COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

In the Matter of Brockton Power Company LLC Project Change Filing	)	EFSB 07-7A/D.P.U. 07-58/59

FINAL DECISION ON BROCKTON POWER COMPANY LLC PROJECT CHANGE FILING

Robert J. Shea
Presiding Officer
September 28, 2011

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LIST OF ABBREVIATIONS

ACE	-	Alternatives for Communities and Environment, Inc., a nonprofit corporation representing various individuals residing in the Town of West Bridgewater and the City of Brockton. The term "ACE" also refers to the intervenors themselves.
ACO	-	Administrative Consent Order
Air Plan	-	Air Plan Approval Application
AWRF	-	Advanced Wastewater Reclamation Facility, a wastewater treatment plant located in Brockton.
BMWS	-	Brockton Municipal Water Supply
BP	-	The petitioner, Brockton Power Company LLC
BWC	-	Brockton Water Commission
City	-	City of Brockton
CO	-	Carbon monoxide
Company	-	The petitioner, Brockton Power Company LLC
CWMP	-	The Comprehensive Water Management Plan developed by the City of Brockton
Department	-	Department of Public Utilities
dBA	-	A-weighted decibel
EPA	-	Environmental Protection Agency
°F	-	Degrees Fahrenheit
EFSB	-	Energy Facilities Siting Board
ERC	-	Emission Reduction Credit
Final Decision	-	The Final Decision issued in the consolidated cases of EFSB 07-7/ D.P.U. 07-58/D.P.U. 07-59 on August 7, 2009.

GHGs	-	Greenhouse gases
gpcd	-	Gallons per capita per day
GZA Report	-	Jones River Watershed Study: Final Report (2003) undertaken by GZA GeoEnvironmental, Inc. for the Massachusetts Department of Environmental Conservation, introduced into evidence as an attachment to RR-EFSB-ACE-C-25.
HRSG	-	Heat Recovery Steam Generator
kW	-	Kilowatt
L_{90}	-	Sound level exceeded 90 percent of the time
MADEP	-	Massachusetts Department of Environmental Protection
MA DCR	-	Massachusetts Department of Conservation and Recreation
MEPA	-	Massachusetts Environmental Protection Act
MGD	-	Million gallons of water per day
MGY	-	Million gallons of water per year
MISER	-	Massachusetts Institute for Social and Economic Research
MW	-	Megawatts
NAAQS	-	National Ambient Air Quality Standards
NEP	-	New England Power Company
NO_X	-	Nitrogen oxide
Original Proceeding	-	The consolidated proceeding denominated as EFSB 07-7 /D.P.U. 07-58/07-59, which concerns the Project.
PCF	-	The Project Change Filing submitted on April 9, 2010, which commenced the present proceeding.
$PM_{2.5}$	-	Particulate matter of 2.5 microns or less in diameter
PM_{10}	-	Particulate matter of 10 microns or less in diameter

Project	-	350 MW combined-cycle electric generating facility to be constructed adjacent to the AWRF in the Oak Hill industrial park located in Brockton, Massachusetts.
PSD	-	Prevention of Significant Deterioration
RGGI	-	Regional Greenhouse Gas Initiative
Section 69J¼ Petition	-	The petition to construct an energy generating facility brought by Brockton Power Company LLC pursuant to G.L. c. 164, § 69J¼, which was one of the petitions consolidated into the Original Proceeding.
Section 72 Petition	-	The petition seeking permission to construct a line for the transmission of electricity for distribution, which was brought pursuant to G.L. c. 164, § 72, and which was one of the petitions consolidated into the Original Proceeding.
SILs	-	Significant Impact Levels
Siting Board	-	Energy Facilities Siting Board
SO_2	-	Sulfur dioxide
SO_X	-	Sulfur oxides
Teal Study	-	Silver Lake and Jones River Watershed Study (2000) prepared by Teal Ltd. for the Jones River Watershed Association. The Teal Study was introduced into evidence as an attachment to RR-EFSB-ACE-C-25.
tpy	-	Tons per year
TRWA	-	The Taunton River Watershed Alliance
ug/m^3	-	Micrograms per cubic meter of air
ULSD	-	Ultra Low Sulfur Distillate
VOC	-	Volatile Organic Compound
WMA	-	Water Management Act, G.L. c. 21G

Zoning Exemption Petition	-	The petition seeking exemption from the zoning restrictions of the City of Brockton pursuant to G.L. c. 40A, § 3, which was one of the petitions consolidated into the Original Proceeding.

The Siting Board hereby (1) APPROVES, subject to the condition set forth below, Brockton Power Company LLC's ("Brockton Power" or "Company") proposed change that would eliminate the use of ultra low sulfur distillate ("ULSD") for fuel for the Project; (2) APPROVES Brockton Power's proposed change to the height of the Project's buildings; and (3) DENIES Brockton Power's proposed change that would allow the Project to use water from the Brockton Municipal Water Supply ("BMWS") rather than water from Brockton's Advanced Wastewater Reclamation Facility ("AWRF").

I. INTRODUCTION

On August 7, 2009, the Siting Board approved Brockton Power's 2007 Petition to construct a 350 MW generation facility in Brockton ("Project"). Brockton Power Company, LLC, EFSB 07-07 (August 7, 2009). On April 9, 2010, Brockton Power submitted a Project change filing ("PCF") to the Siting Board. In its PCF, Brockton Power seeks approval to: (1) eliminate the use of ULSD and to rely solely on natural gas as the Project's fuel; (2) change the design of the buildings in order, the Company asserted, to comply with local zoning restrictions; and (3) rather than using AWRF water for cooling, as originally proposed, use water from the BMWS (Exh. BP-C-1, at 1-6, 1-7). The proposed Project changes are discussed in further detail below.

II. PROCEDURAL HISTORY

On July 12, 2007, Brockton Power filed a petition with the Energy Facilities Siting Board ("Siting Board" or "EFSB") pursuant to G.L. c. 164, § 69J¼ (the "Section 69J¼ Petition") seeking approval to construct a 350 MW combined-cycle electric generating facility at the Oak Hill Industrial Park in Brockton, Massachusetts ("Project"). On the same day, the Company also filed two petitions with the Department of Public Utilities ("Department"). One of these two petitions requested individual and comprehensive zoning relief for the Project pursuant to G.L. c. 40A, § 3 (the "Zoning Exemption Petition," case number D.P.U. 07-58), while the other petition requested permission to construct and operate a transmission line pursuant to G.L. c. 164, § 72 ("Section 72 Petition," case number D.P.U. 07-59). The two Department cases were referred to the Siting Board for review and decision pursuant to G.L. c. 25, § 4, and all three

were consolidated into one proceeding. These consolidated cases are referred to herein as the "Original Proceeding."

There were six intervenors and six limited participants in the Original Proceeding.[1] A total of 20 days of evidentiary hearings were held, and more than 800 exhibits were introduced into evidence. Five parties and two limited participants filed initial briefs and five parties filed reply briefs. The Siting Board met three times in public session to hear arguments and to deliberate on this matter. In a decision issued on August 7, 2009, ("Final Decision") the Siting Board approved the Section 69J¼ Petition, with conditions, and approved the Section 72 Petition, also with conditions (Final Decision at 117-120). The Board, however, denied the Zoning Exemption Petition (id. at 120). Three of the intervenors appealed, and their appeals were consolidated. A single justice of the Supreme Judicial Court has twice issued a stay of the appeal pending the Board's decision on the PCF. City of Brockton v. Energy Facilities Siting Board, SJ-2009-0453 (orders dated May 25, 2010, and June 27, 2011).

The Company submitted the PCF on April 9, 2010. The Project change proceeding is a continuation of the Original Proceeding. Consequently, the parties and limited participants in the Original Proceeding continued to be parties and limited participants in the Project change proceeding. The Siting Board staff and the intervenors issued extensive discovery relating to the Project change, and staff held six days of evidentiary hearings. The City, the Company, ACE, and TRWA filed initial briefs; and the City, the Company, and ACE filed reply briefs.

III. STANDARD OF REVIEW

In its 2009 approval of the Project, the Siting Board required the Company to notify it of any Project changes other than minor variations, so that it might decide whether to inquire further into such issues. Final Decision at 120-121. The standard of review to determine

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[1] The intervenors are: the Taunton River Watershed Alliance ("TRWA"), the Town of West Bridgewater ("West Bridgewater"), various residents of Brockton and West Bridgewater represented by Alternatives for Communities and Environment, Inc. ("ACE"); New England Power Company ("NEP"); Custom Blends, LLC ("Custom Blends") and the City of Brockton ("City"). The limited participants are: Brockton City Councilor Thomas G. Brophy; State Representative Geraldine Creedon; former State Senator Robert S. Creedon, Jr.; Linda Balzotti, Mayor of the City of Brockton; State Representative Christine E. Canavan; and Susan Nicastro.

whether further inquiry is warranted was articulated by the Siting Board in the Berkshire Power Decision on Compliance ("Berkshire Compliance Decision") 7 DOMSB 423, at 437 (1997). In the Berkshire Compliance Decision, the Siting Board declined to make further inquiry regarding certain project changes if the change did not alter in any substantive way either the assumptions or conclusions reached in its analysis of the project's environmental impacts in the Original Proceeding. Id.; see also IDC Bellingham LLC Decision on Compliance ("IDC Bellingham Compliance Decision") 11 DOMSB 27, at 38-39 (2000).

