

#	ID	Proposing Entity	Focus Area	Project Title	Submitted Cost (\$M)
26	983			500 kV Safety Solutions (Optional reinforcements depending on selected proposals)	\$2,839.36

Ohio Cluster Proposals

Three entities submitted proposals to address the Ohio Cluster violations, and the selected proposals for detailed constructability evaluations are provided in **Table 5** below.

Table 5. Ohio Cluster Proposals for Detailed Evaluation

#	ID	Proposing Entity	Focus Area	Project Title	Submitted Cost (\$M)
1	605	ATSI	Ohio	ATSI 138kV Rebuild + Substation Terminal Upgrades	\$265.16
2	843			Lemoyne-Lake Ave 345 kV Line	\$455.04
3	294	NEETMH		Bay Shore-Davis-Besse-Lake Ave	\$257.30
4	357			Bay Shore-Davis-Besse-Lake Ave + Lemoyne-Lake Ave 345 kV	\$344.12
5	533			Lemoyne-Lake Ave 345 kV	\$202.08
6	694	TRNSRC		Fostoria Central-Lake Ave. 345 kV DC	\$328.37

CONSTRUCTABILITY ANALYSIS

Approach

PJM performs an in-depth review of the constructability of the project. This review will typically include an evaluation of project scope, complexity and constructability factors that impact the project cost and/or schedule including but not limited to **ROW** acquisition, land acquisition, siting and permitting requirements, project complexity, project coordination complexity, outage coordination, and project schedule. This window introduced an additional category on proposing entity experience and capability. The following is an outline of PJM and its consultants' approach for detailed constructability analysis of the selected projects:

- 1 | *Environmental (Regulatory) Analysis*: Examine each project utilizing available public-sector data, aerial photographs and internet-based real estate records to determine if the project is feasible and to identify potential regulatory permitting risks. The following is a list of the subtasks that are performed as part of this task:

- (a) Conduct a desktop review to identify significant barriers that might add additional risk to the project, and determine whether the proposed project area (a study area that is defined for each project) can support the economical construction of the electric transmission and/or substation facilities.

The following target information will be referenced by as required and as allowable by available public data sources:

- National Wetland Inventory mapping from United States Fish and Wildlife Service (USFWS), which will include counts and acreages of:
 - Total Non-Tidal Wetlands
 - Wetlands of Special State Concern
 - Subaqueous Lands
 - Total Wetlands
 - Non-Tidal (Non-Forested) Wetlands
 - Non-Tidal (Forested) Wetlands

- Mapping of specially designated wetlands, streams or rivers, which will include:
 - Non-Tidal Waterbodies (Count/Acres)
 - 100-Year Flood Plain (Acres)
 - Watershed Boundaries (Count)
 - Outstanding and Exceptional Waters (Count)
 - Wild and Scenic Rivers (Count)
 - United States Geologic Survey Blue Line Streams (Count)

- United States Department of Agriculture(USDA)/The Natural Resources Conservation Service (NRCS) Land Cover mapping, which will include acreages of:
 - Sub-Aquatic Vegetation
 - Forested Uplands
 - Unforested Uplands
 - Agricultural Lands

- Land-Use mapping, which will include:
 - Residences within 100 feet (Count)
 - Residences within 250 feet (Count)
 - Land Zoned Conservation (Acres)
 - Rural Legacy (Acres)
 - Program Open Space (Acres)
 - Private Conservation Easements (Acres & Count)
 - Public Land (Acres & Count)
 - Parcels Crossed (Count)
 - Green Infrastructure/Green Acres program (Acres)
 - National Estuarine Research Reserve Project Areas (Acres & Count)
 - Natural Heritage Areas (Acres & Count)
 - Environmental Trust Easements (Acres & Count)
 - Forest Legacy Easements (Acres & Count)
 - Tidelands
- Public Lands mapping review, which will include the types, counts and acreages of the following:

- State/National Forests
- Natural Areas
- Preserves
- Game Lands
- Recreation Areas

- Cultural Resources mapping review, including the count of previously identified resources, which will include the types, counts, and acreages of the following:
 - Listed and Eligible Historic Structures
 - Listed and Eligible Historic Districts
 - Listed and Eligible Archeological Sites
- Aquatic Resource mapping, including the count of Submerged Historic Resources (if applicable)
- Online distribution data of rare, threatened and endangered species within a 0.5-mile radius of the study area
- Major utility and transportation (roads and rail lines) corridors

(b) Identify those permits and agency consultations that are complex and require long lead times, therefore, potentially significantly affecting the project in-service date. Specifically, evaluate federal and state authorizations required for potential impacts to sensitive environmental resources such as wetlands; rivers and streams; coastal zone management areas; critical habitats; wildlife refuges; conservation land; and rare, threatened and endangered species. The assessment will result in a preliminary list of potential siting issues and permits that could impact cost and/or schedule, including estimated agency review times. Anticipated permit requirements may include the following:

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| <ul style="list-style-type: none"> • U.S. Army Corps of Engineers (USACE) – Section 404 Clean Water Act and Section 10 Rivers and Harbors Act • U.S. Fish and Wildlife Service (USFWS) – Section 7 Endangered Species Act, Migratory Bird Treaty Act, and Bald and Golden Eagle Protection Acts • U.S. Forest Service – National Forest Special Use Permit and Archaeological Protection Resources Act • National Oceanic and Atmospheric Administration (NOAA) National | <ul style="list-style-type: none"> Marine Fisheries Service – Magnuson-Stevens Fishery Conservation and Management Act (MSA) • U.S. Bureau of Ocean Energy Management • U.S. Bureau of Land Management – ROW Grant and Archaeological Protection Resources Act • Federal Aviation Administration (FAA) – Obstruction Determination and FAA Hazard Evaluation • U.S. Coast Guard – Aids to Navigation |
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- State Commission approvals
- State Agency – Rare, threatened, and endangered species issues and clearance requirements
- State Historic Preservation Office (SHPO) and clearance requirements
 - State Department of Transportation and clearance requirements
- State Agency – Section 401 Water Quality Certifications and other applicable water permits
- State Agency – National Pollutant Discharge Elimination System permit
- Local and/or State floodplain permit requirements

(c) Identify potential high-level risks and items that may require protracted permitting time frames or that may raise serious issues during the permitting process.

- 2 | *Transmission Line Analysis*: Review of transmission line modifications proposed based on desktop reviews investigating routing, conductor size and length, rights of way (ROWs) and easements, structures, and construction required
- 3 | *Substation Analysis*: Review of substation modifications proposed based on industry practices to estimate the equipment, bus and general layout required
- 4 | *Construction Schedule*: Prepare a preliminary project schedule for each project. The project schedule will be broken into four project phases: engineering; siting and major permit acquisition; long-lead equipment procurement; and construction and commissioning. Any significant risks to the project schedule will be discussed.
- 5 | *Cost Review*: Prepare preliminary estimate for each project based on engineering expertise and the most recent material and equipment costs. Costs will be broken into eight categories, as required: materials and equipment; engineering and design; construction and commissioning; permitting/routing/siting; right of-way (ROW)/land acquisition; construction management; company overheads and other miscellaneous costs; and project contingency (30%).

Analysis Results

The following sections outline the results of PJM and its consultants' detailed constructability evaluations performed on select proposals and their components organized into the Regional Clusters defined by PJM. These results are also the basis for the Constructability Risk Assessment matrices that are included in **Appendix A – Constructability Matrices** of this report.