/USE, (2) #4 THW & (1) #6 THW GROUND, (4) #6 RHW/USE (IRRIGATION)
- P (6) #10 RHW/USE, (3) #6 THW GROUND
- Q (4) #10 RHW/USE, (2) #6 THW GROUND
- R (2) #10 RHW/USE, (4) #2 RHW/USE, (1) #6 THW & (1) #4 THW GROUND, (2) #6 RHW/USE (IRRIGATION), (1) NO14 AWG 4/C CABLE
- S (2) #10 RHW/USE, (1) #6 THW GROUND
- U (4) #4 RHW/USE, (1) #6 THW GROUND, (2) #6 RHW/USE (IRRIGATION)
- W (2) #4 RHW/USE, (1) #6 THW GROUND
- X (4) #2 RHW/USE, (1) #4 THW GROUND, (2) #6 RHW/USE (IRRIGATION)
- Y (4) #2 RHW/USE, (1) #4 THW GROUND
- Z (2) #2 RHW/USE, (1) #4 THW GROUND

NOTE: IRRIGATION POWER AND FLASHING BEACON CONDUCTORS NOT SHOWN



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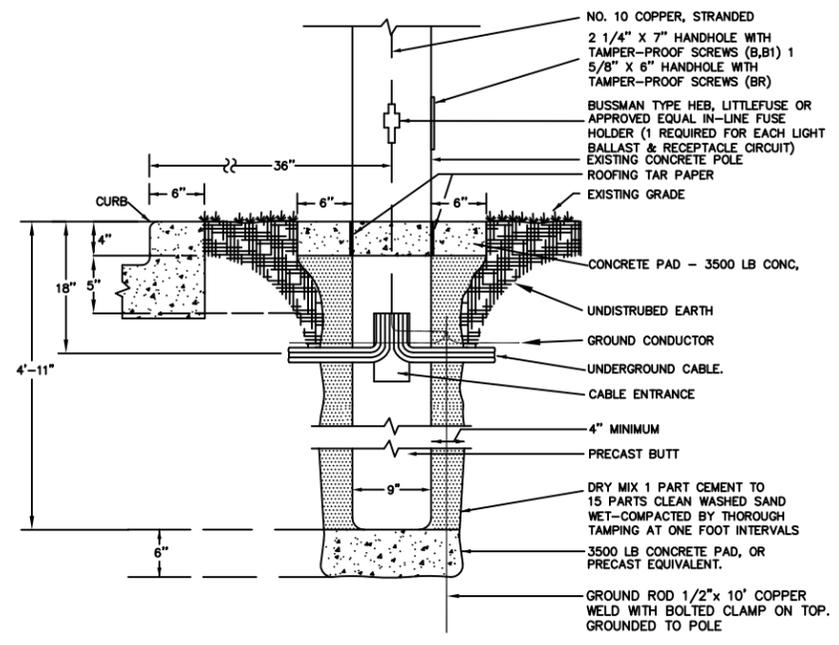
**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

**Lighting Schematic**

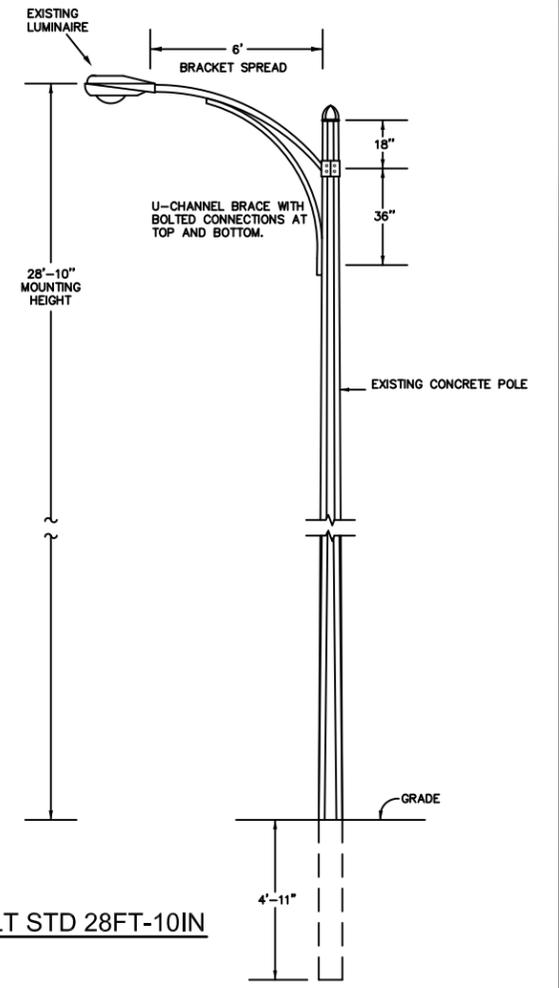
DRWN. BY: JE  
 CH'D BY: CH  
 PROJECT NO.: 1412129  
 DATE: 03/2014

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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	140	26



**EMBEDDED BASE DETAIL (for relocated light)**  
CONCRETE LT STD 28FT-10IN

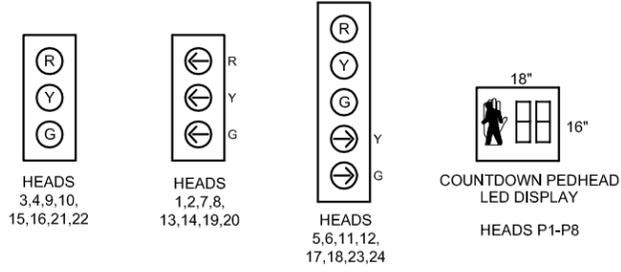


**CONCRETE LT STD 28FT-10IN**  
No Scale

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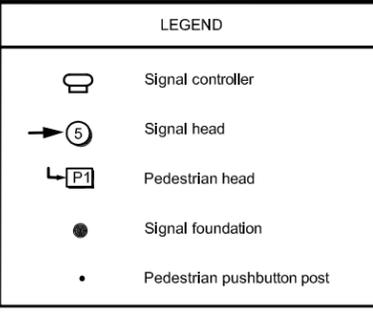
Rev'd.		Scale: 1:40 Hor, 1:10 Ver	
NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		Lighting Details	
DRWN. BY	CHK'D BY	PROJECT NO.	DATE
JE	CH	1412129	03/2014
J:\trans\1412129\CADD\140LT_001_LLIGHT.dwg			
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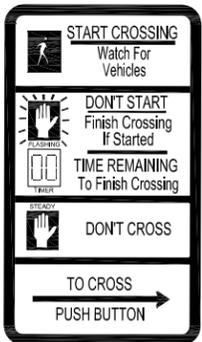
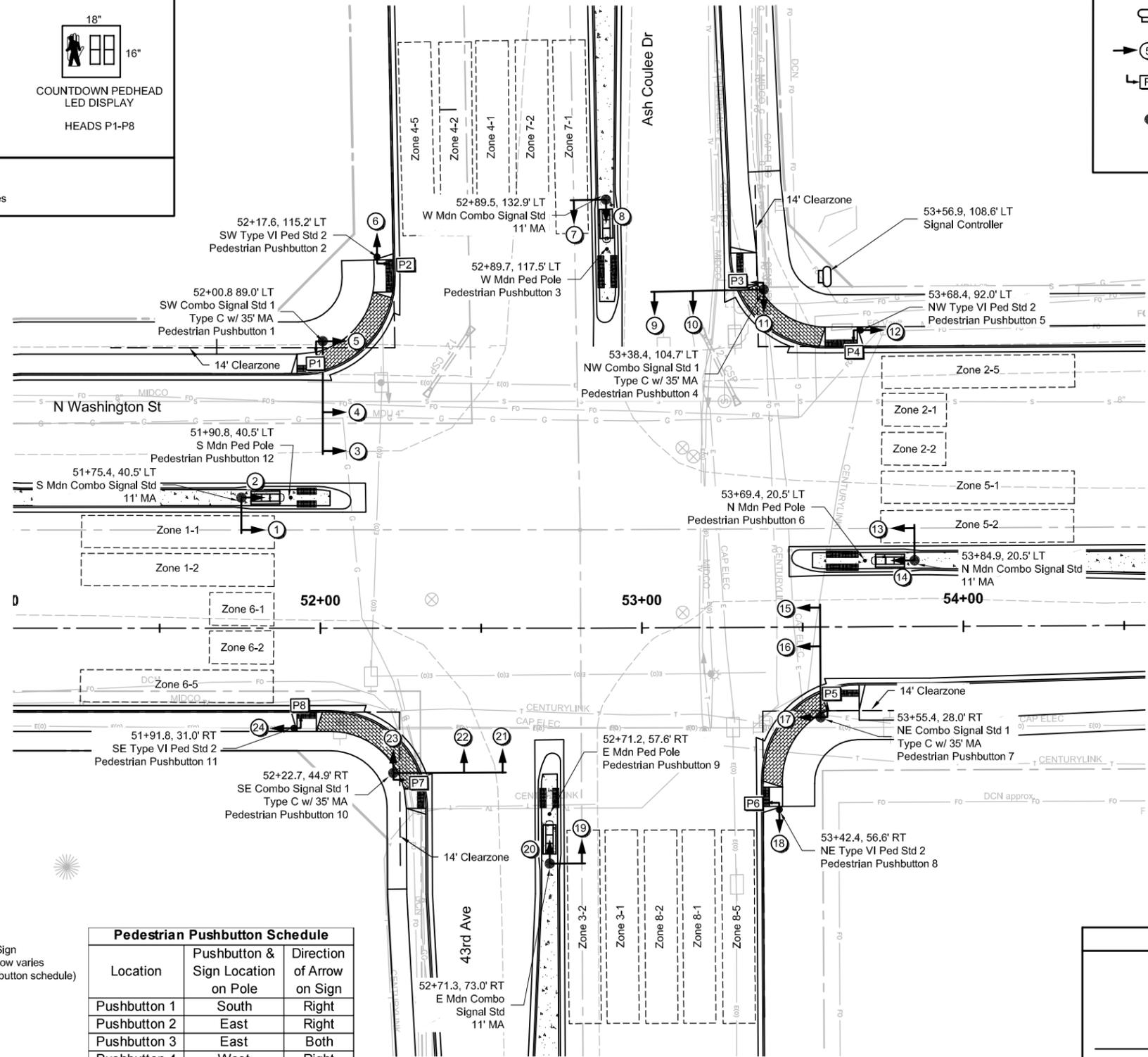
HEADS 3,4,9,10, 15,16,21,22  
HEADS 1,2,7,8, 13,14,19,20  
HEADS 5,6,11,12, 17,18,23,24  
COUNTDOWN PEDHEAD LED DISPLAY  
HEADS P1-P8

All Signal Heads:  
12" LED Lenses &  
5" Louvered Backplates



**DETECTION ZONE SCHEDULE**

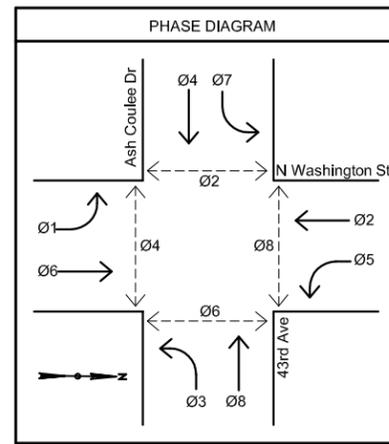
Phase-Number	Distance From Stop Bar (feet)	Length (feet)	Presence/Counting	Passage/Counting	Counting	Locking Memory	Non-Locking Memory
1-1	0	60	X			X	
1-2	0	60	X			X	
2-1	0	20			X		
2-2	0	20			X		
2-3	295	20		X		X	
2-4	295	20		X		X	
2-5	0	60	X				X
3-1	0	60	X			X	
3-2	0	60	X			X	
4-1	0	60	X			X	
4-2	0	60	X			X	
4-3	258	20		X		X	
4-4	258	20		X		X	
4-5	0	60	X				X
5-1	0	60	X			X	
5-2	0	60	X			X	
6-1	0	20			X		
6-2	0	20			X		
6-3	295	20		X		X	
6-4	295	20		X		X	
6-5	0	60	X				X
7-1	0	60	X			X	
7-2	0	60	X			X	
8-1	0	60	X			X	
8-2	0	60	X			X	
8-3	258	20		X		X	
8-4	258	20		X		X	
8-5	0	60	X				X



R10-3e Sign  
Direction of arrow varies  
(see pedestrian pushbutton schedule)

**Pedestrian Pushbutton Schedule**

Location	Pushbutton & Sign Location on Pole	Direction of Arrow on Sign
Pushbutton 1	South	Right
Pushbutton 2	East	Right
Pushbutton 3	East	Both
Pushbutton 4	West	Right
Pushbutton 5	South	Right
Pushbutton 6	South	Both
Pushbutton 7	North	Right
Pushbutton 8	West	Right
Pushbutton 9	West	Both
Pushbutton 10	East	Right
Pushbutton 11	North	Right
Pushbutton 12	North	Both



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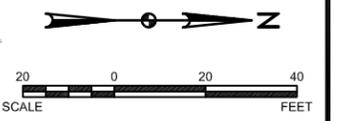
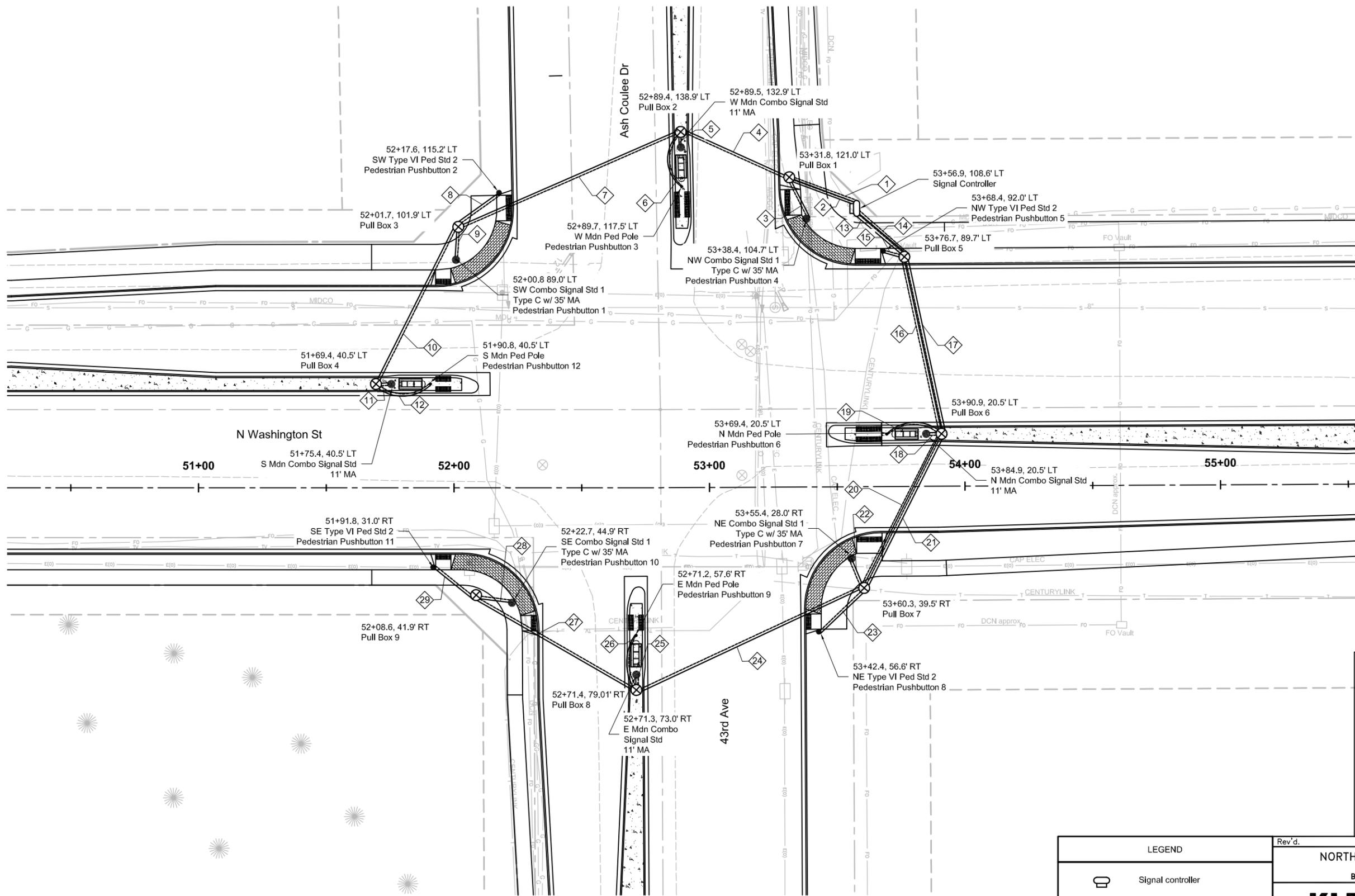
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**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

**Signal Layout**  
Traffic Signal System  
Site 1 - N Washington St  
& Ash Coulee Dr/43rd Ave

DRWN BY: ANG CHKD BY: GJS PROJECT NO.: 1412129 DATE: 08/2014

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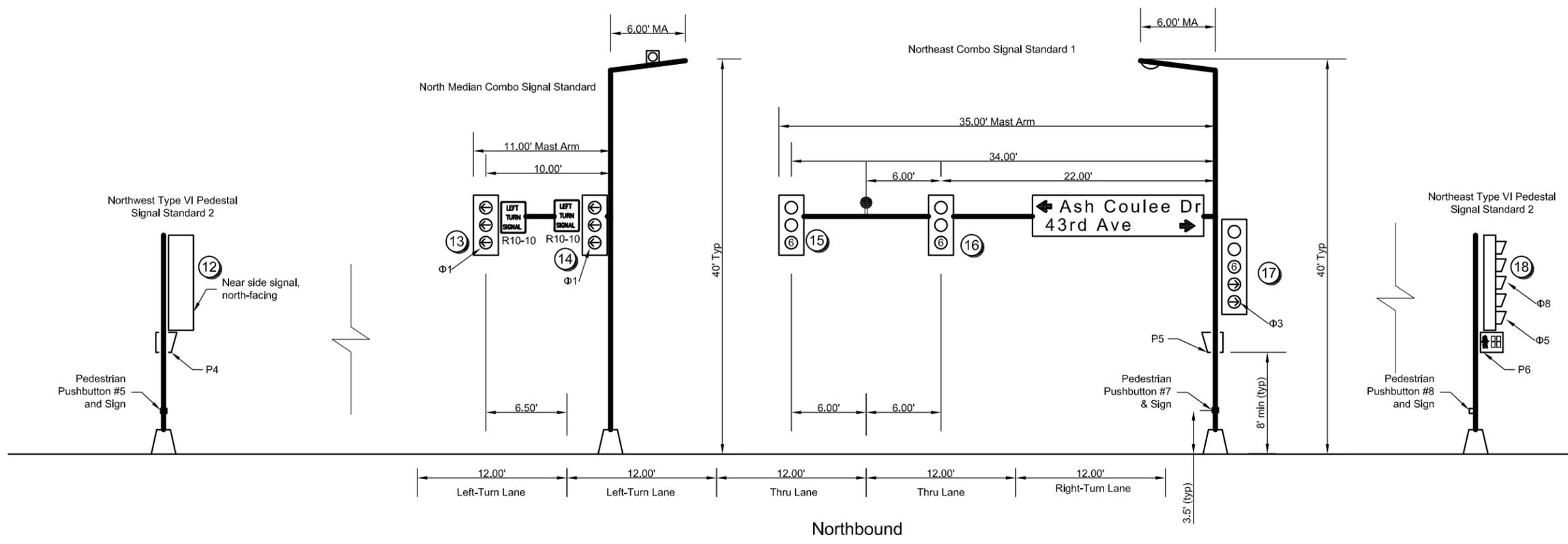


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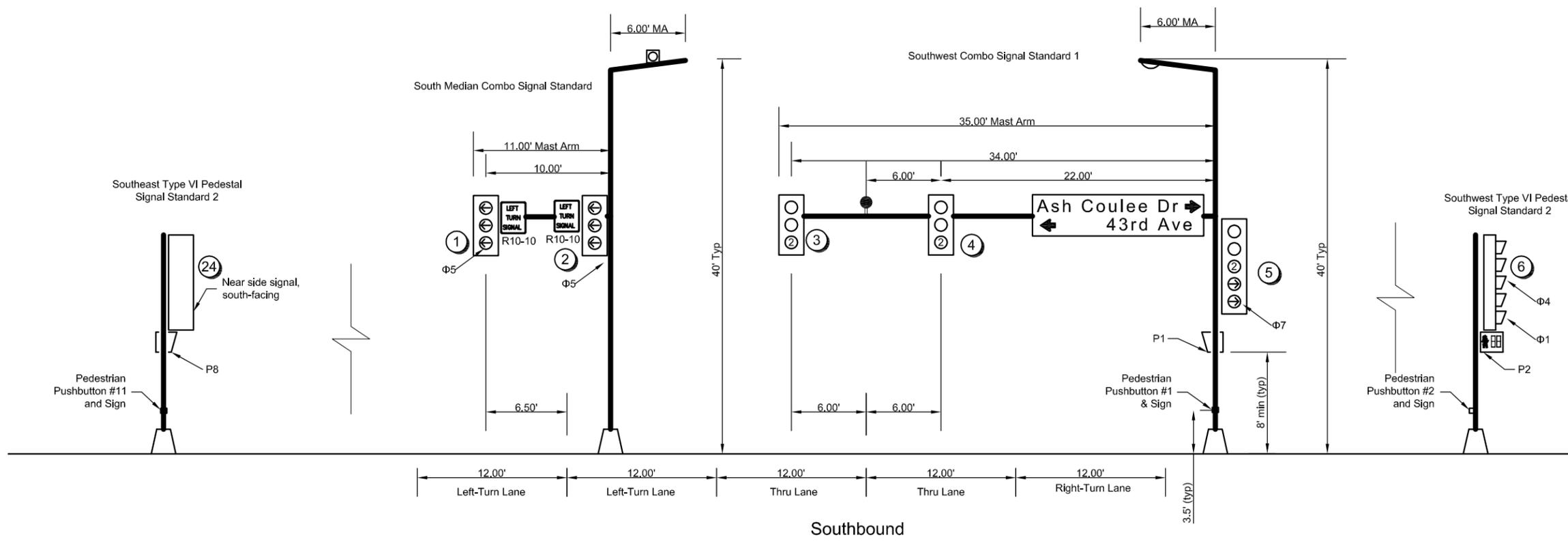
LEGEND	
	Signal controller
	Pull Box
	Cable Run Number

Rev'd.		Scale: 1:40 Hor, 1:10 Ver	
<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
<b>Signal Layout</b> <b>Traffic Signal System</b> <b>Site 1 - N Washington St</b> <b>&amp; Ash Coulee Dr/43rd Ave</b>			
DRWN BY	CHK'D BY	PROJECT NO.	DATE
ANG	GJS	1412129	08/2014
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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	150	3



\*The final location of the video detection cameras shall be determined by the contractor to provide a functional system.



