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SAN FRANCISCO

1875 Connecticut Ave., N.W.
Suite 1200
Washington, D.C. 20009-5728
(202) 986-8000
Facsimile: (202) 986-8102

E-mail address: brett.snyder@llgm.com
Writer's direct dial: (202) 986-8008
Writer's direct fax: (202) 956-3217

LONDON
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April 13, 2007

BY HAND

Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Re: *Broadwater Energy LLC*, Docket Nos. CP06-54-000;
Broadwater Pipeline LLC, Docket Nos. CP06-55-000 & CP06-56-000

Dear Ms. Bose:

Enclosed for filing in the referenced proceedings are Broadwater's April 11 and 13, 2007 responses to the New York Department of State's February 16, 2007 information requests. This filing consists of the following two volumes:

Volume 1 – Public. Broadwater is providing eight copies of Volume 1. A copy of Volume 1 is also being provided on CD.

Volume 2 – Privileged and Confidential. In accordance with section 388.112 of the Commission's regulations, 18 C.F.R. § 388.112, Broadwater states that the information in Volume 2 is confidential private individual information. Broadwater requests that the Commission treat the information in Volume 2 as privileged and confidential information. Broadwater has labeled Volume 2 as "Contains Privileged Information – Do Not Release." Broadwater is providing an original only of Volume 2. A copy of Volume 2 is also being provided on CD.

Please contact the undersigned with any questions regarding this filing.

Respectfully submitted,

Brett A. Snyder

Enclosures

cc: James Martin, FERC (Vols. 1 & 2)

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Broadwater Energy, LLC	)	**Docket Nos.**	**CP06-54-000**
Broadwater Pipeline, LLC	)		**CP06-55-000**
	)		**CP06-56-000**

VOLUME 1

Public

Privileged and Confidential Information Has Been Removed

Dated: April 13, 2007

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CHICAGO
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HOUSTON
JACKSONVILLE
LOS ANGELES
PITTSBURGH
SAN FRANCISCO

99 WASHINGTON AVENUE
SUITE 2020
ALBANY, NY 12210-2820
(518) 626-9000
FACSIMILE: (518) 626-9010

E-MAIL ADDRESS: RALESSI@LLGM.COM

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April 13, 2007

VIA HAND DELIVERY

Mr. Jeffrey Zappieri
Supervisor, Consistency Review Unit
Resources Management Bureau
State of New York Department of State
Division of Coastal Resources
41 State Street
Albany, New York 12231-00001

Re: F-2006-0345
Broadwater Energy Project

Dear Mr. Zappieri:

Attached please find four copies of the March 1, 2007 letter from Energy and Environmental Analysis, Inc. that was inadvertently omitted from Broadwater's response to NYSDOS2 – D & E provided to you on April 11, 2007.

We apologize for any inconvenience this may have caused.

Very truly yours,

Robert J. Alessi

Enclosures/97195
cc: via hand delivery (with enclosure)
Kathleen L. Martens, Esq.
Mr. George Stafford
Susan L. Watson, Esq.

via First Class Mail (with enclosure)
Mr. Alan Bauder, NYSOGS
Captain Peter J. Boynton, USCG
Mr. Thomas Dvorsky, NYSDPS
Mr. Michael Kane, Ecology & Environment, Inc.
William Little, Esq., NYSDEC
Mr. James Martin, FERC (non-formal, courtesy copy; official filing to follow)
Mr. William Staeger, Entrix Environmental Consultants
Broadwater Energy LLC
Broadwater Pipeline LLC

Energy and Environmental Analysis, Inc.
an ICF International Company
1655 North Fort Myer Drive Arlington, Virginia 22209 TEL: (703) 528-1900 FAX: (703) 528-5106

March 1, 2007

Mr. Murray Sondergard
TransCanada Pipeline
(Via Email)

Re: EEA's Response to State of New York Department of State Letter Dated February 16, 2007

Dear Mr. Sondergard:

This letter provides our response to Items D and E in the State of New York Department of State Letter regarding its review of the proposed Broadwater Liquefied Natural Gas (LNG) project.

Response to Item D

Current 2005 pipeline capacities, as per Table 1 below, were generated from firm shipper contracts as per the index of shipper information from individual pipeline electronic bulletin boards. Pipeline additions were assumed to meet anticipated demand growth. Actual future pipeline additions may differ in size, timing, and location. The 1,000 MMcfd incremental peak supply from Broadwater assumes that infrastructure will be added by 2025 to enable transport of 1,000 MMcfd of gas from Broadwater into New York City and/or Long Island.

Table 1 – Pipeline Capacities

New York City 2005 Pipeline	Capacity (MMcfd)
Iroquois Gas Transmission System	200
Columbia Gas Transmission	91
Tennessee Gas Pipeline Co	324
Algonquin Gas Transmission	171
Transcontinental Gas Pipe Line	930
Texas Eastern Transmission	728
Total New York City 2005	2,443

Long Island 2005 Pipeline	Capacity (MMcfd)
Iroquois Gas Transmission System	462
Transcontinental Gas Pipe Line	244
Total Long Island 2005	706

Total New York and Long Island 2005 Capacity	**3,149**

Table 1 (Continued)

Assumed Pipeline Additions		Incremental
Year	Pipeline	Capacity (MMcfd)
2009	Millennium Pipeline or similar	500
2011	Iroquois Pipeline or similar	500
Total Assumed Incremental Pipeline Capacity		1,000
Total New York and Long Island 2025 Capacity		**4,149**
Maximum Broadwater Additional Peak Supply		1,000
Available Pipeline Supply with Broadwater 2025		**5,149**

Response to Item E

The load duration curve for 2025 in Figure 1 includes residential, commercial, industrial, and power generation gas demand, thus it includes all core and non-core gas use. The curve assumes normal weather, i.e., the 30-year averages of heating and cooling degree days for each month, and average temperature variability for days within each month.

Demand growth assumptions for the New York City/Long Island area are as follows:

- Gas-fired generating capacity is projected to increase to 26.0 GW by 2025, an increase of 15.9 GW over levels when the study was completed.
- Generation at gas-fired units is projected to increase to 42.7 TWh per year by 2025, an increase of 26.1 TWh over levels when the study was completed.
- Gas consumption for power generation is projected to increase to 490 Bcf per year by 2025, an increase of 254 Bcf over recent annual levels.
- Residential gas consumption is projected to increase to 248 Bcf per year by 2025, an increase of 29 Bcf over recent annual levels.
- Commercial gas consumption is projected to increase to 209 Bcf per year by 2025, an increase of 18 Bcf over recent annual levels.
- Industrial gas consumption is projected to remain flat at 16 Bcf per year.

Please let me know if you have any questions or require additional information.

Sincerely,

Kevin R. Petak
Vice President

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CHICAGO
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HOUSTON
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LOS ANGELES
PITTSBURGH
SAN FRANCISCO

99 WASHINGTON AVENUE
SUITE 2020
ALBANY, NY 12210-2820
(518) 626-9000
FACSIMILE: (518) 626-9010

E-MAIL ADDRESS: RALESSI@LLGM.COM

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April 11, 2007

VIA HAND DELIVERY

Mr. Jeffrey Zappieri
Supervisor, Consistency Review Unit
Resources Management Bureau
State of New York Department of State
Division of Coastal Resources
41 State Street
Albany, New York 12231-00001

Re: F-2006-0345
Broadwater Energy Project

Dear Mr. Zappieri:

In response to the requests for information in your letter of February 16, 2007 to Mr. Sondergard regarding the above-referenced project, Broadwater is pleased to provide one original and three copies of the enclosed, additional information to your Department in furtherance of the continued review of the Broadwater Energy Project.

Please note that Broadwater requests that the names and addresses of the thirty-two (32) persons listed in the attachment to the enclosed response, NYSDOS2-A, be kept confidential and not disclosed because such information is personal privacy and otherwise subject to such treatment.

Please contact me should you have any questions regarding this matter. Thank you for your continuing attention to this project.

Very truly yours,

Robert J. Alessi

Enclosures/97178
cc: via hand delivery (with enclosures)
Kathleen L. Martens, Esq.
Mr. George Stafford
Susan L. Watson, Esq.

via First Class Mail (with enclosures)
Mr. Alan Bauder, NYSOGS
Captain Peter J. Boynton, USCG
Mr. Thomas Dvorsky, NYSDPS
Mr. Michael Kane, Ecology & Environment, Inc.
William Little, Esq., NYSDEC
Mr. James Martin, FERC (non-formal, courtesy copy; official filing to follow)
Mr. William Staeger, Entrix Environmental Consultants
Broadwater Energy LLC
Broadwater Pipeline LLC

Public Version

Privileged and Confidential Information Has Been Removed

NYSDOS2 – B

Request:

The response from the National Marine Fisheries Service (NMFS) to your letter dated April 12, 2005 (Resource Report 8, Appendix B) in which you requested information regarding commercial fisheries landings in Long Island Sound.

Response:

On May 17, 2005, Broadwater received an email response (attached) from Joseph F. Cofone, Fishery Statistician, at NMFS to the April 12, 2005 letter requesting information regarding commercial fisheries landings in Long Island Sound. The data included in the response was incorporated into Table 1 of Broadwater's *Fishermen Outreach Study* (August 2005) entitled *Species and Total Live Pounds of Fish Harvested in the Long Island Sound Commercial Fisheries during the 2002 and 2003 Fishing Seasons as provided by the National Oceanic and Atmospheric Administration.*

From: Joseph Cofone [mailto:Joseph.Cofone@Noaa.gov]
Sent: Tuesday, May 17, 2005 12:47 PM
To: Raffenberg, Matthew J.; Burnett, John
Cc: Stanley Wang
Subject: LNG Info Request:

Matt:

The data is attached below and the caveats are also listed below.

My contact information is below. Please look this data over and contact me with any questions.

Joe...

--

Joseph F. Cofone
Fishery Statistician
(978) 281-9396
NOAA Fisheries Service
Northeast Regional Office
1 Blackburn Drive
Gloucester, MA 01930

Attached is the summary data for the area concerning the initial LNG Proposal. There are a few things to note when viewing the data.

1) All data are preliminary.

2) The data are from the time period relating to Fishing years 2002 and 2003 (May 2002 through April 2003 and May 2003 through April 2004 respectively)

3) The data are broken out by the following area:
West End:
040 57 25.79 N 073 23 34.75 W
041 04 53.73 N 073 23 44.61 W

East End:
040 58 40.11 N 072 42 35.91 W
041 14 29.59 N 072 41 59.59 W

4) All records are from Federal Permits numbers that posses a permit with a federal reporting requirement.

