

Appendix R-1

Engineering Drawings

Revised December 23, 2015

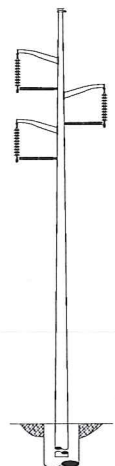


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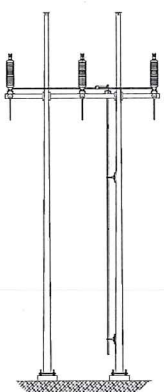
NATIONAL GRID

MERRIMACK VALLEY RELIABILITY PROJECT

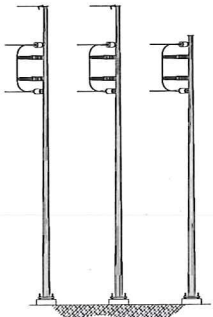
STRUCTURE OUTLINE



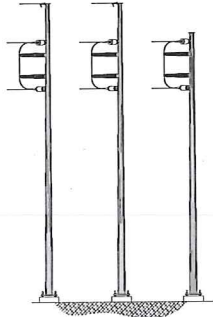
115_ST_DASU_RS
 STEEL DAVIT ARM
 SUSPENSION
 DWG. 400298-C-S-12



115_ST_HFDE_SW
 STEEL H-FRAME
 DEAD END-SWITCH
 DWG. 400298-C-S-13



115_ST_3PDE_SS
 STEEL 3 POLE - PSNH DEMARCATION
 DEAD END
 DWG. 400298-C-S-14A



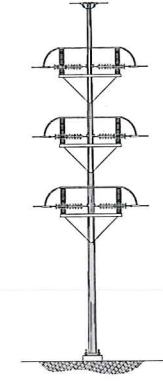
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 STEEL 3 POLE
 DEAD END
 DWG. 400298-C-S-14B



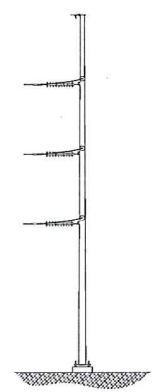
115_ST_DADE_SS
 STEEL DAVIT ARM
 DEAD END-SINGLE STRING
 DWG. 400298-C-S-15



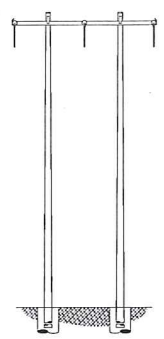
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 STEEL DAVIT ARM
 DEAD END-DOUBLE STRING
 DWG. 400298-C-S-16



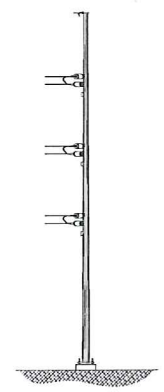
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 STEEL SINGLE POLE
 DEAD END-SWITCH
 DWG. 400298-C-S-17



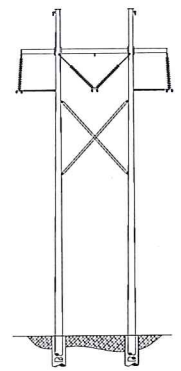
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 STEEL SINGLE POLE
 3-WAY DEAD END
 DWG. 400298-C-S-18



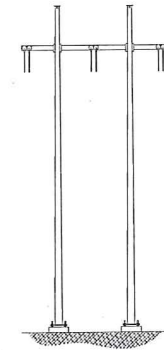
115_WD_HFDE
 WOOD H-FRAME
 DEAD END
 DWG. 400298-C-S-19



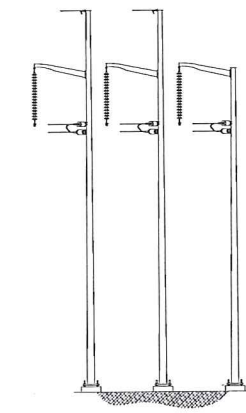
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 STEEL SINGLE POLE
 DEAD END
 DWG. 400298-C-S-20



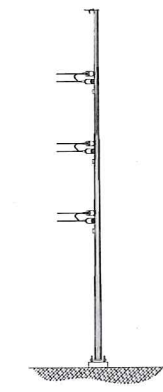
345_ST_HFSU_NB
 STEEL H-FRAME
 SUSPENSION
 DWG. 400298-C-S-51



345_ST_HFDE
 STEEL H-FRAME
 DEAD END
 DWG. 400298-C-S-52



345_ST_3PDE
 STEEL 3 POLE
 DEAD END
 DWG. 400298-C-S-53

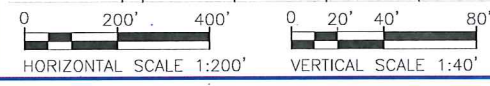
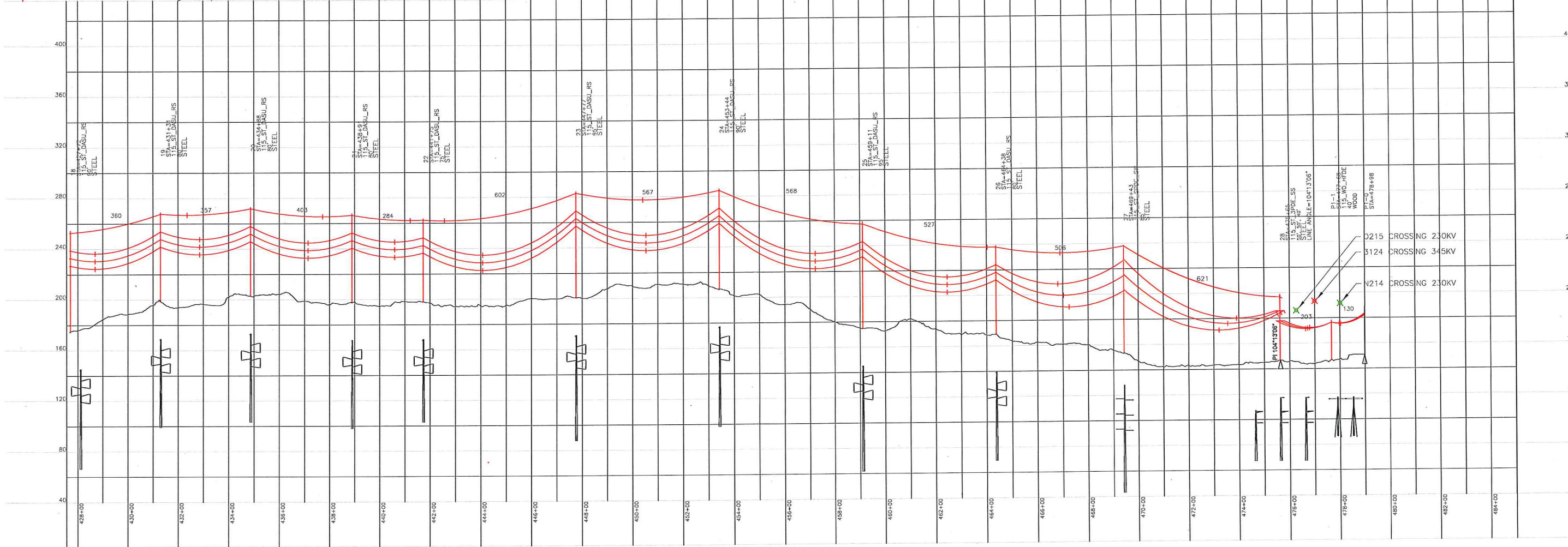
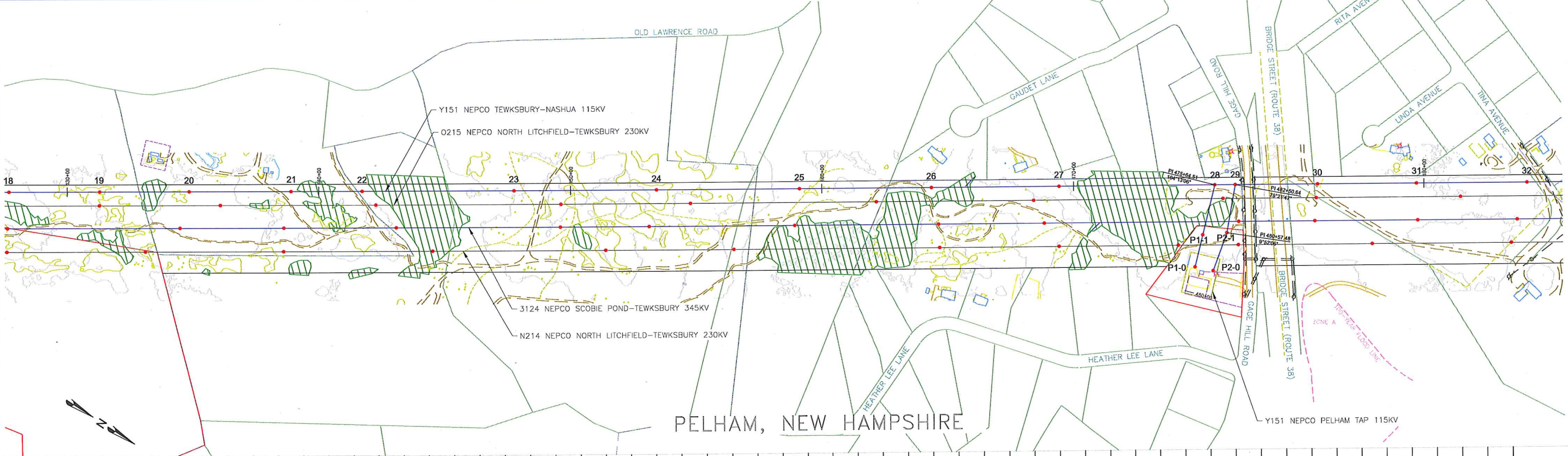


