

RI Reliability Project

Socioeconomic Impact and State Guide Plan Consistency Opinion

Prepared for the:

**Energy Facility Siting Board
(Docket No. 4029)**

By the:

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Introduction

This report was prepared by the Statewide Planning Program in response to an Energy Facilities Siting Board (EFSB) request for an advisory opinion on the socio-economic impact and State Guide Plan consistency of Narragansett Electric / National Grid's proposed RI Reliability Project (EFSB Docket No. 4029). It first provides an overview of the project including purpose and need, proposed improvements, estimated costs, and alternatives considered. It then presents the results of the Program's socioeconomic and State Guide Plan consistency assessments and concludes with findings and recommendations that constitute the Program's advisory opinion.

The EFSB has also requested advisory opinions on this matter from the Public Utilities Commission regarding the need and cost justification of the project and from the affected municipalities regarding its impact on their respective communities. A series of Public Hearings will also be conducted by the EFSB to ensure significant opportunity for others to comment.

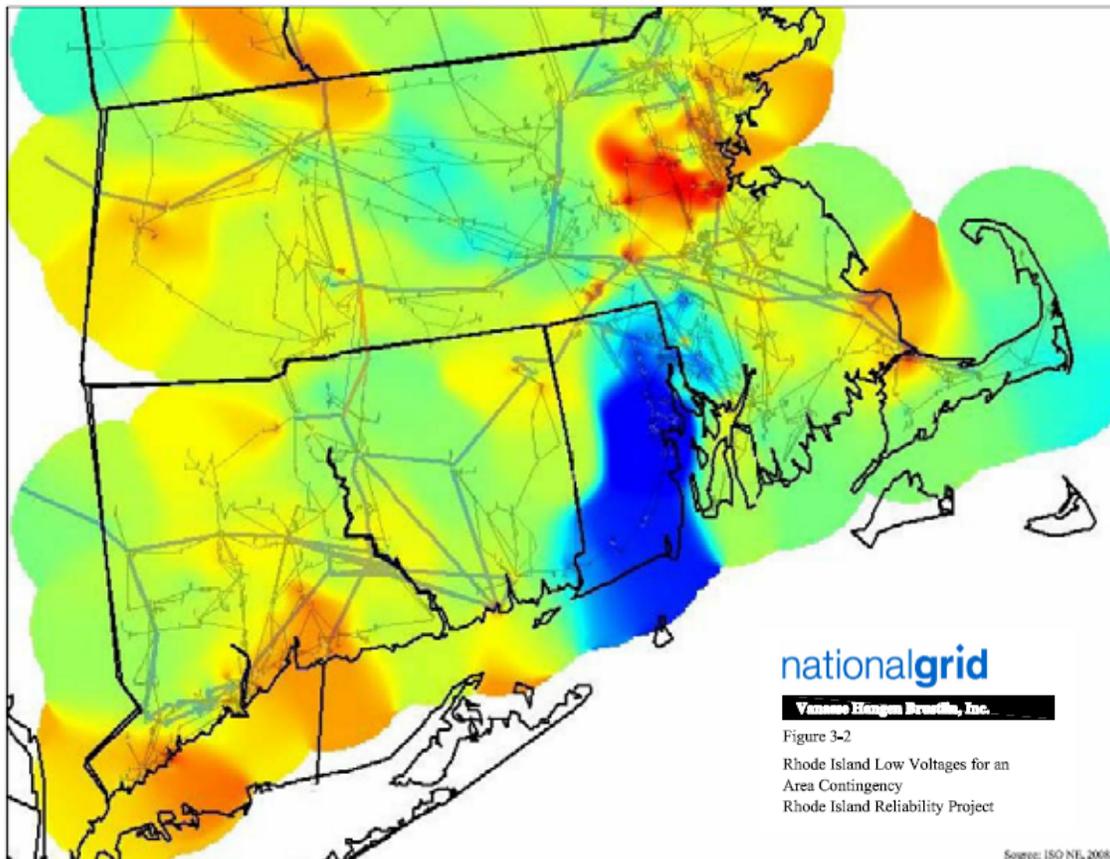
The EFSB consists of three members, the Chairman of the Public Utilities Commission, the Director of the Department of Environmental Management, and the Associate Director of the Department of Administration's Division of Planning. All state and local governmental regulatory authority for the siting, construction, alteration, operation, and licensing of major energy facilities are consolidated within the Board. Exceptions to the Board's authority include permits or licenses issued by the Rhode Island Department of Environmental Management and Coastal Resources Management Council.

