



**FLORIDA SOUTHEAST CONNECTION
PROJECT**

RESOURCE REPORT 9
Air and Noise Quality

September 2014

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RESOURCE REPORT 9 – AIR AND NOISE QUALITY	
Filing Requirement	Location in Environmental Report
<input checked="" type="checkbox"/> Describe existing air quality in the vicinity of the project.	9.2.1
<input checked="" type="checkbox"/> Quantify the existing noise levels (day-night sound level (L_{dn}) and other applicable noise parameters) at the noise sensitive area and at other locations required by state and local noise ordinances.	9.3
<input checked="" type="checkbox"/> Quantify existing and proposed emissions of compressor equipment, plus, construction emissions, including nitrogen oxides (NO_x) and carbon monoxide (CO), and the basis for these calculations. Summarize anticipated air quality impacts for the project.	9.2.2
<input checked="" type="checkbox"/> Describe the existing and proposed compressor units at each station where new, additional, or modified compression units are proposed, including the manufacturer, model number, and horsepower of the compressor units.	Not applicable
<input checked="" type="checkbox"/> Identify any nearby NSA by distance and direction from the proposed compressor unit building/enclosure.	Not applicable
<input checked="" type="checkbox"/> Identify any applicable state or local noise regulations.	9.3.1.2
<input checked="" type="checkbox"/> Calculate the noise impact of the proposed compressor unit modifications or additions, specifying how the impact was calculated including manufacturer's data and proposed noise control equipment.	Not applicable

FEDERAL ENERGY REGULATORY COMMISSION COMMENTS	
ON RESOURCE REPORT 9 – Air and Noise Quality	
Comment	Location in Environmental Report
1. Include a summary table of construction air emissions by county.	Appendix 9A
2. Include a list of the counties where open burning would occur. Include a brief description of any applicable open burning regulations and how FSC would comply with these regulations.	Appendix 9A, Section 9.2.1.6
3. Include the approximate number of days required to complete horizontal direction drill (HDD) operations at each site. In addition, include an HDD noise mitigation plan that would be implemented if 24-hour HDD operations are required. The plan should include: <ul style="list-style-type: none"> a) a provision to notify FERC staff prior to commencing 24-hour HDD activities; b) a residential complaint process should HDD noise become a nuisance; c) a description of noise mitigations measures that FSC would implement; and d) procedures to monitor, document, and report noise levels during 	Tables 9.3-4 & 9.3-5 Appendix 9B

FEDERAL ENERGY REGULATORY COMMISSION COMMENTS	
ON RESOURCE REPORT 9 – Air and Noise Quality	
Comment	Location in Environmental Report
HDD operations. The reports should be included in FSC's biweekly construction reports to FERC.	

ACRONYMS AND ABBREVIATIONS

a.m.	ante meridiem
AQCR	air quality control region
A-wt.	A weighting
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalents
dB	decibels
dBA	A-weighted decibels
°F	degree(s) Fahrenheit
FAC	Florida Administrative Code
FERC	Federal Energy Regulatory Commission
FPL	Florida Power & Light Company
g/VMT	grams per vehicle mile traveled
GHG	greenhouse gas
H&K	Hoover and Keith, Inc.
H2H	high second high
in	inch(s)
km	kilometer(s)
L _{Aeq}	A-weighted L _{eq} in decibels
L _d	day sound level in decibels
L _{dn}	day-night sound level in decibels
L _{eq}	equivalent sound level in decibels
L _n	night sound level in decibels
M&R	metering and regulating
µg/m ³	microgram per cubic meter
MOVES	Mobile Vehicle Emissions Simulator
MP	milepost
NAAQS	National Ambient Air Quality Standards
NGA	Natural Gas Act
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NONROAD	USEPA's NONROAD model, version NONROAD2008a
NSAs	noise sensitive areas
N ₂ O	nitrous oxide
O.B.	octave band
O ₃	ozone
Pb	lead
PM ₁₀	particulate matter with a diameter ≤ 10 microns
PM _{2.5}	particulate matter with a diameter ≤ 2.5 microns
ppm	parts per million
ROW	right-of-way
Sabal Trail	Sabal Trail Transmission Pipeline Project
Secretary	Secretary of the Commission



SIP	State Implementation Plan
SO ₂	sulfur dioxide
SOTA	state-of-the-art
SPL	sound pressure level
SR	State Road
tpy	ton per year
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound(s)
WRAP	Western Regional Air Partnership

9.0 RESOURCE REPORT 9 – AIR AND NOISE QUALITY

9.1 Introduction

Florida Southeast Connection, LLC (“FSC”), a subsidiary of NextEra Energy, Inc., is seeking a Certificate of Public Convenience and Necessity (“Certificate”) from the Federal Energy Regulatory Commission (“FERC”) pursuant to Section 7(c) of the Natural Gas Act (“NGA”) authorizing the construction and operation of an approximately 126.4 mile natural gas pipeline known as the Florida Southeast Connection Project (“FSC Project”). The FSC Project is designed to meet the increased demand for natural gas by the electric generation, distribution, and end use markets in Florida. The FSC Project will also provide additional natural gas supply diversity through a connection to the new Sabal Trail Transmission Pipeline Project (“Sabal Trail”) via a new interconnection hub in central Florida (“Central Florida Hub”). The Sabal Trail Project is the subject of a separate, but related, certificate filing to the FERC.

The FSC Project will increase natural gas transportation capacity and availability to southern Florida by adding a new third pipeline in central and southern Florida. Upon the anticipated in-service date of May 2017, the FSC Project will be capable of providing a minimum of 640 million cubic feet per day (“MMcf/d”) of natural gas to a delivery point at an existing gas yard at Florida Power & Light Company’s (“FPL”) Martin Clean Energy Center in Martin County, Florida.

The proposed FSC Project consists of the construction and operation of approximately 77.1 miles of 36-inch diameter pipeline (MP 0.0 to MP 77.1) and 49.3 miles of 30-inch diameter pipeline (MP 77.1 to MP 126.4) and the construction and operation of the Martin Meter Station. The FSC Project pipeline will start in Osceola County, Florida at the interconnection with Sabal Trail within the Central Florida Hub. The pipeline will traverse Polk, Osceola, Okeechobee, St. Lucie, and Martin Counties, and terminate at the Martin Meter Station. In addition, FSC will install a pig launcher and receiver on the 36-inch diameter segment and on the 30-inch diameter segment of the FSC Project. Resource Report 1 provides a complete summary of the FSC Project facilities (Table 1.2-1) and a location map of the FSC Project facilities (Figure 1.2-1).

This Resource Report addresses air quality (Section 9.2) and noise impacts (Section 9.3) related to the construction and operation of the proposed FSC Project facilities. A checklist showing the status of the FERC filing requirements for Resource Report 9 is included in the table of contents.

9.2 Air Quality

9.2.1 Existing Conditions

9.2.1.1 Climate

The FSC Project is located in central Florida. The climate type is humid sub-tropical, characterized by hot humid summers, short mild winters, and no dry season. The regional climate can be represented by Southeast Regional Data climate center data for Fort Drum 5 NW, Okeechobee County, Florida. Table 9.2-1 provides climate data for this location.

9.2.1.2 National Ambient Air Quality Standards

The United States Environmental Protection Agency (“USEPA”) has promulgated National Ambient Air Quality Standards (“NAAQS”). The NAAQS include primary standards, which are designed to protect human health, including the health of sensitive subpopulations such as children and those with chronic respiratory problems, and secondary standards, which are designed to protect public welfare, including economic interests, visibility, vegetation, animal species, and other concerns. NAAQS currently apply to the following criteria pollutants:

- Particulate matter with a diameter ≤ 10 microns (“PM₁₀”)
- Particulate matter with a diameter ≤ 2.5 microns (“PM_{2.5}”)
- Nitrogen dioxide (“NO₂”)
- Sulfur dioxide (“SO₂”)
- Carbon monoxide (“CO”)
- Ozone (“O₃”)
- Lead (“Pb”)

Each NAAQS is expressed in terms of a pollutant concentration level and an associated averaging period. The current NAAQS are summarized in Table 9.2-2. The NAAQS apply in all FSC Project areas. Notes to Table 9.2-2 list the form of the statistic used to assess compliance with each NAAQS.

States may adopt standards that are more stringent than the NAAQS. Florida repealed its State-specific ambient air quality standards, and adopted the federal NAAQS.

9.2.1.3 Attainment Status

Section 107 of the Clean Air Act (“CAA”) defines an air quality control region (“AQCR”) as a federally-designated area in which NAAQS must be met. An implementation plan is developed for each AQCR describing how ambient air quality standards will be achieved and/or maintained. For each applicable pollutant and averaging period, USEPA designates an area’s attainment status based on monitoring data from the region. Areas that meet the NAAQS are termed “attainment areas.” Areas that do not meet the NAAQS are termed “nonattainment areas.” Areas for which insufficient data are available to determine attainment status are termed “unclassifiable areas.” Areas formerly designated as nonattainment areas that subsequently reached attainment are termed “maintenance areas.” The attainment status designations appear in Title 40 of the Code of Federal Regulations (“CFR”) Part 81.

The FSC Project is located in the following AQCRs:

- Southeast Florida Intrastate AQCR (Okeechobee, St. Lucie, and Martin Counties),
- Central Florida Intrastate AQCR (Osceola County), and
- West Central Florida Intrastate AQCR (Polk County).

Table 9.2-3 shows that, for each pollutant and averaging period, the FSC Project area’s status is attainment or the equivalent.

9.2.1.4 General Conformity

Section 176(c) of the CAA prohibits federal agencies from taking actions in nonattainment or maintenance areas which do not conform to the State Implementation Plan (“SIP”) for the attainment and maintenance of the NAAQS. The purposes of conformity are to (1) ensure federal activities do not interfere with the budgets in the SIPs, (2) ensure actions do not cause or contribute to new violations, and (3) ensure attainment and maintenance of the NAAQS. General Conformity applies only in areas that are designated as NAAQS nonattainment areas or maintenance areas. The FSC Project will be located in attainment areas or the equivalents for all criteria pollutants, and General Conformity does not apply.

9.2.1.5 Existing Ambient Air Quality

Ambient air quality data were obtained from the USEPA AIRDATA database. Monitoring data for 2010 through 2012 are summarized in Table 9.2-4 for the monitors that are nearest or most representative of the FSC Project's areas. For each pollutant and averaging period shown in Tables 9.1-3, the rank generally corresponds to the form of the statistic.

While the data in Table 9.2-4 are the best available, they are not necessarily representative of actual present air quality in the immediate vicinity of the FSC Project.

9.2.1.6 Open Burning

Florida Administrative Code (FAC) Chapter 62-256 contains the State rules governing open burning in Florida. FAC Subsection 62-256 (2)(c) prohibits open burning of vegetative debris and untreated wood except as allowed by subsection 62-256.700. FAC Subsection 62-256.700(3) allows open burning of land clearing debris provided that:

1. The open burning is restricted to the site where the land clearing debris was generated;
2. The fire is ignited after 8:00 a.m. Central time or 9:00 a.m. Eastern time and shall have no visible flame one hour before sunset or anytime thereafter, except in smoke sensitive areas as determined by the Florida Forest Service, where the fire must be extinguished no later than one hour before sunset;
3. The fire is attended, and adequate fire extinguishing equipment is readily available at all times;
4. The moisture content and composition of material to be burned is favorable to good burning which will minimize smoke; and
5. Prior to conducting the open burning, the person responsible for the burn contacts the Florida Forest Service regarding the planned burning activity.

The applicable county regulations are as follows:

1. Martin County Code of Ordinances Article 3 Sec. 79.62 lists requirements for open burning of land clearing debris. However, any burning permitted by the State of Florida, Division of Forestry is exempt from these requirements.
2. The Okeechobee County Code does not regulate open burning of land clearing debris, as this activity is regulated by the State of Florida, Division of Forestry. However, each fire chief may prohibit in his fire district any or all such burning when atmospheric conditions or local circumstances make fires hazardous.
3. Osceola County Article IV Sec. 10-77 prohibits open burning during certain drought conditions. It exempts burning authorized by the State of Florida, Division of Forestry.
4. Polk County Ordinance 08-015 authorizes individual(s) designated by the Fire Chief to declare burn bans during certain drought conditions. It does not include exemptions for open burning authorized by the State of Florida, Division of Forestry.
5. St. Lucie County Code does not restrict open burning authorized by the State of Florida, Division of Forestry.

FSC will comply with these state and local rules when conducting open burning and coordinate with applicable authorities as required.

9.2.2 Air Pollutant Emissions

9.2.2.1 Operating Emissions

There will be no combustion equipment or stationary sources of air pollutant emissions associated with the operation of the FSC Project.

9.2.2.2 Construction Emissions

Table 9.2-5 summarizes the estimated air emissions that will occur as a result of construction of the FSC Project. Appendix 9A provides detailed emissions calculations and includes a breakdown of emissions by county. Construction emissions will include the following:

- Tailpipe emissions from on-road and off-road construction equipment and vehicles,
- Emissions from construction worker vehicles used for commuting, and vehicles used to deliver equipment and materials to the site,
- Fugitive dust from construction activities and wind erosion of disturbed areas prior to revegetation, and
- Open burning of vegetation.

The following methodologies were used to estimate construction emissions:

- Annual average emission factors for Florida in 2016 and 2017 [grams per horsepower hour (“g/hp-hr”)] for NO_x, CO, PM, SO₂, VOC¹, and CO₂ for non-road equipment engines were obtained using the most recent version of the USEPA’s NONROAD model (NONROAD, 2008a). Non-road equipment emission factors (grams per gallon of fuel) for CH₄ and N₂O were obtained from the “2014 Climate Registry Default Emission Factors” (2014), and apportioned based on CO₂ emissions.
- Emissions factors [grams per vehicle mile traveled (“g/VMT”)] for on-road vehicles were obtained from the USEPA Mobile Vehicle Emissions Simulator (“MOVES”) version MOVES, 2010b. Emission factors were obtained for NO_x, CO, PM₁₀, PM_{2.5}, SO₂, VOC, and CO₂, and CO_{2e} for road types in Florida for 2016 and 2017.
- Fugitive dust emissions were estimated using the methodology described in Section 3.4 of the Western Regional Air Partnership (“WRAP”) Fugitive Dust Handbook (2006). Use of this methodology is conservative, as the climates typical of most Western states are more arid than in the FSC Project area.
- Open burning emissions were estimated using the methodology described in AP 42, Fifth Edition, Volume I, Section 13.1, “Wildfires and Prescribed Burning”. Emission factors for CO₂, CH₄ and N₂O were obtained from the “2014 Climate Registry Default Emission Factors”.

The impacts of these emissions on air quality are expected to be minor. Construction emissions will be intermittent, temporary, and spread over a large area. Mitigation measures will include the following:

¹ NONROAD does not provide emissions factors for VOC. The emission factor for total hydrocarbons was used as a surrogate for VOC.

- The construction equipment will be properly maintained and comply with all applicable Federal regulations. Equipment will be operated on an as-needed basis, primarily during daylight hours².
- To the extent practicable, busses or vans will be used to transport construction workers to the work site.
- Fugitive dust emissions will be mitigated by minimizing the extent of the areas disturbed, application of dust suppressants, rinsing construction vehicles before they leave the work site, and avoiding excessive vehicle speeds on unpaved roads. Disturbed areas will be re-vegetated as appropriate. Additionally, all areas disturbed by construction will be stabilized in accordance with FSC's Plan and Procedures.
- Open burning of vegetation will be conducted in accordance with the permit issued by the Florida Forest Service and in accordance with State and local regulations and ordinances.

9.3 Noise Quality

This section of the Resource Report provides an overview of applicable noise regulations and an assessment of noise impacts associated with the FSC Project.

9.3.1 Applicable Noise Regulations

The unit of noise measurement is the decibel ("dB"), which measures the energy of the noise. Because the human ear is not uniformly sensitive to all noise frequencies, the A-weighted frequency scale (denoted as "A-wt" sound level or "dBA") was devised to correspond with the ear's sensitivity.

9.3.1.1 Federal Energy Regulatory Commission

FERC guidelines and typical certificate conditions require that the sound attributable to a compressor station or other operational facilities not exceed a day-night average sound level (i.e., L_{dn}) of 55 dBA at any nearby noise sensitive area ("NSA"), unless such NSAs are established after facility construction. In this case, operation of the FSC Project will not produce noise: Compressor facilities are not proposed as part of the FSC Project and the FSC Project's meter station and launcher and receiver sites are not considered noise sources.

Construction of the FSC Project will produce noise associated with horizontal directional drilling (HDD), and FERC typically requires that the sound attributable to 24-hour HDD operations should not exceed 55 dBA (L_{dn}) at the NSAs or be 10 dBA over the background (ambient) noise level if the ambient levels are above 55 dBA (L_{dn}). If any exceedence of the sound criteria/guidelines is anticipated at any nearby NSA, noise mitigation measures will be implemented during drilling activity to reduce the noise impacts of the drilling operations and achieve the sound criteria/guidelines.

9.3.1.2 State and Local Noise Regulations

The State of Florida does not have a noise standard, although many counties have noise ordinances. The following is a listing of HDDs with NSAs within a one mile radius, and the county in which the HDD is located:

² The atmospheric stability conditions during daytime typically promote more rapid dispersion of pollutants than during nighttime.

