Final

Volume III - Appendices M-S

Comprehensive Environmental Document
Phase I
Greater New Orleans Hurricane and Storm Damage Risk Reduction System

May 2013

US Army Corps
of Engineers®
New Orleans District

APPENDIX M
SOIL DATA AND SOIL MAPS FOR THE HSDRRS PROJECTS

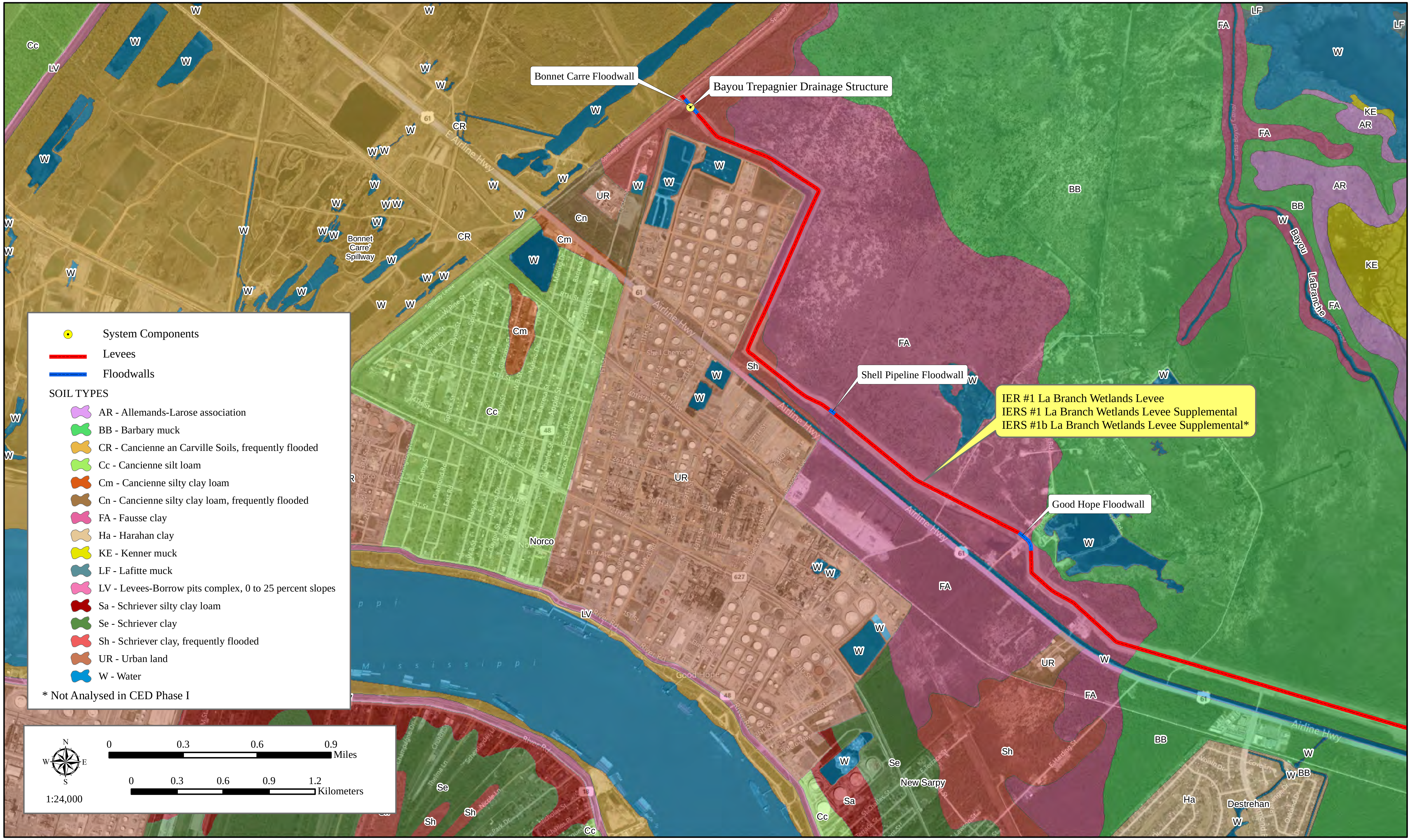
SOIL DATA

Borrow IER #	Borrow Area	Parish/County	HSDRRS Sub-Basin	Prime Famland Soils (acres)	Present/Previous Farm Use
18	1418/1420 Bayou Road	St. Bernard	Chalmette Loop	22.0	None
	1572 Bayou Road	St. Bernard	Chalmette Loop	9.5	None
	910 Bayou Road	St. Bernard	Chalmette Loop	11.6	Pasture
	4001 Flourrisant	St. Bernard	Outside HSDRRS	10.8	Pasture
	Dockville	St. Bernard	Chalmette Loop	80.0	None
	Triumph	Plaquemines	Outside HSDRRS	0.0	N/A
	Belle Chasse	Plaquemines	Belle Chasse	0.0	N/A
	Maynard	Orleans	New Orleans East	0.0	N/A
	Cummings North	Orleans	New Orleans East	0.0	N/A
	Chruchill Farms Pit A	Jefferson	Lake Cataouatche	0.0	N/A
	Westbacnk Site G	Jefferson	Lake Cataouatche	66.0	None
	Bonnet Carre North	St. Charles	Outside HSDRRS	0.0	N/A
19	River Birch Phase 1	Jefferson	Lake Cataouatche	0.0	N/A
	River Birch Phase 2	Jefferson	Lake Cataouatche	0.0	N/A
	Peralington Dirt Phase 1	Hancock	Outside HSDRRS	0.0	N/A
	Eastover	Orleans	New Orleans East	0.0	N/A
	Kimble #2	Plaquemines	Outside HSDRRS	10.1	None
	Sylvia Guillot	St. Bernard	Chalmette Loop	20.2	None
	Gatien-Navy Camp Hope	St. Bernard	Chalmette Loop	7.5	None
	DK Aggregates	St. Bernard	Chalmette Loop	14.0	Grazing Livestock
	St. Gabriel Redevelopment	Iberville	Outside HSDRRS	122.6	None
22	Brad Buras	Plaquemines	Outside HSDRRS	0.0	N/A
	Tabony	Plaquemines	Outside HSDRRS	171.0	None
	Westbank F	Jefferson	Lake Cataouatche	148.0	None
	Westbank I	Jefferson	Lake Cataouatche	34.5	None
	Westbank N	Plaquemines	Belle Chasse	0.0	N/A
23	1025 Florrisant Hwy	St. Bernard	Outside HSDRRS	0.7	Pasture
	Acosta	St. Bernard	Outside HSDRRS	25.0	Pasture
	3C Riverside	St. Charles	Outside HSDRRS	264.0	Farmland
	Mytrle Grove	Plaquemines	Outside HSDRRS	0.0	N/A
	Perlington Dirt Phase 2	Hancock	Outside HSDRRS	0.0	N/A
25	Stumpf Phase 1 and 2	Orleans	New Orleans East	29.7	None
	Westbank D	Jefferson	Lake Cataouatche	52.6	Pasture
	Westbank E Phase 1 and 2	Jefferson	Lake Cataouatche	110.0	Pasture
	Tac Carrere	Plaquemines	Outside HSDRRS	29.0	Pasture

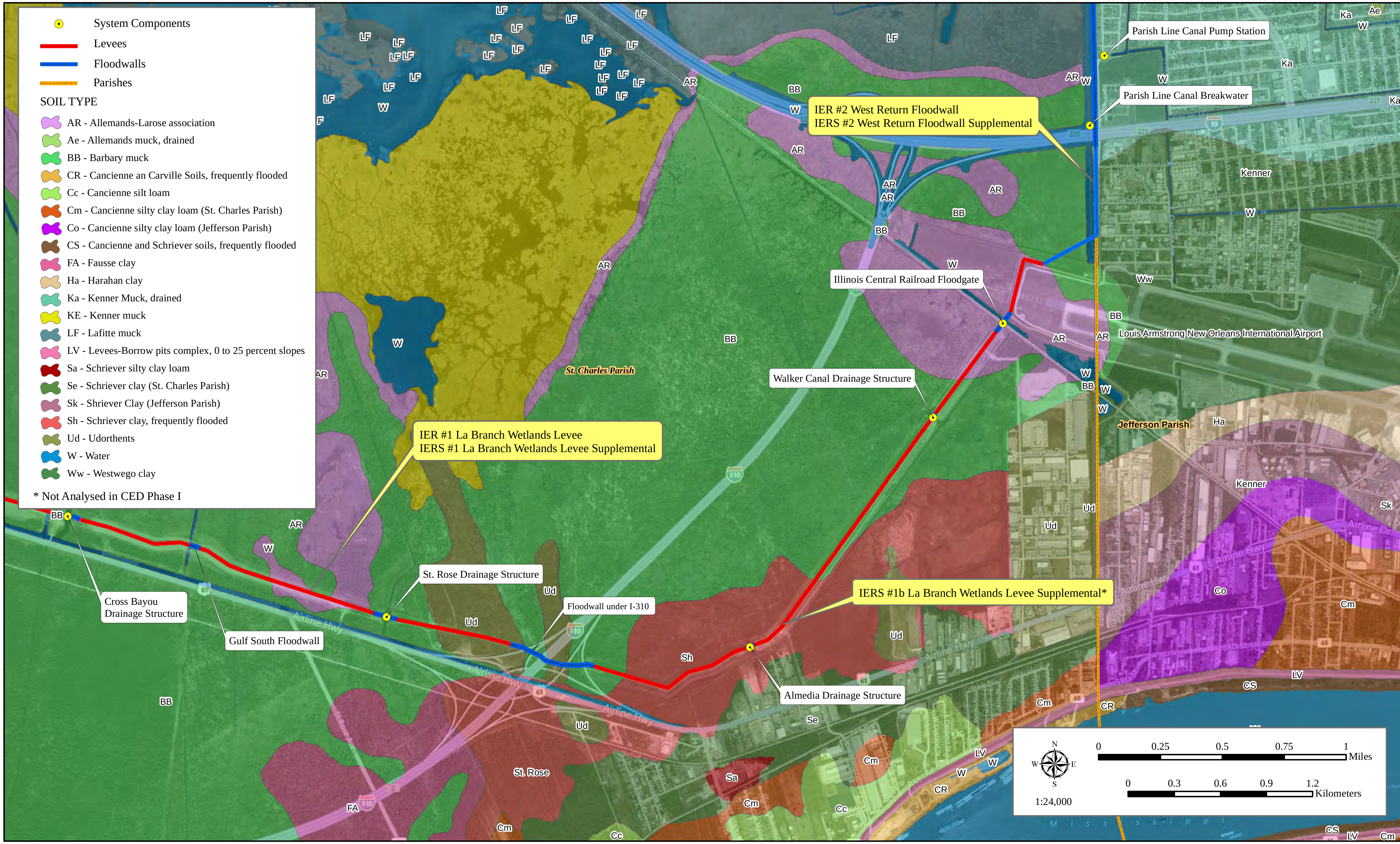
Borrow IER #	Borrow Area	Parish/County	HSDRRS Sub-Basin	Prime Famland Soils (acres)	Present/Previous Farm Use
26	South Kenner Road	Jefferson	Lake Cataouatche	0.0	N/A
	Willswood	Jefferson	Lake Cataouatche	95.5	Pasture
	Meyer	Plaquemines	Outisde HSDRRS	15.0	Farmland
	Wilow Bend	St. John the Baptist	Outside HSDRRS	51.7	Pature
	Frierson	Hancock	Outside HSDRRS	0.0	N/A
28	Brazile	Plaquemines	Outside HSDRRS	18.0	Pasture
	Johnson/Crovetto	St. Bernard	Chalmette Loop	12.5	Pasture
	Westbank F Access Route	Jefferson	Lake Cataouatche	0.3	None
29	Eastover Phase II	Orleans	New Orleans East	0.0	None
	Tammany Holding	St. Tammany	Outside HSDRRS	146.0	None
	Willow Bend Phase II	S. John the Baptist	Outside HSDRRS	475.0	Pasture and Farmland
30	Big Shake	St. James	Outside HSDRRS	441.0	Sugarcane
	Henley	Hancock	Outside HSDRRS	197.0	Pasture and Farmland
	Contreras Dirt (Cells E, F, & Z)	St. Bernard	Chalmette Loop	264.0	None
31	Acosta 2	St. Bernard	Outside HSDRRS	5.4	None
	Idlewild Stage 2	Plaquemines	Outside HSDRRS	2.8	None
	King Mine	Hancock	Outside HSDRRS	100.3	None
	Levis	St. Tammany	Outside HSDRRS	0.0	N/A
	Lilly Bayou	East Baton Rouge	Outside HSDRRS	203.3	None
	Port Bienville	Hancock	Outside HSDRRS	352.0	Pine Production
	Raceland Raw Sugar	LaFourche	Outside HSDRRS	262.5	Sugarcane
	River Birch Landfill Expansion	Jefferson	Lake Cataouatche	52.8	None
	Scarsdale	Plaquemines	Outside HSDRRS	77.1	None
	Spoil Area	St. Bernard	Chalmette Loop	0.0	None
32	Bocage	Ascension	Outside HSDRRS	57.0	Cattle Pasture
	Citurs Lands	Plaquemines	Outside HSDRRS	140.3	Pasture
	Conoco-Phillips	Plaquemines	Outside HSDRRS	76.3	Pasture
	Idlewild Stage 1	Plaquemines	Outside HSDRRS	138.4	Pasture
	Nairn	Plaquemines	Outside HSDRRS	19.9	None
	Plaquemines Dirt & Clay	Plaquemines	Outside HSDRRS	192.3	Cattle Pasture
	3C Riverside Phase 3	St. Charles	Outside HSDRRS	494.8	Pasture

HSDRRS Sub-Basin	Total Prime Farmland Soils in HSDRRS Sub-Basin[1]	Impacted Prime Famland Soils from HSDRRS Risk Reduction Projects (acres)	Impacted Prime Famland Soils from HSDRRS Borrow Projects (acres)	Total Impactd Prime Farmland Soils from HSDRSS Projects (acres)	Percent of Prime Farmland Soils Impacted
St. Charles	5,517.9	0.0	0.0	0.0	0.0
Jefferosn East Bank	12,972.1	0.0	0.0	0.0	0.0
Orleans East Bank	20,126.5	0.0	0.0	0.0	0.0
New Orleans East	9,461.8	0.0	29.7	29.7	0.3
Chalmette Loop	15,442.8	17.1	441.3	458.4	3.0
Belle Chasse	7,355.8	6.4	0.0	6.4	0.1
Gretna-Algiers	7,814.4	0.0	0.0	0.0	0.0
Harvey-Westwego	10,469.6	0.0	0.0	0.0	0.0
Lake Cataouatche	11,495.3	34.0	559.4	593.4	5.2
Overall HSDRRS Sub-Basin Total	100,656.2	57.5	1,030.4	1,087.9	1.1
Overall Outside HSDRRS Sub-Basin Total[2]	98,265.0	N/A	4,099.3	4,099.3	4.2
TOTAL[3]	**198,921.2**	**57.5**	**5,129.7**	**5,187.2**	**2.6**

SOIL MAPS

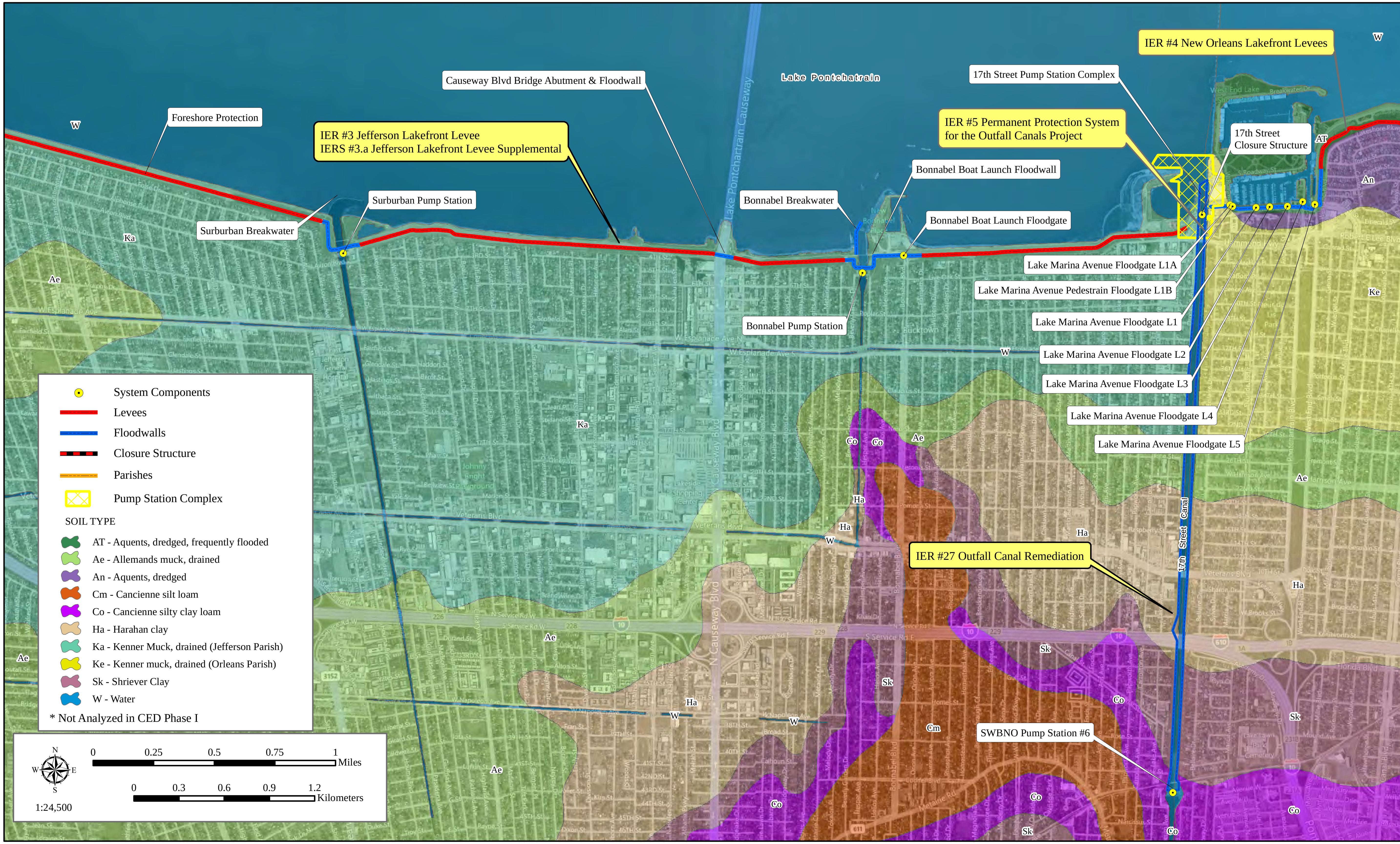


The HSDRRS Risk Reduction Soil Map 1



The HSDRRS Risk Reduction Soil Map 2

The HSDRRS Risk Reduction Soil Map 3



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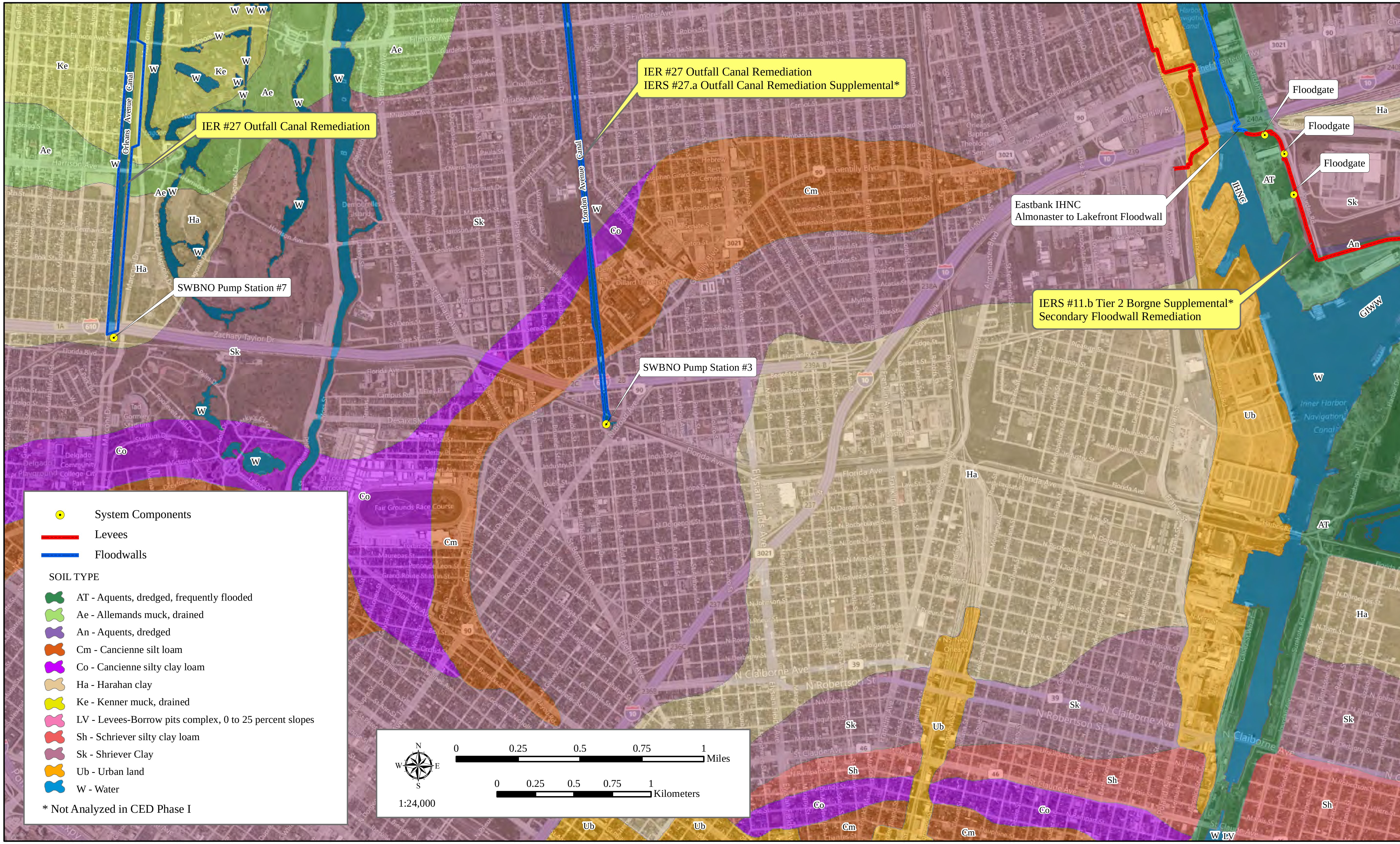
The HSDRRS Risk Reduction Soil Map 5



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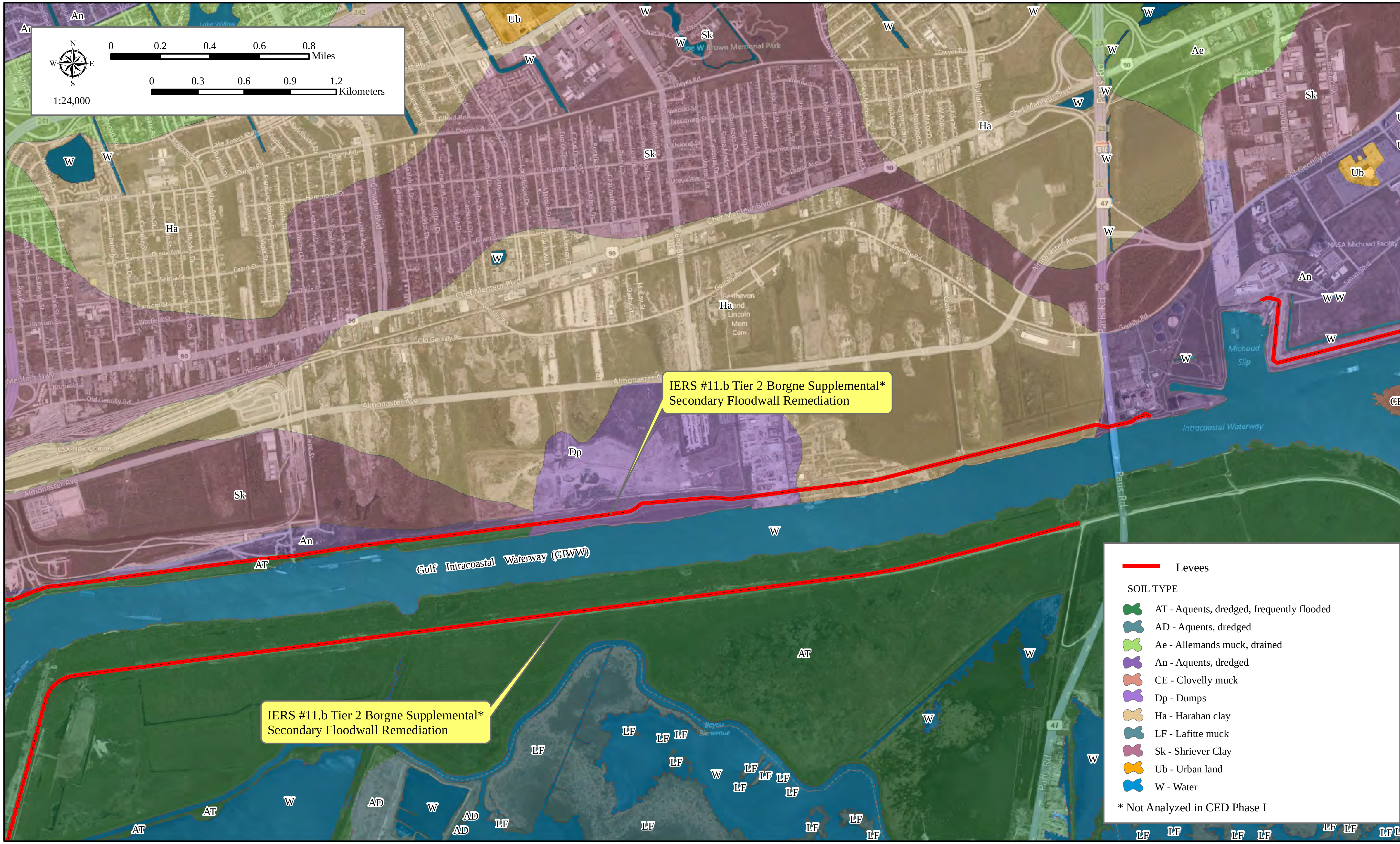

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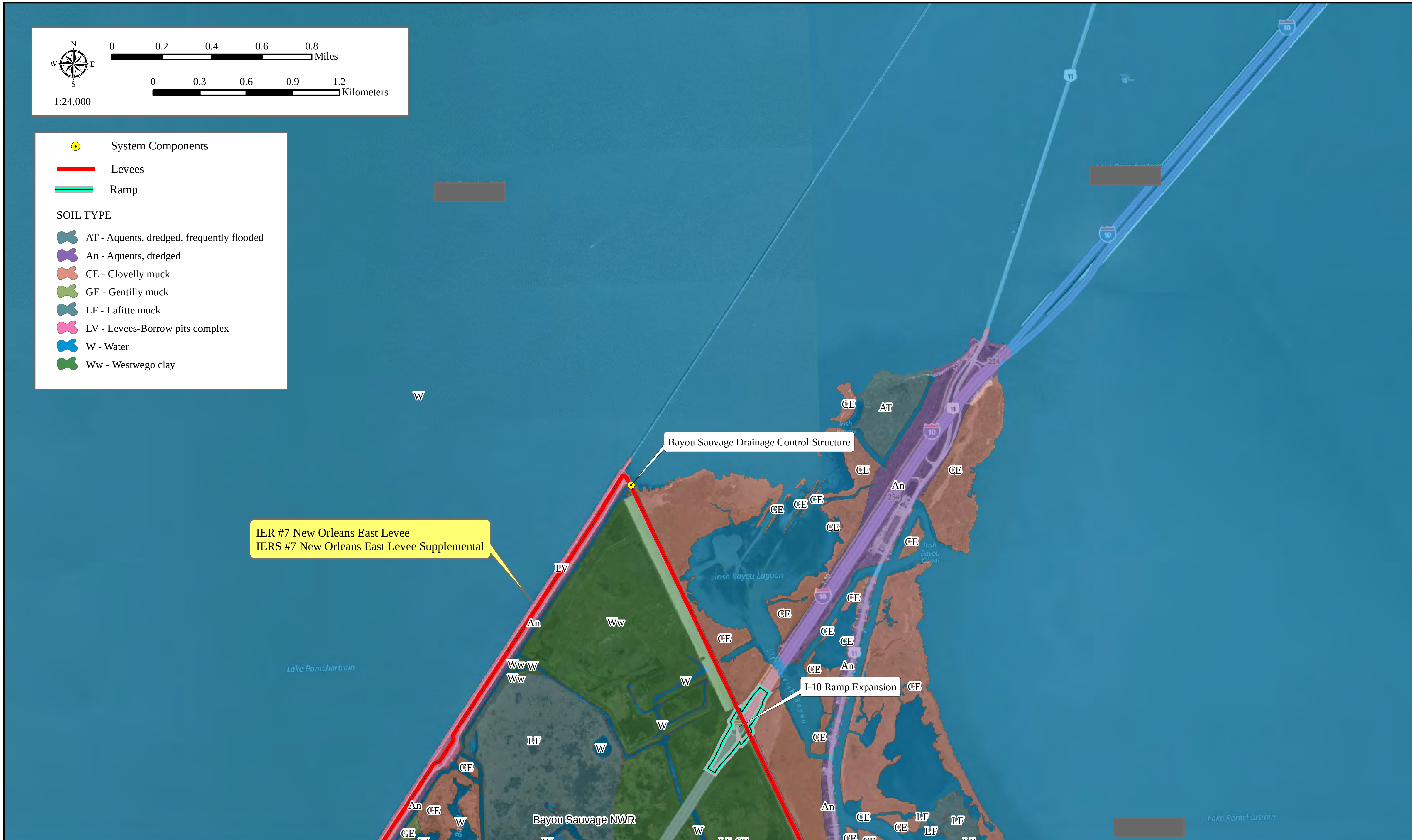

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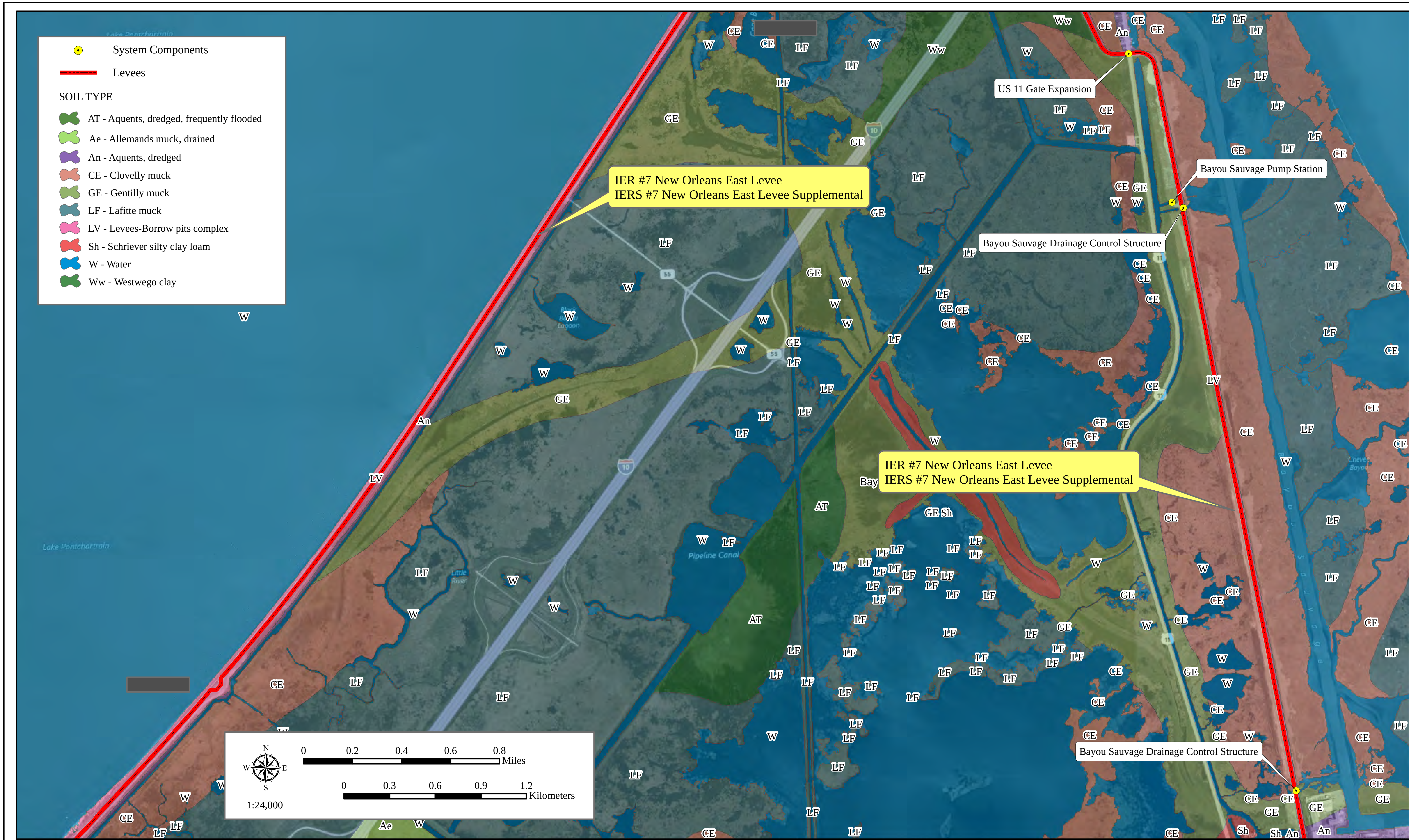
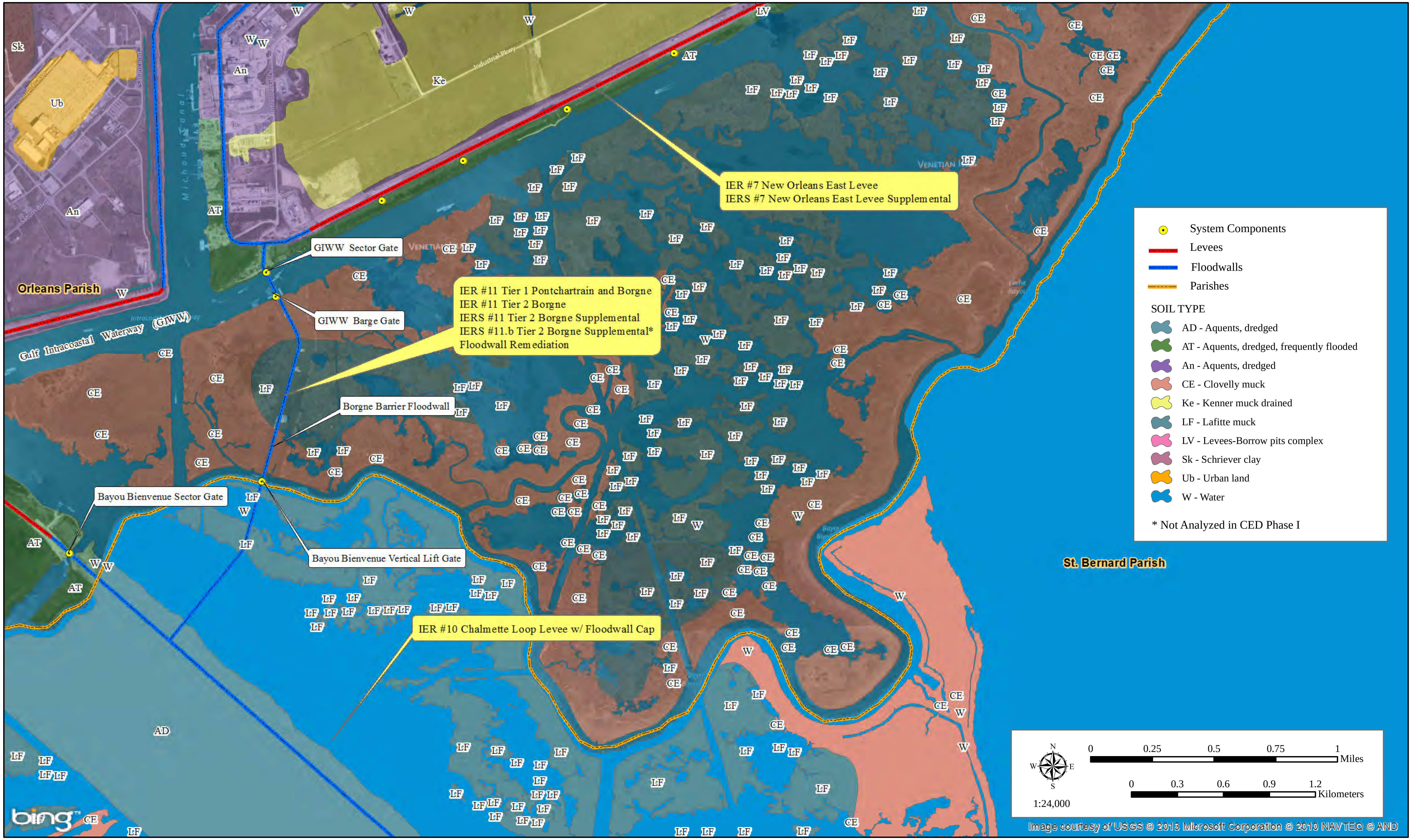


The HSDRRS Risk Reduction Soil Map 10

The HSDRRS Risk Reduction Soil Map 11



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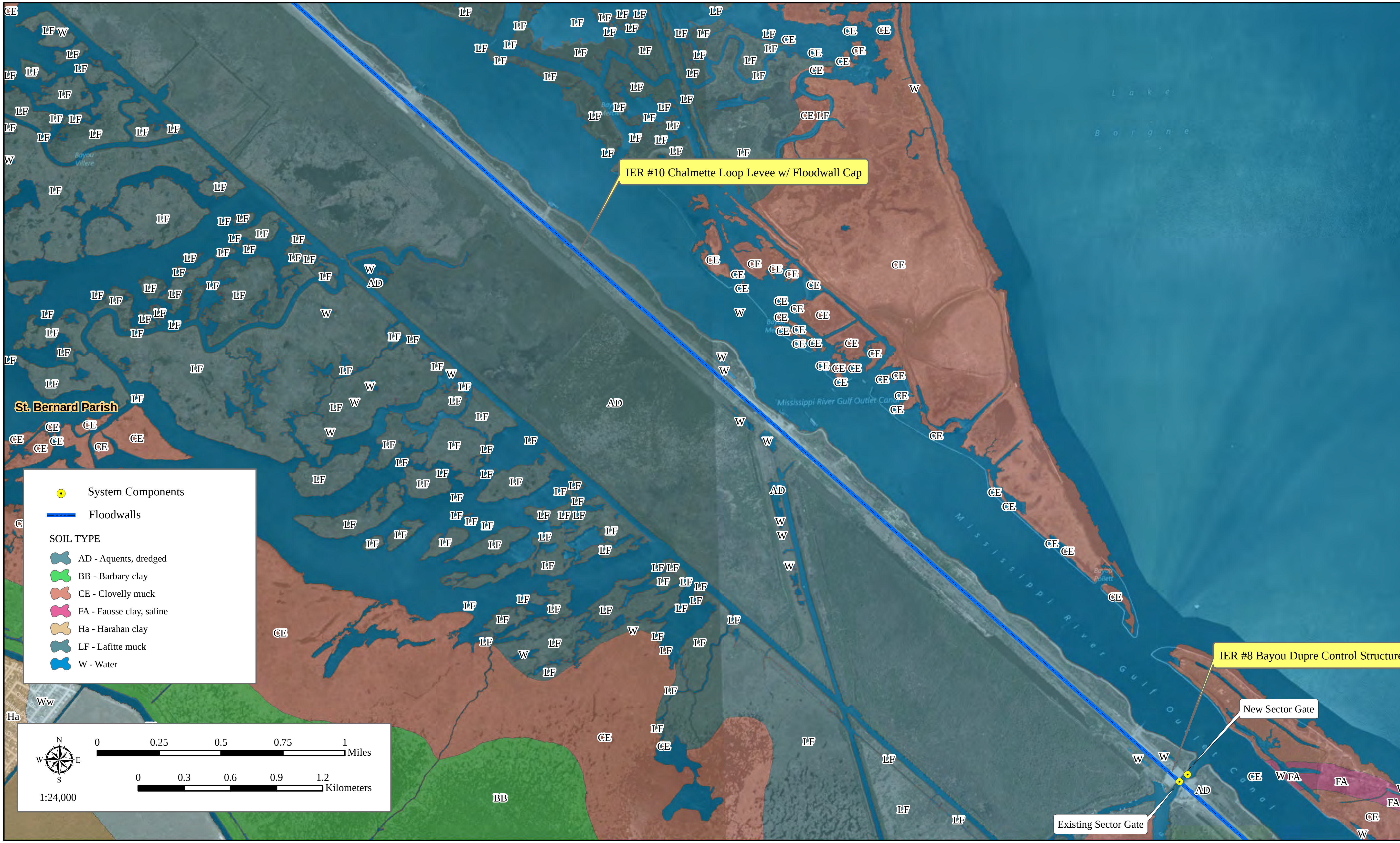

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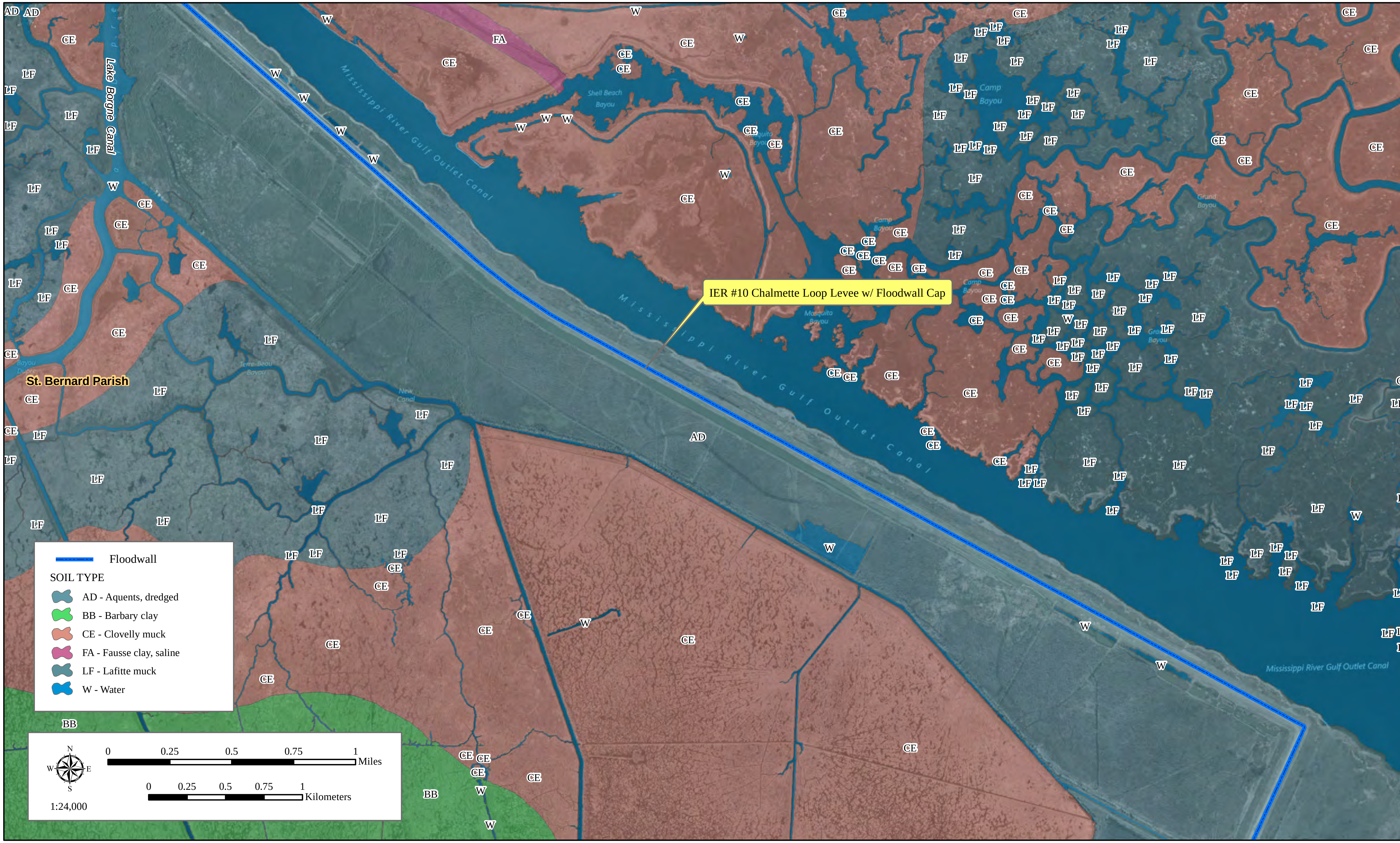

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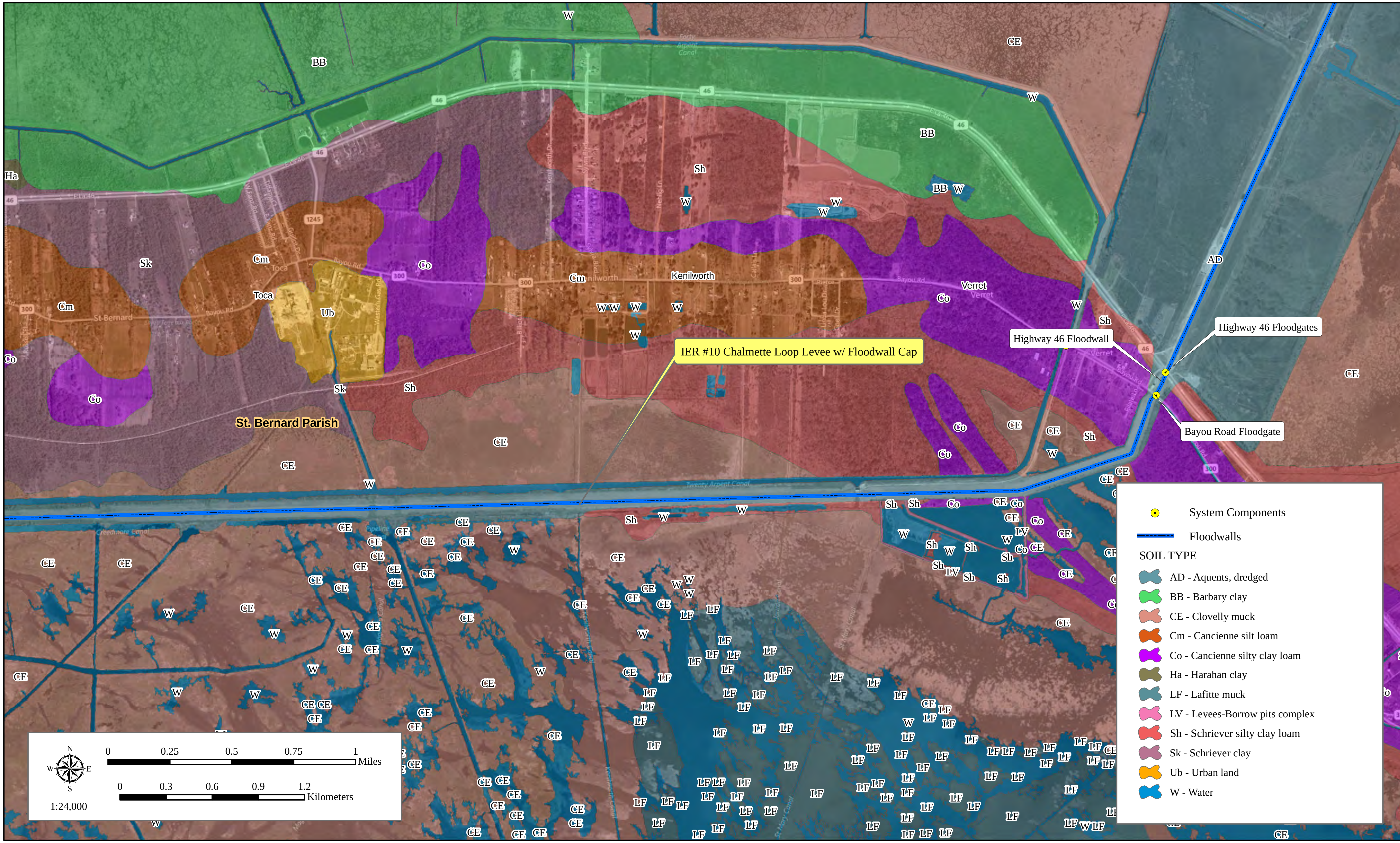

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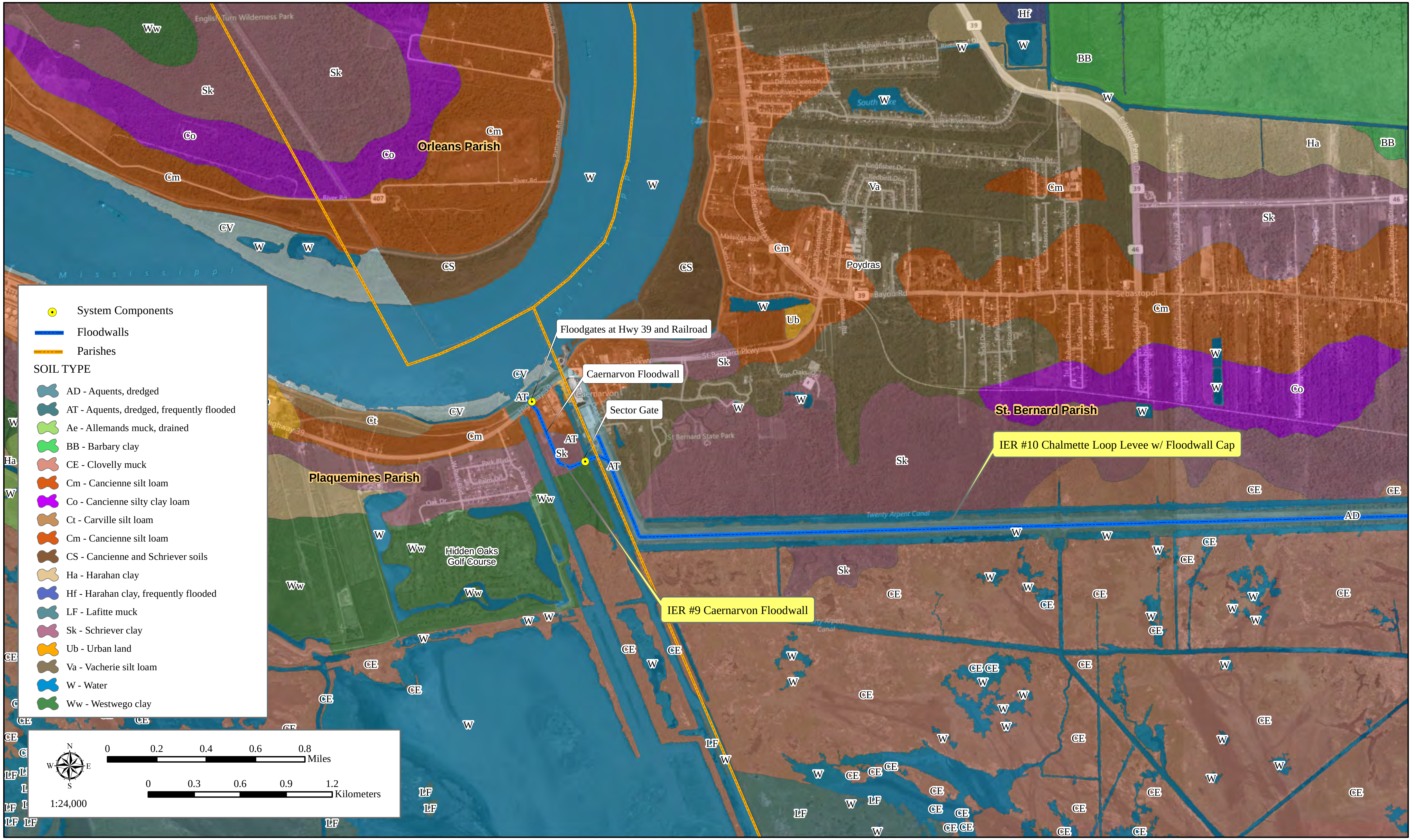

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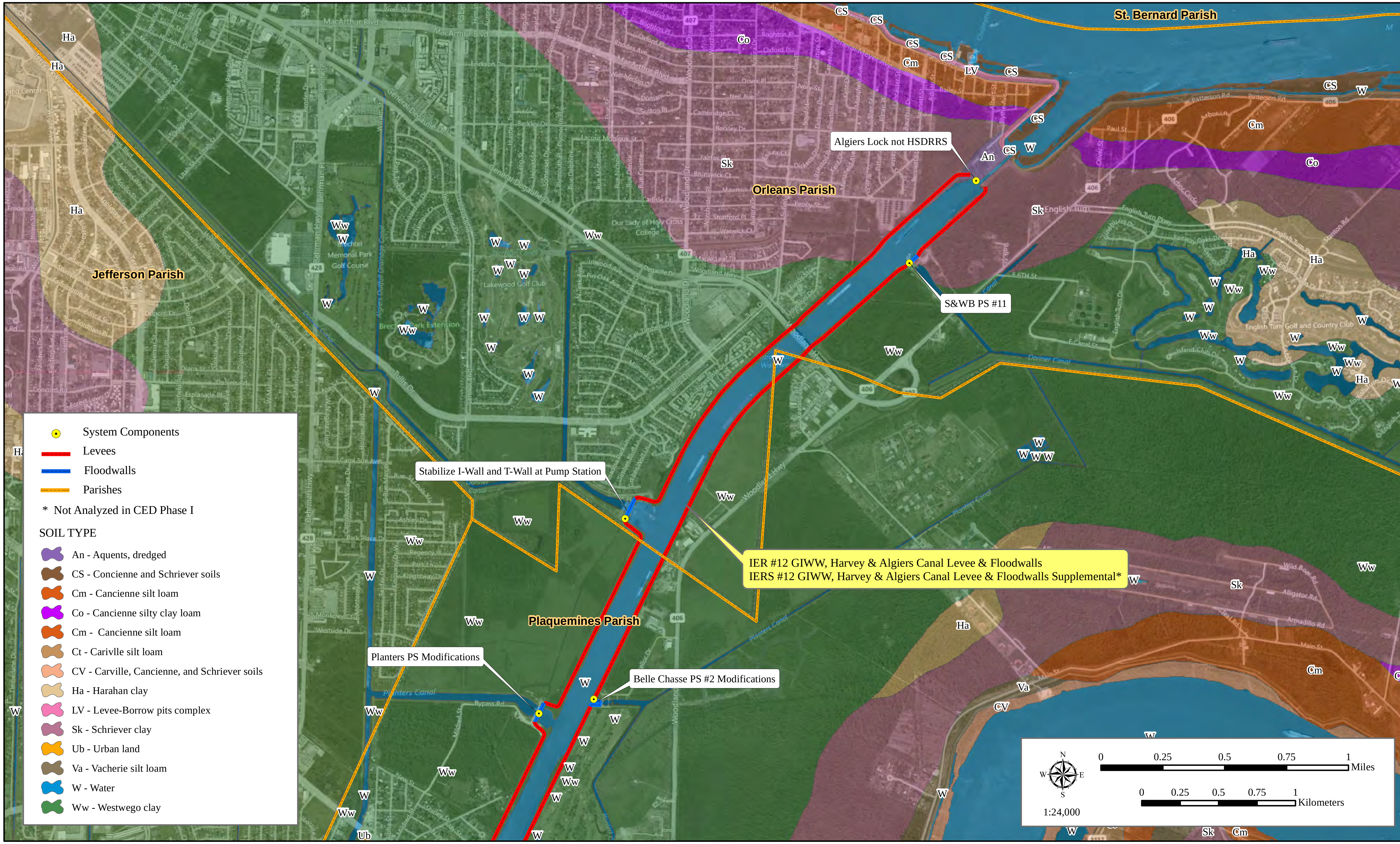
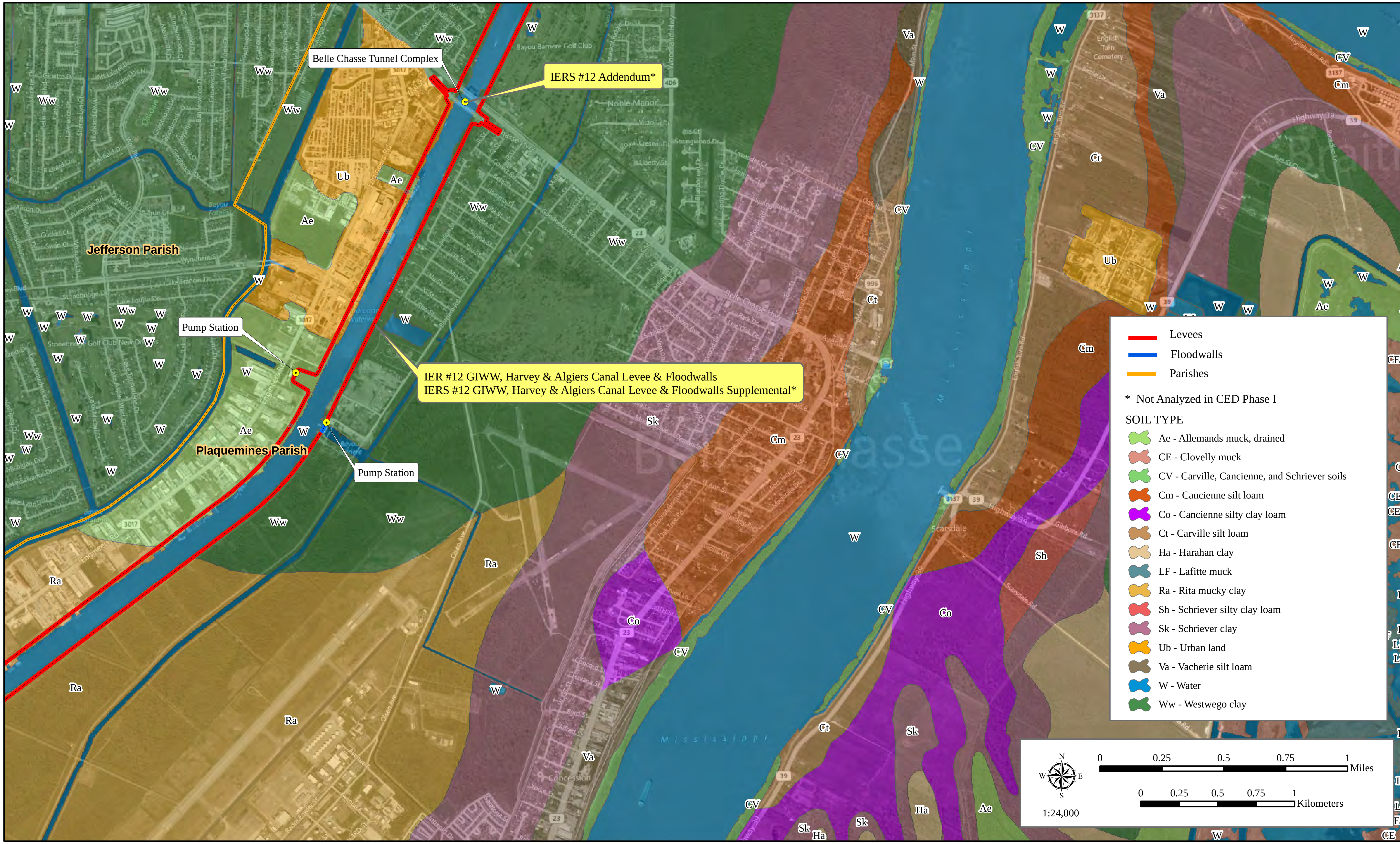
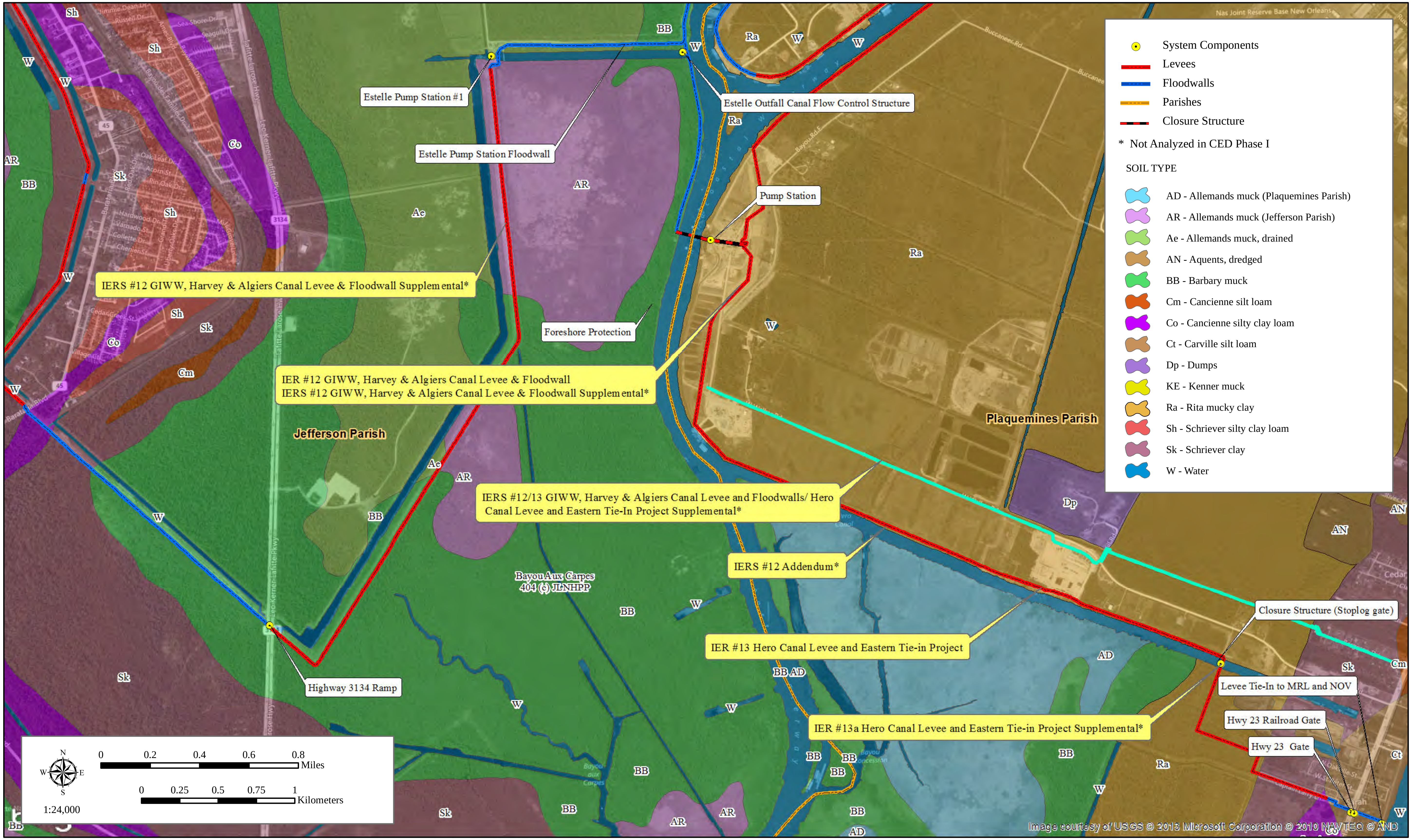


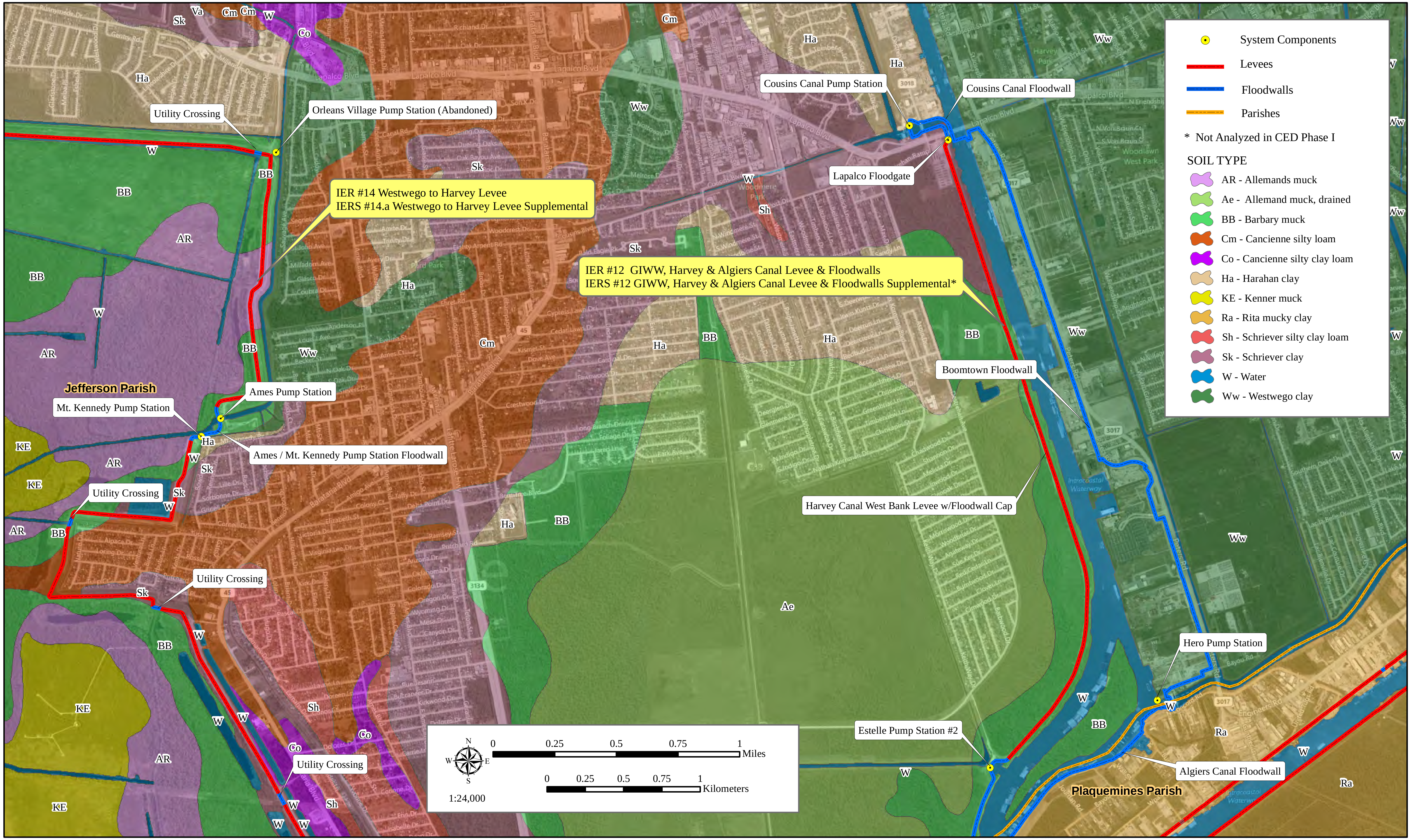
The HSDRRS Risk Reduction Soil Map 17



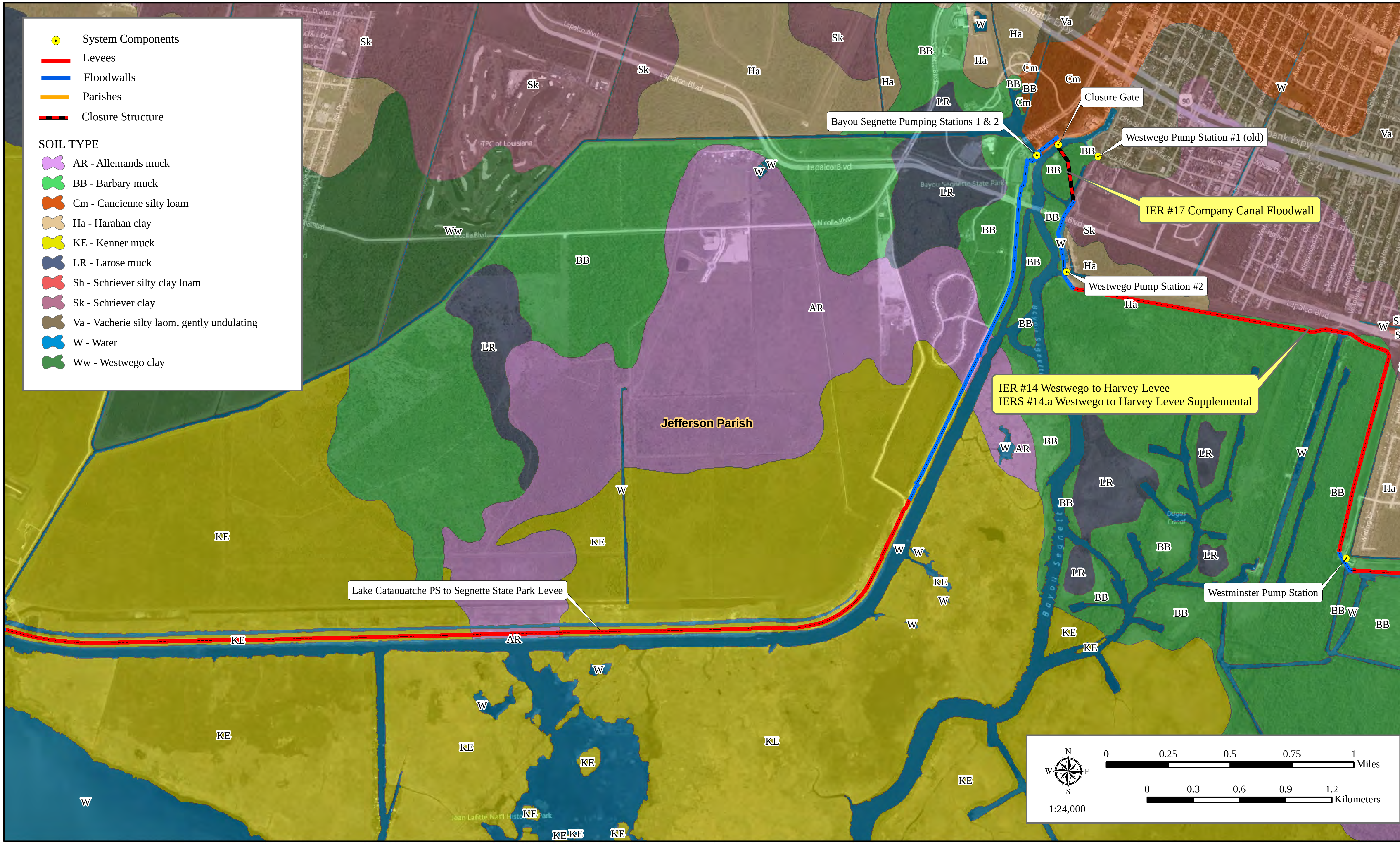
The HSDRRS Risk Reduction Soil Map 18



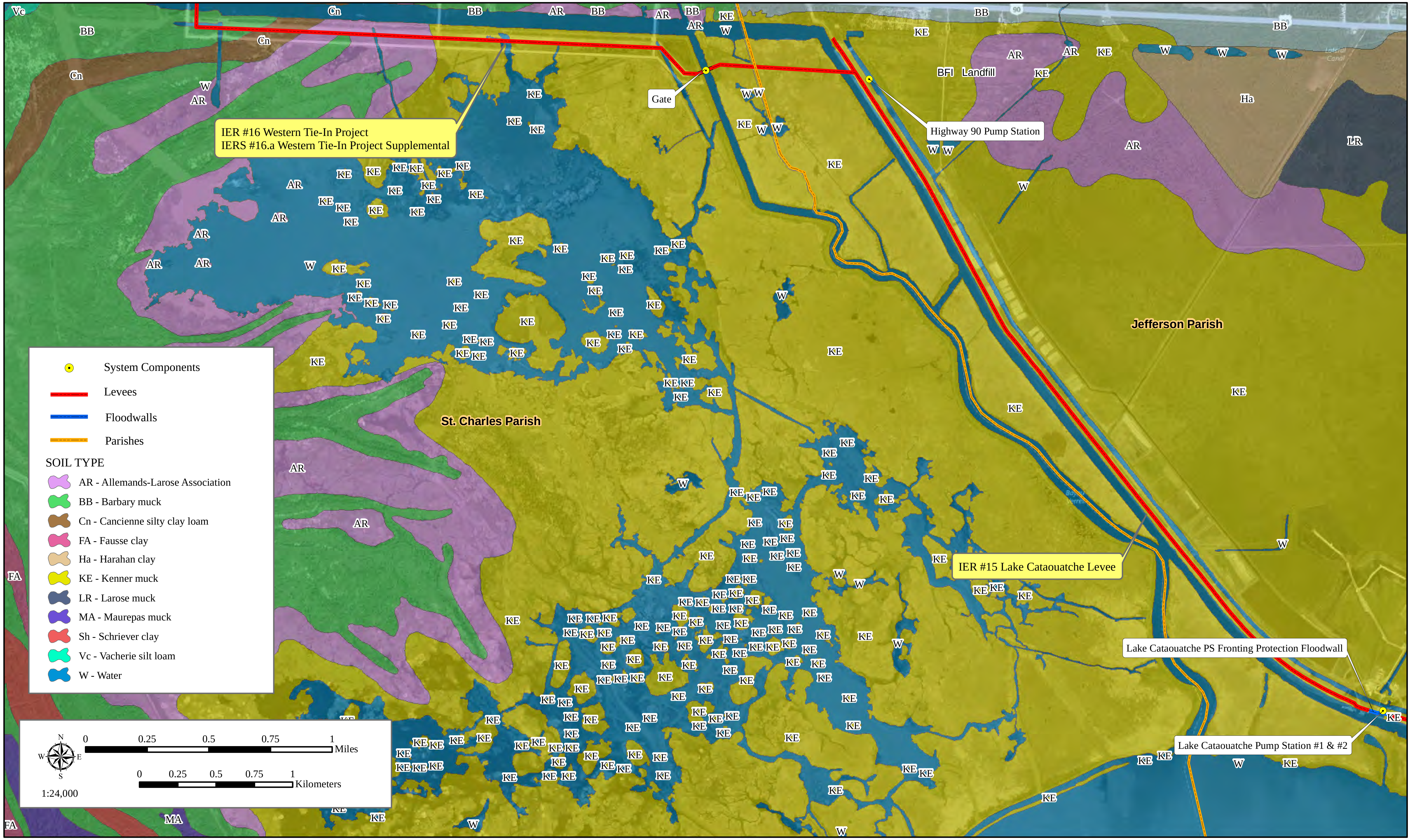
The HSDRRS Risk Reduction Soil Map 19



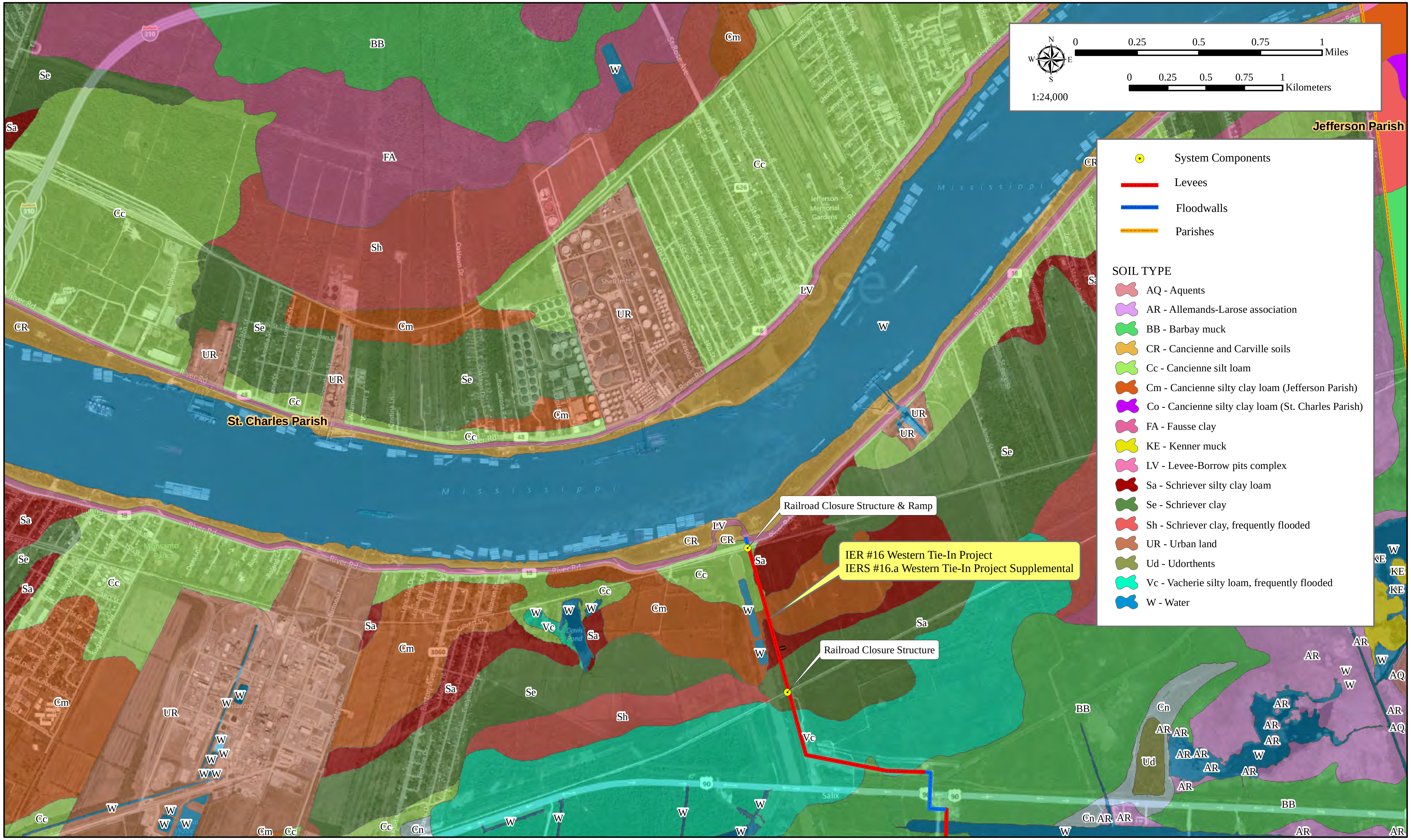
The HSDRRS Risk Reduction Soil Map 20



The HSDRRS Risk Reduction Soil Map 21

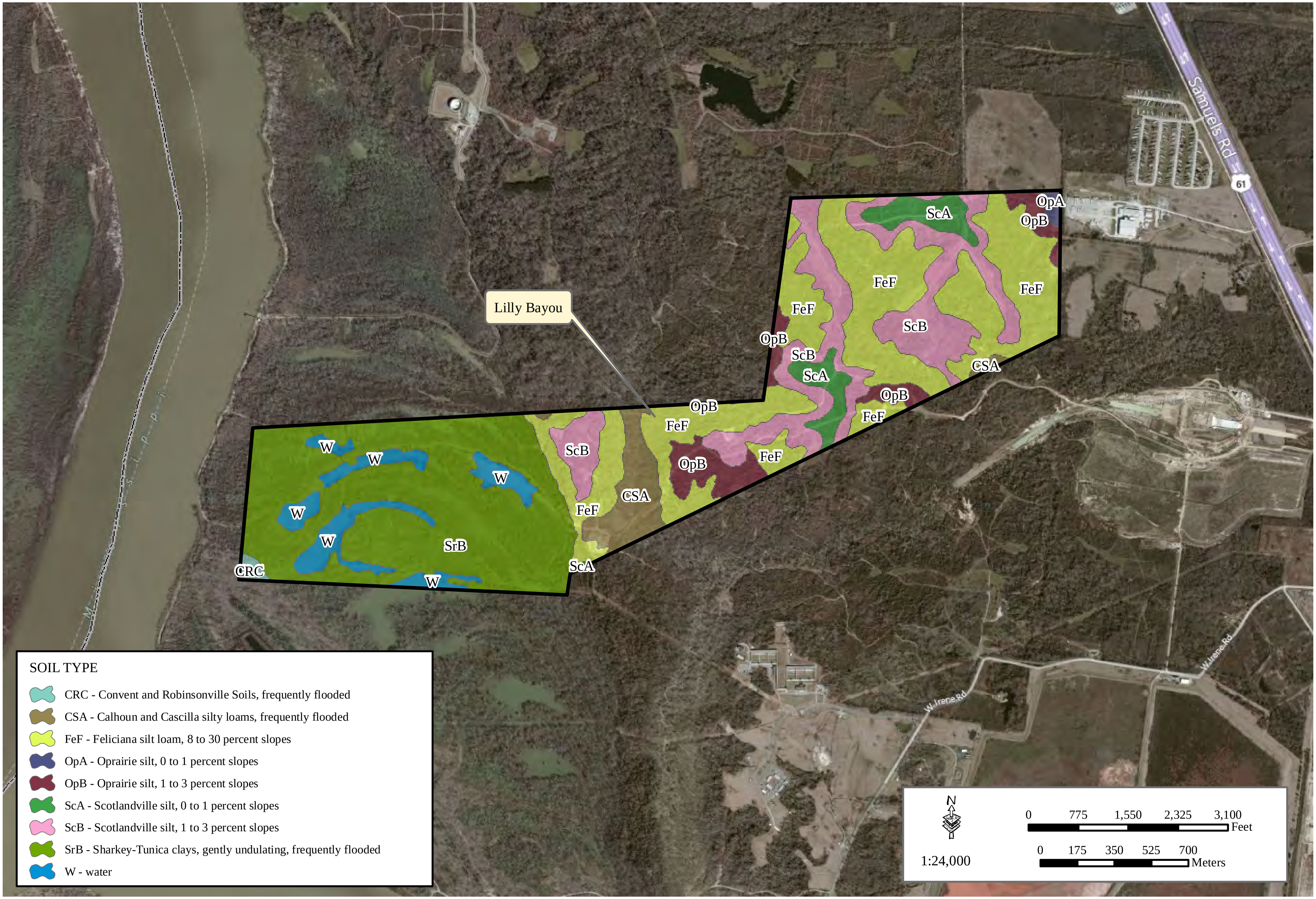


The HSDRRS Risk Reduction Soil Map 22

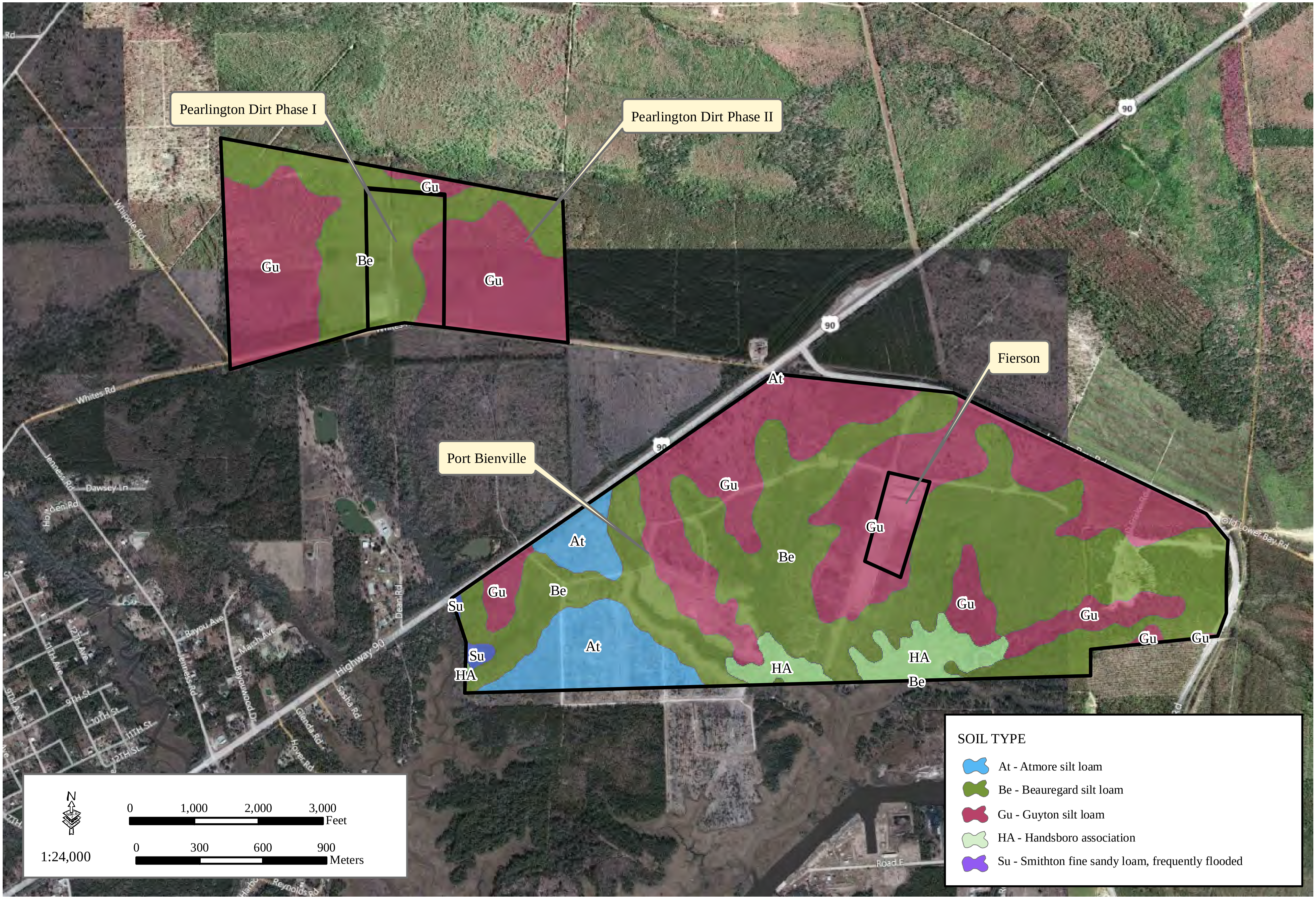


The HSDRRS Risk Reduction Soil Map 23

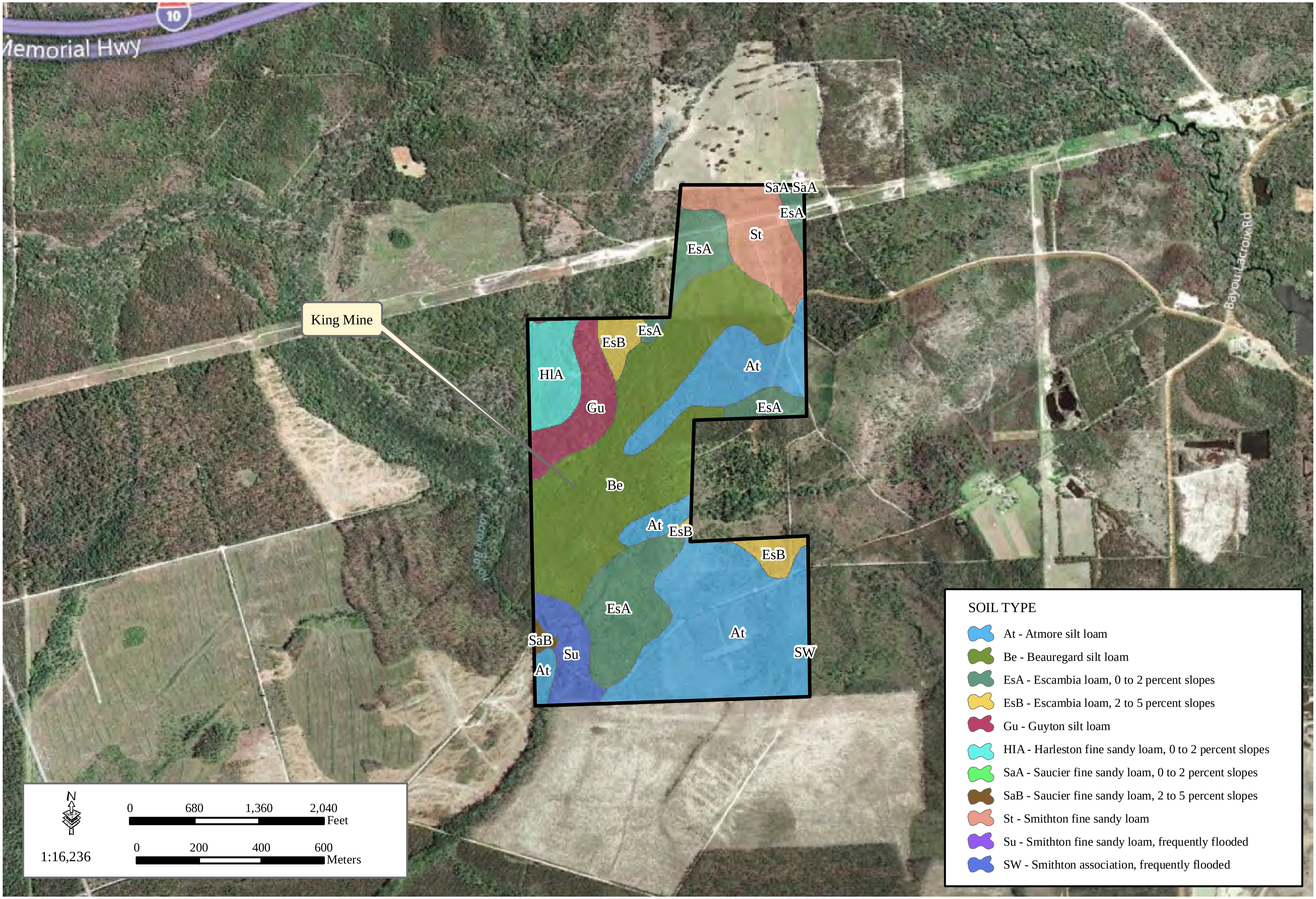
Borrow Site Soils - Ascension Parish, LA



