1.0 INTRODUCTION

Flopam Inc. (Flopam), a wholly owned subsidiary of SNF Holding Company (SNF), has proposed construction of a water treatment chemical manufacturing facility with initial construction planned to begin in the second quarter of 2010. SNF is the largest producer of water-soluble polymers in the world with annual sales over $1.5 billion. SNF operates manufacturing facilities in several countries throughout the world with significant manufacturing facilities in operation in Europe, North America, and Asia. These facilities have maintained an excellent track record of safety and environmental protection by a combination of process design, employee training, response planning, and community outreach. For example, at its Riceboro, Georgia facility, SNF employs a system entitled "CommuniCall" to notify community stakeholders of various events at its facility. SNF expects to expand on its community outreach at the proposed facility with a similar system, either independently or with other chemical manufacturing facilities in the area. In addition, SNF personnel will be involved in activities at local schools and local non-profit organization.

Since its creation in 1978, SNF has reinvested all available cash flow back into the business with a focus on sustained development guaranteeing a long-term stability between environment, business, and social well-being. For example, SNF has made significant investments in training of human resources, safety and environmental protection, and growth in production capacity in addition to its significant investments in developing new products and employing green processes where possible.

SNF's end products are utilized throughout the world in various applications including water treatment, mining, and energy. These markets are driven by the increased scarcity of key resources such as water, oil, and minerals. SNF's products allow these critical resources to be recovered and/or utilized more efficiently.

Recently, there has been an increased focus on "green" manufacturing throughout the developed countries. However, SNF began employing green processes in its operations during the 1990's when they licensed a biological process to produce acrylamide monomer, the major building-block of its products. The biological process for acrylamide production replaces the traditional process for manufacturing acrylamide which uses a copper-based catalyst, utilizes substantially more energy, and operates at elevated temperatures and pressures. In addition to the lower air emissions and reduced waste generation, the biological process is inherently a safer process with a much lower potential for an emergency release. Since that time, SNF has constructed acrylamide monomer manufacturing production at three of its manufacturing facilities throughout the world. Unlike its competitors, the water soluble polymers produced world-wide by SNF utilize acrylamide produced using the inherently safer, lower emitting biological process. As discussed in Section 1.1.1, SNF plans to employ the latest generation of the biological process at the proposed new facility.

In addition to its investments in the biological acrylamide process, SNF has responded to the needs of its markets by investments in developing new products that are more effective in specific applications. SNF currently has the widest range of products in the industry with over 1,100 different products. This strategy has allowed SNF to become the market leader in the production of water soluble polymers and will allow it to continue to expand as a result of the increasing scarcity of key resources.

The management of water resources is one of the major challenges that will face the world over the next few decades. The growth in urban development, together with industrialization and the development of irrigation are increasing the demand for water throughout the world. The desired improvement in water quality means that increasingly more effective products will need to be employed. Although SNF currently has the widest range of products and the largest market share in water treatment, SNF is continuing to invest in new product development. These investments will allow SNF to

produce products that will assist their customers in meeting the increasingly more stringent discharge limits that will be required in the future.

Large quantities of water are also required to recover the desired ores from the impurities that are present in mines throughout the world. Water soluble polymers are commonly used to assist in separating the solids from the water streams and improving water reclamation. SNF continues to invest in developing products that will meet the demands of the mining industry that will require more efficient separation and operation under more extreme conditions in the future.

75 percent of the world's water is used for agriculture, and the earth today feeds more than 6 billion people. Only by controlling water resources and innovating in agriculture is it possible to push back the limits of this vital activity. SNF continues to develop a range of superabsorbents for agricultural use, and offers simple and economical solutions to help in improving water and soil resources management.

Although the need for SNF's products in water treatment, mining, and agriculture have continued to increase, the most significant growth area for SNF's products is in the oil industry. SNF's products have a wide range of applications in the oil industry: production, drilling mud, treatment of drilling mud, prevention of water intrusion, drag reduction, and enhanced oil recovery (EOR). In the 1980's when the price of oil escalated, SNF was a pioneer in EOR in the area of polymer flooding. SNF continued to invest in developing polymer flooding even after most other companies discontinued or significantly reduced their EOR investment as the price of oil dropped significantly during the late 1980's and 1990's. As a result, as oil resources have become increasingly more difficult to find and more costly to recover, SNF is now uniquely positioned with its technical expertise and products to assist with recovery of this critical resource.

The increased production volume of water soluble polymers that is anticipated to be required in EOR will potentially be greater than the volumes required in the other

markets, combined. As a result, SNF has determined that it will be necessary to construct two new manufacturing facilities to produce polyacrylamide water soluble polymers in the near future. In order to better serve this market, SNF determined that it would be necessary to construct one of these facilities in the United States while the other would likely be constructed in China.

Beginning in 2005, SNF began to evaluate various manufacturing sites in the United States. Initially, SNF considered expanding its existing manufacturing facility in Riceboro, Georgia. However, insufficient land and high freight costs may not allow additional manufacturing at this site to remain competitive in the global EOR marketplace for the foreseeable future. After three years of analyzing various sites, SNF has selected a location in Plaquemine, Iberville Parish, Louisiana (see Figure 1) for construction of its proposed facility.

The facility will primarily consist of the following:

- Five acrylamide plants utilizing the latest generation biological process that will produce an aqueous 50 percent solution that will be used in the powder plants, emulsion plant, and specialty products plant. Acrylamide monomer may also be shipped to other SNF facilities and some offsite customers;
- Ten powder plants that will polymerize acrylamide manufactured in the green process with various monomers to produce polyacrylamide powders for sale to customers; and
- A utilities building that will be associated with these operations.

In addition, SNF also expects that the following production facilities may be constructed at the site in the future to produce other water soluble polymers for use in water treatment, as well as the raw materials used in water soluble polymer manufacturing:

- An emulsion plant that will polymerize acrylamide manufactured in the green process with various monomers to produce polyacrylamide for sale to customers as an emulsion;

- A polyamine plant that will produce water soluble polymers (not acrylamide based) for other water treatment applications;
- A diallyldimethylammonium chloride (DADMAC) plant that will produce water soluble polymers that are used primarily in drinking water treatment;
- A specialty products plant that is capable of producing a wider range of water soluble polymers;
- A dimethylaminoethylacrylate (ADAM) plant that is the basis for a cationic monomer that can be polymerized with acrylamide in either the emulsion plant or the powder plants;
- A chloromethylation (CM) plant that will quaternize ADAM to produce the cationic monomer that can be used in the emulsion plant or the powder plants; and
- An acrylamido tertio butyl sulfonate (ATBS) plant that will produce an anionic monomer that can be used in the emulsion plant or the powder plants.

The facility will also require the construction of significant infrastructure to support these operations. In particular, SNF will be required to construct a rail spur from the nearby Shintech Louisiana, L.L.C. facility over 1 mile to the proposed site. The rail spur will not only support SNF's operations but will also facilitate additional development on adjacent properties that have been designated by Iberville Parish for industrial development.

Figure 2 is a site plan for the proposed project. The site plan is not completely final at this stage of the project, and is subject to change. Figures 3 through 11 are process flow diagrams.

The primary applicable Standard Industrial Classification (SIC) Code is 2899, (Chemicals and Chemical Preparations, Not Elsewhere Classified) due to the manufacture of polyacrylamide. The secondary applicable SIC Code is 2869 (Industrial Organic Chemicals, Not Elsewhere Classified), which applies to chemicals that are produced primarily as raw materials in manufacturing polyacrylamide or as a coproduct of manufacturing these raw materials. These materials include acrylamide and methanol.

Manufacturing startup is planned for the second quarter of 2011.

As shown on Figure 1, the proposed site is approximately 800 acres located in Sections 46, 47, 8, 9, 10, 67, 26, 27, 28, and 29 in Township 9 South, Range 13 East of Iberville Parish, Louisiana. Land use in the immediate vicinity of the proposed facility is primarily agricultural (sugarcane), undeveloped, or residential. Ella Road, which is located on the western boundary of the proposed project site, previously supported several residences that have been purchased by SNF.

Flopam will construct and operate the chemical manufacturing facility in a manner that is beneficial to the local community, Iberville Parish, and the State of Louisiana. In addition, adverse impact to the environment will be minimized by Flopam's use of a combination of low-emitting green processes, as well as air emission control technologies that constitute the best available control technology (BACT) and/or the lowest achievable emission rate (LAER). In addition, air dispersion modeling shows that air emissions from the facility are below ambient air standards for all pollutants being emitted. Also, the facility will be located in a section of Iberville Parish that has been designated in the Parish Master Plan for industrial development and currently includes the Georgia Gulf Chemicals & Vinyls, L.L.C. facility and the Shintech Louisiana, L.L.C. facility.

As a result of the current global economy, many manufacturing operations have been required to reduce and/or eliminate operations which have resulted in manufacturing job losses in Iberville Parish, throughout the State, and throughout the country. The SNF facility will employ 512 direct, full-time employees and 100 contractors at the facility. Unlike many chemical manufacturing facilities that employ relatively few, highly skilled personnel, the SNF facility will employ personnel with a wide range of skills that are currently available in the area. As indicated in Section 1.2.2, the SNF project will lead to over 2,400 direct and indirect jobs in Louisiana at its peak with 2,000 jobs in the area. After construction is complete, the facility will support roughly 1,400 direct and indirect Louisiana jobs and 1,200 jobs in the 6-parish area. SNF's operations are expected to

increase salaries in the area by over $1.5 billion over a 16-year period. In addition, $29.9 million in local taxes and $107 million in Louisiana state tax revenue will be generated during the 16-year period as a result of SNF's operations.

In addition to the significant State and local economic benefits from the project, a large portion of the product produced at the facility is expected to be exported to other countries. At a time when the overall U.S. balance of trade is becoming increasingly more negative as a result of the expansion of manufacturing in developing countries, the SNF facility will partially offset the increasingly more negative trade balance since it will utilize raw materials that are primarily produced in Texas and Louisiana to produce products that will be exported throughout the world. In addition, production of products designed for use in enhanced oil recovery may also assist in promoting a renaissance in both onshore and offshore oil production in Louisiana.

Pursuant to the requirements of the Louisiana Revised Statutes (LRS) Title 30, Section 2018, responses to the "Environmental Assessment Statement/IT Questions" are being submitted to the Louisiana Department of Environmental Quality (LDEQ) in support of issuance of environmental permits for the Flopam facility. In particular, on August 19, 2009, SNF submitted Volume 1 of an air permit application to the LDEQ for the Flopam facility. As requested by the LDEQ, Office of Environmental Services, Air Permits Division, Flopam has used the format of the "Revised, Expanded 'IT Decision' Questions" which are generally used for permit applications for hazardous waste treatment, storage, or disposal facilities. Due to this fact, some of the questions are not applicable to a chemical manufacturing facility, as indicated in the responses.

The Flopam responses provided in Sections 2.0 through 6.0 in this report demonstrate that potential adverse environmental impacts resulting from construction and operation of the Flopam facility have been appropriately considered and addressed during the planning and design of the facility. The responses further demonstrate that any such

environmental impacts are greatly outweighed by the non-environmental benefits offered by the project.

1.1 Summary of Key Environmental Considerations

1.1.1 Air Quality

The proposed acrylamide manufacturing process will use an enzyme to produce acrylamide in a biological process. The advantage of using enzymes over traditional reaction methods is that enzymes, unlike most chemical manufacturing catalysts, produce only the desired product and work in water, at or near ambient temperature and pressure, and at or near neutral pH. Processes using enzymes also typically result in waste streams that are easier to dispose since they are composed of biodegradable protein. In contrast, the traditional chemical synthesis for acrylamide requires copper catalysts and results in higher emission rates.

Five acrylamide lines are planned to be installed. The emissions resulting from the proposed Flopam facility will be controlled to levels required by applicable regulations and defined permit conditions. The facility will be operated in compliance with the various air quality permits required by the Federal Clean Air Act (CAA) as amended and the Louisiana Environmental Quality Act (EQA). The facility is designed to minimize impacts to air quality utilizing technologies conforming to Lowest Achievable Emission Rates (LAER) and Best Available Control Technology (BACT).

The proposed facility will be a major source for criteria pollutants and hazardous air pollutants (HAPs) with respect to Title V permitting requirements. Also, the facility will be a major source under Non-attainment area New Source Review (NNSR) and Prevention of Significant Deterioration (PSD) regulations.

Emissions associated with the facility include:

- Particulate matter (PM)
- Sulfur dioxide (SO_2)
- Nitrogen oxides (NO_x)

- Carbon monoxide (CO)
- Volatile organic compounds (VOCs)
- Louisiana Toxic Air Pollutants (TAPs) and HAPs

Emission sources include:

- Chemical and Powder Plant Processes
- Powder Plant and ATBS Product Solids Handling
- Storage Tanks
- Fugitive Emission Sources
- Combustion Sources

Chemical processes include reactors, distillation columns, and other process equipment. Powder Plant processes include dissolution tanks, reactors, grinders, and dryer vents. VOCs and HAP/TAPs are the primary emissions resulting from these processes. Operations at the facility will be controlled to levels that comply with the control requirements of National Emission Standard for Hazardous Air Pollutants (NESHAP) for Sources Categories including the Hazardous Organic NESHAP (HON) and the Miscellaneous Organic NESHAP (MON). Additionally, the facility is required to install LAER for volatile organic compounds. Thermal oxidizers, which provide the highest level of control and constitute LAER, are employed where feasible.

Particulate emissions associated with solids handling will occur during the screening, bagging, and loading of the powder and ATBS product. Particulate emissions will also occur during the powder and ATBS drying processes. Powder Plant screening, bagging, and product loading operations and the ATBS dryer and product handling operations, will be controlled by dust collectors (i.e., bag filters) as product recovery devices and as BACT for particulate matter emissions. The powder plant dryers will be controlled by cyclones as product recovery devices and as BACT for particulate matter emissions.

Storage and process tank emissions are largely dependent on the type of material stored, vapor pressure of the material, and throughput. In general, facility tank emissions are VOCs, HAPs, and TAPs. The facility will control emissions from the tanks to comply with the control requirements of the HON and/or MON.

Fugitive emissions from equipment leaks are generally composed of VOCs, HAPs, and TAPs. Leak Detection and Repair (LDAR) programs are used to detect and limit the frequency and quantity of leaking components. The most stringent LDAR programs require more frequent monitoring and lower leak threshold definitions. The HON and MON LDAR requirements are considered among the most stringent LDAR programs; 40 Code of Federal Regulations (CFR) Part 65, Subpart F LDAR is a similar program. Flopam will implement the LDAR program under 40 CFR 65, Subpart F to limit emissions to the lowest achievable rates.

The combustion sources at the Flopam facility include the ten 25.1 MMBtu per hour boilers, the Powder Plant dryer burners which are rated between 10 and 13 MMBtu per hour each, and three thermal oxidizers rated between 7.0 and 9.4 MMBtu per hour. Where feasible, Flopam will reduce emissions of combustion products (PM, NO_x, SO_2, CO, and VOCs) by using ultra-low NO_x burner boilers, good combustion practices, and combusting natural gas and clean fuels. However, due to concerns about adverse product quality that can result from products of incomplete combustion onto the product, ultra low NO_x burners are not used on the polyacrylamide powder plant dryers.

Air dispersion modeling was also conducted for the proposed Flopam facility. The objective of the modeling is to show whether or not the proposed plant will cause or contribute to potential health problems. Prior to beginning the air dispersion modeling, the facility submitted a modeling protocol to LDEQ that described the proposed model to be used, modeling inputs, and the model methodology. LDEQ accepted the modeling protocol. The results of the modeling showed the proposed plant's emissions will not result in off-site impacts that cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS), PSD Increments, or Ambient Air Standards (AAS) of TAPs.

1.1.2 Water Quality

The wastewater and storm water discharged from the facility will comply with the requirements of the Louisiana Pollutant Discharge Elimination System (LPDES), the Federal Clean Water Act (CWA), and the Louisiana EQA.

The facility is still in the planning stages regarding water usage and discharges; complete information on wastewater is not yet developed. It is anticipated that approximately 0.3 million gallons per day (MGD) of wastewater comprised primarily of boiler blowdown and cooling tower blowdown, with minimal process wastewater, will be collected in an equalization tank and neutralized prior to discharge to the Mississippi River. Process area storm water will be evaluated to determine proper treatment and disposal requirements. Nonprocess area storm water from the facility site will be routed through existing and new ditches to a storm water pond, which will discharge to Bayou la Butte. Nonprocess area storm water from undeveloped areas (i.e., not associated with industrial activity) will continue to gravity flow to Bayou la Butte.

The Flopam facility will be designed to control storm water runoff quality through a proactive storm water pollution prevention program using structural controls such as dikes, curbs, and drains. In addition, best management practices (BMPs) will also be implemented at the facility to minimize and prevent the potential for contamination of storm water runoff. BMPs will include, but will not be limited to, prescribed site inspections of the process and material storage equipment and the pollution prevention structural controls. Specific BMPs will also be implemented to prevent or minimize site erosion from storm water runoff.

Neutralization will be the primary technology for treatment of the utility and process wastewaters prior to discharge to the Mississippi River. Neutralization is accomplished by maintaining pH through the use of an appropriate agent to adjust pH in the wastewater to within the anticipated permitted range of 6.0 to 9.0 standard units. Sanitary wastewater will be treated in a package treatment plant prior to discharge to the Mississippi River.

1.1.3 Water Use

The source of water at the site will be the Mississippi River for industrial purposes and the Iberville Parish public supply for potable water. To minimize water quality impacts, water conservation practices will be employed to the extent practicable.

The facility will use approximately three MGD withdrawn from the Mississippi River, of which on the order of 20 percent will be for cooling purposes. Although 316(b) requirements are not expected to be applicable, the facility is committed to using BACT for the design of the intake structure as would be required by 316(b) and by federal guidance related to the protection of the pallid sturgeon.

1.1.4 Waste Management

The volume and impact of any wastes produced through construction and operation of the Flopam facility will be minimal. Solid wastes generated will include (1) typical "municipal solid wastes" and general office waste; (2) non-hazardous industrial solid wastes; (3) construction debris solid wastes; (4) spent solvents generated from cleaning mechanical equipment; and (5) off-spec product that cannot be reclassified or reprocessed. All of the wastes expected to be generated and the respective methods of handling and disposal are discussed in detail in Section 2.0.

Solid wastes produced at the Flopam facility will be transported off site for disposal at solid waste facilities regulated and permitted by the LDEQ. The Flopam facility will not treat, store, or dispose of any wastes generated at the facility, nor will the chemical manufacturing facility receive any wastes from off site for storage, treatment, or disposal.

1.1.5 Wildlife Habitat, Wetlands, and Other Environmentally-Sensitive Areas

The potential impacts to sensitive environmental receptors such as soils, wetlands, and quality wildlife habitats and their inhabitants are expected to be minimal due to the siting and nature of the project. SNF consulted with the U.S. Fish and Wildlife Services (USFWS) and the Louisiana Department of Wildlife and Fisheries (LDWF) concerning

the presence of listed species and scenic streams. Appendix A contains agency correspondence solicited on behalf of this project. Based on correspondence with these agencies, the endangered pallid sturgeon is the only species known to occur in the near vicinity of the project area. SNF will adhere to the guidance provided by the USFWS in their response of July 9, 2009 to avoid adverse impact to the pallid sturgeon. Following this guidance should result in no adverse affect on the pallid sturgeon.

Wildlife habitat exists on the proposed project site in the form of forested land adjacent to Bayou la Butte and as a result of the edge effect of agricultural land bordering forested land. This habitat is considered marginal due to the surrounding development of additional industrial facilities and the conversion of agricultural land to residential areas.

The New Orleans District of the U.S. Army Corps of Engineers (USACE) has rendered jurisdictional wetland determinations on the project Site. Portions of the east-west corridor where the rail spur will be constructed are jurisdictional forested wetlands. The proposed rail spur has been sited to take advantage of an existing pipeline corridor on the south side of Bayou la Butte. Siting the rail spur immediately adjacent to the existing pipeline corridor will avoid fragmentation of an existing wetland system, thereby reducing secondary and cumulative wetland impacts. Use of previously cleared areas immediately north of Bayou la Butte for the proposed rail spur is not a practicable alternative as this corridor has multiple pipeline and a power line rights-of-way. Approximately 5.9 acres of jurisdictional wetlands may be impacted by construction of the rail spur. The facility layout has been designed to avoid jurisdictional wetlands to the maximum extent practicable. The majority of wetlands on the facility site are in the southern portion of tract. Construction of facility infrastructure in the central and northern portions of the site will effectively avoid most of the identified jurisdictional wetlands. An additional 6 to 8 acres of wetland impact may result from construction of the facility. This includes potential impacts to batture wetlands.

Construction including utility crossings of Bayou la Butte, will be permitted in accordance with Section 404 of the federal Clean Water Act and Section 10 of the Rivers and Harbors Act. SNF will adhere to all requirements set forth in those permits.

As per U.S. Army Corps of Engineers regulations, SNF will provide compensatory wetland mitigation for the unavoidable loss of jurisdictional wetlands. The compensatory mitigation plan will be coordinated with the U.S. Army Corps of Engineers and other relevant state and federal resource and regulatory agencies.

1.1.6 Cultural Resources

SNF has consulted with the State Historic Preservation Officer (SHPO) to determine whether construction-related activities and operation of the Flopam facility could potentially affect sensitive cultural, historical, or archaeological resources or areas that are known to be on the proposed site or in near vicinity of the proposed site. The SHPO's response indicated that a Phase I Cultural Resources survey would be required to identify any prehistoric and/or historic archaeological sites that may be present on the proposed facility property (Appendix A). A Phase I Cultural Resources survey is currently in progress. Until the survey is completed on the site, the presence of or potential impacts to cultural resources cannot be quantified.

1.2 Summary of Key Benefits

1.2.1 Public Need

The primary product that will be produced at the proposed Flopam facility is polyacrylamide powder. Polyacrylamide is a water soluble polymer that is commonly used as a flocculant to assist in removing impurities from water and wastewater treatment applications. Polyacrylamide is also used in a variety of other applications. For example, in mining applications, polyacrylamide is mainly used to assist in solid-liquid separation of tailings streams. Polyacrylamide is also used as a soil conditioning agent in a variety of agricultural applications. These traditional applications for polyacrylamide have experienced a five to seven percent annual growth in worldwide demand that is expected to continue for the foreseeable future.

The largest growth area for polyacrylamide is currently in oil and natural gas exploration and production operations. In addition to its use in oil and natural gas drilling, polyacrylamide has achieved success in enhanced oil recovery (EOR). Polymer flooding using polyacrylamide in EOR applications has been used successfully for over 20 years. In oil fields with polymer flooding, increases in oil recovery of approximately 50 percent have been realized.

The steady increase in growth for polyacrylamide in traditional markets, combined with the significant growth being realized for polyacrylamide in EOR applications, has resulted in SNF's worldwide production operating near capacity. In order to meet the expected market demands, SNF is planning to construct a new polyacrylamide manufacturing facility in Iberville Parish, Louisiana.

1.2.2 Capital Investment and Economic Impact

Flopam will invest over $350 million in the construction of the proposed facility within five years after commencement of construction. Operations are expected to commence at the end of the first year of construction. Employment at the facility will ramp up to 512 full-time direct employees and 100 contractors at the end of construction. An economic impact assessment of Flopam's operations (Appendix B) was completed by Dr. Dek Terrell, Director of the Division of Economic Development at Louisiana State University. Dr. Terrell reports the following primary benefits of the project.

- At the end of the five-year construction period, the Flopam commitment will reach $29.4 million in annual payroll.
- The Flopam commitment results in an injection of over $386 million ($269 million when discounted to 2009 dollars) in Louisiana earnings by the end of 2025 through operations alone.
- Accounting for both direct and indirect economic effects, Flopam operations and construction will lead to over 2,400 total Louisiana jobs at its peak. When the construction phase is complete, Flopam operations will support roughly 1,400 jobs total in Louisiana, including the direct employment of over 500 workers at the site (once it reaches full capacity).

- Louisiana can expect over $3.7 billion ($2.8 billion when discounted to 2009 dollars) in new output over the sixteen year horizon as a result of the injection created by the Flopam facility.

- When indirect effects are included, the Flopam operations should increase Louisiana wages and salaries by over $1.5 billion ($1.1 billion when discounted to 2009 dollars) over the 16-year horizon.

- The Flopam commitment should generate over $107 million ($80 million when discounted to 2009 dollars) in Louisiana state tax revenue (excluding corporate income tax) over the 16-year horizon.

- The Flopam commitment will result in an additional $29.9 million ($22.2 million when discounted to 2009 dollars) in local taxes (excluding property tax) being generated.

Dr. Terrell reports that, in summary, construction and operation of the facility will create substantial economic benefits, both direct and indirect.

2.0 POTENTIAL AND REAL ADVERSE ENVIRONMENTAL IMPACTS

1. Have the potential and real adverse environmental effects of the proposed facility been avoided to the maximum extent possible? (This question requires the permittee to identify adverse environmental impacts, both potential and real)?

Yes. The potential and real adverse effects of the proposed facility have been avoided to the maximum extent possible without unduly curtailing non-environmental benefits.

A. What are the potential environmental impacts of the permittee's proposed facility?

The potential adverse environmental impacts may be categorized as follows:

- Potential air quality degradation
- Potential water quality degradation
- Potential impacts to soils and groundwater through inadequate waste and hazardous materials management
- Potential impacts to sensitive environmental areas and cultural resources

Due to numerous factors involving the (1) siting of the chemical manufacturing facility; (2) environmentally proactive aspects involved in the planning, design, construction, and operation; (3) the technology used to manufacture polyacrylamide; and (4) commitment to environmental regulatory compliance, the potential for any measurable, adverse environmental impacts associated with the Flopam facility are expected to be minimal.

Air Quality

The proposed acrylamide manufacturing process will use a biocatalyst to produce acrylamide. The advantage of using biocatalysts over traditional reaction methods is that biocatalysts, unlike most chemical manufacturing catalysts, work in water, at or near ambient temperature and pressure, and at or near neutral pH. Processes using biocatalysts also typically result in waste streams that are easier to dispose since they are composed of biodegradable

protein. In contrast, the traditional chemical synthesis for acrylamide requires copper catalysts and results in higher emission rates.

Five acrylamide lines are planned to be installed. The emissions resulting from the proposed Flopam facility will be controlled to levels required by all applicable regulations and defined permit conditions. The facility will be operated in compliance with the various air quality permits required by the federal CAA as amended and the Louisiana EQA. The facility is designed to minimize impacts to air quality utilizing technologies conforming to LAER and BACT.

The proposed facility will be a major source for criteria pollutants and HAPs with respect to Title V permitting requirements. Also, the facility will be a major source under NNSR and PSD regulations.

Emissions associated with the facility include:

- PM
- SO_2
- NO_X
- CO
- VOCs
- Louisiana TAPs and HAPs

Emission sources include:

- Chemical and Powder Plant Processes
- Powder Plant and ATBS Product Solids Handling
- Storage Tanks
- Fugitive Emission Sources
- Combustion Sources

Chemical processes include reactors, distillation columns, and other process equipment. Powder Plant processes include dissolution tanks, reactors,

grinders, and dryer vents. VOCs and HAP/TAPs are the primary emissions resulting from these processes. Operations at the facility will be controlled to levels that comply with the control requirements of National Emission Standard for Hazardous Air Pollutants (NESHAP) for Sources Categories including the Hazardous Organic NESHAP (HON) and the Miscellaneous Organic NESHAP (MON). Additionally, the facility is required to install LAER for volatile organic compounds. Thermal oxidizers are commonly used to meet LAER requirements and typically provide the highest level of control for most VOC streams, resulting in VOC destruction in excess of 98 percent or an outlet concentration of 20 ppm. VOCs are destroyed in a thermal oxidizer in a combustion process that produces primarily carbon dioxide and water. However, NO_x is also produced in a thermal oxidizer. For VOC streams containing less than approximately 20 ppm of VOCs, large amounts of natural gas are required to combust the VOC, resulting in NO_x formation. Therefore, for low concentration VOC streams, the adverse environmental impact from the NO_x generated in the thermal oxidizer may exceed the benefit of VOC destruction. Thermal oxidizers will be employed where feasible as LAER.

Particulate emissions associated with solids handling will occur during the screening, bagging, and loading of the powder and ATBS product. Particulate emissions will also occur during the powder and ATBS drying processes. Powder Plant screening, bagging, and product loading operations and the ATBS dryer and product handling operations, will be controlled by dust collectors (i.e., bag filters) as product recovery devices and as BACT for particulate matter emissions. The powder plant dryers will be controlled by cyclones as product recovery devices and as BACT for particulate matter emissions.

Storage and process tank emissions are largely dependent on the type of material stored, vapor pressure of the material, and throughput. In general,

facility tank emissions are VOCs, HAPs, and TAPs. The facility will control emissions from the tanks to comply with the control requirements of the HON and/or MON.

Fugitive emissions from equipment leaks are generally composed of VOCs, HAPs, and TAPs. LDAR programs are used to detect and limit the frequency and quantity of leaking components. The most stringent LDAR programs require more frequent monitoring and lower leak definitions. The HON and MON LDAR requirements are considered among the most stringent LDAR programs. 40 CFR 65, Subpart F LDAR is a similar program. Flopam will implement the LDAR program under 40 CFR 65, Subpart F to limit emissions to the lowest achievable rates.

The combustion sources at the Flopam facility include the ten 25.1 MMBtu per hour boilers, the Powder Plant dryer burners which are rated between 10 and 13 MMBtu per hour each, and three thermal oxidizers rated between 7.0 and 9.4 MMBtu per hour. Flopam will reduce emissions of combustion products (PM, NO_X, SO_2, CO, and VOCs) by using ultra-low NO_x burner boilers, good combustion practices, and combusting natural gas and clean fuels.

Air dispersion modeling was also conducted for the proposed Flopam facility. The objective of the modeling was to show whether or not the proposed plant will cause or contribute to potential health problems. Prior to beginning the air dispersion modeling, the facility submitted a modeling protocol to LDEQ that described the proposed model to be used, modeling inputs, and the model methodology. LDEQ accepted the modeling protocol. The results of the modeling showed the proposed plant's emissions will not result in off-site impacts that cause or contribute to an exceedance of the NAAQS, PSD Increments, or Ambient Air Standards of TAPs.

LDEQ has concluded that there are no soils or vegetation that would be harmed

by concentrations of criteria pollutants below the NAAQS or by concentrations below the monitoring significance levels. Additionally, the U.S. Environmental Protection Agency (USEPA) has stated that "For most types of soil and vegetation, ambient concentrations of criteria pollutants below the secondary NAAQS will not result in harmful effects" [USEPA, *New Source Review Workshop Manual, Prevention of Significant Deterioration and Nonattainment Area Permitting* (Draft 1990)]. Because air dispersion modeling results show that the project will not result in any ambient concentrations above the NAAQS, it is concluded that the project will have no adverse affect on soils or vegetation.

Water Quality

Significant, measurable adverse impacts to water quality will be prevented to the maximum extent possible through application of the selected state-of-the-art polyacrylamide manufacturing technology and strict compliance with the LPDES wastewater discharge permit which will be issued for the Flopam facility.

It is anticipated that approximately 0.3 MGD of wastewater comprised primarily of boiler blowdown and cooling tower blowdown, with relatively small amounts of process wastewater, will be collected in an equalization tank and neutralized. After neutralization, the water will be pumped for final discharge to the Mississippi River, which due to its large volume will assimilate the discharge rapidly.

Process area storm water runoff from the Flopam facility will be evaluated to determine proper treatment and disposal requirements. Uncontaminated nonprocess area storm water will be discharged to Bayou la Butte. Storm water runoff quality will be controlled through a proactive storm water pollution prevention program using structural controls and BMPs to prevent or minimize the potential for contamination of storm water runoff. The LPDES permit will most likely require the preparation of a Storm Water Pollution Prevention Plan (SWPPP) to be implemented following the startup of operations. The SWPPP will address:

- Designation of a pollution prevention team with prescribed responsibilities
- Description of structural controls and BMPs necessary to prevent/minimize storm water contamination from the on-site facilities, equipment, materials, and activities identified as having contamination potential
- Periodic inspections to verify housekeeping
- Prevention and maintenance, structural controls integrity, and BMP effectiveness
- Spill control and countermeasure procedures
- Employee training in the SWPPP requirements
- An Annual Comprehensive Site-wide Storm Water Compliance Assessment

Materials Storage and Potential for Accidental Release

There is always the remote possibility that an accidental release or spill could result in temporary impacts to air quality or water quality. However, Flopam will train its employees to always operate and maintain the chemical manufacturing facility to prevent accidental releases, spills, and leaks. Although one cannot absolutely guarantee that a spill or release will never occur, the Flopam facility will be operated with modern control equipment and proven operating procedures. Hazardous materials and fuels will be stored in appropriately designed containers or tanks within secondary containment

structures. Liquid material transfer areas will be designed so as to drain to collection basins or other secondary containment.

Employees will be properly trained, including regular periodic "refresher" training, in applicable safety and operational procedures and activities that are standard for the chemical industry. In addition, employees will be properly trained in applicable safety, industrial hygiene, and public health procedures and standards in accordance with the Occupational Safety and Health Administration (OSHA) regulations. Furthermore, employees will be trained in the applicable pollution prevention and spill prevention and control measures and procedures including SWPPP requirements. Assuming the minimum storage requirements are met, both the federal CWA and Louisiana EQA, through their implementing regulations, will require that Flopam prepare and actively implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan (federal jurisdiction for any petroleum products and oils) and Spill Prevention and Control (SPC) Plan (state jurisdiction for petroleum, oils, and chemicals that are designated hazardous substances). The SPCC/SPC Plans require the design, construction, and maintenance of structural controls such as berms, dikes, and collection basins in connection with regulated materials handling equipment and storage tanks. The structural controls must be designed and maintained to fully contain (plus a margin of safety for rainfall, etc.) possible leaks or spills. The SPCC/SPC Plans require the development and implementation of standard operating procedures (SOPs) and BMPs for the response to spills, containment of spills, and cleanup.