345_ST_SPDE
 STEEL SINGLE POLE
 DEAD END
 DWG. 400298-C-S-54

INCHES ON ORIGINAL

nationalgrid		MERRIMACK VALLEY RELIABILITY PROJECT		STRUCTURE OUTLINE	
SER	DATE	VERSION DESCRIPTION	PREPARED BY	DATE	VERSION
1	05/27/15	NHSEC PERMIT FILING	JLM	10/29/15	1
2	10/29/15	115KV ST-HFDE REVISED TO 115KV WD-HFDE	FTX	10/29/15	2
3			NPA	10/29/15	
4			N.T.S.		
5			SCALE		
6			SHEET		
7			INDEX		
					2

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PROPOSED OPGW (TO BE DETERMINED)
 PROPOSED DRAKE 795 KCMIL 26/7 ACSS HS285
 SHIELD WIRE SHOWN AT NESC HEAVY 4000 LBS, 60'F MAX SAG
 CONDUCTOR SHOWN AT NESC HEAVY 8000 LBS, 392'F MAX SAG

INCHES ON ORIGINAL

nationalgrid

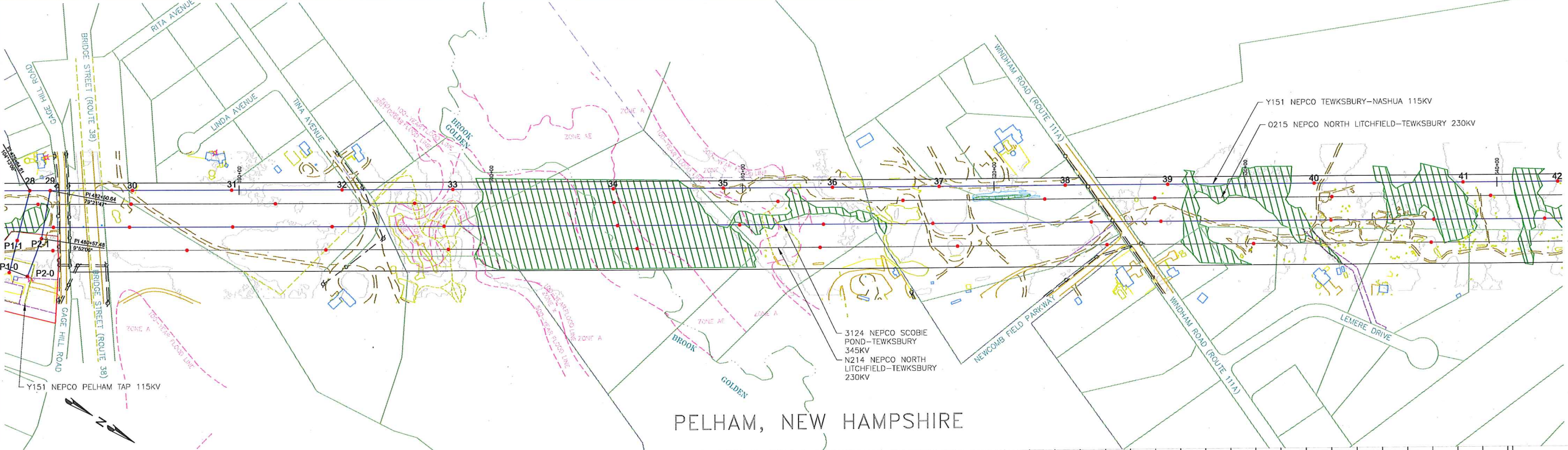
MERRIMACK VALLEY RELIABILITY PROJECT
 PLAN AND PROFILE DRAWINGS
 SCOBIE POND TO TEWKSBURY
 LINE Y151 115KV

NO.	DATE	DESCRIPTION
1	05/27/15	NHSEC PERMIT FILING
2	10/29/15	115KV ST-HFDE TAP STRUCTURE REVISED TO 115KV WD-HFDE
3		
4		
5		
6		
7		

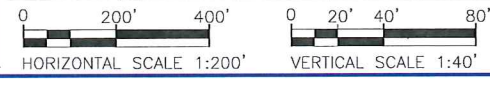
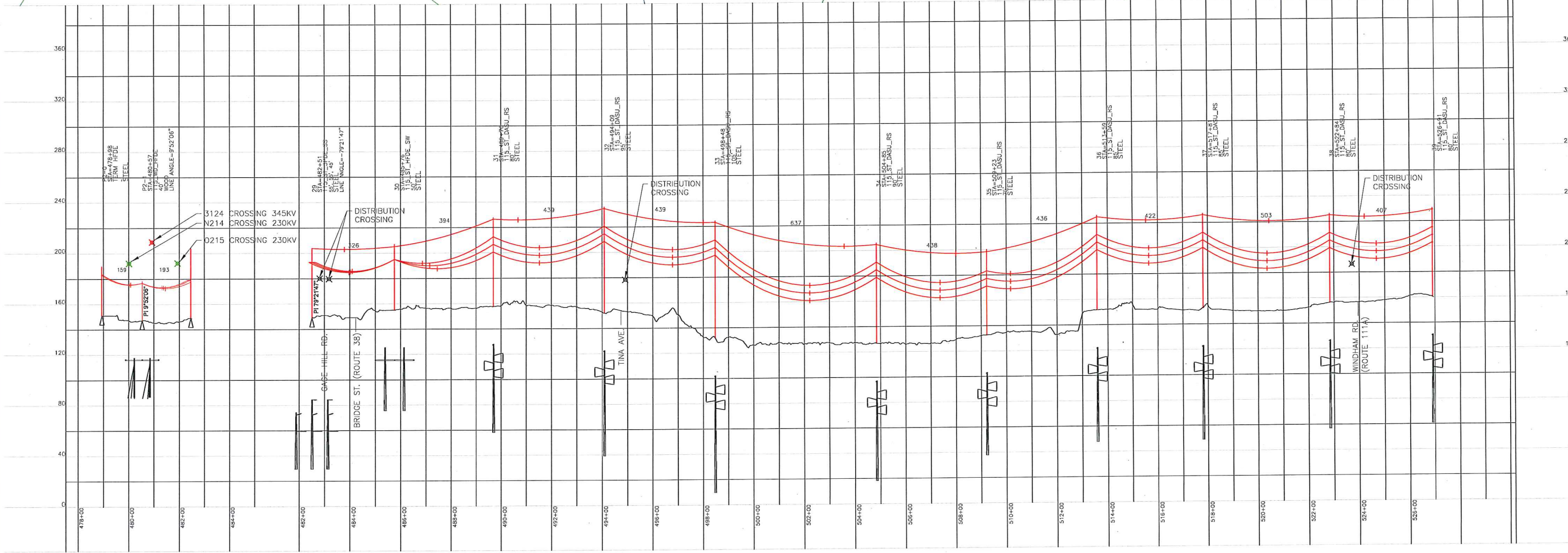
PREPARED BY: KMM 10/29/15
 REVIEWED BY: JLM, NFA 10/29/15
 APPROVED BY: NFA 10/29/15
 SCALE: 1" = 40'
 SHEET: 1 OF 1
 INDEX: 400298

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400298-C-R-307



PELHAM, NEW HAMPSHIRE



PROPOSED OPGW (TO BE DETERMINED)
 PROPOSED DRAKE 795 KCMIL 26/7 ACSS HS285
 SHIELD WIRE SHOWN AT NESC HEAVY 4000 LBS, 60°F MAX SAG
 CONDUCTOR SHOWN AT NESC HEAVY 8000 LBS, 392°F MAX SAG

