Pre-filed Direct Testimony of
John C. Case

COMMONWEALTH OF MASSACHUSETTS
ENERGY FACILITIES SITING BOARD

Western Massachusetts Electric Company	)	**EFSB 08-2/D.P.U. 08-105/D.P.U. 08-106**

PRE-FILED DIRECT TESTIMONY OF JOHN C. CASE

Q. Please state your name, position and business address.

A. My name is John Case. I am the Project Manager of Engineering for the New England East-West Solution ("NEEWS") projects for Northeast Utilities Service Company ("NUSCO") in Berlin, Connecticut. My business address is Northeast Utilities Service Company, P.O. Box 270, Hartford, Connecticut 06141-0270. In my capacity as Project Manager of Engineering, I manage and supervise the engineering effort for the NEEWS projects for Northeast Utilities' Operating Subsidiaries, The Connecticut Light & Power Company ("CL&P"), and Western Massachusetts Electric Company ("WMECO").

Q. On whose behalf are you testifying?

A. I am testifying on behalf of Western Massachusetts Electric Company in this proceeding.

Q. Please summarize your professional and educational background.

A. I have been working for NUSCO for 19 years in various capacities in the Transmission organization. I spent the first 13 years of my career in the Transmission Line Engineering Department working on various transmission line projects in Connecticut and Massachusetts. My responsibilities in that department ranged from transmission line design, structural analysis, project estimating and budget oversight, to drafting siting and other regulatory documents. I was ultimately the Lead Transmission Line Project Engineer on the Bethel-Norwalk Project through siting approval, before I took a position as a Construction Representative and Construction Manager during the 3-year construction phase on that same project. My responsibilities then included oversight of the civil and line construction at the

Norwalk Substation expansion; installation of a gas-insulated substation ("GIS") at Plumtree Substation; Construction Manager for the 345-kV overhead line construction; and the Archers Lane, Hoyts Hill and Norwalk Junction transition stations.

Upon completion of the Bethel – Norwalk Project, I took a position as Project Manager in the Transmission Projects group for one year, working on various projects with overall project manager responsibilities before accepting the position as Project Manager for Engineering on the NEEWS projects where I have been for the last two years.

Responsibilities in my current position include the coordination of the Planning and Engineering functions during scope development of the NEEWS projects, oversight and management of the project estimates, coordination of in-house and consulting engineers, and oversight and management of the preliminary and detailed engineering effort on NEEWS.

I received a B. S. in Civil and Environmental Engineering from Clarkson University, Potsdam, New York in 1990. I also received an M.B.A. from The University of Connecticut in 1998. A copy of my resume is attached as Exhibit WMECO-JCC-2.

Q. Please identify any regulatory proceedings in which you have testified.

A. I have not testified in any previous regulatory proceedings.

Q. What is your involvement and responsibility with respect to WMECO's proposed Greater Springfield Reliability Project ("GSRP" or "Project")?

A. For the Project, my responsibilities are the same as those outlined earlier in my role as Project Manager of NEEWS Engineering. I have worked with the Transmission Planning Department and Engineering functions to help establish the scope of the Project, management of the Project estimate and alternative estimates and coordination and management of the preliminary and detailed engineering phases of the Project as well as ensuring coordination with the NEEWS interfaces of this Project.

Q. For what portions of WMECO's GSRP Petition and for what information responses of WMECO in this proceeding are you responsible?

A. With regard to the Petition for Approval to Construct 345-kV Transmission Lines, Re-Build 115-kV Transmission Lines, and Build and Upgrade Ancillary Facilities (the "Petition"), I am responsible for the Project description in Section 1, the cost estimates for the Project and the alternatives in Section 3, and the descriptions of the layout and engineering details for the Project set forth in Section 5 and Section 7. I am also responsible for various information requests in this proceeding which cover the same topics, all of which are listed with my name, alone or with another, as the responsible witness.

Q. Were the materials referenced above prepared by you or under your supervision and control?

A. The materials above for which I am responsible were prepared by others under my supervision or by me personally.

Q. What is the purpose of this pre-filed testimony?

A. I have prepared this pre-filed testimony to update, correct and revise, as needed, the portions of the Petition for which I am responsible.

Q. Please explain how those changes to the Project arose?

A. Engineering and planning for the Project have continued to make progress since the Petition was filed and have now developed to a more detailed level in comparison to the earlier level that existed at the time the Petition was filed. As a result, engineering and scope changes have occurred in seven principal areas and the EFSB should be informed of those changes in the Project.

Q. What are the principal engineering and scope changes to the Project since the Petition was filed?

A. The principal engineering and scope changes to the Project which have occurred since the Petition was filed are summarized in the following list and explained in more detail later:

1. **Change of Conductor Type** – NUSCO is proposing to standardize on a newer overhead conductor design, Aluminum Conductor, Steel Supported ("ACSS") that is capable of operating at higher temperatures, and lower sags than the previously proposed Aluminum Conductor, Steel Reinforced ("ACSR").
2. **Re-use of Towers**: After the use of high-temperature, low sag ACSS conductors was explored, it was determined that the existing monopole steel structures carrying circuits 1481 and 1552 and 1426 from the Ludlow Substation to the Shawinigan Switching Station can be re-used, at a cost savings to the Project of approximately $14 million. See: Exhibit WMECO-JCC-3, explained further below.
3. **Agawam Substation Changes**: The layout and the location of the modifications to the substation have changed as discussed in Response EFSB-LU-021. See: Exhibit WMECO-JCC-4, explained further below.
4. **Agawam Line Entry Changes**: With the general shift of the station arrangement, line entry at the Agawam Substation was given further study and detailed design. See: Exhibit WMECO-JCC-4, explained further below.
5. **Shawinigan Switching Station Scope Changes**: After additional analyses of the equipment electrical loadings on the ring bus at Shawinigan Switching Station, the scope of replacements required at the station to meet the anticipated loads was increased. See: Exhibit WMECO-JCC-5, explained further below.
6. **Fairmont Switching Station Changes**: Based on an agreement in principle with Holyoke Gas & Electric Company, NUSCO continues to plan to acquire the location where a new Fairmont Switching Station will be built at Alternative Site 1, located northeast of and across Prospect Street from the present location, as originally described at page 7-163 and following of the Petition. See: Exhibit WMECO-JCC-6, explained further below.
7. **Chicopee Substation Breaker Replacements:** Chicopee Substation will require replacement of two circuit breakers to meet the anticipated increase in circuit loads.

Q. Please describe the change in conductor type in greater detail.

A. The Company is moving towards standardizing all new conductors to be an ACSS, rather than the originally proposed ACSR conductor. While it looks identical to an ACSR conductor, the ACSS conductor allows for greater current-carrying capability than a similarly sized ACSR conductor. ACSS would be proposed for all lines on GSRP. This conductor change has resulted in several circuits being able to be reduced in conductor size, and has also resulted in some towers being able to be reused, with new conductors, as opposed to completely rebuilt.

