INDEPENDENT ESTIMATES

ATTACHMENT B1

T006 – NORTH AMERICAN TRANSMISSION

SUBSTATION ENGINEERING COMPANY
8/11/2017

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T006 - North American Transmission

Revision: 4

SUMMARY OF COST ESTIMATE

	Description	Total Amount
1	CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION	$ 12,359,030
2	TRANSMISSION LINE FOUNDATIONS	$ 6,777,500
3	STRUCTURES - TRANSMISSION LINE	$ 12,081,851
4	CONDUCTOR, SHIELDWIRE, OPGW	$ 5,187,754
5	TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE	$ 1,328,890
6	NEW DYSINGER SWITCHYARD	$ 19,771,000
7	STOLLE ROAD SUBSTATION WORKS	$ 11,447,500
8	MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS	$ 32,473,291
	CONTRACTOR MARK-UP (OH&P) 15%	$ 15,214,022
	SUBTOTAL:	$ 116,640,839
	CONTINGENCY (20%)	$ 23,328,168
	TOTAL (A):	**$ 139,969,006**
9	SYSTEM UPGRADE FACILITIES	$ 12,977,025
	CONTRACTOR MARKUP & CONTINGENCY (35%)	$ 4,541,959
	TOTAL (B):	**$ 17,518,984**
	TOTAL PROJECT COST (A+B):	**$ 157,487,990**

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Description of Work: A new 345kV Dysinger Switchyard located approximately 8 miles southeast of the city of Lockport, New York. The Project also includes a new ~20 mile 345kV Transmission Line from Dysinger Switchyard to Stolle Road Substation near Marilla, New York.								
Item	**Description**	**Quantity**	**Unit**	**Supply Rate**	**Labor & Equipment Rate**	**Total Unit Rate:**	**TOTAL:**	**Remarks**
1. CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION								
1.1	Clearing the ROW (mowing & clearing)	121.0	Acre		$ 15,000	$ 15,000	**$ 1,815,000**	
1.2	Access Road	48,535.0	LF		$ 45	$ 45	**$ 2,184,075**	Assumes Type 1 Type Gravel Road
1.3	Silt Fence	48,535.0	LF		$ 4	$ 4	**$ 194,140**	
1.4	Matting	56,952.0	LF		$ 70	$ 70	**$ 3,986,640**	
1.5	Snow Removal	1.0	Sum		$ 320,000	$ 320,000	**$ 320,000**	
1.6	ROW Restoration	20.0	Mile		$ 10,000	$ 10,000	**$ 200,000**	
1.7	Work Pads	770,000.0	SF		$ 4	$ 4	**$ 2,710,400**	
1.8	Restoration for Work Pad areas	77,000.0	SF		$ 0.2	$ 0.2	**$ 11,550**	
1.9	Temporary Access Bridge	20.0	EA		$ 20,035	$ 20,035	**$ 400,700**	
1.10	Air Bridge	5.0	EA		$ 14,445	$ 14,445	**$ 72,225**	
1.11	Stabilized Construction Entrance	10.0	EA		$ 4,580	$ 4,580	**$ 45,800**	
1.12	Maintenance and Protection of Traffic on Public Roads	1.0	LS		$ 300,000	$ 300,000	**$ 300,000**	
1.13	Culverts / Misc. Access	1.0	LS		$ 100,000	$ 100,000	**$ 100,000**	
1.14	Concrete Washout Station	10.0	EA		$ 1,850	$ 1,850	**$ 18,500**	
TOTAL - CLEARING & ACCESS FOR TRANSMISSION LINE:							**$ 12,359,030**	
2. T-LINE FOUNDATIONS								
2.1	Direct Embed Foundations - 23ft deep x 6ft dia.	127.0	Structure		$ 18,000	$ 18,000	**$ 2,286,000**	Supply & Install
2.2	Direct Embed Foundations - 28ft deep x 7ft dia.	5.0	Structure		$ 20,000	$ 20,000	**$ 100,000**	Supply & Install
2.3	Direct Embed Foundations - 30ft deep x 6ft dia.	6.0	Structure		$ 20,000	$ 20,000	**$ 120,000**	Supply & Install
2.4	Drilled Piers - 38ft deep x 9ft dia.	492.4	CUY		$ 1,500	$ 1,500	**$ 738,660**	
2.5	Drilled Piers - 43ft deep x 8ft dia.	792.5	CUY		$ 1,500	$ 1,500	**$ 1,188,780**	
2.6	Drilled Piers - 71ft deep x 9ft dia.	368.0	CUY		$ 1,500	$ 1,500	**$ 552,060**	
2.7	Rock Excavation Adder	896.0	CUY		$ 2,000	$ 2,000	**$ 1,792,000**	
TOTAL - T-LINE FOUNDATIONS:							**$ 6,777,500**	
3. STRUCTURES - TRANSMISSION LINE								
3.1	Tangent Delta Single Steel Pole Tangent (0-1 deg, 100')	18.0	EA	$ 31,401	$ 18,841	$ 50,242	**$ 904,349**	
3.2	Tangent Delta Single Steel Pole Tangent (0-1 deg, 115')	109.0	EA	$ 38,376	$ 23,026	$ 61,402	**$ 6,692,774**	
3.3	Tangent Delta Single Steel Pole Tangent (0-1 deg, 130')	5.0	EA	$ 44,150	$ 26,490	$ 70,641	**$ 353,203**	
3.4	Tangent Delta Single Steel Pole Tangent (0-1 deg, 145')	1.0	EA	$ 50,029	$ 30,018	$ 80,047	**$ 80,047**	
3.5	Small Angle Delta Steel Pole (0-15 deg, 115')	5.0	EA	$ 66,881	$ 40,128	$ 107,009	**$ 535,046**	
3.6	Med Angle Vertical Steel Pole (15-60 deg, 115')	9.0	EA	$ 93,524	$ 56,115	$ 149,639	**$ 1,346,751**	
3.7	Large Angle DE Vertical Steel Pole (60-90 deg, 115')	5.0	EA	$ 111,476	$ 66,885	$ 178,361	**$ 891,806**	
3.8	Large Angle DE Vertical Steel Pole (60-90 deg, 130')	1.0	EA	$ 140,249	$ 84,149	$ 224,398	**$ 224,398**	
3.9	Large Angle DE Vertical Steel Pole (60-90 deg, 145')	1.0	EA	$ 177,172	$ 106,303	$ 283,476	**$ 283,476**	
3.10	Install Grounding	154.0	Structure		$ 5,000	$ 5,000	**$ 770,000**	
TOTAL - STRUCTURES T-LINE:							**$ 12,081,851**	
4. CONDUCTOR, SHIELDWIRE, OPGW								
4.1	(2)/Phase - 795kcmil 26/7 Stranded "Drake" ACSR	20.0	Circuit Mile	$ 53,856	$ 158,400	$ 212,256	**$ 4,240,582**	
4.2	(1) OPGW 36 Fiber AC-33/38/571	20.0	Mile	$ 19,404	$ 27,720	$ 47,124	**$ 941,472**	
4.3	(1) 3/8" HS Steel (2nd SW where required)	1,000.0	Ft	$ 1	$ 5	$ 6	**$ 5,700**	
TOTAL: CONDUCTOR, SHIELDWIRE, OPGW:							**$ 5,187,754**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
5. TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE								
5.1	Tangent - Polymer V-String	399.0	Set	$ 900	$ 720	$ 1,620	**$ 646,380**	
5.2	Angle - Polymer V-String	15.0	Set	$ 1,300	$ 1,040	$ 2,340	**$ 35,100**	
5.3	Deadend - Polymer Double Deadend including Jumper	96.0	Set	$ 1,500	$ 1,350	$ 2,850	**$ 273,600**	
5.4	OPGW Assembly - Tangent	133.0	Set	$ 200	$ 150	$ 350	**$ 46,550**	
5.5	OPGW Assembly - Angle / DE	42.0	Set	$ 250	$ 150	$ 400	**$ 16,800**	
5.6	OHSW Assembly - Angle / DE	4.0	Set	$ 250	$ 150	$ 400	**$ 1,600**	
5.7	OPGW Splice Boxes	9.0	Set	$ 1,500	$ 1,000	$ 2,500	**$ 22,500**	
5.8	OPGW Splice & Test	1.0	Sum		$ 10,800	$ 10,800	**$ 10,800**	
5.9	Spacer Dampers	1,880.0	Ea	$ 50	$ 35	$ 85	**$ 159,800**	
5.10	Vibration Dampers - Conductor	1,880.0	Ea	$ 32	$ 20	$ 52	**$ 97,760**	
5.11	Shieldwire / OPGW Dampers, Misc Fittings	1.0	Sum	$ 10,000	$ 8,000	$ 18,000	**$ 18,000**	
TOTAL: T-LINE INSULATORS, FITTINGS, HARDWARE:							**$ 1,328,890**	
6. NEW DYSINGER SWITCHYARD								
6.1	Site Works including sediment controls, access roads, rough grading, final grading and stone placement	1.0	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	Supply & Install
6.2	Substation Fence	2,450.0	LF		$ 200	$ 200	**$ 490,000**	Supply & Install
6.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
6.4	Switches 3ph	16.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 112,000**	
6.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
6.6	Line Switches 3 ph	5.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 150,000**	
6.7	Instrument Transformers	1.0	Sum		$ 1,046,000	$ 1,046,000	**$ 1,046,000**	
6.8	Breakers	8.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 3,040,000**	
6.9	Arrestors (3 per line)	15.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 112,500**	
6.10	Line Traps	5.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 105,000**	
6.11	Two (2) 345 kV buses	2.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 120,000**	
6.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	Supply & Install
6.13	Low Profile Foundations	231.0	Ea		$ 5,000	$ 5,000	**$ 1,155,000**	Supply & Install
6.14	Caisson DE Foundations	20.0	Ea		$ 50,000	$ 50,000	**$ 1,000,000**	Supply & Install
6.15	Circuit Breaker Foundations	8.0	Ea		$ 75,000	$ 75,000	**$ 600,000**	Supply & Install
6.16	Lightning Mast Foundations	15.0	Ea		$ 15,000	$ 15,000	**$ 225,000**	Supply & Install
6.17	SST Foundation	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	
6.18	Control House and Pad (30' x 90')	1.0	Sum	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	Supply & Install
6.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	
6.20	Control Cables	1.0	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
6.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
6.22	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	Supply & Install
6.23	Protection, Telecom and Metering Equipment (Panels)	30.0	Ea		$ 30,000	$ 30,000	**$ 900,000**	Supply & Install
6.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
6.25	Low Voltage AC Distribution	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
6.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
6.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
6.28	Grounding	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	
6.29	Bus Support 1 Ph	93.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 279,000**	
6.30	Switch Stands	16.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 176,000**	
6.31	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
6.32	Misc. Structures	1.0	Sum	$ -	$ 52,000	$ 52,000	**$ 52,000**	
6.33	Substation A-Frame Structures Standalone	5.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 125,000**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
6.34	Lightning Masts	15.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 180,000**	
6.35	Arrestor Stands	15.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 52,500**	
6.36	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
6.37	Connection of Existing Lines to Dysinger Switchyard	1.0	Sum		$ 3,400,000	$ 3,400,000	**$ 3,400,000**	Supply & Install
TOTAL - DYSINGER SWITCHYARD:							**$ 19,771,000**	
7. STOLLE ROAD SUBSTATION WORKS:								
7.1	Switches 3ph	4.00	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 28,000**	
7.2	Line Switches 3 ph w/ motor-operators	1.00	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 30,000**	
7.3	Instrument Transformers	1.00	Ea		$ 460,000	$ 460,000	**$ 460,000**	
7.4	Breakers	3.00	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 1,140,000**	
7.5	Arrestors (3 per line)	6.00	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 45,000**	
7.6	Line Traps	1.00	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 21,000**	
7.7	345 kV buses	1.00	Ea	$ 12,500	$ 17,500	$ 30,000	**$ 30,000**	Supply & Install
7.8	Low Profile Foundations	91.00	Ea		$ 5,000	$ 5,000	**$ 455,000**	Supply & Install
7.9	Circuit Breaker Foundations	3.00	Ea		$ 75,000	$ 75,000	**$ 225,000**	Supply & Install
7.10	Lightning Mast Foundations	6.0	Ea		$ 15,000	$ 15,000	**$ 90,000**	
7.11	Control Cables	1.00	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	Supply & Install
7.12	Protection, Telecom and Metering Equipment (Panels)	13.00	Ea		$ 30,000	$ 30,000	**$ 390,000**	Supply & Install
7.13	SCADA and Communications	1.00	Sum		$ 125,000	$ 125,000	**$ 125,000**	Supply & Install
7.14	Control Conduits from Cable Tray to Equipment	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
7.15	Cable Trench Systems for Control Cables	1.00	Sum		$ 750,000	$ 750,000	**$ 750,000**	
7.16	Grounding	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	
7.17	Bus Support 1 Ph	54.00	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 162,000**	
7.18	Switch Stands	4.00	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 44,000**	
7.19	Misc. Structures	1.00	Sum		$ 20,000	$ 20,000	**$ 20,000**	Supply & Install
7.20	Lightning Masts	6.00	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 72,000**	Supply & Install
7.21	Arrestor Stands	3.00	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 10,500**	
7.22	Miscellaneous Materials and Above / Below Ground Works	1.00	Sum		$ 750,000	$ 750,000	**$ 750,000**	
7.23	Interconnection arrangement at Stolle Rd Substation	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	
7.24	345kV - 115kV 204/320/400 MVA Transformer	1.00	Ea	$ 3,900,000	$ 750,000	$ 4,650,000	**$ 4,650,000**	
7.25	Transformer Foundation with concrete moat and double steel grating	1.0	Ea		$ 150,000	$ 150,000	**$ 150,000**	
7.26	Firewall 30' long x 12' tall x 1' thick with footer	1.00	Ea		$ 100,000	$ 100,000	**$ 100,000**	Supply & Install
TOTAL - STOLLE RD SUBSTATION WORKS:							**$ 11,447,500**	
8. MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:								
	Contractor Mobilization / Demobilization							
8.1	Mob / Demob	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	
	Project Management, Material Handling & Amenities					$ -	**$ -**	
8.2	Project Management & Staffing (includes PM, Field Engineers / Supervision, Scheduler and	17.0	Months		$ 350,000	$ 350,000	**$ 5,950,000**	
8.3	Site Accommodation, Facilities, Storage	1.0	Sum		$ 1,800,000	$ 1,800,000	**$ 1,800,000**	
	Engineering					$ -	**$ -**	
8.4	Design Engineering	1.0	Sum		$ 3,750,000	$ 3,750,000	**$ 3,750,000**	
8.5	LiDAR	1.0	Sum		$ 400,000	$ 400,000	**$ 400,000**	
8.6	Geotech	1.0	Sum		$ 800,000	$ 800,000	**$ 800,000**	
8.7	Surveying/Staking	1.0	Sum		$ 300,000	$ 300,000	**$ 300,000**	
	Testing & Commissioning					$ -	**$ -**	
8.8	Testing & Commissioning of T-Line and Equipment	1.0	Sum		$ 1,150,000	$ 1,150,000	**$ 1,150,000**	
	Permitting and Additional Costs					$ -	**$ -**	
8.9	Environmental Licensing & Permitting Costs	1.0	Sum		$ 2,308,505	$ 2,308,505	**$ 2,308,505**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
8.10	Environmental Mitigation	1.0	Sum		$ 8,202,072	$ 8,202,072	**$ 8,202,072**	
8.11	Warranties / LOC's	1.0	Sum		$ 418,284	$ 418,284	**$ 418,284**	
8.12	Real Estate Costs (New ROW)	1.0	Sum		$ 157,126	$ 157,126	**$ 157,126**	
8.13	Real Estate Costs (Incumbent Utility ROW)	1.0	Sum		$ 1,502,000	$ 1,502,000	**$ 1,502,000**	
8.14	Legal Fees	1.0	Sum		$ 2,000,000	$ 2,000,000	**$ 2,000,000**	
8.15	Allowance for Funds Used During Construction (AFUDC)	1.0	Sum			$ -	**$ -**	
8.16	Carrying Charges	1.0	Sum			$ -	**$ -**	
8.17	Sales Tax on Materials	1.0	Sum	$ 2,535,304		$ 2,535,304	**$ 2,535,304**	
8.18	Fees for permits, including roadway, railroad, building or other local permits	1.0	Sum		$ 200,000	$ 200,000	**$ 200,000**	
TOTAL - MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:							**$ 32,473,291**	
9. SYSTEM UPGRADE FACILITIES								
SUF 1.1	Depew to Erie Street 115kV Transmission Line 921. Terminal allowance included. See comments.	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Relay was replaced and line ratings increased to 124/137/158 (NOR/LTE/STE) resulting ratings are below line conductor ratings. Scope is to remove all limitations on the circuit so it is limited by lien conductor ratings 125/152/181 (NOR/LTE/STE).
SUF 1.2	Engineering, T&C, PM, Indirects for SUF 1.1 (15%)					$ -	**$ 75,000**	
SUF 2.1	Shawnee to Swann Reconductor	12.00	Mile		$ 400,000	$ 400,000	**$ 4,800,000**	Rate for reconductor is pro-rated from National Grid Niagara - Packard reconductor. Note that rate does not include upgrades to structures or foundations.
SUF 2.2	Engineering, T&C, PM, Indirects FOR SUF 2.2 (15%)					$ -	**$ 720,000**	
SUF 3	Roll Rd Substation							
SUF 3.1	Restoration of station stone within existing substation fence. Assume spoil materials disposed of on-site.	1.00	Ea		$ 100,000	$ 100,000	**$ 100,000**	Supply & Install
SUF 3.2	Transformer 115-34.5kV 90 MVA	1.00	Ea	$ 700,000	$ 200,000	$ 900,000	**$ 900,000**	
SUF 3.3	Switches 115kV 3Ph	1.00	Ea	$ 15,000	$ 12,000	$ 27,000	**$ 27,000**	
SUF 3.4	Switches 35kV 3Ph	1.00	Ea	$ 6,000	$ 4,000	$ 10,000	**$ 10,000**	
SUF 3.5	Breakers 115kV 1200A	1.00	Ea	$ 150,000	$ 50,000	$ 200,000	**$ 200,000**	
SUF 3.6	Breakers 35kV 2000A	1.00	Ea	$ 75,000	$ 15,000	$ 90,000	**$ 90,000**	
SUF 3.7	CVT's 115kV	3.00	Ea	$ 10,000	$ 8,000	$ 18,000	**$ 54,000**	
SUF 3.8	Arrestors 115kV	6.00	Ea	$ 5,000	$ 700	$ 5,700	**$ 34,200**	
SUF 3.9	Arrestors 35kV (for transformer)	3.00	Ea	$ 2,500	$ 500	$ 3,000	**$ 9,000**	
SUF 3.10	Low Profile Foundations	8.00	Ea		$ 5,000	$ 5,000	**$ 40,000**	Supply & Install
SUF 3.11	Circuit Breaker Foundation 115kV	1.00	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
SUF 3.12	Circuit Breaker Foundation 35kV	1.00	Ea		$ 30,000	$ 30,000	**$ 30,000**	Supply & Install
SUF 3.13	Transformer Foundation with concrete moat and double steel grating	1.00	Ea		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
SUF 3.14	Firewall 30' long x 12' tall x 1' thick with footer	1.00	Ea		$ 100,000	$ 100,000	**$ 100,000**	Supply & Install
SUF 3.15	Control Cables	1.00	Sum		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
SUF 3.16	Protection & Telecom Equipment	3.00	Ea		$ 30,000	$ 30,000	**$ 90,000**	
SUF 3.17	SCADA and Communications	1.00	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
SUF 3.18	Low Voltage AC Distribution	1.00	Sum		$ 30,000	$ 30,000	**$ 30,000**	Supply & Install
SUF 3.19	Control Conduits	1.0	Sum		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
SUF 3.20	Grounding	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
SUF 3.21	Switch Stand 115kV (reuse 1 existing)	1.0	Ea	$ 1,500	$ 800	$ 2,300	**$ 2,300**	
SUF 3.22	CVT Stand	3.0	Ea	$ 1,000	$ 1,000	$ 2,000	**$ 6,000**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
SUF 3.23	Arrestor Stand	3.0	Ea	$ 1,000	$ 1,000	$ 2,000	**$ 6,000**	
SUF 3.24	Misc Materials and Above / Below Ground Works	1.0	Sum		$ 120,000	$ 120,000	**$ 120,000**	Supply & Install
SUF 3.25	Engineering, T&C, PM, Indirects for SUF 3 (15%)					$ -	**$ 333,525**	Assumed 15% to cover all misc costs
SUF 4.1	Lockport to Shaw 115kV Transmsision Line 102. NAT report indicated: Remove all limitations to achieve line conductor ratings as the limit. Terminal allowance included.	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	The limiting equipment is not known - scope undefined.
SUF 4.2	Engineering, T&C, PM, Indirects for SUF 4.1 (15%)					$ -	**$ 75,000**	
SUF 5	SYSTEM UPGRADE FACILITIES CONTINGENCY (SEE ASSUMPTIONS & CLARIFICATIONS)						**$ 3,750,000**	Contingency for possible additional SUF upgrades
TOTAL - SYSTEM UPGRADE FACILITIES:							**$ 12,977,025**	

PROJECT TITLE WNY PROJECT EVALUATION- ENVIRONMENTAL LICENSING & PERMITTING COST ELEMENTS						ENVIRONMENTAL LICENSING & PERMITTING COST ESTIMATE RANGE FOR PROPOSED WNY TRANSMISSION PROJECT - T006	
FEDERAL						Proposal 1	
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans	Min.	Max.
USACE	Waters of the US under Section 404 of the Clean Water Act and Section 10 of the 1899 Rivers and Harbors Act (including regulated wetland areas)	Nationwide Permits (NWP) or Individual Permit (IP)	Any work within the boundaries of regulated wetlands (with the exception of isolated wetlands) or waterways to the spring high tide or ordinary high water mark	If project qualifies for a NWP (<0.5 acre disturbance and within NWP project type parameters), a pre-construction notification (PCN) is typically required. NWPs have a 45 day review period starting from when project logged in system (up to 6wk backlog delay in logging projects) If an IP is triggered, USACE will require Alternative Analysis and Public Notice/Hearing. IPs could also trigger restrictive environmental work windows. IPs have a 120 day review period starting from when permit is "deemed complete"	Wetland Delineation; Wetland Function & Value Assessment; Stream Delineation; Restoration Plan	$24,360	$69,050
National Park Service	National Parks	Consultation; Special Use Permit	Only applies if National Park located in project area.	Depending on impact of project request for a special use permit may require a NEPA environmental assessment.			
USFWS	Endangered Species Act Section 7 (ESA) Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act	Consultation (Formal or Informal); Special Use Permit	Any work that may have an affect on listed species or their habitat; or projects within National Wildlife Refuges	USACE coordinates consultation with USFWS for ESA listed species during their permit review. Also includes the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act compliance. Season restrictions on construction could be imposed.	Rare, Threatened & Endangered Species Search; Preparation of Reports and Conservation Plans	$27,800	$94,000
NEPA	National Environmental Policy Act	Categorical Exclusion; EA Finding of No Impact; or EIS Record of Decision	With some exemptions, projects on federally owned lands and/or projects requiring federal permit approvals	Possible NEPA review due if federal agency coordination is required. Federal agency involved to determine if Categorical Exclusion applies. Assumes Article 7 covers NEPA requirements or if an EIS is required it is prepared under SEQRA Task.			
FAA	Airports / Airspace	Federal Aviation Administration (FAA) Notification	New or Replacement Structures near Airports	Depending on construction locations, this permit may only be needed for OP work.	Obstruction Analysis, Mitigation Plan (assumes Engineering Cost)		
STATE							
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans		
NYS Public Service Commission / Department of Public Service (NYSDPS)	Article VII	Article VII: Certificate of Environmental Compatibility and Public Need and Environmental Management & Construction Plan (EM&CP)	Article 7: Major electric transmission facilities with design capacity of 100kV or more extending for at least 10 miles or 125kV and over extending a distance of 1 mile or more (some exclusions for underground transmission applies)	Article 7 will incorporate all of the required State and Local approvals (costed separately), as well as Engineering and Environmental Studies and Public Outreach. Article VII Intervenor Fund payment expected to be $100,000. An Environmental Management & Construction Plan (EM&CP) must be prepared and approved by the PSC. (see 16 NYCRR Parts 85 through 88)	Includes Reports and Plans required for State and Federal Agency Permits, as well as EM&CP, EMF, Noise, Air, Visual Impact Assessment, Invasive Species Control Plan, Mitigation Plans	$600,000	$3,100,000

NYS Public Service Commission / Department of Public Service (NYSDPS)	Part 102		Construction of a utility overhead transmission facility that will convey electric energy at 65kV or higher for a distance of one mile or longer and are not subject to Article VII of the Public Service Law.	May include coordination or studies completed under other line items including: Visual assessment, SHPO determination, OPRHP consultation, Ecological Impacts Assessment	Advantage-Disadvantage Analysis		
NYSDEC	Article 15 Stream Disturbance; Article 24 Wetlands, Open Waters, Wetlands Buffers (100' for Freshwater Wetland)	Individual Permit (IP) (unless developer has General Permit (GP))	Any work within the boundaries of regulated waterways or wetlands, and wetland adjacent areas	Any disturbance within wetlands and/or below mean high tide will require an IP. Areas of temporary disturbance will likely require restoration, including a monitoring and maintenance period. Permanent disturbance will require offsite mitigation up to 3:1 area ratio; also includes a monitoring and maintenance period. GP may only be applicable if project ground disturbance is located outside of wetlands areas (above MHW).	Wetland Delineation; Wetland Restoration/Mitigation Plan	$16,800	$62,000
NYSDEC	Stormwater (If >1 Acre Soil Disturbance)	SPDES General Permit for Stormwater Discharges from Construction Activities GP-0-15-002 & SWPPP	Project areas of soil disturbance	If project involves 1 acre or more soil disturbance, then the GP is required. If located within a Regulated MS4 Municipality, additional coordination may be needed. Weekly inspections by a Qualified Inspector during construction will be required.	SWPPP (assumes Engineering Cost includes Sediment & Erosion Control Plan, Hydraulic & Hydrology Studies, Stormwater Management Design)	$11,200	$38,000
Any State or local government agency that issues permits or approvals	State Environmental Quality Review Act (SEQRA)	Environmental Assessment (EA) Determination of Significance	Projects not covered as a Type II Action (Note a project can not be segmented - all phases/tasks must be considered in the review)	Most projects or activities proposed by a state agency, and all discretionary approvals (permits) from a NYS agency or local government, require an environmental impact assessment. SEQR requires the sponsoring or approving governmental body to identify and mitigate the significant environmental impacts of the activity it is proposing or permitting.			
NYSDOS	State Coastal Management Program Mapped Coastal Area Boundary	Coastal Consistency Concurrence	Projects within the NYSDOS designated Coastal Zone; and consistency with Local Waterfront Revitalization Plans (LWRPs); e.g., Town of Grand Island LWRP	Online mapping available to check if within coastal zone, a significant coastal fish & wildlife habitat (SCFWH), a local waterfront revitalization program area (LWRP), or a comprehensive management program areas (CMP)			
NYSHPO	National Historic Preservation Act (NHPA) Section 106: State and Federal Historic Places; State Mapped Archeologically Sensitive Areas	Cultural Resource Information System (CRIS) Determination	Local, State, or Federal eligible or designated historic places and/or areas of archeological sensitivity (in off-road areas and areas that have not been previously disturbed)	NYSDEC EAF Online Mapper identifies State or National Register of Historic Places and archeological sensitive areas within or adjacent to the project site. Formally enter project information and supporting documents into SHPO's online CRIS program. Staff will review and email a determination of impacts letter	Phase 1A & 1B Archaeological Studies	$13,200	$49,000

NYS NHP	Threatened and Endangered Species	Consultation	Activities that may affect T&E species or their habitat.		See USFWS	$1,200	$6,400
NYSDOT/NYS Thruway Authority/FHWA	State Roadways	Highway Work Permit/Utility Permit, Vegetation Management Permit; Easement	Any work within or crossing State highway ROW	May require restoration landscaping coordination. Typically requires compliance with NEPA including SHPO and USFWS effects determination	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$17,000	$69,000
NYS Canal Corporation	Erie Canal - jurisdiction varies along edge	Canal Occupancy & Work Permit (TA-W99072)	Any work involving the Erie Canal	Must coordinate with Division Permit Engineer about particular section of canal being affected. Commercial permit fee = $25 plus $2,000,000 additional General Aggregate Liability Insurance	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)		
NYS Dept. of Agriculture and Markets	All agricultural lands (including Agricultural Districts)	Part of Article 7 & Article 10 Review process	Any work impacting agricultural land	Must minimize impacts and restore damage to agricultural land, and coordinate with County Soil & Water Conservation District; Vineyards are a major concern in WNYS. Pre-application conference with PSC, DEC and Ag& Markets recommended. Must develop EM&CP in conformance with Art. 7/10 Certificate Conditions. Agricultural Monitor must oversee construction & restoration; requisite 2-yrs post restoration monitoring.	Crop/Pasturing Mitigation Plan (not included in costing)	$11,000	$24,000

REGIONAL

Railroads	Railroad crossings	Consultation-permits may be required; Easement	Access / new structures on RR property		Easement area survey (not included in costs)	$11,000	$76,000

LOCAL/MUNICIPAL

Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans		
County Dept. of Public Works	County Roadways	Lane Closure Permit, Highway Work or Access Permit	Work within county roadways and right-of-ways			$6,000	$40,000
Town, City or Village	Municipal Stormwater (MS4) Review	Approval of SWPPP or EM&CP	Project areas of soil disturbance		See NYSDEC SPDES	$6,000	$35,000
Town, City or Village	Variable	Building Permits	New Structures	Individual Towns/Villages must be consulted on a project specific basis to determine notification and/or permitting procedures. Permit application names vary (e.g. road obstruction permit)		$18,000	$92,000
Town, City or Village	Municipal Roadways	Highway Work Permit; Road Opening Permit	Work within municipal roadways and right-of-ways			$6,000	$35,000
Town, City or Village	Wetlands	Wetland Permit / Conservation Approvals	Mapped wetlands and wetland adjacent areas (buffer width variable)		See USACE / NYSDEC Art. 24	$6,000	$52,000

		Minimum	Maximum
ENVIRONMENTAL LICENSING & PERMITTING COST (EXCLUDING MITIGATION)	**PROJECT T006 TOTAL**	**$775,560**	**$3,841,450**
Excluded cost: Mitigation or restoration for impact to regulated wetlands; agricultural land and tree clearing	**Expected Value**	**$2,308,505**	

ENVIRONMENTAL MITIGATION ESTIMATE

Revision: 4

	Offsite Wetland Mitigation*		Farmland**	
	Min.	Max.	Min.	Max.
Area	39 acres	39 acres	16 acres	32 acres
Cost/Acre	$60,000	$120,000	$503	$503
Ratio	1:1	3:1	1:1	1:1
Total	$2,340,000	$14,040,000	$8,048	$16,096

T006 MITIGATION TOTAL	Minimum	Maximum	Expected Value
	$2,348,048	**$14,056,096**	**$ 8,202,072**

*Offsite wetland mitigation area assumes clearing of NWI Forested/Shrub Wetland Approx. 3.24 miles (17107 lF) by 100' ROW width; Max. cost per acre assumes additional mitigation required for permanent impacts of proposed structures in non-forested wetlands; costing includes design and installation costs only; does not include land acquisition or long term monitoring

**Farmland mitigation based on corn bushel yield at 129 BU/Acre and $3.9/BU (production numbers from 2016 USDA NYS Agriculture Overview), area assumes 5.28 miles (27878 LF) Adjacent to Agriculture Properties by 25' Wide (Min.) or 50' Wide (Max.); does not include land acquisition

REAL ESTATE ESTIMATE (NEW ROW)

Revision: 4

COUNTY: ERIE

DEVELOPER: NORTH AMERICAN (T006)

SEGMENT: DYSINGER - STOLLE SEGMENT

		Area (Acres)	Total Cost
	Sub Total	0.68	$ 4,376.00

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T006 - North American Transmission

Revision: 4

REAL ESTATE ESTIMATE
(INCUMBENT UTILITY ROW)

COUNTY: NIAGARA & ERIE
DEVELOPER: NORTH AMERICAN (T006)
SEGMENT: DYSINGER - STOLLE SEGMENT

	DEVELOPER	SEGMENT	COUNTY	INCUMBENT UTILITY (ROW) (ACRES)	TOTAL ROW COST
1	North American Transmission (Proposal 1)	Dysinger SS to Stolle Rd SS - 19.98 miles	Niagara	5.74	$ 1,502,000
			Erie	296.31	

REAL ESTATE ESTIMATE (SUBSTATIONS)

Revision: 4

COUNTY:	NIAGARA
DEVELOPER:	NORTH AMERICAN (T006)
SEGMENT:	DYSINGER SWITCHYARD

		Total Cost
	Total Cost of Proposed Substation Site	$152,750.00

ASSUMPTIONS AND CLARIFICATIONS

Revision: 4

a) Cost Estimate is based on 2017 rates.
b) Construction schedule is in accordance with the Developers proposed schedule (10 months) - we have assumed continuous working with no breaks in the schedule. Six months have been added to the construction schedule for start up and close out works and assisting in pre-construction activities (i.e. permitting activites, material procurement etc.).
c) Stringing rates allow for protection over crossings (such as rider poles).
d) We have assumed a typical work week (6 x 10 hour days).
e) We have assumed that the Access Road included in Developer Estimate will be Type 1 Gravel Type.
f) Costs will vary for handling and disposal of contaminated spoils, depending on type of contaminants and availability / location of the appropriate tipping facility. Since there is not enough information to provide a quantified estimate for this item, allowance is included in the contingency monies.
g) Costs have been developed based on historical data from Projects of a similar nature (AACE Class 5 and 4 Estimating Practices). We have not engaged any subcontractors or material vendors for formal quotes.
h) Estimated quantities have been used for items in red text in Section 1 of the Estimate (CLEARING & ACCESS FOR T-LINE CONSTRUCTION). These items were not quantified in the Developers Estimate, however we believe that they are necessary for the works.
i) Foundation rates include supply and installation of materials. Drilled Pier rates include supply and testing of concrete, rebar cage and the use of temp or permanent casing.
j) A Contractor Mark-Up (OH&P) of 15% has been included in the Total section.
k) Assumes all environmental data and project details provided are accurate unless noted otherwise.
l) USFWS T&E Assumes that ¼ of the total line in ROW per segment will require field survey for T&E (5 miles).
m) NEPA-Assumes no NEPA because Art VII.
n) SHPO-Assumes consultation and Phase 1A/1B archeological studies with field survey for 50% of project route (10 miles).
o) NYSDOT/FHWA-Assumes any required NEPA coordination/requirements are covered under Article VII.
p) Assumes no coordination with National Parks Service or OPRHP/State Parks.
q)USACE wetland delineation total based on Line Miles in Wetlands - NWI wetland length of 3.34 mile.
r) DEC wetland delineation total based on Line Miles in Wetlands - DEC wetland length of 1.19 miles.

ASSUMPTIONS AND CLARIFICATIONS

Revision: 4

s) Offsite wetland mitigation area costs based on impacts anticipated by clearing of NWI Forested/Shrub Wetland of approximately 3.24 miles (calculated by GEI based on NWI mapper legend categories). Assumes clearing an additional 100 feet within Right of Way. Minimum costs at $60,000/acre, maximum costs at $120,000/acre for additional permanent impacts of proposed structures in non-forested wetlands. Costing includes design and installation costs only and does not include land acquisition or long term monitoring.
t) Agricultural mitigation assumes timber matting impacts and pad impacts on adjacent agriculture land (5.28 miles) requires crop damage payments based on USDA 2016 NYS Agriculture Overview corn yield and bushel price/acre. Minimum assumes 25-foot-wide impact, Maximum assumes 50-foot-wide impact.
u)Mitigation costs for landscaping only (no paving, sidewalks, sound walls, etc.).
v) No tree survey or replanting required outside regulated wetlands areas.
w) Article VII Intervenor Fund payment expected to be $100,000.
x) SUF pricing includes 35% to cover Contractor markup (15%) and contingency (20%)
y) SUF reconductor rate is based on Niagara-Packard (National Grid) reconductor estimate, pro-rated to a rate / mile. Note that this is based on conductor, shieldwire and hardware pricing only and does not include structure or foundation works.
z) System Upgrade Facilities Contingency is allowance for potential additional system upgrades including overdutied breakers, protection changes, unidentified thermal issues, etc that may be identified as detailed studies are completed.

INDEPENDENT ESTIMATES

ATTACHMENT B2

T007 – NORTH AMERICAN TRANSMISSION

SUBSTATION ENGINEERING COMPANY
8/11/2017

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T007 - North American Transmission

Revision: 4

SUMMARY OF COST ESTIMATE

	Description		Total Amount
1	CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION	$	18,262,638
2	TRANSMISSION LINE FOUNDATIONS	$	21,747,379
3	STRUCTURES - TRANSMISSION LINE	$	27,076,848
4	CONDUCTOR, SHIELDWIRE, OPGW	$	8,522,568
5	TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE	$	2,536,564
6	NEW DYSINGER SWITCHYARD	$	19,771,000
7	STOLLE ROAD SUBSTATION WORKS	$	7,548,000
8	GARDENVILLE 345/230kV SUBSTATION WORKS	$	12,822,500
9	MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS	$	53,282,851
	CONTRACTOR MARK-UP (OH&P) 15%	$	25,735,552
	SUBTOTAL:	$	197,305,901
	CONTINGENCY (25%)	$	49,326,475
	TOTAL (A):	**$**	**246,632,376**
10	SYSTEM UPGRADE FACILITIES	$	23,258,025
	CONTRACTOR MARKUP & CONTINGENCY (35%)	$	8,140,309
	TOTAL (B):	**$**	**31,398,334**
	TOTAL PROJECT COST (A+B):	**$**	**278,030,710**

SECO SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

Description of Work: Proposal 1 - A new 345kV Dysinger Switchyard located approximately 8 miles southeast of the city of Lockport, New York. The Project also includes a new ~20 mile 345kV Transmission Line from Dysinger Switchyard to Stolle Road Substation near Marilla, New York. Proposal 2 - Includes Proposal 1 Scope of Work, with the addition of a single circuit 345kV Transmission Line from the Stolle Road 345kV Substation to the existing Gardenville Substation, and a new 345/230kV Transformer at the existing Gardenville Substation. This cost estimate uses Option 1 routing (as per NAT estimate).

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
1. CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION								
1.1	Clearing the ROW (mowing & clearing)	199.0	Acre		$ 15,000	$ 15,000	**$ 2,985,000**	
1.2	Access Road	98,960.0	LF		$ 45	$ 45	**$ 4,453,200**	Assumes Type 1 Type Gravel Road
1.3	Silt Fence	98,960.0	LF		$ 4	$ 4	**$ 395,840**	
1.4	Matting	74,295.0	LF		$ 70	$ 70	**$ 5,200,650**	
1.5	Snow Removal	1.0	Sum		$ 492,000	$ 492,000	**$ 492,000**	
1.6	ROW Restoration	33.0	Mile		$ 10,000	$ 10,000	**$ 330,000**	
1.7	Work Pads	832,500.0	SF		$ 4	$ 4	**$ 2,930,400**	
1.8	Restoration for Work Pad areas	83,250.0	SF		$ 0.2	$ 0.2	**$ 12,488**	
1.9	Temporary Access Bridge	30.0	EA		$ 20,035	$ 20,035	**$ 601,050**	
1.10	Air Bridge	8.0	EA		$ 14,445	$ 14,445	**$ 115,560**	
1.11	Stabilized Construction Entrance	15.0	EA		$ 4,580	$ 4,580	**$ 68,700**	
1.12	Maintenance and Protection of Traffic on Public Roads	1.0	LS		$ 500,000	$ 500,000	**$ 500,000**	
1.13	Culverts / Misc. Access	1.0	LS		$ 150,000	$ 150,000	**$ 150,000**	
1.14	Concrete Washout Station	15.0	EA		$ 1,850	$ 1,850	**$ 27,750**	
TOTAL - CLEARING & ACCESS FOR TRANSMISSION LINE:							**$ 18,262,638**	
2. TRANSMISSION LINE FOUNDATIONS								
2.1	Direct Embed Foundations - 23ft deep x 6ft dia.	136.0	Structure		$ 18,000	$ 18,000	**$ 2,448,000**	Supply & Install
2.2	Direct Embed Foundations - 28ft deep x 7ft dia.	5.0	Structure		$ 20,000	$ 20,000	**$ 100,000**	Supply & Install
2.3	Direct Embed Foundations - 30ft deep x 6ft dia.	35.0	Structure		$ 20,000	$ 20,000	**$ 700,000**	Supply & Install
2.4	Direct Embed Foundations - 37ft deep x 7ft dia.	11.0	Structure		$ 22,000	$ 22,000	**$ 242,000**	Supply & Install
2.5	Drilled Pier 38ft deep x 9ft dia.	984.9	CUY		$ 1,500	$ 1,500	**$ 1,477,334**	
2.6	Drilled Pier 45ft deep x 9ft dia.	349.9	CUY		$ 1,500	$ 1,500	**$ 524,849**	
2.7	Drilled Pier 47ft deep x 8ft dia.	1,347.5	CUY		$ 1,500	$ 1,500	**$ 2,021,250**	
2.8	Drilled Pier 57ft deep x 9ft dia.	443.2	CUY		$ 1,500	$ 1,500	**$ 664,785**	
2.9	Drilled Pier 64ft deep x 8ft dia.	393.2	CUY		$ 1,500	$ 1,500	**$ 589,793**	
2.10	Drilled Pier 71ft deep x 9ft dia.	4,048.4	CUY		$ 1,500	$ 1,500	**$ 6,072,627**	
2.11	Drilled Pier 43ft deep x 8ft dia.	792.5	CUY		$ 1,500	$ 1,500	**$ 1,188,743**	
2.12	Rock Excavation Adder	2,859.0	CUY		$ 2,000	$ 2,000	**$ 5,718,000**	
TOTAL - TRANSMISSION LINE FOUNDATIONS:							**$ 21,747,379**	
3. STRUCTURES - TRANSMISSION LINE								
3.1	Single Steel Pole Tangent Delta - 00- 10 (Ht. 100')	18.0	ea	$ 31,401	$ 18,841	$ 50,242	**$ 904,349**	
3.2	Single Steel Pole Tangent Delta - 00- 10 (Ht. 115')	118.0	ea	$ 38,376	$ 23,026	$ 61,402	**$ 7,245,389**	
3.3	Single Steel Pole Tangent Delta - 00- 10 (Ht. 130')	29.0	ea	$ 44,150	$ 26,490	$ 70,641	**$ 2,048,579**	
3.4	Single Steel Pole Tangent Delta - 00- 10 (Ht. 145')	6.0	ea	$ 50,029	$ 30,018	$ 80,047	**$ 480,280**	
3.5	Single Steel Pole Small Angle Delta - 10- 15 (Ht. 115')	5.0	pole	$ 66,881	$ 40,128	$ 107,009	**$ 535,046**	
3.6	Single Steel Pole Small Angle Delta - 10- 15 (Ht. 130)	4.0	pole	$ 78,872	$ 47,323	$ 126,196	**$ 504,783**	
3.7	Single Steel Pole Small Angle Delta - 10- 15 (Ht. 145)	2.0	pole	$ 94,927	$ 56,956	$ 151,883	**$ 303,765**	
3.8	Single Steel Pole Medium Angle Vertical - 15- 60 (Ht. 115')	9.0	pole	$ 93,524	$ 56,115	$ 149,639	**$ 1,346,751**	
3.9	Single Steel Pole Medium Angle Vertical - 15- 60 (Ht. 130')	7.0	pole	$ 120,604	$ 72,362	$ 192,966	**$ 1,350,760**	
3.10	Single Steel Pole Medium Angle Vertical - 15- 60 (Ht. 145')	7.0	pole	$ 153,391	$ 92,034	$ 245,425	**$ 1,717,975**	
3.11	Single Steel Pole Medium Angle Vertical - 15- 60 (Ht. 185')	3.0	pole	$ 187,828	$ 112,697	$ 300,525	**$ 901,575**	
3.12	Single Steel Pole Large Angle DE Vertical - 60- 90 (Ht. 115')	10.0	pole	$ 111,476	$ 66,885	$ 178,361	**$ 1,783,613**	
3.13	Single Steel Pole Large Angle DE Vertical - 60- 90 (Ht. 130')	15.0	pole	$ 140,249	$ 84,149	$ 224,398	**$ 3,365,971**	
3.14	Single Steel Pole Large Angle DE Vertical - 60- 90 (Ht. 145')	7.0	pole	$ 177,172	$ 106,303	$ 283,476	**$ 1,984,329**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
3.15	Large Angle DE (Ht. 195')	3.0	pole	$ 169,360	$ 101,616	$ 270,976	**$ 812,929**	
3.16	Tangent DE (Ht. 195')	3.0	pole	$ 116,824	$ 70,094	$ 186,918	**$ 560,753**	
3.17	Install Grounding	246.0	Structure		$ 5,000	$ 5,000	**$ 1,230,000**	
TOTAL - STRUCTURES TRANSMISSION LINE:							**$ 27,076,848**	
4. CONDUCTOR, SHIELDWIRE, OPGW								
4.1	(2)/Phase - 795kcmil 26/7 Stranded "Drake" ACSR	32.8	Circuit Mile	$ 53,856	$ 158,400	$ 212,256	**$ 6,964,864**	
4.2	(1) OPGW 36 Fiber AC-33/38/571	32.8	Mile	$ 19,404	$ 27,720	$ 47,124	**$ 1,546,304**	
4.3	(1) 3/8" HS Steel (2nd SW where required)	2,000.0	Ft	$ 1	$ 5	$ 6	**$ 11,400**	
TOTAL: CONDUCTOR, SHIELDWIRE, OPGW:							**$ 8,522,568**	
5. TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE								
5.1	Tangent - Polymer V-String	516.0	Set	$ 900	$ 720	$ 1,620	**$ 835,920**	
5.2	Angle - Polymer V-String	33.0	Set	$ 1,300	$ 1,040	$ 2,340	**$ 77,220**	
5.3	Deadend - Polymer Double Deadend including Jumper	354.0	Set	$ 1,500	$ 1,350	$ 2,850	**$ 1,008,900**	
5.4	OPGW Assembly - Tangent	172.0	Set	$ 200	$ 150	$ 350	**$ 60,200**	
5.5	OPGW Assembly - Angle / DE	148.0	Set	$ 250	$ 150	$ 400	**$ 59,200**	
5.6	OHSW Assembly - Angle / DE	8.0	Set	$ 250	$ 150	$ 400	**$ 3,200**	
5.7	OPGW Splice Boxes	15.0	Set	$ 1,500	$ 1,000	$ 2,500	**$ 37,500**	
5.8	OPGW Splice & Test	1.0	Sum		$ 18,000	$ 18,000	**$ 18,000**	
5.9	Spacer Dampers	2,952.0	Ea	$ 50	$ 35	$ 85	**$ 250,920**	
5.10	Vibration Dampers - Conductor	2,952.0	Ea	$ 32	$ 20	$ 52	**$ 153,504**	
5.11	Shieldwire / OPGW Dampers, Misc Fittings	1.0	Sum	$ 20,000	$ 12,000	$ 32,000	**$ 32,000**	
TOTAL: TRANSMISSION LINE INSULATORS, FITTINGS, HARDWARE:							**$ 2,536,564**	
6. NEW DYSINGER SWITCHYARD								
6.1	Site Works including sediment controls, access roads, rough grading, final grading and stone placement	1.0	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	Supply & Install
6.2	Substation Fence	2,450.0	LF		$ 200	$ 200	**$ 490,000**	Supply & Install
6.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
6.4	Switches 3ph	16.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 112,000**	
6.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
6.6	Line Switches 3 ph	5.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 150,000**	
6.7	Instrument Transformers	1.0	Sum		$ 1,046,000	$ 1,046,000	**$ 1,046,000**	
6.8	Breakers	8.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 3,040,000**	
6.9	Arrestors (3 per line)	15.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 112,500**	
6.10	Line Traps	5.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 105,000**	
6.11	Two (2) 345 kV buses	2.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 120,000**	
6.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	Supply & Install
6.13	Low Profile Foundations	231.0	Ea		$ 5,000	$ 5,000	**$ 1,155,000**	Supply & Install
6.14	Caisson DE Foundations	20.0	Ea		$ 50,000	$ 50,000	**$ 1,000,000**	Supply & Install
6.15	Circuit Breaker Foundations	8.0	Ea		$ 75,000	$ 75,000	**$ 600,000**	Supply & Install
6.16	Lightning Mast Foundations	15.0	Ea		$ 15,000	$ 15,000	**$ 225,000**	Supply & Install
6.17	SST Foundation	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	
6.18	Control House and Pad (30' x 90')	1.0	Sum	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	Supply & Install
6.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	
6.20	Control Cables	1.0	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
6.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
6.22	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	Supply & Install
6.23	Protection, Telecom and Metering Equipment (Panels)	30.0	Ea		$ 30,000	$ 30,000	**$ 900,000**	Supply & Install
6.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
6.25	Low Voltage AC Distribution	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
6.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
6.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
6.28	Grounding	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	
6.29	Bus Support 1 Ph	93.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 279,000**	
6.30	Switch Stands	16.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 176,000**	
6.31	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
6.32	Misc. Structures	1.0	Sum	$ -	$ 52,000	$ 52,000	**$ 52,000**	
6.33	Substation A-Frame Structures Standalone	5.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 125,000**	
6.34	Lightning Masts	15.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 180,000**	
6.35	Arrestor Stands	15.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 52,500**	
6.36	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
6.37	Connection of Existing Lines to Dysinger Switchyard	1.0	Sum		$ 3,400,000	$ 3,400,000	**$ 3,400,000**	Supply & Install
TOTAL - DYSINGER SWITCHYARD:							**$ 19,771,000**	
7. STOLLE ROAD SUBSTATION WORKS:								
7.1	Switches 3ph	6.00	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 42,000**	
7.2	Line Switches 3 ph w/ motor-operators	2.00	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 60,000**	
7.3	Instrument Transformers	1.00	Sum		$ 544,000	$ 544,000	**$ 544,000**	
7.4	Breakers	4.00	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 1,520,000**	
7.5	Arrestors (3 per line)	6.00	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 45,000**	
7.6	Line Traps	2.00	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 42,000**	
7.7	345 kV buses	1.00	Ea	$ 12,500	$ 17,500	$ 30,000	**$ 30,000**	Supply & Install
7.8	Low Profile Foundations	110.00	Ea		$ 5,000	$ 5,000	**$ 550,000**	Supply & Install
7.9	Caisson DE Foundations	4.00	Ea		$ 50,000	$ 50,000	**$ 200,000**	Supply & Install
7.1	Circuit Breaker Foundations	4.00	Ea		$ 75,000	$ 75,000	**$ 300,000**	Supply & Install
7.11	Lightning Mast Foundations	4.0	Ea		$ 15,000	$ 15,000	**$ 60,000**	
7.12	Control Cables	1.00	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	Supply & Install
7.13	Protection, Telecom and Metering Equipment (Panels)	16.00	Ea		$ 30,000	$ 30,000	**$ 480,000**	Supply & Install
7.14	SCADA and Communications	1.00	Sum		$ 125,000	$ 125,000	**$ 125,000**	Supply & Install
7.15	Control Conduits from Cable Tray to Equipment	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
7.16	Cable Trench Systems for Control Cables	1.00	Sum		$ 750,000	$ 750,000	**$ 750,000**	
7.17	Grounding	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	
7.18	Bus Support 1 Ph	54.00	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 162,000**	
7.19	Switch Stands	6.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 66,000**	
7.2	Misc. Structures	1.00	Sum		$ 28,000	$ 28,000	**$ 28,000**	
7.21	Substation A-Frame Structures Standalone	1.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 25,000**	
7.22	Lightning Masts	4.00	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 48,000**	
7.23	Arrestor Stands	6.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 21,000**	
7.24	Miscellaneous Materials and Above / Below Ground Works	1.00	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
7.25	Interconnection arrangement at Stolle Rd Substation	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
TOTAL - STOLLE RD SUBSTATION WORKS:							**$ 7,548,000**	
8. GARDENVILLE 345/230kV SUBSTATION WORKS								
8.1	Site Works including sediment controls, access roads, rough grading, final grading	1.0	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
8.2	Substation Fence	1,400.0	LF		$ 200	$ 200	**$ 280,000**	Supply & Install
8.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
8.4	Switches 3ph	1.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 7,000**	
8.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
8.6	Line Switches 3 ph w/ motor-operators	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
8.7	Instrument Transformers	1.0	Sum		$ 271,000	$ 271,000	**$ 271,000**	
8.8	Breakers	1.0	Ea	$ 250,000	$ 75,000	$ 325,000	**$ 325,000**	

SECO SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
8.9	Arrestors (3 per line)	12.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 90,000**	
8.10	Line Traps	1.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 21,000**	
8.11	230 kV buses	1.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 60,000**	
8.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	
8.13	Low Profile Foundations	40.0	Ea		$ 5,000	$ 5,000	**$ 200,000**	Supply & Install
8.14	Caisson DE Foundations	12.0	Ea		$ 50,000	$ 50,000	**$ 600,000**	Supply & Install
8.15	Circuit Breaker Foundations	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
8.16	Lightning Mast Foundations	1.0	Ea		$ 15,000	$ 15,000	**$ 15,000**	Supply & Install
8.17	SST Foundation	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
8.18	Control House and Pad (14' x 70' - 980 sq. ft)	1.0	Ea	$ 350,000	$ 100,000	$ 450,000	**$ 450,000**	
8.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
8.20	Control Cables	1.0	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
8.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
8.22	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	
8.23	Protection, Telecom and Metering Equipment (Panels)	11.0	Ea		$ 30,000	$ 30,000	**$ 330,000**	Supply & Install
8.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
8.25	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
8.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 357,500	$ 357,500	**$ 357,500**	Supply & Install
8.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 350,000	$ 350,000	**$ 350,000**	Supply & Install
8.28	Grounding	1.0	Sum		$ 125,000	$ 125,000	**$ 125,000**	Supply & Install
8.29	Bus Support 1 Ph	18.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 54,000**	
8.30	Switch Stands	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
8.31	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
8.32	Misc. Structures	1.0	Sum		$ 27,000	$ 27,000	**$ 27,000**	
8.33	Substation A-Frame Structures Standalone	3.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 75,000**	
8.34	Lightning Masts	1.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 12,000**	
8.35	Arrestor Stands	6.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 21,000**	
8.36	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 725,000	$ 725,000	**$ 725,000**	Supply & Install
8.37	345kV - 230kV 480/540/600 MVA Transformer	1.0	Ea	$ 4,750,000	$ 750,000	$ 5,500,000	**$ 5,500,000**	
8.38	Transformer Foundation with concrete moat and double steel grating	1.0	Ea		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
TOTAL - GARDENVILLE SUBSTATION WORKS:							**$ 12,822,500**	
9. MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:								
	Contractor Mobilization / Demobilization							
9.1	Mob / Demob	1.0	Sum		$ 1,200,000	$ 1,200,000	**$ 1,200,000**	
	Project Management, Material Handling & Amenities					$ -	**$ -**	
9.2	Project Management & Staffing (includes PM, Field Engineers / Supervision,	24.0	Months		$ 375,000	$ 375,000	**$ 9,000,000**	
9.3	Site Accommodation, Facilities, Storage	1.0	Sum		$ 2,000,000	$ 2,000,000	**$ 2,000,000**	
	Engineering					$ -	**$ -**	
9.4	Design Engineering	1.0	Sum		$ 6,600,000	$ 6,600,000	**$ 6,600,000**	
9.5	LiDAR	1.0	Sum		$ 600,000	$ 600,000	**$ 600,000**	
9.6	Geotech	1.0	Sum		$ 1,100,000	$ 1,100,000	**$ 1,100,000**	
9.7	Surveying/Staking	1.0	Sum		$ 450,000	$ 450,000	**$ 450,000**	
	Testing & Commissioning					$ -	**$ -**	
9.8	Testing & Commissioning of TRANSMISSION LINE and Equipment	1.0	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	
	Permitting and Additional Costs					$ -	**$ -**	
9.9	Environmental Licensing & Permitting Costs	1.0	Sum		$ 3,120,534	$ 3,120,534	**$ 3,120,534**	
9.10	Environmental Mitigation	1.0	Sum		$ 9,884,084	$ 9,884,084	**$ 9,884,084**	
9.11	Warranties / LOC's	1.0	Sum		$ 738,968	$ 738,968	**$ 738,968**	
9.12	Real Estate Costs (New ROW)	1.0	Sum		$ 7,623,974	$ 7,623,974	**$ 7,623,974**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
9.13	Real Estate Costs (Incumbent Utility ROW)	1.0	Sum		$ 1,949,484	$ 1,949,484	**$ 1,949,484**	
9.14	Legal Fees	1.0	Sum		$ 2,500,000	$ 2,500,000	**$ 2,500,000**	
9.15	Allowance for Funds Used During Construction (AFUDC)	1.0	Sum			$ -	**$ -**	
9.16	Carrying Charges	1.0	Sum			$ -	**$ -**	
9.17	Sales Tax on Materials	1.0	Sum	$ 4,815,807		$ 4,815,807	**$ 4,815,807**	
9.18	Fees for permits, including roadway, railroad, building or other local permits	1.0	Sum		$ 200,000	$ 200,000	**$ 200,000**	
TOTAL - MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:							**$ 53,282,851**	
10. SYSTEM UPGRADE FACILITIES								
SUF 1.1	Depew to Erie Street 115kV Transmission Line 921. Terminal allowance included.	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Relay was replaced and line ratings
SUF 1.2	Engineering, T&C, PM, Indirects for SUF 1.1 (15%)					$ -	$ 75,000	increased to 124/137/158 (NOR/LTE/STE)
SUF 2.1	Shawnee to Swann Reconductor	12.00	Mile		$ 400,000	$ 400,000	**$ 4,800,000**	Rate for reconductor is pro-rated from
SUF 2.2	Engineering, T&C, PM, Indirects FOR SUF 2.2 (15%)					$ -	$ 720,000	National Grid Niagara - Packard
SUF 3	Roll Rd Substation							
SUF 3.1	Restoration of station stone within existing substation fence. Assume spoil materials disposed of on-site.	1.00	Ea		$ 100,000	$ 100,000	**$ 100,000**	Supply & Install
SUF 3.2	Transformer 115-34.5kV 90 MVA	1.00	Ea	$ 700,000	$ 200,000	$ 900,000	**$ 900,000**	
SUF 3.3	Switches 115kV 3Ph	1.00	Ea	$ 15,000	$ 12,000	$ 27,000	**$ 27,000**	
SUF 3.4	Switches 35kV 3Ph	1.00	Ea	$ 6,000	$ 4,000	$ 10,000	**$ 10,000**	
SUF 3.5	Breakers 115kV 1200A	1.00	Ea	$ 150,000	$ 50,000	$ 200,000	**$ 200,000**	
SUF 3.6	Breakers 35kV 2000A	1.00	Ea	$ 75,000	$ 15,000	$ 90,000	**$ 90,000**	
SUF 3.7	CVT's 115kV	3.00	Ea	$ 10,000	$ 8,000	$ 18,000	**$ 54,000**	
SUF 3.8	Arrestors 115kV	6.00	Ea	$ 5,000	$ 700	$ 5,700	**$ 34,200**	
SUF 3.9	Arrestors 35kV (for transformer)	3.00	Ea	$ 2,500	$ 500	$ 3,000	**$ 9,000**	
SUF 3.10	Low Profile Foundations	8.00	Ea		$ 5,000	$ 5,000	**$ 40,000**	Supply & Install
SUF 3.11	Circuit Breaker Foundation 115kV	1.00	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
SUF 3.12	Circuit Breaker Foundation 35kV	1.00	Ea		$ 30,000	$ 30,000	**$ 30,000**	Supply & Install
SUF 3.13	Transformer Foundation with concrete moat and double steel grating	1.00	Ea		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
SUF 3.14	Firewall 30' long x 12' tall x 1' thick with footer	1.00	Ea		$ 100,000	$ 100,000	**$ 100,000**	Supply & Install
SUF 3.15	Control Cables	1.00	Sum		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
SUF 3.16	Protection & Telecom Equipment	3.00	Ea		$ 30,000	$ 30,000	**$ 90,000**	
SUF 3.17	SCADA and Communications	1.00	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
SUF 3.18	Low Voltage AC Distribution	1.00	Sum		$ 30,000	$ 30,000	**$ 30,000**	Supply & Install
SUF 3.19	Control Conduits	1.0	Sum		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
SUF 3.20	Grounding	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
SUF 3.21	Switch Stand 115kV (reuse 1 existing)	1.0	Ea	$ 1,500	$ 800	$ 2,300	**$ 2,300**	
SUF 3.22	CVT Stand	3.0	Ea	$ 1,000	$ 1,000	$ 2,000	**$ 6,000**	
SUF 3.23	Arrestor Stand	3.0	Ea	$ 1,000	$ 1,000	$ 2,000	**$ 6,000**	
SUF 3.24	Misc Materials and Above / Below Ground Works	1.0	Sum		$ 120,000	$ 120,000	**$ 120,000**	Supply & Install
SUF 3.25	Engineering, T&C, PM, Indirects for SUF 3 (15%)					$ -	**$ 333,525**	Assumed 15% to cover all misc costs
SUF 4.1	Lockport to Shaw 115kV Transmsision Line 102. NAT report indicated: Remove all limitations to achieve line conductor ratings as the limit. Terminal allowance included.	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	The limiting equipment is not known - scope undefined.
SUF 4.2	Engineering, T&C, PM, Indirects for SUF 4.1 (15%)					$ -	**$ 75,000**	
SUF 5	Gardenville Circuit Breaker Replacement							
SUF 5.1	Circuit Breaker Foundation	12.0	Ea		$ 75,000	$ 75,000	**$ 900,000**	Supply & Install
SUF 5.2	Below Grade Conduit & Grounding	1.0	Sum		$ 1,200,000	$ 1,200,000	**$ 1,200,000**	Supply & Install
SUF 5.3	Circuit breaker - 230kV	12.0	Ea	$ 250,000	$ 75,000	$ 325,000	**$ 3,900,000**	
SUF 5.4	Switches - 230kV	24.0	Ea	$ 20,000	$ 15,000	$ 35,000	**$ 840,000**	
SUF 5.5	Control Cables	1.0	Sum		$ 1,200,000	$ 1,200,000	**$ 1,200,000**	Supply & Install

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
SUF 5.6	Misc Above Ground Works	1.0	Sum		$ 900,000	$ 900,000	**$ 900,000**	
SUF 5.7	Engineering, T&C, PM, Indirects for SUF 5 (15%)					$ -	**$ 1,341,000**	Assumed 15% to cover all misc costs
SUF 6	SYSTEM UPGRADE FACILITIES CONTINGENCY (SEE ASSUMPTIONS & CLARIFICATIONS)						**$ 3,750,000**	Contingency for possible additional SUF upgrades
TOTAL - SYSTEM UPGRADE FACILITIES:							**$ 23,258,025**	

PROJECT TITLE WNY PROJECT EVALUATION- ENVIRONMENTAL LICENSING & PERMITTING COST ELEMENTS						ENVIRONMENTAL LICENSING & PERMITTING COST ESTIMATE RANGE FOR PROPOSED WNY TRANSMISSION PROJECT - T007	
FEDERAL						Proposal 2	
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans	Min.	Max.
USACE	Waters of the US under Section 404 of the Clean Water Act and Section 10 of the 1899 Rivers and Harbors Act (including regulated wetland areas)	Nationwide Permits (NWP) or Individual Permit (IP)	Any work within the boundaries of regulated wetlands (with the exception of isolated wetlands) or waterways to the spring high tide or ordinary high water mark	If project qualifies for a NWP (<0.5 acre disturbance and within NWP project type parameters), a pre-construction notification (PCN) is typically required. NWPs have a 45 day review period starting from when project logged in system (up to 6wk backlog delay in logging projects) If an IP is triggered, USACE will require Alternative Analysis and Public Notice/Hearing. IPs could also trigger restrictive environmental work windows. IPs have a 120 day review period starting from when permit is "deemed complete"	Wetland Delineation; Wetland Function & Value Assessment; Stream Delineation; Restoration Plan	$26,600	$89,000
National Park Service	National Parks	Consultation; Special Use Permit	Only applies if National Park located in project area.	Depending on impact of project request for a special use permit may require a NEPA environmental assessment.			
USFWS	Endangered Species Act Section 7 (ESA) Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act	Consultation (Formal or Informal); Special Use Permit	Any work that may have an affect on listed species or their habitat; or projects within National Wildlife Refuges	USACE coordinates consultation with USFWS for ESA listed species during their permit review. Also includes the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act compliance. Season restrictions on construction could be imposed.	Rare, Threatened & Endangered Species Search; Preparation of Reports and Conservation Plans	$43,600	$125,600
NEPA	National Environmental Policy Act	Categorical Exclusion; EA Finding of No Impact; or EIS Record of Decision	With some exemptions, projects on federally owned lands and/or projects requiring federal permit approvals	Possible NEPA review due if federal agency coordination is required. Federal agency involved to determine if Categorical Exclusion applies. Assumes Article 7 covers NEPA requirements or if an EIS is required it is prepared under SEQRA Task.			
FAA	Airports / Airspace	Federal Aviation Administration (FAA) Notification	New or Replacement Structures near Airports	Depending on construction locations, this permit may only be needed for OP work.	Obstruction Analysis, Mitigation Plan (assumes Engineering Cost)	$3,000	$9,000
STATE							
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans		
NYS Public Service Commission / Department of Public Service (NYSDPS)	Article VII	Article VII: Certificate of Environmental Compatibility and Public Need and Environmental Management & Construction Plan (EM&CP)	Article 7: Major electric transmission facilities with design capacity of 100kV or more extending for at least 10 miles or 125kV and over extending a distance of 1 mile or more (some exclusions for underground transmission applies)	Article 7 will incorporate all of the required State and Local approvals (costed separately), as well as Engineering and Environmental Studies and Public Outreach. Intervenor Fund payment expected to be $100,000. An Environmental Management & Construction Plan (EM&CP) must be prepared and approved by the PSC. (see 16 NYCRR Parts 85 through 88)	Includes Reports and Plans required for State and Federal Agency Permits, as well as EM&CP, EMF, Noise, Air, Visual Impact Assessment, Invasive Species Control Plan, Mitigation Plans	$600,000	$3,100,000