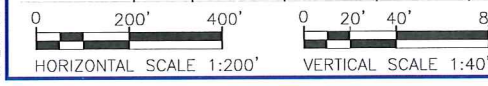
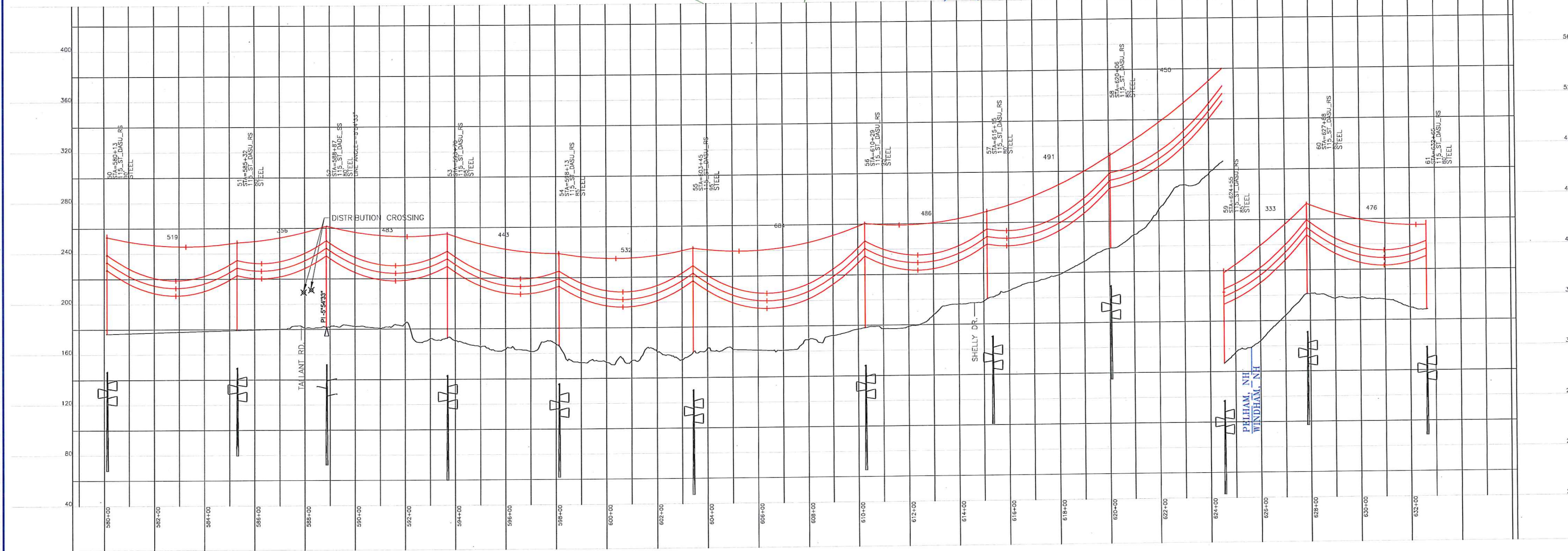
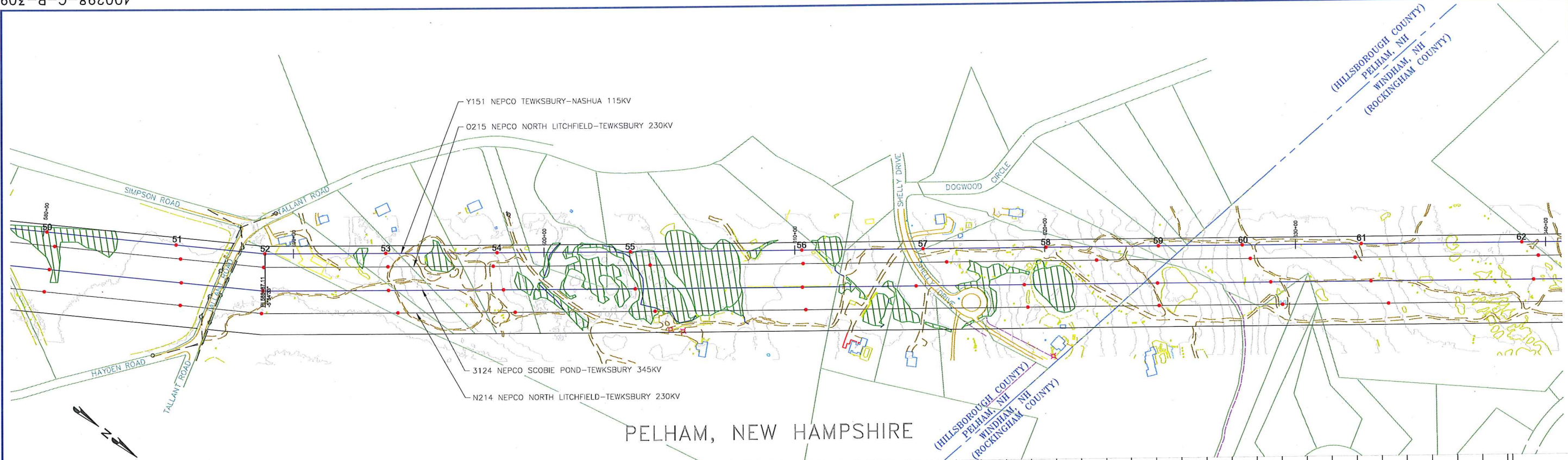
INCHES ON ORIGINAL

nationalgrid		PREPARED BY: KMM 10/29/15	REVIEWED BY: FTX 10/29/15	APPROVED BY: NPA 10/29/15
MERRIMACK VALLEY RELIABILITY PROJECT		SCALE: 1" = 400'	SHEET: 1 OF 1	INDEX: 400298
PLAN AND PROFILE DRAWINGS		SCOBIE POND TO TEWKSBURY		
LINE Y151 115KV		VERSION DESCRIPTION		
NO.	DATE	DESCRIPTION	BY	APP. BY
1	05/27/15	INHSFC PERMIT FILING		
2	10/29/15	115KV ST-HFDE TAP STRUCTURE REVISED TO 115KV WD-HFDE		
3				
4				
5				
6				
7				

400298-C-R-307

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400298-C-R-309



PROPOSED OPGW (TO BE DETERMINED)
 PROPOSED DRAKE 795 KCMIL 26/7 ACSS HS285
 SHIELD WIRE SHOWN AT NESC HEAVY 4000 LBS, 60°F MAX SAG
 CONDUCTOR SHOWN AT NESC HEAVY 8000 LBS, 392°F MAX SAG