- Johnson Avenue – Polk County
- Weohyakapka (Walk-in-Water) Creek – Polk County
- Lake Kissimmee Crossing – Osceola County (entry point) and Polk County (exit point)
- Boggy Branch – Okeechobee County
- State Road 70 Crossing – St. Lucie County
- State Road 710 Crossing – Martin County

The following are applicable noise ordinances within the counties:

- Polk County has a noise ordinance (Ordinance 04-33) that limits construction to the hours of 6 a.m. to 9 p.m.
- Osceola County has a noise ordinance (Article IV of the County Code of Ordinances) that limits construction to the hours of 7 a.m. to sunset.
- Martin County has a noise ordinance, Section 824 of the County Code, which prohibits construction on projects within the county between the hours of 9:00 p.m. to 7:00 a.m. In addition, the ordinance limits noise in residential areas (the applicable land use for the HDD site work at the State Road 710 crossing) to 60 dBA from 7:00 a.m. to 9:00 p.m. and 55 dBA from 9:00 p.m. to 7:00 a.m. but construction related noise levels are exempt from the limits provided construction occurs during allowable hours. The ordinance further requires the use of mufflers on any internal combustion engine used in construction.
- St. Lucie County has a noise ordinance (Chapter 1-13.8) that limits construction to the hours of 7 a.m. and 6 p.m. on weekdays and 8 a.m. and 5 p.m. on Saturdays. No noise ordinance was identified for Okeechobee County.

FSC will seek variances from local noise ordinances to the extent required for the nighttime portion of the 24 hour HDD work (see Section 9.3.3).

9.3.2 Pipeline Construction

FSC plans to begin construction in 2016 and initiate service in May 2017. The majority of construction of the proposed FSC Project would occur from March 2016 through May 2017 using one or more construction spreads. Construction at any single point along the proposed FSC Project, from initial surveying and clearing to backfilling and finish grading, is expected to last approximately two to four months. Any potential construction noise impacts will therefore be intermittent and temporary. Construction will typically include the following activities, which would be performed in phases and would result in noise ranges of between 50 to 90 dBA at 50 feet, depending on the activity, and reduced noise levels further away (see Table 9.3-1):

- Trenching and pipe laying;
- Horizontal boring/jacking (if required);
- Backfilling and right of way restoration;

Construction equipment utilized will differ from phase to phase, but will typically include bulldozers, cranes, dump trucks, sidebooms, and loaders. Noise is generated during construction primarily from diesel engines which power the equipment. Exhaust noise usually is the predominant source of diesel engine noise. All equipment will be required to maintain functional mufflers during construction of the facilities. Noise levels of construction equipment typically utilized for this type of project are presented in Table 9.3-2.

The noise levels presented in Tables 9.3-1 and 9.3-2 are those that would be experienced by people outdoors. A building will provide significant attenuation of associated construction noise impacts. For instance, sound levels can be expected to be up to 27 dBA lower indoors with windows closed. Even in homes with windows open, indoor sound levels can be reduced by up to 17 dBA (USEPA, 1978).

9.3.2.1 Pipeline Construction Noise Mitigation Measures

An important factor mitigating noise impact from pipeline construction is that such noise will be of short duration and limited to a relatively small distance: 50-400 foot stretches. Work in these areas will generally last no more than a few days to one week, as typical construction activities move along the corridor. However, as previously stated, construction from initial surveying and clearing to backfilling and finish grading at any one point would last approximately two to four months. Therefore, no single receptor will be exposed to significant noise levels for an extended period. Additionally, because construction equipment does not operate continually, construction noise is expected to be intermittent. The construction equipment to be used is similar to that used during typical public works projects (e.g., road resurfacing, storm sewer installation, etc.), and will not result in significantly higher noise sources than experienced by the public on such construction projects. As a general construction practice, functional mufflers will be maintained on all equipment to maintain noise levels as low as reasonably achievable.

9.3.3 Horizontal Direction Drilling

HDD techniques are currently proposed to be utilized at nine locations along the pipeline route. In accordance with the FERC requirements, FSC assessed impacts from HDD noise on NSAs within one mile of the HDD entry and exit points. NSAs were identified within a 0.5 mile radius of five of the nine HDD locations. One HDD (State Road 70 Crossing) has no NSAs within a 0.5 mile radius but there are NSAs within a one mile radius. HDD noise was evaluated at these six locations. The remaining three HDDs do not have any NSAs within a one mile radius and were not evaluated.

The NSAs were identified through detailed review of aerial photography at each proposed HDD location and confirmed during a site visit. The HDD entry and exit points and the nearest NSA for each of the evaluated HDD crossings are presented in Figure 9.3-1.

9.3.3.1 Existing Ambient Conditions

The existing ambient noise level in the area of each HDD drill site was estimated by determining the land uses in the area through a review of aerial photography. General ambient noise levels by land use have been estimated by the USEPA (USEPA, 1978). However, a more detailed estimate is provided in the American National Standards Institute (ANSI) standard 12.9-1993/Part 3. This standard provides estimates of existing L_{eq} and L_{dn} levels based on detailed descriptions of land use categories. The levels are in general agreement with those published by USEPA. The ANSI standard noise estimation divides land uses into six distinct categories. These categories, their descriptions and the estimated existing L_{eq} and L_{dn} levels are provided in Table 9.3-3.

Utilizing the ANSI standard, the existing ambient noise level at the nearest NSA to each HDD crossing was estimated. The NSAs at all HDD locations fell into a Category 4 land use (Quiet Urban and Normal Residential Areas), with the exception of the Johnson Avenue HDD, which fell into a Category 3 land use (Quiet Commercial, Industrial Areas, and Normal Urban and Noisy Residential Areas).

9.3.3.2 HDD Noise Levels

HDD utilizes a number of pieces of equipment that include power generation, control rooms, an excavator, and storage trailers. Of these sources, the diesel engine power generation units are the most significant noise generating sources. Noise level data measured at a typical HDD site where a 600 hp drive drill engine was in use were utilized for this analysis. These data indicate that HDD entry generates a sound level, with equipment at full load, of approximately 85 dBA at 50 feet. Noise levels on the exit side of the HDD, where less equipment is needed, are approximately 79 dBA at 50 feet. Estimated HDD noise levels as L_{eq} levels at each NSA location for this Project were calculated assuming daytime drilling only.

The results of the analysis, including all of the HDD locations, the distance and direction to the nearest NSA, estimated existing ambient levels, calculated HDD noise levels, projected increases above existing ambient levels, and total days required are provided in Table 9.3-4 for an unmitigated case. A calculated L_{eq} noise level of 74 dBA is projected at the nearest NSA to the Johnson Avenue HDD entry point, with a corresponding increase above ambient of 16.1 dBA. Much lower sound levels were calculated for the remaining HDD locations, although six entry or exit points would have L_{eq} noise level greater than 55 dBA at their nearest NSAs.

Current plans are for daytime only HDD work at all but the following three locations:

- Lake Kissimmee Crossing
- State Road 710 Crossing
- C-23 Canal Crossing

In the event that the residents indicate that the HDD activities either are or will be a disruption to them, FSC will provide mitigative measures at the HDD entry site or provide compensation to the landowners for temporary housing at a commercial hotel or motel in the general area during HDD-related construction activities. The nearby NSA will be notified several days prior to beginning work to advise them of the onset and duration of construction. An HDD complaint resolution plan is provided in Appendix 9B.

If additional noise mitigation is required, an onsite evaluation of equipment noise will be completed to further identify the predominant noise sources. Based on this evaluation, additional noise mitigation measures will be recommended which may include:

- Reconfiguring equipment locations to take advantage of natural and artificial noise barriers (e.g., straw bales);
- Installing a partial noise barrier around the hydraulic power unit, including the engine & associated engine jacket-water cooler. For example, cover two sides of power unit with a plywood barrier system or other type of effective noise barrier system;
- Using residential grade silencers or mufflers on engines;
- Using gear box noise blankets and other mechanical noise dampening blankets, acoustical tents, acoustical barriers; and
- Employing “low noise” generators.

The above mitigation measures may reduce HDD noise levels by 10 dBA to 15 dBA. Because 24-hour HDD is planned in at least three locations, FSC conducted an additional evaluation of potential noise levels. This additional analysis was conducted for all the HDD sites, even though 24-hour HDD is only currently planned for three locations, and included calculation of the L_{dn}

noise levels to incorporate the additional potential for noise impacts during nighttime hours. The results of this analysis are provided in Table 9.3-5.

The noise level increases predicted in these analyses for 24-hour HDD construction activities are based on unmitigated noise produced by HDD drilling equipment and are therefore considered worst-case. The calculated HDD noise level exceeds FERC's criteria of 55 dBA L_{dn} at the Lake Kissimmee Crossing and State Road 710 Crossing locations and is greater than 10 dBA above the estimated existing L_{dn} level. The noise levels produced by drilling equipment may be reduced by up to 10 to 15 dBA through mitigative actions described previously. There are no NSAs within one mile of the C-23 Canal HDD location.

Residents of nearby NSAs will also be notified in advance of planned overnight HDD-related construction activities to advise them that noise-generating equipment will be operated during night-time hours. Noise surveys will be conducted to determine whether HDD noise levels satisfy the 55 dBA target and the 10 dBA increase criteria. If noise levels cannot be reduced to target levels, then temporary housing will be offered to the occupants of affected NSAs at a commercial hotel or motel in the Project area until nighttime HDD-related construction activities are completed.

9.4 References

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- USEPA. 2005. User's Guide for the Final NONROAD2005, EPA420-R-05-013.
- Western Regional Air Partnership. 2006. Fugitive Dust Handbook, Countess Environmental, Section 3.4.1.

TABLES

**Table 9.2-1
Regional Climate Data for Okeechobee County, Florida**

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (°F)	74.20	75.90	79.60	83.80	88.00	90.20	91.50	91.60	89.70	85.40	80.10	75.00	83.70
Average Min. Temperature (°F)	49.50	50.80	54.70	57.90	63.30	69.00	70.70	71.20	70.10	64.60	57.80	51.00	60.90
Average Total Precipitation (in.)	2.17	2.36	3.21	2.51	4.03	8.04	7.32	7.22	6.80	3.94	2.06	1.82	51.49
Average Total Snow Fall (in.)	-	-	-	-	-	-	-	-	-	-	-	-	-
Average Snow Depth (in.)	-	-	-	-	-	-	-	-	-	-	-	-	-

Source: Data reported for Fort Drum 5 NW, Okeechobee County, Florida by Southeast Regional Data climate center, University of North Carolina, Chapel Hill, NC, <http://www.sercc.com/index.php> accessed 1/11/14

Period of Record: 8/1/1948 to 5/15/2011

°F = degrees Fahrenheit

in. = inches

**Table 9.2-2
National Ambient Air Quality Standards**

Pollutant	Averaging Time	Primary Standard		Secondary Standard		Form
		(ppm)	($\mu\text{g}/\text{m}^3$)	(ppm)	($\mu\text{g}/\text{m}^3$)	
Respirable Particulate (PM ₁₀)	24-hour	---	150	---	150	Not to be exceeded more than once per year on average over 3 years
Fine Particulate (PM _{2.5})	24-hour	---	35	---	35	98 th percentile, averaged over 3 years
	Annual	---	12	---	15	Annual mean, averaged over 3 years
Nitrogen Dioxide (NO ₂)	1-hour	0.100	188	---	---	98 th percentile, averaged over 3 years
	Annual	0.053	100	0.053	100	Annual Mean
Sulfur Dioxide (SO ₂)	1-hour	0.075	196	---	---	99 th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	3-hour	---	---	0.5	1,300	Not to be exceeded more than once per year
Carbon Monoxide (CO)	8-hour	9	10,300	---	---	Not to be exceeded more than once per year
	1-hour	35	40,000	---	---	Not to be exceeded more than once per year
Ozone (O ₃)	1-hour	0.12	236	0.12	236	Not to be exceeded more than once per year
	8-hour (2008)	0.075	147	0.075	147	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
	8-hour (1997)	0.08	157	0.08	157	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Lead (Pb)	3-month rolling	---	0.15	---	0.15	Not to be exceeded

ppm = parts per million
 $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter.
 Source: <http://www.epa.gov/air/criteria.html> accessed 02/3/14

Table 9.2-3 Attainment Status of FSC Project Area		
Pollutant	Designation Date	Status / Designation
PM ₁₀	11/15/1990	Unclassifiable
24-hour PM _{2.5}	12/13/2009	Unclassifiable / Attainment
Annual PM _{2.5}	04/05/2005	Unclassifiable / Attainment
NO ₂	n/a	Cannot be classified or better than national standards
SO ₂	n/a	Cannot be classified
CO	11/15/1990	Unclassifiable / Attainment
1-hour O ₃	10/18/2000	Unclassifiable / Attainment
8-hour O ₃ (1997 Standard)	06/15/2004	Unclassifiable / Attainment
8-hour O ₃ (2008 Standard)	07/20/2012	Unclassifiable / Attainment
Pb	12/31/2010	Unclassifiable
Source: 40 CFR 81.310		

**Table 9.2-4
Existing Ambient Air Quality Estimated for the FSC Project Area**

Pollutant	Monitoring Station ID	Averaging Time	Years	Concentrations		Rank	Comment
				(ppm)	($\mu\text{g}/\text{m}^3$)		
PM ₁₀	12-105-6006	24-hour	2010 - 2012	n/a	41.7	H2H	1, 2
PM _{2.5}	12-105-6006	Annual	2010 - 2012	n/a	7.5	Annual mean	1, 2
		24-hour		n/a	15.8	98th percentile	
NO ₂	12-095-2002	1-hour	2010 - 2012	0.029	54.6	98th percentile, averaged over 3 years	2, 3
		Annual		0.014	26.0	Annual Mean	
SO ₂	12-095-2002	1-hour	2010 - 2012	0.0037	9.6	99th Percentile	2, 3
		3-hour		0.0044	11.5	H2H	
CO	12-095-2002	8-hour	2010 - 2012	1.37	1,565	H2H	2, 3
		1-hour		1.67	1,909	H2H	
O ₃	12-105-6006	8-hour	2010 - 2012	0.070	137	H4H	1, 2
		1-hour		0.091	179	H2H	
Pb	n/a	n/a	n/a	n/a	n/a	Largest 3-month rolling average	4

1. Baptist Childrens' Home, 1015 Sikes Blvd., Lakeland, Polk County, Florida.
2. Complete data for 2013 were not available when this report was prepared.
3. Winter Park, Morris Blvd., Winter Park, Orange County, Florida.
4. Representative data for Pb are not available.

H2H = High second high

H4H = High fourth high

Source: EPA AirData <http://www.epa.gov/airdata/>

**Table 9.2-5
Estimated Construction Emissions**

Year and Source	Emissions by Year (tons)							
	CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}	CO ₂	CO _{2e}
2016								
Construction Equipment	193.51	134.01	0.21	15.46	7.77	7.76	30,044	30,295
Commuting / Deliveries	11.49	24.32	0.07	1.51	0.99	0.96	9,484	9,491
Fugitive Dust	---	---	---	---	163.27	18.79	---	---
Open Burning	275.7	7.8	---	47.3	33.6	33.6	6,219	6,251
Total	480.7	166.1	0.28	64.3	205.7	61.1	45,746	46,037
2017								
Construction Equipment	84.24	58.74	0.10	6.99	3.38	3.37	14,818	14,942
Commuting / Deliveries	5.21	10.58	0.04	0.67	0.42	0.41	4,734	4,738
Fugitive Dust	---	---	---	---	81.64	9.39	---	---
Open Burning	137.85	3.91	-	23.66	16.82	16.82	3,109	3,125
Total	227.3	73.2	0.1	31.3	102.3	30.0	22,661	22,805

Table 9.3-1			
Construction Phase Noise Levels for Pipeline Installation			
Construction Phase	Construction Phase Noise Levels (dBA)		
	50 Feet	400 Feet	1000 Feet
Trenching	60 to 90	42 to 72	33 to 63
Pipe Laying	50 to 90	32 to 72	23 to 63
Backfilling	73 to 84	54 to 65	46 to 57

Source: Ebasco Environmental – Sound Cable Project (New York Power Authority, 1987)

Table 9.3-2			
Noise Levels of Major Construction Equipment (dBA)			
Equipment Type	50 Feet	400 Feet	1000 Feet
Trucks	85	66	58
Crane	83	64	56
Roller	89	70	62
Bulldozers	80	61	53
Pickup Trucks	60	41	33
Backhoes	85	66	58
Source: (BBN 1971)			

**Table 9.3-3
Land Use Categories for Estimating Ambient Noise Levels**

Category	Land Use	Description	Estimated Existing Daytime L_{eq}	Estimated Existing L_{dn}
1	Noisy Commercial and Industrial Areas	Very heavy traffic conditions, such as in busy downtown commercial areas, at intersections of mass transportation and other vehicles, including trains, heavy motor trucks and other heavy traffic, and street corners where motor buses and heavy trucks accelerate.	69 dBA	70 dBA
2	Moderate Commercial and Industrial Areas, and Noisy Residential Areas	Heavy traffic areas with conditions similar to Category 1 but with somewhat less traffic, routes of relatively heavy or fast automobile traffic but where heavy truck traffic is not extremely dense, and motor bus routes.	64 dBA	65 dBA
3	Quiet Commercial, Industrial Areas, and Normal Urban and Noisy Residential Areas	Light traffic conditions where no mass transportation vehicles and relatively few automobiles and trucks pass, and where these vehicles generally travel at low speeds. Residential areas and commercial streets and intersections with little traffic comprise this category.	58 dBA	60 dBA
4	Quiet Urban and Normal Residential Areas	These areas are similar to Category 3 above but, for this group, the background is either distant traffic or is unidentifiable.	53 dBA	55 dBA
5	Quiet Suburban Residential Areas	Isolated areas, far from significant sources of sound.	48 dBA	50 dBA
6	Very Quiet, Sparse Suburban or Rural Areas	These areas are similar to Category 5 above but are usually in unincorporated areas and, for this group, there are few if any near neighbors.	43 dBA	45 dBA
Source: ANSI S12.9-1993/Part 3				

**Table 9.3-4
HDD L_{eq} Site Noise Analysis – No Noise Mitigation**

HDD Station	Distance (feet) /Direction to Nearest NSA	Land Use Category ⁽¹⁾	Existing Daytime L _{eq} ⁽¹⁾	Calculated HDD L _{eq} Noise Level (dBA)	Combined Ambient Plus HDD (dBA)	Increase Over Existing Condition (dBA)	Estimated Duration (Days)
MP-12 Johnson Avenue Entry	160 / W	3	58	74	74.1	16.1	11
MP-12 Johnson Avenue Exit	500 / S	3	58	57	60.5	2.5	11
MP-38 Weohyakapka (Walk in Water) Creek Entry	440 / SW	4	53	64	64.3	11.3	11
MP-38 Weohyakapka (Walk in Water) Creek Exit	340 / S	4	53	61	61.6	8.6	11
MP-54 Lake Kissimmee Crossing Entry	670 / NW	4	53	61	61.6	8.6	15
MP-54 Lake Kissimmee Crossing Exit	2,450 / NW	4	53	42	53.3	0.3	15
MP-85 Indian Hammock Trail Entry	420 / SW	4	53	65	65.2	12.2	10
MP-85 Indian Hammock Trail Exit	1,370 / S	4	53	48	54.2	1.2	10
MP-106 State Road 70 Crossing Entry	3,250 / W	4	53	45	53.6	0.6	10
MP-106 State Road 70 Crossing Exit	4,400 / SW	4	53	36	53.1	0.1	10
MP-124 State Road 710 Crossing Entry	500 / NW	4	53	62	62.5	9.5	9
MP-124 State Road 710 Crossing Exit	1,650 / S	4	53	46	53.8	0.8	9
MP-59 Blanket Bay Slough Crossing	>1 Mile	---	---	---	---	---	11
MP-99 Cow Creek Crossing	>1 Mile	---	---	---	---	---	11
MP-115 C-23 Canal Crossing	>1 Mile	---	---	---	---	---	7

(1) Estimated L_{eq} based on land use as set forth in ANSI 12.9-1993/Part 3.