NYS Public Service Commission / Department of Public Service (NYSDPS)	Part 102		Construction of a utility overhead transmission facility that will convey electric energy at 65kV or higher for a distance of one mile or longer and are not subject to Article VII of the Public Service Law.	Report may include coordination or studies completed under other line items including: Visual assessment, SHPO determination, OPRHP consultation, Ecological Impacts Assessment Submit to the Commission for 60-day notice period: if no response for a formal investigation project can proceed, if formal investigation ordered project modification may be required	Advantage-Disadvantage Analysis		
NYSDEC	Article 15 Stream Disturbance; Article 24 Wetlands, Open Waters, Wetlands Buffers (100' for Freshwater Wetland)	Individual Permit (IP) (unless developer has General Permit (GP))	Any work within the boundaries of regulated waterways or wetlands, and wetland adjacent areas	Any disturbance within wetlands and/or below mean high tide will require an IP. Areas of temporary disturbance will likely require restoration, including a monitoring and maintenance period. Permanent disturbance will require offsite mitigation up to 3:1 area ratio; also includes a monitoring and maintenance period. GP may only be applicable if project ground disturbance is located outside of wetlands areas (above MHW).	Wetland Delineation; Wetland Restoration/Mitigation Plan	$20,240	$72,575
NYSDEC	Stormwater (If >1 Acre Soil Disturbance)	SPDES General Permit for Stormwater Discharges from Construction Activities GP-0-15-002 & SWPPP	Project areas of soil disturbance	If project involves 1 acre or more soil disturbance, then the GP is required. If located within a Regulated MS4 Municipality, additional coordination may be needed. Weekly inspections by a Qualified Inspector during construction will be required.	SWPPP (assumes Engineering Cost includes Sediment & Erosion Control Plan, Hydraulic & Hydrology Studies, Stormwater Management Design)	$11,200	$38,000
Any State or local government agency that issues permits or approvals	State Environmental Quality Review Act (SEQRA)	Environmental Assessment (EA) Determination of Significance	Projects not covered as a Type II Action (Note a project can not be segmented - all phases/tasks must be considered in the review)	Most projects or activities proposed by a state agency, and all discretionary approvals (permits) from a NYS agency or local government, require an environmental impact assessment. SEQR requires the sponsoring or approving governmental body to identify and mitigate the significant environmental impacts of the activity it is proposing or permitting.			
NYSDOS	State Coastal Management Program Mapped Coastal Area Boundary	Coastal Consistency Concurrence	Projects within the NYSDOS designated Coastal Zone; and consistency with Local Waterfront Revitalization Plans (LWRPs); e.g., Town of Grand Island LWRP	Online mapping available to check if within coastal zone, a significant coastal fish & wildlife habitat (SCFWH), a local waterfront revitalization program area (LWRP), or a comprehensive management program areas (CMP)			
NYSHPO	National Historic Preservation Act (NHPA) Section 106: State and Federal Historic Places; State Mapped Archeologically Sensitive Areas	Cultural Resource Information System (CRIS) Determination	Local, State, or Federal eligible or designated historic places and/or areas of archeological sensitivity (in off-road areas and areas that have not been previously disturbed)	NYSDEC EAF Online Mapper identifies State or National Register of Historic Places and archeological sensitive areas within or adjacent to the project site. Formally enter project information and supporting documents into SHPO's online CRIS program. Staff will review and email a determination of impacts letter	Phase 1A & 1B Archaeological Studies	$19,510	$67,930

NYS NHP	Threatened and Endangered Species	Consultation	Activities that may affect T&E species or their habitat.		See USFWS	$1,200	$6,400
NYSDOT/NYS Thruway Authority/FHWA	State Roadways	Highway Work Permit/Utility Permit, Vegetation Management Permit; Easement	Any work within or crossing State highway ROW	May require restoration landscaping coordination. Typically requires compliance with NEPA including SHPO and USFWS effects determination	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$17,000	$200,000
NYS Canal Corporation	Erie Canal - jurisdiction varies along edge	Canal Occupancy & Work Permit (TA-W99072)	Any work involving the Erie Canal	Must coordinate with Division Permit Engineer about particular section of canal being affected. Commercial permit fee = $25 plus $2,000,000 additional General Aggregate Liability Insurance	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)		
NYS Dept. of Agriculture and Markets	All agricultural lands (including Agricultural Districts)	Part of Article 7 & Article 10 Review process	Any work impacting agricultural land	Must minimize impacts and restore damage to agricultural land, and coordinate with County Soil & Water Conservation District; Vineyards are a major concern in WNYS. Pre-application conference with PSC, DEC and Ag& Markets recommended. Must develop EM&CP in conformance with Art. 7/10 Certificate Conditions. Agricultural Monitor must oversee construction & restoration; requisite 2-yrs post restoration monitoring.	Crop/Pasturing Mitigation Plan (not included in costing)	$11,000	$24,000
REGIONAL							
Railroads	Railroad crossings	Consultation-permits may be required; Easement	Access / new structures on RR property		Easement area survey (not included in costs)	$11,000	$200,000
LOCAL/MUNICIPAL							
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans		
County Dept. of Public Works	County Roadways	Lane Closure Permit, Highway Work or Access Permit	Work within county roadways and right-of-ways			$6,000	$40,000
Town, City or Village	Municipal Stormwater (MS4) Review	Approval of SWPPP or EM&CP	Project areas of soil disturbance		See NYSDEC SPDES	$6,000	$35,000
Town, City or Village	Variable	Building Permits	New Structures	Individual Towns/Villages must be consulted on a project specific basis to determine notification and/or permitting procedures. Permit application names vary (e.g. road obstruction permit)		$18,000	$92,000
Town, City or Village	Municipal Roadways	Highway Work Permit; Road Opening Permit	Work within municipal roadways and right-of-ways			$6,000	$35,000
Town, City or Village	Wetlands	Wetland Permit / Conservation Approvals	Mapped wetlands and wetland adjacent areas (buffer width variable)		See USACE / NYSDEC Art. 24	$6,000	$52,000

		Minimum	Maximum
ENVIRONMENTAL LICENSING & PERMITTING COST (EXCLUDING MITIGATION)	**PROJECT T007 TOTAL**	**$806,350**	**$4,186,505**
Excluded cost: Mitigation or restoration for impact to regulated wetlands; agricultural land and tree clearing	**Expected Value**	**$3,120,534.38**	

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T007 - North American Transmission

ENVIRONMENTAL MITIGATION ESTIMATE

Revision: 4

	Offsite Wetland Mitigation*		Farmland**	
	Min.	Max.	Min.	Max.
Area	47 acres	47 acres	18.7 acres	37.3 acres
Cost/Acre	$60,000	$120,000	$503	$503
Ratio	1:1	3:1	1:1	1:1
Total	$2,820,000	$16,920,000	$9,406	$18,762

T007 MITIGATION TOTAL	Minimum	Maximum	Expected Value
	$2,829,406	**$16,938,762**	**$ 9,884,084**

*Offsite wetland mitigation area assumes Highway Alternative Route; clearing of NWI Forested/Shrub Wetland Approx. 3.88 miles (20486 LF) by 100' ROW width; Max. cost per acre assumes additional mitigation required for permanent impacts of proposed structures in non-forested wetlands; costing includes design and installation costs only; does not include land acquisition or long term monitoring
**Farmland mitigation based on corn bushel yield at 129 BU/Acre and $3.9/BU (production numbers from 2016 USDA NYS Agriculture Overview), area assumes 6.16 miles (32525 LF) Adjacent to Agriculture Properties by 25' Wide (Min.) or 50' Wide (Max.); does not include land acquisition

REAL ESTATE ESTIMATE (NEW ROW)

Revision: 4

COUNTY: ERIE

DEVELOPER: NORTH AMERICAN (T007)

SEGMENT: DYSINGER - STOLLE SEGMENT

		Area (Acres)	Total Cost
	Sub Total	0.68	$ 4,376.00

REAL ESTATE ESTIMATE (NEW ROW)

Revision: 4

COUNTY: ERIE

DEVELOPER: NORTH AMERICAN (T007)

SEGMENT: STOLLE TO GARDENVILLE SEGMENT

		Area (Acres)	Total Cost
	Total	167.00	$ 6,838,497.00

REAL ESTATE ESTIMATE
(INCUMBENT UTILITY ROW)

Revision: 4

COUNTY: NIAGARA & ERIE
DEVELOPER: NORTH AMERICAN (T007)
SEGMENT: DYSINGER - STOLLE - GARDENVILLE SEGMENT

	DEVELOPER	SEGMENT	COUNTY	INCUMBENT UTILITY (ROW) (ACRES)	TOTAL ROW COST
T007	North American Transmission (Proposal 2)	Dysinger SS to Stolle Rd SS - 19.98 miles	Niagara	5.74	$ 1,640,000
			Erie	296.31	
		Stolle Rd SS to Gardenville SS - 12.84 miles	Erie	27.55	

REAL ESTATE ESTIMATE (HOUSES)

Revision: 4

COUNTY: ERIE

DEVELOPER: NORTH AMERICAN (T007)

SEGMENT: STOLLE ROAD TO GARDENVILLE

		Total Valuation of Property with 3% Escalation/year (as of 2017)
	Total Valuation Cost	$ 628,349.85

REAL ESTATE ESTIMATE (SUBSTATIONS)

Revision: 4

COUNTY: NIAGARA
DEVELOPER: NORTH AMERICAN (T007)
SEGMENT: DYSINGER SWITCHYARD

		Total Cost
	Total Cost of Proposed Substation Site	$152,750.00

REAL ESTATE ESTIMATE (SUBSTATIONS)

Revision: 4

COUNTY: ERIE
DEVELOPER: NORTH AMERICAN (T007)
SEGMENT: GARDENVILLE SUBSTATION (OPTION 1)

		Total Cost
	Total Cost of Proposed Substation Site	$ 309,483.90

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T007 - North American Transmission

ASSUMPTIONS AND CLARIFICATIONS

Revision: 4

a) Cost Estimate is based on 2017 rates.
b) Construction schedule is in accordance with the Developers proposed schedule (approx 12 months) - we have assumed continuous working with no breaks in the schedule. Six months added to construction schedule for PM time for start up and close out works and float.
c) Stringing rates allow for protection over crossings (such as rider poles).
d) We have assumed a typical work week (6 x 10 hour days).
e) We have assumed the Access Road included in Developer Estimate will be Type 1 Gravel Type.
f) Costs will vary for handling and disposal of contaminated spoils, depending on type of contaminants and availability / location of the appropriate tipping facility. Since there is not enough information to provide a quantified estimate for this item, allowance is included in the contingency monies.
g) Costs have been developed based on historical data from Projects of a similar nature (AACE Class 5 and 4 Estimating Practices). We have not engaged any subcontractors or material vendors for formal quotes.
h) Estimated quantities have been used for items in red text in Section 1 of the Estimate (CLEARING & ACCESS FOR T-LINE CONSTRUCTION). These items were not quantified in the Developers Estimate, however we believe that they are necessary for the works.
i) Foundation rates include supply and installation of materials. Drilled Pier rates include supply and testing of concrete, rebar cage and the use of temp or permanent casing.
j) A Contractor Mark-Up (OH&P) of 15% has been included in the Total section.
k)Assumes all environmental data and project details provided are accurate unless noted otherwise.
l) USFWS T&E Assumes that ¼ of the total line in ROW per proposal will require field survey for T&E (Approximately 32.6 miles).
m)NEPA-Assumes no NEPA because Art VII.
n) SHPO-Assumes consultation and Phase 1A/1B archeological studies with field survey for 50% of project route (Approx. 16.31 miles).
o) NYSDOT/FHWA-Assumes any required NEPA coordination/requirements are covered under Article VII or SEQRA review. Max costs includes additional agency coordination (greater than general fixed costing max.) for new ROW Parallel to Highway.
p) Railroad - Max costs includes additional agency coordination (greater than general fixed costing max.) for new ROW Parallel to Railroad.
q) Assumes no coordination with National Parks Service or OPRHP/State Parks.
r) USACE wetland delineation total based on Line Miles in Wetlands - NWI wetland lengths of 3.91 miles (Min.) and 4.01 miles (Max.).
s) DEC wetland delineation total based on Line Miles in Wetlands - DEC wetland lengths of 2.06 miles (Min.) and 2.61 miles (Max.).
t) Offsite wetland mitigation area costs based on impacts anticipated by clearing of NWI Forested/Shrub Wetland of approximately 3.88 miles using the Stolle Road to Gardenville Highway alternative (calculated by GEI based on NWI mapper legend categories). Assumes clearing an additional 100 feet within Right of Way. Minimum costs at $60,000/acre, maximum costs at $120,000/acre for additional permanent impacts of proposed structures in non-forested wetlands. Costing includes design and installation costs only and does not include land acquisition or long term monitoring.

ASSUMPTIONS AND CLARIFICATIONS

Revision: 4

u) Agricultural mitigation assumes timber matting impacts and pad impacts on adjacent agriculture land (6.16 miles) requires crop damage payments based on USDA 2016 NYS Agriculture Overview corn yield and bushel price/acre. Minimum assumes 25-foot-wide impact, Maximum assumes 50-foot-
v) No tree survey or replanting required outside regulated wetlands areas.
w) Article VII Intervenor Fund payment expected to be $100,000.
x) Mitigation costs for landscaping only (no paving, sidewalks, sound walls, etc.)
y) Expected value of environmental licensing and permitting cost is estimated to be 25% higher than the mean of the range based upon the addition of the new Gardenville to Stolle 345kV line.
z) NAT did not provide estimates from Options 2 and 3 (for connection to Gardenville). Our estimate only includes Option 1.
aa) SUF pricing includes 35% to cover Contractor markup (15%) and contingency (20%)
ab) SUF reconductor rate is based on Niagara-Packard (National Grid) reconductor estimate, pro-rated to a rate / mile. Note that this is based on conductor, shieldwire and hardware pricing only and does not include structure or foundation works.
ac) System Upgrade Facilities Contingency is allowance for potential additional system upgrades including overdutied breakers, protection changes, unidentified thermal issues, etc that may be identified as detailed studies are completed.

INDEPENDENT ESTIMATES

ATTACHMENT B3

T008 – NORTH AMERICAN TRANSMISSION

SUBSTATION ENGINEERING COMPANY
8/11/2017

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T008 - North American Transmission

Revision: 4

SUMMARY OF COST ESTIMATE

	Description		Total Amount
1	CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION	$	22,772,195
2	TRANSMISSION LINE FOUNDATIONS	$	28,417,010
3	STRUCTURES - TRANSMISSION LINE	$	39,158,699
4	CONDUCTOR, SHIELDWIRE, OPGW	$	13,710,320
5	TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE	$	3,821,694
6	NEW DYSINGER SWITCHYARD	$	20,868,000
7	STOLLE ROAD SUBSTATION WORKS	$	14,263,000
8	GARDENVILLE 345/230kV SUBSTATION WORKS	$	12,822,500
9	MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS	$	69,918,737
	CONTRACTOR MARK-UP (OH&P) 15%	$	33,862,823
	SUBTOTAL:	$	259,614,979
	CONTINGENCY (25%)	$	64,903,745
	TOTAL (A):	**$**	**324,518,723**

10	SYSTEM UPGRADE FACILITIES	$	23,258,025
	CONTRACTOR MARKUP & CONTINGENCY (35%)	$	8,140,309
	TOTAL (B):	**$**	**31,398,334**

TOTAL PROJECT COST (A+B):	**$**	**355,917,057**

SECO SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

Revision: 4

Description of Work: Proposal 1 - A new 345kV Dysinger Switchyard located approximately 8 miles southeast of the city of Lockport, New York. The Project also includes a new ~20 mile 345kV Transmission Line from Dysinger Switchyard to Stolle Road Substation near Marilla, New York. Proposal 2 - Includes Proposal 1 Scope of Work, with the addition of a single circuit 345kV Transmission Line from the Stolle Road 345kV Substation to the existing Gardenville Substation, and a new 345/230kV Transformer at the existing Gardenville Substation. This cost estimate uses Option 1 routing (as per NAT estimate). Proposal 3 includes an additional 345kV single circuit transmission line from the Dysinger Switchyard to the existing Stolle Road 345kV Substation.

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
1. CLEARING & ACCESS FOR T-LINE CONSTRUCTION								
1.1	Clearing the ROW (mowing & clearing)	350.00	Acre		$ 15,000	$ 15,000	**$ 5,250,000**	
1.2	Access Road	104,060.30	LF		$ 45	$ 45	**$ 4,682,713**	Assumes Type 1 Type Gravel Road
1.3	Silt Fence	104,060.30	LF		$ 4	$ 4	**$ 416,241**	
1.4	Matting	84,695.00	LF		$ 70	$ 70	**$ 5,928,650**	
1.5	Snow Removal	1.00	Sum		$ 825,000	$ 825,000	**$ 825,000**	
1.6	ROW Restoration	52.79	Mile		$ 10,000	$ 10,000	**$ 527,921**	
1.7	Work Pads	1,040,625.00	SF		$ 4	$ 4	**$ 3,663,000**	
1.8	Restoration for Work Pad areas	104,062.50	SF		$ 0.2	$ 0.2	**$ 15,609**	
1.9	Temporary Access Bridge	30.0	EA		$ 20,035	$ 20,035	**$ 601,050**	
1.10	Air Bridge	8.0	EA		$ 14,445	$ 14,445	**$ 115,560**	
1.11	Stabilized Construction Entrance	15.0	EA		$ 4,580	$ 4,580	**$ 68,700**	
1.12	Maintenance and Protection of Traffic on Public Roads	1.0	LS		$ 500,000	$ 500,000	**$ 500,000**	
1.13	Culverts / Misc. Access	1.0	LS		$ 150,000	$ 150,000	**$ 150,000**	
1.14	Concrete Washout Station	15.0	EA		$ 1,850	$ 1,850	**$ 27,750**	
TOTAL - CLEARING & ACCESS FOR T-LINE:							**$ 22,772,195**	
2. T-LINE FOUNDATIONS								
2.1	Direct Embed Foundations - 23ft deep x 6ft dia.	263.00	Structure		$ 18,000	$ 18,000	**$ 4,734,000**	Supply & Install
2.2	Direct Embed Foundations - 28ft deep x 7ft dia.	10.00	Structure		$ 20,000	$ 20,000	**$ 200,000**	Supply & Install
2.3	Direct Embed Foundations - 30ft deep x 6ft dia.	41.00	Structure		$ 20,000	$ 20,000	**$ 820,000**	Supply & Install
2.4	Direct Embed Foundations - 37ft deep x 7ft dia.	6.00	Structure		$ 22,000	$ 22,000	**$ 132,000**	Supply & Install
2.5	Drilled Pier 38ft deep x 9ft dia.	1,477.41	CUY		$ 1,500	$ 1,500	**$ 2,216,115**	
2.6	Drilled Pier 45ft deep x 9ft dia.	349.90	CUY		$ 1,500	$ 1,500	**$ 524,849**	
2.7	Drilled Pier 47ft deep x 8ft dia.	1,347.49	CUY		$ 1,500	$ 1,500	**$ 2,021,231**	
2.8	Drilled Pier 57ft deep x 9ft dia.	443.20	CUY		$ 1,500	$ 1,500	**$ 664,800**	
2.9	Drilled Pier 64ft deep x 8ft dia.	393.19	CUY		$ 1,500	$ 1,500	**$ 589,782**	
2.10	Drilled Pier 71ft deep x 9ft dia.	4,416.45	CUY		$ 1,500	$ 1,500	**$ 6,624,676**	
2.11	Drilled Pier 43ft deep x 8ft dia.	1,585.04	CUY		$ 1,500	$ 1,500	**$ 2,377,557**	
2.12	Rock Excavation Adder	3,756.00	CUY		$ 2,000	$ 2,000	**$ 7,512,000**	
TOTAL - T-LINE FOUNDATIONS:							**$ 28,417,010**	
3. STRUCTURES - T-LINE								
3.1	Single Steel Pole Tangent Delta - 00- 10 (Ht. 100')	36.00	EA	$ 31,401	$ 18,841	$ 50,242	**$ 1,808,698**	
3.2	Single Steel Pole Tangent Delta - 00- 10 (Ht. 115')	227.00	EA	$ 38,376	$ 23,026	$ 61,402	**$ 13,938,163**	
3.3	Single Steel Pole Tangent Delta - 00- 10 (Ht. 130')	34.00	EA	$ 44,150	$ 26,490	$ 70,641	**$ 2,401,782**	
3.4	Single Steel Pole Tangent Delta - 00- 10 (Ht. 145')	7.00	EA	$ 50,029	$ 30,018	$ 80,047	**$ 560,327**	
3.5	Single Steel Pole Small Angle Delta - 10- 15 (Ht. 115')	10.00	Pole	$ 66,881	$ 40,128	$ 107,009	**$ 1,070,093**	
3.6	Single Steel Pole Small Angle Delta - 10- 15 (Ht. 130)	4.00	Pole	$ 78,872	$ 47,323	$ 126,196	**$ 504,783**	
3.7	Single Steel Pole Small Angle Delta - 10- 15 (Ht. 145)	2.00	Pole	$ 94,927	$ 56,956	$ 151,883	**$ 303,765**	
3.8	Single Steel Pole Medium Angle Vertical - 15- 60 (Ht. 115')	18.00	Pole	$ 93,524	$ 56,115	$ 149,639	**$ 2,693,503**	
3.9	Single Steel Pole Medium Angle Vertical - 15- 60 (Ht. 130')	7.00	Pole	$ 120,604	$ 72,362	$ 192,966	**$ 1,350,760**	
3.10	Single Steel Pole Medium Angle Vertical - 15- 60 (Ht. 145')	7.00	Pole	$ 153,391	$ 92,034	$ 245,425	**$ 1,717,975**	
3.11	Single Steel Pole Medium Angle Vertical - 15- 60 (Ht. 185')	3.00	Pole	$ 187,828	$ 112,697	$ 300,525	**$ 901,575**	
3.12	Single Steel Pole Large Angle DE Vertical - 60- 90 (Ht. 115')	15.00	Pole	$ 111,476	$ 66,885	$ 178,361	**$ 2,675,419**	

SECO SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

Revision: 4

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
3.13	Single Steel Pole Large Angle DE Vertical - 60- 90 (Ht. 130')	16.00	Pole	$ 140,249	$ 84,149	$ 224,398	**$ 3,590,369**	
3.14	Single Steel Pole Large Angle DE Vertical - 60- 90 (Ht. 145')	8.00	Pole	$ 177,172	$ 106,303	$ 283,476	**$ 2,267,804**	
3.15	Large Angle DE (Ht. 195')	3.00	Pole	$ 169,360	$ 101,616	$ 270,976	**$ 812,929**	
3.16	Tangent DE (Ht. 195')	3.00	Pole	$ 116,824	$ 70,094	$ 186,918	**$ 560,753**	
3.17	Install Grounding	400.00	Structure		$ 5,000	$ 5,000	**$ 2,000,000**	Supply & Install
TOTAL - STRUCTURES T-LINE:							**$ 39,158,699**	
4. CONDUCTOR, SHIELDWIRE, OPGW								
4.1	(2)/Phase - 795kcmil 26/7 Stranded "Drake" ACSR	52.79	Circuit Mile	$ 53,856	$ 158,400	$ 212,256	**$ 11,205,444**	
4.2	(1) OPGW 36 Fiber AC-33/38/571	52.79	Mile	$ 19,404	$ 27,720	$ 47,124	**$ 2,487,776**	
4.3	(1) 3/8" HS Steel (2nd SW where required)	3,000.00	Ft	$ 1	$ 5	$ 6	**$ 17,100**	
TOTAL: CONDUCTOR, SHIELDWIRE, OPGW:							**$ 13,710,320**	
5. T-LINE INSULATOR, FITTINGS, HARDWARE								
5.1	Tangent - Polymer V-String	915.00	Set	$ 900	$ 720	$ 1,620	**$ 1,482,300**	
5.2	Angle - Polymer V-String	48.00	Set	$ 1,300	$ 1,040	$ 2,340	**$ 112,320**	
5.3	Deadend - Polymer Double Deadend including Jumper	444.00	Set	$ 1,500	$ 1,350	$ 2,850	**$ 1,265,400**	
5.4	OPGW Assembly - Tangent	305.00	Set	$ 200	$ 150	$ 350	**$ 106,750**	
5.5	OPGW Assembly - Angle / DE	180.00	Set	$ 250	$ 150	$ 400	**$ 72,000**	
5.6	OHSW Assembly - Angle / DE	12.00	Set	$ 250	$ 150	$ 400	**$ 4,800**	
5.7	OPGW Splice Boxes	23.00	Set	$ 1,500	$ 1,000	$ 2,500	**$ 57,500**	
5.8	OPGW Splice & Test	1.00	Sum		$ 27,600	$ 27,600	**$ 27,600**	
5.9	Spacer Dampers	4,752.00	Ea	$ 50	$ 35	$ 85	**$ 403,920**	
5.10	Vibration Dampers - Conductor	4,752.00	Ea	$ 32	$ 20	$ 52	**$ 247,104**	
5.11	Shieldwire / OPGW Dampers, Misc Fittings	1.00	Sum	$ 30,000	$ 12,000	$ 42,000	**$ 42,000**	
TOTAL: T-LINE INSULATORS, FITTINGS, HARDWARE:							**$ 3,821,694**	
6. NEW DYSINGER SWITCHYARD								
6.1	Site Works including sediment controls, access roads, rough grading, final	1.00	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	Supply & Install
6.2	Substation Fence	2,450.00	LF		$ 200	$ 200	**$ 490,000**	Supply & Install
6.3	SSVT	1.00	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
6.4	Switches 3ph	18.00	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 126,000**	
6.5	Fuses 1ph	3.00	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
6.6	Line Switches 3 ph	6.00	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 180,000**	
6.7	Instrument Transformers	1.00	Sum		$ 1,130,000	$ 1,130,000	**$ 1,130,000**	
6.8	Breakers	9.00	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 3,420,000**	
6.9	Arrestors (3 per line)	18.00	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 135,000**	
6.10	Line Traps	6.00	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 126,000**	
6.11	Two (2) 345 kV buses	2.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 120,000**	
6.12	Auxillary Power Generator - 500kW	1.00	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	Supply & Install
6.13	Low Profile Foundations	250.00	Ea		$ 5,000	$ 5,000	**$ 1,250,000**	Supply & Install
6.14	Caisson DE Foundations	24.00	Ea		$ 50,000	$ 50,000	**$ 1,200,000**	Supply & Install
6.15	Circuit Breaker Foundations	9.00	Ea		$ 75,000	$ 75,000	**$ 675,000**	Supply & Install
6.16	Lightning Mast Foundations	15.00	Ea		$ 15,000	$ 15,000	**$ 225,000**	Supply & Install
6.17	SST Foundation	1.00	Ea		$ 75,000	$ 75,000	**$ 75,000**	
6.18	Control House and Pad (30' x 90')	1.0	Sum	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	Supply & Install
6.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	
6.20	Control Cables	1.00	Sum	$ 110,000	$ 110,000	$ 220,000	**$ 220,000**	
6.21	125VDC Batteries	2.00	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
6.22	Station Services	2.00	Ea		$ 25,000	$ 25,000	**$ 50,000**	Supply & Install
6.23	Protection, Telecom and Metering Equipment (Panels)	33.00	Ea		$ 30,000	$ 30,000	**$ 990,000**	Supply & Install

SECO SUBSTATION ENGINEERING COMPANY

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
6.24	SCADA and Communications	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
6.25	Low Voltage AC Distribution	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
6.26	Control Conduits from Cable Tray to Equipment	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
6.27	Cable Trench Systems for Control Cables	1.00	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
6.28	Grounding	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	
6.29	Bus Support 1 Ph	93.00	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 279,000**	
6.30	Switch Stands	18.00	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 198,000**	
6.31	Fuse Stand	1.00	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
6.32	Misc. Structures	1.0	Sum		$ 60,000	$ 60,000	**$ 60,000**	
6.33	Substation A-Frame Structures Standalone	6.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 150,000**	
6.34	Lightning Masts	15.00	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 180,000**	
6.35	Arrestor Stands	18.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 63,000**	
6.36	Miscellaneous Materials and Above / Below Ground Works	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
6.37	Connection of Existing Lines to Dysinger Switchyard	1.00	Sum		$ 3,400,000	$ 3,400,000	**$ 3,400,000**	Supply & Install
TOTAL - DYSINGER SWITCHYARD:							**$ 20,868,000**	
7. STOLLE ROAD SUBSTATION WORKS:								
7.1	Site Works including sediment controls, access roads, rough grading, final grading and stone placement	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
7.2	Substation Fence	715.00	LF		$ 200	$ 200	**$ 143,000**	Supply & Install
7.3	Switches 3ph	14.00	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 98,000**	
7.4	Line Switches 3 ph w/ motor-operators	4.00	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 120,000**	
7.5	Instrument Transformers	1.00	Sum		$ 691,000	$ 691,000	**$ 691,000**	
7.6	Breakers	8.00	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 3,040,000**	
7.7	Arrestors (3 per line)	12.00	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 90,000**	
7.8	Line Traps	4.00	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 84,000**	
7.9	345 kV buses	2.00	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 120,000**	
7.10	Low Profile Foundations	183.00	Ea		$ 5,000	$ 5,000	**$ 915,000**	Supply & Install
7.11	Caisson DE Foundations	16.00	Ea		$ 50,000	$ 50,000	**$ 800,000**	Supply & Install
7.12	Circuit Breaker Foundations	8.00	Ea		$ 75,000	$ 75,000	**$ 600,000**	Supply & Install
7.13	Lightning Mast Foundations	8.00	Ea		$ 15,000	$ 15,000	**$ 120,000**	Supply & Install
7.13	Control House and Pad (25' x 50' - 1250 sq. ft)	1.00	Ea	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	Supply & Install
7.14	Control Cables	1.00	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
7.14	125VDC Batteries	2.00	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
7.15	Protection, Telecom and Metering Equipment (Panels)	27.00	Ea		$ 30,000	$ 30,000	**$ 810,000**	Supply & Install
7.16	SCADA and Communications	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
7.16	Low Voltage AC Distribution & DC Panels & Switches	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
7.17	Control Conduits from Cable Tray to Equipment	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
7.18	Cable Trench Systems for Control Cables	1.00	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
7.19	Grounding	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	
7.20	Bus Support 1 Ph	66.00	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 198,000**	
7.21	Switch Stands	14.00	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 154,000**	
7.22	Misc. Structures	1.0	Sum		$ 42,000	$ 42,000	**$ 42,000**	
7.23	Substation A-Frame Structures Standalone	4.00	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 100,000**	
7.24	Lightning Masts	8.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 96,000**	
7.25	Arrestor Stands	12.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 42,000**	
7.26	Miscellaneous Materials and Above / Below Ground Works	1.00	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
7.27	Interconnection arrangement at Stolle Rd Substation	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
TOTAL - STOLLE RD SUBSTATION WORKS:							**$ 14,263,000**	

SECO SUBSTATION ENGINEERING COMPANY

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
8. GARDENVILLE 345/230kV SUBSTATION WORKS								
8.1	Site Works including sediment controls, access roads, rough grading, final	1.0	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
8.2	Substation Fence	1,400.0	LF		$ 200	$ 200	**$ 280,000**	Supply & Install
8.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
8.4	Switches 3ph	1.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 7,000**	Supply & Install
8.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	Supply & Install
8.6	Line Switches 3 ph w/ motor-operators	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	Supply & Install
8.7	Instrument Transformers	1.0	Sum		$ 271,000	$ 271,000	**$ 271,000**	Supply & Install
8.8	Breakers	1.0	Ea	$ 250,000	$ 75,000	$ 325,000	**$ 325,000**	Supply & Install
8.9	Arrestors (3 per line)	12.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 90,000**	
8.10	Line Traps	1.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 21,000**	
8.11	230 kV buses	1.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 60,000**	
8.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	
8.13	Low Profile Foundations	40.0	Ea		$ 5,000	$ 5,000	**$ 200,000**	
8.14	Caisson DE Foundations	12.0	Ea		$ 50,000	$ 50,000	**$ 600,000**	
8.15	Circuit Breaker Foundations	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	
8.16	Lightning Mast Foundations	1.0	Ea		$ 15,000	$ 15,000	**$ 15,000**	
8.17	SST Foundation	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	
8.18	Control House and Pad (14' x 70' - 980 sq. ft)	1.0	Ea	$ 350,000	$ 100,000	$ 450,000	**$ 450,000**	Supply & Install
8.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	
8.20	Control Cables	1.0	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
8.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	Supply & Install
8.22	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	
8.23	Protection, Telecom and Metering Equipment (Panels)	11.0	Ea		$ 30,000	$ 30,000	**$ 330,000**	Supply & Install
8.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
8.25	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
8.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 357,500	$ 357,500	**$ 357,500**	Supply & Install
8.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 350,000	$ 350,000	**$ 350,000**	Supply & Install
8.28	Grounding	1.0	Sum		$ 125,000	$ 125,000	**$ 125,000**	
8.29	Bus Support 1 Ph	18.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 54,000**	
8.30	Switch Stands	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
8.31	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
8.32	Misc. Structures	1.0	Sum		$ 27,000	$ 27,000	**$ 27,000**	
8.33	Substation A-Frame Structures Standalone	3.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 75,000**	
8.34	Lightning Masts	1.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 12,000**	
8.35	Arrestor Stands	6.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 21,000**	
8.36	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 725,000	$ 725,000	**$ 725,000**	
8.37	345kV - 230kV 480/540/600 MVA Transformer	1.0	Ea	$ 4,750,000	$ 750,000	$ 5,500,000	**$ 5,500,000**	
8.38	Transformer Foundation with concrete moat and double steel grating	1.0	Ea		$ 150,000	$ 150,000	**$ 150,000**	
TOTAL - GARDENVILLE SUBSTATION WORKS:							**$ 12,822,500**	
9. MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:								
	Contractor Mobilization / Demobilization							
9.1	Mob / Demob	1.00	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	
	Project Management, Material Handling & Amenities					$ -	**$ -**	
9.2	Project Management & Staffing (includes PM, Field Engineers / Supervision,	30.00	Months		$ 400,000	$ 400,000	**$ 12,000,000**	
9.3	Site Accommodation, Facilities, Storage	1.00	Sum		$ 2,200,000	$ 2,200,000	**$ 2,200,000**	
	Engineering					$ -	**$ -**	
9.4	Design Engineering	1.00	Sum		$ 8,400,000	$ 8,400,000	**$ 8,400,000**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
9.5	LiDAR	1.00	Sum		$ 600,000	$ 600,000	**$ 600,000**	
9.6	Geotech	1.00	Sum		$ 1,100,000	$ 1,100,000	**$ 1,100,000**	
9.7	Surveying/Staking	1.00	Sum		$ 450,000	$ 450,000	**$ 450,000**	
	Testing & Commissioning							
9.8	Testing & Commissioning of T-Line and Equipment	1.00	Sum		$ 2,000,000	$ 2,000,000	**$ 2,000,000**	
	Permitting and Additional Costs					$ -	**$ -**	
9.9	Environmental Licensing & Permitting Costs	1.00	Sum		$ 3,608,602	$ 3,608,602	**$ 3,608,602**	
9.10	Environmental Mitigation	1.00	Sum		$ 16,814,084	$ 16,814,084	**$ 16,814,084**	
9.11	Warranties / LOC's	1.00	Sum		$ 970,163	$ 970,163	**$ 970,163**	
9.12	Real Estate Costs (New)	1.00	Sum		$ 7,623,974	$ 7,623,974	**$ 7,623,974**	
9.13	Real Estate Costs (Incumbent Utility ROW)	1.00	Sum		$ 3,168,924	$ 3,168,924	**$ 3,168,924**	
9.14	Legal Fees	1.00	Sum		$ 3,000,000	$ 3,000,000	**$ 3,000,000**	
9.15	Allowance for Funds Used During Construction (AFUDC)	1.00	Sum			$ -	**$ -**	
9.16	Carrying Charges	1.00	Sum			$ -	**$ -**	
9.17	Sales Tax on Materials	1.00	Sum	$ 6,282,990		$ 6,282,990	**$ 6,282,990**	
9.18	Fees for permits, including roadway, railroad, building or other local permits	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
TOTAL - MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:							**$ 69,918,737**	
10. SYSTEM UPGRADE FACILITIES								
SUF 1.1	Depew to Erie Street 115kV Transmission Line 921. Terminal allowance included. See comments.	1.00	Sum		$ 500,000	$ 500,000	$ 500,000	Relay was replaced and line ratings increased to 124/137/158 (NOR/LTE/STE) resulting ratings are below line conductor ratings. Scope is to remove
SUF 1.2	Engineering, T&C, PM, Indirects for SUF 1.1 (15%)					$ -	$ 75,000	
SUF 2.1	Shawnee to Swann Reconductor	12.00	Mile		$ 400,000	$ 400,000	$ 4,800,000	Rate for reconductor is pro-rated from National
SUF 2.2	Engineering, T&C, PM, Indirects FOR SUF 2.2 (15%)					$ -	$ 720,000	Grid Niagara - Packard reconductor. Note that rate
SUF 3	Roll Rd Substation							
SUF 3.1	Restoration of station stone within existing substation fence. Assume spoil materials disposed of on-site.	1.00	Ea		$ 100,000	$ 100,000	$ 100,000	Supply & Install
SUF 3.2	Transformer 115-34.5kV 90 MVA	1.00	Ea	$ 700,000	$ 200,000	$ 900,000	$ 900,000	
SUF 3.3	Switches 115kV 3Ph	1.00	Ea	$ 15,000	$ 12,000	$ 27,000	$ 27,000	
SUF 3.4	Switches 35kV 3Ph	1.00	Ea	$ 6,000	$ 4,000	$ 10,000	$ 10,000	
SUF 3.5	Breakers 115kV 1200A	1.00	Ea	$ 150,000	$ 50,000	$ 200,000	$ 200,000	
SUF 3.6	Breakers 35kV 2000A	1.00	Ea	$ 75,000	$ 15,000	$ 90,000	$ 90,000	
SUF 3.7	CVT's 115kV	3.00	Ea	$ 10,000	$ 8,000	$ 18,000	$ 54,000	
SUF 3.8	Arrestors 115kV	6.00	Ea	$ 5,000	$ 700	$ 5,700	$ 34,200	
SUF 3.9	Arrestors 35kV (for transformer)	3.00	Ea	$ 2,500	$ 500	$ 3,000	$ 9,000	
SUF 3.10	Low Profile Foundations	8.00	Ea		$ 5,000	$ 5,000	$ 40,000	Supply & Install
SUF 3.11	Circuit Breaker Foundation 115kV	1.00	Ea		$ 75,000	$ 75,000	$ 75,000	Supply & Install
SUF 3.12	Circuit Breaker Foundation 35kV	1.00	Ea		$ 30,000	$ 30,000	$ 30,000	Supply & Install
SUF 3.13	Transformer Foundation with concrete moat and double steel grating	1.00	Ea		$ 150,000	$ 150,000	$ 150,000	Supply & Install
SUF 3.14	Firewall 30' long x 12' tall x 1' thick with footer	1.00	Ea		$ 100,000	$ 100,000	$ 100,000	Supply & Install
SUF 3.15	Control Cables	1.00	Sum		$ 50,000	$ 50,000	$ 50,000	Supply & Install
SUF 3.16	Protection & Telecom Equipment	3.00	Ea		$ 30,000	$ 30,000	$ 90,000	
SUF 3.17	SCADA and Communications	1.00	Sum		$ 25,000	$ 25,000	$ 25,000	Supply & Install
SUF 3.18	Low Voltage AC Distribution	1.00	Sum		$ 30,000	$ 30,000	$ 30,000	Supply & Install
SUF 3.19	Control Conduits	1.0	Sum		$ 50,000	$ 50,000	$ 50,000	Supply & Install
SUF 3.20	Grounding	1.0	Sum		$ 25,000	$ 25,000	$ 25,000	Supply & Install
SUF 3.21	Switch Stand 115kV (reuse 1 existing)	1.0	Ea	$ 1,500	$ 800	$ 2,300	$ 2,300	
SUF 3.22	CVT Stand	3.0	Ea	$ 1,000	$ 1,000	$ 2,000	$ 6,000	
SUF 3.23	Arrestor Stand	3.0	Ea	$ 1,000	$ 1,000	$ 2,000	$ 6,000	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
SUF 3.24	Misc Materials and Above / Below Ground Works	1.0	Sum		$ 120,000	$ 120,000	$ 120,000	Supply & Install
SUF 3.25	Engineering, T&C, PM, Indirects for SUF 3 (15%)					$ -	$ 333,525	Assumed 15% to cover all misc costs
SUF 4.1	Lockport to Shaw 115kV Transmsision Line 102. NAT report indicated:	1.00	Sum		$ 500,000	$ 500,000	$ 500,000	The limiting equipment is not known - scope
SUF 4.2	Engineering, T&C, PM, Indirects for SUF 4.1 (15%)					$ -	$ 75,000	undefined.
SUF 5	Gardenville Circuit Breaker Replacement							
SUF 5.1	Circuit Breaker Foundation	12.0	Ea		$ 75,000	$ 75,000	$ 900,000	Supply & Install
SUF 5.2	Below Grade Conduit & Grounding	1.0	Sum		$ 1,200,000	$ 1,200,000	$ 1,200,000	
SUF 5.3	Circuit breaker - 230kV	12.0	Ea	$ 250,000	$ 75,000	$ 325,000	$ 3,900,000	
SUF 5.4	Switches - 230kV	24.0	Ea	$ 20,000	$ 15,000	$ 35,000	$ 840,000	
SUF 5.5	Control Cables	1.0	Sum		$ 1,200,000	$ 1,200,000	$ 1,200,000	Supply & Install
SUF 5.6	Misc Above Ground Works	1.00	Sum		$ 900,000	$ 900,000	$ 900,000	Assumed 15% to cover all misc costs
SUF 5.7	Engineering, T&C, PM, Indirects for SUF 5 (15%)					$ -	$ 1,341,000	
SUF 6	SYSTEM UPGRADE FACILITIES CONTINGENCY (SEE ASSUMPTIONS & CLARIFICATIONS)						$ 3,750,000	Contingency for possible additional SUF upgrades
TOTAL - SYSTEM UPGRADE FACILITIES:							**$ 23,258,025**	

PROJECT TITLE WNY PROJECT EVALUATION- ENVIRONMENTAL LICENSING & PERMITTING COST ELEMENTS						ENVIRONMENTAL LICENSING & PERMITTING COST ESTIMATE RANGE FOR PROPOSED WNY TRANSMISSION PROJECT - T008	
FEDERAL						Proposal 3	
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans	Min.	Max.
USACE	Waters of the US under Section 404 of the Clean Water Act and Section 10 of the 1899 Rivers and Harbors Act (including regulated wetland areas)	Nationwide Permits (NWP) or Individual Permit (IP)	Any work within the boundaries of regulated wetlands (with the exception of isolated wetlands) or waterways to the spring high tide or ordinary high water mark	If project qualifies for a NWP (<0.5 acre disturbance and within NWP project type parameters), a pre-construction notification (PCN) is typically required. NWPs have a 45 day review period starting from when project logged in system (up to 6wk backlog delay in logging projects) If an IP is triggered, USACE will require Alternative Analysis and Public Notice/Hearing. IPs could also trigger restrictive environmental work windows. IPs have a 120 day review period starting from when permit is "deemed complete"	Wetland Delineation; Wetland Function & Value Assessment; Stream Delineation; Restoration Plan	$41,320	$116,675
USFWS	Endangered Species Act Section 7 (ESA) Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act	Consultation (Formal or Informal); Special Use Permit	Any work that may have an affect on listed species or their habitat; or projects within National Wildlife Refuges	USACE coordinates consultation with USFWS for ESA listed species during their permit review. Also includes the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act compliance. Season restrictions on construction could be imposed.	Rare, Threatened & Endangered Species Search; Preparation of Reports and Conservation Plans	$43,600	$125,600
FAA	Airports / Airspace	Federal Aviation Administration (FAA) Notification	New or Replacement Structures near Airports	Depending on construction locations, this permit may only be needed for OP work.	Obstruction Analysis, Mitigation Plan (assumes Engineering Cost)	$3,000	$9,000
STATE							
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans		
NYS Public Service Commission / Department of Public Service (NYSDPS)	Article VII	Article VII: Certificate of Environmental Compatibility and Public Need and Environmental Management & Construction Plan (EM&CP)	Article 7: Major electric transmission facilities with design capacity of 100kV or more extending for at least 10 miles or 125kV and over extending a distance of 1 mile or more (some exclusions for underground transmission applies)	Article 7 will incorporate all of the required State and Local approvals (costed separately), as well as Engineering and Environmental Studies and Public Outreach. Intervenor Fund payment expected to be $350,000. An Environmental Management & Construction Plan (EM&CP) must be prepared and approved by the PSC. (see 16 NYCRR Parts 85 through 88)	Includes Reports and Plans required for State and Federal Agency Permits, as well as EM&CP, EMF, Noise, Air, Visual Impact Assessment, Invasive Species Control Plan, Mitigation Plans	$850,000	$3,350,000

NYSDEC	Article 15 Stream Disturbance; Article 24 Wetlands, Open Waters, Wetlands Buffers (100' for Freshwater Wetland)	Individual Permit (IP) (unless developer has General Permit (GP))	Any work within the boundaries of regulated waterways or wetlands, and wetland adjacent areas	Any disturbance within wetlands and/or below mean high tide will require an IP. Areas of temporary disturbance will likely require restoration, including a monitoring and maintenance period. Permanent disturbance will require offsite mitigation up to 3:1 area ratio; also includes a monitoring and maintenance period. GP may only be applicable if project ground disturbance is located outside of wetlands areas (above MHW).	Wetland Delineation; Wetland Restoration/Mitigation Plan	$25,960	$83,300
NYSDEC	Stormwater (If >1 Acre Soil Disturbance)	SPDES General Permit for Stormwater Discharges from Construction Activities GP-0-15-002 & SWPPP	Project areas of soil disturbance	If project involves 1 acre or more soil disturbance, then the GP is required. If located within a Regulated MS4 Municipality, additional coordination may be needed. Weekly inspections by a Qualified Inspector during construction will be required.	SWPPP (assumes Engineering Cost includes Sediment & Erosion Control Plan, Hydraulic & Hydrology Studies, Stormwater Management Design)	$11,200	$38,000
NYSHPO	National Historic Preservation Act (NHPA) Section 106: State and Federal Historic Places; State Mapped Archeologically Sensitive Areas	Cultural Resource Information System (CRIS) Determination	Local, State, or Federal eligible or designated historic places and/or areas of archeological sensitivity (in off-road areas and areas that have not been previously disturbed)	NYSDEC EAF Online Mapper identifies State or National Register of Historic Places and archeological sensitive areas within or adjacent to the project site. Formally enter project information and supporting documents into SHPO's online CRIS program. Staff will review and email a determination of impacts letter	Phase 1A & 1B Archaeological Studies (not included in costing)	$19,510	$67,930
NYS NHP	Threatened and Endangered Species	Consultation	Activities that may affect T&E species or their habitat.		See USFWS	$1,200	$6,400
NYSDOT/NYS Thruway Authority/FHWA	State Roadways	Highway Work Permit/Utility Permit, Vegetation Management Permit; Easement	Any work within or crossing State highway ROW	May require restoration landscaping coordination. Typically requires compliance with NEPA including SHPO and USFWS effects determination	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$17,000	$200,000
NYS Dept. of Agriculture and Markets	All agricultural lands (including Agricultural Districts)	Part of Article 7 & Article 10 Review process	Any work impacting agricultural land	Must minimize impacts and restore damage to agricultural land, and coordinate with County Soil & Water Conservation District; Vineyards are a major concern in WNYS. Pre-application conference with PSC, DEC and Ag& Markets recommended. Must develop EM&CP in conformance with Art. 7/10 Certificate Conditions. Agricultural Monitor must oversee construction & restoration; requisite 2-yrs post restoration monitoring.	Crop/Pasturing Mitigation Plan (not included in costing)	$11,000	$24,000

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T008 - North American Transmission

ENVIRONMENTAL LICENSING AND PERMITTING

Revision: 4

REGIONAL							
Railroads	Railroad crossings	Consultation-permits may be required; Easement	Access / new structures on RR property		Easement area survey (not included in costs)	$11,000	$200,000
LOCAL/MUNICIPAL							
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans		
County Dept. of Public Works	County Roadways	Lane Closure Permit, Highway Work or Access Permit	Work within county roadways and right-of-ways			$6,000	$40,000
Town, City or Village	Municipal Stormwater (MS4) Review	Approval of SWPPP or EM&CP	Project areas of soil disturbance		See NYSDEC SPDES	$6,000	$35,000
Town, City or Village	Variable	Building Permits	New Structures	Individual Towns/Villages must be consulted on a project specific basis to determine notification and/or permitting procedures. Permit application names vary (e.g. road obstruction permit)		$18,000	$92,000
Town, City or Village	Municipal Roadways	Highway Work Permit; Road Opening Permit	Work within municipal roadways and right-of-ways			$6,000	$35,000
Town, City or Village	Wetlands	Wetland Permit / Conservation Approvals	Mapped wetlands and wetland adjacent areas (buffer width variable)		See USACE / NYSDEC Art. 24	$6,000	$52,000

		Minimum	Maximum
ENVIRONMENTAL LICENSING & PERMITTING COST (EXCLUDING MITIGATION)	**PROJECT T008 TOTAL**	**$1,076,790**	**$4,474,905**
Excluded cost: Mitigation or restoration for impact to regulated wetlands; agricultural land and tree clearing	**Expected Value**	**$3,608,601.75**	

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T008 - North American Transmission

ENVIRONMENTAL MITIGATION ESTIMATE

Revision: 4

WNY TRANSMISSION PROJECT - ENVIRONMENTAL MITIGATION COST ESTIMATE FOR T008

	Offsite Wetland Mitigation*		Farmland**	
	Min.	Max.	Min.	Max.
Area	96 acres	96 acres	18.7 acres	37.3 acres
Cost/Acre	$50,000	$100,000	$503	$503
Ratio	1:1	3:1	1:1	1:1
Total	$4,800,000	$28,800,000	$9,406	$18,762

T008 MITIGATION TOTAL	Minimum	Maximum	Expected Value
	$4,809,406	**$28,818,762**	**$ 16,814,084**

*Offsite wetland mitigation area assumes Highway Alternative Route; clearing of NWI Forested/Shrub Wetland Approx. 0.65 miles (3432 LF) by 100' ROW width and 3.24 miles (17107 LF) by 225' ROW width; Max. cost per acre assumes additional mitigation required for permanent impacts of proposed structures in non-forested wetlands; cost per acre Min. and Max. reduced due to area total over 50 acres; costing includes design and installation costs only; does not include land acquisition or long term monitoring

**Farmland mitigation based on corn bushel yield at 129 BU/Acre and $3.9/BU (production numbers from 2016 USDA NYS Agriculture Overview), area assumes 6.16 miles (32525 LF) Adjacent to Agriculture Properties by 25' Wide (Min.) or 50' Wide (Max.); does not include land acquisition

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T008 - North American Transmission

REAL ESTATE ESTIMATE
(NEW ROW)

Revision: 4

COUNTY: NIAGARA & ERIE

DEVELOPER: NORTH AMERICAN (T008)

SEGMENT: NIAGARA - DYSINGER - STOLLE SEGMENT

	Address	Area (Acres)	Total Cost
A	**NIAGARA COUNTY**		
	Sub Total (A)	2.38	$ 51,560.00

B	**ERIE COUNTY**		
	Sub Total (A)	0.68	$ 4,376.00
	Total (A + B)	3.06	$ 55,936.00

REAL ESTATE ESTIMATE (NEW ROW)

Revision: 4

COUNTY: ERIE

DEVELOPER: NORTH AMERICAN (T008)

SEGMENT: STOLLE TO GARDENVILLE SEGMENT

		Area (Acres)	Total Cost
	Total	167.00	$ 6,838,497.00

REAL ESTATE ESTIMATE
(INCUMBENT UTILITY ROW)

COUNTY: NIAGARA & ERIE
DEVELOPER: NORTH AMERICAN (T008)
SEGMENT: DYSINGER - STOLLE - GARDENVILLE SEGMENT

	DEVELOPER	SEGMENT	COUNTY	INCUMBENT UTILITY (ROW) (ACRES)	TOTAL ROW COST
T008	North American Transmission (Proposal 3)	Dysinger SS to Stolle Rd SS - 2x19.98 miles	Niagara	10.33	$ 2,846,000
			Erie	534.58	
		Stolle Rd SS to Gardenville SS - 12.84 miles	Erie	27.55	

REAL ESTATE ESTIMATE (HOUSES)

Revision: 4

COUNTY: ERIE

DEVELOPER: NORTH AMERICAN (T008)

SEGMENT: STOLLE ROAD TO GARDENVILLE

		Total Valuation of Property with 3% Escalation/year (as of 2017)
	Total Valuation Cost	$ 628,349.85

REAL ESTATE ESTIMATE (SUBSTATIONS)

Revision: 4

COUNTY: NIAGARA
DEVELOPER: NORTH AMERICAN (T008)
SEGMENT: DYSINGER SWITCHYARD

		Total Cost
	Total Cost of Proposed Substation Site	$152,750.00

REAL ESTATE ESTIMATE (SUBSTATIONS)

Revision: 4

COUNTY: ERIE
DEVELOPER: NORTH AMERICAN (T008)
SEGMENT: STOLLE ROAD SUBSTATION

		Total Cost
	Total Cost of Proposed Substation Site	$19,440.00

REAL ESTATE ESTIMATE (SUBSTATIONS)

Revision: 4

COUNTY: ERIE
DEVELOPER: NORTH AMERICAN (T008)
SEGMENT: GARDENVILLE SUBSTATION (OPTION 1)

		Total Cost
	Total Cost of Proposed Substation Site	$ 309,483.90

ASSUMPTIONS AND CLARIFICATIONS

Revision: 4

a) Cost Estimate is based on 2017 rates.
b) Construction schedule is in accordance with the Developers proposed schedule (approx 15 months) - we have assumed continuous working with no breaks in the schedule. Six months have been added to the construction schedule PM time for start up and close out works and float.
c) Stringing rates allow for protection over crossings (such as rider poles).
d) We have assumed a typical work week (6 x 10 hour days).
e) We have assumed the Access Road included in Developer Estimate will be Type 1 Gravel Type.
f) Costs will vary for handling and disposal of contaminated spoils, depending on type of contaminants and availability / location of the appropriate tipping facility. Since there is not enough information to provide a quantified estimate for this item, allowance is included in the contingency monies.
g) Costs have been developed based on historical data from Projects of a similar nature (AACE Class 5 and 4 Estimating Practices). We have not engaged any subcontractors or material vendors for formal quotes.
h) The equipment types listed for Dysinger Substation have been taken from a recently completed 345kV switchyard project, using current pricing. Gardenville Transformer is assumed to be 250MVA.
i) Estimated quantities have been used for items in red text in Section 1 of the Estimate (CLEARING & ACCESS FOR T-LINE CONSTRUCTION). These items were not quantified in the Developers Estimate, however we believe that they are necessary for the works.
j) Foundation rates include supply and installation of materials. Drilled Pier rates include supply and testing of concrete, rebar cage and the use of temp
k) A Contractor Mark-Up (OH&P) of 15% has been included in the Total section.
l) Assumes all environmental data and project details provided are accurate unless noted otherwise.
m) Dysinger to Stolle Road Circuit 2 ROW length (19.85 miles) not included in project route total since parallels already accounted for length of Dysinger
n) USFWS T&E Assumes that ¼ of the Total Line in Right of Way will require field survey for T&E (Approx. 8.16 miles).
o) NEPA-Assumes no NEPA because Art VII.
p) SHPO-Assumes consultation and Phase 1A/1B archeological studies with field survey for 50% of Total Line in Right of Way (Approx. 16.31 miles).
q) NYSDOT/FHWA-Assumes any required NEPA coordination/requirements are covered under Article VII or SEQRA review. Max costs includes additional agency coordination (greater than general fixed costing max.) for new ROW Parallel to Highway.
s) Railroad - Max costs includes additional agency coordination (greater than general fixed costing max.) for new ROW Parallel to Railroad.
t) Assumes no coordination with National Parks Service or OPRHP/State Parks
u) USACE wetland delineation total based on Line Miles in Wetlands - NWI wetland lengths of 7.58 miles (Min.) and 7.69 miles (Max.)
v) DEC wetland delineation total based on Line Miles in Wetlands - DEC wetland lengths of 3.49 miles (Min.) and 4.04 miles (Max.)

ASSUMPTIONS AND CLARIFICATIONS

Revision: 4

w) Offsite wetland mitigation area costs based on impacts anticipated by clearing of NWI Forested/Shrub Wetland of approximately 3.88 miles (calculated by GEI based on NWI mapper legend categories). using the Stolle Road to Gardenville Highway alternative. Assumes clearing an additional 125 within the Dysinger to Stolle Road Right of Way (for a total of 225 feet). Minimum costs at $50,000/acre, maximum costs at $100,000/acre for additional permanent impacts of proposed structures in non-forested wetlands. Costing includes design and installation costs only and does not include land acquisition or long term monitoring. Minimum and maximum costs for this proposal assumes a reduced mitigation cost/acre due to size of
x) Agricultural mitigation assumes timber matting impacts and pad impacts on adjacent agriculture land (6.16 miles) requires crop damage payments based on USDA 2016 NYS Agriculture Overview corn yield and bushel price/acre. Minimum assumes 25-foot-wide impact, Maximum assumes 50-foot-
y) No tree survey or replanting required outside regulated wetlands areas.
z) Article VII Intervenor Fund payment expected to be $350,000.
aa) Mitigation costs for landscaping only (no paving, sidewalks, sound walls, etc.).
ab) Expected value of environmental licensing and permitting cost is estimated to be 30% higher than the mean of the range based upon the addition of the new Gardenville to Stolle 345kV line and a second Dysinger to Stolle line.
ac) SUF pricing includes 35% to cover Contractor markup (15%) and contingency (20%)
ad) SUF reconductor rate is based on Niagara-Packard (National Grid) reconductor estimate, pro-rated to a rate / mile. Note that this is based on conductor, shieldwire and hardware pricing only and does not include structure or foundation works.
ae) System Upgrade Facilities Contingency is allowance for potential additional system upgrades including overdutied breakers, protection changes, unidentified thermal issues, etc that may be identified as detailed studies are completed.

INDEPENDENT ESTIMATES

ATTACHMENT B4

T009 – NORTH AMERICAN TRANSMISSION

SUBSTATION ENGINEERING COMPANY
8/11/2017

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T009 - North American Transmission

Revision: 4

SUMMARY OF COST ESTIMATE

	Description	Total Amount
1	CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION	$ 48,929,055
2	TRANSMISSION LINE FOUNDATIONS	$ 40,444,048
3	STRUCTURES - TRANSMISSION LINE	$ 57,905,468
4	CONDUCTOR, SHIELDWIRE, OPGW	$ 21,865,190
5	TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE	$ 5,828,824
6	NEW DYSINGER SWITCHYARD	$ 23,229,000
7	STOLLE ROAD SUBSTATION WORKS:	$ 14,263,000
8	GARDENVILLE 345/230kV SUBSTATION WORKS	$ 12,822,500
9	NIAGARA SUBSTATION WORK	$ 4,246,500
10	MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS	$ 87,506,380
	CONTRACTOR MARK-UP (OH&P) 15%	$ 47,555,995
	SUBTOTAL:	$ 364,595,961
	CONTINGENCY ON ENTIRE PROJECT (25%)	$ 91,148,990
	TOTAL (A):	**$ 455,744,952**
11	SYSTEM UPGRADE FACILITIES	$ 23,258,025
	CONTRACTOR MARKUP & CONTINGENCY (35%)	$ 8,140,309
	TOTAL (B):	**$ 31,398,334**
	TOTAL PROJECT COST (A+B):	**$ 487,143,285**

SECO SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

Revision: 4

Description of Work: Proposal 1 - A new 345kV Dysinger Switchyard located approximately 8 miles southeast of the city of Lockport, New York. The Project also includes a new ~20 mile 345kV Transmission Line from Dysinger Switchyard to Stolle Road Substation near Marilla, New York. Proposal 2 - Includes Proposal 1 Scope of Work, with the addition of a single circuit 345kV Transmission Line from the Stolle Road 345kV Substation to the existing Gardenville Substation, and a new 345/230kV Transformer at the existing Gardenville Substation. This cost estimate uses Option 1 routing (as per NAT estimate). Proposal 3 includes an additional 345kV single circuit transmission line from the Dysinger Switchyard to the existing Stolle Road 345kV Substation. Proposal 4 includes the addition of a 27 mile 345kV Transmission Line from Niagara to Dysinger Switchyard.

