

# STATE OF VERMONT AGENCY OF TRANSPORTATION

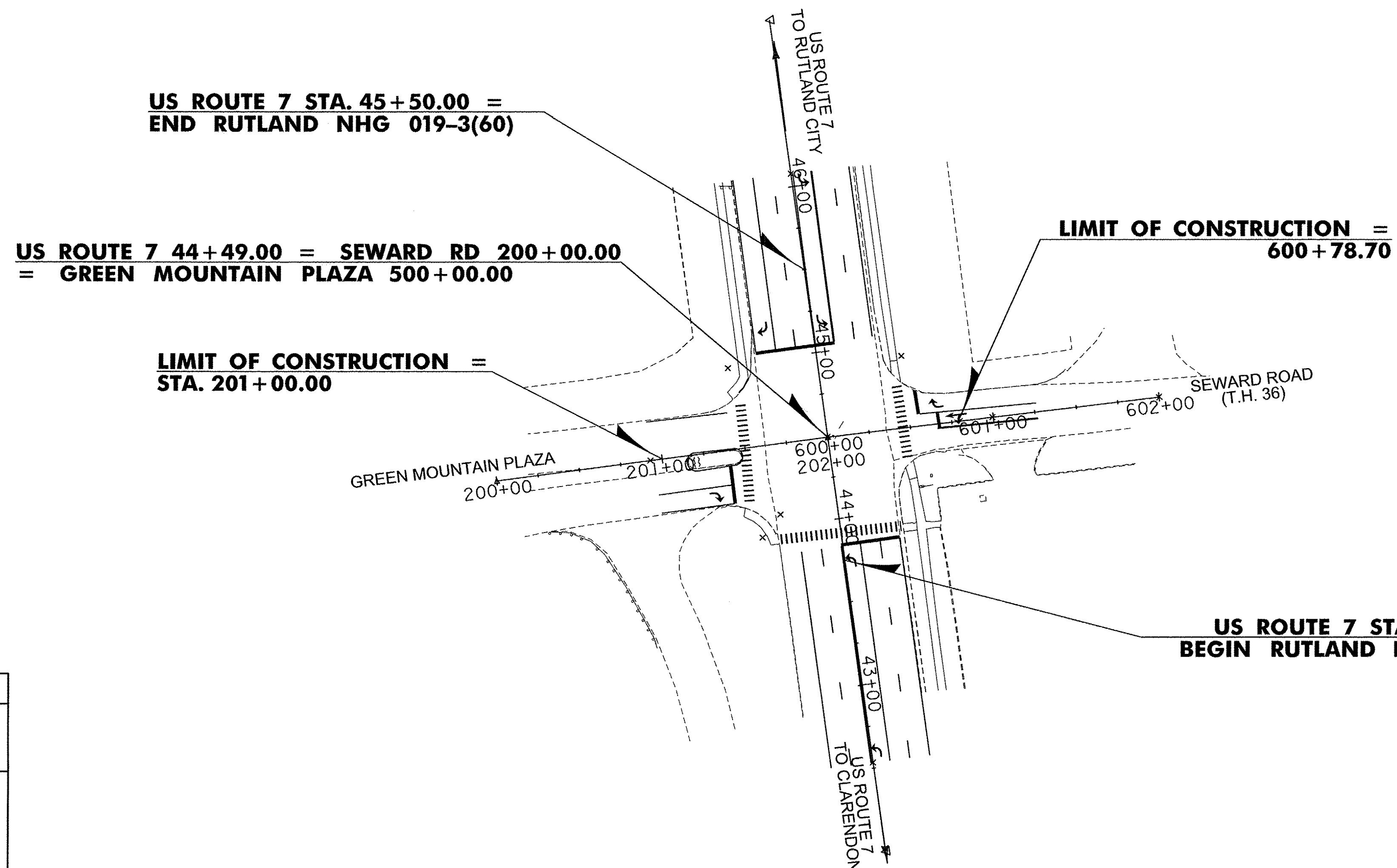
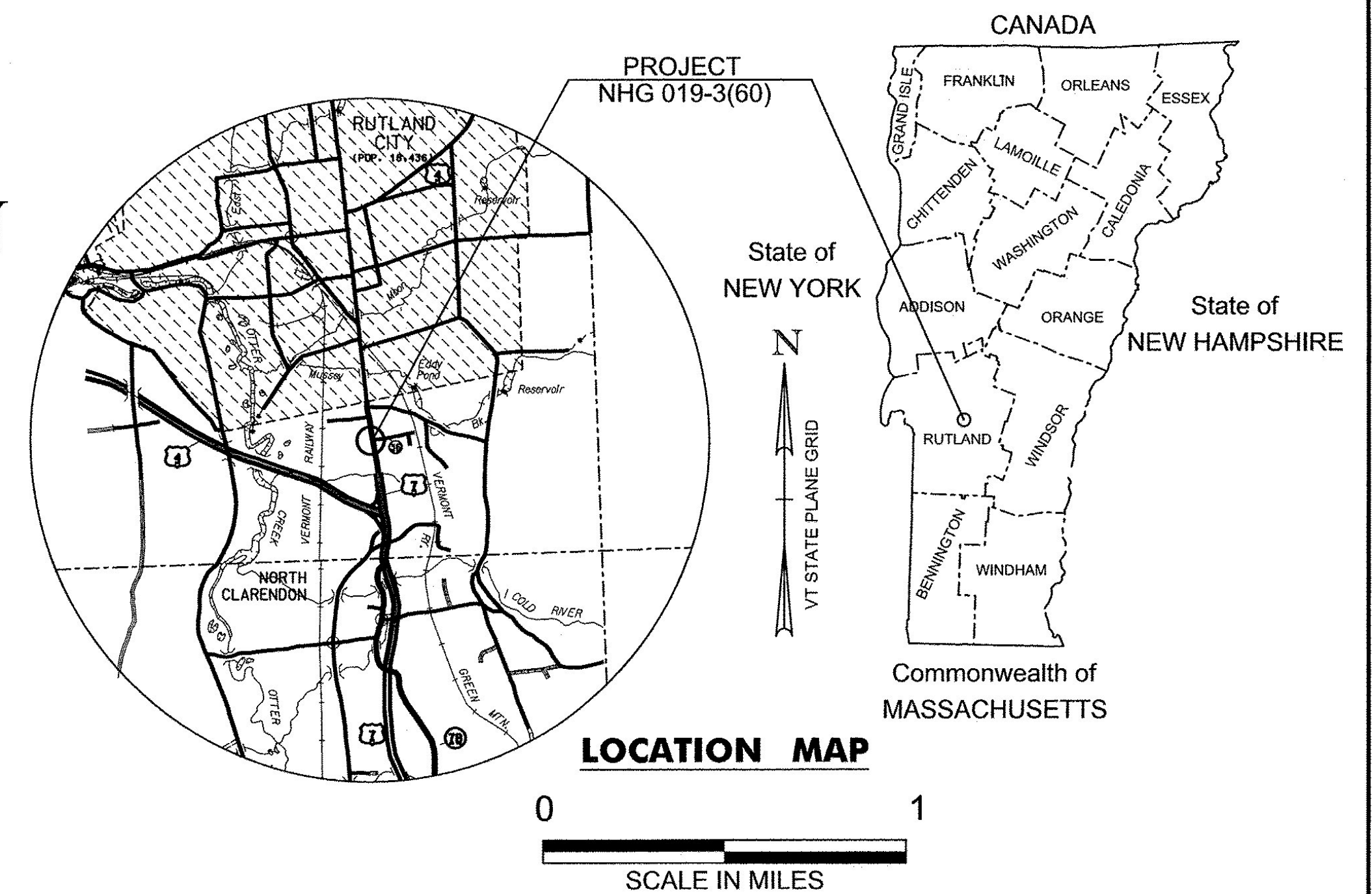


## PROPOSED IMPROVEMENT TOWN OF RUTLAND COUNTY OF RUTLAND US ROUTE 7 (PRINCIPAL ARTERIAL) (NHS)

LOCATED IN THE TOWN OF RUTLAND AT THE INTERSECTION OF US ROUTE 7 AND SEWARD ROAD  
(T.H. #36) AT MILE MARKER 0.84.

PROJECT LENGTH ON US 7 = 275.00 FEET = 0.052 MILES

REPLACEMENT AND UPGRADE OF TRAFFIC SIGNAL EQUIPMENT TO INCLUDE NEW MAST ARMS  
AND MAST ARM POLES, NEW VEHICLE DETECTION, NEW PEDESTRIAN EQUIPMENT, A NEW SIGNAL  
CONTROLLER AND OTHER HIGHWAY RELATED ITEMS.



**Record Plans**  
Contractor: THE BELDEN COMPANY  
Resident Engineer: JACE CURTIS  
Construction Began: SEPTEMBER 11, 2017  
Construction Complete: JULY 9, 2018  
Record Plans By: JACE CURTIS

I hereby certify that all construction required by this set of drawings has been accomplished as indicated herein.

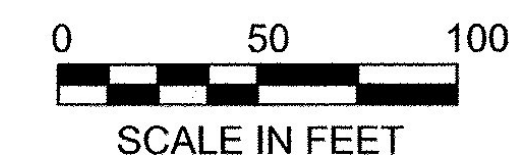
e-Signed by Jace Curtis  
BY: on 2018-09-14 19:49:21 GMT Resident Engineer

Date: September 14, 2018

NOTE: Any further information concerning final quantities, amounts or other details relative to this project may be found at Central Files in the electronic archives.

CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2011, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JULY 20, 2011 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

QUALITY ASSURANCE PROGRAM : LEVEL 1	
SURVEYED BY :	VTRANS
SURVEYED DATE :	FEBRUARY 24, 2016
DATUM	
VERTICAL :	NAVD 88
HORIZONTAL :	NAD 83 (2011)



DIRECTOR OF PROJECT DELIVERY	
APPROVED <i>Jace Curtis</i>	DATE 1/11/2017
PROJECT MANAGER :	PATRICIA COBURN, P.E.
PROJECT NAME :	RUTLAND TOWN
PROJECT NUMBER :	NHG 019-3(60)
SHEET 1 OF 17 SHEETS	

# PRELIMINARY INFORMATION SHEET

## GENERAL NOTES

### PLAN SHEETS

1	TITLE SHEET
2	PRELIMINARY INFORMATION SHEET
3	CONVENTIONAL SYMBOLS LEGEND SHEET
4	TIE SHEET
5	BORING INFORMATION SHEET
6-7	BORING LOG SHEETS
8	QUANTITY SHEET
9	TRAFFIC SIGNAL LAYOUT SHEET
10	TRAFFIC SIGNAL INFORMATION SHEET
11	TRAFFIC SIGNAL NOTES
12	TRAFFIC SIGNAL GENERAL NOTES
13	HEAVY DUTY JUNCTION BOX DETAIL SHEET
14	STREET LIGHTING GENERAL NOTES
15	MAST ARM CROSS SECTIONS
16	MAST ARM, CANTILEVER, & FOOTING DETAILS
17	CONSTRUCTION APPROACH SIGNING

### STANDARDS LIST

E-170	TRAFFIC CONTROL SIGNALS PEDESTRIAN POLE MOUNTED	11/4/1999
E-171A	TRAFFIC CONTROL SIGNALS GENERAL NOTES AND DETAILS	8/9/1995
E-171B	TRAFFIC CONTROL SIGNALS MISC. DETAILS	8/9/1995
E-171C	TRAFFIC CONTROL SIGNALS CANTILEVER MOUNTING DETAILS	8/9/1995
E-173	PULL BOXES AND JUNCTION BOXES	8/9/1995
E-175	POWER DROP STANCHIONS	6/8/2009
E-191	PAVEMENT MARKING DETAILS	2/1/1999
E-192	PAVEMENT MARKING DETAILS	10/12/2000
E-193	PAVEMENT MARKING DETAILS	8/18/1995
T-1	TRAFFIC CONTROL GENERAL NOTES	4/25/2016
T-10	CONVENTIONAL ROADS CONSTRUCTION APPROACH SIGNING	4/25/2016
T-17	TRAFFIC CONTROL MISCELLANEOUS DETAILS	8/6/2012
T-28	CONSTRUCTION SIGN DETAILS	8/6/2012
T-29	CONSTRUCTION SIGN DETAILS	8/6/2012
T-30	CONSTRUCTION SIGN DETAILS	8/6/2012
T-133	LIGHT POLE FOUNDATION DETAILS	7/25/2016
T-134	LIGHT POLE & TRANSFORMER BASE DETAILS	12/21/2015

1. ANY DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL FIELD CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE EXISTING UTILITIES WITHIN AND ADJACENT TO THE LIMITS OF WORK. IN THE EVENT OF DAMAGE TO THESE SYSTEMS AS A RESULT OF THE CONTRACTORS OPERATIONS, THE REPAIRS OR REPLACEMENT SHALL BE COMPLETED AT THE CONTRACTOR'S EXPENSE AS APPROVED BY THE ENGINEER.

## SEEDING FORMULA

% WEIGHT	LBS/AC		NAME	LATIN NAME	GERM %	PURITY %
	BROADCAST	HYDROSEED				
42.50%	34	68	CREeping RED FESCUE	FESTUCA RUBRA X RUBRA	85%	98%
20.00%	16	32	PERRENIAL RYE GRASS	LOLIUM PERENNE	90%	95%
32.50%	26	52	KENTUCKY BLUE GRASS	POA PRATENSIS	85%	85%
5.00%	4	8	ANNUAL RYE GRASS	LOLIUM MULTIFLORUM	85%	85%
<b>100.00%</b>	<b>80</b>	<b>160</b>				

GENERAL AMENDMENT GUIDANCE		
FERTILIZER	LIME	
10/20/10	AG LIME	PELLITIZED
500 LBS/AC	2 TONS/AC	1 TONS/AC

### CONSTRUCTION NOTES:

1. SEED MIX: THE URBAN AREA MIX SHALL NOT BE USED IN WETLANDS OR ANY WATER OF THE STATE OF VERMONT.
2. SEED MIX: USE ONLY AS INDICATED IN THE PLANS.
3. SEED MIX: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. FERTILIZER AND LIMESTONE: SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER.
5. HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, ACHIEVE 90% GROUND COVER OR AS DIRECTED BY THE ENGINEER.
6. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE, THE SITE CONDITIONS AND THE TYPE OF HYDROSEED WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED.
7. TURF ESTABLISHMENT: PLACING SEED, FERTILIZER, LIME AND MULCH PRIOR TO SEPTEMBER 15 AND AFTER APRIL 15 CAN BETTER ENSURE A VIGOROUS GROWTH OF GRASS.

PROJECT NAME: RUTLAND TOWN  
PROJECT NUMBER: NHG 019-3(60)

FILE NAME: t14t190frm.dgn  
PROJECT LEADER: P. COBURN  
DESIGNED BY: M. BOGACZYK  
PRELIMINARY INFORMATION SHEET

PLOT DATE: 2/7/2017  
DRAWN BY: K. YELINEK  
CHECKED BY: P. COBURN  
SHEET 2 OF 17

GENERAL INFORMATION

SYMBOLGY LEGEND NOTE

THE SYMBOLGY ON THIS SHEET IS INTENDED TO COVER STANDARD CONVENTIONAL SYMBOLGY. THE SYMBOLGY IS USED FOR EXISTING & PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROJECT ANNOTATION, AS NOTED ON PROJECT PLAN SHEETS. THIS LEGEND SHEET COVERS THE BASICS. SYMBOLGY ON PLANS MAY VARY, PLAN ANNOTATIONS AND NOTES SHOULD BE USED TO CLARIFY AS NEEDED.

R.O.W. ABBREVIATIONS (CODES) & SYMBOLS

POINT	CODE	DESCRIPTION
	CH	CHANNEL EASEMENT
	CONST	CONSTRUCTION EASEMENT
	CUL	CULVERT EASEMENT
	D&C	DISCONNECT & CONNECT
	DIT	DITCH EASEMENT
	DR	DRAINAGE EASEMENT
	DRIVE	DRIVEWAY EASEMENT
	EC	EROSION CONTROL
	I&M	INSTALL & MAINTAIN EASEMENT
	LAND	LANDSCAPE EASEMENT
	R&RES	REMOVE & RESET
	R&REP	REMOVE & REPLACE
	SR	SLOPE RIGHT
	UE	UTILITY EASEMENT
	(P)	PERMANENT EASEMENT
	(T)	TEMPORARY EASEMENT
■	BNDNS	BOUND SET
□	BNDNS	BOUND TO BE SET
●	IPNS	IRON PIN SET
⊙	IPNS	IRON PIN TO BE SET
⊗	CALC	EXISTING ROW POINT
○	PROW	PROPOSED ROW POINT
[LENGTH]		LENGTH CARRIED ON NEXT SHEET

COMMON TOPOGRAPHIC POINT SYMBOLS

POINT	CODE	DESCRIPTION
⊗	APL	BOUND APPARENT LOCATION
□	BM	BENCH MARK
□	BND	BOUND
⊕	CB	CATCH BASIN
⊕	COMB	COMBINATION POLE
⊕	DITHR	DROP INLET THROATED DNC
⊕	EL	ELECTRIC POWER POLE
⊙	FPOLE	FLAGPOLE
⊙	GASFIL	GAS FILLER
⊙	GP	GUIDE POST
×	GSO	GAS SHUT OFF
⊙	GUY	GUY POLE
⊙	GUYW	GUY WIRE
×	GV	GATE VALUE
⊕	H	TREE HARDWOOD
△	HCTRL	CONTROL HORIZONTAL
△	HVCTRL	CONTROL HORIZ. & VERTICAL
◇	HYD	HYDRANT
⊙	IP	IRON PIN
⊕	IPIPE	IRON PIPE
⊕	LI	LIGHT - STREET OR YARD
⊕	MB	MAILBOX
⊙	MH	MANHOLE (MH)
⊙	MM	MILE MARKER
⊙	PM	PARKING METER
⊙	PMK	PROJECT MARKER
⊙	POST	POST STONE/WOOD
⊕	RRSIG	RAILROAD SIGNAL
⊕	RRSL	RAILROAD SWITCH LEVER
⊕	S	TREE SOFTWOOD
⊕	SAT	SATELLITE DISH
⊕	SHRUB	SHRUB
⊕	SIGN	SIGN
⊕	STUMP	STUMP
⊕	TEL	TELEPHONE POLE
⊕	TIE	TIE
⊕	TSIGN	SIGN W/DOUBLE POST
⊕	VCTRL	CONTROL VERTICAL
⊕	WELL	WELL
×	WSO	WATER SHUT OFF

THESE ARE COMMON VAOT SURVEY POINT SYMBOLS FOR EXISTING FEATURES, ALSO USED FOR PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROPOSED ANNOTATION.

PROPOSED GEOMETRY CODES

CODE	DESCRIPTION
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
CC	CENTER OF CURVE
PT	POINT OF TANGENCY
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
POB	POINT OF BEGINNING
POE	POINT OF ENDING
STA	STATION PREFIX
AH	AHEAD STATION SUFFIX
BK	BACK STATION SUFFIX
D	CURVE DEGREE OF (100FT)
R	CURVE RADUIS OF
T	CURVE TANGENT LENGTH
L	CURVE LENGTH OF
E	CURVE EXTERNAL DISTANCE

UTILITY SYMBOLGY

UNDERGROUND UTILITIES		
— UT —	—	TELEPHONE
— UE —	—	ELECTRIC
— UC —	—	CABLE (TV)
— UEC —	—	ELECTRIC+CABLE
— UET —	—	ELECTRIC+TELEPHONE
— UCT —	—	CABLE+TELEPHONE
— UECT —	—	ELECTRIC+CABLE+TELEP.
— G —	—	GAS LINE
— W —	—	WATER LINE
— S —	—	SANITARY SEWER (SEPTIC)

ABOVE GROUND UTILITIES (AERIAL)

— T —	—	TELEPHONE
— E —	—	ELECTRIC
— C —	—	CABLE (TV)
— EC —	—	ELECTRIC+CABLE
— ET —	—	ELECTRIC+TELEPHONE
— AER E&T —	—	ELECTRIC+TELEPHONE
— CT —	—	CABLE+TELEPHONE
— ECT —	—	ELECTRIC+CABLE+TELEP.
—	—	UTILITY POLE GUY WIRE

PROJECT CONSTRUCTION SYMBOLGY

PROJECT DESIGN & LAYOUT SYMBOLGY		
— CZ —	—	CLEAR ZONE
—	—	PLAN LAYOUT MATCHLINE

PROJECT CONSTRUCTION FEATURES

△	△	TOP OF CUT SLOPE
○	○	TOE OF FILL SLOPE
⊗	⊗	STONE FILL
—	—	BOTTOM OF DITCH L
—	—	CULVERT PROPOSED
—	—	STRUCTURE SUBSURFACE
PDF	PDF	PROJECT DEMARCATION FENCE
BF	BF	BARRIER FENCE
⊗	⊗	TREE PROTECTION ZONE (TPZ)
///	///	STRIPING LINE REMOVAL
~	~	SHEET PILES

CONVENTIONAL BOUNDARY SYMBOLGY

BOUNDARY LINES		
—	—	TOWN BOUNDARY LINE
—	—	COUNTY BOUNDARY LINE
—	—	STATE BOUNDARY LINE
—	—	PROPOSED STATE L.A.R.O.W.
—	—	PROPOSED STATE R.O.W.
—	—	STATE ROW (LIMITED ACCESS)
—	—	STATE ROW
—	—	TOWN ROW
—	—	PERMANENT EASEMENT LINE (P)
—	—	TEMPORARY EASEMENT LINE (T)
—	—	SURVEY LINE
—	—	PROPERTY LINE (P/L)
SR	SR	SLOPE RIGHTS
6f	6f	6F PROPERTY BOUNDARY
4f	4f	4F PROPERTY BOUNDARY
HAZ	HAZ	HAZARDOUS WASTE

EPSC LAYOUT PLAN SYMBOLGY

EPSC MEASURES	
—	FILTER CURTAIN
—	SILT FENCE
—	SILT FENCE WOVEN WIRE
—	CHECK DAM
—	DISTURBED AREAS REQUIRING RE-VEGETATION
—	EROSION MATTING

ENVIRONMENTAL RESOURCES

—	WETLAND BOUNDARY
—	RIPARIAN BUFFER ZONE
—	WETLAND BUFFER ZONE
—	SOIL TYPE BOUNDARY
—	THREATENED & ENDANGERED SPECIES
HAZ	HAZARDOUS WASTE AREA
AG	AGRICULTURAL LAND
HABITAT	FISH & WILDLIFE HABITAT
FLOOD PLAIN	FLOOD PLAIN
OHW	ORDINARY HIGH WATER (OHW)
—	STORM WATER
—	USDA FOREST SERVICE LANDS
—	WILDLIFE HABITAT SUIT/CONN

ARCHEOLOGICAL & HISTORIC

— ARCH —	—	ARCHEOLOGICAL BOUNDARY
— HISTORIC DIST —	—	HISTORIC DISTRICT BOUNDARY
— HISTORIC —	—	HISTORIC AREA
(H)	—	HISTORIC STRUCTURE

CONVENTIONAL TOPOGRAPHIC SYMBOLGY

EXISTING FEATURES	
—	ROAD EDGE PAVEMENT
—	ROAD EDGE GRAVEL
—	DRIVEWAY EDGE
—	DITCH
—	FOUNDATION
—	FENCE (EXISTING)
—	FENCE WOOD POST
—	FENCE STEEL POST
—	GARDEN
—	ROAD GUARDRAIL
—	RAILROAD TRACKS
—	CULVERT (EXISTING)
—	STONE WALL
—	WALL
—	WOOD LINE
—	BRUSH LINE
—	HEDGE
—	BODY OF WATER EDGE
—	LEDGE EXPOSED

PROJECT NAME: RUTLAND TOWN  
 PROJECT NUMBER: NHG 019-3(60)  
 FILE NAME: t14t190frm.dgn PLOT DATE: 2/7/2017  
 PROJECT LEADER: P. COBURN DRAWN BY: M. BOGACZYK  
 DESIGNED BY: M. BOGACZYK CHECKED BY: P. COBURN  
 CONVENTIONAL SYMBOLGY LEGEND SHEET SHEET 3 OF 17

GPS CONTROL POINTS

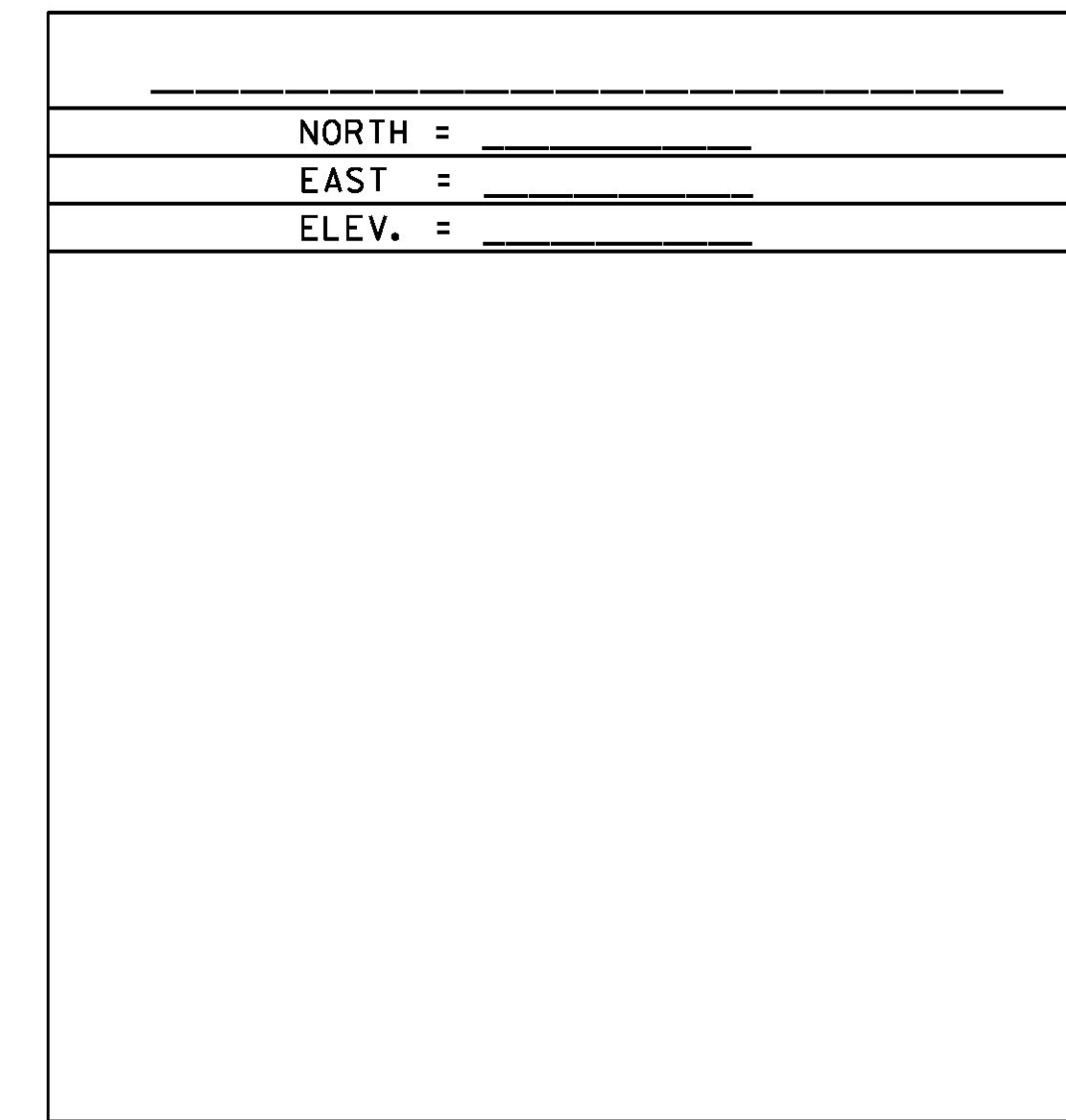
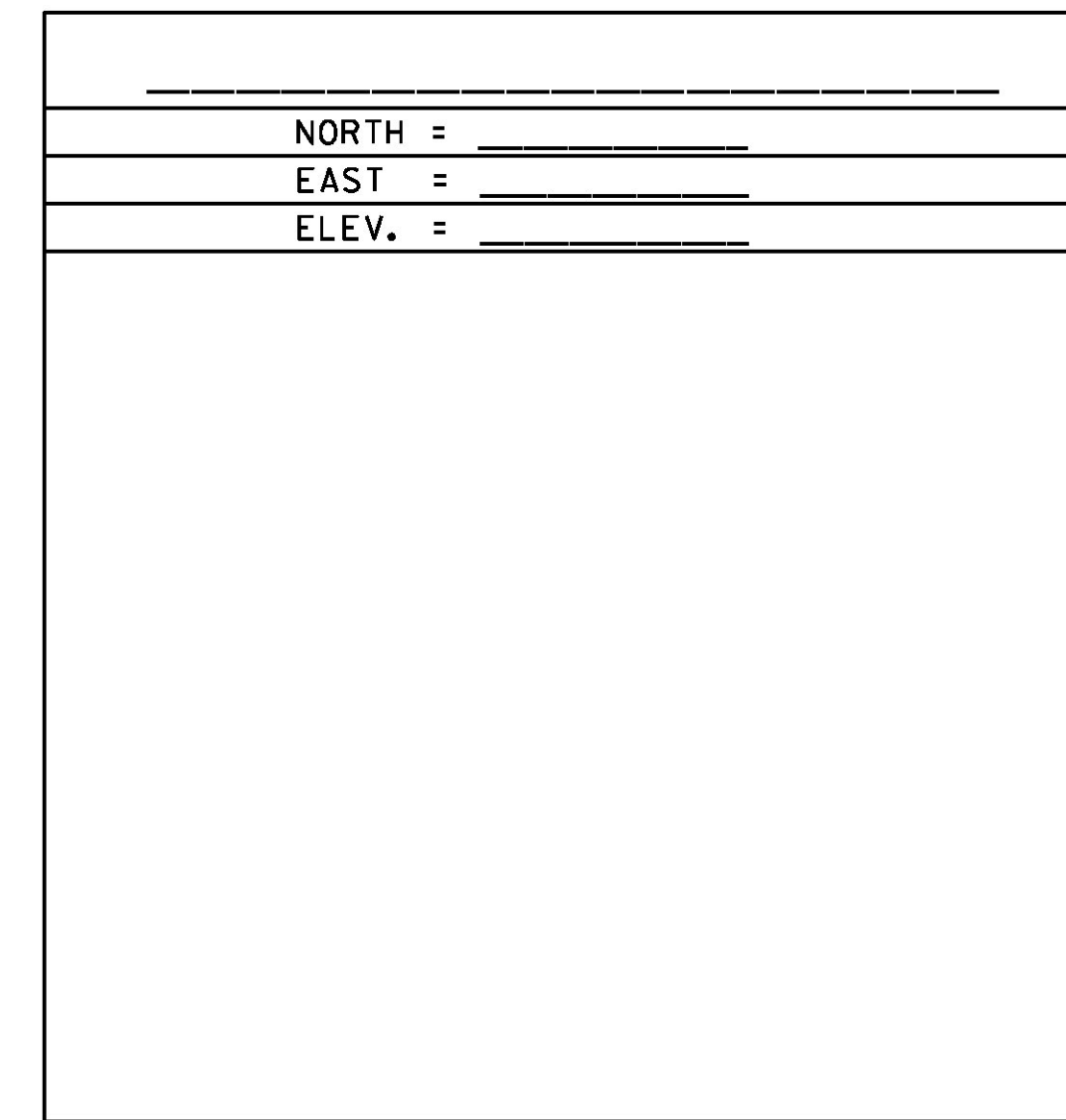
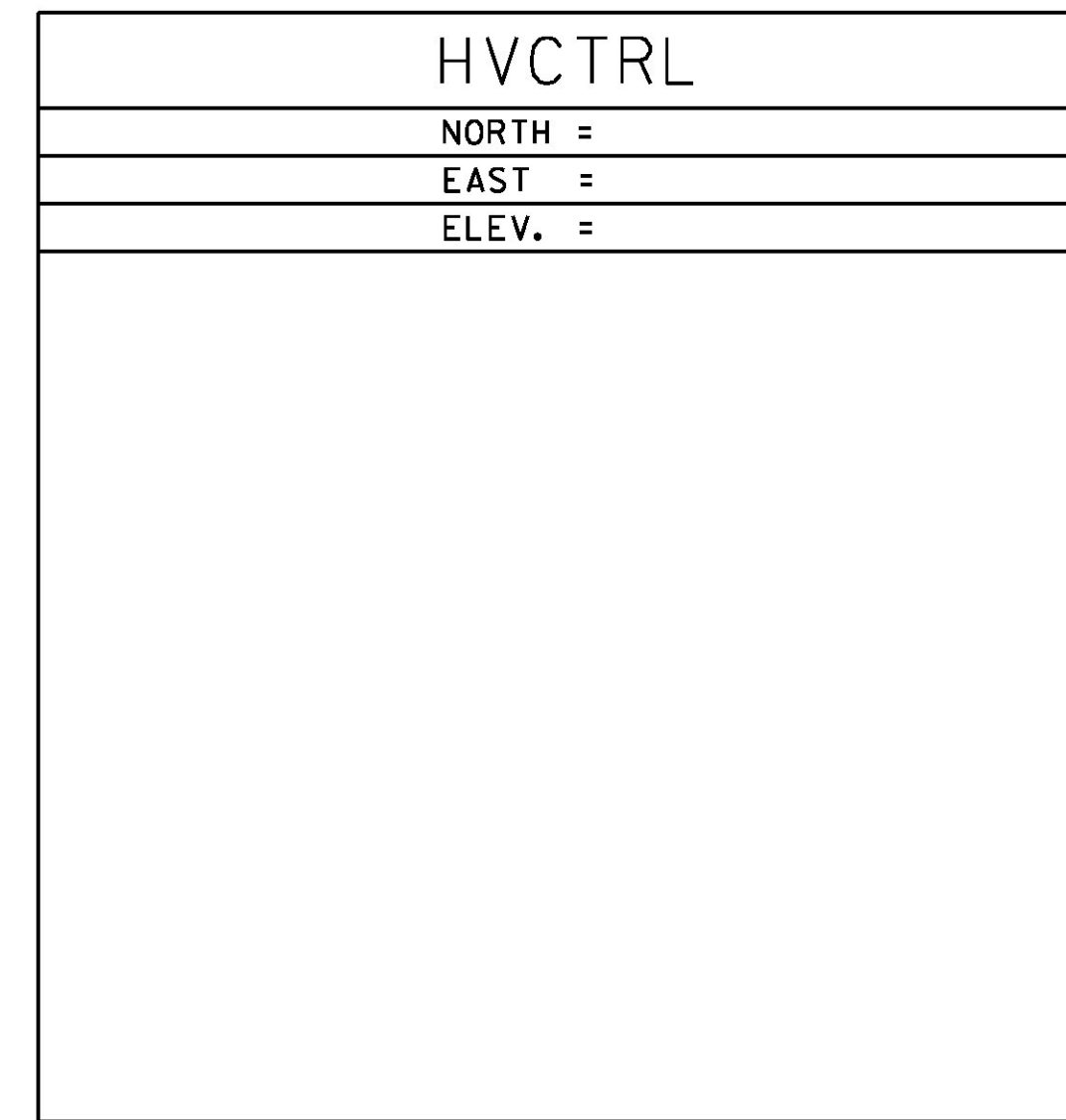
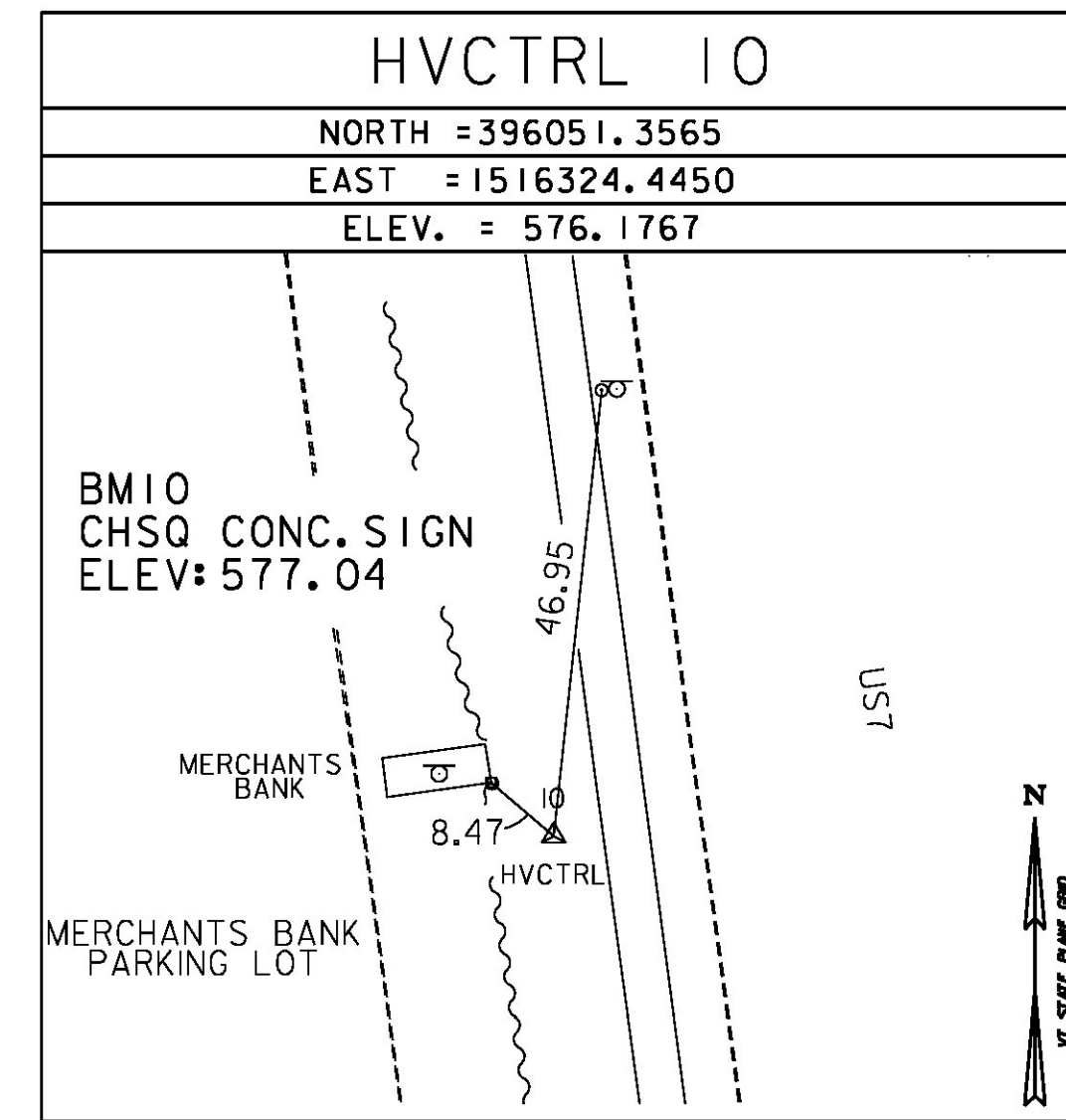
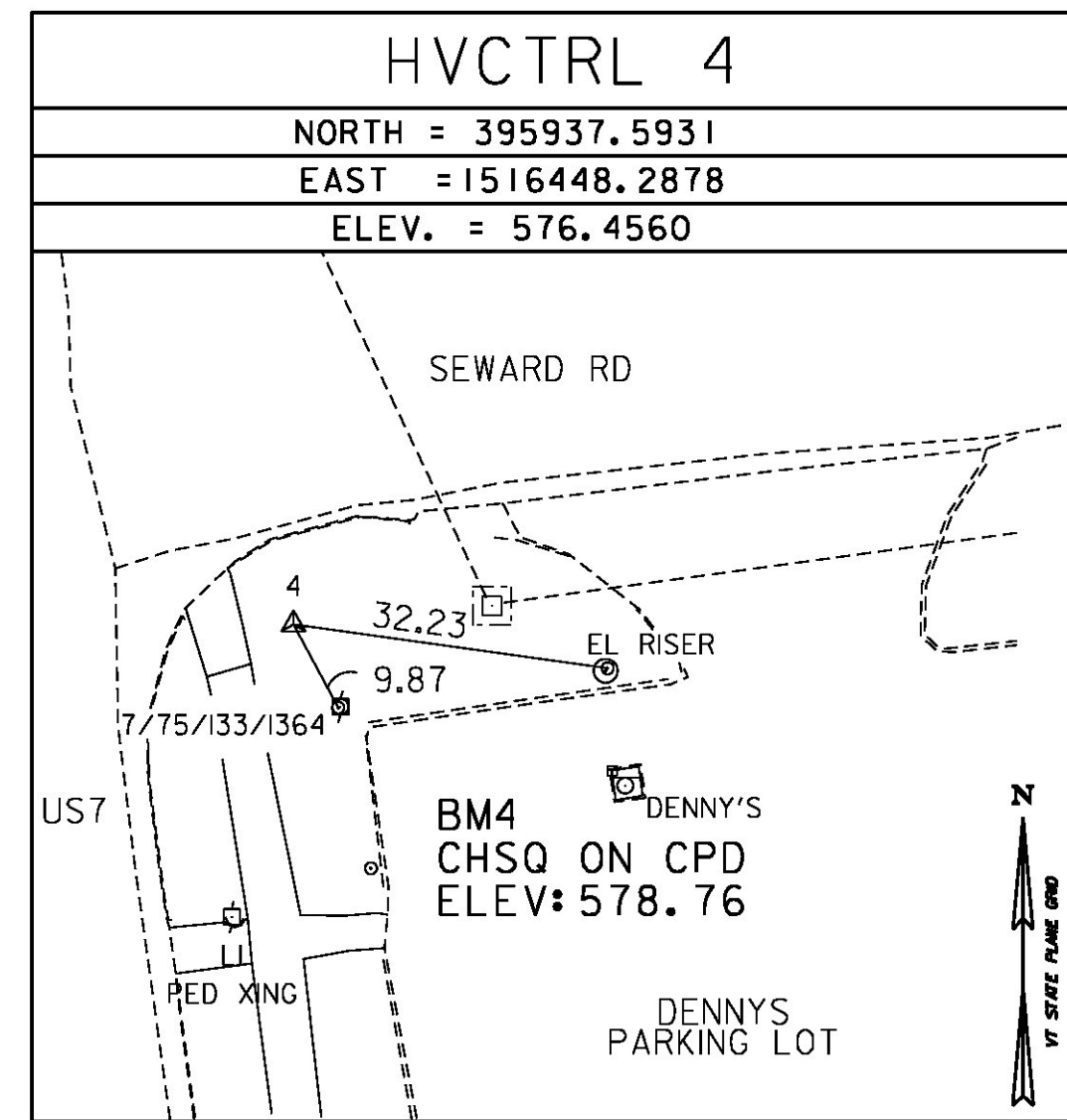
HVCTRL #1  
 DAYS INN RIM  
 NORTH = 395680.5430  
 EAST = 1516471.2950  
 ELEV. = 0.000

GENERAL LOCATION, RUTLAND, VT.  
 TO REACH FROM THE MOST SOUTHERN INTERSECTION OF US ROUTE 4 AND US ROUTE 7, GO NORTH ALONG US ROUTE 7 FOR 0.5 MI (0.8 KM) TO THE ENTRANCE DRIVES TO THE DAYS INN MOTEL AND DENNY'S RESTAURANT ON THE RIGHT. PULL INTO THE DENNY'S PARKING LOT. PARK VEHICLE AND WALK SOUTH ALONG THE SIDEWALK TO A SEWER MANHOLE COVER BETWEEN THE TWO ENTRANCE DRIVES AND BETWEEN US ROUTE 7 AND THE ASPHALT SIDEWALK.  
 THE MARK IS A X-CUT WITH CENTER PUNCH IN THE OUTER METAL RIM OF A 75 CM (30 INCH) DIAMETER SEWER MANHOLE COVER. IT IS 9.7 M (31.8 FT) NORTH OF AND ABOUT 0.5 M (1.6 FT) HIGHER THAN THE CENTERLINE OF THE ENTRANCE DRIVE TO THE DAYS INN MOTEL, 13.1 M (43.0 FT) SOUTH OF THE CENTERLINE OF THE ENTRANCE DRIVE TO THE DENNY'S RESTAURANT, 0.65 M (2.1 FT) EAST OF THE WEST FACE OF THE CONCRETE CURB, 1.0 M (3.3 FT) WEST OF THE WEST EDGE OF THE ASPHALT SIDEWALK AND 12.7 M (41.7 FT) WEST OF THE DAYS INN SIGN.