LEGEND	
	Transformer Base
	Video Detection Camera*
	Traffic Signal head w/ associated phase
	Pedestrian Signal Head
	Signal head Number
	Emergency Vehicle Detection Unit

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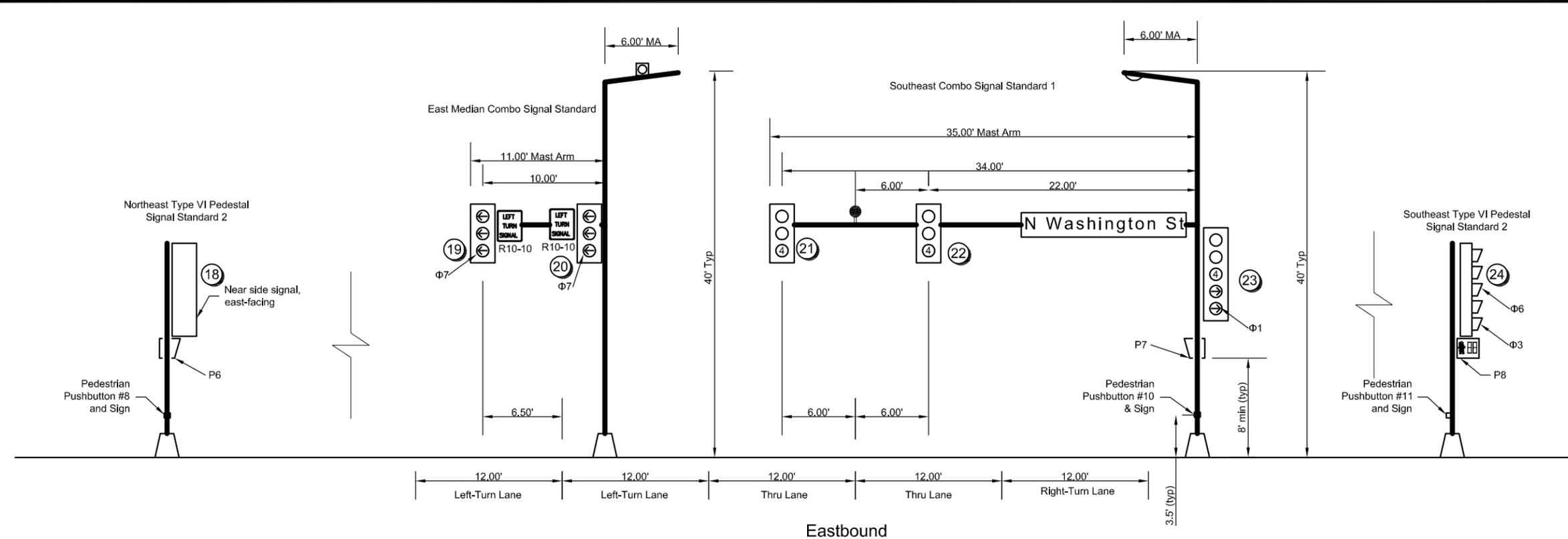
**NORTH WASHINGTON STREET**  
 CITY OF BISMARCK  
 BISMARCK, NORTH DAKOTA

**Elevation Views**  
 Traffic Signal System  
 Site 1 - N Washington St  
 & Ash Coulee Dr/43rd Ave

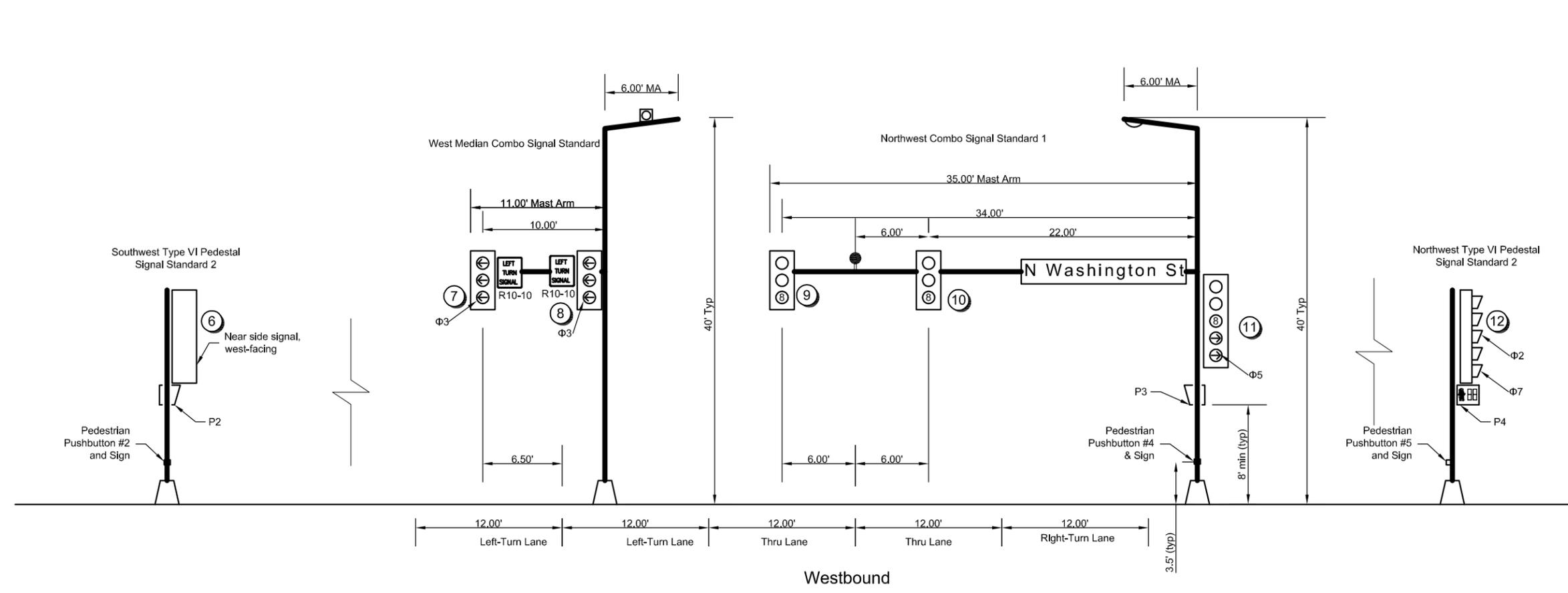
DRWN BY ANG	CHK'D BY GJS	PROJECT NO. 1412129	DATE 08/2014
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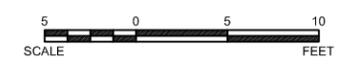


\*The final location of the video detection cameras shall be determined by the contractor to provide a functional system.



LEGEND	
	Transformer Base
	Video Detection Camera*
	Traffic Signal head w/ associated phase
	Pedestrian Signal Head
	Signal head Number
	Emergency Vehicle Detection Unit

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**NORTH WASHINGTON STREET**  
 CITY OF BISMARCK  
 BISMARCK, NORTH DAKOTA

**Elevation Views**  
 Traffic Signal System  
 Site 1 - N Washington St  
 & Ash Coulee Dr/43rd Ave

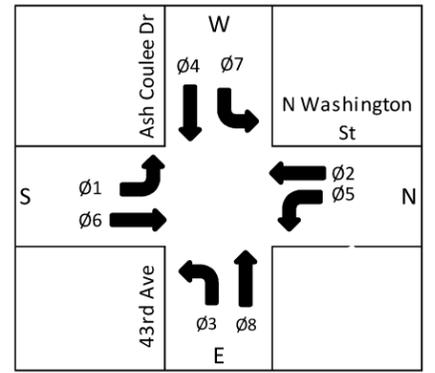
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NB = Northbound (N Washington St)  
 SB = Southbound (N Washington St)  
 EB = Eastbound (Ash Coulee Dr)  
 WB = Westbound (43rd Ave)

Y = Yellow Ball Indication  
 G = Green Ball Indication  
 GL = Green Left Arrow Indication  
 YL = Yellow Left Arrow Indication  
 GR = Green Right Arrow Indication  
 YR = Yellow Right Arrow Indication



**SIGNAL INDICATIONS & PHASING**

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
	NB Left	SB Thru	WB Left	EB Thru	SB Left	NB Thru	EB Left	WB Thru
Corresponding Signal Head(s)	13,14	3,4,5,12	7,8	6,21,22,23	1,2	15,16,17,24	19,20	9,10,11,18
Right-of-Way Display	GL	G	GL	G	GL	G	GL	G
Clearance Display Prior to Next Phase	YL	Y	YL	Y	YL	Y	YL	Y
Corresponding Pedestrian Head(s)		P2,P3		P1,P8		P6,P7		P4,P5
Concurrent Phase	5 or 6	5 or 6	7 or 8	7 or 8	1 or 2	1 or 2	3 or 4	3 or 4
Next Phase (Unless Skipped)	2	3	4	1	6	7	8	5

Overlap - Corresponding Signal Head(s)	6,23		17,24		11,18		5,12	
Overlap - Right-of-Way Display	GR		GR		GR		GR	
Overlap - Clearance Display Prior to Next Phase	YR		YR		YR		YR	

**BASIC INTERVALS (OR FUNCTIONS)**

Minimum Initial	5.0	10.0	5.0	7.0	5.0	10.0	5.0	7.0
Minimum Initial with Pedestrian Actuation*		24.1		24.1		24.1		24.1
Passage Time	2.0	5.0	2.0	5.0	2.0	5.0	2.0	5.0
Total Split (Green + Yellow+ All Red)	24.0	28.0	13.0	15.0	14.0	38.0	13.0	15.0
Yellow Change	3.0	3.9	3.0	3.0	3.0	3.9	3.0	3.0
Red Clearance	4.4	2.6	4.4	4.1	4.4	2.6	4.4	4.1
Walk		7.0		7.0		7.0		7.0
Pedestrian Clearance		17.1		17.1		17.1		17.1

**VOLUME DENSITY TIMING FUNCTIONS - ONLY APPLICABLE DURING "FREE" (UNCOORDINATED) TIMING PLAN**

*Added Initial*

Minimum Initial								
Added Initial per Actuation								
Actuations Before Added Initial								

*Computed Initial*

Minimum Initial								
Maximum Initial								
Actuations to Reach Maximum Initial								

*Extensible Initial*

Minimum Initial								
Maximum Initial								
Added Initial per Actuation								

Passage Time								
Minimum Gap								
Time to Reduce to Minimum Gap								
Reduce Gap Every								
Reduce Gap Every Second By								
Reduce Gap By								

**OTHER CONTROLLER FUNCTIONS**

Recall	No	Minimum	No	No	No	Minimum	No	No
Flashing-Normal & Conflict Monitor	R	Y	R	R	R	Y	R	R
Start Up Phasing	R	G	R	R	R	G	R	R
Emergency Vehicle Pre-emption	x	x	x	x	x	x	x	x
Type of Detector	Refer to Detector Zone Table							
Presence	Refer to Detector Zone Table							
Calling	Refer to Detector Zone Table							
Passage	Refer to Detector Zone Table							
Locking Memory	Refer to Detector Zone Table							
Non-Locking Memory	Refer to Detector Zone Table							

Site	Time Period	Timing Plan	Coordinated Phase	Offset <sup>1</sup>
1	7:00 AM - 7:00 PM	Coordinated	ø2 (South Thru)/ø6 (North Thru)	0
2			ø2 (South Thru)/ø6 (North Thru)	68
1	7:00 PM - 7:00 AM	Free	-	-
2			-	-

<sup>1</sup>Offset is referenced to the last of coordinated phases to turn green at master controller (site 2)

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**NORTH WASHINGTON STREET**  
 CITY OF BISMARCK  
 BISMARCK, NORTH DAKOTA

**Signal Phasing & Controller Settings**  
 Site 1 - N Washington St & Ash Coulee Dr/43rd Ave

DRWN BY: ANG, CHK'D BY: GJS, PROJECT NO.: 1412129, DATE: 08/2014

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Conductor		Cable SWS1 (Southwest Combo Signal) (12 No. 14 AWG)		Cable SWS2 (Southwest Type VI Signal) (12 No. 14 AWG)		Cable WMS (West Median Combo Signal) (7 No. 14 AWG)		Cable NWS1 (Northwest Combo Signal) (12 No. 14 AWG)		Cable NWS2 (Northwest Type VI Signal) (12 No. 14 AWG)		Cable NMS (North Median Combo Signal) (7 No. 14 AWG)		
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication	Head	Indication	Head	Indication	
1	Black		Spare		Spare		Spare		Spare		Spare		Spare	
2	White		Neutral		Neutral		Neutral		Neutral		Neutral		Neutral	
3	Red	3,4,5	Ø2 Red	6	Ø4 Red	7,8	Ø3 Red ←	9,10,11	Ø8 Red	12	Ø2 Red	13,14	Ø1 Red ←	
4	Green		Ground		Ground		Ground		Ground		Ground		Ground	
5	Orange	3,4,5	Ø2 Yellow	6	Ø4 Yellow	7,8	Ø3 Yellow ←	9,10,11	Ø8 Yellow	12	Ø2 Yellow	13,14	Ø1 Yellow ←	
6	Blue	3,4,5	Ø2 Green	6	Ø4 Green	7,8	Ø3 Green ←	9,10,11	Ø8 Green	12	Ø2 Green	13,14	Ø1 Green ←	
7	White	Black	Spare		Spare		Spare		Spare		Spare		Spare	
8	Red	Black	P1	Ø4 Don't Walk	P2	Ø2 Don't Walk	X		P3	Ø2 Don't Walk	P4	Ø8 Don't Walk	X	
9	Green	Black		Spare		Spare				Spare		Spare		
10	Orange	Black	5	Ø7 Yellow →	6	Ø1 Yellow →			11	Ø5 Yellow →	12	Ø7 Yellow →		
11	Blue	Black	5	Ø7 Green →	6	Ø1 Green →			11	Ø5 Green →	12	Ø7 Green →		
12	Black	White	P1	Ø4 Walk	P2	Ø2 Walk			P3	Ø2 Walk	P4	Ø8 Walk		

Conductor		Cable NES1 (Northeast Combo Signal) (12 No. 14 AWG)		Cable NES2 (Northeast Type VI Signal) (12 No. 14 AWG)		Cable EMS (East Median Combo Signal) (7 No. 14 AWG)		Cable SES1 (Southeast Combo Signal) (12 No. 14 AWG)		Cable SES2 (Southeast Type VI Signal) (12 No. 14 AWG)		Cable SMS (South Median Combo Signal) (7 No. 14 AWG)		
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication	Head	Indication	Head	Indication	
1	Black		Spare		Spare		Spare		Spare		Spare		Spare	
2	White		Neutral		Neutral		Neutral		Neutral		Neutral		Neutral	
3	Red	15,16,17	Ø6 Red	18	Ø8 Red	19,20	Ø7 Red ←	21,22,23	Ø4 Red	24	Ø6 Red	1,2	Ø5 Red ←	
4	Green		Ground		Ground		Ground		Ground		Ground		Ground	
5	Orange	15,16,17	Ø6 Yellow	18	Ø8 Yellow	19,20	Ø7 Yellow ←	21,22,23	Ø4 Yellow	24	Ø6 Yellow	1,2	Ø5 Yellow ←	
6	Blue	15,16,17	Ø6 Green	18	Ø8 Green	19,20	Ø7 Green ←	21,22,23	Ø4 Green	24	Ø6 Green	1,2	Ø5 Green ←	
7	White	Black	Spare		Spare		Spare		Spare		Spare		Spare	
8	Red	Black	P5	Ø8 Don't Walk	P6	Ø6 Don't Walk	X		P7	Ø6 Don't Walk	P8	Ø4 Don't Walk	X	
9	Green	Black		Spare		Spare				Spare		Spare		
10	Orange	Black	17	Ø3 Yellow →	18	Ø5 Yellow →			23	Ø1 Yellow →	24	Ø3 Yellow →		
11	Blue	Black	17	Ø3 Green →	18	Ø5 Green →			23	Ø1 Green →	24	Ø3 Green →		
12	Black	White	P5	Ø8 Walk	P6	Ø6 Walk			P7	Ø6 Walk	P8	Ø4 Walk		

INTERNAL MAST ARM/STANDARD SIGNAL HEAD CABLE				
Origin	Destination	# of Cables	SIZE/TYPE	Total LF
South Median Combo Signal Std Transformer Base	Vehicle Head 1	1	14 AWG 5 CONDUCTOR CABLE	39
	Vehicle Head 2	1	14 AWG 5 CONDUCTOR CABLE	30
Southwest Combo Signal Std 1 Transformer Base	Vehicle Head 3	1	14 AWG 5 CONDUCTOR CABLE	62
	Vehicle Head 4	1	14 AWG 5 CONDUCTOR CABLE	50
	Vehicle Head 5	1	14 AWG 7 CONDUCTOR CABLE	20
Southwest Type VI Signal Std 2 Transformer Base	Vehicle Head 6	1	14 AWG 7 CONDUCTOR CABLE	20
West Median Combo Signal Std Transformer Base	Vehicle Head 7	1	14 AWG 5 CONDUCTOR CABLE	39
	Vehicle Head 8	1	14 AWG 5 CONDUCTOR CABLE	30
Northwest Combo Signal Std 1 Transformer Base	Vehicle Head 9	1	14 AWG 5 CONDUCTOR CABLE	62
	Vehicle Head 10	1	14 AWG 5 CONDUCTOR CABLE	50
	Vehicle Head 11	1	14 AWG 7 CONDUCTOR CABLE	20
Northwest Type VI Signal Std 2 Transformer Base	Vehicle Head 12	1	14 AWG 7 CONDUCTOR CABLE	20
North Median Combo Signal Std Transformer Base	Vehicle Head 13	1	14 AWG 5 CONDUCTOR CABLE	39
	Vehicle Head 14	1	14 AWG 5 CONDUCTOR CABLE	30
Northeast Combo Signal Std 1 Transformer Base	Vehicle Head 15	1	14 AWG 5 CONDUCTOR CABLE	62
	Vehicle Head 16	1	14 AWG 5 CONDUCTOR CABLE	50
	Vehicle Head 17	1	14 AWG 7 CONDUCTOR CABLE	20
Northeast Type VI Signal Std 2 Transformer Base	Vehicle Head 18	1	14 AWG 7 CONDUCTOR CABLE	20
East Median Combo Signal Std Transformer Base	Vehicle Head 19	1	14 AWG 5 CONDUCTOR CABLE	39
	Vehicle Head 20	1	14 AWG 5 CONDUCTOR CABLE	30
Southeast Combo Signal Std 1 Transformer Base	Vehicle Head 21	1	14 AWG 5 CONDUCTOR CABLE	62
	Vehicle Head 22	1	14 AWG 5 CONDUCTOR CABLE	50
	Vehicle Head 23	1	14 AWG 5 CONDUCTOR CABLE	20
Southeast Type VI Signal Std 2 Transformer Base	Vehicle Head 24	1	14 AWG 7 CONDUCTOR CABLE	20

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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		Signal Head Cable Connections Site 1 - N Washington St & Ash Coulee Dr/43rd Ave	
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**SIGNAL CABLE & CONDUIT SCHEDULE**