Project Overview

Purpose and Need

In 2008 ISO-NE, National Grid, and Northeast Utilities undertook an extensive review of the transmission system in New England. The resulting studies, "Southern New England Transmission Reliability, Report 1, Needs Analysis" (January 2008) and "New England East-West Solutions, Report 2, Options Analysis" (June 2008) determined that *the transmission system supplying large portions of Rhode Island was reaching the limits of its ability to serve the load* (see Figure 1). In particular these studies found that the potential loss/failure of the single existing 332 345 Kv line which currently extends from the West Farnum Substation in North Smithfield through Smithfield, Johnston, Cranston and West Warwick to the Kent County Substation in Warwick, *would result in significant line and equipment overloads, unacceptable voltages, and/or large scale blackouts*. The purpose of this project is therefore to provide a reliable electric supply to the region by increasing the loading capability of this transmission corridor and maintaining acceptable voltages consistent with National Grid's planning guidelines.

Figure 1 – RI Low Voltages for an Area Contingency



2009 Rhode Island Low Voltages for an Area Contingency
A contingency on a 345 kV transmission line in the Rhode Island area could result in subsequent low voltages (area indicated in blue) throughout the state if the transmission system is not reinforced.

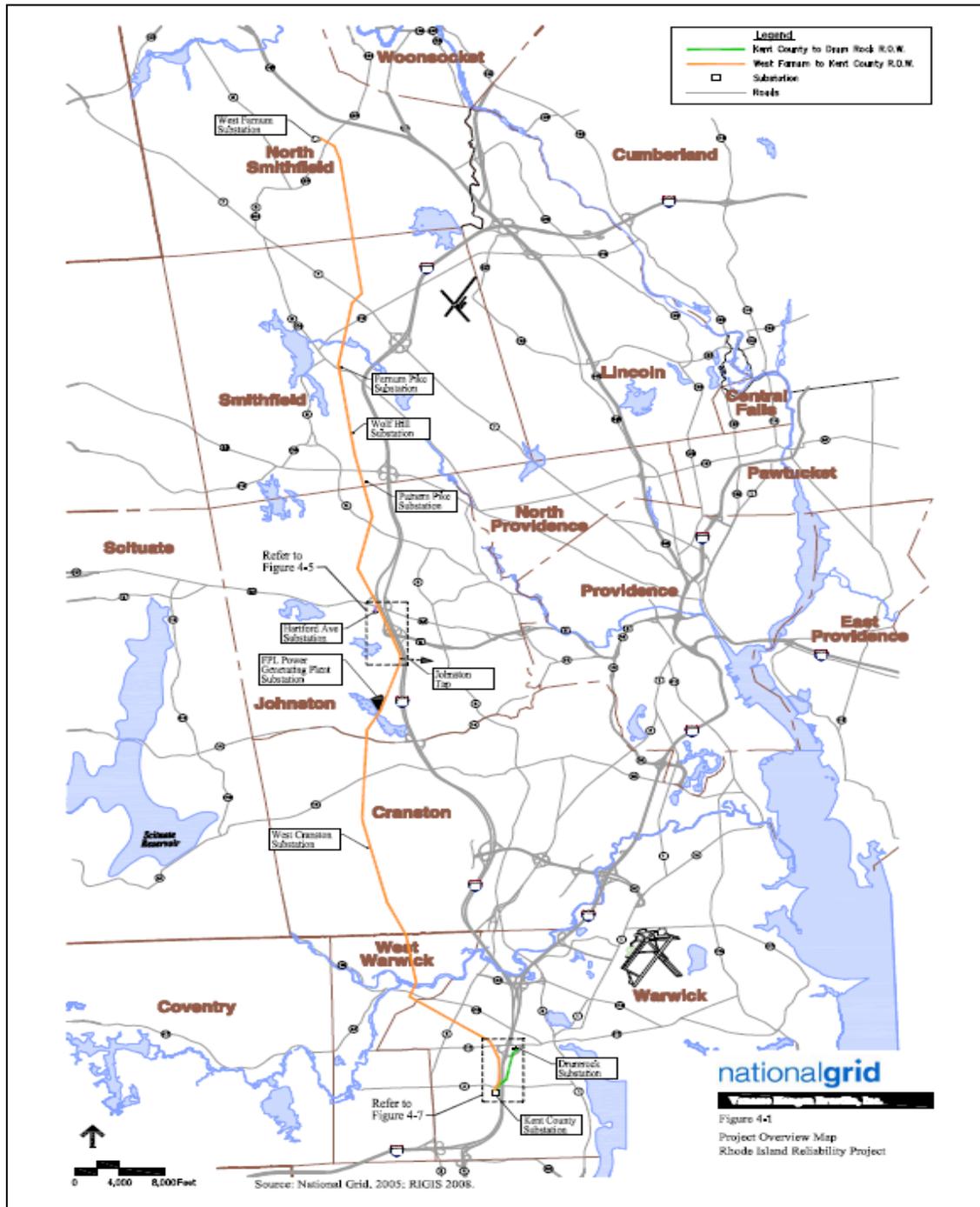
Proposed Improvements and Costs

National Grid's approach in meeting the above need focuses on providing redundancy to the single 345 Kv transmission line that currently serves the Kent County Substation in the south from the West Varnum Substation in the north. In order to achieve this within the confines of the existing ROW, National Grid proposes to relocate and upgrade or "reconductor" two existing transmission lines that run between the two points to make way for the installation of an additional 345 Kv line, to undertake substation improvements needed to accommodate the new 345 Kv line and to reconductor two short transmission line legs that service the local Hartford Avenue and Drumrock Substations (see Figure 2).

