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November 17, 2015

VIA ELECTRONIC FILING

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

Re: Rio Grande LNG, LLC and Rio Bravo Pipeline Company, LLC
Docket No. PF15-20-000
Draft Resource Report 1

Dear Ms. Bose:

On April 13, 2015, the Director of the Office of Energy Projects of the Federal Energy Regulatory Commission ("FERC") issued a notice approving the use of the FERC's Pre-Filing Review Process for the Rio Grande LNG Export Project and the Rio Bravo Pipeline Project in the above-referenced docket. In compliance with the FERC's Pre-Filing Review procedures set forth in 18 C.F.R. § 157.21 (2015), Rio Grande LNG, LLC and Rio Bravo Pipeline Company, LLC (together, "RG Developers") are submitting herewith for filing in the above-reference docket a revised Draft Resource Report 1: General Project Description ("Draft RR1"). This draft reflects certain factual changes and incorporates additional information, as compared to the initial Draft RR1 that was previously submitted to the FERC on May 12, 2015.

Due to the volume of materials being submitted and the privileged and confidential status of some of the information within those materials, RG Developers are submitting Draft RR1 and its appendices in four (4) parts and have designated the submissions as follows:

Public Submissions:

- Draft RR1
- Appendix 1.A
- Appendices 1.B, 1.C, and 1.E through 1.O (Appendices 1.F and 1.O are partially redacted)

Privileged Submission:

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- Appendix 1.D, Appendix 1.F (Non-redacted version) and Appendix 1.O (Non-redacted version)

Appendix 1.D (List of Landowners for the Project) consists entirely of confidential landowner information, and RG Developers request privileged treatment for such information pursuant to FERC Order No. 769 and 18 C.F.R. § 388.112 (2015) of the FERC's regulations. This list is marked "PRIVILEGED – DO NOT RELEASE" in accordance with 18 C.F.R. § 388.112. The RG Developers will continue to verify Appendix 1.D and will provide revisions to the FERC staff as necessary.

Appendix 1.F (List of Stakeholders and Interested Parties) and Appendix 1.O (Dredge Material Management Plan) contain commercially sensitive information developed by the RG Developers that, if disclosed to the competing LNG projects being proposed in the Brownsville area or elsewhere, could be exploited by such other projects to the detriment of the RG Developers' project development efforts, and RG Developers request privileged treatment for a portion of such information pursuant to Exemption 4 of the Freedom of Information Act (5 U.S.C. § 552(b)(4) (2012)). Appendix 1.F and Appendix 1.O have been redacted for the public submission and are marked with "PRIVILEGED – DO NOT RELEASE" in accordance with 18 C.F.R. § 388.112 for the privileged submission.

Please direct any questions or comments regarding this filing to the undersigned at (202) 662-4555.

Respectfully submitted,

/s/ Erik J.A. Swenson
Erik J.A. Swenson
Islara U. Irgit
Attorneys for Rio Grande LNG, LLC and
Rio Bravo Pipeline Company, LLC

EJAS/IUI

cc: Gertrude Johnson (FERC)
Jennifer McCoy (Edge Engineering and Science, LLC)

PF15-20-000

Rio Grande LNG Project
Rio Bravo Pipeline Project

Draft Resource Report 1:
General Project Description

November 17, 2015

Prepared for:

RIO GRANDE LNG

RIO BRAVO PIPELINE

3 Waterway Square Place, Suite 400
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Prepared by:

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SUMMARY OF FILING INFORMATION	
INFORMATION	**SECTION REFERENCE**
Minimum Filing Requirements	
☐ 1. Provide a detailed description and location map of the project facilities (§380.12(c)(1)) • Include all pipeline and aboveground facilities , and associated land requirements. • Include support areas for construction or operation. • Identify facilities to be modified, abandoned, replaced, or removed • Identify other companies that must construct jurisdictional facilities related to the project, where the facilities would be located, and where they are in the Commission's approval process.	Sections 1.2 and 1.8 Note details regarding other companies' jurisdictional facilities related to the project will be included in the FERC Application anticipated for March 2016.
☐ 2. Describe any non-jurisdictional facilities that will be built in association with the project (§ 380.12(c)(2)) • Include auxiliary facilities (See § 2.55(a)). • Describe the relationship to the jurisdictional facilities. • Include ownership, land requirements, gas consumption, megawatt size, construction status, and an update of the latest status of federal, state, and local permits/approvals. • Include the length and diameter of any interconnecting pipeline. • Current 1:24,000/1:25,000 scale topographic maps showing the location of the facilities. • Correspondence with the appropriate State Historic Preservation Officer (SHPO) or duly authorized Tribal Historic Preservation Officer (THPO) for tribal lands regarding whether properties eligible for listing on the National Register of Historic Places (NRHP) would be affected. • Correspondence with the U.S. Fish and Wildlife Service (and National Marine Fisheries Service, if appropriate) regarding potential impacts of the proposed facility on federally listed threatened and endangered species. • For facilities within a designated coastal zone management area, a consistency determination or evidence that the owner has requested a consistency determination from the state's coastal zone management program. • Apply the four-factor test to each facility. (See § 380.12(c)(2)(ii)(A)-(D))	Section 1.9, 1.11, Appendix 1.E 1:24,000/1:25,000 scale topographic maps showing the location of the facilities will be included in the FERC Application anticipated for March 2016.
☐ 3. Provide current, original United States Geological Survey 7.5-minute series topographic maps covering at least a 0.5-mile-wide corridor centered on the pipeline, with mileposts showing the project facilities (§ 380.12(c)(3)(i)) • Maps of equivalent details are acceptable if legible (check with staff). • Show locations of all linear project elements, and label them. • Show locations of all significant aboveground facilities, and label them.	Appendix 1.A Maps of nonlinear construction areas will be included in the FERC Application anticipated for March 2016.

SUMMARY OF FILING INFORMATION	
INFORMATION	**SECTION REFERENCE**
Minimum Filing Requirements	
• Show nonlinear construction areas on maps at a scale of 1:3,600 or larger keyed graphically and by milepost to the right-of-way maps.	
☐ 4. Provide aerial images or photographs or alignment sheets based on these sources with mileposts showing the project facilities, covering at least a 0.5 mile-wide corridor, and including mileposts (§ 380.12(c)(3)(ii)) • No more than 1-year old. • Scale no smaller than 1:6,000. • Older images/photographs/alignment sheets should be modified to show any residences not depicted in the original.	Section 1.2 and Appendix 1.B *(to be submitted in December 2015*) Third bullet point is N/A.
☐ 5. Provide plot/site plans of compressor stations showing the location of the nearest noise-sensitive areas (schools, hospitals, or residences) within 1 mile of the compressor station, existing and proposed compressor and auxiliary buildings, access roads, and the limits of areas that would be permanently disturbed.. (§ 380.12(c)(3,4)) • Scale no smaller than 1:3,600. • Show reference to topographic maps and aerial alignments provided above.	Section 1.2.3.1; See also Draft Resource Report 9, "Air and Noise Quality"
☐ 6. Describe and identify by milepost construction and restoration methods to be used in areas of rugged topography, residential areas, active croplands, sites where the pipeline would be located parallel to and under roads, and sites where explosives are likely to be used. (§ 380.12(c)(6))	Section 1.5.1 (Terminal); Section 1.5.2 (Pipeline); and Section 1.5.3 (Pipeline Aboveground Facilities) Appendix 1.L (Part B)
☐ 7. Identify the permits required for construction across surface waters. (§ 380.12(c)(9)) • Include the status of all permits. • For construction in the federal offshore area be sure to include consultation with the MMS. File with the MMS for rights-of-way grants at the same time or before you file with FERC.	Section 1.9 and Appendix 1.E
☐ 8. Provide the names and addresses of all affected landowners as required and certify that all affected landowners will be notified. (§ 380.12(c)(10)) • Affected landowners are defined in § 157.6(d)(2). • Provide an electronic copy directly to the environmental staff.	Appendix 1.D

SUMMARY OF FILING INFORMATION	
INFORMATION	**SECTION REFERENCE**
Additional Information Often Missing and Resulting in Data Requests	
☐ Describe all authorizations required to complete the proposed action and the status of applications for such authorizations. Identify environmental mitigation requirements specified in any permit or proposed in any permit application to the extent not specified elsewhere in this section. (§	Section 1.9 and Appendix 1.E

	380.12(c)(9))	
☐	Provide plot/site plans of all other aboveground facilities that are not completely within the right-of-way	Sections 1.2.3 and 1.3 Plot plans for metering stations will be presented in the FERC Application anticipated in March 2016
☐	Provide detailed typical construction right-of-way cross-section diagrams showing information such as widths and relative locations of existing rights-of-way, new permanent rights-of-way, and temporary construction rights-of-way.	Section 1.5.2.1
☐	Summarize the total acreage of land affected by construction and operation of the project.	Section 1.3.1.1 (Terminal), Section 1.3.2.1 (Pipeline System)
☐	If Resource Report 5 – Socioeconomics is not provided, provide the start and end dates of construction, the number of pipeline spreads that will be used, and the workforce per spread. (§ 380.12(c)(7))	Section 1.4 and Resource Report 5, "Socioeconomics"
☐	Send two additional copies of topographic maps and aerial images/photographs directly to the environmental staff of the Office of Energy Projects. (§ 380.12(c)(3)(iii))	Topographic Map book submitted as Appendix 1A. Alignment Sheets (Appendix 1B) will be submitted to the FERC following the submittal of Draft Resource Report 1 under separate cover in December 2015.
	Identify facilities to be abandoned, and state how they would be abandoned, how the site would be restored, who would own the site or right-of-way after abandonment, and who would be responsible for any facilities abandoned in place. (§ 380.12(c)(5)(i)) When the right-of-way or the easement would be abandoned, identify whether landowners were given the opportunity to request that the facilities on their property, including foundations and below ground components, be removed. Identify any landowners whose preferences the company does not intend to honor, and the reasons therefore. (§ 380.12(c)(5)(ii))	Section 1.8
	Describe reasonably foreseeable plans for future expansion of facilities, including additional land requirements and the compatibility of those plans with the current proposal. (§ 380.12(c)(8))	Section 1.8

SUMMARY OF FERC'S JUNE 25, 2015 COMMENTS ON DRAFT RESOURCE REPORT 1	
FERC COMMENT (wording revised to match current terminology)	**SECTION REFERENCE**
1. Regarding the phased construction of the planned project, include the following: a. a discussion of the potential to delay or forego the construction of Project elements scheduled for late stage construction based on market conditions;	Section 1.4.1
b. the expected timing for beginning construction of the trains and pipeline facilities associated with each construction stage;	Figure 1.4-1 for Terminal timing; and Section 1.4.2 for Pipeline timing
c. the general sequence for constructing of the Project in stages, to include the timing of restoration, if any, for the Stage 1 pipeline right-of-way and temporary workspaces in comparison to the clearing of the later Stage pipeline right-of-way and temporary workspaces;	Section 1.5.2.1
d. a table indicating which components of the Rio Grande LNG, LLC (Rio Grande) liquefied natural gas (LNG) Terminal (Terminal) facilities would be constructed during each stage of construction (similar to table 1.4-1 for the Rio Bravo Pipeline Company, LLC [Rio Bravo] pipeline);	Section 1.2.1
e. figures depicting each stage of Terminal construction, as well as each stage of pipeline construction, that also define the construction area overlap between the various stages; and revised appendix 1.C to include each stage of construction;	Table 1.1-1, Figures 1.2-3 and 1.2-4 for Terminal Construction Figures 1.4-1 and 1.4-2, and Appendix 1.C
f. revised appendix 1.C to include each phase of construction	Figures 1.4-1 and 1.4-2, and Appendix 1.C
2. The Rio Grande Developers (RG Developers) have indicated the FERC Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) and Wetland and Waterbody Construction and Mitigation Procedures (Procedures) were used to create a project-specific Plan and Procedures. Provide the RG Developers' Plan and Procedures, specifying any deviations from the FERC Plan and Procedures and including measures from the RG Developers' Erosion Control Plan that may be more conservative that those measures required by the FERC Plan and Procedures. For all deviations requested, provide justification and the proposed equal compliance measure(s).	Appendix 1.L
3. Develop traffic management plans that include the following: a. the estimated number of truck and barge trips that would be required on a daily or weekly basis during construction; b. the estimated number of vehicular and waterborne vessel traffic that would be required on a daily or weekly basis during operation c. finalized details on road modifications, as mentioned in section 1.4.3.10, to address increased truck and commuter traffic on State Highway 48; and d. expected travel routes and times for construction and operational vehicular commuters	See Draft Resource Report 5, "Socioeconomics" "Traffic Study" is planned, and results will be presented in the FERC Application (anticipated for March 2016).
4. Provide documentation of all consultations and correspondence conducted to date with federal, state, and local permitting authorities.	Appendix 1.E
5. In section 1.2, provide the defined number of LNG carriers that the	Section 1.2.1.5

SUMMARY OF FERC'S JUNE 25, 2015 COMMENTS ON DRAFT RESOURCE REPORT 1	
FERC COMMENT (wording revised to match current terminology)	**SECTION REFERENCE**
Terminal would receive on a yearly basis for LNG export.	
6. In section 1.2, discuss the details and/or circumstances under which the Rio Bravo pipeline would transport additional natural gas for unaffiliated third parties.	Section 1.2
7. In section 1.2.1, discuss the terms of the lease of the property at the planned Terminal site, including the potential for lease extension at the end of the term.	Section 1.2.1
8. Provide a legible and clear version of figure 1.2-2 that includes a legend to clearly define the hatch markings shown in the figure. In the figure filed on March 20, 2015, a large construction area was outlined at the western extent of the Terminal site. Justify the use of the western construction area during early stage of construction and operation, rather than using the entire or portion of the late stage facilities area as the early stage of construction workspace	Figure 1.2-2 revised and e-size version in Appendix 1.I Table 1.1-1, Figures 1.2-3 and 1.2-4 for Terminal Construction Stages
9. In section 1.2.1.3, provide an update on the feasibility of obtaining electrical power for the planned Terminal from the existing grid or a hybrid system. Similarly, provide an update on the potential to use municipal services for freshwater and sewage treatment, as discussed in section 1.4.3.11	Sections 1.2.1.3 and 1.11
10. In section 1.2.1.3, provide the amount of potable and industrial water that would be required for operation of the Terminal and a discussion of the withdrawal location, timing of withdrawal, and intake screening measures. In addition, clarify whether separate freshwater storage tanks would be installed for potable and industrial water, or if the storage tank for the firewater system would be multi-purpose	Section 1.2.1.3 address offsite water supply and firewater and a detailed discussion of firewater system is in Draft Resource Report 13, see also Section 1.11.3
11. In section 1.2.1.5: a. describe the LNG carrier docking and departing process at the Terminal, including the orientation of the LNG carriers along the ship channel during loading; b. specify the transit time to the Terminal once an LNG carrier has entered inland waters; c. provide an estimate of how long each LNG carrier would be docked at the facility during transfer; and d. include information on tug or other support vessels that would be required during operation of the project, where these vessels would reside, and if they would be dedicated to the project or under contract from an outside source	Section 1.2.1.5 Updated and Draft Resource Report 13
12. Provide the number of refrigerant truck unloading berths and frequency of refrigerant deliveries anticipated via truck	Section 1.2.1.8
13. Identify the anticipated road routes or general direction leading from Route 4 [sic] for the LNG trucks, the refrigerant delivery trucks, and the natural gas liquids trucks travelling to and from the planned Terminal	Section 1.2.1.8
14. Clarify the term "semi-permanent contractor yard."	Term has been removed.
15. Confirm that a communications tower is not required or include a	Terminal will have two internal radio

SUMMARY OF FERC'S JUNE 25, 2015 COMMENTS ON DRAFT RESOURCE REPORT 1	
FERC COMMENT (wording revised to match current terminology)	**SECTION REFERENCE**
description of the facility, including height. In addition, clarify the need for such towers at the planned compressor stations	communication tower (Section 1.2.1.9) and no external communication towers No communication towers for the compressor stations.
16. Identify the interconnections, by company name, that the planned Rio Bravo pipeline would connect for transporting natural gas to the Terminal or clarify whether the interconnects are the same as mentioned in section 1.2.3.1	Section 1.2.2.2
17. Include a table listing the locations by milepost where the planned pipeline would be adjacent to or collocated with existing rights-of-way and provide offset from the existing disturbance, the type of easement, and the name of the existing infrastructure	Table 1.2-1
18. Clarify whether Compressor Station 2 would also be remotely operated. In addition, clarify the location of remote operation for such facilities	Section 1.2.3.1
19. Clarify the term "battery" limits of the Terminal site	Term has been removed
20. In table 1.3-1: a. include a footnote indicating that the remaining 250 acres of the Terminal site would be maintained as a permanent vegetated buffer; b. specify why a construction laydown area would have a permanent operational footprint of 66 acres; and c. when information is available, justify the need for temporary staging areas outside of the Terminal site and provide their locations	Section 1.3 Table 1.3-1 updated
21. Specify the heights of the ground flares and the "modest elevation" flare near the boil-off gas station	Section 1.3.1.1 The term "modest elevation" has been removed
22. Modify table 1.3-2 to provide the acreage for construction and operation of Pipeline 1 and Pipeline 2, the acreage of overlap between the Pipeline 1 construction and Pipeline 2 construction, and the overall total impact from each project component listed	Section 1.3 Table 1.3-2 updated and Table 1.3-3
23. Include a column for land use type in tables 1.3-3 and 1.3-4	Table 1.3-3 has been replaced by Appendix 1.J Table 1.3-5 updated Table 1.3-6
24. Provide the expected start date and expected duration of construction for Stage 1 and 2 of the pipelines and Stages 1 through 6 of the compressor stations	Section 1.4.2 and Figure 1.4-1
25. Figure 1.4-1 shows 170 feet of total construction workspace for the pipelines rights-of-way. Provide justification for maintaining a 50-foot offset between the two pipelines rather than 25 feet. In addition, the figure depicts concurrent construction of Pipeline 1 and Pipeline 2; if construction would not be concurrent, provide two separate figures showing previously disturbed right-of-way during Pipeline 2 construction and the measures RG	Section 1.5.2 The RG Developers are requesting a total nominal construction workspace of 150 feet with a 25-foot offset between Pipelines 1 and 2. Figures

SUMMARY OF FERC'S JUNE 25, 2015 COMMENTS ON DRAFT RESOURCE REPORT 1	
FERC COMMENT (wording revised to match current terminology)	**SECTION REFERENCE**
Developers would implement to ensure restoration of portions of the Pipeline 1 construction right-of-way	1.5-2 and 1.5-3
26. Verify that Meter Station 2 would be constructed under Pipeline 1 for the pipeline. Also, verify that Meter Stations 1 and 2 would be constructed concurrently with Compressor Stations 1 and 2, respectively	Section 1.2.3
27. Clarify the need for any hand-clearing of vegetation required for the placement of the guide wire for the horizontal direction drill	Section 1.5.2.2
28. Include general procedures to address reliability and integrity of the facility and minimize environmental contamination in the event of a Category 5 hurricane. Include, at a minimum, design features and operational procedures that would be implemented before, during, and after a hurricane	Sections 1.7.1.5 and 1.7.16
29. Consult with U.S. Customs and Border Protection to address potential concerns regarding site security and access control. Provide documentation of consultation	Section 1.7.1.7
30. Identify the locations (maps and descriptions) and company/owner of non-jurisdictional facilities associated with the project, including applicable interconnects with pipelines in the Agua Dulce Gas Hub. For interconnects, provide pipeline length, diameter, right-of-way width, and other available information. In addition, describe the environmental impacts of each facility and provide the status of regulatory review by the respective permit and review authorities	Section 1.2.2.2 and Figure 1.2-9 Detailed information about interconnects is expected in the FERC Application for March 2016
31. Consult with land managing agencies, state and local planning agencies, and other appropriate entities to identify past, present, and reasonably foreseeable future projects (e.g., roads, bridges, mining, utility projects, other pipelines and compressor stations, large commercial/industrial/residential developments, etc.) in the potential resource area of impact that could be affected by the project, specifically include the Annova LNG Brownsville Project and the Texas LNG Project. The RG Developers should describe how they define the area of impact for each resource area, because the area of impact may vary by resource. Include a description of cumulative and/or overlapping impacts these projects and the planned projects would have on each environmental resource. Also include descriptions of the measures that would be implemented to minimize these impacts. Lastly, include a map showing the identified projects in relation to the planned project	Section 1.12, Table 1.12-1, and Figure 1.12-1
32. Include a table that identifies: a. the project(s) type/name and county; b. approximate distance and direction of the project(s) from the planned project facilities c. a description of the project(s); and d. the current status and schedule of the project(s) (e.g., proposed for October 2015, under construction, completed)	Table 1.12-1
33. In the additional cumulative effects analysis to be provided with subsequent draft Resource Report 1, include a discussion of impacts on existing and future users of the Brownsville Ship Channel and Brazos	Section 1.2.1.5

SUMMARY OF FERC'S JUNE 25, 2015 COMMENTS ON DRAFT RESOURCE REPORT 1	
FERC COMMENT (wording revised to match current terminology)	**SECTION REFERENCE**
Santiago Pass that would result from the passage of all LNG carriers from the combined LNG projects planned or contemplated for the Brownsville Ship Channel, including anticipated moving safety and security zone that would be applied to each LNG carrier passage.	
34. Related to cumulative effects, discuss the potential need to communicate with Annova LNG Common Infrastructure, LLC and Texas LNG Brownsville, LLC (as directed by the U.S. Coast Guard or otherwise) regarding coordinating LNG-related ship traffic in the Brownsville Ship Channel during operation of the facilities	Section 1.12 Additional discussion of potential impacts resulting from LNG-related vessel traffic based on the findings of the Water Suitability Analysis will be presented in the FERC Application (anticipated for March 2016)

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Abbreviations and Acronyms

°F	degrees Fahrenheit
AC	alternating current
AEP	American Electric Power
AGRU	Acid Gas Removal Unit
API	American Petroleum Institute
Bcf/d	billion cubic feet per day
BMPs	best management practices
BND	Brownsville Navigation District
BOG	boil-off gas
BPA	Brownsville Port Authority
BSC	Brownsville Ship Channel
C3MR™	APCI's propane, pre-cooled, mixed refrigerant, liquefaction process
CCTV	closed-circuit television
CFR	Code of Federal Regulations
CNG	compressed natural gas
CO_2	carbon dioxide
DMMP	Dredged Material Management Plan
DOE	U.S. Department of Energy
EI	environmental inspector
EIA	Energy Information Administration
EPA	U.S. Environmental Protection Agency
ESD	emergency shut-down
FERC	Federal Energy Regulatory Commission
gpm	gallons per minute
H_2S	hydrogen sulfide
HDD	horizontal directional drilling
hp	horsepower
ISO	International Standards Organization
LNG	liquefied natural gas

m^3	cubic meters
m^3/hr	cubic meters per hour
MCHE	Main Cryogenic Heat Exchanger
MOF	material off-loading facility
MP	milepost
MTPA	million tons per annum
NCCER	National Center for Construction Education and Research
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NGA	Natural Gas Act
NGL	natural gas liquid
NMFS	National Marine Fisheries Service
OSHA	Occupational Safety and Health Administration
PHMSA	U.S. Pipeline and Hazardous Materials Safety Administration
Pipeline System	Pipeline and all associated facilities owned by Rio Bravo Pipeline Company, LLC
Project	Terminal and Pipeline System
psi	pounds per square inch
psig	pounds per square inch gage
QA	quality assurance
QC	quality control
RB Pipeline	Rio Bravo Pipeline Company, LLC
RG Developers	Rio Grande LNG, LLC, and Rio Bravo Pipeline Company, LLC
RG LNG	Rio Grande LNG, LLC
ROW	right-of-way
SCADA	Supervisory Control and Data Acquisition System
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
TCEQ	Texas Commission on Environmental Quality
Terminal	RG LNG's natural gas liquefaction and liquefied natural gas export facility
USACE	U.S. Army Corps of Engineers

USCG	U.S. Coast Guard
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
VHF	very high frequency
WSA	Waterway Suitability Assessment

Resource Report 1: General Project Description

Rio Grande LNG, LLC (RG LNG) proposes to construct a natural gas liquefaction facility and liquefied natural gas (LNG) export terminal (Terminal) in Cameron County, Texas, along the north embankment of the Brownsville Ship Channel (BSC). In concert with the Terminal, Rio Bravo Pipeline Company, LLC (RB Pipeline) proposes to construct an associated pipeline system (Pipeline System) within the state of Texas to allow for interconnection with a network of existing pipelines that traverse the northern end of Kleberg County and Jim Wells County, and which are in proximity to the Energy Transfer Partners King Ranch Gas Plant (formerly the Exxon King Ranch Gas Plant). Pipelines in the referenced network are tied into the Agua Dulce Hub[1]. The Pipeline System will collect and transport natural gas to the Terminal site. RG LNG and RB Pipeline are hereinafter referred to collectively as the "Rio Grande Developers" (RG Developers), and the Terminal and Pipeline System are hereinafter referred to collectively as the "Project."

The RG Developers have prepared this Draft Resource Report 1 in compliance with the requirements of the Federal Energy Regulatory Commission (FERC) regulations for authorization under Sections 3 and 7 of the Natural Gas Act (NGA) to site, construct, own, and operate the Project. On March 20, 2015, the RG Developers requested approval to participate in the FERC Pre-Filing Process to assist in the identification and proper assessment of issues and to provide input into the development of the environmental reports. FERC began processing the request and assigned the Project the Pre-Filing Docket Number PF15-20-000. FERC formally accepted the Project into the Pre-Filing Process on April 13, 2015. The RG Developers submitted a preliminary draft of Resource Report 1 on May 12, 2015. FERC issued comments on this preliminary draft on June 25, 2015.

Draft Resource Report 1 provides a description of the Project and its purpose and need from both national and regional perspectives, as well as a specific description of the Project facilities and certain

[1] The Agua Dulce Hub is located in Nueces County, Texas, and includes connections for the following pipelines: Houston Pipe Line, Gulf South Pipeline, Kinder Morgan Texas Pipelines, Natural Gas Pipeline Co. of America, Transcontinental Gas Pipeline, Tennessee Gas Pipeline, TransTexas Gas, and EPGT Texas Pipeline. Based on the proposed Pipeline System interconnects being relatively close to the Agua Dulce Hub, it is expected that pricing indicators for the Pipeline System feed gas will be comparable to those at the Agua Dulce Hub. The proposed Pipeline System interconnect locations will hereafter be collectively referred to as the "Agua Dulce Market Area."

non-jurisdictional facilities. The proposed construction schedule, land requirements, operation and maintenance, and safety procedures for the Project are also addressed in this report.

Table 1.12-1 and Figure 1.12-1 of this Draft Resource Report identify other proposed or reasonably foreseeable projects that, in combination with the Project, could result in cumulative impacts. Cumulative impacts are the collective result of the incremental impacts of an action that, when added to the impacts of other past, present, and reasonably foreseeable future actions, will affect the same resources, regardless of what agency or person undertakes those actions (40 Code of Federal Regulations [CFR] Part 1508.7). These include, but are not limited to, actions under analysis by a regulatory agency, proposals being considered by state or local planners, plans that have begun implementation, or future actions that have been funded. The RG Developers' formal application, which is anticipated to be submitted in March 2016, will provide a detailed discussion regarding potential cumulative impacts on a resource by resource basis based on the projects identified in Table 1.11-1 as well any additional projects that are identified prior to the FERC Application.

Draft Resource Report 1 also provides an update of the applicable regulatory approvals and coordination with the respective federal, state, and local agencies (see Appendix 1.E for a summary of regulatory approvals and coordination efforts).

1.1 Purpose and Need

The basic project purpose is to construct a natural gas pipeline, and a natural gas liquefaction and export terminal. The overall project purpose is to construct a natural gas pipeline, and a natural gas liquefaction and export terminal capable of receiving and loading up to two ocean-going liquefied natural gas (LNG) vessels at a time. The LNG terminal would also be able to load LNG tanker trucks. More specifically, the primary purpose of the Project is to develop, own, operate, and maintain a natural gas pipeline and liquefaction and export facilities in South Texas that provide an additional source of firm, long-term, and competitively priced natural gas in the form of LNG to the global market. To meet anticipated customer demand and provide economies of scale, the Project facilities will have an annual nominal production capacity of approximately 27 million tons per annum (MTPA) of LNG. The Project is physically situated to: (1) access a well-developed portion of the U.S. natural gas transportation network that can take advantage of North America's plentiful natural gas reserves as a source of feedstock and fuel for the Project; and (2) facilitate shipping of LNG produced by the Project to African, Asian, Caribbean, European, Middle Eastern and South American destinations. The Project will rely on LNG vessels to transport LNG produced at the facility to overseas markets. The facilities will be capable of receiving and loading up to two ocean-going LNG vessels at a time. The

LNG terminal facility portion of the Project will also be able to load LNG tanker trucks, which can supply LNG to the growing network of local CNG/LNG vehicle refueling stations in South Texas.[2]

The Project has been proposed due to the presence of plentiful natural gas reserves in North America and the ability to produce natural gas from those reserves, convert a portion of those reserves into LNG and transport such LNG to markets at a favorable price. The liquefaction and export of natural gas represents a market-based solution to supporting and expanding the market for North America's vast natural gas resources, thereby helping to support and stabilize our domestic energy industry while also providing foreign nations with a cleaner, more cost-effective and safer energy supply alternative. Furthermore, the Project will be a natural follow-on to the President's National Export Initiative signed on March 11, 2010.[3]

In particular, the RG Developers' objectives (needs) include:

- A location previously designated for industrial development and compatible with a Project design that reduces, minimizes or mitigates environmental impacts to the fullest extent practicable so that the Project will be welcomed by the majority of the community;
- A location where local and regional labor is available and where the development of any additional housing and other infrastructure needed to support the Project workforce is practicable;
- A location conducive to the safety of existing residents of the communities surrounding the Project;

[2] The U.S. Department of Energy's Alternative Fuels Data Center web pages list 22 public CNG fueling stations, four public LNG fueling stations, and one combined CNG and LNG fueling station currently operating in South Texas (in locations below. -30 degrees N latitude or essentially those stations at least as far south as Houston). See http://www.afdc.energy.gov/fuels/natural_gas_locations.html (use the interactive map to identify Texas CNG and LNG fueling stations, then download the supporting data for each of these fuel types). It should be noted that in recent months, the State of Texas legislature has been passing legislation on tax credits and other policy items for the development of LNG as vehicle fuel.

[3] Executive Order No. 13,534, 3 CFR 198 (2010). President Obama called for a doubling of United States exports during the five years following the Executive Order. Unfortunately, the United States only managed to increase exports by approximately 28% during this period. *Compare* U.S. Census Bureau, *Exhibit 1. U.S. International Trade in Goods and Services* (Jan. 2015), https://www.census.gov/foreign-trade/Press-Release/2015pr/01/exh1.pdf (providing data for the year 2014), *with* U.S. Census Bureau, *Exhibit 1. U.S. International Trade in Goods and Services* (Dec. 2010), https://www.census.gov/foreign-trade/Press-Release/2010pr/final_revisions/exh1.pdf (providing comparable data for 2010). It is anticipated that LNG exports would make a meaningful contribution to expanding U.S. exports.

- Access to natural gas markets that allows the Agua Dulce Hub and Henry Hub market prices to be referenced as reliable indicators of natural gas used as fuel or feedstock by the Project, while also facilitating the physical delivery of natural gas produced in Texas' natural gas producing regions, as well as virtually everywhere else in North America that is interconnected with pipelines serving the Agua Dulce Market Area, either by direct delivery or displacement;
- Construction of the Terminal on a site for which exclusive usage rights can be secured on a long-term basis (minimum of 20 years) at a favorable cost that also is suitable for shipping LNG by LNG vessels for delivery to overseas locations to the east, west and south of the United States without unduly long LNG vessel transit times to any of the markets with the greatest known need for LNG;
- An onsite LNG storage capacity of about 720,000 cubic meters (m^3), as required to efficiently match natural gas liquefaction capacity with ship loading time requirements;
- A location with frontage on navigable waters at least 42 feet deep or that can connect to waters at least 42 feet deep with minimal dredging, so as to allow the berthing of two LNG vessels simultaneously, where such LNG vessels are sized to take advantage of the Project's LNG supply capabilities;
- A location that allows for the placement of the liquefaction facilities adjacent to the waterfront marine facilities to avoid the need for long LNG piping runs that would increase the Project's environmental footprint, decrease safety, and be cost prohibitive;
- A location in an area with generally benign sea and climate conditions so as to allow largely uninterrupted operations of the Terminal and LNG vessels approaching and departing from the Terminal;
- A location adjacent to roads suitable for modest long-term truck traffic associated with the loading of LNG and natural gas liquids (NGLs) at the Terminal for road transport;
- A commercial operating date of the Terminal during the 4th quarter of 2020 to be attractive to LNG shippers/consumers anticipating demand in that time frame;
- A location sufficiently close to areas with a history of demand for natural gas liquids to offer favorable prospects for disposition of by-products resulting from the pre-treatment of natural gas used for feedstock in the Project's liquefaction process;
- Providing supply to fast growing, newly emerging, LNG importing markets with rising domestic demands for natural gas used for power generation, industrial and other purposes to facilitate economic growth or the phasing out of coal-fired generation;
- Integrating reliable electric supply arrangements at an affordable cost, as necessary to supply the full operational electric requirements of the Terminal;

- A location with access to a reliable fresh water supply at an affordable cost, as necessary to supply the Terminal's modest potable and industrial water requirements; and
- Use of proven technical specifications and components for all critical aspects of the Project consistent with predictable costs, reliable and safe operation, a long-economic operating life, and compatible with government permitting requirements, supporting Project financing and marketability.

As proposed, the Project not only meets the need of the RG Developers to utilize their capital and LNG industry expertise in a productive and profitable enterprise, but also serves the fundamental needs of the United States to:

- Expand its economy;
- Provide jobs for its citizens;
- Provide opportunities to increase the wealth of the nation through constructive deployment of capital;
- Provide an avenue for companies to benefit from the bountiful supplies of economically producible natural gas in North America;
- Promote a stable and robust natural gas industry;
- Stimulate the economies of its trading partners; and
- Improve national and world security.

When completed, the Project's liquefaction facilities will enable RG LNG (for itself or on the behalf of others), once authorized by the U.S. Department of Energy's (DOE) Office of Fossil Energy, to export LNG equivalent to an average of 3.6 billion cubic feet per day (Bcf/d) of natural gas.

The implementation of the Project will also result in the following benefits, all of which are consistent with the public interest and the improvement of Brownsville's port infrastructure and industrial base:

- Stimulate the local, regional, and national economies through the creation and preservation of numerous construction and permanent jobs (through the entire value chain, from (a) Terminal and Pipeline System related activities, which include employment by the RG Developers and Terminal operations supporting industries such as the Port of Brownsville, ship pilots and ship support industries, to (b) the exploration and production sector as well as industries that support that sector);

- Promote the stability of domestic natural gas pricing via an increase in domestic natural gas production potential and further integration of United States demand with global LNG demand;
- Provide an economically stimulating outlet to producers of domestic natural gas;
- Facilitate the ability of foreign nations to displace less desirable energy sources (e.g., higher cost and less environmentally friendly fuels) with natural gas;
- Improve ambient air quality in nations abroad by displacing fuels that have higher carbon content, mercury emissions, and particulate emissions;
- Support conversion of domestic (United States) long-haul truck fleet, local fleet vehicles, school district and municipal system buses, and other ground transportation to LNG, which enhances United States air quality at competitive cost;
- Increase economic stability in the region through long-term contracts requiring the Project to be operated and maintained for multiple decennia;
- Improve United States balance of trade;
- Generate tax income for local, state and national governmental entities; and
- Increase economic trade and ties with foreign nations authorized to receive export from the United States.

1.2 Project Description – Overview

RG LNG is proposing to develop a natural gas liquefaction facility and LNG export terminal capable of producing approximately 27 MTPA of LNG. The Terminal will be located in Cameron County, Texas and will have six liquefaction trains, each with a nominal capacity of 4.5 MTPA (i.e., a long-term average of approximately 0.6 Bcf/d), four LNG tanks (each with a capacity of 180,000 m^3), two marine jetties for ocean-going LNG vessels (ranging up to 185,000 m^3 in capacity), one turning basin, and four LNG and two NGL truck loading bays. The Terminal is configured to efficiently manage the size of the facility. In particular, RG LNG has developed a master plan with a plant layout and infrastructure that allows for continuous construction activities centered around the successive construction of the six liquefaction trains, with supporting utilities and infrastructure being added in support of the stepped increased liquefaction capacity. Though construction of the six liquefaction trains is anticipated to be continuous, the construction process will take place in six stages, with the start of each train's construction ideally occurring between six to nine months after the previous train's commenced construction. RG LNG developed a staged construction schedule to avoid an excessive amount of pre-investment in supporting utilities and infrastructure that may only be needed when later constructed trains come into operation, and also to reduce manpower peak and thereby reduce

impacts. This proposed configuration of the Terminal will allow a portion of the Project to come online (subject to FERC approval) and start producing revenues while construction continues on the later stage facilities.

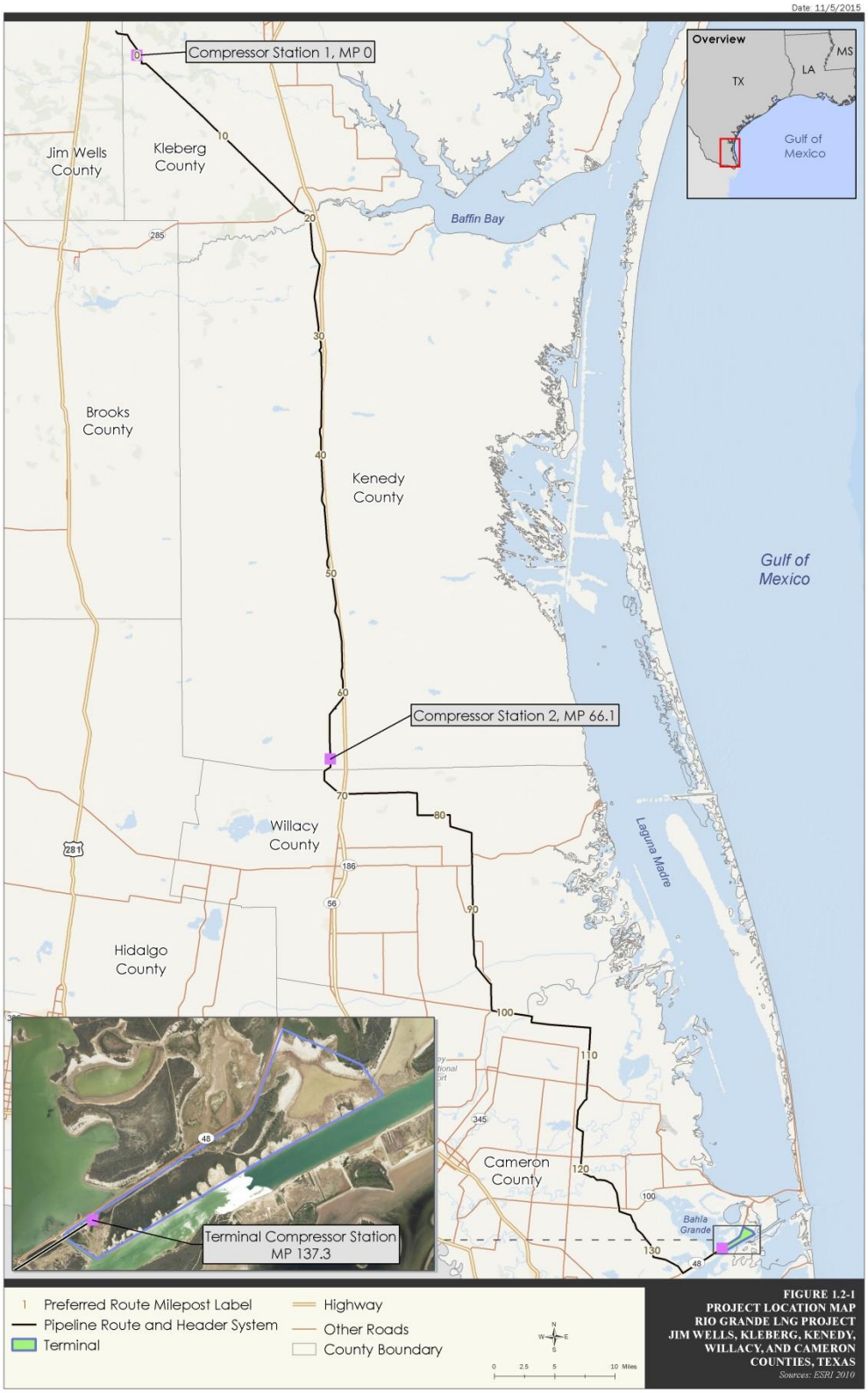
The Terminal will receive natural gas feedstock from the Pipeline System within the state of Texas. The Pipeline System, to be developed by RB Pipeline, will include two parallel 42-inch-diameter pipelines approximately 137 miles in length, three compressor stations, a 2.7-mile-long Header System to interconnect with a network of existing natural gas transmission pipelines, associated metering stations, mainline valve sites, access roads, and temporary contractor/pipe yards. The two parallel 42-inch pipelines will run north to south from a starting point (milepost [MP] 0.0) to the Terminal, as shown in Figure 1.2-1. As described in greater detail in Sections 1.2.2.2, 1.2.3, and 1.11 of this Resource Report, the Header System at the upstream end of the Pipeline System will have multiple interconnects to the existing natural gas pipeline grid located in the Agua Dulce Market Area.

