

JOB #18
CITY OF BISMARCK
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

HLU-1-999(032), PCN 21817
City Project # HC 17-110

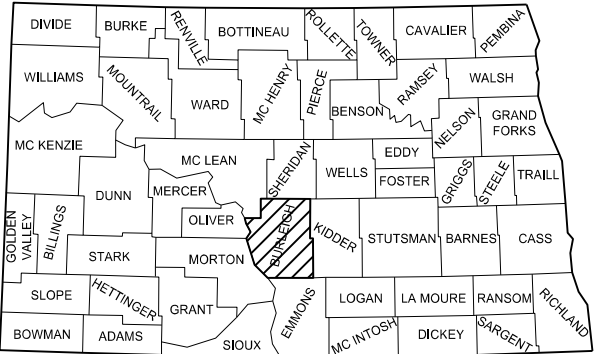
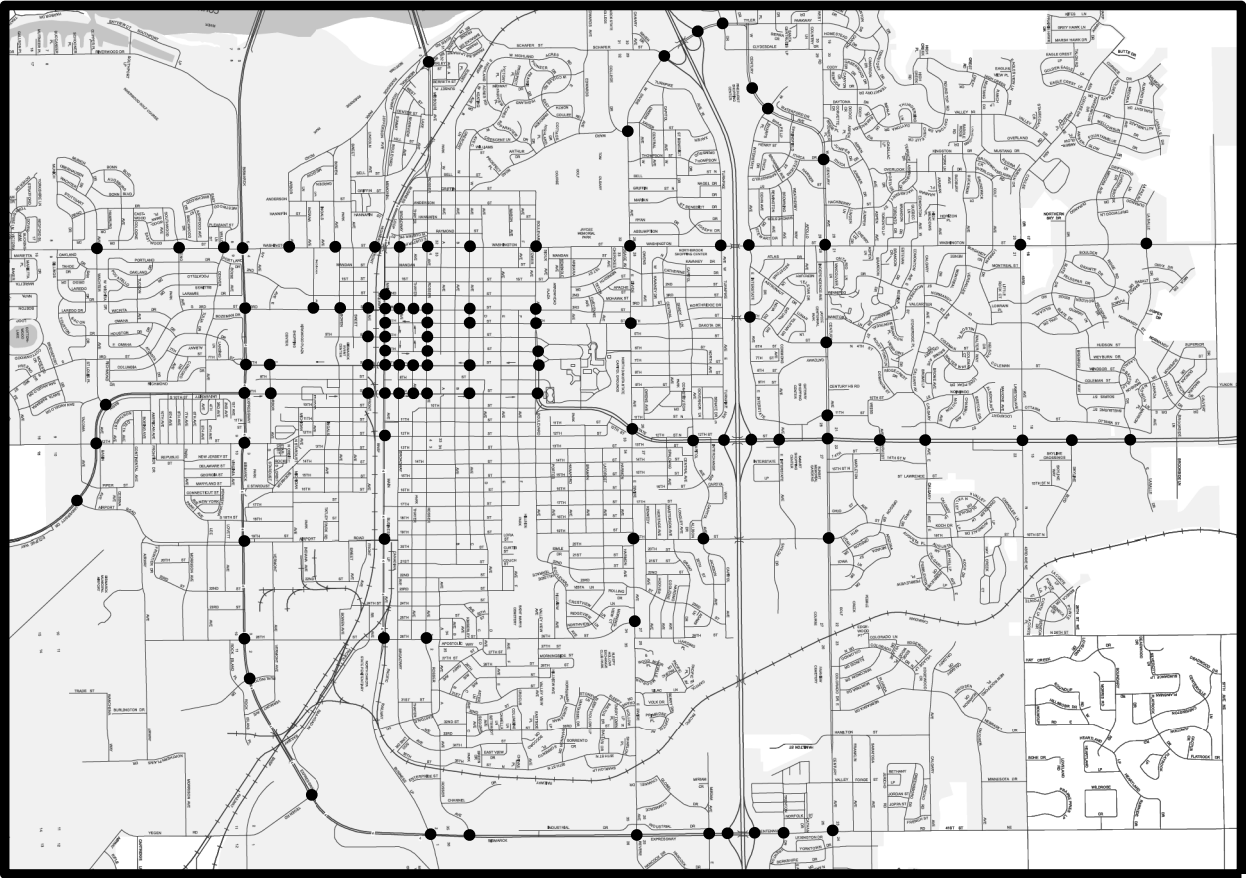
Burleigh County
Bismarck, ND

Traffic Signal Safety Improvements
Pedestrian Countdown Head Replacement and Law Enforcement Confirmation Light Installation

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	HLU-1-999(032)	21817	1	1

GOVERNING SPECIFICATIONS:
2014 Standard Specifications adopted by the North Dakota
Department of Transportation and the Supplemental Specifications
effective on the date the project is advertised.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
HLU-1-999(032)	N/A	N/A



STATE COUNTY MAP

DESIGNERS
Joshua Loegering, PE
Stephen Joersz, EI
Jared Loegering, PE

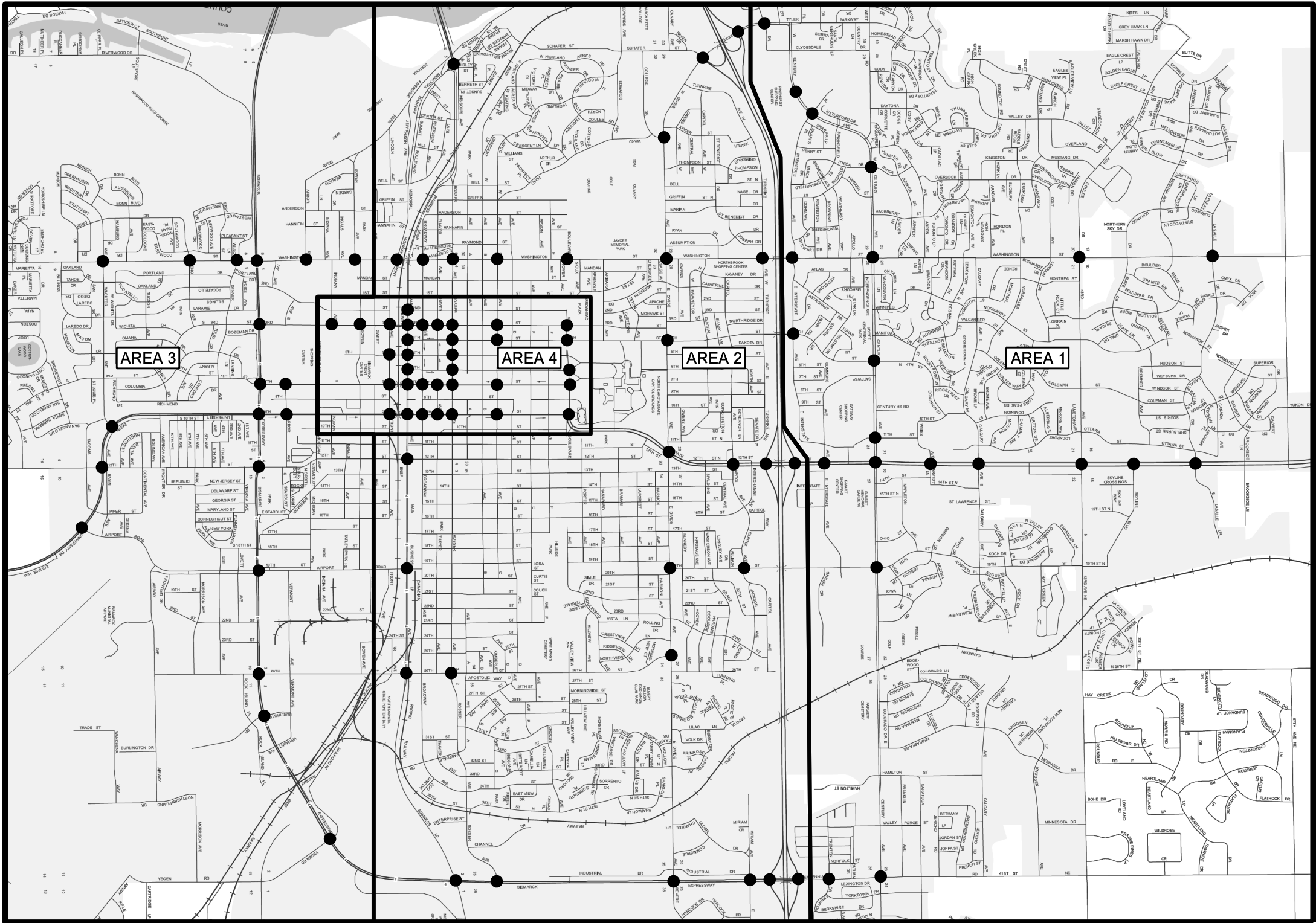
APPROVED DATE 09/05/17
Gabriel J. Schell /s/
CITY OF BISMARCK ENGINEER
CITY OF BISMARCK
APPROVED DATE 09/05/17
Robert Fode /s/
OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.
APPROVED DATE 08/31/17
Joshua M. Loegering /s/
Kadrmass, Lee & Jackson

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2	1	Table of Contents & Standard Drawings	D-704-10	Construction Sign Details - Regulatory Signs					
4	1-5	Scope of Work	D-704-13	Barricade And Channelizing Device Details					
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8	1	Estimate of Quantities	D-704-24	Shoulder Closures And Bridge Painting Layouts					
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● Intersection Improvements Location

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HLU-1-999(032)
BISMARCK, NORTH DAKOTA

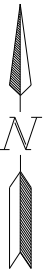
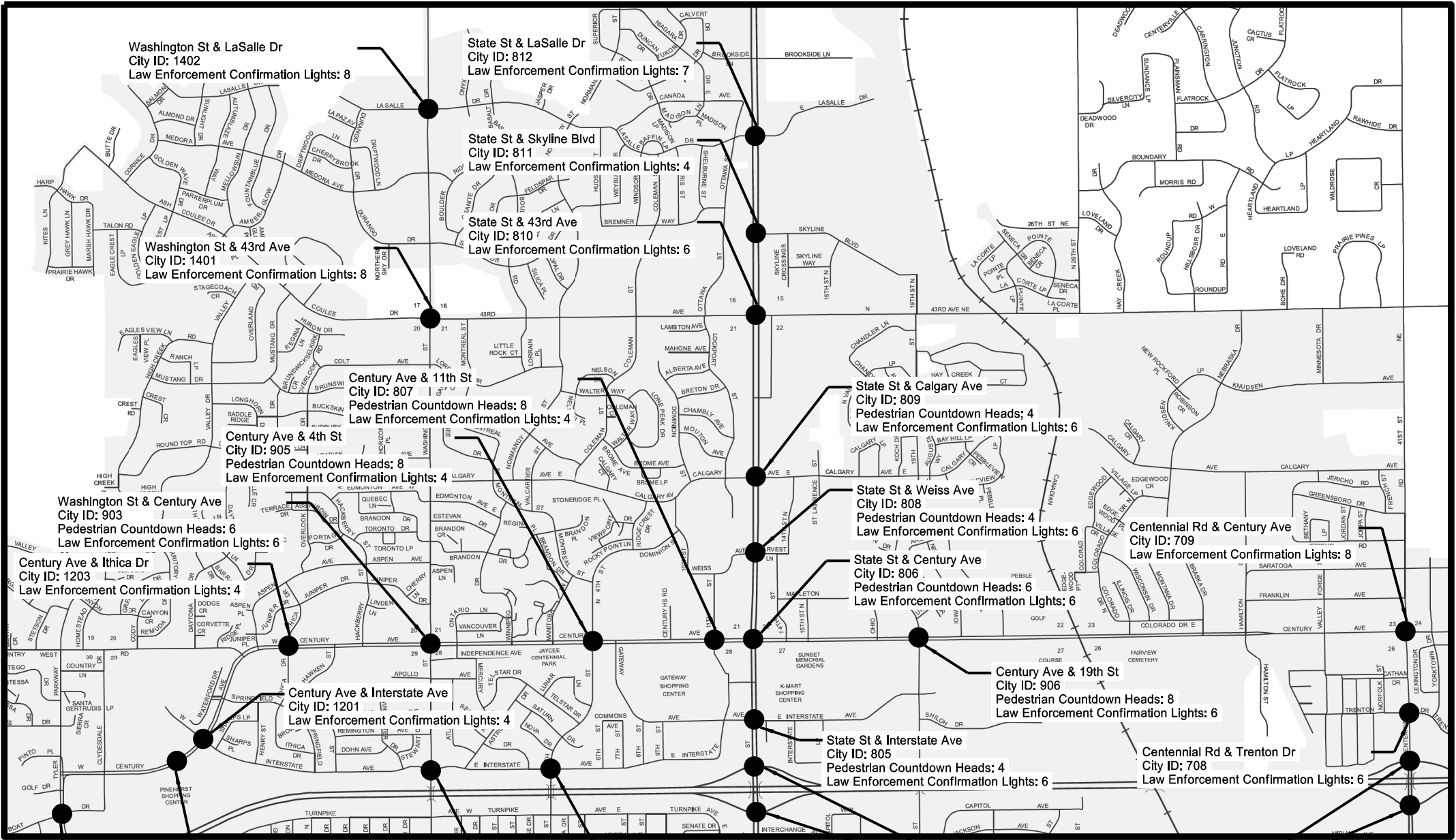


SCOPE OF WORK

DRAWN BY BJT	CHKD. BY JML	PROJECT NO. 5417102
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● Intersection Improvements Location



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BISMARCK, NORTH DAKOTA

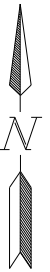
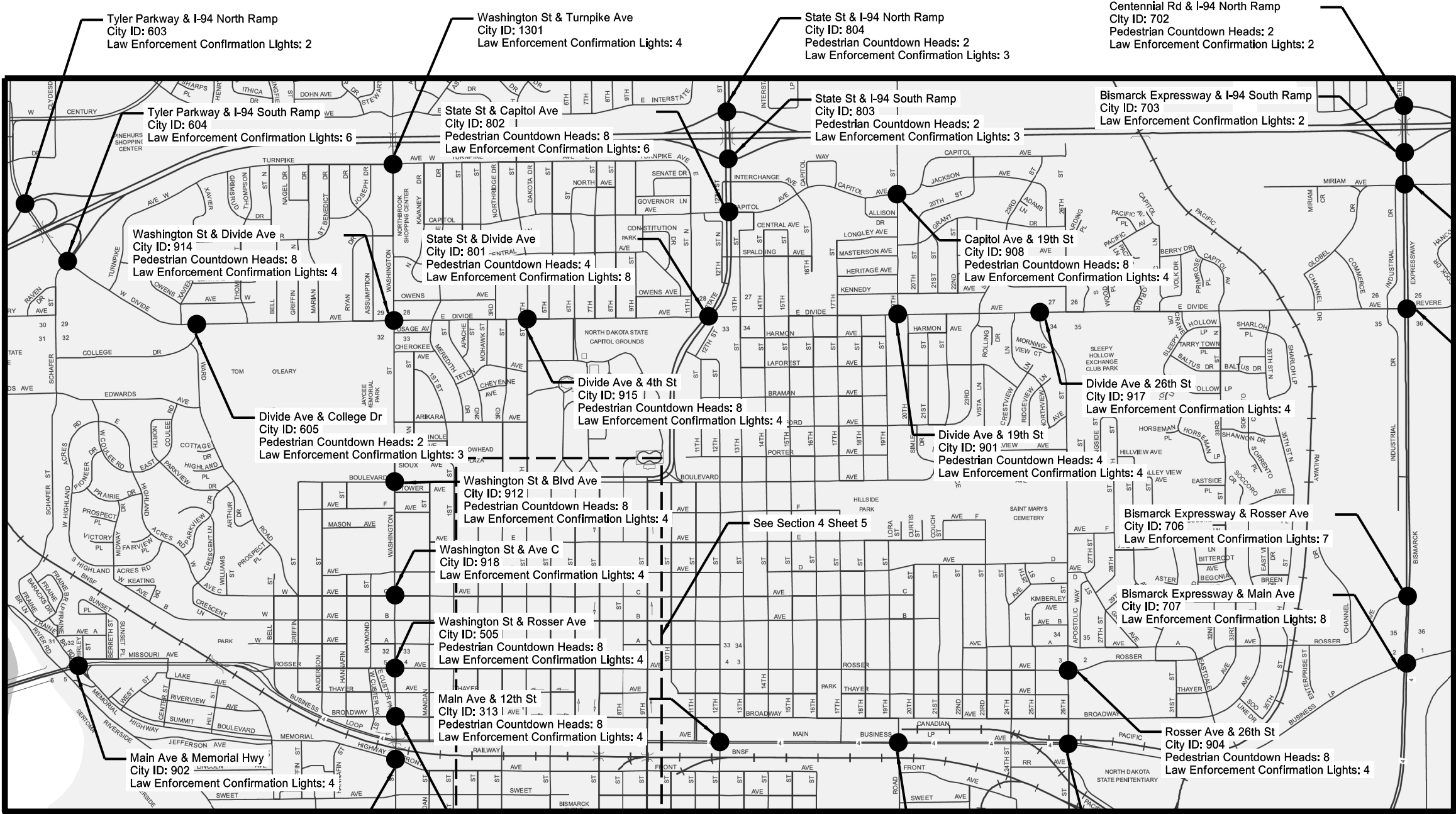


SCOPE OF WORK
AREA 1

DRAWN BY: BJT
CHKD BY: JML
PROJECT NO.: 5417102

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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● Intersection Improvements Location



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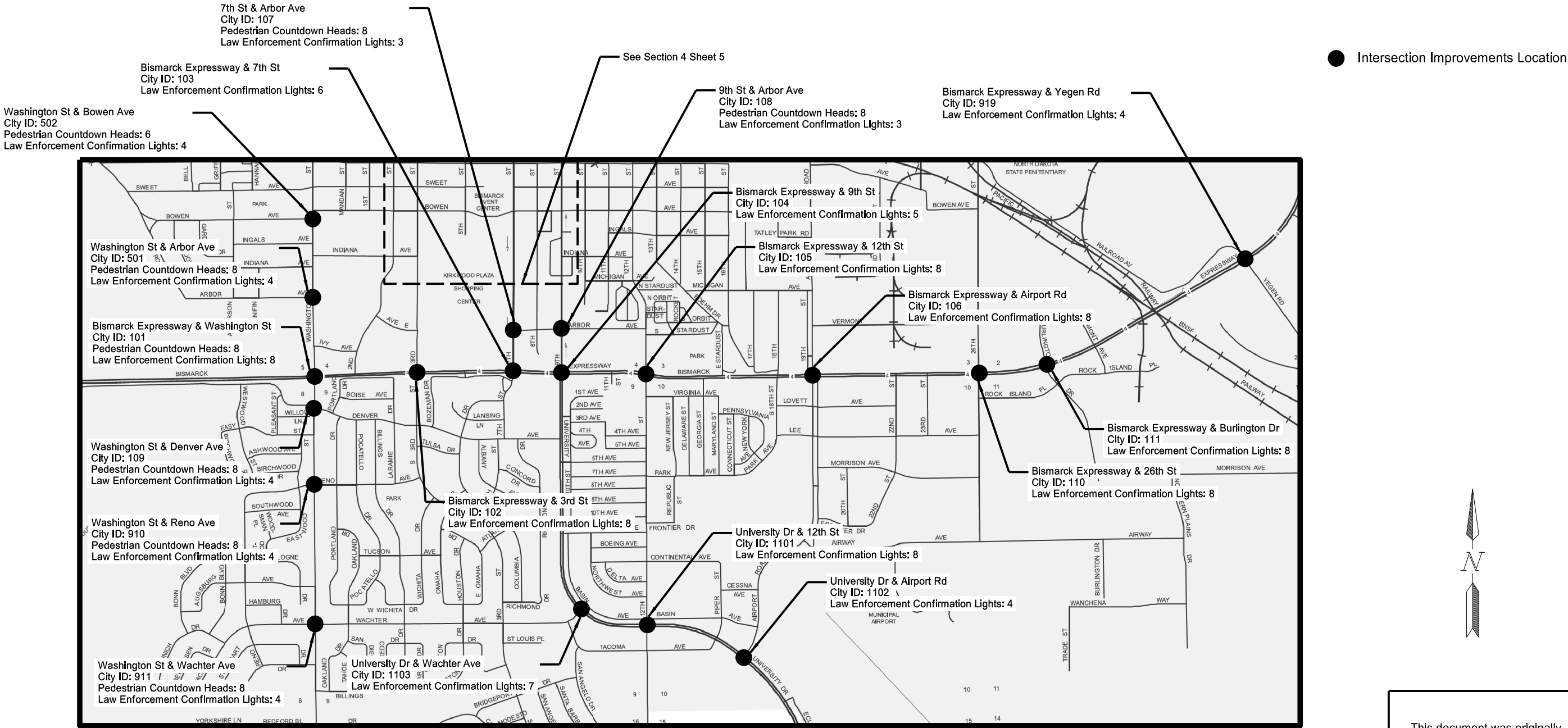
HLU-1-999(032)
BISMARCK, NORTH DAKOTA



SCOPE OF WORK
AREA 2


DRAWN BY: BJT
CHKD BY: JML
PROJECT NO.: 5417102

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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HLU-1-999(032)
BISMARCK, NORTH DAKOTA



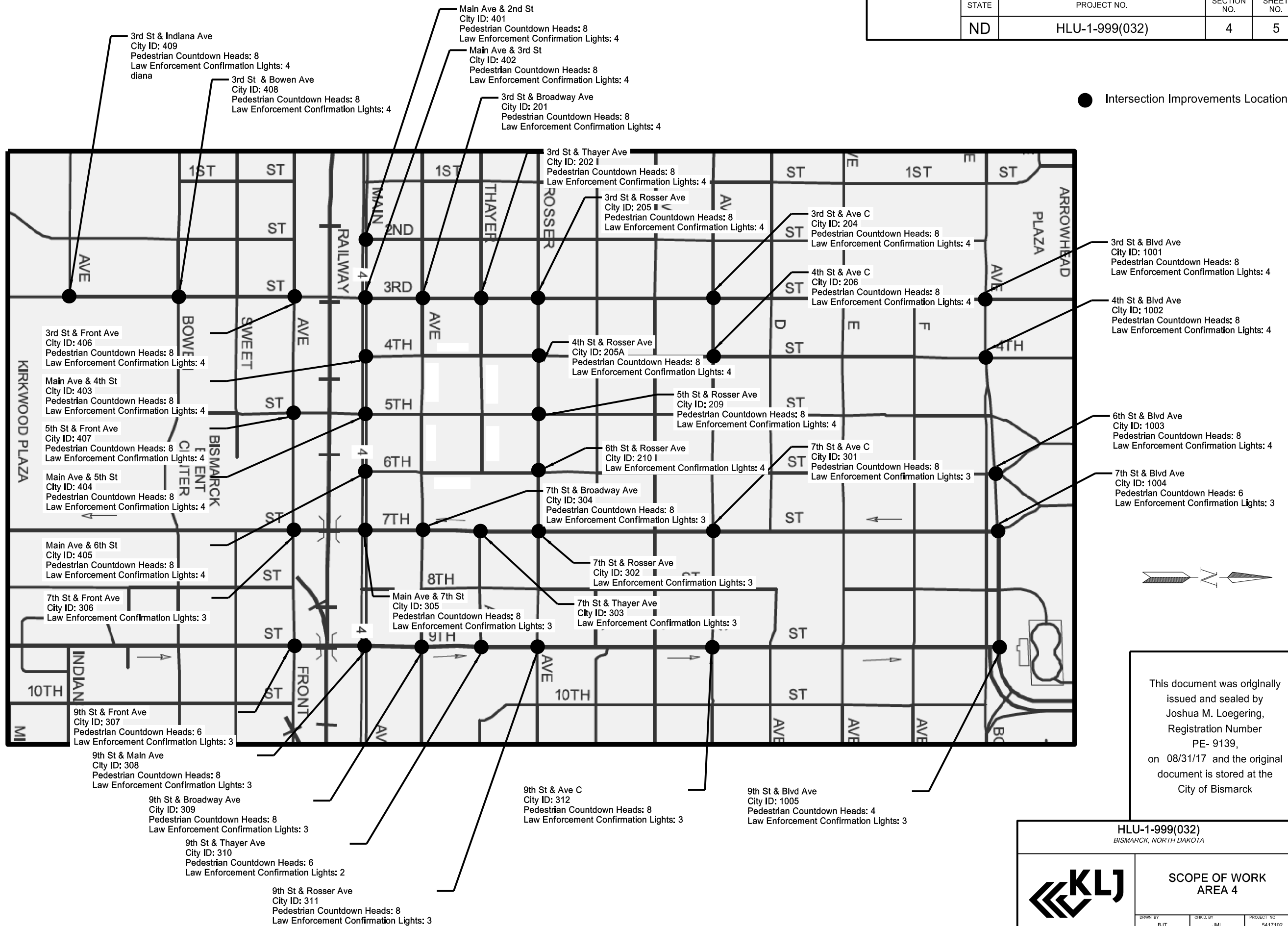
SCOPE OF WORK
AREA 3

DRAWN BY
BJT

CHKD BY
JML

PROJECT NO.
5417102

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NOTES

704-P01 TRAFFIC CONTROL: Use the following layouts on the Standard Drawings for traffic control:

D-704-25, Layout X: Use at intersections as directed by the Engineer
D-704-34: Use at intersections as directed by the Engineer
D-704-9, 10, 13, 14 and 50 are applicable.

The Traffic Control Devices List (See Section 100) includes enough devices for two D-704-25 setups and two D-704-34 setups. There are additional quantities for “Road Work Ahead”, “Be Prepared To Stop”, and “Flagger Symbol” signs for cross streets on a one lane closure. Only one step down in speed is required, eliminating the need for two of the speed limit signs in the D-704-34 layout. Reduce existing speeds, as required, by a maximum of 15 MPH. The Traffic Control Devices list is an estimated quantity of traffic control signs and equipment needed for this project. Include all costs associated with providing, installing, moving and modifying the traffic control for this project in the price bid for “TRAFFIC CONTROL”.

Pedestrian traffic must be maintained at all times during construction. Maintain an ADA compliant path with a minimum width of 36” to allow pedestrian traffic to pass. Included all costs associated to maintain pedestrian access in the price bid for “TRAFFIC CONTROL”.

Use D-704-24, Layout Type U for the installation of pedestrian countdown signal heads as directed by the Engineer.

Lane closures will not be allowed during peak hours on the following corridors:

- 7th Street
- 9th Street
- State Street
- Bismarck Expressway

Peak hours:
Monday Thru Friday
6:30 am to 7:00 pm

Notify the Engineer 48 hours prior to any lane closures that will occur after dark or on weekends. Any lane closure in place during Peak hours will result in liquidated damages at a charge of \$500 per lane per hour. Charges will apply whether or not work is in progress and regardless of weather conditions. Liquidated damages may run concurrently with liquidated damages associated with failure to complete all work by the required date.

772-P01 PEDESTRIAN COUNTDOWN SIGNAL HEADS: Remove and replace the existing pedestrian heads and bracketing at the intersections indicated in the plans with 16” pedestrian countdown signal heads and new bracketing. Provide black polycarbonate housing for the all pedestrian heads installed on the project and provided as spares. Place anti-seize compound on all threaded components.

All existing bracketing and pedestrian heads removed are the property of the Contractor.

Provide bracketing capable of mounting the new pedestrian countdown signal heads to the existing signal standards and pedestals. Provide bracketing that is constructed of un-brushed aluminum. The mounting location of the new pedestrian heads is subject to approval by the Engineer. The mounting locations of the new pedestrian heads may vary from the existing locations on the signal standards or pedestals. Include all costs associated with the removal and replacement of the pedestrian heads in the price bid for “PEDESTRIAN COUNTDOWN SIGNAL HEAD-__”.

Any damage that occurs during the removal and replacement of the pedestrian heads and bracketing is the responsibility of the Contractor. All costs incurred to repair the damage, to the Engineer’s approval, is included in the price bid for “PEDESTRIAN COUNTDOWN SIGNAL HEAD-__”.

Include any costs associated with wiring modifications necessary to install the pedestrian countdown heads in the price bid for “PEDESTRIAN COUNTDOWN SIGNAL HEAD-__”. Provide twenty-five spare pedestrian countdown heads of the same model/manufacture that are used on the project. Include all costs associated with providing the twenty-five spare pedestrian heads in the price bid for “PEDESTRIAN COUNTDOWN SIGNAL HEAD-__”.

772-P02 PEDESTRIAN COUNTDOWN SIGNAL HEAD VISOR: Provide a tunnel style visor for each pedestrian countdown signal head. Include all cost associated with furnishing and installing the tunnel visors in the price bid for “PEDESTRIAN COUNTDOWN SIGNAL HEAD-__”.

