

Construction and Operation of a Proposed  
Municipal Solid Waste Biorefinery,  
TerraFuels, LLC  
Galveston County, Texas

USDA Rural Business Cooperative Service

September 2, 2011

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Public Notice Information

## **I. Proposal Description and Need**

The United States Department of Agriculture, Rural Business Cooperative Service (RBS) is proposing to provide a Loan Note Guarantee to Banco Bilbao Vizcaya Argentaria Bank for TerraFuels LLC (TerraFuels) to construct and operate a new municipal solid waste biorefinery outside of Alvin, Texas. TerraFuels proposes to construct a municipal solid waste biorefinery with anticipated annual production reaching approximately 5.2 million gallons of green gasoline per year from the conversion of post sorted municipal solid waste (PSMSW). The biorefinery is proposed for construction outside of Alvin, Galveston County, Texas, on a 31-acre parcel just south and adjacent to its proposed feedstock supply source, Waste Management's Coastal Plains Recycle and Disposal Facility (Figure 1).

The National Environmental Policy Act (NEPA) of 1969 requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of Proposed Actions. As a result, this proposal has been classified as requiring an Environmental Assessment (EA) in accordance with RBS's regulations of 7CFR 1940-Subpart G and NEPA 42 U.S.C. §4321. This EA evaluates the potential environmental impacts that could result from the proposed biorefinery.

The purpose of this action is to provide a loan guarantee to assist in the development and construction of a commercial-scale biorefinery for the development of advanced biofuels. The authority for such loan guarantees is Section 9003 of the Farm Security and Rural Investment Act of 2002 (FSRIA) (as amended by Section 9001 of the Food, Conservation, and Energy Act of 2008 (2008 Farm Bill)) which provides for the financing of commercial-scale biorefineries to produce advanced biofuels. Advanced biofuels are defined under The Energy Independence and Security Act of 2007 which established a national goal of renewable fuel standard production of some 36 billion gallons of renewable fuels by 2022. TerraFuels proposes to construct and operate a biorefinery to produce advanced biofuels to help meet that goal.

The Proposal will use approximately 240 dry tons per day of feedstock (i.e., primarily food waste, cardboard and waste/contaminated paper; however, the facility is also able to accept grass clippings and other organic materials) to produce on average 5.2 million gallons of green gasoline per year. Green Gasoline is a liquid identical to standard gasoline yet created from sustainable biomass sources such as organic wastes, switchgrass or poplar trees. PSMSW is considered a renewable resource, therefore depletion is not anticipated.

The Facility consists of the following operations and utilities:

- An upstream operation (feedstock processing and fermentation),
- A midstream operation (concentration), and
- A downstream operation (thermal conversion, hydrogenation and oligomerization)
- Associated Infrastructure (Utilities, Storage, wastewater treatment facility etc.)

The final product, green gasoline, will be shipped to a refinery for blending into the gasoline

produced by the refinery. Transportation corridors to the refinery currently exist and infrastructure, such as water and electricity supplies is available at the proposed site. Natural gas and hydrogen pipelines will be piped in from locations outside the areas. The Biorefinery construction will have a total footprint of approximately 10 acres.

For purposes of this Environmental Assessment (EA) this proposal includes the construction of the biorefinery within 10 acres of the proposed 31-acre proposal area, and related infrastructure, including a proposed approximate 5.5-mile long hydrogen gas pipe line (underground), 935-foot long natural gas line (underground), 270-foot long electrical connection (above ground), and 1,675-foot long proposed potable water line (underground), to be located on a 31-acre parcel adjacent and south of the Coastal Plains Recycling and Disposal Facility east of Alvin, TX. The approximate center of the subject property is located at Latitude 29° 25'8" N and Longitude 95°11'30 W and is located just northwest of the western end of Superior Oil Field Road, Alvin, TX 77511, approximately 200 to 400 feet south of the Coastal Plains Landfill (Figure 1).

As indicated above, the Proposal's location was chosen for its proximity to the feedstock supply source, its proximity to the refineries and blending facilities that will use the green gasoline that the Proposal will produce, the availability of local laborers, and the availability of utilities and other consumables.

This proposal will impart overall environmental benefits related to its reduction in greenhouse gas emissions from a reduction in the burning of fossil fuels and diversion of organic waste from storage into a landfill and into renewable energy. The expected project lifespan is 20 years. There are no plans for future expansion at this time.

## **II. Primary Beneficiaries and Related Activities**

The primary beneficiary of the Proposal will be TerraFuels as owner of the Facility. Terrabon Inc. will provide the leading edge and robust fermentation technology developed at Texas A&M University as well as the overall development, implementation and, if necessary, on-going management of the Proposal. Once the Proposal is completed and operational, Terrabon will benefit from having successfully proven the commercial viability of its proprietary MixAlco<sup>®</sup> technology. Other second-tier beneficiaries will include Waste Management, Valero, and Texas A&M University. Waste Management, the owner of TerraFuels and the supplier of the feedstock, will benefit from the revenues that TerraFuels will make from the Proposal, and also from finding a more profitable and environmentally beneficial use for PSMSW rather placing these wastes in the landfill.

Valero will benefit from the Proposal because the green gasoline from the Facility will qualify for Renewable Identification Numbers (RINs) that Valero can use to meet the mandates of Renewable Fuel Standard II (RFS2). Texas A&M University will benefit because it will receive royalty revenues for its MixAlco<sup>®</sup> technology under its license agreement with Terrabon. USDA benefits from the production of green gasoline since it furthers the national objective of increased

biofuels in accordance with the RFS2 goals, as well as RD goals of creating employment and development opportunities in rural areas.

### **III. Description of Proposal Area**

The Proposal will be located approximately 200 to 400 feet away, and adjacent to and south of Waste Management's Coastal Plains Recycle and Disposal Facility in Alvin, TX on 10 acres within a 31-acre parcel (Figures 1 through 5).

The Coastal Plains Recycle and Disposal facility is a large landfill that services the larger Houston and Galveston metropolitan area. This Landfill, that processes approximately 1,600 tons per day of municipal solid waste, was chosen due to its size and ability to gather significant quantities of organic municipal waste as well as its close proximity (less than 30 miles) to the Valero's Texas City refinery, which is anticipated to purchase 100 percent of the plant's gasoline output.

A portion of the property (5-acres) required for the Facility will be purchased from a third party land owner. Contiguous land (approximately 26-acres) will be conveyed to the Facility by Waste Management. The Proposal area is on land that is currently unoccupied, and contains trees and vegetation allowed to populate since the last agricultural and mining activities. It is surrounded to the north and west by land owned and operated by Waste Management's Coastal Plains Landfill. Residential houses are located within 100 to 150 feet to the southeast of the 10 acre property. The land adjacent to the south is in agricultural production and or idle.

The land surface at the site is relatively flat with a maximum surface elevation of about 35 feet above mean sea level. Surface drainage flows toward an unnamed drainage ditch located in the southwestern and southeastern quadrants of the subject property. The ditch flows offsite to the east into Galveston County and on to its confluence with Dickinson Bayou. The USGS map shows a flood levee and ditch to the west of the subject property that flows to the north. While remnants of the levee still exist, the drainage ditch has been removed. The proposed site contains three ponds located near the center of the tract and a wetland to the west of the ponds along the western property border which are discussed in Section X.

### **IV. Environmental Impact**

#### **1. Air Quality**

The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards (40 CFR part 50) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. **Primary standards** set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. **Secondary standards** set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The EPA Office of Air Quality Planning and Standards (OAQPS) has set National Ambient Air Quality Standards (NAAQS) for six principal pollutants, which are called "criteria" pollutants.

They are listed below. Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb - 1 part in 1,000,000,000) by volume, milligrams per cubic meter of air (mg/m<sup>3</sup>), and micrograms per cubic meter of air (µg/m<sup>3</sup>).