Potential impacts to soil and groundwater through inadequate hazardous materials and solid waste management will be reduced by implementing site-specific housekeeping procedures that include routine storage area and transfer equipment inspections and maintaining a clean and safe work environment. Flopam will manage, store, transport, and dispose of solid wastes in a manner

that will prevent potential impacts to the environment through accidental releases. The Flopam facility will maintain several materials on site for use in operations and will handle the materials in accordance with the manufacturer's recommended management practices as well as all health, safety, and environmental regulations and requirements. The materials anticipated to be stored and utilized at the facility are listed in Table 1.

Flopam will comply with the OSHA Process Safety Management of Highly Hazardous Chemicals Standard (Process Safety Management or PSM), 29 CFR 1910.119, to address the risks involved with the storage, handling, and processing of highly hazardous materials (found in Appendix A of 29 CFR 1910.119) and all elements of PSM.

Flopam will also develop a program and plan for the storage of acrylonitrile, allyl alcohol (24 percent), dimethylamine, epichlorohydrin, ethylenediamine, methyl chloride, and oleum (20 percent SO_3) that are regulated under the USEPA's Accidental Chemical Release/Risk Management Program provisions contained in 40 CFR 68. LDEQ also regulates these materials under their Chemical Accident Prevention and Minimization of Consequences Regulation contained in the Louisiana Administrative Code (LAC) at Title 33, Part III, Chapter 59. These federal and State regulations require development and implementation of a Risk Management Plan (RMP) that includes a hazard assessment program. The hazard assessment program includes (1) the identification of listed hazardous substances and quantities stored on site; (2) five-year accident history (for existing facilities); and (3) the worst-case and alternate-case release scenarios including the potential impact to the surrounding community. The analysis of impact to the community is commonly referred to as the "Off-site Consequence Analysis." Flopam will follow the protocols and guidance established by the USEPA and LDEQ to perform this analysis. Additional requirements for the development of an accidental release

prevention program and an emergency response program apply if the worst-case release scenario impacts a public receptor. Flopam will develop a risk management program in accordance with 40 CFR 68 and LAC 33:III, Chapter 59 and submit an RMP as required to the USEPA and inform the Local Emergency Planning Committee (LEPC) of emergency response procedures.

Wildlife Habitats, Wetlands, and Other Environmentally Sensitive Areas

The potential impacts to sensitive environmental receptors such as soils, wetlands, and quality wildlife habitats and their inhabitants are expected to be minimal due to the siting and nature of the project. Per the USFWS, only one listed species was noted in the vicinity of the project area, the Pallid Sturgeon. The only planned construction related activity that will occur in or adjacent to the Mississippi River is the construction of an intake structure, which will be designed in accordance with Section 316(b) of the CWA and with guidance provided by the USFWS to avoid adverse impact to the sturgeon and its habitat. This proposed intake structure is also subject to USACE permitting under Section 10 of the Rivers and Harbors Act and Section 404 of the CWA, which will further minimize impacts to this species and its habitat.

In addition, because the construction area for the Flopam facility will involve in excess of five acres, all construction activities will be undertaken in compliance with the LPDES Storm Water General Permit for Large Construction Activities. The LPDES general permit for construction activities requires implementation of a SWPPP which addresses structural controls and BMPs to prevent storm water contamination that could otherwise result from soil erosion and other activities/sources associated with the facility construction.

Following construction, the wastewaters and storm water discharges from operation of the Flopam facility will be in compliance with the individual LPDES permit and as such will not measurably impact wetlands and wildlife or

their habitat. Measurable impacts to fishes and other aquatic life are not expected from the standpoint of water pollution or impaired water quality.

Cultural Resources

Contact with the SHPO indicated that a Phase I Cultural Resources survey would be required to identify any prehistoric and/or historic archaeological sites that may be present on the proposed facility property. Until such a survey is completed on the site, the presence of or potential impacts to cultural resources cannot be quantified. This survey is currently in progress and will be completed prior to the issuance of the USACE permits. If cultural resources are identified on the site, potential impacts will be minimized by complying with the SHPO requirements.

Sound and Visual Impacts

The majority of SNF's manufacturing operations are located within buildings that are similar to those found in warehouse operations. Operations within buildings result in significantly less sound impacts on adjacent properties. In addition, as shown on Figure 2, buffer zones are planned to separate the developed areas of the facility from adjacent properties. For example, along the northern property boundary (Louisiana Highway 405), a 300-foot vegetated buffer is planned. Similarly, 150-foot buffers are planned along the eastern and western property boundaries. Of the approximately 800 acres of land that SNF has either purchased or under option, only approximately 200 acres will be developed for this project. The remainder will remain agricultural and will provide additional buffering along the western and southern portions of the site. These vegetated buffer zones, combined with a significant portion of the operations being located within buildings will result in minimal noise and visual impacts to passersby and adjacent landowners.

Potential Loss of Farm Land

As mentioned previously, Flopam has purchased or optioned approximately 800 acres of land for the facility. The land has recently been used for various agricultural purposes (primarily sugar cane and pastures for grazing). Of this land, Flopam plans to develop approximately 150 acres. Flopam is currently in discussions with a local farmer who has proposed to lease the undeveloped areas and maintain agricultural operations on these lands. Flopam expects that this approach, when properly managed, will result in negligible to low loss of agricultural output from the site.

1. **What wastes will be handled?**
    a. **Classes of chemicals**
    b. **Quantities (hazardous and non hazardous)**
    c. **Physical and chemical characteristics**
    d. **Hazardous waste classification (listed, characteristic, etc.)**

The volume and impact of wastes produced through construction and operation of the Flopam project will be minimal. Solid wastes generated will include (1) typical "municipal solid wastes" or general office waste; (2) non-hazardous industrial solid wastes; (3) construction debris solid wastes; (4) solvents generated from cleaning and maintaining equipment; and (5) off-spec product that cannot be reclassified or reprocessed.

The largest quantity of debris produced will be during the Flopam facility construction. The quantity of construction debris produced each subsequent year will be dependent upon construction and maintenance activities at the Flopam facility and will vary from year to year.

Flopam will be classified as a small quantity generator (SQG) of hazardous waste. SQGs are generators which generate between 100 to 1,000 kg (220 to 2,200 pounds) per month of hazardous waste. Routine hazardous wastes anticipated to be generated will include: waste from laboratory quality

assurance analytical activities (solvents), maintenance activities (paint waste and cleaning solvents), and incidental waste from the acrylamide plant (filters, etc.). The operational intent will be to minimize any excess "spent" materials by handling and using only limited volumes. Wastes generated at the site will be properly classified and managed in accordance with federal Resource Conservation and Recovery Act (RCRA) regulations and the equivalent State of Louisiana waste management regulations. The specific hazardous waste classifications (listed and characteristics) will be determined once specific solvents and specific operations are defined (i.e., once specific lab solvents and maintenance solvents are selected). Hazardous waste codes associated with facility wastes will likely include D001 (ignitability), D002 (corrosivity), and U007 (acrylamide).

2. **How will they be handled?**
   a. **Treatment**
   b. **Storage**
   c. **Disposal**

With the exception of neutralization, which is allowed without a permit under RCRA regulations, no wastes will be treated and/or disposed of on site. Wastes will only be stored on site temporarily pending transport for proper off-site disposal. Wastes generated at the Flopam facility will be transported off site to recyclers or permitted solid waste disposal facilities by permitted transporters. Collection and temporary storage of waste awaiting transport will be handled in accordance with LDEQ and USEPA approved methods. Such methods include marking bins and other temporary storage containers with appropriate labels to identify the waste stored and regular inspections of temporary storage areas and containers. Good housekeeping measures and practices will be mandatory in connection will waste management activities. Employees involved with waste management will be appropriately trained. Waste will not be stored on the premises in a manner that would require the plant to be permitted as a solid

waste treatment, storage, or disposal facility. When possible, Flopam will recycle/reuse potential materials to reduce the quantity of solid waste produced by the facility. Flopam will only contract with specific disposal facilities that have a good track record in compliance with waste management regulations.

3. Sources of Waste

a. On-site generation (type and percentage of total handled)
b. Off-site generation (type and percentage of total handled)

The nonhazardous wastes generated at the Flopam facility will be generated from equipment and facility maintenance and office activities. Potential hazardous waste, generated in small quantities, includes: laboratory solvents, cleaning solvents, paint waste, and spent filters. No wastes from off site will be handled at the Flopam facility.

4. Where will the wastes be shipped if not handled at this site?

Wastes generated at the Flopam facility will be transported off site to recyclers or solid waste disposal facilities that are appropriately permitted by LDEQ and that have a good environmental compliance record. When possible, the Flopam facility will recycle/reuse potential materials to reduce the quantity of solid waste produced by the facility. Flopam will only contract with specific disposal facilities that have a good track record in compliance with waste management regulations.

5. What wastes will remain on site permanently?

Wastes produced at the Flopam facility will be transported off site for disposal at a permitted solid waste facility. No wastes will remain on site permanently. Wastes generated will be transported off site when the containers collecting the waste are declared full or the waste is no longer generated. The Flopam facility will not be a permitted solid or hazardous waste treatment facility. No wastes will be received from other facilities or any off-site activities.

B. By which of the following potential pathways could releases of hazardous materials from the proposed facility endanger local residents or other living organisms?

1. **Air**
2. **Water**
3. **Soil**
4. **Food**

Air, water, and soil are potential pathways for hazardous materials to reach environmental receptors such as people; agricultural lands, crops, and livestock; wildlife and fishes; wetlands and other sensitive habitats; and other natural resources including surface water and groundwater. However, the design, construction, and operation of the facility will not endanger any of these important environmental receptors.

The proposed acrylamide manufacturing process will use a biocatalyst to produce acrylamide. The advantage of using biocatalysts over traditional reaction methods is that biocatalysts, unlike most chemical manufacturing catalysts, work in water, at or near ambient temperature and pressure, and at or near neutral pH. Processes using biocatalysts also typically result in waste streams that are easier to dispose since they are composed of biodegradable protein. In contrast, the traditional chemical synthesis for acrylamide requires copper catalysts and results in higher emission rates. Since the manufacturing process chosen is a very clean process and no products are produced for food production, food is not considered a potential pathway.

As discussed previously in Section 2.0 and in Section 1.1.1, air dispersion modeling demonstrates that the permitted air emissions that will result from the operation of the facility will not exhibit the potential for harmful effects to local residents, wildlife, and other habitats, soils, crops, or aquatic life.

Under normal operations, it is not considered possible or even reasonably likely that contaminants associated with the operation of the Flopam facility will

migrate to nearby farms or private property or result in measurable adverse impacts to surface water, groundwater, or terrestrial or aquatic life as a result of the permitted wastewater and storm water runoff discharges to the Mississippi River and Bayou la Butte. The permitted wastewater discharged will not result in levels in the Mississippi River of any trace metals or other pollutants that will remotely approach potentially toxic levels for humans, wildlife, fishes, or livestock. The wastewater discharge permit will establish permit limitations that will ensure protection of the receiving stream, aquatic life, and human health.

Significant and hazardous materials will be stored on site. Proper containment and management techniques will minimize, if not eliminate, the potential for an accidental air release or spill to Bayou la Butte or to the land at or surrounding the facility. An emergency response plan will be developed to assure the protection of the public health of the local community in case of a release of hazardous materials to the atmosphere.

C. What is the likelihood or risk potential of such release?

Although there may be a remote possibility that an accidental release or spill could result in temporary impacts to air quality or water quality, the likelihood and risk of such releases are considered to be extremely low because of the design and construction of the significant material storage and handling facilities and the experience and training of plant personnel in handling any hazardous materials that are used on site. Flopam has a commitment to the local community, the regulatory agencies, and its own employees to always operate and maintain the chemical manufacturing facility to prevent accidental spills, leaks, or releases. The Flopam facility will be operated with modern equipment and proven operating procedures. Hazardous materials and fuels will be stored in appropriately designed containers or tanks within secondary containment structures (if applicable). Liquid material transfer areas will be designed so as to drain to collection basins or other secondary containment.

Employees will be properly trained, including regular periodic "refresher" training, in all applicable safety and operational procedures and activities that are standard for the chemical industry. In addition, employees will be properly trained in all applicable safety, industrial hygiene, and public health procedures and standards in accordance with the OSHA regulations. Furthermore, employees will be trained in the applicable pollution prevention and spill prevention and control measures and procedures. Both the federal CWA and Louisiana EQA, through their implementing regulations, require that Flopam prepare and actively implement an SPCC Plan (federal jurisdiction for any petroleum products and oils) and an SPC Plan (state jurisdiction for petroleum, oils, and chemicals that are designated hazardous substances).

The SPCC/SPC Plans require the design, construction and maintenance of structural controls such as berms, dikes and containment basins in connection with regulated material handling equipment and storage tanks. The structural controls must be designed and maintained to fully contain (plus a margin of safety for rainfall, etc.) any possible leaks or spills. The SPCC/SPC Plans require the development and implementation of SOPs and BMPs for the response to spills, containment of spills, and cleanup.

The Flopam facility will store acrylonitrile, allyl alcohol (24 percent), dimethylamine (anhydrous), epichlorohydrin, ethylenediamine, methyl chloride, and Oleum (20 percent SO_3) which are regulated under the USEPA's Chemical Accidental Release/Risk Management Program regulations promulgated under 40 CFR 68 and the LDEQ's Chemical Accident Prevention and Minimization of Consequences regulations promulgated at LAC 33:III.Chapter 59. These regulations require development and implementation of a risk management program that includes a hazard assessment program. The hazard assessment program must at a minimum identify listed hazardous substances and quantities stored on site; provide a five-year accident history

(for existing facilities); and identify the worst case release scenario and the potential impact to the surrounding community. The analysis of impact to the community is commonly referred to as "Off-site Consequence Analysis". Flopam will follow protocol and guidance established by USEPA to perform this analysis. Additional requirements for the development of an accidental release prevention program and an emergency response program will apply if the worst-case release scenario impacts a public receptor. Flopam will develop a risk management program in accordance with 40 CFR 68 and LAC 33:III.Chapter 59. Pursuant to this program, Flopam will submit an RMP as required to the appropriate regulatory agencies. The RMP will be appropriately implemented and followed to reduce the risk and consequences of any unlikely release of these chemicals.

D. What are the real adverse environmental impacts of the permittee's proposed facility?

1. Short-term effects

a. Land area taken out of system

Short-term environmental impacts associated with the Flopam facility are expected to be minimal and mostly associated with the construction phase. The minimal short-term impacts can be summarized to include the following:

- There will be a nominal increase in traffic on Louisiana Highway 405 (River Road) in the vicinity of the project during the construction phase.
- There will be increased noise associated with construction activities and increased traffic during construction.
- There will be increased dust associated with construction activities.
- There will be loss of approximately 200 acres of agricultural lands through conversion to an industrial site. The economic benefits associated with the Flopam facility clearly outweigh the economic

impact associated with the loss of the agricultural activity on this acreage.

- There will be minimal loss of potential wetland habitat associated with utilities installation; however, impacts to jurisdictional wetlands will be mitigated and some impacted areas will recover through natural recruitment upon completion of construction activities.

- There will be temporary disruption and likely displacement of certain wildlife species. This impact will be offset in time by recruitment back into certain areas subsequent to completion of construction and emigration to nearby available habitat.

- There will be generation of construction debris and other solid wastes associated with construction activities for transport and proper disposal off site.

- There will be storm water discharges associated with the construction activities. These will be controlled through implementation of an SWPPP and appropriate BMPs.

These short-term impacts are considered minor and are clearly outweighed by nonenvironmental benefits associated with the project.

2. Long-term effects

Negligible to minimal long-term environmental impacts are expected from the construction and operation of the Flopam facility. Approximately 200 acres of agricultural land will be converted to an industrial site. This project will take water from the Mississippi River which will be returned there (minus losses from usage or evaporation). There will be some usage of potable water. Air emissions will be present and properly controlled through the requirements and conditions of the air permit and state-of-the-art emission control technology as discussed below. Also, there will be permitted wastewater and storm water discharges that will be regulated as discussed below. Air emissions and wastewater discharges will be controlled to avoid adverse short-term and long-

term environmental impacts to the maximum extent possible without unduly affecting non-environmental benefits.

Groundwater Use

It is not yet certain whether the facility will directly use groundwater resources with the installation of water wells at the site. If water wells are utilized, withdrawal is expected to be less than 1 MGD. Potable water will be obtained from Iberville Parish Water District Number 3. Public water supplied by this entity is a combination of groundwater and Mississippi River water. Purchase of potable water from District Number 3 should not significantly affect groundwater withdrawals.

Water Quality and Wastewater Discharges

There will be no significant measurable, adverse short-term or long-term effects associated with the wastewater and storm water discharges from the proposed facility. The discharges will be permitted in accordance with the LPDES program as administered by the LDEQ with oversight from USEPA Region 6. Potential health risks associated with wastewater discharges will be minimal as they will consist primarily of treated sanitary and utility wastewaters. Minimal amounts of treated process wastewater will also be discharged.

Because the proposed wastewater and industrial storm water discharges are considered "point sources" as defined by the Federal CWA and Louisiana EQA, an LPDES permit is required to authorize the discharges. Flopam will apply for an LPDES permit as soon as plans have been finalized regarding water usage and management. The LPDES permit will authorize the discharge of certain wastewaters to the Mississippi River and storm water runoff to Bayou la Butte. LPDES permits are issued under authority of the federal CWA and the Louisiana EQA. The CWA established the National Pollutant

Discharge Elimination System (NPDES program), which is administered in Louisiana as the LPDES program.

The CWA NPDES/LPDES program authorizes the discharge of wastewaters from industrial, commercial, and governmental facilities. The objective of the NPDES/LPDES program is to regulate the quality of wastewater (including storm water runoff) from such facilities to the extent necessary to protect the water quality of the ambient receiving waterbody (e.g., stream, river, bayou, lake, etc.). An NPDES/LPDES discharge permit regulates wastewater quality by establishing conditions and effluent limitations that must be achieved by the permittee in order to discharge wastewaters legally. Permit effluent limitations specifically regulate the nature and quantity of potential pollutants that can be legally discharged. They are established in strict accordance with the CWA and EQA.

Permit effluent limitations are developed and implemented in NPDES/LPDES permits through two primary procedures, both dictated by the CWA. The first procedure is called "technology-based" permitting and involves what are known as National Categorical Effluent Guidelines and Standards (effluent guidelines or EFGs). The CWA mandates that the USEPA develop and establish EFGs that are specific to various industrial, commercial, and governmental activities and facilities. The specific EFGs that apply to a given activity/facility type are based upon the technologies and levels of wastewater treatment that are applicable and achievable for that given activity/facility. For example, the USEPA has established categorical EFGs for petroleum refining, petrochemical manufacturing, organic chemical and plastics manufacturing, pulp and paper manufacturing, etc. The categorical EFGs that will apply to Flopam for the discharge of process wastewater related to the manufacture of acrylamide are the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) Point Source Category Effluent Guidelines and Standards located at 40 CFR

414, Subpart H (Specialty Organic Chemicals). Process wastewater discharges from the manufacture of methanol are subject to regulation under 40 CFR 414, Subpart F (Commodity Organic Chemicals). However, since there will be no process wastewater discharges from the methanol recovery area, Subpart F will not be applicable. For the remainder of the Flopam facility, there are no applicable effluent guidelines under 40 CFR 400-471 (Subchapter N).

Industry specific, categorical EFGs address the various types of wastewater streams and pollutants associated with each industrial category. For the OCPSF category, the EFGs apply to certain potential pollutants which may occur in process wastewater. Through the development of the OCPSF EFGs, the USEPA: (1) identified the important potential pollutants associated with each type of wastewater, and (2) prescribed the levels of the potential pollutants that must not be exceeded to determine the quality of the wastewater that can be legally discharged under authority of the CWA and EQA.

For what are known as "conventional" pollutants [e.g., oil and grease, biochemical oxygen demand (BOD), total organic carbon (TOC), total suspended solids (TSS or "particulates"), total dissolved solids (TDS), acidity or alkalinity (measured as pH), etc.], EFGs specify two possible levels of technology-based treatment quality: (1) that achieved by "Best Practical Control Technology Currently Available" (BPT), or (2) that achieved by "Best Conventional Pollutant Control Technology" (BCT). A LPDES permit must establish effluent limitations for a given "conventional" pollutant based on the more stringent of BPT or BCT. Similarly, for what are known as "toxic" pollutants [certain "heavy" metals such as lead or mercury and certain organic chemicals such as chloroform or polychlorinated biphenyls (PCBs)] and "non-conventional" pollutants [such as ammonia or chemical oxygen demand (COD)], EFGs also specify two possible levels of technology-based treatment quality: (1) that achieved by BPT, or (2) that achieved by "Best Available

Control Technology Economically Achievable" (BAT). Again, a LPDES permit must establish effluent limitations based on the more stringent of BPT or BAT. Further, for "new source" facilities such as the Flopam facility, the EFGs specify an additional level of technology-based treatment quality known as "New Source Performance Standards" (NSPS). In many instances and for certain pollutants, NSPS may be more stringent than BPT, BCT or BAT. In any event, when NSPS apply, as in the case for the Flopam facility, the LPDES permit must establish effluent limitations based on NSPS.

In certain cases, the EFGs may not address every possible pollutant. In cases when such pollutants are of concern, the LDEQ and/or USEPA must develop facility-specific limitations using what is called "Best Professional Judgment" (BPJ) or Best Engineering Judgment to establish effluent limitations in the LPDES permit. BPJ limitations must be established in accordance with regulations that require sound scientific and engineering procedures. As a group, effluent limitations based on NSPS, BPT, BCT, BAT or BPJ are called "technology-based effluent limitations" (TBELs).

The second procedure authorized and required by the CWA for establishing permit effluent limitations to protect the environment and public health is called "water quality-based permitting". This second procedure involves the establishment of "water quality-based effluent limitations" (WQBELs). WQBELs define the maximum amount of a potential pollutant, including a conservatively derived safety margin, that when discharged to an ambient receiving waterbody will not impair designated uses or violate the applicable standards of quality for the receiving waterbody or waters downstream.

To complement the NPDES/LPDES permitting program and the National Categorical Effluent Guidelines and Standards, the CWA requires the USEPA and state environmental agencies (e.g., LDEQ) to undertake what is called the

Water Quality Standards (WQS) program. The WQS program is a continuing, dynamic program through which standards of quality for the public surface waters of the United States are developed and established through a scientific and official rulemaking process. The purpose of the WQS program is to establish enforceable standards which when appropriately developed and applied to ambient waterbodies ensure that certain beneficial uses designated by the CWA are not impaired or adversely impacted. WQS include two components: (1) water quality criteria which define the quality of water that must be maintained in the ambient environment, and (2) the designated beneficial uses that must be protected under the law. Different water quality criteria are specific to the various chemical, physical, and biological constituents or characteristics that define water quality as well as to potential chemical, physical, and biological pollutants that can adversely impact water quality. Depending on the specific constituent, characteristic, or pollutant to which a water quality criterion applies, the criterion may be expressed as a numerical value or defined narratively. Designated beneficial uses include:

- Propagation of fish and wildlife (all waters)
- Propagation of shellfish (coastal/marine waters)
- Potable/drinking water supply (those freshwaters designated as public water supply)
- Agriculture water supply (freshwaters)
- Contact recreation (fishing, swimming, boating, etc.) (all waters)
- Industrial water supply (as appropriate)
- Outstanding Natural Resource Waters (only those specifically designated because of particular scenic, recreational, and/or ecological attributes)

WQS numerical criteria are developed and established to protect the above uses as they apply to a given waterbody. Toxicological and ecological information and data are continually updated and used to establish or revise numerical criteria to assure protection of human health, aquatic life, wildlife, and livestock, including exposure through consumption.

The CWA and Louisiana Water Control Law (under the EQA) prohibit the LDEQ and/or USEPA from issuing a NPDES/LPDES permit for a wastewater discharge that *"causes, has reasonable potential to cause, or contributes to"*: (1) a violation of any water quality standard numerical or narrative criterion, (2) adverse impact to or impairment of designated water uses, or (3) endangers public health and welfare. This is assured to the maximum extent possible through the water quality-based permitting procedure called the "reasonable potential determination" or "water quality standards screening" procedure. Using this procedure, the permitting authority (i.e., LDEQ) must make a comparison between: (1) the TBELs for those pollutants to be addressed in the permit for which National Categorical Effluent Guidelines apply or effluent characterization data for those pollutants without applicable National Categorical EFGs, and (2) WQBELs. The more stringent values between TBELs and WQBELs or between effluent characterization data and WQBELs must be established in the LPDES permit as appropriate.

Therefore, through implementation of technology-based permitting procedures (mandatory for all permits) and water quality-based permitting (as determined necessary based on effluent characterization data or otherwise determined necessary at the permitting authority's discretion and application of appropriate scientific analysis), it can be reasonably expected that the final LPDES permit issued by the LDEQ will be fully protective of the water quality of Bayou la Butte and the Mississippi River and the designated uses dependent upon good water quality, specifically fish and wildlife, agricultural, and

recreational uses. On this basis, it can be concluded that any long-term impacts to water quality will be avoided to the maximum extent possible.

Of special note in connection with water temperature, the Louisiana WQS regulations prohibit a discharger from elevating the ambient water temperature of the receiving waters to any significant degree either during cold water months or warm water months. The Flopam facility will be operated in such a manner as to fully comply with that prohibition.

In summary, the LPDES permit must and will limit the types and quantities of pollutants through technology-based permitting and, as necessary, water quality-based permitting. It is Flopam's clear intent as a corporate citizen of Iberville Parish to not only operate the Flopam facility to meet and comply with all of the conditions and limitations of the LPDES permit, but when and where practical, to exceed the requirements.

Storm Water Runoff/Flooding Exacerbation

Flopam will develop and implement both structural and non-structural control measures to manage and discharge the storm water runoff from the proposed facility. Additionally, the final LPDES permit will require the development and implementation of a SWPPP.

Based upon an initial site assessment of the hydraulic capacity of Bayou la Butte in the vicinity of the proposed Flopam facility, it was concluded that the proposed storm water discharges will not adversely impact the local surface hydrology. The discharge volume rate of storm water is not projected to alter or increase flood elevations in this reach of Bayou la Butte to any measurable extent.

Process area storm water that may need to be treated and pumped to the Mississippi River will be negligible in volume as compared to the flow of the Mississippi River.

Air

There will be an increase in emissions of NO_x, CO, VOCs, SO_2, PM, HAPs, and TAPs. However, modeling has shown that the project will not cause or contribute to a violation of a NAAQS, exceed a PSD Increment, or cause or contribute to a violation of an AAS. Furthermore, the utilization of state of the art technology, including ultra-low NO_x burners where feasible, fabric filters and cyclones, and thermal oxidizers as controls along with the use of an inherently cleaner process, good combustion practices, clean burning fuels, and stringent implementation of leak detection and repair of equipment leaks, minimizes the environmental impacts of the proposed facility.

Noise

Using USEPA estimates of noise exposure, factory workers are routinely exposed to an average 24-hour sound level of 87 decibels (dBs), and persons living in rural, non-industrial areas are routinely exposed to an average 24-hour sound level of 48 dBs. The residents in the rural area neighboring the proposed project site have been and are routinely exposed to factory noise associated with the Shintech Louisiana, LLC (Shintech) polyvinyl chloride (PVC) Manufacturing Complex and the Georgia Gulf Corporation Manufacturing Complex. A minimal increase in current ambient noise levels is possible for those residences off of River Road located in close proximity to the eastern property boundary. However, SNF intends to conduct additional tree plantings to further reduce noise impacts to the east of the proposed facility.

Wildlife Habitats, Wetlands, and Other Environmentally Sensitive Areas

The potential for long-term impacts to sensitive environmental receptors such as soils, wetlands, and quality wildlife habitats and their inhabitants are expected to be minimal due to the following:

- The footprint of the facility will be located in agriculturally impacted portions of the site.
- Flopam will follow USFWS guidance relative to construction and operation of the intake structure to avoid impact to the pallid sturgeon.
- Flopam will apply for and receive all appropriate permits for air emissions, discharges of wastewater, storm water, and hydrostatic test waters, and for impacts to wetlands.
- Impacts to wetlands associated with the installation of utilities will require mitigation to replace wetland functions and value lost due to the project.

Cultural Resources

In the event cultural resources are discovered on the site, Flopam will avoid them to the extent practicable. Those resources that are determined to be significant that cannot be avoided will be handled in accordance with the procedures of the National Historic Preservation Act (Section 106).

3.0 COST BENEFIT ANALYSIS

II. Does a cost benefit analysis of the environmental impact costs balance against the social and economic benefits of the proposed facility demonstrate that the latter outweighs the former? (This question requires the permittee to perform a cost-benefit analysis, or at least a quantitative indication of the economic benefits and a qualitative description of the negative impacts expected from the permittee's operation. The latter should come from the answer to question I.)

Yes. The social and the economic benefits of the proposed facility, highlighted below, clearly demonstrate that the economic benefits of the project outweigh the environmental impact costs. The document The Economic Impact of SNF Operations on Louisiana and Select Parishes by Mr. Dek Terrell can be found in Appendix B. The Regional Input-Output Modeling System (RIMS II), as created by the U.S. Department of Commerce, Bureau of Economic Analysis (BEA), was used in this analysis for evaluating the indirect economic impacts of the project.

A. How was it determined that this facility was needed?

1. **Local or regional survey**
2. **On-site or off-site needs**
3. **Regional solid waste management benefit**
4. **Generic survey of solid waste needs (compatibility with master plan)**

The primary product that will be manufactured at the proposed Flopam facility is polyacrylamide powder. Polyacrylamide is a water soluble polymer that is commonly used as a flocculant to assist in removing impurities from water and wastewater treatment applications. Polyacrylamide is also used in a variety of other applications. For example, in mining applications, polyacrylamide is mainly used to assist in solid-liquid separation of tailings streams. Polyacrylamide is also used as a soil conditioning agent in a variety of agricultural applications. These traditional applications for polyacrylamide have experienced a five to seven percent annual growth in worldwide demand that is expected to continue for the foreseeable future.

The largest growth area for polyacrylamide is currently in oil and natural gas exploration and production operations. In addition to its use in oil and natural gas drilling, polyacrylamide has achieved success in enhanced oil recovery (EOR). Polymer flooding using polyacrylamide in EOR applications has been used successfully for over 30 years. In oil fields with polymer flooding, increases in oil recovery of approximately 50 percent have been realized.

Over the last few years, as oil prices have consistently remained above $40 per barrel, the major oil companies and the national oil companies throughout the world have increased investments in EOR. As a pioneer in the use of polymer flooding over the last 30 years, SNF has seen a significant increase in the number of EOR projects throughout the world. Many of these projects are currently in the early stages while others are undergoing pilot testing or in the initial stages of full-scale production. The volume of polyacrylamide required to meet the needs of these projects is substantially higher than the current markets for polyacrylamide in the traditional water and wastewater treatment markets.

The steady increase in growth for polyacrylamide in traditional markets, combined with the significant growth being realized for polyacrylamide in EOR applications, has resulted in SNF's worldwide production operating near capacity. In order to meet the expected market demands, SNF is planning to construct a new polyacrylamide manufacturing facility.

B. What will be the positive economic effects on the local community?

1. **How many permanent jobs will be created?**
2. **What is the expected annual payroll?**
3. **What is the expected economic multiplier from item B2?**
4. **What is the expected tax base and who will receive benefits?**

RIMS II, as created by the BEA, was used in the economic analysis conducted by Mr. Dek Terrell (Appendix B) to evaluate the indirect economic impacts of the proposed facility.

The report summarizes estimates of the economic impact of the Flopam facility to be located in Iberville Parish. The impact study covers two areas, the state of Louisiana and a six-parish area. The six-parish area includes Iberville, West Baton Rouge, East Baton Rouge, Livingston, Ascension, and Assumption Parishes. The SNF commitment is to spend a specified amount on acquisitions and construction in the first five years and to spend a specified amount on wages and taxable purchases over a 16-year period (see Table 2). It should be noted that the first year (2010) includes construction only and does not include operations. Operational employment will begin in 2011 and reach full capacity by 2015. The operation will directly employ over 500 workers when it reaches full capacity.

By the end of 2015, the SNF commitment will reach $29.4 million in annual payroll. The SNF commitment constitutes an injection of over $386 million ($269 million when discounted to 2009 dollars) in Louisiana earnings by the end of 2025 through operations alone. Accounting for both direct and indirect economic effects, Flopam operations and construction will lead to over 2,400 total Louisiana jobs at its peak. When the construction phase is complete, Flopam will support roughly 1,400 Louisiana jobs.

Louisiana can expect over $3.7 billion ($2.8 billion when discounted to 2009 dollars) in new output over the 16-year horizon as a result of the injection created by the SNF agreement.

When indirect effects are included, the SNF operations should increase Louisiana wages and salaries by over $1.5 billion ($1.1 billion when discounted to 2009 dollars) over the 16-year horizon.

The SNF commitment should generate over $107 million ($79.7 million when discounted to 2009 dollars) in Louisiana state tax revenue over the 16-year horizon. In addition to this, $29.9 million ($22.2 million when discounted to 2009 dollars) in local taxes will be generated. State taxes exclude corporate income tax, and local taxes exclude property tax.

The six-parish area will be the primary beneficiary of this activity. At its peak, construction and operations will lead to over 2,000 jobs in the area. Operations will support 1,200 jobs in the six-parish area after the construction phase is complete.

C. What will be the potential negative economic effects on the local community?

1. What are the possible effects on property value?

There should be little, if any, impact on property values. The area supports industrial development and is listed as such an area in the Iberville Parish Master Plan of 2005. Currently, the proposed project site is undeveloped and agricultural land. A Traffic Impact Analysis completed by Urban Systems, Inc. for this project indicated that there would be a nominal impact to traffic as a result of the project. This report is included as Appendix C. Residences located off of Ella Road, the western site boundary, have been or are in the process of being purchased by SNF and will not be further affected. Other nearby residences are located between existing industrial, agricultural, and undeveloped lands. It is possible that property values associated with agricultural lands may increase due to further conversion of agricultural land to industrial use.