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
1. CLEARING & ACCESS FOR T-LINE CONSTRUCTION								
1.1	Clearing the ROW (mowing & clearing)	515.0	Acre		$ 15,000	$ 15,000	**$ 7,725,000**	
1.2	Access Road	197,895.0	LF		$ 45	$ 45	**$ 8,905,275**	Assumes Type 1 Type Gravel Road
1.3	Silt Fence	197,895.0	LF		$ 4	$ 4	**$ 791,580**	
1.4	Matting	187,069.0	LF		$ 70	$ 70	**$ 13,094,830**	
1.5	Snow Removal	1.0	Sum		$ 1,200,000	$ 1,200,000	**$ 1,200,000**	
1.6	ROW Restoration	80.0	Mile		$ 10,000	$ 10,000	**$ 800,000**	
1.7	Work Pads	3,650,000.0	SF		$ 4	$ 4	**$ 12,848,000**	
1.8	Restoration for Work Pad areas	365,000.0	SF		$ 0.2	$ 0.2	**$ 54,750**	
1.9	Temporary Access Bridge	60.0	EA		$ 20,035	$ 20,035	**$ 1,202,100**	
1.10	Air Bridge	20.0	EA		$ 14,445	$ 14,445	**$ 288,900**	
1.11	Stabilized Construction Entrance	34.0	EA		$ 4,580	$ 4,580	**$ 155,720**	
1.12	Maintenance and Protection of Traffic on Public Roads	1.0	LS		$ 1,200,000	$ 1,200,000	**$ 1,200,000**	
1.13	Culverts / Misc. Access	1.0	LS		$ 600,000	$ 600,000	**$ 600,000**	
1.14	Concrete Washout Station	34.0	EA		$ 1,850	$ 1,850	**$ 62,900**	
TOTAL - CLEARING & ACCESS FOR T-LINE:							**$ 48,929,055**	
2. T-LINE FOUNDATIONS								
2.1	Direct Embed Foundations - 23ft deep x 6ft dia.	416.0	Structure		$ 18,000	$ 18,000	**$ 7,488,000**	Supply & Install
2.2	Direct Embed Foundations - 28ft deep x 7ft dia.	15.0	Structure		$ 20,000	$ 20,000	**$ 300,000**	Supply & Install
2.3	Direct Embed Foundations - 30ft deep x 6ft dia.	63.0	Structure		$ 20,000	$ 20,000	**$ 1,260,000**	Supply & Install
2.4	Direct Embed Foundations - 37ft deep x 7ft dia.	8.0	Structure		$ 22,000	$ 22,000	**$ 176,000**	Supply & Install
2.5	Drilled Pier 38ft deep x 9ft dia.	1,477.3	CUY		$ 1,500	$ 1,500	**$ 2,216,001**	
2.6	Drilled Pier 45ft deep x 9ft dia.	699.8	CUY		$ 1,500	$ 1,500	**$ 1,049,685**	
2.7	Drilled Pier 47ft deep x 8ft dia.	2,310.0	CUY		$ 1,500	$ 1,500	**$ 3,464,967**	
2.8	Drilled Pier 57ft deep x 9ft dia.	1,772.8	CUY		$ 1,500	$ 1,500	**$ 2,659,201**	
2.9	Drilled Pier 64ft deep x 8ft dia.	393.2	CUY		$ 1,500	$ 1,500	**$ 589,782**	
2.10	Drilled Pier 71ft deep x 9ft dia.	4,416.5	CUY		$ 1,500	$ 1,500	**$ 6,624,676**	
2.11	Drilled Pier 43ft deep x 8ft dia.	2,113.4	CUY		$ 1,500	$ 1,500	**$ 3,170,076**	
2.12	Drilled Pier 48ft deep x 9ft dia.	746.4	CUY		$ 1,500	$ 1,500	**$ 1,119,660**	
2.13	Rock Excavation Adder	5,163.0	CUY		$ 2,000	$ 2,000	**$ 10,326,000**	
TOTAL - T-LINE FOUNDATIONS:							**$ 40,444,048**	
3. STRUCTURES - T-LINE								
3.1	Single Steel Pole Tangent Delta - 00- 10 (Ht. 100')	104.0	EA	$ 31,401	$ 18,841	$ 50,242	**$ 5,225,126**	
3.2	Single Steel Pole Tangent Delta - 00- 10 (Ht. 115')	312.0	EA	$ 38,376	$ 23,026	$ 61,402	**$ 19,157,299**	
3.3	Single Steel Pole Tangent Delta - 00- 10 (Ht. 130')	52.0	EA	$ 44,150	$ 26,490	$ 70,641	**$ 3,673,313**	
3.4	Single Steel Pole Tangent Delta - 00- 10 (Ht. 145')	11.0	EA	$ 50,029	$ 30,018	$ 80,047	**$ 880,514**	
3.5	Single Steel Pole Small Angle Delta - 10- 15 (Ht. 115')	15.0	pole	$ 66,881	$ 40,128	$ 107,009	**$ 1,605,139**	
3.6	Single Steel Pole Small Angle Delta - 10- 15 (Ht. 130)	5.0	pole	$ 78,872	$ 47,323	$ 126,196	**$ 630,979**	
3.7	Single Steel Pole Small Angle Delta - 10- 15 (Ht. 145)	3.0	pole	$ 94,927	$ 56,956	$ 151,883	**$ 455,648**	
3.8	Single Steel Pole Medium Angle Vertical - 15- 60 (Ht. 115')	24.0	pole	$ 93,524	$ 56,115	$ 149,639	**$ 3,591,337**	
3.9	Single Steel Pole Medium Angle Vertical - 15- 60 (Ht. 130')	11.0	pole	$ 120,604	$ 72,362	$ 192,966	**$ 2,122,623**	

SECO SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

Revision: 4

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
3.10	Single Steel Pole Medium Angle Vertical - 15- 60 (Ht. 145')	13.0	pole	$ 153,391	$ 92,034	$ 245,425	**$ 3,190,524**	
3.11	Single Steel Pole Medium Angle Vertical - 15- 60 (Ht. 185')	3.0	pole	$ 187,828	$ 112,697	$ 300,525	**$ 901,575**	
3.12	Single Steel Pole Large Angle DE Vertical - 60- 90 (Ht. 115')	15.0	pole	$ 111,476	$ 66,885	$ 178,361	**$ 2,675,419**	
3.13	Single Steel Pole Large Angle DE Vertical - 60- 90 (Ht. 130')	16.0	pole	$ 140,249	$ 84,149	$ 224,398	**$ 3,590,369**	
3.14	Single Steel Pole Large Angle DE Vertical - 60- 90 (Ht. 145')	8.0	pole	$ 177,172	$ 106,303	$ 283,476	**$ 2,267,804**	
3.15	Large Angle DE - 60- 90 (Ht. 145')	6.0	pole	$ 97,225	$ 58,335	$ 155,560	**$ 933,362**	
3.16	Large Angle DE - 60- 90 (Ht. 165')	3.0	pole	$ 105,869	$ 63,521	$ 169,390	**$ 508,170**	
3.17	Large Angle DE - 60- 90 (Ht. 195')	9.0	pole	$ 169,360	$ 101,616	$ 270,976	**$ 2,438,787**	
3.18	Tangent Dead End (Ht. 165')	3.0	pole	$ 86,818	$ 52,091	$ 138,908	**$ 416,724**	
3.19	Tangent Dead End (Ht. 195')	3.0	pole	$ 116,824	$ 70,094	$ 186,918	**$ 560,753**	
3.20	Install Grounding	616.0	Structure		$ 5,000	$ 5,000	**$ 3,080,000**	
TOTAL - STRUCTURES T-LINE:							**$ 57,905,468**	
4. CONDUCTOR, SHIELDWIRE, OPGW								
4.1	(2)/Phase - 795kcmil 26/7 Stranded "Drake" ACSR	84.2	Circuit Mile	$ 53,856	$ 158,400	$ 212,256	**$ 17,874,078**	
4.2	(1) OPGW 36 Fiber AC-33/38/571	84.2	Mile	$ 19,404	$ 27,720	$ 47,124	**$ 3,968,312**	
4.3	(1) 3/8" HS Steel (2nd SW where required)	4,000.0	Ft	$ 1	$ 5	$ 6	**$ 22,800**	
TOTAL: CONDUCTOR, SHIELDWIRE, OPGW:							**$ 21,865,190**	
5. T-LINE INSULATOR, FITTINGS, HARDWARE								
5.1	Tangent - Polymer V-String	1,446.0	Set	$ 900	$ 720	$ 1,620	**$ 2,342,520**	
5.2	Angle - Polymer V-String	69.0	Set	$ 1,300	$ 1,040	$ 2,340	**$ 161,460**	
5.3	Deadend - Polymer Double Deadend including Jumper	666.0	Set	$ 1,500	$ 1,350	$ 2,850	**$ 1,898,100**	
5.4	OPGW Assembly - Tangent	502.0	Set	$ 200	$ 150	$ 350	**$ 175,700**	
5.5	OPGW Assembly - Angle / DE	222.0	Set	$ 250	$ 150	$ 400	**$ 88,800**	
5.6	OHSW Assembly - Angle / DE	16.0	Set	$ 250	$ 150	$ 400	**$ 6,400**	
5.7	OPGW Splice Boxes	34.0	Set	$ 1,500	$ 1,000	$ 2,500	**$ 85,000**	
5.8	OPGW Splice & Test	1.0	Sum		$ 40,800	$ 40,800	**$ 40,800**	
5.9	Spacer Dampers	7,212.0	Ea	$ 50	$ 35	$ 85	**$ 613,020**	
5.10	Vibration Dampers - Conductor	7,212.0	Ea	$ 32	$ 20	$ 52	**$ 375,024**	
5.11	Shieldwire / OPGW Dampers, Misc Fittings	1.0	Sum	$ 30,000	$ 12,000	$ 42,000	**$ 42,000**	
TOTAL: T-LINE INSULATORS, FITTINGS, HARDWARE:							**$ 5,828,824**	
6. NEW DYSINGER SWITCHYARD								
6.1	Site Works including sediment controls, access roads, rough grading, final grading and stone placement	1.0	Sum		$1,500,000.00	$ 1,500,000	**$ 1,500,000**	Supply & Install
6.2	Substation Fence	2,450.0	LF		$200	$ 200	**$ 490,000**	Supply & Install
6.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
6.4	Switches 3ph	22.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 154,000**	
6.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
6.6	Line Switches 3 ph w/ motor operators	7.0	Ea	$ 15,000	$15,000.00	$ 30,000	**$ 210,000**	
6.7	Instrument Transformers	1.0	Sum		$ 1,214,000	$ 1,214,000	**$ 1,214,000**	
6.8	Breakers	11.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 4,180,000**	
6.9	Arrestors (3 per line)	21.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 157,500**	
6.10	Line Traps	7.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 147,000**	
6.11	345 kV buses	2.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 120,000**	
6.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	Supply & Install
6.13	Low Profile Foundations	305.0	Ea		$ 5,000	$ 5,000	**$ 1,525,000**	Supply & Install
6.14	Caisson DE Foundations	28.0	Ea		$ 50,000	$ 50,000	**$ 1,400,000**	Supply & Install
6.15	Circuit Breaker Foundations	11.0	Ea		$ 75,000	$ 75,000	**$ 825,000**	Supply & Install

SECO SUBSTATION ENGINEERING COMPANY

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
6.16	Lightning Mast Foundations	20.0	Ea		$15,000	$ 15,000	**$ 300,000**	Supply & Install
6.17	SST Foundation	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
6.18	Control House and Pad (30' x 90' - 2700 sq. ft)	1.0	Sum	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	
6.19	Generator Foundation	1.0	Ea		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
6.20	Control Cables	1.3	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 260,000**	
6.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
6.22	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	Supply & Install
6.23	Protection, Telecom and Metering Equipment (Panels)	37.0	Ea		$ 30,000	$ 30,000	**$ 1,110,000**	Supply & Install
6.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
6.25	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
6.26	Control Conduits from Cable Trench to Equipment	1.3	Sum		$ 250,000	$ 250,000	**$ 325,000**	Supply & Install
6.27	Cable Trench Systems for Control Cables	1.3	Sum		$ 750,000	$ 750,000	**$ 975,000**	Supply & Install
6.28	Grounding	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
6.29	Bus Support 1 Ph	129.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 387,000**	
6.30	Switch Stands	22.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 242,000**	
6.31	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
6.32	Misc. Structures	1.0	Sum		$ 68,000	$ 68,000	**$ 68,000**	
6.33	Substation A-Frame Structures Standalone	7.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 175,000**	
6.34	Lightning Masts	20.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 240,000**	
6.35	Arrestor Stands	21.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 73,500**	Supply & Install
6.36	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
6.37	Connection of Existing Lines to Dysinger Switchyard	1.0	Sum		$ 3,400,000	$ 3,400,000	**$ 3,400,000**	Supply & Install
TOTAL - DYSINGER SWITCHYARD:							**$ 23,229,000**	
7. STOLLE ROAD SUBSTATION WORKS:								
7.1	Site Works including sediment controls, access roads, rough grading, final grading and stone placement	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
7.2	Substation Fence	715.00	LF		$ 200	$ 200	**$ 143,000**	Supply & Install
7.3	Switches 3ph	14.00	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 98,000**	
7.4	Line Switches 3 ph w/ motor-operators	4.00	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 120,000**	
7.5	Instrument Transformers	1.00	Sum		$ 691,000	$ 691,000	**$ 691,000**	
7.6	Breakers	8.00	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 3,040,000**	
7.7	Arrestors (3 per line)	12.00	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 90,000**	
7.8	Line Traps	4.00	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 84,000**	
7.9	345 kV buses	2.00	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 120,000**	
7.10	Low Profile Foundations	183.00	Ea		$ 5,000	$ 5,000	**$ 915,000**	Supply & Install
7.11	Caisson DE Foundations	16.00	Ea		$ 50,000	$ 50,000	**$ 800,000**	Supply & Install
7.12	Circuit Breaker Foundations	8.00	Ea		$ 75,000	$ 75,000	**$ 600,000**	Supply & Install
7.13	Lightning Mast Foundations	8.00	Ea		$ 15,000	$ 15,000	**$ 120,000**	Supply & Install
7.14	Control House and Pad (25' x 50' - 1250 sq. ft)	1.00	Ea	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	
7.15	Control Cables	1.00	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
7.16	125VDC Batteries	2.00	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
7.17	Protection, Telecom and Metering Equipment (Panels)	27.00	Ea		$ 30,000	$ 30,000	**$ 810,000**	Supply & Install
7.18	SCADA and Communications	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
7.19	Low Voltage AC Distribution & DC Panels & Switches	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
7.20	Control Conduits from Cable Tray to Equipment	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
7.21	Cable Trench Systems for Control Cables	1.00	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
7.22	Grounding	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
7.23	Bus Support 1 Ph	66.00	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 198,000**	
7.24	Switch Stands	14.00	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 154,000**	
7.25	Misc. Structures	1.0	Sum		$ 42,000	$ 42,000	**$ 42,000**	
7.26	Substation A-Frame Structures Standalone	4.00	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 100,000**	
7.27	Lightning Masts	8.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 96,000**	
7.28	Arrestor Stands	12.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 42,000**	
7.29	Miscellaneous Materials and Above / Below Ground Works	1.00	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
7.30	Interconnection arrangement at Stolle Rd Substation	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
TOTAL - STOLLE RD SUBSTATION WORKS:			Ea		$ 100,000		**$ 14,263,000**	
8. GARDENVILLE 345/230kV SUBSTATION WORKS								
8.1	Site Works including sediment controls, access roads, rough grading, final grading	1.0	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
8.2	Substation Fence	1,400.0	LF		$ 200	$ 200	**$ 280,000**	Supply & Install
8.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
8.4	Switches 3ph	1.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 7,000**	
8.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
8.6	Line Switches 3 ph w/ motor-operators	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
8.7	Instrument Transformers	1.0	Sum		$ 271,000	$ 271,000	**$ 271,000**	
8.8	Breakers	1.0	Ea	$ 250,000	$ 75,000	$ 325,000	**$ 325,000**	
8.9	Arrestors (3 per line)	12.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 90,000**	
8.10	Line Traps	1.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 21,000**	
8.11	230 kV buses	1.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 60,000**	
8.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	
8.13	Low Profile Foundations	40.0	Ea		$ 5,000	$ 5,000	**$ 200,000**	Supply & Install
8.14	Caisson DE Foundations	12.0	Ea		$ 50,000	$ 50,000	**$ 600,000**	Supply & Install
8.15	Circuit Breaker Foundations	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
8.16	Lightning Mast Foundations	1.0	Ea		$ 15,000	$ 15,000	**$ 15,000**	Supply & Install
8.17	SST Foundation	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
8.18	Control House and Pad (14' x 70' - 980 sq. ft)	1.0	Ea	$ 350,000	$ 100,000	$ 450,000	**$ 450,000**	
8.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
8.20	Control Cables	1.0	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
8.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
8.22	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	Supply & Install
8.23	Protection, Telecom and Metering Equipment (Panels)	11.0	Ea		$ 30,000	$ 30,000	**$ 330,000**	Supply & Install
8.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
8.25	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
8.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 357,500	$ 357,500	**$ 357,500**	Supply & Install
8.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 350,000	$ 350,000	**$ 350,000**	Supply & Install
8.28	Grounding	1.0	Sum		$ 125,000	$ 125,000	**$ 125,000**	Supply & Install
8.29	Bus Support 1 Ph	18.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 54,000**	
8.30	Switch Stands	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
8.31	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
8.32	Misc. Structures	1.0	Sum		$ 27,000	$ 27,000	**$ 27,000**	
8.33	Substation A-Frame Structures Standalone	3.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 75,000**	
8.34	Lightning Masts	1.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 12,000**	
8.35	Arrestor Stands	6.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 21,000**	
8.36	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 725,000	$ 725,000	**$ 725,000**	Supply & Install
8.37	345kV - 230kV 480/540/600 MVA Transformer	1.0	Ea	$ 4,750,000	$ 750,000	$ 5,500,000	**$ 5,500,000**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
8.38	Transformer Foundation with concrete moat and double steel grating	1.0	Ea		$ 150,000	$ 150,000	**$ 150,000**	
TOTAL - GARDENVILLE SUBSTATION WORKS:							**$ 12,822,500**	
9. NIAGARA SUBSTATION WORK								
9.1	Site Works including sediment controls, access roads, rough grading, final grading and stone placement	0.6	Sum		$ 1,000,000	$ 1,000,000	**$ 600,000**	Supply & Install
9.2	Substation Fence	320.0	LF		$ 200	$ 200	**$ 64,000**	Supply & Install
9.3	Switches 3ph	2.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 14,000**	
9.4	Line Switches 3 ph w/ motor operators	1.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 30,000**	
9.5	Instrument Transformers	1.0	Sum		$ 163,000	$ 163,000	**$ 163,000**	
9.6	Breakers	1.0	Ea	$ 250,000	$ 75,000	$ 325,000	**$ 325,000**	
9.7	Arrestors (3 per line)	6.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 45,000**	
9.8	Line Traps	1.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 21,000**	
9.9	345 kV buses	0.5	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 30,000**	
9.10	Low Profile Foundations	37.0	Ea		$ 5,000	$ 5,000	**$ 185,000**	Supply & Install
9.11	Caisson DE Foundations	4.0	Ea		$ 50,000	$ 50,000	**$ 200,000**	Supply & Install
9.12	Circuit Breaker Foundations	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
9.13	Control Cables	1.0	Sum	$50,000	$ 50,000	$ 100,000	**$ 100,000**	
9.14	Protection, Telecom and Metering Equipment (Panels)	3.0	Ea		$ 30,000	$ 30,000	**$ 90,000**	Supply & Install
9.15	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
9.16	Control Conduits from Cable Trench to Equipment	1.0	Sum		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
9.17	Cable Trench Systems for Control Cables	1.0	Sum		$ 350,000	$ 350,000	**$ 350,000**	Supply & Install
9.18	Grounding	1.0	Sum		$ 125,000	$ 125,000	**$ 125,000**	Supply & Install
9.19	Underground Riser Structures	6.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 21,000**	
9.20	Bus Support 1 Ph	6.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 18,000**	
9.21	Switch Stands	2.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 22,000**	
9.22	Misc. Structures	1.0	Ea		$ 8,000	$ 8,000	**$ 8,000**	
9.23	Substation A-Frame Structures Standalone	1.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 25,000**	
9.24	Arrestor Stands	3.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 10,500**	
9.25	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 200,000	$ 200,000	**$ 200,000**	Supply & Install
9.26	345kV underground cable with terminations. (680 Circuit Ft.)	1.0	Ea		$ 1,200,000	$ 1,200,000	**$ 1,200,000**	Supply & Install
TOTAL - NIAGARA SUBSTATION WORKS:							**$ 4,246,500**	
10. MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:								
	Contractor Mobilization / Demobilization							
10.1	Mob / Demob	1.0	Sum		$ 2,000,000	$ 2,000,000	**$ 2,000,000**	
	Project Management, Material Handling & Amenities					$ -	**$ -**	
10.2	Project Management & Staffing (includes PM, Field Engineers / Supervision,	36.0	Months		$ 450,000	$ 450,000	**$ 16,200,000**	
10.3	Site Accommodation, Facilities, Storage	1.0	Sum		$ 2,500,000	$ 2,500,000	**$ 2,500,000**	
	Engineering					$ -	**$ -**	
10.4	Design Engineering	1.0	Sum		$ 10,500,000	$ 10,500,000	**$ 10,500,000**	
10.5	LiDAR	1.0	Sum		$ 800,000	$ 800,000	**$ 800,000**	
10.6	Geotech	1.0	Sum		$ 1,700,000	$ 1,700,000	**$ 1,700,000**	
10.7	Surveying/Staking	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	
	Testing & Commissioning							
10.8	Testing & Commissioning of T-Line and Equipment	1.0	Sum		$ 2,500,000	$ 2,500,000	**$ 2,500,000**	
	Permitting and Additional Costs					$ -	**$ -**	
10.9	Environmental Licensing & Permitting Costs	1.0	Sum		$ 4,336,429	$ 4,336,429	**$ 4,336,429**	
10.10	Environmental Mitigation	1.0	Sum		$ 20,514,989	$ 20,514,989	**$ 20,514,989**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
10.11	Warranties / LOC's	1.0	Sum		$ 1,358,623	$ 1,358,623	**$ 1,358,623**	
10.12	Real Estate Costs (New)	1.0	Sum		$ 7,675,534	$ 7,675,534	**$ 7,675,534**	
10.13	Real Estate Costs (Incumbent Utility ROW)	1.0	Sum		$ 4,555,924	$ 4,555,924	**$ 4,555,924**	
10.14	Legal Fees	1.0	Sum		$ 3,500,000	$ 3,500,000	**$ 3,500,000**	
10.15	Sales Tax on Materials	1.0	Sum	$ 8,164,882		$ 8,164,882	**$ 8,164,882**	
10.16	Fees for permits, including roadway, railroad, building or other local permits	1.0	Sum		$ 200,000	$ 200,000	**$ 200,000**	
TOTAL - MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:							**$ 87,506,380**	
11. SYSTEM UPGRADE FACILITIES								
SUF 1.1	Depew to Erie Street 115kV Transmission Line 921. Terminal allowance included. See comments.	1.00	Sum		$ 500,000	$ 500,000	$ 500,000	Relay was replaced and line ratings increased to 124/137/158 (NOR/LTE/STE) resulting ratings are below line conductor
SUF 1.2	Engineering, T&C, PM, Indirects for SUF 1.1 (15%)					$ -	$ 75,000	
SUF 2.1	Shawnee to Swann Reconductor	12.00	Mile		$ 400,000	$ 400,000	$ 4,800,000	Rate for reconductor is pro-rated from
SUF 2.2	Engineering, T&C, PM, Indirects FOR SUF 2.2 (15%)					$ -	$ 720,000	National Grid Niagara - Packard
SUF 3	Roll Rd Substation							
SUF 3.1	Restoration of station stone within existing substation fence. Assume spoil	1.00	Ea		$ 100,000	$ 100,000	$ 100,000	Supply & Install
SUF 3.2	Transformer 115-34.5kV 90 MVA	1.00	Ea	$ 700,000	$ 200,000	$ 900,000	$ 900,000	
SUF 3.3	Switches 115kV 3Ph	1.00	Ea	$ 15,000	$ 12,000	$ 27,000	$ 27,000	
SUF 3.4	Switches 35kV 3Ph	1.00	Ea	$ 6,000	$ 4,000	$ 10,000	$ 10,000	
SUF 3.5	Breakers 115kV 1200A	1.00	Ea	$ 150,000	$ 50,000	$ 200,000	$ 200,000	
SUF 3.6	Breakers 35kV 2000A	1.00	Ea	$ 75,000	$ 15,000	$ 90,000	$ 90,000	
SUF 3.7	CVT's 115kV	3.00	Ea	$ 10,000	$ 8,000	$ 18,000	$ 54,000	
SUF 3.8	Arrestors 115kV	6.00	Ea	$ 5,000	$ 700	$ 5,700	$ 34,200	
SUF 3.9	Arrestors 35kV (for transformer)	3.00	Ea	$ 2,500	$ 500	$ 3,000	$ 9,000	
SUF 3.10	Low Profile Foundations	8.00	Ea		$ 5,000	$ 5,000	$ 40,000	Supply & Install
SUF 3.11	Circuit Breaker Foundation 115kV	1.00	Ea		$ 75,000	$ 75,000	$ 75,000	Supply & Install
SUF 3.12	Circuit Breaker Foundation 35kV	1.00	Ea		$ 30,000	$ 30,000	$ 30,000	Supply & Install
SUF 3.13	Transformer Foundation with concrete moat and double steel grating	1.00	Ea		$ 150,000	$ 150,000	$ 150,000	Supply & Install
SUF 3.14	Firewall 30' long x 12' tall x 1' thick with footer	1.00	Ea		$ 100,000	$ 100,000	$ 100,000	Supply & Install
SUF 3.15	Control Cables	1.00	Sum		$ 50,000	$ 50,000	$ 50,000	Supply & Install
SUF 3.16	Protection & Telecom Equipment	3.00	Ea		$ 30,000	$ 30,000	$ 90,000	Supply & Install
SUF 3.17	SCADA and Communications	1.00	Sum		$ 25,000	$ 25,000	$ 25,000	Supply & Install
SUF 3.18	Low Voltage AC Distribution	1.00	Sum		$ 30,000	$ 30,000	$ 30,000	Supply & Install
SUF 3.19	Control Conduits	1.0	Sum		$ 50,000	$ 50,000	$ 50,000	Supply & Install
SUF 3.20	Grounding	1.0	Sum		$ 25,000	$ 25,000	$ 25,000	Supply & Install
SUF 3.21	Switch Stand 115kV (reuse 1 existing)	1.0	Ea	$ 1,500	$ 800	$ 2,300	$ 2,300	
SUF 3.22	CVT Stand	3.0	Ea	$ 1,000	$ 1,000	$ 2,000	$ 6,000	
SUF 3.23	Arrestor Stand	3.0	Ea	$ 1,000	$ 1,000	$ 2,000	$ 6,000	
SUF 3.24	Misc Materials and Above / Below Ground Works	1.0	Sum		$ 120,000	$ 120,000	$ 120,000	Supply & Install
SUF 3.25	Engineering, T&C, PM, Indirects for SUF 3 (15%)					$ -	$ 333,525	Assumed 15% to cover all misc costs
SUF 4.1	Lockport to Shaw 115kV Transmsision Line 102. NAT report indicated: Remove all limitations to achieve line conductor ratings as the limit. Terminal allowance included.	1.00	Sum		$ 500,000	$ 500,000	$ 500,000	The limiting equipment is not known - scope undefined.
SUF 4.2	Engineering, T&C, PM, Indirects for SUF 4.1 (15%)					$ -	$ 75,000	
SUF 5	Gardenville Circuit Breaker Replacement							
SUF 5.1	Circuit Breaker Foundation	12.0	Ea		$ 75,000	$ 75,000	$ 900,000	Supply & Install
SUF 5.2	Below Grade Conduit & Grounding	1.0	Sum		$ 1,200,000	$ 1,200,000	$ 1,200,000	Supply & Install
SUF 5.3	Circuit breaker - 230kV	12.0	Ea	$ 250,000	$ 75,000	$ 325,000	$ 3,900,000	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
SUF 5.4	Switches - 230kV	24.0	Ea	$ 20,000	$ 15,000	$ 35,000	$ 840,000	
SUF 5.5	Control Cables	1.0	Sum		$ 1,200,000	$ 1,200,000	$ 1,200,000	Supply & Install
SUF 5.6	Misc Above Ground Works	1.00	Sum		$ 900,000	$ 900,000	$ 900,000	Supply & Install
SUF 5.7	Engineering, T&C, PM, Indirects for SUF 5 (15%)						$ 1,341,000	Assumed 15% to cover all misc costs
SUF 6	SYSTEM UPGRADE FACILITIES CONTINGENCY (SEE ASSUMPTIONS & CLARIFICATIONS)						$ 3,750,000	Contingency for possible additional SUF upgrades
TOTAL - SYSTEM UPGRADE FACILITIES:							**$ 23,258,025**	

ENVIRONMENTAL LICENSING AND PERMITTING

PROJECT TITLE WNY PROJECT EVALUATION- ENVIRONMENTAL LICENSING & PERMITTING COST ELEMENTS						ENVIRONMENTAL LICENSING & PERMITTING COST ESTIMATE RANGE FOR PROPOSED WNY TRANSMISSION PROJECT - T009	
FEDERAL						Proposal 4	
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans	Min.	Max.
USACE	Waters of the US under Section 404 of the Clean Water Act and Section 10 of the 1899 Rivers and Harbors Act (including regulated wetland areas)	Nationwide Permits (NWP) or Individual Permit (IP)	Any work within the boundaries of regulated wetlands (with the exception of isolated wetlands) or waterways to the spring high tide or ordinary high water mark	If project qualifies for a NWP (<0.5 acre disturbance and within NWP project type parameters), a pre-construction notification (PCN) is typically required. NWPs have a 45 day review period starting from when project logged in system (up to 6wk backlog delay in logging projects) If an IP is triggered, USACE will require Alternative Analysis and Public Notice/Hearing. IPs could also trigger restrictive environmental work windows. IPs have a 120 day review period starting from when permit is "deemed complete"	Wetland Delineation; Wetland Function & Value Assessment; Stream Delineation; Restoration Plan	$52,240	$137,075
USFWS	Endangered Species Act Section 7 (ESA) Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act	Consultation (Formal or Informal); Special Use Permit	Any work that may have an affect on listed species or their habitat; or projects within National Wildlife Refuges	USACE coordinates consultation with USFWS for ESA listed species during their permit review. Also includes the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act compliance. Season restrictions on construction could be imposed.	Rare, Threatened & Endangered Species Search; Preparation of Reports and Conservation Plans	$77,600	$193,600
FAA	Airports / Airspace	Federal Aviation Administration (FAA) Notification	New or Replacement Structures near Airports	Depending on construction locations, this permit may only be needed for OP work.	Obstruction Analysis, Mitigation Plan (assumes Engineering Cost)	$3,000	$9,000
STATE							
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans		
NYS Public Service Commission / Department of Public Service (NYSDPS)	Article VII	Article VII: Certificate of Environmental Compatibility and Public Need and Environmental Management & Construction Plan (EM&CP)	Article 7: Major electric transmission facilities with design capacity of 100kV or more extending for at least 10 miles or 125kV and over extending a distance of 1 mile or more (some exclusions for underground transmission applies)	Article 7 will incorporate all of the required State and Local approvals (costed separately), as well as Engineering and Environmental Studies and Public Outreach. Intervenor Fund payment expected to be $350,000. An Environmental Management & Construction Plan (EM&CP) must be prepared and approved by the PSC. (see 16 NYCRR Parts 85 through 88)	Includes Reports and Plans required for State and Federal Agency Permits, as well as EM&CP, EMF, Noise, Air, Visual Impact Assessment, Invasive Species Control Plan, Mitigation Plans	$850,000	$3,350,000

ENVIRONMENTAL LICENSING AND PERMITTING

NYSDEC	Article 15 Stream Disturbance; Article 24 Wetlands, Open Waters, Wetlands Buffers (100' for Freshwater Wetland)	Individual Permit (IP) (unless developer has General Permit (GP))	Any work within the boundaries of regulated waterways or wetlands, and wetland adjacent areas	Any disturbance within wetlands and/or below mean high tide will require an IP. Areas of temporary disturbance will likely require restoration, including a monitoring and maintenance period. Permanent disturbance will require offsite mitigation up to 3:1 area ratio; also includes a monitoring and maintenance period. GP may only be applicable if project ground disturbance is located outside of wetlands areas (above MHW).	Wetland Delineation; Wetland Restoration/Mitigation Plan	$31,160	$94,550
NYSDEC	Stormwater (If >1 Acre Soil Disturbance)	SPDES General Permit for Stormwater Discharges from Construction Activities GP-0-15-002 & SWPPP	Project areas of soil disturbance	If project involves 1 acre or more soil disturbance, then the GP is required. If located within a Regulated MS4 Municipality, additional coordination may be needed. Weekly inspections by a Qualified Inspector during construction will be required.	SWPPP (assumes Engineering Cost includes Sediment & Erosion Control Plan, Hydraulic & Hydrology Studies, Stormwater Management Design)	$11,200	$38,000
NYSDOS	State Coastal Management Program Mapped Coastal Area Boundary	Coastal Consistency Concurrence	Projects within the NYSDOS designated Coastal Zone; and consistency with Local Waterfront Revitalization Plans (LWRPs); e.g., Town of Grand Island LWRP	Online mapping available to check if within coastal zone, a significant coastal fish & wildlife habitat (SCFWH), a local waterfront revitalization program area (LWRP), or a comprehensive management program areas (CMP)		$3,400	$15,000
NYSHPO	National Historic Preservation Act (NHPA) Section 106: State and Federal Historic Places; State Mapped Archeologically Sensitive Areas	Cultural Resource Information System (CRIS) Determination	Local, State, or Federal eligible or designated historic places and/or areas of archeological sensitivity (in off-road areas and areas that have not been previously disturbed)	NYSDEC EAF Online Mapper identifies State or National Register of Historic Places and archeological sensitive areas within or adjacent to the project site. Formally enter project information and supporting documents into SHPO's online CRIS program. Staff will review and email a determination of impacts letter	Phase 1A & 1B Archaeological Studies (not included in costing)	$33,120	$108,760
NYS NHP	Threatened and Endangered Species	Consultation	Activities that may affect T&E species or their habitat.		See USFWS	$1,200	$6,400
NYSDOT/NYS Thruway Authority/FHWA	State Roadways	Highway Work Permit/Utility Permit, Vegetation Management Permit; Easement	Any work within or crossing State highway ROW	May require restoration landscaping coordination. Typically requires compliance with NEPA including SHPO and USFWS effects determination	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$17,000	$200,000
NYS Canal Corporation	Erie Canal - jurisdiction varies along edge	Canal Occupancy & Work Permit (TA-W99072)	Any work involving the Erie Canal	Must coordinate with Division Permit Engineer about particular section of canal being affected. Commercial permit fee = $25 plus $2,000,000 additional General Aggregate Liability Insurance	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$3,800	$3,800

ENVIRONMENTAL LICENSING AND PERMITTING

NYS Dept. of Agriculture and Markets	All agricultural lands (including Agricultural Districts)	Part of Article 7 & Article 10 Review process	Any work impacting agricultural land	Must minimize impacts and restore damage to agricultural land, and coordinate with County Soil & Water Conservation District; Vineyards are a major concern in WNYS. Pre-application conference with PSC, DEC and Ag& Markets recommended. Must develop EM&CP in conformance with Art. 7/10 Certificate Conditions. Agricultural Monitor must oversee construction & restoration; requisite 2-yrs post restoration monitoring.	Crop/Pasturing Mitigation Plan (not included in costing)	$11,000	$24,000
REGIONAL							
Railroads	Railroad crossings	Consultation-permits may be required; Easement	Access / new structures on RR property		Easement area survey (not included in costs)	$11,000	$200,000
LOCAL/MUNICIPAL							
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans		
County Dept. of Public Works	County Roadways	Lane Closure Permit, Highway Work or Access Permit	Work within county roadways and right-of-ways			$6,000	$40,000
Town, City or Village	Municipal Stormwater (MS4) Review	Approval of SWPPP or EM&CP	Project areas of soil disturbance		See NYSDEC SPDES	$6,000	$35,000
Town, City or Village	Variable	Building Permits	New Structures	Individual Towns/Villages must be consulted on a project specific basis to determine notification and/or permitting procedures. Permit application names vary (e.g. road obstruction permit)		$18,000	$92,000
Town, City or Village	Municipal Roadways	Highway Work Permit; Road Opening Permit	Work within municipal roadways and right-of-ways			$6,000	$35,000
Town, City or Village	Wetlands	Wetland Permit / Conservation Approvals	Mapped wetlands and wetland adjacent areas (buffer width variable)		See USACE / NYSDEC Art. 24	$6,000	$52,000

		Minimum	Maximum
ENVIRONMENTAL LICENSING & PERMITTING COST (EXCLUDING MITIGATION)	**PROJECT T009 TOTAL**	**$1,147,720**	**$4,634,185**
Excluded cost: Mitigation or restoration for impact to regulated wetlands; agricultural land and tree clearing	**Expected Value**	**$4,336,428.75**	

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T009 - North American Transmission

ENVIRONMENTAL MITIGATION ESTIMATE

Revision: 4

	Offsite Wetland Mitigation*		Farmland**	
	Min.	Max.	Min.	Max.
Area	117 acres	117 acres	53 acres	106 acres
Cost/Acre	$50,000	$100,000	$503	$503
Ratio	1:1	3:1	1:1	1:1
Total	$5,850,000	$35,100,000	$26,659	$53,318

T009 MITIGATION TOTAL	**Minimum**	**Maximum**	**Expected Value**
	$5,876,659	**$35,153,318**	**$ 20,514,989**

*Offsite wetland mitigation area assumes Highway Alternative Route; clearing of NWI Forested/Shrub Wetland Approx. 2.37 miles (12517 LF) by 100' ROW width and 3.24 miles (17107 LF) by 225' ROW width; Max. cost per acre assumes additional mitigation required for permanent impacts of proposed structures in non-forested wetlands; cost per acre Min. and Max. reduced due to area total over 50 acres; includes design and installation costs only; does not include land acquisition or long term monitoring.

**Farmland mitigation based on corn bushel yield at 129 BU/Acre and $3.9/BU (production numbers from 2016 USDA NYS Agriculture Overview), area assumes 17.58 miles (92822 LF) Adjacent to Agriculture Properties by 25' Wide (Min.) or 50' Wide (Max.); does not include land acquisition

REAL ESTATE ESTIMATE (NEW ROW)

Revision: 4

COUNTY: NIAGARA & ERIE

DEVELOPER: NORTH AMERICAN (T009)

SEGMENT: NIAGARA - DYSINGER - STOLLE SEGMENT

	Address	Area (Acres)	Total Cost
A	**NIAGARA COUNTY**		
	Sub Total (A)	2.38	$ 51,560.00

B	**ERIE COUNTY**		
	Sub Total (A)	0.68	$ 4,376.00
	Total (A + B)	3.06	$ 55,936.00

REAL ESTATE ESTIMATE (NEW ROW)

Revision: 4

COUNTY: ERIE

DEVELOPER: NORTH AMERICAN (T009)

SEGMENT: STOLLE TO GARDENVILLE SEGMENT

		Area (Acres)	Total Cost
	Total	167.00	$ 6,838,497.00

SUBSTATION ENGINEERING COMPANY

Revision: 4

REAL ESTATE ESTIMATE
(INCUMBENT UTILITY ROW)

COUNTY: NIAGARA & ERIE
DEVELOPER: NORTH AMERICAN (T009)
SEGMENT: NIAGARA-DYSINGER - STOLLE - GARDENVILLE SEGMENT

	DEVELOPER	SEGMENT	COUNTY	INCUMBENT UTILITY (ROW) (ACRES)	TOTAL ROW COST
T009	North American Transmission (Proposal 4)	Dysinger SS to Stolle Rd SS - 2x19.98 miles	Niagara	10.33	$ 4,234,000
			Erie	534.58	
		Stolle Rd SS to Gardenville SS - 12.84 miles	Erie	27.55	
		Niagara to Dysinger - 27.16	Niagara	408.32	

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T009 - North American Transmission

REAL ESTATE ESTIMATE (HOUSES)

Revision: 4

COUNTY: ERIE

DEVELOPER: NORTH AMERICAN (T009)

SEGMENT: STOLLE ROAD TO GARDENVILLE

		Total Valuation of Property with 3% Escalation/year (as of 2017)
	Total Valuation Cost	$ 628,349.85

REAL ESTATE ESTIMATE (SUBSTATIONS)

Revision: 4

COUNTY: NIAGARA
DEVELOPER: NORTH AMERICAN (T009)
SEGMENT: DYSINGER SWITCHYARD

		Total Cost
	Total Cost of Proposed Substation Site	$152,750.00

REAL ESTATE ESTIMATE (SUBSTATIONS)

Revision: 4

COUNTY: ERIE
DEVELOPER: NORTH AMERICAN (T009)
SEGMENT: STOLLE ROAD SUBSTATION

		Total Cost
	Total Cost of Proposed Substation Site	$19,440.00

REAL ESTATE ESTIMATE (SUBSTATIONS)

Revision: 4

COUNTY: ERIE
DEVELOPER: NORTH AMERICAN (T009)
SEGMENT: GARDENVILLE SUBSTATION (OPTION 1)

		Total Cost
	Total Cost of Proposed Substation Site	$ 309,483.90

ASSUMPTIONS AND CLARIFICATIONS

Revision: 4

a) Cost Estimate is based on 2017 rates.
b)We have assumed a construction schedule of 24 months, with no breaks in the schedule. Six months have been added to the construction schedule PM time for start up and close out works and float.
c) Stringing rates allow for protection over crossings (such as rider poles).
d) We have assumed a typical work week (6 x 10 hour days).
e) We have assumed the Access Road included in Developer Estimate will be Type 1 Gravel Type.
f) Costs will vary for handling and disposal of contaminated spoils, depending on type of contaminants and availability / location of the appropriate tipping facility. Since there is not enough information to provide a quantified estimate for this item, allowance is included in the contingency monies.
g) Costs have been developed based on historical data from Projects of a similar nature (AACE Class 5 and 4 Estimating Practices). We have not engaged any subcontractors or material vendors for formal quotes.
h) Estimated quantities have been used for items in Section 1 of the Estimate (CLEARING & ACCESS FOR T-LINE CONSTRUCTION). These items were not quantified in the Developers Estimate, however we believe that they are necessary for the works.
i) Foundation rates include supply and installation of materials. Driller Pier rates include supply and testing of concrete, rebar cage and the use of temp or permanent casing.
j) A Contractor Mark-Up (OH&P) of 15% has been included in the Total section.
k) Dysinger to Stolle Road Circuit 2 ROW length (19.85 miles) not included in project route total since parallels already accounted for length of Dysinger to Stolle Road (19.97 miles).
l) USFWS T&E Assumes that ¼ of the Total Line in Right of Way will require field survey for T&E (Approx. 14.96 miles).
m) NEPA-Assumes no NEPA because Art VII.
o) SHPO-Assumes consultation and Phase 1A/1B archeological studies with field survey for 50% of Total Line in Right of Way (Approx. 29.92 miles).
p) NYSDOT/FHWA-Assumes any required NEPA coordination/requirements are covered under Article VII or SEQRA review. Max costs includes additional agency coordination (greater than general fixed costing max.) for new ROW Parallel to Highway.
q) Railroad - Max costs includes additional agency coordination (greater than general fixed costing max.) for new ROW Parallel to Railroad.
r) Assumes no coordination with National Parks Service or OPRHP/State Parks
s) USACE wetland delineation total based on Line Miles in Wetlands - NWI wetland lengths of 10.31 miles (Min.) and 10.41 miles (Max.)
t) DEC wetland delineation total based on Line Miles in Wetlands - DEC wetland lengths of 4.99 miles (Min.) and 5.54 miles (Max.)

ASSUMPTIONS AND CLARIFICATIONS

Revision: 4

u) Offsite wetland mitigation area costs based on a total of approximately 5.6 miles of impacts anticipated by clearing of NWI Forested/Shrub Wetland (calculated by GEI based on NWI mapper legend categories) using the Stolle Road to Gardenville Highway alternative (0.65 miles). Assumes clearing an additional 125 feet within the 3.24 mile Dysinger to Stolle Road Right of Way (for a total of 225 feet width) and 100 feet of additional clearing in the 1.72 mile Dysinger to Niagara segment. Minimum costs at $50,000/acre, maximum costs at $100,000/acre for additional permanent impacts of proposed structures in non-forested wetlands. Costing includes design and installation costs only and does not include land acquisition or long term monitoring. Minimum and maximum costs for this proposal assumes a reduced mitigation cost/acre due to size of mitigation.
v) Agricultural mitigation assumes timber matting impacts and pad impacts on a total of 17.6 miles of adjacent agriculture land (22.86 miles for the Stolle to Gardenville Highway route and Dysinger to Niagara minus 5.28 of duplicate miles for the second circuit from Dysinger to Stolle Rd) requires crop damage payments based on USDA 2016 NYS Agriculture Overview corn yield and bushel price/acre. Minimum assumes 25-foot-wide impact, Maximum assumes 50-foot-wide impact.
w) No tree survey or replanting required outside regulated wetlands areas.
x) Article VII Intervenor Fund payment expected to be $350,000.
y) Mitigation costs for landscaping only (no paving, sidewalks, sound walls, etc.).
z) Did not calculate for any real estate acquisition cost of public or private lands or fees associated for property rights for railroad crossings, town road crossings etc.
aa) Expected value of environmental licensing and permitting cost is estimated to be 50% higher than the mean of the range based upon the addition of the new Gardenville to Stolle 345kV line, a second Dysinger to Stolle line and a new Niagara to Dysinger 345kV line.
ab) SUF pricing includes 35% to cover Contractor markup (15%) and contingency (20%)
ac) SUF reconductor rate is based on Niagara-Packard (National Grid) reconductor estimate, pro-rated to a rate / mile. Note that this is based on conductor, shieldwire and hardware pricing only and does not include structure or foundation works.
ad) System Upgrade Facilities Contingency is allowance for potential additional system upgrades including overdutied breakers, protection changes, unidentified thermal issues, etc that may be identified as detailed studies are completed.

INDEPENDENT ESTIMATES

ATTACHMENT B5

T011 – NATIONAL GRID

SUBSTATION ENGINEERING COMPANY
8/11/2017

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T011 - National Grid Moderate Power Transfer Solution

Revision: 4

SUMMARY OF COST ESTIMATE

Segment	Description	Total Amount
	CLEARING & ACCESS WORKS FOR T-LINE CONSTRUCTION	$ 28,554,443
1	WG D2 -IDENTIFIED LINE WORK 180, 181, 182 (MINIMAL SOLUTION)	$ 45,533,358
	WG E NEW BUS TIE BREAKER AT PACKARD STATION TO BE PLACED IN SERIES WITH EXISTING BREAKER R342	$ 880,000
	WG F REPLACE THERMALLY LIMITING EQUIPMENT AT PACKARD STATION FOR LINE 181	$ 200,000
2	WG-H IDENTIFIED LINE WORK 130, 133	$ 7,261,318
	WG-I REPLACE THERMALLY LIMITING EQUIPMENT AT HUNTLEY STATION	$ 235,000
3	WG-J IDENTIFIED LINE WORK 191	$ 3,670,736
4	WG-M IDENTIFIED LINE WORK 103, 104	$ 486,376
	WG-N REPLACE THERMALLY LIMITING EQUIPMENT AT LOCKPORT STATION FOR LINES 101,102	$ 500,000
5	WG-O - NYSEG/NYPA/N GRID - ELIMINATE DOUBLE CIRCUIT CONTINGENCY FOR LINE 61/64	$ 1,570,740
	WG-P2 - IDENTIFIED 181 LINE WORK (URBAN SWITCH TO ERIE, NYSEG)	$ 3,564,852
	WG-Q - REPLACE THERMALLY LIMITING EQUIPMENT AT ERIE STN FOR LINE 181	$ 1,250,000
	WG-R - REPLACE THERMALLY LIMITING EQUIPMENT LINE 54 (NYSEG 921)	$ 1,250,000
	WG-U - REPLACE THERMALLY LIMITING EQUIPMENT ROBINSON STN LINE 64	$ 1,700,000
	WG-V - REPLACE THERMALLY LIMITING EQUIPMENT NIAGARA STN LINE 102	$ 500,000
	MOBILIZATION, ACCESS, CIVILS, PROJECT MANAGEMENT, OVERHEADS, MISC:	$ 27,447,225
	CONTRACTOR MARK UP (OH&P) 15%	$ 18,690,607
	SUBTOTAL (A):	$ 143,294,655
	CONTINGENCY ON ENTIRE PROJECT (20%)	$ 28,658,931
	TOTAL (A):	**$ 171,953,585**

SYSTEM UPGRADE FACILITIES	$ 3,750,000
CONTRACTOR MARKUP & CONTINGENCY (35%)	$ 1,312,500
SUBTOTAL (B):	**$ 5,062,500**

TOTAL PROJECT COST (A+B):	**$ 177,016,085**

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
Clearing & Access Works for T-Line Construction								
	Access, Matting, ROW Maintenance					$ -	$ -	
1.1	Gravel Access Road Improvement	17,000.00	LF		$ 7	$ 7	**$ 119,000**	Assumes Type 1 Gravel Road
1.2	Temporary Matting	250,000.00	LF		$ 70	$ 70	**$ 17,500,000**	
1.3	Work Pads	108,500.00	SF		$ 4	$ 4	**$ 381,920**	
1.4	Restoration for Work Pad areas	10,850.00	SF		$ 0.2	$ 0.2	**$ 1,628**	
1.5	New Access Roads	21,000.00	LF		$ 250	$ 250	**$ 5,250,000**	
1.6	Air Bridge	6.00	EA		$ 14,445	$ 14,445	**$ 86,670**	
1.7	Stabilized Construction Entrance	240.00	EA		$ 4,580	$ 4,580	**$ 1,099,200**	
1.8	Maintenance and Protection of Traffic on Public Roads	1.00	LS		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	
1.9	Temporary Access Bridges	15.00	EA		$ 20,035	$ 20,035	**$ 300,525**	
1.10	Concrete Washout Station	30.00	EA		$ 1,850	$ 1,850	**$ 55,500**	
1.11	Rock Coring Allowance for Foundations (say 5ft / caisson for 60 caissons)	300.00	FT		$ 4,200	$ 4,200	**$ 1,260,000**	
1.12	Snow Removal & Maintenance	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	
TOTAL CLEARING & ACCESS:							**$ 28,554,443**	
SEGMENT 1	**D2, E & F**							
WG D2 -Identified Line Work 180, 181, 182 (Minimal Solution)								
2	**Removal of Existing 115kV Line**							
	Wire Removal Work							
	Line 181/105 – Remove approximately 26.6 circuit miles, 115kV/69kV (Packard Substation to Ellicott Junction):							
2.1	Remove 13.3 circuit miles (typically 350 MCM 19 strand Copper) - Line 105	13.30	Mile		$ 15,000	$ 15,000	**$ 199,500**	
2.2	Remove13.3 circuit miles (typically 350 MCM 19 strand Copper) - Line 181	13.30	Mile		$ 15,000	$ 15,000	**$ 199,500**	
2.3	Remove 26.6 miles of existing 3/8” x 7 steel EHS shieldwire	26.60	Mile		$ 12,000	$ 12,000	**$ 319,200**	
2.4	Conductor attachment assembly at Packard Substation	1.00	Lot		$ 20,000	$ 20,000	**$ 20,000**	
	Line 180/181 – Remove approximately 7.2 circuit miles, 115kV (Ellicott Junction to Youngman Substation):					$ -		
2.5	Remove 7.2 circuit miles (typically 400 MCM 19 strand Copper) - Line 180	7.20	Mile		$ 15,000	$ 15,000	**$ 108,000**	
2.6	Remove 7.2 circuit miles (typically 350 MCM 19 strand Copper) - Line 181	7.20	Mile		$ 15,000	$ 15,000	**$ 108,000**	
2.7	Remove 14.4 miles of existing 3/8” x 7 steel EHS shieldwire	14.40	Mile		$ 12,000	$ 12,000	**$ 172,800**	
2.8	Conductor attachment assembly at Urban Switch	1.00	Lot		$ 20,000	$ 20,000	**$ 20,000**	
	Line 180/182 – Remove approximately 12.4 circuit miles, 115kV (Structure 280 at Packard to Grand Island Substation):							
2.9	Remove 12.4 circuit miles (typically 400 MCM 19 strand Copper) - Line 182	12.40	Mile		$ 15,000	$ 15,000	**$ 186,000**	
2.10	Remove 12.4 miles of existing 3/8” x 7 steel EHS shieldwire	12.40	Mile		$ 12,000	$ 12,000	**$ 148,800**	
	Line 182/92 – Remove approximately 7.2 circuit miles, 115kV/69kV (Ellicott Junction to Youngman Substation):							
2.11	Remove 7.2 circuit miles (typically 400 MCM 19 strand Copper) - Line 182	7.20	Mile		$ 15,000	$ 15,000	**$ 108,000**	
2.12	Remove 7.2 circuit miles (typically 400 MCM 19 strand Copper) - Line 92	7.20	Mile		$ 15,000	$ 15,000	**$ 108,000**	
2.13	Remove 14.4 miles of existing 3/8” x 7 steel EHS shieldwire	14.40	Mile		$ 12,000	$ 12,000	**$ 172,800**	
	Structure Removal Work							
	Line 181/105 – Remove 181 structures (Packard Substation to Ellicott Junction)							
	Remove 37 deadend structures:							
2.14	Remove 34 double circuit lattice deadend towers	34.00	Structure		$ 9,000	$ 9,000	**$ 306,000**	
2.15	Remove 3 single pole wood deadend structures	3.00	Structure		$ 5,000	$ 5,000	**$ 15,000**	
	144 suspension structures:							
2.16	Remove 11 double circuit steel suspension towers	11.00	Structure		$ 7,500	$ 7,500	**$ 82,500**	
2.17	Remove 10 double circuit suspension flex towers	10.00	Structure		$ 8,000	$ 8,000	**$ 80,000**	
2.18	Remove 6 H-Frame wood suspension structures	6.00	Structure		$ 6,000	$ 6,000	**$ 36,000**	
2.19	Remove 117 2 pole-wood suspension structures	117.00	Structure		$ 6,000	$ 6,000	**$ 702,000**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
	Line 180/181 – Remove 39 Structures (Ellicott Junction to Youngman Substation):							
	Remove 18 deadend structures:							
2.20	Remove 14 double circuit lattice deadend towers	14.00	Structure		$ 9,000	$ 9,000	**$ 126,000**	
2.21	Remove 4 double circuit single pole steel deadend structures	4.00	Structure		$ 8,000	$ 8,000	**$ 32,000**	
	Remove 21 suspension structures:							
2.22	Remove 19 double circuit flex towers suspension structures	19.00	Structure		$ 7,000	$ 7,000	**$ 133,000**	
2.23	Remove 1 H-frame suspension structure	1.00	Structure		$ 6,000	$ 6,000	**$ 6,000**	
2.24	Remove 1 double circuit single pole steel suspension structure	1.00	Structure		$ 7,000	$ 7,000	**$ 7,000**	
	Line 180/182 – Remove 65 structures (Structure 280 at Packard to Grand Island Substation):							
	Remove 53 structures – Ellicott Junction to Pack Club Lane Substation							
	Remove 20 deadend structures							
2.25	Remove 8 double circuit lattice deadend towers	8.00	Structure		$ 9,000	$ 9,000	**$ 72,000**	
2.26	Remove 1 single pole wood deadend structure	1.00	Structure		$ 5,000	$ 5,000	**$ 5,000**	
2.27	Remove 5 double circuit steel pole deadend structures	5.00	Structure		$ 9,000	$ 9,000	**$ 45,000**	
2.28	Remove 1 H-frame wood deadend structure	1.00	Structure		$ 6,000	$ 6,000	**$ 6,000**	
	Remove 38 suspension structures:							
2.29	Remove 29 double circuit suspension flex towers	29.00	Structure		$ 7,000	$ 7,000	**$ 203,000**	
2.30	Remove 1 double circuit steel suspension towers	1.00	Structure		$ 6,000	$ 6,000	**$ 6,000**	
2.31	Remove 8 2-pole wood suspension structures	8.00	Structure		$ 8,000	$ 8,000	**$ 64,000**	
	Line 182 – Remove 12 structures (Near Urban Switch):							
	Remove 4 deadend structures:							
2.32	Remove 2 double circuit lattice deadend towers	2.00	Structure		$ 16,000	$ 16,000	**$ 32,000**	
2.33	Remove 2 3-pole wood deadend structures	2.00	Structure		$ 8,000	$ 8,000	**$ 16,000**	
	Remove 8 suspension structures:							
2.34	Remove 3 double circuit steel suspension towers	3.00	Structure		$ 8,000	$ 8,000	**$ 24,000**	
2.35	Remove 3 double circuit suspension flex towers	3.00	Structure		$ 7,000	$ 7,000	**$ 21,000**	
2.36	Remove 2 H-frame suspension structures	2.00	Structure		$ 6,000	$ 6,000	**$ 12,000**	
	Line 182/92 – Remove 39 structures (Ellicott Junction to Youngman Substation):							
	Remove 18 deadend structures:							
2.37	Remove 14 double circuit lattice deadend towers	14.00	Structure		$ 9,000	$ 9,000	**$ 126,000**	
2.38	Remove 4 double circuit single pole steel deadend structures	4.00	Structure		$ 8,000	$ 8,000	**$ 32,000**	
	Remove 21 suspension structures:							
2.39	Remove 19 double circuit flex towers suspension structures	19.00	Structure		$ 7,000	$ 7,000	**$ 133,000**	
2.40	Remove 1 H-frame suspension structure	1.00	Structure		$ 6,000	$ 6,000	**$ 6,000**	
2.41	Remove 1 double circuit single pole steel suspension structure	1.00	Structure		$ 8,000	$ 8,000	**$ 8,000**	
2.42	Remove (2) Crossing Rail Road (3) Crossing Niagara River 300 ft. (3) offshore after Niagara River Crossing	8.00	Structure		$ 10,000	$ 10,000	**$ 80,000**	
	Proposed Rebuild of 115kV Lines							
2.43	Install Davit Arm Steel 1P suspension DCSS 115kV Structure Type P	63.00	Structure	$ 9,000.00	$ 8,100	$ 17,100	**$ 1,077,300**	
2.44	Install DE DCSS 115kV Structure Type Q	32.00	Structure	$ 29,700.00	$ 26,730	$ 56,430	**$ 1,805,760**	
2.45	Install Davit Arm Wood Restrained Suspension 115kV Structure Type R	165.00	Structure	$ 3,500.00	$ 26,000	$ 29,500	**$ 4,867,500**	
2.46	Install Davit Arm Steel DE 115kV Structure Type S	57.00	Structure	$ 18,000.00	$ 16,200	$ 34,200	**$ 1,949,400**	
2.47	Install 6' Dia x 23' deep reinforced concrete foundation caisson (cylindrical) Structure Type S (35 Nos)	1,100.00	CY		$ 1,500	$ 1,500	**$ 1,650,000**	
2.48	Direct Embedment foundation 36" Dia x 14' Deep Structure Type R (165 Nos)	165.00	Structure		$ 22,000	$ 22,000	**$ 3,630,000**	
2.49	Direct Embedment foundation 36" Dia x 20' Deep Structure Type P (63 Nos)	63.00	Structure		$ 25,000	$ 25,000	**$ 1,575,000**	
2.50	Install 6' Dia x 31' deep reinforced concrete foundation caisson (cylindrical) Structure Type Q (24 Nos)	980.00	CY		$ 1,500	$ 1,500	**$ 1,470,000**	
2.51	Install 8' Dia x 38' deep reinforced concrete foundation caisson (cylindrical) Structure Type S/Q Angle DE (30 Nos)	2,100.00	CY		$ 1,500	$ 1,500	**$ 3,150,000**	
	Install Wire Work							
	Line 181 – Install approximately 13.3 circuit miles, 115kV (Packard Substation to Ellicott Junction)							
2.52	Install 13.3 circuit miles of 1590 kcmil ACSR "FALCON" conductor	13.30	Mile	$ 55,440.00	$ 79,200	$ 134,640	**$ 1,790,712**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
2.53	Install 13.3 miles of 3/8" x 7 strand EHS steel shieldwire	13.30	Mile	$ 7,920.00	$ 15,840	$ 23,760	**$ 316,008**	
2.54	Conductor attachment assembly at Packard Substation	1.00	Lot		$ 20,000	$ 20,000	**$ 20,000**	
	Line 182 – Install approximately 3.6 circuit miles, 115kV (Ellicott Junction to Youngman Substation)							
	Install 3.6 circuit miles of 1590 kcmil ACSR "FALCON" conductor:							
2.55	Install 3.6 circuit miles of 1590 kcmil ACSR "FALCON" conductor-Line 182	3.60	Mile	$ 55,440.00	$ 79,200	$ 134,640	**$ 484,704**	
2.56	Install 3.6 miles of 3/8" x 7 strand EHS steel shieldwire	3.60	Mile	$ 7,920.00	$ 15,840	$ 23,760	**$ 85,536**	
2.57	Conductor attachment assembly at Park Club Lane Substation	1.00	Lot		$ 30,000	$ 30,000	**$ 30,000**	
	Line 182/180 – Install approximately 6.2 circuit miles, 115kV (Structure 280 at Packard to Grand Island Substation)							
2.58	Install 12.4 circuit miles of 1590 kcmil ACSR "FALCON" conductor							
2.59	Install 6.2 circuit miles of 1590 kcmil ACSR "FALCON" conductor-Line 182	6.20	Mile	$ 55,440.00	$ 79,200	$ 134,640	**$ 834,768**	
2.60	Install 6.2 circuit miles of 1590 kcmil ACSR "FALCON" conductor-Line 180	6.20	Mile	$ 55,440.00	$ 79,200	$ 134,640	**$ 834,768**	
2.61	Install 12.4 miles of 3/8" x 7 strand EHS steel shieldwire	12.40	Mile	$ 7,920.00	$ 15,840	$ 23,760	**$ 294,624**	
2.62	Conductor attachment assembly at Park Club Lane Substation	1.00	Lot		$ 30,000	$ 30,000	**$ 30,000**	
	Line 180/181 – Install approximately 3.6 circuit miles, 115kV (Ellicott Junction to Youngman Substation)							
	Install 7.2 circuit miles of 1590 kcmil ACSR "FALCON" conductor:							
2.63	Install 3.6 circuit miles of 1590 kcmil ACSR "FALCON" conductor- Line 181	3.20	Mile	$ 55,440.00	$ 79,200	$ 134,640	**$ 430,848**	
2.64	Install 3.6 circuit miles of 1590 kcmil ACSR "FALCON" conductor- Line 182	3.20	Mile	$ 55,440.00	$ 79,200	$ 134,640	**$ 430,848**	
2.65	Install 7.2 miles of 3/8" x 7 strand EHS steel shieldwire	7.20	Mile	$ 7,920.00	$ 15,840	$ 23,760	**$ 171,072**	
2.66	Conductor attachment assembly at American Standard Tap	1.00	Lot		$ 10,000	$ 10,000	**$ 10,000**	Supply & Install
2.67	OGW Overhead Ground Wire 5/8" Dia (3/8" x 7 Strand EHS Shieldwire)	36.50	Mile	$ 7,920.00	$ 15,840	$ 23,760	**$ 867,240**	
2.68	Install 11 temporarily DE structures to support Line 180 or Line 182.	11.00	Structure		$ 25,000	$ 25,000	**$ 275,000**	Supply & Install
	Insulator & Hardware Work							
2.69	Tangent - Porcelain String (10 Discs Assembly)	66.00	Set	$ 900.00	$ 720	$ 1,620	**$ 106,920**	
2.70	Angle & Deadend Porcelain String (10 Disc Assembly)	120.00	Set	$ 1,300.00	$ 1,040	$ 2,340	**$ 280,800**	
2.71	Jumper Post Porcelain String (Assembly)	66.00	Set	$ 500.00	$ 400	$ 900	**$ 59,400**	
2.72	Allowances for Group M and W with no details	1.00	Sum		$ 100,000	$ 100,000	**$ 100,000**	Supply & Install
	River Crossing 1.2 Miles extra allowance							
2.73	Install River Crossing Structures (2 Structures)	100,000.00	Lbs.	$ 1.80	$ 2	$ 4	**$ 354,000**	
2.74	Install off shore structures (3 Structures)	60,000.00	Lbs.	$ 1.80	$ 2	$ 4	**$ 212,400**	
2.75	Install on land structures (1 Structure)	50,000.00	Lbs.	$ 1.80	$ 2	$ 4	**$ 177,000**	
2.76	Rental of 2 barges with 150 Ton Cranes each for 180 days	12.00	Months		$ 110,000	$ 110,000	**$ 1,320,000**	Supply & Install
2.77	Safety Plan and Coast Guard	1.00	Sum		$ 100,000	$ 100,000	**$ 100,000**	Supply & Install
2.78	Mobilization/Demobilization of Barges and equipment operators	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
2.79	8' Dia x 70 Deep Reinforced Concrete foundation caisson (cylindrical) -river crossing	150.00	CY		$ 1,500	$ 1,500	**$ 225,000**	Supply & Install
2.80	Install reinforced concrete slabs to connect all precast piles	513.00	CY		$ 850	$ 850	**$ 436,050**	Supply & Install
2.81	Precast Concrete Slab	1.00	Sum		$ 700,000	$ 700,000	**$ 700,000**	Supply & Install
2.82	Precast Concrete piers per Str. (4' Dia x 100' depth) 66CY per each pile, 6 per structure	2.00	Structure		$ 475,200	$ 475,200	**$ 950,400**	Supply & Install
2.83	Precast Concrete piers per Str. (2' Dia x 80' depth) 13CY per each pile, 4 per structure	3.00	Structure		$ 62,400	$ 62,400	**$ 187,200**	Supply & Install
2.84	Pile Driving Equipment B-21 Bumminghammer Diesel Hammer	360.00	Day		$ 3,000	$ 3,000	**$ 1,080,000**	Supply & Install
2.85	Boring under water	10.00	Bores		$ 500,000	$ 500,000	**$ 5,000,000**	Supply & Install
2.86	Drilling/casing 1840 LF	1,840.00	VLF	$ 200.00		$ 200	**$ 368,000**	
2.87	Rock drilling 240 LF	240.00	VLF		$ 4,200	$ 4,200	**$ 1,008,000**	Supply & Install