National Grid estimates total Project cost at \$247,000,000. Specific project components and their associated cost estimates are as follows:

1. Relocation and reconstruction of the 20.2 mile long S-171 and T-172 115 Kv transmission lines within National Grid's existing ROW (\$115,600,000).

Figure 2 – Project Overview Map



2. Construction of a new 21.4 Mile 345 Kv transmission line in the space created by relocating the two existing 115 Kv transmission lines (\$61,900,000).
3. Installation of additional switching and handling equipment at the Kent County and West Farnum Substations needed to accommodate the new 345 Kv transmission line (\$62,100,000).

4. Relocation of 0.2 miles of the L-190 and G-185S 115 Kv transmission lines at the Kent County Substation to accommodate the new 345 Kv transmission line (\$500,000).
5. Relocation of 0.7 miles of the H-17 and B-23 115 Kv, and the 332 345 Kv transmission lines in the vicinity of West Farnum Substation to accommodate the new 345 Kv transmission line (\$2,350,000).
6. Reconductoring the S-171 and T-172 115 Kv transmission lines between Hartford Avenue Substation in Johnston and the Johnston Tap Point (\$750,000).
7. Reconductoring the 1 mile G-185N 115 Kv transmission line from Kent County Substation to Drumrock Substation (\$3,800,000).

According to National Grid, all improvements have been designed in accordance with the reliability criteria contained in the latest version of the National Grid Transmission Planning Guide (May 2006) ("Transmission Planning Guide"), ISO New England, Inc. (ISO-NE) and New England Power Pool (NEPOOL) standards, the Northeast Power Coordinating Council (NPCC) criteria, and the North American Electric Reliability Corporation's (NERC) Reliability Standards (collectively, the Planning Documents).