#	RUN		CONDUIT		NOTES	CABLE					
	ITEM	STATION, OFFSET	SIZE (IN)	LF		Origin	Destination	# of Cables	SIZE/TYPE	Total LF	TITLE
1	Origin Destination Traffic Signal Controller Pull Box 1	53+56.9, 108.6' LT 53+31.8, 121.0' LT	3	28		Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller	Pull Box 1 Pull Box 1 Pull Box 1 Pull Box 1 Pull Box 1 Pull Box 1	2 2 2 1 1 4	14 AWG 12 CONDUCTOR CABLE 14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	86 86 86 43 43 172	SWS1, SWS2 SMS, WMS SMV, WMV ED25 EL25 PB1, PB2, PB3, PB12
2	Origin Destination Traffic Signal Controller Pull Box 1	53+56.9, 108.6' LT 53+31.8, 121.0' LT	2	28		Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller	Pull Box 1 Pull Box 1 Pull Box 1 Pull Box 1	1 1 1 1	14 AWG 12 CONDUCTOR CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	43 43 43 43	NWS1 ED38 EL38 PB4
3	Origin Destination Pull Box 1 Northwest Combo Signal Std 1	53+31.8, 121.0' LT 53+38.4, 104.7' LT	2	18		Pull Box 1 Pull Box 1 Pull Box 1 Pull Box 1	Northwest Combo Signal Std 1 Transformer Base Northwest Emergency Preemption Detector Northwest Emergency Preemption Lamp Pushbutton 4	1 1 1 1	14 AWG 12 CONDUCTOR CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	29 78 78 32	NWS1 ED38 EL38 PB4
4	Origin Destination Pull Box 1 Pull Box 2	53+31.8, 121.0' LT 52+89.4, 138.9' LT	3	46		Pull Box 1 Pull Box 1 Pull Box 1 Pull Box 1 Pull Box 1 Pull Box 1	Pull Box 2 Pull Box 2 Pull Box 2 Pull Box 2 Pull Box 2 Pull Box 2	2 2 2 1 1 4	14 AWG 12 CONDUCTOR CABLE 14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	116 116 116 58 58 232	SWS1, SWS2 SMS, WMS SMV, WMV ED25 EL25 PB1, PB2, PB3, PB12
5	Origin Destination Pull Box 2 West Median Combo Signal Std	52+89.4, 138.9' LT 52+89.5, 132.9' LT	2	6		Pull Box 2 Pull Box 2	West Median Combo Signal Std Transformer Base West Median Video Detection Unit	1 1	14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE	17 66	WMS WMV
6	Origin Destination Pull Box 2 West Median Pedestrian Pole	52+89.4, 138.9' LT 52+89.7, 117.5' LT	2	25		Pull Box 2	West Median Pedestrian Pole	1	16 AWG 2 CONDUCTOR CABLE	39	PB3
7	Origin Destination Pull Box 2 Pull Box 3	52+89.4, 138.9' LT 52+01.7, 101.9' LT	3	95		Pull Box 2 Pull Box 2 Pull Box 2 Pull Box 2 Pull Box 2 Pull Box 2	Pull Box 3 Pull Box 3 Pull Box 3 Pull Box 3 Pull Box 3 Pull Box 3	2 1 1 1 1 3	14 AWG 12 CONDUCTOR CABLE 14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	214 107 107 107 107 321	SWS1, SWS2 SMS SMV ED25 EL25 PB1, PB2, PB12
8	Origin Destination Pull Box 3 Southwest Type VI Signal Std 2	52+01.7, 101.9' LT 52+17.6, 115.2' LT	2	21		Pull Box 3 Pull Box 3	Southwest Type VI Signal Std 2 Transformer Base Pushbutton 2	1 1	14 AWG 12 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	32 35	SWS2 PB2
9	Origin Destination Pull Box 3 Southwest Combo Signal Std 1	52+01.7, 101.9' LT 52+00.8, 89.0' LT	2	13		Pull Box 3 Pull Box 3 Pull Box 3 Pull Box 3	Southwest Combo Signal Std 1 Transformer Base Southwest Emergency Preemption Detector Southwest Emergency Preemption Lamp Pushbutton 1	1 1 1 1	14 AWG 12 CONDUCTOR CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	24 73 73 27	SWS1 ED25 EL25 PB1
10	Origin Destination Pull Box 3 Pull Box 4	52+01.7, 101.9' LT 51+69.4, 40.5' LT	2	70		Pull Box 3 Pull Box 3 Pull Box 3	Pull Box 4 Pull Box 4 Pull Box 4	1 1 1	14 AWG 7 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE VIDEO DETECTION CABLE	82 82 82	SMS PB12 SMV
11	Origin Destination Pull Box 4 South Median Combo Signal Std	51+69.4, 40.5' LT 51+75.4, 40.5' LT	2	6		Pull Box 4 Pull Box 4	South Median Combo Signal Std Transformer Base South Median Video Detection Unit	1 1	14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE	17 66	SMS SMV
12	Origin Destination Pull Box 4 South Median Pedestrian Pole	51+69.4, 40.5' LT 51+60.8, 40.5' LT	2	25		Pull Box 4	South Median Pedestrian Pole	1	16 AWG 2 CONDUCTOR CABLE	39	PB12
13	Origin Destination Traffic Signal Controller Pull Box 5	53+56.9, 108.6' LT 53+76.7, 89.7' LT	3	28		Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller	Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5	3 1 1 1 1 4	14 AWG 12 CONDUCTOR CABLE 14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	129 43 43 43 43 172	NES1, NES2, NWS2 NMS NMV ED16 EL16 PB5, PB6, PB7, PB8
14	Origin Destination Traffic Signal Controller Pull Box 5	53+56.9, 108.6' LT 53+76.7, 89.7' LT	3	28		Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller	Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5	2 1 1 1 1 3	14 AWG 12 CONDUCTOR CABLE 14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	86 43 43 43 43 129	SES1, SES2 EMS EMV ED47 EL47 PB9, PB10, PB11

SWS1 = Southwest Combo Signal Standard 1  
SWS2 = Southwest Type VI Signal Standard 2  
WMS = West Median Combo Signal Standard  
NWS1 = Northwest Combo Signal Standard 1  
NWS2 = Northwest Type VI Signal Standard 2  
NMS = North Median Combo Signal Standard  
NES1 = Northeast Combo Signal Standard 1  
NES2 = Northeast Type VI Signal Standard 2  
EMS = East Median Combo Signal Standard  
SES1 = Southeast Combo Signal Standard 1  
SES2 = Southeast Type VI Signal Standard 2  
SMS = South Median Combo Signal Standard  
NMV = North Median Video Detection Unit  
SMV = South Median Video Detection Unit  
EMV = East Median Video Detection Unit  
WMV = West Median Video Detection Unit  
ED16 = Ø1 + Ø6 EVP Detector  
ED25 = Ø2 + Ø5 EVP Detector  
ED38 = Ø3 + Ø8 EVP Detector  
ED47 = Ø4 + Ø7 EVP Detector  
EL16 = Ø1 + Ø6 EVP Light  
EL25 = Ø2 + Ø5 EVP Light  
EL38 = Ø3 + Ø8 EVP Light  
EL47 = Ø4 + Ø7 EVP Light  
PB1 = Pedestrian Pushbutton 1  
PB2 = Pedestrian Pushbutton 2  
PB3 = Pedestrian Pushbutton 3  
PB4 = Pedestrian Pushbutton 4  
PB5 = Pedestrian Pushbutton 5  
PB6 = Pedestrian Pushbutton 6  
PB7 = Pedestrian Pushbutton 7  
PB8 = Pedestrian Pushbutton 8  
PB9 = Pedestrian Pushbutton 9  
PB10 = Pedestrian Pushbutton 10  
PB11 = Pedestrian Pushbutton 11  
PB12 = Pedestrian Pushbutton 12

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**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA



Cable and Conduit Schedule  
Site 1 - N Washington St & Ash Coulee Dr/43rd Ave

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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	150	9

#	RUN		CONDUIT		NOTES	CABLE						
	ITEM	STATION, OFFSET	SIZE (IN)	LF		Origin	Destination	# of Cables	SIZE/TYPE	Total LF	TITLE	
15	Origin Destination	Pull Box 5 Northwest Type VI Signal Std 2	53+76.7, 89.7' LT 53+68.4, 92.0' LT	2	9		Pull Box 5 Pull Box 5	Northwest Type VI Signal Std 2 Transformer Base Pushbutton 5	1 1	14 AWG 12 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	20 23	NWS2 PB5
16	Origin Destination	Pull Box 5 Pull Box 6	53+76.7, 89.7' LT 53+90.9, 20.5' LT	3	71		Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5	Pull Box 6 Pull Box 6 Pull Box 6 Pull Box 6 Pull Box 6 Pull Box 6	2 1 1 1 1 3	14 AWG 12 CONDUCTOR CABLE 14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	166 83 83 83 83 249	NES1, NES2 NMS NMV ED16 EL16 PB6, PB7, PB8
17	Origin Destination	Pull Box 5 Pull Box 6	53+76.7, 89.7' LT 53+90.9, 20.5' LT	3	71		Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5	Pull Box 6 Pull Box 6 Pull Box 6 Pull Box 6 Pull Box 6 Pull Box 6	2 1 1 1 1 3	14 AWG 12 CONDUCTOR CABLE 14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	166 83 83 83 83 249	SES1, SES2 EMS EMV ED47 EL47 PB9, PB10, PB11
18	Origin Destination	Pull Box 6 North Median Combo Signal Std	53+90.9, 20.5' LT 53+84.9, 20.5' LT	2	6		Pull Box 6 Pull Box 6	North Median Combo Signal Std Transformer Base North Median Video Detection Unit	1 1	14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE	17 66	NMS NMV
19	Origin Destination	Pull Box 6 North Median Pedestrian Pole	53+90.9, 20.5' LT 53+69.4, 20.5' LT	2	24		Pull Box 6	North Median Pedestrian Pole	1	16 AWG 2 CONDUCTOR CABLE	38	PB6
20	Origin Destination	Pull Box 6 Pull Box 7	53+90.9, 20.5' LT 53+60.3, 39.5' RT	3	68		Pull Box 6 Pull Box 6 Pull Box 6 Pull Box 6	Pull Box 7 Pull Box 7 Pull Box 7 Pull Box 7	2 1 1 2	14 AWG 12 CONDUCTOR CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	160 80 80 160	NES1, NES2 ED16 EL16 PB7, PB8
21	Origin Destination	Pull Box 6 Pull Box 7	53+90.9, 20.5' LT 53+60.3, 39.5' RT	3	68		Pull Box 6 Pull Box 6 Pull Box 6 Pull Box 6 Pull Box 6 Pull Box 6	Pull Box 7 Pull Box 7 Pull Box 7 Pull Box 7 Pull Box 7 Pull Box 7	2 1 1 1 1 3	14 AWG 12 CONDUCTOR CABLE 14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	160 80 80 80 80 240	SES1, SES2 EMS EMV ED47 EL47 PB9, PB10, PB11
22	Origin Destination	Pull Box 7 Northeast Combo Signal Std 1	53+60.3, 39.5' RT 53+55.4, 28.0' RT	2	13		Pull Box 7 Pull Box 7 Pull Box 7 Pull Box 7	Northeast Combo Signal Std 1 Transformer Base Northeast Emergency Preemption Detector Northeast Emergency Preemption Lamp Pushbutton 7	1 1 1 1	14 AWG 12 CONDUCTOR CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	24 73 73 27	NES1 ED16 EL16 PB7
23	Origin Destination	Pull Box 7 Northeast Type VI Signal Std 2	53+60.3, 39.5' RT 53+42.4, 56.6' RT	2	25		Pull Box 7 Pull Box 7	Northeast Type VI Signal Std 2 Transformer Base Pushbutton 8	1 1	14 AWG 12 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	36 39	NES2 PB8
24	Origin Destination	Pull Box 7 Pull Box 8	53+60.3, 39.5' RT 52+71.4, 79.0' RT	3	98		Pull Box 7 Pull Box 7 Pull Box 7 Pull Box 7 Pull Box 7 Pull Box 7	Pull Box 8 Pull Box 8 Pull Box 8 Pull Box 8 Pull Box 8 Pull Box 8	2 1 1 1 1 3	14 AWG 12 CONDUCTOR CABLE 14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	220 110 110 110 110 330	SES1, SES2 EMS EMV ED47 EL47 PB9, PB10, PB11
25	Origin Destination	Pull Box 8 East Median Combo Signal Std	52+71.4, 79.0' RT 52+71.3, 73.0' RT	2	6		Pull Box 8 Pull Box 8	East Median Combo Signal Std Transformer Base East Median Video Detection Unit	1 1	14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE	17 66	EMS EMV
26	Origin Destination	Pull Box 8 East Median Pedestrian Pole	52+71.4, 79.0' RT 52+71.2, 57.6' RT	2	23		Pull Box 8	East Median Pedestrian Pole	1	16 AWG 2 CONDUCTOR CABLE	37	PB9
27	Origin Destination	Pull Box 8 Pull Box 9	52+71.4, 79.0' RT 52+08.6, 41.9' RT	2	73		Pull Box 8 Pull Box 8 Pull Box 8 Pull Box 8	Pull Box 9 Pull Box 9 Pull Box 9 Pull Box 9	2 1 1 2	14 AWG 12 CONDUCTOR CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	170 85 85 170	SES1, SES2 ED47 EL47 PB10, PB11
28	Origin Destination	Pull Box 9 Southeast Combo Signal Std 1	52+08.6, 41.9' RT 52+22.7, 44.9' RT	2	15		Pull Box 9 Pull Box 9 Pull Box 9 Pull Box 9	Southeast Combo Signal Std 1 Transformer Base Southeast Emergency Preemption Detector Southeast Emergency Preemption Lamp Pushbutton 10	1 1 1 1	14 AWG 12 CONDUCTOR CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	26 75 75 29	SES1 ED47 EL47 PB10
29	Origin Destination	Pull Box 9 Southeast Type VI Signal Std 2	52+08.6, 41.9' RT 51+91.8, 31.0' RT	2	20		Pull Box 9 Pull Box 9	Southeast Type VI Signal Std 2 Transformer Base Pushbutton 11	1 1	14 AWG 12 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	31 34	SES2 PB11

SWS1 = Southwest Combo Signal Standard 1  
SWS2 = Southwest Type VI Signal Standard 2  
WMS = West Median Combo Signal Standard  
NWS1 = Northwest Combo Signal Standard 1  
NWS2 = Northwest Type VI Signal Standard 2  
NMS = North Median Combo Signal Standard  
NES1 = Northeast Combo Signal Standard 1  
NES2 = Northeast Type VI Signal Standard 2  
EMS = East Median Combo Signal Standard  
SES1 = Southeast Combo Signal Standard 1  
SES2 = Southeast Type VI Signal Standard 2  
SMS = South Median Combo Signal Standard  
NMV = North Median Video Detection Unit  
SMV = South Median Video Detection Unit  
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ED16 = Ø1 + Ø6 EVP Detector  
ED25 = Ø2 + Ø5 EVP Detector  
ED38 = Ø3 + Ø8 EVP Detector  
ED47 = Ø4 + Ø7 EVP Detector  
EL16 = Ø1 + Ø6 EVP Light  
EL25 = Ø2 + Ø5 EVP Light  
EL38 = Ø3 + Ø8 EVP Light  
EL47 = Ø4 + Ø7 EVP Light  
PB1 = Pedestrian Pushbutton 1  
PB2 = Pedestrian Pushbutton 2  
PB3 = Pedestrian Pushbutton 3  
PB4 = Pedestrian Pushbutton 4  
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PB10 = Pedestrian Pushbutton 10  
PB11 = Pedestrian Pushbutton 11  
PB12 = Pedestrian Pushbutton 12

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**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA



Cable and Conduit Schedule  
Site 1 - N Washington St & Ash Coulee Dr/43rd Ave

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ANG	GJS	1412129	08/2014

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**LEGEND**

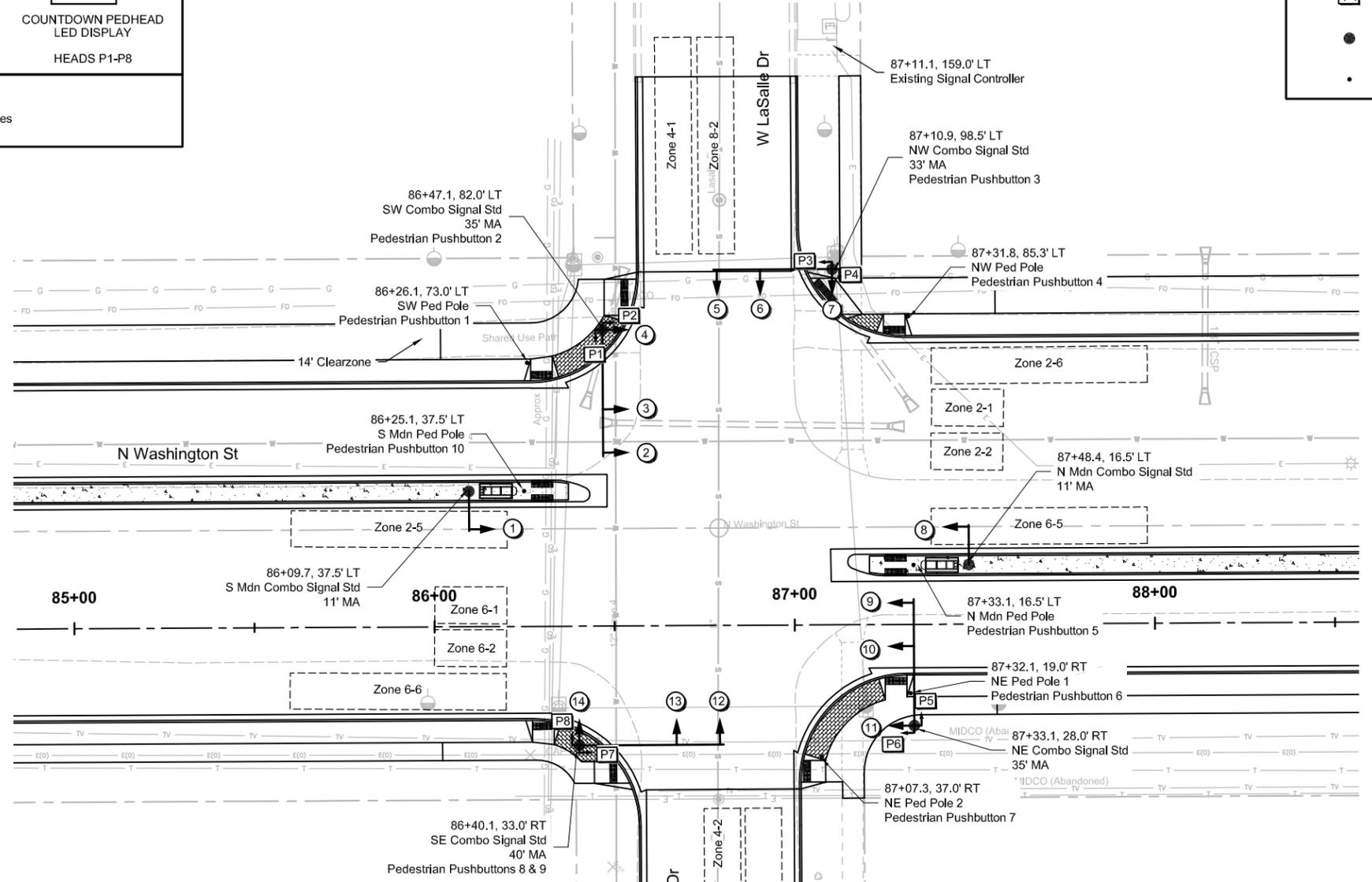
- Signal controller
- Signal head
- Pedestrian head
- Signal foundation
- Pedestrian pushbutton post

**HEADS**  
2,3,4,6,7  
9,10,11,13,14

**HEADS**  
1,5,8,12

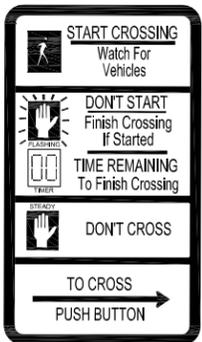
**COUNTDOWN PEDHEAD LED DISPLAY**  
HEADS P1-P8

All Signal Heads:  
12" LED Lenses &  
5" Louvered Backplates



**DETECTION ZONE SCHEDULE**

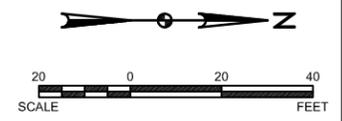
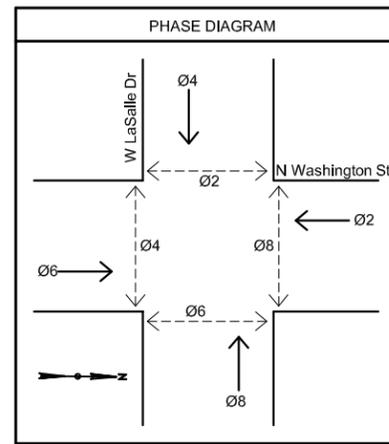
Phase-Number	Distance From Stop Bar (feet)	Length (feet)	Presence/Counting	Passage/Counting	Counting	Locking Memory	Non-Locking Memory
2-1	0	20			X		
2-2	0	20			X		
2-3	295	20	X			X	
2-4	295	20	X			X	
2-5	0	60	X			X	
2-6	0	60	X				X
4-1	0	60	X			X	
4-2	0	60	X			X	
6-1	0	20			X		
6-2	0	20			X		
6-3	295	20	X			X	
6-4	295	20	X			X	
6-5	0	60	X			X	
6-6	0	60	X				X
8-1	0	60	X			X	
8-2	0	60	X			X	



R10-3e Sign  
Direction of arrow varies  
(see pedestrian pushbutton schedule)

**Pedestrian Pushbutton Schedule**

Location	Pushbutton & Sign Location on Pole	Direction of Arrow on Sign
Pushbutton 1	North	Left
Pushbutton 2	West	Left
Pushbutton 3	East	Left
Pushbutton 4	South	Right
Pushbutton 5	South	Both
Pushbutton 6	South	Left
Pushbutton 7	East	Left
Pushbutton 8	East	Right
Pushbutton 9	South	Left
Pushbutton 10	North	Both