**Table 1. National Ambient Air Quality Standards**

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
Carbon Monoxide (CO)	9 ppm (10 mg/m <sup>3</sup> )	8-hour	None	
	35 ppm (40 mg/m <sup>3</sup> )	1-hour		
Lead (Pb)	0.15 µg/m <sup>3</sup>	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m <sup>3</sup>	Quarterly Average	Same as Primary	
Nitrogen Dioxide (NO <sub>2</sub> )	53 ppb	Annual (Arithmetic Average)	Same as Primary	
	100 ppb	1-hour	None	
Particulate Matter (PM <sub>10</sub> )	150 µg/m <sup>3</sup>	24-hour	Same as Primary	
Particulate Matter (PM <sub>2.5</sub> )	15.0 µg/m <sup>3</sup>	Annual (Arithmetic Average)	Same as Primary	
	35 µg/m <sup>3</sup>	24-hour	Same as Primary	
Ozone (O <sub>3</sub> )	0.075 ppm (2008 std)	8-hour	Same as Primary	
	0.08 ppm (1997 std)	8-hour	Same as Primary	
	0.12 ppm	1-hour	Same as Primary	
Sulfur Dioxide (SO <sub>2</sub> )	0.03 ppm	Annual (Arithmetic Average)	0.5 ppm	3-hour
	0.14 ppm	24-hour		
	75 ppb	1-hour	None	

<http://www.epa.gov/air/criteria.html>

Areas of the country where air pollution levels persistently exceed the national ambient air quality standards may be designated "nonattainment" and have lower allowable thresholds of the criteria pollutants.

The project is located in a severe non-attainment zone for ozone (NO<sub>x</sub> and VOC) pollutants. Therefore, this non-attainment area is subject to a lower threshold for emissions of the criteria pollutants than those areas which are located within attainment zones. The emission threshold amounts for criteria pollutants in this non-attainment area are shown below in Table 2.

**Table 2: Facility Estimated Air Emissions**

<b>Pollutant</b>	<b>Short-Term Emissions Lbs/Hour</b>	<b>Annual Emissions Tons per year (Tpy)</b>	<b>NAAQS significance levels (Tpy) (40 CFR 81.344)</b>
<b>NOX</b>	52.99	16.86	25
<b>PM10</b>	1.76	3.64	15
<b>PM 2.5</b>	tbd <sup>1</sup>	tbd	15
<b>Sox (SO2)</b>	1.72	0.21	40
<b>CO</b>	16.82	13.79	50
<b>VOC</b>	4.24	12.28	25
<b>HAPs</b>	tbd	tbd	tbd

<sup>1</sup> To be determined (tbd)

All air emissions from the Facility will be authorized under a Texas Commission on Environmental Quality (TCEQ) new source review permit. Since the emission levels are below Major Source significance level, the project itself did not trigger a federal Non-Attainment New Source Review and therefore will not be reviewed by USEPA.

Specific Permits for the facility will include:

- 30 TAC §106.183 Boilers, Heaters, and Other Combustion Devices
- 30 TAC §106.261 General Facilities (Emission Limitations)
- 30 TAC §106.262 General Facilities (Emission and Distance Limitations)

Criteria air pollutant emissions will be emitted from boilers, heater, scrubber vents, conveyors and shredders, storage tanks, flare, loading racks, and piping components. Estimated emission calculations for these sources were performed based on the preliminary plant design. The estimates for all 6 criteria pollutants were below the non-attainment threshold.

Levels of Hazardous Air Pollutants (HAPs) will also be regulated according to monitored concentrations compared to air pollutant health effects screening levels (ESL) determined by TCEQ. If the HAP emission levels are less than 10 percent of the health ESL no further mitigation will be required, if the HAP emission levels are greater than 10 percent of the health ESL, a full project wide modeling and health effects review is conducted. If exceedances are greater than two times the ESL, the project is reviewed by TCEQ's Toxicology Department. If the exceedances are acceptable, no further review is required. If the exceedances are found to be unacceptable, the permit applicant is required to reassess their operations such that the emissions emitted are reduced.

TCEQ publishes a list of Effects Screening Levels (ESLs) for use by the TCEQ Toxicology Division for air permitting. The list is used to evaluate potential for effects to occur as a result of exposure to concentrations of constituents in the air. ESLs are based on data concerning health



effects, odor/nuisance potential, and effects on vegetation. They are not ambient air standards. If predicted or measured airborne levels of a constituent do not exceed the screening level, adverse health or welfare would not be expected to result.

Due to concern for ammonia (NH<sub>3</sub>) in the process water which will be used as a coolant in the biorefinery process, ammonia, along with other pollutants will be required to be monitored with this permit, will be sampled and monitored on a random and/or periodic basis from the facility while in operation. The results will be evaluated by TCEQ as part of the new source permit and this monitoring will continue for the life of the permit (personal communication Hima Draksharam of TCEQ, August 26, 2011).

In summary, the emission estimates for the facility are consistent with USEPA and Texas Commission on Environmental Quality (TCEQ) classification for a new source emitter in severe non-attainment zones (Table 2). The new source emitter permit to be obtained from TCEQ will require that the Facility emissions are below the NAAQS levels (listed in Table 2 above).

Although the facility is proposed within a severe non-attainment area for the criteria air pollutants, the proposed facility emissions will not result in significant adverse environmental impacts to air quality because the proposed emissions from the facility are in keeping with TCEQ air quality permit requirements and as such are not expected to have significant adverse effects. Only a minor adverse effect is expected to result from the emissions of pollutants from the facility, since without the facility there would be no increase in emissions in the area.

## **2. Water Quality and Hydrology**

### **Amounts and types of effluents/Wastewater**

The Texas Commission on Environmental Quality (TCEQ) Texas Pollutant Discharge Elimination System (TPDES) program has federal regulatory authority over discharges of pollutants to Texas surface water, with the exception of discharges associated with oil, gas, and geothermal exploration. Texas assumed the National Pollutant Discharge Elimination System from the EPA in 1998. Texas's Wastewater Disposal Regulatory Program, implemented by TCEQ, issues TPDES permits to control discharges of pollutants to surface waters.

No significant volume of wastewater is anticipated to be produced from the biorefinery because the facility has been given authorization from the TCEQ to recycle the process water and utilize it in the cooling process. The goal of this recycling is to recover the majority of the process water and reuse it, along with the use of fresh water, in the process. A new wastewater treatment facility will be constructed on the 10-acre site and will be designed to remove any contaminants. Preliminary designs plan to outfall the treated wastewater to the ditch located southeast of the property. The discharge will meet any regulatory standards for contaminants and physical parameters so that release is acceptable into the receiving stream. Any pollutants will be identified in the wastewater, treated and removed prior to discharge based on the sampling protocol prescribed in the TPDES regulatory program requirements.

TerraFuels is in the process of obtaining the TPDES wastewater discharge permit from TCEQ for the proposal should operations require a need to treat wastewater and discharge it to receiving streams. This is a backup precaution in the event that the elimination of wastewater, as described above, is not successful, and there is a need to treat effluent and discharge wastewater to adjacent streams.

**Source(s) and rates of water consumption and adequacy of water supply sources;**

A large amount of water is part of the incoming PSMSW feed material. Food waste has a moisture level of at least 70 percent, and this water has to be removed from the carboxylate salts. Due to the substantial amount of water that is part of the feedstock material and the neutral/slightly positive water balance, additional water make-up is not required for the process. As a result, no groundwater, surface water, well water, or water from an aquifer will be needed for the Facility on a regular basis. The MixAlco<sup>®</sup> technology is somewhat unique in this regard compared to other biofuel facilities.

During operations, the Proposal will generate distilled water. Other uses will be sought for the distilled water rather than discharging. For example, nearby industrial complexes that have a need for pure water may be interested in its use. It is planned that the water will be used as cooling water make-up and boiler water make-up. As a result, no impacts on the existing raw water supply will be incurred. Well water limits are a constraint in the Gulf Coast area, and aquifers are not used to supply significant amounts of water for this area.