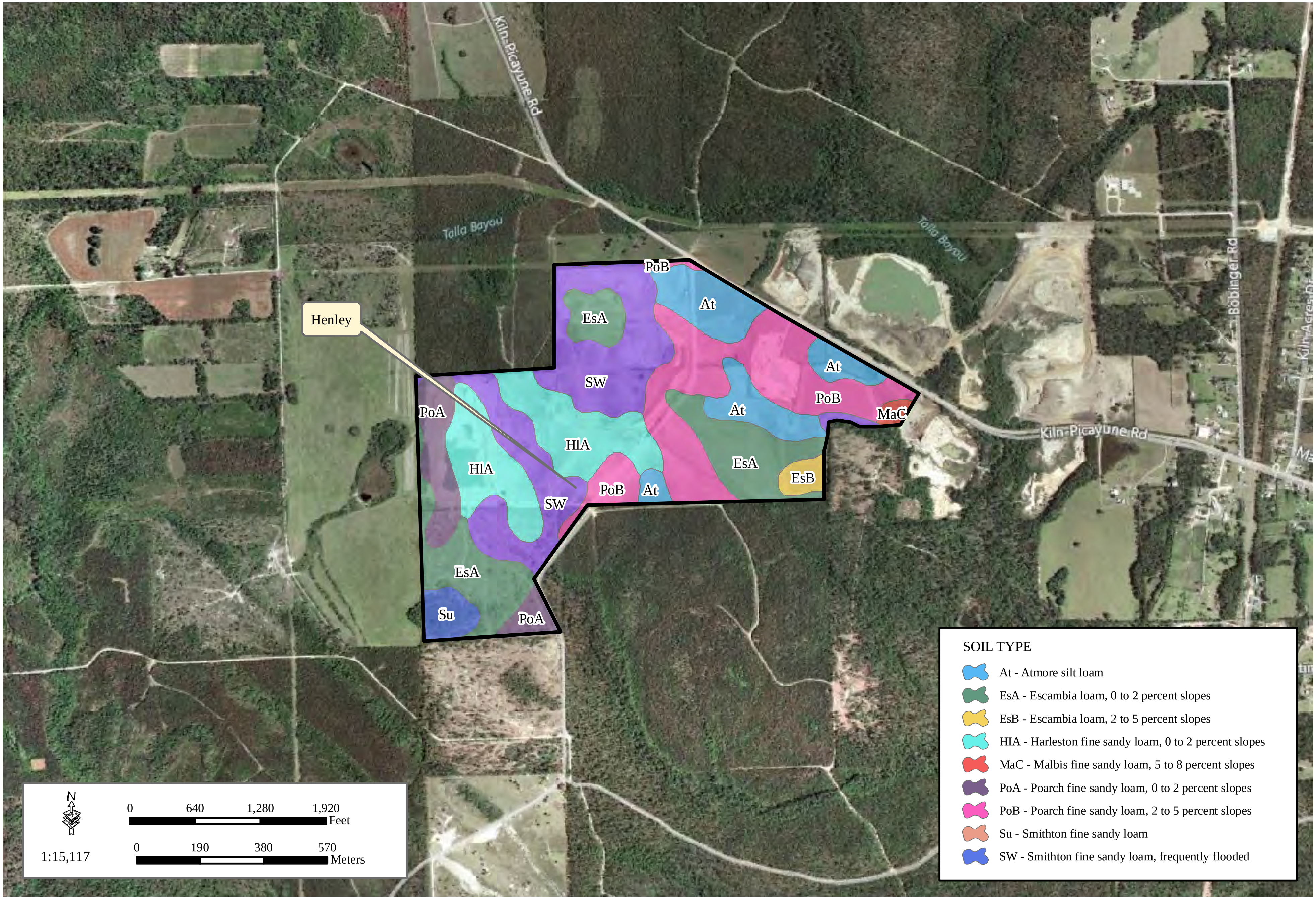
Borrow Site Soils - East Baton Rouge Parish, LA



Borrow Site Soils - Hancock, MS - Map 1

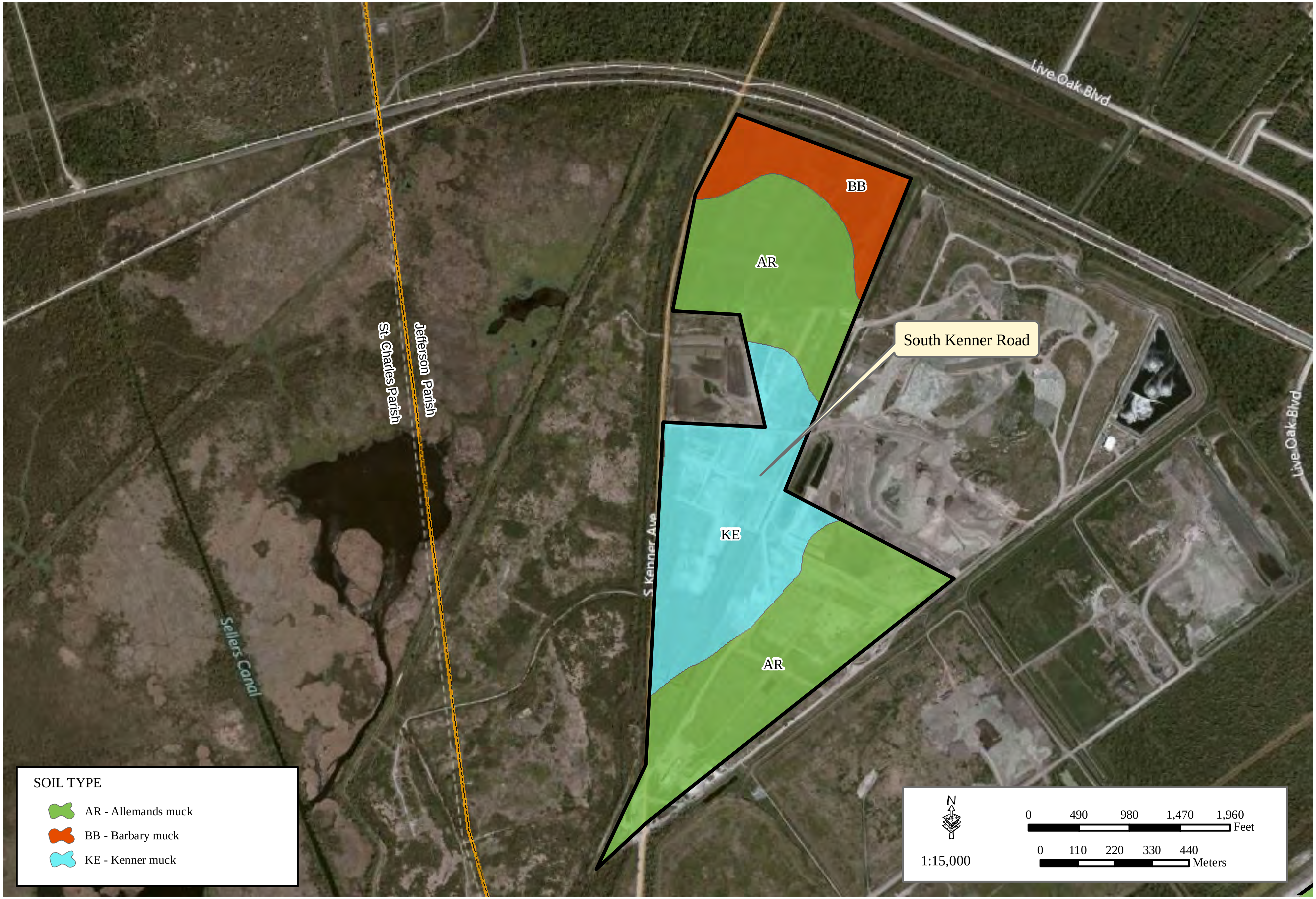


Borrow Site Soils - Hancock, MS - Map 2

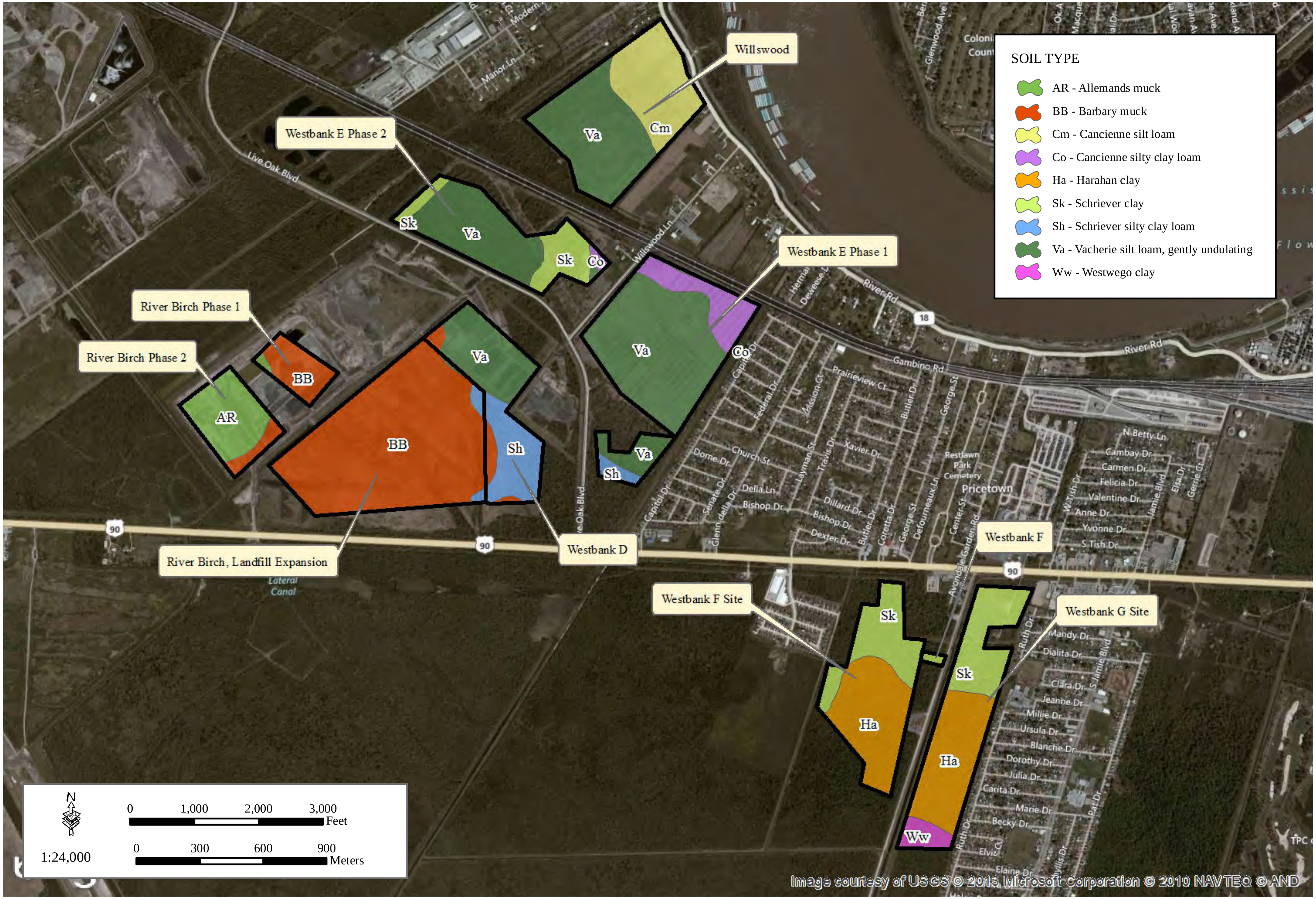


Borrow Site Soils - Hancock, MS - Map 3

Borrow Site Soils - Iberville Parish, LA



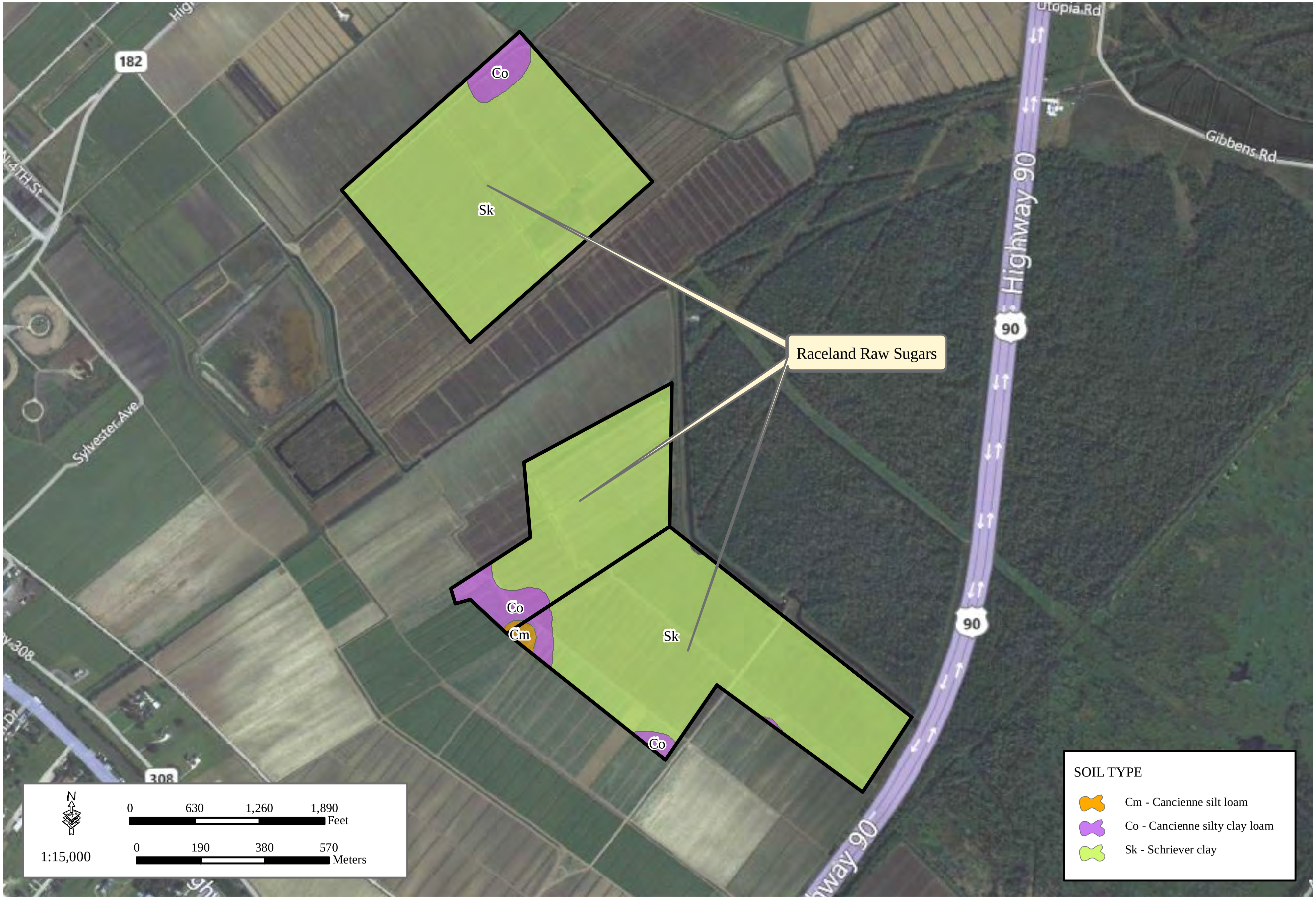
Borrow Site Soils - Jefferson Parish, LA - Map 1



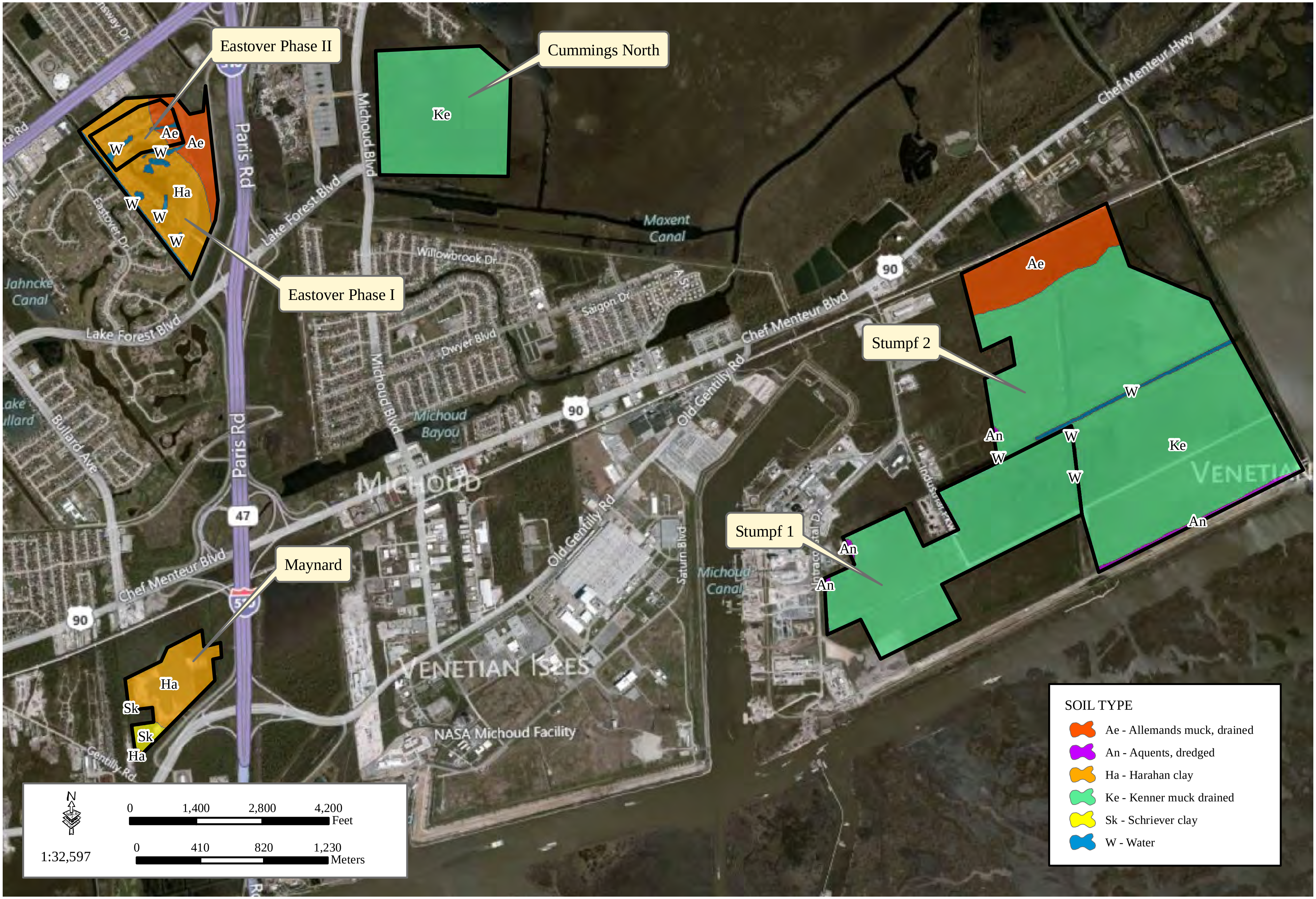
Borrow Site Soils - Jefferson Parish, LA - Map 2

Borrow Site Soils - Jefferson Parish, LA - Map 3

Borrow Site Soils - Jefferson Parish, LA - Map 4



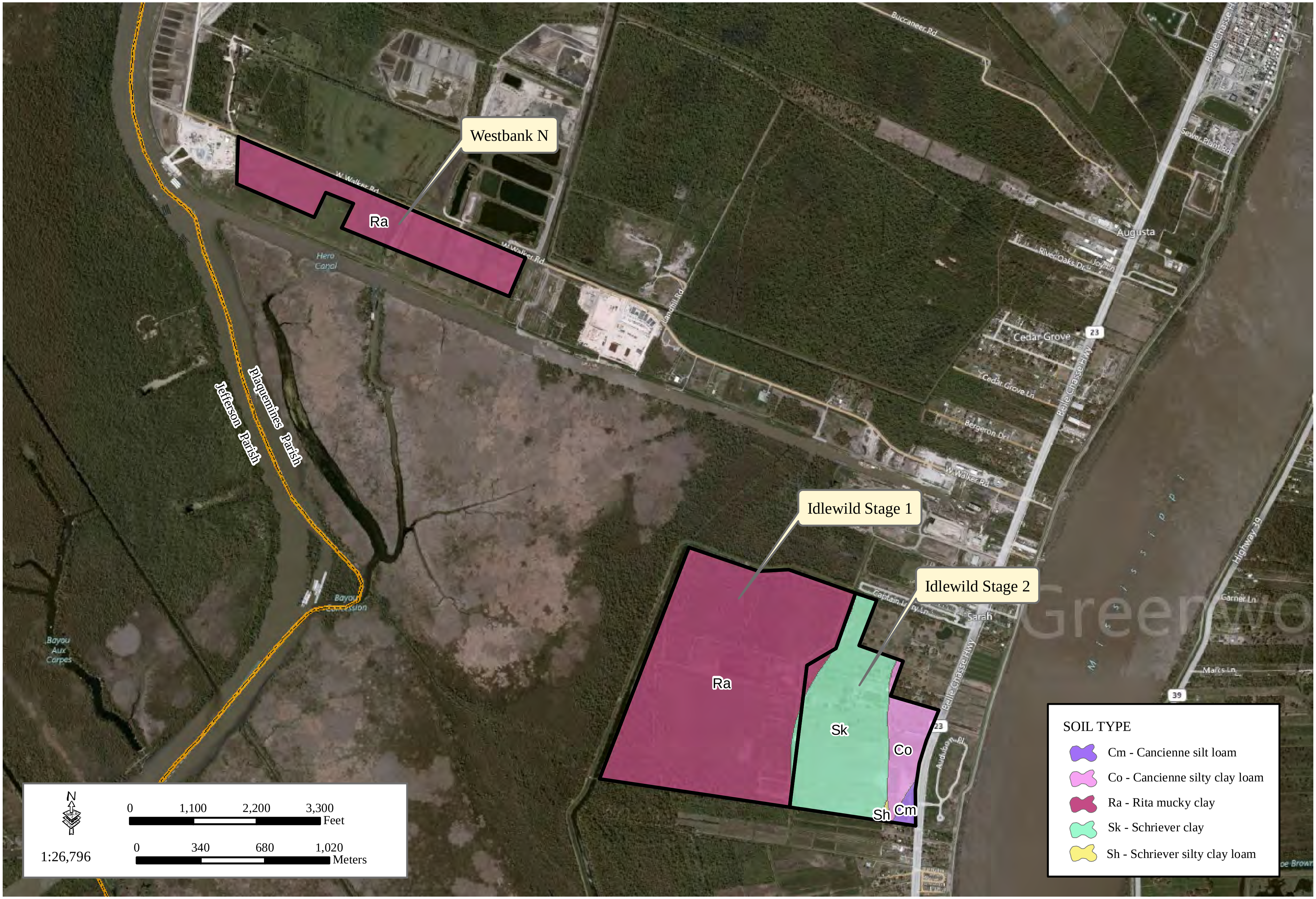
Borrow Site Soils - Lafourche Parish



Borrow Site Soils - Orleans Parish, LA

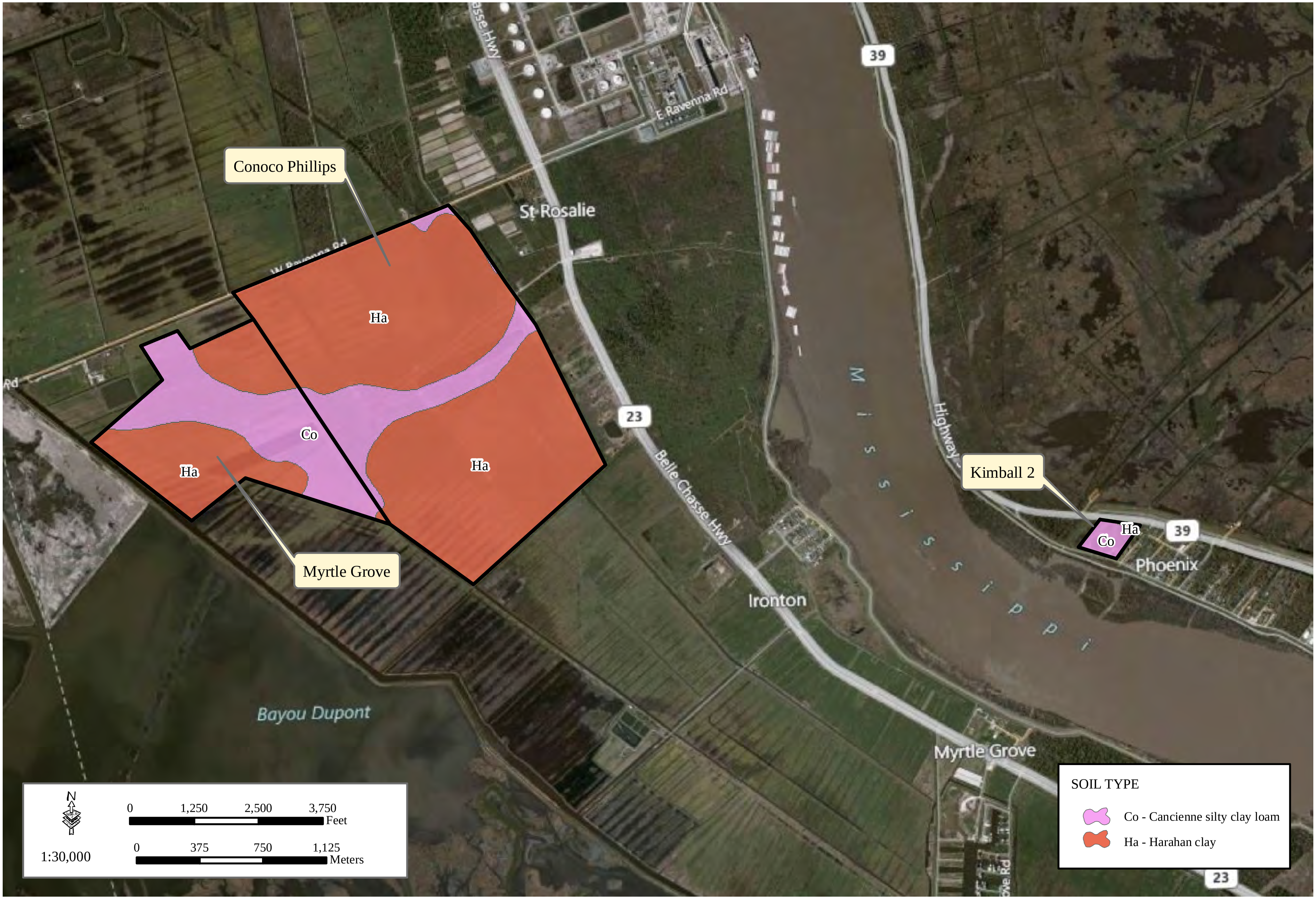
Borrow Site Soils - Plaquemines Parish - Map 1

Borrow Site Soils - Plaquemines Parish - Map 2

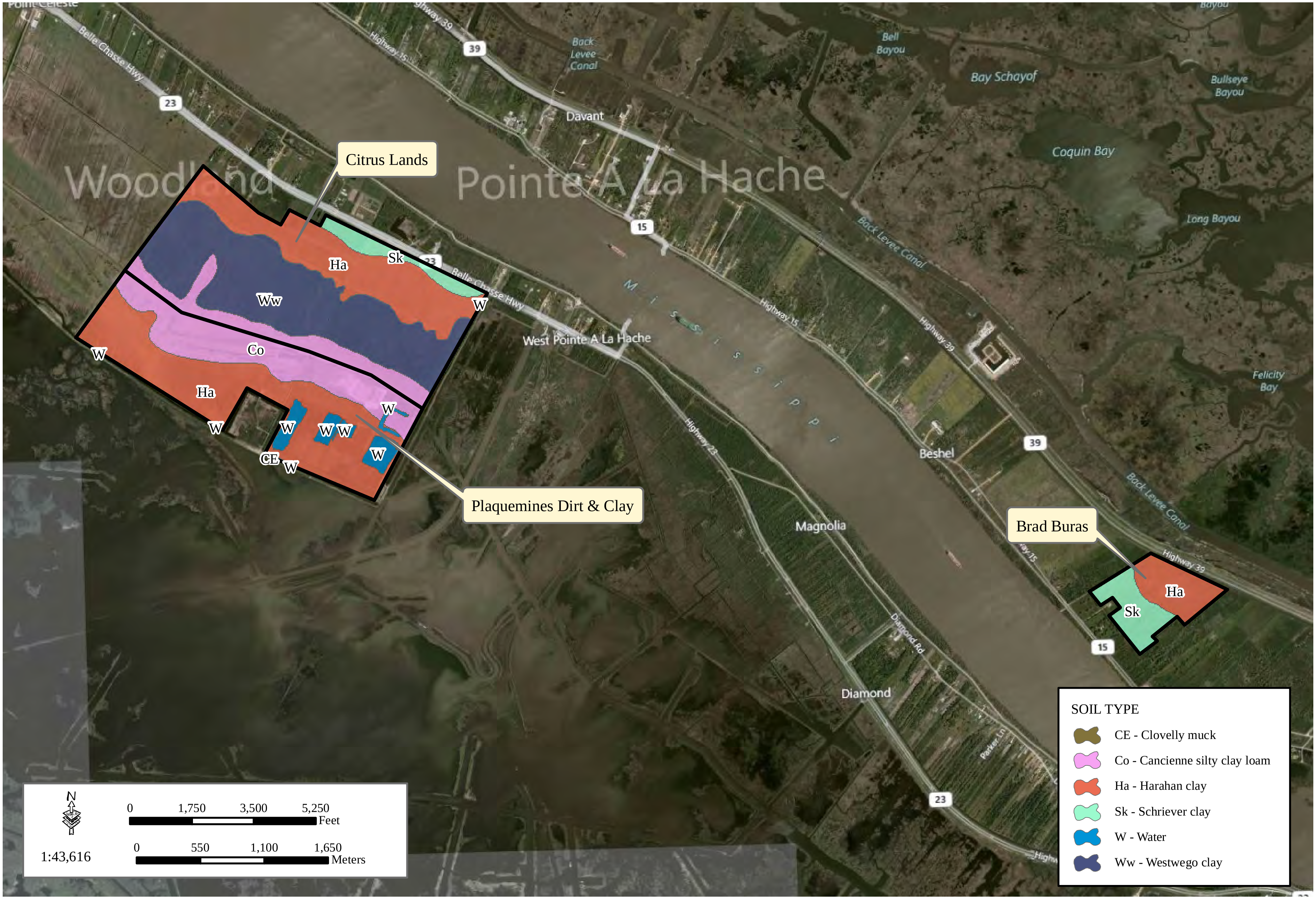


Borrow Site Soils - Plaquemines Parish - Map 3

Borrow Site Soils - Plaquemines Parish - Map 4



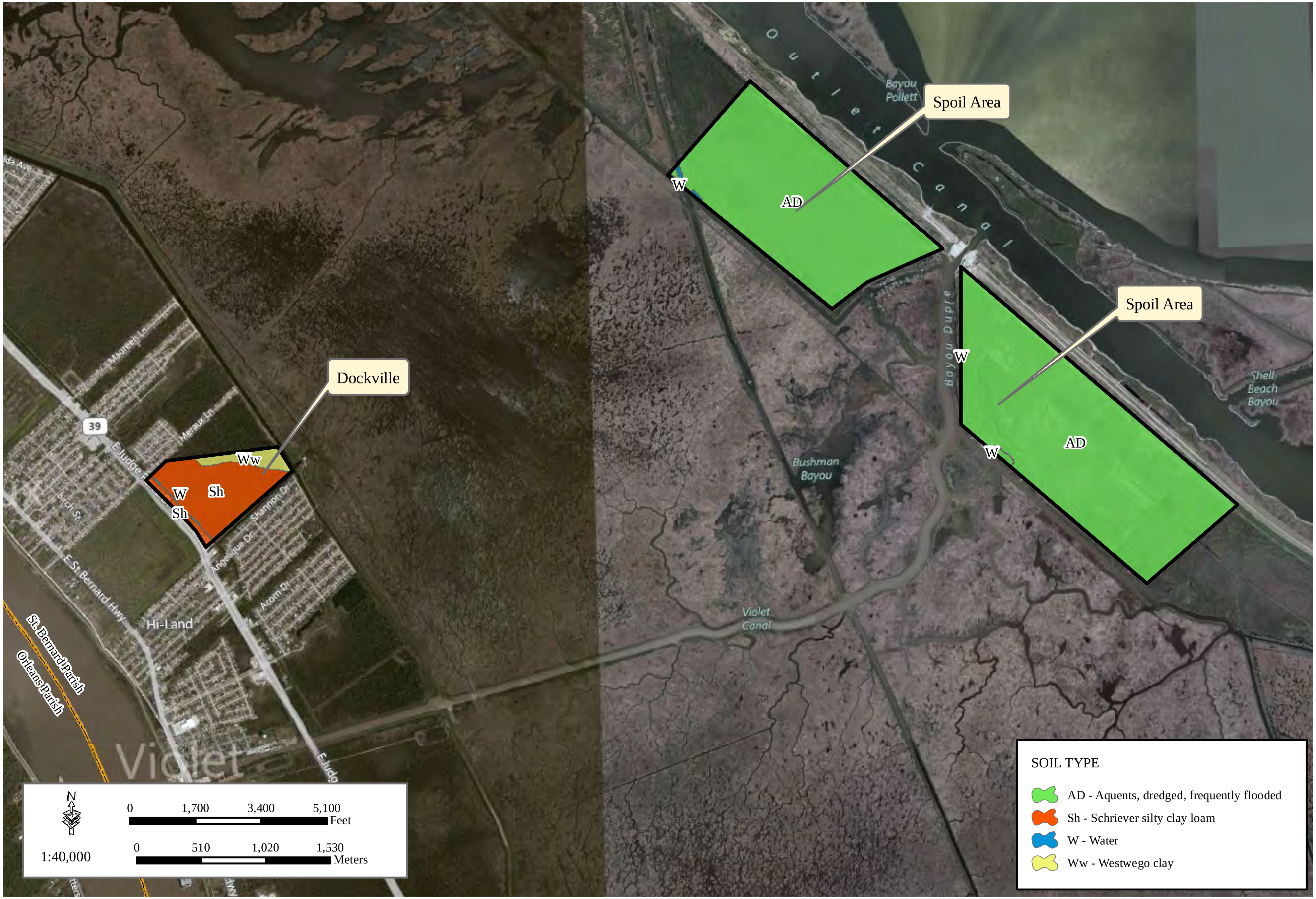
Borrow Site Soils - Plaquemines Parish - Map 5



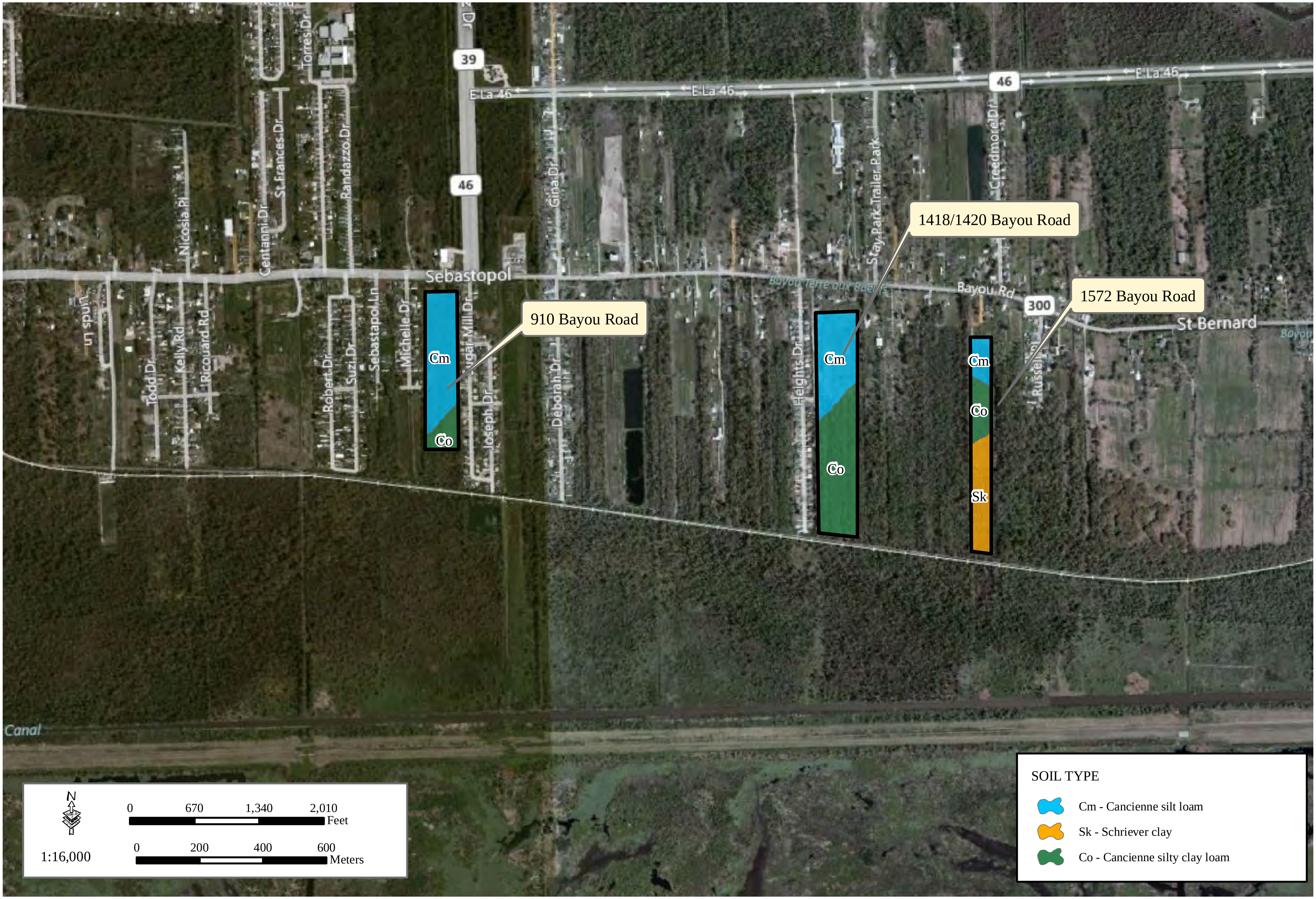
Borrow Site Soils - Plaquemines Parish - Map 6

Borrow Site Soils - Plaquemines Parish - Map 7

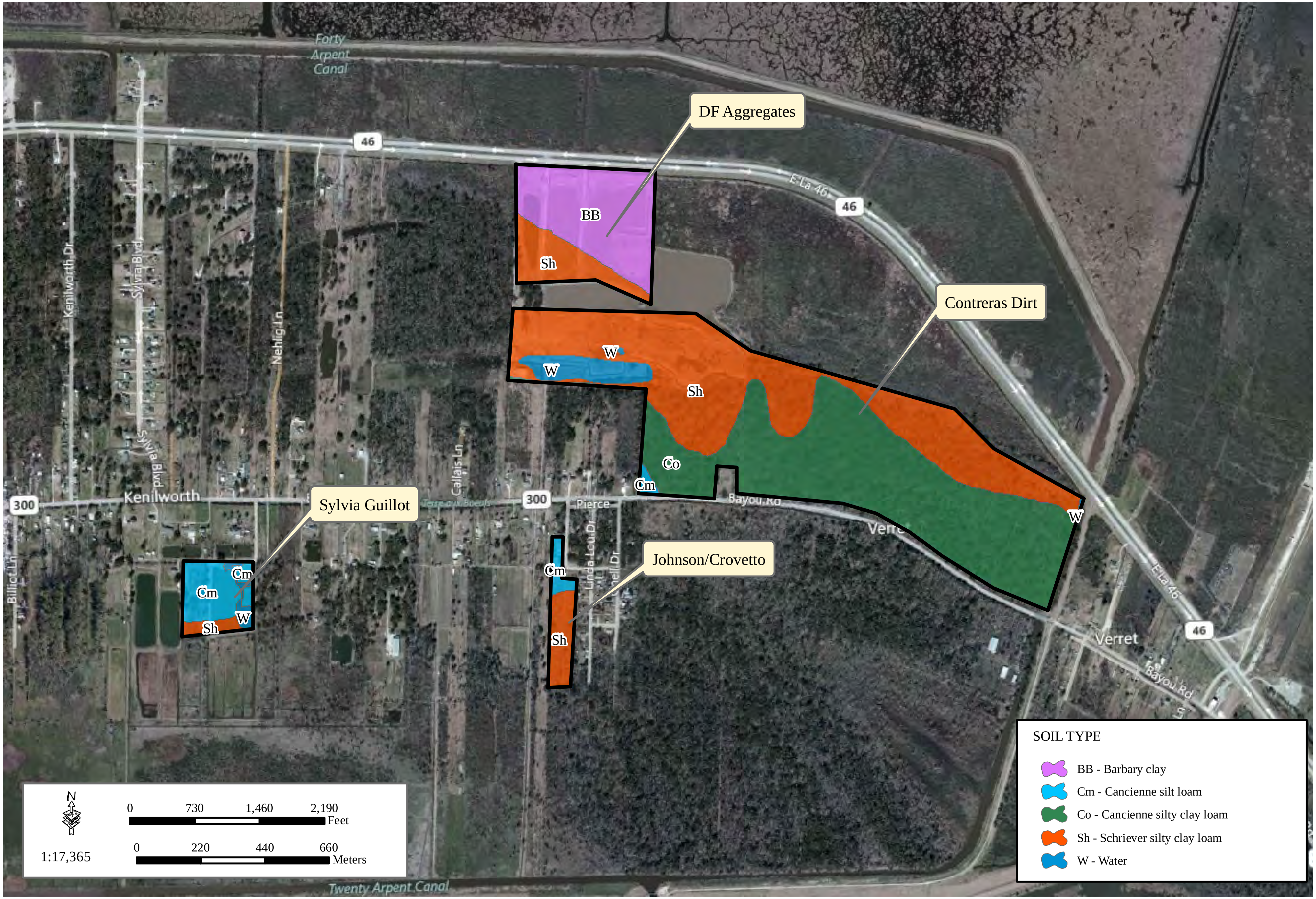
Borrow Site Soils - Plaquemines Parish - Map 8



Borrow Site Soils - St. Bernard - Map 1



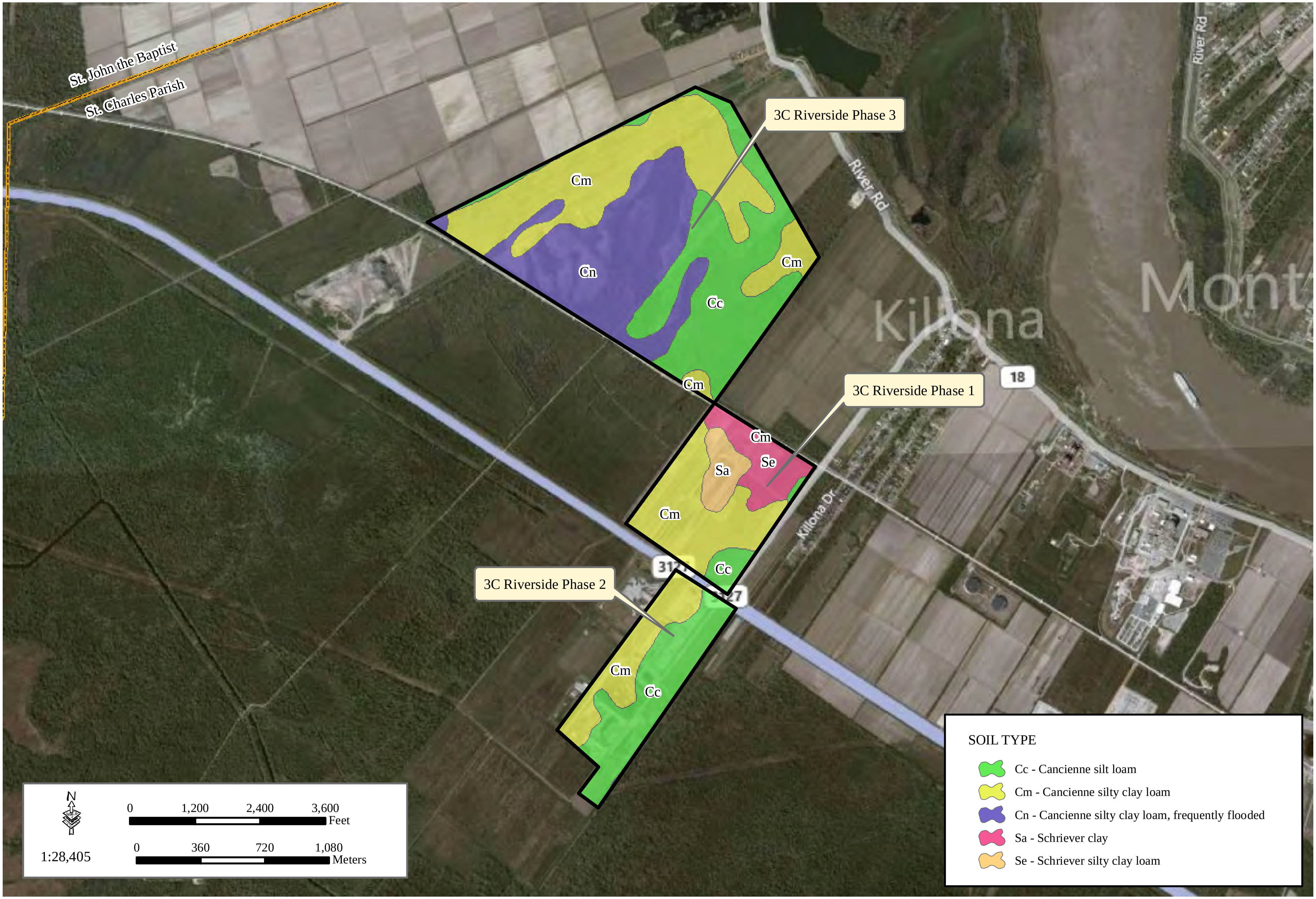
Borrow Site Soils - St. Bernard - Map 2



Borrow Site Soils - St. Bernard - Map 3

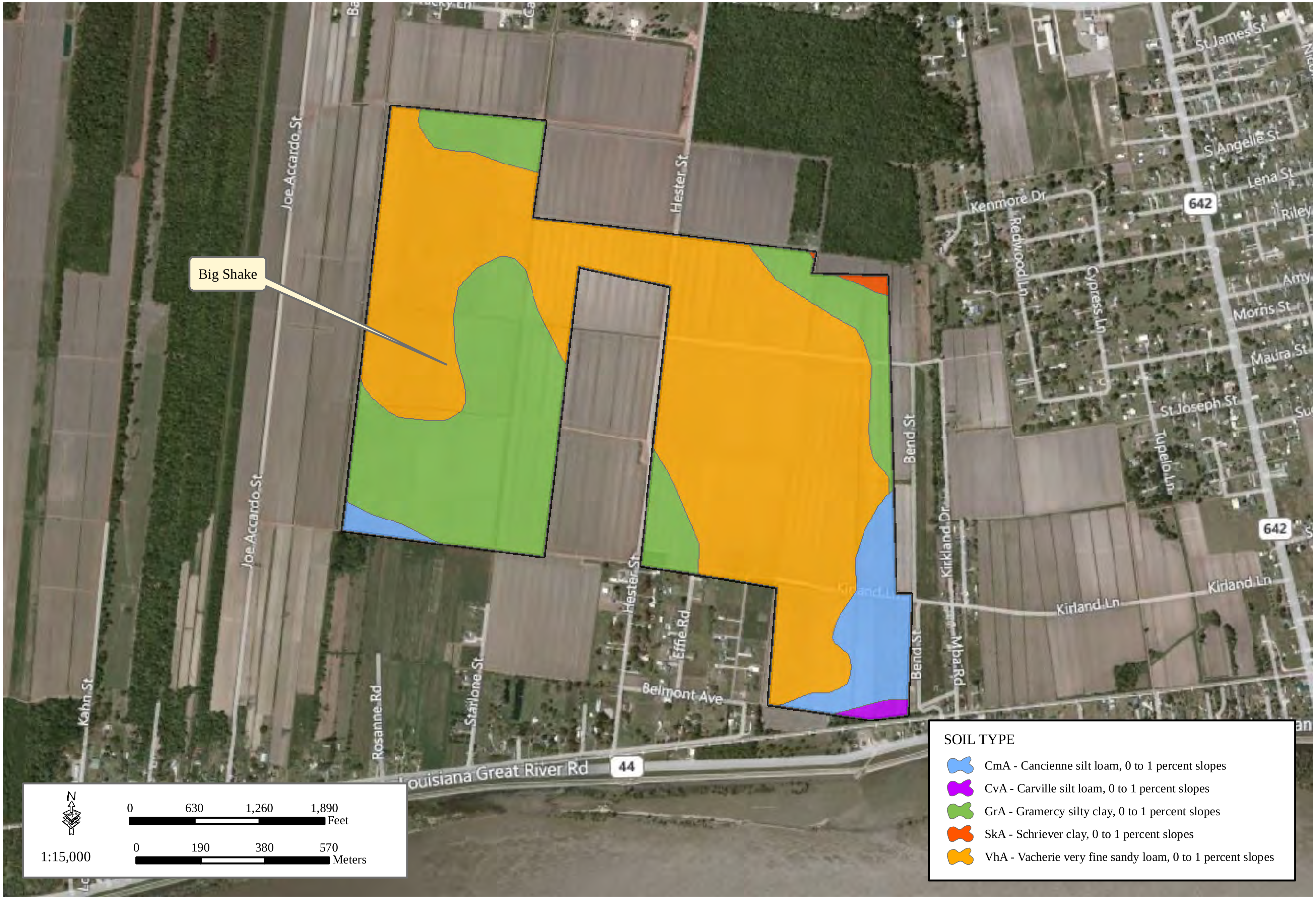
Borrow Site Soils - St. Bernard - Map 4

Borrow Site Soils - St. Bernard - Map 5

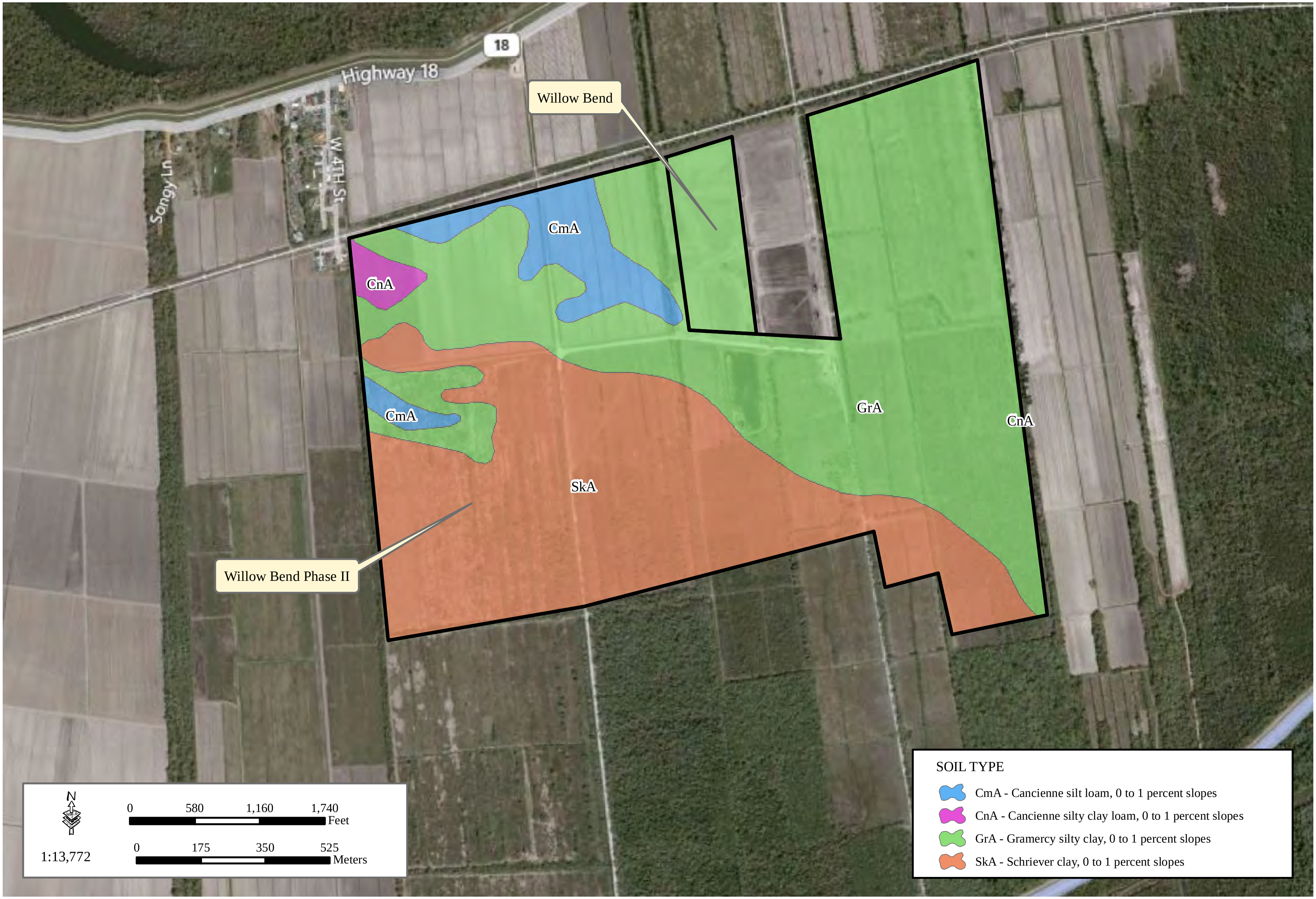


Borrow Site Soils - St. Charles Parish, LA - Map 1

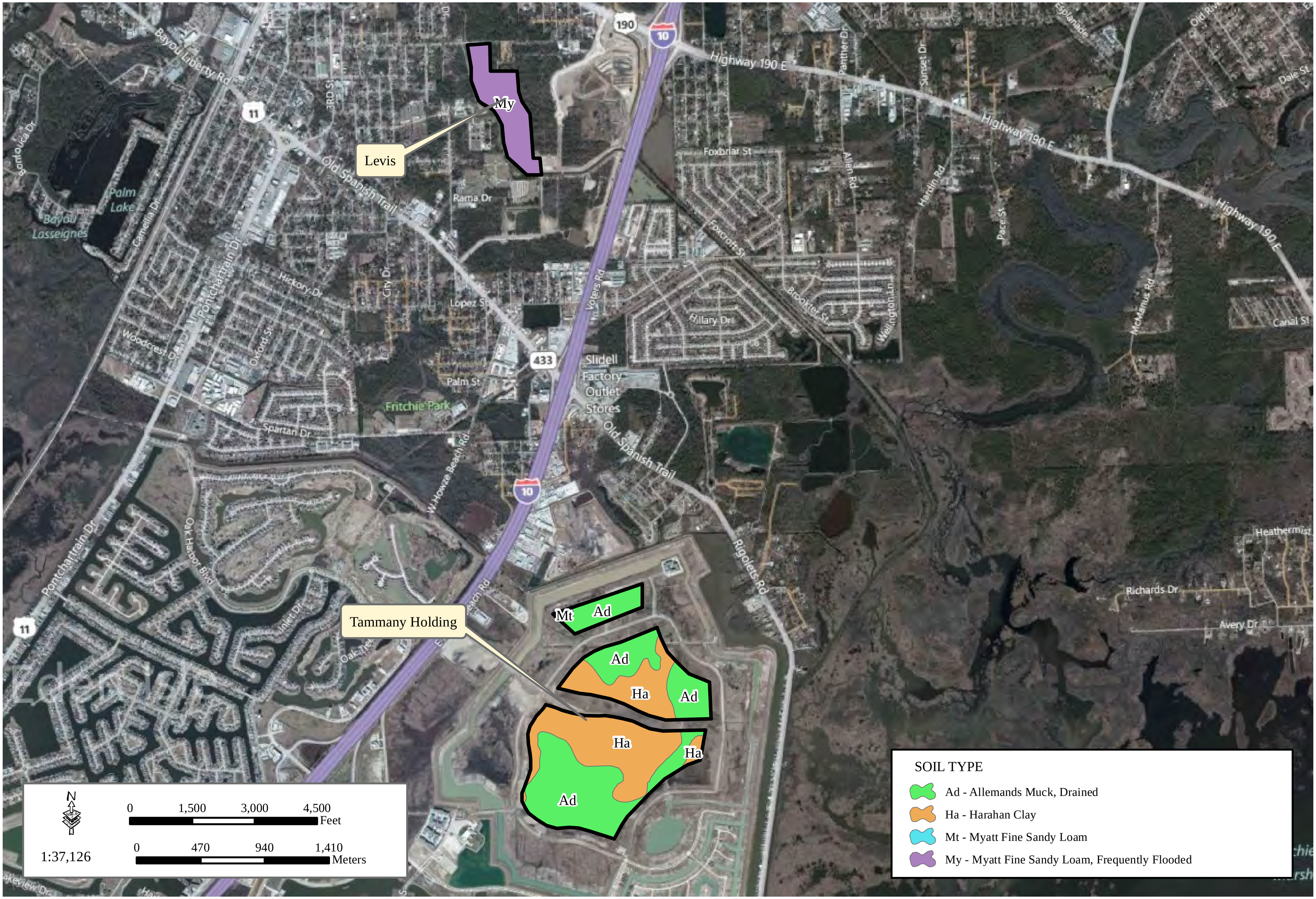
Borrow Site Soils - St. Charles Parish, LA - Map 2



Borrow Site Soils - St. James, LA



Borrow Site Soils - St. John the Baptist, LA



Borrow Site Soils - St. Tammany, LA

APPENDIX N
WETLAND AND BLH MITIGATION TABLE

Table 1. HSDRRS Impacts and Compensatory Mitigation to be Completed*

IER	Parish	Side	Non-wet BLH	Non-wet BLH	Marsh (Acres)	Marsh AAHUs	Swamp (Acres)	Swamp AAHUs	BLH (acres)	BLH AAHUs	Water Bottoms (Acres)
			acres	*AAHUs*	*acres*	*AAHUs*	*acres*	*AAHUs*	*acres*	*AAHUs*	*acres*
1 LaBranche Levee	St. Charles	Protected	-	-	-	-	137.05	73.99	-	-	-
		Flood	-	-	-	-	143.57	110.97	11.33	8.09	
1.a Supp. LaBranche Levee	St. Charles	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
2 West Return Floodwall	St. Charles, Jefferson	Protected	-	-	-	-	-	-	-	-	75.00
		Flood	-	-	17.00	9.00	-	-	-	-	
2.a Supp. West Return Floodwall	St. Charles, Jefferson	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	14.50	11.60	2.00	1.55	-	-	
3 Jefferson Lakefront Levee	Jefferson	Protected	-	-	-	-	-	-	-	-	26.40
		Flood	-	-	-	-	-	-	-	-	
3.a Supp. Jefferson Lakefront Levee	Jefferson	Protected	-	-	-	-	-	-	-	-	275.00
		Flood	-	-	-	-	-	-	-	-	
4 Orleans Lakefront Levee	Orleans	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
5 Lakefront Pump Stations	Jefferson, Orleans	Protected	-	-	-	-	-	-	-	-	3.60
		Flood	-	-	-	-	-	-	-	-	
6 Citrus Lands Levee	Orleans	Protected	-	-	-	-	-	-	-	-	68.00
		Flood	-	-	-	-	-	-	-	-	
6.a Supp. Citrus Lands Levee	Orleans	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
7 Lakefront Levee	Orleans	Protected	-	-	100.40	36.80	-	-	151.70	79.30	106.00
		Flood	-	-	70.00	37.20	-	-	30.00	11.90	
7.a Supp. Lakefront Levee	Orleans	Protected	-	-	119.00	42.90	-	-	169.00	89.20	12.49
		Flood	-	-	126.00	67.40	-	-	32.80	12.20	
8 Bayou Bienvenue/Dupre	St. Bernard	Protected	-	-	-	-	-	-	-	-	0.30
		Flood	-	-	-	-	-	-	-	-	
9 Caenarvon Floodwall	St. Bernard	Protected	-	-	-	-	-	-	-	-	0.30
		Flood	10.00	4.65	1.90	1.20	-	-	1.20	0.66	
10 Chalmette Loop	St. Bernard	Protected	-	-	106.55	57.31	-	-	38.32	16.44	50.00
		Flood	-	-	323.04	209.94	-	-	35.31	15.22	
11 Tier 2 Borgne IHNC	Orleans, St. Bernard	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	122.00	24.33	-	-	15.00	2.59	
11 Tier 2Supp. Borgne IHNC	Orleans, St. Bernard	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
11 Tier 2 Pontchartrain IHNC	Orleans, St. Bernard	Protected	-	-	-	-	-	-	-	-	7.00
		Flood	-	-	-	-	-	-	-	-	
12 GIWW, Harvey, Algiers	Jefferson, Orleans, Plaquemines	Protected	-	-	-	-	-	-	251.70	175.10	-
		Flood	-	-	-	-	74.70	38.40	2.40	2.00	
13 Hero Canal, East. Terminus	Plaquemines	Protected	-	-	-	-	-	-	13.00	7.80	-
		Flood	-	-	-	-	39.00	28.87	19.00	10.59	
14 Westwego to Harvey Levee	Jefferson	Protected	-	-	-	-	-	-	44.50	29.67	-
		Flood	-	-	-	-	29.75	17.02	45.50	18.58	

IER	Parish	Side	Non-wet BLH	Non-wet BLH	Marsh (Acres)	Marsh AAHUs	Swamp (Acres)	Swamp AAHUs	BLH (acres)	BLH AAHUs	Water Bottoms (Acres)
			acres	*AAHUs*	*acres*	*AAHUs*	*acres*	*AAHUs*	*acres*	*AAHUs*	*acres*
14 Supp. Westwego to Harvey Levee	Jefferson	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	-	-	42.00	24.00	-	-	
15 Lake Cataouatche	Jefferson	Protected	-	-	-	-	-	-	23.50	6.12	-
		Flood	-	-	-	-	-	-	3.60	1.35	
16 Western Tie-in	Jefferson, St. Charles	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	134.10	65.50	-	-	78.60	36.20	
16 Supp. Western Tie-in	Jefferson, St. Charles	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	14.10	9.00	-	-	79.10	37.26	
17 Company Canal Floodwall	Jefferson	Protected	-	-	-	-	-	-	5.50	2.69	-
		Flood	-	-	-	-	19.00	17.09	-	-	
18 GFBM	Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles	Protected	461.00	197.84	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
19 CFBM	Hancock County, MS; Iberville, Jefferson, Orleans, Plaquemines, St. Bernard	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
22 GFBM	Jefferson, Plaquemines	Protected	244.69	118.54	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
23 CFBM	Hancock County, MS; Plaquemines, St. Bernard, St. Charles	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
25 GFBM	Jefferson, Orleans, Plaquemines	Protected	933.00	284.00	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
26 CFBM	Jefferson, Plaquemines, St. John the Baptist; Hancock, MS	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
27 Lakefront Pump Stations	Orleans	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
27 Lakefront Pump Stations	Orleans	Protected	-	-	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
28 GFBM	Jefferson, Plaquemines, St. Bernard	Protected	19.94	8.45	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
29 CFBM	Orleans, St. Tammany, St. John the Baptist	Protected	107.30	48.60	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
30 CFBM	St. Bernard and St. James; Hancock, MS	Protected	225.00	189.40	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
31 CFBM	E.Baton Rouge, Jeff, Lafourche, Plaquem, St. Bern, St. Tam; Hancock, MS	Protected	965.3	572.2	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
32 CFBM	Ascension, Plaquemines, St. Charles	Protected	195.00	96.20	-	-	-	-	-	-	-
		Flood	-	-	-	-	-	-	-	-	
Totals		Protected	3151.57	1515.35	325.95	137.01	137.05	73.99	697.22	406.32	624.09
		Flood	10	4.65	805.64	426.17	350.02	237.9	353.84	156.64	
		Both	3161.57	1520	1131.59	563.18	487.07	311.89	1051.06	562.96	624.09

- Not applicable to the IER or number impacted is 0
GFBM: Government Furnished Borrow Material // CFBM: Contractor Furnished Borrow Material
* Based on Final CARs for IERs completed by November 15, 2010

APPENDIX O
HSDRRS AIR QUALITY ASSUMPTIONS AND ANALYSIS

AIR QUALITY ASSUMPTIONS

Comprehensive Environmental Document (CED) Air Quality Methodology and Assumptions

In order to provide an adequate air quality resource analysis for the CED, various assumptions were required. Below is a listing of these various assumptions, as well as methodologies and models, used for the CED analysis.

Conformity Analysis

The General Conformity Rule ensures that the actions taken by Federal agencies in nonattainment and maintenance areas do not interfere with a state's plans to meet national standards for air quality. A conformity analysis is required for Ascension, Iberville, and East Baton Rouge Parishes because they are in non-attainment for ozone; however, a conformity analysis is not required for the other Parishes or Counties.

A conformity analysis determines whether a Federal action meets the requirements of the general conformity rule. A conformity analysis must be conducted if a Federal action would result in the generation of air emissions that would exceed conformity threshold levels of pollutants for an air basin that is designated as a nonattainment or maintenance area under the National Ambient Air Quality Standards (NAAQS), or if emissions from the action are deemed regionally significant. A conformity analysis must demonstrate that the project emissions would conform with the CAA and the relevant State implementation plan and would not degrade air quality in the impacted air basin.

- Ascension, Iberville, and East Baton Rouge Parishes are in non-attainment for ozone.
- Hancock County, Orleans, Jefferson, Plaquemines, St. Charles, St James, Plaquemines, St. John the Baptist, Lafourche, and St. Bernard Parishes are in attainment for all NAAQS; however, Orleans, Jefferson, St. Bernard and St. Charles Parishes are maintenance areas for ozone. The project corridor is located in the New Orleans Ozone Maintenance Area, which includes the parishes of Orleans, Jefferson, St. Bernard and St. Charles. The New Orleans Ozone Maintenance area is strictly for transportation conformity (for transportation-related highway construction). Although transportation conformity regulations do apply for nonattainment and maintenance areas, the nature of this project would not fall under transportation conformity as the project is not intended to increase overall transportation capacity for the area, and will not be reflected in short-term or long-term transportation planning for the area.

Impact Analysis

The emissions were not segregated by Parish except for those Parishes in non-attainment for ozone, i.e. Ascension, Iberville, and East Baton Rouge. Calculations sheets for each IER are included herein. Temporary increases in air pollution would occur from these main sources:

- Combustion emissions from the engines of construction equipment, workers commuting to work and trucking of miscellaneous supplies;
- Fugitive dust (PM-10) when soils are disturbed at the construction site.

The air calculation methodologies utilized to estimate air emissions produced by the installation of HSDRRS Proposed Actions are denoted below. Overall, 32 IERs were analyzed for 105 projects (reaches) based on the material quantities, number of trips, and the timing of trips (including duration).

Methodologies

Transportation of the HSDRRS Construction Materials

CEMVN produced a transportation report (USACE 2009) describing the environmental impacts of transporting the materials necessary to construct the HSDRRS. The analyses addressed the magnitude of the construction effort, in conjunction with the schedule for completion. This adequately analyzes Source 1 (see tables 4-32 and 4-33).

Combustion Construction Equipment Emissions

USEPA's NONROAD Model (USEPA 2005) was used to calculate emissions from construction equipment as recommended by USEPA's *Procedures Document for National Emission Inventory, Criteria Air Pollutants, 1985-1999.*

Fugitive Dust Emissions

Fugitive dust emissions were calculated using the emission factor of 0.19 ton per acre per month, a more current standard than the 1985 PM-10 emission factor of 1.2 tons per acre-month presented in AP-42 Section 13 Miscellaneous Sources 13.2.3.3. Emission estimates are based on assumptions as to the amount of construction activity occurring during certain time periods for each reach (e.g., assume 3 miles of a 9 mile reach is being disturbed by construction activities in any one month).

Emissions from Construction Worker Commutes

The MOBILE 6.2 model was used to quantify the emissions from construction worker commutes. The model calculates emission rates under various conditions affecting in-use emission levels (e.g., ambient temperatures, average traffic speeds). This analysis does not include non-road emissions from demolition, construction equipment used to build the HSDRRS, or emissions from materials, transportation off of the public roads within temporary work area easements, or at construction sites, which would be covered under the analyses described above.

Assumptions

Schedules for construction activities varied for the different LPV and WBV reaches. Construction schedules varied for hours during the day and days during the week. Air emissions were calculated by IERs and not by individual reach. Sometimes the schedules changed for different reaches within IERs and when this occurred a weighted average for scheduled hours was used. In addition, it was assumed that the equipment did not run during the entire scheduled times during the day due to lunch breaks, shift change, refueling, and repairs. Over the course of the year, several rain days occurred. Assumptions were made for each scenario and are presented in Table 1 below.