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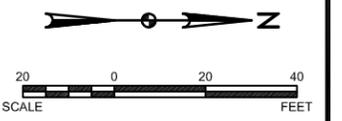
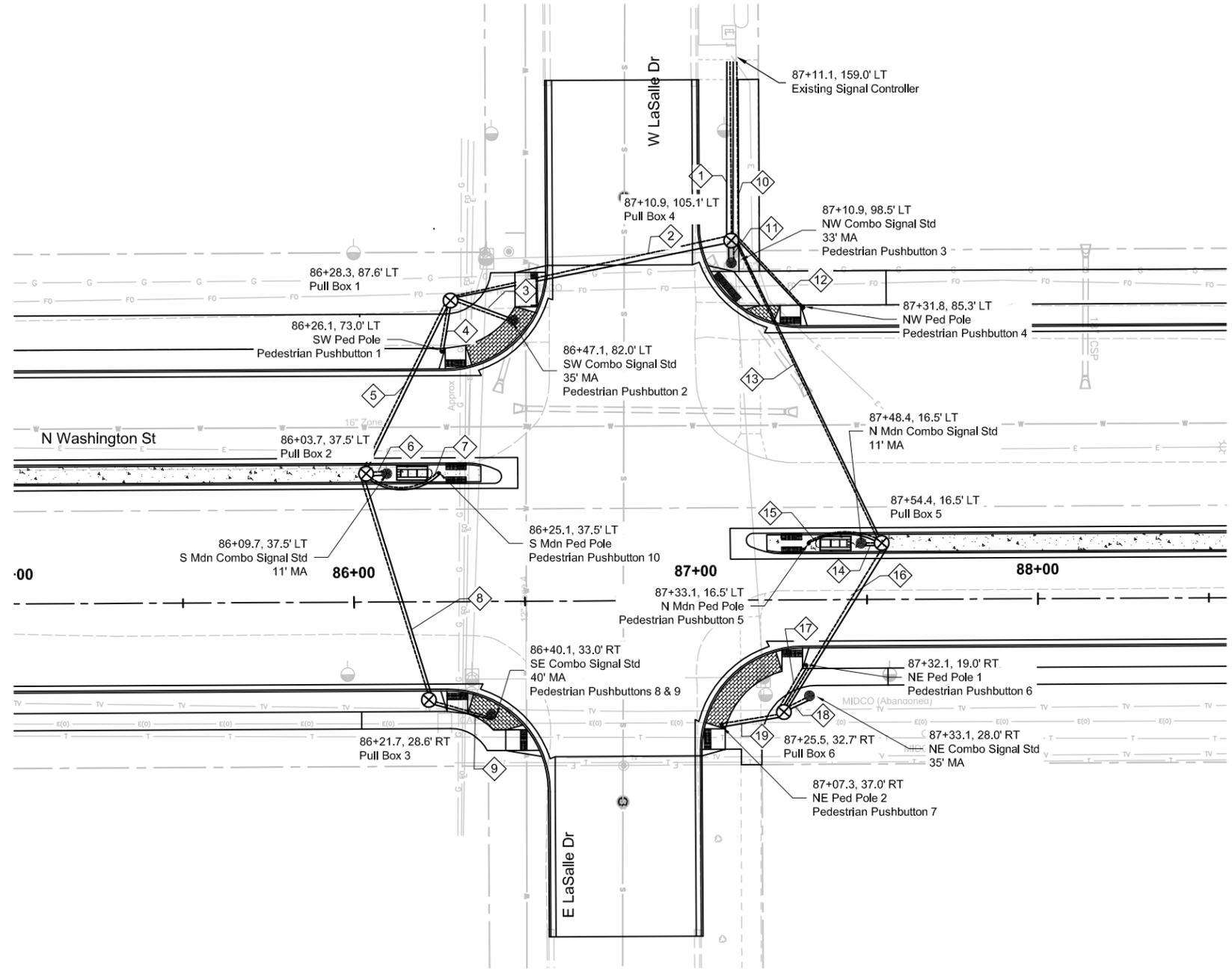
**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

**KLJ**  
Signal Layout  
Traffic Signal System  
Site 2 - N Washington St & LaSalle Dr

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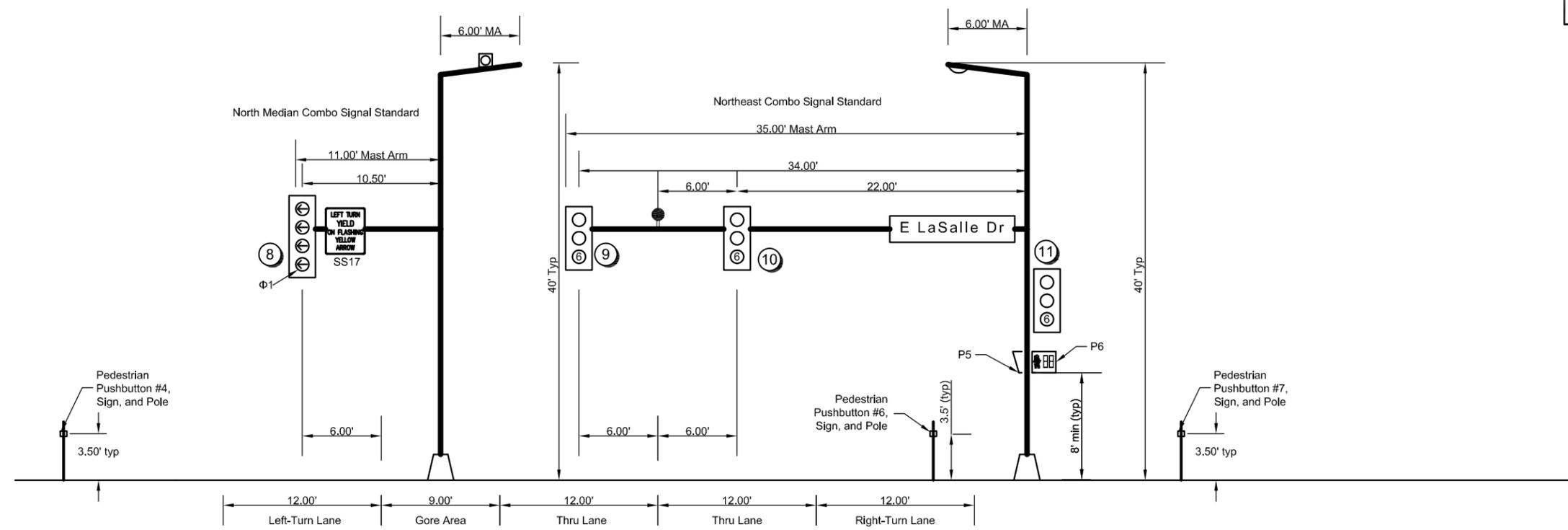
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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
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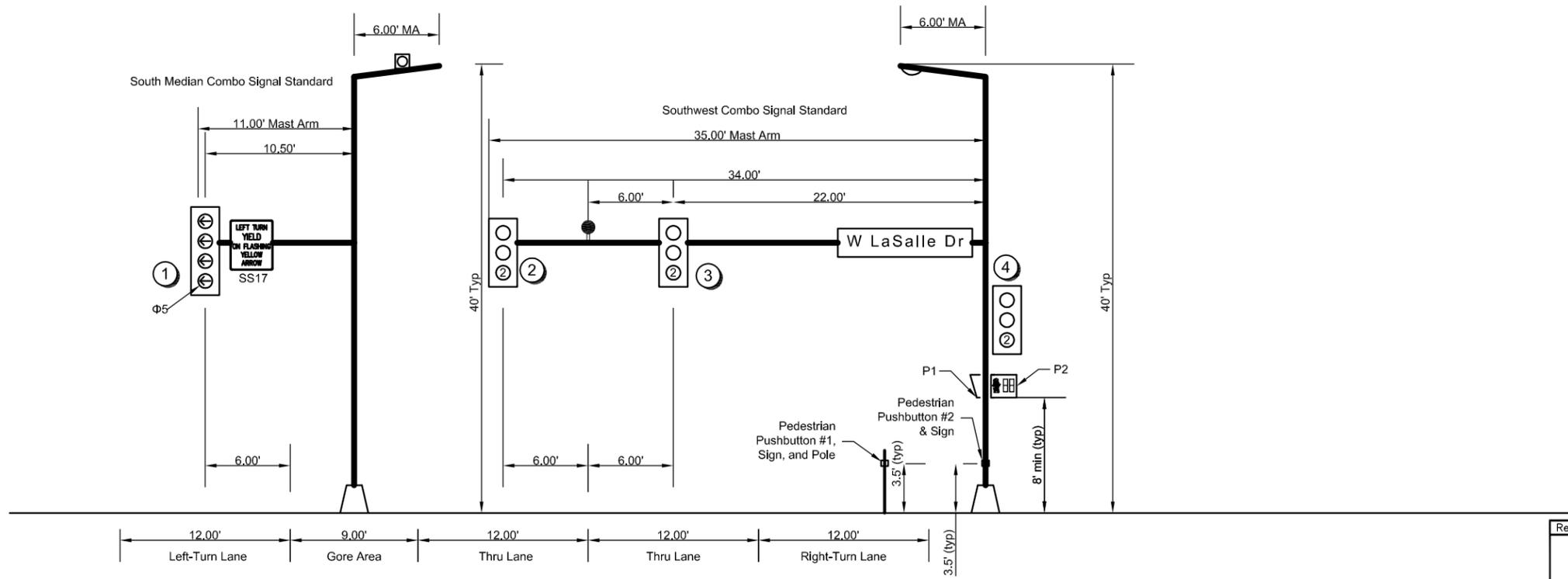


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<b>LEGEND</b> Signal controller Pull Box Cable Run Number	Rev'd.	Scale: 1:40 Hor, 1:10 Ver
	<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA	
	<b>Signal Layout</b> <b>Traffic Signal System</b> <b>Site 2 - N Washington St &amp; LaSalle Dr</b>	
DRWN BY: ANG CHK'D BY: GJS PROJECT NO: 1412129 DATE: 08/2014	J:\trans\1412129\CADD\150SL_001_LSGNL.dwg © Kadmas, Lee & Jackson 2014	



Northbound

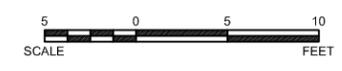


Southbound

\*The final location of the video detection cameras shall be determined by the contractor to provide a functional system.

LEGEND	
	Transformer Base
	Video Detection Camera*
	Traffic Signal head w/ associated phase
	Pedestrian Signal Head
	Signal head Number
	Emergency Vehicle Detection Unit

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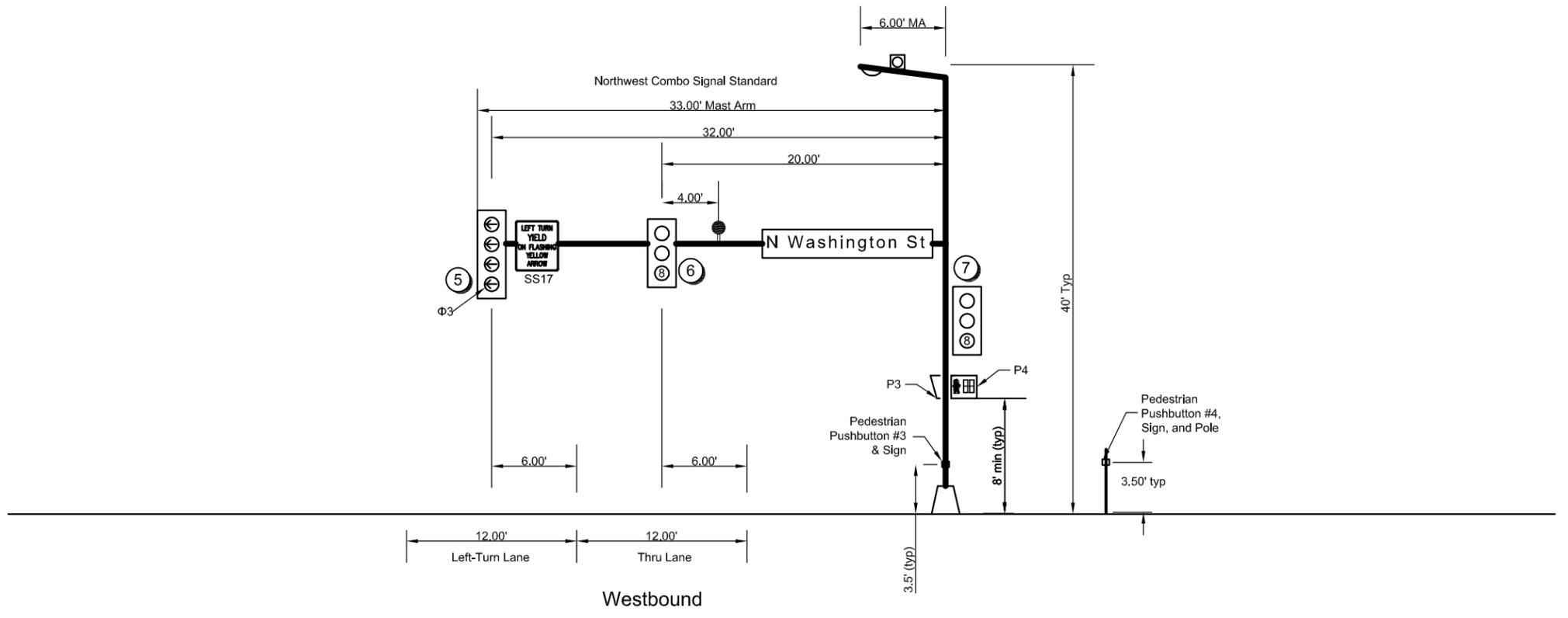
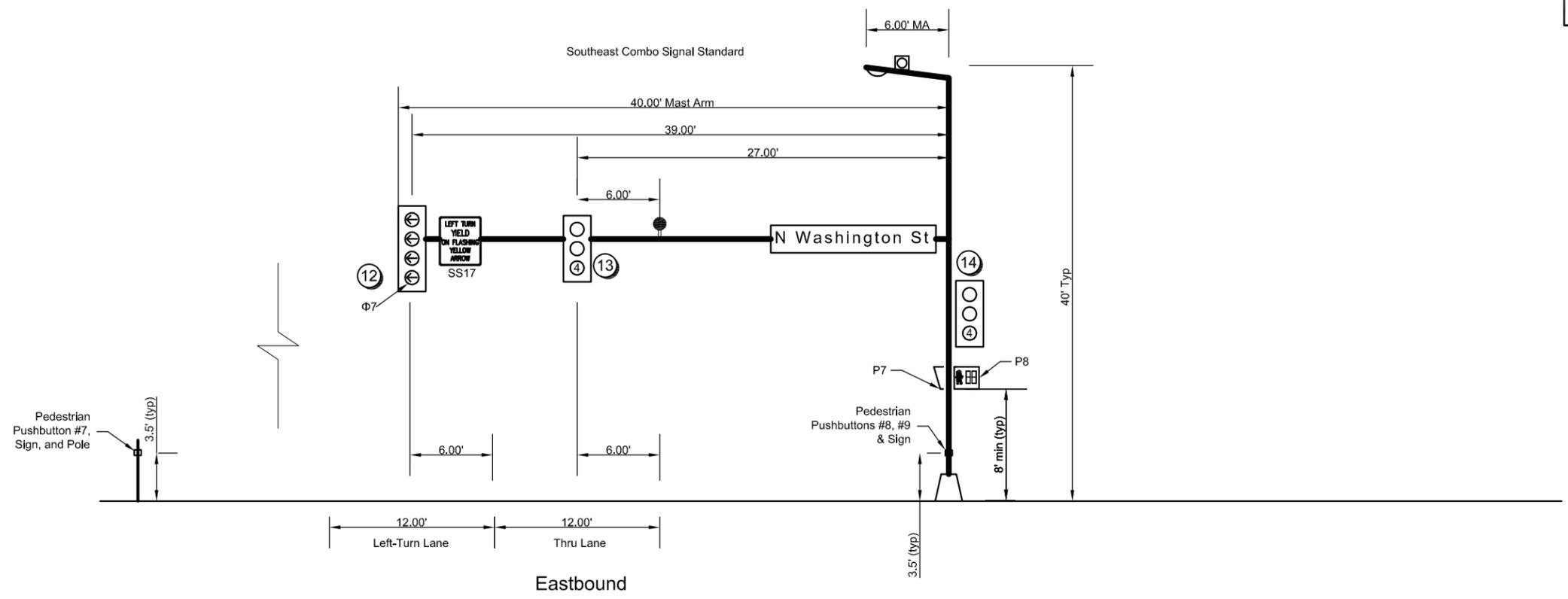
**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

**Elevation Views**  
Traffic Signal System  
Site 2 - N Washington St & LaSalle Dr

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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	150	13



\*The final location of the video detection cameras shall be determined by the contractor to provide a functional system.

LEGEND	
	Transformer Base
	Video Detection Camera*
	Traffic Signal head w/ associated phase
	Pedestrian Signal Head
	Signal head Number
	Emergency Vehicle Detection Unit

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**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

**Elevation Views**  
Traffic Signal System  
Site 2 - N Washington St & LaSalle Dr

DRWN. BY	CHK'D BY	PROJECT NO.	DATE
ANG	GJS	1412129	08/2014

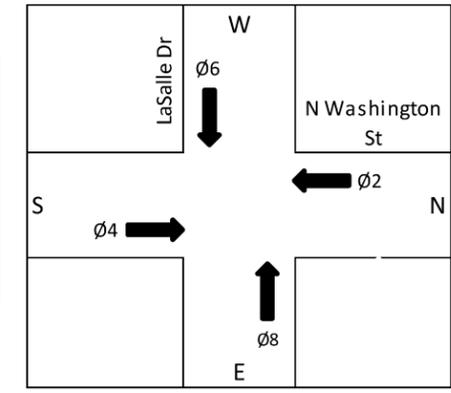
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**SIGNAL INDICATIONS & PHASING**

	Phase 1 Future	Phase 2 SB Thru	Phase 3 Future	Phase 4 EB Thru	Phase 5 Future	Phase 6 NB Thru	Phase 7 Future	Phase 8 WB Thru
Corresponding Signal Head(s)		2,3,4,8		5,13,14		1,9,10,11		6,7,12
Right-of-Way Display		G,G,G,FYA		G,G,FYA		FYA,G,G,G		G,G,FYA
Clearance Display Prior to Next Phase		Y,Y,Y,YL		Y,Y,YL		YL,Y,Y,Y		Y,Y,YL
Corresponding Pedestrian Head(s)		P2,P3		P1,P8		P6,P7		P4,P5
Concurrent Phase		6		8		2		4
Next Phase (Unless Skipped)		4		2		8		6
Overlap - Corresponding Signal Head(s)								
Overlap - Right-of-Way Display								
Overlap - Clearance Display Prior to Next Phase								

NB = Northbound (N Washington St)  
 SB = Southbound (N Washington St)  
 EB = Eastbound (LaSalle Dr)  
 WB = Westbound (LaSalle Dr)

Y = Yellow Ball Indication  
 G = Green Ball Indication  
 GL = Green Left Arrow Indication  
 YL = Yellow Left Arrow Indication  
 GR = Green Right Arrow Indication  
 YR = Yellow Right Arrow Indication  
 FYA=Flashing Yellow Arrow



**BASIC INTERVALS (OR FUNCTIONS)**

Minimum Initial		10.0		7.0		10.0		7.0
Minimum Initial with Pedestrian Actuation		19.9		23.3		19.9		23.3
Passage Time		5.0		2.0		5.0		2.0
Total Split (Green + Yellow+ All Red)		55.0		25.0		55.0		25.0
Yellow Change		3.9		2.8		3.9		2.8
Red Clearance		2.0		4.4		2.0		4.4
Walk		7.0		7.0		7.0		7.0
Pedestrian Clearance		12.9		16.3		12.9		16.3

**VOLUME DENSITY TIMING FUNCTIONS - ONLY APPLICABLE DURING "FREE" (UNCOORDINATED) TIMING PLAN**

<i>Added Initial</i>								
Minimum Initial								
Added Initial per Actuation								
Actuations Before Added Initial								
<i>Computed Initial</i>								
Minimum Initial								
Maximum Initial								
Actuations to Reach Maximum Initial								
<i>Extensible Initial</i>								
Minimum Initial								
Maximum Initial								
Added Initial per Actuation								
<i>Passage Time</i>								
Minimum Gap								
Time to Reduce to Minimum Gap								
Reduce Gap Every								
Reduce Gap Every Second By								
Reduce Gap By								

Site	Time Period	Timing Plan	Coordinated Phase	Offset <sup>1</sup>
1	7:00 AM - 7:00 PM	Coordinated	ø2 (South Thru)/ø6 (North Thru)	0
2			ø2 (South Thru)/ø6 (North Thru)	68
1	7:00 PM - 7:00 AM	Free	-	-
2			-	-

<sup>1</sup>Offset is referenced to the last of coordinated phases to turn green at master controller (site 2)

**OTHER CONTROLLER FUNCTIONS**

Recall		Minimum	No	No		Minimum	No
Flashing-Normal & Conflict Monitor		Y	R	R		Y	R
Start Up Phasing		G	R	R		G	R
Emergency Vehicle Pre-emption		x	x	x		x	x
Type of Detector	Presence	Refer to Detector Zone Table					
	Calling						
	Passage						
Locking Memory							
Non-Locking Memory							

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**NORTH WASHINGTON STREET**  
 CITY OF BISMARCK  
 BISMARCK, NORTH DAKOTA

**KLJ** Signal Phasing & Control Settings  
 Site 2 - N Washington St & LaSalle Dr

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Conductor		Cable SMS (South Median Combo Signal) (7 No. 14 AWG)		Cable SWS (Southwest Combo Signal) (12 No. 14 AWG)		Cable NWS 1 (Northwest Combo Signal) (12 No. 14 AWG)		Cable NWS 2 (Northwest Combo Signal) (7 No. 14 AWG)	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black	1	Ø6 FYA ←	P2	Ø2 Walk		Spare	P3	Ø2 Walk
2	White		Neutral		Neutral		Neutral		Neutral
3	Red	1	Ø6 Red ←	2,3,4	Ø2 Red	6,7	Ø8 Red	P3	Ø2 Don't Walk
4	Green		Ground		Ground		Ground		Ground
5	Orange	1	Ø6 Yellow ←	2,3,4	Ø2 Yellow	6,7	Ø8 Yellow	P4	Ø8 Don't Walk
6	Blue	1	Ø5 Green ←	2,3,4	Ø2 Green	6,7	Ø8 Green	P4	Ø8 Walk
7	White	Black	Spare		Spare		Spare		Spare
8	Red	Black	X	P2	Ø2 Don't Walk	5	Ø4 Red ←	X	X
9	Green	Black		Spare	Spare				
10	Orange	Black		P1	Ø4 Don't Walk	5	Ø4 Yellow ←		
11	Blue	Black		Spare	Spare	5	Ø3 Green ←		
12	Black	White		P1	Ø4 Walk	5	Ø4 FYA ←		

All protected left turn phases are for future implementation only.