2. Will public costs rise for:

a. Police protection
b. Fire protection
c. Medical facilities
d. Schools
e. Roads (also see below)

Police Protection

There should be no increased police protection required as a result of the Flopam project since the plant will utilize its own security staff.

Fire Protection

There should be no increased fire protection required as a result of the Flopam facility. The Plaquemine Fire Department would respond to a major fire emergency at the facility and is adequately staffed.

Medical Facilities

There should be no increased demand placed on the local medical facilities as a result of the Flopam facility. The existing medical facilities should be adequate since the majority of the new job positions created as part of this project will be filled with local residents.

Schools

There should be no increased demand placed on the local school systems as a result of the Flopam facility. The existing schools should be adequate since the majority of new jobs created as part of this project will be filled with local residents. Their children should be currently enrolled in schools around the region.

Roads

The proposed site location is off of River Road (LA 405). An access road will be constructed off of LA 405 and will be permitted through the Louisiana

Department of Transportation and Development (LDOTD). Ella Road will remain and may be utilized for emergencies if necessary, but it is not intended to be a regular ingress/egress point for the facility. Based on the Traffic Impact Analysis, LA 405 should be able to adequately handle increased traffic anticipated during the construction phase of the project as well as when operations begin. As part of the project, the traffic study did recommend providing a right-turn lane on eastbound LA 405 to accommodate the turning movement of the facility's employees. SNF will construct the right-turn lane during the initial stages of construction.

3. **Does the prospective site have the potential for precluding economic development of the area by business or industries because of the risk associated with establishing such operations adjacent to the proposed facility?**

The subject property is located in a section of Iberville Parish designated for industrial development. Since the area already supports significant industrial activity, economic development in the area should not be hindered as a result of the operation of the proposed facility. Substantial farmland acreage remains in the vicinity of the facility such that the conversion of approximately 150 acres should not adversely affect farming in the region.

D. Was transportation a factor in choosing the proposed site?

1. **What mode(s) of transportation will be used for the site?**
   a. **Truck**
   b. **Rail**
   c. **Barge**
   d. **Other**

This site was selected in part due to the multimodal transportation network present in Iberville Parish. Under initial operating conditions, Flopam will primarily utilize roads and rail service. Barge service may become more favorable in the future.

2. What geographical area will it serve?

The proposed Flopam facility will serve Iberville Parish and the State of Louisiana, as well as those users of its products in North America, South America, and overseas.

3. By how much will local road traffic volume increase?

a. Can local roads handle the traffic volume expected?
b. Can local roads handle the weight of trucks?

The proposed site location is off of LA 405. According to the Traffic Impact Analysis prepared for the Flopam facility, there will be a maximum of 250 construction-related personnel accessing the site during the first five years of construction (build-out is anticipated to take five years), combined with approximately 118 employees after the first year increasing to a maximum of 512 employees by full operation during year five. The fifth year of construction (fourth year of operation) results in the largest number of individuals accessing the site on a daily basis; between contractors, construction personnel, and employees, there will be approximately 752 persons arriving at the site daily. The study assumed that all trips were new trips; therefore, there will be an increase in traffic volume. However, the level of service presently provided by LA 405 will remain unchanged. There will be a nominal decrease in the level of service provided at the LA 1/LA 75 interchange in both directions during peak traffic and at Evergreen Road at LA 1. All of these roads currently service the adjacent Shintech facility and are capable of handling truck traffic.

4. What are the long-term expectations of the proposed site?

a. Longevity of the facility?

Flopam is expected to last into the foreseeable future. A similar facility SNF operates in Georgia continues to operate and expand after over 20 years of operation.

b. Who owns the facility?

Flopam Inc. is the owner/operator, and its parent company is SNF Holding Company.

c. Are the owners financially backed by others?

No. The project is backed only by Flopam Inc. and its parent company, SNF Holding Company.

d. When is closure anticipated?

Given market forecast and previous chemical industry experience, it is anticipated that the plant will remain competitive for the foreseeable future (over 20 years).

e. Who is responsible for the site after closure?

Flopam Inc.

f. What assurances will there be that the site will be closed in accordance with the plan?

Not applicable.

g. What financial assurance will be established to demonstrate the ability to handle problems after closure?

Not applicable.

h. Who certifies that the site is properly closed?

Not applicable.

i. How are people protected from unwittingly buying land after closure?

1) Is the closed facility recorded in the deed?

2) What future uses are possible?

Flopam will be responsible for facility closure. A typical search of the property history would reveal the former use of the facility for chemical manufacturing and the designation of the site by Iberville Parish as the

"SNF Industrial Area". Possible future uses of the post-closure site would be defined by future site conditions and local regulations and ordinances, which cannot be reasonably defined at this time.

4.0 ALTERNATIVE PROJECTS

III. Are there alternative projects which would offer more protection to the environment than the proposed facility without unduly curtailing nonenvironmental benefits? (This question requires the permittee to demonstrate having considered alternate technologies.)

No. There are no alternative projects that offer more protection to the environment without unduly curtailing non-environmental benefits.

A. Why was this technology chosen (e.g., incineration or land filling?)

1. **Are other technologies available?**
2. **Describe the engineering design and operating techniques used to compensate for any site deficiencies.**

Flopam will produce acrylamide using a biological process which operates at approximately ambient temperature and pressure. The waste produced in the process is a spent enzyme catalyst which is not a hazardous waste. This process is much safer and has a much lower environmental impact when compared with the traditional copper catalyst which is completed at high temperature and pressure. The traditional process results in much higher air emissions and generates hazardous waste.

Through best engineering judgment and operating experience, SNF/Flopam has concluded that the biological process which will be used to produce the acrylamide is the most efficient and economical method that also achieves reasonable environmental protection without unduly curtailing nonenvironmental benefits.

There were no site deficiencies necessitating the development of compensatory engineering design and technology.

B. Is the proposed technology an improvement over that presently available?

Yes. This process is much safer and has a much lower environmental impact when compared with the traditional copper catalyst which is completed at high temperature and pressure and which results in much higher air emissions and generates hazardous waste.

C. Describe the reliability of technology chosen.

1. Past experiences

Based on SNF's experiences at other facilities, the technology chosen is extremely reliable. SNF has operated acrylamide plants using the biological process for approximately 15 years. SNF has also operated powder plants using the proposed technology for approximately 30 years.

2. Environmental Impacts

The minimal environmental impacts associated with this facility are discussed in detail in Section 2.0 (I.A and I.D).

D. Describe the sequence of technology used from arrival of wastes to the end process at the facility (flow chart).

1. **Analysis of waste**
2. **Unloading**
3. **Storage**
4. **Treatment**
5. **Monitoring**
6. **Closure**
7. **Post-closure**
8. **Disposal**
9. **Any residuals requiring further handling**

Not applicable since the proposed facility will not receive or process wastes from other facilities.

E. Will this facility replace an outmoded/worse polluting one?

The new facility will not directly replace an existing manufacturing facility.

F. What consumer products are generating the waste to be disposed? Are there alternative products that would entail less hazardous waste generation?

The Flopam facility will manufacture acrylamide and polyacrylamide for commercial use. Wastes generated at the Flopam facility are expected to be minimal, and no hazardous wastes will be directly produced by the manufacturing process. Therefore, it is believed that these products are better than any known alternatives. An in-depth discussion of waste generation and management is presented in Section 2.0 (I.A.).

5.0 ALTERNATIVE SITES

IV. Are there alternative sites, which would offer more protection to the environment than the proposed facility site without unduly curtailing non-environmental benefits? (This is the question that deals directly with siting criteria.)

No. There are no alternative sites that would offer more protection to the environment than the selected site without unduly curtailing non-environmental benefits. As described below, the chosen site exhibits many advantageous characteristic for the location of the polyacrylamide manufacturing facility.

A. Why was this site chosen?

A rigorous process was employed over a four-year period to evaluate potential sites for the proposed facility. The process was employed on numerous sites along the Gulf Coast of the U.S. between Corpus Christi, Texas and Mobile, Alabama. This region was selected due to the proximity to the raw material sources and the proximity to container ports for export of product. The first stage of the process involved contacting personnel in each state's respective economic development organization. Economic development personnel were also contacted within each of the major electric utility providers in the region. This resulted in an exhaustive list of sites for further evaluation.

The process systematically evaluated various parameters including financial, environmental, safety, and long-term viability. Critical requirements for the site are as follows:

- Minimum of 600 acres of developable acreage;
- Ability to obtain railroad service to the site;
- Ability to construct a barge or ship dock at the site;
- The developable acreage is not located in an area classified by the Federal Emergency Management Agency (FEMA) as a 100-year flood zone;
- Minimum of 25 miles from the gulf coast;
- Availability of sufficient water, electricity, and natural gas in the vicinity;
- Availability of labor in the local markets; and

- Proximity to raw material sources and container ports to minimize transportation impacts and costs.

1. Specific advantages of the site:

- Approximately 750 acres of developable acreage
- Ability to construct facilities required to obtain railroad service to the site
- A barge dock can be constructed
- Not located in an area classified by Federal Emergency Management Agency (FEMA) as a 100-year flood zone
- Approximately 50 miles from the coast
- Sufficient utilities are available for the foreseeable future
- A diverse range of personnel are available in local labor markets
- Centrally located to critical raw material sources to minimize transportation impacts
- Proximity to deep water container port for exporting products

2. Were other sites considered and rejected?

Yes, other sites were considered as discussed below.

3. Is the location of the site irrevocable; i.e., would denial of permit based on site preclude the project?

Yes, the site decision is irrevocable.

It was determined that there are no alternative sites which would offer more protection to the environment than the proposed facility site without unduly curtailing non-environmental benefits based on the following considerations.

Acreage Requirements

Polyacrylamide demand for EOR applications is expected to exceed 250,000 tons per year within a five-to-seven year period. Within 15 to 20 years, EOR applications may require 500,000 to 750,000 tons per year of polyacrylamide. In order to be competitive in the global marketplace for the foreseeable future as the demand develops, a site with a minimum of 600 developable acres is

required. The selected site location in Plaquemine consists of approximately 800 acres of land, and so meets this criteria.

Availability of Rail Service

The highest volume raw materials at the proposed facility will be acrylonitrile, acrylic acid, and caustic soda. Raw materials are primarily received in liquid form via railroad tank cars. Although it is possible to receive acrylonitrile and caustic soda by truck, rail, barge, or ship, the primary method of receiving acrylonitrile will initially be rail. The advantages of rail deliveries compared with truck deliveries include improved safety and lower emissions from transportation, as well as lower freight costs. Although it is possible to receive acrylonitrile and caustic soda by barge, acrylic acid is not currently shipped by barge. As a result, the proposed project must be located within an area that is capable of receiving rail service.

In addition to raw material shipping, the majority of the product produced at the facility will be exported by intermodal container. A large portion of the intermodal containers will likely be loaded onto rail cars. The ability to load intermodal containers directly onto rail cars at the facility will minimize the requirements for truck transportation of product from the facility.

As a result of the need to receive raw materials by railroad tank car and the advantage of shipping intermodal containers by rail, rail service is essential for this project. The selected site location in Plaquemine meets this criteria.

Barge and/or Ship Dock Availability

Future regulation of shipping of hazardous materials combined with changes in the markets for SNF's raw materials may adversely impact the ability of the proposed facility to receive raw materials by rail. As a result, a dock is expected to be required in the future for the facility to remain viable. The

proposed facility is located on the Mississippi River in an area that can accommodate a barge dock in the future. In addition, a commercial liquid terminal is currently in operation almost directly across the river in Sunshine, Louisiana. As an alternative to constructing a barge dock at the facility, raw material storage tanks could be constructed at the liquid terminal and pipelines installed under the river between the terminal and the proposed Flopam facility. As a result, the selected Plaquemine site has the capability of allowing Flopam to receive raw materials by ship, barge, and rail.

FEMA Flood Zone Classification

The proposed Flopam facility is being constructed to meet expected growth in the markets for SNF's products. SNF's customers will be adversely impacted if SNF is unable to deliver product throughout the year. Furthermore, SNF may not be able to acquire insurance to protect its entire $350 million investment if the facility is located in a FEMA flood zone. As a result, construction in a FEMA flood zone presents an unacceptable risk to SNF's business and to SNF's customers. The selected Plaquemine site is not classified by FEMA as within a 100-year flood zone.

Proximity to the Coast

Flopam's business and customers will be adversely impacted in the event of extended downtime as a result of a hurricane. As a result, construction within 25 miles of the Gulf Coast represents an unacceptable risk to SNF's business and to SNF's customers. The selected Plaquemine site is located approximately 50 miles from the Gulf Coast.

Availability of Sufficient Utilities

The Flopam facility will utilize water, natural gas, and electricity in its manufacturing operations. Flopam has determined that sufficient utilities are available in the selected Plaquemine area to supply these resources to the site.

Availability of Labor in Local Markets

Most large chemical manufacturing facilities utilize primarily skilled laborers to operate and maintain the facility. However, Flopam's customers require that a significant portion of the product produced at the facility be packaged in either 25 kilogram bags or Supersaks. As a result, the Flopam facility requires a diverse workforce including low-skilled employees for operations such as packaging and forklift operating, as well as higher skilled employees for other operating and maintenance positions. The Flopam facility is projected to employ over 500 employees within a five-year period. Flopam has reviewed data on the labor markets within a 25-mile radius of the facility and determined that the labor markets can supply the required number of employees at the appropriate skill levels.

Proximity to Raw Material Sources

The largest volume raw material that will be utilized at the Flopam facility is acrylonitrile. Acrylonitrile is currently produced in Westwego, Louisiana; Beaumont, Texas; Green Lake (Calhoun County), Texas; and Lima, Ohio. The proximity of the Plaquemine site to the Westwego and Beaumont sites will minimize the impacts (environmental, logistics, costs, etc.) from transportation of acrylonitrile.

The other major raw materials utilized at the facility will be acrylic acid and caustic soda. Caustic soda is produced by three manufacturers within ten miles of the proposed site and by numerous manufacturers within 60 miles of the site. Acrylic acid is produced primarily in the greater Houston, Texas area which is relatively close to the Plaquemine site. The Plaquemine site location is expected to result in relatively low impacts from raw material transportation.

Proximity to Container Ports

A significant portion of the product produced at the Flopam facility will be exported in intermodal containers. Although a large portion will be shipped out via rail directly to customers in North America, a large portion will also be shipped out on container ships. Proximity to container ports is essential to minimize the transportation impacts (environmental, logistics, costs, etc.) from outbound freight. The Plaquemine site is located within 100 miles of the container port at the Port of New Orleans.

Alternative Site Evaluation

Initially, SNF evaluated its existing site in Riceboro. However, due to the relatively small amount of acreage available, this site was eliminated. In addition, due to the long distance from raw material sources which results in high transportation impacts and freight costs, this site was not expected to be viable for the foreseeable future. SNF subsequently evaluated numerous sites between Corpus Christi, Texas and Mobile, Alabama. This general area was selected due to the proximity to raw material sources. Sites were first eliminated if there was not sufficient developable land outside an area classified by FEMA as a 100-year flood zone. Additional sites were eliminated if it was determined that a significant amount of wetlands would be impacted and require mitigation. Sites were then eliminated if a preliminary evaluation indicated that rail service and/or barge access were not feasible. The remaining site selection parameters were then evaluated for the sites that were not eliminated as a result of the above parameters. Following are some examples of the sites that were evaluated and eliminated from consideration.

An initial evaluation of the former National Pipe and Tube site in Liberty, Texas was completed. Although the site was less than 200 acres, this site was not originally eliminated since there was believed to be sufficient land available in the vicinity. In addition, the proximity to raw material sources in

Beaumont, Green Lake, and Houston, Texas provided potential advantages in transportation impacts. However, it was subsequently determined that the inactive rail spur to the site could not be easily reactivated due to excessive congestion on the Union Pacific Railroad main line through Liberty. In addition, it was also determined that the Trinity River was no longer navigable without significant dredging. As a result, this site was eliminated.

A site in an existing industrial park in Pearlington, Mississippi was also evaluated. However, this site was eliminated when it was determined that only 400 contiguous acres were available. In addition, the site is located within 25 miles of the Gulf Coast, and portions of this acreage are within a 100-year flood zone. Therefore, this site was eliminated from consideration.

A site that was owned by the Port of Victoria in Victoria, Texas was also evaluated. Although the Port of Victoria had additional acreage available, only 500 acres were made available to SNF. In addition, there were concerns that there would not be appropriate water rights available at this site during a drought. Therefore, this site was eliminated from consideration.

A site in Green Lake (Calhoun County), Texas was also evaluated. Although SNF purchased 250 acres at this site, it was later determined that the adjacent manufacturing facility would not sell the additional land required under appropriate terms that would allow the Flopam facility to be viable for the foreseeable future. Therefore, this site was eliminated from consideration.

A site in Terrebonne Parish, Louisiana near Houma was also considered. Although several hundred acres are available at this site, with the exception of approximately 250 acres, the majority of the site consisted of wetlands located within a 100-year flood zone. As a result, this site was eliminated from consideration.

Another site that was considered included the Pointe Sunshine site in Ascension Parish, Louisiana. Although this site also met the criteria for the proposed facility, this site did not offer any significant advantages over the Iberville Parish site. However, construction of the rail spur required constructing one or more additional road crossings for the rail spur and significant costs were required to bring electricity to the site. As a result, this site was eliminated from consideration.

Other than the Pointe Sunshine site and the selected Iberville Parish site, no other sites were identified that met the required site selection criteria without significant mitigation and/or other investments.

B. Is the chosen site in or near environmentally sensitive areas?

1. **Wetlands**
2. **Estuaries**
3. **Critical Habitat**
4. **Historic or culturally significant areas**
   a. **Indian Mounds**
   b. **Antebellum houses**
   c. **Tourist attractions or facilities (*e.g.*, bed and breakfast inns)**
   d. **Campgrounds or parks**

The proposed project site contains jurisdictional wetlands as determined by the USACE. SNF has made every attempt to avoid the wetland areas in siting the facility on the property; however, some potential wetlands may be impacted. As the proposed project site is not located in the Louisiana Coastal Zone, there are no estuaries in the vicinity of the project area. There is one endangered species, the pallid sturgeon, known to inhabit the Mississippi River in the project area. SNF will be following guidance from the USFWS to avoid adverse impact to this species when constructing and operating their water intake structure. A Phase I Cultural Resources Survey has been requested by the SHPO. The results of this survey will indicate whether any

potentially significant cultural resources are on the site. There are no tourist attractions, parks, or campgrounds in close proximity to the site.

C. What is the zoning and existing land use of the prospective site and nearby area?

1. **Is the site near existing heavy industrial, chemical process or refinery operations?**
2. **Is there a precedent for chemical contamination near the site or it the soil and water pristine?**
3. **Is the area particularly noted for its esthetic beauty?**

The proposed project site is located adjacent to the Shintech PVC Manufacturing complex. The area is noted in the Iberville Parish Master Plan of 2005 as supporting industrial development. There is no precedent of chemical contamination on the proposed site. Potential wetlands and agricultural land represent the only aesthetic resources associated with the proposed project site and surrounding area. Since a chemical facility is present adjacent to the proposed project site, expansion of industrial infrastructure on the property is not anticipated to result in a diminished visual experience for individuals using River Road.

D. Is this site flood prone?

1. **Is the site in a flood plain?**
   a. **How current are the maps used to make flood plain determinations?**
   b. **What is the elevation of the site?**
   c. **Is diking required or desired to provide flood protection?**

FEMA Flood Insurance Rate Maps (FIRM) (map revised August 1991) for Iberville Parish confirm that the proposed project site does not lie within the 100-year floodplain. Since the facility is located outside the floodplain, no diking is required to provide flood protection. Elevation of the project site ranges from approximately 23 feet national geodetic vertical datum (NGVD) at

River Road, to approximately 18 feet NGVD at the southwestern edge of the property.

i. **What is the design height of the dike?**

Not Applicable

ii. **How is the dike protected from erosion?**

Not Applicable

iii. **What frequency and design storm was used?**

Not Applicable

iv. **Is the access to the site over the dikes?**

Not applicable since the proposed facility is located outside the 100-year floodplain.

2. **Is the site hurricane vulnerable?**

   a. **Is the site in an area subject to storm surge?**
   b. **What are the design storm specifications?**
   c. **Should damage from wave action be considered?**
   d. **For what levels of wind speed is the facility designed?**

The proposed Flopam facility is away from coastal areas, thus storm surge and wave action due to hurricanes are not potential threats. The plant will be designed to withstand high wind speeds utilizing current industry design standards. Emergency preparation plans will be in place to protect the facility during hazardous weather.

E. **Is groundwater protected?**

1. **Are aquifers or recharge areas underlying the site used for drinking water?**

The Plaquemine Aquifer (Mississippi River Alluvial Aquifer) is the regional freshwater supply aquifer and is capable of producing water usable for domestic or industrial purposes. The Plaquemine Aquifer is not a federally

protected sole-source aquifer under the Safe Drinking Water Act, and no other water-bearing units beneath or in proximity to the site are sole-source aquifers. The closest sole-source aquifer to the project is the Chicot Aquifer, located in southwestern Louisiana.

The facility will be operated and maintained in full compliance with the LPDES permit and air quality permits. Therefore, compliance with all applicable environmental standards of the CWA, CAA, and Louisiana EQA will be achieved, further protecting area resources, including groundwater.

2. What is the relationship of the site to the water table?

Based on information obtained from the Soil Survey of Iberville Parish, the facility site is comprised of Sharkey and Commerce soils. Both of these soil series exhibit seasonally high water tables [water at approximately two feet below ground surface (bgs)] from December to April. Water occurs in artesian condition typical from four feet to 24 feet mean sea level within the Plaquemine Aquifer.

3. What wells exist in the area?

Based upon the LDOTD database of registered water wells, 21 registered groundwater supply wells were identified as being located within a two-mile radius of the proposed facility location. Eleven of these wells are for industrial or power generation use, five for domestic use, three for public supply, one for stock use, and one of unknown use. The nearest LDOTD-registered well is located greater than one mile from the approximate center of the operational area of the proposed facility.

4. What is the flow rate and direction of the groundwater flow?

Since the upper sands of the Plaquemine Aquifer are in direct hydraulic connection with the Mississippi River, direction of groundwater movement fluctuates in response to the stage of the Mississippi River.

5. What is the groundwater quality in the underlying aquifers?

The water quality of the groundwater in the Plaquemine Aquifer typically exhibits hard to very hard calcium bicarbonate-like characteristics, with some soft to moderately hard sodium bicarbonate-like characteristics. The dissolved solids content ranges from 200 milligrams per liter (mg/L) to 800 to 1,000 mg/L. Principal dissolved solids include calcium, magnesium, sodium chloride, and bicarbonate. The water is relatively noncorrosive, with a pH near neutral. Iron and manganese are a minor fraction of the dissolved solids' content; however, some clogging of well screens and distribution systems do occur due to the presence of these minerals. Water from the upper sand unit of the aquifer in particular is generally very hard and high in iron (hardness ranges from 150 to more than 500 mg/L, while iron content ranges from 1 to more than 20 mg/L). The chloride content is relatively low, ranging from 5 to 25 mg/L near the Mississippi River. The water can be and is used for domestic and industrial purposes.

6. Is there a hydraulic connection between the aquifers?

Not Applicable.

F. Does the prospective site pose potential health risks as defined by proximity to:

1. **Prime agricultural area (crop or pastureland)**
2. **Residential area**
3. **Schools or day care centers**
4. **Hospitals or prisons**
5. **Public buildings or entertainment facilities**
6. **Food storage area**

7. Existing community health problems that may be aggravated by operation of additional hazardous waste disposal capacity

Air Quality

Air dispersion modeling has shown that there will be no exceedances of the NAAQS or AAS within the surrounding communities. Furthermore, the utilization of state of the art technology, including ultra-low NO_x burners, fabric filters and cyclones, and thermal oxidizers as controls along with the use of an inherently cleaner process, good combustion practices, clean burning fuels, and stringent implementation of leak detection and repair of equipment leaks, minimizes the environmental impacts of the proposed facility.

Water Quality

Under normal daily operations, it is not considered possible or even reasonably likely that contaminants associated with the operation of the Flopam facility will migrate to off-site property as a result of the to-be-permitted wastewater and storm water runoff discharges to the Mississippi River and Bayou la Butte.

The only reasonably possible (although very remote) scenario for migration of contaminants to nearby farms or residential areas would be in connection with an uncontrolled catastrophic spill or release of a hazardous material utilized and stored on site. Because of SNF's significant experience with these raw materials and processes, as well as the systems employed, the likelihood and risks associated with an accidental release or spill are considered to be very low.

Although one cannot absolutely guarantee that a spill will never occur, the Flopam facility has been designed with state-of-the-art technology. It will be operated with well-trained personnel, modern equipment and operating procedures. Employees will be properly trained, including regular periodic

"refresher" training, in applicable safety and operational procedures and activities that are standard for the chemical industry. In addition, employees will be properly trained in applicable safety, industrial hygiene, and public health procedures and standards in accordance with the OSHA regulations. Further, employees will be trained in the applicable pollution prevention and spill prevention and control measures and procedures. Both the CWA and Louisiana EQA, through their implementing regulations, require that Flopam prepare and actively implement what are known as a SPCC Plan (federal jurisdiction for any petroleum products and oils) and SPC Plan (state jurisdiction for petroleum, oils, and chemicals that are designated hazardous substances). The SPCC/SPC Plans require the design, construction and maintenance of structural controls such as berms, dikes, and containment basins in connection with regulated material handling equipment and storage tanks. The structural controls must be designed and maintained to fully contain (plus a margin of safety for rainfall, etc.) possible leaks or spills. The SPCC/SPC Plans require the development and implementation of SOPs and BMPs for the response to spills, containment of spills, and cleanup.

It is Flopam's policy as a good corporate citizen to fully require all managers and employees to always perform their jobs with public safety and environmental considerations in the forefront. Therefore, in the event of a spill, structural controls, SOPs, and BMPs will be in place to the maximum extent possible to prevent any loss or migration of spilled contaminants from Flopam's property.

G. Is air quality protected?

1. Is the site within an ozone or non-attainment area?

The proposed facility will be located in Iberville Parish which is designated as an area that is in non-attainment with the 8-hour ozone standard. The parish is designated as being in attainment, unclassifiable, or not designated

for all other criteria pollutants. Each pollutant with monitored concentrations below the NAAQS is classified as attainment.

2. What contaminants are likely to be generated at the site?

The following air contaminants are likely to be generated at this site: NO_x, CO, VOCs, SO_2, PM, HAPs, and TAPs. However, modeling has shown that the project will not cause or contribute to a violation of a NAAQS, exceed a PSD Increment, or cause or contribute to a violation of an AAS. The dispersion model results demonstrate that emissions from the proposed facility will not adversely impact the surrounding community.

3. What protection is afforded from each contaminant generated by the site?

Utilization of state of the art technology, including ultra-low NO_x burners where feasible, fabric filters and cyclones, and thermal oxidizers as controls along with the use of an inherently cleaner process, good combustion practices, clean burning fuels, and stringent implementation of leak detection and repair of equipment leaks, will minimize the environmental impacts and odors from the proposed facility. These controls represent BACT, LAER, and maximum available control technology (MACT), which provide the top performing level of vapor reduction and emission control.

4. What is the potential for unregulated emissions?

The air permit application submitted in August 2009 identifies both significant and insignificant (exempt) emission sources that are anticipated for the Flopam facility. As required by Louisiana regulations, Flopam will permit all applicable emission sources and will operate the facility in accordance with applicable regulations.

As discussed in Section 2.0 (I.A. "Material Storage and Potential for Accidental Release"), there is always the remote possibility of an accidental

release resulting in unregulated emissions. However, the Flopam facility will be designed with modern control equipment and interlocks. Furthermore, Flopam's employees will be trained to operate and maintain the manufacturing equipment in a manner to prevent unregulated and accidental releases.

5. What plans are implemented to provide for odor control?

As discussed in the response to IV.G.3, emission controls meeting BACT, LAER, and MACT will be employed that will also serve as odor control.

6. Who will be affected by emissions?

Modeling for the project indicates that NAAQS, PSD Increment, and AAS thresholds, which are protective of human health, will not be exceeded. Therefore, there surrounding community will not be adversely affected by emissions from the proposed facility.

7. Describe the control of vapors at various stage of process.

See response to IV.G.3.

H. Have physical site characteristics been studied; what has been done in terms of geotechnical investigations?

A Phase I Environmental Site Assessment (ESA) was conducted in December 2008 and yielded no evidence of areas of concern. No records were identified of oil and gas wells on the site. Similarly, no storage of agricultural chemicals was discovered. One grain silo remains on the site, and there are ponds and a former residence located on the property. The ponds were constructed by the former residents of the site. No subsurface investigations were conducted as a result of the Phase I ESA.

1. Site geology

The Flopam facility will be located in the Mississippi River alluvial plain. Sediments deposited by the Mississippi and Atchafalaya Rivers and their distributaries formed area soils. The dominant geological process active in the area since Tertiary time [approximately 66 million to two million years before present (BP)] has been deposition of sediments in the gradually-subsiding Gulf Coast Geosyncline. The regional dip of beds to the south and the thickening of the geologic section to the south illustrate the effects of the geosyncline.

The sediments deposited in the upper 1,100 feet of the project site are of Quaternary age (zero to two million years BP). The Quaternary time consists of two epochs that are represented in the subsurface: (1) sediments from the Recent Epoch (zero to 10,000 years BP) occur in the upper 100 feet bgs; and (2) sediments from the Pleistocene Epoch (10,000 to two million years BP) occur at depths from 100 to 600 feet bgs.

Sediments from Tertiary Age are typically encountered at depths greater than 600 feet bgs. The geology at the plant site typically consists of four stratigraphic zones overlying the upper sands of the Plaquemine Aquifer. The four stratigraphic zones overlying the Plaquemine Aquifer are: the second aquitard, the 30-foot pervious zone, the first aquitard, and the surface soils. The surface soils that overlay the first aquitard are approximately 10 feet thick. These soils are the result of deposition on the floodplain portion of the natural levee environment along the Mississippi River and tend to be alternating lean clay (CL) to fat clay (CH) with occasional silt (ML) lenses.

2. Hydrology

Surface drainage from the property generally flows south through a series of drainage ditches to Bayou la Butte, portions of which have been substantially

modified and channelized to facilitate drainage of sugar cane fields and other areas of the natural levee of the Mississippi River in this vicinity. Surrounding properties also drain south to Bayou la Butte, which flows generally to the west and southwest from the subject property. The batture area drains into the Mississippi River.

3. Topography

The proposed project site lies in the Mississippi River alluvial plain. Sediments deposited by the Mississippi and Atchafalaya Rivers and their distributaries formed area soils. With the exception of the Mississippi River, there are two primary physiographic features: natural levees and backswamps. Both of these features are present on the proposed facility site. The Mississippi River is the dominant feature of the region. Prior to the construction of the artificial levee system along the river in the 1930s, the river deposited a thick sequence of natural levee deposits adjacent to its channel. Beyond these natural levee deposits (i.e., away from the river), floodplain deposits occurred. Bayou la Butte is located within the property boundary. No tributaries enter the river below Baton Rouge, and all surface drainage except for the area between the constructed levee system is away from the river.

4. Soil Properties

According to the Soil Survey of Iberville Parish, the soils on the subject site are Convent soils (frequently flooded), Commerce silt loam, Commerce silty clay loam, Sharkey silty clay loam, Sharkey clay, and Sharkey clay, gently undulating.

Convent soils (frequently flooded) are level to gently undulating soils on the natural levees of the Mississippi River between the river and the protection levee (batture). The soils were formed in loamy alluvium and are subject to

flooding, scouring, and deposition. Slopes range from zero to three percent. These soils are high in fertility, but flooding and scouring reduce the potential for these soils to be used for cropland. The majority of the acreage of these Convent soils is in woodland or pasture.

Commerce silt loam is a nearly level loamy soil located in high positions on the natural levees of the Mississippi River. Commerce silty clay loam is located in intermediate positions on the Mississippi River's. Slope gradients are typically less than one percent. These soils are high in fertility. Air and water move through the soil somewhat slowly. Run off occurs at a slow to medium rate. The majority of Commerce soils are in cropland, primarily sugarcane and soybeans.

According to the Soil Survey of Iberville Parish, Sharkey soils formed in clayey alluvium are mostly level, and are located on the low and intermediate parts of the natural levees of the Mississippi River and its tributaries. Slope gradients range from zero to three percent. This series consists of poorly drained, very slowly permeable soils that are high in fertility. Sharkey silty clay loam and Sharkey clay support cropland and pasture, while gently undulating Sharkey clay supports pasture and woodland (due to irregular sloping).

5. Aquifer location

The Plaquemine Aquifer is typically encountered approximately 100 feet bgs in the vicinity of the proposed project site and consists of alternating coarse and fine-grained materials. The maximum depth of the aquifer in the project area is approximately 500 feet bgs.

6. Subsidence problems

The surficial stratum of very stiff to hard silty clays and clays will provide excellent support for shallow foundations. These soils should provide adequate bearing capacity for the planned loads. However, the loading conditions will result in settlement that may be unacceptable for the planned equipment conditions. Shallow and deep foundations will be used where required to ensure settlement of equipment is limited.

7. Climatic conditions

Iberville Parish has a humid subtropical climate typical of south Louisiana. Warm, moist maritime tropical air from the Gulf of Mexico is pervasive in the project area. During the winter and early spring months, the typical maritime tropical air is occasionally displaced by polar air from Canada for durations of less of than a week. The overall climate provides for ample sunshine, warm temperatures, a long frost-free season, and abundant precipitation throughout the year. Extreme weather conditions are associated with thunderstorms, squall lines, and hurricanes (rare, due to the distance of Iberville Parish from the Louisiana coast).

6.0 MITIGATING MEASURES

V. Are there mitigating measures which would offer more protection to the environment that the facility as proposed without unduly curtailing nonenvironmental benefits? (This question requires the permittee to demonstrate having considered the most stringent techniques for reducing or more efficiently handling waste.)

