7.0 IT QUESTIONS RESPONSE

7.1 PROJECT OVERVIEW

This section is provided for the Administrative Authority's consideration as required by Article IX, Section 1 of the Louisiana Constitution, and fulfills the requirement to provide an Environmental Assessment Statement through responses to the "IT Decision Questionnaire" in accordance with LA R.S. 30:2018 (B). This statement will show that the social and economic benefits of the proposed Nucor facility will far outweigh any adverse environmental impacts. Permitting of the facility therefore fully comports with Louisiana's public trust doctrine.

7.1.1 *Project Description*

Nucor Corporation (Nucor) is the leading steel producer and steel scrap recycler in North America, and is based in Charlotte, North Carolina. In 2008 Nucor produced over 20 million metric tons of steel, generated net sales of $23.66 billion, and employed over 21,700 workers - primarily in the United States. Nucor has a strong desire to strengthen American manufacturing, the American steel industry, and empower the American worker by providing high-quality products, high-paying jobs, and a strong sense of environmental and community stewardship in all of its mills.

As part of its strategy of increasing the production of higher-quality steels for use in automotive and white goods manufacturing, Nucor plans to build a new direct reduction iron facility with a capacity to produce five million metric tons of DRI iron. The North American market is one of the world's biggest for high-grade steels, and this project is intended to strengthen Nucor's position as the leading steelmaker in the country.

Nucor plans to commence construction of the proposed Nucor Steel Direct Reduced Iron facility in the first half of 2011, with initial operations starting in 2012. The mill will produce the high-quality iron units necessary for top-grade sheet steels, which generally cannot be made from scrap material alone. Last year, Nucor purchased and imported from outside of the United States millions of tons of pig iron and DRI in order to enhance the metallurgy of steels produced at several of its electric arc furnace (EAF) mini-mills located across the southern United States. This mill will help to secure the supply of a vital raw material for Nucor's existing operations.

Figure 7-1 shows the proposed location of Nucor Steel Direct Reduction Iron Facility. Currently, no other site in North America is being considered for this project. The new facility will produce DRI through two essentially identical process units, each designed for 2.5 million tons of DRI production. By-product DRI fines will be collected and pressed with cement into bricks at a dedicated briquetting operation for use by Nucor's EAF mills, or for sale on the open market.

7.1.2 *Process Description*

Nucor will use the latest processes and most advanced techniques for making DRI iron pellets that are available in the industry, with the goal of operating the most efficient facility of its kind in the nation, in regards to production and air emissions. A full description of these processes can be found in Section 1, and is summarized below.

The DRI process reduces the iron oxide content of iron ore pellets into iron metal through direct contact with a reducing gas. The effectiveness of this reduction process is called metallization, and the process equipment will be designed to achieve a metallization rate of at least 92% of the oxides within the ore. The reduction will take place in a countercurrent vertical shaft furnace, where reducing gas passes up through iron oxide pellets, which feed through the furnace by gravity. The major elements of the DRI process include the following: (1) iron oxide preparation; (2) reducing gas preparation; (3) DRI reactor shaft furnace; (4) DRI product handling; and (5) ancillary operations, including a package boiler, two cooling towers, and a flare for pressure relief. Each process element is described in detail in Section 1.

Nucor is also considering an innovative technology that allows the elimination of the energy and emission intensive "reformer" step in the reducing gas preparation phase. This process is still experimental and has never been attempted at a DRI facility of the size that Nucor is considering. Nucor is thus seeking a permit for a traditional, reformer-based DRI facility, but is also seeking authority to construct, in the alternative, the reformer-less HYL process unit. The only significant difference, from an emissions and permitting perspective, is that the HYL process substitutes a small process heater for the reformer and allows substitution of a smaller process boiler than that required by the traditional process. Thus the emissions presented in the application are conservative.

7.2 *"HAVE THE POTENTIAL AND REAL ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED FACILITY BEEN AVOIDED TO THE MAXIMUM EXTENT POSSIBLE?"*

Potential environmental impacts are associated with virtually any greenfield industrial project. Nucor is committed to minimizing the potential impact of its operations upon the local environment, and has conducted analyses of both the potential impacts of the proposed facility, as well as the best methods and technologies for minimizing them. The proposed Nucor Steel Direct Reduced Iron facility in St. James Parish has been designed to minimize adverse environmental impacts from the construction and the operation of the facility. Nucor is committed to using best available control technologies and best practices to reduce or prevent potential and real adverse environmental impacts where such measures are feasible.

7.2.1 *General Environmental Impacts*

The proposed site of the Nucor Steel Direct Reduced Iron Facility will be collocated with the Nucor Direct Reduced Iron Facility (NSLA), and shares in the

assessment of impacts with the larger project. NSLA will be located on three tracts of land in St. James Parish, known as the Entergy property (2,933 acres), the Port of South Louisiana (PSL) property (174 acres), and the Schexnayder property (954 acres). Figure 7-2 shows the approximate boundaries of the land tracts under consideration for development. Currently, the majority usage of these properties is for sugar cane production, although a portion of the Entergy and Peabody properties are undeveloped except for pipeline and utility easements.

7.2.1.1 *Wetlands*

The Nucor property will occupy approximately 4,060 acres. The US Army Corps of Engineers (USACE) has previously conducted a wetlands determination of the property, which remains valid for the property under consideration. Approximately 336 acres of jurisdictional waters (wetlands) are located in the project area south of LA Hwy 3125. The majority of the property situated north of LA Hwy 3125, approximately 1,136 acres, has also been delineated as wetlands. The balance of this area, approximately 108 acres of land, has been cultivated for sugar cane and is not considered to be a jurisdictional wetland. A more complete description of wetland areas can be found in Section 7.5.2.1.

Nucor intends to leave the vast majority of wetland areas on the property undisturbed. However, some small impacts to wetlands on the property will be unavoidable. The construction of a high voltage power line from the facility, to tie into existing power infrastructure, will impact a portion of the wetland areas north of LA Hwy 3125. The bulk of wetland areas south of LA Hwy 3125 will also be preserved, but small portions of existing wetland areas will need to be removed from the existing system for construction of the entrance road, site grading, building construction, and pile driving for the Mississippi River docks. Any wetlands removed from the property will be mitigated as required under the Section 404 of the Clean Water Act (CWA), as administered by the USACE. Although plans for mitigation have not yet been finalized and approved by USACE, the mitigation efforts will likely include allowing all or part of the cultivated acreage north of LA Hwy 3125 to revert to forested wetlands.

Once the facility is constructed, Nucor plans to operate without water discharges under normal operating conditions. Process water will be reused, and storm water will be collected for use as process water as much as possible. Therefore, no further real adverse environmental impacts are expected to occur to wetlands on or near the site. In the event that future expansion of the facility occurs, Nucor will address any wetland losses at that time with the USACE, as required under the Section 404 of the CWA.

7.2.1.2 *Threatened and Endangered Species*

The United Stated Fish and Wildlife Service (USFWS) Federally-listed threatened or endangered species within St. James Parish include the West Indian manatee (*Trichechus manatus*), the pallid sturgeon (*Scaphirhynchus albus*), and the Gulf sturgeon (*Acipenser oxyrinchus desotoi*). Under the Endangered Species Act (ESA) of 1973, listed threatened or endangered species are federally protected. Critical habitats of several listed species were identified on and in the general area of the

proposed Nucor facility, please see Figure 7-3 for a map of critical habitats. Although critical habitat has been identified on the proposed site, impacts will be minimized by the placement of process area equipment in areas not identified as critical habitat. In addition, the majority of infrastructure needs for the project already exist, making the intrusion of new roads or rail into critical habitat areas unnecessary. Activities at the Nucor Direct Reduced Iron Facility are not anticipated to impact critical habitat; however, if changes to the site layout or process occur, additional investigation into critical habitat impacts may be conducted.

A review of the Louisiana Department of Wildlife and Fisheries' (LWDF) Louisiana Natural Heritage Program (LNHP) database of threatened and endangered or rare species identified two state-listed species and four species of concern within St. James Parish, Louisiana as detailed in Table 6-1. While the Bald Eagle (*Haliaeetus leuccocephalus*) was delisted from the threatened and endangered species list on June 28, 2007 (50 CFR 17; 37345 - 37372), the Bald Eagle still receives protection under provisions of the Bald and Golden Eagle Protection Act of 1940 and the Migratory Bird Treaty Act of 1918.

The West Indian manatee is a large aquatic mammal that generally inhabits areas around the coast of Florida, but which has been observed in Louisiana. They spend their lives moving between freshwater, brackish, and saltwater environments and generally inhabit slow moving rivers, river mouths, and shallow coastal areas (USFWS, 2007). Due to the fact that facility construction would include structures within the Mississippi River (i.e., loading/unloading dock), the project could potentially impact the West Indian manatee. Nucor will initiate consultations with appropriate federal and state agencies to determine potential impacts and develop mitigation strategies, as necessary, to minimize such impacts.

The Gulf sturgeon is an anadromous fish that inhabits salt water and spawns in freshwater systems. The Gulf sturgeon spawns near the headwater of rivers, and then migrates downstream during the summer. Due to the fact that facility construction would include structures within the Mississippi River (i.e., loading/unloading dock), the project could potentially impact the Gulf sturgeon. Nucor will initiate consultations with appropriate federal and state agencies to determine potential impacts and develop mitigation strategies, as necessary, to minimize such impacts.

The pallid sturgeon is a bottom-dwelling fish that has a distinctive flat shovel-shaped snout. They range in size from thirty to sixty inches long and prefer sand-covered portions of rivers with strong currents and high turbidity. The current population has been restricted from upstream habitats due to dam construction along the Missouri River (USFWS, 2007). Due to the fact that facility construction would include structures within the Mississippi River (i.e., loading/unloading dock), the project could potentially impact the pallid sturgeon. Nucor will initiate consultations with appropriate federal and state agencies to determine potential impacts and develop mitigation strategies, as necessary, to minimize such impacts.

Table 7-1 Threatened and Endangered Species List in St. James Parish, Louisiana

Common Name	Scientific Name	Federal Status	State Status	Habitat present in survey area
West Indian manatee	*Trichechus manatus*	Endangered	Endangered	Possible
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	Threatened	--	Possible
Pallid sturgeon	*Scaphirhynchus albus*	Endangered	--	Possible
Bald Eagle	*Haliaeetus leuccocephalus*	Delisted	Endangered	Possible

The extreme northeastern corner of the proposed site is within 1,000 feet of the boundary of the Maurepas Swamp State Wildlife Management Area (WMA), which is considered a critical habitat. Given its distance away from the site, and the zero-discharge design of the facility, impacts to the Maurepas Swamp WMA due to project construction or operational activities are not expected. Nucor will consult with state and federal agencies on the status of the Maurepas Swamp WMA when requested or conditions warrant.

7.2.1.3 Soils

Operational plans at the Nucor Direct Reduced Iron Facility do not include the production or storage of large quantities of chemicals at the site, and Nucor considers the risks of soil impacts to be small during both the construction and operational phases of the facility. During operation, Nucor will collect and use rain water to the maximum extent possible, mitigating the potential for erosion or sedimentation. In the event of future expansion at the facility, Nucor will address the soils impact of site modifications at that time in compliance with any local, state, and federal regulations. Specific impacts due to construction activities are discussed in Section 7.2.2.2.

7.2.1.4 Cultural and Historical Resources

Potential impacts to cultural resources on the property will be treated with care and sensitivity. Several surveys have been conducted of the site, and no resources are expected on the property. Refer to Section 7.5.2.4 for details of specific cultural and historical resources impacted by the Nucor facility. A Memorandum of Agreement (MOA) with the State Historic Preservation Office (SHPO) was signed during the permitting process for NSLA, addressing potential impacts to historical and cultural resources.

Nucor will employ the best available technology to ensure that cultural resources that require data recovery under the project MOA are handled in a thorough and professionally responsible manner. All data recovery operations will be conducted under the provisions of a written data recovery plan that will be reviewed and approved by appropriate state and federal agencies. The data recovery plan will spell out the field procedures for conducting the data recovery and the extent of the investigation needed on each site to capture the irreplaceable information that each site may contain. The data recovery plan will

include a scientifically sound research design that will pose questions to be addressed by the investigations to ensure an orderly data collection, analysis, and reporting process.

If applicable, a preservation plan will be prepared for any resources that will be preserved in place. The preservation plan will discuss specific methods to be used to ensure that boundaries around resources are clearly marked to prevent inadvertently disturbing resources during construction. The data recovery plan will specify field procedures for conducting the data recovery and the extent of the investigation needed on the site to capture irreplaceable information that each site may contain. The MOA will also describe emergency discovery procedures for potentially significant resources discovered during construction.

7.2.2 *Construction Phase Environmental Impacts*

Although temporary in nature, construction activities at the project site will be extensive, with a peak of 500 workers erecting the facilities and equipment. Nucor has an excellent safety record in construction projects, and requires all contractors to maintain a safe work environment and safe work practices at all times.

7.2.2.1 *Air*

Through engineering design and proven technology, Nucor is endeavoring to minimize the environmental footprint of the Nucor Direct Reduced Iron Facility through every phase of the project, so that potential adverse impacts on air quality are avoided by using the best available control methods and technologies. During construction, potential adverse impacts include fugitive dusts generated by trucks, earth-moving and pile-driving equipment, and an increase in exhaust emissions from the engines of transportation and construction vehicles and temporary construction equipment (e.g. stationary compressors or generators). Other sources of air emissions may include abrasive blasting of metal equipment and components, surface coating (painting) activities, portable generators for welding and work lights, and other minor construction activities.

Nucor's contractors and construction management team will ensure that diesel equipment is properly maintained and operated so as to minimize excessive exhaust emissions. The construction team will also use dust suppression techniques (i.e., water spraying) on construction roadways and corridors if and whenever necessary to prevent or mitigate nuisance dust.

7.2.2.2 *Water and Soil*

The Nucor property will be situated on approximately 2,800 acres of the 4,060 acre property. Soil will be impacted from the existing conditions by construction of the storm water retention pond, site grading, pile driving, and the construction of building foundations and plant roads. Construction activities will disturb soil at the project site, generating the potential for storm water

impacts. Inevitably, rain events will occur in which the capacity of the ground to absorb and hold infiltrated water may be exceeded by the volume or velocity of the water runoff. As shown in Figure 7-5, the project site currently drains into the Blind River watershed.

Activities which loosen sediments tend to increase the sediment loading in storm water runoff. Additionally, newly compacted soil surfaces may have a lower permeability that could increase runoff. Increased runoff may increase sediment transport, may increase scour in downstream areas, and may add to downstream water volume. To mitigate the potential for these impacts, a storm water management program will be developed for the facility that will include construction activities. Structural controls and best management practices (BMPs) will be utilized to minimize the potential adverse impacts on soils during the construction phase.

Storm water discharges from construction sites are authorized by the State through the LAR100000 General Permit for Construction Activities. As a part of the permit requirements, storm water management plans will be developed to control runoff from the site during construction activities. The storm water management plan will incorporate the use of best management practices (BMPs) to control the discharge of sediment to receiving streams and rivers. BMPs will consist of structural controls, such as retention ponds, swales or other physical structures; nonstructural control, such as operation and maintenance programs (i.e., inspections and street sweeping); and training programs. As required in the General permit, regular monitoring of storm water will be required. Professional judgment and design criteria will be practicable to reach the discharge limits set by the State.

Permit requirements necessitate the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) to control runoff from the site during each construction phase. The SWPPP will incorporate monitoring requirements, monitoring reporting forms, inspection requirements, and inspection forms. Responsible parties, personnel, and management are identified in the SWPPP. The SWPPP will be maintained and updated by the indicated responsible parties and it will be retained onsite during construction. Inspection and monitoring forms will be added to the SWPPP as completed.

A storm water management plan will be prepared in addition to the SWPPP, and will include erosion and sediment control measures that will be implemented during construction. Contractors are required (at a minimum) to maintain BMPs for monitoring and erosion control and in accordance with the SWPPP during construction. Measures included in the storm water management plan may include but are not limited to silt fencing, temporary sediment ponds, temporary stream crossings, dust control, mulching, temporary seeding, and permanent stabilization of disturbed areas.

Other potential adverse environmental impacts that may occur during construction include leaks or spills of fuels, oils, or hydraulic fluids from the earth-moving, pile-driving or other construction equipment. Similarly, additional potential adverse impacts could be associated with onsite temporary

fuel storage for the construction equipment and construction-phase vehicles. The SWPPP will identify these potential adverse impacts, provide measures that will be adopted to ensure that leaks and spills are avoided to the extent practicable, and specify the measures to be undertaken to mitigate any inadvertent spills.

Nucor believes that the procedures and plans described above for the construction phase of the Nucor Direct Reduced Iron Facility project have been demonstrated to minimize potential adverse environmental impacts to soil and water media. Nucor has a firm commitment to environmental quality and social responsibility, and will take whatever additional measures that are necessary and reasonable to prevent or minimize the impacts of construction upon the quality of local soil and water conditions.

7.2.2.3 *Solid and Hazardous Waste*

As with any large project, solid wastes will be generated during construction activities at the Nucor Direct Reduced Iron Facility. Nucor will collect and dispose of solid wastes in an efficient and responsible manner, utilizing local landfills. Solid wastes will not be landfilled or permanently stored on site. The generation of solid wastes such as construction debris (e.g., concrete, metal, brick, roofing materials, lumber, and asphalt) will require careful management during the construction phases. Nucor will implement a waste management plan to address the handling of solid wastes from construction activities at the project site.

Nucor does not plan to generate hazardous wastes on site during construction activities, but small quantities associated with specialized construction activities may be collected. Nucor will adhere to all state and federal requirements for the collection and disposal of any hazardous wastes that may be generated at the project site during construction activities.

7.2.2.4 *Noise*

Construction noise at Nucor's facility is not anticipated to cause adverse environmental impacts on neighboring communities due to the diffusion of sound over long distances. Pile-driving and the operation of heavy construction equipment (i.e., bulldozers, pan scrapers, generators, compressors, earth compactors, a temporary cement batch plant, etc.) will produce noise onsite during normal construction hours. As a mitigating measure for noise generated at the facility, Nucor plans to construct an earthen berm along the majority of the site perimeter. This berm will help to shield neighboring property, LA Hwy 3125 and the wetland areas north and east of the project site from construction noise generated at the site locations where major process equipment will be located. The crown of the berm is currently planned to have an elevation of 13 feet above sea level.

7.2.3 *Operational Phase Environmental Impacts*

Most by-product materials from the facility's processes are reused or recycled on-site, primarily through the briquetting plant or the adjacent sinter plant. Briquettes made of DRI fines will be used in Nucor's existing EAF mills. Iron ore fines will be used as sinter feed material or sold.

7.2.3.1 *Air*

As a large, greenfield industrial facility, the Nucor Direct Reduced Iron Facility will meet the Clean Air Act's definition of a major source of air pollutants, which is defined as any single facility emitting to the atmosphere greater than 100 tons per year (tpy) of a single criteria air pollutant, or 250 tpy of all criteria pollutants combined. The criteria pollutants are: particulate matter, oxides of nitrogen (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), volatile organic compounds (VOC), lead (Pb) and ozone. As a new major source of air pollutants, the Nucor Direct Reduced Iron Facility will be subject to federal regulation under the New Source Performance Standards (NSPS).

The total emissions of criteria pollutants will be above the thresholds to have the facility subject to Prevention of Significant Deterioration (PSD) regulations under the New Source Review (NSR) program. PSD regulations will require the determination and installation of Best Achievable Control Technology (BACT). A full BACT analysis has been submitted with this permit application, and is included as Section 3.0.

While the facility will not use or produce, as products, hazardous air pollutants (HAP) in its industrial processes, the facility will also meet the definition of a major source of HAP, which is defined as any single facility emitting greater than 10 tpy of a single HAP, or 25 tpy of all HAP combined. As a major source of HAP, certain processes at the Nucor Direct Reduced Iron Facility will be subject to regulation under the National Emissions Standards for Hazardous Air Pollutants (NESHAP), and may be required to install Maximum Achievable Control Technology (MACT) on activities associated with those processes.

The major sources of combustion at the facility will be the reformers and the package boilers. The reformers will burn mostly top gas from the shaft furnace, with a small addition of natural gas, in order to both recover the energy available in this gas, and to prevent the emission of large quantities of carbon monoxide. Each DRI unit will be equipped with a single reformer, used for heating the reducing gas being fed to the shaft furnace. Each unit's package boiler will combust natural gas to produce process steam for the acid gas absorption system.

