APPENDIX B
CORRESPONDENCE

MEMORANDUM FOR RECORD

NEW ORLEANS TO VENICE LEVEE
ENVIRONMENTAL ASSESSMENT (EA) OR
SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT (SEIS),
PLAQUEMINES PARISH, LOUISIANA

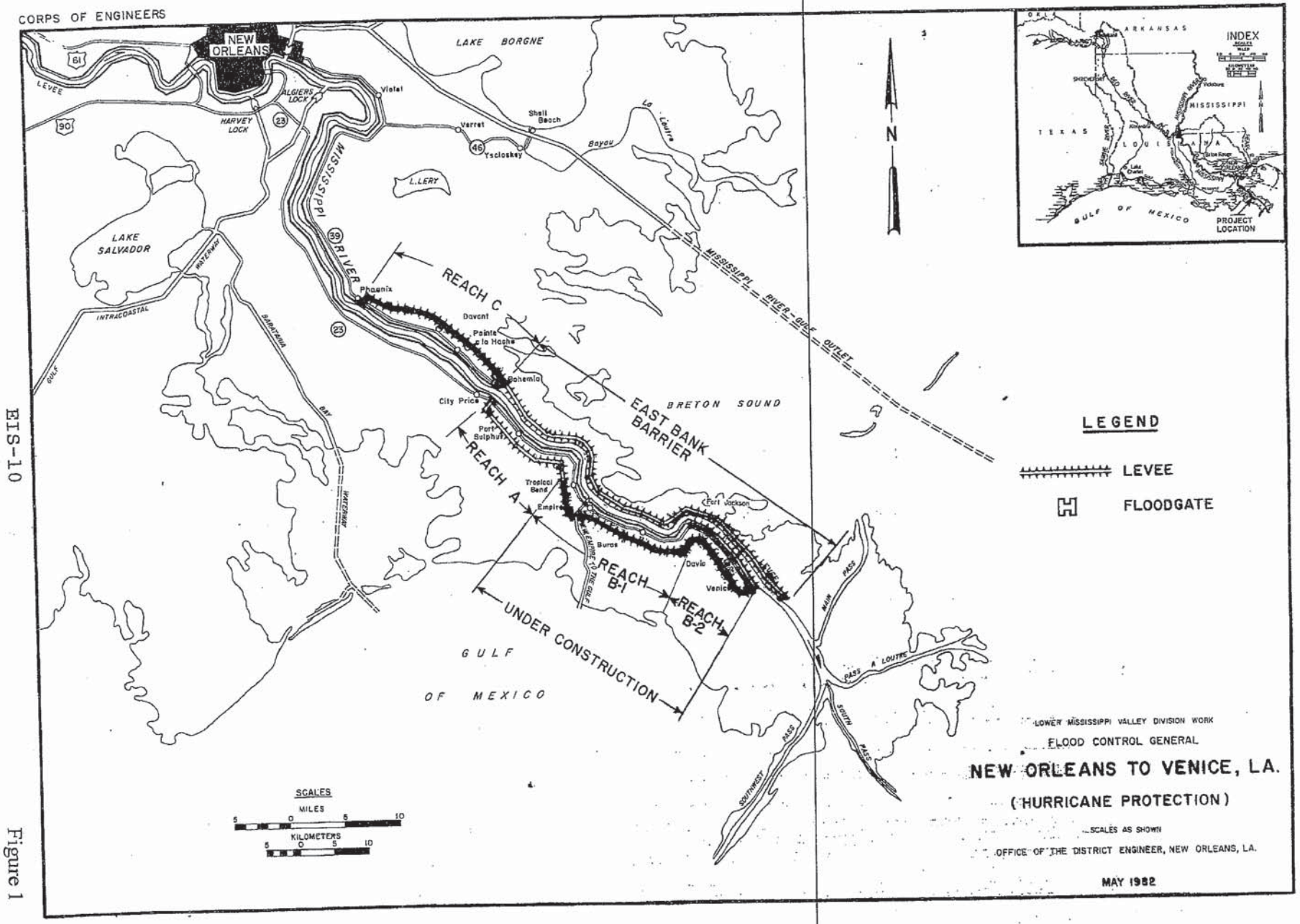
1. Background:

a. The New Orleans to Venice Levee (NOV) is a private or Plaquemines Parish levee constructed to reduce the effects of a storm surge from the west. In 1974, a final Environmental Impact Statement (EIS) was prepared by the U.S. Army Corps of Engineers, New Orleans District, detailing environmental impacts related to enlarging the lower 36 miles of this existing levee (Figure 1, 1985 Final SEIS). The enlarged levee section from City Price to Venice was incorporated into the Federal levee system. In 1987, an SEIS was prepared for levee work on the east side of the Mississippi River and the West Bank Mississippi River Levee (WBRL). The WBRL was constructed to reduce the effects of a storm surge from the east to the lower west bank of Plaquemines Parish. The upper portion of the private or Parish-maintained levee (from Oakville to St. Jude) has been authorized to be incorporated into the NOV.

b. On 29 August 2005, Hurricane Katrina made landfall in Plaquemines Parish at Buras, Louisiana, a town located approximately 55 miles southeast of New Orleans. At that time, the NOV project was approximately 85 percent complete. Since that time, the Corps has repaired all major damages caused by Hurricane Katrina and restored the level of risk reduction to pre-Katrina elevations.

c. CEMVK, CEMVN, and HPO are currently conducting engineering and design analyses to enlarge the non-Federal and Federal portions, respectively, of the NOV. CEMVK, CEMVN, and CEMVS are preparing an SEIS for the proposed enlargement of the non-Federal portion. The SEIS regarding the non-Federal levee is scheduled to be released for public comment in September 2009. CEMVK, CEMVN, and HPO are preparing an EA for the proposed enlargement of the NOV west bank levee. The completed levee enlargement from Oakville to Venice would protect against the NOV Standard Project Hurricane level event.

2. Authority: The existing Federal project, currently known as the New Orleans to Venice Hurricane Protection Project (NOV), was originally authorized by the Flood Control Act of 1962 (Public Law 87-874) as the Mississippi River Delta at and below New Orleans, Louisiana.



EIS-10

Figure 1

3. Purpose: The purpose of this document is twofold: (1) to present the findings and recommendations regarding whether an EA or SEIS is an appropriate environmental compliance document for the proposed NOV Federal levee enlargement and (2) whether or not mitigation completed for past levee enlargement impacts is applicable to future levee enlargement impacts in the same area.

4. Prior Reports: The findings and recommendation are based on review of environmental documents provided by CEMVN and HPO. Each document is summarized below:

a. 1974 Final EIS (FEIS) – discussed enlargement of the west bank back levee from City Price to Venice (36 miles) and construction of a new levee from Phoenix to Bohemia (16 miles) on the east bank of the Mississippi River, plus barrier levees from Bohemia to 10 miles Above Head of Passes (AHP) on the east bank and Fort Jackson to Venice on the west bank (WBRL). The WBRL direct impacts included temporary ponding on 8,500 acres of marsh, 1,000 acres of marsh for borrow material, 780 acres of marsh for levee right-of-way, and 400 acres of upland habitat for levee right-of-way. East bank direct impacts included 220 acres of marsh for levee right-of-way and 2,200 acres of upland habitat for levee right-of-way.

b. 1985 Final SEIS – discussed deficiencies of the 1974 Final SEIS and covered the enlargement of the locally constructed west bank back levee from City Price to Venice, Reaches A, B1, and B2 (Figure 1, 1985 Final SEIS).

Reach A - City Price to Tropical Bend
Reach B1- Tropical Bend to Fort Jackson
Reach B2 - Fort Jackson to Venice

Construction impacts discussed in the 1985 Final SEIS included 2,899 acres of habitat (1,761 acres of marsh and 1,138 acres of estuarine open water habitat) on the flood side of the back levee (Figures 2-5, Appendix B, 1985 Final SEIS).

c. 1985 Mitigation Report – discussed the levee segment from Tropical Bend to Venice (Reaches B1 and B2). Mitigation consisted of creating 300 acres of freshwater marsh on Delta National Wildlife Refuge (NWR). The remaining acres impacted by construction, as discussed in the 1974 FEIS and 1985 Final SEIS, were allowed to restore through natural processes.

d. 1987 EIS – discussed additional impacts for Reach C (east bank) and WBRL. The east bank surge protection levee (1974 FEIS, from Bohemia to 10 miles AHP) was dropped from further consideration.

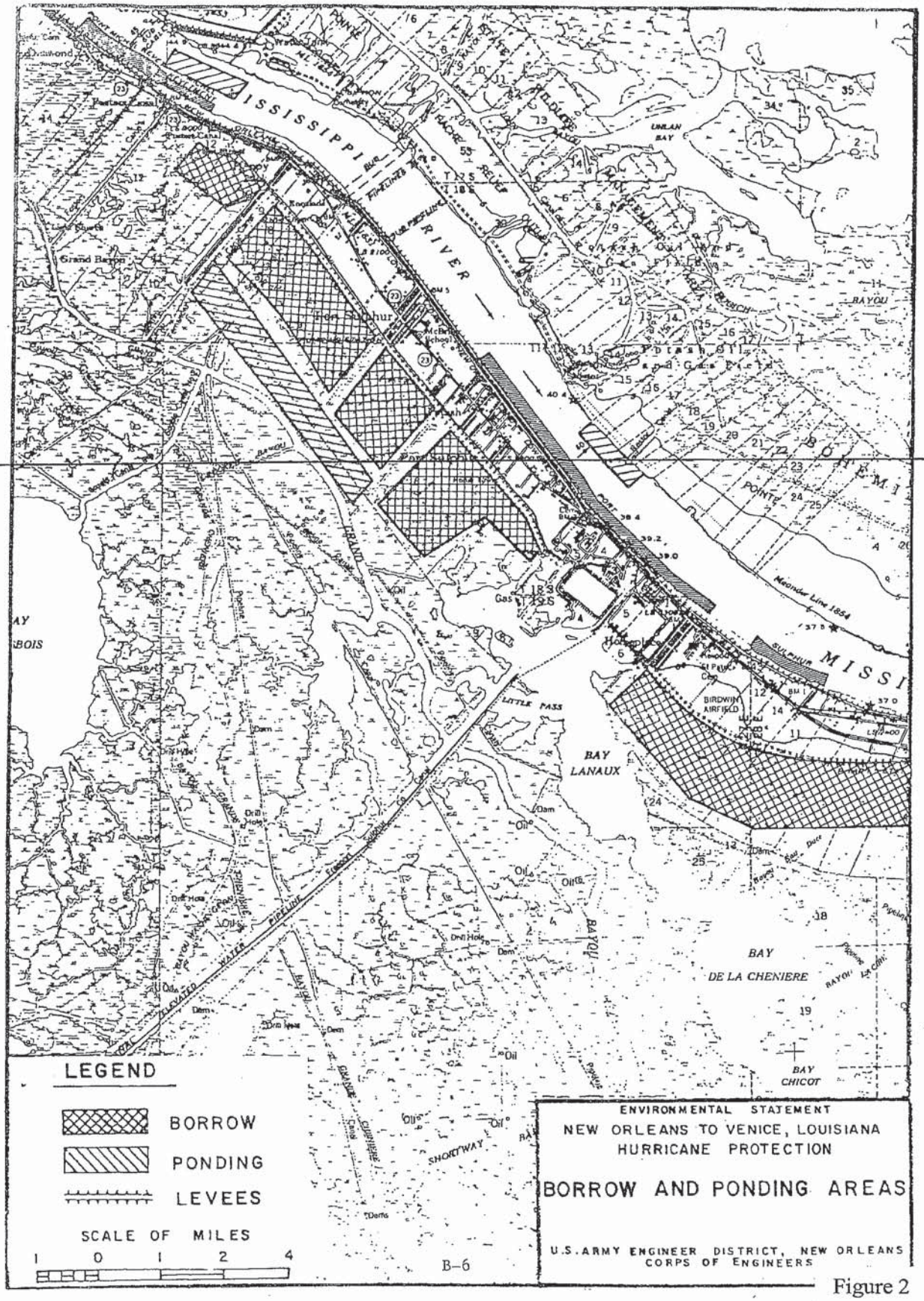
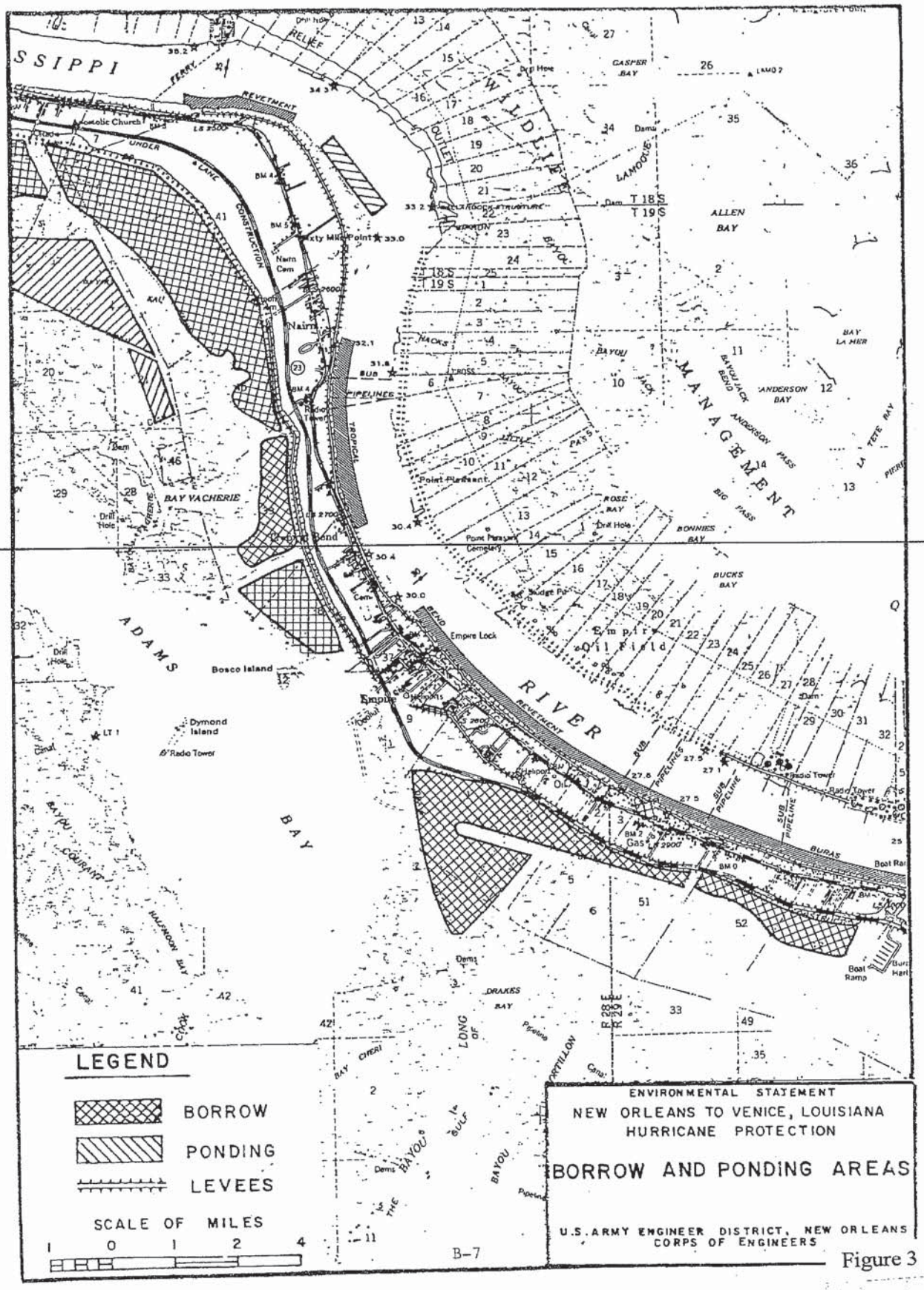

LEGEND
BORROW
PONDING
LEVEES
SCALE OF MILES
1 0 1 2 4
ENVIRONMENTAL STATEMENT
NEW ORLEANS TO VENICE, LOUISIANA
HURRICANE PROTECTION
BORROW AND PONDING AREAS
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
B-6
MISSISSIPPI RIVER
BAY LANAUX
BAY DE LA CHENIERE
BAY CHICOT
LITTLE PASS
BIRDWIN AIRFIELD
Grand Bayou
Meander Line 1854

Figure 2


LEGEND
BORROW
PONDING
LEVEES
SCALE OF MILES
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ENVIRONMENTAL STATEMENT
NEW ORLEANS TO VENICE, LOUISIANA
HURRICANE PROTECTION
BORROW AND PONDING AREAS
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
B-7

Figure 3

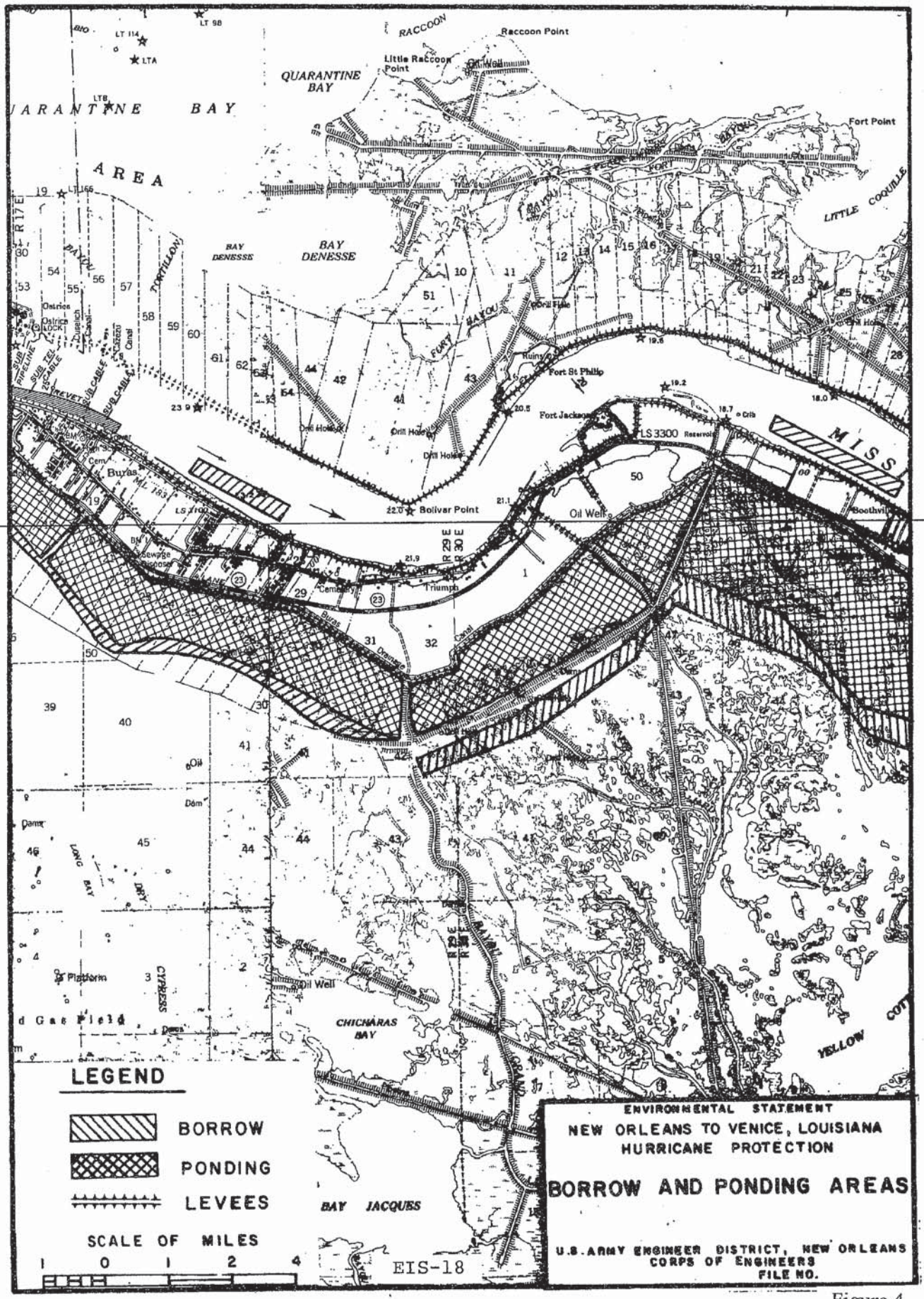
QUARANTINE BAY
AREA
Raccoon Point
Little Raccoon Point
Fort Point
LITTLE COQUILLE
BAY DENESSE
BAY DENESSE
TORTILLON
BAYOU
FORT
Fort St Philip
Fort Jackson
LS 3300
MISS
Buras
Bolivar Point
Oil Well
Triumph
Cemetery
CHICHARAS BAY
BAY JACQUES
YELLOW
Platform
Gas Field
LEGEND
BORROW
PONDING
LEVEES
SCALE OF MILES
1 0 1 2 4
EIS-18
ENVIRONMENTAL STATEMENT
NEW ORLEANS TO VENICE, LOUISIANA
HURRICANE PROTECTION
BORROW AND PONDING AREAS
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
FILE NO.