No. There are no mitigating measures that would offer more protection to the environment than the proposed design without unduly curtailing non-environmental benefits. This project employs a green manufacturing process for producing acrylamide. This project also triggered the PSD and NNSR air permitting requirements. These regulations require BACT and LAER. The entire BACT and LAER analyses are part of the permit application. The facility will also be regulated under the stringent requirements for new sources under the HON and MON rules, which set standards that match the top performing controls for air emissions from the chemical industry. In addition, wastewater is also regulated by LPDES rules that minimize impacts from water discharges. Both the air emission and wastewater discharge permits will implement conditions requiring application of best available control technology. Since no significant adverse environmental impacts are expected to occur, additional mitigating measures are not deemed necessary at this time. Should air emissions and/or wastewater discharge standards applicable to the facility be revised or changed in the future, Flopam will comply with the revised standards.

A. Is this facility part of a master plan to provide waste management? Whose plan?

1. **How does it fit into the plan?**
2. **What geographical area is served by the plan?**

Not applicable. The proposed Flopam facility is not part of a master plan to provide waste management. The facility will be a chemical manufacturing facility and is not a waste management facility.

B. Does the facility fit into an integrated waste management system? (reduction, recovery, recycling, sales tax, exchange, storage, treatment, disposal).

1. **On-site**
2. **Regional**

Not applicable. The proposed Flopam facility does not fit into an integrated waste management system. The Flopam facility will be a chemical manufacturing facility and is not a waste management facility.

C. Can waste be disposed in another fashion (way)?

1. **Technology limitations**
2. **Cost factors**
3. **Other reasons**

Not applicable since the Flopam facility is not a waste treatment, storage, or disposal facility. Procedures for handling waste generated from the facility are discussed in Section 2.0 (I.A).

D. What quality assurance control will be utilized to protect the environment?

1. **Plans for lab work**
2. **How are out-of-spec wastes handled?**
3. **What happens to rejected wastes?**
4. **Treatment stabilization**
5. **Segregation of noncompatible wastes**
6. **Handling of containerized wastes**

Environmental controls and operational plans are discussed in detail in Sections 1.1, 2.0, 4.0, and 5.0.

E. Innovative techniques used to control release of waste or waste constituents into the environment.

1. **Surface impoundment**
2. **Land application treatment**
3. **Landfill (burial)**
4. **Incinerator**
5. **Container storage**

6. Tanks

New and innovative technologies for the reduction of air emissions, wastewater discharge, and waste generation are described in Sections 1.1, 2.0, 4.0, and 5.0.

TABLES

TABLE 1
MATERIALS ANTICIPATED TO BE STORED ON SITE
Flopam Inc. – Plaquemine, Louisiana
GESI Project No. 06504

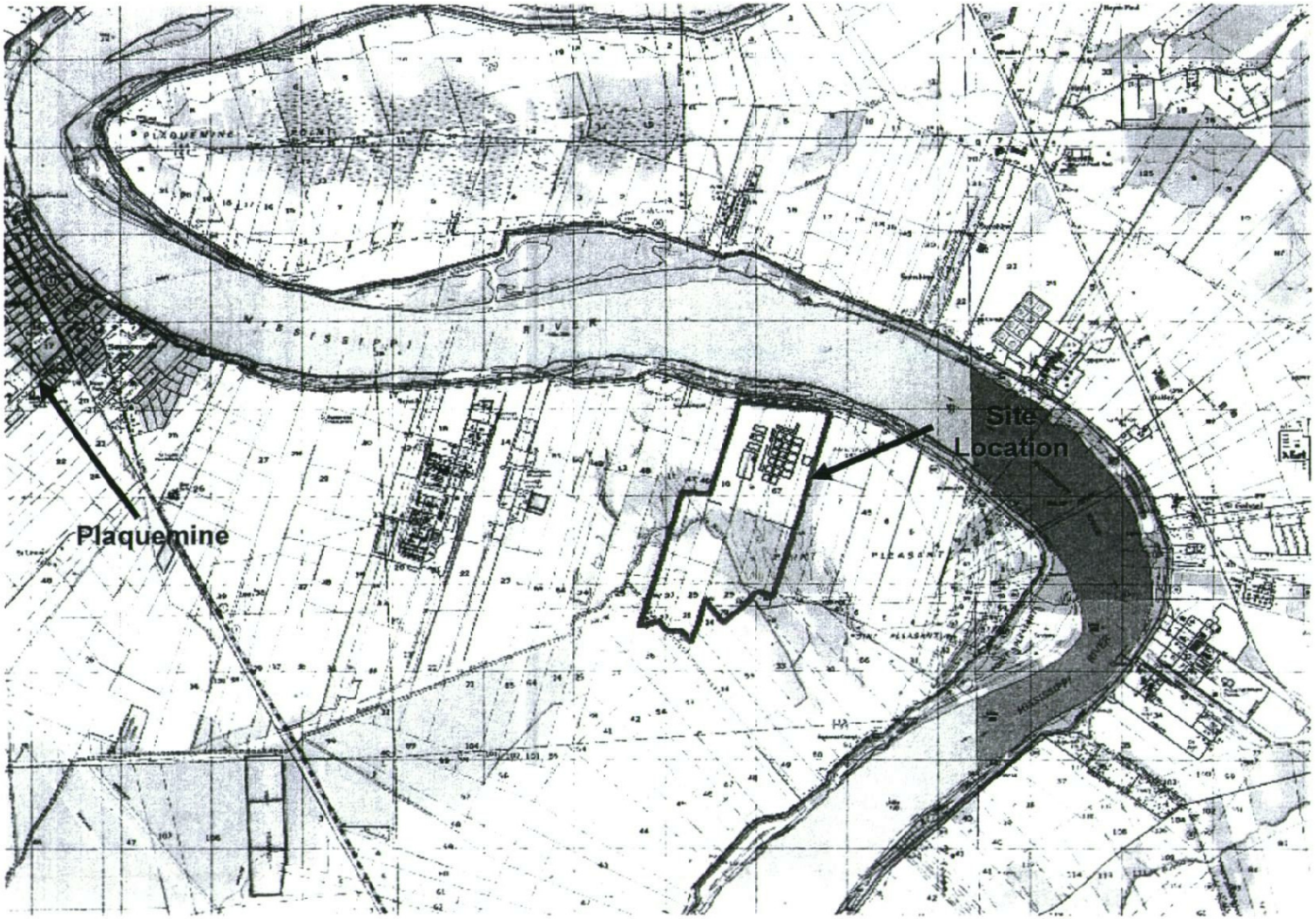
Acrylamide, 50 %
Acrylic Acid
Acrylonitrile
Allyl Alcohol, 24%
Allyl Chloride
Ammonium Hydroxide, 30%
Ammonium Adipate
Ammonium Persulfate
Azeotrope (from ADAM process)
Biocide
Calcium Hydroxide
Caustic Soda
Catalyst/Catalyst Residue (from ADAM process)
Crude Ester (from ADAM process)
Dimethylamine
Dimethylaminoethanol
Epichlorohydrin
Ethyl Acrylate or Methyl Acrylate
Ethylenediamine
Ethylene Glycol
Hexane or Heptane
Hydrochloric acid, 30%
Isobutene
Methanol or Ethanol
Methyl Chloride
Oleum, 20% Sulfur Trioxide (SO_3)
Polysodium Acrylate
Process Oil
Recycle Reactant (from ADAM Process)
Sodium Bisulfite (SBS)
Sodium Acrylate
Sodium Hypochlorite
Surfactant
Washwater, Recycle Water, or Evaporator Bottoms
Product Storage

TABLE 2
FLOPAM FACILITY 2011-2025 PAYROLL COMMITMENTS
Flopam Inc. – Plaquemine, Louisiana
GESI Project No. 06504

Year	Capital Expenditures	Annual Payroll	Taxable Purchases
2010	$100.0	$0.0	$0.0
2011	$75.0	$6.8	$6.0
2012	$75.0	$13.8	$12.0
2013	$50.0	$19.2	$18.0
2014	$50.0	$23.1	$24.0
2015	$0.0	$29.4	$30.0
2016	$0.0	$29.4	$30.0
2017	$0.0	$29.4	$30.0
2018	$0.0	$29.4	$30.0
2019	$0.0	$29.4	$30.0
2020	$0.0	$29.4	$30.0
2021	$0.0	$29.4	$30.0
2022	$0.0	$29.4	$30.0
2023	$0.0	$29.4	$30.0
2024	$0.0	$29.4	$30.0
2025	$0.0	$29.4	$30.0
TOTAL	**$350.0**	**$386.3**	**$390.0**

Note: Values represent million dollars, nominal terms.

FIGURES



Source: USGS Carville, Plaquemine, Saint Gabriel, and White Castle, LA Quadrangles (7.5 Minute Series; 1992). Horizontal Datum: NAD27. Figure Scale: 1 inch = ~1,600 meters.

GESI
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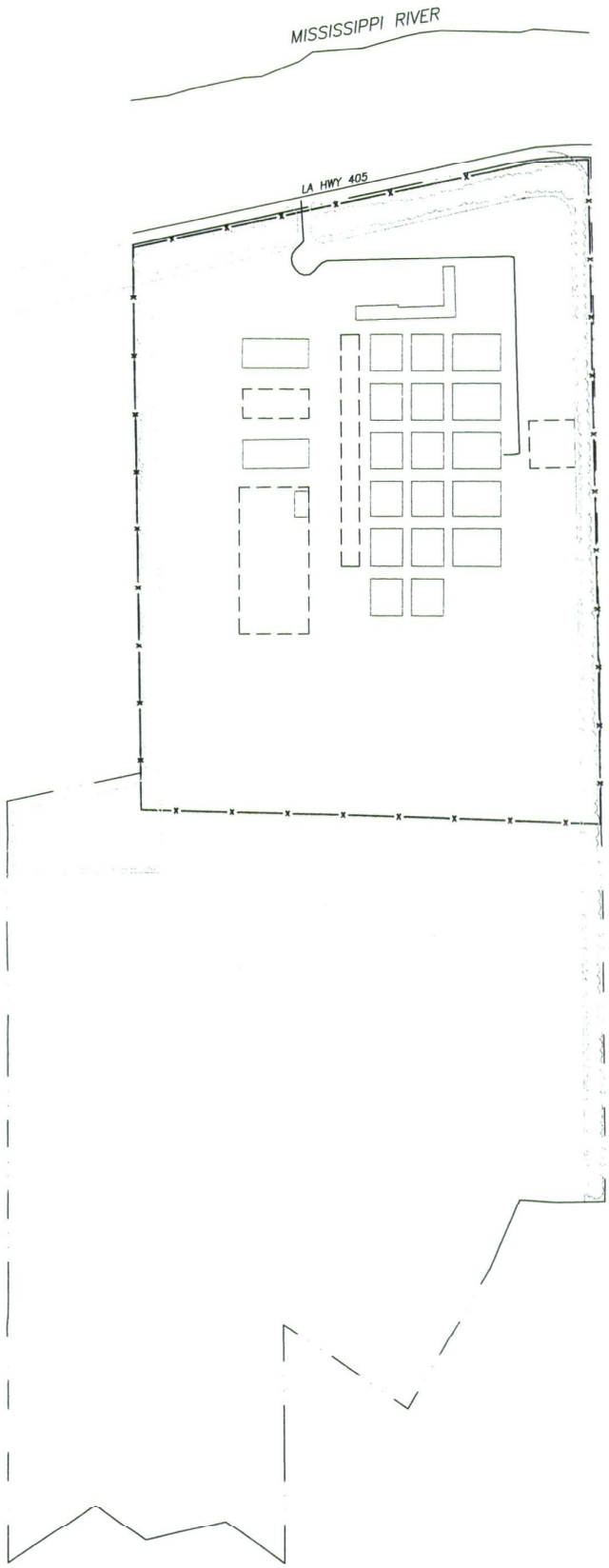
tel 770 919 9552
fax 770 919 9529

FLOPAM INC.
PLAQUEMINE, LOUISIANA

SITE LOCATION MAP

PROJECT NO. 06504

FIGURE 1



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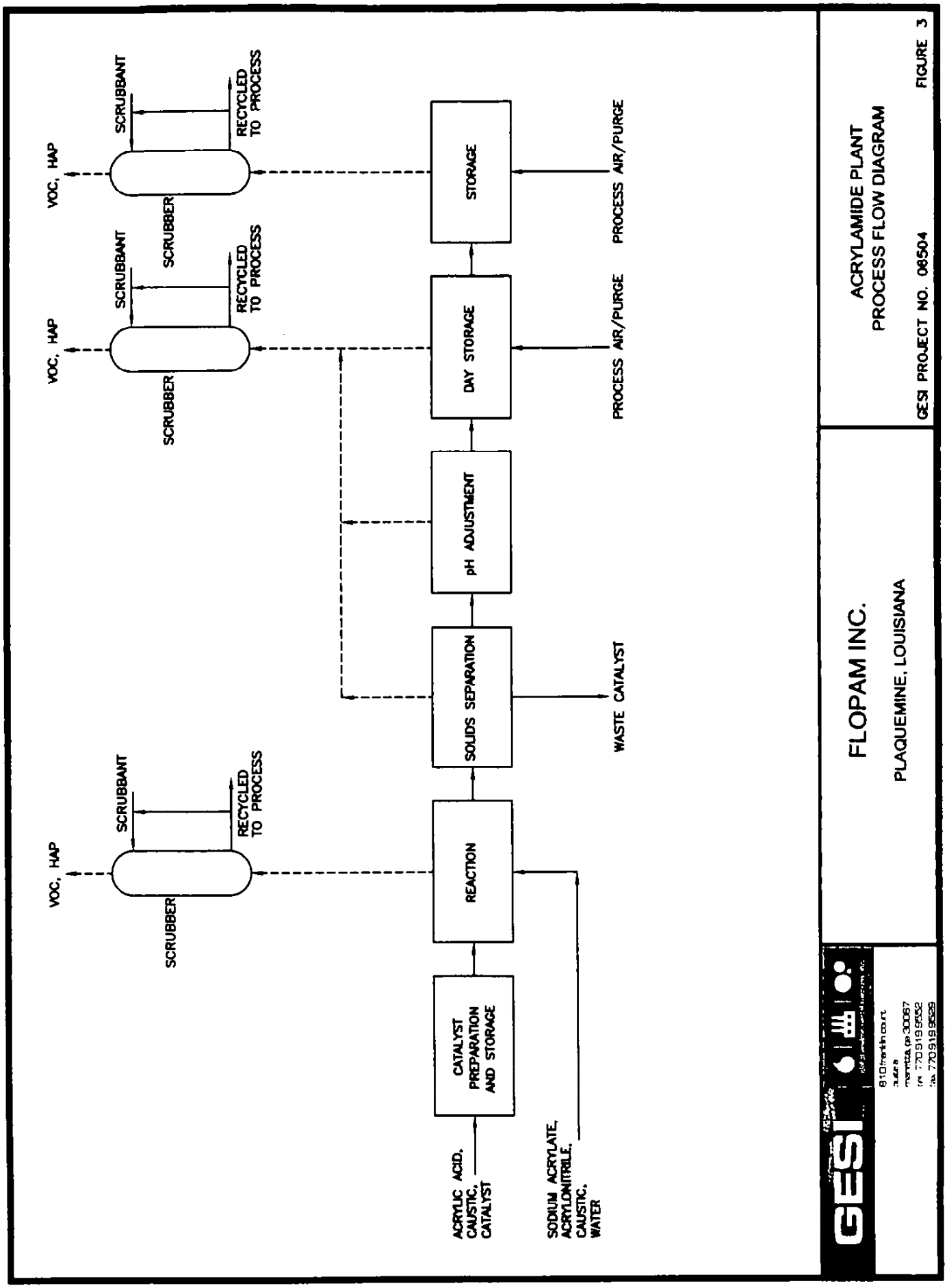
FLOPAM INC.

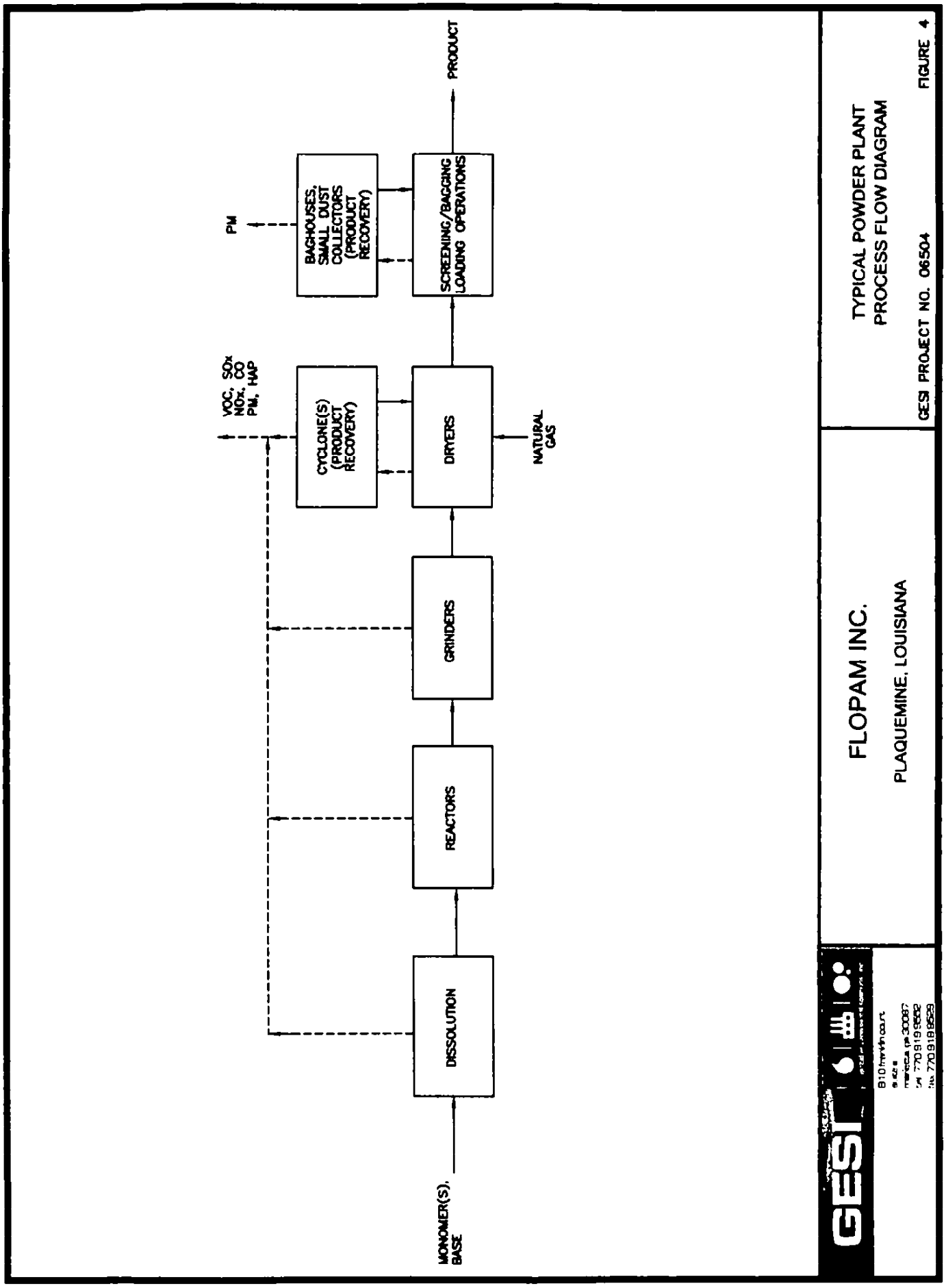
PLAQUEMINE, LOUISIANA

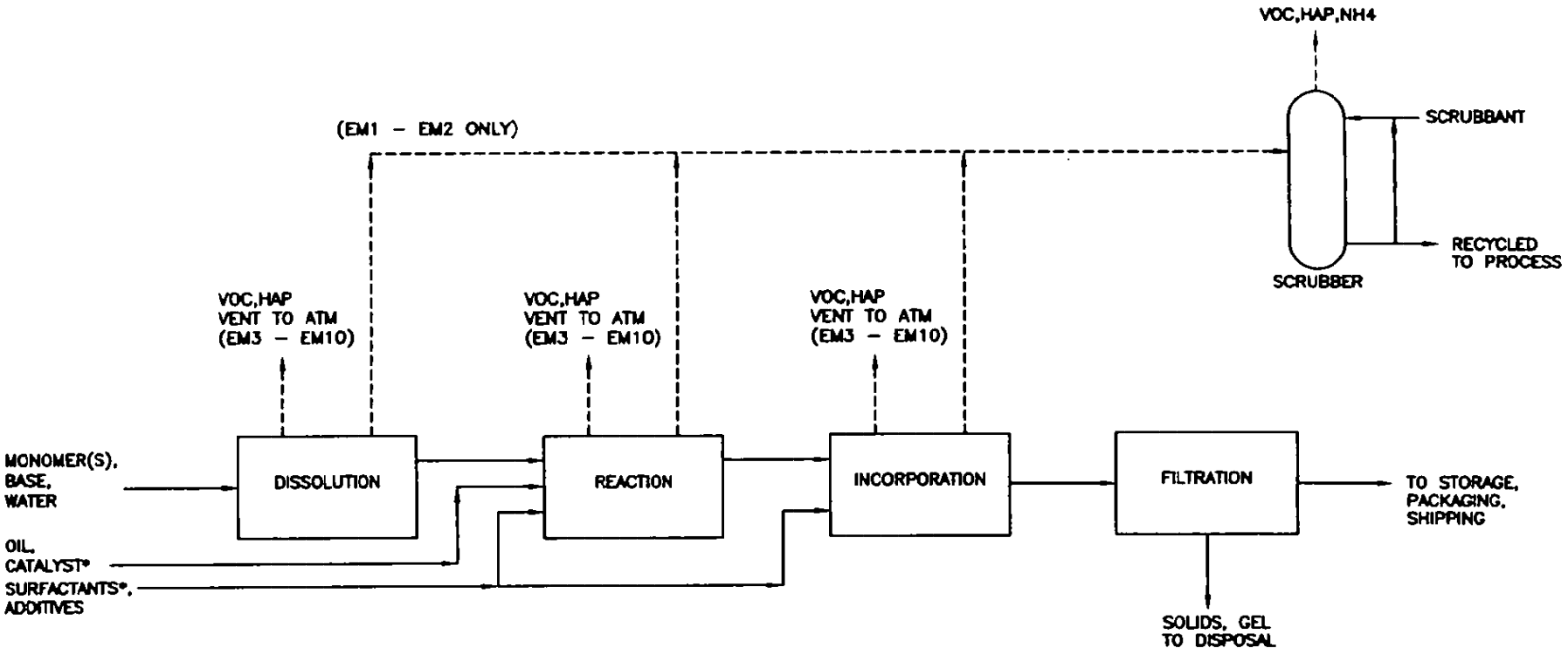
SITE PLAN

GESI PROJECT NO. 06504

FIGURE 2


ACRYLIC ACID, CAUSTIC, CATALYST
SODIUM ACRYLATE, ACRYLONITRILE, CAUSTIC, WATER
CATALYST PREPARATION AND STORAGE
REACTION
SOLIDS SEPARATION
pH ADJUSTMENT
DAY STORAGE
STORAGE
WASTE CATALYST
PROCESS AIR/PURGE
PROCESS AIR/PURGE
SCRUBBER
SCRUBBANT
RECYCLED TO PROCESS
VOC, HAP
SCRUBBER
SCRUBBANT
RECYCLED TO PROCESS
VOC, HAP
SCRUBBER
SCRUBBANT
RECYCLED TO PROCESS
VOC, HAP
FLOPAM INC.
PLAQUEMINE, LOUISIANA
ACRYLAMIDE PLANT
PROCESS FLOW DIAGRAM
GESI PROJECT NO. 08504
FIGURE 3


MONOMER(S), BASE
DISSOLUTION
REACTORS
GRINDERS
DRYERS
NATURAL GAS
CYCLONE(S) (PRODUCT RECOVERY)
VOC, SOx NOx, CO PM, HAP
BAGHOUSES, SMALL DUST COLLECTORS (PRODUCT RECOVERY)
PM
SCREENING/BAGGING LOADING OPERATIONS
PRODUCT
GESI
FLOPAM INC.
PLAQUEMINE, LOUISIANA
TYPICAL POWDER PLANT PROCESS FLOW DIAGRAM
GESI PROJECT NO. 06504
FIGURE 4



* TRANSFERRED FROM WEIGH/MIX TANKS IN EMULSION PLANT THAT ARE INCLUDED IN EMISSION UNITS

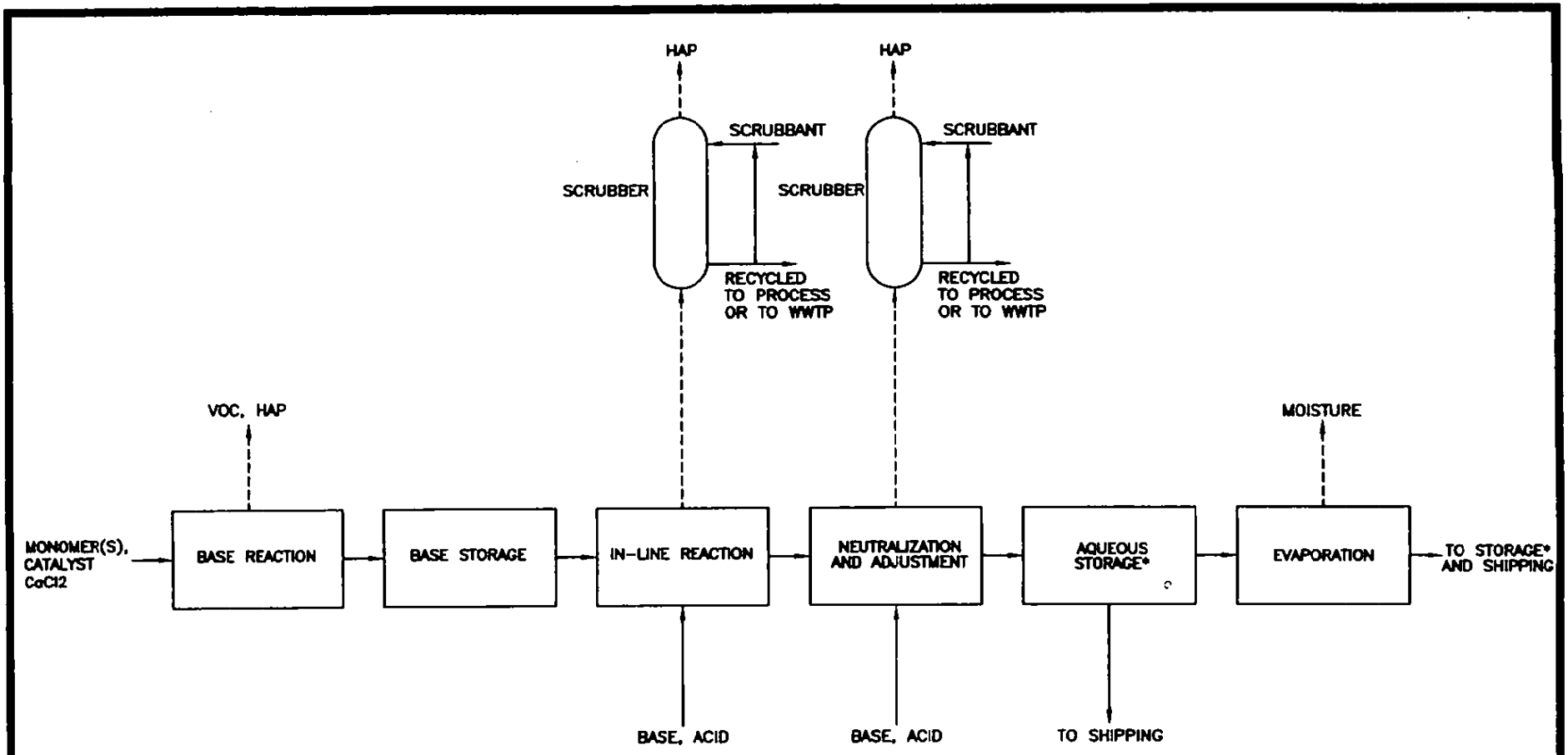
GESI

FLOPAM INC.

PLAQUEMINE, LOUISIANA

TYPICAL EMULSION LINE
PROCESS FLOW DIAGRAM

GESI PROJECT NO. 06504 FIGURE 5



* INCLUDED WITH MISCELLANEOUS PRODUCT STORAGE TANKS

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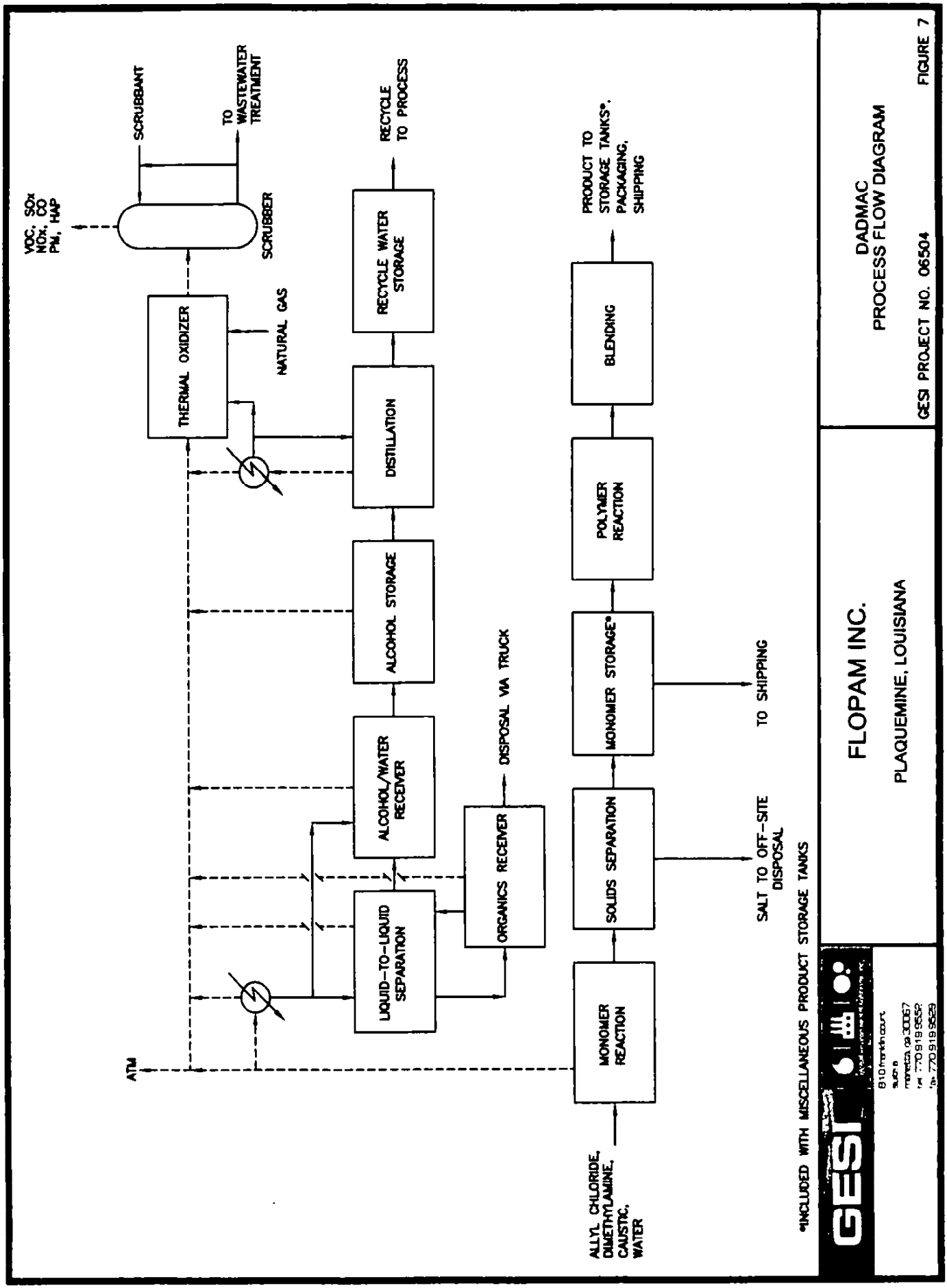
FLOPAM INC.