In the present PCF, it was established that further inquiry would be required. At the first procedural conference, on May 3, 2010, four of the intervenors moved orally that the Project change be treated as a completely new proceeding (Transcript of Procedural Conference, dated May 3, 2010, at 9, 11, 13-15). This issue was subsequently briefed by the parties and the Presiding Officer issued a ruling denying the motion but concluding that further inquiry was necessary to determine whether the Siting Board could approve the Project as changed in the PCF. Accordingly, the Presiding Officer set forth a procedure that called for discovery, pre-filed testimony, evidentiary hearings, and briefs before the case would be presented to the Siting Board for decision (Ruling on Intervenors' Request That Brockton Power's Project Change Filing Be Treated as a New Petition ("New Petition Ruling") at 11).

In a case such as this one, where the Board has conducted further inquiry, the Board evaluates the environmental impacts of a proposed change or changes to ensure that those impacts have been minimized consistent with the minimization of costs associated with the mitigation, control, and reduction of environmental impacts. In prior project change proceedings, the Board has compared the environmental impacts of the facility as originally approved with the environmental impacts of the project as changed. Where impacts increased, the Board has explored mitigation options. Cape Wind Associates, LLC Project Change ("Cape Wind PC"), 16 DOMSB 194, 214-215 (2008); Fore River Development, LLC Project Change ("Fore River PC"), 15 DOMSB 403, 421-422 (2006); Sithe Mystic Development, LLC Project Change ("Sithe Mystic PC"), 13 DOMSB 118, 137-139 (2001). Where relevant, the Board also has considered whether a rebalancing of environmental impacts with reliability and diversity of supply was needed. Fore River PC, 15 DOMSB at 409. Also, the Board has considered a balancing of environmental advantages of the proposed change against environmental disadvantages, some of which can only partially be mitigated. Cape Wind PC, at 206-215.

In addition to reviewing environmental impacts, the Board has considered whether proposed changes were consistent with the current health and environmental protection policies of the Commonwealth. See IDC Bellingham Compliance Decision, 11 DOMSB at 74-75.

As in the original petition to construct proceeding, Brockton Power has the burden of proving that the Project as changed by the PCF "minimize[s] the environmental impacts consistent with the minimization of costs associated with the mitigation, control and reduction of the environmental impacts of the proposed generating facility . . ." G.L. c. 164, § 69J¼, ¶ 5 (iv). See Fore River PC, 15 DOMSB at 415-420.

IV. ELIMINATION OF ULSD CAPABILITY

A. Evidence on ULSD Elimination

The Company proposes to eliminate the capacity to burn ULSD as an alternative to natural gas for up to 60 days (1440 hours) per year (Exh. BP-C-1, at 3-1).[2] The Company stated that while the design and operation of the Project using ULSD for a maximum of 60 days (1440 hours) per year was approved by the Siting Board, and while emissions from the plant when firing ULSD would have met all applicable air quality standards, the Company continued to review several factors related to the use of ULSD as an alternative fuel (Exh. BP-C-1, at 3-1). These factors included community concern over emissions and USLD truck deliveries, as well as the Company's concern that the U.S. Environmental Protection Agency ("EPA") might establish Significant Impact Levels ("SILs") for particulate matter 2.5 microns or smaller in size ("$PM_{2.5}$") (id.).[3] The Company stated that it also reconsidered the dual-fuel design in light of information "reflecting the expansion of natural gas supplies available to the Northeast" and the willingness of Bay State Gas to sign a firm gas transmission agreement (id. at 3-1). The Company asserted that the gas supply expansion, coupled with the firm gas transmission agreement with Bay State

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[2] In both the original and gas-only design, there will be three 2,000 kW "black-start" ULSD-fired generators. These black-start generators can be used to restart the turbine in the event that system power is not available (Exh. BP-C-1, at 3-2).

[3] At the time of the PCF, the U.S. EPA was considering several different possible SILs for $PM_{2.5}$ (Exh. BP-C-1, at 3-6). As modeled in the approved Project, 24-hour maximum emissions of $PM_{2.5}$ would have exceeded the lowest of the U.S. EPA's proposed 24-hour maximum SILs (id.).

Gas, negotiated by the Company after the EFSB's decision in the Original Proceeding, assured the reliability of a gas-only plant (Exh. EFSB-C-G-7). The Company asserted that a gas-only plant would result in a significant reduction in plant emissions, lower capital and operating costs, reduced visual impacts from the elimination of the ULSD storage tank, elimination of most of the truck deliveries of ULSD, and reduced water requirements (Exhs. BP-C-1, at 3-1; EFSB-C-C3).

1. Air Emissions

The Company stated that the elimination of the capability to burn ULSD as an alternative fuel would result in a significant reduction in the Project's potential air emissions, both on an annual and a 24-hour basis (Exh. BP-C-1, at 3-1). The Company explained that it had submitted a revised Air Plan Approval Application ("Air Plan") to the Massachusetts Department of Environmental Protection ("MADEP") in March of 2010 (Exhs. EFSB-C-G-6; EFSB-C-G-6(a)). The revised Air Plan reflected a 100 percent gas-fired facility[4] (Exh. EFSB-C-G-6(a)). MADEP issued a Proposed Conditional Approval of the Air Plan Approval Application on May 3, 2010 (Exh. EFSB-C-G-6). The Company's Air Plan and MADEP's Proposed Conditional Approval of the Air Plan indicated that significant reductions in annual potential emissions for criteria pollutants would result from the proposed change from gas/ULSD to a gas-only facility (Table 1) (Exh. BP-C-1, at 3-3).[5] These reductions range from a low of ten percent for carbon monoxide ("CO") to a high of 42 percent for $PM_{2.5}$ (id.).

[4] For purposes of the "Potential to Emit" calculations in the Air Plan, the Company assumed the equivalent of one of three "black start" diesel generators operating at full load for 400 hours per year (Exhs. EFSB-C-G-6; EFSB-C-G-6(a)).

[5] No party denies that the elimination of the capability to burn ULSD would reduce air emissions associated with the Project. However, the City reasserted its position expressed in the Original Proceeding that the modeled air quality impacts have been inaccurately portrayed by relying on historical meteorological data from Boston's Logan Airport instead of the data available from the Taunton Municipal Airport (COB Brief at 16-17). The decision in the Original Proceeding found that Logan Airport data are likely to be representative of wind patterns in Brockton and that the Company's air modeling approach is likely to comport with MADEP standards. Final Decision at 26.

Table 1: Reductions in Facility-Wide Potential Annual Emissions*

Pollutant	Gas and ULSD (tpy)	Gas Only (tpy)	Reduction (tpy)	% Reduction
NO_X	107.1	76.1	31.0	-29%
CO	108.9	98.5	10.4	-10%
VOC	31.0	19.2	11.8	-38%
PM_{10}**	85.2	51.8	33.4	-39%
$PM_{2.5}$**	85.2	49.1***	36.1	-42%
SO_2	6.9	5.3	1.6	-23%

* Annual emissions are based on a 12-month rolling average, calculated on a monthly basis.

** PM_{10} and $PM_{2.5}$ are not separate pollutants; $PM_{2.5}$ emissions are a subset of PM_{10} emissions (Exh. BP-C-1, at 3-3).

*** The Company reported a 2.9 tons per year ("tpy") reduction in $PM_{2.5}$ associated with a change in assumption about $PM_{2.5}$ in cooling tower drift. The 2.9 tpy change is the only reported difference in $PM_{2.5}$ in the gas-only facility, so the total $PM_{2.5}$ in the gas-only facility calculates to 48.9 tpy. This small (0.2 tpy) discrepancy is unexplained.

The proposed change to a gas-only facility would result in potential annual emissions for each criteria pollutant falling below the 100 tpy level at which the facility would be subject to a Prevention of Significant Deterioration ("PSD") review and permitting by the U.S. EPA (id.). However, the Company acknowledged that the U.S. EPA is in the process of developing a PSD threshold for greenhouse gases ("GHGs"), including carbon dioxide ("CO_2") (id.). If this PSD requirement for GHGs is in effect when construction of the Project begins, the Company will have to have complied with relevant federal requirements (id.).[6]

Further, the Company stated that as a result of the reduction in potential annual nitrogen oxides ("NO_x") emissions associated with the Project change, the facility will require fewer NO_X Emission Reduction Credits ("ERCs") (id.). Specifically, as originally proposed the facility would have been required to offset its NO_X emissions with 135 tons of ERCs per year (107.1 tpy of potential annual emissions of NO_X times a ratio of 1.26) (id.). With the gas-only facility, the required ERCs will be 95.9 tpy, a reduction of 39.1 tpy in ERCs (id.).

In addition to the reductions in potential annual emissions, the Company's modeling of the gas-only facility indicated that there are reductions in the modeled ground level 24-hour and

[6] The Company acknowledged that, regardless of the status of the U.S. EPA rule on PSD for GHGs, the Project will be subject to the Regional Greenhouse Gas Initiative ("RGGI") requirements and will need to offset all its GHG emissions (Exh. BP-C-1, at 3-3).

annual maximum concentrations of criteria pollutants (id. at 3-5 to 3-6). These reductions in ground level concentrations of criteria pollutants result from the elimination of ULSD capability, a revised assumption on $PM_{2.5}$ in the cooling tower drift, and the improved aerodynamic downwash associated with the replacement of the 130-foot HRSG enclosure with a 116-foot acoustically treated sound wall (id.). In total, these three factors produce very significant modeled reductions in ground level concentrations of all criteria pollutants (Table 2).