**Table 9.3-5
HDD L_{dn} Site Noise Analysis – No Noise Mitigation**

HDD Station	Distance (feet) /Direction to Nearest NSA	Land Use Category ⁽¹⁾	Existing L _{dn} ⁽¹⁾	Calculated HDD L _{dn} Noise Level (dBA)	Combined Ambient Plus HDD (dBA)	Increase Over Existing Condition (dBA)	Estimated Duration (Days)
MP-12 Johnson Avenue Entry	160 / W	3	60	80.0	80.0	20.0	11
MP-12 Johnson Avenue Exit	500 / S	3	60	63	64.8	4.8	11
MP-38 Weohyakapka (Walk in Water Creek) Entry	440 / SW	4	55	71	71.1	16.1	11
MP-38 Weohyakapka (Walk in Water Creek) Exit	340 / S	4	55	67	67.3	12.3	11
MP-54 Lake Kissimmee Crossing Entry	670 / NW	4	55	67	67.3	12.3	15
MP-54 Lake Kissimmee Crossing Exit	2,450 / NW	4	55	49	56.0	1.0	15
MP-85 Indian Hammock Trail Entry	420 / SW	4	55	71	71.1	16.1	10
MP-85 Indian Hammock Trail Exit	1,370 / S	4	55	55	58.0	3.0	10
MP-106 State Road 70 Crossing Entry	3,250 / W	4	55	52	56.8	1.8	10
MP-106 State Road 70 Crossing Exit	4,400 / SW	4	55	42	55.2	0.2	10
MP-124 State Road 710 Crossing Entry	500 / NW	4	55	68	68.2	13.2	9
MP-124 State Road 710 Crossing Exit	1,650 / S	4	55	52	56.8	1.8	9
MP-59 Blanket Bay Slough Crossing	>1 Mile	---	---	---	---	---	11
MP-99 Cow Creek Crossing	>1 Mile	---	---	---	---	---	11
MP-115 C-23 Canal Crossing	>1 Mile	---	---	---	---	---	7

(1) Estimated L_{dn} based on land use as set forth in ANSI 12.9-1993/Part 3.

FIGURES



Legend

- Pipeline Centerline
- ⊗ NSA Locations
- ⊕ HDD Entry/Exit
- ▭ Permanent Easement
- ▭ Permanent Easement - HDD
- ▭ Temporary Easement
- ▭ Additional TWS

0 250 500
Feet

Sources: ESRI, USGS, FSC, TRC

FLORIDA SOUTHEAST CONNECTION

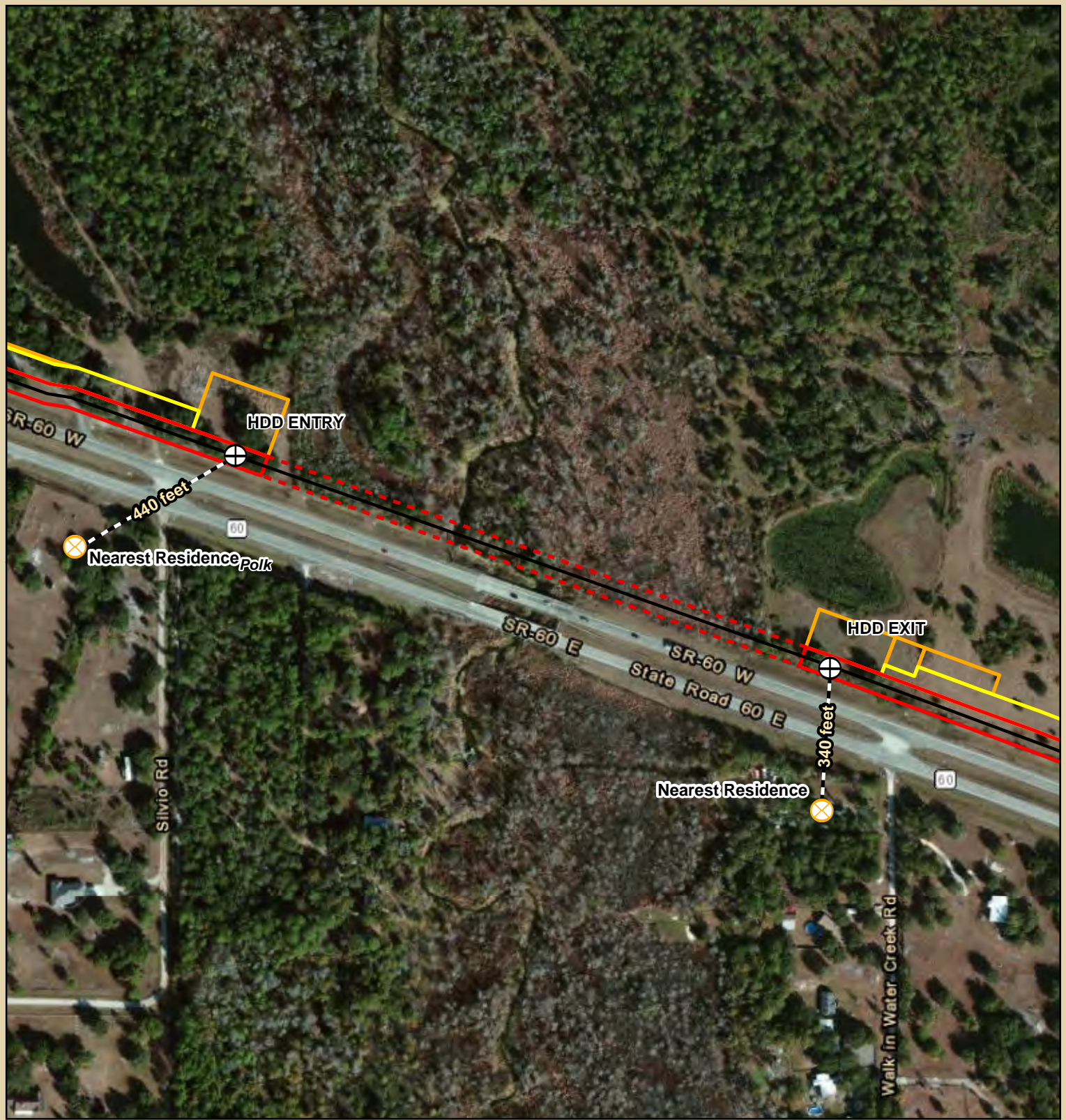
**Figure 9.3-1
Noise Sensitive Areas**

MP-12 – Johnson Avenue

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Legend

- Pipeline Centerline
- ⊗ NSA Locations
- ⊕ HDD Entry/Exit
- ▭ Permanent Easement
- - - Permanent Easement - HDD
- ▭ Temporary Easement
- ▭ Additional TWS

0 250 500
Feet

Sources: ESRI, USGS, FSC, TRC

FLORIDA SOUTHEAST CONNECTION

**Figure 9.3-1
Noise Sensitive Areas**

MP-38 – Walk In Water Creek

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Legend

- Pipeline Centerline
- ⊗ NSA Locations
- ⊕ HDD Entry/Exit
- ▭ Permanent Easement
- ▭ Permanent Easement - HDD
- ▭ Temporary Easement
- ▭ Additional TWS

0 250 500
Feet

Sources: ESRI, USGS, FSC, TRC

FLORIDA SOUTHEAST CONNECTION

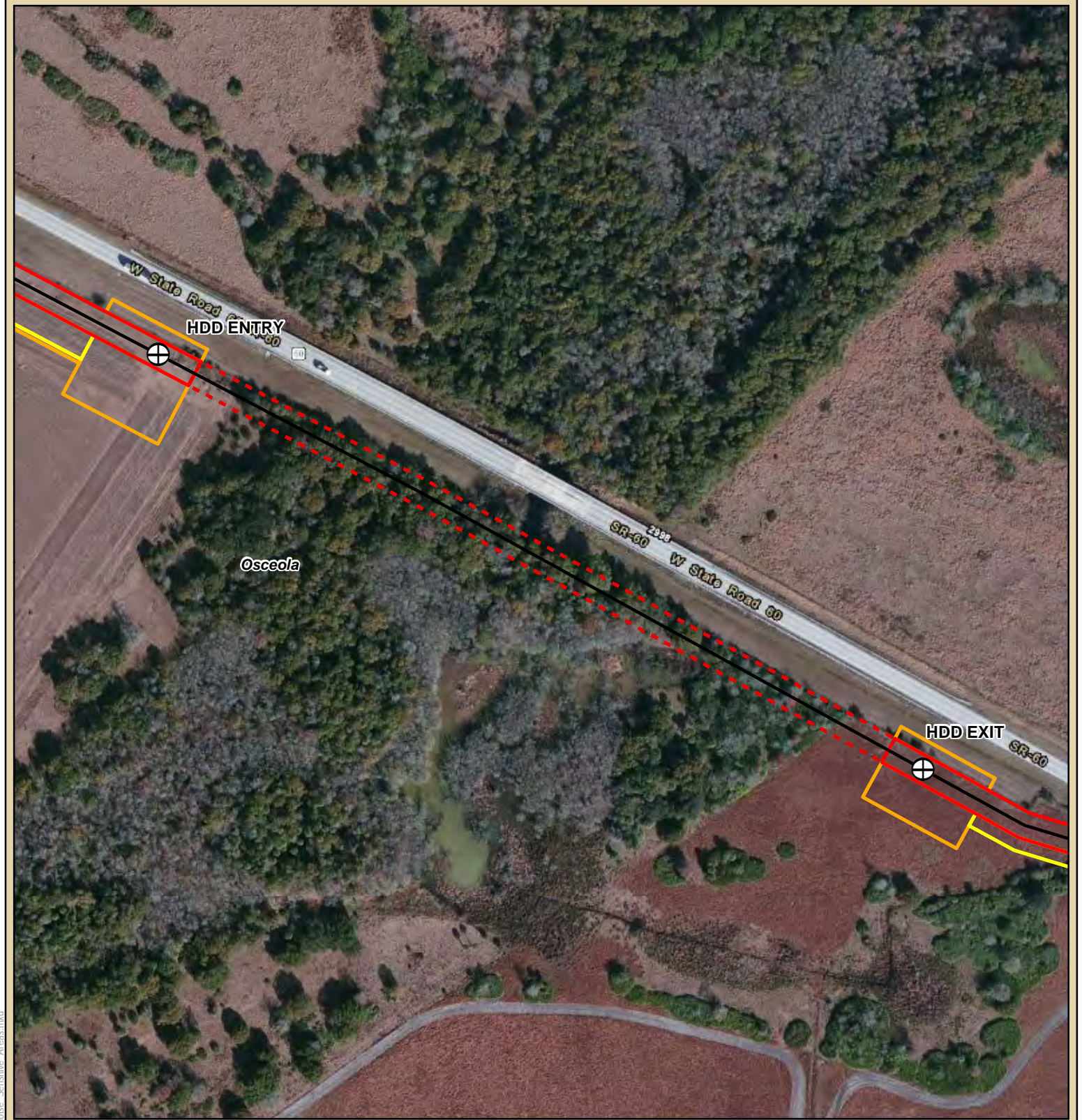
**Figure 9.3-1
Noise Sensitive Areas**

MP-54 Lake Kissimmee

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Legend

- Pipeline Centerline
- ⊗ NSA Locations
- ⊕ HDD Entry/Exit
- ▭ Permanent Easement
- ▭ Permanent Easement - HDD
- ▭ Temporary Easement
- ▭ Additional TWS

0 250 500
Feet

Sources: ESRI, USGS, FSC, TRC

FLORIDA SOUTHEAST CONNECTION

**Figure 9.3-1
Noise Sensitive Areas**

MP-59 Blanket Bay Slough

There are no NSAs within one mile of the HDD entry or exit point shown

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Legend

- Pipeline Centerline
- ⊗ NSA Locations
- ⊕ HDD Entry/Exit
- ▭ Permanent Easement
- ▭ Permanent Easement - HDD
- ▭ Temporary Easement
- ▭ Additional TWS

0 250 500
Feet

Sources: ESRI, USGS, FSC, TRC

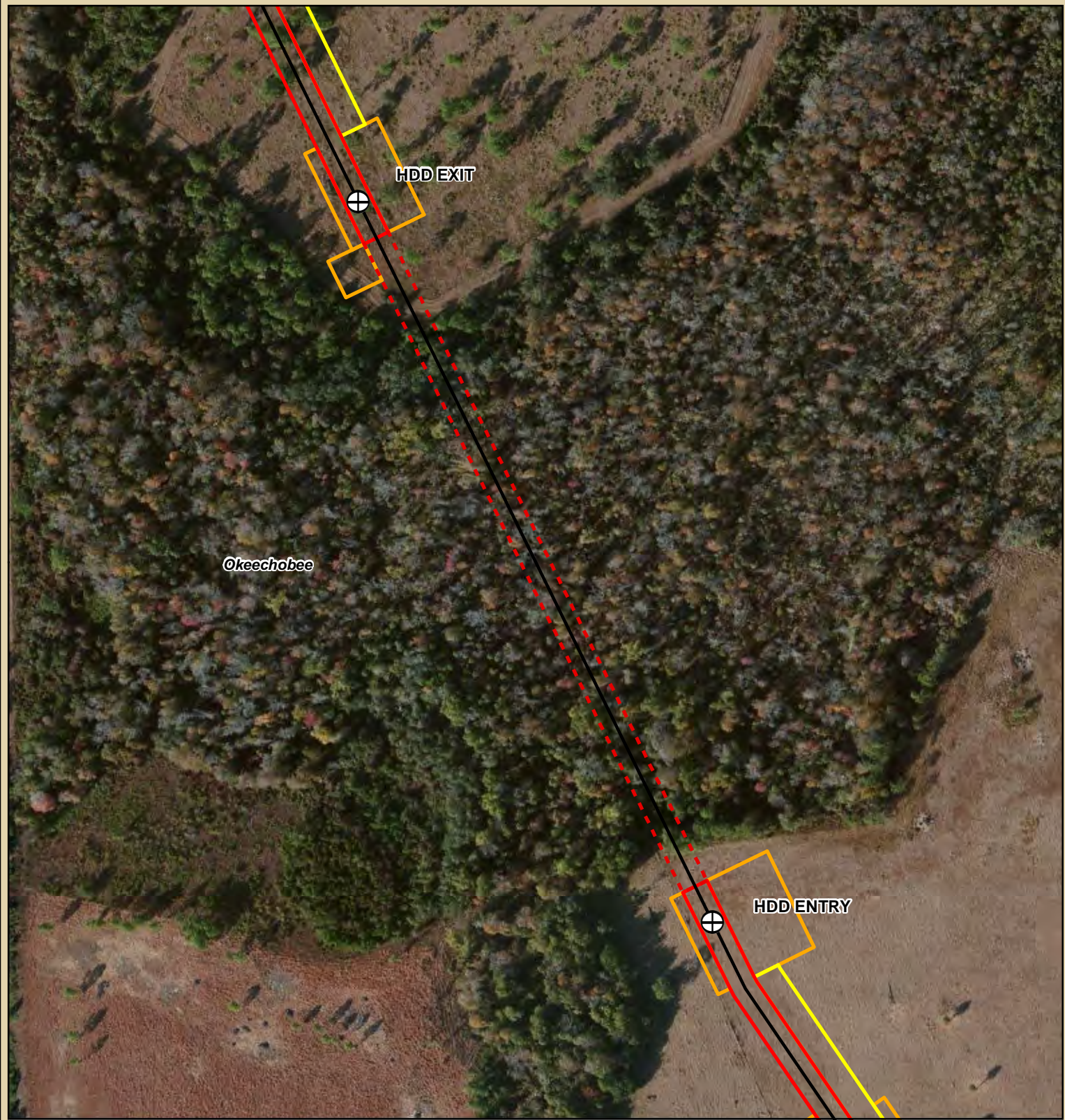
FLORIDA SOUTHEAST CONNECTION

**Figure 9.3-1
Noise Sensitive Areas**

MP-85 Indian Hammock Trail

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9/15/2014



Legend

- Pipeline Centerline
- ⊗ NSA Locations
- ⊕ HDD Entry/Exit
- ▭ Permanent Easement
- ▭ Permanent Easement - HDD
- ▭ Temporary Easement
- ▭ Additional TWS