Figure 4

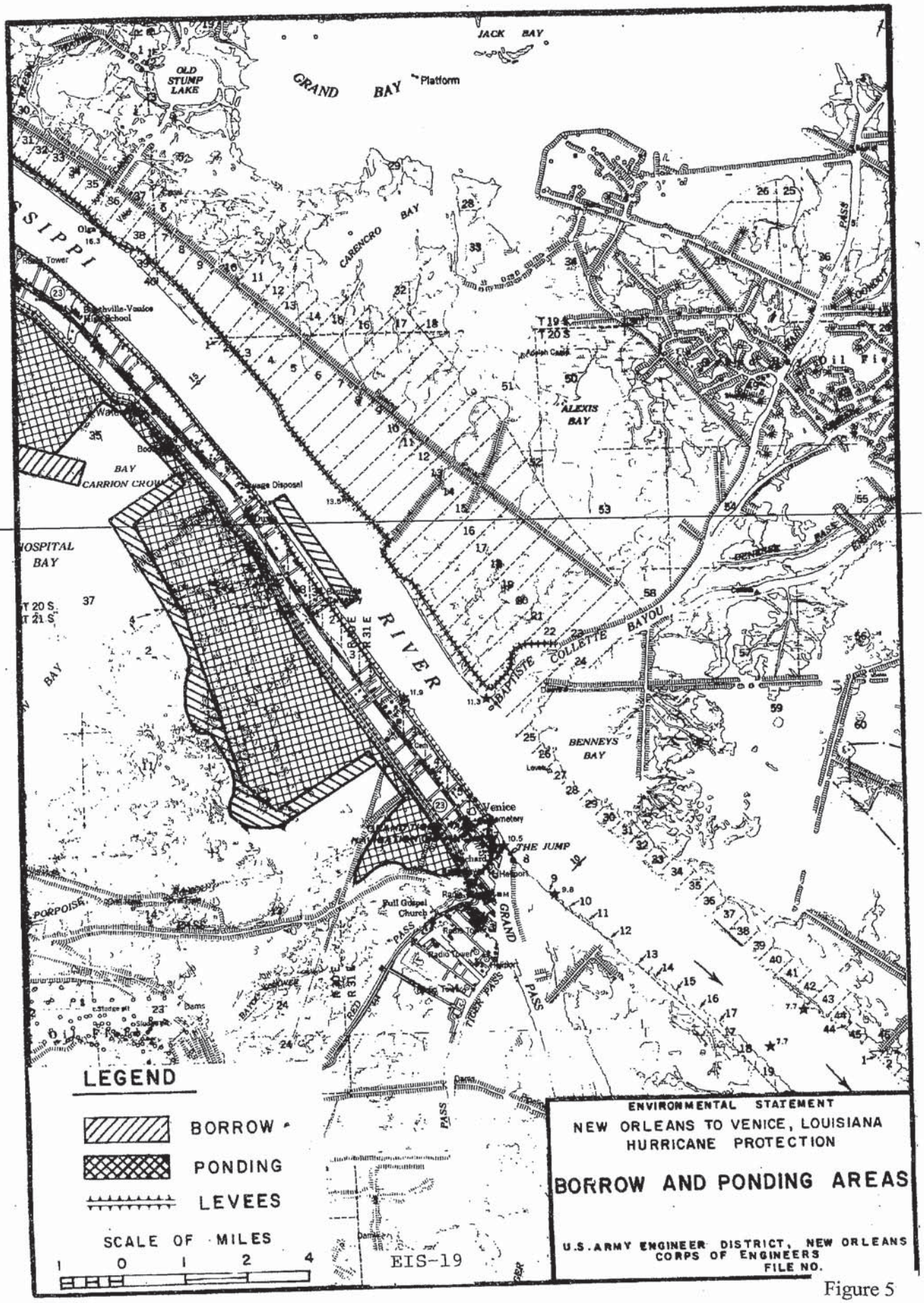
JACK BAY
OLD STUMP LAKE
GRAND BAY
Platform
CARENCRO BAY
ALEXIS BAY
BAY CARRION CROW
HOSPITAL BAY
BAY
RIVER
BAPTISTE COLLETTE BAYOU
BENNEYS BAY
Venice
THE JUMP
Heliport
Radio Tower
Full Gospel Church
PASS
GRAND
TIGER PASS
PORPOISE
BAYOU
RED
Dams
LEGEND
BORROW
PONDING
LEVEES
SCALE OF MILES
1 0 1 2 4
EIS-19
ENVIRONMENTAL STATEMENT
NEW ORLEANS TO VENICE, LOUISIANA
HURRICANE PROTECTION
BORROW AND PONDING AREAS
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS
FILE NO.

Figure 5

e. 1996 Mitigation Report – this document is the final mitigation report prepared for the NOV and discussed additional mitigation needs as the result of constructing the WBRL, east bank back levee (Reach C), and west bank back levee (St. Jude to Tropical Bend Reach A). This document complements the 1985 Mitigation Report for Reaches B1 and B2. Construction methods changed from the 1985 Final SEIS and mitigation needs for Reach A were reevaluated. Results of the reevaluation showed that no mitigation was required for Reach A because borrow material was obtained from cleared farmland located on the protected side of the back levee. Mitigation for WBRL and east bank back levees included creation of 105 acres of marsh and nourishing and preserving 1,230 acres of wetlands on Pass a Loutre State Wildlife Management Area.

5. Findings:

a. Based on a review of the 1985 Final SEIS and the Mitigation Reports, 2,899 acres of direct wetland impacts associated with levee enlargement were mitigated on the Delta NWR. Indirect impacts to 7,409 acres of marsh and estuarine habitat (borrow and ponding areas) were not mitigated for, but allowed to restore naturally. Borrow and ponding areas were located on the flood side of the back levee. Over the past 20+ years, the borrow and ponding area's wetland values have been restored, but no mitigation was done for the temporal losses. There were no project-related impacts within the area protected by the levee.

b. The proposed enlargement of the west bank Federal levee would result in approximately 1,000 acres of wetland/marsh impacts based upon the information available to the Project Delivery Team (PDT) today. Impacts on the protected side of the levee would include filling the old drainage canal to expand the base of the levee, filling wetlands to expand the base of the levee, and digging a new drainage canal within areas designated as wetlands, as well as constructing haul roads. There would also be borrow area impacts as the identified borrow requirement for this project is currently 12 million cubic yards. Diligent efforts would be made to avoid using wetlands as borrow sites. In areas where levee offsets occur on the flood side of the levee, marsh and/or estuarine open water habitat would be minimized to the greatest extent practicable, but it is likely that some marsh areas would be unavoidably adversely impacted.

c. Mitigation completed for construction impacts that occurred approximately 20+ years ago would not apply to future impacts within the same area because marsh and estuarine habitat values within the borrow and ponding areas along the flood side of the Federal levee have been restored through natural processes as planned. Wetland values lost along the protected side of the levee and along the flood side of the levee would require additional mitigation beyond that completed 20+ years ago.

6. Recommendation:

a. An EA and Finding of No Significant Impact (FONSI) are normally prepared for projects that, through design, avoid and minimize adverse impacts to the maximum extent practicable, and the magnitude of impacts to the human environment is considered insignificant.

b. Based on the extent of wetlands in the project area, proposed scope of the levee enlargement, and potential impacts to 1,000 acres of wetlands, the EA would likely conclude that environmental impacts associated with enlarging the Federal levee are significant and an SEIS is warranted. Engineer Regulation 200-2 provides that an EIS should be prepared when there is a determination that a proposed action would result in significant impacts.

c. Quantifying the actual extent of wetland impacts has not been accomplished for the proposed NOV Federal levee enlargement. The Wetland Value Assessment to be conducted by CEMVK, CEMVN, and resource agencies (U.S. Fish and Wildlife Service, National Marine Fisheries Service, Louisiana Department of Natural Resources, and Louisiana Department of Wildlife and Fisheries) would quantify the existing wetland values and the compensation required to mitigate adverse impacts.

d. The Regional Environmental PDT recommendation is to proceed with preparation of a draft SEIS for the NOV Federal levee enlargement. This recommendation is consistent with the SEIS being prepared by the Corps for the proposed NOV non-Federal levee enlargement. The preparation of the SEIS for the Federal levee would require approximately 14 months.

5-29-09
DATE

Alvin B. Lee
ALVIN B. LEE
COL, EN
Commanding

DEPARTMENT OF THE ARMY
VICKSBURG DISTRICT, CORPS OF ENGINEERS
4155 CLAY STREET
VICKSBURG, MISSISSIPPI 391833435

REPLY TO
ATTENTION OF:

CEMVK-PP-PQ (1110-2-1150a)

22 MAY 2009

AC (PER EMAIL)

MEMORANDUM FOR Commander, New Orleans District

SUBJECT: New Orleans to Venice Levee Environmental Assessment or Supplemental Environmental Impact Statement, Plaquemines Parish, Louisiana

1. A copy of a Memorandum for Record, subject as above, is enclosed for your approval and signature.

2. Upon approval, please furnish a signed copy to Mr. Larry Marcy of this office (CEMVK-PP-PQ).

Encl

MICHAEL C. WEHR
COL, Corps of Engineers
Commanding

Routing and Transmittal Slip

Plaquemines Parish EA vs. SEIS MFR - MVK

28 May 2009

	Initials	Date
1. Executive Office CEMVN	MDS	5/28/09
2. Hawkins CEMVN PM		5/27/09
3 Northey CEMVN-OC		5/27/09
4. Owen CEMVN PM-RS	GO	28 May 09

	Action		For Your Information
X	Approval		Investigate
	As Requested		Justify
	Circulate		Note and Return
	Comment		Per Conversation
	Coordination		Prepare Reply
	File		See Me
	For Clearance	X	Signature
	For Correction		

Remarks:
Please return to Gib Owen, Room 363, or call for pick up x-1337

This is MFR for Col. Lee's review and signature concerning decision to complete a SEIS for the Plaquemines Parish NOV project. Issue is whether to do an EA or an SEIS.

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

February 11, 2011 F/SER46/PW:jk
225/389-0508

Mr. Douglas J. Kamiean, P.E.
Chief, Programs and Project Management Division
Regional Planning and Environment Division South
Vicksburg Planning Branch
U.S. Army corps of Engineers
Vicksburg District
4155 East Clay Street
Vicksburg, MS 39183

Dear Mr. Kamiean:

NOAA's National Marine Fisheries Service (NMFS) has received the January 5, 2011, letter transmitting the Wetland Value Assessment (WVA) Report for the New Orleans to Venice Federal Levee System, Plaquemines Parish, Louisiana (NOV). The letter requested our review and comment on the WVAs pursuant to authorities under the Fish and Wildlife Coordination Act. NMFS is a cooperating agency on the Draft Environmental Impact Statement for the NOV project.

This letter is to advise your staff that NMFS has initiated review of that report and all supporting data and spreadsheet calculations. However, due to staffing constraints and other Corps of Engineers projects in Louisiana requiring concurrent attention by NMFS, we have been unable to complete our review at this time. Coordination by the Vicksburg District's contractor with NMFS during preparation of the WVAs was frequent and thorough. Because methods established by NMFS with the contractors for use on the Plaquemines Non-Federal Levee were previously verified as being correct and those methods also were used for the NOV project, we anticipate minimal issues, if any. We will conclude our review of the WVA report and dependent data and calculations once the draft Environmental Impact Statement is advertised. However, review and submission of comments on the NOV WVA report will be completed sooner, if possible. We do not recommend altering the project schedule on account of this particular matter.

Thank you for the coordination and consideration on this project. Please direct any questions regarding these comments to Patrick Williams (225) 389-0508, extension 208.

Sincerely,

for Miles M. Croom
Assistant Regional Director
Habitat Conservation Division

Enclosure

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

February 11, 2011 F/SER46/PW:jk
225/389-0508

Mr. James F. Boggs, Supervisor
Louisiana Field Office
U.S. Fish and Wildlife Service
646 Cajundome Blvd., Suite 400
Lafayette, Louisiana 70506

Dear Mr. Boggs:

NOAA's National Marine Fisheries Service (NMFS) has received the Draft Fish and Wildlife Coordination Act Report (Report) titled "New Orleans to Venice, Louisiana, Hurricane Protection System (NOV), Plaquemines Parish, Louisiana" transmitted by your letter dated January 19, 2011. The Vicksburg District (MVK) is preparing an Environmental Impact Statement for this project. MVK's preferred alternative is to upgrade 16 levee reaches to the 50-year level of risk reduction which includes increasing levee heights to 13.0 feet to 20.5 feet NAVD 88 along different levee reaches. Direct impacts to tidal habitats supportive of estuarine fisheries include the loss of 75.3 acres of intermediate marsh, 30 acres of brackish marsh, and 106 acres of saline marsh. These impacts require approximately 138 acres, 109 acres, and 282 acres of intermediate, brackish, and saline marsh mitigation, respectively, for functional replacement as assessed using the Wetland Value Assessment methodology.

NMFS has reviewed the Report and concurs with the findings and recommendations. Thank you for including comments that NMFS submitted on the Non-Federal Levee (NFL) that are applicable to NOV as well. By letter dated January 5, 2011, MVK submitted a report on the Wetland Value Assessment results for the NOV project for NMFS' review and comment. This is to advise you that we have initiated, but not completed, our review of that report and supporting spreadsheet calculations pertaining only to the marsh analyses. Accordingly, we have no revisions to the methods or results to recommend as it relates to the draft Report at this time.

The primary issue remaining for MVK to address is the overall and specific adequacy of the mitigation plan. A draft mitigation plan was provided from MVK by electronic mail dated January 6, 2011, for interagency review. That plan did not identify a specific project which would be used to compensate for adverse impacts. The Report's Appendix B, Mitigation Priority Areas is appreciated as a good starting plan from which to consider projects. However, it should not be exclusive of other options. Examples of additional projects that could be considered are those nominated this year for consideration under the Coastal Wetlands Planning, Protection and Restoration Act. Please refer to the enclosure for a link to that information and specific projects

therein that may be applicable for NOV/NFL project-specific mitigation consideration. However, most concerning is the uncertainty of financial assurances and any associated potential limitation to implementation. MVK has not responded to questions submitted by NMFS via electronic mail dated January 7, 2011, pertaining to this matter. With no substantive revisions to that plan or clarification of financial assurances shared with the agencies since commenting on the related Plaquemines NFL project, we maintain our determination that the plan does not provide sufficient details on necessary components of a mitigation plan. Lacking more specifics and financial assurances, the mitigation plan may not be sufficient to ensure that adverse environmental impacts to public-trust resources and essential fish habitat would be adequately offset. As such, we particularly are supportive of the Report's recommendation that the mitigation plan be finalized prior to finalization of the Feasibility Report. If a draft Environmental Impact Statement is advertised prior to that time, a supplemental National Environmental Policy Act document likely would be necessary to disclose and resolve the issue of mitigation.

Appendix A, III. Proposed Standardized Assumptions for Marsh. This section identifies the success and monitoring criteria for marsh creation mitigation. Previous recommendations by NMFS on this section for the Plaquemines NFL have been incorporated for NOV. However, please be aware that details in this section are being refined and updated further for the Hurricane Surge Damage Risk Reduction System's mitigation and as a matter of programmatic routine. Therefore, we recommend the Report be revised to use the latest programmatic version of those criteria as they become available.

Thank you for the staff coordination on this project. Please direct any questions regarding these comments to Patrick Williams (225) 389-0508, extension 208.

Sincerely,

for Miles M. Croom
Assistant Regional Director
Habitat Conservation Division

Enclosure

c:
LA DNR, Consistency, Ducote
COE, Vicksburg, Mallard
LDWF, Balkum
EPA, Ettinger
F/SER46, Swafford
Files

Attachment to NMFS Comments on Draft NOV CAR
Date: 2/11/2011

Coastal Wetlands Planning, Protection and Restoration Act Priority Project List 21 nominees can be found at:
ftp://ftp.usace.army.mil/pub/mvn/PPL21%20RPT%20Nominee%20Fact%20Sheets%20and%20Pwpts/

Specific projects therein that may be most applicable in terms of in-kind, in the same watershed (i.e., river basin), and closest to the levee impacts include:

1. Grand Bayou Marsh and Ridge Restoration – westbank
2. West Pointe a la Hache Marsh Creation South – westbank
3. Wills Point Marsh Creation – eastbank

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
3737 Government Street
Alexandria, LA 71302

(318) 473-7751
Fax: (318) 473-7626

April 5, 2011

Nicole Forsyth
Gulf South Research Corporation (GSRC)
8081 GSRI Avenue
Baton Rouge, Louisiana 70820

RE: New Orleans to Venice Federal and Non-Federal Levee Project
Plaquemines Parish, Louisiana

Dear Ms. Forsyth:

Per your request, we have reviewed the soils information for the project location as it pertains to prime and unique farmlands. You indicated in the project description that the proposed activity would be conducted at an existing levee. You also indicated that the existing levee would involve elevating the levee crest fill and expanding the levee base footprint to provide the necessary design strength. The existing levee right of way is exempt from the Prime Farmland Protection Policy Act (FPPA). The areas which are being expanded out of the levee right of way are subject to FPPA due to the conversion. The New Orleans to Venice Non-Federal Levee segment had a shape file so we could remove the existing levee and only evaluate the expanding areas. The segment acres agreed with what you indicated on the CPA-106. The New Orleans to Venice Federal Levee Section did not have the existing levee shape file so we were not able the remove those acres. The total acres we came up with for that segment are more than what you indicated on the CPA-106. This acreage difference does not affect the overall relative value. Please find the two attached NRCS-CPA-106 Farmland Conversion Impact Rating for Corridor Type Projects with our agencies information completed. Also included are maps indicating the location of prime farmland and non-prime farmland for each project segment. The prime farmland soils for the New Orleans to Venice Non-Federal Levee segment corridor A are the Co-Cancienne silty clay loam and the Sk- Schriever clay with a relative value of 90. Corridor B had the same soils with a relative value of 97. The New Orleans to Venice Federal Levee corridor A contained the following prime farmland soils, Cm-Cancienne silt loam, Co-Cancienne silty clay loam, and Sk-Schriever clay with a relative value of 95. Corridor B had the same soils with a relative value of 94.

Please contact me regarding all future requests at the address shown above.

Respectfully,

Kevin D. Norton ACTING FOR
State Conservationist

Attachment

cc: Charles Guillory, State Soil Scientist, Alexandria, Louisiana
Michael Trusclair, District Conservationist, NRCS, Boutte Field Office
Burnell Muse, MLRA Soil Survey Leader, Denham Springs, Louisiana

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
(Rev. 1-91)

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*		3. Date of Land Evaluation Request 3/22/11	4. Sheet 1 of 2
1. Name of Project	New Orleans to Venice Federal Levee	5. Federal Agency Involved	USACE Vicksburg District
2. Type of Project	Flood Risk Reduction (Levees, Floodwalls)	6. County and State	Plaquemines Parish, Louisiana

PART II *(To be completed by NRCS)*		1. Date Request Received by NRCS 3/22/11	2. Person Completing Form Charles Guillory
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form)	YES ☑ NO ☐	4. Acres Irrigated 0	Average Farm Size 375
5. Major Crop(s) Sugarcane, Soybeans	6. Farmable Land in Government Jurisdiction Acres: 29,000 5 %	7. Amount of Farmland As Defined in FPPA Acres: 29,000	5 %
8. Name Of Land Evaluation System Used Plaquemines Parish LESA	9. Name of Local Site Assessment System N/A	10. Date Land Evaluation Returned by NRCS 4/6/11	

PART III *(To be completed by Federal Agency)*	Alternative Corridor For Segment			
	Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly	~~701~~ 2528	~~828~~ 8616		
B. Total Acres To Be Converted Indirectly, Or To Receive Services				
C. Total Acres In Corridor	~~701~~ 2528	~~828~~ 8,616	0	0
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime And Unique Farmland	701	1,649		
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	2.4	5.7		
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	55	55		
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*	95	94		

PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))*	Maximum Points				
1. Area In Nonurban Use	15	10	10		
2. Perimeter In Nonurban Use	10	7	7		
3. Percent Of Corridor Being Farmed	20	8	10		
4. Protection Provided By State And Local Government	20	0	0		
5. Size of Present Farm Unit Compared To Average	10	0	0		
6. Creation Of Nonfarmable Farmland	25	0	0		
7. Availability Of Farm Support Services	5	3	3		
8. On-Farm Investments	20	10	10		
9. Effects Of Conversion On Farm Support Services	25	0	0		
10. Compatibility With Existing Agricultural Use	10	0	0		
TOTAL CORRIDOR ASSESSMENT POINTS	160	38	40	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland (From Part V)	100				
Total Corridor Assessment (From Part VI above or a local site assessment)	160	38	40	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	38	40	0	0

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used?
A	701	3/17/11	YES ☐ NO ☐

5. Reason For Selection:

Corridor A refers to Alternative 2 or the tentatively selected plan (TSP) being analyzed in the Environmental Impact Statement. The TSP will provide the authorized design-grade level of storm risk reduction and it the least environmentally damaging alternative to accomplish the risk reduction system improvements.
Corridor B refers to Alternative 3.