ACSS conductor was developed in the 1970's and is of the same material composition as the ACSR and would have nearly exactly the same diameter and weight as its similarly sized and stranded ACSR conductor. The difference is that ACSS utilizes pre-annealed outer aluminum strands, which allows for the conductor to operate at higher temperatures, with no concern for annealing or loss of strength, in the outside conductive aluminum strands. Whereas ACSR weight is carried by both the steel and aluminum strands (since the aluminum still has "strength"), the weight of an ACSS conductor is carried by the steel core. WMECO will operate ACSS conductor up to 180ºC under emergency conditions compared to 140ºC for ACSR conductors, and realize approximately a 20% increase in ampacity of the cable with similar or less sag for a similar sized conductor. For the GSRP, this allows several circuits to utilize a smaller conductor, reducing conductor costs, structure loads (therefore structure and foundation costs) and in the case of several circuits, has allowed for the re-use of existing structures. The table below identifies the new ACSS conductor size for each circuit on GSRP, along with the originally proposed ACSR conductor.

PROPOSED CONDUCTOR CHANGES FOR THE GREATER SPRINGFIELD RELIABILITY PROJECT

Line #	Line Segment	ORIGINALLY PROPOSED CONDUCTOR **ACSR (KCMIL)**	REVISED PROPOSAL FOR CONDUCTOR **ACSS (KCMIL)**
1230	Piper – Agawam	1590	1272
1314	Chicopee – Agawam	1272	1272
1426	Orchard – Cadwell	1272	1272
1481	Ludlow – Cadwell	2 x 795	1590
1552	Ludlow – Orchard	1590	1272
1601	Fairmont - Piper (old 1723 NS)	1590	1272
1602	Fairmont - Chicopee (old 1254 NS)	1272	1272
1603	Cadwell - ESJ - Fairmt (old 1723 EW)	2 x 1272	2 x 1272
1604	Shawin-ESJ - Fairmt (old 1254 EW)	2 x 1590	2 x 1272
1768	Southwick - South Agawam (old 1768, 1821, 1836)	exist'g / 1272	exist'g / 1272
1781	South Agawam - Agawam	1272	1272
1782	South Agawam - Agawam	1272	1272
1821	North Bloomfield-So Agawam	exist'g to remain	exist'g to remain
1836	North Bloomfield-So Agawam	exist'g to remain	exist'g to remain
1845	Ludlow - Shawinigan	2 x 1272	2 x 1272
3196	Ludlow - Agawam 345-kV line	2 x 1590	2 x 1590
3216	Agawam - CT/MA border 345-kV line	2 x 1590	2 x 1590
3216	North Bloomfield - CT/MA border 345-kV line	2 x 1590	2 x 1590
5001	East Springfield - Cadwell	exist'g to remain	exist'g to remain
5002	East Springfield - Cadwell	exist'g to remain	exist'g to remain

Conductors sizes are listed in kcmil.
ACSR Aluminum Conductor, Steel Reinforced conductor
ACSS Aluminum Conductor, Steel Supported conductor
Yellow highlighted rows indicate changes to the conductor size to a smaller size allowed by ACSS 1768 line conductors will be new on shared structures with the 345-kV line in MA, and no change to existing conductors in CT.

Q. Please describe the re-use of the towers in greater detail?

A. The double circuit steel poles from Ludlow – Orchard Jct. – Shawinigan carrying the 1426, 1552 and 1481 lines were originally installed in the 1970's and designed for a 1272 ACSR conductor. The anticipated loads on those circuits required a bundled 795 conductor or single 1590 ACSR. These conductors were larger than the structures were designed for, and

the bundled conductor in particular would have introduced loads onto the structures that would have required a complete rebuild of the circuit under the original proposal. The consideration of ACSS conductor, with its greater current-carrying capacity allowed a 1272 ACSS conductor to be installed which has sufficient capacity for the loads anticipated on the 1426 and 1552 circuits. For the higher loads on the 1481 line, a 1590 ACSS conductor was considered. Although the margin of conductor capacity to forecast loads was less than would normally be required for a rebuild, it was determined to have sufficient margin to consider its use on these structures to see if a reconductor was feasible. The structures were analyzed for the new conductor loads and anticipated sags and were determined to be suitable for a reconductor, with minimal structure modifications. The modifications include primarily side guys to be installed on most structures (for which they were originally designed), and several structure replacements (6 structures in this section, representing approximately 10% of the structures). The Table below lists the expected structure modifications required to accommodate the reconductoring from Ludlow Substation to Shawinigan Substation.

Summary			
Total Structures	Structures Replaced	Strain Conversions	Other Modifications (e.g. side guys)
55	6	18	34
%	10.9%	32.7%	61.8%

A map of the area that will be reconductored, and revised cross sections are attached as Exhibits WMECO-JCC-3. The ability to reconductor as compared to rebuild results in a savings of over $14 million on these circuits, as shown in the following table:

Construction	**Opinion of Probable Cost (all-in)**
Rebuild	$35,044,748
Reconductor	$20,877,358
Savings	$14,167,390

Q. Please describe the changes in layout and line entry at the Agawam Substation in greater detail.

A. Soil borings from the site and civil analysis revealed a concern with the ability for the soil conditions to support the planned retaining wall on the north side of the site, resulting in a redesign of the layout of the station to provide a general shift of the equipment in the southerly and easterly direction. This drove a need to redesign the station, shifting the transformers and adding gas-insulated transmission line ("GITL") lengths and relocating the 115-kV capacitor banks to the far southern end of the yard, outside of the existing fenced area. The property that the capacitor banks will be located on is currently owned by WMECO and has an abandoned house on it that will be removed. This change causes the 345-kV additions at Agawam Substation to be located predominantly within the existing fenced area, and farther away from the residential areas to the north and west of the station. See: Exhibit WMECO-JCC-4, attached.

As a result of the general shifting of the equipment, it was determined that the overall design of the lines should be re-examined. It was found that overall line entry design would be more reliable, as well as easier to construct and maintain, if circuit 1412 were to be constructed underground for a short distance as its "getaway" from the substation. Reliability was improved since a failure of the shield wire, as the new 345-kV circuit crossed over the 115-kV lines 1412 and 1311, could not cause an outage of the underground line 1412. With one line underground in this short segment, more distance between the overhead circuits was possible, contributing to both the ease of construction and maintenance during operations. With the undergrounding, the separation of the overhead circuits did not satisfy NU Standards for clearance between circuits. By taking the 1412 line underground along the north end of the substation (see Exhibit WMECO-JCC-4, attached), in addition to foregoing benefits, the amount of tree clearing was reduced to the north of the substation. The combination of the undergrounding of the 1412 circuit and the shift in the substation arrangement described above allows several existing 115-kV structures to be re-used and minimizes impacts to residents around the substation. The 1412 line proposed for

undergrounding is part of the Agawam to West Springfield Circuit Separation Project currently pending before the Department of Public Utilities in D.P.U. 09-24/D.P.U. 09-25.