COST ESTIMATE

Revision: 4

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
WG D2 - TOTAL SUPPLY & INSTALL:							**$ 45,533,358**	
WG E New Bus Tie Breaker at Packard Station to be placed in series with existing Breaker R342								
3	**New Bus Breaker at Packard Station**							
3.1	GCB 115kV - 3000A, 63kA	1.00	Unit		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
3.2	115LB1WV1 1 Way Loadbreak Switch Vertical (Located at Structure T and includes the pole)	1.00	Structure		$ 250,000	$ 250,000	**$ 250,000**	
3.3	Relocate 1 No. existing 115kV 3000A disconnect switch 343 to the right of tie breaker R342	1.00	Sum		$ 20,000	$ 20,000	**$ 20,000**	
3.4	Install one new 115kV 123kV , 63kA 3000A SF6 bus tie breaker in series with existing 115kV Areva bus tie R342 breaker	1.00	Sum	$ 150,000.00	$ 50,000	$ 200,000	**$ 200,000**	
3.5	Install new cable and conduit between new tie breaker and control house and associated shield cables	1.00	Sum		$ 35,000	$ 35,000	**$ 35,000**	Supply & Install
3.6	Install new set of AL power conductors and AL four hole pad connectors	1.00	Sum		$ 12,000	$ 12,000	**$ 12,000**	
3.7	Install new AL bus and a 5" upper bus extension to existing breaker R2103 and associated disconnect switches	1.00	Sum		$ 18,000	$ 18,000	**$ 18,000**	
3.8	Structures for Switch and Bus Support	1.00	Sum		$ 30,000	$ 30,000	**$ 30,000**	
3.9	Relocate 115kV disconnect switch 2104 and R2103	1.00	Sum		$ 15,000	$ 15,000	**$ 15,000**	
3.10	Grounding all new electrical equipment	1.00	Sum		$ 10,000	$ 10,000	**$ 10,000**	
3.11	Reconnect, control and integration, test and commissioning	1.00	Sum		$ 20,000	$ 20,000	**$ 20,000**	
3.12	Supply and Install new 115kV switch R2101	1.00	Sum		$ 100,000	$ 100,000	**$ 100,000**	
3.13	Allowance for all secondary electrical works including DC power, AC power and system protection	1.00	Sum		$ 20,000	$ 20,000	**$ 20,000**	
WG E - TOTAL SUPPLY & INSTALL:							**$ 880,000**	
WG F Replace Thermally Limiting Equipment at Packard Station for Line 181								
4	**Replace existing components by suitable aluminum conductor.**							
4.1	Allowance for Thermally Limiting Equipment Upgrade	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	Supply & Install
WG F - TOTAL SUPPLY & INSTALL:							**$ 200,000**	
SEGMENT 2	**H & I**							
WG-H Identified Line Work 130, 133								
5	**Wire Removal Work**							
	Line 130/133 – Remove approximately 18.2 circuit miles, 115kV/69kV (Packard Structures 140 and -Huntley Substation):							
5.1	Remove 18.2 circuit miles (typically 350 MCM 19 strand Copper)	18.20	Mile		$ 15,000	$ 15,000	**$ 273,000**	Supply & Install
5.2	Transfer existing 3/8" x 7 steel EHS shieldwire on 6 structures	26.60	Per Structure		$ 24,000	$ 24,000	**$ 638,400**	
	Structure Removal Work							
	Line 130/133 – Remove 7 double circuit steel deadend lattice towers, 115kV/69kV (Packard Structures 140 and -Huntley Substation):							
	Remove 11 deadend structures:							
5.3	Remove 7 double circuit lattice deadend towers	7.00	Structure		$ 12,000	$ 12,000	**$ 84,000**	
5.4	Remove 4 single pole wood deadend structures	4.00	Structure		$ 6,000	$ 6,000	**$ 24,000**	
5.5	Remove 1 double circuit steel suspension flex tower	1.00	Structure		$ 14,000	$ 14,000	**$ 14,000**	
	Structure Re-inforce Work							
5.6	Install 8 concrete foundation caissons	8.00	Structure		$ 150,000	$ 150,000	**$ 1,200,000**	
5.7	Install 4 wood 3-pole deadend pole structures in kind	4.00	Structure	$ 25,000.00	$ 25,000	$ 50,000	**$ 200,000**	
5.8	Replace seven double circuit steel deadend lattice towers with double circuit steel deadend single pole structures on concrete foundations.	7.00	Structure		$ 85,000	$ 85,000	**$ 595,000**	
5.9	Replace one double circuit steel suspension flex tower with double circuit steel deadend single pole structure on concrete foundation.	1.00	Structure		$ 85,000	$ 85,000	**$ 85,000**	Supply & Install
5.10	Replace steel members on (16) deadend lattice towers	16.00	Structure		$ 10,000	$ 10,000	**$ 160,000**	
5.11	Replace hardware on (30) double circuit deadend structures	30.00	Structure		$ 4,000	$ 4,000	**$ 120,000**	
5.12	Install longitudinal guys on two flex towers	2.00	Structure		$ 25,000	$ 25,000	**$ 50,000**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
	Install (4) temporary wood single pole deadend structures at every deadend structure to be replaced	44.00	Unit		$ 15,000	$ 15,000	**$ 660,000**	
	Wire Installation							
5.13	*Line 130/133 – Reconductoring, 115kV/69kV (Packard Structures 140 and -Huntley Substation):*							
5.14	Transfer 4 double circuit miles of 1590 kcmil ACSR "FALCON" conductor	4.00	Mile	$ 28,000.00	$ 40,000	$ 68,000	**$ 272,000**	
5.15	Install 18.2 miles of 3/8" x 7 strand EHS steel shieldwire	18.20	Mile	$ 7,920.00	$ 15,840	$ 23,760	**$ 432,432**	
5.16	Miscellaneous assemblies	1.00	Lot		$ 30,000	$ 30,000	**$ 30,000**	
5.17	OPGW- 18.2 miles and accessories	18.20	Mile	$ 21,632.00	$ 29,220	$ 50,852	**$ 925,506**	Supply & Install, Splicing, Accessories etc.
	Insulator & Hardware Work							
5.18	Tangent - Porcelain String (10 Discs Assembly)	390.00	Set	$ 900.00	$ 720	$ 1,620	**$ 631,800**	
5.19	Angle & Deadend Porcelain String (10 Disc Assembly)	192.00	Set	$ 1,300.00	$ 1,040	$ 2,340	**$ 449,280**	
5.20	Jumper Post Porcelain String (Assembly)	81.00	Set	$ 500.00	$ 400	$ 900	**$ 72,900**	
5.21	Shieldwire Suspension Clamps	32.00	Set	$ 500.00	$ 400	$ 900	**$ 28,800**	
5.22	Shieldwire DE Clamps	80.00	Set	$ 800.00	$ 640	$ 1,440	**$ 115,200**	
5.23	Miscellaneous materials, dampers, grounding etc.	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
WG H - TOTAL SUPPLY & INSTALL:							**$ 7,261,318**	
WG-I Replace Thermally Limiting Equipment at Huntley Station								
6.1	Upgrade ampacity of Lines 130 & 133 at Huntley Substation	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
6.2	Remove the span between Structures 80 and 414 on the denergized Beck – Terminal Station C 105 sub-transmission line in the vicinity of Structure 167 per input from NY-TLS. A temporary wood single pole structure may be needed in the vicinity of Structure 80 to mitigate any concerns with unbalanced load at the structure. The section of the Beck – Terminal Station C 105 sub-transmission line sharing the ROW with the 130/133 D/C line will be removed as part of the 115 kV Packard –Urban 181 line proposed scope of work for the Western New York Project.	1.00	Sum		$ 20,000	$ 20,000	**$ 20,000**	
6.3	Mitigation works to lower the edge of ROW magnetic fields on the Packard – Huntley 130 line between Structures 140 and 160. The scope of work consists of transposing the top and bottom conductor phases on the 130 line outside Huntley Substation and Walck Road Switch Station in the span between Structure 242 and the bus structures at Huntley Substation and between Walck Road Switch and Structure 132 at Walck Road Switch Station.	1.00	Sum		$ 15,000	$ 15,000	**$ 15,000**	
WG-I - TOTAL SUPPLY & INSTALL:							**$ 235,000**	
SEGMENT 3	**J, K & L**							
WG-J Identified Line Work 191								
7	**Reconductor the Niagara- Packard 191 line with 2156 kcmil ACSS "Bluebird" conductor.**							
	Wire work:							
7.1	Reconductor 3.6 circuit miles with 2156 kcmil ACSS "Bluebird" conductor.	3.60	Mile	$ 55,440.00	$ 79,200	$ 134,640	**$ 484,704**	Supply & Install
7.2	Replace 3.2 miles of existing shieldwire with 7/16" EHS shieldwire.	3.20	Mile	$ 7,920.00	$ 15,840	$ 23,760	**$ 76,032**	
7.3	Transfer conductor, shieldwire and hardware on existing 101, 102, 61 lines to new suspension structures.	13.00	Structure		$ 20,000	$ 20,000	**$ 260,000**	
7.4	Transfer conductor, shieldwire and hardware on existing 101, 102, 61 lines to new deadend structures.	16.00	Structure		$ 25,000	$ 25,000	**$ 400,000**	
7.5	Replace deadend hardware attachment assemblies at the bus structures on the Niagara Substation and Packard Substation.	1.00	Sum		$ 20,000	$ 20,000	**$ 20,000**	
	Structure work:							
7.6	Replace six double circuit deadend lattice towers with 6 D/C deadend steel davit arm structures.	6.00	Structure	$ 37,500.00	$ 37,500	$ 75,000	**$ 450,000**	Supply & Install
7.7	Replace tower members and bolts on 12 lattice towers	12.00	Structure	$ 25,000.00	$ 25,000	$ 50,000	**$ 600,000**	
7.8	Install 6 caisson foundations (8'x20') for D/C deadend steel davit are structures	6.00	Structure	$ 75,000.00	$ 75,000	$ 150,000	**$ 900,000**	
7.9	Remove concrete footers at 6 structure locations (4 footers per structure)	24.00	Units		$ 20,000	$ 20,000	**$ 480,000**	
WG-J - TOTAL SUPPLY & INSTALL:							**$ 3,670,736**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
SEGMENT 4	**M & N**							
WG-M Identified Line Work 103, 104								
8	**Wire and Hardware Work**							
8.1	Reconductor with 795MCM ACRS conductor to sections of lines 103 & 104 of 636MCM ACC	4,000.00	Ft	$ 3.50	$ 5	$ 9	**$ 34,000**	
8.2	Install 0.1 miles of 3/8" x 7 strand EHS steel shieldwire	0.10	Mile	$ 7,920.00	$ 15,840	$ 23,760	**$ 2,376**	
	Structure work:							
8.3	Remove existing structures 55A1, 55A2, 55A3, 55B1, 55B2, 55B3, 55B4 and 55B5	5.00	Structure		$ 10,000	$ 10,000	**$ 50,000**	
8.4	Remove existing conductor and 1/2" EHS	5.00	Structure		$ 5,000	$ 5,000	**$ 25,000**	
8.5	Install new steel vertical deadend pulloff structures	2.00	Structure		$ 50,000	$ 50,000	**$ 100,000**	Supply & Install
8.6	Install new steel three pole deadend pullof structure	1.00	Structure		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
	Foundation Work							
8.7	Install 2 foundations using a vibratory caisson, helical pile or other methods	2.00	Structure		$ 75,000	$ 75,000	**$ 150,000**	Supply & Install
8.8	Install 1 new vibratory caisson foundation	1.00	Structure		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
WG-M - TOTAL SUPPLY & INSTALL:							**$ 486,376**	
WG-N Replace Thermally Limiting Equipment at Lockport Station for Lines 101,102								
9	**Upgrade ampacity of Lines 101, 102**							
9.1	Replace Thermally Limiting Equipment at Lockport Station for Lines 101, 102	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
WG-N TOTAL SUPPLY & INSTALL:							**$ 500,000**	
SEGMENT 5	**O, P2, Q, R, S, T, U and V**							
WG-O - NYSEG/NYPA/N GRID - ELIMINATE DOUBLE CIRCUIT CONTINGENCY FOR LINE 61/64								
10	**Eliminate Double Circuit Contingency for Line 61/64**							
10.1	Install "A" Delta Davit Arm Steel Suspension 230kV	1.00	Structure		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
10.2	Install "B" Davit Arm Steel DE 230kV	3.00	Structure					
10.3	Conductoring 0.70 circuit miles of 1590 ACSR for the 64 Line.	8,500.00	Ft	$ 5.00	$ 8	$ 13	**$ 110,500**	
10.4	Replace OGW overhead ground wire 5/8" Dia (230kV)	2.00	Mile	$ 7,920.00	$ 15,840	$ 23,760	**$ 47,520**	
10.5	Install 8' Dia x 26' deep reinforced concrete foundation caisson (cylindrical) Structure Type S/Q Angle DE (3 Nos)	50.00	CY		$ 1,500	$ 1,500	**$ 75,000**	Supply & Install
10.6	Direct embedment foundation 72" dia x 20' deep	1.00	EA		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
10.7	96" Dia Hole Rock Coring/ Removal	15.00	LF		$ 6,400	$ 6,400	**$ 96,000**	Supply & Install
10.8	*Group O-61/64, P1-181:*							
10.9	Tangent - Porcelain String (10 Discs Assembly)	159.00	Set	$ 900.00	$ 720	$ 1,620	**$ 257,580**	
10.10	Angle & Deadend Porcelain String (10 Disc Assembly)	66.00	Set	$ 1,300.00	$ 1,040	$ 2,340	**$ 154,440**	
10.11	Jumper Post Porcelain String (Assembly)	33.00	Set	$ 500.00	$ 400	$ 900	**$ 29,700**	
WG-O TOTAL SUPPLY & INSTALL:							**$ 1,570,740**	
WG-P2 - IDENTIFIED 181 LINE WORK (URBAN SWITCH TO ERIE, NYSEG)								
11.1	Reconductor approximately 3 miles from Urban Switch to NYSEG owned Erie Substation with 1113 kcmil ACSR conductor (existing is 477 ACSR)	54,648.00	Ft	$ 3.50	$ 5	$ 9	**$ 464,508**	
11.2	Replace 3 miles of double shieldwire	36,432.00	Ft	$ 1.50	$ 3	$ 5	**$ 163,944**	
11.3	Assume full rebuild to support new conductor for strength and clearance purposes	3.00	Miles		$ 50,000	$ 50,000	**$ 150,000**	Supply & Install
11.4	Assuming an approximate ruling span of 600', there will be 27 total structures to replace	27.00	Structure		$ 35,000	$ 35,000	**$ 945,000**	Supply & Install
11.5	Assuming a deadend every 1.5 miles and a few extra deadends for angles = 3 Deadends	3.00	Structure		$ 75,000	$ 75,000	**$ 225,000**	Supply & Install
11.6	Remaining 24 structures will be suspension structures	24.00	Structure		$ 30,000	$ 30,000	**$ 720,000**	Supply & Install
11.7	Suspension: Single circuit wood H-frame suspension structures direct embed (Str. Qty 24)	24.00	Structure	$ 8,000.00	$ 15,000	$ 23,000	**$ 552,000**	
11.8	Deadend: Single circuit steel H-frame steel deadend structures on concrete foundations (Str. Qty 3, Foundation Qty:6)	3.00	Per Structure	$ 42,000.00	$ 37,800	$ 79,800	**$ 239,400**	
11.9	Existing structures are single circuit wood h-frame suspension and deadends	1.00	Sum		$ 5,000	$ 5,000	**$ 5,000**	
11.10	Miscellaneous materials, dampers, grounding etc.	1.00	Sum	$ 50,000.00	$ 50,000	$ 100,000	**$ 100,000**	
WG-P2 TOTAL SUPPLY & INSTALL:							**$ 3,564,852**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
WG-Q - REPLACE THERMALLY LIMITING EQUIPMENT AT ERIE STN FOR LINE 181								
12	**Replace Thermally Limiting Equipment at Erie Station for Line 181 (NYSEG 922 Line)**							
12.1	Replacing one 115kV circuit breaker	1.00	Unit	$ 150,000.00	$ 50,000	$ 200,000	**$ 200,000**	Supply & Install
12.2	Instrument Transformers	1.00	Unit		$ 200,000	$ 200,000	**$ 200,000**	
12.3	New disconnect switches	1.00	Lot		$ 100,000	$ 100,000	**$ 100,000**	
12.4	New A&B relay packages	1.00	Lot		$ 50,000	$ 50,000	**$ 50,000**	
12.5	Conductor and insulator replacement	1.00	Lot		$ 200,000	$ 200,000	**$ 200,000**	
12.6	New cabling (control, instrument, power and panel wiring)	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
12.7	Miscellaneous assemblies	1.00	Sum		$ 300,000	$ 300,000	**$ 300,000**	
WG-Q TOTAL SUPPLY & INSTALL:							**$ 1,250,000**	
WG-R - REPLACE THERMALLY LIMITING EQUIPMENT LINE 54 (NYSEG 921)								
13	**Replace Thermally Limiting Equipment at Erie Station for line 54 (NYSEG 921)**							
13.1	Replacing one 115kV circuit breaker	1.00	Unit	$ 150,000.00	$ 50,000	$ 200,000	**$ 200,000**	Supply & Install
13.2	Instrument Transformers	1.00	Unit		$ 200,000	$ 200,000	**$ 200,000**	
13.3	New disconnect switches	1.00	Lot		$ 100,000	$ 100,000	**$ 100,000**	
13.4	New A&B relay packages	1.00	Lot		$ 50,000	$ 50,000	**$ 50,000**	
13.5	Conductor and insulator replacement	1.00	Lot		$ 200,000	$ 200,000	**$ 200,000**	Supply & Install
13.6	New cabling (control, instrument, power and panel wiring)	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
13.7	Miscellaneous assemblies	1.00	Sum		$ 300,000	$ 300,000	**$ 300,000**	
WG-R TOTAL SUPPLY & INSTALL:							**$ 1,250,000**	
WG-U - REPLACE THERMALLY LIMITING EQUIPMENT ROBINSON STN LINE 64								
14	**Replace Thermally Limiting Equipment at Robinson Station for Line 64**							
14.1	Replacing two 230kV gang operated circuit breaker	2.00	Unit	$ 250,000.00	$ 75,000	$ 325,000	**$ 650,000**	
14.2	Instrument Transformers	1.00	Unit		$ 200,000	$ 200,000	**$ 200,000**	Supply & Install
14.3	New disconnect switches	1.00	Lot		$ 100,000	$ 100,000	**$ 100,000**	
14.4	New A&B relay packages	1.00	Lot		$ 50,000	$ 50,000	**$ 50,000**	
14.5	Conductor and insulator replacement	1.00	Lot		$ 200,000	$ 200,000	**$ 200,000**	
14.6	New cabling (control, instrument, power and panel wiring)	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
14.7	Miscellaneous assemblies	1.00	Sum		$ 300,000	$ 300,000	**$ 300,000**	
WG-U - REPLACE THERMALLY LIMITING EQUIPMENT ROBINSON STN LINE 64							**$ 1,700,000**	
WG-V - REPLACE THERMALLY LIMITING EQUIPMENT NIAGARA STN LINE 102								
15	**Replace Thermally Limiting Equipment at Niagara Station for Line 102**							
15.1	Substation Equipment Replacement	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
WG-V TOTAL SUPPLY & INSTALL:							**$ 500,000**	
MOBILIZATION, ACCESS, CIVILS, PROJECT MANAGEMENT, OVERHEADS, MISC:								
16	**Contractor Mobilization / Demobilization**							
16.1	Mob / Demob	1.00	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	
	Project Management, Material Handling & Amenities					$ -	**$ -**	
16.2	Project Management & Staffing (includes PM, Field Engineers / Supervision, Scheduler and Cost Manager, SHEQ Staff, Materials Management Staff)	36.00	Months		$ 220,000	$ 220,000	**$ 7,920,000**	
16.3	Site Accommodations, Storage, Amenities, Laydown Yards	1.00	Sum		$ 1,700,000	$ 1,700,000	**$ 1,700,000**	
	Engineering					$ -	**$ -**	
16.4	Design Engineering	1.00	Sum		$ 5,000,000	$ 5,000,000	**$ 5,000,000**	
16.5	LiDAR	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	
16.6	Geotech	1.00	Sum		$ 1,100,000	$ 1,100,000	**$ 1,100,000**	
16.7	Surveying/Staking	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	
	Testing and Commissioning					$ -	**$ -**	
16.8	Testing & Commissioning of T-Line and Equipment	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	

COST ESTIMATE

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
	Permitting and Additional Costs					$ -	**$ -**	
16.9	Environmental Licensing & Permitting Costs (see separate tab for breakdown)	1.00	Sum		$ 3,984,698	$ 3,984,698	**$ 3,984,698**	
16.10	Environmental Mitigation Costs (see separate tab for breakdown)	1.00	Sum		$ 227	$ 227	**$ 227**	
16.11	Warranties / LOC's	1.00	Sum		$ 515,916	$ 515,916	**$ 515,916**	
16.12	Legal Fees	1.00	Sum		$ 2,000,000	$ 2,000,000	**$ 2,000,000**	
16.13	Sales Tax on Materials	1.00	Sum	$ 1,526,384		$ 1,526,384	**$ 1,526,384**	Includes 8.75% sales tax
16.14	Allowance for Funds Used During Construction (AFUDC)	1.00	Sum			$ -	**$ -**	
16.15	Carrying Charges	1.00	Sum			$ -	**$ -**	
16.16	Fees for easements or permits, including roadway, railroad, building or other local permits	1.00	Sum			$ 200,000	**$ 200,000**	
PM, OVERHEADS, ACCESS, MISC TOTAL:							**$ 27,447,225**	
SYSTEM UPGRADE FACILITIES								
SUF 1	**SYSTEM UPGRADE FACILITIES CONTINGENCY (SEE ASSUMPTIONS & CLARIFICATIONS)**						**$ 3,750,000**	Contingency for possible additional SUF upgrades
SYSTEM UPGRADE FACILITY TOTAL:							**$ 3,750,000**	

ENVIRONMENTAL LICENSING PERMITTING

PROJECT TITLE WNY PROJECT EVALUATION- ENVIRONMENTAL LICENSING & PERMITTING COST ELEMENTS						ENVIRONMENTAL LICENSING & PERMITTING COST ESTIMATE RANGE FOR PROPOSED WNY TRANSMISSION PROJECT - T011							
FEDERAL						Segment 1		Segment 2		Segment 3		Segment 4	
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
USACE	Waters of the US under Section 404 of the Clean Water Act and Section 10 of the 1899 Rivers and Harbors Act (including regulated wetland areas)	Nationwide Permits (NWP) or Individual Permit (IP)	Any work within the boundaries of regulated wetlands (with the exception of isolated wetlands) or waterways to the spring high tide or ordinary high water mark	If project qualifies for a NWP (<0.5 acre disturbance and within NWP project type parameters), a pre-construction notification (PCN) is typically required. NWPs have a 45 day review period starting from when project logged in system (up to 6wk backlog delay in logging projects) If an IP is triggered, USACE will require Alternative Analysis and Public Notice/Hearing. IPs could also trigger restrictive environmental work windows. IPs have a 120 day review period starting from when permit is "deemed complete"	Wetland Delineation; Wetland Function & Value Assessment; Stream Delineation; Restoration Plan	$38,600	$110,750	$16,200	$68,750			$11,920	$60,725
USFWS	Endangered Species Act Section 7 (ESA) Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act	Consultation (Formal or Informal); Special Use Permit; Incidental Take Permit	Any work that may have an affect on listed species or their habitat; or projects within National Wildlife Refuges	USACE coordinates consultation with USFWS for ESA listed species during their permit review. Also includes the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act compliance. Season restrictions on construction could be imposed.	Rare, Threatened & Endangered Species Search; Preparation of Reports and Conservation Plans	$100,000	$1,000,000	$14,200	$66,800	$11,550	$61,500		
FAA	Airports / Airspace	Federal Aviation Administration (FAA) Notification	New or Replacement Structures near Airports	Depending on construction locations, this permit may only be needed for OP work.	Obstruction Analysis, Mitigation Plan (assumes Engineering Cost)					$3,000	$9,000		
STATE													
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans								
NYS Public Service Commission / Department of Public Service (NYSDPS)	Article VII	Article VII: Certificate of Environmental Compatibility and Public Need and Environmental Management & Construction Plan (EM&CP)	Article 7: Major electric transmission facilities with design capacity of 100kV or more extending for at least 10 miles or 125kV and over extending a distance of 1 mile or more (some exclusions for underground transmission applies)	Article 7 will incorporate all of the required State and Local approvals (costed separately), as well as Engineering and Environmental Studies and Public Outreach. Intervenor Fund payment expected to be $100,000. An Environmental Management & Construction Plan (EM&CP) must be prepared and approved by the PSC. (see 16 NYCRR Parts 85 through 88)	Includes Reports and Plans required for State and Federal Agency Permits, as well as EM&CP, EMF, Noise, Air, Visual Impact Assessment, Invasive Species Control Plan, Mitigation Plans	$600,000	$3,100,000						
NYS Public Service Commission / Department of Public Service (NYSDPS)	Part 102		Construction of a utility overhead transmission facility that will convey electric energy at 65kV or higher for a distance of one mile or longer and are not subject to Article VII of the Public Service Law.	Report may include coordination or studies completed under other line items including: Visual assessment, SHPO determination, OPRHP consultation, Ecological Impacts Assessment Submit to the Commission for 60-day notice period: if no response for a formal investigation project can proceed, if formal investigation ordered project modification may be required	Advantage-Disadvantage Analysis	$13,000	$60,000						
NYSDEC	Article 15 Stream Disturbance; Article 24 Wetlands, Open Waters, Wetlands Buffers (100' for Freshwater Wetland)	Individual Permit (IP) (unless developer has General Permit (GP))	Any work within the boundaries of regulated waterways or wetlands, and wetland adjacent areas	Any disturbance within wetlands and/or below mean high tide will require an IP. Areas of temporary disturbance will likely require restoration, including a monitoring and maintenance period. Permanent disturbance will require offsite mitigation up to 3:1 area ratio; also includes a monitoring and maintenance period. GP may only be applicable if project ground disturbance is located outside of wetlands areas (above MHW).	Wetland Delineation; Wetland Restoration/Mitigation Plan	$12,000	$53,000	$12,000	$53,000			$12,000	$53,000

ENVIRONMENTAL LICENSING PERMITTING

NYSDEC	Stormwater (If >1 Acre Soil Disturbance)	SPDES General Permit for Stormwater Discharges from Construction Activities GP-0-15-002 & SWPPP	Project areas of soil disturbance	If project involves 1 acre or more soil disturbance, then the GP is required. If located within a Regulated MS4 Municipality, additional coordination may be needed. Weekly inspections by a Qualified Inspector during construction will be required.	SWPPP (assumes Engineering Cost includes Sediment & Erosion Control Plan, Hydraulic & Hydrology Studies, Stormwater Management Design)	$11,200	$38,000	$11,200	$38,000	$11,200	$38,000		
Any State or local government agency that issues permits or approvals	State Environmental Quality Review Act (SEQRA)	Environmental Assessment (EA) Determination of Significance	Projects not covered as a Type II Action (Note a project can not be segmented - all phases/tasks must be considered in the review)	Most projects or activities proposed by a state agency, and all discretionary approvals (permits) from a NYS agency or local government, require an environmental impact assessment. SEQR requires the sponsoring or approving governmental body to identify and mitigate the significant environmental impacts of the activity it is proposing or permitting.	Includes Reports and Plans required for State and Federal Agency Permits, as well as, EMF, Noise, Air, Visual Impact Assessment, Invasive Species Control Plan			$10,000	$500,000	$10,000	$500,000	$10,000	$10,000
NYSDOS	State Coastal Zone/ Management Areas	Coastal Consistency Concurrence	Projects within the NYSDOS designated Coastal Zone; and consistency with Local Waterfront Revitalization Plans (LWRPs); e.g., Town of Grand Island LWRP	Online mapping available to check if within coastal zone, a significant coastal fish & wildlife habitat (SCFWH), a local waterfront revitalization program area (LWRP), or a comprehensive management program areas (CMP)		$3,400	$15,000						
NYSHPO	National Historic Preservation Act (NHPA) Section 106: State and Federal Historic Places; State Mapped Archeologically Sensitive Areas	Cultural Resource Information System (CRIS) Determination	Local, State, or Federal eligible or designated historic places and/or areas of archeological sensitivity (in off-road areas and areas that have not been previously disturbed)	NYSDEC EAF Online Mapper identifies State or National Register of Historic Places and archeological sensitive areas within or adjacent to the project site. Formally enter project information and supporting documents into SHPO's online CRIS program. Staff will review and email a determination of impacts letter	Phase 1A & 1B Archaeological Studies	$14,700	$53,500	$7,750	$32,650	$6,700	$29,500		
NYS NHP	Threatened and Endangered Species	Consultation	Activities that may affect T&E species or their habitat.		See USFWS	$1,200	$6,400	$1,200	$6,400	$1,200	$6,400		
NYSDOT/NYS Thruway Authority/FHWA	State Roadways	Highway Work Permit/Utility Permit, Vegetation Management Permit; Easement	Any work within or crossing State highway ROW	May require restoration landscaping coordination. Typically requires compliance with NEPA including SHPO and USFWS effects determination	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$17,000	$69,000			$17,000	$69,000		
NYSOGS	State-owned Underwater Land	Request for Information	Projects includes use of NYS underwater lands	OGS Real Estate staff do respond to email inquiries to determine based on project location and scope if permit application is applicable.	Easement area survey (not included in costs)	$1,200	$6,400						
NYS Canal Corporation	Erie Canal - jurisdiction varies along edge	Canal Occupancy & Work Permit (TA-W99072)	Any work involving the Erie Canal	Must coordinate with Division Permit Engineer about particular section of canal being affected. Commercial permit fee = $25 plus $2,000,000 additional General Aggregate Liability Insurance	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$3,800	$3,800	$3,800	$3,800				
NYS Dept. of Agriculture and Markets	All agricultural lands (including Agricultural Districts)	Part of Article 7 & Article 10 Review process	Any work impacting agricultural land	Must minimize impacts and restore damage to agricultural land, and coordinate with County Soil & Water Conservation District; Vineyards are a major concern in WNYS. Pre-application conference with PSC, DEC and Ag& Markets recommended. Must develop EM&CP in conformance with Art. 7/10 Certificate Conditions. Agricultural Monitor must oversee construction & restoration; requisite 2-yrs post restoration monitoring.	Crop/Pasturing Mitigation Plan (not included in costing)	$11,000	$24,000	$11,000	$24,000				

ENVIRONMENTAL LICENSING PERMITTING

REGIONAL													
Railroads	Railroad crossings	Consultation-permits may be required; Easement	Access / new structures on RR property		Easement area survey (not included in costs)	$11,000	$76,000			$11,000	$76,000		
LOCAL/MUNICIPAL													
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans								
County Dept. of Public Works	County Roadways	Lane Closure Permit, Highway Work or Access Permit	Work within county roadways and right-of-ways			$6,000	$40,000	$6,000	$40,000	$6,000	$40,000		
Town, City or Village	Municipal Stormwater (MS4) Review	Approval of SWPPP or EM&CP	Project areas of soil disturbance		See NYSDEC SPDES	$6,000	$35,000	$6,000	$35,000	$6,000	$35,000		
Town, City or Village	Municipal Roadways	Highway Work Permit; Road Opening Permit	Work within municipal roadways and right-of-ways			$6,000	$35,000	$6,000	$35,000	$6,000	$35,000		
Town, City or Village	Wetlands	Wetland Permit / Conservation Approvals	Mapped wetlands and wetland adjacent areas (buffer width variable)		See USACE / NYSDEC Art. 24	$6,000	$52,000	$6,000	$52,000	$6,000	$52,000	$6,000	$52,000
					Total Cost Range by Segment	$862,100	$4,777,850	$111,350	$955,400	$95,650	$951,400	$39,920	$175,725

	Minimum	Maximum	Expected Value
ENVIRONMENTAL LICENSING & PERMITTING COST (EXCLUDING MITIGATION)	**PROJECT TOII TOTAL**	**$1,109,020**	**$6,860,375**	**$3,984,698**

Excluded cost: Mitigation or restoration for impact to regulated wetlands; agricultural land and tree clearing

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ENVIRONMENTAL MITIGATION ESTIMATE

	Offsite Wetland Mitigation*		Farmland**	
	Min.	Max.	Min.	Max.
Area	0 acres	0 acres	0.3 acres	0.6 acres
Cost/Acre	$60,000	$120,000	$503	$503
Ratio	1:1	3:1	1:1	1:1
Total	$0	$0	$151	$302

T011 MITIGATION TOTAL	Minimum	Maximum	Expected Value
	$151	**$302**	**$227**

*Assumes no offsite wetland mitigation since no clearing of NWI Forested/Shrub Wetland is proposed - all work within existing maintained/cleared ROWs; assumes timber matting impacts to emergent wetlands is considered temporary and restoration seeding costs are accounted for in construction costs

**Farmland mitigation based on corn bushel yield at 129 BU/Acre and $3.9/BU (production numbers from 2016 USDA NYS Agriculture Overview), area assumes 538 LF Matting Impacts to Active Agriculture Land by 25' Wide (Min.) or 50' Wide (Max.); does not include land acquisition

ASSUMPTIONS AND CLARIFICATIONS

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a) Cost Estimate is based on 2017 rates.
b) Construction Schedule is in accordance with the Developers proposed schedule - we have assumed continuous working with no breaks in the schedule.
c) Stringing rates allow for protection over crossings (such as rider poles).
d) We have assumed a typical work week (6 x 10 hour days).
e) We have assumed that pole weights include anchor bolts.
f) The Developer has assumed gravel work pads. During our ROW visit it was determined that matted work pads are required.
g) Costs will vary for handling and disposal of contaminated spoils, depending on type of contaminants and availability / location of the appropriate tipping facility. Since there is not enough information to provide a quantified estimate for this item, allowance is included in the contingency monies.
h) Costs have been developed based on historical data from Projects of a similar nature (AACE Class 5 and 4 Estimating Practices). We have not engaged any subcontractors or material vendors for formal quotes.
i) We have assumed Contractor Mark Up (OH&P) of 15%
j) Assumes all environmental data and project details provided are accurate unless noted otherwise
k) Article 7 required for Segment 1 (excluding Grand Island work)
l) Part 102 Authorization is required for Grand Island if it is not included in the Article 7 scope. If Grand Island work is considered independently from Article 7, separate USACE, NYSDEC, SWPPP, NYSDOS, SHPO, and local permits and costs will apply.
m) Segment 1 USFWS T&E Investigation assumes survey and potential incidental take with Habitat Conservation Plan. Minimum and maximum amounts represent variable coordination efforts
n) USFWS T&E for segments 2 and 3 Assumes that ¼ of the total project route per segment will require field survey for T&E (Segment 2 – 2.28 miles, Segment 3 – 1.75 miles)
o) NEPA-Assumes no NEPA because Art VII (Segments 1) and SEQRA (Segments 2, 3, 4)
p)Article 7 Intervenor Fund payment expected to be $100,000
q) SHPO-Assumes consultation and Phase 1A/1B archeological studies with field survey for 50% of project route (Segment 1 – 11.5 miles, Segment 2 – 4.55 miles, Segment 3 – 3.5 miles, Segment 4 – no survey)
r) NYSDOT/FHWA-Assumes any required NEPA coordination/requirements are covered under Article VII or SEQRA review
s) SEQRA for Segments 2, 3 and 4 assumes applicant is not lead agent. Minimum costs assume FEAF Part I with no additional studies. Maximum assumes an expanded EA. SEQRA for Segment 4 assumes minimum only costs.
t) Assumes no coordination with National Parks Service
u) NYSDOS – Assumes only Segment 1

ASSUMPTIONS AND CLARIFICATIONS

v) USACE wetland delineation totals assumed length of NWI wetland estimates on Permitting Summary Table (Segment 1 – 6.9 miles, Segment 2 – 0.62 miles, Segment 3 – no wetlands, Segment 4 – 0.22 miles). Assumes work group line segment length not duplicated. Assumes NYSDEC delineations overlap and are accounted for in USACE costing.
w) Assumes no permanent wetland impacts and no wetland mitigation required
z) Assumes no agricultural project impacts and no mitigation
aa) No tree survey or replanting required outside regulated wetlands areas
ab) System Upgrade Facilities Contingency is allowance for potential additional system upgrades including overdutied breakers, protection changes, unidentified thermal issues, etc that may be identified as detailed studies are completed.

INDEPENDENT ESTIMATES

ATTACHMENT B6

T012 – NATIONAL GRID

SUBSTATION ENGINEERING COMPANY
8/11/2017

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T012 - National Grid High Power Transfer Solution

Revision: 4

SUMMARY OF COST ESTIMATE

Segment	Description	Total Amount
	CLEARING & ACCESS WORKS FOR T-LINE CONSTRUCTION	$ 77,418,870
1	WG A - NEW 230kV NIAGARA TO GARDENVILLE LINE & RELOCATIONS	$ 70,767,955
	WG B NEW 230kV LINE ASSOCIATED WORK AT GARDENVILLE SUBSTATION	$ 1,105,500
	WG C NEW 230kV LINE - NIAGARA SUBSTATION CONNECTION	$ 1,075,000
2	WG-D1 REBUILD & RE-CONDUCTOR	$ 55,276,810
	WG-E NEW BUS BREAKER AT PACKARD STATION	$ 880,000
	WG-F REPLACE THERMALLY LIMITING EQUIPMENT AT PACKARD SUBSTATION FOR LINE 181	$ 200,000
	WG-G NEW 115kV SWITCHING STATION	$ 11,169,000
3	WG-H PACKARD-HUNTLEY & WALCK-HUNTLEY DOUBLE CIRCUIT LINE WORKS	$ 7,261,318
	WG-I - UPGRADE AMPACITY OF LINES 130 AND 133 AT HUNTLEY SUBSTATION	$ 235,000
4	WG-J - REFURBISHMENT WORKS ON LINES 191	$ 3,670,736
5	WG-M - LINE WORK 103,104	$ 486,376
	WG-N - LINE WORK 101, 102, 103, 104	$ 500,000
6	WG-O - NYSEG/NYPA/N GRID - ELIMINATE DOUBLE CIRCUIT CONTINGENCY FOR LINE 61/64	$ 1,570,740
	WG-P1 - IDENTIFIED 181 LINE WORK (URBAN SWITCH TO ERIE, NYSEG)	$ 5,366,640
	WG-Q - REPLACE THERMALLY LIMITING EQUIPMENT AT ERIE STN FOR LINE 181	$ 1,250,000
	WG-R - REPLACE THERMALLY LIMITING EQUIPMENT LINE 54 (NYSEG 921)	$ 1,250,000
	WG-U - REPLACE THERMALLY LIMITING EQUIPMENT ROBINSON STN LINE 64	$ 1,700,000
	WG-V - REPLACE THERMALLY LIMITING EQUIPMENT NIAGARA STN LINE 102	$ 500,000
	MOB/DEMOB, ACCESS, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:	$ 56,143,133
	CONTRACTOR MARK UP (OH&P) 15%	$ 44,674,062
	SUBTOTAL:	$ 342,501,140
	CONTINGENCY ON ENTIRE PROJECT (25%)	$ 85,625,285
	TOTAL:	**$ 428,126,425**

SYSTEM UPGRADE FACILITIES	$ 3,750,000
CONTRACTOR MARKUP & CONTINGENCY (35%)	$ 1,312,500
TOTAL (B):	**$ 5,062,500**

TOTAL PROJECT COST (A+B):	**$ 433,188,925**

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
Clearing & Access Works for T-Line Construction								
1.1	Gravel Road	34,084.00	LF		$ 45	$ 45	**$ 1,533,780**	Assumes Type 1 Gravel Road
1.2	Gravel Road Improvement	4,757.00	LF		$ 7	$ 7	**$ 33,299**	
1.3	Temporary Matting (temp access roads)	246,623.00	LF		$ 70	$ 70	**$ 17,263,610**	
1.4	Mowing & Clearing	135.00	Acre		$ 15,000	$ 15,000	**$ 2,025,000**	
1.5	Work Pads	13,308,750.00	SF		$ 4	$ 4	**$ 46,846,800**	
1.6	Restoration for Work Pad areas	1,340,875.00	SF		$ 0.15	$ 0.15	**$ 201,131**	
1.7	Temporary Access Bridge	200.00	EA		$ 20,035	$ 20,035	**$ 4,007,000**	
1.8	Air Bridge	50.00	EA		$ 14,445	$ 14,445	**$ 722,250**	
1.9	Stabilized Construction Entrance	200.00	EA		$ 4,580	$ 4,580	**$ 916,000**	
1.1	Maintenance and Protection of Traffic on Public Roads	1.00	LS		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	
1.11	Culverts / Misc. Access	1.00	LS		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	
1.12	Concrete Washout Station	200.00	EA		$ 1,850	$ 1,850	**$ 370,000**	
1.13	Snow Removal & Maintenance	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	
TOTAL CLEARING & ACCESS:							**$ 77,418,870**	
SEGMENT 1	**WGA**							
WG A - NEW 230kV NIAGARA TO GARDENVILLE LINE & RELOCATIONS								
2	**Foundations (New 230kV Transmission Line)**							
2.1	Direct embedment holes - 6 feet diameter, embedment depth of 20 feet for Type A structure (66 Nos)	66.00	Structure		$ 18,000	$ 18,000	**$ 1,188,000**	
2.2	Concrete caisson foundations - 6 feet diameter, depth of 24 feet for Type C structure (144 Nos)	4,350.00	CY		$ 1,500	$ 1,500	**$ 6,525,000**	
2.3	Direct embedment holes - 3 feet diameter, embedment depth of 13.5 feet for Type E structure (154 Nos)	155.00	Structure		$ 15,000	$ 15,000	**$ 2,325,000**	
2.4	Concrete caisson foundations - 8 feet diameter, depth of 26 feet for Type B structure (14Nos)	820.00	CY		$ 1,500	$ 1,500	**$ 1,230,000**	
2.5	Concrete caisson foundation - 8 feet diameter, depth of 38 feet for Type G structure (1 No)	85.00	CY		$ 1,500	$ 1,500	**$ 127,500**	
2.6	Concrete caisson foundations - 8 feet diameter, depth of 26 feet for Type D structure (25 Nos)	1,500.00	CY		$ 1,500	$ 1,500	**$ 2,250,000**	Supply & Install
2.7	Concrete caisson foundations - 8 feet diameter, depth of 48 feet for Type D vertical structure (5 Nos)	550.00	CY		$ 1,500	$ 1,500	**$ 825,000**	
2.8	Concrete caisson foundations - 6 feet diameter, depth of 29 feet for Type F structure (24 Nos)	880.00	CY		$ 1,500	$ 1,500	**$ 1,320,000**	
2.9	Concrete caisson foundations - 8 feet diameter, depth of 36 feet for Type F 90 degree structure (12 Nos)	970.00	CY		$ 1,500	$ 1,500	**$ 1,455,000**	
2.10	Concrete caisson foundations – 7 feet diameter, depth of 34 feet for Type O structure (2 Nos)	120.00	CY		$ 1,500	$ 1,500	**$ 180,000**	
2.11	Concrete caisson foundation – 5 diameter, depth of 21 feet for Type N structure (1 No)	20.00	CY		$ 1,500	$ 1,500	**$ 30,000**	
2.12	Rock Coring Allowance for Foundations (say 5ft / caisson for 200 caissons)	1,000.00	VF		$ 4,200	$ 4,200	**$ 4,200,000**	Based on 6ft dia
3	**Structures (New 230kV Transmission Line)**							
3.1	230kV (Type A - Single circuit steel delta davit arm suspension structure)	66.00	Structure	$ 11,250	$ 10,125	$ 21,375	**$ 1,410,750**	
3.2	230kV (Type C - Single circuit steel vertical suspension structure)	148.00	Structure	$ 17,100	$ 15,390	$ 32,490	**$ 4,808,520**	
3.3	230kV (Type E - Single circuit wood H-frame suspension structure)	77.00	Structure	$ 3,500	$ 26,000	$ 29,500	**$ 2,271,500**	
3.4	230kV (Type B - Single circuit steel delta davit arm deadend structure)	14.00	Structure	$ 32,400	$ 29,160	$ 61,560	**$ 861,840**	
3.5	230kV (Type G - Double circuit steel davit arm deadend structure)	1.00	Structure	$ 42,000	$ 37,800	$ 79,800	**$ 79,800**	
3.6	230kV (Type D - Single circuit steel vertical deadend structure)	30.00	Structure	$ 39,600	$ 35,640	$ 75,240	**$ 2,257,200**	
3.7	230kV (Type F - Single circuit steel 3-pole deadend structure)	12.00	Structure	$ 56,700	$ 51,030	$ 107,730	**$ 1,292,760**	
3.8	230kV/115kV (Type O – Double circuit steel davit arm deadend structure)	2.00	Structure	$ 42,000	$ 37,800	$ 79,800	**$ 159,600**	
3.9	230kV/115kV (Type N – Double circuit steel davit arm suspension structure)	1.00	Structure	$ 19,000	$ 17,100	$ 36,100	**$ 36,100**	
3.10	115kV (Type W – Single circuit steel vertical deadend structure)	2.00	Structure	$ 50,000	$ 45,000	$ 95,000	**$ 190,000**	
3.11	115kV (Type V – Single circuit steel vertical deadend tap structure)	2.00	Structure	$ 52,000	$ 46,800	$ 98,800	**$ 197,600**	
3.12	115kV (Type Q – Double circuit steel davit arm deadend structure)	2.00	Structure	$ 29,700	$ 26,730	$ 56,430	**$ 112,860**	
4	**Conductors, Shieldwire, Hardware, Misc. (New 230kV Transmission Line)**							
4.1	Conductor-36.2 miles of 1590 kcmil ACSR Falcon	659,400.00	Ft	$ 4	$ 5	$ 9	**$ 5,604,900**	
4.2	Static cable-49 miles of 3/8" x 7 strand EHS steel shieldwire	297,500.00	Ft	$ 2	$ 3	$ 5	**$ 1,338,750**	
4.3	Tangent - Porcelain String (10 Discs Assembly)	876.00	Set	$ 900	$ 720	$ 1,620	**$ 1,419,120**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
4.4	Angle & Deadend Porcelain String (10 Disc Assembly)	384.00	Set	$ 1,300	$ 1,040	$ 2,340	**$ 898,560**	
4.5	Jumper Post Porcelain String (Assembly)	192.00	Set	$ 500	$ 400	$ 900	**$ 172,800**	
4.6	Miscellaneous Materials (Dampers, Grounding & Signage)	36.20	Mile		$ 30,000	$ 30,000	**$ 1,086,000**	Supply & Install
4.7	FAA Lightings/ Marking Systems	30.00	Structure		$ 15,000	$ 15,000	**$ 450,000**	Supply & Install
5	**New 36/37 Ayer Tap**							
5.1	Remove 1.1 circuit miles of 400 MCM 19-strand copper conductor (typical) on the 36 Tap	1.10	Mile		$ 8,500	$ 8,500	**$ 9,350**	
5.2	Remove 1.1 circuit miles of 636 MCM 26/7 ACSR conductor (typical) on the 37 Tap	1.10	Mile		$ 9,000	$ 9,000	**$ 9,900**	
5.3	Remove 2.2 circuit miles of 3/8" x 7 strand steel HS shieldwire	2.20	Mile		$ 6,000	$ 6,000	**$ 13,200**	
5.4	Remove single circuit wood 3-pole deadend structures	2.00	Structure		$ 5,000	$ 5,000	**$ 10,000**	
5.5	Remove single circuit lattice deadend towers	4.00	Structure		$ 6,000	$ 6,000	**$ 24,000**	
5.6	Remove single circuit lattice suspension towers	15.00	Structure		$ 5,500	$ 5,500	**$ 82,500**	
6	**Lines Removal & Reconfiguration of 38/39 Lines**							
6.1	Remove 636 MCM 26/7 ACSR conductor (typical) on the 37 line	0.20	Mile		$ 9,000	$ 9,000	**$ 1,800**	
6.2	Remove 3/8" x 7 strand steel HS shieldwire	0.20	Mile		$ 6,000	$ 6,000	**$ 1,200**	
6.3	Remove single circuit wood 3-pole deadend structure	1.00	Structure		$ 5,000	$ 5,000	**$ 5,000**	
6.4	Remove double circuit lattice suspension tower	1.00	Mile		$ 8,000	$ 8,000	**$ 8,000**	
6.5	Remove double circuit suspension lattice flex tower	1.00	Mile		$ 7,000	$ 7,000	**$ 7,000**	
6.6	Install 0.2 circuit miles of 1590 kcmil ACSR "FALCON" conductor on the 38 line	0.20	Mile	$ 55,440	$ 79,200	$ 134,640	**$ 26,928**	
6.7	Install 0.2 miles of 3/8" x 7 strand steel EHS shieldwire	0.20	Mile	$ 7,920	$ 15,840	$ 23,760	**$ 4,752**	
	Install 13 structures (12 deadend structures and 1 suspension structure:							
6.8	115kV (Type U – Single circuit steel 3-pole deadend structure)	6.00	Structure	$ 70,000	$ 40,000	$ 110,000	**$ 660,000**	Type U has been assumed for budgeting purposes
6.9	115kV (Type R – Single circuit wood davit arm suspension structure	1.00	Structure	$ 5,000	$ 20,000	$ 25,000	**$ 25,000**	
6.10	Allowance for all hardware and other accessories for 115kV structures	1.00	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
	Install 25 concrete caisson foundations for 12 structures and install 1 direct embedment hole for 1 structure:							
6.11	Concrete caisson foundations – 5 feet diameter, depth of 28 feet for Type U (18 Nos)	440.00	CY		$ 1,500	$ 1,500	**$ 660,000**	Supply & Install
6.12	Concrete caisson foundations – 8 feet diameter, depth of 38 feet for Type W (4 Nos)	339.71	CY		$ 1,500	$ 1,500	**$ 509,565**	Supply & Install
6.13	Concrete caisson foundation – 6 feet diameter, depth of 25 feet for Type V (1 No)	31.43	CY		$ 1,500	$ 1,500	**$ 47,145**	Supply & Install
6.14	Concrete caisson foundation – 6 feet diameter, depth of 31 feet for Type Q (1 No)	38.97	CY		$ 1,500	$ 1,500	**$ 58,455**	Supply & Install
6.15	Direct embedment hole - 3 feet diameter, embedment depth of 14 feet for Type R	1.00	Structure		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
6.16	Install approximately two 0.1 circuit-mile section of underground cable in a new manhole and duct system.	1.00	Sum		$ 600,000	$ 600,000	**$ 600,000**	Supply & Install
6.17	Replace approximately two 0.2 circuit-mile section of underground cable on the existing circuits.	1.00	Sum		$ 100,000	$ 100,000	**$ 100,000**	Supply & Install
7	**Maple Road Substation to proposed new substation located near Park Club Lane**							
7.1	Remove 400 MCM 19-strand copper conductor (typical) on the 91 line	2.00	Mile		$ 8,500	$ 8,500	**$ 17,000**	
7.2	Remove 400 MCM 19-strand copper conductor (typical) on the 92 line	2.00	Mile		$ 8,500	$ 8,500	**$ 17,000**	
7.3	Remove 3/8" x 7 strand steel HS shieldwire	4.00	Mile		$ 6,000	$ 6,000	**$ 24,000**	
	Remove 64 structures:							
7.4	Remove double circuit lattice deadend towers	9.00	Structure		$ 6,000	$ 6,000	**$ 54,000**	
7.5	Remove double circuit lattice suspension towers	42.00	Structure		$ 6,000	$ 6,000	**$ 252,000**	
7.6	Remove single circuit wood monopole suspension structures	7.00	Structure		$ 6,000	$ 6,000	**$ 42,000**	
7.7	Remove single circuit 3-pole wood deadend structures	5.00	Structure		$ 7,500	$ 7,500	**$ 37,500**	
7.8	Remove single circuit 2-pole wood deadend structure	1.00	Structure		$ 6,500	$ 6,500	**$ 6,500**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
	Obstruction Works							
7.9	2.7 miles of new UG feeders with duct banks	2.70	Mile		$ 6,500,000	$ 6,500,000	**$ 17,550,000**	Supply & Install
7.10	4.1 miles of new OH distribution	4.10	Mile		$ 500,000	$ 500,000	**$ 2,050,000**	
7.11	3.1 miles of new aerial cable subtransmission	3.10	Mile		$ 150,000	$ 150,000	**$ 465,000**	
7.12	3.6 miles of distribution removals	3.60	Mile		$ 100,000	$ 100,000	**$ 360,000**	
7.13	0.5 miles of directional boring	0.50	Mile		$ 1,000,000	$ 1,000,000	**$ 500,000**	
WG A - TOTAL SUPPLY & INSTALL:							**$ 70,767,955**	
WG B NEW 230kV LINE ASSOCIATED WORK AT GARDENVILLE SUBSTATION								
8	**Gardenville Substation Connection**							
	Below Ground							
8.1	Supply & Install Conduit, Ground Grid	1.00	Sum	$ 15,000	$ 45,000	$ 60,000	**$ 60,000**	
	Foundations							
8.2	Terminal Structure Foundation	1.00	Sum		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
8.3	Bus Support Foundation	1.00	Sum		$ 10,000	$ 10,000	**$ 10,000**	Supply & Install
8.4	Pad Foundation (Upgrade) for Breaker & Switch (use existing pad)	1.00	Sum		$ 20,000	$ 20,000	**$ 20,000**	Supply & Install
	Structures							
8.5	A Frame DE Structure	1.00	Unit	$ 54,000	$ 30,000	$ 84,000	**$ 84,000**	Assume approx. 30,000lb
8.6	Switch Structure	1.00	Unit	$ 6,500	$ 4,000	$ 10,500	**$ 10,500**	
8.7	Misc. Structures	1.00	Unit	$ 12,000	$ 8,000	$ 20,000	**$ 20,000**	
	Supply and Install Substation Equipment							
8.8	GCB IPO 230kV - 3000A, 50kA	1.00	Unit	$ 250,000	$ 75,000	$ 325,000	**$ 325,000**	
8.9	DS 230kV Gang Operated - 3000A	2.00	Unit	$ 20,000	$ 15,000	$ 35,000	**$ 70,000**	
8.10	Instrument Transformers	1.00	Sum		$ 122,000	$ 122,000	**$ 122,000**	
	Protection, Telecom, Connections, Misc.							
8.11	Cable and Wire	1.00	Sum	$ 5,000	$ 4,000	$ 9,000	**$ 9,000**	
8.12	Protection, Telecom and Metering Equipment	1.00	Sum	$ 100,000	$ 70,000	$ 170,000	**$ 170,000**	
8.13	Misc. Works / Connections	1.00	Sum		$ 5,000	$ 5,000	**$ 5,000**	Supply & Install
8.14	Fencings, Restorations and Security etc.	1.00	Sum		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
WG B - TOTAL SUPPLY & INSTALL:							**$ 1,105,500**	
WG C NEW 230kV LINE - NIAGARA SUBSTATION CONNECTION								
9	**Niagara Substation Connection**							
	Below Ground							
9.1	Supply & Install Conduit, Ground Grid	1.00	Sum	$ 15,000	$ 45,000	$ 60,000	**$ 60,000**	
	Foundations							
9.2	Terminal Structure Foundation	1.00	Sum		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
9.3	Equipment Foundations (breaker pad, switch, CCVT)	1.00	Sum		$ 30,000	$ 30,000	**$ 30,000**	Supply & Install
	Support / Structures	1.00						
9.5	DE Structure	1.00	Unit	$ 54,000	$ 30,000	$ 84,000	**$ 84,000**	Assume approx. 30,000lb
9.6	Misc. Structures	1.00	Sum		$ 18,000	$ 18,000	**$ 18,000**	
	Supply and Install Substation Equipment							
9.9	GCB IPO 230kV - 3000A, 50kA	1.00	Unit	$ 250,000	$ 75,000	$ 325,000	**$ 325,000**	
9.10	DS 230kV Gang Operated - 3000A	3.00	Unit	$ 20,000	$ 15,000	$ 35,000	**$ 105,000**	
9.11	Adder for Motor Operated	1.00	Unit	$ 6,000	$ 2,000	$ 8,000	**$ 8,000**	
9.12	Instrument Transformers	1.00	Sum		$ 65,000	$ 65,000	**$ 65,000**	
	Protection, Telecom, Connections, Misc.							
9.13	Cable and Wire	1.00	Sum		$ 5,000	$ 5,000	**$ 5,000**	Supply & Install
9.14	Protection, Metering & Telecom Equipment	1.00	Sum	$ 100,000	$ 70,000	$ 170,000	**$ 170,000**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
9.15	Misc. Works / Connections	1.00	Sum		$ 5,000	$ 5,000	**$ 5,000**	
9.16	Fencings, Restorations and Security etc.	1.00	Sum		$ 150,000	$ 150,000	**$ 150,000**	
WG C - TOTAL SUPPLY & INSTALL:							**$ 1,075,000**	
SEGMENT 2								
WG-D1 REBUILD & RE-CONDUCTOR								
Description of Work: The SOW includes re-conductoring portions of the Niagara – Gardenville 180, Packard – Urban 181, Packard – Gardenville 182 115kV lines, as part of the full solution of the Western New York Project. A portion of the Gardenville – Depew 54 line will also be reconductored in support of the project. Reconductoring of the taps is not required except for the American Standard Tap on the 182 line.								
10	**Wire Removal Work**							
	Line 181/105 – Remove approximately 26.6 circuit miles, 115kV/69kV (Packard Substation to Ellicott Junction):							
10.1	Remove 13.3 circuit miles (typically 350 MCM 19 strand Copper) - Line 105	13.30	Mile		$ 15,000	$ 15,000	**$ 199,500**	
10.2	Remove13.3 circuit miles (typically 350 MCM 19 strand Copper) - Line 181	13.30	Mile		$ 15,000	$ 15,000	**$ 199,500**	
10.3	Remove 26.6 miles of existing 3/8” x 7 steel EHS shieldwire	26.60	Mile		$ 12,000	$ 12,000	**$ 319,200**	
10.4	Conductor attachment assembly at Packard Substation	1.00	Lot		$ 50,000	$ 50,000	**$ 50,000**	
	Line 180/181 – Remove approximately 18.2 circuit miles, 115kV (Ellicott Junction to Urban Switch):							
10.5	Remove 9.1 circuit miles (typically 400 MCM 19 strand Copper) - Line 180	9.10	Mile		$ 17,000	$ 17,000	**$ 154,700**	
10.6	Remove 9.1 circuit miles (typically 350 MCM 19 strand Copper) - Line 181	9.10	Mile		$ 15,000	$ 15,000	**$ 136,500**	
10.7	Remove 18.2 miles of existing 3/8” x 7 steel EHS shieldwire	18.20	Mile		$ 12,000	$ 12,000	**$ 218,400**	
10.8	Conductor attachment assembly at Urban Switch	1.00	Lot		$ 50,000	$ 50,000	**$ 50,000**	
	Line 182/92 – Remove approximately 18.2 circuit miles, 115kV/69kV (Ellicott Junction to Urban Switch):							
10.9	Remove 9.1 circuit miles (typically 400 MCM 19 strand Copper) - Line 182	9.10	Mile		$ 17,000	$ 17,000	**$ 154,700**	
10.10	Remove 9.1 circuit miles (typically 400 MCM 19 strand Copper) - Line 92	9.10	Mile		$ 17,000	$ 17,000	**$ 154,700**	
10.11	Remove 18.2 miles of existing 3/8” x 7 steel EHS shieldwire	18.20	Mile		$ 12,000	$ 12,000	**$ 218,400**	
	Line 182 – Remove approximately 0.9 circuit miles, 115kV (Near Urban Switch):							
10.10	Remove circuit miles (typically 400 MCM 19 strand Copper) - Line 182	0.90	Mile		$ 17,000	$ 17,000	**$ 15,300**	
10.11	Remove 0.9 miles of existing 3/8” x 7 steel EHS shieldwire	0.90	Mile		$ 12,000	$ 12,000	**$ 10,800**	
	Line 182/54 – Remove approximately 7.4 circuit miles, 115kV/115kV (Urban Switch to Gardenville Substation):							
10.14	Remove 3.7 circuit miles (typically 400 MCM 19 strand Copper) - Line 182	3.70	Mile		$ 17,000	$ 17,000	**$ 62,900**	
10.15	Remove 3.7 circuit miles (636 KCM 18/1 ACSR) - Line 54	3.70	Mile		$ 18,000	$ 18,000	**$ 66,600**	
10.16	Remove 7.4 miles of existing 3/8” x 7 steel EHS shieldwire	7.40	Mile		$ 12,000	$ 12,000	**$ 88,800**	
10.17	Conductor attachment assembly at Gardenville Substation	1.00	Lot		$ 50,000	$ 50,000	**$ 50,000**	
	Line 182/54 – Remove approximately 7.45 circuit miles, 115kV/115kV (American Standard Tap):							
10.18	Remove 0.02 circuit miles (typically 400 MCM 19 strand Copper) - Line 182 Tap to American Standard Tap	0.02	Mile		$ 17,000	$ 17,000	**$ 340**	
10.19	Remove 0.02 circuit miles (typically 400 MCM 19 strand Copper) - Line 54 Tap to American Standard Tap	0.02	Mile		$ 17,000	$ 17,000	**$ 340**	
10.20	Conductor attachment assembly at American Standard Tap	1.00	Lot		$ 50,000	$ 50,000	**$ 50,000**	
	Line 180/704 – Remove approximately 9.2 circuit miles, 115kV/34.5kV (Urban Switch to Gardenville Substation)							
10.21	Remove 4.6 circuit miles (typically 400 MCM 19 strand Copper) - Line 180	4.60	Mile		$ 17,000	$ 17,000	**$ 78,200**	
10.22	Remove 4.6 circuit miles (typically 336.4 18/1 ACSR) - Line 704	4.60	Mile		$ 16,000	$ 16,000	**$ 73,600**	
10.23	Remove 9.2 miles of existing 3/8” x 7 steel EHS shieldwire	9.20	Mile		$ 12,000	$ 12,000	**$ 110,400**	
10.24	Conductor attachment assembly at Gardenville Substation	1.00	Lot		$ 100,000	$ 100,000	**$ 100,000**	
11	**Structure Removal Work**							
	Line 181/105 – Remove 181 structures (Packard Substation to Ellicott Junction)							
	Remove 37 deadend structures:							
11.1	Remove 34 double circuit lattice deadend towers	34.00	Structure		$ 12,000	$ 12,000	**$ 408,000**	
11.2	Remove 3 single pole wood deadend structures	3.00	Structure		$ 6,000	$ 6,000	**$ 18,000**	
	144 suspension structures:							