0 250 500
Feet

Sources: ESRI, USGS, FSC, TRC

FLORIDA SOUTHEAST CONNECTION

**Figure 9.3-1
Noise Sensitive Areas**

MP-99

There are no NSAs within one mile of the HDD entry or exit point shown

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Legend

- Pipeline Centerline
- ⊗ NSA Locations
- ⊕ HDD Entry/Exit
- ▭ Permanent Easement
- ▭ Permanent Easement - HDD
- ▭ Temporary Easement
- ▭ Additional TWS

0 250 500
Feet

Sources: ESRI, USGS, FSC, TRC

FLORIDA SOUTHEAST CONNECTION

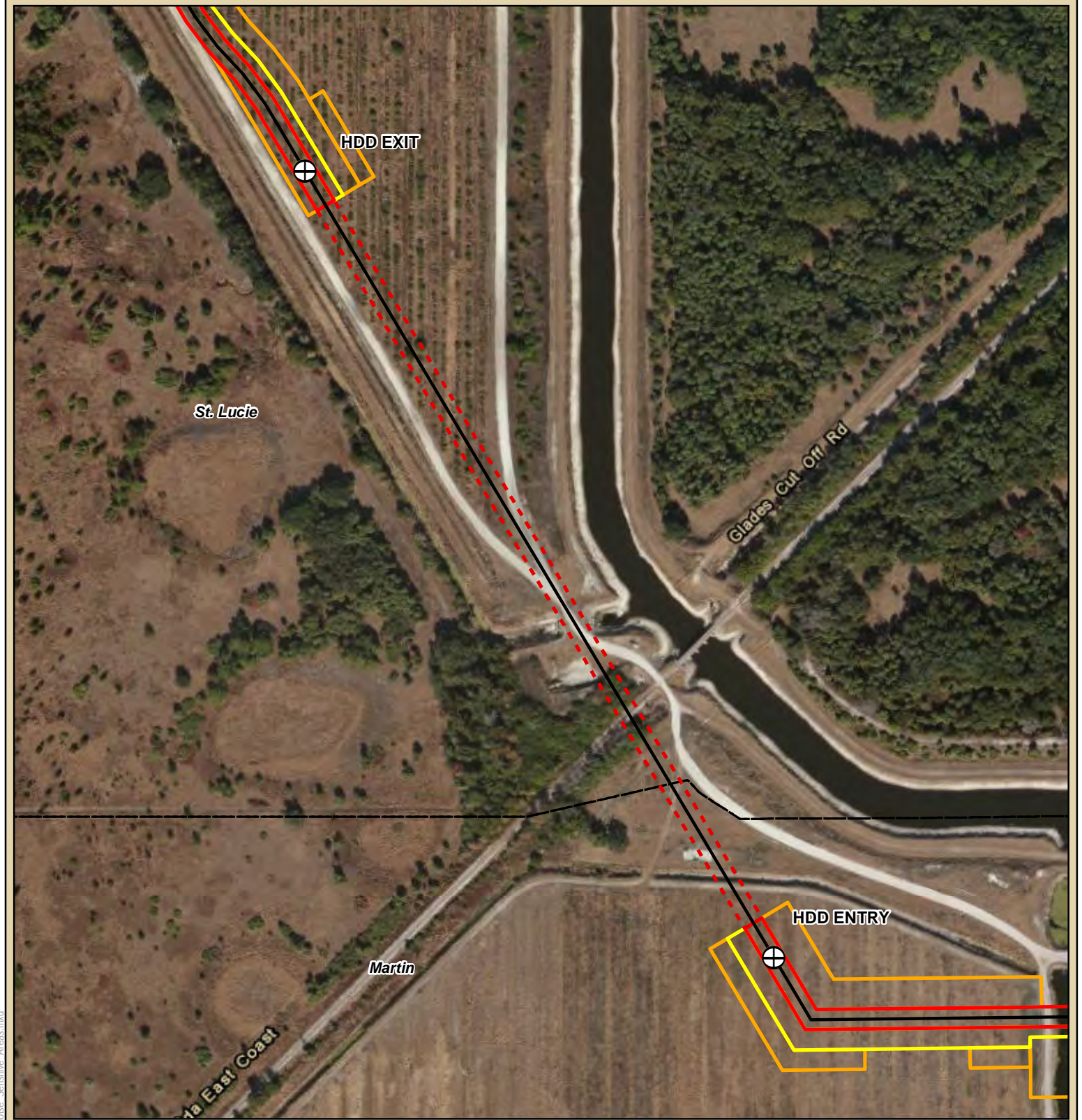
**Figure 9.3-1
Noise Sensitive Areas**

MP-106 - SR 70

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Legend

- Pipeline Centerline
- ⊗ NSA Locations
- ⊕ HDD Entry/Exit
- ▭ Permanent Easement
- ▭ Permanent Easement - HDD
- ▭ Temporary Easement
- ▭ Additional TWS

0 250 500
Feet

Sources: ESRI, USGS, FSC, TRC

FLORIDA SOUTHEAST CONNECTION

**Figure 9.3-1
Noise Sensitive Areas**

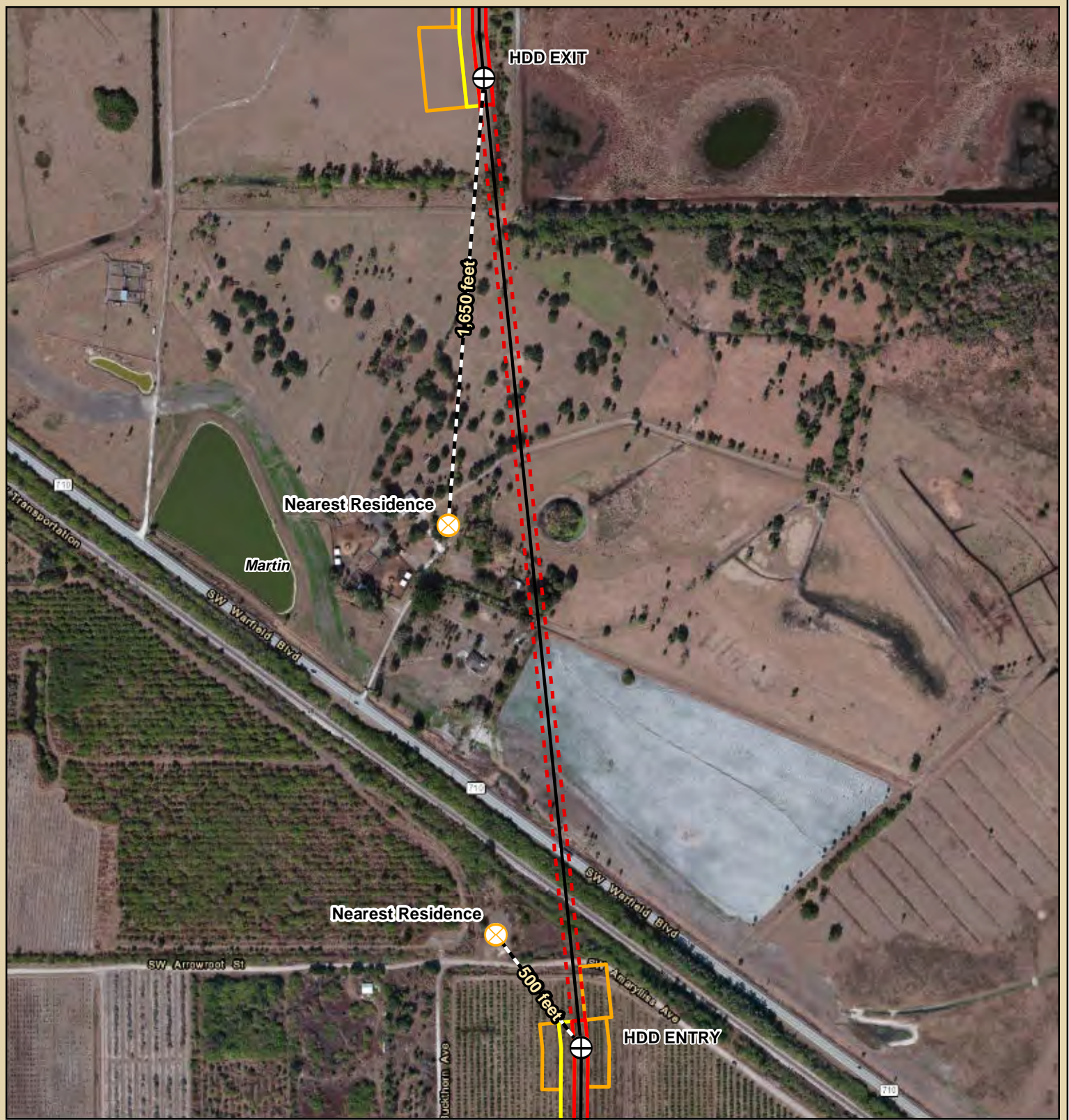
MP-115 C-23 Canal

There are no NSAs within one mile of the HDD entry or exit point shown

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Legend

- Pipeline Centerline
- ⊗ NSA Locations
- ⊕ HDD Entry/Exit
- ▭ Permanent Easement
- ▭ Permanent Easement - HDD
- ▭ Temporary Easement
- ▭ Additional TWS

0 250 500
Feet

Sources: ESRI, USGS, FSC, TRC

FLORIDA SOUTHEAST CONNECTION

**Figure 9.3-1
Noise Sensitive Areas**

MP-124

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APPENDIX 9A

Emission Calculations

Appendix 9A - Emission Calculations
Project Areas and Pipeline Lengths by County

Site	Yards / Staging (acres)	Active Construction (acres)	HDD		Open Burning (acres) ¹	Pipeline Length (miles)
			No. of Locations	Area (acres)		
Martin County						
Additional TWS	-	31.62		-		-
Martin Meter Station	-	0.92		-		0.00
Permanent Easement	-	65.98		-		10.89
Glades Cut Off Rd - HDD	-	-	1	0.46		0.08
State Route 710 - HDD	-	-	1	3.95		0.65
Temporary Easement	-	56.63		-		-
Contractor Yard	42.82	-		-		-
Pipe Storage Yard	26.99	-		-		-
Subtotals	69.81	155.15	2	4.41	95.27	11.62
Okeechobee County						
Additional TWS	-	27.20		-		-
Permanent Easement	-	148.65		-		24.53
Boggy Branch - HDD	-	-	1	1.32		0.22
Cow Creek - HDD	-	-	1	1.55		0.26
Temporary Easement	-	127.27		-		-
MP 77.5 - Pipe Yard	23.06	-		-		-
Subtotals	23.06	303.13	2	2.87	79.61	25.01
Osceola County						
Additional TWS	-	34.61		-		-
Launcher Site	-	0.45		-		-
Permanent Easement	-	143.41		-		23.69
Blanket Bay Slough - HDD	-	-	1	1.69		0.28
Lake Kissimmee - HDD	-	-	1	4.65		0.77
Temporary Easement	-	126.08		-		-
Contractor Yard	112.89	-		-		-
MP 77.5 - Pipe Yard	0.05	-		-		-
Staging Area	4.32	-		-		-
Subtotals	117.25	304.55	2	6.34	85.46	24.74
Polk County						
Additional TWS	-	58.58		-		-
Permanent Easement	-	312.58		-		51.55
Weohyakapka Creek - HDD	-	-	1	1.63		0.27
Cypress Parkway - HDD	-	-	1	1.55		0.26
Lake Kissimmee - HDD	-	-	1	1.77		0.29
Temporary Easement	-	272.39		-		-
Lake Wales Contractor Yard	7.53	-		-		-
MP 4.4 - Contractor Yard	12.76	-		-		-
Subtotals	20.29	643.56	3	4.94	330.74	52.37
St. Lucie County						
Additional TWS	-	20.25		-		-
Permanent Easement	-	73.16		-		12.07
Glades Cut Off Rd - HDD	-	-	1	1.92		0.32
State Route 70 - HDD	-	-	1	1.26		0.21
Temporary Easement	-	55.16		-		-
Subtotals	-	148.57	2	3.19	60.68	12.60
Project Totals	230.41	1,554.96	11	21.75	651.76	126.34
1. Open burning acreage is included in the acreage for Yards / Staging and Active Construction.						

**Table 9.A.1.2 - Florida Southeast Connection
2016 Construction Equipment Criteria Pollutant Tailpipe Emissions**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower	Load Factor	Nonroad Engine Emission Factor (g/hp-hr)						Operating Time (hours)	Pollutant Emissions (tons)					
					On-road Engine Emission Factor (g/VMT)							CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
					CO ²	NO _x ²	SO ₂ ²	VOC ²	PM ₁₀ ²	PM _{2.5} ²							
Build out Yards and set-up field offices																	
D7 Dozer	Diesel	2270002069	235	82%	0.52	1.55	2.9E-03	0.16	0.10	0.10	201	0.02	0.07	1.3E-04	0.01	4.2E-03	4.2E-03
336 Track hoe	Diesel	2270002036	266	82%	0.44	1.34	2.9E-03	0.15	0.08	0.08	201	0.02	0.06	1.4E-04	0.01	3.8E-03	3.8E-03
Pick-up Trucks	Diesel	2016123223	30		1.60	2.02	4.8E-03	0.28	0.10	0.09	1,004	0.05	0.07	1.6E-04	0.01	3.2E-03	3.1E-03
Off Load Rail Cars Transport to Yard and Off Load at Yards																	
Boom Truck	Diesel	2270002045	240	82%	0.43	1.95	3.0E-03	0.17	0.09	0.09	1,607	0.15	0.68	1.1E-03	0.06	0.03	0.03
End Loader	Diesel	2270002066	300	82%	1.93	3.76	3.8E-03	0.54	0.36	0.36	1,607	0.84	1.64	1.7E-03	0.23	0.16	0.16
Pipe Haul Trucks (Sub)	Diesel	2016126123	30		1.39	5.15	0.01	0.30	0.21	0.20	3,214	0.15	0.55	1.5E-03	0.03	0.02	0.02
Pickup Trucks	Diesel	2016123223	30		1.60	2.02	4.8E-03	0.28	0.10	0.09	2,009	0.11	0.13	3.2E-04	0.02	0.01	0.01
Clearing																	
D7 LGP Dozers	Diesel	2270002069	235	82%	0.52	1.55	2.9E-03	0.16	0.10	0.10	1,138	0.13	0.38	7.1E-04	0.04	0.02	0.02
D8 LGP Dozers	Diesel	2270002069	310	82%	0.89	2.22	3.1E-03	0.16	0.13	0.13	1,138	0.28	0.71	1.0E-03	0.05	0.04	0.04
Fecon Shreader(s)	Diesel	2270002081	350	82%	1.42	3.28	3.3E-03	0.22	0.19	0.19	2,277						
336 Track Hoe	Diesel	2270002036	266	82%	0.44	1.34	2.9E-03	0.15	0.08	0.08	1,138	0.12	0.37	7.8E-04	0.04	0.02	0.02
345 Track Hoe	Diesel	2270002036	345	82%	0.77	1.90	3.1E-03	0.15	0.12	0.12	1,138	0.27	0.67	1.1E-03	0.05	0.04	0.04
Grading/Topsoil Segregation																	
D7 LGP Dozers	Diesel	2270002069	235	82%	0.52	1.55	2.9E-03	0.16	0.10	0.10	2,143	0.24	0.71	1.3E-03	0.07	0.04	0.04
D8 LGP Dozers	Diesel	2270002069	310	82%	0.89	2.22	3.1E-03	0.16	0.13	0.13	2,143	0.53	1.33	1.9E-03	0.10	0.08	0.08
336 Track Hoe	Diesel	2270002036	266	82%	0.44	1.34	2.9E-03	0.15	0.08	0.08	3,214	0.34	1.04	2.2E-03	0.12	0.06	0.06
345 Track Hoe	Diesel	2270002036	345	82%	0.77	1.90	3.1E-03	0.15	0.12	0.12	3,214	0.77	1.90	3.1E-03	0.15	0.12	0.12
Stringing Skids and Pipe																	
Skid Truck	Gasoline	2265002072	265	82%	64.68	4.53	0.01	2.00	0.07	0.07	2,411	37.35	2.62	0.01	1.16	0.04	0.04
Boom Truck	Gasoline	2265002045	240	82%	58.03	4.06	0.01	1.78	0.07	0.07	2,411	30.34	2.12	0.01	0.93	0.04	0.04
583 Sideboom	Diesel	2270002045	300	82%	0.74	2.89	3.2E-03	0.18	0.11	0.11	2,411	0.49	1.89	2.1E-03	0.12	0.07	0.07
D6 LGP Dozers	Diesel	2270002069	205	73%	0.52	1.55	2.9E-03	0.16	0.10	0.10	4,821	0.42	1.24	2.3E-03	0.13	0.08	0.08
Athey Wagons	Diesel	2270002069	300	78%	0.89	2.22	3.1E-03	0.16	0.13	0.13	4,821	1.10	2.74	3.9E-03	0.20	0.16	0.16
Pipe Haul Trucks (SUB)	Diesel	2016126123	30		1.39	5.15	0.01	0.30	0.21	0.20	24,105	1.11	4.11	0.01	0.24	0.17	0.16
Field Bending																	
Bender	Diesel	2270002081	50	73%	2.41	3.72	3.6E-03	0.28	0.29	0.29	3,314	0.32	0.50	4.9E-04	0.04	0.04	0.04
125 Air Compressor for mandrel	Gasoline	2265006020	50	73%	21.34	1.89	0.01	0.64	0.07	0.07	3,314	2.85	0.25	1.7E-03	0.09	0.01	0.01
583 Sideboom	Diesel	2270002045	300	64%	0.74	2.89	3.2E-03	0.18	0.11	0.11	3,314	0.52	2.03	2.2E-03	0.13	0.08	0.08
594 Sideboom	Diesel	2270002045	310	64%	0.74	2.89	3.2E-03	0.18	0.11	0.11	3,314	0.54	2.09	2.3E-03	0.13	0.08	0.08