772-P03 PEDESTRIAN PUSHBUTTON SIGNS: Remove and replace the existing push button signs at the intersections indicated in the plans with R10-3e signs. See Section 11 and Section 150 for total quantity of signs required. All existing pushbutton signs and hardware removed are the property of the Contractor.

Provide hardware capable of mounting the new R10-3e pushbutton signs to the existing signal standards and pedestals. Include all costs associated with the removal and replacement of the pushbutton signs in the price bid for “PEDESTRIAN COUNTDOWN SIGNAL HEAD-__”.

Any damage that occurs during the removal and replacement of the pushbutton signs and hardware is the responsibility of the Contractor. All costs incurred to repair the damage, to the Engineer’s approval, is included in the price bid for “PEDESTRIAN COUNTDOWN SIGNAL HEAD-__”.

Include any costs associated with weatherproofing any unused existing holes from existing pushbutton signs in the price bid for “PEDESTRIAN COUNTDOWN SIGNAL HEAD-__”.

Provide twenty-five spare R10-3e signs (ten right arrow, ten left arrow, five double arrow). Include all costs associated with providing the spare pushbutton signs in the price bid for “PEDESTRIAN COUNTDOWN SIGNAL HEAD-__”.

772-P04 LAW ENFORCEMENT CONFIRMATION LIGHTS: Provide blue omni-directional LED law enforcement confirmation lights that are visible from 360° when mounted on the signal heads. Provide a lens for the confirmation light in which the blue tint is integrated into the lens. Blue coating is not allowed. Provide law enforcement confirmation lights that are manufactured specifically for use as law enforcement confirmation lights and have been used for that purpose at intersections within the United States. Provide the Engineer at the time of shop drawing submittal a demo law enforcement confirmation light and mounting hardware that is intended to be used on the project. The law enforcement light and mounting hardware are subject to approval by the Engineer.

Mount the law enforcement confirmation lights on a riser to the traffic signal heads as shown in the plans. Provide un-brushed aluminum risers that are capable of adjusting the height and angle of the confirmation lights. The confirmation lights must be visible above or below the signal head backplate as indicated in the Section 20 details. The riser must not protrude or be visible above or below the signal head backplate. Provide a connection between the riser and traffic signal head that is weather proof and will not allow moisture into the traffic signal head. Connect the law enforcement confirmation lights to the red indication in the corresponding traffic signal head. Place anti-seize compound on all threaded components. Include all costs associated with furnishing and installing the law enforcement confirmation lights in the price bid for “LAW ENFORCEMENT CONFIRMATION LIGHT”.

Any damage resulting from the installation of the law enforcement confirmation lights is the responsibility of the Contractor. All costs incurred to repair the damage, to the Engineer’s approval, is included in the price bid for “LAW ENFORCEMENT CONFIRMATION LIGHT”.

Provide fifty spare law enforcement confirmation lights of the same model/manufacture that is used on the project. Include all costs associated with providing fifty spare confirmation lights in the price bid for “LAW ENFORCEMENT CONFIRMATION LIGHT”.


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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HLU-1-999(032)	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	PRIMARY REGIONAL SYSTEM	SECONDARY REGIONAL SYSTEM	URBAN ROADS	TOTAL
103	100	CONTRACT BOND	L SUM	0.1	0.4	0.5	1.0
702	100	MOBILIZATION	L SUM	0.1	0.4	0.5	1.0
704	1100	TRAFFIC CONTROL	L SUM	0.1	0.4	0.5	1.0
772	2060	PEDESTRIAN COUNTDOWN SIGNAL HEAD-POST MTD	EA	8	99	316	423
772	2061	PEDESTRIAN COUNTDOWN SIGNAL HEAD-PEDESTAL MTD	EA	12	27	10	49
772	2070	LAW ENFORCEMENT CONFIRMATION LIGHT	EA	44	181	254	479

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HLU-1-999(032)
Bismarck, North Dakota



QUANTITIES

DRWN BY
JJL


CHKD BY
JML

PROJECT NO.
5417102

AREA 1 - LAW ENFORCEMENT CONFIRMATION LIGHT, PEDESTRIAN COUNTDOWN HEAD & PUSHBUTTON SIGN SUMMARIES													
Intersection	City ID	Section 150 Sheet #	Law Enforcement Confirmation Light Summary					Pedestrian Countdown Signal Head and Push Button Sign Summary					Funding Source
			Confirmation Light Detail				Total Confirmation Lights	Pedestrian Countdown Signal Head-Post Mtd	Pedestrian Countdown Signal Head-Pedestal	R10-3e Pushbutton Signs			
			NB	SB	EB	WB				Left Arrow	Right Arrow	Double	
Washington St and Interstate Ave	1302	1	1	1	1	1	4	8	0	4	4	0	Urban
Washington St and Century Ave	903	1	2	2	4	4	6	6	0	3	3	0	Urban
Washington St and 43rd Ave	1401	1	5	5	5	5	8	0	0	0	0	0	Urban
Washington St and LaSalle Dr	1402	1	6	6	4	4	8	0	0	0	0	0	Urban
State St and Interstate Ave	805	2	5	4	2	2	6	0	4	0	0	0	Primary
State St and Century Ave	806	2	5	4	2	2	6	1	5	0	0	0	Primary
State St and Weiss Ave	808	2	5	5	2	2	6	2	2	0	0	0	Primary
State St and Calgary Ave	809	2	5	5	1	1	6	4	0	0	0	0	Primary
State St and 43rd Ave	810	3	5	5	1	1	6	0	0	0	0	0	Primary
State St and Skyline Blvd	811	3	1	4	-	1	4	0	0	0	0	0	Primary
State St and LaSalle Dr	812	3	5	5	1	4	7	0	0	0	0	0	Primary
Interstate Ave and 4th St	909	3	1	1	1	1	4	8	0	8	0	0	Urban
Burnt Boat Dr and Tyler Parkway	602	4	2	2	2	4	5	6	2	2	6	2	Urban
Century Ave and Pinehurst Sq	1202	4	1	1	2	2	4	0	0	0	0	0	Urban
Century Ave and Interstate Ave	1201	4	1	1	1	1	4	0	0	0	0	0	Urban
Century Ave and Ithica Dr	1203	4	1	1	1	1	4	0	0	0	0	0	Urban
Century Ave and 4th St	905	5	1	1	2	2	4	8	0	4	4	0	Urban
Century Ave and 11th St	807	5	2	2	2	2	4	8	0	3	5	0	Urban
Century Ave and 19th St	906	5	2	2	4	4	6	8	0	4	4	2	Urban
Centennial Rd and Century Ave	709	5	5	5	5	5	8	0	0	0	0	0	Urban
Centennial Rd and Trenton Dr	708	6	4	4	1	1	6	0	0	0	0	0	Urban
TOTAL							116	59	13	28	26	4	

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HLU-1-999(032)
Bismarck, North Dakota



AREA 1
QUANTITY SUMMARY

DRAWN BY
JUL


CHKD BY
JML

PROJECT NO.
5417102

AREA 2 - LAW ENFORCEMENT CONFIRMATION LIGHT, PEDESTRIAN COUNTDOWN HEAD & PUSHBUTTON SIGN SUMMARIES														
Intersection	City ID	Section 150 Sheet #	Law Enforement Confirmation Light Summary					Pedestrian Countdown Signal Head and Push Button Sign Summary						Funding Source
			Confirmation Light Detail				Total Confirmation Lights	Pedestrian Countdown Signal Head-Post Mtd	Pedestrian Countdown Signal Head-Pedestal	R10-3e Pushbutton Signs				
			NB	SB	EB	WB				Left Arrow	Right Arrow	Double		
Washington St and Front Ave	503	7	1	1	1	1	4	10	2	0	0	0	Urban	
Washington St and Broadway Ave	504	7	1	1	1	1	4	8	0	2	2	0	Urban	
Washington St and Rosser Ave	505	7	1	1	1	1	4	8	0	0	0	0	Urban	
Washington St and Ave C	918	7	1	1	1	1	4	0	0	4	4	0	Urban	
Washington St and Blvd Ave	912	8	1	1	1	1	4	8	0	4	4	0	Urban	
Washington St and Divide Ave	914	8	2	2	2	2	4	8	0	3	5	0	Urban	
Washington St and Turnpike Ave	1301	8	2	2	1	1	4	0	0	0	0	0	Urban	
Divide Ave and 19th St	901	8	-	1	4	1	4	4	0	3	1	0	Urban	
State St and Divide Ave	801	9	4	4	4	4	8	4	0	0	0	0	Secondary	
State St and Capitol Ave	802	9	4	4	1	1	6	8	0	0	0	0	Secondary	
State St and I-94 South Ramp	803	9	1	5	-	-	3	1	1	0	0	0	Secondary	
State St and I-94 North Ramp	804	9	5	1	-	-	3	1	1	0	0	0	Primary	
Bismarck Expressway and Rosser Ave	706	10	3	3	3	1	7	0	0	0	0	0	Secondary	
Bismarck Expressway and Divide Ave	705	10	3	3	3	3	8	0	0	0	0	0	Secondary	
Bismarck Expressway and Miriam Ave	704	10	1	2	1	1	4	6	2	5	1	1	Secondary	
Bismarck Expressway and I-94 South Ramp	703	10	1	1	-	-	2	0	0	0	0	0	Secondary	
Centennial Rd and I-94 North Ramp	702	11	2	1	-	-	2	2	0	1	1	0	Secondary	
Capitol Ave and 19th St	908	11	1	1	1	1	4	8	0	8	0	0	Urban	
Divide Ave and 26th St	917	11	1	1	1	2	4	0	0	0	0	0	Urban	
Rosser Ave and 26th St	904	11	1	1	1	1	4	8	0	7	1	0	Urban	
Main Ave and Memorial Hwy	902	12	1	1	1	1	4	0	0	0	0	0	Secondary	
Main Ave and 12th St	313	12	1	1	1	1	4	8	0	4	4	0	Urban	
Main Ave and Airport Rd	314	12	4	4	4	4	8	8	0	4	4	0	Urban	
Main Ave and 26th St	316	12	3	3	3	3	8	0	0	0	0	0	Urban	
Main Ave and Bismarck Expressway	707	13	3	3	3	3	8	0	0	0	0	0	Secondary	
Tyler Parkway and I-94 North Ramp	603	13	1	1	-	-	2	0	0	0	0	0	Urban	
Tyler Parkway and I-94 South Ramp	604	13	2	2	4	2	6	0	0	0	0	0	Urban	
Divide Ave and College Dr	605	13	1	-	1	2	3	2	0	2	0	0	Urban	
Divide Ave and 4th St	915	14	1	1	1	1	4	8	0	7	1	0	Urban	
Total							134	110	6	54	28	1		

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HLU-1-999(032)
Bismarck, North Dakota



AREA 2
QUANTITY SUMMARY

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JUL


CHKD BY
JML

PROJECT NO.
5417102

AREA 3 - LAW ENFORCEMENT CONFIRMATION LIGHT, PEDESTRIAN COUNTDOWN HEAD & PUSHBUTTON SIGN SUMMARIES														
Intersection	City ID	Section 150 Sheet #	Law Enforement Confirmation				Light Summary	Pedestrian Countdown Signal Head and Push Button Sign Summary						Funding Source
			Confirmation Light Detail				Total Confirmation Lights	Pedestrian Countdown Signal Head-Post Mtd	Pedestrian Countdown Signal Head-Pedestal	R10-3e Pushbutton Signs				
			NB	SB	EB	WB				Left Arrow	Right Arrow	Double		
Washington St and Wachter Ave	911	15	1	1	1	1	4	8	0	8	0	0	Urban	
Washington St and Reno Ave	910	15	1	1	1	1	4	8	0	8	0	0	Urban	
Washington St and Denver Ave	109	15	2	2	2	1	4	5	3	6	2	0	Urban	
Washington St and Bismarck Expressway	101	15	4	4	4	4	8	6	2	6	2	4	Secondary	
Washington St and Arbor Ave	501	16	1	1	1	1	4	8	0	8	0	0	Urban	
Washington St and Bowen Ave	502	16	1	1	1	1	4	3	3	3	4	0	Urban	
7th St and Arbor Ave	107	16	-	1	1	1	3	8	0	4	4	0	Secondary	
9th St and Arbor Ave	108	16	1	-	1	1	3	6	2	6	2	0	Secondary	
University Dr and Airport Rd	1102	17	1	3	-	1	4	0	0	0	0	0	Secondary	
University Dr and 12th St	1101	17	3	3	3	3	8	0	0	0	0	0	Secondary	
University Dr and Wachter Ave	1103	17	3	3	3	1	7	0	0	0	0	0	Secondary	
Bismarck Expressway and Yegen Rd	919	17	1	-	1	3	4	0	0	0	0	0	Secondary	
Bismarck Expressway and 3rd St	102	18	3	3	3	3	8	0	0	0	0	0	Secondary	
Bismarck Expressway and 7th St	103	18	1	4	1	3	6	0	0	0	0	0	Secondary	
Bismarck Expressway and 9th St	104	18	1	-	3	3	5	0	0	0	0	0	Secondary	
Bismarck Expressway and 12th St	105	18	3	3	3	3	8	0	0	0	0	0	Secondary	
Bismarck Expressway and Airport Rd	106	19	3	3	3	3	8	0	0	0	0	0	Secondary	
Bismarck Expressway and 26th St	110	19	3	3	3	3	8	0	0	0	0	0	Secondary	
Bismarck Expressway and Burlington Dr	111	19	3	4	3	3	8	0	0	0	0	0	Secondary	
Total							108	52	10	49	14	4		

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HLU-1-999(032)
Bismarck, North Dakota



AREA 3
QUANTITY SUMMARY

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JUL


CHKD. BY
JML

PROJECT NO.
5417102

AREA 4 - LAW ENFORCEMENT CONFIRMATION LIGHT, PEDESTRIAN COUNTDOWN HEAD & PUSHBUTTON SIGN SUMMARIES													
Intersection	City ID	Section 150 Sheet #	Law Enforement Confirmation Light Summary					Pedestrian Countdown Signal Head and Push Button Sign Summary					Funding Source
			Confirmation Light Detail				Total Confirmation Lights	Pedestrian Countdown Signal Head-Post Mtd	Pedestrian Countdown Signal Head-Pedestal	R10-3e Pushbutton Signs			
			NB	SB	EB	WB				Left Arrow	Right Arrow	Double	
Main Ave and 2nd St	401	20	1	1	1	1	4	8	0	0	0	0	Urban
Main Ave and 3rd St	402	20	1	1	1	1	4	8	0	0	0	0	Urban
Main Ave and 4th St	403	20	1	1	1	1	4	8	0	0	0	0	Urban
Main Ave and 5th St	404	20	1	1	1	1	4	8	0	0	0	0	Urban
Main Ave and 6th St	405	21	1	1	1	1	4	8	0	0	0	0	Urban
Main Ave and 7th St	305	21	-	1	1	2	3	8	0	0	0	0	Secondary
Main Ave and 9th St	308	21	1	-	2	1	3	6	2	0	0	0	Secondary
9th St and Front Ave	307	21	1	-	1	1	3	3	3	0	0	0	Secondary
9th St and Broadway Ave	309	22	1	-	1	1	3	6	2	0	0	0	Secondary
9th St and Thayer Ave	310	22	1	-	1	-	2	2	4	0	0	0	Secondary
9th St and Rosser Ave	311	22	1	-	1	1	3	8	0	0	0	0	Secondary
9th St and Ave C	312	22	1	-	1	1	3	6	2	0	0	0	Secondary
9th St and Blvd Ave	1005	23	1	-	1	1	3	2	2	0	0	0	Secondary
7th St and Front Ave	306	23	-	1	1	1	3	0	0	0	0	0	Secondary
7th St and Broadway Ave	304	23	-	1	1	1	3	6	2	0	0	0	Secondary
7th St and Thayer Ave	303	23	-	1	1	1	3	0	0	0	0	0	Secondary
7th St and Rosser Ave	302	24	-	1	1	1	3	0	0	0	0	0	Secondary
7th St and Ave C	301	24	-	1	1	1	3	6	2	0	0	0	Secondary
7th St and Blvd Ave	1004	24	-	-	1	4	3	5	1	2	0	1	Secondary
6th St and Rosser Ave	210	24	1	1	1	1	4	0	0	0	0	0	Urban
6th St and Blvd Ave	1003	25	1	1	1	1	4	8	0	3	1	2	Urban
5th St and Rosser Ave	209	25	1	1	1	1	4	8	0	0	0	0	Urban
4th St and Rosser Ave	205A	25	1	1	1	1	4	8	0	0	0	0	Urban
4th St and Ave C	206	25	1	1	1	1	4	8	0	0	0	0	Urban
4th St and Blvd Ave	1002	26	1	1	1	1	4	8	0	0	0	0	Urban
3rd St and Indiana Ave	409	26	1	1	1	1	4	8	0	0	0	0	Urban
3rd St and Bowen Ave	408	26	1	1	1	1	4	8	0	0	0	0	Urban
3rd St and Front Ave	406	26	1	1	1	1	4	8	0	0	0	0	Urban
3rd St and Broadway Ave	201	27	1	1	1	1	4	8	0	0	0	0	Urban
3rd St and Thayer Ave	202	27	1	1	1	1	4	8	0	0	0	0	Urban
3rd St and Rosser Ave	205	27	1	1	1	1	4	8	0	0	0	0	Urban
3rd St and Ave C	204	27	1	1	1	1	4	0	0	0	0	0	Urban
3rd St and Blvd Ave	1001	28	1	1	1	1	4	8	0	0	0	0	Urban
5th St and Front Ave	407	28	1	1	1	1	4	8	0	0	0	0	Urban
TOTAL							121	202	20	5	1	3	

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HLU-1-999(032)
Bismarck, North Dakota



AREA 4
QUANTITY SUMMARY

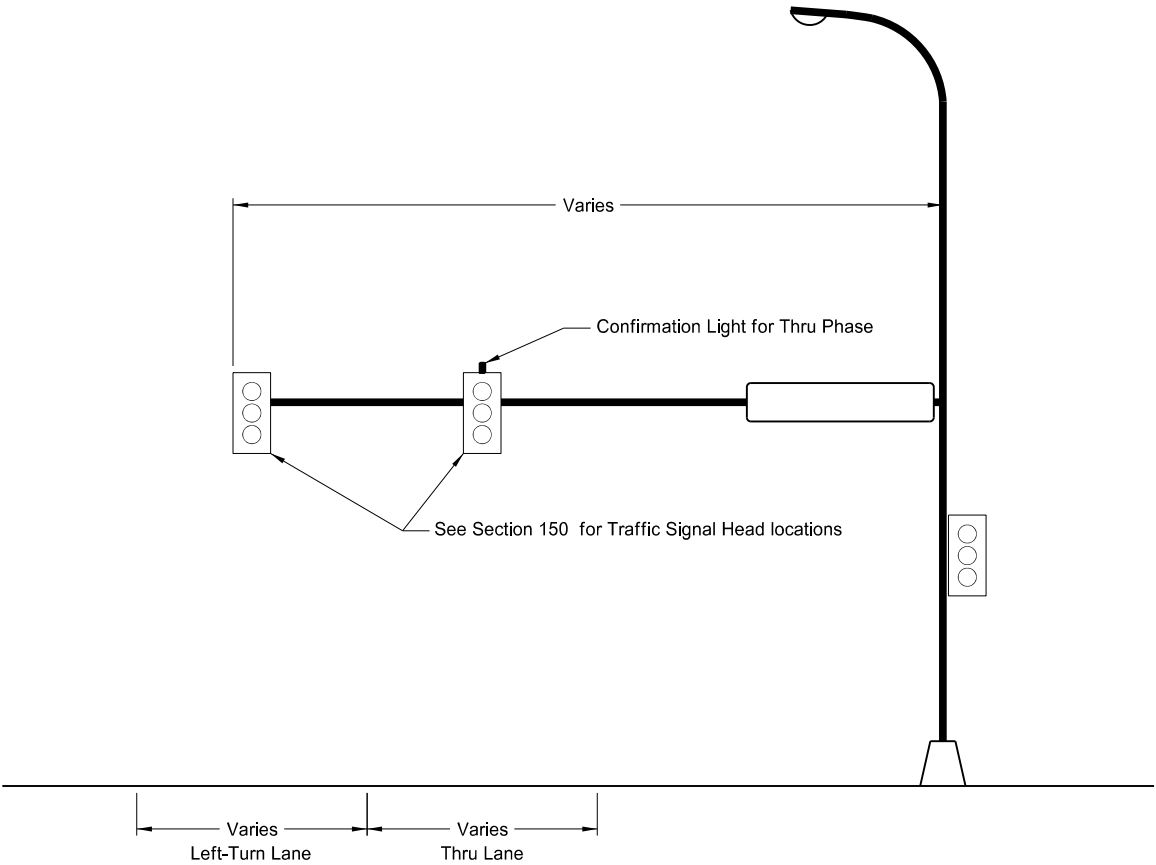
DRAWN BY
JUL

CHKD BY
JML

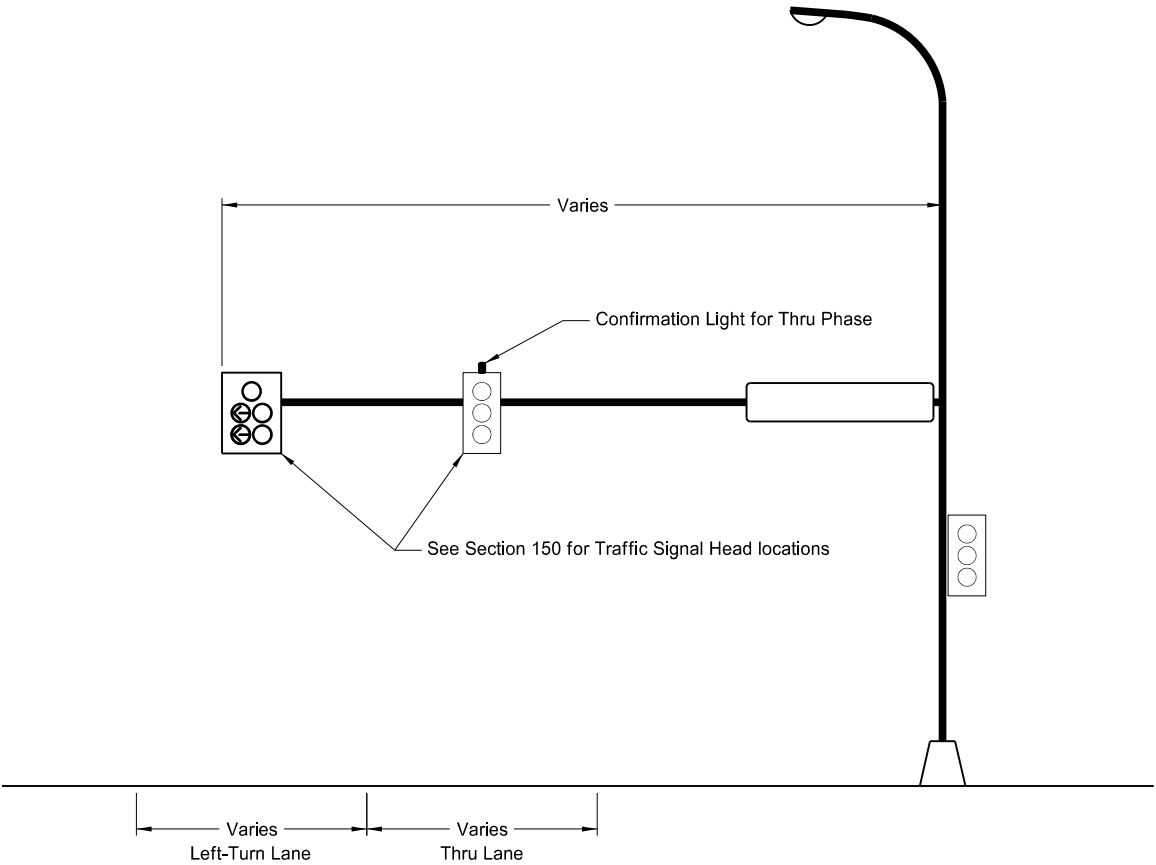
PROJECT NO.
5417102

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HLU-1-999(032)	20	1

DETAIL 1
Permissive Left-Turn Standard Detail



DETAIL 2
Protected/Permissive Left-Turn Standard Detail (5-Section Head)



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HLU-1-999(032)
Bismarck, North Dakota



LAW ENFORCEMENT
CONFIRMATION LIGHTS
DETAILS 1 & 2

DRAWN BY: SJ
CHECKED BY: JML
PROJECT NO.: 5417102

Note: Install confirmation lights directly to the traffic signal head. Mount confirmation lights on a riser.
Connect the confirmation light to the red indication on the terminal block located inside the traffic signal head.

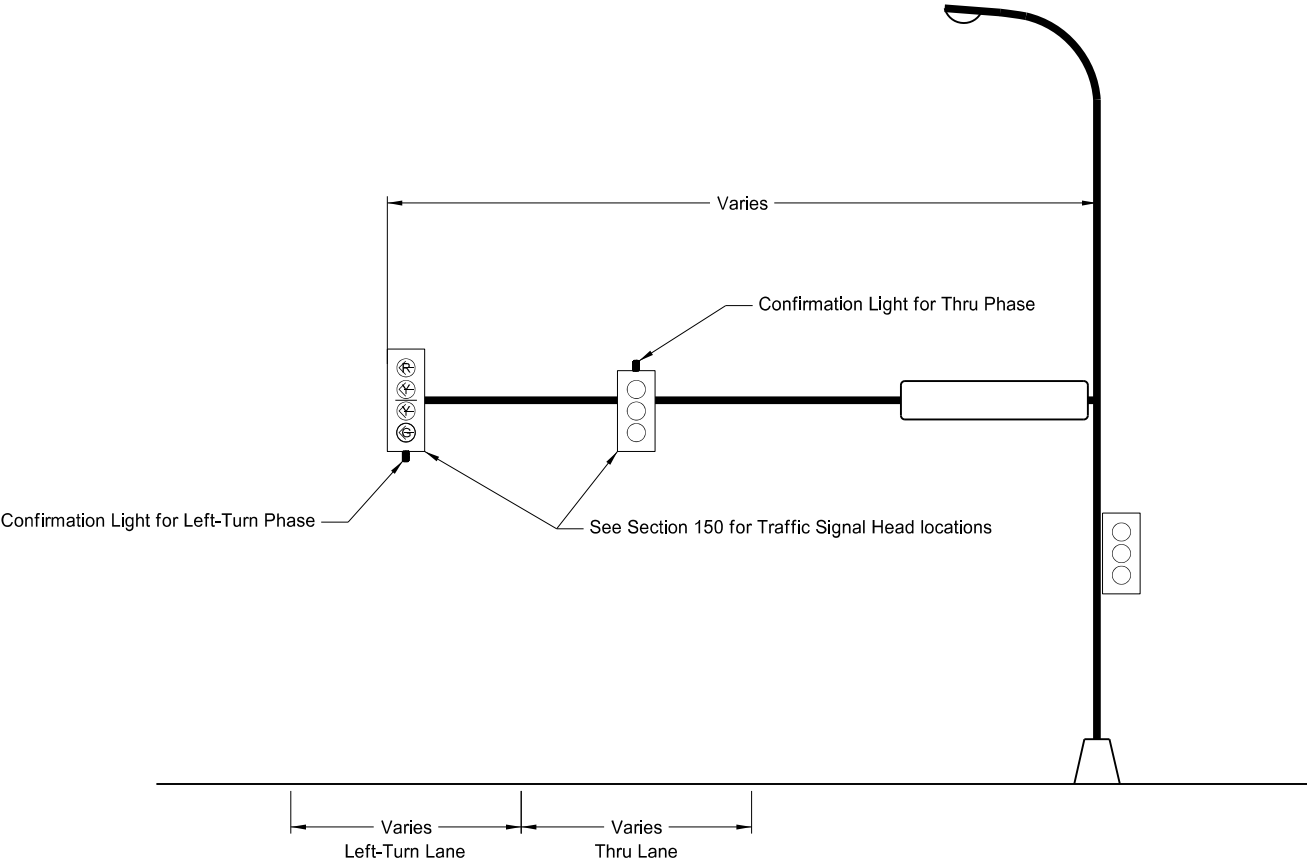
Legend

■ Confirmation Light

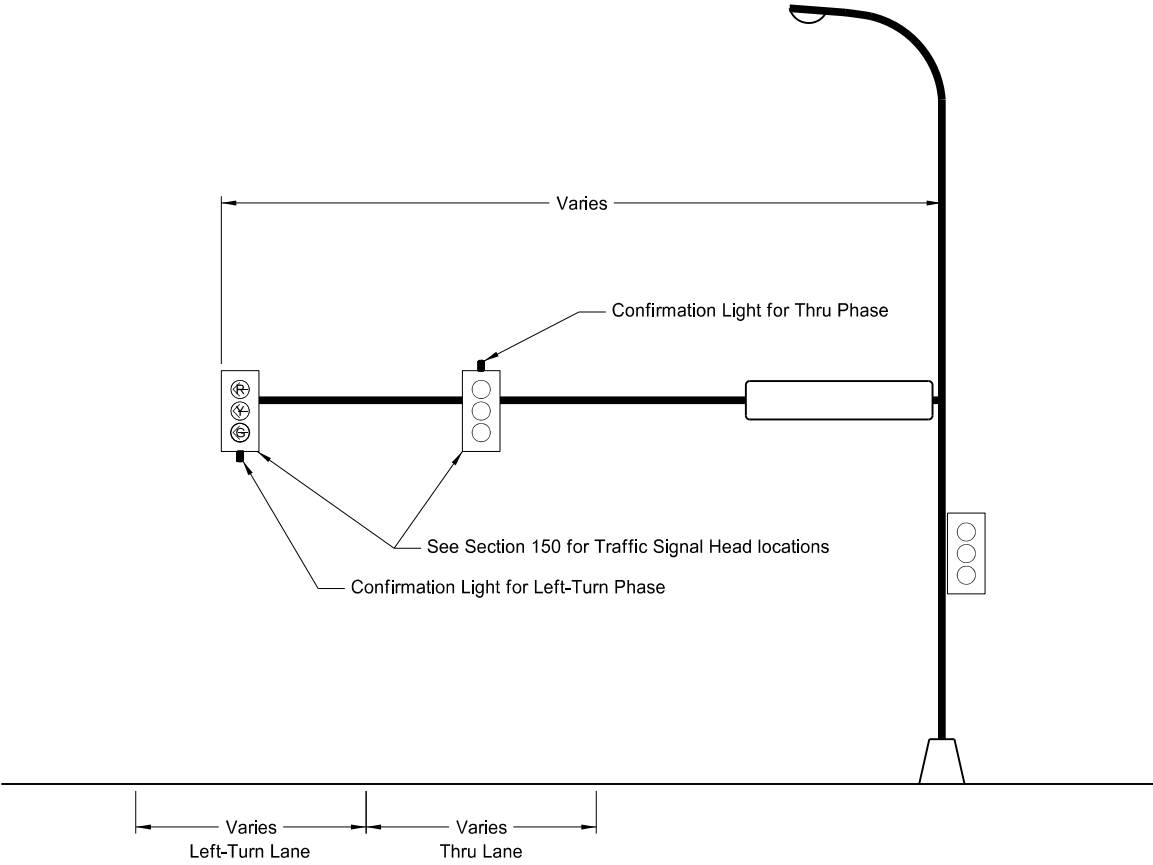
Existing Traffic Signal Head

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HLU-1-999(032)	20	2

DETAIL 3
Protected/Permissive Left-Turn Standard Detail (Flashing Yellow Arrow)



DETAIL 4
Protected Only Left-Turn Standard Detail



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HLU-1-999(032)
Bismarck, North Dakota



LAW ENFORCEMENT
CONFIRMATION LIGHTS
DETAILS 3 & 4

DRAWN BY: SJ
CHKD BY: JML
PROJECT NO.: 5417102

Note: Install confirmation lights directly to the traffic signal head. Mount confirmation lights on a riser.
Connect the confirmation light to the red indication on the terminal block located inside the traffic signal head.