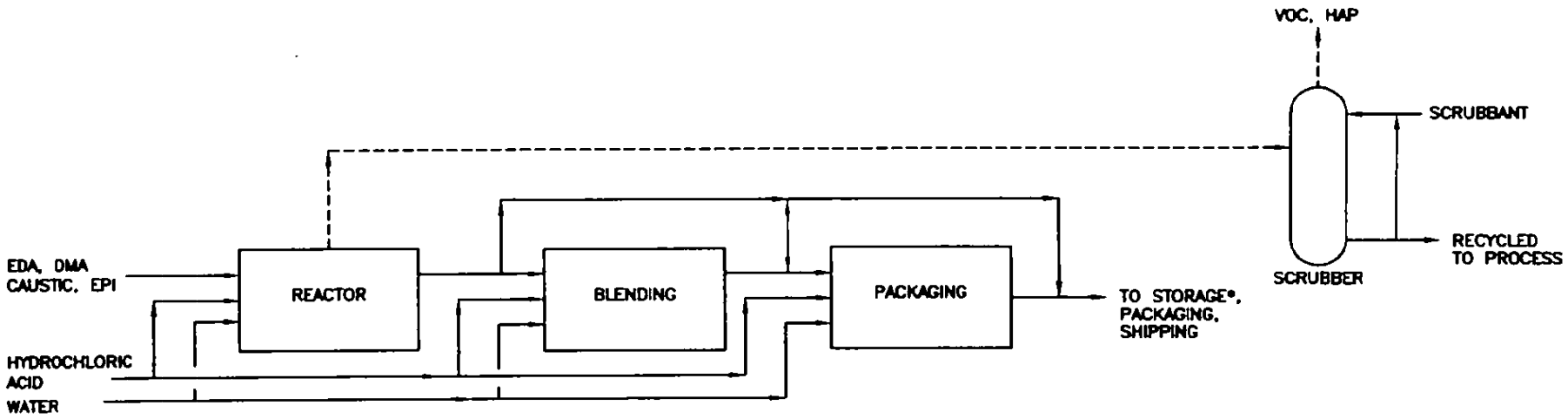
PLAQUEMINE, LOUISIANA

SPECIALTY PRODUCT LINE
PROCESS FLOW DIAGRAM

GESI PROJECT NO. 06504

FIGURE 6


VOC, SOx
NOx, CO
PM, HAP
SCRUBBANT
TO WASTEWATER TREATMENT
SCRUBBER
THERMAL OXIDIZER
NATURAL GAS
RECYCLE TO PROCESS
RECYCLE WATER STORAGE
DISTILLATION
ALCOHOL STORAGE
ALCOHOL/WATER RECEIVER
LIQUID-TO-LIQUID SEPARATION
ORGANICS RECEIVER
DISPOSAL VIA TRUCK
ATM
PRODUCT TO STORAGE TANKS*, PACKAGING, SHIPPING
BLENDING
POLYMER REACTION
MONOMER STORAGE*
TO SHIPPING
SOLIDS SEPARATION
SALT TO OFF-SITE DISPOSAL
MONOMER REACTION
ALLYL CHLORIDE, DIMETHYLAMINE, CAUSTIC, WATER
*INCLUDED WITH MISCELLANEOUS PRODUCT STORAGE TANKS
GESI
FLOPAM INC.
PLAQUEMINE, LOUISIANA
DADMAC
PROCESS FLOW DIAGRAM
GESI PROJECT NO. 06504
FIGURE 7



LEGEND:

DMA = DIMETHYLAMINE
EDA = ETHYLENEDIAMINE
EPI = EPICHLOROHYDRIN

*INCLUDED WITH THE MISCELLANEOUS PRODUCT STORAGE TANKS

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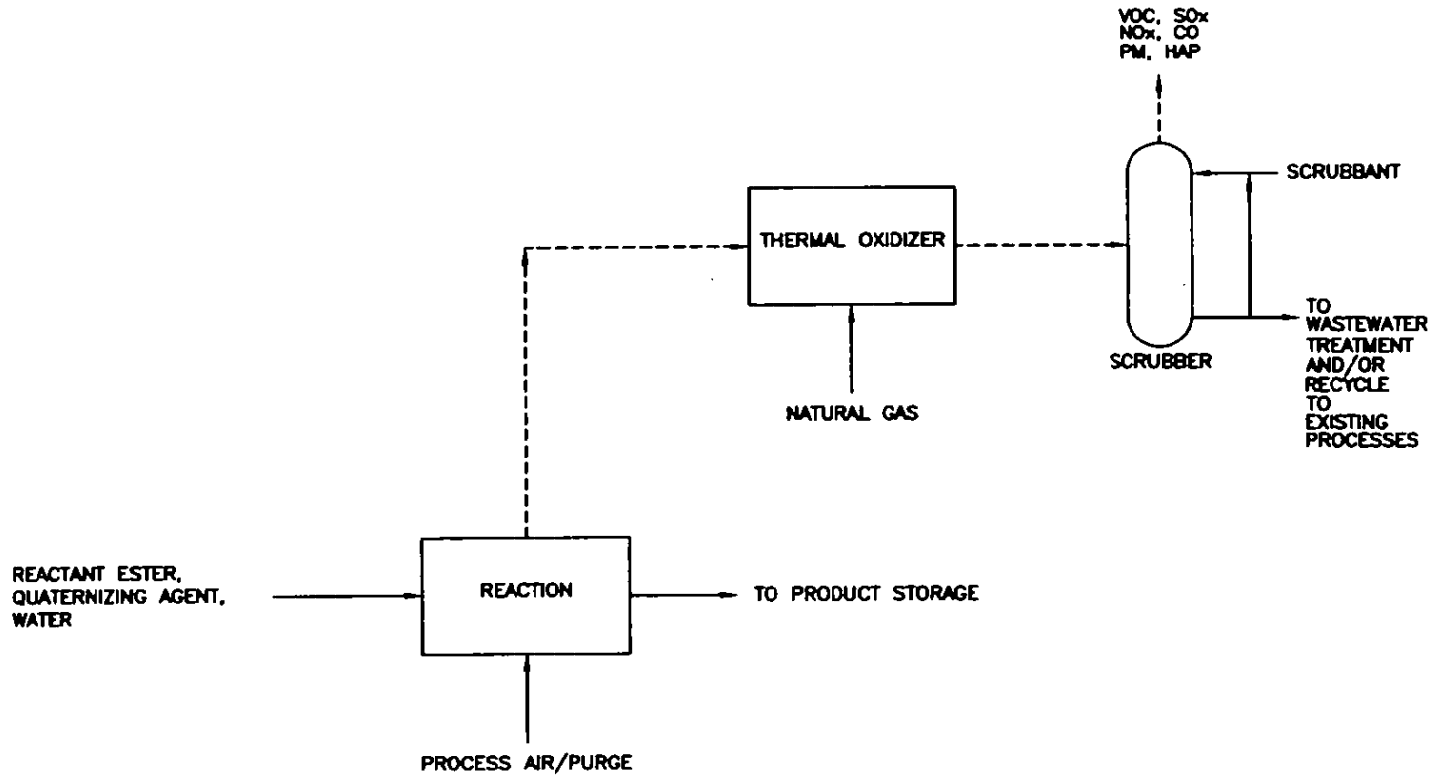
FLOPAM INC.
PLAQUEMINE, LOUISIANA

POLYAMINE
PROCESS FLOW DIAGRAM

GESI PROJECT NO. 06504 FIGURE 8



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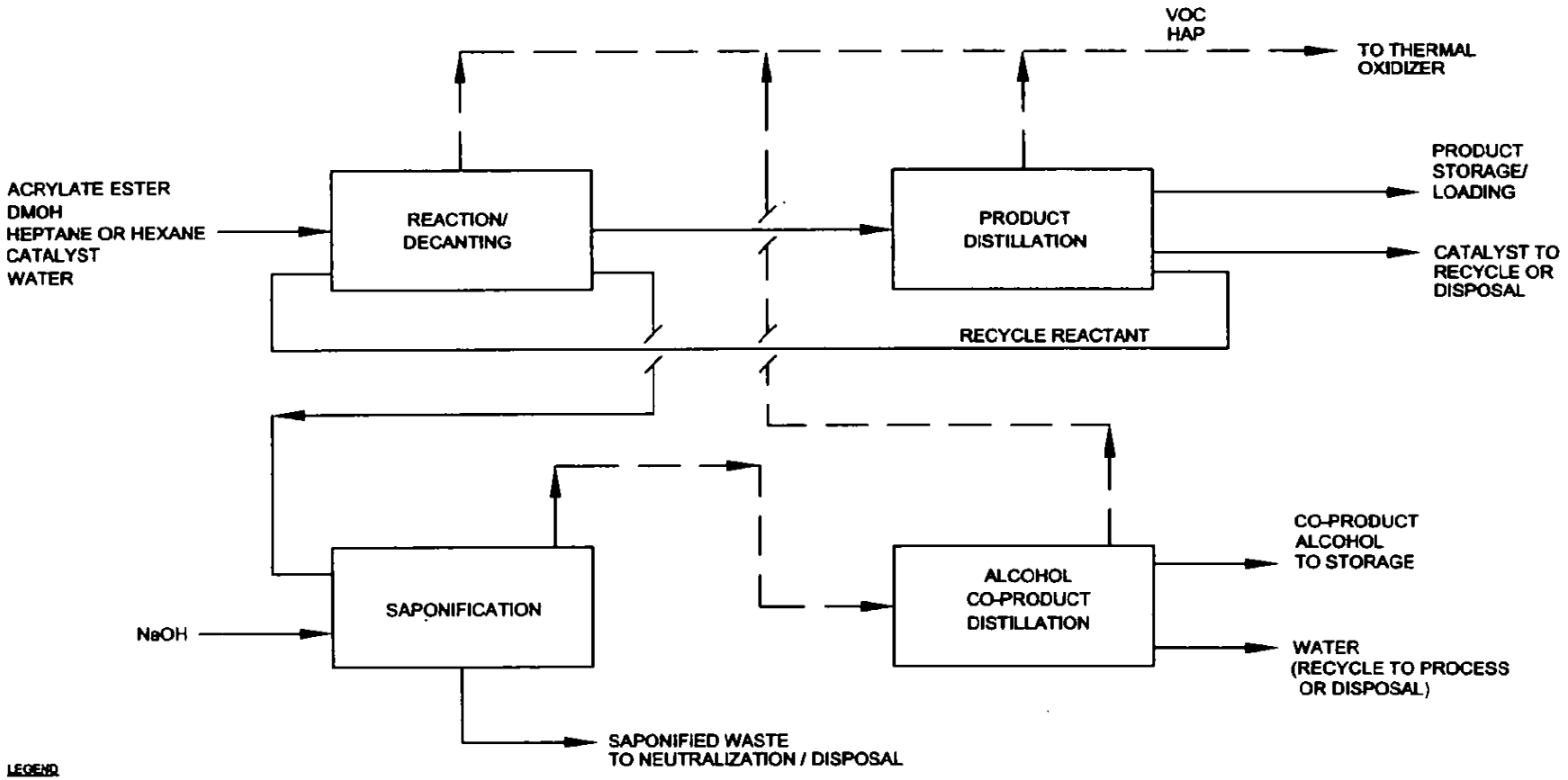
FLOPAM INC.

PLAQUEMINE, LOUISIANA

CHLOROMETHYLATION PLANT
PROCESS FLOW DIAGRAM

GESI PROJECT NO. 06504 FIGURE 9



GESI

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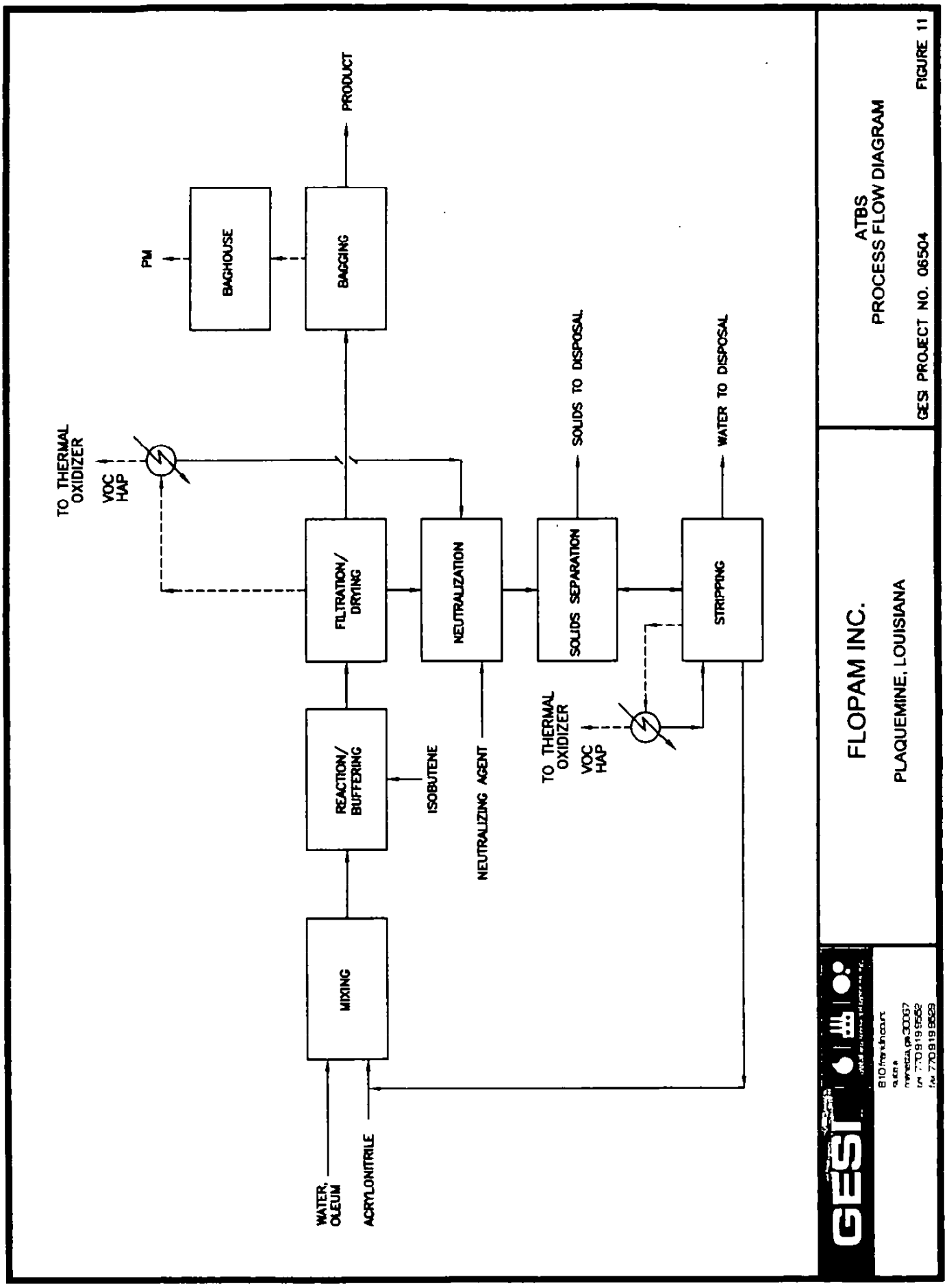
FLOPAM INC.

PLAQUEMINE, LOUISIANA

ADAM PLANT
PROCESS FLOW DIAGRAM

GESI PROJECT NO. 06504 FIGURE 10


PRODUCT
PM
BAGHOUSE
BAGGING
TO THERMAL OXIDIZER
VOC HAP
FILTRATION/ DRYING
NEUTRALIZATION
SOLIDS SEPARATION
STRIPPING
SOLIDS TO DISPOSAL
WATER TO DISPOSAL
REACTION/ BUFFERING
ISOBUTENE
NEUTRALIZING AGENT
TO THERMAL OXIDIZER
VOC HAP
MIXING
WATER, OLEUM
ACRYLONITRILE
GEST
FLOPAM INC.
PLAQUEMINE, LOUISIANA
ATBS
PROCESS FLOW DIAGRAM
GES PROJECT NO. 06504
FIGURE 11

APPENDIX A

Agency Correspondence on Threatened/Endangered Species, Critical Habitats, and Cultural Resources

C-K ASSOCIATES · LLC
ENVIRONMENTAL & ENGINEERING CONSULTANTS

17170 PERKINS ROAD
BATON ROUGE, LA 70810
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FAX (225) 751-2010
http://www.c-ka.com

REGIONAL OFFICES

LAKE CHARLES, LA
PH(337)439-8699
FAX(337)439-3337

SHREVEPORT, LA
PH(318) 797-8636
FAX(318) 798-0478

HOUSTON, TX
PH (281) 397-9016
FAX (281) 397-6637

NEW ORLEANS, LA
PH (504) 301-4992
FAX (504) 304-7759

April 8, 2009

Mr. David Soileau, Jr.
Fish and Wildlife Service
United States Department of the Interior
646 Cajundome Blvd., Suite 400
Lafayette, Louisiana 70506

RE: Proposed Global Environmental Solutions Facility
C-K Associates Project No 4370E

Dear Mr. Soileau:

On behalf of Global Environmental Solutions, Inc. (GESI), C-K Associates, LLC (C-K) respectfully requests a determination of any threatened and endangered species or designated critical habitat that may occur within the project area of the referenced facility.

GESI is planning to construct and operate a manufacturing facility to produce water-soluble polymers for water and wastewater treatment applications. The majority of the raw materials for the facility will be received by either railcar or barge. In addition to the construction of the facility, a water intake structure will be installed on the Mississippi River to provide raw water for the facility.

The facility will be located approximately 5 miles south of Plaquemine in Iberville Parish, Louisiana as depicted on the attached topographic map (Figure 1). Currently, the majority of the project area consists of active and inactive agriculture fields. The inactive agriculture fields have been cultivated within the last two growing seasons, but are currently used for cattle grazing. The remainder of the project area consists of bottomland hardwood forest, baldcypress/tupelo swamp, and black willow forest.

Please feel free to contact me at 225.755.1000 should you have any questions or comments relative to this letter or if C-K can provide assistance in expediting this request.

Sincerely,

Amy Bains

Amy Bains
Environmental Scientist

Attachment

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506

July 9, 2009

Ms. Amy Bains
C-K Associates, L.L.C.
17170 Perkins Road
Baton Rouge, LA 70810

Dear Ms. Bains:

Please reference your April 8, 2009, letter, received by this office on June 24, 2009, requesting our review of the proposed Global Environmental Solutions Facility adjacent to the Mississippi River, 5 miles south of Plaquamine, in Iberville Parish, Louisiana. The U.S. Fish and Wildlife Service (Service) has reviewed the information you provided, and offers the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

According to your letter, a water intake structure would be installed on the Mississippi River to provide raw water for the proposed facility. The proposed water intake structure would be located within areas of the Mississippi River that are inhabited by the endangered pallid sturgeon (*Scaphirhynchus albus*). The pallid sturgeon is found in Louisiana, in both the Mississippi and Atchafalaya Rivers (with known concentrations in the vicinity of the Old River Control Structure Complex); it is possibly found in the Red River as well. The pallid sturgeon is adapted to large, free-flowing, turbid rivers with a diverse assemblage of physical characteristics that are in a constant state of change. Detailed habitat requirements of this fish are not known, but it is believed to spawn in Louisiana. Habitat loss through river channelization and dams has adversely affected this species throughout its range. In an effort to avoid potential project related impacts to the pallid sturgeon we recommend implementing the following Endangered Pallid Sturgeon Recovery Plan guidelines to avoid adverse impacts to the pallid sturgeon.

- Water intakes, such as the intake proposed, serving industry, irrigation, and public water supply that may affect pallid sturgeon recruitment should be screened with a ¼-inch (6.35 mm) mesh and have an intake velocity of less than ½ ft/sec (15.24 cm/sec), or be placed at water depths greater than 15 feet (4.575 m) to protect against entrainment or impingement of pallid sturgeon larvae or fingerlings. A ⅛-inch mesh or less, Johnson (or Johnson-type) screen/intake should be used if feasible and once-through circulation systems should not be employed.

- If feasible, dry cooling systems, or a combination of dry and wet cooling systems should be used to reduce the amount of water withdrawn for cooling purposes. It should be noted that dry cooling systems require a larger land area that could lead to greater wetland or other habitat impacts.

- Variable speed intake pumps should be utilized to reduce water intakes during low demand periods.

- Any repairs to the cooling system that would require the heated discharge to be discontinued should be conducted during summer months. Cessation of heated discharge during cold weather can result in the death of fishes due to the sudden change in water temperature (U.S. Fish and Wildlife Service 1978, Environmental Protection Agency 1976).

- Water intakes should not be located in identified primary spawning and/or nursery areas or mussel beds.

- A reduced water intake during cooler water periods is recommended to avoid any unnecessary impacts to aquatic species by entrainment or impingement (Environmental Protection Agency 1976).

- An inspection/monitoring and maintenance plan for intakes is required to ensure proper operation (National Marine Fisheries Service 1996).

- Intake screens should be equipped with a reliable automatic cleaning system that utilizes proven technology (National Marine Fisheries Service 1996).

The proposed project may also impact wetlands. For a complete jurisdictional wetland delineation of the proposed project, please contact Mr. Robert Heffner (504/862-2274) at the New Orleans District, U.S. Army Corps of Engineers (Corps). If the Corps determines that the proposed project is within their regulatory jurisdiction, official U.S. Fish and Wildlife Service comments will be provided in response to the corresponding Public Notice.

We appreciate the opportunity to provide comments in the planning stages of this proposed activity. If you need further assistance, please contact Joshua Marceaux (337/291-3110) of this office.

Sincerely,

Brad S. Rieck
Deputy Supervisor
Louisiana Field Office

cc: Corps of Engineers, Regulatory Division, New Orleans, LA
NOAA Fisheries (NMFS): Baton Rouge, LA
LDWF, Natural Heritage Program, Baton Rouge, LA

Literature Cited

Environmental Protection Agency. 1976. Development document for best technology available for the location, design, construction and capacity of cooling water intake structures for minimizing adverse environmental impact. EPA 440/1-76/015-a. 263 pages.

National Marine Fisheries Service. 1996. Juvenile fish screen criteria for pump intakes. Environmental and Technical Services Division Portland Oregon. http://www.nwr.noaa.gov/1hydrop/pumpcrit1.htm

U.S. Fish and Wildlife Service. 1978. Impacts of steam-electric power plants on fish and wildlife resources, draft manual. Office of Biological Services, Newton Corner, Massachusetts.

C-K ASSOCIATES · LLC
ENVIRONMENTAL & ENGINEERING CONSULTANTS

17170 PERKINS ROAD
BATON ROUGE, LA 70810
PH (225) 755-1000
FAX (225) 751-2010
http://www.c-ka.com

REGIONAL OFFICES

LAKE CHARLES, LA
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HOUSTON, TX
PH (281) 397-9016
FAX (281) 397-6637

NEW ORLEANS, LA
PH (504) 301-4992
FAX (504) 304-7759

April 8, 2009

Louisiana Department of Wildlife and Fisheries
Natural Heritage Program
P.O. Box 98000
Baton Rouge, Louisiana 70898-9000
Attn: Mr. Gary Lester

RE: Proposed Global Environmental Solutions Facility
C-K Associates Project No 4370E

Dear Mr. Lester:

On behalf of Global Environmental Solutions, Inc. (GESI), C-K Associates, LLC (C-K) respectfully requests a determination of any threatened and endangered species or designated critical habitat that may occur within the project area of the referenced facility.

GESI is planning to construct and operate a manufacturing facility to produce water-soluble polymers for water and wastewater treatment applications. The majority of the raw materials for the facility will be received by either railcar or barge. In addition to the construction of the facility, a water intake structure will be installed on the Mississippi River to provide raw water for the facility.

The facility will be located approximately 5 miles south of Plaquemine in Iberville Parish, Louisiana as depicted on the attached topographic map (Figure 1). Currently, the majority of the project area consists of active and inactive agriculture fields. The inactive agriculture fields have been cultivated within the last two growing seasons, but are currently used for cattle grazing. The remainder of the project area consists of bottomland hardwood forest, baldcypress/tupelo swamp, and black willow forest.

Please send invoices for all processing fees to:

C-K Associates LLC
17170 Perkins Road
Baton Rouge, Louisiana 70810
Attn: Amy Bains

Please feel free to contact me at 225.755.1000 should you have any questions or comments relative to this letter or if C-K can provide assistance in expediting this request.

Sincerely,

Amy Bains

Amy Bains
Environmental Scientist

Attachment

BOBBY JINDAL
GOVERNOR

State of Louisiana
DEPARTMENT OF WILDLIFE AND FISHERIES
OFFICE OF WILDLIFE

ROBERT J. BARHAM
SECRETARY,
JIMMY L. ANTHONY
ASSISTANT SECRETARY

Date	July 17, 2009
Name	Amy Bains
Company	C-K Associates, LLC
Street Address	17170 Perkins Road
City, State, Zip	Baton Rouge, LA 70810
Project	Proposed Global Environmental Solutions Facility C-K Associates Project No 4370E
Project ID	2402009
Invoice Number	09071701

Personnel of the Habitat Section of the Coastal & Non-Game Resources Division have reviewed the preliminary data for the captioned project. After careful review of our database, no impacts to rare, threatened, or endangered species or critical habitats are anticipated for the proposed technical assistance project. No state or federal parks, wildlife refuges, scenic streams, or wildlife management areas are known at the specified site within Louisiana's boundaries.

The Louisiana Natural Heritage Program (LNHP) has compiled data on rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features throughout the state of Louisiana. Heritage reports summarize the existing information known at the time of the request regarding the location in question. The quantity and quality of data collected by the LNHP are dependent on the research and observations of many individuals. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Louisiana have not been surveyed. This report does not address the occurrence of wetlands at the site in question. Heritage reports should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. LNHP requires that this office be acknowledged in all reports as the source of all data provided here. If at any time Heritage tracked species are encountered within the project area, please contact the LNHP Data Manager at 225-765-2643. If you have any questions, or need additional information, please call 225-765-2357.

Sincerely,

Carolyn Michel

for Gary Lester, Coordinator
Natural Heritage Program

C-K ASSOCIATES • LLC
ENVIRONMENTAL & ENGINEERING CONSULTANTS

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BATON ROUGE, LA 70810
PH (225) 755-1000
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HOUSTON, TX
PH (281) 397-9016
FAX (281) 397-6637

NEW ORLEANS, LA
PH (504) 301-4992
FAX (504) 304-7759

April 8, 2009

Louisiana Department of Culture, Recreation & Tourism
Attn: Mr. Duke Rivet
State Historical Preservation Office
P.O. Box 44247
Baton Rouge, LA 70804-4247

RE: Proposed Global Environmental Solutions Facility
C-K Associates' Project No. 4370E

Dear Mr. Rivet:

On behalf of Global Environmental Solutions, Inc. (GESI), C-K Associates, LLC (C-K) respectfully requests a letter of "no objection" indicating that no impacts to known cultural, historical, or archaeological resources will occur as a result of the proposed GESI facility.

GESI is planning to construct and operate a manufacturing facility to produce water-soluble polymers for water and wastewater treatment applications. The majority of the raw materials for the facility will be received by either railcar or barge. In addition to the construction of the facility, a water intake structure will be installed on the Mississippi River to provide raw water for the facility.

The facility will be located approximately 5 miles south of Plaquemine in Iberville Parish, Louisiana as depicted on the attached topographic map (Figure 1). Currently, the majority of the project area consists of active and inactive agriculture fields. The inactive agriculture fields have been cultivated within the last two growing seasons, but are currently used for cattle grazing. The remainder of the project area consists of bottomland hardwood forest, baldcypress/tupelo swamp, and black willow forest.

Please feel free to contact me at 225.755.1000 should you have any questions or comments relative to this letter or if C-K can provide assistance in expediting this request.

Sincerely,
C-K Associates, LLC

Amy Bains

Amy Bains
Environmental Scientist

Attachment

MITCHELL J. LANDRIEU
LIEUTENANT GOVERNOR

State of Louisiana
OFFICE OF THE LIEUTENANT GOVERNOR
DEPARTMENT OF CULTURE, RECREATION & TOURISM
OFFICE OF CULTURAL DEVELOPMENT
DIVISION OF ARCHAEOLOGY

PAM BREAUX
SECRETARY

SCOTT HUTCHESON
ASSISTANT SECRETARY

July 24, 2009

Ms. Amy Bains
C-K Associates, LLC
17170 Perkins Road
Baton Rouge, LA

Re: Proposed Global Environmental Solutions Facility
C-K Associates' Project No. 4370E
Iberville Parish, Louisiana

Dear Ms. Bains:

This is in reference to your letter dated April 8, 2009, that we received June 23, 2009, concerning the above-referenced project. We have reviewed the proposed facility plan and believe that a Phase 1 cultural resources survey is warranted for the entire project area. Given the property's geographical location near the Mississippi River, it is our opinion that there is the possibility of prehistoric and\or historic archaeological sites on the property.

I have enclosed a copy of our contracting archaeologists list for your use. If you have any questions, please contact Rachel Watson in the Division of Archaeology at (225) 342-8165.

Sincerely,

Scott Hutcheson
State Historic Preservation Officer

SH:RW:s

Encl: Contracting Archaeologists List

APPENDIX B

An Economic Analysis of the Construction and Operation of the SNF Project In Iberville Parish, Louisiana

The Economic Impact of SNF Operations on Louisiana and Select Parishes

Dek Terrell
Freeport McMoRan Professor and
Director, Division of Economic Development
Louisiana State University

EXECUTIVE SUMMARY

This report summarizes estimates of the economic impact of SNF located in Iberville Parish. The impact study covers two areas, the state of Louisiana and a 6-parish area. The 6-parish area includes Iberville, West Baton Rouge, East Baton Rouge, Livingston, Ascension, and Assumption Parishes. The SNF commitment is to spend a specified amount on acquisitions and construction in the first five years then spend a specified amount of wages and taxable purchases over a fifteen year period (table 1). The operation will directly employ over 500 workers when it reaches full capacity.

- By the end of 2015, the SNF commitment will reach $29.4 million in annual payroll.
- The SNF commitment constitutes an injection of over $386 million ($269 million when discounted to 2009$) in Louisiana earnings by the end of 2025 through operations alone.
- Accounting for both direct and indirect economic effects, SNF operations and construction will lead to over 2,400 total Louisiana jobs at its peak. When the construction phase is complete, SNF will support roughly 1,400 Louisiana jobs.
- Louisiana can expect over $3.7 billion ($2.8 billion when discounted to 2009$) in new output over the sixteen year horizon as a result of the injection created by the SNF agreement.
- When indirect effects are included, the SNF operations should increase Louisiana wages and salaries by over $1.5 billion ($1.1 billion when discounted to 2009$) over the sixteen year horizon.
- The SNF commitment should generate over $107 million ($80 million when discounted to 2009$) in Louisiana state tax revenue over the sixteen year horizon. In addition to this, $29.9 million ($22.2 million when discounted to $2009) in local taxes will be generated. State taxes exclude corporate income tax and local taxes exclude property tax.
- The 6-parish area will be the primary beneficiary of this activity. At its peak, construction and operations will lead to over 2,000 jobs in the area. Operations will support 1,200 jobs in the 6-parish area after the construction phase is complete.

This report summarizes our findings on the economic impact of SNF operations on both the state of Louisiana and the 6-parish area economies. The 6-parish area includes Iberville, West Baton Rouge, East Baton Rouge, Livingston, Ascension, and Assumption Parishes.

This report focuses on the commitment of expenditures to be paid for construction and operations over a 16 year period. It is worth noting that the first year (2010) includes construction only and does not include operations. Operational employment will begin in 2011 and reach full capacity by 2015. All computations in this report are based on information provided by the Louisiana Department of Economic Development and U.S. Bureau of Economic Analysis RIMS II Input/Output tables.

The results are organized as follows. Because the largest economic impact will come from operations in the state, this report begins there. We present the job, earnings and output creation from operations over the sixteen year horizon. Earnings and output totals are presented as the net present value in 2009$. We then turn to the estimated impact of construction and the total estimated impact of SNF on the Louisiana economy. 6-parish area impacts for operations and construction follow.

All calculations are based on the assumption that SNF commitments over the sixteen year period are met. Table 1 summarizes these commitments.

Table 1
2011-2025 Payroll Commitments
($millions; nominal terms)

Year	CAPEX	Annual Payroll	Taxable Purchases
2010	$100.0	$0.0	$0.0
2011	$75.0	$6.8	$6.0
2012	$75.0	$13.8	$12.0
2013	$50.0	$19.2	$18.0
2014	$50.0	$23.1	$24.0
2015	$0.0	$29.4	$30.0
2016	$0.0	$29.4	$30.0
2017	$0.0	$29.4	$30.0
2018	$0.0	$29.4	$30.0
2019	$0.0	$29.4	$30.0
2020	$0.0	$29.4	$30.0
2021	$0.0	$29.4	$30.0
2022	$0.0	$29.4	$30.0
2023	$0.0	$29.4	$30.0
2024	$0.0	$29.4	$30.0
2025	$0.0	$29.4	$30.0
Total	$350.0	$386.3	$390.0

Table 2 contains the net present value of the earnings injection for the construction and fifteen year operational period beginning in January 2010 and ending in December 2025. We use the thirty year treasury rate (4.34% as of May-09) as the discount rate. Notice that the $269 million injection for the sixteen year horizon is substantially less than the $386 million in total payroll in Table 1. This reflects discounting.

Table 2
Net Present Value of Direct Operations Earnings (millions of 2009$)

Horizon	16 years
Earnings Injection	$269.0

Economic Impact of the Commitments on the Louisiana Economy

Like a rock dropped into a pond, an injection of new dollars into an economy ripples throughout an economy. Spending by the firm and its employees directly creates new sales in the community. Area businesses that benefit from those expenditures in turn hire additional workers. Spending by those businesses and their employees then creates another round of sales for other businesses and the process continues. Economic impact analysis provides us with the tools to quantify the full impact of these ripples in an economy using jobs, earnings, and output multipliers. The US Bureau of Economic Analysis RIMS II Input/Output tables allow us to quantify the full impact of the splash from SNF operations in Louisiana's economy. Figure 1 graphs the estimated direct Louisiana employment and total Louisiana employment that can be expected from SNF. Note that the indirect employment created is high during the initial construction phase up to 2014 and that direct employment in operations expands through 2015.

Figure 1
Total Louisiana Employment
Attributable to the SNF Operations

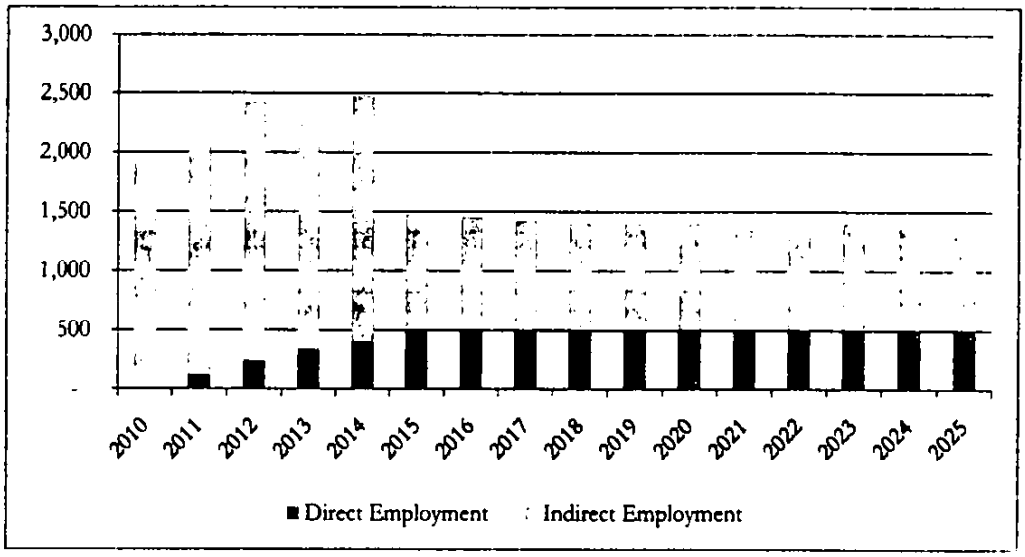


Table 3 contains the estimated impact of SNF operations on the Louisiana economy over the sixteen year period. Accounting for the multiplier effect, Louisiana can expect a total of $2.8 billion in additional output over the next sixteen years as a result of SNF operations. Louisiana can expect a net present value of $1.1 billion additional earnings over the next sixteen years.