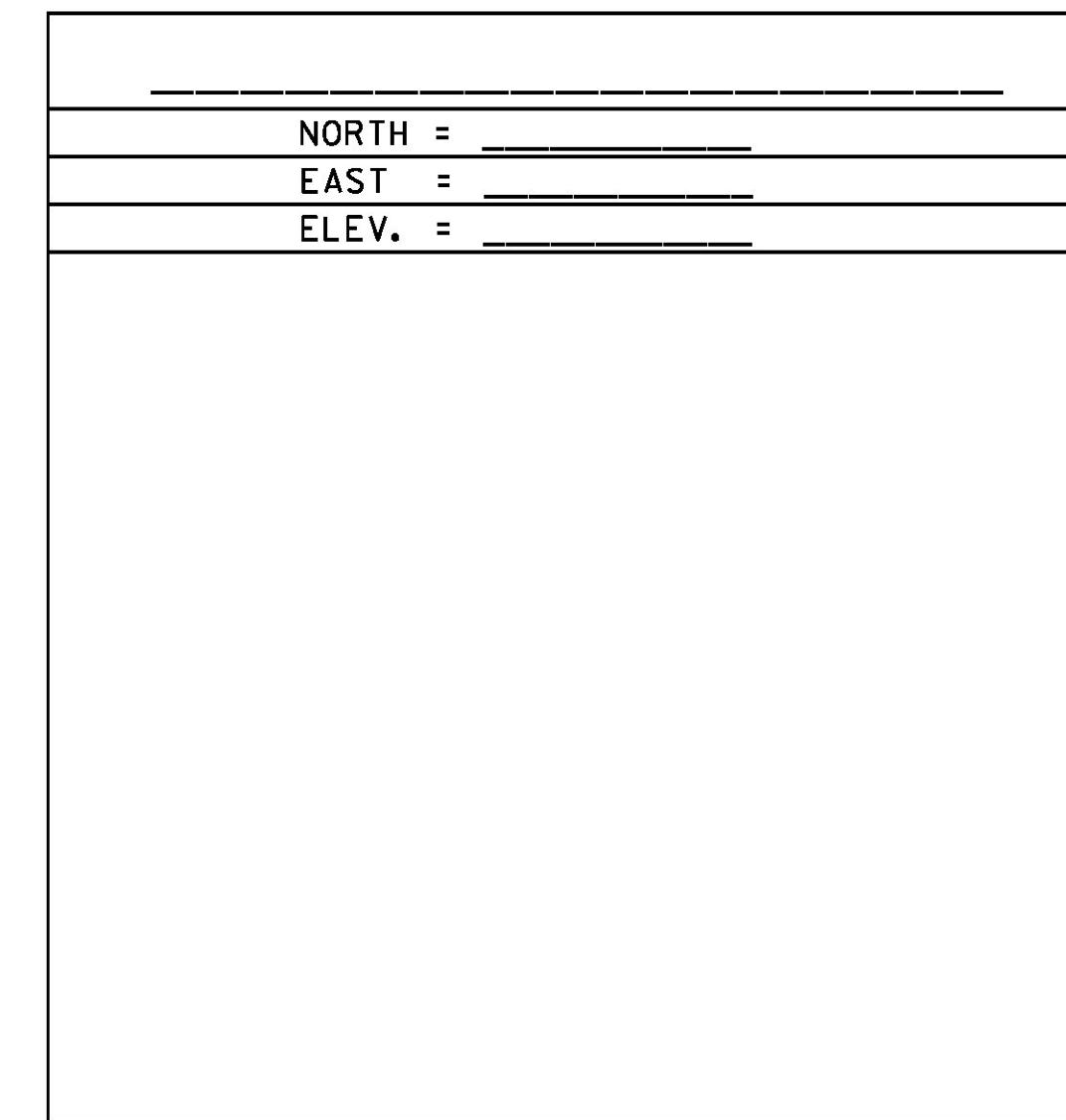
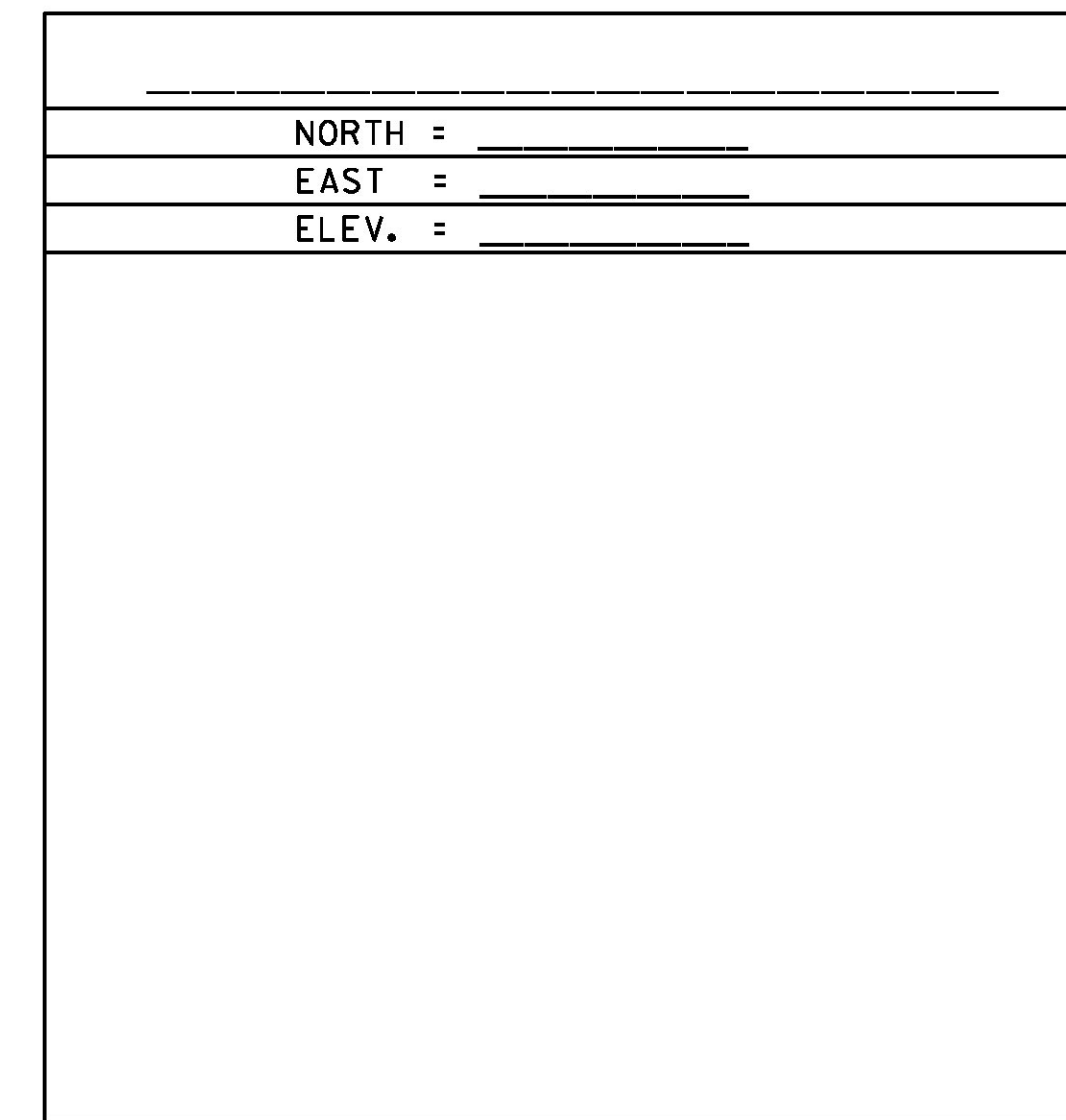
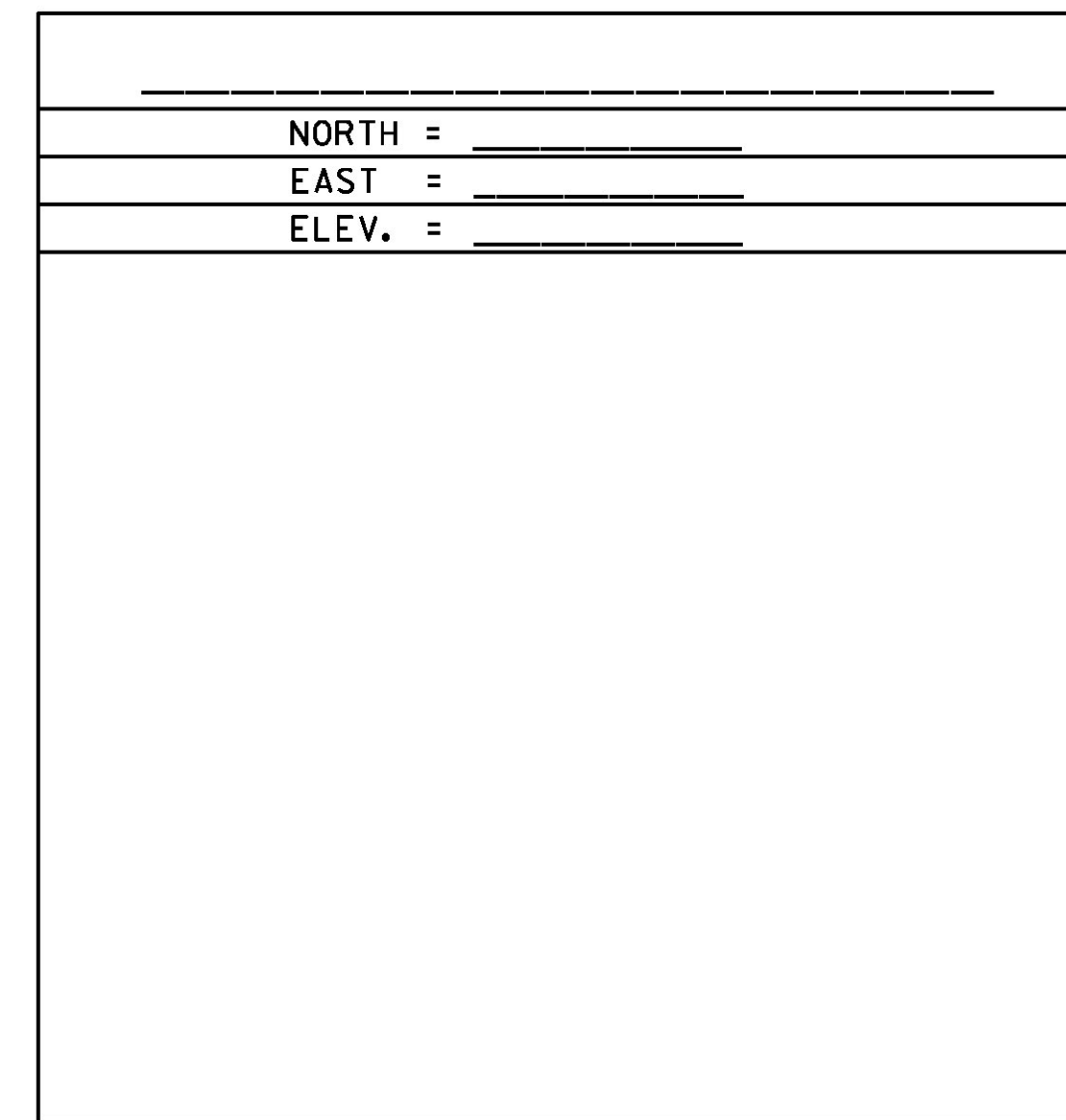
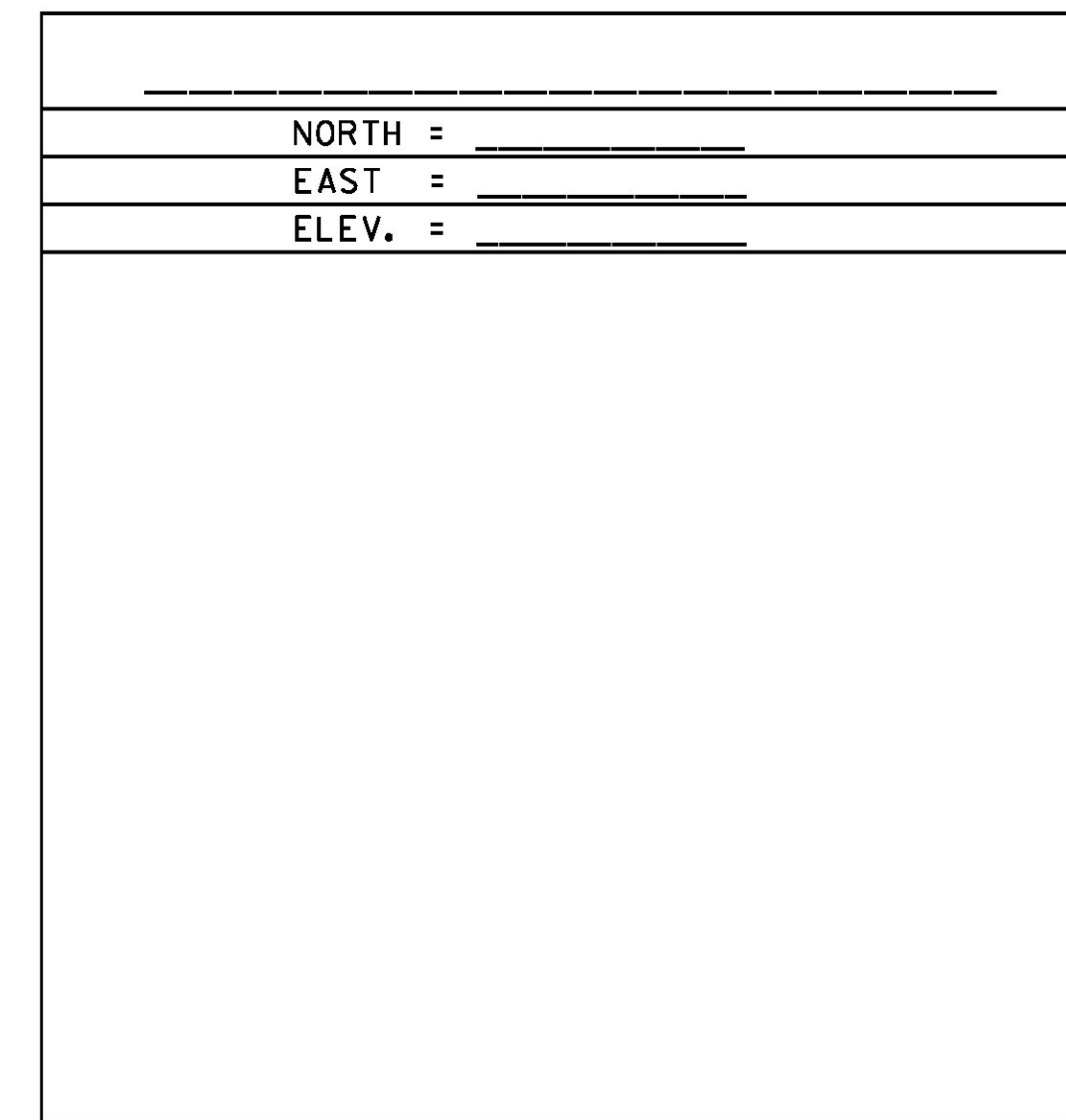
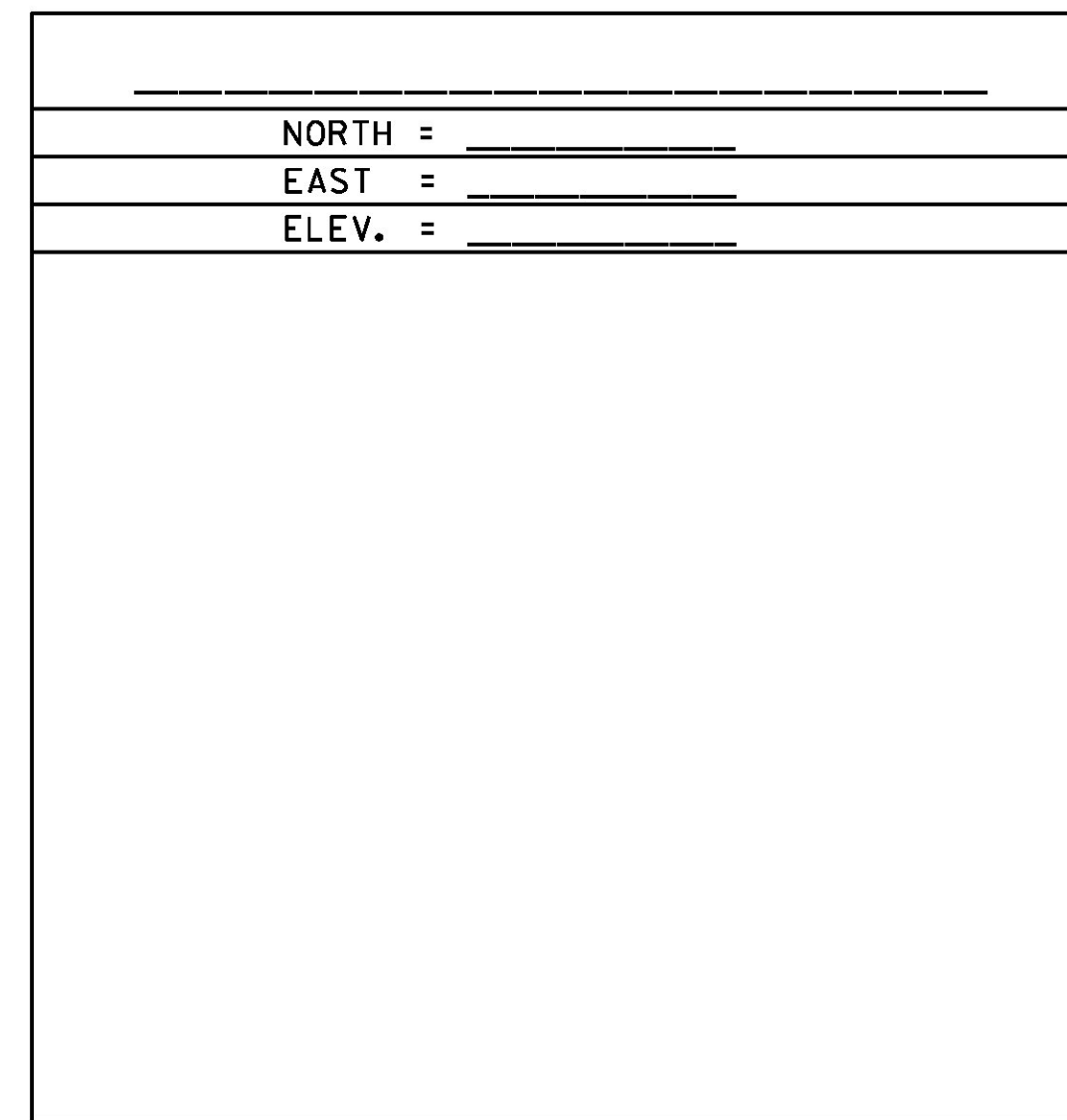
HVCTRL #2  
 METER PIT RUT 11  
 NORTH = 397716.0700  
 EAST = 1516150.9530  
 ELEV. = 568.9900

GENERAL LOCATION, RUTLAND CITY.  
 TO REACH FROM THE INTERSECTION OF U.S. ROUTE 7 AND U.S. ROUTE 4 EAST (WOODSTOCK AVENUE) IN RUTLAND GO SOUTH ALONG U.S. ROUTE 7 FOR 1.5 MI (2.4 KM) TO THE SMITH BUICK DEALERSHIP AND THE MARK ON THE RIGHT IN THE TOP OF A 3 M (9.8 FT) X 3 M (9.8 FT) CONCRETE METER PIT STRUCTURE, 62.8 M (206.0 FT) NORTH OF THE INTERSECTION OF U.S. ROUTE 7 AND COLD RIVER ROAD, 15.8 M (51.8 FT) NORTH OF THE CENTERLINE OF A PAVED DRIVE TO SMITH BUICK, 3.3 M (10.8 FT) WEST OF THE WEST CURB OF U.S. ROUTE 7, 1.9 M (6.2 FT) EAST OF THE NORTHWEST CORNER OF THE METER PIT STRUCTURE, AND 0.1 M (0.3 FT) SOUTH OF THE NORTH EDGE OF THE STRUCTURE.

TRAVERSE TIES



ALIGNMENT TIES



DATUM  
 VERTICAL NAVD 88  
 HORIZONTAL NAD 83 (2011)  
 ADJUSTMENT COMPASS

PROJECT NAME: RUTLAND TOWN  
 PROJECT NUMBER: NHG 019-3(60)  
 FILE NAME: X14T190T.DGN  
 PROJECT LEADER: M. BOGACZYK  
 DESIGNED BY: VTRANS  
 TIE SHEET 1  
 PLOT DATE: 2/7/2017  
 DRAWN BY: H. MCGOWAN  
 CHECKED BY: G. HITCHCOCK  
 SHEET 4 OF 17

# BORING INFORMATION SHEET

## SOIL CLASSIFICATION

AASHTO	
A1	Gravel and Sand
A3	Fine Sand
A2	Silty or Clayey Gravel and Sand
A4	Silty Soil - Low Compressibility
A5	Silty Soil - Highly Compressible
A6	Clayey Soil - Low Compressibility
A7	Clayey Soil - Highly Compressible

## ROCK QUALITY DESIGNATION

R.Q.D. (%)	ROCK DESCRIPTION
<25	Very Poor
25 to 50	Poor
51 to 75	Fair
76 to 90	Good
>90	Excellent

## SHEAR STRENGTH

UNDRAINED SHEAR STRENGTH IN P.S.F.	CONSISTENCY
<250	Very Soft
250-500	Soft
500-1000	Med. Stiff
1000-2000	Stiff
2000-4000	Very Stiff
>4000	Hard

## CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY

DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Soft
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

## COLOR

blk	Black	pnk	Pink
bl	Blue	pu	Purple
brn	Brown	rd	Red
dk	Dark	tn	Tan
gry	Gray	wh	White
gn	Green	yel	Yellow
lt	Light	mitc	Multicolored
or	Orange		

## DEFINITIONS (AASHTO)

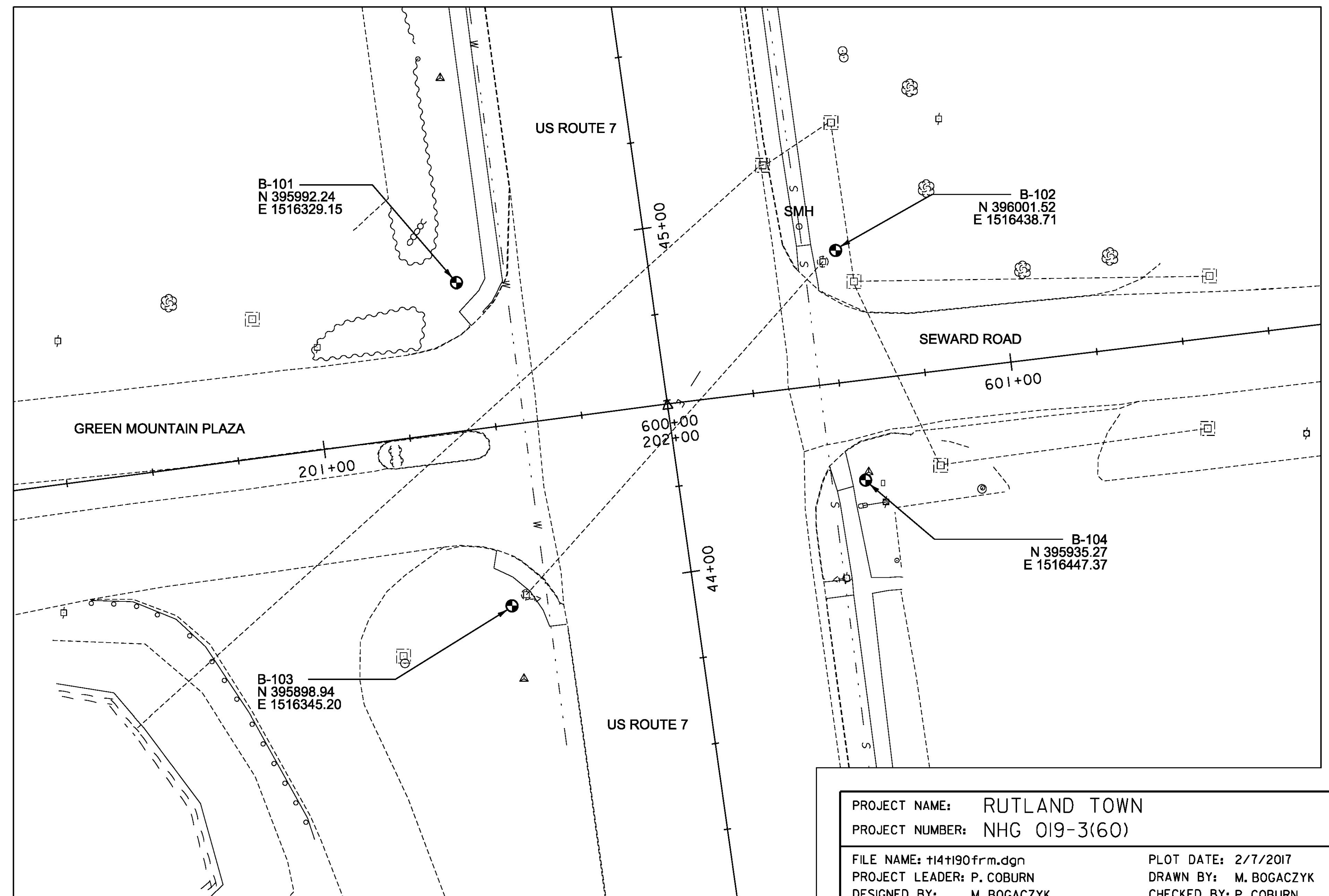
**BEDROCK (LEDGE)** - Rock in its native location of indefinite thickness.  
**BOULDER** - A rock fragment with an average dimension of > 12 inches.  
**COBBLE** - Rock fragments with an average dimension between 3 and 12 inches.  
**GRAVEL** - Rounded particles of rock <3" and > 0.075" (#10 sieve).  
**SAND** - Particles of rock < 0.075" (#10 sieve) and ? 0.0029" (#200 sieve).  
**SILT** - Soil < 0.0029" (#200 sieve), non or slightly plastic and exhibits no strength when air-dried.  
**CLAY** - Fine graded soil, exhibits plasticity when moist and considerable strength when air-dried.  
**VARVED** - Alternate layers of silt and clay.  
**HARDPAN** - Extremely dense soil, cemented layer, not softened when wet.  
**MUCK** - Soft organic soil (containing > 10% organic material).  
**MOISTURE CONTENT** - Weight of water divided by dry weight of soil.  
**FLOWING SAND** - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.  
**STRIKE** - Angle from magnetic north to line of intersection of bed with a horizontal plane.  
**DIP** - Inclination of bed with a horizontal plane.

## COMMONLY USED SYMBOLS

▼	Water Elevation
⊙	Standard Penetration Boring
⊕	Auger Boring
⊖	Rod Sounding
S	Sample
N	Standard Penetration Test
	Blow Count Per Foot For:
	2" O. D. Sampler
	1 3/8" I. D. Sampler
	Hammer Weight Of 140 Lbs.
	Hammer Fall Of 30"
VS	Field Vane Shear Test
US	Undisturbed Soil Sample
B	Blast
DC	Diamond Core
MD	Mud Drill
WA	Wash Ahead
HSA	Hollow Stem Auger
AX	Core Size 1 1/8"
BX	Core Size 1 5/8"
NX	Core Size 2 1/8"
M	Double Tube Core Barrel Used
LL	Liquid Limit
PL	Plastic Limit
PI	Plasticity Index
NP	Non Plastic
w	Moisture Content (Dry Wgt. Basis)
D	Dry
M	Moist
MTW	Moist To Wet
W	Wet
Sat	Saturated
Bo	Boulder
Gr	Gravel
Sa	Sand
Si	Silt
Cl	Clay
HP	Hardpan
Le	Ledge
NLTD	No Ledge To Depth
CNPF	Can Not Penetrate Further
TLOB	Top of Ledge Or Boulder
NR	No Recovery
Rec.	Recovery
%Rec.	Percent Recovery
RQD	Rock Quality Designation
CBR	California Bearing Ratio
<	Less Than
>	Greater Than
R	Refusal (N > 100)
VTSPG	NAD83 - See Note 7

## GENERAL NOTES

- The subsurface explorations shown herein were made by the Agency of Transportation.
- Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by the Agency and may not necessarily reflect actual variations in subsurface conditions that may be encountered between individual boring or sample locations.
- Observed water levels and/or conditions indicated are as recorded at the time of exploration and may vary according to the prevailing rainfall, methods of exploration and other factors.
- Engineering judgement was exercised in preparing the subsurface information presented herein. Analysis and interpretation of subsurface data was performed and interpreted for Agency design and estimating purposes. Presentation of the information in the Contract is intended to provide the Contractor access to the same data available to the Agency. The subsurface information is presented in good faith and is not intended as a substitute for personal investigation, independent interpretation, independent analysis or judgment by the Contractor.
- Pictorial structure details shown on the boring plan layout or soils profiles are for illustrative purposes only and may not accurately portray final contract details.
- Terminology used on the boring logs to describe the hardness, degree of weathering, and spacing of fractures, joints and other discontinuities in the bedrock is defined in the AASHTO Manual on Subsurface Investigations, 1988.
- Northing and Easting coordinates are shown in Vermont State Plan Grid North American Datum 1983 in meters and survey feet.



PROJECT NAME: RUTLAND TOWN  
 PROJECT NUMBER: NHG 019-3(60)

FILE NAME: t14t190frm.dgn PLOT DATE: 2/7/2017  
 PROJECT LEADER: P. COBURN DRAWN BY: M. BOGACZYK  
 DESIGNED BY: M. BOGACZYK CHECKED BY: P. COBURN  
 BORING INFORMATION SHEET SHEET 5 OF 17


STATE OF VERMONT AGENCY OF TRANSPORTATION CONSTRUCTION AND MATERIALS BUREAU CENTRAL LABORATORY		BORING LOG		Boring No.: <b>B-101</b>			
RUTLAND TOWN NHG 019-3(60) US-7, TH-36 MAST ARMS		Page No.: 1 of 1		Pin No.: 14T190			
Checked By: END		Casing		Sampler			
Boring Crew: DAIGNEAULT, JUDKINS, NIETO		Type: H.S.A. & WB SS		Groundwater Observations			
Date Started: 1/14/15 Date Finished: 1/21/15		I.D.: 4 in 1.5 in		Date	Depth (ft)		
VTSPG NAD83: N 395992.24 ft E 1516329.15 ft		Hammer Wt: N.A. 140 lb.		01/21/15	3.5		
Station: _____ Offset: _____		Hammer Fall: N.A. 30 in.		Notes			
Ground Elevation: 575.21 ft		Hammer/Rod Type: Auto/AWJ		After drilling.			
		Rig: CME 45C TRACK C <sub>e</sub> = 1.34					
Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/ft (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
5		A-4, SiSa, brn, Moist, Rec. = 1.3 ft, Lab Note: Grass & roots were within sample. Drilling was performed with Hollow Stem augers.	10-4-4-6 (8)	23.9	16.4	47.8	35.8
		Field Note: No Recovery. Appears to be silty sand	7-3-5-6 (8)				
		Field Note: No Recovery. Appears to be silty sand	3-2-3-3 (5)				
10		A-4, SiSa, Lt/brn, Moist, Rec. = 0.1 ft	2-3-2-5 (5)	15.1	17.2		
		A-1-b, GrSa, Lt/brn-gry, Moist, Rec. = 0.5 ft	4-6-5-6 (11)	12.7	33.8	48.8	17.4
15		A-2-4, SiSa, Lt/brn-gry, Moist, Rec. = 0.7 ft	5-6-6-7 (12)	19.8	4.6	63.3	32.1
		A-1-b, GrSa, brn, Wet, Rec. = 1.6 ft, Could not penetrate further with Hollow Stem Auger.	5-15-7-7 (22)	17.5	33.8	56.5	9.7
20		Field Note: Switched over to Wash Bore drilling. NXDC					
		Field Note: No Recovery. Appears to be sand	5-3-1-2 (4)				
		Field Note: NXDC					
25		A-4, Si, gry, Moist, Rec. = 0.5 ft, Lab Note: A very tiny amount of clay was noticeable.	3-2-1-2 (3)				
		Hole stopped @ 27.0 ft					
Remarks: Hole collapsed at 13.3 ft.							
Notes: 1. Stratification lines represent approximate boundary between material types. Transition may be gradual. 2. N Values have not been corrected for hammer energy. C is the hammer energy correction factor. 3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.							

BORING LOG 2 RUTLAND TOWN NHG 019-3(60).GPJ VERMONT AOT.GDT 2/11/15

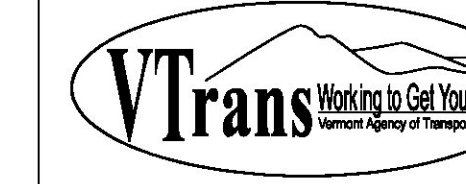
STATE OF VERMONT AGENCY OF TRANSPORTATION CONSTRUCTION AND MATERIALS BUREAU CENTRAL LABORATORY		BORING LOG		Boring No.: <b>B-102</b>			
RUTLAND TOWN NHG 019-3(60) US-7, TH-36 MAST ARMS		Page No.: 1 of 1		Pin No.: 14T190			
Checked By: END		Casing		Sampler			
Boring Crew: DAIGNEAULT, GARROW, HOOK		Type: H.S.A. SS		Groundwater Observations			
Date Started: 1/07/15 Date Finished: 1/07/15		I.D.: 4 in 1.5 in		Date	Depth (ft)		
VTSPG NAD83: N 396001.52 ft E 1516438.71 ft		Hammer Wt: N.A. 140 lb.					
Station: _____ Offset: _____		Hammer Fall: N.A. 30 in.		No water to depth.			
Ground Elevation: 574.84 ft		Hammer/Rod Type: Auto/AWJ					
		Rig: CME 45C TRACK C <sub>e</sub> = 1.34					
Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/ft (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
5		A-2-4, SiSa, brn, Moist, Rec. = 0.8 ft, Lab Note: Grass & small roots were within sample.	6-3-4-4 (7)	42.7	2.4	63.5	34.1
		A-2-4, SiSa, brn, Moist, Rec. = 0.1 ft	4-4-3-4 (7)	13.6	8.2	65.4	26.4
		A-2-4, SiSa, brn, Moist, Rec. = 0.3 ft	3-2-2-4 (4)	10.9	16.0	60.1	23.9
10		A-2-4, SiSa, brn, Moist, Rec. = 1.4 ft	2-2-3-4 (5)	16.3	3.6	64.1	32.3
		A-2-4, SiSa, brn, Moist, Rec. = 1.5 ft, Lab Note: Broken Rock was within sample.	6-8-7-7 (15)	12.6	8.4	65.9	25.7
15		A-2-4, SiSa, brn, Moist, Rec. = 1.5 ft	3-5-6-7 (11)	14.4	7.6	69.0	23.4
		A-2-4, Sa, brn, MTW, Rec. = 1.1 ft	1-4-4-4 (8)	24.1	0.7	84.8	14.5
20		A-4, SiSa, brn, Wet, Rec. = 0.9 ft	3-2-2-1 (4)	30.0		54.8	45.2
		A-4, Si, brn, Wet, Rec. = 1.1 ft, Lab Note: Small layers of clay were noticeable. Sample tested: (NP)	WH-2-2-1 (4)	35.7		5.5	94.5
		A-4, GrSaSi, brn, Wet, Rec. = 0.7 ft	3-5-2-2 (7)	17.0	23.1	23.7	53.2
25		A-4, SaGrSi, brn, MTW, Rec. = 0.7 ft	2-4-8-10 (12)	11.6	32.9	29.1	38.0
		A-4, SaSi, brn, Moist, Rec. = 1.4 ft	4-8-10-14 (18)	15.4	9.4	42.6	48.0
		A-4, SaSi, brn, Moist, Rec. = 1.5 ft	WH-4-18-26 (22)	14.3	8.6	37.0	54.4
Hole stopped @ 26.0 ft							
Remarks: Hole collapsed at 7.5 ft.							
Notes: 1. Stratification lines represent approximate boundary between material types. Transition may be gradual. 2. N Values have not been corrected for hammer energy. C is the hammer energy correction factor. 3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.							

BORING LOG 2 RUTLAND TOWN NHG 019-3(60).GPJ VERMONT AOT.GDT 2/11/15

PROJECT NAME: RUTLAND TOWN	PLOT DATE: 2/7/2017
PROJECT NUMBER: NHG 019-3(60)	DRAWN BY: M. BOGACZYK
FILE NAME: t14t190frm.dgn	CHECKED BY: P. COBURN
DESIGNED BY: M. BOGACZYK	SHEET 6 OF 17
BORING LOG SHEET 1	

 <b>STATE OF VERMONT</b> AGENCY OF TRANSPORTATION CONSTRUCTION AND MATERIALS BUREAU CENTRAL LABORATORY		<b>BORING LOG</b>		Boring No.: <b>B-103</b>					
		<b>RUTLAND TOWN</b> NHG 019-3(60) US-7, TH-36 MAST ARMS		Page No.: 1 of 1 Pin No.: 14T190 Checked By: END					
Boring Crew: <u>DAIGNEAULT, HOOK, NIETO</u> Date Started: <u>1/14/15</u> Date Finished: <u>1/14/15</u> VTSPG NAD83: <u>N 395898.94 ft E 1516345.20 ft</u> Station: _____ Offset: _____ Ground Elevation: <u>576.71 ft</u>		Casing Type: <u>H.S.A.</u> Sampler: <u>SS</u> I.D.: <u>4 in</u> <u>1.5 in</u> Hammer Wt: <u>N.A.</u> <u>140 lb.</u> Hammer Fall: <u>N.A.</u> <u>30 in.</u> Hammer/Rod Type: <u>Auto/AWJ</u> Rig: <u>CME 45C TRACK</u> <u>C<sub>s</sub> = 1.34</u>	Groundwater Observations						
		Date	Depth (ft)	Notes					
				No water to depth.					
Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)			Blows/ft (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
5		A-2-4, GrSiSa, Lt/brn, Moist, Rec. = 1.6 ft, Lab Note: Grass & roots were within sample.			12-9-6-3 (15)	21.5	20.1	51.3	28.6
		A-4, SiSa, Lt/brn, Moist, Rec. = 1.0 ft			3-3-3-5 (6)	16.6	15.7	46.2	38.1
		A-2-4, SiSa, brn, Moist, Rec. = 1.2 ft			2-3-2-4 (5)	15.0	14.3	64.1	21.6
		A-2-4, SiSa, Lt/brn, Moist, Rec. = 1.3 ft			3-4-4-4 (8)	13.7	3.1	64.3	32.6
		A-2-4, SiSa, Lt/brn, Moist, Rec. = 1.7 ft			4-5-6-8 (11)	12.3	0.5	69.4	30.1
10		A-2-4, SiSa, Lt/brn, Moist, Rec. = 1.4 ft			8-7-6-6 (13)	15.5	7.6	60.6	31.8
15		A-3, Sa, Lt/brn, Wet, Rec. = 1.2 ft			2-5-5-5 (10)	23.2	2.5	88.8	8.7
20		A-4, Si, Lt/brn, Wet, Rec. = 1.7 ft, Lab Note: Small layers of clay were noticeable. Sample tested:(NP)			2-2-2-2 (4)	32.2		11.3	88.7
25		A-4, Si, Lt/brn, Wet, Rec. = 1.7 ft, Lab Note: Small layers of clay were noticeable. Sample tested:(NP)			1-2-2-3 (4)	35.1		6.9	93.1
		Hole stopped @ 27.0 ft							
Notes:		1. Stratification lines represent approximate boundary between material types. Transition may be gradual. 2. N Values have not been corrected for hammer energy. C is the hammer energy correction factor. 3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.							

BORING LOG 2 RUTLAND TOWN NHG 019-3(60).GPJ VERMONT AOT.GDT 2/11/15

 <b>STATE OF VERMONT</b> AGENCY OF TRANSPORTATION CONSTRUCTION AND MATERIALS BUREAU CENTRAL LABORATORY		<b>BORING LOG</b>		Boring No.: <b>B-104</b>					
		<b>RUTLAND TOWN</b> NHG 019-3(60) US-7, TH-36 MAST ARMS		Page No.: 1 of 1 Pin No.: 14T190 Checked By: END					
Boring Crew: <u>DAIGNEAULT, HOOK, NIETO</u> Date Started: <u>1/12/15</u> Date Finished: <u>1/12/15</u> VTSPG NAD83: <u>N 395935.27 ft E 1516447.37 ft</u> Station: _____ Offset: _____ Ground Elevation: <u>577.63 ft</u>		Casing Type: <u>H.S.A.</u> Sampler: <u>SS</u> I.D.: <u>4 in</u> <u>1.5 in</u> Hammer Wt: <u>N.A.</u> <u>140 lb.</u> Hammer Fall: <u>N.A.</u> <u>30 in.</u> Hammer/Rod Type: <u>Auto/AWJ</u> Rig: <u>CME 45C TRACK</u> <u>C<sub>s</sub> = 1.34</u>	Groundwater Observations						
		Date	Depth (ft)	Notes					
				No water to depth.					
Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)			Blows/ft (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
5		A-2-4, SiSa with grass & roots, brn, Moist, Rec. = 0.5 ft			16-20-15-8 (35)	27.0	19.2	52.6	28.2
		A-2-4, Sa, Lt/brn, Moist, Rec. = 0.5 ft				9.4	8.4	73.2	18.4
		A-2-4, Sa, Lt/brn, Moist, Rec. = 1.1 ft			4-4-2-2 (6)	8.1	8.1	75.7	16.2
		A-1-b, GrSa, Lt/brn, Moist, Rec. = 1.3 ft			1-2-2-4 (4)	9.8	20.2	72.2	7.6
		A-2-4, SiSa, Lt/brn, Moist, Rec. = 1.6 ft			4-4-5-6 (9)	16.2	4.5	69.2	26.3
10		A-2-4, Sa, Lt/brn, Moist, Rec. = 1.9 ft			4-4-5-4 (9)	8.9	0.8	85.6	13.6
		A-2-4, Sa, Lt/brn, Moist, Rec. = 1.1 ft			4-4-4-5 (8)	7.7	10.7	78.4	10.9
15		A-4, Si, Lt/brn, MTW, Rec. = 0.3 ft, Lab Note: A small layer of clay was noticeable. Sample tested (NP).			2-2-2-2 (4)	36.2	0.4	10.3	89.3
20		A-4, SaSi, Lt/brn, Moist, Rec. = 1.1 ft			4-4-7-10 (11)	14.3	15.2	32.7	52.1
25		A-4, SaGrSi, Lt/brn, Moist, Rec. = 0.8 ft			15-20-36-33 (56)	11.4	27.5	26.6	45.9
		Hole stopped @ 27.0 ft							
Notes:		1. Stratification lines represent approximate boundary between material types. Transition may be gradual. 2. N Values have not been corrected for hammer energy. C is the hammer energy correction factor. 3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.							