Based on this, no impacts on the current raw water supply for the area are anticipated to be incurred. Therefore, the Proposal will not create a shortage of water that could adversely affect the present users of water or any volume reduction in water to the wildlife or environment. No negative water supply issues are expected in terms of human health, safety, or welfare problems.

Process water will be recovered from the incoming food waste material. The process water will include cooling water and boiler feed water. Any large amounts of make-up water (emergency situation) will be supplied from a nearby surface water pond on Waste Management's property. The process operation is not sterile, so it will not require sanitation.

**Stormwater:**

Prior to construction of the Facility, a Notification of Intent will be filed with TCEQ of the Facility's intent to abide by the Storm Water General Permit for Construction. Once construction is completed, a Notice of Termination will be filed for the construction permit and the Facility will notify TCEQ of its intent to permit storm water discharges during operations using the Multi-Sector General Permit, TXR050000.

**Public Drinking Water System:**

The Facility will employ 20 to 30 employees on-site. State regulations (30 TAC § 290.38) define public water systems as those serving at least 25 individuals for at least 60 days out of the year. The Facility will be classified as a non-transient non-community water system. TerraFuels will

notify TCEQ to obtain a PWS identification number. TerraFuels will develop and submit a distribution system plan including specifications to the TCEQ for pre-approval.

The supply of potable water will originate from a system already present on Waste Management's property for their administration buildings. Potable water from their tank will be pumped along 1,675 linear feet of newly installed pipe which will be connected to a tank located on the 10 acre proposal site. The operation will use potable water for sinks, showers, toilets, eye wash stations, and emergency shower stations. A potable water tank will be present, and the supply will be from well water provided by Waste Management. Due to the low volume required by TerraFuels, the additional load will not deplete the Waste Management's potable water system. The design will be sized properly for the number of employees at the Facility.

### **Summary**

No impacts on the current raw water supply for the area will be incurred. The Proposal will not create a shortage of water that could adversely affect the present users of water or any volume reduction in water to the wildlife or environment. No negative water supply issues are expected in terms of human health, safety, or welfare problems.

The Proposal's design, effluents, and extensive pre-treatment are consistent with the State's waste treatment management standards and water quality standards.

### **3. Solid Waste Management and Hazardous Materials**

The Facility will receive feedstock material such as waste/contaminated paper, cardboard, and food scraps segregated and collected exclusively for feedstock for the Facility. TerraFuels will utilize Waste Management in order to procure its feedstock supply. Waste Management will collect the feedstock, and remove any plastics, metals, glass or other inappropriate materials from the feedstock, then truck the feedstock as a slurry via tanker truck to a receiving area which will contain several feedstock receiving tanks. The feedstock will be pumped into the receiving tanks. Therefore, the majority of the solid wastes will be removed from the feedstock prior to arriving at the TerraFuels facility.

Current TCEQ regulations do not specifically identify requirements for using PSMSW as a feedstock. Until policy changes are made to include this type of reuse, TerraFuels will obtain an authorization (notification, registration or permit) for a Type V MSW transfer facility from the TCEQ for the initial receiving operations.

The Facility will efficiently reuse off-stream solid waste material wherever possible by recycling them, however, some waste will be generated and require disposal. Solid waste streams will include: non-digestible solids from the fermentation reaction step, and material sorted from the PSMSW that is unusable in the process. Some of these waste streams have potential reuses such as landfill cover and fuel gas for industrial equipment (steam boiler). Reuse options will be pursued for applicable waste streams. Waste streams with no reuse will be disposed of at the permitted Landfill.

As a generator of waste, TCEQ will require TerraFuels to have a Notice of Registration identifying the waste generated at the plant and any on-site units used to store or manage these wastes. Generation of hazardous waste is not anticipated, but if it is, it will be stored for less than 90 days on-site and disposed of off-site at a permitted TSDf (treatment, storage, disposal facility). No RCRA hazardous waste permit is required for this Proposal.

The primary by-product generated the facility will be undigested residue. Undigested residue is any material that cannot be processed by the natural bacteria culture. This by-product is not considered hazardous. It consists mostly of lignin material. Adequate volume at the adjacent receiving center (landfill and compost operation) is available for this material. Since a large amount of food waste will be diverted from the landfill, the much smaller volume of undigested residue can be accepted by either the landfill or compost operation.

#### **4. Land Use**

The subject 31 acre site was undeveloped through the mid 1950s and historically used for agricultural purposes. Oil and gas exploration and development (Algoa Oil Field) occurred starting in the 1960s. By the late 1980s, the properties had been developed for residential use with the buildings removed prior to 2004. Other than one abandoned residence, no structures are present at the site. The property is currently vacant with three ponds located in the north central portion of the property, and an abandoned residence located near the western property boundary. The ponds are mapped on the National Wetlands Inventory as Freshwater Ponds or Freshwater Emergent wetlands, however, these manmade ponds do not appear to meet the definition of jurisdictional wetlands. Areas immediately surrounding the property are used for agriculture (south), residential (east), and commercial (Coastal Plains Landfill) to the north and west.

The subject site has no zoning restrictions for this use. The Proposal will follow the local and state regulations with respect to obtaining all building permits. The surrounding land uses should not be adversely impacted from an environmental standpoint. Although the Proposal will change the land use from its current state, no significant adverse environmental impacts are expected.

#### **Geomorphology, Geology, and Soils**

Based on the Web Soil Survey from the National Cooperative Soil Survey for the Facility, two soil types are present on the site: 1) Bernard clay loam (Be) with average slope of 0.2 percent; and 2) Bernard-Edna complex (Bn) with nearly level slope. These soils are listed as prime farmland (covered in Section IX) and have hydric inclusions (covered in Section X).

The proposed site is located in an area identified by the USGS as being located on the Beaumont Formation, which is predominately composed of clays and mud. The Chicot and Evangeline Aquifers occur at depths from approximately 250 to 1800 feet below ground surface.

## **5. Transportation**

The main method of transportation for both feedstock supply and fuel off-take will be by truck, using existing roads and highways. Rail tracks are near the plant, but the gasoline product volumes do not warrant the use of rail cars. Highway 6 is the main road near the Facility, and it can handle large quantities of vehicles on a daily basis. The number of feedstock and product off-take trucks is not expected to cause a major safety concern or require any additional traffic control devices.

The waste trucks will arrive at the Landfill entrance either from the west or east on Highway 6. The trucks will then follow the private road going north towards the Landfill. All gasoline product trucks will leave the Landfill entrance and travel to the east on Highway 6 towards the Valero refinery located in Texas City, Texas. No community buildings are located near the Landfill, so the new traffic pattern for the gasoline product trucks should not have any adverse impacts. The area along Highway 6 has no construction projects listed with the county planning office, so the Proposal's transportation impacts are consistent and no air quality control plans should be required.

Transportation corridors to the Landfill currently exist. The proposal will not have a significant impact on either existing roadways or railway transportation. In terms of railway transportation, no conveyance of materials (chemicals, feed, product, etc.) are planned using rail. The Facility will not have rail access that is close enough to the property to make rail a practical option. The number of waste trucks currently entering the landfill is 200-400 per day. The TerraFuels Project will divert the food waste portion of the total waste from the landfill to the biorefinery. It is estimated that the overall amount of trucks entering the landfill might increase slightly due to the biorefinery, but not significantly (less than 20 percent). It is Waste Management's plan to optimize the number of vehicles entering their facility so that the transportation costs are economically viable. This can be achieved using various options (larger vehicles, etc.) and by coordinating the truck logistics. As a result, the normal traffic flow will not be disrupted.