Conductor		Cable NMS (North Median Combo Signal) (7 No. 14 AWG)		Cable NES (Northeast Combo Signal) (12 No. 14 AWG)		Cable SES 1 (Southeast Combo Signal) (12 No. 14 AWG)		Cable SES 2 (Southeast Combo Signal) (7 No. 14 AWG)	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black	8	Ø2 FYA ←	P5	Ø8 Walk		Spare	P7	Ø6 Walk
2	White		Neutral		Neutral		Neutral		Neutral
3	Red	8	Ø2 Red ←	9,10,11	Ø6 Red	13,14	Ø4 Red	P7	Ø6 Don't Walk
4	Green		Ground		Ground		Ground		Ground
5	Orange	8	Ø2 Yellow ←	9,10,11	Ø6 Yellow	13,14	Ø4 Yellow	P8	Ø4 Don't Walk
6	Blue	8	Ø1 Green ←	9,10,11	Ø6 Green	13,14	Ø4 Green	P8	Ø4 Walk
7	White	Black	Spare		Spare		Spare		Spare
8	Red	Black	X	P5	Ø8 Don't Walk	12	Ø8 Red ←	X	X
9	Green	Black		Spare	Spare				
10	Orange	Black		P6	Ø6 Don't Walk	12	Ø8 Yellow ←		
11	Blue	Black		Spare	Spare	12	Ø7 Green ←		
12	Black	White		P6	Ø6 Walk	12	Ø8 FYA ←		

**INTERNAL MAST ARM/STANDARD SIGNAL HEAD CABLE**

Origin	Destination	# of Cables	SIZE/TYPE	Total LF
South Median Combo Signal Std	Vehicle Head 1	1	14 AWG 5 CONDUCTOR CABLE	39
Southwest Combo Signal Std Transformer Base	Vehicle Head 2	1	14 AWG 5 CONDUCTOR CABLE	62
	Vehicle Head 3	1	14 AWG 5 CONDUCTOR CABLE	50
	Vehicle Head 4	1	14 AWG 5 CONDUCTOR CABLE	20
Northwest Combo Signal Std Transformer Base	Vehicle Head 5	1	14 AWG 7 CONDUCTOR CABLE	60
	Vehicle Head 6	1	14 AWG 5 CONDUCTOR CABLE	48
	Vehicle Head 7	1	14 AWG 5 CONDUCTOR CABLE	20
North Median Combo Signal Std	Vehicle Head 8	1	14 AWG 5 CONDUCTOR CABLE	39
Northeast Combo Signal Std Transformer Base	Vehicle Head 9	1	14 AWG 5 CONDUCTOR CABLE	62
	Vehicle Head 10	1	14 AWG 5 CONDUCTOR CABLE	50
	Vehicle Head 11	1	14 AWG 5 CONDUCTOR CABLE	20
Southeast Combo Signal Std Transformer Base	Vehicle Head 12	1	14 AWG 5 CONDUCTOR CABLE	67
	Vehicle Head 13	1	14 AWG 5 CONDUCTOR CABLE	55
	Vehicle Head 14	1	14 AWG 5 CONDUCTOR CABLE	20

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NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		Signal Head Cable Connections Site 2 - N Washington St & Lasalle Dr	
DRWN BY ANG	CHK'D BY GJS	PROJECT NO. 1412129	DATE 08/2014
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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	150	17

#	RUN		CONDUIT		CABLE						
	ITEM	STATION, OFFSET	SIZE (IN)	LF	Origin	Destination	# of Cables	SIZE/TYPE	Total LF	TITLE	
1	Origin	Traffic Signal Controller	87+11.1, 159.0' LT	3	54	Traffic Signal Controller	Pull Box 4	2	14 AWG 12 CONDUCTOR CABLE	138	SES, SWS
	Destination	Pull Box 4	87+10.9, 105.1' LT			Traffic Signal Controller	Pull Box 4	2	14 AWG 7 CONDUCTOR CABLE	198	SMS, SES2
						Traffic Signal Controller	Pull Box 4	2	VIDEO DETECTION CABLE	138	SMV, SEV
						Traffic Signal Controller	Pull Box 4	2	EMERGENCY VEHICLE DETECTOR CABLE	138	ED2, ED4
						Traffic Signal Controller	Pull Box 4	2	14 AWG 2 CONDUCTOR CABLE	138	EL2, EL4
						Traffic Signal Controller	Pull Box 4	5	16 AWG 2 CONDUCTOR CABLE	345	PB1, PB2, PB8, PB9, PB10
2	Origin	Pull Box 4	87+10.9, 105.1' LT	3	84	Pull Box 4	Pull Box 1	2	14 AWG 12 CONDUCTOR CABLE	192	SES1, SWS
	Destination	Pull Box 1	86+28.3, 87.6' LT			Pull Box 4	Pull Box 1	2	14 AWG 7 CONDUCTOR CABLE	192	SMS, SES2
						Pull Box 4	Pull Box 1	2	VIDEO DETECTION CABLE	192	SMV, SEV
						Pull Box 4	Pull Box 1	2	EMERGENCY VEHICLE DETECTOR CABLE	192	ED2, ED4
						Pull Box 4	Pull Box 1	2	14 AWG 2 CONDUCTOR CABLE	192	EL2, EL4
						Pull Box 4	Pull Box 1	5	16 AWG 2 CONDUCTOR CABLE	480	PB1, PB2, PB8, PB9, PB10
3	Origin	Pull Box 1	86+28.3, 87.6' LT	2	20	Pull Box 1	Southwest Combo Signal Std Transformer Base	1	14 AWG 12 CONDUCTOR CABLE	31	SWS
	Destination	Southwest Combo Signal Std	86+47.1, 82.0' LT			Pull Box 1	Southwest Emergency Preemption Detector	1	EMERGENCY VEHICLE DETECTOR CABLE	80	ED2
						Pull Box 1	Southwest Emergency Preemption Lamp	1	14 AWG 2 CONDUCTOR CABLE	80	EL2
						Pull Box 1	Pushbutton 2	1	16 AWG 2 CONDUCTOR CABLE	34	PB2
4	Origin	Pull Box 1	86+28.3, 87.6' LT	2	15	Pull Box 1	Southwest Pedestrian Pole	1	16 AWG 2 CONDUCTOR CABLE	29	PB1
	Destination	Southwest Pedestrian Pole	86+26.1, 73.0' LT								
5	Origin	Pull Box 1	86+28.3, 87.6' LT	3	57	Pull Box 1	Pull Box 2	1	14 AWG 12 CONDUCTOR CABLE	69	SES1
	Destination	Pull Box 2	86+03.7, 37.5' LT			Pull Box 1	Pull Box 2	2	14 AWG 7 CONDUCTOR CABLE	138	SMS, SES2
						Pull Box 1	Pull Box 2	2	VIDEO DETECTION CABLE	138	SMV, SEV
						Pull Box 1	Pull Box 2	1	EMERGENCY VEHICLE DETECTOR CABLE	69	ED4
						Pull Box 1	Pull Box 2	1	14 AWG 2 CONDUCTOR CABLE	69	EL4
						Pull Box 1	Pull Box 2	3	16 AWG 2 CONDUCTOR CABLE	207	PB8, PB9, PB10
6	Origin	Pull Box 2	86+03.7, 37.5' LT	2	6	Pull Box 2	South Median Combo Signal Std Transformer Base	1	14 AWG 7 CONDUCTOR CABLE	17	SMS
	Destination	South Median Combo Signal Std	86+09.7, 37.5' LT			Pull Box 2	South Median Video Detection Unit	1	VIDEO DETECTION CABLE	66	SMV
7	Origin	Pull Box 2	86+03.7, 37.5' LT	2	25	Pull Box 2	South Median Pedestrian Pole	1	16 AWG 2 CONDUCTOR CABLE	39	PB10
	Destination	South Median Pedestrian Pole	86+25.1, 37.5' LT								
8	Origin	Pull Box 2	86+03.7, 37.5' LT	3	69	Pull Box 2	Pull Box 3	1	14 AWG 12 CONDUCTOR CABLE	81	SES1
	Destination	Pull Box 3	86+21.7, 28.6' RT			Pull Box 2	Pull Box 3	1	14 AWG 7 CONDUCTOR CABLE	81	SES2
						Pull Box 2	Pull Box 3	1	VIDEO DETECTION CABLE	81	SEV
						Pull Box 2	Pull Box 3	1	EMERGENCY VEHICLE DETECTOR CABLE	81	ED4
						Pull Box 2	Pull Box 3	1	14 AWG 2 CONDUCTOR CABLE	81	EL4
						Pull Box 2	Pull Box 3	2	16 AWG 2 CONDUCTOR CABLE	162	PB8, PB9
9	Origin	Pull Box 3	86+21.7, 28.6' RT	3	19	Pull Box 3	Southeast Combo Signal Std Transformer Base	1	14 AWG 12 CONDUCTOR CABLE	30	SES1
	Destination	Southeast Combo Signal Std	86+40.1, 33.0' RT			Pull Box 3	Southeast Combo Signal Std Transformer Base	1	14 AWG 7 CONDUCTOR CABLE	30	SES2
						Pull Box 3	Southeast Video Detection Unit	1	VIDEO DETECTION CABLE	79	SEV
						Pull Box 3	Southeast Emergency Preemption Detector	1	EMERGENCY VEHICLE DETECTOR CABLE	72	ED4
						Pull Box 3	Southeast Emergency Preemption Lamp	1	14 AWG 2 CONDUCTOR CABLE	72	EL4
						Pull Box 3	Pushbutton 8	1	16 AWG 2 CONDUCTOR CABLE	33	PB8
						Pull Box 3	Pushbutton 9	1	16 AWG 2 CONDUCTOR CABLE	33	PB9

SWS = Southwest Combo Signal Standard  
NWS = Northwest Combo Signal Standard  
NES = Northeast Combo Signal Standard  
SES = Southeast Combo Signal Standard  
SMS = South Median Combo Signal Standard  
NMS = North Median Video Detection Unit  
SEV = Southeast Video Detection Unit  
NWV = Northwest Video Detection Unit  
SMV = South Median Video Detection Unit  
ED2 = Ø2 EVP Detector  
ED4 = Ø4 EVP Detector  
ED6 = Ø6 EVP Detector  
ED8 = Ø8 EVP Detector  
EL2 = Ø2 EVP Light  
EL4 = Ø4 EVP Light  
EL6 = Ø6 EVP Light  
EL8 = Ø8 EVP Light  
PB1 = Pedestrian Pushbutton 1  
PB2 = Pedestrian Pushbutton 2  
PB3 = Pedestrian Pushbutton 3  
PB4 = Pedestrian Pushbutton 4  
PB5 = Pedestrian Pushbutton 5  
PB6 = Pedestrian Pushbutton 6  
PB7 = Pedestrian Pushbutton 7  
PB8 = Pedestrian Pushbutton 8  
PB9 = Pedestrian Pushbutton 9  
PB10 = Pedestrian Pushbutton 10

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NORTH WASHINGTON STREET  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA



Cable and Conduit Schedule  
Site 2 - N Washington St & LaSalle Dr

DRWN BY	CHK'D BY	PROJECT NO.	DATE
ANG	GJS	1412129	08/2014

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ND	NHU-1-981(101)111	150	18

#	ITEM	STATION, OFFSET	SIZE (IN)	LF	Origin	Destination	# of Cables	SIZE/TYPE	Total LF	TITLE
10	<i>Origin</i> Traffic Signal Controller <i>Destination</i> Pull Box 4	87+11.1, 159.0' LT 87+10.9, 105.1' LT	3	54	Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller Traffic Signal Controller	Pull Box 4 Pull Box 4 Pull Box 4 Pull Box 4 Pull Box 4 Pull Box 4	2 2 2 2 2 5	14 AWG 12 CONDUCTOR CABLE 14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	138 138 138 138 138 345	NES, NWS1 NMS, NWS2 NMV, NWV ED6, ED38 EL6, EL38 PB3, PB4, PB5, PB6, PB7
11	<i>Origin</i> Pull Box 4 <i>Destination</i> Northwest Combo Signal Std	87+10.9, 105.1' LT 87+10.9, 98.5' LT	2	7	Pull Box 4 Pull Box 4 Pull Box 4 Pull Box 4 Pull Box 4 Pull Box 4	Northwest Combo Signal Std Transformer Base Northwest Combo Signal Std Transformer Base Northwest Video Detection Unit Northwest Emergency Preemption Detector Northwest Emergency Preemption Lamp Pushbutton 3	1 1 1 1 1 1	14 AWG 12 CONDUCTOR CABLE 14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	18 18 67 55 55 21	NWS1 NWS2 NWV ED38 EL38 PB3
12	<i>Origin</i> Pull Box 4 <i>Destination</i> Northwest Pedestrian Pole	87+10.9, 105.1' LT 87+31.8, 85.3' LT	2	29	Pull Box 4	Northwest Pedestrian Pole	1	16 AWG 2 CONDUCTOR CABLE	43	PB4
13	<i>Origin</i> Pull Box 4 <i>Destination</i> Pull Box 5	87+10.9, 105.1' LT 87+54.4, 16.5' LT	3	99	Pull Box 4 Pull Box 4 Pull Box 4 Pull Box 4 Pull Box 4 Pull Box 4	Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5	1 1 1 1 1 3	14 AWG 12 CONDUCTOR CABLE 14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	111 111 111 111 111 333	NES NMS NMV ED6 EL6 PB5, PB6, PB7
14	<i>Origin</i> Pull Box 5 <i>Destination</i> North Median Combo Signal Std	87+54.4, 16.5' LT 87+48.4, 16.5' LT	2	6	Pull Box 5 Pull Box 5	North Median Combo Signal Std Transformer Base North Median Video Detection Unit	1 1	14 AWG 7 CONDUCTOR CABLE VIDEO DETECTION CABLE	17 66	NMS NMV
15	<i>Origin</i> Pull Box 5 <i>Destination</i> North Median Pedestrian Pole	87+54.4, 16.5' LT 87+33.1, 16.50' LT	2	25	Pull Box 5	North Median Pedestrian Pole	1	16 AWG 2 CONDUCTOR CABLE	39	PB5
16	<i>Origin</i> Pull Box 5 <i>Destination</i> Pull Box 6	87+54.4, 16.5' LT 87+25.5, 32.7' RT	3	57	Pull Box 5 Pull Box 5 Pull Box 5 Pull Box 5	Pull Box 6 Pull Box 6 Pull Box 6 Pull Box 6	1 1 1 2	14 AWG 12 CONDUCTOR CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE 16 AWG 2 CONDUCTOR CABLE	69 69 69 138	NES ED6 EL6 PB6, PB7
17	<i>Origin</i> Pull Box 6 <i>Destination</i> Northeast Pedestrian Pole 1	87+25.5, 32.7' RT 87+32.1, 19.0' RT	2	15	Pull Box 6	Northeast Pedestrian Pole 1	1	16 AWG 2 CONDUCTOR CABLE	29	PB6
18	<i>Origin</i> Pull Box 6 <i>Destination</i> Northeast Combo Signal Std	87+25.5, 32.7' RT 87+33.1, 28.0' RT	2	9	Pull Box 6 Pull Box 6 Pull Box 6	Northeast Combo Signal Std Transformer Base Northeast Emergency Preemption Detector Northeast Emergency Preemption Lamp	1 1 1	14 AWG 12 CONDUCTOR CABLE EMERGENCY VEHICLE DETECTOR CABLE 14 AWG 2 CONDUCTOR CABLE	20 69 69	NES ED6 EL6
19	<i>Origin</i> Pull Box 6 <i>Destination</i> Northeast Pedestrian Pole 2	87+25.5, 32.7' RT 87+07.3, 37.0' RT	2	19	Pull Box 6	Northeast Pedestrian Pole 2	1	16 AWG 2 CONDUCTOR CABLE	33	PB7

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NWS = Northwest Combo Signal Standard  
NES = Northeast Combo Signal Standard  
SES = Southeast Combo Signal Standard  
SMS = South Median Combo Signal Standard  
NMS = North Median Video Detection Unit  
SEV = Southeast Video Detection Unit  
NWV = Northwest Video Detection Unit  
SMV = South Median Video Detection Unit  
ED2 = Ø2 EVP Detector  
ED4 = Ø4 EVP Detector  
ED6 = Ø6 EVP Detector  
ED8 = Ø8 EVP Detector  
EL2 = Ø2 EVP Light  
EL4 = Ø4 EVP Light  
EL6 = Ø6 EVP Light  
EL8 = Ø8 EVP Light  
PB1 = Pedestrian Pushbutton 1  
PB2 = Pedestrian Pushbutton 2  
PB3 = Pedestrian Pushbutton 3  
PB4 = Pedestrian Pushbutton 4  
PB5 = Pedestrian Pushbutton 5  
PB6 = Pedestrian Pushbutton 6  
PB7 = Pedestrian Pushbutton 7  
PB8 = Pedestrian Pushbutton 8  
PB9 = Pedestrian Pushbutton 9  
PB10 = Pedestrian Pushbutton 10

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NORTH WASHINGTON STREET  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

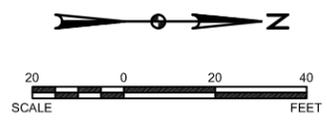
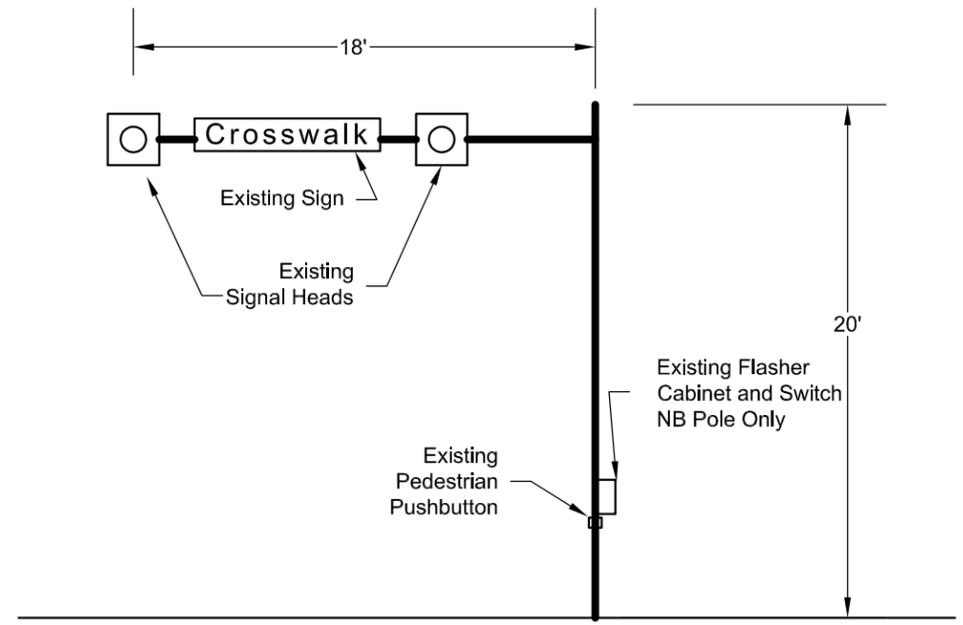
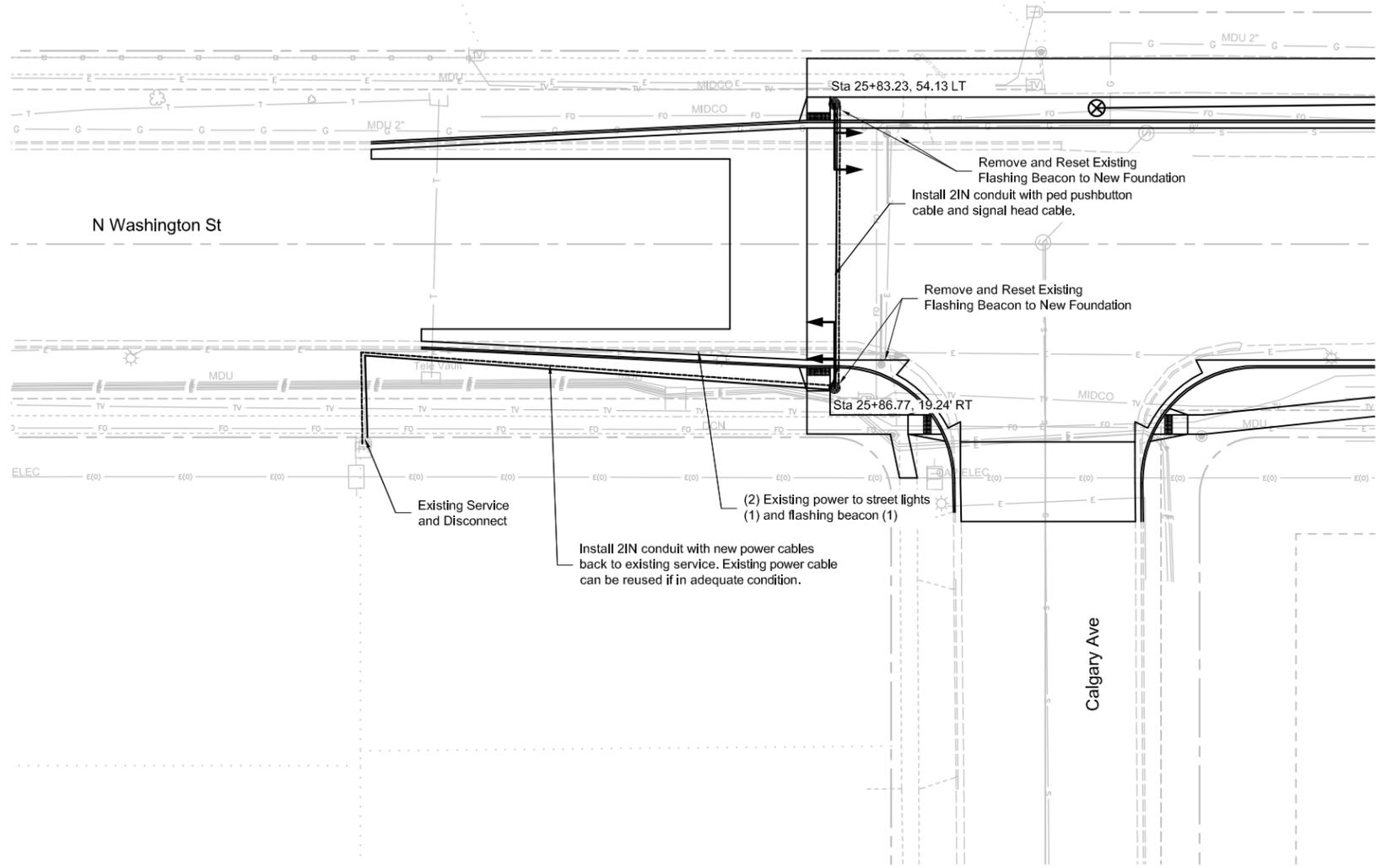