**Table 9.A.1.2 - Florida Southeast Connection
2016 Construction Equipment Criteria Pollutant Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower	Load Factor	Nonroad Engine Emission Factor (g/hp-hr) On-road Engine Emission Factor (g/VMT)						Operating Time (hours)	Pollutant Emissions (tons)					
					CO ²	NO _x ²	SO ₂ ²	VOC ²	PM ₁₀ ²	PM _{2.5} ²		CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
					/ On-Road Ave MPH												
Firing Line Welding																	
125 Air Compressor for mandrel	Gasoline	2265006020	50	55%	21.34	1.89	0.01	0.64	0.07	0.07	3,214	2.08	0.18	1.3E-03	0.06	0.01	0.01
Tack Rig D7 w/ 4 welders	Diesel	2270002069	235	55%	0.52	1.55	2.9E-03	0.16	0.10	0.10	6,428	0.48	1.42	2.7E-03	0.15	0.09	0.09
welder #1	Diesel	2270006025	25	78%	4.09	4.92	4.3E-03	0.93	0.65	0.65	6,428	0.56	0.67	6.0E-04	0.13	0.09	0.09
welder #2	Diesel	2270006025	25	78%	4.09	4.92	4.3E-03	0.93	0.65	0.65	6,428	0.56	0.67	6.0E-04	0.13	0.09	0.09
welder #3	Diesel	2270006025	25	78%	4.09	4.92	4.3E-03	0.93	0.65	0.65	6,428	0.56	0.67	6.0E-04	0.13	0.09	0.09
welder #4	Diesel	2270006025	25	78%	4.09	4.92	4.3E-03	0.93	0.65	0.65	6,428	0.56	0.67	6.0E-04	0.13	0.09	0.09
583 Sideboom	Diesel	2270002045	300	69%	0.74	2.89	3.2E-03	0.18	0.11	0.11	3,214	0.54	2.10	2.3E-03	0.13	0.08	0.08
Morooka Buggies	Diesel	2270002069	300	64%	0.89	2.22	3.1E-03	0.16	0.13	0.13	32,140	6.06	15.11	0.02	1.10	0.87	0.87
Welding Machines	Diesel	2270006025	25	82%	4.09	4.92	4.3E-03	0.93	0.65	0.65	80,350	7.42	8.93	0.01	1.70	1.17	1.17
Field Joint Coating																	
Skid Truck and or Morooka	Diesel	2270002069	300	64%	0.89	2.22	3.1E-03	0.16	0.13	0.13	9,642	1.82	4.53	0.01	0.33	0.26	0.26
FBE Coating Equipment	Gasoline	2265002081	85	87%	65.34	4.58	0.01	2.03	0.07	0.07	6,428	34.04	2.39	0.01	1.06	0.04	0.04
375 Air compressor	Gasoline	2265006020	110	87%	21.34	1.89	0.01	0.64	0.07	0.07	6,428	14.39	1.27	0.01	0.43	0.05	0.05
Ditching																	
336 Track Hoe	Diesel	2270002036	266	82%	0.44	1.34	2.9E-03	0.15	0.08	0.08	7,432	0.78	2.40	0.01	0.27	0.14	0.14
345 Track Hoe	Diesel	2270002036	345	82%	0.77	1.90	3.1E-03	0.15	0.12	0.12	7,432	1.78	4.40	0.01	0.35	0.27	0.27
D7 LGP Dozers	Diesel	2270002069	235	82%	0.52	1.55	2.9E-03	0.16	0.10	0.10	2,477	0.28	0.82	1.5E-03	0.09	0.05	0.05
D8 LGP Dozers	Diesel	2270002069	310	82%	0.89	2.22	3.1E-03	0.16	0.13	0.13	2,477	0.62	1.54	2.2E-03	0.11	0.09	0.09
Lower In and Tie-ins																	
336 Track Hoe	Diesel	2270002036	266	64%	0.44	1.34	2.9E-03	0.15	0.08	0.08	5,223	0.43	1.32	2.8E-03	0.15	0.08	0.08
345 Track Hoe	Diesel	2270002036	345	64%	0.77	1.90	3.1E-03	0.15	0.12	0.12	5,223	0.98	2.41	3.9E-03	0.19	0.15	0.15
583 Sideboom	Diesel	2270002045	300	64%	0.74	2.89	3.2E-03	0.18	0.11	0.11	15,668	2.46	9.58	0.01	0.61	0.37	0.37
594 Sideboom	Diesel	2270002045	310	64%	0.74	2.89	3.2E-03	0.18	0.11	0.11	15,668	2.54	9.90	0.01	0.63	0.38	0.38
Morooka Buggies	Diesel	2270002069	300	55%	0.89	2.22	3.1E-03	0.16	0.13	0.13	10,446	1.69	4.22	0.01	0.31	0.24	0.24
185 Air compressor	Gasoline	2265006020	65	55%	21.34	1.89	0.01	0.64	0.07	0.07	5,223	4.39	0.39	2.7E-03	0.13	0.01	0.01
Welding Machines	Diesel	2270006025	25	64%	4.09	4.92	4.3E-03	0.93	0.65	0.65	17,409	1.25	1.51	1.3E-03	0.29	0.20	0.20
Backfill & Clean-up																	
336 Track Hoe	Diesel	2270002036	266	82%	0.44	1.34	2.9E-03	0.15	0.08	0.08	2,411	0.25	0.78	1.7E-03	0.09	0.05	0.05
345 Track Hoe	Diesel	2270002036	345	82%	0.77	1.90	3.1E-03	0.15	0.12	0.12	2,411	0.58	1.43	2.3E-03	0.12	0.09	0.09
D7 LGP Dozers	Diesel	2270002069	235	82%	0.52	1.55	2.9E-03	0.16	0.10	0.10	4,821	0.54	1.59	3.0E-03	0.17	0.10	0.10
D8 LGP Dozers	Diesel	2270002069	310	82%	0.89	2.22	3.1E-03	0.16	0.13	0.13	4,821	1.20	3.00	4.2E-03	0.22	0.17	0.17
Farm Tractor	Diesel	2270005010	90	82%	4.66	4.34	4.0E-03	0.57	0.38	0.38	4,821	1.83	1.70	1.6E-03	0.22	0.15	0.15

**Table 9.A.1.2 - Florida Southeast Connection
2016 Construction Equipment Criteria Pollutant Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Engine Emission Factor (g/hp-hr) On-road Engine Emission Factor (g/VMT)						Operating Time (hours)	Pollutant Emissions (tons)					
					CO ²	NO _x ²	SO ₂ ²	VOC ²	PM ₁₀ ²	PM _{2.5} ²		CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
Auger Bore Crew																	
Auger Bore Machine 36-600	Diesel	2270002033	116	43%	1.20	4.18	3.3E-03	0.34	0.25	0.25	1,466	0.10	0.34	2.7E-04	0.03	0.02	0.02
3 Axle Flatbed W/12 Ton Crane	Diesel	2270002045	350	43%	0.74	2.89	3.2E-03	0.18	0.11	0.11	1,466	0.18	0.70	7.7E-04	0.04	0.03	0.03
3 Axle Lowboy Tractor & Trailer	Diesel	2016126123	30		1.39	5.15	0.01	0.30	0.21	0.20	1,466	0.07	0.25	6.8E-04	0.01	0.01	0.01
336 Excavator-CAT	Diesel	2270002036	266	59%	0.44	1.34	2.9E-03	0.15	0.08	0.08	1,466	0.11	0.34	7.3E-04	0.04	0.02	0.02
RT-630 Crane-Grove	Diesel	2265002045	160	47%	58.03	4.06	0.01	1.78	0.07	0.07	1,466	7.05	0.49	1.6E-03	0.22	0.01	0.01
SA250 Welding Machine-Lincoln	Diesel	2270006025	40	21%	4.09	4.92	4.3E-03	0.93	0.65	0.65	1,466	0.06	0.07	5.9E-05	0.01	0.01	0.01
G115KW Generator-IR	Diesel	2270006005	125	43%	1.24	4.14	3.3E-03	0.35	0.25	0.25	1,466	0.11	0.36	2.9E-04	0.03	0.02	0.02
3" Ditch Pump	Gasoline	2265006010	4	69%	213.79	2.16	0.02	6.63	0.35	0.35	1,466	0.95	0.01	1.0E-04	0.03	1.6E-03	1.6E-03
Total												178.3	118.1	0.19	14.0	7.0	7.0
HDD Crew - Per Site																	
Forklift, 8000+ Lbs	Diesel	2270002057	110	59%	0.93	2.30	3.2E-03	0.21	0.21	0.21	161	0.01	0.03	3.7E-05	2.4E-03	2.4E-03	2.4E-03
336 Excavator-CAT	Diesel	2270002036	266	59%	0.44	1.34	2.9E-03	0.15	0.08	0.08	161	0.01	0.04	8.0E-05	4.2E-03	2.2E-03	2.2E-03
580SL Backhoe-Case	Diesel	2270002036	110	59%	0.65	1.49	3.0E-03	0.16	0.15	0.15	161	0.01	0.02	3.4E-05	1.9E-03	1.8E-03	1.8E-03
RT-860B Crane-Grove	Diesel	2265002045	190	47%	58.03	4.06	0.01	1.78	0.07	0.07	161	0.92	0.06	2.1E-04	0.03	1.1E-03	1.1E-03
Sam 400 Welder Lincoln	Diesel	2270006025	57	21%	5.39	5.15	4.4E-03	1.00	0.78	0.78	161	0.01	0.01	9.3E-06	2.1E-03	1.6E-03	1.6E-03
G260KW Generator-IR	Diesel	2270006025	310	21%	3.04	4.35	3.9E-03	0.58	0.38	0.38	161	0.04	0.05	4.4E-05	0.01	4.4E-03	4.4E-03
Light Towers	Diesel	2270002027	13	43%	2.42	4.59	4.0E-03	0.49	0.35	0.35	161	2.4E-03	4.5E-03	3.9E-06	4.8E-04	3.5E-04	3.5E-04
1100K # Drill Rig DD-1100RS	Diesel	2270002033	765	43%	1.50	5.59	3.3E-03	0.39	0.23	0.23	161	0.09	0.33	1.9E-04	0.02	0.01	0.01
Mud Tank Cleaning System	Diesel	2270006010	500	43%	1.20	3.92	3.3E-03	0.28	0.18	0.18	241	0.07	0.22	1.9E-04	0.02	0.01	0.01
625K # Drill Rig DD-625	Diesel	2270002033	600	43%	1.45	4.18	3.3E-03	0.27	0.20	0.20	161	0.07	0.19	1.5E-04	0.01	0.01	0.01
Mud Tank Cleaning System	Diesel	2270006010	460	43%	1.20	3.92	3.3E-03	0.28	0.18	0.18	161	0.04	0.14	1.1E-04	0.01	0.01	0.01
150K# Drill Rig	Diesel	2270002033	300	43%	1.25	4.19	3.3E-03	0.28	0.19	0.19	161	0.03	0.10	7.5E-05	0.01	4.3E-03	4.3E-03
Mud Tank Cleaning System	Diesel	2270006010	460	43%	1.20	3.92	3.3E-03	0.28	0.18	0.18	161	0.04	0.14	1.1E-04	0.01	0.01	0.01
80K# Drill Rig	Diesel	2270002033	200	43%	1.03	3.97	3.3E-03	0.31	0.21	0.21	161	0.02	0.06	5.0E-05	4.7E-03	3.1E-03	3.1E-03
Mud Tank Cleaning System	Diesel	2270006010	87	43%	2.36	4.25	3.7E-03	0.47	0.43	0.43	161	0.02	0.03	2.4E-05	3.1E-03	2.8E-03	2.8E-03
3/4 Ton Crew Cab Truck	Diesel	2016123223	30		1.60	2.02	4.8E-03	0.28	0.10	0.09	161	0.01	0.01	2.5E-05	1.5E-03	5.1E-04	5.0E-04
5 Ton Cargo Truck	Diesel	2016126123	30		1.39	5.15	0.01	0.30	0.21	0.20	161	0.01	0.03	7.5E-05	1.6E-03	1.1E-03	1.1E-03
Total												1.38	1.4	1.4E-03	0.13	0.1	0.1
¹ User's Guide for the Final NONROAD2005, except as noted Model, EPA420-R-05-013, US EPA, December 2005 (non-road engines) Motor Vehicle Emission Simulator (MOVES) - User Guide for MOVES2010b, U.S. Environmental Protection Agency, June 2013 (onroad engines) ² EPA NONROAD2008 run for calendar year 2016, Florida (or nonroad engine), MOVES 2010b (onroad engine)																	

**Table 9.A.1.3 - Florida Southeast Connection
2016 Construction Equipment Greenhouse Gas Tailpipe Emissions**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Emission Factor (g/hp-hr) On-road Emission Factor (g/VMT)				Operating Time (hours)	Pollutant Emissions (tons)			
					CO ₂ ²	CH ₄ ³	N ₂ O ³	CO ₂ e ⁴		CO ₂	N ₂ O	CH ₄	CO ₂ e
Build out Yards and set-up field offices													
D7 Dozer	Diesel	2270002069	235	82%	536	0.030	0.014	541	201	23	1.3E-03	5.8E-04	23
336 Track hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	201	26	1.5E-03	6.6E-04	26
Pick-up Trucks	Diesel	2016123223	30		642			643	1,004	21	-	-	21
Off Load Rail Cars Transport to Yard and Off Load at Yards													
Boom Truck	Diesel	2270002045	240	82%	530	0.030	0.014	535	1,607	185	0.01	4.7E-03	187
End Loader	Diesel	2270002066	300	82%	625	0.035	0.016	630	1,607	272	0.02	0.01	275
Pipe Haul Trucks (Sub)	Diesel	2016126123	30		1,939			1,941	3,214	206	-	-	206
Pickup Trucks	Diesel	2016123223	30		642			643	2,009	43	-	-	43
Clearing													
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	1,138	130	0.01	3.3E-03	131
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	1,138	171	0.01	4.4E-03	173
Fecon Shreader(s)	Diesel	2270002081	350	82%	536	0.030	0.014	541	2,277	386	0.02	0.01	390
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	1,138	147	0.01	3.7E-03	148
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	1,138	190	0.01	4.8E-03	192
Grading/Topsoil Segregation													
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	2,143	244	0.01	0.01	246
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	2,143	322	0.02	0.01	325
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	3,214	414	0.02	0.01	418
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	3,214	538	0.03	0.01	542
Stringing Skids and Pipe													
Skid Truck	Gasoline	2265002072	265	82%	745	0.042	0.017	751	2,411	430	0.02	0.01	434
Boom Truck	Gasoline	2265002045	240	82%	737	0.042	0.017	743	2,411	386	0.02	0.01	389
583 Sideboom	Diesel	2270002045	300	82%	530	0.030	0.014	535	2,411	347	0.02	0.01	350
D6 LGP Dozers	Diesel	2270002069	205	73%	536	0.030	0.014	541	4,821	427	0.02	0.01	430
Atthey Wagons	Diesel	2270002069	300	78%	536	0.030	0.014	541	4,821	663	0.04	0.02	669
Pipe Haul Trucks (SUB)	Diesel	2016126123	30		1,939			1,941	24,105	1,546	-	-	1,547
Field Bending													
Bender	Diesel	2270002081	50	73%	595	0.034	0.015	601	3,314	79	4.5E-03	2.0E-03	80
125 Air Compressor for mandrel	Gasoline	2265006020	50	73%	709	0.040	0.016	715	3,314	95	0.01	2.2E-03	95
583 Sideboom	Diesel	2270002045	300	64%	530	0.030	0.014	535	3,314	372	0.02	0.01	375
594 Sideboom	Diesel	2270002045	310	64%	530	0.030	0.014	535	3,314	385	0.02	0.01	388