BORING LOG 2 RUTLAND TOWN NHG 019-3(60).GPJ VERMONT AOT.GDT 2/11/15

PROJECT NAME:	RUTLAND TOWN
PROJECT NUMBER:	NHG 019-3(60)
FILE NAME:	t14t190frm.dgn
DESIGNED BY:	M. BOGACZYK
BORING LOG SHEET 2	
PLOT DATE:	2/7/2017
DRAWN BY:	M. BOGACZYK
CHECKED BY:	P. COBURN
SHEET	7 OF 17

# QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES			
								ROADWAY	EROSION CONTROL	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
								1			1		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22	--			
								200			200		HR	UNIFORMED TRAFFIC OFFICERS	630.10	EST.			
								400			400		HR	FLAGGERS	630.15	EST.			
										1	1		LS	TESTING EQUIPMENT, CONCRETE	631.16	--			
								1			1		LS	MOBILIZATION/DEMOBILIZATION	635.11	--			
								2			2		EACH	PORTABLE CHANGEABLE MESSAGE SIGN	641.15	--			
									20		20		LB	SEED	651.15	EST.			
									50		50		LB	FERTILIZER	651.18	EST.			
									0.1		0.1		TON	HAY MULCH	651.25	EST.			
								3			3		CY	TOPSOIL	651.35	EST.			
								15			15		SF	TRAFFIC SIGNS, TYPE A	675.20	--			
								1			1		EACH	TRAFFIC CONTROL SIGNAL SYSTEM, INTERSECTION	678.15	--			
								450			450		LF	ELECTRICAL CONDUIT (2" DIA.)(SCH. 80)	678.21	3			
								900			900		LF	WIRED CONDUIT (2" DIA.)(SCH. 80)	678.23	13			
								1			1		EACH	REMOVAL OF EXISTING TRAFFIC CONTROL SIGNAL SYSTEM	678.45	--			
								3			3		EACH	BRACKET ARM	679.47	--			
								3			3		EACH	LUMINAIRE (LUMINAIRE, LED)	679.50	--			
								1			1		EACH	STREET LIGHT CONTROL DEVICE	679.54				
								4			4		EACH	SPECIAL PROVISION (JUNCTION BOX, HEAVY DUTY)	900.620	--			
								225			225		LF	SPECIAL PROVISION (HORIZONTAL DIRECTIONAL DRILLING)(10" CASING PIPE)	900.640	6			
								1			1		LS	SPECIAL PROVISION (TRAFFIC CONTROL, ALL INCLUSIVE)	900.645	--			

PROJECT NAME:	RUTLAND TOWN
PROJECT NUMBER:	NHG 019-3(60)
FILE NAME:	t14t190frm.dgn
PROJECT LEADER:	P. COBURN
DESIGNED BY:	M. BOGACZYK
QUANTITY SHEET	
PLOT DATE:	2/7/2017
DRAWN BY:	M. BOGACZYK
CHECKED BY:	P. COBURN
SHEET	8 OF 17

**TRAFFIC CONTROL SIGNAL SYSTEM, INTERSECTION**

SEE LIST OF MAJOR EQUIPMENT,  
TRAFFIC SIGNAL INFORMATION SHEET

**MAST ARM POLES**

MAP-1 = STA. 201+45.09, LT 37.51'  
MAP-2 = STA. 44+90.75, RT 50.53'  
MAP-3 = STA. 43+95.10, LT 46.97'  
MAP-4 = STA. 600+51.68, RT 27.55'

**PEDESTRIAN PEDESTAL POSTS**

PP-1 = STA. 44+77.62, RT 48.93'  
PP-2 = STA. 44+04.10, LT 52.48'  
PP-3 = STA. 43+92.22, RT 52.86'

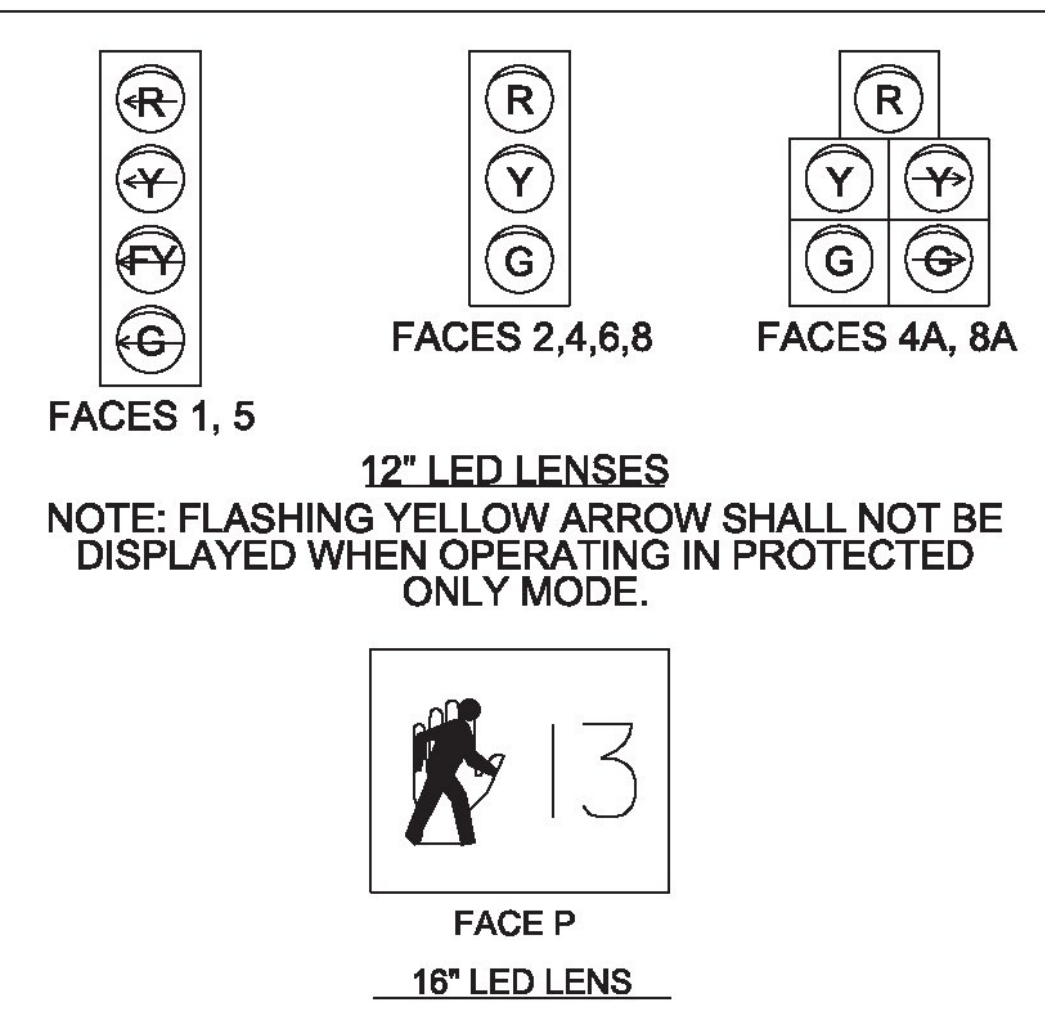
**CONTROLLER CABINET (GROUND-MOUNTED)**

STA. 44+94.50, RT 52.69' 45+04.18, RT 54.14'

**PEDESTRIAN SIGNAL HEADS**

STA. 43+92.22, RT 52.86'  
STA. 43+95.10, LT 46.97'  
STA. 44+04.10, LT 52.48'  
STA. 44+29.45, RT 51.45' 44+20.46, RT 51.14'  
STA. 44+77.62, RT 48.93'  
STA. 44+86.97, LT 54.59'

**PROPOSED SIGNAL  
FACE ARRANGEMENTS**



**SPECIAL PROVISION (JUNCTION BOX, HEAVY DUTY)**

JB-1 = STA. 45+01.98, LT 49.51' 45+12.96, RT 53.01'  
JB-2 = STA. 45+08.09, RT 63.17' 45+10.59, RT 72.45'  
JB-3 = STA. 44+07.15, LT 56.86' 44+05.94, RT 56.87'  
JB-4 = STA. 44+27.05, RT 59.29' 44+23.42, RT 66.11'  
JB-5 = STA. 43+77.92, RT 43.98'

**WIRED CONDUIT**

SEE TRAFFIC SIGNAL  
INFORMATION SHEET

**ELECTRICAL CONDUIT**

SEE TRAFFIC SIGNAL  
INFORMATION SHEET

**SPECIAL PROVISION (HORIZONTAL DIRECTIONAL DRILLING)(10" CASING PIPE)**

STA. 44+11.71, LT 56.54' - STA. 44+90.95, LT 51.03' (79')  
STA. 44+27.96, RT 59.25' - STA. 44+70.11, RT 61.87' (42')  
STA. 45+03.20, LT 47.99' - STA. 45+04.17, RT 50.47' (98')

**SPECIAL PROVISION (LUMINAIRE, LED) (MAST ARM POLE MOUNTED)**

STA. 201+45.09, LT 37.51' (MAP-1)  
STA. 44+90.75, RT 50.52' (MAP-2)  
STA. 43+95.10, LT 46.97' (MAP-3)

**BRACKET ARM (MAST ARM POLE MOUNTED)**

STA. 201+45.09, LT 37.51' (MAP-1)  
STA. 44+90.75, RT 50.52' (MAP-2)  
STA. 43+95.10, LT 46.97' (MAP-3)

**REMOVAL OF EXISTING TRAFFIC CONTROL SIGNAL SYSTEM**

**REMOVE EXISTING STRAIN POLES**

STA. 44+00.13, LT  
STA. 44+83.29, RT

**REMOVE EXISTING SPAN WIRE**

STA. 44+00.13, LT - STA. 44+83.29, RT

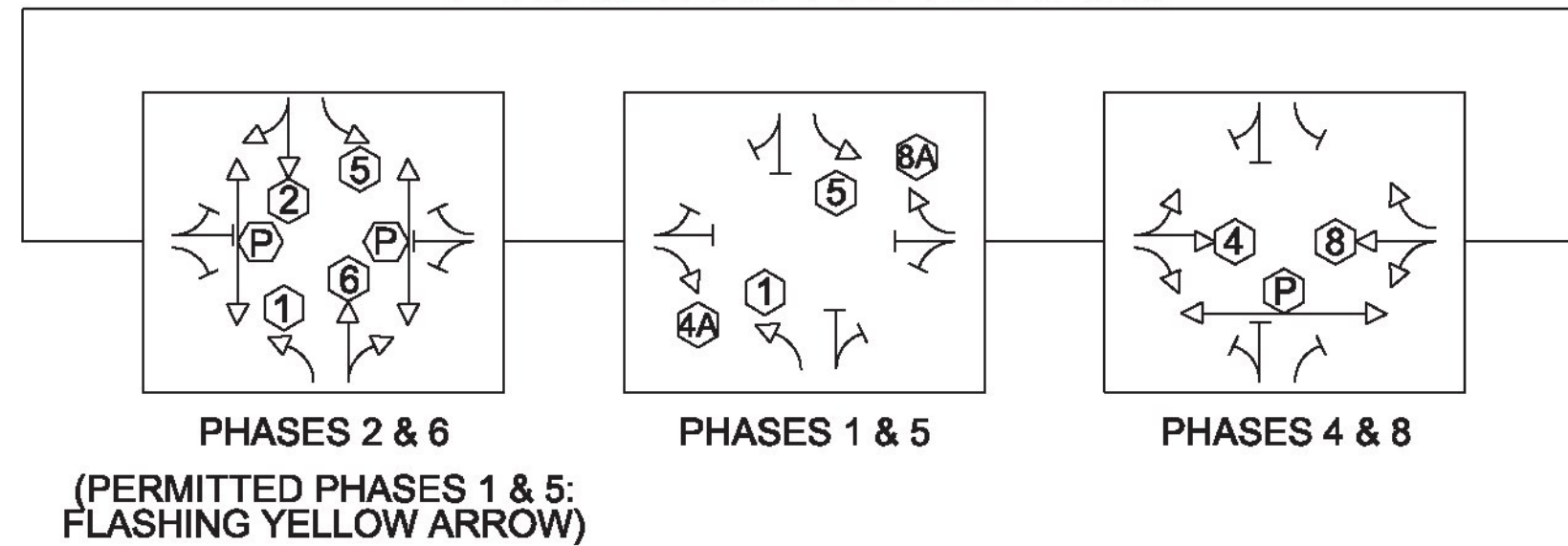
**REMOVE EXISTING SIGNAL CONTROLLER CABINET**

STA. 44+94.50, RT

**SPECIAL PROVISION (HORIZONTAL DIRECTIONAL DRILLING)(10" CASING PIPE)**

STA. 43+78.00, RT 39.13' - STA. 43+79.09, LT 42.90' (88')  
STA. 44+28.61, RT 66.39' - STA. 44+69.19, RT 37.98' (48')  
STA. 45+11.01, RT 48.48' - STA. 45+12.87, LT 47.88' (98')

**PHASING DIAGRAM**



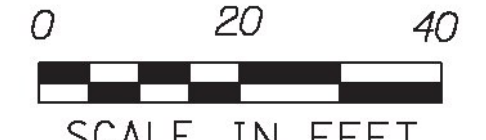
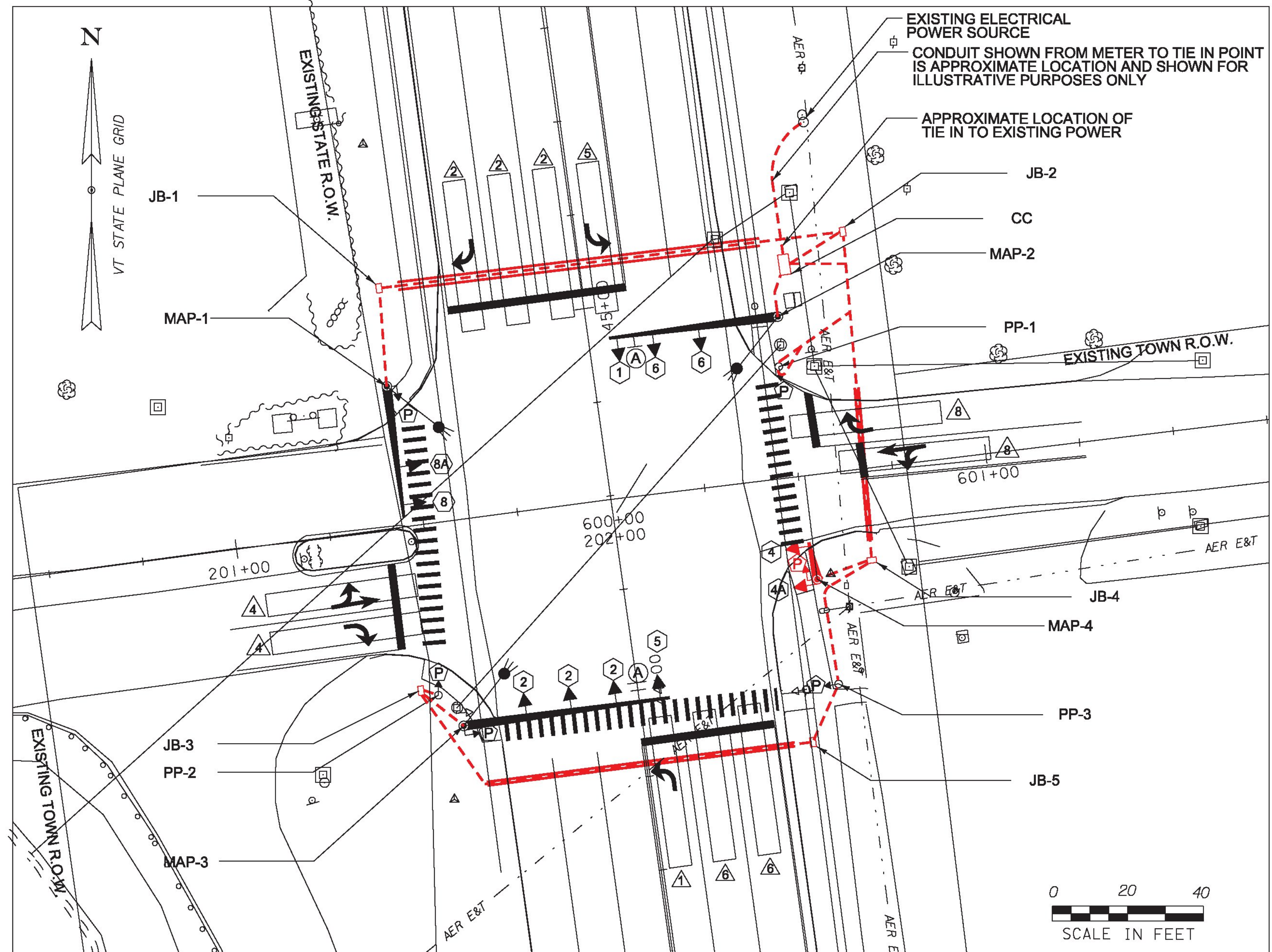
**SIGN DETAIL**



**NOTES:**

- CALL DIG SAFE PRIOR TO PERFORMING ANY EXCAVATION WORK. 1-888-DIG-SAFE
- ALL EXISTING PAVEMENT MARKINGS AND SIGNS TO REMAIN UNLESS OTHERWISE NOTED.
- PAVEMENT MARKINGS ARE NOT PROPOSED WITH THIS PROJECT BUT ARE SHOWN FOR LOCATION PURPOSES ONLY.
- AREAS NEEDING TURF RE-ESTABLISHMENT WILL REQUIRE 4 INCHES MINIMUM OF TOPSOIL APPLICATION.
- REMOVAL OF EXISTING TRAFFIC SIGNAL SYSTEM SHALL NOT OCCUR UNTIL THE PROPOSED SYSTEM IS CONSTRUCTED AND OPERATIONAL.
- REMOVAL OF EXISTING TRAFFIC SIGNAL SYSTEM WILL BE PAID UNDER ITEM NUMBER 678.45- REMOVAL OF EXISTING TRAFFIC CONTROL SIGNAL SYSTEM.
- EXISTING SIGNAL CONTROLLER, MALFUNCTION MANAGEMENT UNIT, DETECTION EQUIPMENT, AND SIGNAL HEADS WILL REMAIN THE PROPERTY OF THE STATE AND WILL BE SALVAGED TO MENDON TRAFFIC SHOP, 84 US 4, MENDON, VT 05701. COORDINATE MATERIAL TRANSFER WITH VTRANS SIGNAL TECH STEVE GUYETTE, (802)655-1580.
- SEWER LINE AT STATION 45+03.00, RT IS APPROXIMATELY 8 FEET BELOW FINISHED GRADE.
- DRAINAGE PIPE AT STATION 45+03.00, RT IS APPROXIMATELY 10 FEET BELOW FINISHED GRADE.
- WATER LINE AT STATION 45+02.00, LT IS APPROXIMATELY 5 FEET BELOW FINISHED GRADE.
- DRAINAGE PIPE AT STATION 600+61.00, LT IS APPROXIMATELY 6 FEET BELOW FINISHED GRADE.
- EXISTING STRAIN POLE FOUNDATION SHALL BE REMOVED TO A DEPTH THAT IS A MINIMUM OF 18" BELOW FINISH GRADE.

**AS BUILT SIGNAL LAYOUT SHEET**



**LEGEND**

- MAST ARM & POLE
- CONTROLLER CABINET
- JUNCTION BOX, HEAVY DUTY
- PEDESTAL POST
- SIGNAL HEAD WITH PHASE NO.
- PEDESTRIAN SIGNAL HEAD
- WIRED CONDUIT
- WIRED CONDUIT IN ELECTRICAL CONDUIT SLEEVE
- MAST ARM-MOUNTED SIGN
- STOP BAR DETECTION AREA
- LUMINAIRE

AM	OFF	PM
81	395	390
3	4	0
22	120	166

AM	OFF	PM
27	42	31
2	14	5
10	25	32

AM	OFF	PM
25	85	851
969	826	14
28		

2014 HOURLY VOLUMES  
US ROUTE 7 & SEWARD ROAD

<b>PROJECT NAME:</b> RUTLAND TOWN	<b>PLOT DATE:</b> ****DATE***
<b>PROJECT NUMBER:</b> NHG 019-3(60)	<b>DRAWN BY:</b> ****NAME***
<b>FILE NAME:</b> ****NAME***	<b>CHECKED BY:</b> ****NAME***
<b>PROJECT LEADER:</b> ****NAME***	<b>SHEET 9 OF 17</b>
<b>DESIGNED BY:</b> ****NAME***	
<b>TRAFFIC SIGNAL LAYOUT SHEET</b>	

**LIST OF MAJOR EQUIPMENT**

EQUIPMENT ITEM 678.15 (MS-307: US 7 & SEWARD ROAD)	QUANTITY
ECONOLITE COBALT TRAFFIC SIGNAL CONTROLLER (NEMA TS2)	1
NEMA "P44" BASE MOUNTED CONTROLLER CABINET WITH 15-INCH EXTENDED BASE ON A CONCRETE FOUNDATION, POWDER COATED FLAT BLACK WITH ANCILLARY CONTROL EQUIPMENT	1
POWDER COATED FLAT BLACK STEEL MAST ARM SIGNAL POLE WITH 35 FOOT MAST ARM (MAP-1)	1
POWDER COATED FLAT BLACK STEEL MAST ARM SIGNAL POLE WITH 45 FOOT MAST ARM (MAP-2)	1
POWDER COATED FLAT BLACK STEEL MAST ARM SIGNAL POLE WITH 55 FOOT MAST ARM (MAP-3)	1
POWDER COATED FLAT BLACK STEEL MAST ARM SIGNAL POLE WITH 10 FOOT MAST ARM (MAP-4)	1
ONE WAY, 3-SECTION, 12-INCH POLYCARBONATE MAST ARM MOUNTED LED TRAFFIC SIGNAL HEAD WITH TUNNEL VISORS AND 5-INCH LOUVERED BACKPLATES WITH 2-INCH RETROREFLECTIVE TAPE BORDER. ALL PIECES TO BE FLAT BLACK.	7
ONE WAY, 4-SECTION, 12-INCH POLYCARBONATE MAST ARM MOUNTED LED TRAFFIC SIGNAL HEAD WITH TUNNEL VISORS AND 5-INCH LOUVERED BACKPLATES WITH 2-INCH RETROREFLECTIVE TAPE BORDER. ALL PIECES TO BE FLAT BLACK.	2
ONE WAY, 5-SECTION, 12-INCH POLYCARBONATE MAST ARM MOUNTED LED TRAFFIC SIGNAL HEAD WITH TUNNEL VISORS AND 5-INCH LOUVERED BACKPLATES WITH 2-INCH RETROREFLECTIVE TAPE BORDER. ALL PIECES TO BE FLAT BLACK.	2
SIGNAL MOUNTING HARDWARE	11
VEHICLE DETECTOR EXTENSION BRACKET	6
STOP BAR DETECTOR ASSEMBLY	4
ADVANCE DETECTOR ASSEMBLY	2
VEHICLE DETECTION PROCESSOR	2
ACCESSIBLE PEDESTRIAN PUSH BUTTON ASSEMBLIES POLE MOUNTED WITH LOCATOR TONE, R10-3e SIGN, FLAT BLACK HOUSING	6
ACCESSIBLE PEDESTRIAN SIGNAL HEADS COUNTDOWN STYLE, FLAT BLACK HOUSING	3
ACCESSIBLE PEDESTRIAN SIGNAL HEADS COUNTDOWN STYLE, FLAT BLACK HOUSING POLE MOUNTED	3
PEDESTRIAN PEDESTAL POST	3
GPS TIME CLOCK	1

**CONDUIT SCHEDULE**

CONDUIT	WRED CONDUIT		ELECTRICAL CONDUIT		DESCRIPTION
	2"	4"	2"	4"	
STANCHION TO JB-2	41				POWER
JB-2 TO CC	17				POWER
JB-2 TO CC	17				SIGNAL/LIGHTING
JB-2 TO CC	17				VEHICLE DETECTION
JB-2 TO CC			17		FUTURE USE
CC TO MAP-2	10				SIGNAL/LIGHTING
CC TO MAP-2	10				VEHICLE DETECTION
CC TO MAP-2			10		FUTURE USE
MAP-2 TO PP-1	19				PED FACILITY
MAP-2 TO PP-1			19		FUTURE USE
JB-2 TO JB-1	119				SIGNAL/LIGHTING
JB-2 TO JB-1	119				VEHICLE DETECTION
JB-2 TO JB-1			119		FUTURE USE
JB-2 TO JB-4	82				SIGNAL/LIGHTING
JB-2 TO JB-4	82				VEHICLE DETECTION
JB-2 TO JB-4			82		FUTURE USE
JB-1 TO MAP-1	19				SIGNAL/LIGHTING
JB-1 TO MAP-1	19				VEHICLE DETECTION
JB-1 TO MAP-1			19		FUTURE USE
JB-1 TO JB-3	101				SIGNAL/LIGHTING
JB-1 TO JB-3	101				VEHICLE DETECTION
JB-1 TO JB-3			101		FUTURE USE
JB-3 TO MAP-3	20				SIGNAL/LIGHTING
JB-3 TO MAP-3	20				DETECTION
JB-3 TO MAP-3			20		FUTURE USE
JB-3 TO PP-2	9				PED FACILITY
JB-3 TO PP-2			9		FUTURE USE
JB-4 TO MAP-4	14				SIGNAL/LIGHTING
JB-4 TO MAP-4	14				VEHICLE DETECTION
JB-4 TO MAP-4			14		FUTURE USE
MAP-4 TO PP-3	37				PED FACILITY
MAP-4 TO PP-3			37		FUTURE USE
SUBTOTAL	887		447		
ROUNDING	13		3		
<b>TOTALS</b>	<b>900</b>		<b>450</b>		

SEE AS BUILT SCHEDULE NEXT PAGE

**CONTROLLER TIMING INFORMATION**

CONTROLLER TIMING CHART									
PHASE	1	2	3	4	5	6	7	8	9
IN USE	X	X		X	X	X		X	
TRAFFIC MOVEMENT	←	↑		←↑	←	↑		←↑	
MIN. GREEN	8	8		8	8	8		8	
WALK		7		7		7		7	
PED CLEAR		20		23		20		23	
DELAYED GREEN		5		5		5		5	
MAX 1 - GREEN (OFF)	28	29		32	28	29		32	
MAX 2 - GREEN (AM)	10	27		32	10	27		32	
MAX 3 - GREEN (PM)	29	33		37	29	33		37	
YELLOW CLEARANCE	4.5	4.5		4	4.5	4.5		4	
ALL RED CLEARANCE	2.5	2.5		3	2.5	2.5		3	
VEHICLE EXTENSION	3	3		3	3	3		3	
RECALL MODE		SOFT				SOFT			

**COORDINATION PLAN**

PATTERN	COS	CYCLE	FLASH	OFFSET	SPLIT PHASES/SPLIT TIMES									
					1	2	3	4	5	6	7	8		
1	FREE		N/A											
2	111	110	5	35	36		39	35	36					39
3	222	90	73	17	34		39	17	34					39
4	333	120	75	36	40		44	36	40					44

**COORDINATED STEPS**

PLAN NO.	EVENT	ACTION PLAN	TIMES			
1	1	1	12:00 AM	TO		6:00 AM
1	2	3	6:00 AM	TO		9:00 AM
1	3	2	9:00 AM	TO		3:30 PM
1	4	4	3:30 PM	TO		6:00 PM
1	5	2	6:00 PM	TO		12:00 AM

**TIME OF DAY PROGRAM**

WEEKDAY TIMINGS			
FLASH	12:00 AM	TO	6:00 AM
MAX 2 - AM PEAK	6:00 AM	TO	9:00 AM
MAX 1 - OFF PEAK	9:00 AM	TO	3:30 PM
MAX 3 - PM PEAK	3:30 PM	TO	6:00 PM
MAX 1 - OFF PEAK	6:00 PM	TO	12:00 AM

**ACTION PLAN**

ACTION PLAN	SPLIT PATTERN
1	254 - FREE
2	2
3	3
4	4
5	255 - FLASH

PROJECT NAME:	RUTLAND TOWN
PROJECT NUMBER:	NHG 019-3(60)
FILE NAME: t14t190trrf.dgn	PLOT DATE: 2/7/2017
PROJECT LEADER: P. COBURN	DRAWN BY: M. BOGACZYK
DESIGNED BY: M. BOGACZYK	CHECKED BY: P. COBURN
TRAFFIC SIGNAL INFORMATION SHEET	SHEET 10 OF 17

# AS BUILT CONDUIT SCHEDULE

Conduit	2" WIRED CONDUIT (FT.)	2" ELECTRICAL CONUIT (FT.)	EXTRA RUN 2" CONDUIT (FT.)	DESCRIPTION
Stanchion to CC	5			POWER
JB2 to CC	17			SIGNAL/LIGHTING
JB2 to CC	18			VEHICLE DETECTION
JB2 to CC		18		FUTURE USE
JB2 to CC			18	SIGNAL/LIGHTING
CC to MAP2	24			SIGNAL/LIGHTING
CC to MAP2	23			VEHICLE DETECTION
CC to MAP2		24		FUTURE USE
CC to MAP2			23	SIGNAL/LIGHTING
CC to PP1	55			PED FACILITY
CC to PP1		60		FUTURE USE
JB2 to JB1	126			SIGNAL/LIGHTING
JB2 to JB1	126			VEHICLE DETECTION
JB2 to JB1		126		FUTURE USE
JB2 to JB1			125	SIGNAL/LIGHTING
JB2 to JB4	95			SIGNAL/LIGHTING
JB2 to JB4	99			VEHICLE DETECTION
JB2 to JB4		99		FUTURE USE
JB2 to JB4			98	SIGNAL/LIGHTING
JB1 to MAP1	35			SIGNAL/LIGHTING
JB1 to MAP1	33			VEHICLE DETECTION
JB1 to MAP1		34		FUTURE USE
JB1 to MAP1			32	SIGNAL/LIGHTING
JB3 to MAP3	17			SIGNAL/LIGHTING
JB3 to MAP3	17			VEHICLE DETECTION
JB3 to MAP3		18		FUTURE USE
JB3 to MAP3			17	SIGNAL/LIGHTING
JB3 to PP2	14			PED FACILITY
JB3 to PP2		16		FUTURE USE
JB4 to MAP4	23			SIGNAL/LIGHTING
JB4 to MAP4	23			VEHICLE DETECTION
JB4 to MAP4		24		FUTURE USE
JB4 to MAP4			23	SIGNAL/LIGHTING
JB5 to PP3	26			PED FACILITY
PP3 to JB4		45		FUTURE USE
JB3 to JB5	125			SIGNAL/LIGHTING
JB3 to JB5	124			VEHICLE DETECTION
JB3 to JB5		124		FUTURE USE
JB3 to JB5			125	SIGNAL/LIGHTING
JB5 to JB4	62			SIGNAL/LIGHTING
JB5 to JB4	62			VEHICLE DETECTION
JB5 to JB4		63		FUTURE USE
JB5 to JB4			62	SIGNAL/LIGHTING
JB5 to JB4			64	FUTURE USE
<b>Total</b>	<b>1149</b>	<b>651</b>	<b>587</b>	

**RUTLAND TOWN  
NHG 019-3(60)**

AS BUILT CONDUIT SCHEDULE  
SHEET 10A

# TRAFFIC SIGNAL NOTES

## A. NEW SIGNAL EQUIPMENT

1. ALL SIGNAL HEADS SHALL BE 12" POLYCARBONATE. THE SIGNAL HEADS SHALL HAVE FLAT BLACK HOUSINGS AND VISORS.
2. THE TRAFFIC SIGNAL CONTROLLER AND RELATED EQUIPMENT SHALL BE AN ECONOLITE COBALT (NEMA TS2) IN A NEMA P44 TRAFFIC CONTROL CABINET WITH 15" BASE EXTENSION INSTALLED AT THE LOCATION SHOWN ON PLANS. THE TRAFFIC CONTROL CABINET SHALL BE ORIENTED SO THAT THE DOOR DOES NOT FACE THE ROADWAY.
3. ALL SIGNAL HEADS SHALL HAVE RED, YELLOW AND GREEN L.E.D. SIGNALS WITH A VISIBLE BEAM SPREAD OF 80 DEGREES OFF AXIS.
4. ALL SIGNAL EQUIPMENT SHALL BE PAINTED FLAT BLACK.
5. ALL SIGNAL EQUIPMENT AND MAST ARM SIGNS SHALL HAVE SAFETY CABLES.
6. A DISCONNECT BREAKER FOR EACH CIRCUIT SHALL BE INSTALLED IN A RAINPROOF (NEMA 3R), LOCKED CABINET ON A STANCHION NEXT TO OR BELOW THE METER SOCKET.
7. ALL TRAFFIC SIGNAL HEADS SHALL HAVE LOUVERED BACK PLATES WITH A 2" RETRO-REFLECTIVE TAPE BORDER.
8. THE FINAL LOCATION OF ALL NEW TRAFFIC SIGNAL EQUIPMENT SHALL BE APPROVED BY THE ENGINEER.

## B. SIGNAL OPERATION

1. SWITCH-OVER TO NEW SIGNAL SYSTEM SHALL NOT OCCUR DURING PEAK OPERATING PERIODS. UNIFORMED TRAFFIC OFFICERS SHALL CONTROL TRAFFIC DURING SWITCH-OVER.
2. ALL SIGNALS SHALL DWELL ON THE US ROUTE 7 THRU MOVEMENT.
3. THE US ROUTE 7 THRU PHASE SHALL BE USED FOR THE START-UP PHASE FOLLOWING FLASHING OPERATION.
4. SIGNAL TIMING SHOWN ON THE PLANS MAY REQUIRE FINE-TUNING IN THE FIELD BASED ON TRAFFIC OBSERVATION AND/OR ADDITIONAL FIELD STUDIES.
5. THE EXISTING TRAFFIC SIGNAL SYSTEM SHALL REMAIN OPERATIONAL UNTIL THE NEW TRAFFIC SIGNAL SYSTEM BECOMES FULLY OPERATIONAL.
6. REMOVAL OF THE EXISTING SIGNAL SYSTEM WILL BE PAID FOR UNDER ITEM NUMBER 678.45, REMOVAL OF EXISTING TRAFFIC CONTROL SIGNAL SYSTEM.

## C. JUNCTION BOXES

1. JUNCTION BOXES ARE DETAILED ON SHEET 13.
2. THE LOGO ON JUNCTION BOXES SHALL BE "TRAFFIC SIGNAL."
3. ALL JUNCTION BOXES SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 678.

## D. TRAFFIC SIGNAL CONDUIT

1. ALL TRAFFIC SIGNAL WIRED CONDUIT SHALL BE SCHEDULE 80 PVC.
2. WHEN CONDUIT IS PLACED BELOW THE ROADWAY OR ACROSS SIDE ROADS, IT SHALL BE PLACED IN A STEEL OR HDPE SLEEVE, SIZE AS SHOWN ON THE PLANS.
3. ALL UNUSED CONDUIT ENDS SHALL BE FILLED WITH STEEL WOOL PRIOR TO BEING CAPPED.
4. ALL TRAFFIC SIGNAL CONDUIT WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 678.

## E. VEHICLE DETECTION

1. STOP BAR AND ADVANCE VEHICLE DETECTOR LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR IN ACCORDANCE WITH THE MANUFACTURER'S GUIDANCE FOR THE TYPE OF DETECTOR SUPPLIED. THE CONTRACTOR SHALL SUBMIT PROPOSED MOUNTING LOCATIONS AND DOCUMENTATIONS OF CONFORMANCE WITH THE MANUFACTURER'S GUIDANCE TO THE ENGINEER FOR APPROVAL.
2. ALL VEHICLE DETECTORS SHALL BE PLACED SUCH THAT OCCLUSION IS MINIMIZED AND PHASING IS NOT AFFECTED.
3. STOP BAR VEHICLE DETECTION AREAS SHALL EXTEND 5 FEET PAST THE STOP BAR.
4. ADVANCE VEHICLE DETECTION AREAS SHALL BE A MINIMUM OF 400 FEET UPSTREAM OF THE STOP BAR ON PHASES 2 AND 6.

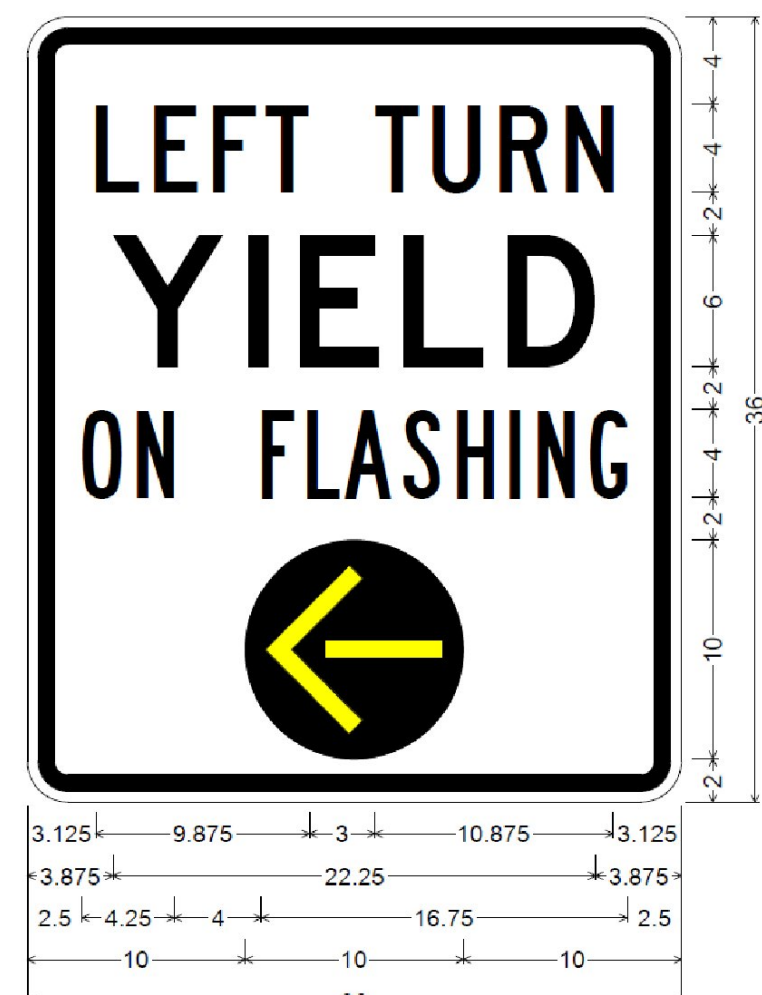
5. STOP BAR DETECTION SHALL BE WAVETRONIX SMARTSENSOR MATRIX.
6. ADVANCE VEHICLE DETECTION SHALL BE WAVETRONIX SMARTSENSOR ADVANCE.
7. THERE SHALL BE NO WIRING SPLICES BETWEEN THE SIGNAL CONTROLLER EQUIPMENT AND THE VEHICLE DETECTORS.
8. ADVANCE DETECTION SHALL INCORPORATE ALL LANES FOR PHASES 2 AND 6.
9. SEE THE PLANS OR THE SPECIAL PROVISIONS FOR A DETAILED LIST OF MAJOR EQUIPMENT

## F. GENERAL

1. A UNIFORMED TRAFFIC OFFICER WITH A BLUE LIGHT SHALL BE PRESENT DURING ALL LANE CLOSURES.
2. UNIFORMED TRAFFIC OFFICERS MUST CONTROL THE INTERSECTION IF NECESSARY. FLAGGERS SHALL NOT BE USED TO CONTROL THE INTERSECTION.
3. THE CONTRACTOR SHALL ACQUIRE ALL THE NECESSARY PERMITS AND MAKE ALL NECESSARY ARRANGEMENTS WITH THE UTILITY COMPANY TO PROVIDE A PERMANENT POWER SUPPLY TO THE TRAFFIC SIGNAL EQUIPMENT, IF APPLICABLE. THE ROUTING OF POWER TO THE INTERSECTION SHALL BE SUCH THAT THE STATE HAS FULL RESPONSIBILITY FROM THE TRANSFORMER THROUGH THE SIGNAL SYSTEM. NO INTERVENING OWNERSHIP/ RESPONSIBILITY SHALL BE ALLOWED.
4. ALL ELECTRICAL WIRING SHALL BE DONE BY A LICENSED ELECTRICIAN AND OVERSEEN BY A MASTER ELECTRICIAN.

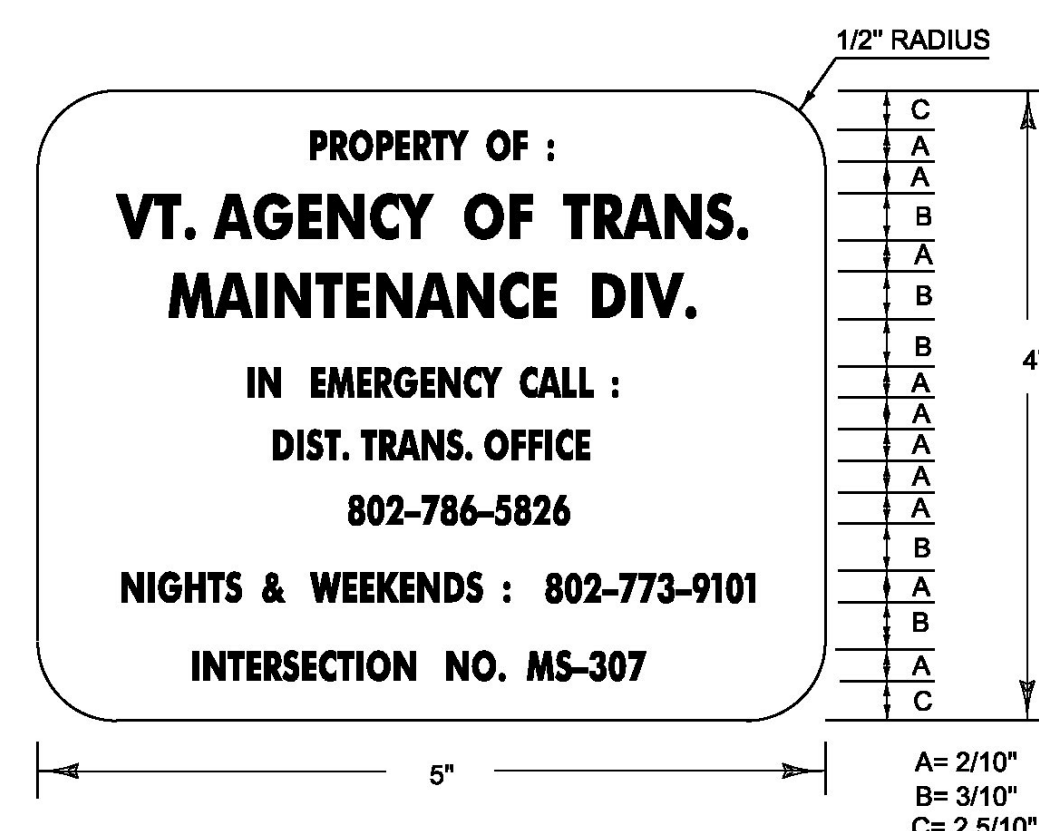
## G. COORDINATION

1. TELEMETRY SHALL BE ESTABLISHED USING THE EXISTING FORM OF INTERCONNECTION; HARDWIRE TO THE MASTER CONTROLLER.
2. CONTACT THE RUTLAND CITY DEPARTMENT OF PUBLIC WORKS AT (802)773-1813 FOR COORDINATION OF INTERCONNECTION. CURRENTLY INTERCONNECTED WITH CITY OWNED SIGNALS TO THE NORTH OF THE PROJECT.