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
11.3	Remove 11 double circuit steel suspension towers	11.00	Structure		$ 14,000	$ 14,000	**$ 154,000**	
11.4	Remove 10 double circuit suspension flex towers	10.00	Structure		$ 13,000	$ 13,000	**$ 130,000**	
11.5	Remove 6 H-Frame wood suspension structures	6.00	Structure		$ 10,000	$ 10,000	**$ 60,000**	
11.6	Remove 117 2 pole-wood suspension structures	117.00	Structure		$ 8,000	$ 8,000	**$ 936,000**	
	Line 180/181 – Remove 95 structures (Ellicott Junction to Urban Switch)							
	Remove 58 structures – Ellicott Junction to Pack Club Lane Substation:							
	Remove 18 deadend structures:							
11.8	Remove 14 double circuit lattice deadend towers	14.00	Structure		$ 12,000	$ 12,000	**$ 168,000**	
11.9	Remove 4 double circuit single pole steel deadend structures	4.00	Structure		$ 8,000	$ 8,000	**$ 32,000**	
	Remove 40 suspension structures:							
11.10	Remove 38 double circuit flex towers suspension structures	38.00	Structure		$ 6,600	$ 6,600	**$ 250,800**	
11.11	Remove 1 H-frame suspension structure	1.00	Structure		$ 6,000	$ 6,000	**$ 6,000**	
11.12	Remove 1 double circuit single pole steel suspension structure	1.00	Structure		$ 12,000	$ 12,000	**$ 12,000**	
	Remove 37 structures – Park Club Lane Substation to Urban Switch:							
11.13	Remove 10 double circuit lattice deadend towers	10.00	Structure		$ 12,000	$ 12,000	**$ 120,000**	
	Remove 27 suspension structures:							
11.14	Remove 2 double circuit steel towers suspension structures	2.00	Structure		$ 66,000	$ 66,000	**$ 132,000**	
11.15	Remove 25 double circuit flex towers suspension structures	25.00	Structure		$ 66,000	$ 66,000	**$ 1,650,000**	
	Line 182/92 – Remove 96 structures (Ellicott Junction to Urban Switch)							
	Remove 58 structures – Ellicott Junction to Pack Club Lane Substation							
	Remove 20 deadend structures							
11.15	Remove 13 double circuit lattice deadend towers	13.00	Structure		$ 12,000	$ 12,000	**$ 156,000**	
11.16	Remove 1 single pole wood deadend structure	1.00	Structure		$ 18,000	$ 18,000	**$ 18,000**	
11.17	Remove 5 double circuit steel pole deadend structures	5.00	Structure		$ 14,000	$ 14,000	**$ 70,000**	
11.18	Remove 1 H-frame wood deadend structure	1.00	Structure		$ 6,600	$ 6,600	**$ 6,600**	
	Remove 38 suspension structures:							
11.19	Remove 29 double circuit suspension flex towers	29.00	Structure		$ 14,000	$ 14,000	**$ 406,000**	
11.20	Remove 1 double circuit steel suspension towers	1.00	Structure		$ 6,600	$ 6,600	**$ 6,600**	
11.21	Remove 8 2-pole wood suspension structures	8.00	Structure		$ 8,000	$ 8,000	**$ 64,000**	
	Remove 38 structures – Park Club Lane Substation to Urban Switch:							
11.22	Remove 10 double circuit lattice deadend towers	10.00	Structure		$ 12,000	$ 12,000	**$ 120,000**	
	Remove 27 suspension structures:							
11.23	Remove 2 double circuit steel towers suspension structures	2.00	Structure		$ 6,600	$ 6,600	**$ 13,200**	
11.24	Remove 25 double circuit flex towers suspension structures	25.00	Structure		$ 6,600	$ 6,600	**$ 165,000**	
11.25	Remove 1 switch structure (Urban 369)	1.00	Structure		$ 6,600	$ 6,600	**$ 6,600**	
	Line 182 – Remove 12 structures (Near Urban Switch):							
	Remove 4 deadend structures:							
11.26	Remove 2 double circuit lattice deadend towers	2.00	Structure		$ 16,000	$ 16,000	**$ 32,000**	
11.27	Remove 2 3-pole wood deadend structures	2.00	Structure		$ 8,000	$ 8,000	**$ 16,000**	
	Remove 8 suspension structures:							
11.28	Remove 3 double circuit steel suspension towers	3.00	Structure		$ 8,000	$ 8,000	**$ 24,000**	
11.29	Remove 3 double circuit suspension flex towers	3.00	Structure		$ 6,600	$ 6,600	**$ 19,800**	
11.30	Remove 2 H-frame suspension structures	2.00	Structure		$ 6,000	$ 6,000	**$ 12,000**	
	Line 182/54 – Remove 45 structures (Urban Switch to Gardenville Substation):							
11.31	Remove 12 double circuit lattice deadend towers	12.00	Structure		$ 12,000	$ 12,000	**$ 144,000**	
	Remove 33 suspension structures:							
11.32	Remove 1 double circuit steel suspension tower	1.00	Structure		$ 6,600	$ 6,600	**$ 6,600**	
11.33	*Remove 25 double circuit suspension flex towers:*	25.00	Structure		$ 7,000	$ 7,000	**$ 175,000**	
11.34	Remove 7 2-pole wood suspension structures	7.00	Structure		$ 8,000	$ 8,000	**$ 56,000**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
	Line 180/704 – Remove 54 structures (Urban Switch to Gardenville Substation):							
11.35	Remove 21 double circuit lattice deadend towers	21.00	Structure		$ 12,000	$ 12,000	**$ 252,000**	
11.36	Remove 33 suspension structures							
11.37	Remove 3 double circuit steel towers suspension structures	3.00	Structure		$ 6,600	$ 6,600	**$ 19,800**	
11.38	Remove 30 double circuit flex towers suspension structures	30.00	Structure		$ 6,600	$ 6,600	**$ 198,000**	
12	**Wire Installation**							
	Line 181 – Install approximately 18.8 circuit miles, 115kV (Packard Substation to Park Club Lane Substation)							
12.1	Install 18.8 circuit miles of 1590 kcmil ACSR "FALCON" conductor	18.80	Mile	$ 55,440	$ 79,200	$ 134,640	**$ 2,531,232**	
12.2	Install 18.8 miles of 3/8" x 7 strand EHS steel shieldwire	18.80	Mile	$ 7,920	$ 15,840	$ 23,760	**$ 446,688**	
12.3	Conductor attachment assembly at Packard Substation	1.00	Lot		$ 30,000	$ 30,000	**$ 30,000**	
	Line 182/180 – Install approximately 11.2 circuit miles, 115kV (Ellicott Junction to Park Club Lane Substation)							
	Install 11.2 circuit miles of 1590 kcmil ACSR "FALCON" conductor:							
12.4	Install 5.6 circuit miles of 1590 kcmil ACSR "FALCON" conductor	5.60	Mile	$ 55,440	$ 79,200	$ 134,640	**$ 753,984**	
12.5	Install 5.6 circuit miles of 1590 kcmil ACSR "FALCON" conductor-Line 180	5.60	Mile	$ 55,440	$ 79,200	$ 134,640	**$ 753,984**	
12.6	Install 11.2 miles of 3/8" x 7 strand EHS steel shieldwire	11.20	Mile	$ 7,920	$ 15,840	$ 23,760	**$ 266,112**	
12.7	Conductor attachment assembly at Park Club Lane Substation	1.00	Lot		$ 30,000	$ 30,000	**$ 30,000**	
	Line 181/182 – Install approximately 6.4 circuit miles, 115kV (Park Club Lane Substation to Urban Switch)							
	Install 6.4 circuit miles of 1590 kcmil ACSR "FALCON" conductor:							
12.8	Install 3.2 circuit miles of 1590 kcmil ACSR "FALCON" conductor- Line 181	3.20	Mile	$ 55,440	$ 79,200	$ 134,640	**$ 430,848**	
12.9	Install 3.2 circuit miles of 1590 kcmil ACSR "FALCON" conductor- Line 182	3.20	Mile	$ 55,440	$ 79,200	$ 134,640	**$ 430,848**	
12.10	Install 6.4 miles of 3/8" x 7 strand EHS steel shieldwire	6.40	Mile	$ 7,920	$ 15,840	$ 23,760	**$ 152,064**	
12.11	Conductor attachment assembly at Urban Switch	1.00	Lot		$ 30,000	$ 30,000	**$ 30,000**	
	Line 182/54 – Install approximately 8.2 circuit miles, 115kV (Urban Switch to Gardenville Substation):							
	Install 8.2 circuit miles of 1590 kcmil ACSR "FALCON" conductor:							
12.12	Install 4.5 circuit miles of 1590 kcmil ACSR "FALCON" conductor- Line 182	4.50	Mile	$ 55,440	$ 79,200	$ 134,640	**$ 605,880**	
12.13	Install 3.7 circuit miles of 1590 kcmil ACSR "FALCON" conductor-Line 54	3.70	Mile	$ 55,440	$ 79,200	$ 134,640	**$ 498,168**	
12.14	Install 8.2 miles of 3/8" x 7 strand EHS steel shieldwire	8.20	Mile	$ 7,920	$ 15,840	$ 23,760	**$ 194,832**	
12.15	Conductor attachment assembly at Gardenville Substation	1.00	Lot		$ 30,000	$ 30,000	**$ 30,000**	
	Line 182/54 – Install approximately 0.04 circuit miles, 115kV/115kV (American Standard Tap):							
	Install 0.04 circuit miles of 1590 kcmil ACSR "FALCON" conductor							
12.16	Install 0.02 circuit miles of 1590 kcmil ACSR "FALCON"- Line 182 Tap to American Standard Tap	0.02	Mile	$ 55,440	$ 79,200	$ 134,640	**$ 2,693**	
12.17	Install 0.02 circuit miles of 1590 kcmil ACSR "FALCON" - Line 54 Tap to American Standard Tap	0.02	Mile	$ 55,440	$ 79,200	$ 134,640	**$ 2,693**	
12.18	Conductor attachment assembly at American Standard Tap	1.00	Lot		$ 10,000	$ 10,000	**$ 10,000**	
12.19	OPGW- 7 miles and accessories	7.00	Mile	$ 21,632	$ 29,220	$ 50,852	**$ 355,964**	Includes accessories, splicing & testing
13	**Insulator & Hardware Work**							
	Group D1:							
13.1	Tangent - Porcelain String (10 Discs Assembly)	576.00	Set	$ 900	$ 720	$ 1,620	**$ 933,120**	
13.2	Angle & Deadend Porcelain String (10 Disc Assembly)	1,020.00	Set	$ 1,300	$ 1,040	$ 2,340	**$ 2,386,800**	
13.3	Jumper Post Porcelain String (Assembly)	510.00	Set	$ 500	$ 400	$ 900	**$ 459,000**	
14	**Install Structure Work:**							
	Line 181 – Install approximately 240 structures (60 deadends, 180 suspensions) :							
	(Packard Substation to Park Club Lane Substation)							
	Install 180 structures – Packard Substation to Ellicott Junction							
14.1	Install 37 structures (Type S – Single circuit davit arm steel deadend)	37.00	Structure	$ 50,000	$ 45,000	$ 95,000	**$ 3,515,000**	
14.2	Install 143 structures (Type R – Single circuit davit arm wood suspension)	143.00	Structure	$ 3,500	$ 26,000	$ 29,500	**$ 4,218,500**	
	Install 60 structures – Ellicott Junction to Pack Club Lane Substation							
14.3	Install 23 structures (Type S – Single circuit davit arm steel deadend)	23.00	Structure	$ 47,000	$ 26,000	$ 73,000	**$ 1,679,000**	
14.4	Install 37 structures (Type R – Single circuit davit arm wood suspension)	37.00	Structure	$ 3,500	$ 26,000	$ 29,500	**$ 1,091,500**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
	Line 182/180 – Install approximately 60 structures (26 deadends, 34 suspensions), 115kV (Ellicott Junction to Pack Club Lane Substation)							
14.5	Install 1 structure (Type S – Single circuit davit arm steel deadend)	15.00	Structure	$ 47,000	$ 26,000	$ 73,000	**$ 1,095,000**	
14.6	Install 25 structures (Type Q – Double circuit davit arm steel deadend)	25.00	Structure	$ 29,700	$ 26,730	$ 56,430	**$ 1,410,750**	
14.7	Install 34 structures (Type P – Double circuit davit arm steel suspension)	34.00	Structure	$ 21,000	$ 26,000	$ 47,000	**$ 1,598,000**	
	Line 181/182 – Install approximately 39 structures (14 deadends, 24 suspensions, 1 Hframe deadend switch) (Park Club Lane Substation to Urban Switch):							
14.8	Install 14 structures (Type Q – Double circuit davit arm steel deadend)	14.00	Structure	$ 29,700	$ 26,730	$ 56,430	**$ 790,020**	
14.9	Install 24 structures (Type P – Double circuit davit arm steel suspension)	47.00	Structure	$ 21,000	$ 18,900	$ 39,900	**$ 1,875,300**	
14.10	Install 1 H-frame deadend switch structure and switch (Urban 369) (Type T – H-frame deadend switch)	1.00	Structure	$ 45,000	$ 40,500	$ 85,500	**$ 85,500**	
	Line 182/54 – Install approximately 53 structures (15 deadends, 38 suspension tangents) (Urban Switch to Gardenville Substation)							
14.11	Install 15 structures (Type Q – Double circuit davit arm steel deadend)	15.00	Structure	$ 29,700	$ 26,730	$ 56,430	**$ 846,450**	
14.12	Install 38 structures (Type P – Double circuit davit arm steel suspension)	38.00	Structure	$ 21,000	$ 18,900	$ 39,900	**$ 1,516,200**	
15	**Install Foundation Work:**							
	Line 181 – Install 60 drilled shaft foundations and 180 direct embed holes (Packard Substation to Park Club Lane Substation)							
	Install 60 drilled shaft foundations:							
15.1	Install 47 drilled shaft - 6 feet diameter, depth of 23 feet	47.00	Structure		$ 27,000	$ 27,000	**$ 1,269,000**	Supply and Install
15.2	Type S– Single circuit davit arm steel tangent deadend - foundation accessories, misc. works	47.00	Structure		$ 13,000	$ 13,000	**$ 611,000**	
15.3	Install 13 drilled shaft - 8 feet diameter, depth of 37 feet - foundation accessories, misc. works	13.00	Structure		$ 30,000	$ 30,000	**$ 390,000**	
15.4	Type S– Single circuit davit arm 90° line angle deadend)	13.00	Structure		$ 13,000	$ 13,000	**$ 169,000**	
15.5	Install 180 direct embed holes - embedment depth of 14 feet	180.00	Structure		$ 16,000	$ 16,000	**$ 2,880,000**	
15.6	Type R – Single circuit davit arm wood suspension - - foundation accessories, misc. works	180.00	Structure		$ 13,000	$ 13,000	**$ 2,340,000**	
	Line 182/180 – Install 26 drilled shaft foundations and 34 direct embed holes (Ellicott Junction to Pack Club Lane Substation):							
	Install 26 drilled shaft foundations:							
15.7	Install 1 drilled shaft - 6 feet diameter, depth of 23 feet	1.00	Structure		$ 27,000	$ 27,000	**$ 27,000**	
15.8	Type S – Single circuit davit arm steel tangent deadend - foundation accessories, misc. works	1.00	Structure	$ 18,000	$ 13,000	$ 31,000	**$ 31,000**	
15.9	Install 24 drilled shaft - 6 feet diameter, depth of 31 feet	24.00	Structure		$ 28,000	$ 28,000	**$ 672,000**	
15.10	Type Q – Double circuit davit arm steel tangent deadend - foundation accessories, misc. works	24.00	Structure	$ 29,700	$ 13,000	$ 42,700	**$ 1,024,800**	
15.11	Install 1 drilled shaft - 8 feet diameter, depth of 37 feet	1.00	Structure		$ 35,000	$ 35,000	**$ 35,000**	
15.12	Type Q – Double circuit davit arm 90° line angle deadend - foundation accessories, misc. works	1.00	Structure	$ 29,700	$ 13,000	$ 42,700	**$ 42,700**	
15.13	Install 34 direct embed holes - embedment depth of 20 feet	34.00	Structure		$ 18,000	$ 18,000	**$ 612,000**	Supply and Install
15.14	Type P – Double circuit davit arm steel suspension - foundation accessories, misc. works	34.00	Structure		$ 13,000	$ 13,000	**$ 442,000**	
	Line 181/182 – Install16 drilled shaft foundations and 24 direct embed holes (Park Club Lane Substation to Urban Switch):							
	Install 16 drilled shaft foundations:							
15.15	Install 13 drilled shaft - 6 feet diameter, depth of 23 feet	13.00	structure		$ 27,000	$ 27,000	**$ 351,000**	
15.16	Type Q – Double circuit davit arm steel tangent deadend - foundation accessories, misc. works	13.00	structure	$ 29,700	$ 13,000	$ 42,700	**$ 555,100**	
15.17	Install 1 drilled shaft - 8 feet diameter, depth of 37 feet	1.00	structure		$ 30,000	$ 30,000	**$ 30,000**	Supply and Install
15.18	Type Q – Double circuit davit arm 90° angle deadend - foundation accessories, misc. works	1.00	structure	$ 29,700	$ 13,000	$ 42,700	**$ 42,700**	
15.19	Install 2 drilled shaft – 5 feet diameter, depth of 16 feet	2.00	structure		$ 16,000	$ 16,000	**$ 32,000**	Supply and Install
15.20	Type T – H-frame deadend switch - foundation accessories, misc. works	1.00	structure		$ 15,000	$ 15,000	**$ 15,000**	Supply and Install
15.21	Install 24 direct embed holes - embedment depth of 20 feet	24.00	structure	$ 9,000	$ 18,000	$ 27,000	**$ 648,000**	
15.22	Type P – Double circuit davit arm steel suspension - foundation accessories, misc. works	26.00	structure	$ 9,000	$ 13,000	$ 22,000	**$ 572,000**	
	Line 182/54 – Install 15 drilled shaft foundations and 38 direct embed holes (Urban Switch to Gardenville Substation)							
15.23	Install 15 drilled shaft foundations							

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
15.24	Install 14 drilled shaft - 6 feet diameter, depth of 31 feet	14.00	structure		$ 36,000	$ 36,000	**$ 504,000**	Supply and Install
15.25	Type Q – Double circuit davit arm steel tangent deadend - foundation accessories, misc. works	14.00	structure	$ 29,700	$ 13,000	$ 42,700	**$ 597,800**	
15.26	Install 1 drilled shaft - 8 feet diameter, depth of 38 feet	1.00	structure		$ 38,000	$ 38,000	**$ 38,000**	Supply and Install
15.27	Type Q – Double circuit davit arm 90° angle deadend - foundation accessories, misc. works	1.00	structure	$ 29,700	$ 13,000	$ 42,700	**$ 42,700**	
15.28	Install 38 direct embed holes - embedment depth of 20 feet	38.00	structure		$ 18,000	$ 18,000	**$ 684,000**	
15.29	Type P – Double circuit davit arm steel suspension - foundation accessories, misc. works	38.00	structure	$ 9,000	$ 13,000	$ 22,000	**$ 836,000**	
	Line Switches							
15.3	Supply and Install line switch for WG-D1	1.00	Unit		$ 100,000	$ 100,000	**$ 100,000**	Supply and Install
WG D1 - TOTAL SUPPLY & INSTALL:							**$ 55,276,810**	
WG-E NEW BUS BREAKER AT PACKARD STATION								
16	**New Bus Breaker at Packard Station**							
16.1	GCB 115kV - 3000A, 63kA	1.00	Unit		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
16.2	115LB1WV1 1 Way Loadbreak Switch Vertical (Located at Structure T and includes the pole)	1.00	Structure		$ 250,000	$ 250,000	**$ 250,000**	
16.3	Relocate 1 No. existing 115kV 3000A disconnect switch 343 to the right of tie breaker R342	1.00	Sum		$ 20,000	$ 20,000	**$ 20,000**	
16.4	Install one new 115kV 123kV , 63kA 3000A SF6 bus tie breaker in series with existing 115kV Areva bus tie R342 b	1.00	Sum	$ 150,000	$ 50,000	$ 200,000	**$ 200,000**	
16.5	Install new cable and conduit between new tie breaker and control house and associated shield cables	1.00	Sum		$ 35,000	$ 35,000	**$ 35,000**	Supply & Install
16.6	Install new set of AL power conductors and AL four hole pad connectors	1.00	Sum		$ 12,000	$ 12,000	**$ 12,000**	
16.7	Install new AL bus and a 5" upper bus extension to existing breaker R2103 and associated disconnect switches	1.00	Sum		$ 18,000	$ 18,000	**$ 18,000**	
16.8	Structures for Switch and Bus Support	1.00	Sum		$ 30,000	$ 30,000	**$ 30,000**	
16.9	Relocate 115kV disconnect switch 2104 and R2103	1.00	Sum		$ 15,000	$ 15,000	**$ 15,000**	
16.10	Grounding all new electrical equipment	1.00	Sum		$ 10,000	$ 10,000	**$ 10,000**	
16.11	Reconnect, control and integration, test and commissioning	1.00	Sum		$ 20,000	$ 20,000	**$ 20,000**	
16.12	Supply and Install new 115kV switch R2101	1.00	Sum		$ 100,000	$ 100,000	**$ 100,000**	
16.13	Allowance for all secondary electrical works including DC power, AC power and system protection	1.00	Sum		$ 20,000	$ 20,000	**$ 20,000**	
WG-E - TOTAL SUPPLY & INSTALL:							**$ 880,000**	
WG-F REPLACE THERMALLY LIMITING EQUIPMENT AT PACKARD SUBSTATION FOR LINE 181								
17	**Replace Thermally Limiting Equipment at Packard Substation for Line 181**							
17.1	Conductor & insulator replacement	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	Supply & Install
WG-F - TOTAL SUPPLY & INSTALL:							**$ 200,000**	
WG-G NEW 115kV SWITCHING STATION								
18	**Supply and Install new 115kV Switching Station near Park Club Lane**							
	Structures							
18.1	Angles Bus Support- 3 Phase	7.00	Unit	$ 5,000	$ 10,000	$ 15,000	**$ 105,000**	
18.2	Sta. SVC Stand- 3 Phases	1.00	Unit	$ 15,000	$ 20,000	$ 35,000	**$ 35,000**	
18.3	Switch Stands (assume future SW Stands use bus supports)	18.00	Unit	$ 25,000	$ 30,000	$ 55,000	**$ 990,000**	
18.4	Misc. Structures	1.00	Sum		$ 385,000	$ 385,000	**$ 385,000**	
18.5	Line Terminal (shared columns)	3.00	Unit	$ 18,000	$ 22,000	$ 40,000	**$ 120,000**	
18.6	Lightning Masts	8.00	Unit	$ 45,000	$ 25,000	$ 70,000	**$ 560,000**	
	Equipment		Unit					
18.7	115kV Switches	16.00	Unit		$ 100,000	$ 100,000	**$ 1,600,000**	
18.8	115kV Line Switches	5.00	Unit		$ 100,000	$ 100,000	**$ 500,000**	
18.9	115kV Instrument Transformers	1.00	Sum		$ 545,000	$ 545,000	**$ 545,000**	
18.10	115kV Circuit Breakers	8.00	Unit	$ 150,000	$ 50,000	$ 200,000	**$ 1,600,000**	
18.11	115kV Sta SVC- 1Phase	3.00	Unit	$ 50,000	$ 18,000	$ 68,000	**$ 204,000**	
18.12	Arrestor	15.00	Unit	$ 50,000	$ 25,000	$ 75,000	**$ 1,125,000**	
18.13	Arrestor Sta SVC	3.00	Unit	$ 75,000	$ 25,000	$ 100,000	**$ 300,000**	
	Foundations							
18.14	Grading, Civils, Access Works, Ground Grid, Conduit	1.00	Sum		$ 325,000	$ 325,000	**$ 325,000**	Supply & Install
18.15	Foundations for Low Profile Structures	68.00	Unit		$ 5,000	$ 5,000	**$ 340,000**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
18.16	Caisson DE Structures	10.00	Structure		$ 75,000	$ 75,000	**$ 750,000**	
18.17	115kV Circuit Breaker Pad	8.00	Sum		$ 10,000	$ 10,000	**$ 80,000**	
18.18	Pier Lighting Mast	8.00	Sum		$ 5,000	$ 5,000	**$ 40,000**	
	Control House							
18.19	Control House 35' x 65' (includes supply & install and foundations)	1.00	Sum	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	Supply & Install (includes foundations)
	Protection, Telecom, Connections, Misc.							
18.20	Cable and Wire	1.00	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
18.21	Protection, Telecom and Metering Equipment (Panels)	23.00	Sum		$ 30,000	$ 30,000	**$ 690,000**	Supply & Install
WG-G - TOTAL SUPPLY & INSTALL:							**$ 11,169,000**	
SEGMENT 3								
WG-H PACKARD-HUNTLEY & WALCK-HUNTLEY DOUBLE CIRCUIT LINE WORKS								
Description of Work: Re-conductor 18.2 circuit miles of the Packard-Huntley and Walck - Huntley Double Circuit Line between structures 140 and Huntley Substation. Scope includes foundation and structure works and replacement of insulators, fittings and hardware.								
19	**Wire Removal Work**							
	Line 130/133 – Remove approximately 18.2 circuit miles, 115kV/69kV (Packard Structures 140 and -Huntley Substation):							
19.1	Remove 18.2 circuit miles (typically 350 MCM 19 strand Copper)	18.20	Mile		$ 15,000	$ 15,000	**$ 273,000**	
19.2	Transfer existing 3/8" x 7 steel EHS shieldwire on 6 structures	26.60	Mile		$ 24,000	$ 24,000	**$ 638,400**	
	Structure Removal Work							
	Line 130/133 – Remove 7 double circuit steel deadend lattice towers, 115kV/69kV (Packard Structures 140 and -Huntley Substation):							
	Remove 11 deadend structures:							Supply & Install
19.3	Remove 7 double circuit lattice deadend towers	7.00	Structure		$ 12,000	$ 12,000	**$ 84,000**	
19.4	Remove 4 single pole wood deadend structures	4.00	Structure		$ 6,000	$ 6,000	**$ 24,000**	
19.5	Remove 1 double circuit steel suspension flex tower	1.00	Structure		$ 14,000	$ 14,000	**$ 14,000**	
	Structure Re-inforce Work							
19.6	Install 8 concrete foundation caissons	8.00	Structure		$ 150,000	$ 150,000	**$ 1,200,000**	
19.7	Install 4 wood 3-pole deadend pole structures in kind	4.00	Structure	$ 25,000	$ 25,000	$ 50,000	**$ 200,000**	
19.8	Replace seven double circuit steel deadend lattice towers with double circuit steel deadend single pole structures on concrete foundations.	7.00	Structure		$ 85,000	$ 85,000	**$ 595,000**	Supply & Install
19.9	Replace one double circuit steel suspension flex tower with double circuit steel deadend single pole structure on concrete foundation.	1.00	Structure		$ 85,000	$ 85,000	**$ 85,000**	
19.10	Replace steel members on (16) deadend lattice towers	16.00	Structure		$ 10,000	$ 10,000	**$ 160,000**	
19.11	Replace hardware on (30) double circuit deadend structures	30.00	Structure		$ 4,000	$ 4,000	**$ 120,000**	
19.12	Install longitudinal guys on two flex towers	2.00	Structure		$ 25,000	$ 25,000	**$ 50,000**	
19.13	Install (4) temporary wood single pole deadend structures at every deadend structure to be replaced	44.00	Unit		$ 15,000	$ 15,000	**$ 660,000**	
	Wire Installation							
19.14	*Line 130/133 – Reconductoring, 115kV/69kV (Packard Structures 140 and -Huntley Substation):*							
19.15	Transfer 4 double circuit miles of 1590 kcmil ACSR "FALCON" conductor	4.00	Mile	$ 28,000	$ 40,000	$ 68,000	**$ 272,000**	
19.16	Install 18.2 miles of 3/8" x 7 strand EHS steel shieldwire	18.20	Mile	$ 7,920	$ 15,840	$ 23,760	**$ 432,432**	
19.17	Miscellaneous assemblies	1.00	Lot		$ 30,000	$ 30,000	**$ 30,000**	
19.18	OPGW- 18.2 miles and accessories	18.20	Mile	$ 21,632	$ 29,220	$ 50,852	**$ 925,506**	Supply & Install, Splicing, Accessories etc.
	Insulator & Hardware Work							
19.19	Tangent - Porcelain String (10 Discs Assembly)	390.00	Set	$ 900	$ 720	$ 1,620	**$ 631,800**	
19.20	Angle & Deadend Porcelain String (10 Disc Assembly)	192.00	Set	$ 1,300	$ 1,040	$ 2,340	**$ 449,280**	
19.21	Jumper Post Porcelain String (Assembly)	81.00	Set	$ 500	$ 400	$ 900	**$ 72,900**	
19.22	Shieldwire Suspension Clamps	32.00	Set	$ 500	$ 400	$ 900	**$ 28,800**	
19.23	Shieldwire DE Clamps	80.00	Set	$ 800	$ 640	$ 1,440	**$ 115,200**	
19.24	Miscellaneous materials, dampers, grounding etc.	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
WG-H - TOTAL SUPPLY & INSTALL:							**$ 7,261,318**	
WG-I - UPGRADE AMPACITY OF LINES 130 AND 133 AT HUNTLEY SUBSTATION								
20.1	Upgrade ampacity of Lines 130 & 133 at Huntley Substation	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	Supply & Install
20.2	Remove the span between Structures 80 and 414 on the denergized Beck – Terminal Station C 105 sub-transmission line in the vicinity of Structure 167 per input from NY-TLS. A temporary wood single pole structure may be needed in the vicinity of Structure 80 to mitigate any concerns with unbalanced load at the structure. The section of the Beck – Terminal Station C 105 sub-transmission line sharing the ROW with the 130/133 D/C line will be removed as part of the 115 kV Packard –Urban 181 line proposed scope of work for the Western New York Project.	1.00	Sum		$ 20,000	$ 20,000	**$ 20,000**	
20.3	Mitigation works to lower the edge of ROW magnetic fields on the Packard – Huntley 130 line between Structures 140 and 160. The scope of work consists of transposing the top and bottom conductor phases on the 130 line outside Huntley Substation and Walck Road Switch Station in the span between Structure 242 and the bus structures at Huntley Substation and between Walck Road Switch and Structure 132 at Walck Road Switch Station.	1.00	Sum		$ 15,000	$ 15,000	**$ 15,000**	
WG-I - TOTAL SUPPLY & INSTALL:							**$ 235,000**	
SEGMENT 4								
WG-J - REFURBISHMENT WORKS ON LINES 191								
	WG-J							
21	**Wire work:**							
21.1	Reconductor 3.6 circuit miles with 2156 kcmil ACSS “Bluebird” conductor.	3.60	Mile	$ 55,440	$ 79,200	$ 134,640	**$ 484,704**	
21.2	Replace 3.2 miles of existing shieldwire with 7/16" EHS shieldwire.	3.20	Mile	$ 7,920	$ 15,840	$ 23,760	**$ 76,032**	
21.3	Transfer conductor, shieldwire and hardware on existing 101, 102, 61 lines to new suspension structures.	13.00	Structure		$ 20,000	$ 20,000	**$ 260,000**	Supply & Install
21.4	Transfer conductor, shieldwire and hardware on existing 101, 102, 61 lines to new deadend structures.	16.00	Structure		$ 25,000	$ 25,000	**$ 400,000**	
21.5	Replace deadend hardware attachment assemblies at the bus structures on the Niagara Substation and Packard Substation.	1.00	Sum		$ 20,000	$ 20,000	**$ 20,000**	
22	**Structure work:**					$ -	**$ -**	
22.1	Replace six double circuit deadend lattice towers with 6 D/C deadend steel davit arm structures.	6.00	Structure		$ 75,000	$ 75,000	**$ 450,000**	Supply & Install
22.2	Replace tower members and bolts on 12 lattice towers	12.00	Structure		$ 50,000	$ 50,000	**$ 600,000**	
22.3	Install 6 caisson foundations (8'x20') for D/C deadend steel davit are structures	6.00	Structure		$ 150,000	$ 150,000	**$ 900,000**	
22.4	Remove concrete footers at 6 structure locations (4 footers per structure)	24.00	Units		$ 20,000	$ 20,000	**$ 480,000**	
WG-J- TOTAL SUPPLY & INSTALL:							**$ 3,670,736**	
SEGMENT 5								
WG-M - LINE WORK 103,104								
23	**Wire and Hardware Work**							
23.1	Reconductor with 795MCM ACRS conductor to sections of lines 103 & 104 of 636MCM ACC	4,000.00	Ft	$ 4	$ 5	$ 9	**$ 34,000**	
23.2	Install 0.1 miles of 3/8” x 7 strand EHS steel shieldwire	0.10	Mile	$ 7,920	$ 15,840	$ 23,760	**$ 2,376**	
	Structure work:							
23.3	Remove existing structures 55A1, 55A2, 55A3, 55B1, 55B2, 55B3, 55B4 and 55B5	5.00	Structure		$ 10,000	$ 10,000	**$ 50,000**	
23.4	Remove existing conductor and 1/2" EHS	5.00	Structure		$ 5,000	$ 5,000	**$ 25,000**	
23.5	Install new steel vertical deadend pulloff structures	2.00	Structure		$ 50,000	$ 50,000	**$ 100,000**	Supply & Install
23.6	Install new steel three pole deadend pullof structure	1.00	Structure		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
	Foundation Work							
23.7	Install 2 foundations using a vibratory caisson, helical pile or other methods	2.00	Structure		$ 75,000	$ 75,000	**$ 150,000**	Supply & Install
23.8	Install 1 new vibratory caisson foundation	1.00	Structure		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
WG-M TOTAL SUPPLY & INSTALL:							**$ 486,376**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
WG-N - LINE WORK 101, 102, 103, 104								
24	**Upgrade ampacity of Lines 101, 102, 103, 104**							
24.1	Replace Thermally Limiting Equipment at Lockport Station for Lines 101, 102	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
WG-N TOTAL SUPPLY & INSTALL:							**$ 500,000**	
SEGMENT 6								
WG-O - NYSEG/NYPA/N GRID - ELIMINATE DOUBLE CIRCUIT CONTINGENCY FOR LINE 61/64								
25	**Eliminate Double Circuit Contingency for Line 61/64**							
25.1	Install "A" Delta Davit Arm Steel Suspension 230kV	1.00	Structure		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
25.2	Install "B" Davit Arm Steel DE 230kV	3.00	Structure					
25.3	Conductoring 0.70 circuit miles of 1590 ACSR for the 64 Line.	8,500.00	Ft	$ 5	$ 8	$ 13	**$ 110,500**	
25.4	Replace OGW overhead ground wire 5/8" Dia (230kV)	2.00	Mile	$ 7,920	$ 15,840	$ 23,760	**$ 47,520**	
25.5	Install 8' Dia x 26' deep reinforced concrete foundation caisson (cylindrical) Structure Type S/Q Angle DE (3 Nos)	50.00	CY		$ 1,500	$ 1,500	**$ 75,000**	Supply & Install
25.6	Direct embedment foundation 72" dia x 20' deep	1.00	EA		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
25.7	96" Dia Hole Rock Coring/ Removal	15.00	LF		$ 6,400	$ 6,400	**$ 96,000**	Supply & Install
	Group O-61/64, P1-181:							
25.8	Tangent - Porcelain String (10 Discs Assembly)	159.00	Set	$ 900	$ 720	$ 1,620	**$ 257,580**	
25.9	Angle & Deadend Porcelain String (10 Disc Assembly)	66.00	Set	$ 1,300	$ 1,040	$ 2,340	**$ 154,440**	
25.10	Jumper Post Porcelain String (Assembly)	33.00	Set	$ 500	$ 400	$ 900	**$ 29,700**	
WG-O TOTAL SUPPLY & INSTALL:							**$ 1,570,740**	
WG-P1 - IDENTIFIED 181 LINE WORK (URBAN SWITCH TO ERIE, NYSEG)								
26	**Foundation Works:**							
26.1	Direct Embed for H Frame's	52.00	Structure		$ 15,000	$ 15,000	**$ 780,000**	Supply & Install
26.2	Caissons for Dead End Structures	8.00	Structure		$ 55,000	$ 55,000	**$ 440,000**	Supply & Install
27	**Structure Work:**							
27.1	Install H Frames	52.00	Structure	$ 3,500	$ 26,000	$ 29,500	**$ 1,534,000**	
27.2	Install Dead Ends	8.00	Structure	$ 42,000	$ 37,800	$ 79,800	**$ 638,400**	
28	**Wire work:**							
28.1	1113 kcmil installation	114,000.00	Ft	$ 4	$ 5	$ 9	**$ 969,000**	
28.2	Install double shield wire	75,600.00	Ft	$ 2	$ 3	$ 5	**$ 340,200**	
29	**Insulators & Hardware Work**							
29.1	Suspension Sets	156.00	Ea.	$ 900	$ 720	$ 1,620	**$ 252,720**	
29.2	Angle / Deadend Sets	48.00	Ea.	$ 1,300	$ 1,040	$ 2,340	**$ 112,320**	
29.3	Shieldwire Fittings / Misc. Works	1.00	Sum		$ 300,000	$ 300,000	**$ 300,000**	Supply & Install
WG-P1 TOTAL SUPPLY & INSTALL:							**$ 5,366,640**	
WG-Q - REPLACE THERMALLY LIMITING EQUIPMENT AT ERIE STN FOR LINE 181								
30	**Replace Thermally Limiting Equipment at Erie Station for Line 181 (NYSEG 922 Line)**							
30.1	Replacing one 115kV circuit breaker	1.00	Unit	$ 150,000	$ 50,000	$ 200,000	**$ 200,000**	
30.2	Instrument Transformers	1.00	Unit		$ 200,000	$ 200,000	**$ 200,000**	
30.3	New disconnect switches	1.00	Lot		$ 100,000	$ 100,000	**$ 100,000**	
30.4	New A&B relay packages	1.00	Lot		$ 50,000	$ 50,000	**$ 50,000**	
30.5	Conductor and insulator replacement	1.00	Lot		$ 200,000	$ 200,000	**$ 200,000**	
30.6	New cabling (control, instrument, power and panel wiring)	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
30.7	Miscellaneous assemblies	1.00	Sum		$ 300,000	$ 300,000	**$ 300,000**	
WG-Q TOTAL SUPPLY & INSTALL:							**$ 1,250,000**	
WG-R - REPLACE THERMALLY LIMITING EQUIPMENT LINE 54 (NYSEG 921)								
31	**Replace Thermally Limiting Equipment at Erie Station for line 54 (NYSEG 921)**							
31.1	Replacing one 115kV circuit breaker	1.00	Unit	$ 150,000	$ 50,000	$ 200,000	**$ 200,000**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
31.2	Instrument Transformers	1.00	Unit		$ 200,000	$ 200,000	**$ 200,000**	
31.3	New disconnect switches	1.00	Lot		$ 100,000	$ 100,000	**$ 100,000**	
31.4	New A&B relay packages	1.00	Lot		$ 50,000	$ 50,000	**$ 50,000**	
31.5	Conductor and insulator replacement	1.00	Lot		$ 200,000	$ 200,000	**$ 200,000**	
31.6	New cabling (control, instrument, power and panel wiring)	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
31.7	Miscellaneous assemblies	1.00	Sum		$ 300,000	$ 300,000	**$ 300,000**	
WG-R TOTAL SUPPLY & INSTALL:							**$ 1,250,000**	
WG-U - REPLACE THERMALLY LIMITING EQUIPMENT ROBINSON STN LINE 64								
32	**Replace Thermally Limiting Equipment at Robinson Station for Line 64**							
32.1	Replacing two 230kV gang operated circuit breaker	2.00	Sum	$ 250,000	$ 75,000	$ 325,000	**$ 650,000**	
32.2	Instrument Transformers	1.00	Unit		$ 200,000	$ 200,000	**$ 200,000**	
32.3	New disconnect switches	1.00	Lot		$ 100,000	$ 100,000	**$ 100,000**	
32.4	New A&B relay packages	1.00	Lot		$ 50,000	$ 50,000	**$ 50,000**	
32.5	Conductor and insulator replacement	1.00	Lot		$ 200,000	$ 200,000	**$ 200,000**	
32.6	New cabling (control, instrument, power and panel wiring)	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
32.7	Miscellaneous assemblies	1.00	Sum		$ 300,000	$ 300,000	**$ 300,000**	
WG-U TOTAL SUPPLY & INSTALL:							**$ 1,700,000**	
WG-V - REPLACE THERMALLY LIMITING EQUIPMENT NIAGARA STN LINE 102								
33	**Replace Thermally Limiting Equipment at Niagara Station for Line 102**							
33.1	Substation Equipment Replacement	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
WG-V TOTAL SUPPLY & INSTALL:							**$ 500,000**	
SEGMENT 7	**Local Transmission Plan**							
MOB/DEMOB, ACCESS, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:								
34	**Contractor Mobilization / Demobilization**						**$ -**	
34.1	Mob / Demob	1.00	Sum		$ 2,000,000	$ 2,000,000	**$ 2,000,000**	
36	**Project Management, Material Handling & Amenities**					$ -	**$ -**	
36.1	Project Management & Staffing (includes PM, Field Engineers / Supervision, Scheduler and Cost Manager, SHEQ Staff, Materials Management Staff)	36.00	Months		$ 350,000	$ 350,000	**$ 12,600,000**	
36.2	Site Accommodations, Storage, Amenities, Laydown Yards	1.00	Sum		$ 2,500,000	$ 2,500,000	**$ 2,500,000**	
37	**Engineering**					$ -	**$ -**	
37.1	Design Engineering	1.00	Sum		$ 10,000,000	$ 10,000,000	**$ 10,000,000**	
37.2	LiDAR	1.00	Sum		$ 800,000	$ 800,000	**$ 800,000**	
37.3	Geotech	1.00	Sum		$ 1,800,000	$ 1,800,000	**$ 1,800,000**	
37.4	Surveying/Staking	1.00	Sum		$ 800,000	$ 800,000	**$ 800,000**	
38	**Testing & Commissioning**					$ -	**$ -**	
38.1	Testing & Commissioning of T-Line and Equipment	1.00	Sum		$ 2,500,000	$ 2,500,000	**$ 2,500,000**	
39	**Permitting and Additional Costs**					$ -	**$ -**	
39.1	Environmental Licensing & Permitting Costs	1.00	Sum		$ 5,965,150	$ 5,965,150	**$ 5,965,150**	
39.2	Environmental Mitigation Costs	1.00	Sum		$ 7,796,225	$ 7,796,225	**$ 7,796,225**	
39.3	Warranties / LOC's	1.00	Sum		$ 1,277,797	$ 1,277,797	**$ 1,277,797**	
39.4	Real Estate Costs (New)	1.00	Sum		$ 172,069	$ 172,069	**$ 172,069**	
39.5	Real Estate Costs (Incumbent Utility ROW)	1.00	Sum		$ 1,157,000	$ 1,157,000	**$ 1,157,000**	
39.6	Legal Fees	1.00	Sum		$ 2,000,000	$ 2,000,000	**$ 2,000,000**	
39.7	Sales Tax on Materials	1.00	Sum		$ 4,574,892	$ 4,574,892	**$ 4,574,892**	Includes 8.75% sales tax
39.8	Fees for easements or permits, including roadway, railroad, building or other local permits	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
MOB/DEMOB, ACCESS, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS - TOTAL:							**$ 56,143,133**	
SYSTEM UPGRADE FACILITIES								

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
SUF 1	SYSTEM UPGRADE FACILITIES CONTINGENCY (SEE ASSUMPTIONS & CLARIFICATIONS)						$ 3,750,000	Contingency for possible additional SUF upgrades
SYSTEM UPGRADE FACILITY TOTAL:							$ 3,750,000	

ENVIRONMENTAL LICENSING AND PERMITTING

Revision: 4

PROJECT TITLE WNY PROJECT EVALUATION- ENVIRONMENTAL LICENSING & PERMITTING COST ELEMENTS						ENVIRONMENTAL LICENSING & PERMITTING COST ESTIMATE RANGE FOR PROPOSED WNY TRANSMISSION PROJECT - T012									
FEDERAL						Segment 1		Segment 2		Segment 3		Segment 4		Segment 5	
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
USACE	Waters of the US under Section 404 of the Clean Water Act and Section 10 of the 1899 Rivers and Harbors Act (including regulated wetland areas)	Nationwide Permits (NWP) or Individual Permit (IP)	Any work within the boundaries of regulated wetlands (with the exception of isolated wetlands) or waterways to the spring high tide or ordinary high water mark	If project qualifies for a NWP (<0.5 acre disturbance and within NWP project type parameters), a pre-construction notification (PCN) is typically required. NWPs have a 45 day review period starting from when project logged in system (up to 6wk backlog delay in logging projects) If an IP is triggered, USACE will require Alternative Analysis and Public Notice/Hearing. IPs could also trigger restrictive environmental work windows. IPs have a 120 day review period starting from when permit is "deemed complete"	Wetland Delineation; Wetland Function & Value Assessment; Stream Delineation; Restoration Plan	$27,000	$89,000	$42,500	$118,000	$16,200	$68,750			$11,800	$60,600
USFWS	Endangered Species Act Section 7 (ESA) Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act	Consultation (Formal or Informal); Special Use Permit	Any work that may have an affect on listed species or their habitat; or projects within National Wildlife Refuges	USACE coordinates consultation with USFWS for ESA listed species during their permit review. Also includes the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act compliance. Season restrictions on construction could be imposed.	Rare, Threatened & Endangered Species Search; Preparation of Reports and Conservation Plans	$47,800	$134,000	$57,300	$153,000	$14,300	$67,000	$11,550	$61,500		
FAA	Airports / Airspace	Federal Aviation Administration (FAA) Notification	New or Replacement Structures near Airports	Depending on construction locations, this permit may only be needed for OP work.	Obstruction Analysis, Mitigation Plan (assumes Engineering Cost)	$3,000	$9,000	$3,000	$9,000	$3,000	$9,000	$3,000	$9,000		
STATE															
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans										
NYS Public Service Commission / Department of Public Service (NYSDPS)	Article VII	Article VII: Certificate of Environmental Compatibility and Public Need and Environmental Management & Construction Plan (EM&CP)	Article 7: Major electric transmission facilities with design capacity of 100kV or more extending for at least 10 miles or 125kV and over extending a distance of 1 mile or more (some exclusions for underground transmission applies)	Article 7 will incorporate all of the required State and Local approvals (costed separately), as well as Engineering and Environmental Studies and Public Outreach. Intervenor Fund payment expected to be $100,000. An Environmental Management & Construction Plan (EM&CP) must be prepared and approved by the PSC. (see 16 NYCRR Parts 85 through 88)	Includes Reports and Plans required for State and Federal Agency Permits, as well as EM&CP, EMF, Noise, Air, Visual Impact Assessment, Invasive Species Control Plan, Mitigation Plans	$600,000	$3,100,000	$600,000	$3,100,000						
NYSDEC	Article 15 Stream Disturbance; Article 24 Wetlands, Open Waters, Wetlands Buffers (100' for Freshwater Wetland)	Individual Permit (IP) (unless developer has General Permit (GP))	Any work within the boundaries of regulated waterways or wetlands, and wetland adjacent areas	Any disturbance within wetlands and/or below mean high tide will require an IP. Areas of temporary disturbance will likely require restoration, including a monitoring and maintenance period. Permanent disturbance will require offsite mitigation up to 3:1 area ratio; also includes a monitoring and maintenance period. GP may only be applicable if project ground disturbance is located outside of wetlands areas (above MHW).	Wetland Delineation; Wetland Restoration/Mitigation Plan	$12,000	$53,000	$12,000	$53,000	$12,000	$53,000			$12,000	$53,000
NYSDEC	Stormwater (If >1 Acre Soil Disturbance)	SPDES General Permit for Stormwater Discharges from Construction Activities GP-0-15-002 & SWPPP	Project areas of soil disturbance	If project involves 1 acre or more soil disturbance, then the GP is required. If located within a Regulated MS4 Municipality, additional coordination may be needed. Weekly inspections by a Qualified Inspector during construction will be required.	SWPPP (assumes Engineering Cost includes Sediment & Erosion Control Plan, Hydraulic & Hydrology Studies, Stormwater Management Design)	$11,200	$38,000	$11,200	$38,000	$11,200	$38,000	$11,200	$38,000		

ENVIRONMENTAL LICENSING AND PERMITTING

Any State or local government agency that issues permits or approvals	State Environmental Quality Review Act (SEQRA)	Environmental Assessment (EA) Determination of Significance	Projects not covered as a Type II Action (Note a project can not be segmented - all phases/tasks must be considered in the review)	Most projects or activities proposed by a state agency, and all discretionary approvals (permits) from a NYS agency or local government, require an environmental impact assessment. SEQR requires the sponsoring or approving governmental body to identify and mitigate the significant environmental impacts of the activity it is proposing or permitting.	Includes Reports and Plans required for State and Federal Agency Permits, as well as, EMF, Noise, Air, Visual Impact Assessment, Invasive Species Control Plan					$10,000	$500,000	$10,000	$500,000	$10,000	$10,000
NYSDOS	State Coastal Zone/ Management Areas	Coastal Consistency Concurrence	Projects within the NYSDOS designated Coastal Zone; and consistency with Local Waterfront Revitalization Plans (LWRPs); e.g., Town of Grand Island LWRP	Online mapping available to check if within coastal zone, a significant coastal fish & wildlife habitat (SCFWH), a local waterfront revitalization program area (LWRP), or a comprehensive management program areas (CMP)		$3,400	$15,000			$3,400	$15,000				
NYSHPO	National Historic Preservation Act (NHPA) Section 106: State and Federal Historic Places; State Mapped Archeologically Sensitive Areas	Cultural Resource Information System (CRIS) Determination	Local, State, or Federal eligible or designated historic places and/or areas of archeological sensitivity (in off-road areas and areas that have not been previously disturbed)	NYSDEC EAF Online Mapper identifies State or National Register of Historic Places and archeological sensitive areas within or adjacent to the project site. Formally enter project information and supporting documents into SHPO's online CRIS program. Staff will review and email a determination of impacts letter	Phase 1A & 1B Archaeological Studies	$21,200	$73,000	$25,000	$84,400	$7,750	$32,650	$6,700	$29,500		
NYS NHP	Threatened and Endangered Species	Consultation	Activities that may affect T&E species or their habitat.		See USFWS	$1,200	$6,400	$1,200	$6,400	$1,200	$6,400	$1,200	$6,400		
NYSDOT/NYS Thruway Authority/FHWA	State Roadways	Highway Work Permit/Utility Permit, Vegetation Management Permit; Easement	Any work within or crossing State highway ROW	May require restoration landscaping coordination. Typically requires compliance with NEPA including SHPO and USFWS effects determination	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$17,000	$69,000	$17,000	$69,000						
NYS Canal Corporation	Erie Canal - jurisdiction varies along edge	Canal Occupancy & Work Permit (TA-W99072)	Any work involving the Erie Canal	Must coordinate with Division Permit Engineer about particular section of canal being affected. Commercial permit fee = $25 plus $2,000,000 additional General Aggregate Liability Insurance	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$3,800	$3,800	$3,800	$3,800	$3,800	$3,800				
NYS Dept. of Agriculture and Markets	All agricultural lands (including Agricultural Districts)	Part of Article 7 & Article 10 Review process	Any work impacting agricultural land	Must minimize impacts and restore damage to agricultural land, and coordinate with County Soil & Water Conservation District; Vineyards are a major concern in WNYS. Pre-application conference with PSC, DEC and Ag& Markets recommended. Must develop EM&CP in conformance with Art. 7/10 Certificate Conditions. Agricultural Monitor must oversee construction & restoration; requisite 2-yrs post restoration monitoring.	Crop/Pasturing Mitigation Plan (not included in costing)	$11,000	$24,000	$11,000	$24,000	$11,000	$24,000				
REGIONAL															
Railroads	Railroad crossings	Consultation-permits may be required; Easement	Access / new structures on RR property		Easement area survey (not included in costs)	$11,000	$76,000	$11,000	$76,000						
LOCAL/MUNICIPAL															

ENVIRONMENTAL LICENSING AND PERMITTING

Revision: 4

Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans										
County Dept. of Public Works	County Roadways	Lane Closure Permit, Highway Work or Access Permit	Work within county roadways and right-of-ways			$6,000	$40,000	$6,000	$40,000	$6,000	$40,000	$6,000	$40,000		
Town, City or Village	Municipal Stormwater (MS4) Review	Approval of SWPPP or EM&CP	Project areas of soil disturbance		See NYSDEC SPDES	$6,000	$35,000	$6,000	$35,000	$6,000	$35,000	$6,000	$35,000		
Town, City or Village	Variable	Building Permits	New Structures	Individual Towns/Villages must be consulted on a project specific basis to determine notification and/or permitting procedures. Permit application names vary (e.g. road obstruction permit)		$18,000	$92,000	$18,000	$92,000	$18,000	$92,000	$18,000	$92,000		
Town, City or Village	Municipal Roadways	Highway Work Permit; Road Opening Permit	Work within municipal roadways and right-of-ways			$6,000	$35,000	$6,000	$35,000	$6,000	$35,000	$6,000	$35,000		
Town, City or Village	Wetlands	Wetland Permit / Conservation Approvals	Mapped wetlands and wetland adjacent areas (buffer width variable)		See USACE / NYSDEC Art. 24	$6,000	$52,000	$6,000	$52,000	$6,000	$52,000	$6,000	$52,000		
					Total Cost Range by Segment	$811,600	$3,944,200	$837,000	$3,988,600	$135,850	$1,071,600	$85,650	$898,400	$33,800	$123,600

		Minimum	Maximum	Expected Value
ENVIRONMENTAL LICENSING & PERMITTING COST (EXCLUDING MITIGATION)	**PROJECT TOI2 TOTAL**	**$1,903,900**	**$10,026,400**	**$5,965,150**

Excluded cost: Mitigation or restoration for impact to regulated wetlands; agricultural land and tree clearing

ENVIRONMENTAL MITIGATION ESTIMATE

	Offsite Wetland Mitigation*		ROW Restoration (Seeding)**		Farmland***	
	Min.	Max.	Min.	Max.	Min.	Max.
Area	21 acres	21 acres	82 acres	163 acres	50 acres	100 acres
Cost/Acre	$100,000	$200,000	$4,000	$4,000	$503	$503
Ratio	1:1	3:1	1:1	1:1	1:1	1:1
Total	$2,100,000	$12,600,000	$328,000	$489,000	$25,150	$50,300

T012 MITIGATION TOTAL	**Minimum**	**Maximum**	**Expected Value**
	$2,453,150	**$13,139,300**	**$ 7,796,225**

*Offsite wetland mitigation area assumes 9141 LF Forested Wetland Project Impact Reported in Permitting Summary Table by 100' ROW clearing width; includes design and installation costs only; does not include land acquisition or long term monitoring

**Assumes hydroseeding restoration only for sensitive areas within the ROW requiring timber matting (minus Active Agriculture) 141990 LF by 25' Wide (Min.) or 50' Wide (Max.)

***Farmland mitigation based on corn bushel yield at 129 BU/Acre and $3.9/BU (production numbers from 2016 USDA NYS Agriculture Overview), area assumes 87,558 LF Matting Impacts to Active Agriculture Land by 25' Wide (Min.) or 50' Wide (Max.); does not include land acquisition or monitoring

REAL ESTATE ESTIMATE
(NEW ROW)

COUNTY: NIAGARA
DEVELOPER: NATIONAL GRID
SEGMENT: NIAGARA TO LOCKPORT SEGMENT

		Area (Acres)	Total Cost
	Total Cost	17.98	$ 172,069

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T012 - National Grid High Power Transfer

Revision: 4

REAL ESTATE ESTIMATE
(INCUMBENT UTILITY ROW)

COUNTY: NIAGARA & ERIE
DEVELOPER: NATIONAL GRID (T012)
SEGMENT: NIAGARA - GARDENVILLE SEGMENT

	DEVELOPER	SEGMENT	COUNTY	INCUMBENT UTILITY (ROW) (ACRES)	TOTAL ROW COST
T012	National Grid (High Transfer)	Niagara to Gardenville - 36.2 miles	Niagara	203.82	$ 1,157,224
			Erie	92.85	

ASSUMPTIONS AND CLARIFICATIONS

Revision: 4

a) Cost Estimate is based on 2017 rates.
b) Construction Schedule is in accordance with the Developers proposed schedule - we have assumed continuous working with no breaks in the
c) Stringing rates allow for protection over crossings (such as rider poles).
d) We have assumed a typical work week (6 x 10 hour days).
e) We have assumed that pole weights include anchor bolts.
f) The Developer has assumed gravel work pads. During our ROW visit it was determined that matted work pads are required.
g) Costs will vary for handling and disposal of contaminated spoils, depending on type of contaminants and availability / location of the appropriate tipping facility. Since there is not enough information to provide a quantified estimate for this item, allowance is included in the contingency monies.
h) Costs have been developed based on historical data from Projects of a similar nature (AACE Class 5 and 4 Estimating Practices). We have not engaged any subcontractors or material vendors for formal quotes.
i) 15% Contractor Mark Up (OH&P) has been applied.
j) Assumes all environmental data and project details provided are accurate unless noted otherwise
k) USFWS T&E Assumes that ¼ of the total project route per segment will require field survey for T&E (Segment 1 – 9 miles, Segment 2 – 10.9 miles, Segment 3 – 2.28 miles, Segment 4 – 1.75 miles)
l) NEPA-Assumes no NEPA because Art VII (Segments 1 and 2)
m) Article 7 Intervenor Fund payment expected to be $100,000
n) SHPO- Assumes consultation and Phase 1A/1B archeological studies with field survey for 50% of project route (Segment 1 – 18 miles, Segment 2 – 21.8 miles, Segment 3 – 4.55 miles, Segment 4 – 3.5 miles)
o) NYSDOT/FHWA-Assumes any required NEPA coordination/requirements are covered under Article VII or SEQRA review
p) SEQRA for Segments 3, 4 and 5 assumes applicant is not lead agent. Minimum costs assume FEAF Part I with no additional studies. Maximum assumes an expanded EA. SEQRA for Segment 5 assumes minimum only costs.
q) Assumes no coordination with National Parks Service or OPRHP/State Parks
r) NYSDOS – Assumes coordination needed for work at Niagara Station and Huntley Station (Segments 1 and 3)
s) USACE wetland delineation totals assumed length of NWI wetland estimates on Permitting Summary Table. Assumes work group line segment length not duplicated (Segment 1 - 4 miles, Segment 2 - 7.9 miles, Segment 3 - 1.3 mile, Segment 5 – 0.2 miles). Assumes NYSDEC delineations overlap and are
t) Mitigation costs for landscaping only (no paving, sidewalks, soundwalls, etc.)
u) No tree survey or replanting required outside regulated wetlands areas
v) Agricultural mitigation (Segment 1 only) assumes timber matting impacts and pad impacts on active agriculture land linear feet (87,558) requires crop damage payments based on USDA 2016 NYS Agriculture Overview corn yield and bushel price/acre. Minimum assumes 25-foot-wide impact, Maximum

ASSUMPTIONS AND CLARIFICATIONS

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w) Wetland mitigation area 100' wide ROW by 9141' Forested Wetland Project Impact (Segment 1) Reported in Permitting Summary Table. Wetland mitigation includes design and installation costs only; does not include land acquisition or long term monitoring. Offsite mitigation for new ROW disturbance at 1:1 and 3:1 and mitigation within ROW seeding only. Assumes no off-site wetland mitigation is required for other work segments.
x) System Upgrade Facilities Contingency is allowance for potential additional system upgrades including overdutied breakers, protection changes, unidentified thermal issues, etc that may be identified as detailed studies are completed.

INDEPENDENT ESTIMATES

ATTACHMENT B7

T013 – NYPA/ NYSEG

SUBSTATION ENGINEERING COMPANY
8/11/2017

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T013 - NYPA and NYSEG

Revision: 4

SUMMARY OF COST ESTIMATE

	Description	Total Amount
1	DYSINGER SWITCHING STATION	$ 21,947,000
2	GARDENVILLE TO STOLLE ROAD 230KV TRANSMISSION LINE RECONDUCTORING	$ 14,140,200
3	LINE SEPARATION	$ 2,292,025
4	SOUTH PERRY SUBSTATION	$ 5,421,000
5	STOLLE ROAD SUBSTATION	$ 36,859,022
6	DYSINGER - STOLLE ROAD NEW 345kV TRANSMISSION LINE	$ 46,864,263
7	MOB/DEMOB, ACCESS, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS	$ 40,364,217
	CONTRACTOR MARK UP (OH&P) 15%	$ 25,183,159
	SUBTOTAL:	$ 193,070,885
	CONTINGENCY ON ENTIRE PROJECT (20%)	$ 38,614,177
	TOTAL PROJECT COST:	**$ 231,685,063**

SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
1. DYSINGER SWITCHING STATION								
Description of Work: The proposed new Dysinger Switching Station, an approximately five acre station, is planned to be located in the Town of Royalton in Niagara County, New York. The station requires the acquisition of one parcel of property.								
1	**Supply and Install a New Switching Station**							
1.1	Site Works including sediment controls, access roads, rough grading, final grading and stone placement	1.0	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	Supply & Install
1.2	Substation Fence	2,020.0	LF		$ 200	$ 200	**$ 404,000**	Supply & Install
1.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
1.4	Switches 3ph	16.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 112,000**	
1.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
1.6	Line Switches 3 ph with motor-operator	5.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 150,000**	
1.7	Instrument Transformers	1.0	Sum		$ 962,000	$ 962,000	**$ 962,000**	
1.8	Breakers	8.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 3,040,000**	
1.9	Arrestors (3 per line)	15.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 112,500**	
1.10	Two (2) 345 kV buses	2.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 120,000**	
1.11	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	
1.12	Low Profile Foundations	293.0	Ea		$ 5,000	$ 5,000	**$ 1,465,000**	Supply & Install
1.13	Caisson DE Foundations	32.0	Ea		$ 50,000	$ 50,000	**$ 1,600,000**	Supply & Install
1.14	Circuit Breaker Foundations	8.0	Ea		$ 75,000	$ 75,000	**$ 600,000**	Supply & Install
1.15	SST Foundation	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
1.16	345 KV Line trap, 2400 A, for phase B on the line to Stolle Rd.	1.0	Ea	$ 15,000	$ 12,000	$ 27,000	**$ 27,000**	Supply & Install
1.17	Control House and Pad (30' x 90')	1.0	Ea	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	
1.18	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
1.19	Control Cables	1.0	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
1.20	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
1.21	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	
1.22	Protection, Telecom and Metering Equipment (Panels)	30.0	Ea		$ 30,000	$ 30,000	**$ 900,000**	Supply & Install
1.23	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
1.24	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
1.25	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
1.26	Cable Trench Systems for Control Cables	1.0	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
1.27	Grounding	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
1.28	Bus Support 1 Ph	118.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 354,000**	
1.29	Switch Stands	23.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 253,000**	
1.30	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
1.31	Misc. Structures	1.0	Sum		$ 44,000	$ 44,000	**$ 44,000**	
1.32	Substation A-Frame Structures Shared Column	12.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 300,000**	
1.35	Arrestor Stands	15.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 52,500**	
1.36	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
1.37	Connection of Existing Lines to Dysinger Switchyard	1.0	Sum		$ 5,000,000	$ 5,000,000	**$ 5,000,000**	Supply & Install
1. DYSINGER SWITCHING STATION - TOTAL SUPPLY & INSTALL:							**$ 21,947,000**	
2. GARDENVILLE TO STOLLE ROAD 230KV TRANSMISSION LINE RECONDUCTORING								
Description of Work: The Gardenville - Stolle Road section includes re-conductoring approximately 12 miles of the existing 230kV Line Gardenville -Stolle Road Circuit #66, between the Towns of West Seneca and Elma, Erie County. The line crosses 14 roads and two railroads. The existing line is supported by double circuit steel structure towers for most of the 12 miles and transitions to wood H-Frame structures for the last four miles connecting to Stolle Road Substation. The project utilizes the existing structures for the re-conductoring. The project also includes upgrade of existing protection relays in the remote ends of Gardenville and Stole Road Substations.								
2	**230kV Reconductoring**						**$ -**	
2.1	Reconductoring 1590 ACSR Falcon	250,000.00	Ft	$ 3	$ 5	$ 8	**$ 1,875,000**	
2.2	Reconductoring shield wire	83,000.00	Ft	$ 1	$ 5	$ 6	**$ 473,100**	
2.3	Reconductoring 48 fibers OPGW (1)	83,000.00	Ft	$ 4	$ 5	$ 9	**$ 763,600**	
2.4	OPGW Splice Boxes	5.00	Ea	$ 1,500	$ 1,000	$ 2,500	**$ 12,500**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
2.5	OPGW Splice & Test	1.00	Sum		$ 6,000	$ 6,000	**$ 6,000**	
2.6	Insulators for suspension structures (ANSI 52-5 and 52-8)	96.00	Set	$ 1,500	$ 1,500	$ 3,000	**$ 288,000**	
2.7	Miscellaneous including hardware, guying, etc.	12.00	Mile		$ 30,000	$ 30,000	**$ 360,000**	Supply & Install
2.8	Matting for wetland & sensitive areas	105,600.00	Ft		$ 70	$ 70	**$ 7,392,000**	
2.9	Access Roads	140.00	Structure		$ 10,000	$ 10,000	**$ 1,400,000**	
2.10	Remove existing conductor	8.00	Mile	$ 15,000	$ 15,000	$ 30,000	**$ 240,000**	
2.11	Replacement of 20% of steel structure arms and cross sections	12.00	Structure	$ 10,000	$ 10,000	$ 20,000	**$ 240,000**	
2.12	Replacement of 20% of wood H-Frames pieces	6.00	Structure	$ 7,500	$ 7,500	$ 15,000	**$ 90,000**	
2.13	Miscellaneous	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	
2. GARDENVILLE TO STOLLE ROAD 230KV TRANSMISSION LINE RECONDUCTORING- TOTAL SUPPLY & INSTALL:							**$ 14,140,200**	
3. LINE SEPARATION								
Description of Work: The project includes separation of three structures approximately 3,000 feet of National Grid's Niagara to Packard line 61 and NYSEG's Niagara to Robinson Road line 64.								
3.1	Foundations - Tangents-Delta Configuration-1(single circuit)	1.00	EA		$ 60,000	$ 60,000	**$ 60,000**	Supply & Install
3.2	Foundations - Slight-Angles-Vertical Configuration	1.00	EA		$ 90,000	$ 90,000	**$ 90,000**	Supply & Install
3.3	Foundations - Heavy Angle-Vertical Configuration (15-25 degrees))-1 (double circuit)	1.00	EA		$ 120,000	$ 120,000	**$ 120,000**	Supply & Install
3.4	Foundations - Dead-Ends Vertical Configuration (25-90 degrees)- 2 (single circuit)	1.00	EA		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
3.5	Steel Poles 345kV Heavy Dead-End Structures	1.00	EA	$ 125,000	$ 75,000	$ 200,000	**$ 200,000**	
3.6	Steel Poles 345kV Slight Angles Vertical Structures	1.00	EA	$ 117,000	$ 80,300	$ 197,300	**$ 197,300**	
3.7	Steel Poles 345kV Angles >60 Structures	1.00	EA	$ 93,500	$ 56,000	$ 149,500	**$ 149,500**	
3.8	Steel Poles 345kV Tangent-Delta Configuration Structures	1.00	EA	$ 38,000	$ 23,000	$ 61,000	**$ 61,000**	
3.9	Conductoring 1192 45/7" "BUNTING" ACSR	20,000.00	Ft	$ 3	$ 5	$ 8	**$ 160,000**	
3.10	Shield wiring 7/16 EHS Static	5,000.00	Ft	$ 1	$ 5	$ 6	**$ 28,500**	
3.11	V-strings Suspension and tension strings hardware, OPGW, vibration dampers and spacers	20.00	EA	$ 5,000	$ 5,000	$ 10,000	**$ 200,000**	
3.12	Insulators for suspension structures (ANSI 52-5 and 52-8)	30.00	EA	$ 850	$ 850	$ 1,700	**$ 51,000**	
3.13	Miscellaneous	1.00	Sum		$ 100,000	$ 100,000	**$ 100,000**	
3.14	Matting for wetland & sensitive areas	5,280.00	Ft		$ 70	$ 70	**$ 369,600**	
3.15	Access Roads to each structure	6.00	EA		$ 10,000	$ 10,000	**$ 60,000**	
3.16	Work Pads	75,000.00	SQFT		$ 4	$ 4	**$ 264,000**	
3.17	Restoration of Work Pad Areas	7,500.00	SQFT		$ 0.2	$ 0.2	**$ 1,125**	
3.18	Clearing existing ROW for work spaces	2.00	Acre		$ 15,000	$ 15,000	**$ 30,000**	
3. LINE SEPARATION- TOTAL SUPPLY & INSTALL:							**$ 2,292,025**	
4. SOUTH PERRY SUBSTATION								
Description of Work: The project includes upgrades to the existing South Perry Substation.								
4	**Supply and Install New Phase Angle Regulator**							
4.1	Site Works including sediment controls, access roads, rough grading, final grading and stone placement	1.00	Sum		$ 375,000	$ 375,000	**$ 375,000**	
4.2	Substation Fence	375.00	LF		$ 200	$ 200	**$ 75,000**	Supply & Install
4.3	115kV 82MVA Phase Angle Regulator	1.00	Ea	$ 3,500,000	$ 500,000	$ 4,000,000	**$ 4,000,000**	
4.4	Switches 3ph	2.00	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 14,000**	
4.5	Line Switches 3 ph with motor-operator	1.00	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 30,000**	
4.6	Instrument Transformers	1.00	Sum		$ 121,000	$ 121,000	**$ 121,000**	
4.7	Arrestors	9.00	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 67,500**	
4.8	Low Profile Foundations	11.00	Ea		$ 5,000	$ 5,000	**$ 55,000**	Supply & Install
4.9	Caisson DE Foundations	4.00	Ea		$ 50,000	$ 50,000	**$ 200,000**	Supply & Install
4.10	Control Cables	1.00	Sum	$ 10,000	$ 10,000	$ 20,000	**$ 20,000**	
4.11	Protection, Telecom and Metering Equipment (Panels)	4.00	Ea		$ 30,000	$ 30,000	**$ 120,000**	Supply & Install
4.12	Control Conduits to Equipment	1.00	Sum		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
4.13	Grounding	1.00	Sum		$ 90,000	$ 90,000	**$ 90,000**	Supply & Install

