Congress 115kV Substation Flood Mitigation Update

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Project Summary

Project Summary
5 UI coastal substations are “at-risk” of simultaneous destruction from a single “100-year” flood event (greater than 40% chance over 50 years). Congress Substation was identified as one of the 5 UI substations. A project has been developed and constructed at Congress Substation to include flood protection to the 100-year flood level plus 3 feet. The objective of today’s presentation is to provide an update on the final cost for the Congress Substation Floodwall Project.

Outline

Presentation Contents
Background Information *Project Updates – Cost Breakdown* *Project Updates – Cost Increases* *Conclusion* *Questions* *Appendices*

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Background Information

Congress Substation

Project Details

- Weather events experienced in the recent years, along with revisions to Federal Emergency Management Agency (FEMA) flood maps have necessitated UI to take action to evaluate the risk and potential impact of a single 100-year coastal flooding event of its coastal substations and evaluate mitigating solution alternatives. UI Planning commissioned a study, *Coastal Substation Flooding Asset Condition Review*, to evaluate the flood risks and impacts at Congress Substation. The report concluded that the substation is "at-risk" of destruction and or/incapacitation for a FEMA 100-year flood event. The report further concluded the preferred solution to address flooding at the substation is to construct a floodwall system along the substation perimeter.
- The Base Flood Elevation (BFE) at Congress Substation is elevation 12.0 feet. This station is at risk as all critical equipment elevations are below the BFE (or FEMA 1% annual chance flood level). Loss of equipment would interrupt service to the substation and directly interrupt service to approximately 35,000 customers.
- The flood wall was designed to the 100-year flood level plus 3 feet.

Timeline

Date	*Description*
08/28/2011	Storm Irene
10/22/2012	Storm Sandy
07/18/2013	FEMA Flood Maps Updated
10/28/2015	Rain Event
09/21/2016	PAC Presentation[1]
07/19/2022	TCA Presentation[2]
07/31/2022	Construction Start
08/29/2024	In-Service Date
02/26/2025	PAC Update

Notes

(1) PAC Presentation – Coastal Substation Flood Mitigation Study, September 21st, 2016.

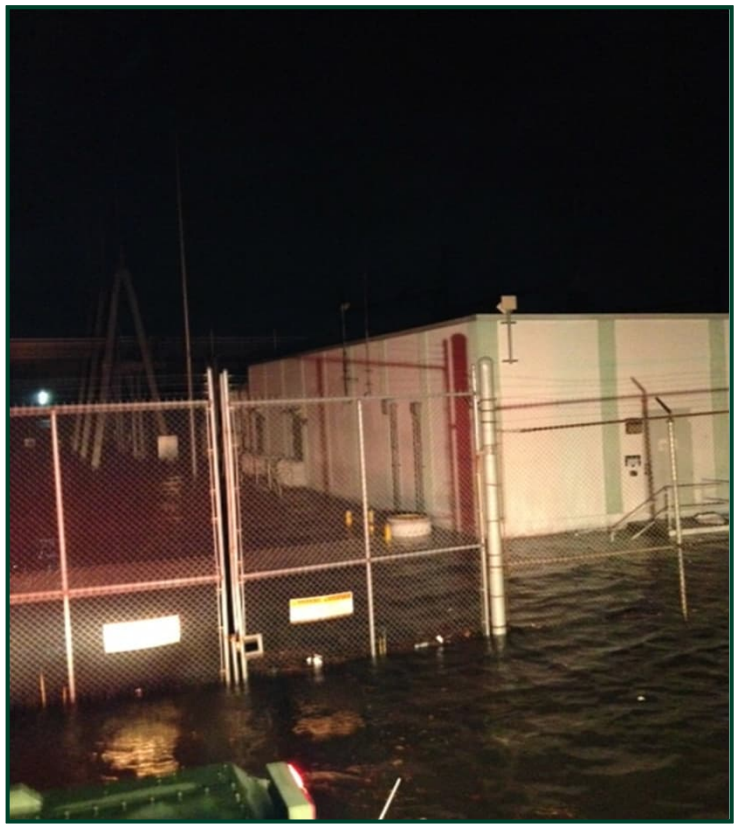
(2) TCA Presentation – Congress 115kV Substation Flood Mitigation TCA Presentation, July 19th, 2022.