Table of Commercial Fisheries Landings in Long Island Sound Sent by NOAA Fisheries

Species	Live Pounds
Angler	43,680
Scup	40,733
Bluefish	14,827
Flounder, Summer	12,513
Lobster	5,394
Tautog	3,642
Butterfish	3,527
Squid (Loligo)	1,810
Skates	1,767
Sea Robins	1,222
Sea Bass, Black	1,093
Flounder, Yellowtail	770
Flounder, Winter	572
Bass, Striped	272
Dogfish Smooth	189
Hake, Red	92
Croaker, Atlantic	26
Eel, Conger	25
Bonito	12
Flounder, Sand-Dab	4

NYSDOS2 – C

Request:

The boat traffic survey included with the consistency certification provides information on the number of vessels passing within 2.5 miles of the FSRU. Please provide information on the number and classification of vessels at distances between 2.5 and 10 miles away.

Response:

The boat traffic survey did not evaluate or attempt to classify of vessels greater than 2.5 miles from the FSRU location. As mentioned in the *Boat Traffic Survey* (January, 2006), a distance of 2.5 miles was determined based on technical considerations and data accuracy requirements. From a technical standpoint, in terms of risk to public safety and property, hazards from credible spill scenarios (accidental or intentional) would not extend beyond this distance. From a data reliability standpoint, at a distance greater than 2.5 miles the accuracy of surveying dropped markedly due to the distance between the boats.

NYSDOS2 – D & E

Request:

D. Information relating to Figure 1 of Appendix A of Resource Report 1 entitled "Buffer Created by Broadwater Supplies on Pipeline Utilization During Peak Periods". Figure 1 presents three horizontal lines representing pipeline capacity into New York City (NYC) and Long Island in 2005, 2025 without Broadwater, and 2025 with Broadwater. Please provide the assumptions and data that were used to generate the line "Projected Total Pipeline Capacity into NYC and Long Island in 2025"

E. Also in Figure 1, a load duration curve entitled "Projected Daily NYC and Long Island 2025 Demand" shows projected gas consumption from highest to lowest demand day. Please provide the assumptions and data that were used to generate this curve with respect to demand and supply growth, indicating whether it reflects normal weather conditions or is modeled after design weather conditions. Also provide information indicating whether it reflects both core and non-core customer demand including electrical generation and interruptible loads. If it does, please provide projections for growth in natural gas fueled electrical generation capacity and output.

Response:

Broadwater obtained clarifications from the author of the report contained in Appendix A of Resource Report 1, Energy and Environmental Analysis Inc. (EEA) to respond to this request. Those clarifications are reflected in attached letter from EEA dated March 1, 2007.

NYSDOS2 – F

Request:

DOS understands that a final lighting plan for the FSRU has not been developed. Please provide us with any information not in the DEIS, consistency certification, or resource reports that will be considered in the final lighting plan, including nighttime docking at the FSRU, and lighting used and luminescence generated by LNG carriers servicing the FSRU.

Response:

All information used in evaluating the potential visual impact of night lighting is provided in the Visual Resource Assessment. The visual study was based on broad based assumptions concerning probable lighting conditions. As noted in the Visual Resource Assessment, light simulation software does not replicate human perception of lighting. Similarly, existing condition photography cannot illustrate actual illumination and glare experienced in the field by the human eye.

When completed, Broadwater will provide to the Department of State its response to the FERC Environmental Information Request 4-1 issued on March 6, 2007 in which the FERC has requested an updated lighting plan.

NYSDOS2 – G

Request:

Provide any guidance that the U.S. Coast Guard has provided to you regarding the coloring scheme required for the FSRU and its various structures. Provide any additional visual analysis that was conducted using alternative color schemes.

Response:

Broadwater has been provided with no guidance from the U.S. Coast Guard concerning the color scheme for the FSRU or YMS.

NYSDOS2 – H

Request:

The Visual Resource Assessment states: "Based on this definition (from DEC) it is reasonable to conclude that visibility of the proposed LNG terminal does not result in a detrimental effect on the perceived beauty of any place or structure; nor will the project cause the diminishment of public enjoyment and appreciation of an inventoried resource, or impair the character or quality of such a place." Please provide any public perception surveys that were conducted to support this conclusion.

Response:

No public perception surveys were conducted to support the conclusion that "the project would not result in a detrimental effect on the perceived beauty of any place or structure, nor will the project cause the diminishment of public enjoyment and appreciation of an inventoried resource". This conclusion is based, instead, on the degree of project visibility presented in the photographic simulations contained in the Visual Resource Assessment, and Broadwater's professional judgment.

It should be noted that the use of public perception surveys is not an accepted visual resource industry standard and is not considered to be a reliable method for assessing the visual impacts of a project. This is primarily due to the fact that respondents to such surveys are likely to react negatively to a proposed change in the area in which they live, and that any responses to a public perception study may well incorporate other non-visual perceptions (i.e. safety concerns, general opposition to the project) rather than focusing solely on the visual aspects of a given project. Identification of a completely unbiased sample to participate in a public perception survey is therefore difficult to achieve. Additionally, surveys of this type attempt to evaluate a three dimensional project using two dimensional photos. To fully understand the impact of a project, two dimensional photo simulations would need to be viewed in conjunction with other factors present at the project location. This allows potential respondents to appreciate the surroundings and conditions present at the location so that a comprehensive evaluation can be given. This is difficult and or impossible to accomplish with a written survey.

NYSDOS2 – I

Request:

The Visual Resource Assessment states: "It is likely that the FAA will require this structure to be illuminated with red flashing aviation obstruction lights mounted at the top and mid-point of the tower." Please provide information indicating whether and how the visual impact of these flashing lights are addressed in the assessment.

Response:

Assessment of the visual impact of the aviation lights is provided in Section 4.5.3.1 of the Visual Resource Assessment. See text below.

4.5.3.1. Maritime and Aviation Obstruction Lighting

The Project includes FAA obstruction to aviation lighting and a maritime navigation aids system. These are federally mandated safety features and cannot be omitted or reduced.

The maritime navigation aids system will include white colored lights, flashing Morse U at 30 second intervals and visible for 10 nautical miles (11.5 statute miles) from points 5m above sea level. Subsidiary warning lights, to be located along the port and starboard sides of the FSRU, will be red colored and visible for 2 nautical miles (2.3 statute miles) from points 5m above sea level. These maritime obstruction lights are consistent with navigation aid systems commonly found throughout the Long Island Sound.

According to FAA Advisory Circular AC70/7460-1K. Structures that exceed an overall height of 200 feet (61m) above ground level should normally be marked and/or lighted. The emergency burn-off flare (279 feet [85 m]) is the only structure exceeding this height. It is likely that the FAA will require this structure to be illuminated with red flashing aviation obstruction lights (L-864, 20-40 flashes per minute) mounted at the top and mid-point of the tower. Because the Project includes a helideck (for emergency transport only), one (1) red flashing aviation obstruction light (L-864) will also be mounted on the radar mast (177 ft [54 m]).

Such aviation obstruction lighting is similar to red flashing nighttime obstruction lights commonly found on radio/transmission towers and tall industrial facilities commonly found throughout the Long Island and Connecticut coastlines.

Such maritime and aviation obstruction lighting is designed with sufficient intensity to provide ample warning to mariners and pilots in close proximity to the

obstruction. At distances of nine (9) miles and greater from the nearest coastal vantage point, such obstruction lighting will be marginally visible on clear nights and completely obscured during poor visibility. When visible it will be difficult to distinguish the navigational aids and aviation obstruction lighting from similar sources commonly visible throughout the Sound.

NYSDOS2 – J

Request:

Information provided in Broadwater's consistency certification and resource reports indicates that alternative Project locations and technologies in the Atlantic Ocean south of Long Island would not be feasible for general reasons related to: ocean wave conditions, potential visual impacts, and pipeline installation difficulties related to population density and presence of environmentally sensitive area. Please provide the information, analysis and data used for the south shore sites investigated and the specific reasons each site was rejected. Please provide a full description of the process used to identify all potential sites in the Atlantic Ocean, the screening that led to the selection of the three sites evaluated, and a list of the sites not subjected to further analysis.

Response:

The myriad of alternative terminal concepts and sites, and associated alternative pipeline routes that were considered by Broadwater are shown on Figure 1. The information, analysis and data used for evaluation of potential terminal sites in the Atlantic Ocean are provided in the main body of this response, while the information, analysis and data used for evaluation of the pipeline alternatives associated with the potential terminal sites in the Atlantic Ocean are summarized in Appendix 1 to this response.

In Broadwater's Regional Screening analysis, sites were evaluated against 7 specific criteria (*see* Resource Report 10 "Alternatives", Section 10.6.1.). Only 2 of these 7 criteria are germane to the Atlantic Ocean sites on the south side of Long Island:

- Unsuitable metocean (weather and marine related) conditions; and

- Pipeline routing, constructability, and operability issues due to length and seafloor environment.

<u>Minimum Criteria Required to Fulfill the Purpose and Need of the Broadwater Project</u>

Of the specific minimum criteria required to fulfill the purpose and need of the Broadwater Project (*see* Resource Report 10, Section 10.2) the following criteria are particularly relevant to an LNG import terminal concept and site in the Atlantic Ocean south of Long Island, where a LNG import terminal must:

- Be able to provide reliable natural gas deliveries to the Region (i.e., Long Island, New York City and Connecticut) via pipeline connections; and

- Comprise a site situated close to an existing pipeline system serving the Region with downstream takeaway capability greater than 1.0 bcfd.

NYSDOS2 – J

It has been established by Broadwater that the only pipeline system serving the Region that could fulfill the purpose and need of the Project is the existing Iroquois Gas Transmission System pipeline (*see* Resource Report 10, Section 10.4.1). Although the southern end of the Iroquois system through Connecticut and on into Long Island and New York City consists of a single 24-inch diameter pipeline, it has a significantly higher operating pressure (MAOP 1,400 psig) than the other existing and proposed pipeline systems in the Region, with corresponding greater efficiencies in transporting gas volumes. In terms of pipeline hydraulics, any LNG terminal directly connected to the Iroquois pipeline system would enjoy direct access to markets in New York City (connection to ConEd at Hunts Point), Long Island (connections to KeySpan at Northport and South Commack) and southern Connecticut (various connections to local distribution companies, end users and transmission pipelines).