Table 1. Assumptions for HSDRRS Construction Work Hours

IER	HSDRRS Reach	Construction Contract Permissible Hours	Assumed Hours for Construction Equipment
#1 / S #1	LPV-03d.2	daylight hours only	20 hr/day, 320 day/year
	All other reaches	24 hr/day, 7 days/week operations permitted	
#2 / S #2	All reaches	24 hr/day, 7 days/week operations permitted	20 hr/day, 320 day/year
#3 / S #3.A	LPV-00.2, LPV-01.2, LPV-18.2	7 am to 10 pm	20 hr/day, 320 day/year
	LPV-02.2, LPV-19.2, LPV-20.2	6 am to 9 pm	
	LPV-17.2, LPV-10.2, LPV-11.2, LPV-12.2, LPV-17.2	24 hr/day, 7 days/week operations permitted	
#4	LPV-104.02	7 am to 9 pm Mon-Fri, 8 am to 9 pm Sat & Sun	12 hr/day, 320 day/year
#5	LPV-101.02	24 hr/day, 7 days/week operations permitted	20 hr/day, 320 day/year
	LPV-102.01	24 hr/day, 7 days/week operations permitted	
	LPV-103.01	24 hr/day, 7 days/week operations permitted	
	LPV-103.01A2	7 am to 9 pm Mon-Fri, 8 am to 9 pm Sat, no work on Sun	
#6 / S #6	LPV-105.01	7 am to 9 pm Mon-Fri, 8 am to 9 pm Sat & Sun	20 hr/day, 300 day/year
	LPV-106	8 hr/day, 7 days/week operations permitted	
	LPV-107	24 hr/day, 7 days/week operations permitted	
#7 / S #7	LPV-108, LPV-109.02a, LPV-109.02c, LPV-111.01, LPV-111-02	24 hr/day, 7 days/week operations permitted	20 hr/day, 320 day/year
	LPV-109.02b	24 hr/day, 7 days/week operations permitted	
	LPV-110	24 hr/day, 5 days/week, work on weekends & holidays must be requested	
#8	All reaches	24 hr/day, 7 days/week operations permitted	20 hr/day, 320 day/year
#9	LPV-149	18 hr/day (6 am to 12:00 am), 7 days/week operations permitted	16 hr/day, 320 day/year
#10	All reaches	24 hr/day, 5 days/week operations permitted, work on Sat & Sun requires 48 hr notice	20 hr/day, 240 day/year
#11 Tier 2 Ponchartrain		7 am to 9 pm Mon-Fri, 8 am to 9 pm Sat & Sun	16 hr/day, 320 day/year
#11 Tier 2 Borgne / S #11 Tier 2 Borgne		24 hr/day, 7 days/week operations permitted	

Table 1, continued

IER	HSDRRS Reach	Construction Contract Permissible Hours	Assumed Hours for Construction Equipment
#12 / S #12	WBV-21	6 am to 9 pm,7 days/week	16 hr/day, 320 day/year
	WBV-33	6 am to 6 pm, 7 days/week	
	All other reaches	24 hr/day, 7 days/week operations permitted	
	WBV-09b	24 hr/day, 7 days/week operations permitted	
	WBV-09c	7 am to 9 pm, 7 days/week	
	WBV-12	24 hr/day, 7 days/week operations permitted	
#13	WBV-09a	7 am to 9 pm, 7 days/week at Pump Station #24, all other areas 24 hr/day, 7 days/week operations permitted	18 hr/day, 320 day/year
	WBV-09b	24 hr/day, 7 days/week operations permitted	
	WBV-09c	7 am to 9 pm, 7 days/week	
	WBV-12	24 hr/day, 7 days/week operations permitted	
#14 / S #14.A	WBV-14.c, WBV-14.i, WBV-14.e.2	6 am to 9 pm,7 days/week	20 hr/day, 240 day/year
	WBV-14.b	24 hr/day, 7 days/week operations permitted	
	WBV-14.d, WBV-30, WBV-37	24 hr/day, 7 days/week operations permitted	
#15	WBV-17.b2, WBV-15.a.2	6 am to 9 pm,7 days/week	18 hr/day, 320 day/year
	WBV-18.2	6 am to 9 pm,7 days/week	
	WBV-15.b.2	24 hr/day, 7 days/week operations permitted	
#16 / S #16.A	WBV-70, WBV-71, WBV-72, WBV-74, WBV-76	24 hr/day, 7 days/week operations permitted	20 hr/day, 320 day/year
	WBV-73	24 hr/day, 7 days/week operations permitted	
	WBV-75, WBV-77	24 hr/day, 7 days/week operations permitted	
#17	WBV-24, WBV-16.b, WBV-20, WBV-22	24 hr/day, 7 days/week operations permitted	18 hr/day, 320 day/year
	WBV-16.2, WBV-21	6 am to 9 pm,7 days/week	
#27	All reaches	24 hr/day, 7 days/week operations permitted	20 hr/day, 320 day/year
IERs 18 through 32	All Contractors	24 hr/day, 7 days/week operations permitted	20 hr/day, 320 day/year

AIR QUALITY CALCULATIONS FOR
HSDRRS BORROW SITES PARISHES IN NON-ATTAINMENT

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #32

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	8	300	8	240	4608000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	4	300	8	240	2304000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	6	300	8	240	3456000
Diesel Front End Loaders	8	300	8	240	4608000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #32

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	1.727	6.601	23.359	1.625	1.574	3.758	2723.340
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.889	3.453	12.010	0.838	0.812	1.879	1361.670
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	1.371	5.256	18.129	1.257	1.219	2.818	2042.505
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**7.080**	**28.288**	**85.932**	**6.399**	**6.209**	**13.153**	**9532.731**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #32

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	20	20	0.29	0.34	0.63
CO	12.4	15.7	40	240	20	20	2.62	3.32	5.95
NOx	0.95	1.22	40	240	20	20	0.20	0.26	0.46
PM-10	0.0052	0.0065	40	240	20	20	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	20	20	0.00	0.00	0.00
CO2	369	511	40	240	20	20	78.07	108.12	186.19

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #32

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	15.71	
NOx	311	0.46	
Total		16.17	202.36

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	153.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	348.84	174.42	34.88	17.44
Staging Areas	0.00	0.00	0.00	0.00
Total	**348.84**	**174.42**	**34.88**	**17.44**

* The total combined area of the EIR 32 barrow pits is 1,538 acres, assume 10% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #32

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	7.08	28.29	85.93	6.40	6.21	13.15	9532.73	26901.96	36434.69
Construction Site-Fugitive PM-10	NA	NA	NA	174.42	17.44	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.66	6.09	1.02	0.02	0.02	NA	186.19	332.59	518.79
Total emissions-CONSTRUCTION	**7.74**	**34.38**	**86.95**	**180.84**	**23.67**	**13.15**	**9,719**	**27,235**	**36,953**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #31

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	15	300	8	240	8640000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	2	300	8	240	1152000
Diesel Tractors/Loaders/Backhoes	4	100	8	240	768000
Diesel Bull Dozers	5	300	8	240	2880000
Diesel Front End Loaders	15	300	8	240	8640000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	8	40	8	240	614400

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #31

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	3.237	12.378	43.798	3.047	2.952	7.046	5106.262
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.444	1.727	6.005	0.419	0.406	0.939	680.835
Diesel Tractors/Loaders/Backhoes	1.566	6.948	6.111	1.159	1.126	0.804	584.903
Diesel Bull Dozers	1.143	4.380	15.107	1.047	1.016	2.349	1702.087
Diesel Front End Loaders	3.618	14.758	47.606	3.332	3.237	7.046	5105.310
Diesel Fork Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.819	2.546	4.042	0.494	0.481	0.548	397.643
Total Emissions	**11.944**	**47.334**	**129.776**	**10.348**	**10.042**	**19.604**	**14209.592**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #31

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	20	20	0.29	0.34	0.63
CO	12.4	15.7	40	240	20	20	2.62	3.32	5.95
NOx	0.95	1.22	40	240	20	20	0.20	0.26	0.46
PM-10	0.0052	0.0065	40	240	20	20	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	20	20	0.00	0.00	0.00
CO2	369	511	40	240	20	20	78.07	108.12	186.19

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #31

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	15.71	
NOx	311	0.46	
Total		16.17	202.36

Delivery Trucks	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	200.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	456.00	228.00	45.60	22.80
Staging Areas	0.00	0.00	0.00	0.00
Total	**456.00**	**228.00**	**45.60**	**22.80**

* The total combined area of the EIR 30 barrow pits is 751 acres, assume 50% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #31

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	11.94	47.33	129.78	10.35	10.04	19.60	14209.59	40658.91	54868.50
Construction Site-Fugitive PM-10	NA	NA	NA	228.00	22.80	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.66	6.09	1.02	0.02	0.02	NA	186.19	332.59	518.79
Total emissions-CONSTRUCTION	**12.60**	**53.42**	**130.79**	**238.36**	**32.86**	**19.60**	**14,396**	**40,992**	**55,387**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #19

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	4	300	8	240	2304000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	1	300	8	240	576000
Diesel Tractors/Loaders/Backhoes	3	100	8	240	576000
Diesel Bull Dozers	4	300	8	240	2304000
Diesel Front End Loaders	3	300	8	240	1728000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #19

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.863	3.301	11.679	0.812	0.787	1.879	1361.670
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.222	0.863	3.002	0.209	0.203	0.470	340.417
Diesel Tractors/Loaders/Backhoes	1.174	5.211	4.583	0.870	0.844	0.603	438.677
Diesel Bull Dozers	0.914	3.504	12.086	0.838	0.812	1.879	1361.670
Diesel Front End Loaders	0.724	2.952	9.521	0.666	0.647	1.409	1021.062
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**4.279**	**17.463**	**44.862**	**3.718**	**3.608**	**6.778**	**4913.429**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #19

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	10	10	0.14	0.17	0.31
CO	12.4	15.7	40	240	10	10	1.31	1.66	2.97
NOx	0.95	1.22	40	240	10	10	0.10	0.13	0.23
PM-10	0.0052	0.0065	40	240	10	10	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	10	10	0.00	0.00	0.00
CO2	369	511	40	240	10	10	39.04	54.06	93.10

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	1	1	0.00	0.01	0.01
CO	1.32	3.21	60	240	1	1	0.02	0.05	0.07
NOx	4.97	12.6	60	240	1	1	0.08	0.20	0.28
PM-10	0.12	0.33	60	240	1	1	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	1	1	0.00	0.01	0.01
CO2	536	536	60	240	1	1	8.51	8.51	17.01

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #19

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	7.86	
NOx	311	0.23	
Total		8.08	101.18

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.33	
NOx	311	86.71	
Total		87.04	104.06

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	42.10	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	95.99	47.99	9.60	4.80
Staging Areas	0.00	0.00	0.00	0.00
Total	**95.99**	**47.99**	**9.60**	**4.80**

* The total combined area of the EIR 19 barrow pits is 421 acres, assume 10% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #19

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	4.28	17.46	44.86	3.72	3.61	6.78	4913.43	14058.98	18972.40
Construction Site-Fugitive PM-10	NA	NA	NA	47.99	4.80	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.33	3.04	0.51	0.01	0.01	NA	93.10	166.30	259.39
Total emissions-CONSTRUCTION	**4.61**	**20.51**	**45.37**	**51.72**	**8.42**	**6.78**	**5,007**	**14,225**	**19,232**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #1 / IER SUPPLEMENTAL #1

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION IER #1

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Road Compactors	3	100	8	240	576000
Diesel Dump Truck	1	300	8	240	576000
Diesel Excavator	2	300	8	240	1152000
Diesel Hole Trenchers	1	175	8	15	21000
Diesel Bore/Drill Rigs	2	300	8	240	1152000
Diesel Cement & Mortar Mixers	0	300	8	30	0
Diesel Cranes	3	175	8	240	1008000
Diesel Graders	3	300	8	240	1728000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	6	300	8	240	3456000
Diesel Front End Loaders	6	300	8	240	3456000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Trenchers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Diesel Bore/Drill Rigs	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Diesel Cement & Mortar Mixers	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION IER #1

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Paver	0.235	0.939	3.110	0.216	0.209	0.470	340.354
Diesel Dump Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Excavator	0.432	1.650	5.840	0.406	0.394	0.939	680.835
Diesel Hole Cleaners\Trenchers	0.012	0.056	0.134	0.011	0.010	0.017	12.399
Diesel Bore/Drill Rigs	0.762	2.907	9.077	0.635	0.622	0.927	672.456
Diesel Cement & Mortar Mixers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.489	1.444	6.354	0.378	0.367	0.811	588.955
Diesel Graders	0.666	2.590	9.007	0.628	0.609	1.409	1021.252
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	1.371	5.256	18.129	1.257	1.219	2.818	2042.505
Diesel Front End Loaders	1.447	5.903	19.043	1.333	1.295	2.818	2042.124
Diesel Aerial Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**7.406**	**29.031**	**83.824**	**6.385**	**6.205**	**11.889**	**8619.296**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION IER #1

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	30	30	0.65	0.77	1.41
CO	12.4	15.7	60	240	30	30	5.90	7.47	13.38
NOx	0.95	1.22	60	240	30	30	0.45	0.58	1.03
PM-10	0.0052	0.0065	60	240	30	30	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	30	30	0.00	0.00	0.01
CO2	369	511	60	240	30	30	175.67	243.27	418.94

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION IER #1

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	35.35	
NOx	311	1.03	
Total		36.38	455.32

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	3	miles*
Length (converted)	15840	feet
Width	200	feet
Area	72.73	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	165.82	82.91	16.58	8.29
Staging Areas	0.38	0.19	0.04	0.02
Total	**166.20**	**83.10**	**16.62**	**8.31**

* Assume 3 miles of 9 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	7.41	29.03	83.82	6.39	6.21	11.89	8619.30	26254.28	34873.57
Construction Site-Fugitive PM-10	NA	NA	NA	83.10	8.31	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.44	13.52	1.59	0.02	0.02	NA	418.94	530.72	949.65
Total emissions-CONSTRUCTION	**8.85**	**42.55**	**85.41**	**89.50**	**14.54**	**11.89**	**9038**	**26785**	**35823**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance area for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #1-S

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	0	300	8	240	0
Diesel Pile Drivers	1	175	8	240	336000
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	1	175	8	240	336000
Diesel Graders	0	300	8	240	0
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	1	300	8	240	576000
Diesel Front End Loaders	1	300	8	240	576000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #1-S

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Pile Drivers	0.189	0.903	2.151	0.170	0.163	0.274	198.392
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.163	0.481	2.118	0.126	0.122	0.270	196.318
Diesel Graders	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	0.229	0.876	3.021	0.209	0.203	0.470	340.417
Diesel Front End Loaders	0.241	0.984	3.174	0.222	0.216	0.470	340.354
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**1.595**	**6.614**	**15.982**	**1.340**	**1.299**	**2.223**	**1611.640**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #1-S

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	10	10	0.14	0.17	0.31
CO	12.4	15.7	40	240	10	10	1.31	1.66	2.97
NOx	0.95	1.22	40	240	10	10	0.10	0.13	0.23
PM-10	0.0052	0.0065	40	240	10	10	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	10	10	0.00	0.00	0.00
CO2	369	511	40	240	10	10	39.04	54.06	93.10

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	1	1	0.00	0.01	0.01
CO	1.32	3.21	60	240	1	1	0.02	0.05	0.07
NOx	4.97	12.6	60	240	1	1	0.08	0.20	0.28
PM-10	0.12	0.33	60	240	1	1	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	1	1	0.00	0.01	0.01
CO2	536	536	60	240	1	1	8.51	8.51	17.01

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #1-S

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	7.86	
NOx	311	0.23	
Total		8.08	101.18

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.33	
NOx	311	86.71	
Total		87.04	104.06

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006

PM2.5 Emissions

PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	2.50	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	5.70	2.85	0.57	0.29
Staging Areas	0.00	0.00	0.00	0.00
Total	**5.70**	**2.85**	**0.57**	**0.29**

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #1-S

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	1.59	6.61	15.98	1.34	1.30	2.22	1611.64	5010.30	6621.94
Construction Site-Fugitive PM-10	NA	NA	NA	2.85	0.29	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.33	3.04	0.51	0.01	0.01	NA	93.10	166.30	259.39
Total emissions-CONSTRUCTION	**1.92**	**9.66**	**16.49**	**4.20**	**1.59**	**2.22**	**1,705**	**5,177**	**6,881**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR
IER #2 / IER SUPPLEMENTAL #2

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #2

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Road Compactors	2	100	8	240	384000
Diesel Dump Truck	2	300	8	240	1152000
Diesel Excavator	1	300	8	240	576000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	1	300	8	30	72000
Tug Boat and Barge	1	1200	8	30	288000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	3	300	8	240	1728000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	3	300	8	240	1728000
Diesel Front End Loaders	4	300	8	240	2304000
Diesel Fork Lifts	1	100	8	240	192000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #2

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.157	0.626	2.074	0.144	0.140	0.313	226.903
Diesel Dump Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Excavator	0.216	0.825	2.920	0.203	0.197	0.470	340.417
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.048	0.182	0.567	0.040	0.039	0.058	42.029
Tug Boat and Barge	0.194	0.736	2.310	0.152	0.149	0.232	168.114
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.666	2.590	9.007	0.628	0.609	1.409	1021.252
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	0.686	2.628	9.064	0.628	0.609	1.409	1021.252
Diesel Front End Loaders	0.965	3.935	12.695	0.889	0.863	1.879	1361.416
Diesel Fork Lifts	0.419	1.642	1.811	0.294	0.286	0.201	146.162
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**5.487**	**22.249**	**61.980**	**4.765**	**4.626**	**8.806**	**6383.284**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #2

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	30	30	0.65	0.77	1.41
CO	12.4	15.7	60	240	30	30	5.90	7.47	13.38
NOx	0.95	1.22	60	240	30	30	0.45	0.58	1.03
PM-10	0.0052	0.0065	60	240	30	30	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	30	30	0.00	0.00	0.01
CO2	369	511	60	240	30	30	175.67	243.27	418.94

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #2

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	35.35	
NOx	311	1.03	
Total		36.38	455.32

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #2

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	1	miles*
Length (converted)	5280	feet
Width	200	feet
Area	24.24	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	55.27	27.64	5.53	2.76
Staging Areas	0.38	0.19	0.04	0.02
Total	**55.65**	**27.83**	**5.57**	**2.78**

* Assume 1 miles of 3.4 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #2

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	5.49	22.25	61.98	4.77	4.63	8.81	6383.28	19412.89	25796.17
Construction Site-Fugitive PM-10	NA	NA	NA	27.83	2.78	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.44	13.52	1.59	0.02	0.02	NA	418.94	530.72	949.65
Total emissions-CONSTRUCTION	**6.93**	**35.77**	**63.57**	**32.61**	**7.43**	**8.81**	**6802**	**19944**	**26746**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance area for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #2-S

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	0	300	8	240	0
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	0	300	8	240	0
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	2	300	8	240	1152000
Tug Boat and Barge	2	1200	8	240	4608000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	2	300	8	240	1152000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	1	300	8	240	576000
Diesel Front End Loaders	1	300	8	240	576000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #2-S

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.762	2.907	9.077	0.635	0.622	0.927	672.456
Tug Boat and Barge	3.098	11.781	36.968	2.437	2.387	3.707	2689.825
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.444	1.727	6.005	0.419	0.406	0.939	680.835
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	0.229	0.876	3.021	0.209	0.203	0.470	340.417
Diesel Front End Loaders	0.241	0.984	3.174	0.222	0.216	0.470	340.354
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**5.971**	**23.099**	**68.816**	**4.867**	**4.746**	**7.871**	**5709.239**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #2-S

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	25	25	0.36	0.43	0.79
CO	12.4	15.7	40	240	25	25	3.28	4.15	7.43
NOx	0.95	1.22	40	240	25	25	0.25	0.32	0.57
PM-10	0.0052	0.0065	40	240	25	25	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	25	25	0.00	0.00	0.00
CO2	369	511	40	240	25	25	97.59	135.15	232.74

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #2-S

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	19.64	
NOx	311	0.57	
Total		20.21	252.95

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #2-S

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	2.50	acres

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	5.70	2.85	0.57	0.29
Staging Areas	0.00	0.00	0.00	0.00
Total	**5.70**	**2.85**	**0.57**	**0.29**

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #2-S

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	5.97	23.10	68.82	4.87	4.75	7.87	5709.24	21551.11	27260.35
Construction Site-Fugitive PM-10	NA	NA	NA	2.85	0.29	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.81	7.58	1.13	0.02	0.02	NA	232.74	372.22	604.96
Total emissions-CONSTRUCTION	**6.78**	**30.68**	**69.95**	**7.73**	**5.05**	**7.87**	**5,942**	**21,923**	**27,865**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR
IER #3 / IER SUPPLEMENTAL #3.A

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #3

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	20	360	2160000
Diesel Road Compactors	2	100	20	360	1440000
Diesel Dump Truck	2	300	20	360	4320000
Diesel Excavator	1	300	20	360	2160000
Diesel Pile Drivers	2	175	20	360	2520000
Clam Shell Dredge	1	300	20	40	240000
Tug Boat and Barge	1	1200	20	40	960000
Diesel Cranes	3	175	20	360	3780000
Diesel Graders	4	300	20	360	8640000
Diesel Tractors/Loaders/Backhoes	1	100	20	360	720000
Diesel Bull Dozers	5	300	20	360	10800000
Diesel Front End Loaders	12	300	20	360	25920000
Diesel Fork Lifts	1	100	20	360	720000
Diesel Generator Set	2	40	20	360	576000

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #3

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	1.047	4.927	13.068	0.976	0.952	1.761	1275.852
Diesel Road Compactors	0.587	2.349	7.776	0.540	0.524	1.174	850.885
Diesel Dump Truck	2.095	9.855	26.136	1.952	1.904	3.523	2551.703
Diesel Excavator	0.809	3.094	10.949	0.762	0.738	1.761	1276.566
Diesel Pile Drivers	1.416	6.776	16.135	1.277	1.222	2.055	1487.938
Clam Shell Dredge	0.159	0.606	1.891	0.132	0.130	0.193	140.095
Tug Boat and Barge	0.645	2.454	7.702	0.508	0.497	0.772	560.380
Diesel Cranes	1.833	5.415	23.827	1.416	1.375	3.041	2208.580
Diesel Graders	3.332	12.949	45.036	3.142	3.047	7.046	5106.262
Diesel Tractors/Loaders/Backhoes	1.468	6.514	5.729	1.087	1.055	0.754	548.346
Diesel Bull Dozers	4.285	16.424	56.652	3.928	3.809	8.807	6382.828
Diesel Front End Loaders	10.854	44.274	142.819	9.997	9.712	21.137	15315.931
Diesel Fork Lifts	1.571	6.157	6.792	1.103	1.071	0.754	548.108
Diesel Generator Set	0.768	2.387	3.789	0.463	0.451	0.514	372.790
Total Emissions	**30.870**	**124.181**	**368.300**	**27.283**	**26.485**	**53.293**	**38626.265**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #3

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	360	30	30	0.97	1.15	2.12
CO	12.4	15.7	60	360	30	30	8.85	11.21	20.07
NOx	0.95	1.22	60	360	30	30	0.68	0.87	1.55
PM-10	0.0052	0.0065	60	360	30	30	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	360	30	30	0.00	0.00	0.01
CO2	369	511	60	360	30	30	263.50	364.90	628.40

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	360	2	2	0.01	0.03	0.04
CO	1.32	3.21	60	360	2	2	0.06	0.15	0.22
NOx	4.97	12.6	60	360	2	2	0.24	0.60	0.84
PM-10	0.12	0.33	60	360	2	2	0.01	0.02	0.02
PM 2.5	0.13	0.36	60	360	2	2	0.01	0.02	0.02
CO2	536	536	60	360	2	2	25.52	25.52	51.03

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	360	0	0	-	0.00	-
CO	12.4	15.7	60	360	0	0	-	0.00	-
NOx	0.95	1.22	60	360	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	360	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	360	0	0	-	0.00	-
CO2	369	511	60	360	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #3

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	53.02	
NOx	311	1.55	
Total		54.57	682.98

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	1.00	
NOx	311	260.13	
Total		261.13	312.17

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #3

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	2	miles*
Length (converted)	10560	feet
Width	200	feet
Area	48.49	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	110.55	55.27	11.05	5.53
Staging Areas	0.38	0.19	0.04	0.02
Total	**110.93**	**55.46**	**11.09**	**5.55**

* Assume 2 miles of 6 mile reach is being disturbed by construction activities at any one time

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #3

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	30.87	124.18	368.30	27.28	26.49	53.29	38626.26	115312.98	153939.24
Construction Site-Fugitive PM-10	NA	NA	NA	55.46	5.55	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	2.16	20.28	2.39	0.03	0.03	NA	628.40	796.08	1424.48
Total emissions-CONSTRUCTION	**33.03**	**144.46**	**370.69**	**82.78**	**32.06**	**53.29**	**39,255**	**116,109**	**155,364**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance area for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #3a

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	0	300	8	240	0
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	0	300	8	240	0
Diesel Pile Drivers	1	175	8	240	336000
Clam Shell Dredge	2	300	8	240	1152000
Tug Boat and Barge	2	1200	8	60	1152000
Diesel Cranes	1	175	8	240	336000
Diesel Graders	0	300	8	240	0
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	0	300	8	240	0
Diesel Front End Loaders	0	300	8	240	0
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	0	40	8	240	0

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #3a

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Pile Drivers	0.189	0.903	2.151	0.170	0.163	0.274	198.392
Clam Shell Dredge	0.762	2.907	9.077	0.635	0.622	0.927	672.456
Tug Boat and Barge	0.774	2.945	9.242	0.609	0.597	0.927	672.456
Diesel Cranes	0.163	0.481	2.118	0.126	0.122	0.270	196.318
Diesel Graders	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Front End Loaders	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Emissions	**2.279**	**8.974**	**24.116**	**1.830**	**1.785**	**2.599**	**1885.848**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #3a

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	10	10	0.14	0.17	0.31
CO	12.4	15.7	40	240	10	10	1.31	1.66	2.97
NOx	0.95	1.22	40	240	10	10	0.10	0.13	0.23
PM-10	0.0052	0.0065	40	240	10	10	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	10	10	0.00	0.00	0.00
CO2	369	511	40	240	10	10	39.04	54.06	93.10

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	1	1	0.00	0.01	0.01
CO	1.32	3.21	60	240	1	1	0.02	0.05	0.07
NOx	4.97	12.6	60	240	1	1	0.08	0.20	0.28
PM-10	0.12	0.33	60	240	1	1	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	1	1	0.00	0.01	0.01
CO2	536	536	60	240	1	1	8.51	8.51	17.01

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #3a

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	7.86	
NOx	311	0.23	
Total		8.08	101.18

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.33	
NOx	311	86.71	
Total		87.04	104.06

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	2.50	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	5.70	2.85	0.57	0.29
Staging Areas	0.00	0.00	0.00	0.00
Total	**5.70**	**2.85**	**0.57**	**0.29**

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #3a

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	2.28	8.97	24.12	1.83	1.79	2.60	1885.85	7557.00	9442.85
Construction Site-Fugitive PM-10	NA	NA	NA	2.85	0.29	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.33	3.04	0.51	0.01	0.01	NA	93.10	166.30	259.39
Total emissions-CONSTRUCTION	**2.61**	**12.02**	**24.62**	**4.69**	**2.08**	**2.60**	**1,979**	**7,723**	**9,702**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #4

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #4

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Road Compactors	2	100	8	240	384000
Diesel Dump Truck	2	300	8	240	1152000
Diesel Excavator	1	300	8	240	576000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	0	300	8	40	0
Tug Boat and Barge	0	1200	8	40	0
Diesel Cranes	2	175	8	240	672000
Diesel Graders	4	300	8	240	2304000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	3	300	8	240	1728000
Diesel Front End Loaders	5	300	8	240	2880000
Diesel Fork Lifts	1	100	8	240	192000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #4

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.157	0.626	2.074	0.144	0.140	0.313	226.903
Diesel Dump Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Excavator	0.216	0.825	2.920	0.203	0.197	0.470	340.417
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.889	3.453	12.010	0.838	0.812	1.879	1361.670
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	0.686	2.628	9.064	0.628	0.609	1.409	1021.252
Diesel Front End Loaders	1.206	4.919	15.869	1.111	1.079	2.349	1701.770
Diesel Fork Lifts	0.419	1.642	1.811	0.294	0.286	0.201	146.162
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**5.709**	**23.179**	**65.278**	**5.005**	**4.856**	**9.456**	**6853.912**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #4

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	30	30	0.65	0.77	1.41
CO	12.4	15.7	60	240	30	30	5.90	7.47	13.38
NOx	0.95	1.22	60	240	30	30	0.45	0.58	1.03
PM-10	0.0052	0.0065	60	240	30	30	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	30	30	0.00	0.00	0.01
CO2	369	511	60	240	30	30	175.67	243.27	418.94

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #4

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	35.35	
NOx	311	1.03	
Total		36.38	455.32

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	2.5	miles*
Length (converted)	13200	feet
Width	200	feet
Area	60.61	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	138.18	69.09	13.82	6.91
Staging Areas	0.38	0.19	0.04	0.02
Total	**138.56**	**69.28**	**13.86**	**6.93**

* Assume 2.5 miles of 7 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #4

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	5.71	23.18	65.28	5.00	4.86	9.46	6853.91	20444.22	27298.13
Construction Site-Fugitive PM-10	NA	NA	NA	69.28	6.93	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.44	13.52	1.59	0.02	0.02	NA	418.94	530.72	949.65
Total emissions-CONSTRUCTION	**7.15**	**36.70**	**66.87**	**74.31**	**11.81**	**9.46**	**7273**	**20975**	**28248**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance area for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #5

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #5

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	60	144000
Diesel Road Compactors	1	100	8	30	24000
Diesel Dump Truck	1	300	8	60	144000
Diesel Excavator	1	300	8	30	72000
Diesel Pile Drivers	0	175	8	30	0
Clam Shell Dredge	0	300	8	40	0
Tug Boat and Barge	0	1200	8	40	0
Diesel Cranes	1	175	8	90	126000
Diesel Graders	1	300	8	30	72000
Diesel Tractors/Loaders/Backhoes	1	100	8	90	72000
Diesel Bull Dozers	1	300	8	30	72000
Diesel Front End Loaders	1	300	8	30	72000
Diesel Fork Lifts	1	100	8	240	192000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #5

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.070	0.328	0.871	0.065	0.063	0.117	85.057
Diesel Road Compactors	0.010	0.039	0.130	0.009	0.009	0.020	14.181
Diesel Dump Truck	0.070	0.328	0.871	0.065	0.063	0.117	85.057
Diesel Excavator	0.027	0.103	0.365	0.025	0.025	0.059	42.552
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.061	0.181	0.794	0.047	0.046	0.101	73.619
Diesel Graders	0.028	0.108	0.375	0.026	0.025	0.059	42.552
Diesel Tractors/Loaders/Backhoes	0.147	0.651	0.573	0.109	0.106	0.075	54.835
Diesel Bull Dozers	0.029	0.109	0.378	0.026	0.025	0.059	42.552
Diesel Front End Loaders	0.030	0.123	0.397	0.028	0.027	0.059	42.544
Diesel Fork Lifts	0.419	1.642	1.811	0.294	0.286	0.201	146.162
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**1.095**	**4.250**	**7.575**	**0.818**	**0.795**	**1.004**	**728.523**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #5

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	30	30	0.65	0.77	1.41
CO	12.4	15.7	60	240	30	30	5.90	7.47	13.38
NOx	0.95	1.22	60	240	30	30	0.45	0.58	1.03
PM-10	0.0052	0.0065	60	240	30	30	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	30	30	0.00	0.00	0.01
CO2	369	511	60	240	30	30	175.67	243.27	418.94

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #5

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	35.35	
NOx	311	1.03	
Total		36.38	455.32

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	0	miles*
Length (converted)	0	feet
Width	200	feet
Area	21.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	47.88	23.94	4.79	2.39
Staging Areas	0.38	0.19	0.04	0.02
Total	**48.26**	**24.13**	**4.83**	**2.41**

* Assume one of the two stations area is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #5

Construction Emissions for Criteria Pollutants (tons per year)									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	1.09	4.25	7.58	0.82	0.80	1.00	728.52	2383.33	3111.85
Construction Site-Fugitive PM-10	NA	NA	NA	24.13	2.41	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.44	13.52	1.59	0.02	0.02	NA	418.94	530.72	949.65
Total emissions-CONSTRUCTION	**2.54**	**17.77**	**9.17**	**24.97**	**3.23**	**1.00**	**1147**	**2914**	**4062**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance area for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR
IER #6 / IER SUPPLEMENTAL #6

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #6

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Road Compactors	2	100	8	240	384000
Diesel Dump Truck	2	300	8	240	1152000
Diesel Excavator	6	300	8	240	3456000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	1	300	8	90	216000
Tug Boat and Barge	1	1200	8	90	864000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	8	300	8	240	4608000
Diesel Tractors/Loaders/Backhoes	4	100	8	240	768000
Diesel Bull Dozers	4	300	8	240	2304000
Diesel Front End Loaders	8	300	8	240	4608000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #6

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.157	0.626	2.074	0.144	0.140	0.313	226.903
Diesel Dump Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Excavator	1.295	4.951	17.519	1.219	1.181	2.818	2042.505
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.143	0.545	1.702	0.119	0.117	0.174	126.086
Tug Boat and Barge	0.581	2.209	6.931	0.457	0.448	0.695	504.342
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	1.777	6.906	24.019	1.676	1.625	3.758	2723.340
Diesel Tractors/Loaders/Backhoes	1.566	6.948	6.111	1.159	1.126	0.804	584.903
Diesel Bull Dozers	0.914	3.504	12.086	0.838	0.812	1.879	1361.670
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
Diesel Fork Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**10.946**	**44.192**	**119.457**	**9.474**	**9.197**	**17.235**	**12494.417**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #6

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	30	30	0.65	0.77	1.41
CO	12.4	15.7	60	240	30	30	5.90	7.47	13.38
NOx	0.95	1.22	60	240	30	30	0.45	0.58	1.03
PM-10	0.0052	0.0065	60	240	30	30	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	30	30	0.00	0.00	0.01
CO2	369	511	60	240	30	30	175.67	243.27	418.94

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #6

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	35.35	
NOx	311	1.03	
Total		36.38	455.32

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	2	miles*
Length (converted)	10560	feet
Width	200	feet
Area	48.49	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	110.55	55.27	11.05	5.53
Staging Areas	0.38	0.19	0.04	0.02
Total	**110.93**	**55.46**	**11.09**	**5.55**

* Assume 2 miles of 6 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #6

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	10.95	44.19	119.46	9.47	9.20	17.24	12494.42	37424.80	49919.22
Construction Site-Fugitive PM-10	NA	NA	NA	55.46	5.55	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.44	13.52	1.59	0.02	0.02	NA	418.94	530.72	949.65
Total emissions-CONSTRUCTION	**12.39**	**57.71**	**121.05**	**64.96**	**14.76**	**17.24**	**12913**	**37956**	**50869**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance area for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #6-S

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	0	300	8	240	0
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	0	300	8	240	0
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	2	300	8	240	1152000
Tug Boat and Barge	2	1200	8	240	4608000
Diesel Cranes	1	175	8	240	336000
Diesel Graders	0	300	8	240	0
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	0	300	8	240	0
Diesel Front End Loaders	0	300	8	240	0
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	0	40	8	240	0

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #6-S

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.762	2.907	9.077	0.635	0.622	0.927	672.456
Tug Boat and Barge	3.098	11.781	36.968	2.437	2.387	3.707	2689.825
Diesel Cranes	0.163	0.481	2.118	0.126	0.122	0.270	196.318
Diesel Graders	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Front End Loaders	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Emissions	**4.791**	**18.714**	**53.993**	**3.829**	**3.738**	**5.653**	**4101.609**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #6-S

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	15	15	0.22	0.26	0.47
CO	12.4	15.7	40	240	15	15	1.97	2.49	4.46
NOx	0.95	1.22	40	240	15	15	0.15	0.19	0.34
PM-10	0.0052	0.0065	40	240	15	15	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	15	15	0.00	0.00	0.00
CO2	369	511	40	240	15	15	58.56	81.09	139.65

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #6-S

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	11.78	
NOx	311	0.34	
Total		12.13	151.77

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	22.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	50.16	25.08	5.02	2.51
Staging Areas	0.00	0.00	0.00	0.00
Total	**50.16**	**25.08**	**5.02**	**2.51**

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #6-S

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	4.79	18.71	53.99	3.83	3.74	5.65	4101.61	16911.63	21013.23
Construction Site-Fugitive PM-10	NA	NA	NA	25.08	2.51	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.50	4.60	0.90	0.02	0.02	NA	139.65	292.97	432.61
Total emissions-CONSTRUCTION	**5.29**	**23.32**	**54.90**	**28.92**	**6.26**	**5.65**	**4,241**	**17,205**	**21,446**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #7 / IER SUPPLEMENTAL #7

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #7

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Road Compactors	4	100	8	240	768000
Diesel Dump Truck	3	300	8	240	1728000
Diesel Excavator	8	300	8	240	4608000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	1	300	8	90	216000
Tug Boat and Barge	1	1200	8	90	864000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	8	300	8	240	4608000
Diesel Tractors/Loaders/Backhoes	4	100	8	240	768000
Diesel Bull Dozers	8	300	8	240	4608000
Diesel Front End Loaders	10	300	8	240	5760000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #7

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Compactors	0.313	1.253	4.147	0.288	0.279	0.626	453.805
Diesel Dump Truck	0.838	3.942	10.454	0.781	0.762	1.409	1020.681
Diesel Excavator	1.727	6.601	23.359	1.625	1.574	3.758	2723.340
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.143	0.545	1.702	0.119	0.117	0.174	126.086
Tug Boat and Barge	0.581	2.209	6.931	0.457	0.448	0.695	504.342
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	1.777	6.906	24.019	1.676	1.625	3.758	2723.340
Diesel Tractors/Loaders/Backhoes	1.566	6.948	6.111	1.159	1.126	0.804	584.903
Diesel Bull Dozers	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
Diesel Front End Loaders	2.412	9.839	31.738	2.222	2.158	4.697	3403.540
Diesel Fork Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**13.489**	**54.568**	**152.773**	**11.827**	**11.483**	**22.246**	**16124.986**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #7

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	40	40	0.86	1.02	1.89
CO	12.4	15.7	60	240	40	40	7.87	9.97	17.84
NOx	0.95	1.22	60	240	40	40	0.60	0.77	1.38
PM-10	0.0052	0.0065	60	240	40	40	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	40	40	0.00	0.00	0.01
CO2	369	511	60	240	40	40	234.22	324.36	558.58

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #7

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	47.13	
NOx	311	1.38	
Total		48.51	607.09

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	3	miles*
Length (converted)	15840	feet
Width	200	feet
Area	72.73	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	165.82	82.91	16.58	8.29
Staging Areas	0.38	0.19	0.04	0.02
Total	**166.20**	**83.10**	**16.62**	**8.31**

* Assume 3 miles of 21 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	13.49	54.57	152.77	11.83	11.48	22.25	16124.99	47849.67	63974.65
Construction Site-Fugitive PM-10	NA	NA	NA	83.10	8.31	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.91	17.98	1.94	0.02	0.02	NA	558.58	649.59	1208.18
Total emissions-CONSTRUCTION	**15.40**	**72.55**	**154.71**	**94.95**	**19.81**	**22.25**	**16,684**	**48,499**	**65,183**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance area for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #7-SUPPLIMENTAL

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	0	300	8	240	0
Diesel Road Compactors	1	100	8	240	192000
Diesel Dump Truck	1	300	8	240	576000
Diesel Excavator	0	300	8	240	0
Diesel Pile Drivers	1	175	8	240	336000
Clam Shell Dredge	0	300	8	90	0
Tug Boat and Barge	0	1200	8	90	0
Diesel Cranes	1	175	8	240	336000
Diesel Graders	0	300	8	240	0
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	1	300	8	240	576000
Diesel Front End Loaders	1	300	8	240	576000
Diesel Fork Lifts	1	100	8	240	192000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #7-SUPPLIMENTAL

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Compactors	0.078	0.313	1.037	0.072	0.070	0.157	113.451
Diesel Dump Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Excavator	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Pile Drivers	0.189	0.903	2.151	0.170	0.163	0.274	198.392
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.163	0.481	2.118	0.126	0.122	0.270	196.318
Diesel Graders	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	0.229	0.876	3.021	0.209	0.203	0.470	340.417
Diesel Front End Loaders	0.241	0.984	3.174	0.222	0.216	0.470	340.354
Diesel Fork Lifts	0.419	1.642	1.811	0.294	0.286	0.201	146.162
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**2.194**	**8.887**	**19.335**	**1.768**	**1.715**	**2.649**	**1920.958**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #7-SUPPLIMENTAL

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	15	15	0.32	0.38	0.71
CO	12.4	15.7	60	240	15	15	2.95	3.74	6.69
NOx	0.95	1.22	60	240	15	15	0.23	0.29	0.52
PM-10	0.0052	0.0065	60	240	15	15	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	15	15	0.00	0.00	0.00
CO2	369	511	60	240	15	15	87.83	121.63	209.47

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #7-SUPPLIMENTAL

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N_2O or NO_x	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	17.67	
NO_x	311	0.52	
Total		18.19	227.66

Delivery Trucks	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	0.67	
NO_x	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	-	
NO_x	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #7-SUPPLIMENTAL

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	3	miles*
Length (converted)	800	feet
Width	150	feet
Area	2.75	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	6.28	3.14	0.63	0.31
Staging Areas	0.38	0.19	0.04	0.02
Total	**6.66**	**3.33**	**0.67**	**0.33**

* Assume 3 miles of 21 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #7-SUPPLIMENTAL

Construction Emissions for Criteria Pollutants (tons per year)									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	2.19	8.89	19.34	1.77	1.71	2.65	1920.96	6068.13	7989.09
Construction Site-Fugitive PM-10	NA	NA	NA	3.33	0.33	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.73	6.83	1.07	0.02	0.02	NA	209.47	352.40	561.87
Total emissions- CONSTRUCTION	**2.93**	**15.72**	**20.41**	**5.12**	**2.07**	**2.65**	**2,130**	**6,421**	**8,551**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance area for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #8

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #8

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Road Compactors	0	100	8	240	0
Diesel Dump Truck	1	300	8	240	576000
Diesel Excavator	1	300	8	240	576000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	1	300	8	90	216000
Tug Boat and Barge	1	1200	8	90	864000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	1	300	8	240	576000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	1	300	8	240	576000
Diesel Front End Loaders	2	300	8	240	1152000
Diesel Fork Lifts	1	100	8	240	192000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #8

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Excavator	0.216	0.825	2.920	0.203	0.197	0.470	340.417
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.143	0.545	1.702	0.119	0.117	0.174	126.086
Tug Boat and Barge	0.581	2.209	6.931	0.457	0.448	0.695	504.342
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.222	0.863	3.002	0.209	0.203	0.470	340.417
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	0.229	0.876	3.021	0.209	0.203	0.470	340.417
Diesel Front End Loaders	0.482	1.968	6.348	0.444	0.432	0.939	680.708
Diesel Fork Lifts	0.419	1.642	1.811	0.294	0.286	0.201	146.162
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**4.541**	**18.436**	**45.310**	**3.753**	**3.645**	**5.986**	**4340.287**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #8

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	40	40	0.86	1.02	1.89
CO	12.4	15.7	60	240	40	40	7.87	9.97	17.84
NOx	0.95	1.22	60	240	40	40	0.60	0.77	1.38
PM-10	0.0052	0.0065	60	240	40	40	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	40	40	0.00	0.00	0.01
CO2	369	511	60	240	40	40	234.22	324.36	558.58

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #8

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	47.13	
NOx	311	1.38	
Total		48.51	607.09

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	0	miles*
Length (converted)	0	feet
Width	200	feet
Area	0.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	8.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	0.00	0.00	0.00	0.00
Staging Areas	1.52	0.76	0.15	0.08
Total	**1.52**	**0.76**	**0.15**	**0.08**

* Assume 3 miles of 21 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #8

Construction Emissions for Criteria Pollutants (tons per year)									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	4.54	18.44	45.31	3.75	3.65	5.99	4340.29	14204.82	18545.10
Construction Site-Fugitive PM-10	NA	NA	NA	0.76	0.08	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.91	17.98	1.94	0.02	0.02	NA	558.58	649.59	1208.18
Total emissions-CONSTRUCTION	**6.45**	**36.42**	**47.24**	**4.53**	**3.74**	**5.99**	**4,899**	**14,854**	**19,753**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance area for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #9

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #9

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Road Compactors	0	100	8	240	0
Diesel Dump Truck	3	300	8	240	1728000
Diesel Excavator	8	300	8	240	4608000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	1	300	8	30	72000
Tug Boat and Barge	1	1200	8	30	288000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	1	300	8	240	576000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	4	300	8	240	2304000
Diesel Front End Loaders	3	300	8	240	1728000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #9

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.838	3.942	10.454	0.781	0.762	1.409	1020.681
Diesel Excavator	1.727	6.601	23.359	1.625	1.574	3.758	2723.340
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.048	0.182	0.567	0.040	0.039	0.058	42.029
Tug Boat and Barge	0.194	0.736	2.310	0.152	0.149	0.232	168.114
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.222	0.863	3.002	0.209	0.203	0.470	340.417
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	0.914	3.504	12.086	0.838	0.812	1.879	1361.670
Diesel Front End Loaders	0.724	2.952	9.521	0.666	0.647	1.409	1021.062
Diesel Fork Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**7.753**	**31.572**	**84.497**	**6.716**	**6.519**	**12.183**	**8831.374**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #9

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	40	40	0.86	1.02	1.89
CO	12.4	15.7	60	240	40	40	7.87	9.97	17.84
NOx	0.95	1.22	60	240	40	40	0.60	0.77	1.38
PM-10	0.0052	0.0065	60	240	40	40	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	40	40	0.00	0.00	0.01
CO2	369	511	60	240	40	40	234.22	324.36	558.58

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #9

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	47.13	
NOx	311	1.38	
Total		48.51	607.09

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	0.25	miles*
Length (converted)	1320	feet
Width	300	feet
Area	9.09	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	8.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	20.73	10.36	2.07	1.04
Staging Areas	1.52	0.76	0.15	0.08
Total	**22.25**	**11.12**	**2.22**	**1.11**

* Assume 3 miles of 21 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #9

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	7.75	31.57	84.50	6.72	6.52	12.18	8831.37	26472.25	35303.63
Construction Site-Fugitive PM-10	NA	NA	NA	11.12	1.11	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.91	17.98	1.94	0.02	0.02	NA	558.58	649.59	1208.18
Total emissions-CONSTRUCTION	**9.66**	**49.55**	**86.43**	**17.86**	**7.65**	**12.18**	**9,390**	**27,122**	**36,512**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance area for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #10

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #10

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Road Compactors	6	100	8	240	1152000
Diesel Dump Truck	3	300	8	240	1728000
Diesel Excavator	8	300	8	240	4608000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	0	300	8	30	0
Tug Boat and Barge	0	1200	8	30	0
Diesel Cranes	2	175	8	240	672000
Diesel Graders	3	300	8	240	1728000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	6	300	8	240	3456000
Diesel Front End Loaders	10	300	8	240	5760000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	4	40	8	240	307200

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #10

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Compactors	0.470	1.879	6.221	0.432	0.419	0.939	680.708
Diesel Dump Truck	0.838	3.942	10.454	0.781	0.762	1.409	1020.681
Diesel Excavator	1.727	6.601	23.359	1.625	1.574	3.758	2723.340
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.666	2.590	9.007	0.628	0.609	1.409	1021.252
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	1.371	5.256	18.129	1.257	1.219	2.818	2042.505
Diesel Front End Loaders	2.412	9.839	31.738	2.222	2.158	4.697	3403.540
Diesel Fork Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.410	1.273	2.021	0.247	0.240	0.274	198.821
Total Emissions	**10.776**	**43.535**	**123.114**	**9.472**	**9.194**	**18.137**	**13145.498**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #10

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	40	40	0.86	1.02	1.89
CO	12.4	15.7	60	240	40	40	7.87	9.97	17.84
NOx	0.95	1.22	60	240	40	40	0.60	0.77	1.38
PM-10	0.0052	0.0065	60	240	40	40	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	40	40	0.00	0.00	0.01
CO2	369	511	60	240	40	40	234.22	324.36	558.58

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #10

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N_2O or NO_x	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	47.13	
NO_x	311	1.38	
Total		48.51	607.09

Delivery Trucks	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	0.67	
NO_x	311	173.42	
Total		174.09	208.11

	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	-	
NO_x	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #10

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	0.25	miles*
Length (converted)	1320	feet
Width	300	feet
Area	9.09	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	8.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	20.73	10.36	2.07	1.04
Staging Areas	1.52	0.76	0.15	0.08
Total	**22.25**	**11.12**	**2.22**	**1.11**

* Assume 3 miles of 21 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #10

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	10.78	43.53	123.11	9.47	9.19	18.14	13145.50	38557.78	51703.28
Construction Site-Fugitive PM-10	NA	NA	NA	11.12	1.11	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.91	17.98	1.94	0.02	0.02	NA	558.58	649.59	1208.18
Total emissions-CONSTRUCTION	**12.69**	**61.51**	**125.05**	**20.62**	**10.33**	**18.14**	**13,704**	**39,207**	**52,911**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR
IER #11 TIER 2 PONTCHARTRAIN
IER #11 TIER 2 BORGNE
IER SUPPLEMENTAL #11 TIER 2 BORGNE

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #11

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Road Compactors	4	100	8	240	768000
Diesel Dump Truck	6	300	8	240	3456000
Diesel Excavator	2	300	8	240	1152000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	1	300	8	240	576000
Tug Boat and Barge	1	1200	8	240	2304000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	1	300	8	240	576000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	3	300	8	240	1728000
Diesel Front End Loaders	6	300	8	240	3456000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #11

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Compactors	0.313	1.253	4.147	0.288	0.279	0.626	453.805
Diesel Dump Truck	1.676	7.884	20.909	1.561	1.523	2.818	2041.362
Diesel Excavator	0.432	1.650	5.840	0.406	0.394	0.939	680.835
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Tug Boat and Barge	1.549	5.890	18.484	1.219	1.193	1.853	1344.913
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.222	0.863	3.002	0.209	0.203	0.470	340.417
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	0.686	2.628	9.064	0.628	0.609	1.409	1021.252
Diesel Front End Loaders	1.447	5.903	19.043	1.333	1.295	2.818	2042.124
Diesel Fork Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**9.793**	**40.317**	**108.223**	**8.367**	**8.140**	**14.367**	**10414.998**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #11

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	40	40	0.86	1.02	1.89
CO	12.4	15.7	60	240	40	40	7.87	9.97	17.84
NOx	0.95	1.22	60	240	40	40	0.60	0.77	1.38
PM-10	0.0052	0.0065	60	240	40	40	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	40	40	0.00	0.00	0.01
CO2	369	511	60	240	40	40	234.22	324.36	558.58

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #11

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	47.13	
NOx	311	1.38	
Total		48.51	607.09

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	2	miles*
Length (converted)	10560	feet
Width	300	feet
Area	72.73	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	8.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	165.82	82.91	16.58	8.29
Staging Areas	1.52	0.76	0.15	0.08
Total	**167.34**	**83.67**	**16.73**	**8.37**

* Assume 2 miles of 14 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #11

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	9.79	40.32	108.22	8.37	8.14	14.37	10415.00	33902.27	44317.27
Construction Site-Fugitive PM-10	NA	NA	NA	83.67	8.37	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.91	17.98	1.94	0.02	0.02	NA	558.58	649.59	1208.18
Total emissions-CONSTRUCTION	**11.70**	**58.30**	**110.16**	**92.06**	**16.53**	**14.37**	**10,974**	**34,552**	**45,525**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #11 TIER 2 LAKE BORGNE

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Road Compactors	1	100	8	240	192000
Diesel Dump Truck	3	300	8	90	648000
Diesel Excavator	1	300	8	90	216000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	2	300	8	240	1152000
Tug Boat and Barge	3	1200	8	240	6912000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	1	300	8	240	576000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	3	300	8	240	1728000
Diesel Front End Loaders	2	300	8	240	1152000
Diesel Fork Lifts	1	100	8	240	192000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #11 TIER 2 LAKE BORGNE

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Compactors	0.078	0.313	1.037	0.072	0.070	0.157	113.451
Diesel Dump Truck	0.314	1.478	3.920	0.293	0.286	0.528	382.755
Diesel Excavator	0.081	0.309	1.095	0.076	0.074	0.176	127.657
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.762	2.907	9.077	0.635	0.622	0.927	672.456
Tug Boat and Barge	4.646	17.671	55.452	3.656	3.580	5.560	4034.738
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.222	0.863	3.002	0.209	0.203	0.470	340.417
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	0.686	2.628	9.064	0.628	0.609	1.409	1021.252
Diesel Front End Loaders	0.482	1.968	6.348	0.444	0.432	0.939	680.708
Diesel Fork Lifts	0.419	1.642	1.811	0.294	0.286	0.201	146.162
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**9.940**	**39.288**	**110.380**	**8.124**	**7.922**	**12.935**	**9381.334**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #11 TIER 2 LAKE BORGNE

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	40	40	0.86	1.02	1.89
CO	12.4	15.7	60	240	40	40	7.87	9.97	17.84
NOx	0.95	1.22	60	240	40	40	0.60	0.77	1.38
PM-10	0.0052	0.0065	60	240	40	40	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	40	40	0.00	0.00	0.01
CO2	369	511	60	240	40	40	234.22	324.36	558.58

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #11 TIER 2 LAKE BORGNE

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	47.13	
NOx	311	1.38	
Total		48.51	607.09

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	1	miles*
Length (converted)	5280	feet
Width	300	feet
Area	36.36	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	12.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	82.91	41.45	8.29	4.15
Staging Areas	2.28	1.14	0.23	0.11
Total	**85.19**	**42.59**	**8.52**	**4.26**

* Assume 1 miles of 4 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #11 TIER 2 LAKE BORGNE

Construction Emissions for Criteria Pollutants (tons per year)									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	9.94	39.29	110.38	8.12	7.92	12.93	9381.33	34576.73	43958.07
Construction Site-Fugitive PM-10	NA	NA	NA	42.59	4.26	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.91	17.98	1.94	0.02	0.02	NA	558.58	649.59	1208.18
Total emissions-CONSTRUCTION	**11.85**	**57.27**	**112.32**	**50.74**	**12.20**	**12.93**	**9,940**	**35,226**	**45,166**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #11 TIER 2 PONTCHARTRAIN

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Road Compactors	1	100	8	240	192000
Diesel Dump Truck	3	300	8	90	648000
Diesel Excavator	1	300	8	90	216000
Diesel Pile Drivers	2	175	24	240	2016000
Clam Shell Dredge	2	300	24	240	3456000
Tug Boat and Barge	2	1200	8	240	4608000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	1	300	8	240	576000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	1	300	8	240	576000
Diesel Front End Loaders	2	300	8	240	1152000
Diesel Fork Lifts	1	100	8	240	192000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #11 TIER 2 PONTCHARTRAIN

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Compactors	0.078	0.313	1.037	0.072	0.070	0.157	113.451
Diesel Dump Truck	0.314	1.478	3.920	0.293	0.286	0.528	382.755
Diesel Excavator	0.081	0.309	1.095	0.076	0.074	0.176	127.657
Diesel Pile Drivers	1.133	5.421	12.908	1.022	0.978	1.644	1190.350
Clam Shell Dredge	2.285	8.721	27.231	1.904	1.866	2.780	2017.369
Tug Boat and Barge	3.098	11.781	36.968	2.437	2.387	3.707	2689.825
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.222	0.863	3.002	0.209	0.203	0.470	340.417
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	0.229	0.876	3.021	0.209	0.203	0.470	340.417
Diesel Front End Loaders	0.482	1.968	6.348	0.444	0.432	0.939	680.708
Diesel Fork Lifts	0.419	1.642	1.811	0.294	0.286	0.201	146.162
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**10.213**	**41.074**	**112.612**	**8.437**	**8.218**	**13.091**	**9494.066**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #11 TIER 2 PONTCHARTRAIN

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	40	40	0.86	1.02	1.89
CO	12.4	15.7	60	240	40	40	7.87	9.97	17.84
NOx	0.95	1.22	60	240	40	40	0.60	0.77	1.38
PM-10	0.0052	0.0065	60	240	40	40	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	40	40	0.00	0.00	0.01
CO2	369	511	60	240	40	40	234.22	324.36	558.58

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #11 TIER 2 PONTCHARTRAIN

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	47.13	
NOx	311	1.38	
Total		48.51	607.09

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	0	miles*
Length (converted)	0	feet
Width	300	feet
Area	0.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	14.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	0.00	0.00	0.00	0.00
Staging Areas	2.66	1.33	0.27	0.13
Total	**2.66**	**1.33**	**0.27**	**0.13**

* Assume 2 miles of 14 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #11 TIER 2 PONTCHARTRAIN

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	10.21	41.07	112.61	8.44	8.22	13.09	9494.07	35277.77	44771.84
Construction Site-Fugitive PM-10	NA	NA	NA	1.33	0.13	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.91	17.98	1.94	0.02	0.02	NA	558.58	649.59	1208.18
Total emissions-CONSTRUCTION	**12.13**	**59.05**	**114.55**	**9.79**	**8.37**	**13.09**	**10,053**	**35,927**	**45,980**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #11 TIER 2 LAKE BORGNE-SUPPLIMENTAL

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	0	300	8	240	0
Diesel Road Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	90	0
Diesel Excavator	0	300	8	90	0
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	1	300	8	240	576000
Tug Boat and Barge	1	1200	8	240	2304000
Diesel Cranes	1	175	8	240	336000
Diesel Graders	0	300	8	240	0
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	0	300	8	240	0
Diesel Front End Loaders	0	300	8	240	0
Diesel Fork Lifts	1	100	8	240	192000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #11 TIER 2 LAKE BORGNE-SUPPLIMENTAL

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Tug Boat and Barge	1.549	5.890	18.484	1.219	1.193	1.853	1344.913
Diesel Cranes	0.163	0.481	2.118	0.126	0.122	0.270	196.318
Diesel Graders	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Front End Loaders	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Fork Lifts	0.419	1.642	1.811	0.294	0.286	0.201	146.162
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**3.485**	**13.648**	**33.792**	**2.710**	**2.640**	**3.674**	**2666.041**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #11 TIER 2 LAKE BORGNE-SUPPLIMENTAL

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	20	20	0.43	0.51	0.94
CO	12.4	15.7	60	240	20	20	3.94	4.98	8.92
NOx	0.95	1.22	60	240	20	20	0.30	0.39	0.69
PM-10	0.0052	0.0065	60	240	20	20	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	20	20	0.00	0.00	0.00
CO2	369	511	60	240	20	20	117.11	162.18	279.29

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #11 TIER 2 LAKE BORGNE-SUPPLIMENTAL

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	23.57	
NOx	311	0.69	
Total		24.25	303.54

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	1	miles*
Length (converted)	5280	feet
Width	300	feet
Area	36.36	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	12.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	82.91	41.45	8.29	4.15
Staging Areas	2.28	1.14	0.23	0.11
Total	**85.19**	**42.59**	**8.52**	**4.26**

* Assume 1 miles of 4 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #11 TIER 2 LAKE BORGNE-SUPPLIMENTAL

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	3.49	13.65	33.79	2.71	2.64	3.67	2666.04	10596.54	13262.58
Construction Site-Fugitive PM-10	NA	NA	NA	42.59	4.26	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.97	9.06	1.25	0.02	0.02	NA	279.29	411.84	691.13
Total emissions-CONSTRUCTION	**4.45**	**22.71**	**35.04**	**45.32**	**6.92**	**3.67**	**2,945**	**11,008**	**13,954**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR
IER #12 / IER SUPPLEMENTAL #12

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #12

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Compactors	6	100	8	240	1152000
Diesel Dump Truck	9	300	8	240	5184000
Diesel Excavator	3	300	8	240	1728000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	2	300	8	240	1152000
Tug Boat and Barge	2	1200	8	240	4608000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	1	300	8	240	576000
Diesel Tractors/Loaders/Backhoes	4	100	8	240	768000
Diesel Bull Dozers	6	300	8	240	3456000
Diesel Front End Loaders	10	300	8	240	5760000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	4	40	8	240	307200

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #12

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Compactors	0.470	1.879	6.221	0.432	0.419	0.939	680.708
Diesel Dump Truck	2.514	11.825	31.363	2.342	2.285	4.227	3062.044
Diesel Excavator	0.647	2.476	8.760	0.609	0.590	1.409	1021.252
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.762	2.907	9.077	0.635	0.622	0.927	672.456
Tug Boat and Barge	3.098	11.781	36.968	2.437	2.387	3.707	2689.825
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.222	0.863	3.002	0.209	0.203	0.470	340.417
Diesel Tractors/Loaders/Backhoes	1.566	6.948	6.111	1.159	1.126	0.804	584.903
Diesel Bull Dozers	1.371	5.256	18.129	1.257	1.219	2.818	2042.505
Diesel Front End Loaders	2.412	9.839	31.738	2.222	2.158	4.697	3403.540
Diesel Fork Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.410	1.273	2.021	0.247	0.240	0.274	198.821
Total Emissions	**15.571**	**63.728**	**172.519**	**13.251**	**12.898**	**22.703**	**16458.671**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #12

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	60	120	1.29	3.07	4.36
CO	12.4	15.7	60	240	60	120	11.81	29.90	41.70
NOx	0.95	1.22	60	240	60	120	0.90	2.32	3.23
PM-10	0.0052	0.0065	60	240	60	120	0.00	0.01	0.02
PM 2.5	0.0049	0.006	60	240	60	120	0.00	0.01	0.02
CO2	369	511	60	240	60	120	351.34	973.07	1,324.41

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	4	4	0.02	0.03	0.05
CO	1.32	3.21	60	240	4	4	0.08	0.20	0.29
NOx	4.97	12.6	60	240	4	4	0.32	0.80	1.12
PM-10	0.12	0.33	60	240	4	4	0.01	0.02	0.03
PM 2.5	0.13	0.36	60	240	4	4	0.01	0.02	0.03
CO2	536	536	60	240	4	4	34.02	34.02	68.05

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #12

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N_2O or NO_x	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	109.02	
NO_x	311	3.23	
Total		112.25	1,436.66

Delivery Trucks	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	1.33	
NO_x	311	346.85	
Total		348.18	416.22

Kirtland AFB staff and Students	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	-	
NO_x	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	2	miles*
Length (converted)	10560	feet
Width	300	feet
Area	72.73	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	12.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	165.82	82.91	16.58	8.29
Staging Areas	2.28	1.14	0.23	0.11
Total	**168.10**	**84.05**	**16.81**	**8.40**

* Assume 2 miles of 24 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #12

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	15.57	63.73	172.52	13.25	12.90	22.70	16458.67	54042.56	70501.23
Construction Site-Fugitive PM-10	NA	NA	NA	84.05	8.40	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	4.41	41.99	4.34	0.05	0.05	NA	1324.41	1461.02	2785.43
Total emissions-CONSTRUCTION	**19.98**	**105.72**	**176.86**	**97.35**	**21.35**	**22.70**	**17,783**	**55,504**	**73,287**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #12-SUPPLIMENTAL

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	1	100	8	240	192000
Diesel Dump Truck	1	300	8	240	576000
Diesel Excavator	1	300	8	240	576000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	1	300	8	240	576000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	1	300	8	240	576000
Diesel Front End Loaders	1	300	8	240	576000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #12-SUPPLIMENTAL

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.078	0.313	1.037	0.072	0.070	0.157	113.451
Diesel Dump Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Excavator	0.216	0.825	2.920	0.203	0.197	0.470	340.417
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.222	0.863	3.002	0.209	0.203	0.470	340.417
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	0.229	0.876	3.021	0.209	0.203	0.470	340.417
Diesel Front End Loaders	0.241	0.984	3.174	0.222	0.216	0.470	340.354
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**2.430**	**10.282**	**23.684**	**2.078**	**2.019**	**3.445**	**2497.669**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #12-SUPPLIMENTAL

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	10	15	0.22	0.38	0.60
CO	12.4	15.7	60	240	10	15	1.97	3.74	5.70
NOx	0.95	1.22	60	240	10	15	0.15	0.29	0.44
PM-10	0.0052	0.0065	60	240	10	15	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	10	15	0.00	0.00	0.00
CO2	369	511	60	240	10	15	58.56	121.63	180.19

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #12-SUPPLIMENTAL

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	14.98	
NOx	311	0.44	
Total		15.42	195.61

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	0.5	miles*
Length (converted)	2640	feet
Width	300	feet
Area	18.18	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	12.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	41.45	20.73	4.15	2.07
Staging Areas	2.28	1.14	0.23	0.11
Total	**43.73**	**21.87**	**4.37**	**2.19**

* Assume 2 miles of 24 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #12-SUPPLIMENTAL

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	2.43	10.28	23.68	2.08	2.02	3.45	2497.67	7426.56	9924.23
Construction Site-Fugitive PM-10	NA	NA	NA	21.87	2.19	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.63	5.85	1.00	0.02	0.02	NA	180.19	326.26	506.45
Total emissions-CONSTRUCTION	**3.06**	**16.13**	**24.68**	**23.96**	**4.22**	**3.45**	**2,678**	**7,753**	**10,431**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #13

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #13

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Compactors	3	100	8	240	576000
Diesel Dump Truck	3	300	8	240	1728000
Diesel Excavator	3	300	8	240	1728000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	1	300	8	240	576000
Tug Boat and Barge	1	1200	8	240	2304000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	1	300	8	240	576000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	4	300	8	240	2304000
Diesel Front End Loaders	4	300	8	240	2304000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	4	40	8	240	307200

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #13

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Compactors	0.235	0.939	3.110	0.216	0.209	0.470	340.354
Diesel Dump Truck	0.838	3.942	10.454	0.781	0.762	1.409	1020.681
Diesel Excavator	0.647	2.476	8.760	0.609	0.590	1.409	1021.252
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Tug Boat and Barge	1.549	5.890	18.484	1.219	1.193	1.853	1344.913
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.222	0.863	3.002	0.209	0.203	0.470	340.417
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	0.914	3.504	12.086	0.838	0.812	1.879	1361.670
Diesel Front End Loaders	0.965	3.935	12.695	0.889	0.863	1.879	1361.416
Diesel Fork Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.410	1.273	2.021	0.247	0.240	0.274	198.821
Total Emissions	**9.043**	**36.432**	**97.336**	**7.606**	**7.397**	**12.939**	**9380.403**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #13

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	40	120	0.58	2.04	2.62
CO	12.4	15.7	40	240	40	120	5.25	19.93	25.18
NOx	0.95	1.22	40	240	40	120	0.40	1.55	1.95
PM-10	0.0052	0.0065	40	240	40	120	0.00	0.01	0.01
PM 2.5	0.0049	0.006	40	240	40	120	0.00	0.01	0.01
CO2	369	511	40	240	40	120	156.15	648.72	804.87

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	4	4	0.02	0.03	0.05
CO	1.32	3.21	60	240	4	4	0.08	0.20	0.29
NOx	4.97	12.6	60	240	4	4	0.32	0.80	1.12
PM-10	0.12	0.33	60	240	4	4	0.01	0.02	0.03
PM 2.5	0.13	0.36	60	240	4	4	0.01	0.02	0.03
CO2	536	536	60	240	4	4	34.02	34.02	68.05

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #13

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	65.49	
NOx	311	1.95	
Total		67.44	872.30

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	1.33	
NOx	311	346.85	
Total		348.18	416.22

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	1.5	miles*
Length (converted)	7920	feet
Width	300	feet
Area	54.55	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	12.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	124.36	62.18	12.44	6.22
Staging Areas	2.28	1.14	0.23	0.11
Total	**126.64**	**63.32**	**12.66**	**6.33**

* Assume 1.5 miles of 3.3 mile reach is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #13

Construction Emissions for Criteria Pollutants (tons per year)									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	9.04	36.43	97.34	7.61	7.40	12.94	9380.40	30497.72	39878.13
Construction Site-Fugitive PM-10	NA	NA	NA	63.32	6.33	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	2.67	25.47	3.07	0.04	0.04	NA	804.87	1020.36	1825.23
Total emissions-CONSTRUCTION	**11.72**	**61.90**	**100.40**	**70.97**	**13.77**	**12.94**	**10,185**	**31,518**	**41,703**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #14 / IER SUPPLEMENTAL #14.A

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #14

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Compactors	6	100	8	240	1152000
Diesel Dump Truck	6	300	8	240	3456000
Diesel Excavator	2	300	8	240	1152000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	1	300	8	240	576000
Tug Boat and Barge	1	1200	8	240	2304000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	6	300	8	240	3456000
Diesel Tractors/Loaders/Backhoes	6	100	8	240	1152000
Diesel Bull Dozers	10	300	8	240	5760000
Diesel Front End Loaders	12	300	8	240	6912000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	4	40	8	240	307200

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #14

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Compactors	0.470	1.879	6.221	0.432	0.419	0.939	680.708
Diesel Dump Truck	1.676	7.884	20.909	1.561	1.523	2.818	2041.362
Diesel Excavator	0.432	1.650	5.840	0.406	0.394	0.939	680.835
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Tug Boat and Barge	1.549	5.890	18.484	1.219	1.193	1.853	1344.913
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	1.333	5.180	18.014	1.257	1.219	2.818	2042.505
Diesel Tractors/Loaders/Backhoes	2.349	10.423	9.166	1.739	1.688	1.206	877.354
Diesel Bull Dozers	2.285	8.760	30.214	2.095	2.031	4.697	3404.175
Diesel Front End Loaders	2.894	11.806	38.085	2.666	2.590	5.637	4084.248
Diesel Fork Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.410	1.273	2.021	0.247	0.240	0.274	198.821
Total Emissions	**15.877**	**64.879**	**172.622**	**13.640**	**13.258**	**24.076**	**17453.348**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #14

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	40	120	0.58	2.04	2.62
CO	12.4	15.7	40	240	40	120	5.25	19.93	25.18
NOx	0.95	1.22	40	240	40	120	0.40	1.55	1.95
PM-10	0.0052	0.0065	40	240	40	120	0.00	0.01	0.01
PM 2.5	0.0049	0.006	40	240	40	120	0.00	0.01	0.01
CO2	369	511	40	240	40	120	156.15	648.72	804.87

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	4	4	0.02	0.03	0.05
CO	1.32	3.21	60	240	4	4	0.08	0.20	0.29
NOx	4.97	12.6	60	240	4	4	0.32	0.80	1.12
PM-10	0.12	0.33	60	240	4	4	0.01	0.02	0.03
PM 2.5	0.13	0.36	60	240	4	4	0.01	0.02	0.03
CO2	536	536	60	240	4	4	34.02	34.02	68.05

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #14

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	65.49	
NOx	311	1.95	
Total		67.44	872.30

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	1.33	
NOx	311	346.85	
Total		348.18	416.22

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	2	miles*
Length (converted)	10560	feet
Width	300	feet
Area	72.73	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	12.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	165.82	82.91	16.58	8.29
Staging Areas	2.28	1.14	0.23	0.11
Total	**168.10**	**84.05**	**16.81**	**8.40**

* Assume 2 miles of 8.8 miles of levee is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #14

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	15.88	64.88	172.62	13.64	13.26	24.08	17453.35	54082.47	71535.82
Construction Site-Fugitive PM-10	NA	NA	NA	84.05	8.40	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	2.67	25.47	3.07	0.04	0.04	NA	804.87	1020.36	1825.23
Total emissions-CONSTRUCTION	**18.55**	**90.35**	**175.69**	**97.73**	**21.70**	**24.08**	**18,258**	**55,103**	**73,361**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #14-A

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	2	100	8	240	384000
Diesel Dump Truck	2	300	8	240	1152000
Diesel Excavator	2	300	8	240	1152000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	240	0
Diesel Cranes	2	175	8	240	672000
Diesel Graders	2	300	8	240	1152000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	2	300	8	240	1152000
Diesel Front End Loaders	4	300	8	240	2304000
Diesel Fork Lifts	1	100	8	240	192000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #14-A

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.157	0.626	2.074	0.144	0.140	0.313	226.903
Diesel Dump Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Excavator	0.432	1.650	5.840	0.406	0.394	0.939	680.835
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.444	1.727	6.005	0.419	0.406	0.939	680.835
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	0.457	1.752	6.043	0.419	0.406	0.939	680.835
Diesel Front End Loaders	0.965	3.935	12.695	0.889	0.863	1.879	1361.416
Diesel Fork Lifts	0.419	1.642	1.811	0.294	0.286	0.201	146.162
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**5.011**	**20.417**	**55.998**	**4.357**	**4.228**	**8.047**	**5832.723**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #14-A

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	15	15	0.22	0.26	0.47
CO	12.4	15.7	40	240	15	15	1.97	2.49	4.46
NOx	0.95	1.22	40	240	15	15	0.15	0.19	0.34
PM-10	0.0052	0.0065	40	240	15	15	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	15	15	0.00	0.00	0.00
CO2	369	511	40	240	15	15	58.56	81.09	139.65

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #14-A

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N_2O or NO_x	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	11.78	
NO_x	311	0.34	
Total		12.13	151.77

Delivery Trucks	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	0.67	
NO_x	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	-	
NO_x	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	22.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	50.16	25.08	5.02	2.51
Staging Areas	0.00	0.00	0.00	0.00
Total	**50.16**	**25.08**	**5.02**	**2.51**

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #14-A

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	5.01	20.42	56.00	4.36	4.23	8.05	5832.72	17540.66	23373.39
Construction Site-Fugitive PM-10	NA	NA	NA	25.08	2.51	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.50	4.60	0.90	0.02	0.02	NA	139.65	292.97	432.61
Total emissions-CONSTRUCTION	**5.51**	**25.02**	**56.90**	**29.45**	**6.75**	**8.05**	**5,972**	**17,834**	**23,806**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #15

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #15

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Compactors	3	100	8	240	576000
Diesel Dump Truck	3	300	8	240	1728000
Diesel Excavator	1	300	8	240	576000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	1	300	8	120	288000
Tug Boat and Barge	1	1200	8	120	1152000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	4	300	8	240	2304000
Diesel Tractors/Loaders/Backhoes	4	100	8	240	768000
Diesel Bull Dozers	6	300	8	240	3456000
Diesel Front End Loaders	8	300	8	240	4608000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #15

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Compactors	0.235	0.939	3.110	0.216	0.209	0.470	340.354
Diesel Dump Truck	0.838	3.942	10.454	0.781	0.762	1.409	1020.681
Diesel Excavator	0.216	0.825	2.920	0.203	0.197	0.470	340.417
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.190	0.727	2.269	0.159	0.156	0.232	168.114
Tug Boat and Barge	0.774	2.945	9.242	0.609	0.597	0.927	672.456
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.889	3.453	12.010	0.838	0.812	1.879	1361.670
Diesel Tractors/Loaders/Backhoes	1.566	6.948	6.111	1.159	1.126	0.804	584.903
Diesel Bull Dozers	1.371	5.256	18.129	1.257	1.219	2.818	2042.505
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
Diesel Fork Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**10.313**	**42.224**	**109.775**	**8.824**	**8.573**	**15.333**	**11115.542**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #15

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	40	120	0.58	2.04	2.62
CO	12.4	15.7	40	240	40	120	5.25	19.93	25.18
NOx	0.95	1.22	40	240	40	120	0.40	1.55	1.95
PM-10	0.0052	0.0065	40	240	40	120	0.00	0.01	0.01
PM 2.5	0.0049	0.006	40	240	40	120	0.00	0.01	0.01
CO2	369	511	40	240	40	120	156.15	648.72	804.87

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	4	4	0.02	0.03	0.05
CO	1.32	3.21	60	240	4	4	0.08	0.20	0.29
NOx	4.97	12.6	60	240	4	4	0.32	0.80	1.12
PM-10	0.12	0.33	60	240	4	4	0.01	0.02	0.03
PM 2.5	0.13	0.36	60	240	4	4	0.01	0.02	0.03
CO2	536	536	60	240	4	4	34.02	34.02	68.05
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #15

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	65.49	
NOx	311	1.95	
Total		67.44	872.30

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	1.33	
NOx	311	346.85	
Total		348.18	416.22

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	2	miles*
Length (converted)	10560	feet
Width	300	feet
Area	72.73	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	12.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	165.82	82.91	16.58	8.29
Staging Areas	2.28	1.14	0.23	0.11
Total	**168.10**	**84.05**	**16.81**	**8.40**

* Assume 2 miles of 8 miles of levee is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #15

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	10.31	42.22	109.78	8.82	8.57	15.33	11115.54	34397.94	45513.49
Construction Site-Fugitive PM-10	NA	NA	NA	84.05	8.40	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	2.67	25.47	3.07	0.04	0.04	NA	804.87	1020.36	1825.23
Total emissions-CONSTRUCTION	**12.99**	**67.69**	**112.84**	**92.91**	**17.02**	**15.33**	**11,920**	**35,418**	**47,339**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR
IER #16 / IER SUPPLEMENTAL #16.A

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #16

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	2	300	8	240	1152000
Diesel Compactors	3	100	8	240	576000
Diesel Dump Truck	2	300	8	240	1152000
Diesel Excavator	1	300	8	240	576000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	1	300	8	120	288000
Tug Boat and Barge	1	1200	8	30	288000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	4	300	8	240	2304000
Diesel Tractors/Loaders/Backhoes	4	100	8	240	768000
Diesel Bull Dozers	6	300	8	240	3456000
Diesel Front End Loaders	8	300	8	240	4608000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #16

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Road Compactors	0.235	0.939	3.110	0.216	0.209	0.470	340.354
Diesel Dump Truck	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Excavator	0.216	0.825	2.920	0.203	0.197	0.470	340.417
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.190	0.727	2.269	0.159	0.156	0.232	168.114
Tug Boat and Barge	0.194	0.736	2.310	0.152	0.149	0.232	168.114
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.889	3.453	12.010	0.838	0.812	1.879	1361.670
Diesel Tractors/Loaders/Backhoes	1.566	6.948	6.111	1.159	1.126	0.804	584.903
Diesel Bull Dozers	1.371	5.256	18.129	1.257	1.219	2.818	2042.505
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
Diesel Fork Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**9.453**	**38.701**	**99.359**	**8.107**	**7.872**	**14.168**	**10270.973**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #16

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	40	120	0.58	2.04	2.62
CO	12.4	15.7	40	240	40	120	5.25	19.93	25.18
NOx	0.95	1.22	40	240	40	120	0.40	1.55	1.95
PM-10	0.0052	0.0065	40	240	40	120	0.00	0.01	0.01
PM 2.5	0.0049	0.006	40	240	40	120	0.00	0.01	0.01
CO2	369	511	40	240	40	120	156.15	648.72	804.87

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	4	4	0.02	0.03	0.05
CO	1.32	3.21	60	240	4	4	0.08	0.20	0.29
NOx	4.97	12.6	60	240	4	4	0.32	0.80	1.12
PM-10	0.12	0.33	60	240	4	4	0.01	0.02	0.03
PM 2.5	0.13	0.36	60	240	4	4	0.01	0.02	0.03
CO2	536	536	60	240	4	4	34.02	34.02	68.05
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #16

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	65.49	
NOx	311	1.95	
Total		67.44	872.30

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	1.33	
NOx	311	346.85	
Total		348.18	416.22

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	1.5	miles*
Length (converted)	7920	feet
Width	300	feet
Area	54.55	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	12.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	124.36	62.18	12.44	6.22
Staging Areas	2.28	1.14	0.23	0.11
Total	**126.64**	**63.32**	**12.66**	**6.33**

* Assume 1.5 miles of 4.5 miles of levee is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #16

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	9.45	38.70	99.36	8.11	7.87	14.17	10270.97	31136.98	41407.95
Construction Site-Fugitive PM-10	NA	NA	NA	63.32	6.33	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	2.67	25.47	3.07	0.04	0.04	NA	804.87	1020.36	1825.23
Total emissions-CONSTRUCTION	**12.13**	**64.17**	**102.43**	**71.47**	**14.24**	**14.17**	**11,076**	**32,157**	**43,233**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #16A-SUPPLIMENTAL

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	0	300	20	320	0
Diesel Compactors	1	100	20	320	640000
Diesel Dump Truck	0	300	20	320	0
Diesel Excavator	0	300	20	320	0
Diesel Pile Drivers	0	175	20	320	0
Clam Shell Dredge	0	300	20	120	0
Tug Boat and Barge	0	1200	20	30	0
Diesel Cranes	1	175	20	20	70000
Diesel Graders	1	300	20	320	1920000
Diesel Tractors/Loaders/Backhoes	2	100	20	320	1280000
Diesel Bull Dozers	1	300	20	320	1920000
Diesel Front End Loaders	1	300	20	320	1920000
Diesel Fork Lifts	1	100	20	320	640000
Diesel Generator Set	2	40	20	320	512000

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #16A-SUPPLIMENTAL

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Compactors	0.261	1.044	3.456	0.240	0.233	0.522	378.171
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.034	0.100	0.441	0.026	0.025	0.056	40.900
Diesel Graders	0.741	2.878	10.008	0.698	0.677	1.566	1134.725
Diesel Tractors/Loaders/Backhoes	2.610	11.581	10.184	1.932	1.876	1.340	974.838
Diesel Bull Dozers	0.762	2.920	10.071	0.698	0.677	1.566	1134.725
Diesel Front End Loaders	0.804	3.280	10.579	0.741	0.719	1.566	1134.513
Diesel Fork Lifts	1.396	5.473	6.037	0.980	0.952	0.670	487.207
Diesel Generator Set	0.683	2.121	3.368	0.412	0.401	0.457	331.369
Total Emissions	**7.290**	**29.396**	**54.145**	**5.728**	**5.560**	**7.742**	**5616.448**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION IER #16A SUPPLIMENTAL

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	320	15	20	0.29	0.45	0.74
CO	12.4	15.7	40	320	15	20	2.62	4.43	7.05
NOx	0.95	1.22	40	320	15	20	0.20	0.34	0.55
PM-10	0.0052	0.0065	40	320	15	20	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	320	15	20	0.00	0.00	0.00
CO2	369	511	40	320	15	20	78.07	144.16	222.23

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	320	4	4	0.02	0.05	0.07
CO	1.32	3.21	60	320	4	4	0.11	0.27	0.38
NOx	4.97	12.6	60	320	4	4	0.42	1.07	1.49
PM-10	0.12	0.33	60	320	4	4	0.01	0.03	0.04
PM 2.5	0.13	0.36	60	320	4	4	0.01	0.03	0.04
CO2	536	536	60	320	4	4	45.36	45.36	90.73
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. USEPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION IER #16A SUPPLIMENTAL

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	18.55	
NOx	311	0.55	
Total		19.09	241.33

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	1.78	
NOx	311	462.46	
Total		464.24	554.97

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION IER #16A SUPPLIMENTAL

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; USEPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; USEPA 2006

PM2.5 Emissions

PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	SEPA 2001; USEPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	SEPA 2001; USEPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Proje	12	months
Length	1.5	miles*
Length (converted)	7920	feet
Width	300	feet
Area	54.55	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	12.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	124.36	62.18	12.44	6.22
Staging Areas	2.28	1.14	0.23	0.11
Total	**126.64**	**63.32**	**12.66**	**6.33**

* Assume 1.5 miles of 4.5 miles of levee is being disturbed by construction activities at any one month

References:

USEPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

USEPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.*Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; USEPA 2001; USEPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the USEPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (USEPA 2001; USEPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of USEPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the USEPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the USEPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The USEPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; USEPA 2001; USEPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the USEPA National Emission Inventory (USEPA 2001; USEPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (USEPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The USEPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (USEPA 2006).