Cable and Conduit Schedule  
Site 2 - N Washington St & LaSalle Dr

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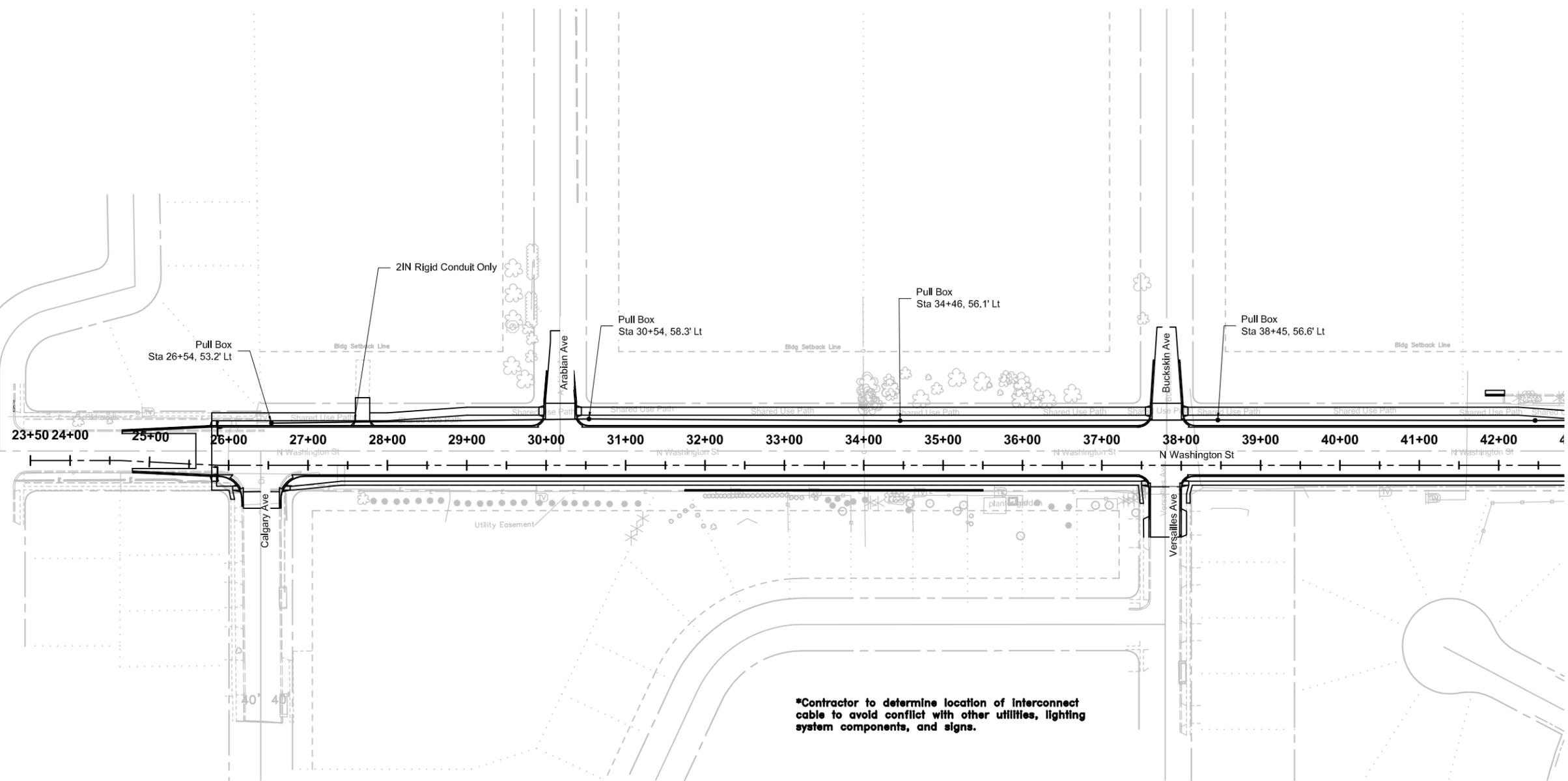
STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	150	19



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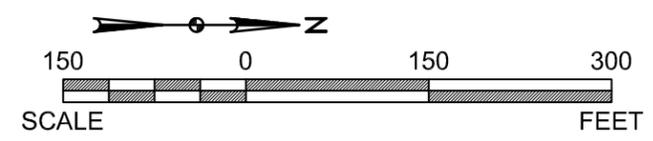
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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
				<b>Signal Layout</b> <b>Calgary Ave Mast Arm</b> <b>Flashing Beacon System</b>			
				DRWN BY ANG	CHK'D BY GJS	PROJECT NO. 1412129	DATE 08/2014
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ND	NHU-1-981(101)111	150	20



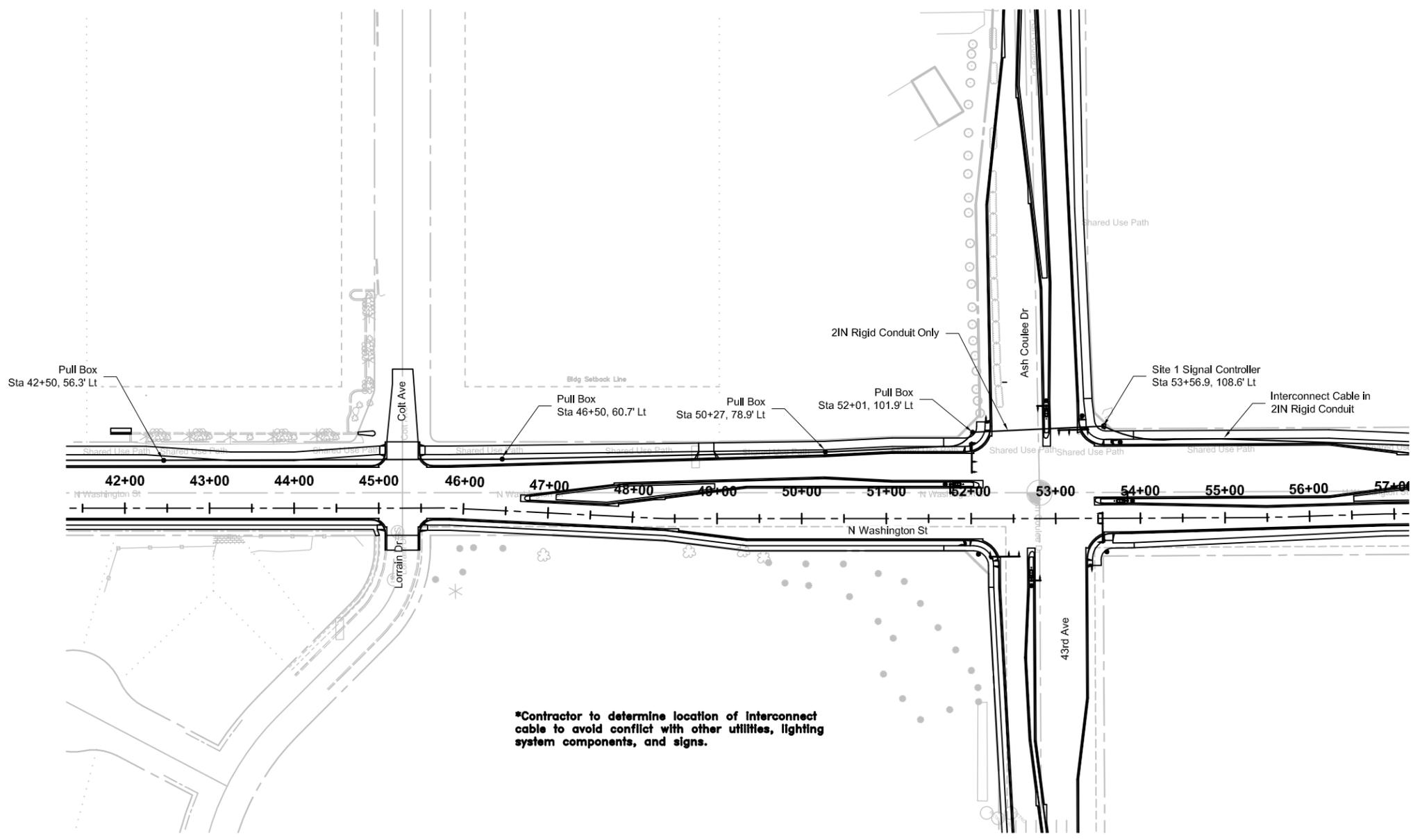
**\*Contractor to determine location of interconnect cable to avoid conflict with other utilities, lighting system components, and signs.**

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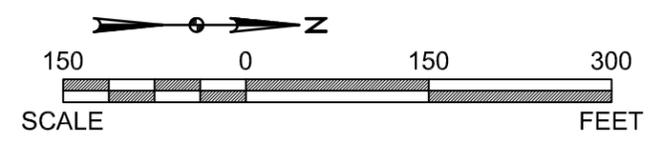
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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
 <b>2 In Conduit</b> Calgary Ave to Ash Coulee Dr/43rd Ave			
DRWN. BY	CHK'D BY	PROJECT NO.	DATE
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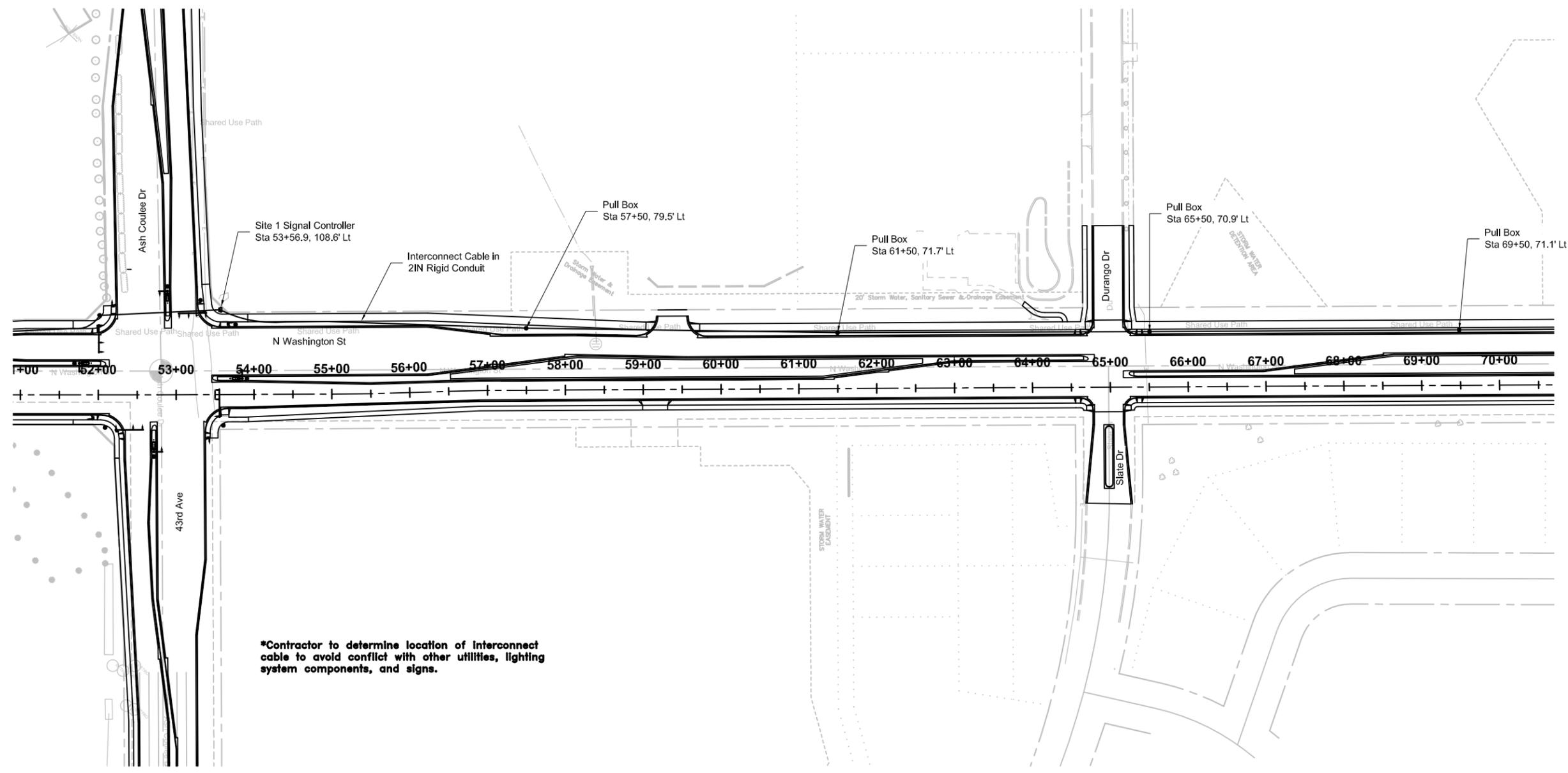
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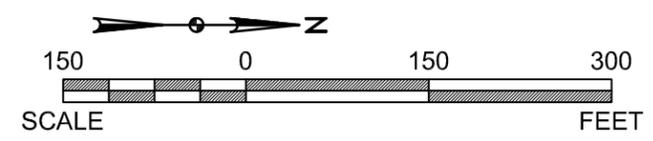
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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		<b>Interconnection Cable</b> Calgary Ave to Ash Coulee Dr/43rd Ave	
		DRWN. BY ANG	CHK'D BY GJS
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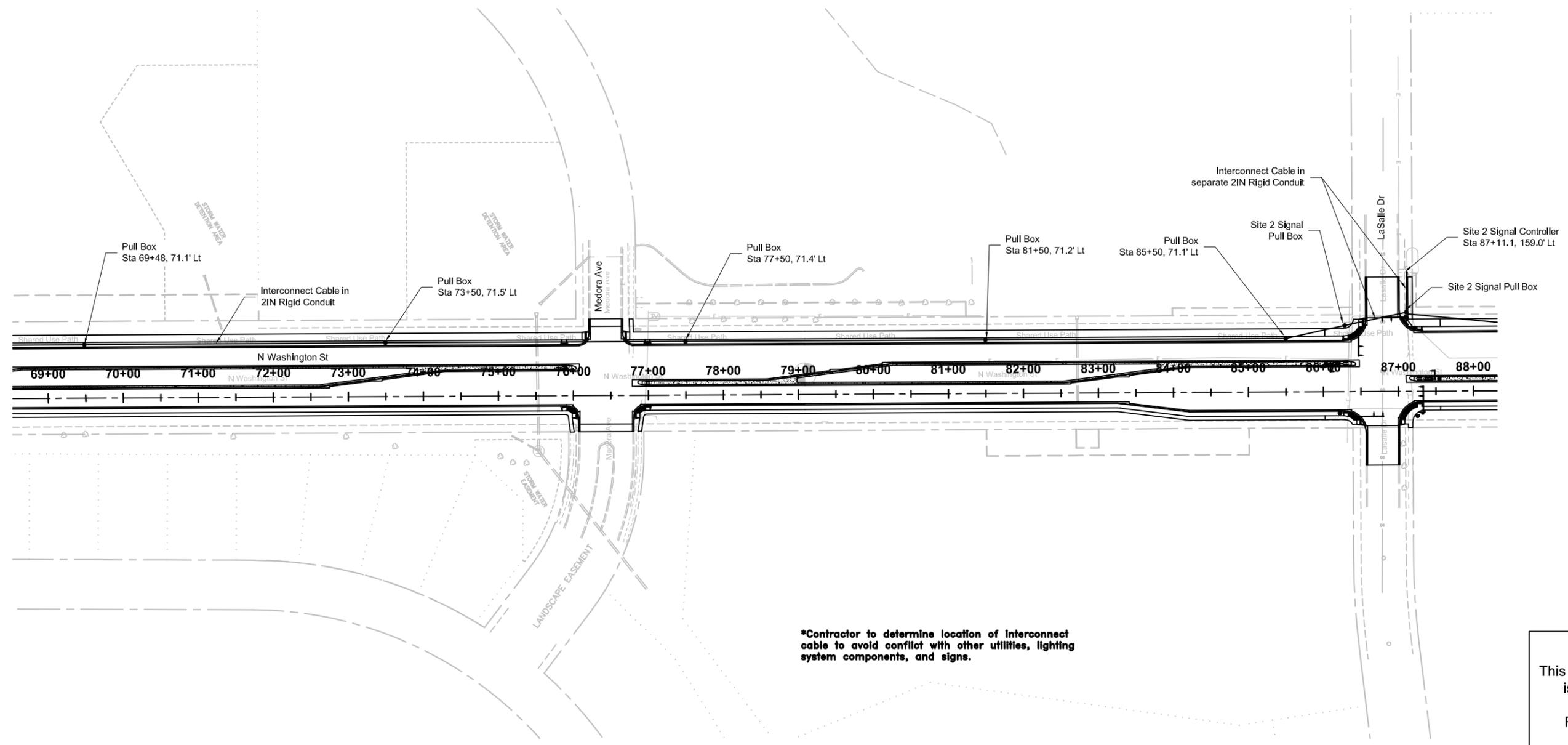
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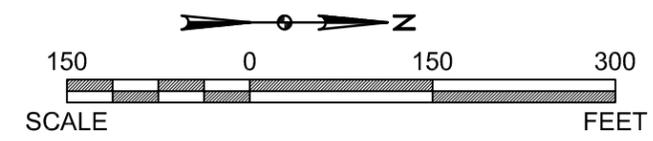
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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA							
 <b>Interconnection Cable</b> Ash Coulee Dr/43rd Ave to LaSalle Dr							
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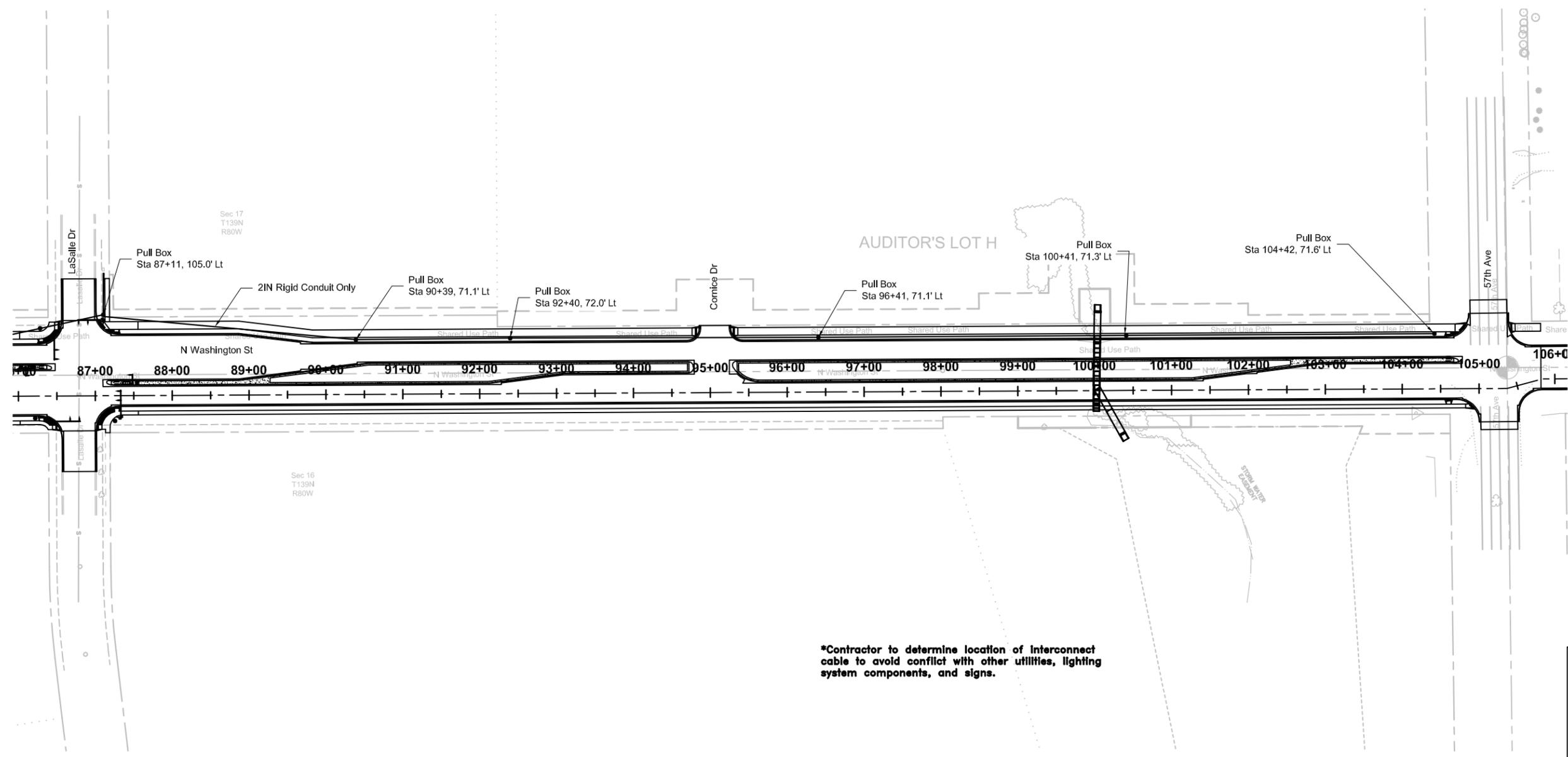
**\*Contractor to determine location of interconnect cable to avoid conflict with other utilities, lighting system components, and signs.**