Signature of Person Completing this Part: **Nicole Forsyth** DATE **3/21/11**

NOTE: Complete a form for each segment with more than one Alternate Corridor

CORRIDOR - TYPE SITE ASSESSMENT CRITERIA

The following criteria are to be used for projects that have a linear or corridor - type site configuration connecting two distant points, and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor - type site or design alternative for protection as farmland along with the land evaluation information.

(1) How much land is in nonurban use within a radius of 1.0 mile from where the project is intended?
More than 90 percent - 15 points
90 to 20 percent - 14 to 1 point(s)
Less than 20 percent - 0 points

(2) How much of the perimeter of the site borders on land in nonurban use?
More than 90 percent - 10 points
90 to 20 percent - 9 to 1 point(s)
Less than 20 percent - 0 points

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?
More than 90 percent - 20 points
90 to 20 percent - 19 to 1 point(s)
Less than 20 percent - 0 points

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?
Site is protected - 20 points
Site is not protected - 0 points

(5) Is the farm unit(s) containing the site (before the project) as large as the average - size farming unit in the County ? (Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage or Farm Units in Operation with $1,000 or more in sales.)
As large or larger - 10 points
Below average - deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average - 9 to 0 points

(6) If the site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?
Acreage equal to more than 25 percent of acres directly converted by the project - 25 points
Acreage equal to between 25 and 5 percent of the acres directly converted by the project - 1 to 24 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project - 0 points

(7) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?
All required services are available - 5 points
Some required services are available - 4 to 1 point(s)
No required services are available - 0 points

(8) Does the site have substantial and well-maintained on-farm investments such as barns, other storage building, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?
High amount of on-farm investment - 20 points
Moderate amount of on-farm investment - 19 to 1 point(s)
No on-farm investment - 0 points

(9) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?
Substantial reduction in demand for support services if the site is converted - 25 points
Some reduction in demand for support services if the site is converted - 1 to 24 point(s)
No significant reduction in demand for support services if the site is converted - 0 points

(10) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?
Proposed project is incompatible to existing agricultural use of surrounding farmland - 10 points
Proposed project is tolerable to existing agricultural use of surrounding farmland - 9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland - 0 points


Farmland Conversion Impact Rating - Prime Farmland Map
New Orleans to Venice Federal Levee - Alternative 2
Overview Map
ST BERNARD PARISH
PLAQUEMINES PARISH
JEFFERSON PARISH
LAFOURCHE PARISH
All areas are prime farmland
Not prime farmland
N
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10
20
Miles


Farmland Conversion Impact Rating - Prime Farmland Map
New Orleans to Venice Federal Levee - Alternative 2
Map 1 of 5
All areas are prime farmland
Not prime farmland
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2
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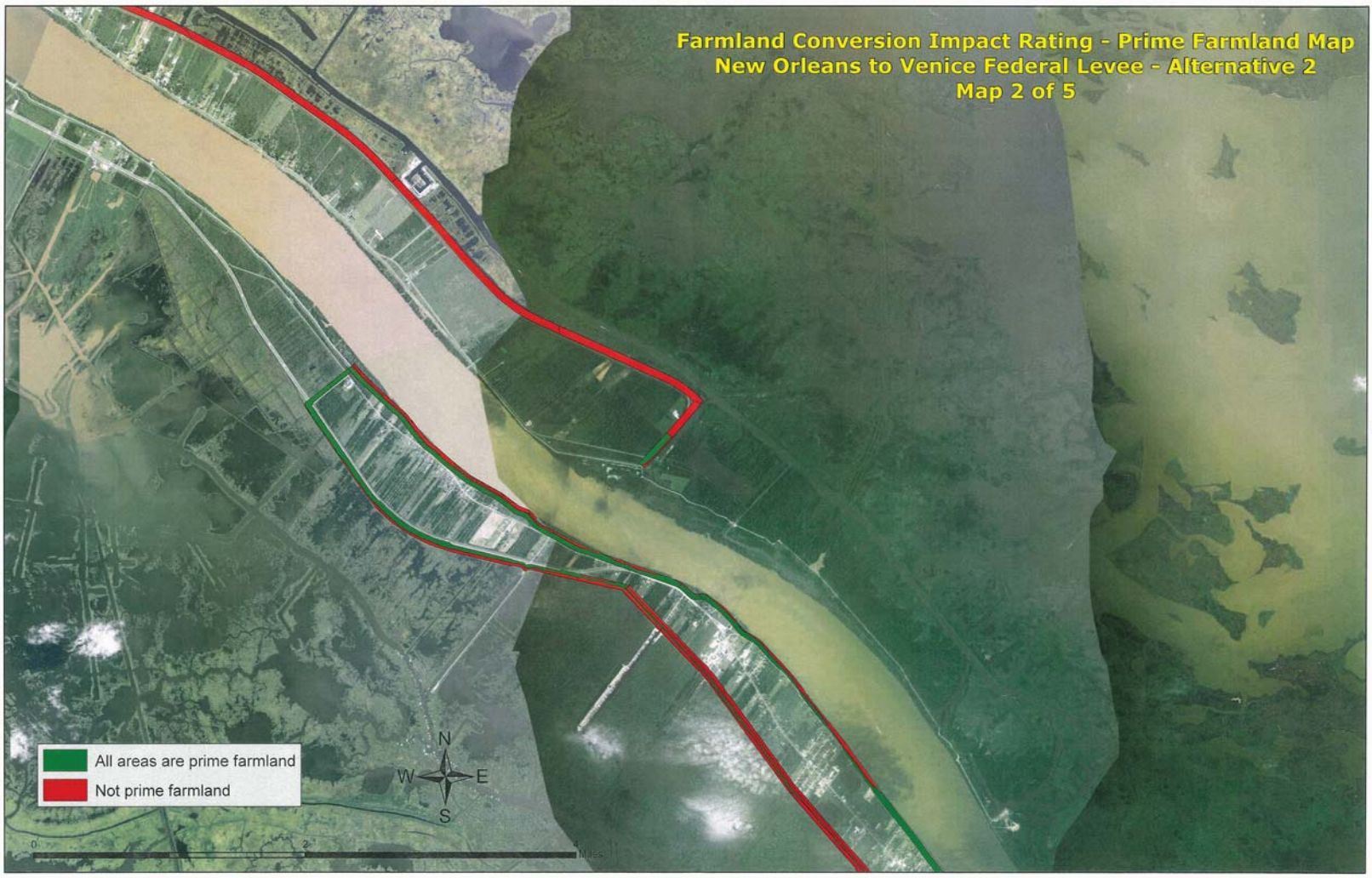
Miles


Farmland Conversion Impact Rating - Prime Farmland Map
New Orleans to Venice Federal Levee - Alternative 2
Map 2 of 5
All areas are prime farmland
Not prime farmland
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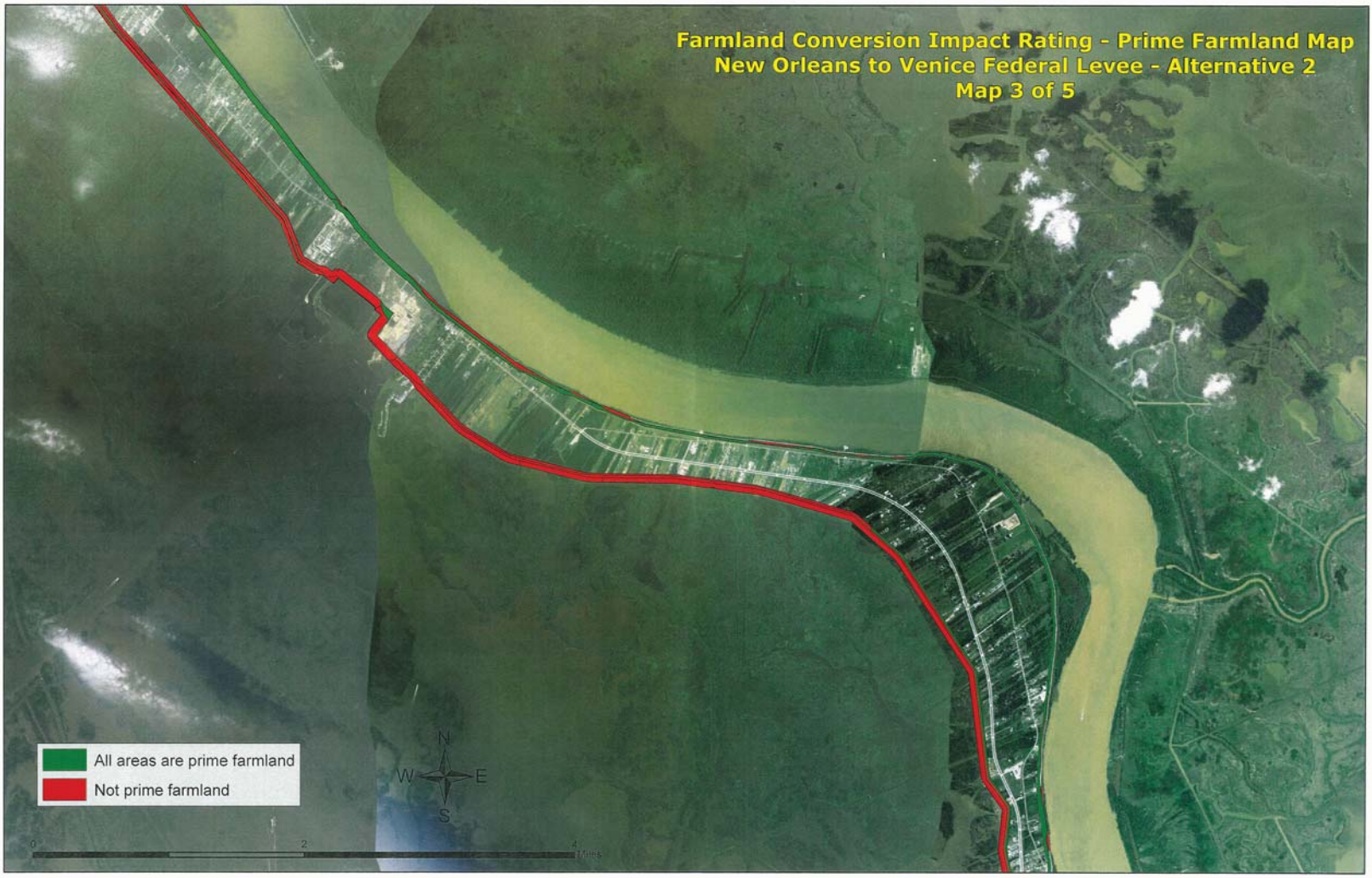
Farmland Conversion Impact Rating - Prime Farmland Map
New Orleans to Venice Federal Levee - Alternative 2
Map 3 of 5
All areas are prime farmland
Not prime farmland
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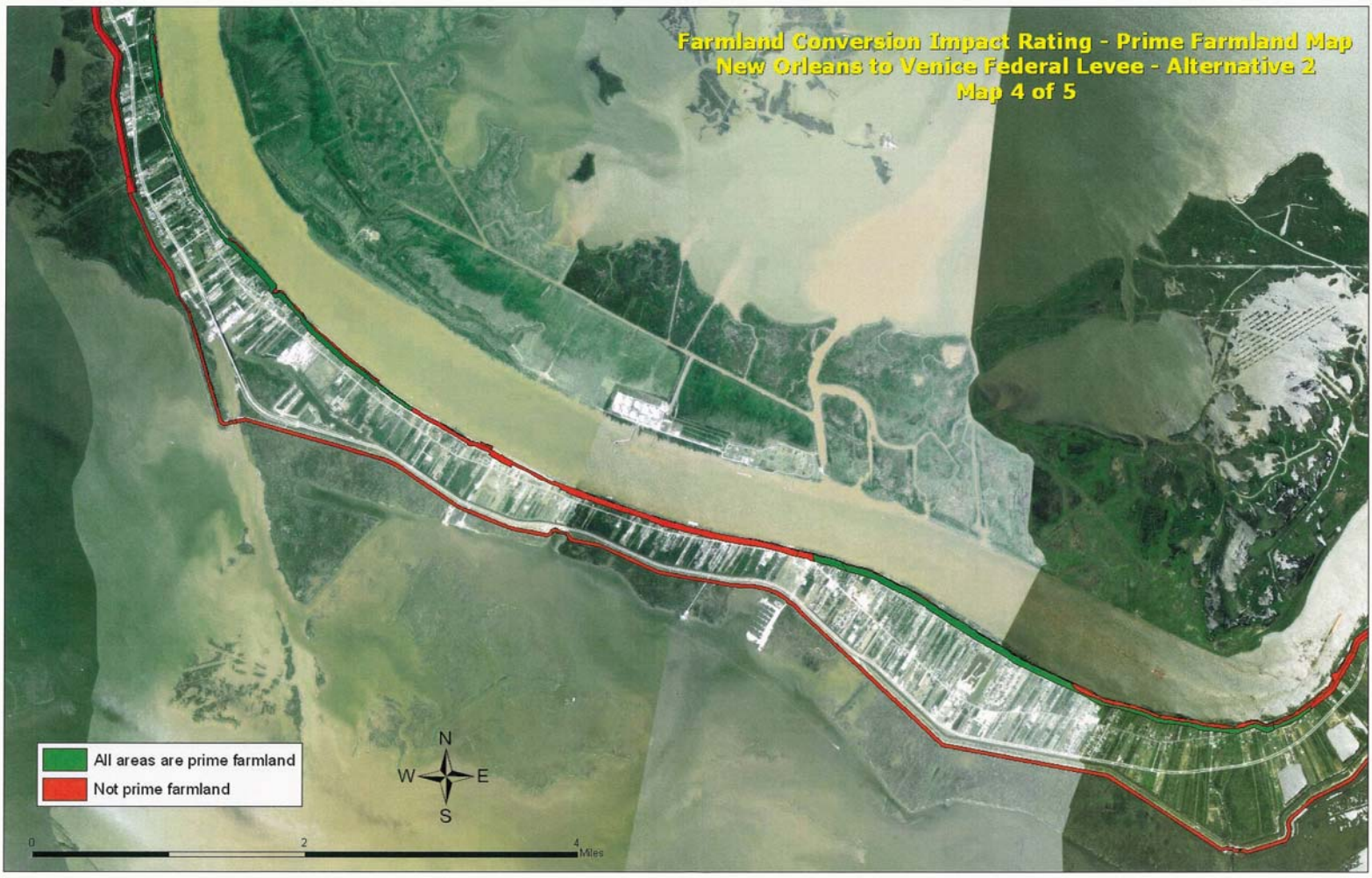
Farmland Conversion Impact Rating - Prime Farmland Map
New Orleans to Venice Federal Levee - Alternative 2
Map 4 of 5
All areas are prime farmland
Not prime farmland
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Farmland Conversion Impact Rating - Prime Farmland Map
New Orleans to Venice Federal Levee - Alternative 2
Map 5 of 5
All areas are prime farmland
Not prime farmland
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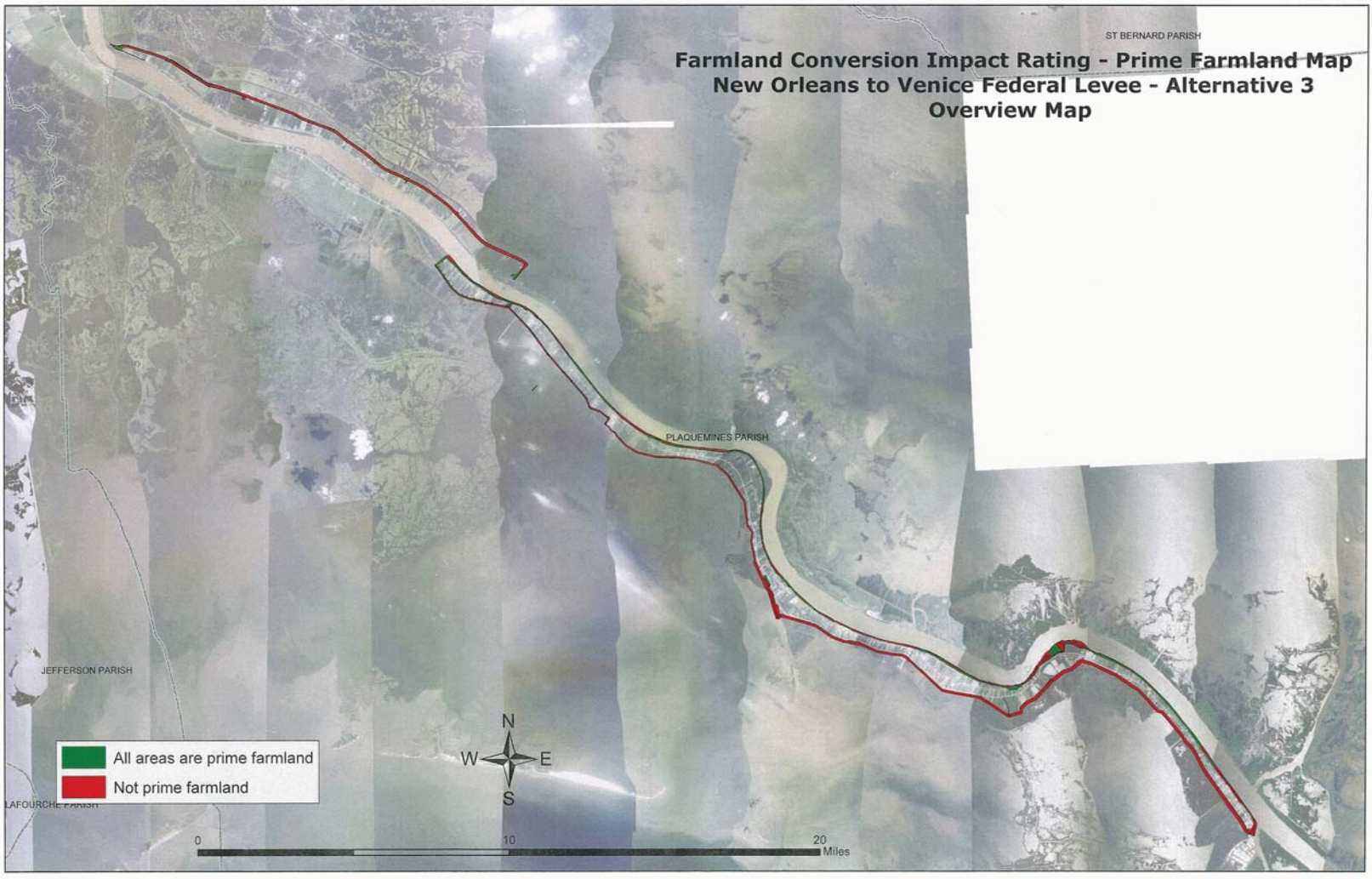
Farmland Conversion Impact Rating - Prime Farmland Map
New Orleans to Venice Federal Levee - Alternative 3
Overview Map
ST BERNARD PARISH
PLAQUEMINES PARISH
JEFFERSON PARISH
All areas are prime farmland
Not prime farmland
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Farmland Conversion Impact Rating - Prime Farmland Map
New Orleans to Venice Federal Levee - Alternative 3
Map 1 of 5
All areas are prime farmland
Not prime farmland
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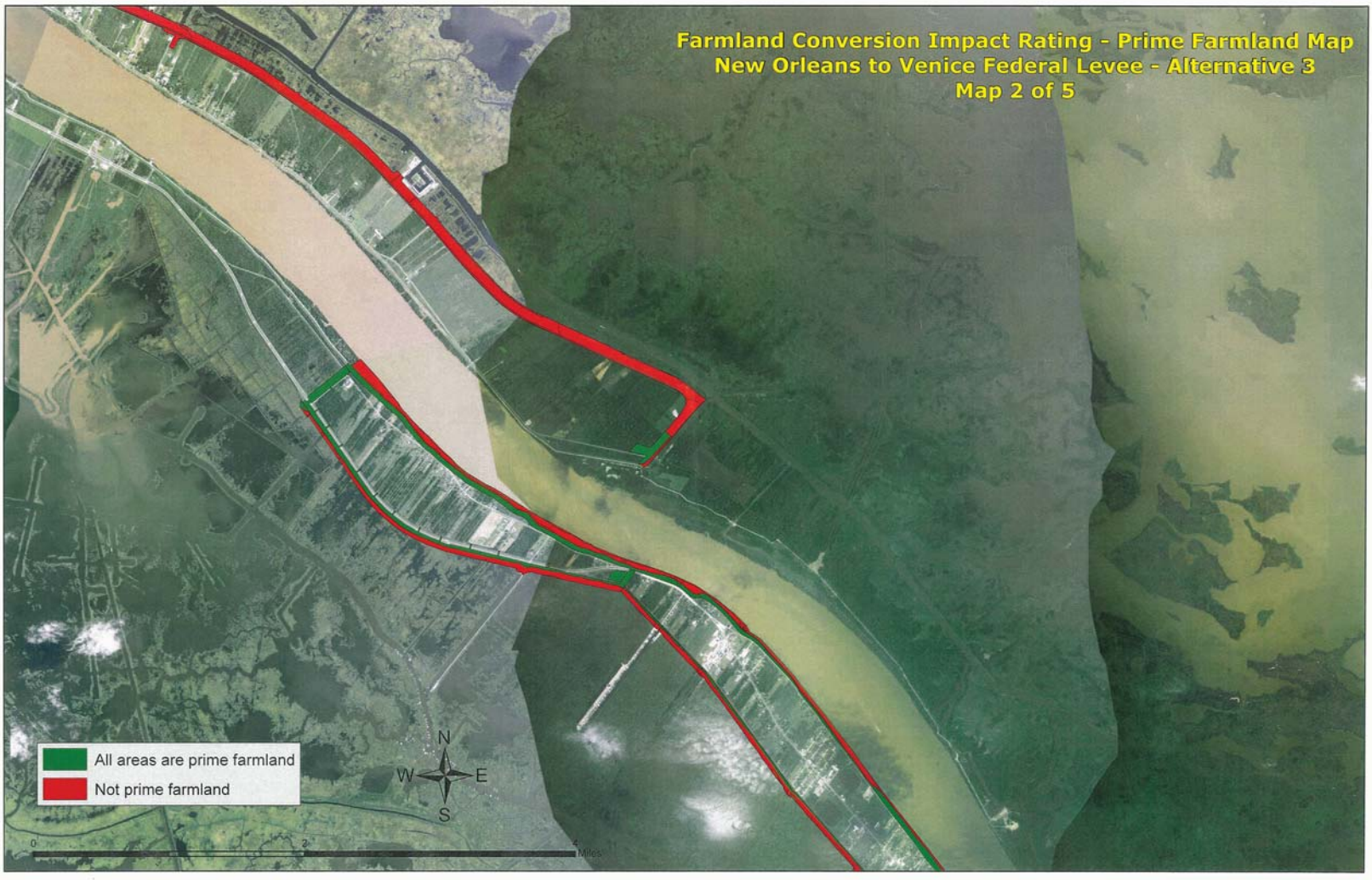
Farmland Conversion Impact Rating - Prime Farmland Map
New Orleans to Venice Federal Levee - Alternative 3
Map 2 of 5
All areas are prime farmland
Not prime farmland
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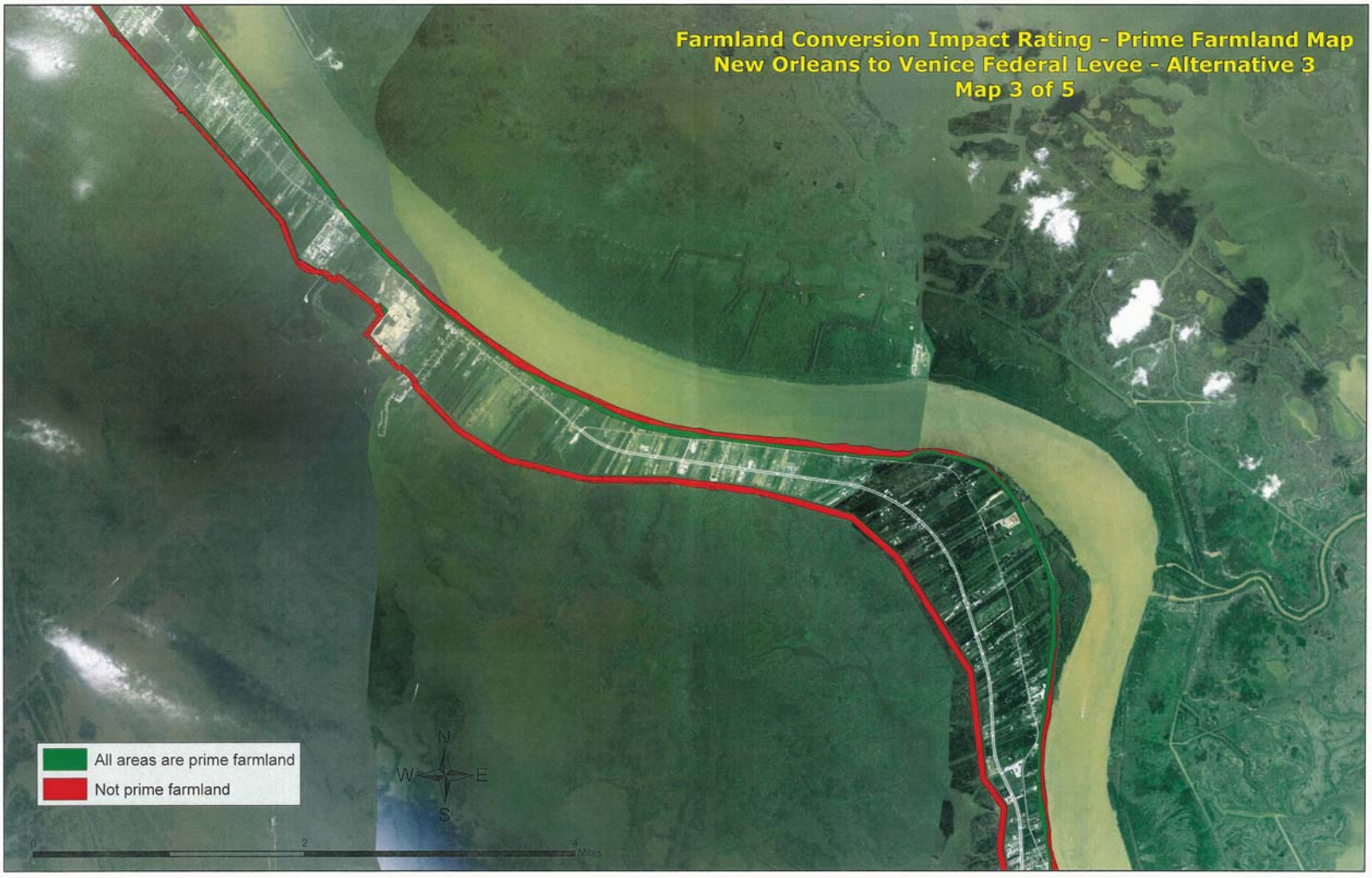
Farmland Conversion Impact Rating - Prime Farmland Map
New Orleans to Venice Federal Levee - Alternative 3
Map 3 of 5
All areas are prime farmland
Not prime farmland
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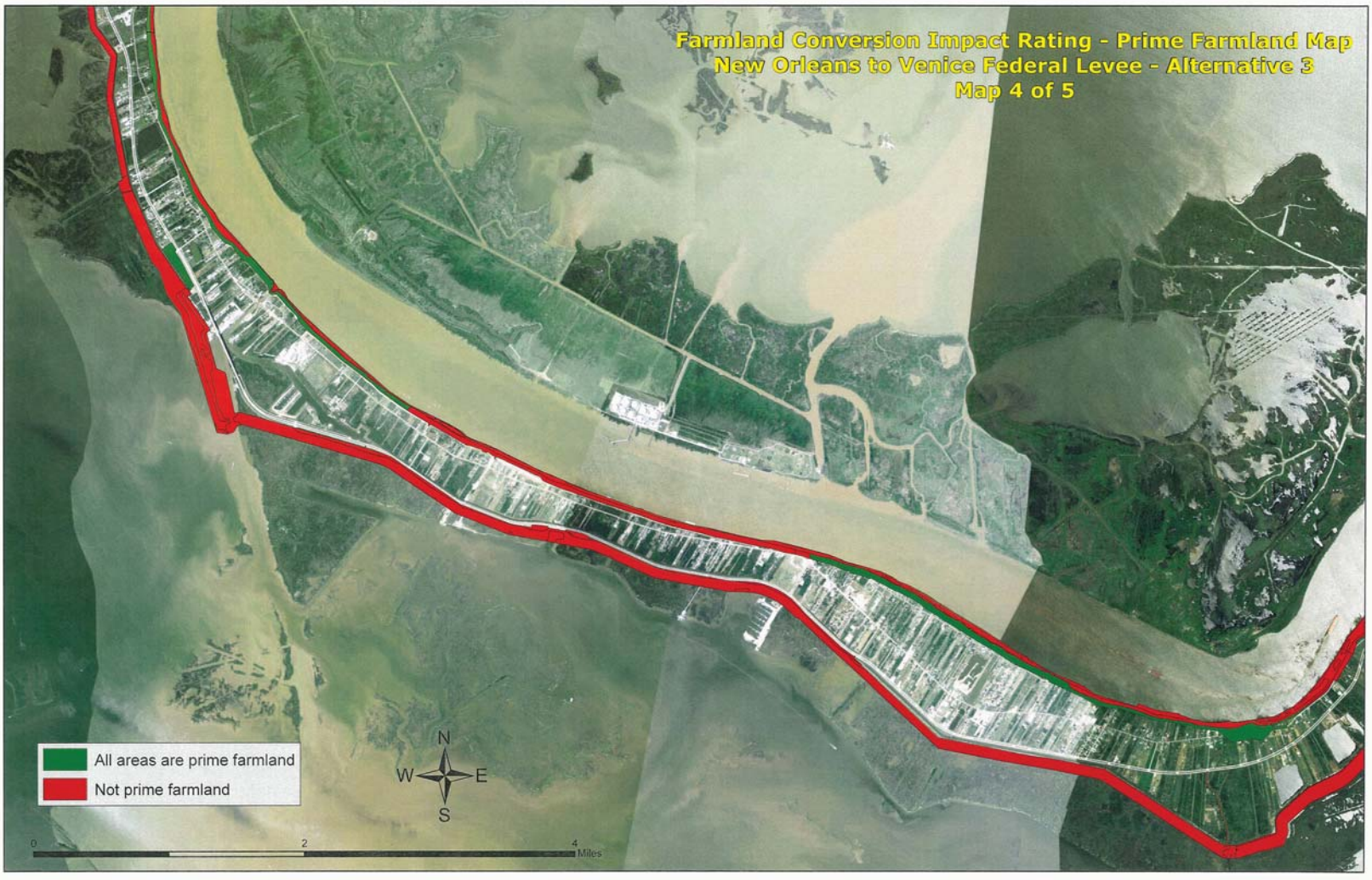
Farmland Conversion Impact Rating - Prime Farmland Map
New Orleans to Venice Federal Levee - Alternative 3
Map 4 of 5
All areas are prime farmland
Not prime farmland
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Farmland Conversion Impact Rating - Prime Farmland Map
New Orleans to Venice Federal Levee - Alternative 3
Map 5 of 5
All areas are prime farmland
Not prime farmland
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APPENDIX C
USFWS COORDINATION AND CONCURRENCE