Table 2: Modeled Air Quality Impacts vs. SILs and NAAQS

Pollutant	Averaging Period	Approved Project Max Impact (ug/m3)	Gas Only Max Impact (ug/m3)	% Reduction	SIL (ug/m3)	Gas Only Modeled Air Concentration as % of NAAQS(3)
NO_2	Annual Max	0.0325	0.0265	19%	1	9%
	1-Hour Max		2.36		8	29.4%
SO_2	3-Hour (H2H)	0.229	0.098	57%	25	4.4%
	24-Hour (H2H)	0.137	0.055	60%	5	9.3%
	Annual Max	0.00225	0.002	10%	1	10.0%
PM_{10}	24-Hour (H2H)	3.43	1.90	45%	5	24.4%
	Annual Max	0.25	0.24	5%	1	37.1%
$PM_{2.5}$[(1)][7]	24-Hour[(2)]	3.43	0.61	82%	1.2[(1)]	80.9%
	Annual Max	0.25	0.03	89%	0.3[(1)]	63.1%
CO[8]	1-Hour (H2H)	7.78	1.44	82%	2,000	8.6%
	8-Hour (H2H)	4.43	0.69	84%	500	18.9%

Sources: Exhs. BP-C-1, at 3-5 and 3-6; EFSB-C-G-6 (Supp.) at 21
(1) Reflects the U.S. EPA SILs for $PM_{2.5}$ adopted on 10/20/2010 and slated to become effective 10/20/2011
(2) Five-year average of maximum 24-hour high values
(3) Modeled air concentrations include measured background levels
H2H = highest second high value

[7] With respect to $PM_{2.5}$, the City contends that the Company has underestimated total PM emissions from the emergency or "black start" generators and that as of January 2011 the applicable standard for these generators will have changed from Tier 2 non-road engine to a more stringent Tier 4 non-road standard (COB Brief at 13-14). The Company asserts that it has correctly followed U.S. EPA calculations and cites the receipt of a Proposed Conditional Air Plan Approval for the Project (without ULSD) from MADEP in May 2010 (Exh. EFSB-C-G-6(a) App. C at 10; EFSB-C-G-6(b); Company Brief at 20; Company Reply Brief at 16-17). Furthermore, the Company stated that Tier 4 standards became effective in January 2011 and, therefore, that the Company will purchase emergency generators that meet those standards (Company Reply Brief at 16-17).

[8] The City asserted that the Company has understated the Project's CO emissions (COB Initial Brief at 8-9; COB Reply Brief at 3-6). The Company countered that its calculations are correct and follow acceptable modeling procedures (Company Initial Brief at 22; Company Reply Brief at 13-14). The Company also stated that once the plant has been constructed and is operational, it will be subject to enforceable annual and hourly limits that will have been set out in MADEP's Conditional Air Plan Approval (Company Initial Brief at 14-15).

2. Number of Truck Deliveries

In the Original Proceeding, the Company estimated that after the initial filling of its 750,000-gallon ULSD storage tank (which would have required 12 tanker truck deliveries per day over ten days), tanker deliveries would generally occur sporadically depending upon the number of hours that the plant operated on ULSD (Exh. BP-1, at 4-69). The Company stated that after the initial filling of the tank, the maximum frequency of deliveries would be two trucks per hour during the coldest days of winter when natural gas was unavailable and the plant was operating continuously on ULSD (id.). The currently proposed gas-only plant would eliminate all of the ULSD deliveries associated with fuel for the turbine, leaving only a small number of ULSD deliveries associated with supplying fuel for the emergency "black start" generators.[9] The Company noted that there would continue to be tanker truck deliveries of aqueous ammonia[10] at a rate of two to three per month (id.).

3. Other Environmental Impacts

The elimination of the capability to burn ULSD would also result in a small reduction in the visual impact and total water requirements of the Project (Exh. BP-C-1, at 3-1). The proposed design changes would eliminate the 750,000-gallon ULSD storage tank and its associated containment dike and foam fire suppression system, as well as the ULSD truck unloading area, pumps and piping (id.). The ULSD storage tank would have been located at the southwest corner of the site (Exh. BP-1, at 1-17, 4-86, 4-87).

The elimination of the capability to burn ULSD would eliminate the need for water injection for NO_X control (Exh. BP-C-1, at 2-30). The Company estimated that water injection requirements for NO_X control while firing on ULSD would have been about 150,000 gallons

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9 The record does not indicate the number of ULSD deliveries associated with the black start generators. However, the Air Plan indicates that the maximum permitted hours of emergency generation per year would require 57,160 gallons of ULSD (Exhs. EFSB-C-G-6; EFSB-C-G-6(a) at App. C). If the ULSD were delivered in typical tank trucks with a capacity of 12,500 gallons, this would indicate that as few as five deliveries a year could be required (assuming adequate on-site storage at the plant).

10 Aqueous ammonia is used in the Selective Catalytic Reduction system, which serves to reduce the level of NO_X emissions from the plant (Exh. BP-1, at 4-72).

per day or a maximum of nine million gallons per year assuming the total permitted 60 days of ULSD firing (id.).

The Company also asserts that the elimination of ULSD capability would reduce the impervious proportion of the proposed Project site surface area (Exh. BP-C-1, at 1-7).

4. Reduced Capital and Operating Costs

The Company reported that the capital cost of the Project would be approximately $4.53 million lower for the gas-only plant than for a dual-fuel/ULSD plant (Exh. EFSB-C-C3). The majority of the reduction in capital cost would be associated with the lower cost of a gas-only turbine compared to a dual-fuel turbine ($4 million) (id.). The remaining $532,000 in savings would be due to the elimination of the ULSD storage tank, ULSD unloading facilities, and oil pumping and piping (id.). Operational cost would also be significantly reduced due to reduced need for pre-filtration and chemical treatment of water (Exh. ACE-C-C-1).

5. Impact on Reliability of Regional Electric System

As recently as 2006, the EFSB accepted potential increased air quality and other environmental impacts in exchange for the system reliability and fuel diversity benefits achieved by having dual-fuel capacity at a gas-fired power plant. Fore River PC, 15 DOMSB at 403 (EFSB approved an "Alternative Fuel Plan" in which the applicant agreed to switch from low-sulfur diesel to ULSD in exchange for an increase in the number of days it could run on oil). See also Brockton Power, LLC, 10 DOMSB 157, 192 (2000); Sithe Edgar Development LLC, 10 DOMSB 1 (2000).

The Company asserted that because it has a firm gas transportation agreement with Bay State Gas[11] for gas delivery to the plant and because of recent expansions in the capacity of the interstate gas pipeline infrastructure and added liquefied natural gas ("LNG") receiving terminals serving New England, the Project would provide a reliable energy supply even without ULSD backup capability (Exh. EFSB-C-G-7).

The Company provided evidence that eight Massachusetts merchant power plants built since the Commonwealth's adoption of electric utility deregulation in 1997 operated exclusively

[11] The record indicates that the Bay State Gas contract is firm with regard to transmission capacity on the Bay State system (Exh. BP-C-1, at 3-1).

on natural gas in 2008-2009, despite the fact that four of the facilities were also permitted and built to burn distillate fuel oil (Exh. BP-C-1, at 2-32). The Company stated that its firm transmission contract with Bay State Gas should reduce the concern about the facility's reliability (Exh. BP-C-1, at 1-5).

B. Analysis and Findings on ULSD Elimination

The Company has demonstrated that the elimination of the capacity to burn ULSD would result in significant reductions in environmental impacts. The elimination of ULSD would reduce the emissions of criteria pollutants on an annual, 24-hour, and hourly basis. The proposed change would also significantly reduce tanker truck traffic to the plant and reduce somewhat the visual impact, capital and operating costs, and water usage of the facility.

In its past decisions, the EFSB has approved construction of a number of gas-fired plants with oil backup fuel capability. Pioneer Valley Energy Facility, EFSB 08-1, 2009; IDC Bellingham, LLC, 9 DOMSB 225; Sithe Edgar Development, LLC, 10 DOMSB 1. In those cases, the petitioner proposed generating facilities with dual-fuel capability. The Board considered whether the impacts associated with oil backup needed to be mitigated and whether any increased impacts were balanced by the enhancement of reliability. The EFSB has also approved gas-fired plants without oil backup. Nickel Hill Energy, LLC, 11 DOMSB 83 (2000); Sithe West Medway Development, LLC, 10 DOMSB 274 (2000). In a project change case increasing a facility's use of oil, Fore River PC, 15 DOMSB at 420 (2006), the Board found that the air quality and water use impacts were outweighed by the reliability and diversity benefits of the oil backup capability.

However, the Siting Board has not addressed a situation in which a petitioner has proposed to eliminate the capability to burn oil after initially proposing dual-fuel capability. While dual-fuel capability would inherently provide greater reliability, the Company provided evidence that the gas-only Project would provide a reliable energy supply. Based on this record, and subject to the Company's submitting its gas supply strategy as part of a compliance filing prior to operation, the EFSB finds that the elimination of ULSD fuel capability will reduce environmental impacts, without a significant adverse reduction in reliability. Therefore, the EFSB finds that the elimination of ULSD fuel capability would reduce environmental impacts,

consistent with the minimization of costs associated with the mitigation, control and reduction of environmental impacts.