The top gas will be treated before combustion at the reformers for the removal of hydrogen sulfide and incombustible particles prior to being used for fuel, so that the majority of these potential pollutants do not pass through the burners and out of the exhaust stack. The top gas has a low heating value, does not contain organic compounds, and should combust cleanly. Sulfur dioxide (SO_2) emissions from these sources will be low relative to the volume of gas combusted due to

the acid gas absorption system which will treat the fuel for the removal of hydrogen sulfide, which is then further separated with the use of a chelated iron-based catalyst. Nitrogen oxides (NO_x) will also be generated during the combustion of top gas. However, due to the low heating value of the top gas fuel, and the low temperature at which it burns, combusting it produces less NO_x than when burning conventional fossil fuels, on a per unit of energy basis. The addition of natural gas to the fuel will allow for the use of low NO_x burner technology, which operates on the principle of staging combustion and reducing flame temperature. Additionally, Nucor will mitigate the generation of NO_x compounds through the installation of selective catalytic reduction.

Fugitive dusts will from time to time be generated at different areas of the facility. The Nucor Direct Reduced Iron Facility will receive shipments of iron ore pellets and pulverized limestone ship (iron ore) and truck (limestone). Additionally, the Nucor Direct Reduced Iron Facility will ship out or move internally other materials, such as DRI pellets, DRI fines, iron ore fines, and DRI briquettes. The transfer and processing of these materials to conveyor belts, storage piles, silos, crushers, and screeners has the potential to generate dust. Finally, truck and equipment traffic in process areas has the potential to generate fugitive dusts.

The control of dust emissions will be actively addressed by the project. Material processing steps throughout the facility, such as screening and filling of storage structures, will incorporate active dust collection with baghouse or high-energy scrubber controls. Material conveyors will be fully enclosed to prevent the wind from picking up particles from the belts. Plant roads will undergo frequent wetting with water, in order to reduce the potential for dust emissions from this source, in accordance with the fugitive dust mitigation plan. Storage piles will also be wetted with either water or special agents designed to help prevent dust generated from wind erosion of the piles.

7.2.3.2 *Water*

Nucor constantly strives to develop new technologies and devise ways to reduce its environmental impacts. This translates to improving recycling processes, reducing the use of natural resources, reusing as much water as practicable and capturing potential energy (heat) losses for reuse in its processes. Nucor will minimize impacts to water quality to the extent practicable.

Nucor will be a net water user, so under normal conditions does not propose to discharge waste water. It is possible that due to a major rain event or an unplanned emergency there may be a need to discharge storm water. Storm water discharged to waters of the State will be regulated under a Louisiana Pollution Discharge Elimination System (LPDES) permit. This LPDES Permit Program is authorized under the Clean Water Act (CWA) and administered by the State. It allows discharges of wastewater in quantities that will not cause a degradation of water quality and that will maintain State in-stream water quality standards.

7.2.3.2.1 *Non-Contact Cooling Water*

Non-contact cooling water will be used for transferring heat between, or removing heat from, process equipment without contacting process materials. Non-contact cooling water will be withdrawn from the river and collected from rainfall events, pre-treated to remove sediments and other equipment contaminants, and then circulated within the facility to cool process equipment. Some non-contact water will be specially treated for use as boiler water for the package boiler. Non-contact cooling water transfers heat to the atmosphere through cooling towers, and is reused several times. Wastewater will be generated as blowdown from the cooling towers (blowdown is removal of a portion of the non-contact cooling water to mitigate the buildup of salts in the system due to evaporation and concentration). Although not anticipated, blowdown water may also be discharged via and in accordance with an LPDES permit.

7.2.3.2.2 *Contact Process Water*

Cooling water will not be used in direct contact applications at the DRI facility.

7.2.3.2.3 *Process Wastewater*

Process water will be used at several high-energy scrubbing devices for the control of DRI dust. Due to the nature of this material, which reacts exothermically with air, dry collection of the dust in baghouses presents a potential safety hazard from fires. The water used in the scrubbers is sent to a clarifier for the settling of solids, and then reused in the dust control water system. The clarifier is occasionally dredged of solids, which may be used as sinter feed or otherwise recycled. A blowdown stream may be necessary to prevent the buildup of dissolved solids in the scrubbing medium. This blowdown water may be used in direct cooling application within the NSLA facility. Although not anticipated, blowdown water may also be discharged via and in accordance with an LPDES permit.

7.2.3.2.4 *Sanitary Wastewater*

Sanitary wastewater will remain separate from process waters and will be discharged to a local wastewater treatment plant, or to a package treatment plant installed and operated by Nucor. The nearest local treatment plant to the project site identified by Nucor is the St. James Parish Water Plant located in Convent, Louisiana. Nucor will work with parish and local officials to assess the capacity of the St. James Parish Water Plant in order to determine whether it can support the sanitary wastewater needs of the Nucor Direct Reduced Iron Facility during construction and operation of the facility. Nucor has no plans to discharge sanitary wastewater from the site.

7.2.3.2.5 *Storm Water*

Water that runs off the ground and buildings as a result of rain is known as storm water. Generally, storm water will collect solid materials (sediments) as it flows over roads, across yards, and stockpile areas. Most storm water flows across the ground and does not contact industrial activities. For storm water from the site that is unlikely to contact pollutants other than sediments, the storm water will be captured in a large settling pond to enable these solids to settle, after which the water will be treated for use as process or cooling water. Although Nucor does not intend to discharge storm water under normal circumstances, any water discharged from settling ponds or other areas of the site will be in compliance with the requirements of Nucor's industrial storm water LPDES discharge permit.

7.2.3.3 *Solid and Hazardous Waste*

The Nucor Direct Reduced Iron Facility will generate solid wastes which must be disposed of in a responsible and environmentally conscious manner. A waste minimization plan will be implemented that is designed to reduce the volume and toxicity of wastes generated to the extent practicable to minimize the present and future threat to human health and the environment. Nucor has no plans to landfill or permanently store solid wastes on-site, and will utilize appropriate local landfills for the disposal of any solid waste generated at the facility.

Nucor intends to minimize the generation of solid wastes by recycling as much process material as possible. Process material recycling will mainly be handled by the briquetting plant and the sinter plant. A waste management plan will be created and implemented prescribing the proper onsite collection and offsite transportation for re-using, recycling, or disposing of waste in accordance with applicable local, State, and federal regulations. Impacts to soil from fuels, oils, or spills of other substances will be minimized wherever possible.

From time to time, activities at the Nucor Direct Reduced Iron Facility may generate a listed hazardous waste. Hazardous wastes should not be generated by the industrial processes at the facility, and are more likely to be associated with maintenance activities. Although a formal determination cannot be made until operations have commenced, Nucor fully expects to be classified as a Small Quantity Generator (SQG) of listed hazardous wastes. An SQG is a facility which generates less than 2,200 pounds of hazardous waste in any given month. The Nucor Direct Reduced Iron Facility will be a manufacturing plant, not a waste-management facility. Therefore the facility will not receive any listed wastes from off-site generators or sources.

All hazardous wastes generated at the facility will be stored in accordance with applicable state and federal requirements, including accumulation time (i.e., less than 90 days). The facility will follow all applicable requirements pertaining to the collection, containment, recordkeeping, and shipment of hazardous wastes. At no time will hazardous wastes be disposed of on-site. The waste management plan will also address proper handling and disposal of construction-related items

that may contain hazardous substances and wastes. Environmental media that has been contaminated as a result of a release will be properly mitigated, remediated, and/or disposed of in accordance with local, State, and federal regulations.

7.2.3.4 *Noise*

During production operations, process equipment at the Nucor Direct Reduced Iron Facility has the potential to generate noise. Additionally, some noise can be expected from increased truck and rail traffic. The facility has been designed and located on the property to minimize the impacts of noise from operations to the neighboring communities.

Measures for the mitigation of noise from process operations have been included in the facility design. These measures include the construction of a large earthen berm around portions of the facility boundary. Current plans have the crown of the berm at an elevation of 13 feet above sea level. The berm will insulate surrounding areas from any sudden noise attributable to process equipment operations. Additionally, process areas have been situated so as to be close to the center of the property, to further reduce the impact of any noise generated by operating activities.

There will be a single main entrance and driveway for the mill, which has been located for access from LA Hwy 3125. LA Hwy 3125 has very few residential properties located on it near the project site, and this location is on the opposite side of the project site from the majority of nearby residences located on LA Hwy 44 (River Road). Nucor feels that this is the best possible location for the main plant entrance for the smooth flow of operations, the minimization of traffic congestion, and the insulation of residences from unwanted road noise. Nucor will seek the input of parish leaders and local residents to address any concerns of road noise generated by facility operations.

Additional rail traffic may also be generated by operations at the Nucor Direct Reduced Iron Facility, with associated noise. Nucor plans to receive as much freight as possible by ship and barge, but must be prepared to accept materials shipped by rail when necessary. Shipping product or byproduct materials by rail is not anticipated at this time. Plans are in place to install a small switchyard area to store and handle a number of rail cars on-site, without congesting off-site tracks or blocking nearby roads for undue periods of time. Nucor will work with railway operators to schedule rail deliveries so as to minimize disruption to the local community.

7.3 *"DOES A COST BENEFIT ANALYSIS OF THE ENVIRONMENTAL IMPACT COSTS BALANCED AGAINST THE SOCIAL AND ECONOMIC BENEFITS OF THE PROPOSED FACILITY DEMONSTRATE THAT THE LATTER OUTWEIGHS THE FORMER?"*

The Nucor Direct Reduced Iron Facility represents a significant investment for the future of Nucor, the State of Louisiana, and St. James Parish. Such an investment will reap large and tangible benefits for the local and state economies.

Job creation, increased household earnings, boosted sales, tax revenue enhancements, and infrastructure improvements should naturally follow the commencement of the project. This section will itemize the expected benefits of the proposed project, and demonstrate its viability from a cost benefit perspective.

In an effort to quantify the expected impacts upon the local economy from the wider NSLA project, Nucor commissioned an economic impact analysis from Dr. Loren C. Scott and Associates (LSA), entitled *The Economic Impacts on the St. James Parish Economy of the Project Iron Mill Integrated Production Facility*. The analysis of costs and benefits associated with the NSLA project relied in large part upon the effects predicted by LSA. The full text of this report was included in Appendix G of the NSLA permit application.

7.3.1 *Project Business Drivers*

In 2004, Nucor announced a long-term goal to develop enough sources of high-quality scrap substitute to eventually account for 1/3 of its raw materials mix. This proposed DRI facility is a part of Nucor's strategy to increase control over raw material supply by developing a variety of scrap alternatives. Nucor is using an increasing volume of high quality scrap substitutes in its raw materials because of the following reasons:

- The increased global demand for scrap has increased associated costs and cost volatility;
- The import of scrap substitutes into the United States (U.S.) has tripled over the past decade; and
- Nucor has steadily been adding higher-value products to its mix over recent years and many of these products require higher quality raw material mixes that cannot be obtained from scrap alone.

This facility will serve as a source of clean iron units regularly imported from other countries and delivered to six of Nucor's electric are furnace (EAF) mini mills throughout the southern United States. The current volatility of scrap metal availability demands a regular supply of iron to bridge supply gaps in raw material feed to the mini mills.

7.3.2 *Current Economic Conditions*

The following information can be seen in Tables 7-3 and 7-4. The per capita income in St. James Parish for the year 2000 was approximately $14,500. This is lower than the per capita income of both the State and the neighboring parishes. Local towns have similar per capita incomes in 2000, with the exception of Donaldsonville and Garyville, with per capita incomes approximately $12,000, and South Vacherie, with a per capita income approximately $17,250.

The median family income in St. James Parish, approximately $41,750 in 2000, was roughly on par with that of the state, but lower than that of neighboring parishes. Donaldsonville, North Vacherie, and Garyville all had median family

incomes in 2000 that were lower than that of St. James Parish [approximately $30,000]. South Vacherie's median family income was approximately $53,000. Data from both 2000 and 2006 for the State and Ascension Parish suggest that the per capita income and median family income may be slightly higher now than statistics show for 2000.

Of families in St. James Parish, 18 percent are below the poverty level; this value is higher than those both for the State and neighboring parishes. Of the neighboring towns, Donaldsonville has the highest percentage of families below the poverty level at 32.8 percent, and South Vacherie has the lowest at 11.8 percent.

As of 2000, roughly 55 percent of the population was in the labor force in St. James Parish. The percentage of the population in the labor force for neighboring parishes and the State was slightly higher, ranging from almost 60 percent to over 68 percent.

The unemployment rate in St. James Parish is 10.2 percent. This value is higher than unemployment rates both for the state and neighboring parishes. Of the local towns, Donaldsonville has the highest unemployment rate at 13.3 percent and South Vacherie has the lowest at 5.1 percent.

Table 7-3 Economic Characteristics of the Three-Parish Area

	State of Louisiana		St. James Parish		Ascension Parish		St. John the Baptist Parish	
	2000	2006	2000	2006	2000	2006	2000	2006
Per Capita Income	16,912	20,367	14,381	NA	17,858	23,223	15,445	NA
Median Family Income	39,774	48,261	41,751	NA	50,626	60,891	43,925	NA
Families Below Poverty Level*	183,448	154,450	1,004	NA	2,254	1,928	1,576	NA
Percent	*15.8%*	*14.4%*	*18.0%*	NA	*10.7%*	*7.8%*	*13.9%*	NA
In Labor Force (age 16 and over)	2,016,114	2,026,458	8,556	NA	37,203	50,810	19,218	NA
Percent	*59.4%*	*61.0%*	*54.6%*	NA	*66.3%*	*68.3%*	*61.6%*	NA
Unemployment Rate	7.3%	7.8%	10.2%	NA	5.4%	5.9%	6.9%	NA

Source: U.S. Census Data, 2000 and 2006.
*Households are classified as being in poverty when the total income of the householder's family is below the appropriate poverty threshold; thresholds vary depending on size of family, number of related children, and, for 1- and 2-person families, age of householder.
NA = Not Available

Table 7-4 Economic Characteristics of Neighboring Towns in year 2000

	Donaldsonville	Lutcher	Gramercy	North Vacherie	Garyville	South Vacherie
Per Capita Income	12,009	15,129	14,040	13,032	11,998	17,241
Median Family Income	29,408	42,317	39,350	32,404	34,155	53,053
Families Below Poverty Level	613	211	145	124	172	115
Percent	*32.8%*	*21.1%*	*17.4%*	*20.7%*	*24.1%*	*11.8%*
In Labor Force (age 16 and over)	2,883	1,437	1,201	869	1,054	1,614
Percent	*53.7%*	*49.8%*	*52.6%*	*51.4%*	*54.9%*	*59.2%*
Unemployment Rate	13.3%	7.3%	8.1%	10.0%	10.0%	5.1%

Source: U.S. Census Data, 2000 and 2006.

In the year 2000, 33 percent of the population in St. James Parish was under the age of 20 (Table 7-5). This percentage is similar to those of neighboring Parishes and slightly higher than that of the State. Similarly, the percentage of the population under 20 years old ranges in neighboring towns from approximately 30 percent in South Vacherie to almost 36 percent in Donaldsonville (Table 7-6).

Table 7-5 Age Characteristics of the Three-Parish Area

	State of Louisiana		St. James Parish		Ascension Parish		St. John the Baptist Parish	
	2000	2006	2000	2006	2000	2006	2000	2006
Under 5 years	317,392	301,198	1,483	NA	6,258	7,278	3,463	NA
Percent	*7.1%*	*7.0%*	*7.0%*	NA	*8.2%*	*7.5%*	*8.0%*	NA
5 to 9 years	336,780	294,827	1,711	NA	6,407	7,894	3,692	NA
Percent	*7.5%*	*6.9%*	*8.1%*	NA	*8.4%*	*8.1%*	*8.6%*	NA
10 to 14 years	347,912	305,073	1,863	NA	6,484	6,821	3,874	NA
Percent	*7.8%*	*7.1%*	*8.8%*	NA	*8.5%*	*7.0%*	*9.0%*	NA
15 to 19 years	365,945	332,146	1,936	NA	6,213	7,823	3,837	NA
Percent	*8.2%*	*7.7%*	*9.1%*	NA	*8.1%*	*8.0%*	*8.9%*	NA
Total	*30.6%*	*28.7%*	*33.0%*	NA	*33.2%*	*30.6%*	*34.5%*	NA

Source: U.S. Census Data, 2000 and 2006.
NA = Not Available

Table 7-6 Age Characteristics of Neighboring Towns

	Donaldsonville	Lutcher	Gramercy	North Vacherie	Garyville	South Vacherie
Under 5 years	654	235	212	173	210	236
Percent	*8.6%*	*6.3%*	*6.9%*	*7.2%*	*7.6%*	*6.7%*
5 to 9 years	668	277	257	185	235	251
Percent	*8.8%*	*7.4%*	*8.4%*	*7.7%*	*8.5%*	*7.1%*
10 to 14 years	692	279	256	234	268	280
Percent	*9.1%*	*7.5%*	*8.3%*	*9.7%*	*9.7%*	*7.9%*
15 to 19 years	694	353	236	241	257	310
Percent	*9.1%*	*9.5%*	*7.7%*	*10.0%*	*9.3%*	*8.7%*
Total	*35.6%*	*30.7%*	*31.3%*	*34.6%*	*35.1%*	*30.4%*

Source: U.S. Census Data, 2000 and 2006.

In St. James Parish, 25 percent of families with incomes below the poverty level have children; nearly 50 percent of families with incomes below the poverty level do not have husbands present (Table 7-7). Of those low-income families with female heads of household, almost 65 percent of them have children all under the age of five.

In towns neighboring the project site, the percentage of families below the poverty level with children earning income ranges from almost 17 percent in South Vacherie to over 40 percent in Donaldsonville (Table 7-8). The percentage of families with incomes under the poverty line who have no male head of household ranges from approximately 42 percent in Gramercy to over 61 percent in Lutcher; of those families, the percentage of those with children all under the age of five range from almost 39 percent in Garyville to over 83 percent in North Vacherie (Table 7-8).

Table 7-7 Percentage of Families Whose Income in the Past 12 Months is Below the Poverty Line in the Three-Parish Area

	State of Louisiana		St. James Parish		Ascension Parish		St. John the Baptist Parish	
	2000	2006	2000	2006	2000	2006	2000	2006
All Families	*15.8%*	*14.4%*	*18.0%*	NA	*10.7%*	*7.8%*	*13.9%*	NA
With related children under 18 years	*22.1%*	*22.0%*	*25.0%*	NA	*13.7%*	*10.3%*	*17.7%*	NA
With related children under 5 years only	*26.7%*	*22.6%*	*22.8%*	NA	*15.5%*	*7.8%*	*22.2%*	NA
Married couple families	NA	*5.8%*	NA	NA	NA	*1.8%*	NA	NA
With related children under 18 years	NA	*7.5%*	NA	NA	NA	*1.5%*	NA	NA
With related children under 5 years only	NA	*8.3%*	NA	NA	NA	*0.0%*	NA	NA
Families with female householder, no husband	*40.6%*	*39.3%*	*48.7%*	NA	*36.5%*	*31.2%*	*37.8%*	NA
With related children under 18 years	*49.4%*	*50.2%*	*58.4%*	NA	*43.0%*	*38.0%*	*43.1%*	NA
With related children under 5 years only	*60.7%*	*54.4%*	*64.7%*	NA	*54.6%*	*56.6%*	*52.0%*	NA

Source: U.S. Census Data, 2000 and 2006.
NA = Not Available

Table 7-8 Percentage of Families Whose Income in the Past 12 Months is Below the Poverty Line in Neighboring Towns

	Donaldsonville	Lutcher	Gramercy	North Vacherie	Garyville	South Vacherie
All Families	32.8%	21.1%	17.4%	20.7%	24.1%	11.8%
With related children under 18 years	42.2%	28.5%	24.5%	31.4%	32.1%	16.8%
With related children under 5 years only	49.4%	26.3%	31.3%	34.3%	28.6%	6.5%
Families with female householder, no husband	56.0%	61.5%	42.1%	50.7%	45.0%	47.4%
With related children under 18 years	66.2%	66.0%	51.4%	72.4%	50.9%	60.7%
With related children under 5 years only	73.8%	58.3%	66.7%	83.3%	38.7%	60.0%

Source: U.S. Census Data, 2000 and 2006.

The economic data presented above depicts a local economy which is lagging in the state and amongst neighboring parishes. Louisiana frequently ranks in the bottom half of national rankings of socio-economic status.

7.3.3 *Economic Benefits for St. James Parish*

The analysis prepared by LCA for the NSLA project determined that "By virtually any measure, the injection of new monies caused by the construction and operation of this new integrated facility in St. James Parish will be the biggest sales/earnings/jobs/tax generator the parish has ever experienced." The addition of the DRI facility to the NSLA project does not substantively alter this determination.