**SIGN DETAIL**  
NOT TO SCALE

MAST ARM MOUNTING BRACKET HARDWARE WILL BE CONSIDERED INCIDENTAL TO ITEM 675.20 TRAFFIC SIGNS, TYPE A FOR THIS OVERHEAD ASSEMBLY.



**CONTROLLER PLAQUE DETAIL**  
NOT TO SCALE

LEGEND: - BLACK (NON-REFL.) - STAMPED PRIOR TO PAINTING  
BACKGROUND: NATURAL ALUMINUM OR BRASS SURFACE

## NOTES:

- 1.) THE PLAQUE SHALL BE MOUNTED ON ALL TRAFFIC SIGNAL CONTROLLER CABINETS. IT SHALL BE FASTENED TO THE CONTROLLER CABINET IN SUCH A MANNER AS TO BE NOT EASILY REMOVED, SUCH AS WELDED, RIVETED OR BOLTED WITH VANDAL PROOF BOLTS.
- 2.) THE LETTERS SHALL BE PUNCHED OR STAMPED, SUCH STAMPING SHALL PENETRATE AT LEAST 1/2 THE BASE MATERIAL THICKNESS.
- 3.) THE BASE MATERIAL FOR THE PLAQUE SHALL BE BRASS OR ALUMINUM WITH A MINIMUM THICKNESS OF 0.100 INCHES.

PROJECT NAME:	RUTLAND TOWN
PROJECT NUMBER:	NHC 019-3(60)
FILE NAME:	114190frm.dgn
PROJECT LEADER:	P. COBURN
DESIGNED BY:	M. BOGACZYK
TRAFFIC SIGNAL NOTES	
PLOT DATE:	2/7/2017
DRAWN BY:	M. BOGACZYK
CHECKED BY:	P. COBURN
SHEET	II OF 17

- NATURAL WIND GUSTS: INCLUDE
- TRUCK INDUCED WIND GUSTS: INCLUDE FOR ROADWAYS WHERE SPEED LIMIT IS 40 M.P.H. OR GREATER
- GALLOPING: NOT REQUIRED

**FOUNDATION CRITERIA**

- CONCRETE: CONCRETE, CLASS B, VTrans' "STANDARD SPECIFICATIONS FOR CONSTRUCTION", DATED 2011, SECTION 541.
- REINFORCING STEEL: REINFORCING STEEL, LEVEL I VTrans' "STANDARD SPECIFICATIONS FOR CONSTRUCTION", DATED 2011, SECTION 507.
- GEOTECHNICAL SOIL RESISTANCES TO BE DETERMINED BY CONTRACTOR. GEOTECHNICAL DATA REPORT SUMMARIZING SUBSURFACE INVESTIGATION INCLUDED IN CONTRACT DOCUMENTS

**3. ANCHOR BOLTS**

- A) GALVANIZED ANCHOR BOLTS WITH TWO HEXAGON NUTS AND TWO WASHERS PER BOLT SHALL BE FURNISHED WITH EACH POLE. ANCHOR BOLT PLATES, WHEN USED, SHALL ALSO BE GALVANIZED. SEE SECTION 714.09. AFTER INSTALLATION, A MINIMUM OF TWO THREADS ON THE BOLT SHOULD BE EXPOSED ABOVE THE NUT.
- B) A MINIMUM OF 6 ANCHOR BOLTS SHALL BE PROVIDED AT EACH SINGLE UPRIGHT POST FOUNDATIONS.
- C) PROCEDURE FOR TIGHTENING DOUBLE-NUT ANCHOR BOLT CONNECTIONS:
  1. VERIFY THAT THE NUTS CAN BE TURNED ONTO THE BOLTS PAST THE ELEVATION CORRESPONDING TO THE BOTTOM OF EACH IN-PLACE LEVELING NUT AND BE BACKED OFF BY THE EFFORT OF ONE PERSON ON A 12-IN. LONG WRENCH OR EQUIVALENT (I.E., WITHOUT EMPLOYING A PIPE EXTENSION ON THE WRENCH HANDLE).
  2. CLEAN AND LUBRICATE THE EXPOSED THREADS OF ALL ANCHOR BOLTS. CLEAN AND LUBRICATE THE THREADS AND BEARING SURFACES OF ALL LEVELING NUTS. RE-LUBRICATE THE EXPOSED THREADS OF THE ANCHOR BOLTS AND THE THREADS OF THE LEVELING NUTS IF MORE THAN 24 HOURS HAS ELAPSED SINCE EARLIER LUBRICATION, OR IF THE ANCHOR BOLTS AND LEVELING NUTS HAVE BECOME WET SINCE THEY WERE FIRST LUBRICATED.
  3. TURN THE LEVELING NUTS ONTO THE ANCHOR BOLTS AND ALIGN THE NUTS TO THE SAME ELEVATION.
  4. PLACE STRUCTURAL WASHERS ON TOP OF THE LEVELING NUTS (ONE WASHER CORRESPONDING TO EACH ANCHOR BOLT).
  5. INSTALL THE BASE PLATE ATOP THE LEVELING NUTS. PLACE STRUCTURAL WASHERS ON TOP OF THE BASE PLATE (ONE WASHER CORRESPONDING TO EACH ANCHOR BOLT), AND TURN THE TOP NUTS ONTO THE ANCHOR BOLTS.
  6. TIGHTEN TOP NUTS TO A SNUG-TIGHT CONDITION IN A STAR PATTERN. SNUG-TIGHT IS DEFINED AS THE MAXIMUM NUT ROTATION RESULTING FROM THE FULL EFFORT OF ONE PERSON ON A 12-IN. LONG WRENCH OR EQUIVALENT. A STAR TIGHTENING PATTERN IS ONE IN WHICH THE NUTS ON OPPOSITE OR NEAR-OPPOSITE SIDES OF THE BOLT CIRCLE ARE SUCCESSIVELY TIGHTENED IN A PATTERN RESEMBLING A STAR. (FOR EXAMPLE, FOR AN 8-BOLT CIRCLE WITH BOLTS SEQUENTIALLY NUMBERED 1 TO 8, TIGHTEN NUTS IN THE FOLLOWING BOLT ORDER: 1, 5, 7, 3, 8, 4, 6, 2.)
  7. TIGHTEN LEVELING NUTS TO A SNUG-TIGHT CONDITION IN A STAR PATTERN.
  8. BEFORE FINAL TIGHTENING OF THE TOP NUTS, MARK THE REFERENCE POSITION OF EACH TOP NUT IN A SNUG-TIGHT CONDITION WITH A SUITABLE MARKING ON ONE FLAT WITH A CORRESPONDING REFERENCE MARK ON THE BASE PLATE AT EACH BOLT. THEN INCREMENTALLY TURN THE TOP NUTS USING A STAR PATTERN UNTIL ACHIEVING THE REQUIRED NUT ROTATION SPECIFIED BELOW. TURN THE NUTS IN AT LEAST TWO FULL TIGHTENING CYCLES (PASSES). AFTER TIGHTENING, VERIFY THE NUT ROTATION.
  9. TOP NUTS FOR ASTM F1554 GRADE 55 ANCHOR BOLTS SHALL BE TIGHTENED TO 1/3 TURN BEYOND SNUG TIGHT CONDITION FOR BOLTS LESS THAN OR EQUAL TO 1 1/2" DIAMETER AND 1/6 TURN BEYOND SNUG TIGHT CONDITION FOR BOLTS GREATER THAN 1 1/2" DIAMETER. THE TOLERANCE FOR NUT ROTATION IS PLUS 20 DEGREES. USE A BEVELED WASHER IF THE NUT IS NOT IN FIRM CONTACT WITH THE BASE PLATE OR THE OUTER FACE OF THE BASE PLATE IS SLOPED MORE THAN 1:40.

**4. FLANGE BOLTS**

ALL FLANGE BOLTS, HEX NUTS, AND WASHERS SHALL CONFORM TO SUBSECTION 714.05. THE FLANGE BOLTS SHALL BE CAPABLE OF RESISTING 133% OF THE FULL DESIGN STRESS OF THE TUBE AT ITS YIELD STRENGTH STRESS. FLANGE BOLTS SHALL BE TENSIONED IN ACCORDANCE WITH SUBSECTION 506.19. DIRECT TENSION INDICATORS ARE REQUIRED.

**5. U-BOLTS**

U-BOLTS AND ASSOCIATED HARDWARE SHALL CONFORM TO SUBSECTION 714.04.

NON-CANTILEVERED OVERHEAD SIGN AND SIGNAL STRUCTURES:  
 ASTM 1500, GRADE B WELDED AND SEAMLESS STEEL PIPE (ROUNDS ONLY)  
 API 5L GRADE X42 AMERICAN PETROLIUM INSTITUTE SPECIFICATION 5L

**7. GALVANIZING**

ALL STEEL COMPONENTS, EXCEPT CONCRETE REINFORCING, ARE TO BE HOT DIPPED GALVANIZED AFTER FABRICATION. THE ASSEMBLIES SHALL BE DESIGNED AND FABRICATED TO PERMIT GALVANIZING ON ALL INTERIOR AND EXTERIOR SURFACES AND SHALL BE FREE OF POCKETS AND OTHER STRUCTURAL OBSTRUCTIONS THAT WILL NOT PERMIT PROPER DEPOSITION OF ZINC COATING. GALVANIZING SHALL BE IN ACCORDANCE WITH SECTION 752.02.

**8. WELDING**

- A) ALL WELDING SHALL BE PERFORMED PER SECTION 506.10
- B) ALL WELDS SHALL BE AT LEAST AS STRONG AS THE MATERIAL(S) BEING WELDED

**9. FOUNDATIONS**

- A) FOOTINGS SHALL BE DESIGNED IN ACCORDANCE WITH VTrans' MATERIALS & RESEARCH ENGINEERING INSTRUCTIONS GEOTECHNICAL DESIGN PROCEDURES FOR MAST ARM AND OVERHEAD SIGN SUPPORT FOUNDATIONS (MREI 10-01), DATED MARCH 9, 2010, A COPY OF WHICH CAN BE FOUND ON THE AGENCY'S WEBSITE: WWW.VTRANS.VERMONT.GOV.
- B) FOUNDATIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE FOLLOWING NOTES:
  1. A MINIMUM EMBEDMENT DEPTH OF FIVE FEET SHALL BE USED FOR ALL SPREAD FOOTING FOUNDATIONS; MEASURED FROM THE GROUND SURFACE ELEVATION TO THE BOTTOM OF THE FOOTING ELEVATION.
  2. FOR DRILLED SHAFT FOUNDATIONS, CONCRETE SHALL BE POURED AGAINST UNDISTURBED SOIL UNLESS A PERMANENT CASING IS DESIGNED FOR AND APPROPRIATE SUPPORTING CALCULATIONS ARE PROVIDED. THE TOP TWO FEET OF SOIL SHALL BE NEGLECTED FOR DESIGN PURPOSES. A DISPOSABLE CIRCULAR CONCRETE FORM, IF USED, SHALL NOT BE PLACED DEEPER THAN TWO FEET, IN ORDER NOT TO REDUCE THE FRICTION BETWEEN THE SOIL AND THE CONCRETE.
  3. AS AN ALTERNATIVE TO THE DRILLED HOLES, FOOTINGS MAY BE POURED IN EXCAVATED HOLES USING THE PROPER FORMS, WHICH MUST BE REMOVED. THE EXCAVATED HOLES SHALL BE AT LEAST TWO FEET CLEAR OF THE FOUNDATION SIDES AND ONE FOOT DEEPER THAN THE FOUNDATION. CARE SHALL BE TAKEN TO AVOID EXCAVATING AROUND THE TOP OF THE FOUNDATION. THE BACKFILL MATERIAL SHALL BE COMPACTED AS DESCRIBED IN SECTION 204.08. DESIGN LIMITS AS FOR AUGURED FOOTINGS APPLIES.
  4. ANY BACKFILL PLACED ADJACENT TO THE FOOTING SHALL BE GRANULAR MATERIAL MEETING THE REQUIREMENTS FOR GRANULAR BACKFILL FOR STRUCTURES, SECTION 704.08. IT SHALL BE COMPACTED AS DESCRIBED IN SECTION 204.08.
  5. CONCRETE FOR THE FOUNDATION SHALL CONFORM TO THE REQUIREMENTS OF CONCRETE, SECTION 541 STRUCTURAL CONCRETE. IF DRILLED SHAFT FOUNDATIONS ARE REQUIRED, THE CONCRETE SPECIFICATIONS MAY NEED TO BE ADJUSTED FOR CONSTRUCTABILITY ISSUES. HOWEVER, IF REQUIRED, THE CONTRACTOR SHALL SUBMIT ANY CHANGES TO THE CONCRETE SPECIFICATION FOR REVIEW BY THE VTrans PROJECT MANAGER.
  6. STEEL PILES IF USED, SHALL MEET THE REQUIREMENTS OF SECTION 505.
  7. WHEN THE DESIGN DEPTH OF A FOUNDATION CANNOT BE OBTAINED DUE TO UNFORSEEN FIELD CONDITIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER FOR THE MANUFACTURER TO OBTAIN A REVISED FOUNDATION DESIGN. SUCH A REVISION SHALL BE SUBMITTED TO THE VTrans PROJECT MANAGER AND MAY REQUIRE UP TO A FOUR WEEK REVIEW PERIOD BY VTrans.
- C) SIGNALS/SIGNS SHALL BE INSTALLED AND LEVELED AND POLES SHALL BE PLUMB PRIOR TO PLACING GROUT UNDER POLE BASE. GROUT MATERIAL SHALL BE NON-SHRINKING MORTAR CONFORMING TO SECTION 707.03, MORTAR TYPE IV.

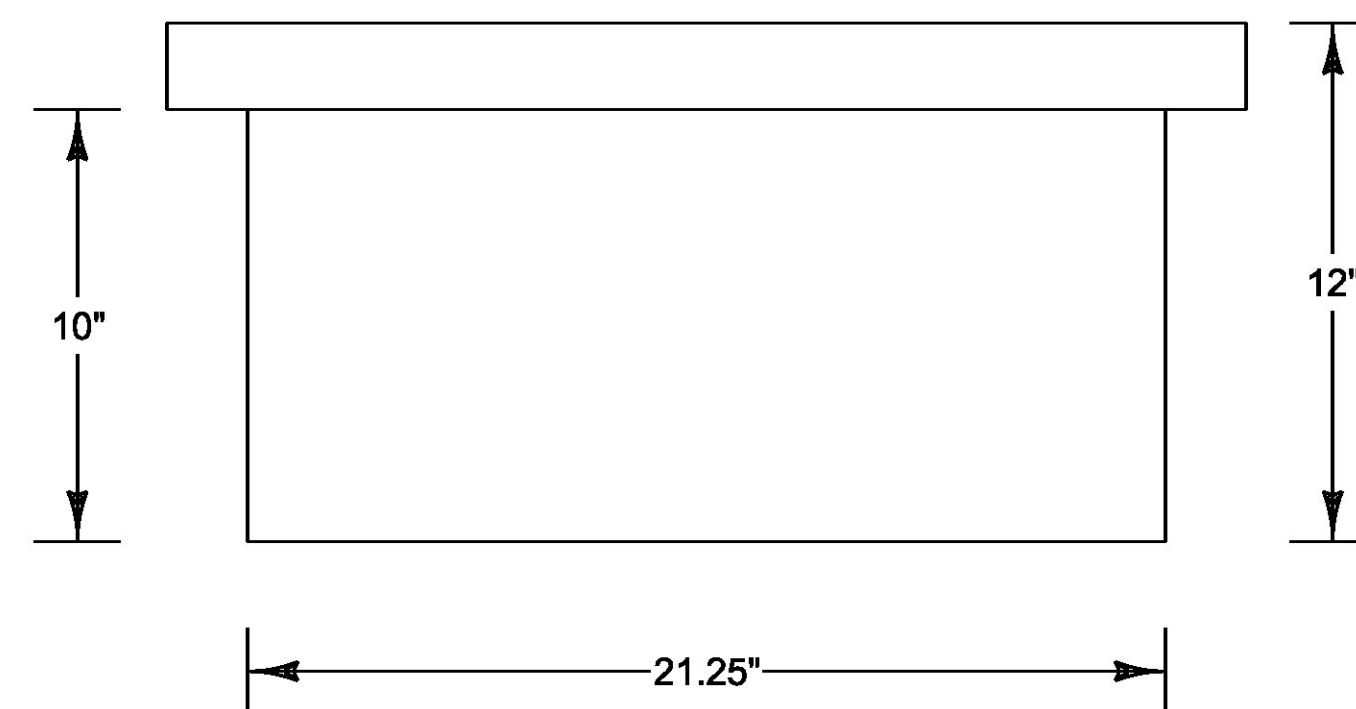
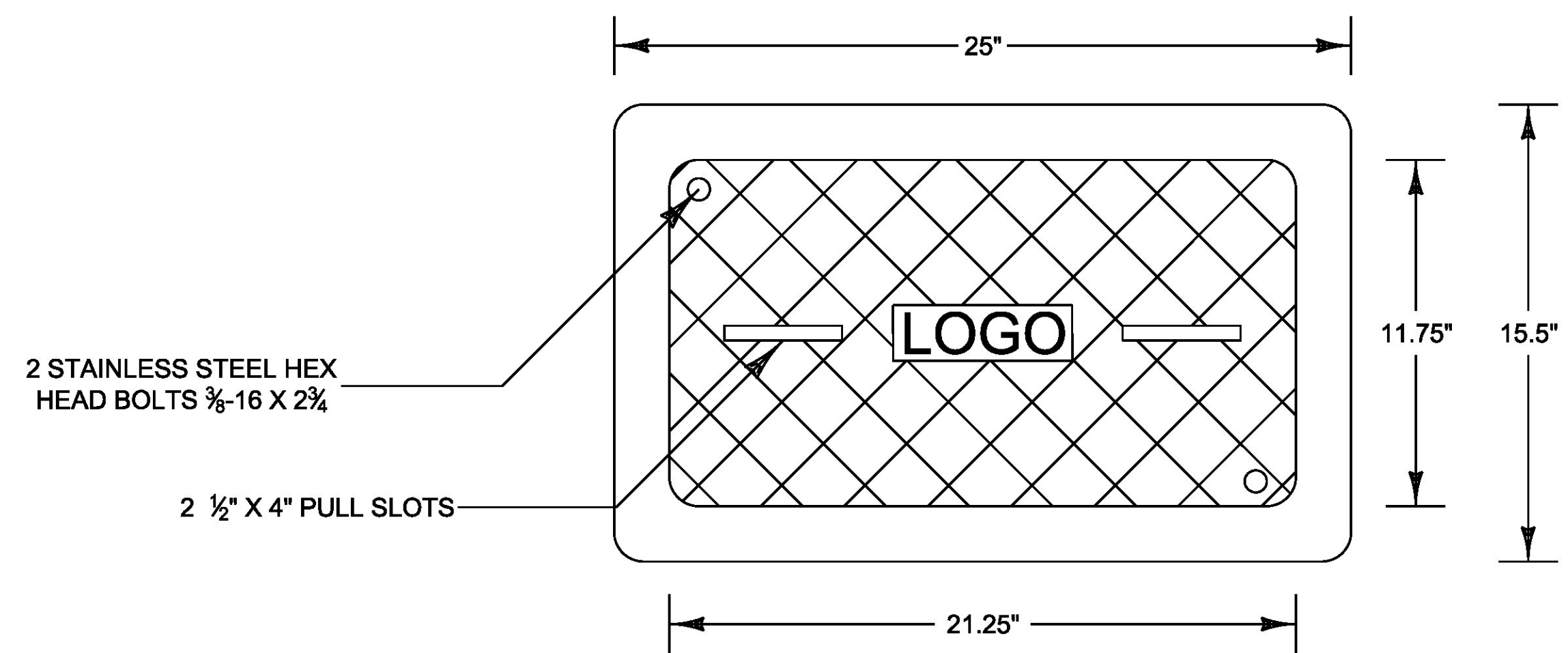
**10. EACH OVERHEAD TRAFFIC SIGNAL/SIGN SUPPORT SHALL BE GROUNDED. THE GROUND SHALL CONSIST OF THE FOLLOWING:**

- A) AN INTERNAL GROUND LUG OPPOSITE THE HAND HOLE
- B) A #6 (MIN.) SOFT DRAWN COPPER GROUNDING ELECTRODE CONDUCTOR
- C) A 5/8" X 8' (MIN.) COPPER CLAD GROUNDING ELECTRODE THE RESISTANCE TO GROUND SHALL BE 25 OHMS OR LESS. ADDITIONAL GROUNDING ELECTRODES MAY BE REQUIRED (MINIMUM SPACING SHALL BE 6'). WHEN A POWER SERVICE, METER AND DISCONNECT ARE ATTACHED TO A POLE, THERE SHALL BE A CONTINUOUS GROUND WIRE FROM THE METER AND DISCONNECT WITH MAY RUN INTERNAL TO THE UPRIGHT, THROUGH THE 1/2" FLEXIBLE TUBING IN THE CONCRETE BASE TO THE REQUIRED GROUNDING ELECTRODE(S). THE GROUND WIRE FROM THE POLE GROUNDING LUG, CONTROLLER CABINET AND/OR LUMINAIRE MAY ATTACH TO THIS CONTINUOUS GROUNDING ELECTRODE CONDUCTOR FROM THE SERVICE METER AND DISCONNECT. THE CONTRACTOR SHALL PERFORM A RESISTANCE TO GROUND TEST ON THE CONTINUOUS GROUNDING ELECTRODE CONDUCTOR FROM THE SERVICE METER AND DISCONNECT AND PROVIDE A WRITTEN STATEMENT TO THE AREA ELECTRICAL INSPECTOR THAT THE GROUNDING ELECTRODE CONDUCTOR IS CONTINUOUS FROM THE SERVICE METER AND DISCONNECT AND THE RESISTANCE TO GROUND IS 25 OHMS OR LESS.

**11. HORIZONTAL MEMBERS SHALL BE CAMBERED AND THE VERTICAL POLES BACK RAKED, WHERE APPLICABLE, TO THE ANTICIPATED DEAD LOAD DEFLECTION PLUS THE CAMBER, IF ANY, SPECIFIED ON THE PLANS.**

**12. AN EQUIVALENT ALTERNATE DESIGN MAY BE SUBSTITUED FOR THE DETAILS AND MATERIALS SHOWN.**

- B) THE DE RATIO.
- C) VIBRA1 AASHT
- D) THE AI
- E) ITEMS AND FC AASHT
- F) FAILUF REJEC
- G) A MINII
- H) EVERY SIGNAL CAPAC SIGNAL EXTEN TRAFFI OF 85%
- 15. FABRICATION DRA MANAGER FOR AP INCLUDE THE FOLI
  - A) DETAIL
  - B) MATER BY COI
  - C) NOTAT STATIC
  - D) DETAIL SUPPC
  - E) ALL EL RECOF
  - F) DEAD I
  - G) WELDII PROCE WELD I
  - H) BOLT T
- 16. THE TRAFFIC SIGN SYSTEM, UNLESS I MOUNTED ON A M/ OF THE SIGNAL HE
- 17. BASE PLATES SHA HEIGHT, YIELD STF MEMBER DIAMETE STAMPED ON A ME
- 18. SEE STANDARD E-



**JUNCTION BOX NOTES:**

1. JUNCTION BOX SHALL BE CONSTRUCTED WITH PRECAST MONOLITHIC POLYMER CONCRETE.
2. CONDUIT SIZE SHALL BE AS SHOWN ON THE PLANS.
3. EXCAVATION FOR JUNCTION BOX SHALL INCLUDE EXCAVATION OF AN AREA ONE FOOT OUTSIDE AND EXTENDING ONE FOOT BELOW THE FINISH GRADE OF THE BOTTOM OF THE JUNCTION BOX. ONE FOOT OF GRANULAR MATERIAL THAT MEETS THE REQUIREMENTS OF SUBSECTION 703.04, SHALL BE PLACED IN THE EXCAVATED AREA AND PROPERLY COMPACTED PRIOR TO INSTALLATION. COMPACTION SHALL MEET REQUIREMENTS OF SUBSECTION 301.06. WHERE NECESSARY AND AT THE DISCRETION OF THE ENGINEER, A DRAINAGE PIPE (MINIMUM 3" PERFORATED PVC) SHALL BE PROVIDED FROM THE JUNCTION BOX TO THE NEAREST APPROPRIATE OUTLET. ANY EXCAVATION AND DRAINAGE SHALL BE INCIDENTAL TO 900.620 SPECIAL PROVISION (JUNCTION BOX, HEAVY DUTY).
4. ALL EXPOSED METAL HARDWARE, INCLUDING JUNCTION BOX COVERS, FRAMES AND ANGLES, SHALL BE STAINLESS STEEL.
5. A SUFFICIENT COVER GASKET SHALL BE PROVIDED TO REDUCE THE INFLOW OF FLUIDS. THE COVER GAPS SHALL BE FILLED WITH CAULKING JUST PRIOR TO PROJECT COMPLETION.
6. WHEN INSTALLING ON SLOPES, JUNCTION BOXES SHALL BE TIPPED TO MATCH THE EXISTING SLOPE UP TO A 1 ON 4 SLOPE. EXCAVATED MATERIAL SHALL BE USED TO SHAPE AROUND THE LOW SIDE OF THE BOX TO THE SATISFACTION OF THE ENGINEER AND SHALL BE MOW-ABLE. IF SUFFICIENT MATERIAL IS NOT AVAILABLE, MATERIAL MEETING THE REQUIREMENTS OF EARTH BORROW (SUBSECTION 703.02) SHALL BE USED. PAYMENT SHALL BE CONSIDERED INCIDENTAL TO 900.620 SPECIAL PROVISION (JUNCTION BOX, HEAVY DUTY).
7. ALL COVERS SHALL BE FLUSH WITH THE BOXES AND FRAMES.
8. ALL CONDUIT ENTERING THE JUNCTION BOX THROUGH A CUTOUT SHALL HAVE BUSHINGS TO PROTECT THE CABLES.
9. ALL JUNCTION BOX COVERS SHALL BE SKID RESISTANT.
10. ALL COVERS SHALL HAVE THE LOGO PUNCHED, FORMED OR STAMPED INTO A FLAT RECTANGULAR AREA IN ACCORDANCE WITH STANDARD E-173. MINIMUM LETTER HEIGHT IS 1/2". MINIMUM DEPTH IS 1/8".
11. DIMENSIONS SHOWN ARE MINIMUM SIZE REQUIRED. EQUIVALENT JUNCTION BOX OF LARGER DIMENSIONS MAY BE USED.
12. LOAD RATING SHALL BE NO LESS THAN 15,000 LBS.

PROJECT NAME: RUTLAND TOWN	
PROJECT NUMBER: NHG 019-3(60)	
FILE NAME: t14t190hdjb.dgn	PLOT DATE: 2/7/2017
PROJECT LEADER: P. COBURN	DRAWN BY: K. RECORD
DESIGNED BY: K. RECORD	CHECKED BY: M. BOGACZYK
HEAVY DUTY JUNCTION BOX DETAIL SHEET	SHEET 13 OF 17

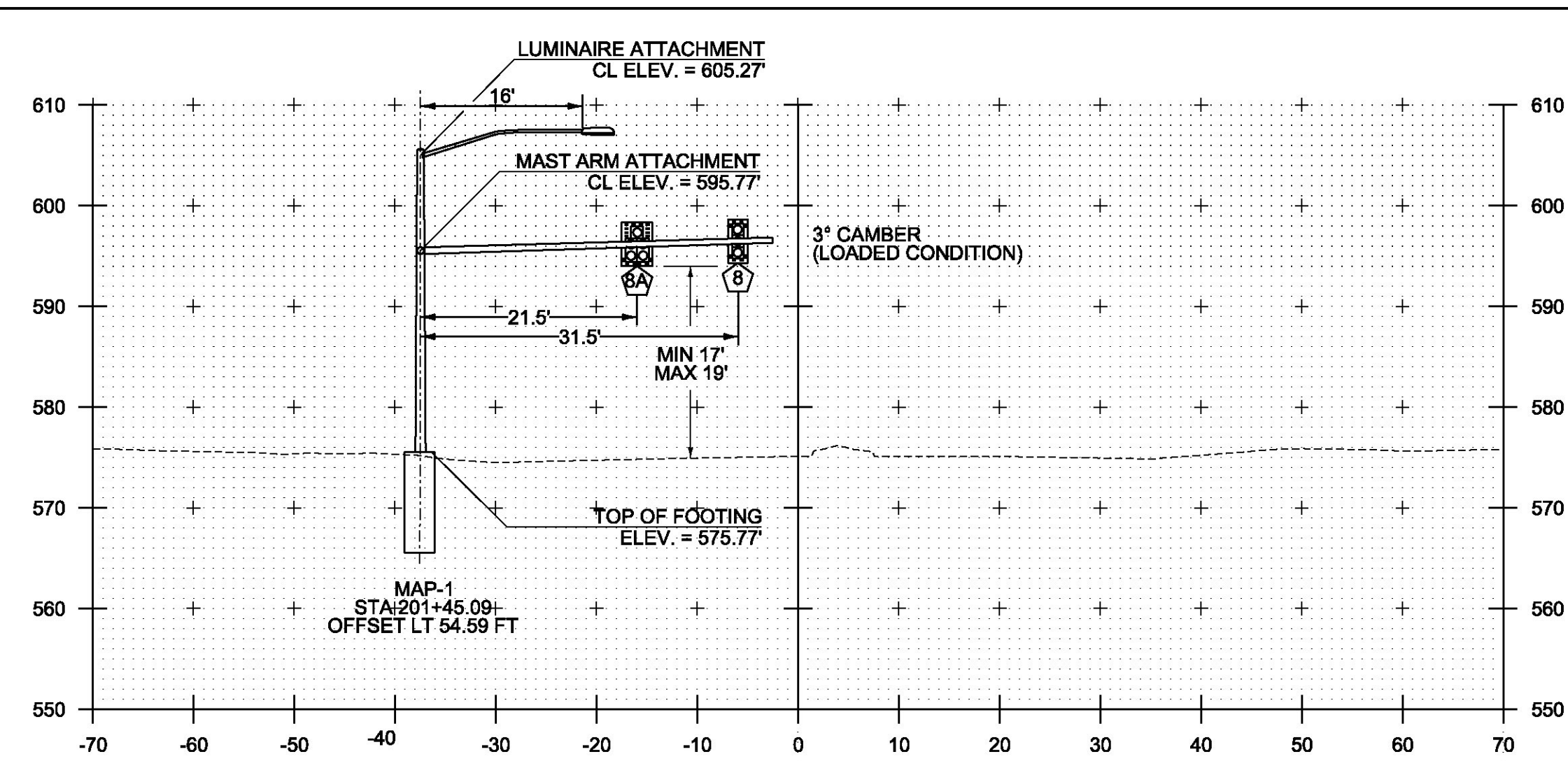
**NOT TO SCALE**

# STREET LIGHTING GENERAL NOTES

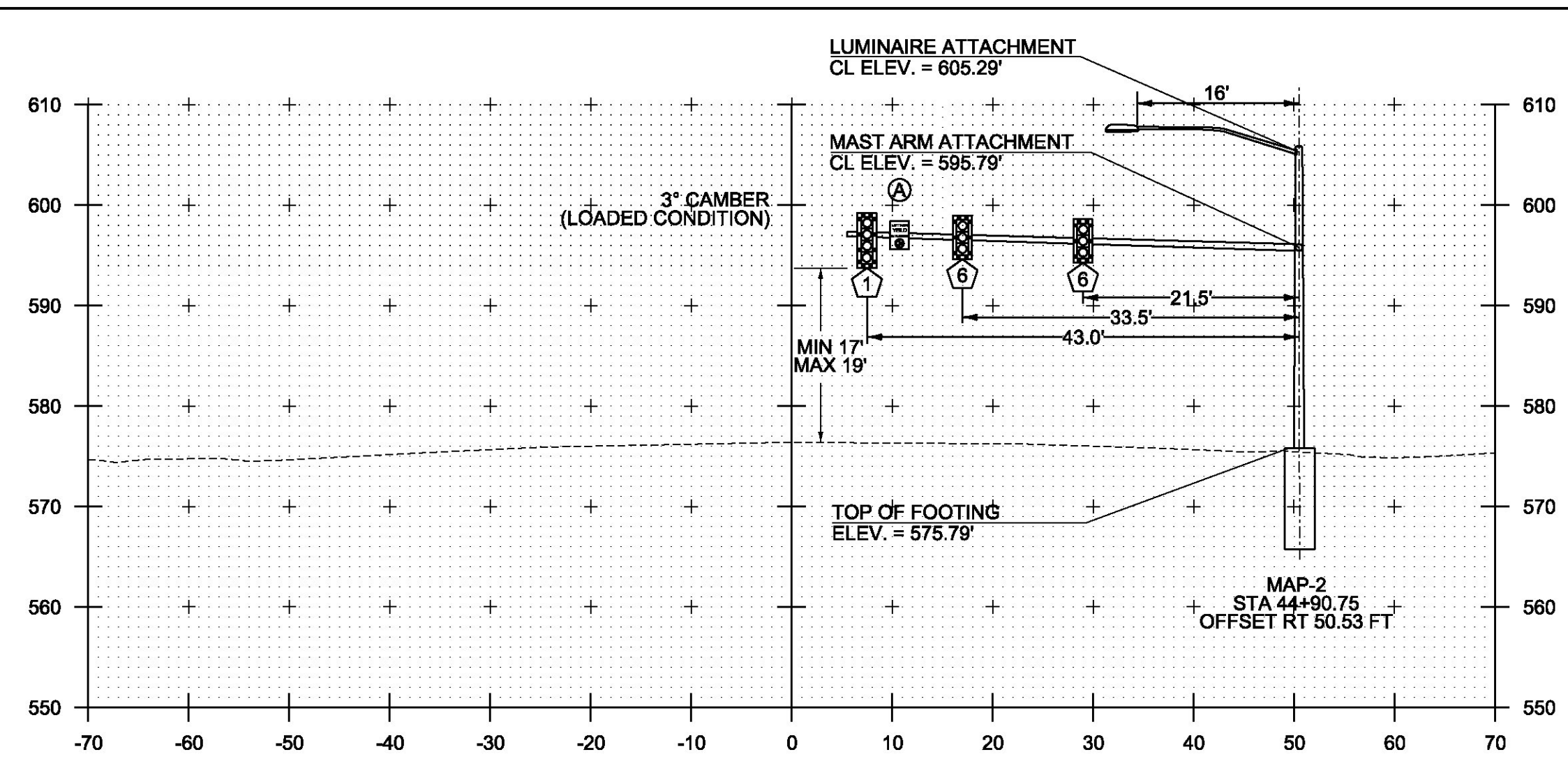
1. BRACKET ARMS SHALL BE TRUSS-STYLE TYPE AND SHALL BE DESIGNED IN ACCORDANCE WITH THE 2013 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS AND ITS LATEST REVISIONS.
2. STREET LIGHT ASSEMBLIES SHALL BE PAINTED FLAT BLACK AND HAVE FLAT BLACK HOUSINGS. FINISHES SHALL BE PER SECTION 679 OF THE LATEST SPECIFICATIONS FOR CONSTRUCTION.
3. LUMINAIRES
  - A. LUMINAIRES SHALL BE ONE OF THE FOLLOWING ONLY:
    1. BETA LEDWAY IP-SERIES
    2. HOLOPHANE LEDGENDS SERIES
    3. LRL LED SAT-96M SERIES
  - B. NO SUBSTITUTIONS FOR LUMINAIRES SHALL BE ALLOWED.
  - C. ALL LUMINAIRE HOUSINGS SHALL BE EQUIPPED WITH BIRD SPIKES.
4. WIRING AND GROUNDING
  - A. CIRCUIT CONDUCTORS SHALL BE CLEARLY IDENTIFIED BY CORROSION RESISTANT TAGS INDICATING CIRCUIT NUMBER AND PANEL SOURCES AT EVERY LIGHT POLE AND HANDHOLE.
  - B. ALL CONDUIT MUST INCLUDE A GROUNDING CONDUCTOR. RIGID STEEL CONDUIT SHALL BE PROPERLY CONNECTED AT THE JOINTS SO AS TO BE WATERTIGHT AND MAINTAIN ELECTRICAL CONTINUITY AND HAVE GROUNDING BUSHINGS SO AS TO ACT AS A GROUNDING CONDUCTOR.
  - C. THE GROUNDING CONDUCTOR SHALL BE CONTINUOUS.
  - D. ALUMINUM WIRE SHALL NOT BE USED FOR GROUND WIRE.
5. STREET LIGHTING CONTROL DEVICE
  - A. ASTRONOMICAL CLOCKS SHALL BE ONE OF THE FOLLOWING OR APPROVED EQUAL:
    1. TORK EWZ SERIES
    2. INTERMATIC ET 800 SERIES
    3. PARAGON EC SERIES
  - B. STREET LIGHTING EQUIPMENT SHALL BE WIRED SUCH THAT ONE CONTROL DEVICE COMMANDS THE FUNCTIONS ASSOCIATED WITH POWERING UP AND DOWN ALL LUMINAIRES.
6. SEE STANDARD DRAWINGS T-133 AND T-134 FOR ADDITIONAL INFORMATION.

PROJECT NAME: RUTLAND TOWN  
PROJECT NUMBER: NHG 019-3(60)

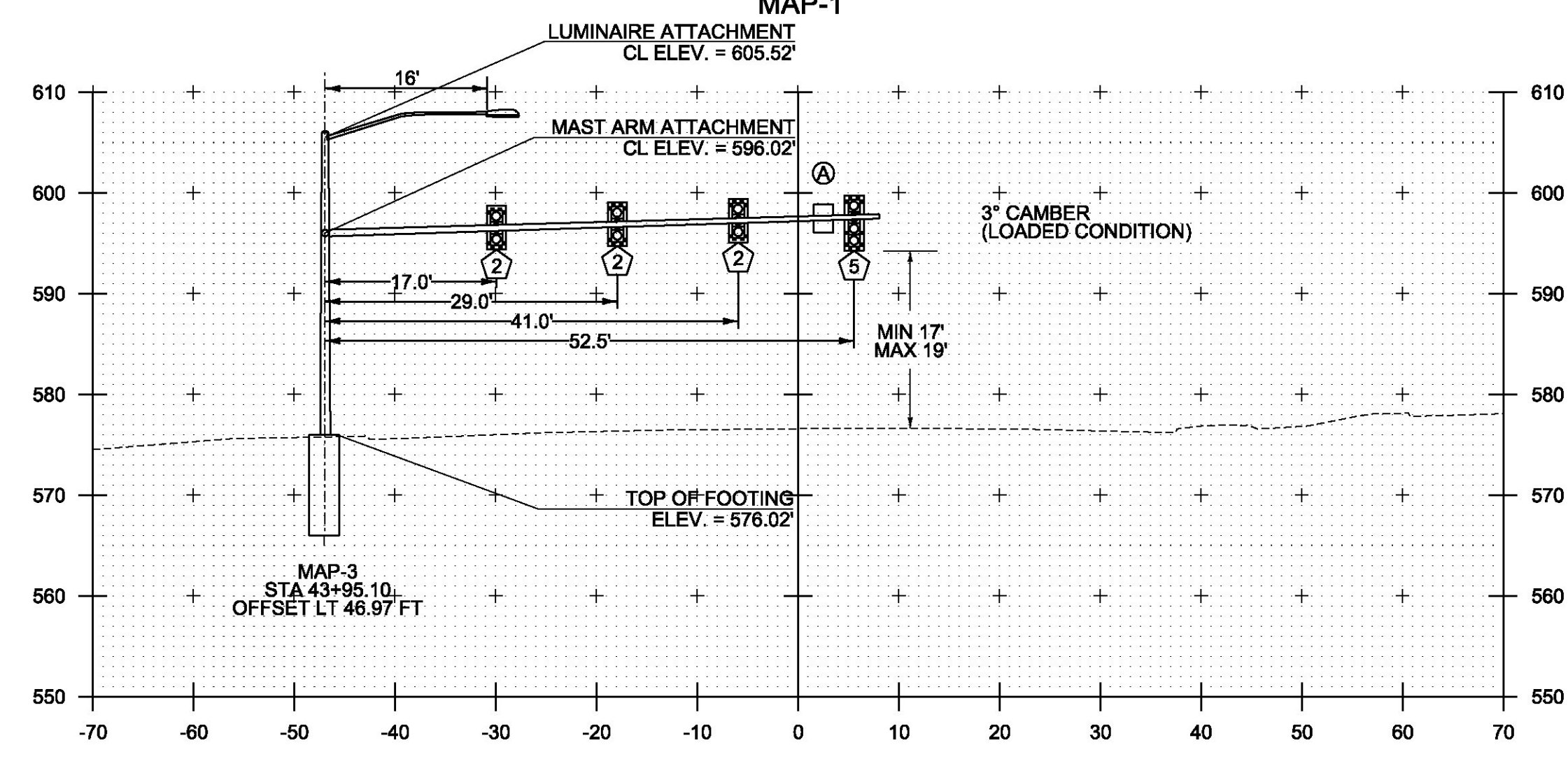
FILE NAME: t14t190frm.dgn PLOT DATE: 2/7/2017  
PROJECT LEADER: P. COBURN DRAWN BY: M. BOGACZYK  
DESIGNED BY: M. BOGACZYK CHECKED BY: P. COBURN  
STREET LIGHTING GENERAL NOTES SHEET SHEET 14 OF 17



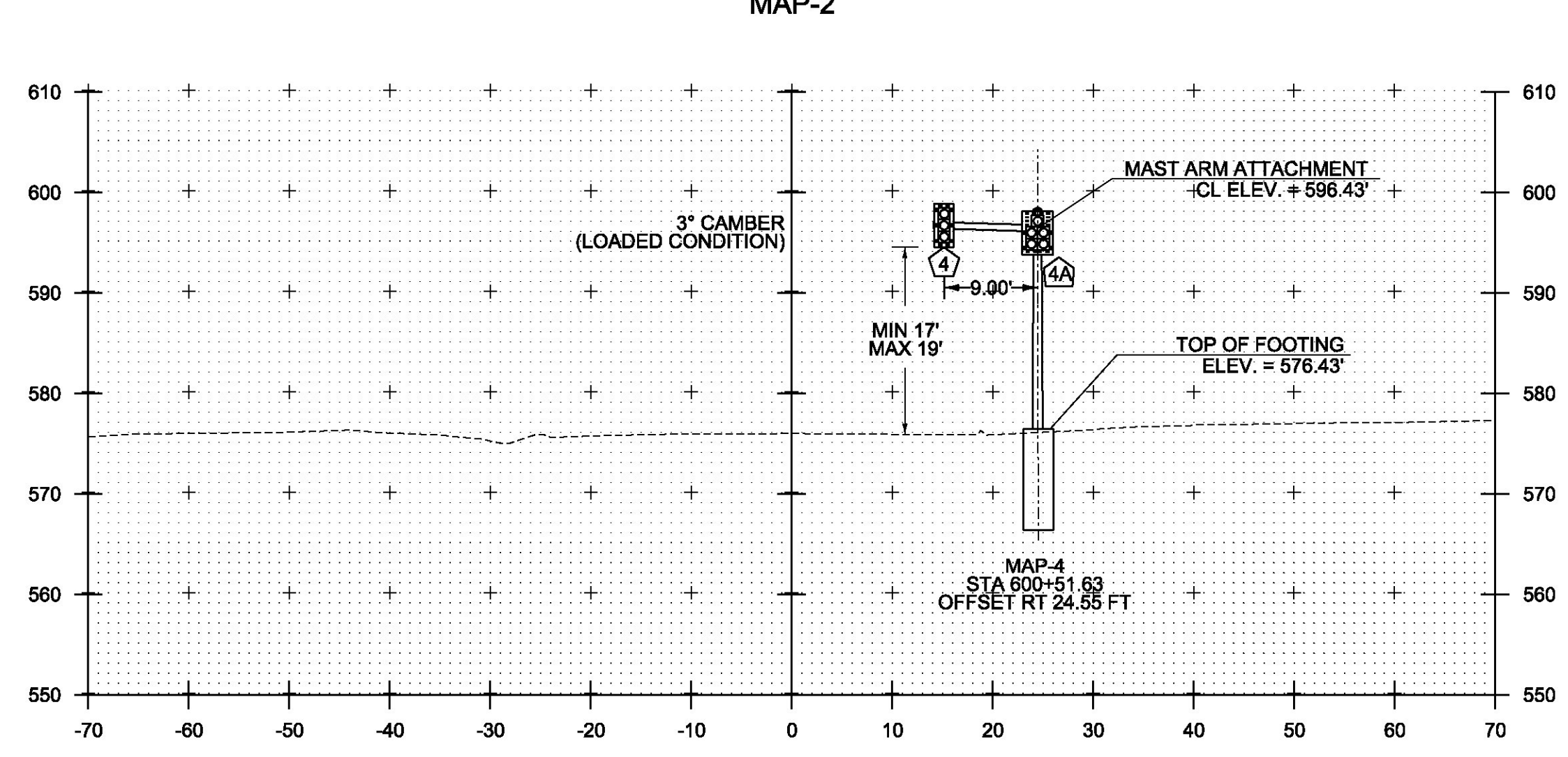
201+45.09  
MAP-1



44+90.75  
MAP-2



43+95.10  
MAP-3

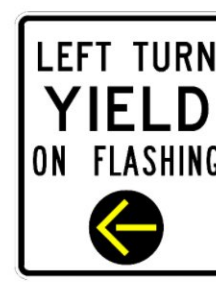


600+51.63  
MAP-4

NOTES:

1. THE MANCHESTER - RUTLAND TOWN SURF(60) PROJECT WAS COMPLETED AFTER THIS SURVEY AND ADDED BETWEEN 5/8" AND 3/4" OF PAVEMENT TO THE EXISTING ROAD GRADE.
2. ALL MAST ARM FOOTINGS SHALL INCLUDE A FOUR INCH REVEAL. ELEVATIONS SHOWN IN CROSS SECTIONS ARE APPROXIMATE FINAL GRADE ELEVATIONS FOR CONTRACTOR BIDDING PURPOSES ONLY. ACTUAL FOOTING ELEVATIONS SHALL BE DETERMINED BY THE CONTRACTOR.
3. MAST ARM FOOTING SIZES ARE APPROXIMATE. FOOTING DESIGNS SHALL BE DETERMINED BY THE FABRICATOR IN ACCORDANCE WITH SOIL CONDITIONS AND ACTUAL MAST ARM LOADINGS TRANSMITTED TO THE TOP OF THE FOOTINGS.
4. REFER TO BORING LOG SHEETS FOR BORING INFORMATION.
5. SIGNAL HEADS SHALL BE MOUNTED ON THE VERTICAL CENTER OF THE MAST ARM.
6. SEE NOTE 14H OF TRAFFIC SIGNAL GENERAL NOTES SHEET REGARDING THE LOADING AT THE END OF THE MAST ARMS.