SECO SUBSTATION ENGINEERING COMPANY

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
4.14	Bus Support 1 Ph	3.00	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 9,000**	
4.15	Switch Stands	2.00	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 22,000**	
4.16	Misc. Structures	1.00	Sum		$ 12,000	$ 12,000	**$ 12,000**	
4.17	Substation A-Frame Structures	1.00	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 25,000**	
4.18	Arrestor Stands	3.00	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 10,500**	
4.19	Miscellaneous Materials and Above / Below Ground Works	1.00	Sum		$ 100,000	$ 100,000	**$ 100,000**	
4. SOUTH PERRY SUBSTATION- TOTAL SUPPLY & INSTALL:							**$ 5,421,000**	
5. STOLLE ROAD SUBSTATION								
Description of Work: The project includes upgrades to the existing Stolle Road Substation.								
5	**Supply and Install Substation upgrading equipment**							
5.1	Site Works including sediment controls, access roads, rough grading, final grading and stone placement	1.00	Sum		$ 2,000,000	$ 2,000,000	**$ 2,000,000**	
5.2	345-230kV, 240/320/400/448 MVA (55//65 deg C) Auto-transformer connected Y-Y-Delta	2.00	Ea	$ 3,900,000	$ 500,000	$ 4,400,000	**$ 8,800,000**	
5.3	345 kV, 3000A, 40ka Breakers, IPO	9.00	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 3,420,000**	
5.4	345 kV, 3000A, 3PH-GOP, 63 kA, motor-operated switches	18.00	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 540,000**	
5.5	345 kV, 3000A, 3PH-GOP, 63 kA, motor-operated switches equipped w/interlocked grounding switch	1.00	Ea	$ 20,000	$ 16,000	$ 36,000	**$ 36,000**	
5.6	Instrument Transformers	1.00	Sum		$ 1,137,200	$ 1,137,200	**$ 1,137,200**	
5.9	Station Class Surge Arresters - ratings: 276 kV/220 kV MVOC	21.00	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 157,500**	
5.10	345 KV Line trap, 2400 A, for phase B on the line to Dysinger	1.00	Ea	$ 15,000	$ 12,000	$ 27,000	**$ 27,000**	
5.11	XLPE Cable 2000 KCM Supply and Installation	3,000.00	Ft	$ 60	$ 48	$ 108	**$ 324,000**	
5.12	Terminations	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	Supply & Install
5.13	Ductbank	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
5.14	345 kV Post Insulators	37.00	Ea	$ 750	$ 600	$ 1,350	**$ 49,950**	
5.15	5" AL T6-6061 IPS Bus bar	4,068.00	Ft	$ 5	$ 4	$ 8	**$ 32,544**	
5.16	1590 KCM AAC Overhead Cable	12,972.00	Ft	$ 3	$ 2	$ 5	**$ 58,374**	
5.17	Control House Steel 26' x 62' and Pad	1.00	Ea	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	
5.18	RELAY BUS DIFF 115 KV GE B30 SYS B	3.00	Ea	$ 12,000	$ 9,600	$ 21,600	**$ 64,800**	
5.19	RELAY BUS DIFF 115 KV SEL 487B SYS A	3.00	Ea	$ 7,000	$ 5,600	$ 12,600	**$ 37,800**	
5.20	RELAY SEL 421 LN DIST APP SYS A	1.00	Ea	$ 7,000	$ 5,600	$ 12,600	**$ 12,600**	
5.21	RELAY CAP BK/MFER/LN B 115 KV SYSA SEL451	9.00	Ea	$ 5,000	$ 4,000	$ 9,000	**$ 81,000**	
5.22	RELAY BUS DIFF 345 KV SEL 487E SYS A	4.00	Ea	$ 9,000	$ 7,200	$ 16,200	**$ 64,800**	
5.23	RELAY GE T60 345/115/34/12/KV TFR DIFF/RE	4.00	Ea	$ 9,000	$ 7,200	$ 16,200	**$ 64,800**	
5.24	RELAY PRT MOD GE L90 W7K	1.00	Ea	$ 14,000	$ 11,200	$ 25,200	**$ 25,200**	
5.25	Protection, Telecom and Metering Equipment (Panels)	17.00	Ea	$ 5,000	$ 4,000	$ 9,000	**$ 153,000**	
5.26	Guard 800, RFL 9780, 9785	3.00	Ea	$ 10,000	$ 8,000	$ 18,000	**$ 54,000**	
5.27	125VDC Substation Battery Systems (345 kV)	2.00	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
5.28	(345 kV, 230 KV, 115 kV)	1.00	Ea	$ 3,750	$ 3,000	$ 6,750	**$ 6,750**	
5.29	JMUX's (Including remote ends)	3.00	Ea	$ 9,000	$ 7,200	$ 16,200	**$ 48,600**	
5.30	HVI-Positron (Including remote ends)	3.00	Ea	$ 15,000	$ 12,000	$ 27,000	**$ 81,000**	
5.31	230 kV, 3000A, 40ka Breakers, 3PH-GOP	5.00	Ea	$ 250,000	$ 75,000	$ 325,000	**$ 1,625,000**	
5.32	230 kV, 3000A, 3PH-GOP, 63 kA, motor-operated switches	12.00	Ea	$ 20,000	$ 15,000	$ 35,000	**$ 420,000**	
5.33	230 kV, 3000A, 3PH-GOP, 63 kA, motor-operated switches equipped w/interlocked grounding switch	1.00	Ea	$ 20,000	$ 15,000	$ 35,000	**$ 35,000**	
5.34	230 kV S/P CCVT, 207000:115-69V (1800-3000:1-1) Instrument Transformers	18.00	Ea	$ 14,000	$ 8,000	$ 22,000	**$ 396,000**	
5.35	Station Class Surge Arresters - ratings: 172 kV/140 kV MVOC	21.00	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 157,500**	
5.36	XLPE Cable 2000 KCM Supply and Installation	11,448.00	Ft	$ 15	$ 12	$ 26	**$ 297,648**	
5.37	230 kV Post Insulators	39.00	Ea	$ 650	$ 520	$ 1,170	**$ 45,630**	
5.38	5" AL T6-6061 IPS Bus bar	1,951.00	Ft	$ 5	$ 4	$ 8	**$ 15,608**	
5.39	1590 KCM AAC Overhead Cable	2,000.00	Ft	$ 2	$ 2	$ 4	**$ 7,200**	
5.40	RELAY BUS DIFF 115 KV GE B30 SYS B	1.00	Ea	$ 12,000	$ 9,600	$ 21,600	**$ 21,600**	
5.41	RELAY BUS DIFF 115 KV SEL 487B SYS A	1.00	Ea	$ 7,000	$ 5,600	$ 12,600	**$ 12,600**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
5.42	RELAY SEL 421 LN DIST APP SYS A	4.00	Ea	$ 7,000	$ 5,600	$ 12,600	**$ 50,400**	
5.43	RELAY CAP BK/MFER/LN B 115 KV SYSA SEL451	7.00	Ea	$ 5,000	$ 4,000	$ 9,000	**$ 63,000**	
5.44	RELAY PRT MOD GE L90 W7K	4.00	Ea	$ 14,000	$ 11,200	$ 25,200	**$ 100,800**	
5.45	Protection & Control Panels	7.00	Ea	$ 5,000	$ 4,000	$ 9,000	**$ 63,000**	
5.46	Guard 800, RFL 9780, 9785	10.00	Ea	$ 10,000	$ 8,000	$ 18,000	**$ 180,000**	
5.47	125VDC Substation Battery Systems (230 kV)	2.00	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
5.48	115 kV, 3000A, 40ka Breakers, 3PH-GOP	2.00	Ea	$ 150,000	$ 50,000	$ 200,000	**$ 400,000**	
5.49	115 kV, 3000A, 3PH-GOP, 63 kA, motor-operated switches	5.00	Ea	$ 15,000	$ 12,000	$ 27,000	**$ 135,000**	
5.51	Station Class Surge Arresters - ratings: 96 kV/76 kV MVOC	6.00	Ea	$ 5,000	$ 700	$ 5,700	**$ 34,200**	
5.52	XLPE Cable 2000 KCM Supply and Installation	5,500.00	Ft	$ 15	$ 12	$ 26	**$ 143,550**	
5.53	4" AL T6-6061 IPS Bus bar	306.00	Ft	$ 4	$ 3	$ 6	**$ 1,928**	
5.54	1590 KCM AAC Overhead Cable	400.00	Ft	$ 2	$ 2	$ 4	**$ 1,440**	
5.55	RELAY CAP BK/MFER/LN B 115 KV SYSA SEL451	2.00	Ea	$ 5,000	$ 4,000	$ 9,000	**$ 18,000**	
5.56	Protection & Control Panels	1.00	Ea	$ 5,000	$ 4,000	$ 9,000	**$ 9,000**	
5.57	Miscellaneous Materials and Above / Below Ground Works	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
5.58	Control Cables	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
5.59	Conduit	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
5.60	Cable trenches	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
5.61	Bus works	1.00	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
5.62	Cable and Wire	1.00	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
5.63	New fence	3,040.00	LF		$ 200	$ 200	**$ 608,000**	Supply & Install
5.64	SCADA and Communications	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
5.65	Commissioning and Testing	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	Supply & Install
5.66	Low Voltage AC Distribution & DC Panels & Switches	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
5.67	Low Profile	402.00	Structure		$ 5,000	$ 5,000	**$ 2,010,000**	Supply & Install
5.68	Caisson Dead End	31.00	Structure		$ 50,000	$ 50,000	**$ 1,550,000**	Supply & Install
5.69	Circuit Breaker	16.00	Structure		$ 75,000	$ 75,000	**$ 1,200,000**	Supply & Install
5.70	Lightning Mast	17.00	Structure		$ 15,000	$ 15,000	**$ 255,000**	Supply & Install
5.71	Transformer with concrete moat and double steel grating.	2.00	Structure		$ 150,000	$ 150,000	**$ 300,000**	Supply & Install
5.72	Bus Support 1ph	77.00	Unit	$ 2,000	$ 1,000	$ 3,000	**$ 231,000**	
5.73	Bus Support 3ph	12.00	Unit	$ 4,500	$ 2,000	$ 6,500	**$ 78,000**	
5.74	Switch Stands	37.00	Unit	$ 8,000	$ 3,000	$ 11,000	**$ 407,000**	
5.75	Misc. Structures	1.00	Sum		$ 90,000	$ 90,000	**$ 90,000**	
5.76	Lightning Masts 70-ft	17.00	Unit	$ 10,000	$ 2,000	$ 12,000	**$ 204,000**	
5.77	A-frame Dead End	8.00	Unit	$ 20,000	$ 5,000	$ 25,000	**$ 200,000**	
5.78	H-frame Dead End	2.00	Unit	$ 30,000	$ 15,000	$ 45,000	**$ 90,000**	
5.79	UG Riser Structure 1ph (assume [2] fnds per ph.)	40.00	Unit	$ 15,000	$ 15,000	$ 30,000	**$ 1,200,000**	
5.80	Grounding	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
5. STOLLE ROAD SUBSTATION - TOTAL SUPPLY & INSTALL:							**$ 36,859,022**	
6. DYSINGER - STOLLE ROAD NEW 345kV TRANSMISSION LINE								
Description of Work: The construction of a new approximately 20 miles 345kV single circuit overhead transmission line originating at the new Dysinger Switching Station, and terminating at the existing NYSEG Stolle Road Substation.								
6	**New 345kV Transmission Line**							
6.1	Foundations for Tangents-Delta Configuration	143.00	Structure		$ 60,000	$ 60,000	**$ 8,580,000**	Supply & Install
6.2	Foundations for Slight-Angles-Vertical Configuration	3.00	Structure		$ 90,000	$ 90,000	**$ 270,000**	Supply & Install
6.3	Foundations for Heavy Angle-Vertical Configuration	1.00	Structure		$ 120,000	$ 120,000	**$ 120,000**	Supply & Install
6.4	Foundations Dead-Ends Vertical Configuration	12.00	Structure		$ 150,000	$ 150,000	**$ 1,800,000**	Supply & Install
6.5	Steel Poles 345kV Heavy Dead-End Structures	12.00	Structure	$ 125,000	$ 75,000	$ 200,000	**$ 2,400,000**	
6.6	Steel Poles 345kV Slight Angles Vertical Structures	3.00	Structure	$ 67,000	$ 40,000	$ 107,000	**$ 321,000**	
6.7	Steel Poles 345kV Angles >60 Structures	1.00	Structure	$ 93,500	$ 56,000	$ 149,500	**$ 149,500**	

SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

Revision: 4

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate	TOTAL	Remarks
6.8	Steel Poles 345kV Tangent-Delta Configuration Structures	143.00	Structure	$ 38,000	$ 23,000	$ 61,000	**$ 8,723,000**	
6.9	Conductoring double bundled 795 Drake ACSR	650,000.00	Ft	$ 2	$ 5	$ 7	**$ 4,355,000**	
6.10	Shield wiring of 7#9 Alumoweld (1)	111,000.00	Ft	$ 1	$ 5	$ 6	**$ 632,700**	
6.11	Wiring of 48 fibers OPGW (1)	111,000.00	Ft	$ 4	$ 5	$ 9	**$ 999,000**	
6.12	OPGW Splice Boxes	9.00	Ea	$ 1,500	$ 1,000	$ 2,500	**$ 22,500**	
6.13	OPGW Splice & Test	1.00	Sum		$ 10,800	$ 10,800	**$ 10,800**	Supply & Install
6.14	Insulators for suspension structures (ANSI 52-5 and 52-8)	1,933.00	Set	$ 850	$ 150	$ 1,000	**$ 1,933,000**	
6.15	V-strings Suspension and tension strings hardware, OPGW, vibration dampers and spacers	1.00	Lot	$ 1,000,000	$ 900,000	$ 1,900,000	**$ 1,900,000**	
6.16	Install grounding	159.00	Ea		$ 5,000	$ 5,000	**$ 795,000**	Supply & Install
6.17	Matting for wetland & sensitive areas	36,960.00	Ft		$ 70	$ 70	**$ 2,587,200**	Supply & Install
6.18	Work Pads	1,837,500.00	SQFT		$ 4	$ 4	**$ 6,468,000**	Supply & Install
6.19	Restoration of Work Pad Areas	183,750.00	SQFT		$ 0.2	$ 0.2	**$ 27,563**	Supply & Install
6.20	Access Roads	159.00	Structure		$ 10,000	$ 10,000	**$ 1,590,000**	Supply & Install
6.21	Clearing of virgin forest land	46.00	Acre		$ 15,000	$ 15,000	**$ 690,000**	Supply & Install
6.22	Clearing existing ROW for work spaces	46.00	Acre		$ 15,000	$ 15,000	**$ 690,000**	Supply & Install
6.23	Maintenance and Protection of Traffic on Public Roads	1.00	Sum		$ 800,000	$ 800,000	**$ 800,000**	Supply & Install
6.24	Culverts and Misc Access	1.00	Sum		$ 300,000	$ 300,000	**$ 300,000**	Supply & Install
6.25	Snow Removal	1.00	Sum		$ 700,000	$ 700,000	**$ 700,000**	Supply & Install
6. DYSINGER - STOLLE ROAD NEW 345kV TRANSMISSION LINE - TOTAL SUPPLY & INSTALL:							**$ 46,864,263**	
7. MOB/DEMOB, ACCESS, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS								
7	**Contractor Mobilization / Demobilization**							
7.1	Mob / Demob	1.00	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	
	Project Management, Material Handling & Amenities	1.00				$ -	**$ -**	
7.2	Project Management & Staffing (includes PM, Field Engineers / Supervision, Scheduler and Cost Manager, SHEQ Staff, Materials Management Staff)	22.00	Months		$ 350,000	$ 350,000	**$ 7,700,000**	
7.3	Site Accommodations, Storage, Amenities, Laydown Yards	1.00	Sum		$ 1,800,000	$ 1,800,000	**$ 1,800,000**	
	Engineering	-				$ -	**$ -**	
7.4	Design Engineering	1.00	Sum		$ 6,000,000	$ 6,000,000	**$ 6,000,000**	
7.5	LiDAR	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	
7.6	Geotech	1.00	Sum		$ 800,000	$ 800,000	**$ 800,000**	
7.7	Surveying/Staking	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	
	Testing & Commissioning	-				$ -	**$ -**	
7.8	Testing & Commissioning of T-Line and Equipment	1.00	Sum		$ 2,500,000	$ 2,500,000	**$ 2,500,000**	
	Permitting and Additional Costs	-				$ -	**$ -**	
7.9	Environmental Licensing & Permitting Costs	1.00	Sum		$ 2,366,540	$ 2,366,540	**$ 2,366,540**	
7.10	Environmental Mitigation	1.00	Sum		$ 6,312,700	$ 6,312,700	**$ 6,312,700**	
7.11	Warranties / LOC's	1.00	Sum		$ 693,715	$ 693,715	**$ 693,715**	
7.12	Real Estate Costs (New)	1.00	Sum		$ 497,876	$ 497,876	**$ 497,876**	
7.13	Real Estate Costs (Incumbent Utility ROW)	1.00	Sum		$ 1,613,000	$ 1,613,000	**$ 1,613,000**	
7.14	Legal Fees	1.00	Sum		$ 2,000,000	$ 2,000,000	**$ 2,000,000**	
7.15	Allowance for Funds Used During Construction (AFUDC)	1.00	Sum			$ -	**$ -**	
7.16	Carrying Charges	1.00	Sum			$ -	**$ -**	
7.17	Fees for permits, including roadway, railroad, building or other local permits	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
7.18	Sales Tax on Materials	1.00	Sum	$ 5,380,386		$ 5,380,386	**$ 5,380,386**	
7. MOB/DEMOB, ACCESS, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS - TOTAL SUPPLY & INSTALL:							**$ 40,364,217**	

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T013- NYPA and NYSEG

ENVIRONMENTAL LICENSING AND PERMITTING

Revision: 4

PROJECT TITLE WNY PROJECT EVALUATION- ENVIRONMENTAL LICENSING & PERMITTING COST ELEMENTS						ENVIRONMENTAL LICENSING & PERMITTING COST ESTIMATE RANGE FOR PROPOSED WNY TRANSMISSION PROJECT - T013	
FEDERAL						Proposal	
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans	Min.	Max.
USACE	Waters of the US under Section 404 of the Clean Water Act and Section 10 of the 1899 Rivers and Harbors Act (including regulated wetland areas)	Nationwide Permits (NWP) or Individual Permit (IP)	Any work within the boundaries of regulated wetlands (with the exception of isolated wetlands) or waterways to the spring high tide or ordinary high water mark	If project qualifies for a NWP (<0.5 acre disturbance and within NWP project type parameters), a pre-construction notification (PCN) is typically required. NWPs have a 45 day review period starting from when project logged in system (up to 6wk backlog delay in logging projects) If an IP is triggered, USACE will require Alternative Analysis and Public Notice/Hearing. IPs could also trigger restrictive environmental work windows. IPs have a 120 day review period starting from when permit is "deemed complete"	Wetland Delineation; Wetland Function & Value Assessment; Stream Delineation; Restoration Plan	$17,880	$124,400
USFWS	Endangered Species Act Section 7 (ESA) Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act	Consultation (Formal or Informal); Special Use Permit	Any work that may have an affect on listed species or their habitat; or projects within National Wildlife Refuges	USACE coordinates consultation with USFWS for ESA listed species during their permit review. Also includes the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act compliance. Season restrictions on construction could be imposed.	Rare, Threatened & Endangered Species Search; Preparation of Reports and Conservation Plans	$42,800	$124,000
FAA	Airports / Airspace	Federal Aviation Administration (FAA) Notification	New or Replacement Structures near Airports	Depending on construction locations, this permit may only be needed for OP work.	Obstruction Analysis, Mitigation Plan (assumes Engineering Cost)	$3,000	$9,000
STATE							
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans		
NYS Public Service Commission / Department of Public Service (NYSDPS)	Article VII	Article VII: Certificate of Environmental Compatibility and Public Need and Environmental Management & Construction Plan (EM&CP)	Article 7: Major electric transmission facilities with design capacity of 100kV or more extending for at least 10 miles or 125kV and over extending a distance of 1 mile or more (some exclusions for underground transmission applies)	Article VII will incorporate all of the required State and Local approvals (costed separately), as well as Engineering and Environmental Studies and Public Outreach. An Environmental Management & Construction Plan (EM&CP) must be prepared and approved by the PSC. (see 16 NYCRR Parts 85 through 88) Assumes Intervenor Fund amount of $100,000	Includes Reports and Plans required for State and Federal Agency Permits, as well as EM&CP, EMF, Noise, Air, Visual Impact Assessment, Invasive Species Control Plan, Mitigation Plans	$600,000	$3,100,000
NYSDEC	Article 15 Stream Disturbance; Article 24 Wetlands, Open Waters, Wetlands Buffers (100' for Freshwater Wetland)	Individual Permit (IP) (unless developer has General Permit (GP))	Any work within the boundaries of regulated waterways or wetlands, and wetland adjacent areas	Any disturbance within wetlands and/or below mean high tide will require an IP. Areas of temporary disturbance will likely require restoration, including a monitoring and maintenance period. Permanent disturbance will require offsite mitigation up to 3:1 area ratio; also includes a monitoring and maintenance period. GP may only be applicable if project ground disturbance is located outside of wetlands areas (above MHW).	Wetland Delineation; Wetland Restoration/Mitigation Plan	$12,000	$53,000

ENVIRONMENTAL LICENSING AND PERMITTING

NYSDEC	Stormwater (If >1 Acre Soil Disturbance)	SPDES General Permit for Stormwater Discharges from Construction Activities GP-0-15-002 & SWPPP	Project areas of soil disturbance	If project involves 1 acre or more soil disturbance, then the GP is required. If located within a Regulated MS4 Municipality, additional coordination may be needed. Weekly inspections by a Qualified Inspector during construction will be required.	SWPPP (assumes Engineering Cost includes Sediment & Erosion Control Plan, Hydraulic & Hydrology Studies, Stormwater Management Design)	$11,200	$38,000
NYSHPO	National Historic Preservation Act (NHPA) Section 106: State and Federal Historic Places; State Mapped Archeologically Sensitive Areas	Cultural Resource Information System (CRIS) Determination	Local, State, or Federal eligible or designated historic places and/or areas of archeological sensitivity (in off-road areas and areas that have not been previously disturbed)	NYSDEC EAF Online Mapper identifies State or National Register of Historic Places and archeological sensitive areas within or adjacent to the project site. Formally enter project information and supporting documents into SHPO's online CRIS program. Staff will review and email a determination of impacts letter	Phase 1A & 1B Archaeological Studies	$19,200	$67,000
NYS NHP	Threatened and Endangered Species	Consultation	Activities that may affect T&E species or their habitat.		See USFWS	$1,200	$6,400
NYSDOT/NYS Thruway Authority/FHWA	State Roadways	Highway Work Permit/Utility Permit, Vegetation Management Permit; Easement	Any work within or crossing State highway ROW	May require restoration landscaping coordination. Typically requires compliance with NEPA including SHPO and USFWS effects determination	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$17,000	$69,000
NYS Dept. of Agriculture and Markets	All agricultural lands (including Agricultural Districts)	Part of Article 7 & Article 10 Review process	Any work impacting agricultural land	Must minimize impacts and restore damage to agricultural land, and coordinate with County Soil & Water Conservation District; Vineyards are a major concern in WNYS. Pre-application conference with PSC, DEC and Ag& Markets recommended. Must develop EM&CP in conformance with Art. 7/10 Certificate Conditions. Agricultural Monitor must oversee construction & restoration; requisite 2-yrs post restoration monitoring.	Crop/Pasturing Mitigation Plan (not included in costing)	$11,000	$24,000
REGIONAL							
Railroads	Railroad crossings	Consultation-permits may be required; Easement	Access / new structures on RR property		Easement area survey (not included in costs)	$11,000	$76,000
LOCAL/MUNICIPAL							
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans		
County Dept. of Public Works	County Roadways	Lane Closure Permit, Highway Work or Access Permit	Work within county roadways and right-of-ways			$6,000	$40,000
Town, City or Village	Municipal Stormwater (MS4) Review	Approval of SWPPP or EM&CP	Project areas of soil disturbance		See NYSDEC SPDES	$6,000	$35,000

ENVIRONMENTAL LICENSING AND PERMITTING

Town, City or Village	Variable	Building Permits	New Structures	Individual Towns/Villages must be consulted on a project specific basis to determine notification and/or permitting procedures. Permit application names vary (e.g. road obstruction permit)		$18,000	$92,000
Town, City or Village	Municipal Roadways	Highway Work Permit; Road Opening Permit	Work within municipal roadways and right-of-ways			$6,000	$35,000
Town, City or Village	Wetlands	Wetland Permit / Conservation Approvals	Mapped wetlands and wetland adjacent areas (buffer width variable)		See USACE / NYSDEC Art. 24	$6,000	$52,000
						Minimum	**Maximum**
		ENVIRONMENTAL LICENSING & PERMITTING COST (EXCLUDING MITIGATION)			**PROJECT T013 TOTAL**	**$788,280**	**$3,944,800**
Excluded cost: Mitigation or restoration for impact to regulated wetlands; agricultural land and tree clearing					**Expected Value**	**$2,366,540**	

ENVIRONMENTAL MITIGATION ESTIMATE

	Offsite Wetland Mitigation*		Farmland**	
	Min.	Max.	Min.	Max.
Area	30 acres	30 acres	16.8 acres	33.7 acres
Cost/Acre	$60,000	$120,000	$503	$503
Ratio	1:1	3:1	1:1	1:1
Total	$1,800,000	$10,800,000	$8,450	$16,951

T013 MITIGATION TOTAL	**Minimum**	**Maximum**	**Expected Value**
	$1,808,450	**$10,816,951**	**$ 6,312,701**

*Offsite wetland mitigation area assumes clearing of NWI Forested/Shrub Wetland Approx. 3.24 miles (17107 lF) by 75' ROW width; Max. cost per acre assumes additional mitigation required for permanent impacts of proposed structures in non-forested wetlands; costing includes design and installation costs only; does not include land acquisition or long term monitoring

**Farmland mitigation based on corn bushel yield at 129 BU/Acre and $3.9/BU (production numbers from 2016 USDA NYS Agriculture Overview), area assumes 5.56 miles (29356.8 LF) Adjacent to Agricultural Land by 25' Wide (Min.) or 50' Wide (Max.); does not include land acquisition

REAL ESTATE ESTIMATE (NEW ROW)

Revision: 4

COUNTY: ERIE

DEVELOPER: NYPA/NYSEG (T013)

SEGMENT: DYSINGER - STOLLE SEGMENT

		Area (Acres)	Total Cost
	Sub Total	0.68	$ 4,376.00

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T013 - NYPA and NYSEG

Revision: 4

REAL ESTATE ESTIMATE
(INCUMBENT UTILITY ROW)

COUNTY: NIAGARA & ERIE
DEVELOPER: NORTH AMERICAN (T006)
SEGMENT: DYSINGER - STOLLE SEGMENT

	DEVELOPER	SEGMENT	COUNTY	INCUMBENT UTILITY (ROW) (ACRES)	TOTAL ROW COST
1	NYPA and NYSEG	Dysinger to Stolle - 20.6 miles	Niagara	5.97	$ 1,613,000
			Erie	318.64	

Revision: 4

REAL ESTATE ESTIMATE (SUBSTATIONS)

COUNTY:	NIAGARA
DEVELOPER:	NYPA/NYSEG (T013)
SEGMENT:	DYSINGER SUBSTATION

		Total Cost
	Total Cost of Proposed Substation Site	$493,500.00

ASSUMPTIONS AND CLARIFICATIONS

Revision: 4

a) Cost Estimate is based on 2017 rates.
schedule.
c) Stringing rates allow for protection over crossings (such as rider poles).
d) We have assumed a typical work week (6 x 10 hour days).
e) We have assumed that pole weights include anchor bolts.
f) The Developer has assumed gravel work pads. During our ROW visit it was determined that matted work pads are required.
g) Costs will vary for handling and disposal of contaminated spoils, depending on type of contaminants and availability / location of the appropriate tipping facility. Since there is not enough information to provide a quantified estimate for this item, allowance is included in the contingency monies.
h) Costs have been developed based on historical data from Projects of a similar nature (AACE Class 5 and 4 Estimating Practices). We have not engaged any subcontractors or material vendors for formal quotes but budgetary costs for transformers, phase shifting transformers and reactors were obtained from vendors.
i)Acquisition of land includes the new site for Dysinger Substation. Remiander of project utilizes existing ROW.
j)Assumes all environmental data and project details provided are accurate unless noted otherwise.
k)USFWS T&E Species- Assumes that ¼ of the total line in ROW per segments will require field survey for T&E (5 miles + 3miles)
l)NEPA-Assumes no NEPA because Art VII
m)SHPO-Assumes consultation and Phase 1A/1B archeological studies with field survey for 50% of project route (16 miles)
n)NYSDOT/FHWA-Assumes any required NEPA coordination/requirements are covered under Article VII
o)Assumes no coordination with National Parks Service or OPRHP/State Parks
p)Consultant delineated approximately 7 miles of wetland along the Dysinger to Stolle Road ROW. Minimum costs assume delineating 1.72 miles along the Stolle to Gardenville ROW at $4000/mile only. Maximum costs assume delineation will need to be repeated along both ROW's for a total of 8.72 miles at $7500/mile. Delineation costs included in USACE permitting not duplicated on NYSDEC. Assumes NYSDEC delineations overlap and are accounted for in USACE costing.
q)Offsite wetland mitigation area costs based on impacts anticipated by clearing of NWI Forested/Shrub Wetland of approximately 3.24 miles (calculated by GEI based on NWI mapper legend categories). Assumes clearing an additional 75 feet within Right of Way. Minimum costs at $60,000/acre, maximum costs at $120,000/acre for additional permanent impacts of proposed structures in non-forested wetlands. Costing includes design and installation costs only and does not include land acquisition or long term monitoring. Mitigation costs assume no offsite mitigation for Gardenville to Stolle.

ASSUMPTIONS AND CLARIFICATIONS

r)Agricultural mitigation assumes timber matting impacts and pad impacts on adjacent agriculture land total (5.56 miles) along the Dysinger to Stolle and Gardenville to Stolle routes requires crop damage payments. Payments based on USDA 2016 NYS Agriculture Overview corn yield and bushel price/acre. Minimum assumes 25-foot-wide impact, Maximum assumes 50-foot-wide impact.
s)Assumes Right of Way restoration is accounted for in construction costs
t)Mitigation costs for landscaping only (no paving, sidewalks, sound walls, etc.)
u)No tree survey or replanting required outside regulated wetlands areas
v)Assumes Article VII Intervenor Fund payment expected to be $100,000
w)Assume preliminary engineering and preparation of interconnection studies are complete.

INDEPENDENT ESTIMATES

ATTACHMENT B8

T014 – NEXTERA ENERGY

SUBSTATION ENGINEERING COMPANY
8/11/2017

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T014 - NextEra Energy

SECO SUBSTATION ENGINEERING COMPANY

SUMMARY OF COST ESTIMATE

		PROPOSAL (T014)	
		PREFERRED ROUTE	ALTERNATIVE ROUTE
	Description	Total Amount	Total Amount
1	CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION	$ 12,717,405	$ 13,571,466
2	TRANSMISSION LINE FOUNDATIONS	$ 3,200,398	$ 10,001,353
3	STRUCTURES - TRANSMISSION LINE	$ 4,688,312	$ 12,215,200
4	CONDUCTOR, SHIELDWIRE, OPGW	$ 6,137,208	$ 6,089,688
5	TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE	$ 1,382,170	$ 1,829,571
6	NEW DYSINGER SUBSTATION	$ 37,852,000	$ 37,852,000
7	EAST STOLLE RD SUBSTATION	$ 13,963,000	$ 13,963,000
8	MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS	$ 31,728,688	$ 43,673,566
	CONTRACTOR MARK-UP (OH&P) 15%	$ 16,750,377	$ 20,879,376
	SUBTOTAL:	$ 128,419,558	$ 160,075,219
	CONTINGENCY (20%)	$ 25,683,912	$ 32,015,044
	TOTAL (A):	**$ 154,103,470**	**$ 192,090,263**
9	SYSTEM UPGRADE FACILITIES	$ 19,705,790	$ 19,705,790
	CONTRACTOR MARKUP & CONTINGENCY (35%)	$ 6,897,027	$ 6,897,027
	TOTAL (B):	**$ 26,602,817**	**$ 26,602,817**
	TOTAL PROJECT COST (A+B):	**$ 180,706,286**	**$ 218,693,080**

COST ESTIMATE

(PREFERRED ROUTE)

Revision: 5

Description of Work: The Project consists of 2 new 345kV Switchyards (Dysinger and new East Stolle Road. TO14 includes the 345kV, 700MVA Phase Shifting Transformer at Dysinger Switchyard), the Scope of Work also includes approximately 20 miles of new 345kV Transmission Line, located in Erie County and Niagara County (Empire State Line). This estimate includes for the Developers Preferred Route which utilizes an existing utility ROW. Wood H-Frames will be used to minimize visual impact.

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
1. CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION								
1.1	Clearing the ROW (mowing & clearing)	139.0	Acre		$ 15,000	$ 15,000	**$ 2,085,000**	
1.2	Access Road	48,535.0	LF		$ 45	$ 45	**$ 2,184,075**	Assumes Type 1 Type Gravel Road
1.3	Silt Fence	48,535.0	LF		$ 4	$ 4	**$ 194,140**	
1.4	Matting	56,952.0	LF		$ 70	$ 70	**$ 3,986,640**	
1.5	Snow Removal	1.0	Sum		$ 320,000	$ 320,000	**$ 320,000**	
1.6	ROW Restoration	20.0	Mile		$ 10,000	$ 10,000	**$ 200,000**	
1.7	Work Pads	795,000.00	SF		$ 4	$ 4	**$ 2,798,400**	
1.8	Restoration for Work Pad areas	79,500.00	SF		$ 0.2	$ 0.2	**$ 11,925**	
1.9	Temporary Access Bridge	20.0	EA		$ 20,035	$ 20,035	**$ 400,700**	
1.10	Air Bridge	5.0	EA		$ 14,445	$ 14,445	**$ 72,225**	
1.11	Stabilized Construction Entrance	10.0	EA		$ 4,580	$ 4,580	**$ 45,800**	
1.12	Maintenance and Protection of Traffic on Public Roads	1.0	LS		$ 300,000	$ 300,000	**$ 300,000**	
1.13	Culverts / Misc. Access	1.0	LS		$ 100,000	$ 100,000	**$ 100,000**	
1.14	Concrete Washout Station	10.0	EA		$ 1,850	$ 1,850	**$ 18,500**	
TOTAL - CLEARING & ACCESS FOR TRANSMISSION LINE:							**$ 12,717,405**	
2. TRANSMISSION LINE FOUNDATIONS								
2.1	Direct Embed Foundation 3' x 11'	267.0	Ea		$ 9,680	$ 9,680	**$ 2,584,560**	Supply & Install
2.2	Direct Embed Foundation 3' x 12'	35.0	Ea		$ 10,648	$ 10,648	**$ 372,680**	Supply & Install
2.3	Direct Embed Foundation 3' x 13'	8.0	Ea		$ 11,713	$ 11,713	**$ 93,702**	Supply & Install
2.4	Direct Embed Foundation 3' x 14'	5.0	Ea		$ 12,884	$ 12,884	**$ 64,420**	Supply & Install
2.5	Direct Embed Foundation 3' x 15'	6.0	Ea		$ 14,172	$ 14,172	**$ 85,035**	Supply & Install
TOTAL - TRANSMISSION LINE FOUNDATIONS:							**$ 3,200,398**	
3. STRUCTURES - TRANSMISSION LINE								
3.1	Dead-End 3 Pole Wood Structure, H2 80ft	5	Ea	$ 6,000	$ 8,185	$ 14,185	**$ 70,927**	
3.2	Dead-End 3 Pole Wood Structure, H2 90ft	2	Ea	$ 7,200	$ 6,925	$ 14,125	**$ 28,250**	
3.3	Dead-End 3 Pole Wood Structure, H2 100ft	2	Ea	$ 8,640	$ 8,459	$ 17,099	**$ 34,198**	
3.4	Dead-End 3 Pole Wood Structure, H2 110ft	1	Ea	$ 10,368	$ 12,689	$ 23,057	**$ 23,057**	
3.5	Angle 3 Pole Wood Structure, H1-90ft	4	Ea	$ 6,480	$ 13,177	$ 19,657	**$ 78,628**	
3.6	Angle 3 Pole Wood Structure, H1-100ft	1	Ea	$ 7,776	$ 16,471	$ 24,247	**$ 24,247**	
3.7	Tangent H-Frame Wood Structure, H2 85'	1	Ea	$ 4,800	$ 15,373	$ 20,173	**$ 20,173**	
3.8	Tangent H-Frame Wood Structure, H2 90'	118	Ea	$ 5,760	$ 18,448	$ 24,208	**$ 2,856,506**	
3.9	Tangent H-Frame Wood Structure, H2 95'	11	Ea	$ 6,912	$ 22,137	$ 29,049	**$ 319,541**	
3.10	Tangent H-Frame Wood Structure, H2 100'	3	Ea	$ 8,294	$ 8,185	$ 16,480	**$ 49,439**	
3.11	Tangent H-Frame Wood Structure, H2 105'	1	Ea	$ 9,953	$ 6,925	$ 16,878	**$ 16,878**	
3.12	Tangent H-Frame Wood Structure, H2 115'	1	Ea	$ 11,944	$ 8,459	$ 20,403	**$ 20,403**	
3.13	Tangent H-Frame Wood Structure, H2 125'	3	Ea	$ 14,333	$ 12,689	$ 27,021	**$ 81,064**	
3.14	Install Grounding	153.0	Structure		$ 5,000	$ 5,000	**$ 765,000**	Supply & Install
3.15	Guy Wires and Anchors for DE / Angle Structures	15.0	Structure		$ 20,000	$ 20,000	**$ 300,000**	Supply & install
TOTAL - STRUCTURES TRANSMISSION LINE:							**$ 4,688,312**	

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
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COST ESTIMATE

(PREFERRED ROUTE)

Revision: 5

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
4. CONDUCTOR, SHIELDWIRE, OPGW								
4.1	(2)/Phase - 795kcmil 26/7 Stranded "Drake" ACSR	21	Circuit Mile	$ 53,856	$ 158,400	$ 212,256	**$ 4,457,376**	
4.2	(1) OPGW 48 Fiber	21	Mile	$ 22,176	$ 27,720	$ 49,896	**$ 1,047,816**	
4.3	(1) 3/8" HS Steel	21	Mile	$ 3,696	$ 26,400	$ 30,096	**$ 632,016**	
TOTAL: CONDUCTOR, SHIELDWIRE, OPGW:							**$ 6,137,208**	
5. TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE								
5.1	Tangent - Polymer V-String	414	Set	$ 900	$ 720	$ 1,620	**$ 670,680**	
5.2	Deadend / Angle Assemblies	96.0	Set	$ 1,500	$ 1,040	$ 2,540	**$ 243,840**	
5.3	OPGW Assembly - Tangent	138.0	Set	$ 200	$ 150	$ 350	**$ 48,300**	
5.4	OPGW Assembly - Angle / DE	34.0	Set	$ 250	$ 150	$ 400	**$ 13,600**	
5.5	OHSW Assembly - Tangent	138.0	Set	$ 200	$ 150	$ 350	**$ 48,300**	
5.5	OHSW Assembly - Angle / DE	34.0	Set	$ 250	$ 150	$ 400	**$ 13,600**	
5.8	OPGW Splice Boxes	9.0	Ea	$ 1,500	$ 1,000	$ 2,500	**$ 22,500**	
5.7	OPGW Splice & Test	1.0	Sum		$ 10,800	$ 10,800	**$ 10,800**	
5.8	Spacer Dampers	2,310.0	Ea	$ 50	$ 35	$ 85	**$ 196,350**	
5.9	Vibration Dampers - Conductor	1,850.0	Ea	$ 32	$ 20	$ 52	**$ 96,200**	
5.10	Shieldwire / OPGW Dampers, Misc Fittings	1.0	Sum	$ 10,000	$ 8,000	$ 18,000	**$ 18,000**	
TOTAL: TRANSMISSION LINE INSULA+52:63TORS, FITTINGS, HARDWARE:							**$ 1,382,170**	
6. NEW DYSINGER SWITCHYARD								
6.1	Site Works including sediment controls, access roads, rough grading, final	1.0	Sum		$ 1,650,000.00	$ 1,650,000	**$ 1,650,000**	Supply & Install
6.2	Substation Fence	2,840.0	LF		$ 200.00	$ 200	**$ 568,000**	Supply & Install
6.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
6.4	Switches 3ph	24.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 168,000**	
6.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
6.6	Line Switches 3 ph w/ motor-operators	7.0	Ea	$ 15,000	$ 15,000.00	$ 30,000	**$ 210,000**	
6.7	Instrument Transformers	1.0	Sum		$ 1,214,000	$ 1,214,000	**$ 1,214,000**	
6.8	Breakers	11.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 4,180,000**	
6.9	Arrestors (3 per line)	27.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 202,500**	
6.10	Line Traps	7.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 147,000**	
6.11	345 kV buses	2.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 120,000**	
6.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	
6.13	Low Profile Foundations	308.0	Ea		$ 5,000	$ 5,000	**$ 1,540,000**	Supply & Install
6.14	Caisson DE Foundations	52.0	Ea		$ 50,000	$ 50,000	**$ 2,600,000**	Supply & Install
6.15	Circuit Breaker Foundations	11.0	Ea		$ 75,000	$ 75,000	**$ 825,000**	Supply & Install
6.16	Lightning Mast Foundations	5.0	Ea		$ 15,000	$ 15,000	**$ 75,000**	Supply & Install
6.17	SST Foundation	1.0	Ea		$ 75,000.00	$ 75,000	**$ 75,000**	Supply & Install
6.18	Control House and Pad (30' x 90')	1.0	Ea	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	
6.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
6.20	Control Cables	1.0	Sum	$ 150,000	$ 150,000	$ 300,000	**$ 300,000**	
6.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
6.22	Station Services	2.0	Ea	$ -	$ 25,000	$ 25,000	**$ 50,000**	
6.23	Protection, Telecom and Metering Equipment (Panels)	40.0	Ea		$ 30,000	$ 30,000	**$ 1,200,000**	Supply & Install
6.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
6.25	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
6.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 357,500	$ 357,500	**$ 357,500**	Supply & Install
6.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 975,000	$ 975,000	**$ 975,000**	Supply & Install
6.28	Grounding	1.0	Sum		$ 275,000	$ 275,000	**$ 275,000**	Supply & Install
6.29	Bus Support 3 Ph	23.0	Ea	$ 4,500	$ 2,000	$ 6,500	**$ 149,500**	
6.30	Bus Support 1 Ph	42.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 126,000**	

COST ESTIMATE

(PREFERRED ROUTE)

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
6.31	Switch Stands	26.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 286,000**	
6.32	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
6.33	Misc. Structures	1.0	Sum		$ 74,000	$ 74,000	**$ 74,000**	
6.34	Substation A-Frame Structures Standalone	13.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 325,000**	
6.35	Lightning Masts	5.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 60,000**	
6.36	Arrestor Stands	21.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 73,500**	
6.37	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
6.38	Connection of Existing Lines to Dysinger Switchyard	1.0	Sum		$ 5,000,000	$ 5,000,000	**$ 5,000,000**	Supply & Install
6.39	345kV 700MVA Phase Shifting Transformer	1.0	Sum	$ 11,000,000	$ 500,000	$ 11,500,000	**$ 11,500,000**	
6.40	Transformer Foundation with concrete moat and double steel grating	1.0	Sum		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
TOTAL - DYSINGER SWITCHYARD:							**$ 37,852,000**	
7. EAST STOLLE RD SUBSTATION								
7.1	Site Works including sediment controls, access roads, rough grading, final	1.0	Sum		$ 1,000,000.00	$ 1,000,000	**$ 1,000,000**	Supply & Install
7.2	Substation Fence	1,900.0	LF		$ 200.00	$ 200	**$ 380,000**	Supply & Install
7.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
7.4	Switches 3ph	9.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 63,000**	
7.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
7.6	Line Switches 3 ph w/ motor-operators	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
7.7	Instrument Transformers	1.0	Sum		$ 752,000	$ 752,000	**$ 752,000**	
7.8	Breakers	4.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 1,520,000**	
7.9	Arrestors (3 per line) and shunt reactor	12.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 90,000**	
7.10	Line Traps	2.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 42,000.00**	
7.11	345 kV buses	1.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 60,000**	
7.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	
7.13	Low Profile Foundations	147.0	Ea		$ 5,000	$ 5,000	**$ 735,000**	Supply & Install
7.14	Caisson DE Foundations	20.0	Ea		$ 50,000	$ 50,000	**$ 1,000,000**	Supply & Install
7.15	Circuit Breaker Foundations	4.0	Ea		$ 75,000	$ 75,000	**$ 300,000**	Supply & Install
7.16	Lightning Mast Foundations	5.0	Ea		$ 15,000	$ 15,000	**$ 75,000**	Supply & Install
7.17	SST Foundation	1.0	Ea		$ 75,000.00	$ 75,000	**$ 75,000**	Supply & Install
7.18	Control House and Pad (25' x 50' - 1250 sq. ft)	1.0	Ea	$ 350,000	$ 100,000	$ 450,000	**$ 450,000**	
7.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
7.20	Control Cables	1.0	Sum	$ 130,000	$ 130,000	$ 260,000	**$ 260,000**	
7.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
7.22	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	
7.23	Protection, Telecom and Metering Equipment (Panels)	18.0	Ea		$ 30,000	$ 30,000	**$ 540,000**	Supply & Install
7.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
7.25	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
7.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 357,500	$ 357,500	**$ 357,500**	Supply & Install
7.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 975,000	$ 975,000	**$ 975,000**	Supply & Install
7.28	Grounding	1.0	Sum		$ 125,000	$ 125,000	**$ 125,000**	Supply & Install
7.29	Bus Support 3 Ph	9.0	Ea	$ 4,500	$ 2,000	$ 6,500	**$ 58,500**	
7.30	Bus Support 1 Ph	21.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 63,000**	
7.31	Switch Stands	13.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 143,000**	
7.32	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
7.33	Misc. Structures	1.0	Sum		$ 24,000	$ 24,000	**$ 24,000**	
7.34	Substation A-Frame Structures Standalone	5.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 125,000**	
7.35	Lightning Masts	5.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 60,000**	
7.36	Arrestor Stands	12.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 42,000**	

COST ESTIMATE

(PREFERRED ROUTE)

Revision: 5

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
7.37	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
7.38	345kV 30MVAR Shunt Reactor	1.0	Ea	$ 732,000	$ 100,000	$ 832,000	**$ 832,000**	
7.39	Transformer Foundation with concrete moat and double steel grating	1.0	Sum		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
7.40	Interconnection arrangement at Stolle Rd Substation	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
TOTAL - EAST STOLLE RD SUBSTATION:							**$ 13,963,000**	
8. MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS								
	Contractor Mobilization / Demobilization							
8.1	Mob / Demob	1.00	Sum		$ 800,000	$ 800,000	**$ 800,000**	
	Project Management, Material Handling & Amenities					$ -	**$ -**	
8.2	Project Management & Staffing (includes PM, Field Engineers / Supervision, Scheduler and Cost Manager, SHEQ Staff, Admin, Materials Management Staff)	14.00	Months		$ 220,000	$ 220,000	**$ 3,080,000**	
8.3	Site Accommodation, Facilities, Storage	1.00	Sum		$ 1,400,000	$ 1,400,000	**$ 1,400,000**	
	Engineering					$ -	**$ -**	
8.4	Design Engineering	1.00	Sum		$ 3,600,000	$ 3,600,000	**$ 3,600,000**	
8.5	LiDAR	1.00	Sum		$ 400,000	$ 400,000	**$ 400,000**	
8.6	Geotech	1.00	Sum		$ 600,000	$ 600,000	**$ 600,000**	
8.7	Surveying/Staking	1.00	Sum		$ 400,000	$ 400,000	**$ 400,000**	
	Testing & Commissioning							
8.8	Testing & Commissioning of TRANSMISSION LINE and Equipment	1.00	Sum		$ 1,600,000	$ 1,600,000	**$ 1,600,000**	
	Permitting and Additional Costs					$ -	**$ -**	
8.9	Environmental Licensing & Permitting Costs	1.00	Sum		$ 2,312,325	$ 2,312,325	**$ 2,312,325**	
8.10	Environmental Mitigation	1.00	Sum		$ 9,472,635	$ 9,472,635	**$ 9,472,635**	
8.11	Warranties / LOC's	1.00	Sum		$ 459,515	$ 459,515	**$ 459,515**	
8.12	Real Estate Costs (New ROW)	1.00	Sum		$ 391,346	$ 391,346	**$ 391,346**	
8.13	Real Estate Costs (Incumbent Utility ROW)	1.00	Sum		$ 1,793,000	$ 1,793,000	**$ 1,793,000**	
8.14	Legal Fees	1.00	Sum		$ 2,000,000	$ 2,000,000	**$ 2,000,000**	
8.15	Sales Tax on Materials	1.00	Sum	$ 3,219,867		$ 3,219,867	**$ 3,219,867**	
8.16	Fees for permits, including roadway, railroad, building or other local permits	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
8.17	Allowance for Funds Used During Construction (AFUDC)	1.00	Sum			$ -	**$ -**	
8.18	Carrying Charges	1.00	Sum			$ -	**$ -**	
TOTAL - MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:							**$ 31,728,688**	
9. SYSTEM UPGRADE FACILITIES								
SUF 1.1	Depew to Erie Street 115kV Transmission Line 921. Terminal allowance included. See comments.	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Relay was replaced and line ratings increased to 124/137/158 (NOR/LTE/STE) resulting ratings are below line conductor ratings. Scope is to remove all limitations on the circuit so it is limited by line conductor ratings 125/152/181 (NOR/LTE/STE).
SUF 1.2	Engineering, T&C, PM, Indirects for SUF 1.1 (15%)					$ -	**$ 75,000**	
SUF 2.1	Shawnee to Swann Reconductor	12.00	Mile		$ 400,000	$ 400,000	**$ 4,800,000**	Rate for reconductor is pro-rated from National Grid Niagara - Packard reconductor. Note that rate does not include upgrades to structures or foundations.
SUF 2.2	Engineering, T&C, PM, Indirects FOR SUF 2.2 (15%)					$ -	**$ 720,000**	

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COST ESTIMATE

(PREFERRED ROUTE)

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
SUF 3.1	Roll Rd to Stolle Rd 115kV Transmission Line 928. Terminal allowance included. See comments.	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Replace limiting terminal equipment at Stolle Rd 115 kV Substation.
SUF 3.2	Engineering, T&C, PM, Indirects for SUF 3.1 (15%)					$ -	**$ 75,000**	
SUF 4	**100MVAR Shunt Reactor at RG&E Sta 80**							
SUF 4.1	Site Works including sediment controls, access roads, rough grading, final	1.00	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	Supply & Install
SUF 4.2	Substation Fence	600.00	LF		$ 200	$ 200	**$ 120,000**	Supply & Install
SUF 4.3	Shunt Reactor 3ph 345kV 100MVAR	1.00	Ea	$ 1,500,000	$ 500,000	$ 2,000,000	**$ 2,000,000**	
SUF 4.4	Switches 3ph 345kV	1.00	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 30,000**	
SUF 4.5	CVT's 345kV	3.00	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 63,000**	
SUF 4.6	Breakers 345kV	1.00	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 380,000**	
SUF 4.7	Arrestors - 235kV	3.00	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 22,500**	
SUF 4.8	Low Profile Foundations	19.00	Ea		$ 5,000	$ 5,000	**$ 95,000**	Supply & Install
SUF 4.9	Circuit Breaker Foundations	1.00	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
SUF 4.10	Lightning Mast Foundations	2.00	Ea		$ 15,000	$ 15,000	**$ 30,000**	Supply & Install
SUF 4.11	Reactor Foundation with concrete moat and double steel grating	1.00	Ea		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
SUF 4.12	Control Cables	1.00	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
SUF 4.13	Protection & Telecom Equipment	3.00	Ea		$ 15,000	$ 15,000	**$ 45,000**	Supply & Install
SUF 4.14	SCADA and Communications	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
SUF 4.15	Low Voltage AC Distribution	1.0	Sum		$ 300,000	$ 300,000	**$ 300,000**	Supply & Install
SUF 4.16	Control Conduits	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
SUF 4.17	Cable Trench System for Control Conduits	1.0	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
SUF 4.18	Grounding	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
SUF 4.19	Bus Support 3ph	2.0	Ea	$ 3,000	$ 2,000	$ 5,000	**$ 10,000**	
SUF 4.20	Bus Support 1ph	3.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 9,000**	
SUF 4.21	Switch Stands	1.0	Ea	$ 1,500	$ 800	$ 2,300	**$ 2,300**	
SUF 4.22	Fuse Stand	1.0	Ea	$ 1,500	$ 800	$ 2,300	**$ 2,300**	
SUF 4.23	CVT Stand	3.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 10,500**	
SUF 4.24	Lightning Mast	2.0	Ea	$ 10,000	$ 5,000	$ 15,000	**$ 30,000**	
SUF 4.25	Misc Materials and Above / Below Ground Works	1.0	Ea		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	Supply & Install
SUF 4.26	**Engineering, T&C, PM, Indirects (15%)**					$ -	**$ 1,211,190**	
SUF 5	**SYSTEM UPGRADE FACILITIES CONTINGENCY (SEE ASSUMPTIONS & CLARIFICATIONS)**						**$ 3,750,000**	Contingency for possible additional SUF upgrades
TOTAL -SUF							**$ 19,705,790**	

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(ALTERNATE ROUTE)

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Description of Work: The Project consists of 2 new 345kV Switchyards (Dysinger and new East Stolle Road. TO14 includes the 345kV, 700MVA Phase Shifting Transformer at Dysinger Switchyard), the Scope of Work also includes approximately 22 miles of new 345kV Transmission Line, located in Erie County and Niagara County (Empire State Line). This estimate includes for the Developers Alternate Route which uses Steel Poles.

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
1. CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION								
1.1	Clearing the ROW (mowing & clearing)	118.0	Acre		$ 15,000	$ 15,000	**$ 1,770,000**	
1.2	Access Road	53,388.5	LF		$ 45	$ 45	**$ 2,402,483**	Assumes Type 1 Type Gravel Road
1.3	Silt Fence	53,388.5	LF		$ 4	$ 4	**$ 213,554**	
1.4	Matting	62,647.2	LF		$ 70	$ 70	**$ 4,385,304**	
1.5	Snow Removal	1.0	Sum		$ 320,000	$ 320,000	**$ 320,000**	
1.6	ROW Restoration	22.0	Mile		$ 10,000	$ 10,000	**$ 220,000**	
1.7	Work Pads	940,000.00	SF		$ 4	$ 4	**$ 3,308,800**	
1.8	Restoration for Work Pad areas	94,000.00	SF		$ 0.2	$ 0.2	**$ 14,100**	
1.9	Temporary Access Bridge	20.0	EA		$ 20,035	$ 20,035	**$ 400,700**	
1.10	Air Bridge	5.0	EA		$ 14,445	$ 14,445	**$ 72,225**	
1.11	Stabilized Construction Entrance	10.0	EA		$ 4,580	$ 4,580	**$ 45,800**	
1.12	Maintenance and Protection of Traffic on Public Roads	1.0	LS		$ 300,000	$ 300,000	**$ 300,000**	
1.13	Culverts / Misc. Access	1.0	LS		$ 100,000	$ 100,000	**$ 100,000**	
1.14	Concrete Washout Station	10.0	EA		$ 1,850	$ 1,850	**$ 18,500**	
TOTAL - CLEARING & ACCESS FOR TRANSMISSION LINE:							**$ 13,571,466**	
2. TRANSMISSION LINE FOUNDATIONS								
2.1	Direct Embed Foundation for Vertical Tangent Poles (5'x 20')	109.0	Ea		$ 18,000	$ 18,000	**$ 1,962,000**	Supply & Install
2.2	Direct Embed Foundation for Vertical Tangent Poles (5'x 20.5')	12.0	Ea		$ 18,900	$ 18,900	**$ 226,800**	Supply & Install
2.3	Direct Embed Foundation for Vertical Tangent Poles (5'x 21')	16.0	Ea		$ 20,790	$ 20,790	**$ 332,640**	Supply & Install
2.4	Direct Embed Foundation for Vertical Tangent Poles (5'x 21.5')	3.0	Ea		$ 22,869	$ 22,869	**$ 68,607**	Supply & Install
2.5	Direct Embed Foundation for Vertical Tangent Poles (5'x 23')	1.0	Ea		$ 25,156	$ 25,156	**$ 25,156**	Supply & Install
2.6	Caisson Foundation for Vertical Angle (9' x 20')	445.5	CUY		$ 1,500	$ 1,500	**$ 668,250**	
2.7	Caisson Foundation for Dead End (10' x 35')	3,978.6	CUY		$ 1,500	$ 1,500	**$ 5,967,900**	
2.8	Rock Adder	500.0	CUY		$ 1,500	$ 1,500	**$ 750,000**	
TOTAL - TRANSMISSION LINE FOUNDATIONS:							**$ 10,001,353**	
3. STRUCTURES - TRANSMISSION LINE								
3.1	Steel Vertical Tangent Monopole (130' including embedment)	109	Ea	$ 25,200	$ 15,120	$ 40,320	**$ 4,394,880**	
3.2	Steel Vertical Tangent Monopole (135' including embedment)	12	Ea	$ 27,900	$ 16,740	$ 44,640	**$ 535,680**	
3.3	Steel Vertical Tangent Monopole (141' including embedment)	16	Ea	$ 30,600	$ 18,360	$ 48,960	**$ 783,360**	
3.4	Steel Vertical Tangent Monopole (145' including embedment)	3	Ea	$ 34,200	$ 20,520	$ 54,720	**$ 164,160**	
3.5	Steel Vertical Tangent Monopole (162' including embedment)	1	Ea	$ 37,800	$ 22,680	$ 60,480	**$ 60,480**	
3.6	Steel Vertical Angle Monopole (131')	9	Ea	$ 66,600	$ 39,960	$ 106,560	**$ 959,040**	
3.7	Steel Vertical Deadend Monopole (105')	38	Ea	$ 72,000	$ 43,200	$ 115,200	**$ 4,377,600**	
3.8	Install Grounding	188	Ea		$ 5,000	$ 5,000	**$ 940,000**	Supply & Install
TOTAL - STRUCTURES TRANSMISSION LINE:							**$ 12,215,200**	
4. CONDUCTOR, SHIELDWIRE, OPGW								
4.1	(2)/Phase - 795kcmil 26/7 Stranded "Drake" ACSR	23	Circuit Mile	$ 53,856	$ 158,400	$ 212,256	**$ 4,881,888**	
4.2	(1) OPGW 48 Fiber	23	Mile	$ 22,176	$ 27,720	$ 49,896	**$ 1,147,608**	
4.3	(1) 3/8" HS Steel	2	Mile	$ 3,696	$ 26,400	$ 30,096	**$ 60,192**	
TOTAL: CONDUCTOR, SHIELDWIRE, OPGW:							**$ 6,089,688**	
5. TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE								
5.1	Tangent - Polymer V-String	450	Set	$ 900	$ 720	$ 1,620	**$ 729,000**	
5.2	Deadend / Angle Assemblies	234.0	Set	$ 1,500	$ 1,040	$ 2,540	**$ 594,360**	

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5.3	OPGW Assembly - Tangent	150.0	Set	$ 200	$ 150	$ 350	**$ 52,500**	
5.5	OPGW Assembly - Angle / DE	72.0	Set	$ 250	$ 150	$ 400	**$ 28,800**	
5.6	OHSW Assembly - Angle / DE	15.0	Set	$ 250	$ 150	$ 400	**$ 6,000**	
5.8	OPGW Splice Boxes	10.0	Ea	$ 1,500	$ 1,000	$ 2,500	**$ 25,000**	
5.9	OPGW Splice & Test	1.0	Sum		$ 12,000	$ 12,000	**$ 12,000**	
5.10	Spacer Dampers	2,835.0	Ea	$ 50	$ 35	$ 85	**$ 240,975**	
5.11	Vibration Dampers - Conductor	2,268.0	Ea	$ 32	$ 20	$ 52	**$ 117,936**	
5.12	Shield wire / OPGW Dampers, Misc Fittings	1.0	Sum	$ 15,000	$ 8,000	$ 23,000	**$ 23,000**	
TOTAL: TRANSMISSION LINE INSULATORS, FITTINGS, HARDWARE:							**$ 1,829,571**	
6. NEW DYSINGER SUBSTATION								
6.1	Site Works including sediment controls, access roads, rough grading, final grading and	1.0	Sum		$ 1,650,000.00	$ 1,650,000	**$ 1,650,000**	Supply & Install
6.2	Substation Fence	2,840.0	LF		$ 200.00	$ 200	**$ 568,000**	Supply & Install
6.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
6.4	Switches 3ph	24.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 168,000**	
6.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
6.6	Line Switches 3 ph w/ motor-operators	7.0	Ea	$ 15,000	$ 15,000.00	$ 30,000	**$ 210,000**	
6.7	Instrument Transformers	1.0	Sum		$ 1,214,000	$ 1,214,000	**$ 1,214,000**	
6.8	Breakers	11.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 4,180,000**	
6.9	Arrestors (3 per line)	27.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 202,500**	
6.10	Line Traps	7.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 147,000**	
6.11	345 kV buses	2.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 120,000**	
6.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	
6.13	Low Profile Foundations	308.0	Ea		$ 5,000	$ 5,000	**$ 1,540,000**	Supply & Install
6.14	Caisson DE Foundations	52.0	Ea		$ 50,000	$ 50,000	**$ 2,600,000**	Supply & Install
6.15	Circuit Breaker Foundations	11.0	Ea		$ 75,000	$ 75,000	**$ 825,000**	Supply & Install
6.16	Lightning Mast Foundations	5.0	Ea		$ 15,000	$ 15,000	**$ 75,000**	Supply & Install
6.17	SST Foundation	1.0	Ea		$ 75,000.00	$ 75,000	**$ 75,000**	Supply & Install
6.18	Control House and Pad (30' x 90')	1.0	Ea	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	
6.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
6.20	Control Cables	1.0	Sum	$ 150,000	$ 150,000	$ 300,000	**$ 300,000**	
6.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
6.22	Station Services	2.0	Ea	$ -	$ 25,000	$ 25,000	**$ 50,000**	
6.23	Protection, Telecom and Metering Equipment (Panels)	40.0	Ea		$ 30,000	$ 30,000	**$ 1,200,000**	Supply & Install
6.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
6.25	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
6.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 357,500	$ 357,500	**$ 357,500**	Supply & Install
6.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 975,000	$ 975,000	**$ 975,000**	Supply & Install
6.28	Grounding	1.0	Sum		$ 275,000	$ 275,000	**$ 275,000**	Supply & Install
6.29	Bus Support 3 Ph	23.0	Ea	$ 4,500	$ 2,000	$ 6,500	**$ 149,500**	
6.30	Bus Support 1 Ph	42.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 126,000**	
6.31	Switch Stands	26.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 286,000**	
6.32	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
6.33	Misc. Structures	1.0	Sum		$ 74,000	$ 74,000	**$ 74,000**	
6.34	Substation A-Frame Structures Standalone	13.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 325,000**	
6.35	Lightning Masts	5.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 60,000**	
6.36	Arrestor Stands	21.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 73,500**	
6.37	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
6.38	Connection of Existing Lines to Dysinger Switchyard	1.0	Sum		$ 5,000,000	$ 5,000,000	**$ 5,000,000**	Supply & Install
6.39	345kV 700MVA Phase Shifting Transformer	1.0	Sum	$ 11,000,000	$ 500,000	$ 11,500,000	**$ 11,500,000**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
6.40	Transformer Foundation with concrete moat and double steel grating	1.0	Sum		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
TOTAL - DYSINGER SWITCHYARD:							**$ 37,852,000**	
7. EAST STOLLE RD SUBSTATION								
7.1	Site Works including sediment controls, access roads, rough grading, final grading and	1.0	Sum		$ 1,000,000.00	$ 1,000,000	**$ 1,000,000**	Supply & Install
7.2	Substation Fence	1,900.0	LF		$ 200.00	$ 200	**$ 380,000**	Supply & Install
7.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
7.4	Switches 3ph	9.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 63,000**	
7.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
7.6	Line Switches 3 ph w/ motor-operators	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
7.7	Instrument Transformers	1.0	Sum		$ 752,000	$ 752,000	**$ 752,000**	
7.8	Breakers	4.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 1,520,000**	
7.9	Arrestors (3 per line) and shunt reactor	12.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 90,000**	
7.10	Line Traps	2.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 42,000**	
7.11	345 kV buses	1.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 60,000**	
7.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	
7.13	Low Profile Foundations	147.0	Ea		$ 5,000	$ 5,000	**$ 735,000**	Supply & Install
7.14	Caisson DE Foundations	20.0	Ea		$ 50,000	$ 50,000	**$ 1,000,000**	Supply & Install
7.15	Circuit Breaker Foundations	4.0	Ea		$ 75,000	$ 75,000	**$ 300,000**	Supply & Install
7.16	Lightning Mast Foundations	5.0	Ea		$ 15,000	$ 15,000	**$ 75,000**	Supply & Install
7.17	SST Foundation	1.0	Ea		$ 75,000.00	$ 75,000	**$ 75,000**	Supply & Install
7.18	Control House and Pad (25' x 50' - 1250 sq. ft)	1.0	Ea	$ 350,000	$ 100,000	$ 450,000	**$ 450,000**	
7.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
7.20	Control Cables	1.0	Sum	$ 130,000	$ 130,000	$ 260,000	**$ 260,000**	
7.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
7.22	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	
7.23	Protection, Telecom and Metering Equipment (Panels)	18.0	Ea		$ 30,000	$ 30,000	**$ 540,000**	Supply & Install
7.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
7.25	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
7.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 357,500	$ 357,500	**$ 357,500**	Supply & Install
7.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 975,000	$ 975,000	**$ 975,000**	Supply & Install
7.28	Grounding	1.0	Sum		$ 125,000	$ 125,000	**$ 125,000**	Supply & Install
7.29	Bus Support 3 Ph	9.0	Ea	$ 4,500	$ 2,000	$ 6,500	**$ 58,500**	
7.30	Bus Support 1 Ph	21.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 63,000**	
7.31	Switch Stands	13.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 143,000**	
7.32	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
7.33	Misc. Structures	1.0	Sum		$ 24,000	$ 24,000	**$ 24,000**	
7.34	Substation A-Frame Structures Standalone	5.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 125,000.00**	
7.35	Lightning Masts	5.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 60,000**	
7.36	Arrestor Stands	12.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 42,000**	
7.37	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
7.38	345kV 30MVAR Shunt Reactor	1.0	Ea	$ 732,000	$ 100,000	$ 832,000	**$ 832,000**	
7.39	Transformer Foundation with concrete moat and double steel grating	1.0	Sum		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
7.40	Interconnection arrangement at Stolle Rd Substation	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
TOTAL - EAST STOLLE RD SUBSTATION:							**$ 13,963,000**	
8. MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:								
	Contractor Mobilization / Demobilization							
8.1	Mob / Demob	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	
	Project Management, Material Handling & Amenities							