The RG Developers intend to operate the Project such that:

1. RB Pipeline will own a small portion of the natural gas at the time such natural gas enters the Pipeline in the vicinity of the Agua Dulce Market Area and use that natural gas to operate the Pipeline; or
2. RG LNG will own the remainder of the natural gas at the time such natural gas enters the Pipeline in the vicinity of the Agua Dulce Market Area, RG LNG may furnish a portion of such natural gas to RB Pipeline to operate the Pipeline, RB Pipeline will transport the remaining natural gas for RG LNG to the Terminal, RG LNG will use a portion of its natural gas to operate the Terminal and convert the remainder into LNG at the Terminal, use boil-off gas (BOG) to operate the Terminal, and load such LNG onto LNG vessels, LNG tanker trucks or International Standards Organization (ISO) containers to be hauled by truck; or
3. Third parties (who, in some cases, could be affiliates of the RG Developers) will own the natural gas at the time such natural gas enters the Pipeline System in the vicinity of the Agua Dulce Market Area, such third parties may furnish a portion of such natural gas to RB Pipeline to operate the Pipeline System, RB Pipeline will transport the remaining natural gas for such third parties to the Terminal, the third parties may furnish a portion of the natural gas to operate the Terminal, RG LNG will process the natural gas owned by the third parties into LNG under tolling agreements, may use BOG to operate the Terminal, and load the remaining LNG onto LNG vessels, LNG tanker trucks, or ISO containers hauled by trucks;

4. With regard to LNG loaded onto LNG vessels at the Terminal, RG LNG will export such LNG on its own behalf, or as an agent for third parties, in accordance with authorizations to be obtained from the DOE; and

Figure 1.2-1: Project Location Map



5. The Pipeline System may transport additional natural gas for unaffiliated third parties in amounts in excess of the natural gas needed to operate the Project and for purposes other than for use at the Terminal, in accordance with a FERC approved pipeline transportation and services tariff. At the present time, the RG Developers are unaware of any third-party demand for natural gas transportation services that have reached a point of certainty sufficient to justify designing the Pipeline System with a capacity substantially greater than that needed to supply the Terminal and the operating needs of the Pipeline System. Therefore, the current Pipeline System design is to meet the demand of RG LNG's six liquefaction trains including normal design tolerances without having to unnecessarily increase environmental impacts (e.g., a single 42-inch pipeline paired with a single 36-inch pipeline would not be sufficient to meet the needs of the Terminal and operate Compressor Stations 1 and 2 of the Pipeline System). However, prior to accepting any natural gas transportation customers (including RG LNG) for the Pipeline System, RB Pipeline will hold an open season, in accordance with FERC requirements for NGA Section 7 jurisdictional pipelines. If the open season process demonstrates additional demand for firm transportation capacity on non-discriminatory terms acceptable to RB Pipeline, RB Pipeline would seek to increase the Pipeline System capacity or apportion capacity among bidders offering equivalent value, willing to accept minimum term commitments established by RB Pipeline, and meeting RB Pipeline's credit requirements. Based on the proposed routing of the Pipeline System, the availability of transportation on existing and planned pipelines in the area, and the RG Developers' understanding of potential Pipeline System customers, RB Pipeline anticipates that any demand for firm transportation capacity above and beyond the needs of the Terminal and the Pipeline System could be accommodated in a variety of ways, such as by increasing the diameter of one or both of the 42-inch pipelines comprising the Pipeline System. Authority would be sought from FERC on a timely basis in the event such a situation arises.

RG LNG expects all, or the large majority of, agreements for such sales of LNG or natural gas to be LNG tolling arrangements that will take the form of long-term contracts (30 years, plus an additional 10 years, plus another 10 years).

The location of the Project facilities is depicted on Figure 1.2-1. Topographic mapping and aerial alignment sheets of the Project facilities are provided in Appendices 1.A and 1.B respectively. The RG Developers utilized the most updated public aerial photographs available in the development of these maps in order to provide the most accurate representation of current conditions on the ground. While the available aerial photography is greater than one year old, the majority of the aerial photographs are from 2014-2015, and RB Pipeline verified the accuracy of the photographs during the constructability/engineering survey completed for the Project. Of the 137.3 miles for the Pipeline System, RB Pipeline was able to complete engineering surveys on 134.0 miles, or 97.7% of the total

distance. Detailed descriptions of the Terminal and Pipeline System are presented in Sections 1.2.1 and 1.2.2, respectively.

1.2.1 Terminal Facilities

All Terminal facilities will be located within an approximately 1,000-acre parcel of land owned by the Brownsville Navigation District (BND) of Cameron County, Texas and situated along the north embankment of the BSC. The property is roughly centered between the eastern end of the BSC at Laguna Madre and the Port of Brownsville turning basin at its western end. The center point of the Terminal property has the approximate coordinates: Latitude 26°1′ N and Longitude 97°16′ W. Pursuant to an existing binding lease option agreement, the Terminal site will be secured by RG LNG through a long-term lease with the BND. Approximately 774 acres of the parcel will be developed as part of the Terminal facilities, and the balance of the parcel (approximately 210 acres) will be retained as a natural buffer.

On November 6, 2013, the RG Developers executed an "Option to Lease" with the BND, which grants the RG Developers the exclusive right and option to lease an approximate 500-acre parcel of land on the northern side of the BSC. This 500-acre parcel of land was expanded to approximately 1,000 acres (GIS analysis calculates approximately 984 acres for total parcel size) by an amendment dated November 6, 2014. The RG Developers and BND have agreed to a series of milestones that must be met in order to maintain the validity of the option, all of which have been complied with as of the date of this filing. The terms of the final lease are still to be finalized between the parties, at which time the exact acreage of the leased land will be finalized. It is anticipated that the final lease will provide for a term of up to 50 years, which is the maximum term allowable under applicable law.

As previously indicated, the Terminal will be configured to efficiently manage the size of the facility. In particular, the RG Developers have developed a master plan with a plant layout and infrastructure that allow for continuous construction activities centered around the successive construction of the six liquefaction trains, with supporting utilities and infrastructure being added in support of the stepped increased of liquefaction capacity. Though construction of the six liquefaction trains is anticipated to be continuous, the construction process will take place in six distinct stages, with the start of each train's construction ideally occurring between six to nine months after the previous train's commenced construction.

The RG Developers developed a staged construction schedule to avoid an excessive amount of pre-investment in supporting utilities and infrastructure that will only be needed when later constructed trains come into operation. The configuration of the Terminal will allow a portion of the Project to

come online (subject to FERC approval) and start producing revenues while construction continues on the later stage facilities.

Figure 1.2-2 presents the Terminal overall site plan at full build. Table 1.1-1 provides a list of key construction and installation activities during each respective stage of Terminal construction. Figures 1.2-3 and 1.2-4 depict the spatial and temporal distribution of the temporary laydown areas within the Terminal site during Stages 1 through 3 and during Stages 4 through 6, respectively. See Appendix 1.H for the high-quality oversized renderings of Figures 1.2-2, 1.2-3, and 1.2-4.

Table 1.1-1: Terminal Stage Construction and Installation Sequence

Stage 1
• Site Preparation: site fill for entire facility with platform grading for Stage 1 facilities and temporary laydown areas
• Erect temporary facilities (e.g. offices, warehousing, and temporary utilities)
• Levee construction for entire facility
• Berth 1 and Turning Basin (*note: Stage 1 will include the complete dredging effort for Berths 1 and 2 and the Turning Basin, but will not include the installation of the physical infrastructure for Berth 2*)
• Security Fence for entire facility
• Utility Switchyard and custody transfer metering substation
• Pipeline Compressor Station 3 site preparation and fencing
• LNG Train 1
• LNG Tanks 1 and 2
• LNG Road Tanker Loading Bays 1 and 2
• MOF (material off-loading facility)
• Ground Flares: No. 1 Unit
• Condensate Storage (2 tanks)
• Refrigerant Road Tanker Unloading Bays (1 ethylene/ethane and 1 propane - including bullets)
• Condensate Road Tanker Loading Bays (2)
• Firewater System supply system for entire Terminal, but distribution only to the developed stage areas
• BOG Compressors No. 1 and 2
• LNG Tank and BOG Vent
• Utilities for LNG Train 1
• Essential Power Generation 1
• Permanent Plant Buildings, including: - Administration Building - Central Control Building - Workshop and Laboratory - Fire Truck Garage - Canteen, Medical, and Visitors Building - Warehouse - Chemical Shelter

Table 1.1-1: Terminal Stage Construction and Installation Sequence

- Gate House - Local Equipment Rooms and Electrical Substations for LNG Train 1
• Ponds and Effluent Treatment Plants - Ponds No. 1, 2, 3, and 6 - Drainage system including underground for developed areas plus surface run-off in undeveloped areas
• Plant Communication Towers and Telecommunication System
• Permanent Plant Parking
Stage 2
• Site preparation: platform grading for Stage 2 facilities and for the shift in the location of temporary facilities areas established during Stage1 to their Stage 2 locations
• LNG Train 2
• Local Equipment Rooms and Electrical Substations for LNG Train 2
• Utilities for LNG Train 2
• Fire Water distribution to this stage's developed areas
• Drainage system expansion for this stage's developed areas
• BOG Compressor No. 3
• Ground Flares: No. 2 Unit
Stage 3
• Site preparation: platform grading for Stage 3 facilities and for the shift in the location of temporary facilities areas established during previous stages to their Stage 3 locations
• LNG Train 3
• Local Equipment Rooms and Electrical Substations for LNG Train 3
• Utilities for LNG Train 3
• Fire Water distribution to this stage's developed area
• Drainage system expansion for this stage's developed areas and drainage pond No. 4
• BOG Compressor No. 4
Stage 4
• Site preparation: platform grading for Stage 4 facilities and for the shift in the location of temporary facilities areas established during previous stages to their Stage 4 locations, will move most of temporary facilities to the west acreage
• LNG Train 4
• Local Equipment Rooms and Electrical Substations for LNG Train 4
• Utilities for LNG Train 4
• Essential Power Generation Unit West
• Fire Water distribution to this stage's developed area
• Drainage systems expansion for this stage's developed area
• Ground Flares: No. 3 Unit
• BOG Compressors No. 5 and 6
• LNG Tank 3

Table 1.1-1: Terminal Stage Construction and Installation Sequence

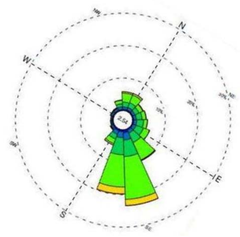
• LNG Berth 2
• LNG Road Tanker Bays 3 and 4
Stage 5
• Site preparation: platform grading for Stage 5 facilities and for the shift in the location temporary facilities areas established during previous stages to their Stage 5 locations
• LNG Train 5
• Local Equipment Rooms and Electrical Substations for LNG Train 5
• Utilities for LNG Train 5
• Fire Water distribution to this stage's developed area
• Drainage systems expansion for this stage's developed areas and drainage pond No. 5
• BOG Compressor No. 7
• LNG Tank 4
Stage 6
• Site preparation: platform grading for Stage 6 facilities and for the shift in the location temporary facilities areas established during previous stages to their Stage 6 locations
• LNG Train 6
• Local Equipment Rooms and Electrical Substations for LNG Train 6
• Utilities for LNG Train 6
• Fire Water distribution to this stage's developed area
• Drainage systems expansion for this stage's developed area
• BOG Compressor No. 8
• Remove all temporary facilities areas except infrastructure needed for future maintenance shutdowns

The Terminal design will comply with the requirements of National Fire Protection Association (NFPA) Standard 59A, regulations of the U.S. Pipeline and Hazardous Materials Safety Administration (PHMSA) at 49 CFR 193, and all other applicable standards. The Terminal will be surrounded by a security perimeter fence with gated access to ensure control over site access

Site elevations have been optimized to reduce the amount of offsite fill needed, while creating a sufficiently high site grade elevation to allow for gravity drainage under practically all conditions, which also eases the construction process when excavating.

Figure 1.2-2: Terminal Overall Site Plan

(Attached)



E +0 | E +1000 | E +2000 | E +3000 | E +4000 | E +5000 | E +6000 | E +7000 | E +8000 | E +9000 | E +10000 | E +11000 | E +12000 | E +13000 | E +14000 | E +15000 | E +16000

N +6000 | N +5000 | N +4000 | N +3000 | N +2000 | N +1000 | N +0

CONSTRUCTION MANAGEMENT OFFICES
MUSTER POINT
EMERGENCY EXIT OVER LEVEE
PROPOSED CROSSING (WITH TRAFFIC LIGHTS)
TEMPORARY PARKING
SECURITY BUILDING
ADMINISTRATION BUILDING
SITE ENTRANCE THROUGH LEVEE
WAREHOUSE
WATER STORAGE AREA
OPEN AIR STORAGE
DIESEL GENERATORS
DIESEL STORAGE
CANTEEN, VISITORS AND MEDICAL CENTRE
CONDENSATE STORAGE
CHEMICAL STORAGE SHELTER
REFRIGERANT TRUCK UNLOADING
WORKSHOP
SLOPS STORAGE
FIRE TRUCK GARAGE
MOUNDED REFRIGERANT STORAGE
CENTRAL CONTROL BUILDING
REFRIGERANT IMPOUNDING BASIN
PROPERTY BOUNDARY
FENCE (TYPICAL)
TRUCK WAITING
NITROGEN AND INSTRUMENT AIR
SEAWATER FIRE PUMPS
LNG AND CONDENSATE TRUCK LOADING BAYS
TRUCK LOADING IMPOUNDING BASIN
WATER INTAKE CHANNEL FOR SEAWATER FIRE PUMPS
PIPELINE METERING
PROPOSED CROSSING (WITH TRAFFIC LIGHTS)
DIESEL STORAGE
LEVEE
PROPOSED CROSSING (WITH TRAFFIC LIGHTS)
ACCESS THROUGH LEVEE
DIESEL GENERATORS
ACCESS THROUGH LEVEE
CORRIDOR FOR HIGH VOLTAGE CABLE
PIPELINE PIGGING AREA
MUSTER POINT
MUSTER POINT
HAUL ROAD
PROPERTY BOUNDARY
EXISTING HIGHWAY 48
PUBLIC UTILITY EASEMENT
UNDERGROUND PIPE CORRIDOR
CHANNEL WIDENING
WETLAND OFFSET/ RESTORATION
NOTE 3
SWITCHYARD NOTE 4
POND 6
TRAIN 6
TRAIN 5
TRAIN 4
TRAIN 3
GROUND FLARES
TRAIN 2
TRAIN 1
POND 2
GENERAL PARKING
POND 1
LNG TANK 1
LNG TANK 2
LNG TANK 3
LNG TANK 4
WETLAND OFFSET/ RESTORATION
PIPELINE COMPRESSOR
FENCE
POND 5
POND 4
POND 3
1388309.06
16531513.85
(UTM)
HAUL ROAD OVER LEVEE
MUSTER POINT
U.S.A.C.E CENTERLINE OF BROWNSVILLE SHIP CHANNEL
CHANNEL LINE
CHANNEL LINE
BERTH 1
BERTH 2
TURNING CIRCLE
LNG TANK AND SHIP BOG VENT
BOG AREA
EXISTING SHORELINE
CENTERLINE OF BROWNSVILLE SHIP CHANNEL AS REFERENCED IN DEED FROM GARCIA LAND AND LIVESTOCK CO.
MATERIAL OFFLOADING FACILITY
LNG TRAIN IMPOUNDING BASIN
LNG TRAIN IMPOUNDING BASIN
FLARE KO DRUMS
LNG TRAIN IMPOUNDING BASIN
LNG TANKS 1 AND 2 IMPOUNDING BASIN
LNG TANKS 3 AND 4 IMPOUNDING BASIN
TYPICAL LNG CARRIER

0 500 1000 1500 2000 2500

1" = 625'-0"

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF SUPPORT OF RIO GRANDE LNG FERC FILING FOR INCLUSION IN FERC RESOURCE REPORT 13 UNDER THE AUTHORITY OF BALDEV PATEL 46867 ON 22 OCT 2015. IT IS NOT TO BE USED FOR ANY OTHER PURPOSES. REGISTERED BRANCH OFFICE: CB&I UK LIMITED REGISTRATION NUMBER: F-10296

RIO GRANDE LNG

CLIENT DWG NO:

TITLE: OVERALL SITE PLAN

FOR: RIO GRANDE LNG

NOTES

1. UTM COORDINATES BASED ON NAD_1983_2011_STATEPLANE_TEXAS_SOUTH_FIPS_4205_FT_US.
2. UNLESS OTHERWISE NOTED ALL CO-ORDINATES, ELEVATIONS AND DIMENSIONS ARE IN FEET AND INCHES.
3. REFER TO RIO BRAVO PIPELINE PROJECT COMPRESSOR STATION 3 PLOT PLAN FOR DETAILS.
4. PUBLIC UTILITY ELECTRICAL SWITCHYARD.

REFERENCE DRAWINGS

- 195910-000-CV-DR-0001 EARTHWORK GENERAL ARRANGEMENT LAYOUT PLAN
- 195910-000-PI-0003 PLOT PLAN KEYPLAN
- 195910-000-FUSV-DR-0003 BOUNDARY SURVEY
- PREVIOUSLY ISSUED UNDER 195910-000-PI-01-000001

REV.	REVISION DESCRIPTION	DRAWN	CK'D	APPD	DATE
I	ISSUED FOR FERC	DS	LS	EM	22 OCT 15
H	ISSUED FOR FERC	DS	LS	EM	9 OCT 15
G	ISSUED FOR HAZID	DS	LS	EM	17 SEP 15
F	ISSUED FOR HAZID	DS	LS	EM	21 AUG 15
E	ISSUED FOR CLIENT REVIEW	HJ	LS	EM	21 JULY 15
D	ISSUED FOR INFORMATION	GM	EM	JK	25 JUNE 15

PROJECT NO: 195910 | SCALE AT ANSI D: 1" - 625.0' | DWG NO: 195910-000-PI-DR-0001 | REV: I

Figure 1.2-3: Configuration of Terminal Facilities and Temporary Construction Laydown Areas during Stages 1 through 3

(Attached)

PLANT NORTH
TRUE NORTH
32.1703°

E +0 | E +1000 | E +2000 | E +3000 | E +4000 | E +5000 | E +6000 | E +7000 | E +8000 | E +9000 | E +10000 | E +11000 | E +12000 | E +13000 | E +14000 | E +15000 | E +16000

N +6000
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N +3000
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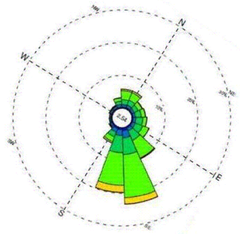
N +1000
N +0



CONSTRUCTION MANAGEMENT OFFICES
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EMERGENCY EXIT OVER LEVEE
PROPOSED CROSSING (WITH TRAFFIC LIGHTS)
TEMPORARY PARKING
ADMINISTRATION BUILDING
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SITE ENTRANCE THROUGH LEVEE
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DIESEL STORAGE
CHEMICAL STORAGE SHELTER
CONDENSATE STORAGE
WORKSHOP
REFRIGERANT TRUCK UNLOADING
FIRE TRUCK GARAGE
SLOPS STORAGE
CENTRAL CONTROL BUILDING
MOUNDED REFRIGERANT STORAGE
PROPERTY BOUNDARY
REFRIGERANT IMPOUNDING BASIN
FENCE (TYPICAL)
PIPELINE METERING
PROPOSED CROSSING (WITH TRAFFIC LIGHTS)
ACCESS THROUGH LEVEE
MUSTER POINT
DIESEL STORAGE
DIESEL GENERATORS
STAGE 3 TEMP. SITE OFFICE
LEVEE
CORRIDOR FOR HIGH VOLTAGE CABLE
HAUL ROAD
STAGE 2 TEMP. SITE OFFICE
PIPELINE PIGGING AREA
PROPERTY BOUNDARY
EXISTING HIGHWAY 48
PUBLIC UTILITY EASEMENT
TRUCK WAITING
NITROGEN AND INSTRUMENT AIR
WETLAND OFFSET/ RESTORATION
CHANNEL WIDENING
NOTE 3
SWITCHYARD NOTE 4
WAREHOUSING
BUS UNLOADING AREA
GROUND FLARES
SEAWATER FIRE PUMPS
POND 6
POND 4
POND 3
POND 2
POND 1
LNG TANK 1
LNG TANK 2
STAGE 1 TEMP. SITE OFFICE
LNG AND CONDENSATE TRUCK LOADING BAYS
PIPELINE COMPRESSOR
FENCE
BATCH PLANT
STAGING AREA
OFFICES
TRUCK LOADING IMPOUNDING BASIN
1388309.06
16531513.85
(UTM)
HAUL ROAD OVER LEVEE
MUSTER POINT
CONSTRUCTION DOCK
EXISTING SHORELINE
WATER INTAKE CHANNEL FOR SEAWATER FIRE PUMPS
U.S.A.C.E CENTERLINE OF BROWNSVILLE SHIP CHANNEL
CHANNEL LINE
DREDGED AREA
CHANNEL LINE
TURNING CIRCLE
BERTH 1
LNG TANK AND SHIP BOG VENT
BOG AREA
TYPICAL LNG CARRIER
EXISTING SHORELINE
CENTERLINE OF BROWNSVILLE SHIP CHANNEL AS REFERENCED IN DEED FROM GARCIA LAND AND LIVESTOCK CO.
MATERIAL OFFLOADING FACILITY
FLARE KO DRUMS
LNG TRAIN IMPOUNDING BASIN
LNG TANKS 1 AND 2 IMPOUNDING BASIN

0 500 1000 1500 2000 2500
1" = 500'-0"
(0.0254m = 152.43m)

NOTES

1. UTM COORDINATES BASED ON NAD_1983_2011_STATEPLANE_TEXAS_SOUTH_FIPS_4205_FT_US.
2. UNLESS OTHERWISE NOTED ALL CO-ORDINATES, ELEVATIONS AND DIMENSIONS ARE IN FEET AND INCHES.

REFERENCE DRAWINGS

195910-000-CV-DR-0001 GRADE ELEVATIONS
195910-000-PI-0003 PLOT PLAN KEYPLAN
195910-000-FUSV-DR-0003 BOUNDARY SURVEY 1
PREVIOUSLY ISSUED UNDER 195910-000-PI-01-000001

REV.	REVISION DESCRIPTION	DRAWN	CK'D	APPD	DATE
A	ISSUED FOR INFORMATION	POS	MS		10 NOV 15

RIO GRANDE LNG

CLIENT DWG NO:

TITLE:

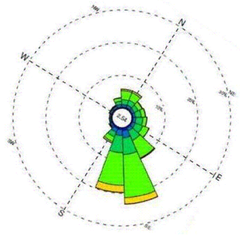
OVERALL SITE PLOT PLAN
STAGE 1 TO 3
TEMPORARY FACILITIES

FOR: RIO GRANDE LNG

PROJECT NO: 195910 | SCALE AT ANSI D: 1" - 500.0' | DWG NO: 195910-000-PI-SK-0003 | REV: A

Figure 1.2-4: Configuration of Terminal Facilities and Temporary Construction Laydown Areas during Stages 4 through 6

(Attached)



E +0 | E +1000 | E +2000 | E +3000 | E +4000 | E +5000 | E +6000 | E +7000 | E +8000 | E +9000 | E +10000 | E +11000 | E +12000 | E +13000 | E +14000 | E +15000 | E +16000

N +6000 | N +5000 | N +4000 | N +3000 | N +2000 | N +1000 | N +0

CONSTRUCTION MANAGEMENT OFFICES
MUSTER POINT
EMERGENCY EXIT OVER LEVEE
PROPOSED CROSSING (WITH TRAFFIC LIGHTS)
TEMPORARY PARKING
SECURITY BUILDING
ADMINISTRATION BUILDING
SITE ENTRANCE THROUGH LEVEE
WAREHOUSE
WATER STORAGE AREA
OPEN AIR STORAGE
DIESEL GENERATORS
CANTEEN, VISITORS AND MEDICAL CENTRE
DIESEL STORAGE
CHEMICAL STORAGE SHELTER
CONDENSATE STORAGE
WORKSHOP
REFRIGERANT TRUCK UNLOADING
FIRE TRUCK GARAGE
SLOPS STORAGE
CENTRAL CONTROL BUILDING
MOUNDED REFRIGERANT STORAGE
PROPERTY BOUNDARY
REFRIGERANT IMPOUNDING BASIN
FENCE (TYPICAL)
POND 2
GENERAL PARKING
POND 1
STAGE 4 NITROGEN AND INSTRUMENT AIR
TRUCK WAITING
NITROGEN AND INSTRUMENT AIR
WETLAND OFFSET/ RESTORATION
SEAWATER FIRE PUMPS
LNG AND CONDENSATE TRUCK LOADING BAYS
TRUCK LOADING IMPOUNDING BASIN
WATER INTAKE CHANNEL FOR SEAWATER FIRE PUMPS
TURNING CIRCLE
BERTH 1
BERTH 2
LNG TANK 1
LNG TANK 2
LNG TANK 3
LNG TANK 4
STAGE 4-6 TEMP. SITE OFFICE
PIPELINE METERING
PROPOSED CROSSING (WITH TRAFFIC LIGHTS)
DIESEL STORAGE
PROPOSED CROSSING (WITH TRAFFIC LIGHTS)
LEVEE
PIPELINE PIGGING AREA
ACCESS THROUGH LEVEE
DIESEL GENERATORS
ACCESS THROUGH LEVEE
CORRIDOR FOR HIGH VOLTAGE CABLE
PROPERTY BOUNDARY
MUSTER POINT
STAGE 6 TEMP. SITE OFFICE
MUSTER POINT
STAGE 5 TEMP. SITE OFFICE
STAGE 4 TEMP. SITE OFFICE
HAUL ROAD
EXISTING HIGHWAY 48
PUBLIC UTILITY EASEMENT
CHANNEL WIDENING
WETLAND OFFSET/ RESTORATION
NOTE 3
SWITCHYARD NOTE 4
UNDERGROUND FIRE CORRIDOR
WAREHOUSE CONSTRUCTION LAYDOWN AREA
STAGE 4 CONSTRUCTION LAYDOWN AREA
STAGE 4-6 CONSTRUCTION LAYDOWN AREA
STAGE 4-6 CONSTRUCTION LAYDOWN AREA
STAGE 4-6 CONSTRUCTION LAYDOWN AREA
STAGE 4-6 CONSTRUCTION LAYDOWN AREA
WAREHOUSE CONSTRUCTION LAYDOWN AREA
LARGE-SALLIE LAYDOWN YARD
MAIN SCAFFOLD YARD, MAIN CONSTRUCTION YARD 7 ACRES
WAREHOUSE BUILDING # 1
WAREHOUSE BUILDING # 2
WAREHOUSE BUILDING # 3
BUS UNLOADING AREA
STAGING AREA
OFFICES
TRAIN 6
TRAIN 5
TRAIN 4
TRAIN 3
GROUND FLARES
TRAIN 2
TRAIN 1
POND 6
POND 5
POND 4
POND 3
FENCE
BATCH PLANT
PIPELINE COMPRESSOR
1388309.06
16531513.85
(UTM)
HAUL ROAD OVER LEVEE
MUSTER POINT
U.S.A.C.E CENTERLINE OF BROWNSVILLE SHIP CHANNEL
CONSTRUCTION DOCK
EXISTING SHORELINE
CHANNEL LINE
DREDGED AREA
CHANNEL LINE
CENTERLINE OF BROWNSVILLE SHIP CHANNEL AS REFERENCED IN DEED FROM GARCIA LAND AND LIVESTOCK CO.
MATERIAL OFFLOADING FACILITY
LNG TRAIN IMPOUNDING BASIN
LNG TRAIN IMPOUNDING BASIN
FLARE KO DRUMS
LNG TRAIN IMPOUNDING BASIN
LNG TANK AND SHIP BOG VENT
BOG AREA
LNG TANKS 1 AND 2 IMPOUNDING BASIN
LNG TANKS 3 AND 4 IMPOUNDING BASIN
TYPICAL LNG CARRIER
EXISTING SHORELINE

0 500 1000 1500 2000 2500

1" = 500'-0"
(0.0254m = 152.43m)

RIO GRANDE LNG

CLIENT DWG NO:

TITLE:

OVERALL SITE PLOT PLAN
STAGE 4 - 6
TEMPORARY FACILITIES

FOR: RIO GRANDE LNG

NOTES

1. UTM COORDINATES BASED ON NAD_1983_2011_STATEPLANE_TEXAS_SOUTH_FIPS_4205_FT_US.
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REFERENCE DRAWINGS

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REV.	REVISION DESCRIPTION	DRAWN	CK'D	APPD	DATE
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PROJECT NO: 195910 | SCALE AT ANSI D: 1" - 500.0'

DWG NO: 195910-000-PI-SK-0004 | REV: A

Through grading, fill, and use of levees, the Terminal will be designed to withstand major storms. Although a significant percentage of the Terminal site is within flood hazard zones inundated by 1% annual chance flooding events, a storm surge protection levee surrounding the Terminal will have a elevations ranging from 16 to 18 feet NAVD88 to protect the Terminal from a 100-year flood event with a base flood level of 10.7 feet NAVD88, as described in Section 6.3.1.5 of Draft Resource Report 6, "Geological Resources." In a 500-year event, there may be wave overtopping but no failure on the main levee function. Under this scenario, storm surge water will be buffered on site in ponds and drained by gravity when storm surge waters reside. Much of the local south Texas coastal area lies within a flood hazard zone, and large portions of the BSC shoreline are undeveloped; therefore, construction of the Terminal would not appreciably increase flooding potential in the region, and coastal development is not anticipated to be at greater risk of flooding as a result of construction of the Terminal. When practical, RG LNG will utilize onsite sources for the fill material, through the use of the existing dredged spoil dump areas or excavated soils from the future waterfront. The use of onsite sources for general fill is preferred because it reduces the amount of fill needed to be imported and the amount of dredge spoil that will need to be disposed of. Offsite fill material will be imported as necessary to supplement the onsite fill source. RG LNG has identified a site on Port Isabel property to be used as a source for fill material and will continue to evaluate and identify offsite source sites for fill material. The potential environmental or socioeconomic impacts resulting from the use of the Port Isabel site or any additional sites identified will be evaluated in the appropriate resource reports for the FERC Application and included in the Terminal's Fill Management Plan, which will be submitted with FERC Application (anticipated for March 2016). Offsite fill will be transported to the Terminal by a combination of truck and waterway transport, depending on the source of the fill, and by assessing which transportation method will result in the least disturbance to existing road and waterway traffic. In addition to the need for general fill, supplementary structural (granular) fill materials will be brought to the site as sub-base material to foundations, roads, and plant pavement. For all imported fill, RG LNG will obtain clean fill material from approved sources that adhere to regulatory requirements.

1.2.1.1 Pipeline Interconnect and Gas Gate Station

Feed natural gas for the Terminal will be transported from interconnected natural gas transportation facilities within the state of Texas via the Pipeline System to the Terminal. The Pipeline System at its upstream end will have a Header System (see Section 1.2.2.2) to allow for multiple interconnections with the existing natural gas pipeline grid located in the Agua Dulce Market Area, such that there will be multiple natural gas routing and sourcing possibilities for the Project.

The gas gate station at the Terminal will contain Compressor Station 3 and the custody transfer meter. Within the operational footprint of Compressor Station 3, there will be the following elements: main pipeline automatic isolation valves, pipeline pig receiving facilities, scrubbers, gas

chromatography, high integrity pressure protection system, and electric-driven gas booster compressors with after coolers to deliver specified natural gas conditions to the Terminal. Compressor Station 3 will increase the operating pressure of the Pipeline System to around 1,200 pounds per square inch (psi) to meet the feed pressure requirements of the liquefaction trains. It should be noted that even though Compressor Station 3 is sited within the fence line of the Terminal, this compressor station is part of the Pipeline System and is discussed in further detail in Section 1.2.3 of this Resources Report.

The custody transfer meter will serve as the interconnect between the Pipeline System and Terminal.

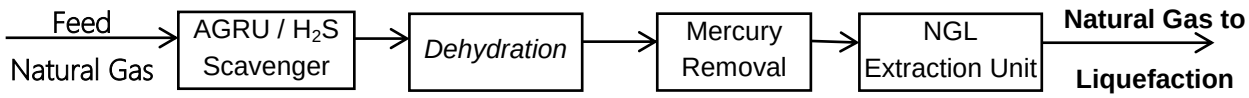
1.2.1.2 Liquefaction Trains

The Terminal will consist of six liquefaction trains (i.e., a sequence of process units) operating simultaneously, each with a nominal capacity of 4.5 MTPA (or a long-term average of about 0.6 Bcf/d). Each liquefaction train will include four feed natural gas pre-treatment units (i.e., Acid Gas Removal Unit (AGRU), Dehydration Unit, Mercury Removal Unit, and Natural Gas Liquid (NGL) Extraction Unit, as well as a Liquefaction Unit.) Each liquefaction train will have an approximate footprint of 830 feet x 1,020 feet, or roughly 846,000 square feet.

Feed Natural Gas Pretreatment

The feed natural gas for the liquefaction trains will be pipeline quality natural gas. Small amounts of impurities contained in the natural gas carried by the Pipeline System supplying the Terminal will be removed at the Terminal prior to liquefaction in order to render the natural gas compatible with the Terminal's liquefaction facilities and produce an end-product with specifications meeting the needs of RG LNG's customers.

The sketch below illustrates the sequence of the pre-treatment units for each process train, and each sequence is also described below.



- Acid Gas Removal Unit (AGRU) - Material concentrations of carbon dioxide (CO_2) in the pipeline natural gas will freeze in the liquefaction unit and is, therefore, removed in the AGRU. This natural gas also contains low concentrations of hydrogen sulfide (H_2S), which is also removed in this unit (greater detail provided below). Lean amine (without CO_2 and H_2S) is contacted with the natural gas in the AGRU absorber column, where the CO_2 and H_2S are removed from the gas to accepted industry standards. The treated natural gas is then sent to the dehydration system. The

rich amine (now containing CO_2 and H_2S) is dropped in pressure and sent to the regeneration system. The acid gas (CO_2 and H_2S) is stripped from the amine and sent for disposal in a thermal oxidizer. The regenerated amine is cooled and pumped back to the AGRU absorber. In the thermal oxidizer, the H_2S and trace amounts of hydrocarbons in the waste acid gas stream are incinerated and the residuals subsequently released (in accordance with all applicable air permits and emissions standards).

- H_2S Scavenger Unit (part of the front-end of the AGRU Unit) - Feed natural gas to each LNG train will pass through H_2S scavenger units to reduce the hydrogen sulfide content to no more than 0.4 parts per million by volume. This is required to reduce the sulfur dioxide (SO_2) emissions from the fuel gas system. The feed natural gas will then be filtered in the H_2S scavenger. After-filters to remove metal oxide adsorbent dust coming from the H_2S scavenger units (2 x 100% filters) will be installed in parallel to allow filter change-out during normal operation.
- Dehydration Unit - The amine solution of the AGRU saturates the feed gas with water. The purpose of the Dehydration Unit is to remove the water from the treated gas to less than 0.1 parts per million by volume to avoid freezing and plugging in the downstream cryogenic equipment. The Dehydration unit is based on a three-bed molecular sieve bed configuration (Natural Gas Dehydrators), with two beds operating in water adsorption mode while the third bed is being regenerated. A fraction of the dry treated gas is heated in the Regeneration Gas Heater and passed through the saturated molecular sieve bed to remove adsorbed water. The spent regeneration gas is cooled in the Regeneration Gas Air Cooler, and the condensed water removed in the regeneration gas/liquid knock-out drum before being compressed in the Regeneration Gas Recycle Compressor and recycled upstream of the Treated Gas Aircooler. If the compressor is not available, the regeneration gas is rerouted to the fuel gas system. To minimize the water load on the dehydration unit, the treated gas leaving the AGRU is cooled in the treated gas air cooler and the Wet Feed/High Pressure Propane Vaporizer. Knocked out water is collected in the Dehydrator Inlet Separator and sent to the High Pressure Flash Vessel in the AGRU. The dried gas leaving the dehydration unit is filtered with the Natural Gas Dehydrators After-Filter before entering the Mercury Removal Unit. The regeneration gas is sourced from downstream of the Dehydrator After-Filter and so has the same composition and conditions as the dry treated feed gas to the NGL Recovery Unit. The operating pressure will vary with plant throughput.

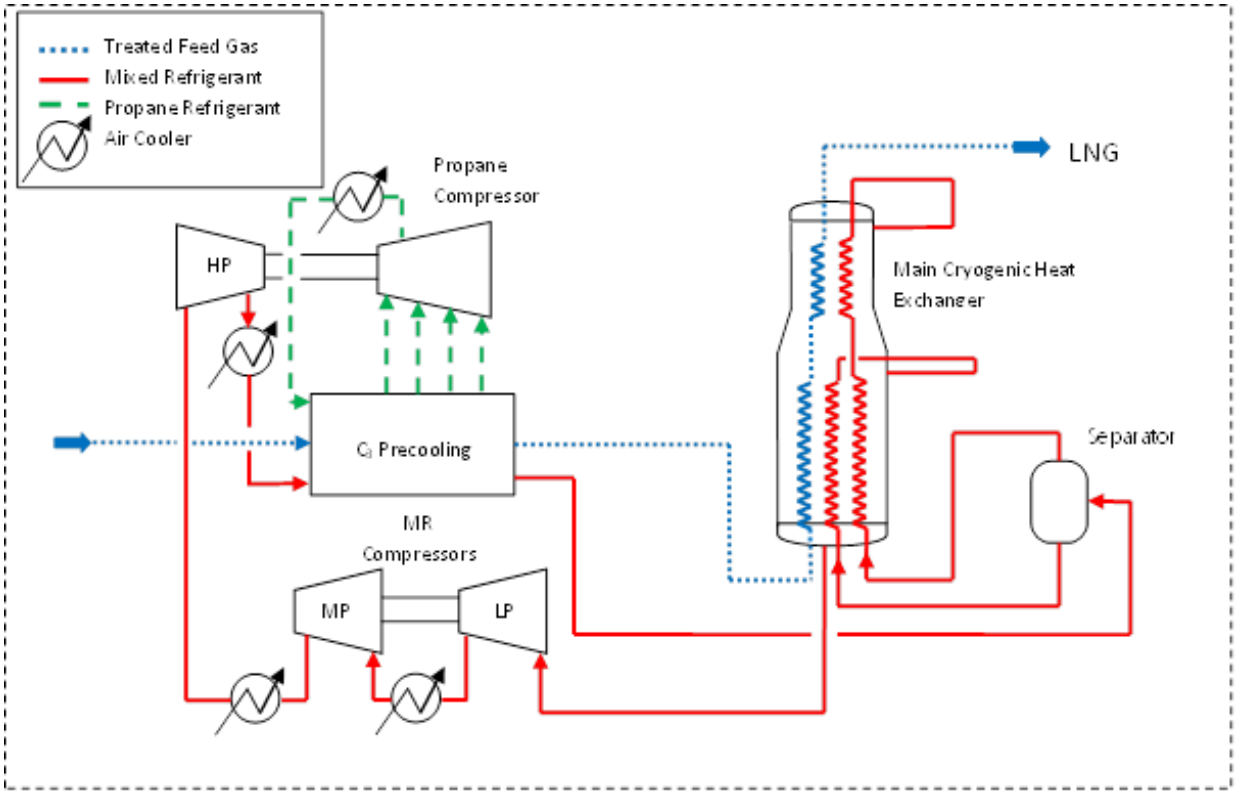
- Mercury Removal Unit – Trace mercury occurs naturally in some associated natural gas, which will corrode any aluminum components within the liquefaction process and, therefore, must be removed. This unit consists of a single Mercury adsorber, utilizing a sulfur impregnated activated carbon (or metal oxide) adsorbent. Any elemental mercury in the feed natural gas is trapped on the adsorbent. Periodically, spent adsorbent will be removed and sent for specialist offsite regeneration and mercury recovery. After going through the mercury removal process, the treated natural gas is sent to the heavy NGL Extraction Unit.

- NGL Extraction Unit - The feed natural gas contains small amounts of heavy hydrocarbons. These components will freeze in the liquefaction unit and are, therefore, removed in the NGL Extraction Unit. The natural gas from the mercury removal unit is cooled in heat exchangers and a turbo expander to condense NGLs from the feed natural gas, after which the treated natural gas is re-compressed and passes to the main liquefaction process. The condensed NGLs are passed through a de-ethanizer column and a stabilizer column to give a stabilized condensate product, which is sent for storage. The light components from overhead of the de-ethanizer and stabilizer columns will be returned to the main natural gas stream upstream of the liquefaction unit. A truck loading facility will be provided for exporting the modest quantities of stabilized condensate product to Texas and surrounding states.

Liquefaction Unit

After feed natural gas pretreatment to remove the contaminants and heavy hydrocarbon components, the Air Products and Chemicals, Inc., propane, pre-cooled, mixed refrigerant, liquefaction process (C3MR™) will liquefy the natural gas (see Figure 1.2-5). The liquefaction process uses two main refrigerant cycles. The first is a single component refrigerant cycle using propane to achieve pre-cooling of the natural gas and mixed refrigerant. The second is a mixed refrigerant cycle that liquefies and sub-cools the feed natural gas. The mixed refrigerant is composed of nitrogen, methane, ethylene and/or ethane, and propane.

Figure 1.2-5: Process Schematic of C3MR™ Process



Treated feed natural gas is first pre-cooled using propane refrigerant at descending pressure levels and corresponding lower vaporization temperatures. After being cooled by the propane refrigerant, the feed natural gas enters the Main Cryogenic Heat Exchanger (MCHE). The MCHE is a spiral-wound heat exchanger and consists of a top and a bottom bundle. The feed natural gas stream is condensed in the bottom bundle of the exchanger then subcooled in the top bundle.

The propane circuit is a closed-loop system. Propane vapor from the vaporizers at each pressure level is fed to the propane compressor, where it is compressed. The propane refrigerant is then de-superheated, condensed, and sub-cooled by ambient fin-fan air cooling before being routed to the various propane refrigerant heat exchangers.

Low temperature refrigeration to liquefy and sub-cool the natural gas is provided by a closed-loop mixed refrigerant system. The low-pressure mixed refrigerant vapor from the bottom of the MCHE is compressed to high-pressure before being cooled by ambient air and then partially condensed against successive levels of propane. The high-pressure mixed refrigerant is then separated into two phases in a separator vessel and cooled in the MCHE before being let down in pressure and used to cool the natural gas. It should be noted that both mixed refrigerant and LNG hydraulic turbines are also planned to be installed to provide an enhancement in the train LNG production capacity.