Alternatives Assessed

The Rhode Island Reliability Project Environmental Report prepared for National Grid by the consulting firm of Vanasse Hangen Brustlin (VHB) reports the following regarding the assessment of alternatives to the proposed improvements:

Non-transmission Alternatives

Non-transmission alternatives, including demand side management, traditional generation, distributed generation, and combined heat and power were evaluated. These technologies did not address the numerous transmission overloading and voltage performance issues on the transmission system, and were dismissed for these reasons.

Alternative Transmission Interconnections

Two alternative transmission interconnections were evaluated. One was the development of a 345 Kv interconnection from Brayton Point in Somerset, MA to the Kent County Substation. The second alternative would have installed 115 Kv cables from the Franklin Square Substation in Providence to Sockanossett Substation in Cranston. Both of these options offered poor performance, resulting in overloaded facilities, and unacceptable system voltages.

Other Overhead Routes

Utilization of the National Grid owned, but presently undeveloped, ROW that runs between the Sherman Road and Kent County Substations was evaluated. Use of this 44 mile long ROW was found to be economically competitive to the proposed Project; however, the environmental effects associated with clearing the undeveloped ROW were found to be much greater than for the proposed Project.

National Grid also examined the potential use of existing roadway corridors in assessing alternative overhead routes. This proved undesirable however as required electrical

safety clearances would necessitate the acquisition of additional ROW along most public streets thereby potentially displacing homes, businesses, and other adjoining land uses, and adding significant cost and time to develop the alternative. The visibility of this type of installation would also be much greater than for the proposed Project.

Other Overhead Configurations within the existing ROW

Two alternative overhead configurations were considered within the existing ROW. These included H-frame construction for the 345 Kv transmission line, and double circuit davit arm construction with one of the 115 Kv lines on the same ROW. H-frame construction would have required significant ROW acquisition along the route, and double circuit alternatives had unacceptable common mode failure issues.

Underground Alternatives

Various underground alternatives were considered. These included route alternatives using the existing overhead ROW and the public roadway network as well as two separate cable technologies. However, compared to the preferred overhead plan (\$247,000,000), the underground alternative was rejected because of significantly higher construction costs (\$415,350,000), negative operational issues, and ramifications on future expansion.

Following an evaluation of the relative merits and short comings of the various transmission and non-transmission alternatives, National Grid determined that the proposed action of constructing the 359 345 Kv overhead single circuit davit arm transmission line within the existing ROW (with the associated other components of the Project) was the preferred alternative.