Table 3
The Impact of the SNF Operations Wages
On the Louisiana Economy (millions of 2009$)

Horizon	Output	Earnings
16 years	$2,779.8	$1,139.1

Note: This table provides the net present value of total Louisiana output and earnings that can be expected from SNF. All figures include both the direct and indirect impact of operations.

Our next task consists of estimating the state taxes that Louisiana can expect as a result of SNF operations. In particular, we seek to quantify the state taxes Louisiana could expect to receive directly and indirectly as a result of SNF operations. Table 4 contains the estimated nominal and real (discounted to 2009$) state taxes generated for the 16 year horizon. Our methodology estimates state taxes based on the ratio of state tax receipts as percentage of personal income. The computation implicitly includes state sales and personal income tax revenues, but excludes corporate and property taxes. Note that this calculation implicitly includes state taxes paid by employees of business other than SNF and state sales taxes created by those spending new earnings resulting from the "ripples" in the economy.

Table 4
Nominal and Real Louisiana State Tax Revenues
Attributable to SNF Operations ($millions)

Horizon	Nominal Taxes	Real Taxes (NPV $2009)
16 years	$107.0	$79.7

Local Economic Impact

Since the location of the SNF is in Iberville Parish, the 6-parish area (Iberville, West Baton Rouge, East Baton Rouge, Livingston, Ascension, and Assumption Parishes) will benefit most from their operations. Table 5 summarizes the estimated economic impact of the SNF commitment on the 6-parish area (both discounted to 2009$). Over the sixteen year period SNF commitment will add just under $2.6 billion in output and almost $1.1 billion in earnings to the 6-parish area economy. At the peak of construction and operations, SNF will support over 2,000 jobs. During normal operations the facility will employ over 500 workers directly and support over 1,200 total local jobs.

Table 5
The Impact of the SNF Operation
on the 6-Parish Area Economy (millions 2009$)

Horizon	Output	Earnings
16 years	$2,629.7	$1,057.1

Note: This table provides the net present value of total 6-parish output and earnings that can be expected from SNF. All figures include both the direct and indirect impact of construction and operations.

Table 6 contains the estimated local taxes attributable to SNF.

Table 6
Nominal and Real 6-Parish Area Tax Revenues
Attributable to SNF Operations ($millions)

Horizon	Nominal Taxes	Real Taxes (NPV $2009)
16 years	$29.9	$22.2

Note: All figures exclude potential tax revenues associated with property tax.

Conclusion

This report analyzes the economic impact of a major agreement for construction and operations (SNF) of a manufacturing facility in Iberville Parish. Perhaps the easiest way to summarize the impact of this agreement on Louisiana's economy is to focus on the injection of jobs into the state. With direct employment peaking at 512 it should come as no surprise that the 6-parish area will benefit substantially from SNF's presence. Once the multiplier effects are considered, our computations indicate over 1,200 6-parish area jobs can be expected from operations. The impact is not limited to the 6-parish area. After the construction phase is complete, total employment across the state will rise by roughly 1,400 as a result of attracting SNF.

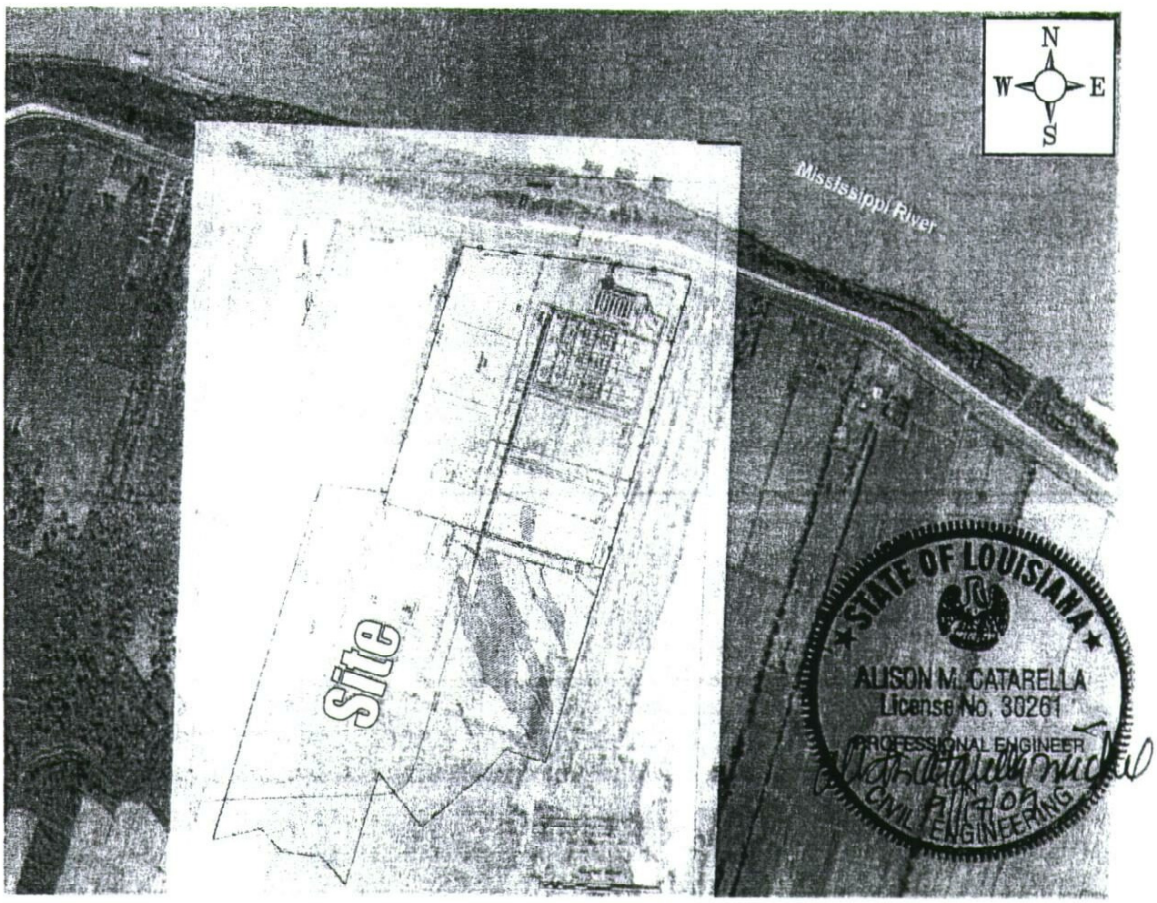
APPENDIX C

Traffic Impact Analysis

Flopam, Inc.

Iberville Parish, Louisiana

Traffic Impact Analysis



Prepared for:

Global Environmental Solutions, Inc.

GES, LLC

Prepared by:

Urban Systems, Inc.
400 N. Peters St.
New Orleans, LA 70130

September 2009

Project # 09-020

TRAFFIC IMPACT ANALYSIS
FLOPAM PLANT, INC.
IBERVILLE PARISH, LOUISIANA

1.0 Introduction

This report has been prepared to estimate the traffic impact of a proposed 800 acre chemical manufacturing plant on LA 405 (River Road). The proposed Flopam plant is located to the south of LA 405 between Ella and Pierce roads in Plaquemine, Louisiana. Figure 1 presents the location of the proposed site. Figure 2 presents a preliminary site plan.

The study area for this report includes LA 405, LA 75, LA 1, and Evergreen Road. This report outlines the existing traffic volume and flow conditions at the intersections of LA 75 (Belleview Drive) at LA 1 NB (Church Street) and at LA 1 SB (Eden Street), LA 1 at Evergreen Road, LA 405 (River Road) at LA 75 (Belleview Drive), assigns new trips to the site based on existing traffic patterns and estimates the impact of these new trips on the intersections within the study area and at the site driveways.

As proposed, access to the site is to be provided by a single entrance/exit driveway on LA 405 (River Road). The proposed driveway is to provide access to all turning movements. A secondary emergency access is planned on Ella Road.

A separate chemical plant, Shintech, is currently under construction on an adjacent property west of the site. For the purpose of this report, it is assumed that the normal operation of Shintech will be occurring when this project begins.

The duration of the plant construction is expected to be completed in 5 years and with plant operation beginning after the first year with a constant increase of employees every year till the construction is finished. Table 1 summarizes the number of employees, construction workers, and contractors expected during each year. It is estimated that a maximum of 250 construction personnel would be working during the construction phase, a maximum of 100 contractors from the start of construction phase, and a maximum of 512 regular employees during normal operation.

Table 1: Number of Employees/ Construction Workers

Years	0	1	2	3	4	5
Employees	0	118	241	335	402	512
Construction Workers	250	250	250	250	250	0
Contractors	0	100	100	100	100	100
Total	250	468	591	685	752	612

The traffic impact analysis was performed for normal operation and for construction plus operation. Year 4 is projected to generate the peak volumes.

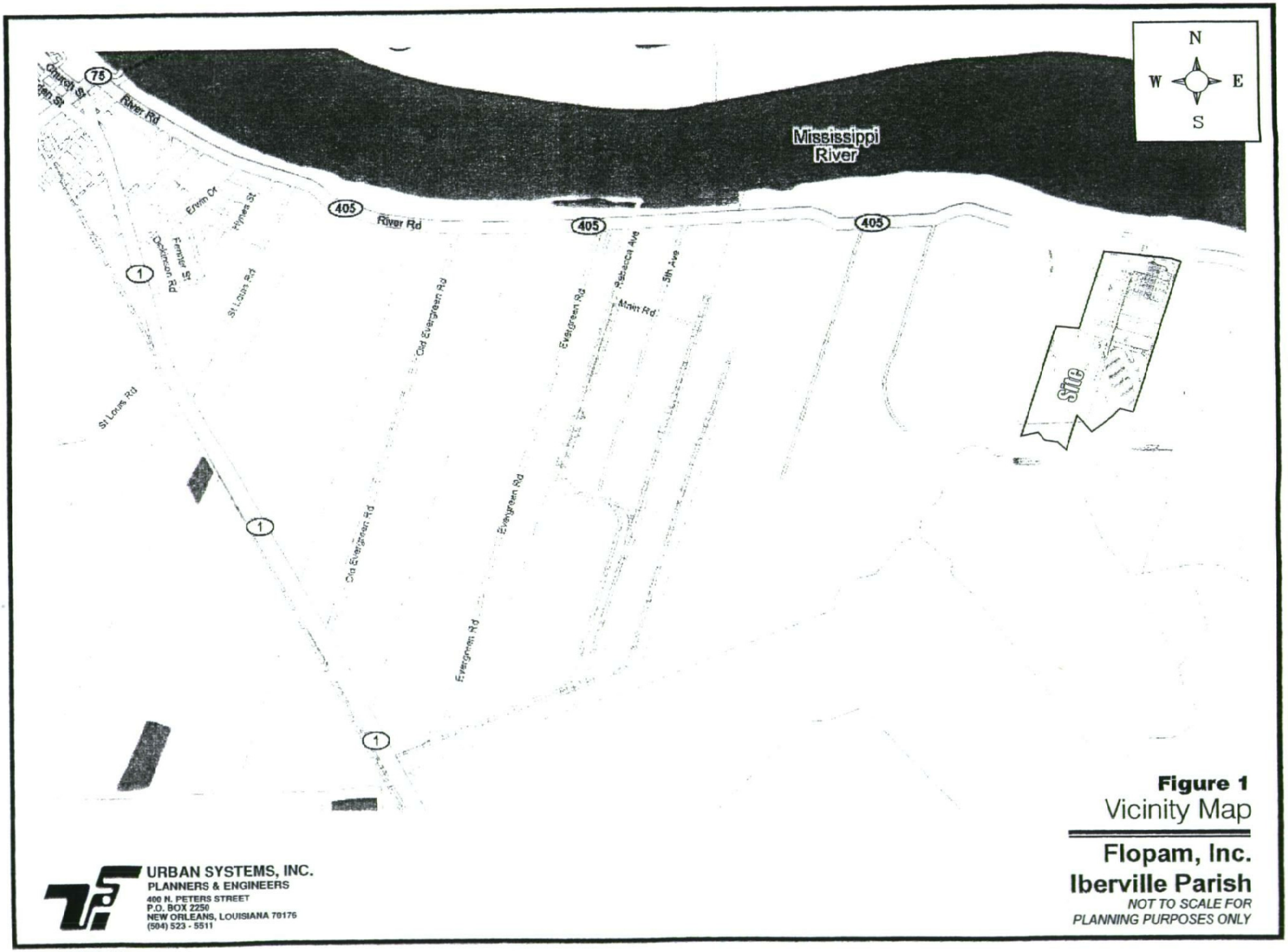
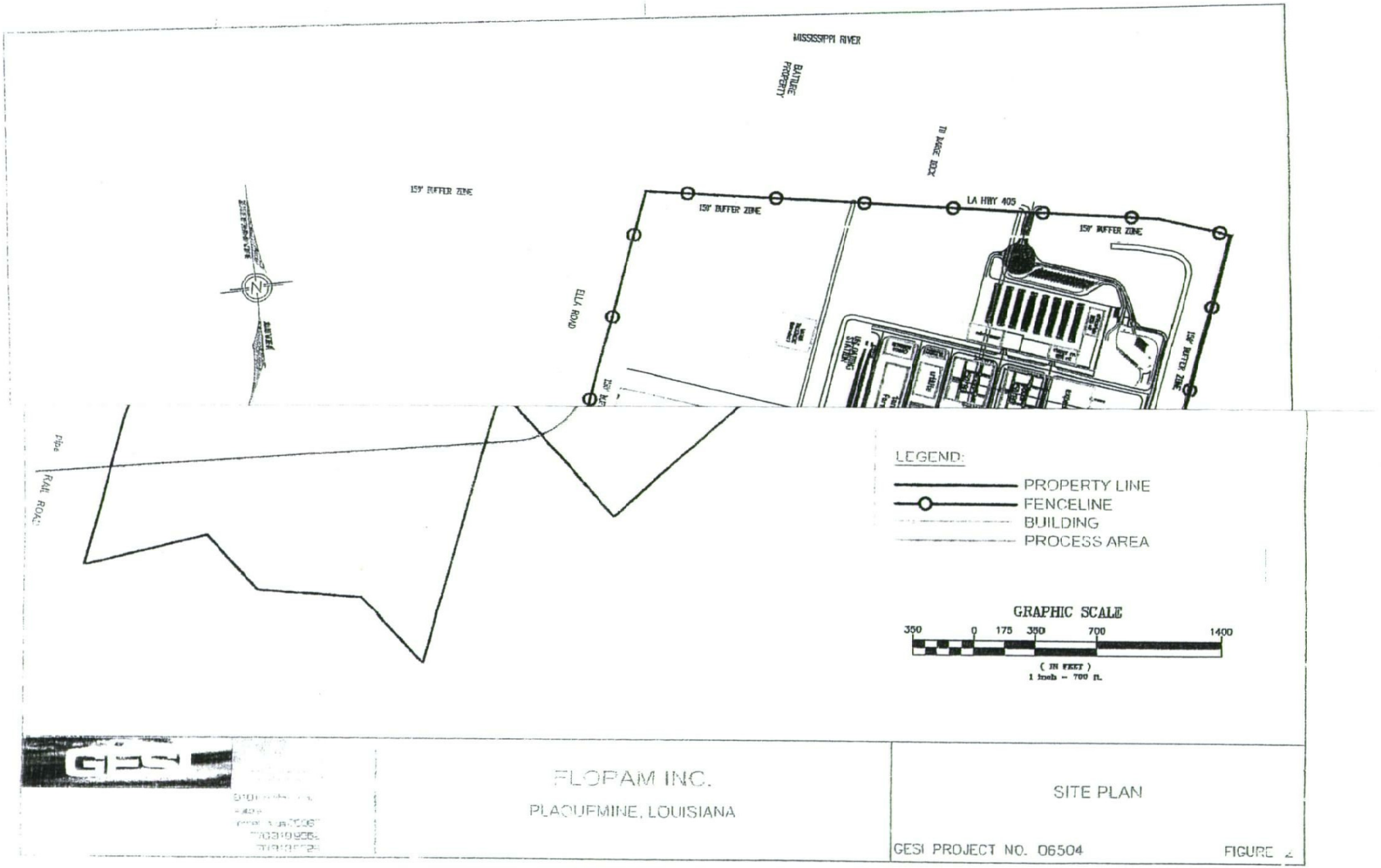


Figure 1
Vicinity Map

Flopam, Inc.
Iberville Parish
NOT TO SCALE FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 2250
NEW ORLEANS, LOUISIANA 70176
(504) 523 - 5511

Project # 09-020



GESI

FLOPAM INC.

PLAQUEMINE, LOUISIANA

SITE PLAN

GESI PROJECT NO. 06504

FIGURE 2

2.0 Existing Conditions

The proposed plant location is approximately 2.2 miles east of Evergreen Road on LA 405 on a currently vacant tract. This site is surrounded by vacant land and a few single family residents in a rural area. The following describes the existing roadway conditions with the study area:

- LA 405 at the site is a two-lane roadway without shoulders and the posted speed limit is 45 mph
- Evergreen Road is a two lane roadway that provides a connection from LA 405 to LA 1 with a posted speed limit of 45 mph
- LA 1 is a four lane roadway separated with a grass median of approximately 45 feet with 8 feet shoulders on both sides
- LA 75 is a five lane roadway with a center two-way-left-turn-lane (TWLTL)

Two signalized and two unsignalized intersections were included in the study area. The following describes the existing intersection conditions:

- LA 75 (Belleview Drive) at LA 1 NB (Church Street) is a signalized four legged intersection that operates as a fixed time interconnected signal. The left turns phase on LA 75 consists of permitted operations only. AM peak occurred from 7:15 to 8:15 AM and the PM peak occurred from 5:00 to 6:00 PM.
- LA 75 (Belleview Drive) at LA 1 SB (Eden Street) is a signalized four legged intersection that operates as a volume density interconnected signal. The left turn phase on LA 75 consists of both permitted and protected operations. AM peak occurred from 7:15 to 8:15 AM and the PM peak occurred from 4:30 to 5:30 PM.
- LA 1 at Evergreen Road is an unsignalized T-intersection with stop sign on Evergreen Road. AM peak occurred from 6:30 to 7:30 AM and the PM peak occurred from 4:45 to 5:45 PM
- LA 405 (River Road) at LA 75 (Belleview Drive) is a unsignalized T-intersection with a stop sign on LA 75.

Figure 3 illustrates the existing lane configurations for the study area intersections. LA 1 and LA 75 currently service high traffic volumes and large industrial facilities where as LA 405 and Evergreen Road carry moderate traffic volumes.

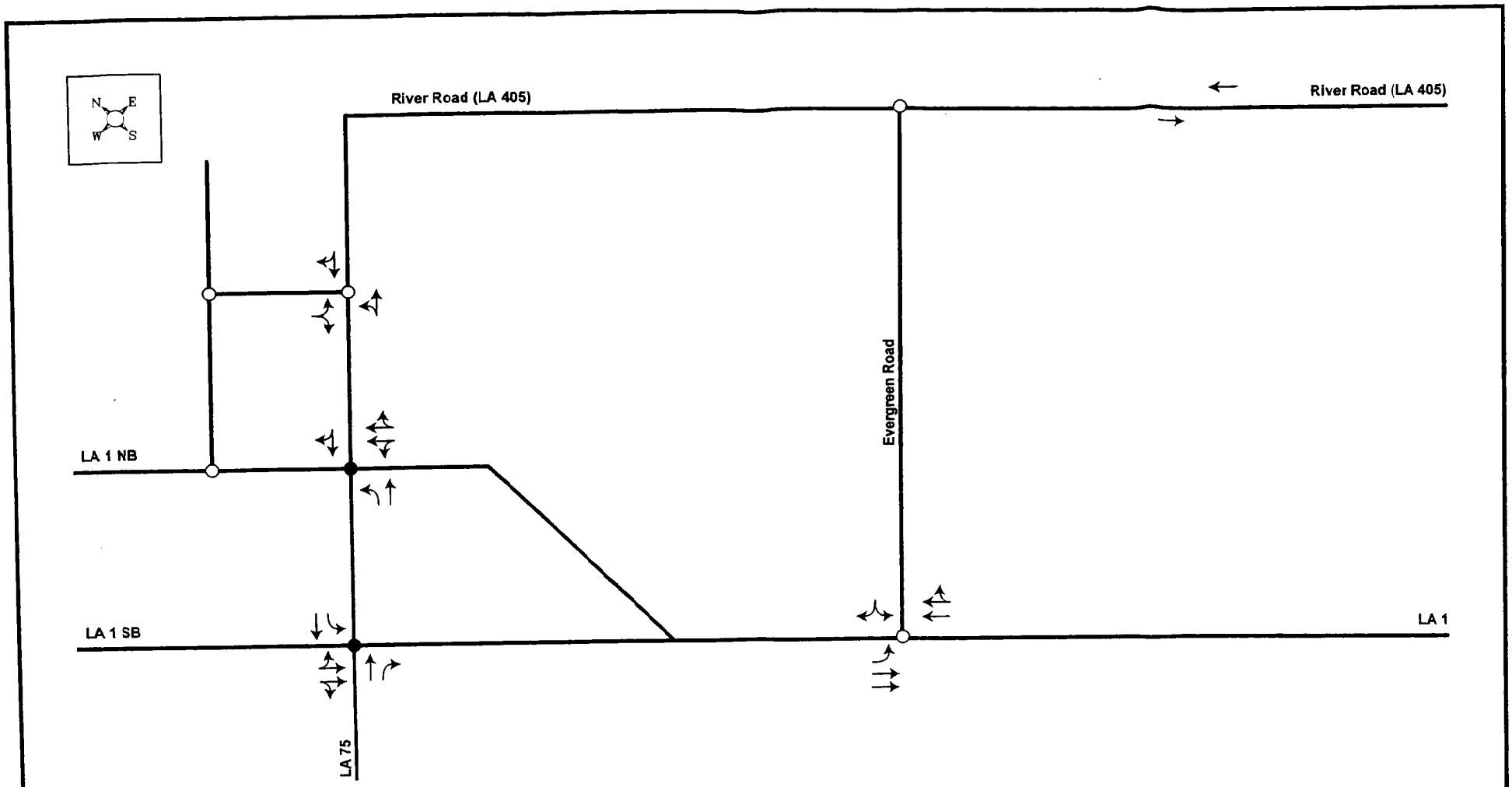


Figure 3
Existing Lane Configurations

Flopam, Inc.
Iberville Parish
NOT TO SCALE
FOR PLANNING PURPOSES ONLY

URBAN SYSTEMS, INC.
PLANNERS & ENGINEERS
400 N. PETERS STREET
P.O. BOX 8250
NEW ORLEANS, LOUISIANA 70176
(504) 823 - 5311

Project # 05-020

3.0 Background Traffic Conditions

Traffic data was collected by Neel-Schaffer, Inc. in April of 2008 at the study area intersections. Twenty-four hour count data was collected on LA 405 to the east of Evergreen Road by Urban Systems, Inc. in March of 2009. The normal operating condition traffic volumes as reported in the traffic impact study by Neel-Schaffer dated April 2008 was used as the background conditions for this report except for the intersection of LA 1 at Evergreen Road. At the time of this report, a driveway providing direct access from Shintech to LA 1 was under construction. Therefore the background conditions traffic for the LA 1 at Evergreen intersection was based on existing count data and did not include Shintech related traffic. Figure 4 illustrates the background traffic conditions during the weekday AM and PM peak hours.

4.0 Trip Generation Estimates

The vehicle trip demand estimates construction plus operation and the normal operation phases were based on employee and construction worker estimates provided by GESI. The trip generation percentages were based on the Shintech plant study done in May of 2008 by Neel-Schaffer, Inc.

Tables 2 and 3 summarize the trips estimates during peak hours for Flopam chemical plant for construction plus operation and the normal operation phases respectively. For the purpose of this report it was assumed that all trips to the site were new trips. It was also assumed that there would be 1.3 construction workers per vehicle, 1 employee per vehicle, and 1 contractor per vehicle (Neel-Schaffer, Inc. Shintech report)

Table 2: Trip Generation during Year 4 Construction plus Operation

DESCRIPTION	AM PEAK			PM PEAK		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Employees	198	104	302	3	98	101
Construction Workers	189	4	193	4	189	193
Contractors	49	26	75	1	24	25
TOTALS	436	134	570	8	311	319

Table 3: Trip Generation during Normal Operation

DESCRIPTION	AM PEAK			PM PEAK		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Employees	252	132	384	4	124	128
Construction Workers	0	0	0	0	0	0
Contractors	49	26	75	1	24	25
TOTALS	301	158	459	5	148	153

The proposed plant operation is to include four shifts, administration shift from 8 am to 5 pm, a day shift from 7 am to 3 pm, a second shift from 3 pm to 11 pm, and a night shift from 11 pm to 7 am. The combination of employees and contractors is expected to be 25% of the total on each shift. Therefore based on the shift schedule, it was estimated that 50% of the employees and contractors will begin their shift during the am peak hour with only 25% ending their shift during the pm peak hour. No shifts will begin during the pm peak hour. It was further assumed that 97% of the am peak beginning of shift traffic will enter in the am peak with 3% exiting and the reverse in the pm peak. The construction workers were assumed to work a single shift and that 97% will enter with 3% exiting in the am peak and reverse in the pm peak.

5.0 Trip Distribution and Traffic Assignments

The site is located to the south of LA 405 on a currently vacant parcel in an area of sparse development. Based on the existing directional flows within the project study area, the configuration of the roadway network, development patterns, and professional judgment, the trip distribution and traffic assignments in the Shintech plant report were considered to be appropriate for the distribution of traffic in this study. The site-generated AM peak traffic for Year 4 construction plus operation phase would approach/depart the site as illustrated in Figure 5. The site-generated AM and PM peak traffic for normal operation phase would approach/depart the site as illustrated in Figure 6. These figures include the projected volumes at the site driveway.

6.0 Projected Traffic Volumes within the TIA Study Area

Projected traffic volumes within the study area include existing volumes during the peak hours plus estimated trips generated by the proposed development. Figure 7 and Figure 8 illustrates the projected traffic volumes for year 4 construction plus operation phase and normal operation phase respectively.

7.0 Capacity Analysis

To evaluate intersection traffic operations in the immediate vicinity of the site, a Level of Service/capacity analysis was prepared for each of the subject locations. Levels of

Service (LOS) represent a qualitative and quantitative evaluation of the traffic operation of a given intersection using procedures developed by the Transportation Research Board and contained in the Highway Capacity Manual, Special Report 209. The Highway Capacity Manual (HCM) procedures have been adapted to computer based analysis packages, which include signalized and unsignalized intersection modules.

Levels of Service range from LOS A, a condition of little or no delay to LOS F, a condition of capacity breakdown represented by heavy delay and congestion. Level of Service B is characterized as stable flow. Level of Service C is considered to have a stable traffic flow, but is becoming susceptible to congestion with general levels of comfort and convenience declining noticeably. Level of Service D approaches unstable flow as speed and freedom to maneuver are severely restricted and LOS E represents unstable flow at or near capacity levels with poor levels of comfort and convenience. Table 4 and Table 5 present the Level of Service criteria for signalized intersections and un-signalized intersections respectively.

Table 4: Level of Service Criteria for Signalized Intersections

Signalized Intersections	
Level of Service	**Control Delay (Sec/Veh)**
A	≤10
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

Table 5: Level of Service Criteria for Un-Signalized Intersections

Unsignalized Intersections	
Level of Service	**Control Delay (Sec/Veh)**
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