Q. Please describe the changes at the Shawinigan Switching Station in greater detail?

A. The scope of work proposed at the Shawinigan Switching Station has increased from that originally proposed in the Project. The increased scope at Shawinigan requires the replacement of two breakers and two disconnect switches. The changes are all one-for-one replacements to increase the electrical ratings of the equipment and do not enlarge the footprint of the station. Originally, the 4T and 6T breakers (and associated terminal equipment) were proposed for replacement. After analyzing the load flows around the ring bus under various breaker-out scenarios, and considering the winter and summer output for the MASSPower generators, it was determined that an additional two breakers would require replacement (1T and 2T) along with associated terminal equipment. See: Exhibit WMECO-JCC-5, attached, which shows the original and the revised scope of work for Shawinigan Switching Station.

Q. Please describe the changes to the Fairmont Switching Station in greater detail?

A. As described earlier, an agreement in principal for the sale of the property proposed for the new Fairmont Switching Station has been reached by the current landowner, Holyoke Gas and Electric. The design of the station remains primarily as it was proposed in the Petition; however, the latest plan is attached to show the status of the design. Requirements have been further refined to show the civil work required at the site. This drawing is attached as Exhibit WMECO-JCC-6.

Q. Please describe the changes at Chicopee Substation in greater detail?

A. The 1T and 2T breakers at Chicopee Substation were determined to require replacement, after additional detail analysis into the thermal ratings of the existing equipment was completed.

Q. Does this complete your pre-filed testimony?

A. Yes, it does.

JOHN C. CASE

PROFESSIONAL EXPERIENCE

Project Manager – NEEWS Engineering

2007 - Present
Northeast Utilities Service Company - Hartford, CT

Responsibility for oversight and management of all aspects of engineering on the New England East West family of projects. These projects involve significant reliability upgrades in the Southern New England area, totaling an estimated $1.49 billion. This position involves the coordination of the System Planning and Engineering functions to establish the most cost-effective solutions for the project needs, establishing the base estimate for all projects, review of all siting and engineering documents, management and coordination of the engineering effort between in-house and external engineering resources; transmission business and engineering responsibilities in the procurement effort and final design oversight responsibility.

Project Manager – Transmission Projects

2006 - 2007
Northeast Utilities Service Company - Hartford, CT

Overall management responsibility over all aspects of assigned transmission projects, including engineering, risk analysis and mitigation, siting and permitting, budget, contracting and closeout. Projects ranged in magnitude from $500,000 substation upgrades to $5,000,000 transmission line projects.

Construction Manager – Transmission Construction Test and Maintenance

2003 - 2006
Connecticut Light and Power Company - Hartford, CT

Responsibility for Owner's oversight and management of the construction effort on portions of the Bethel – Norwalk project including contractor coordination, site safety, compliance to specifications and contracts, outage clearance tag holder and change order negotiation. This was a $350,000,000 project to construct a 20+ mile transmission line in Southwest Connecticut. This project involved 345-kV and 115-kV XLPE underground cable, 345-kV HPFF cable, 3 intermediate 345-kV transition stations and two significant 345-kV GIS substation expansions. Segments under my direct responsibility included the following:

- Norwalk S/S – Civil site work and 115-kV transmission line relocations
- Norwalk S/S – upgrade replacements to 115-kV substation yard
- Plumtree S/S – Civil and Electrical construction of a 345-kV GIS substation and 345-kV XLPE line terminals.
- Hoyts Hill, Archers Lane and Norwalk Jct transition stations - Civil and Electrical construction of 345-kV XLPE and HPFF transition stations.
- Plumtree – Norwalk 345-kV line – All aspects of 345-kV and 115-kV overhead transmission line construction.

JOHN C. CASE

Project Engineer

1990 - 2003
Northeast Utilities Service Company - Hartford, CT

Project Engineer on a variety of construction projects involving all tasks associated with engineering, design, estimating, securing regulatory approvals, and drafting construction specifications.

Major projects include:
- Bethel – Norwalk 345-kV line – Lead Project Engineer responsible for all aspects of engineering through project siting approval.
  - Edision Electrical Institute Award
- NEON / NU Fiber optic backbone system – Lead Project Engineer in CT and MA for 245 miles of fiber optic cable installation, up to 122 fibers
  - Chairman's Award Nominee
- North Bloomfield – Agawam - Reconductor 18 miles of 115-kV double-circuit transmission line on an emergency basis
  - President's Award Winner
- Devon Station Generation - Connect emergency gas turbine generators to system
  - World Construction Record
- Developed pole-top extension to cost-effectively uprate 345-kV structures
  - Spot Recognition Award

Committees and Responsibilities held:
- Qualified Clearance Holder
- Transmission Standards Committees - Structures and Ratings Committees
- Dynamic Thermal Ratings Committee
- Develop structural alternatives to reduce magnetic fields
- Computer analyses (ETADS) of towers and design modifications

EDUCATION

Master of Business Administration

May, 1998
University of Connecticut - West Hartford, CT
Bachelor of Science degree in Civil/Environmental Engineering
May, 1990
Clarkson University - Potsdam, NY

HONORS AND ACTIVITIES

- Certified Engineer-in-Training in Connecticut
- Northeast Utilities Retail Business Group President's Award, 1998
- NU SPOT Recognition Awards 1993 and 1998
- Delta Sigma Phi National Fraternity