The number of green gasoline product trucks is estimated to be three per day. This number will be in addition to the current number of trucks accessing the landfill. Appropriate signage will be installed to direct the trucks to the correct location. It is not anticipated that local roads will be adversely impacted due to this volume increase. The local roads in the landfill area are in a rural community, with few businesses and residents neighboring the landfill. The majority of businesses and residents are located along Highway 6, which is the main road near the landfill. Highway 6 is designed to handle a large amount of vehicle traffic on a daily basis. With the current truck volume going to the landfill, proper signs and signals are already installed to meet the current and future volume.

## **6. Natural Environment: Biological Resources**

### **Vegetation**

The proposed 31-acre site consists of abandoned cropland/pasture which has reverted to partially wooded areas, three open ponds which remain dry for a significant portion of the year, and a fringe

of forested areas. The upland and wetland forested areas are dominated by the non-native Chinese tallow tree in the overstory, and various scrub shrub vegetation in the understory. The wetland area is also dominated by Chinese tallow tree, and has slippery elm in the over and understories.

### **Fish and Wildlife Species**

Galveston County contains many aquatic and terrestrial habitats, and has a large amount of biodiversity of mammals and vertebrates that could occur on or surrounding the proposed site. The proposal is located within the Post Oak Savannah and Coastal Prairies ecoregions of Texas, and the subject property is located within the Coastal Prairies ecoregion ([http://www.tpwd.state.tx.us/landwater/land/habitats/oak\\_prairie/regulatory/](http://www.tpwd.state.tx.us/landwater/land/habitats/oak_prairie/regulatory/), <http://www.fws.gov/southwest/clearlakees/coastalprairie.htm>).

The Coastal Prairie is located along the western gulf coast of the United States, in southwest Louisiana and southeast Texas, just inland from the coastal marsh region. This Coastal Prairie is a tallgrass prairie similar in many ways to the tallgrass prairie of the midwestern United States. It is estimated that, in pre-settlement times, there were nine million acres of Coastal Prairie, with 2.5 million acres in Louisiana, and 6.5 million acres in Texas. Today, substantially less than one percent of the Coastal Prairie remains with remnants totaling less than 100 acres in Louisiana and less than 65,000 acres in Texas. While much of the former prairie has been converted to pasture for cattle grazing, the majority has been altered for growing rice, sugarcane, forage, and grain crops. In Louisiana, most of the prairie's few remaining remnants are found on narrow strips of land along railroad tracks. A larger amount remains in Texas because it was used for cattle production and never plowed. Many species, however, have been lost through overgrazing [http://library.fws.gov/pubs/paradise\\_lost.pdf](http://library.fws.gov/pubs/paradise_lost.pdf)..

Coastal Prairie, and its adjacent marsh habitat, provided immense spaces for waterfowl and thousands of other forms of wildlife. Even in its altered state, Coastal Prairie routinely hosts more red-tailed hawk, northern harrier, white ibis, and white-faced ibis than any other region in the United States. Waterfowl, sandpipers, and other shorebirds are abundant during the fall, winter, and spring months, paralleling and often surpassing other regions with longstanding traditions as crucial stopover areas for these species. Many rare European species such as northern wheatear, black-tailed godwit, curlew sandpiper, and ruff have also been observed routinely ([http://library.fws.gov/pubs/paradise\\_lost.pdf](http://library.fws.gov/pubs/paradise_lost.pdf)).

The proposed 31-acre site has been previously cleared and graded as a result of oil and gas exploration and has been in farm operations historically. The proposed facility will not significantly adversely affect biological resources within the 31 acre site, or in the surrounding areas. There may be a minor adverse effect to the wildlife, such as deer, birds, amphibians, snakes, and other species common to this region, within the 31-acre site that utilize the wetland/farmed areas, however, these effects are not expected to have a significant adverse effect. Therefore, no significant adverse direct or indirect effects to the existing biological resources in the area are expected. Please refer to the "Section VIII Compliance with the Endangered Species Act" for discussion of federally listed species.

### **Microorganisms Proposed for Use**

The microorganisms proposed for the fermentation and other facility processes are obtained from natural locations (salt water marsh areas). The processes will require no enzyme addition and no special microorganisms are required. The use of a natural bacterial culture to decompose the biomass will be used. No sterilization of fermentation equipment or piping is required before commissioning the plant. No containment mechanism is required as a result. The facility has no intentions of using any genetically altered organisms. Therefore, no significant adverse direct or indirect effects to the existing biological resources in the area from the facilities processes are expected.

### **7. Human Population: Socioeconomic Factors**

The land directly adjacent to the Landfill is currently not inhabited and only a small amount of residential properties are located in the general vicinity of the proposed site, to the east of the property. Population increases are not expected to occur due to the proximity of the Landfill. The surrounding rural area has large tracts of land that are used primarily for agricultural purposes. The Proposal will require 26 full-time employees, and will hire local candidates if possible. Also, no discernable impact is expected with the slight additional traffic generated over a 24 hour period, and no additional air emissions or odors are anticipated.

The Proposal will employ approximately over 280 construction workers during the 18-month construction period and 26 full time employees to provide operations and maintenance services (O&M). The O&M team will be hired six months to one year prior to startup of the plant in order to build and train the team. In addition to direct employees, local contractors will be hired to perform maintenance services for the Facility. Over the first 10 years, approximately 200 indirect and direct jobs will be created as a result of the TerraFuels Proposal. A summary of the number of employees to operate the Facility is shown in the table below.

**Table 3: List of Employees for Proposed Facility**

<b>Man Power Estimates</b>	
No of hours worked per year	2080
Load Operators	2
Pretreatment/Fermentation Operators	8
Conversion Operations	8
Maintenance Tech	3
Site Manager	1
Chemical Engineer	1
Lab/EHS supervisor	1
Admin	2
	26

**Near-by populations (including minority and low-income):**

***Proposal Area - Census Tract 48167723400***

According to the 2000 census, the proposal area (census tract 48167723400), the population density was 166 people per square mile (<http://epamap14.epa.gov/ejmap/entry.html>). The percent minority for this census tract was 23.8 percent minority. The racial makeup of the county was 89.9 percent White, 1.8 percent Black or African American, 21.4 percent Hispanic origin, and 1 percent from other races. The median annual income for a household in this census tract is comparable to that for the county (24.8 percent in the \$ 25,000 to \$50,000 bracket and 24 percent in the “greater than \$75,000” bracket). About 9.8 percent of the population in this census tract is below the poverty line.

***Galveston County***

As a comparison, in Galveston County, according to the 2000 census the population density was 628 people per square mile. The racial makeup of the county was 72.69 percent White, 15.44 percent Black or African American, 0.47 percent Native American, 2.10 percent Asian, 0.04 percent Pacific Islander, 7.18 percent from other races, and 2.08 percent from two or more races. Of this makeup, 17.96 percent of the population were Hispanic or Latino of any race. This is a 27.3 percent minority for the county. The median income for a household in the county was \$42,419, and the median income for a family was \$51,435. About 10.10 percent of families and 13.20 percent of the population were below the poverty line.

The proposal is not anticipated to have a disproportionate adverse effect on any minority or low-income populations. Please refer to Appendix II to review Rural Development Form 2006-38, Rural Development Environmental Justice and Civil Rights Impact Analysis and accompanying figures. To the contrary the proposal is expected to have several beneficial effects to the communities.

**8. Construction**

**Extent of necessary site clearing and excavation**

Construction, operation and maintenance of the biorefinery will result in the short and long-term loss of mostly non-native vegetation. The biorefinery will be constructed on an area of the site that has already been cleared formerly for agricultural purposes, as well as, previously impacted for oil and gas exploration. Following the completion of construction, temporary workspace and areas within the biorefinery location not covered by facilities will be revegetated with native grasses and shrubs or rock to minimize wind and water erosion, to provide competition with noxious weeds and enhance aesthetics.

Potential impacts could include temporary soil erosion and the loss of soil productivity. Construction and operation activities, such as vegetation clearing, trenching, grading, topsoil segregation and backfilling, may increase erosion potential by temporarily destabilizing the soil surface associated with the proposal, which could adversely affect the subject site soils temporarily. Soil disturbances and compaction may also occur as the result of construction vehicular traffic. These impacts would be temporary and minimized to the extent possible.