For a terminal located in the Atlantic Ocean south of Long Island the only other prospective pipeline connection would be to Transco's Lower Bay Extension located between New Jersey and a landfall at Long Beach, Long Island where it connects to the KeySpan system. The Transco system is a long-haul pipeline delivering gas from the Gulf Coast and storage in western Pennsylvania, and it is the largest provider of gas deliveries to the New York City area including Long Island. Transco's Lower Bay Extension consists of a single 26-inch diameter pipeline and it has a significantly lower operating pressure than Iroquois (MAOP currently 800 psig; proposed to be up-rated to 960 psig to increase its throughput from 600 MMcfd to 700 MMcfd – *see* FERC Docket No. CP06-34-001).

Connecting to Transco's Lower Bay Extension would enable access to Long Island markets served by KeySpan, but accessing the New York City and Connecticut markets accessible through Iroquois would not be a straight forward proposition, and - if workable at all - would likely require facility expansions on the Transco, KeySpan, ConEd and Iroquois systems on Long Island that in aggregate would be greater than that for the Project as proposed (note that no expansion of Iroquois is needed for the Project as proposed). Therefore, a connection to the Transco system is deemed to be an unsuitable alternative and was not considered by Broadwater in its evaluation of alternative sites in the Atlantic Ocean south of Long Island.

<u>Sites Considered in the Atlantic Ocean South of Long Island</u>

As shown in Figure 1, Broadwater considered representative terminal locations in the Atlantic Ocean off eastern Long Island (3.14 FSRU E, 3.23 CLNG B; and Eastern Long Island Atlantic Ocean Sites with associated onshore and offshore pipelines) and western Long Island (3.23 CLNG A). These sites are positioned so as to provide for the evaluation of potential terminal sites and their associated pipeline routes required for a

connection with the existing Iroquois pipeline that i) either route around the eastern or western ends of Long Island while remaining offshore; or ii) involve a landfall and shore crossing on the south shore of Long Island coupled with new-build onshore pipelines in rights-of-way extending beyond the shore crossing.

Atlantic Ocean sites located between the eastern and western extremities of Long Island were not considered reasonable siting opportunities due to the presence of obstacles to a feasible pipeline landfall and shore crossing. For example, the barrier islands along the central south shore of Long Island comprise a continuous string of public parks and beaches that are avoided by the landfalls and onshore routes connected to the Atlantic Ocean terminal sites considered by Broadwater in its alternatives evaluation.

In summary, the foregoing was the process that led to the selection of the three sites evaluated. They are considered representative of all potential sites in the Atlantic Ocean. All of these sites were rejected for the various reasons presented in Resource Report 10 (*see* Section 10.6.1), in Broadwater's response to FERC EIR 2-11 (*see* Appendix 2 to this response), and as elaborated on below. There were no other specific sites subjected to further analysis for the simple reason that there would be no change in the findings from Broadwater's Regional Screening analysis:

> "… based on a number of environmental and engineering considerations, the preferred location for the Project is an area off the coast of Long Island in the Sound ranging from 3 miles off the coast out to the New York State – Connecticut State lines offshore of Suffolk County, New York."

It was on this premise that Broadwater then advanced its final alternative analysis of this identified Project study area, which was used to select the site for placement of both the FSRU and the subsea pipeline (*see* Resource Report 10, Section 10.6.2).

<u>Proximity of Atlantic Ocean Sites to an Existing Pipeline System Serving the Region</u>

The assessment of this criterion is detailed in Resource Report 10, Section 10.6.1.1 "Analysis of Pipeline Routes from Atlantic Ocean Sites". Broadwater concluded that sites off eastern Long Island require significant new pipeline construction in order to access the Iroquois Gas Transmission System, therefore these alternatives are less desirable than alternatives located within the interior of Long Island Sound.

Furthermore, in response to the FERC's May 1, 2006 Environmental Information Request 2-11 (*see* Appendix 2 to this response), based on the desktop evaluation of these additional alternatives and comparison of the critical factors affecting pipeline routing, the preferred alternative identified in Broadwater's application continues to be placement of the FSRU approximately 9 miles offshore of Long Island in its current proposed

NYSDOS2 – J

location with an offshore pipeline connection to the Iroquois Gas Transmission System via a 21.7 mile east-west pipeline. The data presented in the alternatives assessment provided in the response to the FERC's Environmental Information Request 2-11 further supports Broadwater's original alternatives analysis presented in Resource Report 10 resulting in the selection of the proposed Project, the terminal site and the Preferred Route.

Provision by Atlantic Ocean Sites of Reliable Natural Gas Deliveries to the Region

This criterion is addressed in Resource Report 10, Section 10.5 in a comparison of offshore LNG terminal concepts, and in Section 10.6.1 in the discussion of the results of the Regional Screening analysis. The following discussion expands on Resource Report 10 by focusing more on those aspects of marine operability pertinent to terminal sites in the Atlantic Ocean south of Long Island.

For any offshore facility, marine operability is a critical consideration. Environmental factors affecting marine operability include consideration of the following:

- Wind velocity and direction, including seasonal variations;
- Wave height and direction, as well as wave period;
- Tidal currents, frequency and direction; and
- Visibility (fog conditions).

In addition to the above, an analysis of motion characteristics of the vessels in response to environmental conditions must also be assessed.

The combination of these factors, taken together, determines the conditions under which LNG carrier berthing, departure and side-by-side mooring operations with the FSRU can be safely conducted. The proportion of time when these environmental conditions are within the envelope of safe operations defines the relative operability of the terminal. Obviously, if the combination of environmental conditions lies outside this envelope for significant periods of time, the ability to unload LNG cargoes, and hence the overall reliability of the facility, is affected. Assessments of this type are generally conducted by computer simulation, based on historical environmental data. Broadwater has completed such an assessment for Long Island Sound, and has concluded that in the relatively benign metocean conditions of Long Island Sound, marine operability for the FSRU and LNG carrier is greater than 98%, thereby ensuring a high level of reliability in marine operations.

The assessed operational limits, which are taken in combination, for the facility are summarized in Table 1 below. This information is provided in Broadwater's Resource Report 11 "Safety and Reliability" (*see* Section 11.4.2.3).

NYSDOS2 – J

Table 1 Summary of Operational Limits

Operational Limit	Significant Wave Height		Wind Velocity		Current Velocity	
	(m)	(ft)	(knots)	(mph)	(knots)	(ft/sec)
Approach Limits	2	6.6	33	38	0.9	1.5
Side-by-Side Mooring Limits	3	9.8	39	45	0.9	1.5
Departure Limits	2	6.6	33	38	0.9	1.5

When Broadwater considered potential locations in the Atlantic Ocean, regional metocean data was reviewed.

Data on environmental conditions offshore from the south side of Long Island is available from NOAA's National Data Buoy Center (www.nbdc.noaa.gov). Two NOAA data buoys, Station 44025 and Station 44017, are located off Long Island. Station 44025 is located 30 nautical miles off Islip, New York and Station 44017 is located 23 nautical miles southwest of Montauk Point, New York. Historical data and climatic summaries are available for both stations. In particular, detailed information for Station 44025 is available for more than 10 years (meteorological conditions, spectral wave density data, and so on).

This information was further augmented by the Hydrobase Ship Observation Database (www.hydrobase.net) which includes wave data and other information taken from observations on ships in the region.

Based on an examination of these observations, it was determined that the wind and wave conditions prevailing on the south side of Long Island Sound would significantly impair the marine operability and would result in significantly higher downtime than for a Long Island Sound location. Adverse metocean conditions are particularly significant in the winter months, a time when reliable gas supplies, and hence LNG deliveries, are critical to the region. During winter periods in particular, Broadwater estimates that downtime could be greater than 25%, compared to less than 2% for a Long Island Sound location.

The conclusions in Broadwater's site selection work were validated by FERC in their Draft Environmental Impact Statement. On page 4-29, the DEIS states:

> Siting an FSRU in either the Atlantic Ocean or in Block Island Sound would present greater technical difficulties during operation due to the more frequent severe weather conditions and sea states in those areas. Because LNG carriers must berth alongside the FSRU to unload LNG, severe weather conditions would result in conditions that would preclude

NYSDOS2 – J

> the possibility of berthing. In both Block Island Sound and the Atlantic Ocean, those conditions occur more frequently than in Long Island Sound and could result in interruptions in service if the conditions lasted for an extended period of time. A review of NOAA buoy data indicated that average hourly wave heights near Montauk Point and in the Atlantic Ocean south of Long Island exceed the 2-meter operational threshold for LNG transfer approximately **18 percent** of the time. Between September and April, wave heights in these areas exceed 2 meters more than **22 percent** of the time. By contrast, average hourly wave heights in Central Long Island Sound never exceeded the 2-meter threshold in 2004 or 2005 (NOAA 2006d). Further, an FSRU sited in the Atlantic Ocean south of Long Island could conflict with established commercial shipping lanes. (Emphasis added)

In addition to evaluating ongoing metocean conditions, Broadwater also considered extreme events for which the FSRU and yoke mooring system must be designed. Tropical events considered include tropical depressions, tropical storms and hurricanes, which generally occur during the late summer and fall. Extra-tropical storms are cyclones originating outside the tropics, distinguished from tropical cyclones by greater scale, the presence of one or more fronts and the absence of great central intensity. The extra-tropical storms affecting Long Island include the "nor'easter" winter storms, such as the well known Ash Wednesday storm in March 1962.

Locating a baseload LNG facility in the open ocean would significantly increase its exposure to extreme storm events, resulting in greater cost and risk. For example, in 1992, a wave height of 9.3 meters (30.5 feet) was recorded at Station 44025. Based on an inspection of recent historical data, maximum wave heights greater than 6 meters (19.7 feet) are not uncommon in this area. This should be contrasted with the comparatively benign environment of Long Island Sound. The Great Hurricane of 1938 that struck Long Island produced a maximum wave height within the Sound of 3.8 meters (12.5 feet).