References:

USEPA 2001. Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999. USEPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

USEPA 2006. Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants. PrUSEPAred for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. Improvement of Specific Emission Factors (BACM Project No. 1). Midwest Research Institute (MRI). PrUSEPAred for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS IER #16A SUPPLIMENTAL

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	7.29	29.40	54.15	5.73	5.56	7.74	5616.45	17021.49	22637.94
Construction Site-Fugitive PM-10	NA	NA	NA	63.32	6.33	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.81	7.44	2.03	0.04	0.04	NA	222.23	652.34	874.57
Total emissions-CONSTRUCTION	**8.10**	**36.83**	**56.18**	**69.09**	**11.94**	**7.74**	**5,839**	**17,674**	**23,513**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: USEPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #17

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #17

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	3	100	8	240	576000
Diesel Dump Truck	3	300	8	240	1728000
Diesel Excavator	1	300	8	240	576000
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	1	300	8	240	576000
Tug Boat and Barge	1	1200	8	60	576000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	2	300	8	240	1152000
Diesel Tractors/Loaders/Backhoes	4	100	8	240	768000
Diesel Bull Dozers	4	300	8	240	2304000
Diesel Front End Loaders	4	300	8	240	2304000
Diesel Fork Lifts	1	100	8	240	192000
Diesel Generator Set	2	40	8	240	153600

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #17

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.235	0.939	3.110	0.216	0.209	0.470	340.354
Diesel Dump Truck	0.838	3.942	10.454	0.781	0.762	1.409	1020.681
Diesel Excavator	0.216	0.825	2.920	0.203	0.197	0.470	340.417
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Tug Boat and Barge	0.387	1.473	4.621	0.305	0.298	0.463	336.228
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.444	1.727	6.005	0.419	0.406	0.939	680.835
Diesel Tractors/Loaders/Backhoes	1.566	6.948	6.111	1.159	1.126	0.804	584.903
Diesel Bull Dozers	0.914	3.504	12.086	0.838	0.812	1.879	1361.670
Diesel Front End Loaders	0.965	3.935	12.695	0.889	0.863	1.879	1361.416
Diesel Fork Lifts	0.419	1.642	1.811	0.294	0.286	0.201	146.162
Diesel Generator Set	0.205	0.636	1.011	0.124	0.120	0.137	99.411
Total Emissions	**7.552**	**31.109**	**77.385**	**6.397**	**6.215**	**10.673**	**7737.953**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #17

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	40	40	0.58	0.68	1.26
CO	12.4	15.7	40	240	40	40	5.25	6.64	11.89
NOx	0.95	1.22	40	240	40	40	0.40	0.52	0.92
PM-10	0.0052	0.0065	40	240	40	40	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	40	40	0.00	0.00	0.00
CO2	369	511	40	240	40	40	156.15	216.24	372.39

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	4	4	0.02	0.03	0.05
CO	1.32	3.21	60	240	4	4	0.08	0.20	0.29
NOx	4.97	12.6	60	240	4	4	0.32	0.80	1.12
PM-10	0.12	0.33	60	240	4	4	0.01	0.02	0.03
PM 2.5	0.13	0.36	60	240	4	4	0.01	0.02	0.03
CO2	536	536	60	240	4	4	34.02	34.02	68.05

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #17

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N_2O or NO_x	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	31.42	
NO_x	311	0.92	
Total		32.34	404.73

Delivery Trucks	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	1.33	
NO_x	311	346.85	
Total		348.18	416.22

Kirtland AFB staff and Students	Conversion	Emissions CO_2 tons/yr	Total CO_2
VOCs	25	-	
NO_x	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length	1	miles*
Length (converted)	5280	feet
Width	300	feet
Area	36.36	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	12.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	82.91	41.45	8.29	4.15
Staging Areas	2.28	1.14	0.23	0.11
Total	**85.19**	**42.59**	**8.52**	**4.26**

* Assume 1 mile of 2 miles of levee is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #17

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	7.55	31.11	77.38	6.40	6.21	10.67	7737.95	24255.52	31993.47
Construction Site-Fugitive PM-10	NA	NA	NA	42.59	4.26	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.31	12.18	2.03	0.03	0.04	NA	372.39	665.18	1037.57
Total emissions-CONSTRUCTION	**8.86**	**43.29**	**79.42**	**49.03**	**10.51**	**10.67**	**8,110**	**24,921**	**33,031**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #18

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #18

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	6	300	8	240	3456000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	2	300	8	240	1152000
Diesel Tractors/Loaders/Backhoes	4	100	8	240	768000
Diesel Bull Dozers	4	300	8	240	2304000
Diesel Front End Loaders	4	300	8	240	2304000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #18

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	1.295	4.951	17.519	1.219	1.181	2.818	2042.505
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.444	1.727	6.005	0.419	0.406	0.939	680.835
Diesel Tractors/Loaders/Backhoes	1.566	6.948	6.111	1.159	1.126	0.804	584.903
Diesel Bull Dozers	0.914	3.504	12.086	0.838	0.812	1.879	1361.670
Diesel Front End Loaders	0.965	3.935	12.695	0.889	0.863	1.879	1361.416
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**5.566**	**22.697**	**58.405**	**4.846**	**4.702**	**8.858**	**6421.261**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #18

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	10	10	0.14	0.17	0.31
CO	12.4	15.7	40	240	10	10	1.31	1.66	2.97
NOx	0.95	1.22	40	240	10	10	0.10	0.13	0.23
PM-10	0.0052	0.0065	40	240	10	10	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	10	10	0.00	0.00	0.00
CO2	369	511	40	240	10	10	39.04	54.06	93.10

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	1	1	0.00	0.01	0.01
CO	1.32	3.21	60	240	1	1	0.02	0.05	0.07
NOx	4.97	12.6	60	240	1	1	0.08	0.20	0.28
PM-10	0.12	0.33	60	240	1	1	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	1	1	0.00	0.01	0.01
CO2	536	536	60	240	1	1	8.51	8.51	17.01

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #18

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	7.86	
NOx	311	0.23	
Total		8.08	101.18

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.33	
NOx	311	86.71	
Total		87.04	104.06

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #18

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	116.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	264.48	132.24	26.45	13.22
Staging Areas	0.00	0.00	0.00	0.00
Total	**264.48**	**132.24**	**26.45**	**13.22**

* The total combined area of the EIR 18 barrow pits is 1,116 acres, assume 10% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #18

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	5.57	22.70	58.41	4.85	4.70	8.86	6421.26	18303.16	24724.42
Construction Site-Fugitive PM-10	NA	NA	NA	132.24	13.22	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.33	3.04	0.51	0.01	0.01	NA	93.10	166.30	259.39
Total emissions-CONSTRUCTION	**5.89**	**25.74**	**58.91**	**137.09**	**17.94**	**8.86**	**6,514**	**18,469**	**24,984**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #19

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #19

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	4	300	8	240	2304000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	1	300	8	240	576000
Diesel Tractors/Loaders/Backhoes	3	100	8	240	576000
Diesel Bull Dozers	4	300	8	240	2304000
Diesel Front End Loaders	3	300	8	240	1728000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #19

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.863	3.301	11.679	0.812	0.787	1.879	1361.670
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.222	0.863	3.002	0.209	0.203	0.470	340.417
Diesel Tractors/Loaders/Backhoes	1.174	5.211	4.583	0.870	0.844	0.603	438.677
Diesel Bull Dozers	0.914	3.504	12.086	0.838	0.812	1.879	1361.670
Diesel Front End Loaders	0.724	2.952	9.521	0.666	0.647	1.409	1021.062
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**4.279**	**17.463**	**44.862**	**3.718**	**3.608**	**6.778**	**4913.429**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #19

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	10	10	0.14	0.17	0.31
CO	12.4	15.7	40	240	10	10	1.31	1.66	2.97
NOx	0.95	1.22	40	240	10	10	0.10	0.13	0.23
PM-10	0.0052	0.0065	40	240	10	10	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	10	10	0.00	0.00	0.00
CO2	369	511	40	240	10	10	39.04	54.06	93.10

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	1	1	0.00	0.01	0.01
CO	1.32	3.21	60	240	1	1	0.02	0.05	0.07
NOx	4.97	12.6	60	240	1	1	0.08	0.20	0.28
PM-10	0.12	0.33	60	240	1	1	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	1	1	0.00	0.01	0.01
CO2	536	536	60	240	1	1	8.51	8.51	17.01
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #19

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	7.86	
NOx	311	0.23	
Total		8.08	101.18

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.33	
NOx	311	86.71	
Total		87.04	104.06

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #19

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	42.10	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	95.99	47.99	9.60	4.80
Staging Areas	0.00	0.00	0.00	0.00
Total	**95.99**	**47.99**	**9.60**	**4.80**

* The total combined area of the EIR 19 barrow pits is 421 acres, assume 10% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #19

Construction Emissions for Criteria Pollutants (tons per year)									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	4.28	17.46	44.86	3.72	3.61	6.78	4913.43	14058.98	18972.40
Construction Site-Fugitive PM-10	NA	NA	NA	47.99	4.80	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.33	3.04	0.51	0.01	0.01	NA	93.10	166.30	259.39
Total emissions-CONSTRUCTION	**4.61**	**20.51**	**45.37**	**51.72**	**8.42**	**6.78**	**5,007**	**14,225**	**19,232**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #22

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #22

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	4	300	8	240	2304000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	1	300	8	240	576000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	2	300	8	240	1152000
Diesel Front End Loaders	3	300	8	240	1728000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #22

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.863	3.301	11.679	0.812	0.787	1.879	1361.670
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.222	0.863	3.002	0.209	0.203	0.470	340.417
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	0.457	1.752	6.043	0.419	0.406	0.939	680.835
Diesel Front End Loaders	0.724	2.952	9.521	0.666	0.647	1.409	1021.062
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**3.039**	**12.237**	**35.764**	**2.719**	**2.639**	**5.436**	**3940.143**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #22

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	5	5	0.07	0.09	0.16
CO	12.4	15.7	40	240	5	5	0.66	0.83	1.49
NOx	0.95	1.22	40	240	5	5	0.05	0.06	0.11
PM-10	0.0052	0.0065	40	240	5	5	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	5	5	0.00	0.00	0.00
CO2	369	511	40	240	5	5	19.52	27.03	46.55

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	1	1	0.00	0.01	0.01
CO	1.32	3.21	60	240	1	1	0.02	0.05	0.07
NOx	4.97	12.6	60	240	1	1	0.08	0.20	0.28
PM-10	0.12	0.33	60	240	1	1	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	1	1	0.00	0.01	0.01
CO2	536	536	60	240	1	1	8.51	8.51	17.01

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #22

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	3.93	
NOx	311	0.11	
Total		4.04	50.59

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.33	
NOx	311	86.71	
Total		87.04	104.06

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	29.10	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	66.35	33.17	6.63	3.32
Staging Areas	0.00	0.00	0.00	0.00
Total	**66.35**	**33.17**	**6.63**	**3.32**

* The total combined area of the EIR 22 barrow pits is 291 acres, assume 10% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #22

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	3.04	12.24	35.76	2.72	2.64	5.44	3940.14	11198.47	15138.61
Construction Site-Fugitive PM-10	NA	NA	NA	33.17	3.32	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.17	1.56	0.39	0.01	0.01	NA	46.55	126.67	173.22
Total emissions-CONSTRUCTION	**3.21**	**13.80**	**36.16**	**35.90**	**5.97**	**5.44**	**3,987**	**11,325**	**15,312**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #23

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #23

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	6	300	8	240	3456000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	3	300	8	240	1728000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	3	300	8	240	1728000
Diesel Front End Loaders	6	300	8	240	3456000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #23

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	1.295	4.951	17.519	1.219	1.181	2.818	2042.505
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.666	2.590	9.007	0.628	0.609	1.409	1021.252
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	0.686	2.628	9.064	0.628	0.609	1.409	1021.252
Diesel Front End Loaders	1.447	5.903	19.043	1.333	1.295	2.818	2042.124
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**5.259**	**21.178**	**61.678**	**4.710**	**4.571**	**9.395**	**6809.518**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #23

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	5	5	0.07	0.09	0.16
CO	12.4	15.7	40	240	5	5	0.66	0.83	1.49
NOx	0.95	1.22	40	240	5	5	0.05	0.06	0.11
PM-10	0.0052	0.0065	40	240	5	5	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	5	5	0.00	0.00	0.00
CO2	369	511	40	240	5	5	19.52	27.03	46.55

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	1	1	0.00	0.01	0.01
CO	1.32	3.21	60	240	1	1	0.02	0.05	0.07
NOx	4.97	12.6	60	240	1	1	0.08	0.20	0.28
PM-10	0.12	0.33	60	240	1	1	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	1	1	0.00	0.01	0.01
CO2	536	536	60	240	1	1	8.51	8.51	17.01

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #23

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	3.93	
NOx	311	0.11	
Total		4.04	50.59

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.33	
NOx	311	86.71	
Total		87.04	104.06

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #23

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	55.50	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	126.54	63.27	12.65	6.33
Staging Areas	0.00	0.00	0.00	0.00
Total	**126.54**	**63.27**	**12.65**	**6.33**

* The total combined area of the EIR 23 barrow pits is 555 acres, assume 10% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #23

Construction Emissions for Criteria Pollutants (tons per year)									
Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	5.26	21.18	61.68	4.71	4.57	9.40	6809.52	19313.46	26122.98
Construction Site-Fugitive PM-10	NA	NA	NA	63.27	6.33	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.17	1.56	0.39	0.01	0.01	NA	46.55	126.67	173.22
Total emissions-CONSTRUCTION	**5.43**	**22.74**	**62.07**	**67.99**	**10.91**	**9.40**	**6,856**	**19,440**	**26,296**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #25

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #25

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	6	300	8	240	3456000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	3	300	8	240	1728000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	6	300	8	240	3456000
Diesel Front End Loaders	8	300	8	240	4608000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #25

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	1.295	4.951	17.519	1.219	1.181	2.818	2042.505
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.666	2.590	9.007	0.628	0.609	1.409	1021.252
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	1.371	5.256	18.129	1.257	1.219	2.818	2042.505
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**6.427**	**25.774**	**77.090**	**5.783**	**5.612**	**11.744**	**8511.478**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #25

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	20	20	0.29	0.34	0.63
CO	12.4	15.7	40	240	20	20	2.62	3.32	5.95
NOx	0.95	1.22	40	240	20	20	0.20	0.26	0.46
PM-10	0.0052	0.0065	40	240	20	20	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	20	20	0.00	0.00	0.00
CO2	369	511	40	240	20	20	78.07	108.12	186.19

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #25

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	15.71	
NOx	311	0.46	
Total		16.17	202.36

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	116.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	264.48	132.24	26.45	13.22
Staging Areas	0.00	0.00	0.00	0.00
Total	**264.48**	**132.24**	**26.45**	**13.22**

* The total combined area of the EIR 25 barrow pits is 1,161 acres, assume 10% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #25

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	6.43	25.77	77.09	5.78	5.61	11.74	8511.48	24135.72	32647.20
Construction Site-Fugitive PM-10	NA	NA	NA	132.24	13.22	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.66	6.09	1.02	0.02	0.02	NA	186.19	332.59	518.79
Total emissions-CONSTRUCTION	**7.08**	**31.86**	**78.11**	**138.04**	**18.85**	**11.74**	**8,698**	**24,468**	**33,166**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #26

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #26

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	6	300	8	240	3456000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	2	300	8	240	1152000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	3	300	8	240	1728000
Diesel Front End Loaders	6	300	8	240	3456000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #26

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	1.295	4.951	17.519	1.219	1.181	2.818	2042.505
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.444	1.727	6.005	0.419	0.406	0.939	680.835
Diesel Tractors/Loaders/Backhoes	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	0.686	2.628	9.064	0.628	0.609	1.409	1021.252
Diesel Front End Loaders	1.447	5.903	19.043	1.333	1.295	2.818	2042.124
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**4.645**	**18.578**	**57.148**	**4.211**	**4.087**	**8.724**	**6322.875**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #26

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	5	5	0.07	0.09	0.16
CO	12.4	15.7	40	240	5	5	0.66	0.83	1.49
NOx	0.95	1.22	40	240	5	5	0.05	0.06	0.11
PM-10	0.0052	0.0065	40	240	5	5	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	5	5	0.00	0.00	0.00
CO2	369	511	40	240	5	5	19.52	27.03	46.55

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	1	1	0.00	0.01	0.01
CO	1.32	3.21	60	240	1	1	0.02	0.05	0.07
NOx	4.97	12.6	60	240	1	1	0.08	0.20	0.28
PM-10	0.12	0.33	60	240	1	1	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	1	1	0.00	0.01	0.01
CO2	536	536	60	240	1	1	8.51	8.51	17.01

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #26

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	3.93	
NOx	311	0.11	
Total		4.04	50.59

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.33	
NOx	311	86.71	
Total		87.04	104.06

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #26

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	41.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	93.48	46.74	9.35	4.67
Staging Areas	0.00	0.00	0.00	0.00
Total	**93.48**	**46.74**	**9.35**	**4.67**

* The total combined area of the EIR 26 barrow pits is 441 acres, assume 10% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #26

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	4.65	18.58	57.15	4.21	4.09	8.72	6322.87	17889.29	24212.16
Construction Site-Fugitive PM-10	NA	NA	NA	46.74	4.67	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.17	1.56	0.39	0.01	0.01	NA	46.55	126.67	173.22
Total emissions-CONSTRUCTION	**4.82**	**20.14**	**57.54**	**50.96**	**8.77**	**8.72**	**6,369**	**18,016**	**24,385**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #27

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #27

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	0	300	8	240	0
Diesel Pile Drivers	2	175	8	240	672000
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	2	175	8	240	672000
Diesel Graders	0	300	8	240	0
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	1	300	8	240	576000
Diesel Front End Loaders	2	300	8	240	1152000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #27

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Pile Drivers	0.378	1.807	4.303	0.341	0.326	0.548	396.783
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.326	0.963	4.236	0.252	0.244	0.541	392.636
Diesel Graders	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	0.229	0.876	3.021	0.209	0.203	0.470	340.417
Diesel Front End Loaders	0.482	1.968	6.348	0.444	0.432	0.939	680.708
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**2.579**	**10.720**	**24.953**	**2.148**	**2.082**	**3.438**	**2492.929**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #32

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	20	20	0.29	0.34	0.63
CO	12.4	15.7	40	240	20	20	2.62	3.32	5.95
NOx	0.95	1.22	40	240	20	20	0.20	0.26	0.46
PM-10	0.0052	0.0065	40	240	20	20	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	20	20	0.00	0.00	0.00
CO2	369	511	40	240	20	20	78.07	108.12	186.19

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #32

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	15.71	
NOx	311	0.46	
Total		16.17	202.36

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #27

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	20.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	45.60	22.80	4.56	2.28
Staging Areas	0.00	0.00	0.00	0.00
Total	**45.60**	**22.80**	**4.56**	**2.28**

* The total combined area of the EIR 27 levees, assume 10% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #27

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	2.58	10.72	24.95	2.15	2.08	3.44	2492.93	7824.78	10317.71
Construction Site-Fugitive PM-10	NA	NA	NA	22.80	2.28	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.66	6.09	1.02	0.02	0.02	NA	186.19	332.59	518.79
Total emissions-CONSTRUCTION	**3.23**	**16.81**	**25.97**	**24.96**	**4.38**	**3.44**	**2,679**	**8,157**	**10,836**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR
IER #28

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #28

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	2	300	8	240	1152000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	2	300	8	240	1152000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	2	300	8	240	1152000
Diesel Front End Loaders	3	300	8	240	1728000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #28

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	0.432	1.650	5.840	0.406	0.394	0.939	680.835
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.444	1.727	6.005	0.419	0.406	0.939	680.835
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	0.457	1.752	6.043	0.419	0.406	0.939	680.835
Diesel Front End Loaders	0.724	2.952	9.521	0.666	0.647	1.409	1021.062
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**3.221**	**13.187**	**34.454**	**2.812**	**2.730**	**5.168**	**3745.951**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #28

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	20	20	0.29	0.34	0.63
CO	12.4	15.7	40	240	20	20	2.62	3.32	5.95
NOx	0.95	1.22	40	240	20	20	0.20	0.26	0.46
PM-10	0.0052	0.0065	40	240	20	20	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	20	20	0.00	0.00	0.00
CO2	369	511	40	240	20	20	78.07	108.12	186.19

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #28

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	15.71	
NOx	311	0.46	
Total		16.17	202.36

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #28

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	16.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	36.48	18.24	3.65	1.82
Staging Areas	0.00	0.00	0.00	0.00
Total	**36.48**	**18.24**	**3.65**	**1.82**

* The total combined area of the EIR 28 barrow pits is 32.79 acres, assume 50% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #28

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	3.22	13.19	34.45	2.81	2.73	5.17	3745.95	10795.70	14541.65
Construction Site-Fugitive PM-10	NA	NA	NA	18.24	1.82	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.66	6.09	1.02	0.02	0.02	NA	186.19	332.59	518.79
Total emissions-CONSTRUCTION	**3.88**	**19.28**	**35.47**	**21.07**	**4.57**	**5.17**	**3,932**	**11,128**	**15,060**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #29

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #29

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	6	300	8	240	3456000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	6	300	8	240	3456000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	6	300	8	240	3456000
Diesel Front End Loaders	6	300	8	240	3456000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #29

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	1.295	4.951	17.519	1.219	1.181	2.818	2042.505
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	1.333	5.180	18.014	1.257	1.219	2.818	2042.505
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	1.371	5.256	18.129	1.257	1.219	2.818	2042.505
Diesel Front End Loaders	1.447	5.903	19.043	1.333	1.295	2.818	2042.124
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**6.611**	**26.396**	**79.750**	**5.967**	**5.790**	**12.213**	**8852.023**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #29

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	20	20	0.29	0.34	0.63
CO	12.4	15.7	40	240	20	20	2.62	3.32	5.95
NOx	0.95	1.22	40	240	20	20	0.20	0.26	0.46
PM-10	0.0052	0.0065	40	240	20	20	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	20	20	0.00	0.00	0.00
CO2	369	511	40	240	20	20	78.07	108.12	186.19

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #29

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	15.71	
NOx	311	0.46	
Total		16.17	202.36

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #29

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	82.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	186.96	93.48	18.70	9.35
Staging Areas	0.00	0.00	0.00	0.00
Total	**186.96**	**93.48**	**18.70**	**9.35**

* The total combined area of the EIR 29 barrow pits is 882 acres, assume 50% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #29

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	6.61	26.40	79.75	5.97	5.79	12.21	8852.02	24967.46	33819.48
Construction Site-Fugitive PM-10	NA	NA	NA	93.48	9.35	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.66	6.09	1.02	0.02	0.02	NA	186.19	332.59	518.79
Total emissions-CONSTRUCTION	**7.27**	**32.49**	**80.77**	**99.46**	**15.16**	**12.21**	**9,038**	**25,300**	**34,338**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #30

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #30

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	5	300	8	240	2880000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	4	300	8	240	2304000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	5	300	8	240	2880000
Diesel Front End Loaders	5	300	8	240	2880000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #30

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	1.079	4.126	14.599	1.016	0.984	2.349	1702.087
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.889	3.453	12.010	0.838	0.812	1.879	1361.670
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	1.143	4.380	15.107	1.047	1.016	2.349	1702.087
Diesel Front End Loaders	1.206	4.919	15.869	1.111	1.079	2.349	1701.770
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**5.481**	**21.984**	**64.630**	**4.913**	**4.768**	**9.865**	**7149.999**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #30

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	20	20	0.29	0.34	0.63
CO	12.4	15.7	40	240	20	20	2.62	3.32	5.95
NOx	0.95	1.22	40	240	20	20	0.20	0.26	0.46
PM-10	0.0052	0.0065	40	240	20	20	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	20	20	0.00	0.00	0.00
CO2	369	511	40	240	20	20	78.07	108.12	186.19

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #30

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	15.71	
NOx	311	0.46	
Total		16.17	202.36

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #30

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	75.10	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	171.23	85.61	17.12	8.56
Staging Areas	0.00	0.00	0.00	0.00
Total	**171.23**	**85.61**	**17.12**	**8.56**

* The total combined area of the EIR 30 barrow pits is 751 acres, assume 50% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #30

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	5.48	21.98	64.63	4.91	4.77	9.86	7150.00	20236.96	27386.96
Construction Site-Fugitive PM-10	NA	NA	NA	85.61	8.56	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.66	6.09	1.02	0.02	0.02	NA	186.19	332.59	518.79
Total emissions-CONSTRUCTION	**6.14**	**28.07**	**65.65**	**90.54**	**13.35**	**9.86**	**7,336**	**20,570**	**27,906**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR
IER #31

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #31

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	15	300	8	240	8640000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	2	300	8	240	1152000
Diesel Tractors/Loaders/Backhoes	4	100	8	240	768000
Diesel Bull Dozers	5	300	8	240	2880000
Diesel Front End Loaders	15	300	8	240	8640000
Diesel Fork Lifts	2	100	8	240	384000
Diesel Generator Set	8	40	8	240	614400

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #31

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	3.237	12.378	43.798	3.047	2.952	7.046	5106.262
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.444	1.727	6.005	0.419	0.406	0.939	680.835
Diesel Tractors/Loaders/Backhoes	1.566	6.948	6.111	1.159	1.126	0.804	584.903
Diesel Bull Dozers	1.143	4.380	15.107	1.047	1.016	2.349	1702.087
Diesel Front End Loaders	3.618	14.758	47.606	3.332	3.237	7.046	5105.310
Diesel Fork Lifts	0.838	3.284	3.622	0.588	0.571	0.402	292.324
Diesel Generator Set	0.819	2.546	4.042	0.494	0.481	0.548	397.643
Total Emissions	**11.944**	**47.334**	**129.776**	**10.348**	**10.042**	**19.604**	**14209.592**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #31

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	20	20	0.29	0.34	0.63
CO	12.4	15.7	40	240	20	20	2.62	3.32	5.95
NOx	0.95	1.22	40	240	20	20	0.20	0.26	0.46
PM-10	0.0052	0.0065	40	240	20	20	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	20	20	0.00	0.00	0.00
CO2	369	511	40	240	20	20	78.07	108.12	186.19

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #31

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	15.71	
NOx	311	0.46	
Total		16.17	202.36

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
PM2.5 Emissions			
PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	200.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	456.00	228.00	45.60	22.80
Staging Areas	0.00	0.00	0.00	0.00
Total	**456.00**	**228.00**	**45.60**	**22.80**

* The total combined area of the EIR 30 barrow pits is 751 acres, assume 50% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

CALCULATION SHEET-SUMMARY OF EMISSIONS-IER #31

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	11.94	47.33	129.78	10.35	10.04	19.60	14209.59	40658.91	54868.50
Construction Site-Fugitive PM-10	NA	NA	NA	228.00	22.80	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.66	6.09	1.02	0.02	0.02	NA	186.19	332.59	518.79
Total emissions-CONSTRUCTION	**12.60**	**53.42**	**130.79**	**238.36**	**32.86**	**19.60**	**14,396**	**40,992**	**55,387**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

AIR QUALITY CALCULATIONS FOR IER #32

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #32

Assumptions for Combustion Emissions					
Type of Construction Equipment	Num. of Units	HP Rated	Hrs/day	Days/yr	Total hp-hrs
Water Truck	1	300	8	240	576000
Diesel Compactors	0	100	8	240	0
Diesel Dump Truck	0	300	8	240	0
Diesel Excavator	8	300	8	240	4608000
Diesel Pile Drivers	0	175	8	240	0
Clam Shell Dredge	0	300	8	240	0
Tug Boat and Barge	0	1200	8	60	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	4	300	8	240	2304000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	6	300	8	240	3456000
Diesel Front End Loaders	8	300	8	240	4608000
Diesel Fork Lifts	0	100	8	240	0
Diesel Generator Set	1	40	8	240	76800

Emission Factors							
Type of Construction Equipment	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	PM-10 g/hp-hr	PM-2.5 g/hp-hr	SO2 g/hp-hr	CO2 g/hp-hr
Water Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Road Compactors	0.370	1.480	4.900	0.340	0.330	0.740	536.200
Diesel Dump Truck	0.440	2.070	5.490	0.410	0.400	0.740	536.000
Diesel Excavator	0.340	1.300	4.600	0.320	0.310	0.740	536.300
Diesel Pile Drivers	0.510	2.440	5.810	0.460	0.440	0.740	535.800
Clam Shell Dredge	0.600	2.290	7.150	0.500	0.490	0.730	529.700
Tug Boat and Barge	0.610	2.320	7.280	0.480	0.470	0.730	529.700
Diesel Cranes	0.440	1.300	5.720	0.340	0.330	0.730	530.200
Diesel Graders	0.350	1.360	4.730	0.330	0.320	0.740	536.300
Diesel Tractors/Loaders/Backhoes	1.850	8.210	7.220	1.370	1.330	0.950	691.100
Diesel Bull Dozers	0.360	1.380	4.760	0.330	0.320	0.740	536.300
Diesel Front End Loaders	0.380	1.550	5.000	0.350	0.340	0.740	536.200
Diesel Fork Lifts	1.980	7.760	8.560	1.390	1.350	0.950	690.800
Diesel Generator Set	1.210	3.760	5.970	0.730	0.710	0.810	587.300

CALCULATION SHEET-COMBUSTION EMISSIONS-CONSTRUCTION- IER #32

Emission factors (EF) were generated from the NONROAD2005 model for the 2006 calendar year. The VOC EFs includes exhaust and evaporative emissions. The VOC evaporative components included in the NONROAD2005 model are diurnal, hotsoak, running loss, tank permeation, hose permeation, displacement, and spillage. The construction equipment age distribution in the NONROAD2005 model is based on the population in U.S. for the 2006 calendar year.

Emission Calculations							
Type of Construction Equipment	VOC tons/yr	CO tons/yr	NOx tons/yr	PM-10 tons/yr	PM-2.5 tons/yr	SO2 tons/yr	CO2 tons/yr
Water Truck	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Compactors	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Dump Truck	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Excavator	1.727	6.601	23.359	1.625	1.574	3.758	2723.340
Diesel Pile Drivers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Clam Shell Dredge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tug Boat and Barge	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cranes	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Graders	0.889	3.453	12.010	0.838	0.812	1.879	1361.670
Diesel Tractors/Loaders/Backhoes	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	1.371	5.256	18.129	1.257	1.219	2.818	2042.505
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
Diesel Fork Lifts	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Generator Set	0.102	0.318	0.505	0.062	0.060	0.069	49.705
Total Emissions	**7.080**	**28.288**	**85.932**	**6.399**	**6.209**	**13.153**	**9532.731**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #32

Construction Worker Personal Vehicle Commuting to Construction Site-Passenger and Light Duty Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of cars	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	40	240	20	20	0.29	0.34	0.63
CO	12.4	15.7	40	240	20	20	2.62	3.32	5.95
NOx	0.95	1.22	40	240	20	20	0.20	0.26	0.46
PM-10	0.0052	0.0065	40	240	20	20	0.00	0.00	0.00
PM 2.5	0.0049	0.006	40	240	20	20	0.00	0.00	0.00
CO2	369	511	40	240	20	20	78.07	108.12	186.19

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	10,000-19,500 lb Delivery Truck	33,000-60,000 lb semi trailer rig	Mile/day	Day/yr	Number of trucks	Number of trucks	Total Emissions Cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.29	0.55	60	240	2	2	0.01	0.02	0.03
CO	1.32	3.21	60	240	2	2	0.04	0.10	0.14
NOx	4.97	12.6	60	240	2	2	0.16	0.40	0.56
PM-10	0.12	0.33	60	240	2	2	0.00	0.01	0.01
PM 2.5	0.13	0.36	60	240	2	2	0.00	0.01	0.02
CO2	536	536	60	240	2	2	17.01	17.01	34.02

	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Passenger Cars g/mile	Pick-up Trucks, SUVs g/mile	Mile/day	Day/yr	Number of Cars	Number of trucks	Total Emissions cars tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	1.36	1.61	60	240	0	0	-	0.00	-
CO	12.4	15.7	60	240	0	0	-	0.00	-
NOx	0.95	1.22	60	240	0	0	-	0.00	-
PM-10	0.0052	0.0065	60	240	0	0	-	0.00	-
PM 2.5	0.0049	0.006	60	240	0	0	-	0.00	-
CO2	369	511	60	240	0	0	-	0.00	-

Truck Emission Factor Source: MOBILE6.2 USEPA 2005 Emission Facts: Average annual emissions and fuel consumption for gasoline-fueled passenger cars and light trucks. EPA 420-F-05-022 August 2005. Emission rates were generated using MOBILE.6 highway.

CALCULATION SHEET-TRANSPORTATION COMBUSTION EMISSIONS-CONSTRUCTION- IER #32

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks;
http://www.epa.gov/climatechange/emissions/usinventoryreport.html

CARBON EQUIVALENTS

Construction Commuters	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	15.71	
NOx	311	0.46	
Total		16.17	202.36

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.67	
NOx	311	173.42	
Total		174.09	208.11

Kirtland AFB staff and Students	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	-	
NOx	311	-	
Total		-	-

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION- IER #32

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
General Construction Activities	0.19	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006
New Road Construction	0.42	ton PM10/acre-month	MRI 1996; EPA 2001; EPA 2006

PM2.5 Emissions

PM2.5 Multiplier	0.10	(10% of PM10 emissions assumed to be PM2.5)	EPA 2001; EPA 2006
Control Efficiency	0.50	(assume 50% control efficiency for PM10 and PM2.5 emissions)	EPA 2001; EPA 2006

Project Assumptions

Construction Area (0.19 ton PM10/acre-month)

Duration of Soil Disturbance in Projec	12	months
Length		miles*
Length (converted)		feet
Width		feet
Area	153.00	acres

Conversion Factors

0.000022957	acres per sq. feet
5280	feet per mile

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	0.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	**PM10 controlled**	**PM2.5 uncontrolled**	**PM2.5 controlled**
Construction Area (0.19 ton PM10/ac	348.84	174.42	34.88	17.44
Staging Areas	0.00	0.00	0.00	0.00
Total	**348.84**	**174.42**	**34.88**	**17.44**

* The total combined area of the EIR 32 barrow pits is 1,538 acres, assume 10% is being disturbed by construction activities at any one month

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Fugitive Dust Emission Factors

General Construction Activities Emission Factor

0.19 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The area-based emission factor for construction activities is based on a study completed by the Midwest Research Institute (MRI) Improvement of Specific Emission Factors (BACM Project No. 1), March 29, 1996. The MRI study evaluated seven construction projects in Nevada and California (Las Vegas, Coachella Valley, South Coast Air Basin, and the San Joaquin Valley). The study determined an average emission factor of 0.11 ton PM10/acre-month for sites without large-scale cut/fill operations. A worst-case emission factor of 0.42 ton PM10/acre-month was calculated for sites with active large-scale earth moving operations. The monthly emission factors are based on 168 work-hours per month (MRI 1996). A subsequent MRI Report in 1999, Estimating Particulate Matter Emissions from Construction Operations, calculated the 0.19 ton PM10/acre-month emission factor by applying 25% of the large-scale earthmoving emission factor (0.42 ton PM10/acre-month) and 75% of the average emission factor (0.11 ton PM10/acre-month).

The 0.19 ton PM10/acre-month emission factor is referenced by the EPA for non-residential construction activities in recent procedures documents for the National Emission Inventory (EPA 2001; EPA 2006). The 0.19 ton PM10/acre-month emission factor represents a refinement of EPA's original AP-42 area-based total suspended particle (TSP) emission factor in Section 13.2.3 Heavy Construction Operations. In addition to the EPA, this methodology is also supported by the South Coast Air Quality Management District and the Western Regional Air Partnership (WRAP) which is funded by the EPA and is administered jointly by the Western Governor's Association and the National Tribal Environmental Council. The emission factor is assumed to encompass a variety of non-residential construction activities including building construction (commercial, industrial, institutional, governmental), public works, and travel on unpaved roads. The EPA National Emission Inventory documentation assumes that the emission factors are uncontrolled and recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas.

New Road Construction Emission Factor

0.42 ton PM10/acre-month Source: MRI 1996; EPA 2001; EPA 2006

The emission factor for new road construction is based on the worst-case conditions emission factor from the MRI 1996 study described above (0.42 tons PM10/acre-month). It is assumed that road construction involves extensive earthmoving and heavy construction vehicle travel resulting in emissions that are higher than other general construction projects. The 0.42 ton PM10/acre-month emission factor for road construction is referenced in recent procedures documents for the EPA National Emission Inventory (EPA 2001; EPA 2006).

PM2.5 Multiplier **0.10**

PM2.5 emissions are estimated by applying a particle size multiplier of 0.10 to PM10 emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (EPA 2006).

Control Efficiency for PM10 and PM2.5 **0.50**

The EPA National Emission Inventory documentation recommends a control efficiency of 50% for PM10 and PM2.5 in PM nonattainment areas. Wetting controls will be applied during project construction (EPA 2006).

References:

EPA 2001. *Procedures Document for National Emissions Inventory, Criteria Air Pollutants, 1985-1999.* EPA-454/R-01-006. Office of Air Quality Planning and Standards, United States Environmental Protection Agency. March 2001.

EPA 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

MRI 1996. *Improvement of Specific Emission Factors (BACM Project No. 1).* Midwest Research Institute (MRI). Prepared for the California South Coast Air Quality Management District, March 29, 1996.

Construction Emissions for Criteria Pollutants (tons per year)

Emission Source	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
Combustion Emissions	7.08	28.29	85.93	6.40	6.21	13.15	9532.73	26901.96	36434.69
Construction Site-Fugitive PM-10	NA	NA	NA	174.42	17.44	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.66	6.09	1.02	0.02	0.02	NA	186.19	332.59	518.79
Total emissions-CONSTRUCTION	**7.74**	**34.38**	**86.95**	**180.84**	**23.67**	**13.15**	**9,719**	**27,235**	**36,953**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Orleans, Jefferson, Plaqueminnes, St. Charles and St Bernard Parish are in attainment for all NAAQS; however, Orleans, Jefferson, St Bernard and St, Charles are a maintenance areas for Ozone.

Carbon Equivalents	Conversion Factor
N2O or NOx	311
Methane or VOCs	25

Source: EPA 2010 Reference, Tables and Conversions, Inventory of U.S. Greenhouse Gas Emissions and Sinks; http://www.epa.gov/climatechange/emissions/usinventoryreport.html

APPENDIX P
ECONOMIC IMPACT FORECAST SYSTEM TABLE

ECONOMIC IMPACT FORECAST SYSTEM REPORT - HSDRRS CED

	2005		2006		2007		2008		2009		2010		2011		
FORECAST INPUT	Input	RTV	Input	RTV	Input	RTV	Input	RTV	Input	RTV	Input	RTV	Input	RTV	Total
Change In Local Expenditures	$250,000,000		$750,000,000		$2,241,379,000		$2,689,655,000		$2,689,655,000		$2,689,655,000		$2,689,655,000		$13,999,999,000
Change In Civilian Employment	0		0		0		0		0		0		0		
Average Income of Affected Civilia	$0		$0		$0		$0		$0		$0		$0		
Percent Expected to Relocate	0		0		0		0		0		0		0		
Change In Military Employment	0		0		0		0		0		0		0		
Average Income of Affected Milita	$0		$0		$0		$0		$0		$0		$0		
Percent of Militart Living On-post	0		0		0		0		0		0		0		
FORECAST OUTPUT															
Employment Multiplier	3.49		3.49		3.49		3.49		3.49		3.49		3.49		3.49
Income Multiplier	3.49		3.49		3.49		3.49		3.49		3.49		3.49		3.49
Sales Volume - Direct	$178,366,800		$535,100,300		$1,599,150,000		$2,689,655,000		$2,689,655,000		$2,689,655,000		$2,689,655,000		$13,071,237,100
Sales Volume - Induced	$444,133,200		$1,332,400,000		$3,981,883,000		$6,697,242,000		$6,697,242,000		$6,697,242,000		$6,697,242,000		$32,547,384,200
Sales Volume - Total	$622,500,000	1.21%	$1,867,500,000	3.62%	$5,581,033,000	10.83%	$9,386,897,000	18.22%	$9,386,897,000	18.22%	$9,386,897,000	18.22%	$9,386,897,000	18.22%	$45,618,621,000
Income - Direct	$31,293,840		$93,881,500		$280,565,400		$471,890,800		$471,890,800		$471,890,800		$471,890,800		$2,293,303,940
Income - Induced)	$77,921,660		$233,765,000		$698,607,800		$1,175,008,000		$1,175,008,000		$1,175,008,000		$1,175,008,000		$5,710,326,460
Income - Total(place of work)	$109,215,500	0.42%	$327,646,500	1.27%	$979,173,200	3.80%	$1,646,899,000	6.39%	$1,646,899,000	6.39%	$1,646,899,000	6.39%	$1,646,899,000	6.39%	$8,003,631,200
Employment - Direct	804		2412		7208		12123		12123		12123		12123		58,916
Employment - Induced	2002		6006		17948		30187		30187		30187		30187		146,704
Employment - Total	2806	0.43%	8418	1.28%	25156	3.83%	42310	6.43%	42310	6.43%	42310	6.43%	42310	6.43%	205,620
Local Population	0		0		0		0		0		0		0		0
Local Off-base Population	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0

HSDRRS Region of Influence: Jefferson, Orleans, Plaquemines, St. Bernard and St. Charles parishes

Source: Economic Impact Forecast System (EIFS), U.S. Army Corp of Engineers

APPENDIX Q
USFWS COORDINATION ACT REPORTS

PROGRAMMATIC COORDINATION ACT REPORT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd
Suite 400
Lafayette, Louisiana 70506

November 26, 2007

Colonel Alvin B. Lee
District Engineer
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Colonel Lee:

Please reference the Individual Environmental Reports (IER) being prepared under the approval of the Council on Environmental Quality (CEQ) that will partially fulfill the U.S. Army Corps of Engineers (Corps) compliance with the National Environmental Policy Act of 1969 (83 Stat. 852, as amended; 42 U.S.C. 4321-4347). IERs are a CEQ approved alternative arrangement for compliance with NEPA that would allow expedited implementation of improved hurricane protection measures. Work proposed in those IERs would be conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4). That law authorized the Corps to upgrade two existing hurricane protection projects (i.e., Westbank and Vicinity of New Orleans and Lake Pontchartrain and Vicinity) in the Greater New Orleans area in southeast Louisiana. This draft report contains a description of resources in the project area and provides planning objectives and recommendations to minimize project impacts on those resources.

The proposed protection was authorized by Supplemental 4 which directed the Corps to proceed with engineering, design, modification, and construction, where necessary, of the Lake Pontchartrain and Vicinity and the West Bank and Vicinity Hurricane Protection Projects so those projects would provide 100-year hurricane protection. Procedurally, project construction has been authorized in the absence of the report of the Secretary of the Interior that is required by Section 2(b) of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). In this case, the authorization process has prevented our agencies from following the normal procedures for fully complying with the FWCA. The FWCA requires that our Section 2(b) report be made an integral part of any report supporting further project authorization or administrative approval.

Because of the uncertainties regarding the project design, the project's impacts are undetermined at the current stage of planning, therefore, we cannot complete our evaluation of the IER's effects on fish and wildlife resources and cannot entirely fulfill our reporting responsibilities under Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). Accordingly, extensive additional Service involvement during subsequent detailed planning, engineering, design, and construction phase of each IER, along with more-definitive project information that will be available during those planning phases, will be required so that we can fulfill our responsibilities under that Act. Therefore, to fulfill the coordination and reporting requirements of the FWCA, the Service will be providing post-authorization draft and final supplemental 2(b) reports to this programmatic report for each IER. Therefore, this report does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the FWCA. This report has not been reviewed by the Louisiana Department of Wildlife and Fisheries (LDWF) or the National Marine Fisheries Service (NMFS) but their comments on this report will be provided under separate cover.

Should you or your staff have any questions regarding this letter and our attached report, please contact David Walther (337/291-3122) of this office.

Sincerely,

James F. Boggs
Acting Supervisor
Louisiana Field Office

Attachment

cc: National Marine Fisheries Service, Baton Rouge, LA
EPA, Dallas, TX
LA Dept. of Wildlife and Fisheries, Baton Rouge, LA
LA Dept. of Natural Resources, CMD, Baton Rouge, LA
LA Dept. of Natural Resources, CRD, Baton Rouge, LA

Draft Fish and Wildlife Coordination Act Report
for the
Individual Environmental Reports (IER)

Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4)

PROVIDED TO
NEW ORLEANS DISTRICT
U.S. ARMY CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY
DAVID WALTHER
FISH AND WILDLIFE BIOLOGIST

U.S. FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
LAFAYETTE, LOUISIANA
NOVEMBER 2007

U.S. FISH AND WILDLIFE SERVICE – SOUTHEAST REGION

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EXECUTIVE SUMMARY

The Corps of Engineers New Orleans District (Corps) is preparing Individual Environmental Reports (IER) under the approval of the Council on Environmental Quality (CEQ). Those IERs will partially fulfill the Corps compliance with the National Environmental Policy Act of 1969 (83 Stat. 852, as amended; 42 U.S.C. 4321- 4347). IERs are a CEQ approved alternative arrangement for compliance with NEPA that would allow expedited implementation of improved hurricane protection measures. Work proposed in those IERs would be conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4). That law authorized the Corps to upgrade two existing hurricane protection projects (i.e., Westbank and Vicinity of New Orleans and Lake Pontchartrain and Vicinity) in the Greater New Orleans area in southeast Louisiana. This draft report contains a description of resources in the project area and provides planning objectives and recommendations to minimize project impacts on those resources.

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This report incorporates and supplements our FWCA Reports that addressed impacts and mitigation features for the Westbank and Vicinity of New Orleans (dated November 10, 1986, August 22, 1994, November 15, 1996, and June 20, 2005) and the Lake Pontchartrain and Vicinity Hurricane (dated July 25, 1984, and January 17, 1992) Protection projects. Impacts and mitigation needs resulting from government and contractor provided borrow areas have been addressed in an October 25, 2007, and a November 1, 2007, FWCA reports, respectively. Therefore, this report will not address those borrow impacts and future impacts will be addressed in FWCA supplements to those FWCA reports. In addition, specific recommendations for mitigation will be addressed in separate FWCA reports because mitigation is still within early planning phases and lacks sufficient details to be adequately addressed.

Construction of the increased flood protection would result in un-quantified habitat losses. The Service does not object to providing improved hurricane protection to the Greater New Orleans area provided the following fish and wildlife conservation recommendations are incorporated into future project planning and implementation:

1. To the greatest extent possible, situate flood protection features so that destruction of wetlands and non-wet bottomland hardwoods are avoided or minimized.

2. Minimize enclosure of wetlands with new levee alignments. When enclosing wetlands is unavoidable, acquire non-development easements on those wetlands, or maintain hydrologic connections with adjacent, un-enclosed wetlands to minimize secondary impacts from development and hydrologic alteration.

3. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design project features and timing of construction.

4. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.

5. The project's first Project Cooperation Agreement (or similar document) should include language that includes the responsibility of the local-cost sharer to provide operational, monitoring, and maintenance funds for mitigation features.

6. Further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, or other similar documents) should be coordinated with the Service, NMFS, LDWF, Environmental Protection Agency (EPA) and Louisiana Department of Natural Resources (LDNR). The Service shall be provided an opportunity to review and submit recommendations on the all work addressed in those reports.

7. The Corps should avoid impacts to public lands, if feasible. If not feasible the Corps should establish and continue coordination with agencies managing public lands that may be impacted by a project feature until construction of that feature is complete and prior to any subsequent maintenance. Points of contacts for the agencies potentially impacted by project features are: Kenneth Litzenberger, Project Leader for the Service's Southeast National Wildlife Refuges and Jack Bohannan (985) 822-2000, Refuge Manager for the Bayou Sauvage National Wildlife Refuge (NWR), Office of State Parks contact Mr. John Lavin at 1-888-677-1400, National Park Service (NPS), contact Superintendent David Luchsinger, (504) 589-3882 extension 137 (david_luchsinger@nps.gov) or Chief of Resource Management David Muth (504)

589-3882 extension 128, (david_muth@nps.gov) and for the 404(c) area contact the previously mentioned NPS personnel and Ms. Barbara Keeler (214) 665-6698 with the EPA.

8. If applicable, a General Plan should be developed by the Corps, the Service, and the managing natural resource agency in accordance with Section 3(b) of the FWCA for mitigation lands.

9. If mitigation lands are purchased for inclusion within a NWR those lands must meet certain requirements; a summary of some of those requirements is provided in Appendix A. Other land-managing natural resource agencies may have similar requirements that must be met prior to accepting mitigation lands; therefore if they are proposed as a manager of a mitigation site they should be contacted early in the planning phase regarding such requirements.

10. If a proposed project feature is changed significantly or is not implemented within one year of the date of our Endangered Species Act consultation letter, we recommend that the Corps reinitiate coordination with this office to ensure that the proposed project would not adversely affect any federally listed threatened or endangered species or their habitat.

11. In general, larger and more numerous openings in a protection levee better maintain estuarine dependent fishery migration. Therefore, as much opening as practicable, in number, size, and diversity of locations should be incorporated into project levees.

12. Flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable, especially structures located in tidal passes.

13. Flood protection water control structures should remain completely open except during storm events. Management of those structures should be developed in coordination with the Service, NMFS, LDWF, and LDNR.

14. Any flood protection water control structure sited in canals, bayous, or navigation channels that does not maintain the pre-project cross section should be designed and operated with multiple openings within the structure. This should include openings near both sides of the channel as well as an opening in the center of the channel that extends to the bottom.

15. The number and siting of openings in flood protection levees should be optimized to minimize the migratory distance from the opening to enclosed wetland habitats.

16. Flood protection structures within a waterway should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure invert to enhance organism passage. Various ramp designs should be considered.

17. To the maximum extent practicable, structures should be designed and/or selected and installed such that average flow velocities during <u>peak</u> flood or ebb tides do not exceed 2.6 feet

per second. However, this may not necessarily be applicable to tidal passes or other similar major exchange points.

18. To the maximum extent practicable, culverts (round or box) should be designed, selected, and installed such that the invert elevation is equal to the existing water depth. The size of the culverts should be selected that would maintain sufficient flow to prevent siltation.

19. Culverts should be installed in construction access roads unless otherwise recommended by the natural resource agencies. At a minimum, there should be one, 24-inch culvert placed every 500 feet and one at natural stream crossings. If the depth of water crossings allow, larger sized culverts should be used. Culvert spacing should be optimized on a case-by-case basis. A culvert may be necessary if the road is less than 500-feet long and an area would hydrologically isolated without that culvert.

20. Water control structures should be designed to allow rapid opening in the absence of an offsite power source after a storm passes and water levels return to normal.

21. Levee alignments and water control structure alternatives should be selected to avoid the need for fishery organisms to pass through multiple structures (i.e., structures behind structures) to access an area.

22. Operational plans for water control structures should be developed to maximize the cross-sectional area open for as long as possible. Operations to maximize freshwater retention or redirect freshwater flows could be considered if hydraulic modeling demonstrates that is possible and such actions are recommended by the natural resource agencies.

23. The Corps shall fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.

24. Acquisition, habitat development, maintenance and management of mitigation lands should be allocated as first-cost expenses of the project, and the local project-sponsor should be responsible for operational costs. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation, then the Corps should provide the necessary funding to ensure mitigation obligations are met on behalf of the public interest.

25. Any proposed change in mitigation features or plans should be coordinated in advance with the Service, NMFS, LDWF, EPA and LDNR.

26. A report documenting the status of mitigation implementation and maintenance should be prepared every three years by the managing agency and provided to the Corps, the Service, NMFS, EPA, LDNR and LDWF. That report should also describe future management activities, and identify any proposed changes to the existing management plan.

INTRODUCTION

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DESCRIPTION OF THE STUDY AREA

The study area is located within the Mississippi River Deltaic Plain of the Lower Mississippi River Ecosystem. Portions of Jefferson, Orleans, St. Charles, St. Bernard and Plaquemines Parishes are included in the study area. Higher elevations occur on the natural levees of the

Mississippi River and its distributaries. Developed lands are primarily associated with natural levees, but extensive wetlands have been leveed and drained to accommodate residential, commercial, and agricultural development. Federal, State, and local levees have been installed for flood protection purposes, often with negative effects on adjacent wetlands. Navigation channels such as the Gulf Intracoastal Waterway and the Mississippi River – Gulf Outlet are also prominent landscape features, as are extensive oil and gas industry access channels and pipeline canals. Extensive wetlands and associated shallow open waters dominate the landscape outside the flood control levees. Major waterbodies include Lake Pontchartrain located north of the project area, the Mississippi River which bisects the project area, and Lake Borgne which is located on the eastern edge of the project area.

FISH AND WILDLIFE RESOURCES

Description of Habitats

Habitat types in the project area include forested wetlands (i.e., bottomland hardwoods and/or swamps), non-wet bottomland hardwoods, marsh, open water, and developed areas. Due to urban development and a forced-drainage system, the hydrology of most of the forested habitat has been altered. The forced-drainage system has been in operation for many years, and subsidence is evident throughout the areas enclosed by levees.

Wetlands (forested, marsh, and scrub-shrub) within the study area provide plant detritus to adjacent coastal waters and thereby contribute to the production of commercially and recreationally important fishes and shellfishes. Wetlands in the project area also provide valuable water quality functions such as reduction of excessive dissolved nutrient levels, filtering of waterborne contaminants, and removal of suspended sediment. In addition, coastal wetlands buffer storm surges reducing their damaging effect to man-made infrastructure within the coastal area.

Factors that will strongly influence future fish and wildlife resource conditions outside of the protection levees include freshwater input and loss of coastal wetlands. Depending upon the deterioration rate of marshes, the frequency of occasional short-term saltwater events may increase. Under that scenario, tidal action in the project area may increase gradually as the buffering effect of marshes is lost, and use of that area by estuarine-dependent fishes and shellfish tolerant of saltwater conditions would likely increase. Regardless of which of the above factors ultimately has the greatest influence, freshwater wetlands within and adjacent to the project area will probably experience losses due to development, subsidence, and erosion.

The ongoing loss of coastal Louisiana wetlands (approximately 1,149 square miles between 1956 and 2004; average loss rate of 24 square miles per year) was recently exacerbated by Hurricanes Katrina and Rita in 2005. Those hurricanes caused an initial loss of wetlands equivalent to 9 years (approximately 217 square miles) of mean annual losses. Louisiana wetlands provide 26 percent of the seafood landed in the conterminous United States and over 5 million migratory waterfowl utilize those wetlands every year. In addition, those wetlands provide protection to coastal towns, cities and their infrastructure, as well as important infrastructure for the nation's oil and gas industry.

Non-wet bottomland hardwoods within the project area also provide habitat for wildlife resources. Between 1932 and 1984, the acreage of bottomland hardwoods in Louisiana declined by 45 percent (Rudis and Birdsey 1986). By 1970, Jefferson Parish was classified as entirely urban or nonforested in the U.S. Forest Service's forest inventory with most of this loss resulting from development within non-wet areas inside the hurricane protection levees. A large percentage of the original bottomland hardwoods within the Mississippi River floodplain in the Deltaic Plain are located within levees. However, losses of that habitat type are not regulated or mitigated with the exception of impacts resulting from Corps projects as required by Section 906(b) of the Water Resources Development Act of 1986.

As previously mentioned, the Service has provided FWCA Reports for the two-subject protection projects. Those reports contain a through discussion of the significant fish and wildlife resources (including those habitats) that occur within the study area. For brevity, that discussion is incorporated by reference herein but the following brief descriptions are provided to update the previously mentioned information.

Forested Habitats

Forested habitats in the study area are divided into two major types; bottomland hardwood forests and cypress-tupelo swamps. Bottomland hardwood forests found in the project area occur primarily on the natural levees of the Mississippi River or former distributary channels. Dominant vegetation may include sugarberry, water oak, live oak, bitter pecan, black willow, American elm, Drummond red maple, Chinese tallow-tree, boxelder, green ash and elderberry. Most bottomland hardwoods that are located within the constructed hurricane protection projects have been degraded by forced drainage and resultant subsidence. Those areas are also often fragmented by development. Conversely, those bottomland hardwoods located outside the protection levees or in areas where structures through the levees maintain a hydrologic connection, still retain many wetland functions and values.

Cypress-tupelo swamps are located along the flanks of larger distributary ridges as a transition zone between bottomland hardwoods and lower-elevation marsh or scrub-shrub habitats. Cypress-tupelo swamps exist where there is little or no salinity, usually minimal daily tidal action and are usually flooded throughout most of the growing season. Bald cypress-tupelogum are the dominant vegetation within this habitat type, however, Drummond red maple, green ash, and black willow are also common. Cypress swamps that are within the levee system and under forced drainage are often dominated by bald cypress, but vegetative species more typical of bottomland hardwoods will dominate the under- and mid-story vegetation. These sites will often have ecological functions closer to those of a bottomland hardwood. Because of their altered hydrology, these areas can potentially convert to sites dominated by bottomland hardwood species.

Marshes

Marsh types within the project area include fresh, intermediate, brackish, and saline. Fresh marshes occur at the upper ends of interdistributary basins and are often characterized by floating or semi-floating organic soils and minimal daily tidal action. Vegetation may include maidencane, bulltongue, cattail, California bulrush, pennywort, giant cutgrass, American cupscale, spikerushes, bacopa, and alligatorweed. Associated open water habitats may often support extensive beds of floating-leafed and submerged aquatic vegetation including water hyacinth, Salvinia, duckweeds, American lotus, white water lily, water lettuce, coontail, Eurasian milfoil, hydrilla, pondweeds, naiads, fanwort, wild celery, water stargrass, elodea, and others.

Intermediate marshes are a transitional zone between fresh and brackish marshes and are often characterized by organic, semi-floating soils. Typically, intermediate marshes experience low levels of daily tidal action. Salinities are negligible or low throughout much of the year, with salinity peaks occurring during late summer and fall. Vegetation includes saltmeadow cordgrass, deer pea, three-cornered grass, cattail, bulltongue, seashore paspalum, wild millet, fall panicum, and bacopa. Ponds and lakes within the intermediate marsh zone often support extensive submerged aquatic vegetation including southern naiad, Eurasian milfoil, and wigeongrass.

Brackish marshes are characterized by low to moderate daily tidal energy and by soils ranging from firm mineral soils to organic semi-floating soils. Freshwater conditions may prevail for several months during early spring; however, low to moderate salinities occur during much of the year, with peak salinities in the late summer or fall. Vegetation is usually dominated by saltmeadow cordgrass, but also includes saltgrass, three-cornered grass, leafy three-square, and deer pea. Shallow brackish marsh ponds occasionally support abundant beds of wigeongrass.

Saline marshes occur along the fringe of the coastal wetlands. Those marshes usually exhibit fairly firm mineral soils and experience moderate to high daily tidal energy. Vegetation is dominated by saltmarsh cordgrass but may also include saltgrass, saltmeadow cordgrass, black needlerush, and leafy three-square. Submerged aquatic vegetation is rare. Within the study area, intertidal mud flats are most common in saline marshes.

Scrub-Shrub Habitats

Scrub-shrub habitat is often found along the flanks of distributary ridges and in marshes altered by spoil deposition or drainage projects. Typically it is bordered by marsh at lower elevations and by developed areas, cypress-tupelo swamp, or bottomland hardwoods at higher elevations. Typical scrub-shrub vegetation includes elderberry, wax myrtle, buttonbush, black willow, Drummond red maple, Chinese tallow-tree, and groundselbush. Some scrub-shrub habitat is an early successional stage of bottomland hardwood forests.

Open-Water Habitats

Open-water habitat within the project area consists of ponds, lakes, canals, bays, and bayous. Natural marsh ponds and lakes are typically shallow, ranging in depth from 6 inches to over 2 feet. Typically, the smaller ponds are shallow and the larger lakes and bays are deeper. In fresh and low-salinity areas, ponds and lakes may support varying amounts of submerged and/or floating-leaved aquatic vegetation. Brackish and, much less frequently, saline marsh ponds and lakes may support wigeongrass beds.

Canals and larger bayous typically range in depth from 4 or 5 feet, to over 15 feet. Strong tidal flows may occur at times through those waterways, especially where they provide hydrologic connections to other large waterbodies. Such canals and bayous may have mud or clay bottoms that range from soft to firm. Dead-end canals and small bayous are typically shallow and their bottoms may be filled in to varying degrees with semi-fluid organic material. Erosion due to wave action and boat wakes, together with shading from overhanging woody vegetation, tends to retard the amount of intertidal marsh vegetation growing along the edges of those waterways.

Drainage canals enclosed within the hurricane protection project are stagnant except when pumps are operating to remove water. Runoff from developed areas has likely reduced the habitat value of that aquatic habitat by introducing various urban pollutants, such as oil, grease, and excessive nutrients. Clearing and development has eliminated much of the riparian habitat that would normally provide shade and structure for many aquatic species.

Developed Areas

Developed habitats in the study area include residential and commercial areas, as well as roads and existing levees. Those habitats do not support significant wildlife use. Most of the development is located on higher elevations of the Mississippi River natural levees and former distributary channels; however, vast acreages of swamp and marsh have been placed under forced drainage systems and developed. Limited amounts of agricultural lands occur through out the area; agriculture includes sugarcane farming, cattle production, and haying. Some development in wetlands is also occurring as result of permitted fill activities.

Fishery/Aquatic Resources

Drainage canals in the study area do not support significant fishery resources because of dense vegetation, poor water quality, and inadequate depth. Freshwater sport fishes present in the project area, but outside of the levees, include largemouth bass, crappie, bluegill, redear sunfish, warmouth, channel catfish, and blue catfish. Other fishes likely to be present include yellow bullhead, freshwater drum, bowfin, carp, buffalo, and gar. Estuarine-dependent fishes and shellfishes such as Atlantic croaker, red drum, spot, sand seatrout, spotted seatrout, southern flounder, Gulf menhaden, striped mullet, brown shrimp, white shrimp, and blue crab are found in the intermediate to saline marshes.

Some of the waterbodies in the project area meet criteria for primary and secondary contact recreation and partially meets criteria for fish and wildlife propagation, while others do not meet the criteria for fish and wildlife propagation. Causes for not fully meeting fish and wildlife propagation criteria include excessive nutrients, organic enrichment, low dissolved oxygen levels, flow and habitat alteration, pathogens and noxious aquatic plants. Indicated sources of those problems include hydromodification, habitat modification, recreational activities, and unspecified upstream sources. Municipal point sources, urban runoff, storm sewers, and onsite wastewater treatment systems are also known contributors to poor water quality in the area.

Deteriorating water quality in the Barataria Basin, at least partially correlated to wetlands loss and a commensurate reduction in the area's waste assimilation capacity, is a major problem affecting fish and wildlife in that portion of the study area. According to Bahr et al. (1983), factors that currently adversely affect water quality in the Barataria Basin are those generally related to urban development and associated urban pollution, altered land-use patterns, and hydrologic modifications (drainage, etc.) within the watershed. Two major human-related causes of water quality degradation include eutrophication and increased levels of toxic substances.

Essential Fish Habitat

Estuarine wetlands and associated shallow waters within the project area have been identified as Essential Fish Habitat (EFH) for both postlarval, juvenile and sub-adult stages of brown shrimp, white shrimp, and red drum, as well as the adult stages of those species in the nearshore and offshore reaches. EFH has also been designated for various life stages of Spanish mackerel, bluefish, cobia, and mangrove snapper in the nearshore, marine-portion of the project area and in the lower portions of the estuary. EFH requirements vary depending upon species and life stage. Categories of EFH in the project area include estuarine emergent wetlands, estuarine water column, submerged aquatic vegetation, and estuarine water bottoms. Detailed information on Federally managed fisheries and their EFH is provided in the 1998 generic amendment of the Fishery Management Plans for the Gulf of Mexico, prepared by the Gulf of Mexico Fishery Management Council (GMFMC). That generic amendment was prepared in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA); (P.L. 104-297). Estuarine-dependent species such as those listed above also serve as prey for other species managed under the MSFCMA by the GMFMC (e.g., red drum, mackerels, snappers, and groupers) and highly migratory species (e.g., billfishes and sharks) managed by the NMFS. Recommendations to minimize and/or avoid impacts to estuarine fishery species were developed by NMFS along with supporting literature and are included in Appendix B.

Wildlife Resources

Mammals known to occur in the project-area bottomland hardwoods and marshes include mink, raccoon, swamp rabbit, nutria, river otter, and muskrat. Those habitats also support a variety of birds including herons, egrets, ibises, least bittern, rails, gallinules, olivaceous cormorant, white pelican, pied-billed grebe, black-necked stilt, sandpipers, gulls, and terns. Forested and scrub-shrub habitats within the study area also provide habitat for many resident passerine birds and essential resting areas for many migratory songbirds including warblers, orioles, thrushes, vireos, tanagers, grosbeaks, buntings, flycatchers, and cuckoos. Many of these and other passerine birds have undergone a decline in population primarily due to habitat loss.

Given the extent of development and drainage, waterfowl use within the hurricane protection system is likely minimal, except in the adjacent wetlands outside the levees. Swamps, fresh and intermediate marshes usually receive greater waterfowl utilization than brackish and saline marshes because they generally provide more waterfowl food. Migratory species expected to occur in the project area include gadwall, green-winged teal, blue-winged teal, northern shoveler, mallard, pintail, American widgeon, lesser scaup, ring-necked duck, redhead, and canvasback. Resident species expected to occur in that area include mottled duck and wood duck.

The study area also supports resident hawks and owls including the red-shouldered hawk, barn owl, common screech owl, great horned owl, and barred owl. The red-tailed hawk, marsh hawk, and American kestrel are seasonal residents which utilize habitats within the study area.

Amphibians such as the pig frog, bullfrog, leopard frog, cricket frog, and Gulf coast toad are expected to occur in the fresh and low salinity wetlands of the project area. Reptiles such as the American alligator, snapping turtle, softshell turtle, red-eared turtle, and diamond backed terrapin are also expected to occur in the project-area wetlands and waterbodies.

Endangered and Threatened Species

To aid the Corps in complying with their proactive consultation responsibilities under the Endangered Species Act (ESA), the Service provided a list of threatened and endangered species and their critical habitats within the coastal parishes of the New Orleans District in an August 7, 2006, letter to the Corps. The Service recommends that the Corps conduct ESA consultation on each IER as soon as plans are developed and impact locations are identified. If the plans are changed significantly or relocated, or work is not implemented within 1 year following that coordination, we recommend that the Corps reinitiate coordination with this office to ensure that the proposed project would not adversely affect any Federally listed threatened or endangered species or their habitat.

Protected Species

The Migratory Bird Treaty Act (MBTA) (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.) and the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d) offer additional protection to many bird species within the project area including colonial nesting birds and the bald eagle (*Haliaeetus leucocephalus*).

The project area is located where colonial nesting waterbirds may be present. LDWF currently maintains a database of these colonies locations. That database is updated primarily by monitoring the colony sites that were previously surveyed during the 1980s. Until a new, comprehensive coast-wide survey is conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect the proposed work sites for the presence of undocumented nesting colonies during the nesting season (e.g. February through September depending on the species). If colonies exist work should not be conducted within 1,000 feet of the colony during the nesting season

Forested habitat in the project-area may provide nesting habitat for the bald eagle, which has officially been removed from the List of Endangered and Threatened Species as of August 8,

2007. Although the bald eagle has been removed from the threatened and endangered species list, it continues to be protected under the MBTA and the BGEPA. The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations regarding how to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. Those guidelines recommend maintaining: (1) a specified distance between the activity and the nest (buffer area); (2) natural areas (preferably forested) between the activity and nest trees (landscape buffers); and (3) avoiding certain activities during the breeding season. The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. Ideally, buffers would be large enough to protect existing nest trees and provide for alternative or replacement nest trees. On-site personnel should be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. A copy of the NBEM Guidelines is available at:
http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf. If after consulting those guidelines you need further assistance in determining the appropriate size and configuration of buffers or the timing of activities in the vicinity of a bald eagle nest, the please contact this office.

National Wildlife Refuges, Parks, 404(c) area

Located within the study area are the Bayou Segnette and the St. Bernard State Parks, which are operated by the Louisiana Department of Culture, Recreation and Tourism, Office of State Parks. Please contact Mr. John Lavin at 1-888-677-1400 regarding work on those areas.

The Barataria Preserve unit of Jean Lafitte National Historical Park and Preserve (JLNHPP) is located on the west bank of the Mississippi River and managed by the National Park Service (NPS). NPS has no authority to enter into agreements with others to allow uses which adversely affect park lands. Therefore, NPS lands cannot be directly utilized or adversely impacted by any flood control project feature unless authorized explicitly by congress. For additional information concerning NPS lands within the area please contact Superintendent David Luchsinger, (504) 589-3882 extension 137 (david_luchsinger@nps.gov) or Chief of Resource Management David Muth (504) 589-3882 extension 128, (david_muth@nps.gov).

An area adjacent to the Jean Lafitte National Historic Park and Preserve (JLNHPP) was subject to an Environmental Protection Agency (EPA) Final Determination under the Clean Water Act (CWA) Section 404(c) in 1985. According to the EPA Final Determination, the discharge of any dredged or fill material within the approximately 3200 acre site, referred to as the Bayou aux Carpes 404(c) area, is restricted. The EPA action allowed for three specific exceptions, none of which appears to apply to the Corps' current hurricane protection proposal. Previous requests which have fallen outside those exceptions have been denied by EPA as being contrary to the CWA 404(c) determination. One such categorical denial prohibited the Corps from altering the alignment of the West Bank Hurricane Protection Levee such that it would encroach upon the Bayou aux Carpes 404(c) area.

The EPA 404(c) action was intended as an advance notification to the public and agencies of the government's determination under the CWA Section 404 for the area, in the sense of planning aid coordination. In light of this existing determination, we would expect the NEPA work on the portion of the levee forming the 404(c) boundary to thoroughly evaluate the range of feasible alternatives and their environmental impacts, as well as documenting the Corps' legal and regulatory authority for any alternative that would entail impacts to the Bayou aux Carpes 404(c) area.

The Bayou aux Carpes 404(c) is one of only 11 such actions ever completed by EPA. Approximately 2,800 acres within the site are in Federal ownership and Congress is considering legislation to adjust the boundary of the Barataria Preserve to include the Bayou aux Carpes within the JLNHPP. In the meantime, the National Park Service (NPS) has constructive possession of the area. Therefore, the Corps should contact both the NPS (see contacts above) and EPA (Ms. Barbara Keeler, 214/665-6698) regarding any proposed project feature that may impact that area.

The NPS also has constructive possession of additional Federal lands located adjacent to WBV14c. Congress is considering legislation to adjust the boundary of the Barataria Preserve to also include those lands (i.e., CIT tract) within the JLNHPP.

The Service's Bayou Sauvage National Wildlife Refuge is located in the eastern portion of the project area. The National Wildlife Refuge System Improvement Act of 1997 authorized that no new or expanded use of a refuge may be allowed unless it is first determined to be compatible. A compatibility determination is a written determination signed and dated by the Refuge Manager and Regional Refuge Chief, signifying that a proposed or existing use of a national wildlife refuge is a compatible use or is not a compatible use. A compatible use is defined as a proposed or existing wildlife-dependent recreational use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purposes of the national wildlife refuge. A compatibility determination is only required when the Service has jurisdiction over the use. For example, proposed uses that deal exclusively with air space, navigable waters or overly refuges where another Federal agency has primary jurisdiction over the area, would not be subject to compatibility.

Federal agencies proposing a project that includes features on a national wildlife refuge are encouraged to contact the Refuge Manager early in the planning process. The Refuge Manager will work with the project proponent to determine if the proposed project constitutes a "refuge use" subject to a compatibility determination. If the proposed project requires a compatibility determination, a concise description of the project (refuge use) including who, what, where, when, how and why will be needed to prepare the compatibility determination. In order to determine the anticipated impacts of use, the project proponent may be required to provide sufficient data and information sources to document any short-term, long-term, direct, indirect or cumulative impacts on refuge resources. Compatibility determinations will include a public review and comment before issuing a final determination.

All construction or maintenance activities (e.g., surveys, land clearing, etc.) on a National Wildlife Refuge (NWR) will require the Corps to obtain a Special Use Permit from the Refuge Manager; furthermore, all activities on that NWR must be coordinated with the Refuge Manager. Therefore, we recommend that the Corps request issuance of a Special Use Permit well in advance of conducting any work on the refuge. Please contact Kenneth Litzenberger, Project Leader for the Service's Southeast National Wildlife Refuges and Jack Bohannan (985) 822-2000, Refuge Manager for the Bayou Sauvage National Wildlife Refuge for further information on compatibility of flood control features, and for assistance in obtaining a Special Use Permit. Close coordination by both the Corps and its contractor must be maintained with the Refuge Manager to ensure that construction and maintenance activities are carried out in accordance with provisions of any Special Use Permit issued by the NWR.

If mitigation lands are purchased for inclusion within a NWR, those lands must meet certain requirements; a summary of some of those requirements is provided in Appendix A. Other land-managing natural resource agencies may have similar requirements that must be met prior to accepting mitigation lands; therefore if they are proposed as a manager of a mitigation site they should be contacted early in the planning phase regarding such requirements.

Future Fish and Wildlife Resources

The combination of subsidence and sea level rise is called submergence or land sinking. As the land sinks the wetlands become inundated with higher water levels, stressing most non-fresh marsh plants, bottomland hardwood plants and even cypress-tupelo swamps leading to plant death and conversion to open water. Other major causes of wetland losses within the study area include altered hydrology, storms, saltwater intrusion (caused by marine processes invading fresher wetlands), shoreline erosion, herbivory, and development activities including the direct and indirect impacts of dredge and fill (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority 1998). The continued conversion of wetlands and forested habitat to open water or developed land represent the most serious fish and wildlife-related problems in the study area. Those losses could be expected to cause significant declines in coastal fish and shellfish production and in the study area's carrying capacity for numerous migratory waterfowl, wading birds, other migratory birds, alligators, furbearers, and game mammals. Wetland losses will also reduce storm surge protection of developed lands, and will likely contribute to water quality degradation associated with excessive nutrient inputs.

ALTERNATIVES UNDER CONSIDERATION

The proposed plan involves upgrading the existing flood protection levees, floodwalls, and floodgates around the Greater New Orleans area. Most improvements will be constructed partially, sometimes entirely, within the existing right-of-way (ROW). However, some proposed closures, i.e., the Inner Harbor Navigation Canal and the Gulf Intracoastal Waterway, would require new construction ROWs and may impact high quality habitats. Some alternatives that have been examined include expanding ROWs into the lower quality habitat side of a levee, utilizing floodwalls so that minimal expansion of ROWs would occur and incorporating subsoil mixing that would also reduce the expansion of a levee ROW.

PROJECT IMPACTS

The Corps has not yet selected a recommended plan but is continuing to evaluate plans at several levels of protection for each IER. Although some construction will occur in developed areas and on existing levees, project implementation will also directly impact marshes, bottomland hardwoods, swamps, and shrub-scrub areas that provide low to high habitat values for diverse fish and wildlife resources. Project impacts would result primarily from levee rights-of-way (ROW) expansion and construction of levees, borrow pits, floodwalls, navigable floodgates, and associated features.

Development is ongoing within the hurricane protection levees; therefore, the Service has assumed that, for this specific project, project-induced development within enclosed wetlands will be insignificant. However, project impacts to non-wet bottomland hardwoods as a result of flood protection improvements should be mitigated.

To quantify anticipated project impacts to fish and wildlife resources, the Service will use the Wetland Value Assessment (WVA) methodology. The WVA was developed to evaluate restoration projects proposed for funding under Section 303 of the Coastal Wetlands Planning, Protection and Restoration Act. The WVA version utilized in this evaluation was modified by the Louisiana Department of Natural Resources to better determine impacts and mitigation needs in forested wetlands. Further explanation of how impacts/benefits are assessed with WVA and an explanation of the assumptions affecting HSI values for each target year will be available for review at the Fish and Wildlife Service's (Service) Lafayette, Louisiana, field office. For tidally influenced marshes the National Marine Fisheries Service will have copies of those WVAs at their Baton Rouge, Louisiana office.

FISH AND WILDLIFE CONSERVATION MEASURES

The President's Council on Environmental Quality defined the term "mitigation" in the National Environmental Policy Act regulations to include:

(a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments.

The Service supports and adopts this definition of mitigation and considers its specific elements to represent the desirable sequence of steps in the mitigation planning process. Based on current and expected future without-project conditions, the planning goal of the Service is to develop a balanced project, i.e., one that is responsive to demonstrated hurricane protection needs while addressing the co-equal need for fish and wildlife resource conservation.

The Service's Mitigation Policy (Federal Register, Volume 46, No. 15, January 23, 1981) identifies four resource categories that are used to ensure that the level of mitigation recommended by Service biologists will be consistent with the fish and wildlife resource values involved. Considering the high value of forested wetlands and marsh for fish and wildlife and the relative scarcity of that habitat type, those wetlands are usually designated as Resource Category 2 habitats, the mitigation goal for which is no net loss of in-kind habitat value. The degraded (i.e., non-wet) bottomland hardwood forest and any wet pastures that may be impacted, however, are placed in Resource Category 3 due to their reduced value to wildlife, fisheries and lost/degraded wetland functions. The mitigation goal for Resource Category 3 habitats is no net loss of habitat value. Project impacts to wetlands will be minimized to some extent by hauling in material for the levee. Because the project is already, avoiding the project impacts altogether (i.e., the "no action" alternative) is not feasible. Therefore, remaining project impacts should be mitigated via compensatory replacement of the habitat values lost.

Toward that end, the Service recommends that the following planning objectives be adopted to guide future project studies.

1. Conserve important fish and wildlife habitat (i.e., bottomland hardwoods, cypress swamps, fresh and estuarine marsh and associated shallow open water habitats) by minimizing the acreage of those habitats directly affected by flood control features.

2. Minimize enclosure of wetlands with new levee alignments. When enclosing wetlands is unavoidable, acquire non-development easements on those wetlands, or maintain hydrologic connections with adjacent, un-enclosed wetlands to minimize secondary impacts from development and hydrologic alteration.

3. Operate water control structures in levees to allow for (or maintain) fish and shellfish access into enclosed wetland areas.

4. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design of levees, other project features and timing of construction.

5. Fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.

SERVICE POSITION AND RECOMMENDATIONS

Construction of the increased flood protection would result in un-quantified habitat losses. The Service does not object to providing improved hurricane protection to the Greater new Orleans area provided the following fish and wildlife conservation recommendations are incorporated into future project planning and implementation:

1. To the greatest extent possible, situate flood protection features so that destruction of

wetlands and non-wet bottomland hardwoods are avoided or minimized.

2. Minimize enclosure of wetlands with new levee alignments. When enclosing wetlands is unavoidable, acquire non-development easements on those wetlands, or maintain hydrologic connections with adjacent, un-enclosed wetlands to minimize secondary impacts from development and hydrologic alteration.

3. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design project features and timing of construction.

4. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.

5. The project's first Project Cooperation Agreement (or similar document) should include language that includes the responsibility of the local-cost sharer to provide operational, monitoring, and maintenance funds for mitigation features.

6. Further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, or other similar documents) should be coordinated with the Service, NMFS, LDWF, Environmental Protection Agency (EPA) and Louisiana Department of Natural Resources (LDNR). The Service shall be provided an opportunity to review and submit recommendations on the all work addressed in those reports.

7. The Corps should avoid impacts to public lands, if feasible. If not feasible the Corps should establish and continue coordination with agencies managing public lands that may be impacted by a project feature until construction of that feature is complete and prior to any subsequent maintenance. Points of contacts for the agencies potentially impacted by project features are: Kenneth Litzenberger, Project Leader for the Service's Southeast National Wildlife Refuges and Jack Bohannan (985) 822-2000, Refuge Manager for the Bayou Sauvage National Wildlife Refuge (NWR), Office of State Parks contact Mr. John Lavin at 1-888-677-1400, National Park Service (NPS), contact Superintendent David Luchsinger, (504) 589-3882 extension 137 (david_luchsinger@nps.gov) or Chief of Resource Management David Muth (504) 589-3882 extension 128, (david_muth@nps.gov) and for the 404(c) area contact the previously mentioned NPS personnel and Ms. Barbara Keeler (214) 665-6698 with the EPA.

8. If applicable, a General Plan should be developed by the Corps, the Service, and the managing natural resource agency in accordance with Section 3(b) of the FWCA for mitigation lands.

9. If mitigation lands are purchased for inclusion within a NWR those lands must meet certain requirements; a summary of some of those requirements is provided in Appendix A. Other land-managing natural resource agencies may have similar requirements that must be met prior to accepting mitigation lands; therefore if they are proposed as a manager of a mitigation site they should be contacted early in the planning phase regarding such requirements.

10. If a proposed project feature is changed significantly or is not implemented within one year of the date of our Endangered Species Act consultation letter, we recommend that the Corps reinitiate coordination with this office to ensure that the proposed project would not adversely affect any federally listed threatened or endangered species or their habitat.

11. In general, larger and more numerous openings in a protection levee better maintain estuarine dependent fishery migration. Therefore, as much opening as practicable, in number, size, and diversity of locations should be incorporated into project levees.

12. Flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable, especially structures located in tidal passes.

13. Flood protection water control structures should remain completely open except during storm events. Management of those structures should be developed in coordination with the Service, NMFS, LDWF, and LDNR.

14. Any flood protection water control structure sited in canals, bayous, or navigation channels that does not maintain the pre-project cross section should be designed and operated with multiple openings within the structure. This should include openings near both sides of the channel as well as an opening in the center of the channel that extends to the bottom.

15. The number and siting of openings in flood protection levees should be optimized to minimize the migratory distance from the opening to enclosed wetland habitats.

16. Flood protection structures within a waterway should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure invert to enhance organism passage. Various ramp designs should be considered.

17. To the maximum extent practicable, structures should be designed and/or selected and installed such that average flow velocities during peak flood or ebb tides do not exceed 2.6 feet per second. However, this may not necessarily be applicable to tidal passes or other similar major exchange points.

18. To the maximum extent practicable, culverts (round or box) should be designed, selected, and installed such that the invert elevation is equal to the existing water depth. The size of the culverts should be selected that would maintain sufficient flow to prevent siltation.