LNG from the MCHE is let down in pressure and flashed in the LNG tanks. This flash gas is compressed by the BOG compressor system and routed to the fuel gas system for use within the Terminal.

The refrigerant compressors in each liquefaction train are driven by two natural gas-fired, state-of-the-art, General Electric Frame 7 combustion turbines (or equivalent) with associated electric helper/starter motors.

1.2.1.3 Utility and Support System for the Liquefaction Facility

Boil-Off Gas System

BOG will be generated due to ambient heat transfer into system components, piping, and storage tanks, due to flashing and displacement of LNG run down into the storage tanks, and from vapor return associated with vessel loading. The BOG will be collected, compressed, and used as high-pressure fuel gas within the Terminal.

Fuel Gas System

Fuel gas primarily will be BOG supplemented with feed natural gas from the Pipeline System. High-pressure fuel gas will supply the refrigerant compressor gas turbines. Low-pressure fuel gas will supply the fired heaters and thermal oxidizer and will also be used for flare purge and pilots. Waste gas streams from pre-treatment units will also contribute to the total fuel gas balance to minimize the amount of gas incinerated in the flare system.

Hot Oil System

Hot oil is used for process heating, primarily in the feed natural gas pre-treatment units. The hot oil system is a closed-loop heating medium system for each liquefaction train, for which heat is provided by natural gas-fired heaters.

Pressure Relief and Flare System

The Terminal's flare system is designed to safely and reliably vent and/or flare any overpressure in the system during start-up, shutdown, plant upsets, and emergency conditions. Any hydrocarbon liquids requiring venting will be collected and vaporized prior to release. Combustion (i.e., flaring) is environmentally superior to venting because it results in the release of water and CO_2, rather than methane and other hydrocarbons. RG LNG is proposing the use of ground flares for the main process areas to minimize visual impact, supplemented by a 100-foot elevated cold vent (no permanently lit pilot), the LNG tank, and BOG vent for the storage and loading area. The flare system is designed to dispose of the maximum anticipated vapor release during a process unit or site-wide emergency, taking into account all operating modes of the process units, including startup and shutdown.

The LNG tank and BOG vent has no continuous emissions, and will only occasionally vent small amounts of BOG when equipment is shut-down for maintenance. In upset and emergency conditions, such as a prolonged interruption of power supply to the Terminal, or in (rare) gassing-up operations for an LNG vessel arriving inerted after dry-dock maintenance cycle, the vent may be ignited to burn-off natural gas in lieu of venting. For normal LNG vessel loading operations, excess BOG from the vessel will be returned via a closed-loop vapor return system back onshore and treated in the BOG handling system to avoid emissions to air. The LNG tank and BOG vent are located in the storage and loading area (see Figure 1.2-1).

A ground flare unit is required to safely depressurize up to three LNG trains during an emergency scenario, with a second ground flare unit being available as a full capacity back-up when the first ground flare unit is shut down for maintenance or inspection. For the full six liquefaction trains configuration, a third ground flare unit is added to retain sufficient flare capacity. Ground flare units will be 6 feet high and will be enclosed in an approximately 67-foot-high vertical (louvre) wall for heat protection and to avoid visibility from outside the Terminal. See Figure 1.2-2 for the location of the ground flares within the Terminal.

Electric Power Supply

After a detailed study of the viability of taking in electric power from the grid in lieu of the original base case of onsite power generation, and in close cooperation with American Electric Power (AEP – the local transmission system operator), the RG Developers have determined that the current AEP electricity grid distribution system in the Port of Brownville area is of sufficient capacity and reliability to make Project reliance on the existing grid transmission facilities and electricity sourced through such grid economically feasible and environmentally superior to primary generation at the Terminal site.

Given the associated benefits of reduced air emissions, high availability, and perceived cost advantages, the RG Developers have eliminated on-site natural gas-fired turbine generators for power generation. Details of the AEP's proposed interconnect with the Terminal is discussed in Section 1.11 "FERC Non-Jurisdictional Facilities."

Back-up power for essential Terminal loads will be supplied via six onsite, diesel generators, each with a 2.725 megawatt capacity. These generators will only be utilized for testing purposes, as per NFPA 110, and during emergency scenarios involving the loss of grid supplied power.

Water Supply

Fresh water will be imported to the Terminal via a direct interconnect to a proposed municipal water line from the Brownsville Public Utilities Board, with the BND acting as wholesaler (bulk seller) and

distributor. Details of the municipal water interconnect with the Terminal are discussed in Section 1.11 "FERC Non-Jurisdictional Facilities." If fresh water is needed during construction prior to the commissioning of the proposed municipal water line, RG LNG will purchase fresh water from available local municipal districts and import the water via tanker trucks.

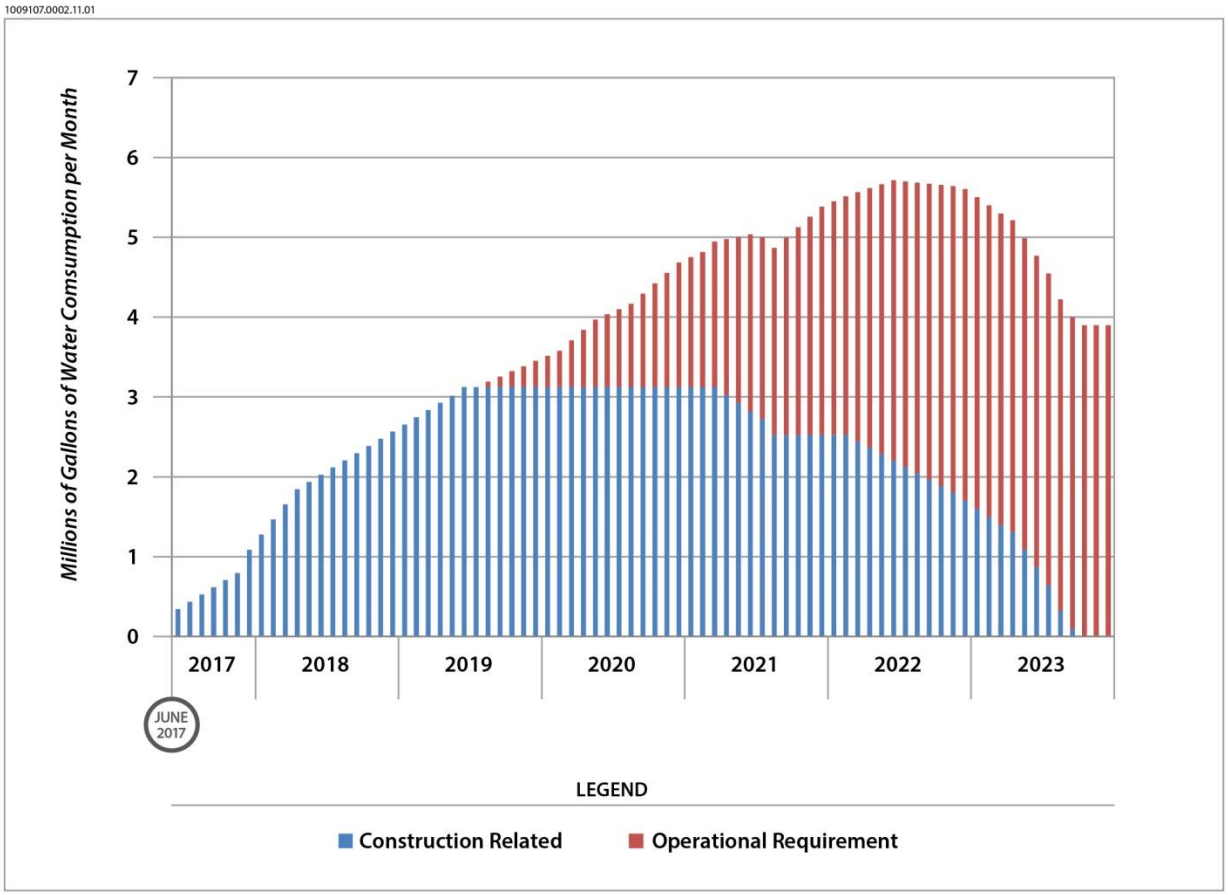
During operation of liquefaction trains 1-6, the ration of anticipated potable water usage is as follows:

- Service water – 35% (normal usage) / 40%(peak usage);
- Drinking water – 10% (normal usage) / 15% (peak usage); and
- Demineralization water – 55% (normal use) / 45% (peak usage).

The Terminal's liquefaction units will be air-cooled, thereby largely eliminating the Terminal's operational process water requirements.

Figure 1.2-6 shows the estimated water consumption of the site, including during operations.

Figure 1.2-6: Terminal Site Estimated Water Consumption



Sewage Handling

Similar to the description of the fresh water supply for the Terminal, the BND is also planning for a pumped sewage collection header that enables transport of sewage for treatment in the sewage treatment plant operated by the BND. The Terminal will have an internal sewage system that will collect sewage from various temporary and permanent amenities and transport the sewage to two tie-in points for the BND sewage header. Details of the municipal sewage disposal interconnect with the Terminal is discussed in Section 1.11 "FERC Non-Jurisdictional Facilities."

Firewater System

The Terminal will include a firewater system to control and/or extinguish a fire event within the Terminal's fence line. The design of the firewater system supply and distribution systems will be based on the volume of firewater required to deal with the maximum credible fire event, creating the "design basis firewater demand," plus an allowance of 1,000 gallons per minute (gpm) (227 m^3/hour) for hose streams. The system will be capable of achieving a minimum operating pressure of 100 pounds per square inch gage (psig) at the inlet of firewater equipment when discharging the

maximum firewater demand. All the calculations include an allowance of 1,000 gpm for hand-held appliances, as required by NFPA 59A.

The Terminal facilities will be divided into separate fire areas such that a fire in one area can be contained without it spreading to an adjacent area. The liquefaction facilities will include a primary closed-looped firewater supply and distribution system for emergency situations, such as fighting fires, cooling structures and equipment exposed to thermal radiation, and dispersing flammable vapors. A firewater ring main distribution system will be provided to all areas of the Terminal to supply firewater based systems (i.e., water spray, monitors, hydrants, hose reels, foam systems, and fire tenders). Fire tenders may take suction from the firewater system via hydrant standpipe pumper connections.

The firewater system demand scenarios have been analyzed, and the maximum demand scenario is 4, 313 gpm at the NGL extraction area in the process train. The firewater pump capacity is rounded up to provide 4,315 gpm of firewater supply to monitors, hydrants, hose reels, and deluge/foam systems.

The first response fire water source will be a firewater/service water storage tank, with a capacity of approximately one million gallons. This tank will be supplied by the Terminal's interconnect with the proposed municipal water source. The tank's working volume is sized to give two hours of supply to the maximum fire-fighting demand (in accordance with the requirements of NFPA 59A) plus three days storage of the average service water usage. The storage tank will be designed and installed in accordance with NFPA 22 and American Petroleum Institute (API) 650.

The fresh water firewater pumps will be provided to supply a minimum discharge pressure of 100 psig at the furthest point of demand. Preliminary hydraulic analysis has shown that the fire pumps can achieve the required flow and pressure demands with a 20-inch ring main.

In addition to the freshwater firewater pumps, the Terminal will have seawater firewater pumps for redundancy. The seawater firewater pumps will be automatically activated when the supply of the fresh water in firewater/service water storage tank is exhausted or is unavailable for any reason. The seawater firewater pumps will draw water directly from the BSC and the seawater will directly feed the firewater pumps and will not be stored in the water storage tanks. The intake of the seawater firewater pumps will be screened using typical industry protection methods to minimize entrapment of aquatic organisms.

1.2.1.4 LNG Storage

Four LNG tanks, each with a net pumpable capacity of approximately 180,000 m^3, will store the LNG product for all six liquefaction trains. Two LNG tanks will be constructed in conjunction with Stages 1

through 3, and two additional LNG tanks with the same design will be completed in concert with Stages 4 and 5 for a final storage capacity of 720,000 m^3. Each LNG tank will be approximately 275 feet in diameter and reach about 175 feet in height above grade. The LNG tank design used for the Terminal is the "full containment type," consisting of double-wall construction, with an inner wall of low-temperature 9% nickel steel and an outer wall of reinforced post-tensioned concrete.

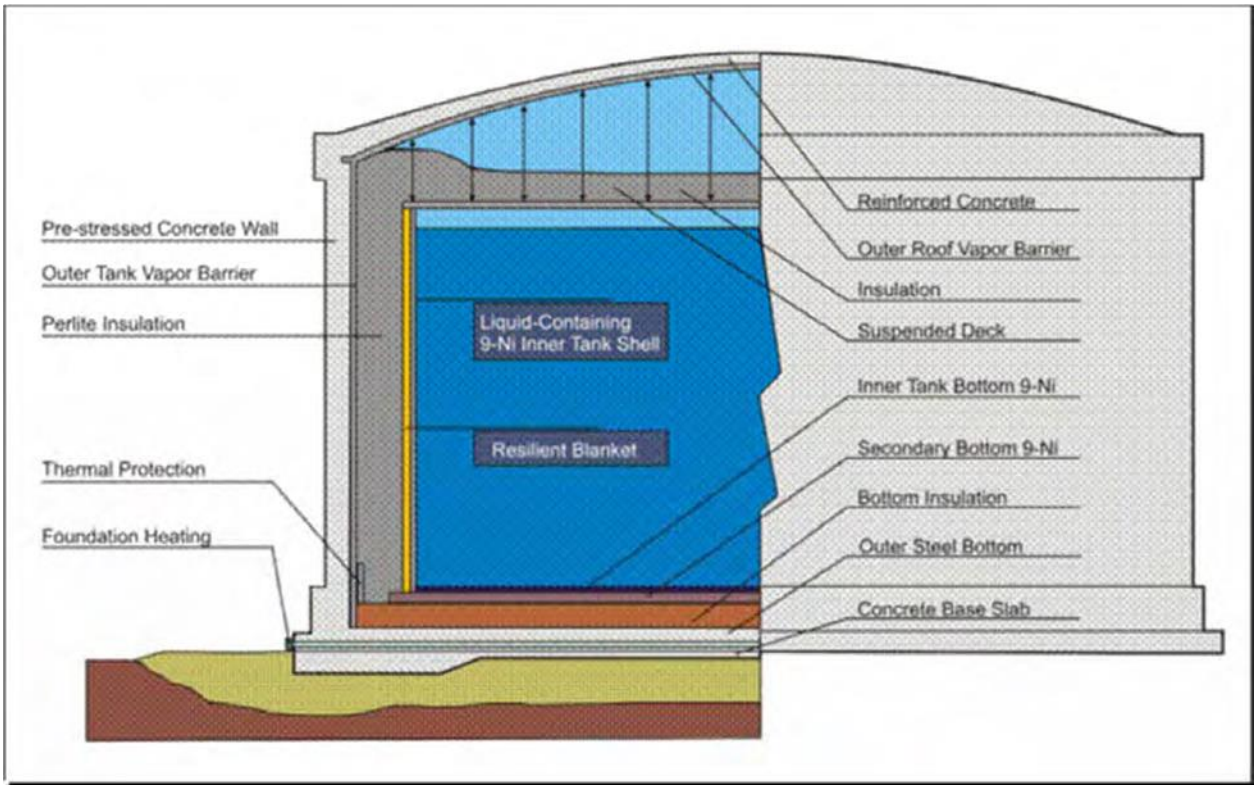
As illustrated in Figure 1.2-7, each LNG tank will have the following features:

- Inner tank with floor slab and wall: 9% nickel steel containment;
- Thermal insulation systems:
  - Foam-glass layers under the inner tank with bottom/corner protection,
  - Resilient blanket with perlite fill of the annular space between inner and outer tank walls,
  - Thermal insulation (blankets) on the suspended deck;
- A reinforced concrete foundation/outer tank floor slab with steel liner on the inside as a vapor barrier;
- Outer tank wall: post-tensioned - concrete with a steel liner as a vapor barrier;
- Reinforced concrete, domed roof with steel liner as a vapor barrier, supporting also:
  - External roof structures for LNG and vapor pipework,
  - Pump columns and other nozzle penetrations through the roof,
  - The suspended deck supporting thermal insulation over the inner tank;
- Roof platforms, walkways, and pipe supports;
- External stairways, ladders, and pipe supports; and
- Entrance of all pipework thought the tank roof.

The LNG tanks will be designed and constructed in such a manner that the self-supporting primary containment and the secondary containment will be capable of independently containing the LNG. The primary containment will contain the LNG under normal operating conditions, whereas the secondary containment is designed to be capable of containing 110% of the capacity of the inner tank in the event of a failure of the primary containment. All piping and equipment connections will be located at the roof of the tanks to minimize the risk of draining the tanks' contents during an unanticipated auxiliary failure.

The LNG tanks' construction sequence for the Project is presented in Appendix 1.G.

Figure 1.2-7: Typical LNG Tank Components



1.2.1.5 Marine Facilities and LNG Vessel Loading

The Terminal will incorporate two LNG export berths along the southern boundary of the site and recessed from the BSC (see Figure 1.2-2 for the full build and Figure 1.2-3 for the installation of the first berth only). Each export berth will have a jetty with an access roadway on a trestle leading to the LNG loading platform using industry standard top side piping and equipment, a LNG spill containment system, four berthing dolphins, and three bow and three stern mooring dolphins. In addition, catwalks will be provided between the dolphins and the loading platform to provide personnel access.

Terminal marine facilities will accommodate LNG vessels with capacities ranging from 125,000 m^3 to 185,000 m^3.

Each LNG loading platform is a reinforced concrete deck supported by either steel pipe piles or precast concrete cylinder piles. The deck and trestle top elevation will be designed to ensure that the lowest horizontal member of the deck is at least one foot above the predicted 500-year storm surge. The main loading deck will accommodate four marine loading arms (three for loading and one for vapor return), a vessel gangway, and other typical jetty top-sides equipment. The following equipment will be provided on the loading platform: piping manifold support, jetty drain/surge drum,

marine access, gangway to provide access to vessels, firewater monitors, and industry standard auxiliaries, such as gas analyzers, electrical systems and instrumentation equipment.

Access to the LNG loading platform is provided by a trestle, which provides structural support for a 15-foot wide roadway, a 4-foot wide personnel walkway, LNG product piping, and auxiliary mechanical and electrical systems. The access trestle will be supported by steel or concrete piles, as determined later in the design process and subject to approval by FERC.

The breasting dolphins and fenders will be designed to withstand vessel berthing impacts, wind, and current induced forces. The dolphins are designed as separate structures isolated from the LNG loading platform to ensure that berthing loads from large LNG vessels are not transferred to the LNG loading platform. Each of the breasting dolphins will be equipped with suitably rated, twin quick release hook assemblies with an integrated capstan.

The mooring dolphins will be spaced to meet Oil Companies International Marine Forum mooring recommendations providing for adequate mooring lines for the design vessels. Each mooring dolphin will be equipped with a suitably rated, triple, quick release hook assembly with an integrated capstan. Mooring and breasting dolphins will be interconnected with walkways.

All dolphins will be supported on large-diameter steel monopoles with a steel top-deck, or multiple steel pipe or concrete piles with a reinforced concrete deck. FERC approval will be obtained for the final design before construction.

The ship-shore infrastructure will also include:

- Communication systems;
- A berthing aid system to show distance and approach velocity; and
- Mooring load monitoring system on all quick release hooks, with online feedback to the moored vessel.

Both LNG berths will be placed in a single recessed pocket large enough to allow separation between moored LNG vessels and marine traffic on the BSC. The jetty berthing line where the jetty loading arms connect to the ship manifold is set back 770 feet from the edge of the ship channel. Longitudinal separation between two 1,000-foot-long berthed vessels will be at least 250 feet.

A turning basin will be constructed on the eastern side of the marine facilities, next to the recessed berth pocket to avoid interference with a LNG vessel being loaded at either berth and to minimize overall dredging volumes. The turning basin will have a diameter of approximately either 1,500 or

1,700 feet based on final design. Additional information on the turning basin is discussed in Section 1.2.1.7.

The location, berth size, and orientation of LNG vessel loading facilities will be designed to ensure a safe navigable approach and departure condition, a secure mooring environment, and safe distance from the influence of passing vessels.

LNG vessel loading facilities will have a maximum 12,000 cubic meters per hour (m^3/hr) loading rate per berth, and an aggregate LNG loading rate over two berths of 18,000 m^3/hr. In order to facilitate this maximum rate per berth, RG LNG is proposing to install a 36-inch-diameter main LNG loading line into each jetty with a vapor balance line for the supply of LNG from the onsite LNG tanks to the loading platform. Each jetty will also be outfitted with a small-diameter LNG recirculation line to keep the liquid piping cool when loading operations are not occurring. Transfer of LNG from the platform to the vessels will be accomplished via three LNG loading arms and a vapor return arm.

Dredging

Dredging is needed to provide adequate water depth to minus 43 feet mean low low water (plus an additional 2 feet of over dredge allowance) for the LNG vessels to access the marine loading berths from the ship channel and for the creation of the turning basin. A siltation model study was developed to produce guidelines on anticipated siltation at the Terminal, which, in turn, will support setting the final dredging depth and volume (inclusive siltation allowance). The anticipated siltation rate for the turning basin and LNG berths is on the order of 9 to 12 inches per year and maintenance dredging would be expected to occur every two to four years, with approximately 250,000 to 500,000 cubic yards of material to be removed each maintenance dredging cycle. A copy of this study is included in Draft Resource Report 13, "Engineering and Design Material," Appendix K.13.

In addition, real-time desktop simulations have been undertaken and siltation rate predictions have been made to refine the required dredging depths (a copy of this study is included in Draft Resource Report 13, "Engineering and Design Material," Appendix K.13). Currently, the BSC allows for a depth of 42 feet and a channel base width of 250 to 300 feet, and the U.S. Army Corp of Engineers (USACE) previously approved a plan to dredge the BSC to a depth of 52 feet (independent of the RG Developers' Project proposal). This plan to dredge will result in a widened navigable channel for LNG vessels in excess of 300 feet. Dredging for the Terminal will be completed in coordination with and under the responsibility of the BND and in accordance with all relevant guidelines and applicable requirements for permits issued by the USACE. In addition to the aforementioned widening of the BSC, the potential for an additional widening at the bend of the BSC near the entrance channel may be necessary to facilitate the transit of vessels calling on the Terminal.

As part of the site preparation, the following shoreline protection measures will be implemented by RG LNG at the Terminal:

- The Terminal platform along the shallow channel embankments will be straightened and trimmed at a 1:3 vertical slope and protected by rip-rap from an approximately -2 feet to an elevation of +6 feet to stop erosion of the shoreline by waves from passing vessels; and
- In the dredged berth area's and the turning basin where ship propellers (from tugs) may act on the underwater slopes, again a 1:3 slope is foreseen stabilized by rip-rap cover.

For detailed discussion of the shoreline protection and scour analysis, see Draft Resource Report 13, "Engineering and Design Material," which includes the Shoreline Protection and Scour Study Report (195910-000-MFNLRP-0004) and Shoreline/Scour Protection Drawing (195910-000-MFNL-DR-0016 through 0019).

Vessel Travel: To and From Terminal

According to the Brownsville Santiago Pilots Association (a.k.a. Brownsville Harbor Pilots), approximately 350 larger vessels call on the Port of Brownsville annually (well below the capacity of the existing channel and harbor facilities). RG LNG forecasts that, on average, six LNG vessels per week (approximately 312 annually) will make calls at the Terminal when operating at full capacity.

Based on common practice, it is likely that the BSC will operate as a single-direction channel between the Terminal berthing location and the BSC's outer channel markers 2 and 3 (located just outside the jetties) for marine traffic when the LNG vessels are in transit. For the most conservative scenario where no other (large) vessels could concurrently travel, even in the same direction, within the BSC, then the theoretical channel capacity is approximately 12 larger commercial vessels traveling one way in or out of the BSC per calendar day, assuming 24/7 operations. This equates to a maximum of six larger commercial vessels traveling round-trip and calling on the BSC per day. The current BSC usage shows approximately one large vessel calling at the Port of Brownsville per day. It should be noted that this most conservative scenario and all other transit considerations and restrictions are the subject of deliberations and final decision by the USCG, as part of the Waterway Suitability Assessment (WSA) process.

Based on the current BSC usage of one large vessel calling per day, plus the addition of one large vessel accounting for one LNG vessel that will be calling on the Terminal per day, a total of two large vessels will use the BSC per day. The BSC would be functioning at about one-third of the theoretical channel capacity, leaving enough room for future growth or resolving potential congestion scenarios, such as after a Port closure triggered by extreme winds. The theoretical channel capacity of the BSC

could increase in the future if the Port of Brownsville's anticipated Vessel Traffic Management System was to allow multiple large vessels to travel in the BSC concurrently and in the same direction.

Ultimately, the maximum number of LNG vessels calling on the Terminal per year will be determined by Project requirements and through coordination with the USCG as part of the WSA process. RG LNG is coordinating with the USCG Captain of the Port Sector Corpus Christi, the BND, the Marine Safety Unit of Brownsville, and other stakeholders identified by the USCG to prepare and submit the required WSA for the Project. Based on prior meetings with the USCG, these individuals and agencies participated in the Waterway Risk Assessment Stakeholder workshop. The responses and concerns of stakeholders, as well as an analysis of risks and mitigation, will be considered and incorporated into the WSA Report, for further consideration by the USCG.

In accordance with the USCG Captain of the Port Sector Corpus Christi, the BND, and the Marine Safety Unit of Brownsville, the RG Developers will utilize the designated Pilot Boarding Station (i.e., a pre-authorized staging location), which will be well outside of the BSC. This location will be determined upon further coordination with the Captain of the Port Sector Corpus Christi and other concerned parties. From this location, a member of the Brownsville Harbor Pilots will board the LNG vessel and take over the responsibility of navigating the vessel through the BSC to the Terminal facility. Transit of LNG vessels will be executed with a full tug support spread at limited sailing speeds of 5 to 10 knots, giving a total estimated transit time from inland waters to the Terminal of approximately two hours.

Upon arrival of each LNG vessel to the Terminal facility, the LNG vessel will be turned in a dedicated turning basin area, and be placed alongside the Terminal waterfront. These final maneuvers will take up to one extra hour to turn and safely moor the LNG vessel along the berth. Most LNG vessels will be turned in arrival ballast conditions and be secured to the mooring dolphins along the port side of the vessel, with the bow of the vessel facing easterly (i.e., parallel to the BSC). Turning and subsequent mooring of the vessel in this manner will ease the departure maneuvers of a loaded vessel. Turning and mooring of the vessels will be completed under the assistance of the aforementioned tugs. All ballast water management by the incoming LNG vessels will be in accordance the vessel's approved Ballast Water Management Plan.

Projected vessel loading times are variable and dependent on vessel capacity. With a proposed maximum LNG loading rate of approximately 12,000 m^3/hr per berth, it is anticipated that the average of each vessel from mooring to full loading will be approximately 20 to 24 hours. This duration includes the initial safety check list, cool-down of loading equipment, full LNG transfer, and final custody transfer measurements. When loading is completed, loading arms disconnected, and

paperwork finalized, it will take the laden LNG vessel approximately two hours to clear the BSC on the outbound voyage at limited sailing speeds between 5 to 10 knots under escort tug guidance.

In and outbound LNG vessel transits through the BSC will typically see the assistance of a pilot boat to transfer pilots in the outer port reaches, with tugs escorting the LNG vessel to and from the Terminal through the BSC. Additional tugs will assist with the final turn and berthing maneuver of the LNG vessel. Based on the desktop simulations, the tugs will typically have a bollard pull capacity of between 65 and 75 metric ton each, with the final capacity being confirmed in upcoming full mission simulations.

Given the expected regular calls of LNG vessels to the Brownsville port, an upgraded tug spread will be located in the Port of Brownsville area. The tugs will not be part of the RG LNG assets; rather, it is foreseen that a tender will be arranged for experienced tug suppliers to submit their technical and commercial proposals to render tugging services for a series of years, with the actual customers being the LNG shippers that bring LNG vessels to the Terminal. At least two of the tugs that will be used will have fire-fighting capacity.

There are no berthing facilities for tugs at the Terminal waterfront, although a tug might find a temporary mooring at the MOF, if available.

1.2.1.6 Material Off-Loading Facility (MOF)

A MOF will be utilized to transport material from the Port of Brownsville to the Terminal as an alternative transportation method to road transportation. Construction of a MOF is planned near the western extent of the Terminal site. The MOF would include an extended quay wall head and locally dredged berthing pocket for barges and shallow draft sea-going vessels to directly offload bulk materials onsite. Larger vessels carrying main equipment will offload at the Port of Brownsville area. The MOF will require a dredging depth of -10.85 feet NAVD88 for the removal of 29,000 cubic yards. The MOF will be designed to allow both lift-on/lift-off and roll-on/roll-off transport modes.

The MOF will be used for the following:

- Barge transport of site soil fill, crush stone, and sand for concrete fabrication;
- Offloading large equipment and/or prefabricated modules that cannot be transported on State Highway 48; and
- Selective bulk materials if waterborne transport brings advantages.

See Draft Resource Report 5, "Socioeconomics," for a discussion of the anticipated barge traffic that would result due the construction of the Terminal. Additional detail regarding the anticipated barge

traffic based on the planned "Traffic Study" will be presented in FERC Application (anticipated for March 2016).

1.2.1.7 Terminal Turning Basin

A turning basin will be constructed near the eastern boundary of the Terminal site (see Figure 1.2-2). The results of a desktop vessel simulation concluded that both a 1,500-foot- and 1,700-foot-diameter turning basin would be functionally feasible. The final selection of the turning base diameter will be dependent on the planned full-mission simulations, with RG LNG's preference being to utilize the smaller diameter basin, if feasible. The turning basin will be dredged to a depth of 45 feet (guaranteed dredge depth of 43 feet, plus 2 feet of overdredge allowance). Dredging of the recessed berth pocket and parts of the turning area outside the dredged BSC are the responsibility of RG LNG. Section 1.5 provides a more detailed description of construction techniques. See Resources Report 13, "Engineering and Design Material," for additional detailed engineering design of the turning basin and a summary of the simulations that have been conducted.

1.2.1.8 Terminal Truck Loading Facilities

The Terminal will include facilities to allow loading and unloading of tanker trucks. The following are planned as part of Terminal:

- A small portion of the LNG produced at the Terminal will be loaded onto third-party trucks for over road distribution to LNG vehicle refueling stations in South Texas. The exact amount of LNG that will be loaded onto trucks will be dependent on market demand, but will not likely exceed 2% of the maximum annual production of the Terminal. Four LNG tanker truck loading bays are included in the Terminal design, with each bay having the capacity to handle 12 to 15 trucks per day, assuming 24/7 operations. Estimated capacity of each truck will be 38 m^3 of LNG;
- Additional truck unloading facilities (one per refrigerant product) near the refrigerant storage tank area will be constructed to unload make-up refrigerant (propane and liquid ethylene or ethane) transported to the Terminal site for storage and use within the liquefaction process. During normal operations, the anticipated delivery of refrigerant cargo will be on average approximately six ISO 40-foot long containers every two months; and
- Two loading bays are included in the Terminal design for loading of NGL condensate product into third-party tanker trucks for delivery into the market place. During normal operations, the facilities will support up to 15 tanker trucks per day per bay.

Travel routes for the tanker trucks will likely include the following roadways, with the final selection of the route dependent on the individual-third party trucking service:

- LNG Tanker Trucks: Utilize State Highways 48, 550, and 551 and Interstate 77 for northbound transit, and State Highways 49 and 101 for southbound transit;
- Refrigerant Tanker Trucks: Utilize State Highways 48, 550, and 551 and Interstate 77 for transit from Houston/Corpus Christi to the Terminal site; and
- NGL Condensate Tanker Trucks: Utilize State Highways 48, 550, and 551 and Interstate 77 for northbound transit, and State Highways 49 and 101 for southbound transit, as well as State Highway 48 for transit to Brownsville.

1.2.1.9 Buildings and Communication

The Terminal site will include administrative buildings, a Central Control Building, a workshop, a warehouse, electrical equipment enclosures, and other support structures.

Support infrastructure components of the Terminal will also consist of:

- Perimeter security fencing and gate access control;
- Video surveillance of the plant and its perimeter;
- Access roads and parking areas;
- Electrical substations for power distribution;
- Essential diesel generator sets at strategic locations in the Terminal;
- Field instrument rooms for distributed controls;
- Site drainage; and
- Maintenance contractor laydown and staging area.

The communication system at the Terminal will be comprised of two radio towers for internal communication (approximately 66 feet in height), a telephone exchange system, a ship-to-shore communication system, a computer network and email system, a plant telecommunication network, a telemetry system for data transfer to/from the Pipeline and gas production sites, and a closed-circuit television (CCTV) system. No external communication towers are planned for the Terminal site at this time.

Communication systems will comply with government regulations. Marine band very high frequency (VHF) radios will be provided for communication with the LNG vessels. Access to the control system will be provided to allow remote monitoring of facility operations by approved parties.

1.2.2 Pipeline System

The Pipeline System includes two new, approximately 137-mile-long, 42-inch-outside-diameter, parallel, feed gas pipelines sharing a right-of-way (ROW), three 180,000-horsepower (hp) compressor stations, meter stations, six mainline valve sites, a 2.7-mile-long Header System with multiple interconnects, access roads, and temporary contractor/pipe yards. The Pipeline System will be constructed in a staggered process timed so as to ensure that Pipeline 1 construction is completed by the time Stage 1 of the Terminal construction process is completed, and Pipeline 2 construction is completed by the time Stage 4 of the Terminal construction is completed. The compression capacity of each compressor station will be incrementally increased as necessary to raise the Pipeline System throughput capacity to match Terminal natural gas liquefaction capacity coming on in six stages (see Table 1.2-4 for a description of the construction sequences of the Project components). As described below, the Pipeline System includes a Header System at its upstream end to allow for multiple interconnections (see Section 1.2.2.2) to the existing natural gas pipeline grid located in the Agua Dulce Market Area in Texas.

1.2.2.1 Pipelines

One 42-inch pipeline (Pipeline 1) with the capacity to deliver approximately 2.25 Bcf/d to the Terminal will be constructed and placed into operation in conjunction with completion of Compressor Stage 1 and 2/Terminal LNG Train 1 construction (Stage 1 Terminal construction). The second pipeline (Pipeline 2), with identical capacity to the first, will be constructed and placed into operation in conjunction with completion of Compressor Stage 4/Terminal Train 4 construction (Stage 4 Terminal construction). Once Pipeline 2 is constructed and placed into operation, the Pipeline System will have a total throughput capacity of approximately 4.5 Bcf/d of natural gas, which will be sufficient to supply the full Project's fuel needs.

Approximately 68% of the Pipeline ROW will be co-located (adjacent to or within 300 feet of) with existing ROWs and/or man-made linear features, such as railroads, roads, canals, pipelines and electric lines, to reduce impacts to previously undisturbed areas and to limit the number of affected landowners; the remaining 32% of the Pipeline ROW will be greenfield. Table 1.2-1 provides the locations, by MP, for those portions of the Pipeline ROW that are co-located with existing ROWs. Aerial, photo-based alignment sheets for the Pipeline System are included as Appendix 1.B.

Table 1.2-1: Rio Bravo Pipeline Collocation within 300 Feet of Existing Man-Made Linear Features

Begin MP	End MP	Collocation Length (miles)	Adjacent Infrastructure (Type of ROW)	Existing Infrastructure Owner (if known)
Kleberg County				
0.00	19.37	19.37	Gas Pipeline (utility)	Sarita Gas – ExxonMobil Corp.
Kenedy County				
20.08	21.00	0.92	Railroad (railroad)	Union Pacific
24.00	29.46	5.46	Railroad (railroad)	Union Pacific
30.11	31.00	0.89	Railroad (railroad)	Union Pacific
31.43	37.83	6.4	Railroad (railroad)	Union Pacific
37.83	38.40	0.57	Private Road (road)	Unknown
38.37	43.00	4.63	Railroad (railroad)	Union Pacific
44.22	48.55	4.33	Railroad (railroad)	Union Pacific
50.10	52.64	2.64	Railroad (railroad)	Union Pacific
54.00	58.00	4	Railroad (railroad)	Union Pacific
59.00	60.45	1.45	Railroad (railroad)	Union Pacific
Willacy County				
68.06	70.01	1.95	Gas Pipeline (utility)	Unknown
70.57	78.14	7.57	Private Road (road)	Unknown
78.16	80.83	2.67	Canal (canal)	Unknown
83.62	93.50	9.88	Electrical (utility)	Unknown
96.73	102.81	6.08	Electrical (utility)	Unknown
Cameron County				
102.81	103.44	0.63	Canal (canal)	Unknown
107.73	113.70	5.97	Canal (canal)	Unknown
117.35	117.75	0.4	Canal (canal)	Unknown
120.28	122.43	2.15	Electrical (utility)	Unknown
123.16	125.55	2.39	Gas Pipeline (utility)	Unknown
133.49	137.31	4.23	Public Road (road)	State Hwy 48

1.2.2.2 Header System

Although no firm commercial arrangements have been completed, RB Pipeline intends to design and construct an approximately 2.7-mile-long Header System from the suction side (north side) of Compressor Station 1 in order to facilitate the necessary interconnects with the unaffiliated natural gas pipelines (three interstate and three intrastate pipelines). The Header System will be installed in conjunction with, and in parallel to, the construction of Pipeline 1 and Compressor Station's Stage 1 and 2 compressors. The size and pipe configuration will be determined during the detailed engineering and design phase of the Pipeline System. In addition to the Header System, RB Pipeline

intends to evaluate interconnections (two have been identified to date) with other unaffiliated natural gas pipelines where they cross the Pipeline ROW, thereby allowing natural gas to be supplied through displacement or direct access from a wide variety of supply sources. The relevant pipeline operators, existing pipeline systems, and their respective current capacities to which interconnects are proposed are:

- Energy Transfer Partners – HGPC System: 0.75 Bcf/d (crossed by the Header System);
- Kinder Morgan Tejas – TGPL Mustang: 1 Bcf/d (crossed by the Header System);
- Natural Gas Pipeline of America – Gulf Coast Mainline: 0.5 Bcf/d (crossed by the Header System);
- NET Mexico Pipeline Partners: 2 Bcf/d (crossed by the Header System);
- Tennessee Gas Pipeline – TGP: 1 Bcf/d (crossed by the Header System);
- Texas Eastern Transmission Co. – TETCO STFE PETR: 0.6 Bcf/d (crossed by the Pipeline ROW);
- Transcontinental Pipeline – North Padre Island: 0.37 Bcf/d (crossed by the Pipeline ROW); and
- Transcontinental Pipeline – Transco: 0.5 Bcf/d (crossed by the Header System).

This represents an existing total throughput capacity of just over 6.7 Bcf/d.

The Natural Gas Pipeline of America, Tennessee Gas Pipeline, Texas Eastern Transmission Co., and Transcontinental Pipeline facilities are all interstate pipelines subject to the FERC's jurisdiction under the Natural Gas Act and will be the subject to separate FERC proceedings. The Energy Transfer Partners, the Kinder Morgan Tejas, and the NET Mexico Pipeline Partners pipeline facilities are intrastate facilities and not FERC jurisdictional.

RB Pipeline will construct and operate the necessary metering station and valves at each interconnect location. RB Pipeline will monitor flow volumes via RB Pipeline's supervisory control and data acquisition (SCADA) system, including the ability to close valves in the event of over pressurization. RB Pipeline expects to design and configure the Pipeline and Header System so that adequate flows can be achieved from the interconnecting pipelines into the Pipeline System without the need for additional compression on the other pipelines. The RG Developers will submit to the FERC additional information on any FERC jurisdictional aboveground pipeline facilities that would be part of, or would be required because of, the Header System as such information becomes available.

Figures 1.2-8 shows the preliminary Header System layout including the proposed locations for interconnection with each of these natural gas pipelines; Figure 1.2-9 shows the potential interconnect points along the Pipeline System. RB Pipeline does not anticipate the need to construct an extensive network of laterals to interconnect with the proposed unaffiliated natural gas pipelines based on the

current Header System design. Additional information regarding each of the interconnections will be supplied to FERC as it becomes available.