April 2, 2007

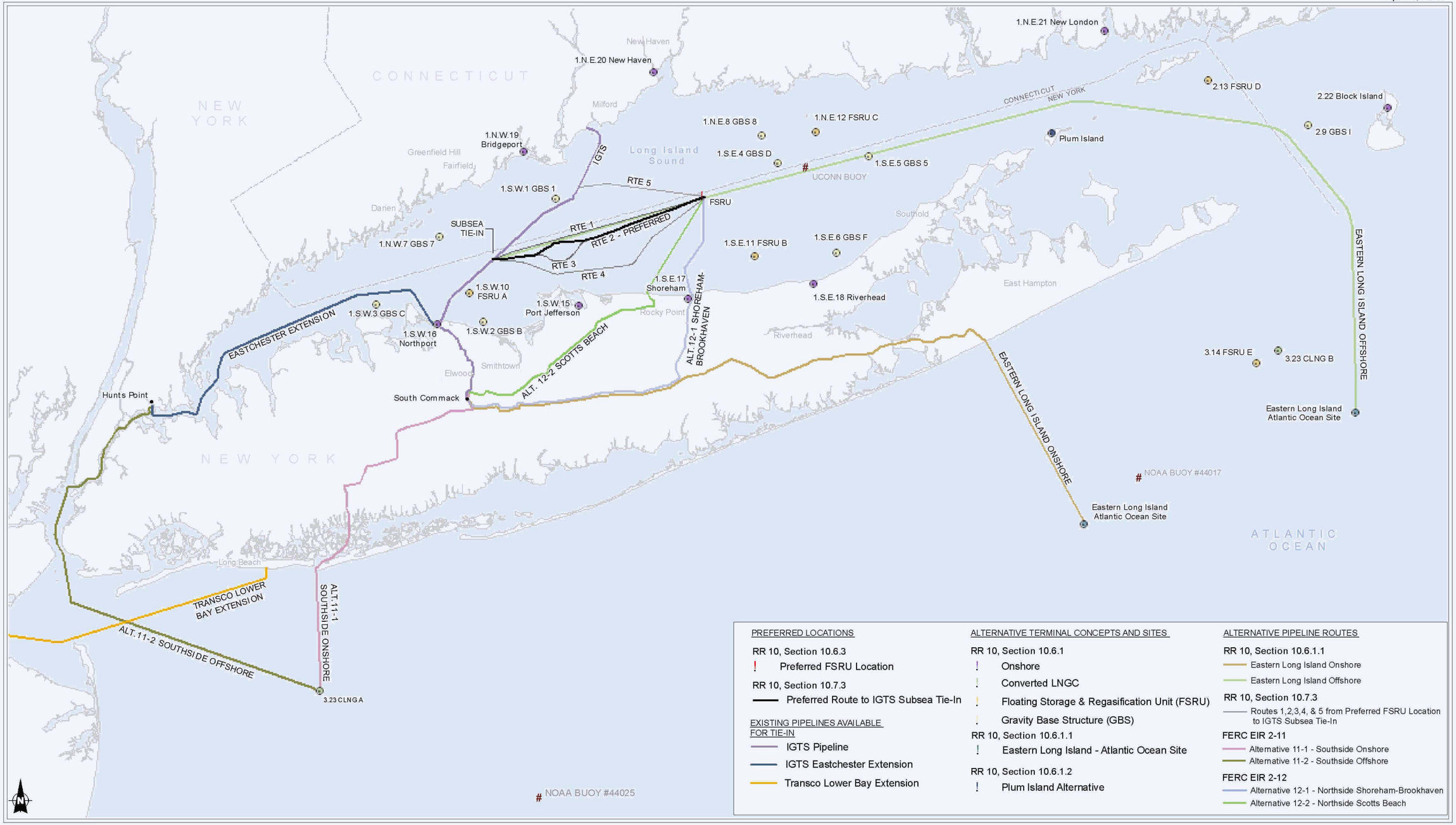

Figure 1 Alternative Terminal Sites and Pipeline Routes Considered by Broadwater

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Appendix 1

Information, analysis and data used for the south shore sites investigated

Table 10-9 Comparison of Pipeline Routes from Atlantic Ocean LNG Terminal Site Alternatives							
Route Alternative	**New-Build Pipeline Length**	**Environmental Constraints**	**Information, analysis and data used**	**Engineering Constraints**	**Information, analysis and data used**	**Cost Constraints**	**Information, analysis and data used**
Long Island Onshore Route Alternative	•• 20 miles offshore Atlantic •• 2 miles inshore bay crossing •• 58 miles onshore •• Total: approx. 80 miles	Increased sedimentation in sensitive coastal areas due to pipeline construction	Overlay analysis in ESRI ArcGIS with Pipeline and Coastal Habitat, NYS DEC, 2002; and Sedimentary Types, U. S. Geological Survey Open-File Report OFR 00-304, 2000	2 landfalls in sensitive nearshore and beach environments	Overlay analysis in ESRI ArcGIS with Pipeline and Marine Use Assignments-New York only NYS DEC, 2003; and Coastal Habitat, NYS DEC, 2002	Excessive overall route length	Route is 4 times longer than the Preferred Alternative
		Noise and visual impacts in surrounding areas during pipeline construction and operation from on-shore compressor station	Excessive length of the pipeline (80 miles) will require the construction of a compressor station which will result in increased noise levels and visual impacts in the surrounding areas	Collocation along busy and congested urban roadways	Onshore pipeline route would extend along the Route 27 (POW/MIA) Memorial Highway Iroquois Gas Transmission System - Brookhaven Lateral Project, Federal Energy Regulatory Commission - Docket No. PF05-16, Environmental Report, November 2005	Construction issues: - offshore Atlantic weather - shore crossings - congested onshore right-of-way	Met-ocean conditions that exist in the Atlantic are much greater than Long Island Sound including wave heights and tidal action. Southampton is a populated residential area that would be impacted by the onshore right-of-way
		Disturbance of contaminated sediments in shoreline areas during construction	Overlay analysis in ESRI ArcGIS with Pipeline and Sedimentary Types, U. S. Geological Survey Open-File Report OFR 00-304, 2000 Buchholtz ten Brink, M.R., and E.L. Mecray. 1998. Contaminant Distribution and Accumulation in Sediments of Long Island Sound: Field Work and Initial Results. Chapter 5, in Poppe, L.M., and Polloni, C., eds., *Long Island Sound Environmental Studies*: U.S. Geological Survey Open-File Report 98-502, Chapter 5, CD-ROM. Available at: http://pubs.usgs.gov/openfile/of98-502/chapt5/ch5ftpg.htm	Siting of a new-build onshore compressor station	Excessive length of the pipeline (80 miles) will require the construction of a compressor station Resource Report 10, Section 10.7.2.1 Pipeline System Hydraulic Examination Broadwater's response to FERC Staff's Comments on Environmental Resource Reports, No. 1-16 issued March 31, 2006, update and justification for intermediate compression spacing		

Table 10-9 Comparison of Pipeline Routes from Atlantic Ocean LNG Terminal Site Alternatives							
Route Alternative	**New-Build Pipeline Length**	**Environmental Constraints**	**Information, analysis and data used**	**Engineering Constraints**	**Information, analysis and data used**	**Cost Constraints**	**Information, analysis and data used**
		Disturbance to tidal and intertidal wetland communities containing sensitive habitats in National Seashore and Wildlife Refuge area	Overlay analysis in ESRI ArcGIS with Pipeline and US National Wildlife Sanctuaries U.S. Fish and Wildlife Service, 2000 and NYSDEC Tidal Wetlands, 2000 and NYSDEC Freshwater Wetlands, 2000				
		Disruption to traffic patterns and highway use for extended periods during pipeline construction due to restrictive rights-of-way	Onshore pipeline route would extend along the Route 27 (POW/MIA) Memorial Highway area and traffic would be disrupted during installation due to possible lane closers and lane restrictions				

Table 10-9 Comparison of Pipeline Routes from Atlantic Ocean LNG Terminal Site Alternatives

Route Alternative	New-Build Pipeline Length	Environmental Constraints	Information, analysis and data used	Engineering Constraints	Information, analysis and data used	Cost Constraints	Information, analysis and data used
Long Island Offshore Route Alternative	•• 20 miles offshore Atlantic •• 30 miles Block Island Sound •• 60 miles Long Island Sound •• Total: approx. 110 miles	Impacts to Race area and surrounding islands which contain DOS significant and rare habitats	DOS significant habitat (NYSDEC Coastal Habitat, 2002) is identified in the vicinity of this alternative and the pipeline route. These areas could be impacted by construction operations	Potential to encounter unexploded ordinances in the offshore Atlantic	NOAA electronic nautical charts indicate these areas may contain unexploded ordinance	Excessive overall route length	Route is greater than 5 times the length of the Preferred Alternative
		Impacts to the Race as a migratory corridor for marine life	Several marine mammals use this area as a migratory corridor and could be impacted by increased vessel traffic during construction	Reefs, shoals and ledges off Montauk Point and through the Block Island Sound	1m Bathymetry from U.S. Geological Survey Open-File Report 002-02, 2002 indicate the presence of formations in this area	Design issues: - pipeline on-bottom stability assurance - all-weather remote offshore platform reliability assurance	Sandwave zones and areas of exposed bedrock, reefs, shoals and ledges typically require very detailed subsea surveys and special design and construction for spanning rectification to avoid excessive bending loads and current induced fatigue loading cycles, adding complexity and cost to the pipeline Remote offshore platform siting, and met-ocean conditions in general and especially those that exist in the Atlantic create operational complexity and cost
		Decreased access to high use fishing areas during construction	Construction would take place in a larger area dues to the excessive pipeline length and fishing access would be impeded in these areas during construction	Sandwave zones and exposed bedrock areas through the Block Island Sound	Sedimentary Types from U. S. Geological Survey Open-File Report OFR 00-304, 2000	Construction issues: - offshore Atlantic weather - seabed obstacles, potential span correction requirements and currents - offshore platform logistics	Overlay analysis in ESRI ArcGIS with Pipeline and Nautical Charts NOAA Office of Coast Survey; and Ferry Routes, ESRI StreetMap Mapping Software, 2001
		Obstruction to commerce in the Race area that is used by charter boats	Pipeline construction operations in the race area will be longer and result in more vessels in the area due to the 110 mile pipeline length	Restricted anchoring zones (submarines)	NOAA Electronic Nautical Charts, 2003 and NYS DEC Marine Use Assignments, 2002		