V. CHANGES IN STRUCTURE DESIGN

A. Evidence on Structure Changes

The PCF proposes three changes to the design of the facility. First, as originally proposed, the Project would have included a 130-foot building enclosing the Heat Recovery Steam Generator ("HRSG") (Exh. BP-C-1, at 1-7). The PCF proposes to eliminate that building and, in its place, to construct four 116-foot sound walls surrounding the HRSG (id.). The Company argued that the new design, unlike the original design, would not violate the height limitations in the Brockton Zoning Ordinance (id. at 4-1). These four sound walls without a roof, the Company argued, would not constitute a "building" as that term is defined in the ordinance and, therefore, would not be governed by its height limitations (id.).

Second, the main power facility building, as originally proposed, would have had a maximum height of 64 feet. The PCF lowers the maximum height of that building to 60 feet (id.). The Company asserted that this change would bring the building into compliance with the Brockton Zoning Ordinance height limit for a "principal building" (id.).

Third, the Company is proposing to redesign the accessory buildings so that all of them would have a maximum height of less than 25 feet (id. at 4-2). These buildings include the natural gas metering and compressor building, the water treatment building, the cooling tower electric equipment building, the switchgear building, the fire pump house, the switchyard control building, and the aqueous ammonia storage building (id.). The redesign of these buildings, the Company represented, would bring them into compliance with the provisions of the Brockton Zoning Ordinance, including the restrictions on height for accessory buildings (id.). The Company also asserts that the design change would reduce visual and noise impacts, as described below.

1. Noise

Two tables taken from the PCF appear below. Both of them provide a comparison between the predicted operational sound levels of the Project constructed pursuant to the Project

change and the predicted operational sound levels of the Project constructed pursuant to the terms of the Final Decision (Exh. BP-C-1, at 4-13, 4-14).

In each table, the projected noise increase, over the L_{90} background level,[12] for the Project constructed in accordance with the Project change, appears under the column entitled "Updated Increase over Background (dBA)" (id.). In contrast, the projected noise increase, over the L_{90} background level, for the Project constructed in accordance with the Final Decision appears in the column entitled "EFSB Approved Increase (dBA)" (id.).

The first table presents these data as calculated using the ambient daytime and evening background noise at the nearest residences (id.). The second table presents these data as calculated using the ambient nighttime background noise at the nearest residences (id.).

Table 3: Sound Level Evaluation – Daytime/Evening Background at Nearest Residences

Receptor	Brockton Plant (dBA)	Lowest L90 Background (dBA)	Total (dBA)	Updated Increase Over Background (dBA)	EFSB Approved Increase (dBA)
ST-1 End of Mobile Dr.	38	41	43	2	2
ST-2 Hayward Ave./Rt. 28 Intersection	42	56	56	0	0
ST-3 Crown Place Condos	41	42	45	3	2
ST-4 71 Appleby St.	40	36	41	5	5
ST-6 Brockton Housing Main Street	34	43	44	1	0

Source: BP-C-1, at 4-14

[12] L_{90} is the sound level in dBA exceeded 90 percent of the time during the measurement period (Exh. BP-1, App. E at 1). It represents the residual sound level, which is the background sound level observed when there are no obvious nearby intermittent noise sources (id.).

Table 4: Sound Level Modeling Results – Project (with Changes) Plus Nighttime Background at Nearest Residence

Receptor	Brockton Plant (dBA)	Lowest L_{90} Background (dBA)	Total (dBA)	Updated Increase Over Background (dBA)	EFSB Approved Increase (dBA)
ST-1 End of Mobile Dr.	38	39	42	3	3
ST-2 Hayward Ave./ Rte. 28 Intersection	42	39	44	5	5
ST-3 Crown Place Condos	41	41	44	3	3
ST-4 71 Appleby St.	40	36	41	5	5
ST-6 Brockton Housing Main Street	34	40	41	1	1

Source: Exh. BP-C-1, at 4-14, Table 4.3-3

Table 3 indicates that the predicted daytime operational sound levels of the Project, if constructed pursuant to the terms of the PCF, would result in an increase of one decibel over the level approved in the Final Decision at two of the six receptors: ST-3 and ST-6. This one decibel increase, however, is primarily the result of rounding. The actual increase at the ST-3 receptor would be 0.1 dBA, and the actual increase at the ST-6 receptor would be 0.2 dBA (Exh. RR-EFSB-C-7).

ACE argued that the Board should require Brockton Power to implement additional noise mitigation to reduce the maximum noise level at receptors ST-4 and ST-2 to 3 dBA for a cost of $3.5 million (ACE Brief at 29-30; Exh. EFSB-C-N-15).

2. Visual Impacts

The Company states that the design changes for the facility would result in reduced visual impacts. The principal design change is the replacement of the 130-foot tall HRSG building by a set of shorter, 116-foot tall, sound walls (Exh. BP-C-1, at 4-1). In the PCF, the Company set forth a viewshed summary (id. at 4-20) that corresponds, in large part, to the viewshed summary in the original Project filing (Exh. BP-1 at 4-87 through 4-102). The PCF viewshed summary

indicates that for the most part, the expected views of the Project will remain the same whether or not the PCF is approved. There are, however, two locations at which the reduced height of the HRSG would result in a mitigation of impacts.

One of the places of reduced visual impacts is found at location number 8, designated as "Crown Place." There, the HRSG walls would be visible if the Project were constructed as approved in the Final Decision, but they would not be visible if the design changes were implemented (Exh. BP-C-1, at 4-20). The other such place is found at location number 4, designated as "Hayward Street." There, the HRSG walls would be more visible if the Project were constructed as originally approved than if the Project were constructed using the design changes proposed in the PCF (id.).

B. Analysis and Findings Regarding Structure Design Changes

The Company has indicated that its goal in lowering the heights of the buildings and substituting sound walls for an enclosed structure around the HRSG is to comply with the Brockton Zoning Ordinance.[13] Whether the change in the height of the buildings would result in a zoning-compliant structure is outside the scope of the Siting Board's consideration in this proceeding. In the Original Proceeding, the Board declined to grant the zoning exemption sought (Final Decision at 120), and the PCF does not seek to obtain a zoning exemption from the Board.[14] Therefore, zoning per se is not an issue in the present proceeding. However, the design changes do warrant evaluation in terms of changes in environmental impacts including those relating to noise and visual impacts.

With respect to noise, the evidence supplied by the Company indicates that the Project change would result in only de minimis increases in noise levels at two of the six receptors during the daytime and evening hours. Table 4 indicates that the predicted operational sound

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[13] Since the filing of the Company's Zoning Exemption Petition, the City has amended its zoning ordinance to remove electric power generating plants from the list of permitted uses in the Industrial-2 and 3 zones (Exh. EFSB-C-COB-Z-11-REVISED (Attachment)). The City and Brockton Power disagree as to whether this amendment applies to the Project (Exh. COB-C-MB-1, at 3).

[14] We note that the zoning disputes between the parties are presently being addressed in other proceedings that have been brought in other forums, including Land Court (Exh. EFSB-C-COB-Z-16; see also, Company Brief at 29, n. 23).

levels of the Project, if constructed pursuant to the terms of the PCF, would either be identical or very close to the sound levels approved in the Final Decision. Further, we note that in the Original Proceeding, the Board declined to require the Company to implement mitigation that could achieve a similar 2 dBA reduction of nighttime ambient sound level increases at receptors ST-2 and ST-4 for a net increased cost of $1.2 million over the $11.5 million of noise mitigation costs incorporated in the Project design. Final Decision at 54. In so finding, the Board stated, "the proposed facility as planned would already provide a level of noise mitigation consistent with Siting Board precedent." Id. Therefore, the Siting Board finds that the changed facility also would provide a level of noise mitigation consistent with Board precedent and declines to impose the additional mitigation ACE requests.

With respect to visual impacts, the height changes proposed by the PCF would somewhat mitigate the facility's appearance. Altogether, there is no evidence that further noise or visual mitigation would be more feasible or less expensive than the mitigation proposed in the PCF. Therefore, the Siting Board finds that the structure design changes minimize both visual and noise impacts, but otherwise do not affect the environmental impacts of the approved Project, consistent with minimization of the cost associated with mitigation, control and reduction of environmental impacts.

VI. CHANGE IN WATER SUPPLY

In its Final Decision, the EFSB stated that the proposed use of AWRF water for cooling water makeup was preferable to using BMWS water. Thus, the Board found that water resource impacts would be minimized based on, among other factors, Brockton Power's use of AWRF water as the facility's primary cooling water source.[15] However, recognizing the record evidence indicating some uncertainty around the availability of the City's AWRF water supply, the Siting Board imposed the following condition:

> The Siting Board directs the Company to work with the City of Brockton with respect to water supply issues associated with use of Brockton AWRF water, and

[15] The Siting Board concluded that subject to various water-related conditions and "any further ruling or conditions that the Siting Board may issue as part of its review of a project change review," water resource impacts of the proposed facility, including impacts related to water use, would be minimized. Final Decision at 47.

> to provide a report to the Siting Board with respect to the outcome of such efforts. Furthermore, if the Company intends to use potable water for the majority of the water requirements of its proposed facility, the Siting Board directs the Company to provide a project change filing to the Siting Board, together with an analysis as detailed as that done for AWRF water, but directed to those issues that are germane to the use of potable water, including opportunities for water conservation.
>
> Final Decision at 117.

A. Evidence on Water Supply Changes

Brockton Power stated that it has developed plans to use BMWS water as cooling tower makeup water based upon the City's unwillingness to negotiate an agreement for Brockton Power to purchase treated effluent from the AWRF for that purpose (Exh. BP-C-1, at 1-1).