Impact on vegetation and soil resources from the construction phase of the proposal would be confined to the construction footprint of the Site and related utilities. Construction contract terms will include the SWPPP plan that includes BMPs for erosion control and sediment control during construction to minimize soils exiting the construction site, and disturbed areas would be stabilized and revegetated as soon as practical. Implementation of BMPs by the construction contractor would control soil erosion and dust creation during construction and minimize stormwater runoff associated with construction activities in the subject site. Because the proposal would likely disturb more than 5 acres, development of the site would be regulated under the TPDES. A Notice of Intent must be submitted to the Texas Commission on Environmental Quality 48 hours in advance of any ground disturbing activities. Prior to ground disturbing activities, a Storm Water Pollution Prevention Plan must be in place and all BMPs should be monitored on a regular basis in accordance with TXR 150000.

Noise associated with the construction project will be monitored by the construction company (pile driving, welding, grinding, equipment unloading, truck traffic, etc.). A decibel monitoring device will be present to check any potential noise issues. All employees working on the job site will be expected to wear proper hearing protection. The noise levels outside the project boundary will not be at a nuisance level.

While there is an expected minor, temporary adverse effect to the localized air quality based on the temporary emissions from the burning of fossil fuels from construction equipment, construction operations will not have a significant adverse impact to air quality.

### **9. Energy Impacts**

The Facility will require electrical, natural gas, hydrogen, wastewater treatment and water supply facilities in order to operate. All of these utilities are available from local utility companies. Power supply lines are currently in the area, and the local power company has indicated that the anticipated usage will not be an issue. In addition, the area will still have capacity for any future projects. The Proposal will produce more energy than it consumes, so it will have a positive energy impact on the area. When possible, energy conserving devices will be incorporated into the project design (motion sensors, variable frequency drives, efficient light bulbs, etc.). The engineering design company will make efforts to use as many energy conservation devices as possible.

The proposal would require expenditures of energy, including natural and depletable resources, during the construction phase. For example, an increase in energy resource consumption during the construction phase of the proposal is expected due to diesel and gasoline demands for power machines. However, the energy use would be short-term and have negligible impacts to energy resources, with no appreciable effect on energy availability or costs. Adverse impacts on energy resources associated with the operation of the proposal are expected to be negligible relative to the amount of energy which will be created from the conversion of PSMSW to green gasoline.

Refer to Section IV 12. for utilities descriptions.

## **10. Noise, Vibrations, Seismic Conditions, Fire-Prone locations, radiation, aesthetic considerations.**

### **Noise**

No noise problems are anticipated. The following machinery may generate noise levels at the equipment location between 85 to 110 decibels: a gas-fired boiler, and air compressor. Employees will be equipped with ear plugs when around this machinery. In addition there will be motor driven equipment that will generate noise including: pumps, agitators, and mechanical separators. Several trucks per day will be loading and unloading at the site. The noise levels outside the boundary of the Project will not be at nuisance levels.

### **Vibrations**

No vibrations are expected to result from the proposed project. All rotating equipment will be monitored for excessive vibration as part of a preventative maintenance program.

### **Seismic**

The site is not located over any major or minor fault lines and is in a low probability area for Seismic Conditions according to the 2008 U.S. Geological Survey (USGS) National Seismic Hazard Map which display earthquake ground motions for various probability levels across the United States (<http://earthquake.usgs.gov/earthquakes/states/texas/hazards.php>).

### **Fire-prone location**

Due to the large amount of rain, the biorefinery is not located in a fire-prone area. Fire protection devices will be present at the property as a precaution. Employees will be trained on how to respond in case of a fire situation.

### **Radiation**

TerraFuels will not procure, produce, or utilize any radioactive elements in the operations of its facility, so no radiation risk will be present.

### **Aesthetics**

The Proposal should not have aesthetic issues. The Facility will be located within a rural area, adjacent to an existing Landfill. Wastes brought on-site will be sorted within a building and processed in enclosed pieces of equipment such as tanks. No piles of materials will be visible.

### **Odor**

Some materials managed at the Proposal have odors but these will be managed to reduce off-site issues. Odors may occur from materials such as the organic waste feed streams (i.e., food waste) and the fermentation process. The areas that are prone to odor will be managed, ensuring any vents from these areas pass through the water scrubber, and then the biofilter.

Off-gasses from the fermentor and descumming sections will be processed in a packed tower. Water scrubs the top packed section to strip the majority of hydrogen sulfide and other gas

contaminants. The biofilter will breakdown and process the remaining hazardous and odor causing components using natural biological organisms. Under certain conditions if an overabundance of sulfur containing wastes (such as proteins) has been introduced, some hydrogen sulfide gas could be generated by sulfur reducing bacteria and result in odor complaints. This will be avoided by measuring feedstock characteristics and making process adjustments. Sodium hypochlorite is also available for injection into the off-gas treatment system should hydrogen sulfide be present in amounts that might overcome the biofilter.

### **11. Safety and Occupational Health**

Site safety will be managed by strict adherence to U.S. OSHA requirements as well as the more stringent TerraFuels safety policy. The site boundary is fenced and will be closed 24 hrs a day and accessible only by authorized personnel with approval from TerraFuels. Any personnel entering the site must adhere to the TerraFuels Safety policy.

All safety precautions will be taken in the design of this project. Employees and contractors are expected to wear the correct personal protection equipment (PPE) at all times. Safety meetings will be held monthly in order to emphasize the importance of safety. Any safety issues will be reported immediately, and corrective actions will be determined. Safety items will be tracked by the construction company and their Environmental Health and Safety Group. Process Safety Management programs will be required.

### **12. Utility Infrastructure**

The Facility will require electrical, natural gas, hydrogen, wastewater and water facilities in order to operate. All of these utilities are available from local utility companies. There are no known wetlands or historic areas located in any of the proposed rights-of way for the utilities. If any wetlands are identified along the utility corridors, the appropriate authorization from USACE, if required, will be obtained to comply with Section 404 of the Clean Water Act.

#### **Hydrogen Gas**

Hydrogen is required in the production of gasoline using Terrabon's MixAlco<sup>®</sup> technology. It will be used in the hydrogenation and oligomerization steps of the process. An existing hydrogen pipeline is present near the proposed TerraFuels Facility. It is large enough to provide the hydrogen volume requirements for the operation. Based on economic studies, the preferred option is to use a hydrogen supply from a pipeline source rather than producing hydrogen from a steam methane reformer technology, where natural gas is converted into hydrogen.

The conceptual design of the new 5-5 mile long hydrogen pipeline is shown in Figure 6. The new hydrogen pipeline will connect with the existing supply pipe (shown in blue) on the west side of Cemetery Road. The new pipeline will follow an existing right-of-way (ROW) that is present in a northwest direction and used for power lines. This ROW is approximately 100 feet wide and large enough for the new pipeline, as only 10 feet will be required. Trees have already been cleared along this ROW and no known wetlands or historic areas are located in this region. The length of this portion of pipeline will be 23,000 linear feet and is shown in a magenta color (Figure 6). At

the end of the power line ROW, the new hydrogen pipeline will change directions and follow a southwest route. At this point, it will follow another existing ROW used by a natural gas pipeline (owned by Kinder Morgan, shown in green). This portion of the new hydrogen pipeline is 4,500 linear feet and is marked in red (Figure 6).

In order to connect to the biorefinery, the final section of the new hydrogen pipeline will follow a western route as shown in Figure 6 (950 linear feet, marked in a dark blue color). No existing ROW is present, however, the property in this area is owned by Waste Management. It is anticipated that it will not be difficult to obtain a ROW as a result. No known wetlands or historical areas are present along this route. The new hydrogen pipeline installation will follow all required regulations and guidelines, and required permits and notifications will be obtained before any work is started. A certified installation contractor will be used, who is knowledgeable about the area, permits, and has pipeline installation experience. The pipeline will have a diameter of 4-inches and will be made from carbon steel.