Table 10-9 Comparison of Pipeline Routes from Atlantic Ocean LNG Terminal Site Alternatives							
Route Alternative	**New-Build Pipeline Length**	**Environmental Constraints**	**Information, analysis and data used**	**Engineering Constraints**	**Information, analysis and data used**	**Cost Constraints**	**Information, analysis and data used**
		Obstruction or potential construction delays due to exclusions zones from Navy vessels in the Race	Entrance of Navy vessels in the Race area that are approaching port in Connecticut would require exclusion zones and any construction in these areas would be delayed or halted until the Navy vessel is clear	High traffic through the Race during construction	Pipeline construction operations in the race area will be longer and result in more vessels in the area due to the 110 mile pipeline length		
		Increased sedimentation due to excessive pipeline length	Type of Sediments present based on U. S. Geological Survey Open-File Report OFR 00-304, 2000	Strong tidal currents through the Race and associated subsea scouring issues	Met-ocean conditions that exist in the Race are much greater than western and central Long Island Sound including wave heights and tidal action		
		Increased disturbance to benthic habitats due to increase pipeline length	Benthic communities are temporarily disturbed during pipeline construction and the excessive route length results in increased disturbance	Siting and design of offshore compressor station platforms	Offshore platforms would be needed due to excessive pipeline length Resource Report 10, Section 10.7.2.1 Pipeline System Hydraulic Examination Broadwater's response to FERC Staff's Comments on Environmental Resource Reports, EIR No. 1-16 issued March 31, 2006, justification for intermediate compression spacing		
		Increased risk for collisions in high traffic areas of the Race with risks for spills	Excessive overall route length will result in increased construction time and increased vessel traffic during this period which could result in collisions or spills				
		Additional offshore platforms result in greater water quality and benthic impacts	Construction of additional offshore platforms will increase localized turbidity and sedimentation and could cause greater impacts to benthic communities				

Table 10-9 Comparison of Pipeline Routes from Atlantic Ocean LNG Terminal Site Alternatives							
Route Alternative	**New-Build Pipeline Length**	**Environmental Constraints**	**Information, analysis and data used**	**Engineering Constraints**	**Information, analysis and data used**	**Cost Constraints**	**Information, analysis and data used**
		Potential to encounter more cultural resources such as shipwrecks	NOAA Automated Wreck and Obstruction Information System, 2004 indicates the presence of cultural resources and shipwrecks in the area and excessive overall route length will result in more encounters of these sensitive resource				

EIR 2-11 Table 1 Comparison of Preferred Route and Alternatives						
Parameter	**Preferred Route**	**Information, analysis and data used**	**Alternative 11-1 – Southside Onshore**	**Information, analysis and data used**	**Alternative 11-2 – Southside Offshore**	**Information, analysis and data used**
Length (miles)	21.7	Overlay analysis in ESRI ArcGIS with Pipeline route	40.5	Overlay analysis in ESRI ArcGIS with Pipeline route	50.2	Overlay analysis in ESRI ArcGIS with Pipeline route
Utility crossings	2	Overlay analysis in ESRI ArcGIS with Pipeline and Utility Lines and Areas and Cable Lines and Areas, NOAA Electronic Nautical Charts, 2003	10	Overlay analysis in ESRI ArcGIS with Pipeline and Utility Lines and Areas and Cable Lines and Areas, NOAA Electronic Nautical Charts, 2003	14	Overlay analysis in ESRI ArcGIS with Pipeline and Utility Lines and Areas and Cable Lines and Areas, NOAA Electronic Nautical Charts, 2003
Compressor Stations	0	FERC Resource Reports	1 minimum (on a platform located offshore)	Resource Report 10, Section 10.7.2.1 Pipeline System Hydraulic Examination Broadwater's response to FERC Staff's Comments on Environmental Resource Reports, EIR No. 1-16 issued March 31, 2006, justification for intermediate compression spacing	1 minimum (located onshore)	Resource Report 10, Section 10.7.2.1 Pipeline System Hydraulic Examination Broadwater's response to FERC Staff's Comments on Environmental Resource Reports, EIR No. 1-16 issued March 31, 2006, justification for intermediate compression spacing
Construction corridor/ROW (miles)	(21.7 offshore)	Pipeline length from Resource Report 1, Section 1.3.1	22.9 (17.6 offshore)	Measurement analysis in ESRI ArcGIS of alternative pipeline route	0.6 (49.6 offshore)	Measurement analysis in ESRI ArcGIS of alternative pipeline route
Estimated number of on shore non-typical work areas 1 (does not include road crossings)	0	FERC Resource Reports	12	Overlay Analysis in ESRI ArcGIS with pipeline and North American Transportation Atlas Data – Bureau of Transportation Statistics	1	Overlay Analysis in ESRI ArcGIS with pipeline and North American Transportation Atlas Data – Bureau of Transportation Statistics
Estimated acreage of permanent and construction ROW (does not include cable sweep on Preferred route)	16/199	Construction area from Resource Report 2, Section 2.5.1.1	29/285	Overlay Analysis in ESRI ArcGIS with pipeline and construction area needs for Preferred Alternative extended for this alternative routes offshore portion and a ROW width of approximately 100 feet for the onshore portion	35/350	Overlay Analysis in ESRI ArcGIS with pipeline and construction area needs for Preferred Alternative extended for this alternative route length
Land Use						
Forested land (No. miles traversed)	0	Intersect analysis in ESRI ArcGIS with Pipeline and Land Use and Cover, U.S. Environmental Protection Agency's Office of Water, 1998	.3	Intersect analysis in ESRI ArcGIS with Pipeline and Land Use and Cover, U.S. Environmental Protection Agency's Office of Water, 1998	0	Intersect analysis in ESRI ArcGIS with Pipeline and Land Use and Cover, U.S. Environmental Protection Agency's Office of Water, 1998
Residential land (No. miles traversed)	0		7.5		0	

EIR 2-11 Table 1 Comparison of Preferred Route and Alternatives						
Parameter	**Preferred Route**	**Information, analysis and data used**	**Alternative 11-1 – Southside Onshore**	**Information, analysis and data used**	**Alternative 11-2 – Southside Offshore**	**Information, analysis and data used**
Estimated number of residences within 50 feet of edge of construction ROW	0	FERC Resource Reports	457	Federal Energy Regulatory Commission, Office of Energy Projects, GUIDANCE MANUAL FOR ENVIRONMENTAL REPORT PREPARATION (August 2002) requires a site-specific residential construction plan describing specific mitigation techniques for existing residences and buildings within 50 feet of the edge of the construction work area Existing residences and buildings counted from aerial photographic images available online at http://earth.google.com	0	N/A
Federal Parks (conservations areas) (No. miles traversed)	0	Intersect analysis in ESRI ArcGIS with Pipeline and Federal Land, U.S. Fish and Wildlife Service, 2002	0	Intersect analysis in ESRI ArcGIS with Pipeline and Federal Land, U.S. Fish and Wildlife Service, 2002	0	Intersect analysis in ESRI ArcGIS with Pipeline and Federal Land, U.S. Fish and Wildlife Service, 2002
State Parks (conservation areas) (No. miles traversed)	0	Intersect analysis in ESRI ArcGIS with Pipeline and Local and State Parks, ESRI Streetmap Dataset, 2004	0.3	Intersect analysis in ESRI ArcGIS with Pipeline and Local and State Parks, ESRI Streetmap Dataset, 2004	0	Intersect analysis in ESRI ArcGIS with Pipeline and Local and State Parks, ESRI Streetmap Dataset, 2004
Scenic River Corridors (No. miles traversed)	0	FERC Resource Reports	0	N/A	0	N/A
Roadways/Bridges/Tunnels (Number encountered)	0	FERC Resource Reports	0	Overlay Analysis in ESRI ArcGIS with pipeline and North American Transportation Atlas Data – Bureau of Transportation Statistics	13	Overlay Analysis in ESRI ArcGIS with pipeline and North American Transportation Atlas Data – Bureau of Transportation Statistics
Onshore Biological Components						
Freshwater wetlands (No. miles traversed)	0	Intersect analysis in ESRI ArcGIS with Pipeline and NYSDEC Freshwater Wetlands, 2000	12	Intersect analysis in ESRI ArcGIS with Pipeline and NYDEC Freshwater Wetlands, 2000	3.2	Intersect analysis in ESRI ArcGIS with Pipeline and NYDEC Freshwater Wetlands, 2000
Tidal wetlands (No. miles traversed)	0	Intersect analysis in ESRI ArcGIS with Pipeline and NYSDEC Tidal Wetlands, 2000	2.6	Intersect analysis in ESRI ArcGIS with Pipeline and NYDEC Tidal Wetlands, 2000	1.6	Intersect analysis in ESRI ArcGIS with Pipeline and NYDEC Tidal Wetlands, 2000
Significant coastal habitat (No. miles traversed)	0	Intersect analysis in ESRI ArcGIS with Pipeline and NYSDEC Coastal Habitat, 2002	5.5	Intersect analysis in ESRI ArcGIS with Pipeline and NYDEC Coastal Habitat, 2002	0	Intersect analysis in ESRI ArcGIS with Pipeline and NYDEC Coastal Habitat, 2002
Count of stream and creek crossings	0	Intersect analysis in ESRI ArcGIS with Pipeline and NYDEC 1:24000 Hydrography Network, 2000	11	Intersect analysis in ESRI ArcGIS with Pipeline and NYDEC 1:24000 Hydrography Network, 2000	0	Intersect analysis in ESRI ArcGIS with Pipeline and NYDEC 1:24000 Hydrography Network, 2000
Refuge Areas	0	Overlay analysis in ESRI ArcGIS with Pipeline and Wildlife Refuges, U.S. Fish and Wildlife Service, 2002	0	Overlay analysis in ESRI ArcGIS with Pipeline and Wildlife Refuges, U.S. Fish and Wildlife Service, 2002	0	Overlay analysis in ESRI ArcGIS with Pipeline and Wildlife Refuges, U.S. Fish and Wildlife Service, 2002