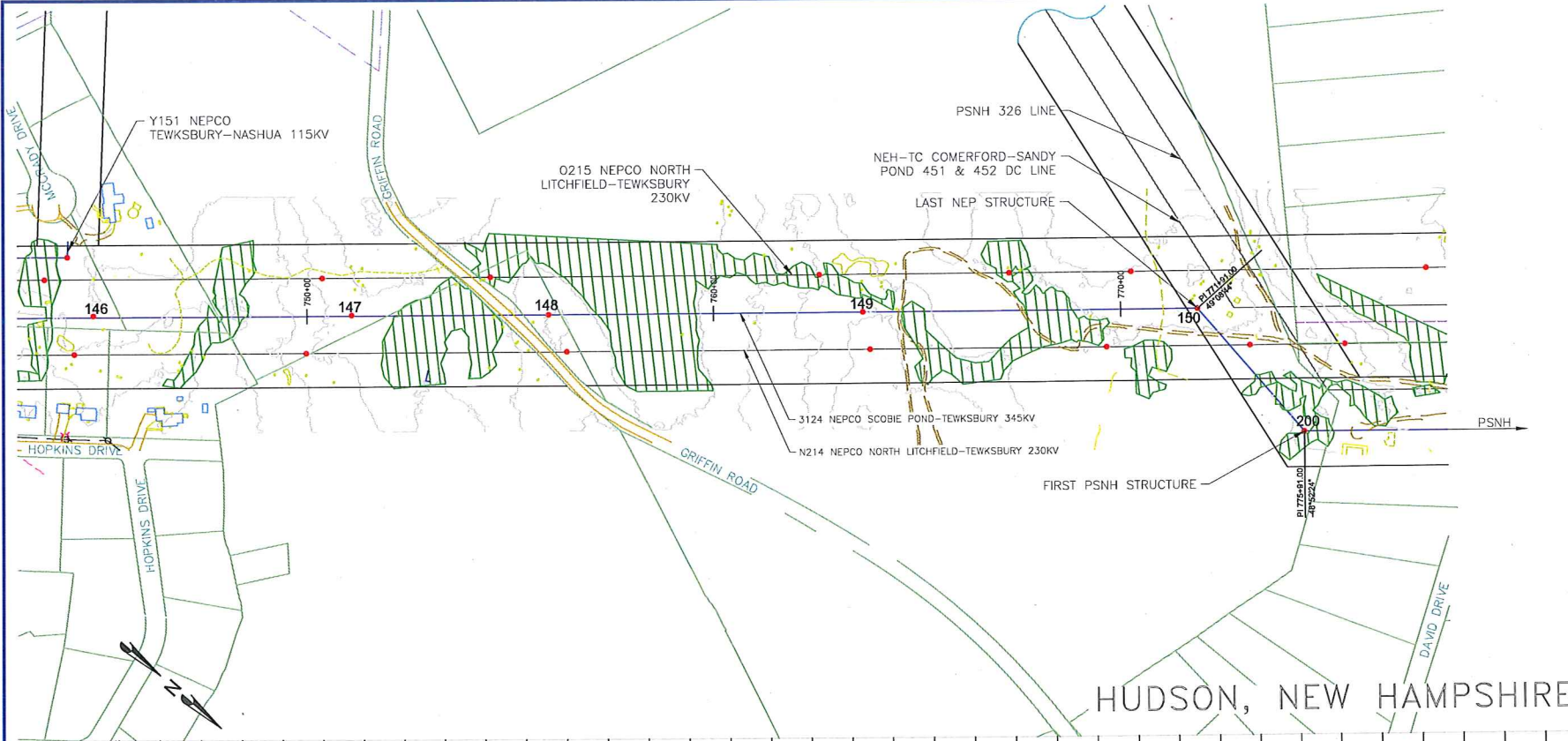
INCHES ON ORIGINAL

MERRIMACK VALLEY RELIABILITY PROJECT		nationalgrid	
PLAN AND PROFILE DRAWINGS		VER. DATE	
SCOBIE POND TO TEWKSBURY		1	05/22/15
LINE Y151 115KV		2	10/29/15
PREPARED BY	KMM	REVIEWED BY	FTX
SCALE	1" = 40'	APPROVED BY	NPA
SHEET	1 OF 1	INDEX	400298
VERSION	DESCRIPTION	DATE	BY
1	INITIAL PERMIT FILING	05/22/15	KMM
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4			
5			
6			
7			

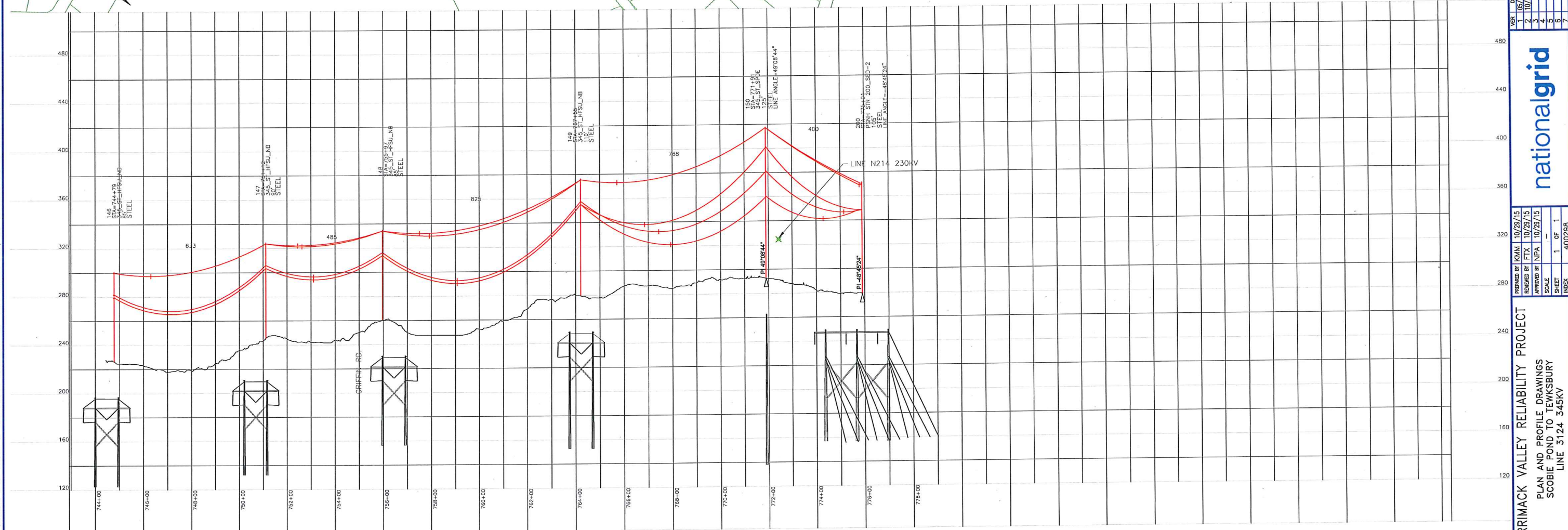
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400298-C-R-714



HUDSON, NEW HAMPSHIRE



PROPOSED 3/8"-7 STRAND EHS AND OPGW (TO BE DETERMINED)
 PROPOSED BUNDLED FALCON 1590 KCMIL 54/19 ACSR
 SHIELD WIRE SHOWN AT NESC HEAVY, 4000 LBS, 60°F MAX SAG
 CONDUCTOR SHOWN AT NESC HEAVY, 10000 LBS 284°F MAX SAG

INCHES ON ORIGINAL

nationalgrid		PREPARED BY: KMM	DATE: 10/29/15
		REVIEWED BY: FTX	DATE: 10/29/15
		APPROVED BY: NFA	DATE: 10/29/15
		SCALE: 1" = 400'	SHEET: 1 OF 1
		INDEX: 400298	
		VERSION DESCRIPTION	VERSION
		1. 05/22/15 NHSEC PERMIT FILING	1
		2. 10/29/15 RELOCATED 3124 STRUCTURE 148	2
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		4.	4
		5.	5
		6.	6
		7.	7
		8.	8
		9.	9

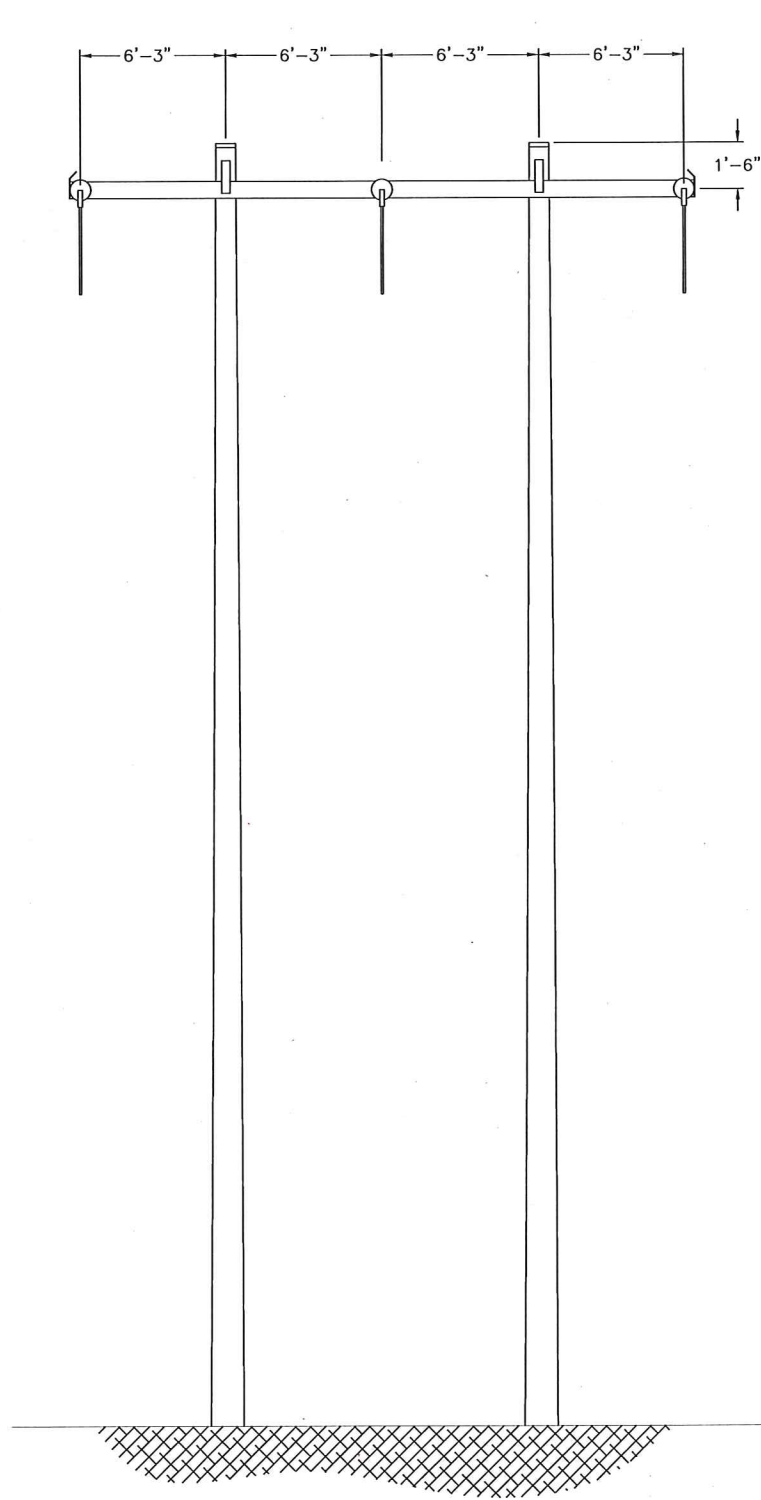
MERRIMACK VALLEY RELIABILITY PROJECT
 PLAN AND PROFILE DRAWINGS
 SCOBIE POND TO TEWKSBURY
 LINE 3124 345KV