1. Brockton Municipal Water Use

a. Historical Water Use

Since 1899, the City of Brockton has had the right to take water from Silver Lake, located in Pembroke, Halifax, Plympton, and Kingston, as well as the obligation to provide water to the towns of Whitman and Hanson (and, on an emergency basis, to the towns of Pembroke, Halifax, and East Bridgewater). In the 1960s, the City experienced a severe drought. In 1964, the Legislature granted the City the right, under certain conditions, to divert water from Furnace Pond in Pembroke and Monponsett Pond in Halifax into Silver Lake, thereby expanding the volume of water available to the City from the Silver Lake system (i.e., Silver Lake together with the two ponds). Since 1994, the City has obtained less than ten percent of its supply from the Brockton Reservoir in Avon (Exh. BP-C-1, App. A at 2-1 to 2-5, 2-18).[16]

In addition to the severe drought of the 1960s, the City of Brockton experienced a prolonged drought in the early 1980s. The 1964-1967 drought is, for Brockton and surrounding communities, the "drought of record," defined as the period of hydrological record keeping during which natural hydrological conditions have contributed the least to water supply volumes

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[16] MADEP, under its Water Management Act ("WMA") Permit, allows the City an authorized withdrawal volume of 0.83 MGD from Brockton Reservoir (Exh. BP-C-1, App. A at Table 1-1).

(Exh. BP-C-1, App. A at 2-6 to 2-7). The drought of the 1980s is classified as a "20-year drought," i.e., a level of drought that occurs approximately once every 20 years (id.).[17]

In 1986, the combination of prolonged drought conditions, leaky pipes and the City's lack of water conservation precipitated: (1) a Declaration of State Water Supply Emergency and Order ("Emergency Declaration") by MADEP; and (2) subsequent direct intervention by MADEP in the City's water supply management (Exh. ACE-4). In November 1995, MADEP and the City entered into an ACO (ACO-SE-95-5005) that replaced the Emergency Declaration (id.).

The ACO imposed many requirements on the City. It mandated that the 12-month running average of water pumped to the City's water distribution system not exceed 11.3 MGD (the equivalent of 110 percent of the system safe yield established at the time of the ACO) (Exh. BP-C-1, App. A at sub-appendix B at 3-4 to 3-5).[18] In addition, the ACO required the City:

- to re-establish the Brockton Board of Water Commissioners ("BWC");[19]
- to plan for short-term and long-term water supply needs subject to MADEP approval;
- to develop a five-year water management plan addressing water conservation and new connections;[20] and
- to submit monthly demand reports to MADEP (id.).

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17 MADEP uses the drought of record to determine the average annual withdrawal permitted from a reservoir, unless the applicant has a detailed drought management plan that complies with MADEP standards.

18 The ACO also provided that a Declaration of Emergency would go into effect if the 12-month running average exceeded the designated amount (Exh. BP-C-1, App. A at sub-appendix B at 3-4 to 3-5). The designated amount excluded volumes from the more recently constructed Aquaria Water, LLC ("Aquaria") desalination facility (id. at 3-5).

19 The BWC is variously referred to as the Brockton Board of Water Commissioners and the Brockton Water Commission.

20 Specifically, "[t]he City shall submit a five-year water management plan to the Department for its approval which proposes at a minimum to manage and regulate conservation measures and new water hookups in a manner that will ensure that the City's water consumption does not exceed its safe yield and ensures an equitable allocation of a limited water supply" (Exh. ACE-4).

The ACO, which grew out of the 1986 Emergency Declaration, was amended twice, first in February 1997 and again in December 1997. The February 1997 modification of the ACO mandated that the City develop agreements with Whitman and Hanson concerning new connections in those towns; submit a report to MADEP on short-term water sharing; and prepare a comprehensive water management plan ("CWMP") concerning existing water supplies (Exh. BP-C-1, App. A at sub-appendix B at 3-4 to 3-5). The December 1997 amendment of the ACO changed only the deadline for the City's submission of its work plan and long-term water supply strategy (id.).

The ACO represents a joint effort by MADEP and the City to develop a long-term approach to the management of Brockton area water supply and resources (Exh. ACE-4). The City has not been released from the requirements of the ACO. However, the City stated in the 2009 CWMP that it had complied with the requirements of the ACO (Exh. BP-C-1, App. A at sub-appendix B at 2-24).

The re-established BWC has undertaken a range of water conservation measures including: a pipe replacement program; leak detection and repair; dissemination of water conservation information; meter testing, replacement, and calibration; installation of efficient water fixtures in new buildings; retrofit of water fixtures in public office buildings and housing; water rates designed to promote conservation; and more frequent billing, to emphasize the connection between water cost and use (Exh. BP-C-1, App. A at sub-appendix B at 5-1 to 5-2). On an on-going basis, the BWC institutes water demand controls as necessary, including outdoor water use restrictions. In addition, the BWC reviews all applications for new water service and may refuse service to water-intensive uses[21] for which compelling need has not been demonstrated (id.).

b. Aquaria Desalination Facility

In 1993, the Massachusetts Executive Office of Environmental Affairs published a report outlining a strategy for meeting the water needs of the City and other Taunton River Basin communities through the year 2020. Among other things, the report proposed a desalination

[21] Notably, the November 2009 draft of the City's Water Supply Operations Plan identifies laundromats and car washes as water intensive uses (Exh. BP-C-1, App. A at sub-appendix B at 5-1 to 5-2).

plant as a solution for the long-term water needs of these communities (Exh. BP-ACE-C-AM-10(1), at 5). In December 2008, the Aquaria desalination water treatment facility (which draws water from the Taunton River) was connected to the BMWS (Exh. BP-C-1, at 2-6, 2-18).[22]

Under the Aquaria contract, the City is entitled to a "Firm Commitment" from Aquaria that represents the minimum amount of water that Aquaria must make available to the City and for which the City is obligated to make an annual fixed payment (Exh. BP-C-1, at 2-6). The annual payment is independent of the volume of water actually used by the City (id.). In addition to the fixed payment, the City pays a separate charge for each 100,000 gallons of Aquaria water it receives (id.).[23] In 2014, when the Project is expected to begin operation, the City's Firm Commitment from Aquaria will be 3.5 MGD. The City's Firm Commitment amount increases incrementally yearly until a maximum of 4.07 MGD is reached in 2019. The Firm Commitment remains 4.07 MGD through 2029. The City also has the right to buy the first 1.0 MGD of "excess water" from Aquaria on a "daily and yearly average basis" (Exh. BP-C-1, Section 2, Att. 2, at 11). During June, July and August, the City has the right to demand that Aquaria produce and provide a minimum of 0.5 MGD of excess water in addition to the Firm Commitment (id. at 12).

The Massachusetts Environmental Policy Act ("MEPA") certificate for the Aquaria facility required each community that wanted to use Aquaria water to apply for modification of its WMA permit. In 2005, in accordance with this directive and an application from the City of Brockton, MADEP modified the WMA permit it had issued to the City (Exh. BP-ACE-C-AM-10(1)). The WMA permit required the City to submit a CWMP for MADEP approval that would identify the City's water withdrawals and all its sources, and how the City would "manage its

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[22] The City entered into a 20-year agreement with Aquaria in 2002 to purchase water from the Aquaria facility (Exh. BP-C-1, Section 2, Att. 2). Deliveries of water to the BMWS began in April 2009 (Exh. BP-C-1, at 2-6, 2-18, 2-22). This agreement with Aquaria also grants the City options to renew for an additional 30 years in five-year increments (Exh. BP-C-1, Section 2, Att. 2, at 11, 16-17).

[23] The fixed and variable components each have escalation clauses beginning in the fourth year (Exh. BP-C-1, Section 2, Att. 2, at 11, 16-17). The annual fixed payment is $167,480 per 0.1 MGD of Firm Commitment, before any escalation (id.). In 2014, the annual payment will be $5.8 million plus escalation (id.). From 2019-2029, the annual payment will be $6.8 million plus escalation (id.). There is no required minimum daily or annual take incumbent upon the City (id.).

withdrawals, including any volumes purchased, to minimize the environmental impacts associated with the withdrawals" (Exh. BP-C-1, App. A at sub-appendix C at 8). MADEP further stated:

> While the Department believes the Aquaria connection will provide [the City] with a long-term source of water and the opportunity to better manage its other water sources to minimize environmental impacts, it is premature to make a judgment on the appropriate management of [the City's] sources, until the [CWMP] is reviewed and approved. The Department will modify [the City's] permit upon the Department's approval of the management plan to require the implementation of a plan that minimizes the impacts of the existing withdrawals (Exh. BP-C-1, App. A at sub-appendix C at 2).

The City submitted a draft CWMP (which addresses demand management and includes a draft Drought Demand Management Plan) in May 2007. In its CWMP, the City requests that the ACO be lifted. MADEP provided comments on May 21, 2009. The City submitted its response to those comments in November 2009. MADEP has not yet approved the CWMP (Exh. BP-C-1, App. A).

c. Current Water Use

For the years 1996 through 2010, the City's annual average water demand was approximately 10 MGD (RR-EFSB-ACE-C-24(1); Exhs. BP-C-1, at 2-25; ACE-C-W-10, at 2). In 2009 and the first ten months of 2010, respectively, finished water (after water treatment) from the Silver Lake system and Brockton Reservoir averaged 9.28 MGD and 8.93 MGD (RR-EFSB-C-24(1)). Finished water volumes from the Brockton Reservoir averaged 0.63 MGD in 2009 and 0.59 MGD in 2010 (through October) (id.).