Background Information – Flood Events

Congress Substation

Congress Substation – 2015 Rain Event
October 28th, 2015

Congress Substation – Storm Sandy
October 22nd, 2012



Congress Substation – Storm Sandy
October 22nd, 2012

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Cost Breakdown

	2016 Estimate, $M (PAC)					2022 Estimate, $M (RC)					2024 Estimate, $M (PAC)					Net $M Variance
	PTF	Non-PTF	Total	% of Total		PTF	Non-PTF	Total	% of Total		PTF	Non-PTF	Total	% of Total		
Material	0.90	0.80	1.70	10%		0.00	0.00	0.00	0%		0.00	0.00	0	0%		-1.70
Labor & Equipment	7.80	0.70	8.50	52%		22.60	0.60	23.20	63%		30.96	0.94	31.9	59%		23.40
Right of Way	0.00	0.00	0.00	0%		0.00	0.00	0.00	0%		0.00	0.00	0	0%		0.00
Engineering/Permitting /Indirect	2.20	0.10	2.30	14%		6.10	0.70	6.80	18%		17.29	0.53	17.82	33%		15.52
Escalation	0.30	0.00	0.30	2%		0.00	0.00	0.00	0%		0.00	0.00	0	0%		-0.30
Future Cost Allocations	1.40	0.00	1.40	8%		0.00	0.00	0.00	0%		0.00	0.00	0	0%		-1.40
AFUDC	0.50	0.00	0.50	3%		2.74	0.25	2.99	8%		4.06	0.12	4.18	8%		3.68
Contingency	1.80	0.00	1.80	11%		3.70	0.30	4.00	11%		0.00	0.00	0	0%		-1.80
Total	14.90	1.60	16.50	100%		35.14	1.85	36.99	100%		52.31	1.59	53.9	100%		37.40

Project Update

Cost Increase - Materials

Category Increase	
Increase ($M)	
Materials[1] *2016: $1.70M* *2022: $0.00M* *2024: $0.00M* *Variance: -$1.70M*	• Material cost is part of the construction contractor SOW and is included in their contract. • UI did not purchase any major materials. • Materials included are part of the construction cost (labor and equipment).

Note

(1) – Refer to Appendix A for a more detailed breakdown of the cost increase.

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Project Update

Cost Increase – Labor and Equipment

Category Increase	
Increase ($M)	

Labor and Equipment[1]
 	
2016: $8.50M
2022: $23.20M
2024: $31.90M
Variance: $23.40M
	• Land easements and permits caused a delay in construction by approximately six months.
	  • Delays include obtaining land easements and permits from the Juvenile Detention Center (JDC), Greater Bridgeport Transit Authority (GBTA) and Metro North Railroad (MNR).
	  • Land easements were not approved prior to construction start date. Team managed to obtain a temporary agreement for a year while working on getting the easements.
	• High soil management and disposal costs included cost increases due to handling hazardous waste[1].
	• Multiple underground utilities and structures found during construction which were not present on the previous as-built drawings had an impact on the installation of the design and caused delays in construction.
	• Settlements on one of the Metro North Railroad (MNR) rail bridge structures adjacent to our construction site beyond the entry permit monitoring limits caused a six-month delay in construction and required use of different equipment and additional settlement and subsoil condition monitoring.
	• Additional environmental permit requirements and requirements from the neighboring property owners including flood wall and piles design modifications. UI was required to build a water-based trestle platform and coffer dam to allow construction access for heavy machinery and equipment from the river side.
	• After contract was awarded, revisions were made to construction means and methods as defined in the accepted Issued for Construction (IFC) documents. This required permits to be resubmitted and caused a delay of approximately six months.
	  • The original basis of design was to conduct this work via a barge but the barge was not available at the required time necessitating in a change in the means and methods of construction.
	  • The change required having a trestle platform in place, requiring additional permits that were not originally included and took additional time to have approved.

Note

(1) – Refer to Appendix B and Appendix C for a detailed breakdown of the cost increase.

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Project Update

Cost Increase – Engineering Permitting Indirect

Category Increase	
Increase ($M)	
Engineering Permitting Indirect[1] *2016: $2.30M* *2022: $6.80M* *2024: $17.82M* *Variance: $15.52M*	• The timeframe for obtaining land easements and permits from the Juvenile Detention Center (JDC), Greater Bridgeport Transit Authority (GBTA) and Metro North Railroad (MNR) took longer than anticipated. • Additional environmental permit requirements and requirements from the neighboring property owners including flood wall and piles design modifications. UI was required to build a water-based trestle platform and coffer dam to allow construction access for heavy machinery and equipment from the river side. • Having a trestle platform in place required additional permits that were not originally included and took additional time to have them approved which delayed construction. • Settlements on one of the Metro North Railroad (MNR) rail bridge structures adjacent to our construction site beyond the entry permit monitoring limits caused a six-month delay in construction and required use of different equipment and additional settlement and subsoil condition monitoring. • Additional permitting requirements and design changes resulted in increases to engineering scope and indirect costs.