SIGN DETAIL

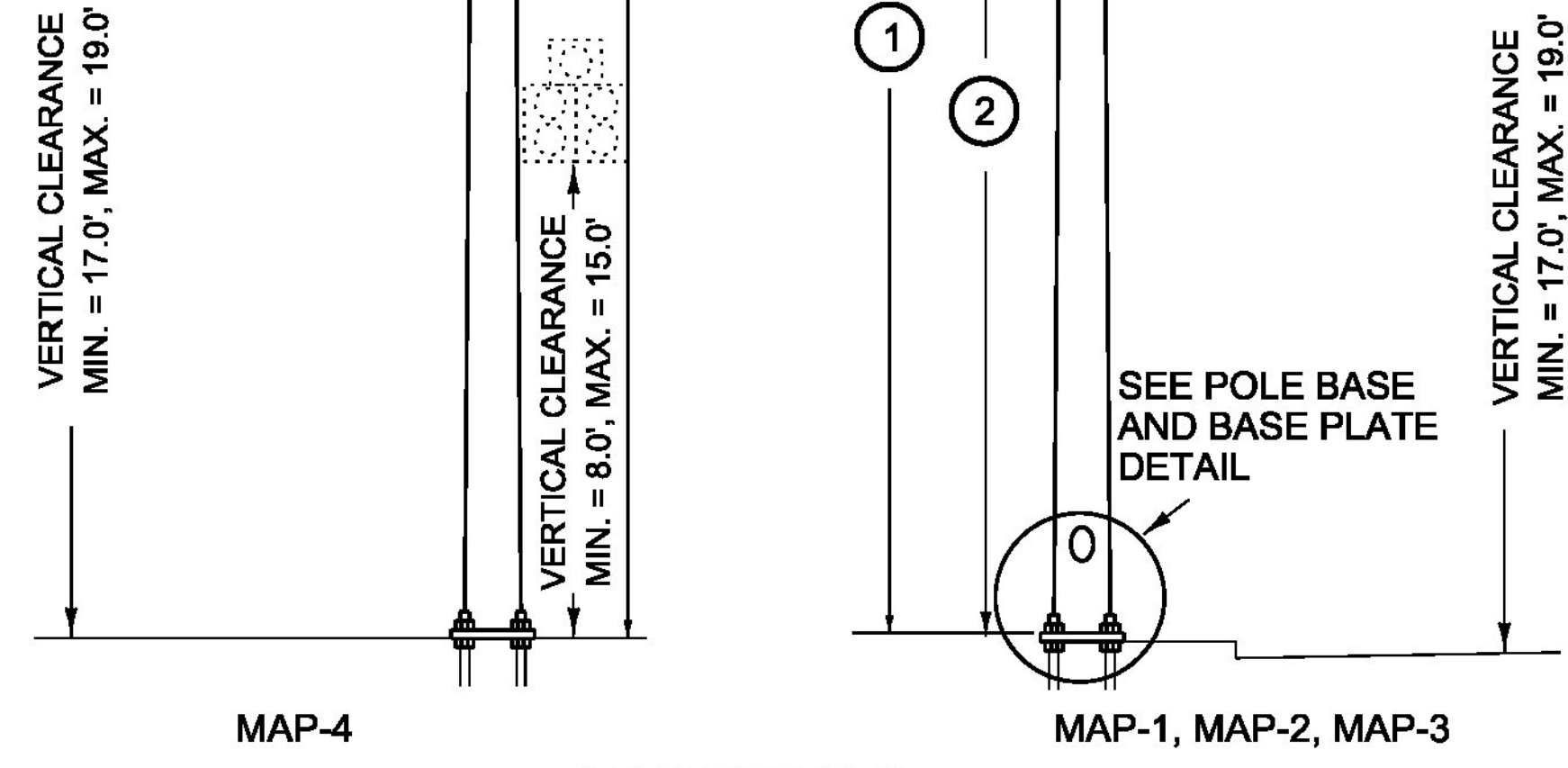


(A)

PROJECT NAME: RUTLAND TOWN  
PROJECT NUMBER: NHG 019-3(60)

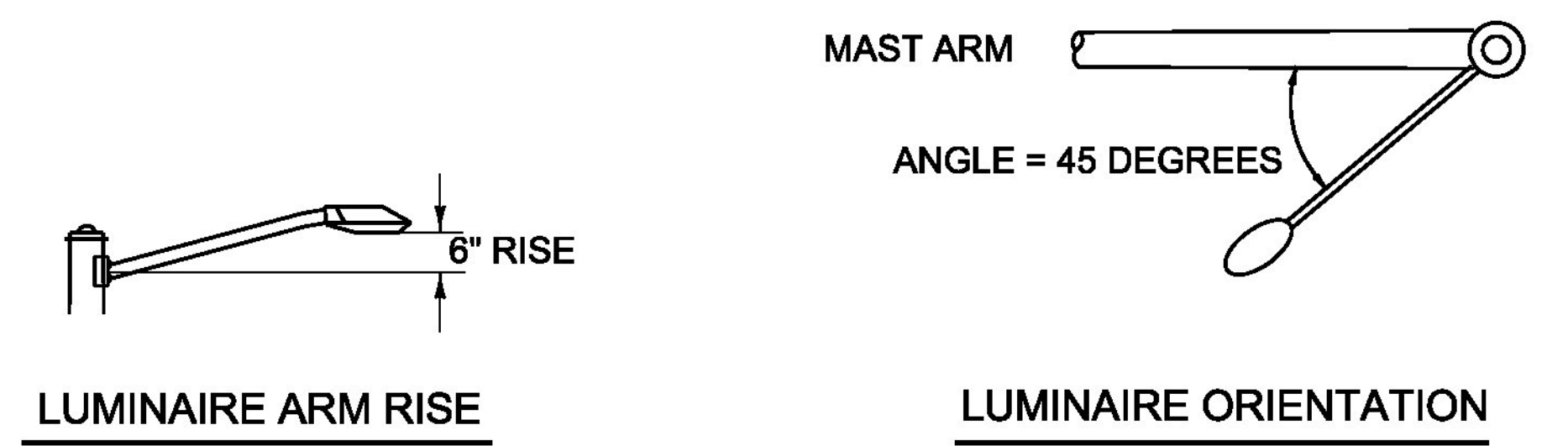
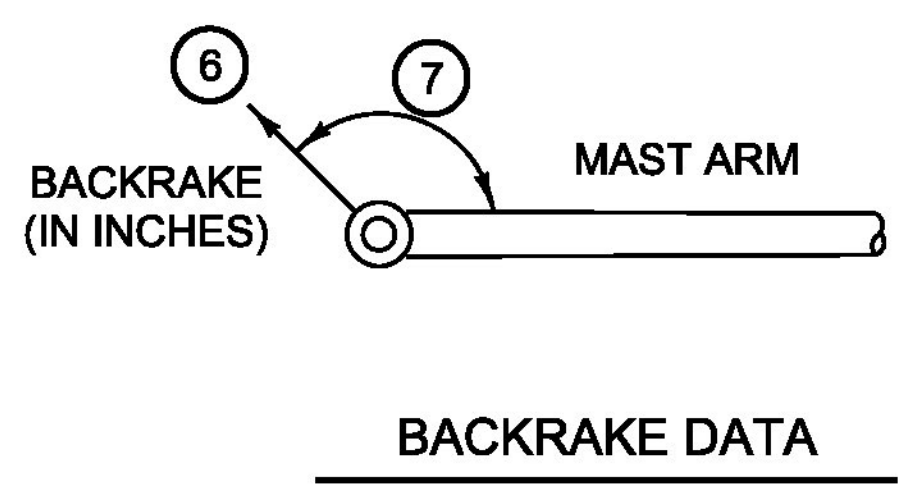
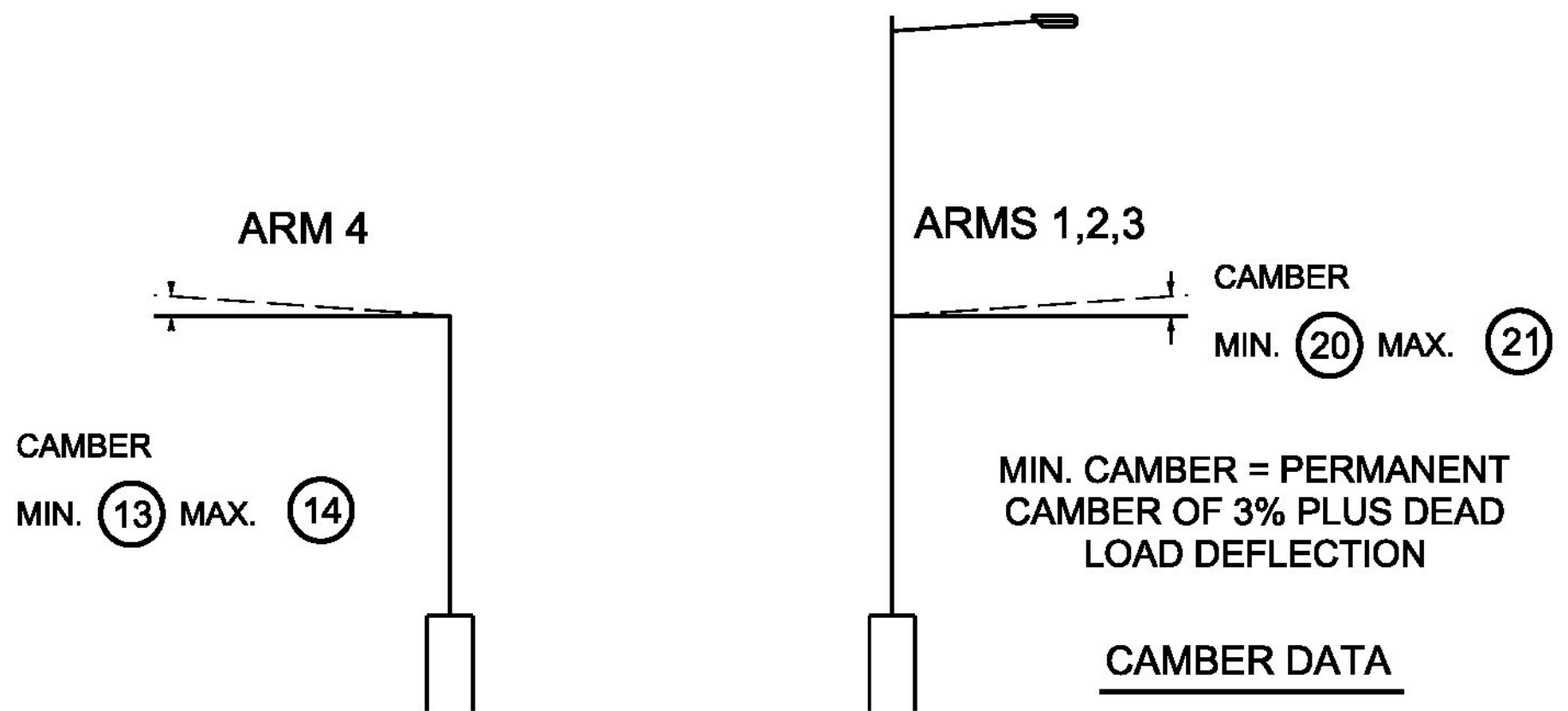
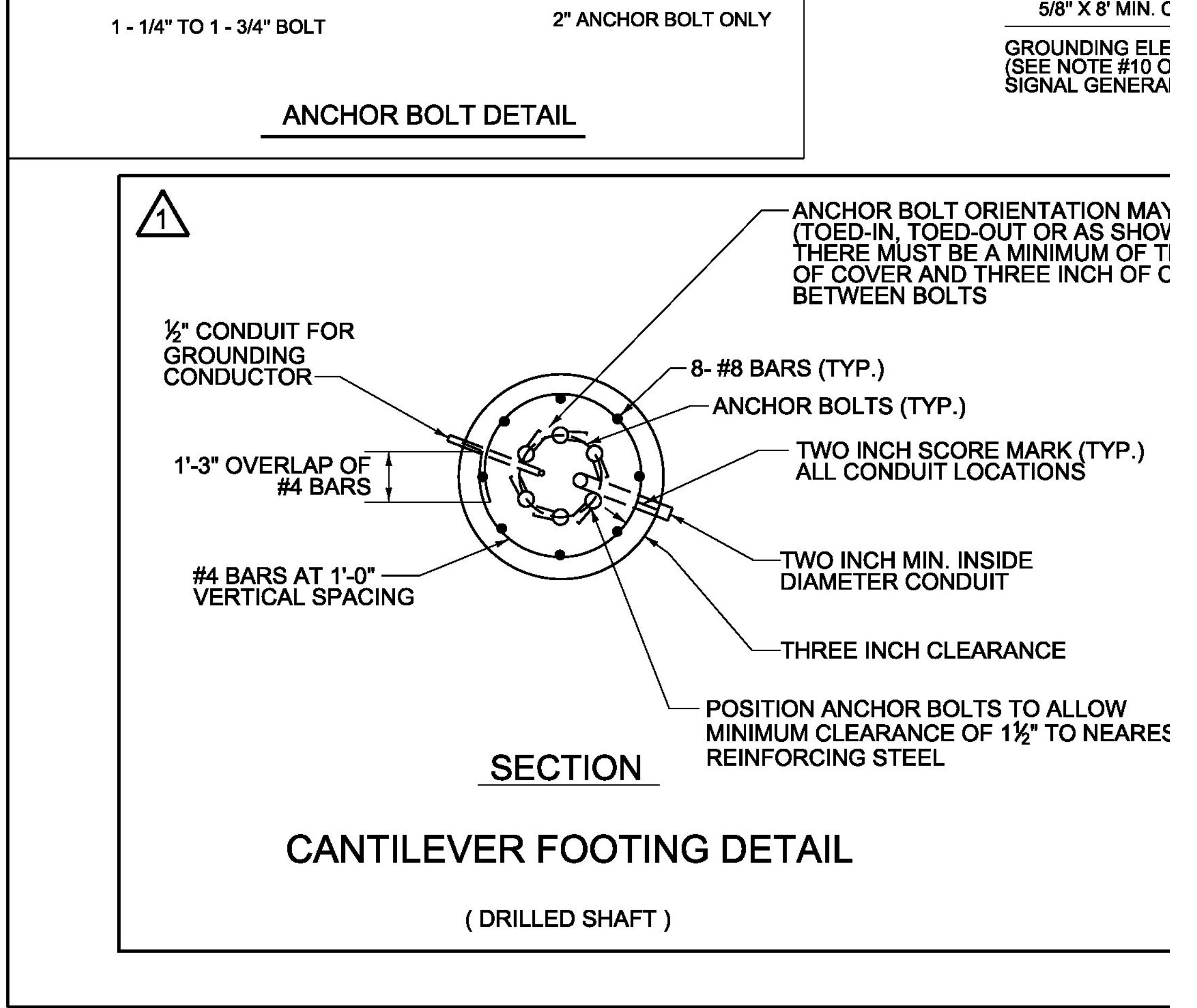
FILE NAME: 1141190xsl.dgn  
PROJECT LEADER: P. COBURN  
DESIGNED BY: M. BOGACZYK  
MAST ARM CROSS SECTIONS

PLOT DATE: 2/7/2017  
DRAWN BY: M. BOGACZYK  
CHECKED BY: P. COBURN  
SHEET 15 OF 17



- MAP DETAILS**
- POLE BASE DIAMETER (3)
  - POLE GAUGE (4)
  - POLE TAPER RATE (5)

- ARM 1,2,3 DIAMETER (10)
- ARM 1,2,3 GAUGE (11)
- ARM 1,2,3 TAPER RATE (12)
- ARM 4 DIAMETER (17)
- ARM 4 GAUGE (18)
- ARM 4 TAPER RATE (19)



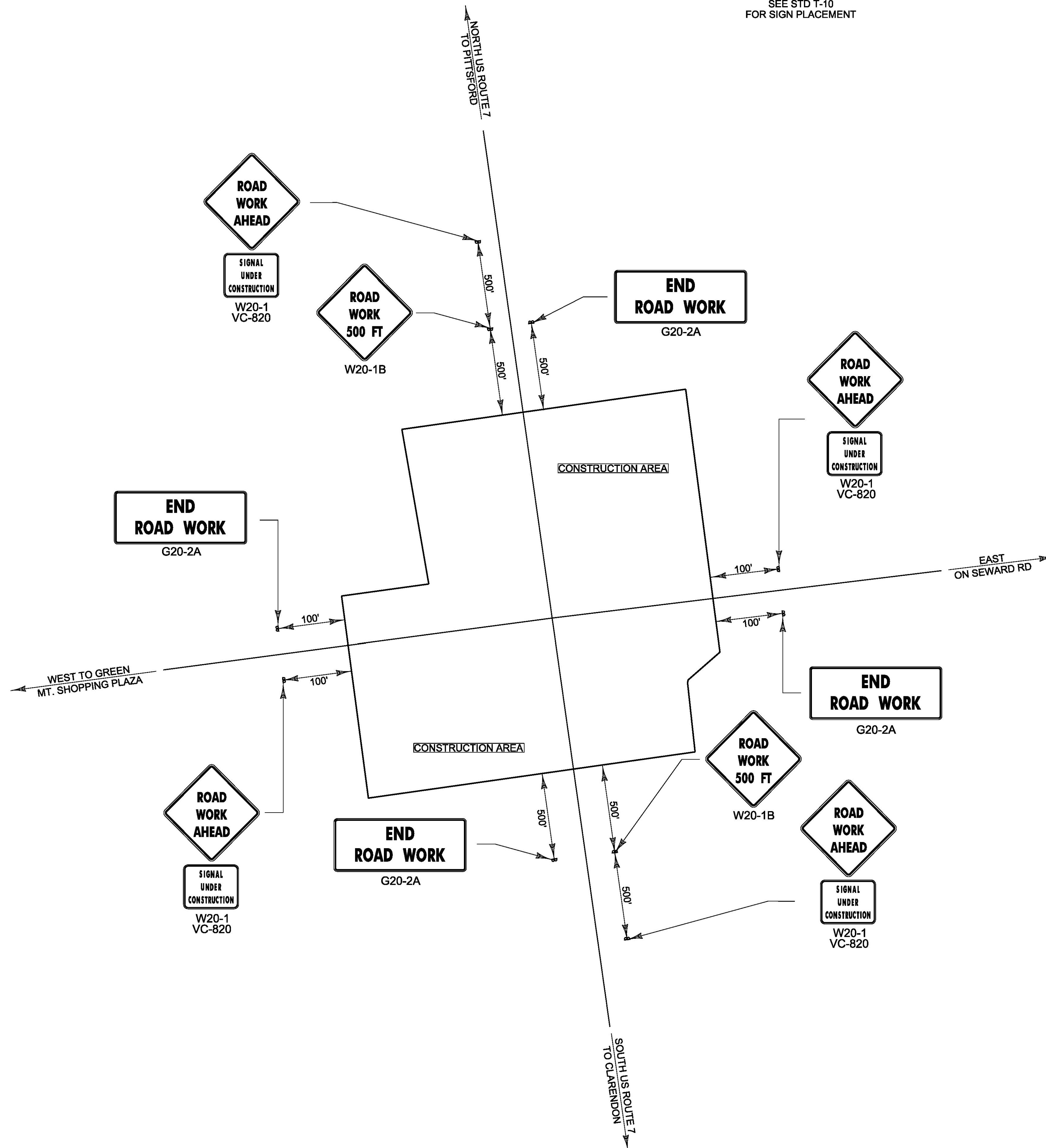
STRUCTURE DIMENSIONS (IN FEET)																														
POLE	POLE DATA							ARM DATA														FOOTING DATA		BASE PLATE / BOLT DATA						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(BC)	(F)	(S)	(T)	(P)	ANCHOR BOLT SIZE
MAP-1	30	20						35	18													16								
MAP-2	30	20						45	18													16								
MAP-3	30	20						55	18													16								
MAP-4	20.5	20						10	18																					

**NOTE:** DETAILS MAST ARM, CANTILEVER, & FOOTING DETAIL SHEET NTS

REV	DATE	DESCRIPTION
1	3/13/2017	1. CANTILEVER FOOTING DETAIL: UPDATED TO DEPICT MIN. 6 ANCHOR BOLTS. 2. POLE BASE AND BASE PLATE DETAIL: UPDATED TO DEPICT MIN. 6 ANCHOR BOLTS.

## CONSTRUCTION APPROACH SIGNING

NOT TO SCALE  
SEE STD T-10  
FOR SIGN PLACEMENT



## TRAFFIC CONTROL GENERAL NOTES

1. THE CONTRACTOR SHALL SUBMIT A SITE-SPECIFIC TRAFFIC CONTROL PLAN IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 105.03 OF THE VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2011. THIS PLAN SHALL BE SUBMITTED TWO WEEKS IN ADVANCE OF THE START OF CONSTRUCTION AND THE WORK SHALL NOT COMMENCE UNTIL THE SITE-SPECIFIC TRAFFIC CONTROL PLAN HAS BEEN ACCEPTED BY THE PROJECT MANAGER.
2. REFER TO THE CURRENT VERMONT STATE CONSTRUCTION STANDARD DRAWINGS AND THE LATEST EDITION OF THE MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR DETAILED INFORMATION REGARDING CHANNELIZATION DEVICES, TAPER LENGTHS, BARRICADES, DETOURS, LONGITUDINAL DROP-OFFS AND MISCELLANEOUS TRAFFIC CONTROL DETAILS, IF APPLICABLE (T-1, T-10, T-17, T-28, T-30).
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING CONSTRUCTION SIGNAGE SO AS NOT TO INTERFERE OR OBSTRUCT THE VIEW OF EXISTING TRAFFIC CONTROL DEVICES, STOPPING SIGHT DISTANCE AND CORNER SIGHT DISTANCE. EXISTING SIGNS SHALL BE COVERED OR REMOVED WHEN THEY CONFLICT WITH CONSTRUCTION TRAFFIC OPERATIONS.
4. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL DRIVEWAYS AND BUSINESS ACCESSES DURING CONSTRUCTION 24 HOURS A DAY.
5. FURNISHING, INSTALLING, MAINTENANCE OF, RELOCATING AND REMOVING REFLECTORIZED DRUMS, CONSTRUCTION SIGNING FOR TRAFFIC SHIFTS AND PEDESTRIAN BARRICADES AND SIGNAGE WILL BE PAID FOR UNDER CONTRACT ITEM 900.645, SPECIAL PROVISION (TRAFFIC CONTROL, ALL INCLUSIVE).
6. SPECIAL CARE SHALL BE TAKEN TO PROVIDE ACCESS THROUGH THE WORK ZONES FOR EMERGENCY VEHICLES. THE CONTRACTOR SHALL COORDINATE WITH BOTH POLICE AND FIRE DEPARTMENTS FROM RUTLAND TO DETERMINE THEIR MINIMUM ACCESS REQUIREMENTS BEFORE PROCEEDING TO THE NEXT PHASE OF CONSTRUCTION. THE CONTRACTOR SHALL ENSURE THAT ACCESS IS AVAILABLE TO ALL PROPERTIES AT ALL TIMES FOR EMERGENCY VEHICLES.
7. THE CONTRACTOR SHALL PROVIDE TWO (2) PORTABLE CHANGEABLE MESSAGE SIGNS FOR THE DURATION OF THE PROJECT. THE LOCATION AND MESSAGE CONTENT SHALL BE APPROVED IN THE FIELD BY THE ENGINEER. PORTABLE CHANGEABLE MESSAGE SIGNS SHOULD NOT REPEAT MESSAGE ON STATIC SIGNS. PORTABLE CHANGEABLE MESSAGE SIGNS WILL BE PAID FOR UNDER CONTRACT ITEM 641.15, PORTABLE CHANGEABLE MESSAGE BOARDS.
8. PRIOR TO THE COMMENCEMENT OF ANY WORK OR THE PLACEMENT OF EQUIPMENT ON THE ROADWAY THE CONTRACTOR SHALL PROVIDE ADVANCED WARNING SIGNS IN ACCORDANCE WITH THE CONSTRUCTION SIGNING APPROACH PLANS AND THE LATEST EDITION OF THE MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
9. ACCESSIBLE PEDESTRIAN ACCOMMODATIONS SHALL BE PROVIDED AT ALL TIMES THROUGHOUT CONSTRUCTION IN COMPLIANCE WITH THE MUTCD. THE TRAFFIC CONTROL PLAN SHALL INDICATE PEDESTRIAN ACCOMMODATIONS.
10. LANE CLOSURES WILL BE LIMITED TO OFF PEAK TRAFFIC TIMES (9:00 AM TO 3:00 PM) TO REDUCE DELAY THROUGH THE PROJECT AREA.

PROJECT NAME: RUTLAND TOWN

PROJECT NUMBER: NHG 019-3(60)

FILE NAME: t14t190frm.dgn

PLOT DATE: 2/7/2017

PROJECT LEADER: P. COBURN

DRAWN BY: M. BOGACZYK

DESIGNED BY: M. BOGACZYK

CHECKED BY: P. COBURN

CONSTRUCTION APPROACH SIGNING

SHEET 17 OF 17



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State of Vermont  
Highway Safety & Design Section

*Agency of Transportation*  
Project Delivery Bureau

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TO: THE BELDEN COMPANY, INC.

FROM: PATRICIA COBURN, PROJECT MANAGER

DATE: JULY 18, 2017

SUBJECT: RUTLAND TOWN NHG 019-3(60) SHOP DRAWING APPROVAL

---

The following equipment has been approved in the attached response document:

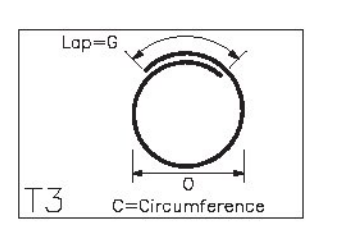
- Foundation rebar fabrication drawing as provided by Harris Rebar/Barker Steel.

Please let me know if you have any questions.

PLC:mcb

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Drawing Sheet: R01		B96 LIST												
Bar Mark	Qty	Size	Total Length	Type	X'	Y'	Z'	1'	2'	3'	4'	5'	6'	
4A01	52	#4	9'-1"	T3										



**Approved**

BY: Patti Coburn, P.E.

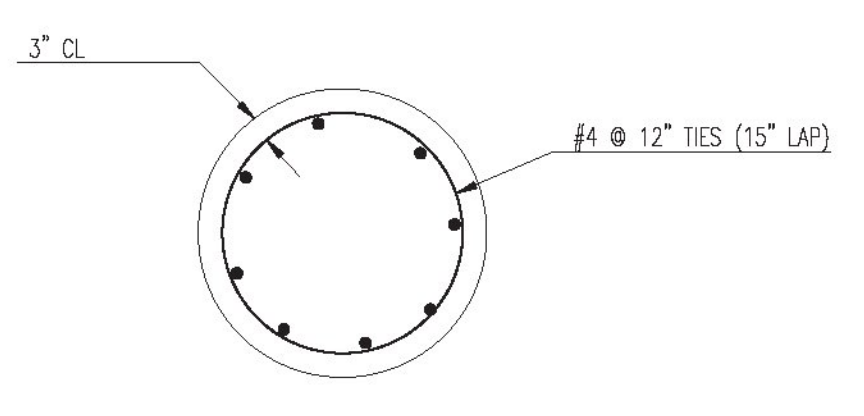
DATE: 06/23/2017

RESUBMIT: No

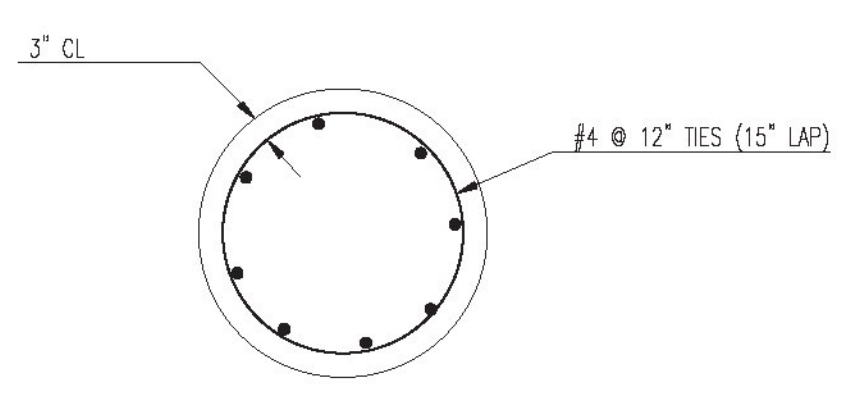
RECEIVED: June 22, 2017

CKD BY: Matt Bogaczyk

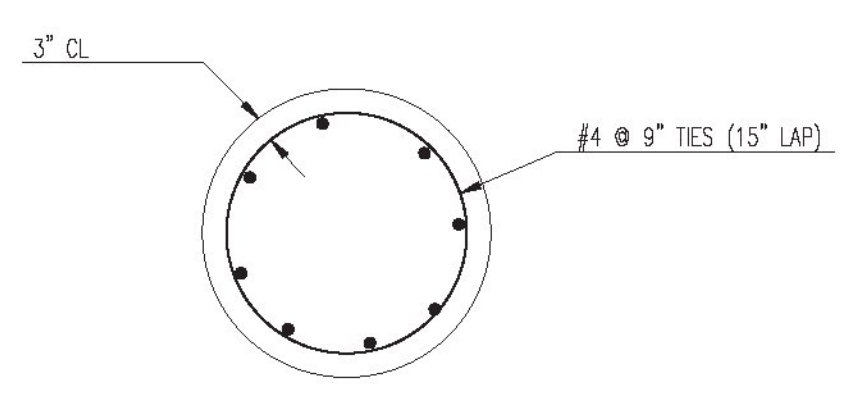
**STATE OF VERMONT**  
**AGENCY OF TRANSPORTATION**