The primary social benefits from the project will arise from the creation of jobs, higher household earnings, increased sales, and new tax revenue. With increased employment for the residents of the parish, plus the influx of employees commuting to work from outside of the parish, a full spectrum of business sectors will experience higher demand as spending increases, including construction, housing, manufacturing, transportation, business services (e.g. banking), person services, and retail. LCA estimated the level of these economic benefits from the wider NSLA project, please refer to the NSLA application for the detailed analysis.

7.3.3.1 *Employment*

The construction activities of the Nucor Direct Reduced Iron Facility project will be conducted in two phases. Phase I will involve the construction of the first DRI unit with a capacity of 2.5 million metric tons of product, and will take place over a period of approximately 24 months. Immediately upon the completion of Phase I, construction is planned to begin on Phase II, with an expected construction duration of an additional 24 months. Phase II will consist of an

identical second DRI unit with equal capacity, for a total production rate of 5 million metric tons of DRI pellets. A constant construction workforce of approximately 500 workers is expected during the construction phase of each process unit. After Phase I is complete and in operation, it is expected to require a workforce of 150 permanent employees. An additional 100 employees will be required for operation of Phase II, once completed.

In addition to direct employment at the facility, significant local employment will be indirectly generated because of the project. Indirect employment results from businesses, contractors and suppliers that will be required to support the people and activities present during both construction and operation of the project. Examples of indirect jobs may be freight transportation of concrete and other construction materials, warehousing, professional services such as engineering and surveying, and infrastructure construction.

7.3.3.3 *Household Earnings*

In addition to the benefits enjoyed by the community from sales generated by construction and operation of the project, economic benefits will spread throughout St. James Parish via new earnings generated from jobs created by the project. Direct payrolls from Phase I of the project are expected to exceed $11 million per year, and increase to over $18 million per year after the completion of Phase II. These values reflect an expected average annual salary of $75,000.

7.3.3.4 *Expected Tax Base*

The project will also generate economic benefits for St. James Parish through tax revenues, both direct and indirect. St. James Parish has a distinct tax structure for industry that will best benefit both the project and the community. Because property taxes have yet to be assessed, these direct taxes are not included in this estimate, but are expected to be substantial. Additionally, St. James Parish can expect increased tax revenues from new spending due to household earnings generated by both the construction and operation of the project. St. James Parish will collect approximately 2.4 cents in sales tax for every additional dollar of new household earnings created in the Parish. Please refer to the economic impact analysis for the prior Nucor Steel Louisiana application for details of the expected tax impacts on St. James parish.

7.3.4 *Potential Negative Economic Effects*

With industrial projects past and present, public concerns have sometimes been voiced regarding the potential negative impacts of an industrial project upon local property values and future economic opportunities. A review of the conditions surrounding the Nucor Direct Reduced Iron Facility project site, and the possible affects of industrial activity at the site were conducted as part of this economic evaluation.

7.3.4.1 *Property Values*

Nucor strives to locate in areas where the effects of a project on the local community are as positive as possible, including the site location relative to other properties. Some studies exist that indicate decreased property values may be attributed to industrial projects in certain circumstances. These decreased property values may be due to stigma from surrounding industry, or damage from pollutants affecting property. Nucor will proactively address concerns over property values through close communication with the Parish and by implementing selected infrastructure improvement projects.

The majority of properties in the project site's immediate area are rural in nature. Large tracts of mostly agricultural land border the property to both the east and the west. Lightly developed residential areas, neighborhoods known as Romeville, exist along LA Hwy 44 (River Road) to both the east (downriver) and west (upriver). To the north and east, the McElroy Swamp extends for many miles and is undeveloped and uninhabited. The project site borders the Mississippi River to the south, and faces mostly agricultural tracts and a lightly developed residential area on the west bank. Several industrial properties are in the local area, including the Zen-Noh Grain Corporation, Occidental Chemical Corporation, Mosaic Phosphates Company - Uncle Sam Plant, Motiva Enterprises - Convent Refinery, Mosaic Phosphates Company - Faustina Plant, and CF Industries Incorporated. Refer to Figure 7-5 for the approximate locations of these industrial neighbors. Only a few commercial properties are in the local area, being mostly service stations and restaurants.

Nucor does not anticipate negative property value impacts to agricultural tracts or industrial properties. Additionally, because environmental impacts to the McElroy swamp are expected to be minimal due to the zero-discharge nature of the facility, value impacts to this property are expected to be minimal.

Although not a certainty, there are good indications that the Nucor Direct Reduced Iron Facility project could generate increased residential property values in St. James Parish. The Economic Impact Analysis produced by Loren C. Scott and Associates for the NSLA project estimated that spending in St. James Parish on real estate purchases, rentals and leasing should increase by nearly $32 million annually once operations commence, with an additional one-time increase of over $36 million during construction. The magnitude of these expected spending increases seem to indicate that existing homes would be in higher demand.

Nucor is committed to the communities, in which it operates, frequently improving or refurbishing public spaces. Such public area improvements typically contribute to increased property values. In this instance, Nucor is considering projects ranging from renovating local public spaces and parks to providing well-needed infrastructure such as sewage and road maintenance to residential areas. Nucor intends to swiftly engage the local community in the identification of relevant and appropriate projects. Within the greater St. James

Parish community, Nucor fully expects the project to improve property values as a whole as more services are brought into the area.

7.3.4.2 Public Costs

Because of the influx of employees and resources required for the project, existing community infrastructure must be increased and improved. While existing capacity is sufficient for the current social conditions in St. James Parish, the demands put on parish infrastructure by the Nucor Direct Reduced Iron Facility project could prove to be challenging. Therefore, an increase in public costs will accompany the additional public services necessary for strengthening the following:

- Police protection;
- Fire protection;
- Medical facilities;
- Schools;
- Utilities and sewage; and,
- Roads.

While these costs will certainly be necessary, they will be vastly outweighed by the economic benefits brought to the Parish. Additionally, Nucor is considering mechanisms to directly, or in partnership, improve community infrastructure in tandem with the construction of the facility. Nucor will consult with local communities and regulators to identify and prioritize appropriate projects and strategies to reduce the economic burden that may be felt in the Parish during construction of the facility.

7.3.5 Transportation Factors in Site Selection

7.3.5.1 Modes of Transportation

Trucks, trains, barges, and ships will be used for transportation of materials to and from the project. These industrial modes of transportation will bring raw materials into the site as well as distribute finished products. These modes of transportation will be necessary for both construction and operation of the project. In addition to the freight and shipping necessary for project materials, transportation will also be required for employees during both construction and operation of the project. Cars and buses will be used to transport employees to and from, in addition to in and around, the project area.

7.3.5.2 Geographical Area to be Serviced

As the Nucor Direct Reduced Iron Facility's primary product, DRI pellets will be distributed to existing electric arc furnace mills operated by Nucor, including mills in Armorel, AR, Hickman, AR, Memphis, TN, Decatur, AL, Jackson, MS, Berkeley, SC and Tuscaloosa, AL. These mills will in turn produce steel products for distribution nationwide.

7.3.6 *Long Term Expectations*

A project of this magnitude is expected to operate indefinitely. The Nucor Direct Reduced Iron Facility project represents a significant capital investment of over $264 million, exclusive of site acquisition and development costs attributable the wider NSLA project, and will be a long-term investment for the benefit of Nucor, St. James Parish and the greater Louisiana community for a length of time that has no set limit. In the history of Nucor, only one facility has ever been closed, and all employees affected by the closure were offered employment at other facilities owned by Nucor. Nucor has never had a lay-off due to lack of work, including during the recent economic downturn of 2008 and 2009.

Nucor is the sole owner of the project and will be fully responsible for the site if and when closure of the project takes place under its ownership. Because closure is not expected at this time, there is no formal plan for project closure and subsequent site security. If and when closure of the project is deemed feasible, Nucor will draft a comprehensive closure management plan. This plan will document a detailed time-line of closure activities, arrangements for employee assistance and community involvement, and site decommissioning events. This plan will also outline stipulations for ensuring that the project site is properly maintained and secured; Nucor will certify that the site is officially closed. Additionally, this plan will involve key stakeholders and a stakeholder engagement process to ensure that needs and concerns of the greater community are understood and addressed during closure activities. Stakeholder engagement will also be integral to identifying and evaluating future uses for the project site after closure.

Nucor has shown extensive financial strength in its existing assets. Nucor is a company with extensive financial backing to develop credible projects, with credible assurances that they will be constructed, operated, and, if necessary, closed in the best possible manner.

7.4 *"ARE THERE ALTERNATIVE PROJECTS WHICH WOULD OFFER MORE PROTECTION TO THE ENVIRONMENT THAN THE PROPOSED FACILITY WITHOUT UNDULY CURTAILING NON-ENVIRONMENTAL BENEFITS?"*

In light of changing economic conditions and public comment on the NSLA permits, Nucor has considered alternative projects and technologies in the planning for this project. The direct reduction of iron produces a material suitable for use in electric arc furnace mills for making steel products of a certain quality. Together with pig iron, these materials represent the best "clean iron units" currently available for the manufacture of higher value-added steel products.

7.4.1 *Technology Selection*

Although DRI pellets have a lower iron content than pig iron, they are a cost effective raw material for steelmaking in several applications. The manufacture

of DRI depends upon a substantial and long-term supply of natural gas. In past years, the DRI has been considered to be unattractive in the United States due to the high price of natural gas. Due to recent finds and extraction innovations of shale gas, both the current price and the future outlook of natural gas prices has made the investigation of domestic DRI production more favorable.

The only comparable product to DRI is pig iron, a material for which Nucor is already permitted to make at NSLA. With the installation of DRI production capacity as part of the Nucor Steel Louisiana project, Nucor will have an excellent mix of ironmaking capabilities, affording it the flexibility to meet the product quality and cost demands of its customers.

7.5 *"ARE THERE ALTERNATIVE SITES WHICH WOULD OFFER MORE PROTECTION TO THE ENVIRONMENT THAN THE PROPOSED FACILITY SITE WITHOUT UNDULY CURTAILING NON-ENVIRONMENTAL BENEFITS?"*

7.5.1 *Site Selection Criteria*

Nucor developed robust site selection criteria which took into consideration access to raw materials, ability to transport and distribute product to multiple clients, the local market for electricity, labor availability, environmental impacts, the size of land available for purchase, site elevation, the distance from open water and existing physical constraints. The St. James Parish site was chosen for the following reasons.

7.5.1.1 *Global*

The United States was selected as the location to best meet the needs of the proposed facility. A United States location is in close proximity to the proposed mill's market base, and has excellent shipping lanes for raw material logistics.

7.5.1.1.1 *Access to Raw Materials*

Roughly two tonnes of raw materials (i.e., coal and iron ore) are needed for the production of one tonne of pig iron product. Therefore, it was essential to have the site located near access to these raw materials, from a cost and logistics basis. The United States is a major global source for coal, in particular the low-sulfur anthracite coal necessary for metallurgical coke. Canada and Brazil are major sources for iron ore. A location which could accept a deep-draft, ocean-going freighter was therefore critical to a site in the United States. The Mississippi River is navigable to ships as far north as Baton Rouge.

7.5.1.1.2 *Ability to Transport and Distribute Product to Multiple Clients*

The site needed to have good logistical access. Specifically, the site needed access to a body of water navigable to barge traffic for the shipment of finished goods to Nucor's existing mini-mills. A location which could accept ocean shipping was also desirable. Therefore, general areas were chosen for each

country (Canada - St. Lawrence Seaway (Quebec); Brazil – ocean port; United States - Pacific/ Atlantic Oceans and Gulf of Mexico).

7.5.1.1.3 *Local Market for Electricity (Need and Demand)*

Electricity is generated during the pig iron production process. Therefore it is desirable that the site be located in an area where Nucor can sell energy at a good commercial rate. The United States, Canada and Brazil have a high need and demand for electricity.

7.5.1.1.4 *Labor Availability*

The site needed to be in close proximity to a large pool of industrial-skilled labor. The project will provide close to 900 jobs, the majority of which must be sourced locally. This criteria resulted in having no weight in the decision because all locations would provide a sufficient labor work force.

7.5.1.1.5 *Environmental Impacts*

No matter where the project is eventually located, Nucor will use Best Available Control Technology (BACT) in the design and construction of the facility, in order to minimize the impact of the facility on the local environment and community. Therefore, from a cost or regulatory perspective this criterion had no weight in the decision to locate at one site over another.

7.5.1.2 *United States*

The St. James Parish location was selected as the best to meet the following needs for the proposed facility.

7.5.1.2.1 *Access to Rail Spurs and Connections*

The site needed access to a rail system to be able to receive raw material freight and to potentially ship out product.

7.5.1.2.2 *Size of Land Available*

Nucor has purchased the land necessary for this project, which is capable of accommodating the phased development plan. Due to the available space at the Convent location, and the recent determination by LDEQ that the site was acceptable for the intended use of ironmaking, the NSLA site was determined to be the best possible location meeting size and accessibility requirements for the project.

7.5.1.2.3 *Access to Natural Gas*

A substantial supply of natural gas is needed for the operation of the DRI facility. The natural gas is primarily used as a raw material to generate reducing gas for the shaft furnace, but also as supplemental fuel for the reformers and as primary fuel for the package boilers.

7.5.1.2.4 Local Roads and Transportation

Local roads and transportation would need to be adequate to handle the increased traffic volume during the construction and operation phases of the project. A location near a major highway or freeway is desirable.

7.5.1.2.5 Elevation of Site and Distance from Open Water

The site needed to be sufficiently far away from the open water and at a high enough elevation to not be at risk from flooding due to hurricanes and tropical storms. Obviously, the proximal distance being farther away and higher elevation would be preferred.

7.5.1.2.6 Limit Physical Land-Base Restrictions

Bridges and/or shallow channel drafts can limit access to certain waterways for ocean-going ships/barges. Mobile Bay in Alabama is too shallow (approx. 40 feet) to allow ship access. The Mississippi Delta had a large portion of land available (1,500 acres); however, no deep water ports were available to directly bring in iron ore. Large ocean-going ships cannot travel up the Mississippi River beyond Baton Rouge.

7.5.2 Sensitive Areas

In order to ensure that the operation of the Nucor Direct Reduced Iron Facility would not unduly impact the environmental or historical value of the surrounding area, an investigation of specific sensitive areas neighboring the property was conducted.

7.5.2.1 Wetlands

U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Maps (Figure 7-7) provide a detailed overview of mapped wetlands that may be associated with the project area. A review of these maps indicates that approximately 336 acres of wetlands are within the project area. It is important to note that jurisdictional wetlands are determined by maps generated by the US Army Corps of Engineers (USACE), which may differ slightly from NWI data.

The vast majority of wetland areas identified, both on and off of the property, are north of LA 3125. These areas form the southern rim of the Maurepas Swamp, and there are no plans to develop in this area as part of the Nucor Direct Reduced Iron Facility project. Additionally, current project plans will leave those wetland areas identified south of LA 3125 largely untouched. Nucor obtained a Section 404 permit from the USACE, and will abide by the wetland mitigation requirements of the permit.

7.5.2.2 Estuaries

An estuary is a semi-enclosed coastal body of water with one or more rivers or streams flowing into it, and with a free connection to the open sea. An estuary is

typically the tidal mouth of a river (*æstus* is Latin for tide), and estuaries are often characterized by sedimentation or silt carried in from terrestrial runoff and, frequently, from offshore. They are typically made up of brackish water.

Many estuaries exist within the State of Louisiana. However, as shown in Figure 7-8, there are no estuaries within Nucor's property boundary, or in the immediate vicinity. Regardless of this fact, Nucor has no plans to discharge any waters to the lakes, rivers or streams of the State under normal operating conditions. Therefore, Nucor believes the potential of the Nucor Direct Reduced Iron Facility to impact estuaries is very small.

7.5.2.3 *Critical Habitats*

Figure 7-3 displays critical habitat areas within the Nucor Direct Reduced Iron Facility property, and in nearby areas. Forested wetland represents the vast majority of these areas, interspersed with areas of wetland marsh. The mass of wetland area to the north and northeast of the project site embodies the southwestern extremity of the Maurepas Swamp. The Maurepas swamp is a largely forested wetland area drained by the Blind River into Lake Maurepas.

Wetland areas represent the only critical habitats within the project area. Wetlands have been addressed by this report in Section 7.5.2.1. To the extent possible, project plans have been made which avoid the disturbance of the forested wetland areas within the project site. Nucor has made zero-discharge plans for storm water and process water use during normal operations, which should minimize project impacts upon wetland areas outside of the project site.

7.5.2.4 *Historic or Culturally Significant Areas*

The landforms and history of the area suggest that it possesses a low potential for containing cultural resources. Archaeological and historical studies have been conducted on the property by Coastal Environments, Inc. (1979, 1982, 1996, 2006), Southern Archaeological Research, Inc., (1981), Tulane University (1981), and Earth Search (1996, 1997). The entire property has been surveyed as a result of those studies, and four archaeological sites have been identified that are listed in the State of Louisiana archaeological site files. Those four sites correspond with sugar plantations that historically were operated within the study property. Those sites are 16SJ21 (Helvetia Plantation), 16SJ20 (Wilton Plantation), 16SJ30 (Colomb Plantation), and 16SJ34 (Saint Rose Plantation). Figure 7-9 shows the locations of historic and culturally significant areas on the Nucor site.

According to archeological site file for Helvetia Plantation (16SJ21), the westernmost of the four sites located within the present project area was first settled during the historic period by early Acadian settlers in the 1760s. Prior to and immediately after the arrival of the Acadians, several Native American groups are known to have settled in the general area of the plantation. Among those groups were the Houma and the Alabama, both of whom settled a short distance upstream. There are no known Native American habitations within the limits of 16SJ21. In the 1830s, the lands of the original Acadian settlers were

assimilated to create Helvetia Plantation. Although the Helvetia Plantation main house was demolished in 1966, sugar cane is still cultivated on the property.

Wilton Plantation (16SJ20), like neighboring Helvetia Plantation, was first settled in the 1760s by Acadian immigrants. In the late 1820s, the small parcels of these inhabitants were assimilated to form the core of Wilton Plantation, the largest of the four plantations in the study area. The Wilton plantation house was damaged during Hurricane Betsy in 1965, and was salvaged seven years later. Though neither the house nor the sugar mill remain, sugar cane is still grown on the property (Hahn et al. 1996:4-13, 4-22).

Tulane University conducted a Phase I cultural resources survey of Colomb Plantation (16SJ30) in 1981. That work was undertaken on behalf of Waldemar S. Nelson, & Company, Inc., for the then proposed Peabody Coal Terminal. The Tulane University project area was limited to about the 267 acre area between Wilton and St. Rose plantations. The results of the Tulane investigations were presented by Vickie Carpenter et al., in 1981. Carpenter et al. (1981:21) did not conduct a great deal of background research relative to the historic development of the Colomb Plantation project area, and it remains unknown when the lands of the plantation were first settled during the historic period. The property may have been acquired by Christophe Colomb in about 1810. The plantation, however, was apparently not developed until about 1835-1840. There is no known past occupation of Colomb Plantation by Native Americans.

Though encompassing four plantations that would have once included innumerable buildings, very few structures remain in the present project area. Even many of those standing as recently as 1996 have since been removed. Indeed, the only substantial structures remaining on the four plantations are Hymel's Seafood Restaurant, and the adjoining plantation store on Wilton and Helvetia plantations. The Helvetia Plantation sugar mill is no longer in operation, and has been at least partially dismantled. The only other known structures on Helvetia Plantation are a relatively modern barn area and a modern pump house and shed. There are no surviving standing structures at neighboring Wilton and Colomb plantations, and only a single-wide mobile home and the remains of a barn at St. Rose Plantation. With the exception of the barn, none of the surviving standing structures have been assessed for NRHP eligibility. No pre-civil war houses, tourist attractions or facilities, or campgrounds or parks are located on or near the study property. Based on this information, Nucor does not expect impacts to cultural and historical resources.

7.5.3 *Zoning and Land Use*

St. James Parish does not have a defined system of zoning or land use. Therefore, no re-zoning or land use restrictions need to be addressed with title to the property. The following section addresses common concerns associated with land use.

7.5.3.1 Heavy Industrial, Chemical Process, and Refinery Operations

As shown in Figure 7-5, the proposed project site is surrounded by heavy industrial facilities along the Mississippi River. The facilities that are near the proposed Nucor site include:

- Motiva Enterprises LLC - Convent Refinery,
- Mosaic Phosphate Company - Faustina Plant,
- Zen-Noh Grain Corporation,
- CF Industries,
- Allied Waste - Colonial Landfill
- Mosaic Phosphate Company - Uncle Sam Plant, and
- Occidental Chemical Corporation.