400298-C-R-714

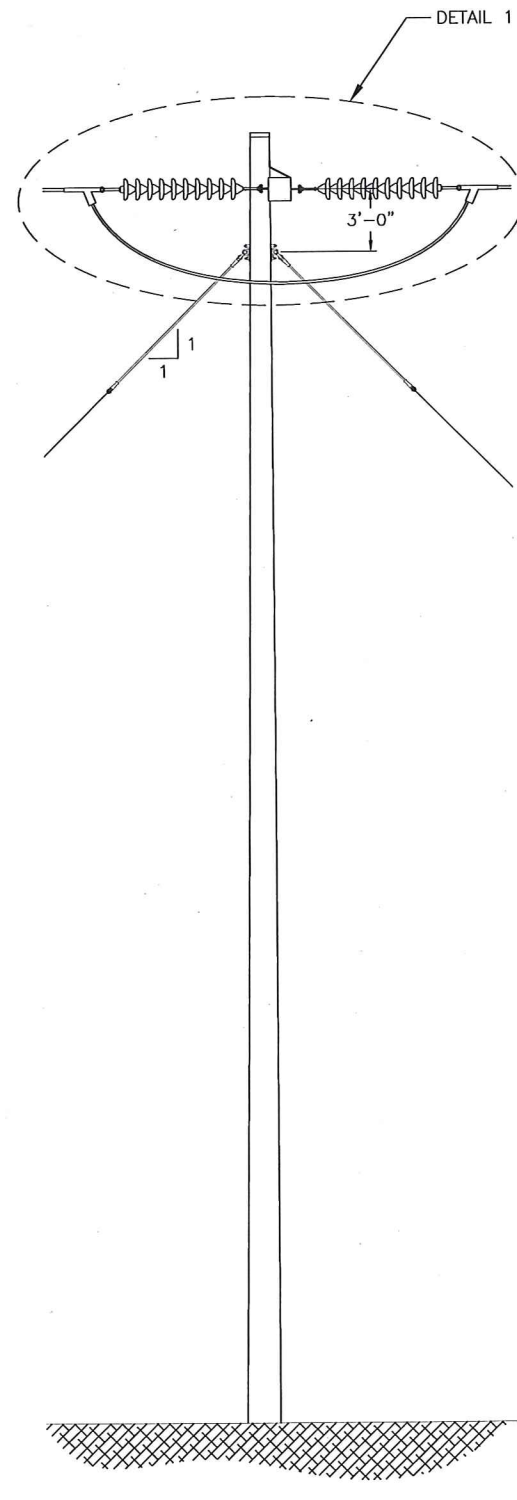
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PRINTED 10/29/2015 2:19 PM

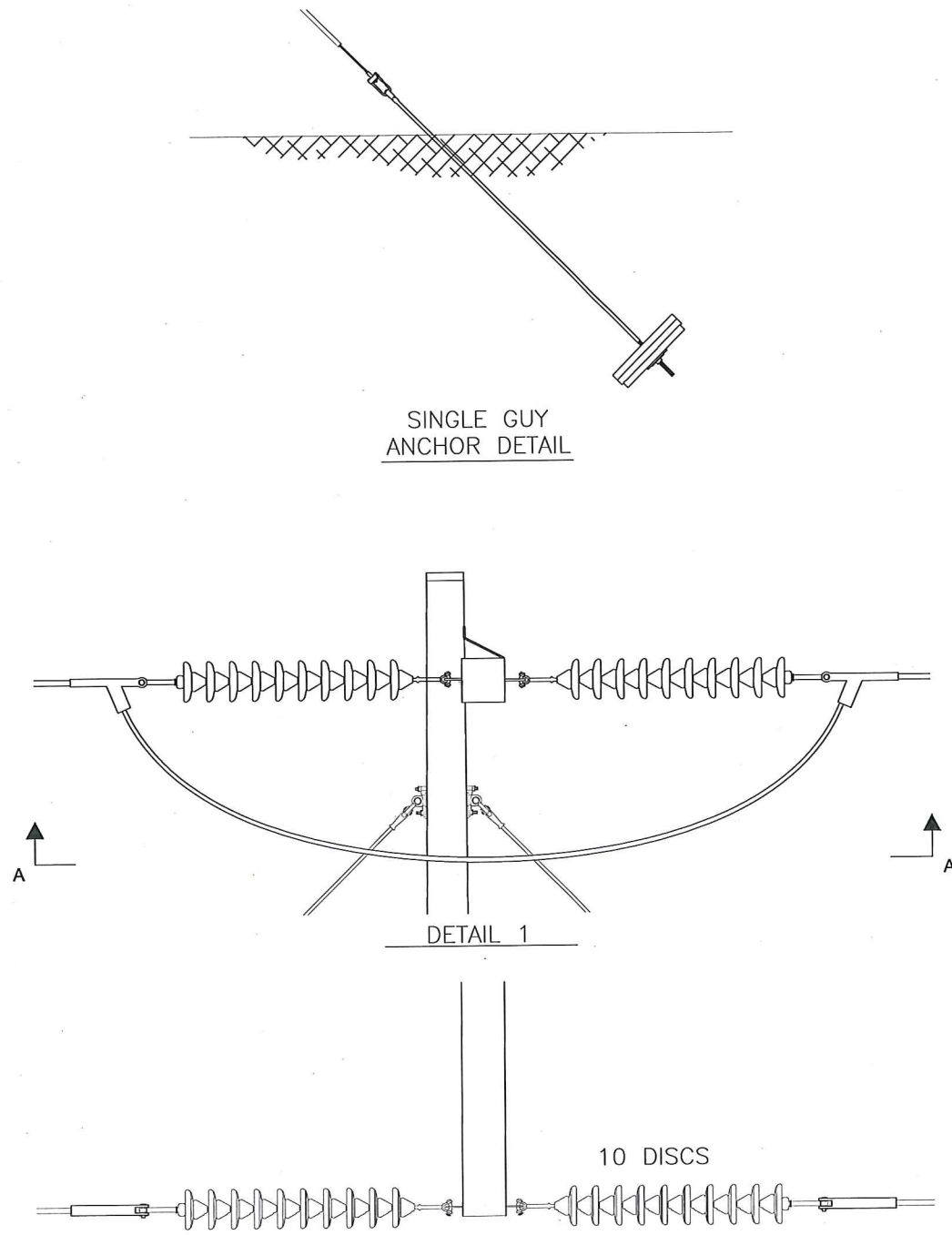
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FRONT ELEVATION