### **Electrical Service**

The Proposal will use existing transmission lines serving the Landfill, and will not require installation of additional transmission facilities, except for those specifically on the Proposal. Electrical lines will be installed overhead from existing power lines to a transformer located at the southwest area of the property. The estimated distance for the new power lines is 270 linear feet for an above ground electrical connection (Figure 7).

### **Natural Gas**

The area near the landfill has several natural gas pipelines available, less than 1-mile away. The proposal will require the installation of a 935-foot long, underground natural gas line to be installed (Figure 7).

### **Water**

The MixAlco<sup>®</sup> technology has a neutral to slightly positive water balance, so process water will not need to be purchased from an outside source. Potable water will be provided from an existing tank located on Waste Management's property. The potable water will be used for the office building (toilets, sinks, showers, etc.). The proposal will require a 1,675-foot long proposed, underground, potable water line to be installed (Figure 7).

### **Wastewater Facility**

As mentioned in Section IV. 2. Water Quality, the majority of the wastewater will be recycled in the facility. However, as a backup to treat wastewater, should it not be recycled efficiently at all times, a new wastewater treatment facility will be constructed on the 10 acres site and will be designed to remove any contaminants in the wastewater according to TPDES wastewater discharge requirements. Preliminary designs have the treated wastewater outfall to the ditch located off the property to the southeast.

### **13. Feedstock Availability and Proximity**

#### **Feedstock Pretreatment, Transportation and Storage**

The Proposal will use approximately 240 dry tons per day of Post Sorted Municipal Sorted Waste (PSMSW) feedstock from Waste Management's Coastal Plains Recycle and Disposal Facility to produce on average 5.2 million gallons of "green gasoline" per year. Feedstock will consist primarily of food waste, cardboard and waste/contaminated paper. The Facility will receive feedstock material segregated and collected exclusively for the Facility. TerraFuels will utilize Waste Management in order to procure its feedstock supply. Waste Management will collect the feedstock, and remove any plastics, metals, glass or other inappropriate materials from the feedstock, then truck the feedstock as a slurry via tanker truck to a receiving area which will contain several feedstock receiving tanks. The feedstock will be pumped into the receiving tanks.

The facility is also able to accept grass clippings and other organic materials, however, those feedstocks are not anticipated for use in the facility at this time. All of these feedstock materials are considered "renewable" resources in that there is plentiful supply of this waste material and depletion is not anticipated.

The Coastal Plains Recycle and Disposal facility is a large landfill that services the larger Houston and Galveston metropolitan area. This Landfill, that processes approximately 1,600 tons per day of municipal solid waste, was chosen due to its size and ability to gather significant quantities of organic municipal waste as well as its close proximity (less than 30 miles) to the Valero's Texas City refinery, which is anticipated to purchase 100 percent of the plant's gasoline output.

If the feedstock proposed for use at the facility was not used at the proposed facility, it would be placed in the adjacent landfill. Use of the proposed feedstocks is not anticipated to have an overall adverse effects on the human environment, but is expected to have a beneficial effect on the human environment based on the reduction wastes making their way to the landfill, recycling of this material into usable energy, and reduction in carbon use by offset of petroleum usage by the production of green gasoline.

### **V. Coastal Zone Management Act**

The proposed project is not located within areas protected by the Coastal Barrier Resources Act of 1972 (16 U.S. C part 3501 et. seq.) or defined as coastal zone by the Coastal Zone Management Act (16 U.S.C. part 1451 et seq.). The TerraFuel Facility is not located within the Coastal Management Program Boundary as defined by Texas Administrative Code (TAC) 31, Part 16, §503.1, therefore impacts to coastal areas protected by the Coastal Barrier Resources Act will not occur as a result of this proposal.

### **VI. Compliance with Advisory Council on Historic Preservation's Regulations**

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, requires federal agencies to take into account the effect of undertakings on historic properties (archaeological sites and historic buildings, sites, landmarks and districts) that are eligible for and/or listed on the National Register of Historic Places (NRHP). This consideration must be made

in consultation with the Texas State Historical Preservation Officer (TX SHPO), administered by the Texas Historical Society (KHS). According to the NHPA, Indian tribes must also be consulted regarding any potential impact the proposal may have on tribal cultural and/or historical resources. RBS in consultation with the TX SHPO did not identify any tribes who are known to be interested in potential tribal cultural and/or historical resources in this area, therefore no tribes were consulted.

The National Register of Historic Places and its monthly supplements were reviewed to determine whether there are any listed properties located within the area affected by the TerraFuels Facility Proposal. There are no listed properties within at least of 5 miles of the facility. In addition, a request was submitted to the Texas Historical Commission, Department of Antiquities Protection for a review letter addressing the presence, location and potential impact upon any archeological or historical sites within or adjacent to the referenced facility and along the utility corridors. No historic properties were identified in the vicinity of the proposal.

RBS made a determination of no potential to effect historic resources based on consultation with the THC which indicated no properties within the vicinity of the undertaking. All utility corridors are proposed in within existing utility right-of-ways, which are presumed previously disturbed, or based on their location adjacent to the 31-acre property where no historic properties are expected to be located.

In a response letter dated August 9, 2011, the TX SHPO concurred with RBS's determination of no effect for the proposal. A copy of the agency request letters and associated correspondences received is included in Appendix I. Therefore, no adverse affect to historic resources is anticipated for this proposal.

#### **VII. Compliance with the Wild and Scenic Rivers Act**

The TerraFuels Facility will not affect a river or portion of a river which is either included in the National Wild and Scenic Rivers System or designated for potential addition to the system. The Rio Grande River in Big Bend National Park is the only designated such river system in Texas. The Facility is located over 450 miles from the designated river. As such, the facility is not within one-quarter mile of the banks of the river, will not withdraw water from or discharge water to the designated river, and is not visible from the river.

#### **VIII. Compliance with Endangered Species Act Federally Listed Species Analysis**

An evaluation of the USFWS regional listings for the potential to affect listed endangered (LE) or threatened (LT) species or critical habitat or adversely affect a proposed critical habitat for an endangered or threatened species or jeopardize the continued existence of a proposed endangered or threatened species was completed in March of 2011. The evaluation also looked at the potential for impacts to proposed endangered (PE) or threatened (PT) species of critical habitat (formerly referred to as Category II Species). Potential impacts to Candidates for Listing (C) (formerly referred to as Category I Species) were also evaluated.

Information for review was obtained from the Texas Parks and Wildlife Department (TPWD) regarding rare, threatened, and endangered species database for Galveston County

[http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered\\_species](http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species) and from the Texas Natural Diversity Database (TXNDD), a database providing publically available location specific data on rare, threatened, and endangered species, natural communities and other significant features of conservation concern to TPWD. Species within the LE/LT, PE/PT, or C categories were evaluated for their potential to be impacted by the Proposal. None of the evaluated species or their habitats are known or suspected to occur on the property to be developed by the facility.

An onsite environmental survey was conducted in March 22, 2011. The survey was conducted to identify any potential habitat for threatened and endangered species. The survey concluded that no species, potential habitat, or designated critical habitat was observed within the proposed project limits during the site visit. As such, no adverse impacts to these federally listed threatened or endangered species or their habitats are expected to occur as a result of the proposed project. RBS made a determination of no effect for federally listed threatened and endangered species to for the proposal on August 1, 2011, and forwarded a copy of this determination to the appropriate USFWS field office in accordance with Section 7 of the Endangered Species Act.

A request was made of the Wildlife Habitat Assessment Program (WHAP) to review this assessment. Based on the results of the evaluation and review by WHAP, no listed endangered or threatened species or critical habitat or proposed critical habitat for an endangered or threatened species will be affected by the Proposal. Documentation and correspondence related to this determination are provided in Appendix I.