Figure 1.2-8: Pipeline Header System Location Map 1

(Attached)

Date: 11/10/2015

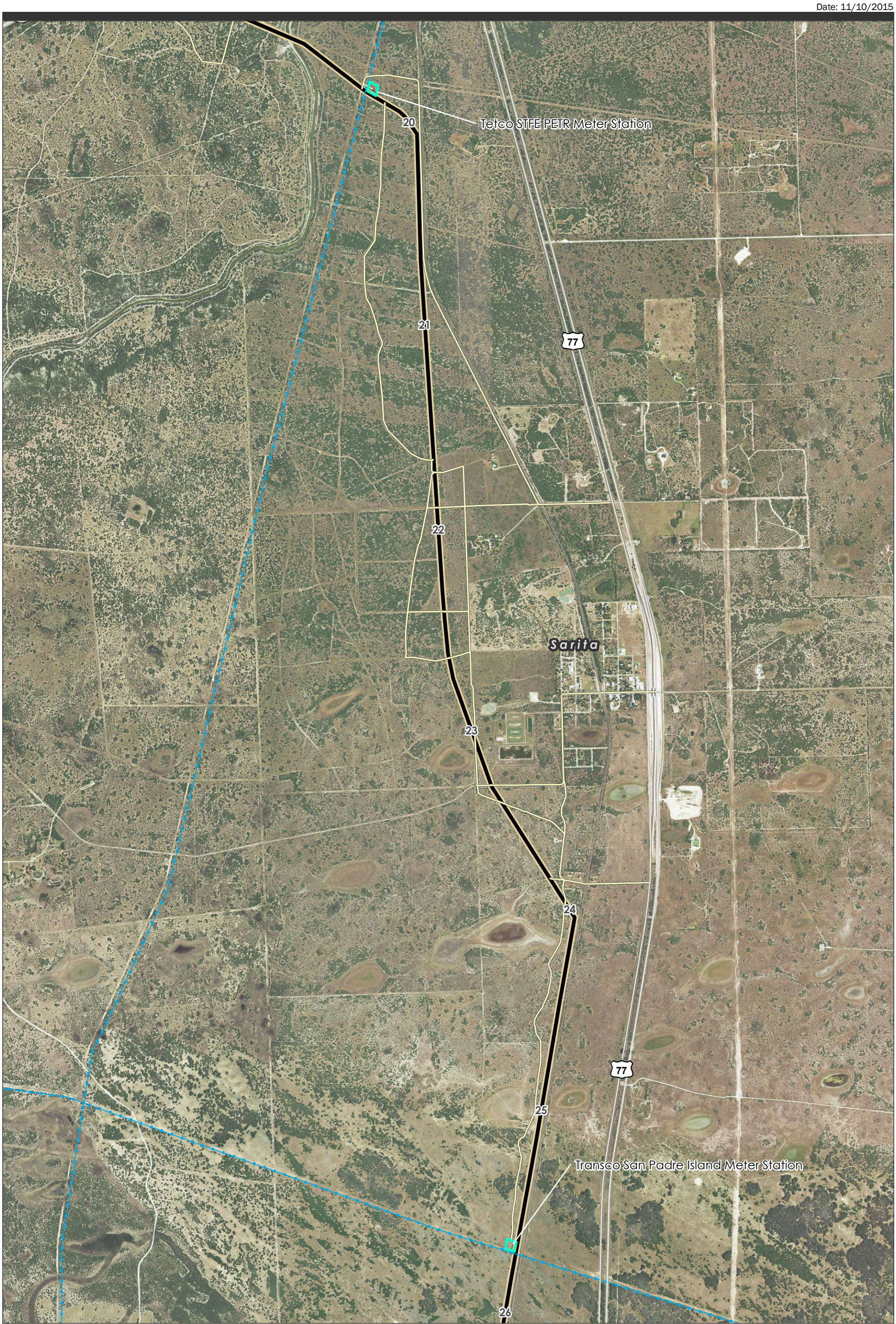
FIGURE 1.2-8
PIPELINE HEADER SYSTEM
LOCATION MAP
RIO GRANDE LNG PROJECT

Source: NAIP 2014

Figure 1.2-9: Pipeline Interconnect Locator Map 2

(Attached)

Date: 11/10/2015



1 Preferred Route Milepost Label
Pipeline Route
Permanent Easement
Meter Sites
Access Road
Natural Gas Pipelines

N
W E
S

0 0.5 1 Mile

FIGURE 1.2-9
PIPELINE INTERCONNECT
LOCATION MAP 2
RIO GRANDE LNG PROJECT

Source: NAIP 2014, ESRI 2014

While the amount of transportation capacity required by the Project is substantially less than the existing capacity on the pipelines with which the RG Developers propose to interconnect, it should be noted that growing demand in the region, including the Project, is likely to stimulate pipeline system enhancements (e.g., looping, additional compression, installation of larger pipelines) to further increase the throughput capacity of the relevant connecting pipelines or other pipelines that may provide competing transportation for shippers currently using the pipelines to which the RG Developers will connect. For example, on August 28, 2015, Mexico's Comisión Federal de Electricidad issued a request for proposals to construct a new natural gas header and pipeline with a capacity of 2.6 Bcf/d from Nueces County to Brownsville, Texas, to interconnect with a new pipeline to run south into Mexico.[4] The Header System of the new Comisión Federal de Electricidad pipeline would include substantial interconnects with many of the same pipelines that the RG Developers propose to interconnect with, as well as several other pipelines. The U.S. Energy Information Administration (EIA) has identified other announced, applied for, approved, or under construction Texas pipeline enhancement projects with a total anticipated cost of about $1.4 billion involving at least 288 miles of pipeline and an additional summed capacity of over 7.7 Bcf/d, almost all with target in-service dates no later than 2018.[5]

This is part of an on-going pattern in Texas. According to EIA data, from 2000 through 2010, over $7.3 billion was expended in Texas for the construction of new natural gas pipelines and laterals, the expansion of existing natural gas pipelines, and the conversion of existing pipelines to natural gas service.[6] This included 4,762 miles of pipeline projects with a summed capacity of over 32 Bcf/d.[7] Similarly, from 2011 through June of 2015, at least another $257 million was spent to complete another 762 miles of pipeline improvements in Texas, with a summed capacity of over 8 Bcf/d.[8]

1.2.3 Aboveground Facilities

This section describes the aboveground facilities for the Pipeline System. These aboveground facilities will include three compressor stations, six mainline valve sites with two valves per location (one for each pipeline), four metering sites that house a total of six meter stations (two metering sites will contain two interconnects) along the Header System, two interconnect metering sites along the Pipeline ROW, one check meter station at Compressor Station 1, one custody transfer meter station at the Terminal at Compressor Station 3, and eight pig launchers and/or receivers located within the

[4] http://www.cfe.gob.mx/Proveedores/3_Licitacionesprincipales/SiteAssets/AmendedandRestatedRequestforProposalsNuecesBrownsville28082015.pdf (last visited October 9, 2015).
[5] *See*, http://www.eia.gov/naturalgas/data.cfm (last visited October 9, 2015).
[6] *Id.*
[7] *Id.*
[8] *Id.*

individual compressor stations. The exact location, capacity, and installation schedule of the meter stations will be determined during commercial negotiations with the various interconnecting parties. Table 1.2-2 lists the MP locations and provides a brief description of these aboveground facilities.

Table 1.2-2: Summary of Aboveground Facilities for the Pipeline System

Facility ID	Horsepower	Milepost (MP)	County
Compressor Stations			
Compressor Station 1	180,000[1]	0.0	Kleberg
Compressor Station 2	180,000[1]	66.1	Kenedy
Compressor Station 3[2]	180,000[1]	137.3	Cameron
Metering Sites			
Header System[3]			
Header System Metering Site 1[3]	N/A	HS0.2	Kleberg
Header System Metering Site 3	N/A	HS0.16	Kleberg
Header System Metering Site 4[5]	N/A	HS0.78	Kleberg
Header System Metering Site 6	N/A	HS2.7	Jim Wells
Compressor Stations			
Metering Site 1[6]	N/A	0.0	Kleberg
Metering Site 2[7]	N/A	137.3	Cameron
Pipeline ROW Interconnects			
Metering Site 3	N/A	19.7	Kenedy
Metering Site 4	N/A	25.7	Kenedy
Pig Launcher and Receiver Locations			
Pig Launcher[6] (2)	N/A	0.0	Kleberg
Pig Launcher (2) and Receiver[8] (2)	N/A	66.1	Kenedy
Pig Receiver[7] (2)	N/A	137.3	Cameron
Mainline Valve Sites			
Mainline Valve Site 1	N/A	18.3	Kleberg
Mainline Valve Site 2	N/A	35.3	Kenedy
Mainline Valve Site 3	N/A	49.2	Kenedy
Mainline Valve Site 4	N/A	85.3	Willacy
Mainline Valve Site 5	N/A	102.4	Cameron
Mainline Valve Site 6	N/A	121.4	Cameron

Notes:
[1] 180,000 hp is the maximum capacity at full build of each compressor station.
[2] Compressor Station 3 is located within the fence line of the Terminal.
[3] The MP for the metering stations along the Header System are based on the Header System 2.7-mile footprint
[4] Meter Site 1 contains 2 metering stations (one per interconnect)
[5] Meter Site 3 contains 2 metering stations (one per interconnect)
[6] Located within the footprint of Compressor Station 1.
[7] Located within the footprint of Compressor Station 3.
[8] Located within the footprint of Compressor Station 2.
Key:
N/A = not applicable

The three compressor stations will be constructed in six stages similar to, and in parallel with, the construction and installation of the Terminal stages. Each compressor stage consists of installing a 30,000 hp turbine compressor at each compressor station site, including all required auxiliary equipment. Compressor Station Stage 1 and Stage 2 construction will be conducted contemporaneously and in parallel to the construction and installation of Pipeline 1 and Terminal Stage 1/Train 1. Stage 3 construction of the compressor stations will be conducted and installed in parallel to the Stage 3/Train 3 of the Terminal. Stage 4 construction of the compressor stations will be conducted and installed in parallel to Stage 4/Train 4 of the Terminal and in parallel to the construction and installation of Pipeline 2. Stages 5 and 6 construction of the compressor stations will be conducted and installed in parallel to Stages 5 and 6/Trains 5 and 6 of the Terminal. See Table 1.2-4 for summary of the construction of the compressor stations in relation to the construction sequences of the Pipeline and Terminal.

Six mainline valves will be installed in conjunction with the construction and installation of Pipeline 1. An additional six valves will be installed in conjunction with the construction and installation of Pipeline 2.

The check meter site (at Compressor Station 1) and the custody transfer site (at Compressor Station 3) will be installed in conjunction with Stages 1 and 2 of the compressor stations and Pipeline 1, with a measurement capacity up to 2.25 Bcf/d or full capacity of Trains 1, 2, and 3 of the Terminal. The meter stations will be expanded in parallel to the construction and installation of Pipeline 2, Compressor Stations Stage 4, and Terminal Train 4, with a total capacity of 4.5 Bcf/d. The various interconnect meters will be installed on the Header System and/or other sites along the Pipeline ROW in conjunction with the other Pipeline System components. The number, the capacities, and dates of installation of the individual meter stations will be determined during the commercial negotiations with the various interconnecting parties.

The RG Developers anticipate that some or all of the pipeline interconnect companies may prefer separate aboveground facilities associated with their interconnection to be developed, permitted, owned, maintained, and operated by the interconnection pipelines. These facilities will be minimal and largely limited to valves and metering facilities. The RG Developers intend to provide separate aboveground facilities at each interconnection for the Pipeline System.

1.2.3.1 Pipeline Compressor Stations

The Pipeline System will include three compressor stations. At full build-out, each compressor station will have a maximum capacity of 180,000 hp achieved by the installation of six compressor units at each compressor station. Though the final footprint of the three compressor stations will be established during Pipeline 1 construction, the compressor units will only be installed as they are

needed to bring additional natural gas to each new Terminal LNG train, as described above in Section 1.2.3.

Table 1.2-3 identifies the associated infrastructure for each compressor station, and a detailed description of each compressor station is provided below.

Table 1.2-3: Compressor Station Components

Unique to Compressor Stations 1 and 2
Six Titan 250 Turbine Compressor Packages each containing a gas-fired turbine engine and a rotary gas compressor at full build
Unique to Compressor Station 3
Six Electric-Driven Solar Compressor Packages each containing an electric drive and a rotary gas compressor at full build
Typical Components Common to All Compressor Station Sites
Two compressor buildings
Gas after coolers
Power and control building
Office shop warehouse, including a kitchenette and bathroom
Fuel gas filter separator
Main gas unit suction scrubbers
SCADA system
Perimeter security fencing and gate access control
Video surveillance of the site and its perimeter
Parking areas
Essential service domestic gas generator sets
Site drainage

- Compressor Station 1: A natural gas, turbine-driven compressor station at MP 0.0 will be constructed on approximately 40 acres of leased land to raise the Pipeline System's operational pressure to about 1,350 psi. At full build, the compressor station will have a maximum capacity of 180,000 hp. The maximum capacity of Compressor Station 1 will be achieved with the installation of six 30,000 hp gas turbines in a staggered installation process as described above. Compressor Station 1 will receive the feed natural gas from the Pipeline System's Header System. See Section 1.2.2.2 for a full description of the Pipeline System's Header System. Table 1.2-3 identifies the components of Compressor Station 1.
- Compressor Station 2: A natural gas, turbine-driven, intermediate compressor station will be constructed at MP 66.1 on approximately 40 acres of leased land. At full build, the compressor station will have a maximum capacity of 180,000 hp. Similar to Compressor Station 1, Compressor Station 2 will achieve this maximum capacity by the installation of six 30,000 hp gas turbines in a

staggered installation process as described above. Compressor Station 2 will compensate for a decrease in the operational pressure along the Pipeline System and will increase the pressure back to about 1,350 psi. Table 1.2-3 identifies the components of Compressor Station 2.

- Compressor Station 3: Compressor Station 3 will be located on an approximately 27-acre parcel entirely within the Terminal's fence line, but is a component of the Pipeline System and is subject to Section 7 of the NGA. At full build, the compressor station will have a maximum capacity of 180,000 hp, achieved by the installation of six electric-driven compressors in a staggered installation process similar to that of Compressor Stations 1 and 2. Compressor Station 3 will increase the pressure back to about 1,200 psi. Table 1.2-3 identifies the components of Compressor Station 3.

Electricity for Compressor Stations 1 and 2 will be provided by local utilities; electricity for Compressor Station 3 will be provided by the Terminal.

See Figures 1.2-10 through 1.2-12 for typical drawings of plot plan and full buildout of Compressor Stations 1, 2 and 3, respectively.

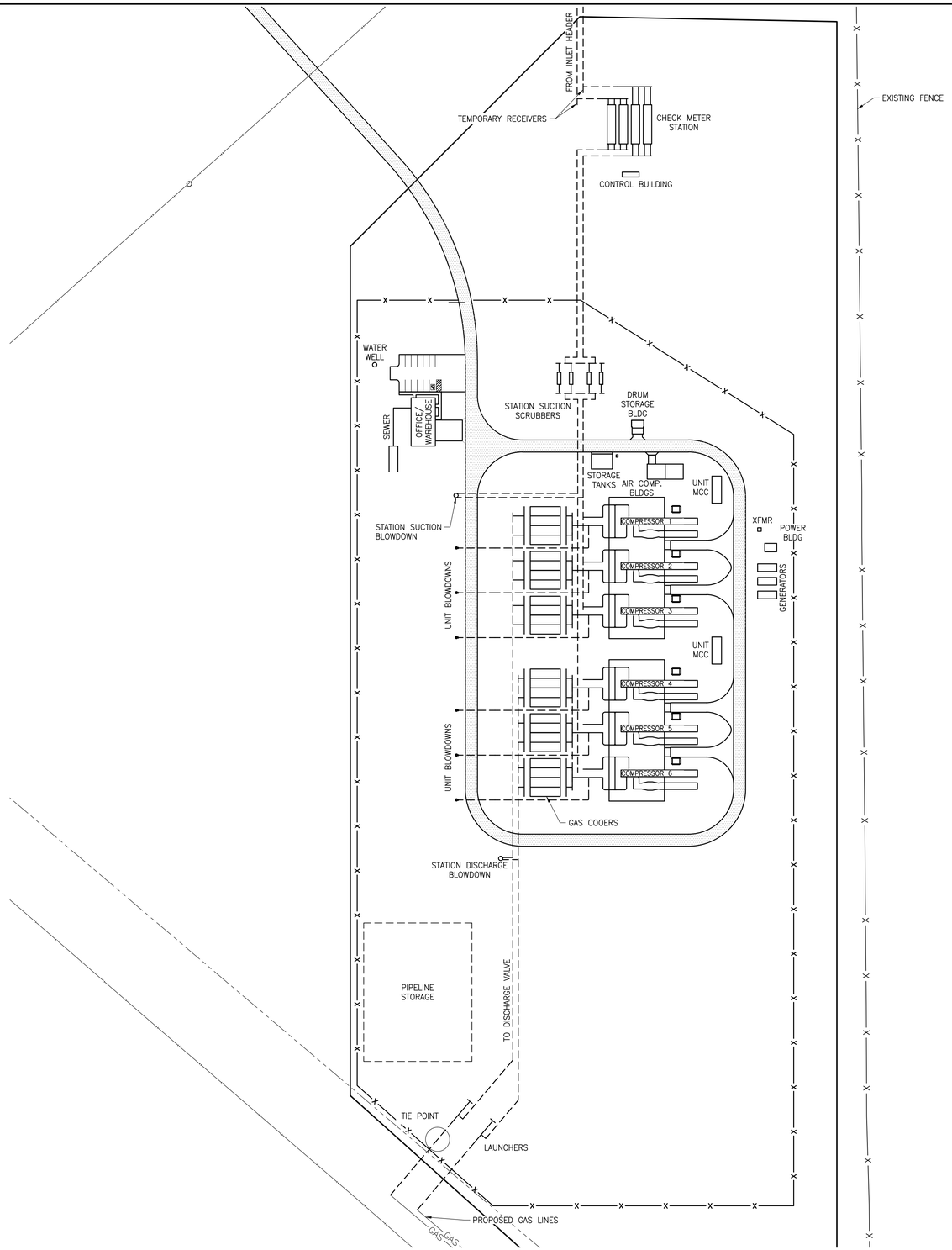
Table 1.2-4: Sequence of Construction for the Terminal, Pipeline, and Compressor Stations

Project Facility	Construction Sequence[1]						
Terminal Installation by Stage	Stage 1		Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Pipeline Installation (other than Compressor Stations)	Pipeline 1 Installed		No Activity	No Activity	Pipeline 2 Installed	No Activity	No Activity
Compressor 1 Build Out by Stage[2] (hp installed/total capacity)	Stage 1 (30,000/ 30,000)	Stage 2 (30,000/ 60,000)	No Activity	Stage 3 (30,000/ 90,000)	Stage 4 (30,000/ 120,000)	Stage 5 (30,000/ 150,000)	Stage 6 (30,000/ 180,000)
Compressor 2 Build Out by Stage[2] (hp installed/total capacity)	Stage 1 (30,000/ 30,000)	Stage 2 (30,000/ 60,000)	No Activity	Stage 3 (30,000/ 90,000)	Stage 4 (30,000/ 120,000)	Stage 5 (30,000/ 150,000)	Stage 6 (30,000/ 180,000)
Compressor 3 Build Out by Stage[2] (hp installed/total capacity)	Stage 1 (30,000/ 30,000)	Stage 2 (30,000/ 60,000)	No Activity	(30,000/ 90,000)	Stage 4 (30,000/ 120,000)	Stage 5 (30,000/ 150,000)	Stage 6 (30,000/ 180,000)

Notes:
[1] Stage refers to Terminal construction stages.
Key:
hp = horsepower

Figure 1.2-10: Plot Plan and Full Buildout fo Compressor Station 1

(Attached)



N

0 100 200 Feet

LEGEND:

ABOVE GRADE PIPING

BELOW GRADE PIPING

CONFIDENTIAL

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RIO BRAVO PIPELINE

PRELIMINARY

DATE: 11/12/15

– NOT FOR CONSTRUCTION –

REV	DESCRIPTION	CHK	DATE	APP	DATE
P2	PRELIMINARY			JRS	11/12/15
P1	PRELIMINARY			JRS	11/11/15

REVISION

DRAWN BY	ZBT	11/11/15
DESIGNED BY		
CHECKED BY		
APPROVED BY		
HGA JOB NO.	R15019	
PLOT SCALE	1:1	
MODEL ID		

HGA Engineering

www.hga-llc.com
Home Office: Ruston, LA
T: 318-255-6825

FIRM #: TX F-3808

RIO BRAVO PIPELINE PROJECT

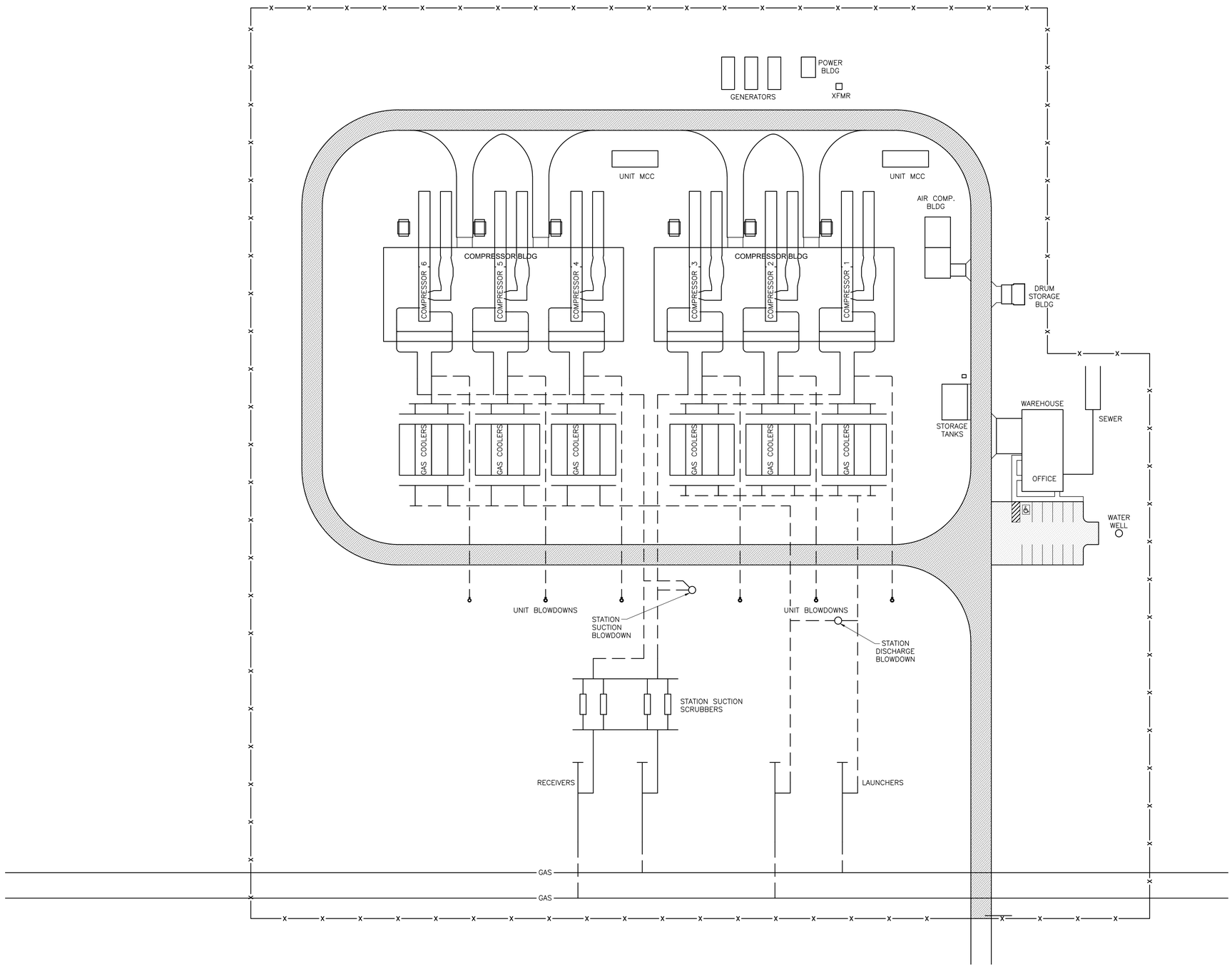
COMPRESSOR STATION 1
PLOT PLAN – FULL BUILD OUT

SCALE	DRAWING NUMBER	REV
1:100	R15019-1-SK-004	P2

11/12/2015 8:47:18 AM

Figure 1.2-11: Plot Plan and Full Buildout fo Compressor Station 2

(Attached)



RIO BRAVO PIPELINE

PRELIMINARY
DATE: 11/12/15
– NOT FOR CONSTRUCTION –

REV	DESCRIPTION	CHK	DATE	APP	DATE
P2	PRELIMINARY			JRS	11/12/15
P1	PRELIMINARY			JRS	11/11/15

REVISION

DRAWN BY	ZBT	11/11/15
DESIGNED BY		
CHECKED BY		
APPROVED BY		
HGA JOB NO.	R15019	
PLOT SCALE	1:1	
MODEL ID		

HGA Engineering
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T: 318-255-6825
FIRM #: TX F-3808

RIO BRAVO PIPELINE PROJECT

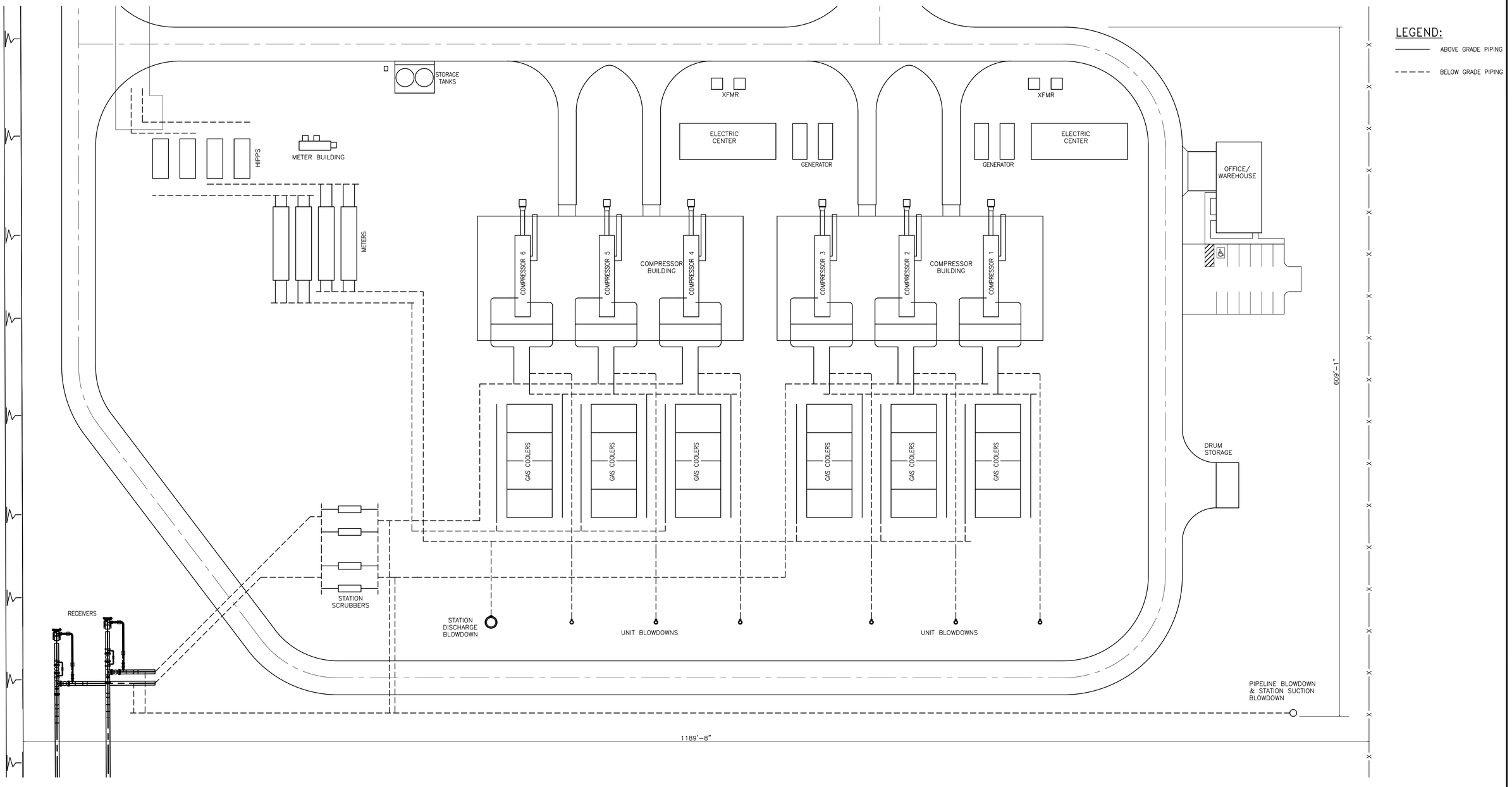
COMPRESSOR STATION 2
PLOT PLAN – FULL BUILD OUT

SCALE	DRAWING NUMBER	REV
1:50	R15019-2-SK-004	P2

11/12/2015 8:44:41 AM
ZBT, HGA

Figure 1.2-12: Plot Plan and Full Buildout fo Compressor Station 3

(Attached)



RIO BRAVO PIPELINE

PRELIMINARY
DATE: 11/11/15
– NOT FOR CONSTRUCTION –

REV	DESCRIPTION	CHK	DATE	APP	DATE
P1	PRELIMINARY			JRS	11/11/15

REVISION

DRAWN BY	ZBT	11/11/15
DESIGNED BY		
CHECKED BY		
APPROVED BY		
HGA JOB NO.		
PLOT SCALE	1:1	
MODEL ID		

HGA Engineering
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T: 318-255-6825
FIRM #: TX F-3808

RIO BRAVO PIPELINE PROJECT

COMPRESSOR STATION 3
PLOT PLAN – FULL BUILD OUT

SCALE	DRAWING NUMBER	REV
1"=40'-0"	R15019-3-SK-004	P1

11/11/2015 3:43 PM
ZBT_ZDS

Lighting

Outdoor lighting for all compressor stations will be limited to the minimum amount required for security during unmanned nighttime operation. The security systems will incorporate outdoor video cameras, and all building entry and exit doors will have lighting for security. These lights will have directional control, or they will be positioned in a downward direction to minimize their visibility for local residences and their effect on migratory birds, while maintaining Occupational Safety and Health Administration (OSHA) standards for lighting. The lighting for Compressor Station 3 will also incorporate the overall Terminal lighting philosophy. Additional discussion of the potential impacts to migratory birds from lighting is discussed Draft Resource Report 3, "Fish, Wildlife, and Vegetation," and the Terminal lighting philosophy is found in Draft Resource Report 13, "Engineering and Design Material," Appendix K.13.

Communication

All three compressor stations will be capable of remote operation from the RG LNG Control Room Building using a SCADA system. The SCADA system will allow for remote monitoring and process control. Gas quality, pressure, temperature, and volumetric flow rate will be monitored continuously using sensory equipment installed at various system locations, including any in-flow/out-flow direct interconnecting points along the Pipeline. However, in the event of abnormal compressor station shutdown, compressor station startup will be accomplished by onsite personnel; remote startup of the compressor station will not be possible.

Remote communications will be provided via SCADA system.

1.2.3.2 Metering and Regulating Stations

Based on the preliminary siting, there are four meter sites that house a total of six metering stations (two metering sites will contain two interconnects) along the Header System and two interconnect meter sites along the Pipeline ROW. The exact location, capacity, and installation schedule of the meter stations will be determined during commercial negotiations with the various interconnecting parties. Each meter station will have metering and flow control facilities, as well as any over pressure protection devices that may be required. Each meter station will have a communication package to allow remote operations via a SCADA system. Each meter station will have a connecting valve to the Header System or Pipeline 1 and/or Pipeline 2 and a valve to the interconnecting party's pipeline (the size of each valve is to be determined).

A check meter station will be sited at MP 0.0 within the limits of Compressor Station 1's fenced facility. The meter station will be installed in conjunction with construction Stages 1 and 2 of the compressor stations and Pipeline 1, with a measurement capacity up to 2.25 Bcf/d or full capacity of Trains 1, 2,

and 3 of the Terminal. The meter station will be expanded in parallel to the construction and installation Pipeline 2, Compressor Stations Stage 4, and Terminal Train 4, with a total capacity of 4.5 Bcf/d. This meter station will serve as a check measurement that will measure the total volume of feed gas from the various interconnects before entering the Pipeline System through the suction header of Compressor Station 1. This meter station will consist of a series of parallel 20-inch ultrasonic meter tubes and will have a communication package to allow for remote operations via a SCADA system.

The custody transfer meter station and regulating station will be sited at MP 137.3 within the limits of Compressor Station 3. It will be installed in conjunction with construction Stages 1 and 2 of the compressor stations and Pipeline 1, with a measurement capacity up to 2.25 Bcf/d or full capacity of Trains 1, 2, and 3 of the Terminal. The meter station will be expanded in parallel to the construction and installation Pipeline 2, Compressor Stations Stage 4, and Terminal Train 4, with a total capacity of 4.5 Bcf/d. The meter station will serve as the custody transfer metering point that will track the amount of feed natural gas delivered by the Pipeline System into the Terminal. This will, in essence, be the amount of natural gas entering the Pipeline System upstream interconnect via the Header System at Compressor Station 1, minus the necessary fuel natural gas used to run the Pipeline System's natural gas turbines that drive the booster compressors located at Compressor Stations 1 and 2. This meter station will consist of a series of parallel 20-inch ultrasonic meter tubes and will have a communication package to allow for remote operations via a SCADA system.

1.2.3.3 Launcher and Receiver Locations

A total of three pig launching and/or receiving locations will be installed as part of Pipeline System, as follows:

- Launcher Location 1: Two launchers will be sited at MP 0.0 within the limits of Compressor Station 1. These launchers will consist of two 42-inch launchers with actuated valves, one for each pipeline.
- Launcher/Receiver Location 2: This location will be sited at MP 66.1 within the limits of Compressor Station 2. The location will consist of two 42-inch receivers with actuated valves, and two 42-inch launchers with actuated valves. There will be one set of launchers/receivers for each pipeline.
- Receiver Location 3: Two receivers will be sited at MP 137.3 within the limits of Compressor Station 3 within the fence line of the Terminal site. These receivers will consist of two 42-inch receivers with actuated valves, one for each pipeline.

Construction of Pipeline 1 will include the installation of the first set of launcher/receiver sets, with the second set installed in conjunction with construction of Pipeline 2. All launchers and receivers will require manual, local operation.

1.2.3.4 Mainline Valves

A total of six mainline valve sites at approximately 20-mile intervals along the Pipeline System will be installed at the MPs indicated in Table 1.2-2. Each 0.13-acre valve setting will consist of two 42-inch valves (one for each pipeline) that will be situated entirely within the permanent ROW easement. Appropriate fencing will be installed surrounding the limits of the piping. The 0.13-acre operational footprint for each mainline valve setting will be established during Pipeline 1 construction, but the valves will be installed as needed for the Pipeline System. Construction of Pipeline 1 will include the installation of the first valve at each of the six mainline valve settings, with the second valve installed in conjunction with construction of Pipeline 2.

1.3 Land Requirements

1.3.1 Terminal Facility

1.3.1.1 Terminal Land Requirements

The Terminal site development requires approximately 774 acres of land along the north embankment of the BSC for the installation of the proposed layout comprising six liquefaction trains (with pre-treatment facilities), four LNG tanks, two marine jetties, and one turning basin. The remaining approximately 210 acres of land, one area outside the eastern boundary of the permanent fence line and one area outside of the western boundary of the permanent fence line, will be used as natural buffer during operation and offers potential restoration opportunities to provide offset for unavoidable wetland impacts at the Terminal.

The Terminal's current design includes approximately 774 acres of land that will be permanently converted for operation. A summary of the construction and operational land requirements for the Terminal components is provided and tabulated in Table 1.3-1.

Table 1.3-1: Land Requirements for the Terminal

Terminal Site	Acres
Property Boundary	984
Terminal Operational Boundary	774
Individual Components of the Terminal[1]	
Buildings Area	38
Permanent Parking Area	8
RB Pipeline Compressor Station 3	27
Electrical Switch-yard	8
Material Offloading Area (MOF)	15
Utility Easement	44
Ponds	19
West Wetland Restoration Area[2]	54
Channel on West side of Terminal	11
East Wetland Restoration Area	142
LNG Trains 1-6	117
Flare Area	43
BOG Area	10
Refrigerant and Condensate Storage	16
Truck Loading and Waiting Area	14
LNG Tank Area	48
Berth Area (including turning basin area within plant boundary)	66
Essential Diesel and Water Systems Area	9
Utility Area	10
Electrical Substations	5
Miscellaneous Plant Areas	279

Notes:
[1] The small discrepancy in totaling the Individual Components of the Terminal is due to rounding
[2] The approximately 210 acre natural buffer is comprised of The West Wetland Restoration Area, the Channel on the West Side of the Terminal and the East Wetland Restoration Area

The general usage of acreage by the Terminal master plan, as developed, is based on the following guidelines and considerations:

- The main liquefaction train layout follows the proven concept of the LNG industry, and the trains have been oriented with their main pipe-racks/air-cooler banks aligned with the prevailing wind directions. The footprint of each liquefaction train is approximately 830 feet x 1,020 feet;
- The main process flares will be ground flares, requiring an approximate 43-acre footprint. Ground flares have been selected to reduce visual impact. The ground flares will be approximately 6 feet

high and will be enclosed in an approximately 67-foot-high vertical wall for heat protection and to avoid visibility from outside the facility;

- The LNG tank and BOG vent will be located in the storage and loading area;
- The sequence of liquefaction trains and their supporting ground flares will allow for a smooth expansion process and minimum interconnecting line lengths;
- Safety distances are maintained between the main Terminal components and the perimeter fence. The Terminal is being designed to be and will be constructed in accordance with the siting requirements of 49 CFR 193, Subpart B and NFPA 59A (2001 edition), which the U.S. Department of Transportation (USDOT) incorporated within 49 CFR 193 on April 9, 2004;
- Full containment LNG tanks are spaced at one tank diameter distance and located at a relatively close distance to the two jetties to minimize the large-diameter LNG loading line lengths;
- Truck loading and unloading bays will be located in a clear open area and in proximity to relevant storage facilities to keep interconnecting lines short;
- Permanent buildings, such as offices, Central Control Building, and maintenance facilities, are located at the northeast side of the Terminal, well segregated from the liquefaction trains and storage/marine facilities to improve access logistics;
- LNG jetties are arranged parallel to the main ship channel in a dedicated berth pocket to allow for ease of docking operations and to avoid interference from passing vessels in the BSC;
- The LNG vessel turning area is clear of the LNG jetties to enhance the safety of the moored LNG vessels;
- The MOF along the BSC will be located on the far western extent of the Terminal site to be serviceable during the full build-out of the Terminal and to provide good access with connected laydown acreage north of the MOF;
- The design retains essential laydown areas within the Terminal site for expansion and future maintenance activities;
- Disturbance and use of the western extent of the site have been minimized to accommodate a planned (and permitted) widening of the Bahia Grande channel; and
- Disturbance will be minimized/avoided in land areas to the east and west of the permanent fence line (approximately 210 acres) to provide natural buffering and to provide opportunity for preservation and/or the development of wetland restoration.

1.3.1.2 Terminal Access

The Terminal will utilize three access points that will connect the Terminal facilities within the levee with State Highway 48, subject to Texas DOT approval. The main Terminal access is expected to be located towards the eastern portion of the Terminal site, in the proximity of truck (un)loading systems, and main offices and maintenance infrastructure. The westernmost access point will be used for access to the MOF, Compressor Station 3, and AEP's switch-yard. The centrally located access point will offer access to Terminal liquefaction trains and to the main laydown areas for Stages 1 and 3 of Terminal construction. The eastern access point will provide the primary access to general parking, temporary offices, LNG tanks 3 and 4, jetty 2 construction, and the temporary laydown areas for Stages 4 through 6 of Terminal construction.

Within the fence line of the Terminal, multiple haul roads will be constructed to provide internal access to the Terminal facilities. A haul road will also be constructed over the levee to connect the MOF to the Terminal facilities within the fence line.

Due to an anticipated increase in traffic on State Highway 48 as a result of construction and operation activities, RG LNG will evaluate the addition of exit lanes and/or traffic lights on State Highway 48 to safely regulate traffic during the construction and operation of the facilities. To address the potential impacts to the existing traffic on State Highway 48, RG LNG will undertake a formal traffic study to evaluate the potential magnitude of impacts and to identify measures that could be implemented to mitigate the potential impacts to existing traffic. The results of the planned traffic study will be presented in the FERC Application (anticipated for submittal in March 2016). Draft Resource Report 5, "Socioeconomics," provides a description of the anticipated number of vehicles and number of trips during the construction and operation of the facilities.

1.3.1.3 Temporary Offsite Facilities

During construction of the Terminal, the RG Developers will use two offsite locations for temporary storage. During Stages 1 through 4, the offsite storage areas will be approximately 10 acres of a 63-acre site at the Port of Brownsville and 4 acres at Port Isabel (Figure 1.3-1). These areas will be used for the temporary storage of cargo received by ship prior to dispatching it to the Terminal site.

During Stages 5 and 6, an additional temporary storage site of approximately 63 acres in the Port of Brownsville will be used for storage of equipment and materials. The additional 63 acres of storage in the Port of Brownsville will be used during construction when the area within the Terminal designated for Trains 5 and 6 can no longer be used for laydown, as during previous stages. The potential environmental or socioeconomic impacts resulting from the use of these two additional temporary

storage sites will be evaluated in the appropriate resource reports in the FERC Application (anticipated for March 2016).

Figure 1.3-1: Proposed Temporary Storage at the Port of Brownsville and Port Isabel

1.3.2 Pipeline Facilities

1.3.2.1 Pipeline Land Requirements

Land requirements for the Pipeline System facilities are summarized in Table 1.3-2 and discussed in subsequent sections. The Pipeline facilities will require the procurement of temporary (construction) ROW workspace, permanent (operational) easements, and any additional temporary workspace, and contractor/ pipe yards. The impacts due to the construction and operation of the Header System are discussed separately in Section 1.3.2.2 A detailed description of the vegetation affected by the Pipeline System is provided in Draft Resource Report 3, "Fish, Wildlife, and Vegetation." There will be approximately 1,675 acres of overlap between the land affected for Pipeline 1 and Pipeline 2 during Pipeline construction, with approximately 1,211 acres of the overlap comprised by the permanent ROW.