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8.2	Project Management & Staffing (includes PM, Field Engineers / Supervision, Scheduler and Cost Manager, SHEQ Staff, Admin, Materials Management Staff)	14.00	Months		$ 350,000	$ 350,000	**$ 4,900,000**	
8.3	Site Accommodation, Facilities, Storage	1.00	Sum		$ 1,400,000	$ 1,400,000	**$ 1,400,000**	
	Engineering							
8.4	Design Engineering	1.00	Sum		$ 4,770,000	$ 4,770,000	**$ 4,770,000**	
8.5	LiDAR	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	
8.6	Geotech	1.00	Sum		$ 1,100,000	$ 1,100,000	**$ 1,100,000**	
8.7	Surveying/Staking	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	
	Testing & Commissioning							
8.8	Testing & Commissioning of TRANSMISSION LINE and Equipment	1.00	Sum		$ 1,600,000	$ 1,600,000	**$ 1,600,000**	
	Permitting and Additional Costs					$ -	**$ -**	
8.9	Environmental Licensing & Permitting Costs	1.00	Sum		$ 3,477,113	$ 3,477,113	**$ 3,477,113**	
8.10	Environmental Mitigation	1.00	Sum		$ 8,002,635	$ 8,002,635	**$ 8,002,635**	
8.11	Warranties / LOC's	1.00	Sum		$ 575,441	$ 575,441	**$ 575,441**	
8.12	Real Estate Costs (New ROW)	1.00	Sum		$ 7,993,538	$ 7,993,538	**$ 7,993,538**	
8.13	Real Estate Costs (Incumbent Utility ROW)	1.00	Sum		$ 90,000	$ 90,000	**$ 90,000**	
8.14	Legal Fees	1.00	Sum		$ 3,500,000	$ 3,500,000	**$ 3,500,000**	
8.15	Sales Tax on Materials	1.00	Sum	$ 4,064,839		$ 4,064,839	**$ 4,064,839**	
8.16	Fees for permits, including roadway, railroad, building or other local permits	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
8.17	Allowance for Funds Used During Construction (AFUDC)	1.00	Sum			$ -	**$ -**	
8.18	Carrying Charges	1.00	Sum			$ -	**$ -**	
TOTAL - MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:							**$ 43,673,566**	
9. SYSTEM UPGRADE FACILITIES								
SUF 1.1	Depew to Erie Street 115kV Transmission Line 921. Terminal allowance included. See comments.	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Relay was replaced and line ratings increased to 124/137/158 (NOR/LTE/STE) resulting ratings are below line conductor ratings. Scope is to remove all limitations on the circuit so it is limited by lien conductor ratings 125/152/181 (NOR/LTE/STE).
SUF 1.2	Engineering, T&C, PM, Indirects for SUF 1.1 (15%)					$ -	**$ 75,000**	
SUF 2.1	Shawnee to Swann Reconductor	12.00	Mile		$ 400,000	$ 400,000	**$ 4,800,000**	Rate for reconductor is pro-rated from National Grid Niagara - Packard reconductor. Note that rate does not include upgrades to structures or foundations.
SUF 2.2	Engineering, T&C, PM, Indirects FOR SUF 2.2 (15%)					$ -	**$ 720,000**	
SUF 3.1	Roll Rd to Stolle Rd 115kV Transmission Line 928. Terminal allowance included. See comments.	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Replace limiting terminal equipment at both Stolle Rd 115 kV Substation and Roll Rd 115 kV Substation.
SUF 3.2	Engineering, T&C, PM, Indirects for SUF 3.1 (15%)					$ -	**$ 75,000**	
SUF 4	**100MVAR Shunt Reactor at RG&E Sta 80**							
SUF 4.1	Site Works including sediment controls, access roads, rough grading, final grading and stone placement - approx 1. acre	1.00	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	Supply & Install
SUF 4.2	Substation Fence	600.00	LF		$ 200	$ 200	**$ 120,000**	Supply & Install
SUF 4.3	Shunt Reactor 3ph 345kV 100MVAR	1.00	Ea	$ 1,500,000	$ 500,000	$ 2,000,000	**$ 2,000,000**	
SUF 4.4	Switches 3ph 345kV	1.00	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 30,000**	
SUF 4.5	CVT's 345kV	3.00	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 63,000**	
SUF 4.6	Breakers 345kV	1.00	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 380,000**	
SUF 4.7	Arrestors - 235kV	3.00	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 22,500**	
SUF 4.8	Low Profile Foundations	19.00	Ea		$ 5,000	$ 5,000	**$ 95,000**	Supply & Install

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
SUF 4.9	Circuit Breaker Foundations	1.00	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
SUF 4.10	Lightning Mast Foundations	2.00	Ea		$ 15,000	$ 15,000	**$ 30,000**	Supply & Install
SUF 4.11	Reactor Foundation with concrete moat and double steel grating	1.00	Ea		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
SUF 4.12	Control Cables	1.00	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
SUF 4.13	Protection & Telecom Equipment	3.00	Ea		$ 15,000	$ 15,000	**$ 45,000**	Supply & Install
SUF 4.14	SCADA and Communications	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
SUF 4.15	Low Voltage AC Distribution	1.0	Sum		$ 300,000	$ 300,000	**$ 300,000**	Supply & Install
SUF 4.16	Control Conduits	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
SUF 4.17	Cable Trench System for Control Conduits	1.0	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
SUF 4.18	Grounding	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
SUF 4.19	Bus Support 3ph	2.0	Ea	$ 3,000	$ 2,000	$ 5,000	**$ 10,000**	
SUF 4.20	Bus Support 1ph	3.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 9,000**	
SUF 4.21	Switch Stands	1.0	Ea	$ 1,500	$ 800	$ 2,300	**$ 2,300**	
SUF 4.22	Fuse Stand	1.0	Ea	$ 1,500	$ 800	$ 2,300	**$ 2,300**	
SUF 4.23	CVT Stand	3.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 10,500**	
SUF 4.24	Lightning Mast	2.0	Ea	$ 10,000	$ 5,000	$ 15,000	**$ 30,000**	
SUF 4.25	Misc Materials and Above / Below Ground Works	1.0	Ea		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	Supply & Install
SUF 4.26	**Engineering, T&C, PM, Indirects (15%)**					$ -	**$ 1,211,190**	
SUF 5	**SYSTEM UPGRADE FACILITIES CONTINGENCY (SEE ASSUMPTIONS & CLARIFICATIONS)**						**$ 3,750,000**	Contingency for possible additional SUF upgrades
TOTAL -SUF							**$ 19,705,790**	

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T014 - NextEra Energy

ENVIRONMENTAL LICENSING AND PERMITTING

Revision: 5

PROJECT TITLE WNY PROJECT EVALUATION- ENVIRONMENTAL LICENSING & PERMITTING COST ELEMENTS						ENVIRONMENTAL LICENSING & PERMITTING COST ESTIMATE RANGE FOR PROPOSED WNY TRANSMISSION PROJECT - T014			
FEDERAL						**Preferred Route**		**Alternative Route**	
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans	Min.	Max.	Min.	Max.
USACE	Waters of the US under Section 404 of the Clean Water Act and Section 10 of the 1899 Rivers and Harbors Act (including regulated wetland areas)	Nationwide Permits (NWP) or Individual Permit (IP)	Any work within the boundaries of regulated wetlands (with the exception of isolated wetlands) or waterways to the spring high tide or ordinary high water mark	If project qualifies for a NWP (<0.5 acre disturbance and within NWP project type parameters), a pre-construction notification (PCN) is typically required. NWPs have a 45 day review period starting from when project logged in system (up to 6wk backlog delay in logging projects) If an IP is triggered, USACE will require Alternative Analysis and Public Notice/Hearing. IPs could also trigger restrictive environmental work windows. IPs have a 120 day review period starting from when permit is "deemed complete"	Wetland Delineation; Wetland Function & Value Assessment; Stream Delineation; Restoration Plan	$26,600	$88,250	$26,600	$88,250
National Park Service	National Parks	Consultation; Special Use Permit	Only applies if National Park located in project area.	Depending on impact of project request for a special use permit may require a NEPA environmental assessment.					
USFWS	Endangered Species Act Section 7 (ESA) Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act	Consultation (Formal or Informal); Special Use Permit	Any work that may have an affect on listed species or their habitat; or projects within National Wildlife Refuges	USACE coordinates consultation with USFWS for ESA listed species during their permit review. Also includes the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act compliance. Season restrictions on construction could be imposed.	Rare, Threatened & Endangered Species Search; Preparation of Reports and Conservation Plans	$27,800	$94,000	$30,300	$99,000
NEPA	National Environmental Policy Act	Categorical Exclusion; EA Finding of No Impact; or EIS Record of Decision	With some exemptions, projects on federally owned lands and/or projects requiring federal permit approvals	Possible NEPA review due if federal agency coordination is required. Federal agency involved to determine if Categorical Exclusion applies. Assumes Article 7 covers NEPA requirements or if an EIS is required it is prepared under SEQRA Task.					
FAA	Airports / Airspace	Federal Aviation Administration (FAA) Notification	New or Replacement Structures near Airports	Depending on construction locations, this permit may only be needed for OP work.	Obstruction Analysis, Mitigation Plan (assumes Engineering Cost)				
STATE									
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans				
NYS Public Service Commission / Department of Public Service (NYSDPS)	Article VII	Article VII: Certificate of Environmental Compatibility and Public Need and Environmental Management & Construction Plan (EM&CP)	Article 7: Major electric transmission facilities with design capacity of 100kV or more extending for at least 10 miles or 125kV and over extending a distance of 1 mile or more (some exclusions for underground transmission applies)	Article 7 will incorporate all of the required State and Local approvals (costed separately), as well as Engineering and Environmental Studies and Public Outreach. Article VII Intervenor Fund payment expected to be $100,000. An Environmental Management & Construction Plan (EM&CP) must be prepared and approved by the PSC. (see 16 NYCRR Parts 85 through 88)	Includes Reports and Plans required for State and Federal Agency Permits, as well as EM&CP, EMF, Noise, Air, Visual Impact Assessment, Invasive Species Control Plan, Mitigation Plans	$600,000	$3,100,000	$600,000	$3,100,000

ENVIRONMENTAL LICENSING AND PERMITTING

NYS Public Service Commission / Department of Public Service (NYSDPS)	Part 102		Construction of a utility overhead transmission facility that will convey electric energy at 65kV or higher for a distance of one mile or longer and are not subject to Article VII of the Public Service Law.	May include coordination or studies completed under other line items including: Visual assessment, SHPO determination, OPRHP consultation, Ecological Impacts Assessment	Advantage-Disadvantage Analysis				
NYSDEC	Article 15 Stream Disturbance; Article 24 Wetlands, Open Waters, Wetlands Buffers (100' for Freshwater Wetland)	Individual Permit (IP) (unless developer has General Permit (GP))	Any work within the boundaries of regulated waterways or wetlands, and wetland adjacent areas	Any disturbance within wetlands and/or below mean high tide will require an IP. Areas of temporary disturbance will likely require restoration, including a monitoring and maintenance period. Permanent disturbance will require offsite mitigation up to 3:1 area ratio; also includes a monitoring and maintenance period. GP may only be applicable if project ground disturbance is located outside of wetlands areas (above MHW).	Wetland Delineation; Wetland Restoration/Mitigation Plan	$12,000	$53,000	$12,000	$53,000
NYSDEC	Stormwater (If >1 Acre Soil Disturbance)	SPDES General Permit for Stormwater Discharges from Construction Activities GP-0-15-002 & SWPPP	Project areas of soil disturbance	If project involves 1 acre or more soil disturbance, then the GP is required. If located within a Regulated MS4 Municipality, additional coordination may be needed. Weekly inspections by a Qualified Inspector during construction will be required.	SWPPP (assumes Engineering Cost includes Sediment & Erosion Control Plan, Hydraulic & Hydrology Studies, Stormwater Management Design)	$11,200	$38,000	$11,200	$38,000
Any State or local government agency that issues permits or approvals	State Environmental Quality Review Act (SEQRA)	Environmental Assessment (EA) Determination of Significance	Projects not covered as a Type II Action (Note a project can not be segmented - all phases/tasks must be considered in the review)	Most projects or activities proposed by a state agency, and all discretionary approvals (permits) from a NYS agency or local government, require an environmental impact assessment. SEQR requires the sponsoring or approving governmental body to identify and mitigate the significant environmental impacts of the activity it is proposing or permitting.					
NYSDOS	State Coastal Management Program Mapped Coastal Area Boundary	Coastal Consistency Concurrence	Projects within the NYSDOS designated Coastal Zone; and consistency with Local Waterfront Revitalization Plans (LWRPs); e.g., Town of Grand Island LWRP	Online mapping available to check if within coastal zone, a significant coastal fish & wildlife habitat (SCFWH), a local waterfront revitalization program area (LWRP), or a comprehensive management program areas (CMP)					
NYSHPO	National Historic Preservation Act (NHPA) Section 106: State and Federal Historic Places; State Mapped Archeologically Sensitive Areas	Cultural Resource Information System (CRIS) Determination	Local, State, or Federal eligible or designated historic places and/or areas of archeological sensitivity (in off-road areas and areas that have not been previously disturbed)	NYSDEC EAF Online Mapper identifies State or National Register of Historic Places and archeological sensitive areas within or adjacent to the project site. Formally enter project information and supporting documents into SHPO's online CRIS program. Staff will review and email a determination of impacts letter	Phase 1A & 1B Archaeological Studies	$13,200	$49,000	$14,200	$52,000
NYS NHP	Threatened and Endangered Species	Consultation	Activities that may affect T&E species or their habitat.		See USFWS	$1,200	$6,400	$1,200	$6,400

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ENVIRONMENTAL LICENSING AND PERMITTING

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NYSDOT/NYS Thruway Authority/FHWA	State Roadways	Highway Work Permit/Utility Permit, Vegetation Management Permit; Easement	Any work within or crossing State highway ROW	May require restoration landscaping coordination. Typically requires compliance with NEPA including SHPO and USFWS effects determination	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$17,000	$69,000	$17,000	$69,000
NYS Canal Corporation	Erie Canal - jurisdiction varies along edge	Canal Occupancy & Work Permit (TA-W99072)	Any work involving the Erie Canal	Must coordinate with Division Permit Engineer about particular section of canal being affected. Commercial permit fee = $25 plus $2,000,000 additional General Aggregate Liability Insurance	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)				
NYS Dept. of Agriculture and Markets	All agricultural lands (including Agricultural Districts)	Part of Article 7 & Article 10 Review process	Any work impacting agricultural land	Must minimize impacts and restore damage to agricultural land, and coordinate with County Soil & Water Conservation District; Vineyards are a major concern in WNYS. Pre-application conference with PSC, DEC and Ag& Markets recommended. Must develop EM&CP in conformance with Art. 7/10 Certificate Conditions. Agricultural Monitor must oversee construction & restoration; requisite 2-yrs post restoration monitoring.	Crop/Pasturing Mitigation Plan (not included in costing)	$11,000	$24,000	$11,000	$24,000
REGIONAL									
Railroads	Railroad crossings	Consultation-permits may be required; Easement	Access / new structures on RR property		Easement area survey (not included in costs)	$11,000	$76,000	$11,000	$76,000
LOCAL/MUNICIPAL									
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans				
County Dept. of Public Works	County Roadways	Lane Closure Permit, Highway Work or Access Permit	Work within county roadways and right-of-ways			$6,000	$40,000	$6,000	$40,000
Town, City or Village	Municipal Stormwater (MS4) Review	Approval of SWPPP or EM&CP	Project areas of soil disturbance		See NYSDEC SPDES	$6,000	$35,000	$6,000	$35,000
Town, City or Village	Variable	Building Permits	New Structures	Individual Towns/Villages must be consulted on a project specific basis to determine notification and/or permitting procedures. Permit application names vary (e.g. road obstruction permit)		$18,000	$92,000	$18,000	$92,000
Town, City or Village	Municipal Roadways	Highway Work Permit; Road Opening Permit	Work within municipal roadways and right-of-ways			$6,000	$35,000	$6,000	$35,000
Town, City or Village	Wetlands	Wetland Permit / Conservation Approvals	Mapped wetlands and wetland adjacent areas (buffer width variable)		See USACE / NYSDEC Art. 24	$6,000	$52,000	$6,000	$52,000

		Minimum	Maximum	Minimum	Maximum
ENVIRONMENTAL LICENSING & PERMITTING COST (EXCLUDING MITIGATION)	**PROJECT T014 TOTAL**	**$773,000**	**$3,851,650**	**$776,500**	**$3,859,650**
	Expected Value	**$2,312,325**		**$3,477,112.50**	

Excluded cost: Mitigation or restoration for impact to regulated wetlands; agricultural land and tree clearing

Client: NYISO
Project: Western Transmission Project Evaluation
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ENVIRONMENTAL MITIGATION ESTIMATE

Revision: 5

WNY TRANSMISSION PROJECT - ENVIRONMENTAL MITIGATION COST ESTIMATE FOR T014

	Offsite Wetland Mitigation*				Farmland**	
	Preferred Route		Alternative Rotue		Preferred & Alternative Routes	
	Min.	Max.	Min.	Max.	Min.	Max.
Area	45 acres	45 acres	38 acres	38 acres	30 acres	60 acres
Cost/Acre	$60,000	$120,000	$60,000	$120,000	$503	$503
Ratio	1:1	3:1	1:1	3:1	1:1	1:1
Total	$ 2,700,000	$16,200,000	$2,280,000	$13,680,000	$15,090	$30,180

T014 PREFERRED ROUTE MITIGATION TOTAL	Minimum	Maximum	Expected Value
	$2,715,090	**$16,230,180**	**$ 9,472,635**

T014 ALTERNATIVE ROUTE MITIGATION TOTAL	Minimum	Maximum	Expected Value
	$2,295,090	**$13,710,180**	**$ 8,002,635**

*Offsite wetland mitigation area assumes clearing of NWI Forested/Shrub Wetland approx. 3.24 miles (17107 LF) by 115' ROW width for the Preferred Route and approx. 3.47 (18322 LF) by 90' ROW width for the Alternative Route; Max. cost per acre assumes additional mitigation required for permanent impacts of proposed structures in non-forested wetlands; costing includes design and installation costs only; does not include land acquisition or long term monitoring

**Farmland mitigation based on corn bushel yield at 129 BU/Acre and $3.9/BU (production numbers from 2016 USDA NYS Agriculture Overview), area assumes 9.8 miles (51744 LF) Land Adjacent to Agriculture District/Crop Land by 25' Wide (Min.) or 50' Wide (Max.); does not include land acquisition

Revision: 5

REAL ESTATE ESTIMATE
(NEW ROW)

COUNTY: ERIE
DEVELOPER: NEXTERA (T014 & T015 PREFERRED)
SEGMENT: DYSINGER - STOLLE SEGMENT

		Area (Acres)	Total Cost
	Total	0.68	$ 4,376.00

Revision: 5

REAL ESTATE ESTIMATE
(INCUMBENT UTILITY ROW)

COUNTY: NIAGARA & ERIE
DEVELOPER: NEXTERA (T014 & T015 PREFERRED)
SEGMENT: DYSINGER - STOLLE SEGMENT

	DEVELOPER	SEGMENT	COUNTY	INCUMBENT UTILITY (ROW) (ACRES)	TOTAL ROW COST
1	NEXTERA ENERGY	Dysinger SS to Stolle Rd SS - 19.93 miles	Niagara	4.59	$ 1,793,000
			Erie	355.48	

Revision: 5

REAL ESTATE ESTIMATE
(NEW ROW - 80FT. CORRIDOR)

COUNTY: NIAGARA & ERIE
DEVELOPER: NEXTERA (T014 & T015 ALTERNATIVE)
SEGMENT: DYSINGER TO STOLLE ROAD SEGMENT

	Address	Area (Acres)	Total Cost
A	**NIAGARA COUNTY**		
	Sub Total (A)	5.30	$ 124,550.00
B	**ERIE COUNTY**		
	Sub Total (B)	191.75	$ 5,572,547.00
	Total (A + B)	197.05	$ 5,697,097.00

Revision: 5

REAL ESTATE ESTIMATE
(NEW ROW - 10FT. ADDITIONAL CORRIDOR)

COUNTY:	NIAGARA & ERIE
DEVELOPER:	NEXTERA (T014 & T015 ALTERNATIVE)
SEGMENT:	DYSINGER TO STOLLE ROAD SEGMENT

	Address	Area (Acres)	Total Cost
A	**NIAGARA COUNTY**		
	Sub Total (A)	0.59	$ 13,865.00
B	**ERIE COUNTY**		
	Sub Total (B)	26.28	$ 858,481.50
	Total (A + B)	26.87	$ 872,346.50

Revision: 5

REAL ESTATE ESTIMATE
(INCUMBENT UTILITY ROW)

COUNTY: NIAGARA & ERIE
DEVELOPER: NEXTERA (T014 & T015 ALTERNATIVE)
SEGMENT: DYSINGER - STOLLE SEGMENT

	DEVELOPER	SEGMENT	COUNTY	INCUMBENT UTILITY (ROW) (ACRES)	TOTAL ROW COST
1	NEXTERA ENERGY (Alternative)	Dysinger SS to Stolle Rd SS - 21.66 miles	Niagara	1.20	$ 90,000
			Erie	17.16	

REAL ESTATE ESTIMATE (HOUSES)

Revision: 5

COUNTY: ERIE

DEVELOPER: NEXTERA (T014 & T015 ALTERNATIVE)

SEGMENT: DYSINGER - STOLLE SEGMENT

		Total Valuation of Property with 3% Escalation/year (as of 2017)
	Total Valuation Cost	$ 1,037,124.17

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T014 - NextEra Energy

REAL ESTATE ESTIMATE

Revision: 5

COUNTY:	NIAGARA
DEVELOPER:	NEXTERA
SEGMENT:	DYSINGER SUBSTATION

		Total Cost
	Total Cost of Proposed Substation Site	$ 251,450.00

REAL ESTATE ESTIMATE

Revision: 5

COUNTY:	ERIE
DEVELOPER:	NEXTERA
SEGMENT:	STOLLE ROAD SUBSTATION

		Total Cost
	Total Cost of Proposed Substation Site	$ 135,520.00

Revision: 5

ASSUMPTIONS AND CLARIFICATIONS

a) Cost Estimate is based on 2017 rates.
b) Construction Schedule is in accordance with the Developers proposed schedule (6 months for construction - seems light) - we have assumed continuous working with no breaks in the schedule. Six months added for start up and close out works and assisting in pre-construction activities (i.e. permitting activates, material procurement etc.)
c) Stringing rates allow for protection over crossings (such as rider poles).
d) We have assumed a typical work week (6 x 10 hour days).
e) Wood Pole types are based on Plan and Profile drawings. Direct embed foundations are assumed to be 10% plus 2 ft and rates include backfill. Steel Pole weights and foundation types are estimated based on benchmark data.
f) We have assumed that the Access Road upgrades include gravel updates only.
g) Costs will vary for handling and disposal of contaminated spoils, depending on type of contaminants and availability / location of the appropriate tipping facility. Since there is not enough information to provide a quantified estimate for this item, allowance is included in the contingency monies.
h) Costs have been developed based on historical data from Projects of a similar nature (AACE Class 5 and 4 Estimating Practices). We have not engaged any subcontractors or material vendors for formal quotes.
i) The equipment types listed for Dysinger and East Stolle Rd Substation have been taken from a recently completed 345kV substation project, using current pricing.
j) Estimated quantities have been used for items in red text in Section 1 of the Estimate (CLEARING & ACCESS FOR T-LINE CONSTRUCTION). These items were not quantified in the Developers Estimate, however we believe that they are necessary for the works.
k) A Contractor Mark-Up (OH&P) of 15% has been included in the Total section
l) Assumes all environmental data and project details provided are accurate unless noted otherwise.
m) USFWS T&E assumes ¼ of the total Preferred Route will require field survey for T&E (5 miles).
n)USFWS T&E assumes ¼ of the total Alternative Route will require field survey for T&E (5. 5 miles).
o) NEPA-Assumes no NEPA because Art VII.
p) SHPO-Assumes consultation and Phase 1A/1B archeological studies with field survey for 50% of Preferred Route (10 miles) and Alternative Route (11 miles).
q) NYSDOT/FHWA-Assumes any required NEPA coordination/requirements are covered under Article VII.
r) Assumes no coordination with National Parks Service or OPRHP/State Parks.
s) USACE wetland delineation total for Preferred and Alternative Routes is based on combined NYSDEC/USACE wetland length of 3.9 miles from information in Proposal Attachment C.
t) NYSDEC delineations overlap and are accounted for in USACE costing.

ASSUMPTIONS AND CLARIFICATIONS

u) Offsite wetland mitigation area costs for the Preferred Route based on impacts anticipated by clearing of NWI Forested/Shrub Wetland of approximately 3.24 miles (calculated by GEI based on NWI mapper legend categories). Assumes clearing an additional 115 feet within Right of Way. Minimum costs $60,000/acre at 1:1 ratio, maximum costs at $120,000/acre at 3:1 ratio for additional permanent impacts of proposed structures in non-forested wetlands. Costing includes design and installation costs only and does not include land acquisition or long term monitoring.
v) Offsite wetland mitigation area costs for the Alternative Route based on impacts anticipated by clearing of NWI Forested/Shrub Wetland of approximately 3.47 calculated by GEI based on NWI mapper legend categories). Assumes clearing 90 wide feet within Right of Way. Minimum costs at $60,000/acre at 1:1 ratio, maximum costs at $120,000/acre at 3:1 ratio for additional permanent impacts of proposed structures in non-forested wetlands. Costing includes design and installation costs only and does not include land acquisition or long term monitoring.
w) Agricultural mitigation for Preferred and Alternative Routes assumes timber matting impacts and pad impacts on adjacent agriculture land (9.8 miles) requires crop damage payments based on USDA 2016 NYS Agriculture Overview corn yield and bushel price/acre. Minimum assumes 25-foot-wide impact, Maximum assumes 50-foot-wide impact.
x) Assumes Right of Way restoration is accounted for in construction costs.
y) Mitigation costs for landscaping only (no paving, sidewalks, sound walls, etc.).
z) No tree survey or replanting required outside regulated wetlands areas.
aa) Article VII Intervenor Fund payment expected to be $100,000.
ab) Expected value of Alt. Route is estimated to be 50% higher than the mean of the range of environmental licensing and permitting costs due to new ROW.
ac) SUF pricing is included at the end of the estimate workbook (costs excluded from main estimate).
ad) SUF pricing includes 35% to cover Contractor markup (15%) and contingency (20%)
ae) Reconductor pricing (SUF 2 - Shaw to Swan Reconductor) is based on Niagara-Packard (National Grid) reconductor estimate, pro-rated to a rate / mile. Note that this is based on conductor, shieldwire and hardware pricing only and does not include structure or foundation works.
af) System Upgrade Facilities Contingency is allowance for potential additional system upgrades including overdutied breakers, protection changes, unidentified thermal issues, etc that may be identified as detailed studies are completed.

INDEPENDENT ESTIMATES

ATTACHMENT B9

T015 – NEXTERA ENERGY

SUBSTATION ENGINEERING COMPANY
8/11/2017

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T015 - NextEra Energy

SECO SUBSTATION ENGINEERING COMPANY

SUMMARY OF COST ESTIMATE

		PROPOSAL (T015)	
		PREFERRED ROUTE	ALTERNATIVE ROUTE
	Description	Total Amount	Total Amount
1	CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION	$ 12,717,405	$ 13,571,466
2	TRANSMISSION LINE FOUNDATIONS	$ 3,200,398	$ 10,001,353
3	STRUCTURES - TRANSMISSION LINE	$ 4,688,312	$ 12,215,200
4	CONDUCTOR, SHIELDWIRE, OPGW	$ 6,137,208	$ 6,089,688
5	TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE	$ 1,382,170	$ 1,829,571
6	NEW DYSINGER SUBSTATION	$ 25,374,000	$ 25,374,000
7	EAST STOLLE RD SUBSTATION	$ 13,963,000	$ 13,963,000
8	MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS	$ 28,687,203	$ 40,632,082
	CONTRACTOR MARK-UP (OH&P) 15%	$ 14,422,454	$ 18,551,454
	SUBTOTAL:	$ 110,572,150	$ 142,227,813
	CONTINGENCY (20%)	$ 22,114,430	$ 28,445,563
	TOTAL (A):	**$ 132,686,580**	**$ 170,673,375**
9	SYSTEM UPGRADE FACILITIES	$ 19,705,790	$ 19,705,790
	CONTRACTOR MARKUP & CONTINGENCY (35%)	$ 6,897,027	$ 6,897,027
	TOTAL (B):	**$ 26,602,817**	**$ 26,602,817**
	TOTAL PROJECT COST (A+B):	**$ 159,289,397**	**$ 197,276,192**

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T015 - NextEra Energy

COST ESTIMATE

(PREFERRED ROUTE)

Revision: 5

Description of Work: The Project consists of 2 new 345kV Switchyards (Dysinger and new East Stolle Road. TO15 excludes the 345kV, 700MVA Phase Shifting Transformer at Dysinger Switchyard), the Scope of Work also includes approximately 20 miles of new 345kV Transmission Line, located in Erie County and Niagara County (Empire State Line). This estimate includes for the Developers Preferred Route which utilizes an existing utility ROW. Wood H-Frames will be used to minimize visual impact.

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
1. CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION								
1.1	Clearing the ROW (mowing & clearing)	139.0	Acre		$ 15,000	$ 15,000	**$ 2,085,000**	
1.2	Access Road	48,535.0	LF		$ 45	$ 45	**$ 2,184,075**	Assumes Type 1 Type Gravel Road
1.3	Silt Fence	48,535.0	LF		$ 4	$ 4	**$ 194,140**	
1.4	Matting	56,952.0	LF		$ 70	$ 70	**$ 3,986,640**	
1.5	Snow Removal	1.0	Sum		$ 320,000	$ 320,000	**$ 320,000**	
1.6	ROW Restoration	20.0	Mile		$ 10,000	$ 10,000	**$ 200,000**	
1.7	Work Pads	795,000.00	SF		$ 4	$ 4	**$ 2,798,400**	
1.8	Restoration for Work Pad areas	79,500.00	SF		$ 0.2	$ 0.2	**$ 11,925**	
1.9	Temporary Access Bridge	20.0	EA		$ 20,035	$ 20,035	**$ 400,700**	
1.10	Air Bridge	5.0	EA		$ 14,445	$ 14,445	**$ 72,225**	
1.11	Stabilized Construction Entrance	10.0	EA		$ 4,580	$ 4,580	**$ 45,800**	
1.12	Maintenance and Protection of Traffic on Public Roads	1.0	LS		$ 300,000	$ 300,000	**$ 300,000**	
1.13	Culverts / Misc. Access	1.0	LS		$ 100,000	$ 100,000	**$ 100,000**	
1.14	Concrete Washout Station	10.0	EA		$ 1,850	$ 1,850	**$ 18,500**	
TOTAL - CLEARING & ACCESS FOR TRANSMISSION LINE:							**$ 12,717,405**	
2. TRANSMISSION LINE FOUNDATIONS								
2.1	Direct Embed Foundation 3' x 11'	267.0	Ea		$ 9,680	$ 9,680	**$ 2,584,560**	Supply & Install
2.2	Direct Embed Foundation 3' x 12'	35.0	Ea		$ 10,648	$ 10,648	**$ 372,680**	Supply & Install
2.3	Direct Embed Foundation 3' x 13'	8.0	Ea		$ 11,713	$ 11,713	**$ 93,702**	Supply & Install
2.4	Direct Embed Foundation 3' x 14'	5.0	Ea		$ 12,884	$ 12,884	**$ 64,420**	Supply & Install
2.5	Direct Embed Foundation 3' x 15'	6.0	Ea		$ 14,172	$ 14,172	**$ 85,035**	Supply & Install
TOTAL - TRANSMISSION LINE FOUNDATIONS:							**$ 3,200,398**	
3. STRUCTURES - TRANSMISSION LINE								
3.1	Dead-End 3 Pole Wood Structure, H2 80ft	5	Ea	$ 6,000	$ 8,185	$ 14,185	**$ 70,927**	
3.2	Dead-End 3 Pole Wood Structure, H2 90ft	2	Ea	$ 7,200	$ 6,925	$ 14,125	**$ 28,250**	
3.3	Dead-End 3 Pole Wood Structure, H2 100ft	2	Ea	$ 8,640	$ 8,459	$ 17,099	**$ 34,198**	
3.4	Dead-End 3 Pole Wood Structure, H2 110ft	1	Ea	$ 10,368	$ 12,689	$ 23,057	**$ 23,057**	
3.5	Angle 3 Pole Wood Structure, H1-90ft	4	Ea	$ 6,480	$ 13,177	$ 19,657	**$ 78,628**	
3.6	Angle 3 Pole Wood Structure, H1-100ft	1	Ea	$ 7,776	$ 16,471	$ 24,247	**$ 24,247**	
3.7	Tangent H-Frame Wood Structure, H2 85'	1	Ea	$ 4,800	$ 15,373	$ 20,173	**$ 20,173**	
3.8	Tangent H-Frame Wood Structure, H2 90'	118	Ea	$ 5,760	$ 18,448	$ 24,208	**$ 2,856,506**	
3.9	Tangent H-Frame Wood Structure, H2 95'	11	Ea	$ 6,912	$ 22,137	$ 29,049	**$ 319,541**	
3.10	Tangent H-Frame Wood Structure, H2 100'	3	Ea	$ 8,294	$ 8,185	$ 16,480	**$ 49,439**	
3.11	Tangent H-Frame Wood Structure, H2 105'	1	Ea	$ 9,953	$ 6,925	$ 16,878	**$ 16,878**	
3.12	Tangent H-Frame Wood Structure, H2 115'	1	Ea	$ 11,944	$ 8,459	$ 20,403	**$ 20,403**	
3.13	Tangent H-Frame Wood Structure, H2 125'	3	Ea	$ 14,333	$ 12,689	$ 27,021	**$ 81,064**	
3.14	Install Grounding	153.0	Structure		$ 5,000	$ 5,000	**$ 765,000**	Supply & Install
3.15	Guy Wires and Anchors for DE / Angle Structures	15.0	Structure		$ 20,000	$ 20,000	**$ 300,000**	Supply & install
TOTAL - STRUCTURES TRANSMISSION LINE:							**$ 4,688,312**	
4. CONDUCTOR, SHIELDWIRE, OPGW								
4.1	(2)/Phase - 795kcmil 26/7 Stranded "Drake" ACSR	21	Circuit Mile	$ 53,856	$ 158,400	$ 212,256	**$ 4,457,376**	
4.2	(1) OPGW 48 Fiber	21	Mile	$ 22,176	$ 27,720	$ 49,896	**$ 1,047,816**	
4.3	(1) 3/8" HS Steel	21	Mile	$ 3,696	$ 26,400	$ 30,096	**$ 632,016**	

COST ESTIMATE

(PREFERRED ROUTE)

Revision: 5

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
TOTAL: CONDUCTOR, SHIELDWIRE, OPGW:							**$ 6,137,208**	
5. TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE								
5.1	Tangent - Polymer V-String	414	Set	$ 900	$ 720	$ 1,620	**$ 670,680**	
5.2	Deadend / Angle Assemblies	96.0	Set	$ 1,500	$ 1,040	$ 2,540	**$ 243,840**	
5.3	OPGW Assembly - Tangent	138.0	Set	$ 200	$ 150	$ 350	**$ 48,300**	
5.4	OPGW Assembly - Angle / DE	34.0	Set	$ 250	$ 150	$ 400	**$ 13,600**	
5.5	OHSW Assembly - Tangent	138.0	Set	$ 200	$ 150	$ 350	**$ 48,300**	
5.5	OHSW Assembly - Angle / DE	34.0	Set	$ 250	$ 150	$ 400	**$ 13,600**	
5.8	OPGW Splice Boxes	9.0	Ea	$ 1,500	$ 1,000	$ 2,500	**$ 22,500**	
5.7	OPGW Splice & Test	1.0	Sum		$ 10,800	$ 10,800	**$ 10,800**	
5.8	Spacer Dampers	2,310.0	Ea	$ 50	$ 35	$ 85	**$ 196,350**	
5.9	Vibration Dampers - Conductor	1,850.0	Ea	$ 32	$ 20	$ 52	**$ 96,200**	
5.10	Shieldwire / OPGW Dampers, Misc Fittings	1.0	Sum	$ 10,000	$ 8,000	$ 18,000	**$ 18,000**	
TOTAL: TRANSMISSION LINE INSULA+52:63TORS, FITTINGS, HARDWARE:							**$ 1,382,170**	
6. NEW DYSINGER SWITCHYARD								
6.1	Site Works including sediment controls, access roads, rough grading, final	1.0	Sum		$1,500,000.00	$ 1,500,000	**$ 1,500,000**	Supply & Install
6.2	Substation Fence	2,500.0	LF		$200.00	$ 200	**$ 500,000**	Supply & Install
6.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
6.4	Switches 3ph	22.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 154,000**	
6.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
6.6	Line Switches 3 ph w/ motor-operators	7.0	Ea	$ 15,000	$15,000	$ 30,000	**$ 210,000**	
6.7	Instrument Transformers	1.0	Sum		$ 1,214,000	$ 1,214,000	**$ 1,214,000**	
6.8	Breakers	11.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 4,180,000**	
6.9	Arrestors (3 per line)	21.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 157,500**	
6.10	Line Traps	7.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 147,000**	
6.11	345 kV buses	2.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 120,000**	
6.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	
6.13	Low Profile Foundations	282.0	Ea		$ 5,000	$ 5,000	**$ 1,410,000**	Supply & Install
6.14	Caisson DE Foundations	48.0	Ea		$ 50,000	$ 50,000	**$ 2,400,000**	Supply & Install
6.15	Circuit Breaker Foundations	11.0	Ea		$ 75,000	$ 75,000	**$ 825,000**	Supply & Install
6.16	Lightning Mast Foundations	5.0	Ea		$15,000	$ 15,000	**$ 75,000**	Supply & Install
6.17	SST Foundation	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
6.18	Control House and Pad (30' x 90')	1.0	Ea	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	
6.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
6.20	Control Cables	1.0	Sum	$ 130,000	$ 130,000	$ 260,000	**$ 260,000**	
6.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
6.22	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	
6.23	Protection, Telecom and Metering Equipment (Panels)	37.0	Ea		$ 30,000	$ 30,000	**$ 1,110,000**	Supply & Install
6.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
6.25	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
6.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 357,500	$ 357,500	**$ 357,500**	Supply & Install
6.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 975,000	$ 975,000	**$ 975,000**	Supply & Install
6.28	Grounding	1.0	Sum		$ 275,000	$ 275,000	**$ 275,000**	Supply & Install
6.29	Bus Support 3 Ph	19.0	Ea	$ 4,500	$ 2,000	$ 6,500	**$ 123,500**	
6.30	Bus Support 1 Ph	36.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 108,000**	
6.31	Switch Stands	24.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 264,000**	
6.32	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
6.33	Misc. Structures	1.0	Sum		$ 74,000	$ 74,000	**$ 74,000**	
6.34	Substation A-Frame Structures Standalone	12.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 300,000**	

COST ESTIMATE

(PREFERRED ROUTE)

Revision: 5

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
6.35	Lightning Masts	5.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 60,000**	
6.36	Arrestor Stands	21.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 73,500**	
6.37	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
6.38	Connection of Existing Lines to Dysinger Switchyard	1.0	Sum		$ 5,000,000	$ 5,000,000	**$ 5,000,000**	Supply & Install
TOTAL - DYSINGER SWITCHYARD:							**$ 25,374,000**	
7. EAST STOLLE RD SUBSTATION								
7.1	Site Works including sediment controls, access roads, rough grading, final	1.0	Sum		$ 1,000,000.00	$ 1,000,000	**$ 1,000,000**	Supply & Install
7.2	Substation Fence	1,900.0	LF		$ 200.00	$ 200	**$ 380,000**	Supply & Install
7.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
7.4	Switches 3ph	9.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 63,000**	
7.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
7.6	Line Switches 3 ph w/ motor-operators	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
7.7	Instrument Transformers	1.0	Sum		$ 752,000	$ 752,000	**$ 752,000.00**	
7.8	Breakers	4.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 1,520,000.00**	
7.9	Arrestors (3 per line) and shunt reactor	12.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 90,000**	
7.10	Line Traps	2.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 42,000.00**	
7.11	345 kV buses	1.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 60,000**	
7.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	
7.13	Low Profile Foundations	147.0	Ea		$ 5,000	$ 5,000	**$ 735,000**	Supply & Install
7.14	Caisson DE Foundations	20.0	Ea		$ 50,000	$ 50,000	**$ 1,000,000**	Supply & Install
7.15	Circuit Breaker Foundations	4.0	Ea		$ 75,000	$ 75,000	**$ 300,000**	Supply & Install
7.16	Lightning Mast Foundations	5.0	Ea		$ 15,000	$ 15,000	**$ 75,000**	Supply & Install
7.17	SST Foundation	1.0	Ea		$ 75,000.00	$ 75,000	**$ 75,000**	Supply & Install
7.18	Control House and Pad (25' x 50' - 1250 sq. ft)	1.0	Ea	$ 350,000	$ 100,000	$ 450,000	**$ 450,000**	
7.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
7.20	Control Cables	1.0	Sum	$ 130,000	$ 130,000	$ 260,000	**$ 260,000.00**	
7.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
7.22	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	
7.23	Protection, Telecom and Metering Equipment (Panels)	18.0	Ea		$ 30,000	$ 30,000	**$ 540,000**	Supply & Install
7.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
7.25	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
7.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 357,500	$ 357,500	**$ 357,500**	Supply & Install
7.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 975,000	$ 975,000	**$ 975,000**	Supply & Install
7.28	Grounding	1.0	Sum		$ 125,000	$ 125,000	**$ 125,000**	Supply & Install
7.29	Bus Support 3 Ph	9.0	Ea	$ 4,500	$ 2,000	$ 6,500	**$ 58,500**	
7.30	Bus Support 1 Ph	21.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 63,000**	
7.31	Switch Stands	13.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 143,000**	
7.32	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
7.33	Misc. Structures	1.0	Sum		$ 24,000	$ 24,000	**$ 24,000.00**	
7.34	Substation A-Frame Structures Standalone	5.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 125,000**	
7.35	Lightning Masts	5.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 60,000**	
7.36	Arrestor Stands	12.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 42,000**	
7.37	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
7.38	345kV 30MVAR Shunt Reactor	1.0	Ea	$ 732,000	$ 100,000	$ 832,000	**$ 832,000**	
7.39	Transformer Foundation with concrete moat and double steel grating	1.0	Sum		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
7.40	Interconnection arrangement at Stolle Rd Substation	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
TOTAL - EAST STOLLE RD SUBSTATION:							**$ 13,963,000**	
8. MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS								
	Contractor Mobilization / Demobilization							

SECO SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

(PREFERRED ROUTE)

Revision: 5

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
8.1	Mob / Demob	1.00	Sum		$ 800,000	$ 800,000	**$ 800,000**	
	Project Management, Material Handling & Amenities					$ -	**$ -**	
8.2	Project Management & Staffing (includes PM, Field Engineers / Supervision,	14.00	Months		$ 220,000	$ 220,000	**$ 3,080,000**	
8.3	Site Accommodation, Facilities, Storage	1.00	Sum		$ 1,400,000	$ 1,400,000	**$ 1,400,000**	
	Engineering					$ -	**$ -**	
8.4	Design Engineering	1.00	Sum		$ 3,000,000	$ 3,000,000	**$ 3,000,000**	
8.5	LiDAR	1.00	Sum		$ 400,000	$ 400,000	**$ 400,000**	
8.6	Geotech	1.00	Sum		$ 600,000	$ 600,000	**$ 600,000**	
8.7	Surveying/Staking	1.00	Sum		$ 400,000	$ 400,000	**$ 400,000**	
	Testing & Commissioning							
8.8	Testing & Commissioning of TRANSMISSION LINE and Equipment	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	
	Permitting and Additional Costs					$ -	**$ -**	
8.9	Environmental Licensing & Permitting Costs	1.00	Sum		$ 2,312,325	$ 2,312,325	**$ 2,312,325**	
8.10	Environmental Mitigation	1.00	Sum		$ 9,472,635	$ 9,472,635	**$ 9,472,635**	
8.11	Warranties / LOC's	1.00	Sum		$ 395,286	$ 395,286	**$ 395,286**	
8.12	Real Estate Costs (New ROW)	1.00	Sum		$ 391,346	$ 391,346	**$ 391,346**	
8.13	Real Estate Costs (Incumbent Utility ROW)	1.00	Sum		$ 1,793,000	$ 1,793,000	**$ 1,793,000**	
8.14	Legal Fees	1.00	Sum		$ 2,000,000	$ 2,000,000	**$ 2,000,000**	
8.15	Sales Tax on Materials	1.00	Sum	$ 1,442,611		$ 1,442,611	**$ 1,442,611**	
8.16	Fees for permits, including roadway, railroad, building or other local permits	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
8.17	Allowance for Funds Used During Construction (AFUDC)	1.00	Sum			$ -	**$ -**	
8.18	Carrying Charges	1.00	Sum			$ -	**$ -**	
TOTAL - MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:							**$ 28,687,203**	
9. SYSTEM UPGRADE FACILITIES								
SUF 1.1	Depew to Erie Street 115kV Transmission Line 921. Terminal allowance included. See comments.	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Relay was replaced and line ratings increased to 124/137/158 (NOR/LTE/STE) resulting ratings are below line conductor ratings. Scope is to remove all limitations on the circuit so it is limited by lien conductor ratings 125/152/181 (NOR/LTE/STE).
SUF 1.2	Engineering, T&C, PM, Indirects for SUF 1.1 (15%)					$ -	**$ 75,000**	
SUF 2.1	Shawnee to Swann Reconductor	12.00	Mile		$ 400,000	$ 400,000	**$ 4,800,000**	Rate for reconductor is pro-rated from National Grid Niagara - Packard reconductor. Note that rate does not include upgrades to structures or foundations.
SUF 2.2	Engineering, T&C, PM, Indirects FOR SUF 2.2 (15%)					$ -	**$ 720,000**	
SUF 3.1	Roll Rd to Stolle Rd 115kV Transmission Line 928. Terminal allowance included. See comments.	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Replace limiting terminal equipment at both Stolle Rd 115 kV Substation.
SUF 3.2	Engineering, T&C, PM, Indirects for SUF 3.1 (15%)					$ -	**$ 75,000**	
SUF 4	**100MVAR Shunt Reactor at RG&E Sta 80**							
SUF 4.1	Site Works including sediment controls, access roads, rough grading, final	1.00	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	Supply & Install
SUF 4.2	Substation Fence	600.00	LF		$ 200	$ 200	**$ 120,000**	Supply & Install
SUF 4.3	Shunt Reactor 3ph 345kV 100MVAR	1.00	Ea	$ 1,500,000	$ 500,000	$ 2,000,000	**$ 2,000,000**	
SUF 4.4	Switches 3ph 345kV	1.00	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 30,000**	
SUF 4.5	CVT's 345kV	3.00	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 63,000**	

SECO SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

(PREFERRED ROUTE)

Revision: 5

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
SUF 4.6	Breakers 345kV	1.00	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 380,000**	
SUF 4.7	Arrestors - 235kV	3.00	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 22,500**	
SUF 4.8	Low Profile Foundations	19.00	Ea		$ 5,000	$ 5,000	**$ 95,000**	Supply & Install
SUF 4.9	Circuit Breaker Foundations	1.00	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
SUF 4.10	Lightning Mast Foundations	2.00	Ea		$ 15,000	$ 15,000	**$ 30,000**	Supply & Install
SUF 4.11	Reactor Foundation with concrete moat and double steel grating	1.00	Ea		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
SUF 4.12	Control Cables	1.00	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
SUF 4.13	Protection & Telecom Equipment	3.00	Ea		$ 15,000	$ 15,000	**$ 45,000**	Supply & Install
SUF 4.14	SCADA and Communications	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
SUF 4.15	Low Voltage AC Distribution	1.0	Sum		$ 300,000	$ 300,000	**$ 300,000**	Supply & Install
SUF 4.16	Control Conduits	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
SUF 4.17	Cable Trench System for Control Conduits	1.0	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
SUF 4.18	Grounding	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
SUF 4.19	Bus Support 3ph	2.0	Ea	$ 3,000	$ 2,000	$ 5,000	**$ 10,000**	
SUF 4.20	Bus Support 1ph	3.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 9,000**	
SUF 4.21	Switch Stands	1.0	Ea	$ 1,500	$ 800	$ 2,300	**$ 2,300**	
SUF 4.22	Fuse Stand	1.0	Ea	$ 1,500	$ 800	$ 2,300	**$ 2,300**	
SUF 4.23	CVT Stand	3.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 10,500**	
SUF 4.24	Lightning Mast	2.0	Ea	$ 10,000	$ 5,000	$ 15,000	**$ 30,000**	
SUF 4.25	Misc Materials and Above / Below Ground Works	1.0	Ea		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	Supply & Install
SUF 4.26	**Engineering, T&C, PM, Indirects (15%)**					$ -	**$ 1,211,190**	
SUF 5	**SYSTEM UPGRADE FACILITIES CONTINGENCY (SEE ASSUMPTIONS & CLARIFICATIONS)**						**$ 3,750,000**	Contingency for possible additional SUF upgrades
TOTAL -SUF							**$ 19,705,790**	

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T015 - NextEra Energy

COST ESTIMATE

(ALTERNATE ROUTE)

Revision:5

Description of Work: The Project consists of 2 new 345kV Switchyards (Dysinger and new East Stolle Road. TO15 excludes the 345kV, 700MVA Phase Shifting Transformer at Dysinger Switchyard), the Scope of Work also includes approximately 22 miles of new 345kV Transmission Line, located in Erie County and Niagara County (Empire State Line). This estimate includes for the Developers Alternate Route which uses Steel Poles.

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
1. CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION								
1.1	Clearing the ROW (mowing & clearing)	118.0	Acre		$ 15,000	$ 15,000	**$ 1,770,000**	
1.2	Access Road	53,388.5	LF		$ 45	$ 45	**$ 2,402,483**	Assumes Type 1 Type Gravel Road
1.3	Silt Fence	53,388.5	LF		$ 4	$ 4	**$ 213,554**	
1.4	Matting	62,647.2	LF		$ 70	$ 70	**$ 4,385,304**	
1.5	Snow Removal	1.0	Sum		$ 320,000	$ 320,000	**$ 320,000**	
1.6	ROW Restoration	22.0	Mile		$ 10,000	$ 10,000	**$ 220,000**	
1.7	Work Pads	940,000.00	SF		$ 4	$ 4	**$ 3,308,800**	
1.8	Restoration for Work Pad areas	94,000.00	SF		$ 0.2	$ 0.2	**$ 14,100**	
1.9	Temporary Access Bridge	20.0	EA		$ 20,035	$ 20,035	**$ 400,700**	
1.10	Air Bridge	5.0	EA		$ 14,445	$ 14,445	**$ 72,225**	
1.11	Stabilized Construction Entrance	10.0	EA		$ 4,580	$ 4,580	**$ 45,800**	
1.12	Maintenance and Protection of Traffic on Public Roads	1.0	LS		$ 300,000	$ 300,000	**$ 300,000**	
1.13	Culverts / Misc. Access	1.0	LS		$ 100,000	$ 100,000	**$ 100,000**	
1.14	Concrete Washout Station	10.0	EA		$ 1,850	$ 1,850	**$ 18,500**	
TOTAL - CLEARING & ACCESS FOR TRANSMISSION LINE:							**$ 13,571,466**	
2. TRANSMISSION LINE FOUNDATIONS								
2.1	Direct Embed Foundation for Vertical Tangent Poles (5'x 20')	109.0	Ea		$ 18,000	$ 18,000	**$ 1,962,000**	Supply & Install
2.2	Direct Embed Foundation for Vertical Tangent Poles (5'x 20.5')	12.0	Ea		$ 18,900	$ 18,900	**$ 226,800**	Supply & Install
2.3	Direct Embed Foundation for Vertical Tangent Poles (5'x 21')	16.0	Ea		$ 20,790	$ 20,790	**$ 332,640**	Supply & Install
2.4	Direct Embed Foundation for Vertical Tangent Poles (5'x 21.5')	3.0	Ea		$ 22,869	$ 22,869	**$ 68,607**	Supply & Install
2.5	Direct Embed Foundation for Vertical Tangent Poles (5'x 23')	1.0	Ea		$ 25,156	$ 25,156	**$ 25,156**	Supply & Install
2.6	Caisson Foundation for Vertical Angle (9' x 20')	445.5	CUY		$ 1,500	$ 1,500	**$ 668,250**	
2.7	Caisson Foundation for Dead End (10' x 35')	3,978.6	CUY		$ 1,500	$ 1,500	**$ 5,967,900**	
2.8	Rock Adder	500.0	CUY		$ 1,500	$ 1,500	**$ 750,000**	
TOTAL - TRANSMISSION LINE FOUNDATIONS:							**$ 10,001,353**	
3. STRUCTURES - TRANSMISSION LINE								
3.1	Steel Vertical Tangent Monopole (130' including embedment)	109	Ea	$ 25,200	$ 15,120	$ 40,320	**$ 4,394,880**	
3.2	Steel Vertical Tangent Monopole (135' including embedment)	12	Ea	$ 27,900	$ 16,740	$ 44,640	**$ 535,680**	
3.3	Steel Vertical Tangent Monopole (141' including embedment)	16	Ea	$ 30,600	$ 18,360	$ 48,960	**$ 783,360**	
3.4	Steel Vertical Tangent Monopole (145' including embedment)	3	Ea	$ 34,200	$ 20,520	$ 54,720	**$ 164,160**	
3.5	Steel Vertical Tangent Monopole (162' including embedment)	1	Ea	$ 37,800	$ 22,680	$ 60,480	**$ 60,480**	
3.6	Steel Vertical Angle Monopole (131')	9	Ea	$ 66,600	$ 39,960	$ 106,560	**$ 959,040**	
3.7	Steel Vertical Deadend Monopole (105')	38	Ea	$ 72,000	$ 43,200	$ 115,200	**$ 4,377,600**	
3.8	Install Grounding	188	Ea		$ 5,000	$ 5,000	**$ 940,000**	Supply & Install
TOTAL - STRUCTURES TRANSMISSION LINE:							**$ 12,215,200**	
4. CONDUCTOR, SHIELDWIRE, OPGW								
4.1	(2)/Phase - 795kcmil 26/7 Stranded "Drake" ACSR	23	Circuit Mile	$ 53,856	$ 158,400	$ 212,256	**$ 4,881,888**	
4.2	(1) OPGW 48 Fiber	23	Mile	$ 22,176	$ 27,720	$ 49,896	**$ 1,147,608**	
4.3	(1) 3/8" HS Steel	2	Mile	$ 3,696	$ 26,400	$ 30,096	**$ 60,192**	
TOTAL: CONDUCTOR, SHIELDWIRE, OPGW:							**$ 6,089,688**	
5. TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE								
5.1	Tangent - Polymer V-String	450	Set	$ 900	$ 720	$ 1,620	**$ 729,000**	
5.2	Deadend / Angle Assemblies	234.0	Set	$ 1,500	$ 1,040	$ 2,540	**$ 594,360**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
5.3	OPGW Assembly - Tangent	150.0	Set	$ 200	$ 150	$ 350	**$ 52,500**	
5.5	OPGW Assembly - Angle / DE	72.0	Set	$ 250	$ 150	$ 400	**$ 28,800**	
5.6	OHSW Assembly - Angle / DE	15.0	Set	$ 250	$ 150	$ 400	**$ 6,000**	
5.8	OPGW Splice Boxes	10.0	Ea	$ 1,500	$ 1,000	$ 2,500	**$ 25,000**	
5.9	OPGW Splice & Test	1.0	Sum		$ 12,000	$ 12,000	**$ 12,000**	
5.10	Spacer Dampers	2,835.0	Ea	$ 50	$ 35	$ 85	**$ 240,975**	
5.11	Vibration Dampers - Conductor	2,268.0	Ea	$ 32	$ 20	$ 52	**$ 117,936**	
5.12	Shield wire / OPGW Dampers, Misc Fittings	1.0	Sum	$ 15,000	$ 8,000	$ 23,000	**$ 23,000**	
TOTAL: TRANSMISSION LINE INSULATORS, FITTINGS, HARDWARE:							**$ 1,829,571**	
6. NEW DYSINGER SUBSTATION								
6.1	Site Works including sediment controls, access roads, rough grading, final grading and	1.0	Sum		$1,500,000.00	$ 1,500,000	**$ 1,500,000**	Supply & Install
6.2	Substation Fence	2,500.0	LF		$200.00	$ 200	**$ 500,000**	Supply & Install
6.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
6.4	Switches 3ph	22.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 154,000**	
6.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
6.6	Line Switches 3 ph w/ motor-operators	7.0	Ea	$ 15,000	$15,000	$ 30,000	**$ 210,000**	
6.7	Instrument Transformers	1.0	Sum		$ 1,214,000	$ 1,214,000	**$ 1,214,000**	
6.8	Breakers	11.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 4,180,000**	
6.9	Arrestors (3 per line)	21.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 157,500**	
6.1	Line Traps	7.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 147,000**	
6.11	345 kV buses	2.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 120,000**	
6.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	
6.13	Low Profile Foundations	282.0	Ea		$ 5,000	$ 5,000	**$ 1,410,000**	Supply & Install
6.14	Caisson DE Foundations	48.0	Ea		$ 50,000	$ 50,000	**$ 2,400,000**	Supply & Install
6.15	Circuit Breaker Foundations	11.0	Ea		$ 75,000	$ 75,000	**$ 825,000**	Supply & Install
6.16	Lightning Mast Foundations	5.0	Ea		$15,000	$ 15,000	**$ 75,000**	Supply & Install
6.17	SST Foundation	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
6.18	Control House and Pad (30' x 90')	1.0	Ea	$ 650,000	$ 200,000	$ 850,000	**$ 850,000**	
6.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
6.2	Control Cables	1.0	Sum	$ 130,000	$ 130,000	$ 260,000	**$ 260,000**	
6.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
6.22	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	
6.23	Protection, Telecom and Metering Equipment (Panels)	37.0	Ea		$ 30,000	$ 30,000	**$ 1,110,000**	Supply & Install
6.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
6.25	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
6.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 357,500	$ 357,500	**$ 357,500**	Supply & Install
6.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 975,000	$ 975,000	**$ 975,000**	Supply & Install
6.28	Grounding	1.0	Sum		$ 275,000	$ 275,000	**$ 275,000**	Supply & Install
6.29	Bus Support 3 Ph	19.0	Ea	$ 4,500	$ 2,000	$ 6,500	**$ 123,500**	
6.3	Bus Support 1 Ph	36.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 108,000**	
6.31	Switch Stands	24.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 264,000**	
6.32	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
6.33	Misc. Structures	1.0	Sum		$ 74,000	$ 74,000	**$ 74,000**	
6.34	Substation A-Frame Structures Standalone	12.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 300,000**	
6.35	Lightning Masts	5.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 60,000**	
6.36	Arrestor Stands	21.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 73,500**	
6.37	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
6.38	Connection of Existing Lines to Dysinger Switchyard	1.0	Sum		$ 5,000,000	$ 5,000,000	**$ 5,000,000**	Supply & Install
TOTAL - DYSINGER SWITCHYARD:							**$ 25,374,000**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
7. EAST STOLLE RD SUBSTATION								
7.1	Site Works including sediment controls, access roads, rough grading, final grading and stone placement	1.0	Sum		$ 1,000,000.00	$ 1,000,000	**$ 1,000,000**	Supply & Install
7.2	Substation Fence	1,900.0	LF		$ 200.00	$ 200	**$ 380,000**	Supply & Install
7.3	SSVT	1.0	Ea	$ 200,000	$ 50,000	$ 250,000	**$ 250,000**	
7.4	Switches 3ph	9.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 63,000**	
7.5	Fuses 1ph	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
7.6	Line Switches 3 ph w/ motor-operators	3.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 90,000**	
7.7	Instrument Transformers	1.0	Sum		$ 752,000	$ 752,000	**$ 752,000.00**	
7.8	Breakers	4.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 1,520,000.00**	
7.9	Arrestors (3 per line) and shunt reactor	12.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 90,000**	
7.10	Line Traps	2.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 42,000.00**	
7.11	345 kV buses	1.0	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 60,000**	
7.12	Auxillary Power Generator - 500kW	1.0	Ea	$ 160,000	$ 40,000	$ 200,000	**$ 200,000**	
7.13	Low Profile Foundations	147.0	Ea		$ 5,000	$ 5,000	**$ 735,000**	Supply & Install
7.14	Caisson DE Foundations	20.0	Ea		$ 50,000	$ 50,000	**$ 1,000,000**	Supply & Install
7.15	Circuit Breaker Foundations	4.0	Ea		$ 75,000	$ 75,000	**$ 300,000**	Supply & Install
7.16	Lightning Mast Foundations	5.0	Ea		$ 15,000	$ 15,000	**$ 75,000**	Supply & Install
7.17	SST Foundation	1.0	Ea		$ 75,000.00	$ 75,000	**$ 75,000**	Supply & Install
7.18	Control House and Pad (25' x 50' - 1250 sq. ft)	1.0	Ea	$ 350,000	$ 100,000	$ 450,000	**$ 450,000**	
7.19	Generator Foundation	1.0	Sum		$ 25,000	$ 25,000	**$ 25,000**	Supply & Install
7.20	Control Cables	1.0	Sum	$ 130,000	$ 130,000	$ 260,000	**$ 260,000.00**	
7.21	125VDC Batteries	2.0	Ea	$ 50,000	$ 50,000	$ 100,000	**$ 200,000**	
7.22	Station Services	2.0	Ea		$ 25,000	$ 25,000	**$ 50,000**	
7.23	Protection, Telecom and Metering Equipment (Panels)	18.0	Ea		$ 30,000	$ 30,000	**$ 540,000**	Supply & Install
7.24	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
7.25	Low Voltage AC Distribution & DC Panels & Switches	1.0	Sum		$ 500,000	$ 500,000	**$ 500,000**	Supply & Install
7.26	Control Conduits from Cable Tray to Equipment	1.0	Sum		$ 357,500	$ 357,500	**$ 357,500**	Supply & Install
7.27	Cable Trench Systems for Control Cables	1.0	Sum		$ 975,000	$ 975,000	**$ 975,000**	Supply & Install
7.28	Grounding	1.0	Sum		$ 125,000	$ 125,000	**$ 125,000**	Supply & Install
7.29	Bus Support 3 Ph	9.0	Ea	$ 4,500	$ 2,000	$ 6,500	**$ 58,500**	
7.30	Bus Support 1 Ph	21.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 63,000**	
7.31	Switch Stands	13.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 143,000**	
7.32	Fuse Stand	1.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 11,000**	
7.33	Misc. Structures	1.0	Sum		$ 24,000	$ 24,000	**$ 24,000.00**	
7.34	Substation A-Frame Structures Standalone	5.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 125,000**	
7.35	Lightning Masts	5.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 60,000**	
7.36	Arrestor Stands	12.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 42,000**	
7.37	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
7.38	345kV 30MVAR Shunt Reactor	1.0	Ea	$ 732,000	$ 100,000	$ 832,000	**$ 832,000**	
7.39	Transformer Foundation with concrete moat and double steel grating	1.0	Sum		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
7.40	Interconnection arrangement at Stolle Rd Substation	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	Supply & Install
TOTAL - EAST STOLLE RD SUBSTATION:							**$ 13,963,000**	
8. MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:								
	Contractor Mobilization / Demobilization							
8.1	Mob / Demob	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	
	Project Management, Material Handling & Amenities							
8.2	Project Management & Staffing (includes PM, Field Engineers / Supervision, Scheduler and	14.00	Months		$ 350,000	$ 350,000	**$ 4,900,000**	
8.3	Site Accommodation, Facilities, Storage	1.00	Sum		$ 1,400,000	$ 1,400,000	**$ 1,400,000**	