EIR 2-11 Table 1 Comparison of Preferred Route and Alternatives						
Parameter	**Preferred Route**	**Information, analysis and data used**	**Alternative 11-1 – Southside Onshore**	**Information, analysis and data used**	**Alternative 11-2 – Southside Offshore**	**Information, analysis and data used**
Onshore Soils Types						
Onshore soils susceptible to erosion (No. miles traversed)	0	Overlay analysis in ESRI ArcGIS with Pipeline and USDA NRCS SSURGO Soils Data, 2000	23.6	Overlay analysis in ESRI ArcGIS with Pipeline and USDA NRCS SSURGO Soils Data, 2000	0	Overlay analysis in ESRI ArcGIS with Pipeline and USDA NRCS SSURGO Soils Data, 2000
Sole-source aquifers encountered/shallow groundwater (No. miles traversed)	0		Along 22 miles of offshore route		0	
Offshore Biological Components						
Fisheries use areas (No. miles traversed)	0	Overlay Analysis in ESRI ArcGIS with Pipeline and NOAA Classified Shellfish Growing Areas, 1995; Fisheries, NOAA Electronic Nautical Charts, 2003; NYS DEC Marine Use Assignments, 2002	0.06	Overlay Analysis in ESRI ArcGIS with Pipeline and NOAA Classified Shellfish Growing Areas, 1995; Fisheries, NOAA Electronic Nautical Charts, 2003; NYS DEC Marine Use Assignments, 2002	32	Overlay Analysis in ESRI ArcGIS with Pipeline and NOAA Classified Shellfish Growing Areas, 1995; Fisheries, NOAA Electronic Nautical Charts, 2003; NYS DEC Marine Use Assignments, 2002
Submerged Aquatic Vegetation(No. miles traversed)	0	Overlay Analysis in ESRI ArcGIS with Pipeline and Submerged Aquatic Vegetation from NOAA Electronic Nautical Charts, 2003	4.5	Overlay Analysis in ESRI ArcGIS with Pipeline and Submerged Aquatic Vegetation from NOAA Electronic Nautical Charts, 2003	0	Overlay Analysis in ESRI ArcGIS with Pipeline and Submerged Aquatic Vegetation from NOAA Electronic Nautical Charts, 2003
Offshore Marine Use Components						
Nearest Distance to Shore from Terminal (miles)	9.7	Near Analysis in ESRI ArcGIS with Terminal and NOAA/NOS Medium Resolution Digital Vector Shoreline, 2002.	11.4	Near Analysis in ESRI ArcGIS with Terminal and NOAA/NOS Medium Resolution Digital Vector Shoreline, 2002	11.4	Near Analysis in ESRI ArcGIS with Terminal and NOAA/NOS Medium Resolution Digital Vector Shoreline, 2002
Within 1 mile of Dumping Areas (Active/Inactive)	1	Overlay analysis in ESRI ArcGIS with pipeline and buffer of Active and Inactive Dumping Grounds, NOAA Electronic Nautical Charts, 2003.	0	Overlay analysis in ESRI ArcGIS with pipeline and buffer of Active and Inactive Dumping Grounds, NOAA Electronic Nautical Charts, 2003	0	Overlay analysis in ESRI ArcGIS with pipeline and buffer of Active and Inactive Dumping Grounds, NOAA Electronic Nautical Charts, 2003
Bathymetry Depth (meters)	-18 to -39	Overlay analysis in ESRI ArcGIS with pipeline and 1m Bathymetry, U.S. Geological Survey Open-File Report 002-02, 2002	0 to -25	Overlay analysis in ESRI ArcGIS with pipeline and 1m Bathymetry, U.S. Geological Survey Open-File Report 002-02, 2002	0 to -30	Overlay analysis in ESRI ArcGIS with pipeline and 1m Bathymetry, U.S. Geological Survey Open-File Report 002-02, 2002
Submarine Cable Crossing	2	Overlay analysis in ESRI ArcGIS with Pipeline and Cable Lines and Areas, NOAA Electronic Nautical Charts, 2003	0	Overlay analysis in ESRI ArcGIS with Pipeline and Cable Lines and Areas, NOAA Electronic Nautical Charts, 2003	7	Overlay analysis in ESRI ArcGIS with Pipeline and Cable Lines and Areas, NOAA Electronic Nautical Charts, 2003
Within 1 mile of Lightering Area	1	Overlay analysis in ESRI ArcGIS with Pipeline and 1-Mile buffer of Lightering Zones, U.S. Coast Guard, 2000.	0	Overlay analysis in ESRI ArcGIS with Pipeline and 1-Mile buffer of Lightering Zones, U.S. Coast Guard, 2000	0	Overlay analysis in ESRI ArcGIS with Pipeline and 1-Mile buffer of Lightering Zones, U.S. Coast Guard, 2000
Wrecks within 1 mile	9	Overlay analysis in ESRI ArcGIS with 1-Mile buffer of Pipeline and Wrecks, NOAA Automated Wreck and Obstruction Information System, 2004	12	Overlay analysis in ESRI ArcGIS with 1-Mile buffer of Pipeline and Wrecks, NOAA Automated Wreck and Obstruction Information System, 2004	1	Overlay analysis in ESRI ArcGIS with 1-Mile buffer of Pipeline and Wrecks, NOAA Automated Wreck and Obstruction Information System, 2004
Ferry Route Crossing	1	Overlay analysis in ESRI ArcGIS with Pipeline and Ferry Routes, ESRI Streetmap, 2003.	0	Overlay analysis in ESRI ArcGIS with Pipeline and Ferry Routes, ESRI Streetmap, 2003	0	Overlay analysis in ESRI ArcGIS with Pipeline and Ferry Routes, ESRI Streetmap, 2003

EIR 2-11 Table 1 Comparison of Preferred Route and Alternatives						
Parameter	**Preferred Route**	**Information, analysis and data used**	**Alternative 11-1 – Southside Onshore**	**Information, analysis and data used**	**Alternative 11-2 – Southside Offshore**	**Information, analysis and data used**
Potentially Contaminated Soils or Sediments (Present: Yes/No)						
PCBs	No	Buchholtz ten Brink, M.R., and E.L. Mecray. 1998. Contaminant Distribution and Accumulation in Sediments of Long Island Sound: Field Work and Initial Results. Chapter 5, in Poppe, L.M., and Polloni, C., eds., *Long Island Sound Environmental Studies*: U.S. Geological Survey Open-File Report 98-502, Chapter 5, CD-ROM. Available at: http://pubs.usgs.gov/openfile/of98-502/chapt5/ch5ftpg.htm	UNK	Buchholtz ten Brink, M.R., and E.L. Mecray. 1998. Contaminant Distribution and Accumulation in Sediments of Long Island Sound: Field Work and Initial Results. Chapter 5, in Poppe, L.M., and Polloni, C., eds., *Long Island Sound Environmental Studies*: U.S. Geological Survey Open-File Report 98-502, Chapter 5, CD-ROM. Available at: http://pubs.usgs.gov/openfile/of98-502/chapt5/ch5ftpg.htm	Yes	Buchholtz ten Brink, M.R., and E.L. Mecray. 1998. Contaminant Distribution and Accumulation in Sediments of Long Island Sound: Field Work and Initial Results. Chapter 5, in Poppe, L.M., and Polloni, C., eds., *Long Island Sound Environmental Studies*: U.S. Geological Survey Open-File Report 98-502, Chapter 5, CD-ROM. Available at: http://pubs.usgs.gov/openfile/of98-502/chapt5/ch5ftpg.htm Presence of sediment contamination in Upper and Lower New York Bay
Dioxin	No		UNK		Yes	
Metals	No		Yes		Yes	
Pesticides	No		UNK		Yes	
PAHs	No		UNK		Yes	
Petroleum hydrocarbons	No		Yes		Yes	
Sediment Types (miles traversed)						
Gravely Sand	0.4	Overlay analysis in ESRI ArcGIS with Pipeline and Sedimentary Types from U. S. Geological Survey Open-File Report OFR 00-304, 2000.	UNK	Overlay analysis in ESRI ArcGIS with Pipeline and Sedimentary Types from U. S. Geological Survey Open-File Report OFR 00-304, 2000	NA	Overlay analysis in ESRI ArcGIS with Pipeline and Sedimentary Types from U. S. Geological Survey Open-File Report OFR 00-304, 2000
Sand	1.8		UNK		NA	
Sandy Silt, Clayey Silt, or Silt	8.7		UNK		NA	
Sand- Silt-Clay	4.9		UNK		NA	
Silt-Clay/Sand	6.0		UNK		NA	
Deposition	11.3		UNK		NA	
Erosion	1.7		UNK		NA	
Sorting	8.7		UNK		NA	

EIR 2-11 Comparison of Pipeline Routes from Atlantic Ocean LNG Terminal Site Alternatives					
Route Alternative	**New-Build Pipeline Length**	**Environmental Constraints**	**Information, analysis and data used**	**Engineering Constraints**	**Information, analysis and data used**
Alternative 11-1 FSRU on south side of Long Island and onshore at Jones Beach with Connection at South Commack	40.5 Miles 22.9 Miles Onshore 17.6 Miles Offshore	Route involves greatest disturbance to submerged aquatic vegetation (4.5 miles) in shoreline areas	Overlay analysis in ESRI ArcGIS with Pipeline and Coastal Habitats, NYS DEC, 2002; and Submerged and Aquatic Vegetation, NOAA Electronic Nautical Charts, 2003	Landfall in sensitive near shore and beach environments	Overlay analysis in ESRI ArcGIS with Pipeline and Marine Use Assignments, NYS DEC, 2003; and Coastal Habitat, NYS DEC, 2002
		Disturbance of contaminated sediments in shoreline areas during construction	Overlay analysis in ESRI ArcGIS with Pipeline and Sedimentary Types and Environments, U. S. Geological Survey Open-File Report OFR 00-304, 2000	Co-location along busy and congested urban roadways	Overlay analysis with aerial photographic images available online at http://earth.google.com
		Disturbance to tidal and intertidal wetland communities containing sensitive habitats	Overlay analysis in ESRI ArcGIS with Pipeline and Tidal Wetlands and Coastal Habitat, NYS DEC, 2002; NOAA Electronic Nautical Charts, 2003	Construction and operation of a pipeline in a residential area	Overlay analysis with aerial photographic images available online at http://earth.google.com
		Disruption to traffic patterns and highway use for extended periods during pipeline construction due to restrictive rights-of-way	Overlay analysis with aerial photographic images available online at http://earth.google.com	Intermediate compression required, necessitating the construction of at least one compressor station	Resource Report 10, Section 10.7.2.1 Pipeline System Hydraulic Examination Broadwater's response to FERC Staff's Comments on Environmental Resource Reports, EIR No. 1-16 issued March 31, 2006, justification for intermediate compression spacing
		Unstable soils for land-based components due to high water table	Overlay analysis in ESRI ArcGIS with Pipeline and USDA NRCS SSURGO Soils Data, 2000		
		Specialized dewatering techniques required to account for high water table and discharge of the water during construction	Presence of the Nassau-Suffolk sole source aquifer which is supported primarily by surface runoff recharge and results in a high water table in many areas - USDA NRCS SSURGO Soils Data, 2000		
		Potential impacts to the Nassau – Suffolk sole source aquifer	Nassau-Suffolk sole source aquifer presence		