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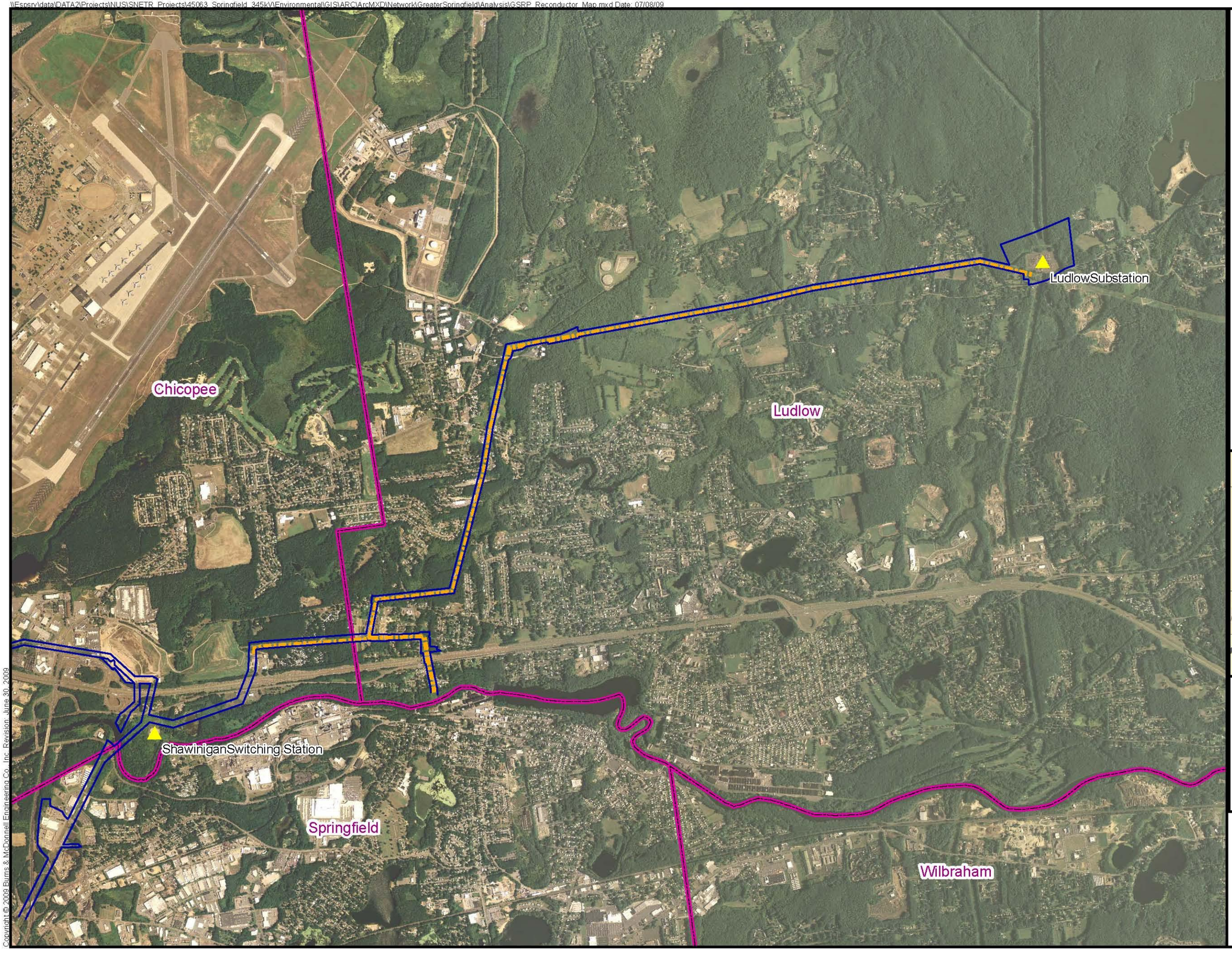


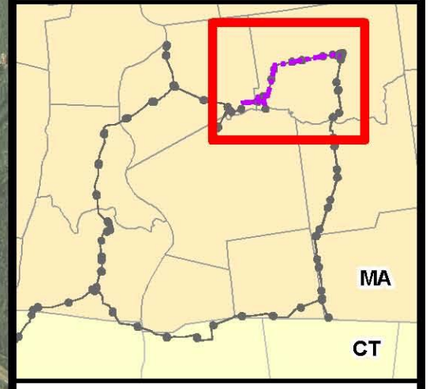
Legend

- Substation
- Location of Reconductor
- Existing Overhead Corridor
- Town Boundary

NORTH

0 1,250 2,500 5,000 Feet

Source: USDA NAIP (2006)



Burns & McDonnell
SINCE 1898

Shawinigan S/S to Ludlow S/S Reconductor Map

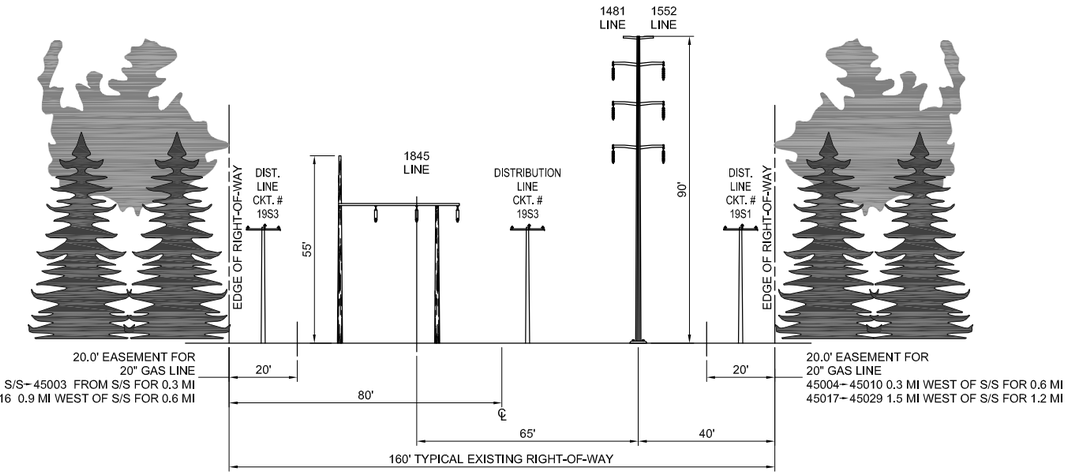
XS-17

ORCHARD JCT.
TO
LUDLOW S/S

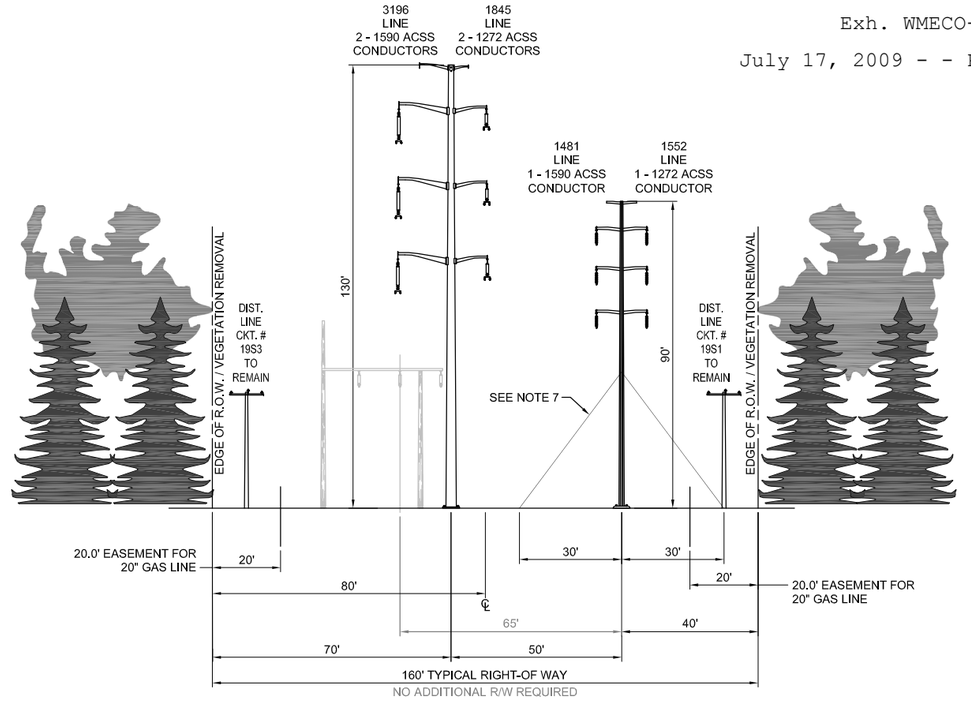
4.8 MILES

EXISTING
RIGHT-OF-WAY
160'