Table 1.3-2: Land Requirements for the Construction and Operation of Pipeline 1

Pipeline Component	Land Temporarily Affected during Construction (acres)[1]	Land Permanently Affected during Operations (acres)[2]	Total Disturbance for Pipeline 1 (Construction + Operation)
Pipeline 1 ROW	792.6	1,210.8	**2,003.40**
Additional Temporary Workspace[3]	58.1	0.0	**58.10**
Contractor(s) and Pipe Yards[4]	135.6	0.0	**135.60**
Compressor Stations 1 and 2[5]	36.4	40.9	**77.30**
Mainline Valves Sites[6]	0.0	0.8	**0.80**
Temporary Access Roads[7]	356.5	0.0	**356.50**
Permanent Access Roads[7,8]	0.0	23.6	**23.60**
Total[9]	**1,379.2**	**1,276.1**	**2,655.30**

Notes:
[1] Temporary impacts represent those areas of the relevant footprint that would only be disturbed during construction and would then be allowed to revert to pre-construction conditions when construction activities are completed.
[2] Permanent impacts represent those areas of the relevant footprint that would be affected during construction and retained during the operation of the Project.
[3] Additional temporary workspace is required only if it is determined that space within pipeline ROW is not sufficient.
[4] The RG Developers anticipate the need to identify additional contractor and pipe yards. These will be submitted as identified.
[5] Impacts due to Compressor Station 3 are accounted for in the impact calculations for the Terminal.
[6] Impacts due to mainline valve sites have been removed from the Pipeline ROW where overlap occurs.
[7] Impact calculations based on a 20-foot-wide road. Access roads are subject to modification based on field survey and ongoing landowner consultation
[8] Impacts due to permanent access roads have been removed from the Pipeline ROW where overlap occurs.
[9] Totals are estimates based on current design and are subject to revision in the final FERC application

Table 1.3-3: Land Requirements for the Construction and Operation of Stage 2

Pipeline Component	Land Affected during Construction (acres)[1]	Land Affected during Operations (acres)[2]	Total Disturbance for Pipeline 2 (Construction + Operation)
Pipeline 2 ROW	790.5	1,210.8	**2,001.3**
Additional Temporary Workspace[3]	57.7	0.0	**57.7**
Contractor(s) and Pipe Yards[4]	135.6	0.0	**135.6**
Compressor Stations 1 and 2[4]	40.9	0.0	**40.9**
Mainline Valves Sites[4]	0.8	0.0	**0.8**
Temporary Access Roads[4,5,6]	356.5	0.0	**356.5**
Permanent Access Roads[4,5,6]	23.6		**23.6**
Total[7]	**1,405.6**	**1,210.8**	**2,616.4**

Notes:
[1] Temporary impacts represent those areas of the relevant footprint that would only be disturbed during construction and would allowed to revert to pre-construction conditions when construction activities are completed.
[2] Permanent impacts represent those areas of the relevant footprint that would be retained during the operation of the Project.
[3] Additional temporary workspace is required only if it is determined space within pipeline ROW is not sufficient.
[4] The initial ground disturbance impacts to construct the contractor/pipe yards, Compressor Stations 1 and 2, mainline valve sites, and temporary and permanent access roads were documented in Pipeline 1 impacts. Pipeline 2 will use the same footprints for construction and the impacts due to the utilization of these Pipeline facilities and access roads have been categorized as temporary impacts for Pipeline 2 construction.
[5] Access roads are subject to modification based on field survey and ongoing landowner consultation
[6] Impacts due to permanent access roads have been removed from the Pipeline ROW where overlap occurs.
[7] Totals are estimates based on current design and are subject to revision in the final FERC application

Project construction will result in both temporary and permanent land disturbance. Following the construction of the Project, disturbed areas will be restored to their pre-construction contours and revegetated per the landowner and applicable agency's requests (see Section 1.5).

Appendix 1.B contains aerial image based alignment sheets for the Pipeline System. Figures 1.5-2 and 1.5-3, presented in Section 1.5, are typical ROW cross-sections.

1.3.2.2 Header System

Land requirements for the Header System are summarized in Table 1.3-4. The Header System will require the procurement of temporary (construction) ROW workspace, permanent (operational) easements for ROW and metering stations, additional temporary workspace, and a permanent access road. A detailed description of the vegetation affected by the Header System is provided in Draft Resource Report 3, "Fish, Wildlife, and Vegetation."

Table 1.3-4: Land Requirements for the Construction and Operation of the Header System

Header System Component	Land Affected during Construction (acres)[1]	Land Affected during Operations (acres)[2]	Total Disturbance for Header System (Construction + Operation)
Pipeline ROW	16.2	24.3	**40.5**
Additional Temporary Workspace	2.4	0.0	**2.4**
Meter Sites	0.0	6.3	**6.3**
Permanent Access Road	0.0	7.2	**7.2**
Total	**18.6**	**37.8**	**56.4**

1.3.2.3 Pipeline and Header System Access Roads

The Pipeline System will require the use of multiple temporary and permanent access roads. Temporary access roads (106 existing roads and three new roads) will be utilized during the construction phase of the Pipeline and will be restored to pre-construction conditions following completion of Pipeline construction, unless otherwise agreed upon by the land owner and approved by FERC. Permanent access roads will be properly maintained by the RG Developers for the life of the respective facilities. Nine permanent access roads will be constructed to access Compressor Stations 1 and 2, the six mainline valve sites, and the Header System. Access roads are summarized in Table 1.3-5, and a complete list of access roads, including land requirements, is provided in Appendix 1.I.

Table 1.3-5: Summary of Access Roads

County	Number of Temporary Access Roads	Number of Permanent Access Roads	Total Length (miles)
Jim Wells	0	2[1]	7.6
Kleberg	8	1[1]	33.5
Kenedy	27	3	37.0
Willacy	33	1	44.5
Cameron	41	2	41.9
Total	**109**	**9**	**164.5**

Notes:
[1] The permanent access roads to Compressor Station 1 and the Header System occur in Jim Wells and Kleberg counties. These access roads were only counted for Jim Wells County for Table 1.3-5

1.3.2.4 Pipeline System Contractor and Pipe Yards

Temporary contractor/pipe yard sites will be used during construction of the Pipeline System. These areas will be primarily utilized for siting, staging, and storage of equipment, pipe, and materials, as well as temporary field offices and pipe preparation/field assembly areas. Construction will require the

use of multiple sites. At this point in the development of the Pipeline System, one site has been identified. This site will be located on 135.6 acres of privately owned land in Willacy County approximately 8 miles to the west of MP 70.1. Further site selection of the contractor/pipe yards will continue throughout the planning and permitting phases of the Pipeline. All temporary contractor/pipe yard sites will be submitted to and approved by the FERC prior to their use during construction. Upon completion of Pipeline System construction, all areas utilized as contractor/pipe yards will be restored to preconstruction conditions, unless otherwise agreed upon by the land owner. The temporary contractor/pipe yards for the Pipeline are provided in Table 1.3-6, and a map of the contractor/pipe yard-1 is included in Appendix 1.A.

Table 1.3-6: Temporary Contractor/Pipe Yards for the Pipeline

Name	Approximate Milepost (MP)	County	Landcover Type	Size (acres)	Distance to Closest Point on Pipeline Centerline (miles)
Contractor/Pipe Yard-1	70.1	Willacy	Row Crops	135.6	8
Additional Contractor/Pipe Yards	TBD	TBD	TBD	TBD	TBD

1.3.2.5 Pipeline Additional Temporary Workspace

RB Pipeline anticipates the need for additional temporary workspace in addition to nominal construction ROW workspaces previously noted in Section 1.3.2. The additional temporary workspace may be required:

- To facilitate construction at road, railroad, wetland, waterbody, and third-party utility line crossings;
- To provide construction equipment and material storage;
- For equipment turnaround areas;
- At points of inflection, crossovers, and tie-in locations;
- For topsoil segregation and storage; and
- At hydrostatic test water withdrawal and discharge locations.

Appendix 1.J identifies additional temporary workspaces currently proposed for construction of Pipelines 1 and 2. Any additional workspaces identified during the ongoing design process will be submitted to the FERC as part of the FERC application (Anticipated submission March 2016). Identified additional temporary workspace locations are shown on the preliminary construction alignment sheets (Appendix 1.B). Except as otherwise required due to site-specific constraints, additional temporary workspace will be set back a minimum of 50 feet from the edges of wetlands and

waterbodies. Appendix 1.K includes a list of all additional temporary workspace requiring modifications from the FERC Wetland and Waterbody Construction and Mitigation Procedures and the associated site specific justification.

Header System

The construction of the Header System will require the use of additional temporary workspace due to the crossing of public and private roads and foreign pipelines, as well as for points of inflection. The proposed additional temporary workspace required for the Header System will result in the temporary impact of approximately 2.4 acres. All of the additional temporary workspaces along the Header System will be set back a minimum of 50 feet from the edges of wetlands and waterbodies. Appendix 1.K identifies all of the additional temporary workspace proposed for construction of the Header System.

1.3.2.6 Pipeline Aboveground Facilities

Land requirements for all aboveground facilities, including both construction and operation, associated with the Pipeline are summarized in the Table 1.3-7.

Table 1.3-7: Land Requirements for Aboveground Facilities

Facility ID	Approximate Milepost (MP)	County	Pipeline 1		Pipeline 2	
			Land Affected During Construction (acres)[1]	Land Affected During Operation (acres)[2]	Land Affected During Construction (acres)[1]	Land Affected During Operation (acres)[2]
Compressor Stations						
Compressor Station 1	0.0	Kleberg	13.4	23.7	23.7	0.0
Compressor Station 2	66.1	Kenedy	23.0	17.3	17.3	0.0
Compressor Station 3	137.3	Cameron	0.0[3]	0.0[3]	0.0[3]	0.0[3]
Pig Launcher and Receiver Locations						
Pig Launcher (2)	0.0	Kleberg	0.0[4]	0.0[4]	0.0[4]	0.0[4]
Pig Launcher and Receiver (2)	66.1	Kenedy	0.0[4]	0.0[4]	0.0[4]	0.0[4]
Pig Receiver (2)	137.0	Cameron	0.0[4]	0.0[4]	0.0[4]	0.0[4]
Metering and Regulating Station						
Header System						
Header System Metering Site 1[5]	HS-0.2	Kleberg	0.0	2.1	2.1	0.0
Header System Metering Site 2	HS-0.16	Kleberg	0.0	1.4	1.4	0.0
Header System Metering Site 3[6]	HS-0.78	Kleberg	0.0	1.4	1.4	0.0
Header System Metering Site 4	HS-2.7	Jim Wells	0.0	1.4	1.4	0.0
Compressor Stations						

Table 1.3-7: Land Requirements for Aboveground Facilities

Facility ID	Approximate Milepost (MP)	County	Pipeline 1		Pipeline 2	
			Land Affected During Construction (acres)[1]	Land Affected During Operation (acres)[2]	Land Affected During Construction (acres)[1]	Land Affected During Operation (acres)[2]
Metering Site 1[7]	0.0	Kleberg	0.0[7]	0.0[7]	0.0[7]	0.0[7]
Metering Site 2[8]	137.3	Cameron	0.0[7]	0.0[7]	0.0[7]	0.0[7]
Pipeline ROW Interconnects						
Metering Site 3	19.7	Kenedy	0.0	1.4	1.4	0.0
Metering Site 4	25.7	Kenedy	0.0	1.4	1.4	0.0
Mainline Valve Sites						
Mainline Valve Site 1	18.0	Kleberg	0.0	0.13[8]	0.13[8]	0.0
Mainline Valve Site 2	35.5	Kenedy	0.0	0.13[8]	0.13[8]	0.0
Mainline Valve Site 3	49.0	Kenedy	0.0	0.13[8]	0.138	0.0
Mainline Valve Site 4	85.0	Willacy	0.0	0.13[8]	0.13[8]	0.0
Mainline Valve Site 5	102.0	Cameron	0.0	0.13[8]	0.13[8]	0.0
Mainline Valve Site 6	121.0	Cameron	0.0	0.13[8]	0.13[8]	0.0
		Total	**36.4**	**50.9**	**50.9**	**0.0**

Note:
[1] Temporary impacts represent those areas of the relevant footprint that would only be disturbed during construction and would then be fully reclaimed when construction activities are completed.
[3] Impacts due to Compressor Station 3 are accounted for in the impact calculations for the Terminal; therefore, these impacts are not included in the total presented in the table.
[4] Pig launchers/receivers will be located within the operational footprint of the Compressor Stations.
[5] Header System Metering Site 1 contains 2 metering facilities (one per interconnect)
[6] Header System Metering Site 3 contains 2 metering facilities (one per interconnect)
[7] Metering Station 1 and 2 will be located within the operational footprint of the Compressor Stations 1and 3, respectively.
[8] The impact acreage of the mainline valve sites has been extracted from the Permanent ROW footprint

1.4 Construction Schedule and Employment

1.4.1 Terminal Schedule and Employment

Upon receipt of all necessary authorizations and permits, the RG Developers anticipate construction of the Terminal to begin in June of 2017, for an initial in-service date by the 4th Quarter of 2020 for the first liquefaction train, with subsequent trains consecutively coming online through 2024. While presenting the Terminal as a staged construction process, the RG Developers anticipate that construction at the Terminal site will be continuous, with a seamless transition between Terminal stages. Figures 1.2-3 and 1.2-4 depict the staged construction process of the Terminal and Figure 1.4-1 provides an overview of the construction schedule for the Terminal.

The RG Developers describe the Project construction as occurring in stages to contrast this with other LNG facility projects that are being developed in multiple phases. In contrast to some other projects that have sought multiple approvals for separate commercial phases of their projects, starting with an initial base project and adding subsequent expansions later, the RG Developers are proposing a single large project that (1) reflects its existing commercial aspirations and (2) is consistent with the National Environmental Policy Act's (NEPA) concern for cumulative impacts and the avoidance of artificially segmenting the project in a manner that understates anticipated impacts. While the RG Developers intend to develop the full Project, if the expected market demand for LNG from the Project does not materialize, any downward revision in the size of the Project would naturally fall along the lines created by the staged construction approach.

Figure 1.4-1: Terminal Construction Schedule

(Attached)

Next Decade - Rio Grande LNG Project

Document No. 195910-000-PC-PL-0002

Rio Grande 6 Train EPC Level 1 Schedule

Document Rev. and Date: Rev. F 16-Nov-15

CBI RIO GRANDE LNG

2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024

J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

Months from Approval: -6 -5 -4 -3 -2 -1 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92

MILESTONES

FERC Milestones

Key Project Milestones

RR1&10 · Draft · FEED Pkg · Final Application (RR1 to RR13) · EPC Contract Award · Final EIS · FERC Approval · ATS · FID · FNTP St 1 · FNTP Stage 2 · FNTP Stage 3 · FNTP Stage 4 · Permanent Power Available · FNTP Stage 5 · Feed Gas Available · FNTP Stage 6 · RLFC Stage 1 · SC Stage 1 · SC Stage 2 · SC Stage 3 · SC Stage 4 · SC Stage 5 · SC Stage 6

FEED

Front End Engineering Design (FEED) — Pre-Filing Phase | Post-Filing Phase

EPC Contract Development

Pre-Engineering

Prep of Long Lead Equip Purchases and Early Works S/C's

EPC

FERC Interface (continuous) — EPC

Detailed Engineering

Detailed Engineering (Single Effort ISBL all Stages) — Last Equip MRQ · 30% Model Reviews · 1st IFC Dwgs · 60% Model Reviews · 90% Model · Last Isometrics

Procurement

Refrigeration Compressors & Drivers (MR/PR) — Rel Stage 1 · VD · Rel Stage 2 · Rel Stage 3 · Rel Stage 4 · Delv St 1 · Rel Stage 5 · Delv St 2 · Rel Stage 6 · Delv St 3 · Delv St 4 · Delv St 5 · Delv St 6

Main Cryogenic Heat Exchangers (MCHE) — Rel St 1 · VD · Rel Stage 2 · Rel Trains 3 · Delv St 1 · Delv St 2 · Delv St 3 · Delv St 4 · Delv St 5 · Delv St 6

Air Cooler Exchangers (AFC) — Rel St 1 · VD · Rel Stage 2 · Rel Stage 3 · Delv St 1 · Delv St 2 · Delv St 3 · Delv St 4 · Delv St 5 · Delv St 6

Other Major Equipment — Rels St 1 Start · Last Equip Rel · Last Equip VD · Last Equip St 1&2 Delv · St 3 Last Delv · St 4 Last Delv · St 5 Last Delv · St 6 Last Delv

Structural Steel — St 1 Rel · St 1 Rack Delv · St 1 Last Delv · St 2 Last Delv · St 3 Last Delv · St 4 Last Delv · St 5 Last Delv · St 6 Last Delv

Piping, Valves & Fittings — St 1 Rel Bulk · St 1 1st Delv · St 1 Last Delv · St 2 Last Delv · St 3 Last Delv · St 4 Last Delv · St 5 Last Delv · St 6 Last Delv

Instruments — Rel St 1 ICSS · Last St 1&2 Delv · Stage 6 Last Delv

Electrical Equipment and Bulk Materials — St 1 Rels Equipment · Main S/S Bldg Delv · Last St 1&2 Delv · Stage 6 Last Delv

Construction

Stage 1 — Connections to Water, Sanitary

Site Earthwork Cut / Fill / Soil Stabilization — Start Site Prep · Tr 1 · Tr 2 · Tr 3 · Tr 4 · Tr 5 · Entire Site Complete

Levee Construction — Earthwork to 100 Yr Storm Elevation · Entire Levee Complete

Piling — Start Test Piling · Start Pipe Rack · Start TT

Construction Dock (MOF) — Start MOF

Permanent Marine Facilities (incl. Dredging) — Entire Dredging Complete

Berth Topsides - Jetty #1 — Jetty #1 MC

Utilities & Facilities Construction — Main S/S Bldg · Admin. & WH Bldg · Main Control Room MC

Train #1 — 1st Concrete · Start Steel · Start A/G Piping · Start AFC · Start MR/PR Erection · Start Loop Checks · Tr 1 MC

LNG Tanks #1 & #2 — 1st Concrete-Tanks · Tank 1 MC · Tank 2 MC

Mechanical Completion Stage 1 — Stage 1 MC

Stage 2 — Train #2 — Start Piling · Start Concrete · Stage 2 Construction & Pre-Commissioning · Stage 2 MC

Stage 3 — Train #3 — Start Piling · Start Concrete · Stage3 Construction & Pre-Commissioning · Stage 3 MC

Stage 4 — Utilities & Facilities Construction

Berth Substructure & Topsides - Jetty #2 — Jetty #2 MC

Train #4 — Start Piling · Start Concrete · Stage 4 Construction & Pre-Commissioning · Stage 4 MC

LNG Tank #3 — Start Concrete · Tank 3 MC

Stage 5 — Train #5 — Start Piling · Start Concrete · Stage5 Construction & Pre-Commissioning · Stage 5 MC

LNG Tank #4 — Start Concrete · Tank 5 MC

Stage 6 — Train #6 — Start Piling · Start Concrete · Stage 6 Construction & Pre-Commissioning · Stage 6 MC

Commissioning & Start-up

Commissioning — Temporary Power Available · Permanent Power Available · Utilities Commissioned · Stage 1 Feed Gas Available · Off-Plot Water & Sewage Commissioned

Start-up & Initial Operation to 1st Cargo — St 1 RFSU · St 2 RFSU · St 3 RFSU · St 4 RFSU · St 5 RFSU · St 6 RFSU

Performance Testing to Substantial Completion — St 1 RLFC · St 2 RLFC · St 3 RLFC · St 4 RLFC · St 5 RLFC · St 6 RLFC; St 1 SC · St 2 SC · St 3 SC · St 4 SC · St 5 SC · St 6 SC

Abbreviations:

AFC: Air Cooled Exchangers
ATS: Access To the Site
Delv: Delivery
EIS: Environmental Impact Study
EPC: Engineering (E), Procurement (P) & Construction (C)
FEED: Front End Engineering & Design
FERC: Federal Energy Regulatory Commission
FID: Final Investment Decision
FNTP: Full Notice to Proceed (+3 Months from EPC Contract Award)
ICSS: Integrated Control & Safety System
IFC: Issue For Construction
LLI: Long Lead Item
MC: Mechanical Completion / Pre-Commissioning Complete
MCHE: Main Cryogenic Heat Exchanger
MOF: Material Off-loading Facility
MRQ: Material Requisition for Inquiry
MR/PR: MR / PR Compressors & Drivers
PO: Purchase Order
REL: Release
RFSU: Ready For Start Up
RLFC: Ready to Load First Cargo
RR: FERC Resource Reports
SC: Substantial Completion
S/C: Subcontractor
St: Stage of Project - See RR1 Table for Stage Details
TT: Compressor Structure Table Top
VD: Critical Vendor Data Received (from Vendor)

The RG Developers have adopted a Terminal layout and infrastructure design that allows for continuous construction activities centered around the successive construction of the six liquefaction trains for the proposed Terminal, with necessary onsite ancillary facilities and pipeline capacity being added in stages with increases in liquefaction capacity as construction progresses. This approach will allow a portion of the Project to come online (subject to FERC approval) and start producing revenues while construction continues on the later stage facilities.

The start of each LNG train's construction would ideally occur between six to nine months after the previous LNG train's commenced construction. The relevant factors dictating the need for a staged expansion include:

- Limiting the peak labor force levels on the Terminal site to keep the regional socioeconomic impact within reasonable limits;
- Avoiding logistical bottlenecks (e.g., transportation and storage) and considering the supply limits of vendors delivering key equipment, such as compressors and heat exchangers;
- Avoiding unbalances between local and foreign labor, and allowing the opportunity for long-term construction work for local citizens;
- Reusing the same construction equipment and skilled labor pools for the successive construction of the six liquefaction trains, which will improve the cost effectiveness, quality, and safety of the Terminal's construction; and
- Timing the completion of facilities to commence service with growth in demand for LNG from the Terminal.

The construction schedule and staging plan have been developed and will be refined (subject to FERC approval) as necessary to take into account information on project design, the availability of onsite and offsite work spaces, the development of plans for construction worker and equipment transportation and mobilization, as well as FERC policies on the timing of project completion from the date of issuance of its approval of the Project and anticipated market demand. Construction delays and contingencies could also cause the stagger between individual stages to be shortened or lengthened.

The construction of the supporting utilities and overall infrastructure in the Terminal master plan is divided into multiple stages in order to efficiently manage the size of the proposed Terminal. Given that a facility with six liquefaction trains is a large project, RG LNG developed a staged construction schedule to avoid an excessive amount of pre-investment in supporting utilities and infrastructure that

may only be needed when later constructed trains come into operation. Such staged development applies to, among others, ground flare systems, jetties, and instrument air and nitrogen utilities.

Table 1.1-1 provides a descriptive breakdown of each stage of construction. As noted, individual stages may have greater or lesser overlap with prior and successive stages depending on a variety of factors.

The six to nine month staggered construction between liquefaction trains allows an optimal balance of construction resource requirements and constructability considerations while reducing risks of simultaneous construction and operation activities in the same area of the Terminal. This train construction stagger reduces the peak manpower and associated construction traffic offsite and onsite by the use of the undeveloped site areas as lay-down areas, thus containing activities within the Terminal area as far as practical.

The configuration of the site layout actually allows to a large extent the segregation of construction related traffic and construction work area's from already operational parts of the Terminal. With the proposed stagger between various trains, heavy construction activities will be largely complete when adjacent Trains sections of the Terminal start the commissioning process (or are in operations).

Even if the stagger in timing changes a little, spacing between adjacent trains does allows the construction of a new train next to a fully operational train, taking into account normal measures like temporary fencing, extra gas detection, specific operational security protocols and stop-work procedures in place.

The RG Developers have raised the full amount of capital that is expected to be required to complete permitting of the Project and fully intend to build-out the entire Project in order to take advantage of economies of scale. However, as is true for any project of this size, the full build-out of the Project is dependent on attracting sufficient capital to complete construction. Until the Final Investment Decision is made, the possibility of scaling back the Project will exist. Should market demand judge that not all of the Project's proposed capacity is required, the RG Developers would seek to adjust their master plan accordingly and postpone (or cancel) some of the project elements, such as one or more liquefaction trains, possibly some LNG storage capacity and the associated supporting utilities and infrastructure. The RG Developers would also consider building one instead of the two natural gas supply pipelines currently proposed by RB Pipeline, which can be decided at an earlier or later time in the staged construction of the Project.

The RG Developers are already involved in serious discussions with potential off-takers for a majority of the full proposed capacity of the Project and expect to proceed with the Project as proposed. Next

Decade, the parent company of the RG Developers, has signed Heads of Agreements totaling 14 MTPA for the sale and purchase of LNG for the RG LNG Facility. The RG Developers are taking a long-term view of LNG markets and do not have alternative lines of business to which it might divert its available capital. As such, the proposed Project is less susceptible to changes in current market conditions than LNG export projects being pursued by other developers having alternative lines of business. In light of the RG Developers' commercial plans, they concluded that it was appropriate to seek permitting for the entire Project in the form of one continuous construction process, albeit with the practical reality that any project this size will be constructed with sequential elements. This will allow FERC and other agencies to review the full potential impact of the proposed Project and better evaluate cumulative impacts in accordance with the intent of the NEPA.

During Terminal construction, an average of approximately 3,000 personnel will be employed (working in shifts) at any point in time, with peak employment potentially reaching up to 5,100 personnel at or near the direct job site for limited periods. It is estimated that approximately 30% of the workforce will be recruited locally. The civil and structural skilled workers will be available from the local area. In some cases, skilled local workers that have traveled to work outside of the area will be able to return to the area to work at the Terminal. Less skilled workers will be utilized as laborers and helpers and will learn on the job. In consideration of the length of the schedule, unskilled workers recruited early in the schedule could become semi-skilled or skilled workers by the end of the Terminal's construction. The workforce recruiting program will give preference to the residents of the local community.

RG LNG will conduct environmental, safety, and specialized training for all construction personnel during onsite project training sessions. This training will consist of a minimum of general awareness training to ensure the proper field implementation of the Project-Specific Plan and Procedures (Appendix 1.L), regulatory conditions, and other mitigation measures.

1.4.2 Pipeline Schedule and Employment

The Pipeline System will be constructed in a staggered process timed so as to ensure that Pipeline 1 construction is completed by the time Stage 1 of the Terminal construction process is completed, and Pipeline 2 construction is completed by the time Stage 4 of the Terminal construction is completed. Figure 1.4-2 provides an overview of the construction schedule for the Pipeline System. The compression capacity of each compressor station will be incrementally increased as necessary to raise the Pipeline throughput capacity to match Terminal natural gas liquefaction capacity coming on in six stages. The three compressor stations will be constructed in six stages similar and in parallel to the construction and installation of the Terminal stages. Compressor Station Stage 1 and Stage 2 construction will be conducted contemporaneously and in parallel to the construction and installation

of Pipeline 1 and Terminal Stage 1/Train 1. Stage 3 of the compressor stations will be constructed and installed in parallel to the Stage 3/Train 3 of the Terminal. Stage 4 of the compressor stations will be constructed and installed in parallel to Stage 4/Train 4 of the Terminal and in parallel to the construction and installation of Pipeline 2. Stages 5 and 6 of the compressor stations will be constructed and installed in parallel to Stages 5 and 6/Trains 5 and 6 of the Terminal.

Figure 1.4-2: Pipeline System Construction Schedule

(Attached)

Rio Bravo Pipeline Proposed Project Schedule

Document Date:

Nov. 12, 2015

	2015				2016				2017				2018				2019				2020				2021				2022				2023				2024			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
	From Train 1 In-Service			-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
MILESTONES																																						
Key Project Milestones																					TR 1 IS			TR 2 IS				TR 3 IS		TR 4 IS				TR 5 IS			TR 6 S	
FEED																																						
Pipeline Front End Engineering Design (FEED)			Pre-Filing Phase																																			
Compressor Facilities Front End Engineering Design (FEED)			Pre-Filing Phase																																			
EPC																																						
Detailed Engineering																																						
Compressor & Metering Facilities									Stage 1 & 2												3S	4S	3E	5S	4E	6S		5E		6E									
Pipeline Facilities											Pipeline 1										Pipeline 2																		
Procurement																																						
Compressor Facilities																																						
Compressors									Stage 1 & 2												3S	4S	3E	5S	4E	6S		5E		6E									
Gas Coolers										Stage 1 & 2													Stage 3		Stage 4			Stage 5		Stage 6									
Other Major Equipment										Stage 1 & 2													Stage 3		Stage 4			Stage 5		Stage 6									
Piping, Valves & Fittings											Stage 1 & 2												Stage 3		Stage 4			Stage 5		Stage 6									
Metering Facilities																																						
Ultrasonic Meters											PL 1 Meters												PL 2 Meters																
Flow Controls/OPP											PL 1 Meters												PL 2 Meters																
Valves and Fittings											PL1 Meters												PL 2 Meters																
Pipeline Facilities																																						
Mainline Pipe											Pipeline 1												Pipeline 2																
Large Diameter Valves											Pipeline 1												Pipeline 2																
Launcher/Recievers											Pipeline 1												Pipeline 2																
Small Diameter Valves and Fittings											Pipeline 1												Pipeline 2																
Construction																																						
Compressor Facilities																																						
Stage 1 Compressors																	Stage 1																						
Stage 2 Compressors																	Stage 2																						
Stage 3 Compressors																									Stage 3														
Stage 4 Compressors																											Stage 4												
Stage 5 Compressors																															Stage 5								
Stage 6 Compressors																																	Stage 6						
Metering Facilities																			PL 1 Meters												PL 2 Meters								
Pipeline Facilities																			Pipeline 1												Pipeline 2								

Abbreviations:
TR: Train
IS: In-Service
S: Stage Start
E: Stage End
PL: Pipeline

During Pipeline 1 construction, RB Pipeline estimates an average of approximately 1,000 personnel to be employed at any point in time, with peak employment reaching up to some 1,500 personnel at or near the direct job site. The estimate of construction personnel for Pipeline 1 includes those for Stage 1 and 2 of construction of Compressor Stations 1, 2, and 3. In order to increase the capacity at each of the compressor stations during each subsequent Stage (i.e., 3, 4, 5, and 6 [Table 1.2-4]), RB Pipeline will utilize an average of 60 personnel at any point in time, with a peak employment near 100 personnel during each stage of construction of the compressor stations.

RB Pipeline will conduct environmental, safety, and specialized training for all construction personnel during onsite project orientation sessions. Specific to environmental aspects of the Pipeline System, training modules will be developed to address sensitive resources (environmental and archaeological) that occur along the Pipeline System to ensure the proper field implementation of best management practices (BMPs), which include, but are not limited to:

- Hazardous material handling;
- Erosion and sedimentation controls; and
- Specialized construction techniques, among others, and to define the limits of disturbance.

As appropriate, training will also address specific regulatory conditions specified in permits and other mitigation measures proposed by the RB Pipeline. Pursuant to the Pipeline System being placed in service, the RB Pipeline will follow an Operation and Maintenance Plan, which will include copies of all pertinent permits, with particular reference to long-term permit conditions that require training.

Pipelines 1 and 2 will each be constructed using two construction spreads. Construction Spread 1 will extend from Compressor Station 1 at MP 0.0 to Compressor Station 2 at MP 66.1. Construction Spread 2 will extend from Compressor Station 2 to Compressor Station 3 at MP 137.3. During Pipeline 1 construction and Pipeline 2 construction, the two construction spreads will be constructed simultaneously.

The duration for the construction Pipeline 1 is expected to be approximately 12 months (Figure 1.4-2), with the construction of the compressor stations being the longer lead item. Mainline construction typically proceeding at a pace of 15 to 20 constructed miles per month, with construction expected to take 12 months. Simultaneous construction of each of the three compressor stations is expected to take approximately 12 months. Currently, the Pipeline System is scheduled to start construction the first half of 2019, approximately two years after the start of construction of the Terminal.

Pipeline 2 construction, beginning with any additional clearing and preparation of construction ROW, will commence approximately 18 months following complete installation and restoration associated with Pipeline 1 construction. The anticipated construction sequence and duration of Pipeline 2 installation is identical to that of the Pipeline 1 noted above.

The Header System will be constructed in conjunction with Construction Spread 1 of Pipeline 1.

1.5 Construction Procedures

1.5.1 Terminal Construction Procedures

Except where otherwise authorized, the Terminal facilities will be designed and constructed in accordance with all applicable federal, state, and local regulations, permits, and industry-recognized standards. Applicable federal regulations include 49 CFR 193, Liquefied Natural Gas Facilities: Federal Safety Standards; 49 CFR 192, Transportation of Natural Gas and other Gas by Pipeline: Minimum Federal Safety Standards; and 18 CFR 2.69, Guidance. See Draft Resource Report 13, "Engineering and Design Material," Appendix D for a complete list of regulations, codes, and standards applicable to the Terminal.

The National Center for Construction Education and Research (NCCER) system will be used at the Terminal site to train workers. NCCER is a not-for-profit educational foundation created in 1996 and provides standardized construction and maintenance curriculum and assessments with portable credentials. These credentials are tracked through NCCER's registry that allows organizations and companies to verify the qualifications of their craft professionals and/or check the qualifications of possible new hires. NCCER's registry also assists craft professionals by maintaining their records in a secure database.

At the Terminal site, the Engineering, Procurement, and Construction contractor will supply and administer:

- An accredited training program (based on uniform standards and criteria);
- Qualified trainers;
- NCCER accredited certifications;
- Instruction for all major categories of craft;
- Prescribed craft curriculum; and
- Certificates for passing the course.

1.5.1.1 Temporary Facilities

Temporary facilities will be installed to support the construction activities onsite. These facilities will be established when the site preparation activities are completed in the relevant areas.

Offices

Factory built offices will be moved to the Terminal site to provide a work place for the RG Developer's onsite representatives and contractor's project management and construction management teams, and will be located on the Terminal site in a construction management team complex near the permanent Terminal buildings.

All normally occupied (permanent) buildings, including medical, warehouse, maintenance, equipment, and induction/training facilities, will be located at a safe distance from the liquefaction Trains. Any temporary office or workshop buildings used for construction will be relocated to distances greater than 600 feet to the west of new Terminal stages before a new stage is started up with introduction of natural gas.

All temporary buildings will comply with the Cameron County, state, and federal building code requirements for design and installation. The floors of normally occupied buildings will be elevated in accordance with flood plain requirements, and buildings will be anchored to resist wind loads.

Satellite construction office locations for each liquefaction train and in the LNG tank/jetty area will be positioned adjacent to the work area. Each location will consist of a satellite office building, satellite warehouse, satellite tool room, and air conditioned lunch tent, as well as air conditioned toilet facilities.

Medical Facilities

Trained emergency response individuals will be incorporated into the workforce and have access to first aid kits. These "first aiders" will be supported by additional medical support personnel located at the medical center, which will be located in the main construction management complex.

The medical center will consist of a reception and waiting area, offices, examination rooms, observation area, secure medical storage, ambulance shelter, and toilets. If an air ambulance service is required, an area adjacent to the medical center will be reserved and kept clear of obstructions that could interfere with helicopter operations.

Training Facility

A training center will be located in the site office complex. The building will contain facilities for training and offering potential skill upgrades to employees throughout the duration of construction, pre-commissioning, and commissioning.

In addition to individual offices, cubicles, a break room, and toilets, the building will contain a reception area, waiting area, and various sized rooms that may be subdivided based on the size of the group or groups.

Lunch Facilities

Well-ventilated lunch tents will be provided in each area for the use of the workforce. Maintenance crews will keep the lunch area tidy and clean. Half of one 60-foot x 120-foot construction team office will consist of a 'great room' without offices or internal walls. Tables and chairs will be provided for lunch and other break periods, safety meetings, and similar gatherings. This common area will further encourage and provide additional opportunity for communications between all Project parties (i.e., RG Developer, Construction Contractor Joint Venture, and subcontractor representatives as well as other management, construction, commissioning and support personnel).

Temporary Security Fence

A temporary fence will be installed during early site work. Temporary fencing and gates will be utilized at entrance gates in conjunction with secondary construction gate offices. Temporary fencing will be installed between sections of permanent fence where installation operations have been suspended. Temporary security fences may also be installed at various locations within the exterior security fence to protect assets and control the movement of personnel on an as-needed basis. Assets requiring protection may include, but are not limited to, office and warehouse buildings, material laydown areas, bus discharge areas, and employee parking lots. Those areas requiring security fencing to protect or control personnel access may include the induction and training center, energized electrical equipment, and restricted areas, such as parts of the plant undergoing commissioning activities or placed in service.

Offsite laydown areas, employee parking lots, and work areas will be reviewed, with temporary fencing installed on an as-needed basis.

Parking and Workforce Transportation

Site access for construction personnel will be via State Highway 48. A traffic study will be conducted to identify, quantify, and recommend mitigation for any vehicular traffic impact to State of Texas roadways related to the Project. The results of the planned traffic study will be presented in the FERC

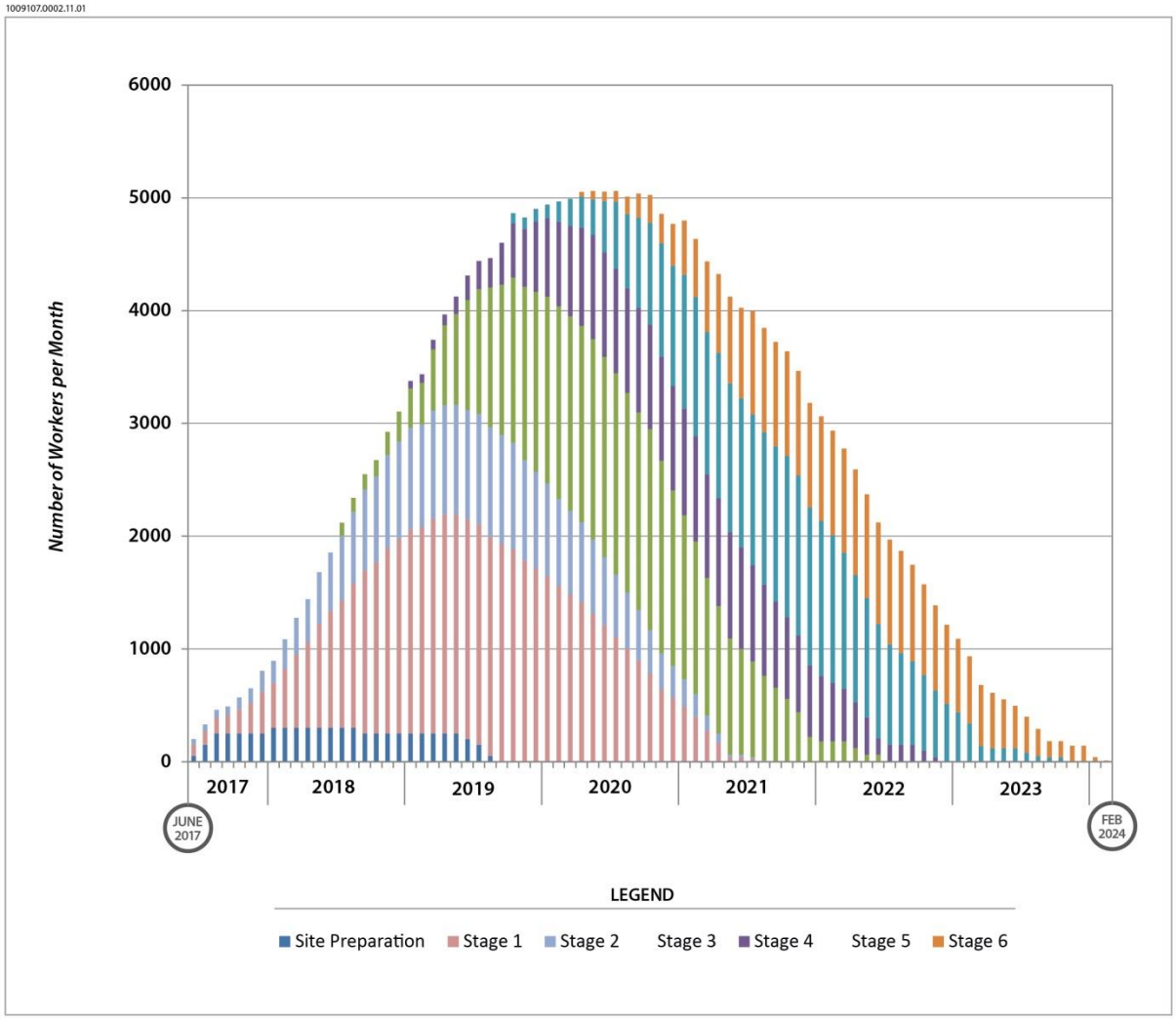
Application (anticipated for submittal in March 2016). This survey will determine the level of vehicular traffic impact and formulate the required mitigation measures, such as limiting the number of personal vehicles that can be parked at the Terminal site, use of offsite parking areas, intersection improvements and traffic signals, additional through-lanes and turning lanes, signs, and the use of off-duty officers to provide intersection control.

Peak traffic hours will be between 6:00 a.m. to 7:00 a.m. and 5:30 p.m. to 6:30 p.m., Monday through Friday. Depending on the results of the traffic survey, a substantial number of workers may need to be either transported by bus from park-and-ride type parking facilities or by buses that will run during mornings and evenings along main routes between the Brownsville/Harlingen and Port Isabel/South Padre Island areas and the job site.

Accommodation

A housing and accommodation survey of the Brownsville area was conducted to determine the amount of extra outside labor that can be accommodated when supplementing the locally available labor pool to support the construction program. The findings showed that the locally available housing will be sufficient to accommodate the workforce. Periodic surveys will be conducted during the course of the schedule to maintain an understanding of any fluctuations in locally available housing, so plans can be implemented to mitigate any significant reductions in the amount of locally available housing. See Draft Resource Report 5, "Socioeconomics," for a detailed description of the existing housing resources and the impacts the construction and operation of the Terminal may have on housing resources. The workforce build-up for the six potential trains is illustrated on Figure 1.5-1. This figure is based on a slightly shorter construction time line than indicated in Figure 1.4-1 in order to be conservative with respect to the rate of worker ramp up and down. If site preparation is able to commence in May of 2017 as indicated in Figure 1.4-1, the beginning of the curve would likely simply shift forward in time, and the number of workers present at any given time prior to the final months of construction may be reduced by a negligible amount. If work is completed in May of 2024 as shown on Figure 1.4-1, rather than February 2024 as shown in Figure 1.5-1, the most likely scenario would be a stretching of the right hand portion of the curve (*i.e.,* the curve would reflect a small number of workers on site for a longer period at the conclusion of construction to attend to punch list items or other completion details).

Figure 1.5-1: Workforce Histogram for the Terminal from Initial Site Preparation through Commissioning and Start-Up of the Six LNG Trains



Construction Utilities

Water will be delivered by trucks from an available supply from the local municipal water districts until the permanent water line from the Port of Brownsville becomes available. The majority of power will be provided by the local transmission system operator, as described in Sections 1.2.1.3 and 1.11.3 In addition, diesel-driven generators will be provided in cases where cable hook-up is not suitable, cable supply proves to have insufficient capacity, or prior to temporary cable supply becoming available.

Warehousing and Storage

A main onsite warehouse and satellite warehouses will be provided for the proper storage of construction materials. A material receiving office will be located within the material warehouse area. The building will include individual offices and cubicles for material management team members, a secure document storage room, a break room, and toilet facilities. Authorized deliveries of permanent materials will be directed by the security office to the permanent material receiving office. Permanent Terminal materials will be received, inventoried, secured, and made available for collection by the material management team.