DEPARTMENT OF THE ARMY
VICKSBURG DISTRICT, CORPS OF ENGINEERS
4155 CLAY STREET
VICKSBURG, MISSISSIPPI 39183-3435

REPLY TO
ATTENTION OF:

January 28, 2011

Regional Planning and
Environment Division South
Vicksburg Planning Branch

This project has been reviewed for effects to Federal trust resources under our jurisdiction and currently protected by the Endangered Species Act of 1973 (Act). The project, as proposed,
(X) Will have no effect on those resources
( ) Is not likely to adversely affect those resources.
This finding fulfills the requirements under Section 7(a)(2) of the Act.

Acting Supervisor
Louisiana Field Office
U.S. Fish and Wildlife Service

Date Feb 11 2011

Mr. James Boggs
U.S. Fish and Wildlife Service
Ecological Services
646 Cajundome Blvd, Suite 400
Lafayette, Louisiana 70506

Dear Mr. Boggs:

The U.S. Army Corps of Engineers, Vicksburg District, is preparing a Supplemental Environmental Impact Statement (SEIS) for the New Orleans to Venice (NOV) Federal levee system project that will evaluate the potential impacts associated with the proposed improvements to the existing hurricane protection levee along the Mississippi River corridor in Plaquemines Parish, Louisiana (enclosure 1).

Previously, consultation was conducted in a letter of September 10, 2009, stating no Federally listed threatened or endangered species were found in the project area. Also, the letter requested consultation be reinitiated annually to ensure that any listed species information remains current as the project develops. This letter serves as reinitiation of consultation.

The project includes upgrading existing Federal levees on the east bank from Phoenix to Bohemia and on the west bank from St. Jude to Venice to provide the authorized design grade for storm risk reduction. This SEIS is being prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council of Environmental Quality's regulations (40 Code of Federal Regulations [CFR] 1500-1508), as reflected in Corps Engineer Regulation (ER) 200-2-2.

The developed portions of Plaquemines Parish are located within the area protected by the levee system in a confined corridor parallel to the Mississippi River, bounded on all sides by flood protection levees. Levees along the Mississippi River, which protect developed

areas from river floods, are called Mississippi River levees (MRL), and levees located adjacent to marsh or water areas away from the river and designed to protect developed areas from tidal inundation and hurricane surge floods are called back levees. The levees are also designated as east or west bank, depending on which side of the Mississippi River they are located. The Corps is authorized to reduce the risk of flood inundation from a design hurricane that has a radius of 30 nautical miles, a wind velocity of 100 miles per hours, a central pressure of 27.6 inches, and a forward speed of 5 to 11 knots. Elevations for the system were developed through modeling of the design hurricane on various potential tracks that could affect the project area.

The purpose of the proposed action is to provide the design grade level of storm risk reduction protection authorized by Congress for Plaquemines Parish. The elevations of existing floodwalls and levees within some sections of the back levees and portions of the MRL are below the authorized design elevation. Some portions of the same sections also lack subsurface stability to support design grade level flood protection capability. The proposed action is needed to reduce risk to residences, businesses, and other infrastructures from storm-induced and wave-driven storm events in the Gulf of Mexico and high-water events on the Mississippi River.

The project includes upgrading 16 miles of existing back levees on the east bank and 37 miles of back levee and 34 miles of MRL on the west bank. The proposed action is divided into 14 individual projects designed to be bid in separate contracts and constructed independently of each other (enclosures 2-5). The proposed action would increase the elevation of all Federal flood risk reduction structures to meet authorized design grade and stabilize those sections of levees where subsoil deficiencies or internal levee deficiencies undermine their strength. In most levee sections, this would involve elevating the levee crest with earthen fill and expanding the levee base footprint to provide the necessary design strength. The addition of earthen fill and expansion of the levee base would be the most likely method to stabilize subsoil sections of levees requiring additional strength. Concrete T-walls would be repaired or replaced on top of some levees where design and cost factors dictate. Existing pump station walls and gates would also be raised and stabilized to meet the authorized design criteria. In areas where raising the levee elevation to meet

authorized design grades would require fill outside the existing right-of-way (ROW), additional ROWs would be acquired. Louisiana Highway 23, local parish roads, and open water canals and lakes, as well as sensitive wetland habitats, are the primary ROW considerations that would constrict or limit expansion of existing levee footprints.

Several Federally listed species are known to occur in the vicinity of the NOV levee project. These species are West Indian manatee (*Trichechus manatus*), Endangered (E); piping plover (*Charadrius melodus*), Threatened (T) and Critical Habitat (CH); bald eagle (*Haliaeetus leucocephalus*), delisted; Gulf sturgeon (*Acipenser oxyrhinchus desotoi*), T; pallid sturgeon (*Scaphirhynchus albus*), E; green sea turtle (*Chelonia mydas*), T; hawksbill sea turtle (*Eretmochelys imbricata*), E; Kemp's ridley sea turtle (*Lepidochelys kempii*), E; leatherback sea turtle (*Dermochelys coriacea*), E; and loggerhead sea turtle (*Caretta caretta*), T. There are also three species which are not Federally protected, but are state-protected species known to occur in the vicinity of the NOV levee project--bald eagle, brown pelican (*Pelecanus occidentalis*), and peregrine falcon (*Falco peregrinus*). The bald eagle and brown pelican are listed as E, and the peregrine falcon is listed as T/E by the Louisiana Natural Heritage Program (LNHP). The LNHP maintains the state list of threatened and endangered species and plant communities in Louisiana. Each of the aforementioned species is described in more detail below:

a. Brown Pelican. State listed as an endangered species, brown pelicans feed along the United States coast in shallow estuarine waters, using sandspits and offshore sandbars as daily resting and nocturnal roosting areas. Brown pelican nesting colonies are found on small, offshore islands protected from mammalian predators where nests are built in mangrove trees or other shrubby vegetation. The brown pelican was extirpated from Louisiana in 1963 as a result of exposure to pesticides and was reintroduced between 1968 and 1980. Population productivity peaked in Louisiana in 2004, when 16,501 nesting pairs produced 39,021 fledglings. During 2005, an oil spill, tropical storms, and hurricanes resulted in reduced productivity and substantial loss of habitat, especially east of the Mississippi River. Major threats to this species include chemical pollutants, colony site erosion, disease, and human disturbance.

b. Piping Plover. Federally and state listed as a threatened species, the piping plover's winter range includes the southern coast of Louisiana. The plover is an active forager for aquatic

invertebrates along beaches and mudflats of barrier islands in southeastern coastal parishes. The U.S. Fish and Wildlife Service (FWS) designated certain coastal islands within Plaquemines Parish as critical habitat for the wintering piping plover. Critical habitat areas include Unit LA-5 (Timbalier Island to East Grand Terre Island; 2,321 hectares (ha) (5,735 acres) in Terrebonne, LaFourche, Jefferson, and Plaquemines Parishes); Unit LA-6 (Mississippi River Delta, 105 ha (259 acres) in Plaquemines Parish); Unit LA-7 (Breton Islands and Chandeleur Island Chain and 3,116 ha (7,700 acres) in Plaquemines and St. Bernard Parishes). Although there is designated critical habitat for the wintering piping plover within Plaquemines Parish, the proposed action would not occur in any area of critical habitat for the species.

c. Peregrine Falcon. Peregrine falcons feed primarily on medium-sized birds to waterfowl; however, rarely or locally, small mammals, lizards, fishes, and insects may be consumed. The species nests on cliffs and ledges; however, formally in Louisiana, the falcon nested in cavities of large old trees. Artificial, manmade nest sites include tall buildings, bridges, rock quarries, and raised platforms. When not breeding, peregrine falcons forage in areas of concentrated prey, including farmlands, marshes, lakeshores, river mouths, tidal flats, dunes and beaches, broad river valleys, cities, and airports. Formerly, the species bred in Kansas, Arkansas, northeastern Louisiana, Tennessee, northern Alabama, and northwestern Georgia. Inland, peregrines inhabit open plant communities such as grasslands and meadows, usually near rivers or lakes. They are found in mixed deciduous and coniferous forests of the eastern and southeastern United States. Throughout their range, they inhabit open forests, usually being found near large openings and along forest edges near water. In Louisiana, the peregrine falcon inhabits the Pontchartrain, Barataria, Terrebonne, Mississippi, Mermentau, Calcasieu, and Sabine River Basins.

d. Bald Eagle. On July 9, 2007, the bald eagle was removed from the Federal Endangered Species Act (ESA). Only bald eagles located in central Arizona are protected as "threatened" under the ESA. However, the bald eagle remains protected under the Migratory Bird Treaty Act of 1918 and is listed as state endangered by the Louisiana Natural Heritage Program. Bald eagles inhabit forested wetlands, riparian zones, rivers, streams, and other open bodies of freshwater as fish compose the major portion of their diet, although the species has been

known to feed on carrion. Breeding habitat most commonly includes areas close to coastal areas, bays, rivers, lakes, or other bodies of water that reflect the general availability of primary food sources including fish, waterfowl, and seabirds. In Louisiana, bald eagles mate in the fall and begin nesting and egg laying in December. Clutch size is 1 to 3, with incubation lasting approximately 5 weeks. Juvenile eagles first fly at 10 to 12.5 weeks old and are cared for by both adults. The Louisiana Department of Threatened and Endangered Species and Fisheries documented 336 active bald eagle nests that produced 424 young birds during a 2006 to 20007 survey. Major threats include habitat loss, disturbance by humans, biocide contamination, decreasing food supply, and illegal shooting.

e. Gulf Sturgeon. The Gulf sturgeon, Federally and state listed as a threatened species, is an anadromous fish that occurs in many rivers, streams, and estuarine waters along the northern Gulf coast between the Mississippi and Suwannee Rivers. In Louisiana, the Gulf sturgeon has been reported at Rigolette Pass, rivers and lakes of the Pontchartrain Basin, and adjacent estuarine areas. Spawning occurs in coastal rivers between late winter and early spring (i.e., March to May). Adults and subadults may be found in coastal rivers and streams until November and in estuarine or marine waters during the remainder of the year. Gulf sturgeons less than 2 years old appear to remain in riverine habitats and estuarine areas throughout the year, rather than migrate to marine waters. Habitat alterations, such as those caused by water control structures that limit and prevent spawning, poor water quality, and overfishing, have negatively affected this species. Critical habitat for the Gulf sturgeon occurs in Louisiana, but none is designated within the immediate project area.

f. Pallid Sturgeon. Federally and state listed as an endangered species, the pallid sturgeon is one of the most poorly known and infrequently recorded freshwater fishes in North America. It inhabits large rivers and apparently prefers main river channels of excessively turbid rivers in areas with strong currents over firm sandy bottom. In Louisiana, the pallid sturgeon was formerly thought to be restricted to the main channel of the Mississippi River. Recent data indicate that the species also exists in the Atchafalaya River. Pallid sturgeons have been documented in the Mississippi River as far south as Donaldsonville, but likely occur below New Orleans albeit at relatively low numbers.

g. Sea Turtles.