19. Culverts should be installed in construction access roads unless otherwise recommended by the natural resource agencies. At a minimum, there should be one, 24-inch culvert placed every 500 feet and one at natural stream crossings. If the depth of water crossings allow, larger sized culverts should be used. Culvert spacing should be optimized on a case-by-case basis. A culvert may be necessary if the road is less than 500-feet long and an area would hydrologically isolated without that culvert.

20. Water control structures should be designed to allow rapid opening in the absence of an offsite power source after a storm passes and water levels return to normal.

21. Levee alignments and water control structure alternatives should be selected to avoid the need for fishery organisms to pass through multiple structures (i.e., structures behind structures) to access an area.

22. Operational plans for water control structures should be developed to maximize the cross-sectional area open for as long as possible. Operations to maximize freshwater retention or redirect freshwater flows could be considered if hydraulic modeling demonstrates that is possible and such actions are recommended by the natural resource agencies.

23. The Corps shall fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.

24. Acquisition, habitat development, maintenance and management of mitigation lands should be allocated as first-cost expenses of the project, and the local project-sponsor should be responsible for operational costs. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation, then the Corps should provide the necessary funding to ensure mitigation obligations are met on behalf of the public interest.

25. Any proposed change in mitigation features or plans should be coordinated in advance with the Service, NMFS, LDWF, EPA and LDNR.

26. A report documenting the status of mitigation implementation and maintenance should be prepared every three years by the managing agency and provided to the Corps, the Service, NMFS, EPA, LDNR and LDWF. That report should also describe future management activities, and identify any proposed changes to the existing management plan.

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APPENDIX A

Summary of basic mitigation land requirements before land is transferred to the U.S. Fish and Wildlife Service

SUBJECT: Revised Summary of basic mitigation land requirements before land is transferred over to the Service.

The following represents a summary of basic mitigation land requirements before land is transferred over to the Service. This does not necessarily represent a comprehensive list, but does represent our best effort to identify all land requirements within reason.

1. For inclusion into the National Wildlife Refuge (NWR) system the lands must be located within a refuge's acquisition boundary.

2. The Service must be provided copies of any easements/agreements for right-of-way on the property especially as it pertains to maintenance of such right-of-way, frequency of maintenance and costs associated with that maintenance if the maintenance is to be preformed by the landowner.

3. The area must be surveyed prior to acquisition by the United States or transfer to the Fish and Wildlife Service. The survey will be conducted by the Corps of Engineers (Corps) or an approved contractor. Boundaries must be marked and permanent monuments set at all corners. Copies of the surveyor notes, plats, etc. resulting from such survey must be provided to Service.

4. Language must be placed in the deed dedicating the mitigation land to fish and wildlife conservation in perpetuity.

5. When possible any restrictive covenants or liens shall be removed, especially if they could interfere with mitigation implementation, operation and/or maintenance.

6. Completion of a Level 1 survey for hazardous, toxic, and/or radioactive wastes with a copy being provided to the Service. If the Level 1 survey indicates the need for further investigations/surveys, those investigations/surveys must be completed and a copy provided to the Service. Lands having unremediated hazardous, toxic, and/or radioactive wastes present may not be accepted into a NWR. Remediated sites will be assessed for inclusion on a case-by-case basis. Documentation of the level of remediation is to be provided to the Service.

7. Funding mechanism for operation and maintenance of the mitigation lands and mitigation features (e.g., water control structures, timber stand improvements, etc.).

8. Documentation must be provided to the Service describing the mitigation goals and objectives in addition to a description of necessary operation and maintenance activities needed to accomplish the stated goals and objectives.

9. Mineral rights should be purchased. If it is not possible to purchase, then protection of surface rights via the following language:

> "The vendors reserve for themselves, their successors and assigns, the right to explore, for, operate, produce, remove and transport, oil and gas from the lands herein described. The vendors reserve unto themselves, their successors and assigns, the right of ingress and egress over the said lands in pursuance of the reservations set forth above.
>
> The land is now subject to oil and gas lease in favor of ________________________________, as per lease of record in the records of ____________________, ______________________, pages _____________ of Book _______________, and the conveyance is subject to the rights of the lessee in said lease.
>
> The oil and gas reservations made by the vendors herein in favor of themselves, their successors and assigns, shall be subject to the following stipulations, and any lease made by the vendors, their successors or assigns, subsequent to the date of this deed, shall contain the following stipulations for the protection of the vendee.
>
> The vendors, their successors and assigns, agree that prior to entry upon the land for purposes of exploration, development or production of, oil and/or gas, they shall obtain a Special Use Permit from the U.S. Fish and Wildlife Service, which permit is for the purpose of providing for access and protecting the natural resources of the area for which the land was acquired, and whose terms and conditions will not unreasonably restrain the activities of the vendors, and their successors and assigns.
>
> It is mutually understood between the parties that the intention of the Government in acquiring this area is to create a refuge for, and the protection of, wildlife in the area herein acquired, and the vendors will conform to, and be governed by, and the vendors herein bind themselves, their successors and assigns, agents and employees, to conform to, and be governed by, the rules and regulations pertaining to the protection of wildlife and refuge administration prescribed from time to time by the Secretary of the Interior or his/her authorized agent, the Director of Fish and Wildlife Service, except that such regulations shall not unreasonably restrain the exercise and use by the vendors, their successors and assigns, of the reservation set out in this agreement."

10. The Service would need a title commitment and policy in favor of United States of America that is in the American Land Title Association (ALTA) U.S. Policy 9/28/91 format as provided in Title Standards 2001.

If the title remains with the local-sharer or the Corps a General Plan as provided for under Section 3 of the Fish and Wildlife Coordination Act (48 Stat. 401; 16 U.S.C. 661 et seq.) must be written. However, the Service may chose to not manage lands for which it does not have title.

APPENDIX B

National Marine Fisheries Service Baton Rouge Field Office

Recommendations for Fisheries Friendly Design and Operation of Hurricane and Flood Protection Water Control Structures and Supporting Appendices

SUMMARY

The purpose of this document is to: 1) identify design and operational guiding principles that would optimize passage of estuarine dependent marine fisheries species, or at least, minimize adverse impacts to their passage through hurricane and flood protection water control structures planned for the New Orleans District of the U.S. Army Corps of Engineers; and, 2) provide background literature for environmental justification and documentation. Specific projects for which this guidance should be considered include the Mississippi River and Tributaries, Morganza to the Gulf of Mexico Hurricane Protection Project; Donaldsonville to the Gulf Project; Supplemental Appropriations Projects, and the Louisiana Coastal Protection and Restoration Project (LACPR). However, these guiding principles would also pertain to any civil works projects that could include combinations of levees and/or water control structures. Project delivery teams should remain flexible to adapt these design principles on a case-by-case basis as new fishery resource information and project-specific hydraulics data become available.

In general, the ability of estuarine dependent marine fishery organisms to migrate to and from coastal habitats decreases as structural restrictions increase, thereby reducing fishery production. The physical ability (i.e., swimming speed) to navigate through a structure is not the only factor influencing fish passage. Both behavioral and physical responses govern migration and affect passage of fishery organisms through structures. These responses may vary by species and life stage. In addition, most marine fishery species are relatively planktonic in early life stages and are dependent on tidal movement to access coastal marsh nursery areas. For this reason, in general, the greater the flow through a structure into a hydrologically affected wetland area, the greater the marine fishery production functions provided by that area.

Data on marine fishery species migrations in the Gulf of Mexico are too limited to allow the development of definitive design and operational considerations for water control structures that would guarantee the protection of marine fishery production. Anecdotal comparisons can be made with data from water intake and fish passage studies from the west and east coasts. It should not be assumed that structures that have been determined to provide sufficient drainage capacity also optimize or provide adequate fishery passage. More investigation is warranted to refine and adaptively manage water control structure design and operations to minimize adverse impacts to fishery passage. Case specific recommendations for some features under the Mississippi Tributaries, Morganza to the Gulf of Mexico Hurricane Protection Project and LACPR are provided in the appendices. In addition, biological background information is provided in the appendices to assist in preparation of environmental documents required by the National Environmental Policy Act (NEPA).

Summary of guiding principles for designing and operating flood protection water control structures to maintain marine fishery passage:

- Generally, bigger and more numerous openings in hurricane and flood protection levees better maintain estuarine dependent fishery migration. As much opening as practicable, in number, size, and diversity of location should be considered.
- Flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable, especially structures located in tidal passes.
- Flood protection water control structures should remain completely open except during storm events.
- Any flood protection water control structure sited in canals, bayous, or navigation channels that do not maintain the pre-project cross section should be designed and operated with multiple openings within the structure. This should include openings near both sides of the channel as well as an opening in the center of the channel that extends to the bottom.
- The number and siting of openings in flood protection levees should be optimized to minimize the migratory distance from the opening to enclosed wetland habitats.
- Structures should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure invert to enhance organism passage. Various ramp designs should be considered.
- To the maximum extent practicable, structures should be designed and/or culverts selected such that average flow velocities during <u>peak</u> flood or ebb tides do not exceed 2.6 feet/second. This may not necessarily be applicable to tidal passes or other similar major exchange points.
- To the maximum extent practicable, culverts (round or box) should be designed, selected, and installed such that the invert elevation is equal to the existing water depth. The size of the culverts should be selected that would maintain sufficient flow to prevent siltation.
- Culverts should be installed in construction access roads unless otherwise recommended by the natural resource agencies. At a minimum, there should be one, 24-inch culvert placed every 500 feet and at natural stream crossings. If the depth of water crossings allow, larger sized culverts should be used. Culvert spacing should be optimized on a case-by-case basis. A culvert may be necessary if the road is less than 500-feet long and an area would hydrologically isolated without that culvert.
- Water control structures should be designed to allow rapid opening in the absence of an offsite power source after a storm passes and water levels return to normal.
- Levee alignments and water control structure alternatives should be selected to avoid the need for fishery organisms to pass through multiple structures (i.e., structures behind structures) to access an area.
- Operational plans should be developed to maximize the cross-sectional area open for as long as possible. Operations to maximize freshwater retention or redirect freshwater flows could be considered if hydraulic modeling demonstrates that is possible and such actions are recommended by the natural resource agencies.

INTRODUCTION

Various flood protection and environmental water control structures in hurricane protection levees are being designed and considered for inclusion with ongoing local and federal civil works projects within the boundaries of the New Orleans District. Design purposes of the structures vary and may include maintaining safe navigation and optimizing drainage and passage of fishery organisms. For the Morganza to the Gulf of Mexico hurricane protection project, an interagency Habitat Evaluation Team (HET) and NOAA's National Marine Fisheries Service (NMFS) identified economically important fishery species that should be considered when assessing structure impacts on estuarine fisheries migration. Both the federal and state governments manage some of these species. Primary species that could be affected by flood protection structures in Louisiana include brown shrimp, white shrimp, blue crab, red drum, black drum, spotted seatrout, sand seatrout, southern flounder, and gulf menhaden. Some information is included herein on forage species, the production of which is important to maintain as they serve as important links of the aquatic food web for many of the managed fishery species.

The Baton Rouge office of NMFS has developed preliminary design principles for hurricane and flood protection water control structures to reduce impacts to living marine resources, especially related to migrations of estuarine dependent species. The basis for the following recommended guiding principles is briefly discussed where supporting literature is available. Case specific examples for some features under the Mississippi River and Tributaries, Morganza to the Gulf of Mexico hurricane protection project and the Louisiana Coastal Protection and Restoration Project are provided in the appendices. Basic behavior and physiology effects on the passage of fishery organisms are discussed in detail in appendices C and D, to aid federal agencies in environmental evaluations and descriptions under NEPA.

This document has been developed in consideration of input from the interagency HET, university faculty, fish passage staff of various agencies, and cursory literature reviews. These design considerations are intended to address potential impacts to living marine resources pursuant to the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act. Impacts to resources managed under other authorities, such as the Endangered Species Act or the Marine Mammal Protection Act, are not addressed in this document.

GUIDING PRINCIPLES FOR DESIGNING FISHERIES FRIENDLY FLOOD PROTECTION WATER CONTROL STRUCTURES

1. Generally, bigger and more numerous openings in hurricane and flood protection levees better maintain estuarine dependent fishery migration. As much opening as practicable, in number, size, and diversity of location should be considered.

Most of Louisiana's commercial and recreational fishery species must have access to estuarine marshes to successfully complete some part of their life cycle (i.e., they are estuarine-dependent). Estuarine-dependent fishery productivity is a measure of standing crop (the number of fishery organisms present at a point in time) and the turnover rate (the rate at which the population is replaced). All things being equal, fishery production would be lower following levee and water control construction if structures retard turnover rate. This would be the case even while standing crop may appear normal. Restrictions in tidal movement caused by water control structures and levees would result in degraded or substantially changed species composition, which could alter fishery production and/or displace fisheries.

Marine transient species emigrate (i.e., move from coastal marshes towards Gulf waters) towards higher salinity water; therefore, a structure that maintains the greatest degree of opening while allowing the project objectives to be met would be desirable (Rogers et al. 1992).

2. Flood protection water control structures in any watercourse should maintain pre-project cross section in width and depth to the maximum extent practicable, especially structures located in tidal passes.

Water control structures should be designed to have a water flow capacity (and similar dimensions where possible) comparable to the waterway before construction. Restricted water exchange in marshes enclosed by levees and water control structures diminishes recruitment and standing stocks of species that must migrate from coastal spawning sites to marsh nurseries (Rogers et al. 1994). As the amount of hydrologic control increases, the effect on migration and production of marine transients and residents increases. Greater restriction decreases turn over rate of estuarine-dependent fishery organisms, which decreases their production (Rogers et al. 1992[a]). Slotted and fixed crest weirs have been found to delay immigration. As the degree of restriction increased from slotted weirs, to low elevation weir, and to fixed crest weirs, greater impacts to different fisheries species and their emigration were observed.

Design considerations for hurricane and flood protection water control structures should include features to accommodate vertical and horizontal fishery distribution patterns within interior marsh tidal pathways and coastal passes. Fishery organisms exhibit preferences by species, life stage, and in some cases tide cycle, for vertical and horizontal distribution within smaller or interior marsh tidal connections (Table 1). Behavioral and physiological responses, such as diel vertical migration, affect these preferred distribution patterns.

Study of Keith Lake Pass in Texas revealed that all portions of the water column, both vertically and horizontally, are used by fishery organisms (Hartman et al. 1987). Most estuarine-dependent fishery species preferred the bottom or shore zones during flood tides, but were much denser near the shores of the pass, in slower moving water, on ebb tide. This lateral movement on slack to ebb tides appears to be a behavioral action to prevent displacement from the pass during ebb tide to accelerate movement to marsh nursery areas. The study identified the response to light cycles with midday densities greatest at bottom and densities greatest at surface during dawn to dusk. Similar within pass distribution patterns were reported by Sabins and Truesdale at Grand Isle, Louisiana (1974).

Table 1. Table on fishery preference within the water column (Marotz et al. 1990; Herke and Rogers 1985; Hartman et al. 1987; Sabins and Truesdale 1974). "[a]" denotes juveniles; "[b]" denotes immigrating; "[c]" denotes emigrating; "[e]" denotes ebb tide; "[f]" denotes flood tide.

	Vertical Distribution			Horizontal Distribution
Species	Surface	Mid-depth	Bottom	Shore/Nearshore
brown shrimp[b]	X	X		X[e]
white shrimp[b]	X	X		
white shrimp[c]		X		X[e]
blue crab	X			Xe
red drum[a]				X[e]
red drum[b]		X	X	
red drum[c]			X	
bay anchovy	X			
striped mullet	X			
Atlantic croaker[a]	X	X		X[e]
Atlantic croaker		X	X	X[e]
spotted seatrout		X	X	
sand seatrout		X	X	X[e]
gulf menhaden	X	X		
southern flounder				X[f]
black drum				X[e]

3. Flood protection water control structures should remain completely open except during storm events.

Fish passage should be optimized by the duration that structures remain fully open. Rozas and Minello (1999) reported that even when water-control structures were open, the densities of transient species were low inside areas enclosed by levees and water control structures as compared to natural areas.

Fisheries migration that temporarily may be impacted with storm related closures are listed in Table 2. The degree of impact would be influenced by the timing and duration of a structure closure relative to peak migration.

Table 2. Migration of economically important fisheries in Louisiana that temporarily may be impacted with storm related closures.

Species	Migration Period Overlapping with Hurricane Season
brown shrimp	April - mid July
white shrimp	July – November
blue crab	June – September
spotted seatrout	April – October
sand seatrout	April – October
red drum	August - December
black drum	March – July
southern flounder	September - October

4. Any flood protection water control structures sited in canals, bayous, or navigation channels that do not maintain the pre-project cross section should be designed and operated with multiple openings within the structure. This should include openings near both sides of the channel as well as an opening in the center of the channel that extends to the bottom.

Hartman et al. (1987) recommended structures not be constructed in a tidal pass. If a structure was constructed, they recommended the incorporation of several gates at several vertical and horizontal locations, with baffles near shore. Baffles near shore are to direct shore or near shore fish passage on ebb tides through the available structure opening(s) (e.g., gates in wing walls).

Structures should be designed and operated with multiple openings if the pre-project water depth and widths of a channel are not maintained. Multiple openings are necessary to optimize passage of fishery organisms that prefer to migrate along the sides, bottom, and top of channels. For example, Rogers et al. (1992[a]) recommended opening some vertical slots and top, middle, and bottom gates in a structure with multiple slots and gates.

5. The number and siting of openings in flood protection levees should be optimized to minimize the migratory distance from the opening to enclosed wetland habitats.

The location and number of structures likely affects the abundance and distribution of estuarine fishery species within habitats that would be located on the protected side of levees and water control structures. Rogers et al. (1992[c]) determined that marine transient species were most numerous nearest the structures, partially due to the proximity of the openings with respect to the area enclosed. Similarly, other studies have shown there is a decrease in fishery species abundance and diversity the greater the distance from the access point (Peterson and Turner 1994). This can become more pronounced if an environmental gradient (e.g., salinity) exists between an access point and the interior habitat located on the protected side of structures (Cashner 1994).

6. Structures should include shoreline baffles and/or ramps (e.g., rock rubble, articulated concrete mat) that slope up to the structure invert to enhance organism passage. Various ramp designs should be considered.

Study of Keith Lake Pass in Texas revealed vertical and horizontal distribution patterns of fishery organisms in the pass (Hartman et al. 1987). Estuarine-dependent fishery organisms preferred the bottom or near shore zones on flood tides. Most organisms appeared near shores of the pass on ebb tide in slower moving water. Baffles near shore are to direct shore or near shore fish passage through the structure.

Many fish migrate along the water bottom. Water control structures with crests or inverts higher than the lower portion of a channel could impede migration through the deep-water portions of channels. Ramps can provide a means to guide organisms over and through structures and increase access of fisheries organisms to enclosed habitat (Lafleur 1994). Various ramp designs need to be investigated.

7. To the maximum extent practicable, structures should be designed and/or culverts selected such that average flow velocities during <u>peak</u> flood or ebb tides do not exceed 2.6 feet/second.

In this preliminary investigation, no studies were located that evaluated the impacts of swimming speeds for the fishery species and life stages of concern in Louisiana. To avoid preventing or reducing ingress or egress of fishery organisms, preliminary guidance on water velocities through structures in Louisiana could be based on anecdotal comparisons with data available on general swimming speeds from studies on the west and east coasts (Tables 3 and 4).

Swimming speeds of estuarine and marine fish and crustaceans is a function of shape, stage of development, length, ambient temperature, light, and duration required for swimming performance. For most species, absolute speed increases as size increases. Generally, fish swimming speeds range from 2-4 body lengths/second with burst speeds up to 5 body lengths/second (Meyers et al. 1986).

Water intake studies have shown that maintaining water velocities less than 0.5 ft/sec would protect most fish and their life stages from being adversely affected by those flows (USEPA 2004). The species and life stages of fish for that study could not be located at this time and further investigation for Gulf of Mexico species is warranted. They also recommended creating horizontal velocity fields to avoid adverse affects on fish because fish are better able to orient to horizontal verses vertical flow. This could allow selective avoidance of water flows not preferred by fish or minimize disorientation or mortality rates caused by flows.

Eberhardt (personal communication) reported velocities exceeding 0.82 feet/second began to impede fish passage. Fish passage was decreased by 50% for velocities exceeding 2.6 feet/second. Based on evaluation of freshwater species, Gardner (2006) recommends keeping velocities through round culverts less than 1.8 ft/sec during 90% of the fish migration season. To improve fish passage through culverts, installing baffles within culverts should be considered to reduce flow velocity barriers for fish (Pacific Watershed Associates 1994).

Table 3. Water flow velocity thresholds for affecting fish passage or avoiding impingement within flows or on screens.

Source	Water Flow Velocity (ft/sec)	
Alyson Eberhardt, personal communication	0.82	Begin to impede
	2.62	Decreased fish passage by 50%
Gardner 2006	1.8	Critical velocity (freshwater fish)
Meyers et al. 1986	<0.49	To avoid impingement

USEPA 2004	<0.50	Protected 96% of the fish tested from impingement

Table 4. Sustained fish swimming speeds. Adapted from Meyers et al. (1986). Note that no data was located for the fisheries species and life stages for the Gulf of Mexico.

Fish/life stage	Swimming Speeds (ft/sec)
Atlantic herring	0.19 – 0.3
Mullet	4.19
Horse mackerel	4.46
Sole	0.19 - 0.3
most larvae	0.82 – 0.98

Based on these limited data, larval fish could be adversely impacted by water flow rates exceeding 0.82 feet/second. Post-larval and juvenile stages of flounders could be impacted by flow rates around 1.0 ft/sec. Other species or larger life stages likely would not be adversely impacted until flow rates exceed 2.62 feet/second based on inferences from these data. Water flow velocity monitoring in the Terrebonne Basin by the U.S. Fish and Wildlife Service has found maximum flows through existing open channels exceeding 1.0 feet /second and in larger saline marsh channels and passes exceeding 2.0 feet/second.

If the spatial extent of flow velocity fields exceed the distance that can be traveled with sustained or burst swimming speeds of fishery organisms, those flows could prevent or reduce ingress or egress during the time which those flows exist. However, the degree of mortality from not being able to access nursery and foraging habitat is not known. High flow rates may aid passage of larval fish that primarily depend on passive transport for migratory distribution and access to estuarine habitat on the protected side of levees, if the high flows do not induce mortality from injury or fatigue. Water flow could exceed the fish swimming rates for short periods and still provide passage during low flows or during still water.

8. To the maximum extent practicable, culverts (round or box) should be designed, selected, and installed such that the invert elevation is equal to existing water depth. The size of the culverts should be selected that would maintain sufficient flow to prevent siltation.

Design considerations should include installing baffles within culverts to reduce flow velocity barriers (Pacific Watershed Associates 1994). Passage of salmon and herring species has been shown to be impaired by culverts. With baffles or other similar features, still water areas could be created to enhance fish passage.

If water control structures include plunge pools, the invert elevation of the structure could be equal to the depth of the plunge pool if the plunge pool is deeper than the pre-project water depth. This deeper invert would optimize passage of fisheries species, in particular bottom dweller species.

Fish often require visual cues for orientation and exhibit faster swimming speeds at increased light levels. Herring type fish (e.g., gulf menhaden) are particularly sensitive to light levels. However, although herring exhibited a preference for unshaded portions of treatments during both day and night periods, as little as 1.4% of the ambient light was necessary for their passage through a culvert (Mosser and Terra 1999).

9. Culverts should be installed in construction access roads unless otherwise recommended by the resource agencies. At a minimum, there should be one, 24-inch culvert placed every 500 feet and at all water crossings. If the depth of water crossings allow, larger sized culverts should be used. Culvert spacing should be optimized on a case-by-case basis. A culvert may be necessary, even if the road is less than 500 feet long, if an area would be hydrologically isolated without that culvert.

10. Water control structures should be designed to allow rapid opening in the absence of an offsite power source after storm passage and return of normal water levels.

Regardless of structure size, designs and contingency plans should include means to rapidly open the water control structures when flooding risks subside after a storm. Designs and plans should include infrastructure, equipment, and staff necessary to open the structures even if offsite electricity is not available. Design safeguards should be developed to protect the structures from being damaged rendering them inoperable and locked in a closed configuration after passage of a storm.

11. Levee alignment and water control structure alternatives should be selected to avoid the need for fishery organisms to pass through multiple structures (i.e., structures behind structures) to access an area.

12. Operational plans should be developed to maximize the cross-sectional area open for as long as possible. Operations to maximize freshwater retention or redirect freshwater flows could be considered if hydraulic modeling demonstrates that is possible and such actions are recommended by the natural resource agencies.

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APPENDIX C

BEHAVIOR

The physical ability (i.e., swimming speed) to navigate a structure is not the only factor influencing fish passage, especially for small structures. Behavioral responses to stimuli individually or interactively affect passage with physiological constraints or responses. Behavior generally can be categorized as schooling and non-schooling behavior.

SCHOOLING BEHAVIOR

Schooling behavior consists of strategies that provide hydrodynamic efficiency, reduced predation, increased efficiency in finding food, and increased reproductive success. Water control structures for flood protection impact large numbers of fishery organisms due to this group response. This could be because fish exhibit the tendency to approach and orient to other members of the species (i.e., biotaxis). This orientation confers a hydrodynamic advantage that is more efficient than individuals due primarily to vortices setup by lead fish. Schools function as a living organism where the group reacts to stimuli as an individual. It is this group reaction that influences greater affect on passage through water control structures.

NON-SCHOOLING BEHAVIOR

Agonistic, territorial, and hierarchical behaviors are examples of non-schooling behavior exhibited by fish. Agonistic and territorial behaviors are largely unknown for the listed estuarine and marine fishery species of concern and their life stages. Structures that create physically taxing water flow velocities and some low flow areas may encourage these behaviors as fish compete for resting areas similar to competition seen with fish competing for resting areas within shrimp trawls or behind rocks in river riffle/pool habitat. It is possible these behavioral responses overall may not be that influential on fish passage through a structure, but may come more into play during low flow conditions such as lower tides or slack tide. Hierarchical behavior can often be driven by a combination of physiological responses and will be discussed in that section. Overall, investigation on behavioral responses to water control structures is needed to avoid and minimize adversely impacting fishery passage if not optimizing it.

APPENDIX D

PHYSIOLOGICAL

Fishery species and life stages react differently to a current of water (i.e., rheotaxis). Generally, fish are better able to orient to horizontal verses vertical flow (Meyers et al. 1986).

Locomotion

There are two means for migratory transport of estuarine and marine fish and crustaceans: passive and active transport. Passive transport is drift of organisms carried by the tides and currents. Larval and post-larval fish and crustacean life stages are predominately transported passively by tides and currents. Passive transport via tidal forcing can play a strong role in migration of sub-adult and adult brown shrimp, white shrimp, and blue crabs. Active transport is movement by swimming, which is the primary means of locomotion for sub-adults and adult fish.

SWIMMING SPEED

Refer to guiding principles number 7 for details on swimming speeds relative to impacts on fish passage.

BEHAVIORAL/PHYSIOLOGY INTERACTION

Many fishery organisms exhibit hierarchical behavior. This is a direct response to stimuli, such as astronomical (e.g., tidal rhythm) or meteorological driven flows. For example, brown shrimp mediate transport by circadian or diel vertical migration. Brown shrimp move down in the water column or cease activity as the become negatively buoyant when low salinity and temperature water develop in estuaries with north winds associated with spring fronts. Brown shrimp activity resumes with their movement up in the water column with increasing water temperature, salinity, and hydrostatic pressure associated with the southerly gulf return following after a cold front (Rogers et al. 1993). Similar selective tidal stream transport was reported by Hartman et al. (1987). Fishery organisms identify tide changes by detecting altered velocity, salinity, temperature, all of which can cue staging for immigration with an incoming tide. Future tidal pass or inlet studies are needed for better information on vertical distribution, depth preferences, and changes in buoyancy or behavior to evaluate active and passive transport of fishery organisms.

APPENDIX E

Reference Websites, Fish Passage Agency Representatives, and University Faculty

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http://www.nwp.usace.army.mil/pm/e/en_fish.asp

USACE, ERDC, Coastal Hydraulics Lab
http://chl.erdc.usace.army.mil/CHL.aspx?p=s&a=ResearchAreas;22

USFWS Fish Passage Decision Support System
http://fpdss.fws.gov/index.jsp

NC State's Center for Transportation and the Environment website:
http://www.itre.ncsu.edu/

http://itre.ncsu.edu/CTE/gateway/downloads/Culvert%20Impact%20Study(December2002).pdf

http://itre.ncsu.edu/CTE/gateway/downloads/FishPassage.pdf

FishXing software and learning systems for fish passage through culverts. This software is intended to assist engineers, hydrologists, and fish biologists in the evaluation and design of culverts for fish passage. It is free and available for download.
http://stream.fs.fed.us/fishxing/

- Allows for comparison of multiple culverts designs within a single project.
- Calculates hydraulic conditions within circular, box, pipe-arch, open-bottom arch, and embedded culverts.
- Contains default swimming abilities for numerous North American fish species.
- Contains three different options for defining tailwater elevations.
- Calculates water surface profiles through the culvert using gradually varied flow equations, including hydraulic jumps.

- Outputs tables and graphs summarizing the water velocities, water depths, outlet conditions, and lists the limiting fish passage conditions for each culvert.

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APPENDIX C
LATIN NAMES FOR SOME SPECIES DISCUSSED IN THE REPORT AND/OR FOUND IN THE PROJECT AREA

PLANTS

American sycamore	*Platanus occidentalis*
Black willow	*Salix nigra*
Box elder	*Acer negundo*
Chinese tallow-tree	*Triadica sebifera*
Cypress	*Taxodium distichum*
Eastern cottonwood	*Populus deltoides*
Green ash	*Fraxinus pennsylvanica*
Overcup oak	*Quercus lyrata*
Red maple	*Acer rubrum*
Red mulberry	*Morus rubra*
Roughleaf dogwood	*Cornus drummondii*
Sugarberry	*Celtis laevigata*
Sweet pecan	*Carya illinoinensis*
Water oak	*Quercus nigra*
Willow oak	*Quercus phellos*

FISH

Banded pygmy sunfish	*Elassoma zonatum*
Bigmouth buffalo	*Ictiobus cyprinellus*
Black crappie	*Pomoxis nigromaculatus*
Blue catfish	*Ictalurus furcatus*
Bluegill	*Lepomis macrochirus*
Blue sucker	*Cycleptus elongates*
Brook silverside	*Labidesthes sicculus*
Bullhead minnow	*Pimephales vigilax*
Channel catfish	*Ictalurus punctatus*
Chub shiner	*Notropis potteri*
Common carp	*Cyprinus carpio*
Dollar sunfish	*Lepomis marginatus*
Dusky darter	*Percina sciera*
Emerald shiner	*Notropis atherinoides*
Flathead catfish	*Pylodictis olivaris*
Freshwater drum	*Aplodinotus grunniens*
Ghost shiner	*Notropis buchanani*
Gizzard shad	*Dorosoma cepedianum*
Golden shiner	*Notemigonus crysoleucas*
Golden topminnow	*Fundulus chrysotus*

Goldeye	*Hiodon alosoides*
Grass carp	*Ctenopharyngodon idella*
Green sunfish	*Lepomis cyanellus*
Inland silverside	*Menidia beryllina*
Largemouth bass	*Micropterus salmoides*
Logperch	*Percina caprodes*
Longear	*Lepomis megalotis*
Longnose gar	*Lepisosteus osseus*
Mimic shiner	*Notropis volucellus*
Mississippi silvery minnow	*Hybognathus nuchalis*
Orangespotted sunfish	*Lepomis humilis*
Pallid sturgeon	*Scaphirhynchus albus*
Paddlefish	*Polyodon spathula*
Pugnose minnow	*Opsopoeodus emiliae*
Redear	*Lepomis microlophus*
Red shiner	*Cyprinella lutrensis*
Redspotted sunfish	*Lepomis miniatus*
River carpsucker	*Carpiodes carpio*
River darter	*Percina shumardi*
Shortnose gar	*Lepisosteus platostomus*
Shovelnose sturgeon	*Scaphirhynchus platorynchus*
Silverband shiner	*Notropis shumardi*
Silver chub	*Macrhybopsis storeriana*
Skipjack	*Alosa chrysochloris*
Slough darter	*Etheostoma gracile*
Smallmouth buffalo	*Ictiobus bubalus*
Spotted bass	*Micropterus punctulatus*
Spotted gar	*Lepisosteus oculatus*
Striped bass	*Morone saxatilis*
Threadfin shad	*Dorosoma petenense*
Warmouth	*Lepomis gulosus*
Western mosquitofish	*Gambusia affinis*
White bass	*Morone chrysops*
White crappie	*Pomoxis annularis*
White-striped bass hybrid	*Morone saxatilis x Morone chrysops*
Yellow bass	*Morone mississippiensis*
Yellow bullhead	*Ameiurus natalis*

AMPHIBIANS

American bullfrog	*Rana catesbeiana*
Cope's gray treefrog	*Hyla chrysoscelis*
Dwarf salamander	*Eurycea quadridigitata*
Eastern narrow-mouthed toad	*Gastrophryne carolinensis*

Fowler's toad	*Bufo fowleri*
Green treefrog	*Hyla cinerea*
Northern cricket frog	*Acris crepitans*
Pig frog	*Rana grylio*
Small mouth salamander	*Ambystoma texanum*
Southern leopard frog	*Rana sphenocephala*
Spring peeper	*Pseudacris crucifer*
Western chorus frog	*Pseudacris triseriata*
Gulf coast toad	*Bufo vallicpes*

REPTILES

American Alligator	*Alligator mississipiensis*
Cooter	*Pseudemys floridana*
Copperhead	*Agkistrodon contortrix*
Cottonmouth	*Agkistrodon piscivorus*
Diamondback terapin	*Malaclemys terepin*
Eastern stinkpot turtle	*Sternotherus odoratus*
False map turtle	*Graptemys pseudogeographica*
Five-lined skink	*Eumeces fasciatus*
Racer	*Coluber constrictor*
Red eared turtle	*Pseudemys scripta*
Ring-necked snake	*Diadophis punctatus*
Smooth softshell turtle	*Trionyx muticus*
Snapping turtle	*Chelydra serpentina*
Watersnake	*Nerodia fasciata*

BIRDS

American wigeon	*Anas americana*
Anhinga	*Anhinga anhinga*
Bald eagle	*Haliaeetus leucocephalus*
Barred owl	*Strix varia*
Belted kingfisher	*Ceryle alcyon*
Black-necked stilt	*Himantopus mexicanus*
Blue-winged teal	*Anas discors*
Carolina chickadee	*Poecile carolinensis*
Double-crested cormorant	*Phalacrocorax auritus*
Eastern meadowlark	*Sturnella magna*
Gadwall	*Anas strepera*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Greater white-fronted goose	*Anser albifrons*

Green heron	*Butorides virescens*
Green-winged teal	*Anas crecca*
Interior least tern	*Sterna antillarum athalassos*
Mallard	*Anas platyrhynchos*
Mourning dove	*Zenaida macroura*
Northern cardinal	*Cardinalis cardinalis*
Northern pintail	*Anas acuta*
Osprey	*Pandion haliaetus*
Pied-billed grebe	*Podilymbus podiceps*
Red-bellied woodpecker	*Melanerpes carolinus*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Red-shouldered hawk	*Buteo lineatus*
Red-winged blackbird	*Agelaius phoeniceus*
Snow goose	*Chen caerulescens*
Solitary sandpiper	*Tringa solitaria*
Spotted sandpiper	*Actitis macularia*
White-eyed vireo	*Vireo griseus*
Wood duck	*Aix sponsa*

MAMMALS

Bobcat	*Lynx rufus*
Cotton mouse	*Peromyscus gossypinus*
Coyote	*Canis latrans*
Eastern cottontail rabbit	*Sylvilagus floridanus*
Fox	*Vulpes vulpes*
	Urocyon cinereoargenteus
Fox squirrel	*Sciurus niger*
Hispid cotton rat	*Sigmodon hispidus*
Mink	*Mustela vison*
Nutira	*Myocaster coypus*
Muskrat	*Ondatra zibethicus*
Northern raccoon	*Procyon lotor*
Swamp rabbit	*Sylvaligus aquaticus*
Virginia opossum	*Didelphis virginiana*
White-tailed deer	*Odocoileus virginianus*

CED DRAFT COORDINATION ACT REPORT

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

MAR 27 2012

REPLY TO
ATTENTION OF

Regional Planning and
Environmental Division, South
Environmental Planning Branch

Mr. Jeffrey Weller
Field Supervisor
U.S. Fish and Wildlife Service (USFWS)
646 Cajundome Blvd - Suite 400
Lafayette, LA 70506

Dear Mr. Weller:

The enclosed information is provided to complete coordination and compliance requirements under the Fish and Wildlife Coordination Act and the Endangered Species Act for the first phase of the Comprehensive Environmental Document (CED) for the Greater New Orleans Hurricane Storm Damage and Risk Reduction System (HSDRRS) project. The US Army Corps of Engineers, New Orleans District (CEMVN) in accordance with Federal Register Vol. 72, No. 48, Tuesday, March 13, 2007, is preparing a CED to meet the provisions of the Alternative Arrangements to the National Environmental Policy Act (NEPA) that were adopted for the Orleans Hurricane and Storm Damage Reduction System following the Hurricane Season of 2005.

When the Alternative Arrangements for the HSDRRS project was first proposed the preparation of only one CED document was anticipated. However, as construction activities have progressed and construction completion dates and dates for related monitoring activities have moved beyond June 2011, the decision was made to release the CED as a phased or supplemented document. To date some of the data gaps identified in the Individual Environmental Reports (IERs) have not been fully closed. Items that have not been fully addressed or completed include; the wetlands and non wet Bottomland Hardwood Forest Mitigation final Plans and IERs, the comprehensive armoring plan, development of final Operations, Maintenance, Repair, Replacement and Rehabilitation plans and the completion of various long term monitoring efforts related to the Bayou aux Carpes Clean Water Act 404c site (IER 12) and monitoring associated with the protection at the Inner Harbor Navigation Canal (IER 11 Tier 2 Pontchartrain).

The Individual Environmental Reports (IERs) that will be addressed in the first Phase of the CED document and included in the cumulative impact analysis are listed in the enclosed Table 1. The IERs that have been completed or are in development but did not meet the cutoff date for the phase I CED and the cumulative impacts discussion are listed in Table 2.

The purpose of the CED is to address cumulative HSDDRS impacts and cumulative regional impacts as well as fill data gaps. Flood damage risk reduction construction activities associated with the HSDRRS and the alternative arrangements have been underway since 2007 and are anticipated to continue into August 2014. HSDRRS mitigation construction activities are currently scheduled to be conducted between 2014 and 2017. Although construction activities will continue beyond 2014, delaying the preparation and release of the first phase of the CED until all the flood damage risk reduction construction activities are completed would unnecessarily delay the release of information to the public.

Throughout the HSDRRS planning process and preparation of the alternative arrangement IER NEPA documents, the USACE obtained concurrence, permits and authorizations necessary to be in compliance with environmental laws prior to the initiation of construction activities. Both compliance with the FWCA and the ESA was achieved prior to the release of draft IERs for public review. In addition, throughout the construction phase of the HSDRRS flood damage risk reduction features, if construction activities were not implemented within one year of ESA coordination or if proposed plans were changed significantly, ESA coordination was reinitiated. A listing of the Coordination Act Reports prepared for the IERs addressed in the Phase I CED can be found in Table 3 along with the initial ESA coordination compliance dates.

Based on previous endangered species coordination which was conducted for all the actions evaluated in the first phase of the CED, the continued ESA coordination that has occurred throughout the alternative arrangement process, the implementation of mitigation measures or best management practices for those construction activities that have been completed or are underway, and the fact that no takes have been documented associated with construction activities, we determined that the HSDRRS flood damage risk reduction construction activities listed in Table 1, have not adversely affected any threatened or endangered species, or their critical habitat.

Please review the enclosed information and inform us whether or not you agree with our determination. We request a response by May 26, 2012, for the activities listed in Table 1. If you have any questions about this request or require any additional information, please contact Beth Nord at (504) 862-2167 or via email at beth.p.nord@usace.army.mil.

Sincerely,

Joan M Exnicios

Joan M. Exnicios
Chief, Environmental Planning
Branch

Enclosure

Comprehensive Environmental Document (CED) Phase I Coordination for Fish and Wildlife Coordination Act (FWCA) and Endangered Species Act (ESA)

Purpose and Need for the Proposed Action

On 29 August 2005, Hurricane Katrina caused major damage to the Federal and non-Federal control and Hurricane and Storm Damage Risk Reduction System (HSDRRS) located in Southeast Louisiana. Hurricane Rita followed this storm on 24 September 2005, and make landfall on the Louisiana-Texas state border, causing damage to the HSDRRS in southern Louisiana. Since the storms, the United States Army Corps of Engineers (USACE) has been working with state and local officials to restore the Federal and non-Federal flood control and HSDRRS projects and related works in the affected area.

The New Orleans District (CEMVN) coordinated with the Council on Environmental Quality (CEQ) and a team comprised of personnel from Federal and State natural resource agencies to develop Alternative Arrangements for compliance with the National Environmental Policy Act of 1969 (NEPA) and the CEQ regulations for implementing NEPA(40 CFR § 1500-1508). The Alternative Arrangements were initiated by CEMVN on March 13, 2007. The Alternative Arrangement Process was utilized in order to expeditiously complete environmental analysis for changes to the authorized system and the 100-year level of the HSDRRS, formerly known as the Hurricane Protection System. A component of the Alternative Arrangements includes the preparation of a CED to address data gaps and cumulative HSDRRS and regional cumulative impacts. This first phase of the CED is being prepared to meet commitments outlined in the Alternative Arrangements dated February 23, 2007, and the Federal Register Notice Vol. 72, No. 48, dated March 13, 2007. It should be noted that at the time the Alternative Arrangements were developed it was envisioned that only one CED document would be prepared. However, as construction activities have progressed and construction completion dates and dates for related monitoring activities have moved beyond June 2011, the decision was made release the CED as a phased or supplemented document.

Description of Action

The proposed actions for all the IERs included in the phase I CED can be found in the Coordination Act Reports (CARs) previously prepared for the IERs or the supplemental IERs that have been prepared. Reference table 1 for the list of IERs that are included in the first phase of the CED and the cumulative impacts discussion. Reference table 2 for a list of IERs that are not included in the first phase of the CED. Reference table 3 for a list of the CAR and ESA dates of the IERs that are being analyzed in the Phase I CED document.

Table 1. HSDRRS IERs Analyzed in the CED
(Decision Records Signed by November 15, 2010)

Alternative NEPA Arrangements Document	Basin	Sub-Basin	Parish	Descriptor Title	Type of HSDRRS Action	Date of Signed Decision Record
IER #1	LPV	St. Charles	St. Charles	La Branche Wetlands Levee	Risk Reduction	June 9, 2008
IER Supplemental #1	LPV	St. Charles	St. Charles	La Branche Wetlands Levee Supplemental	Risk Reduction	June 29, 2009
IER #2	LPV	Jefferson East Bank	St. Charles, Jefferson	West Return Floodwall	Risk Reduction	July 18, 2008
IER Supplemental #2	LPV	Jefferson East Bank	St. Charles, Jefferson	West Return Floodwall Supplemental	Risk Reduction	October 29, 2009
IER #3	LPV	Jefferson East Bank	Jefferson	Lakefront Levee	Risk Reduction	July 25, 2008
IER Supplemental #3.a	LPV	Jefferson East Bank	Jefferson	Lakefront Levee Supplemental	Risk Reduction	December 18, 2009
IER #4	LPV	Orleans East Bank	Orleans	New Orleans Lakefront Levee, West of Inner Harbor Navigational Canal	Risk Reduction	March 19, 2009
IER #5	LPV	Orleans East Bank	Orleans	Outfall Canal Closure Structures, 17th Street Canal, Orleans Avenue Canal and London Avenue Canal	Risk Reduction	June 30, 2009
IER #6	LPV	New Orleans East	Orleans	Citrus Lakefront Levee	Risk Reduction	June 25, 2009
IER Supplemental #6	LPV	New Orleans East	Orleans	Citrus Lakefront Levee Supplemental	Risk Reduction	February 8, 2010
IER #7	LPV	New Orleans East	Orleans	New Orleans East Lakefront to Michoud Canal	Risk Reduction	June 19, 2009
IER Supplemental #7	LPV	New Orleans East	Orleans	New Orleans East Lakefront to Michoud Canal Supplemental	Risk Reduction	May 3, 2010
IER #8	LPV	Chalmette Loop	St. Bernard	Bayou Dupre Control Structure	Risk Reduction	June 23, 2009
IER #9	LPV	Chalmette Loop	St. Bernard	Caernarvon Floodwall	Risk Reduction	February 8, 2010
IER #10	LPV	Chalmette Loop	St. Bernard	Chalmette Loop Levee	Risk Reduction	May 26, 2009
IER #11 Tier 1 Pontchartrain and Borgne	LPV	New Orleans East	Orleans	Improved Protection on the Inner Harbor Navigation Canal	Risk Reduction (Programmatic)	March 14, 2008
IER #11 Tier 2 Pontchartrain	LPV	New Orleans East	Orleans	IHNC, Pontchartrain	Risk Reduction	April 1, 2010
IER #11 Tier 2 Borgne	LPV	New Orleans East	Orleans	IHNC, Borgne	Risk Reduction	October 21, 2008
IER Supplemental #11 Tier 2 Borgne	LPV	New Orleans East	Orleans	IHNC, Borgne Supplemental	Risk Reduction	December 10, 2009
IER #12	WBV	Gretna-Algiers	Jefferson, Orleans, Plaquemines	GIWW, Harvey and Algiers Canal Levee and Floodwalls	Risk Reduction	February 18, 2009
IER #13	WBV	Belle Chasse	Plaquemines	Hero Canal Levee and Eastern Terminus	Risk Reduction	December 4, 2009
IER #14	WBV	Harvey-Westwego	Jefferson	Westwego to Harvey Levee	Risk Reduction	August 26, 2008
IER Supplemental #14.a	WBV	Harvey-Westwego	Jefferson	Westwego to Harvey Levee Supplemental	Risk Reduction	February 9, 2010
IER #15	WBV	Lake Cataouatche	Jefferson	Lake Cataouatche Levee	Risk Reduction	June 12, 2008
IER #16	WBV	Lake Cataouatche	Jefferson	Western Terminus Levee	Risk Reduction	June 12, 2009
IER Supplemental #16.a	WBV	Lake Cataouatche	Jefferson	Western Terminus Levee Supplemental	Risk Reduction	August 24, 2010
IER #17	WBV	Lake Cataouatche	Jefferson	Company Canal Floodwall	Risk Reduction	January 21, 2009

Table 1. HSDRRS IERs Analyzed in the CED

(Decision Records Signed by November 15, 2010)

Alternative NEPA Arrangments Document	Basin	Sub-Basin	Parish	Descriptor Title	Type of HSDRRS Action	Date of Signed Decision Record
IER #18	N/A	New Orleans East, Chalmette Loop, Belle Chasse, Lake Cataouatche	Plaquemines, St. Bernard , St. Charles	Government Furnished Borrow #1	Borrow	February 21, 2008
IER #19	N/A	New Orleans East, Chalmette Loop, Lake Cataouatche	Iberville, Plaquemines, Hancock County	Contractor Furnished Borrow #1	Borrow	February 14, 2008
IER #22	N/A	Belle Chasse, Lake Cataouatche	Plaquemines	Government Furnished Borrow #2	Borrow	May 30, 2008
IER #23	N/A	N/A	Plaquemines, St. Bernard, St. Charles, Hancock County	Contractor Furnished Borrow #2	Borrow	May 6, 2008
IER #25	N/A	New Orleans East, Lake Cataouatche	Plaquemines	Government Furnished Borrow #3	Borrow	February 3, 2009
IER #26	N/A	Lake Cataouatche	Plaquemines, St. John the Baptist, Hancock County	Pre-Approved Contractor Furnished Borrow #3	Borrow	October 20, 2008
IER #27	LPV	Jefferson East Bank, Orleans East Bank	Orleans, Jefferson	Outfall Canal Remediation on the 17th Street, Orleans Avenue, and London Avenue Canals	Risk Reduction	October 11, 2010
IER #28	N/A	Chalmette Loop, Lake Cataouatche	Plaquemines	Government Furnished Borrow #4	Borrow	July 31, 2009
IER #29	N/A	New Orleans East	St. John the Baptist, St. Tammany	Contractor Furnished Borrow #4	Borrow	September 8, 2009
IER #30	N/A	Chalmette Loop	St. James, Hancock County	Contractor Furnished Borrow #5	Borrow	September 28, 2009
IER #31	N/A	Chalmette Loop, Lake Cataouatche	East Baton Rouge, Lafourche, Plaquemines, St. Bernard, St. Tammany, Hancock County	Contractor Furnished Borrow #7	Borrow	October 29, 2010
IER #32	N/A	N/A	Ascension, Plaquemines, St. Charles	Contractor Furnished Borrow #6	Borrow	January 22, 2010

Table 2. HSDRRS IERs NOT Included or Analyzed in the CED
(Decision Record Signed after November 15, 2010 or IER Anticipated as of September 2011)

Alternative NEPA Arrangments Document	Basin	Sub-Basin	Parish	Descriptor Title	Type of HSDRRS Action	Date of Signed Decision Record
IER Supplemental #1b	LPV	St. Charles	St. Charles	La Branche Wetlands Levee Supplemental	Risk Reduction	July 6, 2011
IER Supplemental #2.b	LPV	Jefferson East Bank	St. Charles, Jefferson	West Return Floodwall Supplemental	Risk Reduction	
IER Supplemental #5	LPV	Orleans East Bank	Orleans	Outfall Canal Closure Structures, 17th Street Canal, Orleans Avenue Canal and London Avenue Canal Supplemental	Risk Reduction	
IER Supplemental #10	LPV	Chalmette Loop	St. Bernard	Chalmette Loop Levee Supplemental	Risk Reduction	
IER Supplemental #11.b Tier 2	LPV	New Orleans East	Orleans	IHNC, Borgne Supplemental	Risk Reduction	November 29, 2010
IER Supplemental #11.c Tier 2	LPV	New Orleans East	Orleans	IHNC, Borgne Supplemental	Risk Reduction	March 22, 2011
IER Supplemental #11.d Tier 2 Pontchartrain	LPV	New Orleans East	Orleans	IHNC, Pontchartrain Supplemental	Risk Reduction	
IER Supplemental #12	WBV	Gretna-Algiers	Jefferson, Orleans, Plaquemines	GIWW, Harvey and Algiers Canal Levee and Floodwalls Supplemental	Risk Reduction	November 20, 2010
IER Supplemental #12.a	WBV	Gretna-Algiers	Jefferson, Orleans, Plaquemines	GIWW, Harvey and Algiers Canal Levee and Floodwalls Supplemental	Risk Reduction	February 23, 2011
IER Supplemental #12 / 13	WBV	Belle Chasse	Plaquemines	12/13 Waterline WBV	Risk Reduction	February 4, 2011
IER Supplemental #13a	WBV	Belle Chasse	Plaquemines	Hero Canal Levee and Eastern Terminus Supplementa	Risk Reduction	April 21, 2011
IER Supplemental #15.a	WBV	Lake Cataouatche	Jefferson	Lake Cataouatche Levee Supplemental	Risk Reduction	September 7, 2011
IER Supplemental #15.b	WBV	Lake Cataouatche	Jefferson	Lake Cataouatche Levee Supplemental	Risk Reduction	
IER Supplemental #16.b	WBV	Lake Cataouatche	Jefferson	Western Terminus Levee Supplemental	Risk Reduction	
IER Supplemental #25.a	N/A	New Orleans East	Orleans	Government Furnished Borrow #3: Stumpf Stockpile Clearance Supplemental	Borrow	
IER Supplemental #27.a	LPV	Jefferson East Bank, Orleans East Bank	Orleans, Jefferson	Outfall Canal Remediation on the 17th Street, Orleans Avenue, and London Avenue Canals Supplemental	Risk Reduction	April 15, 2011
IER #33	WBV	Belle Chasse	Orleans, Plaquemines	Co-located MRL Levee	Risk Reduction	December 31, 2010
IER Supplemental #33.a	WBV	Belle Chasse	Orleans, Plaquemines	Co-located MRL Levee Supplemental	Risk Reduction	
IER #35	N/A			Contractor Furnished Borrow #8	Borrow	
IER #36	LPV/WBV	N/A	N/A	HSDRRS Mitigation	Mitigation	
IER #37	LPV/WBV	N/A	N/A	HSDRRS Mitigation	Mitigation	

Table 3. IER CAR dates and ESA coordination

INDIVIDUAL ENVIRONMENTAL REPORTS						
NEPA Document	Basin	Parish	Title	DR Signed	USFWS ESA Date	CAR Date
IER #1	LPV	St. Charles	La Branche Wetlands Levee	6/9/2008	4/8/2008	1/4/2008
IERS #1.a	LPV	St. Charles	La Branche Wetlands Levee	6/29/2009	4/3/2009	7/22/2008
IER #2	LPV	Jefferson	West Return Floodwall	7/18/2008	5/5/2008	7/15/2008
IERS #2.a	LPV	Jefferson	West Return Floodwall	10/29/2009	8/20/2009	9/9/2009
IER #3	LPV	Jefferson	Jefferson Parish Lakefront Levees	7/25/2008	2/22/2008	7/21/2008
IERS #3.a	LPV	Jefferson	Jefferson Parish Lakefront Levees	12/18/2009	8/20/2009	10/9/2009
IER #4	LPV	Orleans	Orleans Lakefront	3/19/ 2009	1/20/2009	12/17/2009
IER #5	LPV	Orleans	Permanent Pump Stations	6/30/2009	12/6/2007	6/6/2009
IER #6	LPV	Orleans	New Orleans East Lakefront	6/25/2009	1/30/2007	5/29/2009
IERS #6	LPV	Orleans	New Orleans East Lakefront	2/8/2010	11/16/2009	10/9/2009
IER #7	LPV	Orleans	New Orleans East Lakefront to Michoud Canal	6/19/2009	12/6/2007 1/30/2007	6/15/2009
IERS #7	LPV	Orleans	New Orleans East Lakefront to Michoud Canal	5/3/ 2010	1/22/2010	6/15/2009
IER #8	LPV	Orleans	Bayou Dupree Structure	6/23/2009	5/28/2009	5/28/2009
IER #9	LPV		Caernarvon Closure	2/8/2010	12/22/2009	1/25/2010
IER #10	LPV	St. Bernard	St. Bernard Parish Levee	5/26/2009	5/15/2009	5/19/2009
IER #11-Tier 1	LPV	Orleans	IHNC Surge Barrier, Borgne	3/14/2008	3/26/2008	3/29/2010 final CAR w/Tier-2 Ponchartrain

Table 3. IER CAR dates and ESA coordination Continued

INDIVIDUAL ENVIRONMENTAL REPORTS						
NEPA Document	**Basin**	**Parish**	**Title**	**DR Signed**	**USFWS ESA Date**	**CAR Date**
IER #11-Tier 2	LPV	Orleans	IHNC Surge Barrier, Borgne	10/21/2008	6/27/2008	10/9/2008
IERS #11.a-Tier 2	LPV	Orleans	IHNC Surge Barrier, Borgne	12/10/2009	6/27/2008	9/18/2009
IERS #11-Tier 2	LPV	Orleans	IHNC, Pontchartrain	4/1/2010	2/2/2009 8/31/2009	3/29/2010
IER #12	WBV	Plaquemines	GIWW WCC	2/18/2009	6/25/2008	2/18/2009
			EPA Modification Bayou aux Carpes 404	5/28/2009		
IER #13	WBV	Plaquemines	Eastern Tie-In	12/4/2009	3/10/2009	11/24/2009
IER #13	WBV	Plaquemines	Eastern Tie-In – Addendum	12/4/2009		3/20/2009
IER #14	WBV	Jefferson	Harvey to Westwego	8/26/2008	7/31/2008	8/18/2008
IERS #14.a	WBV	Jefferson	Harvey to Westwego	2/9/2010	9/2/2009	1/13/2010
IER #15	WBV	Jefferson	Lake Cataouatche	6/12/2008	5/22/2008	7/28/2008
IER #16	WBV	St. Charles	Western Terminus	6/12/2009	11/28/2007	6/8/2009
IERS #16.a	WBV	St. Charles	Western Terminus	8/24/2010	5/7/2010	8/11/2010
IER #17	WBV	Jefferson	Company Canal	1/21/2009	11/21/2008	12/22/2008
IER #18			Government Furnished Borrow #1	2/21/2008		
			1418/1420 Bayou Road	2/21/2008	3/15/2007	11/15/2010
			1572 Bayou Road	2/21/2008	3/15/2007	11/15/2010
			910 Bayou Road	2/21/2008	3/7/2007	11/15/2010
			4001 Florissant	2/21/2008	3/7/2007	11/15/2010
			Dockville	2/21/2008	3/15/2007	11/15/2010

Table 3. IER CAR dates and ESA coordination Continued

INDIVIDUAL ENVIRONMENTAL REPORTS						
NEPA Document	Basin	Parish	Title	DR Signed	USFWS ESA Date	CAR Date
			Triumph	2/21/2008	8/20/2007	11/15/2010
			Belle Chase	2/21/2008	4/17/2007	11/15/2010
			Maynard	2/21/2008	5/29/2007	11/15/2010
			Cummings North	2/21/2008	4/5/2007	11/15/2010
			Churchill Farms Pit A	2/21/2008	4/17/2007	11/15/2010
			Westbank Site G	2/21/2008	5/24/2007	11/15/2010
			Bonnet Carre North	2/21/2008	5/29/2007	11/15/2010
IER #19			Contractor Furnished Borrow #1	2/14/2008		
			River Birch Phase I	2/14/2008	6/28/2004	11/15/2010
			River Birch Phase II	2/14/2008	2/7/2007	11/15/2010
			Pearlington Dirt Phase I	2/14/2008	9/15/2006	11/15/2010
			Eastover	2/14/2008	3/20/2007	11/15/2010
			Kimble #2	2/14/2008	8/20/2007	11/15/2010
			Sylvia Guillot	2/14/2008	1/29/2007	11/15/2010
			Gatien-Navy Camp Hope	2/14/2008	8/20/2007	11/15/2010
			DK Aggregates	2/14/2008	12/21/2006	11/15/2010
			St. Gabriel Redevelopment	2/14/2008	3/8/2007	11/15/2010
IER #22			Government Furnished Borrow #2	5/30/2008		
			Brad Buras	5/30/2008	6/28/2007	11/15/2010

Table 3. IER CAR dates and ESA coordination Continued

NEPA Document	Basin	Parish	Title	DR Signed	USFWS ESA Date	CAR Date
INDIVIDUAL ENVIRONMENTAL REPORTS						
			Tabony	5/30/2008	9/14/2007	11/15/2010
			Westbank F	5/30/2008	9/19/2009	11/15/2010
			Westbank I	5/30/2008	9/28/2007	11/15/2010
			Westbank N	5/30/2008	9/19/2007	11/15/2010
IER #23			Contractor Furnished Borrow #2	5/6/2008		
			1025 Florissant	5/6/2008	8/9/2007	11/15/2010
			Acosta	5/6/2008	7/2/2007	11/15/2010
			3C Riverside	5/6/2008	7/27/2007	11/15/2010
			Myrtle Grove	5/6/2008	1/29/2007	11/15/2010
			Pearlington Dirt Phase 2	5/6/2008	1/14/2008	11/15/2010
IER #25			Government Furnished Borrow #3	2/3/2009		
			Stumpf Phase 1	2/3/2009	4/10/2008	11/15/2010
			Stumpf Phase 2	2/3/2009	5/21/2008	11/15/2010
			Westbank D	2/3/2009	4/25/2008	11/15/2010
			Westbank E Phase 1 & 2	2/3/2009	4/25/2008	11/15/2010
			Tac Carrere	2/3/2009	4/10/2008	11/15/2010
IER #26			Pre-Approved Contractor Furnished Borrow #3	10/20/2008		
			South Kenner Road	10/20/2008	1/22/2008	11/15/2010
			Willswood	10/20/2008	7/2/2007	11/15/2010

Table 3. IER CAR dates and ESA coordination Continued

NEPA Document	Basin	Parish	Title	DR Signed	USFWS ESA Date	CAR Date
			INDIVIDUAL ENVIRONMENTAL REPORTS			
			Meyer	10/20/2008	6/19/2007	11/15/2010
			Willow Bend	10/20/2008	1/25/2008	11/15/2010
			Frierson	10/20/2008	2/26/2008	11/15/2010
IER #28			Government Furnished Borrow #4	7/31/2009		
			Johnson/Crovetto	7/31/2009	6/3/2008	7/27/2009
			Bazile	7/31/2009	3/2/2009	7/27/2009
			Westbank F Access Routes	7/31/2009	3/3/2009	7/27/2009
IER #29			Contractor Furnished Borrow #4	9/8/2009		
			Eastover Phase II	9/8/2009	1/29/2008	9/3/2009
			Tammy Holding	9/8/2009	6/25/2008	9/3/2009
			Willow Bend Phase II	9/8/2009	1/25/2008	9/3/2009
IER #30			Contractor Furnished Borrow #5	9/28/2009		
			Big Shake	9/28/2009	7/17/2008 7/22/2008	9/23/2009
			Henley	9/28/2009	7/22/2008	9/23/2009
			Contreras Dirt Z	9/28/2009	6/12/2008	9/23/2009
			Contreras Cell E	9/28/2009	6/12/2008	9/23/2009
			Contreras Cell F	9/28/2009	6/12/2008	9/23/2009

Table 3. IER CAR dates and ESA coordination Continued

INDIVIDUAL ENVIRONMENTAL REPORTS						
NEPA Document	Basin	Parish	Title	DR Signed	USFWS ESA Date	CAR Date
IER #31			Contractor Furnished Borrow #7	10/29/ 2010		
			Acosta 2	10/29/ 2010	7/6/2009	8/30/2010
			Idlewild Stage 2	10/29/ 2010	2/23/2009	8/30/2010
			King Mine	10/29/ 2010	8/6/2008	8/30/2010
			Levis	10/29/ 2010	7/30/2008	8/30/2010
			Lily Bayou	10/29/ 2010	4/25/2008	8/30/2010
			Port Bienville	10/29/ 2010	9/21/2009	8/30/2010
			Raceland Raw Sugars	10/29/ 2010	4/18/2008	8/30/2010
			River Birch Landfill Expansion	10/29/ 2010	2/27/2009	8/30/2010
			Scarsdale	10/29/ 2010	4/18/2008	8/30/2010
			Spoil Area	10/29/ 2010	2/27/2009	8/30/2010
IER #32			Contractor Furnished Borrow #6	1/22/2010		1/20/2010
			Bocage	1/22/2010	6/18/2008	1/20/2010
			Citrus Lands	1/22/2010	1/29/2009	1/20/2010
			Conoco Philips	1/22/2010	3/18/2009	1/20/2010
			Idlewild Stage 1	1/22/2010	2/23/2009	1/20/2010
			Nairn	1/22/2010	2/23/2009	1/20/2010
			Plaquemines Dirt & Clay	1/22/2010	2/23/2009	1/20/2010
			3C Riverside Phase 3	1/22/2010	4/1/2008	1/20/2010

Table 3. IER CAR dates and ESA coordination Continued

INDIVIDUAL ENVIRONMENTAL REPORTS						
NEPA Document	**Basin**	**Parish**	**Title**	**DR Signed**	**USFWS ESA Date**	**CAR Date**
			3C Riverside Phase 3	1/22/2010	4/1/2008	1/20/2010

In addition to the information provided in the final IER documents the following additional information related to completed or on-going construction activities is provided to update the information available to you regarding fish and wildlife resource impacts.

HSDDRS Construction Updates

Threatened and Endangered Species, Migratory Bird Treaty and Migratory Bird Conservation Acts

A summary of the endangered or threatened species that were expected to be found by project area and the potential impacts to those species are listed in table 4-16. This table was compiled based on USACE determinations and USFWS responses on IER specific ESA coordination.

To date no threatened or endangered species takes have been reported during construction activities. In general the areas where threatened or endangered species or their protected habitat impacts were potentially present were in project areas that were located along the Lake Pontchartrain and Lake Borgne shorelines or adjacent wetlands areas. The species or their habitat that had the potential to be impacted included the West Indian manatee, gulf sturgeon and the Kemp's ridley, loggerhead and green sea turtles. The potential for temporary impacts to brown pelicans was also identified for the IER 3, IER 5, IER 7, IER Supplemental 7, and IER 9 project areas. Brown pelican impacts were described as the types of impacts that would have been caused by temporary impacts from construction activities (noise and vibration). Pelican feeding or resting would have been disturbed by the temporary construction impacts. The individual birds would have been displaced during construction activities but likely would return to the impacted areas following project completion. Subsequent to the endangered species coordination, the brown pelican was removed from the endangered species list on December 17, 2009. The brown pelican remains protected under the provisions of the Migratory Bird Treaty Act.

During the coordination for individual IERs, the USFWS and NMFS provided recommendations to mitigate impacts to protected species or their habitats. A discussion of mitigation measures implemented during construction is discussed below.

IERs #1- #11

Contract specification language was included on contracts awarded for work performed along the Lake Pontchartrain shoreline alerting construction contract employees to the potential presence of the West Indian manatees, sea turtles and gulf sturgeon. The contract language required signage, monitoring and reporting as well as species specific measures to be implemented to avoid impacts during construction activities. The IER specific species are listed in Table 4-16. The species specific specification language can be found in the applicable IERs.

IER #1

A colonial nesting rookery was identified during preparation of IER #1 as historically occurring adjacent to the project area. As a result the USFWS recommended monitoring and measures to prevent nesting activities be implemented during construction. These recommendations were adopted in the IER. Because of the potential for the establishment of nesting activities along the construction alignment nesting preventing measures were implemented between February 15, 2010 and September 1, 2010. Through the use of contracted personnel measures including auditory deterrents such as clapping, yelling, shooting propane cannons, bangers and screamers as well as riding of ATVs. Visual repellents included the presence of team members and the use of canines, streamers, kites and hand-held laser devices. At the rookery site more intense measures were taken including the constant presence of a team member. The plan included measures to deter birds from nesting within 1,000 feet of construction activity along the entire IER #1 alignment. These nesting prevention measures were conducted seven days a week from dawn to dusk throughout the nesting season.   Despite the actions taken to deter nesting, the canal along Airline Hwy became a nesting ground for yellow crowned night heron. Each nest was documented, reported and monitored by the abatement team. Personnel from the Service and Corps made periodic site visits to observe the reported nests. Some of the nests were unsuccessful, apparently due to predation, and the Service concluded that a "take" was not justified for any of the lost nests. All active nests were monitored until the end of nesting season.

IER #2

The potential to for a colonial nesting bird colonies utilize the swamp found along the alignment of IER 2 was disclosed in the IER. As a result the USFWS recommended monitoring prior to the start of construction activities and if birds moved into these areas implementing measures to prevent nesting activities during construction. These recommendations were adopted in IER 2. In January 2011, bird activity was detected in the area along the Parish Line Canal and within the 1,000 ft buffer zone for nesting for the Lake Pontchartrain and Vicinity Contract LPV-3.2.a. A nesting prevention plan was developed and implemented which included auditory deterrents such as clapping, yelling, and an hourly discharge of propane cannons. Streamers and onsite inspections were used as visual repellents. Monitoring has been conducted between April 2011 and March 2012. Construction activities, nesting prevention measures and monitoring are still underway as of March 2012.

IER #5

The construction of the permanent pump stations for the 17th Street, Orleans Avenue and London Avenue outfall canal will be conducted as part of a design build contract. Although construction activities for permanent pump stations for the 17th Street, Orleans Avenue and London Avenue outfall canals has not begun, the preliminary designs prepared for the design build work do not require breakwaters to provide 100-year level of risk reduction. If breakwaters are not installed as part of the permanent pump station construction then permanent loss of 3.3 acres of critical Gulf sturgeon habitat would not occur.

IER #6 and IER #7

The proposed plan for IER 6 and IER 7 included the placement of rock on the existing foreshore protection to raise several sections of the foreshore protection. Those activities were estimated to impact approximately 44 acres of water bottom through dredging and an additional 134 acres of water bottom used as a temporary stockpile area for the excavated lake bottom and a permanent impact to 14 acres of habitat due to placement on rock on existing foreshore protection features. As part of project coordination recommendations were provided to perform surveys to quantify impacts to submerged aquatic vegetation (SAV) prior to the proposed fill activities. Due to shallow water depths in the areas where the work was proposed it was determined that the proposed fill activities were not likely to adversely affect Gulf sturgeon or their critical habitat or sea turtles.

Following preparation of the IERs but prior to the implementation of foreshore protection construction activities, the CEMVN performed additional evaluations of the proposed 100-year risk reduction plan. This 100-year flood damage risk reduction plan as described in IERs 6 and 7 included both the demolition and replacement of existing I-wall floodwalls with T-wall floodwalls and repair or levee reconstruction combined with rehabilitation or construction of foreshore protection along the Lake Pontchartrain shoreline. The results of the re-evaluation indicated that the proposed foreshore protection construction activities were not a necessary to provide the 100-year level of flood damage risk reduction for the June 2011 construction event. As a result, the foreshore protection construction activities and requested SAV surveys were not implemented because the proposed water bottom impacts specifically related to foreshore construction or repair did not occur. It is important to note that although the foreshore construction activities did not occur with the June 2011 construction event, the potential exists for future foreshore protection construction during the 50 year project life. If those construction activities occur in the future, SAV surveys would be conducted.

IER #11 Tier 2 Pontchartrain

Recommendations for avoiding impacts to gulf sturgeon were provided during the preparation of IER 11 Tier 2 Pontchartrain and the associated ESA coordination activities. Recommendations to monitor and, if detected, remove gulf sturgeon from the construction area during specific phases of the construction activities were proposed during ESA coordination and incorporated as environmental commitments in the IER. To meet those environmental commitments a team of Engineering Research Development Center biologists was on hand to monitor and relocate any Gulf Sturgeon that were detected during coffer dam unwatering. The coffer dam was monitored using a variety of detection and sampling methods. Those methods included; surveying with a humming bird side scanner, gill netting and electro shocking. The monitoring work was conducted in April 2011. Preliminary assessment of the coffer dam pool was performed between April 18 and April 20, 2011. The coffer dam unwatering started on April 29, 2011, and the fish monitoring team continued their sampling activities through May 1, 2011 when the unwatering was completed. No gulf sturgeon were detected.

Other measures that were recommended associated with IER 11 Tier 2 Pontchartrain construction activities including performing construction activities in a manner that minimized the generation of turbidity plumes. A technique recommended in the CAR to reduce during construction turbidity was to conduct coffer dam construction activities only during a slack tide was not implemented. Instead of timing construction activities and starting and stopping work, a rock dike was constructed to provide the same benefit of preventing flow and turbidity plumes caused by coffer dam construction activities from moving into Lake Pontchartrain.

Turbidity monitoring was conducted during the installation of the rock dike and scour hole in filling. Turbidity monitoring was conducted between September 29, 2010, and January 3, 2011. This was the period when active filling work; the filling of the scour hole, vibro-compaction activities, and the driving of sheet piles were conducted. Turbidity monitoring was suspended in January 2011 because the monitoring did not exceed a difference of greater than 50 NTUs between background readings in Lake Pontchartrain and the construction work that was being conducted within the canal or coffer dam. Once the piling driving for coffer dam construction was completed the majority of the water based construction generated turbidity was confined within the coffer dam. Additional monitoring will be conducted following the installation of the gates, removal of the coffer dam and regrading/sloping of the canal bottom. That work is projected to occur in mid to late 2012.

IER #14

In April 2010, a colonial bird nesting rookery was observed during a joint USFWS and USACE aerial survey. The rookery was adjacent to the West Bank and Vicinity WBV-14.d reach and was comprised of great egrets and great blue herons. An on-site inspection confirmed that some of the nests in the colony were within 1,000 ft. of the work zone. The construction activities had been underway for some time but the nesting colony had not been detected prior to the aerial survey. The colony was located in a mature, closed-canopy swamp. Examination of the colony by the USFWS, showed that the adults and immature birds were nesting and feeding normally and that the nearby construction activities were not noticeably changing bird behavior. At the time of the discovery the most disruptive of the construction activities, pile-driving was shifting away from the immediate location of the nesting activities. The USFWS subsequently made the assessment that continued construction activities would not result in a “take”.

Table 4-16. Summary of the HSDRRS Impacts on Threatened and Endangered Species by IER[1]

IER* #	Project/Parish	Species Potentially Present	Determination	Comments
1	LaBranche/St. Charles	Manatee	No effects	Highly unlikely that manatees entered the canals and drainages; drainage control structures are too far upstream for manatee presence
S 1	LaBranche/St. Charles	Manatee	Not likely to adversely affect (NLAA)	USFWS Concurrence of NLAA
2	Lake Pontchartrain/Jefferson	None	No effects	
S 2	Lake Pontchartrain/Jefferson	None	No effects	
3	Jefferson East Bank/Jefferson	Manatee, Gulf sturgeon, Kemp's ridley, loggerhead, and green sea turtles	NLAA	Temporary disturbance to foraging areas during construction for manatee, sturgeon and pelican; permanent impacts on 9 acres and temporary impacts on 29 acres of Gulf sturgeon critical habitat; implemented manatee and sturgeon BMPs
S 3.a	Jefferson East Bank/Jefferson	Manatee, Gulf sturgeon, Kemp's ridley, loggerhead, and green sea turtles	NLAA	Temporary disturbance to foraging areas during construction for manatee, sturgeon and pelican; implemented manatee and sturgeon BMPs; loss of 8 acres of bottom feeding areas for sturgeon
4	New Orleans Lakefront west of IHNC	Manatee, Gulf sturgeon, Kemp's ridley, loggerhead, and green sea turtles	No effects	All project construction occurred on land
5	Outfall Canals at 17th Street, Orleans Avenue, and London Avenue	Manatee, Gulf sturgeon, Kemp's ridley, loggerhead, and green sea turtles	NLAA; adverse modification to sturgeon critical habitat (CH) (3.3 acres)	Temporary impacts on pelican, sturgeon and turtle foraging habits; the potential for the permanent loss of 3.3 acres of sturgeon critical habitat; no effect on manatee
6	Citrus Lakefront	Manatee, Gulf sturgeon, Kemp's ridley, loggerhead, and green sea turtles	NLAA; adverse modification to sturgeon CH (6.9 acres)	Temporary impacts on pelican, sturgeon and turtle foraging habits; no effect on manatee

Table 4-16, continued

IER* #	Project/Parish	Species Potentially Present	Determination	Comments
S 6	Citrus Lakefront	Manatee, Gulf sturgeon, Kemp's ridley, loggerhead, and green sea turtles	No effects	Different design of I-wall
7	New Orleans East Lakefront to Michoud Canal	Manatee, Gulf sturgeon, Kemp's ridley, loggerhead, and green sea turtles	NLAA	Temporary disturbance to foraging areas during construction for manatee, sturgeon and pelican; implemented manatee and sturgeon BMPs
S 7	New Orleans East Lakefront to Michoud Canal	Manatee, Gulf sturgeon, Kemp's ridley, loggerhead, and green sea turtles	NLAA	Temporary disturbance to foraging areas during construction of barge access for manatee, sturgeon and pelican; implemented manatee and sturgeon BMPs
8	Bayou Dupre	Manatee, Gulf sturgeon, Kemp's ridley, loggerhead, and green sea turtles	NLAA for manatee; no effect on other species	Temporary disturbance to foraging areas during construction for manatee; BMPs were implemented
9	Caernarvon Floodwall	Manatee and Gulf sturgeon	NLAA on manatee and brown pelican; no effect on sturgeon	Temporary disturbance for foraging areas for pelicans and manatees
10	Chalmette Loop	Manatee, Gulf sturgeon and loggerhead sea turtle	NLAA	
11 Tier 2 Borgne	IHNC-Borgne	Manatee, Gulf sturgeon, Kemp's ridley, loggerhead, and green sea turtles	NLAA	Temporary and permanent impacts; permanently converted approximately 250 acres of open water bottom
S 11 Tier 2 Borgne		Manatee, Gulf sturgeon, Kemp's ridley, loggerhead, and green sea turtles	No effects	Eliminated vertical gate
11 Tier 2 Pontchartrain	IHNC Pontchartrain	Manatee, Gulf sturgeon, Kemp's ridley, loggerhead, and green sea turtles	NLAA	Temporary and permanent impacts; permanently converted 7 acres of open water bottom
12/S 12	GIWW, Harvey and Algiers Floodwalls	None	No effects	
13	West Bank, Hero Canal, and Eastern Tie-In	None	No effects	
14	Westwego to Harvey	None	No effects	

Table 4-16, continued

IER* #	Project/Parish	Species Potentially Present	Determination	Comments
S 14.a	Westwego to Harvey	None	No effects	
15	Lake Cataouatche	None	No effects	
16/S 16.a	West Bank Western Tie In	None	No effects	
17	West Bank Company Canal	None	No effects	
18	GF Borrow, Jefferson, Orleans, Plaquemines, St. Charles, and St. Bernard parishes	None	No effects	
19	Pre-Approved Contractor Borrow, Jefferson, Orleans, Plaquemines, St. Charles, and St. Bernard parishes	None	No effects	
22	GF Borrow, Jefferson and Plaquemines, St. Charles, and St. Bernard parishes	None	No effects	
23	Pre-Approved Contractor Borrow, Plaquemines, St. Charles, and St. Bernard parishes and Hancock County	None	No effects	
25	GF Borrow, Orleans, Jefferson, and Plaquemines parishes	None	No effects	
26	Pre-Approved Contractor Borrow, Jefferson, Plaquemines, and St. John the Baptist parishes and Hancock County	None	No effects	
27	Outfall Canal Remediation at 17th Street, Orleans Avenue, and London Avenue	None	No effects	Project was remediation of floodwalls
28	GF Borrow Site, Plaquemines, St. Bernard and St. Tammany parishes	None	No effects	
29	CF Borrow, Orleans, St. John the Baptist and Jefferson parishes	None	No effects	
30	CF Borrow, St. Bernard and St. James parishes and Hancock County	None	No effects	

Table 4-16, continued

IER* #	Project/Parish	Species Potentially Present	Determination	Comments
31	CF Borrow in East Baton Rouge, Jefferson, LaFourche, Plaquemines, St. Bernard and St. Tammany parishes	None	No effects	
32	CF Borrow, Ascension, Plaquemines, and St. Charles parishes	None	No effects	

*S – Supplemental
[1] Includes all Alternative NEPA Arrangement documents completed by November 15, 2010

Remaining Data Gaps

One of the objectives of the CED was to close data gaps identified in the IERs. Throughout the preparation of the IERs commitments have been made to address a variety of data gaps. Data gaps specifically related to fish and wildlife resources included commitments made to perform long term monitoring and data collection related to IER 11 Tier 2 Pontchartrain Improved Protection on the Inner Harbor Navigation Canal, Orleans and St. Bernard Parish, Louisiana, and IER 12 Gulf Intracoastal Waterway (GIWW), Harvey, and Algiers Levees and Floodwalls, Jefferson, Orleans, and Plaquemines Parishes, Louisiana. A discussion of the status of those commitments can be found below.

IER #11, Tier 2 Pontchartrain

In IER 11, Tier 2 Pontchartrain, the CEMVN committed to conducting monitoring to obtain observed dissolved oxygen data. The IER stated that if the results of the monitoring demonstrate the need for further modeling or actions to address adverse impacts, the CEMVN would conduct further work. That further work would be comprised of additional coordination with the resource agencies to complete modeling, within authorization and funding. The modeling in turn would be used to evaluate alternatives to rectify, or mitigate adverse impacts. IER 11 Tier 2 Pontchartrain indicated that the CED would include both the results of the monitoring and the interpretation of the results. The water quality monitoring is underway, but the analysis of the data gathered will not be completed until 2013. This is after the Phase I CED it projected to be released to the public. A discussion of the status of the monitoring as of March 2012 will be included in the Phase I CED.

IER #12 Gulf Intracoastal Waterway (GIWW), Harvey, and Algiers Levees and Floodwalls

In IER 12, the CEMVN made commitments to evaluate further and reduce potential impacts to the Bayou aux Carpes 404c CWA area by agreeing to support adaptive management efforts and ensure that project feature augmentations would be implemented to minimize adverse impacts within the Bayou aux Carpes 404c CWA area. Modeling studies are currently underway to determine the best and safest alternatives for augmenting the Bayou aux Carpes 404c CWA augmentations. Once the studies are completed the USACE and HSDRRS interagency team will meet to determine which features will be constructed. The Phase I CED will provide the status of the modeling studies up to March 2012.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
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Lafayette, Louisiana 70506

May 17, 2013

Colonel Edward R. Fleming
District Commander
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Colonel Fleming,

Please reference the Comprehensive Environmental Document (CED) being prepared under the approval of the Council on Environmental Quality (CEQ) that will partially fulfill the U.S. Army Corps of Engineers (Corps) compliance with the National Environmental Policy Act of 1969 (NEPA)(83 Stat. 852, as amended; 42 U.S.C. 4321- 4347). The CED complies with CEQ's approved alternative arrangement for compliance with NEPA that allowed expedited implementation of improved hurricane protection measures. Work presented in the CED was conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4) and Public Law 110-28, U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 (5th Supplemental). Those laws authorized the Corps to upgrade two existing hurricane protection projects (i.e., Westbank and Vicinity of New Orleans and Lake Pontchartrain and Vicinity) in the Greater New Orleans area in southeast Louisiana. Those projects and the authorized work are collectively referred to as the Hurricane Storm Damage and Risk Reduction Study (HSDRRS) in this report. This revised draft report contains a brief description of resources in the project area and an estimate of impacts to those resources and the Fish and Wildlife Service's (Service) position on mitigation options being proposed, and identification of outstanding issues and project impacts that should be addressed in subsequent CEDs or Individual Environmental Reports (IER), as appropriate.