Aside from industrial use, the majority of land in the area is rural or undeveloped.

7.5.3.2 Chemical Contamination

The majority of the property has only ever been used for agricultural purposes, or is undisturbed wetland. Exceptions to this are the multiple pipelines that cross the property, and an existing compressor station for a natural gas pipeline. It is currently undetermined whether or not the compressor station will be moved from the property due to the project. A Phase II site assessment will be performed on the site. Nucor expects to find some affected soils in a few specific spots, most likely due to the operation and maintenance of farm equipment (fuel- or oil spill-related contamination such as diesel, lube oil, etc.). Any such areas will be remediated as required by State and Local regulations, in coordination with any necessary relocation of the existing pipelines.

Release of chemical contaminants into soils from operations at the Nucor Direct Reduced Iron Facility is unlikely due to the processes involved, the design of the facility and the use of paved process areas. As previously stated, the facility will not dispose of any solid or hazardous waste on the site.

7.5.3.3 Visual Amenity

The Nucor Direct Reduced Iron Facility project site is not noted for its visual amenity. The site is mainly cultivated fields with some uncultivated forested wetlands, the Mississippi River levee, and two minor highways. The site is largely flat (except for the levee), and is poorly drained. Farm roads throughout the site primarily parallel drainage ditches. The site has been cultivated for sugarcane for many years, and there is a designated burn site within the property for residual cane.

To the greatest extent possible, the local view will be managed to provide an aesthetically appealing industrial complex. Such measures will include

buffering, landscaping, attractive signs and entrance, and painted equipment. Buildings will be constructed of materials, textures, and colors to ensure they blend in with their environment and present an aesthetically appealing façade, and landscaping will be sown with native plants. Additionally, Nucor intends to build a large earthen berm along a majority section of the project perimeter, with an absolute elevation of 13 feet, equating to a height of 8 feet above grade at the major thoroughfare to the site, LA Hwy 3125. The purpose of the berm is to both reduce the impact of noise at ground level, and to provide a pleasing frontage at the facility boundary. Project plans include landscaping of the berm and main plant entrance to enhance appearance.

The Clean Air Act (CAA) protects visibility and visual amenity at National Wildlife Areas and certain national parks designated as Class I areas. Class I areas are defined by Section 162 of the CAA to be "all - (1) international parks, (2) national wilderness areas which exceed 5,000 acres in size, (3) national memorial parks that exceeds 5,000 acres in size, and (4) national parks which exceed six thousand acres in size, and which are in existence on the date of enactment of the CAA Amendments of 1977 shall be class I areas and may not be re-designated." Class I areas are managed by the Bureau of Land Management, with each area having an individual Federal Land Manager (FLM).

The FLM has designated criteria for determining the impact of industrial activities upon air quality-related values upon Class I areas, including visibility, and which facilities are subject to such review. Generally, facilities must apply a simple test to their scenario if they are situated within 300 km of a Class I area. The Breton Island National Wildlife Management Area (Breton) is the only Class I area within 300 km of the facility (~ 192 km). The scope of the DRI facility project falls beneath FLM review thresholds under FLAG guidelines.

7.5.4 *Flooding*

The Nucor Direct Reduced Iron Facility project site may be prone to flooding due it location along the Mississippi river, and its proximity to the Maurepas Swamp which surrounds the Blind River area southwest of Lake Maurepas. According to the 1999 FEMA Q3 Flood Hazard Maps, the Nucor facility is mostly out of the flood hazard zone (100-year floodplain) due to the USACE levee that lines the Mississippi River. However, the property areas north of State Route 3125 are within the special flood hazard zone, as shown on Figure 7-10. The land area covered by the floodwaters of the base flood is the Special Flood Hazard Area (SFHA) on NFIP maps. The SFHA is the area where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. Nucor does not anticipate construction or operation activities will occur within the property areas that are part of the SFHA.

Figure 7-11 shows a map depicting storm surge-related risks, as determined by the National Oceanographic and Atmospheric Administration (NOAA). NOAA has assigned storm surge risk levels to coastal areas by assigning risk scores based on the expected frequency of storm surge events and the potential magnitude of damage that could be caused. The majority of the Nucor Direct

Reduced Iron Facility project site falls within a Category 4 assignment of storm surge risk. This indicates that flooding of the site is possible as a result of hurricanes rated a Category 2 or higher on the Saffir-Simpson scale.

Flooding of the Nucor site could potentially cause damage to process machinery, buildings and vehicles, but represents little risk of widespread environmental harm. The Nucor Direct Reduced Iron Facility will not store bulk quantities of organic liquids or other toxic chemicals, and will not consume, process, or generate hazardous chemicals or waste as part of the manufacturing process. There should not be any damage to facility structures from wave action since the facility is located 162 miles above head-of passes, corresponding to 115 miles inland from the mouth of the Mississippi River in a straight line. Structures will be designed to withstand winds in accordance with State and Local building codes. In the event of a major storm event, Figure 7-12 displays the emergency evacuation routes near the Nucor facility.

7.5.5 *Ground Water Protection*

The ground water aquifers underlying the proposed Nucor site include the following freshwater bearing formations:

- Gramercy Formation
- Norco Formation
- Gonzales-New Orleans Formation

These and other water-bearing formations comprise the Lower Mississippi Alluvial Aquifer System. Aquifers beneath the site are not vertically connected and they are separated by significant thicknesses of low-permeability clays. Regardless, ground water will be protected at the proposed facility in several ways.

During construction, the emplaced pilings will be naturally sealed from vertical communication and downward migration by the plastic nature and low permeability of the subsurface clays. During facility operations, any and all hazardous and non-hazardous bulk liquid materials will be stored in suitable above-ground storage tanks with secondary containment surrounding each tank. Underground storage tanks, if used, would be designed and operated in accordance with local, State, and federal regulations. Nucor has no plans to utilize aquifer waters for industrial processes, and no plans to install any sort of injection wells for the disposal of fluid wastes.

7.5.6 *Potential Health Risks Due to Proximity*

The site chosen for the Nucor Direct Reduced Iron Facility project is extremely rural. Institutions and crop lands in close proximity to the proposed facility were identified to assess potential health risks.

7.5.6.1 *Cultivated Land*

Figure 7-6 displays a map showing the type and quantity of prime agricultural areas (i.e., crop or pasture land) in the vicinity of the project site. Sugarcane is the predominate crop currently grown within the property boundary, and indeed throughout St. James Parish. Within a 5-mile radius of the project site, very little land is dedicated to pasture. Operations at the Nucor Direct Reduced Iron Facility are not expected to stress crops to any meaningful degree. The facility will not use or process large quantities of hazardous chemicals, and the zero discharge nature of the plant's process water system should prevent the disruption of irrigation due to sedimentation in neighboring cultivated parcels. Sugar cane croplands currently co-exist with several industrial facilities in the local area without known affect, including three ammonia and/or phosphates fertilizer plants, a chlorinated chemicals facility, and a petroleum refinery.

7.5.6.2 *Institutions*

As shown in Figure 7-13, there are only two public institutions within a 1-mile radius of the Nucor facility: the Pleasant Hill Baptist Church, and Romeville Park. Both of these are located in the Romeville neighborhood on LA Hwy 44 just downriver from the project site. When the area under consideration is taken to a 5-mile radius, the number of public areas rises to 26:

- Five secondary educational institutions,
- Fourteen religious institutions,
- Three public parks,
- One child day care center,
- One college, and,
- One detention center.

Nucor has conducted sophisticated air dispersion modeling to determine the expected concentrations of pollutants in the local area using the AERMOD model. This modeling includes all industrial sources in the area including the proposed project, and the results are included with this application as Section 5.0. Even with the most conservative assumptions of emission rates and meteorological conditions, the results of this modeling indicate that the highest predicted concentration of each criteria pollutant will be well below the USEPA thresholds for the protection of human health and the environment, known as the National Ambient Air Quality Standards (NAAQS). Additional modeling was conducted for predicting the concentration of Toxic Air Pollutants (TAPs), as defined by the Louisiana Department of Environmental Quality, with similar results. On the basis of this modeling, conducted using methods and protocols to be approved by LDEQ, Nucor believes that the protection of human health and the environment is assured for areas located in close proximity to the project site. Nucor will work actively with LDEQ to address any questions or concerns with the modeling results.

7.5.7 *Protection of Air Quality*

Air quality will be protected by using BACT and MACT, as appropriate and required by federal and state regulations. These control measures will help to minimize air emissions impacts on the local community.

7.5.7.1 *Attainment and Non-Attainment Areas for Ozone*

High concentrations of ground-level ozone have been determined to have respiratory health effects in humans, and to contribute to atmospheric haze. Ozone is often referred to as a secondary pollutant, meaning that it is not directly emitted by anthropogenic activity but rather is formed in the atmosphere due to the reaction of precursor chemicals. The two most important ozone precursors have been identified as volatile organic compounds (VOC) and nitrogen oxides (NO_x). St. James Parish is in attainment with EPA's National Ambient Air Quality Standard (NAAQS) for ozone, known as the 8-hour ozone standard (Figure 7-14). However, the bordering parish of Ascension has been classified as non-attainment for ozone.

The Nucor Direct Reduced Iron Facility will be considered a major source of VOC under the Clean Air Act (CAA), as part of the wider NSLA facility. The majority of these emissions will be generated from operations at the coking ovens, and as products of combustion at the power boilers, hot blast stoves and sinter plant. Emissions of VOC have been conservatively (highly) estimated at the maximum possible operating rates, in order to analyze the greatest potential impact of these emissions on the environment. Even estimated in this manner, VOC will be the smallest criteria pollutant emitted from the project by total weight. Nucor will implement best combustion practices to minimize the formation of VOC due to combustion.

Emission of NO_x from the facility will also be considered major under the CAA. NO_x is typically formed when nitrogen found in either the fuel or the combustion air, which is normally inert, oxidizes at very high flame temperatures. The majority of these emissions will be generated during combustion of top gas at the reformers, and by burning natural gas at the package boilers. Nucor has made a determination of BACT control for NO_x emissions from these sources, and will implement these control technologies for the sources mentioned above. The determination of BACT is included with this application as Section 3.0.

Evidence exists from steel industry sources that the formation of NO_x due to the combustion of top gas is lower than that for natural gas (about one-third), as well as other traditional fossil fuels, on a per unit of energy basis. This has been attributed to fact that flame temperatures when burning such a low heat quality fuel are relatively low, and do not reach the very high temperatures required to produce large volumes of NO_x. Thus, the combustion of top gas represents a significant advantage over other fuels from the perspective of NO_x emissions, and thus favors the reduced formation of ozone.

7.5.7.2 *Contaminants Generated On-Site and Resulting Protection*

As discussed in this section, the Nucor Direct Reduced Iron Facility will meet the CAA's definition of a major source of criteria and hazardous air pollutants. Nucor will install BACT and MACT to provide for the protection of human health and the environment, in accordance with federal and state regulations. Nucor has extensively modeled the potential concentrations of contaminants due to the project and surrounding industrial activity. This modeling included typical PSD modeling requirements using AERMOD. The results of these studies have determined that ambient air quality will not suffer a significant adverse impact due to the Nucor Direct Reduced Iron Facility project.

7.5.7.3 *Potential for Unregulated Emissions*

Air emissions from the Nucor Direct Reduced Iron Facility will be permitted and regulated under all applicable federal and state regulations. The materials handled in the iron making process are normally solid minerals which are known to be chemically stable, and the facility will not manufacture or process potentially volatile organic liquids or toxic chemicals. Nucor believes that the potential for unregulated emissions will be very small.

7.5.7.4 *Odor Control*

Nucor believes that odor will not be a major concern with the Nucor Direct Reduced Iron Facility project, and iron-making processes in general. Currently, no odors are anticipated from the proposed processes and there are no plans to control or mitigate odors from the plant. Nucor will work closely with local officials and neighbors to address any concerns which arise due to odors from the facility.

7.5.7.5 *Air Emission Impacts*

Nucor will strive to maintain compliance with all federal, state and local laws and regulations governing the operation of an industrial facility which generates air emissions. As previously discussed, this will entail the installation of BACT under the New Source Review program, as well as MACT under the National Emission Standards for Hazardous Air Pollutants.

Nucor has invested heavily in the characterization and modeling of air emissions from the Nucor Direct Reduced Iron Facility project. Air dispersion modeling has been conducted to determine the possible impacts of air emissions upon the surrounding area. The results of air dispersion models show that the Nucor Direct Reduced Iron Facility project will meet all thresholds set by federal and state authorities.

Under the auspices of the CAA, the USEPA set the NAAQS for criteria pollutants as the minimum level of air quality deemed safe for human health. Nucor has modeled the potential concentrations of criteria pollutants in the local area due to emissions from the project and neighboring industrial activity, using the AERMOD model. The outcome of this modeling demonstrated that the Nucor

Direct Reduced Iron Facility project will not result in criteria pollutant concentrations at or above the NAAQS. The complete results of this modeling can be found in Section 5.

LDEQ requires major-source permit applicants to model emissions of TAPs which exceed certain threshold quantities, called minimum emission rates. Nucor has modeled the potential concentrations of TAPs in the local area due to emissions from the project and neighboring industrial activity, using the AERMOD model. This modeling concluded that concentrations of TAPs will remain below the Ambient Air Standards set by LDEQ. The full modeling report can be found in Section 5.

7.5.8 *Site Characteristics*

7.5.8.1 *Site Geology*

The site is located in the Mississippi River Deltaic Plain of the south Louisiana Hills portion of the Gulf Coastal Plain Physiographic Province. Sediments in the Deltaic Plain range in age from late Triassic to Recent Holocene and consist of over 5 miles of thickness of evaporates (Jurassic Louann), carbonates and younger Pliocene and Pleistocene clastic sediments. According to the geologic information published by the Louisiana Geological Survey and the USACE, the site is underlain by Holocene alluvial and natural levee deposits. This unit is composed of upper level Natural Levee materials, which are underlain by a zone of Reworded Pleistocene Age deposits which in turn are underlain by Pleistocene Age deposits. Beneath these layers, reworked Pleistocene layers were encountered and consisted of variable layers of low plasticity and high plasticity clays with intermittent silt and sand zones. Beneath this layer are Pleistocene Age deposits. These deposits consisted primarily of plastic clay with intermittent low plasticity clay and silt layers.

Figure 7-15 displays the geological formation found under the Nucor site. Alluvium and natural levees are found within the property boundary of the Nucor site. Alluvium is a gray to brownish gray clay and silty clay, reddish brown in the Red River Valley, some sand and gravel locally, which includes all alluvial valley deposits except natural levees of major streams. The natural levees are gray and brown silt, silty clay, some very fine sand, reddish brown along the Red River. They are shown only on past and present courses of major streams.

7.5.8.2 *Topography*

Louisiana is bordered to the west by the state of Texas; to the north by Arkansas; to the east by the state of Mississippi; and to the south by the Gulf of Mexico.

The surface of the state may properly be divided into two parts, the uplands and the alluvial, including coast and swamp regions. The alluvial regions, including the low swamps and coast lands, cover an area of about 20,000 square miles (52,000 km^2); they lie principally along the Mississippi River, which traverses the state from north to south for a distance of about 600 miles (1,000 km) and

ultimately empties into the Gulf of Mexico; the Red River; the Ouachita River and its branches; and other minor streams. The breadth of the alluvial region along the Mississippi River is from 10 to 60 miles (15 to 100 km), and along the other rivers it averages about 10 miles (15 km). The Mississippi River flows upon a ridge formed by its own deposits, from which the lands incline toward the low swamps beyond at an average fall of six feet per mile (3 m/km). The alluvial lands along other streams present very similar features.

The higher lands and contiguous hill lands of the north and northwestern part of the state have an area of more than 25,000 square miles (65,000 km²). They consist of prairie and woodlands. The elevations above sea-level range from 10 feet (3 m) at the coast and swamp lands to 50 and 60 feet (15–18 m) at the prairie and alluvial lands. In the uplands and hills the elevations rise to Driskill Mountain the highest point in the state at only 535 feet (163 m) above sea level. Only two other states in the union, Florida and Delaware, are geographically lower than Louisiana, though several other states, such as Kansas and Nebraska, are geographically flatter.

Besides the navigable rivers already named (some of which are called bayous), there are the Sabine, forming the western boundary, and the Pearl, the eastern boundary, the Calcasieu, the Mermentau, the Vermilion, the Teche, the Atchafalaya, the Boeuf, the Lafourche, the Courtableau, the D'Arbonne, the Macon, the Tensas, the Amite, the Tchefuncte, the Tickfaw, the Natalbany, and a number of other streams of lesser note, constituting a natural system of navigable waterways, aggregating over 4,000 miles (6,400 km) in length, which is unequalled in the United States. The state also has 1,060 square miles (2,745 km²) of land-locked bays, 1,700 square miles (4,400 km²) of inland lakes, and a river surface of over 500 square miles (1,300 km²).

Figure 7-16 is a zoomed in view of the topography at the Nucor site.

7.5.8.3 *Soil Properties*

As shown in Figure 7-17, the following soils are located within Nucor's property boundary (including approximate acreages):

- Barbary association (Ba) - 366 acres;
- Cancienne silty loam (Cm) - 767 acres;
- Cancienne silty clay loam (Cn) - 319 acres;
- Carville fine sandy loam (Co) - 29 acres;
- Carville complex (Cr) - 211 acres;
- Mhoon silty clay loam (Mh) - 77 acres;
- Schriever silty clay loam (Sh) - 832 acres;
- Schriever clay (Sk) - 267 acres;
- Schriever association, frequently flooded (Sm) - 713 acres;
- Vacherie fine sandy loam (Va) - 434 acres; and,

- Vacherie silt loam (Vh) - 48 acres.

Barbary association (Ba) is a soil that is level and very poorly drained. It is a very fluid mineral soil in swamps. This soil is ponded and flooded most of the time. Typically, the soil has a muck surface layer and a gray, very fluid clay underlying material. This soil has low strength. The total subsidence potential is medium. If the soil is drained, it can have a very high shrink-swell potential.

Cancienne silt loam (Cm) is a nearly level, somewhat poorly drained soil on alluvial plains. It is loamy throughout and has high fertility. Runoff is slow, and water and air move moderately slowly through the soil. A seasonal high water table is about 1.5 to 4 feet below the surface during December through April. The shrink-swell potential is moderate. Slopes range from 0 to 2 percent.

Cancienne silty clay loam (Cn) is a nearly level, somewhat poorly drained soil on alluvial plains. It is loamy throughout and has high fertility. Runoff is slow, and water and air move moderately slowly through the soil. A seasonal high water table is about 1.5 to 4 feet below the surface during December through April. The shrink-swell potential is moderate. Slopes range from 0 to 2 percent.

Carville fine sandy loam (Co) is a nearly level, somewhat poorly drained soil on the alluvial plains of the Mississippi River. The surface layer is loamy and the underlying material is stratified with loamy and sandy materials. Natural fertility is high. Permeability is moderate. The soil has a seasonal high water table during wet periods.

Carville complex (Cr) is a complex consisting of a nearly level somewhat poorly drained, loamy soil and a similar soil that is calcareous throughout. The soils are on alluvial plains of the Mississippi River. They are loamy throughout. Natural fertility is high. Permeability is moderate. Both soils have a seasonal high water table during wet periods.

Mhoon silty clay loam (Mh) is a level or nearly level, poorly drained soil on flood plains. It is loamy, grayish, and mottled throughout. Soil reaction is medium acid to neutral in the surface layer and neutral to moderately alkaline in the subsoil. Natural fertility is high. Surface runoff is slow, and permeability is slow. The soil has a seasonal high water table within 3 feet of the soil surface during December through April. The shrink-swell potential is moderate in the subsoil. Slopes are less than 1 percent.

Schrieve silty clay loam (Sh) is a level or nearly level, poorly drained soil is on flood plains. The surface layer is loamy and the subsoil is clayey. Cracks form during dry periods, and they seal over during wet periods. Natural fertility is high. Runoff is slow. A seasonal high water table is within 2 feet of the soil surface during December to April. Flooding is rare. The soil dries slowly once wetted. The shrink-swell potential is high or very high in the subsoil. Slopes are less than 1 percent.

Schriever clay (Sk) is a nearly level, poorly drained, soil on broad flats on the alluvial plain. It is clayey throughout. Natural fertility is medium or high.

Runoff is slow or very slow. Water and air move very slowly through the soil. The shrink-swell potential is high or very high. A seasonal high water table is within 2 feet of the soil surface during December through April. Flooding is rare, but it can occur during unusually wet periods. Slopes are less than 1 percent.