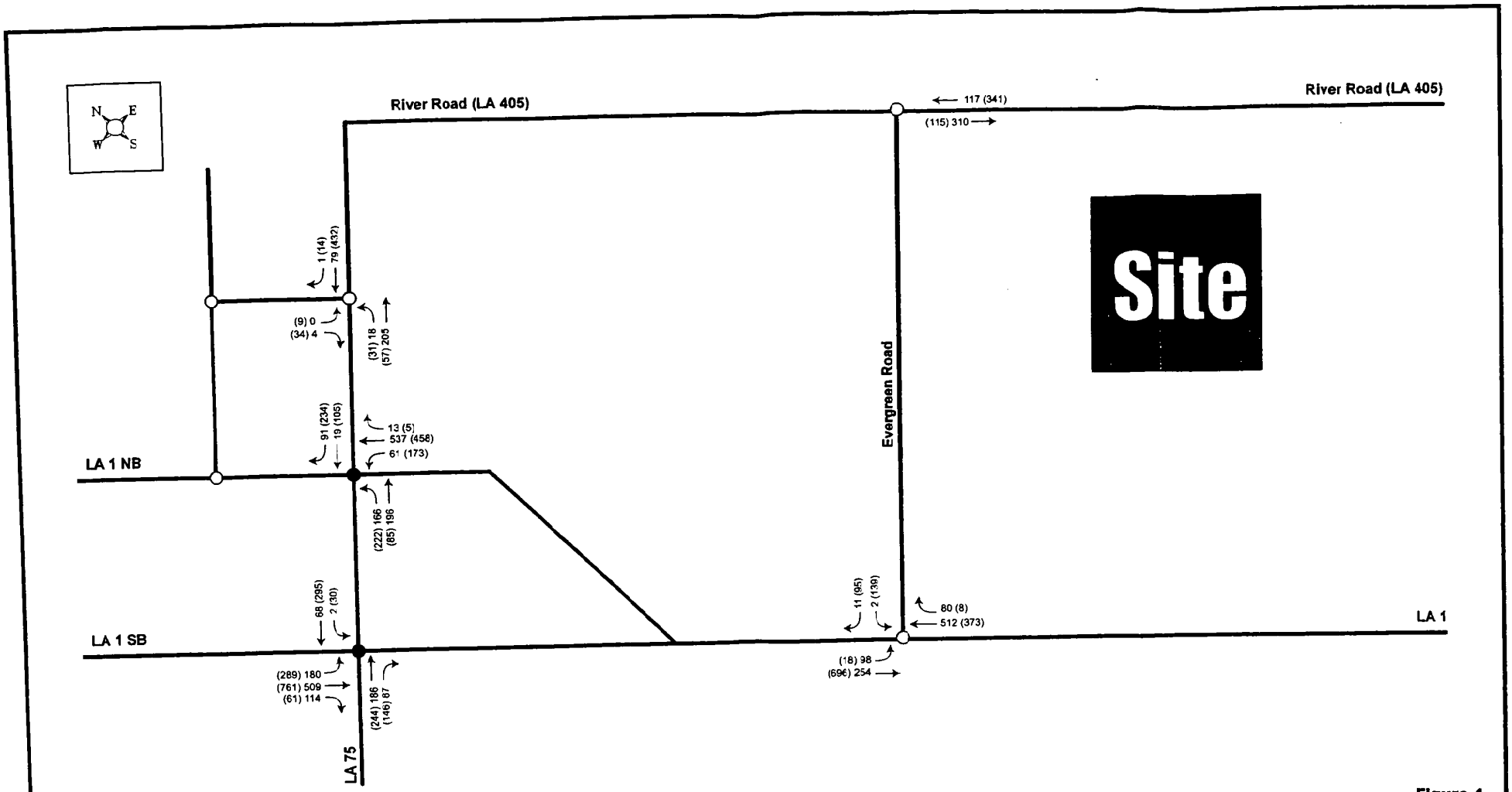


Figure 4
*Background Traffic Volumes

Flopam, Inc.
Iberville Parish
NOT TO SCALE
FOR PLANNING PURPOSES ONLY

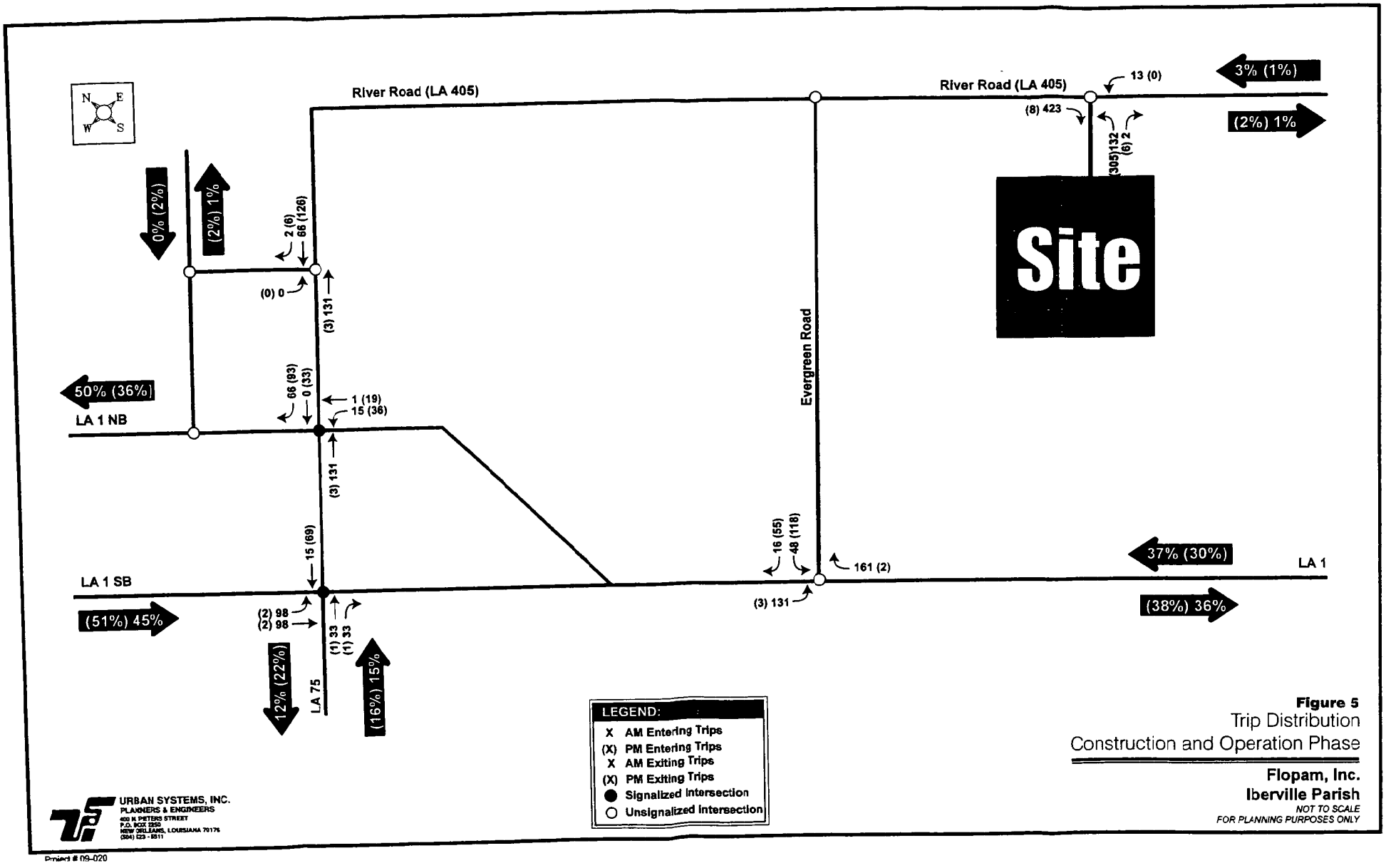


Figure 5
Trip Distribution
Construction and Operation Phase

Flopam, Inc.
Iberville Parish
NOT TO SCALE
FOR PLANNING PURPOSES ONLY

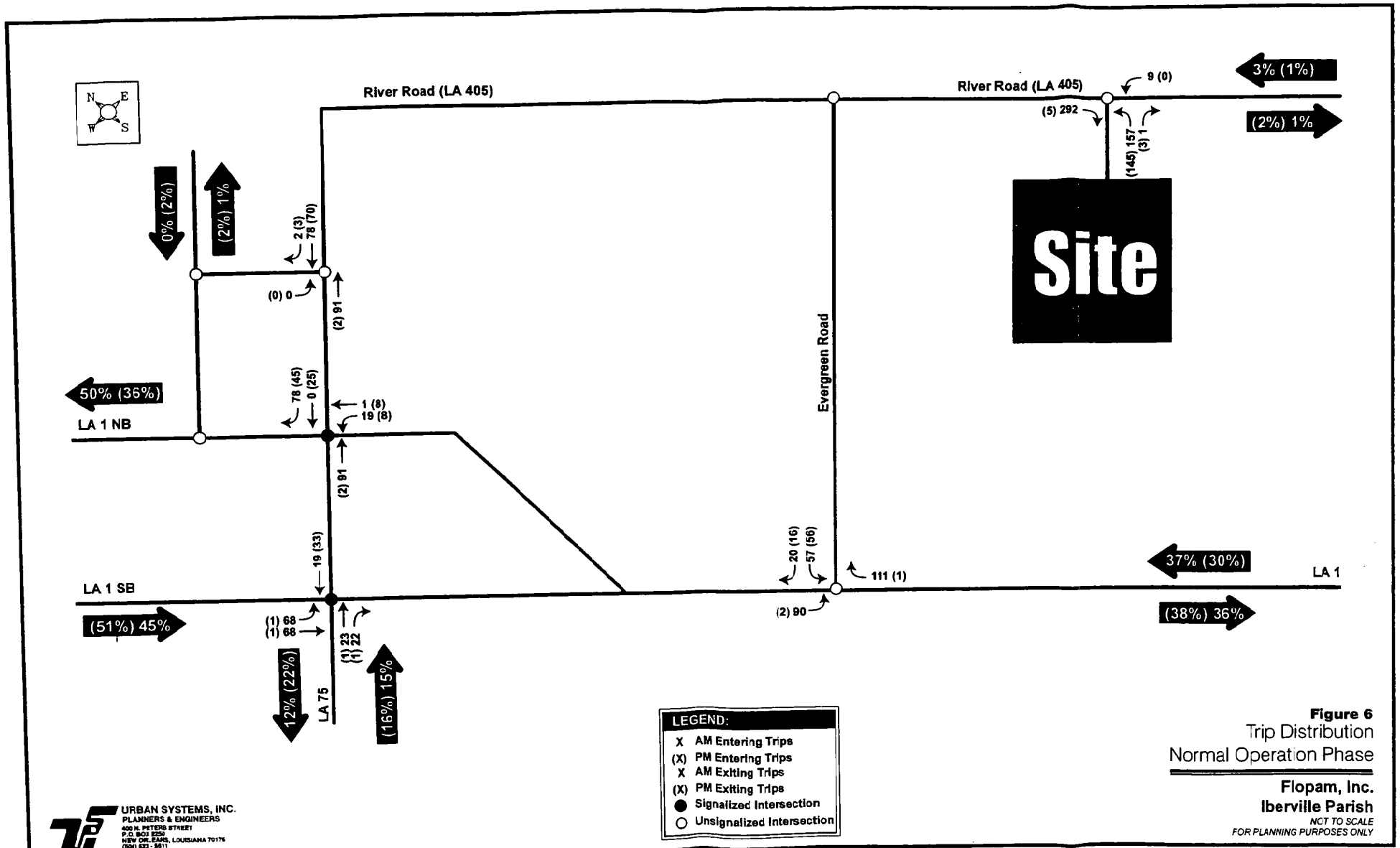


Figure 6
Trip Distribution
Normal Operation Phase

Flopam, Inc.
Iberville Parish
NOT TO SCALE
FOR PLANNING PURPOSES ONLY

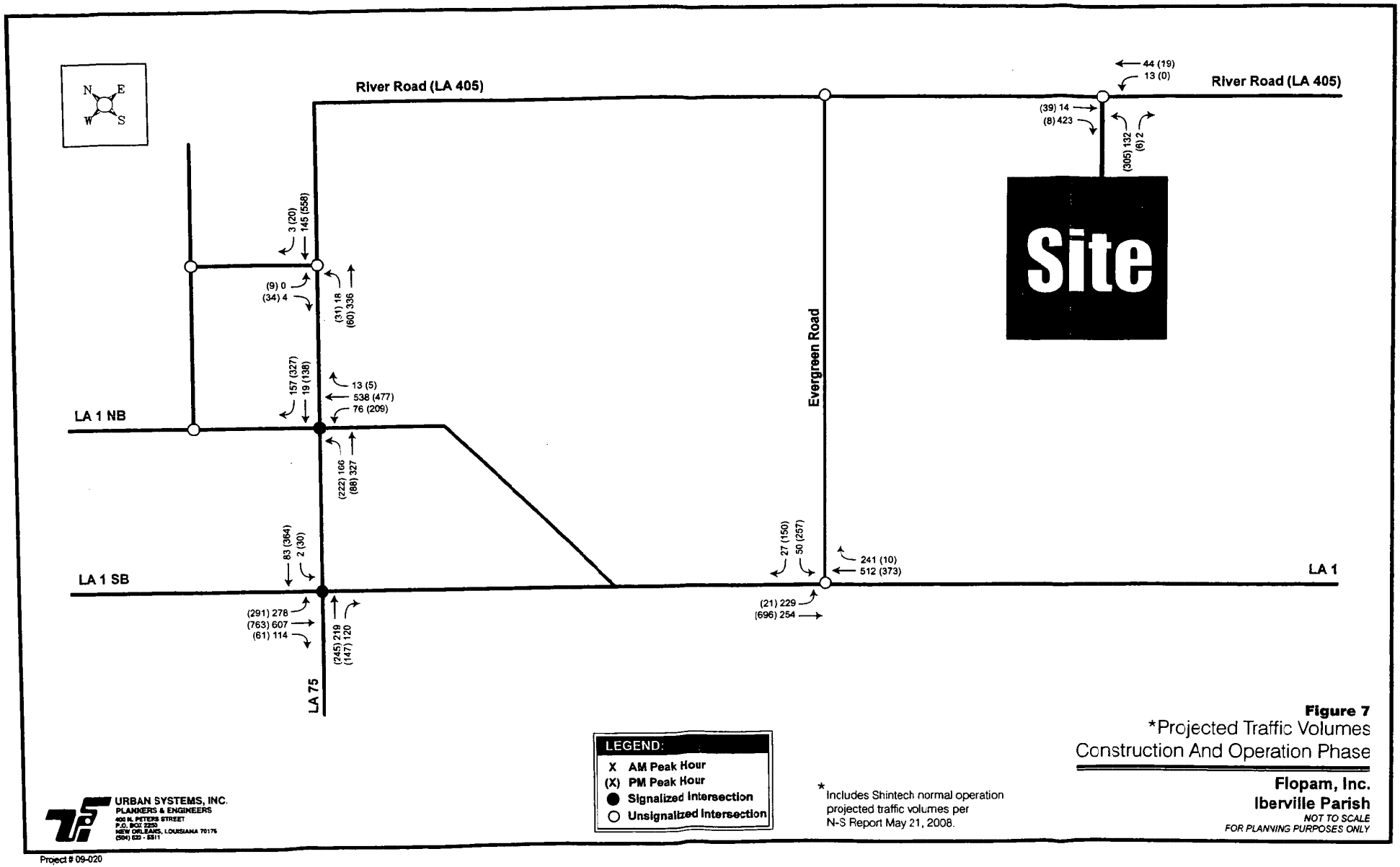
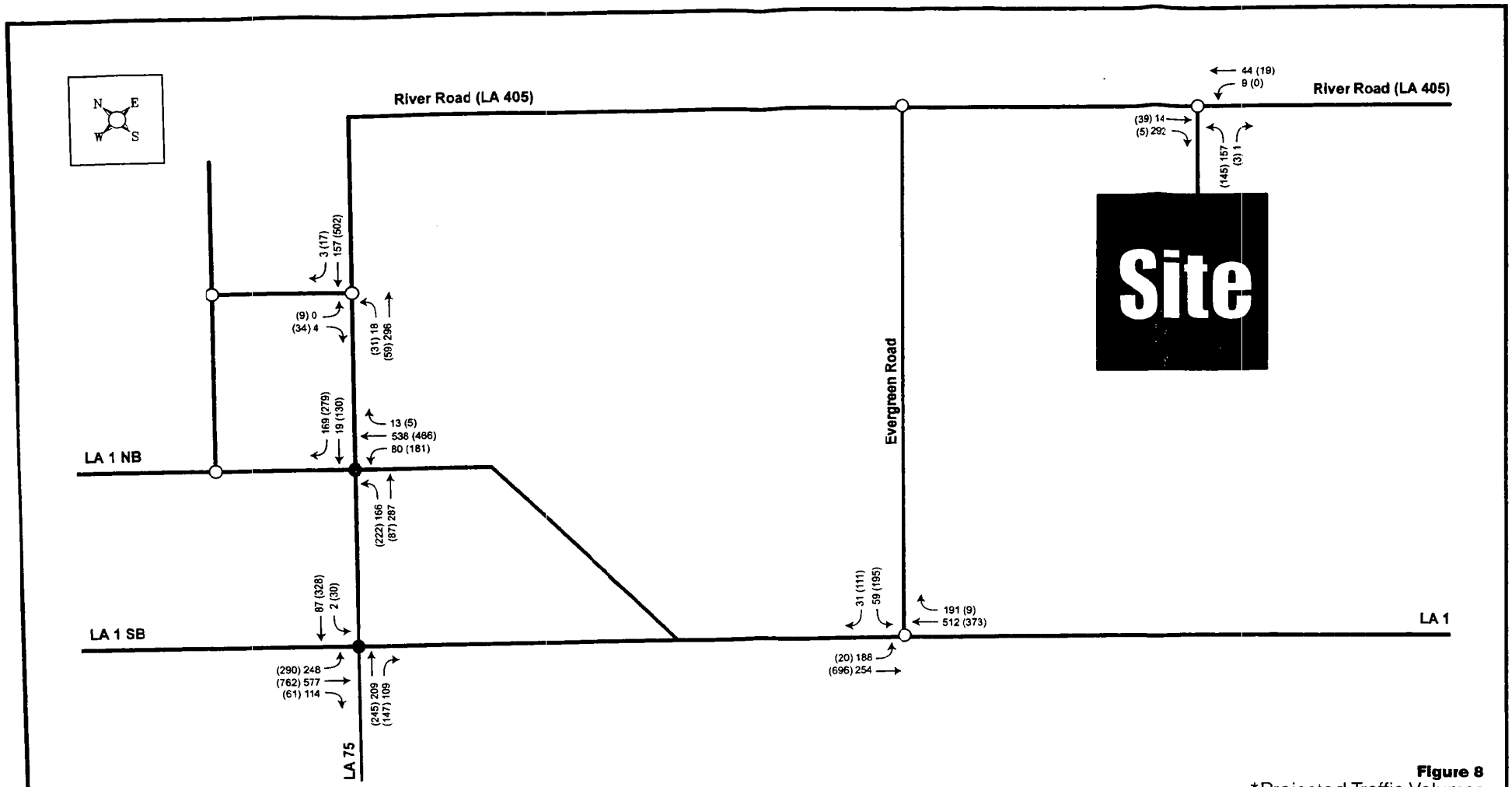


Figure 7
*Projected Traffic Volumes
Construction And Operation Phase

Flopam, Inc.
Iberville Parish
NOT TO SCALE
FOR PLANNING PURPOSES ONLY



Background Conditions Level of Service

Level of service and delay estimates for the background conditions at LA 1 NB at LA 75 and at LA 1 at Evergreen Road intersections were generated by Neel-Schaffer, Inc., 2008 using TEAPAC/Highway Capacity Software (HCS) for the Shintech normal operating and existing conditions respectively. An existing change in lane configuration on the LA 75 northbound approach at LA 1 SB was analyzed. Table 6 presents the results of the analysis of the conditions.

Table 6: Background Conditions Level of Service Analysis

Intersection Approach	AM Peak		PM Peak	
	LOS	Delay in (Sec/Veh)	LOS	Delay in (Sec/Veh)
LA 1 NB at LA 75 (Signalized)*	**B**	**15.3**	**C**	**21.2**
LA 1 NB Westbound	A	6.5	B	17.6
LA 75 Northbound	C	27.7	C	27.9
LA 75 Southbound	C	25.0	C	21.8
LA 1 SB at LA 75 (Signalized)	**B**	**19.4**	**C**	**22.6**
LA 1 SB Eastbound	B	15.7	B	18.9
LA 75 Northbound**	C	29.9	C	31.5
LA 75 Southbound	C	21.4	C	25.1
LA 1 at Evergreen Rd. (Unsignalized)*				
LA 1 Eastbound	A	9.3	A	8.2
Evergreen Rd Southbound	B	11.2	C	18.6
LA 405 at LA 75 (Unsignalized)				
LA 75 Eastbound	A	8.7	B	12.2
LA 405 Northbound	A	7.4	A	8.5

* Based on Shintech analysis performed by Neel-Schaffer
** Includes NB right turn lane

A review of Table 6 indicates acceptable LOS conditions for all approaches during the AM and PM peak period. These results include the improvements based on the recommended signal timing plan changes for LA 1 SB at LA 75 from the Shintech report.

Projected Conditions Level of Service

The intersections identified in study area and the site driveways were analyzed to determine the expected impacts of the project on traffic conditions. Highway Capacity Software Plus was used to perform the analysis for all intersections. Intersection analysis worksheets are included in the appendix.

Table 7 presents the capacity analysis results for background traffic conditions, projected construction plus operation and normal operation phases during AM peak period.

Table7: Projected LOS analysis during AM peak

Intersection Approach	Background		Year 4 Construction plus Operation		Normal Operation	
	LOS	Delay in (Sec/veh)	LOS	Delay in (Sec/Veh)	LOS	Delay in (Sec/Veh)
LA 1 NB at LA 75	**B**	**15.3**	**C**	**23.3**	**C**	**22.5**
LA 1 NB Westbound	A	6.5	B	10.3	B	10.4
LA 75 Northbound	C	27.7	D	37.9	D	36.8
LA 75 Southbound	C	25.0	C	28.6	C	29.1
LA 1 SB at LA 75	**B**	**19.4**	**C**	**20.8**	**C**	**20.4**
LA 1 SB Eastbound	B	15.7	B	17.5	B	16.9
LA 75 Northbound**	C	29.9	C	30.7	C	30.4
LA 75 Southbound	C	21.4	C	21.6	C	21.7
LA 1 at Evergreen Rd.						
LA 1 Eastbound	A	9.3	B	11.7	B	10.8
Evergreen Southbound	B	11.2	C	19.7	C	18.0
LA 405 at LA 75						
LA 75 Eastbound	A	8.7	A	9.1	A	9.1
LA 405 Northbound	A	7.4	A	7.6	A	7.6
LA 405 at Site Driveway						
LA 405 Westbound	-	-	A	8.4	A	8.0
Site Driveway Northbound	-	-	B	12.0	B	11.4

** Includes NB right turn lane

A review of Table 7 indicates that although degradation of levels of service is expected with the addition of site-generated trips, delay increases expected at the study area intersections during the AM peak period are not overly significant.

Table 8 presents the capacity analysis results for existing traffic conditions, projected construction plus operation and normal operation phases during PM peak period.

Table 8: Projected LOS analysis during PM peak

Intersection Approach	Background		Year 4 Construction plus Operation		Normal Operation	
	LOS	Delay in (Sec/veh)	LOS	Delay in (Sec/veh)	LOS	Delay in (Sec/veh)
LA 1 NB at LA 75	**C**	**21.2**	**C**	**30.5**	**C**	**26.3**
LA 1 NB Westbound	B	17.6	C	21.2	C	20.8
LA 75 Northbound	C	27.9	D	53.7	D	38.8
LA 75 Southbound	C	21.8	C	28.6	C	25.6
LA 1 SB at LA 75	**C**	**22.6**	**C**	**24.8**	**C**	**24.4**
LA 1 SB Eastbound	B	18.9	C	20.9	C	20.8
LA 75 Northbound**	C	31.5	C	32.3	C	32.3
LA 75 Southbound	C	25.1	C	28.5	C	27.3
LA 1 at Evergreen Rd.						
LA 1 Eastbound	A	8.2	A	8.2	A	8.2
Evergreen Southbound	C	18.6	D	31.8	C	20.5
LA 405 at LA 75						
LA 75 Eastbound	B	12.2	B	13.9	B	13.1
LA 405 Northbound	A	8.5	A	8.9	A	8.7
LA 405 at Site Driveway						
LA 405 Westbound	-	-	A	7.3	A	7.3
Site Driveway Northbound	-	-	B	11.0	A	9.6

** Includes NB right turn lane

A review of the results presented in Table 8 indicates although unacceptable conditions may be expected during construction and operation, acceptable conditions are expected during the normal operation phases during both the AM and PM peaks.

8.0 Turn Lane Warrant Analyses

Turn lane warrant analyses was conducted for the site driveway on LA 405 to determine the need for left-turn or right-turn lanes into the site. Table 9 presents a summary of the turn lane warrant analyses for AM and PM peak periods during construction plus operation and the normal operation phases.

Table 9: Summary of Turn Lane Warrant Analysis Results, LA 405 at Site Driveways

Site Driveway Location		Turn-Lane Warrant Variables 55-MPH Roadway Speed	AM Peak	PM Peak
Driveway for Normal Operation	Left Turn Lane Analysis	% of Left Turn Volume	17	1
		Advancing Volume (one direction)	53	19
		Opposing Volume	306	44
		Left-turn lane warranted	**NO**	**NO**
	Right Turn Lane Analysis	Roadway Volume (one direction)	306	44
		Right-turn volume	292	5
		Right-turn lane warranted	**YES**	**NO**
Driveway for Year 4 Construction plus Operation	Left Turn Lane Analysis	% of Left Turn Volume	23	1
		Advancing Volume (one direction)	57	19
		Opposing Volume	437	47
		Left-turn lane warranted	**NO**	**NO**
	Right Turn Lane Analysis	Roadway Volume (one direction)	437	47
		Right-turn volume	423	8
		Right-turn lane warranted	**YES**	**NO**

A review of Table 9 indicates that a right turn lane is warranted on LA 405 at the site driveway for both phases during AM peak period.

9.0 Conclusions and Recommendations

This report has outlined background traffic volume and flow conditions on LA 1 at its intersections with LA 75, Evergreen Road and LA 405 at LA 75. Existing traffic operations in the vicinity of the site with the Shintech normal operations traffic are expected to be acceptable during peak times. New traffic associated with the development of Flopam chemical manufacturing plant was projected and the impact was nominal at the subject intersections and at the site driveway.

The following recommendations are offered for projected conditions with site-generated trips.

- Provide a right-turn lane on eastbound LA 405 at the site driveway.
- Consider providing a northbound left turn phase at the intersection of LA 1 NB at LA 75, not as a direct result of this project, but to improve operations for this approach.

APPENDIX

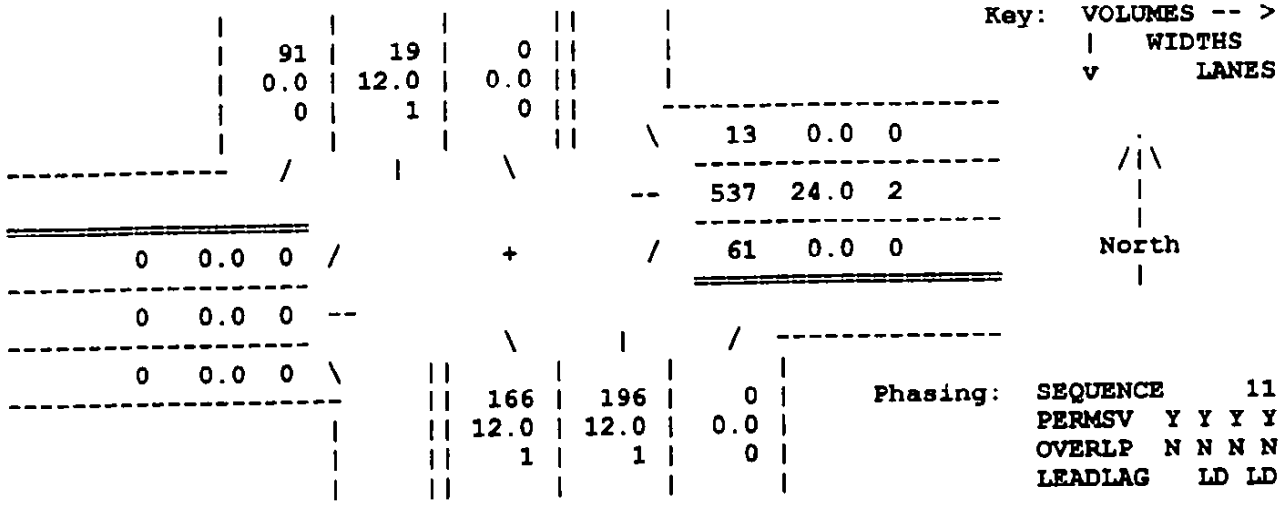
- Existing Capacity Analyses
- Projected Capacity Analyses for year 4 construction plus operation and normal operational phase
- Left-Turn Lane and Right-Turn Lane Warrant Analyses

Analysis by Neel-Schaffer

Shintech; Iberville Parish, LA; N-S Proj. No. 00.07001.00 05/07/08
LA Hwy 1 NB at Belleview Rd 18:34:35
AM Peak Operations

SIGNAL2000/TEAPAC[Ver 2.80.00] - Display of Intersection Parameters

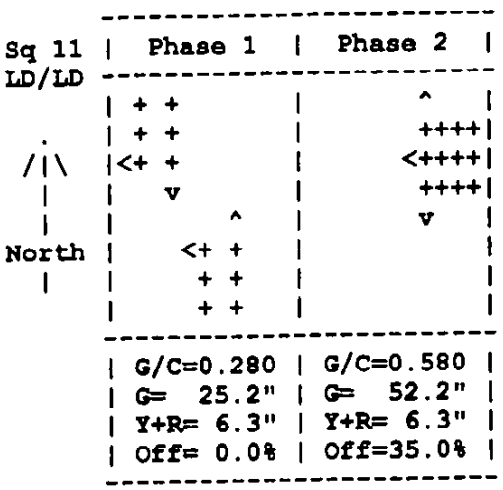
Intersection # 1 -



Shintech; Iberville Parish, LA; N-S Proj. No. 00.07001.00 05/07/08
LA Hwy 1 NB at Belleview Rd 18:34:25
AM Peak Operations

SIGNAL2000/TEAPAC[Ver 2.80.00] - Capacity Analysis Summary

Intersection Averages for Int # 1 -
V/C 0.359 (Critical V/C 0.384) Control Delay 15.3 Level of Service B



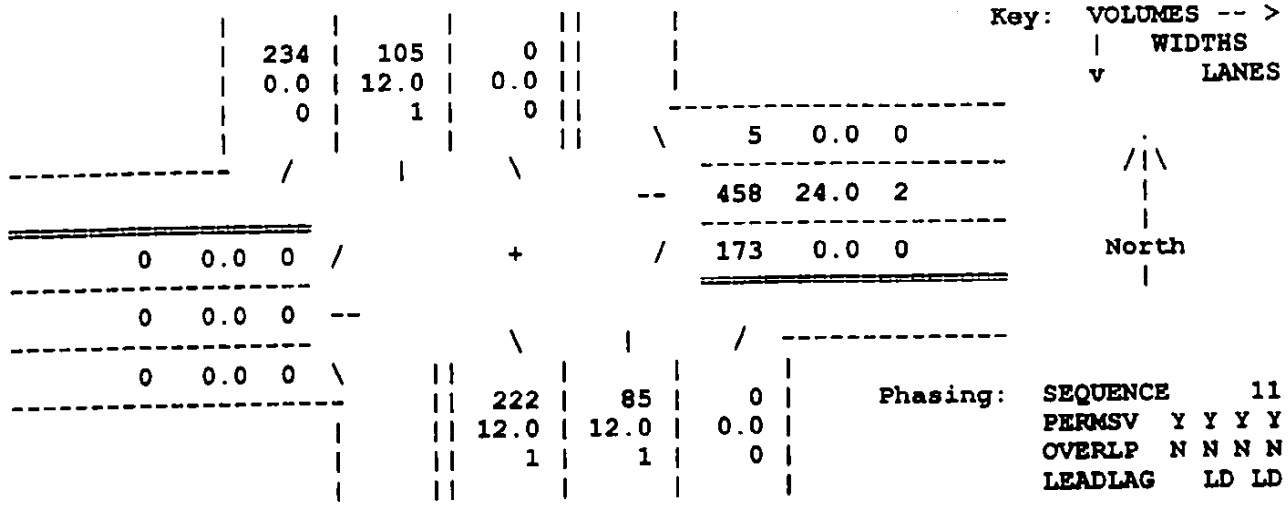
C= 90 sec G= 77.4 sec = 86.0% Y=12.6 sec = 14.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
N Approach								25.0	C+	
RT+TH	12/1	0.155	0.280	340	466	97	0.208	25.0	C+	88 ft
S Approach								27.7	C	
TH	12/1	0.198	0.280	387	522	215	0.412	26.9	C+	204 ft
LT	12/1	0.232	0.280	248	354	182	0.514	28.5	C	184 ft
E Approach								6.5	A	
RT+TH+LT	24/2	0.261	0.580	2046	2046	658	0.322	6.5	A	142 ft

Shintech; Iberville Parish, LA; N-S Proj. No. 00.07001.00 05/07/08
LA Hwy 1 NB at Belleview Rd 18:39:13
PM Peak Operations

SIGNAL2000/TEAPAC[Ver 2.80.00] - Display of Intersection Parameters

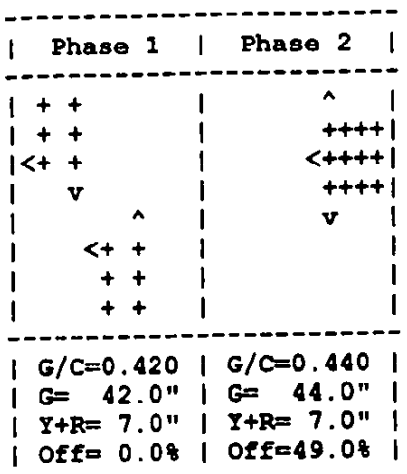
Intersection # 1 -



Shintech; Iberville Parish, LA; N-S Proj. No. 00.07001.00 05/07/08
LA Hwy 1 NB at Belleview Rd 18:39:04
PM Peak Operations

SIGNAL2000/TEAPAC[Ver 2.80.00] - Capacity Analysis Summary

Intersection Averages for Int # 1 -
V/C 0.491 (Critical V/C 0.588) Control Delay 21.2 Level of Service C+



C=100 sec G= 86.0 sec = 86.0% Y=14.0 sec = 14.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
N Approach								21.8	C+	
RT+TH	12/1	0.300	0.420	600	712	353	0.496	21.8	C+	328 ft
S Approach								27.9	C	
TH	12/1	0.189	0.420	665	782	94	0.120	17.8	B	75 ft
LT	12/1	0.405	0.420	262	340	247	0.726	31.8	C	285 ft
E Approach								17.6	B	
RT+TH+LT	24/2	0.291	0.440	1445	1539	702	0.456	17.6	B	275 ft

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Drew Philpot
Agency/Co.	Neel-Schaffer, Inc.
Date Performed	4/30/2007
Analysis Time Period	AM Peak Existing

Site Information

Intersection	LA 1 at Evergreen Rd
Jurisdiction	Iberville Parish
Analysis Year	2008

Project Description: Shintech Plaquemine Site N-S Prj# 00.07001.001

East/West Street: LA 1 | North/South Street: Evergreen Road

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	98	254			512	80
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	108	282	0	0	568	88
Percent Heavy Vehicles	0	–	–	2	–	–
Median Type	Raised curb					
RT Channelized			0			0
Lanes	1	2	0	0	2	0
Configuration	L	T			T	TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				2	0	11
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	0	0	2	0	12
Percent Heavy Vehicles	0	0	0	2	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	1	0
Configuration					LTR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LTR	
v (veh/h)	108						14	
C (m) (veh/h)	941						595	
v/c	0.11						0.02	
95% queue length	0.39						0.07	
Control Delay (s/veh)	9.3						11.2	
LOS	A						B	
Approach Delay (s/veh)	--	–					11.2	
Approach LOS	--	–					B	

HCS+™ Version 5.21

Generated: 5/1/2008 2:09 PM

Int Delay = $\frac{10.1 \times 92 + 14 \times 16.2}{108 + 14 + 568 + 12 + 2 + 12} = 1.1$ A

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	Drew Philpot
Agency/Co.	Neel-Schaffer, Inc.
Date Performed	4/30/2007
Analysis Time Period	PM Peak Existing

Site Information

Intersection	LA 1 at Evergreen Rd
Jurisdiction	Iberville Parish
Analysis Year	2008

Project Description: Shintech Plaquemine Site N-S Prj# 00.07001.001

East/West Street: LA 1 | North/South Street: Evergreen Road

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	18	696			373	8
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	20	773	0	0	414	8
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	1	2	0	0	2	0
Configuration	L	T			T	TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				139	0	95
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	0	0	154	0	105
Percent Heavy Vehicles	0	0	0	2	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	1	0
Configuration					LTR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LTR	
v (veh/h)	20						259	
C (m) (veh/h)	1148						520	
v/c	0.02						0.50	
95% queue length	0.05						2.75	
Control Delay (s/veh)	8.2						18.6	
LOS	A						C	
Approach Delay (s/veh)	--	--					18.6	
Approach LOS	--	--					C	

HCS+™ Version 5.21

Generated: 5/1/2008 2:09 PM

LN delay = $\frac{20.2 + 259.1}{20 + 773 + 414 + 8 + 154 + 105}$ = 2.4 A

Analysis by Urban Systems Inc.

HCS+: Signalized Intersections Release 5.2

Analyst: BKS
Agency: USI
Date: 4/29/2009
Period: AM Peak
Project ID: 09-020 Flopam Plant Inc.
E/W St: LA 1 SB

Inter.: LA 1 SB at LA 75
Area Type: All other areas
Jurisd: Iberville Parish
Year : 2009 Background

N/S St: LA 75

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	0	0	0	0	0	1	1	1	1	0
LGConfig		LTR						T	R	L	T	
Volume	180	509	114					186	87	2	68	
Lane Width		12.0						12.0	12.0	12.0	12.0	
RTOR Vol			11						9			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A				NB Left			
Thru	A				Thru	A		
Right	A				Right	A		
Peds					Peds			
WB Left					SB Left	A	A	
Thru					Thru	A	A	
Right					Right			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	52.0					3.0	27.0	
Yellow	4.5					4.5	4.5	
All Red	1.5					1.5	1.5	

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	1788	3439	0.49	0.52	15.7	B	15.7	B
Westbound								
Northbound								
T	503	1863	0.41	0.27	30.5	C	29.9	C
R	427	1583	0.20	0.27	28.4	C		
Southbound								
L	328	1770	0.01	0.36	21.0	C		
T	671	1863	0.11	0.36	21.4	C	21.4	C

Intersection Delay = 19.4 (sec/veh) Intersection LOS = B

HCS+: Signalized Intersections Release 5.2

Analyst: BKS
Agency: USI
Date: 4/29/2009
Period: PM Peak
Project ID: 09-020 Flopam Plant Inc.
E/W St: LA 1 SB

Inter.: LA 1 SB at LA 75
Area Type: All other areas
Jurisd: Iberville Parish
Year : 2009 Background

N/S St: LA 75

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	0	0	0	0	0	1	1	1	1	0
LGConfig		LTR						T	R	L	T	
Volume	289	761	61					244	146	30	295	
Lane Width		12.0						12.0	12.0	12.0	12.0	
RTOR Vol			6						15			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4	5	6	7	8
EB	Left		A			NB Left			
	Thru		A			Thru		A	
	Right		A			Right		A	
	Peds					Peds			
WB	Left					SB Left	A		A
	Thru					Thru	A		A
	Right					Right			
	Peds					Peds			
NB	Right					EB Right			
SB	Right					WB Right			
Green			52.0				3.0	27.0	
Yellow			4.5				4.5	4.5	
All Red			1.5				1.5	1.5	

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	1807	3475	0.68	0.52	18.9	B	18.9	B
Westbound								
Northbound								
T	503	1863	0.54	0.27	32.3	C	31.5	C
R	427	1583	0.34	0.27	29.8	C		
Southbound								
L	274	1770	0.12	0.36	21.9	C		
T	671	1863	0.49	0.36	25.4	C	25.1	C

Intersection Delay = 22.6 (sec/veh) Intersection LOS = C

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BKS
Agency/Co.	USI
Date Performed	4/30/2009
Analysis Time Period	AM Peak

Site Information

Intersection	LA 405 at LA 75
Jurisdiction	Iberville Parish
Analysis Year	2009 Background

Project Description: 09-020 Flopam Plant, Inc.