The hurricane protection work authorized by Supplemental 4 and 5 directed the Corps to proceed with engineering, design, modification, and construction, where necessary, of the Lake Pontchartrain and Vicinity and the West Bank and Vicinity Hurricane Protection Projects so those projects would provide 100-year hurricane protection. Procedurally, project construction was authorized in the absence of the report of the Secretary of the Interior that is required by Section 2(b) of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). Therefore, to comply with Section 2(b), Service reports were completed for all IERs prior to signing of the Decision Record that granted approval for project implementation. IERs are CEQ-approved NEPA documents for the alternative arrangement process that replaced the standard NEPA process and documents (i.e., Environmental Assessments, Environmental Impact Statements).

As project planning proceeded IERs were completed on project components that were located in geographically adjacent areas or functioned as an individually important component of the flood risk reduction system. While most features are completed some are in the final phases of planning and/or construction. The CED represents an overview of known project impacts at this stage of project implementation but prior to completion; therefore, we cannot complete our evaluation of the CED's effects on fish and wildlife resources and cannot entirely fulfill our reporting responsibilities under Section 2(b) of the FWCA. Accordingly, extensive additional Service involvement during subsequent detailed planning, engineering, design, and construction phase of each IER, along with more-definitive project information that will be available during those planning phases, will be required so that we can fulfill our responsibilities under that Act. Therefore, to fulfill the coordination and reporting requirements of the FWCA, the Service will be providing post-authorization draft and final supplemental 2(b) reports to this programmatic report for each remaining IER. Therefore, this revised draft report does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the FWCA. This revised draft report has been reviewed by the Louisiana Department of Wildlife and Fisheries (LDWF) and the National Marine Fisheries Service (NMFS) and their comments have been incorporated into this report.

Should you or your staff have any questions regarding this letter and our attached report, please contact David Walther (337/291-3122) of this office.

Sincerely,

Jeffrey D. Weller
Supervisor
Louisiana Ecological Services Office

Attachment

cc: Southeast National Wildlife Refuge, Bayou Lacombe, LA
Jean Lafitte National Historical Park & Preserve, New Orleans, LA
National Marine Fisheries Service, Baton Rouge, LA
EPA, Dallas, TX
LA Dept. of Wildlife and Fisheries, Baton Rouge, LA
LA Dept. of Natural Resources, CMD, Baton Rouge, LA
CPRA, Baton Rouge, LA

Revised Draft Fish and Wildlife Coordination Act Report
for the
Comprehensive Environmental Document (CED)

Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4) and Public Law 110-28, U.S.Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 (5th Supplemental)

PROVIDED TO
NEW ORLEANS DISTRICT
U.S. ARMY CORPS OF ENGINEERS
NEW ORLEANS, LOUISIANA

PREPARED BY
DAVID WALTHER
FISH AND WILDLIFE BIOLOGIST

U.S. FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
LAFAYETTE, LOUISIANA
MAY 2013

U.S. FISH AND WILDLIFE SERVICE – SOUTHEAST REGION

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EXECUTIVE SUMMARY

A Comprehensive Environmental Document (CED) is being prepared under the approval of the Council on Environmental Quality (CEQ) that will partially fulfill the U.S. Army Corps of Engineers (Corps) compliance with the National Environmental Policy Act of 1969 (NEPA)(83 Stat. 852, as amended; 42 U.S.C. 4321- 4347). The CED complies with CEQ's approved alternative arrangement for compliance with NEPA that allowed expedited implementation of improved hurricane protection measures. Work presented in the CED was conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4) and Public Law 110-28, U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 (5th Supplemental). Those laws authorized the Corps to upgrade two existing hurricane protection projects (i.e., Westbank and Vicinity of New Orleans and Lake Pontchartrain and Vicinity) in the Greater New Orleans area in southeast Louisiana. Those projects and the authorized work are collectively referred to as the Hurricane Storm Damage and Risk Reduction Study (HSDRRS) in this report. This revised draft report contains a brief description of resources in the project area and an estimate of impacts to those resources and the Fish and Wildlife Service's (Service) position on mitigation options being proposed, and identification of outstanding issues and project impacts that should be addressed in subsequent CED and Individual Environmental Reports (IER), as appropriate.

The hurricane protection work authorized by Supplemental 4 and 5 directed the Corps to proceed with engineering, design, modification, and construction, where necessary, of the Lake Pontchartrain and Vicinity (LPV) and the West Bank and Vicinity (WBV) Hurricane Protection Projects so those projects would provide 100-year hurricane protection. Procedurally, project construction was authorized in the absence of the report of the Secretary of the Interior that is required by Section 2(b) of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). Therefore, to comply with Section 2(b), Service reports were completed for all IERs prior to signing of the Decision Record that granted approval for project implementation. IERs are CEQ-approved NEPA documents for the alternative arrangement process that replaced the typical NEPA process and documents (i.e., Environmental Assessments, Environmental Impact Statements).

Because there was no project design when the project was authorized, HSDRRS impacts to fish and wildlife resources were undetermined. However, as project planning proceeded and designs and impacts were determined, IERs were completed to disclose such impacts. IERs were written for project features that were located in geographically adjacent areas or functioned as an individually important feature(s) of the flood risk reduction system. The CED represents an overview of known project impacts at this stage of project implementation; therefore, we cannot complete our evaluation of the CED's effects on fish and wildlife resources and cannot entirely fulfill our reporting responsibilities under Section 2(b) of the FWCA. Accordingly, extensive additional Service involvement during subsequent detailed planning, engineering, design, and construction phase of each IER, along with more-definitive project information that will be available during those planning phases, will be required so that we can fulfill our responsibilities under that Act. Therefore, to fulfill the coordination and reporting requirements of the FWCA, the Service will be providing post-authorization draft and final supplemental 2(b) reports to this programmatic report for each IER. Therefore, this revised draft report does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the FWCA. This revised draft report has been reviewed by the Louisiana Department of Wildlife and Fisheries (LDWF) and the National Marine Fisheries Service (NMFS) and their comments have been incorporated into this report.

This report incorporates and supplements our FWCA Reports that addressed impacts and mitigation features for the original project authorizations for the Westbank and Vicinity of New Orleans (dated November 10, 1986, August 22, 1994, November 15, 1996, and June 20, 2005) and the Lake Pontchartrain and Vicinity Hurricane (dated July 25, 1984, and January 17, 1992) Protection projects. It also supplements our November 26, 2007, Draft FWCA Report that provided twenty-six programmatic recommendations for the HSDRRS authorized work to help avoid and minimize impacts to fisheries, wetlands, forested habitats, migratory birds, and public lands. Relevant recommendations from that report were selected for inclusion into our reports on each IER along with additional recommendations that were developed to address specific project features (e.g., wildlife crossings, etc.) or areas (e.g., 404c, etc.). This report also supplements all 39 of our reports on IERs provided to date but primarily updates the impact acreage and habitat units lost; all relevant recommendations in those reports remain valid unless noted otherwise in this report. In addition, this report does not revise the Service's August 6, 2006, Planning-aid letter that defined a protocol to avoid and minimize impacts to wetlands and bottomland hardwoods from borrow site placement or our September 9, 2009, Planning-aid letter that provided a map identifying potential borrow sites that might meet some of the those protocols. This revised draft report also does not modify our position regarding implementation of mitigation measures for LPV impacts as expressed in our September 13, 2012, Planning-aid letter. Specific recommendations for mitigation IERs will be addressed in separate FWCA reports; however our current position on those planning efforts is presented.

Construction of the increased flood protection resulted in habitat losses to wetlands and dry bottomland hardwoods. Total acreage and average annual habitat units (AAHUs) of habitats lost due to project construction that the Service recommended mitigation was 2,044.9 and 992.3, respectively. Of those impacts, forested (wet and non-wet) habitat impacts consisted of 1,421 acres (684.8 AHHUs) and marsh impacts totaled 623.9 acres (307.5 AAHUs). Impacts to National Wildlife Refuge (NWR), National Park Service (NPS), and State Park lands and Environmental Protection Agency (EPA) 404(c) designated wetlands (included in the above totals) consisted of the loss of 380.4 acres (181.8 AAHUs); of which forested habitat losses consisted of 254.5 acres (131.7 AAHUs) and marsh losses totaled 125.9 acres (50.1 AAHUs). The Service does not object to the completion of improved hurricane protection to the Greater New Orleans area provided the following fish and wildlife conservation recommendations are incorporated into future project planning and implementation and outstanding issues are adequately resolved via ongoing planning efforts:

1. To the greatest extent possible, situate final flood protection features so that impacts to wetlands and non-wet bottomland hardwoods are avoided or minimized.

2. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design project features and timing of construction. Forest clearing associated with project features

should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.

3. If a proposed project feature is changed significantly or is not implemented within one year of the last Endangered Species Act consultation for that feature, we recommend that the Corps reinitiate coordination with this office to ensure that the proposed project would not adversely affect any federally listed threatened or endangered species or their habitat.

4. The Corps shall fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.

5. Mitigation areas should not permanently convert Essential Fish Habitat to non-tidal elevations. For those mitigation areas that would be non-tidal for a brief period (till restoration of tidal connectivity) mitigation may be required for that temporal loss.

6. Further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, Water Control Plans, or other similar documents) should be coordinated with the Service, NMFS, LDWF, EPA and Louisiana Department of Natural Resources (LDNR). The Service shall be provided an opportunity to review and submit recommendations on the all work addressed in those reports.

7. The Corps should avoid impacts to public lands, if feasible. If not feasible the Corps should establish and continue coordination with agencies managing public lands that may be impacted by a project feature until construction of that feature is complete and prior to any subsequent maintenance. In addition all mitigation proposed to occur on public lands should be coordinated with the respective land managing agency. Points of contacts for the agencies potentially impacted by project features are: Kenneth Litzenberger, Project Leader for the Service's Southeast National Wildlife Refuges and Neal Lalonde (985) 822-2000, Refuge Manager for the Bayou Sauvage National Wildlife Refuge (NWR), Office of State Parks contact Mr. Brent Evans at 1-888-677-1400, National Park Service (NPS), contact Superintendent Carol Clark, (504) 589-3882 extension 137 (Carol_Clark@nps.gov) or Chief of Resource Management Guy Hughes (504) 589-3882 extension 128, (Guy_Hughes@nps.gov) and for the 404(c) area contact the previously mentioned NPS personnel and Ms. Barbara Keeler (214) 665-6698 with the EPA.

8. If applicable, a General Plan should be developed by the Corps, the Service, and the managing natural resource agency in accordance with Section 3(b) of the FWCA for mitigation lands.

9. If mitigation lands are purchased for inclusion within a NWR those lands must meet certain requirements; a summary of some of those requirements is provided in Appendix A. Other land-managing natural resource agencies may have similar requirements that must be met prior to accepting mitigation lands; therefore, if they are proposed as a manager of a mitigation site they should be contacted early in the planning phase regarding such requirements.

10. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation and/or maintenance of mitigation lands, then the Corps should provide the necessary funding to ensure mitigation obligations are met on behalf of the public interest.

11. Any proposed change in mitigation features or plans should be coordinated in advance with the Service, NMFS, LDWF, EPA and LDNR.

12. The Service encourages the Corps to finalize mitigation plans and proceed to mitigation construction so that it will be concurrent with project construction and revising the impact and mitigation period-of-analysis to reflect additional temporal losses will not be required.

13. For on-refuge impacts the Service prefers and recommends implementation of the Bayou Sauvage brackish marsh alternative because this alternative ranks higher in long-term sustainability and property management feasibility over other brackish marsh alternatives. Additionally, the Service does not support the selection of the Golden Triangle mitigation alternative. However, NMFS believes that implementation of the Golden Triangle mitigation project may afford storm wave reduction benefits to the Surge Barrier and does not object to mitigating impacts in the Golden Triangle Furthermore, the Service supports the mitigation of on-refuge flood-side bottomland hardwood impacts on either side of the levee (flood or protected) and recommends that the Corps, in consultation with the Service, develop acceptable mitigation for such impacts.

14. The Service has informally expressed concerns via emails dated May 4, 2011, and June 9, 2011, regarding the mitigation alternatives along State Highway 45 that were developed to mitigate impacts to NPS lands. The Service recommends that the Corps continue coordinating the development of mitigation plans and address our concerns.

15. The Corps in cooperation with the natural resource agencies is still evaluating alternative enhancement measures for the EPA Bayou aux Carpes 404(c) designated wetlands. Enhancement measures, which would ensure the integrity of the 404(c) area is maintained, are a condition of the 404(c) modification. The Service encourages the Corps to select and implement the preferred enhancement alternative(s).

16. The Service recommends that the Corps work with the natural resource agencies to incorporate proposed modifications and finalize the "GUIDELINES – WET BOTTOMLAND HARDWOOD HABITAT ENHANCEMENT, SWAMP HABITAT RESTORATION, AND SWAMP HABITAT ENHANCEMENT" and the untitlted document for marsh mitigation.

17. The Service recommends that the Corps maintain full responsibility for any mitigation project for a minimum of 4-years post planting. The Corps should maintain full responsibility for all marsh mitigation projects until the projects are found to be fully compliant with success and performance requirements. Those requirements should be developed in cooperation with the resource agencies and included in the mitigation IERs.

18. The Service recommends the continued coordination of the development of Water Control Plans until all plans are finalized and for any future changes to the plans.

19. At this time none of the mitigation planning documents describe in detail actions needed by the Corps and/or the local sponsor if mitigation is not succeeding as planned. The Service recommends that this important component of the mitigation plan be developed.

20. The Service recommends that impacts associated with contractor-provided borrow sources and status of mitigation implementation be provided to the Service.

INTRODUCTION

A Comprehensive Environmental Document (CED) is being prepared under the approval of the Council on Environmental Quality (CEQ) that will partially fulfill the U.S. Army Corps of Engineers (Corps) compliance with the National Environmental Policy Act of 1969 (NEPA)(83 Stat. 852, as amended; 42 U.S.C. 4321- 4347). The CED complies with CEQ's approved alternative arrangement for compliance with NEPA that allowed expedited implementation of improved hurricane protection measures. Work presented in the CED was conducted under the authority of Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4) and Public Law 110-28, U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 (5th Supplemental). Those laws authorized the Corps to upgrade two existing hurricane protection projects (i.e., Westbank and Vicinity of New Orleans and Lake Pontchartrain and Vicinity) in the Greater New Orleans area in southeast Louisiana. Those projects and the authorized work are collectively referred to as the Hurricane Storm Damage and Risk Reduction Study (HSDRRS) in this report. This revised draft report contains a brief description of resources in the project area and an estimate of impacts to those resources and the Fish and Wildlife Service's (Service) position on mitigation options being proposed, and identification of outstanding issues and project impacts that should be addressed in subsequent CED reports.

The hurricane protection work authorized by Supplemental 4 and 5 directed the Corps to proceed with engineering, design, modification, and construction, where necessary, of the Lake Pontchartrain and Vicinity (LPV) and the West Bank and Vicinity (WBV) Hurricane Protection Projects so those projects would provide 100-year hurricane protection. Procedurally, project construction was authorized in the absence of the report of the Secretary of the Interior that is required by Section 2(b) of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). Therefore, to comply with Section 2(b), Service reports were completed for all Individual Environmental Reports (IERs) prior to signing of the Decision Record that granted approval for project implementation. IERs are CEQ-approved NEPA documents for the alternative arrangement process that replaced the typical NEPA process and documents (i.e., Environmental Assessments, Environmental Impact Statements).

Because there was no project design when the project was authorized, HSDRRS impacts to fish and wildlife resources were undetermined. However, as project planning proceeded and designs and impacts were determined, IERs were completed to disclose such impacts. IERs were written for project features that were located in geographically adjacent areas or functioned as an individually important feature(s) of the flood risk reduction system. The CED represents an overview of known project impacts at this stage of project implementation; therefore, we cannot complete our evaluation of the IER's effects on fish and wildlife resources and cannot entirely fulfill our reporting responsibilities under Section 2(b) of the FWCA. Accordingly, extensive additional Service involvement during subsequent detailed planning, engineering, design, and construction phase of each IER, along with more-definitive project information that will be available during those planning phases, will be required so that we can fulfill our responsibilities under that Act. Therefore, to fulfill the coordination and reporting requirements of the FWCA, the Service will be providing post-authorization draft and final supplemental 2(b) reports to this programmatic report for each IER. Therefore, this report does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the FWCA. This report has not been reviewed by the Louisiana Department of Wildlife and Fisheries (LDWF) or the National Marine Fisheries Service (NMFS) and the NMFS comments on this report are attached to the end of this report.

This report incorporates and supplements our FWCA Reports that addressed impacts and mitigation features for the original project authorizations for the Westbank and Vicinity of New Orleans (dated November 10, 1986, August 22, 1994, November 15, 1996, and June 20, 2005) and the Lake Pontchartrain and Vicinity Hurricane (dated July 25, 1984, and January 17, 1992) Protection projects. It also supplements our November 26, 2007, Draft FWCA Report that provided twenty-six programmatic recommendations for the HSDRRS authorized work to help avoid and minimize impacts to fisheries, wetlands, forested habitats, migratory birds, and public lands. Relevant recommendations from that report were selected for our reports on each IER along with additional recommendations that were developed to address specific project features (e.g., wildlife crossings, etc.) or areas (e.g., 404c, etc.). This report also supplements all 39 of our reports on IERs provided to date but only updates the impact acreage and habitat units lost; all relevant recommendations in those reports remain valid. In addition, this report does not revise the Service's August 6, 2006, Planning-aid letter that defined a protocol to avoid and minimize impacts to wetlands and bottomland hardwoods from borrow site placement or our September 9, 2009, Planning-aid letter that provided a map identifying potential borrow sites that might meet some of the those protocols. This revised draft report also does not modify our position regarding implementation of mitigation measures for LPV impacts as expressed in our September 13, 2012, and May 14, 2013, Planning-aid letters. Specific recommendations for mitigation IERs will be addressed in separate FWCA reports; however our current position on those planning efforts will be presented.

DESCRIPTION OF THE STUDY AREA'S FISH AND WILDLIFE RESOURCES

As previously mentioned, the Service has provided several FWCA Reports for the two-subject protection projects. Those reports contain a thorough discussion of the significant fish and wildlife resources (including those habitats) that occur within the study area. For brevity, that discussion is incorporated by reference herein but the following brief descriptions are provided to update the previously mentioned information.

The study area is located within the Mississippi River Deltaic Plain of the Lower Mississippi River Ecosystem. Portions of Jefferson, Orleans, St. Charles, St. Bernard and Plaquemines Parishes are included in the study area. Higher elevations occur on the natural levees of the Mississippi River and its distributaries. Developed lands are primarily associated with natural levees, but extensive wetlands have been leveed and drained to accommodate residential, commercial, and agricultural development. Federal, State, and local levees have been installed for flood protection purposes, often with negative effects on adjacent wetlands. Navigation channels such as the Gulf Intracoastal Waterway and the Mississippi River – Gulf Outlet are also prominent landscape features, as are extensive oil and gas industry access channels and pipeline canals. Extensive wetlands and associated shallow open waters dominate the landscape outside the flood control levees. Major water bodies include Lake Pontchartrain located north of the project area, the Mississippi River which bisects the project area, and Lake Borgne which is located on the eastern edge of the project area.

Habitat types in the project area include forested wetlands (i.e., bottomland hardwoods and/or swamps), hydrologically altered (i.e.non-wet) bottomland hardwoods, marsh, open water, and developed areas. Due to urban development and a forced-drainage system, the hydrology of most of the forested habitat within the levee system has been altered. The forced-drainage system has been in operation for many years, and subsidence is evident throughout the areas enclosed by levees.

Wetlands (forested, marsh, and scrub-shrub) within the study area provide plant detritus to adjacent coastal waters and thereby contribute to the production of commercially and recreationally important fishes and shellfishes. Wetlands in the project area also provide valuable water quality functions such as reduction of excessive dissolved nutrient levels, filtering of waterborne contaminants, and removal of suspended sediment. In addition, coastal wetlands buffer storm surges reducing their damaging effects to man-made infrastructure within the coastal area.

Factors that will influence future fish and wildlife resource conditions outside of the protection levees include freshwater input and loss of coastal wetlands. Depending upon the deterioration rate of marshes, the frequency of occasional short-term saltwater events may increase. Under that scenario, tidal action in the project area may increase gradually as the buffering effect of marshes is lost, and use of that area by estuarine-dependent fishes and shellfish tolerant of saltwater conditions would likely increase. Therefore, freshwater wetlands within and adjacent to the project area will experience losses due to development, subsidence, and erosion.

The ongoing loss of coastal Louisiana wetlands (approximately 1,149 square miles between 1956 and 2004; average loss rate of 24 square miles per year) was exacerbated by Hurricanes Katrina and Rita in 2005. Those hurricanes caused an initial loss of wetlands equivalent to 9 years (approximately 217 square miles) of mean annual losses (Barras 2007). Louisiana wetlands provide 26 percent of the seafood landed in the conterminous United States and over 5 million migratory waterfowl utilize those wetlands every year.

Non-wet bottomland hardwoods within the project area also provide habitat for wildlife resources. Between 1932 and 1984, the acreage of bottomland hardwoods in Louisiana declined by 45 percent (Rudis and Birdsey 1986). By 1970, Jefferson Parish was classified as entirely urban or nonforested in the U.S. Forest Service's forest inventory with most of this loss resulting from development within non-wet areas inside hurricane protection levees. A large percentage of the original bottomland hardwoods within the Mississippi River floodplain in the project area are located within levees. However, losses of that habitat type are not regulated or mitigated with the exception of impacts resulting from Corps projects as required by Section 906(b) of the Water Resources Development Act of 1986 and Section 2036(a) of the Water Resources Development Act of 2007.

Mammals known to occur in the project-area bottomland hardwoods and marshes include mink, raccoon, swamp rabbit, nutria, river otter, and muskrat. Those habitats also support a variety of birds including herons, egrets, ibises, least bittern, rails, gallinules, olivaceous cormorant, white pelican, pied-billed grebe, black-necked stilt, sandpipers, gulls, and terns (Lowery 1974). Forested and scrub-shrub habitats within the study area also provide habitat for many resident passerine birds and essential resting areas for many migratory songbirds including warblers, orioles, thrushes, vireos, tanagers, grosbeaks, buntings, flycatchers, and cuckoos. Many of these and other passerine birds have undergone a decline in population primarily due to habitat fragmentation and loss.

Given the extent of development and drainage, waterfowl use within the hurricane protection system is minimal; however, waterfowl usage is prevalent in the less altered wetlands outside the levee. In those wetlands outside the levee, greater waterfowl usage occurs in the swamps and in the fresh and intermediate marshes because they provide more waterfowl food sources than brackish and saline marshes.

The Migratory Bird Treaty Act (MBTA) (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.) and the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d) offer additional protection to many bird species within the project area including colonial nesting birds and the bald eagle (*Haliaeetus leucocephalus*). We continue to recommend that a qualified biologist inspect proposed work sites for the presence of undocumented nesting colonies during the nesting season (e.g. February through September depending on the species). If colonies exist, work should not be conducted within 1,000 feet of the colony during the nesting season. On-site personnel should also be informed of the possible presence of nesting bald eagles within the project boundary, and should identify, avoid, and immediately report any such nests to this office. If a bald eagle nest is located within 660 feet of the levee right-of-way (ROW) the Corps should completed an on-line evaluation (http://www.fws.gov/southeast/es/baldeagle) to determine potential disturbance to nesting bald eagles and any protective measures necessary. A copy of that evaluation should be provided to this office. If assistance is needed in completing the evaluation please contact this office.

Open water habitat in the study area consists of drainage canals which do not support significant fishery resources because of dense vegetation, poor water quality, and inadequate depth. Other open water habitat consists of natural lakes, bays, and bayous, in addition to major navigation channels, canals associated with petroleum activities and the Mississippi River. Open water habitat is being gained through coastal erosion at the expense of coastal wetlands (Conner and Day 1987). Freshwater sport fishes present in the project area, but outside of the levees, include largemouth bass, crappie, bluegill, redear sunfish, warmouth, channel catfish, and blue catfish. Other fishes likely to be present include yellow bullhead, freshwater drum, bowfin, carp, buffalo, and gar. Estuarine-dependent fishes and shellfishes such as Atlantic croaker, red drum, spot, sand seatrout, spotted seatrout, southern flounder, Gulf menhaden, striped mullet, brown shrimp, white shrimp, and blue crab are found in the intermediate to saline marshes and Lake Pontchartrain and Borgne and adjacent water bodies. The juxtaposition of open water habitat and the productivity of coastal habitats support recreational and commercial fisheries for many of these species.

Some of the waterbodies in the project area meet the criteria for primary and secondary contact recreation and partially meets the criteria for fish and wildlife propagation, while others do not meet the criteria for fish and wildlife propagation (Louisiana Department of Environmental Quality; online). Causes for not fully meeting fish and wildlife propagation criteria include excessive nutrients, organic enrichment, low dissolved oxygen levels, flow and habitat alteration, pathogens and noxious aquatic plants. Sources of those problems include hydromodification, habitat modification, recreational activities, and unspecified upstream sources. Municipal point sources, urban runoff, storm sewers, and onsite wastewater treatment systems are also known contributors to poor water quality in the area.

Deteriorating water quality in the Barataria Basin, at least partially correlated to wetlands loss and a commensurate reduction in the area's waste assimilation capacity, is a major problem affecting fish and wildlife in that portion of the study area. According to Bahr et al. (1983), factors that currently adversely affect water quality in the Barataria Basin are those generally related to urban development and associated urban pollution, altered land-use patterns, and hydrologic modifications (drainage, etc.) within the watershed. Two major human-related causes of water quality degradation include eutrophication and increased levels of toxic substances (Conner and Day 1987).

Essential Fish Habitat

Estuarine wetlands and associated shallow waters within the project area have been identified by NMFS as Essential Fish Habitat (EFH) for both postlarval, juvenile and sub-adult stages of brown shrimp, white shrimp, and red drum, as well as the adult stages of those species in the nearshore and offshore reaches. EFH has also been designated for various life stages of Spanish mackerel and cobia in the nearshore, marine-portion of the project area and in the lower portions of the estuary. EFH requirements vary depending upon species and life stage. Categories of EFH in the project area include estuarine emergent wetlands, estuarine water column, submerged aquatic vegetation, and estuarine water bottoms. Detailed information on Federally managed fisheries and their EFH is provided in the 2005 generic amendment of the Fishery Management Plans for the Gulf of Mexico, prepared by the Gulf of Mexico Fishery Management Council (GMFMC). That generic amendment was prepared in accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA); (P.L. 104-297). Estuarine-dependent species such as those listed above also serve as prey for other species managed under the MSFCMA by the GMFMC (e.g., red drum, mackerels, snappers, and groupers) and highly migratory species (e.g., billfishes and sharks) managed by the NMFS.

Endangered and Threatened Species

To aid the Corps in complying with their proactive consultation responsibilities under the Endangered Species Act (ESA), the Service provided a list of threatened and endangered species and their critical habitats within the coastal parishes of the New Orleans District in an August 7, 2006, letter to the Corps. The Corps conducted ESA consultations on each IER as soon as plans were developed and impact locations were identified. If the plans were changed significantly or relocated, or work was not implemented within 1 year following that coordination, the Corps was advised to reinitiate coordination with this office to ensure that the proposed project would not adversely affect any Federally listed threatened or endangered species or their habitat or any other Service trust resources. We recommend that this process continue until all project features are completed.

National Wildlife Refuges, Parks, 404(c) area

Located within the study area are the Bayou Segnette and the St. Bernard State Parks, which are operated by the Louisiana Department of Culture, Recreation and Tourism, Office of State Parks. The Barataria Preserve unit of Jean Lafitte National Historical Park and Preserve (JLNHPP) is located on the west bank of the Mississippi River and managed by the National Park Service (NPS). An area now included in the JLNHPP is subject to a 1985 Environmental Protection Agency (EPA) Final Determination under the Clean Water Act (CWA) Section 404(c). The EPA 404(c) action was intended as an advance notification to the public and agencies of the government's determination under the CWA Section 404 for the area, in the sense of planning aid coordination. The Service's Bayou Sauvage National Wildlife Refuge (NWR) is located in the eastern portion of the project area. All of these public lands experienced fish and wildlife habitat impacts and the Service continues to recommend and support the mitigation for impacts to public lands on public lands within the managing agency's jurisdiction.

If mitigation lands are purchased for inclusion within a NWR, those lands must meet certain requirements; a summary of some of those requirements is provided in Appendix A. Other land-managing natural resource agencies may have similar requirements that must be met prior to accepting mitigation lands; therefore, if they are proposed as a manager of a mitigation site they should be contacted early in the planning phase regarding such requirements.

PROJECT IMPACTS AND MITIGATION

Project impacts resulted primarily from levee ROWs expansion and construction of levees, borrows pits, floodwalls, navigable floodgates, and associated features. Development is ongoing within the hurricane protection levees; therefore, the Service has assumed that, for this specific project, project-induced development was insignificant. Habitats impacted by HSDRRS work included wet and non-wet bottomland hardwoods, swamp, dry fields, open water without aquatic vegetation, and fresh, intermediate, and brackish marshes.

The Service's Mitigation Policy (Federal Register, Volume 46, No. 15, January 23, 1981) identifies four resource categories that are used to ensure that the level of mitigation recommended by Service biologists will be consistent with the fish and wildlife resource values impacted. The Service did not recommend mitigation for impacts to Category 4 Resources which included those within the existing ROW (i.e., maintained, non-wet grassland) and/or impacted low quality non-wet or prevalent habitats (e.g., open water without aquatic vegetation, dry fields, etc.). Considering the high value of forested wetlands and marsh for fish and wildlife and the relative scarcity of that habitat type in the area, those wetlands were designated as Resource Category 2, the mitigation goal for which is no net loss of in-kind habitat value. Degraded (i.e., non-wet) bottomland hardwood forests and any wet pastures that were impacted, however, were placed in Resource Category 3 due to their reduced value to wildlife, fisheries and reduced fish and wildlife functions. The mitigation goal for Resource Category 3 habitats is no net loss of habitat value. Because Louisiana is gaining open water areas due to coastal erosion the Service did not request mitigation for this habitat type and did not summarize impacts by acreage.

To quantify anticipated project impacts to fish and wildlife resources, the Service continues to use the Wetland Value Assessment (WVA) methodology. Further explanation of how impacts/benefits are assessed with the WVA and an explanation of the assumptions affecting habitat suitability indices (HIS) values are available for review at the Service's Louisiana field office. Impact assessments and mitigation benefit assessments were coordinated with other State and Federal agencies.

Fish and Wildlife Coordination Act reports and supplemental reports were provided as project designs changed or post-construction impacts were calculated. This report derives lost Average Annual Habitat Units (AAHUs) from the latest impact acreage calculations utilizing Geographic Information System (GIS) ROW data provided by the Corps and recent aerial photography. Because some construction activities are still ongoing, acreage and AAHUs may be revised in future FWCA reports. However, this report supplements all previously provided acreage and AAHU losses in our previous reports.

Total acreage and AAHUs of habitats lost due to project construction that the Service recommended mitigation was 2,044.9 and 992.3, respectively. Of those impacts, forested (wet and non-wet) habitat impacts consisted of 1,421 acres (684.8 AHHUs) and marsh totaled 623.9 acres (307.5 AAHUs). A summary of impacts by IER and habitat type is presented in Appendix B. Impacts to public lands and EPA 404(c) designated wetlands (included in the above totals) consisted of the loss of 380.4 acres (181.8 AAHUs); of which forested habitat losses consisted of 254.5 acres (131.7 AAHUs) and marsh losses totaled 125.9 acres (50.1 AAHUs). Acreage of impacts presented are those known to have occurred by the date of this report. Differences in known acreage between the Service's report and the CED are a result of the CED presenting impacts that occurred up to November 15, 2010, but not beyond that date. Ongoing activities have resulted in impacts that occurred beyond the date of those included in the CED and future impacts beyond those reported may also occur, such as IER 16 that is still being constructed. Reduction of reported impacted areas could also occur as detailed plans and aerial photographs reveal ROWs that may not have been utilized during construction. The Corps further divided impacts according to their location relative to the hurricane protection project (i.e., flood side or protected side). The Service did not use this categorization for forested areas because the functions and values of habitats impacted, while influenced by their location, were not significantly altered or impacted such that a separate analysis or impact accounting was deemed necessary.

Fish and Wildlife Coordination Act reports for borrow sites presented impacts for use of the entire site. However, not all borrow sites were used and of those used not all of the entire area was utilized. Of the government-furnished sites only Maynard and Cummings (IER 18) were used; therefore, only impacts of those two sites are reported as impacts. There is some lack of clarity regarding impacts associated with contractor-provided borrow sources and status of mitigation implementation; therefore, acreage impacted and AAHUs lost will be presented in future FWCA reports. Individuals or companies providing contractor borrow sites were responsible were mitigating all impacts.

Some direct project impacts were not quantifiable but occurred; such impacts included closure of estuarine organism migration routes during construction of IERs 1, 8 and 11 and reduced wildlife movement due to floodwall construction on IER 10. However, minimization measures were incorporated when feasible, such as placement of culverts to allow some limited water exchange and estuarine organism access at migration routes for IER 8 and construction of wildlife passages within the floodwall for IER 10.

Because HSDRRS impacts spanned several watersheds it was decided by the Corps and the natural resource agencies to accept mitigation for project impacts within the basins where impacts occurred. LPV impacts would be undertaken in the Lake Pontchartrain Basin and WBV impacts would be located in the Barataria Basin. Criteria used to screen mitigation proposals were developed for each basin. Criteria common to both basins included:

- Compliance with Water Resources Development Acts, the Clean Water Act and associated regulations, Corps regulations and policies, and other applicable environmental laws
- Risk of encountering hazard, toxic, or radioactive wastes
- In- kind habitat replacement of lost AAHUs (per Corps guidance)
- Technically viable
- Must not be a project(s) that would occur under Future Without Mitigation Project Conditions
- Must have independent utility (not dependant on the completion of other projects)
- Can be scaled to meet mitigation requirements
- No stand-alone bottomland hardwood-dry projects; bottomland hardwood-dry requirements will be mitigated contiguous with mitigation for another habitat types and can be mitigated either on the flood or protected side of a levee and can be mitigated via wet bottomland hardwood (i.e., out-of-kind)
- No stand alone marsh nourishment projects
- Wet bottomland hardwood projects must be contiguous with an existing resource-managed area
- Flood-side mitigation projects must be part of project(s) that consist of multiple habitat types unless contiguous with another resource-managed area (i.e., mitigation bank, State or Federal managed area)
- Fresh marsh can be mitigated as either fresh or intermediate marsh

Basin specific criteria will be presented in our report for each mitigation IER along with additional criteria used during the alternative evaluation process (AEP) that selected the final alternatives and the tentatively selected plan (TSP).

Mitigation alternatives have been developed by the Corps, natural resource agencies, non-governmental organizations, and the public but internal review of the final mitigation plan by the Corps is ongoing. The Service encourages the Corps to finalize mitigation plans and proceed to mitigation construction so that it will be concurrent with project construction and revising the impact and mitigation period-of-analysis to reflect additional temporal losses would not be required.

Some wet and/or non-wet bottomland hardwood mitigation alternatives or alternative features include the conversion of EFH habitat to non-tidal elevations (e.g., supratidal or uplands); this would incur additional mitigation for the loss of such habitat. Therefore, mitigation areas should not permanently convert Essential Fish Habitat to non-tidal elevations. For those mitigation areas that would be non-tidal for a brief period (till restoration of tidal connectivity) mitigation may be required for that temporal loss.

For on-refuge impacts the Service prefers and recommends implementation of the Bayou Sauvage brackish marsh alternative because this alternative ranks higher in long-term sustainability and property management feasibility over other brackish marsh alternatives. The Service does not support the selection of the Golden Triangle alternative. However, NMFS believes that implementation of the Golden Triangle mitigation project may afford storm wave reduction benefits to the Surge Barrier and does not object to mitigating impacts in the Golden Triangle

The Service supports the mitigation of on-refuge flood-side bottomland hardwood impacts on either side of the levee (flood or protected) and recommends that the Corps in consultation with the Service quickly develop acceptable mitigation for such impacts.

The Service has informally expressed concerns via emails dated May 4, 2011, and June 9, 2011, regarding the mitigation alternatives along State Highway 45 that were developed to mitigate impacts to NPS lands. Specifically, the filling of borrow pits with sand and covering them with topsoil is an untested mitigation method in Louisiana. Service staff observations of plantings at disposal sites that were silt and clays over laying sand indicate that success was minimal. It was surmised that when a majority of a trees roots began penetrating the underlying sand layer the trees began to experience mortality. Mixing of topsoil with underlying sand to a sufficient depth that tree roots would not encounter pure sand during its life is a possible rectification of this potential problem. The Service recommends the Corps continue coordinating mitigation plans and address this concern.

The Corps in cooperation with the natural resource agencies is still evaluating alternative enhancement measures for the EPA Bayou aux Carpes 404(c) designated wetlands. Enhancement measures are a condition of the 404(c) modification, which would ensure the integrity of the 404(c) area is maintained post-construction. The Service encourages the Corps to expedite the selection and implementation of the preferred enhancement alternative(s). In addition, the Service supports the determination that mitigation for impacts to the 404(c) area or the NPS lands can be mitigated on NPS property.

Modification and finalization of the "GUIDELINES – WET BOTTOMLAND HARDWOOD HABITAT ENHANCEMENT, SWAMP HABITAT RESTORATION, AND SWAMP HABITAT ENHANCEMENT" document is needed. This plan addresses reforestation planting, Chinese tallow tree removal and control methods, monitoring, success criteria, and some remedial actions. The Service has provided recommendations to the tree species list and the percentages proposed for planting to ensure successful reforestation, while some modifications have been made some revisions are still needed. In our 2005 report, the Service provided Chinese tallow tree removal and control methods for WBV mitigation, since that time the methodology has changed to improve the success of such efforts. These revised methods should be incorporated into the mitigation reforestation plan. The methodology proposed to modify reforestation and restoration of jurisdictional wetland success criteria should more closely reflect those standards utilized by mitigation banks.

The Service's review of the above document revealed the proposal that replanting beyond achievement of the initial success criteria (i.e., 1 year post planting) would be undertaken by the local sponsor. This appears to transfer the Operations Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) to the local sponsor upon attainment of the initial success criteria. The Service recommends that the Corps maintain full responsibility for any mitigation project for a minimum of 4-years post planting. That would allow the 4-year success criteria to be evaluated, prior to turning operation and maintenance responsibilities over to the local sponsor. Based on our experience, it is difficult to forecast the likely future success of the mitigation project based solely on mitigation activities accomplished during year one. The second monitoring event, performed 4 years after the initial mitigation activities, would provide significantly more insight into the continued development, success, and effectiveness of the implemented features. Because mitigation is a project feature, we believe that waiting for the 4 year monitoring event is analogous to waiting for the completion of a levee lift to start OMRR&R; prior to that, the determination of success or completeness of a project (or project feature) would be lacking. The above comments only address some of the Services concerns with this document and our informal comments previously provided should still be consulted during future revisions to those guidelines. A summary of the most important informal comments can be found in Appendix C.

The Corps has been working with the Service and other natural resource agencies to develop marsh mitigation specifications; the Service recommends that necessary revisions and finalization of this document be undertaken.

Water Control Plans for IERs 1, 8 and 11 have been coordinated with the Service and other natural resource agencies; the Service recommends that this coordination continue until all plans are finalized and for any future changes to the plans. Coordinating plan development provides the opportunity to incorporate mitigative measures.

At this time none of the mitigation planning documents describe in detail actions needed by the Corps and/or the local sponsor if mitigation is not succeeding as planned. The Service recommends that this important component of the mitigation plan be developed.

SERVICE POSITION AND RECOMMENDATIONS

Construction of the increased flood protection resulted in habitat losses to wetlands and dry bottomland hardwoods. Total acreage and AAHUs of habitats lost due to project construction that the Service recommended mitigation was 2,044.9 and 992.3, respectively. Of those impacts, forested (wet and non-wet) habitat impacts consisted of 1,421 acres (684.8 AHHUs) and marsh totaled 623.9 acres (307.5 AAHUs). Impacts to NWR, NPS, and State Park lands and EPA 404(c) designated wetlands (included in the above totals) consisted of the loss of 380.4 acres (181.8 AAHUs); of which forested habitat losses consisted of 254.5 acres (131.7 AAHUs) and marsh losses totaled 125.9 acres (50.1 AAHUs). The Service does not object to the completion of improved hurricane protection to the Greater New Orleans area provided the following fish and wildlife conservation recommendations are incorporated into future project planning and implementation and outstanding issues are adequately resolved via ongoing planning efforts:

1. To the greatest extent possible, situate final flood protection features so that impacts to wetlands and non-wet bottomland hardwoods are avoided or minimized.

2. Avoid adverse impacts to bald eagle nesting locations and wading bird colonies through careful design project features and timing of construction. Forest clearing associated with project features should be conducted during the fall or winter to minimize impacts to nesting migratory birds, when practicable.

3. If a proposed project feature is changed significantly or is not implemented within one year of the last Endangered Species Act consultation for that feature, we recommend that the Corps reinitiate coordination with this office to ensure that the proposed project would not adversely affect any federally listed threatened or endangered species or their habitat.

4. The Corps shall fully compensate for any unavoidable losses of wetland habitat or non-wet bottomland hardwoods caused by project features.

5. Mitigation areas should not permanently convert Essential Fish Habitat to non-tidal elevations. For those mitigation areas that would be non-tidal for a brief period (till restoration of tidal connectivity) mitigation may be required for that temporal loss.

6. Further detailed planning of project features (e.g., Design Documentation Report, Engineering Documentation Report, Plans and Specifications, Water Control Plans, or other similar documents) should be coordinated with the Service, NMFS, LDWF, EPA and Louisiana Department of Natural Resources (LDNR). The Service shall be provided an opportunity to review and submit recommendations on the all work addressed in those reports.

7. The Corps should avoid impacts to public lands, if feasible. If not feasible the Corps should establish and continue coordination with agencies managing public lands that may be impacted by a project feature until construction of that feature is complete and prior to any subsequent maintenance. In addition all mitigation proposed to occur on public lands should be coordinated with the respective land managing agency. Points of contacts for the agencies potentially impacted by project features are: Kenneth Litzenberger, Project Leader for the Service's Southeast National Wildlife Refuges and Neal Lalonde (985) 822-2000, Refuge Manager for the Bayou Sauvage National Wildlife Refuge (NWR), Office of State Parks contact Mr. Brent Evans at 1-888-677-1400, National Park Service (NPS), contact Superintendent Carol Clark, (504) 589-3882 extension 137 (Carol_Clark@nps.gov) or Chief of Resource Management Guy Hughes (504) 589-3882 extension 128, (Guy_Hughes@nps.gov) and for the 404(c) area contact the previously mentioned NPS personnel and Ms. Barbara Keeler (214) 665-6698 with the EPA.

8. If applicable, a General Plan should be developed by the Corps, the Service, and the managing natural resource agency in accordance with Section 3(b) of the FWCA for mitigation lands.

9. If mitigation lands are purchased for inclusion within a NWR those lands must meet certain requirements; a summary of some of those requirements is provided in Appendix A. Other land-managing natural resource agencies may have similar requirements that must be met prior to accepting mitigation lands; therefore, if they are proposed as a manager of a mitigation site they should be contacted early in the planning phase regarding such requirements.

10. If the local project-sponsor is unable to fulfill the financial mitigation requirements for operation and/or maintenance of mitigation lands, then the Corps should provide the necessary funding to ensure mitigation obligations are met on behalf of the public interest.

11. Any proposed change in mitigation features or plans should be coordinated in advance with the Service, NMFS, LDWF, EPA and LDNR.

12. The Service encourages the Corps to finalize mitigation plans and proceed to mitigation construction so that it will be concurrent with project construction and revising the impact and mitigation period-of-analysis to reflect additional temporal losses will not be required.

13. For on-refuge impacts the Service prefers and recommends implementation of the Bayou Sauvage brackish marsh alternative because this alternative ranks higher in long-term sustainability and property management feasibility over other brackish marsh alternatives. Additionally, the Service does not support the selection of the Golden Triangle mitigation alternative. However, NMFS believes that implementation of the Golden Triangle mitigation project may afford storm wave reduction benefits to the Surge Barrier and does not object to mitigating impacts in the Golden Triangle Furthermore, the Service supports the mitigation of on-refuge flood-side bottomland hardwood impacts on either side of the levee (flood or protected) and recommends that the Corps, in consultation with the Service, develop acceptable mitigation for such impacts.

14. The Service has informally expressed concerns via emails dated May 4, 2011, and June 9, 2011, regarding the mitigation alternatives along State Highway 45 that were developed to mitigate impacts to NPS lands. The Service recommends that the Corps continue coordinating the development of mitigation plans and address our concerns.

15. The Corps in cooperation with the natural resource agencies is still evaluating alternative enhancement measures for the EPA Bayou aux Carpes 404(c) designated wetlands. Enhancement measures, which would ensure the integrity of the 404(c) area is maintained, are a condition of the 404(c) modification. The Service encourages the Corps to select and implement the preferred enhancement alternative(s).

16. The Service recommends that the Corps work with the natural resource agencies to incorporate proposed modifications and finalize the "GUIDELINES – WET BOTTOMLAND HARDWOOD HABITAT ENHANCEMENT, SWAMP HABITAT RESTORATION, AND SWAMP HABITAT ENHANCEMENT" and the untitlted document for marsh mitigation.

17. The Service recommends that the Corps maintain full responsibility for any mitigation project for a minimum of 4-years post planting. The Corps should maintain full responsibility for all marsh mitigation projects until the projects are found to be fully compliant with success and performance requirements. Those requirements should be developed in cooperation with the resource agencies and included in the mitigation IERs.

18. The Service recommends the continued coordination of the development of Water Control Plans until all plans are finalized and for any future changes to the plans.

19. At this time none of the mitigation planning documents describe in detail actions needed by the Corps and/or the local sponsor if mitigation is not succeeding as planned. The Service recommends that this important component of the mitigation plan be developed.

20. The Service recommends that impacts associated with contractor-provided borrow sources and status of mitigation implementation be provided to the Service.

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APPENDIX A

Summary of basic mitigation land requirements before land is transferred to the U.S. Fish and Wildlife Service

SUBJECT: Revised Summary of basic mitigation land requirements before land is transferred over to the Service.

The following represents a summary of basic mitigation land requirements before land is transferred over to the Service. This does not necessarily represent a comprehensive list, but does represent our best effort to identify all land requirements within reason.

1. For inclusion into the National Wildlife Refuge (NWR) system the lands must be located within a refuge's acquisition boundary.

2. The Service must be provided copies of any easements/agreements for right-of-way on the property especially as it pertains to maintenance of such right-of-way, frequency of maintenance and costs associated with that maintenance if the maintenance is to be preformed by the landowner.

3. The area must be surveyed prior to acquisition by the United States or transfer to the Fish and Wildlife Service. The survey will be conducted by the Corps of Engineers (Corps) or an approved contractor. Boundaries must be marked and permanent monuments set at all corners. Copies of the surveyor notes, plats, etc. resulting from such survey must be provided to Service.

4. Language must be placed in the deed dedicating the mitigation land to fish and wildlife conservation in perpetuity.

5. When possible any restrictive covenants or liens shall be removed, especially if they could interfere with mitigation implementation, operation and/or maintenance.

6. Completion of a Level 1 survey for hazardous, toxic, and/or radioactive wastes with a copy being provided to the Service. If the Level 1 survey indicates the need for further investigations/surveys, those investigations/surveys must be completed and a copy provided to the Service. Lands having unremediated hazardous, toxic, and/or radioactive wastes present may not be accepted into a NWR. Remediated sites will be assessed for inclusion on a case-by-case basis. Documentation of the level of remediation is to be provided to the Service.

7. Funding mechanism for operation and maintenance of the mitigation lands and mitigation features (e.g., water control structures, timber stand improvements, etc.).

8. Documentation must be provided to the Service describing the mitigation goals and objectives in addition to a description of necessary operation and maintenance activities needed to accomplish the stated goals and objectives.

9. Mineral rights should be purchased. If it is not possible to purchase, then protection of surface rights via the following language:

> "The vendors reserve for themselves, their successors and assigns, the right to explore, for, operate, produce, remove and transport, oil and gas from the lands herein described. The vendors reserve unto themselves, their successors and assigns, the right of ingress and egress over the said lands in pursuance of the reservations set forth above.
>
> The land is now subject to oil and gas lease in favor of ____, as per lease of record in the records of ____________________, __________________________, pages ______________ of Book _________________, and the conveyance is subject to the rights of the lessee in said lease.
>
> The oil and gas reservations made by the vendors herein in favor of themselves, their successors and assigns, shall be subject to the following stipulations, and any lease made by the vendors, their successors or assigns, subsequent to the date of this deed, shall contain the following stipulations for the protection of the vendee.
>
> The vendors, their successors and assigns, agree that prior to entry upon the land for purposes of exploration, development or production of, oil and/or gas, they shall obtain a Special Use Permit from the U.S. Fish and Wildlife Service, which permit is for the purpose of providing for access and protecting the natural resources of the area for which the land was acquired, and whose terms and conditions will not unreasonably restrain the activities of the vendors, and their successors and assigns.
>
> It is mutually understood between the parties that the intention of the Government in acquiring this area is to create a refuge for, and the protection of, wildlife in the area herein acquired, and the vendors will conform to, and be governed by, and the vendors herein bind themselves, their successors and assigns, agents and employees, to conform to, and be governed by, the rules and regulations pertaining to the protection of wildlife and refuge administration prescribed from time to time by the Secretary of the Interior or his/her authorized agent, the Director of Fish and Wildlife Service, except that such regulations shall not unreasonably restrain the exercise and use by the vendors, their successors and assigns, of the reservation set out in this agreement."

10. The Service would need a title commitment and policy in favor of United States of America that is in the American Land Title Association (ALTA) U.S. Policy 9/28/91 format as provided in Title Standards 2001.

If the title remains with the local-sharer or the Corps a General Plan as provided for under Section 3 of the Fish and Wildlife Coordination Act (48 Stat. 401; 16 U.S.C. 661 et seq.) must be written. However, the Service may chose to not manage lands for which it does not have title.

APPENDIX B
HSDRRS IMPACTS

NEPA Document[1]	Project/ Impacts		Swamp	Dry BLH	Wet BLH	Fresh Marsh	Intermediate Marsh	Brackish Marsh	Impact Type Totals	IER Totals
IER 1	LPV Temporary	Acres	58						58	186.7
		AAHUs	20.1						20.1	102.7
	LPV Permanent	Acres	128.7						128.7	
		AAHUs	82.6						82.6	
IER 2	LPV Temporary	Acres						4.3	4.3	30.2
		AAHUs						0.9	0.9	14
	LPV Permanent	Acres						25.9	25.9	
		AAHUs						13.1	13.1	
IER 7	LPV Temporary	Acres			16.9		7.3	29.1	53.3	358.7
		AAHUs			2.2		0.2	7.4	9.8	168.9
	LPV Permanent	Acres			199.9		82.3	23.2	305.4	
		AAHUs			105.3		42.3	11.5	159.1	
IER 9	LPV Temporary	Acres		2.1	0.1	0.6			2.8	12
		AAHUs		1.2	0.04	0.2			1.4	3.3
	LPV Permanent	Acres		6.7	1.1	1.4			9.2	
		AAHUs		1.1	0.7	0.1			1.9	
IER 10	LPV Temporary	Acres			20.5	1.1	5.9		27.5	332.7
		AAHUs			9	0.5	3.2		12.7	137.4
	LPV Permanent	Acres		5.2	113.5	35.5	52.5	98.5	305.2	
		AAHUs		2.3	17.4	10.6	29.8	64.6	124.7	
IER 11[2]	LPV Temporary	Acres		11.9					11.9	89
		AAHUs		2					2	36.7
IER 11	LPV	Acres						77.1		

NEPA Document[1]	Project/ Impacts		Swamp	Dry BLH	Wet BLH	Fresh Marsh	Intermediate Marsh	Brackish Marsh	Impact Type Totals	IER Totals
	Permanent	AAHUs						34.7		
IER 12	LPV Temporary	Acres	6.9	22.2					29.1	216.7
		AAHUs	1.4	7.4					8.8	139.2
	LPV Permanent	Acres	26	159.2	2.4				187.6	
		AAHUs	14	114.4	1.99				130.4	
IER 13	LPV Temporary	Acres	10.7	2.6	4.5				17.8	58.1
		AAHUs	2.9	0.7	0.9				4.5	24.1
	LPV Permanent	Acres	20.9	14.3	5.1				40.3	
		AAHUs	7.1	9.6	2.9				19.6	
IER 14	WBV Temporary	Acres	0.7		0.4				1.1	229.5
		AAHUs	0.4		0.3				0.7	139.6
	WBV Permanent	Acres	107.9		120.5				228.4	
		AAHUs	61.8		77.1				138.9	
IER 15	WBV Temporary	Acres			0.6	15			15.6	62.1
		AAHUs			0.1	3			3.1	30.8
	WBV Permanent	Acres			15.2	31.3			46.5	
		AAHUs			82	19.5			27.7	
IER 16[3]	WBV Temporary	Acres			3.2	0.7			3.9	219.7
		AAHUs			0.1	0.1			0.2	108
	WBV Permanent	Acres			83.6	132.2			215.8	
		AAHUs			42	65.8			107.8	
IER 17	WBV Temporary	Acres			3.4				3.4	23.5
		AAHUs			1.6				1.6	18.8
	WBV Permanent	Acres	17.8		2.3				20.1	
		AAHUs	16.1		1.1				17.2	

NEPA Document[1]	Project/ Impacts		Swamp	Dry BLH	Wet BLH	Fresh Marsh	Intermediate Marsh	Brackish Marsh	Impact Type Totals	IER Totals
IER 18[4]	Borrow	Acres		226						226
	Permanent	AAHUs		68.8						68.8
Total		Acres	377.6	450.2	593.2	217.8	148	258.1	2044.9	
		AAHUs	206.4	207.5	270.9	99.8	75.5	132.2	992.3	

[1]Includes all impacts (i.e., supplementals, tiers, and addendums) determined by the date of this report unless otherwise noted.
[2]All temporary ROW impacts resulted in permanent impacts to existing habitats thus they were included in the permanent totals.
[3]Only impacts from the first IER are reported; no impacts from any supplemental IER was included because of the uncertainty of actual acreage impacted.
[4]Only Maynard and Cummings borrow sites were utilized thus impact acreage has decreased from FWCA Report.

Note: IERs 3, 4, 5, 6, and 8 did result in any quantifiable impact to any Service trust resources or their habitats, thus no compensation mitigation was recommended. IER 24 was a stockpile area that was cancelled prior to completion.

Impacts to Public Land by IER

IER and Lands Impacted[1]	Project/ Impacts		Swamp	Dry BLH	Wet BLH	Fresh Marsh	Intermediate Marsh	Brackish Marsh	Impact Type Totals	IER Totals
IER 7 NWR	LPV Temporary	Acres AAHUs			15.9 2.1		7.3 0.2	14.8 3.8	38 6.1	298.3 143
	LPV Permanent	Acres AAHUs			171.5 90.8		79 41.1	9.8 5	260.3 136.9	
IER 12 404c	LPV Temporary	Acres AAHUs							0	4.5 2.7
	LPV Permanent	Acres AAHUs	4.2 2.5		0.3 0.2				4.5 2.7	
IER 12 404c and NPS	WBV Temporary	Acres AAHUs							0	5.1 3.6
	WBV Permanent	Acres AAHUs	3 1.8		2.1 1.8				5.1 3.6	
IER 14 NPS	WBV Temporary	Acres AAHUs			0.01 0.1				0.01 0.1	51.8 29.8
	WBV Permanent	Acres AAHUs	51.7 29.6		0.1 0.1				51.8 29.7	
IER 15 Bayou Segnette State Park	WBV Temporary	Acres AAHUs				15 3			15 3	15 3
	WBV Permanent	Acres AAHUs							0	
IER 17 Bayou Segnette State Park	WBV Temporary	Acres AAHUs			3.4 1.6				3.4 1.6	5.7 2.7
	WBV Permanent	Acres AAHUs			2.3 1.1				2.3 1.1	

[1]Includes all impacts determined by the date of this report unless otherwise noted. NWR = National Wildlife Refuge NPS = National Park Service

APPENDIX C

Page 1, Planting Guidelines for Wet Bottomland Hardwood Habitat Enhancement – We recommend using standards established by the Natural Resources Conservation Service for seedling selection (e.g., 3/8"-diameter root collar, 12" – 18" stem height plus 8" – 10" root length, and 4 - 8 lateral roots). Those standards (NRCS, Code 612, "Establishment Specifications - Tree/Shrub Establishment") were provided in an attachment to a June 9, 2011, electronic mail message from our office, and can be supplied again, if necessary. The fourth sentence of this paragraph states that planting could be delayed until late spring or early summer. The Service strongly recommends against the planting of bare-root seedlings beyond the standard March 15 deadline. Based on our experience, we would anticipate very high mortality rates for bare-root seedlings that are not dormant when planted.

Page 1, second and third paragraphs - As written a minimum of 3 hard mast and 3 soft mast tree species is required. The Service believes this number is too low to achieve a diverse forest and could result in low survival rates; therefore the Service recommends that this number be increased to 4 hard mast and 5 soft mast species.

Page 2, Table 1A - Table 1A's percent composition for water oak should be no greater than 5% because of poor survival of this species. White ash should be replaced with pumpkin ash.

Page 2, Table 2 - Saltbush, roughleaf dogwood, honey locust, and dwarf palmetto should be removed from this table based on factors such as site suitability, likelihood of natural regeneration, value to wildlife, and commercial availability of seedlings.

Page 3, last paragraph - The Service nøte's that replanting beyond achievement of the initial success criteria (i.e., 1 year post planting) would be undertaken by the local sponsor. This appears to transfer the Operations Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) to the local sponsor upon attainment of the initial success criteria. The Service recommends that the Corps maintain full responsibility for any mitigation project for a minimum of 4-years post planting. That would allow the 4-year success criteria to be evaluated, prior to turning operation and maintenance responsibilities over to the local sponsor. Based on our experience, it is difficult to reasonably forecast the likely future success of the mitigation project based solely on mitigation activities accomplished during year one. The second monitoring event, performed 4 years after the initial mitigation activities, would provide significantly more insight into the continued development, success, and effectiveness of the implemented features. Because mitigation is a project feature, we believe that waiting for the 4 year monitoring event is analogous to waiting for the completion of a levee lift to start OMRR&R; prior to that, the determination of success or completeness of a project (or project feature) would be lacking.

Page 4, Tables 3 and 4 - Increase the maximum percentage of bald cypress to 70 or 75% and reduce the Drummond red maple percentage to no more than 5%. Bitter pecan should be replaced with water hickory. In Table 4 delete roughleaf dogwood, swamp privet, and swamp rose.

Page 4, Guidelines for the Eradication and Control of Invasive and Nuisance Plant Species - The following information presents a more detailed description of eradication and control methods recommended by the Service. If a site is forested with mature Chinese tallow trees, we recommend that the site be mechanically cleared prior to the application of any chemical. Chemically treating a mature may prove largely unsuccessful due to the relatively uneven canopy structure, which would result in an uneven application, leaving many mid-story and understory stems completely untreated. Mechanical clearing of the site 1 month after chemical treatment, as proposed, would not allow sufficient time for chemicals to be fully transported to the roots (significantly increasing the likelihood of root-sprouting). The proposed timeline for applying ground herbicide following mechanical clearing may also be ineffective because most of the future resprouting would take longer than 1 week to occur.

In order to increase the success of the proposed Chinese tallow-tree eradication, the Service recommends the following sequence of actions (they are listed in chronological order):

1) Mechanically clear the site with a hydro-axe or similar equipment. We support either tree disposal or mulching techniques as previously proposed.

2) Allow a minimum of 2 months (during the growing season) for root resprouting to occur.

3) Use a tractor with boom-sprayer to apply chemicals to the Chinese tallow-tree resprouts. With this method, more cost-effective alternatives to Clearcast® may be used (if a foliar-application chemical is used, then it would not be necessary to use a discriminant/selective chemical such as Clearcast®). Chemical treatment should occur in the late summer or fall, when plant resources are being transported to the roots; this increases the likelihood of a complete "root-kill." The acceptable chemical treatment period is June 1 through October 15, with the optimum period occurring September 1 through October 15. To ensure effectiveness, the treatment must occur before the leaves begin to change color for the autumn season.

4) Allow adequate time for seed germination/sprouting to occur (i.e., a second growing season). Most seeds that did not germinate during the first year of site preparation, should germinate during the second growing season. Chemically treat the site as described in "3" above.

5) Plant bare-root seedlings during the following dormant season (December 15 – March 15). This would allow a minimum of 2 months between the second chemical treatment and the planting of seedlings.

Page 6, third bullet – While allowing water depths of 1 to 2 feet to occur over the swamp such depths could adversely impact seedling survival during the first several years following planting. Therefore, the Service recommends that such water depths be only allowed after almost all seedlings are taller than the expected depth of flooding.

COMMENT LETTER

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
263 13th Avenue, South
St. Petersburg, Florida 33701

November 2, 2012 F/SER46/RH:jk
225/389-0508

Mr. Jeffrey D. Weller, Supervisor
Louisiana Field Office
U.S. Fish and Wildlife Service
646 Cajundome Blvd, Suite 400
Lafayette, Louisiana 70506

Dear Mr. Weller:

NOAA's National Marine Fisheries Service (NMFS) has received the draft Fish and Wildlife Coordination Act Report (Report) for the Comprehensive Environmental Document (CED) being prepared by the U.S. Army Corps of Engineers (USACE). The CED is intended to comply with the approved alternative arrangements for compliance with the National Environmental Policy Act developed to allow for the improvement of the Greater New Orleans Hurricane Storm Damage and Risk Reduction System (HSDRRS) following the passage of Hurricane Katrina. The CED is intended to summarize information and impacts quantified in a large number of Individual Environmental Reports pertaining to various geographic sections of the HSDRRS project.

As summarized in the Report, the construction of the HSDRRS project has resulted in adverse impacts to more than 2,000 acres of various habitats for which compensatory mitigation is necessary. While the approximate magnitude of those impacts have been understood for a number of years, final selection of specific mitigation projects to offset those impacts has not be completed. Once mitigation projects are selected, engineering and design, land rights acquisitions and implementation could take years, resulting in additive significant temporal loss of wetland functions resulting from the construction of HSDRRS. Wording in paragraph 3, page 8 of the Report, and Conservation Recommendation #10 suggest revisions to impact analysis could be necessary to offset temporal losses of functions. NMFS concurs and believes it will be necessary to re-quantify increases in mitigation requirements which could result from each yearly delay between the impacts caused by HSDRRS construction and the implementation of mitigation. NMFS further believes such a quantification of delay impacts on mitigation requirements may encourage final selection of the mitigation plan and its timely construction. NMFS therefore recommends the Report be revised to quantify annual increases in mitigation requirements, by habitat type, which would be necessary to offset temporal losses in wetland functions and values resulting from delays in the implementation of compensatory mitigation.

Conservation Recommendation #15 recommends the USACE maintain full responsibility for any mitigation project for at least four years after planting. This recommendation appears to apply to mitigation projects designed to offset impacts to bottomland hardwood or swamp habitats only. Given HSDRRS implementation has resulted in substantial impacts to tidally influenced marsh, NMFS believes this recommendation should be revised. Specifically, NMFS recommends the following sentence be added to Conservation Recommendation #15: "The Corps should maintain full responsibility for all marsh mitigation projects until monitoring guidelines to be developed and included in the CED are completed and demonstrate the projects are fully compliant with success and performance requirements."

As presently is being evaluated, some tidally influenced waters designated as essential fish habitat (EFH) are being considered as mitigation sites to create supratidal or upland elevations to help offset impacts to wet and non-wet bottomland hardwood habitats. Such a conversion of EFH to non-tidal elevations would result in a loss of EFH which would require further mitigation. NMFS recommends the Report be revised to discuss this issue and to add a Conservation Recommendation which stated tidally influenced water bottoms should not be converted to non-tidal elevations as a component of any HSDRRS mitigation plan.

The Essential Fish Habitat section of the Report lists bluefish and mangrove snapper among managed species potentially in the project area. Those two species should be deleted from this section of the document. In addition, it cites a 1998 generic amendment of the Fishery Management Plans as providing detailed information on federally managed fisheries and their EFH. That document was updated in 2005 and the new year should be the one cited in this section of the Report.

The Report indicates the U.S. Fish and Wildlife Service does not support the selection of the Golden Triangle mitigation project to offset impacts to brackish marsh which occurred on the Bayou Sauvage National Wildlife Refuge. NMFS believes implementing mitigation in the Golden Triangle area could provide infrastructure support benefits by helping project the Surge Barrier from hurricane-generated waves. As such, NMFS does not object to offsetting impacts to brackish marsh in the Golden Triangle area and requests wording be added to the Report to reflect this position.

Other than the comments provided above, NMFS has no further recommendations for revisions to the Report and fully supports the other Conservation Recommendations. We appreciate the opportunity to review and comment on this Report.

Sincerely,

Virginia M. Fay

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

c:
EPA, Ettinger
NOD, Behrens, Wilkinson
LA DWF, Bourgeois
F/SER46, Swafford
Files

AGENCY LETTERS

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

JUN 15 2012

REPLY TO
ATTENTION OF
Regional Planning and
Environmental Division, South
Environmental Planning Branch

Mr. Melvin C. Mitchell, Sr.
Louisiana Department of Env. Quality
Water Quality Certificates Section
P.O. Box 4313
Baton Rouge, LA 70821-4313

Dear Mr. Mitchell:

The US Army Corps of Engineers New Orleans District (CEMVN) is currently preparing the first phase of the Comprehensive Environmental Document for the Hurricane Storm Damage and Risk Reduction System (HSDRRS) project. CEMVN in accordance with Federal Register Vol. 72, No. 48, Tuesday, March 13, 2007, is preparing a CED to meet the provisions of the Alternative Arrangements to the National Environmental Policy Act (NEPA) that were adopted for the Orleans Hurricane and Storm Damage Reduction System following the Hurricane Season of 2005. Previously under the provisions of alternative arrangements, CEMVN prepared Individual Environmental Reports (IERs) that separately addressed all the segments of the HSDRRS. In conjunction with the preparation of IERs water quality certification was received through your agency.

When the Alternative Arrangements for the HSDRRS project was first proposed the preparation of only one CED document was anticipated. However, as construction activities have progressed and construction completion dates and dates for related monitoring activities have moved beyond June 2011 and some data gaps remain, the decision was made to release the CED as a phased or supplemented document. Some of the items that have not been fully addressed or completed include; the wetlands and non wet Bottomland Hardwood Forest Mitigation final Plans and IERs, the comprehensive armoring plan, development of final Operations, Maintenance, Repair, Replacement and Rehabilitation plans and the completion of various long term monitoring efforts related to the Bayou aux Carpes Clean Water Act 404c site (IER 12) and monitoring associated with the protection at the Inner Harbor Navigation Canal (IER 11 Tier 2 Pontchartrain). The US Army Corps of Engineers New Orleans District (CEMVN) continues to work on completing these activities and will address these outstanding items in a future phase of the CED.

The Individual Environmental Reports (IERs) that will be addressed in the first Phase of the CED document and included in the cumulative impact analysis section of the CED are listed in the enclosed Table 1. For each IER listed in Table 1 and discussed in the CED water quality application was made. The IERs that have been completed or are in development but did not meet the cutoff date for the phase I CED and the cumulative impacts discussion are listed in Table 2.

The purpose of the CED is to address cumulative HSDDRS impacts and cumulative regional impacts as well as fill data gaps. Flood damage risk reduction construction activities associated with the HSDRRS have been underway since 2007 and are anticipated to continue into August 2014. HSDRRS mitigation construction activities are currently scheduled to be conducted between 2014 and 2017. Although construction activities will continue beyond 2014, delaying the preparation and release of the first phase of the CED until all the flood damage risk reduction construction activities are completed would unnecessarily delay the release of information to the public.

Throughout the HSDRRS planning process and preparation of the alternative arrangement NEPA documents, the IERs, the USACE obtained concurrence, permits and authorizations necessary to be in compliance with environmental laws prior to the initiation of construction activities. Compliance with the Louisiana Water Quality Certification Program was achieved prior to finalizing IERs and signing decision records. All of the actions described in the CED previously achieved compliance with the State of Louisiana's Water Quality Certification Program. A listing of the Water Quality Certifications and their dates is provided in Table 3.

Based on your review of the enclosed information, please advise if an additional Water Quality Application is required for the phase I Comprehensive Environmental Document.

If you have any questions about this request or require any additional information, please contact Beth Nord at (504) 862-2167 or via email at beth.p.nord@usace.army.mil.

Sincerely,

Joan M. Exnicios
For Chief, Environmental Planning
Branch

Enclosure

Hurricane and Storm Damage Risk Reduction System

COMPREHENSIVE ENVIRONMENTAL DOCUMENT PHASE I

INTRODUCTION

The New Orleans District (CEMVN) coordinated with the Council on Environmental Quality (CEQ) and team comprised of personnel from Federal and State natural resource agencies to develop Alternative Arrangements for implementing the National Environmental Policy Act of 1969 (NEPA) and the CEQ regulations for implementing NEPA(40 CFR § 1500-1508). The Alternative Arrangements were implemented by CEMVN on March 13, 2007. The Alternative Arrangement Process was implemented in order to expeditiously complete environmental analysis for changes to the authorized system and the 100-year level of the Hurricane and Storm Damage Risk Reduction System (HSDRRS), formerly known as the Hurricane Protection System.

A component of the Alternative Arrangements includes the preparation of a comprehensive environmental document to address data gaps and cumulative HSDRRS and regional cumulative impacts. This first phase of the CED is being prepared to meet commitments outlined in the Alternative Arrangements dated February 23, 2007, and the Federal Register Notice Vol. 72, No. 48, dated March 13, 2007.

Throughout the HSDRRS planning process and preparation of the alternative arrangement Individual Environmental Documents (IER) NEPA documents, the CEMVN obtained concurrence, permits and authorizations necessary to be in compliance with environmental laws prior to the initiation of construction activities. Compliance with the Louisiana Water Quality Certification Program, Section 401 of the Clean Water Act was achieved prior to the release of draft IERs for public review. In addition, throughout the construction phase of the HSDRRS flood damage risk reduction features, if proposed plans were changed coordination was re-initiated through the preparation of Environmental Re-evaluations which were submitted to the HSDRRS interagency team for review and response.

A listing of all the IERs addressed in the phase I CED document and the Water Quality Certifications and the dates the certifications were issued are provided with this submittal.

PURPOSE AND NEED FOR THE PROPOSED ACTION

On 29 August 2005, Hurricane Katrina caused major damage to the Federal and non-Federal control and Hurricane and Storm Damage Risk Reduction System (HSDRRS) located in Southeast Louisiana. Hurricane Rita followed this storm on 24 September 2005, and make landfall on the Louisiana-Texas state border, causing damage to the HSDRRS in southern Louisiana. Since the storms, the United States Army Corps of Engineers (USACE) has been working with state and local officials to restore the Federal and non-Federal flood control and

HSDRRS projects and related works in the affected area.

The purpose of the proposed action is to construct and maintain 100-year flood protection for the residents and businesses through the Greater New Orleans area. The proposed actions results from a defined need to reduce flood risk and storm damage to residences, businesses, and other infrastructure from hurricanes (100-year storm events) and other high water events. The completed Greater New Orleans HSDRRS would lower the risk of harm to citizens, and damage to infrastructure during a storm event. The safety of people in the region is the highest priority of the CEMVN. The proposed action resulted from the efforts to restore the Federal and non-Federal flood control and hurricane storm damage reduction projects post Hurricane Katrina and Rita and provide a 100-year level of flood protection.

The term "100-year level of risk reduction" refers to a level of protection which reduces the risk of hurricane surge and wave driven flooding that the New Orleans Metropolitan area has a 1% chance of experiencing each year. The CED provides a cumulative impacts assessment of actions previously disclosed in IERs, as well as a discussion of regional cumulative impacts.

DESCRIPTION OF THE PROPOSED ACTION

The HSDRRS project area is located in southeast Louisiana in the Parishes of St. Charles, Jefferson, Orleans, St. Bernard and Plaquemines. Much of the area has low ground elevation and much of the area is below sea level. The HSDRRS project area is bounded Lake Pontchartrain to the north, Lake Borgne and Breton Sound to the east and Bayou Trepagnier, Cross Bayou and the Davis Pond Freshwater Diversion Outfall Canal to the west. The Mississippi River also divides the project area. As a result, portions of the Mississippi River Levees have been incorporated into the HSDRRS system. To the South the project area is bounded by wetlands and swamps that are part of the Barataria Estuary System. The Barataria Estuary System connects directly to the Gulf of Mexico.

The Greater New Orleans metropolitan area has been under development for many centuries and many of the areas that are located within the HSDRRS were previously impacted by development activities. Those impacts included clearing and filling of wetlands, urban and industrial development and the development of a forced drainage system.

The proposed actions for all the IERs included in the first phase of the CED can be found in the Water Quality Applications previously prepared for the IERs. Reference Table 1 for the list of IERs that are included in the first phase of the CED. The IERs that have been completed or are in development but did not meet the cutoff date for the first phase of the CED are listed in Table 2. A listing of the Water Quality Certifications and the dates the certifications were issued for the IERs included in the first phase of the CED can be found in Table 3.

