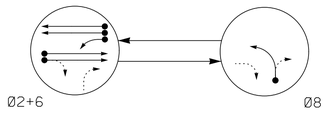
PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.106.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

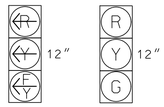
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21,22	G	R	Y
61	~~G~~	~~R~~	~~Y~~
62,63	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



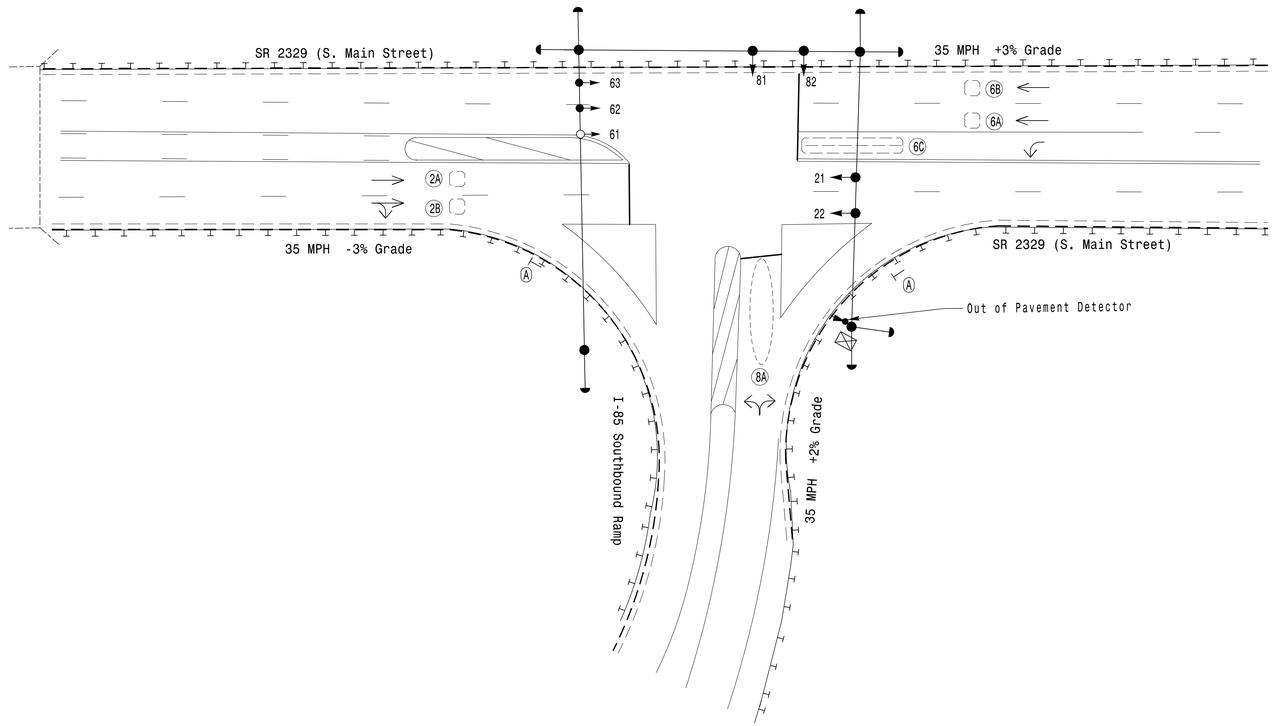
61

21,22
62,63
81,82

DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	70	EXIST	-	2	Yes	-	-	-	N	-	X
2B	6X6	70	EXIST	-	2	Yes	-	-	-	N	-	X
6A	6X6	70	EXIST	-	6	Yes	-	-	-	N	-	X
6B	6X6	70	EXIST	-	6	Yes	-	-	-	N	-	X
6C	6X40	0	2-4-2	-	6	Yes	-	-	-	N	-	X
✳ 8A	N/A	0	N/A	-	8	Yes	-	-	-	N	-	X

✳ Microwave Detection



TIMING CHART

FEATURE	PHASE 2	PHASE 6	PHASE 8
Min Green *	10	10	7
Walk *	-	-	-
Ped Clear	-	-	-
Veh. Extension *	3.0	3.0	3.0
Max 1 *	45	45	25
Yellow	4.1	4.1	3.0
Red Clear	1.8	1.8	2.4
Red Revert	2.0	2.0	2.0
Actuations B4 Add *	-	-	-
Seconds /Actuation *	-	-	-
Max Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Locking Detector	X	X	-
Recall Position	MIN RECALL	MIN RECALL	-
Dual Entry	-	-	-
Simultaneous Gap	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

2 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal heads numbered 62 and 63.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Remove existing "Left Turn Signal" sign-(R10-10L)
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
9. Install new cabinet on the existing cabinet foundation.
10. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
11. Reconnect lead-in cable to separate loops 2A & 2B and 6A & 6B, as shown.
12. Existing signal heads 61 & 62 have been relabeled to 62 & 63, respectively.
13. Existing phase 4 has been changed to phase 8 on this plan. Change all signal heads, pedestrian signal heads, pedestrian push buttons, and detection zones as needed to achieve the phasing shown.
14. City system data:
    Controller Asset #1320.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
	Microwave Detection Area	
	Out of Pavement Detector	
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ

Signal Upgrade

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 2329 (S. Main Street)
at
I-85 Southbound Ramp

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	LL Matney	REVIEWED BY:	KP Baumann

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

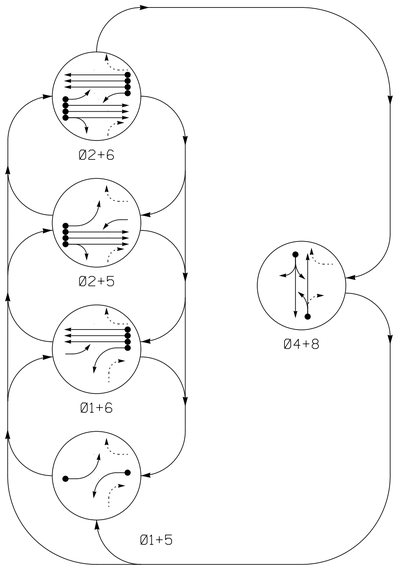
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by:
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
SIGNATURE
3/11/2022
DATE

SIG. INVENTORY NO. 12-1320

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.107.0

DEFAULT PHASING DIAGRAM



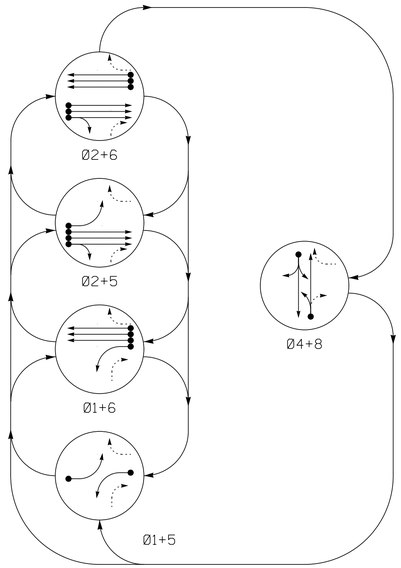
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←●	←●	←FY	←FY	←R	←Y
21, 22, 23	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←●	←FY	←●	←FY	←R	←Y
61, 62, 63	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

ALTERNATE PHASING DIAGRAM

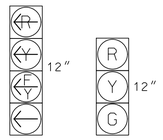


ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←●	←●	←R	←R	←R	←Y
21, 22, 23	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←●	←R	←●	←R	←R	←Y
61, 62, 63	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



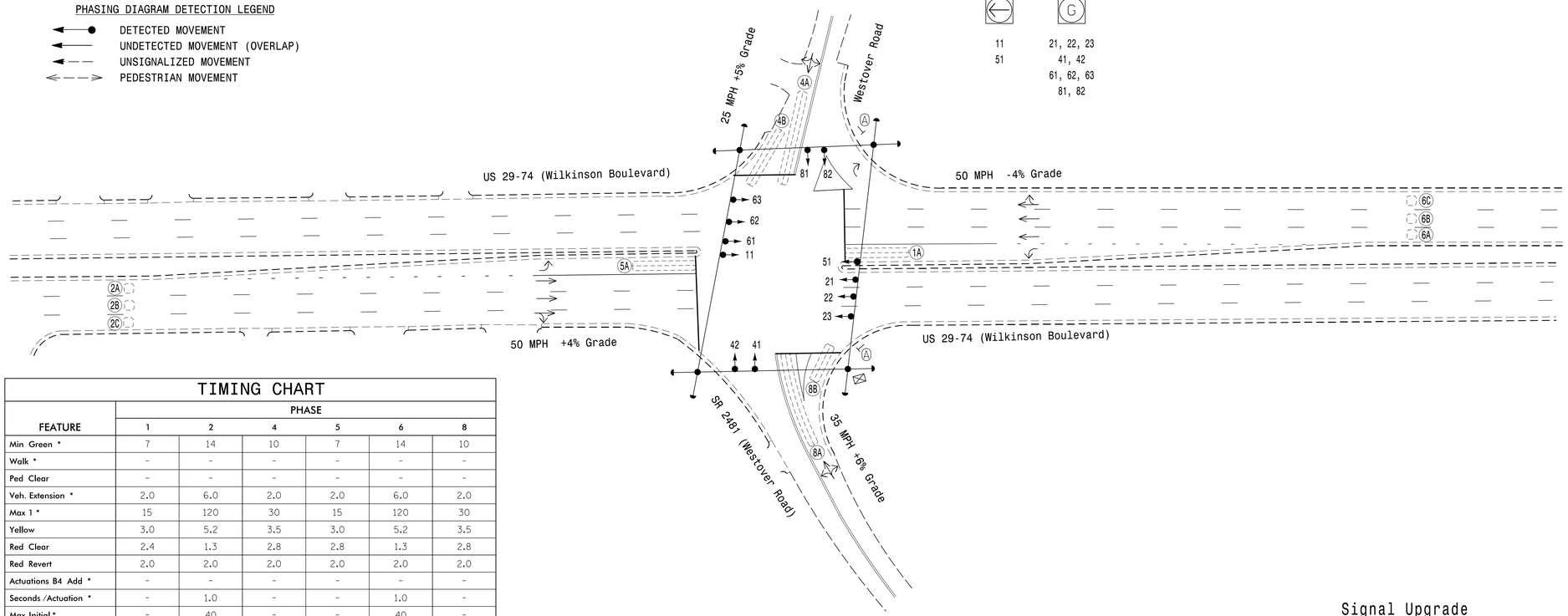
11
51

21, 22, 23
41, 42
61, 62, 63
81, 82

DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Yes	-	15*	-	N	-	X
					6#	Yes	-	3	-	G	-	X
2A	6X6	355	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	355	EXIST	-	2	Yes	-	-	X	N	-	X
2C	6X6	355	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X60	+5	2-4-2	-	4	Yes	-	3	-	N	-	X
4B	6X40	+5	2-4-2	-	4	Yes	-	15	-	N	-	X
5A	6X40	0	2-4-2	-	5	Yes	-	15*	-	N	-	X
					2#	Yes	-	3	-	G	-	X
6A	6X6	355	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	355	EXIST	-	6	Yes	-	-	X	N	-	X
6C	6X6	355	EXIST	-	6	Yes	-	-	X	N	-	X
8A	6X60	+5	2-4-2	-	8	Yes	-	3	-	N	-	X
8B	6X25	+5	2-4-2	-	8	Yes	-	10	-	N	-	X

* Disable delay during Alternate Phasing Operation.
\# Disable phase call for loop during Alternate Phasing operation.



TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	14	10	7	14	10
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	15	120	30	15	120	30
Yellow	3.0	5.2	3.5	3.0	5.2	3.5
Red Clear	2.4	1.3	2.8	2.8	1.3	2.8
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	1.0	-	-	1.0	-
Max Initial *	-	40	-	-	40	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.1	-	-	3.1	-
Locking Detector	-	X	-	-	X	-
Recall Position	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

5 Phase
Fully Actuated
With Alternate Phasing Operation
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. The City Engineer or their representative will determine the hours of use for each phasing plan.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
10. Install new cabinet on the existing cabinet foundation.
11. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
12. City system data:
    Controller Asset #1348

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
▭↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○~	Signal Pole with Sidewalk Guy	●~
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
----------	2-in Underground Conduit	----------
N/A	Right of Way	----------
→	Directional Arrow	→
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ

Signal Upgrade

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared For:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74 (Wilkinson Boulevard)
at
SR 2481 (Westover Road)/
Westover Road

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	SP Pennington	REVIEWED BY:	KP Baumann

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

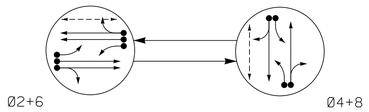
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by:
SDC7084A0B0B447...
3/11/2022
SIGNATURE DATE

SIG. INVENTORY NO. 12-1348

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.108.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

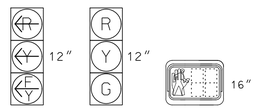
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21	~~FY~~	~~R~~	~~Y~~
22,23	G	R	Y
41,42	R	G	R
61	~~FY~~	~~R~~	~~Y~~
62,63	G	R	Y
81,82	R	G	R
P41,P42	DW	W	DRK
P61,P62	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



21
61

22,23
41,42
62,63
81,82

P41,P42
P61,P62

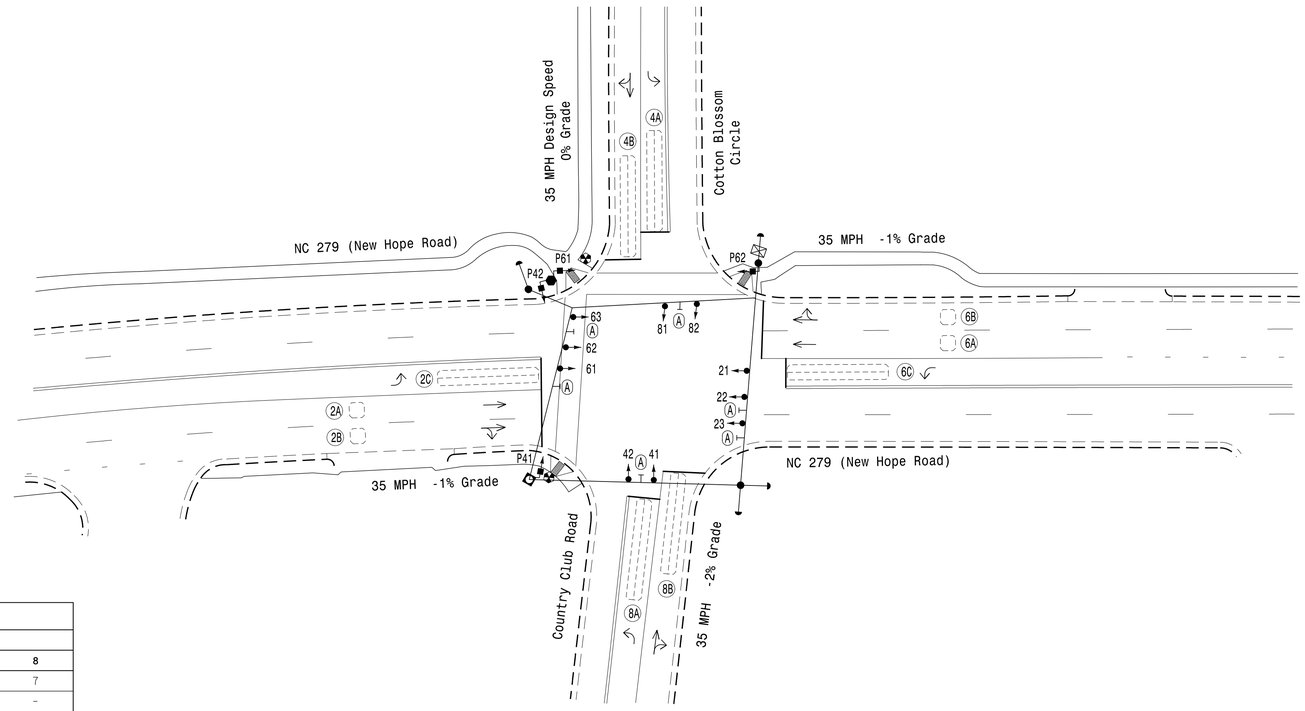
DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	70	EXIST	-	2	Yes	-	-	-	N	-	X
2B	6X6	70	EXIST	-	2	Yes	-	-	-	N	-	X
2C	6X40	0	2-4-2	-	2	Yes	-	-	-	N	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	3	-	N	-	X
4B	6X40	0	2-4-2	-	4	Yes	-	5	-	N	-	X
6A	6X6	70	EXIST	-	6	Yes	-	-	-	N	-	X
6B	6X6	70	EXIST	-	6	Yes	-	-	-	N	-	X
6C	6X40	0	2-4-2	-	6	Yes	-	-	-	N	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	3	-	N	-	X
8B	6X40	0	2-4-2	-	8	Yes	-	5	-	N	-	X

2 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
9. Install new cabinet on the existing cabinet foundation.
10. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
11. Reconnect lead-in cable to separate loops 2A, 2B, 6A, & 6B, as shown.
12. City of system data:
    Controller Asset #1354.



TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	10	7	10	7
Walk *	-	7	7	-
Ped Clear	-	18	15	-
Veh. Extension *	3.0	2.0	3.0	2.0
Max 1 *	45	25	45	25
Yellow	3.9	4.0	3.9	4.0
Red Clear	1.5	1.6	1.5	1.6
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	X	-	X	-
Recall Position	MIN RECALL	-	MIN RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	Metal Strain Pole	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
(A)	Street Name Sign (D3-1)	(A)

Signal Upgrade

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared For:
Transportation Mobility and Safety Division
North Carolina Department of Transportation
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

NC 279 (New Hope Road)
at
Country Club Road /
Cotton Blossom Circle

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	CF Davis	REVIEWED BY:	KP Baumann

SCALE
0 30
1"=30'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

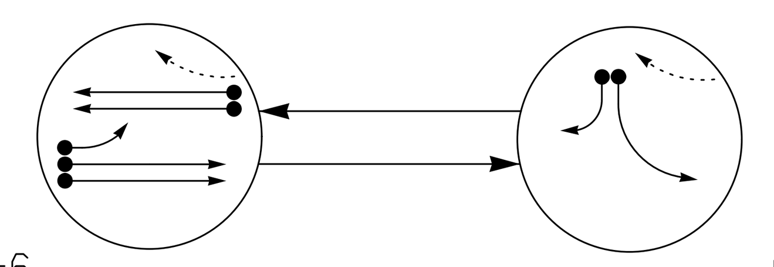
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by:
3/11/2022
DOCUMENTS NOT CONSIDERED FINAL UNLESS SIGNED
DATE

SIG. INVENTORY NO. 12-1354

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.109.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

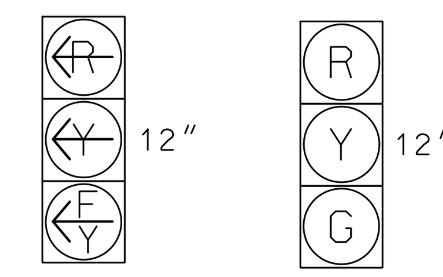
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21	← F/Y	← R	← Y
22,23	G	R	Y
41,42,43	R	G	R
61,62	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



DETECTOR INSTALLATION CHART

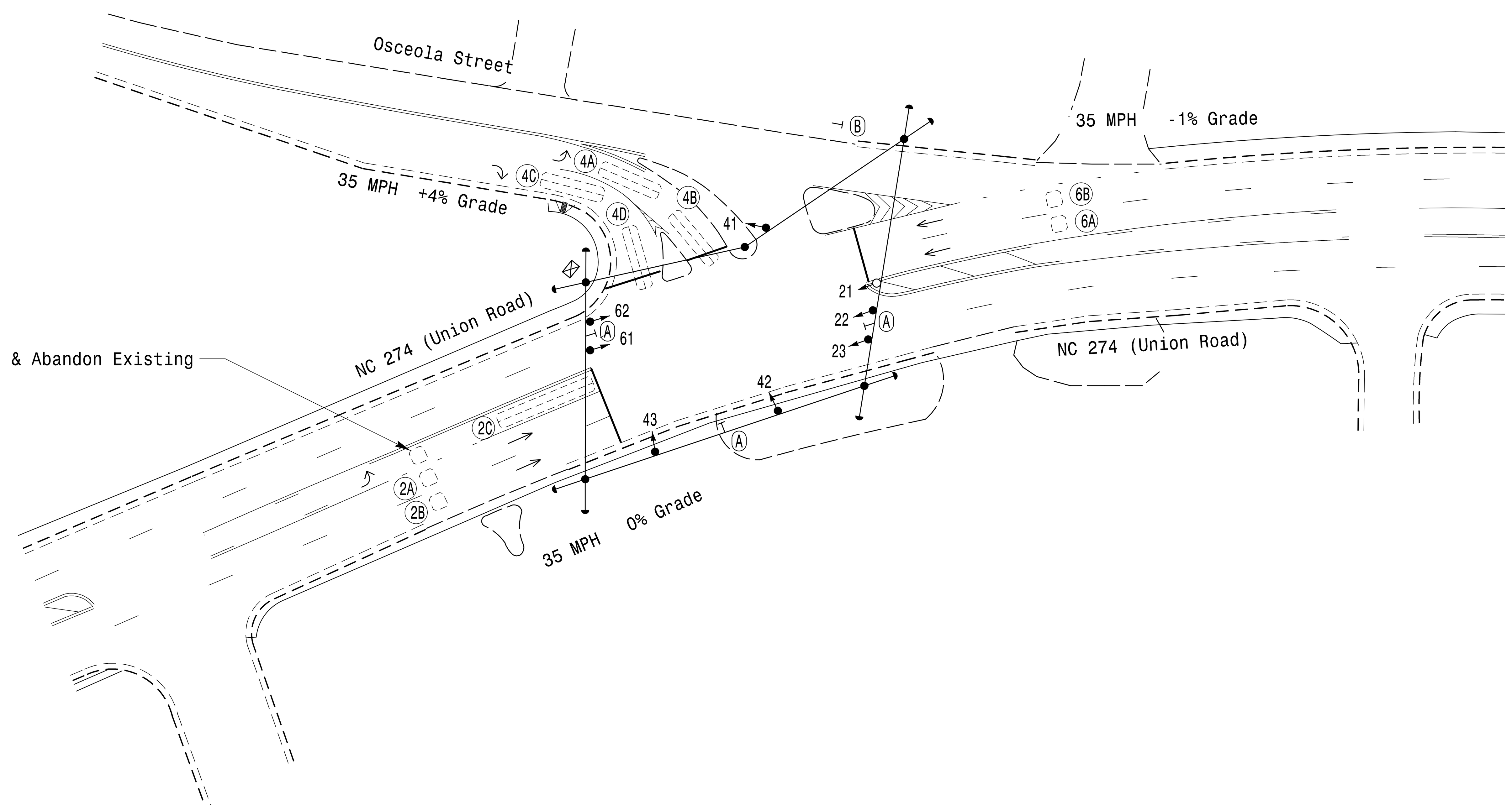
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	70	EXIST	-	2	Yes	-	-	-	N	-	X
2B	6X6	70	EXIST	-	2	Yes	-	-	-	N	-	X
2C	6X40	0	2-4-2	-	2	Yes	-	-	-	N	-	X
4A	6X25	30	2-4-2	-	4	Yes	-	-	-	N	-	X
4B	6X25	+5	2-4-2	-	4	Yes	-	-	-	N	-	X
4C	6X25	30	2-4-2	-	4	Yes	-	10	-	N	-	X
4D	6X25	+5	2-4-2	-	4	Yes	-	15	-	N	-	X
6A	6X6	70	EXIST	-	6	Yes	-	-	-	N	-	X
6B	6X6	70	EXIST	-	6	Yes	-	-	-	N	-	X

(DETECTOR: LOOP through NEW LOOP; PROGRAMMING: PHASE through TYPE)

2 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal heads numbered 22 & 23.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
9. Install new cabinet on the existing cabinet foundation.
10. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
11. Existing loops 2B, 2C, & 2D have been relabeled to 2A, 2B, & 2C, respectively.
12. Reconnect lead-in cable to separate loops 2A, 2B, 4A, 4B, 6A, & 6B, as shown.
13. Existing signal heads 21 & 22 have been relabeled to 22 & 23, respectively.
14. City system data:
    Controller Asset #1358.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
(A)	Street Name Sign (D3-1)	(A)
(B)	"YIELD" Sign (R1-2)	(B)

TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green *	10	7	10
Walk *	-	-	-
Ped Clear	-	-	-
Veh. Extension *	3.0	1.0	3.0
Max 1 *	45	25	45
Yellow	3.9	3.0	3.9
Red Clear	2.7	2.3	2.7
Red Revert	2.0	2.0	2.0
Actuations B4 Add *	-	-	-
Seconds /Actuation *	-	-	-
Max Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Locking Detector	X	-	X
Recall Position	MIN RECALL	-	MIN RECALL
Dual Entry	-	-	-
Simultaneous Gap	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

3/9/2022 11:16:36 AM Danielle.Curri **kimley-horn.com*SE_RAL1*RAL_TPTO*_ITS*011036569 Gastonia Signal System*9 Signals*S4 - Signal Design*F121358-2021.dgn

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Signal Upgrade

Prepared For: Transportation Mobility and Safety Division, Signal Design Section, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40 1"=40'

NC 274 (Union Road) at Osceola Street

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	CF Davis	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

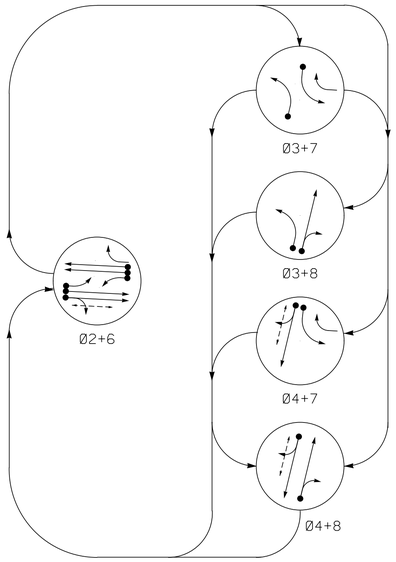
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 5DC709A86BCB447... SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1358

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.110.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

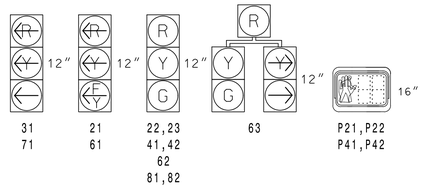
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
21	~~FY~~	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
22, 23	G	R	R	R	R	Y
31	~~R~~	~~←~~	~~←~~	~~R~~	~~R~~	~~R~~
41, 42	R	R	R	G	G	R
61	~~FY~~	~~R~~	~~R~~	~~R~~	~~R~~	~~Y~~
62	G	R	R	R	R	Y
63	G	~~R~~	R	~~R~~	R	Y
71	~~R~~	~~←~~	~~R~~	~~←~~	~~R~~	~~R~~
81, 82	R	R	G	R	G	R
P21, P22	W	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	W	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



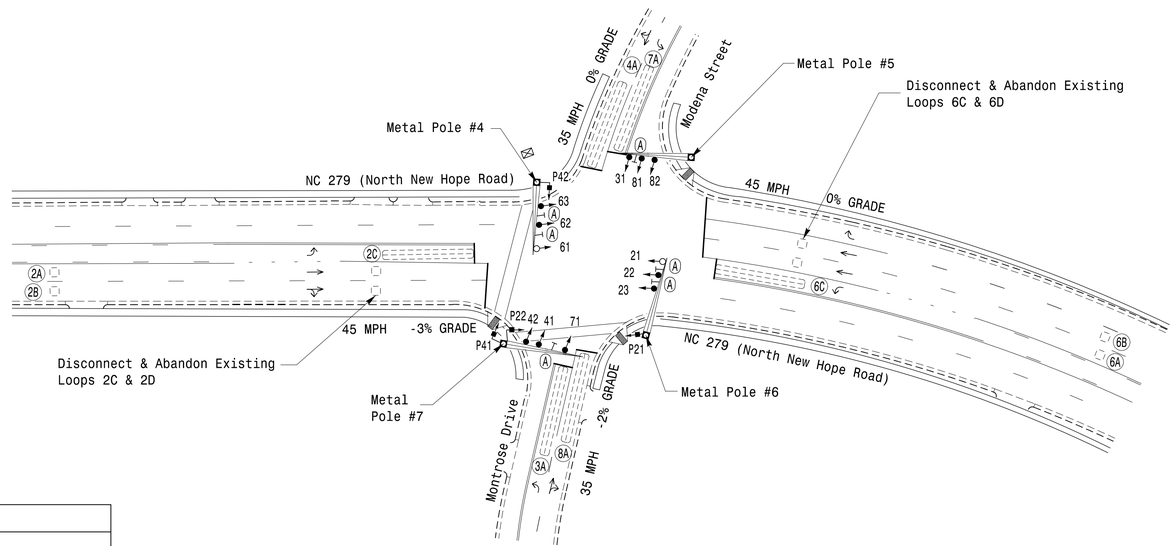
DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2C	6X60	0	2-4-2	-	2	Yes	-	-	-	G	-	X
3A	6X60	0	2-4-2	-	3	Yes	-	3	-	N	-	X
4A	6X60	0	2-4-2	-	4	Yes	-	10	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6C	6X60	0	2-4-2	-	6	Yes	-	-	-	G	-	X
7A	6X60	0	2-4-2	-	7	Yes	-	3	-	N	-	X
8A	6X60	0	2-4-2	-	8	Yes	-	10	-	N	-	X

5 Phase Fully Actuated Gastonia Signal Sysem

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 3 and/or phase 7 may be lagged.
4. Reposition existing signal heads numbered 22, 23, 62, & 63.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
12. Disconnect and abandon existing loops 2C, 2D, 6C, & 6D.
13. Install new cabinet on the existing cabinet foundation.
14. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
15. Existing signal heads 21 & 22 have been relabeled to 22 & 23, respectively.
16. Existing loops 2E & 6E have been relabeled to 2C & 6C, respectively.
17. Do NOT install backplates on Metal Pole #6.
18. City system data:
    Controller Asset #1373



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Metal Pole with Mastarm	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Street Name Sign (D3-1)	Ⓐ

TIMING CHART

FEATURE	PHASE 2	3	4	6	7	8
Min Green *	12	7	7	12	7	7
Walk *	7	-	7	-	-	-
Ped Clear	17	-	20	-	-	-
Veh. Extension *	6.0	1.0	1.0	6.0	1.0	1.0
Max 1 *	60	15	30	60	15	30
Yellow	4.8	3.0	3.8	4.8	3.0	4.0
Red Clear	2.0	3.1	2.3	2.0	2.6	2.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	1.5	-	-	1.5	-	-
Max Initial *	34	-	-	34	-	-
Time Before Reduction *	15	-	-	15	-	-
Time To Reduce *	30	-	-	30	-	-
Minimum Gap	3.0	-	-	3.0	-	-
Locking Detector	X	-	-	X	-	-
Recall Position	MIN RECALL	-	-	MIN RECALL	-	-
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared For:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

NC 279 (N. New Hope Road) at Modena Street / Montrose Drive

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	EE Dogbe	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

SCALE 0 50 1"=50'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

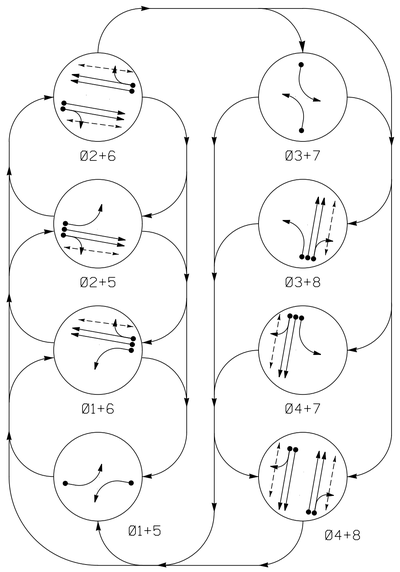
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 3/11/2022
DOCUMENTS ONLY SIGNATURE DATE

SIG. INVENTORY NO. 12-1373

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.111.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

EV PREEMPT PHASES

(Medium Priority)

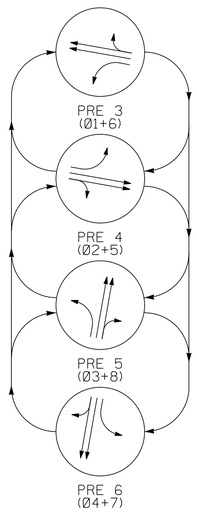


TABLE OF OPERATION

SIGNAL FACE	PHASE 1+5	1+6	2+5	2+6	3+7	3+8	4+7	4+8	PRE 3	PRE 4	PRE 5	PRE 6	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	R	R	R	R	G	R	R	Y
31	~~R~~	~~R~~	~~R~~	~~R~~	←	←	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	~~R~~
41, 42	R	R	R	R	R	R	G	G	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	~~R~~	~~R~~
61,62	R	G	R	G	R	R	R	R	G	R	R	R	Y
71	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~	←	~~R~~	~~R~~	~~R~~	~~R~~	←	~~R~~
81,82	R	R	R	R	R	G	R	G	R	R	G	R	R
P21, P22	DW	DW	W	W	DW	DW	DW	DW	DW	DW	DW	DW	DRK
P41, P42	DW	DW	DW	DW	DW	DW	W	W	DW	DW	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DW	DW	DW	DW	DW	DW	DRK
P81, P82	DW	DW	DW	DW	DW	W	DW	W	DW	DW	DW	DW	DRK

DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	+5	2-4-2	-	1	Yes	-	-	-	N	-	X
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
3A	6X60	+5	2-4-2	-	3	Yes	-	-	-	N	-	X
4A	6X6	300	EXIST	-	4	NO	3.1	-	-	N	-	X
4B	6X6	300	EXIST	-	4	NO	3.1	-	-	N	-	X
4C	6X60	+5	2-4-2	-	4	Yes	-	-	-	N	-	X
4D	6X60	+5	2-4-2	-	4	Yes	-	-	-	N	-	X
5A	6X60	+5	2-4-2	-	5	Yes	-	-	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
7A	6X60	+5	2-4-2	-	7	Yes	-	-	-	N	-	X
8A	6X6	300	EXIST	-	8	NO	3.1	-	-	N	-	X
8B	6X6	300	EXIST	-	8	NO	3.1	-	-	N	-	X
8C	6X60	+5	EXIST	-	8	Yes	-	-	-	N	-	X
8D	6X60	+5	EXIST	-	8	Yes	-	-	-	N	-	X

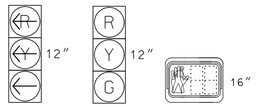
8 Phase
Fully Actuated w/
Emergency Vehicle Preemption
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Reposition existing signal heads numbered 41 & 42.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
10. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
11. Pavement markings are existing.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
13. Disconnect and abandon existing loops 2C, 2D, 6C and 6D.
14. Install new cabinet on the existing cabinet foundation.
15. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
16. Reconnect lead-in cable to separate loops 4A, 4B, 8A, & 8B, as shown.
17. Install GPS emergency preemption system per manufacturer's instructions to achieve preemption needed, as shown in phasing diagram.
18. All proposed pedestrian signal heads shall be black in color. See Project Special Provisions for details.
19. All proposed pedestrian pedestals and pushbutton posts shall be black in color. See Project Special Provisions for details.
20. City system data:
    Controller Asset #1378.

SIGNAL FACE I.D.

All Heads L.E.D.