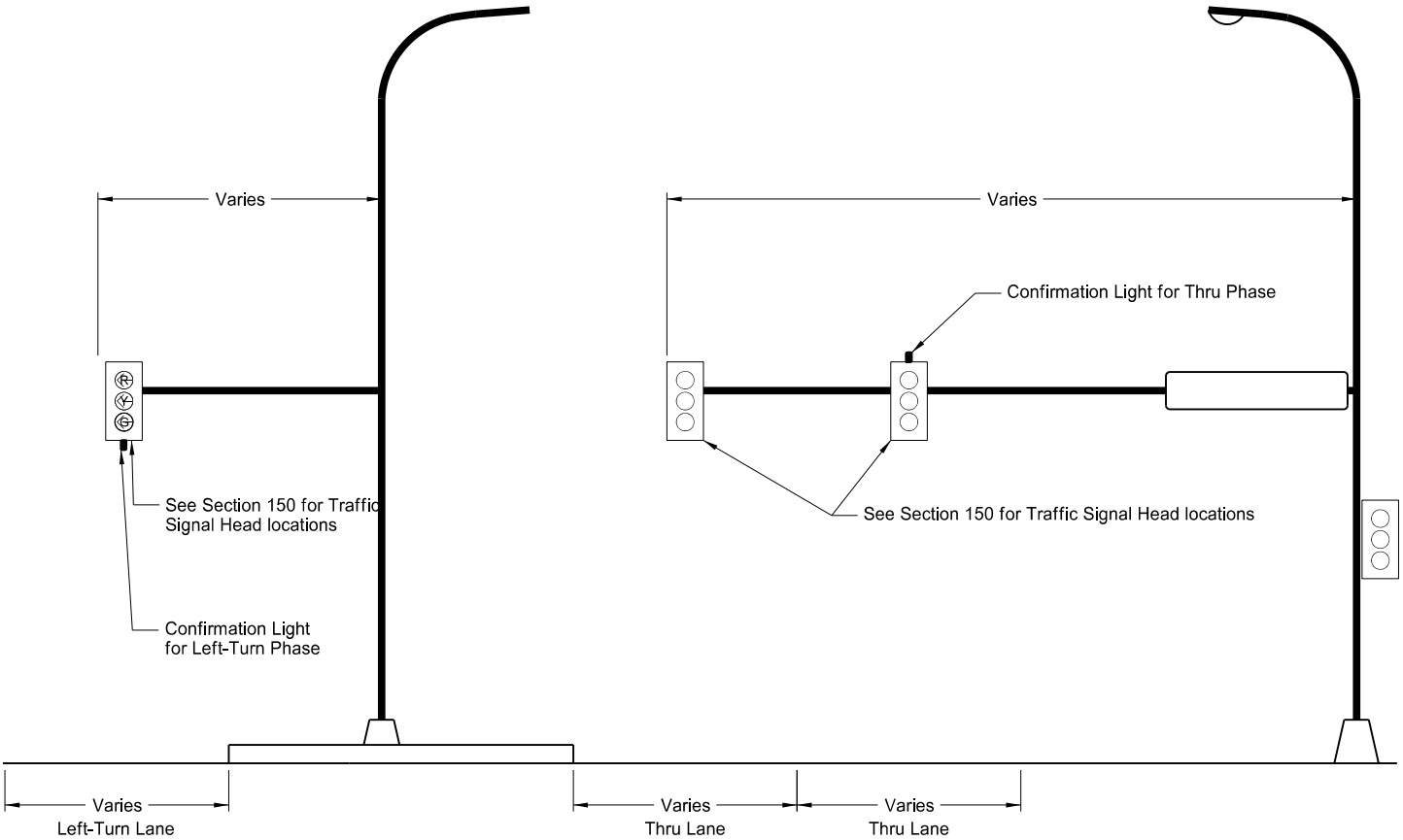
Legend

■ Confirmation Light

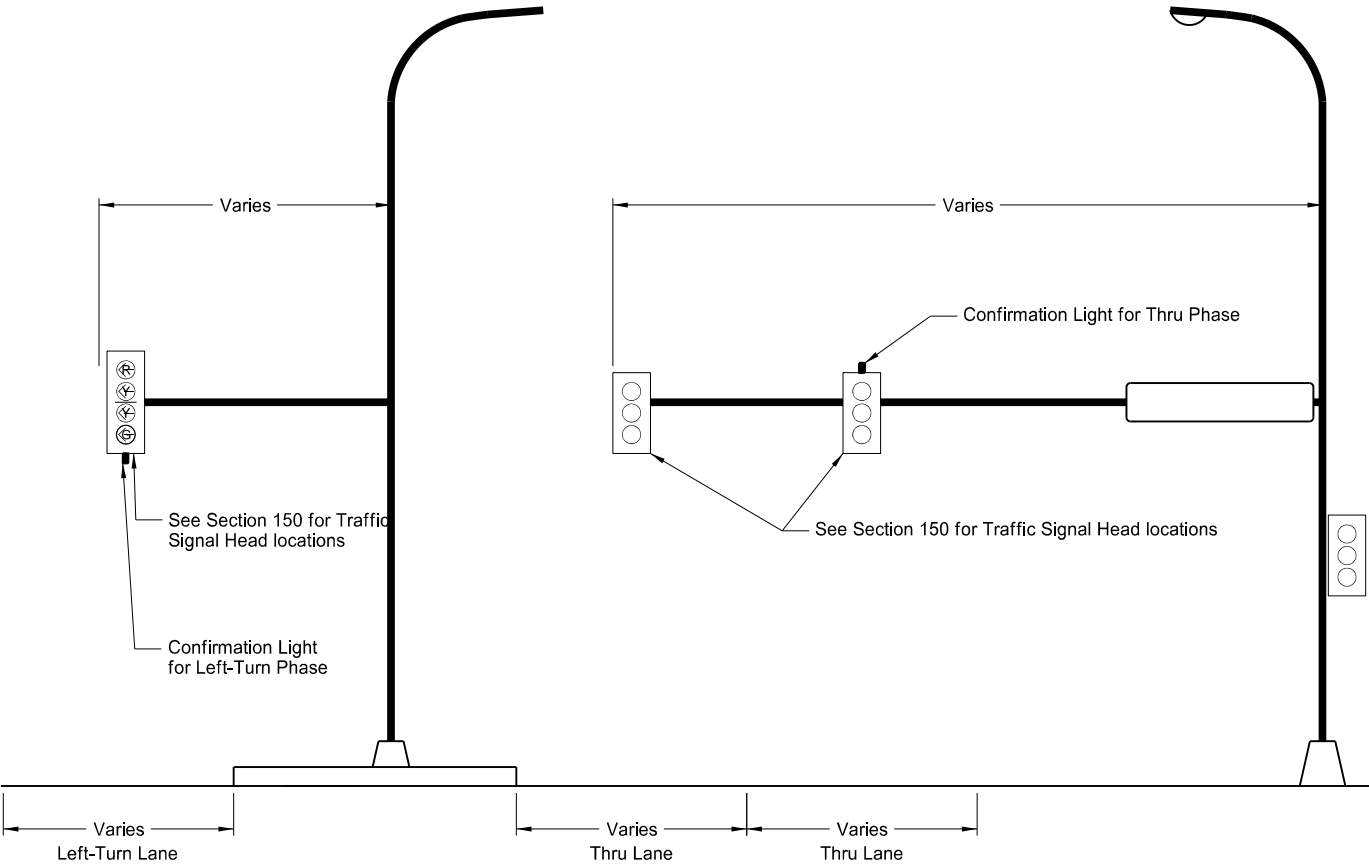
Existing Traffic Signal Head

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HLU-1-999(032)	20	3

DETAIL 5
Protected Only Left-Turn Standard Detail (Median Signal Standard)



DETAIL 6
Protected/Permissive Left-Turn Standard Detail (Median Signal Standard)



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HLU-1-999(032)
Bismarck, North Dakota



LAW ENFORCEMENT
CONFIRMATION LIGHTS
DETAILS 5 & 6

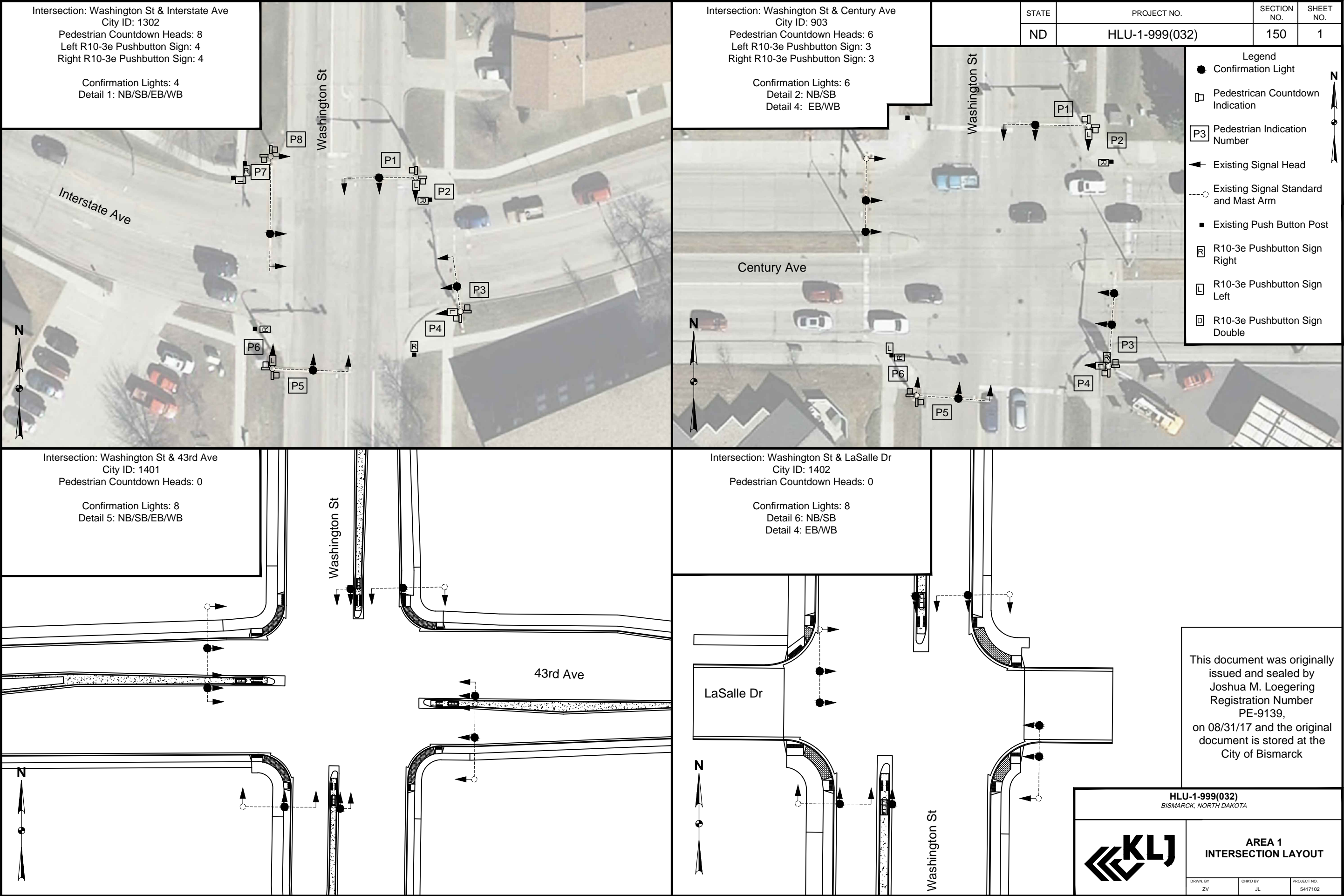
DRAWN BY: SJ
CHKD BY: JML
PROJECT NO.: 5417102

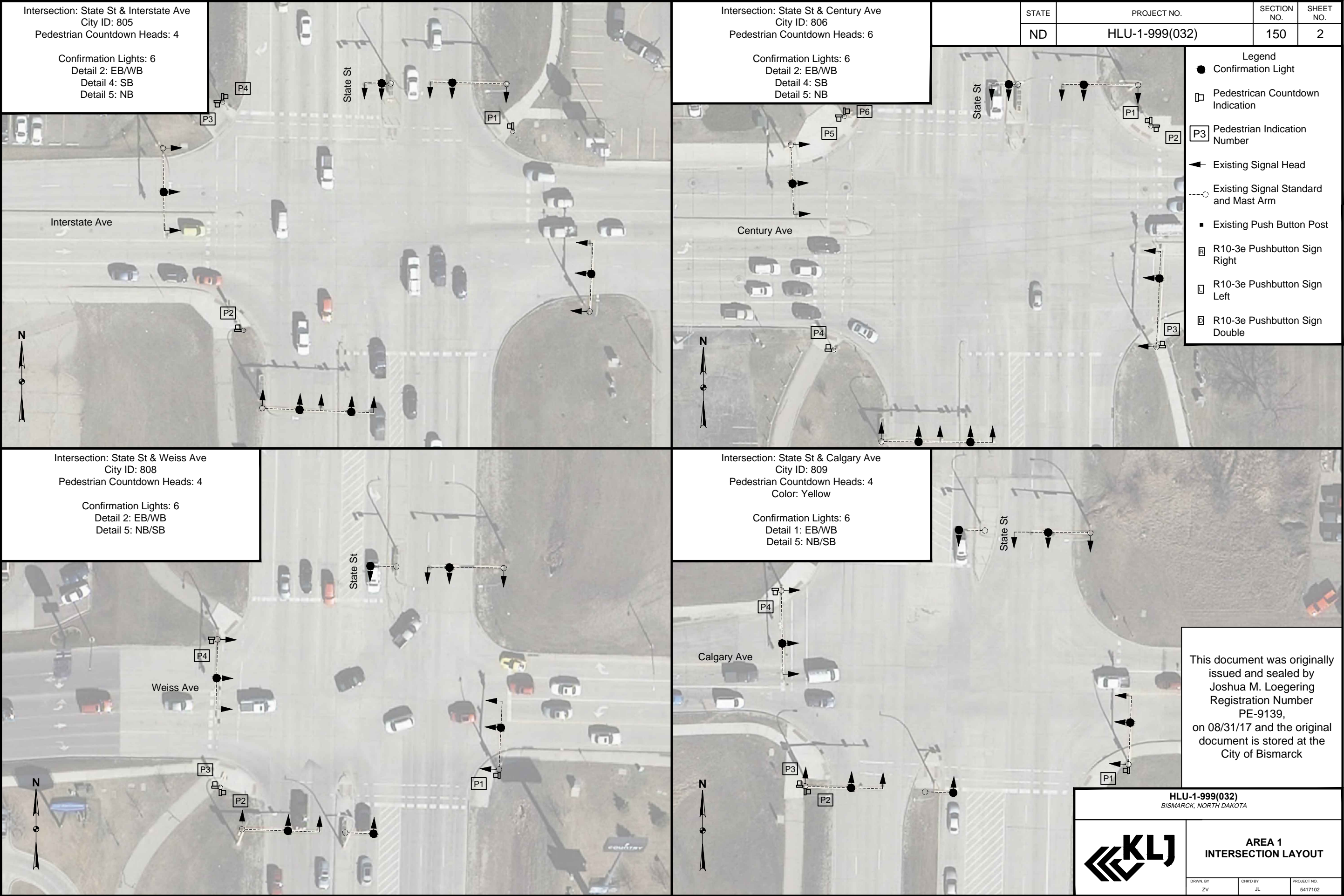
Note: Install confirmation lights directly to the traffic signal head. Mount confirmation lights on a riser.
Connect the confirmation light to the red indication on the terminal block located inside the traffic signal head.