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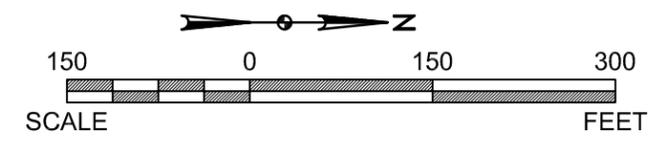
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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
 <b>Interconnection Cable</b> Ash Coulee Dr/43rd Ave to LaSalle Dr			
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<b>NORTH WASHINGTON STREET</b> CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		<b>2 In Conduit</b> <b>LaSalle Dr</b> <b>to 57th Ave</b>	
DRWN. BY	CHK'D BY	PROJECT NO.	DATE
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SPEC	CODE	ITEM DESCRIPTION	UNIT	TRAFFIC SIGNAL SYSTEM - SITE 1	TRAFFIC SIGNAL SYSTEM - SITE 2	REVISE FLASHING BEACON SYSTEM	IT SYSTEM	TOTAL
772	0020	CONCRETE FOUNDATION-TRAFFIC SIGNALS	EA	12	6	2	-	20
772	0100	PULLBOX	EA	9	6	-	20	35
772	0240	2IN DIAMETER RIGID CONDUIT	LF	426	176	74	8,011	8,687
772	0270	3IN DIAMETER RIGID CONDUIT	LF	601	493	-	-	1,094
772	0300	UNDERGROUND CONDUCTOR NO6-TYPE RHW	LF	-	-	320	-	320
772	0310	UNDERGROUND CONDUCTOR NO6-TYPE THW	LF	-	-	160	-	160
772	0375	EMERGENCY VEHICLE DETECTOR CABLE	LF	1,157	1,074	-	-	2,231
772	0432	NO14 AWG 2 CONDUCTOR CABLE	LF	1,157	1,074	240	-	2,471
772	0435	NO14 AWG 5 CONDUCTOR CABLE	LF	675	513	80	-	1,268
772	0437	NO14 AWG 7 CONDUCTOR CABLE	LF	1,041	1,000	-	-	2,041
772	0442	NO14 AWG 12 CONDUCTOR CABLE	LF	1,938	897	-	-	2,835
772	0420	NO16 AWG 2 CONDUCTOR CABLE	LF	2,948	2,343	-	-	5,291
772	0450	INTERCONNECT CABLE	LF	-	-	-	3,800	3,800
772	0700	TYPE VI SIGNAL STANDARD	EA	4	-	-	-	4
772	0812	COMBO 11FT MA SIG & LT STD-TYPE C	EA	4	2	-	-	6
772	1032	COMBO 33FT MA SIG & LT STD-TYPE C	EA	-	1	-	-	1
772	1052	COMBO 35FT MA SIG & LT STD-TYPE C	EA	4	2	-	-	6
772	1102	COMBO 40FT MA SIG & LT STD-TYPE C	EA	-	1	-	-	1
772	1810	1-WAY 3 SEC HEAD W/12IN LENS-POST MTD	EA	-	4	-	-	4
772	1812	1-WAY 3 SEC HEAD W/12IN LENS-MA MTD	EA	16	6	-	-	22
772	1822	1-WAY 4 SEC HEAD W/12IN LENS-MA MTD	EA	-	4	-	-	4
772	1830	1-WAY 5 SEC HEAD W/12IN LENS-POST MTD	EA	8	-	-	-	8
772	2060	PEDESTRIAN COUNTDOWN SIGNAL HEAD-POST MTD	EA	8	8	-	-	16
772	2200	PEDESTRIAN PUSHBUTTON POST	EA	4	6	-	-	10
772	2215	PEDESTRIAN PUSHBUTTON & SIGN	EA	12	10	-	-	22
772	2260	VIDEO DETECTION CABLE	LF	1,097	1,076	-	-	2,173
772	2265	VIDEO DETECTION SYSTEM <sup>1</sup>	EA	1	1	-	-	2
772	2350	CONTROLLER TYPE 1 <sup>2</sup>	EA	1	1	-	-	2
772	2610	EMERGENCY VEHICLE PRE-EMPTION UNIT <sup>3</sup>	EA	4	4	-	-	8
772	3165	REMOVE CONCRETE FOUNDATION	EA	1	-	2	-	3

<sup>1</sup>Includes resetting cameras, video monitor, access point and all other equipment required for a fully operational video detection system.  
<sup>2</sup>Includes cabinet, working slab, conflict monitor, load switches, flashers, bus interface units and all other equipment required as reset or new for a fully operational traffic signal controller.  
<sup>3</sup>Includes resetting detectors, lights and all other equipment required for a fully operation preemption system.

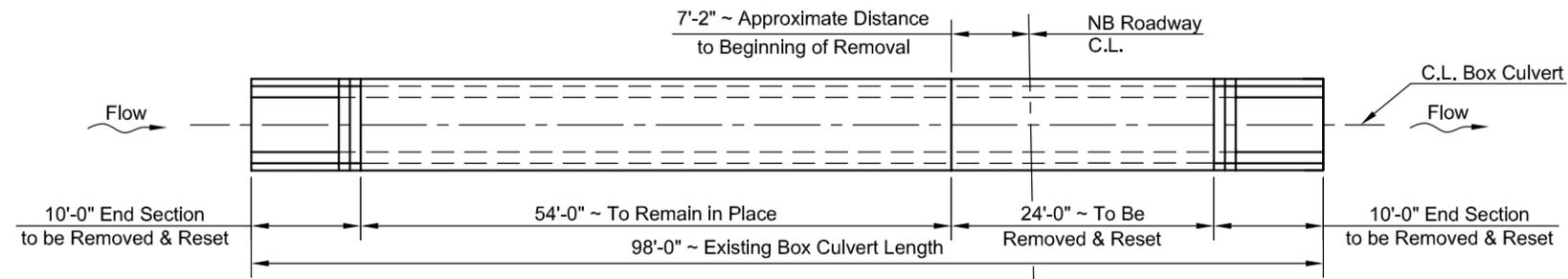
772	2935	REVISE FLASHING BEACON SYSTEM	EA	1
772	9200	IT SYSTEM	EA	1
772	9811	TRAFFIC SIGNAL SYSTEM - SITE 1	EA	1
772	9812	TRAFFIC SIGNAL SYSTEM - SITE 2	EA	1

**Items shown above are for informational purposes, contractor shall provide all labor and equipment necessary for the signal system to be fully operational as shown in the plans.**

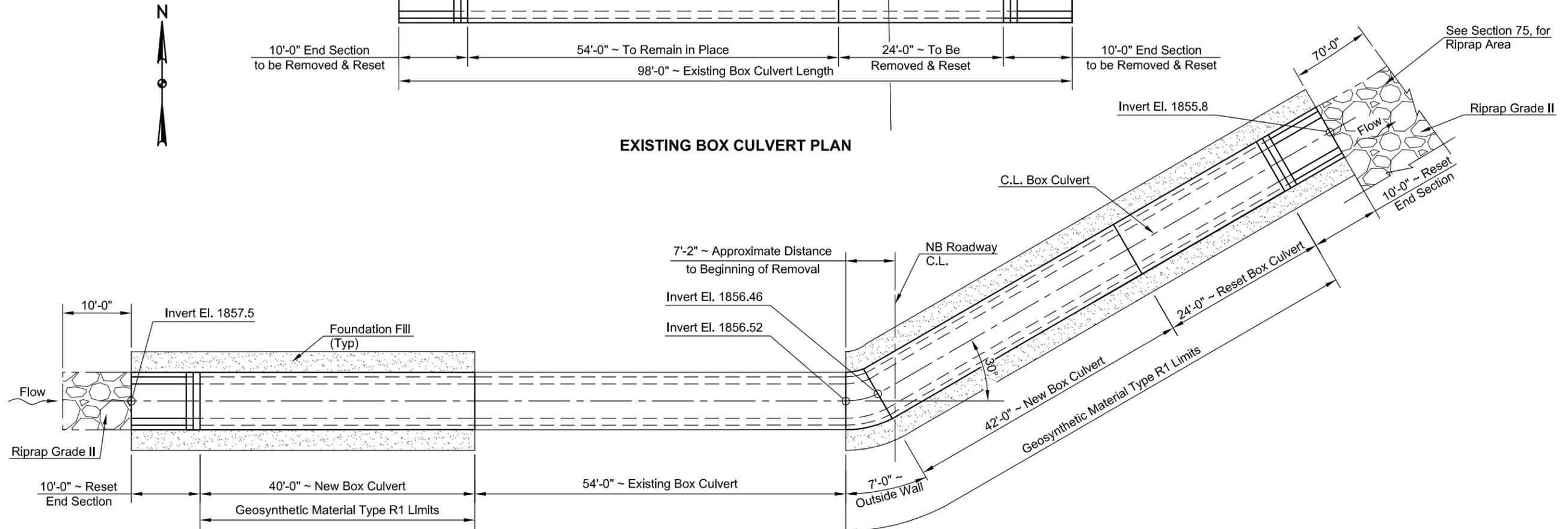
**Items shall be included in the corresponding price bid "REVISE FLASHING BEACON SYSTEM", "TRAFFIC SIGNAL SYSTEM - SITE \_" and "IT SYSTEM"**

This document was originally issued and sealed by Gabriel J. Schell Registration Number PE-6876, on 9/09/15 and the original document is stored at the City of Bismarck

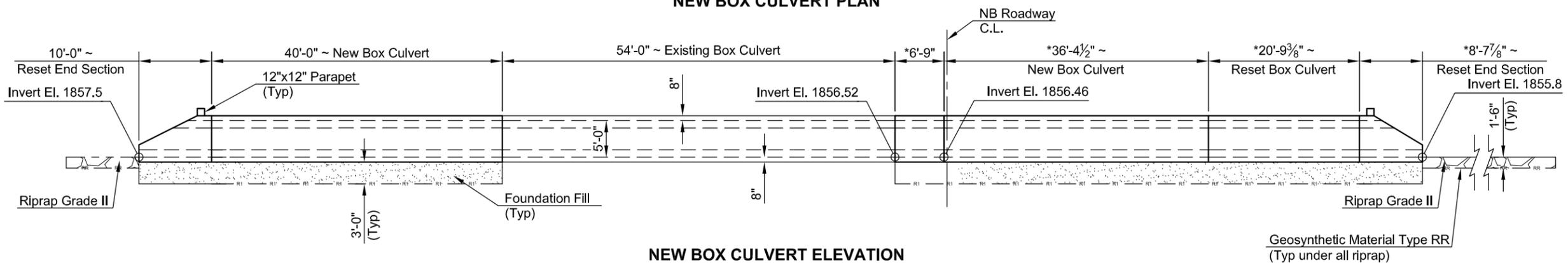
Rev'd.		Scale: 1:40 Hor, 1:10 Ver	
NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		Estimate of Quantities	
DRWN BY ANG	CHK'D BY GJS	PROJECT NO. 1412129	DATE 08/2014
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**EXISTING BOX CULVERT PLAN**



**NEW BOX CULVERT PLAN**



**NEW BOX CULVERT ELEVATION**

For a single barrel box culvert with an 8" thick roof, 8" floor and 8" walls, the following total factored moments would result from the application of the required loads:

FACTORED DESIGN MOMENTS (SINGLE)	
WALL MOMENT	0 ft-lbs
ROOF MOMENTS	
CORNER	-6,189 ft-lbs
BOTTOM	8,797 ft-lbs
FLOOR MOMENTS	
CORNER	-6,949 ft-lbs
TOP	9,405 ft-lbs

FACTORED DESIGN SHEARS (SINGLE)	
WALL SHEAR	1,885 lbs
ROOF SHEAR	5,090 lbs
FLOOR SHEAR	7,480 lbs

**STRUCTURAL QUANTITIES ONLY**

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0127	REMOVE & SALVAGE CULVERT - ALL TYPES & SIZES	LF	44
210	0050	BOX CULVERT EXCAVATION	EA	1
210	0127	CHANNEL EXCAVATION	L SUM	1
210	0210	FOUNDATION FILL	CY	138
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
256	0200	RIPRAP GRADE II	CY	37
606	0705	7FT X 5 FT PRECAST RCB CULVERT	LF	86.8
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	SY	454
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	74

\*Dimension as measured perpendicular to NB Roadway C.L.

THIS DOCUMENT WAS ORIGINALLY ISSUED AND SEALED BY DUSTIN KINNISCHTKE REGISTRATION NUMBER PE-6530 ON 8/25/2014 AND THE ORIGINAL DOCUMENT IS STORED AT THE CITY OF BISMARCK.

Rev'd.	
NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA	
N Washington St Precast Concrete Single Box Culvert Layout	
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PROJECT NO. 1412129	DATE 06/2014
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## STRUCTURAL NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-1-981(101)111	170	2

100-P01 SCOPE OF WORK: Work at this site consists of extending a single barrel 7' x 5' RCB. The box culvert is to be extended 40'-0" on the west end and approximately 46'-10" on the east end along the centerline of the box culvert. The extension on the east end includes the introduction of a 30° degree bend that is approximately 4'-10" in length. Segments of the existing box culvert including the end sections will be reset.

202-P01 REMOVE & SALVAGE CULVERT: Remove and reset the existing box culvert as shown in the plans. Each existing end section is 10' long and will be reset and attached to the new or reset box culvert as shown. Additionally, 24' of the existing box culvert barrel sections will be removed and reset to the east. Work drawings of the existing box culvert are available and can be obtained from the Engineer. All labor required to remove and reset the 24' of barrel sections and both 10' end sections will be included in the unit price bid for "REMOVE & SALVAGE CULVERT-ALL TYPES & SIZES". Plan quantity of "REMOVE & SALVAGE CULVERT-ALL TYPES & SIZES" will be paid. Any damage done to the barrel and end sections during removal and resetting operations will be repaired at the contractor's expense.

210-P01 BOX CULVERT EXCAVATION: Perform Box Culvert Excavation according to Section 210. Excavation material deemed suitable by the engineer can be used for roadway embankment.

The suitability of material from on-site excavations for use in embankments will be determined by the engineer. Embankment constructed from channel excavated material will not be measured for separate payment but will be included in the price bid for "BOX CULVERT EXCAVATION". If the channel excavated material is not suitable for roadway embankment it will become property of the contractor and disposed of outside of the road right-of-way, not adjacent to the construction site, and at a site approved by the engineer. All costs associated with excavation, hauling, depositing and leveling the material will be included in the unit price bid for "BOX CULVERT EXCAVATION".

Moisture and density controls will be in accordance with Section 203.04 E.2 of the Standard Specifications. The requirements of 203.04 E.1 will also apply.

210-P02 CHANNEL EXCAVATION: Grade the ends of the box culvert extensions to the natural channel as well as grade adjoining areas for wetland mitigation as noted in the plans. There is an estimated quantity of 260 CY of excavation that will be required to complete this work. All excavation required to complete this work is included in the price bid for "Channel Excavation"

210-P02 FOUNDATION PREPARATION: The bidders will be aware of the possible inundated conditions at this site before the bid letting. The cost of any cofferdams, dewatering the excavation and all measures required to maintain flow will be included in the bid for "FOUNDATION PREPARATION-BOX CULVERT".

210-P03 FOUNDATION FILL: Place backfill in layers of not more than six inches, moisten or dry as required, and thoroughly compact with mechanical tamping equipment. Moisture and density controls will be in accordance with in Section 714.04 A.7.

256-P01 RIPRAP GRADE II: Install "RIPRAP GRADE II" as shown on the plans. Excavation and shaping necessary to prepare the bed for placement of riprap is not a pay item, but is included in the price bid for "RIPRAP GRADE II". Do not use broken concrete as riprap. Payment of "RIPRAP GRADE II" will be paid according to the designated length, width and depth as shown on the plans unless otherwise designated by the Engineer in the field.

606-P01 PRECAST REINFORCED CONCRETE BOX CULVERT AND END SECTIONS: Tie all barrel and end sections together with 1" diameter tie bolts. All joints require two ties per exterior wall located at either the third points of the clear wall height or to match the existing tie bolt locations. If the existing tie bolts are no longer able to be reused, they will be replaced with new ones. The costs of replacing any unusable tie bolts will be included in the unit price bid for "7FT X 5FT PRECAST RCB CULVERT".

Surface finish "C" in accordance with Section 602.04 I.3 of the Standard Specifications will be required on all exposed surfaces of the wings and the parapet. All costs associated with applying surface finish "C" will be included in the unit price bid for "7FT X 5FT PRECAST RCB CULVERT".

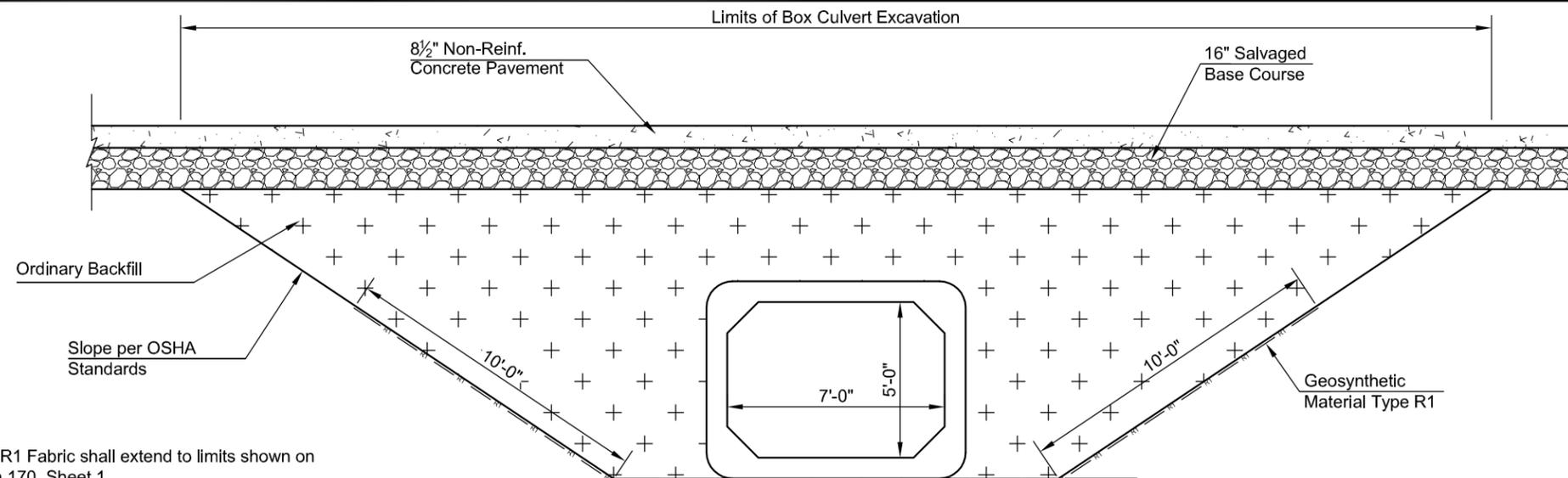
DESIGN LOADS:  
Live Load = HL-93  
Maximum Fill Height = 7'

WORK DRAWINGS: The contractor will submit the following work drawings to the Engineer for review:

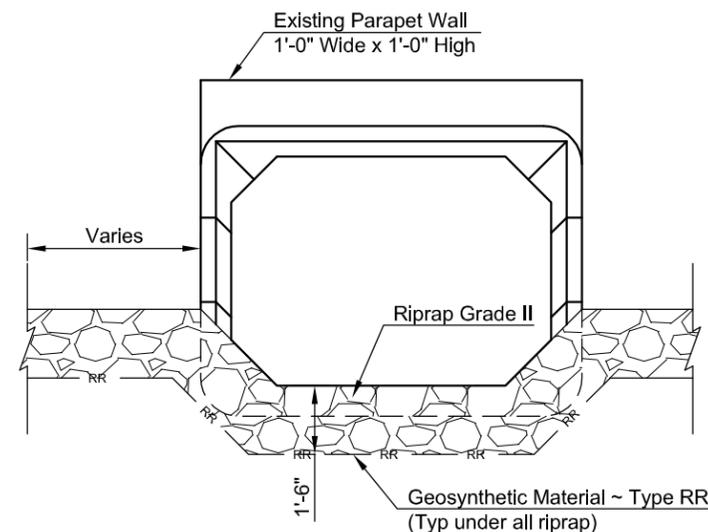
Precast RCB

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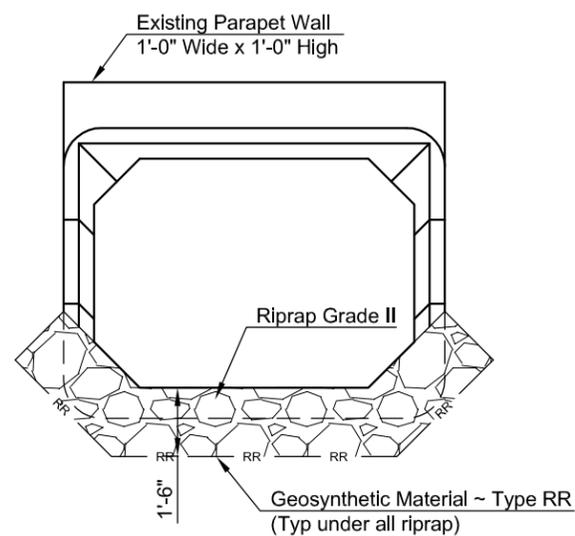
STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	170	3



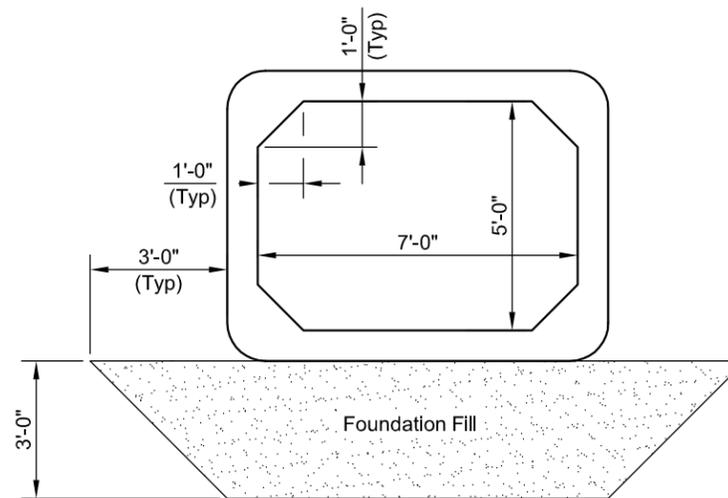
\* Type R1 Fabric shall extend to limits shown on Section 170, Sheet 1.