Water demand for the Project would vary depending on the temperature and capacity factor at which the Project was operated. The Company provided water demand projections based on three operating scenarios. The Company's projections are indicated in Table 5 below.

Table 5. Brockton Power Estimated Water Consumption

Daily Average (100% capacity factor,[24] 59°F[25])	1.75 MGD
Average Annual Basis (70% capacity factor,[26] 59°F)	1.1 MGD
Daily Maximum (100% capacity factor, 90°F)	2.1 MGD

Source: Exh. EFSB-C-W3

Thus, on an annual basis, the Project would add more than ten percent to the current water demand on the City's municipal water system (Exh. BP-C-1, at 2-5, 2-8). During the summer electrical peak period, the period that the Silver Lake-Jones River ecosystem is most stressed, the Project is expected to use water at the rate of 2.1 MGD, or roughly twice its annual average rate of 1.1 MGD (Exhs. BP-C-1, at 2-8; EFSB-C-W-26, at 2).

The Project as a prospective water customer of the City provides a striking comparison to the existing large customers of the water system. According to the 2009 Brockton WMA Filing to MADEP ("2009 Brockton WMA Filing"),[27] as of the end of 2009, BMWS provided 266 residential institutions (e.g., public housing) with 473.97 million gallons of water per year ("MGY"), or approximately 1.3 MGD shared among the 266 connections in the category (Exh. COB-C-W-7(A)). In the municipal/institutional/non-profit (including hospitals) category, 76 connections used 17.618 MGY, or approximately 0.232 MGD (id.). In the industrial sector, 179 connections shared 78.366 MGY, or 0.215 MGD (id.). Thus, although large residential institutions together consume 0.2 MGD more than the Project, that category consists of 266 locations. In the industrial category, existing water users in the City require significantly less water on an average daily basis than would the Project.

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24 The capacity factor is the ratio of actual output over a period of time and what the facility would produce operating at full capacity over the same time period.

25 Except in estimating daily maximum water demand, the Company projected water demand based on a 59 degree Fahrenheit ("°F") temperature day. According to the Company, 59°F is used by the Independent System Operator ("ISO") as an average daily temperature (Tr. 1, at 25).

26 The Company states that its best judgment is that the Project would operate at a 70 percent capacity factor (Tr. 1, at 25).

27 The BWC submitted the filing (MADEP PWSID#4044000) to MADEP for the reporting period 1/1/2009 – 12/31/2009) (Exh. COB-C-W-7(A)).

d. Projected Water Use

In October 2009, the Massachusetts Department of Conservation and Recreation ("MA DCR") issued projected 2015 and 2020 estimates of BMWS water use by Brockton, Whitman, and other communities historically supplied by the City of Brockton's municipal water system (Exh. BP-C-1, at App. A sub-appendix A at 5). These are provided in Table 6, below.

Table 6. Projected BMWS Demand

Location	Year 2015		Year 2020	
	Low (MGD)	High (MGD)	Low (MGD)	High (MGD)
Brockton	9.17	10.29	9.31	10.46
Whitman	0.93	1.08	0.94	1.08
All Other	0.05	0.07	0.05	0.07
Total	10.15	11.44	10.30	11.61

Source: Exh. BP-C-1, at App. A sub-appendix A at 5

For Brockton and Whitman, MA DCR based its demand estimates on information from Brockton's Annual Statistical Reports and on Metropolitan Area Planning Council data for the two communities (id.). Low and high estimates incorporate different assumptions of daily per capita water use (id.). Low estimates assume water use based on the City of Brockton's actual gallons per capita per day ("gpcd") water use in 2009 (id.). High estimates assume water use at the rate of 65 gpcd (id.). Both low and high estimates also provide for "unaccounted-for" water loss (id.).[28]

MADEP has designated 65 gpcd as the water conservation standard for residential water use (Tr. 2, at 357-359). Brockton's actual rate of water use, at 63 gpcd, has been lower than the conservation target set by MADEP (Exh. BP-C-1, App. A at 3-1). Since the ACO has been in place, from 1996 to 2010, Brockton's average annual use has remained relatively constant (around 10 MGD), as has its gpcd water use (RR-EFSB-ACE-C-24(1); Exhs. BP-C-1, at 2-25;

[28] For Whitman, low and high estimates were derived by a process similar to Brockton's. MA DCR used historical annual norms (0.02 and 0.07 MGD) to represent its low and high estimates for use by other communities (i.e., other than Brockton and Whitman) (Exh. BP-C-1, at App. A sub-appendix A at 5).

ACE-C-W-10, at 2; BP-C-1, App. A sub-appendix A at 4-5).[29] In its updated CWMP filed with MADEP in 2009, as indicated in Section VI.A.1.a, above, the City describes its continuing efforts to conserve water by detecting leaks, replacing water pipes, maintaining and replacing water meters, and implementing other conservation programs.

Table 7, below, presents the availability of water volumes from the City of Brockton's traditional water supply (the Silver Lake system and Brockton Reservoir), given the projected level of the City's water demand under various scenarios in 2014. This is the year that the Company anticipates the initial operation of its Project. In 2014, as Table 7 indicates, the range of total Brockton water demand with the Project would range between 11.25 and 12.54 MGD, assuming average annual potable water demand of the Project of 1.1 MGD. If the Project's peak daily demand of 2.1 MGD were assumed, total Brockton water demand would range from 12.2 to 13.54 MGD in 2014.

[29] Census data show less than two percent population growth in the decade from 1990 to 2000 in the Brockton water service area (Exh. BP-C-1, App. A at 3-2). Year 2010 census data were not available for the City of Brockton at the time of the evidentiary hearings. The City provided two forecasts of population growth in its 2009 comments to MADEP. At that time, the Massachusetts Institute for Social and Economic Research ("MISER") forecasted no population growth for the decade 2001 to 2010 (id.). MISER forecasted a slight decrease in Brockton water service area population from 2010 to 2020 (id.). The Old Colony Planning Council forecasted a five percent increase from 2000 to 2010 and a three percent increase from 2010 to 2020 (id.).

Table 7.
City of Brockton Municipal Water Supply Scenarios, Traditional Water Supply Sources
Projections for Calendar Year 2014, Initial Project Operation
All Figures in MGD

Year	City Water Demand Before Project	Project Water Requirements	Total Water Demand City & Project	Available Water (ACO in place)	Water Balance (ACO in place)
2010 (Average of Jan.-Oct.)	10.23*	--	--	11.3□	--
2014 (Low Estimate)	10.15*	1.1^(a) 1.75^(b) 2.1^(c)	11.25 11.90 12.25	11.3□	+0.05 -0.6 -0.95
2014 (High Estimate)	11.44*	1.1^(a) 1.75^(b) 2.1^(c)	12.54 13.19 13.54	11.3□	-1.24 -1.89 -2.24

* City of Brockton, average finished water demand, January through October (2010) (RR-EFSB-C-24). Silver Lake raw water withdrawals for the same period averaged 9.90 MGD (id.). The range of withdrawals from Silver Lake was 7.9 to 12.6 MGD. Withdrawals exceeded the average more than half the time (id.).

∗ The high and low forecasts for City of Brockton water use in 2014 are from Exh. BP-C-1, at 2-25, Table 2.3-1 and checked against information in Exhs. EFSB-C-W-3, at 2, ACE-C-W-10, Table 2.4-1, and BP-C-1, App. A sub-appendix A at 4-5. For further detail, see Exh. BP-C-1, at 2-24 (discussion) and Exh. BP-C-1, App. A sub-appendix A at 4-5.

∧ (a) Demand for water, anticipated annual average daily demand (70% capacity factor, 59 °F) (Exh. BP-C-1, at 2-7).
∧ (b) Average daily demand, 100% capacity factor, 59 °F (Exh. ACE-C-W-10).
∧ (c) Maximum daily demand, 100% capacity factor, 90 °F (Exh. EFSB-C-W-3).

□ 110% of 9.4 MGD from the Silver Lake system and 0.83 MGD from the Brockton Reservoir (Exhs. BP-C-1, at 2-17 to 2-18, 2-22; EFSB-C-W-3).

Should the City choose to use it, Aquaria gives the City greater flexibility in making BMWS withdrawals from its traditional resources (Tr. 5, at 718-722). In other words, the City might choose to use water from Aquaria for the Project rather than from its traditional sources

(id.). Daily data for City of Brockton withdrawals from its various water resources in 2009 and 2010, however, suggest that incremental BMWS water supply might also come entirely or in part from the City's traditional sources, especially the Silver Lake system (RR-EFSB-ACE-C-24(1)). The City, in addition, has indicated that it treats Aquaria as a supplemental water source to its use of Silver Lake and Brockton Reservoir (RR-EFSB-COB-C-26).[30] The Company testified that it is unable to affect the City's decisions in this regard (Tr. 5, at 721).

The Company asserted that the City is using the City's traditional system sources at or near ACO limits and that, therefore, incremental water to supply the Project would come from Aquaria, not the City's traditional water resources (Tr. 6, at 948). The Company further argued that projections of the City's water requirements in 2014 indicate that the City would potentially demand more water than its ACO allows at that time, the planned first year of operation of the Project (Exh. EFSB-C-W-1; Tr. 6, at 948). The Company therefore anticipated that the Project would not require further drawdown of the City's historical water supply system, nor have a material effect on measures, such as seasonal releases to the Jones River, that might affect the environmental health of the sources of the City's water supply (Exh. EFSB-C-W-20).