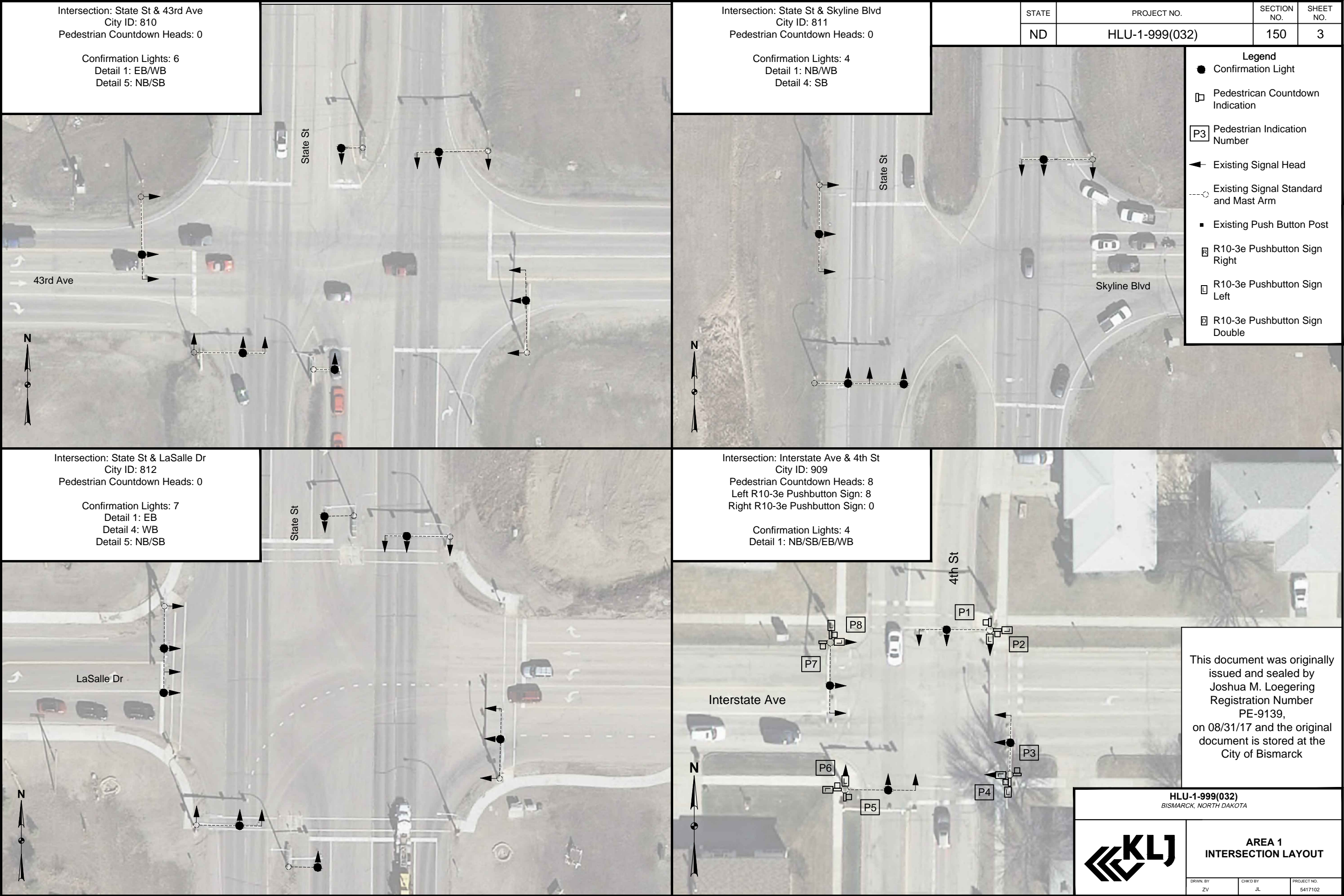
Legend

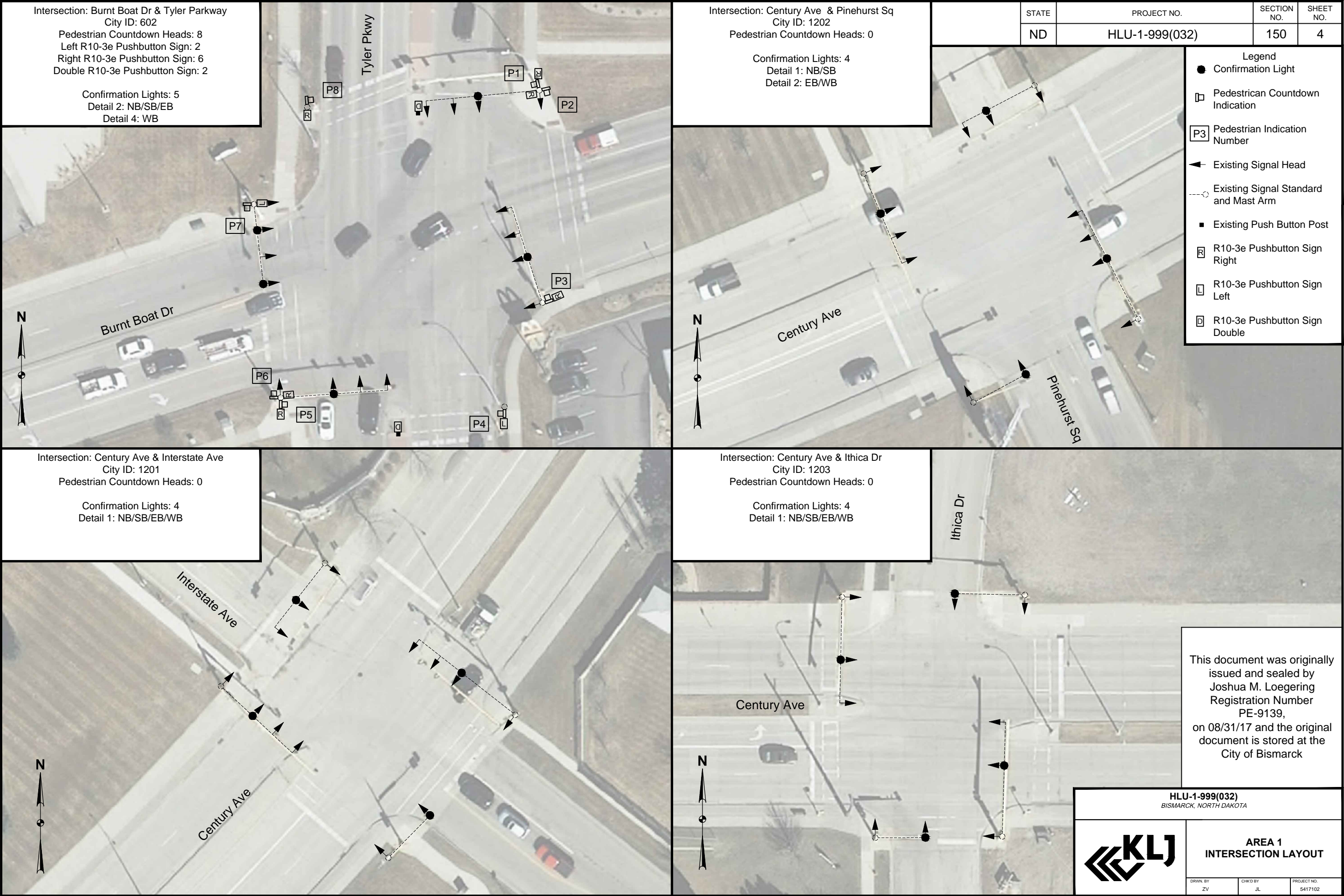
■ Confirmation Light

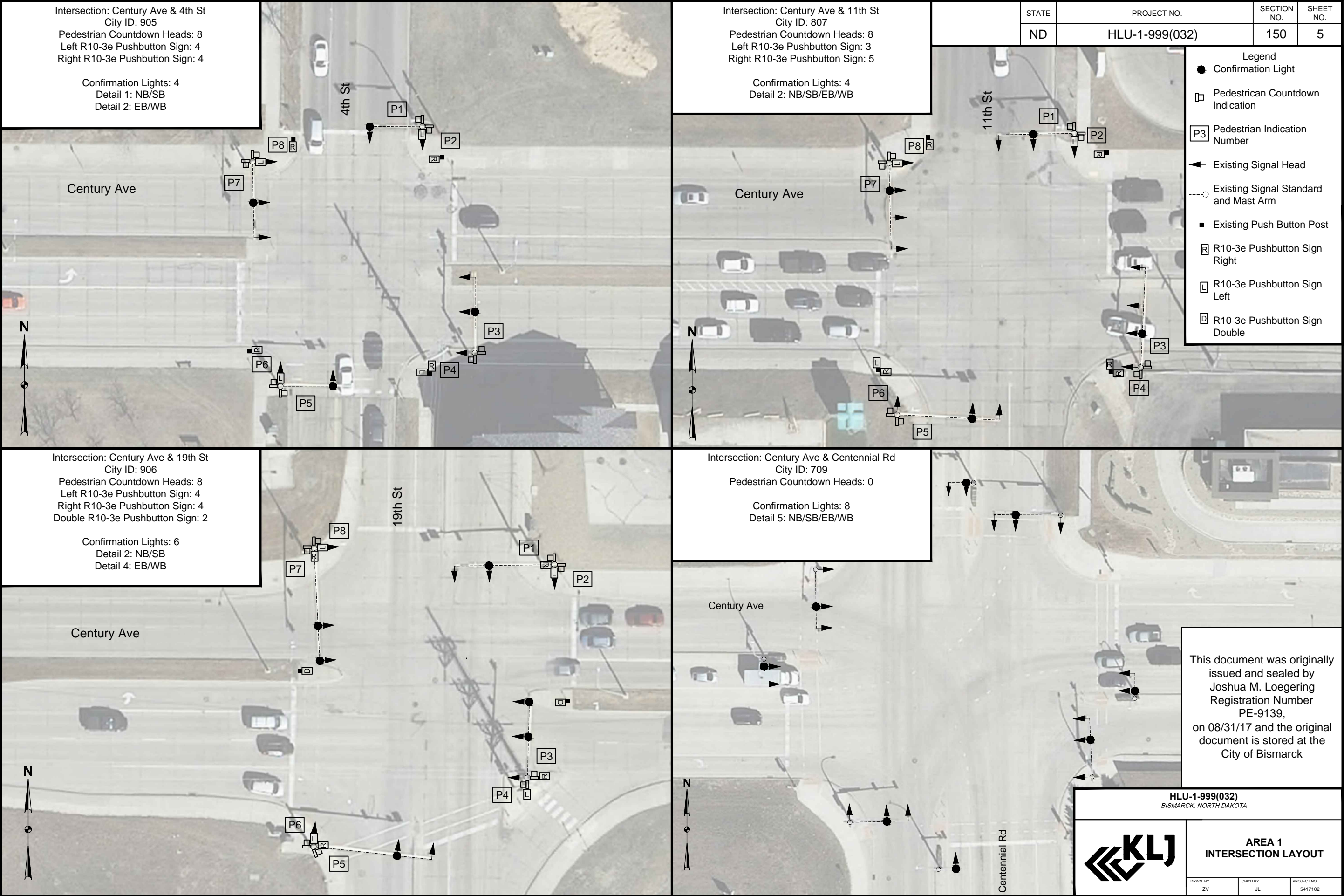
Existing Traffic Signal Head

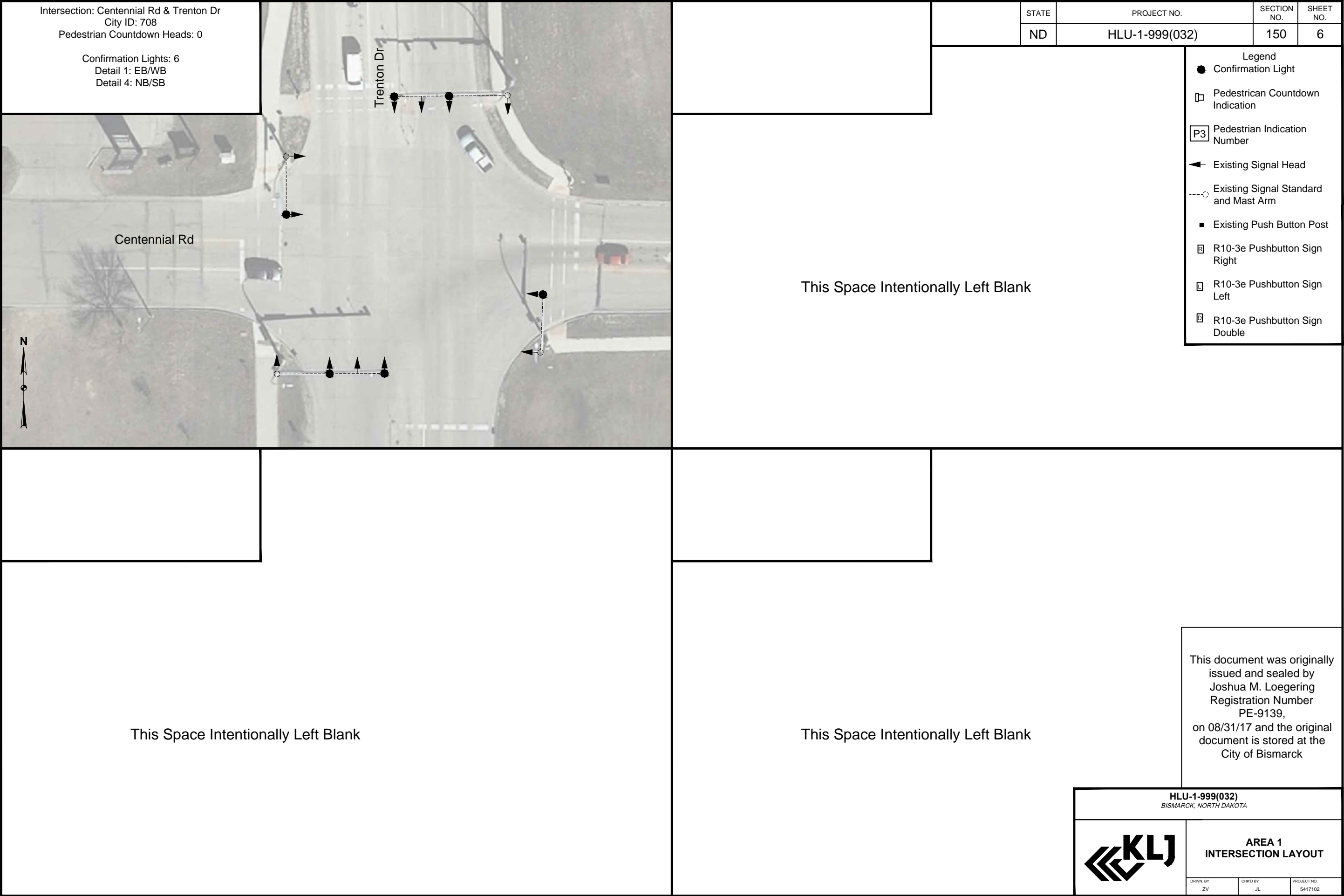


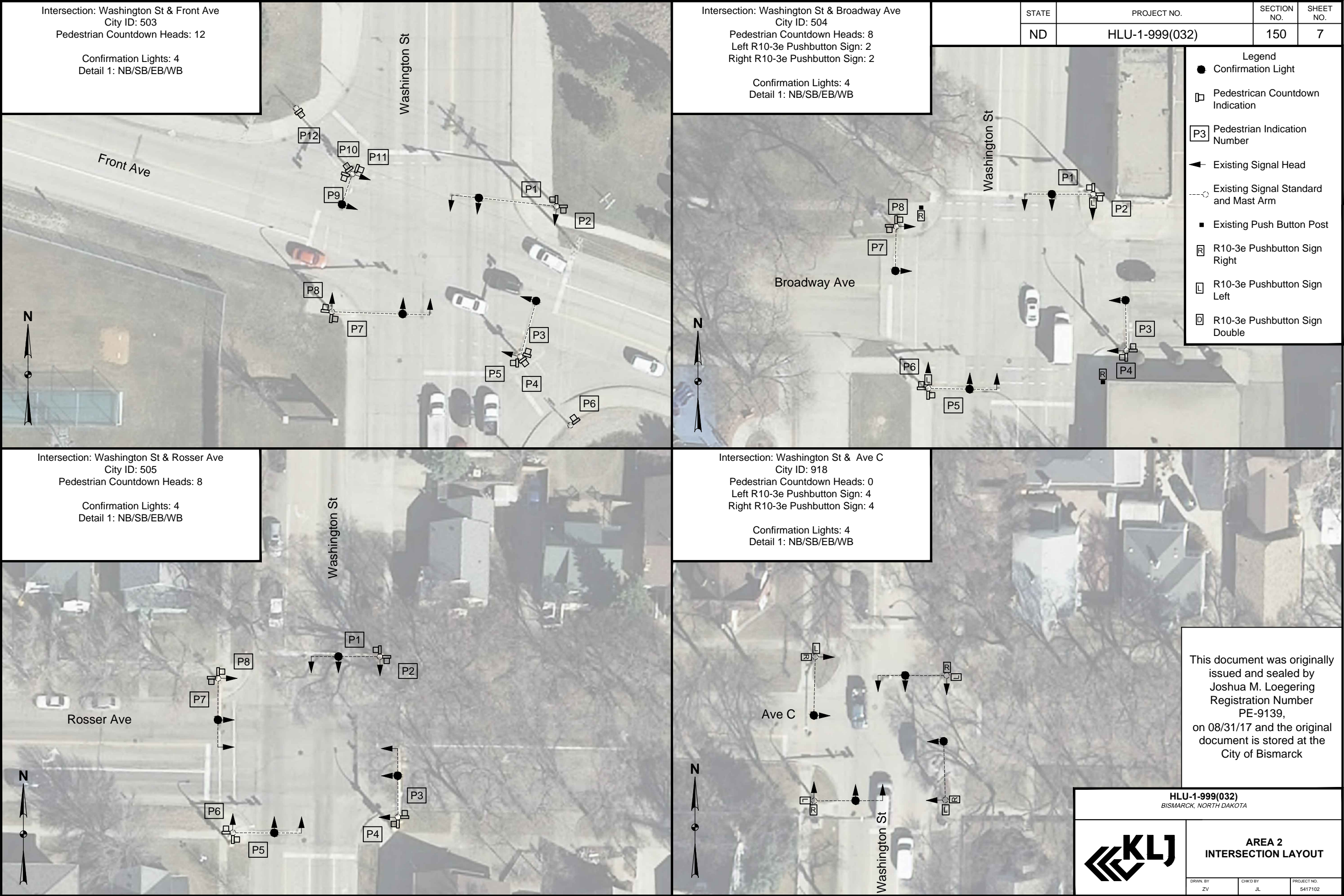


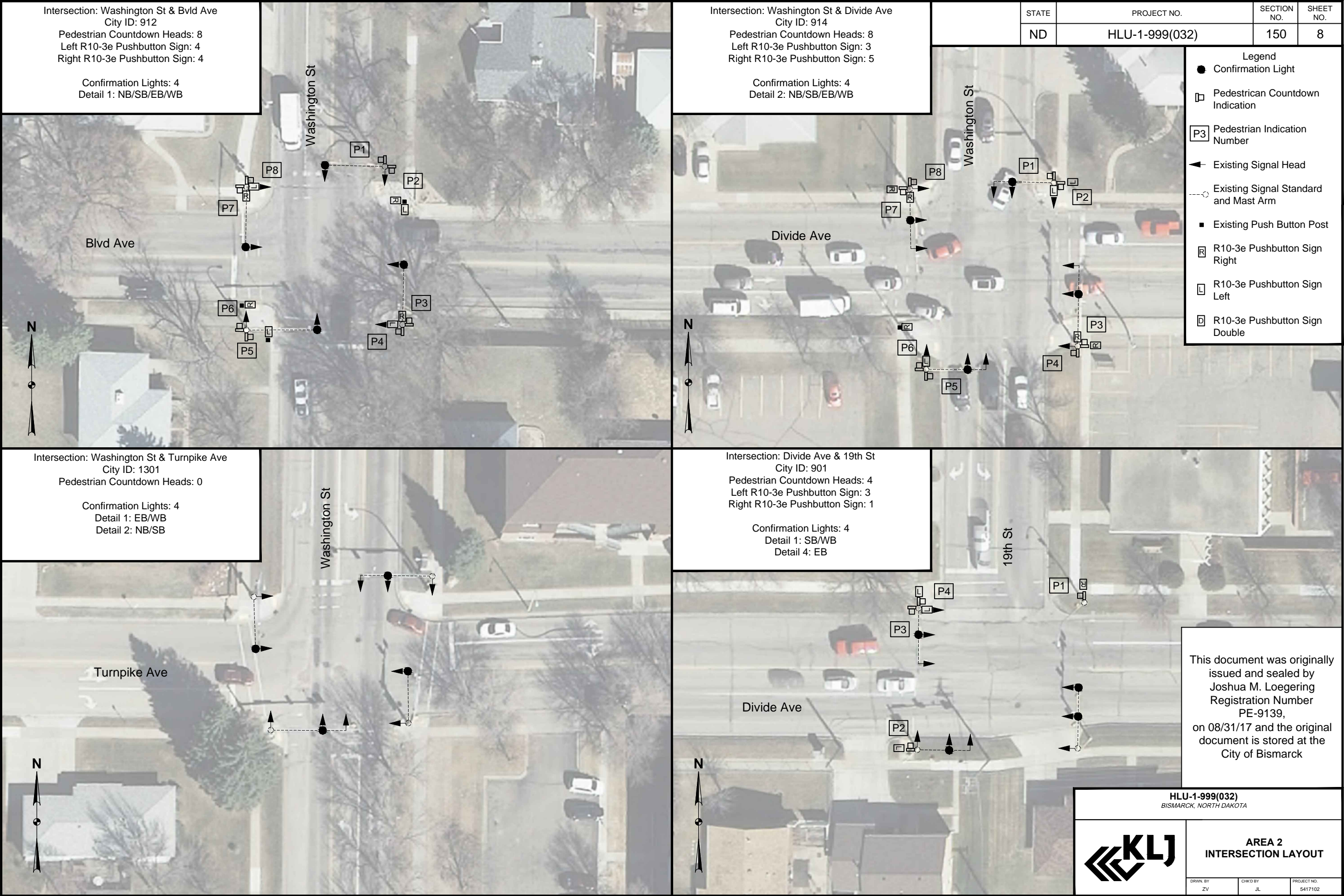


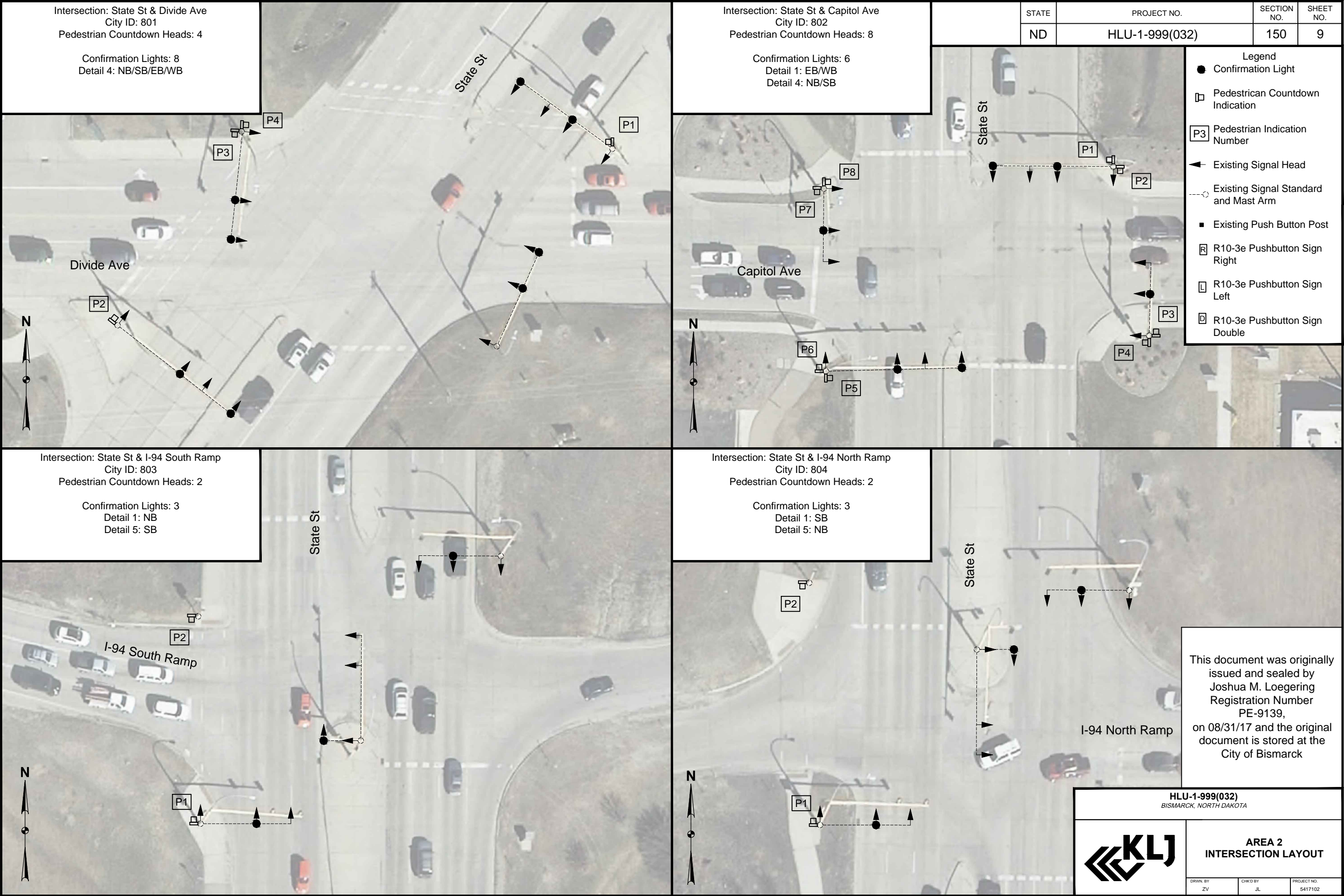






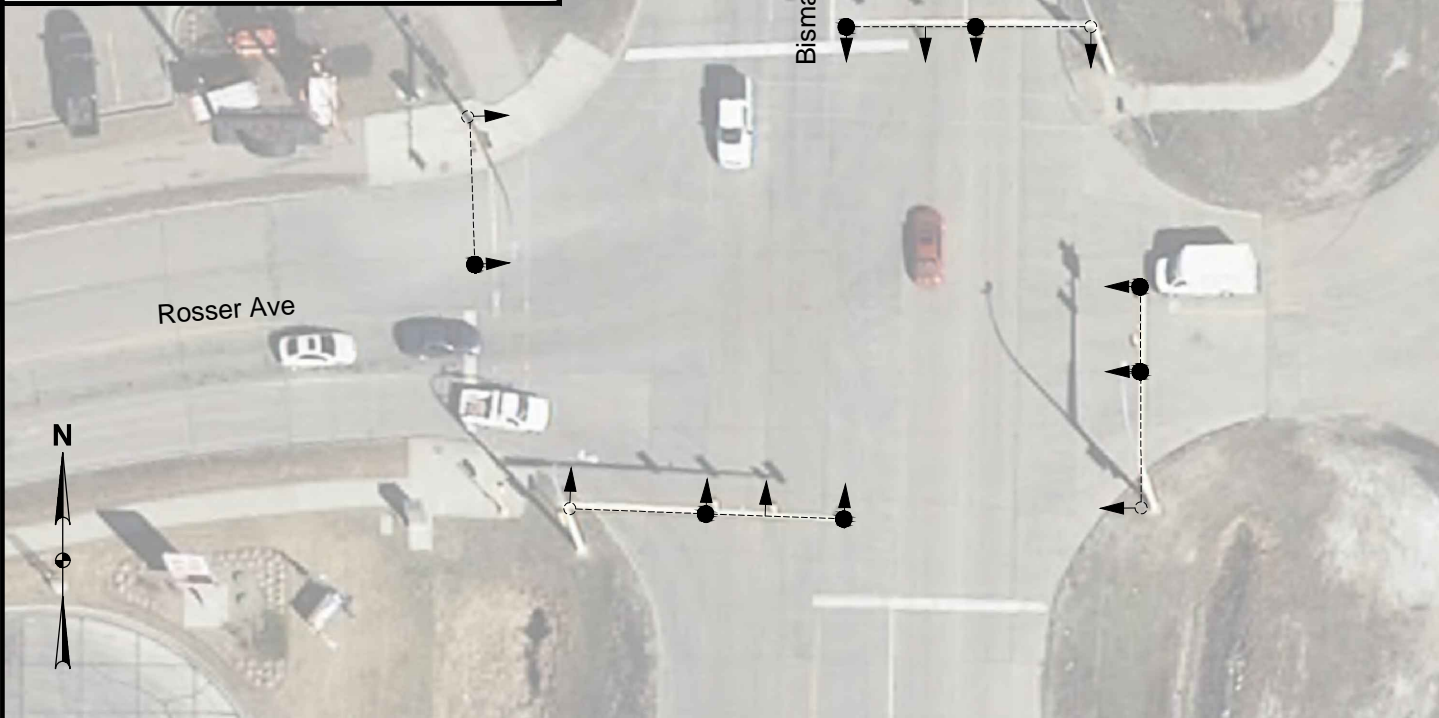






Intersection: Bismarck Expressway & Rosser Ave
City ID: 706
Pedestrian Countdown Heads: 0

Confirmation Lights: 7
Detail 1: WB
Detail 3: NB/SB/EB



Intersection: Bismarck Expressway & Divide Ave
City ID: 705
Pedestrian Countdown Heads: 0

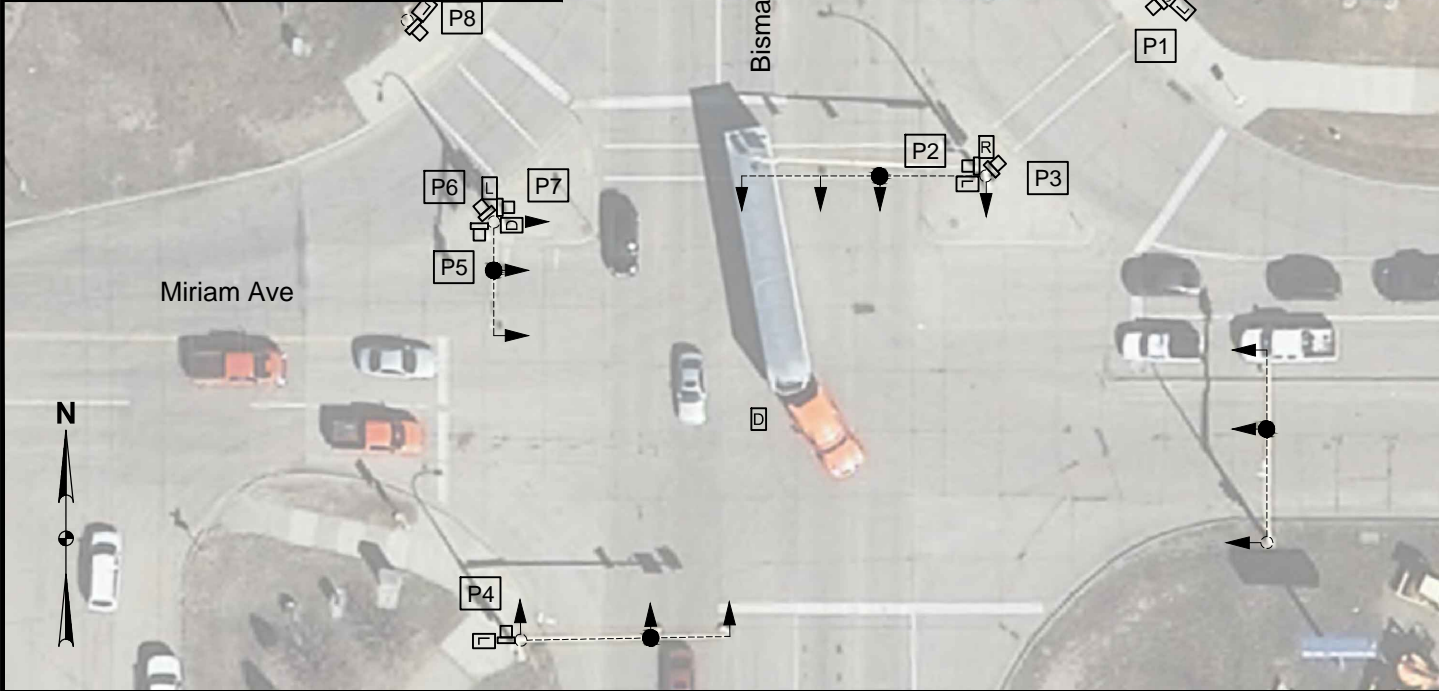
Confirmation Lights: 8
Detail 3: NB/SB/EB/WB



- Legend
- Confirmation Light
 - Pedestrian Countdown Indication
 - P3 Pedestrian Indication Number
 - ◀ Existing Signal Head
 - Existing Signal Standard and Mast Arm
 - Existing Push Button Post
 - R10-3e Pushbutton Sign Right
 - L10-3e Pushbutton Sign Left
 - D10-3e Pushbutton Sign Double

Intersection: Bismarck Expressway & Miriam Ave
City ID: 704
Pedestrian Countdown Heads: 8
Left R10-3e Pushbutton Sign: 5
Right R10-3e Pushbutton Sign: 1
Double R10-3e Pushbutton Sign: 1

Confirmation Lights: 4
Detail 1: NB/EB/WB
Detail 2: SB




Intersection: Bismarck Expressway & I-94 South Ramp
City ID: 703
Pedestrian Countdown Heads: 0

Confirmation Lights: 2
Detail 1: NB/SB



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Registration Number PE-9139,
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HLU-1-999(032)
BISMARCK, NORTH DAKOTA