**EAST END VIEW**  
(Showing Dimensions & Finished Section)

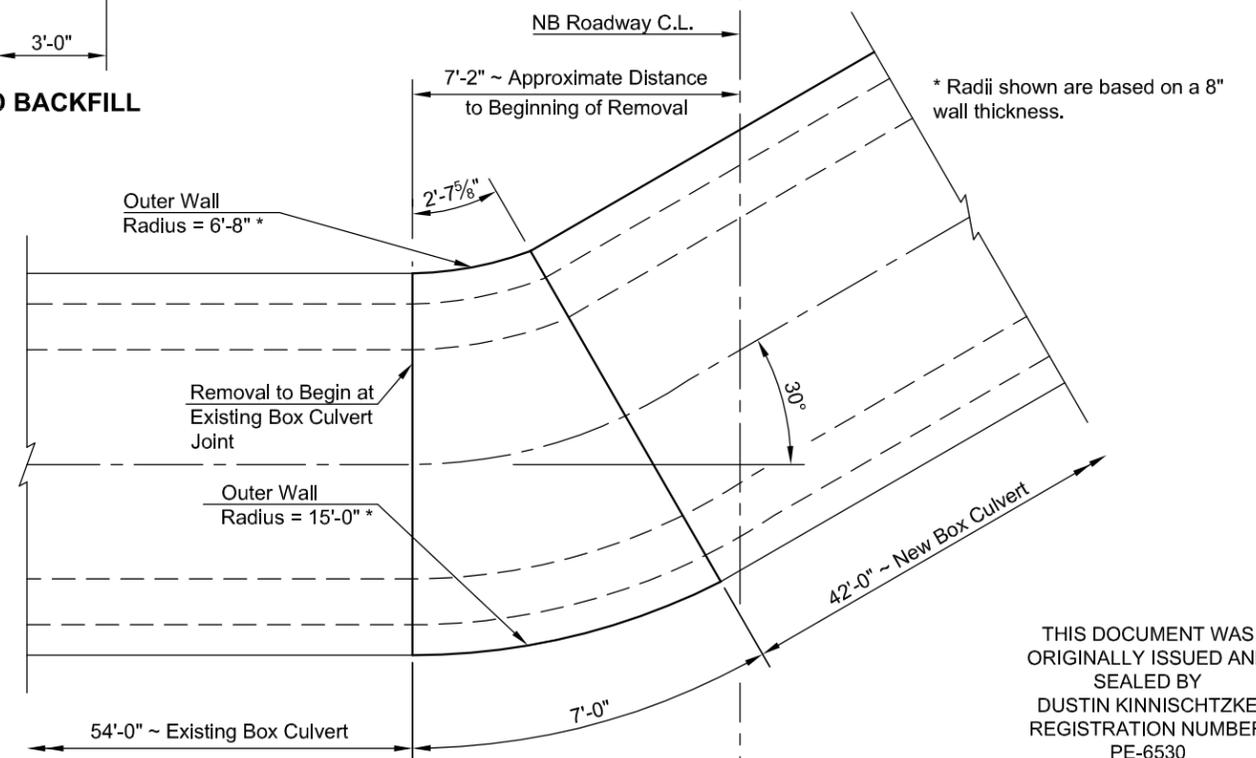


**WEST END VIEW**  
(Showing Dimensions & Finished Section)



**BARREL SECTION**  
(Showing Dimensions & Fill Under Box)

**BOX CULVERT EXCAVATION AND BACKFILL**

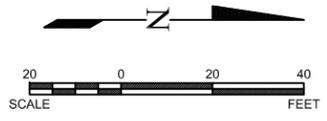
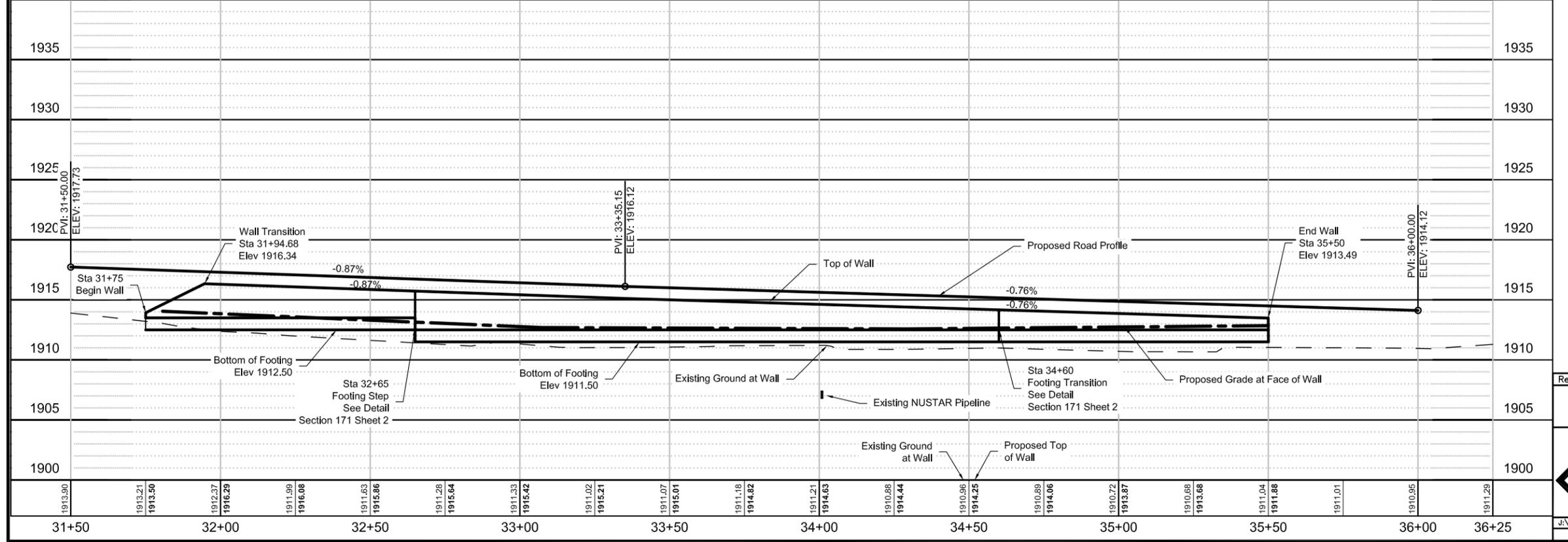
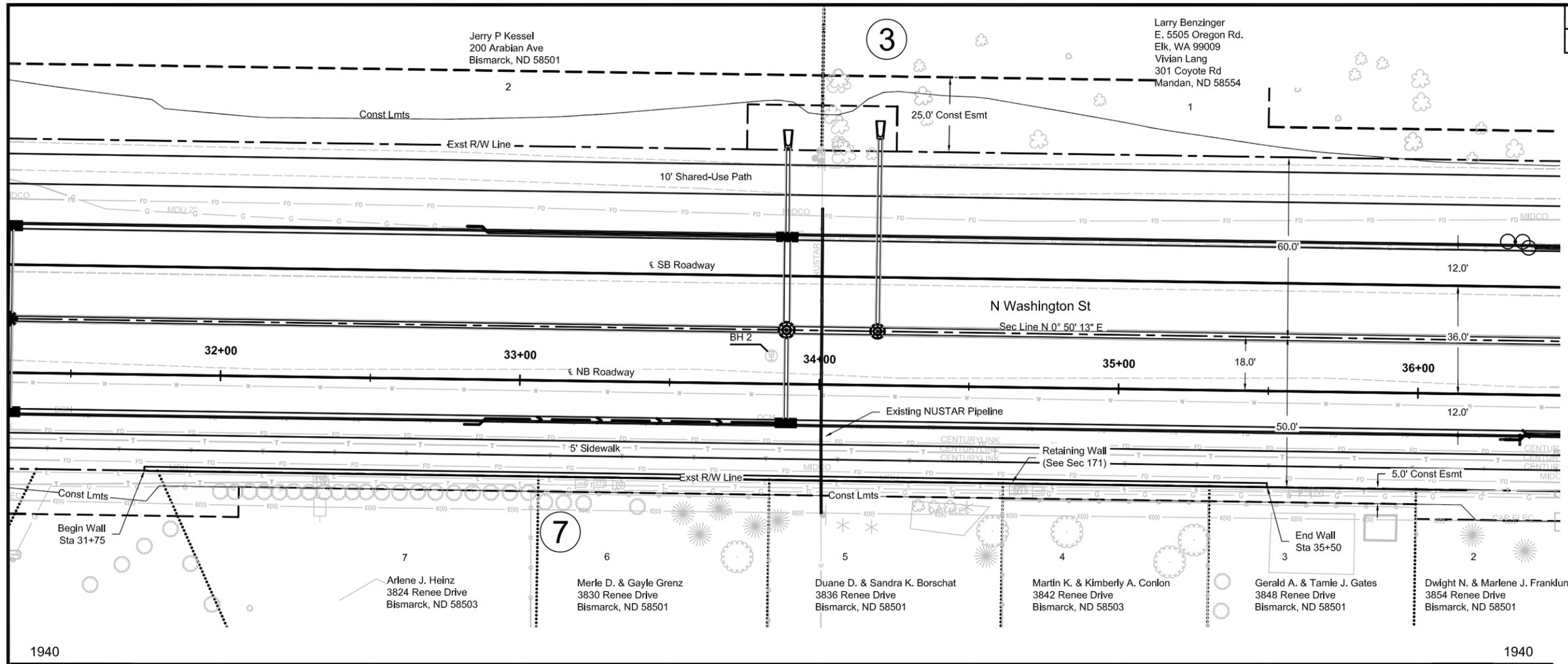


**BEND DETAIL**

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Rev'd.			
NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
N Washington St Precast Concrete Single Box Culvert Details			
DRWN BY DMW	CHK'D BY DJK	PROJECT NO. 1412129	DATE 06/2014
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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	171	1



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**NORTH WASHINGTON STREET**  
CITY OF BISMARCK  
BISMARCK, NORTH DAKOTA

**N Washington St Retaining Wall Plan & Profile**  
Sta 31+75 to Sta 35+50

KLJ

DRWN BY	CHK'D BY	PROJECT NO.	DATE
JJK	GJS	1412129	06/2014

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STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	171	2

**PLAN NOTES**

- 100 SCOPE OF WORK: Work at this site consists of building retaining wall segments along North Washington Street. The retaining wall will be a cast-in-place reinforced concrete wall of varying heights supported by a cast-in-place reinforced concrete footing.
- 210 ORDINARY BACKFILL MATERIAL: Backfill will be natural material from the site. The backfill will be placed in layers of not more than 6 inches, moistened or dried as required, and thoroughly compacted with mechanical tamping equipment.
- 210 FOUNDATION PREPARATION: All costs for foundation preparation work items shown in Section 210 in the Specifications will be included in the unit price bid for "CLASS AE-3 CONCRETE." Foundation soils will be observed and approved by the engineer prior to concrete placement.
- 602 SURFACE FINISH "C": Surface Finish "C" will be required on the face of the wall and the top of the wall for the retaining wall. This work will be included in the unit price bid for "CLASS AE-3 CONCRETE."
- 602 RETAINING WALL AND RETAINING WALL FOOTINGS: The cost of furnishing and placing, perforated pipe, geotextile fabric, drainage aggregate, preformed expansion joint filler, dowel bar assembly, waterproofing material and other miscellaneous items for the retaining walls and footings will be included in the unit price bid for "CLASS AE-3 CONCRETE".

- 602 WALL DRAINAGE: The drainage aggregate will be Aggregate Class 4 in accordance with Section 816.02. The drainage pipe will terminate at approximately Station 35+55 as directed by the Engineer and capped with a rodent screen. Drainage pipe and rodent screen will be included in the unit price bid for "Class AE-3 concrete".

The expansion joints as called for in the plans will go through the stem wall and the footing. Additional expansion joints will be required at spacings not to exceed 90 feet at locations determined by the Contractor. The dowel bar assembly required at each expansion joint is required in the stem wall and the footing.

- 612 REINFORCING STEEL: Reinforcing steel for wall and footing will be Grade 60. Dimensions for bent bars are given out to out and to tangent intersections unless otherwise noted. Fabrications and tolerances will be in accordance with the CRSI Manual of Standard Practice. Estimated quantities for "REINFORCING STEEL - GRADE 60" are based on overall wall dimensions and do not take into account joints or lap splices. No adjustment to bid quantities will be made based on actual quantities placed in the field.

**DESIGN STRENGTHS:**

f<sub>c</sub> = 3,000 psi ~ Class AE-3 Concrete  
 f<sub>y</sub> = 60,000 psi ~ Reinforcing Steel

Load & Resistance Factor Design

**SHOP DRAWINGS:**

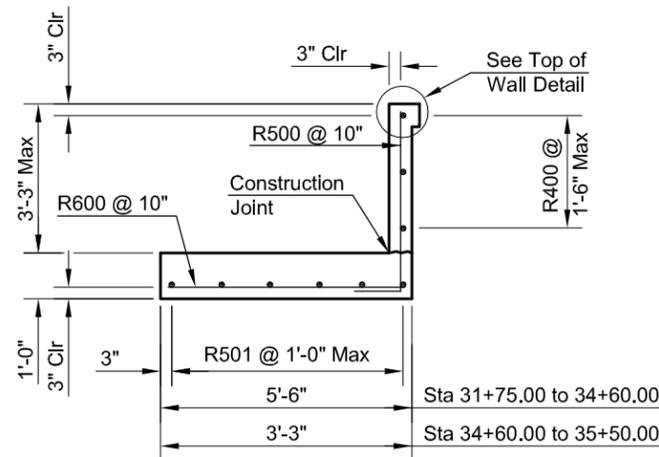
Reinforcing Steel

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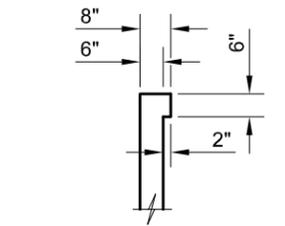
ESTIMATE OF QUANTITIES (Retaining Walls Only)				
SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1130	CLASS AE-3 CONCRETE	CY	83.9
612	0115	REINFORCING STEEL - GRADE 60	LBS	7704

Rev'd.			
NORTH WASHINGTON STREET CITY OF BISMARCK BISMARCK, NORTH DAKOTA			
		Retaining Wall Notes	
		DRWN BY BJJ	CHKD BY JRS
PROJECT NO. 1412129		DATE 08/2014	
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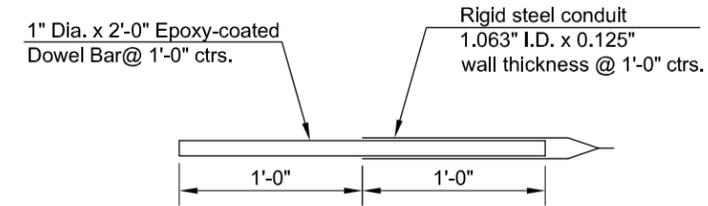
STATE	PROJECT NO.	SEC. NO.	SHEET NO.
ND	NHU-1-981(101)111	171	3



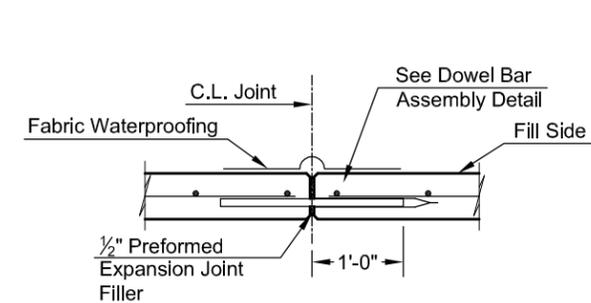
**WALL TYPICAL SECTION (Showing Reinforcing)**



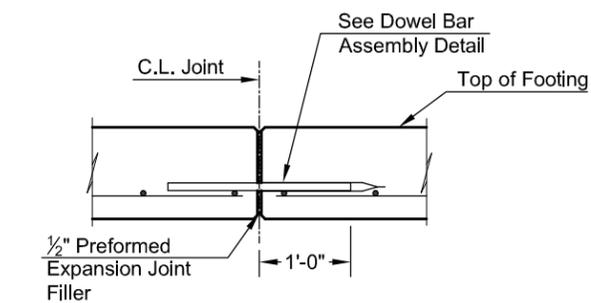
**TOP OF WALL DETAIL**



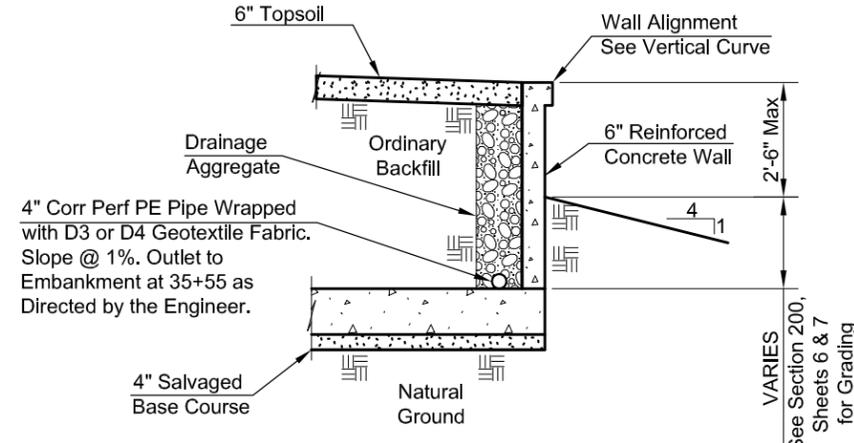
**DOWEL BAR ASSEMBLY**



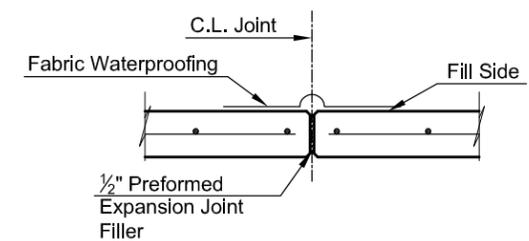
**EXPANSION JOINT DETAIL @ WALL (At 90' Maximum Spacing)**



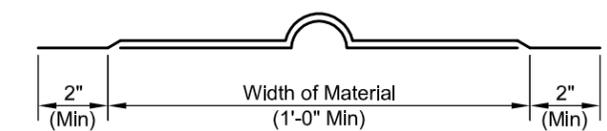
**EXPANSION JOINT DETAIL @ FOOTING (At 90' Maximum Spacing)**



**WALL TYPICAL SECTION (Showing Grading Details)**

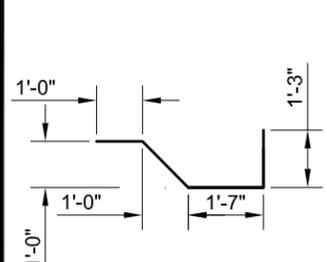


**CONTRACTION JOINT DETAIL @ WALL (At 30' Maximum Spacing)**

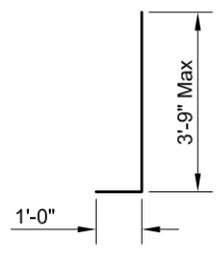


Fabric waterproofing shall be applied in accordance with Section 602.03B of the NDDOT Specifications. All material and work shall be included in the pay item "Class AE-3 Concrete."

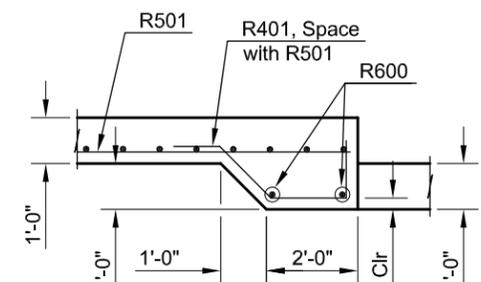
**FABRIC WATERPROOFING DETAIL**



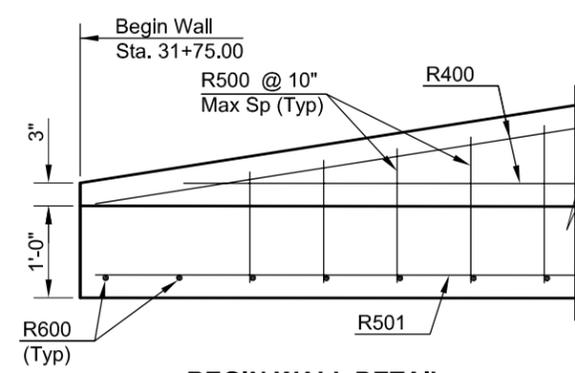
**R401 STEP BAR**



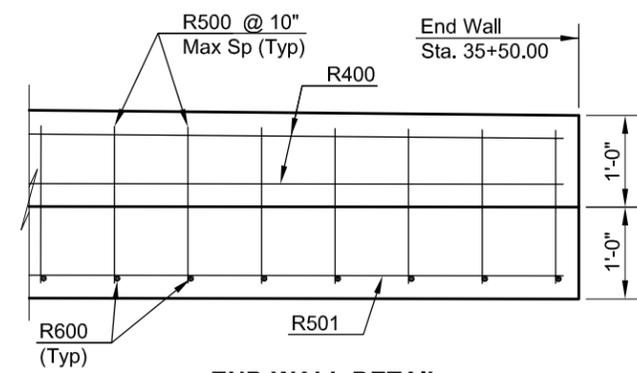
**R500 BAR**



**STEP DETAIL**



**BEGIN WALL DETAIL**



**END WALL DETAIL**

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MINIMUM LAP SPLICE LENGTH	
#4	1'-9"
#5	2'-2"

Rev'd.

NORTH WASHINGTON STREET  
 CITY OF BISMARCK  
 BISMARCK, NORTH DAKOTA

**KLJ**

Retaining Wall  
 Details

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