11	21,22	P21,P22
31	41,42	P41,P42
51	61,62	P61,P62
71	81,82	P81,P82

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
⬡	Type II Signal Pedestal	⬢
○─	Signal Pole with Guy	●─
○─	Signal Pole with Sidewalk Guy	●─
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	———
→	Directional Arrow	→
Ⓐ	Street Name Sign (D3-1)	Ⓐ

TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	-	4	-	4	-	4	-	4
Ped Clear	-	19	-	23	-	20	-	20
Veh. Extension *	1.0	6.0	1.0	1.0	1.0	6.0	1.0	1.0
Max 1 *	15	45	15	30	15	45	15	30
Yellow	3.0	4.6	3.0	4.7	3.0	4.4	3.0	4.3
Red Clear	3.1	1.6	2.6	1.5	2.9	1.4	2.6	1.5
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	35	-	-	-	35	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

EV PREEMPT

FUNCTION	PRE 3	PRE 4	PRE 5	PRE 6
Exit Phase(s)	2+6	2+6	4+8	4+8
Preempt Override	OFF	OFF	OFF	OFF
Delay Time	0	0	0	0
Ped Clear Through Yellow	Y	Y	Y	Y
Terminate Phases	N	N	N	N
Entrance Walk	1	1	1	1
Entrance Ped Clear	255*	255*	255*	255*
Entrance Min Green	1	1	1	1
Entrance Yellow Change	25.5*	25.5*	25.5*	25.5*
Entrance Red Clear	25.5*	25.5*	25.5*	25.5*
Minimum Dwell Time	7	7	7	7
Preempt Input Extension Time **	2	2	2	2
Preempt Max Time	120	120	120	120
Exit Yellow Change	25.5*	25.5*	25.5*	25.5*
Exit Red Clear	25.5*	25.5*	25.5*	25.5*

* Time defaults to time used for phase during normal operation
** Program Timing on GPS Detection Unit

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Signal Upgrade

Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1255 (Hudson Boulevard) at SR 2457 (Robinwood Drive)

Division 12 Gaston County Gastonia

PLAN DATE: May 2021 REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington REVIEWED BY: KP Baumann

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

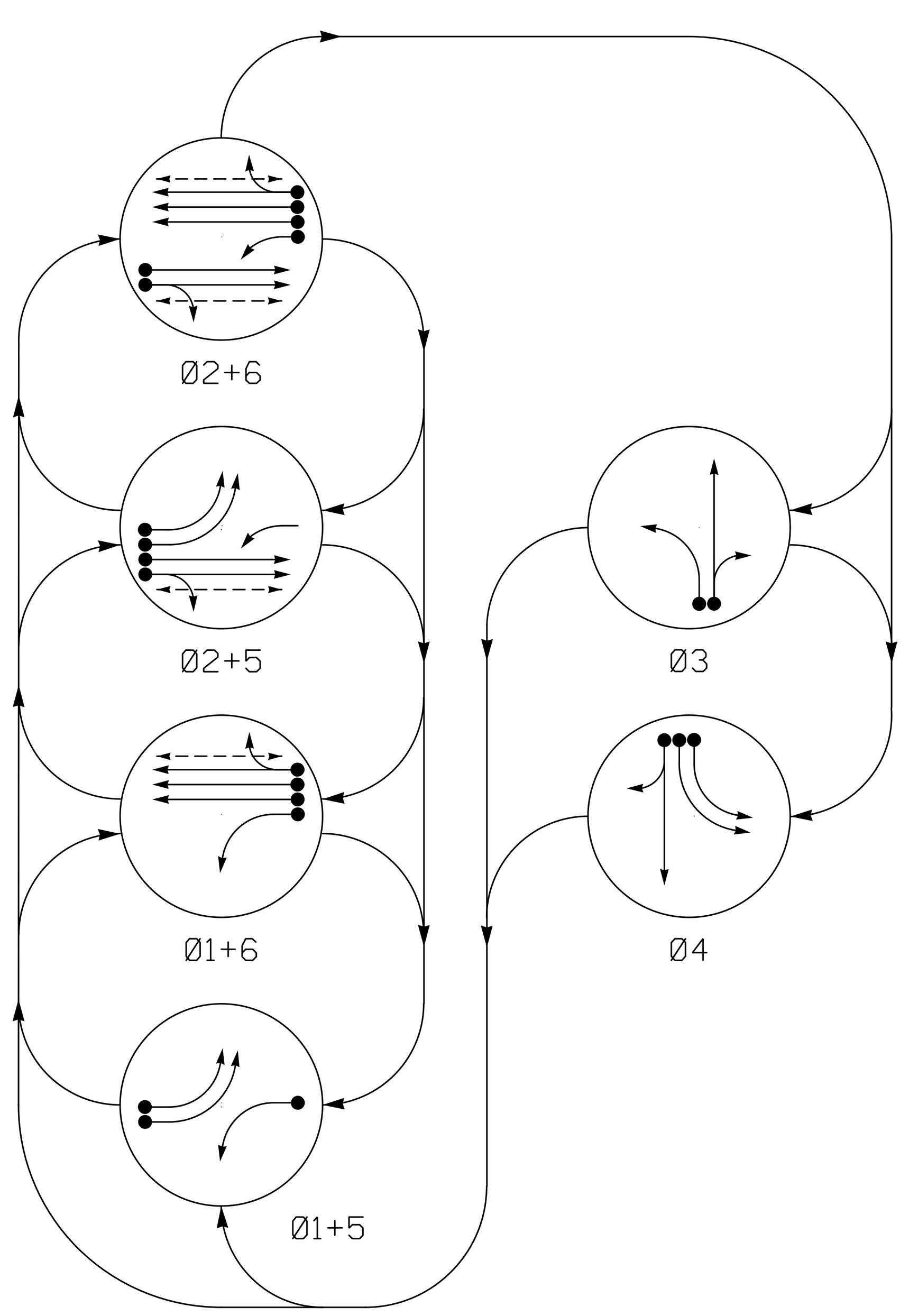
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 3/11/2022
GOVERNMENT SIGNATURE DATE

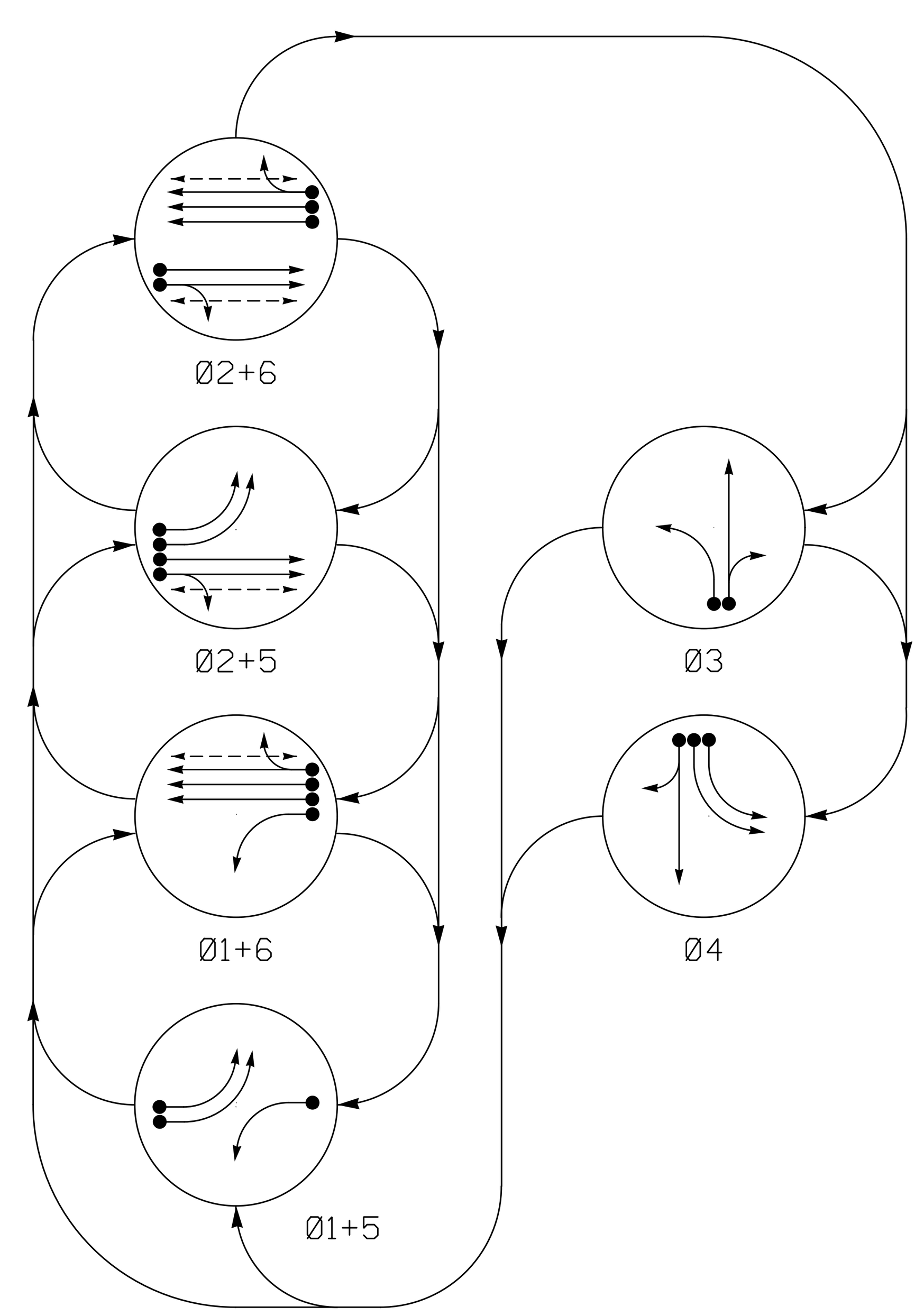
SIG. INVENTORY NO. 12-1378

3/9/2022 11:14:46 AM Danielle.Curri
\\kimley-horn.com\SE_RAL1\RAL_TPTO_ITS\011036569 Gastonia Signal System\Signals\54 - Signal Design\012378-2021.dgn

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	←F/Y	←F/Y	←R	←R	←Y
21, 22	R	R	G	G	R	R	Y
31	R	R	R	R	G/←	R	R
32	R	R	R	R	G	R	R
41, 42	←R	←R	←R	←R	←R	←	←R
43, 44	R	R	R	R	R	G	R
51, 52	←	←R	←	←R	←R	←R	←R
61, 62, 63	R	G	R	G	R	R	Y
P21, P22	DW	DW	W	W	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←	←	←R	←R	←R	←R	←Y
21, 22	R	R	G	G	R	R	Y
31	R	R	R	R	G/←	R	R
32	R	R	R	R	G	R	R
41, 42	←R	←R	←R	←R	←R	←	←R
43, 44	R	R	R	R	R	G	R
51, 52	←	←R	←	←R	←R	←R	←R
61, 62, 63	R	G	R	G	R	R	Y
P21, P22	DW	DW	W	W	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DW	DRK

DETECTOR INSTALLATION CHART

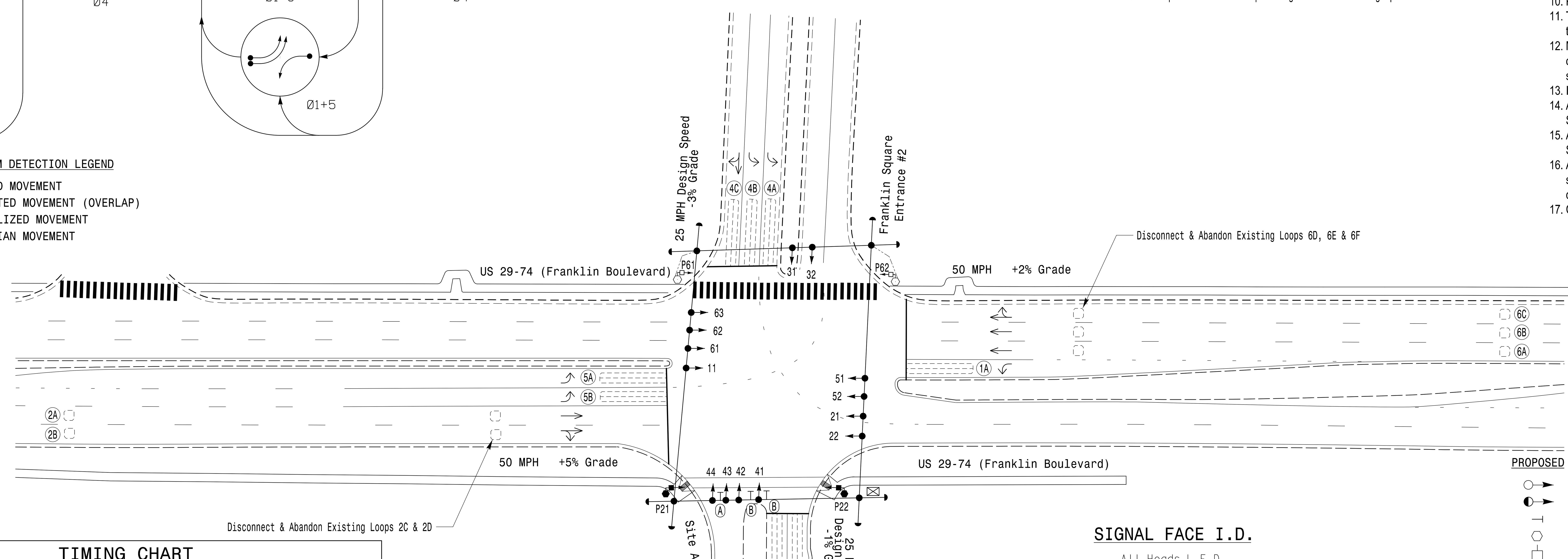
DETECTOR: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING: PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Yes	-	5*	-	N	-	X
					6#	Yes	-	3	-	G	-	X
2A	6X6	355	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	355	EXIST	-	2	Yes	-	-	X	N	-	X
3A	6X40	0	2-4-2	-	3	Yes	-	-	-	N	-	X
3B	6X40	0	2-4-2	-	3	Yes	-	-	-	N	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	N	-	X
4B	6X40	0	2-4-2	-	4	Yes	-	-	-	N	-	X
4C	6X40	0	2-4-2	-	4	Yes	-	-	-	N	-	X
5A	6X40	0	2-4-2	-	5	Yes	-	-	-	N	-	X
5B	6X40	0	2-4-2	-	5	Yes	-	-	-	N	-	X
6A	6X6	355	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	355	EXIST	-	6	Yes	-	-	X	N	-	X
6C	6X6	355	EXIST	-	6	Yes	-	-	X	N	-	X

* Disable delay during Alternate Phasing Operation.
# Disable phase call for loop during Alternate Phasing Operation.

6 Phase Fully Actuated w/ Alternate Phasing Operation Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Disconnect & abandon existing loops 2C, 2D, 6D, 6E and 6F.
6. Set all detector units to presence mode.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing.
11. The City Engineer or their representative will determine the hours of use for each phasing plan.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
13. Install new cabinet on the existing cabinet foundation.
14. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
15. All proposed pedestrian signal heads shall be black in color. See Project Special Provision for details.
16. All proposed pedestrian pedestals and pushbutton posts shall be black in color. See Project Special Provisions for details.
17. City system data:
    Controller Asset #1401



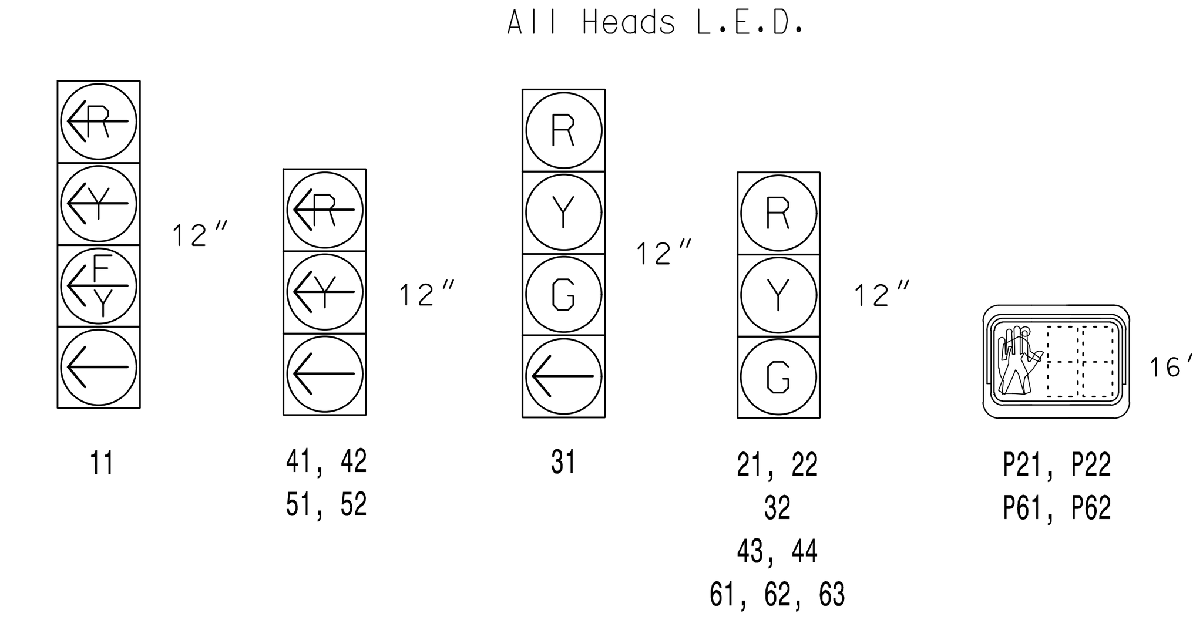
TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green *	7	14	7	7	7	14
Walk *	-	7	-	-	-	7
Ped Clear	-	19	-	-	-	34
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0
Max 1 *	20	60	25	25	20	60
Yellow	3.0	4.6	3.2	3.3	3.0	4.6
Red Clear	3.7	2.1	3.3	3.3	3.5	2.1
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.0
Max Initial *	-	40	-	-	-	40
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.1	-	-	-	3.1
Locking Detector	-	X	-	-	-	X
Recall Position	-	MIN RECALL	-	-	-	MIN RECALL
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

SIGNAL FACE I.D.

All Heads L.E.D.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Type II Signal Pedestal	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Wheelchair Ramp	
(A)	Street Name Sign (D3-1)	(A)
(B)	Left Turn "ONLY" Sign (R3-5L)	(B)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Signal Upgrade

Prepared For: Transportation Mobility and Safety Division, State of North Carolina Department of Transportation, Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF: Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

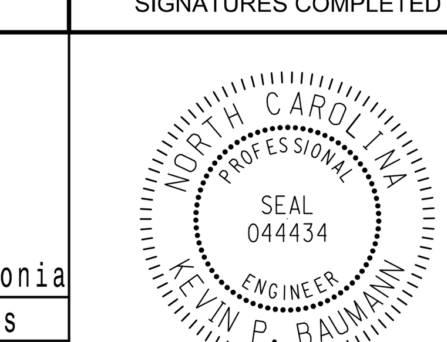
SCALE 0 40 1"=40'

US 29-74 (Franklin Blvd.) at Franklin Square Entrance #2/ Site Access

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	SP Pennington	REVIEWED BY:	KP Baumann

REVISIONS | INIT. | DATE

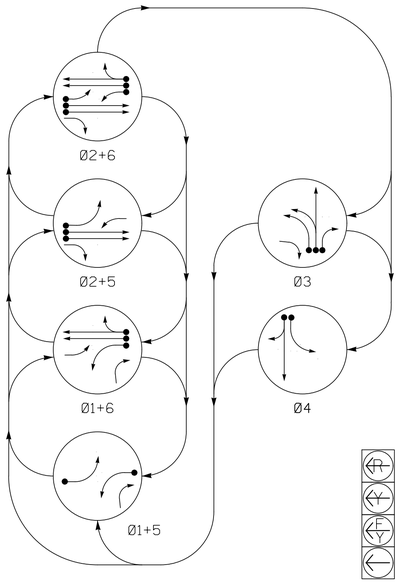


DocuSigned by: SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1401

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.113.0

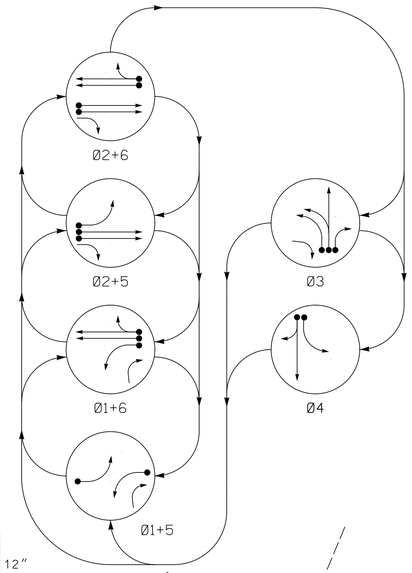
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←Y	←Y	F.Y	F.Y	←R	←R	←Y
21	R	R	G	G	R	R	Y
22	R	R	G	G	R/→	R	Y
31	R	R	R	R	G←	R	R
32	R/→	R/→	R	R	G	R	R
41	R	R	R	R	R	G←	R
42	R	R	R	R	R	G	R
51	←F.Y		F.Y		←R	←R	←Y
61, 62	R	G	R	G	R	R	Y

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3	Ø4	FLASH
11	←Y	←Y	←R	←R	←R	←R	←Y
21	R	R	G	G	R	R	Y
22	R	R	G	G	R/→	R	Y
31	R	R	R	R	G←	R	R
32	R/→	R/→	R	R	G	R	R
41	R	R	R	R	R	G←	R
42	R	R	R	R	R	G	R
51	←Y	←R	←Y	←R	←R	←R	←Y
61, 62	R	G	R	G	R	R	Y

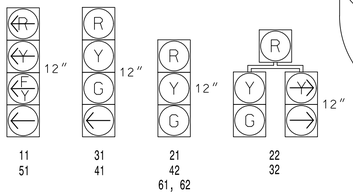
DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	+20	2-4-2	-	1	Yes	-	15*	-	N	-	X
					6#	Yes	-	-	-	N	-	X
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
3A	6X60	+5	2-4-2	-	3	Yes	-	3	-	N	-	X
3B	6X60	+5	2-4-2	-	3	Yes	-	-	-	N	-	X
3C	6X60	+5	2-4-2	-	3	Yes	-	10	-	N	-	X
4A	6X30	+5	2-4-2	-	4	Yes	-	3	-	N	-	X
4B	6X60	+5	2-4-2	-	4	Yes	-	10	-	N	-	X
5A	6X60	+5	2-4-2	-	5	Yes	-	15*	-	N	-	X
					2#	Yes	-	-	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X

* Reduce delay to 3 seconds during Alternate Phasing Operation.
\# Disable Phase call for loop during Alternate Phasing Operation.

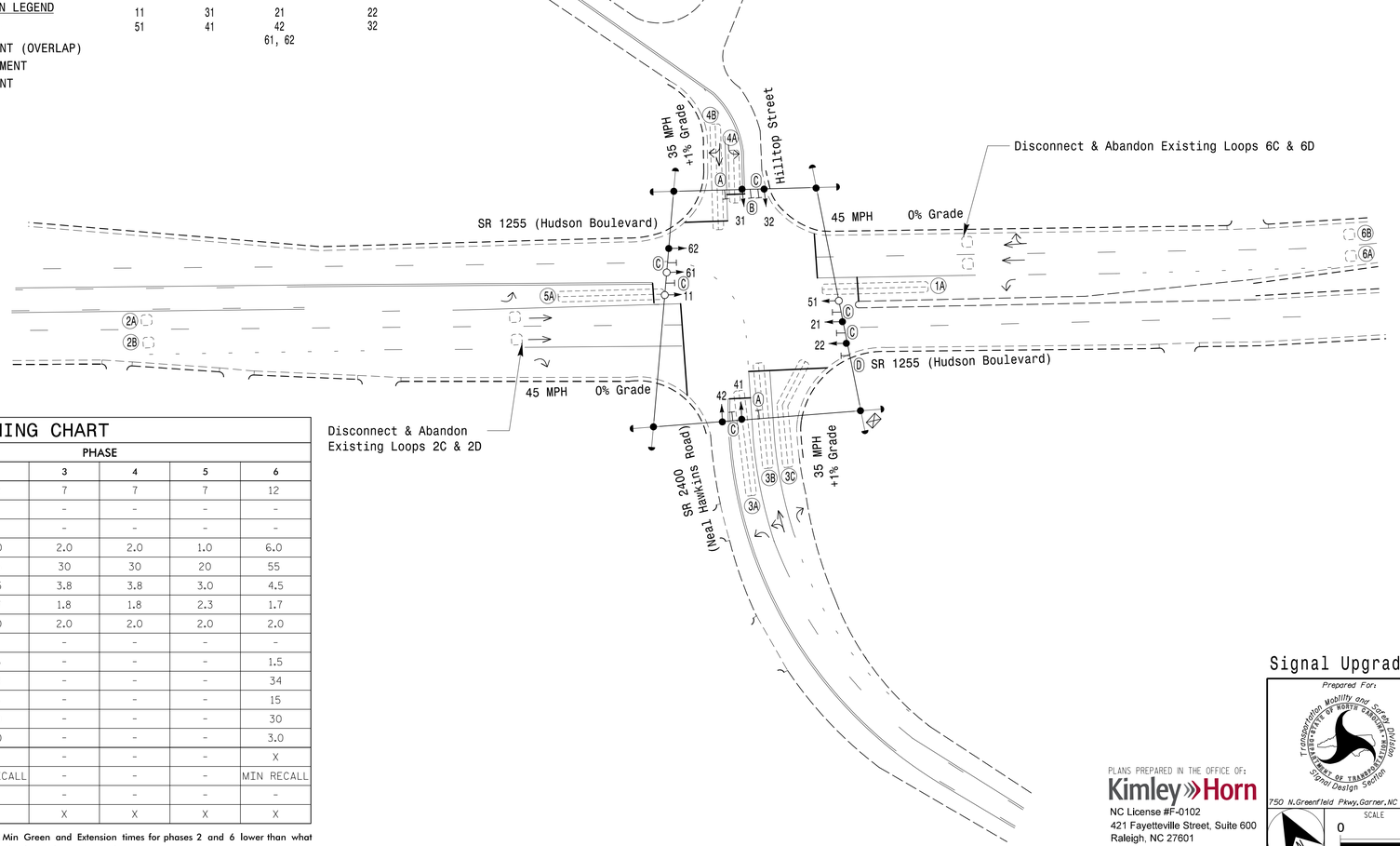
SIGNAL FACE I.D.

All Heads L.E.D.



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6
Min Green *	7	12	7	7	7	12
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	1.0	6.0	2.0	2.0	1.0	6.0
Max 1 *	15	55	30	30	20	55
Yellow	3.0	4.5	3.8	3.8	3.0	4.5
Red Clear	3.2	1.7	1.8	1.8	2.3	1.7
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5
Max Initial *	-	34	-	-	-	34
Time Before Reduction *	-	15	-	-	-	15
Time To Reduce *	-	30	-	-	-	30
Minimum Gap	-	3.0	-	-	-	3.0
Locking Detector	-	X	-	-	-	X
Recall Position	-	MIN RECALL	-	-	-	MIN RECALL
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

6 Phase
Fully Actuated
w/ Alternate Phasing Operation
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. The order of phase 3 and phase 4 may be reversed.
5. Reposition existing signal head numbered 62.
6. Abandon and disconnect existing loops 2C, 2D, 6C, and 6D.
7. Set all detector units to presence mode.
8. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
9. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
10. Pavement markings are existing.
11. The City Engineer or their representative will determine the hours of use for each phasing plan.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
13. Install new cabinet on the existing cabinet foundation.
14. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
15. Reconnect lead-in cable to separate loops 2A, 2B, 6A & 6B, as shown.
16. Existing signal heads 22 and 23 have been relabeled to 21 and 22, respectively.
17. City system data:
    Controller Asset #: 1410

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	Combined Through and Left Arrow Sign (R3-6L)	Ⓑ
Ⓒ	Street Name Sign (D3-1)	Ⓒ
Ⓓ	Right Arrow "ONLY" Sign (R3-5R)	Ⓓ

Signal Upgrade

Prepared For: NCDOT Transportation Mobility and Safety Division, Signal Design Section

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40 1"=40'

SR 1255 (Hudson Boulevard) at SR 2400 (Neal Hawkins Road) / Hilltop Street

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	DM Curri	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

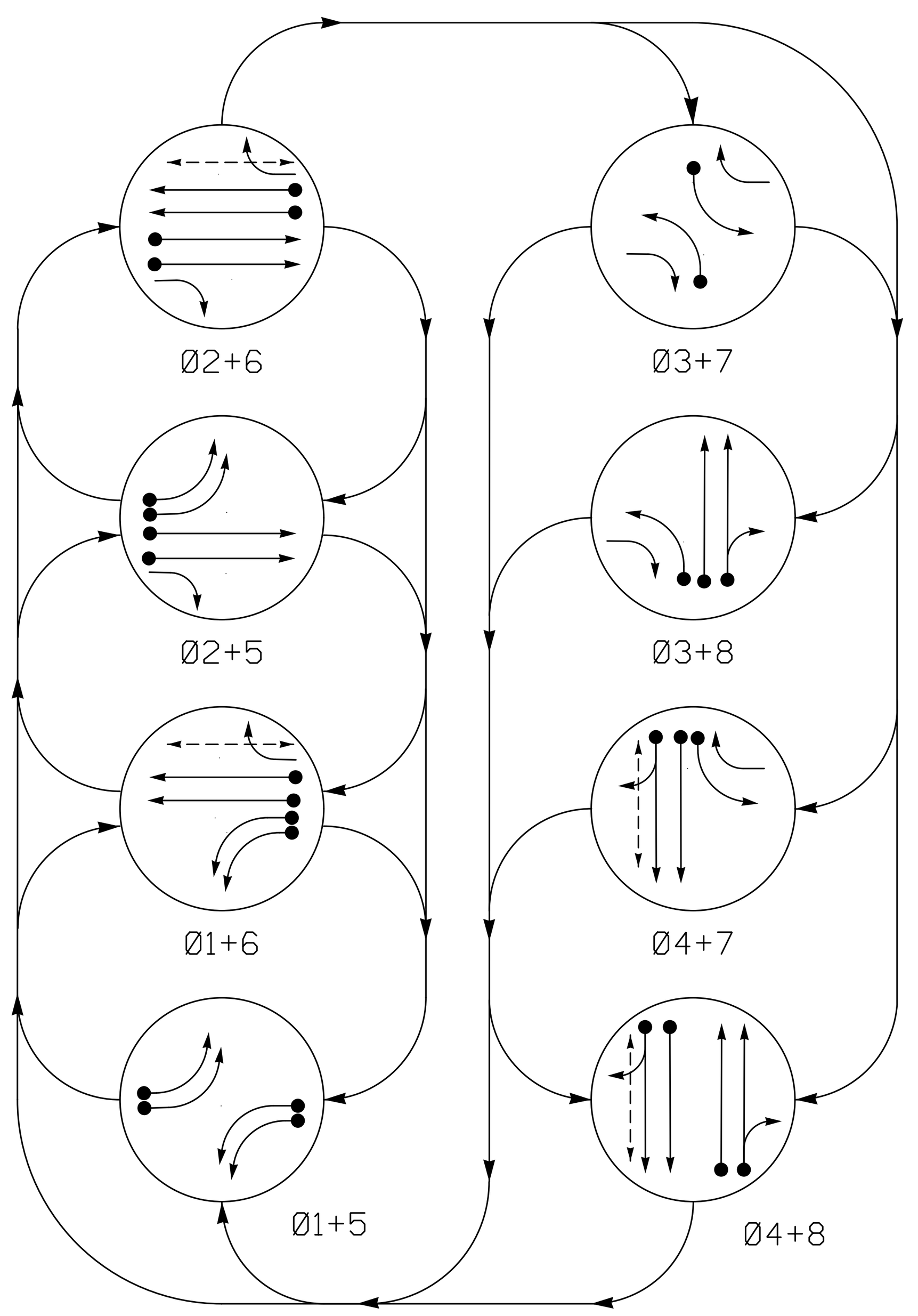
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 3/11/2022
SIGNATURE DATE

SIG. INVENTORY NO. 12-1410

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.114.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

EV PREEMPT PHASES

(Medium Priority)

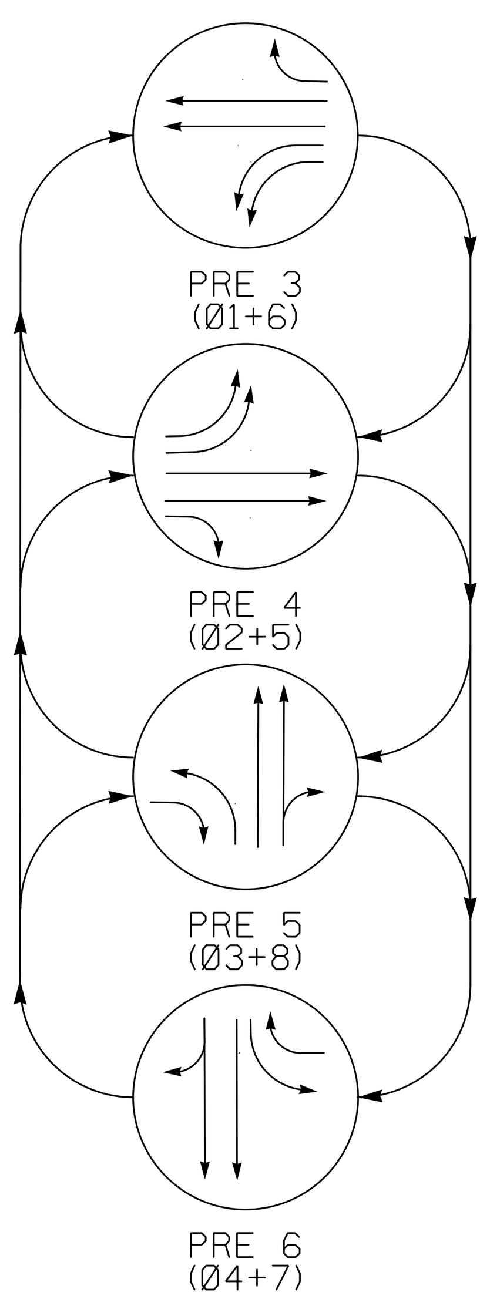
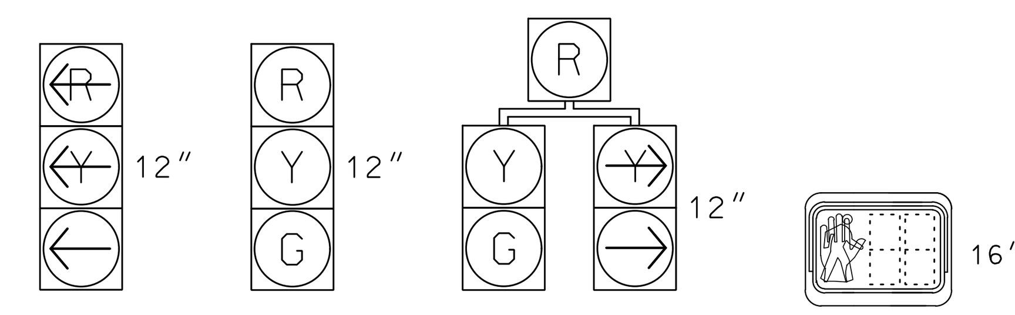


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	PRE3	PRE4	PRE5	PRE6	FLASH
11,12	←	←	←R	←R	←R	←R	←R	←R	←	←R	←R	←R	←R
21	R	R	G	G	R	R	R	R	R	G	R	R	Y
22	R	R	G	G	R/→	R/→	R	R	R	G	R/→	R	Y
31	←R	←R	←R	←R	←	←	←R	←R	←R	←R	←	←R	←R
41,42	R	R	R	R	R	R	G	G	R	R	R	G	R
51,52	←	←R	←	←R	←R	←R	←R	←R	←R	←	←R	←R	←R
61	R	G	R	G	R	R	R	R	G	R	R	R	Y
62	R	G	R	G	R/→	R	R/→	R	G	R	R	R/→	Y
71	←R	←R	←R	←R	←	←R	←	←R	←R	←R	←R	←	←R
81,82	R	R	R	R	R	G	R	G	R	R	G	R	R
P41,P42	DW	DW	DW	DW	DW	DW	W	W	DW	DW	DW	DW	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DW	DW	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



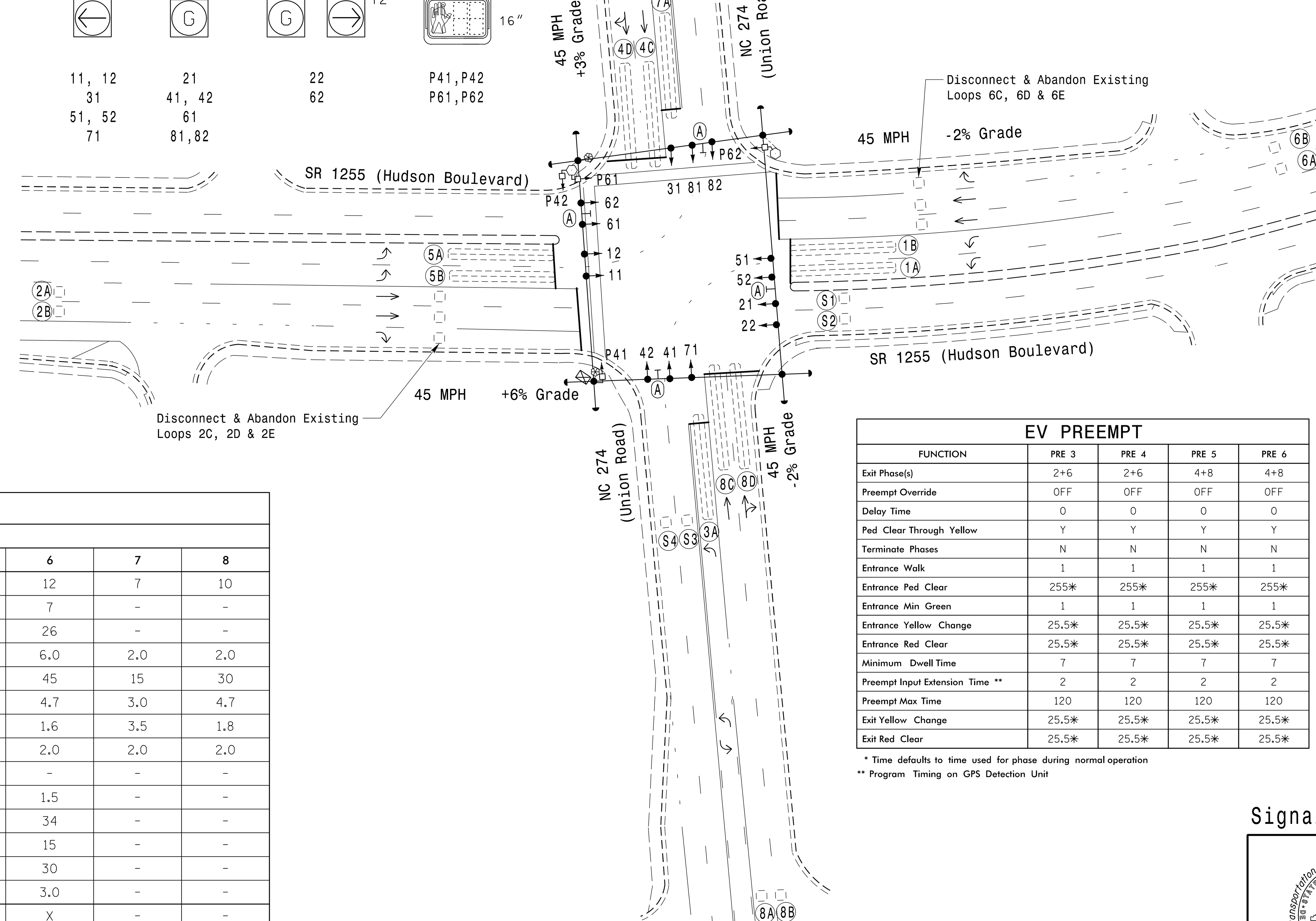
DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Yes	-	-	-	N	-	X
1B	6X60	0	2-4-2	-	1	Yes	-	-	-	N	-	X
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
3A	6X60	+5	2-4-2	-	3	Yes	-	-	-	N	-	X
4A	6X6	300	EXIST	-	4	No	3.1	-	-	N	-	X
4B	6X6	300	EXIST	-	4	No	3.1	-	-	N	-	X
4C	6X60	+5	2-4-2	-	4	Yes	-	-	-	N	-	X
4D	6X60	+5	2-4-2	-	4	Yes	-	-	-	N	-	X
5A	6X60	0	2-4-2	-	5	Yes	-	-	-	N	-	X
5B	6X60	0	2-4-2	-	5	Yes	-	-	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
7A	6X60	+5	2-4-2	-	7	Yes	-	-	-	N	-	X
8A	6X6	300	EXIST	-	8	No	3.1	-	-	N	-	X
8B	6X6	300	EXIST	-	8	No	3.1	-	-	N	-	X
8C	6X60	+5	2-4-2	-	8	Yes	-	-	-	N	-	X
8D	6X60	+5	2-4-2	-	8	Yes	-	-	-	N	-	X
S1	6X6	+150	EXIST	-	-	No	-	-	-	N	X	X
S2	6X6	+150	EXIST	-	-	No	-	-	-	N	X	X
S3	6X6	+200	EXIST	-	-	No	-	-	-	N	X	X
S4	6X6	+200	EXIST	-	-	No	-	-	-	N	X	X