Note

(1) – Refer to Appendix D for a detailed breakdown of the cost increase.

Project Update

Cost Increase - AFUDC

Category Increase	
Increase ($M)	
AFUDC[1] *2016: $0.50M* *2022: $2.99M* *2024: $4.18M* *Variance: $3.68M*	• The timeframe for obtaining land easements and permits from the Juvenile Detention Center (JDC), Greater Bridgeport Transit Authority (GBTA) and Metro North Railroad (MNR) took longer than anticipated. • After contract was awarded, revisions were made to construction means and methods as defined in the accepted Issued for Construction (IFC) documents. This required permits to be resubmitted and caused a delay of approximately six months. • Settlements on one of the Metro North Railroad (MNR) rail bridge structures adjacent to our construction site beyond the entry permit monitoring limits caused a six-month delay in construction and required use of different equipment and additional settlement and subsoil condition monitoring. • In addition to delays noted, overall increase in labor and materials cost contributed to the increase in AFUDC.

Note

(1) – Refer to Appendix E for a detailed breakdown of the cost increase.

Conclusion

Project Summary

The Congress Substation Floodwall Project finished construction on August 29th, 2024. The original estimated project cost presented to the PAC in 2016 was $16.50M. There was an update presented to the RC in 2022 for the TCA with a cost of $37.0M. Due to increases in labor and equipment, engineering, permitting and AFUDC detailed throughout the presentation, the final cost of the project is $53.90M.

2016 Cost: $16.50M
2022 Cost: $37.00M
2024 Cost: $53.90M
Variance: $37.40M

Questions?

Please submit any comments to pacmatters@iso-ne.com and:	
Transmission Owner Contact	
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Appendices

Appendix Summary
Appendix A – Detailed Cost Increase – Materials *Appendix B – Detailed Cost Increase – Labor and Equipment* *Appendix C – Detailed Cost Increase – Labor and Equipment Continued* *Appendix D – Detailed Cost Increase – Engineering Permitting Indirect* *Appendix E – Detailed Cost Increase - AFUDC*

Appendix A – Detailed Cost Increase

Cost Increase - Materials

Category Increase	
Increase ($M)	
Materials *2016: $1.70M* *2022: $0.00M* *2024: $0.00M* *Variance: -$1.70M*	Material cost is part of the construction contractor SOW and is included in their contract. UI did not purchase any major material. Material is included as part of the construction cost (labor and equipment). Material cost escalation and material quantities above the estimated amounts including additional pile quantities were required due to the need to install deeper than originally designed. This is due to the geotechnical characteristics of the subsoil. Additional material was needed beyond estimated quantities, especially for gate piles due to the deeper embedment required. This was discovered during construction and the installation of the piles. Proper resistance in the soil wasn't reached until the piles were driven much deeper than originally anticipated.

Appendix B – Detailed Cost Increase

Cost Increase – Labor and Equipment

Category Increase	
Increase ($M)	
Labor and Equipment *2016: $8.50M* *2022: $23.20M* *2024: $31.90M* *Variance: $23.40M*	The timeframe for obtaining land easements and permits from the Juvenile Detention Center (JDC), Greater Bridgeport Transit Authority (GBTA) and Metro North Railroad (MNR) took longer than anticipated. This resulted in delays to the construction start date and led to increased costs for labor to support the easement and permitting process. The surrounding entities are in the project area and required easements to get construction started. Land easements were not approved prior to construction start date. Team managed to obtain a temporary agreement for a year while working on getting the easements but delayed construction start date. The delay was due to the surrounding entities having a lengthy process that doesn't depend on UI. Original estimated time for obtaining land easements was from August 2021 to July 2022. It took until December 2022 to finalize it, delaying the construction start date for six-months. Accepted Issued for Construction (IFC) drawings had undefined construction means and methods. These were changed by the awarded contractor after the initial submittal of permits which caused a significant delay in the resubmittal process for permits. High soil management and disposal costs included cost increases due to handling hazardous waste. Soil conditions were unidentified even after comprehensive analysis. The Jet grout management plan changed from a beneficial reuse product to a waste product requiring disposal due to possible cross contamination from outside sources and/or conditions that were not identified. This caused cost changes for the disposal of Jet grout as impacted which required additional management and oversight that was not originally anticipated. Multiple underground utilities and structures found during construction which were not present on the previous as-built drawings. This caused impacts on the installation of the design and delays in construction. One example being a portion of the drainage design had to be modified during construction (between March and July of 2024) due to subsurface obstructions not identified prior to engineering. This included removing portions of the drainage that was already installed.