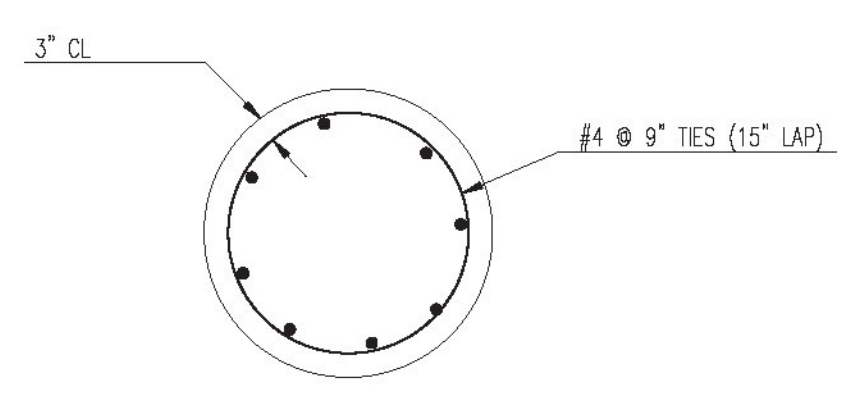
SECTION A - A



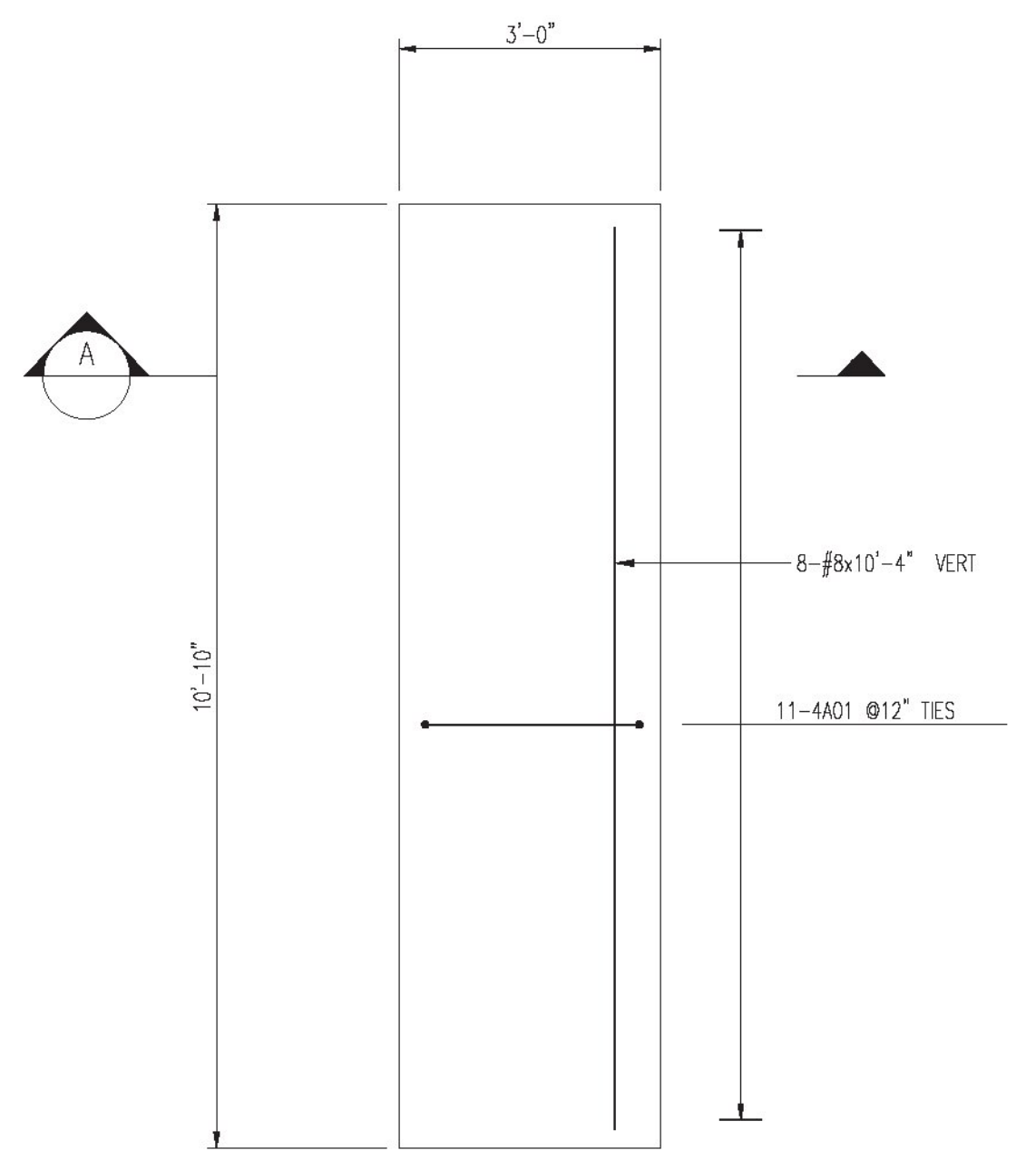
SECTION B - B



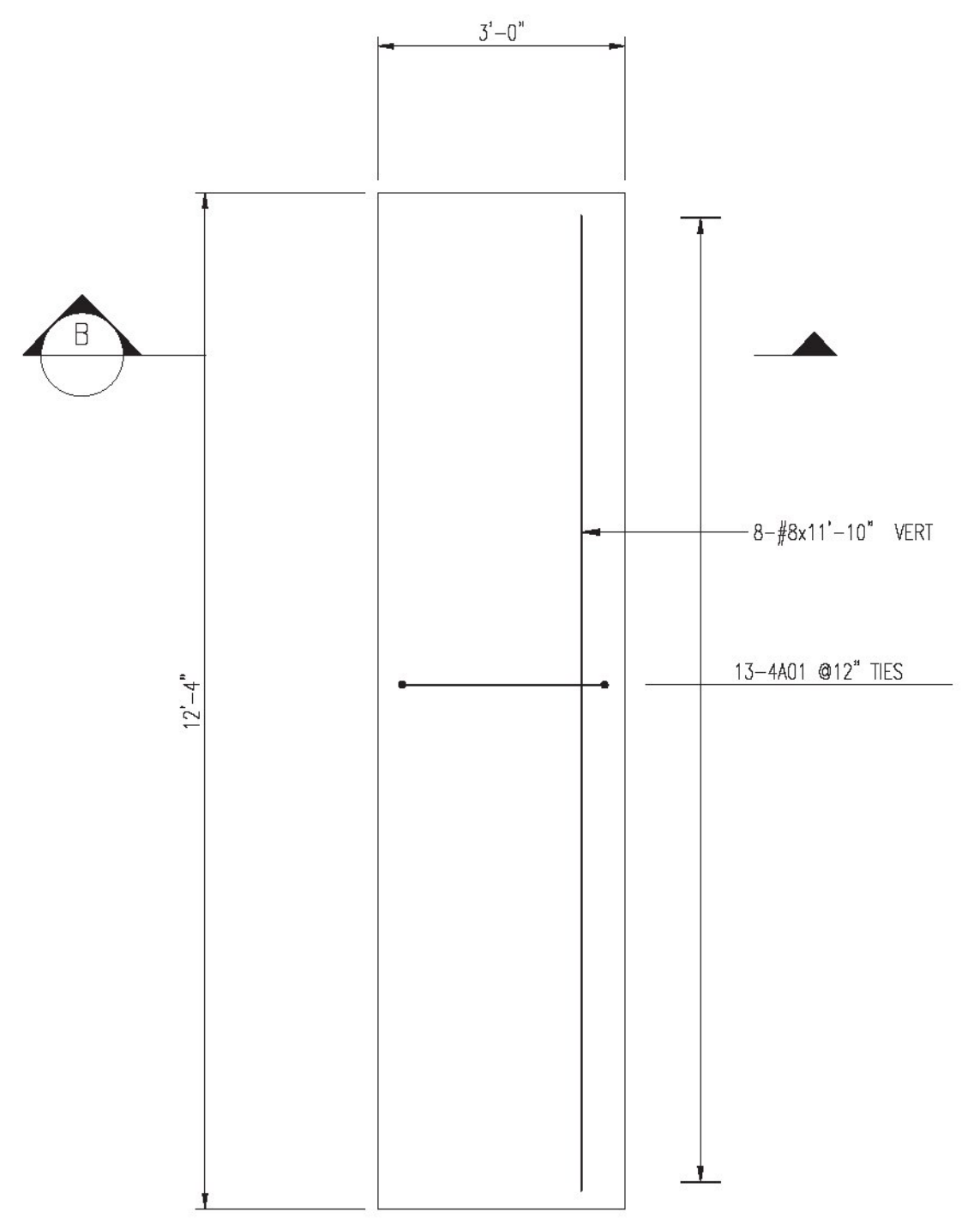
SECTION C - C



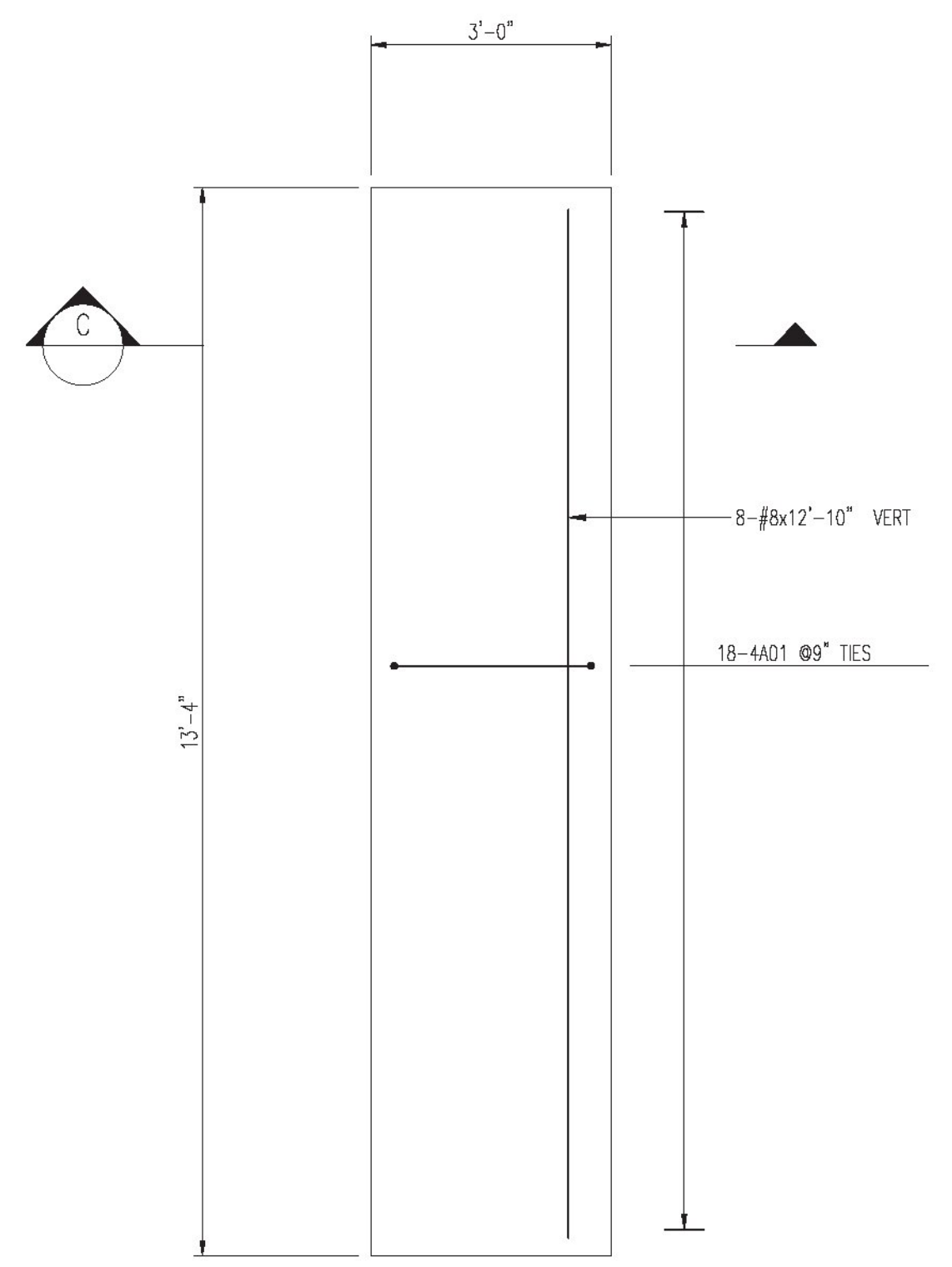
SECTION D - D



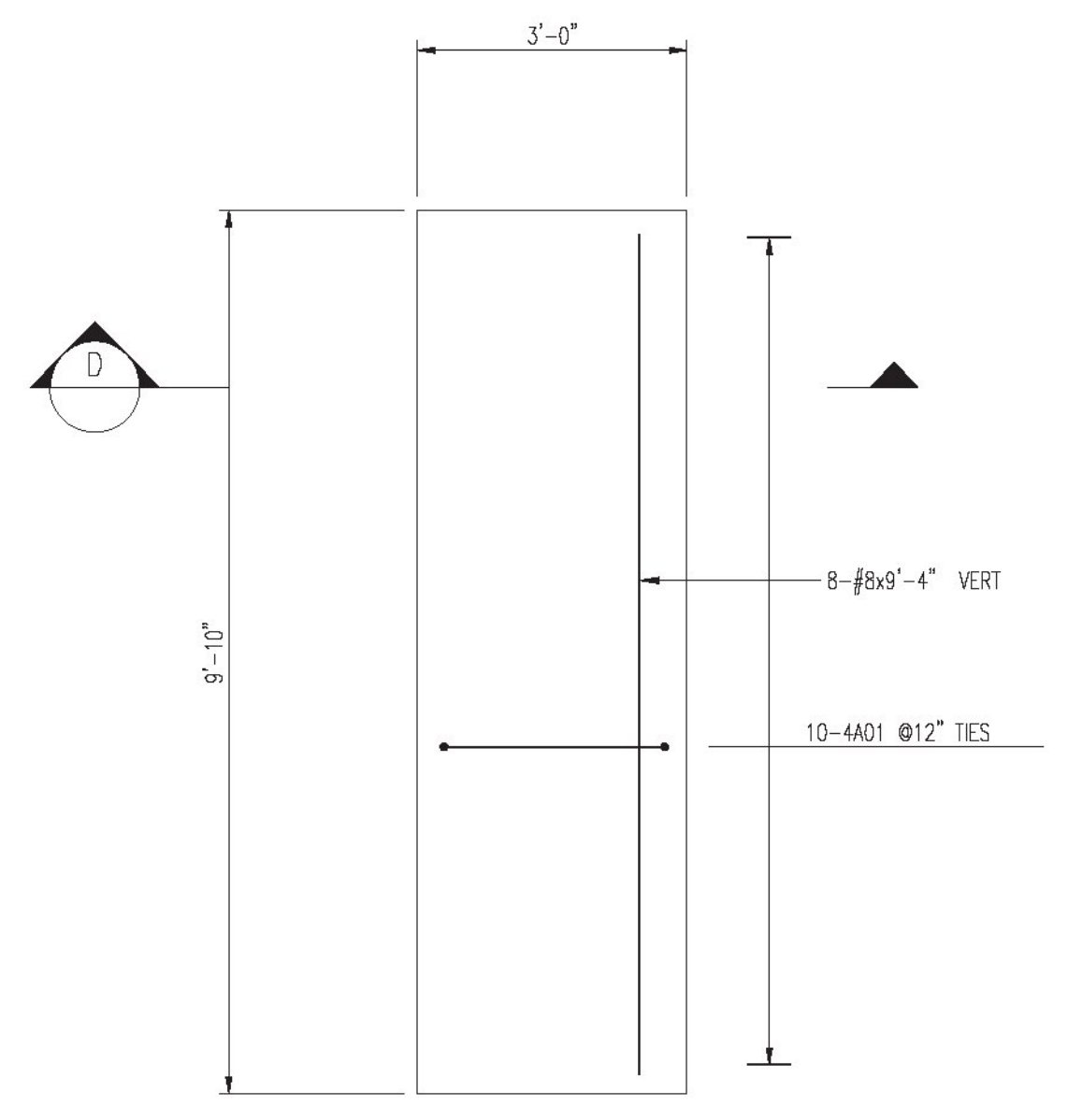
TRAFFIC POLE FNDN MAP #1



TRAFFIC POLE FNDN MAP #2



TRAFFIC POLE FNDN MAP #3



TRAFFIC POLE FNDN MAP #4

LAP CHART-U.N.O.

#11	
#10	
#9	
#8	
#7	
#6	
#5	
#4	
#3	

SIZE TOP BARS \* OTHER BARS  
\* Top bars are horiz. bars with more than 12" of concrete cast below the bars.

No.	Description	Date	By
0	APPROVAL	6/16/17	RLI

Revisions and Issue Record

The full intent and purpose of this drawing is the placing of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trades.

THIS DRAWING IS NOT TO BE SCALED.

**HarrisRebar**  
Barker Steel  
National Strength. Local Service.

DETAILED AT:  
GANAAN  
NEW HAMPSHIRE

Project: RUTLAND TOWN NHG 019  
RUTLAND VT

Drawing: PIERS AND TEST BARS

Customer: THE BELDEN COMPANY

Engineer:

Refer to Release:

Date	Drawn	Chkd.	JOB No.	Dwg. No.
6/16/17	RLI		33506371	R01

W:\rlandry\Project\33506371\Placing Drawings\DWGs\R01.dwg



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State of Vermont  
Highway Safety & Design Section

*Agency of Transportation*  
Project Delivery Bureau

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TO: THE BELDEN COMPANY, INC.

FROM: PATRICIA COBURN, P.E., PROJECT MANAGER

DATE: JUNE 6, 2017

SUBJECT: RUTLAND TOWN NHG 019-3(60) SHOP DRAWING APPROVAL

---

The following equipment has been approved in the attached shop drawing response document:

- Mast arm foundations as provided by Fritz Brothers Engineering, LTD.

Please let me know if you have any questions.

PLC:meb

Attachments: Submittal with comments

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**REVIEWED**  
By Marc Montague (marcy.montague@vermont.gov) at 10:32 am, May 26, 2017

FRITZ BROTHERS ENGINEERING, LTD.

MAY 19, 2017

<b>Approved</b>	
BY:	Patti Coburn
DATE:	06/06/2017
RESUBMIT:	No
RECEIVED:	May 22, 2017
CKD BY:	Matt Bogaczyk
<b>STATE OF VERMONT AGENCY OF TRANSPORTATION</b>	

STRUCTURAL CALCULATIONS & DRAWINGS

FOR

TRAFFIC SIGNAL POLE FOUNDATIONS

RUTLAND, VERMONT

PROJECT NO. NHG 019-3(60)

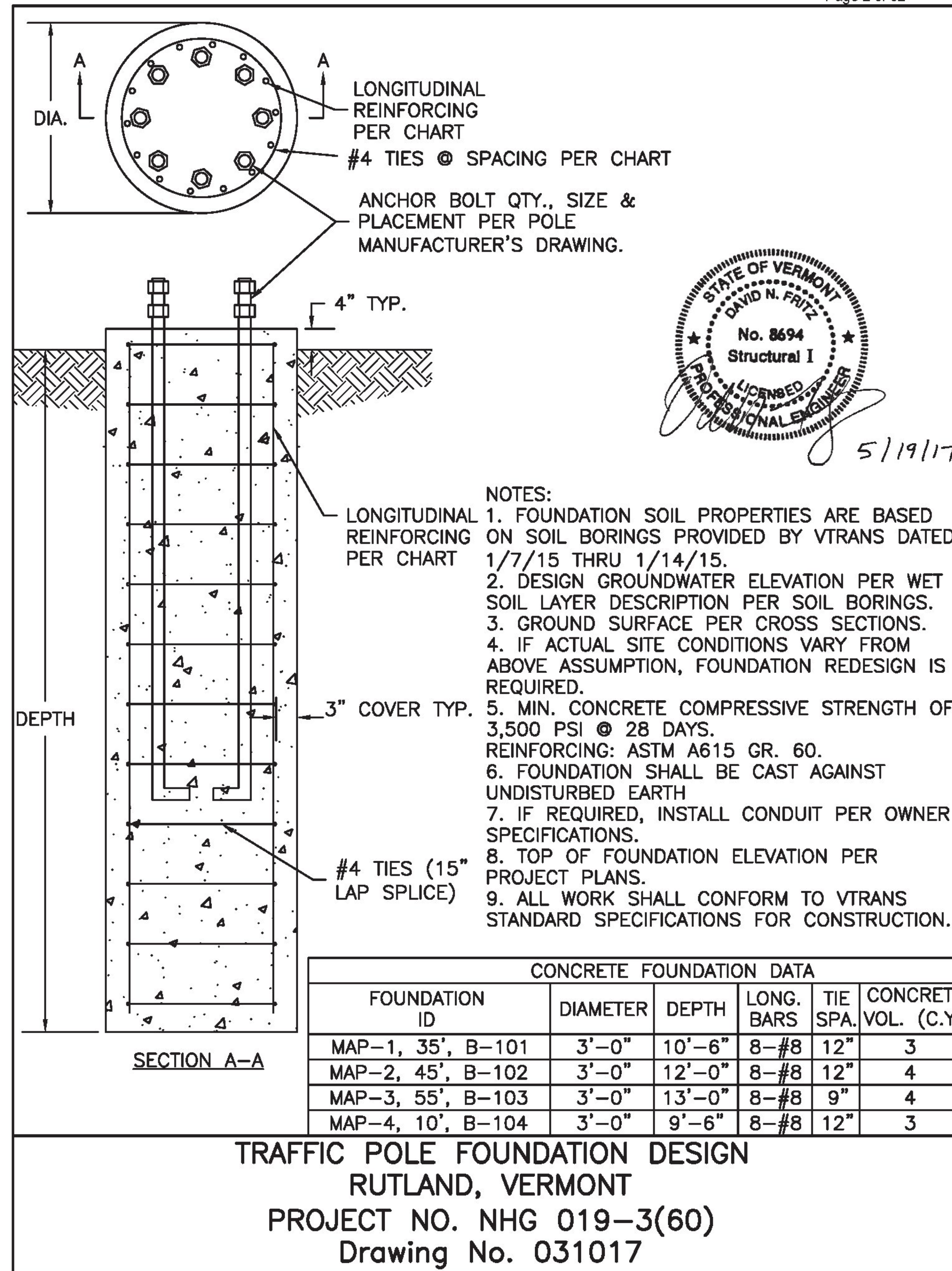


5/19/17

2013 AASHTO SPECIFICATION  
VTRANS MREI 10-01

VTRANS STANDARD SPECIFICATIONS FOR CONSTRUCTION

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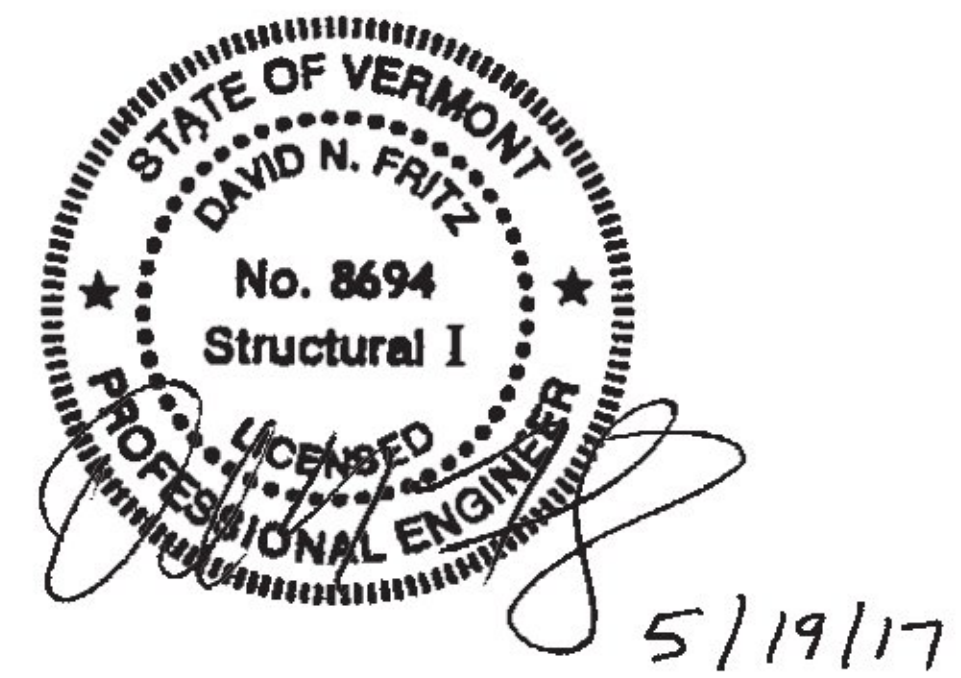


CONCRETE FOUNDATION DATA					
FOUNDATION ID	DIAMETER	DEPTH	LONG. BARS	TIE SPA.	CONCRETE VOL. (C.Y.)
MAP-1, 35', B-101	3'-0"	10'-6"	8-#8	12"	3
MAP-2, 45', B-102	3'-0"	12'-0"	8-#8	12"	4
MAP-3, 55', B-103	3'-0"	13'-0"	8-#8	9"	4
MAP-4, 10', B-104	3'-0"	9'-6"	8-#8	12"	3

**TRAFFIC POLE FOUNDATION DESIGN**  
**RUTLAND, VERMONT**  
**PROJECT NO. NHG 019-3(60)**  
**Drawing No. 031017**

**TRAFFIC POLE FOUNDATION DESIGN**  
**RUTLAND, VERMONT**  
**PROJECT NO. NHG 019-3(60)**  
 Drawing No. 031017

Pole ID	MAP-1, 35'	MAP-2, 45'	MAP-3, 55'	MAP-4, 10'
Boring ID	B-101	B-102	B-103	B-104
<b>Design Input Parameters:</b>				
Axial Service Load (lbs) = $P$	2,646	3,382	4,411	1,292
Shear Service Load (lbs) = $V$	1,786	2,179	2,650	1,240
Overturning Moment Service Load (ft-lbs) = $M$	41,883	57,582	83,572	23,122
Torsional Service Load (ft-lbs) = $T$	34,274	59,194	79,199	6,266
Maximum Projection Above Ground (ft)	0.5	0.5	0.5	0.5
Top Soil to Neglect (ft)	2.0	2.0	2.0	2.0
Design Depth to Ground Water (ft)	20.0	20.0	20.0	20.0
Diameter of Drilled Shaft (ft) = $D$	3.00	3.00	3.00	3.00
Length of Drilled Shaft (Depth) (ft) = $L$	10.50	12.00	13.00	9.50
<b>Summary of Moment Capacity:</b>				
Horizontal Deflection (in)	0.48	0.47	0.48	0.39
Maximum Moment for Steel Design (in-lbs) = $M_{MAX}$	549759	752369	1076687	304794
	OK	OK	OK	OK
<b>Summary of Axial Capacity:</b>				
Ultimate Axial Resistance (Tons)	28.46	36.28	45.02	24.28
Factor of Safety for Axial	21.51	21.45	20.41	37.59
Estimated Settlement (inches)	0.10	0.10	0.10	0.10
	OK	OK	OK	OK
<b>Summary of Torsional Capacity:</b>				
Ultimate Skin Friction Resistance (Tons)	28.46	36.28	45.02	24.28
Ultimate Torsional Side Resistance (ft-lbs)	85380	108840	135060	72840
Ultimate Torsional Base Resistance (ft-lbs)	11698	12768	13793	10486
Combined Torsional Resistance (ft-lbs)	97078	121608	148853	83326
Factor of Safety for Torsion	2.83	2.05	1.88	13.30
	OK	OK	OK	OK



Pole ID	MAP-1, 35'	MAP-2, 45'	MAP-3, 55'	MAP-4, 10'
Boring ID	B-101	B-102	B-103	B-104

Concrete Reinforcing Input Parameters:				
Concrete Design Load Factor = $LF_{CONC}$	1.3	1.3	1.3	1.3
Concrete Compressive Strength (psi) = $f'_c$	3500	3500	3500	3500
Reinforcing Steel Yield (psi) = $f_y$	60000	60000	60000	60000
Diameter of Drilled Shaft (in) = $D$	36.00	36.00	36.00	36.00
Concrete Cover (in) = $C$	3	3	3	3
Diameter of Tie Bar (in) = $d_{TIE}$	0.5	0.5	0.5	0.5
Diameter of Longitudinal Bar (in) = $d_{LONG}$	1	1	1	1
Quantity of Longitudinal Bars = $N$	8	8	8	8

**Check Steel Requirements for Eccentric Axial Load:**

$$e = \frac{M_{MAX}}{P} \quad A_s = N \frac{\pi d_{LONG}^2}{4} \quad A_g = \frac{\pi D^2}{4} \quad D_s = D - 2C - 2d_{TIE} - d_{LONG} \quad \rho_B = \frac{A_s}{A_g}$$

$$\phi P_n = \phi_B 0.85 f'_c D^2 \left[ \sqrt{\left( \frac{0.85e}{D} - 0.38 \right)^2 + \frac{\rho_B f_y D_s}{2.5D 0.85 f'_c}} - \left( \frac{0.85e}{D} - 0.38 \right) \right] \quad P_U = LF_{CONC} P \quad \phi P_n \geq P_U$$

$$\rho_B(\min) = \left[ \left( \frac{P_U}{\phi_B 0.85 f'_c D^2} + \frac{0.85e}{D} - 0.38 \right)^2 - \left( \frac{0.85e}{D} - 0.38 \right)^2 \right] \frac{2.5D 0.85 f'_c}{f_y D_s}$$

Concrete Strength Reduction Factor = $\phi_B$	0.7	0.7	0.7	0.7
Load Eccentricity = $e$	207.77	222.46	244.09	235.91
Area of Longitudinal Bars (in <sup>2</sup> ) = $A_s$	6.28	6.28	6.28	6.28
Gross Area of Concrete (in <sup>2</sup> ) = $A_g$	1017.88	1017.88	1017.88	1017.88
Dia. of Longitudinal Reinforcing Circle (in) = $D_s$	28.00	28.00	28.00	28.00
Bending Reinforcement Ratio = $\rho_B$	0.0062	0.0062	0.0062	0.0062
Concrete Design Strength (lbs) = $\phi P_n$	11543	10722	9706	10067
Concrete Required Strength (lbs) = $P_U$	3440	4397	5734	1680
Minimum Bending Reinforcement Ratio = $\rho_B(\min)$	0.0018	0.0025	0.0036	0.0010
	OK	OK	OK	OK

Pole ID	MAP-1, 35'	MAP-2, 45'	MAP-3, 55'	MAP-4, 10'
Boring ID	B-101	B-102	B-103	B-104

**Check Steel Requirements for Torsional Load:**

$$P_H = \pi(D - 2C - d_{TIE}) \quad A_O = 0.85 \frac{\pi(D - 2C - d_{TIE})^2}{4} \quad A_T = \frac{\pi d_{TIE}^2}{4} \quad S_{MAX} = \frac{\phi_{TOR} 2A_O A_T f_y}{T_U} \quad S \leq S_{MAX}$$

$$\phi T_n = \frac{\phi_{TOR} 2A_O A_T f_y}{S_{MAX}} \quad T_U = LF_{CONC} T \quad \phi T_n \geq T_U \quad A_{TOR} = \frac{A_T}{S_{MAX}} P_H \quad \rho_{TOR} = \frac{A_{TOR}}{A_g}$$

$$\rho_{TOT} = \rho_B + \rho_{TOR} \quad \rho_F(\text{min}) = \text{smaller of } \frac{3\sqrt{f'_c}}{f_y} \text{ or } \rho_{TOT} \left(\frac{4}{3}\right) \quad \rho_C(\text{min}) = 1.0\% \left(\frac{1}{2}\right) = 0.005$$

$$V = \left(\frac{\pi D^2}{4} L\right) / 27 + 1 \quad \rho_{REQ} = \text{Greater of } \rho_F(\text{min}) \text{ or } \rho_C(\text{min}) \quad \rho = \rho_B$$

Concrete Strength Reduction Factor = $\phi_{TOR}$	0.85	0.85	0.85	0.85
Perimeter of Centerline of Tie Bar (in) = $P_H$	92.7	92.7	92.7	92.7
Area of Inside Shear Flow (in <sup>2</sup> ) = $A_O$	581.0	581.0	581.0	581.0
Area of Tie Bar (in <sup>2</sup> ) = $A_T$	0.196	0.196	0.196	0.196
Maximum Tie Bar Spacing (in) = $S_{MAX}$	21.8	12.6	9.4	119.0
Tie Bar Spacing Provided (in) = $S$	12	12	9	12
Concrete Design Strength (in-lbs) = $\phi T_n$	534674	923426	1235504	97750
Concrete Design Strength (ft-lbs) = $\phi T_n$	44556	76952	102959	8146
Concrete Required Strength (ft-lbs) = $T_U$	44556	76952	102959	8146
Concrete Required Strength (in-lbs) = $T_U$	534674	923426	1235504	97750
Area of Longitudinal Steel for Torsion (in <sup>2</sup> ) = $A_{TOR}$	0.836	1.444	1.932	0.153
Longitudinal Reinforcement Ratio for Torsion = $\rho_{TOR}$	0.0008	0.0014	0.0019	0.0002
Total Longitudinal Reinforcement Ratio = $\rho_{TOT}$	0.0027	0.0039	0.0055	0.0012
Minimum Flexural Reinforcement Ratio = $\rho_F(\text{min})$	0.0030	0.0030	0.0030	0.0016
Longitudinal Reinforcement Ratio Provided = $\rho$	0.0062	0.0062	0.0062	0.0062
	OK	OK	OK	OK
Concrete Volume (Cu.Yd.) = $V$	3	4	4	3

**m.b. squires company, inc.**  
**40 garrett road**  
**new wilmington, pa 16142**  
**(724) 946-3000**

LETTER OF TRANSMITTAL

TO: The Belden Company  
20 Belden Road  
Rutland, VT 05701

DATE: <b>May 8, 2017</b>	JOB NO.
ATTENTION: <b>Ken Lougee</b>	
RE: <b>Rutland, VT</b>	
<b>NHG 019-3(60)</b>	
<b>The Belden Co. PO# 1715</b>	

WE ARE SENDING YOU:  Enclosed  Under separate cover via \_\_\_\_\_ the following items:  
 Shop drawings  Prints  Plans  Samples  Specifications  
 Copy of letter  Change order  Cuts  Other

COPIES	DATE	NO.	DESCRIPTION
1			UMC Drawing No. 50400-B775 R0 (3 sheets)
1			UMS-1011 Powder Coat Specification (4 sheets)
1			Computer Analysis of Round Tapered Steel Traffic Signal Support Structures – Req. No. 031017-1 (36 sheets)

THESE ARE TRANSMITTED as checked below:

For approval  Approved as submitted  Resubmit \_\_\_\_\_ copies for approval  
 For your use  Approved as noted  Submit \_\_\_\_\_ copies for distribution  
 As requested  Returned for corrections  Return \_\_\_\_\_ corrected prints  
 For review and comment  \_\_\_\_\_  
 FOR BIDS DUE \_\_\_\_\_  PRINTS RETURNED AFTER LOAN TO US

REMARKS: Ken: Please return one copy marked approved for manufacturing. Order remains on hold

Thank you!

COPY TO: File

SIGNED: *Craig Cavanaugh*

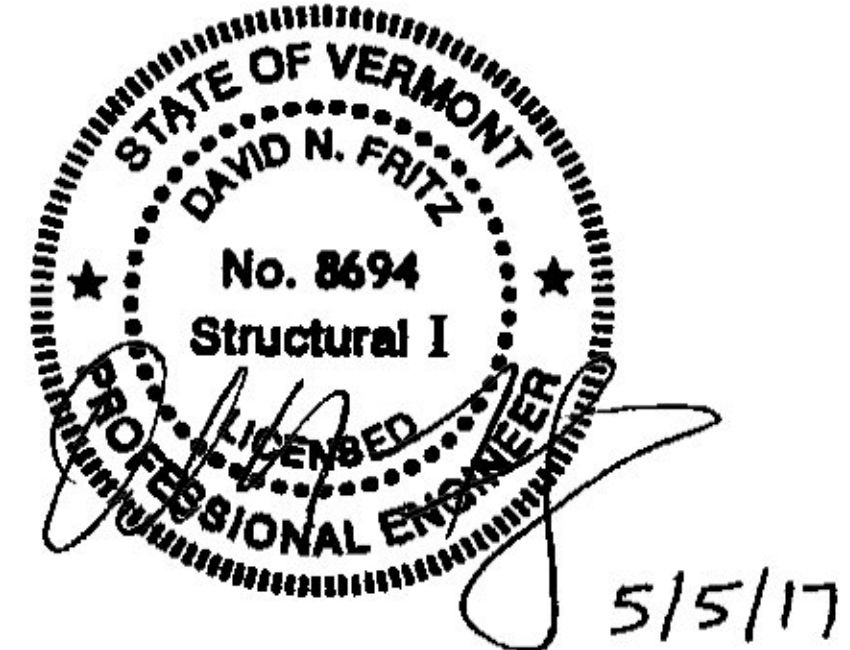
QTY	POLE ID	UMC DESIGN NUMBER	MAST ARM DATA					MAST ARM FLANGE CONNECTION DATA (in)								POLE BASE CONNECTION DATA (in)						LUM ARM REQ'D				
			SPAN	TUBE SIZE	SLIP JOINT LENGTH	MTG HEIGHT	RISE ANGLE	ORIENT	(QTY) BOLT SIZE	X	Y	W	H	ØCA	APL	PPL	G	POLE TUBE SIZE	BC	S	F		ØCB	P	T	ANCHOR BOLT SIZE
1	#4	50400-B775-Y1	10'-0"	7E-8.00x6.60x10'-0"	-	20'-0"	3'	180°	(4) 1	12	9	15 1/2	12 1/2	6	2	1 1/4	3/16	7E-11.00x8.06x21'-0"	15	17	5 3/4	8	5 1/4	2	(8) 1 x 36 x 4	NO
1	#1	50400-B775-Y2	35'-0"	7E-10.00x5.10x35'-0"	-	20'-0"	3'	180°	(4) 1 1/4	14 1/2	10 1/2	18 1/2	14 1/2	8	2	1 1/2	1/4	3E-13.00x8.80x30'-0"	17 1/2	20	6 11/16	10	6	2	(8) 1 1/4 x 42 x 6	YES
1	#2	50400-B775-Y3	45'-0"	3E-11.50x9.12x17'-0" 7E-9.76x5.60x29'-9"	1'-9"	20'-0"	3'	180°	(4) 1 1/4	17	13	21	17	8	2 1/4	1 3/4	1/4	3E-14.50x10.30x30'-0"	19	21 1/2	7 1/4	11 1/2	6	2	(8) 1 1/4 x 42 x 6	YES
1	#3	50400-B775-Y4	55'-0"	3E-14.00x10.82x22'-9" 7E-11.49x6.70x34'-3"	2'-0"	20'-0"	3'	180°	(4) 1 1/2	19 1/2	15	24	19 1/2	8	2 1/4	1 3/4	1/4	3E-17.00x12.80x30'-0"	22	25	8 7/16	13 1/2	6 3/4	2	(8) 1 1/2 x 54 x 6	YES

3 GA = 0.250" WALL THICKNESS  
7 GA = 0.179" WALL THICKNESS  
E = ROUND TAPERED STEEL TUBE @ 0.14 in/ft TAPER

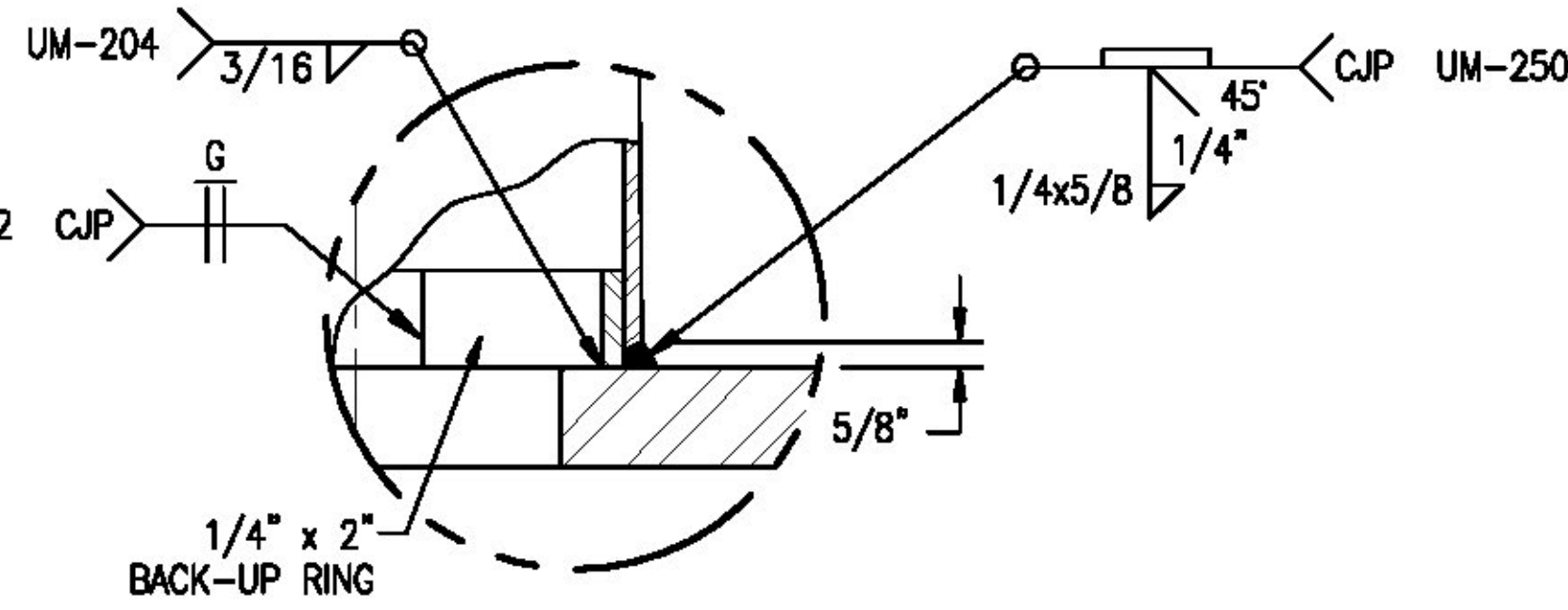
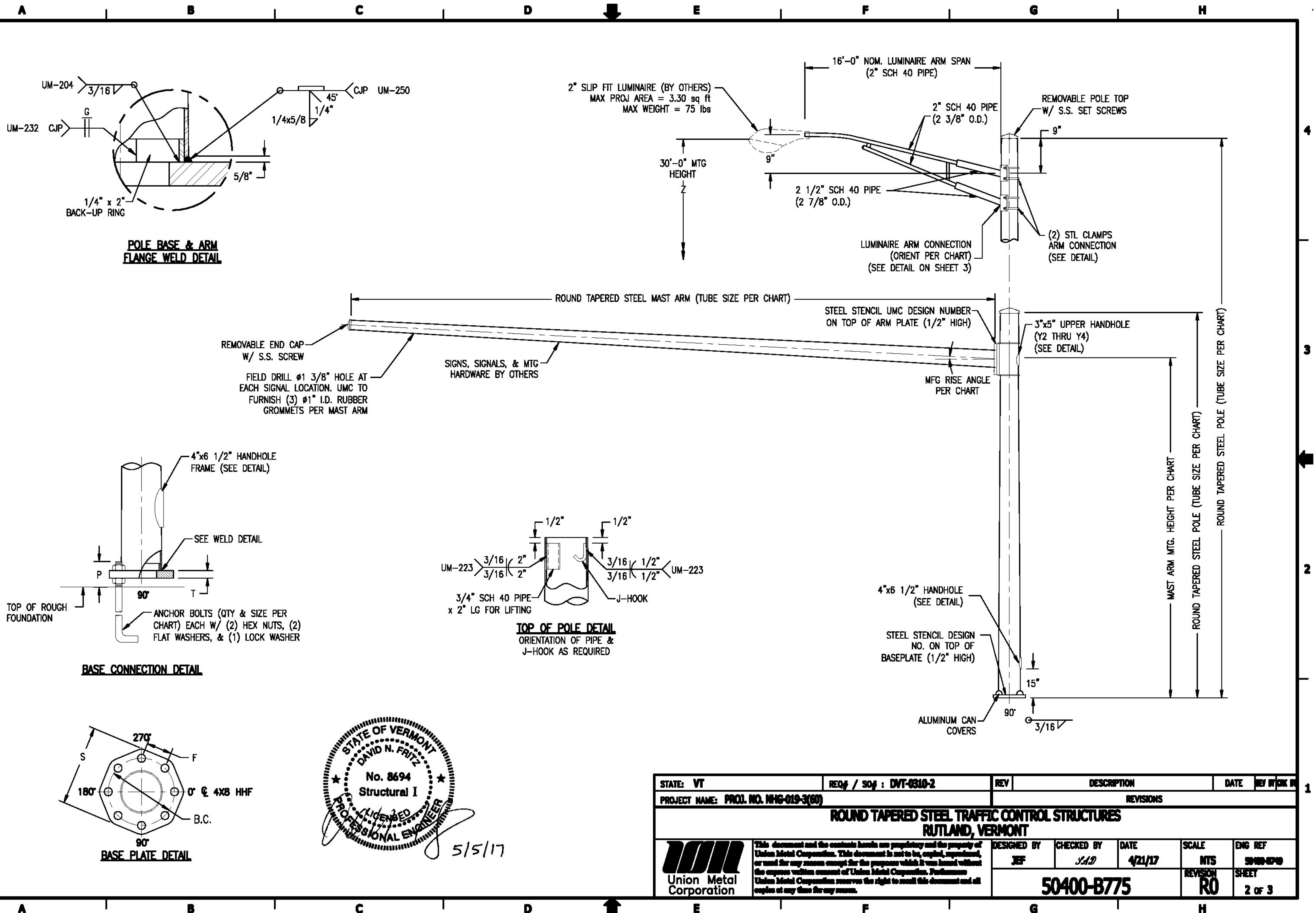
**DESIGN CRITERIA:**

- DESIGNED IN ACCORDANCE WITH THE 2013 "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS" FOR 90 M.P.H. WIND ZONE. THE DESIGN PARAMETERS INCLUDE:  
50 YEAR STRUCTURE DESIGN LIFE  
FATIGUE CATEGORY II CONSIDERATION FOR:  
NATURAL WIND GUST  
TRUCK-INDUCED GUST (65 MPH TRUCK VEHICLE SPEED)
- ANCHOR BOLTS ANALYZED FOR STEEL STRENGTH ONLY. THE ANCHOR BOLT EMBEDMENT LENGTH SHOWN ON THIS DRAWING SHALL BE VERIFIED BY THE FOUNDATION ENGINEER.
- THE EXPOSED LENGTH OF THE ANCHOR BOLT BETWEEN THE TOP OF THE FOUNDATION AND THE BOTTOM OF THE LEVELING NUT SHOULD NOT EXCEED ONE BOLT DIAMETER.
- VIBRATION IS MORE LIKELY TO OCCUR WHEN STRUCTURES ARE INSTALLED WITHOUT ATTACHING THE SIGNALS AND OR SIGNS. THEREFORE, THE INTENDED EQUIPMENT OR DAMPENING DEVICES MUST BE INSTALLED AT THE TIME OF ERECTION. BECAUSE VIBRATION IS GENERALLY UNPREDICTABLE, A MAINTENANCE PROGRAM SHOULD INCLUDE INSPECTION FOR INDICATIONS OF EXCESSIVE VIBRATION OR FATIGUE AND EXAMINATION FOR ANY STRUCTURAL DAMAGE OR BOLT LOOSENING.
- CUSTOMER TO CONFIRM ALL DIMENSIONS & ORIENTATIONS BEFORE RELEASING ORDER FOR MANUFACTURING.