Schriever association, frequently flooded (Sm) is a level, poorly drained or somewhat poorly drained soil at low elevations on the alluvial plain. It is flooded frequently for very long periods. This soil is clayey throughout or it has a loamy surface layer and a clayey subsoil. Natural fertility is high. Surface runoff is very slow. Water and air move very slowly through the soil. The seasonal high water table is near the soil surface. This soil has a very high shrink-swell potential. Slopes are less than 1 percent.

Vacherie fine sandy loam (Va) is a level, somewhat poorly drained soil on intermediate positions on the natural levees of the Mississippi River and its distributaries. It is on areas where natural levees have been breached by former floods. The surface layer and subsoil are loamy, and the underlying material is clayey. Natural fertility is high. Permeability is moderate in the loamy subsoil and very slow in the clayey underlying material. This soil has a seasonal high water table during the winter and spring.

Vacherie silt loam (Vh) is a level, somewhat poorly drained soil on intermediate positions on the natural levees of the Mississippi River and its distributaries. It is on areas where natural levees have been breached by former floods. The surface layer and subsoil are loamy, and the underlying material is clayey. Natural fertility is high. Permeability is moderate in the loamy subsoil and very slow in the clayey underlying material. This soil has a seasonal high water table during the winter and spring.

7.5.8.4 Aquifer Locations and Hydrology

Figure 7-18 displays the different aquifer systems within Nucor's property boundary and in the surrounding area. Figure 7-19 displays the location of underlying hydrologic features of Verret Bayou, Chevreuil Bayou, Citamon Bayou, Grand Bayou, Blind River, and Mississippi River.

7.5.8.5 Subsidence Problems

According to the USGS, the Mississippi River delta plain is subject to the highest rate of relative sea-level rise (3 ft per century) of any region in the nation largely due to rapid geologic subsidence (Figure 7-20). Subsidence impacts the socio-economic fabric of south Louisiana by placing communities and infrastructure at risk of being inundated by Gulf waters.

To assess the impact of marine transgression caused by subsidence at a given location, it is necessary to have a thorough understanding of the natural processes that operate on the delta plain. Reliable scientific data are needed to identify the 'hot spots' of subsidence, where infrastructure is most at risk, and what are the best strategies to sustain and restore Louisiana's coastal wetlands. In a collaborative study, the US Geological Survey (USGS), USACE, and the

University of New Orleans (UNO) developed an objective and reliable scientific database targeting subsidence and sea-level rise for environmental managers, planners, and researchers by conducting detailed studies within the Mississippi River delta plain.

7.5.8.5.1 Short- and Long-Term Trends

Short-term rates of submergence are monitored using tide gauges located across southeastern Louisiana. These gauges, which have been in place since the 1930's, provide records of sea-level change. Tide-gauge records document sub-decadal rises in sea level, this data combined with land-loss data provide information on how sea level affects coastal wetlands and coastal infra-structure. Long-term rates of submergence (over the past several thousand years) can be determined through radiocarbon age dating of peat deposits. Radiocarbon analysis of buried peat deposits formed at sea level will provide information on rates of subsidence and provide insight into Holocene sea-level history.

7.5.8.5.2 Geologic Processes and Controls

Understanding the effects of regional subsidence requires knowledge of a number of factors. Field investigations have been designed to assess subsidence at various spatial and temporal scales across the different geologic provinces of the delta plain:

Structure: The delta plain is traversed by hundreds of coast-parallel normal growth faults. Fault traces and rates of movement can be estimated from existing databases to identify the areas where fault activation contributes to subsidence.

Mississippi River Deposits: Much of the delta plain is located over a paleo-valley cut by the Mississippi River when sea level was lower. This incised valley was filled with deltaic deposits that range in thickness from 20 to 120 m (Figure 7-21). Deltaic deposits comprise a complex network of depositional environments including sandy channel fills, silty natural levees, and muddy inter-distributary bays. The physical property thickness, and lateral extent, of each environment influences the rate of sediment compaction and subsidence.

Fluid Withdrawal: At a local scale the effect of fluid withdrawal can affect subsidence. It is well documented that forced drainage areas experience enhanced subsidence.

7.5.8.5.3 Impacts of Subsidence and Sea-Level Rise

The effect of subsidence on coastal environments of Louisiana varies from direct lowering of roads and levees to rapid degradation of marsh vegetation and soils. As the land subsides and sea level rises, the threat of flooding wetlands and commercial and residential infrastructure increases. Published reports indicate that coastal marshes can typically accrete at a rate that keeps pace with a slow rate of sea-level rise. As the rate of sea-level rise increases, coastal mashes cannot maintain their elevation, and they submerge and are transformed to open water.

Since the arrival of the first settlers, mankind has been changing the Mississippi River delta plain. Variations in subsidence of the delta plain are frequently compounded by drainage of wetlands for agricultural, residential, or industrial development, and the digging of canals through wetland areas. Drainage causes additional subsidence of soils and reduces elevations to below current sea level in many areas. Levees are then necessary to protect the developed areas from flooding. The roads and railways that cross Louisiana coastal wetlands and provide access to coastal communities and inshore and industrial facilities are being progressively lowered by subsidence and threatened by increases in sea level.

7.5.8.6 Weather Conditions

Louisiana has a humid subtropical climate, perhaps the most "classic" example of a humid subtropical climate of all the Southeastern states, with long, hot, humid summers and short, mild winters. The subtropical characteristics of the state are due in large part to the influence of the Gulf of Mexico, which even at its farthest point is no more than 200 miles away. Precipitation is frequent throughout the year, although the summer is slightly wetter than the rest of the year, and there is a dip in precipitation in October.

Southern Louisiana receives far more rainfall than most areas of the country, especially during the winter months. Summers in Louisiana are hot and humid, with high temperatures from mid-June to mid-September averaging 90 °F or more, and overnight lows averaging above 70 °F. In summer, the extreme maximum temperature is much warmer in the north than in the south, with temperatures near the Gulf of Mexico occasionally reaching 100 °F, although temperatures above 95 °F are commonplace.

Temperatures are generally mildly warm in the winter in the southern part of the state, with highs around New Orleans, Baton Rouge, the rest of south Louisiana, and the Gulf of Mexico averaging 66 °F. The overnight lows in the winter average well above freezing throughout the state, with 46 °F the average near the Gulf. Snow is not very common near the Gulf of Mexico.

Louisiana is often affected by tropical cyclones and is very vulnerable to strikes by major hurricanes, particularly the lowlands around and in the New Orleans area. The unique geography of the region with the many bayous, marshes and inlets can make major hurricanes especially destructive. The area is also prone to frequent thunderstorms, especially in the summer. The entire state averages over 60 days of thunderstorms a year, more thunderstorms than any other state except Florida. Louisiana averages 27 tornadoes annually. The entire state is vulnerable to a tornado strike, with the extreme southern portion of the state slightly less than the rest of the state. Tornadoes are much more common from January to March in the southern part of the state.

The winter specifically in St. James Parish is mild. In late spring and summer, temperatures vary from 80 to 90 degrees. Average annual precipitation is 60.6 inches.

7.6 *"ARE THERE MITIGATING MEASURES WHICH WOULD OFFER MORE PROTECTION TO THE ENVIRONMENT THAN THE FACILITY AS PROPOSED WITHOUT UNDULY CURTAILING NON-ENVIRONMENTAL BENEFITS?"*

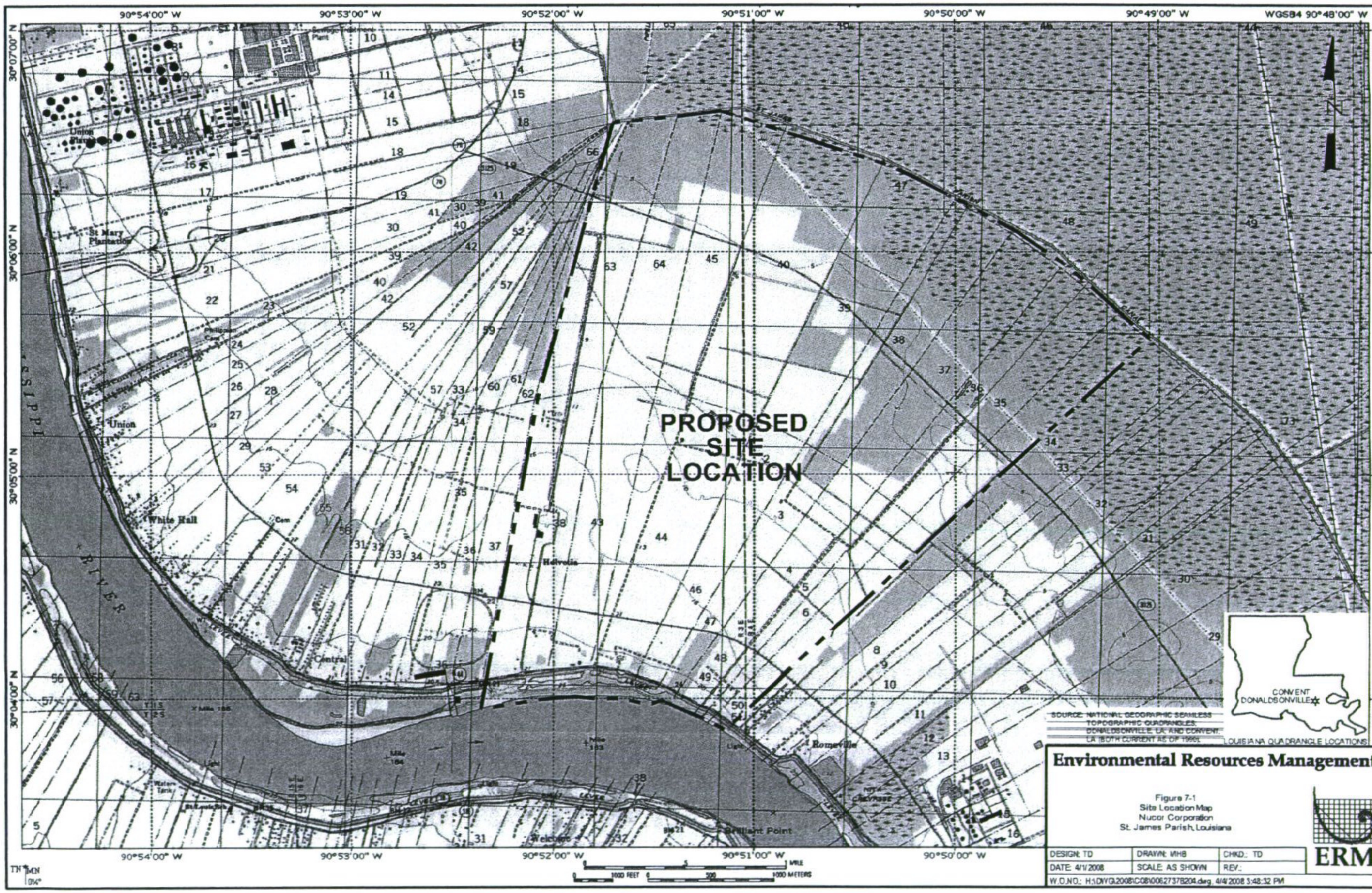
Nucor has carefully considered the environmental impacts of each phase of the project, and from each process area to be built and operated at the site. Nucor will implement innovative techniques, such as storm water collection and zero-discharge water use, to keep our environmental footprint as small as possible. Traditional industry recycling methods such as the proposed sinter plant and briquetting plant will be used to reduce solid wastes as much as possible.

Nucor firmly believes that the proposed the Nucor Direct Reduced Iron Facility facility, with the selected process technologies, environmental controls and waste prevention methods, will minimize the potential environmental impacts of the project upon the local communities and environment. Nucor will work diligently with State, Parish and local authorities to address any concerns that may be held regarding the impact of our project upon public resources and infrastructure.

7.7 *CONCLUSION*

Nucor believes that this Response to the IT Decision Questionnaire has provided the Administrative Authority with strong evidence that the social and economic benefits of the proposed the Nucor Direct Reduced Iron Facility will far outweigh the potential environmental impacts. Specifically, convincing evidence was provided which indicates that the social and economic benefits of the project will be extraordinary, and should greatly outweigh any potential for environmental risk. Nucor fully intends to avoid the potential and real adverse environmental impacts of the project to the maximum extent possible. No alternative sites are available within Louisiana that both meet the needs of the project and could offer more protection to the environment. Alternative technologies were examined and determined to either not provide more protection to the environment, not to meet the underlying project goals, or both. No additional mitigating measures have been determined to be feasible for the project, and Nucor believes this is due to its choice in selecting leading technologies for efficiency and environmental responsibility.

In light of the vast benefits the Nucor Direct Reduced Iron Facility project stands to provide for St. James and surrounding Parishes, it is Nucor's conviction that the project presents a profoundly positive development for the citizens of St. James Parish, and the State of Louisiana. As such, Nucor believes the project fully satisfies Louisiana's public trust doctrine, and requests that permitting be granted on that basis.



Environmental Resources Management

Figure 7-1
Site Location Map
Nucor Corporation
St. James Parish, Louisiana

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SOURCE: GOOGLE EARTH DIGITAL IMAGE DATED OCTOBER 25, 2007; AND PORT OF SOUTH LOUISIANA DRAWING NO. 133.MXD.

NOTE: ALL DIMENSIONS AND MEASURES ARE APPROXIMATE.

Environmental Resources Management

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Figure 7-2
Site Boundary and Land Tracts
Nucor Corporation
St. James Parish, Louisiana

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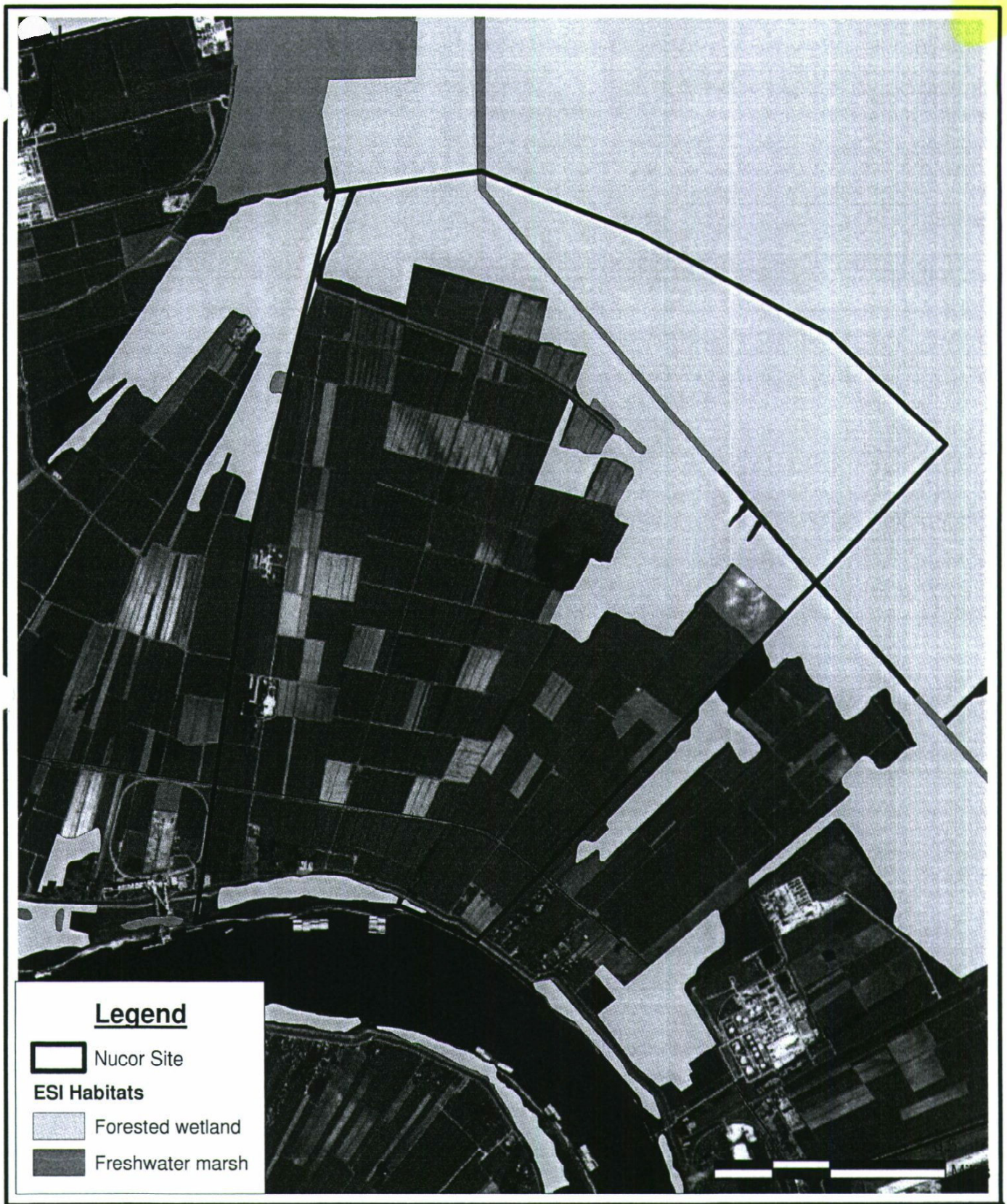

Environmental Resources Management

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Figure 7-3
Critical Habitats
Nucor Corporation
St. James Parish, Louisiana

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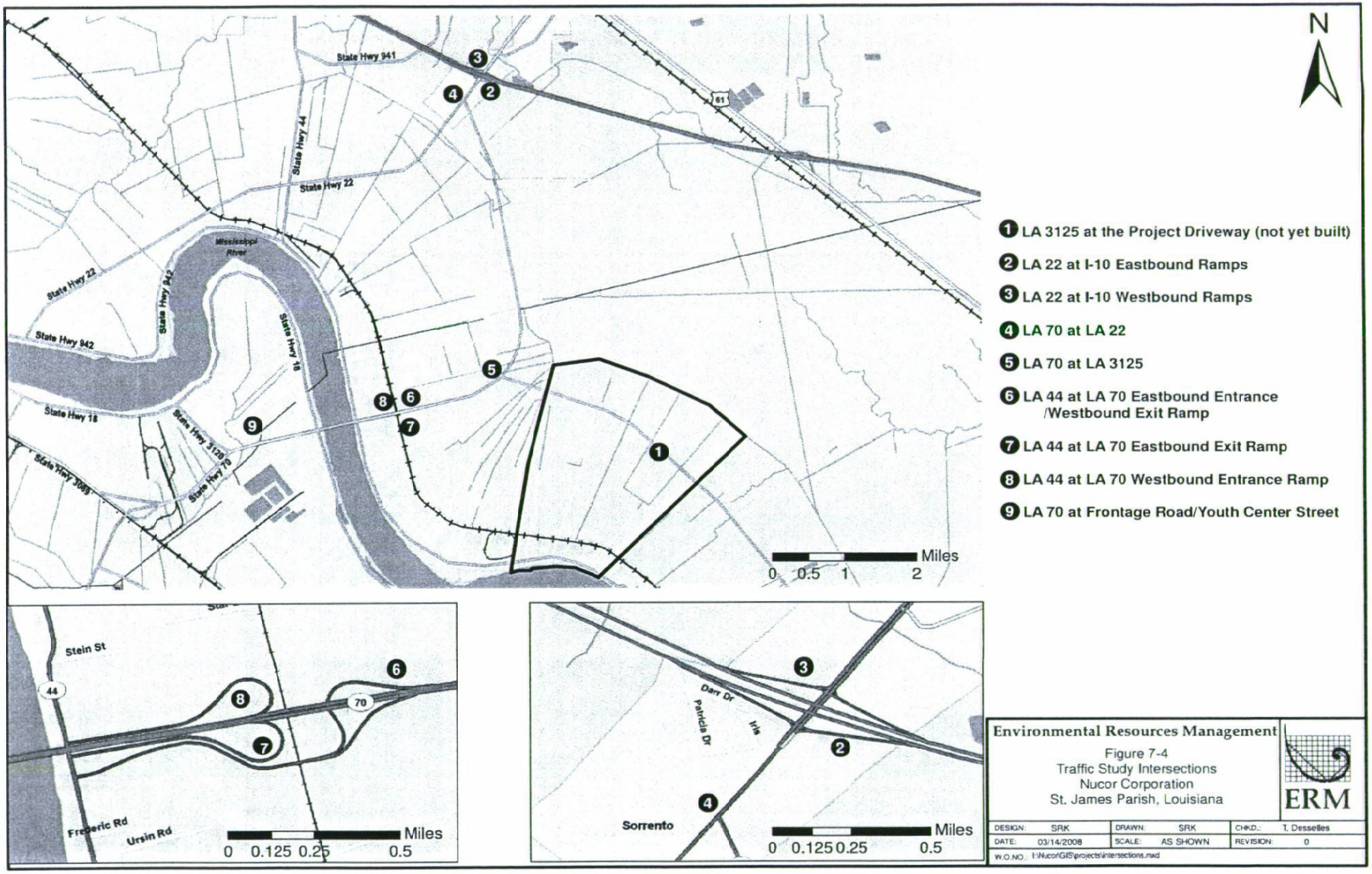