#### **IX. Compliance with Farmland Protection Policy Act (FPPA), NRCS's Implementation Rule, and Departmental Regulation 9500-3 Land Use Policy**

The TerraFuels facility is located along the western boundary of Galveston County and near the Cities of Alvin and Santa Fe, Texas. The facility is not located within the city limits of Alvin or any other municipality. Accordingly, land use is not controlled by zoning in the area, and no permit for "non- conforming use" is required. Neither city nor Galveston County has a published map of land uses within their respective jurisdictions.

All tracts of land within the boundary of the Alvin Facility are currently undeveloped. According to the Galveston County Appraisal District records, the facility lands are currently listed as UN (Undeveloped) with State Property Tax Board (SPTB) designation C1 (Real Vacant Plotted Lots/tracts) (Property ID No. R231365) and E1 (Native Pasture / mostly clean) with SPTB designation D1 (Real Acreage Ranch Land) (Property ID No. R231355).

Pursuant to the Farmland Protection Policy Act (FPPA), the subject site was evaluated to document the presence or absence of important farmland (including prime farmland, farmland of statewide importance, unique farmland, or farmland of local importance). Based on the Web Soil Survey from the National Cooperative Soil Survey for the Facility, two soil types are present on the site: 1) Bernard clay loam (Be) with average slope of 0.2%; and 2) Bernard-Edna complex (Bn) with nearly level slope. The soils on the site are classified as “prime farmland”. The NRCS defines prime farmland soils in the Farmland Protection Act (7 CFR 658.2) as soils with an adequate and dependable source of water, favorable temperatures and growing season, acceptable acidity/alkalinity levels, few or no rocks, sufficient permeability for water and air, and slopes averaging zero to six percent. Review of the Survey denotes that the subject site is classified as “prime farmland if irrigated” (USDA-NRCS, 2011).

RBS, in conjunction with NRCS, completed NRCS’s AD-1006 Farmland Conversion Impact Rating Form in order to assess the proposed conversion of the 10 acres (Appendix II). The total points obtained for this site was 114 out of 260 total points, which indicated that according to the FPPA rule, it may be concluded that the area is already committed to urban development. The subject site already contains infrastructure improvements that are in place (i.e., natural gas, electrical transmission lines), in order to easily convert this parcel into a biorefinery. Therefore, the proposal is not anticipated to have a significant adverse effect to Farmland protected under the FPPA.

## **X. Compliance with Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands**

### **Floodplains**

According to the FEMA Flood Insurance Rate Map (FIRM) for the proposed site, the subject site is not located within a Special Flood Hazard Area or a 100-year or 500-year floodplain (See Appendix II for completed FEMA Form 81-93). Protection of adjacent floodplain areas, with respect to increase of impervious surfaces, will be ensured by adherence to the local stormwater management requirements for retention of stormwater and wastewater releases. As discussed in Section IV 11., there is not anticipated wastewater disposal at this biorefinery, therefore the stormwater managed by standard BMPs should ensure no adverse impact to adjacent floodplain areas. Therefore, the proposal is not expected to have any adverse effect to the 100-year floodplain or 500-year floodplain for critical actions.

### **Wetlands**

Wetland surveys were conducted in March and August of 2011 on the proposed 10-acre site to identify all potential waters of the U.S., including wetlands, which would be affected by the proposed site development, in accordance with Section 404 of the Clean Water Act and USDA’s Department Regulation (DR) 9500-3. The wetland survey revealed the presence of approximately 1.05 acre of forested-scrub/shrub wetlands as well as three man-made ponds (0.13, 0.11 and 0.07 acre in size) for a total of 1.36 acre of wetlands on the 10-acre property proposed for development (Figure 8).



According to USDA Departmental Regulation 9500-3, USDA agencies shall not assist in actions that would convert wetlands to other uses or encroach upon wetlands, unless (1) there is a demonstrated, significant need for the project, program, or facility, and (2) there are no practicable alternative actions or sites that would avoid the conversion or, if conversion is unavoidable, reduce the number of acres to be converted or encroached upon directly and indirectly. Therefore, these areas are to be avoided and are not proposed for impact in this proposal.

Due to the separation of the pond and wetland areas from the nearest jurisdictional water body, the unnamed tributary to Dickinson Bayou, the onsite wetlands and ponds may or may not be considered jurisdictional according to Section 404 of the Clean Water Act. The U.S. Army Corps of Engineers (USACE) has sole responsibility for making determinations as to the jurisdictional status of waters of the U.S. for Section 404 permitting purposes. However, the onsite wetlands meet the definition of wetlands, whether considered jurisdictional by the (USACE) or not, therefore they are to be protected in accordance with DR 9500-3. The three ponds located on the site are manmade and do not appear to have been constructed by damming a water of the U.S. therefore they would not be considered wetlands by RBS.

There were no water ways or other wetlands identified within the remaining 21 acres outside of the 10-acre property proposed for development, however only a preliminary feasibility study, and not a detailed wetland survey, was conducted on this area, so if future development is proposed in this area, a wetland survey would be required. One ditch is located just outside of the 21-acre property boundary to the south east. Review of the most recent and historic USGS 7.5 minute Algoa quadrangles indicates that, due to the shape and location of the contour lines surrounding this ditch, the ditch was likely originally a creek and was channelized prior to 1955. According to the wetland survey report, the ditch exhibited an ordinary high water mark (OHWM) and would, therefore, likely be considered a water of the U.S. by the USACE. The proposed site development would not directly affect this ditch.

Soils on the site are comprised primarily of the Bernard-Edna complex with a small area in the northwest corner comprised of Bernard clay loam. Neither soil is hydric for Galveston County, but they do include hydric components.

Impacts to the onsite wetlands and ponds is not proposed for this proposal by the construction of the biorefinery or its related utilities, as these areas have been avoided in accordance with the avoidance and minimization requirements specified in DR 9500-3 (Figure 9). If impacts to wetlands are proposed in future phases of this proposal, both the USDA and the USACE will need to be contacted to determine if practicable alternatives have been considered and/or to apply for applicable Section 404 authorizations.

## **XI. Compliance with Coastal Barrier Resources Act**

The proposed project is not located within areas protected by the Coastal Barrier Resources Act of

1972 (16 U.S. C part 3501 et. seq.). Therefore, the proposal will not have impacts to coastal areas protected by the Coastal Barrier Resources Act.

## **XII. State Environmental Policy Act**

The proposed project is not subject to a State Environmental Policy Act, as Texas does not have such a program or state regulatory requirement.

## **XIII. Consultation Requirements of Executive Order 12372, Intergovernmental Review of Federal Programs**

According to the U.S. Office of Management and Budget's website Texas does not occur on the Intergovernmental Review (SPOC List). Although Texas has chosen not to participate in the intergovernmental review process and therefore does not have a SPOC, in keeping with the requirements of EO 12372 RBS contacted the County of Galveston, and the City of Alvin Community Development. There were no adverse affects identified thought this consultation. Response letters from each agency are located in Appendix II.

## **XIV. Environmental Analysis of Participating Federal Agency**

There are no formal participating Federal Agency's for this Environmental Assessment (EA). However, as documented in Section X. Compliance with the Executive Order 11988, the USACE may complete a separate EA in conjunction with any proposed wetlands/waterway impact if the onsite wetlands are determined to be jurisdictional by the USACE.

## **XV. Reaction to Proposal**

A Preliminary Public Notice of RBS's review of the biorefinery for funding, to solicit comments from the public, was published in the two local papers, which serve the proposal area, on July 17<sup>th</sup>, 18<sup>th</sup>, and 19<sup>th</sup>, 2011, in the Galveston County Daily News and on July 21<sup>st</sup>, August 4<sup>th</sup> and 11<sup>th</sup>, 2011, in the La Prensa de Houston (Appendix III). The 30-day preliminary noticing period ends September 4<sup>th</sup>, 2011. During this time USDA RBS received one individual requests from the public to review materials related to the proposal.