SIDE ELEVATION



SECTION A-A
CONDUCTOR HARDWARE ASSEMBLY

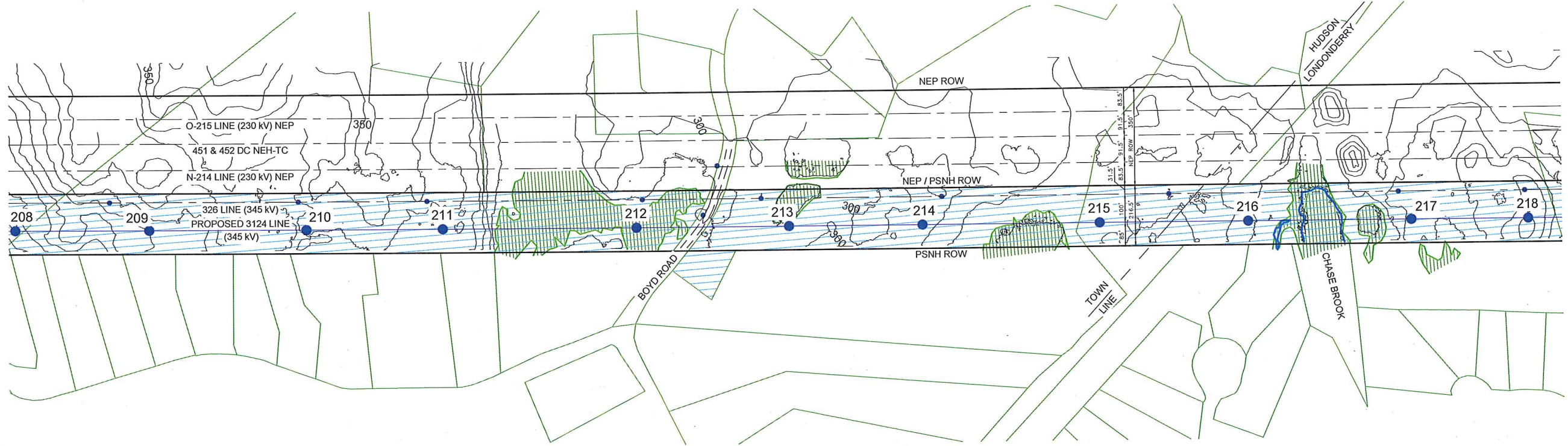
- NOTES:
1. SEE WORK LIST FOR POLE HEIGHT AND CLASS
 2. SEE SP.06.01.301.201 FOR LINE, STRUCTURE NUMBERING AND WARNING SIGNS REQUIRED ON ALL POLES.
 3. SEE SP.06.01.301.401 FOR FOUNDATION SPEC.
 4. SLOPE OF HEAD AND BACK GUYS IS 1:1 UNLESS OTHERWISE NOTED IN WORKLIST COMMENTS.

PREPARED BY	KMM	10/29/15	VERSION	2
REVIEWED BY	FTX	10/29/15	RAM	
APPROVED BY	NPA	10/29/15	FTX	
SCALE	N.T.S.		FTX	
SHEET	1		FTX	
INDEX	1		FTX	

SCOBIE POND --TEWKSBURY
115KV REPLACEMENT STRUCTURE
SINGLE CIRCUIT Y151 LINE
WOOD H-FRAME DEADEND SINGLE INSULATOR STRING

nationalgrid

DATE	10/29/15	DESCRIPTION
1	10/29/15	NHSEC PERMIT FILING
2	10/29/15	115KV ST-HFDE REVISED TO 115KV WD-HFDE
3		
4		
5		
6		
7		



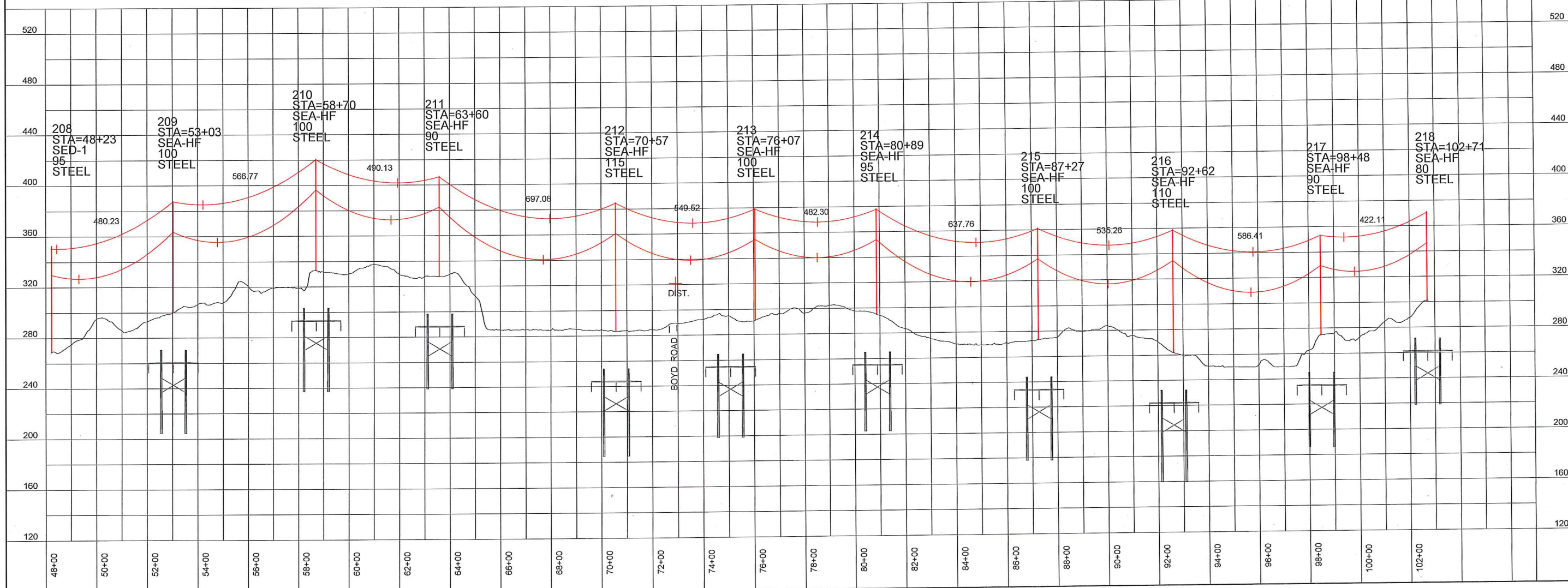
200.0 FT. HORIZ. SCALE
40.0 FT. VERT. SCALE

OPGW 0.650" 48 FIBER
1590 KCMIL ACSR 54/19 "FALCON"

HUDSON, NEW HAMPSHIRE
HILLSBOROUGH COUNTY

LONDONDERRY, NEW HAMPSHIRE
ROCKINGHAM COUNTY

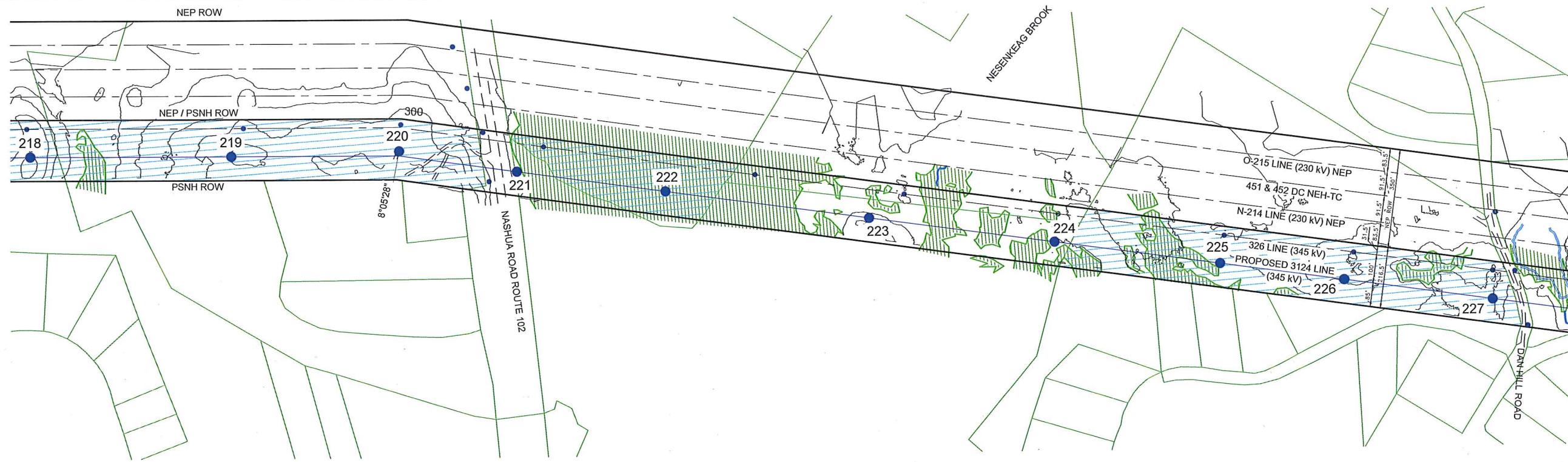
OPGW SHOWN AT 120F MAX SAG
CONDUCTORS SHOWN AT 285F MAX SAG



NO.	REVISION	DATE	BY	CHKD.	APPV.
3	RE-DESIGNED FOR NESC PERMIT FILING	11/11/15	TRC	TRC	TRC
2	RE-DESIGNED PERMIT FILING	08/24/15	TRC	TRC	TRC
1	RE-DESIGNED PERMIT FILING	02/27/15	TRC	TRC	TRC