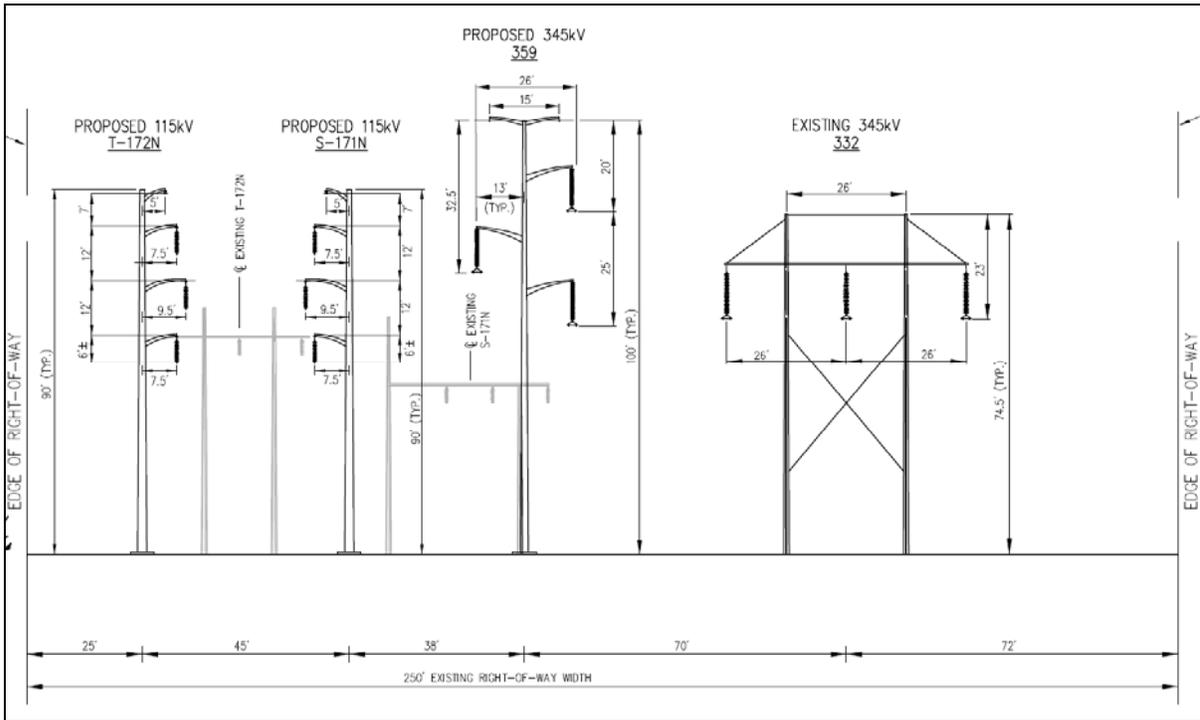
Socioeconomic Impact and State Guide Plan Consistency Assessment

Aesthetics

The most significant long-term negative impact of the project will be the lasting visual mark it leaves on the landscape. These impacts are primarily driven by the increased quantity and height of pole structures that will be used to suspend the relocated 115 Kv and new 345 Kv lines. For example, where the height of the taller existing 345 Kv structures generally range from 56.5 feet to 101.5 feet, the height of the new structures will range from 60 feet to 130 feet, an increase in the overall median height from 78.5 feet to 95 feet or 21% (see Figure 3).

In general the total number of structures located within the ROW would increase by approximately 33% due to the installation of the additional 345 Kv line. Although the viewshed analysis performed by the applicant indicates that the areas of visibility for the proposed 345 Kv transmission line will be similar to those of the existing lines; the visual simulations provided for the whole of the project clearly demonstrate that the aesthetic impact will be much more significant (see Figure 4).

Figure 3 – Typical ROW Cross-section Showing Existing and Proposed Structures



Source: National Grid, 2008.

National Grid's submittal also indicates that existing vegetation, structures and topography will be effective in screening views of the proposed 345 Kv transmission line from most areas and that they will evaluate the feasibility of using plantings to screen views of the proposed transmission structures. Realistically however, it should be recognized that there simply is no way to effectively conceal a 20 mile long string of transmissions lines supported by approximately 720 structures placed at 800' intervals and ranging in typical heights from 90 to 100 feet. Vegetative screening does have its place in mitigating visual impacts, but to meaningfully reduce the significant aesthetic impact of the proposed alternative, the quantity and height of the proposed structures would need to be reduced.

The Environment

Construction of the Project will result in impacts to wetland resources caused by vegetation clearing and the placement of fill for pole structure construction. Approximately 6.5 acres of vegetation will need to be cleared in order to install the new 345 Kv transmission line (approximately 0.75 acres of the clearing is within wetlands). Wetland impacts associated with the construction of pole structures include approximately 2,465 square feet of permanent biological wetland disturbance due to filling. Four transmission structures are proposed within FEMA mapped 100-year floodplain. Construction has the potential to cause water and wind erosion that could result in minor siltation of wetlands, water bodies and drainage systems. The Project appears to have minimal impact on geologic features, groundwater and rare, threatened or endangered species.

Figure 4 – Before & After Visual Simulations

Poppy Hill Drive, Smithfield



Gilcrest Drive, West Warwick



Bald Hill Road, Warwick



Source: Visibility and Visual Impact Assessment, RI Reliability Project, EDR, August 2008.