(1) All species of sea turtles in United States waters are listed as endangered or threatened. The five species found in the Gulf of Mexico are the loggerhead, green, hawksbill, Kemp's ridley, and leatherback. The most common are the loggerhead and Kemp's ridley, but the latter is the most endangered sea turtle worldwide. Kemp's ridley turtles nest almost exclusively in Mexico, but occasional nests have been located in Texas. Sea turtles inhabit warm bays and oceans, seagrass beds, and estuaries; mainland beaches and islands are utilized for nesting. The leatherback tends to inhabit deeper waters. The loggerhead regularly enters marshes, estuaries, and coastal rivers. It has been found throughout the Louisiana coastal zone, but the only recorded nesting of loggerhead in Louisiana was on the Chandeleur Islands.

(2) Sea turtles can migrate over vast distances, but the spatial distribution and seasonal movements of sea turtles are poorly understood. Based upon aerial surveys, in general, the relative abundance of turtles sighted is higher in the eastern Gulf than in the western Gulf. The southern Florida zones apparently have a higher relative abundance of sea turtles than any other region. The west coast of Florida has sea turtle densities that are, on average, 60 times higher than in the western Gulf, but 3 times lower than in the southern Florida areas. Overall, densities remain high through the Big Bend region of Florida, but abundance is reduced off Mississippi and Alabama. West of the Mississippi River, observed sea turtle abundance is extremely low, with no turtles sighted in many of the subzones. In southern Texas, average sea turtle abundance is about 20 times higher than in the other western Gulf zones. Near-shore sea turtle abundances are proportionately higher than in offshore western Gulf subzones, with the greatest density of sea turtles found in the 0- to 18.3-meter zone.

(3) The improvement and construction of the NOV Federal levees would have no effect to listed species. West Indian manatees graze on a variety of aquatic plants and are typically found in waters with dense submerged aquatic beds or floating vegetation. They occasionally enter Lake Pontchartrain and associated coastal waters from June through September and could pass through the NOV levee project area or forage on nearby grass beds in Lake Pontchartrain.

However, the likelihood of a manatee occurring in the project area is extremely low since it is outside their normal range, and no aquatic plants suitable as a food source are located in the NOV levee project area.

(4) No brown pelican or bald eagle breeding or nesting areas are known to occur in the vicinity of the NOV levee project area. These birds are more likely to use the waters and associated habitats in the NOV levee project area for foraging and feeding. The mobility of these bird species is such that construction activities are not expected to harm nor interfere with their activities, and the brown pelican and bald eagle would be able to relocate to similar habitats in the vicinity of the project area for foraging and feeding during site preparation and construction activities. The forested wetlands adjacent to the NOV levee project area may, however, provide nesting habitat for the bald eagle although no nests have been identified within the NOV levee project area. The bald eagle was officially delisted as of August 8, 2007, but disturbance to the bald eagle is prohibited by the Bald and Golden Eagle Protection Act. If the Corps determines that construction activities would take place within 660 feet of an active bald eagle nest, we would contact FWS to determine the appropriate size and configuration of construction buffers and timing of construction activities.

(5) There is no suitable habitat for the peregrine falcon or sea turtles within or in the vicinity of the NOV levee project area; thus, no adverse impacts are anticipated to these species. The piping plover utilizes this portion of the southern coast of Louisiana as part of its winter range; however, none of the NOV sections are within the designated critical habitat units for the piping plover. By scheduling work during months other than those during the winter when piping plovers are most likely present and through the use of a biological monitor during construction, impacts to this species can be avoided.

(6) It is anticipated that Gulf and pallid sturgeons would forage and rest in unaffected areas at a sufficient distance from the NOV levee project area during site preparation and construction as to cause no adverse impact.

Based upon the proposed construction activities for the NOV Federal levee project and mitigation measures to be implemented during construction, the Corps has determined that levee construction

activities would not affect Gulf sturgeon, pallid sturgeon, or manatee individuals, but the temporary displacement and loss of forage items may affect, but is not likely to adversely affect, the Gulf sturgeon, pallid sturgeon, and West Indian manatee. The proposed action would not modify Gulf sturgeon critical habitat. Furthermore, because of a lack of suitable foraging or nesting habitat in the project vicinity, the Corps has determined that the levee project would not affect the brown pelican.

We respectfully request concurrence with our determinations. Additionally, we will be furnishing you a copy of the SEIS when it is released to the public which is currently anticipated to occur in March 2011.

If you have any questions, please do not hesitate to contact Mr. Matt Mallard of this office (telephone (601) 631-5960).

Sincerely,

Douglas J. Kamien, P.E.
Chief, Programs and Project
Management Division

Enclosures

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5505
(727) 824-5312, FAX 824-5309
http://sero.nmfs.noaa.gov

F/SER32:CH

MAR 8 2011

Mr. Douglas J. Kamien, P.E.
Vicksburg Planning Branch
Vicksburg District Corps of Engineers
4155 Clay Street
Vicksburg, MS 39193

Re: New Orleans to Venice Federal Levee System Project and the Non-Federal Levee System Project in Plaquemines Parish

Dear Mr. Kamien:

This responds to your letters dated February 4, 2011, and January 28, 2011, requesting National Marine Fisheries Service (NMFS) concurrence with your determinations pursuant to Section 7 of the Endangered Species Act (ESA) for the referenced Army Corps of Engineers (COE) Vicksburg District's permit application for the "New Orleans to Venice Federal Levee System Project" and the "Non-Federal Levee System Project in Plaquemines Parish," Louisiana. The COE has determined that the project may affect, but is not likely to adversely affect, Gulf sturgeon and sea turtles. Our comments are submitted pursuant to Section 7 of the ESA.

The project area is located in Plaquemines Parish in southeastern Louisiana within the Mississippi River Deltaic Plain of the lower Mississippi River ecosystem. Habitat within the project area contains low marshlands and wetlands. The general elevation within the project areas is approximately 0.5 to 1.5 feet National Geodetic Vertical Datum. The "New Orleans to Venice Federal Levee System Project" includes upgrading 16 miles of existing federal levees on the east bank of the Mississippi river from Phoenix to Bohemia and 37 miles on the west bank from St. Jude to Venice. The "Non-Federal Levee System Project" includes upgrading 32 miles of the existing levee structure on the west bank from Oakville to St. Jude. The proposed actions would increase the elevation of the aforementioned levees where subsoil deficiencies or internal levee deficiencies undermine their strength. In most levee sections, work would involve elevating the levee crest with fill and expanding the levee base footprint to provide necessary design strength. The addition of fill and expansion of the levee base would be the likely method to stabilize subsoil sections of levees requiring additional strength. Existing concrete T-walls would be repaired or replaced where necessary on the crest of some levees. Lastly, where necessary, existing pump station walls and gates would be raised and stabilized.

Federally-listed species under NMFS' purview which may occur at or in the vicinity of the project site include sea turtles and Gulf sturgeon. We have reviewed the project documents you provided. We are unable to find clear reasoning why you believe: (1) any elements of the project may affect any listed species, and (2) adverse effects to listed species resulting from those project elements are unlikely. Based on our review of the project description and the other supporting information (i.e., levees are located on the uplands, adjacent to existing marshes where the elevation is 0.5 to 1.5 feet, and not accessible to listed species), it appears to us that the project may not have any elements that have the potential to affect listed species under NMFS' purview which may occur in the action area. If you have additional information that would support your conclusion (e.g., potential routes of effect to species that were not clearly discussed in the project documents) and wish to provide it to us, please do so and we will reevaluate this action.

A "not likely to adversely affect" decision means that there are potential routes of effect on listed species from the project, its various components, or interrelated or interdependent projects, but the action agency is able to express why those potential effects are all discountable (potentially serious, but very unlikely to occur), insignificant (may occur, but are small and do not rise to the level of take of a species), or completely beneficial. "No effect" is the appropriate conclusion when a listed species will not be affected, either because the species will not be present or because the project does not have any elements with the potential to affect the species. Written concurrence from NMFS is required for action agency "not likely to adversely affect" determinations, but not for "no-effect" determinations. However, for no-effect determinations, action agencies should clearly explain the basis for these determinations in their project file.

If you have any questions, please contact Calusa Horn, fishery biologist, at (727) 824-5312, or by e-mail at Calusa.Horn@noaa.gov.

Sincerely,

David Bernhart
Assistant Regional Administrator
for Protected Resources

File: 1514-22.F.7
Ref: I/SER/2011/00350
I/SER/2011/00262

APPENDIX D
COASTAL ZONE CONSISTENCY DETERMINATION

BOBBY JINDAL
GOVERNOR

SCOTT A. ANGELLE
SECRETARY

State of Louisiana

DEPARTMENT OF NATURAL RESOURCES
OFFICE OF COASTAL MANAGEMENT

April 6, 2011

Gary L. Young
Chief, Vicksburg Planning Branch
Regional Planning & Environmental Division South
Vicksburg District, Corps of Engineers
4155 Clay Street,
Vicksburg, Mississippi 39183-3435

RE: **C20110045, Coastal Zone Consistency**
Vicksburg District, Corps of Engineers
Direct Federal Action
New Orleans Federal Levee Rehabilitation in Plaquemines Parish, **Plaquemines Parish, Louisiana**

Dear Mr. Young:

The above referenced project has been reviewed for consistency with the Louisiana Coastal Resources Program in accordance with Section 307 (c) of the Coastal Zone Management Act of 1972, as amended. The project, as proposed in this application, is consistent with the LCRP. 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,

Gregory J. DuCote
Administrator
Interagency Affairs/Field Services Division

GJD/JH/bgm

CC: Daniel Sumerall, Vicksburg COE
David Butler, LDWF
Frank Cole, OCM/FC
Albertine Kimble, Plaquemines Parish

January 31, 2011

Regional Planning and
Environment Division South
Vicksburg Planning Branch

Mr. Greg DuCote, Administrator
Office of Coastal Management
Interagency Affairs/Field
Services Division
P. O. Box 44487
Baton Rouge, Louisiana 70804-4487

Dear Mr. DuCote:

A Consistency Determination for New Orleans to Venice Federal Levee rehabilitation in Plaquemines Parish, Louisiana, along with a detailed description of the proposed action and figures depicting the locations are enclosed. The proposed action consists of levee maintenance and improvement activities along the protected and flood side of the levees. Shapefiles demonstrating the estimated footprint of the proposed action and necessary access routes are available electronically upon request. The U.S. Army Corps of Engineers, Vicksburg District, believes that the proposed action is consistent with the Louisiana Coastal Resource Program to the maximum extent practicable.

For additional information, please contact Mr. Daniel Sumerall of this office (telephone (601) 631-5428 or e-mail daniel.c.sumerall@usace. army.mil.

Sincerely,

Gary L. Young
Chief, Vicksburg Planning Branch

Enclosure

Copies Furnished: (w/enclosure)

CEMVK-PD-E (Sumerall)
CEMVK-PP-D (Eagles)

APPENDIX E
AIR QUALITY ANALYSIS

SUMMARY OF AIR EMISSIONS-PROPOSED ACTION

Summary of Construction and Transportation Air Emissions Generated by Alternative 2									
	NAAQS Criteria Pollutants (tons per year)						Greenhouse Gases (tpy)		
NOV #	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
1	10.3	49.9	106.6	91	16	15.3	11,610	33,246	44,857
2	3.4	14.5	27.8	5.9	2.7	3.1	2,367	8,683	11,049
5	7.7	38.9	71.8	60.9	10.8	10.1	7,867	22,429	30,295
6	11.2	52.2	112.4	91.9	16.4	15.3	11,596	35,076	46,672
7	9.9	47.7	101.3	91	15.7	14.4	10,926	31,608	42,534
8	9	44	88.9	89.7	14.8	12.5	9,564	27,747	37,312
9	6.8	32.7	65.3	74.3	11.8	9	6,894	20,382	27,277
10	12	56.6	127.7	92.6	17.5	18.3	13,745	39,824	53,569
11	12	56.6	127.7	92.6	17.5	18.3	13,745	39,824	53,569
12	11	52.6	115.1	91.6	16.6	16.4	12,383	35,898	48,281
13	3.5	17.7	24.4	9.2	2.8	2.7	2,242	7,635	9,877
14	3	14.1	20.7	8.9	2.5	2.2	1,832	6,491	8,323
15	8.7	40.9	86.8	48	10.4	11.4	8,778	27,075	35,853
16	11	51.8	114.2	91.4	16.4	15.5	11,798	35,632	47,430
Total	**98.1**	**466.9**	**984.5**	**781.2**	**142.4**	**136**	**103,503**	**307,192**	**410,697**

Summary of Construction and Transportation Air Emissions Generated by Alternative 3									
	NAAQS Criteria Pollutants (tons per year)						Greenhouse Gases (tpy)		
NOV #	VOC	CO	NOx	PM-10	PM-2.5	SO2	CO2	CO2 Equivalents	Total CO2
1	12.7	59.5	137.1	134.6	22.3	19.8	14,872	42,760	57,632
2	5.9	25.2	50.8	7.8	4.5	5.7	4,263	15,877	20,140
5	7.7	38.9	71.8	88.5	13.6	10.1	7,867	22,429	30,295
6	13	59.3	134.8	134.4	22.1	17.9	13,482	42,054	55,536
7	9.9	47.8	101.3	132	19.7	14.4	10,926	31,608	42,534
8	9.9	47.7	101.3	132	19.7	14.4	10,926	31,608	42,534
9	8.1	39.4	79.6	109.9	16.3	11.1	8,456	24,858	33,314
10	13.4	61.9	145.9	135.2	22.9	21.1	15,787	45,504	61,291
11	14.2	66.8	153	135.8	23.4	22	16,537	47,735	64,272
12	12.7	60.4	133.7	134.4	22	19.2	14,495	41,702	56,197
13	3.5	17.7	24.4	9.2	2.8	2.7	2,242	7,635	9,877
14	3.7	17.1	30	13	3.5	3.1	2,504	9,372	11,876
15	11	51.8	114.2	49.9	12.2	15.5	11,798	35,632	47,430
16	11	52.8	115.6	91.6	16.6	16.2	12,321	36,069	48,389
Total	**136.7**	**646.3**	**1,393.50**	**1,308.30**	**221.6**	**193.2**	**146,476**	**434,843**	**581,317**

CALCULATION SHEET-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 01-ALTERNATIVE 2

Assumptions for Combustible 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	6	100	8	240	1152000
Diesel Dump Truck	4	300	8	240	2304000
Diesel Excavator	4	300	8	240	2304000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	0	300	8	240	0
Diesel Cement & Mortar Mixers	0	300	8	240	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	8	300	8	240	4608000
Diesel Front End Loaders	8	300	8	240	4608000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 01-ALTERNATIVE 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 Paver	0.470	1.879	6.221	0.432	0.419	0.939	680.708
Diesel Dump Truck	1.117	5.256	13.939	1.041	1.016	1.879	1360.908
Diesel Excavator	0.863	3.301	11.679	0.812	0.787	1.879	1361.670
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cement & Mortar Mixers	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	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
Diesel Aerial 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	**8.782**	**35.833**	**102.772**	**7.834**	**7.608**	**15.301**	**11089.380**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 01-ALTERNATIVE 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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	6	6	0.05	0.07	0.12
CO	3.21	4.38	60	240	6	6	0.31	0.42	0.72
NOx	12.6	16.20	60	240	6	6	1.20	1.54	2.74
PM-10	0.33	0.36	60	240	6	6	0.03	0.03	0.07
PM 2.5	0.36	0.42	60	240	6	6	0.03	0.04	0.07
CO2	536.00	536.00	60	240	6	6	51.03	51.03	102.07

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasoline Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 01-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.98	
NOx	311	852.80	
Total		855.78	957.85

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 01-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	3	miles*	5280	feet per mile
Length (converted)	15840	feet		
Width	200	feet		
Area	72.73	acres		

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 15.8 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-NOV 01-ALTERNATIVE 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
Combustible Emissions	8.78	35.83	102.77	7.83	7.61	15.30	11089.38	32043.70	43133.08
Construction Site-Fugitive PM-10	NA	NA	NA	83.10	8.31	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.53	14.10	3.78	0.07	0.08	NA	521.00	1202.50	1723.50
Total emissions-CONSTRUCTION	**10.32**	**49.93**	**106.55**	**91.00**	**16.00**	**15.30**	**11,610**	**33,246**	**44,857**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 01-ALTERNATIVE 3

Assumptions for Combustible 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	6	300	8	240	3456000
Diesel Excavator	6	300	8	240	3456000
Diesel Hole Trenchers	1	175	8	240	336000
Diesel Bore/Drill Rigs	0	300	8	240	0
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	6	300	8	240	3456000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	10	300	8	240	5760000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 01-ALTERNATIVE 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	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	1.676	7.884	20.909	1.561	1.523	2.818	2041.362
Diesel Excavator	1.295	4.951	17.519	1.219	1.181	2.818	2042.505
Diesel Hole Cleaners\Trenchers	0.189	0.903	2.151	0.170	0.163	0.274	198.392
Diesel Bore/Drill Rigs	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cement & Mortar Mixers	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	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	2.285	8.760	30.214	2.095	2.031	4.697	3404.175
Diesel Front End Loaders	2.412	9.839	31.738	2.222	2.158	4.697	3403.540
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	**11.138**	**45.427**	**133.301**	**10.001**	**9.711**	**19.803**	**14351.021**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 01-ALTERNATIVE 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	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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	6	6	0.05	0.07	0.12
CO	3.21	4.38	60	240	6	6	0.31	0.42	0.72
NOx	12.6	16.20	60	240	6	6	1.20	1.54	2.74
PM-10	0.33	0.36	60	240	6	6	0.03	0.03	0.07
PM 2.5	0.36	0.42	60	240	6	6	0.03	0.04	0.07
CO2	536.00	536.00	60	240	6	6	51.03	51.03	102.07

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Dasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 01-ALTERNATIVE 3

Passenger 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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.98	
NOx	311	852.80	
Total		855.78	957.85

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 01-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	3	miles*	5280	feet per mile
Length (converted)	15840	feet		
Width	300	feet		
Area	109.09	acres		

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	248.73	124.36	24.87	12.44
Staging Areas	0.38	0.19	0.04	0.02
Total	**249.11**	**124.55**	**24.91**	**12.46**

* Assume 3 miles of 15.8 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-NOV 01-ALTERNATIVE 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
Combustible Emissions	11.14	45.43	133.30	10.00	9.71	19.80	14351.02	41557.14	55908.16
Construction Site-Fugitive PM-10	NA	NA	NA	124.55	12.46	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.53	14.10	3.78	0.07	0.08	NA	521.00	1202.50	1723.50
Total emissions-CONSTRUCTION	**12.67**	**59.53**	**137.08**	**134.63**	**22.25**	**19.80**	**14,872.0**	**42,759.6**	**57,631.7**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 02-ALTERNATIVE 2

Assumptions for Combustible 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	240	0
Diesel Excavator	0	300	8	240	0
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	0	300	8	240	0
Diesel Cement & Mortar Mixers	3	300	8	240	1728000
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	0	300	8	240	0
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 02-ALTERNATIVE 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	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Paver	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 Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cement & Mortar Mixers	1.162	4.418	13.863	0.914	0.895	1.390	1008.684
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	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Front End Loaders	0.241	0.984	3.174	0.222	0.216	0.470	340.354
Diesel Aerial 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	**3.135**	**12.117**	**27.150**	**2.385**	**2.324**	**3.141**	**2279.699**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 02-ALTERNATIVE 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	5	5	0.11	0.13	0.24
CO	12.4	15.7	60	240	5	5	0.98	1.25	2.23
NOx	0.95	1.22	60	240	5	5	0.08	0.10	0.17
PM-10	0.0052	0.0065	60	240	5	5	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	5	5	0.00	0.00	0.00
CO2	369	511	60	240	5	5	29.28	40.54	69.82

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	1	1	0.01	0.01	0.02
CO	3.21	4.38	60	240	1	1	0.05	0.07	0.12
NOx	12.6	16.20	60	240	1	1	0.20	0.26	0.46
PM-10	0.33	0.36	60	240	1	1	0.01	0.01	0.01
PM 2.5	0.36	0.42	60	240	1	1	0.01	0.01	0.01
CO2	536.00	536.00	60	240	1	1	8.51	8.51	17.01

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 02-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	5.89	
NOx	311	0.17	
Total		6.06	75.89

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.50	
NOx	311	142.13	
Total		142.63	159.64

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 02-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	0.12	miles*	5280	feet per mile
Length (converted)	633.6	feet		
Width	200	feet		
Area	2.91	acres		

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	6.63	3.32	0.66	0.33
Staging Areas	0.38	0.19	0.04	0.02
Total	**7.01**	**3.51**	**0.70**	**0.35**

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-NOV 02-ALTERNATIVE 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
Combustible Emissions	3.14	12.12	27.15	2.39	2.32	3.14	2279.70	8482.22	10761.92
Construction Site-Fugitive PM-10	NA	NA	NA	3.51	0.35	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.26	2.35	0.63	0.01	0.01	NA	86.83	200.42	287.25
Total emissions-CONSTRUCTION	**3.39**	**14.47**	**27.78**	**5.90**	**2.69**	**3.14**	**2,367**	**8,683**	**11,049**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 02-ALTERNATIVE 3