LINE 3124 345 KV TRANSMISSION
PLAN AND PROFILE
MERRIMACK VALLEY RELIABILITY PROJECT
DATE: 06/21/15
SCALE: NTS
DES: TRC CHN: TRC
DRAW: TRC APPR:
TOWN: LONDONDERRY
3124
SHEET 2 OF 10
S3124-P002 SH 2

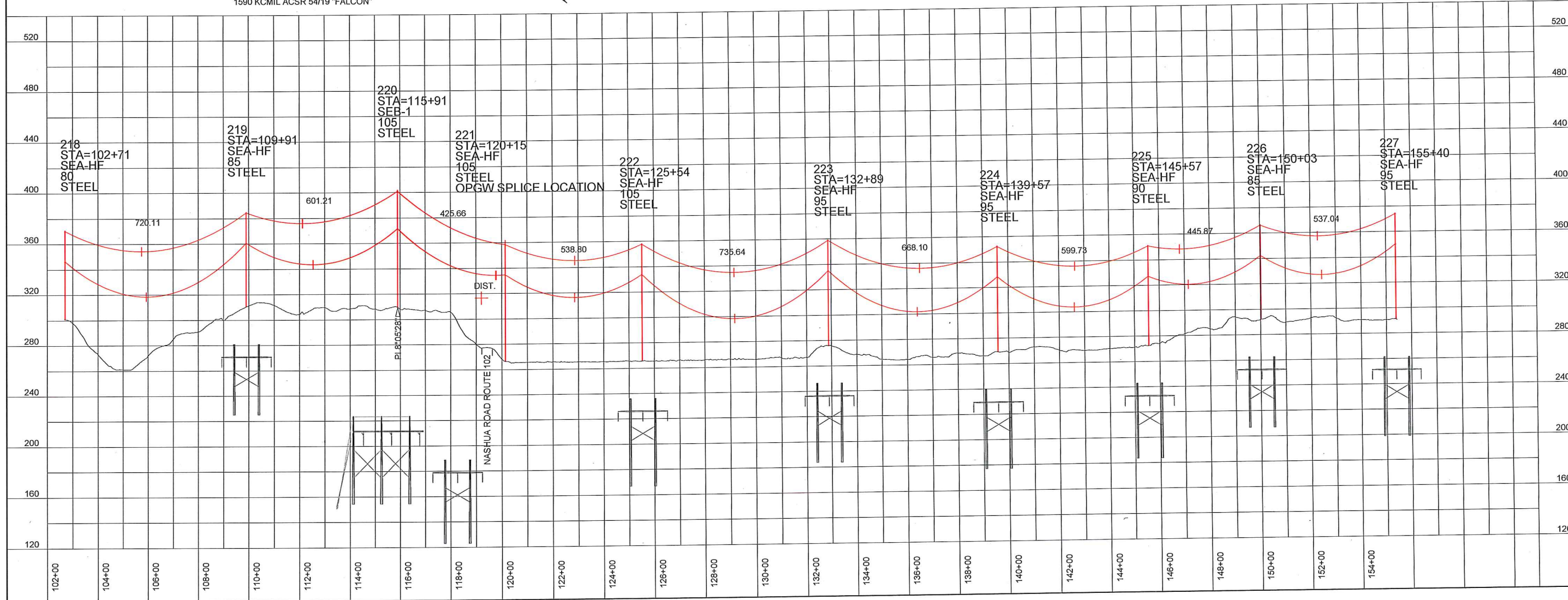


200.0 FT. HORIZ. SCALE
40.0 FT. VERT. SCALE

OPGW 0.650" 48 FIBER
1590 KCMIL ACSR 54/19 "FALCON"

LONDONDERRY, NEW HAMPSHIRE
ROCKINGHAM COUNTY

OPGW SHOWN AT 120F MAX SAG
CONDUCTORS SHOWN AT 285F MAX SAG



NO.	DATE	BY	CHKD.	APP'Y.
3				
2				
1				

EVERSOURCE ENERGY

TRANSMISSION BUSINESS

LINE 3124 345 KV TRANSMISSION
PLAN AND PROFILE
MERRIMACK VALLEY RELIABILITY PROJECT

DATE: 6/20/15

DES: TRC CMC TRC
DRA: TRC JFR

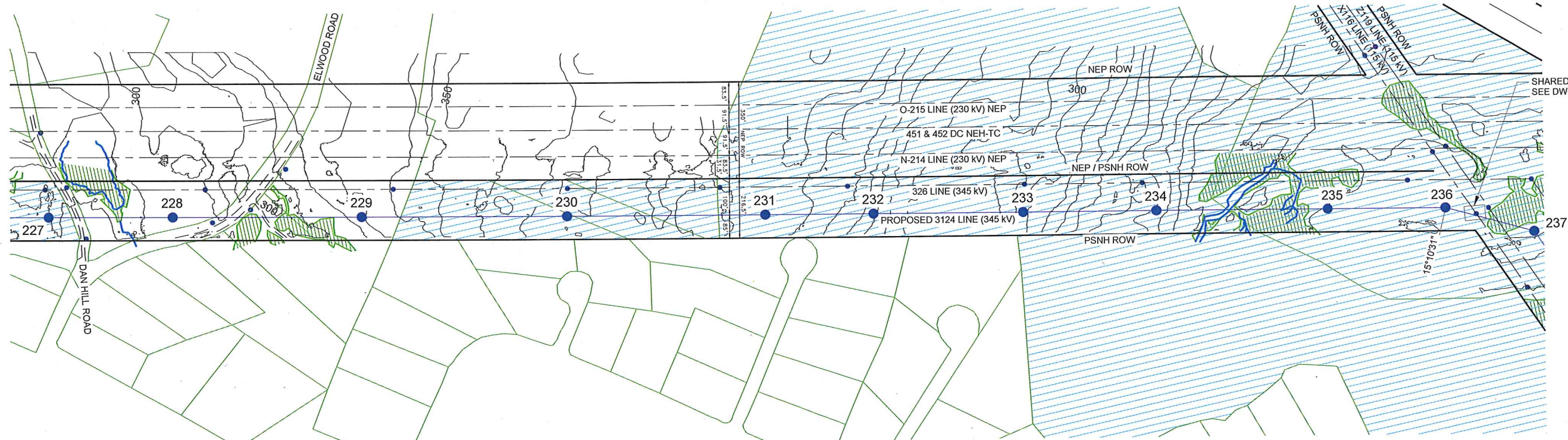
TOWN: LONDONDERRY

3124

TRANSMISSION
SHEET 3 OF 10

SCALE: N/A

3124-P002 SH-3



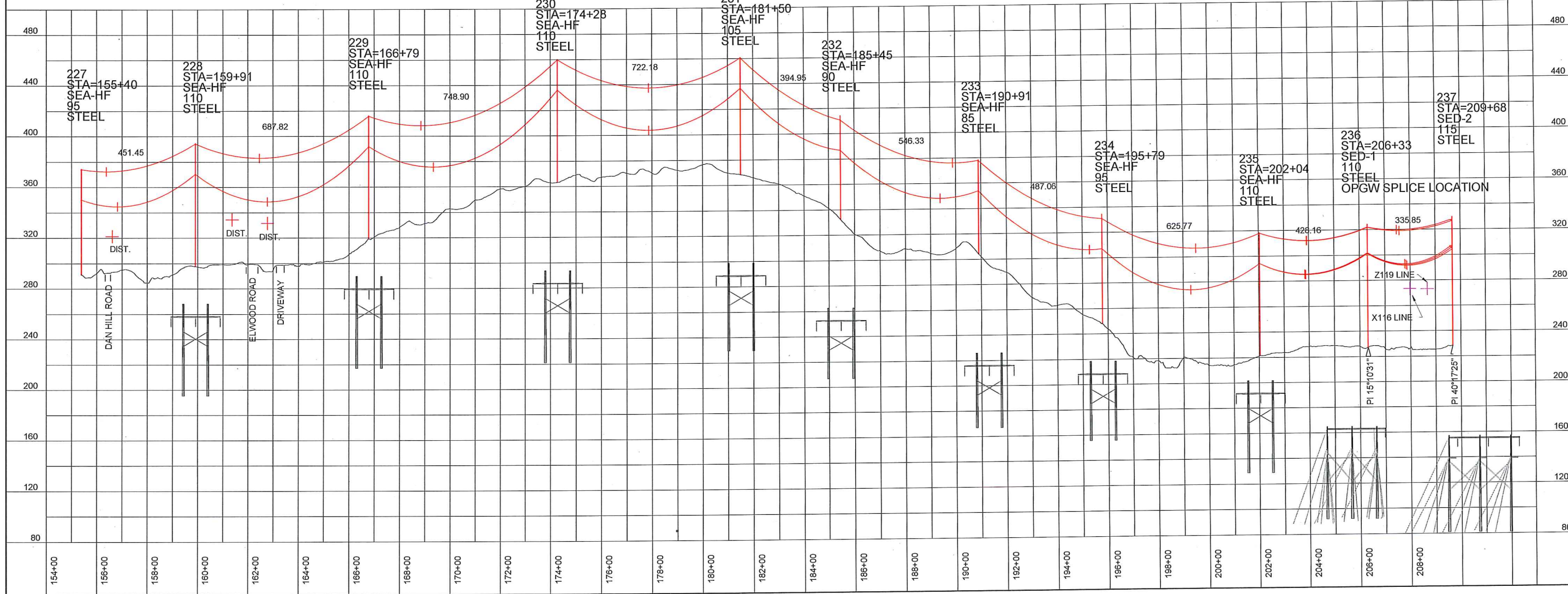
SHARED GUY ANCHOR
SEE DWG. S3124-P0003 SH09