Noise

The project has the potential to create temporary noise concerns related to construction activities and long-term noise concerns related to the operation of the proposed additional 345 Kv transmission line. National Grid's submittal indicates that long-term noise concerns associated with the operation of electric facilities generally result from power transformers located within substations. Although additional transformers are not proposed for installation at the West Farnum substation in North Smithfield, a new transformer is proposed for installation at the Kent County substation in Warwick.

National Grid evaluated the existing noise conditions at this substation by direct measurements over a four day period. These measurements confirmed that the existing substation complies with the City of Warwick's noise ordinance. The sound produced by the additional transformer was modeled as well and the results indicate that there will not be any appreciable increase in the noise levels and the substation will remain in compliance with the City's noise ordinance. According to National Grid, transmission lines themselves do not typically generate appreciable noise levels under normal operating conditions.

Traffic Circulation

The need to remove and reinstall transmission lines across many arterial and collector roadways will require lane restrictions that have the potential to create numerous but relatively minor and temporary travel delays.

Electromagnetic Fields

National Grid plans to optimize the phasing of the new and relocated transmission lines in order to minimize electromagnetic fields (EMFs) at the edge of the ROW. The projected post-construction EMF levels were compared with levels calculated for the existing arrangement of electric lines using predicted 2012 annual average and annual peak loads. Because of the variations in the physical arrangement of lines in the ROW, some edge of ROW EMF levels will increase after the Project is completed and some will decrease. Correspondence with the applicant's representative dated May 26, 2009 indicates however that, the projected EMF levels of the proposed project will be below recommended limits for public exposure published by the International Committee on Electromagnetic Safety.

Cultural and Historic Resource

The excavation required for pole structure construction has the potential to unearth previously unknown archeological resources. The Project ROW has been subject to initial cultural and historic resource assessment studies and walkover surveys. Subsequent studies will concentrate on areas of known and reported resources and in zones of identified archaeological sensitivity. In areas of reported cultural resources and archaeological sensitivity, appropriate investigations will be undertaken prior to any excavation so that potentially significant resources can be evaluated and are not inadvertently disturbed.

The Economy

According to the applicant's response to Statewide Planning Data Request No. 2 dated March 12, 2009, sufficient information was not yet available to specify the exact number of workers by category that are to be employed in the construction of this project. As such, the detailed assessment of the economic impact of their employment, including multipliers traditionally undertaken by the Program, could not be conducted. The applicant currently estimates however that the project will result in "several hundred" temporary job opportunities for linemen, electricians and general construction workers. No new permanent jobs are anticipated as a result of the project. Given this and although the anticipated financial impact can not be quantified, it is assumed that the

project will have positive, albeit temporary, employment and economic impacts within the region.

Since detailed employee count and salary data are not available, the Program also could not complete the income tax based state revenue assessment generally conducted in reviewing these projects. Once again, it can be assumed however that the project will have positive, albeit temporary, revenue impacts to the State given the large number of workers that will be needed to construct the project and the likelihood that a portion of them will pay Rhode Island income taxes.

Significant long-term costs are not expected to accrue to the State as a result of the project. Likewise, significant costs are not expected to accrue to the pertinent municipalities as a result of the project. The project will be constructed within an existing ROW. Additional property acquisitions are not proposed and therefore the existing tax base will not be diminished. The project will not alter population demographics or existing building stock and therefore will not directly impact public education or safety provision costs. The project will not permanently alter municipal transportation infrastructure and the costs of police details needed to supervise temporary roadway restrictions will be borne by the applicant.

The Program’s economic evaluation does indicate that the affected municipalities can expect meaningful tax revenue gains from the construction of the project (see Table 1). It is also presumed that the assessed value of abutting properties will not depreciate appreciably since they already abut an active utility ROW that contains significant transmission infrastructure.