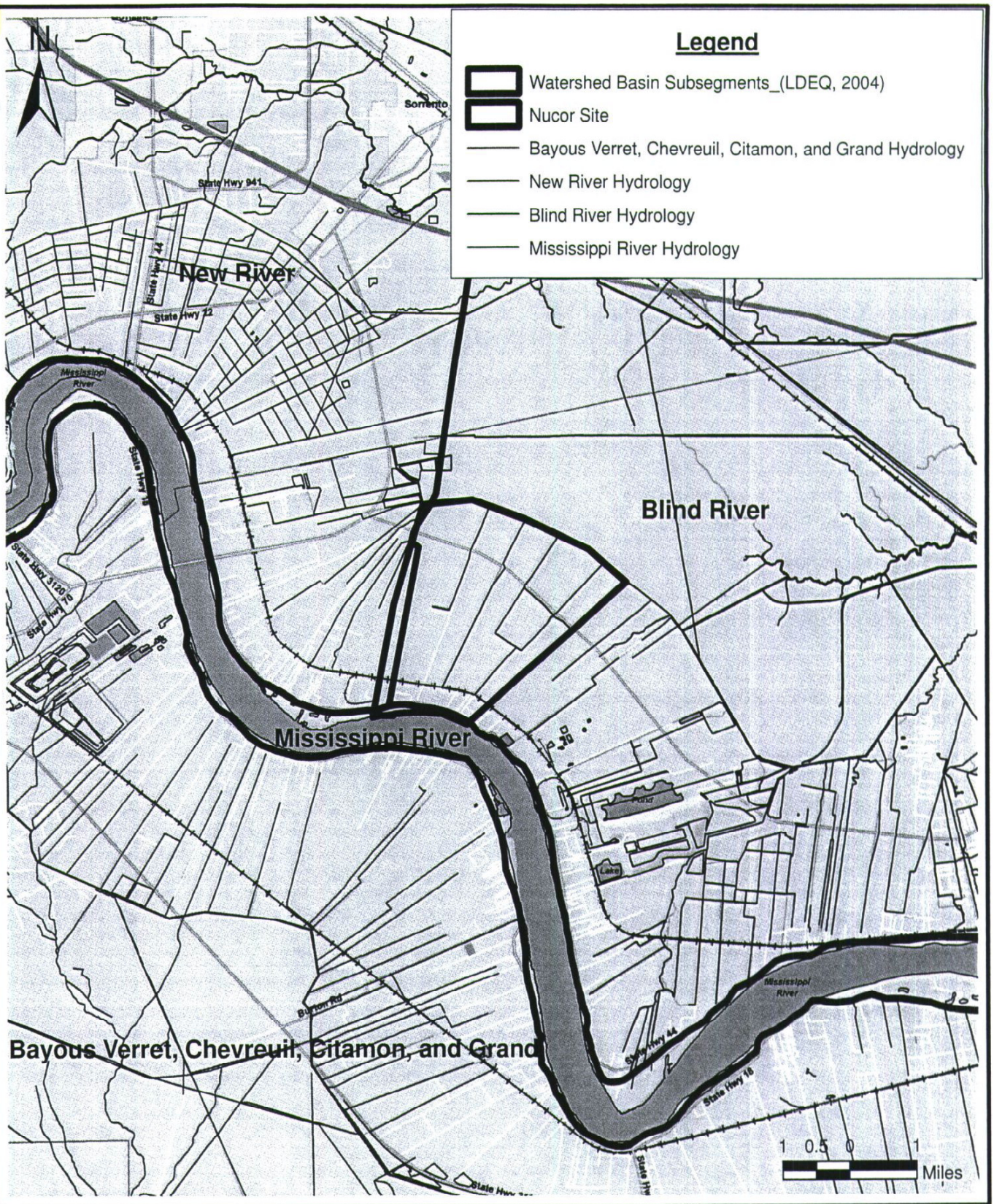

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Figure 7-5
Surface Hydrology
Nucor Corporation
St. James Parish, Louisiana

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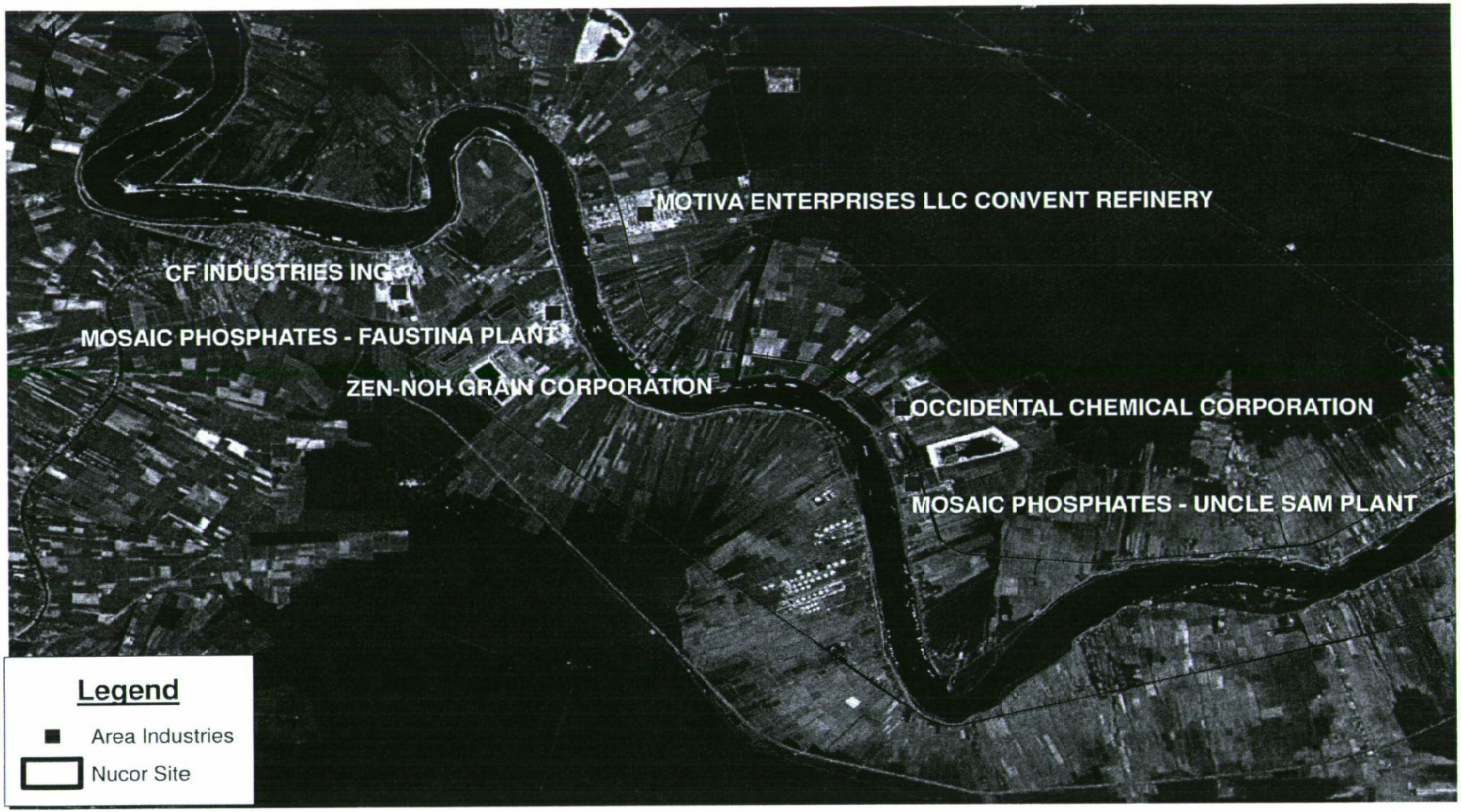

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Figure 7-6
Area Industry
Nucor Corporation
St. James Parish, Louisiana

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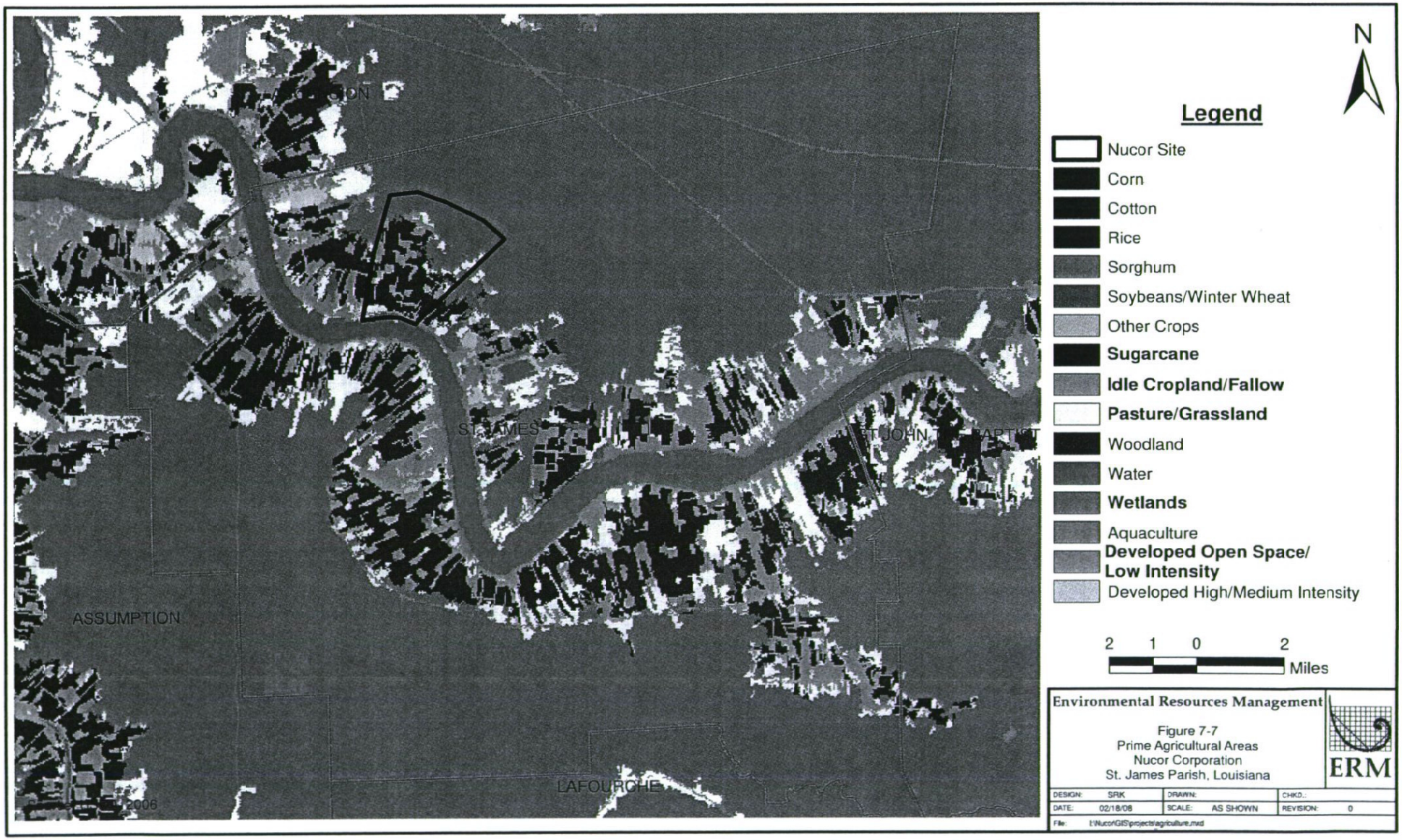

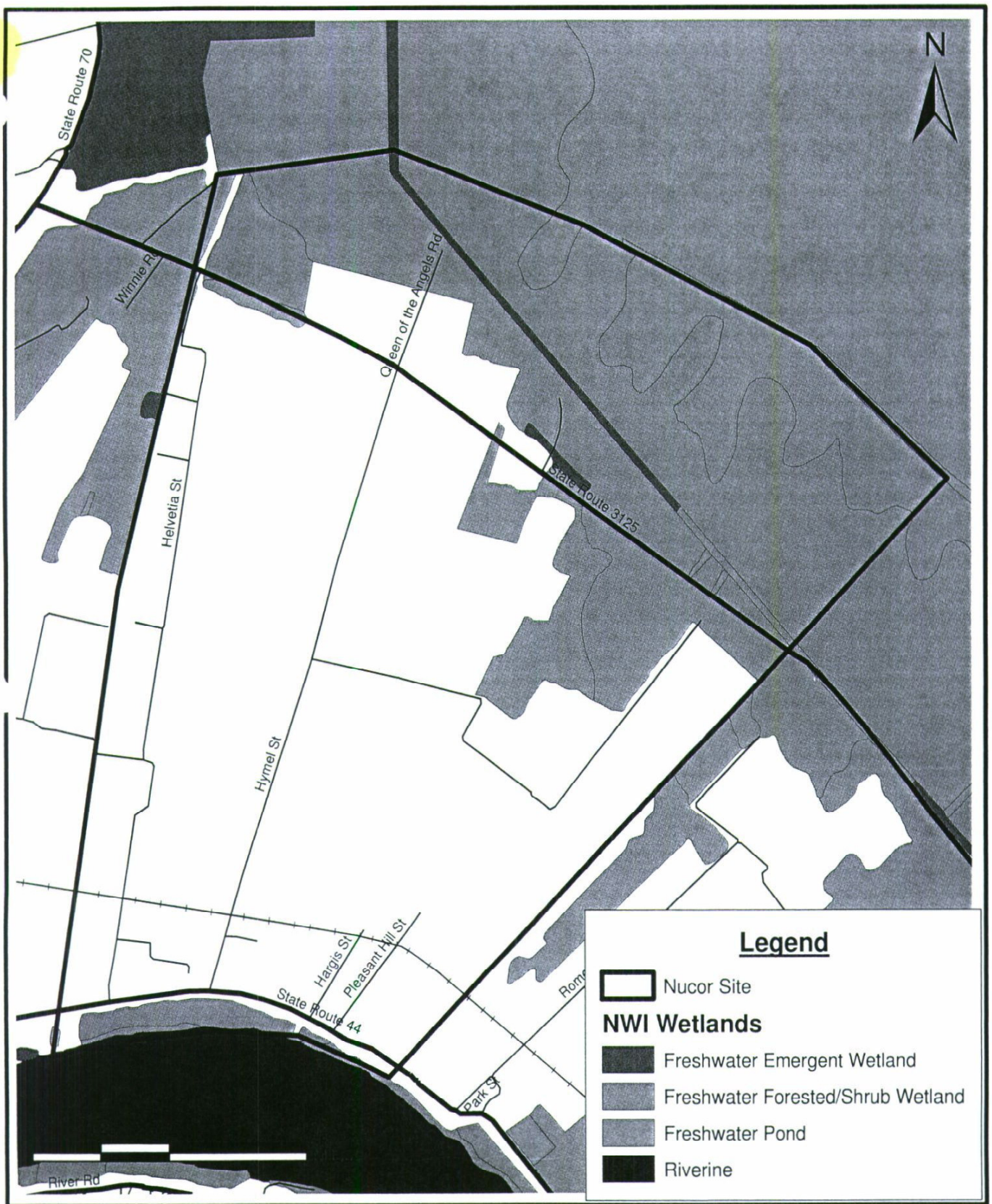

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Figure 7-8
NWI Wetlands
Nucor Corporation
St. James Parish, Louisiana

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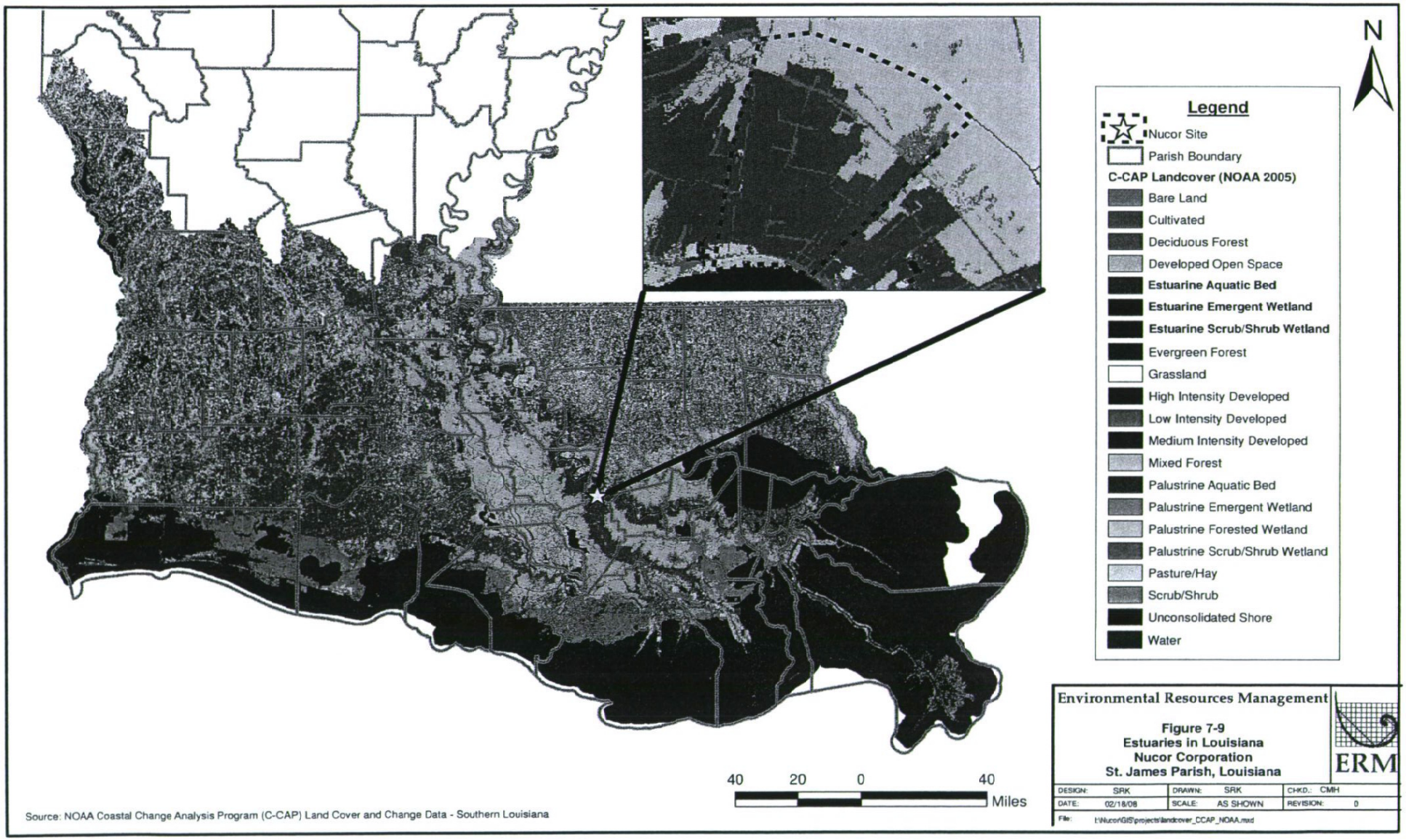