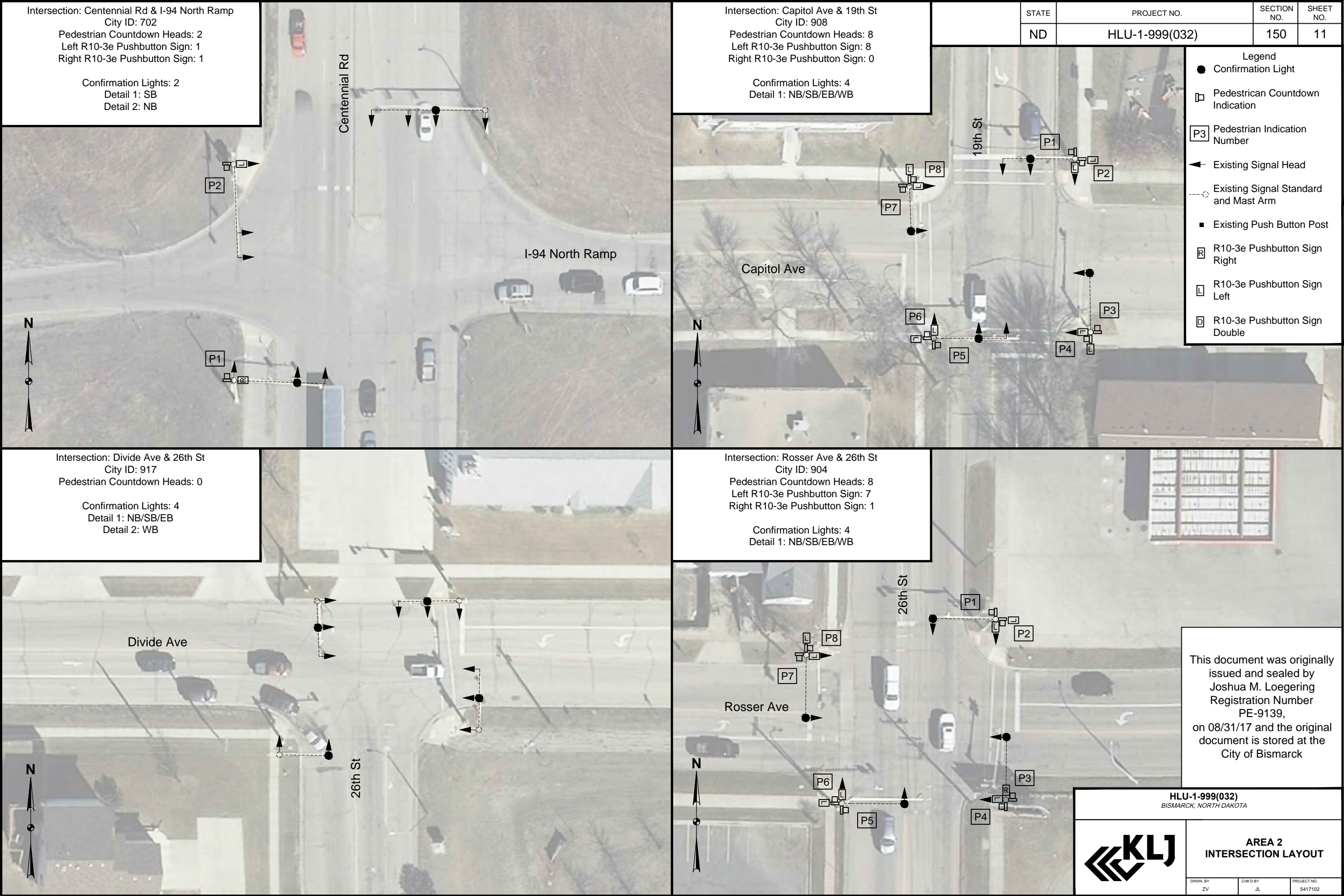


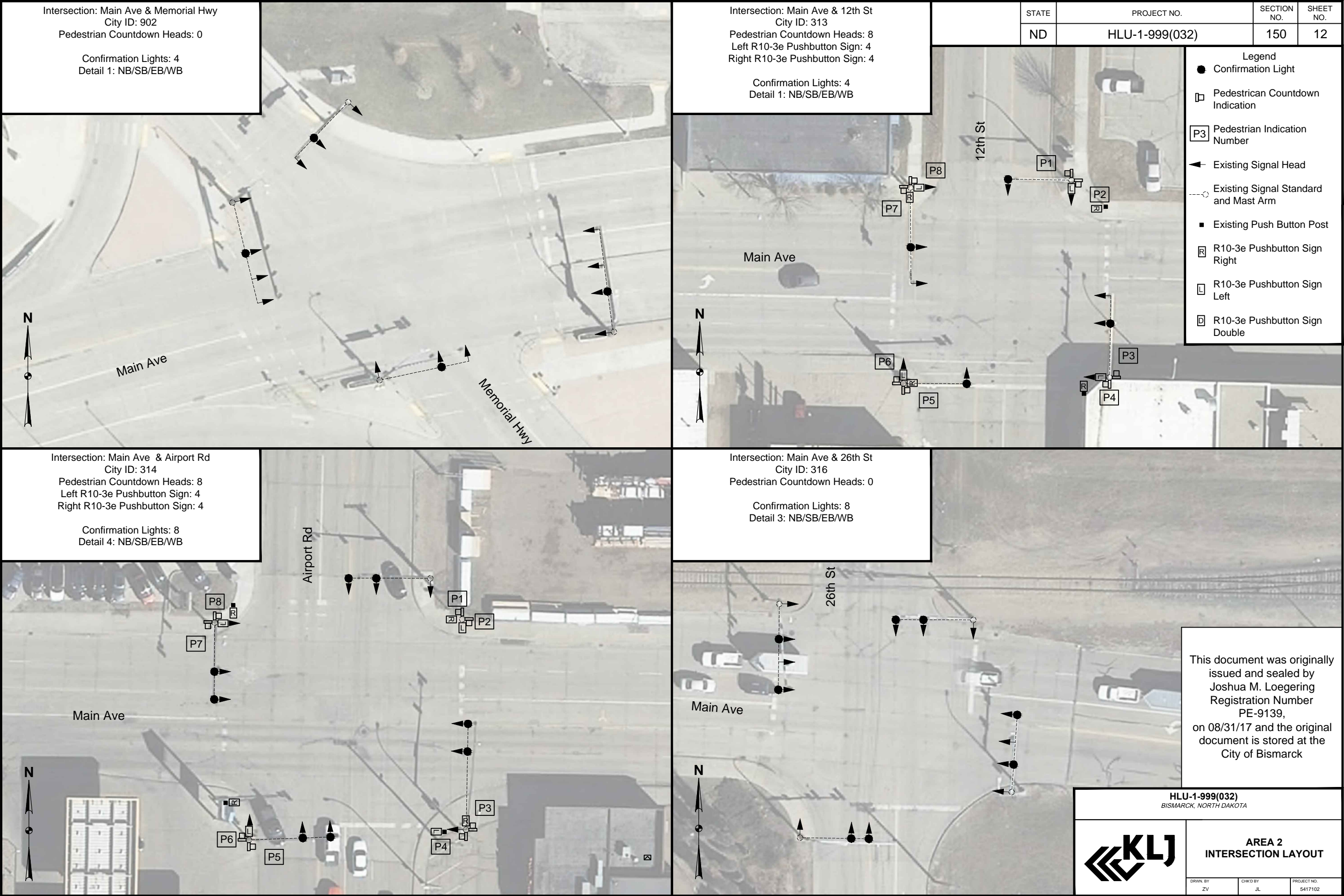
AREA 2
INTERSECTION LAYOUT

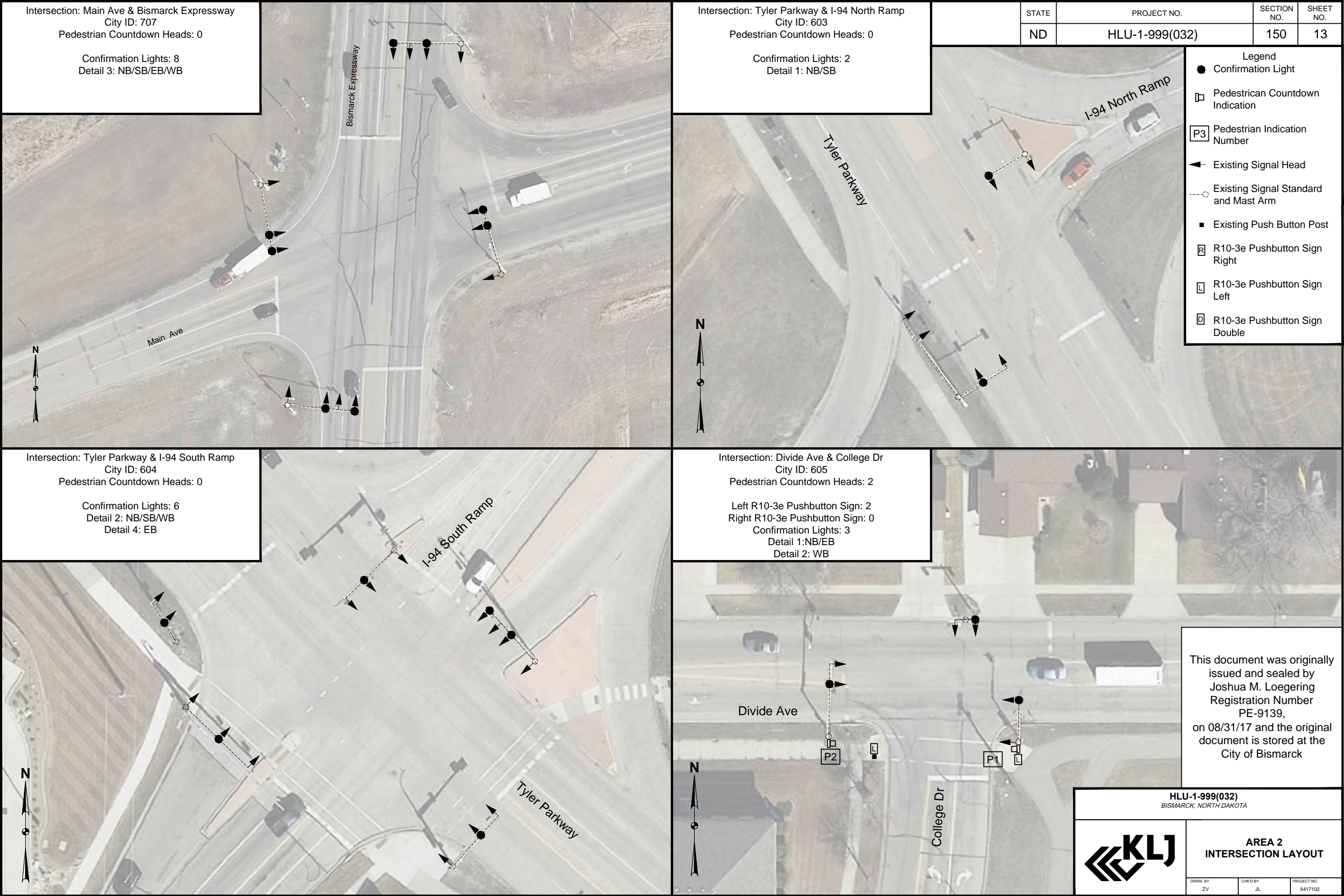
DRWN BY
ZV

CHK'D BY
JL

PROJECT NO.
5417102







Intersection: Divide Ave & 4th St
City ID: 915
Pedestrian Countdown Heads: 8
Left R10-3e Pushbutton Sign: 7
Right R10-3e Pushbutton Sign: 1

Confirmation Lights: 4
Detail 1: NB/SB/EB/WB

Legend

- Confirmation Light
- Pedestrian Countdown Indication
- P3 Pedestrian Indication Number
- ◀ Existing Signal Head
- Existing Signal Standard and Mast Arm
- Existing Push Button Post
- R R10-3e Pushbutton Sign Right
- L R10-3e Pushbutton Sign Left
- D R10-3e Pushbutton Sign Double

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HLU-1-999(032)
BISMARCK, NORTH DAKOTA

AREA 2
INTERSECTION LAYOUT

DRWN. BY
ZV

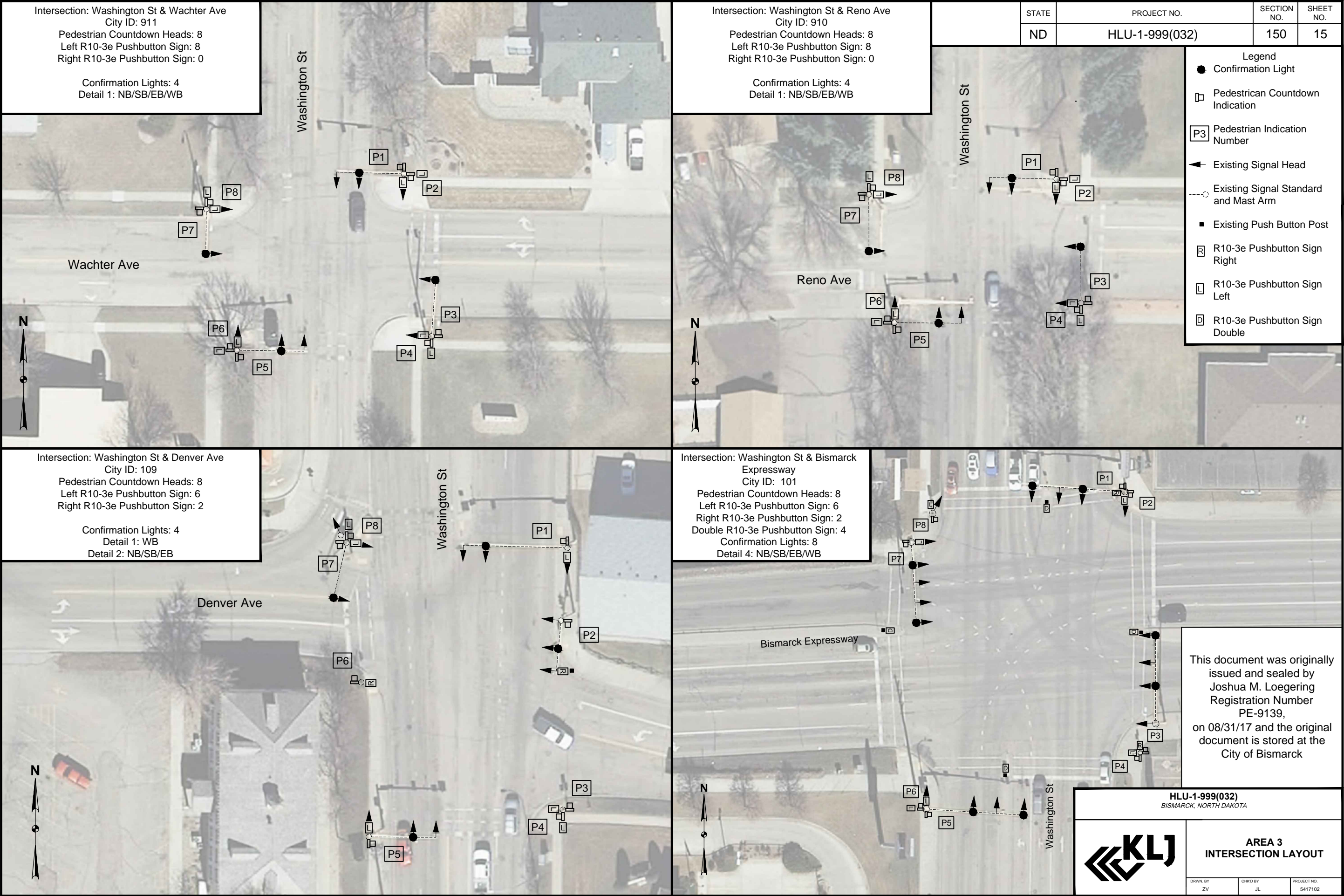
CHK'D BY
JL

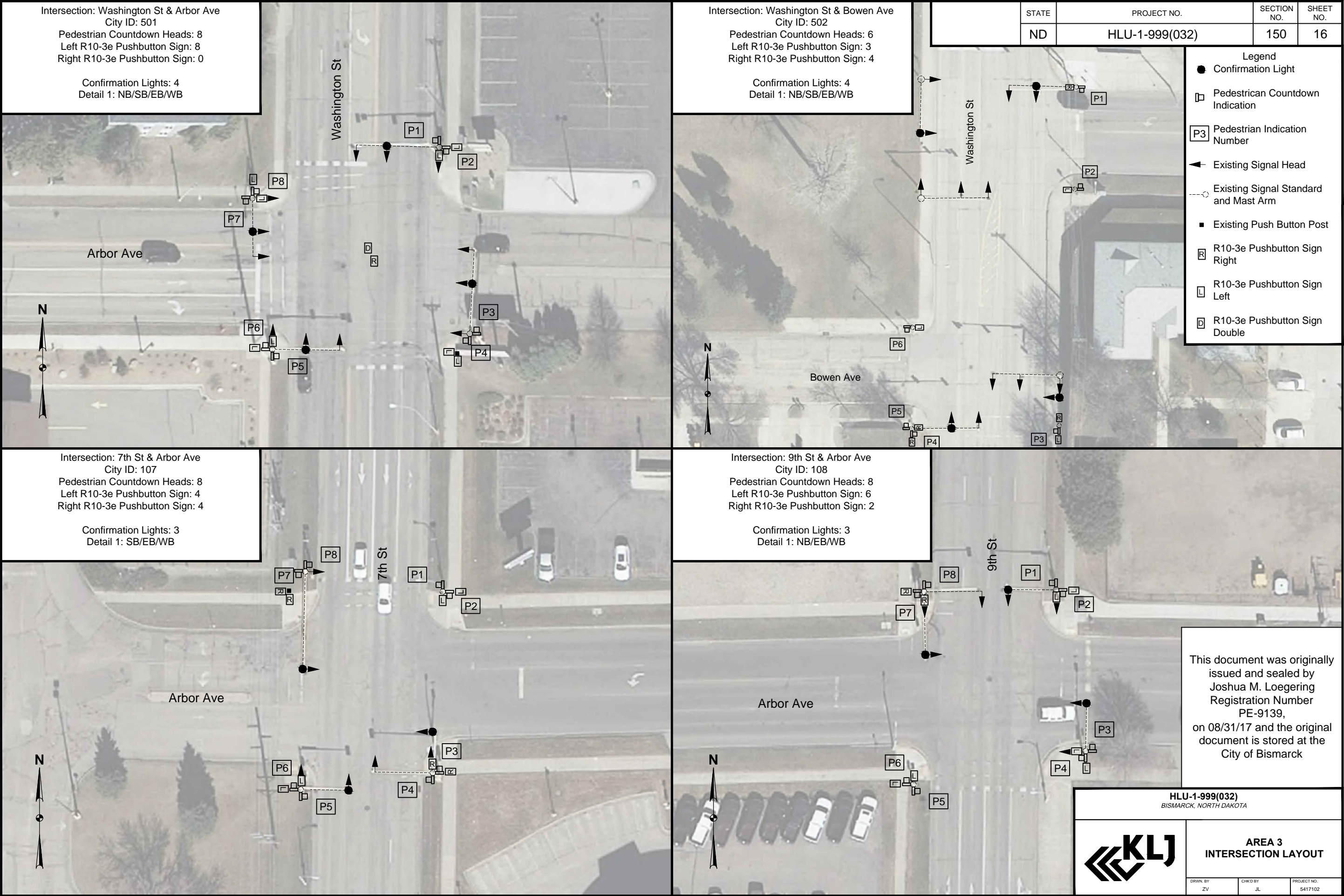
PROJECT NO.
5417102

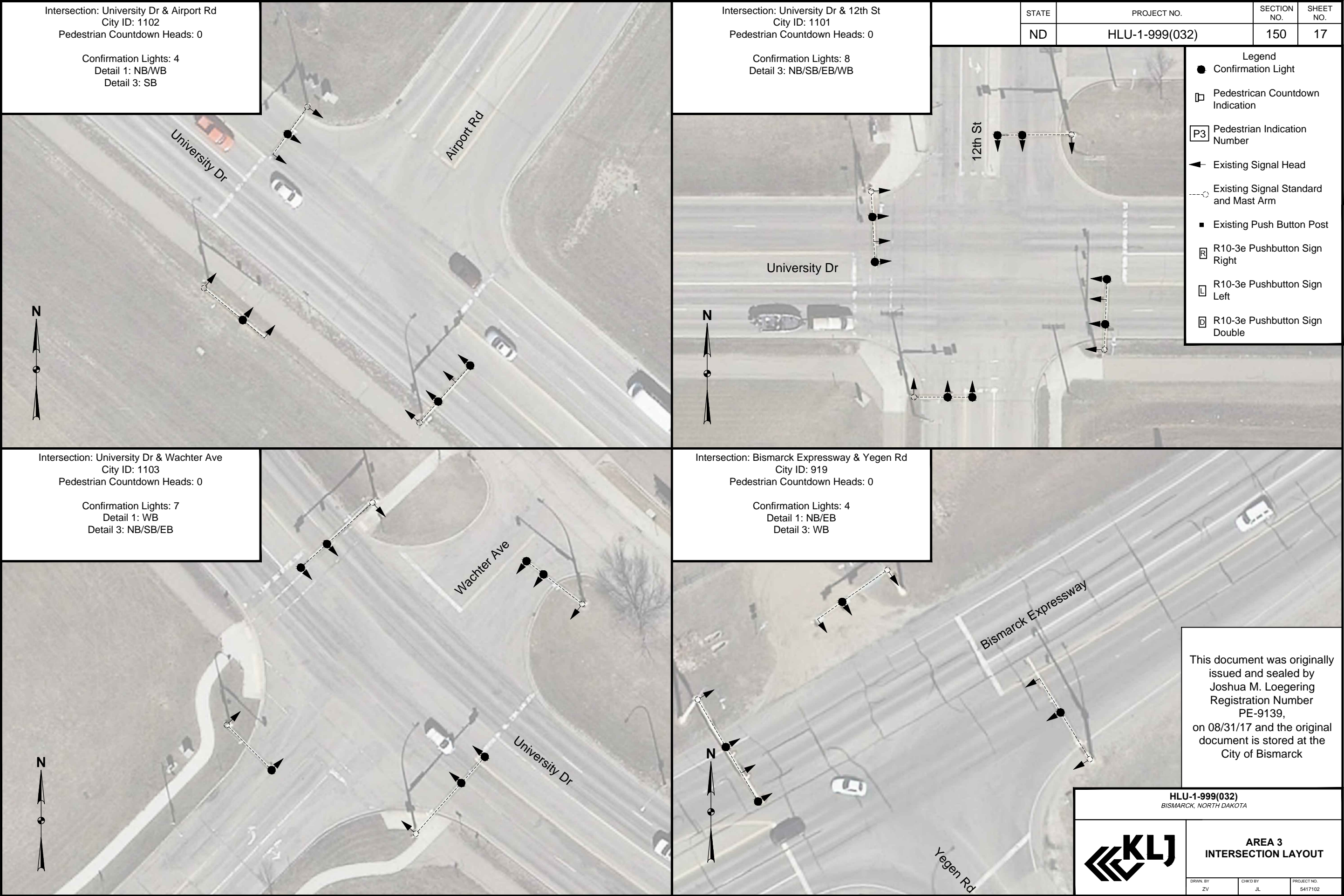
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Registration Number PE-9139,
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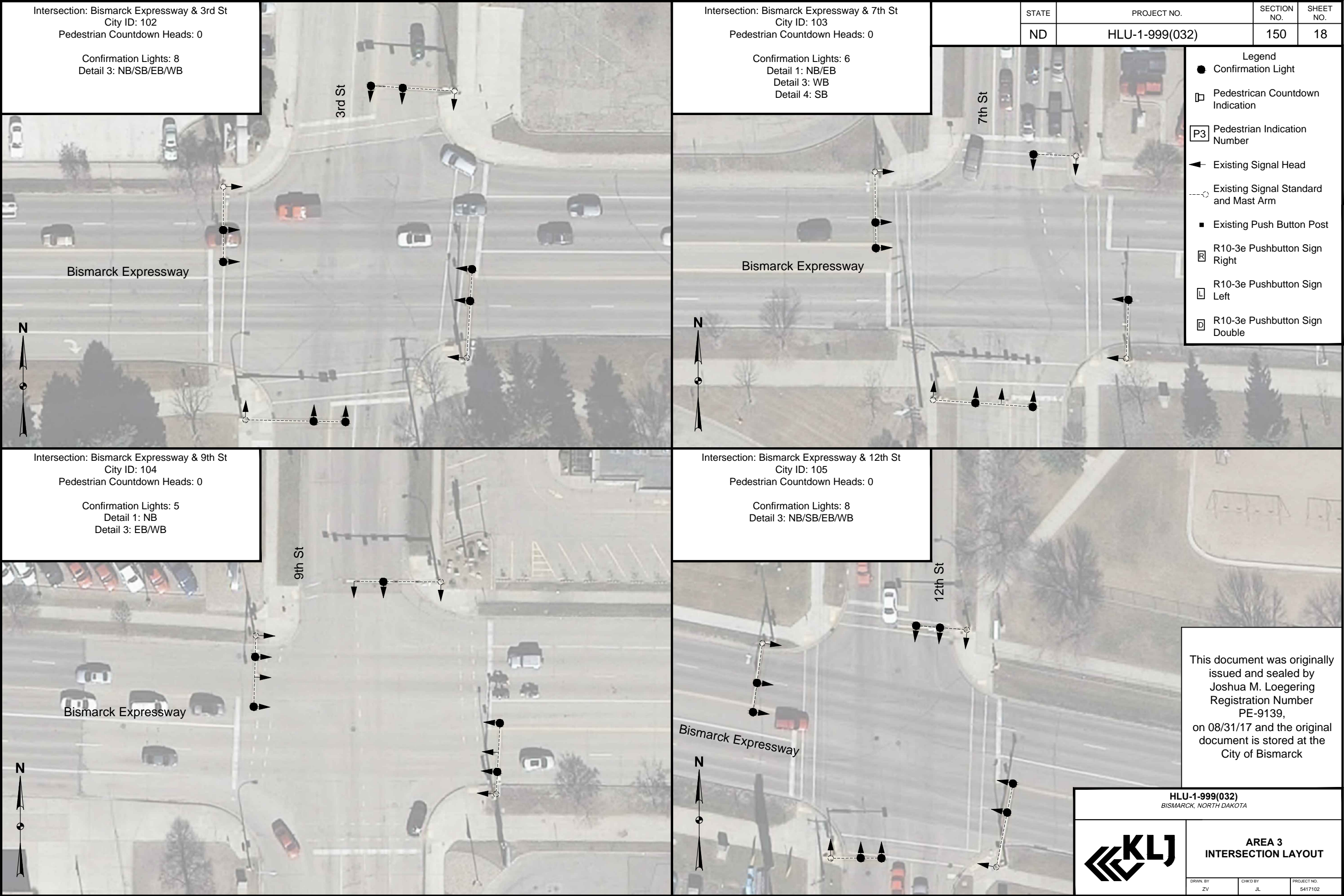
Aug 30, 2017 - 9:14am - \\FRGO-FILES01\p\City\ND\Bismarck\5417102\CAD\Design\Plans\150SGNL_014.dwg

©KLJ 2017









Intersection: Bismarck Expressway & Airport Rd
City ID: 106
Pedestrian Countdown Heads: 0

Confirmation Lights: 8
Detail 3: NB/SB/EB/WB



Intersection: Bismarck Expressway & 26th St
City ID: 110
Pedestrian Countdown Heads: 0

Confirmation Lights: 8
Detail 3: NB/SB/EB/WB



- Legend
- Confirmation Light
 - Pedestrian Countdown Indication
 - P3 Pedestrian Indication Number
 - ◀ Existing Signal Head
 - Existing Signal Standard and Mast Arm
 - Existing Push Button Post
 - R10-3e Pushbutton Sign Right
 - R10-3e Pushbutton Sign Left
 - R10-3e Pushbutton Sign Double

Intersection: Bismarck Expressway & Burlington Dr
City ID: 111
Pedestrian Countdown Heads: 0


Confirmation Lights: 8
Detail 3: NB/EB/WB
Detail 4: SB



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HLU-1-999(032)
BISMARCK, NORTH DAKOTA