Assumptions for Combustible 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	240	0
Diesel Excavator	0	300	8	240	0
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	0	300	8	240	0
Diesel Cement & Mortar Mixers	6	300	8	240	3456000
Diesel Cranes	3	175	8	240	1008000
Diesel Graders	0	300	8	240	0
Diesel Tractors/Loaders/Backhoes	3	100	8	240	576000
Diesel Bull Dozers	0	300	8	240	0
Diesel Front End Loaders	2	300	8	240	1152000
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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 02-ALTERNATIVE 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	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Paver	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 Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cement & Mortar Mixers	2.323	8.836	27.726	1.828	1.790	2.780	2017.369
Diesel Cranes	0.489	1.444	6.354	0.378	0.367	0.811	588.955
Diesel Graders	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Tractors/Loaders/Backhoes	1.174	5.211	4.583	0.870	0.844	0.603	438.677
Diesel Bull Dozers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Front End Loaders	0.482	1.968	6.348	0.444	0.432	0.939	680.708
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	**5.511**	**21.379**	**49.643**	**4.231**	**4.124**	**5.673**	**4117.444**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 02-ALTERNATIVE 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	240	8	8	0.17	0.20	0.38
CO	12.4	15.7	60	240	8	8	1.57	1.99	3.57
NOx	0.95	1.22	60	240	8	8	0.12	0.15	0.28
PM-10	0.0052	0.0065	60	240	8	8	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	8	8	0.00	0.00	0.00
CO2	369	511	60	240	8	8	46.84	64.87	111.72

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	2	2	0.02	0.02	0.04
CO	3.21	4.38	60	240	2	2	0.10	0.14	0.24
NOx	12.6	16.20	60	240	2	2	0.40	0.51	0.91
PM-10	0.33	0.36	60	240	2	2	0.01	0.01	0.02
PM 2.5	0.36	0.42	60	240	2	2	0.01	0.01	0.02
CO2	536.00	536.00	60	240	2	2	17.01	17.01	34.02

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasoline Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 02-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	9.43	
NOx	311	0.28	
Total		9.70	121.42

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.99	
NOx	311	284.27	
Total		285.26	319.28

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 02-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	0.12	miles*	5280	feet per mile
Length (converted)	633.6	feet		
Width	200	feet		
Area	2.91	acres		

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	6.63	3.32	0.66	0.33
Staging Areas	0.38	0.19	0.04	0.02
Total	**7.01**	**3.51**	**0.70**	**0.35**

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-NOV 02-ALTERNATIVE 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
Combustible Emissions	5.51	21.38	49.64	4.23	4.12	5.67	4117.44	15499.59	19617.03
Construction Site-Fugitive PM-10	NA	NA	NA	3.51	0.35	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.42	3.81	1.19	0.02	0.03	NA	145.74	377.09	522.83
Total emissions-CONSTRUCTION	**5.93**	**25.19**	**50.83**	**7.76**	**4.50**	**5.67**	**4,263**	**15,877**	**20,140**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	20

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 05-ALTERNATIVE 2

Assumptions for Combustible 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	1	300	8	240	576000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	0	300	8	240	0
Diesel Cement & Mortar Mixers	0	300	8	240	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	6	300	8	240	3456000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 05-ALTERNATIVE 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 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	0.216	0.825	2.920	0.203	0.197	0.470	340.417
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cement & Mortar Mixers	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	1.447	5.903	19.043	1.333	1.295	2.818	2042.124
Diesel Aerial 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	**6.123**	**24.757**	**68.057**	**5.365**	**5.209**	**10.134**	**7345.549**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 05-ALTERNATIVE 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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	6	6	0.05	0.07	0.12
CO	3.21	4.38	60	240	6	6	0.31	0.42	0.72
NOx	12.6	16.20	60	240	6	6	1.20	1.54	2.74
PM-10	0.33	0.36	60	240	6	6	0.03	0.03	0.07
PM 2.5	0.36	0.42	60	240	6	6	0.03	0.04	0.07
CO2	536.00	536.00	60	240	6	6	51.03	51.03	102.07

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasoline Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 05-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.98	
NOx	311	852.80	
Total		855.78	957.85

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 05-ALTERNATIVE 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 Proje	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 3.2 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-NOV 05-ALTERNATIVE 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
Combustible Emissions	6.12	24.76	68.06	5.36	5.21	10.13	7345.55	21226.33	28571.88
Construction Site-Fugitive PM-10	NA	NA	NA	55.46	5.55	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.53	14.10	3.78	0.07	0.08	NA	521.00	1202.50	1723.50
Total emissions-CONSTRUCTION	**7.66**	**38.86**	**71.83**	**60.90**	**10.83**	**10.13**	**7,867**	**22,429**	**30,295**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 05-ALTERNATIVE 3

Assumptions for Combustible 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	1	300	8	240	576000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	0	300	8	240	0
Diesel Cement & Mortar Mixers	0	300	8	240	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	6	300	8	240	3456000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 05-ALTERNATIVE 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	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	0.216	0.825	2.920	0.203	0.197	0.470	340.417
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Cement & Mortar Mixers	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	1.447	5.903	19.043	1.333	1.295	2.818	2042.124
Diesel Aerial 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	**6.123**	**24.757**	**68.057**	**5.365**	**5.209**	**10.134**	**7345.549**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 05-ALTERNATIVE 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	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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	6	6	0.05	0.07	0.12
CO	3.21	4.38	60	240	6	6	0.31	0.42	0.72
NOx	12.6	16.20	60	240	6	6	1.20	1.54	2.74
PM-10	0.33	0.36	60	240	6	6	0.03	0.03	0.07
PM 2.5	0.36	0.42	60	240	6	6	0.03	0.04	0.07
CO2	536.00	536.00	60	240	6	6	51.03	51.03	102.07

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 05-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.98	
NOx	311	852.80	
Total		855.78	957.85

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 05-ALTERNATIVE 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 Proje	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	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 2 miles of 3.2 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-NOV 05-ALTERNATIVE 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
Combustible Emissions	6.12	24.76	68.06	5.36	5.21	10.13	7345.55	21226.33	28571.88
Construction Site-Fugitive PM-10	NA	NA	NA	83.10	8.31	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.53	14.10	3.78	0.07	0.08	NA	521.00	1202.50	1723.50
Total emissions-CONSTRUCTION	**7.66**	**38.86**	**71.83**	**88.54**	**13.60**	**10.13**	**7,867**	**22,429**	**30,295**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 06-ALTERNATIVE 2

Assumptions for Combustible 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	3	300	8	240	1728000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	3	300	8	240	1728000
Diesel Cranes	1	175	8	240	336000
Diesel Graders	4	300	8	240	2304000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	8	300	8	240	4608000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 06-ALTERNATIVE 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 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	0.647	2.476	8.760	0.609	0.590	1.409	1021.252
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	1.162	4.418	13.863	0.914	0.895	1.390	1008.684
Diesel Cranes	0.163	0.481	2.118	0.126	0.122	0.270	196.318
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	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
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	**9.618**	**38.122**	**108.618**	**8.285**	**8.054**	**15.278**	**11075.320**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 06-ALTERNATIVE 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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	6	6	0.05	0.07	0.12
CO	3.21	4.38	60	240	6	6	0.31	0.42	0.72
NOx	12.6	16.20	60	240	6	6	1.20	1.54	2.74
PM-10	0.33	0.36	60	240	6	6	0.03	0.03	0.07
PM 2.5	0.36	0.42	60	240	6	6	0.03	0.04	0.07
CO2	536.00	536.00	60	240	6	6	51.03	51.03	102.07

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasoline Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 06-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.98	
NOx	311	852.80	
Total		855.78	957.85

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 06-ALTERNATIVE 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 Proje	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 12.2 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-NOV 06-ALTERNATIVE 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
Combustible Emissions	9.62	38.12	108.62	8.29	8.05	15.28	11075.32	33873.54	44948.86
Construction Site-Fugitive PM-10	NA	NA	NA	83.10	8.31	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.53	14.10	3.78	0.07	0.08	NA	521.00	1202.50	1723.50
Total emissions-CONSTRUCTION	**11.15**	**52.22**	**112.39**	**91.46**	**16.44**	**15.28**	**11,596**	**35,076**	**46,672**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 06-ALTERNATIVE 3

Assumptions for Combustible 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	2	300	8	240	1152000
Diesel Excavator	4	300	8	240	2304000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	6	300	8	240	3456000
Diesel Cranes	2	175	8	240	672000
Diesel Graders	4	300	8	240	2304000
Diesel Tractors/Loaders/Backhoes	2	100	8	240	384000
Diesel Bull Dozers	8	300	8	240	4608000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 06-ALTERNATIVE 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	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	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Excavator	0.863	3.301	11.679	0.812	0.787	1.879	1361.670
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	2.323	8.836	27.726	1.828	1.790	2.780	2017.369
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	0.783	3.474	3.055	0.580	0.563	0.402	292.451
Diesel Bull Dozers	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
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	**11.438**	**45.160**	**131.004**	**9.789**	**9.522**	**17.877**	**12960.967**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 06-ALTERNATIVE 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	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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	6	6	0.05	0.07	0.12
CO	3.21	4.38	60	240	6	6	0.31	0.42	0.72
NOx	12.6	16.20	60	240	6	6	1.20	1.54	2.74
PM-10	0.33	0.36	60	240	6	6	0.03	0.03	0.07
PM 2.5	0.36	0.42	60	240	6	6	0.03	0.04	0.07
CO2	536.00	536.00	60	240	6	6	51.03	51.03	102.07

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 06-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.98	
NOx	311	852.80	
Total		855.78	957.85

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 06-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	3	miles*	5280	feet per mile
Length (converted)	15840	feet		
Width	300	feet		
Area	109.09	acres		

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	248.73	124.36	24.87	12.44
Staging Areas	0.38	0.19	0.04	0.02
Total	**249.11**	**124.55**	**24.91**	**12.46**

* Assume 3 miles of 12.2 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-NOV 06-ALTERNATIVE 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
Combustible Emissions	11.44	45.16	131.00	9.79	9.52	17.88	12960.97	40851.28	53812.25
Construction Site-Fugitive PM-10	NA	NA	NA	124.55	12.46	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.53	14.10	3.78	0.07	0.08	NA	521.00	1202.50	1723.50
Total emissions-CONSTRUCTION	**12.97**	**59.26**	**134.78**	**134.41**	**22.06**	**17.88**	**13,482**	**42,054**	**55,536**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 07-ALTERNATIVE 2

Assumptions for Combustible 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	2	300	8	240	1152000
Diesel Excavator	4	300	8	240	2304000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	4	300	8	240	2304000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	8	300	8	240	4608000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 07-ALTERNATIVE 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 Paver	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	0.863	3.301	11.679	0.812	0.787	1.879	1361.670
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
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	**8.397**	**33.625**	**97.514**	**7.419**	**7.206**	**14.356**	**10404.736**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 07-ALTERNATIVE 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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	6	6	0.05	0.07	0.12
CO	3.21	4.38	60	240	6	6	0.31	0.42	0.72
NOx	12.6	16.20	60	240	6	6	1.20	1.54	2.74
PM-10	0.33	0.36	60	240	6	6	0.03	0.03	0.07
PM 2.5	0.36	0.42	60	240	6	6	0.03	0.04	0.07
CO2	536.00	536.00	60	240	6	6	51.03	51.03	102.07

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 07-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.98	
NOx	311	852.80	
Total		855.78	957.85

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 07-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	3	miles*	5280	feet per mile
Length (converted)	15840	feet		
Width	200	feet		
Area	72.73	acres		

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 12.6 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-NOV 07-ALTERNATIVE 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
Combustible Emissions	8.40	33.62	97.51	7.42	7.21	14.36	10404.74	30405.68	40810.42
Construction Site-Fugitive PM-10	NA	NA	NA	83.10	8.31	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.53	14.10	3.78	0.07	0.08	NA	521.00	1202.50	1723.50
Total emissions-CONSTRUCTION	**9.93**	**47.72**	**101.29**	**90.59**	**15.60**	**14.36**	**10,926**	**31,608**	**42,534**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 07-ALTERNATIVE 3

Assumptions for Combustible 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	2	300	8	240	1152000
Diesel Excavator	4	300	8	240	2304000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	4	300	8	240	2304000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	8	300	8	240	4608000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 07-ALTERNATIVE 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	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	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Excavator	0.863	3.301	11.679	0.812	0.787	1.879	1361.670
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
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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	**8.397**	**33.625**	**97.514**	**7.419**	**7.206**	**14.356**	**10404.736**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 07-ALTERNATIVE 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	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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	6	6	0.05	0.07	0.12
CO	3.21	4.38	60	240	6	6	0.31	0.42	0.72
NOx	12.6	16.20	60	240	6	6	1.20	1.54	2.74
PM-10	0.33	0.36	60	240	6	6	0.03	0.03	0.07
PM 2.5	0.36	0.42	60	240	6	6	0.03	0.04	0.07
CO2	536.00	536.00	60	240	6	6	51.03	51.03	102.07

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 07-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.98	
NOx	311	852.80	
Total		855.78	957.85

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 07-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	3	miles*	5280	feet per mile
Length (converted)	15840	feet		
Width	300	feet		
Area	109.09	acres		

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	248.73	124.36	24.87	12.44
Staging Areas	0.38	0.19	0.04	0.02
Total	**249.11**	**124.55**	**24.91**	**12.46**

* Assume 3 miles of 12.6 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-NOV 07-ALTERNATIVE 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
Combustible Emissions	8.40	33.62	97.51	7.42	7.21	14.36	10404.74	30405.68	40810.42
Construction Site-Fugitive PM-10	NA	NA	NA	124.55	12.46	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.53	14.10	3.78	0.07	0.08	NA	521.00	1202.50	1723.50
Total emissions-CONSTRUCTION	**9.93**	**47.72**	**101.29**	**132.04**	**19.74**	**14.36**	**10,926**	**31,608**	**42,534**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 08-ALTERNATIVE 2

Assumptions for Combustible 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	2	300	8	240	1152000
Diesel Excavator	4	300	8	240	2304000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	4	300	8	240	2304000
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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 08-ALTERNATIVE 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 Paver	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	0.863	3.301	11.679	0.812	0.787	1.879	1361.670
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	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	**7.458**	**29.905**	**85.124**	**6.556**	**6.368**	**12.477**	**9043.193**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 08-ALTERNATIVE 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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	6	6	0.05	0.07	0.12
CO	3.21	4.38	60	240	6	6	0.31	0.42	0.72
NOx	12.6	16.20	60	240	6	6	1.20	1.54	2.74
PM-10	0.33	0.36	60	240	6	6	0.03	0.03	0.07
PM 2.5	0.36	0.42	60	240	6	6	0.03	0.04	0.07
CO2	536.00	536.00	60	240	6	6	51.03	51.03	102.07

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasoline Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 08-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.98	
NOx	311	852.80	
Total		855.78	957.85

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 08-ALTERNATIVE 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 Proje	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 8.9 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.

CALCULATION SHEET-SUMMARY OF EMISSIONS-NOV 08-ALTERNATIVE 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
Combustible Emissions	7.46	29.90	85.12	6.56	6.37	12.48	9043.19	26544.94	35588.13
Construction Site-Fugitive PM-10	NA	NA	NA	83.10	8.31	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.53	14.10	3.78	0.07	0.08	NA	521.00	1202.50	1723.50
Total emissions-CONSTRUCTION	**8.99**	**44.00**	**88.90**	**89.73**	**14.76**	**12.48**	**9,564**	**27,747**	**37,312**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 08-ALTERNATIVE 3

Assumptions for Combustible 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	2	300	8	240	1152000
Diesel Excavator	4	300	8	240	2304000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	4	300	8	240	2304000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	8	300	8	240	4608000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 08-ALTERNATIVE 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	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	0.559	2.628	6.970	0.520	0.508	0.939	680.454
Diesel Excavator	0.863	3.301	11.679	0.812	0.787	1.879	1361.670
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
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	**8.397**	**33.625**	**97.514**	**7.419**	**7.206**	**14.356**	**10404.736**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 08-ALTERNATIVE 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	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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	6	6	0.05	0.07	0.12
CO	3.21	4.38	60	240	6	6	0.31	0.42	0.72
NOx	12.6	16.20	60	240	6	6	1.20	1.54	2.74
PM-10	0.33	0.36	60	240	6	6	0.03	0.03	0.07
PM 2.5	0.36	0.42	60	240	6	6	0.03	0.04	0.07
CO2	536.00	536.00	60	240	6	6	51.03	51.03	102.07

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 08-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.98	
NOx	311	852.80	
Total		855.78	957.85

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 08-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	3	miles*	5280	feet per mile
Length (converted)	15840	feet		
Width	300	feet		
Area	109.09	acres		

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	248.73	124.36	24.87	12.44
Staging Areas	0.38	0.19	0.04	0.02
Total	**249.11**	**124.55**	**24.91**	**12.46**

* Assume 3 miles of 8.9 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.

CALCULATION SHEET-SUMMARY OF EMISSIONS-NOV 08-ALTERNATIVE 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
Combustible Emissions	8.40	33.62	97.51	7.42	7.21	14.36	10404.74	30405.68	40810.42
Construction Site-Fugitive PM-10	NA	NA	NA	124.55	12.46	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.53	14.10	3.78	0.07	0.08	NA	521.00	1202.50	1723.50
Total emissions-CONSTRUCTION	**9.93**	**47.72**	**101.29**	**132.04**	**19.74**	**14.36**	**10,926**	**31,608**	**42,534**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 09-ALTERNATIVE 2

Assumptions for Combustible 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	3	300	8	240	1728000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	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	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	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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 09-ALTERNATIVE 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 Paver	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	0.647	2.476	8.760	0.609	0.590	1.409	1021.252
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.914	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 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	**5.780**	**23.320**	**62.772**	**4.998**	**4.858**	**9.032**	**6546.946**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 09-ALTERNATIVE 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	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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	4	4	0.03	0.04	0.08
CO	3.21	4.38	60	240	4	4	0.20	0.28	0.48
NOx	12.6	16.20	60	240	4	4	0.80	1.03	1.83
PM-10	0.33	0.36	60	240	4	4	0.02	0.02	0.04
PM 2.5	0.36	0.42	60	240	4	4	0.02	0.03	0.05
CO2	536.00	536.00	60	240	4	4	34.02	34.02	68.05

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 09-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	1.98	
NOx	311	568.53	
Total		570.52	638.56

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 09-ALTERNATIVE 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 Proje	12	months
Length	2.5	miles*
Length (converted)	13200	feet
Width	200	feet
Area	60.61	acres

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	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	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 miles of 2.5 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-NOV 09-ALTERNATIVE 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
Combustible Emissions	5.78	23.32	62.77	5.00	4.86	9.03	6546.95	19580.67	26127.61
Construction Site-Fugitive PM-10	NA	NA	NA	69.28	6.93	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.02	9.40	2.52	0.05	0.05	NA	347.34	801.67	1149.00
Total emissions-CONSTRUCTION	**6.80**	**32.72**	**65.29**	**74.33**	**11.84**	**9.03**	**6,894**	**20,382**	**27,277**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 09-ALTERNATIVE 3

Assumptions for Combustible 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	3	300	8	240	1728000
Diesel Excavator	3	300	8	240	1728000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	3	300	8	240	1728000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	5	300	8	240	2880000
Diesel Front End Loaders	5	300	8	240	2880000
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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 09-ALTERNATIVE 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	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	0.838	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 Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	1.737	1.528	0.290	0.281	0.201	146.226
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 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	**6.830**	**27.671**	**76.491**	**5.972**	**5.803**	**11.068**	**8021.814**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 09-ALTERNATIVE 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	240	25	25	0.54	0.64	1.18
CO	12.4	15.7	60	240	25	25	4.92	6.23	11.15
NOx	0.95	1.22	60	240	25	25	0.38	0.48	0.86
PM-10	0.0052	0.0065	60	240	25	25	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	25	25	0.00	0.00	0.00
CO2	369	511	60	240	25	25	146.39	202.72	349.11

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	5	5	0.04	0.06	0.10
CO	3.21	4.38	60	240	5	5	0.25	0.35	0.60
NOx	12.6	16.20	60	240	5	5	1.00	1.29	2.29
PM-10	0.33	0.36	60	240	5	5	0.03	0.03	0.05
PM 2.5	0.36	0.42	60	240	5	5	0.03	0.03	0.06
CO2	536.00	536.00	60	240	5	5	42.53	42.53	85.06

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 09-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	29.46	
NOx	311	0.86	
Total		30.32	379.43

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	2.48	
NOx	311	710.67	
Total		713.15	798.20

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 09-ALTERNATIVE 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 Proje	12	months
Length	2.5	miles*
Length (converted)	13200	feet
Width	300	feet
Area	90.91	acres

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	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	207.27	103.64	20.73	10.36
Staging Areas	0.38	0.19	0.04	0.02
Total	**207.65**	**103.83**	**20.77**	**10.38**

* Assume 2 miles of 2.5 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-NOV 09-ALTERNATIVE 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
Combustible Emissions	6.83	27.67	76.49	5.97	5.80	11.07	8021.81	23855.63	31877.44
Construction Site-Fugitive PM-10	NA	NA	NA	103.83	10.38	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.28	11.75	3.15	0.06	0.07	NA	434.17	1002.08	1436.25
Total emissions-CONSTRUCTION	**8.11**	**39.42**	**79.64**	**109.86**	**16.25**	**11.07**	**8,456**	**24,858**	**33,314**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 10-ALTERNATIVE 2