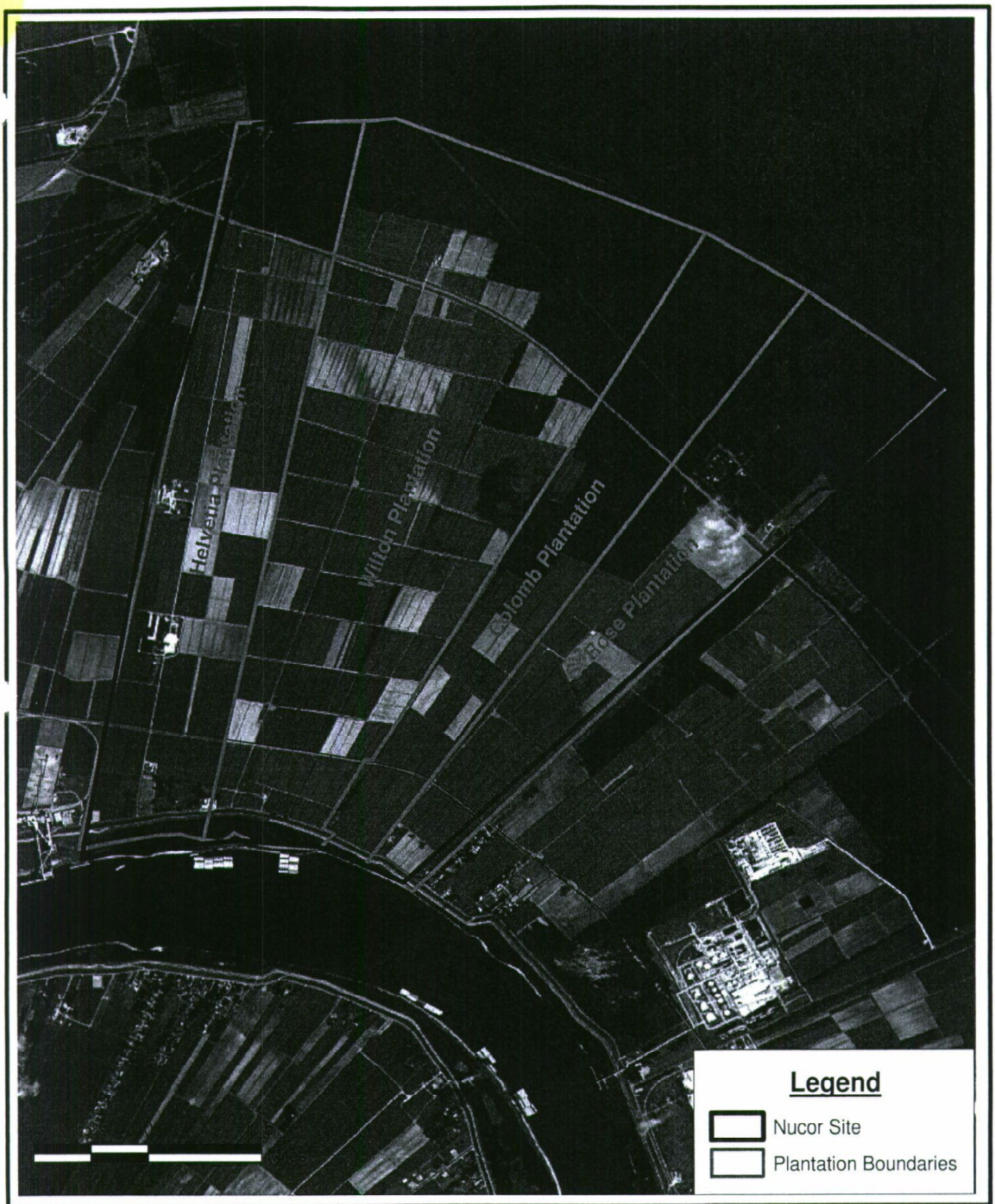

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Figure 7-10
Historical & Cultural Resources
Nucor Corporation
St. James Parish, Louisiana

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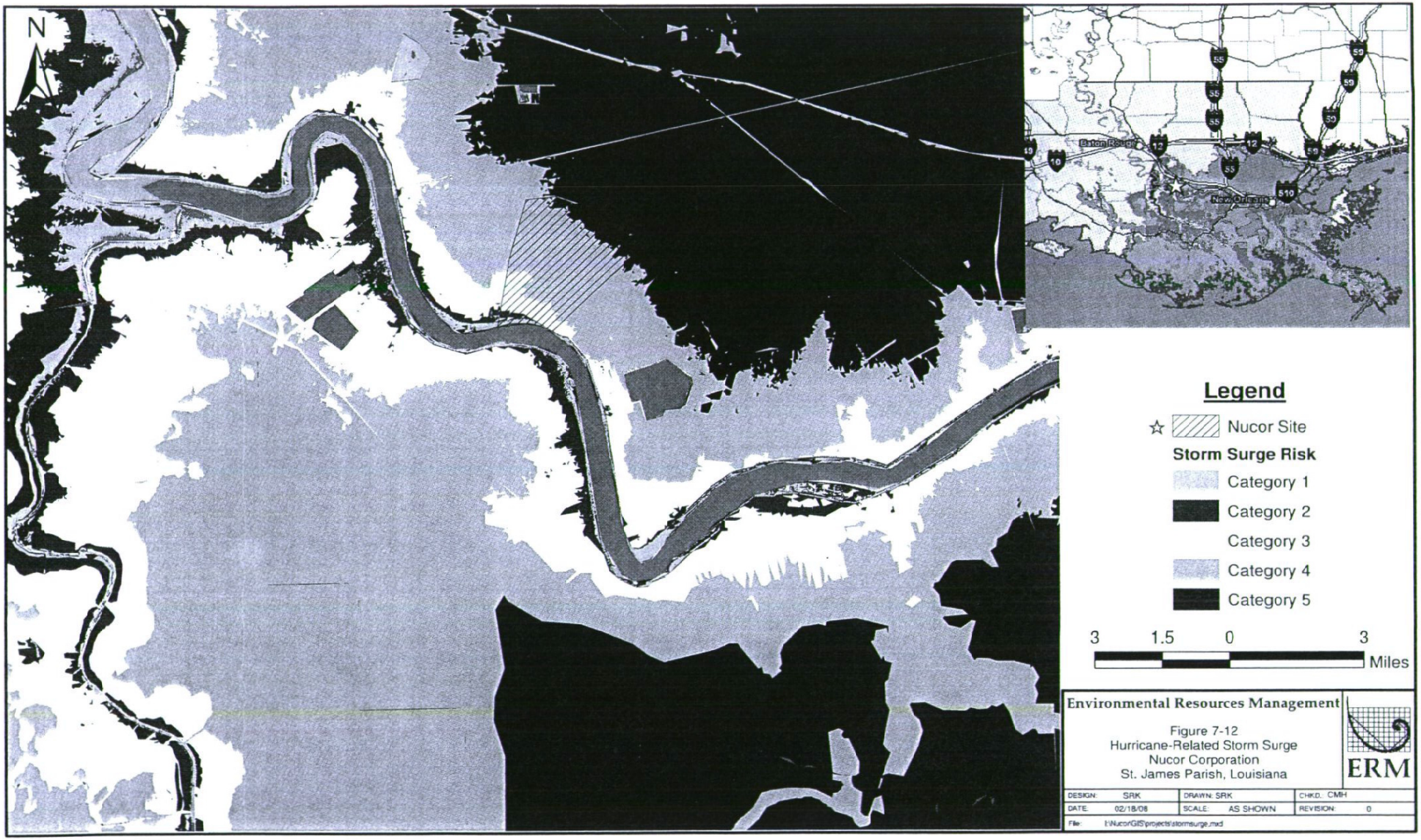

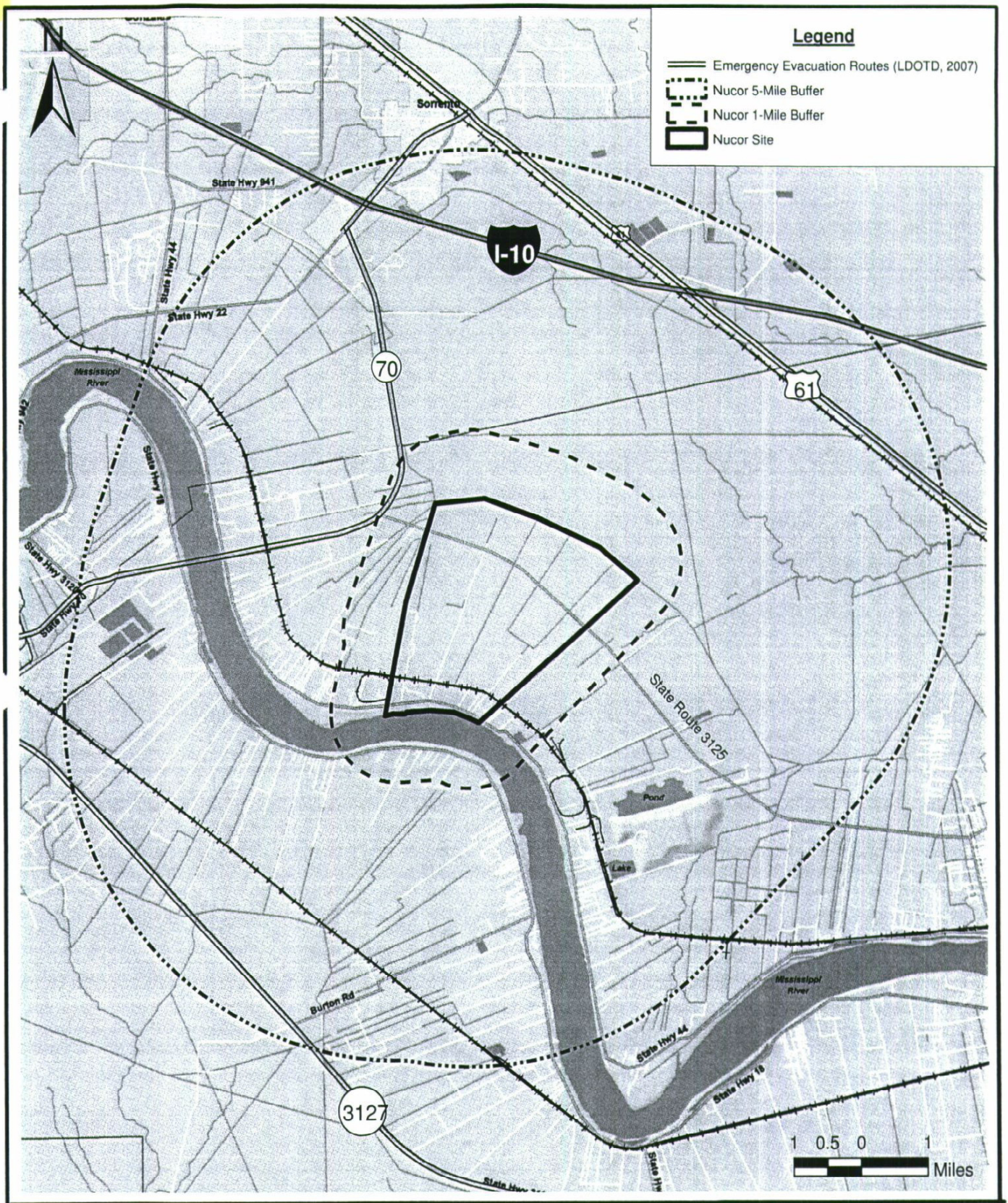

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Figure 7-13
Emergency Evacuation Routes
Nucor Corporation
St. James Parish, Louisiana

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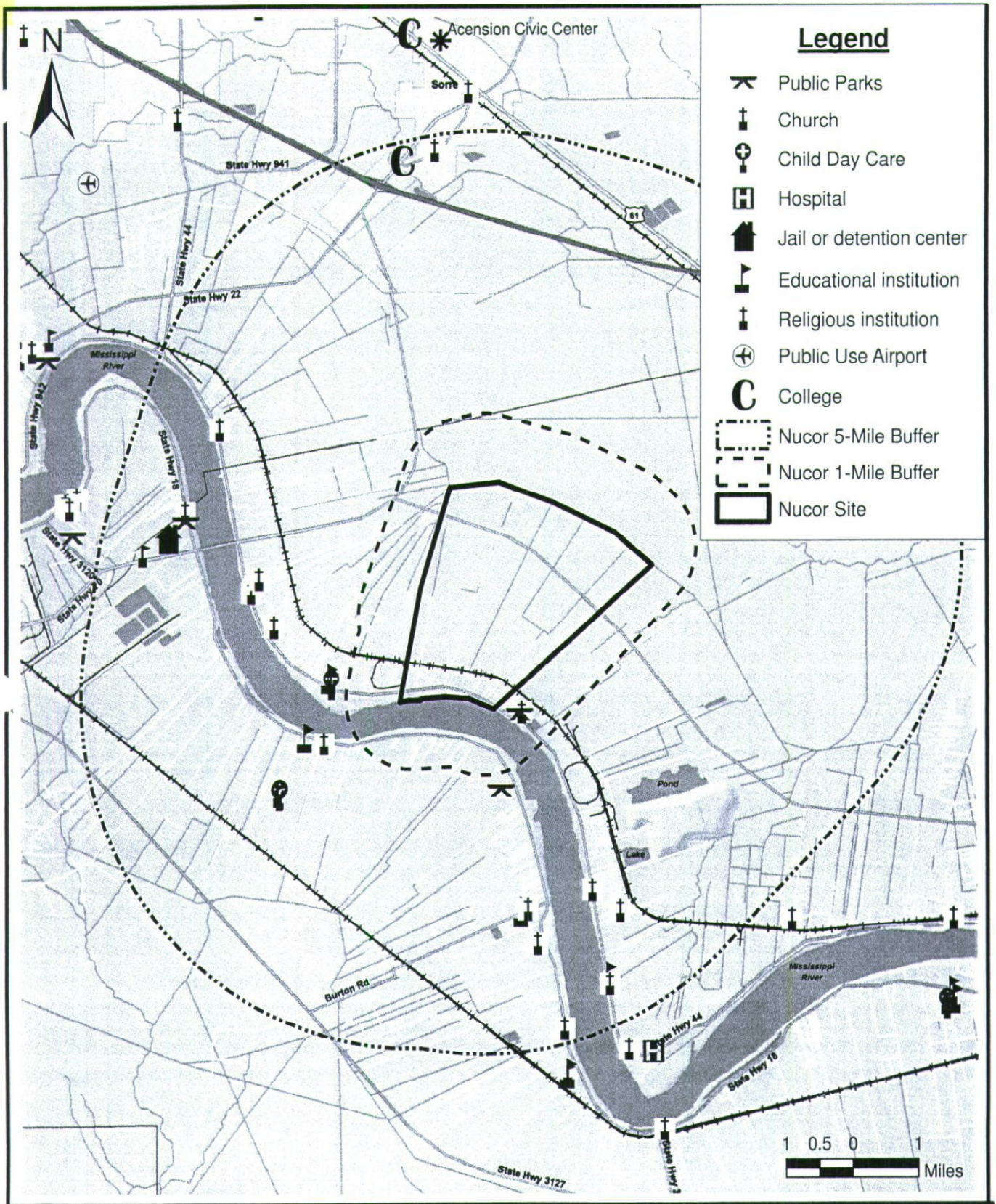

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Figure 7-14
Public Institutions
Nucor Corporation
St. James Parish, Louisiana

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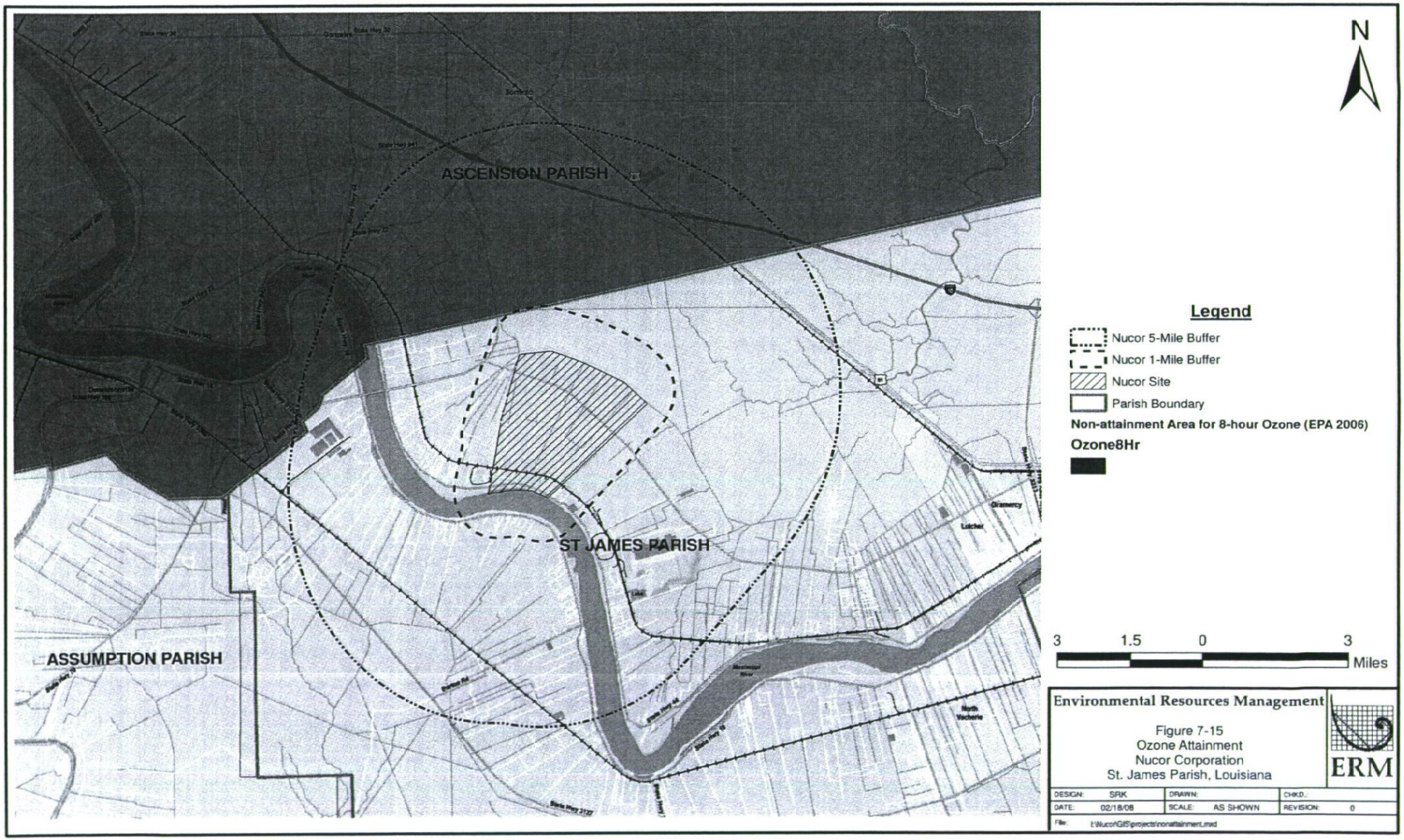

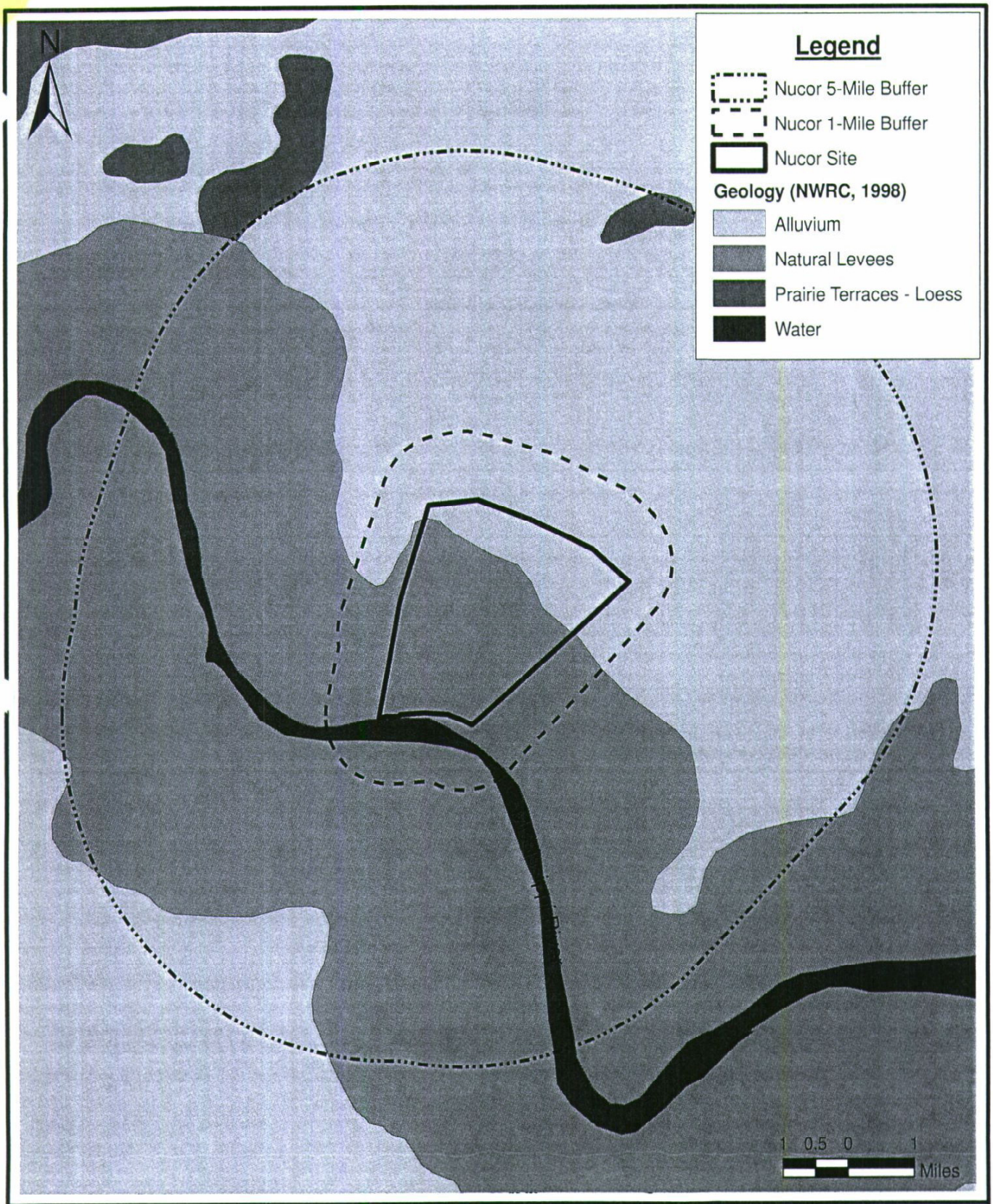

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Figure 7-16
Geology
Nucor Corporation
St. James Parish, Louisiana