East/West Street: LA 75

North/South Street: LA 405

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	18	205			79	1
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	0	4	0	0	0
Percent Heavy Vehicles	2	–	–	0	–	–
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0		4			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	87	1	20	227	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	20						4	
C (m) (veh/h)	1508						976	
v/c	0.01						0.00	
95% queue length	0.04						0.01	
Control Delay (s/veh)	7.4						8.7	
LOS	A						A	
Approach Delay (s/veh)	–	–					8.7	
Approach LOS	–	–					A	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BKS
Agency/Co.	USI
Date Performed	4/30/2009
Analysis Time Period	PM Peak

Site Information

Intersection	LA 405 at LA 75
Jurisdiction	Iberville Parish
Analysis Year	2009 Background

Project Description: 09-020 Flopam Plant, Inc.

East/West Street: LA 75 | North/South Street: LA 405

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	31	57			432	14
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	10	0	37	0	0	0
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	9		34			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	480	15	34	63	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	34						47	
C (m) (veh/h)	1069						546	
v/c	0.03						0.09	
95% queue length	0.10						0.28	
Control Delay (s/veh)	8.5						12.2	
LOS	A						B	
Approach Delay (s/veh)	--	--					12.2	
Approach LOS	--	--					B	

HCS+: Signalized Intersections Release 5.2

Analyst: BKS
Agency: USI
Date: 4/29/2009
Period: AM Peak
Project ID: 09-020 Flopam Plant Inc.
E/W St: LA 1 NB

Inter.: LA 1 NB at LA 75
Area Type: All other areas
Jurisd: Iberville Parish
Year : Year 4 Const + Oper

N/S St: LA 75

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	2	0	1	1	0	0	1	0
LGConfig					LTR		L	T			TR	
Volume				76	538	13	166	327			19	157
Lane Width					12.0		12.0	12.0			12.0	
RTOR Vol						1						16

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left					NB Left	P		
Thru					Thru	P		
Right					Right			
Peds					Peds			
WB Left		P			SB Left			
Thru		P			Thru	P		
Right		P			Right	P		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		52.2				25.2		
Yellow		3.6				3.6		
All Red		2.7				2.7		

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
Westbound								
LTR	2039	3515	0.34	0.58	10.3	B	10.3	B
Northbound								
L	275	983	0.67	0.28	40.9	D		
T	522	1863	0.70	0.28	36.4	D	37.9	D
Southbound								
TR	459	1641	0.39	0.28	28.6	C	28.6	C

Intersection Delay = 23.3 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.2

Analyst: BKS
Agency: USI
Date: 4/29/2009
Period: PM Peak
Project ID: 09-020 Flopam Plant Inc.
E/W St: LA 1 NB

Inter.: LA 1 NB at LA 75
Area Type: All other areas
Jurisd: Iberville Parish
Year : Year 4 Const + Oper

N/S St: LA 75

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	2	0	1	1	0	0	1	0
LGConfig					LTR		L	T			TR	
Volume				209	477	5	222	88			138	327
Lane Width					12.0		12.0	12.0			12.0	
RTOR Vol						1						33

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left					NB Left	P		
Thru					Thru	P		
Right					Right			
Peds					Peds			
WB Left		P			SB Left			
Thru		P			Thru	P		
Right		P			Right	P		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		44.0				42.0		
Yellow		4.0				4.0		
All Red		3.0				3.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
Westbound								
LTR	1536	3491	0.50	0.44	21.2	C	21.2	C
Northbound								
L	265	630	0.93	0.42	67.9	E		
T	782	1863	0.13	0.42	18.1	B	53.7	D
Southbound								
TR	710	1691	0.68	0.42	28.6	C	28.6	C

Intersection Delay = 30.5 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.2

Analyst: BKS
Agency: USI
Date: 4/29/2009
Period: AM Peak
Project ID: 09-020 Flopam Plant Inc.
E/W St: LA 1 NB

Inter.: LA 1 NB at LA 75
Area Type: All other areas
Jurisd: Iberville Parish
Year : Normal Operation

N/S St: LA 75

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	2	0	1	1	0	0	1	0
LGConfig					LTR		L	T			TR	
Volume				80	538	13	166	287			19	169
Lane Width					12.0		12.0	12.0			12.0	
RTOR Vol						1						18

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left					NB Left	P		
Thru					Thru	P		
Right					Right			
Peds					Peds			
WB Left		P			SB Left			
Thru		P			Thru	P		
Right		P			Right	P		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		52.2				25.2		
Yellow		3.6				3.6		
All Red		2.7				2.7		

Cycle Length: 90.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
Westbound								
LTR	2038	3514	0.34	0.58	10.4	B	10.4	B
Northbound								
L	266	949	0.69	0.28	42.7	D		
T	522	1863	0.61	0.28	33.4	C	36.8	D
Southbound								
TR	459	1639	0.41	0.28	29.1	C	29.1	C

Intersection Delay = 22.5 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.2

Analyst: BKS
Agency: USI
Date: 4/29/2009
Period: PM Peak
Project ID: 09-020 Flopam Plant Inc.
E/W St: LA 1 NB

Inter.: LA 1 NB at LA 75
Area Type: All other areas
Jurisd: Iberville Parish
Year : Normal Operation

N/S St: LA 75

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	0	0	0	2	0	1	1	0	0	1	0
LGConfig					LTR		L	T			TR	
Volume				181	466	5	222	87			130	279
Lane Width					12.0		12.0	12.0			12.0	
RTOR Vol						1						37

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left					NB Left	P		
Thru					Thru	P		
Right					Right			
Peds					Peds			
WB Left		P			SB Left			
Thru		P			Thru	P		
Right		P			Right	P		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		44.0				42.0		
Yellow		4.0				4.0		
All Red		3.0				3.0		

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
Westbound								
LTR	1538	3495	0.47	0.44	20.8	C	20.8	C
Northbound								
L	302	720	0.82	0.42	46.9	D		
T	782	1863	0.12	0.42	18.1	B	38.8	D
Southbound								
TR	714	1699	0.58	0.42	25.6	C	25.6	C

Intersection Delay = 26.3 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.2

Analyst: BKS
Agency: USI
Date: 4/29/2009
Period: AM Peak
Project ID: 09-020 Flopam Plant Inc.
E/W St: LA 1 SB

Inter.: LA 1 SB at LA 75
Area Type: All other areas
Jurisd: Iberville Parish
Year : Year 4 Const + Oper

N/S St: LA 75

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	0	0	0	0	0	1	1	1	1	0
LGConfig		LTR						T	R	L	T	
Volume	278	607	114					219	120	2	83	
Lane Width		12.0						12.0	12.0	12.0	12.0	
RTOR Vol			11						12			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A				NB Left			
Thru	A				Thru	A		
Right	A				Right	A		
Peds					Peds			
WB Left					SB Left	A	A	
Thru					Thru	A	A	
Right					Right			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	52.0					3.0	27.0	
Yellow	4.5					4.5	4.0	
All Red	1.5					1.5	2.0	

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	1790	3443	0.61	0.52	17.5	B	17.5	B
Westbound								
Northbound								
T	503	1863	0.48	0.27	31.4	C	30.7	C
R	427	1583	0.28	0.27	29.2	C		
Southbound								
L	298	1770	0.01	0.36	21.2	C		
T	671	1863	0.14	0.36	21.6	C	21.6	C

Intersection Delay = 20.8 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.2

Analyst: BKS
Agency: USI
Date: 4/29/2009
Period: PM Peak
Project ID: 09-020 Flopam Plant Inc.
E/W St: LA 1 SB

Inter.: LA 1 SB at LA 75
Area Type: All other areas
Jurisd: Iberville Parish
Year : Year 4 Const + Oper

N/S St: LA 75

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	0	0	0	0	0	1	1	1	1	0
LGConfig		LTR						T	R	L	T	
Volume	291	763	61					245	147	30	364	
Lane Width		12.0						12.0	12.0	12.0	12.0	
RTOR Vol			6						15			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4	5	6	7	8
EB	Left	A				NB Left			
	Thru	A				Thru	A		
	Right	A				Right	A		
	Peds					Peds			
WB	Left					SB Left	A	A	
	Thru					Thru	A	A	
	Right					Right			
	Peds					Peds			
NB	Right					EB Right			
SB	Right					WB Right			
Green		57.0					3.0	32.0	
Yellow		4.5					4.5	4.5	
All Red		1.5					1.5	1.5	

Cycle Length: 110.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	1801	3475	0.68	0.52	20.9	C	20.9	C
Westbound								
Northbound								
T	542	1863	0.50	0.29	33.1	C	32.3	C
R	461	1583	0.32	0.29	30.9	C		
Southbound								
L	290	1770	0.11	0.37	23.1	C		
T	694	1863	0.58	0.37	28.9	C	28.5	C

Intersection Delay = 24.8 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.2

Analyst: BKS
Agency: USI
Date: 4/29/2009
Period: AM Peak
Project ID: 09-020 Flopam Plant Inc.
E/W St: LA 1 SB

Inter.: LA 1 SB at LA 75
Area Type: All other areas
Jurisd: Iberville Parish
Year : Normal Operation

N/S St: LA 75

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	0	0	0	0	0	1	1	1	1	0
LGConfig		LTR						T	R	L	T	
Volume	248	577	114					209	109	2	87	
Lane Width		12.0						12.0	12.0	12.0	12.0	
RTOR Vol			11						11			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4	5	6	7	8
EB	Left		A			NB Left			
	Thru		A			Thru		A	
	Right		A			Right		A	
	Peds					Peds			
WB	Left					SB Left	A		A
	Thru					Thru	A		A
	Right					Right			
	Peds					Peds			
NB	Right					EB Right			
SB	Right					WB Right			
Green			52.0				3.0	27.0	
Yellow			4.5				4.5	4.5	
All Red			1.5				1.5	1.5	

Cycle Length: 100.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	1790	3442	0.58	0.52	16.9	B	16.9	B
Westbound								
Northbound								
T	503	1863	0.46	0.27	31.1	C	30.4	C
R	427	1583	0.26	0.27	28.9	C		
Southbound								
L	307	1770	0.01	0.36	21.1	C		
T	671	1863	0.14	0.36	21.7	C	21.7	C

Intersection Delay = 20.4 (sec/veh) Intersection LOS = C

HCS+: Signalized Intersections Release 5.2

Analyst: BKS
Agency: USI
Date: 4/29/2009
Period: PM Peak
Project ID: 09-020 Flopam Plant Inc.
E/W St: LA 1 SB

Inter.: LA 1 SB at LA 75
Area Type: All other areas
Jurisd: Iberville Parish
Year : Normal Operation

N/S St: LA 75

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	2	0	0	0	0	0	1	1	1	1	0
LGConfig		LTR						T	R	L	T	
Volume	290	762	61					245	147	30	328	
Lane Width		12.0						12.0	12.0	12.0	12.0	
RTOR Vol			6						15			

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A				NB Left			
Thru	A				Thru	A		
Right	A				Right	A		
Peds					Peds			
WB Left					SB Left	A	A	
Thru					Thru	A	A	
Right					Right			
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	57.0					3.0	32.0	
Yellow	4.5					4.5	4.5	
All Red	1.5					1.5	1.5	

Cycle Length: 110.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	1801	3475	0.68	0.52	20.8	C	20.8	C
Westbound								
Northbound								
T	542	1863	0.50	0.29	33.1	C	32.3	C
R	461	1583	0.32	0.29	30.9	C		
Southbound								
L	290	1770	0.11	0.37	23.1	C		
T	694	1863	0.52	0.37	27.6	C	27.3	C

Intersection Delay = 24.4 (sec/veh) Intersection LOS = C

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BKS
Agency/Co.	USI
Date Performed	4/30/2009
Analysis Time Period	AM Peak

Site Information

Intersection	LA 1at Evergreen Road
Jurisdiction	Iberville Parish
Analysis Year	Year 4 Const + Oper

Project Description: 09-020 Flopam Plant Inc.

East/West Street: LA 1 | North/South Street: Evergreen Road

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	229	254			512	241
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	254	282	0	0	568	267
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	1	2	0	0	2	0
Configuration	L	T			T	TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				50		27
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	0	0	55	0	30
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
v (veh/h)	254						85	
C (m) (veh/h)	794						329	
v/c	0.32						0.26	
95% queue length	1.38						1.01	
Control Delay (s/veh)	11.7						19.7	
LOS	B						C	
Approach Delay (s/veh)	--	--					19.7	
Approach LOS	--	--					C	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BKS
Agency/Co.	USI
Date Performed	4/30/2009
Analysis Time Period	PM Peak

Site Information

Intersection	LA 1 at Evergreen Road
Jurisdiction	Iberville Parish
Analysis Year	Year 4 Const + Oper

Project Description: 09-020 Flopam Plant Inc.

East/West Street: LA 1 | North/South Street: Evergreen Road

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	21	696			373	10
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	23	773	0	0	414	11
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	1	2	0	0	2	0
Configuration	L	T			T	TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				257		150
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	0	0	285	0	166
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
v (veh/h)	23						451	
C (m) (veh/h)	1131						566	
v/c	0.02						0.80	
95% queue length	0.06						7.67	
Control Delay (s/veh)	8.2						31.8	
LOS	A						D	
Approach Delay (s/veh)	--	--					31.8	
Approach LOS	--	--					D	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BKS
Agency/Co.	USI
Date Performed	4/30/2009
Analysis Time Period	AM Peak

Site Information

Intersection	LA 1 at Evergreen Road
Jurisdiction	Iberville Parish
Analysis Year	Normal Operation

Project Description: 09-020 Flopam Plant Inc.

East/West Street: LA 1 | North/South Street: Evergreen Road

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	188	254			512	191
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	208	282	0	0	568	212
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	1	2	0	0	2	0
Configuration	L	T			T	TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				59		31
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	0	0	65	0	34
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
v (veh/h)	208						99	
C (m) (veh/h)	833						376	
v/c	0.25						0.26	
95% queue length	0.99						1.04	
Control Delay (s/veh)	10.8						18.0	
LOS	B						C	
Approach Delay (s/veh)	--	--					18.0	
Approach LOS	--	--					C	

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BKS	Intersection	LA 1 at Evergreen Road
Agency/Co.	USI	Jurisdiction	Iberville Parish
Date Performed	4/30/2009	Analysis Year	Normal Operation
Analysis Time Period	PM Peak		

Project Description: 09-020 Flopam Plant Inc.

East/West Street: LA 1	North/South Street: Evergreen Road
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	20	696			373	9
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	22	773	0	0	414	10
Percent Heavy Vehicles	2	--	--	0	--	--
Median Type	Raised curb					
RT Channelized			0			0
Lanes	1	2	0	0	2	0
Configuration	L	T			T	TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				195		111
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	0	0	216	0	123
Percent Heavy Vehicles	0	0	0	2	0	2
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
v (veh/h)	22						339	
C (m) (veh/h)	1132						565	
v/c	0.02						0.60	
95% queue length	0.06						3.95	
Control Delay (s/veh)	8.2						20.5	
LOS	A						C	
Approach Delay (s/veh)	--	--					20.5	
Approach LOS	--	--					C	

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BKS
Agency/Co.	USI
Date Performed	4/30/2009
Analysis Time Period	AM Peak

Site Information

Intersection	LA 405 at LA 75
Jurisdiction	Iberville Parish
Analysis Year	Year 4 Const + Oper

Project Description: 09-020 Flopam Plant, Inc.

East/West Street: LA 75 | North/South Street: LA 405

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	18	336			145	3
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	0	4	0	0	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0		4			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	161	3	20	373	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	20						4	
C (m) (veh/h)	1427						888	
v/c	0.01						0.00	
95% queue length	0.04						0.01	
Control Delay (s/veh)	7.6						9.1	
LOS	A						A	
Approach Delay (s/veh)	--	--				9.1		
Approach LOS	--	--				A		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BKS
Agency/Co.	USI
Date Performed	4/30/2009
Analysis Time Period	PM Peak

Site Information

Intersection	LA 405 at LA 75
Jurisdiction	Iberville Parish
Analysis Year	Year 4 Const + Oper

Project Description: 09-020 Flopam Plant, Inc.

East/West Street: LA 75 | North/South Street: LA 405

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	31	60			558	20
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	10	0	37	0	0	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	9		34			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	620	22	34	66	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	34						47	
C (m) (veh/h)	952						452	
v/c	0.04						0.10	
95% queue length	0.11						0.35	
Control Delay (s/veh)	8.9						13.9	
LOS	A						B	
Approach Delay (s/veh)	--	--					13.9	
Approach LOS	--	--					B	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BKS
Agency/Co.	USI
Date Performed	4/30/2009
Analysis Time Period	AM Peak

Site Information

Intersection	LA 405 at LA 75
Jurisdiction	Iberville Parish
Analysis Year	Normal Operation

Project Description: 09-020 Flopam Plant, Inc.

East/West Street: LA 75 | North/South Street: LA 405

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	18	296			157	3
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	0	4	0	0	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0		4			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	174	3	20	328	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	20						4	
C (m) (veh/h)	1411						872	
v/c	0.01						0.00	
95% queue length	0.04						0.01	
Control Delay (s/veh)	7.6						9.1	
LOS	A						A	
Approach Delay (s/veh)	--	--					9.1	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	BKS	Intersection	LA 405 at LA 75
Agency/Co.	USI	Jurisdiction	Iberville Parish
Date Performed	4/30/2009	Analysis Year	Normal Operation
Analysis Time Period	PM Peak		

Project Description: 09-020 Flopam Plant, Inc.

East/West Street: LA 75 | North/South Street: LA 405

Intersection Orientation: North-South | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	31	59			502	17
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	10	0	37	0	0	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	9		34			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	557	18	34	65	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	34						47	
C (m) (veh/h)	1008						493	
v/c	0.03						0.10	
95% queue length	0.10						0.31	
Control Delay (s/veh)	8.7						13.1	
LOS	A						B	
Approach Delay (s/veh)	--	--					13.1	
Approach LOS	--	--					B	

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BKS
Agency/Co.	USI
Date Performed	4/30/2009
Analysis Time Period	AM Peak

Site Information

Intersection	LA 405 at Site Driveway
Jurisdiction	Iberville Parish
Analysis Year	Year 4 Const + Oper

Project Description: 09-020 Flopam Plant, Inc.

East/West Street: LA 405 | North/South Street: Site Driveway

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		14	423	13	44	
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	15	470	14	48	0
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	132		2			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	146	0	2	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		14		148				
c (m) (veh/h)		1078		660				
v/c		0.01		0.22				
95% queue length		0.04		0.86				
Control Delay (s/veh)		8.4		12.0				
LOS		A		B				
Approach Delay (s/veh)	--	--	12.0					
Approach LOS	--	--	B					

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BKS
Agency/Co.	USI
Date Performed	4/30/2009
Analysis Time Period	PM Peak

Site Information

Intersection	LA 405 at Site Driveway
Jurisdiction	Iberville Parish
Analysis Year	Year 4 Const + Oper

Project Description: 09-020 Flopam Plant, Inc.

East/West Street: LA 405 | North/South Street: Site Driveway

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		39	8	0	19	
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	43	8	0	21	0
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	305		6			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	338	0	6	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		0		344				
C (m) (veh/h)		1555		938				
v/c		0.00		0.37				
95% queue length		0.00		1.70				
Control Delay (s/veh)		7.3		11.0				
LOS		A		B				
Approach Delay (s/veh)	--	--	11.0					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BKS
Agency/Co.	USI
Date Performed	4/30/2009
Analysis Time Period	AM Peak

Site Information

Intersection	LA 405 at Site Driveway
Jurisdiction	Iberville Parish
Analysis Year	Normal Operation

Project Description: 09-020 Flopam Plant, Inc.

East/West Street: LA 405 | North/South Street: Site Driveway

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		14	292	9	44	
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	15	324	10	48	0
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	157		1			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	174	0	1	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		10		175				
C (m) (veh/h)		1220		738				
v/c		0.01		0.24				
95% queue length		0.02		0.92				
Control Delay (s/veh)		8.0		11.4				
LOS		A		B				
Approach Delay (s/veh)	--	--	11.4					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	BKS
Agency/Co.	USI
Date Performed	4/30/2009
Analysis Time Period	PM Peak

Site Information

Intersection	LA 405 at Site Driveway
Jurisdiction	Iberville Parish
Analysis Year	Normal Operation

Project Description: 09-020 Flopam Plant, Inc.

East/West Street: LA 405 | North/South Street: Site Driveway

Intersection Orientation: East-West | Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		39	5	0	19	
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	0	43	5	0	21	0
Percent Heavy Vehicles	0	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	145		3			
Peak-Hour Factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate, HFR (veh/h)	161	0	3	0	0	0
Percent Heavy Vehicles	2	0	2	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		0		164				
C (m) (veh/h)		1559		939				
v/c		0.00		0.17				
95% queue length		0.00		0.63				
Control Delay (s/veh)		7.3		9.6				
LOS		A		A				
Approach Delay (s/veh)	--	--	9.6					
Approach LOS	--	--	A					

YEAR 4 CONST. + OPERATIONAL PHASE AM PEAK

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

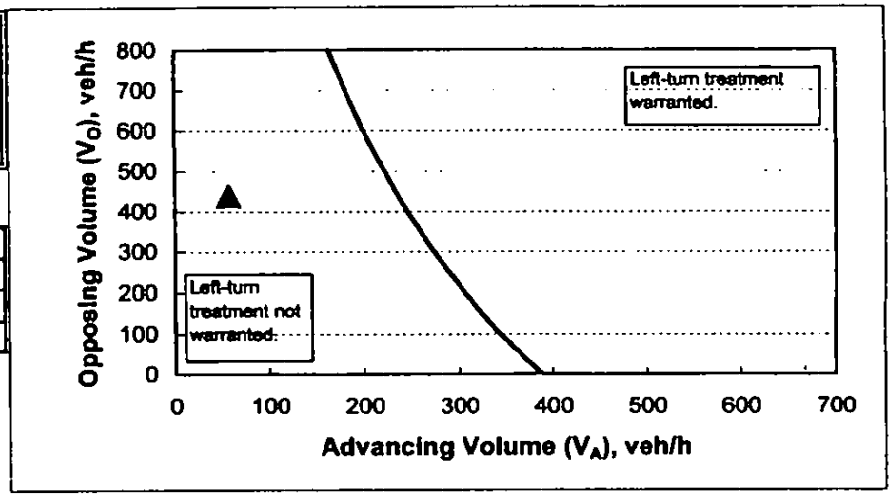
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	45
Percent of left-turns in advancing volume (V_A), %:	23%
Advancing volume (V_A), veh/h:	57
Opposing volume (V_O), veh/h:	437

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	237
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.9
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

YEAR 4 CONST. + OPERATIONAL PHASE PM PEAK

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

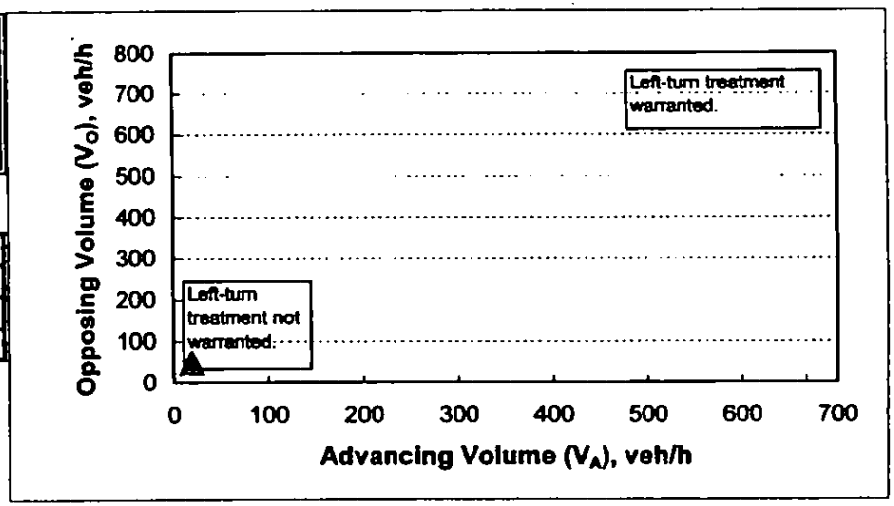
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	45
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	19
Opposing volume (V_O), veh/h:	47

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	2179
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

NORMAL OPERATIONAL PHASE AM PEAK

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

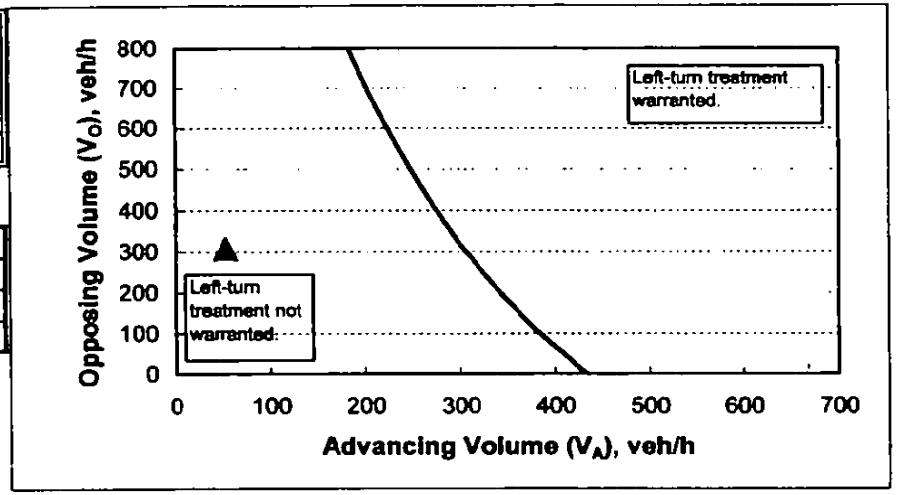
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	45
Percent of left-turns in advancing volume (V_A), %:	17%
Advancing volume (V_A), veh/h:	53
Opposing volume (V_O), veh/h:	306

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	304
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

NORMAL OPERATIONAL PHASE PM PEAK

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

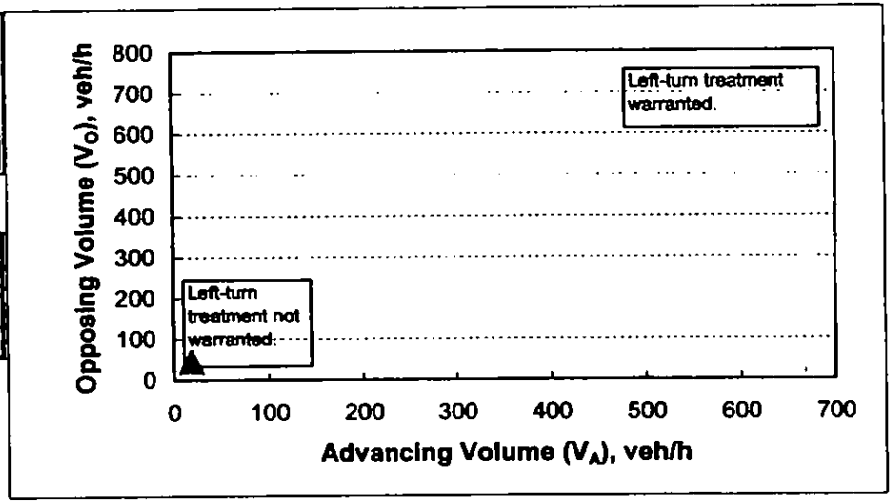
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	45
Percent of left-turns in advancing volume (V_A), %:	15%
Advancing volume (V_A), veh/h:	19
Opposing volume (V_O), veh/h:	44

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	2187
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

YEAR 4 CONST. + OPERATIONAL PHASE AM PEAK

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

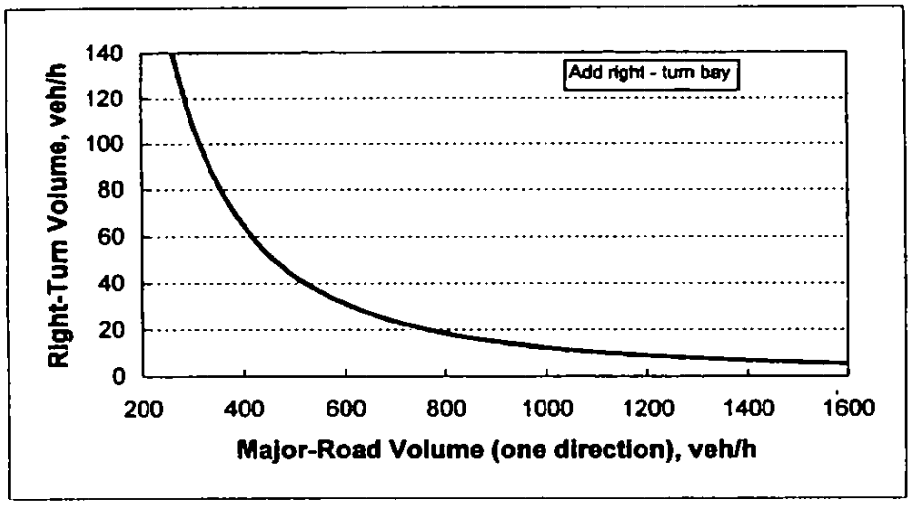
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	437
Right-turn volume, veh/h:	423

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	55
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



YEAR 4 CONST. + OPERATIONAL PHASE PM PEAK

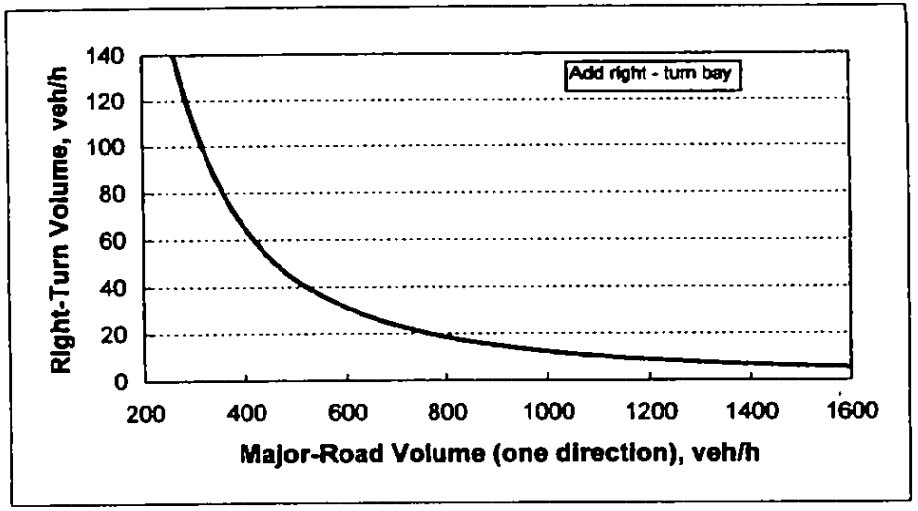
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	2-lane roadway
Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	147
Right-turn volume, veh/h:	8

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	3288
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



NORMAL OPERATIONAL PHASE AM PEAK

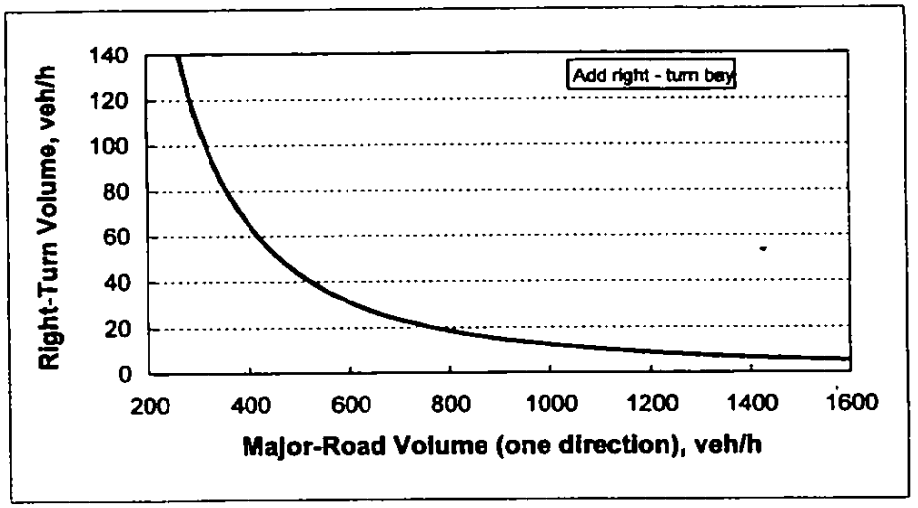
Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	2-lane roadway
Variable	**Value**
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	306
Right-turn volume, veh/h:	292

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	106
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



NORMAL OPERATIONAL PHASE PM PEAK

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

INPUT

Roadway geometry:	2-lane roadway
Variable	Value
Major-road speed, mph:	45
Major-road volume (one direction), veh/h:	44
Right-turn volume, veh/h:	5

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	3710
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.