Assumptions for Combustible 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	4	100	8	240	768000
Diesel Dump Truck	6	300	8	240	3456000
Diesel Excavator	6	300	8	240	3456000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	6	300	8	240	3456000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	8	300	8	240	4608000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 10-ALTERNATIVE 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 Paver	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	1.295	4.951	17.519	1.219	1.181	2.818	2042.505
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
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	**10.469**	**42.570**	**124.334**	**9.357**	**9.091**	**18.270**	**13240.766**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 10-ALTERNATIVE 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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	5	5	0.04	0.06	0.10
CO	3.21	4.38	60	240	5	5	0.25	0.35	0.60
NOx	12.6	16.20	60	240	5	5	1.00	1.29	2.29
PM-10	0.33	0.36	60	240	5	5	0.03	0.03	0.05
PM 2.5	0.36	0.42	60	240	5	5	0.03	0.03	0.06
CO2	536.00	536.00	60	240	5	5	42.53	42.53	85.06

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 10-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.48	
NOx	311	710.67	
Total		713.15	798.20

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 10-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	3	miles*	5280	feet per mile
Length (converted)	15840	feet		
Width	200	feet		
Area	72.73	acres		

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 13 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-NOV 10-ALTERNATIVE 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
Combustible Emissions	10.47	42.57	124.33	9.36	9.09	18.27	13240.77	38763.50	52004.27
Construction Site-Fugitive PM-10	NA	NA	NA	83.10	8.31	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.51	13.98	3.32	0.06	0.07	NA	503.99	1060.41	1564.40
Total emissions-CONSTRUCTION	**11.98**	**56.55**	**127.65**	**92.52**	**17.47**	**18.27**	**13,745**	**39,824**	**53,569**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 10-ALTERNATIVE 3

Assumptions for Combustible 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	4	100	8	240	768000
Diesel Dump Truck	6	300	8	240	3456000
Diesel Excavator	8	300	8	240	4608000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	6	300	8	240	3456000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	10	300	8	240	5760000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 10-ALTERNATIVE 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	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Paver	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	1.727	6.601	23.359	1.625	1.574	3.758	2723.340
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	2.285	8.760	30.214	2.095	2.031	4.697	3404.175
Diesel Front End Loaders	2.412	9.839	31.738	2.222	2.158	4.697	3403.540
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	**11.840**	**47.940**	**142.564**	**10.627**	**10.323**	**21.088**	**15283.144**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 10-ALTERNATIVE 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	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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	5	5	0.04	0.06	0.10
CO	3.21	4.38	60	240	5	5	0.25	0.35	0.60
NOx	12.6	16.20	60	240	5	5	1.00	1.29	2.29
PM-10	0.33	0.36	60	240	5	5	0.03	0.03	0.05
PM 2.5	0.36	0.42	60	240	5	5	0.03	0.03	0.06
CO2	536.00	536.00	60	240	5	5	42.53	42.53	85.06

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 10-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.48	
NOx	311	710.67	
Total		713.15	798.20

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 10-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	3	miles*	5280	feet per mile
Length (converted)	15840	feet		
Width	300	feet		
Area	109.09	acres		

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	248.73	124.36	24.87	12.44
Staging Areas	0.38	0.19	0.04	0.02
Total	**249.11**	**124.55**	**24.91**	**12.46**

* Assume 3 miles of 13 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-NOV 10-ALTERNATIVE 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
Combustible Emissions	11.84	47.94	142.56	10.63	10.32	21.09	15283.14	44443.62	59726.76
Construction Site-Fugitive PM-10	NA	NA	NA	124.55	12.46	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.51	13.98	3.32	0.06	0.07	NA	503.99	1060.41	1564.40
Total emissions-CONSTRUCTION	**13.35**	**61.92**	**145.88**	**135.24**	**22.85**	**21.09**	**15,787**	**45,504**	**61,291**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 11-ALTERNATIVE 2

Assumptions for Combustible 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	4	100	8	240	768000
Diesel Dump Truck	6	300	8	240	3456000
Diesel Excavator	6	300	8	240	3456000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	6	300	8	240	3456000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	8	300	8	240	4608000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 11-ALTERNATIVE 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 Paver	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	1.295	4.951	17.519	1.219	1.181	2.818	2042.505
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
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	**10.469**	**42.570**	**124.334**	**9.357**	**9.091**	**18.270**	**13240.766**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 11-ALTERNATIVE 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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	5	5	0.04	0.06	0.10
CO	3.21	4.38	60	240	5	5	0.25	0.35	0.60
NOx	12.6	16.20	60	240	5	5	1.00	1.29	2.29
PM-10	0.33	0.36	60	240	5	5	0.03	0.03	0.05
PM 2.5	0.36	0.42	60	240	5	5	0.03	0.03	0.06
CO2	536.00	536.00	60	240	5	5	42.53	42.53	85.06

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 11-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.48	
NOx	311	710.67	
Total		713.15	798.20

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 11-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	3	miles*	5280	feet per mile
Length (converted)	15840	feet		
Width	200	feet		
Area	72.73	acres		

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 11.6 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-NOV 11-ALTERNATIVE 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
Combustible Emissions	10.47	42.57	124.33	9.36	9.09	18.27	13240.77	38763.50	52004.27
Construction Site-Fugitive PM-10	NA	NA	NA	83.10	8.31	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.51	13.98	3.32	0.06	0.07	NA	503.99	1060.41	1564.40
Total emissions-CONSTRUCTION	**11.98**	**56.55**	**127.65**	**92.52**	**17.47**	**18.27**	**13,745**	**39,824**	**53,569**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 11-ALTERNATIVE 3

Assumptions for Combustible 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	4	100	8	240	768000
Diesel Dump Truck	8	300	8	240	4608000
Diesel Excavator	8	300	8	240	4608000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	6	300	8	240	3456000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	10	300	8	240	5760000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 11-ALTERNATIVE 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	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Paver	0.313	1.253	4.147	0.288	0.279	0.626	453.805
Diesel Dump Truck	2.234	10.511	27.878	2.082	2.031	3.758	2721.817
Diesel Excavator	1.727	6.601	23.359	1.625	1.574	3.758	2723.340
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	2.285	8.760	30.214	2.095	2.031	4.697	3404.175
Diesel Front End Loaders	2.412	9.839	31.738	2.222	2.158	4.697	3403.540
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	**12.398**	**50.568**	**149.534**	**11.147**	**10.831**	**22.028**	**15963.598**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 11-ALTERNATIVE 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	240	35	35	0.76	0.89	1.65
CO	12.4	15.7	60	240	35	35	6.89	8.72	15.61
NOx	0.95	1.22	60	240	35	35	0.53	0.68	1.21
PM-10	0.0052	0.0065	60	240	35	35	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	35	35	0.00	0.00	0.01
CO2	369	511	60	240	35	35	204.95	283.81	488.76

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	5	5	0.04	0.06	0.10
CO	3.21	4.38	60	240	5	5	0.25	0.35	0.60
NOx	12.6	16.20	60	240	5	5	1.00	1.29	2.29
PM-10	0.33	0.36	60	240	5	5	0.03	0.03	0.05
PM 2.5	0.36	0.42	60	240	5	5	0.03	0.03	0.06
CO2	536.00	536.00	60	240	5	5	42.53	42.53	85.06

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 11-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	41.24	
NOx	311	1.21	
Total		42.44	531.20

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	2.48	
NOx	311	710.67	
Total		713.15	798.20

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 11-ALTERNATIVE 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 Proje	12	months
Length	3	miles*
Length (converted)	15840	feet
Width	300	feet
Area	109.09	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	2.00	acres

	Project Emissions (tons/year)			
	PM10 uncontrolled	PM10 controlled	PM2.5 uncontrolled	PM2.5 controlled
Construction Area (0.19 ton PM10/ac	248.73	124.36	24.87	12.44
Staging Areas	0.38	0.19	0.04	0.02
Total	**249.11**	**124.55**	**24.91**	**12.46**

* Assume 3 miles of 11.6 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-NOV 11-ALTERNATIVE 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
Combustible Emissions	12.40	50.57	149.53	11.15	10.83	22.03	15963.60	46615.92	62579.51
Construction Site-Fugitive PM-10	NA	NA	NA	124.55	12.46	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.75	16.21	3.49	0.06	0.07	NA	573.82	1118.73	1692.55
Total emissions-CONSTRUCTION	**14.15**	**66.78**	**153.02**	**135.76**	**23.35**	**22.03**	**16,537**	**47,735**	**64,272**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 12-ALTERNATIVE 2

Assumptions for Combustible 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	4	100	8	240	768000
Diesel Dump Truck	5	300	8	240	2880000
Diesel Excavator	5	300	8	240	2880000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	6	300	8	240	3456000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	7	300	8	240	4032000
Diesel Front End Loaders	7	300	8	240	4032000
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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 12-ALTERNATIVE 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 Paver	0.313	1.253	4.147	0.288	0.279	0.626	453.805
Diesel Dump Truck	1.396	6.570	17.424	1.301	1.270	2.349	1701.135
Diesel Excavator	1.079	4.126	14.599	1.016	0.984	2.349	1702.087
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	1.600	6.132	21.150	1.466	1.422	3.288	2382.922
Diesel Front End Loaders	1.688	6.887	22.216	1.555	1.511	3.288	2382.478
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	**9.504**	**38.571**	**111.735**	**8.462**	**8.222**	**16.391**	**11879.350**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 12-ALTERNATIVE 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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	5	5	0.04	0.06	0.10
CO	3.21	4.38	60	240	5	5	0.25	0.35	0.60
NOx	12.6	16.20	60	240	5	5	1.00	1.29	2.29
PM-10	0.33	0.36	60	240	5	5	0.03	0.03	0.05
PM 2.5	0.36	0.42	60	240	5	5	0.03	0.03	0.06
CO2	536.00	536.00	60	240	5	5	42.53	42.53	85.06

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 12-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.48	
NOx	311	710.67	
Total		713.15	798.20

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 12-ALTERNATIVE 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 Proje	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 8.8 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-NOV 12-ALTERNATIVE 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
Combustible Emissions	9.50	38.57	111.73	8.46	8.22	16.39	11879.35	34837.29	46716.64
Construction Site-Fugitive PM-10	NA	NA	NA	83.10	8.31	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.51	13.98	3.32	0.06	0.07	NA	503.99	1060.41	1564.40
Total emissions-CONSTRUCTION	**11.02**	**52.55**	**115.05**	**91.62**	**16.60**	**16.39**	**12,383**	**35,898**	**48,281**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 12-ALTERNATIVE 3

Assumptions for Combustible 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	4	100	8	240	768000
Diesel Dump Truck	6	300	8	240	3456000
Diesel Excavator	8	300	8	240	4608000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	0	175	8	240	0
Diesel Graders	6	300	8	240	3456000
Diesel Tractors/Loaders/Backhoes	1	100	8	240	192000
Diesel Bull Dozers	8	300	8	240	4608000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 12-ALTERNATIVE 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	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Paver	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	1.727	6.601	23.359	1.625	1.574	3.758	2723.340
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	1.737	1.528	0.290	0.281	0.201	146.226
Diesel Bull Dozers	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
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	**10.900**	**44.221**	**130.174**	**9.763**	**9.485**	**19.209**	**13921.601**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 12-ALTERNATIVE 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	240	35	35	0.76	0.89	1.65
CO	12.4	15.7	60	240	35	35	6.89	8.72	15.61
NOx	0.95	1.22	60	240	35	35	0.53	0.68	1.21
PM-10	0.0052	0.0065	60	240	35	35	0.00	0.00	0.01
PM 2.5	0.0049	0.006	60	240	35	35	0.00	0.00	0.01
CO2	369	511	60	240	35	35	204.95	283.81	488.76

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	5	5	0.04	0.06	0.10
CO	3.21	4.38	60	240	5	5	0.25	0.35	0.60
NOx	12.6	16.20	60	240	5	5	1.00	1.29	2.29
PM-10	0.33	0.36	60	240	5	5	0.03	0.03	0.05
PM 2.5	0.36	0.42	60	240	5	5	0.03	0.03	0.06
CO2	536.00	536.00	60	240	5	5	42.53	42.53	85.06

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 12-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	41.24	
NOx	311	1.21	
Total		42.44	531.20

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	2.48	
NOx	311	710.67	
Total		713.15	798.20

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 12-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	3	miles*	5280	feet per mile
Length (converted)	15840	feet		
Width	300	feet		
Area	109.09	acres		

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	248.73	124.36	24.87	12.44
Staging Areas	0.38	0.19	0.04	0.02
Total	**249.11**	**124.55**	**24.91**	**12.46**

* Assume 3 miles of 8.8 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-NOV 12-ALTERNATIVE 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
Combustible Emissions	10.90	44.22	130.17	9.76	9.48	19.21	13921.60	40582.88	54504.48
Construction Site-Fugitive PM-10	NA	NA	NA	124.55	12.46	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.75	16.21	3.49	0.06	0.07	NA	573.82	1118.73	1692.55
Total emissions-CONSTRUCTION	**12.65**	**60.43**	**133.66**	**134.38**	**22.01**	**19.21**	**14,495**	**41,702**	**56,197**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 13-ALTERNATIVE 2

Assumptions for Combustible 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	0	300	8	240	0
Diesel Excavator	0	300	8	240	0
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	2	175	8	240	672000
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	1	300	8	240	576000
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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 13-ALTERNATIVE 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 Paver	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 Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	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	0.241	0.984	3.174	0.222	0.216	0.470	340.354
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	**2.661**	**10.371**	**21.593**	**2.053**	**1.998**	**2.684**	**1947.406**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 13-ALTERNATIVE 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	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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	5	5	0.04	0.06	0.10
CO	3.21	4.38	60	240	5	5	0.25	0.35	0.60
NOx	12.6	16.20	60	240	5	5	1.00	1.29	2.29
PM-10	0.33	0.36	60	240	5	5	0.03	0.03	0.05
PM 2.5	0.36	0.42	60	240	5	5	0.03	0.03	0.06
CO2	536.00	536.00	60	240	5	5	42.53	42.53	85.06

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 13-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	17.67	
NOx	311	0.52	
Total		18.19	227.66

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	2.48	
NOx	311	710.67	
Total		713.15	798.20

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 13-ALTERNATIVE 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 Proje	12	months
Length	0.25	miles*
Length (converted)	1320	feet
Width	200	feet
Area	6.06	acres

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	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	13.82	6.91	1.38	0.69
Staging Areas	0.38	0.19	0.04	0.02
Total	**14.20**	**7.10**	**1.42**	**0.71**

* Assume 0.25 miles of 0.25 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-NOV 13-ALTERNATIVE 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
Combustible Emissions	2.66	10.37	21.59	2.05	2.00	2.68	1947.41	6749.85	8697.25
Construction Site-Fugitive PM-10	NA	NA	NA	7.10	0.71	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.81	7.29	2.80	0.06	0.06	NA	294.52	885.44	1179.96
Total emissions-CONSTRUCTION	**3.47**	**17.66**	**24.40**	**9.21**	**2.77**	**2.68**	**2,242**	**7,635**	**9,877**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 13-ALTERNATIVE 3

Assumptions for Combustible 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	0	300	8	240	0
Diesel Excavator	0	300	8	240	0
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	2	175	8	240	672000
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	1	300	8	240	576000
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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 13-ALTERNATIVE 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	0.279	1.314	3.485	0.260	0.254	0.470	340.227
Diesel Road Paver	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 Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	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	0.241	0.984	3.174	0.222	0.216	0.470	340.354
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	**2.661**	**10.371**	**21.593**	**2.053**	**1.998**	**2.684**	**1947.406**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 13-ALTERNATIVE 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	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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	5	5	0.04	0.06	0.10
CO	3.21	4.38	60	240	5	5	0.25	0.35	0.60
NOx	12.6	16.20	60	240	5	5	1.00	1.29	2.29
PM-10	0.33	0.36	60	240	5	5	0.03	0.03	0.05
PM 2.5	0.36	0.42	60	240	5	5	0.03	0.03	0.06
CO2	536.00	536.00	60	240	5	5	42.53	42.53	85.06

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 13-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	17.67	
NOx	311	0.52	
Total		18.19	227.66

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	2.48	
NOx	311	710.67	
Total		713.15	798.20

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 13-ALTERNATIVE 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 Proje	12	months
Length	0.25	miles*
Length (converted)	1320	feet
Width	200	feet
Area	6.06	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	13.82	6.91	1.38	0.69
Staging Areas	0.38	0.19	0.04	0.02
Total	**14.20**	**7.10**	**1.42**	**0.71**

* Assume 0.25 miles of 0.25 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-NOV 13-ALTERNATIVE 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
Combustible Emissions	2.66	10.37	21.59	2.05	2.00	2.68	1947.41	6749.85	8697.25
Construction Site-Fugitive PM-10	NA	NA	NA	7.10	0.71	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.81	7.29	2.80	0.06	0.06	NA	294.52	885.44	1179.96
Total emissions-CONSTRUCTION	**3.47**	**17.66**	**24.40**	**9.21**	**2.77**	**2.68**	**2,242**	**7,635**	**9,877**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 14-ALTERNATIVE 2

Assumptions for Combustible 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	240	0
Diesel Excavator	0	300	8	240	0
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	0
Diesel Cranes	2	175	8	240	672000
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	1	300	8	240	576000
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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 14-ALTERNATIVE 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	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Paver	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 Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.391	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	0.241	0.984	3.174	0.222	0.216	0.470	340.354
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	**2.382**	**9.057**	**18.109**	**1.793**	**1.744**	**2.214**	**1607.179**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 14-ALTERNATIVE 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	10	10	0.22	0.26	0.47
CO	12.4	15.7	60	240	10	10	1.97	2.49	4.46
NOx	0.95	1.22	60	240	10	10	0.15	0.19	0.34
PM-10	0.0052	0.0065	60	240	10	10	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	10	10	0.00	0.00	0.00
CO2	369	511	60	240	10	10	58.56	81.09	139.65

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	5	5	0.04	0.06	0.10
CO	3.21	4.38	60	240	5	5	0.25	0.35	0.60
NOx	12.6	16.20	60	240	5	5	1.00	1.29	2.29
PM-10	0.33	0.36	60	240	5	5	0.03	0.03	0.05
PM 2.5	0.36	0.42	60	240	5	5	0.03	0.03	0.06
CO2	536.00	536.00	60	240	5	5	42.53	42.53	85.06

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 14-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.48	
NOx	311	710.67	
Total		713.15	798.20

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 14-ALTERNATIVE 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 Proje	12	months
Length	0.25	miles*
Length (converted)	1320	feet
Width	200	feet
Area	6.06	acres

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	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	13.82	6.91	1.38	0.69
Staging Areas	0.38	0.19	0.04	0.02
Total	**14.20**	**7.10**	**1.42**	**0.71**

* Assume 0.25 miles of 0.25 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-NOV 14-ALTERNATIVE 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
Combustible Emissions	2.38	9.06	18.11	1.79	1.74	2.21	1607.18	5663.70	7270.88
Construction Site-Fugitive PM-10	NA	NA	NA	7.10	0.71	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.57	5.06	2.63	0.06	0.06	NA	224.70	827.11	1051.82
Total emissions-CONSTRUCTION	**2.95**	**14.12**	**20.74**	**8.95**	**2.52**	**2.21**	**1,832**	**6,491**	**8,323**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 14-ALTERNATIVE 3

Assumptions for Combustible 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	240	0
Diesel Excavator	0	300	8	240	0
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	2	300	8	240	1152000
Diesel Cranes	2	175	8	240	672000
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	1	300	8	240	576000
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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 14-ALTERNATIVE 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	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Paver	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 Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.000	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	0.241	0.984	3.174	0.222	0.216	0.470	340.354
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	**3.156**	**12.003**	**27.351**	**2.402**	**2.341**	**3.141**	**2279.636**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 14-ALTERNATIVE 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	240	10	10	0.22	0.26	0.47
CO	12.4	15.7	60	240	10	10	1.97	2.49	4.46
NOx	0.95	1.22	60	240	10	10	0.15	0.19	0.34
PM-10	0.0052	0.0065	60	240	10	10	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	10	10	0.00	0.00	0.00
CO2	369	511	60	240	10	10	58.56	81.09	139.65

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	5	5	0.04	0.06	0.10
CO	3.21	4.38	60	240	5	5	0.25	0.35	0.60
NOx	12.6	16.20	60	240	5	5	1.00	1.29	2.29
PM-10	0.33	0.36	60	240	5	5	0.03	0.03	0.05
PM 2.5	0.36	0.42	60	240	5	5	0.03	0.03	0.06
CO2	536.00	536.00	60	240	5	5	42.53	42.53	85.06

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 14-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	2.48	
NOx	311	710.67	
Total		713.15	798.20

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 14-ALTERNATIVE 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 Proje	12	months
Length	0.25	miles*
Length (converted)	1320	feet
Width	300	feet
Area	9.09	acres