**Table 9.A.1.3 - Florida Southeast Connection
2016 Construction Equipment Greenhouse Gas Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Emission Factor (g/hp-hr) On-road Emission Factor (g/VMT)				Operating Time (hours)	Pollutant Emissions (tons)			
					CO ₂ ²	CH ₄ ³	N ₂ O ³	CO ₂ e ⁴		CO ₂	N ₂ O	CH ₄	CO ₂ e
Firing Line Welding													
125 Air Compressor for mandrel	Gasoline	2265006020	50	55%	709	0.040	0.016	715	3,214	69	3.9E-03	1.6E-03	70
Tack Rig D7 w/ 4 welders	Diesel	2270002069	235	55%	536	0.030	0.014	541	6,428	491	0.03	0.01	496
welder #1	Diesel	2270006025	25	78%	693	0.039	0.018	699	6,428	95	0.01	2.4E-03	96
welder #2	Diesel	2270006025	25	78%	693	0.039	0.018	699	6,428	95	0.01	2.4E-03	96
welder #3	Diesel	2270006025	25	78%	693	0.039	0.018	699	6,428	95	0.01	2.4E-03	96
welder #4	Diesel	2270006025	25	78%	693	0.039	0.018	699	6,428	95	0.01	2.4E-03	96
583 Sideboom	Diesel	2270002045	300	69%	530	0.030	0.014	535	3,214	386	0.02	0.01	390
Morooka Buggies	Diesel	2270002069	300	64%	536	0.030	0.014	541	32,140	3,648	0.21	0.09	3,681
Welding Machines	Diesel	2270006025	25	82%	693	0.039	0.018	699	80,350	1,258	0.07	0.03	1,270
Field Joint Coating													
Skid Truck and or Morooka	Diesel	2270002069	300	64%	536	0.030	0.014	541	9,642	1,094	0.06	0.03	1,104
FBE Coating Equipment	Gasoline	2265002081	85	87%	745	0.042	0.017	752	6,428	388	0.02	0.01	392
375 Air compressor	Gasoline	2265006020	110	87%	709	0.040	0.016	715	6,428	478	0.03	0.01	482
Ditching													
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	7,432	958	0.05	0.02	967
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	7,432	1,243	0.07	0.03	1,254
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	2,477	372	0.02	0.01	376
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	2,477	372	0.02	0.01	376
Lower In and Tie-ins													
336 Track Hoe	Diesel	2270002036	266	64%	536	0.030	0.014	541	5,223	526	0.03	0.01	530
345 Track Hoe	Diesel	2270002036	345	64%	536	0.030	0.014	541	5,223	682	0.04	0.02	688
583 Sideboom	Diesel	2270002045	300	64%	530	0.030	0.014	535	15,668	1,759	0.10	0.04	1,775
594 Sideboom	Diesel	2270002045	310	64%	530	0.030	0.014	535	15,668	1,818	0.10	0.05	1,834
Morooka Buggies	Diesel	2270002069	300	55%	536	0.030	0.014	541	10,446	1,019	0.06	0.03	1,028
185 Air compressor	Gasoline	2265006020	65	55%	709	0.040	0.018	716	5,223	146	0.01	3.7E-03	147
Welding Machines	Diesel	2270006025	25	64%	693	0.039	0.016	699	17,409	213	0.01	4.8E-03	215
Backfill & Clean-up													
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	2,411	311	0.02	0.01	314
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	2,411	403	0.02	0.01	407
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	4,821	549	0.03	0.01	554
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	4,821	724	0.04	0.02	731
Farm Tractor	Diesel	2270005010	90	82%	594	0.034	0.015	600	4,821	233	0.01	0.01	235

**Table 9.A.1.3 - Florida Southeast Connection
2016 Construction Equipment Greenhouse Gas Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Emission Factor (g/hp-hr) On-road Emission Factor (g/VMT)				Operating Time (hours)	Pollutant Emissions (tons)			
					CO ₂ ²	CH ₄ ³	N ₂ O ³	CO ₂ e ⁴		CO ₂	N ₂ O	CH ₄	CO ₂ e
Auger Bore Crew													
Auger Bore Machine 36-600	Diesel	2270002033	116	43%	530	0.030	0.013	535	1,466	43	2.4E-03	1.1E-03	43
3 Axle Flatbed W/12 Ton Crane	Diesel	2270002045	350	43%	530	0.030	0.014	535	1,466	129	0.01	3.3E-03	130
3 Axle Lowboy Tractor & Trailer	Diesel	2016126123	30		1,939			1,941	1,466	94	-	-	94
336 Excavator-CAT	Diesel	2270002036	266	59%	536	0.030	0.014	541	1,466	136	0.01	3.5E-03	137
RT-630 Crane-Grove	Diesel	2265002045	160	47%	737	0.042	0.017	743	1,466	90	0.01	2.0E-03	90
SA250 Welding Machine-Lincoln	Diesel	2270006025	40	21%	693	0.039	0.016	699	1,466	9	5.4E-04	2.1E-04	9
G115KW Generator-IR	Diesel	2270006005	125	43%	530	0.030	0.012	534	1,466	46	2.6E-03	1.0E-03	46
3" Ditch Pump	Gasoline	2265006010	4	69%	1,228	0.070	0.028	1,238	1,466	5	3.1E-04	1.2E-04	6
Total										27,750	1.47	0.65	27,982
HDD Crew - Per Site													
Forklift, 8000+ Lbs	Diesel	2270002057	110	59%	536	0.030	0.014	541	161	6	3.5E-04	1.6E-04	6
336 Excavator-CAT	Diesel	2270002036	266	59%	536	0.030	0.014	541	161	15	8.5E-04	3.8E-04	15
580SL Backhoe-Case	Diesel	2270002036	110	59%	536	0.030	0.014	541	161	6	3.5E-04	1.6E-04	6
RT-860B Crane-Grove	Diesel	2265002045	190	47%	737	0.042	0.019	744	161	12	6.6E-04	3.0E-04	12
Sam 400 Welder Lincoln	Diesel	2270006025	57	21%	693	0.039	0.018	699	161	1	8.3E-05	3.7E-05	1
G260KW Generator-IR	Diesel	2270006025	310	21%	625	0.035	0.016	630	161	7	4.1E-04	1.8E-04	7
Light Towers	Diesel	2270002027	13	43%	589	0.033	0.015	594	161	1	3.3E-05	1.5E-05	1
1100K # Drill Rig DD-1100RS	Diesel	2270002033	765	43%	530	0.030	0.013	535	161	31	1.8E-03	7.9E-04	31
Mud Tank Cleaning System	Diesel	2270006010	500	43%	530	0.030	0.014	535	241	30	1.7E-03	7.7E-04	31
625K # Drill Rig DD-625	Diesel	2270002033	600	43%	530	0.030	0.014	535	161	24	1.4E-03	6.2E-04	24
Mud Tank Cleaning System	Diesel	2270006010	460	43%	530	0.030	0.014	535	161	19	1.1E-03	4.7E-04	19
150K# Drill Rig	Diesel	2270002033	300	43%	530	0.030	0.014	535	161	12	6.9E-04	3.1E-04	12
Mud Tank Cleaning System	Diesel	2270006010	460	43%	530	0.030	0.014	535	161	19	1.1E-03	4.7E-04	19
80K# Drill Rig	Diesel	2270002033	200	43%	530	0.030	0.013	535	161	8	4.6E-04	2.1E-04	8
Mud Tank Cleaning System	Diesel	2270006010	87	43%	589	0.033	0.015	594	161	4	2.2E-04	9.9E-05	4
3/4 Ton Crew Cab Truck	Diesel	2016123223	30		642			643	161	3	-	-	3
5 Ton Cargo Truck	Diesel	2016126123	30		1,939			1,941	161	10	-	-	10
Total										208.5	1.1E-02	5.0E-03	210.3
<p>1. User's Guide for the Final NONROAD2005, except as noted Model, EPA420-R-05-013, US EPA, December 2005 (non-road engines) Motor Vehicle Emission Simulator (MOVES) - User Guide for MOVES2010b, U.S. Environmental Protection Agency, June 2013 (onroad engines)</p> <p>2. EPA NONROAD2008 run for calendar year 2016, Florida (or nonroad engine), MOVES 2010b (onroad engine)</p> <p>3. 2014 Climate Registry Default Emission Factors, Released: January 10, 2014, Tables 13.1 and 13.7., ratioed based on CO₂ emission factor from NONROAD. http://www.theclimateregistry.org/resources/protocols/general-reporting-protocol/</p> <p>4. For nonroad engines, the GWPs of CO₂, CH₄, and N₂O are 1, 25, and 298, respectively. For on-road engines, CO₂e is obtained directly from MOVES.</p>													

**Table 9.A.1.4 - Florida Southeast Connection
2017 Construction Equipment Criteria Pollutant Tailpipe Emissions**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Engine Emission Factor (g/hp-hr) On-road Engine Emission Factor (g/VMT)						Operating Time (hours)	Pollutant Emissions (tons)					
					CO ²	NO _x ²	SO ₂ ²	VOC ²	PM ₁₀ ²	PM _{2.5} ²		CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
					Build out Yards and set-up field offices												
D7 Dozer	Diesel	2270002069	235	82%	0.42	1.28	2.9E-03	0.15	0.08	0.08	99	0.01	0.03	6.0E-05	3.2E-03	1.6E-03	1.6E-03
336 Track hoe	Diesel	2270002036	266	82%	0.32	1.07	2.8E-03	0.15	0.05	0.05	99	0.01	0.03	6.6E-05	3.5E-03	1.3E-03	1.3E-03
Pick-up Trucks	Diesel	2017123223	30		1.49	1.85	4.7E-03	0.25	0.08	0.08	496	0.02	0.03	7.7E-05	4.0E-03	1.4E-03	1.4E-03
Off Load Rail Cars Transport to Yard and Off Load at Yards																	
Boom Truck	Diesel	2270002045	240	82%	0.37	1.67	3.0E-03	0.17	0.07	0.07	793	0.06	0.29	5.1E-04	0.03	0.01	0.01
End Loader	Diesel	2270002066	300	82%	1.77	3.45	3.7E-03	0.50	0.33	0.33	793	0.38	0.74	8.1E-04	0.11	0.07	0.07
Pipe Haul Trucks (Sub)	Diesel	2017126123	30		1.21	4.48	0.01	0.26	0.18	0.17	1,586	0.06	0.23	7.3E-04	0.01	0.01	0.01
Pickup Trucks	Diesel	2017123223	30		1.49	1.85	4.7E-03	0.25	0.08	0.08	991	0.05	0.06	1.5E-04	0.01	2.8E-03	2.7E-03
Clearing																	
D7 LGP Dozers	Diesel	2270002069	235	82%	0.42	1.28	2.9E-03	0.15	0.08	0.08	562	0.05	0.15	3.4E-04	0.02	0.01	0.01
D8 LGP Dozers	Diesel	2270002069	310	82%	0.78	1.93	3.1E-03	0.16	0.11	0.11	562	0.12	0.30	4.8E-04	0.02	0.02	0.02
Fecon Shreader(s)	Diesel	2270002081	350	82%	1.29	3.00	3.2E-03	0.20	0.18	0.18	1,123						
336 Track Hoe	Diesel	2270002036	266	82%	0.32	1.07	2.8E-03	0.15	0.05	0.05	562	0.04	0.14	3.7E-04	0.02	0.01	0.01
345 Track Hoe	Diesel	2270002036	345	82%	0.66	1.63	3.0E-03	0.15	0.10	0.10	562	0.12	0.29	5.2E-04	0.03	0.02	0.02
Grading/Topsoil Segregation																	
D7 LGP Dozers	Diesel	2270002069	235	82%	0.42	1.28	2.9E-03	0.15	0.08	0.08	1,057	0.09	0.29	6.4E-04	0.03	0.02	0.02
D8 LGP Dozers	Diesel	2270002069	310	82%	0.78	1.93	3.1E-03	0.16	0.11	0.11	1,057	0.23	0.57	9.0E-04	0.05	0.03	0.03
336 Track Hoe	Diesel	2270002036	266	82%	0.32	1.07	2.8E-03	0.15	0.05	0.05	1,586	0.12	0.41	1.1E-03	0.06	0.02	0.02
345 Track Hoe	Diesel	2270002036	345	82%	0.66	1.63	3.0E-03	0.15	0.10	0.10	1,586	0.33	0.81	1.5E-03	0.07	0.05	0.05
Stringing Skids and Pipe																	
Skid Truck	Gasoline	2265002072	265	82%	57.59	4.04	0.01	1.77	0.07	0.07	1,189	16.41	1.15	3.8E-03	0.50	0.02	0.02
Boom Truck	Gasoline	2265002045	240	82%	50.38	3.53	0.01	1.53	0.07	0.07	1,189	13.00	0.91	3.4E-03	0.40	0.02	0.02
583 Sideboom	Diesel	2270002045	300	82%	0.67	2.58	3.1E-03	0.18	0.10	0.10	1,189	0.22	0.83	1.0E-03	0.06	0.03	0.03
D6 LGP Dozers	Diesel	2270002069	205	73%	0.42	1.28	2.9E-03	0.15	0.08	0.08	2,379	0.16	0.50	1.1E-03	0.06	0.03	0.03
Athey Wagons	Diesel	2270002069	300	78%	0.78	1.93	3.1E-03	0.16	0.11	0.11	2,379	0.48	1.18	1.9E-03	0.10	0.07	0.07
Pipe Haul Trucks (SUB)	Diesel	2017126123	30		1.21	4.48	0.01	0.26	0.18	0.17	11,895	0.48	1.76	0.01	0.10	0.07	0.07
Field Bending																	
Bender	Diesel	2270002081	50	73%	2.16	3.59	3.6E-03	0.25	0.25	0.25	1,636	0.14	0.24	2.3E-04	0.02	0.02	0.02
125 Air Compressor for mandrel	Gasoline	2265006020	50	73%	18.82	1.67	0.01	0.56	0.07	0.07	1,636	1.24	0.11	8.5E-04	0.04	4.5E-03	4.5E-03
583 Sideboom	Diesel	2270002045	300	64%	0.67	2.58	3.1E-03	0.18	0.10	0.10	1,636	0.23	0.89	1.1E-03	0.06	0.03	0.03
594 Sideboom	Diesel	2270002045	310	64%	0.67	2.58	3.1E-03	0.18	0.10	0.10	1,636	0.24	0.92	1.1E-03	0.06	0.04	0.04

**Table 9.A.1.4 - Florida Southeast Connection
2017 Construction Equipment Criteria Pollutant Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Engine Emission Factor (g/hp-hr) On-road Engine Emission Factor (g/VMT)						Operating Time (hours)	Pollutant Emissions (tons)					
					CO ²	NO _x ²	SO ₂ ²	VOC ²	PM ₁₀ ²	PM _{2.5} ²		CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
					Firing Line Welding												
125 Air Compressor for mandrel	Gasoline	2265006020	50	55%	18.82	1.67	0.01	0.56	0.07	0.07	1,586	0.90	0.08	6.2E-04	0.03	3.3E-03	3.3E-03
Tack Rig D7 w/ 4 welders	Diesel	2270002069	235	55%	0.42	1.28	2.9E-03	0.15	0.08	0.08	3,172	0.19	0.58	1.3E-03	0.07	0.03	0.03
welder #1	Diesel	2270006025	25	78%	3.59	4.72	4.3E-03	0.80	0.57	0.57	3,172	0.24	0.32	2.9E-04	0.05	0.04	0.04
welder #2	Diesel	2270006025	25	78%	3.59	4.72	4.3E-03	0.80	0.57	0.57	3,172	0.24	0.32	2.9E-04	0.05	0.04	0.04
welder #3	Diesel	2270006025	25	78%	3.59	4.72	4.3E-03	0.80	0.57	0.57	3,172	0.24	0.32	2.9E-04	0.05	0.04	0.04
welder #4	Diesel	2270006025	25	78%	3.59	4.72	4.3E-03	0.80	0.57	0.57	3,172	0.24	0.32	2.9E-04	0.05	0.04	0.04
583 Sideboom	Diesel	2270002045	300	69%	0.67	2.58	3.1E-03	0.18	0.10	0.10	1,586	0.24	0.93	1.1E-03	0.06	0.04	0.04
Morooka Buggies	Diesel	2270002069	300	64%	0.78	1.93	3.1E-03	0.16	0.11	0.11	15,860	2.63	6.49	0.01	0.52	0.39	0.39
Welding Machines	Diesel	2270006025	25	82%	3.59	4.72	4.3E-03	0.80	0.57	0.57	39,650	3.22	4.23	3.8E-03	0.72	0.51	0.51
Field Joint Coating																	
Skid Truck and or Morooka	Diesel	2270002069	300	64%	0.78	1.93	3.1E-03	0.16	0.11	0.11	4,758	0.79	1.95	3.1E-03	0.16	0.12	0.12
FBE Coating Equipment	Gasoline	2265002081	85	87%	58.29	4.09	0.01	1.79	0.07	0.07	3,172	14.98	1.05	3.5E-03	0.46	0.02	0.02
375 Air compressor	Gasoline	2265006020	110	87%	18.82	1.67	0.01	0.56	0.07	0.07	3,172	6.26	0.55	4.3E-03	0.19	0.02	0.02
Ditching																	
336 Track Hoe	Diesel	2270002036	266	82%	0.32	1.07	2.8E-03	0.15	0.05	0.05	3,668	0.29	0.94	2.4E-03	0.13	0.05	0.05
345 Track Hoe	Diesel	2270002036	345	82%	0.66	1.63	3.0E-03	0.15	0.10	0.10	3,668	0.76	1.87	3.4E-03	0.17	0.12	0.12
D7 LGP Dozers	Diesel	2270002069	235	82%	0.42	1.28	2.9E-03	0.15	0.08	0.08	1,223	0.11	0.33	7.4E-04	0.04	0.02	0.02
D8 LGP Dozers	Diesel	2270002069	310	82%	0.78	1.93	3.1E-03	0.16	0.11	0.11	1,223	0.27	0.66	1.0E-03	0.05	0.04	0.04
Lower In and Tie-ins																	
336 Track Hoe	Diesel	2270002036	266	64%	0.32	1.07	2.8E-03	0.15	0.05	0.05	2,577	0.16	0.52	1.3E-03	0.07	0.03	0.03
345 Track Hoe	Diesel	2270002036	345	64%	0.66	1.63	3.0E-03	0.15	0.10	0.10	2,577	0.41	1.02	1.9E-03	0.09	0.06	0.06
583 Sideboom	Diesel	2270002045	300	64%	0.67	2.58	3.1E-03	0.18	0.10	0.10	7,732	1.09	4.23	0.01	0.29	0.16	0.16
594 Sideboom	Diesel	2270002045	310	64%	0.67	2.58	3.1E-03	0.18	0.10	0.10	7,732	1.13	4.37	0.01	0.30	0.17	0.17
Morooka Buggies	Diesel	2270002069	300	55%	0.78	1.93	3.1E-03	0.16	0.11	0.11	5,154	0.73	1.81	2.9E-03	0.15	0.11	0.11
185 Air compressor	Gasoline	2265006020	65	55%	18.82	1.67	0.01	0.56	0.07	0.07	2,577	1.91	0.17	1.3E-03	0.06	0.01	0.01
Welding Machines	Diesel	2270006025	25	64%	3.59	4.72	4.3E-03	0.80	0.57	0.57	8,591	0.54	0.72	6.5E-04	0.12	0.09	0.09
Backfill & Clean-up																	
336 Track Hoe	Diesel	2270002036	266	82%	0.32	1.07	2.8E-03	0.15	0.05	0.05	1,189	0.09	0.31	7.9E-04	0.04	0.02	0.02
345 Track Hoe	Diesel	2270002036	345	82%	0.66	1.63	3.0E-03	0.15	0.10	0.10	1,189	0.25	0.61	1.1E-03	0.06	0.04	0.04
D7 LGP Dozers	Diesel	2270002069	235	82%	0.42	1.28	2.9E-03	0.15	0.08	0.08	2,379	0.21	0.65	1.4E-03	0.08	0.04	0.04
D8 LGP Dozers	Diesel	2270002069	310	82%	0.78	1.93	3.1E-03	0.16	0.11	0.11	2,379	0.52	1.29	2.0E-03	0.10	0.08	0.08
Farm Tractor	Diesel	2270005010	90	82%	4.60	4.33	4.0E-03	0.57	0.37	0.37	2,379	0.89	0.84	7.8E-04	0.11	0.07	0.07