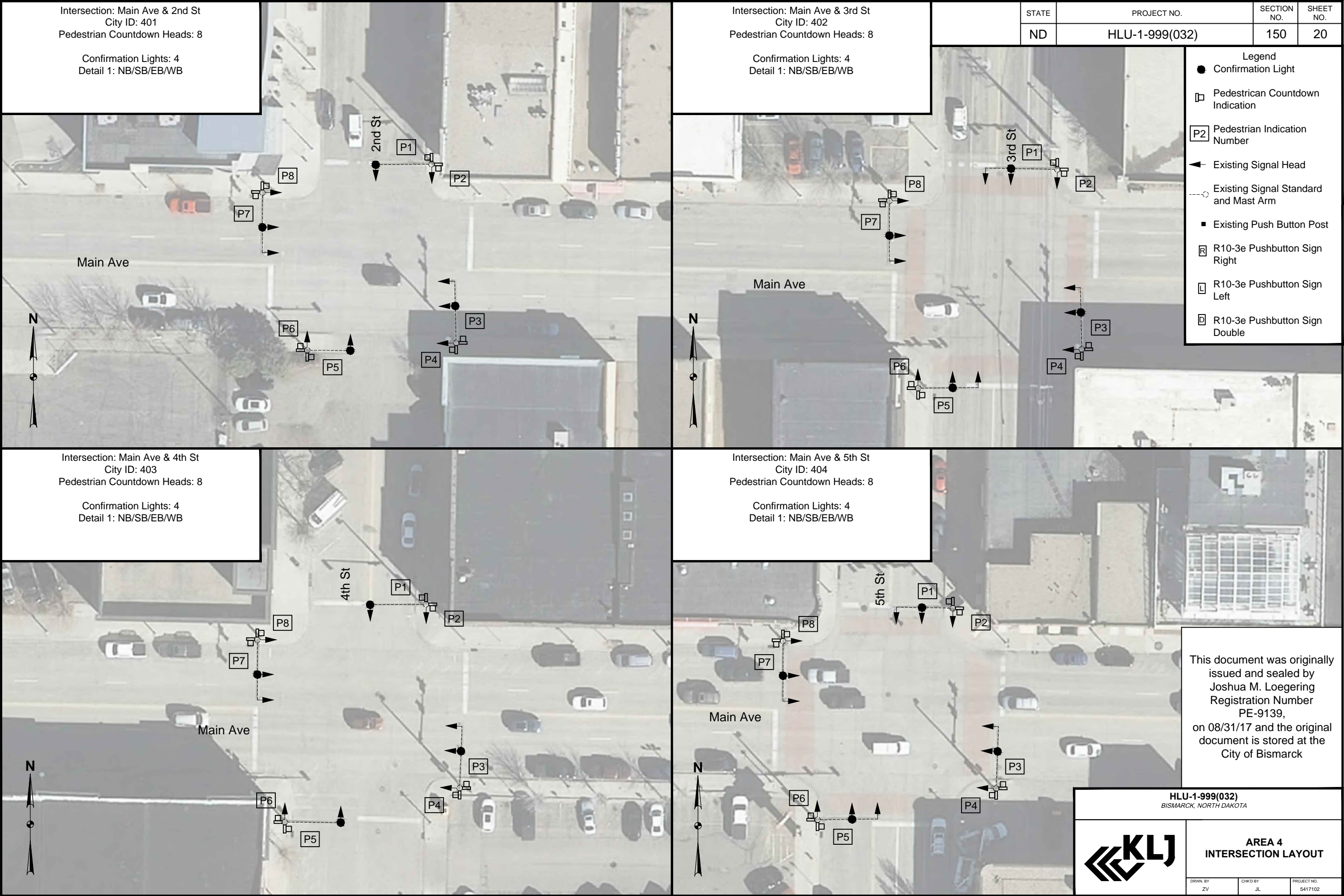


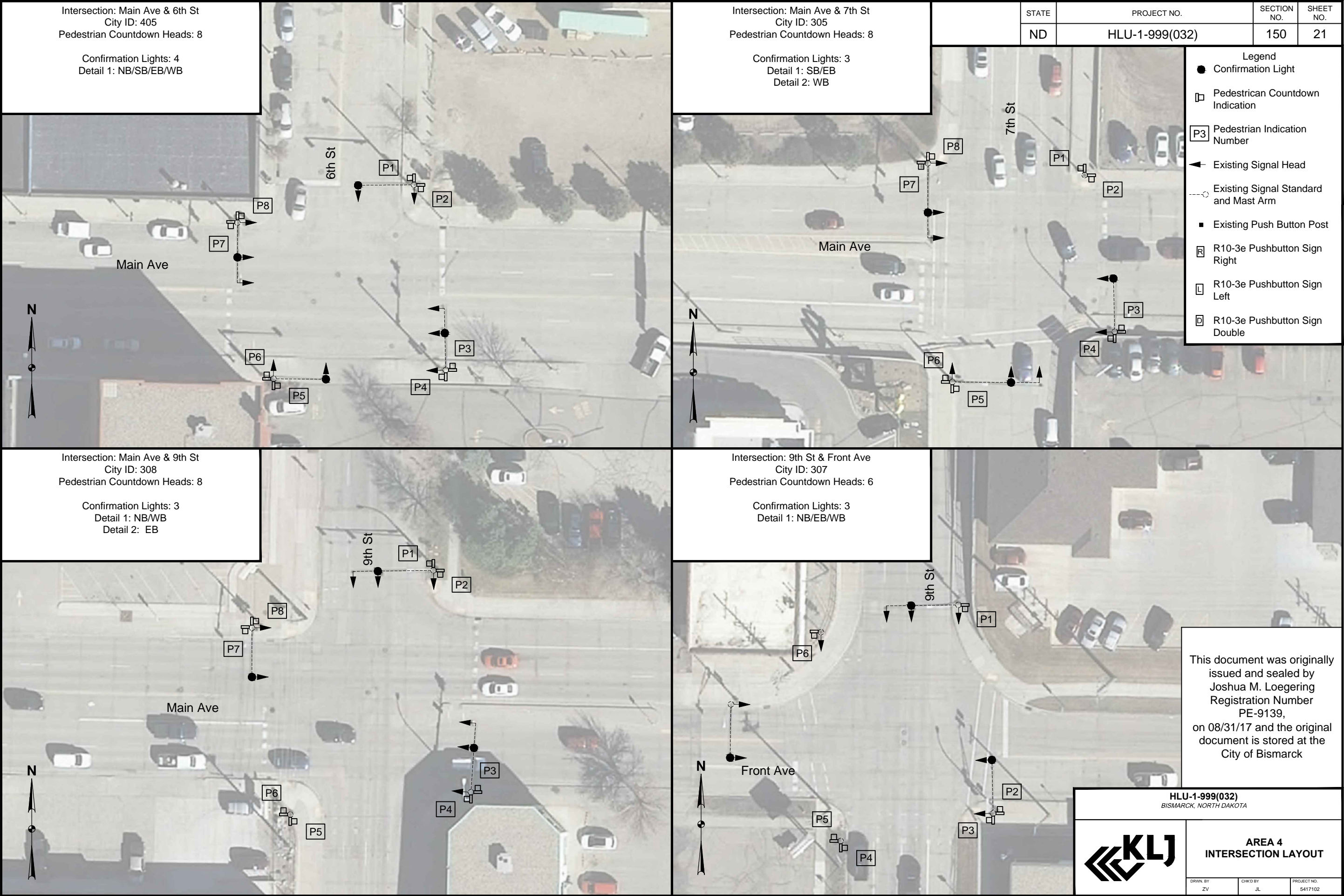
AREA 3
INTERSECTION LAYOUT

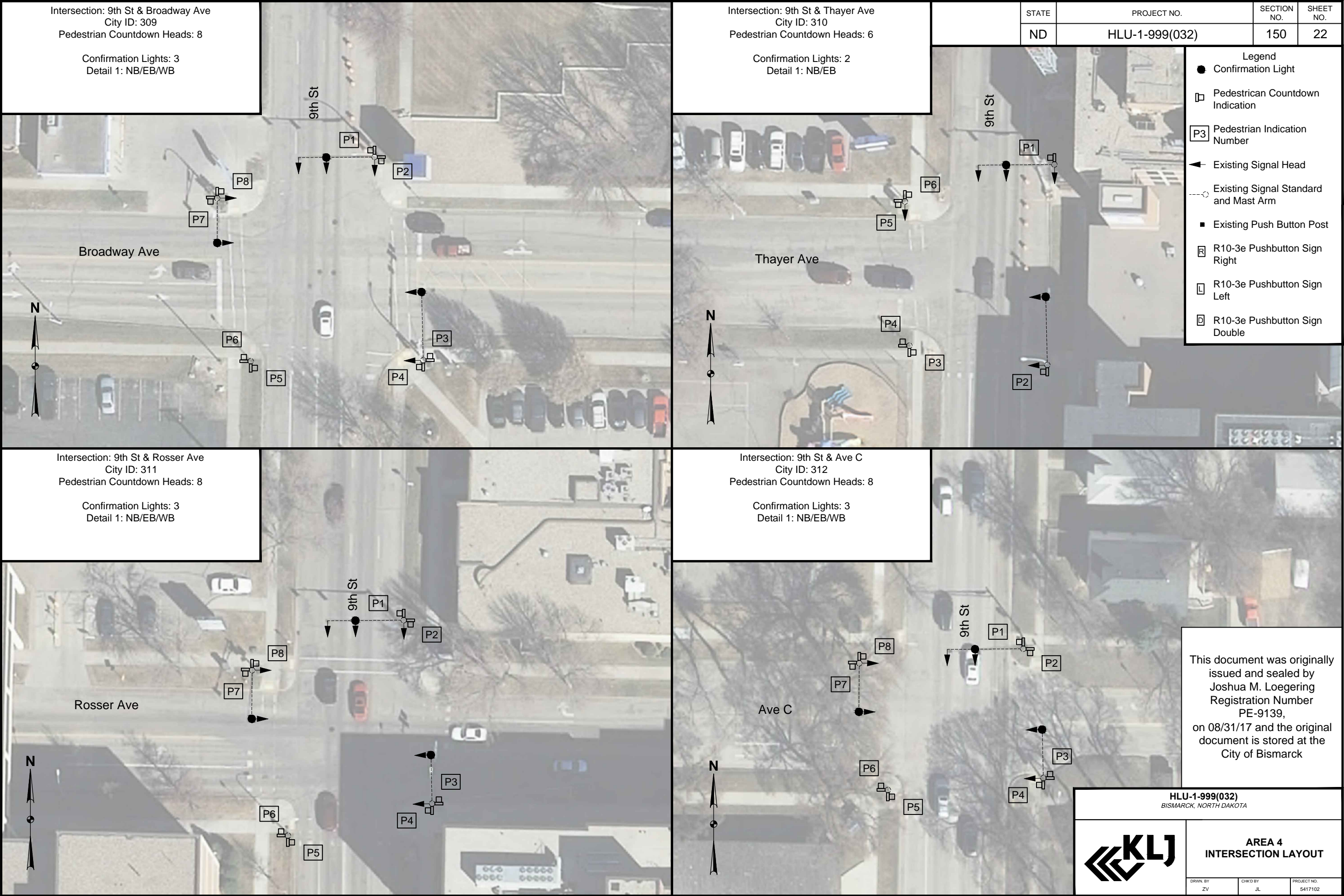
DRWN. BY
ZV

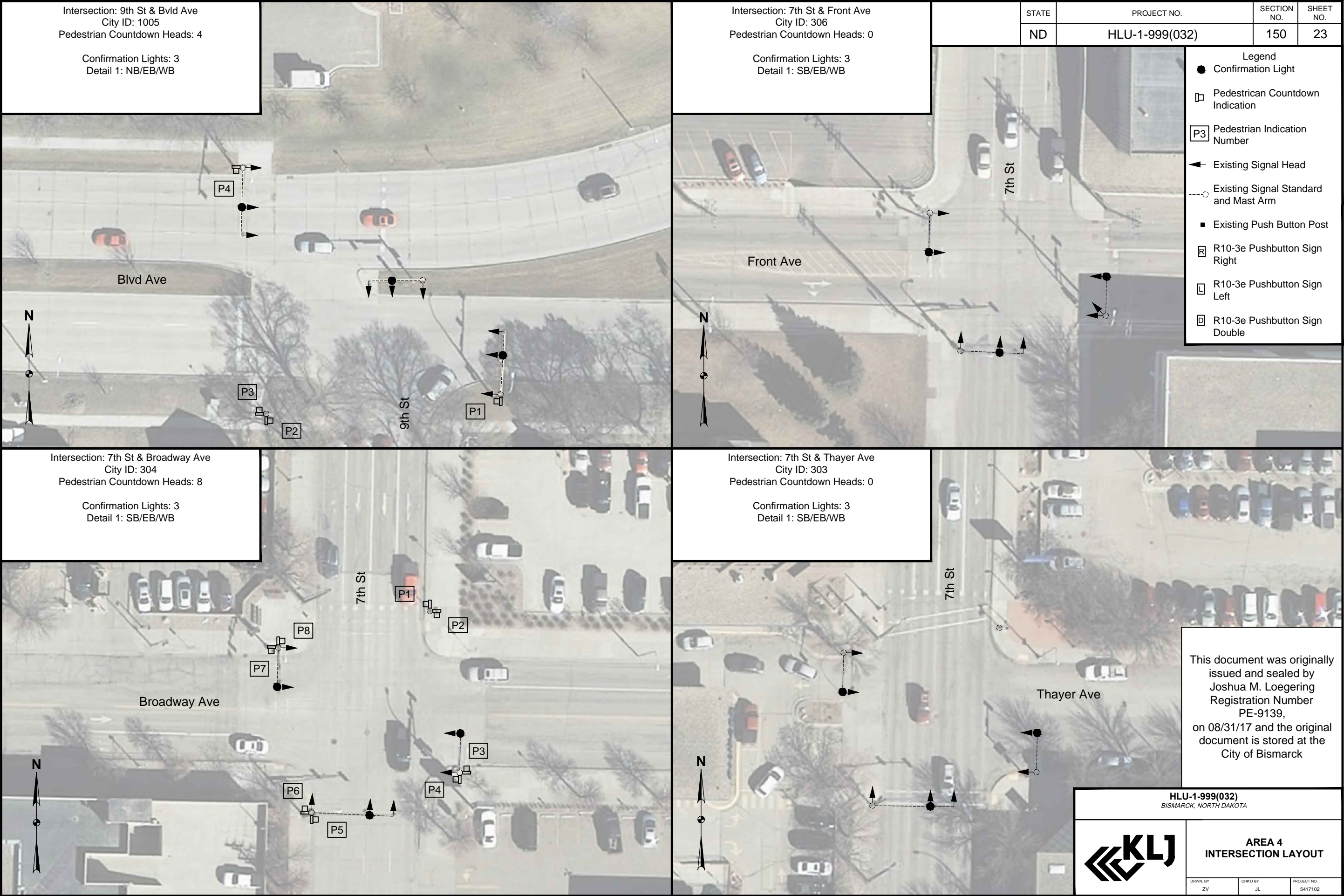
CHKD BY
JL

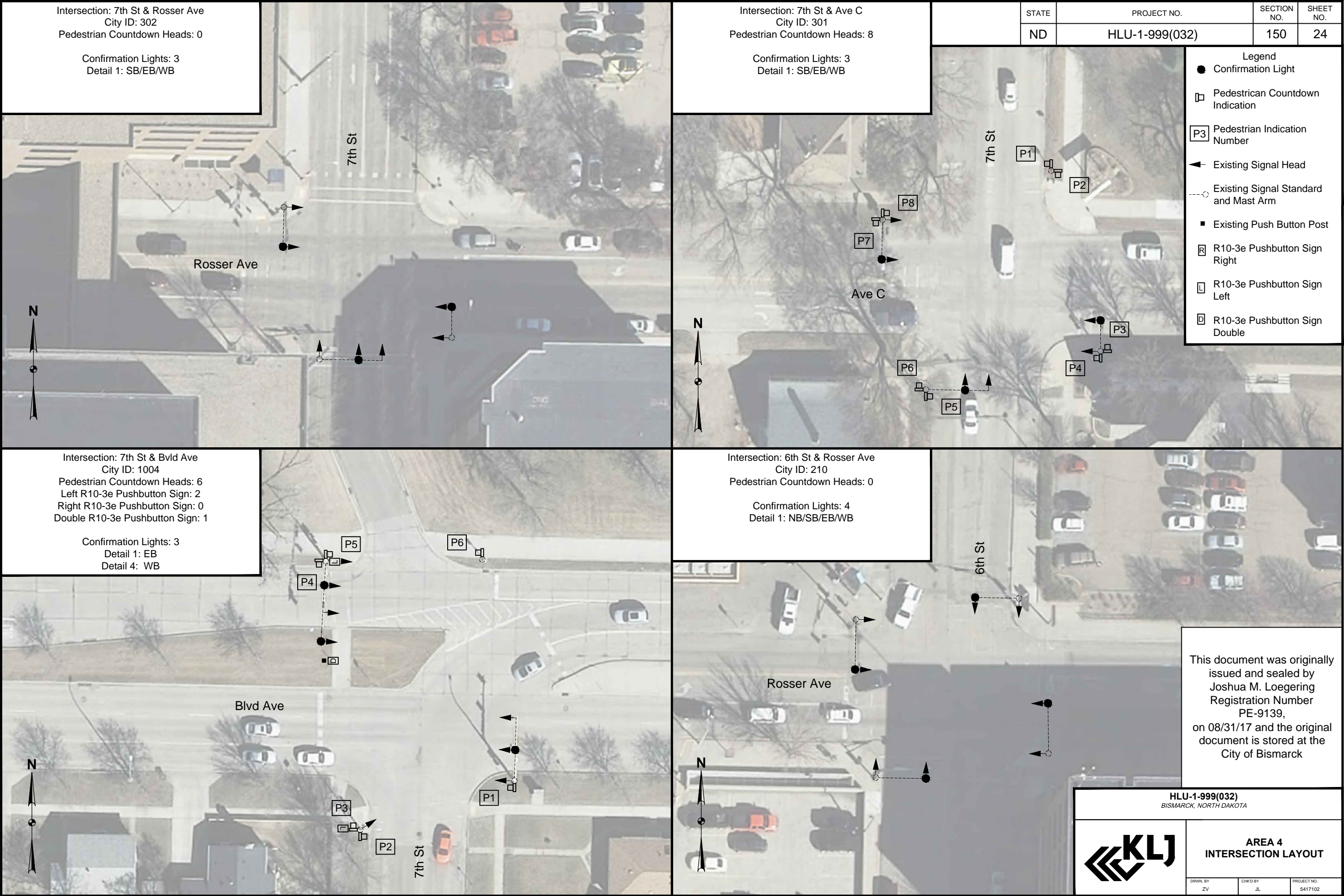
PROJECT NO.
5417102

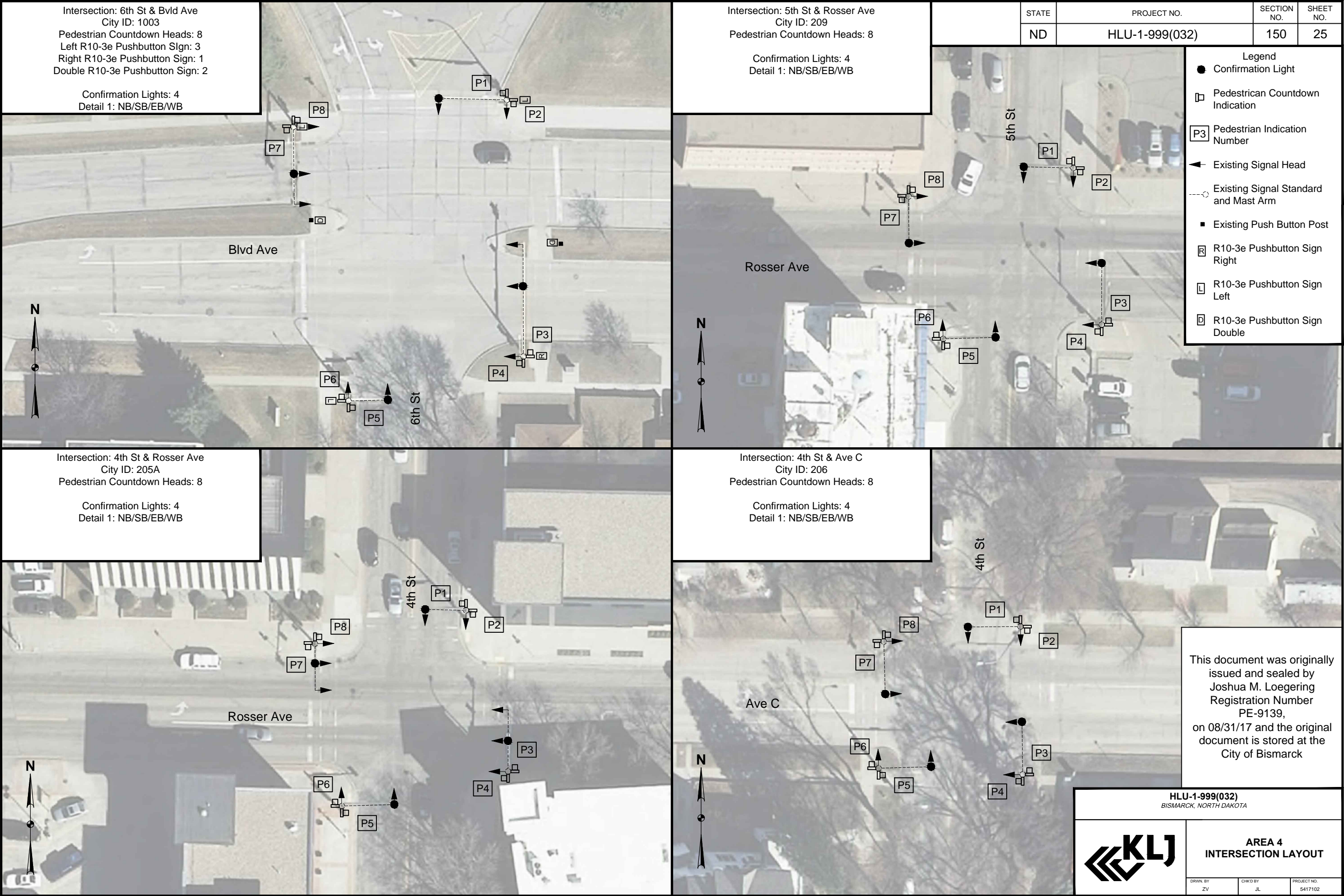


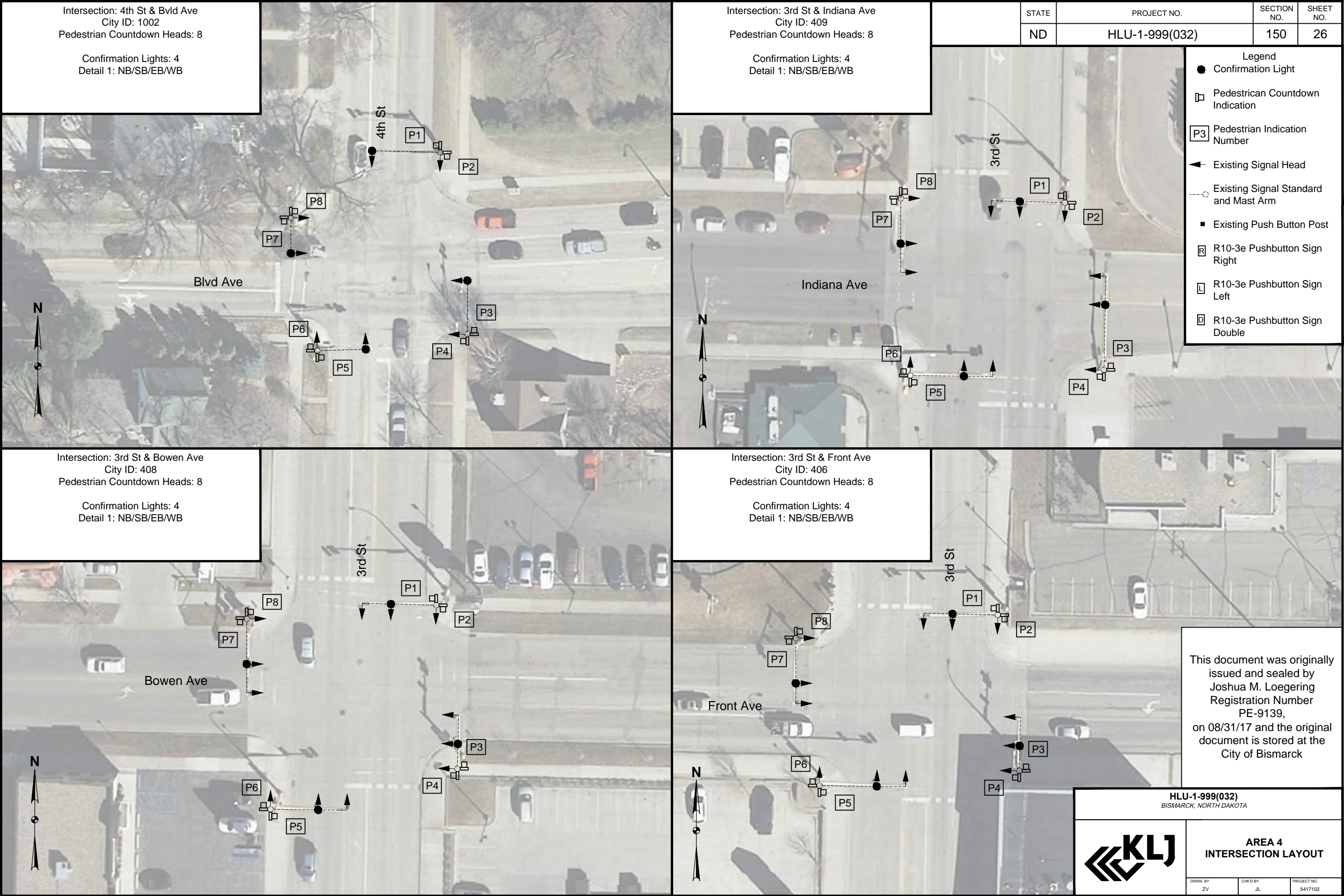


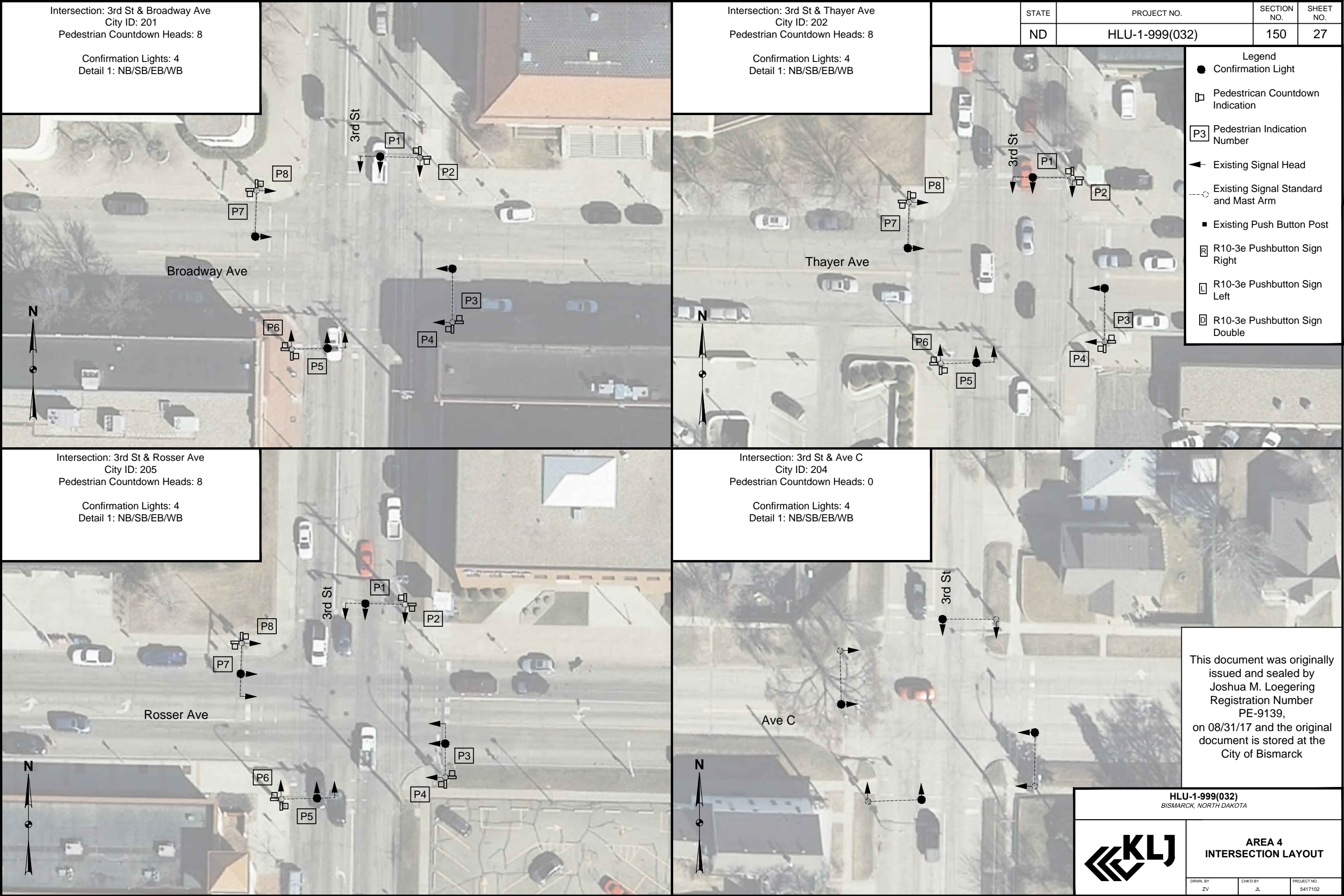








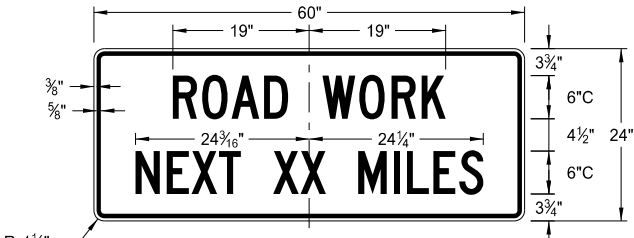




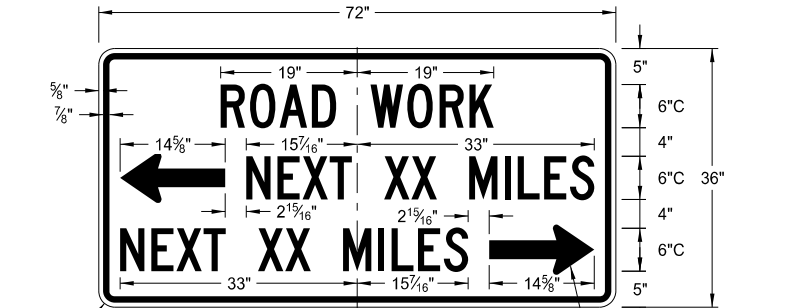


CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

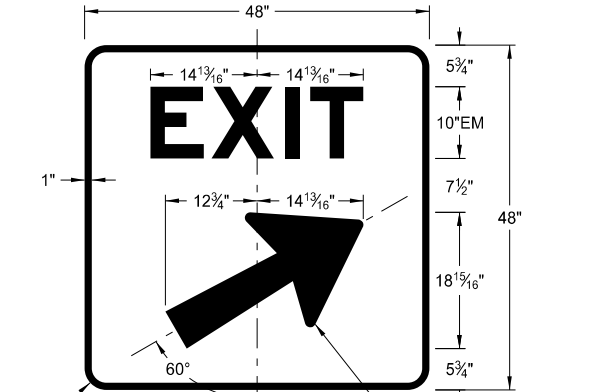
D-704-9



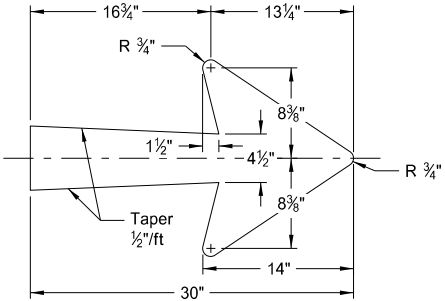
G20-1-60
Legend: black (non-refl)
Background: orange



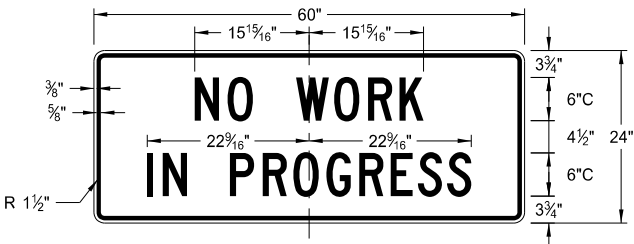
G20-50a-72
Legend: black (non-refl)
Background: orange



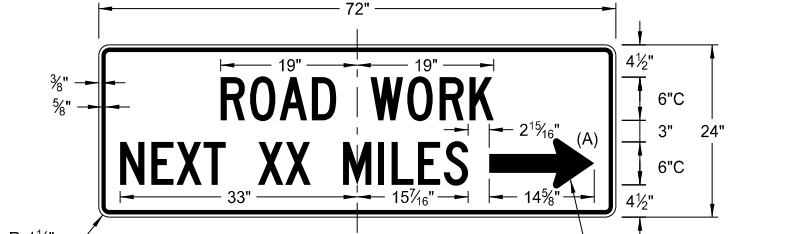
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