Staging Areas

Duration of Construction Project	12	months
Length		miles
Length (converted)		feet
Width		feet
Area	2.00	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	20.73	10.36	2.07	1.04
Staging Areas	0.38	0.19	0.04	0.02
Total	**21.11**	**10.55**	**2.11**	**1.06**

* Assume 0.25 miles of 0.25 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-NOV 14-ALTERNATIVE 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
Combustible Emissions	3.16	12.00	27.35	2.40	2.34	3.14	2279.64	8544.98	10824.61
Construction Site-Fugitive PM-10	NA	NA	NA	10.55	1.06	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	0.57	5.06	2.63	0.06	0.06	NA	224.70	827.11	1051.82
Total emissions-CONSTRUCTION	**3.73**	**17.06**	**29.98**	**13.01**	**3.46**	**3.14**	**2,504**	**9,372**	**11,876**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 15-ALTERNATIVE 2

Assumptions for Combustible 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	2	100	8	240	384000
Diesel Dump Truck	2	300	8	240	1152000
Diesel Excavator	2	300	8	240	1152000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	2	300	8	240	1152000
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	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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 15-ALTERNATIVE 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	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Paver	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 Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.444	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	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	**7.325**	**28.809**	**82.236**	**6.260**	**6.086**	**11.439**	**8292.938**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 15-ALTERNATIVE 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	25	25	0.54	0.64	1.18
CO	12.4	15.7	60	240	25	25	4.92	6.23	11.15
NOx	0.95	1.22	60	240	25	25	0.38	0.48	0.86
PM-10	0.0052	0.0065	60	240	25	25	0.00	0.00	0.00
PM 2.5	0.0049	0.006	60	240	25	25	0.00	0.00	0.00
CO2	369	511	60	240	25	25	146.39	202.72	349.11

Misc. Heavy Duty Trucks Delivery Supply Trucks to Construction Site									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	8	8	0.07	0.09	0.16
CO	3.21	4.38	60	240	8	8	0.41	0.56	0.96
NOx	12.6	16.20	60	240	8	8	1.60	2.06	3.66
PM-10	0.33	0.36	60	240	8	8	0.04	0.05	0.09
PM 2.5	0.36	0.42	60	240	8	8	0.05	0.05	0.10
CO2	536.00	536.00	60	240	8	8	68.05	68.05	136.09

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 15-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	29.46	
NOx	311	0.86	
Total		30.32	379.43

Delivery Trucks	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	3.97	
NOx	311	1,137.07	
Total		1,141.04	1,277.13

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 15-ALTERNATIVE 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 Proje	12	months
Length	1.5	miles*
Length (converted)	7920	feet
Width	200	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	2.00	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	0.38	0.19	0.04	0.02
Total	**83.29**	**41.64**	**8.33**	**4.16**

* Assume 1.5 miles of 1.5 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-NOV 15-ALTERNATIVE 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
Combustible Emissions	7.32	28.81	82.24	6.26	6.09	11.44	8292.94	25646.82	33939.76
Construction Site-Fugitive PM-10	NA	NA	NA	41.64	4.16	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.34	12.11	4.52	0.09	0.10	NA	485.20	1428.36	1913.57
Total emissions-CONSTRUCTION	**8.66**	**40.92**	**86.75**	**48.00**	**10.35**	**11.44**	**8,778**	**27,075**	**35,853**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 15-ALTERNATIVE 3

Assumptions for Combustible 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	4	100	8	240	768000
Diesel Dump Truck	4	300	8	240	2304000
Diesel Excavator	4	300	8	240	2304000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	2	300	8	240	1152000
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	8	300	8	240	4608000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 15-ALTERNATIVE 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	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Paver	0.313	1.253	4.147	0.288	0.279	0.626	453.805
Diesel Dump Truck	1.117	5.256	13.939	1.041	1.016	1.879	1360.908
Diesel Excavator	0.863	3.301	11.679	0.812	0.787	1.879	1361.670
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.444	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	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
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	**9.411**	**37.433**	**109.509**	**8.193**	**7.965**	**15.510**	**11242.672**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 15-ALTERNATIVE 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	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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	8	8	0.07	0.09	0.16
CO	3.21	4.38	60	240	8	8	0.41	0.56	0.96
NOx	12.6	16.20	60	240	8	8	1.60	2.06	3.66
PM-10	0.33	0.36	60	240	8	8	0.04	0.05	0.09
PM 2.5	0.36	0.42	60	240	8	8	0.05	0.05	0.10
CO2	536.00	536.00	60	240	8	8	68.05	68.05	136.09

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 15-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	3.97	
NOx	311	1,137.07	
Total		1,141.04	1,277.13

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 15-ALTERNATIVE 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 Proje	12	months
Length	1.5	miles*
Length (converted)	7920	feet
Width	200	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	2.00	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	0.38	0.19	0.04	0.02
Total	**83.29**	**41.64**	**8.33**	**4.16**

* Assume 1.5 miles of 1.5 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-NOV 15-ALTERNATIVE 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
Combustible Emissions	9.41	37.43	109.51	8.19	7.96	15.51	11242.67	34145.32	45387.99
Construction Site-Fugitive PM-10	NA	NA	NA	41.64	4.16	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.57	14.34	4.69	0.09	0.10	NA	555.03	1486.69	2041.71
Total emissions-CONSTRUCTION	**10.98**	**51.77**	**114.20**	**49.93**	**12.23**	**15.51**	**11,798**	**35,632**	**47,430**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 16-ALTERNATIVE 2

Assumptions for Combustible 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	4	100	8	240	768000
Diesel Dump Truck	4	300	8	240	2304000
Diesel Excavator	4	300	8	240	2304000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	2	300	8	240	1152000
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	8	300	8	240	4608000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 16-ALTERNATIVE 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	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Paver	0.313	1.253	4.147	0.288	0.279	0.626	453.805
Diesel Dump Truck	1.117	5.256	13.939	1.041	1.016	1.879	1360.908
Diesel Excavator	0.863	3.301	11.679	0.812	0.787	1.879	1361.670
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	0.444	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	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
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	**9.411**	**37.433**	**109.509**	**8.193**	**7.965**	**15.510**	**11242.672**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 16-ALTERNATIVE 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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	8	8	0.07	0.09	0.16
CO	3.21	4.38	60	240	8	8	0.41	0.56	0.96
NOx	12.6	16.20	60	240	8	8	1.60	2.06	3.66
PM-10	0.33	0.36	60	240	8	8	0.04	0.05	0.09
PM 2.5	0.36	0.42	60	240	8	8	0.05	0.05	0.10
CO2	536.00	536.00	60	240	8	8	68.05	68.05	136.09

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 16-ALTERNATIVE 2

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	3.97	
NOx	311	1,137.07	
Total		1,141.04	1,277.13

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 16-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	3	miles*	5280	feet per mile
Length (converted)	15840	feet		
Width	200	feet		
Area	72.73	acres		

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 3.0 miles of XX 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-NOV 16-ALTERNATIVE 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
Combustible Emissions	9.41	37.43	109.51	8.19	7.96	15.51	11242.67	34145.32	45387.99
Construction Site-Fugitive PM-10	NA	NA	NA	83.10	8.31	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.57	14.34	4.69	0.09	0.10	NA	555.03	1486.69	2041.71
Total emissions-CONSTRUCTION	**10.98**	**51.77**	**114.20**	**91.39**	**16.38**	**15.51**	**11,798**	**35,632**	**47,430**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 16-ALTERNATIVE 3

Assumptions for Combustible 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	6	100	8	240	1152000
Diesel Dump Truck	6	300	8	240	3456000
Diesel Excavator	6	300	8	240	3456000
Diesel Hole Trenchers	0	175	8	240	0
Diesel Bore/Drill Rigs	1	300	8	240	576000
Diesel Cement & Mortar Mixers	0	300	8	240	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	8	300	8	240	4608000
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 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-COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 16-ALTERNATIVE 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	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Road Paver	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	1.295	4.951	17.519	1.219	1.181	2.818	2042.505
Diesel Hole Cleaners\Trenchers	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Diesel Bore/Drill Rigs	0.381	1.454	4.538	0.317	0.311	0.463	336.228
Diesel Cement & Mortar Mixers	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	1.828	7.008	24.171	1.676	1.625	3.758	2723.340
Diesel Front End Loaders	1.930	7.871	25.390	1.777	1.727	3.758	2722.832
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	**9.457**	**38.430**	**110.914**	**8.403**	**8.165**	**16.234**	**11765.772**

Conversion factors	
Grams to tons	1.102E-06

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 16-ALTERNATIVE 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	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	33,000 - 60,000 lb Delivery Truck VIIIa g/mile	60,000 lb and Over VIIIb semi-rig gm/mile	Mile/day	Day/yr	Number of Delivery trucks	Number of Cement trucks	Total Emissions trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.55	0.70	60	240	8	8	0.07	0.09	0.16
CO	3.21	4.38	60	240	8	8	0.41	0.56	0.96
NOx	12.6	16.20	60	240	8	8	1.60	2.06	3.66
PM-10	0.33	0.36	60	240	8	8	0.04	0.05	0.09
PM 2.5	0.36	0.42	60	240	8	8	0.05	0.05	0.10
CO2	536.00	536.00	60	240	8	8	68.05	68.05	136.09

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)	Heavy-Duty Truck VII g/mile (gasoline)	Mile/day	Day/yr	Number of Deisel Dump Trucks	Number of Gasolean Dump trucks	Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53	1.00	180	240	0	0	-	0.00	-
CO	2.03	27.20	180	240	0	0	-	0.00	-
NOx	8.98	5.38	180	240	0	0	-	0.00	-
PM-10	0.29	0.07	180	240	0	0	-	0.00	-
PM 2.5	0.26	0.06	180	240	0	0	-	0.00	-
CO2	536.00	536.00	180	240	0	0	-	0.00	-

CALCULATION SHEET-TRANSPORTATION COMBUSTIBLE EMISSIONS-CONSTRUCTION NOV 16-ALTERNATIVE 3

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.

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion factor:	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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	3.97	
NOx	311	1,137.07	
Total		1,141.04	1,277.13

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

CALCULATION SHEET-FUGITIVE DUST-CONSTRUCTION NOV 16-ALTERNATIVE 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)

			Conversion Factors	
Duration of Soil Disturbance in Proje	12	months	0.000022957	acres per sq. feet
Length	3	miles*	5280	feet per mile
Length (converted)	15840	feet		
Width	200	feet		
Area	72.73	acres		

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 3.0 miles of XX 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-NOV 16-ALTERNATIVE 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
Combustible Emissions	9.46	38.43	110.91	8.40	8.16	16.23	11765.77	34581.82	46347.59
Construction Site-Fugitive PM-10	NA	NA	NA	83.10	8.31	NA	NA	NA	NA
Construction Workers Commuter & Misc. Trucking	1.57	14.34	4.69	0.09	0.10	NA	555.03	1486.69	2041.71
Total emissions-CONSTRUCTION	**11.03**	**52.77**	**115.60**	**91.60**	**16.58**	**16.23**	**12,321**	**36,069**	**48,389**
De minimis Threshold (1)	100	100	100	100	100	100	NA	NA	25,000

1. Plaquemines Parish is in attainment for all NAAQS

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

Priority Pollutant Emission Factors	Vehicle Class from EPAs MOBILE 6.2	
	HDDV8A	HDDV8B
	(GVRW 33,001 - 60,000 LBS)	(>60,000 LBS GVWR)
MPG	6.6	6.3
Pollutant	Emission Factors (g/mi)	Emission Factors (g/mi)
CO	1.764	2.352
NOx	7.17	8.722
Pb	0	0
PM-10	0.1655	0.188
PM-2.5	0.1523	0.1731
SO2	0.0144	0.0152
O3		
VOCs	0.401	0.48
NOx	7.17	8.722
CO2	1550.2	1626.6
NH3	0.027	0.027

Conversion Factors
1 gram = 0.0000011023113109 tons
1.10231E-06

Barge Emission Factors (g/hour)

NOx	CO	HC

SOx	PM2.5	PM10	CO2	NO2

NOV #	NAAQS Criteria Pollutants (tons per year)					Greenhouse Gases (tpy)		
	VOC	CO	NOx	PM-10	PM-2.5	CO2	CO2 Equivalents	Total CO2
1	4.5	17.4	76.9	2.5	2.2	4,590	24,030	28,620
2	0.0	0.1	0.3	0.0	0.0	20	105	126
5	1.5	5.9	26.2	0.8	0.8	1,564	8,189	9,754
6	0.2	1.0	4.2	0.1	0.1	252	1,320	1,573
7	5.6	21.6	95.5	3.1	2.8	5,700	29,838	35,538
8	3.0	11.6	51.1	1.7	1.5	3,051	15,972	19,023
9	7.3	28.1	124.3	4.0	3.6	7,420	38,846	46,267
10	1.1	4.1	18.0	0.6	0.5	1,073	5,620	6,693
11	2.3	8.8	38.9	1.3	1.1	2,320	12,143	14,463
12	0.0	0.1	0.5	0.0	0.0	33	172	204
13	0.0	0.0	0.2	0.0	0.0	12	61	73
14	0.0	0.1	0.4	0.0	0.0	23	123	146
15	2.2	8.4	37.0	1.2	1.1	2,206	11,550	13,756
16	1.0	3.7	16.5	0.5	0.5	986	5,161	6,147
Total	**29**	**111**	**490**	**16**	**14**	**29,251**	**153,131**	**182,382**

TRANSPORTATION EMISSIONS NOV 01

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		7,770,895				-	4.5	4.54
CO	2.03		7,770,895				-	17.4	17.38
NOx	8.98		7,770,895				-	76.9	76.90
PM-10	0.29		7,770,895				-	2.5	2.48
PM 2.5	0.26		7,770,895				-	2.2	2.23
CO2	536.00		7,770,895				-	4590.1	4,590.05
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	23,312,686	7,770,895

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	113.47	
NOx	311	23,916.05	
Total		24,029.51	28,619.56

TRANSPORTATION EMISSIONS NOV 02

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		34,114				-	0.0	0.02
CO	2.03		34,114				-	0.1	0.08
NOx	8.98		34,114				-	0.3	0.34
PM-10	0.29		34,114				-	0.0	0.01
PM 2.5	0.26		34,114				-	0.0	0.01
CO2	536.00		34,114				-	20.2	20.15
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	102,343	34,114

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.50	
NOx	311	104.99	
Total		105.49	125.64

TRANSPORTATION EMISSIONS NOV 05

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		2,648,364				-	1.5	1.55
CO	2.03		2,648,364				-	5.9	5.92
NOx	8.98		2,648,364				-	26.2	26.21
PM-10	0.29		2,648,364				-	0.8	0.85
PM 2.5	0.26		2,648,364				-	0.8	0.76
CO2	536.00		2,648,364				-	1564.3	1,564.31
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	7,945,092	2,648,364

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	38.67	
NOx	311	8,150.72	
Total		8,189.39	9,753.70

TRANSPORTATION EMISSIONS NOV 06

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		427,032				-	0.2	0.25
CO	2.03		427,032				-	1.0	0.96
NOx	8.98		427,032				-	4.2	4.23
PM-10	0.29		427,032				-	0.1	0.14
PM 2.5	0.26		427,032				-	0.1	0.12
CO2	536.00		427,032				-	252.2	252.24
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	1,281,096	427,032

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	6.24	
NOx	311	1,314.25	
Total		1,320.49	1,572.72

TRANSPORTATION EMISSIONS NOV 07

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		9,649,372				-	5.6	5.64
CO	2.03		9,649,372				-	21.6	21.59
NOx	8.98		9,649,372				-	95.5	95.49
PM-10	0.29		9,649,372				-	3.1	3.08
PM 2.5	0.26		9,649,372				-	2.8	2.76
CO2	536.00		9,649,372				-	5699.6	5,699.61
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	28,948,115	9,649,372

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	140.90	
NOx	311	29,697.33	
Total		29,838.22	35,537.84

TRANSPORTATION EMISSIONS NOV 08

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		5,165,207				-	3.0	3.02
CO	2.03		5,165,207				-	11.6	11.55
NOx	8.98		5,165,207				-	51.1	51.11
PM-10	0.29		5,165,207				-	1.7	1.65
PM 2.5	0.26		5,165,207				-	1.5	1.48
CO2	536.00		5,165,207				-	3050.9	3,050.94
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	15,495,620	5,165,207

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	75.42	
NOx	311	15,896.67	
Total		15,972.08	19,023.03

TRANSPORTATION EMISSIONS NOV 09

Building Materials Transport Heavy Duty Dump Trucks								
	Emission Factors		Assumptions				Results by Pollutant	
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		12,562,548				-	7.3	7.34
CO	2.03		12,562,548				-	28.1	28.10
NOx	8.98		12,562,548				-	124.3	124.32
PM-10	0.29		12,562,548				-	4.0	4.01
PM 2.5	0.26		12,562,548				-	3.6	3.60
CO2	536.00		12,562,548				-	7420.3	7,420.35
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.									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	37,687,644	12,562,548

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	183.43	
NOx	311	38,663.04	
Total		38,846.48	46,266.82

TRANSPORTATION EMISSIONS NOV 10

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		1,817,352				-	1.1	1.06
CO	2.03		1,817,352				-	4.1	4.07
NOx	8.98		1,817,352				-	18.0	17.98
PM-10	0.29		1,817,352				-	0.6	0.58
PM 2.5	0.26		1,817,352				-	0.5	0.52
CO2	536.00		1,817,352				-	1073.5	1,073.46
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	5,452,056	1,817,352

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	26.54	
NOx	311	5,593.16	
Total		5,619.70	6,693.16

TRANSPORTATION EMISSIONS NOV 11

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		3,926,987				-	2.3	2.29
CO	2.03		3,926,987				-	8.8	8.78
NOx	8.98		3,926,987				-	38.9	38.86
PM-10	0.29		3,926,987				-	1.3	1.25
PM 2.5	0.26		3,926,987				-	1.1	1.13
CO2	536.00		3,926,987				-	2319.6	2,319.56
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	11,780,961	3,926,987

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	57.34	
NOx	311	12,085.87	
Total		12,143.21	14,462.77

TRANSPORTATION EMISSIONS NOV 12

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		55,518				-	0.0	0.03
CO	2.03		55,518				-	0.1	0.12
NOx	8.98		55,518				-	0.5	0.55
PM-10	0.29		55,518				-	0.0	0.02
PM 2.5	0.26		55,518				-	0.0	0.02
CO2	536.00		55,518				-	32.8	32.79
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	166,553	55,518

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.81	
NOx	311	170.86	
Total		171.67	204.47

TRANSPORTATION EMISSIONS NOV 13

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		19,872				-	0.0	0.01
CO	2.03		19,872				-	0.0	0.04
NOx	8.98		19,872				-	0.2	0.20
PM-10	0.29		19,872				-	0.0	0.01
PM 2.5	0.26		19,872				-	0.0	0.01
CO2	536.00		19,872				-	11.7	11.74
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	59,616	19,872

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.29	
NOx	311	61.16	
Total		61.45	73.19

TRANSPORTATION EMISSIONS NOV 14

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		39,708				-	0.0	0.02
CO	2.03		39,708				-	0.1	0.09
NOx	8.98		39,708				-	0.4	0.39
PM-10	0.29		39,708				-	0.0	0.01
PM 2.5	0.26		39,708				-	0.0	0.01
CO2	536.00		39,708				-	23.5	23.45
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	119,124	39,708

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	0.58	
NOx	311	122.21	
Total		122.79	146.24

TRANSPORTATION EMISSIONS NOV 15

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		3,735,086				-	2.2	2.18
CO	2.03		3,735,086				-	8.4	8.36
NOx	8.98		3,735,086				-	37.0	36.96
PM-10	0.29		3,735,086				-	1.2	1.19
PM 2.5	0.26		3,735,086				-	1.1	1.07
CO2	536.00		3,735,086				-	2206.2	2,206.21
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	11,205,257	3,735,086

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	54.54	
NOx	311	11,495.26	
Total		11,549.80	13,756.01

TRANSPORTATION EMISSIONS NOV 16

Building Materials Transport Heavy Duty Dump Trucks									
	Emission Factors		Assumptions				Results by Pollutant		
Pollutants	Heavy-Duty Truck VI g/mile (diesel)		Miles per Year				Total Emissions Trucks tns/yr	Total Emissions Trucks tns/yr	Total tns/yr
VOCs	0.53		1,668,953				-	1.0	0.97
CO	2.03		1,668,953				-	3.7	3.73
NOx	8.98		1,668,953				-	16.5	16.52
PM-10	0.29		1,668,953				-	0.5	0.53
PM 2.5	0.26		1,668,953				-	0.5	0.48
CO2	536.00		1,668,953				-	985.8	985.80
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									

Heavy Duty Truck Emissions: Emission Facts: Average In-Use Emissions from Heavy-Duty Trucks. May 2005, EPA420-F-05-0yy

Conversion facto	gms to tons
	0.000001102

Carbon Equivalents	Conversion Factor
N2O or NOx	310
Methane or VOCs	21

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

	3 years	1 year
Total Mileage	5,006,859	1,668,953

CARBON EQUIVALENTS

	Conversion	Emissions CO2 tons/yr	Total CO2
VOCs	25	24.37	
NOx	311	5,136.44	
Total		5,160.81	6,146.62