Communication

Data and voice communications will be supplied through connections available from local suppliers and will connect to a specially fabricated communications cabin, which will, in turn, support the distribution to the various offices and facilities through hard-wired connections, fiber optic cabling, and wireless services, as required.

1.5.1.2 Material Off-loading Facility (MOF)

The MOF structure will be a steel sheet pile bulkhead system with a pile-supported relieving platform behind it. The steel sheet piles will be driven in the water with vibratory hammers that reduce noise attenuation in the water and air, as compared to impact hammers. In the event the sheet piles reach refusal with the vibratory hammer, an impact hammer will be used for a portion of the driving. Barge mooring piles will be either steel pipe piles or pre-cast concrete piles, and they will be installed with an impact hammer. For any piles that must be driven with an impact hammer in the water, mitigation measures for noise attenuation will be agreed upon with the appropriate agencies.

1.5.1.3 Clearing and Grading

The Terminal site will be cleared of vegetation, graded, and compacted, as necessary, to create level surfaces for the movement of construction vehicles to prepare the Terminal site for construction. Appropriate erosion and sediment controls will be installed around disturbed areas prior to the start of Terminal construction in conformance with the Project-Specific Plan and Procedures (Appendix 1.L) to minimize the potential for erosion and/or impacts on onsite and offsite wetlands and waterbodies and to remain in compliance with all permits.

Initial site grading and compaction activities will focus on initial acreage needed for the schedule critical path areas of the first trains and LNG tanks. Early construction activities may need to include soils improvements or pile installation, for the main construction elements, such as tanks and major equipment and rack foundations. The facility will be protected by a suitable storm surge levee constructed from earth levee structures.

Once the initial acreage has been made accessible for subsequent construction activities, the grading and platforming of the development stages and laydown areas will be executed so that additional general fill material may be transported onto the job site. The amount of general fill material to be transported onto the job site is currently estimated to be 4.5 million cubic yards.

1.5.1.4 Site Preparation

The Terminal site has been previously utilized to deposit dredged material from the original excavation of the BSC, and the RG Developers have performed geotechnical surveys throughout the site in order to determine the structural integrity of the underlying geology. The outcome of these studies allowed the RG Developers to determine the best approach for construction excavation techniques and any additional ground improvement techniques that may be necessary.

The presence of a capable sandy soils layer at modest depths of below 45 and 55 feet below grade, in combination with medium stiff sandy clays on the Terminal site, make it possible to construct most foundations on shallow (raft) foundations placed over shallow and/or deep soils improved subbase materials, instead of needing to deploy extensive foundation piles (formed in-ground or driven). Particularly heavy structures with modest footprints and the waterfront structures will still use (driven) foundation piles, but the numbers are modest and, thus, the duration for pile-driving will not be excessive.

As part of the site preparation with cut and fill operations, selective parts of the Terminal site, which are now well below the target final grade level, will be filled with additional general soils fill. Where needed, some over-height will be temporarily placed to pre-consolidate the subsoils sufficiently before deploying further soils improvement techniques followed by the actual foundation construction.

In Draft Resource Report 6, "Geological Resources," and Draft Resource Report 13, "LNG Engineering and Design Material," more details of the proposed foundation concepts are presented, and further details inclusive of method of spoils improvement confirmation and base designs will be included in the FERC Application (anticipated for submittal in March 2016).

1.5.1.5 Concrete Batch Plants

An onsite batch plant is planned to be located on the west end of the plot plan, outside of the levee, with easy access to the MOF. Approximately 170,000 tons of cement, 336,000 tons of sand, and 504,000 tons of crushed rock will be used for the concrete on the Terminal site. The onsite location is advantageous to keep the concrete trucks off of the public roads while also allowing for the receipt of some of the concrete components by barge.

High-quality sand for producing concrete is available at Port of Victoria and will be transported by barge for use at the batch plant. RG Developers estimate that up to 200 barge loads will be transported to the Terminal site over five to six years.

Coarse aggregate (stone) is currently proposed to be quarried at Mission, Texas, and trucked to the site. The stone from Mission is a river run gravel suitable for use as a coarse aggregate. The location of Mission is inland, with no possibility to utilize barge delivery to the Terminal site. Approximately 18,000 truckloads of rock will be transported over a four-year period, at an average rate of 17 truckloads per day and a peak of 50 truckloads per day.

The RG Developers anticipate approximately 27 million gallons of water will be used by the onsite batch plant. Water for the batch plant will be trucked in during the first 12 months of construction and then supplied by the onsite municipal water source interconnect for the remainder of construction. For the first 12 months, RG LNG expects up to five trucks per day to support the operation of the batch plant.

1.5.1.6 Laydown Areas

There is sufficient area onsite to provide for the laydown and temporary storage of equipment and materials for Stages 1 through 4. Additional offsite storage (63 acres) at an area within the Port of Brownsville (Figure 1.3-1) will be used for LNG Trains 5 and 6.

During Stages 1 through 4, a 10-acre area will be used within the Port of Brownsville to temporarily store equipment prior to moving it to the Terminal site. If required, these areas can be used to perform preassembly work. The potential environmental or socioeconomic impacts resulting from the use of these two additional temporary storage sites will be evaluated in the appropriate resource reports in the FERC Application (anticipated for March 2016).

Materials and equipment received onsite will be placed in storage and protected from theft, weather, and damage, as required. Adequate protection will be provided, consisting of proper ventilation, dunnage, purges, heaters, rust preventatives, etc. The site material manager will determine the storage requirements for all materials and equipment using a matrix that lists all of the various categories of material to be received. The specific details in this matrix are based on manufactures' recommendations and learned experience, and will ensure the safe and proper storage of permanent plant materials and equipment. The storage requirements range from open outdoor 'laydown' storage to closed humidity and climate controlled storage.

The construction schedule will be based on a timely completion of main equipment foundations, and the delivery schedule of main equipment will be tuned such that main equipment is received and dressed with insulation and platforms before being placed on its designated foundations.

'Future' facility as well as 'construction laydown area' locations will afford material placements in proximity to the work area. As an example, LNG tank materials may be staged at Future Tank 3 and Tank 4 designated areas, while the dedicated areas for LNG Trains 4, 5, and 6 may also initially serve as laydown in the early days of constructing Stage 1 of the Terminal.

1.5.1.7 Marine Work

The Berth 1 Jetty structure is planned to be constructed prior to conducting the dredging of the berth pocket. This will allow for a completely land based approach to all pile-driving activities associated with this Stage 1 activity.

The Berth 2 Jetty structure is planned as part of Stage 4 construction after the berth pocket is dredged; therefore, this jetty will be constructed with marine equipment and will involve in-water pile-driving activities. The number and type of piles will be determined during the detailed design of the marine facility structures, but it is anticipated that the piles will be either steel pipe piles or pre-cast concrete piles and will be driven with impact hammers. Mitigation measures for noise attenuation in the water will be evaluated for in-water pile installation activities based on consultation with regulatory agencies.

1.5.1.8 Piling

In the event piling is required, foundation installation will commence. Provisions will be in place to ensure that prerequisite deliverables (FERC approved released for construction drawings and required materials), as well as equipment and manpower resources, are available to provide continuity for these tasks.

1.5.1.9 Foundations

As platforming, soils pre-consolidation, shallow and deep soils improvements, and pile-driving progress, foundation installation will commence. Provisions will be in place to ensure that prerequisite deliverables (FERC approved released for construction drawings and required materials), as well as equipment and manpower resources, are available to provide continuity for these tasks.

The equipment foundations will be completed, where possible, to match the scheduled delivery of the equipment and to minimize double handling and storage.

Reinforced steel will be cut and bent to the required shape by a fabrication facility and delivered to the site. Anchor bolts and imbedded items will be provided by a fabricator and delivered to the site for installation. Patent formwork will be used to minimize the amount of onsite form fabrication and simplify installation.

1.5.1.10 Underground Piping

Installation of major underground common piping systems will follow the path of completion of the site preparations. Underground piping within the process and utility areas will be installed in accordance with the path of construction and in conjunction with the foundation work. Piping will be tested and any necessary coating will be applied prior to backfilling.

1.5.1.11 Underground Cabling and Services

Underground cabling includes all underground electrical, instrumentation, and telecommunication cables and the installation of underground grounding system. Installation of major underground and electrical power cabling from main substation to distribution centers will follow the path of completion for site preparations. Underground electrical grounding within the process and utility areas will be installed in accordance with the path of construction and in conjunction with the foundation work.

The contractor will install most of the underground services during the civil phase to avoid any access issues caused by open trenches. Once the underground services are installed, final paving of the area will be completed.

1.5.1.12 Structural Steel

Structural steel and structural steel pipe supports will be fabricated offsite and contractor will implement its material control programs and procedures to ensure that the steel and supports are fabricated and delivered in the sequence required to support the scheduled erection activities. As the Terminal progresses, the steel structures will be reviewed to optimize the amount of onsite or offsite preassembly.

As foundations are completed and backfilled, and sufficient work areas become available, structural erection will commence, initially on the main pipe rack. The installation of the finger pipe racks will follow the foundation work in the various process and utility areas along the same path of construction as the foundation work.

The finger racks are being considered for modularization; however, in planning for the erection of these finger racks, major equipment delivery and erection sequences and requirements will be carefully considered to ensure required access is available to accommodate the transport and setting of this equipment. If this steel erection on the foundations is delayed to provide the required access, considerations will be given to preassembly of segments of the racks and/or structures.

Structural Steel Preassembly

Structural steel preassembly ensures work front availability, reduces work at heights, provides work continuity, and maximizes overall progress. Preassembly of structural steel will be considered for the following structures:

- Interconnecting pipe rack bents;
- Train main pipe rack bents;
- Train interconnecting pipe rack bents;
- Structural for the mixed refrigerant and propane compressors; and
- Compressor shelter roof trusses.

1.5.1.13 Buildings

Construction of other necessary facilities and other buildings, as well as foundations and major utility equipment, will commence once construction of the liquefaction trains has begun. Emphasis will be placed on coordinating the arrival of the major equipment with the completion and curing of the respective foundation so that the equipment can be placed on its foundation when it arrives. This will avoid double handling and intermediate storage onsite.

The buildings are independent sites and will be constructed simultaneously with the liquefaction facilities so that electrical and instrument contractors can install their equipment according to their respective schedules to allow timely cable terminations and functional loop testing.

1.5.1.14 LNG Storage

The LNG tanks will be erected using conventional construction techniques to build full-containment, construction-type storage tanks. A summary of the construction activities is provided below. The tank

construction sequence is illustrated by a few schematic images (see figures in Appendix 1.G). In brief summary, the sequence of the tank construction has the following main steps:

- Levelling the site and placing sub-base material to allow site access;
- Installation of foundation;
- Casting of the reinforced concrete foundation slab;
- Erection of the reinforced (and post-tensioned) concrete walls using a "jump-form" method, and using the future inner carbon steel vapor barrier as internal formwork;
- Parallel to constructing the tank walls, constructing the steel dome structure and suspended deck inside the tank walls on the ground-floor slab;
- Closing the temporary construction openings in the walls, and raising the prepared roofs to the top of the finished outer concrete walls;
- Commencement of the internal tank construction with installation of bottom insulation and the inner tank bottom, followed by the inner tank wall construction, and fitting all required tank internals, such as pump columns;
- In parallel, continuing the roof construction with placing rebar, casting the concrete dome roof over the steel dome (which later functions as vapor barrier), constructing roof structures and platforms, and installing piping and engineering and infrastructure equipment;
- Hydro-testing the inner tank, followed by the permanent closure of construction access doors in the concrete outer wall, followed by installation of resilient blanket and perlite annual space thermal insulation, and installation of thermal insulation on the suspended deck over the inner tank;
- Installation of tank internals, such as instruments and LNG loading pumps; and
- Drying and inerting the tanks as a final step before start-up, which will see the introduction of LNG to cool and fill the tanks.

1.5.1.15 Pressure Testing

Pipe sections will be either hydrostatically or pneumatically tested, depending on the type and intended function of the pipe. In general, cryogenic piping generally will be pneumatically tested with dry air or nitrogen at 1.1 times the design pressure, while non-cryogenic piping will be hydrostatically tested using clean water at 1.5 times the design pressure. Testing will be completed in accordance with 49 CFR 192.

The inner container of the LNG tanks will be hydrostatically tested using approximately 30 million gallons of sea water drawn from the BSC in accordance with the appropriate TCEQ temporary water rights permit. The test water will be treated (e.g., filtered), if determined required, prior to introducing the water into the tanks. The test water will not be transferred from one tank to another, as retention of the test water in any one tank for extended periods of time will have a negative effect on the overall project schedule and represent a potential risk of contamination of the stored water. Upon completion of each test, the water will be drained from the tank via surface drainage or temporary piping to the permanent water retention ponds. Prior to release of the water from the ponds to the BSC, the water will be tested and treated, if determined so required, to confirm suitability of release. Release from the ponds to the BSC would be under controlled conditions to avoid any impact to the BSC.

Hydrostatic test water resources and possible discharge locations are discussed in greater detail in Resource Report 2, "Water Use and Quality."

1.5.1.16 Dredging Requirement and Use of Dredged Materials

A DMMP has been developed to address the dredging and disposal of material associated with construction and maintenance of the MOF, LNG berths, and turning basin. The draft DMMP is provided in Appendix 1.O. A discussion of dredged material placement options and the RG Developers' reasons for picking a preferred option is addressed in Draft Resource Report 10, "Summary of Alternatives". The ultimate management of dredge material will be finalized by ongoing consultation with federal, state, and local resource agencies and interested stakeholders, including the USACE, U.S. Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Services (USFWS), and Texas Commission on Environmental Quality (TCEQ). The following is a summary of the findings presented in the draft DMMP.

All new work material within the areas of the MOF, LNG berths, and turning basin that is above -5 feet NAVD88 is planned to be excavated by land-based equipment and used on the Terminal site as fill material. Excavation is anticipated to take approximately 4 to 6 months using excavators and earth moving equipment, and is expected to yield approximately 0.6 million cubic yards of material to be used as fill material on the LNG Site.

Prior to construction of the LNG plant and LNG jetty marine structures, the MOF will be dredged to allow for receipt and offloading of raw materials and LNG plant equipment. New work material within the dredging area that is below -5 feet NAVD88 will be dredged to a depth of -10.85 feet NAVD88 (-10 feet mean low low water) for the turning basin. This will result in approximately 29,000 cubic yards of material that will potentially be placed on the Project site for use as additional fill or disposed

at Placement Area PA 4B. This dredging is anticipated to take approximately half a month using one small size cutter suction dredge. Figure 4-1 of the draft DMMP (Appendix 1.O) is a map of the proposed material Placement Areas under consideration for the disposal of dredge material.

Approximately 6.6 million cubic yards of material from the berths and turning basin will be dredged. Approximately 10% of the material will be used as fill onsite or on-land as a beneficial use, and the remaining 90% will be placed at one of the three material disposal alternatives deemed practical during a tiered screening process. Screening included all known disposal sites in the area and evaluated site availability, material suitability, site capacity, logistical feasibility, and economic feasibility. The most feasible dredging and disposal methods for this material based on the findings of the DMMP were found to be:

- Mechanical dredging with disposal at the New Work Ocean Dredged Material Disposal Site;
- Hydraulic dredging with disposal at a combination of two Port of Brownsville owned and operated Placement Areas, PA 5A and PA 5B, which will require increases in existing levees to heights of less than 10 feet; and
- Hydraulic dredging with disposal at Placement Areas PA 5A only or PA 5B only, which will require increases in existing levees to heights between 10 and 20 feet (less desirable).

Disposal of the new work material from the LNG berths and turning basin at the New Work Ocean Dredged Material Disposal Site is anticipated to take over 14 months using two large mechanical dredges with 18-cubic-yard heavy duty buckets, and two 5,000-cubic-yard scows per dredge.

Disposal of the new work material from the LNG berths and turning basin at a combination of Placement Areas PA 5A and PA 5B is anticipated to take approximately 13 months using one large size cutter suction dredge with one booster pump. Disposal of all new work material from the LNG berths and turning basin at Placement Areas PA 5A only or PA 5B only is anticipated to take approximately 11 months and 13 months, respectively, using one large size cutter suction dredge with one booster pump.

A shoaling analysis of the Terminal site was performed for post-new work dredging conditions, and determined that maintenance dredging of the LNG berths and turning basin is anticipated every two to four years with a total volume of 250,000 to 500,000 cubic yards of silty/sandy material per episode. Any required maintenance dredging of the MOF would be negligible and, if required, would be included with maintenance dredging of the LNG berths and turning basin.

RG LNG has not selected a final disposal method(s) for the anticipated dredged material. RG LNG will continue to evaluate disposal methods, and the final method will be determined with consultation with the appropriate agencies.

1.5.1.17 Marine Facilities and Turning Basin

As noted above, the Berth 1 Jetty structure is planned to be constructed prior to conducting the dredging of the berth pocket. This will allow for a completely land based approach to all pile-driving activities associated with this Stage 1 activity. As practicable (i.e., lining up of schedules and dredging methods), the excavation and dredging of the berth pocket will be executed at the same time as dredging activities by the BND required for the BSC. Dredging for the Terminal facilities will be completed in coordination with the BND and in accordance with all permits issued by the USACE. Dredged slopes will be stabilized by erosion protection methods against waves from passing vessels and local scour from vessel and tug propellers.

While the marine facility structures for Stages 1 through 3 ultimately include in-water piles, the initial construction execution plan contemplates land-based construction of these structures prior to undertaking the dredging work in this area in order to take advantage of the location of these structures landward of the existing shoreline and to minimize in-water pile-driving activities. The immediate area surrounding the structures will be prepared to support the necessary land-based construction equipment (i.e., cranes, trucks and support equipment) and the construction activities will include pile-driving, construction of pile caps, installation of pre-case concrete beams and slabs, and installation of cast-in-place concrete to finish the top decks of the structures. Once the marine facility structures for Stages 1 through 3 are complete, the dredging work will follow.

The second jetty will be constructed via waterborne marine equipment (i.e., barge mounted cranes, materials barges and support vessels) for Stages 4 through 6. Similar construction activities will be undertaken for the second jetty, but will be accomplished via the waterborne equipment.

In both cases, the marine facility structures will be completed by adding the ship-shore interface elements, such as fenders on the breasting dolphins, quick release hooks on all dolphins, and installation of the catwalks connecting all dolphins.

The installation of most of the top-sides structure/platforming, piping, and equipment on the jetty trestles and central platforms will be conducted from the shore side using the access road on the trestle. Only the installation of the LNG loading arms may require the use of a barge-mounted crane to allow a completely outfitted arm to be lifted into position.

A permanent fire water intake concrete channel and pump pit will be excavated and constructed from concrete and located on the Project site in an area isolated from LNG activities.

1.5.1.18 Mechanical Equipment

Equipment will be transported to the Terminal by truck or barge. Equipment that is too large to ship by truck will be transported to the Terminal by deck barge.

Heavy lift ships arriving in the port will transfer the components to trucks or special material transport vehicles. In cases where the equipment cannot be transported to the site by road, barges will be used to move them from the port to the MOF.

The deck barges will be equipped with a hydraulic lift system or with fixed stands to enable a self-unloading procedure upon arrival at the MOF. The barge will be towed to the Terminal and moored at the MOF. Temporary bridges will be placed to connect the barge with the shore.

Ballast pumps will maintain the barge level during the roll-on/roll-off activity by pumping water in and out of the barge ballast tanks. The self-unloading procedure allows self-elevating transporters to be placed under the equipment which then elevate the transporter bed to lift the load, thereby allowing the loaded transporter to be towed off of the barge to the Terminal. At the Terminal, the equipment will be placed in position for lifting and setting into final position or temporarily stored in a temporary storage area.

The equipment erection activities will generally follow the planned path of construction, but will deviate as required in accordance with equipment deliveries, especially on major and long-lead equipment. The major equipment requiring heavy transport and lift planning will be, where possible, scheduled to maximize utilization of heavy transport and lifting equipment. The transport of the heavy and out-of–gauge equipment to the Terminal will be by barge to the MOF and then special material transport to the foundation or staging area.

Except in the case of pre-dressed vessels and towers, all major equipment will be delivered to its respective foundation or laid down near the foundation such that further heavy transport will not be required prior to erection.

1.5.1.19 Site Drainage

As part of the early site construction activities, the permanent plant drainage system will be constructed in accordance with the staged construction defined in Table 1.2-4. Drainage during construction will utilize the permanent plant drainage system. During the first 12 months of the construction schedule, temporary portable sewage systems will be used and trucked and treated

offsite. After 12 months, construction will utilize the permanent plant sewage line from Port of Brownsville.

1.5.1.20 Site Landscaping

RG LNG intends to utilize horticultural planting where feasible to reduce visual impacts and for erosion control and runoff managing. Currently, RG LNG plans to vegetate the Terminal's northern levee with grass. Similar landscaping will also be utilized, when feasible, in some of the open space areas associated with the operational offices and parking areas in the northeast portion of the Terminal, as well as the open space surrounding ponds 3 through 5 along the southern edge of the Terminal. Additionally, both the eastern and western edges of the Terminal property will not be developed and will be managed as a natural buffer and as potential wetland restoration to offset some of the wetland impacts at the Terminal.

1.5.1.21 Commissioning

When construction is approximately 70% complete, the focus will shift from "construction by area" to "completion by systems." The civil and structural work will, by then, be substantially complete, with the equipment set, and most of the large bore piping installed. The Project schedule will be driven by the mechanical completion and pre-commissioning requirements. The systems' completion and turnover packages will be defined and scoped by engineering in close coordination with the commissioning team and assembled by the construction team. A turnover coordinator will prepare the systems' completion and turnover packages, which will include the following documentation:

1. Marked-up drawings to show the limit of the system and the location of blinds;
2. Line list by system with pressure testing documentation;
3. List of equipment, including motors, with data sheets and inspection reports;
4. Marked-up single-line diagrams with inspection/test reports for electrical equipment;
5. Cable reports;
6. Instrument index with data sheets and calibration sheets;
7. Loop diagrams;
8. Any applicable vendor documentation/drawings;
9. Turnover exception lists; and
10. Detailed punch-list.

As the piping installation, hydrostatic testing, pneumatic testing, and equipment erection work is completed and the density of craft personnel and construction equipment is reduced within each of the areas, the balance of the painting and insulation work will be completed. The pipe racks will be completed first, followed by the process and utility areas. After the installation of the equipment and piping has been completed, the final road paving, site grading, landscaping, and cleanup will be conducted. The temporary construction facilities will be demobilized on a progressive basis when they are no longer needed.

Construction of other necessary facilities and other buildings, as well as foundations and major utility equipment, will commence once construction of the liquefaction trains has begun. Emphasis will be placed on coordinating the arrival of the major equipment with the completion and curing of the respective foundation so that the equipment can be placed on its foundation when it arrives. This will avoid double handling and intermediate storage onsite.

Commissioning and start-up of utilities, such as electrical power distribution, will precede the liquefaction trains and storage tanks.

1.5.1.22 Waste Management

During Construction

It is estimated that about approximately 20,000 tons of non-hazardous waste and 1,000 tons of hazardous waste will be generated during the construction phase of the Terminal. Examples of non-hazardous waste that will be produced are blasting abrasive (grit), concrete rubble, destroyed shipping containers, general domestic waste, general office and plant waste, food waste, metal waste, packaging material, paint waste, pipe insulation, plastic, and vegetation clearing waste. Examples of hazardous waste that will be generated are batteries, empty aerosol tanks, hydrocarbon contaminated soil, medical waste, oil absorbents and rags, spent filters, and used oil. Waste streams will be segregated and collected in dedicated collection containers/bins for regular disposal.

The number and location of these collection areas will be adjusted based on work levels and Terminal needs. Non-hazardous wastes generated by the Terminal will be accumulated, segregated, collected on a regular basis, and removed from the work area. The disposal destination for non-hazardous waste will be to a combination of the Brownsville City Landfill, offsite treatment facilities, storage and disposal facilities, on-site recycling, and/or offsite recycling centers. Hazardous waste will be disposed at offsite recycling facilities and offsite centers and treatment, storage and disposal facilities. All waste disposal, inspections, and documentation in compliance with prevailing regulations will be maintained by the Project.

During Operation

Site-specific operating procedures that meet all regulatory requirements will be developed for the use, handling, and disposal of raw materials and (solids and liquid) wastes. All chemicals stored will be subject to handling and storage requirements in accordance with applicable regulatory requirements and will be provided with the appropriate infrastructure onsite. Periodic audits will be instituted to ensure the facility's waste and raw materials management practices adhere to applicable regulatory requirements. All waste transported offsite for proper disposition will be done so in accordance with all applicable regulatory requirements. During the operational phase, the waste stream volumes will be modest in comparison to construction activities.

1.5.2 Pipeline and Header System Construction Procedures

1.5.2.1 General Pipeline Construction Procedures

RB Pipeline will use conventional techniques for buried pipeline construction to ensure safe, stable, and reliable transmission facilities, consistent with FERC specifications and USDOT regulations in 49 CFR 192. Construction of the pipelines will follow a set of sequential operations unique to the pipeline industry, as further described below.

Pipelines 1 and 2 will each be constructed using two construction spreads. Construction Spread 1 will extend from MP 0.0 to Compressor Station 2 at MP 66.1. The Header System will be constructed as part of the Construction Spread 1. Construction Spread 2 will extend from Compressor Station 2 to Compressor Station 3 at MP 137.3. For both Pipeline 1 and Pipeline 2, the construction spreads will be constructed simultaneously.

Pipeline 1 will consist of the installation of one 42-inch-outside-diameter pipeline within a 75-foot-wide permanent easement to be installed within a 125-foot total construction ROW in areas of normal open trench construction. Typical trench width will be 56 to 60 inches wide.

During Pipeline 2 construction, a second 42-inch-outside-diameter pipeline will be installed adjacent to the Pipeline 1 construction within same 75-foot-wide permanent easement, but positioned at a 25-foot offset from the Pipeline 1. Pipeline 2 will be installed utilizing a 100-foot width of the construction ROW used during Stage 1 construction plus an additional 25-foot width. The total footprint width for Pipeline 1 and Pipeline 2 will be 150 feet in normal construction areas. However, no more than 125 feet of nominal construction ROW would be impacted at any given time. As shown in the accompanying figures, once Pipeline 1 is completed, 25 feet of the original construction ROW (on the opposite of the permanent ROW from the Pipeline 2) will be restored, leaving only 125 feet of construction ROW employed for Stage 2 pipeline construction. It should be noted that the required care will be taken to identify, excavate, and install Pipeline 2 next to the operational Pipeline 1. See

Figures 1.5-2 and 1.5-3 for a cross-section of the typical construction ROW layout for Pipeline 1 and Pipeline 2, respectively.

Pipeline 2 construction, beginning with any additional clearing and preparation of the construction ROW, will commence approximately 18 months following complete installation and restoration associated with Pipeline 1 construction.

The Header System will be constructed in conjunction with Spread 1 of Pipeline 1. Currently the Header System, as presented in this Resource Report, has a 125-foot wide construction ROW, which includes a 75-foot wide permanent easement. However, the final dimensions of the ROW are subject to change based on the ongoing evaluation of interconnect locations along the Header System. A more detailed design of the Header System, including ROW width, pipeline diameter, number of pipelines, and number of interconnects will be presented in the FERC Application (anticipated submittal in March 2016).

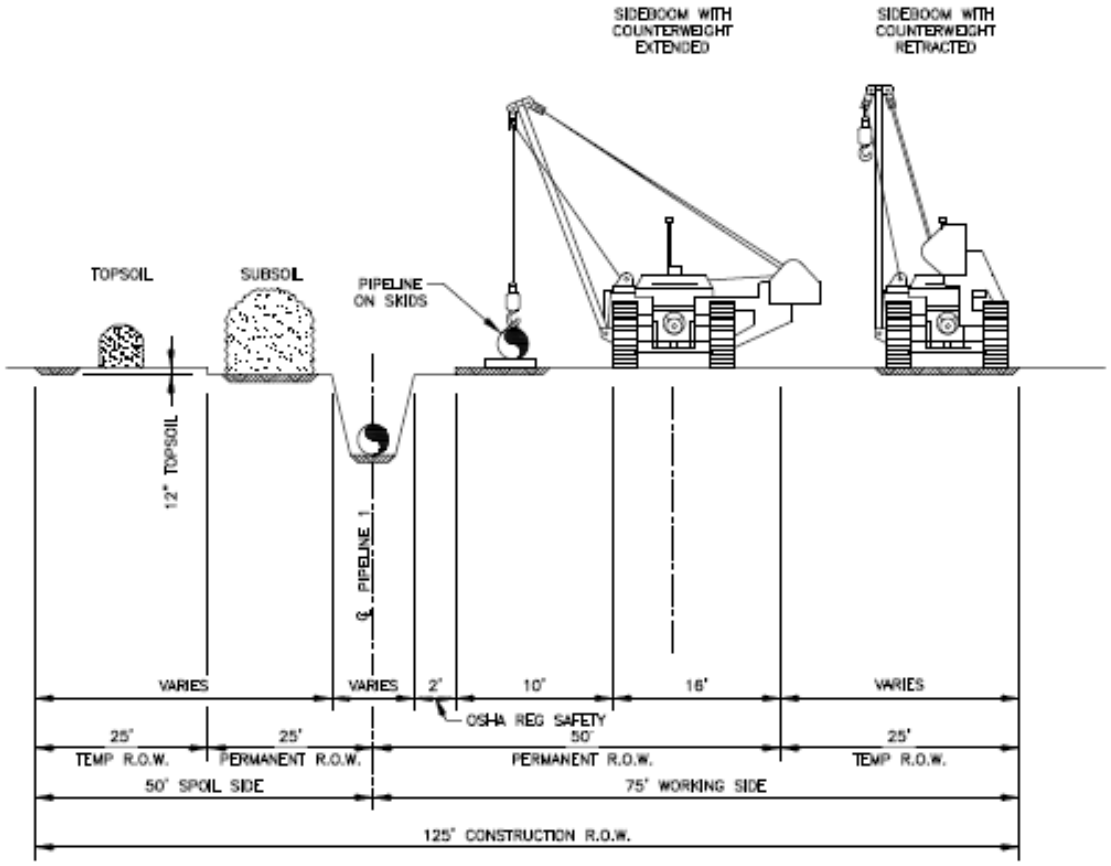
Areas requiring special construction plans and techniques may include road or utility crossings, waterbodies and wetlands, unusual topographies associated with unstable soils and trench conditions, agricultural areas, and permanent recreation facilities, among others. Construction procedures associated with these areas are discussed in subsections below.

Easement Agreements with Landowners

Before construction begins, RB Pipeline will obtain legal rights/ROWs to the land along the pipeline route from landowners. To the extent practicable, ROWs will be obtained by negotiating easement agreements between RB Pipeline and each landowner, which will include detailed discussions on payments for the easement and terms/conditions that may be specific to an individual landowner's needs and land considerations. A ROW agent for RB Pipeline will contact each affected landowner along the Pipeline route to discuss the Project and negotiate an easement agreement.

Figure 1.5-2: Typical Right-of-Way Cross-Section of Pipeline 1 Construction

(Attached)



SPOIL SIDE (FT.)	WORKING SIDE (FT.)	CONST. R.O.W. (FT.)
50'	75'	125'

NOTES:

1. ALTHOUGH THE DIMENSIONS SHOWN ARE TYPICAL, SOME VARIATIONS MAY EXIST DUE TO SITE SPECIFIC CONDITIONS, UNLESS OTHERWISE INDICATED ON THE ALIGNMENT SHEETS, THE MAXIMUM WIDTH OF THE CONSTRUCTION RIGHT-OF-WAY SHALL BE AS SHOWN IN THE TABLE.
2. TOPSOIL AND SUBSOIL SHALL BE SEGREGATED WITHIN ALL RESIDENTIAL AREAS AND IN AGRICULTURAL, PASTURES, INDUSTRIAL AND OTHER AREAS AT LANDOWNER'S OR LAND MANAGING AGENCY'S REQUEST.

HUNT, GUILLOT & ASSOCIATES, L.L.C.
603 REYNOLDS DRIVE
RUSTON, LA 71270
PHONE: 318-255-6825

RIO GRANDE LNG

TYPICAL CONSTRUCTION PIPELINE 1
UPLANDS CONSTRUCTION
NO PARALLEL FEATURE

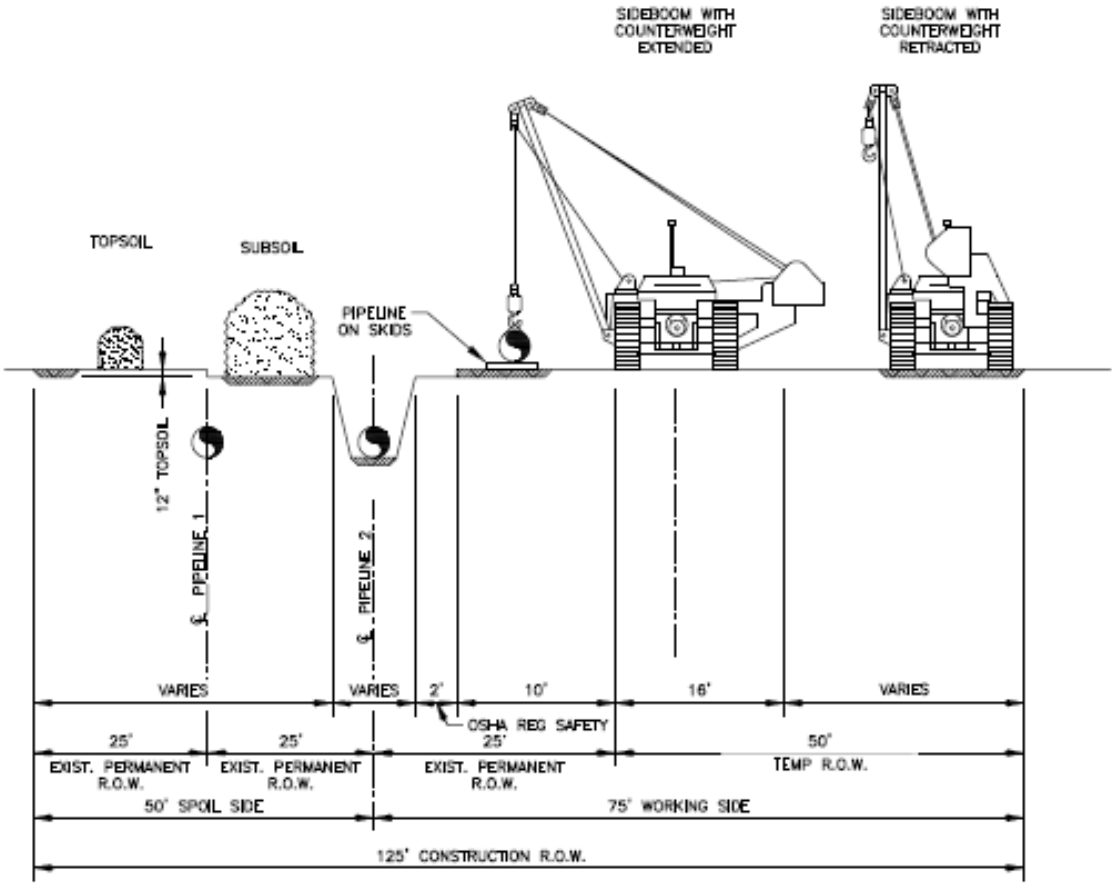
REV	DESCRIPTION	CHK.	DATE	APP.	DATE
P	PRELIMINARY	-	-	-	-

HGA JOB NO:	8.J15028.00.0	
DESIGNED BY	HGA	07/30/15
DRAWN BY	WCG	07/30/15
CHECKED BY	REB	07/30/15
APPROVED BY	BCN	07/30/15
SCALE	NTS	

DRAWING NUMBER: 8.J15028-TYP-01
REV. P

Figure 1.5-3: Typical Right-of-Way Cross-Section of Pipeline 2 Construction

(Attached)



SPOIL SIDE (FT.)	WORKING SIDE (FT.)	CONST. R.O.W. (FT.)
50'	75'	125'

NOTES:

1. ALTHOUGH THE DIMENSIONS SHOWN ARE TYPICAL, SOME VARIATIONS MAY EXIST DUE TO SITE SPECIFIC CONDITIONS, UNLESS OTHERWISE INDICATED ON THE ALIGNMENT SHEETS, THE MAXIMUM WIDTH OF THE CONSTRUCTION RIGHT-OF-WAY SHALL BE AS SHOWN IN THE TABLE.
2. TOPSOIL AND SUBSOIL SHALL BE SEGREGATED WITHIN ALL RESIDENTIAL AREAS AND IN AGRICULTURAL, PASTURES, INDUSTRIAL AND OTHER AREAS AT LANDOWNER'S OR LAND MANAGING AGENCY'S REQUEST.

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RIO GRANDE LNG

TYPICAL CONSTRUCTION PIPELINE 2
UPLANDS CONSTRUCTION
NO PARALLEL FEATURE

REV	DESCRIPTION	CHK.	DATE	APP.	DATE
P	PRELIMINARY	–	–	–	–

HGA JOB NO. 8.J15028.00.0		
DESIGNED BY	HGA	07/30/15
DRAWN BY	WCG	07/30/15
CHECKED BY	REB	07/30/15
APPROVED BY	BCN	07/30/15
SCALE	NTS	

DRAWING NUMBER 8.J15028-TYP-02 REV. P

Two easements will be needed: a temporary easement for construction and a permanent easement for long term operation of the Pipeline System. To be fair and consistent with landowners, RB Pipeline will offer landowners the fair market value for their easements, based on market valuations developed by independent appraisers and recent sales of comparable and proximate properties. In addition to the easement compensation, RB Pipeline will compensate landowners for the use of any additional temporary construction space and the loss of agricultural crop production in a particular affected growing season in a fair and equitable manner.

During construction, RB Pipeline will also utilize additional temporary workspace to provide the necessary workspace at crossings of roads, foreign lines, railroads, waterbodies and wetlands, and at Horizontal Directional Drilling (HDD) crossings. Easement agreements for these additional workspaces will all also be negotiated and secured. See Section 1.3.2.5 for further discussion of additional temporary workspaces and Appendix 1.J for a listing of all additional temporary workspace locations for Pipeline 1 and 2 and the Header System.

Once FERC approves the Project, and if no easement agreement is reached after a good faith effort by RB Pipeline to do so, per the NGA, RB Pipeline may acquire the easement via condemnation proceedings under the procedures provided for in Texas law.

Issues or concerns of landowners should be brought to the attention of RB Pipeline's ROW agent or the RG Developers. If resolution is not reached, the landowner may contact FERC's Landowner Helpline at 1-877-337-2237 or send an email to LandownerHelp@ferc.gov.

Transportation Logistics

Materials

Depending on the selected line pipe suppliers' mill location, pipe will either be shipped via barge to Port of Brownsville and/or directly to the pipe yard staging areas by railroad. Line pipe will be off loaded from the rail cars and hauled to pipe yards. Stringing trucks will be used to take the line pipe from the pipe yards to the Pipeline ROW. Other materials, such as mainline valves, fittings, flanges, and instrumentation, will be shipped from the manufacturers to the pipe yards and warehouses via flatbed trucks. Materials will be stored at the warehouse or in contractor/pipe yards until needed on the ROW .

Equipment

Construction equipment will be delivered to the warehouse and contactor/pipe yards by the pipeline contractor. Lowboys and flatbed trucks will be used to transport the equipment to the yard and from the yard to the Pipeline ROW.

Workers

Workers will provide their own or company provided transportation to the warehouse and contactor/pipe yards. Once at the warehouse, the contractor will typically transport crews to the pipeline ROW via buses. Crew support, such as inspectors, surveyors, and foremen, will drive to the ROW utilizing their own or company vehicles.

Improvements to Existing Infrastructure

Contractor/pipe yards will need to be cleared and leveled, if necessary, and gravel will be brought in. Utilities will also be installed in the warehouse area for electricity, phone lines, water, and portable septic systems. Access pads (drainage pipe, gravel, and mats) will be installed for proper ingress and egress to the pipeline ROW. Some existing entrances will have to be widened and improved in order to accommodate heavy trucks and wide turning radius.

Right-of-Way Surveys

Affected landowners will be notified, and any needed permissions obtained, prior to pre-construction surveys and staking. Following these notifications, a crew will survey and stake the outside limits of the construction ROW and additional temporary work space, the centerline of the Pipeline and drainages, highway and railroad crossings, and access roads. Existing utility lines (e.g., cables, conduits, and pipelines) will be located using One Call and marked with flags, stakes, or other devices to prevent accidental damage during Pipeline construction. A list of affected landowners is provided in Appendix 1.D.

Subject to securing any necessary permission, environmental survey crews will follow the routing crews and mark resource areas, including wetland boundaries, cultural resource sites, and rare species habitat, as applicable, with appropriate fencing, signage, and/or flagging, based on environmental and archaeological surveys and environmental permit conditions.

Erosion and Sediment Control

Following the establishment of workspace boundaries, developers will install temporary soil erosion and sediment control measures along the construction ROW, temporary workspace areas, access roads, and other work areas, as applicable, in accordance with the RG Developers' Project-Specific Plan and Procedures (Appendix 1.L). The implementation of BMPs will minimize erosion of disturbed soils and prevent the transportation of sediment outside of the construction ROW into environmentally sensitive areas, such as wetlands and waterbodies.

Immediately following clearing of the construction ROW, installation of appropriate temporary erosion controls will be implemented. Wetland boundaries within construction workspace are typically staked

with straw bales and/or silt fence barriers along their boundaries. To ensure that appropriate erosion and sediment control measures are maintained until the construction workspace is fully stabilized, the environmental inspector (EI) will inspect all disturbed areas of the construction spread(s) (e.g., construction ROW, pipe storage yards, and temporary contractor yards) that have not been permanently stabilized. Inspections will occur in accordance with project requirements.