200.0 FT. HORIZ. SCALE
40.0 FT. VERT. SCALE

OPGW 0.650" 48 FIBER
1590 KCMIL ACSR 54/19 "FALCON"

LONDONDERRY, NEW HAMPSHIRE
ROCKINGHAM COUNTY

OPGW SHOWN AT 120F MAX SAG
CONDUCTORS SHOWN AT 285F MAX SAG



NO.	REVISION	DATE	BY	CHKD.	APPR.
4	RE-ISSUED FOR NHSEC PERMIT FILING	11/11/15	CRP		
3	ISSUED FOR USE	7/20/15	TSW		
2	RE-ISSUED FOR PERMIT FILING	9/27/15	TSW		
1	ISSUED FOR PERMIT FILING	11/11/15	TSW		

EVERSOURCE ENERGY

TRANSMISSION BUSINESS

LINE 3124 345 KV TRANSMISSION
PLAN AND PROFILE
MERRIMACK VALLEY RELIABILITY PROJECT

DATE: 7/20/15

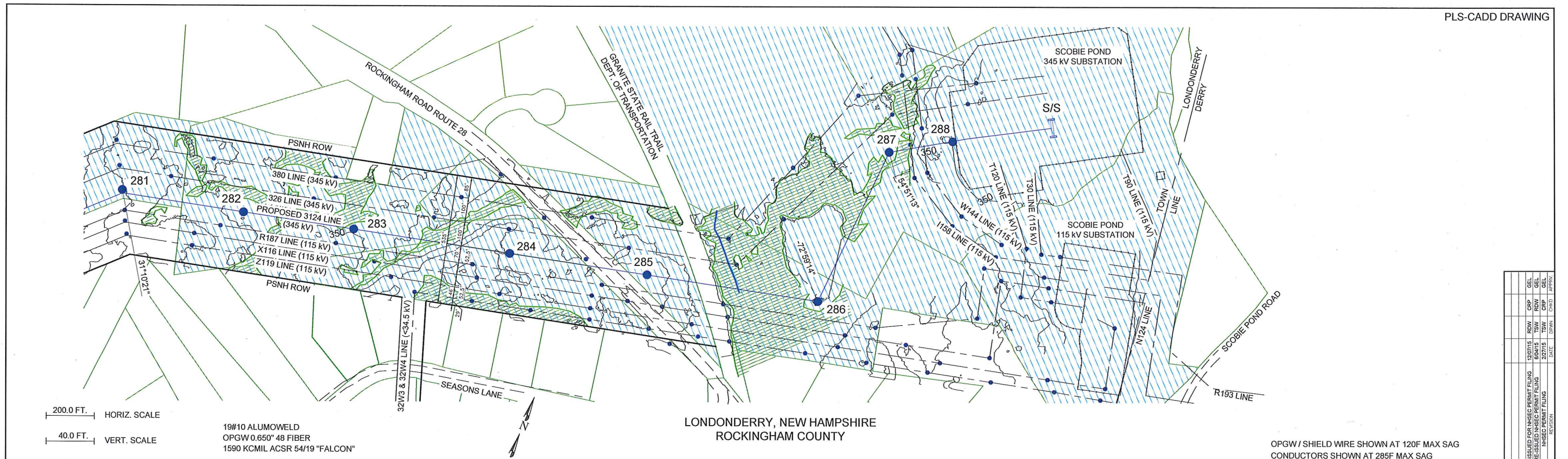
SCALE: NTS

DES: TRC
CHK: TRC
APP: TRC

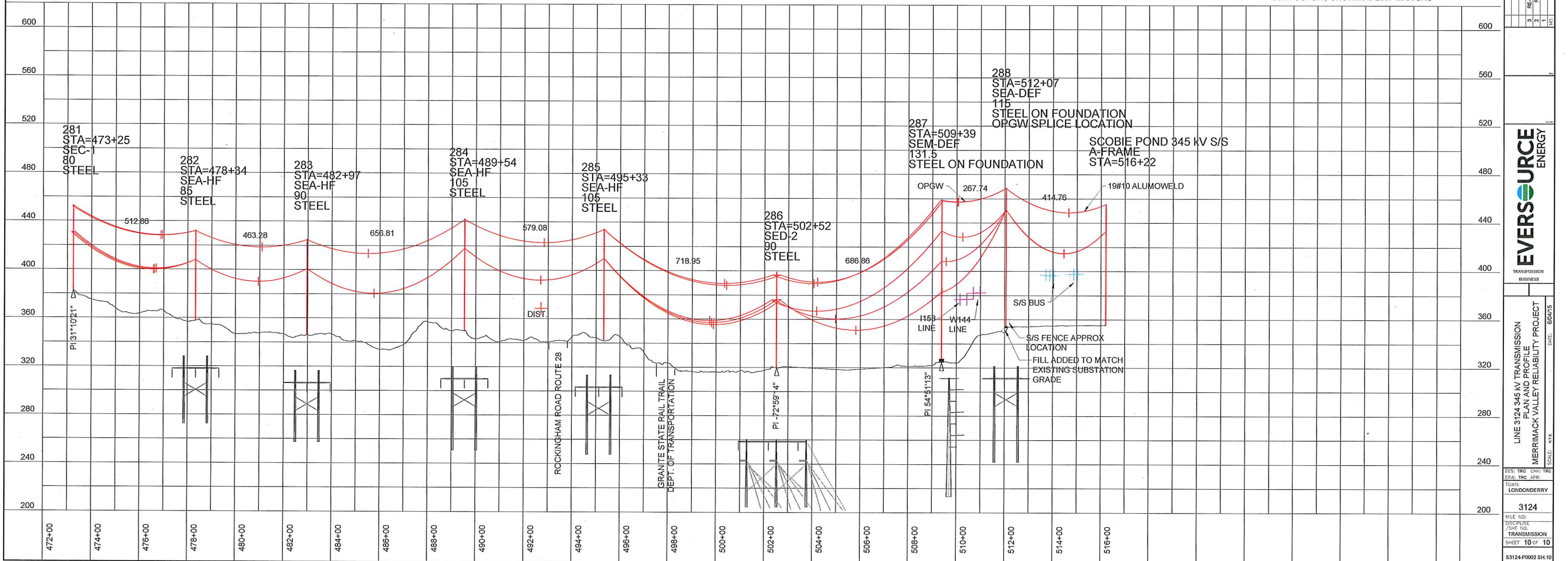
TOWN: LONDONDERRY

3124

DISCIPLINE: TRANSMISSION
SHEET 4 OF 10
S3124-P0002 SH 4



OPGW / SHIELD WIRE SHOWN AT 120F MAX SAG
CONDUCTORS SHOWN AT 285F MAX SAG



NO.	REVISION	DATE	BY	CHKD	APP'Y
3	REVISION FOR MISC PERMIT FILING	12/07/15	TRC	CHD	TRC
2	REVISION FOR MISC PERMIT FILING	02/07/15	TRC	CHD	TRC
1	REVISION FOR MISC PERMIT FILING	02/07/15	TRC	CHD	TRC

EVERSOURCE ENERGY

TRANSMISSION BUSINESS

LINE 3124 345 KV TRANSMISSION
PLAN AND PROFILE
MERRIMACK VALLEY RELIABILITY PROJECT

SCALE: NTS

DATE: 02/01/15

DES: TRC CHD TRC
EQU: TRC AFR
TOWN: LONDONDERRY

3124

MILE NO:
PROJECT NO:
SHEET NO:
TRANSMISSION
SHEET 10 OF 10

S3124-P002 SH.10