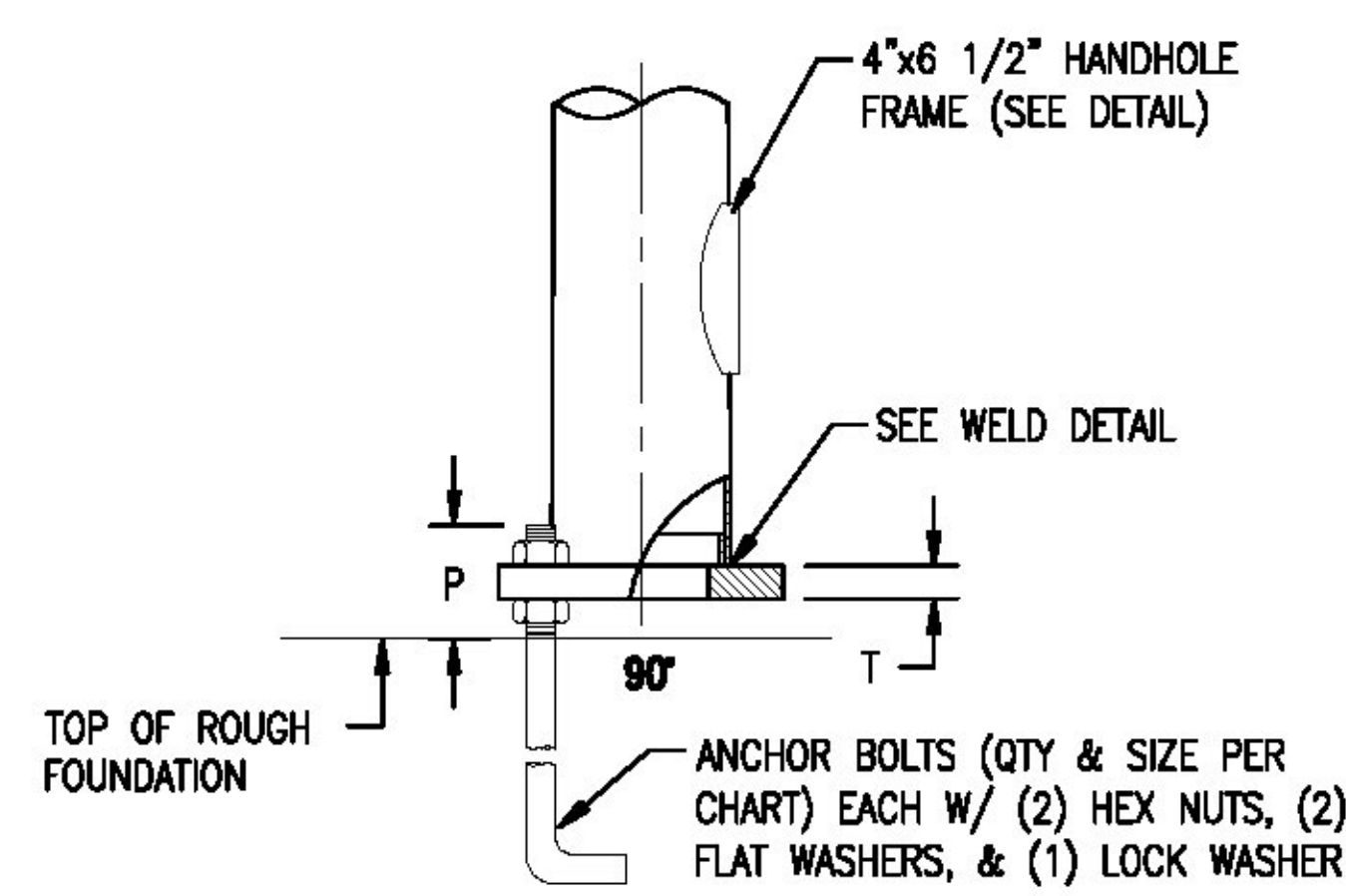
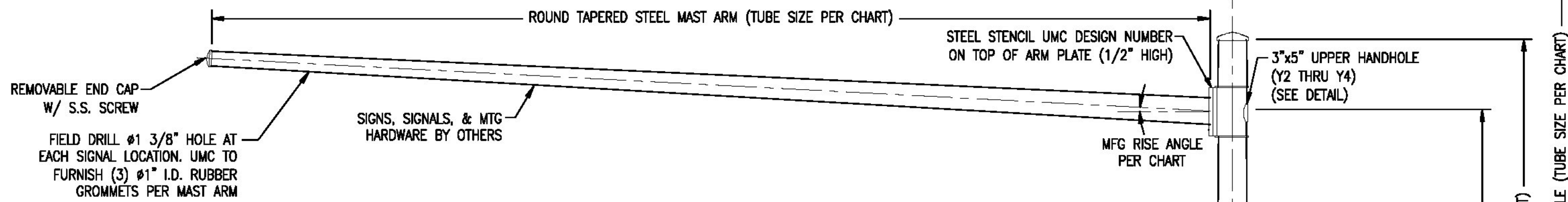
MATERIAL SPECIFICATIONS	
TAPERED TUBE	ASTM A595 GR A
PLATE	ASTM A36
BAR HANDHOLE FRAME	ASTM A529 GR 50 or ASTM A572 GR 50 or ASTM A500 GR B
HANDHOLE COVER	ASTM A1011 or A36
ANCHOR BOLTS	ASTM F1554 GR 55
ANCHOR BOLT NUTS	ASTM A563 GR A
FLAT WASHERS	ASTM F436
ARM CONNECTION BOLTS	ASTM A325
ARM CONNECTION NUTS	ASTM A563 GR DH
CLAMP	ASTM A36 or A1011
POLE TOP/ARM END CAP	ASTM B26 (356.0F) or A1011
PIPE	ASTM A500 GR B or A53 GR B
COUPLING	ASTM A513
S.S. HARDWARE	AISI-300 SERIES (18-8)
STRUCTURE FINISH	H.D. GALV TO ASTM A123 & POWDER COAT
HARDWARE FINISH	H.D. GALV TO ASTM A153



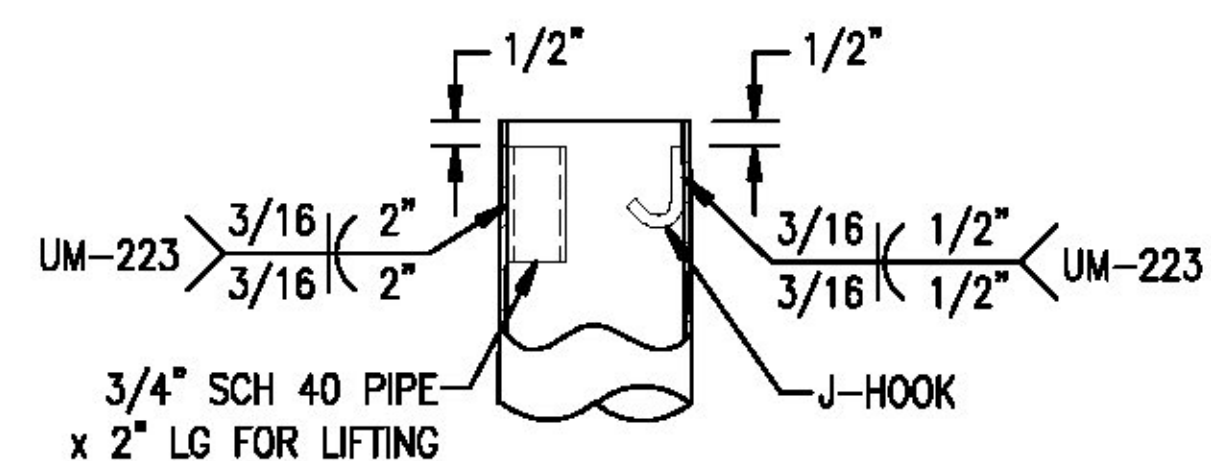
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PROJECT NAME: PROJ. NO. NHG-019-3(60)		REVISIONS			
<b>ROUND TAPERED STEEL TRAFFIC CONTROL STRUCTURES RUTLAND, VERMONT</b>					
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			JEF	JAD	4/21/17
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			50400-B775	NTS	50400-B775
			REVISION	SHEET	
			RO	1 of 3	



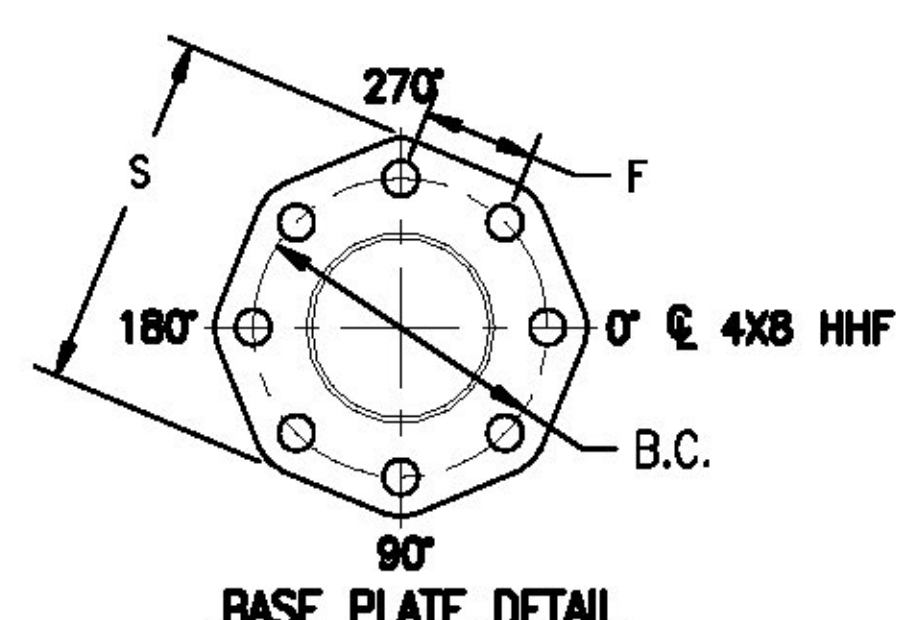
**POLE BASE & ARM FLANGE WELD DETAIL**



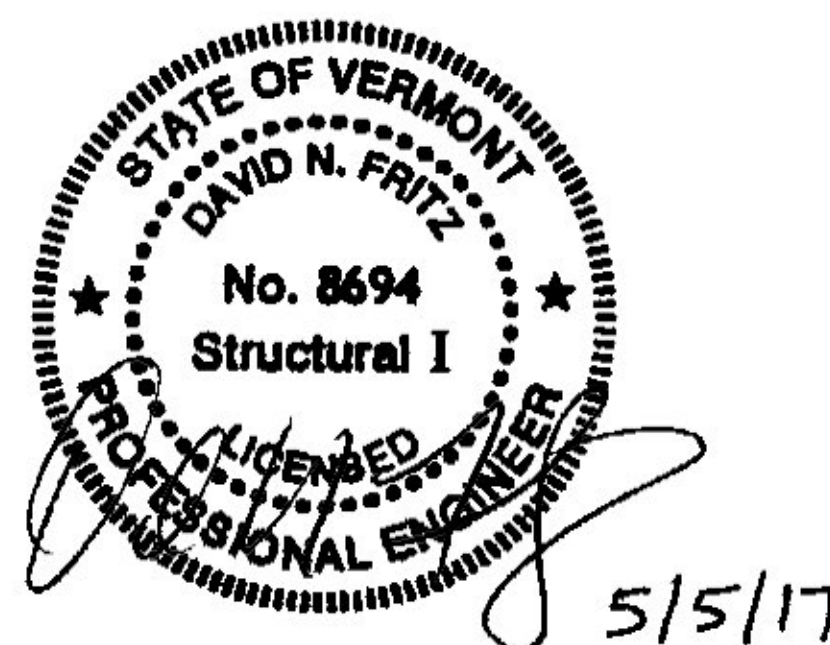
**BASE CONNECTION DETAIL**



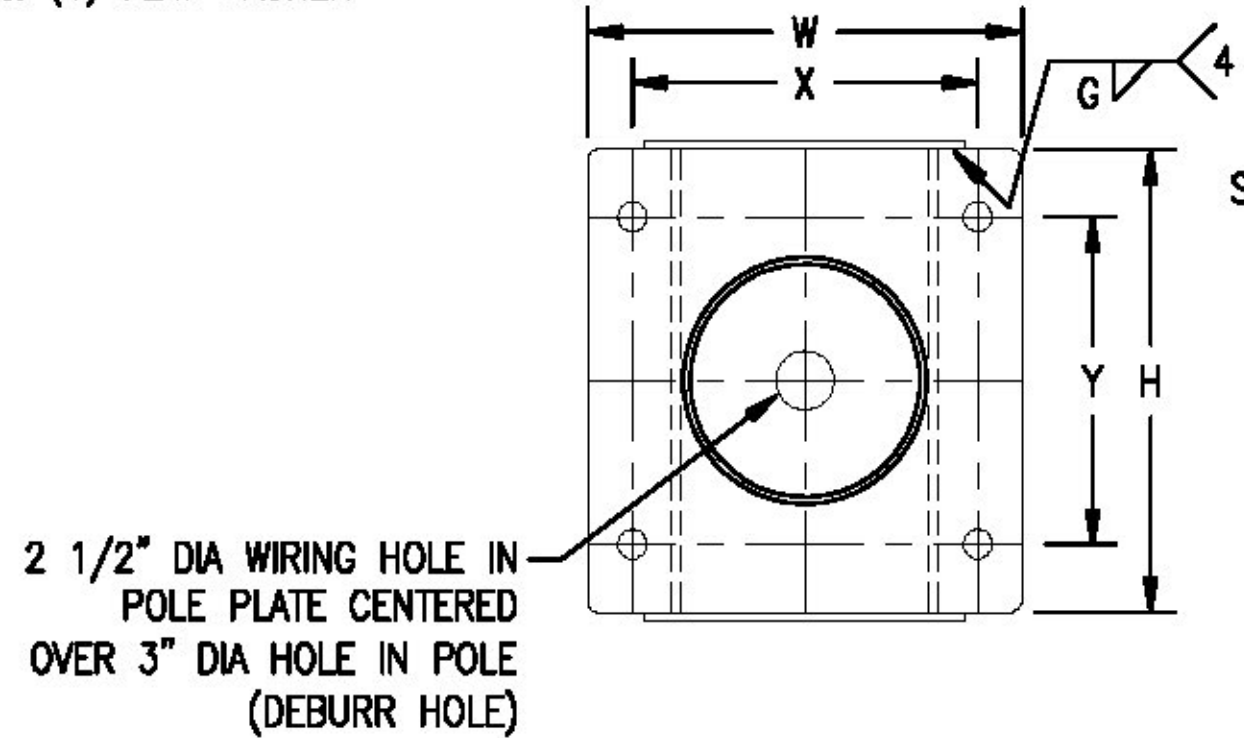
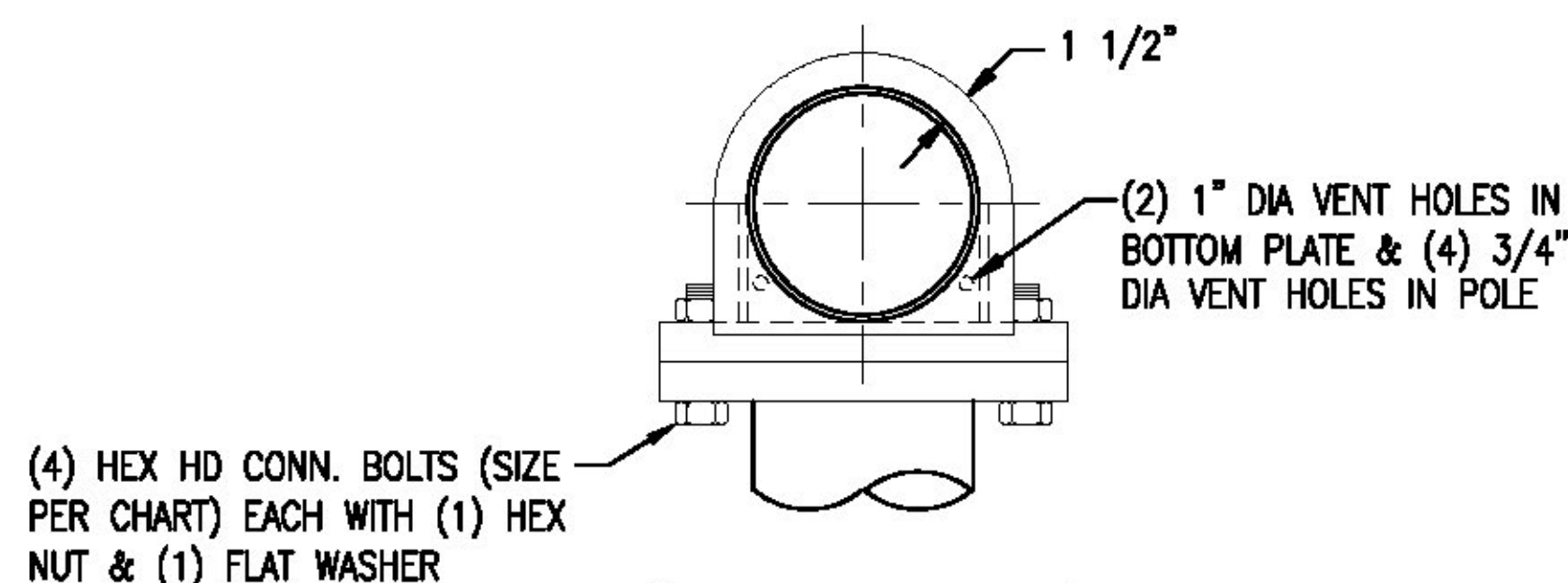
**TOP OF POLE DETAIL**  
ORIENTATION OF PIPE & J-HOOK AS REQUIRED



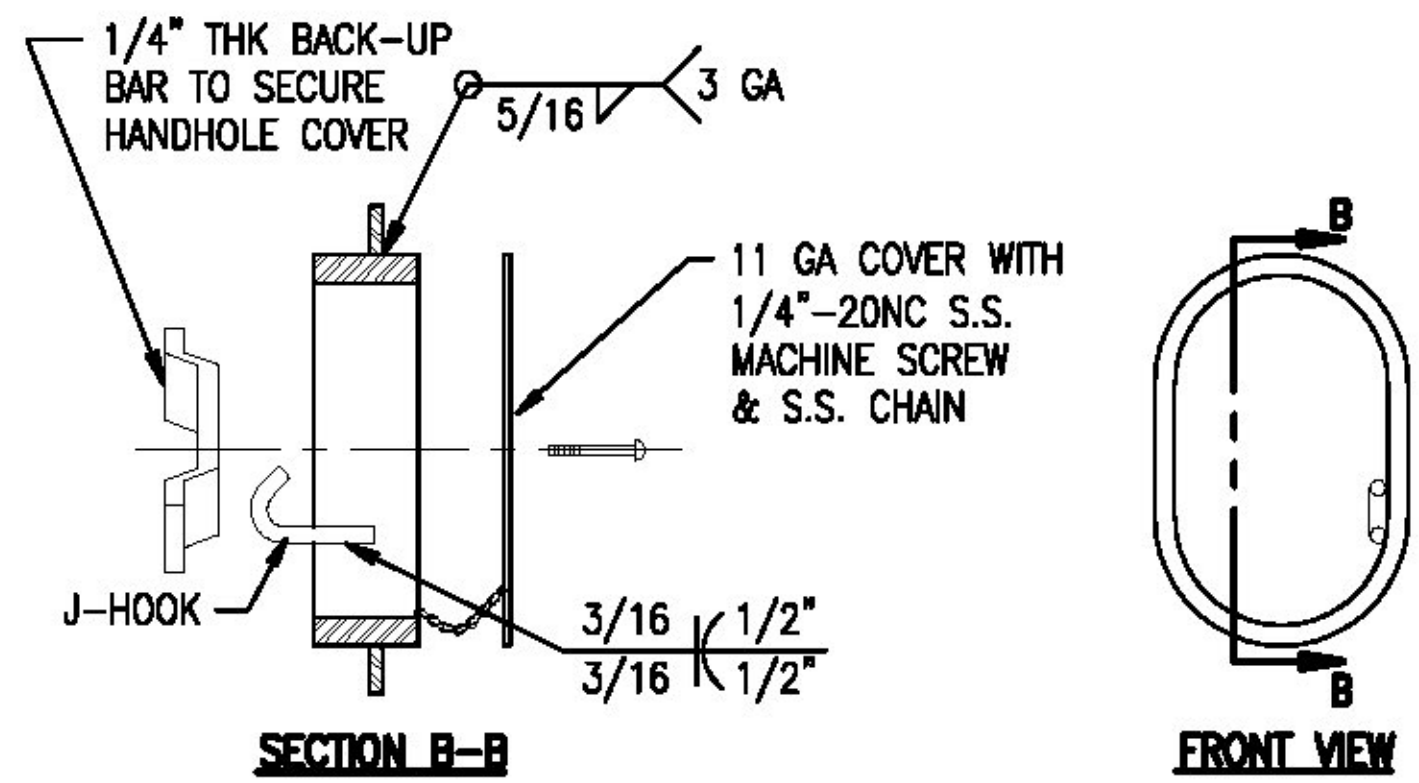
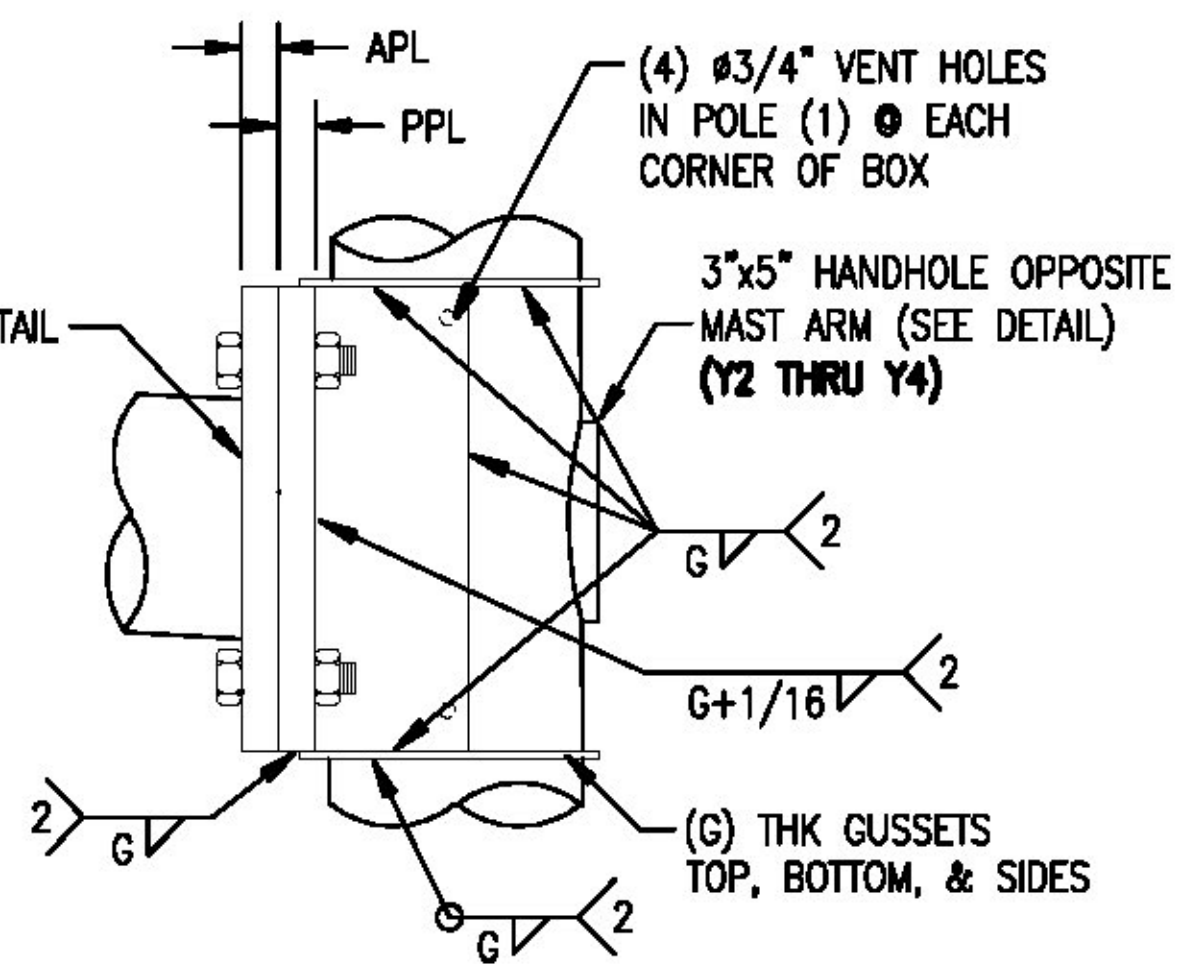
**BASE PLATE DETAIL**



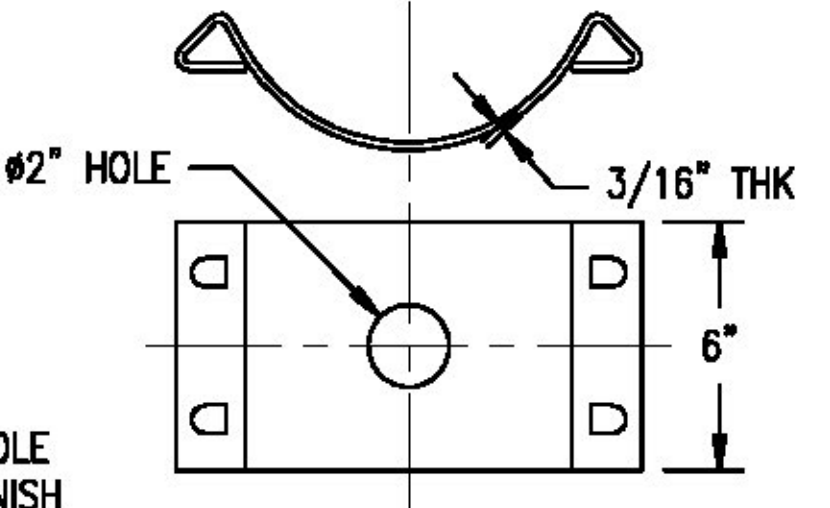
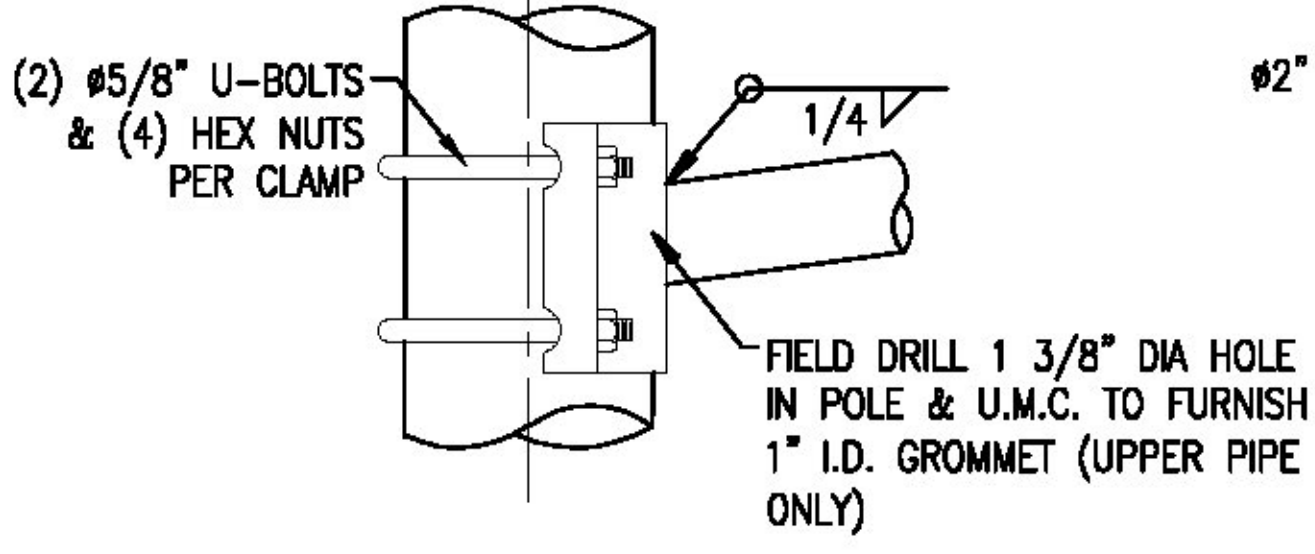
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PROJECT NAME: PROJ. NO. NHG-019-3(60)		REVISIONS			
<b>ROUND TAPERED STEEL TRAFFIC CONTROL STRUCTURES</b> <b>RUTLAND, VERMONT</b>					
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		JEF	JAD	4/21/17	NTS
<b>50400-B775</b>			REVISION	ENG REF	
			<b>RO</b>	<b>50400-B775</b>	<b>2 of 3</b>



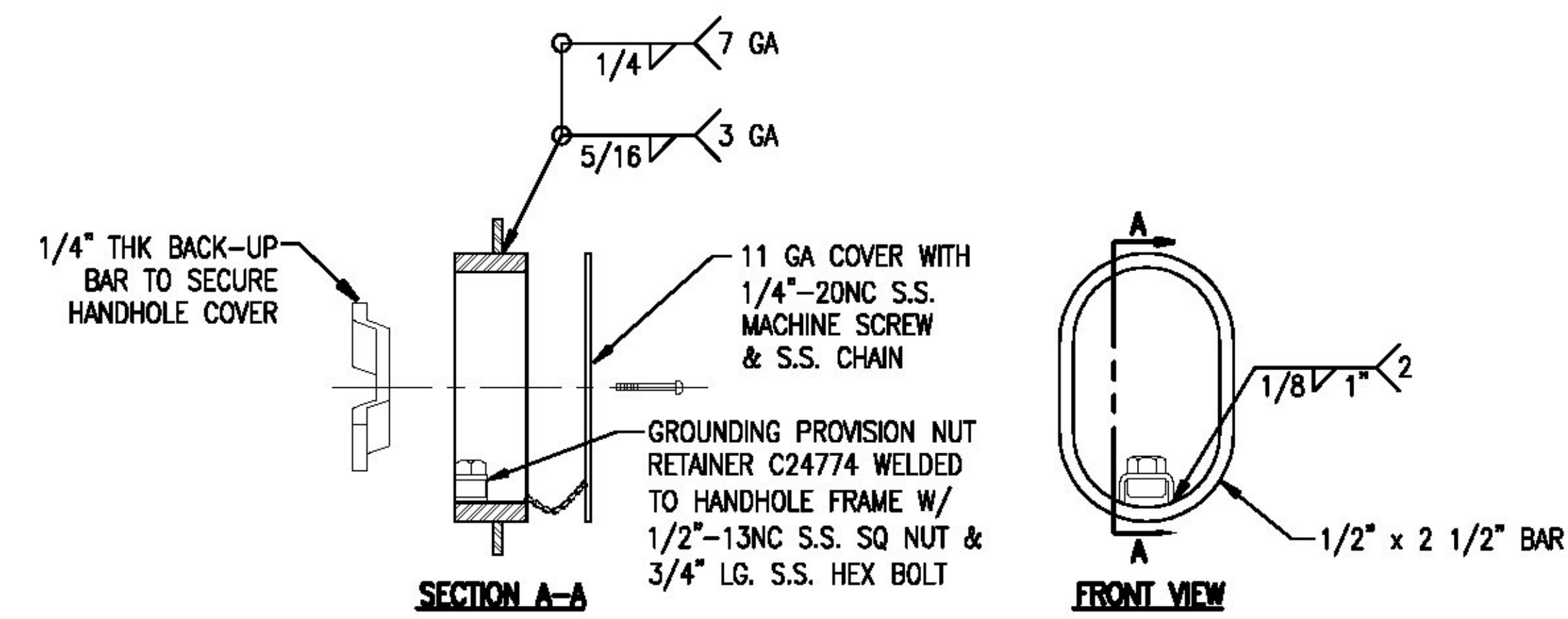
**MAST ARM CONNECTION DETAIL**



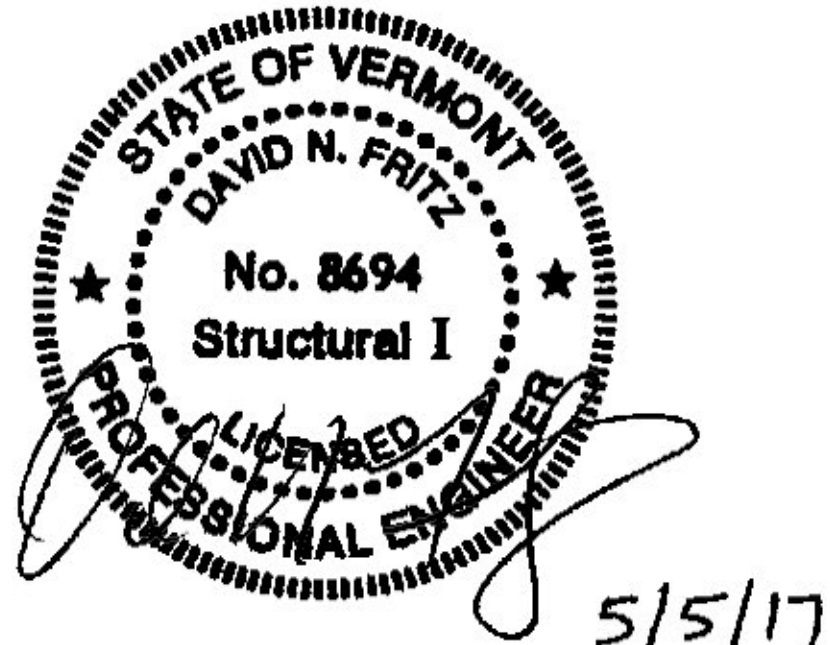
**3"x5" UPPER HANDHOLE FRAME DETAIL (Y2 THRU Y4 ONLY)**



**LUMINAIRE ARM CONNECTION DETAIL (REF B85 SERIES)**



**4"x6 1/2" LOWER HANDHOLE FRAME DETAIL**



STATE: VT	REQ / SO# : DVT-0810-2	REV	DESCRIPTION	DATE	REV BY / CHK BY
PROJECT NAME: PROJ. NO. NHG-019-3(60)		REVISIONS			
<b>ROUND TAPERED STEEL TRAFFIC CONTROL STRUCTURES RUTLAND, VERMONT</b>					
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		JEF	JAD	4/21/17	NTS
<b>50400-B775</b>				ENG REF	50400-B775
				REVISION	SHEET
				RO	3 of 3



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State of Vermont  
Highway Safety & Design Section

Agency of Transportation  
Project Delivery Bureau

---

TO: THE BELDEN COMPANY, INC.

FROM: PATTI COBURN, TRAFFIC DESIGN PROJECT MANAGER

DATE: JUNE 28, 2017

SUBJECT: RUTLAND TOWN NHG 019-3(60) SHOP DRAWING REVIEW

---

VTrans has reviewed the Luminaire with Bird Spikes submittal.

The following equipment has been approved as noted. See attached shop drawing response document and notes below:

- Holophane LEDGENE Series
  - Shall be housing color code "K = Black"
- Bird-X Bird Spikes
  - Shall be the "Stainless SPIKES Needle Strips," regular sized product only

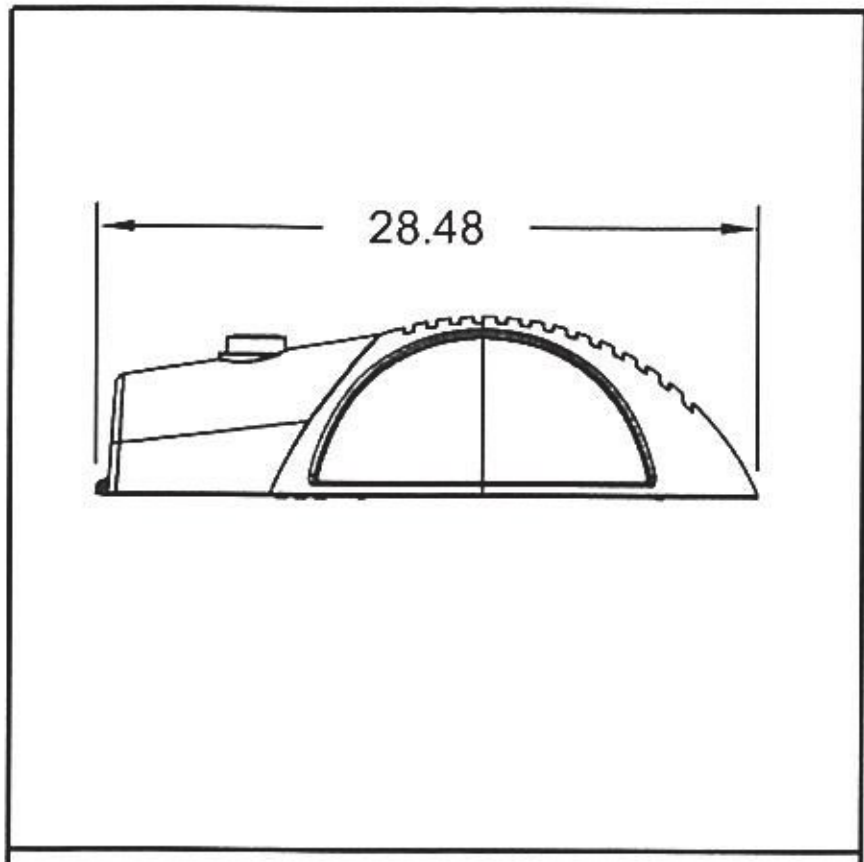
Please feel free to contact me with any questions you may have.

PLC:mcb

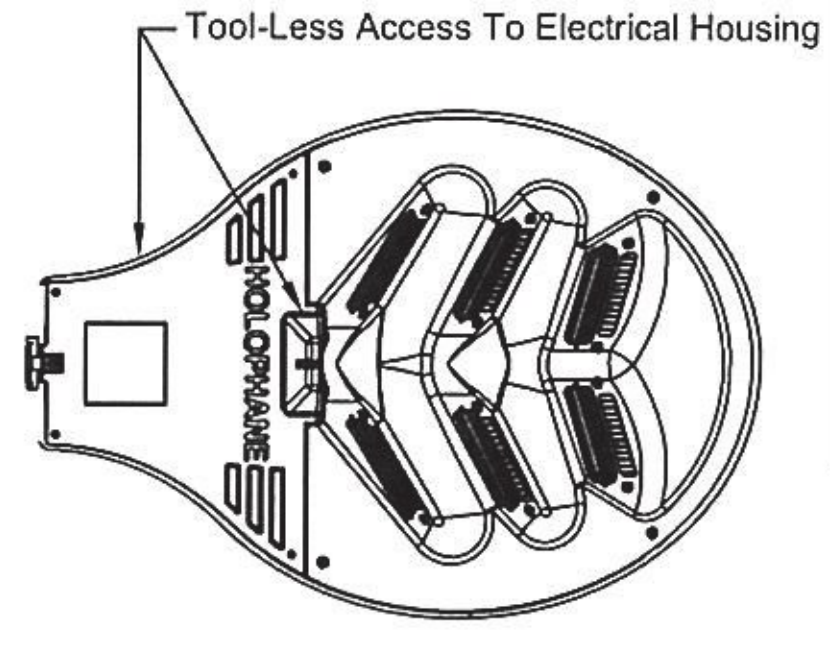
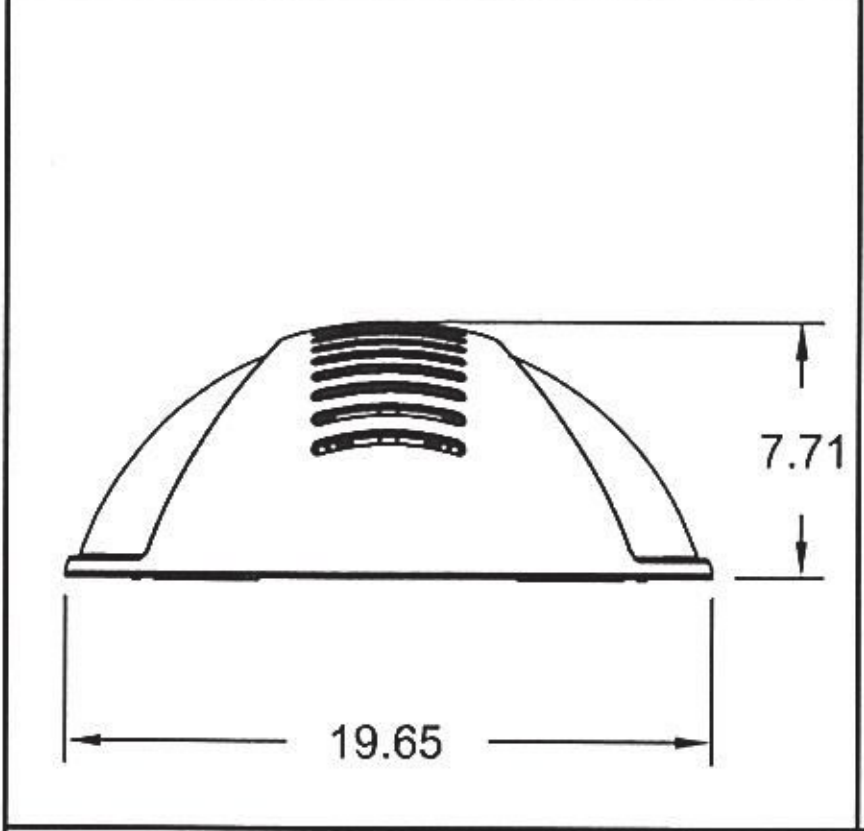
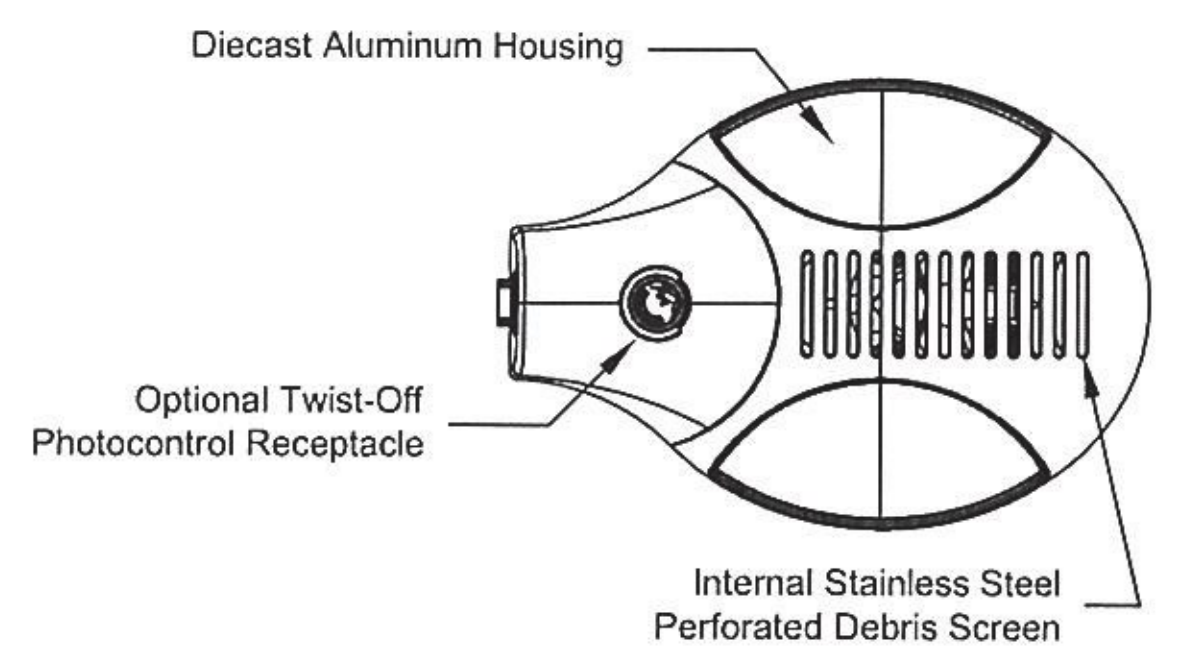
Attachments: Submittals with comments

cc: Project File  
Jace Curtis, VTrans Resident Engineer

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Weight = 28lbs  
EPA = .62



**Approved AsNoted**

BY: Patti Coburn, P.E.  
DATE: 06/28/2017  
RESUBMIT: No  
RECEIVED: June 21, 2017  
CKD BY: Matt Bogaczyk

STATE OF VERMONT  
AGENCY OF TRANSPORTATION

**LEDGEND™**  
LED Roadway Lighting

Functional  
Outdoor

Customer Preferred: (Most Frequently Ordered Catalog Numbers)  
LEDG 120 35 4K AS G L1 R F1  
K L2  
W

LEDG	096	35	5K
Series	Number of LED'S	Drive Current	Color Temperature
LEDgend LED Roadway	120 = 120 LED'S 108 = 108 LED'S 096 = 96 LED'S 084 = 84 LED'S 072 = 72 LED'S 060 = 60 LED'S 048 = 48 LED'S 036 = 36 LED'S	35 = 350mA Driver 53 = 525mA Driver 70 = 700mA Driver	4K = 4,000 K CCT +/- 250K 5K = 5,000 K CCT +/- 250K
AS	<del>G</del>	L2	
Voltage	Housing Color	Optics	
AS = Auto-Sensing Voltage (120 thru 277) *AH = Auto-Sensing Voltage (347 thru 480)	A = As Specified G = Gray H = Graphite K = Black N = Green W = White Z = Bronze	L1 = Type I, Narrow Asymmetric L2 = Type II, Medium Asymmetric L3 = Type III, Wide Asymmetric L4 = Type IV, Forward Throw	

ORDERING INFORMATION:

**OPTIONS**

B = Constant Lumen Output, Bi-Level Dimming  
C = Constant Lumen Output  
DE = ROAM CONCIERGE Dimming Control  
VE = ROAMVIEW Dimming Control  
EL = Extended Life - Driver  
PCS = DTL Solid-State Lighting Photocontrol 120-277V  
P34 = DTL Twist-Off Photocontrol 347V  
P48 = DTL Twist-Off Photocontrol 480V  
PSC = Shorting Cap  
R = NEMA Twist-Off Photocontrol Receptacle  
SP = Single Pack For UPS

**ACCESSORIES**

F1 = Single Fusing (120, 240, 277, 347V)  
F2 = Double Fusing (208, 240, 480V)  
BR-1055-XX = P2 Tenon Adapter  
LEDGHSS = House Side Shield

**NOTES:**

\*Not available with 36 LED's with 35 or 53 drive currents or with options B, C, DE, VE, EL or PCS  
\*Not available with B, C, DE or VE options with 53 drive current  
\*Not available with 120 LED's

**K = Black**

**HOLOPHANE®**  
LEADER IN LIGHTING SOLUTIONS  
An Acuity Brands Company  
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THIS DRAWING, WHEN APPROVED, SHALL BECOME THE COMPLETE SPECIFICATION FOR THE MATERIAL TO BE FURNISHED BY HOLOPHANE. THE CUSTOMER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS. HOLOPHANE SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE TO PROPERTY OR PERSONS ARISING FROM THE USE OF THIS MATERIAL. HOLOPHANE SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE TO PROPERTY OR PERSONS ARISING FROM THE USE OF THIS MATERIAL. HOLOPHANE SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE TO PROPERTY OR PERSONS ARISING FROM THE USE OF THIS MATERIAL.

ORDER #:  
TYPE: JRM  
DRAWN: JRM  
DATE: 10/31/12  
DWG #: LUM\_LEDG

# Specifications

## General Construction

Rugged die cast aluminum housing, low copper aluminum, allow for corrosion resistance and long life. Horizontal arm mount with +/-6 degrees vertical adjustment. Four bolt mast arm provides easy, secure installation and adjustability for arms 1-1/4 & 2 inch pipe (1.66" & 2.38" O.D.) Trigger latch disengages for easy access to four bolt mounting, terminal block, surge protection module, LED drivers, and electronic transfer switch. An optimized maintained thermal management system is achieved by combining a robust heat sink utilizing both convection and conduction methodology with a mechanical design that provides maximum airflow ensuring a minimum of 50,000 hours L70 at 25C operating ambient. Internal perforated stainless steel cover protects the luminaire against dirt and foliage build up while maintaining the integrity of the airflow requirement. Solar guard technology isolates top cover of luminaire from thermal heat sink through four touch points providing protection from solar loading while not in operation.

## Environmental

Luminaire design and tested to comply with ANSI C136:31 2001 for 100,000 cycles at 3G acceleration for normal road and bridge applications. The range of luminaire operation is -40C to +50C.

Six sealed LED light engines meet dust and moisture rating of IP-66 per IEC 60068-2-3 1987 ensures long component life and protection from the environment.

The luminaire is finished with polyester paint applied after a pretreatment process to ensure maximum durability.

The finish shall pass the 1000 hour salt fog test per ASTM B117 and D1654 standard.