Clearing, Grading, and Fencing

The construction corridor will be cleared and graded to remove vegetation, brush, trees, roots, and other obstructions, such as large rocks and stumps. If sensitive site-specific features are identified during the course of field surveys along the edges of the ROW that can be reasonably avoided, effort will be taken to exclude these features from the construction ROW, taking into account FERC's guidelines regarding revisions to the ROW. The ROW will be graded, where necessary, to create a level workspace to allow for safe construction conditions. Grading will be limited in wetland resource areas. Temporary fences and gates will be installed, as needed. No cleared material will be placed within wetland areas. Activities related to the storage of materials adjacent to wetland and waterbody locations will be in compliance with the Project-Specific Plan and Procedures (Appendix 1.L)

The clearance of ROW vegetation will be completed using mechanical means, to the extent practicable, which may include feller-bunchers, hydro-axes, forwarders, skidders, and other appropriate equipment. Clearing by hand with chainsaws may be implemented where specific safety or environmental concerns are warranted.

Disposal of trees and/or woody material cleared from the ROW may be accomplished using several different methods. Trees, if suitable, may be taken offsite by the clearing contractor and used for timber. Woody debris may be chipped onsite and removed. Chipped material not removed may be spread across the ROW within upland areas in a manner that does not inhibit revegetation. Wood chips will not be left within agricultural lands or wetlands. Also, wood chips will not be stockpiled in a manner that could result in transport into a wetland.

Grading activities will be scheduled to minimize the time between initial clearing operations and the actual installation of pipe. To the extent possible, access to the construction ROW generally will be obtained via public roads that intersect the ROW; however, use of existing private roads and construction of new access roads may also be required. RB Pipeline will obtain permission from landowners for the use/improvement of access roads across their property to the construction corridor. Grading of the construction workspace will allow for the movement of heavy equipment and the safe passage of work crews. Grading will include removing tree stumps, ridges, and topographic

irregularities. Generally, machinery will operate on one side of the trench (working side), with excavated materials stockpiled on the other (non-working side).

As appropriate, the clearing and grading operations will incorporate special construction procedures to minimize the amount of vegetation removed from stream banks and slopes, prevent undue disturbance of the soil profile, restore the original contours of the natural ground, and prevent topsoil erosion.

Trench Excavation

Track-mounted excavators and/or wheel ditchers will excavate the trench for the pipeline. Generally, the trench will be approximately 10 to 14 inches wider than the width of the pipe, depending upon the nature of the substrate, with sufficient depth to allow for the minimum cover requirements to the top of the Pipeline in accordance with USDOT regulations pursuant to the Natural Gas Pipeline Safety Act of 1968. Wheel ditcher will be utilized to excavate the trench when feasible as a method to increase trench production and reduce ground disturbing activities.

Unless depicted on site-specific plans or otherwise required by permit condition, the depth of cover for the pipeline will comply with federal and/or state regulations, as applicable, with a minimum of 36 inches of cover, except where geological conditions prevent this depth.

Pipe Stringing

Steel pipe will be procured in nominal 40-foot, and up to 80-foot, lengths or joints and protected with a fusion-bonded epoxy coating applied at the factory (the beveled ends will be left uncoated for welding). Stringing operations involve moving pipe sections into position along the prepared ROW. Pipe will be trucked from the pipe yards to the approved construction workspaces. Individual joints of pipe will be strung along the ROW, parallel to the centerline, and arranged in a manner to provide ease of accessibility to construction personnel. The amount of pipe necessary for waterbody or road crossings typically will be stockpiled in the approved additional temporary workspace near each crossing.

Pipe Bending

Pipe bending will be required to allow the installed pipeline to follow natural topographic grade changes and direction changes of the ROW. For this purpose, prior to line-up and welding, selected joints will be field-bent by track-mounted hydraulic bending machines. For larger horizontal changes of direction, manufactured induction bends may be used.

Pipe bending in the field will be utilized for turns involving slight deflections and/or large radii in conjunction with applicable codes. For turns involving larger deflections and/or small radii, often related to spatial limitations due to easement and topographic constraints, prefabricated induction bends or segmentable fittings will be utilized, according to applicable codes, rather than pipe bending onsite.

Pipe Assembly and Welding

Following stringing and bending, the joints of pipe will be placed on temporary supports adjacent to the trench. The ends will be carefully aligned and welded together using multiple passes for a full penetration weld. Only welders qualified according to applicable American Society of Mechanical Engineers and/or API standards will be permitted to perform the welding. An RB Pipeline-approved welding inspector will conduct welder qualification testing and document all test results, prior to any production welding taking place. A welder failing to meet the acceptance criteria set forth by the RB Pipeline-approved inspector will be disqualified.

Weld Inspection and Weld Repair

To ensure that the assembled pipe meets and/or exceeds the design strength requirements and to ensure weld quality and integrity, the welds will be inspected visually and tested with the use of non-destructive testing, such as radiographic (X-ray) technology, or another approved test method (e.g., ultrasonic testing), or combination of both, as necessary to test 100% of field welds, in accordance with API standards. Welds displaying inclusions (void spaces) or other defects will be repaired or cut out (removed), and new welds will be installed and retested.

Coating, Repair, and Inspection

Upon completion of welding, the previously uncoated ends of the pipe at the joints will be field-coated with an industry-approved anti-corrosion coating to bond to the external factory coating. This coating will be tested prior to lowering the pipe into the trench. The coating on the entire pipe section will be inspected and any damaged areas will be repaired. This inspection will be performed using a "holiday detector" (i.e., pinhole spark detector), which provides an audible sound when passed over a bare piece of steel.

Pipe Preparation and Lowering-In

Once the pipe has been welded together, coated, and inspected, the pipe will be lowered into the trench. If the bottom of the trench is rocky, methods to protect the pipe will be used, including sandbags or support pillows, at designated intervals along the trench. Trench dewatering may be required in certain locations to prevent the pipe from floating and to allow certain limited activities to be performed in the trench. In sections of the ROW where it has been deemed to be a wetland and

that the wetland is within floodways and/or heavily saturated with water, pipeline counter buoyancy weights will be installed. Trench dewatering will be performed in accordance with the applicable federal and state regulations.

Padding, Backfilling, and Grade Restoration

After the pipe is lowered into the trench, the trench will be backfilled. Backfill usually consists of the material originally excavated from the trench; however, in some cases, additional backfill from other sources may be required. No specific borrow sites are expected to be created to support the construction of the Pipeline System (all borrowed material will be sourced from established sites). Any additional earthen fill/spoil and/or any aggregate will be obtained through the construction contractor from a permitted commercial source. RB Pipeline may elect to utilize a padding machine prior to conventional backfilling operations. Use of this equipment will prevent rocky material mixed with subsoil from making direct contact with the pipeline. Padding operations are anticipated to provide 6 inches of screened subsoil cover below and along the sides of the pipe, as well as 12 inches of screened subsoil cover above the pipe. Once the pipeline is adequately protected with screened subsoil, conventional backfilling operations will occur. Any excess excavated materials or materials unsuitable for backfill will be handled as approved by the landowner or land management agency or disposed of in accordance with applicable regulations. In areas where topsoil has been segregated, the subsoil will be placed in the trench first, and then the topsoil will be placed over the subsoil. Backfilling will occur to approximate grade; however, a soil crown may be placed above the trench to accommodate any future soil settlement.

Clean-Up and Restoration

After the completion of backfilling, disturbed areas will be graded, and any remaining trash and debris will be properly disposed of in compliance with applicable regulations. Construction corridors will be protected by the implementation of permanent erosion control measures, including site-specific contouring, slope breakers, mulching, and reseeding to establish soil-holding vegetation. Contouring will be accomplished using acceptable excess soils from construction. If sufficient soils are not available, additional soil will be imported by RB Pipeline in accordance with applicable requirements.

RB Pipeline will consult with the Natural Resource Conservation Service, applicable county conservation districts, or relevant landowners to determine applicable seed mix recommendations. Additional consultations regarding wetland and waterbody specific restoration activities are planned with the USACE.

Cleanup and restoration of Project locations will be conducted in accordance with the procedures outlined in the RG Developers' Project-Specific Plan and Procedures and applicable regulatory approvals. RB Pipeline will ensure the BMPs detailed in this plan are implemented by contractors during construction. Compliance and non-compliance with these requirements will be recorded in the field by EI(s), and details of the activities will be documented in the weekly construction inspection reports.

Pigging

RB Pipeline will use pigs for internal line inspection during the various stages of construction, hydrotesting, drying, commissioning, operations, and maintenance of the Pipeline System. During the construction phase, construction pigging will be used to clean the pipelines of debris prior to hydrotesting. Foam-filling pigs will be used for hydrotesting, and foam drying pig runs will occur following hydrotests. Following drying, caliper pigging will be used to check for anomalies that may have resulted during pipeline installation. Foam pigs will be used during commissioning to segregate natural gas from air or nitrogen as gas enters the pipeline. During the operation phase, intelligent or "smart" pigging will be used to check for anomalies and create a baseline for the integrity maintenance program.

During the operation phase, caliper pigging will be used to check for anomalies and create a baseline for the integrity maintenance program. The Pipeline System will be designed to allow full pigging of the entire pipeline, with minimal interruption of services. As indicated previously, pig launchers and receivers will be constructed and operated completely within the boundaries of the compressor stations.

Hydrostatic Testing

The pipelines will be hydrostatically tested in accordance with 49 CFR 192. In order to hydrostatically test the pipelines, the pipes will be filled with water and maintained at a test pressure for duration of eight hours in compliance with applicable federal regulations. Upon completion of a satisfactory test, water utilized for testing will be discharged to the ground through an energy dissipation structure in a well-vegetated upland area. Hydrostatic testing water may also be discharged into a waterbody, if deemed acceptable and appropriately permitted.

For the hydrostatic testing of the pipeline, water will be withdrawn from multiple sources, including municipal sources when necessary; the pipeline will be tested in manageable lengths and test water re-used by moving water from one tested section to another when possible. It is estimated that approximately 68 gallons per linear foot of pipe will be needed for hydrostatic testing. Water will be withdrawn using submersible water pumps. Water withdrawal will be conducted using low-head and

high-head water pumps placed in or near the water source. The high-head water pumps will be capable of producing 2,000 gallons of water per minute; however, water volume will be governed by the flow rate at the fill source. If test water from one tested section is unable to be pushed to the next section due to unforeseen factors, more test water will be withdrawn, as necessary and in cooperation with authorities. Table 1.5-1 identifies the potential sources of water for hydrostatic testing.

Table 1.5-1: Potential Sources of Water for Hydrostatic Testing

MP	Source Name	Tract ID
19.32	Los Olmos Creek	ND-KLE-005.000 ND-KEN-002.000
84.14	Canal (East Main Drain)	ND-WIL-026.000
88.38	Canal (Donna Drain)	ND-WIL-031.000
95.15	Canal, Levee System	ND-WIL-052.000
101.92	Arroyo Colorado River	ND-CAM-001.000
120.81	Resaca de las Antonias	ND-CAM-050.000
121.06	Pond	ND-CAM-051.000
135.34	San Martin Lake Outlet to Ship Channel	ND-CAM-082.000
137.01	Bahia Grande Outlet	ND-CAM-082.000

The discharge rate of the test water will be regulated using valves and energy dissipation devices to reduce the potential for erosion. An inline caliper tool will be run through the entire length of the pipeline to verify pipe geometry. Draft Resource Report 2, "Water Use and Quality," contains additional information regarding hydrostatic pressure testing.

In the event that RB Pipeline needs to use a water source close to the Gulf Coast, where brackish water is likely, chemicals may be added to treat the water to address possible bacteria, biofilm, or salts and sediment left in the pipe after testing. Prior to use of brackish water for hydrostatic testing, RB Pipeline will develop a specific hydrostatic test plan to address the treatment and handling of any additives or chemicals used, which will include the protocol for the disposal of any treated water to ensure compliance with all applicable discharge regulations.

Pipeline Drying

Upon successful completion of the hydrostatic pressure test and dewatering, the pipeline will be dried and a multi-channel geometry tool will be utilized to locate and measure any anomalies, such as dents, buckles, internal obstructions, and any abnormal pipe ovalities. If any defect exceeding 49 CFR 192 is indicated, it will be repaired or replaced. Once determined that all known defects/anomalies have been repaired or replaced, the pipeline will be purged and pressurized. If supply gas is not

available for 30 days or more, the pipeline will be purged with nitrogen and then pressured up to 4 psi to maintain the inert dried state.

Pipeline Commissioning

After the final tie-ins are complete and inspected, the Pipeline System would be commissioned through the verification of proper installation and function of the pipeline and appurtenant systems, including control and communication equipment, based on the requirements of 49 CFR 192. Upon the commissioning of the Pipeline System, RB Pipeline will notify the FERC that Pipeline System is ready for in-service.

Cathodic Protection and Alternating Current Mitigation

Cathodic protection equipment needed for the pipeline will be determined during the detailed design phase of the Pipeline System (cathodic protection ground beds will be located next to or near county roadways where electrical power will be present). Where additional equipment is required, it is expected to consist of rectifiers and anode beds, which are routinely located within the permanent ROW of the pipeline.

A third-party consultant would be engaged to perform site-specific analysis of the route during the detailed engineering phase of the Project. Details including proximity and voltage of collocated powerlines, soil resistivities, foreign pipeline crossings, and others will be analyzed to develop a cathodic protection design plan for the Pipeline System. Cathodic protection components connecting directly to the pipeline will be installed prior to backfill of the pipeline.

During the detailed engineering phase of the Pipeline System, RB Pipeline will develop an Alternating Current (AC) Mitigation Plan for locations where the Pipeline is co-located with existing power lines. Information regarding any adjacent power lines will be obtained from the utility company, including voltage levels, available fault current, and the location of transformers. Special software modeling techniques will be applied to predict potential induced voltages and determine if mitigation measures are needed for safety and cathodic protection.

1.5.2.2 Specialized Construction Procedures

In addition to conventional pipeline construction techniques, specialized construction techniques will be utilized in sensitive resource areas. These areas include waterbody and wetland crossings or areas with other construction constraints, such as agricultural areas, residential areas, road and railroad crossings, utility crossings, and areas with side slopes. Special construction procedures may also be required due to requirements identified by specific landowners or due to regulatory requirements. Specialized construction procedures are described below.

Trenchless Construction Methods

RB Pipeline is considering three methods of trenchless construction: conventional horizontal bore, HDD,, or by direct pipe installation.

Conventional Horizontal Bore

To complete a conventional horizontal bore, a pit on either side of the road will be excavated to provide a working area for the equipment. A boring machine will be lowered into one pit, and a horizontal hole will be bored to a diameter equal to the diameter of the pipe (or casing, if required) at the depth of pipeline installation. The pipeline section will then be pushed through the bore to the opposite pit. If additional pipeline sections are required to span the length of the bore, these sections will be welded to the first section of the pipeline in the bore pit prior to being pushed through. The locations of the proposed conventional horizontal bores are presented in Table 1.5-2. See Appendix 1.N for a list of existing roads crossed by the Pipeline ROW.

Table 1.5-2: Rio Bravo Pipeline – Conventional Bore Crossings

Feature Crossed	Entry MP	Exit MP	Approximate Length (Feet)
Kleberg County			
Private Road	3.49	3.50	51.10
Private Road	4.69	4.70	43.58
Private Road	5.29	5.30	68.60
Private Road	7.69	7.70	58.29
Private Road	17.92	17.93	43.80
Public Road	18.21	18.24	132.08
Kenedy			
Private Road	23.29	23.30	33.44
Private Road	35.31	35.32	52.22
Private Road	37.86	37.87	49.43
Private Road	38.39	38.41	86.61
Private Road	43.88	43.89	44.87
Private Road	49.22	49.23	60.76
Private Road	53.50	53.51	64.58
Private Road	62.66	62.67	29.30
Private Road	62.85	62.86	33.74
Private Road	63.95	63.96	32.82
Public Road	64.40	64.42	121.66
Private Road	65.23	65.24	31.58
Public Road	66.32	66.33	54.33

Table 1.5-2: Rio Bravo Pipeline – Conventional Bore Crossings

Feature Crossed	Entry MP	Exit MP	Approximate Length (Feet)
Willacy			
Private Road	73.07	73.08	38.90
Private Road	76.27	76.27	41.54
Public Road	85.38	85.39	95.10
Public Road	85.60	85.63	170.43
Public Road	90.25	90.26	60.55
Private Road	91.30	91.30	39.82
Public Road	92.65	92.69	212.55
Public Road	94.60	94.62	81.84
Private Road	94.89	94.90	35.92
Private Road	95.39	95.39	34.73
Private Road	95.98	95.99	42.10
Public Road	96.67	96.69	88.51
Canal	97.03	97.05	79.99
Cameron County			
Public Road	102.26	102.28	81.92
Private Road	102.32	102.33	37.83
Public Road	106.83	106.84	75.61
Public Road	112.49	112.51	108.77
Private Road	116.37	116.38	37.78
Public Road	119.00	119.03	194.14
Public Road	121.37	121.38	61.87
Public Road	121.89	121.91	77.25
Public Road	122.39	122.40	64.92
Public Road	123.20	123.21	98.25
Canal	123.38	123.47	449.95
Public Road	125.24	125.27	169.42
Public Road	126.67	126.68	84.71
Public Road	133.42	133.45	151.00

Horizontal Directional Drilling

The HDD method allows for trenchless construction across an area by drilling a hole significantly below conventional pipeline depth and pulling the pipeline through the pre-drilled hole. HDD is typically used to install pipeline in areas where traditional open-cut excavations are not feasible due to sensitive resource areas or logistical reasons. While overall disturbance within a sensitive area may be minimized by HDD, a greater amount of equipment staging is typically required. The amount of

workspace at the drill entry and exit locations can vary significantly based on site-specific conditions. The entry side of the drill usually consists of the drilling rig and entry hole, control cab, drill string pipe storage, site office and storage trailers, power generators, bentonite storage, bentonite slurry mixing equipment, slurry pump, cuttings separation equipment, cutting return/settlement pit, water trucks and water storage, and the heavy construction equipment necessary to support the operation.

The exit side consists of the exit hole and slurry containment pit, and slurry reclamation equipment, drill string pipe storage, and heavy construction equipment necessary to support the operation. In addition to drilling operations to be conducted within the exit side workspace, temporary workspace is often needed adjacent to the construction ROW to provide a straight corridor for handling pipe at HDD locations where the ROW changes direction. This allows the pipeline to be prefabricated into one continuous section in preparation of the pull–back operation. Once assembled, the pipe is placed on rollers so it may be conveyed into the drill hole.

To facilitate HDD, an electric guide wire coil is typically placed along the ground surface between each HDD entry and exit point, where possible. This guide wire is used to assist in tracking the location of the down-hole drilling equipment and to determine steering inputs during advancement of the pilot bore. Wireline guidance systems typically require two guide wires for HDD crossings that parallel the centerline of an installation with a variable spacing or offset on each side of the centerline, depending on the depth of the HDD installation. Where necessary, minimal vegetative clearing is anticipated to allow the electrical guide wire coils to lay flat upon the ground surface. Such clearing will consist of hand-clearing and/or mowing of an approximately 2-foot-wide path along the route of the guide wires. Thus, anticipated impacts to vegetation will be minimal and temporary. No ground disturbance is anticipated during the laying of guide wires.

Following the completion of the pilot hole, reaming tools will be utilized to enlarge the hole to accommodate the pipeline diameter. The reaming tools will be attached to the drill string at the exit point and will then be rotated and drawn back to incrementally enlarge the pilot hole. During this process, drilling mud consisting of bentonite clay and water will be continuously pumped into the pilot hole to remove cuttings and maintain the integrity of the hole. When the hole has been sufficiently enlarged, a pre-fabricated segment of pipe will be attached behind the reaming tool on the exit side of the crossing and pulled back through the drill hole towards the drill rig. In the event that a particular drill is unsuccessful, RB Pipeline will implement its HDD Contingency Plan (Appendix 1.M).

Table 1.5-3 lists the locations where the RG Developers propose the use of HDD for crossing major highways and large waterbodies and wetlands.

Table 1.5-3: Rio Bravo Pipeline – HDD Crossings

Feature ID	Entry MP	Exit MP	Approximate Length (Feet)
Kleberg County			
SS-T05-001	19.0	19.3	1,600
Willacy County			
Railroad, HWY 77 North and Southbound, Transmission line	70.0	70.3	1,600
SS-T10-008	88.2	88.5	1,600
Willacy and Cameron County			
WW-T09-004 & SS-T09-007	101.6	102.1	2,160
Cameron County			
SS-T04-009 & HY-T04-003	120.6	121.2	3,200
WW-T01-002, SS-T01-001, & WW-T02-002	134.8	135.7	4,865
WW-T02-003, WW-T02-001, SS-T02-001, & WW-Terminal-3	136.3	137.2	4,725

Direct Pipe Technology

Direct Pipe Technology (DPT) is a relatively new technology for the pipeline industry. It allows for trenchless construction in areas where traditional open-cut excavations or HDD crossings are not feasible due to sensitive resource areas or logistical reasons. While overall disturbance within a sensitive area may be minimized by DPT, a greater amount of equipment staging is typically required. The laying process is a one-stage operation, requiring additional workspace near the launching/entry pit with a traditional exit side/pit, including the associated additional work space. DPT is similar to the conventional pipe jacking method. The DPT remotely controlled micro-tunneling rig is joined to a tested and pre-fabricated pipeline. All controlling, transport, and slurry return lines are located inside the working pipe on special wheeled frames allowing quick mounting and dismounting. The entry side of the DPT usually consists of the pipe thrusters, staged line pipe, control cab, site office and storage trailers, power generators, slurry mixing equipment, slurry pump, cuttings separation equipment, cutting return/settlement pit, water trucks and water storage, and the heavy construction equipment necessary to support the operation.

Based on the current design, RG Developers have not identified specific locations where Direct Pipe Technology is required or necessary.

Waterbody Crossing Procedures

Crossing of waterbodies will be conducted in accordance with applicable state and federal permits and the Project Specific Plan and Procedures. RB Pipeline will utilize various methods for installing the pipeline across waterbodies, depending on waterbody classifications and flow conditions at the time

of crossing. Consistent with FERC Procedures, waterbodies will be classified as "minor," "intermediate," or "major," as follows:

- Minor waterbodies include all waterbodies less than or equal to 10 feet wide at the water's edge at the time of crossing;
- Intermediate waterbodies includes all waterbodies greater than 10 feet wide, but less than or equal to 100 feet wide, at the water's edge at the time of crossing; and
- Major waterbodies include all waterbodies greater than 100 feet wide at the water's edge at the time of crossing.

Typical construction drawings for waterbody crossings will be provided in the Project-Specific Procedures. The Draft Project-Specific Procedures are contained within Appendix 1.L.

RB Pipeline anticipates the primary waterbody crossing method to be completed using one of the dry-ditch methods described below. However, if site conditions do not allow for the use of these methods, the RB Pipeline may propose the use of an open-cut crossing method. RB Pipeline will consult with relevant federal and state agencies throughout the pre-filing process to develop appropriate crossing methodologies for all waterbody crossings.

Dry-Ditch Methods

Dam and Pump Crossing

The dam and pump crossing method utilizes temporary diversion structures to dam and/or divert water flow from the workspace. The structure can consist of one or more of the following types: concrete jersey barriers, water bladder, port-a-dams, steel plates, and/or sand bags. Factors determining the type of structure used consist of, but are not limited to, the depth of the stream or waterbody, velocity of flow within the waterbody, channel width, and type.

Prior to excavation of the trench, damming structures will be installed upstream and downstream of the proposed trench. This technique utilizes mechanical pumps and hoses to convey the flow of water around the in-stream work area, allow for the discharging of water downstream of the construction site, and create a dry work area. Multiple discharge pumps may be required to keep the area dry and maintain adequate flow to avoid flooding of the waterbody upstream. Construction crews also will have additional pumps on standby for use should they encounter a high-flow event during construction. The trench will be excavated, and the pipeline will be installed in the dry ditch.

At the time the upstream and downstream dams will be installed, the pumps will be started to divert water around the pipeline crossing and associated workspaces. Water will be discharged to the

downstream area through an energy dissipating (or similar) device to prevent erosion and scouring and minimize turbidity. Once the pipeline is installed, the trench will be backfilled to pre-construction contours, and stream banks will be restored prior to restoring water flow.

The following additional stipulations will apply to all dam and pump waterbody crossings:

- Sufficient pumps, including onsite backup pumps, will be used to maintain downstream flows;
- Dams will be constructed with materials that prevent sediment and other pollutants from entering the waterbody;
- Pump intakes will be screened to minimize entrainment of fish; and
- Dams and pumps will be continuously monitored to ensure proper operation throughout the waterbody crossing.

Flume Crossing

Flume pipe(s) will be installed over the trench prior to trenching (or during trenching, should an unforeseen event create flow), which will remain in place and maintained until restoration of the waterbody is complete. The size and number of flumes will be sufficient for maximum anticipated flows. Excavation equipment located on the stream banks will work around the flume pipe during excavation. The pipe will be threaded under the flume pipe and the ditch will be backfilled while flows are maintained through the flume pipe(s) and downstream. If topographic conditions do not permit the pipe to be threaded under the flume, then the flow may be temporarily pumped while the flume is pulled to lower the pipe into the ditch. Flume pipes will be permanently removed as part of restoration.

The following additional stipulations will apply to all flume waterbody crossings:

- Sand bags or sand bag and plastic sheeting diversion structures (or equivalent) will be used to develop an effective seal and to divert stream flow through the flume pipe;
- Flume pipes will be properly aligned to prevent bank erosion and stream bed scour;
- Flume pipes will not be removed during trenching, pipe laying, or initial stream bed restoration activities; and
- All flume pipes and dams that are not also part of the equipment bridge will be removed as soon as final cleanup of the stream bed and bank is complete.

Open-Cut Crossing Method

Coordination with federal and state agencies throughout the pre-filing process will be utilized to develop appropriate crossing methodologies for all waterbodies, including the use of the open-cut method. The open-cut construction method involves the excavation of the pipeline trench across the waterbody, installation of a prefabricated segment of pipeline, and backfilling of the trench with native material. Depending on the width of the crossing and the reach of the excavating equipment, excavation and backfilling of the trench generally will be accomplished using backhoes or other excavation equipment operating from one or both banks of the waterbody. Per the Project-Specific Plan and Procedures, flow will be maintained at all times. Excavated material from the trench will be placed on the bank above the ordinary high water mark for use as backfill. The pipe segment will be weighted, as necessary, to provide negative buoyancy and placed below scour depth. Typical backfill cover requirements will be met, contours will be restored within the waterbody, and the banks will be stabilized via seeding and/or the installation of erosion control matting or riprap.

The following additional stipulations will apply to all open-cut stream crossings:

- In-stream construction activities (including trenching, pipe installation, backfill, and streambed restoration) will be completed as soon as possible to minimize environmental impacts;
- Use of equipment operating in the waterbody will be limited to that needed to construct the crossing; and
- Material excavated from the trench will be stockpiled in the construction ROW at least 10 feet from the water's edge or in additional extra work areas (located at least 50 feet from the water's edge).

Wetland Crossing Procedures

Construction ROW width will be limited to 100 feet in wetlands, unless engineering or safety constraints dictate a differing width. Pipeline 2 construction will utilize the same construction and permanent ROW used for Pipeline 1 construction. To a great extent, disturbance within wetlands by Pipeline 2 construction will overlap with areas previously disturbed by Pipeline 1 construction.

Additionally, RB Pipeline will limit all operation of construction equipment through wetlands to only that necessary for the installation of each pipeline. Topsoil segregation techniques will be utilized in unsaturated wetlands to preserve the seed bank and allow for successful restoration.

Wetland crossing methods will be determined based on site-specific conditions. Wetlands with soils that can support construction equipment may be crossed using the conventional open-cut method, as described below, with the use of timber mats to prevent soil rutting. However, if site conditions do

not allow for the use of the conventional open-cut method, RB Pipeline may propose the use of alternative crossing methods, such as trenchless techniques (conventional bore, HDD or direct pipe), conventional wetland construction (saturated wetland), standard pipeline construction (non-saturated wetland), and/or the push/pull technique (inundated wetland) to install the pipeline.

Wetland crossing locations along the pipeline are detailed in Resource Report 2, "Water Use and Quality." The wetland impact summary tables provided in Draft Resource Report 2, "Water Use and Quality," identify the proposed crossing technique for each wetland crossing.

1.5.3 Pipeline Aboveground Facilities Construction

The aboveground facilities will be constructed in accordance with RB Pipeline's specifications and USDOT requirements. The duration of construction for the aboveground facilities will vary based on the scope of the work required to construct each facility; however, all aboveground facilities will be completed within the 12-month period anticipated for each pipeline to be constructed.

1.5.3.1 Clearing and Grading

Aboveground facility sites will be cleared of vegetation, graded, and compacted, as necessary, to create level surfaces for the movement of construction vehicles on the sites and to prepare the areas for construction. Appropriate erosion and sediment controls around disturbed areas will be established prior to the start of facility construction to minimize the potential for erosion and the potential for impacts on offsite wetlands and waterbodies.

1.5.3.2 Foundations

Building foundations will be constructed of poured, reinforced concrete (if required, piles may be used). Buildings and associated equipment will be placed on the foundations. Topsoil, if present, will be stripped from the area where foundations will be constructed. Such soil may be used onsite, either for landscaping or for final site restoration. If required, additional soil or subsurface materials will be imported from approved sources to achieve the desired site/foundation grade.

1.5.3.3 Building Design and Construction

Building type (e.g., steel structure, concrete module) and necessity will be evaluated based on climate, operating conditions, permit conditions, and compliance with land use regulations or noise mitigation purposes. The design of the building(s) will comply with local building codes. Buildings will be adequately ventilated, equipped with lighting and insulation if required, and have a sufficient number of doorways to provide unobstructed access for personnel. Steel building structures will be painted with a durable coating system to protect them from the outside elements. During a typical station building construction sequence, the pre-fabricated structural members, steel plate, steel roof decking,

gutters and all associated hardware will be off-loaded from the transport trailer and then installed and erected in place on the constructed foundation and/or pad.

Selection of monolithic concrete module structures will require an appropriately sized mobile crane to lift the building module(s) off of the transport trailer and set them in place on the previously constructed foundation wall and/or pad. All of the modules will be appropriately connected and tied into each other, according to the manufacturer's installation specifications, and appropriately waterproofed. In addition, whether the selection is a steel structure or a concrete module, the design will include cutouts for protrusions through the structure (e.g., electrical and communications conduits and other piping) and will be flashed to ensure that the buildings will be weather-tight. Noise abatement equipment may also be installed during this phase of construction.

Outdoor lighting for all compressor stations will be limited to the minimum amount required for security during unmanned nighttime operation. The security systems will incorporate outdoor video cameras and all building entry and exit doors will have lighting for security. These lights will have directional control, or they will be positioned in a downward position to minimize their visibility in the direction of local residences and their effect on migratory birds, while maintaining OSHA standards for lighting.

1.5.3.4 Pressure Testing

Prior to placing the aboveground facilities into service, both the aboveground and belowground pipes will be hydrostatically tested in accordance with 49 CFR 192, Subpart J. RB Pipeline anticipates that the required water for the hydrostatic testing of the aboveground facilities will be trucked in from a municipal water source.

1.5.3.5 Infrastructure Facilities

The installation of infrastructure facilities will include the various components of auxiliary equipment, piping, and other electrical and mechanical systems. Permanent access roads and parking areas will be constructed during construction of the aboveground facilities. A detailed list of the infrastructure associated with the aboveground facilities can be found in Section 1.2.3.

1.5.3.6 Final Grading and Landscaping

Prior to construction, RB Pipeline will develop plans for the final grading and landscaping of the areas that will be disturbed during construction, including any visual screening measures that may be necessary. These final grading and landscaping plans will be consistent with Project-Specific Plan and Procedures for the restoration of uplands. Once construction is complete, disturbed areas of

aboveground facilities that are not covered with impervious surface or gravel will be finish-graded and seeded to stabilize soils. A security fence then will be constructed around the facility.

1.5.4 Quality Assurance/Quality Control – Inspection

For the purposes of quality assurance and quality control (QA/QC) for compliance with mitigation measures and other applicable regulatory requirements, the RG Developers will be represented on both the Terminal and Pipeline System portions of the Project by chief inspectors. Each chief inspector will be assisted, by one or more craft inspectors, where multiple inspectors are required to provide adequate inspection coverage and an environmental compliance assurance. Additionally, a lead EI will oversee several other EIs. The EIs will report directly to the chief inspector and will have "stop work" authority. The EIs' duties are consistent with those contained in the RG Developers' Project-Specific Plan and Procedures and will include ensuring Project compliance with environmental conditions associated with the FERC Certificate, the RG Developers' environmental designs and specifications, and environmental conditions attached to other permits or authorizations. Prior to construction, Project EIs and the contractor's supervisory personnel will receive copies of the construction drawing packages for their respective and responsible part of the Project. Additionally, safety reviews will be a standard routine before commencing new construction activities.

The RG Developers' engineering and construction contractors are responsible for designing and constructing certificated facilities in compliance with regulatory and non-regulatory requirements and agreements. Any issues of non-compliance with mitigation measures or other regulatory requirements that cannot be solved in the field will be addressed by the construction manager and project manager, and supported by inspectors and QA specialists, depending on the issues to be addressed.

Routine reporting or specific communication with FERC staff regarding design, installation, and maintenance of the facilities described in this Draft Resource Report will be the responsibility of the RG Developers. FERC staff inquiries regarding these facilities should be addressed to the RG Developers.

1.6 Operation and Maintenance Procedures

1.6.1 Terminal

During operation, the Terminal is expected to employ between 150 and 175 full-time employee for the operation of liquefaction Trains 1 and 2, and between 225 and 275 full-time employees for the operation of all 6 trains, subject to an optimization study between own staff and contracted out

activities. All Project operations and maintenance staff will be trained to properly and safely perform their assigned tasks and responsibilities, and for this the recruitment process will start approximately two years before Terminal operations, ensuring most of the new crews are available approximately one year prior to loading the first LNG into a vessel during the testing period. This will allow the new staff to become familiar with the new installations, undergo classroom and field training, attend training by key equipment/system vendor representatives, assist the Project team in finalizing and inspecting the Terminal as it nears mechanical completion and enters pre-commissioning and commissioning stages, and assist the main contractor in executing the commissioning and testing phase before reaching Substantial Completion, at which point the RG LNG team will take over all operational and maintenance responsibilities.

Operators and maintenance staff will be trained in the handling of potential hazardous materials, LNG safety, cryogenic operations, and the proper operation of all equipment. All training will be completed in a manner that meets or exceeds the requirements of the PHMSA, USDOT, USCG, and other applicable regulatory agencies. All of the initial schooling and subsequent training received by staff members will be integrated into a human resource planning tool that maps the progression of employees and the delegated responsibility levels fitting their individual capabilities and skill sets.

Terminal operations will be duly documented in design drawings and manuals that will be accessible via an electronic document management system that ensures only the latest revisions of relevant documents are used. A rigorous "management of change" procedure will safeguard that any contemplated change is duly evaluated and documented before implementation.

The Terminal automation systems will include many pre-engineered routines and automated actions to allow the panel operators to function more in a "monitoring" role, and less in an "active interference" role. A suitably developed alarm management system will help to manage undesired events and incidents.

All main equipment and Terminal sections will be recorded in equipment record cards/files and maintained electronically to allow tracking of the condition and executed maintenance activities over time. For planning and execution of maintenance and the management of spare parts inventories, tailored maintenance management software will be used. The Terminal's waterfront will also be subject to regular inspection and maintenance, such as the state of shoreline protection and maintaining adequate water depths for safe turning and berthing of LNG vessels.

Terminal inspections and maintenance will follow the principles of "risk based inspection" and "condition based maintenance," as far as practical to enhance the overall reliability of the installation in a most efficient manner.

All interventions in the Terminal will be subject to a rigorous "Safety Permit to Work" system controlled by the operations team and audited by the Terminal maintenance and safety staff. Lessons learned while operating and maintaining the Terminal and re-training of staff to embed new insights and learn from past events will also be firmly embedded into daily routines onsite, as will be the rigorous reporting on all parts of the Terminal's actual performance. Draft Resource Report 11, "Reliability and Safety," provides further details on the Terminal's safety procedures.

In order to ensure the operations staff is familiar with and understands its tasks, the RG Developers will develop an Operational Procedure Plan, capturing the above, and aiming to align the operational and safety requirements of the staff with expectations of management. The Operation Procedure Plan will provide functional requirements for the control and safeguarding of systems. This will include addressing topics such as emergency shutdowns, operational shutdowns, spills, fire emergencies, unanticipated gas release, and other routine operational procedures.

The Terminal's permanent maintenance staff will be tasked to conduct or plan/manage/supervise all standard maintenance and overhauls. Any specialized maintenance and/or overhauls needed will be completed by outside professionals trained to perform the specialized task. All maintenance records, both scheduled and unscheduled, will be maintained through the use of a computerized maintenance tracking system. This system will be located onsite with backup storage.

1.6.2 Pipeline

The RG Developers will operate and maintain the facilities in compliance with 49 CFR 192, FERC guidance in 18 CFR 380.15, and maintenance provisions of the RG Developers' Project-Specific Plan and Procedures. The facilities will be operated and maintained in a manner such that pipeline integrity is protected to ensure that a safe and continuous supply of natural gas reaches its ultimate destination.

Maintenance activities will include regularly scheduled gas leak surveys and measures necessary to repair any potential leaks. The latter may include repair or replacement of pipe segments. All fence posts, signs, marker posts, aerial markers, and decals will be painted or replaced to ensure that the pipeline locations will be visible from the air and ground. The pipeline and aboveground facilities will be monitored by implementing the monitoring measures listed in Section 11.6 of the Draft Resource Report 11, "Reliability and Safety. "

Operational activity on the pipeline will be limited primarily to maintenance of the permanent ROW and inspection, repair, and cleaning of the pipeline itself. Regular pipeline patrols will provide information on possible leaks, construction activities, erosion, exposed pipe, population density,

possible encroachment, and any other potential problems that may affect the safety and operation of the pipeline.

Erosion problems on the pipeline ROW will be reported to the local operations supervisor. These reports may originate from landowners or via routine patrol of the ROW. All corrective measures will be conducted, as needed.

In addition, RB Pipeline will participate in the "Call Before You Dig" system. Under this system, anyone planning excavation activities must call a dedicated telephone number to alert all utility companies. Representatives of the utility companies that may be affected then visit the site and mark their facilities so that the excavation can proceed with relative certainty as to the location of all underground lines. The pipeline cathodic protection system also will be monitored and inspected periodically to ensure proper and adequate corrosion protection. Appropriate responses to conditions observed during inspection will be taken.

Additional maintenance functions will include, but are not limited to:

- Backfill replacement and drain tile repair, as necessary;
- Periodic seasonal mowing of the ROWs in accordance with the timing restrictions outlined the RG Developers' Plan and Procedures;
- Periodic inspection of waterbody crossings;
- Maintenance of a supply of emergency pipe, leak repair clamps, sleeves, and other equipment needed for repair activities at the compressor stations; and
- Availability of repair crews with equipment and materials to respond 24/7 in the event of an emergency.

1.6.3 Aboveground Facilities

The RG Developers will operate and maintain the aboveground facilities in accordance with standard procedures designed to ensure the integrity of the facilities and to provide a safe and dependable natural gas supply. The facilities will be designed, constructed, and operated in accordance with requirements of FERC, USDOT, industry-proven practices and techniques, and other regulatory requirements, as applicable.

In accordance with 49 CFR 192, the facilities will be regularly inspected for leakage as part of scheduled operations and maintenance. Standard operations at existing meter stations include: activities such as the calibration, maintenance, and inspection of equipment; the monitoring of

pressure, temperature, and vibration data; and traditional landscape maintenance, such as mowing and application of fertilizer. Standard operations also include periodically checking safety and emergency equipment and cathodic protection systems.

Pipeline facilities will be marked and identified in accordance with applicable regulations. Liaison will be maintained with the public, as well as with government agency regulator activities at the meter stations. Overall, maintenance activities will be in compliance with requirements of the RG Developers' Project-Specific Plan and Procedures, as well as other applicable regulatory requirements. The meter station facilities will be remotely linked to the RG Developers' information and data software networks and infrastructure that monitor the Pipeline System on a 24-hours-per-day basis.

Operation and maintenance considerations for the facilities with regard to safety are described in Draft Resource Report 11, "Reliability and Safety."

1.7 Safety and Security

1.7.1 Terminal

The safety of LNG world-wide is the result of high industry standards, effective regulations, and the industry's commitment to rigorous risk management. There are multiple layers of protection implemented to minimize the likelihood of an LNG release. There are two types of safety features: (1) management systems and (2) equipment/technology systems.

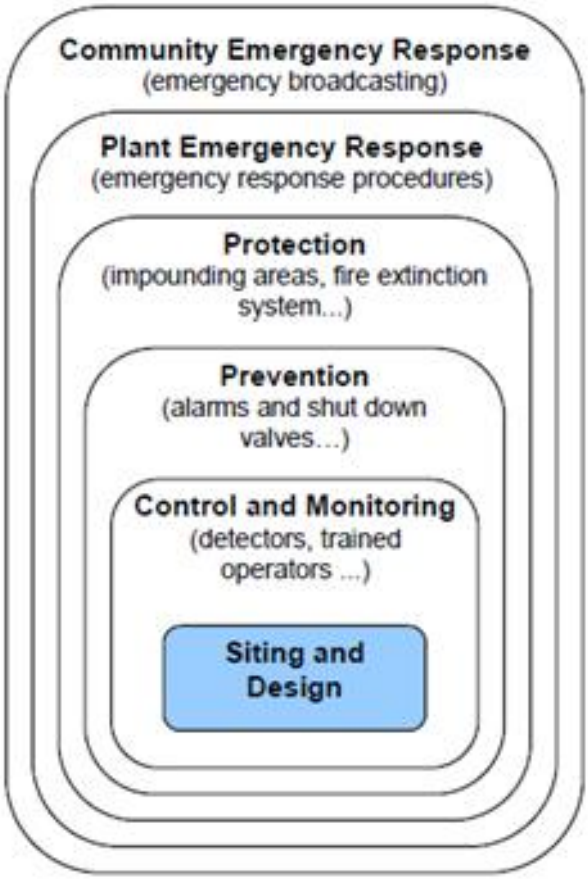
Management systems include studies during the design process that first identify hazards and then review the design to ensure that these hazards are managed based on the hierarchy of the inherent safety, prevention (elimination), detection, control and mitigation. During the operational phases, procedures are written to ensure that safe working practices are encouraged, inspections and maintenance are conducted in an appropriate and timely manner, and that the impact on the public and employees of any unexpected circumstance is minimized.