Appendix C – Detailed Cost Increase

Cost Increase – Labor and Equipment Continued

Category Increase	
Increase ($M)	
Labor and Equipment *2016: $8.50M* *2022: $23.20M* *2024: $31.90M* *Variance: $23.40M*	Settlements on one of the Metro North Railroad (MNR) rail bridge structures adjacent to our construction site beyond the entry permit monitoring limits caused a six-month delay in construction. This required additional geotechnical and engineering investigations and modifications to the construction methods, use of different equipment and additional settlement and subsoil condition monitoring. This was discovered during construction in May 2023 as Metro North Railroad (MNR) structures settled beyond the agreed upon limit, yielding work stoppage in the immediate area. There was a lack of proper information for the engineering design including no as-built pier foundation drawings for the railroad overpass and insufficient geotechnical boring information in the settlement area. This portion was designed with assumptions and Geotechnical borings data being gathered prior to the design phase. Additional environmental permit requirements and requirements from the neighboring property owners including flood wall and piles design modifications. UI was required to build a water-based trestle platform and coffer dam to allow construction access for heavy machinery and equipment from the river side. UI needed to conduct a comprehensive vibration and settlement motioning program with restrictions on construction activities at certain times. The project is a water-front construction which required a trestle platform to facilitate access, specifically crane access and a coffer dam install to allow the enclosed area to be pumped out or drained to create a dry work environment. This was required to install the sheet piles of the wall. Having a trestle platform in place required additional permits that were not originally included and took additional time to have them approved which delayed construction. The original plan was to conduct this work via a barge.

Appendix D – Detailed Cost Increase

Cost Increase – Engineering Permitting Indirect

Category Increase	
Increase ($M)	
Engineering Permitting Indirect *2016: $2.30M* *2022: $6.80M* *2024: $17.82M* *Variance: $15.52M*	The timeframe for obtaining land easements and permits from the Juvenile Detention Center (JDC), Greater Bridgeport Transit Authority (GBTA) and Metro North Railroad (MNR) took longer than anticipated. This resulted in delays to the construction start date and led to increased indirect costs. Additional environmental permit requirements and requirements from the neighboring property owners including flood wall and piles design modifications. UI was required to build a water-based trestle platform and coffer dam to allow construction access for heavy machinery and equipment from the river side. UI needed to conduct a comprehensive vibration and settlement motioning program with restrictions on construction activities at certain times. The project is a water-front construction which required a trestle platform to facilitate access, specifically crane access and a coffer dam install to allow the enclosed area to be pumped out or drained to create a dry work environment. This was required to install the sheet piles of the wall. Having a trestle platform in place required additional permits that were not originally included and took additional time to have them approved which delayed construction. Settlements on one of the Metro North Railroad (MNR) rail bridge structures adjacent to our construction site beyond the entry permit monitoring limits caused a six-month delay in construction. This required additional geotechnical and engineering investigations and modifications to the construction methods, use of different equipment and additional settlement and subsoil condition monitoring. This was discovered during construction in May 2023 as Metro North Railroad (MNR) structures settled beyond the agreed upon limit, yielding work stoppage in the immediate area. There was a lack of proper information for the engineering design including no as-built pier foundation drawings for the railroad overpass and insufficient geotechnical boring information in the settlement area. This portion was designed with assumptions and Geotechnical borings data being gathered prior to the design phase. The original plan was to conduct this work via a barge.

Appendix E – Detailed Cost Increase

Cost Increase – AFUDC

Category Increase	
Increase ($M)	
AFUDC *2016: $0.50M* *2022: $2.99M* *2024: $4.18M* *Variance: $3.68M*	The timeframe for obtaining land easements and permits from the Juvenile Detention Center (JDC), Greater Bridgeport Transit Authority (GBTA) and Metro North Railroad (MNR) took longer than anticipated. This resulted in delays to the construction start date and led to increased indirect costs. Settlements on one of the Metro North Railroad (MNR) rail bridge structures adjacent to our construction site beyond the entry permit monitoring limits caused a six-month delay in construction. This required additional geotechnical and engineering investigations and modifications to the construction methods, use of different equipment and additional settlement and subsoil condition monitoring. This was discovered during construction in May 2023 as Metro North Railroad (MNR) structures settled beyond the agreed upon limit, yielding work stoppage in the immediate area. There was a lack of proper information for the engineering design including no as-built pier foundation drawings for the railroad overpass and insufficient geotechnical boring information in the settlement area. This portion was designed with assumptions and Geotechnical borings data being gathered prior to the design phase.