A public comment was made regarding the potential for ammonia (NH<sub>3</sub>) to be released from its presence in the cooling water, if process water containing NH<sub>3</sub> were to be recycled as coolant. This concern was discussed with the TCEQ Air Quality Permitting official and is described in the Section IV. 1. Air Quality Section. TCEQ indicated that they have taken this concern up with TerraFuels and have determined that the process proposed will use enough tap water, and the NH<sub>3</sub> will be removed in prior steps of this process through evaporation that NH<sub>3</sub> emission should not be above levels that would induce toxicological levels. TCEQ indicated that it would also require a monitoring plan which would ensure that levels are below those that would cause a toxicological effect (personal communication Hima Draksharam of TCEQ, August 26, 2011).

No public meetings were held by RBS on this proposal. To our knowledge there have been no other negative comments or public views expressed about this proposal.

## **XVI. Cumulative Impacts**

This EA did not identify any significant impact to the human environment from cumulative impacts associated with this proposal.

## **XVII. Adverse Impact**

As previously discussed, this proposal includes the construction of the biorefinery within 10 acres of the proposed 31-acre proposal area, and related infrastructure, including a proposed approximate 5.5-mile long hydrogen gas pipe line (underground), 935-foot long natural gas line (underground), 270-foot long electrical connection (above ground), and 1,675-foot long proposed potable water line (underground), to be located on a 31-acre parcel adjacent and south of the Coastal Plains Recycling and Disposal Facility east of Alvin, TX.

As indicated above, no historic resources, wetlands, floodplains, or endangered or threatened species will be impacted on the 10-acre site, and are not anticipated to be impacted on the utility corridors. Although development of the property will result in the direct conversion of important farmland, the Proposal is compatible with Federal, State, local government, private programs and policies to protect farmland. If any of the above resources are identified in the construction of the utility corridors they will be compatible with all Federal, State, and local regulations and policies.

The proposal's construction activities will result in disturbed ground and vegetation and will temporarily produce dust and localized noise. The proposal will result in a minor adverse effect to local flora, fauna, and water quality due to construction and operation of the biorefinery and its associated utilities, however, the facility will be operated in accordance with applicable water quality permits.

Traffic will increase from the area due to shipment of green gasoline, but access to and from the site will be through the adjacent Coastal Plains Recycling and Disposal Facility Landfill property which already handles large trucks.

Indirect impacts will consist of a potential slight increase in air emissions in the area resulting from Facility operations. Air emissions will be monitored, and the facility will be operated in accordance with applicable air quality permits.

Implementation of this Proposal will not result in any significant adverse environmental impacts as defined Section 1508.27 of the Council on Environmental Quality (CEQ) regulations or in RD Instruction 1940.314(b). The proposal would have minor adverse effects to air quality, water quality, and local wildlife, however, it does not pose significant adverse effects to the natural or human environment.

## **XVIII. Alternatives**

### **1. No Action Alternative**

The no action alternative was considered, but due to the economic and regulatory benefits of the Proposal it was rejected. Waste Management will be able to provide a higher value margin for the PSMSW material, increase the life of the landfill, and achieve environmental benefits related to a reduction in GHG emissions. Valero will be able to capture a green gasoline product, required by the Renewable Fuel Standard II.

### **2. Off-site Alternatives**

Other landfill locations in the Houston and Galveston area have been considered, but they do not have enough land available and are further in distance from the refineries located along the Houston Ship Channel. In addition, limited pipeline infrastructure and utilities are available at the alternative locations. TerraFuels consulted with the land owners in the vicinity of the Landfill, which would make a feasible project location logistically with traffic and distance from the Landfill entrance. The majority of land available in the area has private ownership, and many of the owners were not open to selling. Waste Management owns much of land in the area, but it is either deemed as a buffer zone for the landfill, or it is targeted for future landfill expansion, and therefore is not a practicable alternative.

The 10-acre proposed TerraFuels site is ideally suited since it is near existing utility connections (water, natural gas, and electrical), is near the landfill operation so that the truck travel distance is minimal, and is not noticeable from the main public highway to the south.

## **XIX. Mitigation Measures**

No adverse environmental impacts which require mitigation have been identified associated with this Proposal. If impacts to wetlands are proposed in future phases of this proposal, or if this proposal changes and wetland impact is proposed, both the USDA and the USACE will need to be contacted to determine if practicable alternatives have been considered and/or to apply for applicable Section 404 authorizations.

## **XX. Consistency with USDA RBS under Public Law 103–354 Environmental Policies**

This Proposal is consistent with the RBS's environmental policies and the State Office's Natural Resource Management Guide. In accordance with §1940.304(a) (1) (iii), the Proposal includes practicable measures for reducing the adverse impacts to natural resources. TerraFuels has incorporated economically feasible water and energy-saving features and designs into the Proposal (§1940.304(f)) and will operate the facility in accordance with applicable air and water quality standards (§1940.304(h)).

**XXI. Environmental Determinations**

The following recommendations shall be completed:

A. Based on an examination and review of the foregoing information and such supplemental information attached hereto, I recommend that the approving official determine that this proposal will have ( ) a significant effect on the quality of the human environment and an Environmental Impact Statement must be prepared; will not have (X) a significant effect on the quality of the human environment.

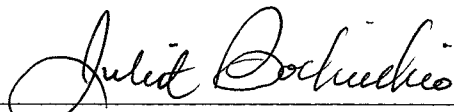
B. I recommend that the approving official make the following compliance determinations for the below-listed environmental requirements.

Not in compliance		In compliance		
			X	Clean Air Act.
			X	Federal Water Pollution Control Act.
			X	Safe Drinking Water Act—Section 1424(e).
			X	Endangered Species Act.
			X	Coastal Barrier Resources Act.
			X	Coastal Zone Management Act—Section 307(c) (1) and (2).
			X	Wild and Scenic Rivers Act.
			X	National Historic Preservation Act.
			X	Archeological and Historic Preservation Act.
			X	Subpart B, Highly Erodible Land Conservation
			X	Subpart C, Wetland Conservation, of the Food Security Act.
			X	Executive Order 11988, Floodplain Management.
			X	Executive Order 11990, Protection of Wetlands.
			X	Farmland Protection Policy Act.
			X	Departmental Regulation 9500-3, Land Use Policy.
			X	State Office Natural Resource Management Guide.

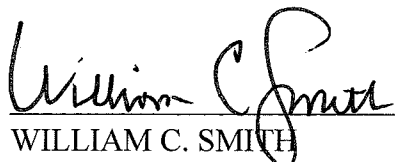
C. I have reviewed and considered the types and degrees of adverse environmental impacts identified by this assessment. I have also analyzed the proposal for its consistency with Rural Development under Public Law 103-354 environmental policies, particularly those related to important farmland protection, and have considered the potential benefits of the proposal. Based upon a consideration and balancing of these factors, I recommend from an environmental standpoint that the proposal

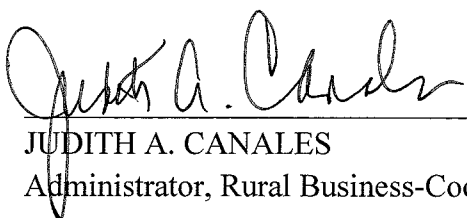
be approved.

not be approved because of the attached reasons.

Prepared by:  09/06/2011  
JULIET C. BOCHICCHIO Date  
Environmental Protection Specialist, Program Support Staff

Recommended:  9/6/2011  
LINDA J. RODGERS Date  
Director, Program Support Staff

Recommended:  9/6/2011  
WILLIAM C. SMITH Date  
Director, Energy Division, Rural Business-Cooperative Service

Approved:  9/6/11  
JUDITH A. CANALES Date  
Administrator, Rural Business-Cooperative Service

[49 FR 3727, Jan. 30, 1984, as amended at 53 FR 36266, Sept. 19, 1988]