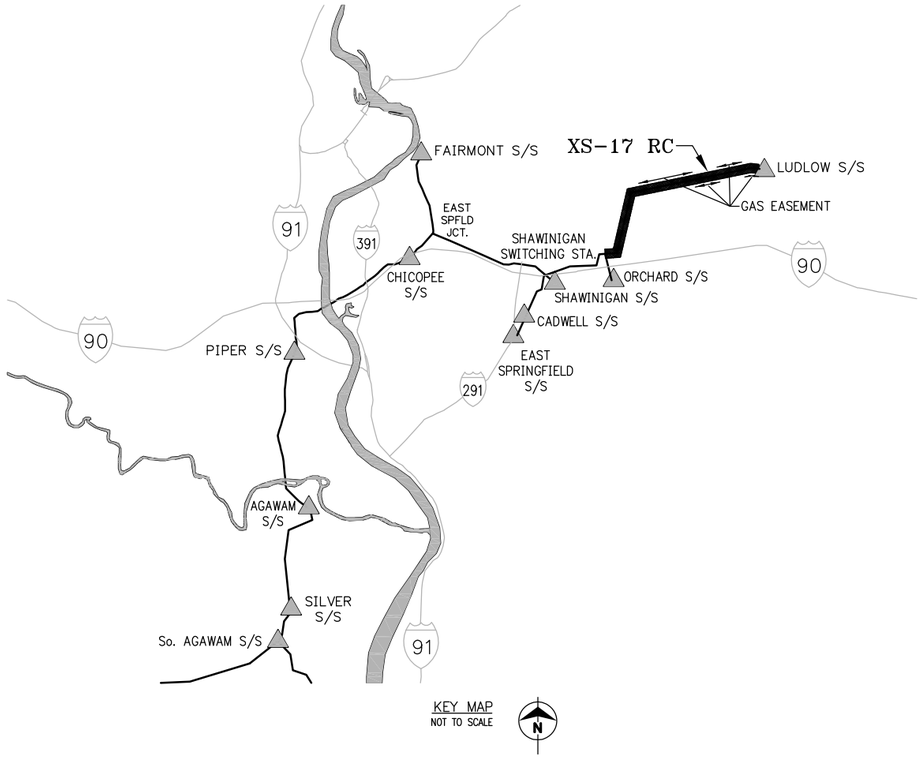
LOOKING
NORTH AND EAST



EXISTING LAYOUT



PROPOSED LAYOUT



NOTES:

1. REMOVE EXISTING WOOD H-STRUCTURE. EXISTING DOUBLE CIRCUIT STEEL POLE TO BE RECONDUCTORED.
2. A 0.2 MILE SECTION, 1.7 MILES EAST OF ORCHARD JUNCTION HAS 210' OF EXISTING R/W. THE REMAINDER OF THE R/W IS 160' WIDE.
3. FINAL 0.6 MILES OF R/W CONTAINS DISTRIBUTION LINES. DISTRIBUTION STARTS BETWEEN EXISTING STRUCTURES AND MOVES TO THE SOUTH SIDE OF R/W FOR FINAL 0.3 MILES. ADDITIONAL DISTRIBUTION LINE CONTINUE ON THE NORTH SIDE OF R/W FOR FINAL 0.3 MILES.
4. PROPOSED STRUCTURE HEIGHTS WERE DETERMINED FROM TYPICAL EXPECTED SPANS. PROPOSED STRUCTURE HEIGHTS ARE SUBJECT TO CHANGE WITH THE COMPLETION OF FINAL DESIGN.
5. EXISTING STRUCTURE HEIGHTS ARE TYPICAL.
6. EXISTING DISTRIBUTION LOCATION IS TYPICAL AND MAY VARY ALONG THE RIGHT-OF-WAY.
7. APPROXIMATELY 40 EXISTING MONOPOLE STRUCTURES FROM SHAWINIGAN S/S TO LUDLOW S/S, WILL REQUIRE SIDE GUYS TO SUPPORT THE NEW CONDUCTOR.

PRELIMINARY -
SUBJECT TO CHANGE

Northeast Utilities System

TITLE GREATER SPRINGFIELD RELIABILITY PROJECT
PROSPOSED CROSS SECTIONS
ORCHARD JCT. TO LUDLOW S/S

BY J. LIGHTNER	CHKD P.M. WILLIAMS	APP	APP
DATE 7/6/09	DATE	DATE	DATE
SCALE NONE	MICROFILM DATE	DWG. NO. XS-17 RC	
P.A. #			

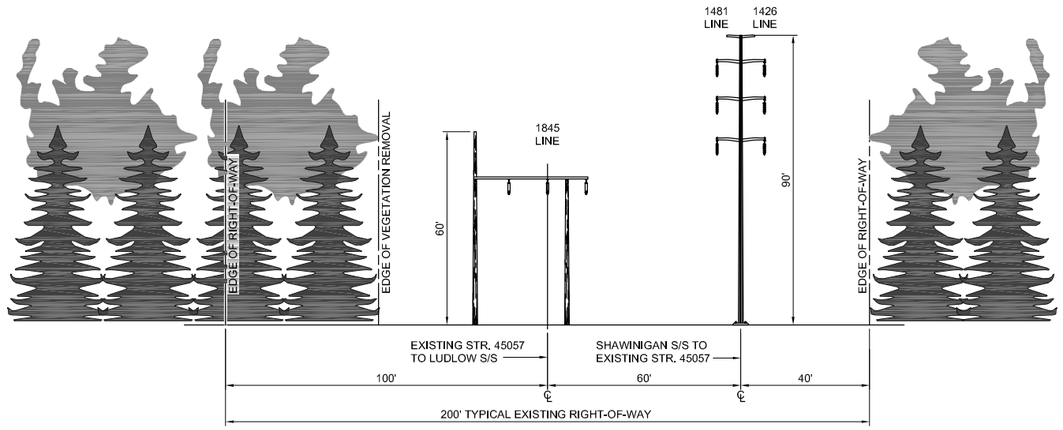
XS-16

SHAWINIGAN S/S TO ORCHARD JCT.