Table 1. HSDRRS IERs Analyzed in the CED
(Decision Records Signed by November 15, 2010)

Alternative NEPA Arrangements Document	Basin	Sub-Basin	Parish	Descriptor Title	Type of HSDRRS Action	Date of Signed Decision Record
IER #1	LPV	St. Charles	St. Charles	La Branche Wetlands Levee	Risk Reduction	June 9, 2008
IER Supplemental #1	LPV	St. Charles	St. Charles	La Branche Wetlands Levee Supplemental	Risk Reduction	June 29, 2009
IER #2	LPV	Jefferson East Bank	St. Charles, Jefferson	West Return Floodwall	Risk Reduction	July 18, 2008
IER Supplemental #2	LPV	Jefferson East Bank	St. Charles, Jefferson	West Return Floodwall Supplemental	Risk Reduction	October 29, 2009
IER #3	LPV	Jefferson East Bank	Jefferson	Lakefront Levee	Risk Reduction	July 25, 2008
IER Supplemental #3.a	LPV	Jefferson East Bank	Jefferson	Lakefront Levee Supplemental	Risk Reduction	December 18, 2009
IER #4	LPV	Orleans East Bank	Orleans	New Orleans Lakefront Levee, West of Inner Harbor Navigational Canal	Risk Reduction	March 19, 2009
IER #5	LPV	Orleans East Bank	Orleans	Outfall Canal Closure Structures, 17th Street Canal, Orleans Avenue Canal and London Avenue Canal	Risk Reduction	June 30, 2009
IER #6	LPV	New Orleans East	Orleans	Citrus Lakefront Levee	Risk Reduction	June 25, 2009
IER Supplemental #6	LPV	New Orleans East	Orleans	Citrus Lakefront Levee Supplemental	Risk Reduction	February 8, 2010
IER #7	LPV	New Orleans East	Orleans	New Orleans East Lakefront to Michoud Canal	Risk Reduction	June 19, 2009
IER Supplemental #7	LPV	New Orleans East	Orleans	New Orleans East Lakefront to Michoud Canal Supplemental	Risk Reduction	May 3, 2010
IER #8	LPV	Chalmette Loop	St. Bernard	Bayou Dupre Control Structure	Risk Reduction	June 23, 2009
IER #9	LPV	Chalmette Loop	St. Bernard	Caernarvon Floodwall	Risk Reduction	February 8, 2010
IER #10	LPV	Chalmette Loop	St. Bernard	Chalmette Loop Levee	Risk Reduction	May 26, 2009
IER #11 Tier 1 Pontchartrain and Borgne	LPV	New Orleans East	Orleans	Improved Protection on the Inner Harbor Navigation Canal	Risk Reduction (Programmatic)	March 14, 2008
IER #11 Tier 2 Pontchartrain	LPV	New Orleans East	Orleans	IHNC, Pontchartrain	Risk Reduction	April 1, 2010
IER #11 Tier 2 Borgne	LPV	New Orleans East	Orleans	IHNC, Borgne	Risk Reduction	October 21, 2008
IER Supplemental #11 Tier 2 Borgne	LPV	New Orleans East	Orleans	IHNC, Borgne Supplemental	Risk Reduction	December 10, 2009
IER #12	WBV	Gretna-Algiers	Jefferson, Orleans, Plaquemines	GIWW, Harvey and Algiers Canal Levee and Floodwalls	Risk Reduction	February 18, 2009
IER #13	WBV	Belle Chasse	Plaquemines	Hero Canal Levee and Eastern Terminus	Risk Reduction	December 4, 2009
IER #14	WBV	Harvey-Westwego	Jefferson	Westwego to Harvey Levee	Risk Reduction	August 26, 2008
IER Supplemental #14.a	WBV	Harvey-Westwego	Jefferson	Westwego to Harvey Levee Supplemental	Risk Reduction	February 9, 2010
IER #15	WBV	Lake Cataouatche	Jefferson	Lake Cataouatche Levee	Risk Reduction	June 12, 2008
IER #16	WBV	Lake Cataouatche	Jefferson	Western Terminus Levee	Risk Reduction	June 12, 2009
IER Supplemental #16.a	WBV	Lake Cataouatche	Jefferson	Western Terminus Levee Supplemental	Risk Reduction	August 24, 2010
IER #17	WBV	Lake Cataouatche	Jefferson	Company Canal Floodwall	Risk Reduction	January 21, 2009

Table 1. HSDRRS IERs Analyzed in the CED

(Decision Records Signed by November 15, 2010)

Alternative NEPA Arrangments Document	Basin	Sub-Basin	Parish	Descriptor Title	Type of HSDRRS Action	Date of Signed Decision Record
IER #18	N/A	New Orleans East, Chalmette Loop, Belle Chasse, Lake Cataouatche	Plaquemines, St. Bernard , St. Charles	Government Furnished Borrow #1	Borrow	February 21, 2008
IER #19	N/A	New Orleans East, Chalmette Loop, Lake Cataouatche	Iberville, Plaquemines, Hancock County	Contractor Furnished Borrow #1	Borrow	February 14, 2008
IER #22	N/A	Belle Chasse, Lake Cataouatche	Plaquemines	Government Furnished Borrow #2	Borrow	May 30, 2008
IER #23	N/A	N/A	Plaquemines, St. Bernard, St. Charles, Hancock County	Contractor Furnished Borrow #2	Borrow	May 6, 2008
IER #25	N/A	New Orleans East, Lake Cataouatche	Plaquemines	Government Furnished Borrow #3	Borrow	February 3, 2009
IER #26	N/A	Lake Cataouatche	Plaquemines, St. John the Baptist, Hancock County	Pre-Approved Contractor Furnished Borrow #3	Borrow	October 20, 2008
IER #27	LPV	Jefferson East Bank, Orleans East Bank	Orleans, Jefferson	Outfall Canal Remediation on the 17th Street, Orleans Avenue, and London Avenue Canals	Risk Reduction	October 11, 2010
IER #28	N/A	Chalmette Loop, Lake Cataouatche	Plaquemines	Government Furnished Borrow #4	Borrow	July 31, 2009
IER #29	N/A	New Orleans East	St. John the Baptist, St. Tammany	Contractor Furnished Borrow #4	Borrow	September 8, 2009
IER #30	N/A	Chalmette Loop	St. James, Hancock County	Contractor Furnished Borrow #5	Borrow	September 28, 2009
IER #31	N/A	Chalmette Loop, Lake Cataouatche	East Baton Rouge, Lafourche, Plaquemines, St. Bernard, St. Tammany, Hancock County	Contractor Furnished Borrow #7	Borrow	October 29, 2010
IER #32	N/A	N/A	Ascension, Plaquemines, St. Charles	Contractor Furnished Borrow #6	Borrow	January 22, 2010

Table 2. HSDRRS IERs NOT Included or Analyzed in the CED
(Decision Record Signed after November 15, 2010 or IER Anticipated as of September 2011)

Alternative NEPA Arrangments Document	Basin	Sub-Basin	Parish	Descriptor Title	Type of HSDRRS Action	Date of Signed Decision Record
IER Supplemental #1b	LPV	St. Charles	St. Charles	La Branche Wetlands Levee Supplemental	Risk Reduction	July 6, 2011
IER Supplemental #2.b	LPV	Jefferson East Bank	St. Charles, Jefferson	West Return Floodwall Supplemental	Risk Reduction	
IER Supplemental #5	LPV	Orleans East Bank	Orleans	Outfall Canal Closure Structures, 17th Street Canal, Orleans Avenue Canal and London Avenue Canal Supplemental	Risk Reduction	
IER Supplemental #10	LPV	Chalmette Loop	St. Bernard	Chalmette Loop Levee Supplemental	Risk Reduction	
IER Supplemental #11.b Tier 2	LPV	New Orleans East	Orleans	IHNC, Borgne Supplemental	Risk Reduction	November 29, 2010
IER Supplemental #11.c Tier 2	LPV	New Orleans East	Orleans	IHNC, Borgne Supplemental	Risk Reduction	March 22, 2011
IER Supplemental #11.d Tier 2 Pontchartrain	LPV	New Orleans East	Orleans	IHNC, Pontchartrain Supplemental	Risk Reduction	
IER Supplemental #12	WBV	Gretna-Algiers	Jefferson, Orleans, Plaquemines	GIWW, Harvey and Algiers Canal Levee and Floodwalls Supplemental	Risk Reduction	November 20, 2010
IER Supplemental #12.a	WBV	Gretna-Algiers	Jefferson, Orleans, Plaquemines	GIWW, Harvey and Algiers Canal Levee and Floodwalls Supplemental	Risk Reduction	February 23, 2011
IER Supplemental #12 / 13	WBV	Belle Chasse	Plaquemines	12/13 Waterline WBV	Risk Reduction	February 4, 2011
IER Supplemental #13a	WBV	Belle Chasse	Plaquemines	Hero Canal Levee and Eastern Terminus Supplementa	Risk Reduction	April 21, 2011
IER Supplemental #15.a	WBV	Lake Cataouatche	Jefferson	Lake Cataouatche Levee Supplemental	Risk Reduction	September 7, 2011
IER Supplemental #15.b	WBV	Lake Cataouatche	Jefferson	Lake Cataouatche Levee Supplemental	Risk Reduction	
IER Supplemental #16.b	WBV	Lake Cataouatche	Jefferson	Western Terminus Levee Supplemental	Risk Reduction	
IER Supplemental #25.a	N/A	New Orleans East	Orleans	Government Furnished Borrow #3: Stumpf Stockpile Clearance Supplemental	Borrow	
IER Supplemental #27.a	LPV	Jefferson East Bank, Orleans East Bank	Orleans, Jefferson	Outfall Canal Remediation on the 17th Street, Orleans Avenue, and London Avenue Canals Supplemental	Risk Reduction	April 15, 2011
IER #33	WBV	Belle Chasse	Orleans, Plaquemines	Co-located MRL Levee	Risk Reduction	December 31, 2010
IER Supplemental #33.a	WBV	Belle Chasse	Orleans, Plaquemines	Co-located MRL Levee Supplemental	Risk Reduction	
IER #35	N/A			Contractor Furnished Borrow #8	Borrow	
IER #36	LPV/WBV	N/A	N/A	HSDRRS Mitigation	Mitigation	
IER #37	LPV/WBV	N/A	N/A	HSDRRS Mitigation	Mitigation	

Table 3. IER Decision Record and Water Quality Certification Dates

INDIVIDUAL ENVIRONMENTAL REPORTS						
NEPA Document	Basin	Parish	Title	DR Signed	WQC	Date
IER #1	LPV	St. Charles	La Branche Wetlands Levee	6/9/2008	JP 080327-02/AI 156863/CER 20080001	4/18/2008
IERS #1.a	LPV	St. Charles	La Branche Wetlands Levee	6/29/2009	WQC 080327-02/AI 156863/CER 20080002	4/20/2009
IER #2	LPV	Jefferson	West Return Floodwall	7/18/2008	WQC 080430-01/AI 157567/CER 20080001	5/19/2008
IERS #2.a	LPV	Jefferson	West Return Floodwall	10/29/2009	WQC 080430-01/AI 157567/CER 20090001	8/6/2009
IER #3	LPV	Jefferson	Jefferson Parish Lakefront Levees	7/25/2008	WQC 080512-01/AI 157821/CER 20080001	5/27/2008
IERS #3.a	LPV	Jefferson	Jefferson Parish Lakefront Levees	12/18/2009	WQC 080512-01/AI 157821/CER 20090001	10/21/2009
IER #4	LPV	Orleans	Orleans Lakefront	3/19/ 2009	Determined not to have WQ impacts	
IER #5	LPV	Orleans	Permanent Pump Stations	6/30/2009	WQC 081110-01/AI 161807/CER 20080001	1/26/2009
IER #6	LPV	Orleans	New Orleans East Lakefront	6/25/2009	WQC 090306-01/AI 163529/CER 20090001	4/6/2009
IERS #6	LPV	Orleans	New Orleans East Lakefront	2/8/2010	USACE determined supplement did not require revision to permit	
IER #7	LPV	Orleans	New Orleans East Lakefront to Michoud Canal	6/19/2009	WQC 090306-01/AI 163529/CER 20090001	6/15/2009
IERS #7	LPV	Orleans	New Orleans East Lakefront to Michoud Canal	5/3/ 2010	2 Feb 2010 e-mail no WQC revision required	
IER #8	LPV	Orleans	Bayou Dupree Structure	6/23/2009	WQC 081222-01/AI 162387/CER 20080001	3/8/2009
IER #9	LPV		Caernarvon Closure	2/8/2010	WQC 090708-02/AI 165754/CER 20090001	9/21/2009
IER #10	LPV	St. Bernard	St. Bernard Parish Levee	5/26/2009	WQC 081222-01/AI 162387/CER 20080001	2/8/2009

Table 3. IER Water Quality Certificate Dates

INDIVIDUAL ENVIRONMENTAL REPORTS

NEPA Document	Basin	Parish	Title	DR Signed	WQC	Date
IER #11-Tier 1	LPV	Orleans	IHNC Surge Barrier, Borgne	3/14/2008	Programmatic Document no WQC	
IER #11-Tier 2	LPV	Orleans	IHNC Surge Barrier, Borgne	10/21/2008	WQC 08616-01/AI 158513/CER 2008001	7/11/2008
IERS #11.a-Tier 2	LPV	Orleans	IHNC Surge Barrier, Borgne	12/10/2009	WQC 08616-01/AI 158513/CER 2008001	7/11/2008
IERS #11-Tier 2	LPV	Orleans	IHNC, Pontchartrain	4/1/2010	WQC091102-02/ AI 158513/CER 20090001	12/28/2009
IER #12	WBV	Plaquemines	GIWW WCC	2/18/2009	WQC 080825-02/AI 160206/CER 20080001	12/16/2008
			EPA Modification Bayou aux Carpes 404	5/28/2009		
IER #13	WBV	Plaquemines	Eastern Tie-In	12/4/2009	WQC 090128-01/AI 162810/CER 20090001	3/6/2009
IER #13	WBV	Plaquemines	Eastern Tie-In – Addendum	12/4/2009		3/20/2009
IER #14	WBV	Jefferson	Harvey to Westwego	8/26/2008	JP 080213-04/AI 156035/CER 20080001	3/4/2008
IERS #14.a	WBV	Jefferson	Harvey to Westwego	2/9/2010	WQC 080213-04/AI 156035/CER 20090001	8/24/2009
IER #15	WBV	Jefferson	Lake Cataouatche	6/12/2008	JP 080213-05/AI 156034/CER 20080001	3/4/2008
IER #16	WBV	St. Charles	Western Terminus	6/12/2009	WQC 090212-06/AI 163172/CER 20090001 and WQC 090212-06/AI 163172/CER 20090002	3/6/2009 and 4/20/2009
IERS #16.a	WBV	St. Charles	Western Terminus	8/24/2010	WQC 090212-06/AI 163172/CER 20100001	4/14/2010
IER #17	WBV	Jefferson	Company Canal	1/21/2009	WQC 080522-02/AI 158048/CER 20080001	7/14/2008
IER #27						
IER #18			Government Furnished Borrow #1	2/21/2008	No WQC Required	

Table 3. IER Water Quality Certificate Dates Continued

INDIVIDUAL ENVIRONMENTAL REPORTS

NEPA Document	Basin	Parish	Title	DR Signed	WQC	Date
			1418/1420 Bayou Road	2/21/2008	No WQC Required	
			1572 Bayou Road	2/21/2008	No WQC Required	
			910 Bayou Road	2/21/2008	No WQC Required	
			4001 Florissant	2/21/2008	No WQC Required	
			Dockville	2/21/2008	No WQC Required	
			Triumph	2/21/2008	No WQC Required	
			Belle Chase	2/21/2008	No WQC Required	
			Maynard	2/21/2008	No WQC Required	
			Cummings North	2/21/2008	No WQC Required	
			Churchill Farms Pit A	2/21/2008	No WQC Required	
			Westbank Site G	2/21/2008	No WQC Required	
			Bonnet Carre North	2/21/2008	No WQC Required	
IER #19			Contractor Furnished Borrow #1	2/14/2008		
			River Birch Phase I	2/14/2008	No WQC Required	
			River Birch Phase II	2/14/2008	No WQC Required	
			Pearlington Dirt Phase I	2/14/2008	No WQC Required	
			Eastover	2/14/2008	No WQC Required	
			Kimble #2	2/14/2008	No WQC Required	
			Sylvia Guillot	2/14/2008	No WQC Required	

Table 3. IER Water Quality Certificate Dates Continued

INDIVIDUAL ENVIRONMENTAL REPORTS

NEPA Document	Basin	Parish	Title	DR Signed	WQC	Date
			Gatien-Navy Camp Hope	2/14/2008	No WQC Required	
			DK Aggregates	2/14/2008	No WQC Required	
			St. Gabriel Redevelopment	2/14/2008	No WQC Required	
IER #22			Government Furnished Borrow #2	5/30/2008		
			Brad Buras	5/30/2008	No WQC Required	
			Tabony	5/30/2008	No WQC Required	
			Westbank F	5/30/2008	No WQC Required	
			Westbank I	5/30/2008	No WQC Required	
			Westbank N	5/30/2008	No WQC Required	
IER #23			Contractor Furnished Borrow #2	5/6/2008		
			1025 Florissant	5/6/2008	No WQC Required	
			Acosta	5/6/2008	No WQC Required	
			3C Riverside	5/6/2008	No WQC Required	
			Myrtle Grove	5/6/2008	No WQC Required	
			Pearlington Dirt Phase 2	5/6/2008	No WQC Required	
IER #25			Government Furnished Borrow #3	2/3/2009		
			Stumpf Phase 1	2/3/2009	No WQC Required	
			Stumpf Phase 2	2/3/2009	No WQC Required	

Table 3. IER Water Quality Certificate Dates Continued

INDIVIDUAL ENVIRONMENTAL REPORTS

NEPA Document	Basin	Parish	Title	DR Signed	WQC	Date
			Westbank D	2/3/2009	No WQC Required	
			Westbank E Phase 1 & 2	2/3/2009	No WQC Required	
			Tac Carrere	2/3/2009	No WQC Required	
IER #26			Pre-Approved Contractor Furnished Borrow #3	10/20/2008		
			South Kenner Road	10/20/2008	No WQC Required	
			Willswood	10/20/2008	No WQC Required	
			Meyer	10/20/2008	No WQC Required	
			Willow Bend	10/20/2008	No WQC Required	
			Frierson	10/20/2008	No WQC Required	
IER #28			Government Furnished Borrow #4	7/31/2009		
			Johnson/Crovetto	7/31/2009	No WQC Required	
			Bazile	7/31/2009	No WQC Required	
			Westbank F Access Routes	7/31/2009	No WQC Required	
IER #29			Contractor Furnished Borrow #4	9/8/2009		
			Eastover Phase II	9/8/2009	No WQC Required	
			Tammy Holding	9/8/2009	No WQC Required	
			Willow Bend Phase II	9/8/2009	No WQC Required	

Table 3. IER Water Quality Certificate Dates Continued

INDIVIDUAL ENVIRONMENTAL REPORTS						
NEPA Document	Basin	Parish	Title	DR Signed	WQC	Date
IER #30			Contractor Furnished Borrow #5	9/28/2009		
			Big Shake	9/28/2009	No WQC Required	
			Henley	9/28/2009	No WQC Required	
			Contreras Dirt Z	9/28/2009	No WQC Required	
			Contreras Cell E	9/28/2009	No WQC Required	
			Contreras Cell F	9/28/2009	No WQC Required	
IER #31			Contractor Furnished Borrow #7	10/29/ 2010		
			Acosta 2	10/29/ 2010	No WQC Required	
			Idlewild Stage 2	10/29/ 2010	No WQC Required	
			King Mine	10/29/ 2010	No WQC Required	
			Levis	10/29/ 2010	No WQC Required	
			Lily Bayou	10/29/ 2010	No WQC Required	
			Port Bienville	10/29/ 2010	No WQC Required	
			Raceland Raw Sugars	10/29/ 2010	No WQC Required	
			River Birch Landfill Expansion	10/29/ 2010	No WQC Required	
			Scarsdale	10/29/ 2010	No WQC Required	
			Spoil Area	10/29/ 2010	No WQC Required	

Table 3. IER Water Quality Certificate Dates Continued

INDIVIDUAL ENVIRONMENTAL REPORTS						
NEPA Document	Basin	Parish	Title	DR Signed	WQC Date	Date
IER #32			Contractor Furnished Borrow #6	1/22/2010		
			Bocage	1/22/2010	No WQC Required	
			Citrus Lands	1/22/2010	No WQC Required	
			Conoco Philips	1/22/2010	No WQC Required	
			Idlewild Stage 1	1/22/2010	No WQC Required	
			Nairn	1/22/2010	No WQC Required	
			Plaquemines Dirt & Clay	1/22/2010	No WQC Required	
			3C Riverside Phase 3	1/22/2010	No WQC Required	

SUMMARY OF HSDRRS IMPACTS AND CONCLUSIONS

This section provides a summary of impacts from HSDRRS construction (HSDRRS 2011), future levee lifts (HSDRRS 2057), cumulative impacts of all HSDRRS construction (HSDRRS 2011 and HSDRRS 2057), and cumulative impacts of HSDRRS and other regional projects. The intensity of impacts described in the CED is classified as negligible, minor, moderate, or major. The impacts assessed in the CED are limited to those IERs that were completed by November 15, 2010 and information available from construction activities and borrow site excavation completed by July 2011. Therefore, the phase I CED does not complete the description of the HSDRRS cumulative impacts, mitigation measures, and closure of data gaps. As such, it is anticipated that CEMVN will prepare supplement(s) to the CED to include this additional information.

SUMMARY OF HSDRRS 2011 CONSTRUCTION IMPACTS

Water Quality

Construction impacts included temporary increases in turbidity, water temperature, and sedimentation, potential increases in contaminants from petroleum, oil, and lubricant spills, and decreases in dissolved oxygen within waterways near the HSDRRS project areas. There were several HSDRRS reaches where the base of the earthen levee was expanded or the levee realignment was redirected into open water of a bayou or lake. These actions temporarily impacted water quality through increased sedimentation during construction activities, but impacts on water quality ceased once the levee material stabilized and was armored. Dredging activities and stockpiling of dredged materials caused a temporary increase in suspended sediments in the water column. Hydrology was temporarily impacted due to coffer dam use at temporary canal closures. Hydro-modification at gated structures and floodwalls caused permanent impacts on water quality through changes in water velocity, and salinities. The HSDRRS increased the amount of impervious surfaces on formerly undeveloped landscapes. This decreased the surface area that can capture and absorb rainfall, which resulted in a larger percentage of rainfall runoff during a storm event. Overall, HSDRRS 2011 construction had a minor to moderate permanent impact on water quality.

SUMMARY OF HSDRRS 2057 CONSTRUCTION IMPACTS

The USACE has determined that additional levee lifts of the HSDRSS levees would be required in the future to continue to provide the 100-year level of risk reduction. The need for future levee lifts is based on anticipated future subsidence and sea-level rise within the HSDRRS project area and loading of the foundation that consolidates the soil at the construction sites. For the purpose of this document these levee lifts are identified as HSDRRS 2057 construction requirements. While the HSDDRS 2057 levee lifts were not authorized in the Supplemental Appropriations Acts they are analyzed below as part of the future cumulative impacts analysis. Future levee lifts would require approximately 7.3 million cubic yards of earthen material.

Water Quality

Short-term impacts on water quality would occur from sedimentation and turbidity from soil movement during construction. Further, there is the potential for contaminants from petroleum, oil, and lubricant spills, and decreases in dissolved oxygen within waterways near levees subject to additional lifts. Temporary, minor water quality impacts would occur due to increased nutrient loading, soluble oxygen demand, and miscellaneous debris. Construction-related impacts would also affect lake bottoms, canal bottoms, drainage waterways, and open water, and cause permanent minor impacts on water quality. Dredging of Lake Pontchartrain and material stockpiling for access to foreshore protection and wave attenuation features in the New Orleans East sub-basin could increase turbidity, disrupt water bottoms, and destroy submerged aquatic vegetations. Overall, HSDRRS 2057 construction is predicted to have moderate permanent impact on water quality.

Cumulative Impacts of HSDRRS 2011 and 2057

The HSDRRS construction and future levee lifts needed to maintain the 100-year level of risk reduction for the life of the project would have cumulative impacts on the natural and human environment in the Greater New Orleans Metropolitan Area.

Water Quality

Cumulative impacts on water quality would occur from filling of waterways and wetlands for HSDRRS construction and future levee lifts. Sedimentation and nutrient loading of waterways from stormwater runoff during rain events has occurred from the cumulative construction activities, dredging, filling, material stockpiling, water body displacement, and hydrologic modifications. The permanent cumulative impact on water quality from all HSDRRS construction activities is predicted to be moderate.

Cumulative Impacts of Past, Present, and Future Regional Actions

Early during the Alternative Arrangements planning process, it was recognized that there would be cumulative impacts associated with implementation of the HSDRRS from construction activities, future levee lifts, and other regional projects. Those regional projects or activities included Storm Damage Reconstruction, Redevelopment, Coastal and Wetlands Restoration, Flood Risk Reduction, Transportation and the BP Oil Spill. In some cases, the IERs did not evaluate cumulative impacts of the HSDRRS and present and future regional actions, and anticipated that the CED would complete the analysis of cumulative impacts for the HSDRRS. Cumulative impacts will be described in detail in the CED. The HSDRRS has contributed and will continue to contribute to cumulative impacts in the Greater New Orleans Metropolitan area and in southeast Louisiana.

Water Quality

In general, construction impacts from all regional projects were determined to temporarily increase turbidity, biological oxygen demand, water temperature, and sedimentation, and lead to potential increases in contaminants from petroleum, oil, and lubricant spills and decreases in dissolved oxygen within waterways. Regional construction and redevelopment projects would have cumulative short-term adverse impacts on water quality in the region due to stormwater runoff from construction sites, dredging, and hydro-modification. In general, there would be cumulative moderate impacts on water quality in the region. Overall the impact of cumulative past, present and future regional actions on water quality is predicted to be moderate.

BOBBY JINDAL
GOVERNOR

SCOTT A. ANGELLE
SECRETARY

State of Louisiana

DEPARTMENT OF NATURAL RESOURCES

OFFICE OF COASTAL MANAGEMENT

June 12, 2012

Joan M. Exnicios
Chief, New Orleans Environmental Branch
Corps of Engineers- New Orleans District
P.O. Box 60267
New Orleans, LA 70160-0267

RE: **C20120133,** Coastal Zone Consistency
New Orleans District, Corps of Engineers
Direct Federal Action
Comprehensive Environmental Document Phase I for the New Orleans Hurricane and Storm Risk Reduction System, Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles, St. John the Baptist, and St. Tammany Parishes, Louisiana

Dear Ms. Exnicios:

After thorough review of the above referenced project, the Office of Coastal Management has determined that all of the described actions and potential impacts were earlier reviewed individually and found to be consistent with the Louisiana Coastal Resources Program. Because there are no proposed actions which may have reasonable foreseeable effects on land or water use or the natural resources of the Louisiana Coastal Zone, this project requires no formal consistency review and this Office offers no comments.

We look forward to the opportunity to review the Comprehensive Environmental Document when it is released for public comment. If you have any questions concerning this determination please contact Brian Marcks of the Consistency Section at (225) 342-7939 or 1-800-267-4019.

Sincerely,

Keith Lovell

Keith Lovell
Action Administrator
Interagency Affairs/Field Services Division

KOL/JDH/bgm
cc: Beth Nord, COE-NOD
David Butler, LDWF
Elizabeth Davoli, CPRA
Rhonda Braud, CPRA

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

APR 20 2012

REPLY TO
ATTENTION OF
Regional Planning and
Environmental Division, South
Environmental Planning Branch

Mr. Keith Lovell
Interagency Affairs - LA-DNR
Field Services Division
Post Office Box 44487, Capitol Station
Baton Rouge, LA 70804-4487

Dear Mr. Lovell:

We request your concurrence with the enclosed Consistency Determination for the first phase of the Comprehensive Environmental Document for the Hurricane Storm Damage and Risk Reduction System (HSDRRS) project. The US Army Corps of Engineers, New Orleans District (CEMVN) in accordance with Federal Register Vol. 72, No. 48, Tuesday, March 13, 2007, is preparing a CED to meet the provisions of the Alternative Arrangements to the National Environmental Policy Act (NEPA) that were adopted for the Orleans Hurricane and Storm Damage Reduction System following the Hurricane Season of 2005.

When the Alternative Arrangements for the HSDRRS project was first proposed the preparation of only one CED document was anticipated. However, as construction activities have progressed and construction completion dates and dates for related monitoring activities have moved beyond June 2011, the decision was made to release the CED as a phased or supplemented document. To date some of some data gaps identified in the Individual Environmental Reports (IERs) have not been fully closed. Some of the items that have not been fully addressed or completed include; the wetlands and non wet Bottomland Hardwood Forest Mitigation final Plans and IERs, the comprehensive armoring plan, development of final Operations, Maintenance, Repair, Replacement and Rehabilitation plans and the completion of various long term monitoring efforts related to the Bayou aux Carpes Clean Water Act 404c site (IER 12) and monitoring associated with the protection at the Inner Harbor Navigation Canal (IER 11 Tier 2 Pontchartrain). The US Army Corps of Engineers New Orleans District (CEMVN) continues to work on these activities and will address these outstanding items in a future phase of the CED.

The Individual Environmental Reports (IERs) that will be addressed in the first Phase of the CED document and included in the cumulative impact analysis are listed in the enclosed Table 1. The IERs that have been completed or are in development but did not meet the cutoff date for the phase I CED and the cumulative impacts discussion are listed in Table 2.

The purpose of the CED is to address cumulative HSDDRS impacts and cumulative regional impacts as well as fill data gaps. Flood damage risk reduction construction activities associated with the HSDRRS and the alternative arrangements have been underway since 2007 and are anticipated to continue into August 2014. HSDRRS mitigation construction activities are currently scheduled to be conducted between 2014 and 2017. Although construction activities will continue beyond 2014, delaying the preparation and release of the first phase of the CED until all the flood damage risk reduction construction activities are completed would unnecessarily delay the release of information to the public.

Throughout the HSDRRS planning process and preparation of the alternative arrangement NEPA documents, the IERs, the USACE obtained concurrence, permits and authorizations necessary to be in compliance with environmental laws prior to the initiation of construction activities. Compliance for the Coastal Zone Management (CZM) Program was achieved prior to the release of draft IERs for public review by the CEMVN's preparation and submittal of an IER specific Consistency Determination and the receipt of a concurrence response from the Louisiana Department of Natural Resources (LDNR). In addition, throughout the construction phase of the HSDRRS flood damage risk reduction features, if construction activities were modified and IER supplemental documents or other coordination documents were prepared Consistency Determination modifications were submitted to the LDNR for review, evaluation, and concurrence. All of the actions described in the CED previously achieved compliance with the State of Louisiana's Coastal Zone Management Program. A listing of the Coastal Zone Consistency Determination concurrence letters and their dates is provided in Table 3.

Based on the enclosed information and Coastal Zone Consistency concurrence letters received related to the IERs construction activities, we believe the proposed action is consistent, to the maximum extent practicable, with the State of Louisiana's approved Coastal Resources Program. Please review the enclosed information and inform us whether or not you agree with our determination. We request a response by June 11, 2012, for the activities evaluated in the IERs listed in Table 1.

If you have any questions about this request or require any additional information, please contact Beth Nord at (504) 862-2167 or via email at beth.p.nord@usace.army.mil.

Sincerely,

Joan M Exnicios

Joan M. Exnicios
Chief, Environmental Planning
Branch

Enclosures

CONSISTENCY DETERMINATION

Louisiana Coastal Use Guidelines

Hurricane and Storm Damage Risk Reduction System

COMPREHENSIVE ENVIRONMENTAL DOCUMENT PHASE I

INTRODUCTION

Section 307 of the Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et. seq. requires that "each federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs." In accordance with Section 307, a Consistency Determination has been prepared for the first phase of the Comprehensive Environmental Document for the Greater New Orleans Hurricane and Storm Damage Risk Reduction System (HSDRRS).

The New Orleans District (CEMVN) coordinated with the Council on Environmental Quality (CEQ) and team comprised of personnel from Federal and State natural resource agencies to develop Alternative Arrangements for implementing the National Environmental Policy Act of 1969 (NEPA) and the CEQ regulations for implementing NEPA(40 CFR § 1500-1508). The Alternative Arrangements were implemented by CEMVN on March 13, 2007. The Alternative Arrangement Process was implemented in order to expeditiously complete environmental analysis for changes to the authorized system and the 100-year level of the HSDRRS, formerly known as the Hurricane Protection System.

A component of the Alternative Arrangements includes the preparation of a comprehensive environmental document to address data gaps and cumulative HSDRRS and regional cumulative impacts. This first phase of the CED is being prepared to meet commitments outlined in the Alternative Arrangements dated February 23, 2007, and the Federal Register Notice Vol. 72, No. 48, dated March 13, 2007. This Consistency Determination is being prepared to address the preparation of the first Phase of the CED.

Throughout the HSDRRS planning process and preparation of the alternative arrangement Individual Environmental Documents (IER) nepa documents, the CEMVN obtained concurrence, permits and authorizations necessary to be in compliance with environmental laws prior to the initiation of construction activities. Compliance with the Coastal Zone Management Act was achieved prior to the release of draft IERs for public review. In addition, throughout the construction phase of the HSDRRS flood damage risk reduction features, if proposed plans were changed Coastal Zone Management Act coordination and compliance was reinitiated through the submittal of a consistency determination modification or negative determination.

A listing of all the IERs addressed in the phase I CED document and the Coastal Zone Management Act and the dates and the identifying Coastal Use Permit Application Numbers are provided with this submittal.

Coastal Use Guidelines were written in order to implement the policies and goals of the Louisiana Coastal Resources Program, and serve as a set of performance standards for evaluating projects. Compliance with the Louisiana Coastal Resources Program, and therefore, Section 307, requires compliance with applicable Coastal Use Guidelines.

PURPOSE AND NEED FOR THE PROPOSED ACTION

On 29 August 2005, Hurricane Katrina caused major damage to the Federal and non-Federal control and Hurricane and Storm Damage Risk Reduction System (HSDRRS) located in Southeast Louisiana. Hurricane Rita followed this storm on 24 September 2005, and make landfall on the Louisiana-Texas state border, causing damage to the HSDRRS in southern Louisiana. Since the storms, the United States Army Corps of Engineers (USACE) has been working with state and local officials to restore the Federal and non-Federal flood control and HSDRRS projects and related works in the affected area.

The purpose of the proposed action is to construct and maintain 100-year flood protection for the residents and businesses through the Greater New Orleans area. The proposed actions results from a defined need to reduce flood risk and storm damage to residences, businesses, and other infrastructure from hurricanes (100-year storm events) and other high water events. The completed Greater New Orleans HSDRRS would lower the risk of harm to citizens, and damage to infrastructure during a storm event. The safety of people in the region is the highest priority of the CEMVN. The proposed action resulted from the efforts to restore the Federal and non-Federal flood control and hurricane storm damage reduction projects post Hurricane Katrina and Rita and provide a 100-year level of flood protection.

The term “100-year level of risk reduction” refers to a level of protection which reduces the risk of hurricane surge and wave driven flooding that the New Orleans Metropolitan area has a 1% chance of experiencing each year.

DESCRIPTION OF THE PROPOSED ACTION

The HSDRRS project area is located in southeast Louisiana in the Parishes of St. Charles, Jefferson, Orleans, St. Bernard and Plaquemines. Much of the area has low ground elevation and much of the area is below sea level. The HSDRRS project area is bounded Lake Pontchartrain to the north, Lake Borgne and Breton Sound to the east and Bayou Trepagnier, Cross Bayou and the Davis Pond Freshwater Diversion Outfall Canal to the west. The Mississippi River also divides the project area. As a result, portions of the the Mississippi River Levees have been incorporated into the HSDRRS system. To the South the project area is bounded by wetlands and swamps that are part of the Barataria Estuary System. The Barataria Estuary System connects directly to the Gulf of Mexico.

The Greater New Orleans metropolitan area has been under development for many centuries and many of the areas that are located within the HSDRRS were previously impacted by development activities. Those impacts included clearing and filling of wetlands, urban and industrial development and the development of a forced drainage system.

The proposed actions for all the IERs included in the first phase of the CED can be found in the Consistency Determinations previously prepared for the IERs. Reference Table 1 for the list of IERs that are included in the first phase of the CED and this Consistency Determination submittal. The IERs that have been completed or are in development but did not meet the cutoff date for the first phase of the CED are listed in Table 2. A listing of the Coastal Zone Management Act permit application numbers and compliance dates for the IERs included in the first phase of the CED can be found in Table 3.

Table 1. HSDRRS IERs Analyzed in the CED
(Decision Records Signed by November 15, 2010)

Alternative NEPA Arrangments Document	Basin	Sub-Basin	Parish	Descriptor Title	Type of HSDRRS Action	Date of Signed Decision Record
IER #1	LPV	St. Charles	St. Charles	La Branche Wetlands Levee	Risk Reduction	June 9, 2008
IER Supplemental #1	LPV	St. Charles	St. Charles	La Branche Wetlands Levee Supplemental	Risk Reduction	June 29, 2009
IER #2	LPV	Jefferson East Bank	St. Charles, Jefferson	West Return Floodwall	Risk Reduction	July 18, 2008
IER Supplemental #2	LPV	Jefferson East Bank	St. Charles, Jefferson	West Return Floodwall Supplemental	Risk Reduction	October 29, 2009
IER #3	LPV	Jefferson East Bank	Jefferson	Lakefront Levee	Risk Reduction	July 25, 2008
IER Supplemental #3.a	LPV	Jefferson East Bank	Jefferson	Lakefront Levee Supplemental	Risk Reduction	December 18, 2009
IER #4	LPV	Orleans East Bank	Orleans	New Orleans Lakefront Levee, West of Inner Harbor Navigational Canal	Risk Reduction	March 19, 2009
IER #5	LPV	Orleans East Bank	Orleans	Outfall Canal Closure Structures, 17th Street Canal, Orleans Avenue Canal and London Avenue Canal	Risk Reduction	June 30, 2009
IER #6	LPV	New Orleans East	Orleans	Citrus Lakefront Levee	Risk Reduction	June 25, 2009
IER Supplemental #6	LPV	New Orleans East	Orleans	Citrus Lakefront Levee Supplemental	Risk Reduction	February 8, 2010
IER #7	LPV	New Orleans East	Orleans	New Orleans East Lakefront to Michoud Canal	Risk Reduction	June 19, 2009
IER Supplemental #7	LPV	New Orleans East	Orleans	New Orleans East Lakefront to Michoud Canal Supplemental	Risk Reduction	May 3, 2010
IER #8	LPV	Chalmette Loop	St. Bernard	Bayou Dupre Control Structure	Risk Reduction	June 23, 2009
IER #9	LPV	Chalmette Loop	St. Bernard	Caernarvon Floodwall	Risk Reduction	February 8, 2010
IER #10	LPV	Chalmette Loop	St. Bernard	Chalmette Loop Levee	Risk Reduction	May 26, 2009
IER #11 Tier 1 Pontchartrain and Borgne	LPV	New Orleans East	Orleans	Improved Protection on the Inner Harbor Navigation Canal	Risk Reduction (Programmatic)	March 14, 2008
IER #11 Tier 2 Pontchartrain	LPV	New Orleans East	Orleans	IHNC, Pontchartrain	Risk Reduction	April 1, 2010
IER #11 Tier 2 Borgne	LPV	New Orleans East	Orleans	IHNC, Borgne	Risk Reduction	October 21, 2008
IER Supplemental #11 Tier 2 Borgne	LPV	New Orleans East	Orleans	IHNC, Borgne Supplemental	Risk Reduction	December 10, 2009
IER #12	WBV	Gretna-Algiers	Jefferson, Orleans, Plaquemines	GIWW, Harvey and Algiers Canal Levee and Floodwalls	Risk Reduction	February 18, 2009
IER #13	WBV	Belle Chasse	Plaquemines	Hero Canal Levee and Eastern Terminus	Risk Reduction	December 4, 2009
IER #14	WBV	Harvey-Westwego	Jefferson	Westwego to Harvey Levee	Risk Reduction	August 26, 2008
IER Supplemental #14.a	WBV	Harvey-Westwego	Jefferson	Westwego to Harvey Levee Supplemental	Risk Reduction	February 9, 2010
IER #15	WBV	Lake Cataouatche	Jefferson	Lake Cataouatche Levee	Risk Reduction	June 12, 2008
IER #16	WBV	Lake Cataouatche	Jefferson	Western Terminus Levee	Risk Reduction	June 12, 2009
IER Supplemental #16.a	WBV	Lake Cataouatche	Jefferson	Western Terminus Levee Supplemental	Risk Reduction	August 24, 2010
IER #17	WBV	Lake Cataouatche	Jefferson	Company Canal Floodwall	Risk Reduction	January 21, 2009

Table 1. HSDRRS IERs Analyzed in the CED

(Decision Records Signed by November 15, 2010)

Alternative NEPA Arrangments Document	Basin	Sub-Basin	Parish	Descriptor Title	Type of HSDRRS Action	Date of Signed Decision Record
IER #18	N/A	New Orleans East, Chalmette Loop, Belle Chasse, Lake Cataouatche	Plaquemines, St. Bernard , St. Charles	Government Furnished Borrow #1	Borrow	February 21, 2008
IER #19	N/A	New Orleans East, Chalmette Loop, Lake Cataouatche	Iberville, Plaquemines, Hancock County	Contractor Furnished Borrow #1	Borrow	February 14, 2008
IER #22	N/A	Belle Chasse, Lake Cataouatche	Plaquemines	Government Furnished Borrow #2	Borrow	May 30, 2008
IER #23	N/A	N/A	Plaquemines, St. Bernard, St. Charles, Hancock County	Contractor Furnished Borrow #2	Borrow	May 6, 2008
IER #25	N/A	New Orleans East, Lake Cataouatche	Plaquemines	Government Furnished Borrow #3	Borrow	February 3, 2009
IER #26	N/A	Lake Cataouatche	Plaquemines, St. John the Baptist, Hancock County	Pre-Approved Contractor Furnished Borrow #3	Borrow	October 20, 2008
IER #27	LPV	Jefferson East Bank, Orleans East Bank	Orleans, Jefferson	Outfall Canal Remediation on the 17th Street, Orleans Avenue, and London Avenue Canals	Risk Reduction	October 11, 2010
IER #28	N/A	Chalmette Loop, Lake Cataouatche	Plaquemines	Government Furnished Borrow #4	Borrow	July 31, 2009
IER #29	N/A	New Orleans East	St. John the Baptist, St. Tammany	Contractor Furnished Borrow #4	Borrow	September 8, 2009
IER #30	N/A	Chalmette Loop	St. James, Hancock County	Contractor Furnished Borrow #5	Borrow	September 28, 2009
IER #31	N/A	Chalmette Loop, Lake Cataouatche	East Baton Rouge, Lafourche, Plaquemines, St. Bernard, St. Tammany, Hancock County	Contractor Furnished Borrow #7	Borrow	October 29, 2010
IER #32	N/A	N/A	Ascension, Plaquemines, St. Charles	Contractor Furnished Borrow #6	Borrow	January 22, 2010

Table 2. HSDRRS IERs NOT Included or Analyzed in the CED
(Decision Record Signed after November 15, 2010 or IER Anticipated as of September 2011)

Alternative NEPA Arrangments Document	Basin	Sub-Basin	Parish	Descriptor Title	Type of HSDRRS Action	Date of Signed Decision Record
IER Supplemental #1b	LPV	St. Charles	St. Charles	La Branche Wetlands Levee Supplemental	Risk Reduction	July 6, 2011
IER Supplemental #2.b	LPV	Jefferson East Bank	St. Charles, Jefferson	West Return Floodwall Supplemental	Risk Reduction	
IER Supplemental #5	LPV	Orleans East Bank	Orleans	Outfall Canal Closure Structures, 17th Street Canal, Orleans Avenue Canal and London Avenue Canal Supplemental	Risk Reduction	
IER Supplemental #10	LPV	Chalmette Loop	St. Bernard	Chalmette Loop Levee Supplemental	Risk Reduction	
IER Supplemental #11.b Tier 2	LPV	New Orleans East	Orleans	IHNC, Borgne Supplemental	Risk Reduction	November 29, 2010
IER Supplemental #11.c Tier 2	LPV	New Orleans East	Orleans	IHNC, Borgne Supplemental	Risk Reduction	March 22, 2011
IER Supplemental #11.d Tier 2 Pontchartrain	LPV	New Orleans East	Orleans	IHNC, Pontchartrain Supplemental	Risk Reduction	
IER Supplemental #12	WBV	Gretna-Algiers	Jefferson, Orleans, Plaquemines	GIWW, Harvey and Algiers Canal Levee and Floodwalls Supplemental	Risk Reduction	November 20, 2010
IER Supplemental #12.a	WBV	Gretna-Algiers	Jefferson, Orleans, Plaquemines	GIWW, Harvey and Algiers Canal Levee and Floodwalls Supplemental	Risk Reduction	February 23, 2011
IER Supplemental #12 / 13	WBV	Belle Chasse	Plaquemines	12/13 Waterline WBV	Risk Reduction	February 4, 2011
IER Supplemental #13a	WBV	Belle Chasse	Plaquemines	Hero Canal Levee and Eastern Terminus Supplementa	Risk Reduction	April 21, 2011
IER Supplemental #15.a	WBV	Lake Cataouatche	Jefferson	Lake Cataouatche Levee Supplemental	Risk Reduction	September 7, 2011
IER Supplemental #15.b	WBV	Lake Cataouatche	Jefferson	Lake Cataouatche Levee Supplemental	Risk Reduction	
IER Supplemental #16.b	WBV	Lake Cataouatche	Jefferson	Western Terminus Levee Supplemental	Risk Reduction	
IER Supplemental #25.a	N/A	New Orleans East	Orleans	Government Furnished Borrow #3: Stumpf Stockpile Clearance Supplemental	Borrow	
IER Supplemental #27.a	LPV	Jefferson East Bank, Orleans East Bank	Orleans, Jefferson	Outfall Canal Remediation on the 17th Street, Orleans Avenue, and London Avenue Canals Supplemental	Risk Reduction	April 15, 2011
IER #33	WBV	Belle Chasse	Orleans, Plaquemines	Co-located MRL Levee	Risk Reduction	December 31, 2010
IER Supplemental #33.a	WBV	Belle Chasse	Orleans, Plaquemines	Co-located MRL Levee Supplemental	Risk Reduction	
IER #35	N/A			Contractor Furnished Borrow #8	Borrow	
IER #36	LPV/WBV	N/A	N/A	HSDRRS Mitigation	Mitigation	
IER #37	LPV/WBV	N/A	N/A	HSDRRS Mitigation	Mitigation	

Table 3. IER CZM Dates

INDIVIDUAL ENVIRONMENTAL REPORTS					
NEPA Document	**Basin**	**Parish**	**Title**	**DR Signed**	**CZM**
IER #1	LPV	St. Charles	La Branche Wetlands Levee	9-Jun-08	C20080104 21-Apr- 2008
IERS #1.a	LPV	St. Charles	La Branche Wetlands Levee	29-Jun-09	C20080104 8-May- 2009
IER #2	LPV	Jefferson	West Return Floodwall	18-Jul-08	C20080223 23-May-2008
IERS #2.a	LPV	Jefferson	West Return Floodwall	29-Oct-09	C20080223(mod 1) 15-Sep-2009
IER #3	LPV	Jefferson	Jefferson Parish Lakefront Levees	25-Jul-08	C20080227 23-May-2008
IERS #3.a	LPV	Jefferson	Jefferson Parish Lakefront Levees	18-Dec-09	C20080227(mod 1) 16-Sep-2009
IER #4	LPV	Orleans	Orleans Lakefront	19-Mar-09	C20080597 20-Jan-2009
IER #5	LPV	Orleans	Permanent Pump Stations	30-Jun-09	C20080112 17-Nov-2008
IER #6	LPV	Orleans	New Orleans East Lakefront	25-Jun-09	C20090065 11-Mar-2009
IERS #6	LPV	Orleans	New Orleans East Lakefront	8-Feb-10	C20090065(mod1) 22-Jan-2010
IER #7	LPV	Orleans	New Orleans East Lakefront to Michoud Canal	19-Jun-09	C20090033 11-Mar-2009
IERS #7	LPV	Orleans	New Orleans East Lakefront to Michoud Canal	3-May-10	C20090033(mod 1) 28-Apr-2010
IER #8	LPV	Orleans	Bayou Dupree Structure	23-Jun-09	C20080057 17-Apr-2008 26-Jan-2009
IER #9	LPV		Caernarvon Closure	8-Feb-10	C20090245 2-Jul-2009
IER #10	LPV	St. Bernard	St. Bernard Parish Levee	26-May-09	C20080556 24-Dec-2008

Table 3. IER CZM Dates

NEPA Document	Basin	Parish	Title	DR Signed	CZM
IER #11-Tier 1	LPV	Orleans	IHNC Surge Barrier, Borgne	14-Mar-08	C20070619 28-Mar-2008
IER #11 -Tier 2	LPV	Orleans	IHNC Surge Barrier, Borgne	21-Oct-08	C20080280 1-Aug-2008
IERS #11.a-Tier 2	LPV	Orleans	IHNC Surge Barrier, Borgne	10-Dec-09	C20080280 9-Sep-2009
IERS #11-Tier 2	LPV	Orleans	IHNC, Pontchartrain	1-Apr-10	C2009045 9-Nov-2009
IER #12	WBV	Plaquemines	GIWW WCC	18-Feb-09	C20080483 17-Dec-2008
			EPA Modification Bayou aux Carpes 404	5-28-09	
IER #13	WBV	Plaquemines	Eastern Tie-In	4-Dec-09	C20090082 13-Mar-2009
IER 13	WBV	Plaquemines	Eastern Tie-In – Addendum	12/4/2009	
IER #14	WBV	Jefferson	Harvey to Westwego	26-Aug-08	C20080048 10-Mar-2008
IERS #14.a	WBV	Jefferson	Harvey to Westwego	9-Feb-10	C20080048 10-Nov-2009
IER #15	WBV	Jefferson	Lake Cataouatche	12-Jun-08	C20080049 10-Mar-2008
IER #16	WBV	St. Charles	Western Terminus	12-Jun-09	C20080324 18-Apr-2009
IERS #16.a	WBV	St. Charles	Western Terminus	24-Aug-10	C20080324 4-May-2009
IER #17	WBV	Jefferson	Company Canal	21-Jan-09	C20080289 11-Sep-2008
IER #18			Government Furnished Borrow #1	21-Feb-08	
			1418/1420 Bayou Road	21-Feb-08	C20070071 12-Mar-07
			1572 Bayou Road	21-Feb-08	C20070071 12-Mar-07
			910 Bayou Road	21-Feb-08	C20070071 12-Mar-07
			4001 Florissant	21-Feb-08	C20070071 12-Mar-07
			Dockville	21-Feb-08	C20070071 12-Mar-07
			Triumph	21-Feb-08	Jul-06
			Belle Chase	21-Feb-08	C20070200 25-Sep-07

Table 3. IER CZM Dates

NEPA Document	Basin	Parish	Title	DR Signed	CZM
			Maynard	21-Feb-08	C20070200 25-Sep-07
			Cummings North	21-Feb-08	C20070200 25-Sep-07
			Churchill Farms Pit A	21-Feb-08	19-Jun-2007 Verbal C20070200 25-Sep-07
			Westbank Site G	21-Feb-08	C20070200 25-Sep-07
			Bonnet Carre North	21-Feb-08	C20070304 22-Jul-07
IER #19			Contractor Furnished Borrow #1	14-Feb-08	
			River Birch Phase I	14-Feb-08	P2003054
			River Birch Phase II	14-Feb-08	P20061802
			Pearlington Dirt Phase I	14-Feb-08	DMR-070125
			Eastover	14-Feb-08	N/A
			Kimble #2	14-Feb-08	P20061684
			Sylvia Guillot	14-Feb-08	N/A
			Gatien-Navy Camp Hope	14-Feb-08	N/A
			DK Aggregates	14-Feb-08	P20061819 21- Dec-06
			St. Gabriel Redevelopment	14-Feb-08	Not located within Coastal Zone
IER #22			Government Furnished Borrow #2	30-May-08	
			Brad Buras	30-May-08	C20070323 3-Sep-07
			Tabony	30-May-08	C20070468 11-Oct-07
			Westbank F	30-May-08	C2007200 25-Sep-07
			Westbank I	30-May-08	C20070323 3-Sep-07
			Westbank N	30-May-08	C20070509 30-Nov-07

Table 3. IER CZM Dates

NEPA Document	Basin	Parish	Title	DR Signed	CZM
IER #23			Contractor Furnished Borrow #2	5/6/2008	
			1025 Florissant	5/6/2008	P20060763 10-Jul-06
			Acosta	5/6/2008	P20070851 15-Jun-07
			3C Riverside	5/6/2008	P20070558 28-Jun-07
			Myrtle Grove	5/6/2008	N/A
			Pearlington Dirt Phase 2	5/6/2008	DMR-070125 25-Jan-07
IER #25			Government Furnished Borrow #3	3-Feb-09	
			Stumpf Phase 1	3-Feb-09	C20080076 24-Apr-08
			Stumpf Phase 2	3-Feb-09	C20080336 22-Sep-08
			Westbank D	3-Feb-09	C20080076 24-Apr-08
			Westbank E Phase 1 & 2	3-Feb-09	C20070509 30-Nov-07
			Tac Carrere	3-Feb-09	C20080076 24-Apr-08
IER #26			Pre-Approved Contractor Furnished Borrow #3	20-Oct-08	
			South Kenner Road	20-Oct-08	P20071264 27-Jun-08
			Willswood	20-Oct-08	P20071574 22-Jul-08
			Meyer	20-Oct-08	P20080039 22-Apr-08
			Willow Bend	20-Oct-08	P20080242 28-Apr-08
			Frierson	20-Oct-08	DMR-080030 1-Aug-07
IER #28			Government Furnished Borrow #4	31-Jul-09	
			Johnson/Crovetto	31-Jul-09	C20080336 22-Sep-08
			Bazile	31-Jul-09	C20080700 4-Mar-09
			Westbank F Access Routes	31-Jul-09	C20080700 4-Mar-2009

Table 3. IER CZM Dates

NEPA Document	Basin	Parish	Title	DR Signed	CZM
IER #29			Contractor Furnished Borrow #4	28-Sep-09	
			Eastover Phase II	28-Sep-09	P20070642
			Tammy Holding	28-Sep-09	P20021241
			Willow Bend Phase II	28-Sep-09	P20080242
IER #30			Contractor Furnished Borrow #5	28-Sep-09	
			Big Shake	28-Sep-09	P20080985
			Henley	28-Sep-09	DMR-090028
			Contreras Dirt Z	28-Sep-09	P20061819 21-Dec-06
			Contreras Cell E	28-Sep-09	P20061819 21-Dec-06
			Contreras Cell F	28-Sep-09	P20061819 21-Dec-06
IER #31			Contractor Furnished Borrow #7	29-Oct-10	
			Acosta 2	29-Oct-10	P20079851 15-Jun-07 P20079851 16-Aug-07
			Idlewild Stage 2	29-Oct-10	P20090517
			King Mine	29-Oct-10	DMR-070269 19-Dec-06
			Levis	29-Oct-10	C20080700 4-Mar-09 P20060363 ST06-23
			Lily Bayou	29-Oct-10	P20070631
			Port Bienville	29-Oct-10	DMR-080030
			Raceland Raw Sugars	29-Oct-10	P20080485
			River Birch Landfill Expansion	29-Oct-10	P20090224
			Scarsdale	29-Oct-10	P20091162

Table 3. IER CZM Dates

NEPA Document	Basin	Parish	Title	DR Signed	CZM
			Spoil Area	29-Oct-10	P20090799
IER #32			Contractor Furnished Borrow #6	22-Jan-10	
			Bocage	22-Jan-10	P20080865 30-Jun-08
			Citrus Lands	22-Jan-10	P20090080 (state) CZM-2009-10
			Conoco Philips	22-Jan-10	P20090238
			Idlewild Stage 1	22-Jan-10	P20090188 (state) CZM-2009-2 (parish)
			Nairn	22-Jan-10	P20090185 CZM-2009-9
			Plaquemines Dirt & Clay	22-Jan-10	P20090144 (state) CZM-2009-9 (parish)
			3C Riverside Phase 3	22-Jan-10	P20090069

GUIDELINES APPLICABLE TO ALL USES

Guideline 1.1 The guidelines must be read in their entirety. Any proposed use may be subject to the requirements of more than one guideline or section of guidelines and all applicable guidelines must be complied with.

Guideline 1.2 Conformance with applicable water and air quality laws, standards and regulations, and with those other laws, standards and regulations which have been incorporated into the coastal resources program shall be deemed in conformance with the program except to the extent that these guidelines would impose additional requirements.

Guideline 1.3 The guidelines include both general provisions applicable to all uses and specific provisions applicable only to certain types of uses. The general guidelines apply in all situations. The specific guidelines apply only to the situations they address. Specific and general guidelines should be interpreted to be consistent with each other. In the event there is an inconsistency, the specific should prevail.

Guideline 1.4 These guidelines are not intended to nor shall they be interpreted so as to result in an involuntary acquisition or taking of property.

Guideline 1.5 No use or activity shall be carried out or conducted in such a manner as to constitute a violation of the terms of a grant or donation of any lands or water-bottoms to the State or any subdivision thereof. Revocations of such grants and donations shall be avoided.

Guideline 1.6 Information regarding the following general factors shall be utilized by the permitting authority in evaluating whether the proposed use is in compliance with the guidelines.

a) type, nature and location of use.

b) elevation, soil and water conditions and flood and storm hazard characteristics of site.

c) techniques and materials used in construction, operation and maintenance of use.

d) existing drainage patterns and water regimes of surrounding area including flow, circulation, quality, quantity and salinity; and impacts on them.

e) availability of feasible alternative sites or methods – for implementing the use.

f) designation of the area for certain uses as part of a local program.

g) economic need for use and extent of impacts of use on economy of locality.

h) extent of resulting public and private benefits.

i) extent of coastal water dependency of the use.

j) existence of necessary infrastructure to support the use and public costs resulting from use.

k) extent of impacts on existing and traditional uses of the area and on future uses for which the area is suited.

l) proximity to, and extent of impacts on important natural features such as beaches, barrier islands, tidal passes, wildlife and aquatic habitats, and forest lands.

m) the extent to which regional, state and national interests are served including the national interest in resources and the siting of facilities in the coastal zones as identified in the coastal resources program.

n) proximity to, and extent of impacts on, special areas, particular areas, or other areas of particular concern of the state program or local programs.

o) likelihood of, and extent of impacts of, resulting secondary impacts and cumulative impacts.

p) proximity to and extent of impacts on public lands or works, or historic, recreational or cultural resources.

q) extent of impacts on navigation, fishing, public access, and recreational opportunities.

r) extent of compatibility with natural and cultural setting.

s) extent of long term benefits or adverse impacts.

Guideline 1.7 It is the policy of the coastal resources program to avoid the following adverse impacts. To this end, all uses and activities shall be planned, sited, designed, constructed, operated and maintained to avoid to the maximum extent practicable significant:

a) reductions in the natural supply of sediment and nutrients to the coastal system by alterations of freshwater flow.

b) adverse economic impacts on the locality of the use and affected governmental bodies.

c) detrimental discharges of inorganic nutrient compounds into coastal waters.

d) alterations in the natural concentration of oxygen in coastal waters.

e) destruction or adverse alterations of streams, wetland, tidal passes, inshore waters and waterbottoms, beaches, dunes, barrier islands, and other natural biologically valuable areas or protective coastal features.

f) adverse disruption of existing social patterns.

g) alterations of the natural temperature regime of coastal waters.

h) detrimental changes in existing salinity regimes.

i) detrimental changes in littoral and sediment transport processes.

j) adverse effects of cumulative impacts.

k) detrimental discharges of suspended solids into coastal waters, including turbidity resulting from dredging.

l) reductions or blockage of water flow or natural circulation patterns within or into an estuarine system or a wetland forest.

m) discharges of pathogens or toxic substances into coastal waters.

n) adverse alteration or destruction of archaeological, historical, or other cultural resources.

o) fostering of detrimental secondary impacts in undisturbed or biologically highly productive wetland areas.

p) adverse alteration or destruction of unique or valuable habitats, critical habitat for endangered species, important wildlife or fishery breeding or nursery areas, designated wildlife management or sanctuary areas, or forestlands.

q) adverse alteration or destruction of public parks, shoreline access points, public works, designated recreation areas, scenic rivers, or other areas of public use and concern.

r) adverse disruptions of coastal wildlife and fishery migratory patterns.

s) land loss, erosion and subsidence.

t) increases in the potential for flood, hurricane or other storm damage, or increases in the likelihood that damage will occur from such hazards.

u) reductions in the long-term biological productivity of the coastal ecosystem.

Guideline 1.8 In those guidelines in which the modifier "maximum extent practicable" is used, the proposed use is in compliance with the guideline if the standard modified by the term is complied with. If the modified standard is not complied with, the use will be in compliance with the guideline if the permitting authority finds, after a systematic consideration of all pertinent information regarding the use, the site and the impacts of the use as set forth in guideline 1.6, and a balancing of their relative significance, that the benefits resulting from the proposed use would clearly outweigh the adverse impacts resulting from non-compliance with the modified standard and there are no feasible and practical alternative locations, methods and practices for the use that are in compliance with the modified standard and:

a) significant public benefits will result from the use, or;

b) the use would serve important regional, state or national interests, including the national interest in resources and the siting of facilities in the coastal zone identified in the coastal resources program, or;

c) the use is coastal water dependent.

The systematic consideration process shall also result in a determination of those conditions necessary for the use to be in compliance with the guideline. Those conditions shall assure that the use is carried out utilizing those locations, methods and practices which maximize conformance to the modified standard; are technically, economically, environmentally, socially and legally feasible and practical and minimize or offset those adverse impacts listed in guideline 1.7 and in the guideline at issue.

Guideline 1.9 Uses shall to the maximum extent practicable be designed and carried out to permit multiple concurrent uses which are appropriate for the location and to avoid unnecessary conflicts with other uses of the vicinity.

Guideline 1.10 These guidelines are not intended to be, nor shall they be, interpreted to allow expansion of governmental authority beyond that established by La. R.S. 49:213.1 through

213.21, as amended; nor shall these guidelines be interpreted so as to require permits for specific uses legally commenced or established prior to the effective date of the coastal use permit program nor to normal maintenance or repair of such uses.

Response:

"These guidelines are acknowledged and have been addressed through the preparation of responses to the guidelines contained within the specific use categories."

GUIDELINES FOR LEVEES

Guideline 2.1 The leveeing of unmodified or biologically productive wetlands shall be avoided to the maximum extent practicable.

Response:
The majority of the Hurricane Storm Damage Risk Reduction System was built over existing federal or non-federal levee or floodwall or along previously impacted areas In a few cases new segments or levee tie-ins did enclose areas which included wetlands. Those IERs and the impacts are summarized below.

IER	Impact	Comment
IER 11	Approximately 403 acres of brackish and saline marsh located south of the Gulf Intracoastal Waterway were enclosed by the construction of the Surge Barrier	The selected alignment was not the alternative that enclosed the largest wetlands area. The structural barrier will be open except during storm conditions therefore the marsh will continue to be highly functional.
IERS 2 West Return Floodwall	16.5 acres brackish marsh and swamp enclosed by the realignment of the floodwall along the New Orleans International Airport	Floodwall was realigned because of constructability, debris and wave erosion issues that would have occurred with the original sharp corner design.
IER 9 Caernarvon Closure	0.6 acres of wetlands enclosed however these wetlands were considered hydrologically isolated prior to construction activities	Wetlands were previously isolated by the construction of Caernarvon Canal, Caernarvon Fresh Water Diversion.
IER 13 Eastern Tie-In	71 acres of wetlands impacted either through direct filling or enclosure	The alignment of levee reach 1 reduced the overall impacts by incorporating/utilizing existing levee alignment in the levee design.
IER 16 Western Terminus	The approximately 2,400 acres of wetlands enclosed by new levee alignment were previously hydrologically modified.	The approximately 2,400 acres of wetlands were previously hydrologically modified by the construction of the Mississippi River Levee, the Union Pacific and Burlington Northern and Santa Fe Railroads, Highway 90, and Davis Pond East Guide Levee. Combined cross section through Hwy 90 retained which would minimize the potential for indirect hydrological impacts to wetlands. The Bayou Verret structure would remain open

		except for storm events. The wetlands area will continue to function and export detritus to adjacent flood side wetlands.

Jurisdictional wetlands were avoided when designating borrow sites. In many cases the individual borrow areas were designated in agricultural lands that are located in areas between the Mississippi River Levee and back levees and would be defined as fastlands under the Louisiana Coastal Resource Program (LCRP) or exempted because of their use as agriculture lands. Fastlands as defined by the LCRP are lands that have been impounded, pumped, and drained either before January 1, 1979 or were lawfully (permitted) after and preventing direct and significant impacts to coastal waters.

<u>Guideline 2.2</u> Levees shall be planned and sited to avoid segmentation of wetland areas and systems to the maximum extent practicable.

Response: The majority of the HSDRRS construction activities are occurring along the alignment of existing levees and floodwalls and as a result new segmentation of wetlands areas and systems is not occurring. In the few cases where new alignments are being constructed and wetlands are being segmented, IER 11 and IER 16, the structures through the levees provide for continued hydrological connections with adjacent wetlands. The structures would be operated such that they would remain open except during storm events, therefore, water exchange with adjacent unsegmented wetlands would remain.

<u>Guideline 2.3</u> Levees constructed for the purpose of developing or otherwise changing the use of a wetland area shall be avoided to the maximum extent practicable.

Response: The majority of the HSDRRS construction activities are occurring along the alignment of existing levees. The HSDRRS project area is located within portions of St. Charles, Jefferson, Orleans, St. Bernard and Plaquemines Parishes. Large sections of Jefferson and Orleans are heavily developed for urban and industrial uses. St. Charles, St. Bernard and Plaquemines Parishes also have urban and industrial development but to a lesser extent than Jefferson and Orleans Parishes. Since most of the HSDRRS alignment follows the previous alignment of the West bank and Vicinity and Lake Pontchartrain and Vicinity projects , those undeveloped lands located within the project boundaries, although previously enclosed, remain undeveloped. Wetland areas that remain within the HSDRRS are subject to local, state and federal permitting and zoning requirements including the Coastal Zone Management Program and the regulatory procedures of the Clean Water Act. Local, state and federal interests would responsible for regulating land development and therefore, responsible for defining mitigation requirements. Development and change of use would be regulated through these programs.

<u>Guideline 2.4</u> Hurricane and flood protection levees shall be located at the non-wetland/wetland interface or landward to the maximum extent practicable.

Response:
The majority of the HSDRRS construction activities are occurring along the alignment of existing levees and floodwalls. In general, the HSDRRS separates urban and industrially developed areas on the protected side of the system from the wetlands or other natural areas located outside of the flood damage and risk reduction system. There are exceptions within the system as well. One exception is the IER 7 New Orleans East Lake Front to Michoud Canal, project area. In this segment of the HSDRRS the protection system is bounded by a wetland

area. In that case, the IER #7, New Orleans East Lake Front to Michoud Canal alignment followed that of the levee, floodwalls and structures that were in place prior to Hurricane Katrina. Therefore, no new areas were enclosed and impacts were reduced by overlaying the HSDRRS 100-year level risk reduction over the previously construction Lake Pontchartrain and Vicinity project. The HSDRRS rebuilt the features to provide the 100-year level of risk reduction. However, since the original alignment of the levee was bounded on both sides by wetlands building the levee to 100-year level of risk reduction expanded levee footprint and impacted an additional 350 acres of wetlands.

Guideline 2.5 Impoundment levees shall only be constructed in wetland areas as part of approved water or marsh management projects or to prevent release of pollutants.

Response:
Not applicable

Guideline 2.6 Hurricane or flood protection levee systems shall be designed, built and thereafter operated and maintained utilizing best practical techniques to minimize disruptions of existing hydrologic patterns, and the interchange of water, beneficial nutrients and aquatic organisms between enclosed wetlands and those outside the levee system.

Response:
The majority of the HSDRRS construction activities occurred along the alignment of the previously construction Lake Pontchartrain and Vicinity and West Bank and Vicinity projects' levee and floodwalls. Where new levee alignments were built structures were included in the project design to allow for continued water exchange and navigation.   Structures such as the Bayou Verret Closure Structure, Western Closure Complex and the Borgne Surge Barrier were designed and built to minimize disruption of existing hydrologic patterns while providing flood damage risk reduction to the Greater New Orleans Area. The structures were designed to be operated such that they would remain open except in the case of storm events. Providing openings in the system allow for the continued exchange of water, nutrients and aquatic organisms from exterior to interior wetlands. IER specific studies and modeling disclosed impacts but both those individual analyses and the cumulative impact assessment conducted during the preparation of the Phase I CED resources such as fisheries and water quality had minor to moderate impacts related to the HSDRRS construction activities. Overall past, present and future cumulative regional impacts were determined to have more significant impacts than the cumulative HSDRRS impacts.

GUIDELINES FOR LINEAR FACILITIES

Guideline 3.1 Linear use alignments shall be planned to avoid adverse impacts on areas of high biological productivity or irreplaceable resource areas.

Response:
The majority of the Hurricane Storm Damage Risk Reduction System was built within or by expanding existing federal or non-federal levee or floodwalls and, therefore, utilized existing linear corridors for construction. In many cases construction activities are occurring partially or entirely along previously impacted areas While wetlands impacts have occurred those impacts were reduced because in many cases previously constructed levees and floodwalls were overlaid with the 100-year level of risk reduction project. Areas that had been previously cleared, grubbed and filled by the construction of the West bank and Vicinity or Lake Pontchartrain and Vicinity projects were incorporated into the 100-year level of risk reduction projects and as a result impacts to humans and natural resources were reduced.

Guideline 3.2 Linear facilities involving the use of dredging or filling shall be avoided in wetland and estuarine areas to the maximum extent practicable.

Response: The majority of the Hurricane Storm Damage Risk Reduction System was built or is being built by utilizing existing levee or floodwall alignments and as a result is performing construction activities entirely or partially within a previously impacted linear corridor.

Guideline 3.3 Linear facilities involving dredging shall be of the minimum practical size and length.

Response: Dredging to provide access for construction activities including the delivery of material was anticipated to deliver materials and construct open water features along the Lake Pontchartrain and GIWW shorelines. The original design for the IER #6 New Orleans East Lake Front and IER #7 New Orleans East Lakefront to Michoud Canal 100- year risk reduction called for the construction or rehabilitation of breakwaters along the lakefront. Reanalysis of the 100-year risk reduction eliminated the need to conduct those construction activities for the June 2011 construction event, therefore, the dredging of 44 acres of Lake Pontchartrain water bottoms did not occur. While impacts did not occur during the June 2011 construction event, within the 50-year project life the foreshore protection may be necessary to provide 100-year risk reduction.

Guideline 3.4 To the maximum extent practicable, pipelines shall be installed through the "push ditch" method and the ditch backfilled.

Response:
In cases where existing pipelines were located in sensitive habitats and were modified because they crossed the HSDRRS alignments, the pipelines were directionally drilled. The Enterprise pipeline was directionally drilled under the Bayou aux Carpes 404c Clean Water Act site (IER 12) to avoid impacts that unique wetlands areas. Similarly directionally drilling was conducted along the Lake Cataouatche Levee (IER 15) at the Chevron Gas Pipeline where is crossed the levee. This was to relate the pipeline from passing up and over the levee to below the levee. The adjacent Jean Lafitte National Historical Park and Preserve (JLNHPP) was impacted by the directional drill activities. However, if the pipeline was not directionally drilled during the 2011 construction activities, future levee lifts of the levee would have required repeated retrofitting of the pipeline and additional impacts to the JLNHPP.

Guideline 3.5 Existing corridors, rights-of-way, canals, and streams shall be utilized to the maximum extent practicable for linear facilities.

Response:
The use of existing corridors and rights-of-way has been implemented throughout the HSDRRS design and construction process. Although in many cases the design criteria for the 100-year level of risk reduction did result in a larger footprint than was previously required for the pre-Katrina Hurricane Protection System Lake Pontchartrain and Vicinity and West Bank and Vicinity projects, utilizing existing corridors and rights-of-way reduced human and natural impacts associated with HSDRRS construction.

Guideline 3.6 Linear facilities and alignments shall be, to the maximum extent practicable, designed and constructed to permit multiple uses consistent with the nature of the facility.

Response:
Not applicable.

Guideline 3.7 Linear facilities involving dredging shall not traverse or adversely affect any barrier island.

Response:
Not applicable.

Guideline 3.8 Linear facilities involving dredging shall not traverse beaches, tidal passes, protective reefs or other natural gulf shoreline unless no other alternative exists. If a beach, tidal pass, reef or other natural gulf shoreline must be traversed for a non-navigation canal, they shall be restored at least to their natural condition immediately upon completion of construction. Tidal passes shall not be permanently widened or deepened except when necessary to conduct the use. The best available restoration techniques which improve the traversed area's ability to serve as a shoreline shall be used

Response:
Water exchange was retained where new levee or floodwall alignments were constructed. New water control structures including the Bayou Verret Closure Structure, Western Closure Complex and Borgne Surge Barrier were built to allow continued water exchange through natural waterways or navigation channels when the HSDRRS perimeter alignment incorporated these areas within the 100-year level risk reduction system.

Guideline 3.9 Linear facilities shall be planned, designed, located and built using the best practical techniques to minimize disruption of natural hydrologic and sediment transport patterns, sheet flow, and water quality, and to minimize adverse impacts on wetlands.

Response:
The majority of the Hurricane Storm Damage Risk Reduction System was built within or by expanding existing federal or non-federal levee or floodwalls and, therefore, utilized existing linear corridors for construction. Where new perimeter protection and new levee and floodwall have been constructed structures have been built to provide opening at natural waterways or navigation channels. The Bayou Verret Closure Structure, Western Closure Complex and the Borgne Surge Barrier were designed and built to minimize disruption of existing hydrologic patterns, and navigation while providing flood damage risk reduction to the Greater New Orleans Area.

Guideline 3.10 Linear facilities shall be planned, designed, and built using the best practical techniques to prevent bank slumping and erosion, saltwater intrusion, and to minimize the potential for inland movement of storm-generated surges. Consideration shall be given to the use of locks in navigation canals and channels which connect more saline areas with fresher areas.

Response: Both the new perimeter protection structures and the structures that previously were in place but that were replaced as part of the HSDRRS construction activities are designed to protect again storm events, specifically storm generated surges and related saltwater intrusion. The Borgne Surge Barrier and associated structures provide a greater level for risk reduction for storm surges to Eastern New Orleans and St. Bernard Parish than existed prior to Hurricane Katrina. The Western Closure Complex provides a greater level for risk reduction than previously existed in the Algiers and Harvey area and expanded protection along the Harvey Canal. Replacing existing structures or building additional structures where new perimeter alignments exist provide protection from saltwater intrusion and inland movement of storm-generated surges.

Guideline 3.11 All non-navigation canals, channels and ditches which connect more saline areas with fresher areas shall be plugged at all waterway crossings and at intervals between crossings in order to compartmentalize them. The plugs shall be properly maintained.

Response: Not applicable.

Guideline 3.12 The multiple use of existing canals, directional drilling and other practical techniques shall be utilized to the maximum extent practicable to minimize the number and size of access canals, to minimize changes of natural systems and to minimize adverse impacts on natural areas and wildlife and fisheries habitat.

Response: No applicable.

Guideline 3.13 All pipelines shall be constructed in accordance with parts 191, 192, and 195 of Title 49 of the Code of Federal Regulations, as amended, and in conformance with the Commissioner of Conservation's Pipeline Safety Rules and Regulations and those safety requirements established by La. R. S. 45:408, whichever would require higher standards.

Guideline 3.14 Areas dredged for linear facilities shall be backfilled or otherwise restored to the pre-existing conditions upon cessation of use for navigation purposes to the maximum extent practicable.

Response: Not applicable.

Guideline 3.15 The best practical techniques for site restoration and re-vegetation shall be utilized for all linear facilities.

Response: Re-vegetation through the establishment of turf is required for all levee and floodwall reaches. Along levee and floodwall alignments vegetation-free zones and root-free zones are maintained to ensure that safety, structural integrity and functionality area retained and accessibility for maintenance, inspection, monitoring and flood-fighting are retained per Engineering Technical Letter No. 1110-2-571 Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankments Dams and Appurtenant Structures.

Guideline 3.16 Confined and dead end canals shall be avoided to the maximum extent practicable. Approved canals must be designed and constructed using the best practical techniques to avoid water stagnation and eutrophication.

Response: Not applicable.

GUIDELINES FOR DREDGED MATERIAL DEPOSITION

Guideline 4.1 Spoil shall be deposited utilizing the best practical techniques to avoid disruption of water movement, flow, circulation and quality.

Response: Concur

Guideline 4.2 Spoil shall be used beneficially to the maximum extent practicable to improve productivity or create new habitat, reduce or compensate for environmental damage done by dredging activities, or prevent environmental damage. Otherwise, existing spoil disposal areas or upland disposal shall be utilized to the maximum extent practicable rather than creating new disposal areas.

Response:

IER	Beneficial Use	Comment
11 tier 2 Borgne	Material generated during the construction of the closure structures was beneficially placed in an approximately 405 area of brackish broken marsh located south of the structure.	Using before and after aerial photography a land change analysis was performed and a net gain of 14 acres of wetlands was documented between 2008 and 2011 (Enclosure 2).
IER 12	Material generated from construction activities associated with Algiers Canal were utilized beneficially at the Salvador geocrib marsh creation site in the Jean Lafitte National Historical Park and Preserve	Approximately 470,000 cubic yards of dredged material was deposited into the Salvador geocrib for marsh creation.
IER 16	Material generated during the construction of the Bayou Verret closure structure was incorporated into the project alignment. This material was used as a construction material.	Reduced the need to acquire additional material from offsite.

Guideline 4.3 Spoil shall not be disposed of in a manner which could result in the impounding or draining of wetlands or the creation of development sites unless the spoil deposition is part of an approved levee or land surface alteration project.

Response: Concur

Guideline 4.4 Spoil shall not be disposed of on marsh, known oyster or clam reef s or in areas of submersed vegetation to the maximum extent practicable.

Response: Access dredging and temporary stockpiling of dredged material in Lake Pontchartrain was conducted in conjunction with Jefferson East Bank (IER #3) construction activities. Approximately 201.5 acres of lake bottom were impacted by construction activities. Sensitive habitat such as oyster reefs did not occur in the construction areas. Temporary short term impacts to water quality were minimized through the use of silt curtains.

Guideline 4.5 Spoil shall not be disposed of in such a manner as to create a hindrance to navigation or fishing, or hinder timber growth.

Guideline 4.6 Spoil disposal areas shall be designed and constructed and maintained using the best practical techniques to retain the spoil at the site, reduce turbidity, and reduce shoreline erosion when appropriate.

Guideline 4.7 The alienation of state-owned property shall not result from spoil deposition activities without the consent of the Department of Natural Resources.

Beneficial use of dredged material is summarized under guideline 4.2. Other dredging activities were associated with dredging to provide access in shallow near shore areas of Lake Pontchartrain. In those situations dredged material was temporarily stockpiled adjacent to the access canals causing temporary turbidity and lake bottom impacts.

GUIDELINES FOR SHORELINE MODIFICATION

Guideline 5.1 Non-structural methods of shoreline protection shall be utilized to the maximum extent practicable.

Guideline 5.2 Shoreline modification structures shall be designed and built using best practical techniques to minimize adverse environmental impacts.

Guideline 5.3 Shoreline modification structures shall be lighted or marked in accordance with U.S. Coast Guard regulations, not interfere with navigation, and should foster fishing, other recreational opportunities, and public access.

Guideline 5.4 Shoreline modification structures shall be built using best practical materials and techniques to avoid the introduction of pollutants and toxic substances into coastal waters.

Guideline 5.5 Piers and docks and other harbor structures shall be designed and built using best practical techniques to avoid obstruction of water circulation.

Guideline 5.6 Marinas, and similar commercial and recreational developments shall to the maximum extent practicable not be located so as to result in adverse impacts on open productive oyster beds, or submersed grass beds.

Guideline 5.7 Neglected or abandoned shoreline modification structures, piers, docks, mooring and other harbor structures shall be removed at the owner's expense, when appropriate.

Guideline 5.8 Shoreline stabilization structures shall not be built for the purpose of creating fill areas for development unless part of an approved surface alteration use.

Guideline 5.9 Jetties, groins, breakwaters and similar structures shall be planned, designed and constructed so as to avoid to the maximum extent practicable downstream land loss and erosion.

Shoreline features constructed along the Lake Pontchartrain shoreline were constructed to protect HSDRRS flood damage risk reduction features erosion and wave impact. Shore line features were proposed along the Lake Pontchartrain shoreline and into Lake Pontchartrain in IER #3 Jefferson East Bank, IER #6 New Orleans East, Citrus Lakefront Levee and IER #7 Lakefront to Michoud Canal. The IER #3 shoreline protection features were constructed. Shoreline protection construction activities described in IER #6 and IER #7 the proposed raising and rehabilitation of existing foreshore protection features was not implemented during the HSDRRS 2011 construction event because it was determined that raising or rehabilitating those features was not necessary to provide the HSDRRS 2011 100-year level of risk reduction. During the 50-year HSDRRS project life that work may need to be conducted.

GUIDELINES FOR SURFACE ALTERATIONS

Guideline 6.1 Industrial, commercial, urban, residential, and recreational uses are necessary to provide adequate economic growth and development. To this end, such uses will be encouraged in those areas of the coastal zone that are suitable for development. Those uses shall be consistent with the other guidelines and shall, to the maximum extent practicable, take place only:

a) on lands five feet or more above sea level or within fast lands; or

b) on lands which have foundation conditions sufficiently stable to support the use, and where flood and storm hazards are minimal or where protection from these hazards can be reasonably well achieved, and where the public safety would not be unreasonably endangered; and

    1) the land is already in high intensity of development use, or

    2) there is adequate supporting infrastructure, or

    3) the vicinity has a tradition of use for similar habitation or development

Response:
Acknowledged

Guideline 6.2 Public and private works projects such as levees, drainage improvements, roads, airports, ports, and public utilities are necessary to protect and support needed development and shall be encouraged. Such projects shall, to the maximum extent practicable, take place only when:

a) they protect or serve those areas suitable for development pursuant to Guideline 6.1; and

b) they are consistent with the other guidelines; and

c) they are consistent with all relevant adopted state, local and regional plans.

Response: Concur. The HSDRRS project protects the Greater New Orleans Area an area with significant existing urban and commercial development.

Guideline 6.3 BLANK (Deleted)

Guideline 6.4 To the maximum extent practicable wetland areas shall not be drained -or filled. Any approved drain or fill project shall be designed and constructed using best practical techniques to minimize present and future property damage and adverse environmental impacts.

Response: Unavoidable impacts to wetlands and dry Bottomland hardwood forest will be mitigated

Guideline 6.5 Coastal water dependent uses shall be given special consideration in permitting because of their reduced choice of alternatives.

Response: Acknowledged

Guideline 6.6 Areas modified by surface alteration activities shall, to the maximum extent practicable, be re-vegetated, refilled, cleaned and restored to their predevelopment condition upon termination of the use.

Response: Acknowledged

<u>Guideline 6.7</u> Site clearing shall to the maximum extent practicable be limited to those areas immediately required for physical development.

Response: Throughout the design and construction process construction areas and temporary work sites were minimized to limit impacts beyond what was required to construct the flood damage risk reduction features.

<u>Guideline 6.8</u> Surface alterations shall, to the maximum extent practicable, be located away from critical wildlife areas and vegetation areas. Alterations in wildlife preserves and management areas shall be conducted in strict accord with the requirements of the wildlife management body.

Response: The majority of the HSDRRS alignment was constructed over the previous West bank and Vicinity and Lake Pontchartrain and Vicinity projects, while this helped reduce the overall area of construction impacts. However in some reaches of the project wildlife areas including Bayou Savage National Wildlife Refuge and the Jean Lafitte National Historical Park and Preserve bordered the previous project and, therefore, bordered the HSDRRS. In those cases all construction activities were coordinated with the adjacent managing agencies.

<u>Guideline 6.9</u> Surface alterations which have high adverse impacts on natural functions shall not occur, to the maximum extent practicable, on barrier islands and beaches, isolated cheniers, isolated natural ridges or levees,' or in wildlife and aquatic species breeding or spawning areas, or in important migratory routes.

Response: Acknowledged. During construction activities best management practices or environmental protection measures were implemented to minimize impacts on natural functions. Specifically nesting protection or monitoring measure were put in place in areas where colonial nesting bird colonies were historically found or where birds were observed near construction activities.

<u>Guideline 6.10</u> The creation of low dissolved oxygen conditions in the water or traps for heavy metals shall be avoided to the maximum extent practicable.

<u>Guideline 6.11</u> Surface mining and shell dredging shall be carried out utilizing the best practical techniques to minimize adverse environmental impacts.

Response: Not applicable.

<u>Guideline 6.12</u> The creation of underwater obstructions which adversely affect fishing or navigation shall be avoided to the maximum extent practicable.

<u>Guideline 6.13</u> Surface alteration sites and facilities shall be designed, constructed, and operated using the best practical techniques to prevent the release of pollutants or toxic substances into the environment and minimize other adverse impacts.

<u>Guideline 6.14</u> To the maximum extent practicable only material that is free of contaminants and compatible with the environmental setting shall be used as fill.

Response: Acknowledged. Borrow sites were evaluated during the borrow IER preparation process. Only earthen material meeting physical and contaminant-free criteria was approved for use for levee construction.

GUIDELINES FOR HYDROLOGIC AND SEDIMENT TRANSPORT MODIFICATIONS

Guideline 7.1 The controlled diversion of sediment-laden waters to initiate new cycles of marsh building and sediment nourishment shall be encouraged and utilized whenever such diversion will enhance the viability and productivity of the outfall area. Such diversions shall incorporate a plan for monitoring and reduction and/or amelioration of the effects of pollutants present in the freshwater source.

Guideline 7.2 Sediment deposition systems may be used to offset land loss, to create or restore wetland areas or enhance building characteristics of a development site. Such systems shall only be utilized as part of an approved plan. Sediment from these systems shall only be discharged in the area that the proposed use is to be accomplished.

Guideline 7.3 Undesirable deposition of sediments in sensitive habitat or navigation areas shall be avoided through the use of the best preventive techniques.

Guideline 7.4 The diversion of freshwater through siphons and controlled conduits and channels, and overland flow to offset saltwater intrusion and to introduce nutrients into wetlands shall be encouraged and utilized whenever such diversion will enhance the viability and productivity of the outfall area. Such diversions shall incorporate a plan for monitoring and reduction and/or amelioration of the effects of pollutants present in the freshwater source.

Guideline 7.5 Water or marsh management plans shall result in an overall benefit to the productivity of the area.

Guideline 7.6 Water control structures shall be assessed separately based on their individual merits and impacts and in relation to their overall water or marsh management plan of which they are a part.

Guideline 7.7 Weirs and similar water control structures shall be designed and built using the best practical techniques to prevent "cut arounds," permit tidal exchange in tidal areas, and minimize obstruction of the migration of aquatic organisms.

Guideline 7.8 Impoundments which prevent normal tidal exchange and/or the migration of aquatic organisms shall not be constructed in brackish and saline areas to the maximum extent practicable.

Guideline 7.9 Withdrawal of surface and ground water shall not result in saltwater intrusion or land subsidence to the maximum extent practicable.

"The proposed action would not involve hydrologic and sediment transport modifications, therefore, these guidelines are not applicable."

GUIDELINES FOR DISPOSAL OF WASTES

Guideline 8.1 The location and operation of waste storage, treatment, and disposal facilities shall be avoided in wetlands to the maximum extent practicable, and best practical techniques shall be used to minimize adverse impacts which may result from such use.

Guideline 8.2 The generation, transportation, treatment, storage and disposal of hazardous wastes shall be pursuant to the substantive requirements of the Department of Natural Resources adopted pursuant to Act 334 of 1978 and approved pursuant to the Resource Conservation and Recovery Act. of 1976 P. 0. 94-580, and of the Office of Conservation for injection below surface.

Guideline 8.3 Waste facilities located in wetlands shall be designed and built to withstand all expectable adverse conditions without releasing pollutants.