Table 1 – Projected Municipal Tax Revenues

Municipality	Existing Facilities			New Construction			Estimated Tax Revenue Gains		
	Project Cost	Asmnt. Rate	Assessed Value	Project Cost	Asmnt. Rate	Assessed Value	Total Assessed Value	Tax Rate/1000	Revenue
N. Smithfield	\$15,469,200	66%	\$10,209,672	\$46,023,300	95%	\$43,722,135	\$53,931,807	\$41.00	\$2,211,204
Smithfield	\$28,668,800	25%	\$7,167,200	\$15,351,200	95%	\$14,583,640	\$21,750,840	\$50.13	\$1,090,370
Johnston	\$29,824,800	25%	\$7,456,200	\$15,970,200	95%	\$15,171,690	\$22,627,890	\$56.00	\$1,267,162
Cranston	\$22,657,600	25%	\$5,664,400	\$12,132,400	95%	\$11,525,780	\$17,190,180	\$23.01	\$395,546
W. Warwick	\$8,092,000	25%	\$2,023,000	\$4,333,000	95%	\$4,116,350	\$6,139,350	\$31.71	\$194,679
Warwick	\$18,287,600	25%	\$4,571,900	\$30,189,900	95%	\$28,680,405	\$33,252,305	\$26.82	\$891,827
Total	\$123,000,000		\$37,092,372	\$124,000,000		\$117,800,000	\$154,892,372		\$6,050,787

This evaluation was conducted under the guidance of the Department of Revenue, Division of Municipal Finance. The assessment and tax rates utilized were confirmed with appropriate municipal officials. Of special note is the different rates used in assessing the value of “new construction” (359 transmission line and associated substation improvements) vs. those applied to improvements to otherwise “existing facilities” (all other relocation and reconducting components). The S-171, T-172 and 359 project costs were apportioned based upon the percentage of total ROW located within the respective municipalities. All other project costs were directly attributed to specific municipalities and distributed accordingly. Project costs utilized in the evaluation were those as updated by National Grid’s response to Statewide Planning Data Request No. 1 dated February 9, 2009. The results of the evaluation are provided as an indicator of potential municipal revenue gains only. They are not intended to be definitive statements on future taxing.

State Guide Plan Consistency

The Statewide Planning Program reviewed the proposed project for consistency with the goals and policies of the State Guide Plan. The project was found to be consistent with 21 out of the Plan's 29 individual elements. The remaining 8 Elements were found not to be directly applicable to the project. Substantial inconsistencies were not identified. Table 2 summarizes these findings by State Guide Plan Element. The factual basis for consistency determinations are detailed in the following section under findings. Additional information regarding the State Guide Plan consistency component of this assessment is available for review at the Division of Planning.

Table 2 – State Guide Plan Consistency Review Summary

No.	Topical Area Addressed	NA	Consistent	Inconsistent	Notes
110	Goals and Policies		√		See related findings in next section
112	Reuse of Surplus Navy Lands	√			Not located on surplus navy land.
121	State Land Use Plan		√		
125	Scituate Reservoir Plan	√			
131	Blackstone River Valley NHC Plan	√			
140	Historical Preservation Plan		√		
152	Outdoor Recreation Plan		√		
155	Greenspace and Greenways Plan		√		
156	Urban and Community Forestry Plan		√		
161	Forest Resources Management Plan		√		
162	Rivers Policy and Classification Plan		√		
171	Solid Waste Management Plan		√		
211	Economic Development Strategy		√		
212	Industrial Land Use Plan		√		
421	State Housing Plan		√		
423	Strategic Housing Plan		√		
611	Ground Transportation Plan		√		
621	Transit Facilities Policy Statement	√			Won't impact significant facilities.
640	Airport System Plan		√		
651	Waterborne Transportation Plan	√			Won't impact waterborne facilities.
661	Freight Rail Plan		√		
715	Narragansett Bay CCMP		√		
721	Water Supply Policies		√		
722	Water Supply Plan		√		
723	Water Emergency Response Plan	√			
724	Drought Management Plan	√			
731	Nonpoint Pollution Management Plan		√		
781	Energy Plan		√		
912	Howard Center Master Plan	√			Not located within Howard Center.
Total (out of 29)		8	21	0	