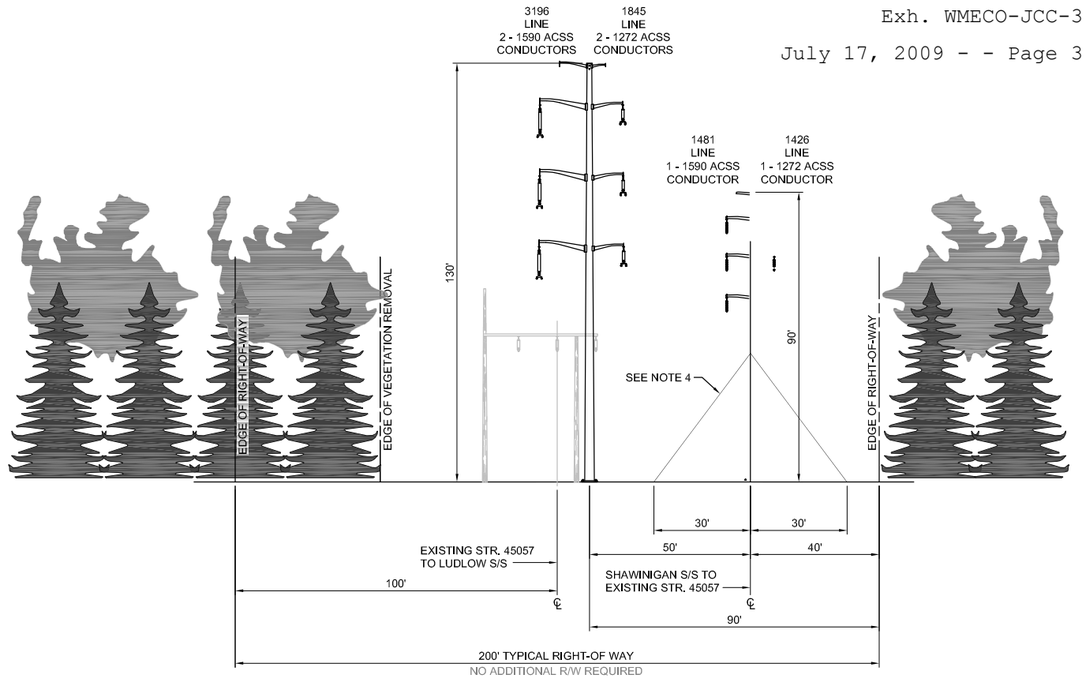
1.4 MILES

EXISTING RIGHT-OF-WAY 200'

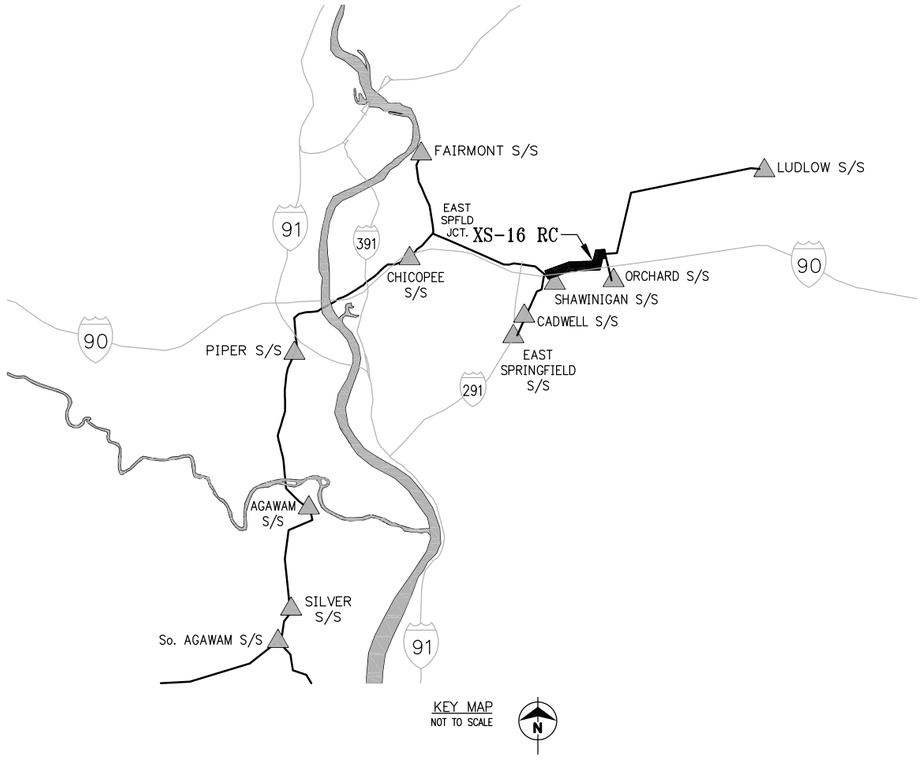
LOOKING EAST



EXISTING LAYOUT



PROPOSED LAYOUT



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3. EXISTING STRUCTURE HEIGHTS ARE TYPICAL.
4. APPROXIMATELY 40 EXISTING MONOPOLE STRUCTURES FROM SHAWINIGAN S/S TO LUDLOW S/S, WILL REQUIRE SIDE GUYS TO SUPPORT THE NEW CONDUCTOR.

PRELIMINARY - SUBJECT TO CHANGE

Northeast Utilities System

TITLE GREATER SPRINGFIELD RELIABILITY PROJECT
PROSPOSED CROSS SECTIONS
SHAWINIGAN S/S TO ORCHARD JCT.

BY J. LIGHTNER	CHKD P.M. WILLIAMS	APP	APP
DATE 7/6/09	DATE	DATE	DATE
SCALE NONE	MICROFILM DATE	DWG. NO. XS-16 RC	
P.A. #			

PROSPECT STREET

VEGETATION CLEARING (TYP.)

40

1412

1311

3196

1314

1230

NEW 345KV CONTROL ENCLOSURE

3216

1781

1782

SPRINGFIELD STREET ROUTE 147

NORTH

LEGEND

- EXISTING STRUCTURE
- PROPOSED STRUCTURE
- REVISED SUBSTATION
- WETLANDS
- EXISTING RIGHT-OF-WAY LINE
- 115kV CONDUCTOR
- 115kV CONDUCTOR
- 345kV CONDUCTOR
- UNDERGROUND
- PROPERTY LINE
- SANITARY SEWER
- EXISTING UG DISTRIBUTION