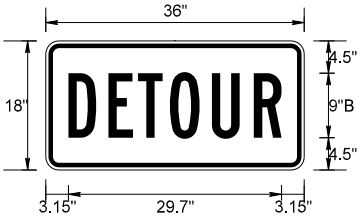
E5-1-48



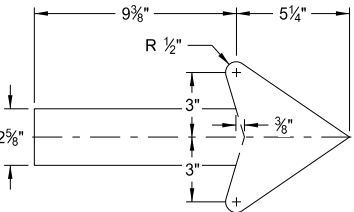
G20-1b-60
Legend: black (non-refl)
Background: orange



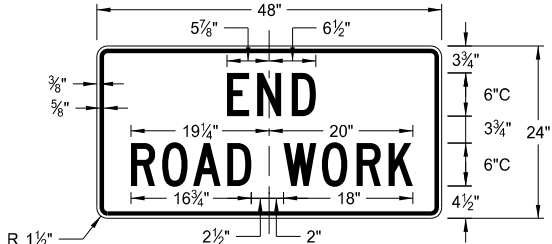
G20-52a-72
Legend: black (non-refl)
Background: orange



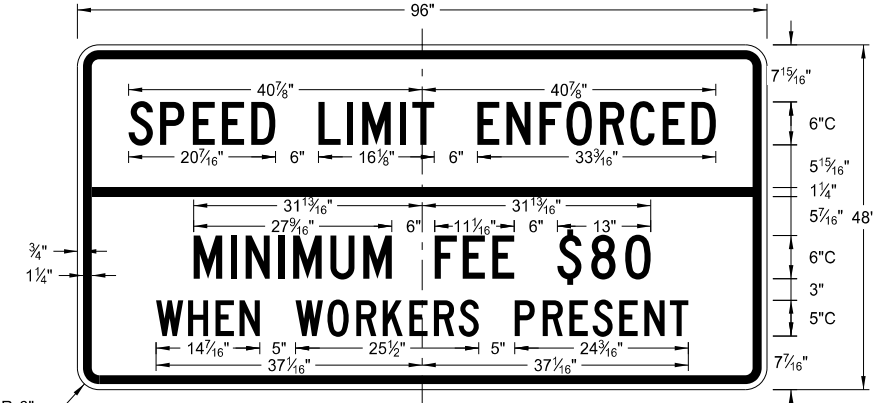
M4-8-36
Legend: black (non-refl)
Background: orange



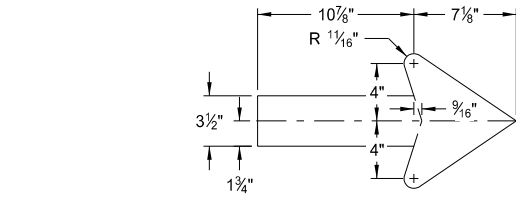
G20-50a-72
G20-52a-72



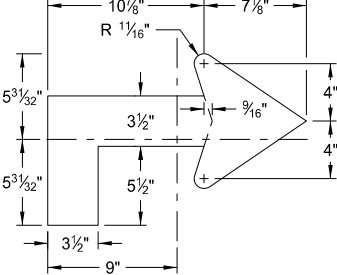
G20-2-48
Legend: black (non-refl)
Background: orange



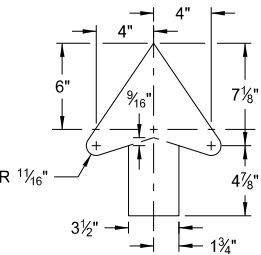
G20-55-96
Legend: black (non-refl)
Background: orange



M4-9(L or R)-30
Right or Left



M4-9(L or R)-30
Advanced Right or Left



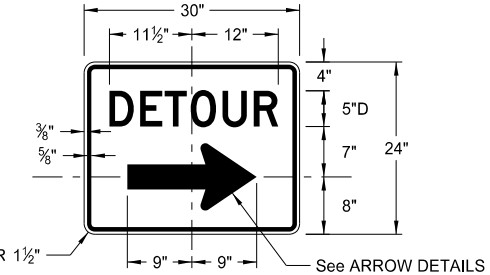
M4-9-30
Straight

ARROW DETAILS

NOTES:
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added sign & background color

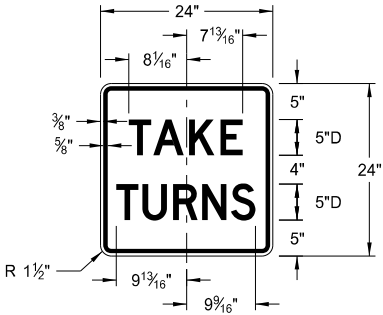
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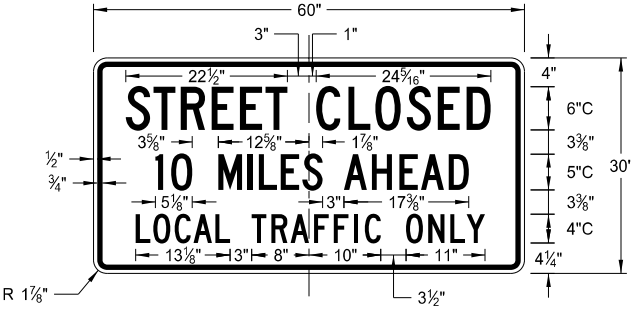
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange

CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

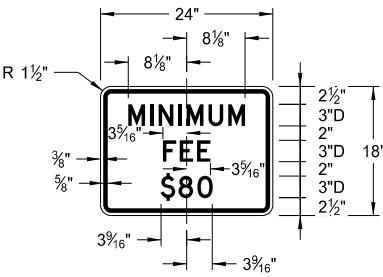
D-704-10



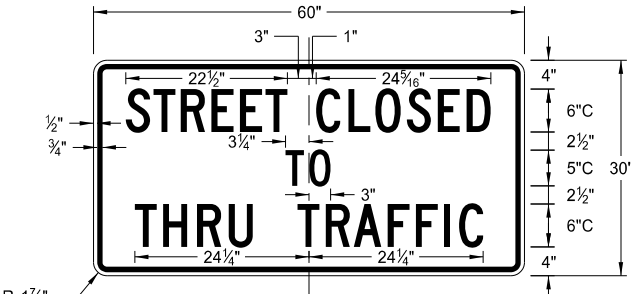
R1-50P-24
Legend: black (non-refl)
Background: white



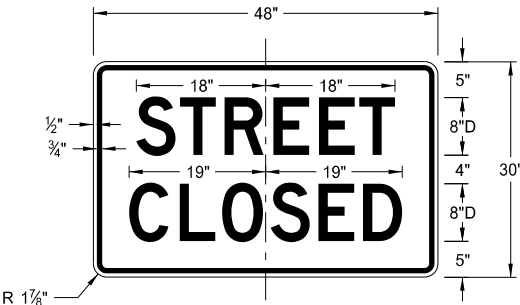
R11-3c-60
Legend: black (non-refl)
Background: white



R2-1aP-24
Legend: black (non-refl)
Background: white



R11-4a-60
Legend: black (non-refl)
Background: white

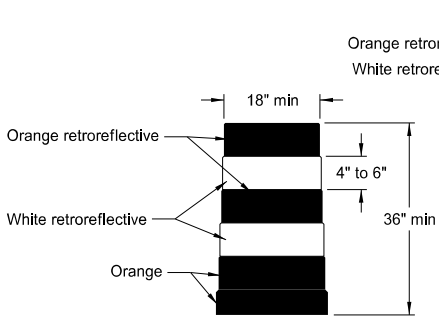


R11-2a-48
Legend: black (non-refl)
Background: white

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 8/17/17 and the original document is stored at the North Dakota Department of Transportation
8-13-13		
REVISIONS		
DATE	CHANGE	
8-17-17	Revised sign number	

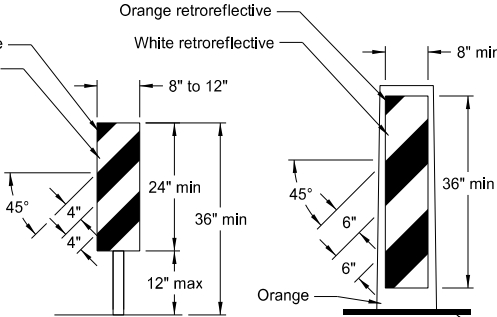
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



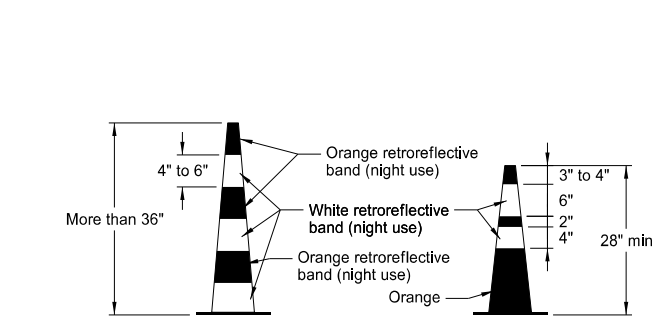
DELINEATOR DRUM

The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized spaces between the horizontal orange and white stripes shall not exceed 3" wide. Stripes shall not be placed on ribs or indentations in the drum. Drums shall have closed tops that will not allow collection of construction debris or other debris. Ballast shall not be placed on the top of a drum.



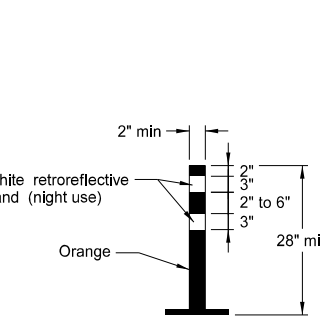
VERTICAL PANEL

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, a stripe width of 6 inches shall be used.



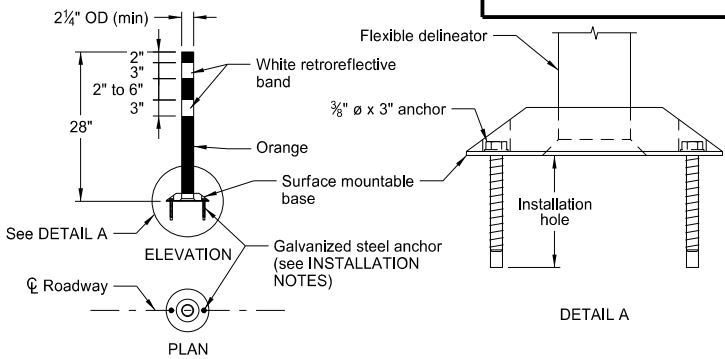
TRAFFIC CONE

Retroreflectorization of cones more than 36" in height shall be provided by alternating orange and white retroreflective stripes. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized space between the orange and white stripes shall not exceed 3" wide.



TUBULAR MARKER

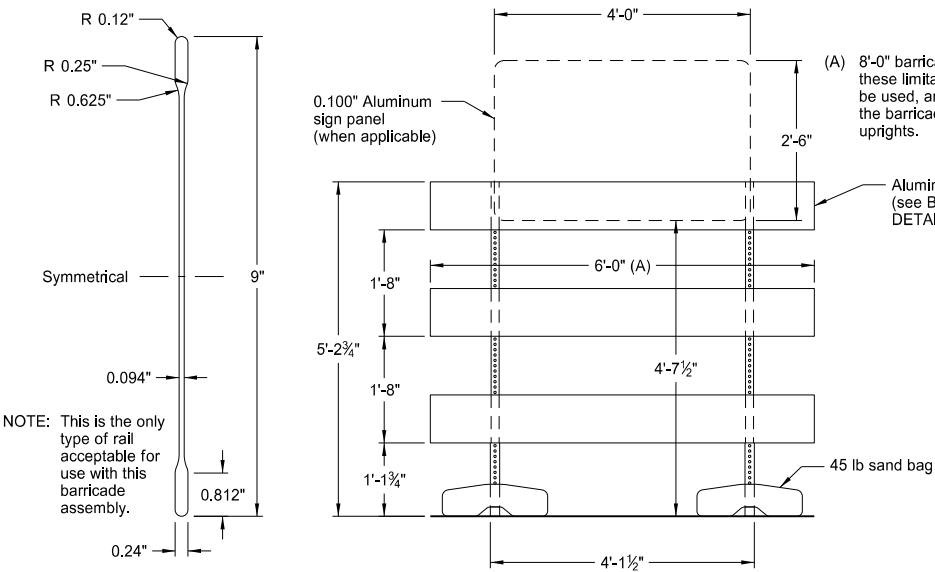
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

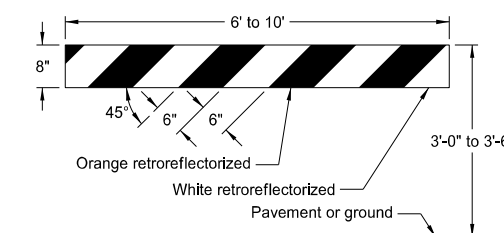
INSTALLATION NOTES:

1. Drill installation holes to diameter and depth as required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, the contractor may use an 8" x 8" butyl pad or hot melt butyl. Butyl shall be removed as close as possible to pavement surface.

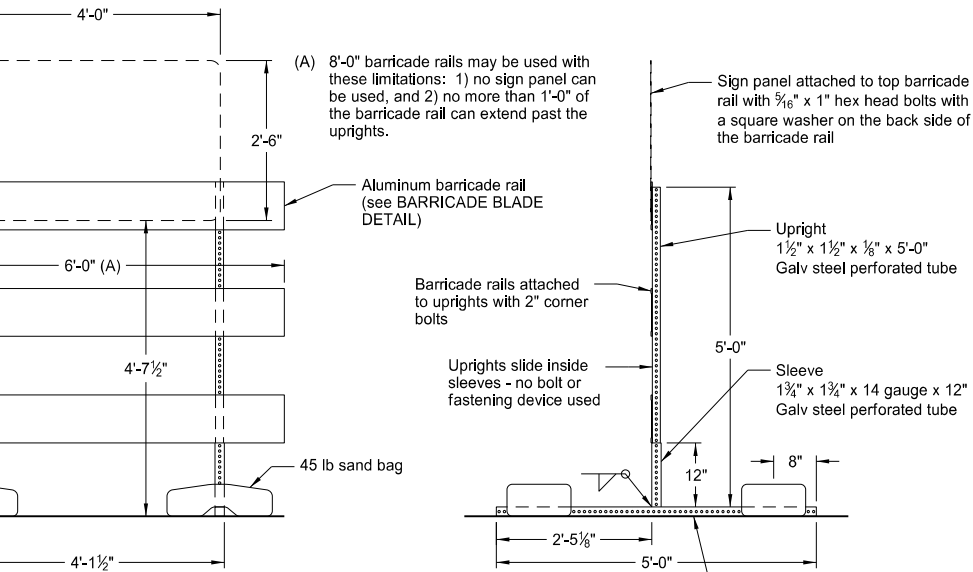


BARRICADE BLADE DETAIL

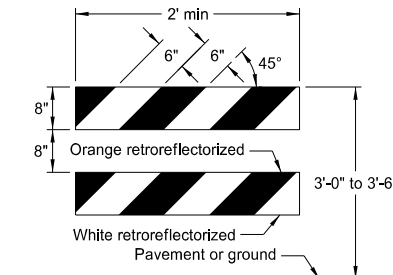
NOTE: This is the only type of rail acceptable for use with this barricade assembly.



TYPE I BARRICADE

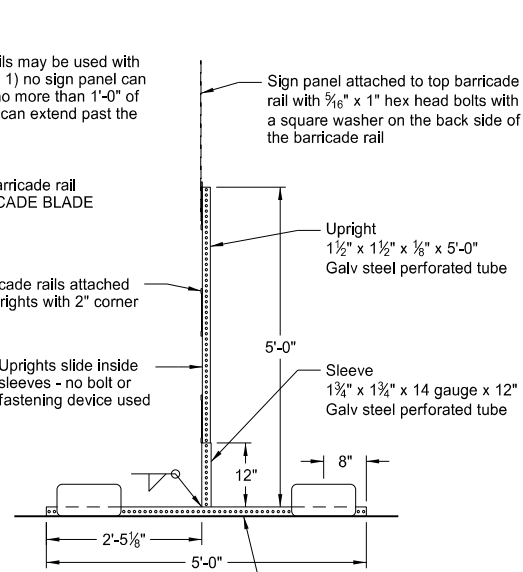


BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

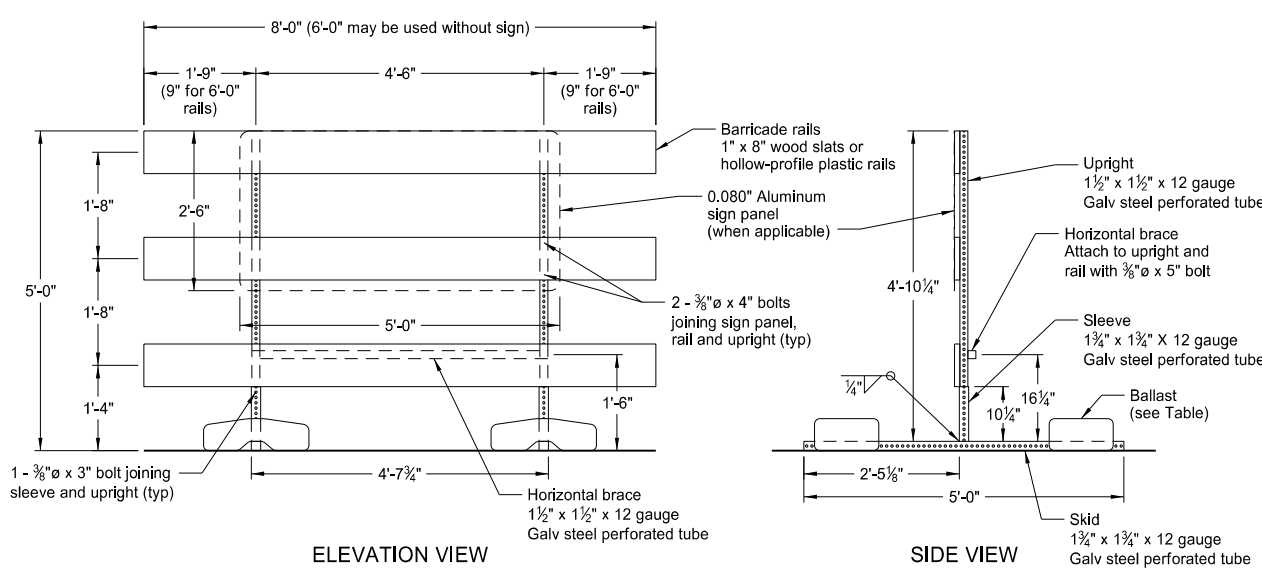


TYPE II BARRICADE

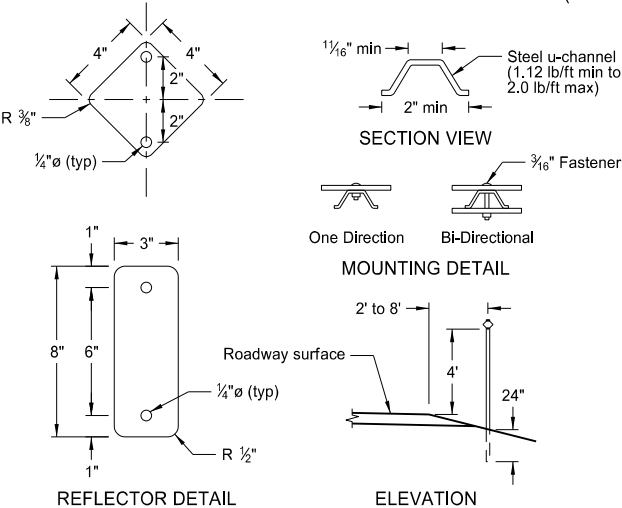
BARRICADE RAIL DETAILS



TYPE III BARRICADE



BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)



DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

Without Sign	4 - 25 lb sandbags
With Sign	6 - 25 lb sandbags

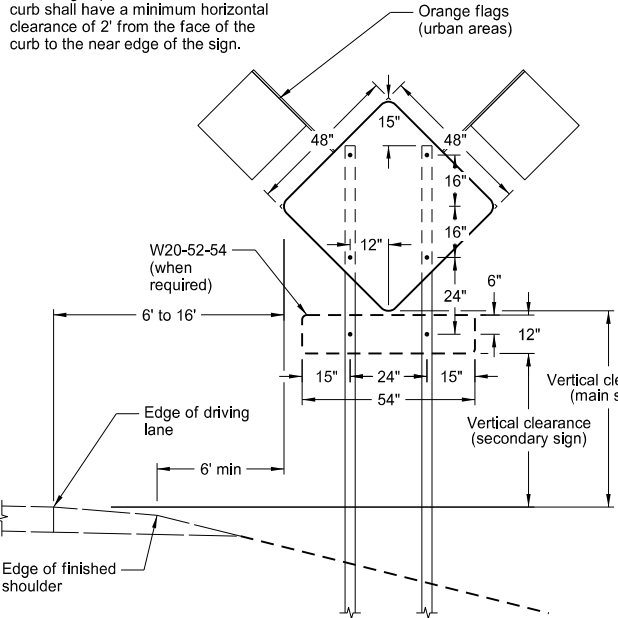
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

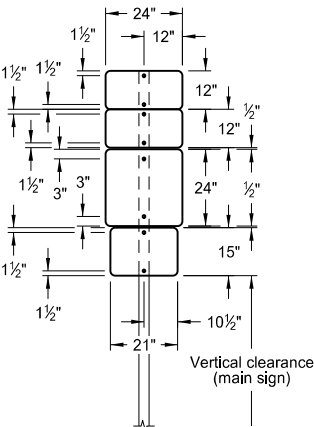
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

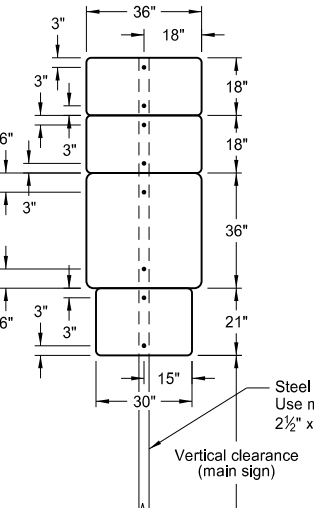
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



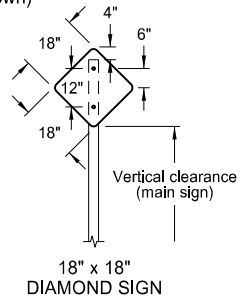
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



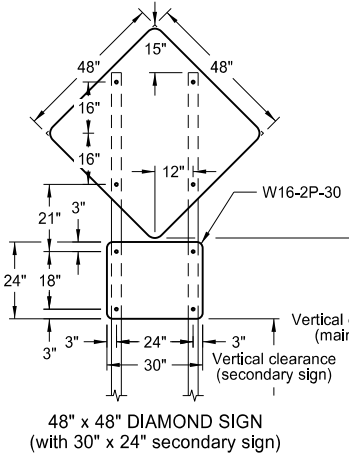
24" x 24" ROUTE MARKER ASSEMBLY



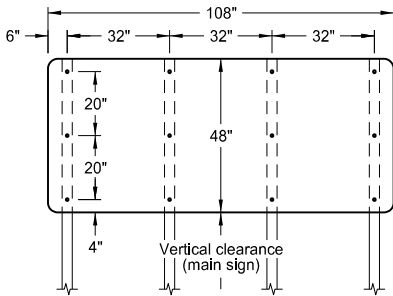
36" x 36" ROUTE MARKER ASSEMBLY



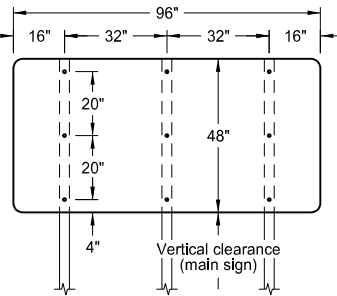
18" x 18" DIAMOND SIGN



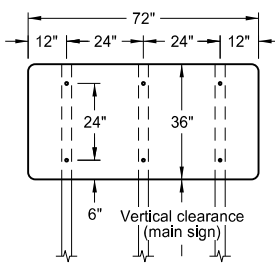
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



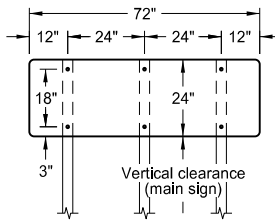
108" x 48" SIGN



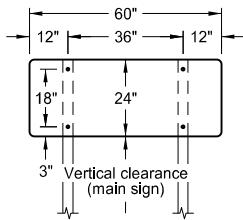
96" x 48" SIGN



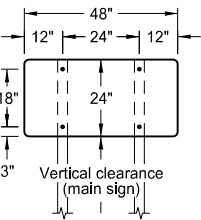
72" x 36" SIGN



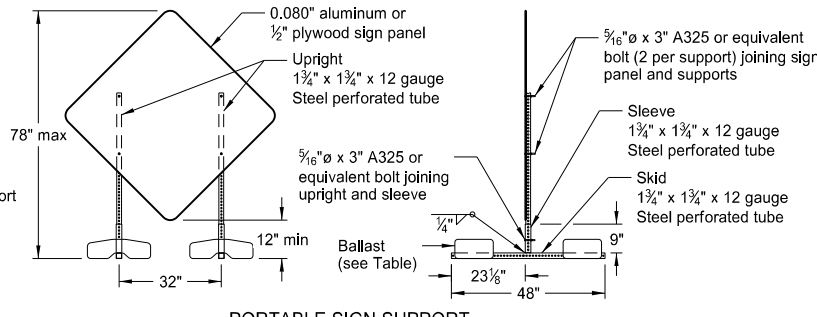
72" x 24" SIGN



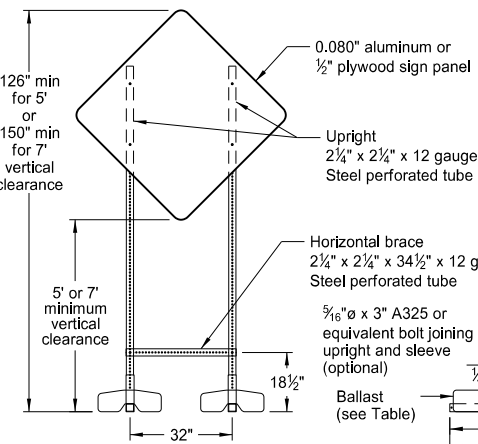
60" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: Supports shall be galvanized or painted. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.

Signs over 50 square feet should be installed on 2 1/2" x 2 1/2" perforated tube supports as a minimum.

Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. All holes to be punched round for 3/8" bolts.

3. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a lane closure sign)

4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

Interstate - white legend on blue background
Interstate Business Loop - white legend on green background
US and State - black legend on white background
County - yellow legend on blue background

5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

The vertical clearance to secondary signs is 1'-0" less than the vertical clearance as stated above.

Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.

6. Portable Signs: Provide portable signs that meet the vertical clearance as stated above. Use portable signs when it is necessary to place signs within the pavement surface.

When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.

Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have a maximum surface area of 16 square feet.