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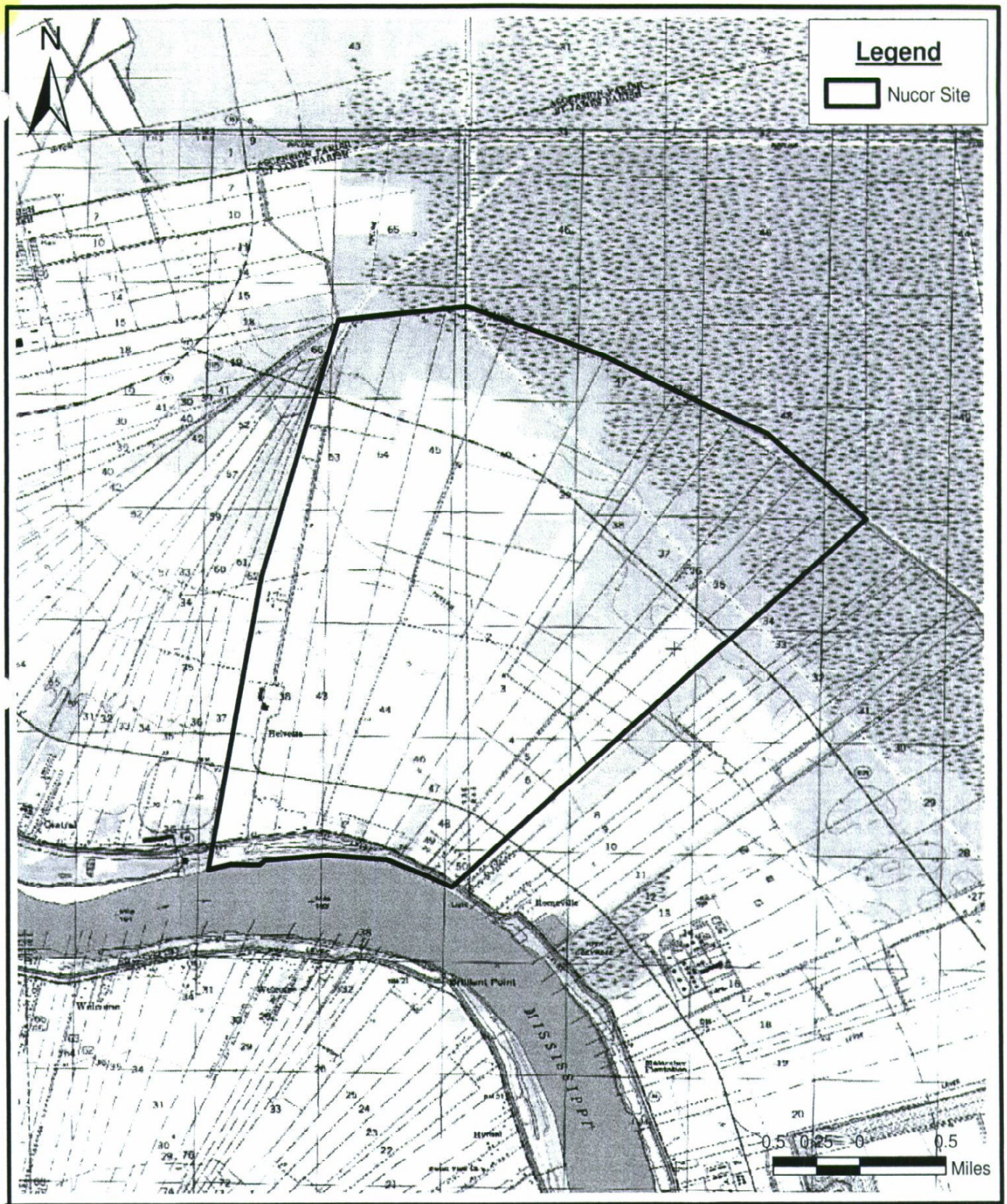

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Figure 7-17
Topography
Nucor Corporation
St. James Parish, Louisiana

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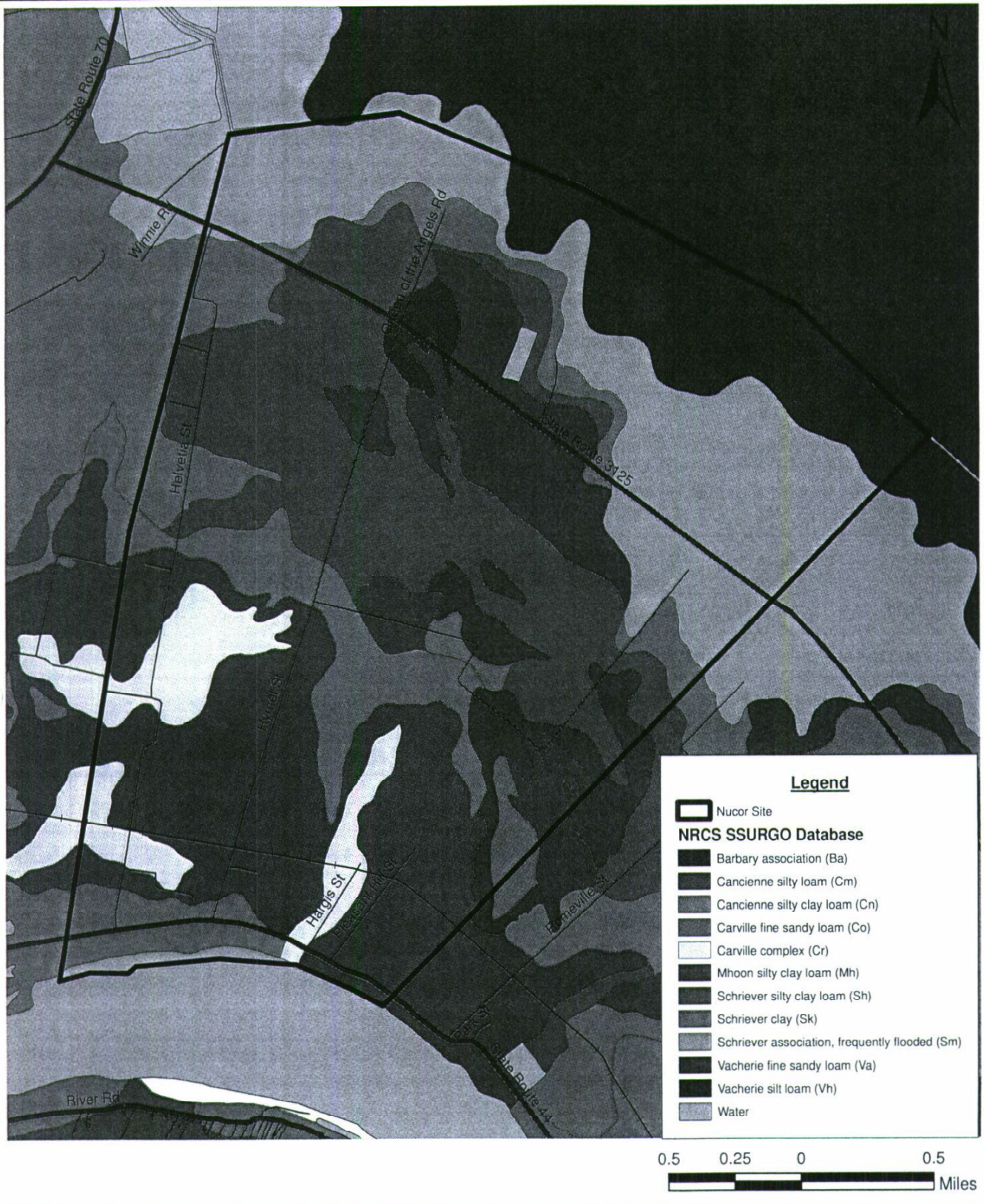

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Figure 7-18
Soils
Nucor Corporation
St. James Parish, Louisiana

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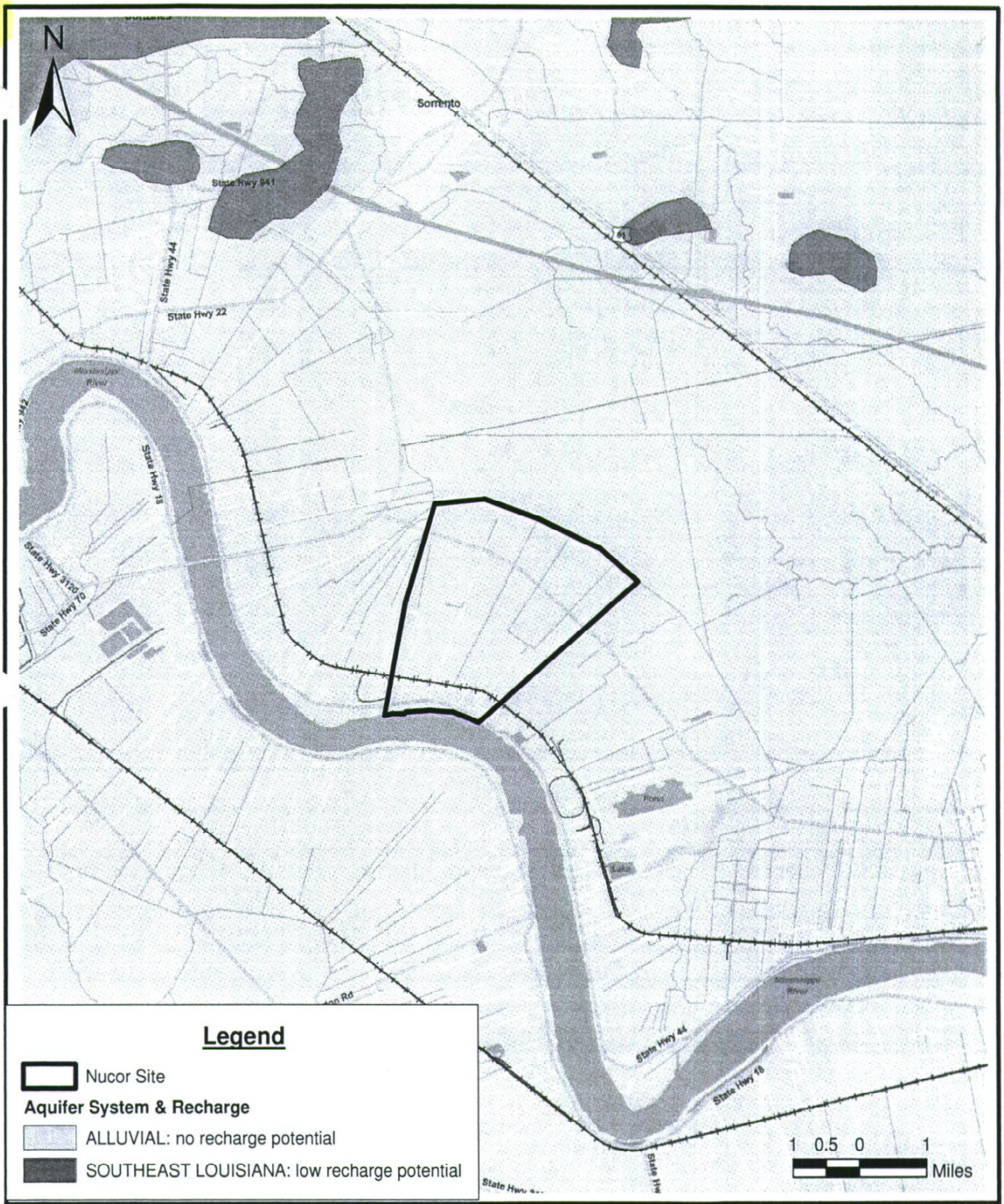

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Figure 7-19
Aquifer
Nucor Corporation
St. James Parish, Louisiana

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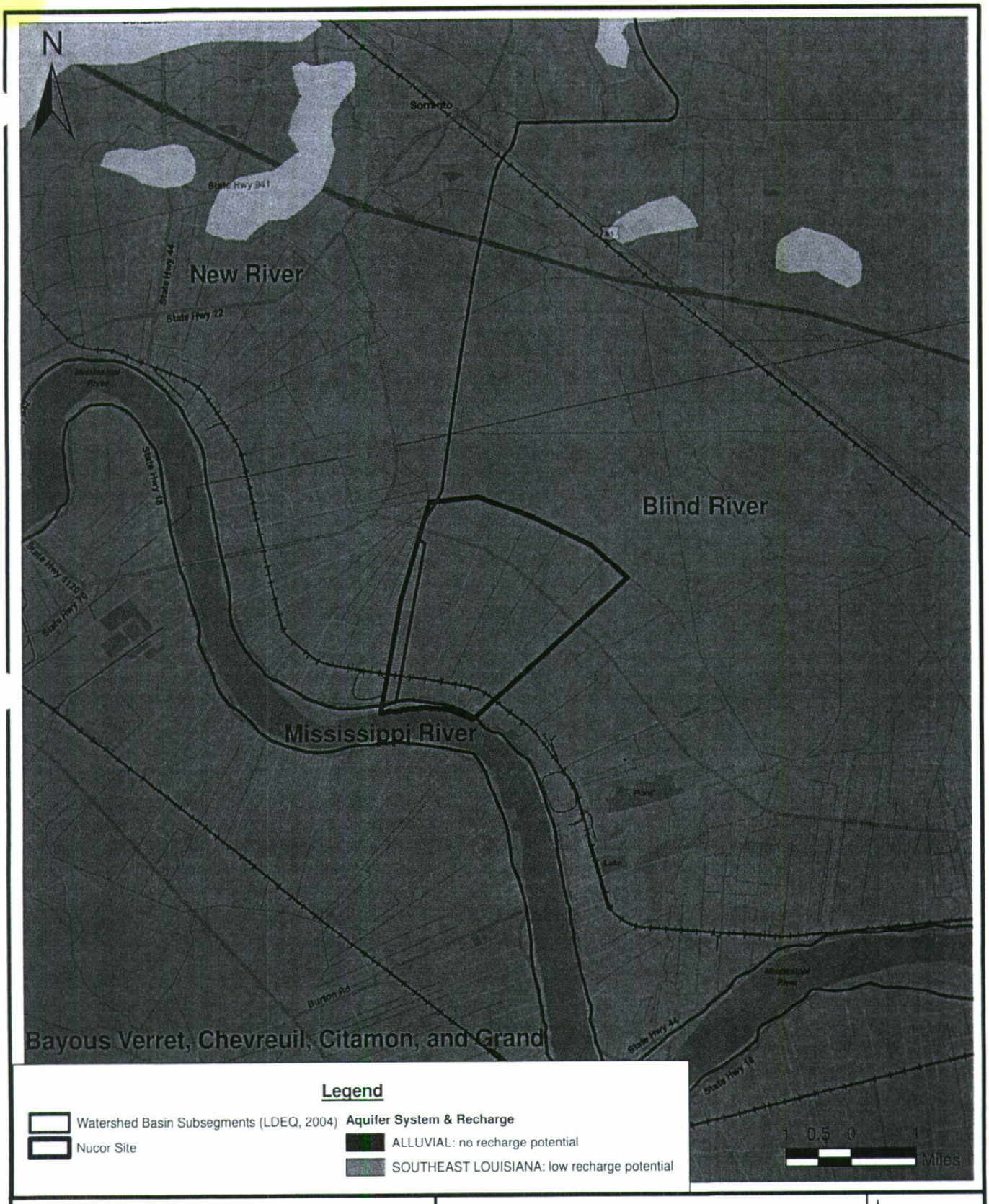

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Figure 7-20
Aquifer & Watershed Features
Nucor Corporation
St. James Parish, Louisiana

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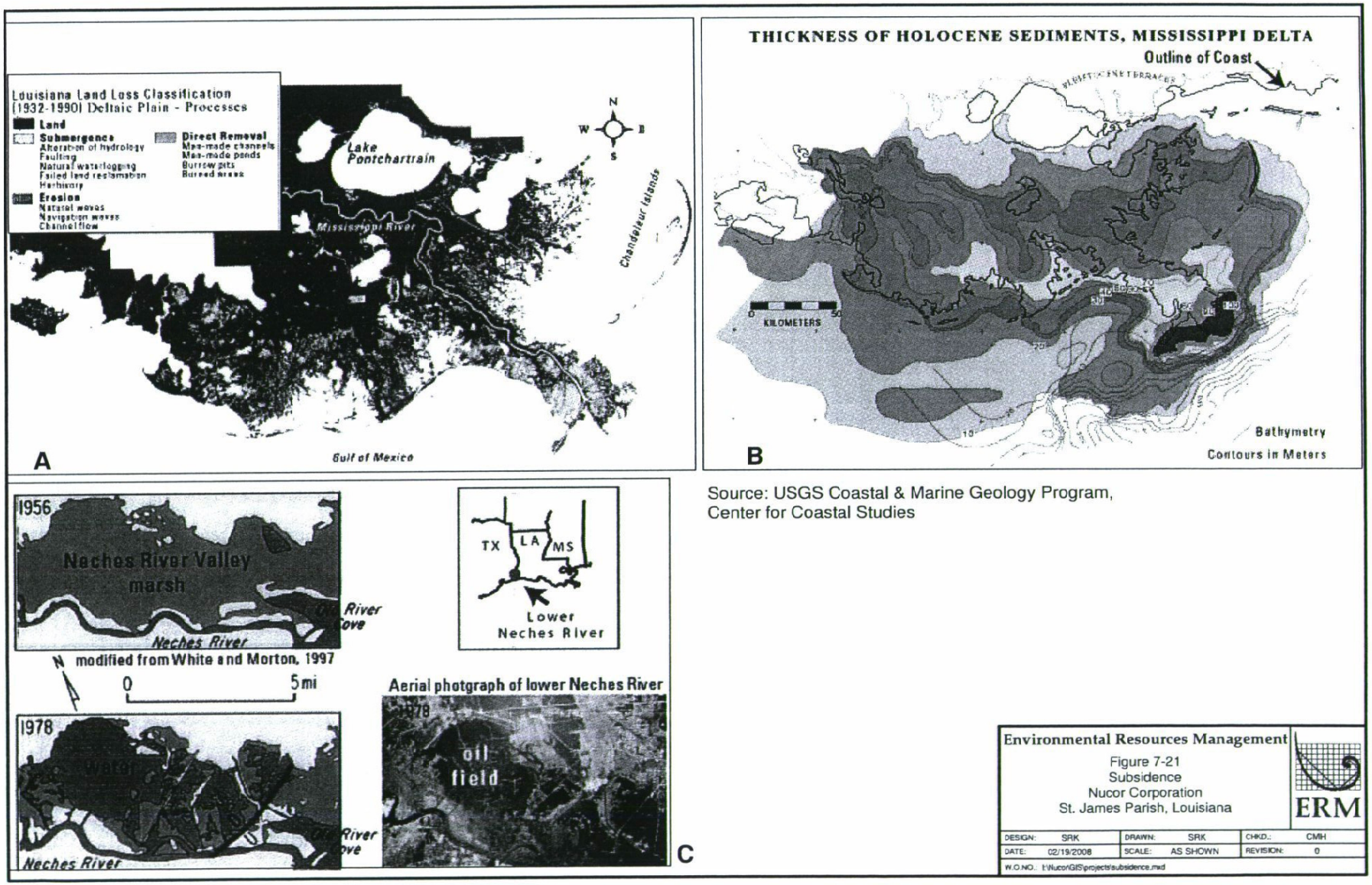

Source: USGS Coastal & Marine Geology Program,
Center for Coastal Studies

Environmental Resources Management	ERM
Figure 7-21 Subsidence Nucor Corporation St. James Parish, Louisiana	

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