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
	Engineering							
8.4	Design Engineering	1.00	Sum		$ 4,170,000	$ 4,170,000	**$ 4,170,000**	
8.5	LiDAR	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	
8.6	Geotech	1.00	Sum		$ 1,100,000	$ 1,100,000	**$ 1,100,000**	
8.7	Surveying/Staking	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	
	Testing & Commissioning							
8.8	Testing & Commissioning of TRANSMISSION LINE and Equipment	1.00	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	
	Permitting and Additional Costs					$ -	**$ -**	
8.9	Environmental Licensing & Permitting Costs	1.00	Sum		$ 3,477,113	$ 3,477,113	**$ 3,477,113**	
8.10	Environmental Mitigation	1.00	Sum		$ 8,002,635	$ 8,002,635	**$ 8,002,635**	
8.11	Warranties / LOC's	1.00	Sum		$ 511,213	$ 511,213	**$ 511,213**	
8.12	Real Estate Costs (New ROW)	1.00	Sum		$ 7,993,538	$ 7,993,538	**$ 7,993,538**	
8.13	Real Estate Costs (Incumbent Utility ROW)	1.00	Sum		$ 90,000	$ 90,000	**$ 90,000**	
8.14	Legal Fees	1.00	Sum		$ 3,500,000	$ 3,500,000	**$ 3,500,000**	
8.15	Sales Tax on Materials	1.00	Sum	$ 2,287,583		$ 2,287,583	**$ 2,287,583**	
8.16	Fees for permits, including roadway, railroad, building or other local permits	1.00	Sum		$ 200,000	$ 200,000	**$ 200,000**	
8.17	Allowance for Funds Used During Construction (AFUDC)	1.00	Sum			$ -	**$ -**	
8.18	Carrying Charges	1.00	Sum			$ -	**$ -**	
TOTAL - MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:							**$ 40,632,082**	
9. SYSTEM UPGRADE FACILITIES								
SUF 1.1	Depew to Erie Street 115kV Transmission Line 921. Terminal allowance included. See comments.	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Relay was replaced and line ratings increased to 124/137/158 (NOR/LTE/STE) resulting ratings are below line conductor ratings. Scope is to remove all limitations on the circuit so it is limited by lien conductor ratings 125/152/181 (NOR/LTE/STE).
SUF 1.2	Engineering, T&C, PM, Indirects for SUF 1.1 (15%)					$ -	**$ 75,000**	
SUF 2.1	Shawnee to Swann Reconductor	12.00	Mile		$ 400,000	$ 400,000	**$ 4,800,000**	Rate for reconductor is pro-rated from National Grid Niagara - Packard reconductor. Note that rate does not include upgrades to structures or foundations.
SUF 2.2	Engineering, T&C, PM, Indirects FOR SUF 2.2 (15%)					$ -	**$ 720,000**	
SUF 3.1	Roll Rd to Stolle Rd 115kV Transmission Line 928. Terminal allowance included. See comments.	1.00	Sum		$ 500,000	$ 500,000	**$ 500,000**	Replace limiting terminal equipment at both Stolle Rd 115 kV Substation and Roll Rd 115 kV Substation.
SUF 3.2	Engineering, T&C, PM, Indirects for SUF 3.1 (15%)					$ -	**$ 75,000**	
SUF 4	**100MVAR Shunt Reactor at RG&E Sta 80**							
SUF 4.1	Site Works including sediment controls, access roads, rough grading, final grading and stone placement - approx 1. acre	1.00	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	Supply & Install
SUF 4.2	Substation Fence	600.00	LF		$ 200	$ 200	**$ 120,000**	Supply & Install
SUF 4.3	Shunt Reactor 3ph 345kV 100MVAR	1.00	Ea	$ 1,500,000	$ 500,000	$ 2,000,000	**$ 2,000,000**	
SUF 4.4	Switches 3ph 345kV	1.00	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 30,000**	
SUF 4.5	CVT's 345kV	3.00	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 63,000**	
SUF 4.6	Breakers 345kV	1.00	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 380,000**	
SUF 4.7	Arrestors - 235kV	3.00	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 22,500**	
SUF 4.8	Low Profile Foundations	19.00	Ea		$ 5,000	$ 5,000	**$ 95,000**	Supply & Install
SUF 4.9	Circuit Breaker Foundations	1.00	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
SUF 4.10	Lightning Mast Foundations	2.00	Ea		$ 15,000	$ 15,000	**$ 30,000**	Supply & Install

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Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Remarks
SUF 4.11	Reactor Foundation with concrete moat and double steel grating	1.00	Ea		$ 150,000	$ 150,000	**$ 150,000**	Supply & Install
SUF 4.12	Control Cables	1.00	Sum	$ 100,000	$ 100,000	$ 200,000	**$ 200,000**	
SUF 4.13	Protection & Telecom Equipment	3.00	Ea		$ 15,000	$ 15,000	**$ 45,000**	Supply & Install
SUF 4.14	SCADA and Communications	1.00	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
SUF 4.15	Low Voltage AC Distribution	1.0	Sum		$ 300,000	$ 300,000	**$ 300,000**	Supply & Install
SUF 4.16	Control Conduits	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
SUF 4.17	Cable Trench System for Control Conduits	1.0	Sum		$ 750,000	$ 750,000	**$ 750,000**	Supply & Install
SUF 4.18	Grounding	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
SUF 4.19	Bus Support 3ph	2.0	Ea	$ 3,000	$ 2,000	$ 5,000	**$ 10,000**	
SUF 4.20	Bus Support 1ph	3.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 9,000**	
SUF 4.21	Switch Stands	1.0	Ea	$ 1,500	$ 800	$ 2,300	**$ 2,300**	
SUF 4.22	Fuse Stand	1.0	Ea	$ 1,500	$ 800	$ 2,300	**$ 2,300**	
SUF 4.23	CVT Stand	3.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 10,500**	
SUF 4.24	Lightning Mast	2.0	Ea	$ 10,000	$ 5,000	$ 15,000	**$ 30,000**	
SUF 4.25	Misc Materials and Above / Below Ground Works	1.0	Ea		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	Supply & Install
SUF 4.26	**Engineering, T&C, PM, Indirects (15%)**					$ -	**$ 1,211,190**	
SUF 5	**SYSTEM UPGRADE FACILITIES CONTINGENCY (SEE ASSUMPTIONS & CLARIFICATIONS)**						**$ 3,750,000**	Contingency for possible additional SUF upgrades
TOTAL -SUF							**$ 19,705,790**	

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Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T015 - NextEra Energy

ENVIRONMENTAL LICENSING AND PERMITTING

Revision: 5

PROJECT TITLE WNY PROJECT EVALUATION- ENVIRONMENTAL LICENSING & PERMITTING COST ELEMENTS						ENVIRONMENTAL LICENSING & PERMITTING COST ESTIMATE RANGE FOR PROPOSED WNY TRANSMISSION PROJECT - T015			
FEDERAL						**Preferred Route**		**Alternative Route**	
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans	Min.	Max.	Min.	Max.
USACE	Waters of the US under Section 404 of the Clean Water Act and Section 10 of the 1899 Rivers and Harbors Act (including regulated wetland areas)	Nationwide Permits (NWP) or Individual Permit (IP)	Any work within the boundaries of regulated wetlands (with the exception of isolated wetlands) or waterways to the spring high tide or ordinary high water mark	If project qualifies for a NWP (<0.5 acre disturbance and within NWP project type parameters), a pre-construction notification (PCN) is typically required. NWPs have a 45 day review period starting from when project logged in system (up to 6wk backlog delay in logging projects) If an IP is triggered, USACE will require Alternative Analysis and Public Notice/Hearing. IPs could also trigger restrictive environmental work windows. IPs have a 120 day review period starting from when permit is "deemed complete"	Wetland Delineation; Wetland Function & Value Assessment; Stream Delineation; Restoration Plan	$26,600	$88,250	$26,600	$88,250
National Park Service	National Parks	Consultation; Special Use Permit	Only applies if National Park located in project area.	Depending on impact of project request for a special use permit may require a NEPA environmental assessment.					
USFWS	Endangered Species Act Section 7 (ESA) Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act	Consultation (Formal or Informal); Special Use Permit	Any work that may have an affect on listed species or their habitat; or projects within National Wildlife Refuges	USACE coordinates consultation with USFWS for ESA listed species during their permit review. Also includes the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act compliance. Season restrictions on construction could be imposed.	Rare, Threatened & Endangered Species Search; Preparation of Reports and Conservation Plans	$27,800	$94,000	$30,300	$99,000
NEPA	National Environmental Policy Act	Categorical Exclusion; EA Finding of No Impact; or EIS Record of Decision	With some exemptions, projects on federally owned lands and/or projects requiring federal permit approvals	Possible NEPA review due if federal agency coordination is required. Federal agency involved to determine if Categorical Exclusion applies. Assumes Article 7 covers NEPA requirements or if an EIS is required it is prepared under SEQRA Task.					
FAA	Airports / Airspace	Federal Aviation Administration (FAA) Notification	New or Replacement Structures near Airports	Depending on construction locations, this permit may only be needed for OP work.	Obstruction Analysis, Mitigation Plan (assumes Engineering Cost)				
STATE									
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans				
NYS Public Service Commission / Department of Public Service (NYSDPS)	Article VII	Article VII: Certificate of Environmental Compatibility and Public Need and Environmental Management & Construction Plan (EM&CP)	Article 7: Major electric transmission facilities with design capacity of 100kV or more extending for at least 10 miles or 125kV and over extending a distance of 1 mile or more (some exclusions for underground transmission applies)	Article 7 will incorporate all of the required State and Local approvals (costed separately), as well as Engineering and Environmental Studies and Public Outreach. Article VII Intervenor Fund payment expected to be $100,000. An Environmental Management & Construction Plan (EM&CP) must be prepared and approved by the PSC. (see 16 NYCRR Parts 85 through 88)	Includes Reports and Plans required for State and Federal Agency Permits, as well as EM&CP, EMF, Noise, Air, Visual Impact Assessment, Invasive Species Control Plan, Mitigation Plans	$600,000	$3,100,000	$600,000	$3,100,000

ENVIRONMENTAL LICENSING AND PERMITTING

NYS Public Service Commission / Department of Public Service (NYSDPS)	Part 102		Construction of a utility overhead transmission facility that will convey electric energy at 65kV or higher for a distance of one mile or longer and are not subject to Article VII of the Public Service Law.	May include coordination or studies completed under other line items including: Visual assessment, SHPO determination, OPRHP consultation, Ecological Impacts Assessment	Advantage-Disadvantage Analysis				
NYSDEC	Article 15 Stream Disturbance; Article 24 Wetlands, Open Waters, Wetlands Buffers (100' for Freshwater Wetland)	Individual Permit (IP) (unless developer has General Permit (GP))	Any work within the boundaries of regulated waterways or wetlands, and wetland adjacent areas	Any disturbance within wetlands and/or below mean high tide will require an IP. Areas of temporary disturbance will likely require restoration, including a monitoring and maintenance period. Permanent disturbance will require offsite mitigation up to 3:1 area ratio; also includes a monitoring and maintenance period. GP may only be applicable if project ground disturbance is located outside of wetlands areas (above MHW).	Wetland Delineation; Wetland Restoration/Mitigation Plan	$12,000	$53,000	$12,000	$53,000
NYSDEC	Stormwater (If >1 Acre Soil Disturbance)	SPDES General Permit for Stormwater Discharges from Construction Activities GP-0-15-002 & SWPPP	Project areas of soil disturbance	If project involves 1 acre or more soil disturbance, then the GP is required. If located within a Regulated MS4 Municipality, additional coordination may be needed. Weekly inspections by a Qualified Inspector during construction will be required.	SWPPP (assumes Engineering Cost includes Sediment & Erosion Control Plan, Hydraulic & Hydrology Studies, Stormwater Management Design)	$11,200	$38,000	$11,200	$38,000
Any State or local government agency that issues permits or approvals	State Environmental Quality Review Act (SEQRA)	Environmental Assessment (EA) Determination of Significance	Projects not covered as a Type II Action (Note a project can not be segmented - all phases/tasks must be considered in the review)	Most projects or activities proposed by a state agency, and all discretionary approvals (permits) from a NYS agency or local government, require an environmental impact assessment. SEQR requires the sponsoring or approving governmental body to identify and mitigate the significant environmental impacts of the activity it is proposing or permitting.					
NYSDOS	State Coastal Management Program Mapped Coastal Area Boundary	Coastal Consistency Concurrence	Projects within the NYSDOS designated Coastal Zone; and consistency with Local Waterfront Revitalization Plans (LWRPs); e.g., Town of Grand Island LWRP	Online mapping available to check if within coastal zone, a significant coastal fish & wildlife habitat (SCFWH), a local waterfront revitalization program area (LWRP), or a comprehensive management program areas (CMP)					
NYSHPO	National Historic Preservation Act (NHPA) Section 106: State and Federal Historic Places; State Mapped Archeologically Sensitive Areas	Cultural Resource Information System (CRIS) Determination	Local, State, or Federal eligible or designated historic places and/or areas of archeological sensitivity (in off-road areas and areas that have not been previously disturbed)	NYSDEC EAF Online Mapper identifies State or National Register of Historic Places and archeological sensitive areas within or adjacent to the project site. Formally enter project information and supporting documents into SHPO's online CRIS program. Staff will review and email a determination of impacts letter	Phase 1A & 1B Archaeological Studies	$13,200	$49,000	$14,200	$52,000
NYS NHP	Threatened and Endangered Species	Consultation	Activities that may affect T&E species or their habitat.		See USFWS	$1,200	$6,400	$1,200	$6,400

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NYSDOT/NYS Thruway Authority/FHWA	State Roadways	Highway Work Permit/Utility Permit, Vegetation Management Permit; Easement	Any work within or crossing State highway ROW	May require restoration landscaping coordination. Typically requires compliance with NEPA including SHPO and USFWS effects determination	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$17,000	$69,000	$17,000	$69,000
NYS Canal Corporation	Erie Canal - jurisdiction varies along edge	Canal Occupancy & Work Permit (TA-W99072)	Any work involving the Erie Canal	Must coordinate with Division Permit Engineer about particular section of canal being affected. Commercial permit fee = $25 plus $2,000,000 additional General Aggregate Liability Insurance	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)				
NYS Dept. of Agriculture and Markets	All agricultural lands (including Agricultural Districts)	Part of Article 7 & Article 10 Review process	Any work impacting agricultural land	Must minimize impacts and restore damage to agricultural land, and coordinate with County Soil & Water Conservation District; Vineyards are a major concern in WNYS. Pre-application conference with PSC, DEC and Ag& Markets recommended. Must develop EM&CP in conformance with Art. 7/10 Certificate Conditions. Agricultural Monitor must oversee construction & restoration; requisite 2-yrs post restoration monitoring.	Crop/Pasturing Mitigation Plan (not included in costing)	$11,000	$24,000	$11,000	$24,000
REGIONAL									
Railroads	Railroad crossings	Consultation-permits may be required; Easement	Access / new structures on RR property		Easement area survey (not included in costs)	$11,000	$76,000	$11,000	$76,000
LOCAL/MUNICIPAL									
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans				
County Dept. of Public Works	County Roadways	Lane Closure Permit, Highway Work or Access Permit	Work within county roadways and right-of-ways			$6,000	$40,000	$6,000	$40,000
Town, City or Village	Municipal Stormwater (MS4) Review	Approval of SWPPP or EM&CP	Project areas of soil disturbance		See NYSDEC SPDES	$6,000	$35,000	$6,000	$35,000
Town, City or Village	Variable	Building Permits	New Structures	Individual Towns/Villages must be consulted on a project specific basis to determine notification and/or permitting procedures. Permit application names vary (e.g. road obstruction permit)		$18,000	$92,000	$18,000	$92,000
Town, City or Village	Municipal Roadways	Highway Work Permit; Road Opening Permit	Work within municipal roadways and right-of-ways			$6,000	$35,000	$6,000	$35,000
Town, City or Village	Wetlands	Wetland Permit / Conservation Approvals	Mapped wetlands and wetland adjacent areas (buffer width variable)		See USACE / NYSDEC Art. 24	$6,000	$52,000	$6,000	$52,000

		Minimum	Maximum	Minimum	Maximum
ENVIRONMENTAL LICENSING & PERMITTING COST (EXCLUDING MITIGATION)	**PROJECT T014 TOTAL**	**$773,000**	**$3,851,650**	**$776,500**	**$3,859,650**
	Expected Value	**$2,312,325**		**$3,477,112.50**	

Excluded cost: Mitigation or restoration for impact to regulated wetlands; agricultural land and tree clearing

ENVIRONMENTAL MITIGATION ESTIMATE

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WNY TRANSMISSION PROJECT - ENVIRONMENTAL MITIGATION COST ESTIMATE FOR T014

	Offsite Wetland Mitigation*				Farmland**	
	Preferred Route		Alternative Rotue		Preferred & Alternative Routes	
	Min.	Max.	Min.	Max.	Min.	Max.
Area	45 acres	45 acres	38 acres	38 acres	30 acres	60 acres
Cost/Acre	$60,000	$120,000	$60,000	$120,000	$503	$503
Ratio	1:1	3:1	1:1	3:1	1:1	1:1
Total	$ 2,700,000	$16,200,000	$2,280,000	$13,680,000	$15,090	$30,180

T014 PREFERRED ROUTE MITIGATION TOTAL	Minimum	Maximum	Expected Value
	$2,715,090	**$16,230,180**	**$ 9,472,635**

T014 ALTERNATIVE ROUTE MITIGATION TOTAL	Minimum	Maximum	Expected Value
	$2,295,090	**$13,710,180**	**$ 8,002,635**

*Offsite wetland mitigation area assumes clearing of NWI Forested/Shrub Wetland approx. 3.24 miles (17107 LF) by 115' ROW width for the Preferred Route and approx. 3.47 (18322 LF) by 90' ROW width for the Alternative Route; Max. cost per acre assumes additional mitigation required for permanent impacts of proposed structures in non-forested wetlands; costing includes design and installation costs only; does not include land acquisition or long term monitoring

**Farmland mitigation based on corn bushel yield at 129 BU/Acre and $3.9/BU (production numbers from 2016 USDA NYS Agriculture Overview), area assumes 9.8 miles (51744 LF) Land Adjacent to Agriculture District/Crop Land by 25' Wide (Min.) or 50' Wide (Max.); does not include land acquisition

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REAL ESTATE ESTIMATE
(NEW ROW)

COUNTY: ERIE
DEVELOPER: NEXTERA (T014 & T015 PREFERRED)
SEGMENT: DYSINGER - STOLLE SEGMENT

		Area (Acres)	Total Cost
	Total	0.68	$ 4,376.00

REAL ESTATE ESTIMATE
(INCUMBENT UTILITY ROW)

COUNTY: NIAGARA & ERIE
DEVELOPER: NEXTERA (T014 & T015 PREFERRED)
SEGMENT: DYSINGER - STOLLE SEGMENT

	DEVELOPER	SEGMENT	COUNTY	INCUMBENT UTILITY (ROW) (ACRES)	TOTAL ROW COST
1	NEXTERA ENERGY	Dysinger SS to Stolle Rd SS - 19.93 miles	Niagara	4.59	$ 1,793,000
			Erie	355.48	

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REAL ESTATE ESTIMATE
(NEW ROW - 80FT. CORRIDOR)

COUNTY: NIAGARA & ERIE
DEVELOPER: NEXTERA (T014 & T015 ALTERNATIVE)
SEGMENT: DYSINGER TO STOLLE ROAD SEGMENT

	Address	Area (Acres)	Total Cost
A	**NIAGARA COUNTY**		
	Sub Total (A)	5.30	$ 124,550.00
B	**ERIE COUNTY**		
	Sub Total (B)	191.75	$ 5,572,547.00
	Total (A + B)	197.05	$ 5,697,097.00

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REAL ESTATE ESTIMATE
(NEW ROW - 10FT. ADDITIONAL CORRIDOR)

COUNTY:	NIAGARA & ERIE
DEVELOPER:	NEXTERA (T014 & T015 ALTERNATIVE)
SEGMENT:	DYSINGER TO STOLLE ROAD SEGMENT

	Address	Area (Acres)	Total Cost
A	**NIAGARA COUNTY**		
	Sub Total (A)	0.59	$ 13,865.00
B	**ERIE COUNTY**		
	Sub Total (B)	26.28	$ 858,481.50
	Total (A + B)	26.87	$ 872,346.50

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REAL ESTATE ESTIMATE
(INCUMBENT UTILITY ROW)

COUNTY: NIAGARA & ERIE
DEVELOPER: NEXTERA (T014 & T015 ALTERNATIVE)
SEGMENT: DYSINGER - STOLLE SEGMENT

	DEVELOPER	SEGMENT	COUNTY	INCUMBENT UTILITY (ROW) (ACRES)	TOTAL ROW COST
1	NEXTERA ENERGY (Alternative)	Dysinger SS to Stolle Rd SS - 21.66 miles	Niagara	1.20	$ 90,000
			Erie	17.16	

REAL ESTATE ESTIMATE (HOUSES)

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COUNTY: ERIE

DEVELOPER: NEXTERA (T014 & T015 ALTERNATIVE)

SEGMENT: DYSINGER - STOLLE SEGMENT

	Address	Total Valuation of Property with 3% Escalation/year (as of 2017)
	Total Valuation Cost	$ 1,037,124.17

REAL ESTATE ESTIMATE

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COUNTY:	NIAGARA
DEVELOPER:	NEXTERA
SEGMENT:	DYSINGER SUBSTATION

	Address	Total Cost
	Total Cost of Proposed Substation Site	$ 251,450.00

REAL ESTATE ESTIMATE

Revision: 5

COUNTY:	ERIE
DEVELOPER:	NEXTERA
SEGMENT:	STOLLE ROAD SUBSTATION

	Address	Total Cost
	Total Cost of Proposed Substation Site	$ 135,520.00

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ASSUMPTIONS AND CLARIFICATIONS

a) Cost Estimate is based on 2017 rates.
b) Construction Schedule is in accordance with the Developers proposed schedule (6 months for construction - seems light) - we have assumed continuous working with no breaks in the schedule. Six months added for start up and close out works and assisting in pre-construction activities (i.e. permitting activates, material procurement etc.)
c) Stringing rates allow for protection over crossings (such as rider poles).
d) We have assumed a typical work week (6 x 10 hour days).
e) Wood Pole types are based on Plan and Profile drawings. Direct embed foundations are assumed to be 10% plus 2 ft and rates include backfill. Steel Pole weights and foundation types are estimated based on benchmark data.
f) We have assumed that the Access Road upgrades include gravel updates only.
g) Costs will vary for handling and disposal of contaminated spoils, depending on type of contaminants and availability / location of the appropriate tipping facility. Since there is not enough information to provide a quantified estimate for this item, allowance is included in the contingency monies.
h) Costs have been developed based on historical data from Projects of a similar nature (AACE Class 5 and 4 Estimating Practices). We have not engaged any subcontractors or material vendors for formal quotes.
i) The equipment types listed for Dysinger and East Stolle Rd Substation have been taken from a recently completed 345kV substation project, using current pricing.
j) Estimated quantities have been used for items in red text in Section 1 of the Estimate (CLEARING & ACCESS FOR T-LINE CONSTRUCTION). These items were not quantified in the Developers Estimate, however we believe that they are necessary for the works.
k) A Contractor Mark-Up (OH&P) of 15% has been included in the Total section
l) Assumes all environmental data and project details provided are accurate unless noted otherwise.
m) USFWS T&E assumes ¼ of the total Preferred Route will require field survey for T&E (5 miles).
n)USFWS T&E assumes ¼ of the total Alternative Route will require field survey for T&E (5. 5 miles).
o) NEPA-Assumes no NEPA because Art VII.
p) SHPO-Assumes consultation and Phase 1A/1B archeological studies with field survey for 50% of Preferred Route (10 miles) and Alternative Route (11 miles).
q) NYSDOT/FHWA-Assumes any required NEPA coordination/requirements are covered under Article VII.
r) Assumes no coordination with National Parks Service or OPRHP/State Parks.
s) USACE wetland delineation total for Preferred and Alternative Routes is based on combined NYSDEC/USACE wetland length of 3.9 miles from information in Proposal Attachment C.
t) NYSDEC delineations overlap and are accounted for in USACE costing.

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ASSUMPTIONS AND CLARIFICATIONS

u) Offsite wetland mitigation area costs for the Preferred Route based on impacts anticipated by clearing of NWI Forested/Shrub Wetland of approximately 3.24 miles (calculated by GEI based on NWI mapper legend categories). Assumes clearing an additional 115 feet within Right of Way. Minimum costs $60,000/acre at 1:1 ratio, maximum costs at $120,000/acre at 3:1 ratio for additional permanent impacts of proposed structures in non-forested wetlands. Costing includes design and installation costs only and does not include land acquisition or long term monitoring.
v) Offsite wetland mitigation area costs for the Alternative Route based on impacts anticipated by clearing of NWI Forested/Shrub Wetland of approximately 3.47 calculated by GEI based on NWI mapper legend categories). Assumes clearing 90 wide feet within Right of Way. Minimum costs at $60,000/acre at 1:1 ratio, maximum costs at $120,000/acre at 3:1 ratio for additional permanent impacts of proposed structures in non-forested wetlands. Costing includes design and installation costs only and does not include land acquisition or long term monitoring.
w) Agricultural mitigation for Preferred and Alternative Routes assumes timber matting impacts and pad impacts on adjacent agriculture land (9.8 miles) requires crop damage payments based on USDA 2016 NYS Agriculture Overview corn yield and bushel price/acre. Minimum assumes 25-foot-wide impact, Maximum assumes 50-foot-wide impact.
x) Assumes Right of Way restoration is accounted for in construction costs.
y) Mitigation costs for landscaping only (no paving, sidewalks, sound walls, etc.).
z) No tree survey or replanting required outside regulated wetlands areas.
aa) Article VII Intervenor Fund payment expected to be $100,000.
ab) Expected value of Alt. Route is estimated to be 50% higher than the mean of the range of environmental licensing and permitting costs due to new ROW.
ac) SUF pricing is included at the end of the estimate workbook (costs excluded from main estimate).
ad) SUF pricing includes 35% to cover Contractor markup (15%) and contingency (20%)
ae) Reconductor pricing (SUF 2 - Shaw to Swan Reconductor) is based on Niagara-Packard (National Grid) reconductor estimate, pro-rated to a rate / mile. Note that this is based on conductor, shieldwire and hardware pricing only and does not include structure or foundation works.
af) System Upgrade Facilities Contingency is allowance for potential additional system upgrades including overdutied breakers, protection changes, unidentified thermal issues, etc that may be identified as detailed studies are completed.

INDEPENDENT ESTIMATES

ATTACHMENT B10

T017 – EXELON TRANSMISSION

SUBSTATION ENGINEERING COMPANY
8/11/2017

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T017 - Exelon Transmission

Revision: 3

SUMMARY OF COST ESTIMATE

	Description		Total Amount
1	CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION	$	40,368,420
2	TRANSMISSION LINE FOUNDATIONS	$	16,694,900
3	STRUCTURES - TRANSMISSION LINE	$	30,784,427
4	CONDUCTOR, SHIELDWIRE, OPGW	$	15,797,866
5	TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE	$	4,498,017
6	STOLLE ROAD SUBSTATION WORKS:	$	3,616,500
7	GARDENVILLE 230kV SUBSTATION WORKS	$	3,414,500
8	NIAGARA SUBSTATION WORK	$	4,209,000
9	MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:	$	66,804,397
	CONTRACTOR MARK-UP (OH&P) 15%	$	27,928,204
	SUBTOTAL:	$	214,116,230
	CONTINGENCY ON ENTIRE PROJECT (25%)	$	53,529,058
	TOTAL (A):	**$**	**267,645,288**

10	SYSTEM UPGRADE FACILITIES	$	23,287,200
	CONTRACTOR MARKUP & CONTINGENCY (35%)	$	8,150,520
	TOTAL (B):	**$**	**31,437,720**

TOTAL PROJECT COST (A+B):	**$**	**299,083,008**

SECO SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

Description of Work: New Niagara to Stolle Road approx. 47 mile 345kV Line, new Gardenville - Stolle Rd 230kV Line approx. 12 miles, Niagara, Gardenville and Stolle Road Substation Upgrades.								
Item	**Description**	**Quantity**	**Unit**	**Supply Rate**	**Labor & Equipment Rate**	**Total Unit Rate:**	**TOTAL:**	**Comments:**
1. CLEARING & ACCESS FOR TRANSMISSION LINE CONSTRUCTION								
1.1	Clearing the ROW (mowing & clearing)	427.0	Acre		$ 15,000	$ 15,000	**$ 6,405,000**	
1.2	Access Road	14,256.0	LF		$ 45	$ 45	**$ 641,520**	Assumes Type 1 Type Gravel Road
1.3	Access Road Improvement	31,680.0	LF		$ 7	$ 7	**$ 221,760**	Assumes Type 1 Type Gravel Road
1.4	Silt Fence	163,680.0	LF		$ 4	$ 4	**$ 654,720**	
1.5	Matting	163,680.0	LF		$ 70	$ 70	**$ 11,457,600**	
1.6	Snow Removal	1.0	Sum		$ 900,000	$ 900,000	**$ 900,000**	
1.7	ROW Restoration	60.0	Mile		$ 10,000	$ 10,000	**$ 600,000**	
1.8	Work Pads	4,520,000.0	SF		$ 4	$ 4	**$ 15,910,400**	
1.9	Restoration for Work Pad areas	452,000.0	SF		$ 0.2	$ 0.2	**$ 67,800**	
1.10	Temporary Access Bridge	60.0	EA		$ 20,035	$ 20,035	**$ 1,202,100**	
1.11	Air Bridge	20.0	EA		$ 14,445	$ 14,445	**$ 288,900**	
1.12	Stabilized Construction Entrance	34.0	EA		$ 4,580	$ 4,580	**$ 155,720**	
1.13	Maintenance and Protection of Traffic on Public Roads	1.0	LS		$ 1,200,000	$ 1,200,000	**$ 1,200,000**	
1.14	Culverts / Misc. Access	1.0	LS		$ 600,000	$ 600,000	**$ 600,000**	
1.15	Concrete Washout Station	34.0	EA		$ 1,850	$ 1,850	**$ 62,900**	
TOTAL - CLEARING & ACCESS FOR TRANSMISSION LINE:							**$ 40,368,420**	
2. TRANSMISSION LINE FOUNDATIONS								
2.1	Drilled Pier 5ft dia.	2,111.2	CUY		$ 1,500	$ 1,500	**$ 3,166,800**	Supply & Install
2.2	Drilled Pier 6ft dia.	4,047.0	CUY		$ 1,500	$ 1,500	**$ 6,070,500**	Supply & Install
2.3	Drilled Pier 7ft dia.	1,320.0	CUY		$ 1,500	$ 1,500	**$ 1,980,000**	Supply & Install
2.4	Drilled Pier 8ft dia.	285.0	CUY		$ 1,500	$ 1,500	**$ 427,500**	Supply & Install
2.5	Drilled Pier 9ft dia.	155.4	CUY		$ 1,500	$ 1,500	**$ 233,100**	Supply & Install
2.6	Drilled Pier 10ft dia.	198.0	CUY		$ 1,500	$ 1,500	**$ 297,000**	Supply & Install
2.7	Rock Excavation Adder	2,260.0	CUY		$ 2,000	$ 2,000	**$ 4,520,000**	
TOTAL - TRANSMISSION LINE FOUNDATIONS:							**$ 16,694,900**	
3. STRUCTURES - TRANSMISSION LINE								
3.1	345kV Dead End / Strain Pole (30-90 deg angle) Ave 114ft	15.0	EA	$ 72,428	$ 43,457	$ 115,885	**$ 1,738,282**	
3.2	345kV Running Angle Pole (3-40 deg angle) Ave 114ft	28.0	EA	$ 58,743	$ 35,246	$ 93,989	**$ 2,631,686**	
3.3	345kV Tangent Pole Ave 112ft	302.0	EA	$ 37,890	$ 22,734	$ 60,624	**$ 18,308,448**	
3.4	345kV / ~~2 - 115kV~~ Dead End / Strain Pole (30-90 deg angle) Ave 168ft	2.0	EA	$ 151,938	$ 91,163	$ 243,101	**$ 486,202**	
3.5	345kV / ~~2 - 115kV~~ Running Angle Pole (3-40 deg angle) Ave 164ft	4.0	EA	$ 111,440	$ 66,864	$ 178,304	**$ 713,215**	
3.6	345kV / ~~2 - 115kV~~ Tangent Pole Ave 163ft	5.0	EA	$ 56,000	$ 33,600	$ 89,600	**$ 447,998**	
3.7	230kV Steel Dead End or Strain Pole (30-90 deg angle) Ave 86ft	8.0	EA	$ 32,834	$ 19,700	$ 52,534	**$ 420,273**	
3.8	230kV Steel Running Angle Pole (3-40 deg angle) Ave 117ft	18.0	EA	$ 43,265	$ 25,959	$ 69,224	**$ 1,246,026**	
3.9	230kV Steel Tangent Pole Ave 110ft	70.0	EA	$ 22,610	$ 13,566	$ 36,176	**$ 2,532,298**	
3.10	Install Grounding	452.0	Structure		$ 5,000	$ 5,000	**$ 2,260,000**	Supply & Install
TOTAL - STRUCTURES TRANSMISSION LINE:							**$ 30,784,427**	
4. CONDUCTOR, SHIELDWIRE, OPGW								
4.1	Bundled Rail ACSR Conductor, 954 kcmil, 45/7, 3 Phases	47.0	Mile	$ 79,200	$ 158,400	$ 237,600	**$ 11,167,200**	
4.2	Ortolan ACSR Conductor, 1033.5kcmil, 45/7, 3 Phases	12.1	Mile	$ 39,600	$ 79,200	$ 118,800	**$ 1,437,480**	
4.3	½" HS Steel (includes 2 x for 345kV, 1 x for 230kV)	560,208.0	Ft	$ 1	$ 5	$ 6	**$ 3,193,186**	
TOTAL: CONDUCTOR, SHIELDWIRE, OPGW:							**$ 15,797,866**	
5. TRANSMISSION LINE INSULATOR, FITTINGS, HARDWARE								
5.1	Tangent - Insulator Sets	1,131.0	Set	$ 900	$ 720	$ 1,620	**$ 1,832,220**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Comments:
5.2	Dead End / Angle - Insulator Sets	450.0	Set	$ 1,300	$ 1,040	$ 2,340	**$ 1,053,000**	
5.3	Post Insulators	75.0	Set	$ 1,500	$ 1,350	$ 2,850	**$ 213,750**	
5.4	OHSW Assembly - Angle / DE (2 x shieldwires 345kV, 1 x 230kV single EHS)	248.0	Set	$ 500	$ 400	$ 900	**$ 223,200**	
5.5	OHSW Assembly - Tangent (2 x shieldwires 345kV, 1 x 230kV single EHS)	684.0	Set	$ 250	$ 150	$ 400	**$ 273,600**	
5.6	Spacer Dampers	6,795.0	Ea	$ 50	$ 35	$ 85	**$ 577,575**	
5.7	Vibration Dampers - Conductor	5,436.0	Ea	$ 32	$ 20	$ 52	**$ 282,672**	
5.8	Shieldwire / OPGW Dampers, Misc Fittings	1.0	Sum	$ 30,000	$ 12,000	$ 42,000	**$ 42,000**	
TOTAL: TRANSMISSION LINE INSULATORS, FITTINGS, HARDWARE:							**$ 4,498,017**	
6. STOLLE ROAD SUBSTATION WORKS:								
	345kV Works							
6.1	Low Profile Foundations	22.0	Ea		$ 5,000	$ 5,000	**$ 110,000**	Supply & Install
6.2	Circuit Breaker Foundation	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
6.3	Below Grade Conduit & Grounding	1.0	Sum		$ 300,000	$ 300,000	**$ 300,000**	Supply & Install
6.4	Bus Support 1ph	12.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 36,000**	
6.5	Switch Stands	2.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 22,000**	
6.6	Misc. Structures	1.0	Sum		$ 27,000	$ 27,000	**$ 27,000**	
6.7	LA Stands	3.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 10,500**	
6.8	Instrument Transformers - 345kV	1.0	Sum		$ 146,000	$ 146,000	**$ 146,000**	
6.9	Motor Operated Disconnect Switches	2.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 60,000**	
6.10	Circuit Breaker 345kV	1.0	Ea	$ 300,000	$ 80,000	$ 380,000	**$ 380,000**	
6.11	Arrestors (3 per line)	3.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 22,500**	
6.12	Line Traps	1.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 21,000**	
6.13	Control Cables	1.0	Sum		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
6.14	Protection, Telecom and Metering Equipment	1.0	Sum		$ 90,000	$ 90,000	**$ 90,000**	Supply & Install
	230kV Works							
6.15	Demo 3ph VT Structure and Foundation	1.0	Sum		$ 15,000	$ 15,000	**$ 15,000**	Supply & Install
6.16	Low Profile Foundations	21.0	Ea		$ 5,000	$ 5,000	**$ 105,000**	Supply & Install
6.17	Caisson Dead End Foundation	4.0	Ea		$ 50,000	$ 50,000	**$ 200,000**	Supply & Install
6.18	Circuit Breaker Foundation	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
6.19	Lightning Mast Foundation	1.0	Ea		$ 15,000	$ 15,000	**$ 15,000**	Supply & Install
6.20	Below Grade Conduit & Grounding	1.0	Sum		$ 300,000	$ 300,000	**$ 300,000**	Supply & Install
6.21	Bus Support 3ph	1.0	Ea	$ 4,500	$ 2,000	$ 6,500	**$ 6,500**	
6.22	Switch Stands	2.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 22,000**	
6.23	Misc. Structures - 230kV	1.0	Sum		$ 33,000	$ 33,000	**$ 33,000**	
6.24	A-frame Dead End	1.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 25,000**	
6.25	LA Stands	3.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 10,500**	
6.26	Lightning Mast	1.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 12,000**	
6.27	Circuit breaker - 230kV	1.0	Ea	$ 250,000	$ 75,000	$ 325,000	**$ 325,000**	
6.28	Instrument Transformers - 230kV	1.0	Sum		$ 146,000	$ 146,000	**$ 146,000**	
6.29	Switches - 230kV	1.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 30,000**	
6.30	Arrestors (3 per line)	3.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 22,500**	
6.31	Line Traps	1.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 21,000**	
6.32	VT's 230kV Relocated	3.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 63,000**	
6.33	Control Cables	1.0	Sum		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
6.34	Protection, Telecom and Metering Equipment	1.0	Sum		$ 90,000	$ 90,000	**$ 90,000**	Supply & Install
6.35	Misc Above / Below Ground Works (345kV and 230kV)	1.0	Sum		$ 700,000	$ 700,000	**$ 700,000**	Supply & Install
TOTAL - STOLLE RD SUBSTATION WORKS:							**$ 3,616,500**	

SECO SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Comments:
7. GARDENVILLE 230kV SUBSTATION WORKS								
7.1	Site Works including sediment controls, access roads, rough grading, final grading	0.3	Sum		$1,000,000.00	$ 1,000,000	**$ 300,000**	Supply & Install
7.2	Substation Fence	200.0	LF		$200	$ 200	**$ 40,000**	Supply & Install
7.3	New microwave antenna pole foundation - caisson type	1.0	Sum		$75,000	$ 75,000	**$ 75,000**	Supply & Install
7.4	Relocate microwave antenna steel pole and ancillary equipment	1.0	Sum		$50,000	$ 50,000	**$ 50,000**	Supply & Install
7.5	Demo microwave antenna pole foundation	1.0	Sum		$20,000	$ 20,000	**$ 20,000**	Supply & Install
7.6	Switches 3ph	2.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 14,000**	
7.7	Line Switches 3 ph w/ motor operators	1.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 30,000**	
7.8	Instrument Transformers	1.0	Sum		$ 260,000	$ 260,000	**$ 260,000**	
7.9	Breakers	1.0	Ea	$ 250,000	$ 75,000	$ 325,000	**$ 325,000**	
7.10	Arrestors (3 per line)	3.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 22,500**	
7.11	Line Traps	1.00	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 21,000**	
7.12	Low Profile Foundations	31.0	Ea		$ 5,000	$ 5,000	**$ 155,000**	Supply & Install
7.13	Caisson DE Foundations	4.0	Ea		$ 50,000	$ 50,000	**$ 200,000**	Supply & Install
7.14	Circuit Breaker Foundations	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
7.15	Lightning Mast Foundations	1.0	Ea		$ 15,000	$ 15,000	**$ 15,000**	Supply & Install
7.16	Control Cables	1.0	Sum	$ 50,000	$ 50,000	$ 100,000	**$ 100,000**	
7.17	Protection , Telecom and Metering Equipment	1.0	Ea		$ 140,000	$ 140,000	**$ 140,000**	Supply & Install
7.18	SCADA and Communications	1.0	Sum		$ 50,000	$ 50,000	**$ 50,000**	Supply & Install
7.19	Control Conduits from Cable Trench to Equipment	1.0	Sum		$ 100,000	$ 100,000	**$ 100,000**	Supply & Install
7.20	Grounding	1.0	Sum		$ 100,000	$ 100,000	**$ 100,000**	Supply & Install
7.21	Bus Support 3 Ph	3.0	Ea	$ 4,500	$ 2,000	$ 6,500	**$ 19,500**	
7.22	Bus Support 1 Ph	3.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 9,000**	
7.23	Switch Stands	3.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 33,000**	
7.24	Misc. Structures	1.0	Sum		$ 13,000	$ 13,000	**$ 13,000**	
7.25	Substation A-Frame Structures Standalone	1.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 25,000**	
7.26	Lightning Masts	1.0	Ea	$ 10,000	$ 2,000	$ 12,000	**$ 12,000**	
7.27	Arrestor Stands	3.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 10,500**	
7.28	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 1,200,000	$ 1,200,000	**$ 1,200,000**	Supply & Install
TOTAL - GARDENVILLE SUBSTATION WORKS:							**$ 3,414,500**	
8. NIAGARA SUBSTATION WORK								
8.1	Site Works including sediment controls, access roads, rough grading, final grading	0.6	Sum		$ 1,000,000	$ 1,000,000	**$ 600,000**	Supply & Install
8.2	Substation Fence	320.0	LF		$ 200	$ 200	**$ 64,000**	Supply & Install
8.3	Switches 3ph	2.0	Ea	$ 5,000	$ 2,000	$ 7,000	**$ 14,000**	
8.4	Line Switches 3 ph w/ motor operators	1.0	Ea	$ 15,000	$ 15,000	$ 30,000	**$ 30,000**	
8.5	Instrument Transformers	1.0	Sum		$ 121,000	$ 121,000	**$ 121,000**	
8.6	Breakers	1.0	Ea	$ 250,000	$ 75,000	$ 325,000	**$ 325,000**	
8.7	Arrestors (3 per line)	6.0	Ea	$ 6,500	$ 1,000	$ 7,500	**$ 45,000**	
8.8	Line Traps	1.0	Ea	$ 13,000	$ 8,000	$ 21,000	**$ 21,000**	
8.9	345 kV buses	0.5	Ea	$ 25,000	$ 35,000	$ 60,000	**$ 30,000**	
8.10	Low Profile Foundations	37.0	Ea		$ 5,000	$ 5,000	**$ 185,000**	Supply & Install
8.11	Caisson DE Foundations	4.0	Ea		$ 50,000	$ 50,000	**$ 200,000**	Supply & Install
8.12	Circuit Breaker Foundations	1.0	Ea		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install
8.13	Control Cables	1.0	Sum	$ 50,000	$ 50,000	$ 100,000	**$ 100,000**	
8.14	Protection , Telecom and Metering Equipment	1.0	Sum		$ 90,000	$ 90,000	**$ 90,000**	Supply & Install
8.15	SCADA and Communications	1.0	Sum		$ 250,000	$ 250,000	**$ 250,000**	Supply & Install
8.16	Control Conduits from Cable Trench to Equipment	1.0	Sum		$ 75,000	$ 75,000	**$ 75,000**	Supply & Install

SECO SUBSTATION ENGINEERING COMPANY

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Comments:
8.17	Cable Trench Systems for Control Cables	1.0	Sum		$ 350,000	$ 350,000	**$ 350,000**	Supply & Install
8.18	Grounding	1.0	Sum		$ 125,000	$ 125,000	**$ 125,000**	Supply & Install
8.19	Underground Riser Structures	6.0	Ea	$ 2,500	$ 1,000	$ 3,500	**$ 21,000**	
8.20	Bus Support 1 Ph	6.0	Ea	$ 2,000	$ 1,000	$ 3,000	**$ 18,000**	
8.21	Switch Stands	2.0	Ea	$ 8,000	$ 3,000	$ 11,000	**$ 22,000**	
8.22	Misc. Structures	1.0	Ea	$ 1,000	$ 1,000	$ 2,000	**$ 2,000**	
8.23	Substation A-Frame Structures Standalone	1.0	Ea	$ 20,000	$ 5,000	$ 25,000	**$ 25,000**	
8.24	Arrestor Stands	6.0	Ea	$2,500	$ 1,000	$ 3,500	**$ 21,000**	
8.25	Miscellaneous Materials and Above / Below Ground Works	1.0	Sum		$ 200,000	$ 200,000	**$ 200,000**	Supply & Install
8.26	345kV underground cable with terminations. (680 Circuit Ft.)	1.0	Ea		$ 1,200,000	$ 1,200,000	**$ 1,200,000**	Supply & Install
TOTAL - NIAGARA SUBSTATION WORKS:							**$ 4,209,000**	
9. MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:								
	Contractor Mobilization / Demobilization							
9.1	Mob / Demob	1.0	Sum		$ 1,500,000	$ 1,500,000	**$ 1,500,000**	
	Project Management, Material Handling & Amenities					$ -	**$ -**	
9.2	Project Management & Staffing (includes PM, Field Engineers / Supervision,	32.0	Months		$ 350,000	$ 350,000	**$ 11,200,000**	
9.3	Site Accommodation, Facilities, Storage	1.0	Sum		$ 2,000,000	$ 2,000,000	**$ 2,000,000**	
	Engineering					$ -	**$ -**	
9.4	Design Engineering	1.0	Sum		$ 7,200,000	$ 7,200,000	**$ 7,200,000**	
9.5	LiDAR	1.0	Sum		$ 800,000	$ 800,000	**$ 800,000**	
9.6	Geotech	1.0	Sum		$ 1,700,000	$ 1,700,000	**$ 1,700,000**	
9.7	Surveying/Staking	1.0	Sum		$ 1,000,000	$ 1,000,000	**$ 1,000,000**	
	Testing & Commissioning							
9.8	Testing & Commissioning of TRANSMISSION LINE and Equipment	1.0	Sum		$ 1,800,000	$ 1,800,000	**$ 1,800,000**	
	Permitting and Additional Costs					$ -	**$ -**	
9.9	Environmental Licensing & Permitting Costs	1.0	Sum		$ 2,859,705	$ 2,859,705	**$ 2,859,705**	
9.10	Environmental Mitigation	1.0	Sum		$ 18,601,683	$ 18,601,683	**$ 18,601,683**	
9.11	Warranties / LOC's	1.0	Sum		$ 786,713	$ 786,713	**$ 786,713**	
9.12	Real Estate Costs (New)	1.0	Sum		$7,017,412	$ 7,017,412	**$ 7,017,412**	
9.13	Real Estate Costs (Incumbent Utility ROW)	1.0	Sum		$2,774,000	$ 2,774,000	**$ 2,774,000**	
9.14	Legal Fees	1.0	Sum		$ 3,500,000	$ 3,500,000	**$ 3,500,000**	
9.15	Sales Tax on Materials	1.0	Sum	$ 3,864,884		$ 3,864,884	**$ 3,864,884**	
9.16	Fees for permits, including roadway, railroad, building or other local permits	1.0	Sum		$ 200,000	$ 200,000	**$ 200,000**	
TOTAL - MOB/DEMOB, ENGINEERING, PERMITTING, T&C, PM & INDIRECTS:							**$ 66,804,397**	
10. SYSTEM UPGRADE FACILITIES								
SUF 1.1	Niagara Falls Blvd to Packard 115kV Line 130 Reconductor	3.67	Mile		$ 400,000	$ 400,000	**$ 1,468,000**	Rate for reconductor is pro-rated from National Grid Niagara - Packard reconductor. Note that rate does not include upgrades to structures or foundations.
SUF 1.2	Engineering, T&C, PM, Indirects FOR suf 1.1 (15%)					$ -	**$ 220,200**	
SUF 2.1	Reconductor National Grid 115kV Line 133	9.78	Mile		$ 400,000	$ 400,000	**$ 3,912,000**	Rate for reconductor is pro-rated from National Grid Niagara - Packard reconductor. Note that rate does not include upgrades to structures or foundations.
SUF 2.2	Engineering, T&C, PM, Indirects FOR SUF 2.2 (15%)					$ -	**$ 586,800**	

COST ESTIMATE

Item	Description	Quantity	Unit	Supply Rate	Labor & Equipment Rate	Total Unit Rate:	TOTAL:	Comments:
SUF 3.1	Depew to Erie Street 115kV Transmission Line 921. Terminal Allowance included. See comments.	1.00	Ea		$ 500,000	$ 500,000	**$ 500,000**	Relay was replaced and line ratings increased to 124/137/158 (NOR/LTE/STE) resulting ratings are below line conductor ratings. Scope is to remove all limitations on the circuit so is it limited by the line conductor ratings, 125/152/181 (NOR/LTE/STE). The limiting equipment is not known - scope undefined. Assumed 15% to cover all misc costs
SUF 3.2	Engineering, T&C, PM, Indirects FOR SUF 3.1(15%)					$ -	**$ 75,000**	
SUF 4.1	Packard to Huntley Reconductor	19.62	Mile		$ 400,000	$ 400,000	**$ 7,848,000**	
SUF 4.2	Engineering, T&C, PM, Indirects for SUF 4.1 (15%)					$ -	**$ 1,177,200**	
SUF 5	SYSTEM UPGRADE FACILITIES CONTINGENCY (SEE ASSUMPTIONS & CLARIFICATIONS)						**$ 7,500,000**	Contingency for possible additional SUF upgrades
TOTAL SYSTEM UPGRADE FACILITIES:							**$ 23,287,200**	

PROJECT TITLE WNY PROJECT EVALUATION- ENVIRONMENTAL LICENSING & PERMITTING COST ELEMENTS						ENVIRONMENTAL LICENSING & PERMITTING COST ESTIMATE RANGE FOR PROPOSED WNY TRANSMISSION PROJECT - T017	
FEDERAL							
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans	Min.	Max.
USACE	Waters of the US under Section 404 of the Clean Water Act and Section 10 of the 1899 Rivers and Harbors Act (including regulated wetland areas)	Nationwide Permits (NWP) or Individual Permit (IP)	Any work within the boundaries of regulated wetlands (with the exception of isolated wetlands) or waterways to the spring high tide or ordinary high water mark	If project qualifies for a NWP (<0.5 acre disturbance and within NWP project type parameters), a pre-construction notification (PCN) is typically required. NWPs have a 45 day review period starting from when project logged in system (up to 6wk backlog delay in logging projects) If an IP is triggered, USACE will require Alternative Analysis and Public Notice/Hearing. IPs could also trigger restrictive environmental work windows. IPs have a 120 day review period starting from when permit is "deemed complete"	Wetland Delineation; Wetland Function & Value Assessment; Stream Delineation; Restoration Plan	$46,760	$126,050
USFWS	Endangered Species Act Section 7 (ESA) Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act	Consultation (Formal or Informal); Special Use Permit	Any work that may have an affect on listed species or their habitat; or projects within National Wildlife Refuges	USACE coordinates consultation with USFWS for ESA listed species during their permit review. Also includes the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act compliance. Season restrictions on construction could be imposed.	Rare, Threatened & Endangered Species Search; Preparation of Reports and Conservation Plans	$80,800	$200,000
FAA	Airports / Airspace	Federal Aviation Administration (FAA) Notification	New or Replacement Structures near Airports	Depending on construction locations, this permit may only be needed for OP work.	Obstruction Analysis, Mitigation Plan (assumes Engineering Cost)	$3,000	$9,000
STATE							
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans		
NYS Public Service Commission / Department of Public Service (NYSDPS)	Article VII	Article VII: Certificate of Environmental Compatibility and Public Need and Environmental Management & Construction Plan (EM&CP)	Article 7: Major electric transmission facilities with design capacity of 100kV or more extending for at least 10 miles or 125kV and over extending a distance of 1 mile or more (some exclusions for underground transmission applies)	Article 7 will incorporate all of the required State and Local approvals (costed separately), as well as Engineering and Environmental Studies and Public Outreach. Intervenor Fund payment expected to be $350,000. An Environmental Management & Construction Plan (EM&CP) must be prepared and approved by the PSC. (see 16 NYCRR Parts 85 through 88)	Includes Reports and Plans required for State and Federal Agency Permits, as well as EM&CP, EMF, Noise, Air, Visual Impact Assessment, Invasive Species Control Plan, Mitigation Plans	$850,000	$3,350,000

NYSDEC	Article 15 Stream Disturbance; Article 24 Wetlands, Open Waters, Wetlands Buffers (100' for Freshwater Wetland)	Individual Permit (IP) (unless developer has General Permit (GP))	Any work within the boundaries of regulated waterways or wetlands, and wetland adjacent areas	Any disturbance within wetlands and/or below mean high tide will require an IP. Areas of temporary disturbance will likely require restoration, including a monitoring and maintenance period. Permanent disturbance will require offsite mitigation up to 3:1 area ratio; also includes a monitoring and maintenance period. GP may only be applicable if project ground disturbance is located outside of wetlands areas (above MHW).	Wetland Delineation; Wetland Restoration/Mitigation Plan	$12,000	$53,000
NYSDEC	Stormwater (If >1 Acre Soil Disturbance)	SPDES General Permit for Stormwater Discharges from Construction Activities GP-0-15-002 & SWPPP	Project areas of soil disturbance	If project involves 1 acre or more soil disturbance, then the GP is required. If located within a Regulated MS4 Municipality, additional coordination may be needed. Weekly inspections by a Qualified Inspector during construction will be required.	SWPPP (assumes Engineering Cost includes Sediment & Erosion Control Plan, Hydraulic & Hydrology Studies, Stormwater Management Design)	$11,200	$38,000
NYSDOS	State Coastal Management Program Mapped Coastal Area Boundary	Coastal Consistency Concurrence	Projects within the NYSDOS designated Coastal Zone; and consistency with Local Waterfront Revitalization Plans (LWRPs); e.g., Town of Grand Island LWRP	Online mapping available to check if within coastal zone, a significant coastal fish & wildlife habitat (SCFWH), a local waterfront revitalization program area (LWRP), or a comprehensive management program areas (CMP)		$3,400	$15,000
NYSHPO	National Historic Preservation Act (NHPA) Section 106: State and Federal Historic Places; State Mapped Archeologically Sensitive Areas	Cultural Resource Information System (CRIS) Determination	Local, State, or Federal eligible or designated historic places and/or areas of archeological sensitivity (in off-road areas and areas that have not been previously disturbed)	NYSDEC EAF Online Mapper identifies State or National Register of Historic Places and archeological sensitive areas within or adjacent to the project site. Formally enter project information and supporting documents into SHPO's online CRIS program. Staff will review and email a determination of impacts letter	Phase 1A & 1B Archaeological Studies (not included in costing)	$34,400	$112,600
NYS NHP	Threatened and Endangered Species	Consultation	Activities that may affect T&E species or their habitat.		See USFWS	$1,200	$6,400
NYSDOT/NYS Thruway Authority/FHWA	State Roadways	Highway Work Permit/Utility Permit, Vegetation Management Permit; Easement	Any work within or crossing State highway ROW	May require restoration landscaping coordination. Typically requires compliance with NEPA including SHPO and USFWS effects determination	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$17,000	$200,000
NYS Canal Corporation	Erie Canal - jurisdiction varies along edge	Canal Occupancy & Work Permit (TA-W99072)	Any work involving the Erie Canal	Must coordinate with Division Permit Engineer about particular section of canal being affected. Commercial permit fee = $25 plus $2,000,000 additional General Aggregate Liability Insurance	Work Zone Traffic Control (WZTC) Plan (assumes included in Engineering Cost)	$3,800	$3,800

ENVIRONMENTAL LICENSING AND PERMITTING

NYS Dept. of Agriculture and Markets	All agricultural lands (including Agricultural Districts)	Part of Article 7 & Article 10 Review process	Any work impacting agricultural land	Must minimize impacts and restore damage to agricultural land, and coordinate with County Soil & Water Conservation District; Vineyards are a major concern in WNYS. Pre-application conference with PSC, DEC and Ag& Markets recommended. Must develop EM&CP in conformance with Art. 7/10 Certificate Conditions. Agricultural Monitor must oversee construction & restoration; requisite 2-yrs post restoration monitoring.	Crop/Pasturing Mitigation Plan (not included in costing)	$11,000	$24,000
REGIONAL							
Railroads	Railroad crossings	Consultation-permits may be required; Easement	Access / new structures on RR property		Easement area survey (not included in costs)	$11,000	$200,000
LOCAL/MUNICIPAL							
Agency	Jurisdiction	Permit/Approval	Primary Regulated Areas	General Permitting Notes	Potential Studies/Plans		
County Dept. of Public Works	County Roadways	Lane Closure Permit, Highway Work or Access Permit	Work within county roadways and right-of-ways			$6,000	$40,000
Town, City or Village	Municipal Stormwater (MS4) Review	Approval of SWPPP or EM&CP	Project areas of soil disturbance		See NYSDEC SPDES	$6,000	$35,000
Town, City or Village	Variable	Building Permits	New Structures	Individual Towns/Villages must be consulted on a project specific basis to determine notification and/or permitting procedures. Permit application names vary (e.g. road obstruction permit)		$18,000	$92,000
Town, City or Village	Municipal Roadways	Highway Work Permit; Road Opening Permit	Work within municipal roadways and right-of-ways			$6,000	$35,000
Town, City or Village	Wetlands	Wetland Permit / Conservation Approvals	Mapped wetlands and wetland adjacent areas (buffer width variable)		See USACE / NYSDEC Art. 24	$6,000	$52,000

		Minimum	Maximum
ENVIRONMENTAL LICENSING & PERMITTING COST (EXCLUDING MITIGATION)	**PROJECT T017 TOTAL**	**$1,127,560**	**$4,591,850**
Excluded cost: Mitigation or restoration for impact to regulated wetlands; agricultural land and tree clearing	**Expected Value**	**$2,859,705**	

Client: NYISO
Project: Western Transmission Project Evaluation
Subject: Cost Estimate
Document No: T017 - Exelon Transmission

ENVIRONMENTAL MITIGATION ESTIMATE

Revision: 3

WNY TRANSMISSION PROJECT - ENVIRONMENTAL MITIGATION COST ESTIMATE FOR T017

	Offsite Wetland Mitigation*		Farmland**	
	Min.	Max.	Min.	Max.
Area	106 acres	106 acres	68.5 acres	137 acres
Cost/Acre	$50,000	$100,000	$503	$503
Ratio	1:1	3:1	1:1	1:1
Total	$5,300,000	$31,800,000	$34,455	$68,911

T017 MITIGATION TOTAL	Minimum	Maximum	Expected Value
	$5,334,455	**$31,868,911**	**$ 18,601,683**

*Offsite wetland mitigation area assumes clearing of NWI Forested/Shrub Wetland Approx. 6.68 miles (35270 LF) by 125' ROW width and 0.43 miles (2270 LF) by 95' ROW width; Max. cost per acre assumes additional mitigation required for permanent impacts of proposed structures in non-forested wetlands; cost per acre Min. and Max. reduced due to area total over 50 acres; includes design and installation costs only; does not include land acquisition or long term monitoring.

**Farmland mitigation based on corn bushel yield at 129 BU/Acre and $3.9/BU (production numbers from 2016 USDA NYS Agriculture Overview), area assumes 22.6 miles (119328 LF) based on Agricultural District Lands adjacent to the project route (GEI calculation) by 25' Wide (Min.) or 50' Wide (Max.); does not include land acquisition

Revision: 3

REAL ESTATE ESTIMATE
(NEW ROW)

COUNTY: NIAGARA & ERIE
DEVELOPER: EXELON (T017)
SEGMENT: NIAGARA - DYSINGER - STOLLE SEGMENT

		Area (Acres)	Total Cost
A	**NIAGARA COUNTY**		
	Sub Total (A)	52.72	$ 404,006.00
B	**ERIE COUNTY**		
	Sub Total (B)	0.68	$ 4,376.00
	Total (A + B)	53.40	$ 408,382.00

Revision: 3

REAL ESTATE ESTIMATE
(NEW ROW)

COUNTY: ERIE
DEVELOPER: EXELON (T017)
SEGMENT: STOLLE TO GARDENVILLE SEGMENT

		Area (Acres)	Total Cost
	Total	124.71	5,518,485.00

REAL ESTATE ESTIMATE
(INCUMBENT UTILITY ROW)

COUNTY: NIAGARA AND ERIE
DEVELOPER: EXELON (T017)
SEGMENT: NIAGARA TO STOLLE TO SEGMENT

	DEVELOPER	SEGMENT	COUNTY	INCUMBENT UTILITY (ROW) (ACRES)	TOTAL ROW COST
T017	Exelon Transmission	Niagara to Stolle - 47.12 miles	Niagara	358.49	$ 2,701,000
			Erie	296.31	
		Stolle Rd SS to Gardenville SS - 12.10 miles	Erie	14.63	$ 73,000

Revision: 3

REAL ESTATE ESTIMATE
(HOUSES)

COUNTY: ERIE
DEVELOPER: EXELON
SEGMENT: STOLLE ROAD SS TO GARDENVILLE SS

		Total Valuation of Property with 3% Escalation/year (as of 2017)
	Total Valuation Cost	$ 1,090,544.99

ASSUMPTIONS AND CLARIFICATIONS

Revision: 3

a) Cost Estimate is based on 2017 rates.
b)We have assumed a construction schedule of 10 months, with no breaks in the schedule. Six months have been added to the construction schedule PM time for start up and close out works and float.
c) Stringing rates allow for protection over crossings (such as rider poles).
d) We have assumed a typical work week (6 x 10 hour days).
e) We have assumed the Access Road included in Developer Estimate will be Type 1 Gravel Type.
f) Costs will vary for handling and disposal of contaminated spoils, depending on type of contaminants and availability / location of the appropriate tipping facility. Since there is not enough information to provide a quantified estimate for this item, allowance is included in the contingency monies.
g) Costs have been developed based on historical data from Projects of a similar nature (AACE Class 5 and 4 Estimating Practices). We have not engaged any subcontractors or material vendors for formal quotes.
h) Estimated quantities have been used for items in red text in Section 1 of the Estimate (CLEARING & ACCESS FOR T-LINE CONSTRUCTION). These items were not quantified in the Developers Estimate, however we believe that they are necessary for the works.
i) Foundation rates include supply and installation of materials. Drilled Pier rates include supply and testing of concrete, rebar cage and the use of temp or permanent casing.
j) Assumes all environmental data and project details provided are accurate unless noted otherwise
k) Considers entire route for costing (Niagara to Packard, Niagara to Stolle, Gardenville to Stolle)
l) USFWS T&E Assumes that ¼ of the Total Line in Right of Way will require field survey for T&E (Approx. 15.6 miles)
m) NEPA-Assumes no NEPA because Art VII
n) SHPO-Assumes consultation and Phase 1A/1B archeological studies with field survey for 50% of Total Line in Right of Way (Approx. 31.2 miles)
o) NYSDOT/FHWA-Assumes any required NEPA coordination/requirements are covered under Article VII
p) Assumes no coordination with National Parks Service or OPRHP/State Parks
q) USACE wetland delineation costs based on total Line Miles in Wetlands (8.94) - NWI and NYSDEC totals calculated by GEI for Niagara to Stolle (7.59 miles) and Stolle to Gardenville (1.35 miles)
r) NYSDEC delineations overlap and are accounted for in USACE costing.

ASSUMPTIONS AND CLARIFICATIONS

s) Offsite wetland mitigation area costs based on a total of approximately 6.68 miles of impacts anticipated by clearing of NWI Forested/Shrub Wetland for Niagara to Stolle and 0.43 miles for Stolle to Gardenville (calculated by GEI based on NWI mapper legend categories) Assumes clearing a width of 125 feet within the Niagara to Stolle Road Right of Way and a width of 95 feet in the Stolle to Gardenville ROW. Minimum costs at $50,000/acre and 1:1 ratio, maximum costs at $100,000/acre and 3:1 ratio for additional permanent impacts of proposed structures in non-forested wetlands. Costing includes design and installation costs only and does not include land acquisition or long term monitoring. Minimum and maximum costs for this proposal assumes a reduced mitigation cost/acre due to size of mitigation.
t) Agricultural mitigation assumes timber matting impacts and pad impacts on a total of 22.56 calculated by GEI from miles of adjacent agriculture district land (Niagara to Stolle and Stolle to Gardenville) requires crop damage payments based on USDA 2016 NYS Agriculture Overview corn yield and bushel price/acre. Minimum assumes 25-foot-wide impact, Maximum assumes 50-foot-wide impact.
u) No tree survey or replanting required outside regulated wetlands areas
v) Article VII Intervenor Fund payment expected to be $350,000
w) Mitigation costs for landscaping only (no paving, sidewalks, sound walls, etc.)
x) SUF pricing is included at the end of the estimate workbook (costs excluded from main estimate).
y) SUF pricing includes 35% to cover Contractor markup (15%) and contingency (20%)
z) SUF reconductor rate is based on Niagara-Packard (National Grid) reconductor estimate, pro-rated to a rate / mile. Note that this is based on conductor, shieldwire and hardware pricing only and does not include structure or foundation works.
aa) System Upgrade Facilities Contingency is allowance for potential additional system upgrades including overdutied breakers, protection changes, unidentified thermal issues, etc that may be identified as detailed studies are completed.