8 Phase
Fully Actuated
w/ Emergency Vehicle Preemption
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
12. Disconnect and abandon existing loops 2C, 2D, 2E, 6C, 6D, and 6E.
13. Install new cabinet on the existing cabinet foundation.
14. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
15. Reconnect lead-in cable to separate loops 1A, 1B, 2A, 2B, 4A, 4B, 5A, 5B, 6A, 6B, 8A, & 8B, as shown.
16. Install GPS emergency preemption system per manufacturer's instructions to achieve preemption needed, as shown in phasing diagram.
17. All proposed pedestrian signal heads shall be black in color. See Project Special Provisions for details.
18. All proposed pedestrian pedestals and pushbutton posts shall be black in color. See Project Special Provisions for details.
19. City system data:
    Controller Asset #1411.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	Street Name Sign (D3-1)	Ⓐ

TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	12	7	10	7	12	7	10
Walk *	-	-	-	7	-	7	-	-
Ped Clear	-	-	-	26	-	26	-	-
Veh. Extension *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max 1 *	15	45	15	30	15	45	15	30
Yellow	3.0	4.1	3.0	4.3	3.0	4.7	3.0	4.7
Red Clear	3.3	1.5	3.7	1.6	3.4	1.6	3.5	1.8
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

EV PREEMPT

FUNCTION	PRE 3	PRE 4	PRE 5	PRE 6
Exit Phase(s)	2+6	2+6	4+8	4+8
Preempt Override	OFF	OFF	OFF	OFF
Delay Time	0	0	0	0
Ped Clear Through Yellow	Y	Y	Y	Y
Terminate Phases	N	N	N	N
Entrance Walk	1	1	1	1
Entrance Ped Clear	255*	255*	255*	255*
Entrance Min Green	1	1	1	1
Entrance Yellow Change	25.5*	25.5*	25.5*	25.5*
Entrance Red Clear	25.5*	25.5*	25.5*	25.5*
Minimum Dwell Time	7	7	7	7
Preempt Input Extension Time **	2	2	2	2
Preempt Max Time	120	120	120	120
Exit Yellow Change	25.5*	25.5*	25.5*	25.5*
Exit Red Clear	25.5*	25.5*	25.5*	25.5*

* Time defaults to time used for phase during normal operation
** Program Timing on GPS Detection Unit

Signal Upgrade

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared For:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 1255 (Hudson Boulevard) at NC 274 (Union Road)

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	DM Curri	REVIEWED BY:	KP Baumann

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 5DC709A86BCB447... SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1411

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.115.0

PHASING DIAGRAM

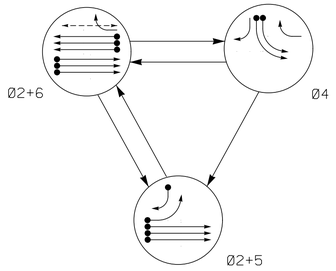
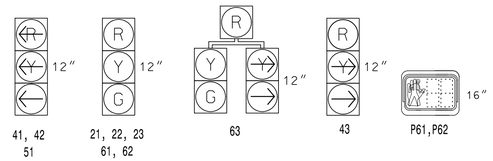


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	Ø2+6	Ø4	FLASH
21, 22, 23	G	G	R	Y
41, 42	~~R~~	~~R~~	←	~~R~~
43	→	R	→	R
51	←	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	Y
63	R	G	R	Y
P61, P62	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	355	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	355	EXIST	-	2	Yes	-	-	X	N	-	X
2C	6X6	355	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X60	0	2-4-2	-	4	Yes	-	-	-	N	-	X
4B	6X60	0	2-4-2	-	4	Yes	-	-	-	N	-	X
5A	6X60	0	2-4-2	-	5	Yes	-	-	-	N	-	X
5B	6X60	0	2-4-2	-	5	Yes	-	15	-	N	-	X
6A	6X6	355	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	355	EXIST	-	6	Yes	-	-	X	N	-	X
6C	6X6	355	EXIST	-	6	Yes	-	-	X	N	-	X

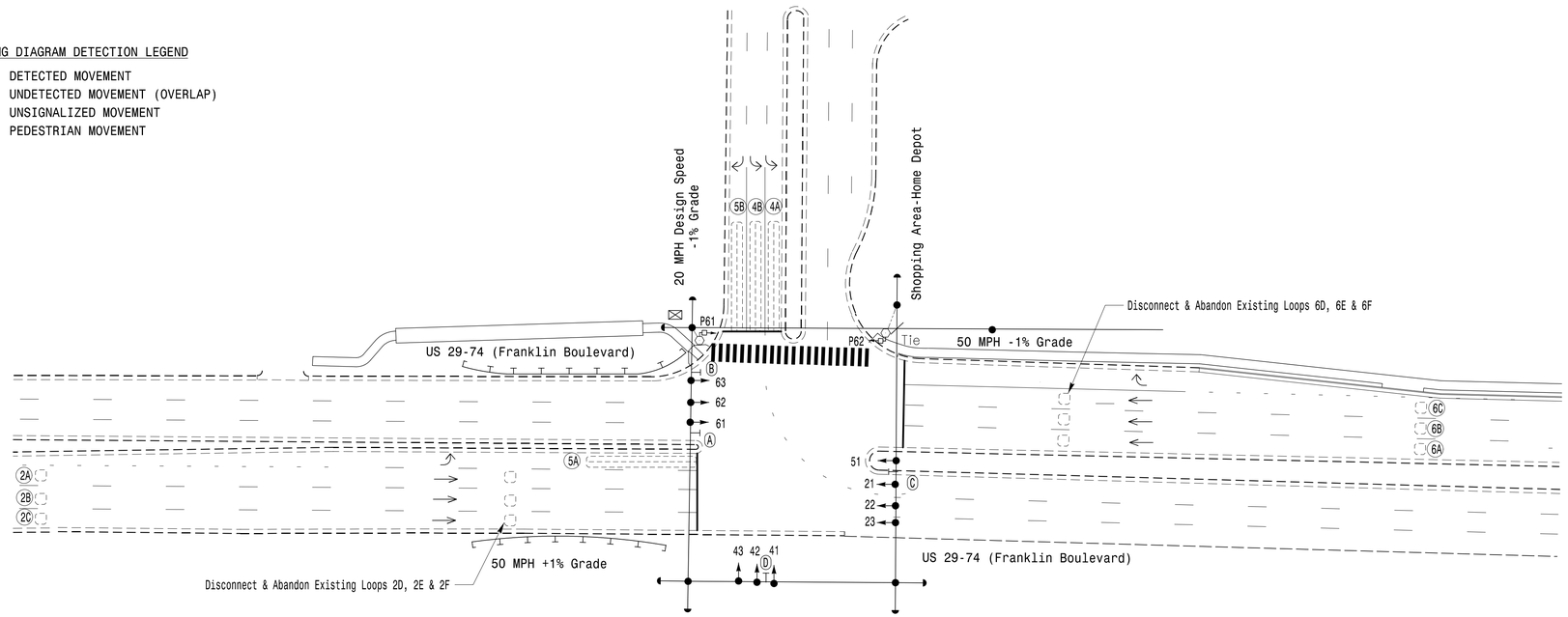
3 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Disconnect & abandon existing loops 2D, 2E, 2F, 6D, 6E, and 6F.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
12. Install new cabinet on the existing cabinet foundation.
13. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
14. All proposed pedestrian signal heads shall be black in color. See Project Special Provisions for details.
15. All proposed pedestrian pedestals and pushbutton posts shall be black in color. See Project Special Provisions for details.
16. Reconnect lead-in cable to separate loops 2A, 2B, 2C, 6A 6B and 6C, as shown.
17. City system data:
    Controller Asset #1454

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
⬡	Type II Signal Pedestal	⬢
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
-----	2-in Underground Conduit	-----
N/A	Right of Way	-----
→	Directional Arrow	→
Ⓐ	No U-Turn Sign (R3-4)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	U-Turn "MUST YIELD" Sign (R3-27)	Ⓒ
Ⓓ	Street Name Sign (D3-1)	Ⓓ

TIMING CHART

FEATURE	PHASE 2	4	5	6
Min Green *	14	7	7	14
Walk *	-	-	-	7
Ped Clear	-	-	-	26
Veh. Extension *	6.0	1.0	2.0	6.0
Max 1 *	60	25	20	60
Yellow	4.7	3.0	3.0	4.9
Red Clear	1.7	3.4	3.1	1.4
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	1.0	-	-	1.0
Max Initial *	40	-	-	40
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.1	-	-	3.1
Locking Detector	X	-	-	X
Recall Position	MIN RECALL	-	-	MIN RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Signal Upgrade

Prepared For: Transportation Mobility and Safety Division, North Carolina Department of Transportation, Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74 (Franklin Boulevard) at Shopping Area-Home Depot

Division 12 | Gaston County | Gastonia

PLAN DATE: May 2021 | REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington | REVIEWED BY: KP Baumann

REVISIONS	INIT.	DATE

SCALE: 0 40 — 1"=40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

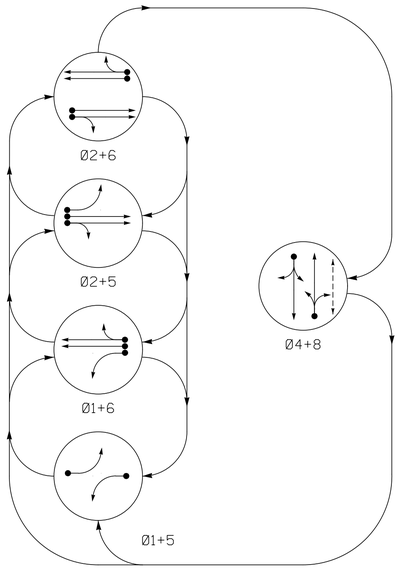
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 3/11/2022
SIGNATURE | DATE

SIG. INVENTORY NO. 12-1454

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.116.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

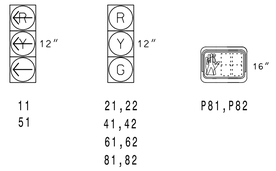
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	Y
41, 42	R	R	R	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R
P81,P82	DW	DW	DW	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	+5	2-4-2	-	1	Yes	-	-	-	N	-	X
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X60	+5	2-4-2	-	4	Yes	-	5	-	N	-	X
5A	6X60	0	2-4-2	-	5	Yes	-	-	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
8A	6X60	+5	2-4-2	-	8	Yes	-	5	-	N	-	X

TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	10	7	12	10
Walk *	-	-	-	-	-	7
Ped Clear	-	-	-	-	-	31
Veh. Extension *	1.0	6.0	1.0	1.0	6.0	1.0
Max 1 *	15	45	25	15	45	25
Yellow	3.0	4.5	3.9	3.0	4.3	3.9
Red Clear	2.1	1.1	2.4	2.4	1.2	2.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	1.5	-
Max Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Locking Detector	-	X	-	-	X	-
Recall Position	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

5 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
11. Disconnect and abandon existing loops 2C, 2D, 4A, 6C, 6D, and 8A.
12. Install new cabinet on the existing cabinet foundation.
13. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
14. Reconnect lead-in cable to separate loops 2A, 2B, 6A & 6B, as shown.
15. Existing loops 4B and 8B have been relabeled to 4A and 8A, respectively.
16. City system data:
    Controller Asset #1459.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
⬡	Type II Signal Pedestal	⬢
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	– – –
→	Directional Arrow	→
Ⓐ	Street Name Sign (D3-1)	Ⓐ

Signal Upgrade

Prepared For: NCDOT Transportation Mobility and Safety Division, Signal Design Section

SR 1255 (Hudson Boulevard) at SR 3217 (Bradford Heights)

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	DM Curri	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

SCALE: 0 50 1"=50'

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000
750 N.Greenfield Pkwy.Garner,NC 27529

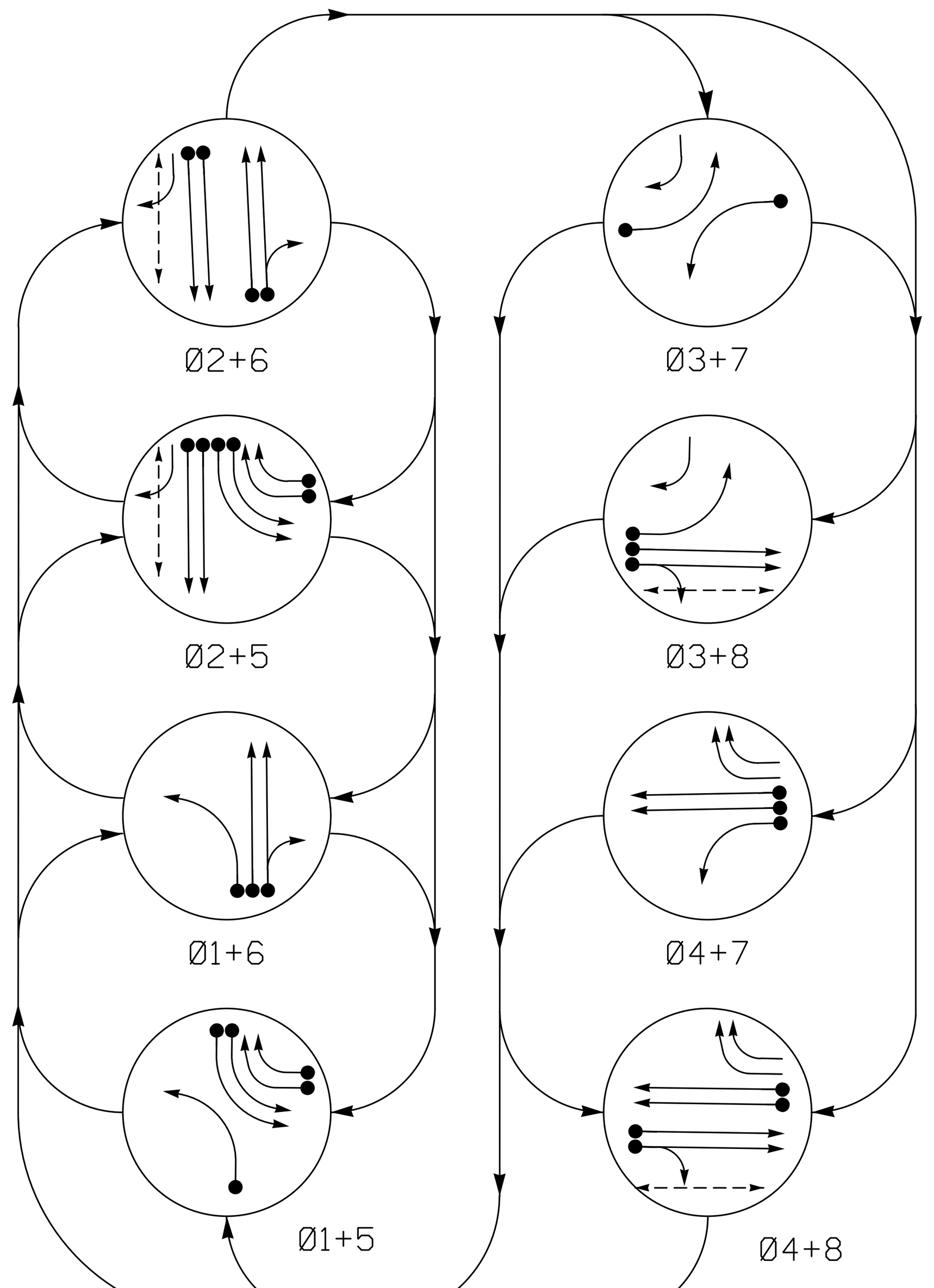
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 3/11/2022
SIGNATURE DATE

SIG. INVENTORY NO. 12-1459

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.117.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

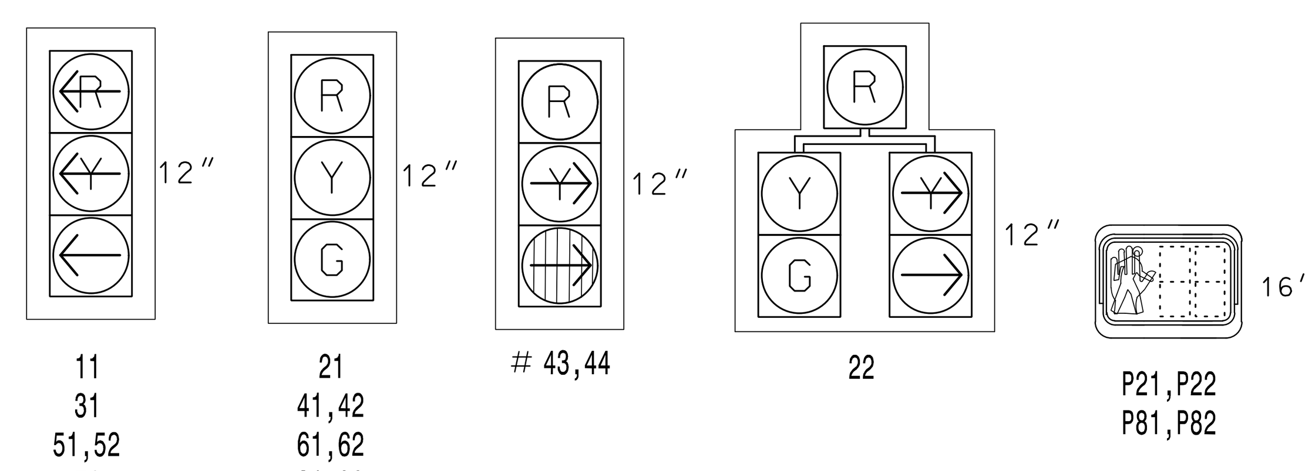
SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	←	←	←R	←R	←R	←R	←R	←R	←R
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R/→	R/→	R	R	Y
31	←R	←R	←R	←R	←	←	←R	←R	←R
41,42	R	R	R	R	R	R	G	G	R
43,44	→	R	→	R	R	R	→	→	R
51,52	←	←R	←	←R	←R	←R	←R	←R	←R
61,62	R	G	R	G	R	R	R	R	Y
71	←R	←R	←R	←R	←	←R	←	←R	←R
81,82	R	R	R	R	R	G	R	G	R
P21,P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P81,P82	DW	DW	DW	DW	DW	W	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

Louvers in Green sections of heads 43 & 44

All Heads have Backplates with reflective borders



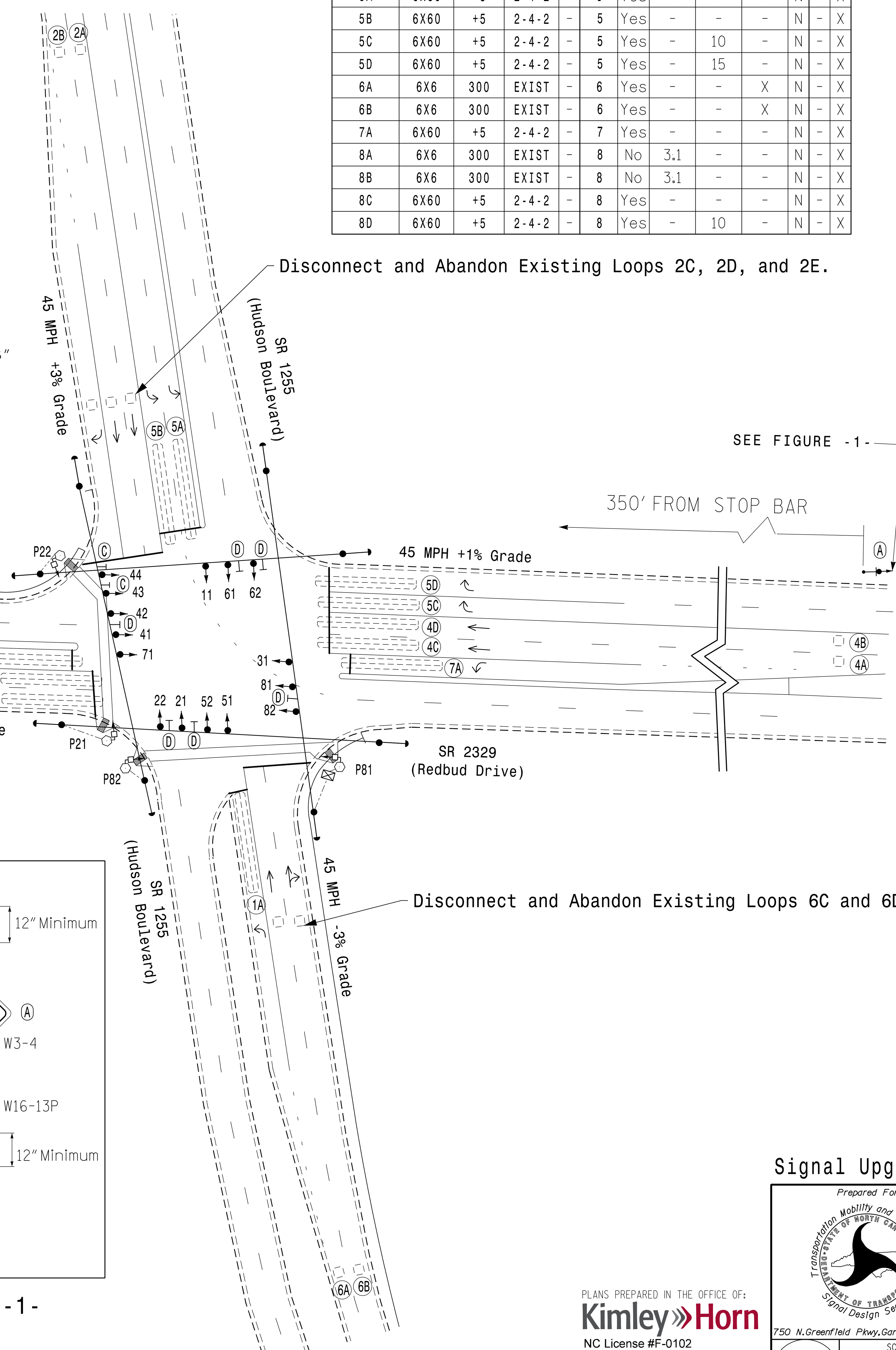
DETECTOR INSTALLATION CHART

DETECTOR: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING: PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Yes	-	-	-	N	-	X
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
3A	6X60	+5	2-4-2	-	3	Yes	-	-	-	N	-	X
4A	6X6	300	EXIST	-	4	No	3.1	-	-	N	-	X
4B	6X6	300	EXIST	-	4	No	3.1	-	-	N	-	X
4C	6X60	+5	2-4-2	-	4	Yes	-	-	-	N	-	X
4D	6X60	+5	2-4-2	-	4	Yes	-	-	-	N	-	X
5A	6X60	+5	2-4-2	-	5	Yes	-	-	-	N	-	X
5B	6X60	+5	2-4-2	-	5	Yes	-	-	-	N	-	X
5C	6X60	+5	2-4-2	-	5	Yes	-	10	-	N	-	X
5D	6X60	+5	2-4-2	-	5	Yes	-	15	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
7A	6X60	+5	2-4-2	-	7	Yes	-	-	-	N	-	X
8A	6X6	300	EXIST	-	8	No	3.1	-	-	N	-	X
8B	6X6	300	EXIST	-	8	No	3.1	-	-	N	-	X
8C	6X60	+5	2-4-2	-	8	Yes	-	-	-	N	-	X
8D	6X60	+5	2-4-2	-	8	Yes	-	10	-	N	-	X

8 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. Activate flashers 3 seconds prior to the end of green for phase 4.
7. Flash vertically mounted beacons alternately.
8. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
9. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
10. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
11. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
12. Pavement markings are existing.
13. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
14. Reconnect lead-in cable to separate loops 4A, 4B, 8A & 8B, as shown.
15. Disconnect and abandon existing loops 2C, 2D, 2E, 6C, and 6D.
16. Install new cabinet on the existing cabinet foundation.
17. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
18. All proposed pedestrian signal heads shall be black in color. See Project Special Provisions for details.
19. All proposed pedestrian pedestals and pushbutton posts shall be black in color. See Project Special Provisions for details.
20. City system data:
    Controller Asset #1460



TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	-	4	-	-	-	-	-	4
Ped Clear	-	25	-	-	-	-	-	28
Veh. Extension *	1.0	2.0	1.0	2.0	2.0	2.0	1.0	2.0
Max 1 *	20	45	15	30	20	45	15	30
Yellow	3.0	4.3	3.0	4.4	3.0	4.8	3.0	4.4
Red Clear	3.6	1.9	3.3	2.0	3.7	1.8	3.4	1.8
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	30	-	-	-	30	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

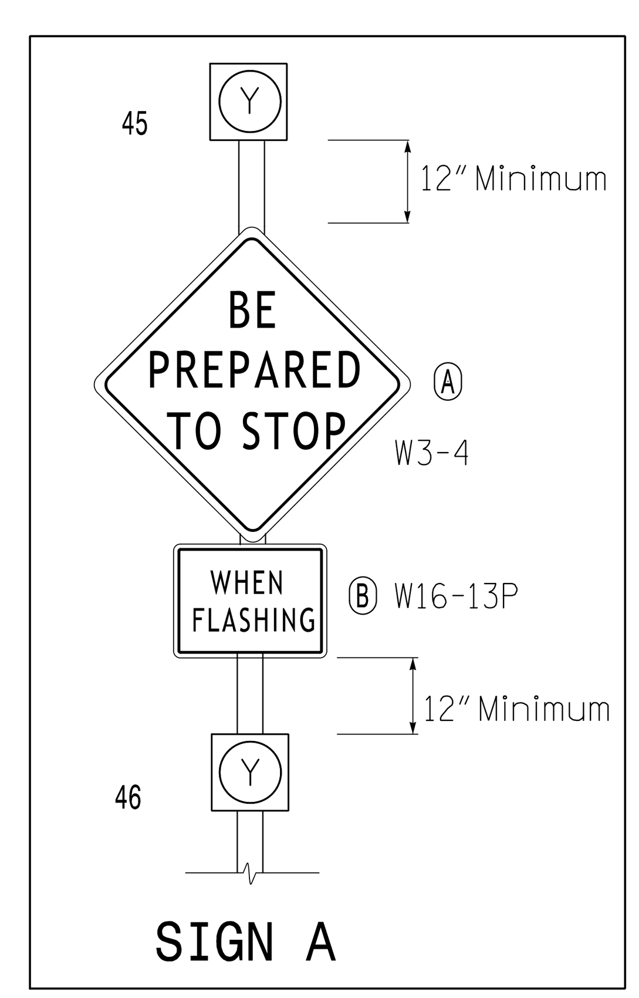


FIGURE -1-

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	BE PREPARED TO STOP Sign (W3-4) (See Figure 1)	A
B	"WHEN FLASHING" Sign (W16-13P) (See Figure 1)	B
C	RIGHT TURN SIGNAL Sign (R10-10R)	C
D	Street Name Sign (D3-1)	D

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Signal Upgrade

Prepared For: Transportation Mobility and Safety Division, State of North Carolina Department of Transportation, Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1255 (Hudson Boulevard) at SR 2446 (Hoffman Road) / SR 2329 (Redbud Drive)

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	CF Davis	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

SCALE 0 50 1"=50'

PLANS PREPARED IN THE OFFICE OF: Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

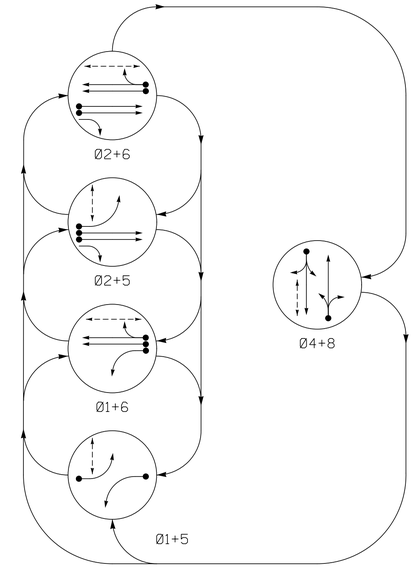
North Carolina Professional Engineer Seal 044434 Kevin P. Baumann

DocuSigned by: 5DC709A06BCB447... SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1460

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.118.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

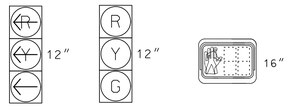
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
21, 22	R	R	G	G	R	Y
41, 42, 43	R	R	R	R	G	R
51	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~	~~R~~
61, 62	R	G	R	G	R	Y
81, 82, 83	R	R	R	R	G	R
P41, P42	DW	DW	DW	DW	W	DRK
P51, P52	W	DW	W	DW	DW	DRK
P61, P62	DW	W	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



11
51

21, 22
41, 42, 43
61, 62
81, 82, 83

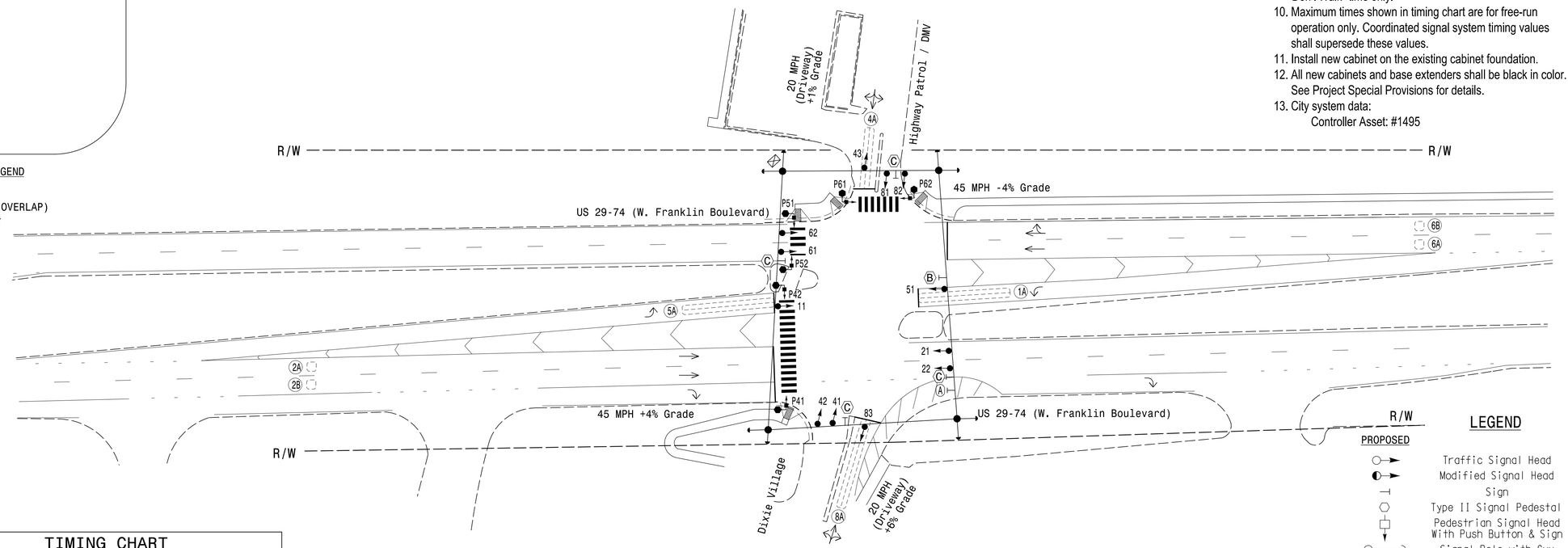
P41, P42
P51, P52
P61, P62

DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Yes	-	-	-	N	-	X
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	3	-	N	-	X
5A	6X60	0	2-4-2	-	5	Yes	-	-	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
8A	6X60	0	2-4-2	-	8	Yes	-	3	-	N	-	X

5 Phase Fully Actuated Gastonia Signal System NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
11. Install new cabinet on the existing cabinet foundation.
12. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
13. City system data:
    Controller Asset: #1495



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Type II Signal Pedestal	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
A	Right Arrow "ONLY" Sign (R3-5R)	A
B	No U-Turn Sign (R3-4)	B
C	Street Name Sign (D3-1)	C

TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Walk *	-	-	7	7	7	-
Ped Clear	-	-	20	7	11	-
Veh. Extension *	1.0	6.0	2.0	2.0	6.0	2.0
Max 1 *	15	100	30	15	100	30
Yellow	3.0	4.2	3.0	3.0	4.9	3.0
Red Clear	3.2	1.3	4.5	3.1	1.5	4.5
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	1.5	-
Max Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Locking Detector	-	X	-	-	X	-
Recall Position	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Signal Upgrade

Prepared For: Transportation Mobility and Safety Division, North Carolina Department of Transportation, Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 29-74 (W. Franklin Boulevard) at Entrance to Highway Patrol/DMV and Dixie Village

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	CF Davis	REVIEWED BY:	KP Baumann

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

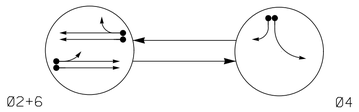
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1495

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.119.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

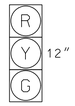
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



21,22
41,42
61,62

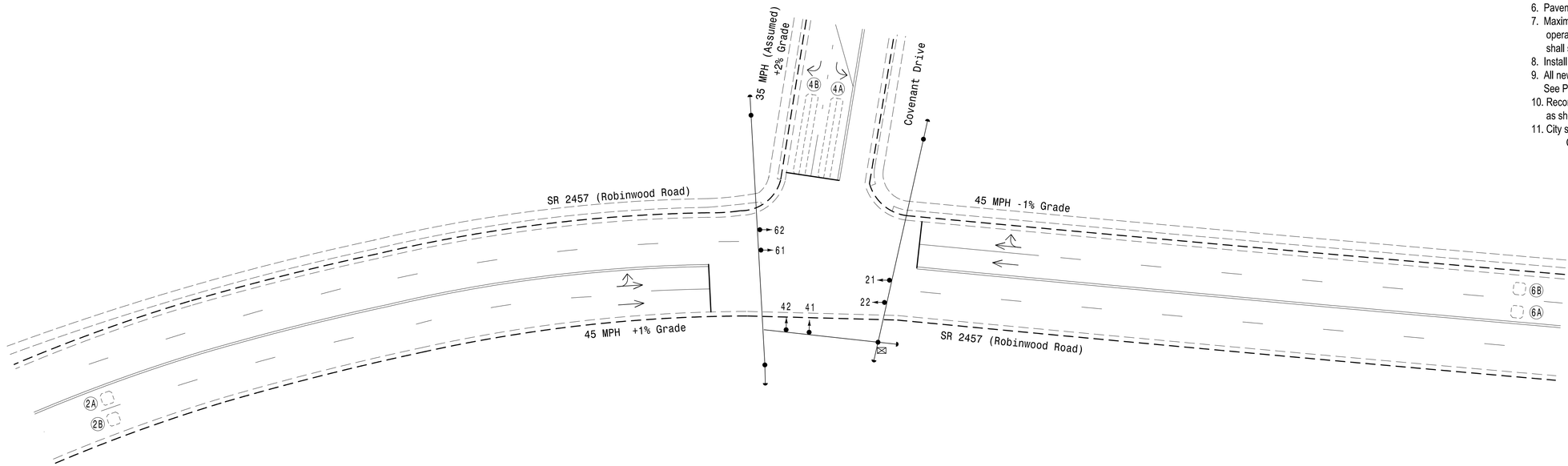
DETECTOR INSTALLATION CHART

DETECTOR						PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	3	-	N	-	X
4B	6X40	0	2-4-2	-	4	Yes	-	10	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X

2 Phase Fully Actuated Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
8. Install new cabinet on the existing cabinet foundation.
9. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
10. Reconnect lead-in cable to separate loops 4A & 4B, as shown.
11. City system data:
    Controller Asset #1512.



TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green *	12	7	12
Walk *	-	-	-
Ped Clear	-	-	-
Veh. Extension *	6.0	2.0	6.0
Max 1 *	45	20	45
Yellow	4.6	3.0	4.6
Red Clear	1.2	1.8	1.2
Red Revert	2.0	2.0	2.0
Actuations B4 Add *	-	-	-
Seconds /Actuation *	1.5	-	1.5
Max Initial *	34	-	34
Time Before Reduction *	15	-	15
Time To Reduce *	30	-	30
Minimum Gap	3.0	-	3.0
Locking Detector	X	-	X
Recall Position	MIN RECALL	-	MIN RECALL
Dual Entry	-	-	-
Simultaneous Gap	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For:
Transportation Mobility and Safety Division
NCDEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SCALE 0 30 1"=30'

SR 2457 (Robinwood Road)
at
Covenant Drive

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	DM Curri	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

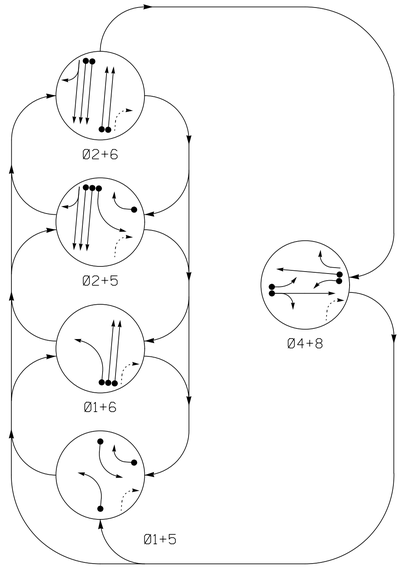
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1512

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.120.0

PHASING DIAGRAM

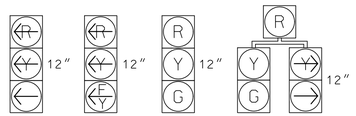


PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.



11
51

41
81

21,22,23
42
61,62
82,83

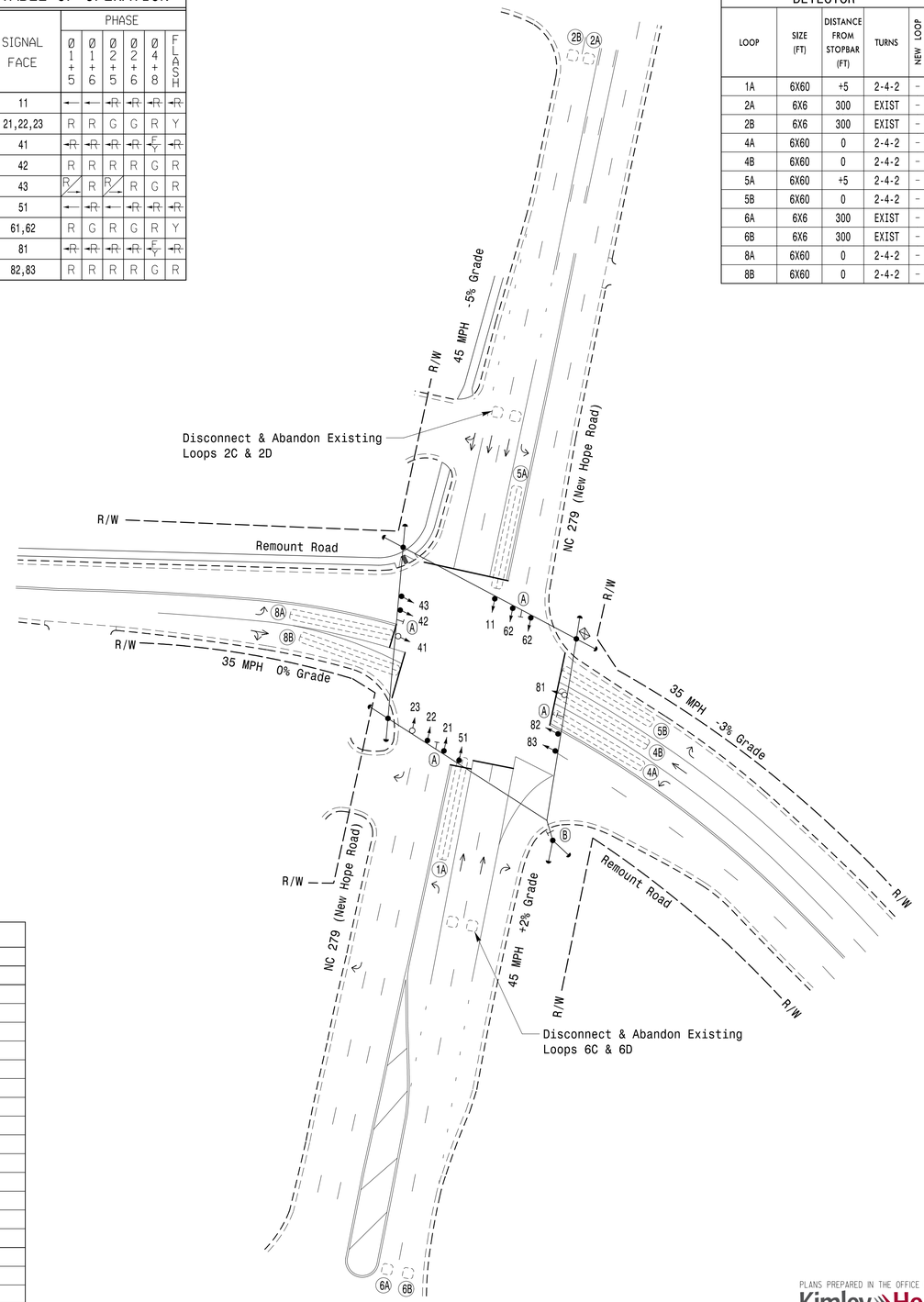
43

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←	←	~~R~~	~~R~~	~~R~~	~~R~~
21,22,23	R	R	G	G	R	Y
41	~~R~~	~~R~~	~~R~~	~~R~~	~~F Y~~	~~R~~
42	R	R	R	R	G	R
43	~~R~~ →	R	~~R~~ →	R	G	R
51	←	~~R~~	←	~~R~~	~~R~~	~~R~~
61,62	R	G	R	G	R	Y
81	~~R~~	~~R~~	~~R~~	~~R~~	~~F Y~~	~~R~~
82,83	R	R	R	R	G	R

DETECTOR INSTALLATION CHART

DETECTOR						PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP		PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	+5	2-4-2	-		1	Yes	-	3	-	N	-	X
2A	6X6	300	EXIST	-		2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-		2	Yes	-	-	X	N	-	X
4A	6X60	0	2-4-2	-		4	Yes	-	-	-	N	-	X
4B	6X60	0	2-4-2	-		4	Yes	-	-	-	N	-	X
5A	6X60	+5	2-4-2	-		5	Yes	-	3	-	N	-	X
5B	6X60	0	2-4-2	-		5	Yes	-	15	-	N	-	X
6A	6X6	300	EXIST	-		6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-		6	Yes	-	-	X	N	-	X
8A	6X60	0	2-4-2	-		8	Yes	-	-	-	N	-	X
8B	6X60	0	2-4-2	-		8	Yes	-	5	-	N	-	X



TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	7	7	12	7
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	1.0	6.0	1.0	1.0	6.0	1.0
Max 1 *	15	45	25	15	45	25
Yellow	3.0	5.0	4.1	3.1	4.3	4.1
Red Clear	3.1	1.9	2.3	2.8	1.9	2.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	1.5	-
Max Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Locking Detector	-	X	-	-	X	-
Recall Position	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

5 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Reposition existing signal heads numbered 21, 22, 82, & 83.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
9. Disconnect and abandon existing loops 2C, 2D, 6C, & 6D.
10. Install new cabinet on the existing cabinet foundation.
11. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
12. Reconnect lead-in cable to separate loops 2A & 2B and 6A & 6B, as shown.
13. Existing signal heads 41, 42, 81, & 82 have been relabeled to 42, 43, 82, & 83, respectively.
14. City system data:
    Controller Asset #1535.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□	Pedestrian Signal Head With Push Button & Sign	■
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·-·-·	2-in Underground Conduit	·-·-·
N/A	Right of Way	- - - -
→	Directional Arrow	→
N/A	Curb Ramp	♿
Ⓐ	Street Name Sign (D3-1)	Ⓐ
Ⓑ	"YIELD" Sign (R1-1)	Ⓑ

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

NC 279 (New Hope Road)
at
Remount Road

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	CF Davis	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 3/11/2022
SIGNATURE DATE

SIG. INVENTORY NO. 12-1535

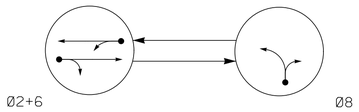
SCALE 0 40 1"=40'

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

3/9/2022 11:17:21 AM Danielle.Curri ***kimley-horn.com*SE_RAL*RAL_TPTD*_ITS*011036569 Gastonia Signal System*9 Signals*64 - Signal Design*c121535-2021.dgn

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.121.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

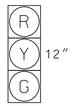
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø8	PHASE FLASH
21,22	G	R	Y
61,62	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

All Heads L.E.D.



21,22
61,62
81,82

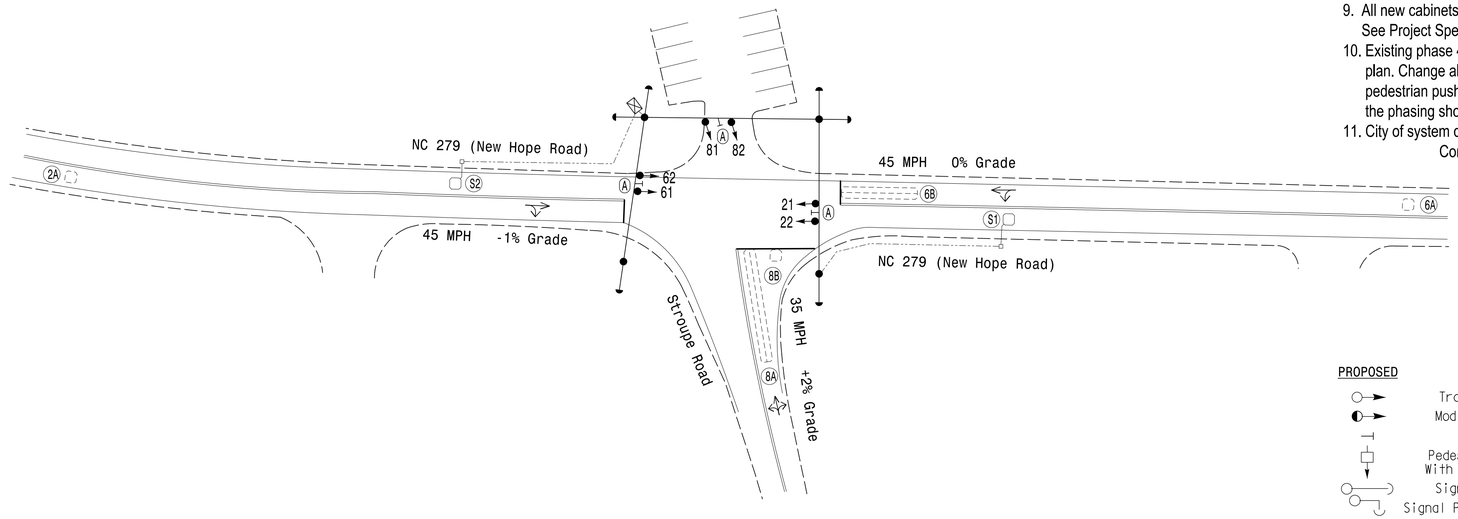
DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	-	N	-	X
6B	6X40	0	2-4-2	-	6	Yes	2.0	5	-	G	-	X
8A	6X60	0	2-4-2	-	8	Yes	-	-	-	N	-	X
8B	6X6	0	EXIST	-	8	Yes	-	5	-	N	-	X
S1	6X6	+200	6	X	-	No	-	-	-	N	X	X
S2	6X6	+200	6	X	-	No	-	-	-	N	X	X

2 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Pavement markings are existing.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
8. Install new cabinet on the existing cabinet foundation.
9. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
10. Existing phase 4 has been changed to phase 8 on this plan. Change all signal heads, pedestrian signal heads, pedestrian push buttons, and loops as needed to achieve the phasing shown.
11. City of system data:
    Controller Asset #1536.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	Street Name Sign (D3-1)	A

TIMING CHART

FEATURE	PHASE 2	PHASE 6	PHASE 8
Min Green *	12	12	7
Walk *	-	-	-
Ped Clear	-	-	-
Veh. Extension *	6.0	6.0	1.0
Max 1 *	90	90	25
Yellow	4.6	4.6	3.0
Red Clear	1.6	1.6	2.3
Red Revert	2.0	2.0	2.0
Actuations B4 Add *	-	-	-
Seconds /Actuation *	2.5	-	-
Max Initial *	34	-	-
Time Before Reduction *	15	15	-
Time To Reduce *	40	40	-
Minimum Gap	3.0	3.0	-
Locking Detector	X	X	-
Recall Position	MIN RECALL	MIN RECALL	-
Dual Entry	-	-	-
Simultaneous Gap	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For: CF Davis

Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signal Design Section

750 N.Greenfield Pkwy,Garner,NC 27529

NC 279 (New Hope Road) at Stroupe Road

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	CF Davis	REVIEWED BY:	KP Baumann

SCALE: 0 40 1"=40'

REVISIONS	INIT.	DATE

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

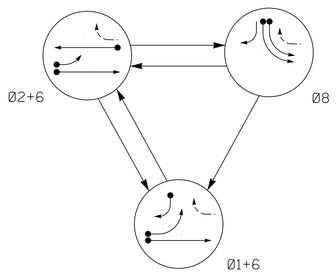
DocuSigned by: SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1536

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

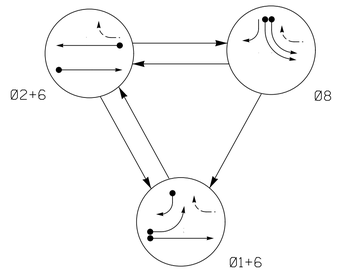
PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.122.0

DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION				
SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø8	PHASE FLASH
11	←	~~F Y~~	~~R~~	~~Y~~
21, 22	R	G	R	Y
61, 62, 63	G	G	R	Y
81, 82	~~R~~	~~R~~	←	~~R~~
83	→	R	→	R

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION				
SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø8	PHASE FLASH
11	←	~~R~~	~~R~~	~~Y~~
21, 22	R	G	R	Y
61, 62, 63	G	G	R	Y
81, 82	~~R~~	~~R~~	←	~~R~~
83	→	R	→	R

DETECTOR INSTALLATION CHART

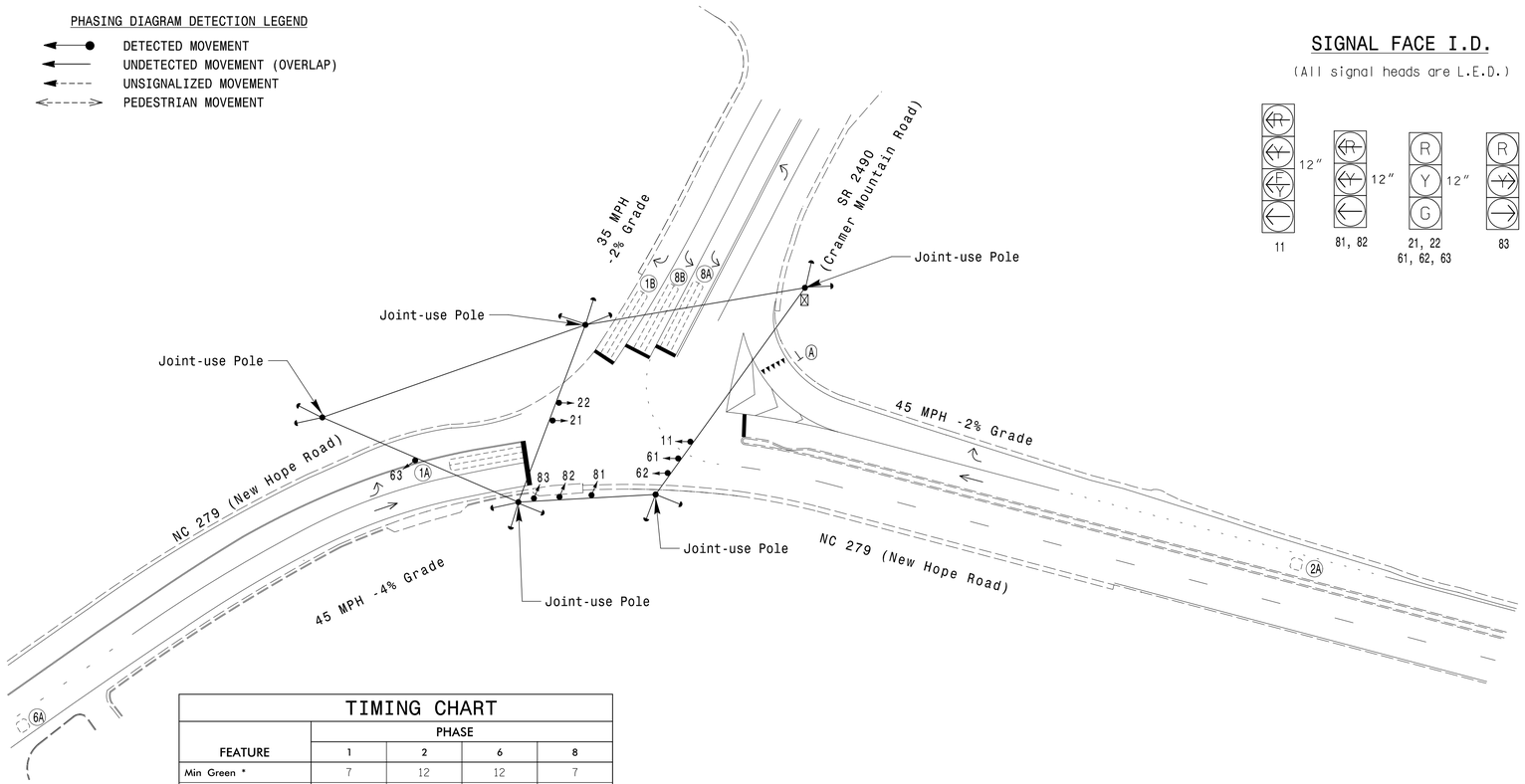
DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Yes	-	15*	-	N	-	X
					6#	Yes	-	3	-	G	-	X
1B	6X40	0	2-4-2	-	1	Yes	-	10	-	N	-	X
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	3	-	N	-	X
8B	6X40	0	2-4-2	-	8	Yes	-	-	-	N	-	X

* Reduce delay to 3 sec. during Alternate Phasing operation.

\# Disable Phase call for loop during Alternate Phasing operation.

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



SIGNAL FACE I.D.

(All signal heads are L.E.D.)

TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green *	7	12	12	7
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Veh. Extension *	2.0	6.0	6.0	2.0
Max 1 *	20	100	100	25
Yellow	3.0	4.9	4.9	3.0
Red Clear	2.6	1.6	1.6	2.9
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	2.5	2.5	-
Max Initial *	-	34	34	-
Time Before Reduction *	-	15	15	-
Time To Reduce *	-	30	30	-
Minimum Gap	-	3.0	3.0	-
Locking Detector	-	X	X	-
Recall Position	-	MIN RECALL	MIN RECALL	-
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○—	Signal Pole with Guy	●—
○⤵	Signal Pole with Sidewalk Guy	●⤵
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	— — —
→	Directional Arrow	→
Ⓐ	"YIELD" Sign (R1-2)	Ⓐ

3 Phase
Fully Actuated w/
Alternate Phasing Operation
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Pavement markings are existing.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. The City Engineer or their representative will determine the hours of use for each phasing plan.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
9. Install new cabinet on the existing cabinet foundation.
10. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
11. Existing phase 4 has been changed to phase 8 on this plan. Change all signal heads, pedestrian signal heads, pedestrian push buttons, and loops as needed to achieve the phasing shown.
12. City system data:
    Controller Asset #1541.

Signal Upgrade

Prepared For:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 279 (New Hope Road)
at
SR 2490 (Cramer Mountain Road)

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	SP Pennington	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

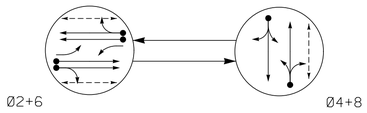
DocuSigned by: 3/11/2022
SIGNATURE DATE

SIG. INVENTORY NO. 12-1541

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.123.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

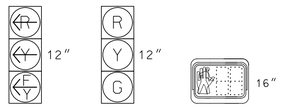
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	PHASE FLASH
21	~~F~~ Y	~~R~~	~~Y~~
22,23	G	R	Y
41,42	R	G	R
61	~~F~~ Y	~~R~~	~~Y~~
62,63	G	R	Y
81,82	R	G	R
P21,P22	W	DW	DRK
P61,P62	W	DW	DRK
P81,P82	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



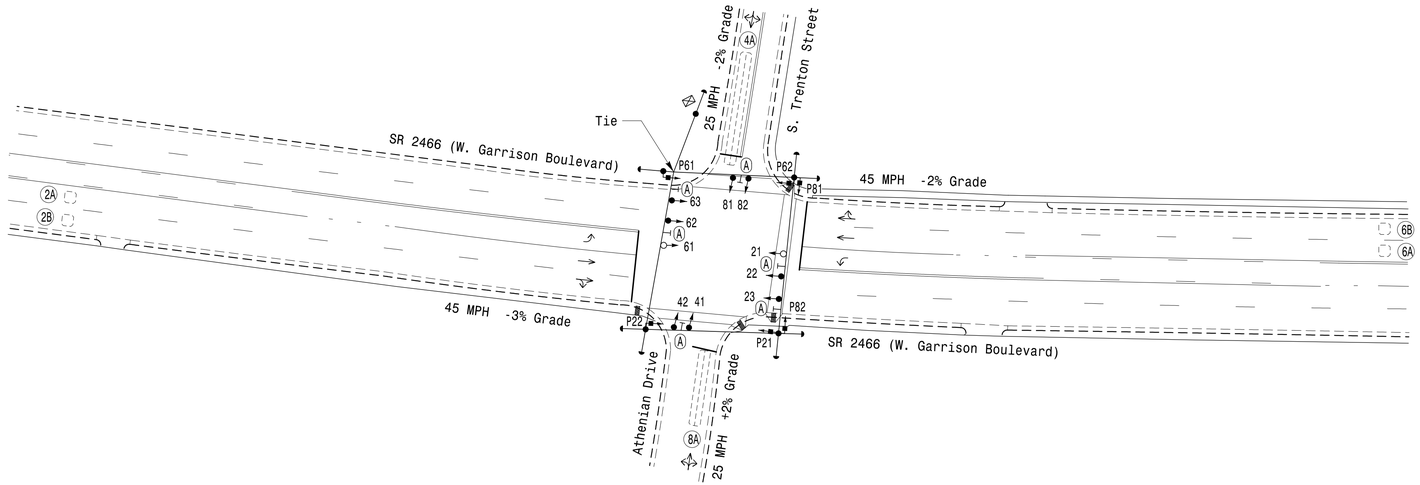
21
61

22,23
41,42
62,63
81,82

P21,P22
P61,P62
P81,P82

DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X60	+5	2-4-2	-	4	Yes	-	5	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	5	-	N	-	X



TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	12	7	12	7
Walk *	7	-	7	7
Ped Clear	10	-	10	17
Veh. Extension *	6.0	1.0	6.0	2.0
Max 1 *	90	25	90	25
Yellow	4.8	3.3	4.8	3.3
Red Clear	1.2	2.5	1.2	2.5
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	1.5	-	1.5	-
Max Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	40	-	40	-
Minimum Gap	3.0	-	3.0	-
Locking Detector	X	-	X	-
Recall Position	MIN RECALL	-	MIN RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

2 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Reposition existing signal heads numbered 22, 23, 62, & 63.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
10. Install new cabinet on the existing cabinet foundation.
11. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
12. Existing signal heads 21, 22, 61, & 62 have been relabeled to 22, 23, 62, & 63, respectively.
13. City of system data:
    Controller Asset #1543.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Pushbutton & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
Ⓐ	Street Name Sign (D3-1)	Ⓐ

Signal Upgrade

Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SR 2466 (W. Garrison Boulevard)
At
S. Trenton Street / Athenian Drive
Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	CF Davis	REVIEWED BY:	KP Baumann

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 3/11/2022
DOCUMENT NOT VALID WITHOUT SIGNATURE DATE

SIG. INVENTORY NO. 12-1543

PLANS PREPARED IN THE OFFICE OF:
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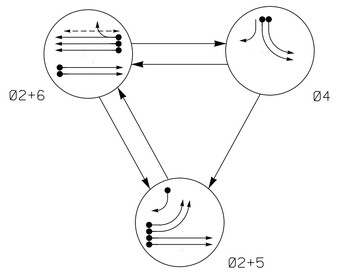
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.124.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

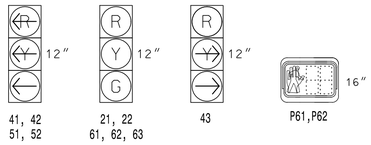
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21, 22	G	G	R	Y
41,42	~~R~~	~~R~~	←	~~R~~
43	→	R	→	R
51, 52	←	~~R~~	~~R~~	~~R~~
61, 62, 63	R	G	R	Y
P61, P62	DW	W	DW	DRK

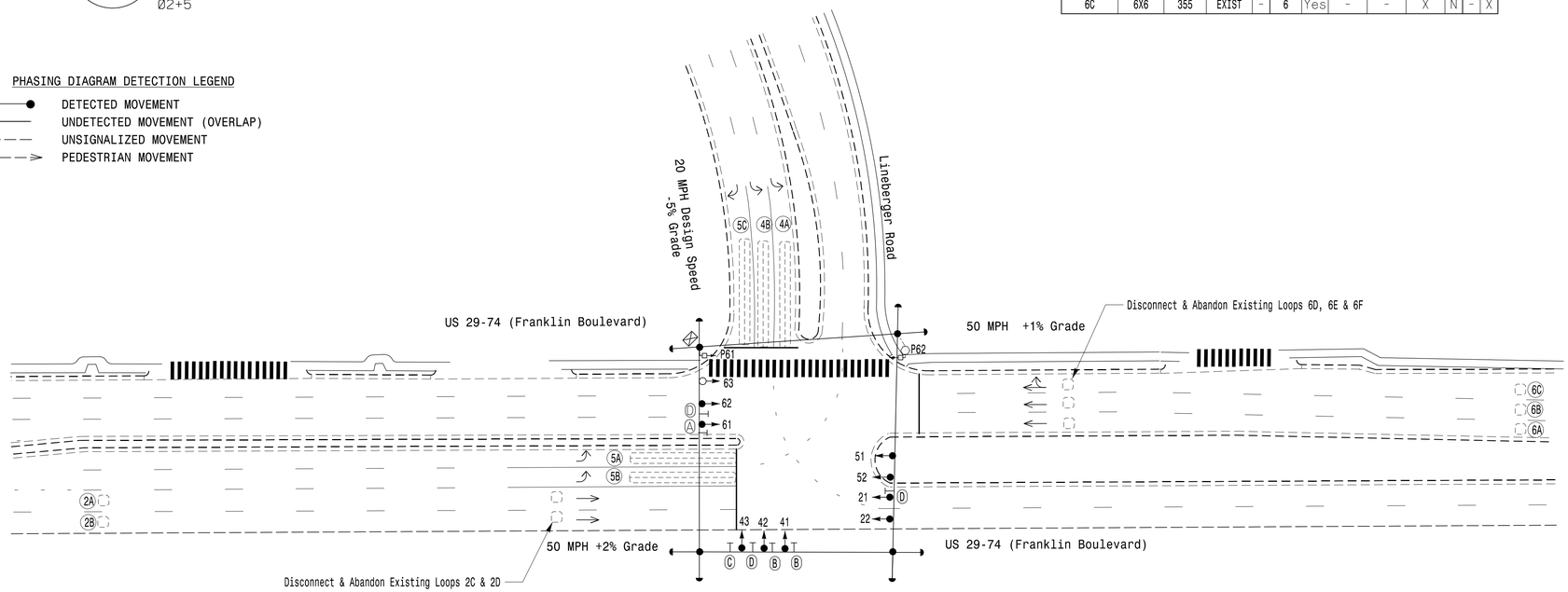
SIGNAL FACE I.D.

All Heads L.E.D.



DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	355	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	355	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X60	0	2-4-2	-	4	Yes	-	-	-	N	-	X
4B	6X60	0	2-4-2	-	4	Yes	-	-	-	N	-	X
5A	6X60	0	2-4-2	-	5	Yes	-	-	-	N	-	X
5B	6X60	0	2-4-2	-	5	Yes	-	-	-	N	-	X
5C	6X60	0	2-4-2	-	5	Yes	-	15	-	N	-	X
6A	6X6	355	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	355	EXIST	-	6	Yes	-	-	X	N	-	X
6C	6X6	355	EXIST	-	6	Yes	-	-	X	N	-	X



TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	14	7	7	14
Walk *	-	-	-	7
Ped Clear	-	-	-	32
Veh. Extension *	6.0	1.0	2.0	6.0
Max 1 *	60	20	15	60
Yellow	4.6	3.1	3.0	4.7
Red Clear	1.6	3.5	3.1	1.5
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	1.5	-	-	1.0
Max Initial *	40	-	-	40
Time Before Reduction *	15	-	-	15
Time To Reduce *	30	-	-	30
Minimum Gap	3.1	-	-	3.1
Locking Detector	X	-	-	X
Recall Position	MIN RECALL	-	-	MIN RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

3 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Disconnect & abandon existing loops 2C, 2D, 6D, 6E, and 6F.
5. Reposition existing signal heads 61 and 62.
6. Set all detector units to presence mode.
7. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
10. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
11. Pavement markings are existing.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
13. Install new cabinet on the existing cabinet foundation.
14. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
15. All proposed pedestrian signal heads shall be black in color. See Project Special Provisions for details.
16. All proposed pedestrian pedestals and pushbutton posts shall be black in color. See Project Special Provisions for details.
17. Reconnect lead-in cable to separate loops 2A, 2B, 6A 6B, and 6C, as shown.
18. City system data:
    Controller Asset #1562

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
⬡	Type II Signal Pedestal	⬢
○—	Signal Pole with Guy	●—
○↓	Signal Pole with Sidewalk Guy	●↓
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
-----	2-in Underground Conduit	-----
N/A	Right of Way	— — —
→	Directional Arrow	→
Ⓐ	No U-Turn Sign (R3-4)	Ⓐ
Ⓑ	Left Arrow "ONLY" Sign (R3-5L)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ
Ⓓ	Street Name Sign (D3-1)	Ⓓ

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 29-74 (Franklin Boulevard) at Lineberger Road

Division 12 Gaston County Gastonia

PLAN DATE: May 2021 REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington REVIEWED BY: KP Baumann

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by:
SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1562

PLANS PREPARED IN THE OFFICE OF:
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421 Fayetteville Street, Suite 600
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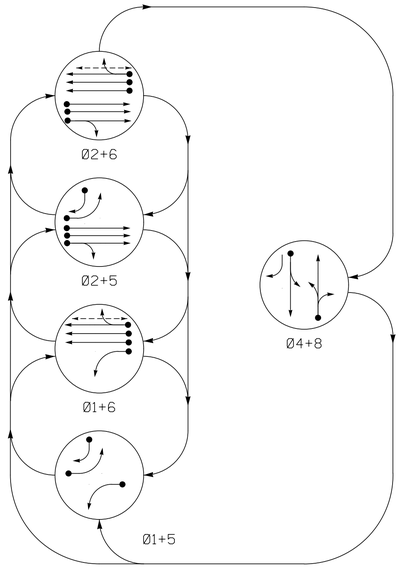
(919) 677-2000

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.125.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

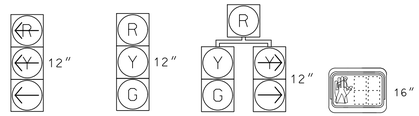
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4+8	FLASH
11	←̶	←̶	R	R	R	R
21, 22, 23	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R	R	R	R	G	R
51	←̶	R	←̶	R	R	R
61, 62, 63	R	G	R	G	R	Y
81, 82	R	R	R	R	G	R
P61, P62	DW	W	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



11
51

21, 22, 23
41
61, 62, 63
81, 82

42

P61, P62

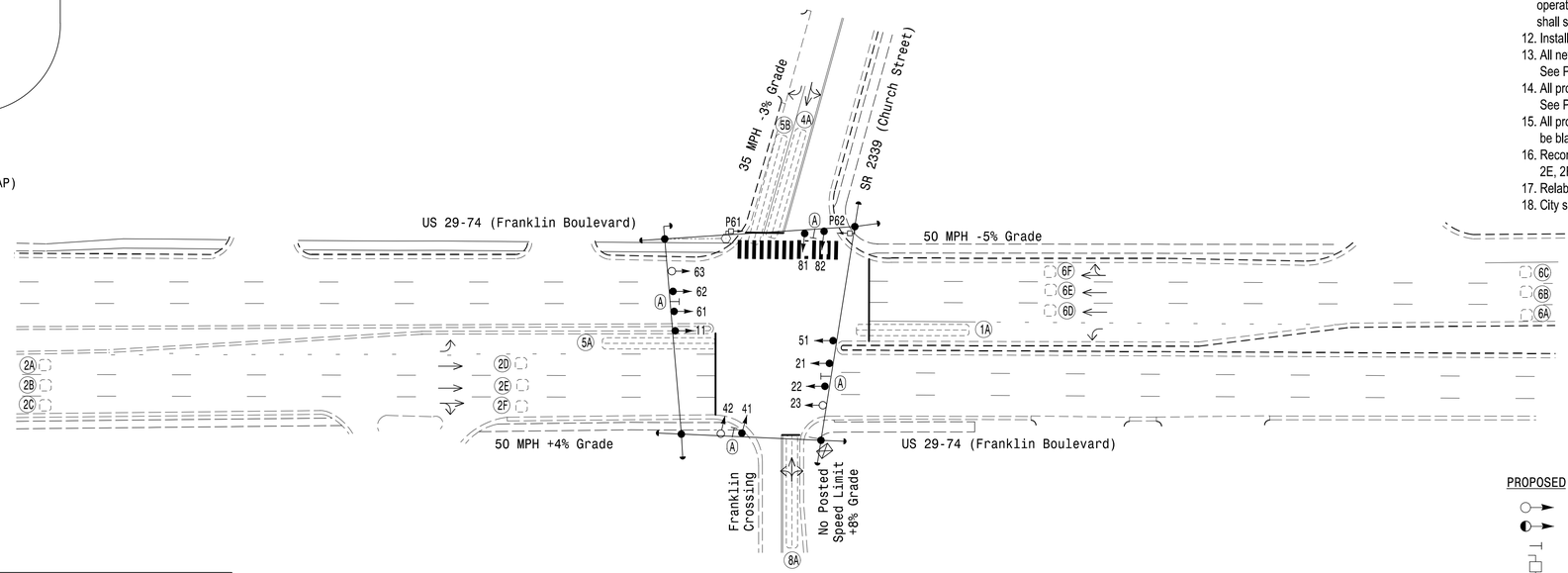
DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	+5	2-4-2	-	1	Yes	-	-	-	N	-	X
2A	6X6	355	EXIST	-	2	Yes	1.9	-	-	N	-	X
2B	6X6	355	EXIST	-	2	Yes	1.9	-	-	N	-	X
2C	6X6	355	EXIST	-	2	Yes	1.9	-	-	N	-	X
2D	6X6	100	EXIST	-	2	Yes	-	-	-	N	-	X
2E	6X6	100	EXIST	-	2	Yes	-	-	-	N	-	X
2F	6X6	100	EXIST	-	2	Yes	-	-	-	N	-	X
4A	6X60	0	2-4-2	-	4	Yes	-	-	-	N	-	X
5A	6X60	0	2-4-2	-	5	Yes	-	-	-	N	-	X
5B	6X60	+5	2-4-2	-	5	Yes	-	10	-	N	-	X
6A	6X6	355	EXIST	-	6	Yes	1.9	-	-	N	-	X
6B	6X6	355	EXIST	-	6	Yes	1.9	-	-	N	-	X
6C	6X6	355	EXIST	-	6	Yes	1.9	-	-	N	-	X
6D	6X6	100	EXIST	-	6	Yes	-	-	-	N	-	X
6E	6X6	100	EXIST	-	6	Yes	-	-	-	N	-	X
6F	6X6	100	EXIST	-	6	Yes	-	-	-	N	-	X
8A	6X60	0	2-4-2	-	8	Yes	-	-	-	N	-	X

5 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Reposition existing signal heads 21, 22, 61, and 62.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
12. Install new cabinet on the existing cabinet foundation.
13. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
14. All proposed pedestrian signal heads shall be black in color. See Project Special Provisions for details.
15. All proposed pedestrian pedestals and pushbutton posts shall be black in color. See Project Special Provisions for details.
16. Reconnect lead-in cable to separate loops 2A, 2B, 2C, 2D, 2E, 2F, 6A, 6B, 6C, 6D, 6E and 6F, as shown.
17. Relabel existing loop 4B as 5B.
18. City system data:
    Controller Asset #1563



TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	14	7	7	14	7
Walk *	-	-	-	-	7	-
Ped Clear	-	-	-	-	17	-
Veh. Extension *	1.0	2.0	1.0	1.0	2.0	1.0
Max 1 *	15	60	30	15	60	30
Yellow	3.1	4.5	4.1	3.0	5.4	4.1
Red Clear	2.6	2.0	2.6	2.4	2.0	2.6
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Locking Detector	-	X	-	-	X	-
Recall Position	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
⬡	Type II Signal Pedestal	⬢
○—	Signal Pole with Guy	●—
○— ◡	Signal Pole with Sidewalk Guy	●— ◡
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	————
→	Directional Arrow	→
Ⓐ	Street Name Sign (D3-1)	Ⓐ

Signal Upgrade

Prepared For:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SCALE 0 40 1"=40'

US 29-74 (Franklin Boulevard) at SR 2339 (Church Street)/ Franklin Crossing

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	SP Pennington	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

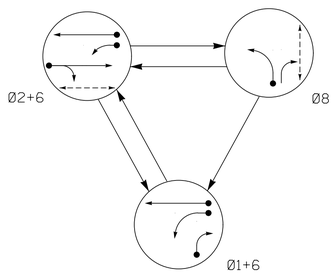
DocuSigned by:
SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1563

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.126.0

3 Phase
Fully Actuated w/ Alternate Phasing Operation
Gastonia Signal System

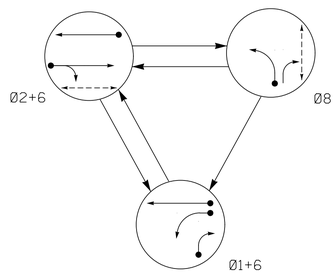
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø8	PHASE FLASH
11	←~~R~~	←~~FY~~	~~R~~	~~Y~~
21, 22	R	G	R	Y
61, 62	G	G	R	Y
81	R	R	G	R
82	R/←	R	G	R
P21, P22	DW	W	DW	DW
P81, P82	DW	DW	W	DW

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+6	PHASE Ø2+6	PHASE Ø8	PHASE FLASH
11	←	~~R~~	~~R~~	~~Y~~
21, 22	R	G	R	Y
61, 62	G	G	R	Y
81	R	R	G	R
82	R/←	R	G	R
P21, P22	DW	W	DW	DW
P81, P82	DW	DW	W	DW

DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Yes	-	15*	-	N	-	X
					6#	Yes	-	3	-	N	-	X
1B	6X60	0	2-4-2	-	1	Yes	-	15	-	N	-	X
2A	6X6	70	6	X	2	Yes	-	-	-	N	-	X
6A	6X6	70	6	X	6	Yes	-	-	-	N	-	X
8A	6X60	0	2-4-2	-	8	Yes	-	3	-	N	-	X

* Disable Delay during Alternate Phasing operation.