**Table 9.A.1.4 - Florida Southeast Connection
2017 Construction Equipment Criteria Pollutant Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Engine Emission Factor (g/hp-hr) On-road Engine Emission Factor (g/VMT)						Operating Time (hours)	Pollutant Emissions (tons)					
					CO ²	NO _x ²	SO ₂ ²	VOC ²	PM ₁₀ ²	PM _{2.5} ²		CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}
Auger Bore Crew																	
Auger Bore Machine 36-600	Diesel	2270002033	116	43%	1.10	3.87	3.3E-03	0.32	0.23	0.23	724	0.04	0.15	1.3E-04	0.01	0.01	0.01
3 Axle Flatbed W/12 Ton Crane	Diesel	2270002045	350	43%	0.67	2.58	3.1E-03	0.18	0.10	0.10	724	0.08	0.31	3.7E-04	0.02	0.01	0.01
3 Axle Lowboy Tractor & Trailer	Diesel	2017126123	30		1.21	4.48	0.01	0.26	0.18	0.17	724	0.03	0.11	3.3E-04	0.01	4.3E-03	4.1E-03
336 Excavator-CAT	Diesel	2270002036	266	59%	0.32	1.07	2.8E-03	0.15	0.05	0.05	724	0.04	0.13	3.5E-04	0.02	0.01	0.01
RT-630 Crane-Grove	Diesel	2265002045	160	47%	50.38	3.53	0.01	1.53	0.07	0.07	724	3.02	0.21	8.0E-04	0.09	4.1E-03	4.1E-03
SA250 Welding Machine-Lincoln	Diesel	2270006025	40	21%	3.59	4.72	4.3E-03	0.80	0.57	0.57	724	0.02	0.03	2.9E-05	0.01	3.8E-03	3.8E-03
G115KW Generator-IR	Diesel	2270006005	125	43%	1.15	3.85	3.3E-03	0.33	0.23	0.23	724	0.05	0.17	1.4E-04	0.01	0.01	0.01
3" Ditch Pump	Gasoline	2265006010	4	69%	213.8	2.16	0.02	6.63	0.35	0.35	724	0.47	4.8E-03	4.9E-05	0.01	7.7E-04	7.7E-04
Total												77.6	51.5	0.09	6.3	3.0	3.0
HDD Crew - Per Site																	
Forklift, 8000+ Lbs	Diesel	2270002057	110	59%	0.82	1.99	3.1E-03	0.19	0.19	0.19	79	4.7E-03	0.01	1.8E-05	1.1E-03	1.1E-03	1.1E-03
336 Excavator-CAT	Diesel	2270002036	266	59%	0.32	1.07	2.8E-03	0.15	0.05	0.05	79	4.4E-03	0.01	3.8E-05	2.0E-03	7.5E-04	7.5E-04
580SL Backhoe-Case	Diesel	2270002036	110	59%	0.51	1.20	2.9E-03	0.15	0.12	0.12	79	2.9E-03	0.01	1.6E-05	8.7E-04	6.6E-04	6.6E-04
RT-860B Crane-Grove	Diesel	2265002045	190	47%	50.38	3.53	0.01	1.53	0.07	0.07	79	0.39	0.03	1.0E-04	0.01	5.4E-04	5.4E-04
Sam 400 Welder Lincoln	Diesel	2270006025	57	21%	5.05	4.98	4.3E-03	0.93	0.72	0.72	79	0.01	0.01	4.5E-06	9.7E-04	7.5E-04	7.5E-04
G260KW Generator-IR	Diesel	2270006025	310	21%	2.79	4.05	3.8E-03	0.53	0.35	0.35	79	0.02	0.02	2.2E-05	3.0E-03	2.0E-03	2.0E-03
Light Towers	Diesel	2270002027	13	43%	2.40	4.55	4.0E-03	0.47	0.35	0.35	79	1.2E-03	2.2E-03	1.9E-06	2.3E-04	1.7E-04	1.7E-04
1100K # Drill Rig DD-1100RS	Diesel	2270002033	765	43%	1.39	5.36	3.2E-03	0.37	0.22	0.22	79	0.04	0.15	9.3E-05	0.01	0.01	0.01
Mud Tank Cleaning System	Diesel	2270006010	500	43%	1.10	3.65	3.2E-03	0.26	0.16	0.16	119	0.03	0.10	9.1E-05	0.01	4.6E-03	4.6E-03
625K # Drill Rig DD-625	Diesel	2270002033	600	43%	1.35	3.89	3.2E-03	0.25	0.18	0.18	79	0.03	0.09	7.3E-05	0.01	4.1E-03	4.1E-03
Mud Tank Cleaning System	Diesel	2270006010	460	43%	1.10	3.65	3.2E-03	0.26	0.16	0.16	79	0.02	0.06	5.6E-05	4.5E-03	2.8E-03	2.8E-03
150K# Drill Rig	Diesel	2270002033	300	43%	1.15	3.89	3.2E-03	0.26	0.17	0.17	79	0.01	0.04	3.7E-05	3.0E-03	2.0E-03	2.0E-03
Mud Tank Cleaning System	Diesel	2270006010	460	43%	1.10	3.65	3.2E-03	0.26	0.16	0.16	79	0.02	0.06	5.6E-05	4.5E-03	2.8E-03	2.8E-03
80K# Drill Rig	Diesel	2270002033	200	43%	0.93	3.66	3.2E-03	0.29	0.19	0.19	79	0.01	0.03	2.4E-05	2.2E-03	1.4E-03	1.4E-03
Mud Tank Cleaning System	Diesel	2270006010	87	43%	2.21	3.98	3.6E-03	0.44	0.40	0.40	79	0.01	0.01	1.2E-05	1.5E-03	1.3E-03	1.3E-03
3/4 Ton Crew Cab Truck	Diesel	2017123223	30		1.49	1.85	4.7E-03	0.25	0.08	0.08	79	3.9E-03	4.8E-03	1.2E-05	6.5E-04	2.2E-04	2.2E-04
5 Ton Cargo Truck	Diesel	2017126123	30		1.21	4.48	0.01	0.26	0.18	0.17	79	3.2E-03	0.01	3.7E-05	6.9E-04	4.7E-04	4.5E-04
Total												0.60	0.7	6.9E-04	0.06	3.2E-02	3.2E-02
<p>1. User's Guide for the Final NONROAD2005, except as noted Model, EPA420-R-05-013, US EPA, December 2005 (non-road engines) Motor Vehicle Emission Simulator (MOVES) - User Guide for MOVES2010b, U.S. Environmental Protection Agency, June 2013 (onroad engines)</p> <p>2. EPA NONROAD2008 run for calendar year 2017, Florida (or nonroad engine), MOVES 2010b (onroad engine)</p>																	

**Table 9.A.1.5 - Florida Southeast Connection
2017 Construction Equipment Greenhouse Gas Tailpipe Emissions**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Emission Factor (g/hp-hr) On-road Emission Factor (g/VMT)				Operating Time (hours)	Pollutant Emissions (tons)			
					CO ₂ ²	CH ₄ ³	N ₂ O ³	CO ₂ e ⁴		CO ₂	N ₂ O	CH ₄	CO ₂ e
Build out Yards and set-up field offices													
D7 Dozer	Diesel	2270002069	235	82%	536	0.030	0.014	541	99	11	6.4E-04	2.9E-04	11
336 Track hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	99	13	7.3E-04	3.3E-04	13
Pick-up Trucks	Diesel	2017123223	30		639			640	496	10	-	-	10
Off Load Rail Cars Transport to Yard and Off Load at Yards													
Boom Truck	Diesel	2270002045	240	82%	531	0.030	0.014	535	793	91	0.01	2.3E-03	92
End Loader	Diesel	2270002066	300	82%	625	0.036	0.016	631	793	134	0.01	3.4E-03	136
Pipe Haul Trucks (Sub)	Diesel	2017126123	30		1,939			1,941	1,586	102	-	-	102
Pickup Trucks	Diesel	2017123223	30		639			640	991	21	-	-	21
Clearing													
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	562	64	3.6E-03	1.6E-03	65
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	562	84	4.8E-03	2.1E-03	85
Fecon Shreader(s)	Diesel	2270002081	350	82%	536	0.030	0.014	541	1,123	191	0.01	4.9E-03	192
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	562	72	4.1E-03	1.8E-03	73
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	562	94	0.01	2.4E-03	95
Grading/Topsoil Segregation													
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	1,057	120	0.01	3.1E-03	122
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	1,057	159	0.01	4.0E-03	160
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	1,586	205	0.01	0.01	206
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	1,586	265	0.02	0.01	268
Stringing Skids and Pipe													
Skid Truck	Gasoline	2265002072	265	82%	738	0.042	0.017	744	1,189	210	0.01	4.8E-03	212
Boom Truck	Gasoline	2265002045	240	82%	730	0.042	0.017	736	1,189	188	0.01	4.3E-03	190
583 Sideboom	Diesel	2270002045	300	82%	530	0.030	0.014	535	1,189	171	0.01	4.4E-03	173
D6 LGP Dozers	Diesel	2270002069	205	73%	536	0.030	0.014	541	2,379	210	0.01	0.01	212
Atthey Wagons	Diesel	2270002069	300	78%	536	0.030	0.014	541	2,379	327	0.02	0.01	330
Pipe Haul Trucks (SUB)	Diesel	2017126123	30		1,939			1,941	11,895	763	-	-	763
Field Bending													
Bender	Diesel	2270002081	50	73%	595	0.034	0.015	601	1,636	39	2.2E-03	1.0E-03	40
125 Air Compressor for mandrel	Gasoline	2265006020	50	73%	707	0.040	0.016	713	1,636	47	2.6E-03	1.1E-03	47
583 Sideboom	Diesel	2270002045	300	64%	530	0.030	0.014	535	1,636	184	0.01	4.7E-03	185
594 Sideboom	Diesel	2270002045	310	64%	530	0.030	0.014	535	1,636	190	0.01	4.8E-03	191

**Table 9.A.1.5 - Florida Southeast Connection
2017 Construction Equipment Greenhouse Gas Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Emission Factor (g/hp-hr) On-road Emission Factor (g/VMT)				Operating Time (hours)	Pollutant Emissions (tons)			
					CO ₂ ²	CH ₄ ³	N ₂ O ³	CO ₂ e ⁴		CO ₂	N ₂ O	CH ₄	CO ₂ e
Firing Line Welding													
125 Air Compressor for mandrel	Gasoline	2265006020	50	55%	707	0.040	0.016	713	1,586	34	1.9E-03	7.7E-04	34
Tack Rig D7 w/ 4 welders	Diesel	2270002069	235	55%	536	0.030	0.014	541	3,172	242	0.01	0.01	245
welder #1	Diesel	2270006025	25	78%	693	0.039	0.018	700	3,172	47	2.7E-03	1.2E-03	47
welder #2	Diesel	2270006025	25	78%	693	0.039	0.018	700	3,172	47	2.7E-03	1.2E-03	47
welder #3	Diesel	2270006025	25	78%	693	0.039	0.018	700	3,172	47	2.7E-03	1.2E-03	47
welder #4	Diesel	2270006025	25	78%	693	0.039	0.018	700	3,172	47	2.7E-03	1.2E-03	47
583 Sideboom	Diesel	2270002045	300	69%	530	0.030	0.014	535	1,586	191	0.01	4.9E-03	192
Morooka Buggies	Diesel	2270002069	300	64%	536	0.030	0.014	541	15,860	1,800	0.10	0.05	1,817
Welding Machines	Diesel	2270006025	25	82%	693	0.039	0.018	700	39,650	621	0.04	0.02	627
Field Joint Coating													
Skid Truck and or Morooka	Diesel	2270002069	300	64%	536	0.030	0.014	541	4,758	540	0.03	0.01	545
FBE Coating Equipment	Gasoline	2265002081	85	87%	738	0.042	0.017	744	3,172	190	0.01	4.3E-03	191
375 Air compressor	Gasoline	2265006020	110	87%	707	0.040	0.016	713	3,172	235	0.01	0.01	237
Ditching													
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	3,668	473	0.03	0.01	477
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	3,668	613	0.03	0.02	619
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	1,223	184	0.01	4.7E-03	185
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	1,223	184	0.01	4.7E-03	185
Lower In and Tie-ins													
336 Track Hoe	Diesel	2270002036	266	64%	536	0.030	0.014	541	2,577	259	0.01	0.01	262
345 Track Hoe	Diesel	2270002036	345	64%	536	0.030	0.014	541	2,577	336	0.02	0.01	339
583 Sideboom	Diesel	2270002045	300	64%	530	0.030	0.014	535	7,732	868	0.05	0.02	876
594 Sideboom	Diesel	2270002045	310	64%	530	0.030	0.014	535	7,732	897	0.05	0.02	905
Morooka Buggies	Diesel	2270002069	300	55%	536	0.030	0.014	541	5,154	503	0.03	0.01	507
185 Air compressor	Gasoline	2265006020	65	55%	707	0.040	0.018	713	2,577	72	4.1E-03	1.8E-03	72
Welding Machines	Diesel	2270006025	25	64%	693	0.039	0.016	699	8,591	105	0.01	2.4E-03	106
Backfill & Clean-up													
336 Track Hoe	Diesel	2270002036	266	82%	536	0.030	0.014	541	1,189	153	0.01	3.9E-03	155
345 Track Hoe	Diesel	2270002036	345	82%	536	0.030	0.014	541	1,189	199	0.01	0.01	201
D7 LGP Dozers	Diesel	2270002069	235	82%	536	0.030	0.014	541	2,379	271	0.02	0.01	273
D8 LGP Dozers	Diesel	2270002069	310	82%	536	0.030	0.014	541	2,379	358	0.02	0.01	361
Farm Tractor	Diesel	2270005010	90	82%	594	0.034	0.015	600	2,379	115	0.01	2.9E-03	116

**Table 9.A.1.5 - Florida Southeast Connection
2017 Construction Equipment Greenhouse Gas Tailpipe Emissions
(Continued)**

Nonroad Equipment / On-Road Equipment	Fuel	Source Category ¹	Nonroad Horsepower / On-Road Ave MPH	Load Factor	Nonroad Emission Factor (g/hp-hr) On-road Emission Factor (g/VMT)				Operating Time (hours)	Pollutant Emissions (tons)			
					CO ₂ ²	CH ₄ ³	N ₂ O ³	CO ₂ e ⁴		CO ₂	N ₂ O	CH ₄	CO ₂ e
Auger Bore Crew													
Auger Bore Machine 36-600	Diesel	2270002033	116	43%	530	0.030	0.013	535	724	21	1.2E-03	5.4E-04	21
3 Axle Flatbed W/12 Ton Crane	Diesel	2270002045	350	43%	530	0.030	0.014	535	724	64	3.6E-03	1.6E-03	64
3 Axle Lowboy Tractor & Trailer	Diesel	2017126123	30		1,939			1,941	724	46	-	-	46
336 Excavator-CAT	Diesel	2270002036	266	59%	536	0.030	0.014	541	724	67	3.8E-03	1.7E-03	68
RT-630 Crane-Grove	Diesel	2265002045	160	47%	730	0.042	0.017	736	724	44	2.5E-03	1.0E-03	44
SA250 Welding Machine-Lincoln	Diesel	2270006025	40	21%	693	0.039	0.016	699	724	5	2.6E-04	1.1E-04	5
G115KW Generator-IR	Diesel	2270006005	125	43%	530	0.030	0.012	534	724	23	1.3E-03	5.2E-04	23
3" Ditch Pump	Gasoline	2265006010	4	69%	1,228	0.070	0.028	1,238	724	3	1.5E-04	6.2E-05	3
Total										13,687	0.72	0.32	13,801
HDD Crew - Per Site													
Forklift, 8000+ Lbs	Diesel	2270002057	110	59%	536	0.030	0.014	541	79	3	1.7E-04	7.7E-05	3
336 Excavator-CAT	Diesel	2270002036	266	59%	536	0.030	0.014	541	79	7	4.2E-04	1.9E-04	7
580SL Backhoe-Case	Diesel	2270002036	110	59%	536	0.030	0.014	541	79	3	1.7E-04	7.7E-05	3
RT-860B Crane-Grove	Diesel	2265002045	190	47%	730	0.041	0.019	736	79	6	3.2E-04	1.5E-04	6
Sam 400 Welder Lincoln	Diesel	2270006025	57	21%	693	0.039	0.018	699	79	1	4.1E-05	1.8E-05	1
G260KW Generator-IR	Diesel	2270006025	310	21%	625	0.035	0.016	630	79	4	2.0E-04	9.1E-05	4
Light Towers	Diesel	2270002027	13	43%	589	0.033	0.015	594	79	0	1.6E-05	7.3E-06	0
1100K # Drill Rig DD-1100RS	Diesel	2270002033	765	43%	530	0.030	0.013	535	79	15	8.7E-04	3.9E-04	15
Mud Tank Cleaning System	Diesel	2270006010	500	43%	530	0.030	0.014	535	119	15	8.5E-04	3.8E-04	15
625K # Drill Rig DD-625	Diesel	2270002033	600	43%	530	0.030	0.014	535	79	12	6.8E-04	3.0E-04	12
Mud Tank Cleaning System	Diesel	2270006010	460	43%	530	0.030	0.014	535	79	9	5.2E-04	2.3E-04	9
150K# Drill Rig	Diesel	2270002033	300	43%	530	0.030	0.014	535	79	6	3.4E-04	1.5E-04	6
Mud Tank Cleaning System	Diesel	2270006010	460	43%	530	0.030	0.014	535	79	9	5.2E-04	2.3E-04	9
80K# Drill Rig	Diesel	2270002033	200	43%	530	0.030	0.013	535	79	4	2.3E-04	1.0E-04	4
Mud Tank Cleaning System	Diesel	2270006010	87	43%	589	0.033	0.015	594	79	2	1.1E-04	4.9E-05	2
3/4 Ton Crew Cab Truck	Diesel	2017123223	30		639			640	79	2	-	-	2
5 Ton Cargo Truck	Diesel	2017126123	30		1,939			1,941	79	5	-	-	5
Total										102.8	5.5E-03	2.4E-03	103.7
<p>1. User's Guide for the Final NONROAD2005, except as noted Model, EPA420-R-05-013, US EPA, December 2005 (non-road engines) Motor Vehicle Emission Simulator (MOVES) - User Guide for MOVES2010b, U.S. Environmental Protection Agency, June 2013 (onroad engines)</p> <p>2. EPA NONROAD2008 run for calendar year 2017, Florida (or nonroad engine), MOVES 2010b (onroad engine)</p> <p>3. 2014 Climate Registry Default Emission Factors, Released: January 10, 2014, Tables 13.1 and 13.7., ratioed based on CO₂ emission factor from NONROAD. http://www.theclimateregistry.org/resources/protocols/general-reporting-protocol/</p> <p>4. For nonroad engines, the GWPs of CO₂, CH₄, and N₂O are 1, 25, and 298, respectively. For on-road engines, CO₂e is obtained directly from MOVES.</p>													