With regard to safety equipment and technology, LNG facilities have multiple levels of hazard detection, mitigation, and intervention systems. There are two types of intervention systems: those based on passive technology, which require no interaction, and an active system, where action is either automatic or an operator is prompted to take action.

Figure 1.7-1 illustrates multiple layers of protective measures that will be employed at this site, which will include, but will not be limited to:

- Quick connect/disconnection couplings (jetty arms);
- Emergency system ship-to-shore interface point (jetty arms);
- Jetty monitoring building;
- Full containment LNG tanks;
- Impoundment basins for LNG spillages;
- Emergency shutdown (ESD) systems;
- Fire/gas and LNG spill detectors;
- Firefighting systems (water deluge, foam generator, and dry powder);
- Hazardous area classification;
- LNG tank anti-rollover systems;
- Depressurization and flare systems;
- Terminal and equipment layout with separation distances;
- Thermal insulation and passive fire-proofing; and
- Terminal security devices.

Figure 1.7-1: Multi-Layered Protection



1.7.1.1 Siting and Design

The siting and design considerations for the Terminal include, among others, the following aspects:

- Meet the requirements of NFPA 59A, USCG regulations, 33 CFR 127, PHMSA regulations, 49 CFR 193, and other standards for safety and fire protection applicable to LNG terminals;
- Be sited a safe distance from Brownsville and Port Isabel and other housing and work places based on risk assessments;
- Be laid out so that the spacing and design of pipes, equipment, and LNG tanks are adequate to prevent escalation of a hazard event to other parts of the site;
- Be constructed of special materials and include systems designed to safely insulate and store LNG at temperatures of -260 degrees Fahrenheit (°F);
- Be divided into fire zones to facilitate accurate hazard detection and deploy appropriate active fire protection responses;

- Pipes containing pressurized flammable liquids or gases and passing through non-hazardous areas will be of fully welded construction without flanges or similar leak sources;
- The use of full containment LNG tanks where the LNG is contained within two LNG proof containers, of which the robust outer concrete tank is able to contain LNG spilled from the inner container;
- A design process inclusive with detailed hazard identification and operability reviews, followed by strict Management of Change procedures to guarantee the presence of proper Terminal documentation; and
- Measures to contain spillages, of both LNG and gases, as far as practical within the Terminal site.

1.7.1.2 Control and Monitoring

Control and monitoring will include, among others:

- A variety of leak detection devices, including cameras, temperature sensors, and various kinds of specific detectors (for discovering fire, flame, gas, smoke, or tank overfill). This detection equipment communicates to the continuously manned control center and can automatically trigger ESD systems. The ESD system will be manually initiated from the shutdown controls located in the Central Control Building;
- A Terminal-wide control system designed on a "fail safe" premise that monitors and maintains all process parameters, such as temperatures, flows and pressures, etc., within expected norms and provides alarms when these criteria are exceeded which allows, where possible, the operators to correct the trends based on a detailed automated alarms management system, and, where necessary, activate a shut-down and the isolation of affected Terminal facilities;
- LNG tank instrumentation to provide alarms to operators and control systems by monitoring the level, temperature, pressure, and the condition of the LNG to prevent overfilling and stratification; and
- Terminal and perimeter surveillance via cameras and other security systems subject to USCG facility security regulations under the Marine Transportation Security Act (33 CFR 105).

1.7.1.3 Prevention

Prevention will include key elements, such as:

- Upon fault detection, ESD valves that will be automatically closed to prevent the further loss of LNG. As mention in Section, 1.7.1.2, The ESD system will be manually or automatically initiated from the shutdown controls located in the Central Control Building;

- The ESD system that can be activated automatically, but also manually from the central control system, or locally by staff working within all areas of the Terminal facilities and jetties;
- Safety training of all staff, including external workers entering the site to execute support (maintenance) activities;
- A rigorous Terminal inspection routine, starting near the completion of construction and commissioning activities and continuing throughout Terminal operations, to ensure that the Terminal is built according to the approved design and remains in compliance with that design and federal and state regulations.

1.7.1.4 Protection

Protection systems will include, among others:

- Containment of potential LNG spills within impounding areas to control the spread and vaporization rate, and, if ignition fire occurs, to maximize firefighting capabilities and minimize impacts inside and outside of the site;
- Overpressure protection (pressure controllers and relief valves) systems and emergency depressurization capabilities, which discharge gases in an emergency scenario to an onsite flare unit for safe disposal;
- Fire protection systems and equipment will be provided in defined areas of the Terminal and appropriate to the anticipated fire hazard at each location. These systems are shown on the firewater piping and coverage plans;
- Active fire protection to supply facilities which will provide the means of control and mitigation in the event of fires, as well as to reduce the risk of escalation in the facility in order to avoid risk to life and minimize material damage;
- Passive fire protection (e.g., fireproofing, fire resistant barriers and coatings) to minimize the impact of fires on main load carrying steel structures to prevent collapse in a fire and, thus, reduce the potential for escalation;
- LNG loading arms that have emergency disconnection systems to ensure that ships can leave the site quickly in an emergency (e.g., a major storm or hurricane) without spilling any material volume of LNG; and
- A perimeter security fence and controlled access at the main gates (onshore) and towards the jetties (as per International Shipping Practices and Standards code for international shipping conventions).

In compliance with 49 CFR 193, the Terminal facilities (i.e. plant, structures and buildings) are being designed to withstand a Category 5 hurricane wind force (3-second burst at 183 miles per hour). Additionally, the levee height will be designed for a 100-year storm surge without any wave overtopping. For 500-year storm surge conditions, the Terminal's varied road and grade elevation is being designed to accommodate wave overtopping.

1.7.1.5 Terminal Emergency Response

Terminal response will include (for more details see the Emergency Response Plan in Appendix 11.C of Resource Report 11, "Reliability and Safety"):

- Trained operators that will always be present in the Terminal to control operations and ensure rapid response to any emergency condition, including making emergency notifications to agencies and responders, and, in extreme events, an emergency broadcast to the community;
- Operators that will be trained to:
  - Operate and maintain the site within federal rules and regulations,
  - Understand the hazards of LNG and of their operation and maintenance activities,
  - Recognize breaches of security and execute security procedures;
- A well-trained operations and maintenance crew that exercises emergency drills on a regular interval, and with parts of the crews trained as fire-fighters for a first site response;
- Active fire protection systems using water, high density foam and dry powder sited throughout the hazardous areas. The system will also allow cooling of adjacent Terminal areas in case of a fire and/or dispersing a gas spill to avoid escalation of the event;
- A ship-to-shore emergency connection system allowing the two facilities to communicate with each other and allow seamless shutdown of one system by the other;
- A facility security plan approved by the USCG; and
- Operational procedures will prescribe that when exceeding certain threshold wind-speeds (e.g., hurricane strength winds) and predictions on further increases, which would prevent further access to the Terminal, the Terminal will be shut-down (and depressurization) and kept in a safe holding mode, with status monitoring continuing from the Central Control Building.

1.7.1.6 Community Emergency Response

Community response will include:

- An emergency response plan developed with the local fire, police, and medical authorities and practiced on a regular basis; and
- Information provided to local and regional media organizations and residents/employers on how people will be informed of any emergency incident.

1.7.1.7 Project Security

Project security will be subject to USCG facility security regulations under the Marine Transportation Security Act (33 CFR 105) and will have a facility security plan approved by the USCG. The Project will meet all necessary security measures required under those regulations, including security fencing, lighting, access control, and a CCTV system. On November 5, 2015, the RG Developers' fencing, site security, and access control plans and drawings were provided to the U.S. Customs and Border Protection's staff for their review and comment. On November 13, the staff, along with the Marine Interdiction Agents and the USCG, did not have any comments or suggestions to the plans and drawings provided.

1.7.1.8 Thermal Exclusion and Vapor Dispersion Zones

Exclusion distances for various flux levels have been calculated in accordance with 49 CFR 193.2057 and Section 2.2.3.2 of NFPA 59A, using the "LNGFire III" computer program model developed by the GRI. The calculation and resulting thermal radiation exclusion zones for the Terminal are detailed in Appendix 11.A of Draft Resource Report 11, "Reliability and Safety."

In accordance with the requirements of Sections 2.2.3.3 and 2.2.3.4 of NFPA 59A, 49 CFR 193.2059, and written interpretations issued by PHMSA in July 2010, provisions have been made within the design of the Terminal that would result in a distinct hazard. Specifically, in accordance with the requirements of 49 CFR 193.2059, dispersion distances will be calculated for one-half the lower flammability limit of natural gas and hydrocarbon refrigerant vapors (including mixed refrigerant). These distances will be calculated for jet releases and also the conveyance and impoundment of a design spill of LNG and flammable refrigerants calculated in accordance with Section 2.2.3.5 of NFPA 59A. The calculation and resulting flammable vapor exclusion zones for the Terminal will be detailed in Appendix 11.A of Resource Report 11, "Reliability and Safety."

1.7.2 Pipeline and Aboveground Facilities

The permanent Pipeline ROW will be patrolled on a periodic basis. The frequency of the patrol of the Pipeline, by either aerial or ground surveys, will be determined in accordance with PHMSA requirements by the pipeline size, operating pressure, class, terrain, weather, and other relevant

factors (RB Pipeline will develop the Emergency Response Plan prior to the start of the Pipeline System operation). The interval between patrols may not be longer than as follows:

- Locations at a highway and railroad crossings: every 7.5 months, but at least twice each calendar year.
- At All Other Places: every 15 months, but at least once each calendar year.

Additional ground surveys will be conducted on an as-needed basis to respond to issues such as landowner concerns and third-party encroachments. During ROW patrols, all permanent erosion control devices that are installed during construction will be inspected to ensure that they are properly functioning. Additionally, attention will be given to:

- Existing stormwater outfalls along the alignment;
- Erosion and washouts along the ROW;
- Water control devices, such as diversions;
- Condition of banks at drainage ditch crossings;
- Fallen timber or other threats to the pipeline;
- Shrubs and other vegetation planted during construction; and
- Any other conditions that could endanger the pipeline.

The local operations supervisor will be notified of any conditions that need attention. Corrective measures will be performed, as needed.

In addition to the external and visual inspection identified above, the Pipeline System will be monitored by a SCADA system and RB Pipeline will conduct regular in-line monitor through the use of smart pigs and caliper pigs per the Pipelines Integrity Management Program (see Draft Resource Report 11, "Reliability and Safety," for additional information on the Pipeline's Integrity Management Program).

Outdoor lighting for all compressor stations will be limited to the minimum amount required for security during unmanned nighttime operation. The security systems will incorporate outdoor video cameras and all building entry and exit doors will have lighting for security. These lights will have directional control, or they will be positioned in a downward position to minimize their visibility in the direction of local residences and their effect on migratory birds, while maintaining OSHA standards for lighting.

1.8 Future Plans and Abandonment

At this time, the RG Developers have no future plans of abandonment or expansion of the Project. If an expansion of the facilities is ever envisioned for the future, the RG Developers will seek appropriate authorization from all relevant federal, state, and local agencies. The RG Developers envision at least a 20-year life span for the Project facilities, but will design and maintain the Terminal and Pipeline System in such a manner that substantial life extension is feasible to reach up to 40 or 50 years, if so required to meet world LNG/gas market demands. Regardless of the duration of utilization for the Project facilities, the RG Developers will obtain the necessary permissions to abandon the facilities in accordance with regulations and landowner requirements that exist at the time of abandonment.

1.9 Permits and Approvals

Construction, operation, and maintenance of the Project facilities will be in accordance with all applicable permits and approvals. A full list of all applicable permits and approvals for all Project facilities is provided in Appendix 1.E, along with the anticipated schedule for filing of all major permits or appropriate documentation.

1.9.1 Terminal

Major permit and approval actions for the Terminal portion of Project involve multiple regulatory agencies, to include environmental reviews by the FERC for authorization of the liquefaction facilities pursuant to Section 3(a) of the NGA, DOE authorization to export LNG to both Free Trade Agreement and Non-Free Trade Agreement countries, the USACE for activities affecting wetlands and waterways, the USFWS for activities with the potential to affect protected species, Texas Historical Commission and/or State Historic Preservation Office (SHPO) for any activities with the potential to affect cultural resources, and the TCEQ for an Air Quality Permit.

As part of Project development, the RG Developers anticipate filing an application with the DOE Office of Fossil Energy in December 2015 to export up to 27 MTPA of LNG to countries that have a Free Trade Agreement with the United States and those countries that do not have a Free Trade Agreement with the United States, but with which trade is lawful. The RG Developers plan to request such export authorization in their own right and/or as the agent for selected LNG tolling parties and LNG buyers.

1.9.2 Pipeline System

Major permit and approval actions for the Pipeline System involve multiple regulatory agencies, including environmental reviews by FERC for authorization of the Pipeline System's facilities pursuant to Section 7(c) of the NGA, the USACE for activities affecting wetlands and waterways, USFWS for activities with the potential to affect protected species, the Texas SHPO for any activities with the potential to affect cultural resources, and the TCEQ for an Air Quality Permit. The table in Appendix 1.E lists all the federal and state agency permits and approvals that will be required for the Project.

1.10 Stakeholder Outreach

As part of the RG Developers' public outreach plan and in compliance with 18 CFR 157.6(d), the RG Developers have provided written notifications to all landowners identified within 0.5 mile of the Terminal facilities and those directly impacted by the Pipeline System during construction and operational phase of the Project. Notification will be sent to affected landowners within 14 days following the date that FERC issues a Notice of Application. Appendix 1.D provides a list of the names and mailing addresses of landowners within 0.5 mile of the Terminal and Compressor Stations and landowners crossed by the Pipeline, Header System, and access roads. This list is privileged and confidential information and will be submitted under separate cover pursuant to 18 CFR § 388.112.

As part of the RG Developers' stakeholder outreach program, the RG Developers hosted three public open houses for the Project. The date and location of each open house are as follows:

1. May 19, 2015, at the Helen Kleberg Community Center, 230 West Yoakum Avenue in Kingsville, Texas (Kleberg County);
2. May 20, 2015, at the American Legion Hall, 211 West Hidalgo Avenue in Raymondville, Texas (Willacy County); and
3. May 21, 2015, at the International Technology, Education and Commerce Center, 301 Mexico Street in Brownsville, Texas (Cameron County).

Beginning in February 2015, the RG Developers have held either one-on-one or group meetings with the agencies or organizations presented in Appendix 1.F. The appendix provides the date, topics of discussion, and parties with whom the meetings were held. RG Developers will continue to meet with interested individuals, agencies and organizations through the FERC process.

In addition, Appendix 1.E identifies the federal and state agencies that have some form of review, consultation, and/or permitting authority over the Project and, where applicable, further reflects the

timeframe within which the RG Developers propose filing for permits, authorizations and/or consulting with each agency. This appendix also provides contact information for agency staff members to whom the RG Developers have provided information about the Project, including notification of the RG Developers' intent to request from the FERC to use the Pre-Filing Process and any indication that the RG Developers have received from each agency as to whether they intend to participate in the Pre-Filing Process. Appendix 1.F contains privileged and confidential information and has been redacted accordingly.

1.11 FERC Non-Jurisdictional Facilities

In order to function, the Project will rely on various infrastructure provided by others that serves a support role. While such infrastructure often falls outside of the FERC's regulatory jurisdiction, for the purposes of fulfilling its NEPA obligations, the FERC must consider whether the construction and operation of such non-jurisdictional facilities are sufficiently related to the jurisdictional project that the FERC is being asked to approve so as to require environmental review of the non-jurisdictional facilities along with the jurisdictional facilities to be acted upon. Pursuant to 18 C.F.R. 380.12(c)(2)(ii), the FERC employs a four-part test to make this determination:

> (A) Whether or not the regulated activity comprises 'merely a link' in a corridor type project (e.g., a transportation or utility transmission project).
>
> (B) Whether there are aspects of the non-jurisdictional facility in the immediate vicinity of the regulated activity which uniquely determine the location and configuration of the regulated activity.
>
> (C) The extent to which the entire project will be within the Commission's jurisdiction.
>
> (D) The extent of cumulative Federal control and responsibility.

The non-jurisdictional facilities identified for the Project include: an external electric supply for the Terminal and municipal water and sewage disposal hookups for the Terminal.[9] The following describes pertinent details about these facilities and applies the four part test, demonstrating that there are no substantial non-jurisdictional facilities requiring a fully-detailed NEPA review.

[9] The Terminal will also have a connection to the existing hard-wired telecommunication (phone) system. The RG Developers expect that this will be a standard interconnect to existing lines running past the Terminal site, and will not involve any significant construction or expansion of non-jurisdictional communications systems.

1.11.1 Electric Power Supply

The Terminal will be connected to a local public electrical network (the grid) as operated by AEP that has been planned to service the various Port of Brownsville new industrial developments and enhance grid interconnectivity with Port Isabel and South Padre Island. On the Terminal site, AEP will construct a switch-yard to connect the Terminal to the main local grid. From the new AEP switch-yard, underground cables will connect to the Terminal's main electricity distribution system.

With the expansion project, the AEP grid will have more than sufficient capacity to feed all planned new Port of Brownsville developments and provide enhanced reliability and improved integration of the Port Isabel and South Padre Island area with AEP's grid on the mainland. The AEP grid, including the expansion, is part of the larger integrated transmission system operated by the Electric Reliability Council of Texas (ERCOT), which is interconnected to numerous electric suppliers and distribution companies. The local AEP grid expansion includes two 138 kilovolt overhead transmission lines connected to the AEP Union Carbide and Loma Alta substations in the Port of Brownsville area. These lines are expected to run north and south of and parallel to State Highway 48 from the west, past the Terminal and towards Port Isabel within the proposed BND utility corridor that will also accommodate main freshwater, the natural gas feed lines, and and sewage pipelines to serve the Port of Brownsville developments.

Construction power during the initial stage will be provided from portable diesel engine-driven generators. Ongoing investigation as to the timely installation of a lower voltage feeder from Port Isabel is being undertaken with the intent of reducing the utilization of the diesel generators prior to installation of the permanent power supply arrangements. Progress with respect to this investigation will reported upon as part of the FERC Application (anticipated in March 2016) and will be discussed in more detail in this Resource Report 1 at that time. Once the AEP high-voltage feeder and substation is installed and available for use, utilization of the portable diesel generators (and any low voltage feeder, if applicable) would be reduced or terminated and the permanent electrical power distribution facilities will be utilized as the Terminal's primary power source.

The Pipeline System will rely on natural-gas turbines to drive its compressors at Compressor Stations 1 and 2 and will use very little electricity. Electric power for instruments, telecommunications and small motors will be supplied to Compressor Stations 1 and 2 via standard (low voltage) customer hook-ups at the metering, mainline valve, and compressor stations sites. Compressor Station 3 will have a much greater electric load, as it will utilize electric motors to drive the compressors. However,

it will be connected to the electric grid using the same non-jurisdictional electric facilities relied upon by the Terminal and discussed previously.

With regard to the FERC's four part test:

(A) The RG Project is not a link in the AEP transmission system, nor is it part of the any electric supplier's generation portfolio or electric distribution company's distribution system. The Terminal and Pipeline System will merely tap into the AEP (or other, properly franchised, local utility distribution companies in the case of the Pipeline System) facilities in a radial fashion and consume the supplied electricity for a purpose not associated with electric generation or transmission.

(B) The AEP facilities in the vicinity of the Terminal play no role in the location or configuration of the RG Project. The RG Developers originally sited and planned the RG Project on the assumption that the RG Project would supply its own electricity and operate independently of the public electric grid. The decision to connect to the AEP system was made, in part, on the basis that the RG Developers could adhere to the original plans for their jurisdictional facilities without the need to self-supply all power.

The existence of AEP or other electric utility facilities in the vicinity of the Pipeline System played no significant role in the location of the Pipeline System. The location of components of the Pipeline System that require a supply of electricity was driven by higher priority considerations, such as hydraulics, safety, landowner preferences, the minimization of environmental impacts through colocation with existing rights-of-ways, and the location of interconnecting pipelines and the Terminal. Such considerations led to the existing proposed locations, which have reasonable access to any necessary power through standard hook-ups to the existing low voltage electric grid that extends throughout the portion of Texas in which the Pipeline System would be located.

(C) The construction and siting of the non-jurisdictional AEP facilities that would serve the Terminal, as well as the electric utilities that would serve the Pipeline System, are outside of the FERC's jurisdiction.

(D) The federal government has minimal control and responsibility for AEP electric transmission facilities within ERCOT, as well as the electric distribution facilities that would serve the Pipeline System. Regulation of such facilities is subject to the jurisdiction of the State of Texas, the facilities would not pass through federally managed land, and no federal funds will be utilized to construct or operate the facilities.

Based on the above-described circumstances, FERC need not conduct a detailed review of any environmental impacts associated with the RG Developer's electric supply arrangements.

1.11.2 Water Supply

The Terminal will connect to a new BND potable freshwater supply header intended to serve various Port of Brownsville customers, including any future Port expansion customers. The freshwater will be provided to the BND by the Brownsville PUB, in accordance with pre-existing arrangements, and distributed to the Terminal by the BND acting as a wholesaler. From the connection point at the Terminal, water will internally be distributed within the Terminal to the various users.

The BND freshwater supply header is foreseen to have a diameter of 16 inches and connect to the PUB grid on the west side of the Port of Brownsville, passing near the Terminal within the proposed BND utility corridor south of State Highway 48. The new BND supply header will have more than adequate supply capacity to feed the maximum projected water intake by the Terminal, and serve other existing and anticipated future off-takers.

The Pipeline System would not require a freshwater supply during construction, except for the purposes of hydrostatic test water. For this purpose, RG Pipeline would rely on the existing facilities of existing suppliers or draw water directly from allowed sources along the route as described elsewhere in this Resource Report 1 – "General Project Description" and the other relevant Resource Reports being filed in conjunction with the application for the RG Project. During operations, only the Compressor Stations would have fresh water supplies. Although the Compressor Stations would normally have no personnel present and only require nominal amounts of water, Compressor Stations 1 and 2 would have standard, low-volume, hookups similar to a residence to the local franchised/municipal water supply system. As additional details become available, information will be provided to the FERC. Compressor Station 3 would not have a separate need for a water supply, due to its location within the Terminal site.

With regard to the FERC's four part test:

(A) The RG Project is not a link in the BND water distribution system, the PUB water supply system, nor any other water distribution or supply system. The Terminal will merely tap into the BND facilities in a radial fashion and make use of the water to conduct an entirely distinct business. Similarly, the Pipeline System will merely tap into the facilities of local water suppliers (to the extent it does not draw water directly from local sources).

(B) The BND facilities in the vicinity of the RG Project play no role in the location or configuration of the Terminal. The RG Developers originally sited and planned the RG Project on the assumption that the Terminal would supply its fresh water (using a desalination plant) and operate independently of public water suppliers. The decision to connect to the BND system was made, in part, on the basis

that the RG Developers could adhere to the original plans for their jurisdictional facilities without the need to self-supply water.

The existence of water suppliers in the vicinity of the Pipeline System played no significant role in the location of the Pipeline System. The location of components of the Pipeline System that require a water supply was driven by higher priority considerations, such as hydraulics, safety, landowner preferences, the minimization of environmental impacts through colocation with existing rights-of-ways, and the location of interconnecting pipelines and the Terminal. Such considerations led to the existing proposed locations, which have reasonable access to any needed water through standard, low-volume hook-ups to existing water supply systems present throughout the portion of Texas in which the Pipeline System would be located.

(C) The construction and siting of the non-jurisdictional BND facilities and the facilities of potential water supplier to the Pipeline System is outside of the FERC's jurisdiction.

(D) The federal government has minimal control and responsibility for BND's water distribution facilities and the facilities of other relevant water suppliers in Texas. Regulation of such facilities is subject to the jurisdiction of the State of Texas or subdivisions thereof, the facilities would not pass through federally managed land, and no federal funds will be utilized to construct or operate the facilities. However, the RG Developer's anticipate that the BND's water supply line will traverse wetlands requiring approval from the USACE pursuant to Section 404 of the Clean Water Act. This minor federal involvement does not justify inclusion of the BND's project in the current FERC review.

Based on the above-described circumstances, FERC need not conduct a detailed review of any environmental impacts associated with the RG Developers' water supply arrangements.

1.11.3 Municipal Sewage Disposal

The Terminal will connect to a new BND pumped-sewage header serving various developments in the Port of Brownsville area along the BSC. The Terminal will have an internal sewage collection and pump transfer system.

The BND sewage header is foreseen to have a diameter of 12 inches and is projected to run in the proposed BND utility corridor south of State Highway 48, connecting to the existing BND sewage treatment plant some five miles west of the Terminal. Again, the capacity of this header well exceeds the maximum projected needs of the Terminal and is being built to service Port of Brownsville tenants generally.

The Pipeline System will not require any wastewater disposal facilities to be constructed or operated in conjunction with the construction of the Pipeline System, except that, as described elsewhere in this Resource Report 1 – "General Project Description" and the other relevant Resource Reports being

filed in conjunction with the application for the RG Project. RG Pipeline will install temporary facilities for the safe disposal of hydrostatic test water in a manner that will have no significant impact on the environment. Other liquid wastes produced by construction workers will be disposed of by licensed third-parties using existing facilities. During operations, only the Compressor Station sites will generate any liquid wastes (when personnel are present). RB Pipeline has not yet determined whether Compressor Stations 1 and 2 will utilize chemical toilets, septic systems, or hookups to franchised/municipal sewage systems to dispose of the minimal volumes of liquid waste that will be produced at these locations. As additional details become available, information will be provided to the FERC. Compressor Station 3 would not have a separate need for a wastewater disposal facilities, due to its location within the Terminal site.

With regard to the FERC's four part test:

(A) The RG Project is not a link in the BND sewage system. The Terminal will merely tap into the BND facilities in a radial fashion and make use of the BND's sewage disposal and treatment system to conduct an entirely distinct business. Similarly, if the Pipeline System connects to sewage systems at all, any connections would constitute radial taps into such system and the Pipeline System would be a minor customer connected solely for the purpose of conducting a separate business.

(B) The BND facilities in the vicinity of the RG Project play no role in the location or configuration of the RG Project. The Terminal will produce only minor amounts of liquid waste, which could have been disposed of through other means, such as an on-site treatment facility discharging into the BSC or arrangements with private waste hauling companies to remove liquid waste via truck. The decision to connect the Terminal to the BND system was made, in part, on the basis that the RG Developers could implement their plans for their jurisdictional facilities without the need to reconfigure the Terminal in order to make use of the BND sewage system.

The existence of sewage systems in the vicinity of the Pipeline System played no significant role in the location of the Pipeline System. The location of components of the Pipeline System that may rely on franchised/municipal sewage systems for wastewater disposal was driven by higher priority considerations, such as hydraulics, safety, landowner preferences, the minimization of environmental impacts through colocation with existing rights-of-ways, and the location of interconnecting pipelines and the Terminal. If such locations are not in proximity to existing suitable sewer lines, RB Pipeline has other options such the use of septic systems or chemical toilets to handle the very small amount of liquid waste that will be produced in conjunction with the operation of the Pipeline System.

(C) The construction and siting of the non-jurisdictional BND facilities, as well as the other sewage disposal facilities that the RG Project may utilize, are outside of the FERC's jurisdiction.

(D) The federal government has minimal control and responsibility for BND's sewage disposal and treatment facilities and the other sewage disposal system that the RG Project may utilize. Regulation of such facilities is subject to the jurisdiction of the State of Texas. The facilities would not pass through federally managed land, and no federal funds will be utilized to construct or operate the facilities. However, the RG Developer's anticipate that the BND's sewage disposal pipe will traverse wetlands requiring approval from the USACE pursuant to Section 404 of the Clean Water Act. This minor federal involvement does not justify inclusion of the BND's project in the current FERC review.

Based on the above-described circumstances, FERC need not conduct a detailed review of any environmental impacts associated with the RG Developer's waste-water disposal arrangements.

1.12 Cumulative Impacts

Cumulative impacts are the result of the incremental impacts of an action that, when added to the impacts of other past, present, and reasonably foreseeable future actions, would affect the same resources, regardless of what agency or person undertakes those actions (40 CFR 1508.7). Compliance with NEPA requires an analysis of these cumulative impacts (40 CFR 1508.25(a)(2) and 40 CFR 1508.25(c)(3)). FERC considers a reasonably foreseeable action as one that has a realistic probability of occurring. These cumulative impacts can derive not only from projects currently under the review of federal regulatory agencies, but also major projects that are being proposed to state or local governments or private entities.

The assessment area for potential cumulative impacts analyzed by the RG Developers includes the area directly affected by construction of the Project (Terminal and Pipeline System) in addition to the anticipated area of effect the Terminal and/or the Pipeline System may have on each resource evaluated in Resource Reports 2 through 9. The RG Developers identified a list of projects to be included in the cumulative impacts analysis by coordinating with regulatory and planning boards and by searching publicly available information. Table 1.12-1 list the major projects that were recently completed, currently under construction, and/or proposed for construction that will be considered by the RG Developers in the cumulative impacts analysis, as well as the anticipated resources per project for which cumulative impacts would occur. Figure 1.12-1 depicts the location of the projects identified in Table 1.12-1.

The basic assumption of the cumulative impacts analysis is that if other activities are deemed to have minor or insignificant impacts, the cumulative impacts resulting from the construction and/or operation of these activities and the construction and operation of the Project will also be considered minor or insignificant. Potential cumulative impacts that may be considered include the following:

wetlands and waterbodies; vegetation and wildlife (primarily federal and state protected species of flora and fauna); cultural resources; socioeconomics and traffic; geology and soils; land use and visual; and air quality and noise.

Table 1.12-1: Major Projects Recently Completed, Currently Under Construction, and/or Proposed for Construction Considered for Cumulative Impacts Analysis

Project/County	Description	Anticipated Operation and Construction Dates	Status	Distance From	Resources Cumulatively Affected
New Electric Transmission Line (American Electric Power)/Cameron	New electric transmission line from Union Carbide and Loma Alta substations in Brownsville to Port Isabel; will be constructed in two phases; to provide electric power to the Terminal.	Phase 1 - Construction /Operation 2020 Phase 2 – Construction /Operation 2022	Proposed	Adjacent to the Terminal and collocated with the Pipeline ROW from approximately MP 133.5 to 137	L, VI, WT, VG, WD
New Potable Waterline (BND) /Cameron	Proposed 16-inch-diameter buried water line running predominantly along State Highway 48 to provide water to the Terminal	Construction - 2020 Operation - 2020	Proposed	Adjacent to the Terminal and collocated with the Pipeline ROW from approximately MP 133.5 to 137	S, L, SW, WT, VG, WD
New Sewer line (BND)/Cameron	Proposed 12-inch-diameter buried sewer line running predominantly along State Highway 48 to dispose of sewage from the Terminal	Construction - 2020 Operation - 2020	Proposed	Adjacent to the Terminal and collocated with the Pipeline ROW from approximately MP 133.5 to 137	S, L, SW, WT, VG, WD
Proposed LNG Facilities					
Texas LNG (Texas LNG LLC)/ Cameron	4-MTPA LNG Facility	Construction - 2017 Operation - 2020	FERC Pre-Filing (Docket PF15-14)	Adjacent to the eastern boundary of the Terminal on the north side of Brownsville Ship Channel	L, VI, SW, WT, WD, A, T, VG, N
Annova LNG Brownsville Project (Annova LNG Common Infrastructure LLC, subsidiary of Exelon Generation)/Cameron	6 MTPA LNG Facility	Construction - 2017 Operation – 2020	FERC Pre-Filing (Docket PF15-15)	South side of Brownsville Ship Channel, 0.3 miles south of the Terminal	L, VI, SW, WT, WD, A, T, VG, N
Gulf Coast LNG Export, LLC Project/Cameron	18 MTPA LNG Facility	Project Proponent has not announced construction or in-service date.	DOE NFTA Application pending (Docket 12-05- LNG)	North side of Brownsville Ship Channel, Approximately 6-miles west of the Terminal	L, VI, SW, WT, WD, A, T, VG, N
Eos LNG, LLC/Cameron	12 MTPA LNG Facility	Project Proponent has not announced construction or in-service date.	DOE NFTA Application pending (Docket 13-116-LNG)	North side of Brownsville Ship Channel, Approximately 5-mileswest of the Terminal	*Note: The lease is expired per discussion with BND. While included in the Table, it will not be included in the cumulative impacts analysis.*

Table 1.12-1: Major Projects Recently Completed, Currently Under Construction, and/or Proposed for Construction Considered for Cumulative Impacts Analysis

Project/County	Description	Anticipated Operation and Construction Dates	Status	Distance From	Resources Cumulatively Affected
Barca LNG/Cameron	12 MTA FLNG Facility	Project Proponent has not announced construction or in-service date.	DOE NFTA Application pending (Docket 13-118-LNG)	North side of Brownsville Ship Channel, Approximately 5-miles west of the Terminal	*Note: The lease is expired per discussion with BND. While included in the Table, it will not be included in the analysis.*
Proposed Pipeline Facilities					
New Intrastate Pipeline (TBD)/Cameron	30-inch-diameter gas pipeline lateral to deliver gas to the Texas LNG	Construction - 2018 Operation – 2020	Proposed	North side of Brownsville Ship Channel, originating approximately 16-miles west of the Terminal	S, L, WT, VG, WD
Comisión Federal de Electricidad, Nueces-Brownsville Pipeline Project/ Nueces to Cameron.	Originating at Agua Dulce Hub in Nueces County and interconnecting with the Tuxpan (Marino Project) approximately 9 miles offshore of the Brownsville Ship Channel at the Mexico border	Construction - 2016 Operation - 2018	Proposed	TBD	S, L, WT, VG, WD
BND South Delivery Header (Energy Transfer Partners)/Cameron	5 mile pipeline multi-customer header serving the Annova LNG facility	Construction - 2017 Operation - 2020	Proposed	TBD	S, L, WT, VG, WD
Proposed Electric Transmission and Generation Projects					
San Roman Wind Farm near Bahia Grande (Pioneer Green Energy)/Cameron	103 MW Wind Energy Facility/ 35-40 wind turbines;	Construction - late 2015 Operation - December 2016	Proposed	Approximately 8-miles northwest of the Terminal and located just east along the Pipeline ROW between MP 122-124	L, VI WT, VG, WD, N
Cameron Wind Project (Apex Clean Energy)/Cameron	165 MW Wind Energy Facility/ 55 Turbines	Construction - 2014 Operation - 2015	Under Construction	Wind Farm is adjacent to the Pipeline ROW at MPs 110-118	L, VI, SW, WT, VG, WD, N
New Electric Transmission Line (South Texas Electric Cooperative)/ Cameron	New electric transmission line serving the Annova LNG facility	Construction - 2017 Operation - 2020	Proposed	TBD	L, VI, WT, WD

Table 1.12-1: Major Projects Recently Completed, Currently Under Construction, and/or Proposed for Construction Considered for Cumulative Impacts Analysis

Project/County	Description	Anticipated Operation and Construction Dates	Status	Distance From	Resources Cumulatively Affected
Cross Valley Electric Transmission Project (Electric Transmission Texas & Sharyland Utilities)/Hidalgo, Cameron	96-mile (approximate) 345 kV transmission line from North Edinburg in Hidalgo County to Loma Alta Substation in Cameron County	Construction - 2014 Operation - 2016	Under Construction	Transmission line begins at Edinburg Substation at approximately 36-miles west of the Pipeline ROW at MP 94 and runs to Loma Alta Substation located approximately 4-miles to the west of the Pipeline ROW at MP 133	L, VI, SW, WT, VG,
Tenaska Brownsville Generating Station (Tenaska)/Cameron	800 MW Natural Gas-Fueled Combined-Cycle Power Plant on 270-acres in North Brownsville	Project Proponent has not announced construction or in-service date	Permits Approved	Approximately 7-miles west of the Pipeline ROW at MP 128	L, VI, SW, WT, VG, WD, A, N
Proposed Transportation Infrastructure Projects					
State Highway 32 (East Loop), Texas Department of Transportation/Cameron	4-lane commercial vehicle facility from Port of Brownsville to Veterans Bridge at Los Tomates	Construction- Unknown Operation - Unknown	Feasibility Studies	Approximately 15-miles southwest of the Terminal	T, SW, WT, A,
State Highway 550 Direct Connector Project (Texas Department of Transportation and CCRMA)/Cameron	Limited access toll road between the Port of Brownsville and Interstate 69E	Construction - Ongoing, Full Operation - 2015	Under Construction	Approximately 5 miles west of the Pipeline between MP 131 and MP 133.	T, SW, WT, A
Upgrade of State Highway 4 by the Texas Department of Transportation/Cameron	Construct 2 Lane Undivided Roadway	Construction - Ongoing Operation - Unknown	Finalizing for Construction	Approximately 15-miles southwest of the Terminal	L, SW, WT,WD, A
South Padre Island Second Access Project, Texas Department of Transportation/Cameron	17.6-mile project consisting of mainland roadway, Laguna Madre crossing bridge and island roadway	Construction – Unknown Operation - Proposed 2018	Feasibility Studies	Approximately 7-miles northeast from the Terminal	L, SW, WT, WD, A
State Highway 100 (SH100) wildlife crossings/Cameron	Install Wildlife Crossings 4-miles east of FM 1847 to 1.75-miles west of FM 510; 0.1-miles in length	Construction - Unknown Operation - Unknown	Finalizing for Construction	SH 100 crosses the Pipeline ROW at approximately MP 125	L, SW, WT, WD
Other Proposed Projects					
Brazos Island Harbor Channel Improvement Project- (U.S. Army Corps of Engineers)/ Cameron	Deepen Brownsville Ship Channel from 42 to 52 feet	Project Proponent has not announced construction or in-service date	Proposed	Adjacent to the Terminal	S, T, SW, WD, A, N
Brownsville Ship Channel and Turning Basin maintenance dredging/Cameron	USACE Galveston District awarded a contract for maintenance dredging to provide deep-draft access for pipe-laying vessel operations	Construction - In Progress Completion – early 2016	In Progress	Adjacent to the Terminal	S, SW

Table 1.12-1: Major Projects Recently Completed, Currently Under Construction, and/or Proposed for Construction Considered for Cumulative Impacts Analysis

Project/County	Description	Anticipated Operation and Construction Dates	Status	Distance From	Resources Cumulatively Affected
Cameron County West Railroad Relocation Project/Cameron	New freight rail relocation project consisting of 8-miles of new railroad and an international bridge crossing	Construction - Ongoing Operation - 2015	Under Construction	Approximately 21-miles west of the Terminal near San Pedro	SW, WT

Key:
SW=Surface Water, GW=Groundwater, WT=Wetlands, VG=Vegetation, WD=Wildlife, C=Cultural, R=Residential Areas, T=Traffic, G=Geology, S=Soils, L=Land Use, VI=Visual, A=Air Quality, N=Noise

1.12.1 Potential Cumulative Impacts

The complete results of this analysis will be provided in the FERC Application anticipated for submittal in March of 2016.

Figure 1.12-1: Cumulative Impact Project Map

(Attached)

Date: 11/9/2015

ID	Name
1	Texas LNG Terminal
2	Annova LNG Terminal
3	New 138 kV Electric Transmission Line (AEP) Estimated Route
4	Brazos Island Harbor Channel Improvement Project
5	Bahia Grande Estuary Channel Restoration
6	Gulf Coast LNG Terminal
7	SpaceX Commercial Spaceport Project
8	New 138 kV Electric Transmission Line (AEP) Estimated Route
9	Eos LNG Terminal (location estimate)
10	Barca LNG Terminal (location estimate)
11	New Sewer Line
12	Loma Alta Substation Cross Valley Electric Transmission Line (ends here)
13	San Roman I Wind Farm
14	New Potable Water Line
15	Customs and Border Patrol replacement/expansion of SH 4 checkpoint facility
16	Brownsville Ship Channel and Turning Basin maintentance dredging
17	Estimated Location for New Intrastate Pipeline for Texas LNG to connect to another pipeline
18	Port and City of Brownsville Industrial Park
19	SH 550 Construct Controlled Access Tolled Facility
20	Tenaska Brownsville Generating Station
21	SH 32 (East Loop) TxDOT Project to Port of Brownsville
22	Cameron County Wind Farm
23	Cross Valley Electric Transmission Line
24	North Edinburg Substation Cross Valley Transmission Line (begins here)
25	Estimated Route for New Sewer Line
26	New 138 kV Electric Transmission Line (AEP)Estimated Route
27	Estimated Route for New Potable Water Line
28	New 138 kV Electric Transmission Line (AEP) Estimated Route 2
29	SH 100 Wildlife Crossings
30	Cross Valley Electric Transmission Line
31	South Padre Island 2nd Access Potential Route Alternative
32	Upgrade of SH 4 1.35 miles NE to Proposed Port Entrance
33	Cameron County West Railroad Relocation Project

Hidalgo

Cameron

Gulf of Mexico

Laguna Madre

Bahia Grande

<---SEE INSET

MEXICO

110

120

130

- CIA Location
- Estimated Route for New Potable Water Line
- Estimated Route for New Sewer Line
- New 138 kV Electric Transmission Line (AEP)Estimated Route
- New 138 kV Electric Transmission Line (AEP) Estimated Route 2
- SH 100 Wildlife Crossings
- Upgrade of SH 4 1.35 miles NE to Proposed Port Entrance
- South Padre Island 2nd Access Potential Route Alternative
- Cameron County West Railroad Relocation Project
- Cross Valley Electric Transmission Line
- Preferred Route (10/02/15)
- Terminal
- International Border

0 2.5 5 10 Miles

N W E S

FIGURE 1.12-1
CUMULATIVE PROJECT MAP
RIO GRANDE LNG PROJECT

Sources: ESRI 2010-2014, UPI 2015, HGA 2015