\# Disable Phase call for loop during Alternate Phasing operation.

NOTES

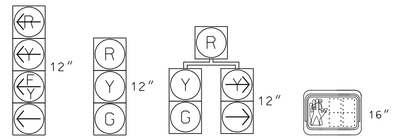
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Reposition existing signal head numbered 62, 81, & 82.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. All proposed pedestrian pedestals and pushbutton posts shall be black in color. See Project Special Provisions for details.
11. Pavement markings are existing.
12. The City Engineer or their representative will determine the hours of use for each phasing plan.
13. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
14. Disconnect and abandon existing loops 2A & 6A and re-cut new loops as shown on this plan.
15. Install new cabinet on the existing cabinet foundation.
16. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
17. All proposed pushbutton posts shall be black in color. See Project Special Provisions for details.
18. Existing phase 4 has been changed to phase 8 on this plan. Change all signal heads, pedestrian signal heads, pedestrian push buttons, and loops as needed to achieve the phasing shown.
19. City system data:
    Controller Asset #1603.

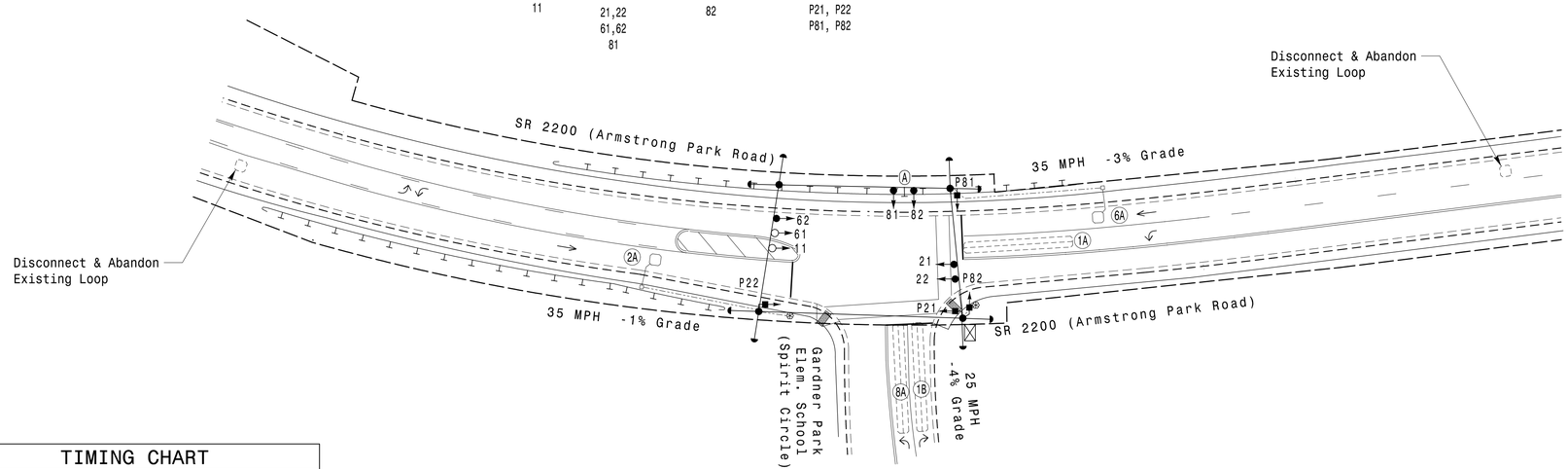
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.





LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊛	Type I Pushbutton Post	⚽
⊓↓	Pedestrian Signal Head With Push Button & Sign	■↓
○—	Signal Pole with Guy	●—
○⌐	Signal Pole with Sidewalk Guy	●⌐
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
------	2-in Underground Conduit	------
N/A	Right of Way	— — — —
→	Directional Arrow	→
N/A	Curb Ramp	◢◣
Ⓐ	Street Name Sign (D3-1)	Ⓐ

TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green *	7	10	10	7
Walk *	-	7	-	7
Ped Clear	-	15	-	12
Veh. Extension *	1.0	3.0	3.0	1.0
Max 1 *	20	60	60	25
Yellow	3.0	4.1	4.1	3.4
Red Clear	1.9	1.6	1.6	1.5
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	X	X	-
Recall Position	-	MIN RECALL	MIN RECALL	-
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared For:
Transportation Mobility and Safety Division
North Carolina Department of Transportation
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 2200 (Armstrong Park Road) at Gardner Park Elem. School (Spirit Circle)

Division 12 Gaston County Gastonia

PLAN DATE: May 2021 REVIEWED BY: SL Phillips

PREPARED BY: SP Pennington REVIEWED BY: KP Baumann

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 3/11/2022

DOCUMENTS NOT CONSIDERED FINAL UNLESS SIGNED

DATE

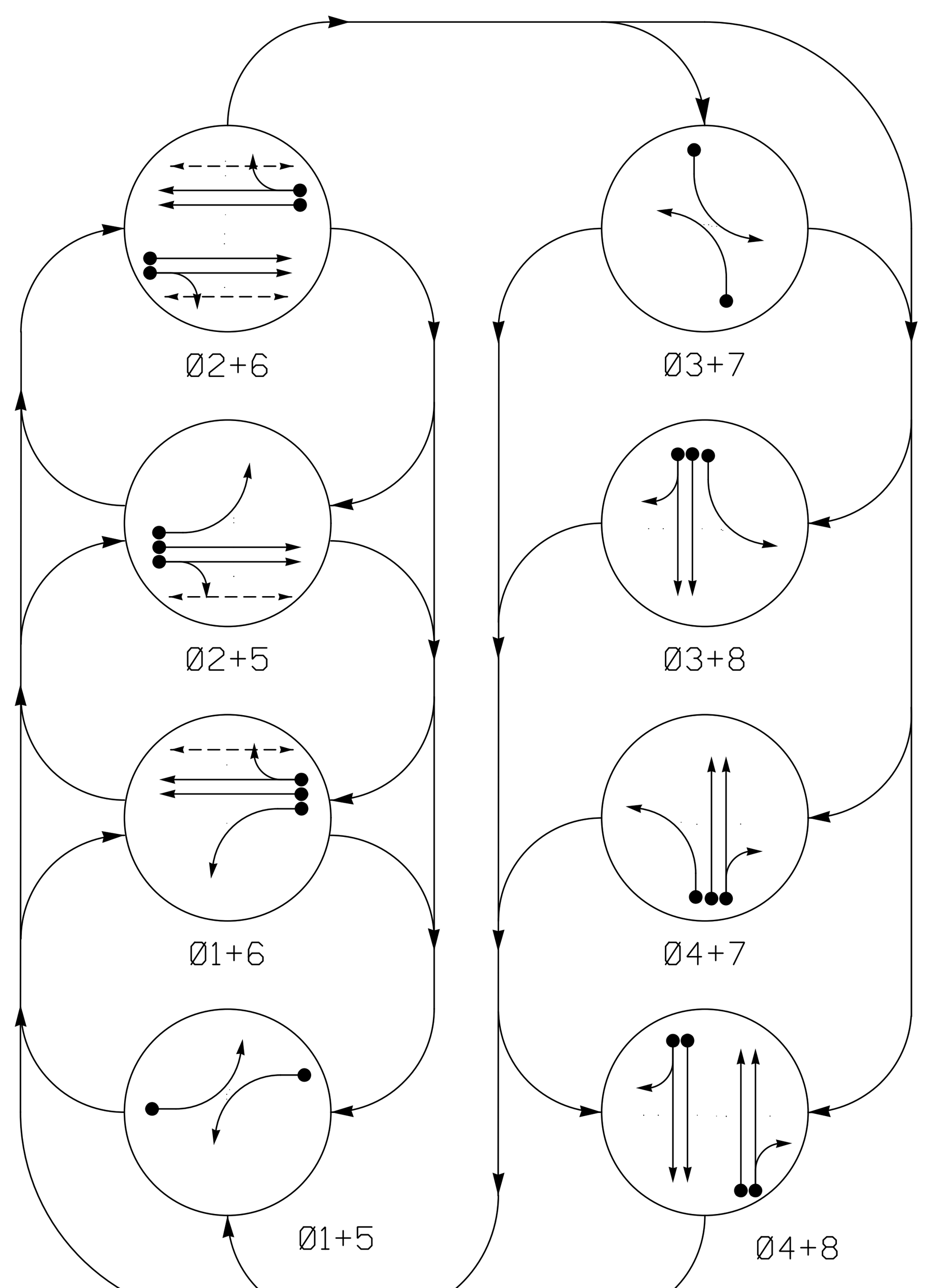
SIG. INVENTORY NO. 12-1603

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.127.0

8 Phase Fully Actuated w/ Emergency Vehicle Preemption Gastonia Signal System

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

EV PREEMPT PHASES

(Medium Priority)

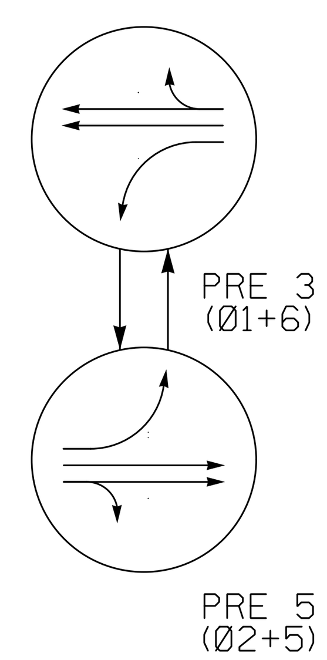
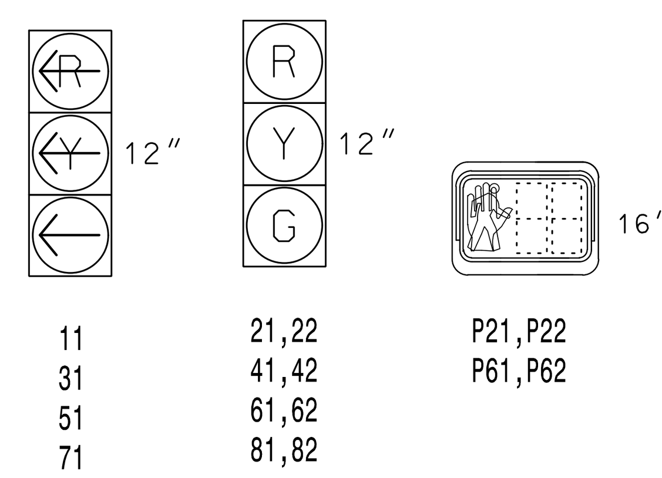


TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	PRE 3	PRE 5	FLASH
11	←	←	←R	←R	←R	←R	←R	←R	←	←R	←R
21,22	R	R	G	G	R	R	R	R	R	G	Y
31	←R	←R	←R	←R	←	←	←R	←R	←R	←R	←R
41,42	R	R	R	R	R	R	G	G	R	R	R
51	←	←R	←	←R	←R	←R	←R	←R	←R	←	←R
61,62	R	G	R	G	R	R	R	R	G	R	Y
71	←R	←R	←R	←R	←	←R	←	←R	←R	←R	←R
81,82	R	R	R	R	R	G	R	G	R	R	R
P21,P22	DW	DW	W	W	DW	DW	DW	DW	DW	DW	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DW	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.

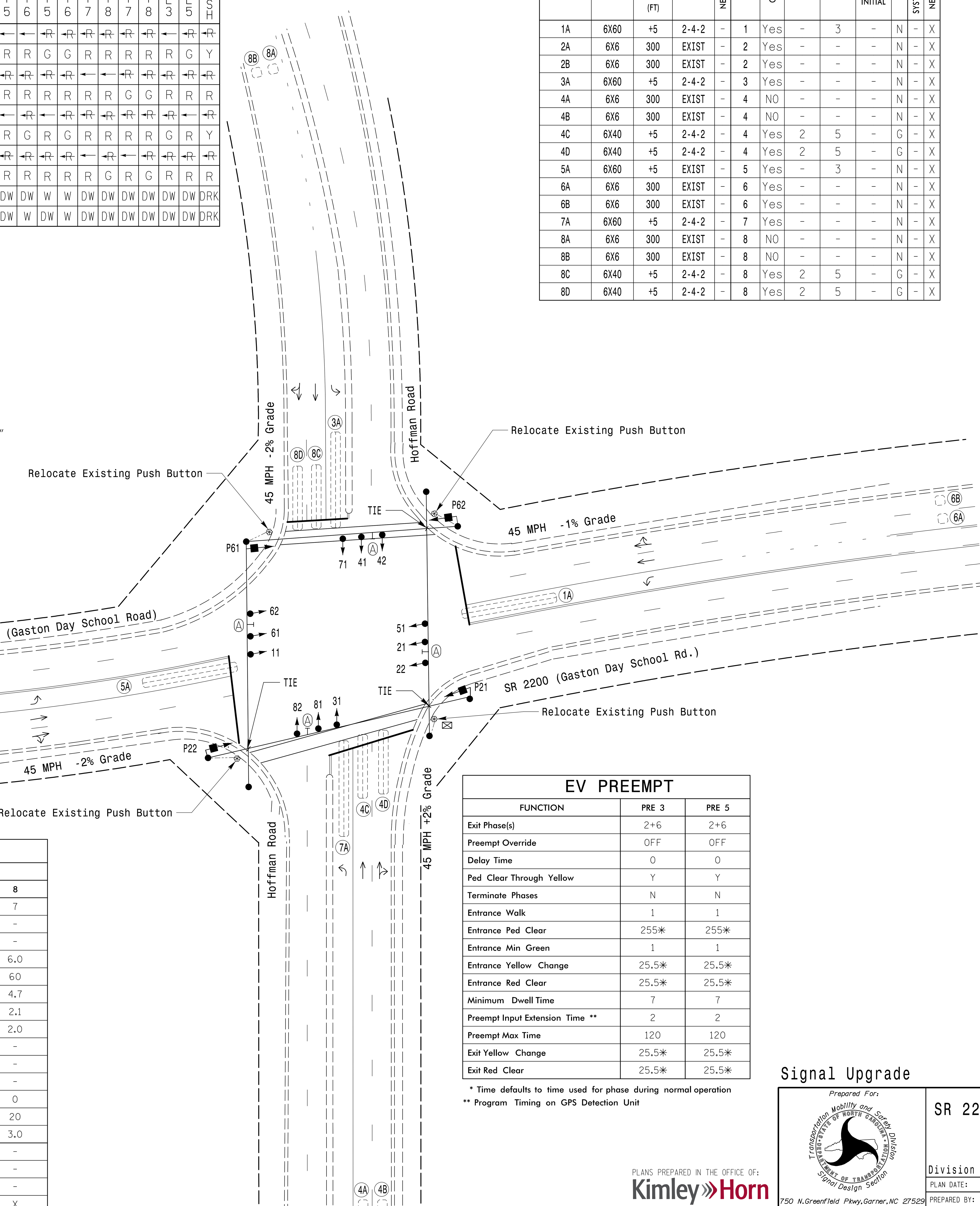


DETECTOR INSTALLATION CHART

DETECTOR: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING: PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	+5	2-4-2	-	1	Yes	-	3	-	N	-	X
2A	6X6	300	EXIST	-	2	Yes	-	-	-	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	-	N	-	X
3A	6X60	+5	2-4-2	-	3	Yes	-	-	-	N	-	X
4A	6X6	300	EXIST	-	4	NO	-	-	-	N	-	X
4B	6X6	300	EXIST	-	4	NO	-	-	-	N	-	X
4C	6X40	+5	2-4-2	-	4	Yes	2	5	-	G	-	X
4D	6X40	+5	2-4-2	-	4	Yes	2	5	-	G	-	X
5A	6X60	+5	EXIST	-	5	Yes	-	3	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	-	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	-	N	-	X
7A	6X60	+5	2-4-2	-	7	Yes	-	-	-	N	-	X
8A	6X6	300	EXIST	-	8	NO	-	-	-	N	-	X
8B	6X6	300	EXIST	-	8	NO	-	-	-	N	-	X
8C	6X40	+5	2-4-2	-	8	Yes	2	5	-	G	-	X
8D	6X40	+5	2-4-2	-	8	Yes	2	5	-	G	-	X

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
12. Install new cabinet on the existing cabinet foundation.
13. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
14. Reconnect lead-in cable to separate loops 2A, 2B, 4A, 4B, 6A, 6B, 8A, and 8B as shown.
15. Relocate existing pedestrian push buttons to TYPE 1 posts, as shown.
16. Install GPS emergency preemption system per manufacturer's instructions to achieve preemption needed, as shown in phasing diagram.
17. All proposed pedestrian pedestals and pushbutton posts shall be black in color. See Project Special Provisions for details.
18. City of system data:
    Controller Asset #1604.



TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	12	7	7	7	12	7	7
Walk *	-	4	-	-	-	4	-	-
Ped Clear	-	27	-	-	-	23	-	-
Veh. Extension *	1.0	6.0	1.0	6.0	1.0	6.0	2.0	6.0
Max 1 *	20	100	20	60	20	100	20	60
Yellow	3.0	4.7	3.0	4.3	3.0	4.6	3.0	4.7
Red Clear	3.5	1.6	3.1	2.0	3.5	1.8	3.4	2.1
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	0	-	15	-	0
Time To Reduce *	-	40	-	20	-	40	-	20
Minimum Gap	-	3.0	-	3.0	-	3.0	-	3.0
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

EV PREEMPT

FUNCTION	PRE 3	PRE 5
Exit Phase(s)	2+6	2+6
Preempt Override	OFF	OFF
Delay Time	0	0
Ped Clear Through Yellow	Y	Y
Terminate Phases	N	N
Entrance Walk	1	1
Entrance Ped Clear	255*	255*
Entrance Min Green	1	1
Entrance Yellow Change	25.5*	25.5*
Entrance Red Clear	25.5*	25.5*
Minimum Dwell Time	7	7
Preempt Input Extension Time **	2	2
Preempt Max Time	120	120
Exit Yellow Change	25.5*	25.5*
Exit Red Clear	25.5*	25.5*

* Time defaults to time used for phase during normal operation
** Program Timing on GPS Detection Unit

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
⊕	Type I Pushbutton Post	⊕
□	Pedestrian Signal Head With Push Button & Sign	■
○—○	Signal Pole with Guy	●—●
○—○	Signal Pole with Sidewalk Guy	●—●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
- - -	2-in Underground Conduit	- - -
N/A	Right of Way	— — —
→	Directional Arrow	→
Ⓐ	Street Name Sign (D3-1)	Ⓐ

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For:
Transportation Mobility and Safety Division
State of North Carolina Department of Transportation
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SR 2200 (Gaston Day School Rd) at Hoffman Road

Division 12 | Gaston County | Gastonia

PLAN DATE: May 2021	REVIEWED BY: SL Phillips
PREPARED BY: SP Pennington	REVIEWED BY: KP Baumann

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 044434 KEVIN P. BAUMANN

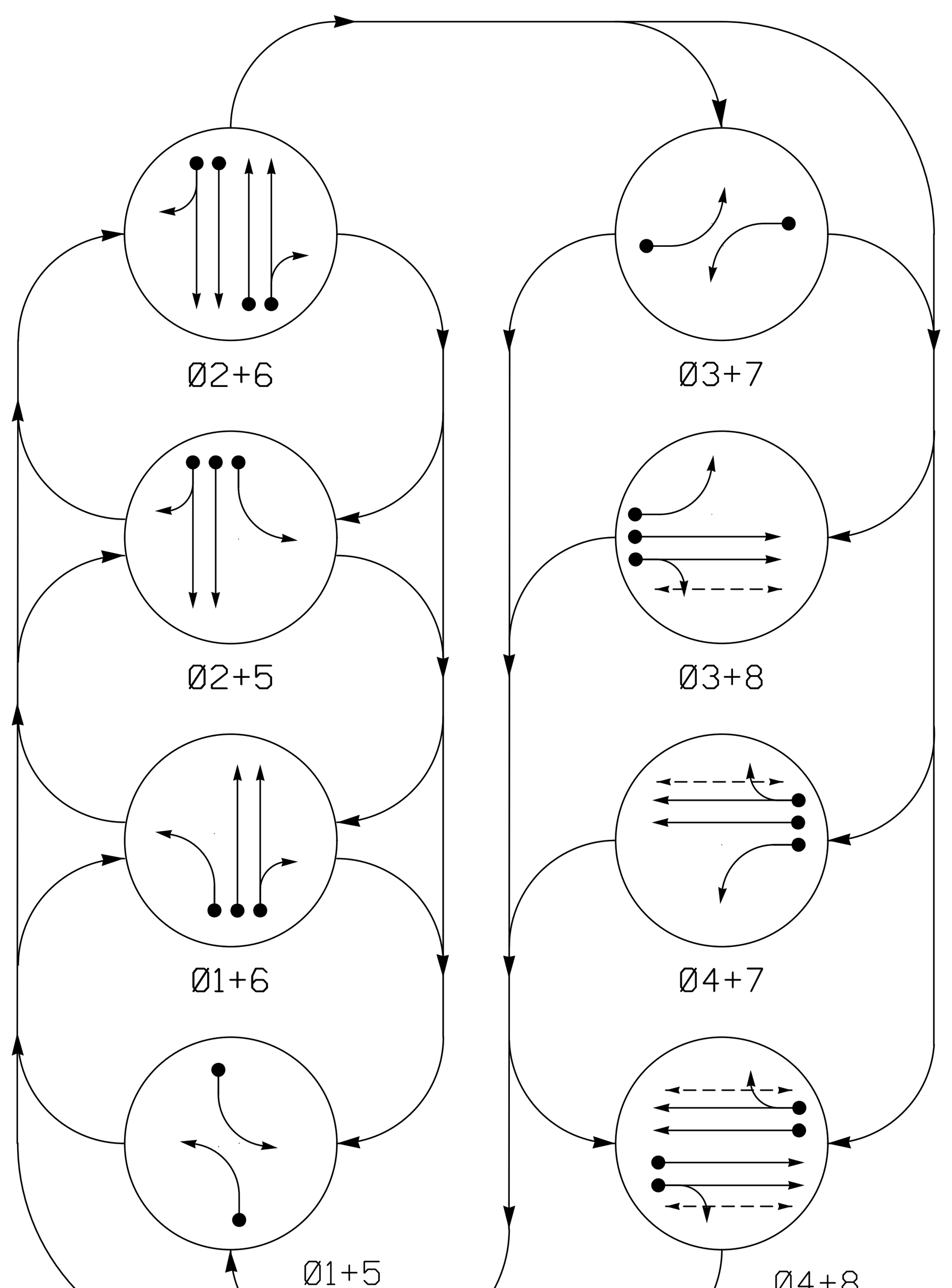
DocuSigned by: 5DC709A06BCB447... SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1604

**kimley-horn.com*SE_RAL1*RAL_TPTO*_ITS*011036569 Gastonia Signal System#9 Signals#54 - Signal Design#0121604-2021.dgn 11:14:59 AM Danielle.Curri 3/9/2022

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.128.0

PHASING DIAGRAM

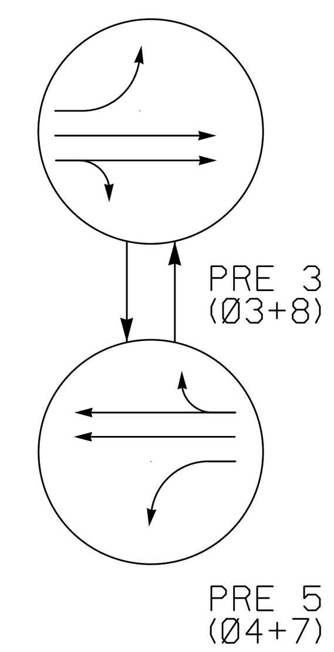


PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

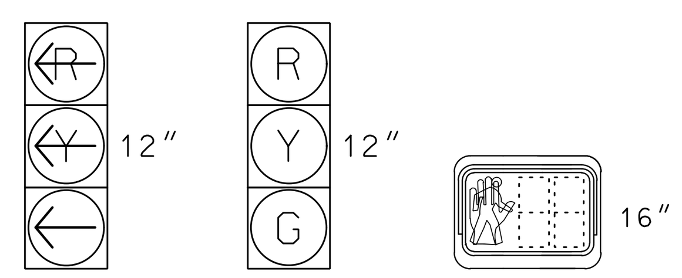
EV PREEMPT PHASES

(Medium Priority)



SIGNAL FACE I.D.

All Heads L.E.D.



11 31 51 71	21,22 41,42 61,62 81,82	P41,P42 P81,P82

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	PRE3	PRE5	FLASH
11	←	←	←R	←R	←R	←R	←R	←R	←R	←R	←R
21,22	R	R	G	G	R	R	R	R	R	R	Y
31	←R	←R	←R	←R	←	←	←R	←R	←	←R	←R
41,42	R	R	R	R	R	R	G	G	R	G	R
51	←	←R	←	←R	←R	←R	←R	←R	←R	←R	←R
61,62	R	G	R	G	R	R	R	R	R	R	Y
71	←R	←R	←R	←R	←	←R	←	←R	←R	←	←R
81,82	R	R	R	R	R	G	R	G	G	R	R
P41,P42	DW	DW	DW	DW	DW	DW	W	W	DW	DW	DRK
P81,P82	DW	DW	DW	DW	DW	W	DW	W	DW	DW	DRK

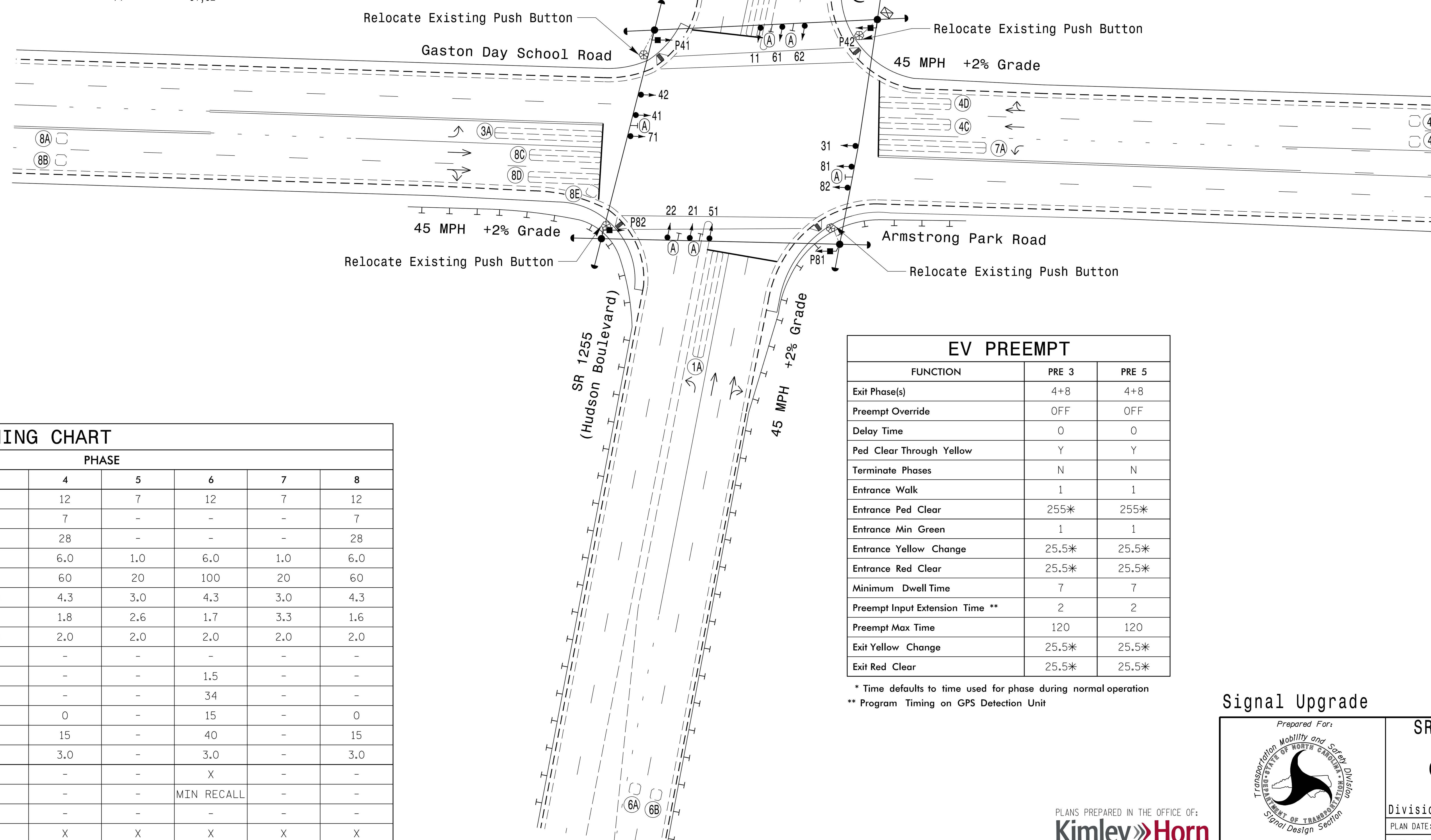
DETECTOR INSTALLATION CHART

DETECTOR: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING: PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X60	0	2-4-2	-	1	Yes	-	-	-	N	-	X
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
3A	6X60	0	2-4-2	-	3	Yes	-	-	-	N	-	X
4A	6X6	300	EXIST	-	4	No	-	-	-	N	-	X
4B	6X6	300	EXIST	-	4	No	-	-	-	N	-	X
4C	6X40	0	2-4-2	-	4	Yes	2	5	-	G	-	X
4D	6X40	0	2-4-2	-	4	Yes	2	5	-	G	-	X
5A	6X60	0	2-4-2	-	5	Yes	-	-	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
7A	6X60	0	2-4-2	-	7	Yes	-	-	-	N	-	X
8A	6X6	300	EXIST	-	8	No	-	-	-	N	-	X
8B	6X6	300	EXIST	-	8	No	-	-	-	N	-	X
8C	6X40	0	2-4-2	-	8	Yes	2	5	-	G	-	X
8D	6X40	0	2-4-2	-	8	Yes	2	5	-	G	-	X
8E	6X6	0	EXIST	-	8	Yes	-	15	-	N	-	X

8 Phase
Fully Actuated w/
Emergency Vehicle Preemption
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Phase 3 and/or phase 7 may be lagged.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
12. Install new cabinet on the existing cabinet foundation.
13. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
14. Reconnect lead-in cable to separate loops 2A, 2B, 4A, 4B, 6A, 6B, 8A & 8B, as shown.
15. Relocate existing pedestrian push buttons to Type I posts, as shown.
16. Install GPS emergency preemption system per manufacturer's instructions to achieve preemption needed, as shown in phasing diagram.
17. Remount pedestrian heads P41, P42, P81, and P82 such that the bottom of the signal housing including brackets is between 7 ft and 10 ft above the sidewalk level as stated by MUTCD Section 4E.05.
18. All proposed pedestrian pedestals and pushbutton posts shall be black in color. See Project Special Provisions for details.
19. City system data:
    Controller Asset #1605.



TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green *	7	12	7	12	7	12	7	12
Walk *	-	-	-	7	-	-	-	7
Ped Clear	-	-	-	28	-	-	-	28
Veh. Extension *	1.0	6.0	1.0	6.0	1.0	6.0	1.0	6.0
Max 1 *	20	100	20	60	20	100	20	60
Yellow	3.0	4.8	3.0	4.3	3.0	4.3	3.0	4.3
Red Clear	2.8	1.6	3.3	1.8	2.6	1.7	3.3	1.6
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	-	1.5	-	-
Max Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	0	-	15	-	0
Time To Reduce *	-	40	-	15	-	40	-	15
Minimum Gap	-	3.0	-	3.0	-	3.0	-	3.0
Locking Detector	-	X	-	-	-	X	-	-
Recall Position	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

EV PREEMPT

FUNCTION	PRE 3	PRE 5
Exit Phase(s)	4+8	4+8
Preempt Override	OFF	OFF
Delay Time	0	0
Ped Clear Through Yellow	Y	Y
Terminate Phases	N	N
Entrance Walk	1	1
Entrance Ped Clear	255*	255*
Entrance Min Green	1	1
Entrance Yellow Change	25.5*	25.5*
Entrance Red Clear	25.5*	25.5*
Minimum Dwell Time	7	7
Preempt Input Extension Time **	2	2
Preempt Max Time	120	120
Exit Yellow Change	25.5*	25.5*
Exit Red Clear	25.5*	25.5*

* Time defaults to time used for phase during normal operation
** Program Timing on GPS Detection Unit

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Type I Pushbutton Post	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
Ⓐ	Street Name Sign (D3-1)	Ⓐ

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Signal Upgrade

Prepared For: Transportation Mobility and Safety Division, Signal Design Section, Department of Transportation, State of North Carolina

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1255 (Hudson Boulevard) at Gaston Day School Road/ Armstrong Park Road

Division 12	Gaston County	Gastonia
PLAN DATE: May 2021	REVIEWED BY: SL Phillips	
PREPARED BY: DM Curri	REVIEWED BY: KP Baumann	

REVISIONS | INIT. | DATE

SCALE 0 40 1"=40'

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

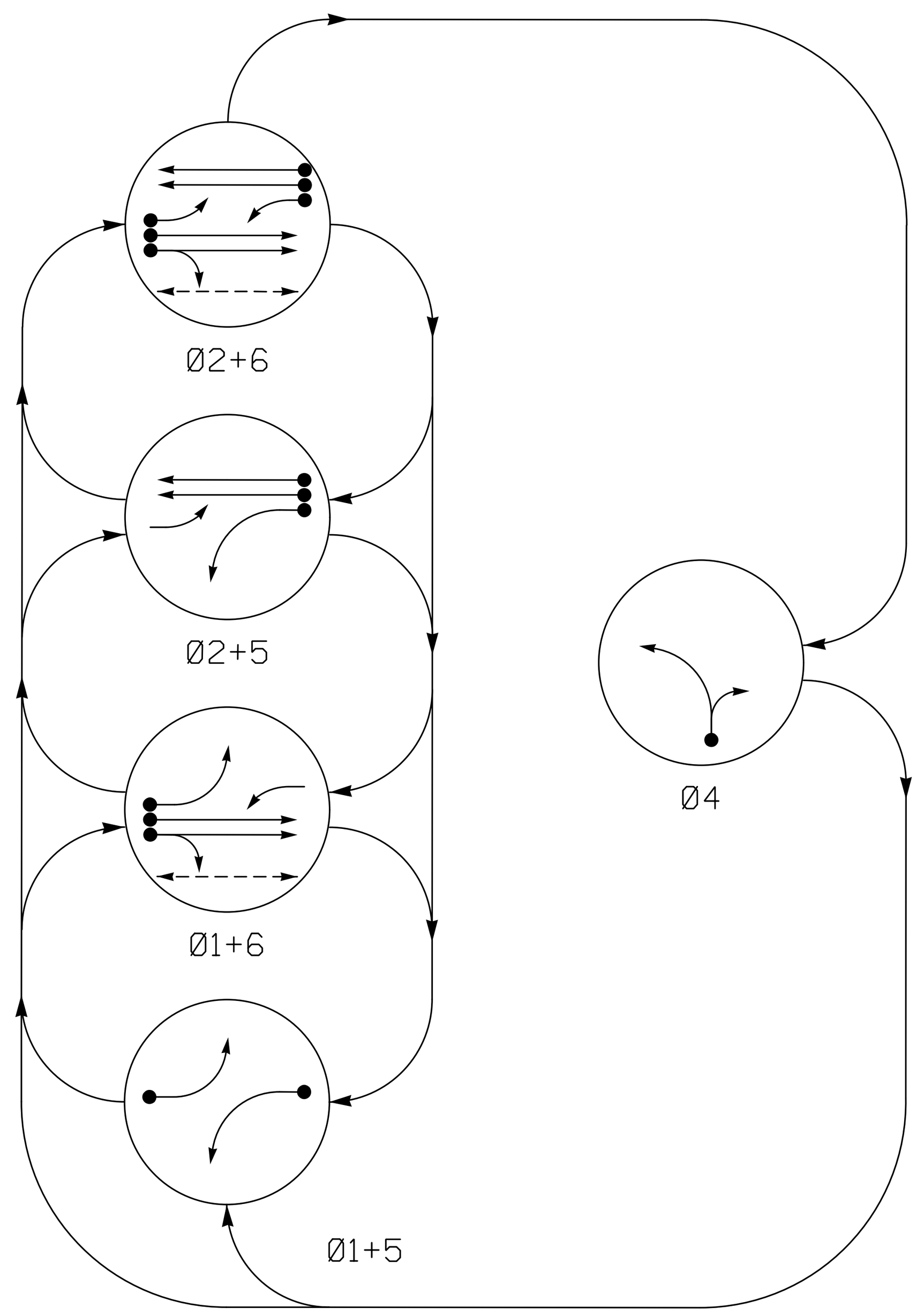
SEAL 044434 NORTH CAROLINA PROFESSIONAL ENGINEER KEVIN P. BAUMANN

DocuSigned by: SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1605

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.129.0

DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

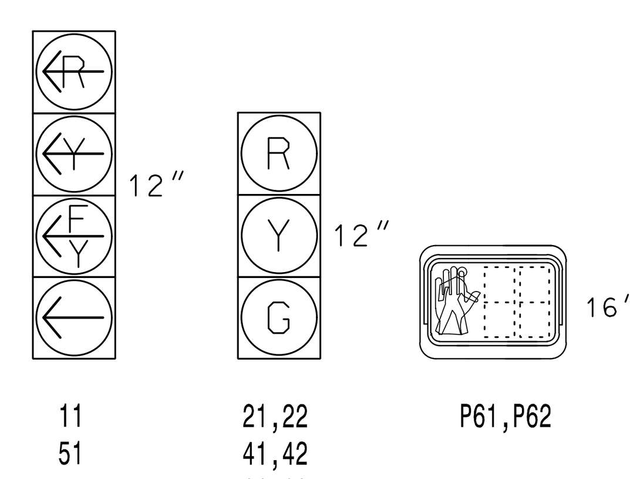
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

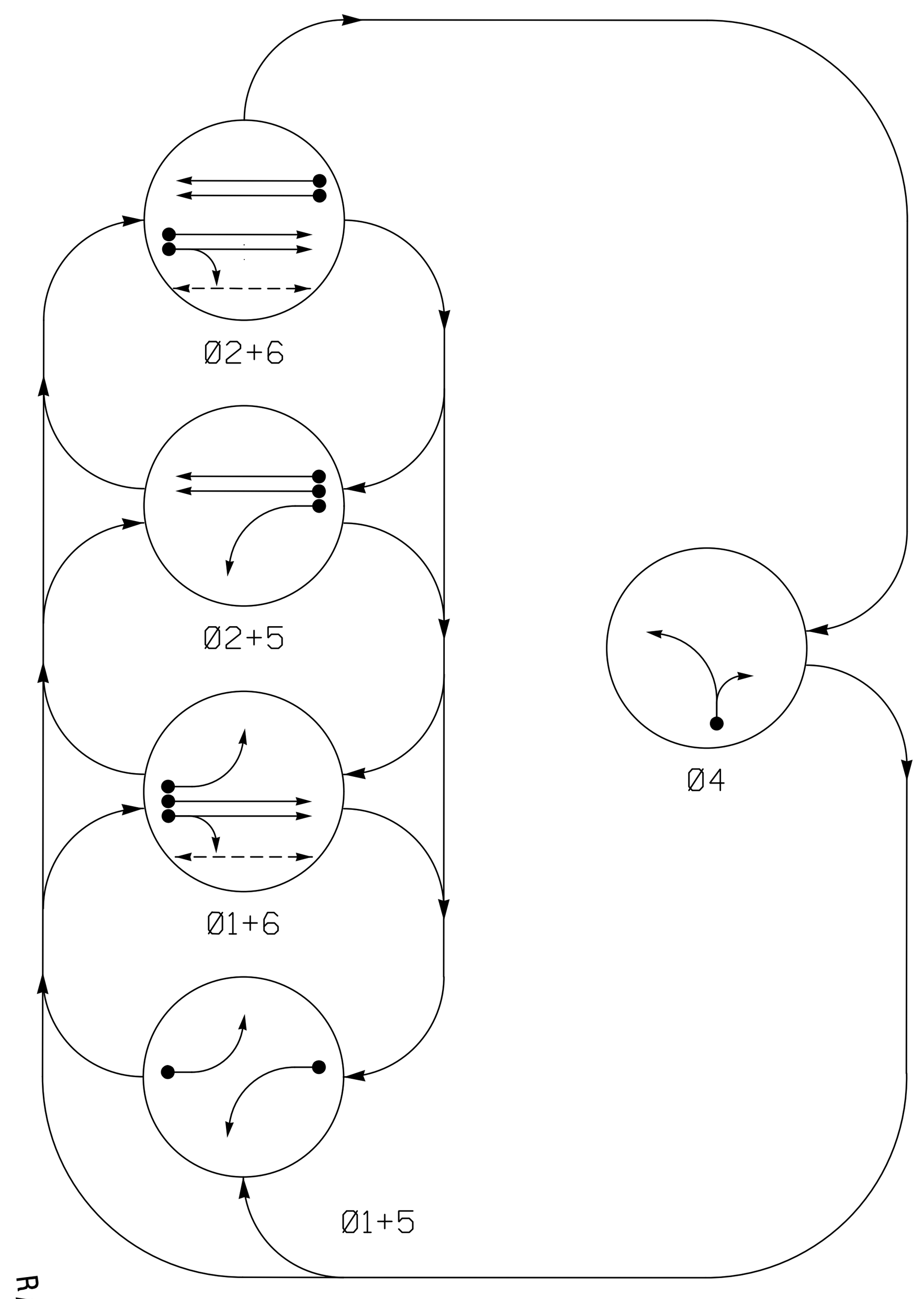
SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4	FLASH
11	←	←	←F/Y	←F/Y	←R	←Y
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←	←F/Y	←	←F/Y	←R	←Y
61,62	R	G	R	G	R	Y
P61,P62	DW	W	DW	W	DW	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



ALTERNATE PHASING DIAGRAM



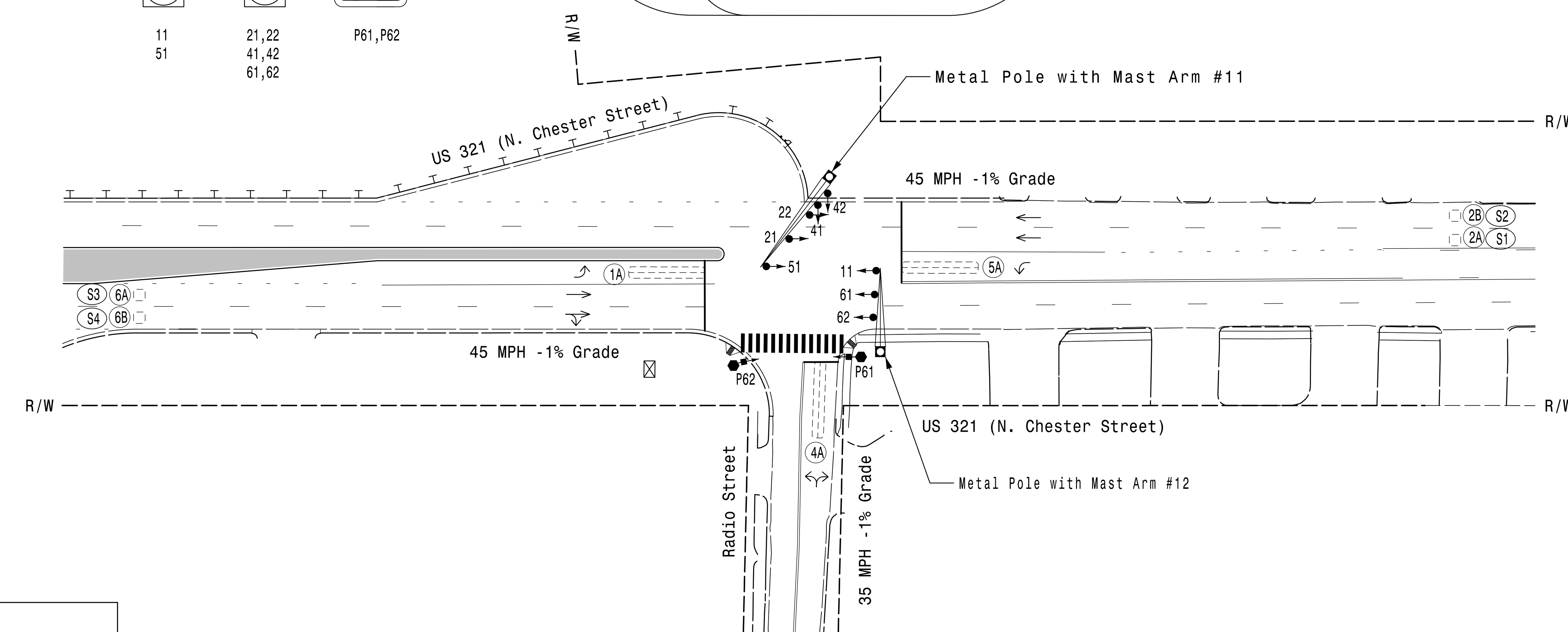
ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4	FLASH
11	←	←	←R	←R	←R	←Y
21,22	R	R	G	G	R	Y
41,42	R	R	R	R	G	R
51	←	←R	←	←R	←R	←Y
61,62	R	G	R	G	R	Y
P61,P62	DW	W	DW	W	DW	DRK

5 Phase
Fully Actuated
w/ Alternate Phasing Operation
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Pavement markings are existing.
9. The City Engineer or their representative will determine the hours of use for each phasing plan.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
11. Install new cabinet on the existing cabinet foundation.
12. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
13. City of system data:
    Controller Asset #1623.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Type II Signal Pedestal	
	Metal Pole with Mastarm	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
N/A	Curb Ramp	

TIMING CHART

FEATURE	PHASE 1	2	4	5	6
Min Green *	7	12	7	7	12
Walk *	-	-	-	-	4
Ped Clear	-	-	-	-	13
Veh. Extension *	2.0	6.0	2.0	2.0	6.0
Max 1 *	20	90	25	20	90
Yellow	3.0	4.6	3.0	3.0	4.6
Red Clear	3.7	2.1	2.6	2.4	2.1
Red Revert	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-
Seconds /Actuation *	-	1.5	-	-	1.5
Max Initial *	-	34	-	-	34
Time Before Reduction *	-	15	-	-	15
Time To Reduce *	-	30	-	-	30
Minimum Gap	-	3.0	-	-	3.0
Locking Detector	-	X	-	-	X
Recall Position	-	MIN RECALL	-	-	MIN RECALL
Dual Entry	-	-	-	-	-
Simultaneous Gap	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

DETECTOR INSTALLATION CHART

DETECTOR: LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING: PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Yes	-	5@	-	N	-	X
					6#	Yes	-	3	-	G	-	X
2A/S1	6X6	300	EXIST	-	2	Yes	-	-	X	N	X	X
2B/S2	6X6	300	EXIST	-	2	Yes	-	-	X	N	X	X
4A	6X40	0	2-4-2	-	4	Yes	-	5	-	N	-	X
5A	6X40	0	2-4-2	-	5	Yes	-	5*	-	N	-	X
					2#	Yes	-	3	-	G	-	X
6A/S3	6X6	300	EXIST	-	6	Yes	-	-	X	N	X	X
6B/S4	6X6	300	EXIST	-	6	Yes	-	-	X	N	X	X

@ Disable delay during Alternate Phasing Operation.
* Reduce Delay to 3 seconds during Alternate Phasing operation.
# Disable Phase call for loop during Alternate Phasing operation.

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Signal Upgrade

Prepared For: Transportation Mobility and Safety Division, State of North Carolina Department of Transportation, Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 321 (N. Chester Street) at Radio Street

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	CF Davis	REVIEWED BY:	KP Baumann

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

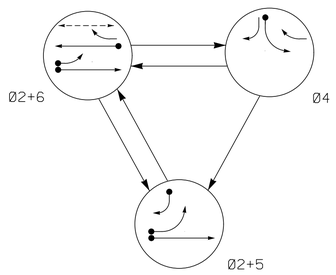
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 5DC709A86BCB447...
SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1623

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.130.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

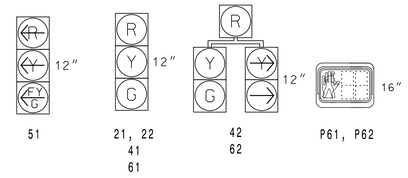
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21,22	G	G	R	Y
41	R	R	G	R
42	R/G	R	G	R
51	←F/Y	←R	←R	←Y
61	R	G	R	Y
62	R	G	R/G→	Y
P61, P62	DW	W	DW	DRK

SIGNAL FACE I.D.

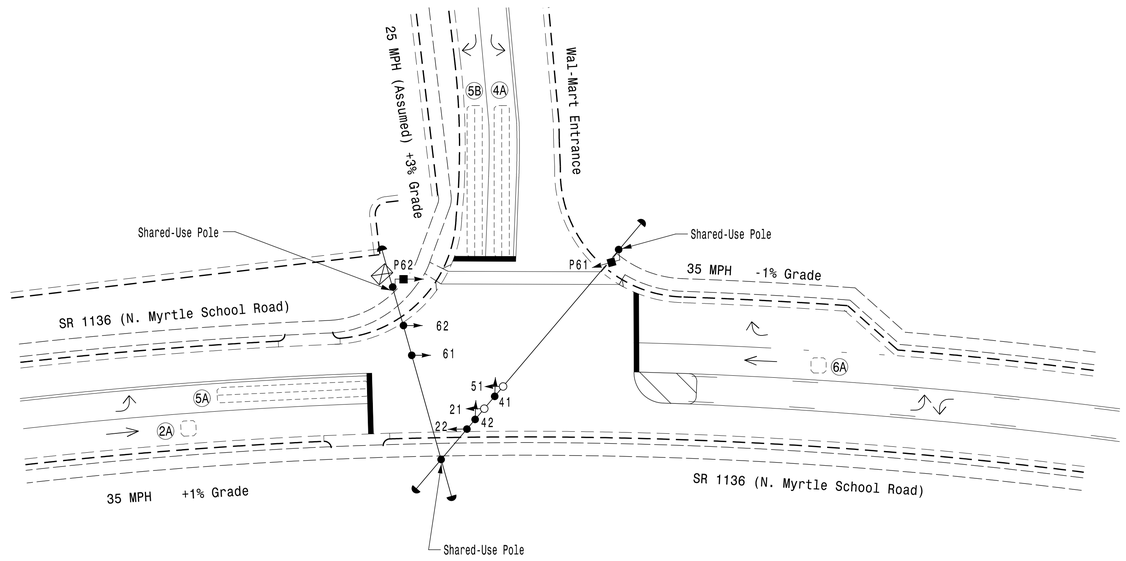
All Heads L.E.D.

(F/Y/G) = Bimodal Section



DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	70	EXIST	-	2	Yes	-	-	-	N	-	X
4A	6X60	0	2-4-2	-	4	Yes	-	3	-	N	-	X
5A	6X60	0	2-4-2	-	5	Yes	-	15	-	N	-	X
					2	Yes	-	-	-	N	-	X
5B	6X60	0	2-4-2	-	5	Yes	-	15	-	N	-	X
6A	6X6	70	EXIST	-	6	Yes	-	-	-	N	-	X



TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	10	7	7	10
Walk *	-	-	-	7
Ped Clear	-	-	-	18
Veh. Extension *	3.0	2.0	1.0	3.0
Max 1 *	60	30	20	60
Yellow	3.9	3.0	3.0	3.9
Red Clear	1.8	2.3	2.6	1.8
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	X	-	-	X
Recall Position	MIN. RECALL	-	-	MIN RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

3 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal head numbered 22.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
12. Install new cabinet on the existing cabinet foundation.
13. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
14. City system data:
    Controller Asset # 1706

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Signal Pole with Guy	●
○	Signal Pole with Sidewalk Guy	●
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
----------	2-in Underground Conduit	----------
N/A	Right of Way	— — —
→	Directional Arrow	→

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For:
Transportation Mobility and Safety Division
State of North Carolina Department of Transportation
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

SR 1136 (N. Myrtle School Road)
at
Wal-Mart Entrance

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	DM Curri	REVIEWED BY:	KP Baumann

SCALE: 0 30 1"=30'

REVISIONS	INIT.	DATE

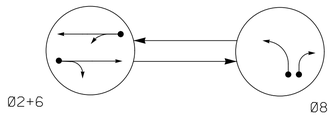
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by:
SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1706

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.131.0

PHASING DIAGRAM



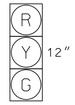
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø2+6	PHASE Ø8	FLASH
21,22	G	R	Y
61,62	G	R	Y
81,82	R	G	R

SIGNAL FACE I.D.

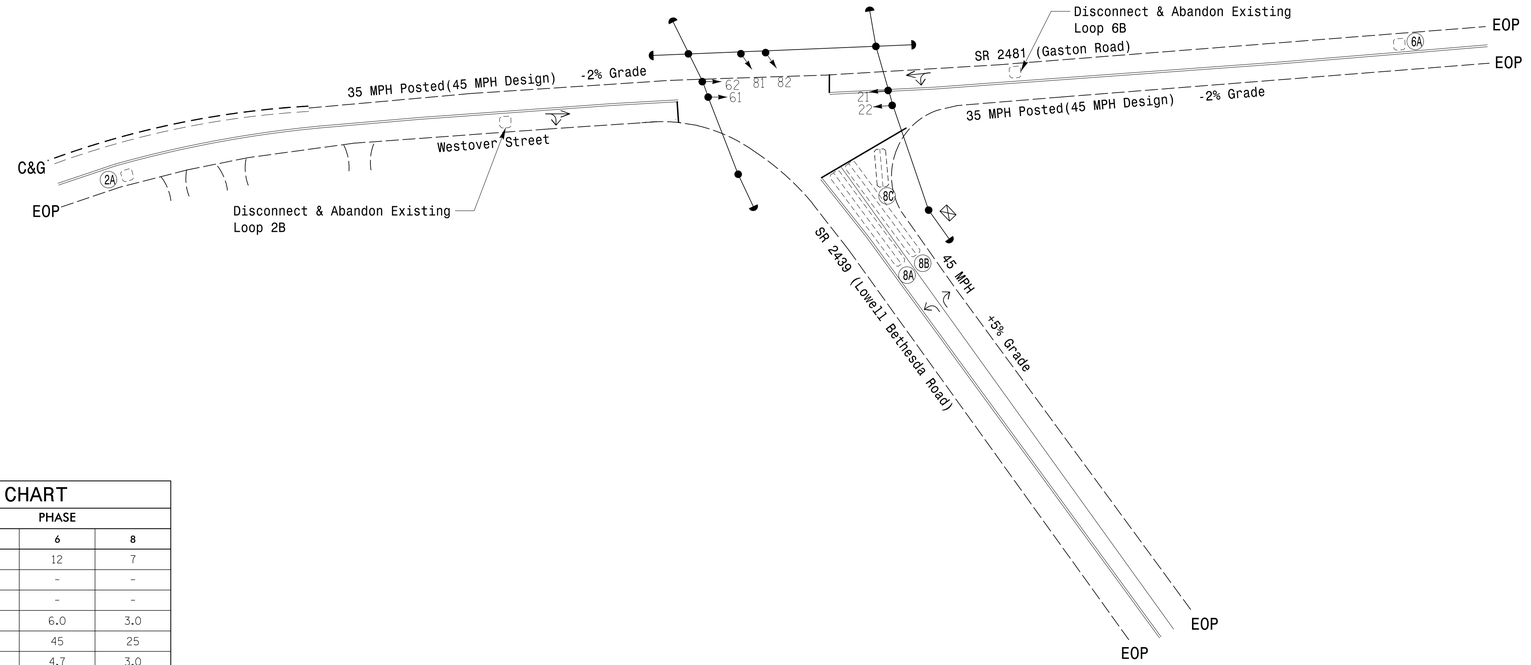
All Heads L.E.D.



21,22
61,62
81,82

DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	-	-	N	-	X
8B	6X40	0	2-4-2	-	8	Yes	-	15	-	N	-	X
8C	6X20	0	2-4-2	-	8	Yes	-	15	-	N	-	X



TIMING CHART

FEATURE	PHASE 2	PHASE 6	PHASE 8
Min Green *	12	12	7
Walk *	-	-	-
Ped Clear	-	-	-
Veh. Extension *	6.0	6.0	3.0
Max 1 *	45	45	25
Yellow	4.7	4.7	3.0
Red Clear	1.3	1.3	2.6
Red Revert	2.0	2.0	2.0
Actuations B4 Add *	-	-	-
Seconds /Actuation *	2.5	2.5	-
Max Initial *	34	34	-
Time Before Reduction *	15	15	-
Time To Reduce *	30	30	-
Minimum Gap	3.0	3.0	-
Locking Detector	X	X	-
Recall Position	MIN RECALL	MIN RECALL	-
Dual Entry	-	-	-
Simultaneous Gap	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

2 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing.
6. Disconnect and abandon existing loops 2B and 6B.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
8. Install new cabinet on the existing cabinet foundation.
9. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
10. Existing phase 4 has been changed to phase 8 on this plan. Change all signal heads, pedestrian signal heads, pedestrian push buttons, and loops as needed to achieve the phasing shown.
11. City of system data:
    Controller Asset #1712.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section

SR 2481 (Gaston Road)/
Westover Street
at
SR 2439 (Lowell Bethesda Road)

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	L Matney	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

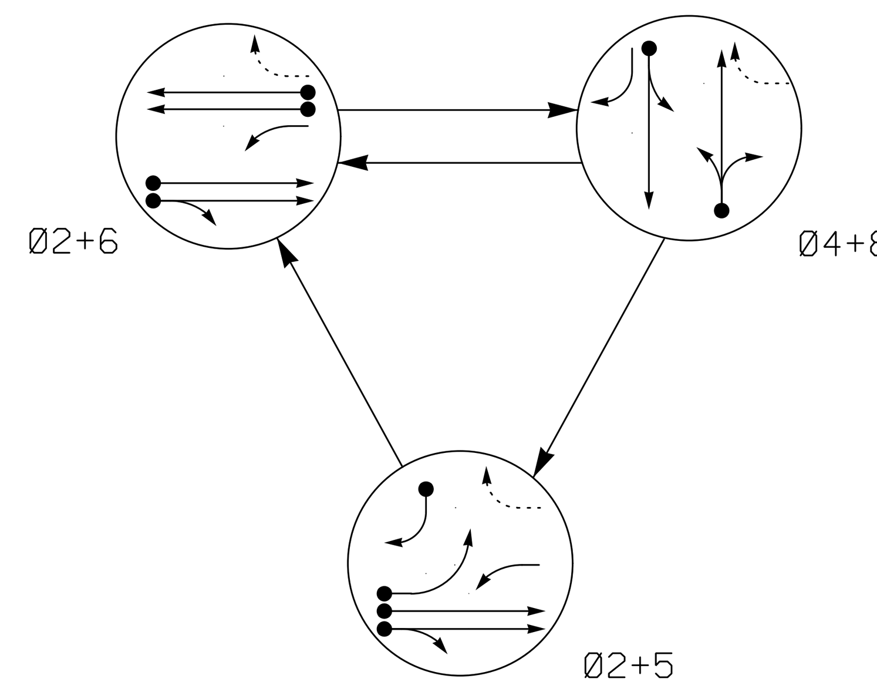
DocuSigned by: 3/11/2022
SIGNATURE DATE

SIG. INVENTORY NO. 12-1712

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

750 N.Greenfield Pkwy,Garner,NC 27529

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

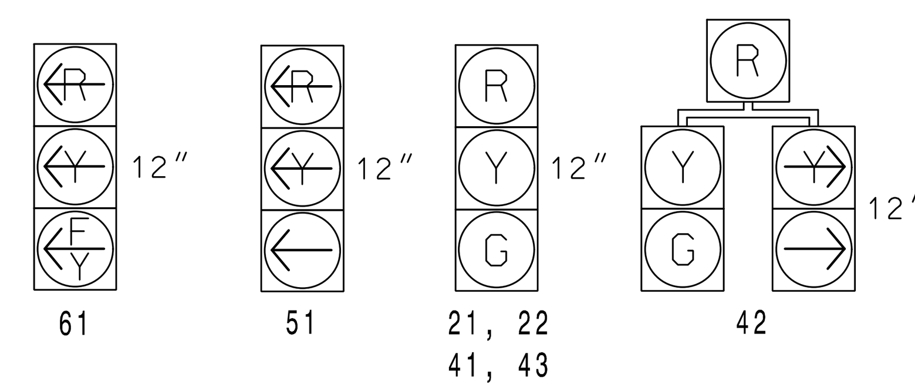
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4+8	FLASH
21, 22	G	G	R	Y
41, 43	R	R	G	R
42	R/→	R	G	R
51	←	←R	←R	←R
61	←F/Y	←F/Y	←R	←Y
62, 63	R	G	R	Y
81, 82	R	R	G	R
SIGN 'F'	*	*	*	OFF

* Changeable Trailblazer Sign controlled remotely

SIGNAL FACE I.D.

All Heads L.E.D.



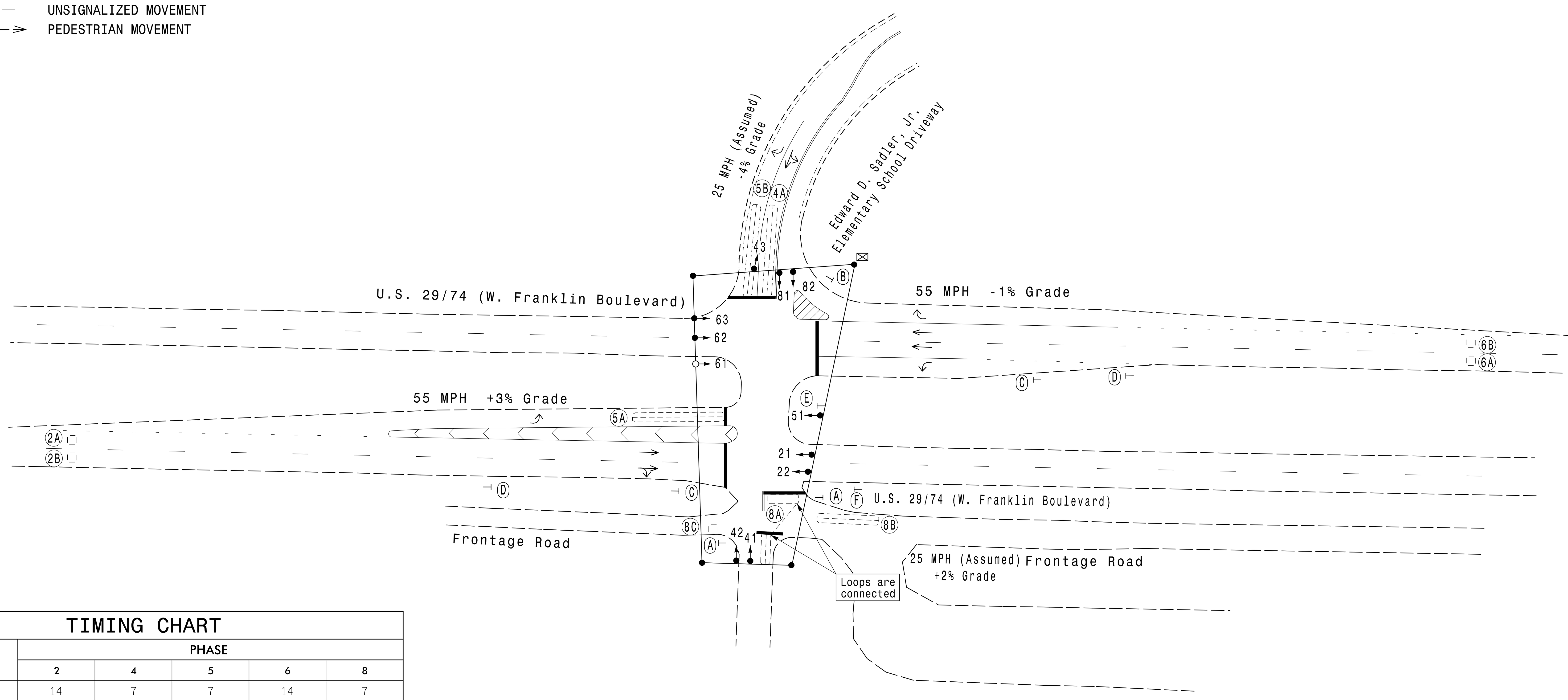
DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	420	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	420	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X60	0	2-4-2	-	4	Yes	-	-	-	N	-	X
5A	6X60	0	2-4-2	-	5	Yes	-	-	-	N	-	X
5B	6X60	0	2-4-2	-	5	Yes	-	15	-	N	-	X
6A	6X6	420	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	420	EXIST	-	6	Yes	-	-	X	N	-	X
8A	EXIST	0	EXIST	-	8	Yes	-	3	-	N	-	X
8B	6X40	EXIST	2-4-2	-	8	Yes	-	3	-	N	-	X
8C	6X6	EXIST	EXIST	-	8	Yes	-	15	-	N	-	X

3 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Reposition existing signal heads numbered 62, 63.
5. Set all detector units to presence mode.
6. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Pavement markings are existing.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
10. Install new cabinet on the existing cabinet foundation.
11. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
12. Existing signal heads 61 and 62 have been relabeled to 62 and 63, respectively.
13. City system data:
    Controller Asset # 1715



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
A	"STOP" Sign (R1-1)	A
B	"YIELD" Sign (R1-2)	B
C	"DO NOT ENTER" Sign (R5-1)	C
D	"WRONG WAY" Sign (R5-1A)	D
E	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	E
F	Type 1B Changeable Trailblazer sign (See Figure 1)	F

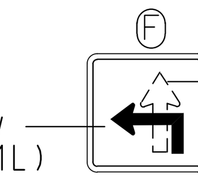
TIMING CHART

FEATURE	PHASE 2	4	5	6	8
Min Green *	14	7	7	14	7
Walk *	-	-	-	-	-
Ped Clear	-	-	-	-	-
Veh. Extension *	6.0	1.0	1.0	6.0	3.0
Max 1 *	90	30	20	90	30
Yellow	5.3	3.4	3.0	5.3	3.4
Red Clear	2.5	3.2	2.9	2.5	3.2
Red Revert	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-
Seconds /Actuation *	1.5	-	-	1.5	-
Max Initial *	46	-	-	46	-
Time Before Reduction *	15	-	-	15	-
Time To Reduce *	40	-	-	40	-
Minimum Gap	3.4	-	-	3.4	-
Locking Detector	X	-	-	X	-
Recall Position	MIN. RECALL	-	-	MIN. RECALL	-
Dual Entry	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

FIGURE 1

TYPE 1B - CHANGEABLE TRAILBLAZER SIGN



PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Signal Upgrade

Prepared For: Transportation Mobility and Safety Division, State of North Carolina Department of Transportation, Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 50
1"=50'

U.S. 29/74 (W. Franklin Boulevard) at Edward D. Sadler, Jr. Elementary School / Frontage Road

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	DM Curri	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

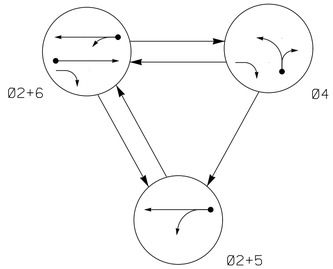
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 5DC709A06BCB447...
SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1715

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.133.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

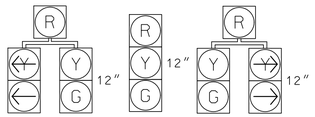
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+5	PHASE Ø2+6	PHASE Ø4	FLASH
21	G	G	R	Y
22	G	G	R	Y
41, 42	R	R	G	R
61	R	G	R	Y
62	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.



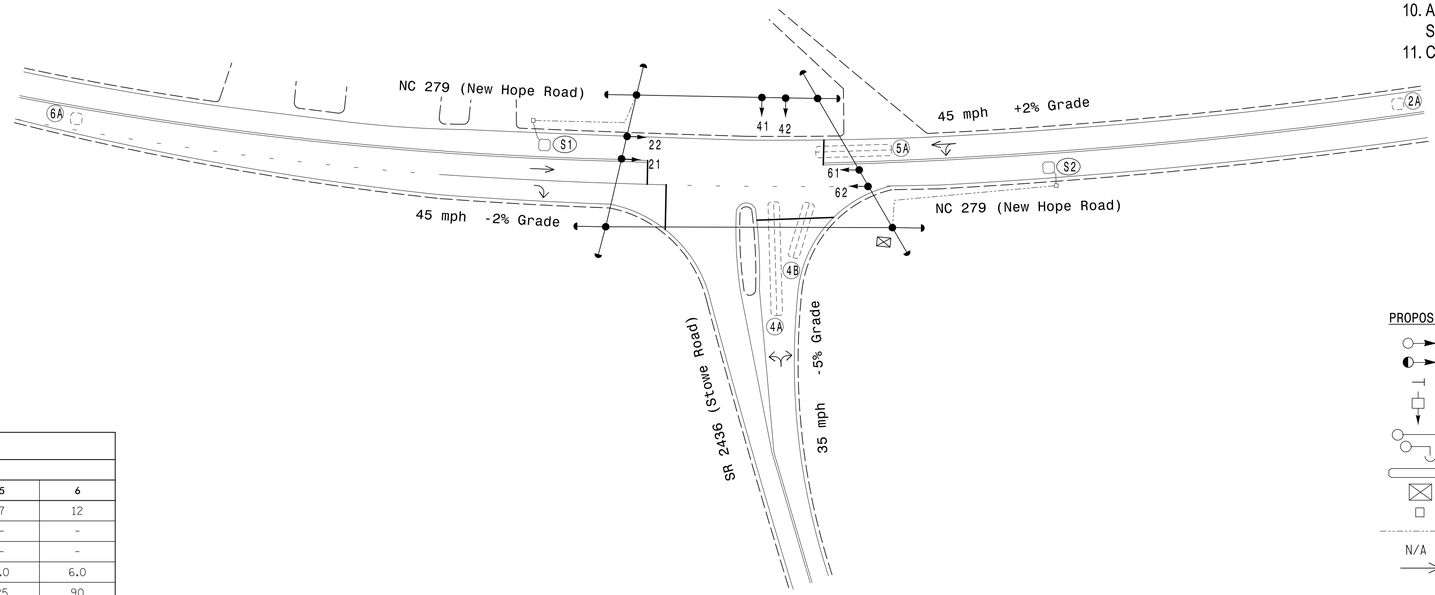
DETECTOR INSTALLATION CHART

DETECTOR LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PROGRAMMING PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	EXIST	-	2	Yes	-	-	-	N	-	X
4A	6X60	+5	2-4-2	-	4	Yes	-	-	-	N	-	X
4B	6X30	+5	2-4-2	-	4	Yes	-	15	-	N	-	X
5A	6X40	+5	2-4-2	-	5	Yes	-	5	-	N	-	X
					2	Yes	2	3	-	G	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
S1	6X6	+150	6	X	-	No	-	-	-	N	X	X
S2	6X6	+200	6	X	-	No	-	-	-	N	X	X

3 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 5 may be lagged.
4. Set all detector units to presence mode.
5. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
9. Install new cabinet on the existing cabinet foundation.
10. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
11. City of system data:
    Controller Asset #1718.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	

TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 5	PHASE 6
Min Green *	12	7	7	12
Walk *	-	-	-	-
Ped Clear	-	-	-	-
Veh. Extension *	6.0	1.0	1.0	6.0
Max 1 *	90	20	25	90
Yellow	4.7	3.1	3.0	4.7
Red Clear	1.4	2.6	2.1	1.4
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	2.5
Max Initial *	-	-	-	34
Time Before Reduction *	15	-	-	15
Time To Reduce *	40	-	-	40
Minimum Gap	3.0	-	-	3.0
Locking Detector	-	-	-	X
Recall Position	MIN RECALL	-	-	MIN RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Signal Upgrade

Prepared For:
Transportation Mobility and Safety Division
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

NC 279 (New Hope Road)
at
SR 2436 (Stowe Road)

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	DM Curri	REVIEWED BY:	KP Baumann

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

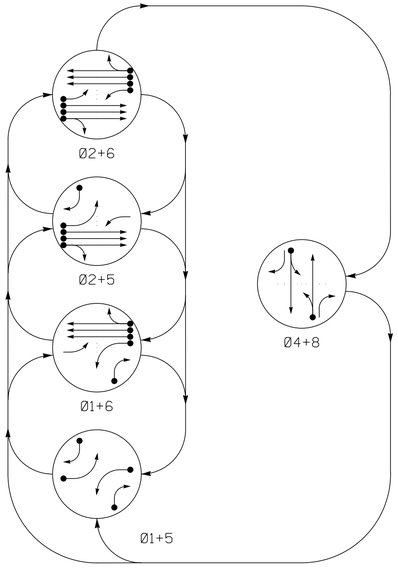
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by:
SIGNATURE 3/11/2022 DATE

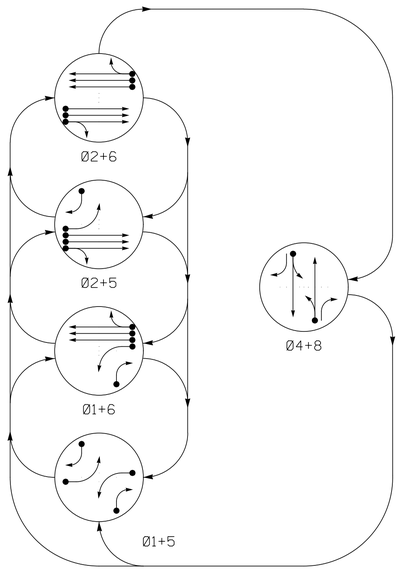
SIG. INVENTORY NO. 12-1718

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.134.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←	←	←F/Y	←F/Y	←R	←Y
21, 22, 23	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R/→	R	R/→	R	G	R
51	←	←F/Y	←	←F/Y	←R	←Y
61, 62, 63	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R/→	R/→	R	R	G	R

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	←	←	←R	←R	←R	←Y
21, 22, 23	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R/→	R	R/→	R	G	R
51	←	←R	←	←R	←R	←Y
61, 62, 63	R	G	R	G	R	Y
81	R	R	R	R	G	R
82	R/→	R/→	R	R	G	R

DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Yes	-	-	-	N	-	X
					6#	Yes	-	3	-	G	-	X
1B	6X40	15	2-4-2	-	1	Yes	-	10	-	N	-	X
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2C	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	N	-	X
5A	6X40	0	2-4-2	-	5	Yes	-	-	-	N	-	X
					2#	Yes	-	3	-	G	-	X
5B	6X40	0	2-4-2	-	5	Yes	-	10	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6C	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
8A	6X40	15	2-4-2	-	8	Yes	-	-	-	N	-	X

* Disable delay during Alternate Phasing Operation.
\# Disable phase call for loop during Alternate Phasing Operation.