**Table 9.A.1.6 - Florida Southeast Connection
On-Road Material Delivery and Worker Commuting Emission Factors**

Vehicle	Emission Factor (g/VMT) ¹								Trip Distance (2-way) (miles)	Vehicle-months	Vehicle Usage (vehicle-days/year)
	CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}	CO ₂	CO _{2e}			
2016											
Diesel Heavy Trucks	1.39	5.15	0.014	0.295	0.211	0.204	1,939	1,941	200	900	19,554
Diesel Buses	2.00	5.21	0.009	0.379	0.247	0.239	1,241	1,242	50	250	5,432
Diesel Light Trucks	1.60	2.02	0.005	0.277	0.096	0.093	642	643	50		-
Gasoline Passenger Cars	1.88	0.19	0.005	0.044	0.004	0.003	314	315	50	1,733	37,651
Gasoline Passenger Trucks	4.29	0.65	0.007	0.161	0.007	0.006	431	432	50	193	4,193
2017											
Diesel Heavy Trucks	1.21	4.48	0.014	0.262	0.178	0.173	1,939	1,941	200	450	9,777
Diesel Buses	1.77	4.58	0.009	0.338	0.213	0.207	1,241	1,243	50	125	2,716
Diesel Light Trucks	1.49	1.85	0.005	0.247	0.085	0.082	639	640	50		-
Gasoline Passenger Cars	1.79	0.16	0.005	0.038	0.004	0.003	308	309	50	866	18,815
Gasoline Passenger Trucks	4.10	0.60	0.006	0.145	0.007	0.006	422	423	50	96	2,086

1. EPA MOVES2010b

**Table 9.A.1.7 - Florida Southeast Connection
On-Road Material Delivery and Worker Commuting Emissions**

Vehicle	Vehicle Miles Traveled (VMT)	Emissions (ton/yr)							
		CO	NO _x	SO ₂	VOC	PM ₁₀	PM _{2.5}	CO ₂	CO _{2e}
2016									
Diesel Heavy Trucks	3,910,800	5.99	22.21	0.06	1.27	0.91	0.88	8,360	8,366
Diesel Buses	271,600	0.60	1.56	2.7E-03	0.11	0.07	0.07	372	372
Diesel Light Trucks	-	-	-	-	-	-	-	-	-
Gasoline Passenger Cars	1,882,550	3.91	0.40	0.01	0.09	0.01	0.01	652	653
Gasoline Passenger Trucks	209,650	0.99	0.15	1.5E-03	0.04	1.5E-03	1.4E-03	100	100
Total		11.49	24.32	0.07	1.51	0.99	0.96	9,484	9,491
2017									
Diesel Heavy Trucks	1,955,400	2.62	9.66	0.03	0.57	0.38	0.37	4,180	4,183
Diesel Buses	135,800	0.26	0.69	1.4E-03	0.05	0.03	0.03	186	186
Diesel Light Trucks	-	-	-	-	-	-	-	-	-
Gasoline Passenger Cars	940,750	1.86	0.17	4.8E-03	0.04	3.7E-03	3.4E-03	320	320
Gasoline Passenger Trucks	104,300	0.47	0.07	7.4E-04	0.02	7.6E-04	7.0E-04	49	49
Total		5.21	10.58	0.04	0.67	0.42	0.41	4,734	4,738

**Table 9.A.1.8 - Florida Southeast Connection
2016 Fugitive Dust**

Acres Disturbed									
Active Construction		1,037							
Yards / Staging		175							
Total		1,212							
Dust Control Efficiency ¹		50%							
Activity	Emission Factor (ton/acre-month)		Reference	Duration (months) ^{7,8}	Uncontrolled Emissions (tons)		Controlled Emissions (tons)		
	PM ₁₀	PM _{2.5}			PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}	
Active Construction									
Construction	1.1E-01	1.1E-02	2, 3	2	228.06	22.81	114.03	11.40	
Wind erosion	1.6E-02	2.4E-03	4, 5, 6	6	98.48	14.77	49.24	7.39	
Yards/Staging	1.6E-02	2.4E-03	4, 5, 6	10	27.74	4.16	13.87	2.08	
Total Emissions					354.28	41.74	177.14	20.87	

1. Assume 50% control from water and other approved dust suppressants. (WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Section 3.4.1.)
2. WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Table 3-2, level 1, average conditions
3. PM_{2.5}/PM₁₀ = 0.10 (WRAP Fugitive Dust Handbook, Section 3.4.1)
4. Wind erosion of exposed areas (seeded land, stripped or graded overburden) = 0.38 ton TSP/acre/yr (WRAP Fugitive Dust Handbook, Table 11-6)
5. PM₁₀/TSP = 0.5, PM_{2.5}/PM₁₀ = 0.15, (WRAP Fugitive Dust Handbook, Section 7-2)
6. Emission factor converted from ton/acre-year to ton/acre-month by dividing by 12
7. It is assumed that construction of a given pipeline segment will entail 2 months of continuous activity.
8. It is assumed that, on average, it will require 6 months to fully revegetate disturbed areas.

**Table 9.A.1.9 - Florida Southeast Connection
2017 Fugitive Dust**

Acres Disturbed									
Active Construction		518							
Yards / Staging		88							
Total		606							
Dust Control Efficiency ¹		50%							
Activity	Emission Factor (ton/acre-month)		Reference	Duration (months) ^{7,8}	Uncontrolled Emissions (tons)		Controlled Emissions (tons)		
	PM ₁₀	PM _{2.5}			PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}	
Active Construction									
Construction	1.1E-01	1.1E-02	2, 3	2	114.03	11.40	57.02	5.70	
Wind erosion	1.6E-02	2.4E-03	4, 5, 6	6	49.24	7.39	24.62	3.69	
Yards/Staging	1.6E-02	2.4E-03	4, 5, 6	5	6.93	1.04	3.47	0.52	
Total Emissions					170.20	19.83	85.10	9.91	

1. Assume 50% control from water and other approved dust suppressants. (WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Section 3.4.1.)
2. WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Table 3-2, level 1, average conditions
3. PM_{2.5}/PM₁₀ = 0.10 (WRAP Fugitive Dust Handbook, Section 3.4.1)
4. Wind erosion of exposed areas (seeded land, stripped or graded overburden) = 0.38 ton TSP/acre/yr (WRAP Fugitive Dust Handbook, Table 11-6)
5. PM₁₀/TSP = 0.5, PM_{2.5}/PM₁₀ = 0.15, (WRAP Fugitive Dust Handbook, Section 7-2)
6. Emission factor converted from ton/acre-year to ton/acre-month by dividing by 12
7. It is assumed that construction of a given pipeline segment will entail 2 months of continuous activity.
8. It is assumed that, on average, it will require 6 months to fully revegetate disturbed areas.

**Table 9.A.1.10 - Florida Southeast Connection
Open Burning**

Fuel Loading (tons/acre)	9.0(a)
Proposed Open Burning Areas	651.8 acres
Percent Burned in 2016	66.7%
Percent Burned in 2017	33.3%

Pollutant	Emission Factor		Emission (tons)	
	(lb/ton)	(lb/acre)	2016	2017
CO	141.0(b)	1,269	275.7	137.8
NO_x	4.0(b)	36	7.8	3.9
VOC	24.2(b)	218	47.3	23.7
PM	17.2(b)	155	33.6	16.8
CO₂	3,180(c)	28,624	6,218.8	3,109.4
CH₄	0.18(d)	1.62	0.4	0.2
N₂O	0.04(d)	0.36	0.1	0.0
CO₂e	3,197(e)	28,772	6,250.9	3,125.4

References

(a) AP42 Table 13.1-1 (10/96) (Region 8: Southern)

(b) AP42 page 13.1-2, Southern Region

(c) 2014 Climate Registry Default Emission Factors, Released: January 10, 2014, Table 12.1.

(d) 2014 Climate Registry Default Emission Factors, Released: January 10, 2014, Table 12.4.

(e) The global warming potentials of CO₂, CH₄, and N₂O are 1, 25, and 298, respectively.

**Table 9.A.1.11 - Florida Southeast Connection
Construction Emissions Totals**

Year and Activity	Construction Equipment Tailpipe Emissions							
	Annual Emissions (tons)							
	CO	NOx	SO ₂	VOC	PM ₁₀	PM _{2.5}	CO ₂	CO _{2e}
2016								
Construction Equipment - HDD								
Martin County	2.76	2.90	2.9E-03	0.27	0.14	0.14	417	421
Okeechobee County	2.76	2.90	2.9E-03	0.27	0.14	0.14	417	421
Osceola County	2.76	2.90	2.9E-03	0.27	0.14	0.14	417	421
Polk County	4.14	4.35	4.3E-03	0.40	0.21	0.21	626	631
St. Lucie County	2.76	2.90	2.9E-03	0.27	0.14	0.14	417	421
Project Totals	15.17	15.94	0.02	1.47	0.78	0.78	2,294	2,313
Construction Equipment - Other								
Martin County	16.41	10.86	0.02	1.29	0.64	0.64	2,553	2,574
Okeechobee County	35.30	23.37	0.04	2.77	1.38	1.38	5,493	5,539
Osceola County	34.92	23.12	0.04	2.74	1.37	1.37	5,434	5,480
Polk County	73.92	48.94	0.08	5.80	2.90	2.89	11,502	11,599
St. Lucie County	17.79	11.78	0.02	1.40	0.70	0.70	2,768	2,791
Project Totals	178.34	118.07	0.19	13.99	6.99	6.98	27,750	27,982
Commuting / Deliveries								
Martin County	1.06	2.24	0.01	0.14	0.09	0.09	873	873
Okeechobee County	2.27	4.81	0.01	0.30	0.20	0.19	1,877	1,879
Osceola County	2.25	4.76	0.01	0.30	0.19	0.19	1,857	1,859
Polk County	4.76	10.08	0.03	0.63	0.41	0.40	3,931	3,934
St. Lucie County	1.15	2.43	0.01	0.15	0.10	0.10	946	947
Project Totals	11.49	24.32	0.07	1.51	0.99	0.96	9,484	9,491
Fugitive Dust								
Martin County	-	-	-	-	26.30	3.38	-	-
Okeechobee County	-	-	-	-	27.16	2.96	-	-
Osceola County	-	-	-	-	47.39	5.99	-	-
Polk County	-	-	-	-	51.53	5.37	-	-
St. Lucie County	-	-	-	-	10.90	1.09	-	-
Project Totals	-	-	-	-	163.27	18.79	-	-
Open Burning								
Martin County	40.30	1.14	-	6.92	4.92	4.92	909	914
Okeechobee County	33.68	0.96	-	5.78	4.11	4.11	760	764
Osceola County	36.15	1.03	-	6.20	4.41	4.41	815	820
Polk County	139.90	3.97	-	24.01	17.07	17.07	3,156	3,172
St. Lucie County	25.67	0.73	-	4.41	3.13	3.13	579	582
Project Totals	275.69	7.82	-	47.32	33.63	33.63	6,219	6,251
2016 Total	480.70	166.15	0.28	64.29	205.66	61.14	45,746	46,037

**Table 9.A.1.11 - Florida Southeast Connection
Construction Emissions Totals
(Continued)**

Year and Activity	Construction Equipment Tailpipe Emissions							
	Annual Emissions (tons)							
	CO	NOx	SO ₂	VOC	PM ₁₀	PM _{2.5}	CO ₂	CO ₂ e
2017								
Construction Equipment - HDD								
Martin County	1.20	1.33	1.4E-03	0.12	0.06	0.06	206	207
Okeechobee County	1.20	1.33	1.4E-03	0.12	0.06	0.06	206	207
Osceola County	1.20	1.33	1.4E-03	0.12	0.06	0.06	206	207
Polk County	1.80	1.99	2.1E-03	0.18	0.10	0.10	309	311
St. Lucie County	1.20	1.33	1.4E-03	0.12	0.06	0.06	206	207
Project Totals	6.62	7.29	0.01	0.67	0.35	0.35	1,131	1,141
Construction Equipment - Other								
Martin County	7.14	4.73	0.01	0.58	0.28	0.28	1,259	1,270
Okeechobee County	15.36	10.18	0.02	1.25	0.60	0.60	2,709	2,732
Osceola County	15.20	10.08	0.02	1.24	0.59	0.59	2,680	2,703
Polk County	32.17	21.33	0.04	2.62	1.25	1.25	5,673	5,721
St. Lucie County	7.74	5.13	0.01	0.63	0.30	0.30	1,365	1,376
Project Totals	77.62	51.45	0.09	6.32	3.03	3.02	13,687	13,801
Commuting / Deliveries								
Martin County	0.48	0.97	3.4E-03	0.06	0.04	0.04	436	436
Okeechobee County	1.03	2.09	0.01	0.13	0.08	0.08	937	938
Osceola County	1.02	2.07	0.01	0.13	0.08	0.08	927	928
Polk County	2.16	4.39	0.02	0.28	0.17	0.17	1,962	1,964
St. Lucie County	0.52	1.06	3.7E-03	0.07	0.04	0.04	472	473
Project Totals	5.21	10.58	0.04	0.67	0.42	0.41	4,734	4,738
Fugitive Dust								
Martin County	-	-	-	-	13.15	1.69	-	-
Okeechobee County	-	-	-	-	13.58	1.48	-	-
Osceola County	-	-	-	-	23.70	3.00	-	-
Polk County	-	-	-	-	25.76	2.68	-	-
St. Lucie County	-	-	-	-	5.45	0.54	-	-
Project Totals	-	-	-	-	81.64	9.39	-	-
Open Burning								
Martin County	20.15	0.57	-	3.46	2.46	2.46	455	457
Okeechobee County	16.84	0.48	-	2.89	2.05	2.05	380	382
Osceola County	18.07	0.51	-	3.10	2.20	2.20	408	410
Polk County	69.95	1.98	-	12.01	8.53	8.53	1,578	1,586
St. Lucie County	12.83	0.36	-	2.20	1.57	1.57	289	291
Project Totals	137.85	3.91	-	23.66	16.82	16.82	3,109	3,125
2017 Total	227.30	73.23	0.14	31.32	102.25	29.99	22,662	22,806

APPENDIX 9B

HDD Noise Complaint Resolution Plan

APPENDIX 9B

Florida Southeast Connection HDD Noise Complaint Resolution Plan

Prior to initiation of any horizontal directional drilling (“HDD”) activities, FSC will notify the FERC in writing as to the location of the HDD, the expected duration of HDD, and if 24 hour HDD will occur. FSC will also contact and notify nearby residents at each HDD site informing them of the same.

FSC has already developed a landowner complaint resolution process that was provided in Resource Report 1. In addition to this process, in the event that area residents have complaints regarding HDD related noise, FSC proposes the following procedures to ensure that any complaints are properly addressed.

- As per the complaint resolution process, nearby residents may call the toll free project 24-hour hotline.
- FSC will conduct noise level measurements of HDD activities outside of the complainant’s residence while HDD activity is occurring. Noise levels will be documented and reported to the FERC (if requested by FERC).
- If noise levels exceed the limits allowed by the FERC, FSC will evaluate and implement additional noise mitigation measures until noise levels are reduced to the required levels. Noise mitigation measures may include any of the following:
 - Reconfiguring of equipment locations to take advantage of natural and artificial barriers (e.g., hay bales);
 - Installation of partial noise barrier walls around specific equipment pieces;
 - Utilized higher performance exhaust mufflers; and
 - Employ low noise generators.
- If noise levels cannot be reduced sufficiently and noise complaints persist, FSC will offer affected homeowners temporary housing at a commercial hotel or motel in the project area until HDD activities are completed.