Advisory Opinion

The Statewide Planning Program is comprised of the State Planning Council and is staffed by the Rhode Island Department of Administration's Division of Planning. This report and the following findings and recommendations which constitute the formal advisory opinion on the socioeconomic impact and State Guide Plan consistency of the Rhode Island Reliability project, were initially drafted by staff and subsequently approved by the State Planning Council on June 11, 2009.

Findings

1. The proposed project substantially conforms to the goals, policies and objectives of the State Guide Plan in that it:
 - a. Improves the reliability of an existing transmission system that is reaching the limits of its ability to accommodate current service demands and is susceptible to significant overloads, unacceptable voltages, and large scale blackouts due to lack of redundancy in transmission capacity.
 - b. Bolsters economic and industrial growth initiatives while ensuring adequate public safety service provision in times of emergency.
 - c. Minimizes potential land use conflicts by placing improvements within an existing corridor that already contains significant transmission facilities and is primarily located within the Urban Services Boundary established by *Land Use 2025*.
 - d. Will not result in long-term negative impacts to drinking water supplies, groundwater, upland surface waters, or the waters of Narragansett Bay.
 - e. Will not result in long-term losses to existing housing stock, outdoor recreation facilities, or greenspace and greenways inventories.
 - f. Will not result in long-term negative impacts to automotive, transit, freight, airport or waterborne transportation infrastructure.
 - g. Minimizes impacts to the state's solid waste disposal capacity through the salvaging of existing conductor wires and metal components.
2. The proposed project will have positive local and regional economic benefits:
 - a. Municipal tax revenues generated within the ROW are expected to increase as a result of the infrastructure investment while municipal costs for service provision related to the continued operation of the transmission corridor are anticipated to remain constant.
 - b. Construction of the project will create "several hundred" temporary employment opportunities for linemen, electricians and construction workers and have positive economic spinoffs within the applicable communities, the State of Rhode Island and the region as a whole.
3. Negative social and environmental impacts produced in building the project will generally be temporary in nature or can be reasonably remediated through the application of standard mitigation measures or the passage of time. These include:
 - a. The clearing of 0.75 acres of wetland vegetation, the filling of 0.06 acres of wetlands and the associated loss of flood storage capacity.
 - b. The potential degradation of stormwater quality that can result from increased erosion and sedimentation rates associated with site clearing and excavation activities.
 - c. The travel delays that can result from the roadway restrictions that will be needed to facilitate the installation of transmission lines across right of ways.
 - d. The increased level of noise emanating from the corridor that will be generated as a result of construction activities.

3. The most significant, permanent and difficult to mitigate negative social impact of the proposed project will be the lasting visual mark that the increased height and quantity of transmission facilities will leave on the region's landscape.

Recommendation

In exercising its regulatory authorities over National Grid's proposed RI Reliability Project, the Statewide Planning Program recommends that the Energy Facility Siting Board ensures that:

1. Any approved design alternative minimizes the visual impact of the project to the most cost effective degree possible. Recognizing that construction within the existing ROW is the most cost effective starting point, the EFSB should consider securing independent engineering professionals to provide an objective technical assessment of the overall design approach; height, quantity and placement of individual structures and potential alternatives for limiting the visual impact including partial burials in the most severely impacted areas.
2. Wetland and flood water storage capacity losses are appropriately compensated for within the applicable watersheds.
3. Appropriate stormwater and erosion control procedures are required for all areas of vegetation clearing and excavation.
4. Affected municipalities are empowered to enforce their respective noise control ordinances if any.
5. Appropriate police details are provided for necessary roadway restrictions.
6. Impacts to cultural resources are avoided through investigation and coordination with the Rhode Island Historical Preservation and Heritage Commission (RIHPHC).