0 100 200

SCALE IN FEET

Burns & McDonnell SINCE 1898

date JUNE 18, 2009

designed K. WHISNER

AGAWAM - WEST SPRINGFIELD CIRCUIT SEPARATION PROJECT

AGAWAM SUBSTATION TRANSMISSION ALIGNMENT

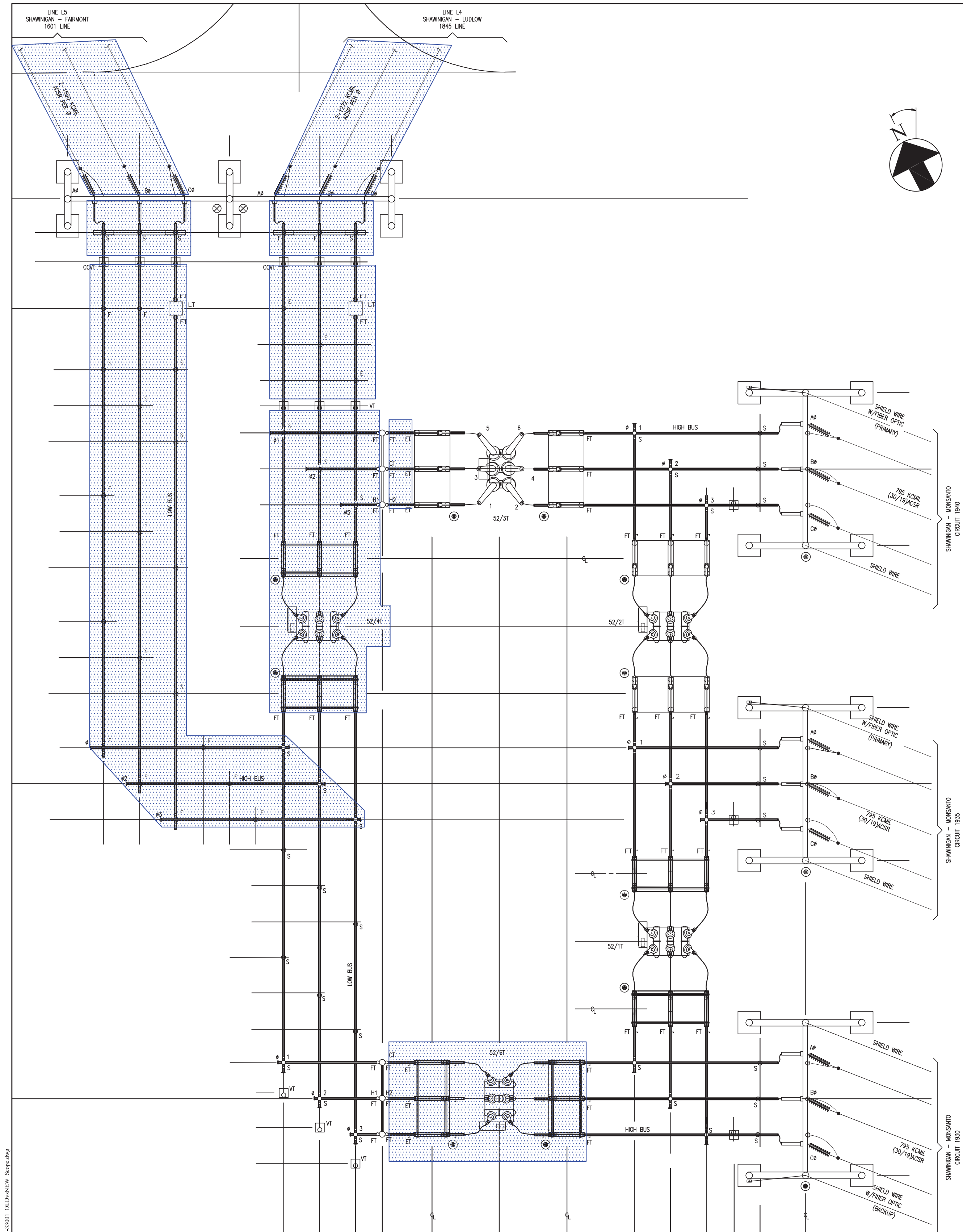
PROSPECT STREET - ALTERNATIVE 3 UNDERGROUND ONE AWS CIRCUIT

project 49942

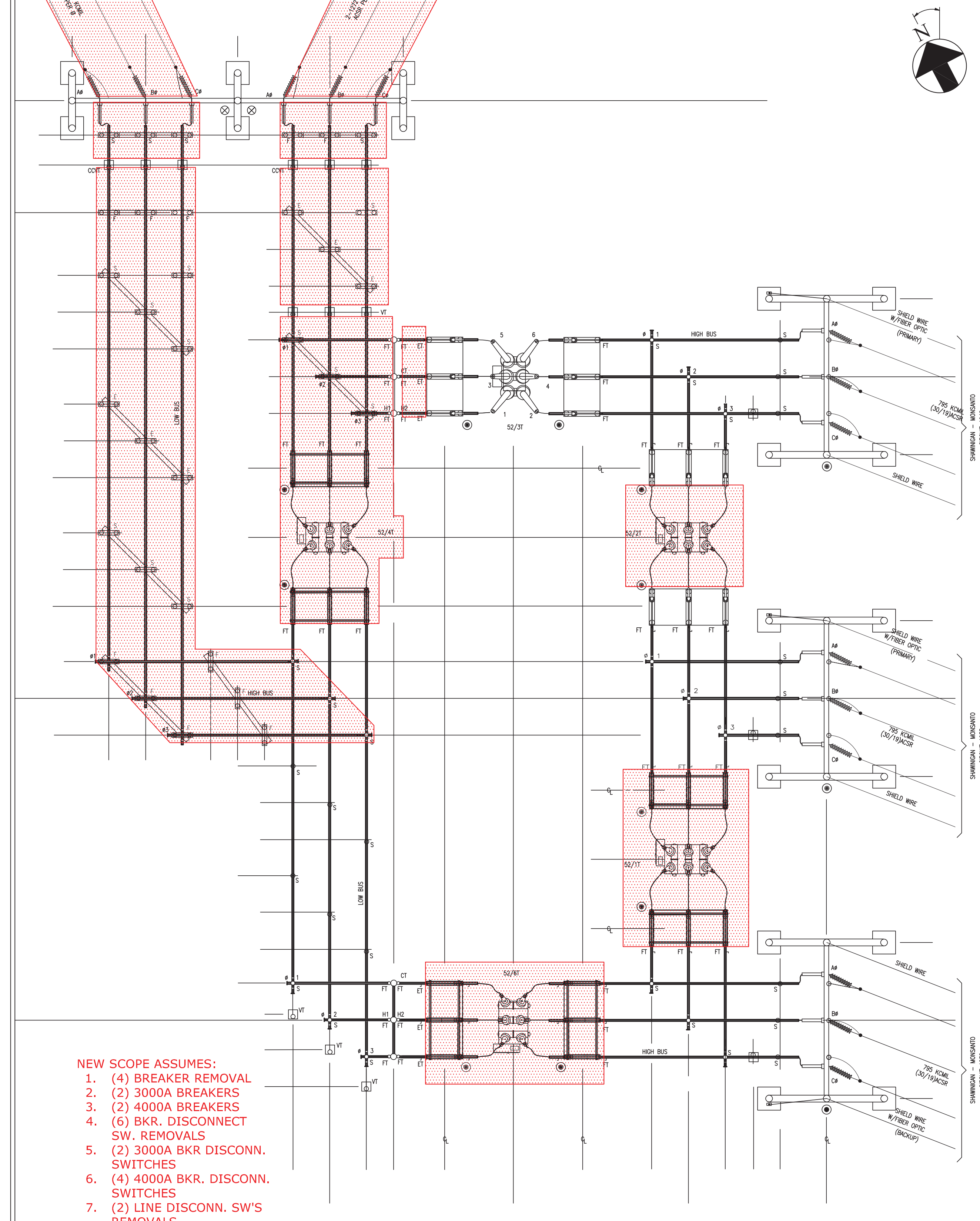
contract

SK - AGAWAM SUB SHT. 3

N: \NUSCO\49942-WS-A\Cadd\Substation\AGAWAM\Agawam_Sub-3.dwg (Layout2) 06-18-2009 14:27 DDL B&McD