ACE argued that even the City's use of Aquaria water to supply the Project's cooling towers might increase environmental impacts on the Silver Lake system (Exh. BP-ACE-C-AM-10). According to ACE, Aquaria volumes that might otherwise moderate impacts of the City's water demand on its traditional potable water sources, including the Silver Lake system, would be diverted for Project use (id.). This outcome would counter what was, in part, the reason for

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30 In a letter to MADEP in November 2009, the Chair of the BWC states that the BWC's preference is to rely on its traditional water supply sources to the extent possible as a cost-saving measure:

> …Aquaria was always intended to be, and remains, a supplemental water source…. The City…[is] now contracted with Aquaria LLC for over $3 million a year in Year 2 of our 20-year contract for this supplemental water supply. That amount will escalate annually [with the increase of] our contractual obligations to buy water from Aquaria….
>
> Given the significant cost differential between treating water from our reservoir system and water purchased from Aquaria, the Brockton Water Commission must continue to protect its registered and permitted water resources while continuing to act as good stewards. It is our responsibility to our ratepayers to control costs as much as possible (Exh. BP-C-1, App. A).

Aquaria's construction, at least as understood by MADEP (id.). MADEP, in its 2005 modification of the City's WMA Permit #9P-4-25-044.01, expresses its belief that Aquaria "will [not only] provide Brockton with a long-term source of water… [but also] the opportunity to better manage [its] other water sources to minimize environmental impacts" (Exh. BP-ACE-C-AM-10(1) at 2).

2. Environmental Impacts

a. Environmental Impacts on the City's Historic Water Supply Sources under the Existing Withdrawal Regime

Historically, Silver Lake, Furnace Pond, and Monponsett Pond (the Silver Lake system) together have provided 90 percent of BMWS water (Exh. BP-C-1, App. A at 2-7 to 2-8). Silver Lake, the largest of these three water bodies, drains an area of approximately 4.1 square miles and is fed by groundwater, small streams, and transfers from Furnace Pond and Monponsett Pond (id. at 2-4 to 2-5). Diversions from Monponsett Pond to Silver Lake occur between October and May when water level in Silver Lake is below 47.5 feet and water in Monponsett Pond is above 52.0 feet (id.). Silver Lake is separated from Forge Pond (a pond not in the Silver Lake system) by a low-lying strip of land at an approximate elevation of 45 feet (id.). When Silver Lake waters are higher than 45 feet, Forge Pond and Silver Lake are essentially connected; at water levels higher than 47.5 feet, water from the system spills over the Forge Pond Dam into the upper Jones River (id.). Water also flows from Monponsett Pond to Stump Brook, where a spillway and flume connect to a fish ladder (id. at 2-4). Cranberry growers withdraw water from both Monponsett and Furnace Ponds (id. at 2-3, 2-4).

In June 2005, MADEP modified its permit to the City, WMA Permit #9P-4-25-044.01.[31] MADEP's cover letter to the City notes the agency's on-going interest in the relationship between the City of Brockton's use of existing resources and its Aquaria volumes. The letter makes reference to a condition of the permit modification, that Brockton will develop a CWMP that will "identify how Brockton will manage its withdrawals, including any volumes purchased

[31] Under this permit, MADEP allows the City to withdraw water from the Taunton River Basin. Modification of the permit in June 2005 was due to anticipated withdrawals from the Taunton River for Aquaria operations, in large part, if not entirely, to provide water to the City of Brockton (Exh. BP-ACE-C-AM-10(1)).

[from Aquaria], to minimize the environmental impacts associated with the withdrawals." Special Condition #4 of MADEP's permit modification, excerpted below states:

> … [T]he…[CWMP] will review Brockton's long-term water supply strategy and provide an analysis of the City's water needs through 2020, taking into account the purchase of water from Aquaria, the alleviation of pent-up demand, redevelopment within the City, continued conservation implementation, the potential needs of the Town of Whitman, and the capacity of Brockton's sources. In developing this plan Brockton should consider existing data studies, including the … Jones River Watershed Study prepared by GZA for DCR (Exh. BP-ACE-C-AM-10(1)).

Two studies are particularly instructive with respect to how the City's water withdrawals affect its water resources and their associated ecosystems. The first of these, referenced above, is the Jones River Watershed Study: Final Report (2003), undertaken by GZA GeoEnvironmental, Inc. ("GZA Report") for the Massachusetts Department of Environmental Conservation (now DCR) (RR-EFSB-ACE-C-25(1)). The second is the Silver Lake and Jones River Watershed Study (2000), prepared by Teal Ltd. ("Teal Study") for the Jones River Watershed Association (RR-EFSB-ACE-C-25(2)). Both studies indicate that withdrawals from Silver Lake may negatively affect habitat for freshwater mussels (RR-EFSB-ACE-C-25(1) at 10; RR-EFSB-ACE-C-25(2) at 3-34).[32] The Teal Study concludes that the upper Jones River is stressed, that Silver Lake flow discontinuities are a contributing factor, and that longer or more intense flow discontinuities would only increase stress on Jones River ecosystems (RR-EFSB-ACE-C-25(2) at 3-34).[33]

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[32] Research results indicated a general decrease in shell size of stranded mussels with time, based on a sampling effort in 1999 that entailed 45-minute collection efforts on nine separate days (August 30 to October 14) as the water levels of Silver Lake were reportedly receding (RR-EFSB-ACE-C-25(1) at 10; RR-EFSB-ACE-C-25(2) at 3-34). The GZA Report and Teal Study reported that 1997 research by Normandeau Associates suggested that mussels lived at a depth of 17 feet, below lake fluctuation levels; however, subsequent research suggested that smaller size mussels and younger age classes were not well represented by the Normandeau Study, and lake level fluctuations may have an impact on such classes (RR-EFSB-ACE-C-25(1) at 10; RR-EFSB-ACE-C-25(2) at 3-34).

[33] Alex Mansfield, witness for ACE, referenced the GZA Report and Teal Study in describing on-going negative environmental consequences to the Jones River and Silver Lake system resulting from the City's use and approach to management of its potable water supply (Exh. ACE-C-AM-1). With respect to mussels in Silver Lake, Mr.

According to ACE and its expert witness, these and other studies indicate that the City of Brockton's chronic water supply problems have led to higher than desirable withdrawals from the Silver Lake system and resulting environmental harm (Exh. ACE-C-AM-1, at 22-23; Tr. 5, 860-868). ACE alleged that this environmental harm includes impairment of fish migration, loss of spawning habitats, reduced ability to sustain diverse fish species, and entrapment of fish in Silver Lake, in addition to impacts to mussels, other aquatic species, and water quality and clarity (Exh. ACE-C-AM-1, at 22-23; RR-EFSB-ACE-C-25).

The Company argued in response that the environmental concerns raised by ACE regarding the City's current use of Silver Lake (e.g., impacts to mussels, fish migrations, and water quality of Silver Lake) are existing issues unrelated to the Project, and that the City has made significant progress in addressing these concerns (Company Reply Brief at 10). The Company argued further that, rather than contributing to the existing situation, the Project can be part of its solution because its payments for BMWS supply would enhance the City's ability to address the identified issues (Exhs. BP-C-1, at 2-33 to 2-34; EFSB-C-W-8; Company Reply Brief at 10-11).

b. Environmental Impacts from Change of Cooling Water Supply

The Company maintained that reuse of resources is a fundamental tenet of environmental engineering and protection and is generally preferable to using other resources for the same purpose (Tr. 4, at 685). The Company indicated that this principle guides its belief that use of recycled effluent would be a better overall solution for the Project than using BMWS supplies (id. at 687). This is reflected in the Final Decision, which states:

> The Siting Board notes that the record shows that the Company has indicated its strong preference for use of water from the Brockton AWRF for the majority of the water requirements of its proposed facility. The Siting Board concludes, consistent with the Company's preference, that proposed use of recycled water for the proposed facility would be preferable to using City of Brockton potable water – the identified backup water supply source to operate the proposed facility (Final Decision at 42)

Mansfield stated that freshwater mussels continue to die with each Silver Lake drawdown; reduction in mussel populations reduces filtration rates in the water column, and this, in turn, reduces the photic zone (Exh. ACE-C-AM-1, at 21-23).

The Company asserted in its PCF, however, that use of AWRF effluent is not feasible because the City has refused to discuss the Company's preferred supply alternative (Exh. BP-C-1, at 2-1 to 2-2). The Company further argued that water resource impacts of the Project have been minimized in its PCF because (1) the BMWS has an ample surplus of water from which to supply the Project with all its water needs, and (2) the environmental impacts associated with the Project's use of BMWS water for cooling tower makeup have been properly minimized in accordance with Siting Board precedent (Company Initial Brief at 8; Exh. BP-C-1, at 2-33 to 2-34).

On the other hand, the Company argued, use of BMWS water would have advantages over using AWRF water with respect to Project cost and the volume of water required (Exh. BP-C-1, at 2-1 to 2-24). The Company stated that design changes associated with the use of BMWS would allow lower construction and operating costs (id.). The Company stated that BMWS water has lower concentrations of total dissolved solids than AWRF effluent, which would allow for operation of the Project cooling system at higher cycles of concentration, thus reducing cooling tower blowdown and overall water volumes (Exh. BP-C-1, at 2-7). The use of BMWS water would also reduce the need for pretreatment and reduce the amount of water discharged to the AWRF.