EIR 2-11 Comparison of Pipeline Routes from Atlantic Ocean LNG Terminal Site Alternatives					
Route Alternative	**New-Build Pipeline Length**	**Environmental Constraints**	**Information, analysis and data used**	**Engineering Constraints**	**Information, analysis and data used**
Alternative 11-2 FSRU on south side of Long Island with connection offshore to pipeline at Hunt's Point (through East River)	50.2 Miles 0.6 miles onshore 49.6 miles offshore	Disturbance and increased sediment load on the water column of potentially highly contaminated sediments in the New York Bight and East River with need for removal and dredge disposal during and after pipeline construction	Overlay analysis in ESRI ArcGIS with Pipeline and Sedimentary Types and Environments, U. S. Geological Survey Open-File Report OFR 00-304, 2000	Disruption of navigation channel use during pipeline installation	Overlay analysis in ESRI ArcGIS with Pipeline and Traffic Channels, NOAA Electronic Nautical Charts, 2003; and Navigable Waterways, U.S. Army Corps of Engineers Navigation Center, 2004
		Increased sedimentation due to excessive pipeline length	Overlay analysis in ESRI ArcGIS with Pipeline and Sedimentary Types and Environments, U. S. Geological Survey Open-File Report OFR 00-304, 2000	Construction under Verrazano Bridge	Overlay analysis in ESRI ArcGIS with Pipeline route and known bridge location
		Increased risk for collisions in high traffic areas of the New York Bight and East River with risks for spills	Overlay analysis in ESRI ArcGIS with Pipeline and Navigable Waterways, U.S. Army Corps of Engineers Navigation Center, 2004; and Ferry Routes, ESRI StreetMap Mapping Software, 2001	High traffic through the New York Bight and East River during construction will limit workspace area	Overlay analysis in ESRI ArcGIS with Pipeline and Navigable Waterways, U.S. Army Corps of Engineers Navigation Center, 2004; and Ferry Routes, ESRI StreetMap Mapping Software, 2001
		Potential to encounter more cultural resources such as shipwrecks with longer offshore pipeline length	Overlay analysis in ESRI ArcGIS with Pipeline and NOAA Automated Wreck and Obstruction Information System, 2004	Intermediate compression required, necessitating the construction of at least one compressor station, likely offshore	Resource Report 10, Section 10.7.2.1 Pipeline System Hydraulic Examination Broadwater's response to FERC Staff's Comments on Environmental Resource Reports, EIR No. 1-16 issued March 31, 2006, justification for intermediate compression spacing
		Increased disturbance to benthic habitats due to increase pipeline length	Overlay analysis in ESRI ArcGIS with Pipeline and Long Island Sound Benthic Communities, U. S. Geological Survey Open-File Report OFR 00-304, 2000		

Appendix 2

Response to FERC's May 1, 2006 Environmental Information Request 2-11

EIR2-11

Request:

Provide a comparative analysis, including tabular summaries, of the potential offshore and onshore impacts associated with the proposed Project and an offshore storage and regasification alternative located on the south side of Long Island, and a new pipeline between the offshore terminal and an interconnect with the existing IGTS pipeline.

Response:

Potential system alternative(s) located off the south shore of Long Island, with LNG storage and regasification occurring in the Atlantic Ocean rather than in Long Island Sound, are the focus of this response. In Resource Report 10, Broadwater identified a similar offshore terminal location as "CLNG A", but discounted its viability from an environmental, economic and engineering standpoint. A major consideration was the significant weather-related impacts upon cargo transfer in the open ocean environment. The offshore Atlantic alternative, including associated pipelines, was further discussed and rejected in Broadwater's recently-filed Coastal Zone Consistency Determination (NYDOS-April 2006) which has been included in the FERC docket and made a part of the FERC record.

Two potential alternative routes to interconnect an offshore Atlantic Ocean terminal with the existing Iroquois system are presented in this EIR response. One alternative traverses Long Island to tie in to the existing IGTS South Commack meter station. The second alternative stays offshore through the New York/New Jersey Harbor and traverses up the East River before making landfall at Hunt's Point with a tie in to the existing IGTS Hunts Point meter station.

Potential onshore and offshore pipeline routes were evaluated using publicly available information. Routes considered in this comparison are described below and shown on Figure 1. Broadwater's preferred route is also presented.

- **Preferred Route (as presented in Broadwater's application) -**This route is 21.7 miles in length, is centrally located within Long Island Sound, and maximizes the distance from either the Long Island or Connecticut shorelines. This route is located completely offshore and does not impact any sensitive shoreline or onshore areas.

- **Alternative 11-1** – This route is 40.5 miles in length and includes an offshore terminal on the southern shore of Long Island due south of the Jones Beach area. This routing maintains a straight-line approach to Jones Beach State Park, going through Hempstead Bay before making landfall at Wantagh. The onshore route then generally follows existing roadway corridors toward the

north before connecting at the South Commack meter station. Alternative 11-1 is not preferred due to the significant coastal habitat and submerged aquatic vegetation encountered in Hempstead Bay, coupled with the significant urban congestion along the onshore corridor.

- **Alternative 11-2** – This route is 50.2 miles in length and includes an offshore terminal on the southern shore of Long Island due south of the Jones Beach area. The route then follows a westerly direction through the Rockaway Inlet and the New York Bight via the East River with a connection at Hunt's Point. Alternative 11-2 encounters the greatest amount of potential sediment contamination along the route in the East River and the New York Bight. These areas are contaminated with several heavy metals and PCBs as a result of sediment deposition and dredge disposal from upper watershed areas including the Hudson River and other industry along the New York Bight with outfalls directly into the East River. Sewer overflows with increased inputs from the heavily populated New York City area also impact this area. This route would more than double the amount of in-water construction impact, and require construction in heavily used and restricted waterways as compared to Broadwater's preferred alternative.

The analysis and supporting tables present a comparison of some of the key environmental and engineering considerations and conditions along the proposed marine and onshore pipeline routing alternatives that led to the selection of the preferred alternative. Alternatives 11-1 and 11-2 start at an offshore location but end at different locations onshore, namely the South Commack meter station and Hunt's Point, respectively. Alternative 11-1 includes an onshore component. Broadwater's preferred route is entirely offshore.

The comparative data analysis presented in Table 1 was gathered as part of a desktop study effort and presents the impacts associated with in-water and onshore features associated with each potential alternative. A summary of environmental and engineering constraints is presented in Table 2.

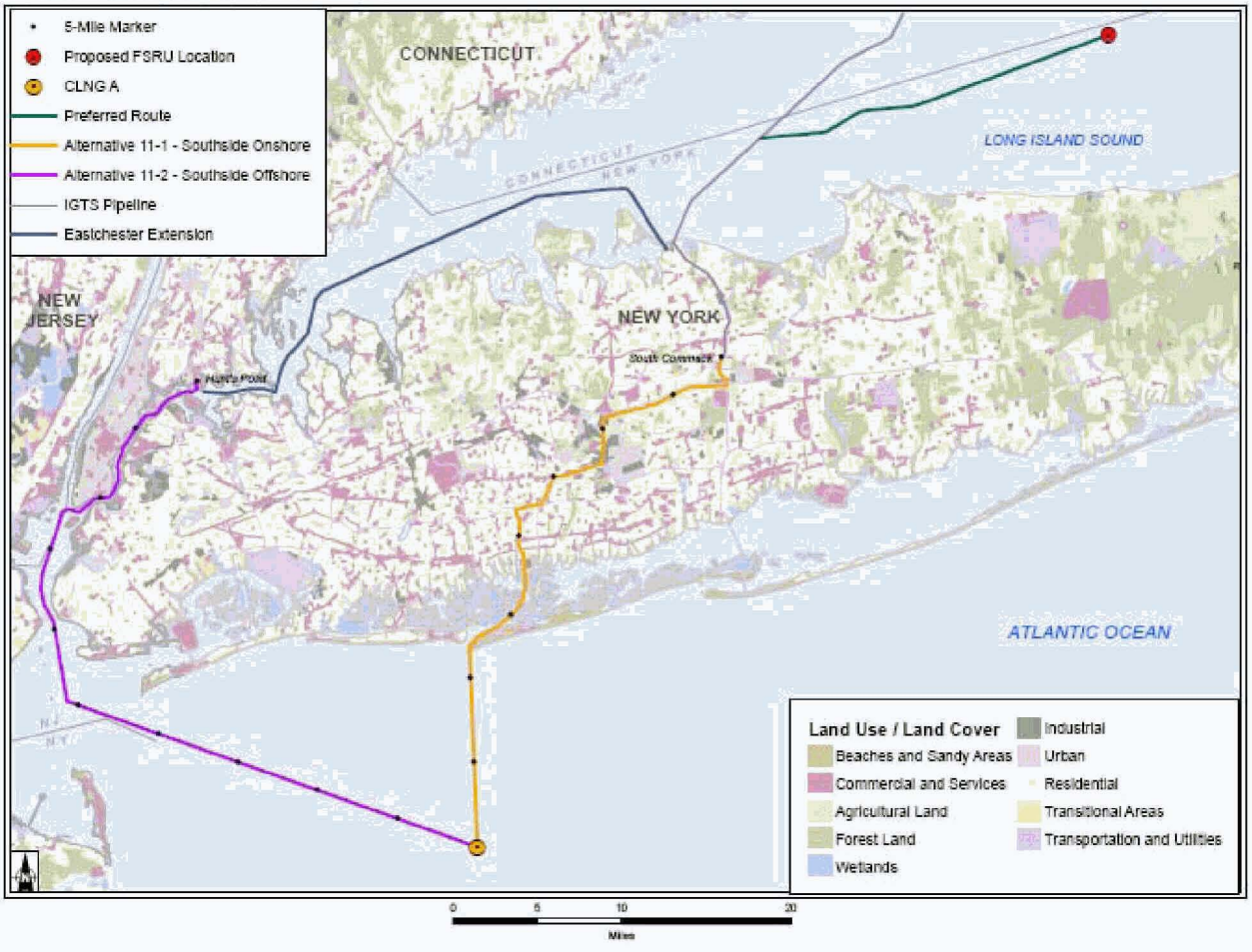

Figure 1 Alternative Pipeline Routes 11-1 and 11-2 from CLNG A

Alternative 11-1 Southside Onshore

Alternative 11-1 is 40.5 miles in total length, which is approximately twice the length of the Preferred Route alternative (21.7 miles). Alternative 11-1 traverses approximately 17.6 miles of offshore open water on the south side of Long Island in the Atlantic Ocean and makes landfall through Jones Inlet in the vicinity of Jones Beach State Park. Less than a mile of the Jones Beach State Park would be traversed (0.3 miles) by the route. Additional land uses that this route crosses include, among others, residential (7.5 miles) and a small amount of forested land. This route was chosen to avoid the need for a landfall along the southern Long Island shoreline. Rather, the pipeline was routed to make landfall in an interior bay near an existing roadway with a crossing of Hempstead Bay.