MINIMUM BALLAST
(For each side of sign support base)

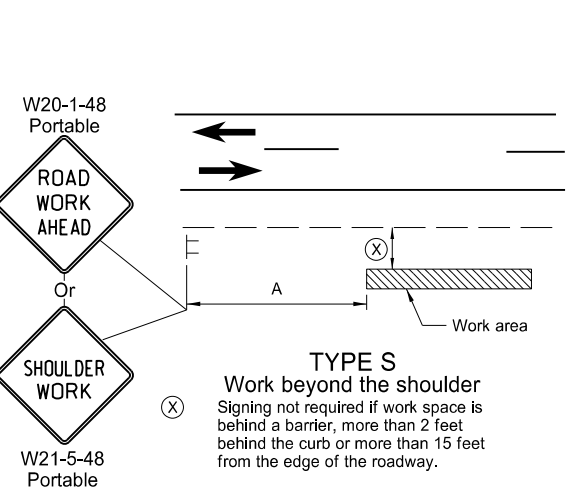
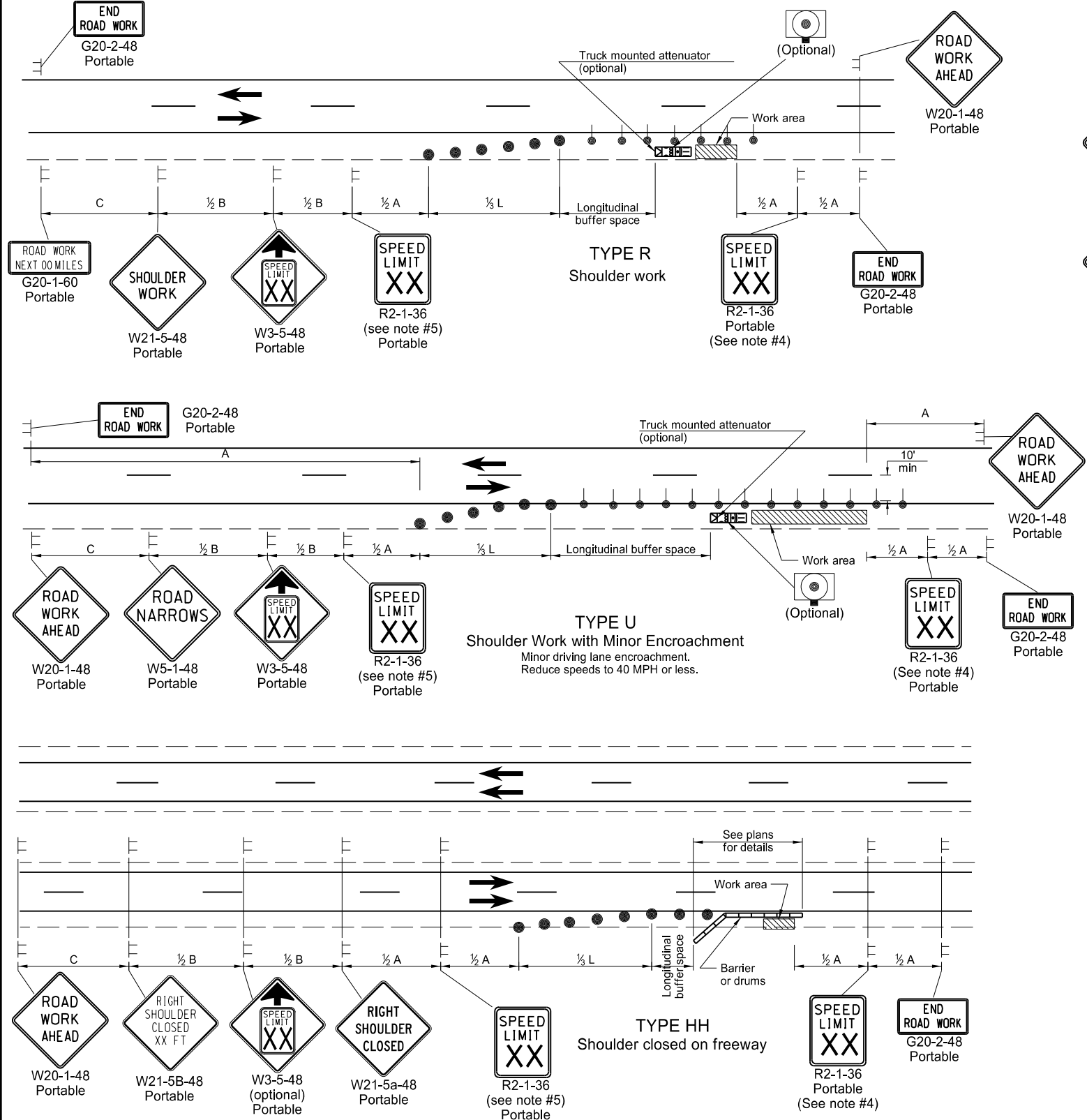
Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

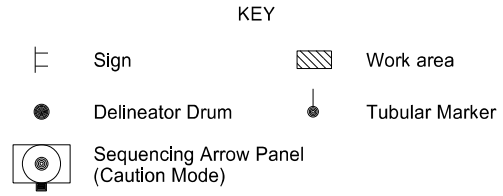
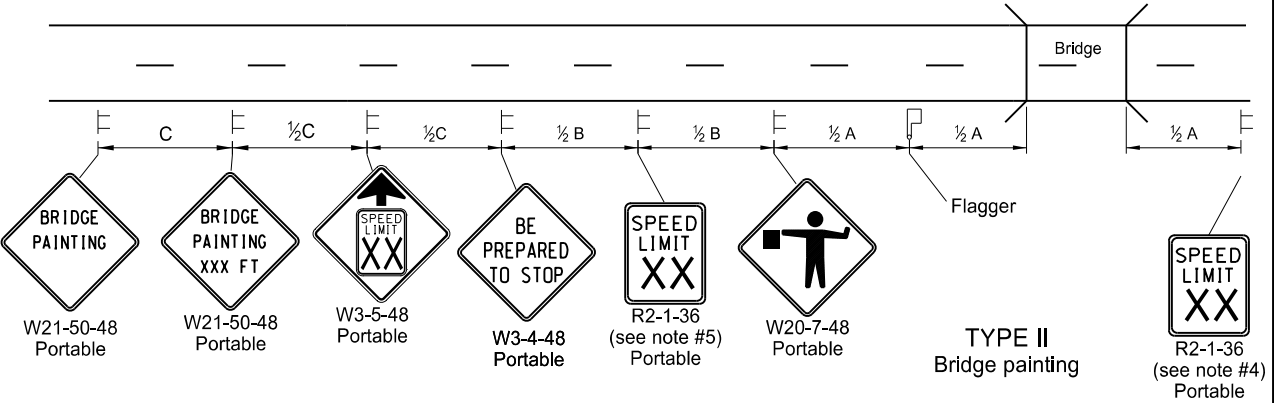
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6.

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SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS



- Notes
- Variables
 - S = Numerical value of speed limit or 85th percentile.
 - W = The width of the taper in feet.
 - L = Minimum length of taper, $S \times W$ for freeways, expressways, and all other roads with speeds of 45 mph or greater, or $W \times S^2 / 60$ for urban, residential, and other streets with speeds of 40 mph or less.
 - Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
 - Sequencing Arrow Panels
 - Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
 - Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
 - Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at $\frac{1}{2}B$.
 - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 - Cover existing speed limit signs within a reduced speed zone.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
 - Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.



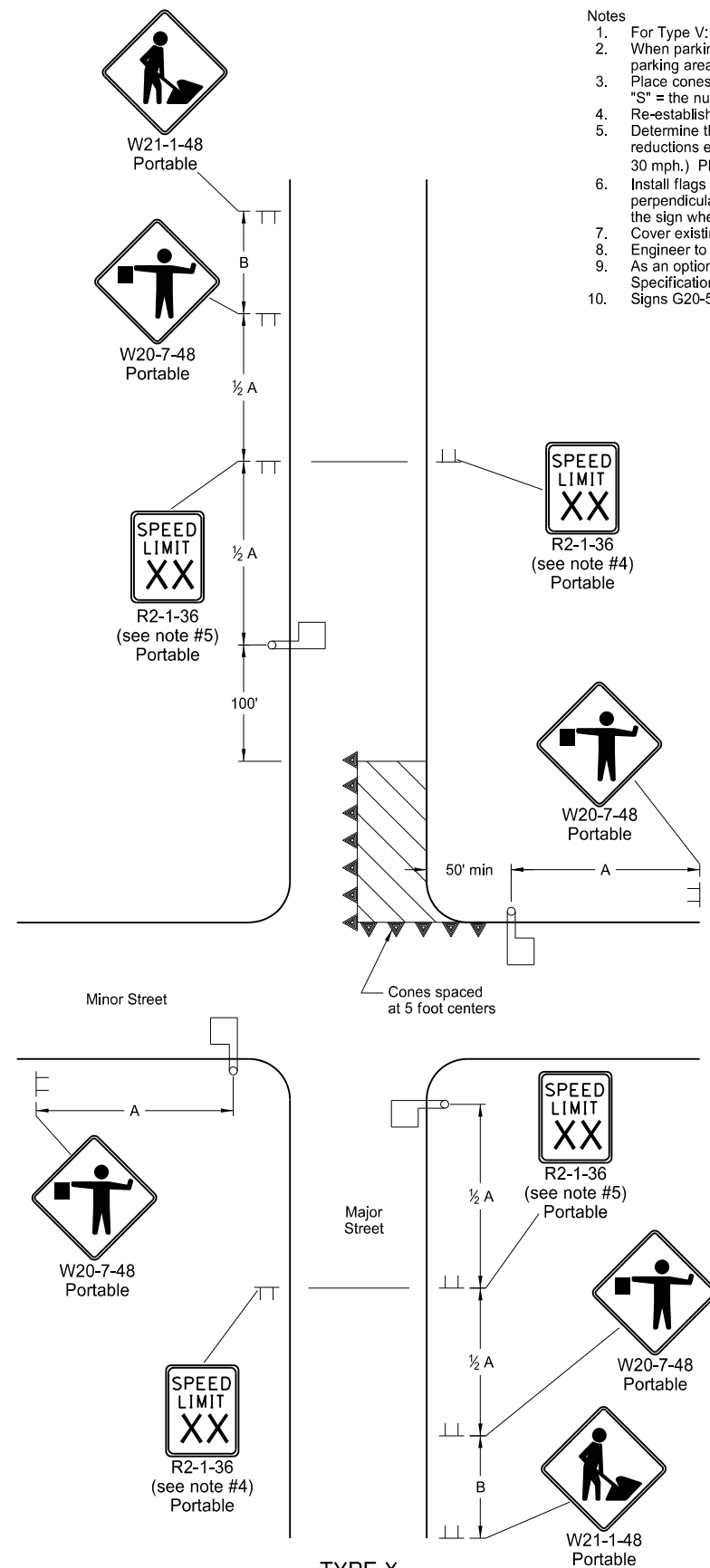
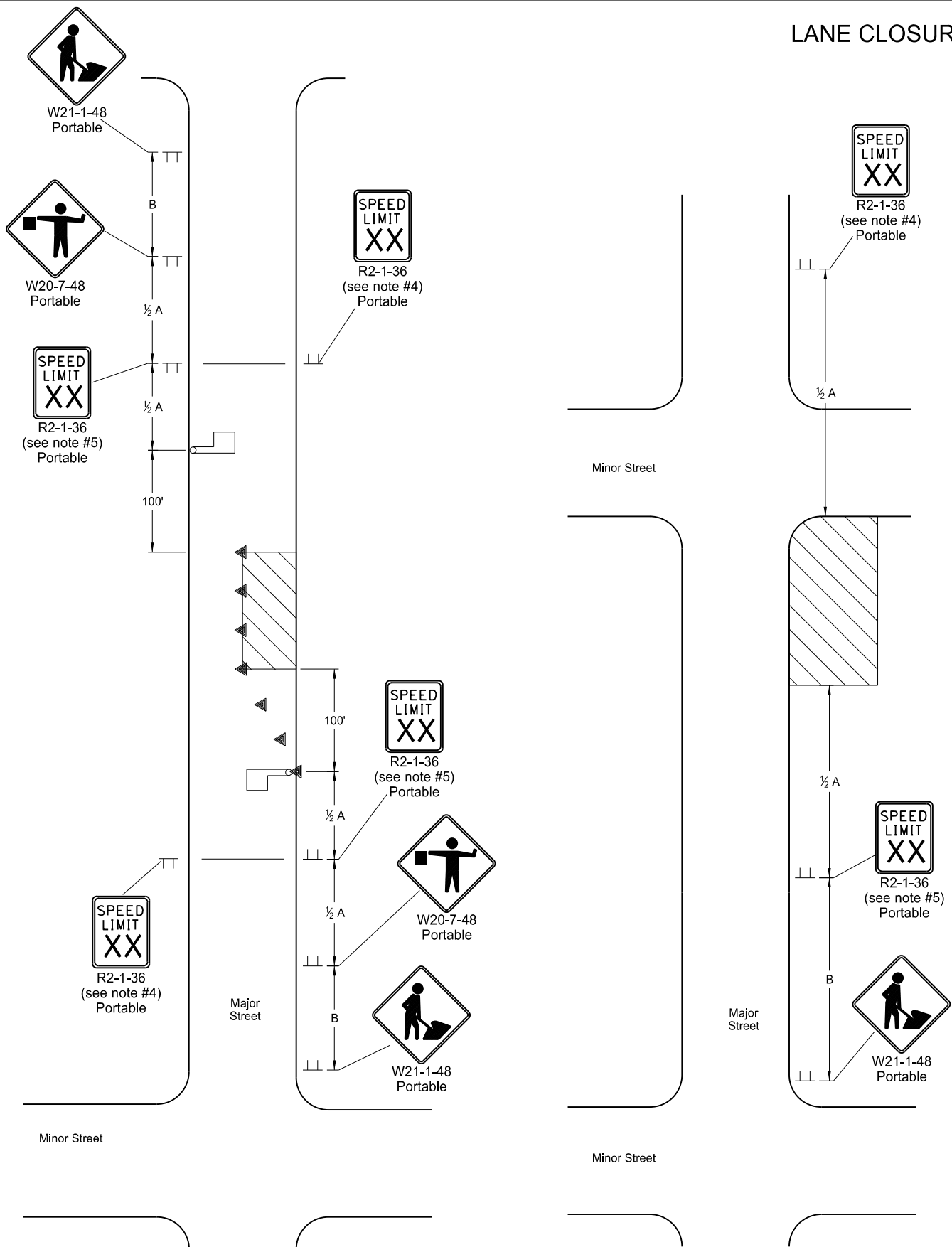
ADVANCE WARNING SIGN SPACING				
Road Type	Distance Between Signs Min. (ft)			
	A	B	C	
Urban - Low Speed (30 mph or less)	150	150	150	
Urban - Low Speed (over 30 to 40 mph)	280	280	280	
Urban - High Speed (over 40 mph to 50 mph)	360	360	360	
Rural - High Speed (over 50 mph to 65 mph)	720	720	720	
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200	
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640	
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500	

Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & revised signs

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Registration Number
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on 08/17/17 and the original document is stored at the
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LANE CLOSURES ON URBAN STREETS LAYOUTS



- Notes
1. For Type V: Work on one side of roadway at a time so as not to block off more than one lane of traffic.
 2. When parking is present, place signs so they are entirely visible above parked vehicles or at the edge of the parking area so they are visible to oncoming traffic. Place signs on portable mounts when located on roadway.
 3. Place cones for tapering traffic at 3 equal spaces and cones for tangents at dimension "S". "S" = the numerical value of speed limit.
 4. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 5. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
 6. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inches square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 7. Cover existing speed limit signs within reduced speed zones.
 8. Engineer to determine safe speed, when necessary.
 9. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
 10. Signs G20-55-96 and R2-1aP-24 are not required for urban projects.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

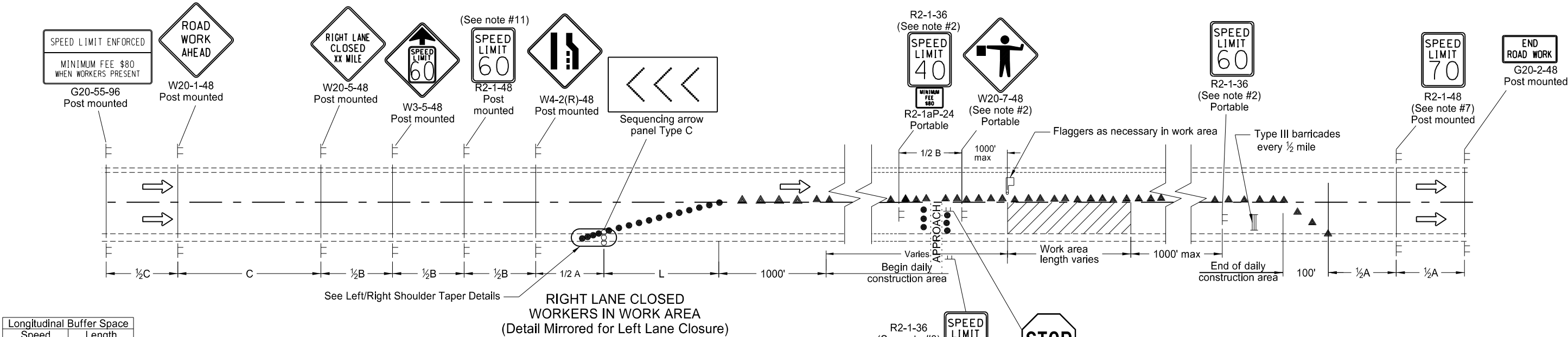
KEY	
	Sign
	Cones
	Work area
	Flagger

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & removed signs

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SIGN LAYOUT FOR ONE LANE CLOSURE

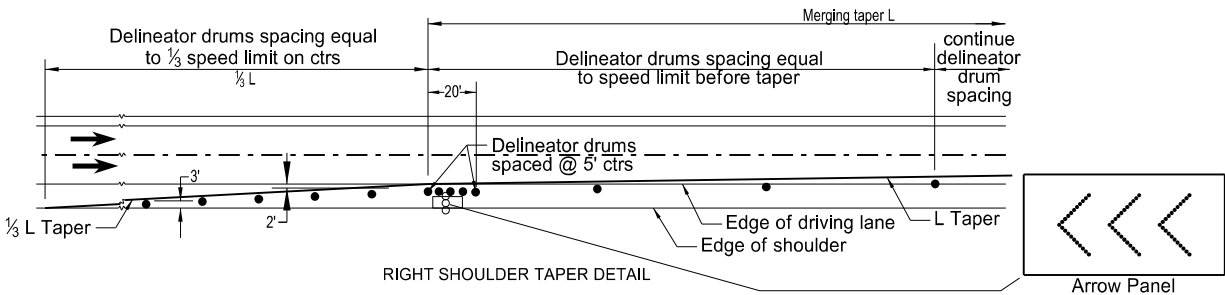
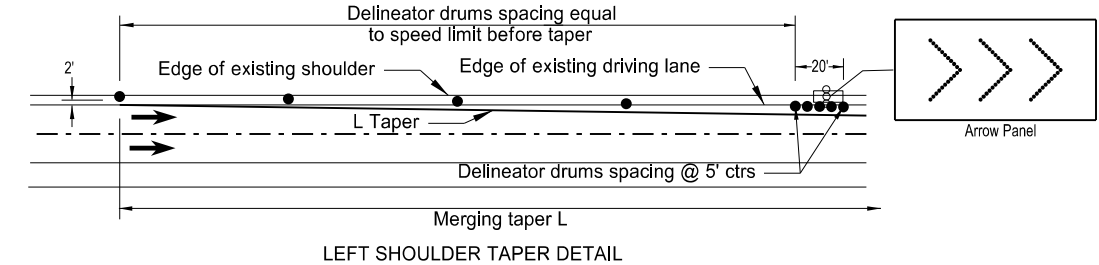
D-704-34



Longitudinal Buffer Space	
Speed (mph)*	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

*Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.

KEY	
	Type I barricade
	Type II barricade
	Type III barricade
	Sign
	Delineator drum
	Work area
	Flagger
	Sequencing arrow panel
	Tubular markers



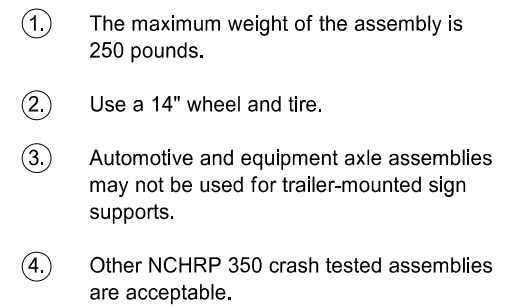
- Notes:
1. Install advance signs for flagging when flaggers are flagging.
 2. Move the advanced flagger sign and speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Place the 40 mph speed limit sign at 1/2 A in advance of the flagger sign and move the 60 mph speed limit sign. Cover or remove the 40 mph speed limit and the Minimum Fee \$80 signs upon completion of the work day or when workers are not present. Determine the exact speed limit in the field, dependent on location and conditions.
 3. Approaches: When the work area encompasses an approach, install a 40 mph speed limit sign to control the approach. Cover the existing stop sign and install a new portable stop sign when the approach is on the side of the lane closure. Remove the approach speed limit sign once the main line 40 mph speed zone is moved past the approach.
 4. Variables:
S=Numerical value of speed limit or 85th percentile
W=The width of taper.
L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or (WxSxS)/60 for urban, residential, and other streets with speeds of 40 mph or less.
 5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".
 6. Place sequencing arrow panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on the roadway surface.
Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
 7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
 8. Cover existing speed limit signs within a reduced speed zone.
 9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 10. Determine the reduced speed limit dependent on the in place speed limit before construction. Where speed limits are to be reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
 11. As an option use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
 12. Sign G20-55-96 is not required if this standard is part of other traffic control layouts or the work is less than 15 days.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-26-2012	
REVISIONS	
DATE	CHANGE
3-15-16	Removed Do Not Pass signs and updated notes
8-17-17	Updated notes & sign nos. & moved Speed Limit signs

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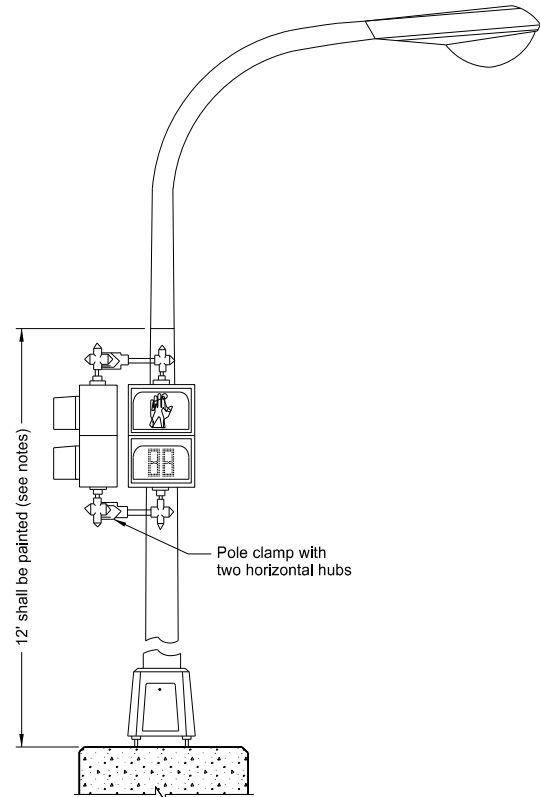
D-704-50



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE

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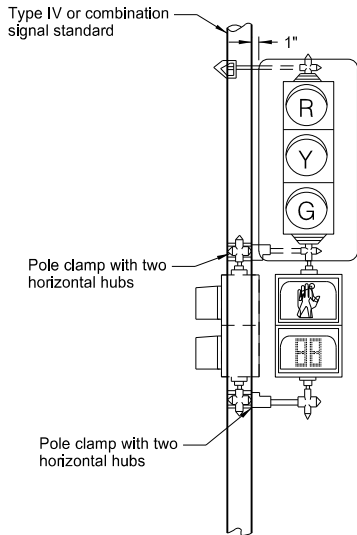
TRAFFIC SIGNAL HEAD MOUNTING



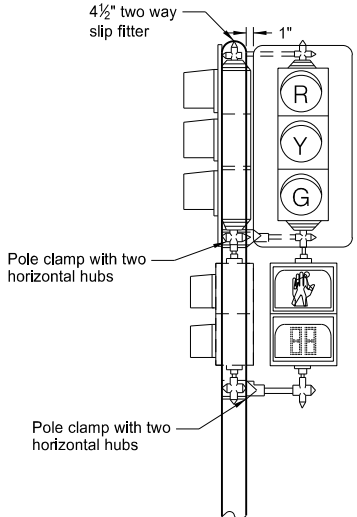
Light Standard Mounted
Pedestrian Signal Head (A)



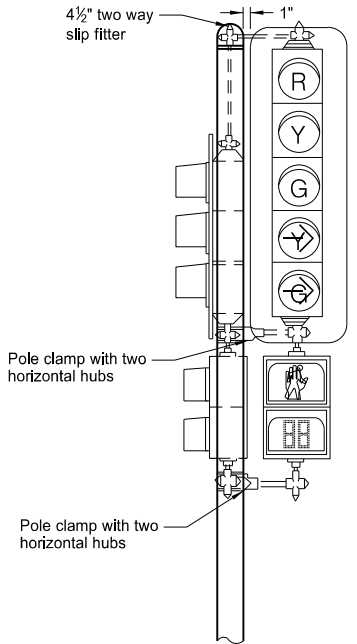
Type II
Pedestal Mounted - Pedestrian (A)



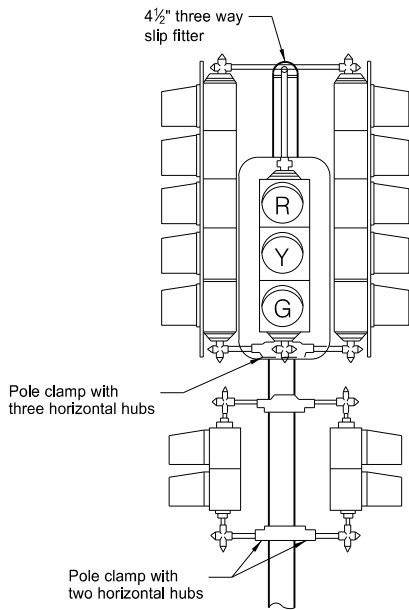
Type IV
Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



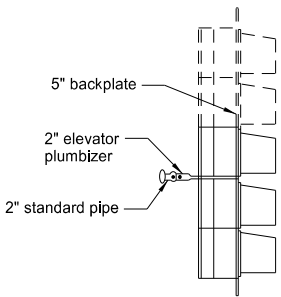
Type V
Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



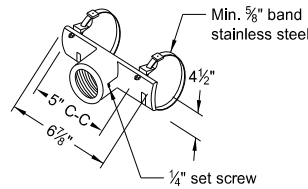
Type VI
Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



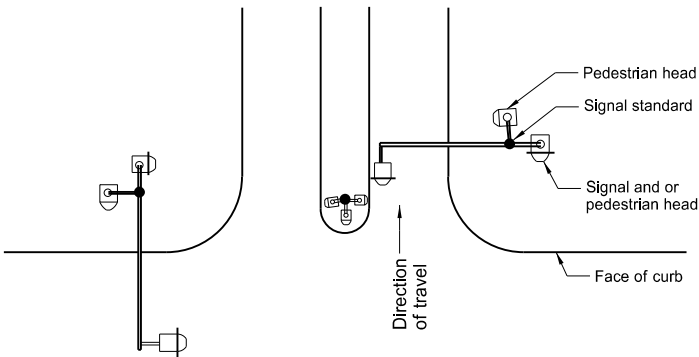
Type VII
Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



Side View
Mid-Span Mounted and
Mast Arm Rigid Mounted
Signal Heads

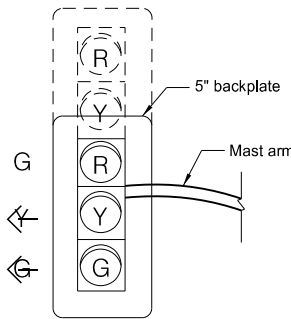


Mast Arm Signal
Head Bracket

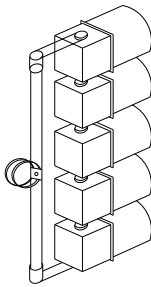


Note: Signal heads shall not protrude over the face of the curb.

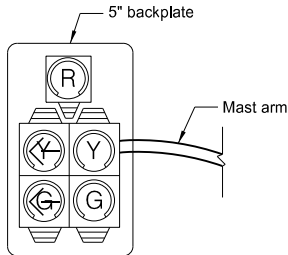
Plan Layout
(typical)



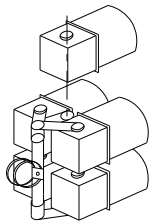
Front View



Isometric View
End Mounted and Mast Arm Rigid Mounted
Signal Heads



Front View



Isometric View

- Notes:
- Reinforcing Plates: Polycarbonate signal heads shall have reinforcing plates installed where the mounting hardware attaches to the signal head. Where a plumbizer is used reinforcing plates shall be placed on each side of the plumbizer.
- Clearance: Clearance from the ground line or sidewalk to the bottom of post or pedestal mounted vehicular signal heads shall be 10 ft. minimum, from pedestrian signal heads shall be 8 ft. minimum.
- Signal Heads: See traffic signal layout for correct mounting position, numbers, size, and arrangement of lenses.
- Pole Clamps: A pole plate with suitable banding material, as approved by the Engineer, may be substituted for the pole clamps. Where traffic signal heads and pedestrian signal heads are mounted one above the other, one pole clamp assembly may be used.
- Paint: Signal housing shall be painted yellow. Backplates shall be painted dull black. Pole clamps and signal head mounting hardware shall be painted the same color as the signal standard shaft.
- When pedestrian heads are light standard mounted, the lower 12 ft. shall be painted the same color as the other traffic signal standards.
- Mounting Details: All signal heads shown are viewed from direction of travel.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-14-13	
REVISIONS	
DATE	CHANGE
7-8-14	Added reinforcing plate note

This document was originally
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Roger Weigel,
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document is stored at the
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