ORIGINAL SCOPE ASSUMES:
1. (2) BREAKER REMOVAL
2. (2) 4000A BREAKERS
3. (4) BKR. DISCONNECT SW. REMOVALS
4. (4) 4000A BKR. DISCONN. SWITCHES
5. (2) LINE DISCONN. SW'S REMOVALS
6. (1) 4000A LINE DISCONN. SWITCH
7. (1) 3000A LINE DISCONN. SWITCH
8. (2) WAVE TRAP REPLACE
9. BUS AND INSULATOR REPLACEMENT



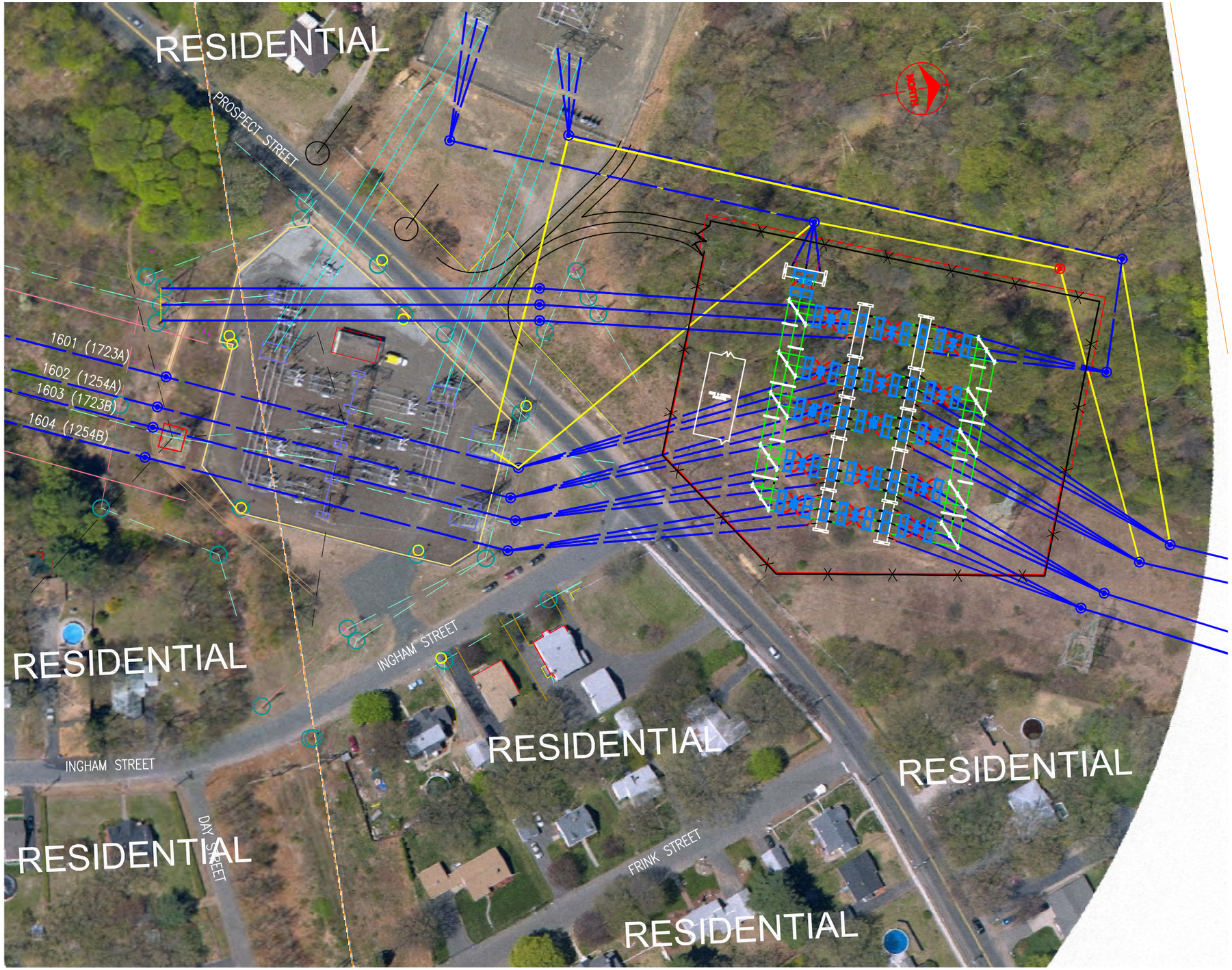
NEW SCOPE ASSUMES:
1. (4) BREAKER REMOVAL
2. (2) 3000A BREAKERS
3. (2) 4000A BREAKERS
4. (6) BKR. DISCONNECT SW. REMOVALS
5. (2) 3000A BKR DISCONN. SWITCHES
6. (4) 4000A BKR. DISCONN. SWITCHES
7. (2) LINE DISCONN. SW'S REMOVALS
8. (1) 4000A LINE DISCONN. SWICH
9. (1) 3000A LINE DISCONN. SWITCH
10. BUS SUPP. STRUCTURE & FOUNDATION REMOVAL
11. BUS AND INSULATOR REPLACEMENT
12. BUS SUPP. STRUCTURE & FDN. REPLACEMENT
13. PREMIUM TIME FOR CONSTRUCTION LABOR

SKETCH

Northeast Utilities Service Co.
FOR WESTERN MASSACHUSETTS ELECTRIC COMPANY

TITLE SHAWINIGAN 55E
115KV SWITCHING STATION–ELECTRICAL EQUIPMENT PLAN
ORIGINAL SCOPE AND NEW SCOPE
CHICOPEE, MASSACHUSETTS

BY BMcD	CHKD	APP	APP PSM
DATE	DATE	DATE	DATE 8/94
H-SCALE 1"=10'-0"	SIZE E	FIELD BOOK & PAGES .	
V-SCALE 1"=10'-0"	V.S. .	R.E.DWG. .	
R.E. PROJ. NUMBER .		NUSCO SK-PLAN SCOPES	



LEGEND WITHIN S/S FENCE:

BLUE	BREAKERS, SWITCHES
WHITE	BUS SUPPORTS, DEADEND STR'S, CTRL ENCLOSURE
GREEN	BUS WORK

LEGEND TRANSMISSION LINE:

BLUE	PERMANENT LINES
YELLOW	TEMPORARY LINES

Northeast Utilities Service Co.

FOR GREATER SPRINGFIELD RELIABILITY PROJECT

TITLE FAIRMONT SWITCHING STATION
TRANSMISSION LINE
GREENFIELD CONCEPTUAL LAYOUT
CHICOPEE, MA

BY PMW	CHKD TAT	APP	APP
DATE 9/05/08	DATE 9/05/08	DATE	DATE
SCALE NONE	SIZE B	DWG. NO.	
PROJ.	V.S.	FIGURE 2	

N:\NUSCO\50270 - GSRP SS\3.05 FAIRMONT\CADD\REF FAIRMONT45709\GREEN FIELD\FAIRMONT NEW SUB OH LINE LAYOUT.DWG 07-10-2009 10:43 BBMcD