While avoiding an Atlantic shore crossing, this alternative would result in significant impact to Hempstead Bay, which is recognized as a Significant Coastal Fish and Wildlife Habitat Area due to extensive marsh development. Construction would result in significant impact to this resource.

The watershed of the Hempstead Bay area where Alternative 11-1 makes landfall exhibits the highest proportion of watershed rendered impervious by roads, parking lots and roofs. Residential development along canals, tributaries and the shoreline is increasing the pressure on the natural bay areas causing increased runoff and contaminant loading as indicated by the presence of contaminated soils or sediments (*see* Table 1). Stormwater runoff from this developed landscape is the most significant source of pollution reaching the tributaries and bays. Elevated levels of coliform bacteria are responsible for the closure of several acres of shellfish beds and local beaches. Nutrients from these point and non-point sources promote the area's extensive seaweed and algal growth that have contributed to the loss of valuable submerged aquatic vegetation, while nutrients and sediments in stormwater runoff are responsible for impacting essential fish habitat. Petroleum hydrocarbons are also noted as sediment and water quality pollutants. Thus water quality in this area is affected by both non-point and point sources of pollution. The delicate biological condition of the landfall area and existing condition of the nearshore environment, which includes essential fish habitat and the highest area of submerged aquatic vegetation (4.5 miles), when compared to other proposed alternatives leads to the conclusion that this is not a preferred pipeline route.

Once onshore, this alternative traverses some very densely developed communities of southern Nassau and Suffolk Counties, Long Island (i.e. Massapequa [est. population 22,000], Bethpage [est. population 16,000], and Deer Park [est. pop 28,000]). To the extent possible, the pipeline would be co-located with existing roadway infrastructure on Long Island. Because of congestion, construction would likely require closing a portion of roadways, and would require specialized construction techniques to accommodate the lack of space, resulting in substantially greater construction time. The communities traversed by this alternative are characterized as relatively affluent communities with a substantial amount of high-end residential and commercial development. Alternative 11-1 would also be required to cross a total of 10 existing utilities. The Preferred Route traverses no residential areas and two offshore utility crossings but no onshore utilities. Other characteristics of the route are identified in Table 1.

Based on the considerable potential impacts resulting from construction of this alternative, Broadwater does not consider this to be a viable option.

Alternative 11-2 Southside Offshore

Alternative 11-2 is 50.2 miles in total length, which is approximately 30 miles longer than the Preferred Route alternative (21.7 miles). The route is located primarily in water

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(49.6 miles), traversing the Atlantic Ocean and the East River, crossing through Queens and Bronx Counties with a connection at Hunts Point. Of particular note, this route would cross an estimated 13 roadways, bridges, and/or tunnels. This route would also cross 14 utilities comprised of seven cables and seven pipelines, along the marine portion of this route. The Preferred Route traverses two offshore utilities. Other characteristics of the route are identified in Table 1.

Alternative 11-2, at 50.2 miles long, represents the proposed route with the greatest potential to impact benthic communities and disturb contaminated sediments. This route traverses the New York Bight and East River, which contain potentially highly contaminated sediments that would become suspended in the water column during pipeline construction and may cause depositional issues in adjacent areas. This can further impact the essential fish habitat that is present along the proposed route and other organisms that exist throughout the water column.

Another characteristic of this alternative is that pipeline construction would occur in nearly 24 miles of a designated navigable waterway with limited work space (e.g. the East River and New York Bight) and excessive vessel traffic issues that increase the risk of collision and spills that would impact water quality, the biological community and local commerce. Pipeline construction in the East River would not likely be by conventional laybarge and towed plow method; it would likely involve pre-dredging of the pipeline trench followed by pipeline installation by a submerged tow method where pipe sections are made up onshore then launched, towed and welded into place. This type of construction would take several months to complete compared to conventional laybarge construction, and would be hampered by interference with normal vessel traffic in the East River.

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Table 1 Comparison of Preferred Route and Alternatives

Parameter	Preferred Route	Alternative 11-1 – Southside Onshore	Alternative 11-2 – Southside Offshore
Length (miles)	21.7	40.5	50.2
Utility crossings	2	10	14
Compressor Stations	0	1 minimum (on a platform located offshore)	1 minimum (located onshore)
Construction corridor/ROW (miles)	(21.7 offshore)	22.9 (17.6 offshore)	0.6 (49.6 offshore)
Estimated number of on shore non-typical work areas [1] (does not include road crossings)	0	12	1
Estimated acreage of permanent and construction ROW (does not include cable sweep on Preferred route)	16/199	29/285	35/530
Land Use			
Forested land (No. miles traversed)	0	0.3	0
Residential land (No. miles traversed)	0	7.5	0
Estimated number of residences within 50 feet of edge of construction ROW	0	457	0
Federal Parks (conservations areas) (No. miles traversed)	0	0	0
State Parks (conservation areas) (No. miles traversed)	0	0.3	0
Scenic River Corridors (No. miles traversed)	0	0	0
Roadways/Bridges/Tunnels (Number encountered)	0	0	13
Onshore Biological Components			
Freshwater wetlands (No. miles traversed)	0	12	3.2

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Table 1 Comparison of Preferred Route and Alternatives

Parameter	Preferred Route	Alternative 11-1 – Southside Onshore	Alternative 11-2 – Southside Offshore
Tidal wetlands (No. miles traversed)	0	2.6	1.6
Significant coastal habitat (No. miles traversed)	0	5.5	0
Count of stream and creek crossings	0	11	0
Refuge Areas		0	0
Onshore soils types			
Onshore soils susceptible to erosion (No. miles traversed)	0	23.6	0
Sole-source aquifers encountered/shallow groundwater (No. miles traversed)	0	Along 22 miles of onshore route	0
Offshore Biological Components			
Fisheries use areas (No. miles traversed)	0	0.06	32
Submerged Aquatic Vegetation(No. miles traversed)	0	4.5	0
Offshore Marine Use Components			
Nearest Distance to Shore from Terminal (miles)	9.7	11.4	11.4
Within 1 mile of Dumping Areas (Active/Inactive)	1	0	0
Bathymetry Depth (meters)	-18 to -39	0 to -25	0 to -30
Submarine Cable Crossing	2	0	7
Within 1 mile of Lightering Area	1	0	0
Wrecks within 1 mile	9	12	1
Ferry Route Crossing	1	0	0

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Table 1 Comparison of Preferred Route and Alternatives

Parameter	Preferred Route	Alternative 11-1 – Southside Onshore	Alternative 11-2 – Southside Offshore
Potentially Contaminated Soils or Sediments (Present: Yes/No)			
PCBs	No	UNK	Yes
Dioxin	No	UNK	Yes
Metals	No	Yes	Yes
Pesticides	No	UNK	Yes
PAHs	No	UNK	Yes
Petroleum hydrocarbons	No	Yes	Yes
Sediment Types (miles traversed)			
Gravelly Sand	0.4	UNK	NA
Sand	1.8	UNK	NA
Sandy Silt, Clayey Silt, or Silt	8.7	UNK	NA
Sand- Silt-Clay	4.9	UNK	NA
Silt-Clay/Sand	6.0	UNK	NA
Deposition	11.3	UNK	NA
Erosion	1.7	UNK	NA
Sorting	8.7	UNK	NA

UNK = Information was not available at the time this analysis was performed.

1 Size of on-shore non-typical work areas cannot be estimated unless a detailed route reconnaissance and site specific pre-engineering study is conducted

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Route Alternative	New-Build Pipeline Length	Environmental Constraints	Engineering Constraints
Alternative 11-1 FSRU on south side of Long Island and onshore at Jones Beach with Connection at South Commack	40.5 Miles 22.9 Miles Onshore 17.6 Miles Offshore	•• Route involves greatest disturbance to submerged aquatic vegetation (4.5 miles) in shoreline areas •• Disturbance of contaminated sediments in shoreline areas during construction •• Disturbance to tidal and inter-tidal wetland communities containing sensitive habitats •• Disruption to traffic patterns and highway use for extended periods during pipeline construction due to restrictive rights-of-way •• Unstable soils for land-based components due to high water table •• Specialized dewatering techniques required to account for high water table and discharge of the water during construction •• Potential impacts to the Nassau – Suffolk sole source aquifer	•• Landfall in sensitive near shore and beach environments •• Co-location along busy and congested urban roadways •• Construction and operation of a pipeline in a residential area •• Intermediate compression required, necessitating the construction of at least one compressor station

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Route Alternative	New-Build Pipeline Length	Environmental Constraints	Engineering Constraints
Alternative 11-2 FSRU on south side of Long Island with connection offshore to pipeline at Hunt's Point (through East River)	50.2 Miles 0.6 miles onshore 49.6 miles offshore	•• Disturbance and increased sediment load on the water column of potentially highly contaminated sediments in the New York Bight and East River with need for removal and dredge disposal during and after pipeline construction •• Increased sedimentation due to excessive pipeline length •• Increased risk for collisions in high traffic areas of the New York Bight and East River with risks for spills •• Potential to encounter more cultural resources such as shipwrecks with longer offshore pipeline length •• Increased disturbance to benthic habitats due to increase pipeline length	•• Disruption of navigation channel use during pipeline installation •• Construction under Verrazano Bridge •• High traffic through the New York Bight and East River during construction will limit workspace area •• Intermediate compression required, necessitating the construction of at least one compressor station, likely offshore

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Recommended Route

Based on the desktop evaluation of these additional alternatives and comparison of the critical factors affecting pipeline routing, the preferred alternative identified in Broadwater's application continues to be placement of the FSRU approximately 9 miles offshore of Long Island in its current proposed location with an offshore pipeline connection to the Iroquois Gas Transmission System via a 21.7 miles east-west pipeline. The data presented in this alternatives assessment further supports Broadwater's original alternatives analysis resulting in the selection of the proposed Project, the terminal site and the Preferred Route.

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure.

Dated at Washington, D.C. this 13th day of April 2007.

Brett A. Snyder