5 Phase
Fully Actuated
With Alternate Phasing Operation
Gastonia Signal System

NOTES

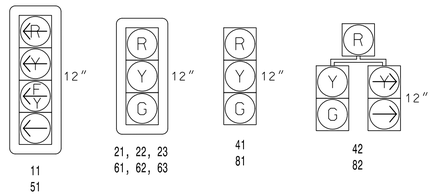
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Phase 1 and/or phase 5 may be lagged.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing.
6. The City Engineer or their representative will determine the hours of use for each phasing plan.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
8. Install new cabinet on the existing cabinet foundation.
9. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
10. City system data:
    Controller Asset #1778

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

SIGNAL FACE I.D.

All Heads L.E.D.



TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	12	10	7	12	10
Walk *	-	-	-	-	-	-
Ped Clear	-	-	-	-	-	-
Veh. Extension *	2.0	6.0	3.0	2.0	6.0	3.0
Max 1 *	20	90	30	20	90	30
Yellow	3.0	5.0	3.6	3.1	5.0	3.6
Red Clear	2.6	1.5	3.0	2.8	1.5	3.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	1.0	-	-	1.0	-
Max Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	30	-	-	30	-
Minimum Gap	-	3.0	-	-	3.0	-
Locking Detector	-	X	-	-	X	-
Recall Position	-	MIN RECALL	-	-	MIN RECALL	-
Dual Entry	-	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○→	Signal Pole with Guy	●→
○↓	Signal Pole with Sidewalk Guy	●↓
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
----------	2-in Underground Conduit	----------
N/A	Right of Way	- - - - - -
→	Directional Arrow	→
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
Ⓑ	Street Name Sign (D3-1)	Ⓑ

Signal Upgrade

Prepared For:
Transportation Mobility and Safety Division
North Carolina Department of Transportation
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SCALE 0 40 1"=40'

US 29-74 (Franklin Boulevard)
at
Gaston Mall Drive /
Nissan Dealer

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	SP Pennington	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

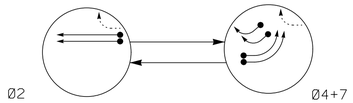
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by:
SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1778

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.135.0

PHASING DIAGRAM



EV PREEMPT PHASES
(Medium Priority)

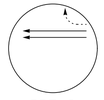
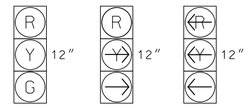


TABLE OF OPERATION				
SIGNAL FACE	PHASE Ø2	PHASE Ø4+7	PHASE PRE 3	PHASE FLASH
21,22	G	R	G	Y
41,42	R	→	R	R
71,72	~~R~~	←	~~R~~	~~R~~

SIGNAL FACE I.D.

All Heads L.E.D.



DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A/S1	6X6	300	EXIST	-	2	Yes	-	-	X	N	X	X
2B/S2	6X6	300	EXIST	-	2	Yes	-	-	X	N	X	X
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	N	-	X
4B	6X40	0	2-4-2	-	4	Yes	-	-	-	N	-	X
7A	6X40	0	2-4-2	-	7	Yes	-	-	-	N	-	X
7B	6X40	0	2-4-2	-	7	Yes	-	-	-	N	-	X

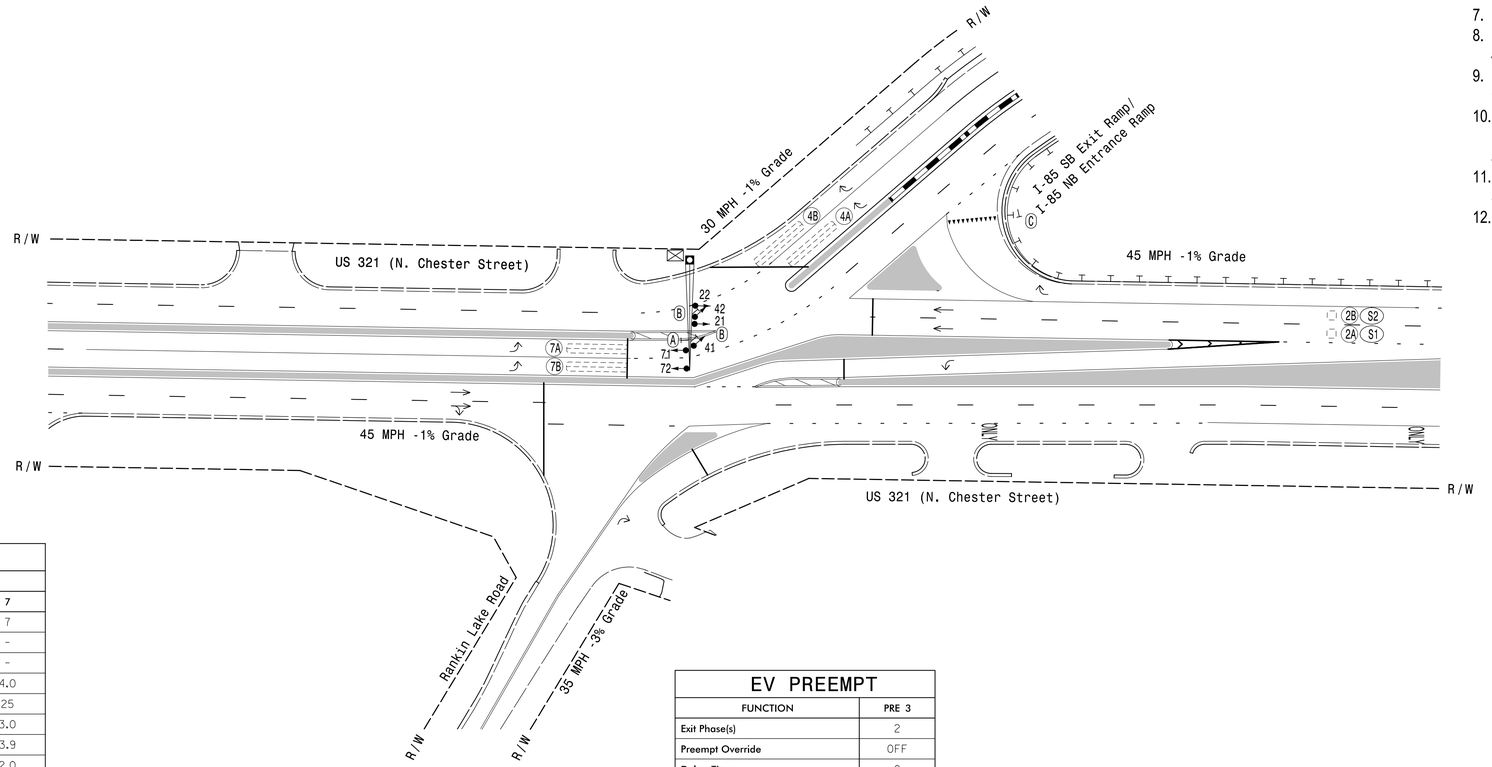
2 Phase
Fully Actuated
w/ Emergency Vehicle Preemption
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Pavement markings are existing.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
7. Install new cabinet on the existing cabinet foundation.
8. Existing signal heads 73 & 74 have been relabeled to 41 & 42, respectively.
9. Existing loops 7C & 7D have been relabeled to 4A & 4B, respectively.
10. Install GPS emergency preemption system per manufacturer's instructions to achieve preemption needed, as shown in the phasing diagram.
11. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
12. City of system data:
    Controller Asset #1803.

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



LEGEND

PROPOSED		EXISTING
○→	Traffic Signal Head	●→
◐→	Modified Signal Head	N/A
⊣	Sign	⊣
□↓	Pedestrian Signal Head With Push Button & Sign	■↓
○	Metal Pole with Mastarm	○
▭	Inductive Loop Detector	▭
⊠	Controller & Cabinet	⊠
□	Junction Box	■
·····	2-in Underground Conduit	·····
N/A	Right of Way	— — —
→	Directional Arrow	→
N/A	Guardrail	⊥⊥⊥
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
Ⓑ	Right Arrow "ONLY" Sign (R3-5R)	Ⓑ
Ⓒ	"YIELD" Sign (R1-2)	Ⓒ

TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 7
Min Green *	12	7	7
Walk *	-	-	-
Ped Clear	-	-	-
Veh. Extension *	6.0	4.0	4.0
Max 1 *	90	25	25
Yellow	4.6	3.0	3.0
Red Clear	2.3	3.9	3.9
Red Revert	2.0	2.0	2.0
Actuations B4 Add *	-	-	-
Seconds /Actuation *	1.5	-	-
Max Initial *	34	-	-
Time Before Reduction *	15	-	-
Time To Reduce *	30	-	-
Minimum Gap	3.0	-	-
Locking Detector	X	-	-
Recall Position	MIN RECALL	-	-
Dual Entry	-	X	X
Simultaneous Gap	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phase 2 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

EV PREEMPT

FUNCTION	PRE 3
Exit Phase(s)	2
Preempt Override	OFF
Delay Time	0
Ped Clear Through Yellow	N
Terminate Phases	N
Entrance Walk	-
Entrance Ped Clear	-
Entrance Min Green	1
Entrance Yellow Change	25.5*
Entrance Red Clear	25.5*
Minimum Dwell Time	7
Preempt Input Extension Time **	2
Preempt Max Time	120
Exit Yellow Change	25.5*
Exit Red Clear	25.5*

* Time defaults to time used for phase during normal operation
** Program Timing on GPS Detection Unit

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Signal Upgrade

Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy.Garner,NC 27529

US 321 (N. Chester Street) at I-85 SB Exit Ramp/ I-85 NB Entrance Ramp

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	CF Davis	REVIEWED BY:	KP Baumann

SCALE 0 50 1"=50'

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

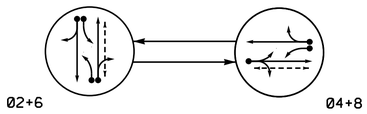
NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by: 3/11/2022
SIGNATURE DATE

SIG. INVENTORY NO. 12-1803

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.136.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

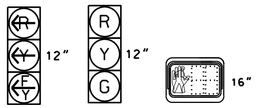
SIGNAL FACE	PHASE 02+6	PHASE 04+8	FLASH
21	~~G~~ Y	~~R~~	~~Y~~
22,23	G	R	Y
41,42	R	G	R
61	~~G~~ Y	~~R~~	~~Y~~
62,63	G	R	Y
81	~~R~~	~~G~~ Y	~~R~~
82,83	R	G	R
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK

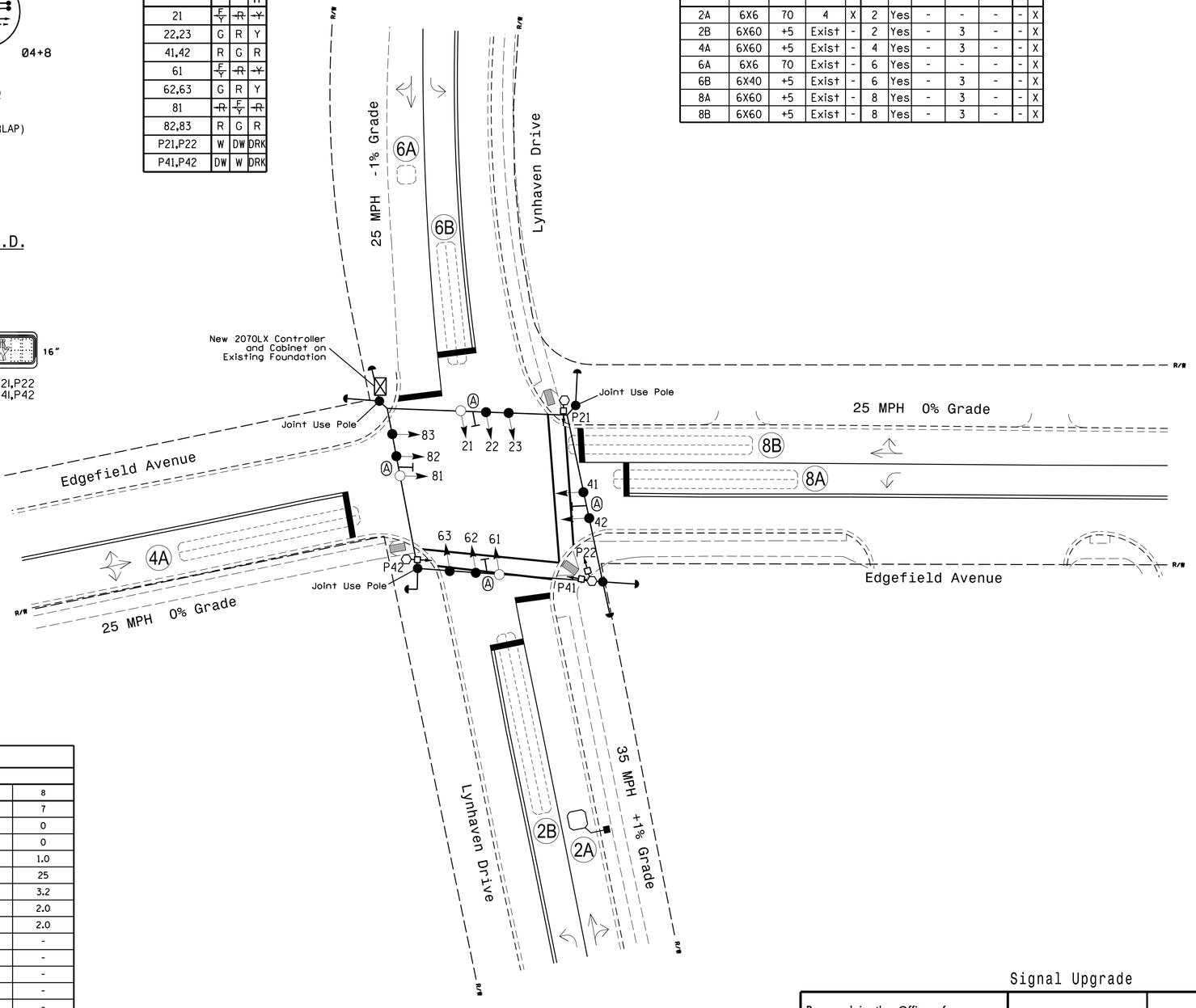
DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	SYSTEM LOOP	NEW CARD
2A	6X6	70	4	X	2	Yes	-	-	-	-	X
2B	6X60	+5	Exist	-	2	Yes	-	3	-	-	X
4A	6X60	+5	Exist	-	4	Yes	-	3	-	-	X
6A	6X6	70	Exist	-	6	Yes	-	-	-	-	X
6B	6X40	+5	Exist	-	6	Yes	-	3	-	-	X
8A	6X60	+5	Exist	-	8	Yes	-	3	-	-	X
8B	6X60	+5	Exist	-	8	Yes	-	3	-	-	X

SIGNAL FACE I.D.

All Heads L.E.D.





TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	10	7	10	7
Walk *	4	4	0	0
Ped Clear	10	10	0	0
Veh. Extension *	3.0	1.0	3.0	1.0
Max 1 *	45	25	45	25
Yellow	3.8	3.2	3.8	3.2
Red Clear	2.1	2.0	2.1	2.0
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	X	-	X	-
Recall Position	VEH. RECALL	-	VEH. RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

2 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Renumber existing signal heads numbered 21, 22, 61, 62, 81 and 82 as 22, 23, 62, 63, 82 and 83 respectively.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. Pavement markings are existing unless otherwise noted.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. All cabinets and base extenders shall be black in color. See Project Special Provisions for details.
12. City system data:
    Controller Asset #0001.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Type II Signal Pedestal	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
	Street Name Sign	

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339
320 Executive Court
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

Prepared For:
181 S.South St.Gastonia,NC 28052

Lynhaven Drive
at
Edgefield Avenue

Division 12 Gaston County Gastonia

PLAN DATE:	April 2021	REVIEWED BY:	E. Sirgany
PREPARED BY:	J. Smith	REVIEWED BY:	

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

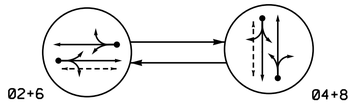
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 018174 ENGINEER EDWARD W. SIRGANY

DocuSigned by: Edward W Sirgany 1/21/2022
30DF5C56A6584F0... DATE

SIG. INVENTORY NO. City-01

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.137.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

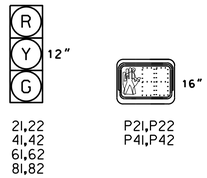
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 02+6	PHASE 04+8	FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK

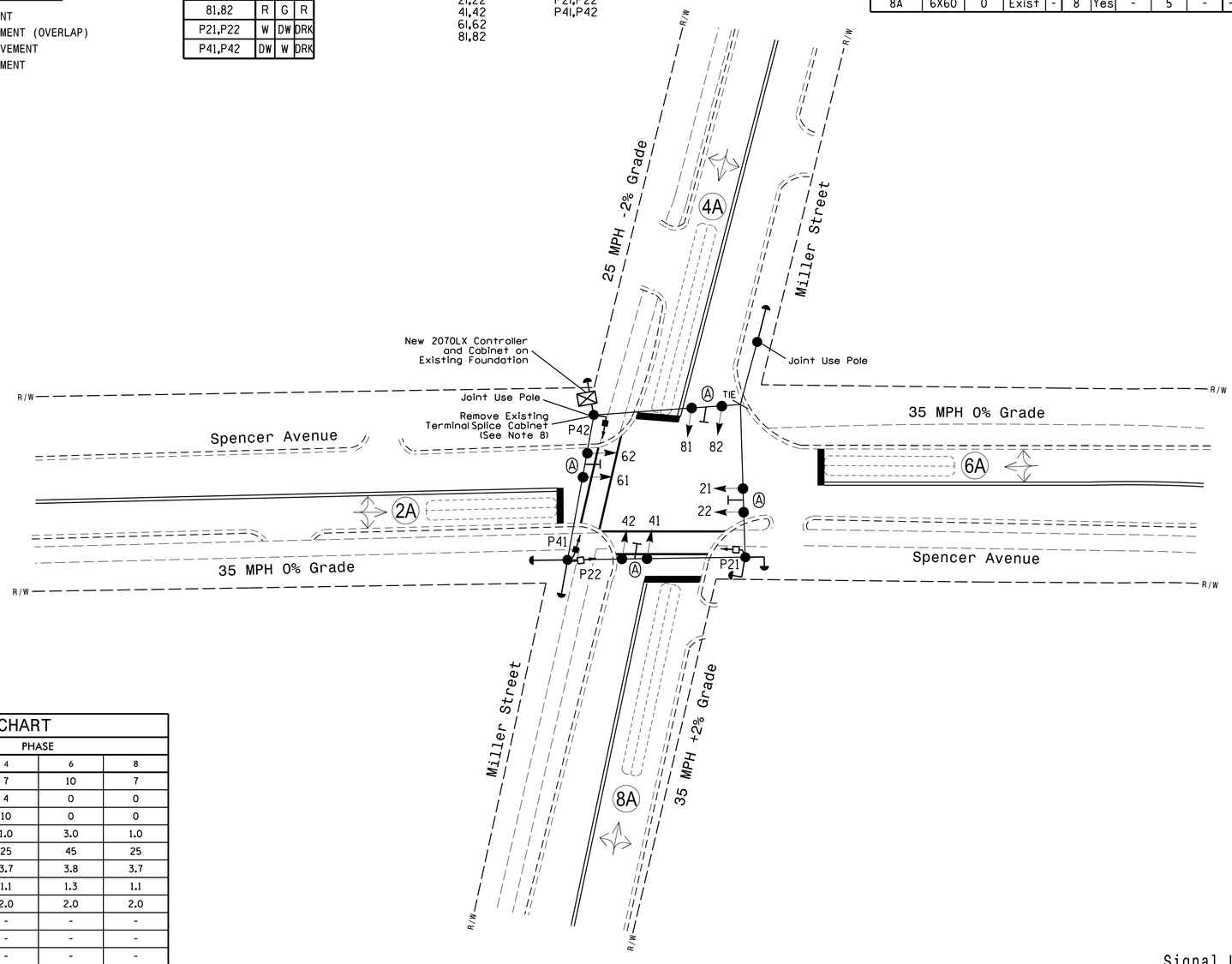
SIGNAL FACE I.D.

All Heads L.E.D.



DETECTOR INSTALLATION CHART

DETECTOR				PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	SYSTEM LOOP	NEW CARD
2A	6X40	0	Exist	-	2	Yes	-	-	-	-	X
4A	6X60	0	Exist	-	4	Yes	-	5	-	-	X
6A	6X40	0	Exist	-	6	Yes	-	-	-	-	X
8A	6X60	0	Exist	-	8	Yes	-	5	-	-	X



TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	10	7	10	7
Walk *	4	4	0	0
Ped Clear	10	10	0	0
Veh. Extension *	3.0	1.0	3.0	1.0
Max 1 *	45	25	45	25
Yellow	3.8	3.7	3.8	3.7
Red Clear	1.3	1.1	1.3	1.1
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	X	-	X	-
Recall Position	VEH. RECALL	-	VEH. RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

2 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Remove existing Terminal Splice Cabinet. Replace existing signal and lead-in cables as required to eliminate aerial splices.
9. Pavement markings are existing unless otherwise noted.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. All cabinets and base extenders shall be black in color. See Project Special Provisions for details.
12. City system data:
    Controller Asset #0002.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
	Street Name Sign	

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339
320 Executive Court
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

Prepared For:
GASTONIA NC
Great Place. Great People. Great Promise.
181 S. South St. Gastonia, NC 28052

Spencer Avenue
at
Miller Street

Division 12 Gaston County Gastonia

PLAN DATE:	April 2021	REVIEWED BY:	J. Smith
PREPARED BY:	M. Parker	REVIEWED BY:	E. Sirgany

SCALE 0 20 1"=20'

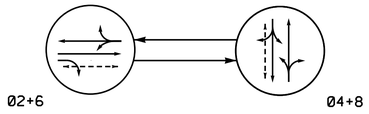
REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 018174 ENGINEER EDWARD W. SIRGANY
DocuSigned by: Edward W Sirgany 1/13/2022
SIGNATURE DATE

SIG. INVENTORY NO. City-02

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig. 138.0

PHASING DIAGRAM



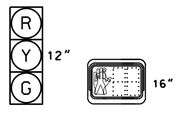
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION			
SIGNAL FACE	PHASE 02+6	PHASE 04+8	FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



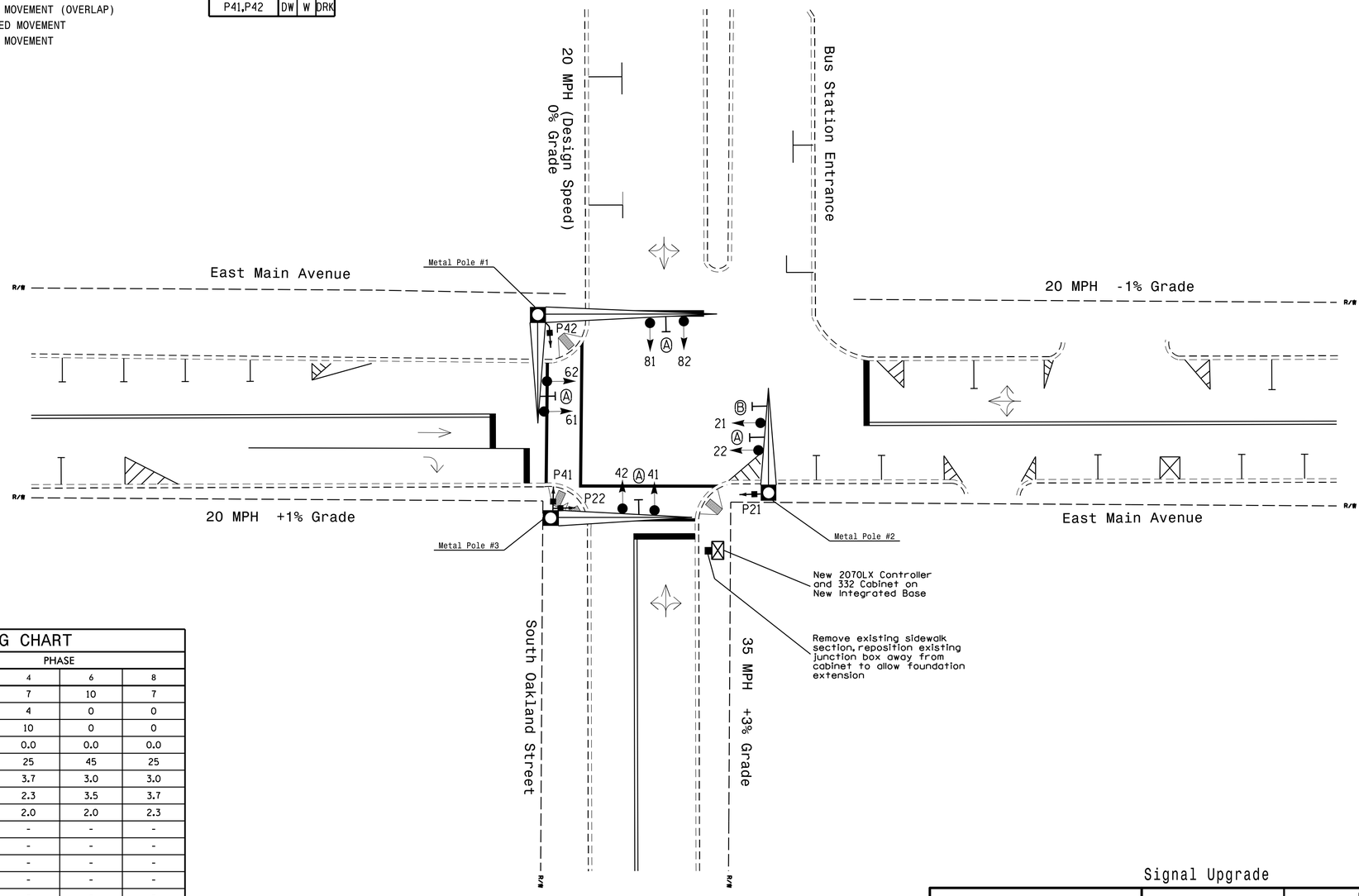
21,22
41,42
61,62
81,82

P21,P22
P41,P42

2 Phase
Pre-Timed
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
5. Pavement markings are existing unless otherwise noted.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. All cabinets and base extenders shall be black in color. See Project Special Provisions for details.
8. City system data:
   Controller Asset #0006.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Metal Pole with Mastarm	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
A	Street Name Sign	A
B	Through Arrow "ONLY" Sign (R3-5A)	B

TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	10	7	10	7
Walk *	4	4	0	0
Ped Clear	9	10	0	0
Veh. Extension *	0.0	0.0	0.0	0.0
Max 1 *	45	25	45	25
Yellow	3.0	3.7	3.0	3.0
Red Clear	3.5	2.3	3.5	3.7
Red Revert	2.0	2.0	2.0	2.3
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	-	-	-
Recall Position	PED/MAX RECALL	PED/MAX RECALL	MAX RECALL	MAX RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339
320 Executive Court
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

Prepared For:
GASTONIA NC
Great Place. Great People. Great Promise.
181 S. South St. Gastonia, NC 28052

East Main Avenue
at
South Oakland Street /
Bus Station Entrance

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	J. Smith
PREPARED BY:	W. Parker	REVIEWED BY:	E. Sirgany

REVISIONS	INIT.	DATE

SCALE 0 20 1"=20'

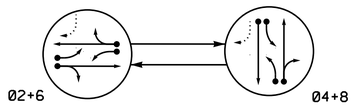
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 018174 ENGINEER EDWARD W. SIRGANY

DocuSigned by: Edward W Sirgany 1/13/2022 DATE
380FB5C86A9584ED...

SIG. INVENTORY NO. City-06

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.139.0

PHASING DIAGRAM



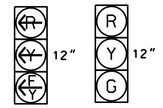
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21	~~F Y~~	~~R~~	~~Y~~
22,23	G	R	Y
41	~~R~~	~~F Y~~	~~R~~
42,43	R	G	R
61	~~F Y~~	~~R~~	~~Y~~
62,63	G	R	Y
81	~~R~~	~~F Y~~	~~R~~
82,83	R	G	R

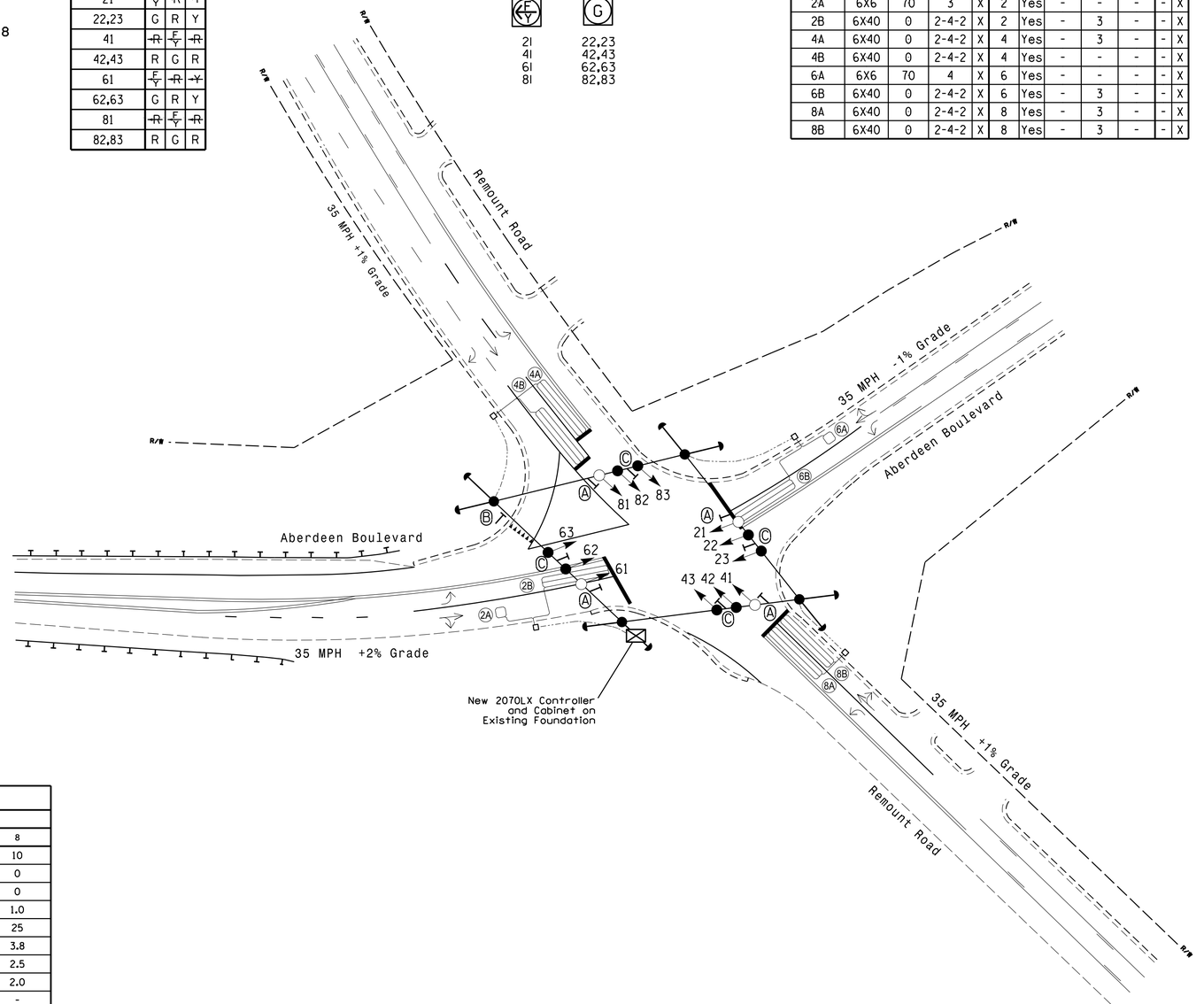
SIGNAL FACE I.D.

All Heads L.E.D.