Guideline 8.4 Waste facilities shall be designed and constructed using best practical techniques to prevent leaching, control leachate production, and prevent the movement of leachate away from the facility.

Guideline 8.5 The use of overland flow systems for non-toxic, biodegradable wastes, and the use of sump lagoons and reservoirs utilizing aquatic vegetation to remove pollutants and nutrients shall be encouraged.

Guideline 8.6 All waste disposal sites shall be marked and, to the maximum extent practicable, all components of waste shall be identified.

Guideline 8.7 Waste facilities in wetlands with identifiable pollution problems that are not feasible and practical to correct shall be closed and either removed or sealed, and shall be properly re-vegetated using the best practical techniques.

Guideline 8.8 Waste shall be disposed of only at approved disposal sites.

Guideline 8.9 Radioactive wastes shall not be temporarily or permanently disposed of in the coastal zone.

"The proposed action would not involve the disposal of wastes and, therefore, these guidelines are not applicable."

GUIDELINES FOR USES THAT RESULT IN THE ALTERATION OF WATERS DRAINING INTO COASTAL WATERS

Guideline 9.1 Upland and upstream water management programs which affect coastal waters and wetlands shall be designed and constructed to preserve or enhance existing water quality, volume, and rate of flow to the maximum extent practicable.

Guideline 9.2 Runoff from developed areas shall to the maximum extent practicable be managed to simulate natural water patterns, quantity, quality and rate of flow.

Guideline 9.3 Runoff and erosion from agricultural lands shall be minimized through the best practical techniques.

"The proposed action would not involve alteration of waters draining into coastal water and, therefore, these guidelines are not applicable."

GUIDELINES FOR OIL, GAS, AND OTHER MINERAL ACTIVITIES

Guideline 10.1 Geophysical surveying shall utilize the best practical techniques to minimize disturbance or damage to wetlands, fish and wildlife and other coastal resources.

Guideline 10.2 To the maximum extent practicable, the number of mineral exploration and production sites in wetland areas requiring flotation access shall be held to the minimum number, consistent with good recovery and conservation practices and the need for energy development, by directional drilling, multiple use of existing access canals and other practical techniques.

Guideline 10.3 Exploration, production and refining activities shall, to the maximum extent practicable, be located away from critical wildlife areas and vegetation areas. Mineral operations in wildlife preserves and management areas shall be conducted in strict accordance with the requirements of the wildlife management body.

Guideline 10.4 Mineral exploration and production facilities shall be to the maximum extent practicable designed, constructed and maintained in such a manner to maintain natural water flow regimes, avoid blocking surface drainage, and avoid erosion.

Guideline 10.5 Access routes to mineral exploration, production and refining sites shall be designed and aligned so as to avoid adverse impacts on critical wildlife and vegetation areas to the maximum extent practicable.

Guideline 10.6 Drilling and production sites shall be prepared, constructed, and operated using the best practical techniques to prevent the release of pollutants or toxic substances into the environment.

Guideline 10.7 All drilling activities, supplies, and equipment shall be kept on barges, on drilling rigs, within ring levees, or on the well site.

Guideline 10.8 Drilling ring levees shall to the maximum extent practicable be replaced with smaller production levees or removed entirely.

Guideline 10.9 All drilling and production equipment, structures, and storage facilities shall be designed and constructed utilizing best practical techniques to withstand all expectable adverse conditions without releasing pollutants.

Guideline 10.10 Mineral exploration, production and refining facilities shall be designed and constructed using best practical techniques to minimize adverse environmental impacts.

Guideline 10.11 Effective environmental protection and emergency or contingency plans shall be developed and complied with for all mineral operations.

Guideline 10.12 The use of dispersants, emulsifiers and other similar chemical agents on oil spills is prohibited without the prior approval of the Coast Guard or Environmental Protection Agency on-Scene Coordinator, in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan.

Guideline 10.13 Mineral exploration and production sites shall be cleared, re-vegetated, detoxified and otherwise restored as near as practicable to their original condition upon termination of operations to the maximum extent practicable.

Guideline 10.14 The creation of underwater obstructions which adversely affect fishing or navigation shall be avoided to the maximum extent practicable.

"The proposed action would not involve oil, gas, and other mineral activities and, therefore, these guidelines are not applicable."

GUIDELINE DEFINITIONS

Levees - any use or activity which creates an embankment to control or prevent water movement, to retain water or other material, or to raise a road or other lineal use above normal or flood water levels. Examples include levees, dikes and embankments of any sort.

Linear Facilities - those uses and activities which result in creation of structures or works which are primarily linear in nature. Examples include pipelines, roads, canals, channels, and powerlines.

Shoreline Modifications - those uses and activities planned or constructed with the intention of directly or indirectly changing or preventing change of a shoreline. Examples include bulkheading, piers, docks, wharves, slips and short canals, and jetties.

Spoil Deposition - the deposition of any excavated or dredged material.

Surface Alterations - those uses and activities which change the surface or usability of a land area or water bottom. Examples include fill deposition, land reclamation, beach nourishment, dredging (primarily areal), clearing, draining, surface mining, construction and operation of transportation, mineral, energy and industrial facilities, and industrial, commercial and urban developments.

Hydrologic and Sediment Transport Modifications - those uses and activities intended to change water circulation, direction of flow, velocity, level, or quality or quantity of transported sediment. Examples include locks, water gates, impoundments, jetties, groins, fixed and variable weirs, dams, diversion pipes, siphons, canals, and surface and groundwater withdrawals.

Waste Disposal - those uses and activities which involve the collections, storage and discarding or disposing of any solid or liquid material. Examples include littering; landfill; open dumping; incineration; industrial waste treatment facilities; sewerage treatment; storage in pits, ponds or lagoons; ocean dumping and subsurface disposal.

Alterations of Waters Draining in Coastal Waters - those uses or activities that would alter, change, or introduce polluting substances into runoff and thereby modify the quality of coastal waters. Examples include water control impoundments, upland and water management programs, and drainage projects from urban, agricultural and industrial developments.

Oil, Gas and Other Mineral Activities - those uses and activities which are directly involved in the exploration, production, and refining of oil, gas and other minerals. Examples include geophysical surveying, establishment of drill sites and access to them, drilling, on site storage of supplies, products and waste materials, production, refining, and spill cleanup.

Coastal Water Dependent Uses - those which must be carried out on, in or adjacent to coastal water areas or wetlands because the use requires access to the water body or wetland or requires the consumption, harvesting or other direct use of coastal resources, or requires the use of coastal water in the manufacturing or transportation of goods. Examples include surface and subsurface mineral extraction, fishing, ports and necessary supporting commercial and industrial facilities, facilities for the construction, repair and maintenance of vessels, navigation projects, and fishery processing plants.

Best Practical Techniques - best practical techniques shall mean those methods or techniques which would result in the greatest possible minimization of the adverse impacts listed in Guideline 1.7 and in specific guidelines applicable to the proposed use. Those methods or techniques shall be the best methods or techniques which are in use in the industry or trade or among practitioners of the use, and which are feasible and practical for utilization.

Water or Marsh Management Plan - a systematic development and control plan to improve and increase biological productivity, or to minimize land loss, saltwater intrusion, erosion or other such environmental problems, or to enhance recreation.

Impoundment Levees - those levees and associated water control structures whose primary purpose is to contain water within the levee system either for the prevention of the release of pollutants, to create fresh water reservoirs, or for management of fish or wildlife resources.

Hurricane or Flood Protection Levees - those levees and associated water control structures whose primary purpose is to prevent occasional surges of flood or storm generated high water. Such levee systems do not include those built to permit drainage or development of enclosed wetland areas.

Development Levees - those levees and associated water control structures whose purpose is to allow control of water levels within the area enclosed by the levees to facilitate drainage or development within the leveed areas. Such levee systems also commonly serve for hurricane or flood protection, but are not so defined for purposes of these guidelines.

Feasible and Practical - those locations, methods and/or practices which are of established usefulness and efficiency and allow the use or activity to be carried out successfully.

Minerals - oil, gas, sulfur, geothermal, geopressured, salt, or other naturally occurring energy or chemical resources which are produced from below the surface in the coastal zone. Not included are such surface resources as clam or oyster shells, dirt, sand, or gravel.

Sediment Deposition Systems - controlled diversions of sediment-laden water in order to initiate land building or sediment nourishment or to minimize undesirable deposition of sediment in navigation channels or habitat areas. Typical activities include diversion channels, jetties, groins or sediment pumps.

Radioactive Wastes - Wastes containing source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended (68 Stat. 923).

OTHER STATE POLICIES INCORPORATED INTO THE PROGRAM

Section 213.8A of Act 361 directs the Secretary of DOTD, in developing the LCRP, to include all applicable legal and management provisions that affect the coastal zone or are necessary to achieve the purposes of Act 361 or to implement the guidelines effectively. It states:

The Secretary shall develop the overall state coastal management program consisting of all applicable constitutional provisions, laws and regulations of this state which affect the coastal zone in accordance with the provisions of this Part and shall include within the program such other applicable constitutional or statutory provisions, or other regulatory or management programs or activities as may be necessary to achieve the purposes of this Part or necessary to implement the guidelines hereinafter set forth.

The constitutional provisions and other statutory provisions, regulations, and management and regulatory programs incorporated into the LCRP are identified and described in Appendix 1. A description of how these other authorities are integrated into the LCRP and coordinated during program implementation is presented in Chapter IV. Since all of these policies are incorporated into the LCRP, federal agencies must ensure that their proposed actions are consistent with these policies as well as the coastal use guidelines. (CZMA, Section 307)

CONSISTENCY DETERMINATION

The proposed action has been planned and designed, constructed, and will be operated, and maintained to avoid to the maximum extent practicable the significant impacts outlined in Guideline 1.7 of this document. The proposed actions would provide significant public benefit and would serve important regional, state, and national interest, and the benefits resulting from the proposed action clearly outweighs the adverse impacts. The proposed actions raise or replace features of the West bank and Vicinity and Lake Pontchartrain and Vicinity project to a 100-year level of risk reduction. In addition to raising the levees and floodwalls that were constructed as part of the Lake Pontchartrain and Vicinity and West Bank and Vicinity project to a 100-year level of protection new segments were constructed as a part of the GNR HSDRRS this include the Western Terminus (Western Tie-In), Western Closure Complex, and the Borgne Complex. Individually the proposed actions included in the Phase 1 CED were determined to be consistent by the USACE and LDNR concurred with those determinations. A listing of the Coastal Use Permit numbers and dates can be found in table 3. In the process of the construction of project features and the evaluation of the cumulative impacts of the HSDRRS project, additional unanticipated project impacts have not been identified. While some data gaps do remain, the cumulative impact analysis for the HSDRRS project assessment indicate that impacts are minor to moderate for the majority of the resources. One exception is the impact to soils caused by borrow removal. However, in many instances these borrow sites are located out of the Coastal Zone or in fastland areas. And in the context of coastal resources the extraction of soils from a non-wetlands areas is less damaging than the extraction of soils from wetlands.

The proposed action construction, operation and maintenance of the Greater New Orleans Area HSDRRS provides 100-year level of risk reduction which decreases the risk of hurricane and storm surge inducing flooding from what was provided prior to project construction. The project also decreases the potential of the discharge of toxic substances into coastal waters.

Where practicable and through project feature design, implementation of best management practices and the implementation of environmental design commitments adverse impacts have been avoided or reduced. Since the HSDRRS has been constructed by incorporating or overlaying the West bank and Vicinity and Lake Pontchartrain and Vicinity projects in many areas of the system has required limited or no additional right-of-way in some project reaches. By building over or incorporating the existing West bank and Vicinity and Lake Pontchartrain and Vicinity project features impacts to human and natural resources have been reduced.

In those areas where a new right-of-way was required natural functions such as water flow and natural circulation, have been retained to the maximum extent practicable through the retention of openings in the system at natural water courses or navigation channels. Structures located in these opening would be closed to protect against storm events, but the majority of the time remain open to allow the exchange of water, wildlife and fish.

Where direct impact to jurisdictional wetlands could not be avoided mitigation projects are being developed to replace the function and value of those wetlands. One major environmental design commitment that has been implemented is the avoidance of jurisdictional wetlands as a source for borrow material. Even though jurisdictional wetlands have been avoided when clearing borrow sites, some impacts to non-jurisdictional bottomland hardwood forests could occur. Concurrent with the use of contractor furnished borrow sites, the impacts to non-jurisdictional bottomland hardwoods (BLH) are being mitigated through the purchase of mitigation credits concurrent with the borrow sites use. To date, impacts on approximately 117.15 acres (65.97 AAHUs) of non-jurisdictional BLH have occured because of excavation for borrow material and those impacts have been mitigated through the purchase of mitigation credits.

In the few cases have new HSDRRS alignments enclosed additional jurisdictional wetlands, IER #11, IERS #2 and IER #13. For the largest new area enclosed area IER #11, the Borgne Complex, the structures that make up the complex would remain open expect during storm events reducing the impacts to water exchange and wildlife and fish movement.

Hazardous, Toxic and Radioactive Waste assessments were conducted for all construction areas and borrow sites prior to their use. Unsuitable areas were avoided and as a result the release of pollutants or toxic substances into the environment was avoided. Similarly the assessments completed for the borrow sites ensured, to the maximum extent practicable, material that was free of contaminants and compatible with the environmental setting was used as fill.

Based on this evaluation, the U. S. Army Corps of Engineers, New Orleans District, has determined that the proposed action is consistent, to the maximum extent practicable, with the State of Louisiana's Coastal Resources Program.

Figure 1. Borgne Barrier Beneficial Use site photograph taken June 25, 2010

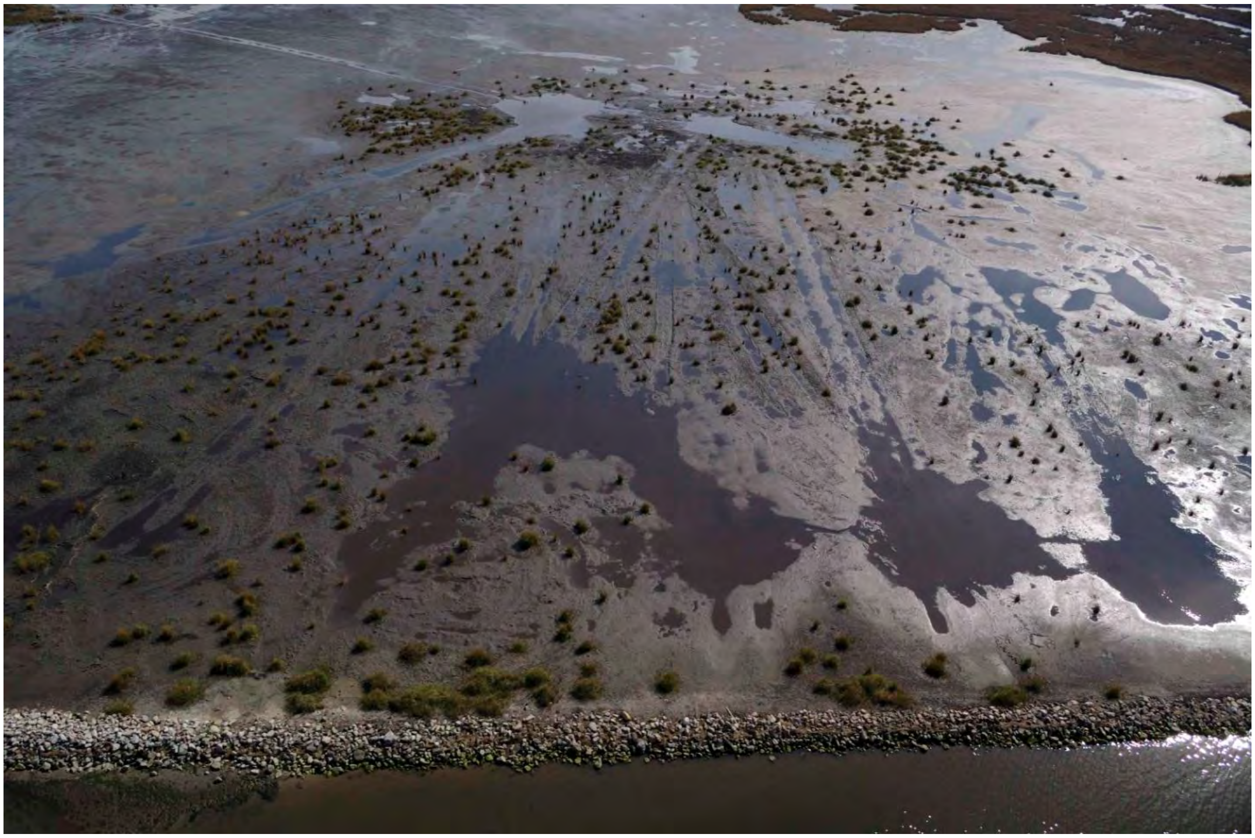

Figure 2. Borgne Barrier Beneficial Use site photograph taken January 27, 2011

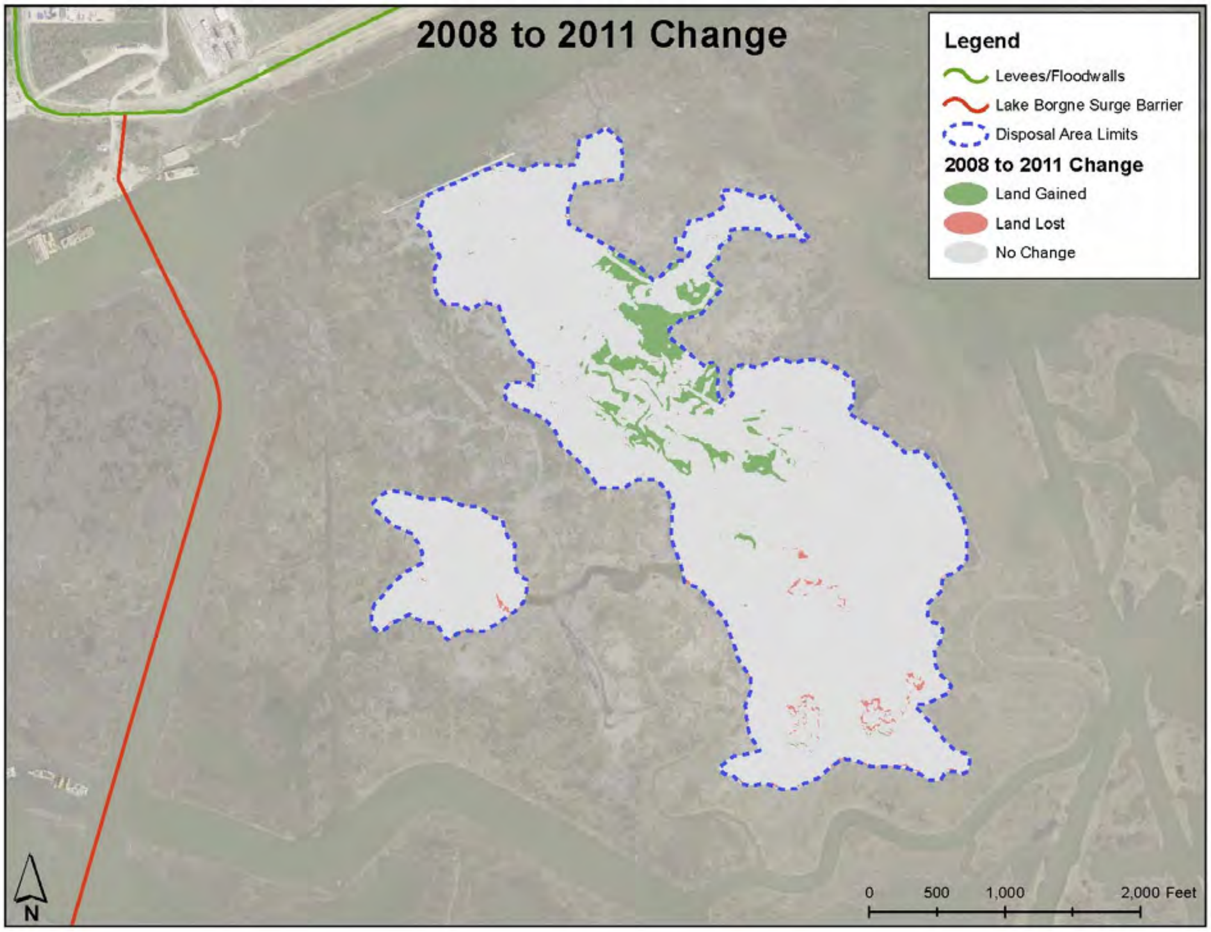

Figure 3. Borgne Barrier Beneficial Use Site land change analysis

APPENDIX R
TABLE OF IER COORDINATION, CONCURRENCE, AND CONSULTATION FOR ENVIRONMENTAL COMPLIANCE

IER	Water Quality Certificate		Coastal Zone Consistency		USFWS T&E Species Concurrence		NMFS T&E Species Concurrence		Cultural Resources Concurrence (SHPO)		CAR		Tribal Nations		Other	
	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Explanation	Date	Explanation
Risk Reduction IERs and IERSs																
1	4/18/2008	JP 080327-02/AI 156863/CER 20080001	4/21/2008	C20080104	4/8/2008	Stamp and Acting Supervisor's signature on letter to James Boggs from CEMVN, indicating concurrence	4/23/2008	Concurrence assumed 30 days after letter sent.	8/3/2007	Letter from Pam Breaux, SHPO, to Elizabeth Wiggins, CEMVN, indicating concurrence	1/14/2008	Letter and CAR from USFWS to CEMVN - January 2008	4/17/2007 4/17/2007 4/20/2007 4/23/2007 11/29 2007	Letters of concurrence received from the Alabama-Coushatta tribe of TX, (4/17/2007), Seminole Tribe of FL (4.17.07), Choctaw Nation of OK (4.20.09), MS Band of Choctaw Indians (4.23.07 and 11.29.07). Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
S #1	4/20/2009	WQC 080327-02/AI 156863/CER 20080002	5/8/2009	C20080104	4/3/2009	Letter from James Boggs, USFWS to Col. Alvin Lee, CEMVN, indicating concurrence	4/29/2009	Concurrence assumed 30 days after letter sent.	12/33/2007	Letter of concurrence	7/22/2008	Letter and CAR from USFWS to CEMVN - July 2008	4/17/2009 4/17/2009 4/20/2009 3/27/2009	Letters of concurrence (4.17.09) from Alabama-Coushatta Tribe of TX; Seminole Tribe of FL (4.17.09); Choctaw Nation of OK (4.20.09); Quapaw Tribe of Oklahoma (email dated 3.27.09). All above in Appendix C, Interagecny Correspondance - IER1S. Report (p. 31) lists MS Band of Choctaw as the concurrence letter received (8/3/07). Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3		
2	5/19/2008	WQC 080430-01/AI 157567/CER 20080001	5/23/3008	C20080223	5/5/2008	Stamp and Acting Supervisor's signature on letter to James Boggs from CEMVN, indicating concurrence	6/5/2008	Letter from Roy Crabtree NMFS, to Elizabeth Wiggins, CEMVN, indicating concurrence	2/15/2008	Letter from Pam Breaux, SHPO, to Elizabeth Wiggins, CEMVN, indicating concurrence	7/15/2008	Letter and draft CAR from USFWS to CEMVN - July 2008	1/9/2008 1/9/2008 1/15/2008	Tribal Concurrence letters from Tunica-Biloxi Tribe of LA, Choctaw Nation of Oklahoma, Mississippi Band of Choctaw Indians. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
S #2	8/6/2009	WQC 080430-01/AI 157567/CER 20090001	9/15/2009	C20080223 (mod 1)	8/20/2009	Stamp and signature of David Watts, USFWS, on copy of letter to James Boggs from CEMVN, indicating concurrence	6/5/2008	Letter of concurrence.	2/15/2008	Letter of concurrence.	9/9/2009	Letter and CAR updates from USFWS to CEMVN	1/15/2008 1/9/2008 1/15/2008 10/16/2009	Letters of concurrence from Mississippi Band of Choctaw Indians, Tunica-Biloxi Tribe of Louisiana, the Choctaw Nation of Oklahoma, and Alabama-Coushatta Tribe of Texas. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
3	5/27/2008	WQC 080512-01/AI 157821/CER 20080001	5/23/2008	C20080227	2/22/2008	Letter from James Boggs, USFWS to Col. Alvin Lee, CEMVN, indicating concurrence	5/28/2008	Letter from Roy Crabtree NMFS, to Elizabeth Behrens, CEMVN, indicating concurrence	1/7/2008 and 3/20/2008	Letters from Pam Breaux, SHPO, to Elizabeth Wiggins, CEMVN, indicating concurrence	7/21/2008	Letter and CAR from USFWS to CEMVN - July 2008	Dec 2007 March 2008 April 2008	Tribal Concurrence letters from Choctaw Nation of OK (2), Chitimacha Tribe of LA, and Quapaw Tribe of OK. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
S #3.a	10/21/2009	WQC 080512-01/AI 157821/CER 20090001	9/16/2009	C20080227 (mod 1)	8/20/2009	Stamp and signature of David Watts, USFWS, on copy of letter to James Boggs from CEMVN, indicating concurrence	8/31/2009	Letter from Roy Crabtree NMFS, to Richard Boe, CEMVN, indicating concurrence	1/7/2008	Letter of concurrence.	10/9/2009	Letter and CAR updates from USFWS to CEMVN	12/26/2007 12/27/2007	Letters of concurrence received from Choctaw Nation of Oklahoma and the Chitimacha Tribe of Louisiana. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
4		WQC not required	1/20/2009	C20080597	12/17/2008	Letter from James Boggs, USFWS, to Col. Alvin Lee, CEMVN, indicating concurrence (Appendix D).	2/3/2009	No effect determination.	1/26/2009	Stamp and signature of Scott Hutcheson of concurrence on copy of letter for request of consultation	3/6/2009	Letter and CAR from USFWS to CEMVN	10/23/2008 11/5/2008 11/5/2008 11/24/2008	Tribal Concurrence letters from Caddo Nation of OK, Alabama-Coushatta Tribe of TX, Seminole Nation of OK, and Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).	1/8/2009	letter from Kieth Casico, LDWF, to Brian Marcks, Historic and Scenic River concurrence, siting CZC C20080597
5	1/26/2009	WQC 081110-01/AI 161807/CER 20080001	11/17/2008	C20080112	12/6/2007	Letter from James Boggs, USFWS to Col. Jeffery Bedey, CEMVN, indicating concurrence for IERs 5-11	4/17/2009	Letter from Roy Crabtree NMFS, to Elizabeth Wiggins, CEMVN, indicating concurrence	3/17/2008	Letter of concurrence.	6/6/2009	Letter and CAR from USFWS to CEMVN - June 2009	10/6/2008 10/11/2008 10/17/2008 5/26/2009	Tribal Concurrence letters from Seminole Nation of OK, Seminole Tribe of FL, Caddo Nation of OK, and Choctaw Nation of OK. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
6	4/6/2009	WQC 090306-01/AI 163529/CER 20090001	3/11/2009	C20090065	1/30/2007	Letter from James Boggs, USFWS to Col. Michael McCormick, CEMVN, indicating concurrence for IERs 5-11	3/13/2009	Letter from Roy Crabtree NMFS, to Elizabeth Behrens, CEMVN, indicating concurrence for IER 6 and 7	9/19/2008	Letter of concurrence	5/29/2009	Letter and CAR from USFWS to CEMVN - May 2009	8/14/2008 8/15/2008 9/4/2008	Tribal Concurrence letters from Seminole Tribe of FL, Seminole Nation of OK, Alabama-Coushatta Tribe of TX, Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
S #6	4/6/2009	WQC 090306-01/AI 163529/CER 20090001	1/22/2010	Letter of concurrence re requested modification to C20090065.	11/13/2009	Letter from James Boggs, USFWS to Col. Alvin Lee, CEMVN, indicating concurrence	N/A	No effect determination.	9/19/2008	Letter of concurrence.	1/22/2010	Letter and CAR updates from USFWS to CEMVN	8/14/2008 8/15/2008 9/4/2008	Tribal Concurrence letters from Seminole Tribe of FL, Seminole Nation of OK, Alabama-Coushatta Tribe of TX, Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
7	4/6/2009	WQC 090306-01/AI 163529/CER 20090001	3/11/2009	C20090033	12/6/2007 and 1/30/2007	Letters from James Boggs, USFWS to Col. Jeffery Bedey and Col. Michael McMocmick, CEMVN, both indicating concurrence for IERs 5-11	3/13/2009	letter from Roy Crabtree NMFS, to Elizabeth Behrens, CEMVN, indicating concurrence for IER 6 and 7	2/17/2009 and 2/25/2009	Letters from Scott Hutcheson, SHPO, to Elizabeth Wiggins, CEMVN, indicating concurrence	6/15/2009	Letter and CAR updates from USFWS to CEMVN	1/26/2009 1/27/2009 2/5/2009 2/12/2009	Tribal Concurrence letters from Seminole Tribe of FL, Jena Band of Choctaw Indians, Choctaw Nation of OK, Alabama-Coushatta Tribe of TX, and Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
S #7	4/6/2009	WQC 090306-01/AI 163529/CER 20090001	4/28/2010	C20090033 (mod)	1/22/2010	Stamp and Acting Supervisor's signature on letter to James Boggs from CEMVN, indicating concurrence	3/25/2010	No effect determination.	2/17/2009 and 2/25/2009	Letters from Scott Hutcheson, SHPO, to Elizabeth Wiggins, CEMVN, indicating concurrence	4/21/2010	Letter and CAR updates from USFWS to CEMVN	1/26/2009, 1/27/2009, 2/5/2009, 2/12/2009	Tribal Concurrence letters from Seminole Tribe of FL, Jena Band of Choctaw Indians, Choctaw Nation of OK, Alabama-Coushatta Tribe of TX, and Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
8	3/8/2009	WQC 081222-01/AI 162387/CER 20080001	4/17/2008 and 1/26/2009	C20080057	5/28/2009	Letter from James Boggs, USFWS to Col. Alvin Lee, CEMVN, indicating concurrence	5/12/2009	No effect determination.	11/19/2007	Letter from Pam Breaux, SHPO, to Elizabeth Wiggins, CEMVN, indicating concurrence	5/28/2009	Letter and CAR updates from USFWS to CEMVN	11/29/2007	Tribal Concurrence letter from Mississippi Band of Choctaw Indians. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
9	9/21/2009	WQC 090708-02/AI 165754/CER 20090001	7/2/2009	C20090245	12/22/2009	Letter from James Boggs, USFWS to Col. Alvin Lee, CEMVN, indicating concurrence	11/15/2009	No effect determination.	12/7/2007	Letter of concurrence.	1/25/2010	Letter and CAR updates from USFWS to CEMVN	Email dated 11/29/2007	Tribal concurrence from MS Band of Choctaw Indians. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		

IER	Water Quality Certificate		Coastal Zone Consistency		USFWS T&E Species Concurrence		NMFS T&E Species Concurrence		Cultural Resources Concurrence (SHPO)		CAR		Tribal Nations		Other	
	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Explanation	Date	Explanation
10	2/8/2009	WQC 081222-01/AI 162387/CER 20080001	12/24/2008	C20080556	5/15/2009	Letter from James Boggs, USFWS to Col. Alvin Lee, CEMVN, indicating concurrence	4/13/2009	No effect determination.	1/20/2009	Stamp and signature of Scott Hutcheson of concurrence on copy of letter for request of consultation	5/19/2009	Letter and CAR updates from USFWS to CEMVN	11/24/2008 10/24/2008 11/12/2008 11/4/2008 10/17/2008 4/27/2009 4/24/2009	Tribal Concurrence letters from Seminole Tribe of FL, Seminole Nation of OK, Choctaw Nation of OK, Alabama-Coushatta Tribe of TX, Caddo Nation of OK, Seminole Tribe of FL, and Alabama-Coushatta Tribe of TX. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
11 Tier 1 Pontchartrain and Borgne		Programmatic document and WQC completed with Tier 2 documents	2/28/2008	C20070619	3/26/2008	Letter from Ronald F. Paille, USFWS to Col. Alvin Lee, CEMVN, indicating concurrence	2/27/2008	Letter from David Bernhart, NMFS, to Elizabeth Behrens, CEMVN, indicating concurrence		Programmatic document and Section 106 consultation completed with Tier 2 documents		Final CARs prepared for Tier 2 IERs		Programmatic document and Section 106 consultation completed with Tier 2 documents		
11 Tier 2 Borgne	7/11/2008	WQC 080616-01/A1 158513/CER 2008001	8/1/2008	C20080280	6/27/2008	Letter of concurrence.	8/12/2008	Letter of concurrence.	6/17/2008	Letter of concurrence.	10/9/2008	Letter and CAR updates from USFWS to CEMVN	5/29/2008 6/16/2008 5/20/2008	Tribal Concurrence letters from Choctaw Nation of OK, Alabama-Coushatta Tribe of TX, Caddo Nation of OK Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
S #11 Tier 2 Borgne	7/11/2008	WQC 080616-01/A1 158513/CER 2008001	9/8/2009	C20080280 (mod)	6/27/2008	Letter of concurrence.		Section 7 requirements completed.	1/3/1904	Letter of concurrence.	11/17/2010	Letter and CAR updates from USFWS to CEMVN	5/29/2008 6/16/2008 5/20/2008	Tribal Concurrence letters from Choctaw Nation of OK, Alabama-Coushatta Tribe of TX, Caddo Nation of OK Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
11 Tier 2 Pontchartrain	12/28/2009	WQC 091102-02/AI 158513/CER 20090001	11/9/2009	C20090495	2/2/2009 8/31/2009	Two letters - first for West Indian manatee; 2nd for other T&E species	8/31/2009	Letter from Roy Crabtree NMFS, to Richard Boe, CEMVN, indicating concurrence	2/20/2009	Letters from Scott Hutcheson, SHPO, to Elizabeth Wiggins, CEMVN, indicating concurrence	3/29/2010	Letter and CAR updates from USFWS to CEMVN	2/19/2009 3/3/2009	Tribal Concurrence letters from Choctaw Nation of OK and Alabama-Coushatta Tribe of TX. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
12	12/16/2008	WQC 080825-02/AI 160206/CER 20080001	12/17/2008	C20080483	6/25/2008	Letter from James Boggs, USFWS to Robert Boudet, CEMVN, indicating concurrence	1/29/2009	Letter from Miles Croom, NMFS, to Gib Owen,, CEMVN, indicating concurrence	8/1/2008	Letter from Brad Collins, SHPO, to Elizabeth Wiggins, CEMVN, indicating concurrence	2/18/2009	Letter and CAR from USFWS to CEMVN - Feb. 2009	7/8/2008 1/22/2009	Tribal concurrence letter from Seminole Tribe of FL and Alabama-Coushatta Tribe of Texas. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
S #12	12/16/2008	WQC 080825-02/AI 160206/CER 20080001	8/6/2010 11/17/2010	C20070509 (mod1) C20080483 (mod2)	6/28/2010	Stamp and Acting Supervisor's signature on letter to James Boggs from CEMVN, indicating concurrence	1/29/2009	Letter from Miles Croom, NMFS, to Gib Owen,, CEMVN, indicating concurrence	12/26/2007	Letter of concurrence.	7/24/2010	Letter and draft CAR from USFWS to CEMVN	12/5/2007 1/15/2008 12/27/2007	Tribal concurrence letters from Choctaw of Oklahoma, the Mississippi Band of Choctaw, and the Chitimacha tribe. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
13	3/6/2009	WQC 090128-01/AI 162810/CER 20090001	3/13/2009	C20090082	3/10/2009	Lettter in Appendix D	12/4/2009	Section 7 requirements completed.	3/30/2009	Stamp and signature of Scott Hutcheson of concurrence on copy of letter for request of consultation	11/24/2009	Letter and CAR from USFWS to CEMVN - Nov. 2008	2/5/2009 2/24/2009 2/18/2009	Tribal concurrence letters received from the Choctaw Nation of Oklahoma, Alabama Coushatta Tribe of Texas, and the Quapaw Tribe of Oklahoma. No other Indian Tribes responded. No response after 30 days from other tribes implied concurrence per 36 CFR 800.3 (c)(4).		
13 Addendum	3/6/2009	WQC 090128-01/AI 162810/CER 20090001	3/13/2009	C20090082	3/10/2009	Lettter in Appendix D	12/4/2009	Section 7 requirements completed.	3/30/2009	Stamp and signature of Scott Hutcheson of concurrence on copy of letter for request of consultation	3/20/2009	Letter and CAR from USFWS to CEMVN - March 2009	2/5/2009 2/24/2009 2/18/2009	Tribal concurrence letters received from the Choctaw Nation of Oklahoma, Alabama Coushatta Tribe of Texas, and the Quapaw Tribe of Oklahoma. No other Indian Tribes responded. No response after 30 days from other tribes implied concurrence per 36 CFR 800.3 (c)(4).		
14	3/4/2008	JP 080213-04	3/10/2008	C20080048	7/31/2008	Letter from James Boggs, USFWS to Col. Alvin Lee, CEMVN, indicating concurrence	8/26/2008	Section 7 requirements completed.	1/23/2008	Letter of concurrence.	8/18/2008	Letter and CAR from USFWS to CEMVN	12/26/2007 12/27/2007	Tribal letters of concurrence from Choctaw Nation of Oklahoma and the Chitimacha Tribe of Louisiana. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
S #14.a	8/24/2009	WQC 080213-04/AI 156035/CER 20090001	11/10/2009	C20080048	9/2/2009	Stamp and Acting Supervisor's signature on letter to James Boggs from CEMVN, indicating concurrence	7/9/2009	Concurrence via email.	8/13/2009	Letters from Scott Hutcheson, SHPO, to Joan Exnicios, CEMVN, indicating concurrence	1/13/2010	Letter and CAR updates from USFWS to CEMVN	7/29/2009 7/30/2009 8/14/2009	Tribal concurrence letters from Seminole Tribe of FL, Choctaw Nation of OK, and Alabama-Coushatta Tribe of TX		
15	3/4/2008	JP 080213-05 (EIR 15, p. 59)	3/10/2008	C20080049	5/22/2008	Letter from James Boggs, USFWS to Col. Alvin Lee, CEMVN, indicating concurrence	5/28/2008	Letter of concurrence.	12/11/2007	Letter of concurrence.	7/28/2008	Letter and CAR updates from USFWS to CEMVN	Email - 11/29/2007	Mississippi Band of Choctaw Indians. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
16	3/6/2009 and 4/20/2009	WQC 090212-06/AI 163172/CER 20090001 and WQC 090212-06/AI 163172/CER 20090002	4/18/2009	C20080324	11/28/2007	Letter from James Boggs, USFWS to Elizabeth Wiggins, CEMVN, indicating concurrence	6/12/209	No effect determination.	3/24/2008 12/11/2008 1/29/2009	Letter of concurrence for Alternative 2 alignment (3/24/08), Alternative 3 alignment (12/11/08), and Alternative 3 alignment expanded (1/29/09)	6/8/2009	Letter and CAR from USFWS to CEMVN - June 2009	Letters received from March 2008 - January 2009.	Alternative 2 alignment: Choctaw Nation of OK concurrence letter (3/31/08); Alternative 3 alignment: Seminole Nation of OK (10/24/08), Alabama Coushatta Tribe of TX (11/5/08), and the Seminole Tribe of FL (11/24/08) concurred; Alternative 3 expanded: Alabama Coushatta Tribe of TX (1/22/09), and the Tunica-Biloxi Tribe of LA (1/26/09) concurred. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
S #16.a	4/14/2010	WQC 090212-06/AI 163172/CER 20100001	5/4/2010	C20080324	5/7/2010	Letter from James Boggs, USFWS to Col. Alvin Lee, CEMVN, indicating concurrence	8/24/2010	No effect determination.	5/20/2010	Stamp and signature of Phil Boggan of concurrence on copy of letter for request of consultation	8/11/2010	Letter and CAR from USFWS to CEMVN - August 2010	5/4/2010 5/10/2010 5/24/2010 7/22/1010	Tribal Concurrence letters from Alabama-Coushatta Tribe of TX, Choctaw Nation of OK, Alabama-Coushatta Tribe of TX, and Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
17	7/14/2008	JP 080522-02	9/11/2008	C20080289	11/21/2008	Letter from James Boggs, USFWS to Col. Alvin Lee, CEMVN, indicating concurrence	12/2/2008	Letter of concurrence.	5/1/2008	Letter of concurrence.	12/22/2008	Letter and CAR from USFWS to CEMVN - December 2008	11/19/2008 11/14/2008	Tribal Concurrence letters from Alabama-Coushatta Tribe of TX and Seminole Nation of OK in Appendix. IER 17 Final, page 79, says Mississippi Band of Choctaw, Chitimacha Tribe of Louisiana, Choctaw Nation of Oklahoma and Seminole Tribe of Florida sent letters of concurrence, but no dates included. Others did not respond after 30 days.		
27	N/A	References to water quality monitoring by DEQ but no mention of certificate	7/21/2010	C20100164	8/13/2010	No effect determination	9/10/2010	No effect determination.	9/2/2010	Stamp and signature of Phil Boggan of concurrence on copy of letter for request of consultation	10/1/2010	Letter and CAR updates from USFWS to CEMVN	8/20/2010 8/26/2010	Tribal Concurrence letters from Seminole Tribe of FL, and Alabama-Coushatta Tribe of TX. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		

IER		Water Quality Certificate		Coastal Zone Consistency		USFWS T&E Species Concurrence		NMFS T&E Species Concurrence		Cultural Resources Concurrence (SHPO)		CAR		Tribal Nations		Other	
		Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Explanation	Date	Explanation
Borrow IERs																	
	All Sites																
	1418/1420 Bayou Rd.	N/A		3/12/2007	C20070071	3/15/2007	No effect determination.		No effect determination.	9/14/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN		Not consulted (see Table 5, IER 18, page 43)		
	1572 Bayou Rd.	N/A		3/12/2007	C20070071	3/15/2007	No effect determination.		No effect determination.	9/14/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN		Not consulted (see Table 5, IER 18, page 43)		
	910 Bayou Rd.	N/A		3/12/2007	C20070071	3/7/2007	No effect determination.		No effect determination.	3/29/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN		Not consulted (see Table 5, IER 18, page 43)		
	4001 Florissant	N/A		3/12/2007	C20070071	3/7/2007	No effect determination.		No effect determination.	1/22/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN		Not consulted (see Table 5, IER 18, page 43)		
	Dockville	N/A		3/12/2007	C20070071	3/15/2007	No effect determination.		No effect determination.	6/6/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN		Not consulted (see Table 5, IER 18, page 43)		
18	**Triumph**	N/A		July, 2006	No identifying number provided	8/20/2007	No effect determination.		No effect determination.	11/7/2005	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN		Not consulted (see Table 5, IER 18, page 43)		
	Belle Chasse	N/A		9/25/2007	C20070200	4/17/2007	No effect determination.		No effect determination.	5/31/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	5/7/2007 5/3/2007 5/3/2007	Tribal Concurrence letters from Mississippi Band of Choctaw Indians, Choctaw Nation of OK, and Quapaw Tribe of OK. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
	Maynard	N/A		9/25/2007	C20070200	5/29/2007	No effect determination.		No effect determination.	6/7/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	5/11/2007 5/22/2007	Tribal Concurrence letters from Mississippi Band of Choctaw Indians and Choctaw Nation of OK. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
	Cummings North	N/A		9/25/2007	C20070200	4/5/2007	No effect determination.		No effect determination.	10/5/2006 and 5/8/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN		Not consulted (see Table 5, IER 18, page 43)		
	Churchill Farms Pit A	N/A		9/25/2007	C20070200	4/17/2007	No effect determination.		No effect determination.	8/14/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	7/30/2007 7/30/2007	Tribal Concurrence letters from Choctaw Nation of OK and Seminole Nation of OK. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
	Westbank Site G	N/A		7/22/2007	C20070200	5/24/2007	No effect determination.		No effect determination.	8/14/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	7/30/2007 7/30/2007	Tribal Concurrence letters from Choctaw Nation of OK and Seminole Nation of OK. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
	Bonnet Carré North	N/A		7/22/2007	C20070304	5/29/2007	No effect determination.		No effect determination.	6/18/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	6/12/2007 5/31/2007	Tribal Concurrence letters from Mississippi Band of Choctaw Indians and Choctaw Nation of OK. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
	All Sites	N/A													Nothing found in document except a refernce to need for a cultural resources report and tribal concurrence (p.13).		
	River Birch Phase 1	N/A		2/14/2008	P20030454	6/28/2004	No effect determination.		No effect determination.	12/14/2006	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN				
	River Birch Phase 2	N/A		2/14/2008	P20061802	2/7/2007	No effect determination.		No effect determination.	12/14/2006	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN				
	Pearlington Dirt Phase 1	N/A		2/14/2008	DMR-070125	9/15/2006	No effect determination.		No effect determination.	12/22/2006	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN				
	Eastover	N/A		2/14/2008	N/A	3/20/2007	No effect determination.		No effect determination.	3/15/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN				
19	**Kimble #2**	N/A		2/14/2008	P20061684	8/20/2007	No effect determination.		No effect determination.	10/10/2006	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN				
	Sylvia Guillot	N/A		2/14/2008	N/A	1/29/2007	No effect determination.		No effect determination.	2/6/2006	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN				
	Gatien-Navy Camp Hope	N/A		2/14/2008	N/A	8/20/2007	No effect determination.		No effect determination.	9/8/2006	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN				
	DK Aggregates	N/A		2/14/2008	P20061819	12/21/2006	No effect determination.		No effect determination.	4/10/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN				
	St. Gabriel Redevelopment	N/A		2/14/2008	Not located in the Coastal Zone	3/8/2007	No effect determination.		No effect determination.	4/17/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN				

IER		Water Quality Certificate		Coastal Zone Consistency		USFWS T&E Species Concurrence		NMFS T&E Species Concurrence		Cultural Resources Concurrence (SHPO)		CAR		Tribal Nations		Other	
		Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Explanation	Date	Explanation
22	**All Sites**	N/A															
	Brad Buras	N/A		9/3/2007	C20070323	6/28/2007	No effect determination.		No effect determination.	7/31/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	7/10/2007 7/12/2007	Tribal Concurrence from Mississippi Band of Choctaw Indians and Quapaw Tribe of Ok. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)). -- 10/10/2007.		
	Tabony	N/A		10/11/2007	C20070468	9/14/2007	No identifying number provided		No effect determination.	3/10/2008	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	12/27/2007 12/5/2007	Tribal Concurrence from Chitimacha Tribe of LA and Choctaw Nation of OK. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)). -- 12/28/2007		
	Westbank F	N/A		9/25/2007	C2007200	9/19/2007	No effect determination.		No effect determination.	2/4/2008	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	1/14/2008	Tribal Concurrence from Mississippi Band of Choctaw Indians. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).) -- 2/19/2008.		
	Westbank I	N/A		9/3/2007	C20070323	9/28/2007	No effect determination.		No effect determination.	11/28/07 and 12/6/07	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	10/15/2007 10/25/2007 10/23/2007 11/8/2007	Tribal Concurrence from Chitimacha Tribe of LA, Choctaw Nation of OK, and Seminole Tribe of FL (2 dates). Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)) -- 111/21/2007.		
	Westbank N	N/A		11/30/2007	C20070509	9/19/2007	No effect determination.		No effect determination.	12/26/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	12/27/2007 1/15/2008 12/5/2007	Tribal Concurrence from Chitimacha Tribe of LA, MS Band of Choctaw Indians, and Choctaw Nation of OK. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)). 1/2/2008.		
23	**All Sites**																
	1025 Florissant	N/A		7/10/2006	P20060763	8/9/2007	No effect determination.		No effect determination.	10/26/2006	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	12/21/2007	No response after 30 days from other tribes implied concurrence (per 36 CFR 800.3 (c(4)) - dated 12/21/2007		
	Acosta	N/A		6/15/2007	P20070851	7/2/2007	No effect determination.		No effect determination.	10/19/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	10/15/2007.	Tribal Concurrences from Choctaw Nation of OK. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c(4).		
	3C Riverside	N/A		6/28/2007	P20070558	7/27/2007	No effect determination.		No effect determination.	12/6/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	11/30/2007	Letter of concurrence from Chotaw Nation of OK on 11/30/2007. No response after 30 days from other tribas implied concurrence per 36 CFR 800.3 (c(4).		
	Myrtle Grove	N/A			N/A	1/29/2007	No effect determination.		No effect determination.	12/19/2006	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	12/21/2007	No response after 30 days from other tribes implied concurrence per 36 CFR 800.3 (c(4).		
	Pearlington Dirt Phase 2	N/A		1/25/2007	DMR-070125	1/14/2008	No effect determination.		No effect determination.	11/22/2006	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	12/5/2007 11/5/2007	Tribal Concurrences from Choctaw Nation of OK and Mississippi Band of Choctaw Indians, Jena Band of Choctaw Indians, Tunica-Biloxi Tribe of LA, Chickasaw Nation		
25	**All Sites**																
	Stumpf Phase 1	N/A		4/24/2008	C20080076	4/10/2008	No effect determination.		No effect determination.	6/11/2008	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	6/13/2008	No response after 30 days from tribes implied concurrence per 36 CFR 800.3 (c)(4).		
	Stumpf Phase 2	N/A		4/22/2008	C20080336	5/21/2008	No effect determination.		No effect determination.	6/11/2008	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	6/13/2008	No response after 30 days from tribes implied concurrence per 36 CFR 800.3 (c)(4).		
	Westbank D	N/A		4/24/2008	C20080076	4/25/2008	No effect determination.		No effect determination.	5/7/2008	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	5/23/2008	No response after 30 days from tribes implied concurrence per 36 CFR 800.3 (c)(4).		
	Westbank E Phase 1 & 2	N/A		11/30/2007	C20070509	4/25/2008	No effect determination.		No effect determination.	5/7/2008	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	5/23/2008	No response after 30 days from tribes implied concurrence per 36 CFR 800.3 (c)(4).		
	Tac Carrere	N/A		4/24/2008	C20080076	4/10/2008	No effect determination.		No effect determination.	4/23/2008	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	4/9/2008 4/3/2008	Triibal Concurrence from Chitimacha Tribe of LA and Choctaw Nation of OK. Others did not respond after 30 days. No response implies concurrence per 36 CFR 800.3 (c)(4).		
26	**All Sites**													9/25/2008			
	South Kenner Road	N/A		7/27/2008	P20071264	1/22/2008	No effect determination.		No effect determination.	5/5/2008	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	4/21/2008 4/28/2008	Tribal Concurrence from Mississippi Band of Choctaw Indians and Choctaw Nation of Oklahoma. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)) -- 5/12/2008		
	Willswood	N/A		7/22/2008	P20071574	7/2/2007	No effect determination.		No effect determination.	5/5/2008	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	4/28/2008 4/29/2008	Tribal Concurrencefrom Choctaw Nation of Oklahoma (2 dates). Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)) -- 5/12/2008.		
	Meyer	N/A		4/22/2008	P20080039	6/19/2007	No effect determination.		No effect determination.	4/3/2008	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	4/3/2008	Tribal Concurrence from Choctaw Nation of Oklahoma. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)) --4/14/2008.		
	Willow Bend	N/A		4/28/2008	P20080242	1/25/2008	No effect determination.		No effect determination.	3/6/2008	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	3/5/2008	Tribal Concurrencefrom Choctaw Nation of Oklahoma. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)) -- 3/28/2008		
	Frierson	N/A		8/1/2007	DMR-080030	2/26/2008	No effect determination.		No effect determination.	11/27/2007	No identifying number provided	11/15/2010	Letter and CAR updates from USFWS to CEMVN	1/14/2008 3/5/2008	Tribal Concurrence from Mississippi Band of Choctaw Indians and Choctaw Nation of Oklahoma. Others sent notices did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)) -- 2/18/2008		

IER		Water Quality Certificate		Coastal Zone Consistency		USFWS T&E Species Concurrence		NMFS T&E Species Concurrence		Cultural Resources Concurrence (SHPO)		CAR		Tribal Nations		Other	
		Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Explanation	Date	Explanation
28	**All Sites**																
28	**Johnson/ Crovetto**	N/A		9/22/2008	C20080336	6/3/2008	No effect determination.			9/23/2008	No identifying number provided	7/27/2009	Letter and CAR updates from USFWS to CEMVN	9/10/2008 9/10/2008	Tribal Concurrence from Alabama Coushatta Tribe of TX and Seminole Nation of OK. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
28	**Bazile**	N/A		3/4/2009	C20080700	3/2/2009	No effect determination.			11/20/2008	No identifying number provided	7/27/2009	Letter and CAR updates from USFWS to CEMVN	11/4/2008 11/14/2008 10/17/2008 10/24/2008	Tribal Concurrence from Alabama Coushatta Tribe of TX, Choctaw Nation of OK, Caddo Nation of OK, Seminole Nation of OK, and Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
28	**Westbank F Access Route**	N/A		3/4/2009	C20070200	3/3/2009	No effect determination.			2/4/2008	No identifying number provided	7/27/2009	Letter and CAR updates from USFWS to CEMVN	1/14/2008	Triibal Concurrence from Mississippi Band of Choctaw Indians. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
29	**All Sites**																
29	**Eastover Phase II**	N/A			P20070642	1/29/2008	No effect determination.		No effect determination.	5/8/2008	No identifying number provided	9/3/2009	Letter and CAR updates from USFWS to CEMVN	4/23/2008	Tribal Concurrence from Choctaw Nation of OK. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
29	**Tammany Holding**	N/A			P20021241	6/25/2008	No effect determination.		No effect determination.	1/6/2009	No identifying number provided	9/3/2009	Letter and CAR updates from USFWS to CEMVN	9/17/2008 and 10/20/2009	Tribal Concurrence from Choctaw Nation of OK and Seminole Nation of FL. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
29	**Willow Bend Phase II**	N/A			P20080242	1/25/2008	No effect determination.		No effect determination.	10/22/2008 and 6/24/2010	New letter from SHPO to CEMVN	9/3/2009	Letter and CAR updates from USFWS to CEMVN	10/8/2008 and 10/1/2008	Tribal Concurrence from Choctaw Nation of OK and Caddo Nation of OK. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
30	**All Sites**									9/16/2009	Stamp and signature of Scott Hutcheson of concurrence on copy of letter for request of consultation						
30	**Big Shake**	N/A			P20080985	7/22/2008 and 7/17/2008	Letter from USFWS to Jim Gruhala, CEMVN, indicating concurrence		No effect determination.	6/15/2009	No identifying number provided	9/23/2009	Letter and CAR updates from USFWS to CEMVN	6/15/2009, 5/26/2009, and 6/17/2009	Tribal Concurrence from Alabama Coushatta Tribe of TX, Caddo Nation of OK, and Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
30	**Henley**	N/A			DMR-090028	7/22/2008	No effect determination.		No effect determination.	6/24/2009	No identifying number provided	9/23/2009	Letter and CAR updates from USFWS to CEMVN		The tribes sent letters did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
30	**Contreras Dirt (all)**	N/A		12/21/2006	P20061819 (Cells E, F, & Z)	6/12/2008	No effect determination.		No effect determination.			9/23/2009	Letter and CAR updates from USFWS to CEMVN				
30	**Contreras Cell E**	N/A		12/21/2006	P20061819	6/12/2008	No effect determination.		No effect determination.	6/10/2009	No identifying number provided	9/23/2009	Letter and CAR updates from USFWS to CEMVN	5/26/2009 5/26/2009 5/12/2009 5/27/2009	Tribal Concurrence from Choctaw Nation of OK, Caddo Nation of OK, Quapaw Tribe of OK, and Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
30	**Contreras Cell F**	N/A		12/21/2006	P20061819	6/12/2008	No effect determination.		No effect determination.	7/10/2009	No identifying number provided	9/23/2009	Letter and CAR updates from USFWS to CEMVN	6/15/2009 5/19/2009 6/17/2009	Tribal Concurrence from Alabama Coushatta Tribe of TX, Caddo Nation of OK, and Seminole Nation of OK. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
30	**Contreras Cell Z**	N/A		12/21/2006	P20061819	6/12/2008	No effect determination.		No effect determination.	6/10/2009 and 7/10/2009	No identifying number provided	9/23/2009	Letter and CAR updates from USFWS to CEMVN	5/26/2009, 5/26/2009, 5/12/2009, and 5/27/2009	Tribal Concurrence from Choctaw Nation of OK, Caddo Nation of OK, Quapaw Tribe of OK, and Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).	6/15/2009, 5/19/2009, 5/19/2009, and 6/17/2009	Tribal Concurrence from Alabama Coushatta Tribe of TX, Caddo Nation of OK, Quapaw Tribe of OK, and Seminole Nation of FL. Others did not respond after 30 days. No response implies concurrence per

IER		Water Quality Certificate		Coastal Zone Consistency		USFWS T&E Species Concurrence		NMFS T&E Species Concurrence		Cultural Resources Concurrence (SHPO)		CAR		Tribal Nations		Other	
		Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Identifier	Date	Explanation	Date	Explanation
31	**All Sites**							9/22/2010	NMFS comment letter, dated 9/22/10, mentioned in Decision Record but not found								
	Acosta 2	N/A		6/15/2007 and8/16/2008	P20070851 (state & parish)	7/6/2009	No effect determination.			6/24/2010	No identifying number provided	10/22/2010	Letter and CAR updates from USFWS to CEMVN	5/28/2010	Tribal Concurrence from Alabama Coushatta Tribe of TX. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	Idlewild Stage 2	N/A			P20090517 (state) CZM-2009-16 (parish)	2/23/2009	No effect determination.			5/14/2009	No identifying number provided	10/22/2010	Letter and CAR updates from USFWS to CEMVN	7/16/2009, 6/19/2009, and 6/24/2009	Tribal Concurrence from Alabama Coushatta Tribe of TX, Caddo Nation of OK, and Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	King Mine	N/A		12/19/2006	DMR-070269 (state)	8/6/2008	No effect determination.			3/9/2009	No identifying number provided	10/22/2010	Letter and CAR updates from USFWS to CEMVN	3/9/2009 and 2/14/2009	Tribal Concurrence from Choctaw Nation of OK and Quapaw Tribe of OK. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	Levis	N/A		3/4/2009	P2006-0363 (state) ST06-023 (parish)	7/30/2008	No effect determination.			6/28/2010	No identifying number provided	10/22/2010	Letter and CAR updates from USFWS to CEMVN		Tribes did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	Lilly Bayou	N/A			P20070631 (state)	4/25/2008	No effect determination.			6/28/2010	No identifying number provided	10/22/2010	Letter and CAR updates from USFWS to CEMVN	6/10/2010	Tribal Concurrence from Choctaw Nation of OK. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	Port Bienville	N/A			DMR-080030 (state)	9/21/2009	No effect determination.			6/1/2010	No identifying number provided	10/22/2010	Letter and CAR updates from USFWS to CEMVN		Tribes did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	Raceland Raw Sugars	N/A			P20080485 (state and parish)	4/18/2008	No effect determination.			8/1/2008	No identifying number provided	10/22/2010	Letter and CAR updates from USFWS to CEMVN		Tribes did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	River Birch Landfill Expansion	N/A			P20090224 (state and parish)	2/27/2009	No effect determination.			6/25/2010	No identifying number provided	10/22/2010	Letter and CAR updates from USFWS to CEMVN	5/28/2010	Tribal Concurrence from Alabama Coushatta Tribe of TX. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	Scarsdale	N/A			P20091162 (state) CZM-2009-29 (parish)	4/18/2008	No effect determination.			6/25/2010	No identifying number provided	10/22/2010	Letter and CAR updates from USFWS to CEMVN		Tribes did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	Spoil Area	N/A			P20090799 (state)	2/27/2009	No effect determination.			6/25/2010	No identifying number provided	10/22/2010	Letter and CAR updates from USFWS to CEMVN		Tribes did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
32	**All Sites**						Letter from James Boggs (USFWS) to Col. Alvin Led (CEMVN) dated 11/23/09 states that no T&E specis or their										
	Bocage	N/A		6/30/2008	P20080865 (state and parish)	6/18/2008	No effect determination.		No effect determination.	6/30/2009	No identifying number provided	1/20/2010	Letter and CAR updates from USFWS to CEMVN	7/2/2009, 6/10/2009, 7/13/2009, and 5/27/2009	Tribal Concurrence from Alabama-Coushatta Tribe of TX, Caddo Nation of OK, Choctaw Nation of OK, and Seminole Tribe of FL . Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	Citrus Lands	N/A			P20090080 (state) CZM-2009-10 (parish)	1/29/2009	No effect determination.		No effect determination.	5/8/2009	No identifying number provided	1/20/2010	Letter and CAR updates from USFWS to CEMVN	7/23/2009	Tribal Concurrence from Choctaw Nation of OK. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	Conoco Phillips	N/A			P20090238 (state)	3/18/2009	No effect determination.		No effect determination.	11/9/2009	No identifying number provided	1/20/2010	Letter and CAR updates from USFWS to CEMVN	11/21/2009	Tribal Concurrence from Alabama-Coushatta Tribe of OK. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)). Others did not respond after 30 days.		
	Idlewild Stage 1	N/A			P20090188 (state) CZM-2009-8 (parish)	2/23/2009	No effect determination.		No effect determination.	5/14/2009	No identifying number provided	1/20/2010	Letter and CAR updates from USFWS to CEMVN	7/16/2009, 6/19/2009, and 7/24/2009	Tribal Concurrence from Alabama-Coushatta Tribe of OK, Caddo Nation of OK, and Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	Nairn	N/A			P20090185 (state) CZM-2009-2 (parish)	2/23/2009	No effect determination.		No effect determination.	4/23/2008	No identifying number provided	1/20/2010	Letter and CAR updates from USFWS to CEMVN	4/9/2008 and 4/3/2008	Tribal Concurrence from Chitimacha Tribe of LA and Choctaw Nation of OK. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	Plaquemines Dirt & Clay	N/A			P20090144 (state) CZM-2009-9 (parish)	2/23/2009	No effect determination.		No effect determination.	4/23/2008	No identifying number provided	1/20/2010	Letter and CAR updates from USFWS to CEMVN	4/9/2008 and 4/3/2008	Tribal Concurrence from Chitimacha Tribe of LA and Choctaw Nation of OK. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		
	3C Riverside Phase 3	N/A			P20090069 (state)	4/1/2008	No effect determination.		No effect determination.	9/8/2008	No identifying number provided	1/20/2010	Letter and CAR updates from USFWS to CEMVN	9/10/2008 and 10/20/2009	Tribal Concurrence from Alabama-Coushatta Tribe of OK, and Seminole Tribe of FL. Others did not respond after 30 days. No response implies concurrence per (per 36 CFR 800.3 (c(4)).		

APPENDIX S
DRAFT GUIDELINES CONCERNING MITIGATION OF IMPACTS ON OPEN WATER HABITATS

APPENDIX S

DRAFT GUIDELINES CONCERNING MITIGATION OF IMPACTS TO OPEN WATER HABITATS AND THE USE OF WVA MODELS TO EVALUATE SUCH IMPACTS
(2 March 2012)

1 INTRODUCTION

This document is intended to provide draft guidance concerning mitigation of impacts to open water habitats resulting from Hurricane & Storm Damage Risk Reduction System (HSDRRS) civil works projects, including impacts generated by HSDRRS mitigation activities. It also provides draft guidance concerning the use of Wetland Value Assessment (WVA) models to evaluate these impacts. These guidelines were developed by the US Army Corps of Engineers, New Orleans District (CEMVN) in coordination with the US Fish and Wildlife Service (USFWS) staff and the National Marine Fisheries Service (NMFS) staff.

The guidance contained herein is <u>not</u> applicable to the evaluation of impacts to open water areas within marsh habitats, or to mitigation of such impacts. Coastal marsh habitats frequently include open water areas that are interspersed with the vegetated marsh features, forming a mosaic of marsh (land) areas and open water areas. Impacts to open water areas within marsh habitats will continue to be addressed as part of the overall marsh landscape. For now, the appropriate WVA marsh community model will continue to be used to evaluate proposed impacts to the marsh/open water complex, since the marsh community models already incorporate a means of assessing project impacts to both the marsh components and the open water components of marsh habitats. At this time, the guidance contained herein is also not applicable to the evaluation and mitigation of impacts to open water areas involving CEMVN civil works projects other than HSDRRS projects.

It is emphasized that the guidelines contained herein are preliminary. They will be refined and finalized during the course of preparing the Tiered Individual Environmental Report(s) (TIERs) covering the constructible portions of the Tentatively Selected Mitigation Plan. The final guidelines will be prepared by CEMVN in coordination with the Interagency Environmental Team and the Non-Federal Sponsor.

2 MITIGATION FOR IMPACTS TO OPEN WATER HABITATS

<u>2.1 Determination of Whether Mitigation Is or Is Not Required</u>

Mitigation of impacts to open water habitats <u>will</u> typically be required for the following scenarios:

A. Any fill impact (deposition of fill) that will:
   (a) Affect open water habitat that is classified by the National Marine Fisheries Service (NMFS) as Essential Fish Habitat (EFH; i.e. NMFS asserts EFH jurisdiction over the affected habitat), <u>and</u>;
   (b) The impact will cause the affected open water area to become non-aquatic habitat.
   Note that, as a very general rule of thumb, NMFS may or may not assert EFH jurisdiction over open water areas in freshwater settings that are non-tidal, but typically will assert EFH jurisdiction over open water areas found in other salinity regimes (i.e. intermediate, brackish, saline) and may assert EFH jurisdiction over open water areas in tidal freshwater settings. Also note that the exception to mitigation requirements addressed in item (3) below may be applicable to the impact scenario described above.

B. Any fill impact to an open water area containing Submerged Aquatic Vegetation (SAV), regardless of the percent cover accounted for by SAV, provided that the impact is anticipated to result in the permanent loss of SAV.

Note that for this scenario, the WVA model used to evaluate the impact would encompass the entire impact footprint (i.e. areas with SAV patches and areas lacking SAV). Also note that when determining SAV presence and coverage, both native and invasive/exotic SAV species will be considered (i.e. the total SAV cover will include the cover accounted for by native species and the cover accounted for by invasive/exotic species combined). Also note that the exception to mitigation requirements addressed in item (3) below may be applicable to the impact scenario described above.

C. Any excavation (dredging) impact to an open water area containing SAV, regardless of the percent cover accounted for by SAV, which adversely affects the SAV but will not result in the creation of anoxic conditions in the affected area.
Note that for this scenario, the WVA model used to evaluate the impact would only be applicable to the SAV patches (i.e. the impacts to the open water areas lacking SAV would not be considered in the model). Note that the exception to mitigation requirements addressed in item (3) below may be applicable to the impact scenario described above.

D. Any excavation impact to an open water area designated as EFH that will result in the creation of permanent anoxic conditions in the affected area, regardless of whether SAV is present or not.
Note that it may be difficult to predict whether a proposed action would result in permanent anoxic conditions. Rather than assuming mitigation will be necessary when there are uncertainties, the approach may be to conduct monitoring of the affected area following implementation of the proposed action to determine whether anoxic conditions have developed and then determine mitigation requirements based on this monitoring. Coordinate with NMFS during project planning to determine the best approach. Note that the exception to mitigation requirements addressed in item (3) below may be applicable to the impact scenario described above.

E. Any fill or excavation impact that adversely affects open water habitat where SAV is present <u>and</u> the SAV species include seagrasses, regardless of the percent cover accounted for by the SAV and regardless of the percentage of the total SAV cover accounted for by seagrasses. As used herein, seagrass species include; turtle grass (*Thalassia testudinum*), Manatee grass (*Syringodium filiforme*), shoal grass (*Halodule wrightii*), star grass (*Halophila englemannii*), and paddle grass (*Halophilia decipiens*).
Note that for this scenario, the WVA model used to evaluate the impact would encompass the entire impact footprint (i.e. areas with SAV patches and areas lacking SAV).

F. Any fill or excavation impact that adversely affects open water habitat that is designated as oyster seed grounds by the Louisiana Department of Wildlife and Fisheries (LDWF).

Mitigation of impacts to open water habitats will <u>not</u> typically be required for the following scenarios:

(1) The proposed action involves dredging that will only impact an open water area where no SAV is present, even if the affected area is EFH. This does <u>not</u> apply to dredging that will: (a) adversely impact open water areas designated as oyster seed grounds by LDWF, or; (b) result in the creation of permanent anoxic conditions in the affected area and the affected area is EFH.

(2) The proposed action involves filling an open water area such that the affected area will <u>not</u> be converted to non-aquatic habitat. This does <u>not</u> apply to: (a) fill activities that will result in the permanent loss of SAV, even though the affected area may remain inter-tidal, or; (b) fill activities that will adversely impact open water areas designated as oyster seed grounds by LDWF.

(3) The proposed action will adversely impact <1 acre within a single open water area (i.e. one impact encompassing <1 acre), even if SAV is present, <u>or</u>; the proposed action will adversely impact multiple open water areas but the total of the impact polygons will affect <1 acre (i.e. cumulative impact is <1 acre), even if SAV is present. This does <u>not</u> apply to actions that will adversely impact: (a) open water areas designated as oyster seed grounds by LDWF; (b) open water areas with SAV and the SAV includes seagrasses; (c) open water areas classified by NMFS as EFH,

although there may be limited cases when the stated mitigation exemption may be applied to EFH. The reader is cautioned that the exemption to mitigation requirements addressed in this item may not be applicable to other situations not specifically addressed in (3)(a) through (3)(c). One should coordinate directly with US Fish and Wildlife Service (USFWS) and NMFS regarding specifics of the proposed action before assuming this exemption is applicable.

Mitigation for temporary impacts to open water areas through actions such as excavating (dredging) temporary construction access canals, followed by back-filling of the affected area, may or may not be required even in cases where SAV, excluding seagrasses, and/or EFH will be impacted. The need for mitigation will be assessed on a case-by-case basis.

Be aware that there could be special circumstances that mandate mitigation of adverse impacts to open water habitats, regardless of the exceptions to mitigation discussed in items (1) through (3) above. Examples include, but are not necessarily limited to: actions that would also adversely affect threatened or endangered species; actions that would also adversely affect federally designated critical habitat; actions that would also adversely affect federally managed species. Another example involves proposed dredging of EFH whereby a substantial acreage of open water habitat lacking SAV will be permanently impacted in such a way that the depth of dredging will preclude colonization by SAV.

Before mitigation will be considered, one should also note that any proposed project that will adversely impact open water habitats will still be subject to demonstrating that all practicable measures to avoid the impact have been taken, that the proposed impact is not avoidable, and that all practicable measures to minimize unavoidable impacts have been taken.

2.2 Type and Location of Mitigation

As a preface to the following discussion, keep in mind that the guidance contained in the Federal Register, Vol. 73, No. 70, Section 332.3(b) concerning the type and location of compensatory mitigation will be applicable to mitigation proposed as compensation for impacts to open water habitats. In general, this guidance indicates that: (a) Mitigation should be within the same watershed as the impact, or, in the case of marine impacts, within the same marine ecological system; (b) The preferential order (i.e. preferred hierarchy) for mitigation is: use of a mitigation bank; use of in-lieu fee program credits; a watershed approach where the goal is to provide the greatest benefits to the watershed (includes on-site mitigation, off-site mitigation, mitigation banks, in-lieu fee program, out-of-kind mitigation); on-site, in-kind mitigation; off-site and/or out-of-kind mitigation.

In general, the preferred method of compensating impacts to open water habitats containing SAV will be in-kind (type-for-type) mitigation through measures such as creation or restoration of SAV beds in existing open water areas or enhancement of open water areas to promote development of SAV beds. However, out-of-kind mitigation in the form of marsh creation, restoration, or enhancement will also be acceptable in most cases. Factors that will be considered in determining whether the mitigation should be in-kind may include, but are not limited to: (a) the relative prevalence of SAV beds within the watershed/basin; (b) the density of SAV species in the area that will be impacted; (c) the persistence of SAV beds in the area that will be impacted (e.g. how persistent SAV cover is during a typical year); (d) the ability to achieve successful in-kind mitigation.

If mitigation will be provided through marsh creation, restoration, or enhancement activities, the marsh should be similar to the predominant marsh type (i.e. fresh, intermediate, brackish, or saline) in the area where the open water impact occurs, provided that this marsh type is capable of replacing most of the functions and values of the affected open water habitat (particularly as regards the fish and wildlife species that could utilize the affected open water habitat). The marsh mitigation feature should include components that allow access to the marsh by fish and other aquatic organisms and must be intertidal. The location of the marsh mitigation feature should be within the same watershed/basin as the impacted habitat.

In some cases, a proposed action that will impact open water habitats may also impact marsh habitats, thereby requiring mitigation for the marsh impact. There may also be cases where the establishment of proposed mitigation features used to compensate for project impacts to non-open water habitats (ex.

mitigation for impacts to marsh, swamp, and/or bottomland hardwood habitats) will impact open water habitats. Assuming one or more marsh mitigation features will be included as part of the overall project mitigation plan, the proposed marsh mitigation may be utilized to compensate for the open water habitat impacts as well as for the marsh impacts. In this case, the marsh mitigation feature(s) used as compensation for the open water impacts should be the feature(s) closest to the location of the open water impacts.

3 EVALUATION OF IMPACTS TO OPEN WATER HABITATS

If mitigation of adverse impacts to open water habitats is required, the open water component of the appropriate WVA marsh model will typically be used to determine the net loss of functions and values (net loss of Average Annual Habitat Units or AAHUs) that will result from the impacts. It must be demonstrated that the proposed mitigation for such impacts will fully compensate for the lost functions and values. This will be accomplished through use of the appropriate WVA marsh model (all components of the marsh model if mitigation will be provided via marsh creation, restoration, or enhancement; the open water component of the marsh model if mitigation will be provide via open water habitat creation, restoration, or enhancement). If the net gain in AAHUs that will result from the proposed mitigation is equal to or greater than the net loss of AAHUs that will result from the impact, then it will typically be assumed that the proposed mitigation adequately compensates for the proposed impact.

One should note that impact/mitigation assessment methods other than the WVA methodology may be used. Such methods will need to be approved on a case-by-case basis.

In situations where mitigation of impacts to open water habitats is not required, such impacts must still be quantified, evaluated, and discussed in an appropriate NEPA document. However, WVA models (or other impact assessment methods) will not need to be used as part of the impact evaluation.

Federal Register, Vol. 46, No. 15 (USFWS Mitigation Policy) sets forth guidance concerning how USFWS may make recommendations concerning mitigation. This guidance is not applicable to mitigation for impacts to threatened or endangered species. Within the cited document, four “resource categories” are used to indicate that the level of mitigation recommended will be consistent with the fish and wildlife resource values involved.

In general, USFWS categorization of impacts to open water habitats will be as follows. The reader is cautioned, however, that there may be exceptions to the generalizations that follow; hence, direct coordination with USFWS is always recommended.

> *<u>Resource Category 4</u>*
> Impacts to open water bottoms, regardless of depth, with no SAV present (even if the proposed action causes the affected area to become non-tidal). Typically, USFWS would not recommend mitigation for such impacts unless the impact will adversely affect LDWF oyster seed grounds or NMFS requests mitigation for EFH impacts. USFWS would discourage impacts, to the extent feasible, and would advise that measures to minimize impacts to water quality (particularly in the case of proposed borrow areas) be taken as part of the proposed action.
>
> *<u>Resource Category 3</u>*
> Impacts to SAV beds in open water habitats. Typically, USFWS would recommend mitigation for such impacts and would require that appropriate mitigation sequencing be employed (impact avoidance and minimization) prior to considering mitigation. USFWS would seek to ensure the mitigation proposed adequately replaces the lost functions and values that would result from the impact, but would not necessarily require in-kind mitigation. USFWS may not require mitigation in cases described under the mitigation exemption described in section 2.1(3).

4 WVA MODELS FOR IMPACTS TO OPEN WATER HABITATS

Components of the WVA models for coastal marsh communities will be utilized to determine the net loss of AAHUs that will result from the proposed impacts to existing open water habitats. Note that all of the formulas addressed herein are directly obtained from the document entitled “Coastal Wetlands Planning, Protection and Restoration Act, Wetland Value Assessment Methodology, Coastal Marsh Community Models”, dated March 19, 2010. This methodology is presently being considered for interim regional approval by the USACE, with the interim approval period lasting 3 years. It is possible that the WVA Marsh Community Model may ultimately be revised for USACE final certification. Such a revision may alter the formulas set forth below.

The reader is further advised that the guidance that follows indicates one can use either the predominant marsh type present near the area where the open water impact or open water mitigation will occur, or one can use the average annual salinity near the impact/mitigation area to determine which formulas should be used. The average annual salinity should be used only in cases where there are no nearby marsh habitats present. Otherwise, the predominant marsh habitat type should be used to determine the appropriate formulas.

4.1 Habitat Suitability Index (HSI) Formulas for Open Water Habitats

The following formulas will be used to determine Habitat Suitability Index (HSI) values for affected open water areas:

(A) If the majority of nearby marsh habitats are fresh or intermediate marshes and/or the average annual salinity in the affected open water area ranges from 0 to <5 ppt:

$$HSI = [\{ 3.5 \times (SIV_2^3 \times SIV_6)^{(1/4)} \} + (SIV_3 + SIV_4 + SIV_5) / 3] / 4.5$$

(B) If the majority of nearby marsh habitats are brackish marshes and/or the average annual salinity in the affected open water area is ranges from 5 to 16 ppt:

$$HSI = [\{ 3.5 \times (SIV_2^3 \times SIV_6^2)^{(1/5)} \} + (SIV_3 + SIV_4 + SIV_5) / 3] / 4.5$$

(C) If the majority of nearby marsh habitats are saline marshes and/or the average annual salinity in the affected open water area is >16 ppt:

$$HSI = [\{ 3.5 \times (SIV_2^3 \times SIV_6^{2.5})^{(1/3.5)} \} + (SIV_3 + SIV_4 + SIV_5) / 3] / 4.5$$

where $SIV_\#$ is the Suitability Index (SI) value for the indicated model variable ($V_\#$, i.e. variables V_2 through V_6), as determined from applicable suitability index graphs set forth in the marsh community model. V_2 = % SAV cover; V_3 = marsh edge & interspersion; V_4 = % of open water area ≤ 1.5 feet deep; V_5 = mean salinity, in ppt, during the growing season; V_6 = aquatic organism access.

4.2 Benefit Assessment Formulas (AAHU Formulas) for Open Water Habitats

The typical formulas for calculating net AAHUs for marsh habitats are:

(A) Formula for fresh and intermediate marshes:

AAHUs = [(2.1 x (Marsh AAHUs)) + (Open Water AAHUs)] / 3.1

(B) Formula for brackish marshes:

AAHUs = [(2.6 x (Marsh AAHUs)) + (Open Water AAHUs)] / 3.6

(C) Formula for saline marshes:

AAHUs = [(3.5 x (Marsh AAHUs)) + (Open Water AAHUs)] / 4.5

When evaluating strictly open water habitats, there would be no marsh habitats interspersed within the boundaries of the open water habitats being considered. Given this, the number of marsh AAHUs would be zero and the preceding formulas are reduced to the following when computing the final AAHUs for open water habitats:

(A) If the majority of nearby marsh habitats are fresh or intermediate marshes and/or the average annual salinity in the affected open water area ranges from 0 to <5 ppt:

Final Open Water AAHUs = Open Water AAHUs / 3.1

(B) If the majority of nearby marsh habitats are brackish marshes and/or the average annual salinity in the affected open water area is ranges from 5 to 16 ppt:

Final Open Water AAHUs = Open Water AAHUs / 3.6

(C) If the majority of nearby marsh habitats are saline marshes and/or the average annual salinity in the affected open water area is >16 ppt:

Final Open Water AAHUs = Open Water AAHUs / 4.5

4.3 Example of Using Weighted Averages for Model Variable Input

Conditions may vary considerably within a given open water habitat being evaluated, particularly as regards SAV cover. The following provides an example of using weighted averages to arrive at appropriate SI values when performing WVA analyses for such conditions.

Example Scenario:
Project will impact a single open water area. The overall impact “footprint” (polygon) encompasses 200 acres. Within this footprint, 3 separate areas (polygons A, B, and C) contain SAV whereas the remainder of the footprint area contains no SAV. The water depth varies. Data for impact acreages, SAV cover, and water depth are:

- Polygon A – 10 acres, SAV cover = 90%, water depth = 3 feet.
- Polygon B – 40 acres, SAV cover = 10%, water depth = 1 foot.
- Polygon C – 20 acres, SAV cover = 70%, water depth = 2 feet.
- Polygon D (remainder of overall impact footprint excluding polygons A thru C) – 130 acres, SAV cover = 0%, water depth = 3 feet.

Assuming the WVA analysis will only be run for the areas containing SAV (a total of 70 acres), weighted averages would be as follows:

- V2 (% SAV) = [(90% x 10/70) + (10% x 40/70) + (70% x 20/70)] = 38.6% weighted avg. SAV cover.
- V4 (% Open Water ≤1.5 feet deep) = [(0% x 10/70) + (100% x 40/70) + (0% x 20/70)] = 57% weighted avg. open water ≤1.5 feet deep.

If the WVA analysis will be run for the entire impact footprint, weighted averages would be as follows:

- V2 (% SAV) = [(90% x 10/200) + (10% x 40/200) + (70% x 20/200) + (0% x 130/200)] = 13.5% weighted avg. SAV cover.
- V4 (% Open Water ≤1.5 feet deep) = [(0% x 10/200) + (100% x 40/200) + (0% x 20/200) + (0% x 130/200)] = 20% weighted avg. open water ≤1.5 feet deep.