The luminaire passed Humidity testing per IEC 60068-2-3 1987 and passed Temperature-Voltage Cycling and Condensing Humidity testing per Acuity Brands Validation Test Specification 902-00007-001

## Regulatory

The luminaire is safety listed to CSA-C22.2 number 250, wet location. See chart below for model rating based on drive current and led combination.

Series	Drive Current	Number of LED'S	CSA Ambient Listing
LEDG	350 mA	36,60,72,84,96,108,120	40C
LEDG	525 mA	36,48,60,72,84,96,108,120	40C
LEDG	700 mA	72,60,48,36	40C
LEDG	700 mA	84	35C
LEDG	700 mA	96	30C
LEDG	700 mA	108	25C

The luminaire is ROHS compliant. Luminaire meets EMI compliance per FCC Title 47 CFR Part 15, Class A.

## Electrical

The surge protection is tested to ANSI/IEEE C62.41-2002 specification. For the AS voltage option (120-277), the device meets category C high (20kV, 10kA). For AH voltage rating (347-480), the protection level is category C low. (6kV, 3kA) The surge protection module (SPD) protects all downstream electronics such as led drivers, transfer switch, and relays for the purpose of protecting from electrical disturbances such as nearby lightning strikes.

Extended life driver option (EL 350 mA only) provides both main and auxiliary driver system extending system driver to 200,000 hours minimum. The control in EL option constantly monitors an output current of the Main Driver. In the event of a Main driver failure (no output current), the control switches power to the Auxiliary driver. The Auxiliary driver is not energized during normal operation.

The photocontrol receptacle is adjustable without tools and is ROAM compatible.

The luminaire is designed to conform to ANSI C82.77:2002 for Maximum Total Harmonic Distortion (THD) -20%. Inrush current complies with NEMA410:2004 table B-2 and line Fluctuations and Ramp input voltage per UL 991:2004.

The luminaire conforms to Electromagnetic compatibility tests for Electrostatic Discharge (ESD) per IEC 61000-4-2:2001, Level 4.

## Optical

Environmentally friendly, zero uplight luminaire reduces light pollution. Glass optics provides minimal dirt depreciation and will not discolor or become brittle over time. The permanence of glass results in less dirt depreciation and more maintained lumens on the intended space. The luminaire is available with narrow, medium, and wide asymmetric distributions designed to maximize pole spacing and reduce energy usage resulting in a lower total cost of ownership. The highly engineered light engine is designed to restrict direct view of individual LED's increasing visual comfort within the field of view. The luminaire is available with LED color temperatures of 4000K and 5000K. The minimum color rendering index (CRI) is 70.

Reference [www.Holophane.com](http://www.Holophane.com) for individual photometric tests on LEDgend LED luminaire that are tested per LM79 guidelines. Consult factory for LM80 data as that varies per LED chip manufacturer.

**LEDGEND™**  
LED Roadway Lighting

Functional  
Outdoor

**HOLOPHANE®**  
LEADER IN LIGHTING SOLUTIONS  
An Acuity Brands Company  
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ORDER #: \_\_\_\_\_  
TYPE: \_\_\_\_\_  
DRAWN: LJS  
DATE: 10/6/11  
DWG #: LUM\_LEDG

**Operating Characteristics**

Number of LED's	CCT	Drive Current	Min Delivered lumens *	Input operating Amps						Input Watts	LPW	L70 @ 25C	L70 @ 40C	Driver life @25C hrs
				120V	208V	240V	277V	347V	480V					
120	4000K	350Ma	9652	1.07	0.63	0.55	0.48	0.37	0.27	129	75	106,000	83,000	100,000
108	4000K	350Ma	8778	0.96	0.57	0.50	0.43	0.33	0.24	116	76	110,000	85,000	100,000
96	4000K	350Ma	7903	0.86	0.50	0.44	0.38	0.30	0.22	103	77	117,000	88,000	100,000
84	4000K	350Ma	7029	0.75	0.44	0.39	0.34	0.26	0.19	91	77	125,000	92,000	100,000
72	4000K	350Ma	6049	0.68	0.40	0.36	0.32	0.23	0.18	81	75	135,000	98,000	100,000
60	4000K	350Ma	5037	0.54	0.32	0.28	0.24	0.19	0.14	65	77	146,000	106,000	100,000
48	4000K	350Ma	4049	0.43	0.25	0.22	0.19	0.15	0.11	52	78	159,000	115,000	100,000
36	4000K	350Ma	3060	0.35	0.22	0.19	0.16	NA	NA	42	73	171,000	124,000	100,000
120	4000K	525Ma	12660	1.65	0.95	0.86	0.75	0.60	0.43	198	64	65,000	51,000	100,000
108	4000K	525Ma	11492	1.49	0.86	0.77	0.68	0.54	0.39	178	65	68,000	53,000	100,000
96	4000K	525Ma	10324	1.32	0.76	0.69	0.60	0.48	0.34	159	65	72,000	56,000	100,000
84	4000K	525Ma	9156	1.22	0.73	0.65	0.59	0.44	0.33	148	62	78,000	61,000	100,000
72	4000K	525Ma	7988	0.98	0.57	0.50	0.44	0.35	0.26	120	67	85,000	65,000	100,000
60	4000K	525Ma	6736	0.83	0.48	0.43	0.38	0.30	0.22	99	68	94,000	72,000	100,000
48	4000K	525Ma	5490	0.66	0.38	0.34	0.30	0.24	0.17	79	69	104,000	79,000	100,000
36	4000K	525Ma	4241	0.52	0.31	0.27	0.25	NA	NA	62	68	115,000	87,000	100,000
108	4000K	700Ma	14320	2.01	1.15	1.02	0.90	0.70	0.51	240	60	50,000	NA	50,000
96	4000K	700Ma	13055	1.79	1.02	0.91	0.80	0.62	0.45	213	61	51,000	NA	65,000
84	4000K	700Ma	11829	1.56	0.89	0.79	0.70	0.54	0.40	187	63	53,000	NA	80,000
72	4000K	700Ma	9780	1.34	0.77	0.68	0.60	0.47	0.34	162	60	60,000	47,000	95,000
60	4000K	700Ma	8625	1.12	0.64	0.57	0.50	0.39	0.28	133	65	65,000	52,000	100,000
48	4000K	700Ma	6937	0.91	0.52	0.46	0.41	0.31	0.23	107	65	73,000	58,000	100,000
36	4000K	700Ma	5248	0.67	0.38	0.34	0.30	0.23	0.17	80	66	77,000	66,000	100,000

- \* Minimum lumen values, reference photometric test for delivered lumens for each distribution
- For 5000K use 1.045 multiplier X 4000 K lumen value

Warranty  
 Limited warranty located at  
[www.acuitybrands.com/CustomerResources/Terms\\_and\\_conditions.aspx](http://www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx)

Actual performance may differ as a result of end-user environment and application.

Actual wattage may differ by +/-8% when operating between 120-480V +/-10%.

NOTE: Specifications subject to change without notice.

**LEDGEND™**  
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Functional  
 Outdoor



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ORDER #:  
 TYPE:  
 DRAWN: JRM  
 DATE: 1/21/13  
 DWG #: LUM\_LEDG

Bird-X  
SPECIFICATIONS  
Stainless SPIKES® Needle Strips

(Go to website I gave you  
IN my EMAIL Dated 6/13/17)  
To view Pictures of SPIKES

Approved AsNoted	
BY:	Patti Coburn, P.E.
DATE:	06/28/2017
RESUBMIT:	No
RECEIVED:	June 21, 2017
CKD BY:	Matt Bogaczyk
STATE OF VERMONT AGENCY OF TRANSPORTATION	

**MANUFACTURER**

Bird-X, Inc. manufactures Stainless SPIKES Needle Strips using polycarbonate with UV inhibitors and ST 302 Hard Surgical Grade Stainless; resistant to virtually all weather and harsh environments.

**PRODUCT DESCRIPTION**

Needle strips are a simple, humane, maintenance-free, long-term solution to pest bird problems, and have been used on buildings and structures worldwide to eliminate roosting and nesting surfaces and landing strips. Birds avoid alighting on the spikes as humans avoid walking on a bed of nails – the spikes are not lethal – just extremely uncomfortable.

Stainless SPIKES have a base mold of transparent polycarbonate, with two types of spiked projections: stainless steel projections that protrude up and out (angled) to both sides, and a central row of polycarbonate projections that protrude straight up. There are three variations:

**Regular:** Alternates *wide* stainless steel projections (4.5" spread) with *narrow* stainless steel projections (1.75" spread) and a central row of *straight-up* polycarbonate projections. Sixty (60) spikes per 2-foot section.

**Slim:** Has only the *narrow* stainless steel projections (1.75" spread) in order to cover ledges less than 2" wide, plus a central row of *straight-up* polycarbonate projections. Thirty-six (36) spikes per 2-foot-section

**Extra-Wide:** Alternates *wide* stainless steel projections (4.5" spread) with *extra-wide* (7" spread) AND *narrow* (1.75" spread) stainless steel projections, plus a central row of *straight-up* polycarbonate projections. Sixty (60) spikes per 2-foot section.

**Extra-Tall:** Alternates *wide* stainless steel projections (4.5" spread), which measure 5.75" tall, with an especially wide (8.5" spread) row of spikes, plus a central row of straight-up polycarbonate projections. Sixty (60) spikes per 2-foot section.

Stainless SPIKES Needle Strips can be installed using Bird-X Spikes Special Adhesive, steel screws, wood screws, or nails – depending on the surface.

Stainless SPIKES Needle Strips are the industry standard on public and private RFPs. With a flexible base, installation is easy – even on curved surfaces. Stainless SPIKES won't corrode or decay. If installed properly, they are long-lasting and require little-to-no maintenance.

**SUPPORT**

Bird-X has the most knowledgeable and experienced sales consultants in the industry. From initial bidding, custom consultations, product recommendations, and installer referrals – Bird-X is prepared to assist with project evaluations. Call 1.800.662.5021 or email [solutions@bird-x.com](mailto:solutions@bird-x.com) for more information.

**A. GENERAL**

**1. SUMMARY**

- a. Install Stainless SPIKES Needle Strips to prevent pest birds from landing, perching or roosting wherever the spikes are applied. They make surfaces uncomfortable, uninviting and intimidating to pest birds. Stainless SPIKES are safe, non-toxic, non-harmful, humane and eco-friendly.

**2. QUALITY ASSURANCE**

- a. Obtain all technical information, consultative services, products and accessories from one manufacturer.

- b. Utilize Bird-X Preferred Installers in your area to ensure experience, knowledge of the products, certification, and insurance coverage.

**3. SUBMITTALS**

- a. Submit manufacturer's descriptive material including samples, literature, catalogs, product specifications, and installation instructions.
- b. Provide warranty on products and installation.
- c. Provide proof of professional installation certification and insurance.

**4. PRODUCT HANDLING**

- a. Protect Stainless SPIKES Needle Strips from damage before, during and after installation.
- b. If damage occurs to Stainless SPIKES Needle Strips at any time, replace the product as soon as possible.

**5. WARRANTY**

- a. Stainless SPIKES Needle Strips are warrantied against defects in materials and workmanship for 10 years from the shipping date. Bird-X will either replace or repair the defective material.

**B. PRODUCTS**

**1. ACCEPTABLE MANUFACTURER**

- a. Bird-X, Inc.  
300 N Oakley Blvd.  
Chicago, IL 60612  
Phone: 800.662.5021 or 312.226.2473  
Fax: 312.226.2480  
Email: [solutions@bird-x.com](mailto:solutions@bird-x.com)  
Website: [www.bird-x.com](http://www.bird-x.com)

**2. MODEL DESIGNATION**

- a. Stainless SPIKES Needle Strips Regular
- b. Stainless SPIKES Needle Strips Narrow
- c. Stainless SPIKES Needle Strips Extra-Wide
- d. Stainless SPIKES Needle Strips Extra-Tall

**3. MATERIAL**

- a. Stainless SPIKES Needle Strips Regular  
Polycarbonate with UV inhibitors, and ST 302 Hard Surgical Grade Stainless; resistant to virtually all weather and harsh environments; base mold of transparent polycarbonate.  
Number of spikes per 2-foot section: 60  
Highest point: 4.3"  
Base width: 0.5"  
Top width: 5"
- b. Stainless SPIKES Needle Strips Narrow  
Polycarbonate with UV inhibitors, and ST 302 Hard Surgical Grade Stainless; resistant to virtually all weather and harsh environments; base mold of transparent polycarbonate.  
Number of spikes per 2-foot section: 36  
Highest point: 4.3"  
Base width: 0.5"  
Top width: 1.5"
- c. Stainless SPIKES Needle Strips Extra-Wide  
Polycarbonate with UV inhibitors, and ST 302 Hard Surgical Grade Stainless; resistant to virtually all weather and harsh environments; base mold of transparent polycarbonate.

Number of spikes per 2-foot section: 60

Highest point: 4.3"

Base width: 0.5"

Top width: 7"

d. **Stainless SPIKES Needle Strips Extra Tall**

Polycarbonate with UV inhibitors, and ST 302 Hard Surgical Grade Stainless; resistant to virtually all weather and harsh environments; base mold of transparent polycarbonate.

Number of spikes per 2-foot section: 60

Highest point: 5.75"

Base width: 0.5"

Top width: 8.5"

**4. MOUNTING SYSTEMS**

- a. Bird-X Bird Spikes Special Adhesive – for surfaces where screws or nails are not preferred
- b. Screws – #12 flat Phillips-head screws
- c. Nails – 1/8" nails
- d. Wire ties – for cabling, piping and thin railings
- e. Clamps or Velcro® – for temporary installations

**C. EXECUTION**

**1. EXAMINATION**

- a. Examine the installation area. Notify architect or contractor of any hazardous or detrimental work conditions.
- b. Do not proceed until work conditions have been corrected.

**2. SURFACE PREPARATION**

- a. Surfaces should be inspected and cleaned before beginning installation.
- b. Remove debris and make repairs as necessary – fallen tree branches, brush, peeling paint, loose parts, rubble, rust, etc.
- c. Use Bird-X Safety Solvent to clean and remove bird droppings and other residue from surfaces.
- d. Make sure surfaces are dry before installation.

**3. INSTALLATION**

- a. Install Stainless SPIKES Needle Strips according to the Bird-X installation instructions.
- b. Install before 'bird season' begins – it is easier to keep the birds away than to rout them out once they have already established a living pattern.
- c. Measure the length of each area to be covered, allowing for curves or bends in the surface. Based on length (multiply length by 2, 3 etc. if necessary for wider widths) order an appropriate amount of Stainless SPIKES. Units may be 'snapped' to fit lengths less than 24".
- d. Bird-X Spikes Special Adhesive – bond only to dry, clean surfaces, when temperature is between 32°F and 120°F. Apply a bead of adhesive to underside of base and firmly press Stainless SPIKES onto surface so that it makes solid contact. Allow adhesive to dry and form a 'rivet' through the holes in the base.
- e. Screws – use #12 flat Phillips-head screws and a screwdriver with a shaft of at least 4".
- f. Nails – use 1/8" nails and a nail set.
- g. Wire ties – recommended for cabling, piping, and thin railings.
- h. Clamps or Velcro® – use for temporary installations.

**4. INSPECTION**

- a. Visually inspect Stainless SPIKES Needle Strips installation for inadequate adherence to surfaces, loose screws, or interfering debris.
- b. Make any necessary repairs immediately.

**Narrow Spikes**

- Width: 2.5" (3.5" coverage)
- Height: 4.75"
- Base width: 0.75"

**Regular Spikes**

- Width: 6.5" (7"-8" coverage)
- Height: 4.75"
- Base width: 1.75"

Shall be the stainless product described above, regular style as shown on this page.



NARROW



REGULAR



Made in the USA

[Download Polycarbonate Bird Spikes Instructions](#)

**Narrow Spikes**

- 10 ft.: 13" x 5" x 5" / 2 lbs
- 25 ft.: 13" x 7" x 12" / 3 lbs
- 50 ft.: 17" x 13" x 7" / 6 lbs
- 100 ft.: 23" x 14" x 6" / 9 lbs

**Regular Spikes**

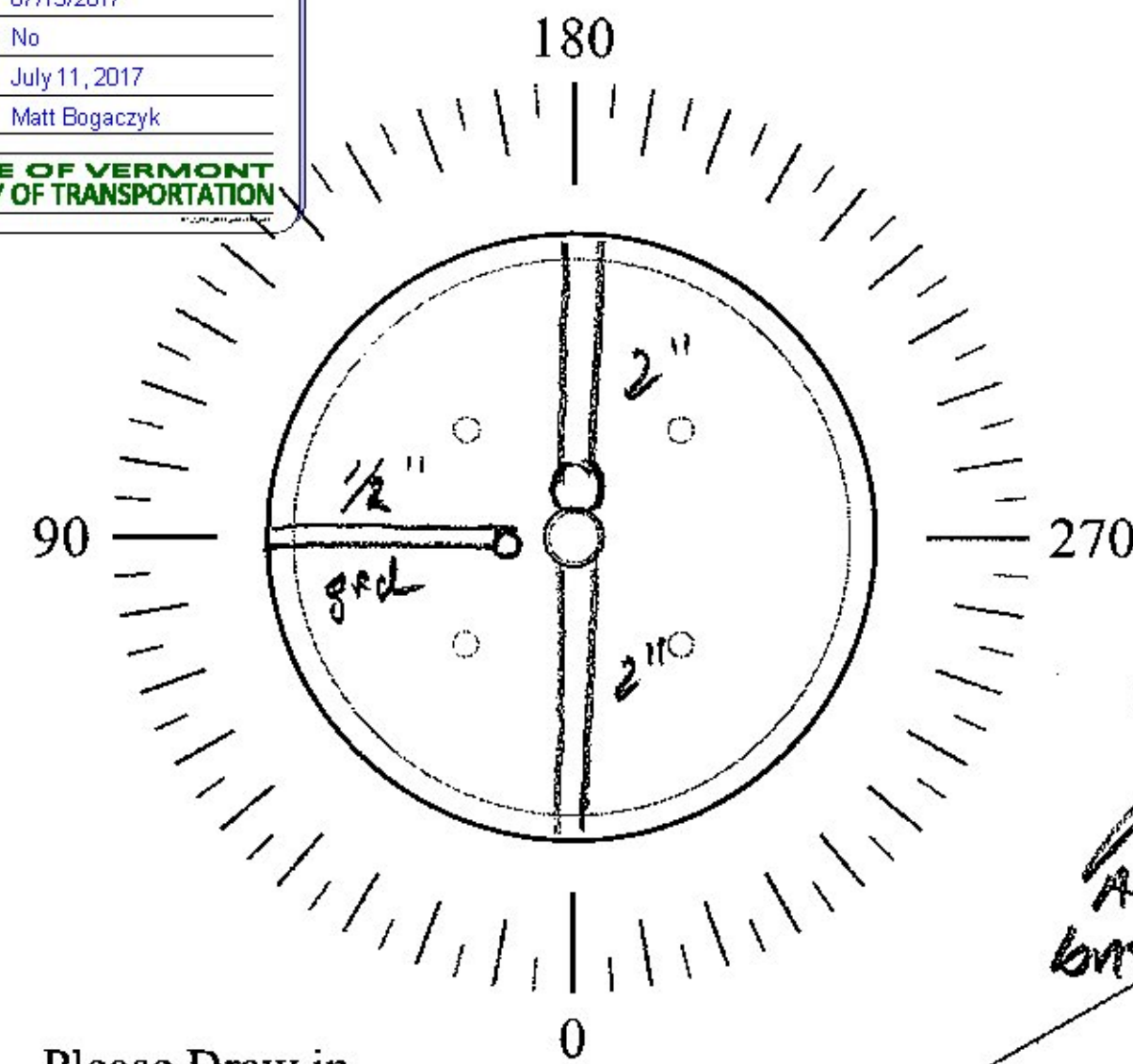
- 10 ft.: 17" x 6" x 13" / 3 lbs
- 25 ft.: 23" x 14" x 6" / 6 lbs
- 50 ft.: 26" x 20" x 14" / 12 lbs
- 100ft.: 26" x 23" x 20" / 24 lbs

- See more at: <http://www.bird-x.com/plastic-spikes-products->

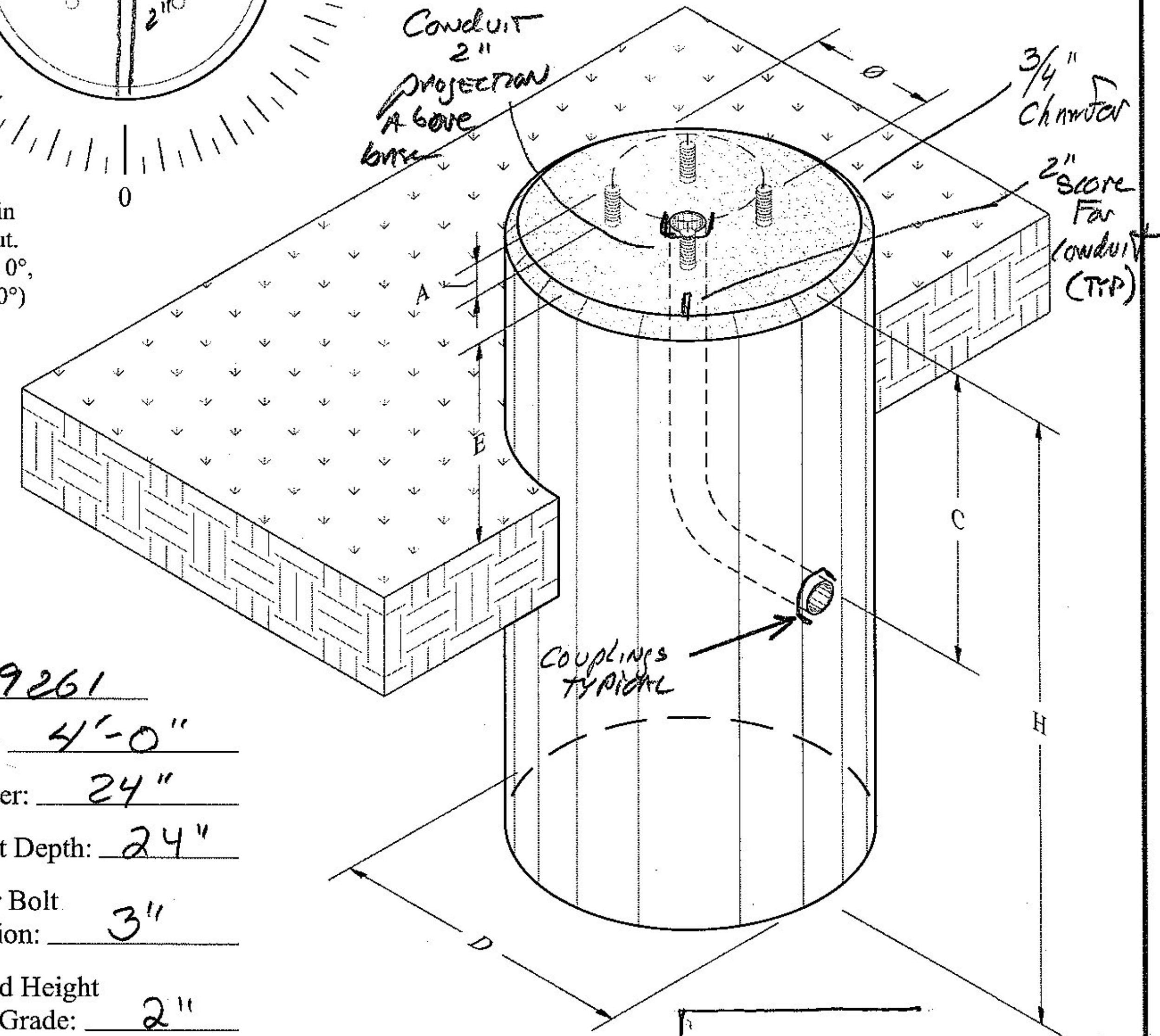
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**Approved**  
 BY: Patti Coburn, P.E.  
 DATE: 07/13/2017  
 RESUBMIT: No  
 RECEIVED: July 11, 2017  
 CRO BY: Matt Bogaczyk  
 STATE OF VERMONT  
 AGENCY OF TRANSPORTATION

Job Name: RUTLAND NHG019-3(60)  
 Customer: LAFARO ELECTRIC  
 Base #: PO #1, PO #2, PO #3  
 Quantity: 3  
 Conduit Size: 2" + 1/2"  
 Bolt Pattern Ø: 14"



Please Draw in  
 Conduit layout.  
 (Suggested at 0°,  
 90°, 180°, 270°)



Job #: 19261  
 (H) Height: 4'-0"  
 (D) Diameter: 24"  
 (C) Conduit Depth: 24"  
 (A) Anchor Bolt  
 Projection: 3"  
 (E) Exposed Height  
 Above Grade: 2"

EST Hwy Pich = 1860 #/EA

ANCHOR BOLT - T&D  
 18"Ø=255 lbs/ft : 24"Ø=460 lbs/ft

**Design Notes:**

- Concrete Minimum 5000 psi at 28 days
- Grade 60 Steel Reinforcing
- Anchor Bolt Projection & Pattern as Required by Project
- Conduit & Anchor Bolts are to be Supplied by Others

**Additional Notes:**

Reinforcing - 2" clear, BLACK BIR, GRADE 60  
 (4) #6 BARS VERTICAL, 5" shorter than Exposed height  
 #4 BAR STRIPPS @ 12" O.C. (3" clear), 15" overall  
 CD



---

State of Vermont  
Highway Safety & Design Section

*Agency of Transportation*  
Project Delivery Bureau

---

TO: THE BELDEN COMPANY, INC.

FROM: PATRICIA COBURN, P.E., PROJECT MANAGER

DATE: AUGUST 14, 2017

SUBJECT: RUTLAND TOWN NHG 019-3(60) HEAVY DUTY JUNCTION BOX SHOP DRAWING

---

The following equipment has been **approved as noted** in the attached shop drawing response document:

- Quazite Box shop drawings as provided by Hubbell.

Please let me know if you have any questions.

PLC:mcb

Attachments: Submittal with comments

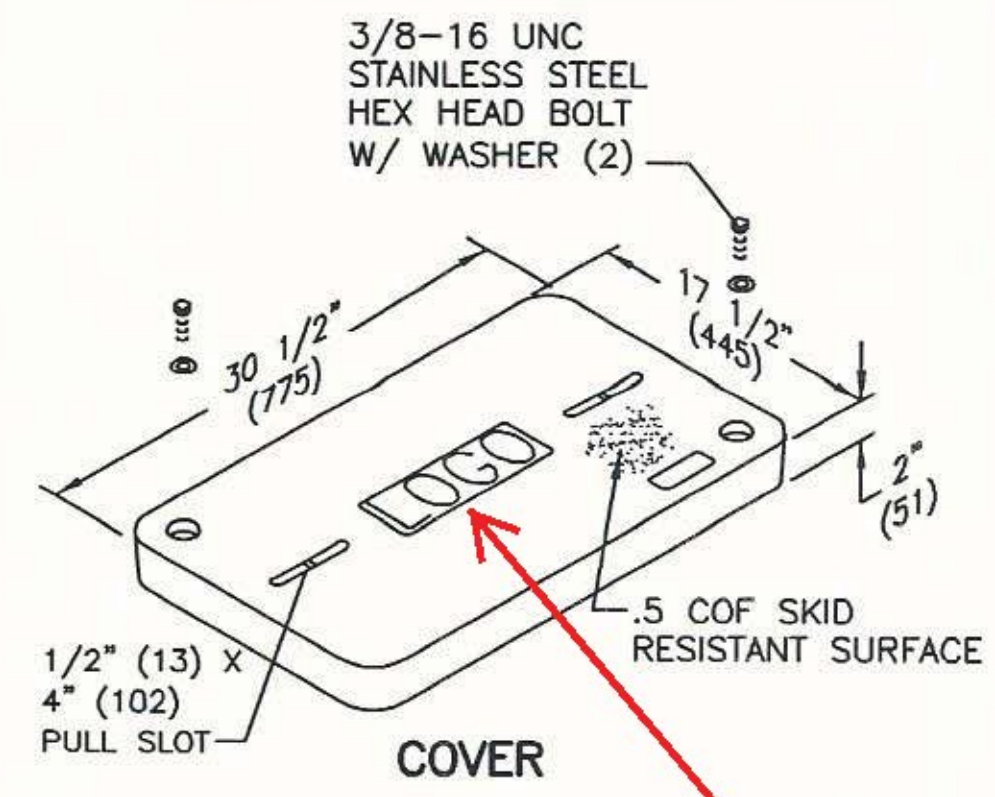
---

<b>Approved AsNoted</b>	
BY:	Patti Coburn, P.E.
DATE:	08/14/2017
RESUBMIT:	No
RECEIVED:	August 11, 2017
CD BY:	Matt Bogaczyk
STATE OF VERMONT AGENCY OF TRANSPORTATION	

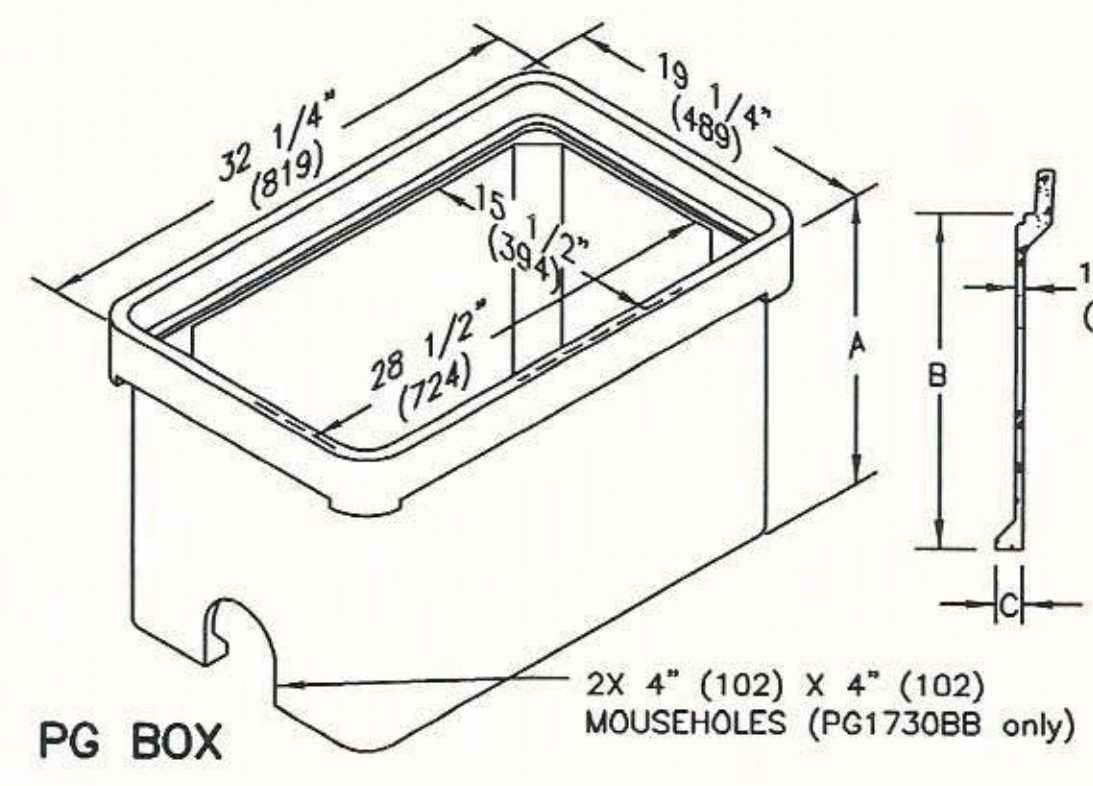


**SPECIFICATIONS/DATA**

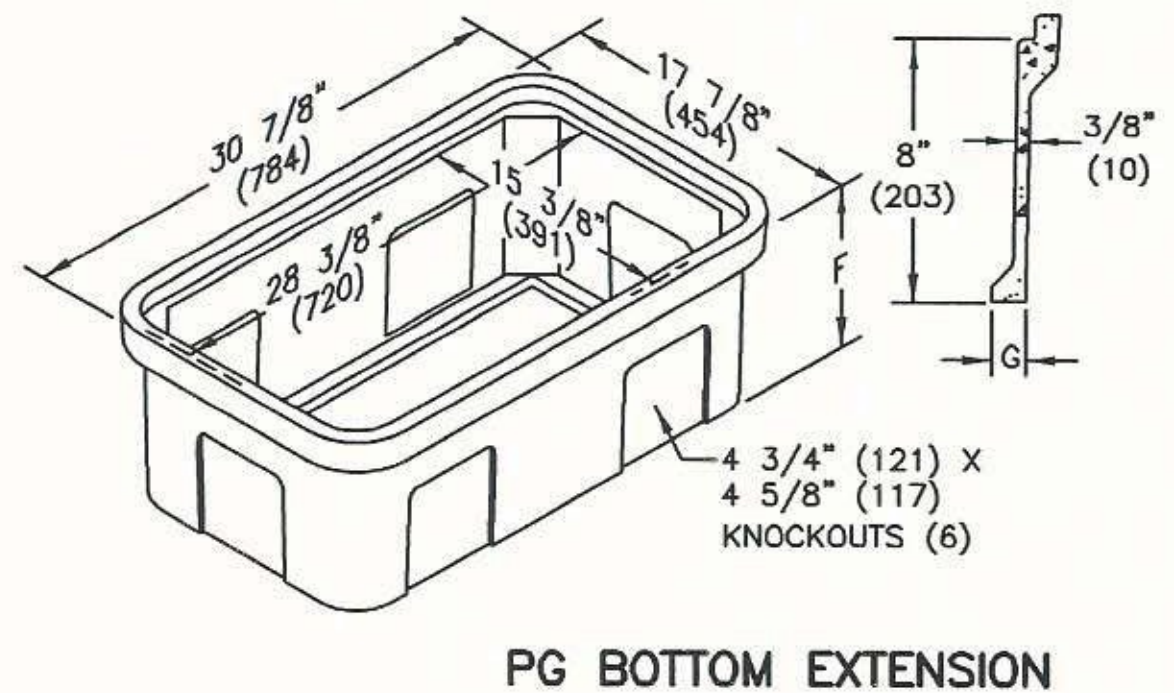
**17" x 30" PG Style (Stackable) Assembly  
and 17" x 30" PD Style Assembly**



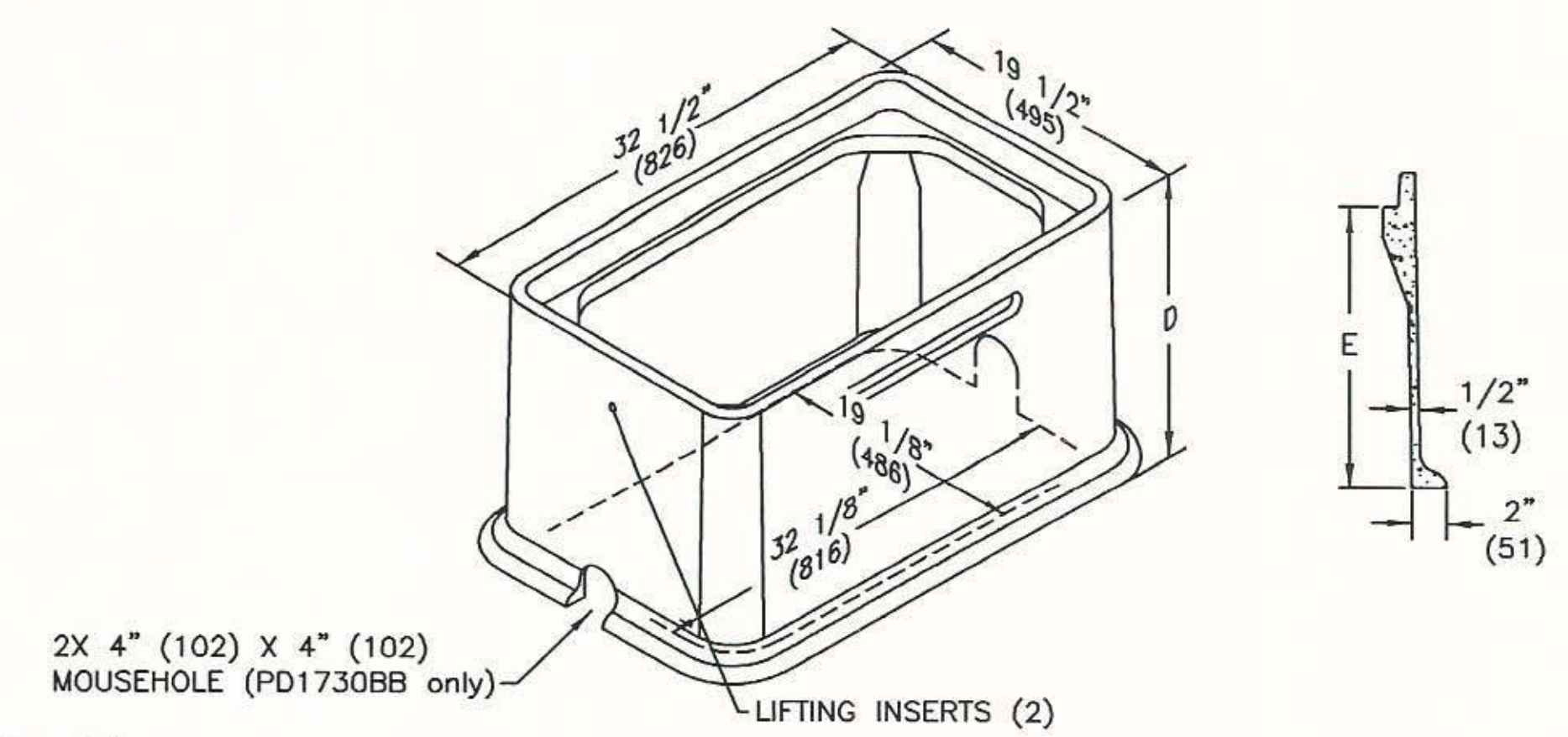
"TRAFFIC SIGNAL"



PG BOX



PG BOTTOM EXTENSION



PD BOX



ENCLOSURE DRAWINGS



**Approved AsNoted**

BY: Patti Coburn, P.E.  
 DATE: 08/14/2017  
 RESUBMIT: No  
 RECEIVED: August 11, 2017  
 CKD BY: Matt Bogaczyk

**STATE OF VERMONT  
 AGENCY OF TRANSPORTATION**

**17" x 30" PG Style (Stackable) Assembly  
 and 17" x 30 PD Style Assembly**

**SPECIFICATIONS/DATA**

**Covers (Blank unless logo is specified)**

DESCRIPTION	PART NO.	WEIGHT #	DESIGN/TEST LOAD #	ANSI TIER*
W/2 Bolts	PG1730CA00	52 (23.6 kg)	8,000 / 12,000	8
Gasketed w/2 Bolts	PG1730CG00	52 (23.6 kg)	8,000 / 12,000	8
No Bolts	PG1730WA00	52 (23.6 kg)	8,000 / 12,000	8
Heavy Duty w/2 Bolts	PG1730HA00	83 (37.6 kg)	15,000 / 22,500	15
Gasketed Heavy Duty w/2 Bolts	PG1730HG00	83 (37.6 kg)	15,000 / 22,500	15
Extra Heavy Duty w/2 Bolts	PG1730HH00	83 (37.6 kg)	22,500 / 33,750	22

Covers with meter lids available upon request. See page 12 or page 56 for meter lid cover load rating explanation.  
 Gasketed covers and bolt grommets must be used with a gasketed box. Gaskets reduce the inflow of fluids but do not make the enclosure water tight.

**PG Boxes (Stackable with self-aligning, replaceable EZ Nut) \*\*22" - 30" Deep boxes must be used as bottom of any stack.)**

ENCLOSURE DRAWINGS

DESCRIPTION	PART NO.	WEIGHT #	DIMENSION A	DIMENSION B	DIMENSION C	DESIGN/TEST LOAD #	ANSI TIER*
Open Bottom	PG1730BA12	67 (30.4 kg)	12" (305 mm)	10" (254 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BA18	94 (42.6 kg)	18" (457 mm)	16" (406 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BA22	106 (48.1 kg)	22" (559 mm)	20" (508 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BA24	122 (55.3 kg)	24" (610 mm)	22" (559 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BA28	126 (57.2 kg)	28" (711 mm)	26" (660 mm)	1/2" (13 mm)	22,500 / 33,750	22
	PG1730BA30	144 (65.3 kg)	30" (762 mm)	28" (711 mm)	1/2" (13 mm)	22,500 / 33,750	22
Open Bottom w/2 Mouseholes	PG1730BB12	65 (29.5 kg)	12" (305 mm)	10" (254 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BB18	92 (41.7 kg)	18" (457 mm)	16" (406 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BB22	104 (47.2 kg)	22" (559 mm)	20" (508 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BB24	120 (54.4 kg)	24" (610 mm)	22" (559 mm)	1 1/4" (32 mm)	22,500 / 33,750	22
	PG1730BB28	124 (56.2 kg)	28" (711 mm)	26" (660 mm)	1/2" (13 mm)	22,500 / 33,750	22
	PG1730BB30	142 (64.4 kg)	30" (762 mm)	28" (711 mm)	1/2" (13 mm)	22,500 / 33,750	22
Solid Bottom	PG1730DA12	85 (38.5 kg)	12 1/2" (318 mm)	10" (254 mm)	N/A	22,500 / 33,750	22
	PG1730DA18	112 (50.8 kg)	18 1/2" (470 mm)	16" (406 mm)	N/A	22,500 / 33,750	22
	PG1730DA22	124 (56.2 kg)	22 1/2" (572 mm)	20" (508 mm)	N/A	22,500 / 33,750	22
	PG1730DA24	137 (62.0 kg)	24 1/2" (622 mm)	22" (559 mm)	N/A	22,500 / 33,750	22
	PG1730DA28	143 (64.9 kg)	28 1/2" (724 mm)	26" (660 mm)	N/A	22,500 / 33,750	22
	PG1730DA30	150 (68.0 kg)	30 1/2" (775 mm)	28" (711 mm)	N/A	22,500 / 33,750	22

**PD Boxes**

DESCRIPTION	PART NO.	WEIGHT #	DIMENSION D	DIMENSION E	DESIGN/TEST LOAD #	ANSI TIER*
Open Bottom	PD1730BA18	129 (59 kg)	18" (457 mm)	16" (406 mm)	22,500 / 33,750	22
	PD1730BA26	166 (75 kg)	26" (660 mm)	24" (610 mm)	22,500 / 33,750	22
Open Bottom w/2 Mouseholes	PD1730BB18	127 (58 kg)	18" (457 mm)	16" (406 mm)	22,500 / 33,750	22
	PD1730BB26	164 (74 kg)	26" (660 mm)	24" (610 mm)	22,500 / 33,750	22
Open Bottom w/Gasket	PD1730BG18	129 (59 kg)	18" (457 mm)	16" (406 mm)	22,500 / 33,750	22
	PD1730BG26	166 (75 kg)	26" (660 mm)	24" (610 mm)	22,500 / 33,750	22

**Extensions (For use under 12" and 18" boxes only, one per box.)**

DESCRIPTION	PART NO.	WEIGHT #	DIMENSION F	DIMENSION G	DESIGN/TEST LOAD #	ANSI TIER*
Open Bottom	PG1730EA08	36 (16.3 kg)	8 3/4" (222 mm)	1" (25 mm)	22,500 / 33,750	22
Solid Bottom	PG1730RA08	55 (24.9 kg)	9 1/4" (235 mm)	N/A	22,500 / 33,750	22

Dimensions & weights in parentheses are metric equivalent.  
 \* Loadings comply with ANSI/SCTE 77 (see page 9).