21 41 61 81 — 22,23 42,43 62,63 82,83

DETECTOR INSTALLATION CHART											
DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	SYSTEM LOOP	NEW CARD
2A	6X6	70	3	X	2	Yes	-	-	-	-	X
2B	6X40	0	2-4-2	X	2	Yes	-	3	-	-	X
4A	6X40	0	2-4-2	X	4	Yes	-	3	-	-	X
4B	6X40	0	2-4-2	X	4	Yes	-	-	-	-	X
6A	6X6	70	4	X	6	Yes	-	-	-	-	X
6B	6X40	0	2-4-2	X	6	Yes	-	3	-	-	X
8A	6X40	0	2-4-2	X	8	Yes	-	3	-	-	X
8B	6X40	0	2-4-2	X	8	Yes	-	3	-	-	X



TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	10	10	10	10
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	3.0	2.0	3.0	1.0
Max 1 *	40	25	40	25
Yellow	3.9	3.8	3.9	3.8
Red Clear	1.4	2.5	1.4	2.5
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	X	-	X	-
Recall Position	VEH. RECALL	-	VEH. RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

2 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Existing phases 2, 4, 6, and 8 have been changed to phases 8, 2, 4, and 6 respectively. Change all signal heads and loops as needed to achieve the phasing shown.
4. Reposition all existing signals and span-mounted signs as necessary to achieve proper alignment.
5. Set all detector units to presence mode.
6. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
7. Pavement markings are existing unless otherwise noted.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. All cabinets and base extenders shall be black in color. See Project Special Provisions for details.
10. City system data:
    Controller Asset #0007.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Guardrail	
N/A	Curb Ramp	
Ⓐ	Left Arrow "ONLY" Sign (R3-5L)	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
Ⓒ	Street Name Sign	Ⓒ

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:

SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339
320 Executive Court
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

Prepared For:

GASTONIA NC
Great Place. Great People. Great Promise.
181 S. South St, Gastonia, NC 28052

Aberdeen Boulevard
at
Remount Road

Division 12 Gaston County Gastonia

PLAN DATE:	April 2021	REVIEWED BY:	J. Smith
PREPARED BY:	W. Parker	REVIEWED BY:	E. Sirgany

REVISIONS	INIT.	DATE

SCALE 0 40 1"=40'

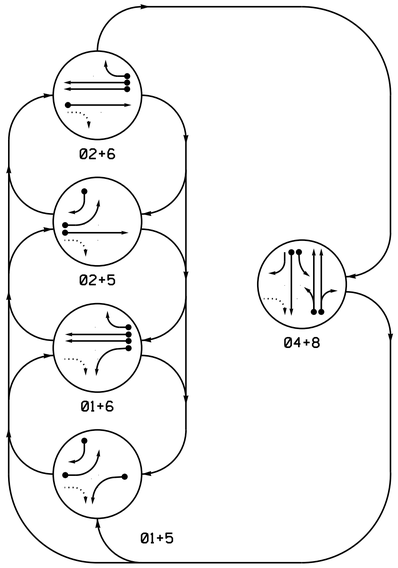
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 018174 ENGINEER EDWARD W. SIRGANY

DocuSigned by: Edward W Sirgany 2/11/2022
DATE

SIG. INVENTORY NO. City-07

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig. 140.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

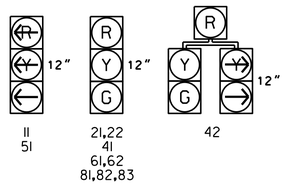
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	04+8	FLASH
11	~~—~~	~~—~~	~~R~~	~~R~~	~~R~~	~~R~~
21,22	R	R	G	G	R	Y
41	R	R	R	R	G	R
42	R/—	R	R/—	R	G	R
51	~~—~~	~~R~~	~~—~~	~~R~~	~~R~~	~~R~~
61,62	R	G	R	G	R	Y
81,82,83	R	R	R	R	G	R

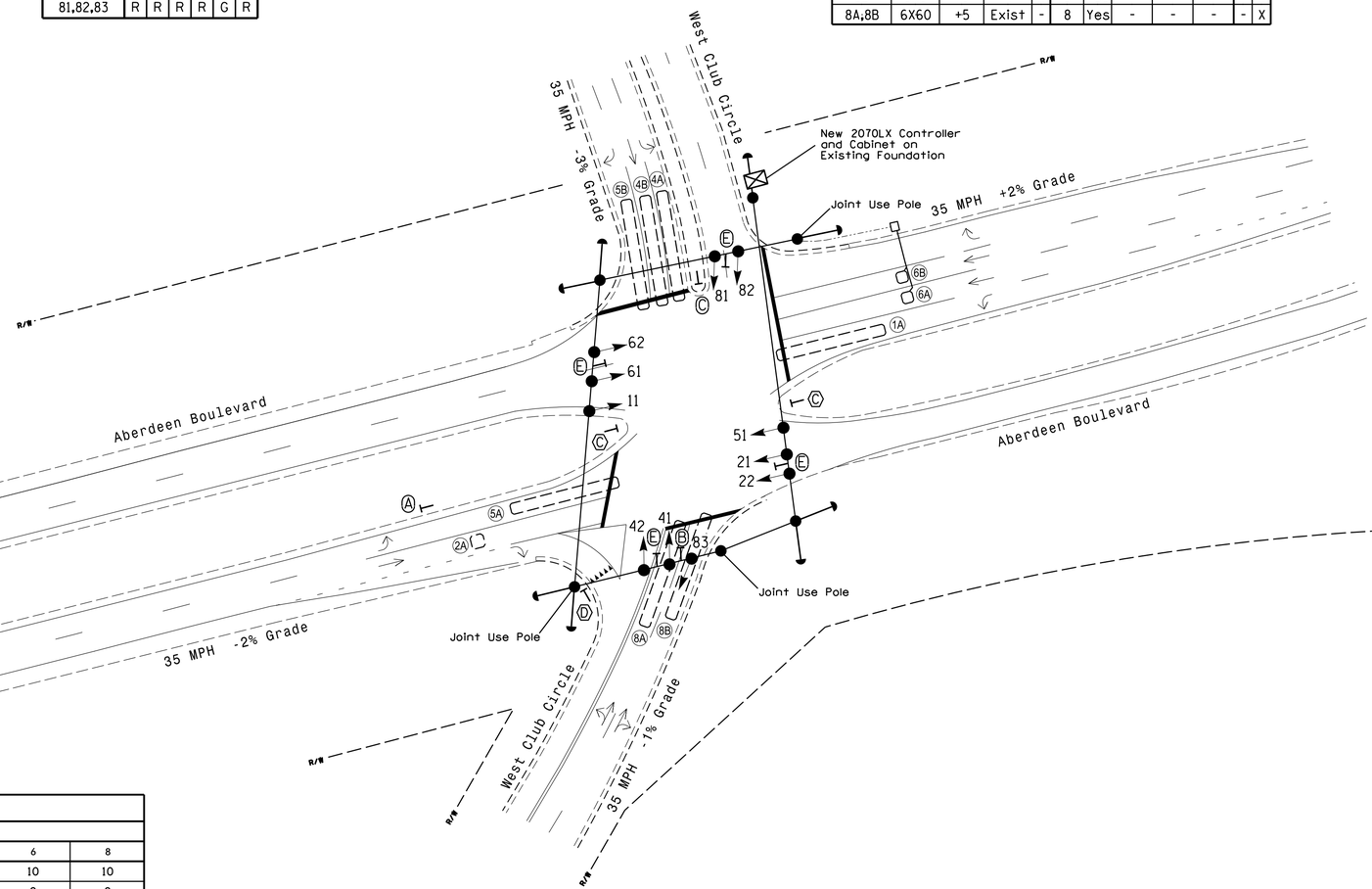
SIGNAL FACE I.D.

All Heads L.E.D.



DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	SYSTEM LOOP	NEW CARD
1A	6X60	+5	Exist	-	1	Yes	-	-	-	-	X
2A	6X6	70	Exist	-	2	Yes	-	-	-	-	X
4A,4B	6X60	+5	Exist	-	4	Yes	-	-	-	-	X
5A	6X60	+5	Exist	-	5	Yes	-	-	-	-	X
5B	6X60	+5	Exist	-	6	Yes	-	15	-	-	X
6A	6X6	70	4	X	6	Yes	-	-	-	-	X
6B	6X6	70	4	X	6	Yes	-	-	-	-	X
8A,8B	6X60	+5	Exist	-	8	Yes	-	-	-	-	X



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
Ⓐ	"LEFT LANE MUST TURN LEFT" Sign (R3-7L)	Ⓐ
Ⓑ	Left Arrow "ONLY" Sign (R3-5L)	Ⓑ
Ⓒ	Keep Right Sign (R4-7A)	Ⓒ
Ⓓ	"YIELD" Sign (R1-2)	Ⓓ
Ⓔ	Street Name Sign	Ⓔ

5 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. In the event of loop replacement, refer to the current ITS and Signal Design Manual and submit a Plan of Record to the Signal Design Section.
7. Pavement markings are existing unless otherwise noted.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
9. All cabinets and base extenders shall be black in color. See Project Special Provisions for details.
10. City system data:
    Controller Asset #0009.

TIMING CHART

FEATURE	PHASE 1	2	4	5	6	8
Min Green *	7	10	10	7	10	10
Walk *	0	0	0	0	0	0
Ped Clear	0	0	0	0	0	0
Veh. Extension *	1.0	3.0	2.0	1.0	3.0	2.0
Max 1 *	20	45	25	20	45	25
Yellow	3.7	4.0	4.1	3.0	3.0	4.1
Red Clear	1.5	1.4	2.4	3.5	3.4	2.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-	-
Max Initial *	-	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-	-
Time To Reduce *	-	-	-	-	-	-
Minimum Gap	-	-	-	-	-	-
Locking Detector	-	X	-	-	X	-
Recall Position	-	VEH. RECALL	-	-	VEH. RECALL	-
Dual Entry	-	-	X	-	-	X
Simultaneous Gap	X	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339
320 Executive Court
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

Prepared For:
GASTONIA NC
Great Place. Great People. Great Promise.
181 S. South St, Gastonia, NC 28052

Aberdeen Boulevard
at
West Club Circle

Division 12 Gaston County Gastonia

PLAN DATE:	April 2021	REVIEWED BY:	J. Smith
PREPARED BY:	M. Parker	REVIEWED BY:	E. Sirgany

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

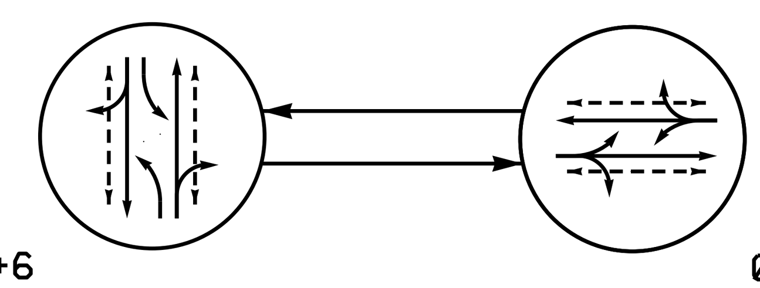
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 018174 ENGINEER EDWARD W. SIRGANY

DocuSigned by: Edward W Sirgany 1/13/2022
39DF8C864664E0... DATE

SIG. INVENTORY NO. City-09

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig. 141.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

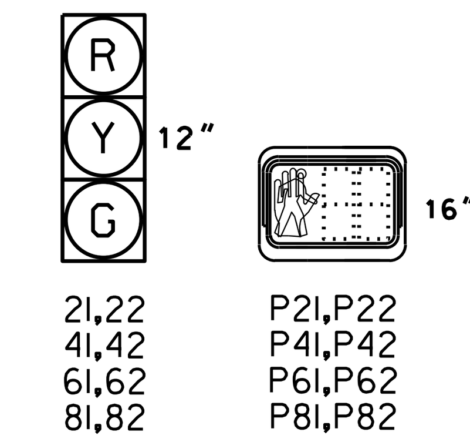
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	Ø4+8	FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK
P61,P62	W	DW	DRK
P81,P82	DW	W	DRK

SIGNAL FACE I.D.

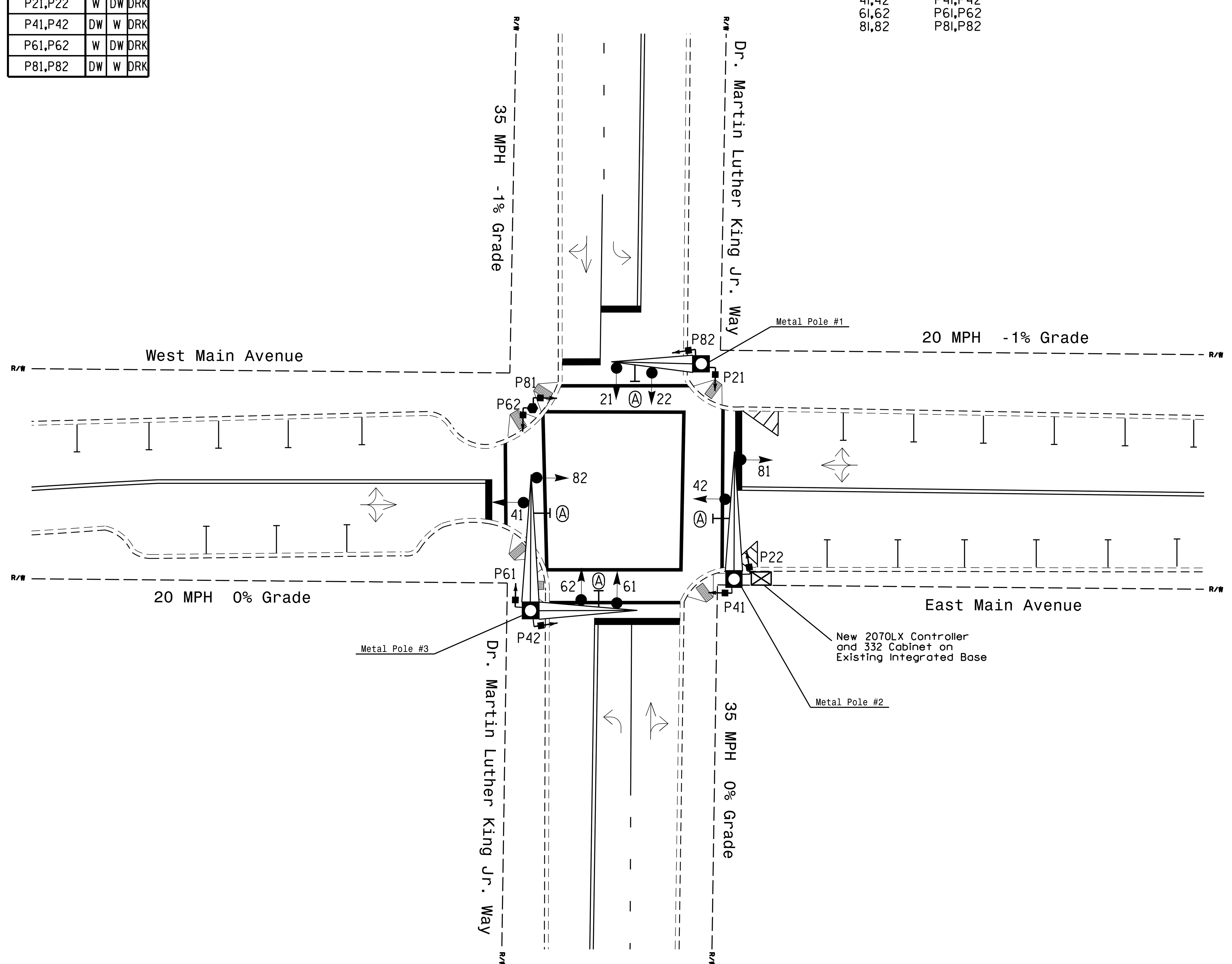
All Heads L.E.D.



2 Phase
Pre-Timed
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
4. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
5. Pavement markings are existing unless otherwise noted.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
7. All cabinets and base extenders shall be black in color. See Project Special Provisions for details.
8. City system data:
   Controller Asset #0010.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Metal Pole with Mastarm	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	Type II Signal Pedestal	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
Ⓐ	Street Name Sign	Ⓐ

TIMING CHART

FEATURE	PHASE 2	4	6	8
Min Green *	15	15	15	15
Walk *	7	7	7	7
Ped Clear	12	10	7	10
Veh. Extension *	0.0	0.0	0.0	0.0
Max 1 *	45	25	45	25
Yellow	3.9	3.9	3.0	3.0
Red Clear	1.3	1.3	2.8	2.8
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds/Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	-	-	-
Recall Position	PED/MAX RECALL	PED/MAX RECALL	PED/MAX RECALL	PED/MAX RECALL
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339
320 Executive Court
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

Prepared For:
GASTONIA NC
Great Place. Great People. Great Promise.
181 S. South St. Gastonia, NC 28052

SCALE 0 20
1"=20'

East Main Avenue / West Main Avenue at Dr. Martin Luther King Jr. Way

Division 12 | Gaston County | Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	J. Smith
PREPARED BY:	M. Parker	REVIEWED BY:	E. Sirgany

REVISIONS	INIT.	DATE

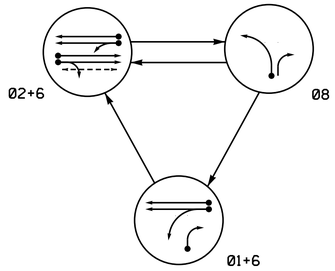
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 018174 ENGINEER EDWARD W. SIRGANY

DocuSigned by: Edward W Sirgany 1/13/2022
DATE

SIG. INVENTORY NO. City-10

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig. 142.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

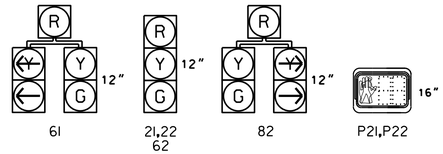
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 08	FLASH
21,22	R	G	R	Y
61	G	G	R	Y
62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R
P21,P22	DW	W	DW	DRK

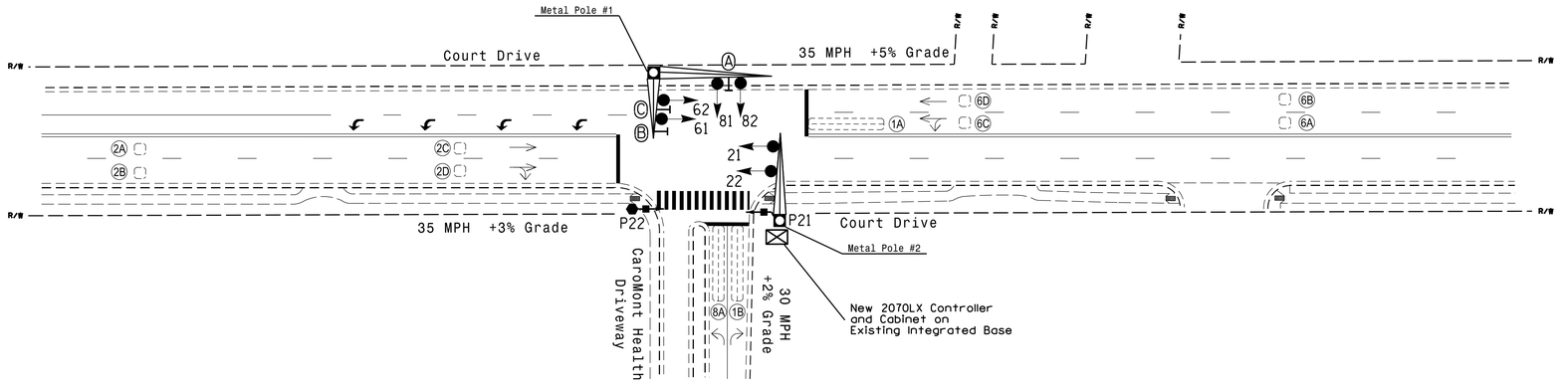
SIGNAL FACE I.D.

All Heads L.E.D.



DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Yes	-	10	-	-	X
					6	Yes	-	-	-	-	X
1B	6X40	0	2-4-2	-	1	Yes	-	10	-	-	X
2A,2B	6X6	250	4	-	2	Yes	1.9	-	-	-	X
2C,2D	6X6	80	3	-	2	Yes	-	-	-	-	X
6A,6B	6X6	250	5	-	6	Yes	1.9	-	-	-	X
6C,6D	6X6	80	4	-	6	Yes	-	-	-	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	-	-	-	X



TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 6	PHASE 8
Min Green *	7	12	12	7
Walk *	0	4	0	0
Ped Clear	0	14	0	0
Veh. Extension *	1.0	2.0	2.0	2.0
Max 1 *	20	45	45	25
Yellow	3.0	3.7	3.6	3.0
Red Clear	2.8	1.5	2.2	2.1
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	-	X	X	-
Recall Position	-	VEH. RECALL	VEH. RECALL	-
Dual Entry	-	-	-	-
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

3 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 1 during phase 2 on.
4. Program controller to clear from phase 2+6 to phase 1 by progressing through phase 8 (see Electrical Details).
5. Existing phase 4 has been changed to phase 8 on this plan. Change all signal heads, pedestrian signal heads, pedestrian pushbuttons, and loops as needed to achieve the phasing shown.
6. Renumber existing loop number 4A as 8A.
7. Set all detector units to presence mode.
8. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
9. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
10. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
11. Pavement markings are existing unless otherwise noted.
12. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
13. All cabinets and base extenders shall be black in color. See Project Special Provisions for details.
14. City system data:
    Controller Asset #0011.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Metal Pole with Mastarm	
	Type II Signal Pedestal	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
A	Street Name Sign	A
B	"LEFT TURN YIELD ON GREEN" Sign (R10-12)	B
C	"DO NOT BLOCK INTERSECTION" Sign (R10-7)	C

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
SUMMIT
DESIGN AND ENGINEERING SER
NC FIRM LICENSE No: P-0339
320 Executive Court
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

Prepared For:
GASTONIA NC
Great Place. Great People. Great Promise.
181 S. South St, Gastonia, NC 28052

Court Drive
at
CaroMont Health Driveway

Division 12 Gaston County Gastonia

PLAN DATE:	April 2021	REVIEWED BY:	J. Smith
PREPARED BY:	M. Parker	REVIEWED BY:	E. Sirgany

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

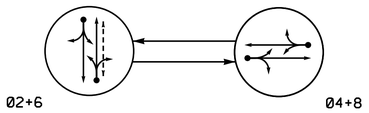
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 018174 ENGINEER EDWARD W. SIRGANY

DocuSigned by: Edward W Sirgany 2/11/2022
DATE

SIG. INVENTORY NO. City-11

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig. 143.0

PHASING DIAGRAM

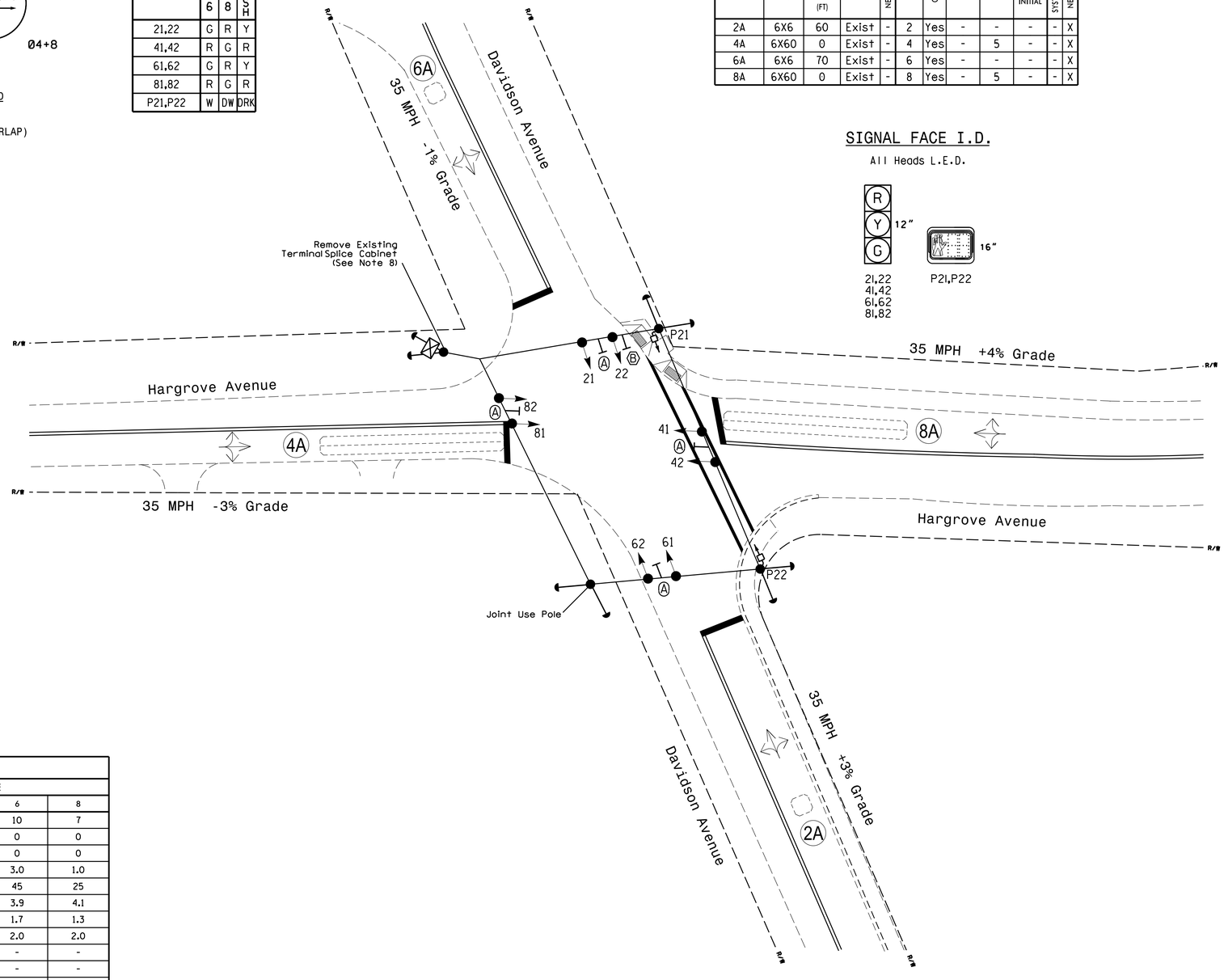


PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION			
SIGNAL FACE	PHASE 02+6	PHASE 04+8	FLASH
21,22	G	R	Y
41,42	R	G	R
61,62	G	R	Y
81,82	R	G	R
P21,P22	W	DW	DRK

DETECTOR INSTALLATION CHART											
DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	SYSTEM LOOP	NEW CARD
2A	6X6	60	Exist	-	2	Yes	-	-	-	-	X
4A	6X60	0	Exist	-	4	Yes	-	5	-	-	X
6A	6X6	70	Exist	-	6	Yes	-	-	-	-	X
8A	6X60	0	Exist	-	8	Yes	-	5	-	-	X



SIGNAL FACE I.D.

All Heads L.E.D.

21,22
41,42
61,62
81,82

P21,P22

2 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. Remove existing Terminal Splice Cabinet. Replace existing signal and lead-in cables as required to eliminate aerial splices.
9. Pavement markings are existing unless otherwise noted.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. All cabinets and base extenders shall be black in color. See Project Special Provisions for details.
12. City system data:
    Controller Asset #0013.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
(A)	Street Name Sign	(A)
(B)	"NO TURN ON RED" Sign (R10-11)	(B)

TIMING CHART				
FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	10	7	10	7
Walk *	0	0	0	0
Ped Clear	0	0	0	0
Veh. Extension *	2.5	1.0	3.0	1.0
Max 1 *	45	25	45	25
Yellow	3.7	4.1	3.9	4.1
Red Clear	2.4	1.3	1.7	1.3
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	-	-	-	-
Max Initial *	-	-	-	-
Time Before Reduction *	-	-	-	-
Time To Reduce *	-	-	-	-
Minimum Gap	-	-	-	-
Locking Detector	X	-	X	-
Recall Position	VEH. RECALL	-	VEH. RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339
320 Executive Court
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

Prepared For:
GASTONIA NC
Great Place, Great People, Great Promise.
181 S. South St. Gastonia, NC 28052

Davidson Avenue
at
Hargrove Avenue

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	J. Smith
PREPARED BY:	M. Parker	REVIEWED BY:	E. Sirgany

SCALE 0 20 1"=20'

REVISIONS	INIT.	DATE

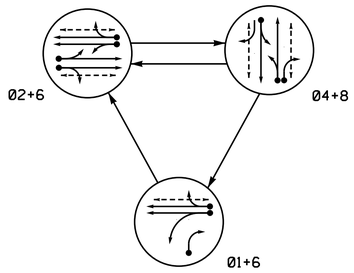
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 018174 ENGINEER EDWARD W. SIRGANY

DocuSigned by: Edward W Sirgany 1/13/2022
39DF0C80A0664E9 DATE

SIG. INVENTORY NO. City-13

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig. 144.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

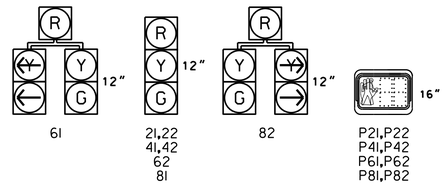
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04+8	FLASH
21,22	R	G	R	Y
41,42	R	R	G	R
61	G	G	R	Y
62	G	G	R	Y
81	R	R	G	R
82	R	R	G	R
P21,P22	DW	W	DW	DRK
P41,P42	DW	DW	W	DRK
P61,P62	W	W	DW	DRK
P81,P82	DW	DW	W	DRK

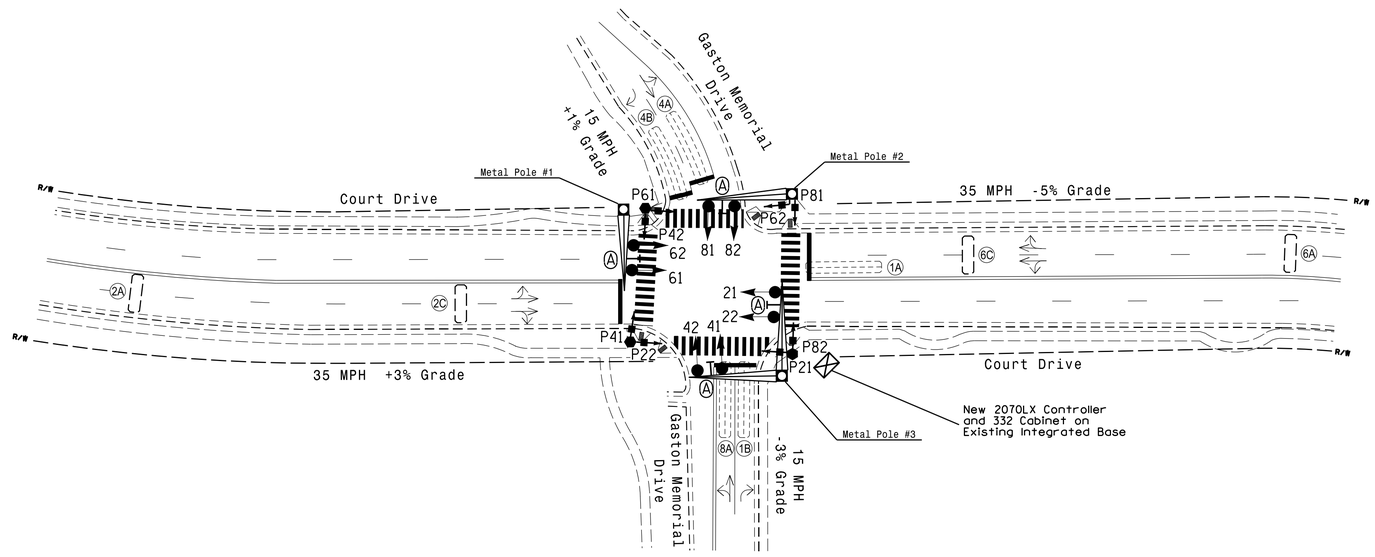
SIGNAL FACE I.D.

All Heads L.E.D.



DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	SYSTEM LOOP	NEW CARD
1A	6X40	+2	2-4-2	-	1	Yes	-	10	-	-	X
					6	Yes	-	-	-	-	X
1B	6X40	+2	2-4-2	-	1	Yes	-	10	-	-	X
2A	6X20	250	3	-	2	Yes	1.9	-	-	-	X
2C	6X20	80	3	-	2	Yes	-	-	-	-	X
4A	6X40	+2	2-4-2	-	4	Yes	-	3	-	-	X
4B	6X40	+2	2-4-2	-	4	Yes	-	10	-	-	X
6A	6X20	250	3	-	6	Yes	1.9	-	-	-	X
6C	6X20	80	3	-	6	Yes	-	-	-	-	X
8A	6X40	+2	2-4-2	-	8	Yes	-	3	-	-	X



TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	7	12	7	12	7
Walk *	0	4	4	4	4
Ped Clear	0	13	12	9	12
Veh. Extension *	1.0	3.0	2.0	3.0	2.0
Max 1 *	20	45	25	45	25
Yellow	3.1	3.7	3.0	4.2	3.0
Red Clear	2.4	1.8	3.5	1.7	3.5
Red Revert	2.0	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-	-
Seconds /Actuation *	-	-	-	-	-
Max Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Locking Detector	-	X	-	X	-
Recall Position	-	VEH. RECALL	-	VEH. RECALL	-
Dual Entry	-	-	X	-	X
Simultaneous Gap	X	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

3 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Omit phase 1 during phase 2 on.
4. Program controller to clear from phase 2+6 to phase 1 by progressing through phases 4+8 (see Electrical Details).
5. Existing phase 4 has been changed to phase 8 on this plan. Change all signal heads, pedestrian signal heads, pedestrian pushbuttons, and loops as needed to achieve the phasing shown.
6. Set all detector units to presence mode.
7. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
8. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
9. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
10. Pavement markings are existing unless otherwise noted.
11. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
12. All cabinets and base extenders shall be black in color. See Project Special Provisions for details.
13. City system data:
    Controller Asset #0014.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Metal Pole with Mastarm	
	Type II Signal Pedestal	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
N/A	Curb Ramp	
	Street Name Sign	

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339
320 Executive Court
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

Prepared For:
GASTONIA NC
Great Place. Great People. Great Promise.
181 S. South St. Gastonia, NC 28052

SCALE 0 40 1"=40'

Court Drive
at
Gaston Memorial Drive

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	J. Smith
PREPARED BY:	M. Parker	REVIEWED BY:	E. Sirgany

REVISIONS	INIT.	DATE

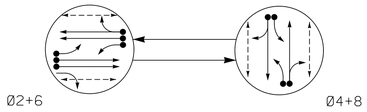
SEAL
NORTH CAROLINA PROFESSIONAL SEAL 018174 ENGINEER EDWARD W. SIRGANY

DocuSigned by: Edward W Sirgany 2/11/2022
DATE

SIG. INVENTORY NO. City-14

PROJECT REFERENCE NO.	SHEET NO.
C-5703	Sig.145.0

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

TABLE OF OPERATION			
SIGNAL FACE	PHASE Ø2+6	PHASE Ø4+8	FLASH
21	~~F Y~~	~~R~~	~~Y~~
22,23	G	R	Y
41,42	R	G	R
61	~~F Y~~	~~R~~	~~Y~~
62,63	G	R	Y
81,82	R	G	R
P21,P22	W	DW	DRK
P41,P42	DW	W	DRK
P61,P62	W	DW	DRK
P81,P82	DW	W	DRK

DETECTOR INSTALLATION CHART

DETECTOR					PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTEND TIME	DELAY TIME	USE ADDED INITIAL	TYPE	SYSTEM LOOP	NEW CARD
2A	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2B	6X6	300	EXIST	-	2	Yes	-	-	X	N	-	X
2C	6X40	0	2-4-2	-	2	Yes	-	3	-	G	-	X
4A	6X40	0	2-4-2	-	4	Yes	-	-	-	N	-	X
4B	6X40	0	2-4-2	-	4	Yes	-	10	-	N	-	X
6A	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6B	6X6	300	EXIST	-	6	Yes	-	-	X	N	-	X
6C	6X40	0	2-4-2	-	6	Yes	-	3	-	G	-	X
8A	6X40	0	2-4-2	-	8	Yes	-	-	-	N	-	X
8B	6X40	0	2-4-2	-	8	Yes	-	10	-	N	-	X

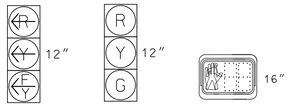
2 Phase
Fully Actuated
Gastonia Signal System

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Pogram pedestrian heads to countdown the flashing "Don't Walk" time only.
7. Pavement markings are existing.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
9. Install new cabinet on the existing cabinet foundation.
10. All new cabinets and base extenders shall be black in color. See Project Special Provisions for details.
11. City of system data:
    Controller Asset #1825.

SIGNAL FACE I.D.

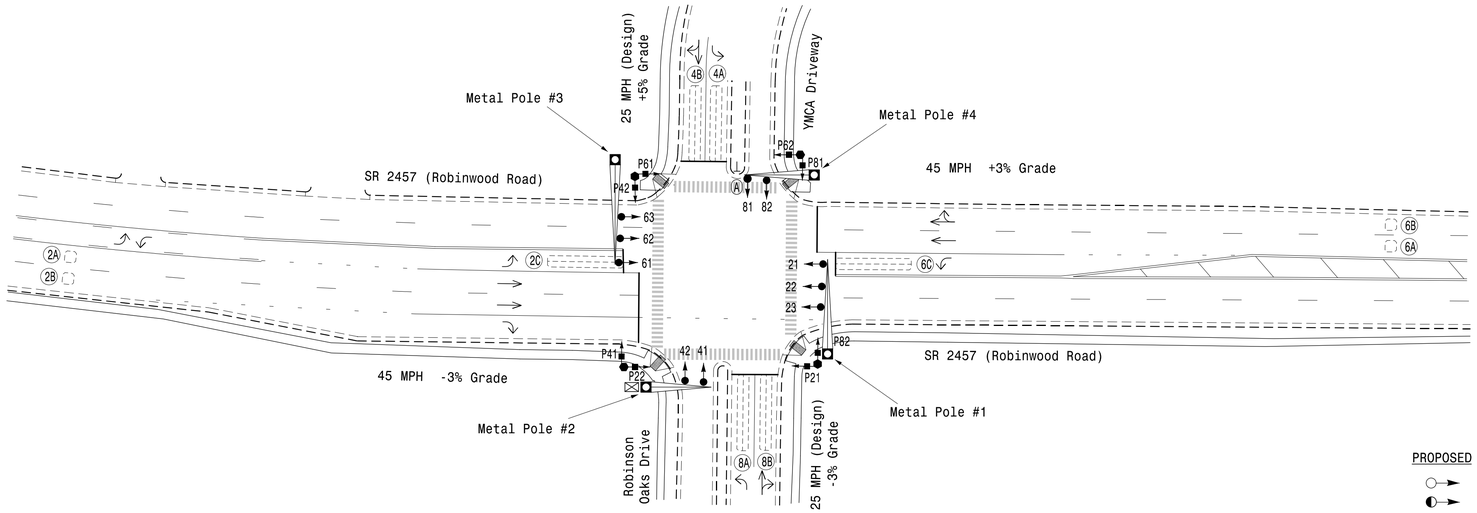
All Heads L.E.D.



21
61

22,23
41,42
62,63
81,82

P21,P22
P41,P42
P61,P62
P81,P82



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Type II Signal Pedestal	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Metal Pole with Mastarm	
N/A	Wheelchair Ramp	
Ⓐ	Keep Right Sign (R4-7A)	Ⓐ

TIMING CHART				
FEATURE	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green *	12	7	12	7
Walk *	7	7	7	7
Ped Clear	16	22	15	21
Veh. Extension *	6.0	2.0	6.0	2.0
Max 1 *	60	20	60	20
Yellow	4.8	3.3	4.8	3.3
Red Clear	1.6	2.8	1.6	2.8
Red Revert	2.0	2.0	2.0	2.0
Actuations B4 Add *	-	-	-	-
Seconds /Actuation *	1.5	-	1.5	-
Max Initial *	34	-	34	-
Time Before Reduction *	15	-	15	-
Time To Reduce *	30	-	30	-
Minimum Gap	3.0	-	3.0	-
Locking Detector	X	-	X	-
Recall Position	MIN RECALL	-	MIN RECALL	-
Dual Entry	-	X	-	X
Simultaneous Gap	X	X	X	X

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

Signal Upgrade

Prepared For:
Transportation Mobility and Safety Division
State of North Carolina Department of Transportation
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SCALE
0 40
1"=40'

SR 2457 (Robinwood Road)
at
Robinson Oaks Drive /
YMCA Driveway

Division 12 Gaston County Gastonia

PLAN DATE:	May 2021	REVIEWED BY:	SL Phillips
PREPARED BY:	CF Davis	REVIEWED BY:	KP Baumann

REVISIONS	INIT.	DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 044434 ENGINEER KEVIN P. BAUMANN

DocuSigned by:
SIGNATURE 3/11/2022 DATE

SIG. INVENTORY NO. 12-1825