ACE asserted that the Siting Board has already found that environmental impacts would be minimized if the Company used AWRF volumes; therefore, ACE argued, the Company's proposal to use BMWS water to cool its facility does not minimize environmental impacts (ACE Initial Brief at 14).

B. Analysis and Findings on Change in Water Supply

The Siting Board notes that the record indicates that the City has been unwilling to meet with the Company to discuss the Company's preferred water supply alternative. Given the City's position, it is reasonable for Brockton Power to conclude that use of AWRF effluent is not feasible at this point, and that it should therefore look to other alternatives. Although described by the Company, the benefits of potable water over AWRF water are therefore not relevant to our analysis of the environmental impacts of the change to potable water and any balancing of those impacts. Accordingly, and contrary to ACE's argument, the Board will not compare the two water sources and choose the one that on balance best minimizes the environmental impacts.

However, consistent with the Siting Board's statutory mandate, the Board will review the proposed use of BMWS water to determine whether "it minimize[s] the environmental impacts consistent with the minimization of costs associated with the mitigation, control and reduction of the environmental impacts of the proposed generating facility." In making this determination, the Siting Board must take into account that approval of the proposed Project change would result in potable water being taken from the BMWS, a municipal water system with a long history of serious water supply difficulties.

The record in this case indicates that the City of Brockton has not had to manage the demand of a water customer of the magnitude presented by the Project. Indeed in its Water Supply Operations Plan, submitted as part of its CWMP, the City of Brockton identifies laundromats and car washes as water intensive uses. In contrast, the Company would increase the City's water demand by more than ten percent of current use. The Company's assertion that its water would come from Aquaria and not Silver Lake is dubious. The Board is not convinced that by 2014 the City's water demand absent the Project would be at the ACO limit. The City's BMWS water use has been approximately 10 MGD, on average, for more than the last ten years. This is 1.3 MGD less than the ACO limit. Over the last decade, per capita water consumption in Brockton has remained constant or slightly decreased; the population has either remained stable or slightly increased; and total water consumption has remained stable. Over the coming decade, forecasts range from slight population decline to slight population increase in the Brockton area. Given the City's relatively stable population and its recent history of successful efforts at water conservation, the Siting Board concludes that the lower projections of BMWS water use are more appropriate and reliable. Given these population and water use trends, BMWS average water consumption, absent the Project, could quite conceivably remain about 1.0 MGD less than the ACO limit.

As a BMWS customer, Brockton Power would not be in a position to restrict its water use to Aquaria water. The City operates the municipal water system and it states that it would elect to use its traditional water sources before using Aquaria water. Brockton Power will not be able to influence that decision. Therefore, the Board concludes that some, and possibly even a significant portion, of the Project's municipal water could come from Silver Lake.

As the Company asserts, the Siting Board has approved the use of municipal potable water for generating facility cooling towers in previous cases including Pioneer Valley Energy

Center, LLC, EFSB 08-1 (2009); Berkshire Power, Inc., 4 DOMSB 221 (1996); Masspower, Inc., 20 DOMSC 301 (1990); and Altresco-Pittsfield, Inc., 17 DOMSC 351 (1988). However, those previous decisions by the Siting Board did not present a long and significant history of water supply and environmental resource stresses of the magnitude evident in Brockton. The magnitude of these stresses is put into sharp focus by the 25 years of MADEP involvement in the City's water management. Issues with water supply management in the City have been sufficiently severe as to warrant the declaration of a water emergency, the institution of an ACO with MADEP, and the construction of the Aquaria desalination facility as a supplementary source of water supply.

The City's water supply problems have resulted in significant environmental impacts to the Silver Lake system. As noted in Section VI.A.2.a, above, the GZA Report and Teal Study indicate that environmental impacts continue to have an influence on the ecosystem health of the City's traditional water sources.

The Company did not provide information on or analysis of the different environmental impacts on the Silver Lake system that would result from the City's water consumption with the Project's use of BMWS water as compared to the City's water consumption without the Project. Rather, the Company restricted its argument to the unsubstantiated and, in fact, highly questionable, claim that its cooling tower water would predominantly come from Aquaria. Without analysis specific to the Silver Lake system, the environmental impacts of the Project change cannot be reliably assessed. Accordingly, the Company has not met its burden of proof and the Board cannot find that the environmental impacts of the proposed change have been minimized consistent with the minimization of costs associated with the mitigation, control, and reduction of environmental impacts.

VII. DECISION

Consistent with the Siting Board's directive to Brockton Power in the Final Decision to inform the Board of any changes to the Project, other than minor variations, the Company has informed the Siting Board of three such changes: the elimination of ULSD as a fuel option; changes in the designs of the buildings; and the use of water from the BMWS, rather than from the AWRF, for cooling tower makeup. In Section IV, the Board found that the elimination of ULSD as a fuel option, subject to one condition, would result in beneficial environmental

impacts and, therefore, that these impacts have been minimized. Furthermore, in Section V, the Board found that design changes to Project structures would have beneficial visual impacts and de minimis noise impacts; therefore, these impacts also have been minimized. However, in Section VI, the Board found that the Company did not demonstrate that its use of water from the BMWS would result in a minimization of environmental impacts.

Accordingly, based on the findings articulated above, the Board approves the PCF insofar as it proposes design changes to Project buildings and elimination of the use of ULSD as fuel, subject to compliance with Conditions (1) through (9) in the Final Decision[34] and with the following condition:

Condition 10:

> The Siting Board directs the Company to submit a written gas supply strategy to the Board as part of a compliance filing prior to operation.

The Siting Board denies approval of the PCF, however, with respect to the proposal to use water from the BMWS rather than water from the AWRF.

The evidence in this case demonstrated that the three proposed Project changes are not interrelated in such a way that implementation of one Project change without implementation of one, or both, of the other two changes is prevented. Accordingly, our findings stated above are made considering each proposed change on a stand-alone basis.

Our conclusion about the cooling water source Project change is not changed if the Siting Board considers all three Project changes collectively. To evaluate the combination of the three proposed changes, the Siting Board balances the environmental advantages and disadvantages of the entire Project as changed by all three Project changes, in order to determine if the Project minimizes environmental impacts consistent with the minimization of costs associated with the mitigation, control and reduction of environmental impacts.

The PCF's air impacts are quantified and include a reduction in six criteria pollutants, with the range of reduction from ten percent to 42 percent. The design changes result in improved visual impacts and de minimis noise impacts. Against these benefits, however, the

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[34] The Siting Board recognizes that this Decision renders moot the first of the nine conditions of the Final Decision.

Board balances the burden that would be imposed on the BMWS as a result of approving the PCF. This impact has not been quantified or even analyzed by the Company in this proceeding. Therefore, the Board is balancing known air emissions reductions and visual benefits against unknown water detriments. As a result, the Board cannot conclude that environmental impacts would be minimized if the PCF were approved in its entirety.

Accordingly, regardless of whether the Siting Board considers the water supply Project change as a stand-alone proposal or the Siting Board balances the effects of all three proposed changes, the Siting Board finds that the Company has not sustained its burden of proving that the environmental impacts of the proposed change or changes have been minimized consistent with the minimization of costs associated with the mitigation, control, and reduction of environmental impacts.

Findings in this decision are based upon the Project change information provided by the Company examined in light of findings the Siting Board made in the Final Decision. Because the Project changes outlined in this decision pertain to the facility approved by the Siting Board in the Original Proceeding, the Company must construct and operate its facility in conformance with its proposals presented in the Original Proceeding; the only modifications permitted are those set forth in this decision.

The Siting Board requires the Company to notify the Siting Board of any further changes other than minor variations to the proposal so that the Siting Board may decide whether to inquire further into a particular issue. The Company is obligated to provide the Siting Board with sufficient information on changes to the proposed Project to enable the Siting Board to make these determinations.

Robert J. Shea
Presiding Officer

Dated this 28th day of September, 2011

APPROVED by the Energy Facilities Siting Board at its meeting of September 22, 2011, by the members present and voting. Voting for approval of the Tentative Decision as amended: Steven Clarke (title) (Acting Energy Facilities Siting Board Chair/Designee for Richard Sullivan, Secretary, Executive Office of Energy and Environmental Affairs); Ann G. Berwick, Chair of the Department of Public Utilities; Jolette A. Westbrook, Commissioner, Department of Public Utilities; James Coleman (Designee for Commissioner, Department of Environmental Protection); Robert Sydney (Designee for the Commissioner, Division of Energy Resources); and Kevin Galligan, Public Member. Voting against approval of the Tentative Decision as amended: Dan Kuhs, Public Member.

Steven Clarke, Acting Chair
Energy Facilities Siting Board

Dated this 28th day of September 2011

Appeal as to matters of law from any final decision, order or ruling of the Siting Board may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the order of the Siting Board be modified or set aside in whole or in part.

Such petition for appeal shall be filed with the Siting Board within twenty days after the date of service of the decision, order or ruling of the Siting Board, or within such further time as the Siting Board may allow upon request filed prior to the expiration of the twenty days after the date of service of said decision, order or ruling. Within ten days after such petition has been filed, the appealing a party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the clerk of said court. (Massachusetts General Laws, Chapter 25, Sec. 5; Chapter 164, Sec. 69P).